FLIGHT CREW OPERATING MANUAL

A318/A319/A320/A321

FMGS

PILOT'S GUIDE

4

AIRBUS®

FOREWORD

R This manual complements the approved Flight Manual. Airbus has attempted to ensure that the data contained in this manual agrees with the data in the Flight Manual. If there is any disagreement, the Flight Manual is the final authority.

COMMENTS — QUESTIONS — SUGGESTIONS

All manual holders and users are encouraged to submit any Flight Crew Operating Manual questions and suggestions to :

R

AIRBUS - BP N°33
1 ROND POINT MAURICE BELLONTE
31707 BLAGNAC CEDEX - FRANCE
TELEX TLSBI7X or 530526F
FAX 33.5.61.93.44.65
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- STL

FOR TECHNICAL OR PROCEDURAL CONTENT

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FOR PRINTING AND DISTRIBUTION

NFC5-04-0010-001-A001AA

CONTENT

This manual provides operating crewmembers with information on the technical, procedural, and performance characteristics of the aircraft.
It is suitable for training purposes and may be used as a flight crew operating manual.
The content is divided into four volumes :

Vol 1 = Systems' description (description of the aircraft systems).
Vol 2 = Flight preparation (performance information, plus loading data).
Vol 3 = Flight operations (operating procedures, techniques, and performance information).
Vol 4 = FMGS pilot's guide (procedures for FMGS use).

USE

As a comprehensive set of references, the FCOM :
- can be used by an operator's flight operations department to supplement its own crew manual
- can be issued directly to crew members for training and subsequently for line operations.

R **WARNINGS, CAUTIONS AND NOTES**

R WARNING : an operating procedure, technique, etc, which may result in personel
R injury or loss of life if not carefully followed.
R CAUTION : an operating procedure, technique, etc, which may result in damage to
R equipment if not carefully followed.
R NOTE : an operating procedure, technique, etc, considered essential to emphasize.

COMPLEMENTARY INFORMATION

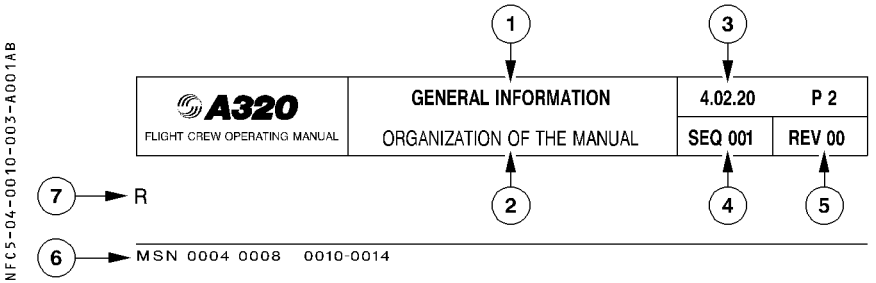
The manual includes technical information required for training as well as complementary information.
- Where a paragraph or schematic is preceded by the heading **FOR INFO** the details given are considered to be "nice to know". Knowledge of these items is not required for the type rating qualification.
- ECAM warnings and cautions are summarized in a table at the end of each chapter of volume 1. Numeric values are given for information only.

OPTIONAL EQUIPMENT

The legend "◁" indicates that a paragraph or a shematic is applicable only if the related equipment is installed.

PAGINATION

R



(1) Chapter title

(2) Subchapter title

(3) FCOM volume number, Chapter number, Section number, Page number

(4) Sequence number is used for Airbus Industrie management of different aircraft configurations and allows to enter into list of effective pages

(5) Revision number of the manual at which the page has been revised

(6) Aircraft MSN

R – 0004 0008 means that the page is applicable to aircraft MSN 004 and MSN 008

R – 0010-0014 means that the page is applicable to aircraft MSN 010 to MSN 0014

– ALL means that the page is applicable to all aircraft covered by the manual.

Correspondance between MSN and registration may be found in the cross reference table

(7) An “R” in front of a line indicates that the line has been revised.

REVISIONS

NORMAL REVISIONS

There are issued periodically to cover non-urgent corrections and changes, and to add new data.
They are accompanied by filing instructions and an updated List of Effective Pages that includes customized pages.
A normal revision record sheet is at the front of each volume.
In addition, each volume has a "List of MOD/MP affecting the manual", that gives a simple explanation of the technical content of each MOD/MP incorporated and its validity per aircraft.

R INTERMEDIATE REVISIONS

R They are issued between normal revisions to cover changes in the definition of the aircraft
R or changes in the composition of the fleet of an airline. They are numbered in ascending
R sequence e.g. 20A, 20B, 20C... for intermediate revisions issued between normal revisions
R 20 and 21.
R They are accompanied by filing instructions and an updated list of effective pages.

TEMPORARY REVISIONS

Printed on yellow paper these are, issued to cover urgent matters arising between normal revisions. They are accompanied by filing instructions and an updated customized list of effective TR.
A yellow temporary revision record sheet is at the front of each volume. It is to be filled by the FCOM's owner.

INCORPORATION OF SERVICE BULLETINS IN THE MANUAL

When a Service Bulletin (SB) has been accomplished on one or more aircraft of the operator fleet, and notified to Airbus Industrie, all affected manuals will reflect the new
R aircraft configuration at next revision. If judged necessary by Airbus Industrie, or requested by the operator, a "Temporary Revision" or an intermediate revision is issued between normal revisions.

OPERATIONS ENGINEERING BULLETINS

These are issued as the need arises to give operators revised or new, but significant, technical and procedural information.
OEBs come with an OEB record sheet. This record sheet is re-issued with each normal revision to update the bulletin embodiment status.
R They are accompanied by filing instructions and an updated customized list of effective OEB.

HOW TO INSERT A REVISION

FILING INSTRUCTIONS

Use the filing instructions as follows :

- REMOVE : The page must be removed. It may be replaced by a new page if associated with an "INSERT" instruction. If not, the page is cancelled.
- INSERT : The page must be inserted. If not associated with a "REMOVE" instruction, the page is new for the operator fleet and does not replace an existing one.

R The column "NOTE" indicates "EFFECTIVITY CHANGE ONLY" if the page is revised due
R to an effectivity change and not due to technical content.

LIST OF EFFECTIVE PAGES (LEP)

The manual after revision must comply with the LEP, which lists all the pages that are in the manual. The new pages are indicated by "N" and the revised pages by "R".

BEST WAY TO GET UPDATED DOCUMENTATION

As soon as any change has been completed on any airplane, the best way to get update documentation is to advise :
AIRBUS INDUSTRIE
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FRANCE
Telex : TLSBP7X.. or 530526F
R FAX 33.5.61.93.28.06
ATTN : Customer Service Directorate – Technical Documentation Services (AI/SE – D)
as soon as any change has been completed on any airplane.

To simplify automatic LEP processing some modifications have been grouped under a common code.

CODE	DESIGNATION
0001	Mod : 26716 or 26799 or 26968 or 27780 or 27831 or 27832 or 28416 or 30645 or 30646 or 30647
0002	Mod : 25240 or 25274 or 26968 or 27831 or 28283 or 28711 or 31364 or 31365
0003	Mod : 25381 or (25295 + 25381 + 28499) or (25381 + 27522 + 28360) or (25295 + 25381 + 27522 + 28360 + 28499)
0004	Mod : (25240 + 25295) or (25274 + 25295) or (25295 + 26968) or (25295 + 27522) or (25295 +28283) or (25295 + 28711) or (26968 + 27522) or (27522 + 27831) or (27522 + 28283) or (27522 + 28711) or (25295 + 31364) or (25295 + 31365) or(27522 + 31364) or (27522 + 31365) or (25295 + 27522 + 28360)
0005	Mod : 26716 or 26717 or 26799 or 26968 or 27780 or 27831 or 27832 or 28416 or 30645 or 30646 or 30647 or (25240 +26968) or (25274 + 26717)
0006	Mod : (24035 + 25863) or (24160 + 25863) or (24211 + 25863)
0007	Mod : 26093 or 26243 or 26716 or 26968 or 26799 or 27780 or 27831 or 27832 or 28416 or 30645 or 30646 or30647
0008	Mod : (25295 + 25381) or (25295 + 25381 + 27522) or (25295 + 25381 + 27522 + 28360)
0009	Mod : (25205 + 26093) or (25205 + 26243) or (25205 + 26716) or (25205 + 26799) or (25205 + 26968) or (25205 + 27780) or (25205 + 27831) or (25205 + 27832) or (25205 + 28416) or (26093 + 26111) or (26093 + 26999) or (26093 + 28382) or (26093 + 30241) or (26111 + 26243) or (26111 + 26716) or (26111 + 26799) or (26111 + 26968) or (26111 + 27780) or (26111 + 27831) or (26111 + 27832) or (26111 + 28416) or (26243 + 26999) or (26243 + 28382) or (26243 + 30241) or (26716 + 26999) or (26716 + 28382) or (26716 + 30241) or (26799 + 26999) or (26799 + 28382) or (26799 + 30241) or (26968 + 26999) or (26968 + 28382) or (26968 + 30241) or (26999 + 27780) or (26999 + 27831) or (26999 + 27832) or (26999 + 28416) or (27780 + 28382) or (27780 + 30241) or (27831 + 28382) or (27831 + 30241) or (27832 + 28382) or (27832 + 30241) or (28382 + 28416) or (28416 + 30241) or (30631 + 26093) or (30631 + 26243) or (30631 + 26716) or (30631 + 26799) or (30631 + 26968) or (30631 + 27780) or (30631 + 27831) or (30631 + 27832) or (30631 + 28416) or (30635 + 26093) or (30635 + 26243) or (30635 + 26716) or (30635 + 26799) or (30635 + 26968) or (30635 + 27780) or (30635 + 27831) or (30635 + 27832) or (30635 + 28416) or (25205 + 30645) or (25205 + 30646) or (25205 + 30647) or (26111 + 30645) or (26111 + 30646) or (26111 + 30647) or (26999 + 30645) or (26999 + 30646) or (26999 + 30647) or (28382 + 30645) or (28382 + 30646) or (28382 + 30647) or (30241 + 30645) or (30241 + 30646) or (30241 + 30647) or (30631 + 30645) or (30631 + 30646) or (30631 + 30647) or (30635 + 30645) or (30635 + 30646) or (30635 + 30647)
0010	Mod : 26497 or (25199 + 26497) or (25200 + 26497) or (25314 + 26497) or (25315 + 26497)
0011	Mod : (26968 + 26999 + 28238) or (26999 + 27831 + 28238)
0012	Mod : 24035 or 24160 or 24211 or (24035 + 25863 + 28551) or (24160 + 25863 + 28551) or (24211 + 25863 + 28551)

CODE	DESIGNATION
0013	Mod : (25205 + 26093) or (25205 + 26243) or (25205 + 26716) or (25205 + 26799) or (25205 + 26968) or (25205 + 27780) or (25205 + 27831) or (25205 + 27832) or (25205 + 28416) or (26093 + 26111) or (26093 + 26999) or (26093 + 28382) or (26093 + 30241) or (26111 + 26243) or (26111 + 26716) or (26111 + 26799) or (26111 + 26968) or (26111 + 27780) or (26111 + 27831) or (26111 + 27832) or (26111 + 28416) or (26243 + 26999) or (26243 + 28382) or (26243 + 30241) or (26716 + 26999) or (26716 + 28382) or (26716 + 30241) or (26799 + 26999) or (26799 + 28382) or (26799 + 30241) or (26968 + 26999) or (26968 + 28382) or (26968 + 30241) or (26999 + 27780) or (26999 + 27831) or (26999 + 27832) or (26999 + 28416) or (27780 + 28382) or (27780 + 30241) or (27831 + 28382) or (27831 + 30241) or (27832 + 28382) or (27832 + 30241) or (28382 + 28416) or (28416 + 30241) or (30631 + 26093) or (30631 + 26243) or (30631 + 26716) or (30631 + 26799) or (30631 + 26968) or (30631 + 27780) or (30631 + 27831) or (30631 + 27832) or (30631 + 28416) or (30635 + 26093) or (30635 + 26243) or (30635 + 26716) or (30635 + 26799) or (30635 + 26968) or (30635 + 27780) or (30635 + 27831) or (30635 + 27832) or (30635 + 28416) or (25205 + 30645) or (25205 + 30646) or (25205 + 30647) or (26111 + 30645) or (26111 + 30646) or (26111 + 30647) or (26999 + 30645) or (26999 + 30646) or (26999 + 30647) or (28382 + 30645) or (28382 + 30646) or (28382 + 30647) or (30241 + 30645) or (30241 + 30646) or (30241 + 30647) or (30631 + 30645) or (30631 + 30646) or (30631 + 30647) or (30635 + 30645) or (30635 + 30646) or (30635 + 30647) or (25274 + 26717 + 28382)
0014	Mod : 26093 or 26243 or 26716 or 26799 or 26968 or 27780 or 27831 or 27832 or 28283 or 28416 or 30645 or 30646 or 30647 or (25295 + 28499) or (25295 + 27522 + 28360 + 28499)
0015	Mod : 26093 or 26243 or 26716 or 26799 or 26968 or 27780 or 27831 or 27832 or 28416 or 30645 or 30646 or 30647
0016	Mod : (24035 + 24064) or (24035 + 24065) or (24035 + 24066) or (24035 + 24067) or (24064 + 24211) or (24065 + 24211) or (24067 + 24160) or (24067 + 24211)
0017	STD or Mod : (25381 + 28500) or (25295 + 25381 + 27522 + 28500) or (25295 + 25381 + 27522 + 28360 + 28500) or (25295 + 25381 + 27522 + 28360 + 28499 + 28500)
0018	Mod : (24064 + 25240) or (24064 + 26968) or (24064 + 28283) or (24065 + 28283) or (24066 + 25274) or (24066 + 27831) or (24066 + 28711) or (24067 + 25274) or (24067 + 27831) or (25240 + 26968) or (24064 + 31365) or (24066 + 31364)
0019	Mod : 26093 or 26243 or 26716 or 26717 or 26799 or 26968 or 27831 or 28416 or 27780 or 27832 or 30645 or 30646 or 30647
0020	Mod : 25199 or 25200 or 25314 or 25315 or (25199 + 26497 + 28290) or (25200 + 26497 + 28290) or (25314 + 26497 + 28290) or (25315 + 26497 + 28290)
0021	Mod : 23885 or 24075 or 25205 or 26111 or 26999 or 28382 or 30241
0022	Mod : 25205 or 26485 or 30631 (25204 + 28382) or (25204 + 26999) or (25204 + 30241) or (25204 + 30635) or (25294 + 28382) or (25294 + 26999) or (25294 + 30241) or (25294 + 30635) or (25204 + 26999 + 28495 + 28382) or (25294 + 26999 + 28382)
0023	Mod : (26111 + 26002) or (28218 + 28382) or (28218 + 26999) or (28218 + 30241) or (28218 + 30635) or (28218 + 26999 + 28495 + 28382)
0024	Mod : 26716 or 26717 or 26799 or 26968 or 27780 or 27831 or 27832 or 28416 or 30645 or 30646 or 30647

CODE	DESIGNATION
0025	Mod : (25205 + 26093) or (25205 + 26243) or (25205 + 26716) or (25205 + 26799) or (25205 + 26968) or (25205 + 27780) or (25205 + 27831) or (25205 + 27832) or (25205 + 28416) or (26093 + 26111) or (26093 + 26999) or (26093 + 28382) or (26093 + 30241) or (26111 + 26243) or (26111 + 26716) or (26111 + 26799) or (26111 + 26968) or (26111 + 27780) or (26111 + 27831) or (26111 + 27832) or (26111 + 28416) or (26243 + 26999) or (26243 + 28382) or (26243 + 30241) or (26716 + 26999) or (26716 + 28382) or (26716 + 30241) or (26717 + 30241) or (26799 + 26999) or (26799 + 28382) or (26799 + 30241) or (26968 + 26999) or (26968 + 28382) or (26968 + 30241) or (26999 + 27780) or (26999 + 27831) or (26999 + 27832) or (26999 + 28416) or (27780 + 28382) or (27780 + 30241) or (27831 + 28382) or (27831 + 30241) or (27832 + 28382) or (27832 + 30241) or (28382 + 28416) or (28416 + 30241) or (30631 + 26093) or (30631 + 26243) or (30631 + 26716) or (30631 + 26799) or (30631 + 26968) or (30631 + 27780) or (30631 + 27831) or (30631 + 27832) or (30631 + 28416) or (30635 + 26093) or (30635 + 26243) or (30635 + 26716) or (30635 + 26799) or (30635 + 26968) or (30635 + 27780) or (30635 + 27831) or (30635 + 27832) or (30635 + 28416) or (25205 + 30645) or (25205 + 30646) or (25205 + 30647) or (26111 + 30645) or (26111 + 30646) or (26111 + 30647) or (26999 + 30645) or (26999 + 30646) or (26999 + 30647) or (28382 + 30645) or (28382 + 30646) or (28382 + 30647) or (30241 + 30645) or (30241 + 30646) or (30241 + 30647) or (30631 + 30645) or (30631 + 30646) or (30631 + 30647) or (30635 + 30645) or (30635 + 30646) or (30635 + 30647)
0026	Mod : 25240 or 25274 or 26968 or 27831 or 28711 or (24309 + 25240 + 28497) or (24309 + 25274 + 28497) or (24309 + 26968 + 28497) or (24309 + 27831+ 28497) or (24309 + 28497 + 28711)
0027	Mod : (msn 2000 + 25346) or (msn 2000 + 24414) or (msn 2000 + 24735)
0028	Mod : (25240 + 25295) or (25274 + 25295)
0029	Mod : 26093 or 26243 or 26716 or 26799 or 26968 or 27780 or 27831 or 27832 or 28416 or 30645 or 30646 or 30647
0030	Mod : (25240 + 25295) or (25274 + 25295) or (25295 + 26968) or (25295 + 27522) or (25295 + 27831) or (25295 + 28283) or (25295 + 28711) or (26968 + 27522) or (27522 + 27831) or (27522 + 28283) or (27522 + 28711) or (25295 + 27522 + 28360)
0031	Mod : 24414 or (24035 + 24414) or (24211 + 24414)
0033	Mod : 25345 or 25346 or (23742 + 25345) or (23742 + 25346)
0036	Mod : (25295 + 26243) or (25295 + 26968) or (25295 + 27831) or (25295 + 28283) or (25295 + 28711) or (26968 + 27522) or (27522 + 27831) or (27522 + 28283) or (27522 + 28711) or (25295 + 27522 + 28360)
0037	STD or Mod : (25295 + 28499) or (27522 + 28360) or (25295 + 27522 + 28360 + 28499)
0038	Mod : 25295 or 27522 or (25295 + 27522) or (25295 + 27522 + 28360)
0039	Mod : 26093 or 26243 or 26716 or 26717 or 26799 or 26968 or 27780 or 27831 or 27832 or 28416 or 30645 or 30646 or 30647

CODE	DESIGNATION
0040	Mod : (25205 + 26093) or (25205 + 26243) or (25205 + 26716) or (25205 + 26799) or (25205 + 26968) or (25205 + 27780) or (25205 + 27831) or (25205 + 27832) or (25205 + 28416) or (26093 + 26111) or (26093 + 26999) or (26093 + 28382) or (26111 + 26243) or (26111 + 26716) or (26111 + 26717) or (26111 + 26799) or (26111 + 26968) or (26111 + 27780) or (26111 + 27831) or (26111 + 27832) or (26111 + 28416) or (26243 + 26999) or (26243 + 28382) or (26716 + 26999) or (26716 + 28382) or (26717 + 26999) or (26717 + 28382) or (26799 + 26999) or (26799 + 28382) or (26968 + 26999) or (26968 + 28382) or (26999 + 27780) or (26999 + 27831) or (26999 + 27832) or (26999 + 28416) or (26093 + 30241) or (26243 + 30241) or (26716 + 30241) or (26799 + 30241) or (26968 + 30241) or (27780 + 28382) or (27780 + 30241) or (27831 + 28382) or (27831 + 30241) or (27832 + 28382) or (26717 + 30635) or (27832 + 30241) or (28382 + 28416) or (28416 + 30241) or (30631 + 26093) or (30631 + 26243) or (30631 + 26716) or (26717 + 30631) or (30631 + 26799) or (30631 + 26968) or (30631 + 27780) or (30631 + 27831) or (30631 + 27832) or (30631 + 28416) or (30635 + 26093) or (30635 + 26243) or (30635 + 26716) or (30635 + 26799) or (30635 + 26968) or (30635 + 27780) or (30635 + 27831) or (30635 + 27832) or (27780 + 30241) or (27831 + 30241) or (30635 + 28416) or (25205 + 30645) or (25205 + 30646) or (25205 + 30647) or (26111 + 30645) or (26111 + 30646) or (26111 + 30647) or (26999 + 30645) or (26999 + 30646) or (26999 + 30647) or (28382 + 30645) or (28382 + 30646) or (28382 + 30647) or (30241 + 30645) or (30241 + 30646) or (30241 + 30647) or (30631 + 30645) or (30631 + 30646) or (30631 + 30647) or (30635 + 30645) or (30635 + 30646) or (30635 + 30647)
0041	Mod : 25205 or 26111 or 26999 or 28382 or 30241
0042	Mod : 25314 or 25315 or 25199 or 25200 or 25274 or 25240 or 27832 or 26716 or 27831or 28416 or 27780 or 26799 or 26968 or 30645 or 30646 or 30647
0043	STD or (28378+31896) or (28378+31897)
0044	STD or (28378+31896) or (28378+31897) or (28238+31896) or (28238+31897)
0045	Mod : 24064 or 24065 or 24066 or 24067 or (28238+31896) or (28238+31897)
R 0046 R	Mod : (25346+31896) or (24414+31896) or (24735+31896) or (25346+31897) or (24414+31897) or (24735+31897) or (25346 + 31897)
0047	Mod : (28238+31896) or (28238+31897)
R 0049	Mod : 26111 or (26999 + 28218) or (28382 + 28218) or (30241 + 28218) or (30631 + 28218) or (30635 + 28218) or (28495 + 28218)
R 0050 R	Mod : 25205 or (28495 + 26001) or (26999 + 26001) or (28382 + 26001) or (30241 + 26001) or (30631 + 26001) + (30635 + 26001)
R 0051 R	Mod : 27620 or (27620 + 32332) or (27620 + 32333)
R 0052 R	Mod : 31896 or 31897 or 32401 or 32402 or 32475
R 0053 R	Mod : (27620 + 31896) or (27620 + 31897) or (27620 + 32401) or (27620 + 32402) or (27620 + 32475)
R 0054 R	Mod : 24105 or (24105 + 31364 + 31906) or (24105 + 31365 + 31905) or (24105 + 32332 + 31905) or (24105 (24105 + 32333 + 31906)
R 0055 R	STD or Mod : (31896 + 32332) or (31897 + 32333)
R 0056 R	Mod : 26968 or 27831 or 28283 or 28711 or 31364 or 31365 or (31896 + 32332) or (31897 + 32333)
R 0057 R	Mod : (24035 + 31896) or (24035 + 31897) or (24035 + 32401) or (24035 + 32402) or (24035 + 32475) or (24160 + 31896) or (24160 + 31897) or (24160 + 32401) or (24160 + 32402) or (24160 + 32475) or (24211 + 31896) or (24211 + 31897) or (24211 + 32401) or (24211 + 32402) or (24211 + 32475) or (24035 + 31896 + 32332 + 32475) or (24160 + 31896 + 32332 + 32475) or (24211 + 31896 + 32332 + 32475)
R 0058 R	Mod : 24035 or 24160 or 24211 or (24035 + 31896 + 32332) or (24035 + 31897 + 32333) or (24160 + 31896 + 32332) or (24160 + 31897 + 32333) or (24211 + 31896 + 32332) or (24211 + 31897 + 32333)

CODE	DESIGNATION
0059	Mod : 24035 or 24160 or 24211 or (24035 + 32475) or (24160 + 32475) or (24211 + 32475) or (24035 + 31896 + 32332) or (24035 + 31896 + 32402) or (24035 + 31897 + 32333) or (24035 + 31897 + 32401) or (24160 + 31896 + 32332) or (24160 + 31896 + 32402) or (24160 + 31897 + 32333) or (24160 + 31897 + 32401) or (24211 + 31896 + 32332) or (24211 + 31896 + 32402) or (24211 + 31897 + 32333) or (24211+ 31897 + 32401)
0060	Mod : 28238 or 30748 or (28238 + 31896 + 32332) or (28238 + 31897 + 32333) or (30748 + 31896 + 32332) or (30748 + 31897 + 32333)
0061	Mod : 28238 or (28238 + 31896 + 32332) or (28238 + 31897 + 32333)
0062	Mod : 31896 or 31897 or (24035 + 31896) or (24035 + 31897) or (24160 + 31896) or (24160 + 31897) or ((24211 + 31896) or (24211 + 31897)
0063	Mod : (28238 + 31896) or (28238 + 31897) or (28238 + 32401) or (28238 + 32402) or (28238 + 32475) or (30748 + 31896) or (30748 + 31897) or (30748 + 32401) or (30748 + 32402) or (30748 + 32475) or (28238 + 31896 + 32332 + 32475) or (30748 + 31896 + 32332 + 32475)
0064	STD or Mod : (28238 + 31896) or (28238 + 31897) or (28238 + 32401) or (28238 + 32402) or (28238 + 32475) or (28238 + 31896 + 32332 + 32475)
0065	Mod : 31896 or 31897 or 32402 or 32401 or 32475 or (31896 + 32402) or (31897 + 32401) or (31896 + 32332 + 32475)
0066	Mod : 32475 or 32401 or 32402 or (31896+32402) or (31897+32401) or (23353 + 32475) or (31896 + 32332 + 32475) or (23353 + 28498 + 32475) or (23353 + 31896 + 32402) or (23353 + 31897 + 32401) or (23353 + 31896 + 32332 + 32475) or (23353 + 28498 + 31986 + 32332 + 32475)
0067	Mod : 32475 or 32401 or 32402 or (31896 + 32402) or (31897 + 32401) or (31896 + 32332 + 32475)
0068	Mod : (31896 + 27620) or (31897 + 27620) or (32402 + 27620) or (32401 + 27620) or (32475 + 27620) or (31896 + 32332 + 32475 + 27620)
0069	Mod : 32475 or 32401 or 32402 or (31896 + 32402) or (31897 + 32401) or (31896 + 32332 + 32475) or (32475 + 24035) or (32401 + 24035) or (32402 + 24035) or (31896 + 32402 + 24035) or (31897 + 32401 + 24035) or (31896 + 32332 + 32475 + 24035) or (32475 + 24160) or (32401 + 24160) or (32402 + 24160) or (31896 + 32402 + 24160) or (31897 + 32401 + 24160) or (31896 + 32332 + 32475 + 24160) or (32475 + 24211) or (32401 + 24211) or (32402 + 24211) or (31896 + 32402 + 24211) or (31897 + 32401 + 24211) or (31896 + 32332 + 32475 + 24211)
0070	Mod : 31579 or 31580 or 31896 or 31897 or 32401 or 32402 or 32475 or (31896 + 32332 + 32475)
0071	STD or Mod : (28238 + 31896) or (28238 + 31897) or (28238 + 32401) or (28238 + 32402) or (28238 + 32475) or (28378 + 31896) or (28378 + 31897) or (28378 + 32401) or (28378 + 32402) or (28378 + 32475) or (28238 + 31896 + 32332 + 32475) or (28378 + 31896 + 32332 + 32475)
0072	Mod : 28378 or (28378 + 31896 + 32332) or (28378 + 31897 + 32333)
0073	Mod : 31579 or 31580 or 31896 or 31897 or 32401 or 32402 or 32475 or (31579 + 31896 + 32332) or (31580 + 31897 + 32333) or (31896 + 32332 + 32475)
0074	Mod : 23353 or (23353 + 31896 + 32332) or (23353 + 31897 + 32333)
0075	Mod : 31896 or 31897 or (23353 + 31896) or (23353 + 31897)
0076	Mod : 31896 or 31897 or 32401 or 32402 or 32475 or (31896 + 32402) or (31897 + 32401) or (23353 + 28498 + 31896) or (23353 + 28498 + 31897) or (23353 + 28498 + 32475) or (31896 + 32332 + 32475) or (23353 + 28498 +31896 + 32332 + 32475)
0077	Mod : (28238 + 31896) or (28238 + 31897) or (28238 + 32401) or (28238 + 32402) or (28238 + 32475) or (28238 + 31896 + 32332 + 32475)

CODE	DESIGNATION
0078	Mod : (28378 + 31896) or (28378 + 31897) or (28378 + 32401) or (28378 + 32402) or (28378 + 32475) or (28378 + 31896 + 32332 + 32475)
0079	Mod : (27831 + 28960) or (27831 + 28960 + 31897 + 32333)
0080	Mod : (25295 + 27831 + 28960) or (25295 + 27831 + 28960 + 31897 + 32333)
0081	Mod : (27531 + 31896) or (27531 + 31897) or (27531 + 32401) or (27531 + 32402) or (27531 + 32475) or (27531 + 31896 + 32332 + 32475)
0082	Mod : 25295 or 27522 or (25295 + 27522) or (25295 + 27522 + 28360) or (25295 + 31896 + 32332) or (25295 + 31897 + 32333) or (27522 + 31896 + 32332) or (27522 + 31897 + 32333) or (25595 + 27522 +31896 + 32322) or (25595 + 27522 +31897 + 32323)
0083	STD or Mod : (25295 + 28499) or (27522 + 28360) or (31896 + 32332) or (31897 + 32333) or (25295 + 27522 + 28360 + 28499)
0084	Mod : 27531 or (27531 + 31896 + 32332) or (27531 + 31897 + 32333)
0085	Mod : (27522 + 31896) or (27522 + 31897) or (27522 + 32401) or (27522 + 32402) or (27522 + 32475) or (27522 + 31896 + 32332 + 32475)
0086	Mod : 27522 or (27522 + 31896 + 32332) or (27522 + 31897 + 32333)
0087	STD or Mod : 32475 or (31896 + 32332) or (31896 + 32402) or (31897 + 32333) or (31897 + 32401)
0088	STD or Mod : (28378 + 32401) or (28378 + 32402) or (28378 + 32475) or (28238 + 32401) or (28238 + 32402) or (28238 + 32475) or (28378 + 31896 + 32402) or (28378 + 31897 + 32401) or (28238 + 31896 + 32402) or (28238 + 31897 + 32401) or (28960 + 31897 + 32401) or (28378 + 31896 + 32332 + 32475) or (28238 + 31896 + 32332 + 32475) or (27831 + 28960 + 31897 + 32401)
0089	Mod : 27620 or (27620 + 31896 + 32332) or (27620 + 31897 + 32333)
0090	Mod : 32262 or 32766 or (23593 + 32262) or (23593+32766) or (23593 + 27256 + 28829 + 32262) or (23593 + 27256 + 28829 + 32766) or (23593 + 27541 + 28829 + 32262) or (23593 + 27541 + 28829 + 32766)
0091	STD or Mod : (24105 + 31364) or (24105 + 31365) or (24105 + 31896) or (24105 + 31897) or (24105 + 32475)
0092	Mod : 31896 or 31897 or (28238 + 31896) or (28238 + 31897) or (27831 + 28960 + 31897)
0093	STD or Mod : 32401 or 32402 or 32475 or (31896+ 32332) or (31897+ 32332) or (28378 + 32475) or (28238 + 32401) or (28238 + 32402) or (28238 + 32475) or (28378 + 31896 + 32402) or (28378 + 31897 + 32401) or (28238 + 31896 + 32402) or (28238 + 31897 + 32401) or (28960 + 31897 + 32401) or (28378 + 31896 + 32332 + 32475) or (28238 + 31896 + 32332 + 32475)
0094	Mod : 31896 or 31897 or (28238 + 31896) or (28238 + 31897) or (28378 + 31869) or (28378 + 31897)
0095	Mod : 32401 or 32402 or 32475 or (31896 + 32402) or (31897 + 32401) or (31896 + 32332 + 32475)
0096	Mod : 26968 or 27831 or 28283 or 28711 or (31896 + 32332) or (31897 + 32333) or (24309 + 28497) or (24309 + 26968 + 28497) or (24309 + 27831 + 28497) or (24309 + 28283 + 28497) or (24309 + 28497 + 28711) or (24309 + 28497 + 31896 + 32332) or (24309 + 28497 + 31897 + 32333)
0097	STD or Mod : (24309 + 28497) or (24309 + 28497 + 31896 + 32332) or (24309 + 28497 + 31897 +32333)
0098	STD or Mod : 24309 or (24309 + 31896 + 32332) or (24309 + 31897 +32333)
0099	STD or Mod : 23353 or (23353 + 31896 + 32332) or (23353 + 31897 +32333)
0100	STD or Mod : (26999 + 28495) or (31896 + 32332) or (31897 + 32333) or (26999 + 28495 + 31896 + 32332) or (26999 + 28495 + 31897 + 32333) or (26999 + 28495 + 28382 + 31896 + 32332) or (26999 + 28495 + 28382 + 31897 + 32333)

CODE	DESIGNATION
0101	Mod : 25205 or 26111 or 26485 or 26999 or 28382 or 30241 or 30631 or 30635 or (25205 + 31896 + 32332) or (25205 + 31897 + 32333) or (26111 + 31896 + 32332) or (26111 + 31897 + 32333) or (26485 + 31896 + 32332) or (26485 + 31897 + 32333) or (26999 + 28382 + 28495) or (26999 + 31896 + 32332) or (26999 + 31897 + 32333) or (28382 + 31896 + 32332) or (28382 + 31897 + 32333) or (30241 + 31896 + 32332) or (30241 + 31897 + 32333) or (30631 + 31896 + 32332) or (30631+ 31897 + 32333) or (30635 + 31896 + 32332) or (25205 + 26999 + 28495) or (30635 + 31897 + 32333) or (26999 + 28382 + 28495 + 31896 + 32332) + (26999 + 28382 + 28495 + 31897 + 32332)
0102	Mod : 23885 or 24075 or 25205 or 26111 or 26485 or 26999 or 28382 or 30241 or 30631 or 30635 or (25205 + 31896 + 32332) or (25205 + 31897 + 32333) or (26111 + 31896 + 32332) or (26111 + 31897 + 32333) or (26485 + 31896 + 32332) or (26485 + 31897 + 32333) or (26999 + 28382 + 28495) or (26999 + 31896 + 32332) or (26999 + 31897 + 32333) or (28382 + 31896 + 32332) or (28382 + 31897 + 32333) or (30241 + 31896 + 32332) or (30241 + 31897 + 32333) or (30631 + 31896 + 32332) or (30631+ 31897 + 32333) or (30635 + 31896 + 32332) or (30635 + 31897 + 32333) or (23885 + 24075 + 26999 + 28495) or (26999 + 28382 + 28495 + 31896 + 32332) or (26999 + 28382 + 28495 + 31897 + 32333)
0105	Mod : (25295 + 25381) or (25295 + 25381 + 27522) or (25295 + 25381 + 27522 + 28360) or (25295 + 25381 + 31896 + 32332) or (25295 + 25381 + 31897 + 32333) or (25295 + 25381 + 27522 + 31896 + 32332) or (25295 + 25381 + 27522 + 31897 + 32333) or (25295 + 25381 + 27522 + 28360 + 31896 + 32332) or (25295 + 25381 + 27522 + 28360 + 31897 + 32333)
0106	STD or Mod : (25381 + 28500) or (31896 + 32332) or (31897 + 32332) or (25295 + 25381 + 27522 + 28500) or (25381 + 28500 + 31896 + 32332) or (25381 + 28500 + 31897 + 32333) or (25295 + 25381 + 27522 + 28360 + 28500) or (25295 + 28381 + 27522 + 28360 + 28499 + 28500) or (25295 + 25381 + 27522 + 28500 + 31896 + 32332) or (25295 + 25381 + 27522 + 28500 + 31897 + 32333) or (25295 + 25381 + 27522 + 28360 + 28500 + 31896 + 32332) or (25295 + 25381 + 27522 + 28360 + 28500 + 31897 + 32333) or (25295 + 25381 + 27522 + 28360 + 28499 + 28500 + 31896 + 32332) or (25295 + 28381 + 27522 + 28360 + 28499 + 28500 + 31897 + 32333)
0107	Mod : 25381 or (25295 + 25381 + 28499) or (25381 + 27522 + 28390) or (25381+ 31896 + 32332) or (25381 + 31897 + 32333) or (25295 + 25381 + 27522 + 28360 + 28499) or (25295 + 25381 + 28499 + 31896 + 32332) or (25295 + 25381 + 28499 + 31897 + 32333) or (25381 + 27522 + 28390 + 31896 + 32332) or (25381 + 27522 + 28390 + 31897 + 32333) or (25295 + 25381 + 27522 + 28360 + 28499 + 31896 + 32332) or (25295 + 25381 + 27522 + 28360 + 28499 + 31897 + 32333)
0108	Mod : 22013 or 24105 or 25225 or (22013 + 31896 + 32332) or (22013 + 31897 + 32333) or (24105 + 31896 + 32332) or (24105 + 31897 + 32333) or (25225 + 31896 + 32332) or (25225 + 31897 + 32333)
0109	Mod : 24309 or (24309 + 31896 + 32332) or (24309 + 31897 + 32333)
0110	Mod : (26968 + 26999 + 28238) or (26999 + 27831 + 28238) or (26999 + 28238 + 32332) or (26999 + 28238 + 32333) or (26968 + 26999 + 28238 + 31896 + 32332) or (26999 + 27831 + 28238 + 31897 + 32333)
0111	STD or Mod : 26111 or (31896 +32332) or (31897 + 32333) or (26111 + 31896 + 32332) or (26111 + 31897 + 32333) or (26495 + 28218 + 31896 + 32332) or (26999 + 28495 + 31896 + 32332) or (26999 + 28495 + 31897 + 32333) or (28218 + 26999 + 28495 + 28382) or (28218 + 26999 + 28495 + 28382 + 31896 + 32332) or (28218 + 26999 + 28495 + 28382 + 31897 + 32333)
0112	Mod : 23885 or 24075 or (24075 + 26999 + 28495 + 28885)
0113	STD or Mod : (23353 + 28498) or (23353 + 28498 + 31896 + 32332) or (23353 + 28498 + 31897 + 32333)

CODE	DESIGNATION
0114	Mod : 25205 or 26485 or 30631 or (25204 + 28382) or (25204 + 26999) or (25204 + 30241) or (25204 + 30635) or (25294 + 28382) or (25294 + 26999) or (25294 + 30241) or (25294 + 30635) or (25205 + 31896 + 32332) or (25205 + 31897 + 32333) or (26485 + 31896 + 32332) or (26485 + 31897 + 32333) or (30631 + 31896 + 32332) or (30631 + 31897 + 32333) or (26999 + 28495 + 25205) or (26001 + 26495 + 31896 + 32332) or (26001 + 26495 + 31897 + 32333) or (26001 + 26999 + 31896 + 32332) or (26001 + 26999 + 31897 + 32333) or (26001 + 28382 + 31896 + 32332) or (26001 + 28382 + 31897 + 32333) or (26001 + 30241 + 31896 + 32332) or (26001 + 30241 + 31897 + 32333) or (26001 + 30631 + 31896 + 32332) or (26001 + 30631 + 31897 + 32333) or (26001 + 26999 + 28382 + 28495) or (25204 + 26999 + 28495 + 28382) or (25294 + 26999 + 28495 + 28382) or (25204 + 28382 + 31896 + 32332) or (25204 + 26999 + 31896 + 32332) or (25204 + 30241 + 31896 + 32332) or (25204 + 30635 + 31896 + 32332) or (25294 + 28382 + 31896 + 32332) or (25294 + 26999 + 31896 + 32332) or (25294 + 30241 + 31896 + 32332) or (25294 + 30635 + 31896 + 32332) or (25204 + 28382 + 31897 + 32333) or (25204 + 26999 + 31897 + 32333) or (25204 + 30241 + 31897 + 32333) or (25204 + 30635 + 31897 + 32333) or (25294 + 28382 + 31897 + 32333) or (25294 + 26999 + 31897 + 32333) or (25294 + 30241 + 31897 + 32333) or (25294 + 30635 + 31897 + 32333) or (26999 + 28495 + 25205 + 31896 + 32332) or (26999 + 28495 + 25205 + 31897 + 32333) or (25204 + 26999 + 28495 + 28382 + 31896 + 32332) or (25204 + 26999 + 28495 + 28382 + 31897 + 32333) or (25294 + 26999 + 28495 + 28382 + 31896 + 32332) or (25294 + 26999 + 28495 + 28382 + 31897 + 32333) or (26001 + 26999 + 28382 + 28495 + 31896 + 32332) or (26001 + 26999 + 28382 + 28495 + 31897 + 32333)
0115	Mod : (25205 + 31896) or (25205 + 31897) or (26111 + 31896) or (26111 + 31897) or (26485 + 31896) or (26485 + 31897) or (26999 + 31896) or (26999 + 31897) or (28382 + 31896) or (28382 + 31897) or (30241 + 31896) or (30241 + 31897) or (30631 + 31896) or (30631 + 31897) or (30635 + 31896) or (30635 + 31897) or (26999 + 28382 + 28495 +31896) or (26999 + 28382 + 28495 +31897)
0116	Mod : (25205 + 32475) or (26111 + 32475) or (26485 + 32475) or (26999 + 32475) or (28382 + 32475) or (30241 + 32475) or (30631 + 32475) or (30635 + 32475) or (25205 + 31896 + 32402) or (26111 + 31896 + 32402) or (26999 + 31896 + 32402) or (26485 + 31896 + 32402) or (28382 + 31896 + 32402) or (30241 + 31896 + 32402) or (30631 + 31896 + 32402) or (30635 + 31896 + 32402) or (26999 + 31897 + 32401) or (28382 + 31897 + 32401) or (30241 + 31897 + 32401) or (30631 + 31897 + 32401) or (30635 + 31897 + 32401) or (25205 + 31896 + 32332 + 32475) or (26111 + 32896 + 32332 + 32475) or (26485 + 32896 + 32332 + 32475) or (26999 + 28382 + 28494 + 32475) or (28382 + 31896 + 32332 + 32475) or (30241 + 31896 + 32332 + 32475) or (30631 + 31896 + 32332 + 32475) or (30635 + 31896 + 32332 + 32475) or (26999 + 28382 + 28495 + 31896 + 32402) or (26999 + 28495 + 28382 + 31897 + 32401) or (26999 + 28382 + 28495 + 31896 + 32332 + 32475)
0117	Mod : 31896 or 31897 or (26999 + 28495 + 31896) or (26999 + 28495 + 31897)
0118	Mod : 31475 or (31896 + 32402) or (31897 + 32401) or (26999 + 28495 + 32475) or (31896 + 32332 + 32475) or (26999 + 28495 + 31896 + 32402) or (26999 + 28495 + 31897 + 32401) or (26999 + 28495 + 31896 + 32332 + 32475)
0120	Mod : 25205 or 26111 or 26485 or 26999 or 28382 or 30241 or 30631 or 30635 or 26485 or (26999 + 28382 + 28495) or (25205 + 26999 + 28495)
0121	Mod : (24309 + 31896) or (24309 + 31897) or (24309 + 32475) or (24309 + 32401) or (24309 + 32402) or (24309 + 28497 + 32475) or (24309 + 28497 + 31896) or (24309 + 28497 + 31897) or (31896 + 24309 + 28497) or (31897 + 24309 + 28497) or (32475 + 24309 + 28497) or (24309 + 31896 + 32332 + 32475) or (24309 + 28497 + 31896 + 32332 + 32475) or (31896 + 32332 + 32475 + 24309 + 28497)
0122	Mod : 31896 or 31897 or 32401 or 32402 or 32475 or (24309 + 31896) or (24309 + 31897) or (24309 + 32401) or (24309 + 32402) or (24309 + 32475) or (24309 + 28497 + 31896) or (24309 + 28497 + 31897) or (24309 + 28497 + 32401) or (24309 + 28497 + 32402) or (24309 + 28497 + 32475) or (31896 + 32332 + 32475) or (24309 + 31896 + 32332 + 32475) or (24309 + 28497 + 31896 + 32332 + 32475)

CODE	DESIGNATION
0123	Mod : 31896 or 31897 or 32475 or (26999 + 28495 + 31896) or (26999 + 28495 + 31897) or (26999 + 28495 + 32475) or (31896 + 32332 + 32475) or (31896 + 26999 + 28382 + 28495) or (26999 + 28382 + 28495 + 31897) or (26999 + 28495 + 31896 + 32332 + 32475)
0124	Mod : (25205 + 31896) or (25205 + 31897) or (25205 + 32475) or (26111 + 31896) or (26111 + 31897) or (26111 + 32475) or (26999 + 31896) or (26999 + 31897) or (26999 + 32475) or (28382 + 31896) or (28382 + 31897) or (28382 + 32475) or (30241 + 31896) or (30241 + 31897) or (30241 + 32475) or (30631 + 31896) or (30631 + 31897) or (30631 + 32475) or (30635 + 31896) or (30635 + 31897) or (30635 + 32475) or (25205 + 31896 + 32332 + 32475) or (26111 + 31896 + 32332 + 32475) or (26485 + 31896 + 32332 + 32475) or (26999 + 28382 + 28495 + 31896) or (26999 + 28382+ 28495 + 31897) or (26999 + 28382 + 28495 + 32475) or (26999 + 31896 + 32332 + 32475) or (28382 + 31896 + 32332 + 32475) or (30241 + 31896 + 32332 + 32475) or (30631 + 31896 + 32332 + 32475) or (30635 + 31896 + 32332 + 32475) or (25205 + 26999 + 28495 + 32475) or (26999 + 28382 + 28495 + 31896 + 32332 + 32475)
0125	Mod : (25295 + 31896) or (25295 + 31897) or (25295 + 32401) or (25295 + 32402) or (25295 + 32475) or (27522 + 31896) or (27522 + 31897) or (27522 + 32401) or (27522 + 32402) or (27522 + 32475) or (31896 + 32332 + 32475) or (25295 + 31896 + 32332 + 32475) or (27522 + 31896 + 32332 + 32475)
0126	Mod : 31896 or 32332 or 32475 or (25381 + 28500 + 31896) or (25381 + 28500 + 31897) or (25381 + 28500 + 31897) or (31896 + 31897 + 32475) or (25295 + 25381 + 27522 + 28500 + 31896) or (25295 + 25381 + 27522 + 28500 + 32332) or (25295 + 25381 + 27522 + 28500 + 32475) or (25381 + 28500 + 31896 + 31897 + 32475) or (25295 + 25381 + 27522 + 28360 + 28500 + 31896) or (25295 + 25381 + 27522 + 28360 + 28500 + 31897) or (25295 + 25381 + 27522 + 28360 + 28500 + 32475) or (25295 + 25381 + 27522 + 28360 + 28499 + 28500 + 31896) or (25295 + 25381 + 27522 + 28360 + 28499 + 28500 + 31897) or (25295 + 25381 + 27522 + 28360 + 28499 + 28500 + 32475) or (25295 + 25381 + 27522 + 28500 + 31896 + 32332 + 32475) or (25295 + 25381 + 27522 + 28360 + 28500 + 31896 + 32332 + 32475) or (25295 + 25381 + 27522 + 28360 + 28499 + 28500 + 31896 + 32332 + 32475)
0127	Mod : (25381 + 31896) or (25381 + 31897) or (25381 + 32475) or (25295 + 25381 + 28499 + 31896) or (25295 + 25381 + 28499 + 31897) or (25395 + 25381 + 28499 + 32475) or (27522 + 25381 + 28360 + 31896) or (27522 + 25381 + 28360 + 31897) or (27522 + 25381 + 28360 + 32475) or (25381 + 31896 + 32332 + 32475) or (25295 + 25381 + 27522 + 28360 + 28499 + 31896) or (25295 + 35381 + 27522 + 28360 + 28499 + 31897) or (25295 + 35381 + 27522 + 28360 + 28499 + 32475) or (25295 + 25381 + 28499 + 31896 + 32332 + 32475) or (25381 + 27522 + 28360 + 31891 + 31897 + 32475) or (25295 + 25381 + 27522 + 28360 + 28499 + 31896 + 32332 + 32475)
0128	Mod : (25295 + 25381 + 31896) or (25295 + 25381 + 31897) or (25295 + 25381 + 32475) or (25295 + 25381 + 27522 + 31896) or (25295 + 25381 + 27522 + 31897) or (25295 + 25381 + 27522 + 32475) or (25295 + 25381 + 27522 + 28390 + 31896) or (25295 + 25381 + 27522 + 28390 + 32332) or (25295 + 25381 + 27522 + 28390 + 32475) or (25395 + 25381 + 31896 + 32332 + 32475) or (25295 + 25381 + 27522 + 31896 + 32332 + 32475) or (25295 + 25381 + 27522 + 28360 + 31896 + 32332 + 32475)
0129	Mod : (22013 + 31896) or (22013 + 31897) or (22013 + 32401) or (22013 + 32402) or (22013 + 32475) or (24105 + 31896) or (24105 + 31897) or (24105 + 32401) or (24105 + 32402) or (24105 + 32475) or (25225 + 31896) or (25225 + 31897) or (25225 + 32401) or (25225 + 32402) or (25225 + 32475) or (22013 + 31896 +32332 + 32475) or (24105 + 31896 + 32332 + 32475) or (25225 + 31896 + 32332 + 32475)

CODE	DESIGNATION
0130	Mod : (26968 + 26999 + 28238 + 31896) or (26999 + 27831 + 28238 + 31897) or (26999 + 27381 + 28238 + 32475) or (26968 + 26999 + 28238 + 31896 + 32332 + 32475) or (26999 + 27831 + 28238 + 31897 + 32333 + 32475)
0131	Mod : 31896 or 31897 or 32475 or (26111 + 31896) or (26111 + 31897) or (26111 + 32475) or (26999 + 28218 + 32475) or (26999 + 28495 + 31896) or (26999 + 28495 + 31897) or (26999 + 28495 + 32475) or (31896 + 32332 + 32475) or (26111 + 31896 + 32332 + 32475) or (26999 + 28495 + 31896 + 32332 + 32475) or (28218 + 26999 + 28495 + 28382 + 31896) or (28218 + 26999 + 28495 + 28382 + 31897) or (28218 + 26999 + 28495 + 28382 + 32475) or (28218 + 26999 + 28495 + 28382 + 31896 + 32332 + 32475)
0132	Mod : (25205 + 31896) or (25205 + 31897) or (25205 + 32475) or (25204 + 28382 + 31896) or (25204 + 28382 + 31897) or (25204 + 28382 + 32475) or (25204 + 26999 + 31896) or (25204 + 26999 + 31897) or (25204 + 26999 + 32475) or (25204 + 30241 + 31896) or (25204 + 30241 + 31897) or (25204 + 30241 + 32475) or (25204 + 30635 + 31896) or (25204 + 30635 + 31897) or (25204 + 30635 + 32475) or (25294 + 28382 + 31896) or (25294 + 28382 + 31897) or (25294 + 28382 + 32475) or (25294 + 26999 + 31896) or (25294 + 26999 + 31897) or (25294 + 26999 + 32475) or (25294 + 30241 + 31896) or (25294 + 30241 + 31897) or (25294 + 30241 + 32475) or (25294 + 30635 + 31896) or (25294 + 30635 + 31897) or (25294 + 30635 + 32475) or (25204 + 28382 + 31896 + 32332 + 32475) or (25204 + 26999 + 31896 + 32332 + 32475) or (25204 + 30241 + 31896 + 32332 + 32475) or (25204 + 30635 + 31896 + 32332 + 32475) or (25294 + 28382 + 31896 + 32332 + 32475) or (25294 + 26999 + 31896 + 32332 + 32475) or (25294 + 30241 + 31896 + 32332 + 32475) or (25294 + 30635 + 31896 + 32332 + 32475) or (25204 + 26999 + 28495 + 28382 + 31896) or (25204 + 26999 + 28495 + 28382 + 31897) or (25204 + 26999 + 28495 + 28382 + 32475) or (25294 + 26999 + 28495 + 28382 + 31896) or (25294 + 26999 + 28495 + 28382 + 31897) or (25294 + 26999 + 28495 + 28382 + 32475) or (24105 + 25294 + 26999 + 28382 + 28495 + 32475) or (25204 + 26999 + 28495 + 28382 + 31896 + 32332 + 32475) or (25294 + 26999 + 28495 + 28382 + 31896 + 32332 + 32475) or (26001 + 26999 + 28382 + 28495 + 31896 + 31897 + 32475)
0133	STD or Mod :(24309 + 28497) or (24309 + 28497 + 31897 + 32333) or (24309 + 28497 + 31896 + 32332)
0151	Mod : 24035 or 24160 or (24189 + 24211) or (24189 + 24211)

R

N°	ISSUE DATE	
00	APR 1992	
01	JUN 1992	
02	SEP 1993	
03	JUN 1994	
04	SEP 1995	
05	MAR 1997	
06	APR 1998	
07	DEC 1998	
08	SEP 1999	
09	MAR 2000	
10	SEP 2000	
11	APR 2001	
12	OCT 2001	
13	MAR 2002	
14	DEC 2002	

N°	TITLE	STATUS	LOCATION
To be filled by the operator, if needed.			

THIS TABLE GIVES, FOR EACH AIRCRAFT INCLUDED IN THE MANUAL, THE CROSS REFERENCE BETWEEN :

- THE MANUFACTURING SERIAL NUMBER (MSN) WHICH APPEARS IN THE LIST OF EFFECTIVE PAGES

- THE REGISTRATION NUMBER OF THE AIRCRAFT AS KNOWN BY AIRBUS INDUSTRIE.

MSN	REGISTRATION
1068	OO-SSB
1145	OO-SSF

V	CH	SEC	---PAGE--	SEQ	--REV--	----VALIDATION CRITERIA----- ----------REASONS OF CHANGE----------
4	02	20	002	100	REV014	CODE:0101

- INCORPORATION OF MOD 25205
- INCORPORATION OF MOD 26111
- INCORPORATION OF MOD 26485
- INCORPORATION OF MOD 26999
- INCORPORATION OF MOD 28495
- INCORPORATION OF MOD 30241
- INCORPORATION OF MOD 30631
- INCORPORATION OF MOD 30635
- TECHNICAL AMENDMENT
  1)"Required" and "Estimated" navigation accuracy values have be revised to reflect more realistic Enroute values on the MCDU, in accordance with the EFIS ND display.

4	02	20	003	100	REV008	CODE:0101

- INCORPORATION OF MOD 26485
- INCORPORATION OF MOD 28495
- INCORPORATION OF MOD 30631
- INCORPORATION OF MOD 30635

4	02	20	006	100	REV011	CODE 0056

- INCORPORATION OF MOD 31364
- INCORPORATION OF MOD 31365
- DELETION OF MOD 25240
- DELETION OF MOD 25274

4	02	20	007	100	REV011	CODE 0056

- INCORPORATION OF MOD 31364
- INCORPORATION OF MOD 31365
- DELETION OF MOD 25240
- DELETION OF MOD 25274

4	02	20	009	001	REV014	CODE 0055

- TECHNICAL AMENDMENT
  1)The missing reference to the LATERAL FUNCTIONS chapter 4.04 has been added.

4	02	20	011	001	REV014	CODE 0055

- TECHNICAL AMENDMENT
  1)Switching conditions from the CRUISE phase to the DESCENT phase are modified to reflect the actual behavior of the A320 FMS Legacy.

4	02	20	014	100	REV006	CODE 0002

- DELETION OF MOD 25240
- DELETION OF MOD 25274

4	02	20	014	100	REV014	CODE 0056

- TECHNICAL AMENDMENT
  1)The CG is not considered for the BEST TARGET SPEED computation.

V CH SEC	---PAGE--	SEQ	--REV--	----VALIDATION CRITERIA----- REASONS OF CHANGE
4 02 20	015	100	REV007	CODE 0002
				- DELETION OF MOD 25240 - DELETION OF MOD 25274
4 02 20	015	100	REV014	CODE 0056
				- TECHNICAL AMENDMENT 1)Addition of a note regarding the OPTIMUM FLIGHT LEVEL (OPT FL) computed by the FMS : differences between the FCOM/QRH and the FMS value may be observed, and wind entries made at different altitudes may affect the FMS-computed OPTIMUM FLIGHT LEVEL.
4 02 20	016	100	REV012	CODE 0056
				- INCORPORATION OF MOD 26968 - INCORPORATION OF MOD 27831 - INCORPORATION OF MOD 28283 - INCORPORATION OF MOD 28711 - INCORPORATION OF MOD 31364 - INCORPORATION OF MOD 31365
4 02 20	018	001	REV014	CODE 0055
				- TECHNICAL AMENDMENT 1)No technical change. The sequence number was changed to ensure the correct page validation for all customers.
4 02 20	022	001	REV014	
				- TECHNICAL AMENDMENT 1)Reference to required distance to land and direct distance to destination have been removed, as they are already described in the corresponding MCDU DES PROG page description section.
4 02 30	002	001	REV014	CODE 0055
				- TECHNICAL AMENDMENT 1)Addition of a note for selecting the LOC* and LOC modes by using the FCU's LOC pushbutton, rather than the APPR pushbutton, in case of a LOC only approach.
4 02 30	007	100	REV006	CODE 0002
				- DELETION OF MOD 25240 - DELETION OF MOD 25274
4 02 30	007	100	REV014	CODE 0056
				- TECHNICAL AMENDMENT 1)Page revised to clarify the DESCENT SPEED PROFILE definition.

V CH SEC ---PAGE-- SEQ	--REV-- ----VALIDATION CRITERIA----- ----------REASONS OF CHANGE----------
4 02 30 010	001 REV014
	- TECHNICAL AMENDMENT 1)When in a holding pattern, the aircraft will respect the altitude constraints as well as the FCU selected altitude.
4 02 30 012	001 REV014
	- TECHNICAL AMENDMENT 1)The APPROACH MODES have been clarified to introduce the precision and non-precision approach concept. Furthermore, the LOC and LOC B/C approach types are clarified to highlight that the APPR pushbutton is not used to arm the LOC guidance mode, but the LOC pushbutton is.
4 03 00 001	001 REV014 CODE:0055
	- TECHNICAL AMENDMENT 1)Contents update.
4 03 10 002	110 REV014 CODE 0033
	- TECHNICAL AMENDMENT 1)Addition of information to reflect that the PFD's altitude display in metric units is an "as installed" item.
4 03 20 003	100 REV011 CODE 0002
	- DELETION OF MOD 25240 - DELETION OF MOD 25274
4 03 20 004	100 REV006 CODE 0002
	- DELETION OF MOD 25240 - DELETION OF MOD 25274
4 03 20 005	100 REV011 CODE 0002
	- DELETION OF MOD 25240 - DELETION OF MOD 25274
4 03 20 008	100 REV006 CODE 0002
	- DELETION OF MOD 25240 - DELETION OF MOD 25274
4 03 20 009	100 REV011 CODE 0002
	- DELETION OF MOD 25240 - DELETION OF MOD 25274
4 03 20 010	100 REV006 CODE 0002
	- DELETION OF MOD 25240 - DELETION OF MOD 25274

V CH SEC	---PAGE--	SEQ	--REV--	----VALIDATION CRITERIA----- REASONS OF CHANGE
4 03 20	011	100	REV008	CODE 0002 - DELETION OF MOD 25240 - DELETION OF MOD 25274
4 03 20	012	001	REV014	CODE:0055 - TECHNICAL AMENDMENT 1)After first engine start, the FMGS computes predictions based on the FQI FOB (FAC as backup), and not on the BLOCK entry.
4 03 20	014	100	REV008	CODE 0002 - DELETION OF MOD 25240 - DELETION OF MOD 25274
4 03 20	015	100	REV006	CODE 0002 - DELETION OF MOD 25240 - DELETION OF MOD 25274
4 03 20	026	001	REV014	CODE:0055 - TECHNICAL AMENDMENT 1)No technical change. The sequence number was changed to ensured correct page validation for all customers.
4 03 20	032	105	REV011	CODE 0096 - INCORPORATION OF MOD 28283 - DELETION OF MOD 25240 - DELETION OF MOD 25274
4 03 20	033	100	REV007	CODE 0002 - DELETION OF MOD 25240 - DELETION OF MOD 25274
4 03 20	052	100	REV014	CODE:0101 - INCORPORATION OF MOD 26485 - INCORPORATION OF MOD 28495 - INCORPORATION OF MOD 30631 - INCORPORATION OF MOD 30635 - TECHNICAL AMENDMENT 1)Page updated to further specify the aircraft definition : GPS PRIMARY Function is installed.
4 03 20	053	100	REV011	CODE:0101 - INCORPORATION OF MOD 25025 - INCORPORATION OF MOD 26485 - INCORPORATION OF MOD 28495 - INCORPORATION OF MOD 30631 - INCORPORATION OF MOD 30635 - DELETION OF MOD 23885 - DELETION OF MOD 24075 - DELETION OF MOD 25205

V CH SEC ---PAGE-- SEQ --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

4 03 20 054 100 REV014 CODE:0101

- INCORPORATION OF MOD 25205
- INCORPORATION OF MOD 26111
- INCORPORATION OF MOD 26485
- INCORPORATION OF MOD 26999
- INCORPORATION OF MOD 28382
- INCORPORATION OF MOD 28495
- INCORPORATION OF MOD 30241
- INCORPORATION OF MOD 30631
- INCORPORATION OF MOD 30635
- TECHNICAL AMENDMENT
  1)Page created to further specify the aircraft definition : The "DESELECT/SELECT GPS 5L" key is installed.

4 03 20 055 105 REV009 CODE:0102

- INCORPORATION OF MOD 26485
- INCORPORATION OF MOD 28495
- INCORPORATION OF MOD 30631

4 03 20 056 100 REV014 CODE 0082

- TECHNICAL AMENDMENT
  1)No technical change.
  The sequence number was changed to ensure the correct page validation for all customers.

4 03 20 060 100 REV014 CODE 0082

- TECHNICAL AMENDMENT
  1)Information has been moved to the next page for pagination purposes.

4 03 20 061 100 REV014 CODE 0082

- TECHNICAL AMENDMENT
  1)Information has been moved from the previous page for pagination purposes.
  2)If the uplinked TOW/TOCG differs from an already existing TOW/TOCG, the INSERT UPLINK* prompt is not displayed.

4 03 20 071 001 REV014 CODE:0055

- TECHNICAL AMENDMENT
  1)Clarification of the conditions for displaying or blanking the MCDU PERF fields.

4 03 20 072 100 REV006 CODE 0002

- DELETION OF MOD 25240
- DELETION OF MOD 25274

4 03 20 073 100 REV006 CODE 0002

- DELETION OF MOD 25240
- DELETION OF MOD 25274

V CH SEC ---PAGE-- SEQ --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

4 03 20 080 100 REV014 CODE:0101

- INCORPORATION OF MOD 25205
- INCORPORATION OF MOD 26111
- INCORPORATION OF MOD 26485
- INCORPORATION OF MOD 26999
- INCORPORATION OF MOD 28495
- INCORPORATION OF MOD 30241
- INCORPORATION OF MOD 30631
- INCORPORATION OF MOD 30635
- TECHNICAL AMENDMENT
  1)The "Required" and "Estimated" navigation accuracy values have been changed on the PROG CRUISE and PROG DES pages to be consistent with the current navigation mode (GPS PRIMARY) in the Enroute area.

4 03 20 081 100 REV014 CODE:0056

- INCORPORATION OF MOD 27831
- INCORPORATION OF MOD 28283
- INCORPORATION OF MOD 28711
- INCORPORATION OF MOD 31364
- INCORPORATION OF MOD 31365
- TECHNICAL AMENDMENT
  1)Page revised to indicate that the maximum REC MAX value is FL391 instead of FL390.

4 03 20 082 100 REV014 CODE:0101

- INCORPORATION OF MOD 25205
- INCORPORATION OF MOD 26111
- INCORPORATION OF MOD 26485
- INCORPORATION OF MOD 26999
- INCORPORATION OF MOD 28495
- INCORPORATION OF MOD 30241
- INCORPORATION OF MOD 30631
- INCORPORATION OF MOD 30635
- TECHNICAL AMENDMENT
  1)The "Required" navigation accuracy field has been revised to reflect more realistic TERMINAL area values on the MCDU PROG page.

4 03 20 083 100 REV014 CODE:0101

- INCORPORATION OF MOD 25205
- INCORPORATION OF MOD 26111
- INCORPORATION OF MOD 26485
- INCORPORATION OF MOD 26999
- INCORPORATION OF MOD 28495
- INCORPORATION OF MOD 30241
- INCORPORATION OF MOD 30631
- INCORPORATION OF MOD 30635
- TECHNICAL AMENDMENT
  1)Reference to the FCOM Volume 1 replaces previous reference to the FCOM Volume 4.

4 03 20 084 100 REV006 CODE:0114

- INCORPORATION OF MOD 24105
- INCORPORATION OF MOD 25294

V CH SEC ---PAGE--	SEQ --REV--	----VALIDATION CRITERIA----- REASONS OF CHANGE
4 03 20 084	100 REV006	CODE:0114 - INCORPORATION OF MOD 28495 - DELETION OF MOD 25205 - DELETION OF MOD 30241
4 03 20 085	100 REV006	CODE:0114 - INCORPORATION OF MOD 24105 - INCORPORATION OF MOD 25294 - INCORPORATION OF MOD 28495 - DELETION OF MOD 25205 - DELETION OF MOD 30241
4 03 20 089	105 REV006	CODE 0002 - DELETION OF MOD 25240 - DELETION OF MOD 25274
4 03 30 001	001 REV014	CODE:0055 - TECHNICAL AMENDMENT 1)The conditions for displaying the "ALIGN IRS" message have been clarified.
4 04 00 001	001 REV006	CODE 0055 - TECHNICAL AMENDMENT 1)Index tailored to FMS2 Thales/Smiths (rev 1).
4 04 10 014	001 REV014	CODE 0055 - TECHNICAL AMENDMENT 1)The MCDU screens have been changed to reflect the actual holding pattern and correct display. Text has also been modified for improved technical understanding.
4 04 10 015	001 REV014	CODE 0055 - TECHNICAL AMENDMENT 1)When in a holding pattern, the aircraft will respect the altitude constraints as well as the FCU selected altitude.
4 04 10 021	001 REV014	CODE 0055 - TECHNICAL AMENDMENT 1)Page modified for better technical understanding.
4 04 10 022	001 REV014	CODE 0055 - TECHNICAL AMENDMENT 1)Page modified for better technical understanding.
4 04 10 030	001 REV014	 - TECHNICAL AMENDMENT 1)The PROG page displayed as an

V	CH	SEC	---PAGE--	SEQ	--REV--	----VALIDATION CRITERIA----- ----------REASONS OF CHANGE----------
						example was amended to show a more realistic situation.
4	04	20	003	100	REV006	CODE 0002 - DELETION OF MOD 25240 - DELETION OF MOD 25274
4	04	20	004	100	REV006	CODE 0002 - DELETION OF MOD 25240 - DELETION OF MOD 25274
4	04	20	005	100	REV006	CODE 0002 - DELETION OF MOD 25240 - DELETION OF MOD 25274
4	04	20	006	100	REV011	CODE 0002 - DELETION OF MOD 25240 - DELETION OF MOD 25274
4	04	20	007	100	REV006	CODE 0002 - DELETION OF MOD 25240 - DELETION OF MOD 25274
4	04	20	008	100	REV006	CODE 0002 - DELETION OF MOD 25240 - DELETION OF MOD 25274
4	04	30	003	001	REV014	- TECHNICAL AMENDMENT 1)"PROCEDURES" item has been modified : if there is an AMSL Altitude constraint above the transition altitude in the departure procedure, the crew must convert it into STD before insertion in the MCDU. 2)The sequence number was changed to ensure the correct page validation for all customers.
4	04	30	010	001	REV014	CODE 0055 - TECHNICAL AMENDMENT 1)No technical change. The sequence number was changed to ensure the correct page validation for all customers.
4	04	30	017	001	REV014	CODE 0055 - TECHNICAL AMENDMENT 1)The reference to "Multifunction Control and Display Unit" has been amended to read "MCDU".
4	04	30	018	001	REV014	CODE 0055 - TECHNICAL AMENDMENT 1)No technical change. The sequence number was changed to ensure the

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V CH SEC ---PAGE-- SEQ --REV-- ----VALIDATION CRITERIA-----
                               ----------------------REASONS OF CHANGE--------------------
-------------------------------------------------------------------------------------------
                         correct page validation for all
                         customers.

4 04 30  021       001 REV014  CODE 0055

                      - TECHNICAL AMENDMENT
                        1)The reference to "Multifunction
                          Control and Display Unit" has been
                          amended to read "MCDU".

4 05 10  003       100 REV006  CODE 0002

                      - DELETION OF MOD 25240
                      - DELETION OF MOD 25274

4 05 10  004       100 REV006  CODE 0002

                      - DELETION OF MOD 25240
                      - DELETION OF MOD 25274

4 05 10  007       100 REV006  CODE 0002

                      - DELETION OF MOD 25240
                      - DELETION OF MOD 25274

4 05 10  008       100 REV006  CODE 0002

                      - DELETION OF MOD 25240
                      - DELETION OF MOD 25274

4 05 10  010       100 REV007  CODE 0002

                      - DELETION OF MOD 25240
                      - DELETION OF MOD 25274

4 05 10  010       100 REV014  CODE 0056

                      - TECHNICAL AMENDMENT
                        1)The note about altitude constraint
                          entries has been clarified.

4 05 10  014       001 REV014  CODE 0055

                      - TECHNICAL AMENDMENT
                        1)Page modified for better technical
                          understanding.

4 05 10  021       100 REV014  CODE 0058

                      - TECHNICAL AMENDMENT
                        1)During cockpit preparation, the PERF
                          CLB page is accessed by pressing the
                          "NEXT PHASE" prompt on the PERF
                          TAKEOFF page, not by the MCDU "NEXT
                          PAGE" key.

4 05 10  022       100 REV014  CODE 0058

                      - TECHNICAL AMENDMENT
                        1)Access to the PERF CRZ page has been
                          clarified.

4 05 30  006       001 REV014

                      - TECHNICAL AMENDMENT
                        1)No technical change. The sequence
```

V CH SEC ---PAGE-- SEQ --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

number was changed to ensure the correct page validation for all customers.

4 05 40 001 001 REV014 CODE 0055

- TECHNICAL AMENDMENT
  1)Page modified for better technical understanding.
  2)Addition of missing information on the PERF CLB screen.

4 05 50 003 100 REV014 CODE:0101

- INCORPORATION OF MOD 26485
- INCORPORATION OF MOD 28495
- INCORPORATION OF MOD 30631
- INCORPORATION OF MOD 30635
- TECHNICAL AMENDMENT
  1)FCOM page revised to reflect the correct MCDU display corresponding to the procedure.

4 05 50 011 100 REV006 CODE 0002

- DELETION OF MOD 25240
- DELETION OF MOD 25274

4 05 60 008 001 REV014 CODE 0055

- TECHNICAL AMENDMENT
  1)No technical change. The sequence number has changed to ensure correct validity for all customers.

4 05 70 001 001 REV014 CODE 0055

- TECHNICAL AMENDMENT
  1)The PERF DES page has been revised to add missing information : Time/Distance predictions to FL025 are also available for the ECON mode.

4 05 70 007 110 REV008 CODE 0010

- DELETION OF MOD 25199

4 05 70 009 001 REV014 CODE 0055

- TECHNICAL AMENDMENT
  1)The CAUTION has been slightly modified to provide the correct message "CHECK APPR GUIDANCE".

4 05 70 015 001 REV014 CODE 0055

- TECHNICAL AMENDMENT
  1)No technical change. The sequence number has changed to ensure correct validity for all customers.

4 05 70 027 001 REV014

- TECHNICAL AMENDMENT
  1)A caution is added to advise the crew not to select the APPR pushbutton for

V CH SEC ---PAGE-- SEQ --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

a LOC only approach.

4 06 20 006 001 REV014 CODE 0055

- TECHNICAL AMENDMENT
  1)No technical change.
  The sequence number has changed to ensure correct validity for all customers.

4 06 20 007 001 REV014 CODE 0064

- TECHNICAL AMENDMENT
  1)No technical change.
  The sequence number has been changed to ensure correct validity for all customers.

4 06 20 008 001 REV014 CODE:0055

- TECHNICAL AMENDMENT
  1)No technical change.
  The sequence number has changed to ensure correct validity for all customers.

M	V	CH	SEC	---PAGE--	SEQ	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
M	V	CH	SEC	---PAGE--	SEQ	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
	4	00	00	001-2	001	REV007		ALL
	4	00	10	001	001	REV013	ORGANIZATION OF THE MANUAL	ALL
	4	00	10	002	001	REV006	ORGANIZATION OF THE MANUAL	
	4	00	10	003	001	REV007	ORGANIZATION OF THE MANUAL	ALL
	4	00	10	004	001	REV007	ORGANIZATION OF THE MANUAL	
	4	00	10	005	001	REV007	ORGANIZATION OF THE MANUAL	ALL
R	4	00	20	001	001	REV014	LIST OF CODES	ALL
R	4	00	20	002	001	REV014	LIST OF CODES	
R	4	00	20	003	001	REV014	LIST OF CODES	ALL
R	4	00	20	004	001	REV014	LIST OF CODES	
N	4	00	20	005	001	REV014	LIST OF CODES	ALL
N	4	00	20	006	001	REV014	LIST OF CODES	
N	4	00	20	007	001	REV014	LIST OF CODES	ALL
N	4	00	20	008	001	REV014	LIST OF CODES	
N	4	00	20	009	001	REV014	LIST OF CODES	ALL
N	4	00	20	010	001	REV014	LIST OF CODES	
R	4	00	30	001	001	REV014	LIST OF NORMAL REVISIONS	ALL
	4	00	35	001	001	REV006	RECORD OF TEMPORARY REVISION	ALL
R	4	00	36	001	001	REV014	LIST OF EFFECTIVE TEMPO.REVI	ALL
R	4	00	70	001	001	REV014	CROSS REFERENCE TABLE	ALL
R	4	00	75	001	001	REV014	HIGHLIGHTS	ALL
R	4	00	80	001	001	REV014	LIST OF EFFECTIVE PAGES	ALL
R	4	00	85	001	001	REV014	LIST OF MODIFICATIONS	ALL
	4	01	00	001	001	REV006		ALL
	4	01	10	001	001	REV006		ALL
	4	01	10	002	001	REV006		
	4	02	00	001	001	REV006		ALL
	4	02	10	001	001	REV006		ALL
N	4	02	20	001	001	REV006		ALL
N	4	02	20	002	100	REV014	CODE:0101	
	4	02	20	003	100	REV008	CODE:0101	ALL
	4	02	20	004	001	REV010	CODE 0055	
	4	02	20	005	001	REV006		ALL
	4	02	20	006	100	REV011	CODE 0056	
	4	02	20	007	100	REV011	CODE 0056	ALL
	4	02	20	008	001	REV006	CODE 0055	

M	V	CH	SEC	---PAGE--	SEQ	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
M	V	CH	SEC	---PAGE--	SEQ	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
R	4	02	20	009	001	REV014	CODE 0055	ALL
R	4	02	20	010	001	REV006		
R	4	02	20	011	001	REV014	CODE 0055	ALL
R	4	02	20	012	001	REV006	CODE 0055	
R	4	02	20	013	001	REV006		ALL
R	4	02	20	014	100	REV014	CODE 0056	
N	4	02	20	015	100	REV014	CODE 0056	ALL
N	4	02	20	016	100	REV012	CODE 0056	
N	4	02	20	017	001	REV006	CODE 0064	ALL
N	4	02	20	018	001	REV014	CODE 0055	
	4	02	20	019	001	REV006		ALL
	4	02	20	020	001	REV006		
N	4	02	20	021	001	REV006		ALL
N	4	02	20	022	001	REV014		
R	4	02	30	001	001	REV006		ALL
R	4	02	30	002	001	REV014	CODE 0055	
	4	02	30	003	100	REV006	M:24035 OR 24160 OR 24211	ALL
	4	02	30	004	100	REV006	M:24035 OR 24160 OR 24211	
	4	02	30	005	100	REV006	CODE 0059	ALL
	4	02	30	006	001	REV006		
R	4	02	30	007	100	REV014	CODE 0056	ALL
R	4	02	30	008	001	REV006		
N	4	02	30	009	001	REV006		ALL
N	4	02	30	010	001	REV014		
R	4	02	30	011	100	REV006	M:24035 OR 24160 OR 24211	ALL
R	4	02	30	012	001	REV014		
	4	02	30	013	100	REV008	M:24035=24160=24211	ALL
R	4	03	00	001	001	REV014	CODE:0055	ALL
R	4	03	00	002	001	REV006	CODE:0055	
R	4	03	10	001	105	REV008	M:27541=(27256+27541)	ALL
R	4	03	10	002	110	REV014	CODE 0033	
	4	03	10	003	001	REV013		ALL
	4	03	10	004	120	REV006	M.24035=24160=(24189+24211)	
	4	03	10	005	001	REV006		ALL
	4	03	20	001	001	REV006	CODE:0055	ALL
	4	03	20	002	001	REV006	CODE:0055	
	4	03	20	003	100	REV011	CODE:0056	ALL
	4	03	20	004	100	REV006	CODE:0056	

M	V	CH	SEC	---PAGE--	SEQ	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
M	V	CH	SEC	---PAGE--	SEQ	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
	4	03	20	005	100	REV011	CODE:0056	ALL
	4	03	20	006	001	REV011	CODE:0055	
	4	03	20	007	001	REV006	CODE:0055	ALL
	4	03	20	008	100	REV006	CODE:0056	
	4	03	20	009	100	REV011	CODE:0056	ALL
	4	03	20	010	100	REV006	CODE:0056	
R	4	03	20	011	100	REV008	CODE:0056	ALL
R	4	03	20	012	001	REV014	CODE:0055	
	4	03	20	013	001	REV006	CODE:0055	ALL
	4	03	20	014	100	REV008	CODE:0056	
	4	03	20	015	100	REV006	CODE:0056	ALL
	4	03	20	016	001	REV006	CODE:0055	
	4	03	20	017	001	REV011	CODE:0055	ALL
	4	03	20	018	001	REV007	CODE:0055	
	4	03	20	019	001	REV006	CODE:0055	ALL
	4	03	20	020	001	REV006	CODE:0055	
	4	03	20	021	001	REV006	CODE:0055	ALL
	4	03	20	022	001	REV006	CODE:0055	
	4	03	20	023	001	REV011	CODE:0055	ALL
	4	03	20	024	001	REV006	CODE:0055	
N	4	03	20	025	001	REV011	CODE:0055	ALL
N	4	03	20	026	001	REV014	CODE:0055	
	4	03	20	027	001	REV007	CODE:0055	ALL
	4	03	20	028	001	REV006	CODE:0055	
	4	03	20	029	001	REV006	CODE:0055	ALL
	4	03	20	030	001	REV006	CODE:0055	
	4	03	20	031	001	REV006	CODE:0055	ALL
	4	03	20	032	105	REV011	CODE 0096	
	4	03	20	033	100	REV007	CODE:0056	ALL
	4	03	20	034	100	REV006	CODE 0098	
	4	03	20	035	001	REV006	CODE:0055	ALL
	4	03	20	036	001	REV006	CODE:0055	
	4	03	20	037	001	REV006	CODE:0055	ALL
	4	03	20	038	001	REV006	CODE:0055	
	4	03	20	039	001	REV011	CODE:0055	ALL
	4	03	20	040	001	REV006	CODE:0055	
	4	03	20	041	001	REV011	CODE:0055	ALL
	4	03	20	042	001	REV006	CODE:0055	
	4	03	20	043	001	REV011	CODE:0055	ALL
	4	03	20	044	001	REV006	CODE:0055	

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	4	03	20	046	001	REV007	CODE:0055	
	4	03	20	047	001	REV006	CODE:0055	ALL
	4	03	20	048	001	REV007	CODE:0055	
	4	03	20	049	001	REV006	CODE:0055	ALL
	4	03	20	050	100	REV013	CODE 0099	
R	4	03	20	051	001	REV006	CODE:0055	ALL
R	4	03	20	052	100	REV014	CODE:0101	
N	4	03	20	053	100	REV011	CODE:0101	ALL
N	4	03	20	054	100	REV014	CODE:0101	
N	4	03	20	055	105	REV009	CODE:0102	ALL
N	4	03	20	056	100	REV014	CODE 0082	
	4	03	20	057	100	REV006	CODE 0082	ALL
	4	03	20	058	100	REV006	CODE 0082	
R	4	03	20	059	100	REV006	CODE 0082	ALL
R	4	03	20	060	100	REV014	CODE 0082	
R	4	03	20	061	100	REV014	CODE 0082	ALL
R	4	03	20	062	100	REV006	CODE 0082	
	4	03	20	063	001	REV006	CODE 0055	ALL
	4	03	20	064	205	REV006	CODE 0105	
	4	03	20	065	205	REV007	CODE 0105	ALL
	4	03	20	066	001	REV007	CODE:0055	
	4	03	20	067	001	REV011	CODE:0055	ALL
	4	03	20	068	001	REV007	CODE:0055	
	4	03	20	069	001	REV011	CODE:0055	ALL
	4	03	20	070	001	REV007	CODE:0055	
R	4	03	20	071	001	REV014	CODE:0055	ALL
R	4	03	20	072	100	REV006	CODE:0056	
	4	03	20	073	100	REV006	CODE:0056	ALL
	4	03	20	074	001	REV006	CODE:0055	
	4	03	20	075	001	REV006	CODE:0055	ALL
	4	03	20	076	001	REV011	CODE:0055	
	4	03	20	077	100	REV006	CODE 0108	ALL
	4	03	20	078	001	REV006	CODE:0055	
N	4	03	20	079	001	REV006	CODE:0055	ALL
N	4	03	20	080	100	REV014	CODE:0101	
N	4	03	20	081	100	REV014	CODE:0056	ALL
N	4	03	20	082	100	REV014	CODE:0101	
N	4	03	20	083	100	REV014	CODE:0101	ALL
N	4	03	20	084	100	REV006	CODE:0114	

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	4	03	20	087	001	REV006	CODE:0055	ALL
	4	03	20	088	001	REV006	CODE:0055	
N	4	03	20	089	105	REV006	CODE:0056	ALL
N	4	03	20	090	100	REV006	CODE:0082	
R	4	03	30	001	001	REV014	CODE:0055	ALL
R	4	03	30	002	001	REV006	CODE:0055	
	4	03	30	003	001	REV006	CODE:0055	ALL
	4	03	30	004	001	REV010	CODE:0055	
	4	03	30	005	001	REV006	CODE:0055	ALL
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	4	03	30	007	001	REV006	CODE:0055	ALL
	4	03	30	008	100	REV006	CODE:0058	
	4	03	30	009	001	REV006	CODE:0055	ALL
	4	03	30	010	001	REV006	CODE:0055	
	4	03	30	011	100	REV008	CODE:0086	1145
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	4	03	40	002	001	REV011		
	4	03	40	003	001	REV011		ALL
	4	03	40	004	001	REV011		
	4	03	40	005	001	REV011		ALL
	4	03	40	006	001	REV011		
	4	03	40	007	001	REV011		ALL
	4	03	40	008	001	REV011		
	4	03	40	009	001	REV011		ALL
	4	03	40	010	001	REV011		
	4	04	00	001	001	REV006	CODE 0055	ALL
	4	04	10	001	001	REV006	CODE 0055	ALL
	4	04	10	002	001	REV006	CODE 0055	
	4	04	10	003	001	REV006	CODE 0055	ALL
	4	04	10	004	001	REV006	CODE 0055	
	4	04	10	005	001	REV006	CODE 0055	ALL
	4	04	10	006	001	REV006	CODE 0055	
	4	04	10	007	001	REV006	CODE 0055	ALL
	4	04	10	008	001	REV006	CODE 0055	
	4	04	10	009	001	REV006	CODE 0055	ALL
	4	04	10	010	001	REV006	CODE 0055	

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R	4	04	10	013	001	REV006	CODE 0055	ALL
R	4	04	10	014	001	REV014	CODE 0055	
N	4	04	10	015	001	REV014	CODE 0055	ALL
N	4	04	10	016	001	REV006	CODE 0055	
	4	04	10	017	001	REV006	CODE 0055	ALL
	4	04	10	018	001	REV006	CODE 0055	
	4	04	10	019	001	REV006	CODE 0055	ALL
	4	04	10	020	001	REV006	CODE 0055	
R	4	04	10	021	001	REV014	CODE 0055	ALL
R	4	04	10	022	001	REV014	CODE 0055	
	4	04	10	023	001	REV006	CODE 0055	ALL
	4	04	10	024	001	REV006	CODE 0055	
	4	04	10	025	001	REV006	CODE 0055	ALL
	4	04	10	026	001	REV007	CODE 0055	
	4	04	10	027	001	REV006	CODE 0055	ALL
	4	04	10	028	001	REV006	CODE 0055	
N	4	04	10	029	001	REV007	CODE 0055	ALL
N	4	04	10	030	001	REV014		
	4	04	10	031	001	REV006	CODE 0055	ALL
	4	04	20	001	001	REV006	CODE 0055	ALL
	4	04	20	002	100	REV006	CODE 0109	
	4	04	20	003	100	REV006	CODE:0056	ALL
	4	04	20	004	100	REV006	CODE:0056	
	4	04	20	005	100	REV006	CODE:0056	ALL
	4	04	20	006	100	REV011	CODE:0056	
	4	04	20	007	100	REV006	CODE:0056	ALL
	4	04	20	008	100	REV006	CODE:0056	
	4	04	30	001	001	REV006		ALL
	4	04	30	002	001	REV013		
N	4	04	30	003	001	REV014		ALL
N	4	04	30	004	001	REV006		
	4	04	30	005	001	REV006		ALL
	4	04	30	006	001	REV006	CODE 0055	
	4	04	30	007	001	REV006	CODE:0087	ALL
	4	04	30	008	001	REV006	CODE:0087	
N	4	04	30	009	001	REV006	CODE 0055	ALL
N	4	04	30	010	001	REV014	CODE 0055	

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	4	04	30	011	001	REV010		ALL
	4	04	30	012	001	REV006		
	4	04	30	013	100	REV008	M:23742	ALL
	4	04	30	014	110	REV008	M:26497=(23742+26497)	
	4	04	30	015	001	REV011		ALL
	4	04	30	016	100	REV011	M:26497	
N	4	04	30	017	001	REV014	CODE 0055	ALL
N	4	04	30	018	001	REV014	CODE 0055	
	4	04	30	019	001	REV006	CODE 0055	ALL
	4	04	30	020	001	REV006		
R	4	04	30	021	001	REV014	CODE 0055	ALL
	4	04	40	001	100	REV006	M:25295=27522	ALL
	4	04	40	002	100	REV006	M:25295=27522	
	4	04	40	003	100	REV006	M:25295=27522	ALL
	4	04	40	004	100	REV006	M:25295=27522	
	4	04	40	005	100	REV006	M:25295=27522	ALL
	4	04	40	006	100	REV006	M:25295=27522	
	4	04	40	007	100	REV006	M:25295=27522	ALL
	4	04	40	008	100	REV006	M:25295=27522	
	4	05	00	001	001	REV011		ALL
	4	05	00	002	100	REV010	M:25863	
	4	05	05	001	001	REV006		ALL
	4	05	10	001	001	REV006	CODE 0055	ALL
	4	05	10	002	001	REV006	CODE 0055	
	4	05	10	003	100	REV006	CODE 0056	ALL
	4	05	10	004	100	REV006	CODE 0056	
	4	05	10	005	001	REV006	CODE 0055	ALL
	4	05	10	006	001	REV006		
	4	05	10	007	100	REV006	CODE 0056	ALL
	4	05	10	008	100	REV006	CODE 0056	
R	4	05	10	009	001	REV006		ALL
R	4	05	10	010	100	REV014	CODE 0056	
	4	05	10	011	001	REV006		ALL
	4	05	10	012	001	REV006	CODE 0055	
R	4	05	10	013	001	REV006		ALL
R	4	05	10	014	001	REV014	CODE 0055	
	4	05	10	015	001	REV011		ALL
	4	05	10	016	001	REV006	CODE 0088	

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	4	05	10	019	001	REV011		ALL
	4	05	10	020	001	REV011		
R	4	05	10	021	100	REV014	CODE 0058	ALL
R	4	05	10	022	100	REV014	CODE 0058	
	4	05	10	023	001	REV011		ALL
	4	05	15	001	001	REV007	CODE 0055	ALL
	4	05	15	002	001	REV006		
	4	05	20	001	200	REV006	M:(23742+24035)=(23742+24189	ALL
	4	05	20	002	100	REV007	M:24035 OR 24189	
	4	05	30	001	120	REV006	CODE 0151	ALL
	4	05	30	002	120	REV006	CODE 0151	
	4	05	30	003	100	REV007	M:24035 OR 24160 OR 24211	ALL
	4	05	30	004	100	REV007	M:24035 OR 24160 OR 24211	
N	4	05	30	005	120	REV007	CODE 0151	ALL
N	4	05	30	006	001	REV014		
	4	05	30	007	001	REV011	CODE 0055	ALL
R	4	05	40	001	001	REV014	CODE 0055	ALL
R	4	05	40	002	100	REV006	M:24035 OR 24160 OR 24211	
	4	05	40	003	100	REV006	M:24035 OR 24160 OR 24211	ALL
	4	05	40	004	100	REV006	M:24035 OR 24160 OR 24211	
	4	05	40	005	001	REV006		ALL
	4	05	40	006	100	REV006	M:24035 OR 24160 OR 24211	
	4	05	40	007	110	REV008	CODE 0031	ALL
	4	05	40	008	001	REV007	CODE 0055	
	4	05	50	001	001	REV008		ALL
	4	05	50	002	001	REV006		
R	4	05	50	003	100	REV014	CODE:0101	ALL
R	4	05	50	004	001	REV006		
	4	05	50	005	001	REV011		ALL
	4	05	50	006	001	REV006	CODE 0055	
	4	05	50	006A	001	REV011	CODE 0055	ALL
	4	05	50	007	001	REV011		ALL
	4	05	50	008	001	REV006		
	4	05	50	009	001	REV006		ALL
	4	05	50	010	001	REV007	CODE 0055	
	4	05	50	011	100	REV006	CODE 0056	ALL
	4	05	50	012	001	REV007	CODE 0055	

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	4	05	50	014	001	REV006		
	4	05	60	001	001	REV010		ALL
	4	05	60	002	100	REV006	M:24035 OR 24160 OR 24211	
	4	05	60	003	100	REV006	M:24035 OR 24160 OR 24211	ALL
	4	05	60	004	100	REV006	CODE 0058	
	4	05	60	005	100	REV011	M:24035 OR 24160 OR 24211	ALL
	4	05	60	006	001	REV008		
N	4	05	60	007	001	REV011		ALL
N	4	05	60	008	001	REV014	CODE 0055	
	4	05	60	009	001	REV006		ALL
	4	05	60	010	001	REV010		
R	4	05	70	001	001	REV014	CODE 0055	ALL
R	4	05	70	002	001	REV006		
	4	05	70	003	001	REV006		ALL
	4	05	70	004	001	REV011		
	4	05	70	005	001	REV006		ALL
	4	05	70	006	110	REV006	M:24035=24160=(24189+24211)	
	4	05	70	007	110	REV008	M: 26497	ALL
	4	05	70	008	001	REV006		
	4	05	70	008A	100	REV010	CODE 0054	ALL
R	4	05	70	009	001	REV014	CODE 0055	ALL
R	4	05	70	010	001	REV006		
	4	05	70	011	001	REV008		ALL
	4	05	70	012	001	REV008		
	4	05	70	013	001	REV008		ALL
	4	05	70	014	001	REV007		
N	4	05	70	015	001	REV014	CODE 0055	ALL
N	4	05	70	016	001	REV011		
	4	05	70	017	001	REV011		ALL
	4	05	70	018	001	REV011		
	4	05	70	019	001	REV011		ALL
	4	05	70	020	001	REV006	CODE 0055	
N	4	05	70	021	001	REV006		ALL
N	4	05	70	022	210	REV008	CODE 0023	
	4	05	70	023	100	REV011	M:24035=24160=24211	ALL
	4	05	70	024	100	REV008	M:24035=24160=24211	
	4	05	70	025	200	REV009	CODE:0016	ALL
	4	05	70	026	001	REV007		

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R	4	05	70	027	001	REV014		ALL
R	4	05	70	028	100	REV006	M:24035=24160=24211	
	4	05	70	029	001	REV006		ALL
	4	05	70	030	001	REV006		
	4	05	80	001	100	REV008	M:26497	ALL
	4	05	80	002	200	REV007	CODE:0006	
	4	05	80	003	110	REV007	M:25863	ALL
	4	05	80	004	100	REV008	M:25863	
	4	05	80	005	100	REV006	M:24035 OR 24160 OR 24211	ALL
	4	06	00	001	001	REV013	CODE:0055	ALL
	4	06	10	001	001	REV012		ALL
	4	06	10	002	001	REV012		
	4	06	20	001	001	REV006		ALL
	4	06	20	002	001	REV013		
	4	06	20	003	001	REV013	CODE 0071	ALL
	4	06	20	004	001	REV013		
R	4	06	20	005	001	REV013	STD=31579=31580=31896=31897	ALL
R	4	06	20	006	001	REV014	CODE 0055	
N	4	06	20	007	001	REV014	CODE 0064	ALL
N	4	06	20	008	001	REV014	CODE:0055	
	4	06	30	001	100	REV012	CODE 0074	ALL
	4	06	30	002	100	REV006	CODE 0074	
	4	06	40	001	001	REV012		ALL
	4	06	40	002	001	REV010		
	4	07	00	001	001	REV006	CODE 0055	ALL
	4	07	10	001	001	REV011	CODE 0055	ALL
	4	07	10	002	001	REV011	CODE 0055	
	4	07	10	003	001	REV011	CODE 0055	ALL
	4	07	10	004	001	REV008	CODE 0055	
	4	07	10	005	001	REV011	CODE 0055	ALL
	4	07	10	006	001	REV011	CODE 0055	
	4	07	10	007	001	REV011	CODE 0055	ALL
	4	07	10	008	001	REV011	CODE 0055	
	4	07	10	009	001	REV011	CODE 0055	ALL
	4	07	10	010	001	REV006	CODE 0055	
	4	07	10	011	001	REV011	CODE 0055	ALL
	4	07	10	012	001	REV011	CODE 0055	
	4	07	10	013	001	REV011	CODE 0055	ALL
	4	07	10	014	001	REV006	CODE 0055	

M V CH SEC ---PAGE--	SEQ	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
M V CH SEC ---PAGE--	SEQ	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
4 07 10 015	001	REV006	CODE 0055	ALL

M V T	REV	MOD SB	MP	TITLE	VALIDITY
.	013A	23353	.....	AUTO FLIGHT - FMS - PROVIDE FMS CROSS LOAD	ALL
N	014	23593	.....	AUTO FLIGHT - MCDU 1 AND 2 - SOFTWARE UPGRADED (CI-20)	ALL
.	013A	23742	.....	AUTO FLIGHT - FCU - INTRODUCE FCU STANDARD M10	ALL
.	013A	24035	.....	INDICATING/RECORDING SYSTEMS - GENERAL- DEFINE CPIP3	ALL
.	013A	24064	.....	AUTO FLIGHT-FMS-INTRODUCE FMGC A320/321 B1 STD WITH OPTIONS AND 400 KILOWORDS FOR CFM 56 VERSIONS	ALL
.	013A	24105	.....	FUSELAGE - REAR FUSELAGE - ADAPT SECTION 17/19 STRUCTURE TO A319 DEFINITION	ALL
.	013A	24309	.....	AUTO FLIGHT - FMGC - PROVIDE TIME CONSTRAINT AND TEN CHARACTERS RTE IDENT FUNCTIONS	ALL
.	013A	24414	.....	AUTO FLIGHT - FLIGHT CONTROL UNIT (FCU) DELETE "EXPEDITE" FUNCTION FROM FCU	ALL
.	013A	24735	.....	AUTOFLIGHT-FCU- INTRODUCE MODIFIED PIN/SOCKET CONNECTOR ON FCU WITH EXPEDITE FUNCTION DELETED (FCU BBM10)	ALL
N	014	25025	.....	COMMUNICATIONS-INTERPHONE- INTRODUCE IDENTIFICATION LABEL FOR INTERPHONE JACKS 1RJ/2RJ	ALL

M V T	REV	MOD SB	MP	TITLE VALIDITY
N	014	25294	.....	NAVIGATION - ADIRS - INSTALL HONEYWELL ADIRS CAPABLE OF A319 A/C ALL
.	013A	25295	.....	AUTOFLIGHT - FMGC - ACTIVATE ACARS INTERFACE IN FMS (CFM AND IAE ENGINES) ALL
.	013A	25345	.....	AUTOFLIGHT-FCU-INTRODUCE F.C.U. STANDARD M11 ALL
.	013A	25346	.....	AUTOFLIGHT-FCU-INTRODUCE FCU STANDARD M11 WITHOUT EXPEDITE FUNCTION ALL
.	013A	25381	.....	AUTOFLIGHT - FMGC - ACTIVATE PRINTER INTERFACE IN FMS (CFM AND IAE ENGINES) ALL
.	013A	25863	.....	AUTO FLIGHT - FCU - DEFINE FLIGHT DIRECTOR ENGAGEMENT IN CROSSED BARS AT GO AROUND ALL
.	013A	26002	.....	NAVIGATION-ADIRS-INTRODUCE LITTON ADIRU 4 MCU STD WITH P/N-309 (AIME FUNCTION) ALL
N	014	26495	.....	WINGS-INBOARD FLAP-MODIFY SLIDING PANEL DRIVING MECHANISM ALL
.	013A	26497	.....	AUTO FLIGHT-GENERAL-ACTIVATE GLOBAL SPEED PROTECTION AND F/D DISENGAGEMENT UPON SPEED CONSTRAINTS ALL
.	013A	26968	.....	AUTO FLIGHT-FMGC-INTRODUCE FMGC CAM0102 FOR A319 AUTOLAND AND GPS/ACARS FOR CFM ENGINES ALL

M V T	REV	MOD SB	MP	TITLE	VALIDITY
.	013B	26999	.....	NAVIGATION - MMR - INSTALL COLLINS MMR PROVIDING ILS AND GPS FUNCTION	00-SSF
.	013A	27256	.....	AUTO FLIGHT - MULTIPURPOSE CONTROL AND DISPLAY UNIT (MCDU) - INTRODUCE MCDU HONEYWELL 2ND GENERATION (P/N -980)	ALL
.	013B	27522	.....	INFORMATION SYSTEM - AIR TRAFFIC AND INFORMATION SYSTEM (ATIMS) - INSTALL ATSU COMPUTER FOR ACARS	00-SSF
.	013A	27541	.....	AUTO FLIGHT - MCDU - INSTALL AN MCDU 2ND GENERATION HONEYWELL FMS (MCDU WITH A340 KEYBOARD)	ALL
.	013A	28218	.....	NAVIGATION-ADIRS-INTRODUCE LITTON ADIRU 4 MCU STD-312	ALL
.	013B	28360	.....	INFORMATION SYSTEMS-ATIMS-REMOVE ATSU INSTALLATION BACK TO ACARS PROVISIONS	00-SSF
N	014	28381	.....	ELECTRIC/ELECTRONIC COMMON INSTALLATION - MODIFY CONNECTOR INTERFACE PLATE FOR ELECTRICAL CONVERTIBLE SEATS	ALL
.	013A	28382	.....	NAVIGATION - MMR - ACTIVATE GPS PRIMARY FUNCTION (HYBRID) IN SEXTANT MMR (WITH HONEYWELL OR LITTON ADIRU)	ALL
N	014	28495	.....	NAVIGATION - MMR - REMOVE COLLINS MMR PROVIDING ILS (FM IMMUNE) AND GPS PRIMARY FUNCTION (PREVIOUS SPEC.)	00-SSF

01.00 CONTENTS

01.10 GENERAL

PREAMBLE

The Auto Flight System is described in the volume 1 and volume 4.
The volume 1 gives a general description of the system and its functions
- Architecture
- Function description
- Basic principle of systems
  - Reversion
  - Protection
  - Managed and selected guidance modes
- Mode information
- Display characteristics (chapter 1.22 and 1.31)

The volume 4 is devoted to the FMGS operational information
- Operational principles
- Pilot interface (MCDU pages)
- Procedural material including :
  - FMGS procedures on ground and in flight
  - mode annunciation in flight
  - typical flight profiles
- Irregularities
  - Degraded modes of operations
  - FMGS failures and procedures
  - FMGS behaviour following failures of other systems

GENERAL PHILOSOPHY

The Flight Management Guidance System (FMGS) operates as follows :

- During cockpit preparation the crew uses the Multifunction Control and Display Unit (MCDU) to insert a preplanned route from origin to destination. This route includes SID, EN ROUTE, WAYPOINTS, STAR, APPROACH, MISSED APPR, and ALTN route as available from the navigation data base.
- Subsequently the system defines a vertical profile and a speed profile, taking into account ATC requirements and performance criteria.

The FMGS computes the aircraft position continually, using stored aircraft performance data and navigation data. Therefore it can steer the aircraft along a preplanned route and vertical and speed profiles. This type of guidance is said to be "managed".

If the pilot wants to modify any flight parameter (SPD, V/S, HDG, etc.) temporarily, he may do so by using the various Flight Control Unit (FCU) selectors. The FMGS then guides the aircraft to the target value of this parameter that he has selected. This type of guidance is said to be "selected".

The two available types of guidance, then, are :

- Managed guidance guides the aircraft along the preplanned route and the vertical and speed/Mach profile. (The FMGS computes the target values of the various flight parameters).
- Selected guidance guides the aircraft to the target values of the various flight parameters the pilot selects by using the FCU selectors.

Selected guidance always has priority over managed guidance.

SYSTEM DESCRIPTION

Please refer to 1.22.10.

02.00 CONTENTS

02.10 INTRODUCTION

02.20 FLIGHT MANAGEMENT PRINCIPLES

02.30 FLIGHT GUIDANCE PRINCIPLES

INTRODUCTION

The flight management and guidance system (FMGS) performs navigation functions and lateral and vertical flight planning functions. It also computes performance parameters and guides the aircraft along a preplanned route.

Each FMGC is divided into two main parts :

- The Flight Management (FM) part controls the following functions :
  - Navigation
  - Management of flight planning
  - Prediction and optimization of performance
  - Management of navigation radios
  - Management of displays
- The Flight Guidance (FG) part performs the following functions :
  - Autopilot (AP) command
  - Flight director (FD) command
  - Autothrust (A/THR) command

This chapter (4.02) describes the operational principles of flight management and flight guidance in order to help the reader understand how the FMGS functions.

NAVIGATION

Essential navigation functions are described in the volume 1 (1.22.20) but some principles are reemphasized in this chapter due to their operational impact.

POSITION ACCURACY (PROG PAGE)

The HIGH or LOW accuracy is indicated on the PROG page.
This display is the result of the comparison between the estimated position error (EPE) and the position accuracy criteria defined by airworthiness authorities for various flight areas.
The flight crew, when the aircraft is not fitted or not using the GPS primary function, must check the navigation accuracy periodically to confirm the system computation.
When the accuracy changes from low to high (or high to low), both MCDUs and NDs display the message "NAV ACCUR UPGRAD" (or "NAV ACCUR DOWNGRAD").

NAVIGATION ACCURACY CHECK

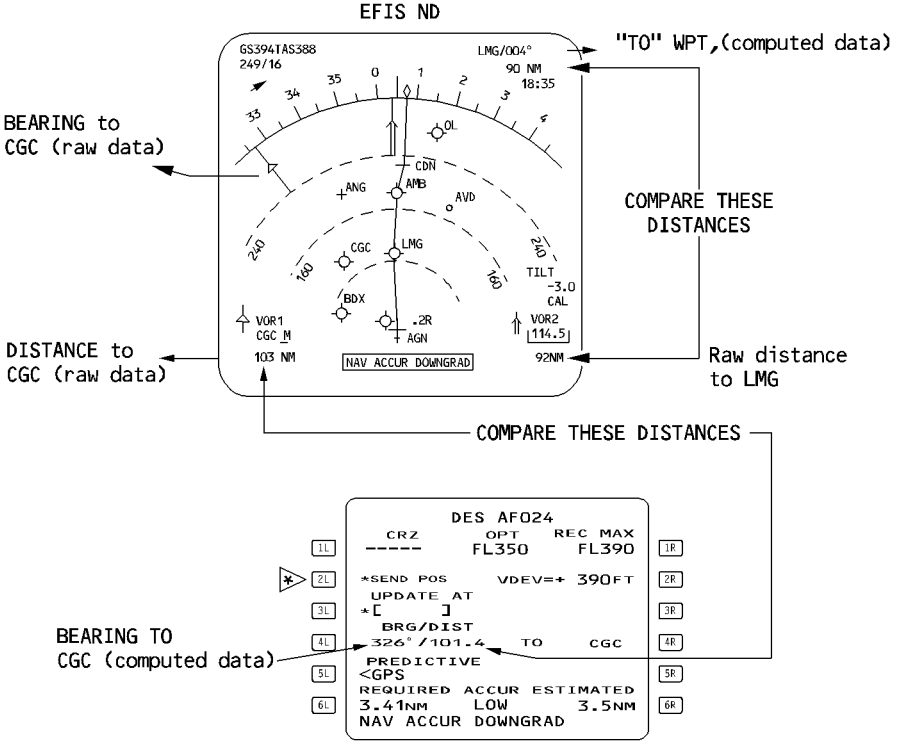
When GPS primary is available, the navigation accuracy check is not required.
When GPS primary is not available, the pilot must perform this essential check :

- Periodically in cruise,
- Prior to initiating descent,
- When entering a terminal/approach area.

The procedure is :

- While en route, check the HIGH/LOW accuracy information.
  - If accuracy is "LOW" (and whenever "NAV ACCUR DOWNGRAD" appears), compare raw data from the tuned navaids with the corresponding FM-computed data on the navigation display or the MCDU PROG page.
  - If accuracy is "HIGH", periodically perform the comparison (about once per hour).
- In descent, and in terminal and approach areas, validate the estimated accuracy, whether it is "HIGH" or "LOW", by comparing the FM data with raw data from the VOR/DME at the destination airfield, if available.

R



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This check verifies and quantifies the FM accuracy. It confirms the reliability of FMGS data itself and of the navigation display presentation. It also validates the use of the NAV mode. By comparing the bearing, the crew may evaluate the validity of the overall check.
In area with high magnetic variation change, this comparison of bearings may not be adequate.

RADIO NAVIGATION TUNING

Each FMGC tunes the navaids it uses for display and computing position.
The FM may tune navaids for display automatically, using an internal logic, or the pilot may tune them manually on the RADIO NAV page.
The FM tunes automatically the DMEs used for position update. It scans them constantly.

NAVAIDS USED FOR DISPLAY

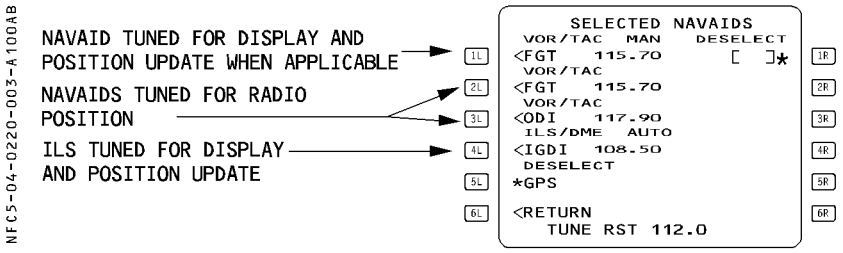
The RADIO NAV page, and the ND show which navaids have been tuned for display.

R *Note : All navaids tuned on the RAD NAV page are used for display purpose.*

NAVAIDS USED FOR POSITION UPDATE

Navaids used for aircraft's position update are displayed on the SELECTED NAVAIDS page.
If a NAVAID is unreliable, the pilot should deselect it manually.

Note : When the FMGC uses the VOR/DME for radio position, it also uses the related VOR/DME for display.
If the crew has selected manually the VOR/DME for display, and if it is not convenient for the FMGC to use it for position update, the FMGC will require the crew to select another VOR/DME. The MCDU will display the message "TUNE BBB FFF.F", BBB is the Navaid identifier and FFF.F the VOR frequency.



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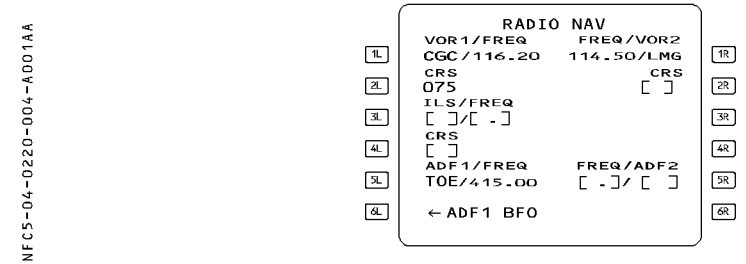
MANUAL TUNING

– **WRITE the identifier on the RAD NAV page.**
Preferably use the identifier.



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● **If the MCDU displays "NOT IN DATA BASE" :**

– **WRITE the frequency.**

– **DISREGARD the ident that appears in small font on the MCDU.**
When a frequency is entered in the VOR field, the FMGC automatically associates to the tuned frequency the closest navaid identifier with the same frequency, and displays it on the RAD NAV page. This identifier may not correspond to the tuned navaid.
If the closest navaid, found in the database, is of a different type (e.g. VOR instead of VOR/DME), the crew will obtain a partial tuning (e.g. VOR indication instead of VOR/DME indication).

CAUTION

Pilots should use the RMP NAV keys only when both FMGCs or both MCDUs are inoperative. When at least one FMGC is operative, use of the NAV key on the RMP (while the LOC update is active) may freeze the FM position during approach, and must be avoided.

NAVAID IDENTIFICATION

– **CHECK the ILS identifier decoding on the PFD, and the VOR or ADF identifier on the ND.**
When the navaid identifier is decoded in agreement with that published, no audio check is necessary.
When the decoding is different from the published one, check the audio. Due to morse coding inaccuracy, wrong decoding may sometimes occur.

R R *Note : When a DME or a TACAN only is selected using either its identifier or its frequency, the NDs do not display the decoded indication.*

FLIGHT PLANNING

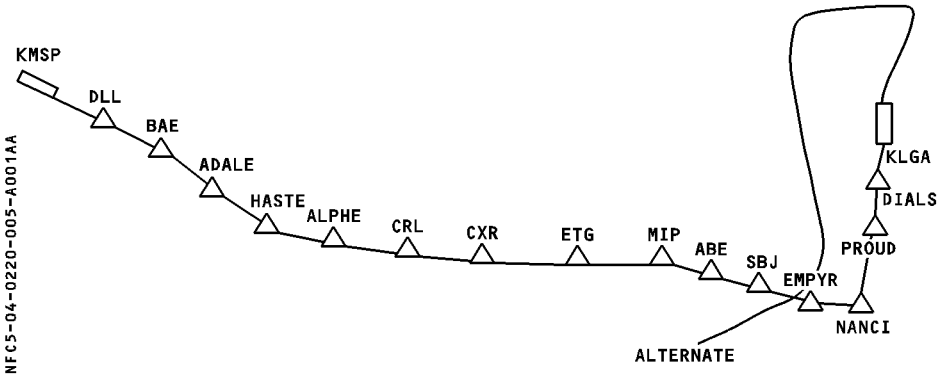
The pilot uses the MCDU to insert flight plans into the FMGS :
- a lateral flight plan that defines the intended horizontal flight path
- a vertical flight plan that defines the intended speed and altitude profile for the aircraft to follow while flying the lateral flight plan.

Note : The flight planning function is available for both the primary and secondary flight plans.

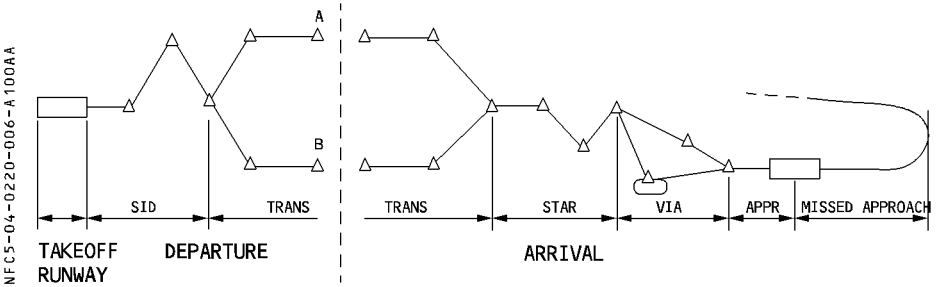
LATERAL FLIGHT PLANNING

To insert the lateral flight plan, the pilot can use either a company route number or an ICAO four-letter city pair. The lateral flight plan includes the following elements :
- Takeoff runway
- Standard instrument departure (SID) and transition to en route mode
- En route waypoints and airways
- Transition from en route mode and standard terminal arrival route (STAR)
- Landing runway with selected approach and approach via
- Missed approach
- Alternate flight plan

EXAMPLE



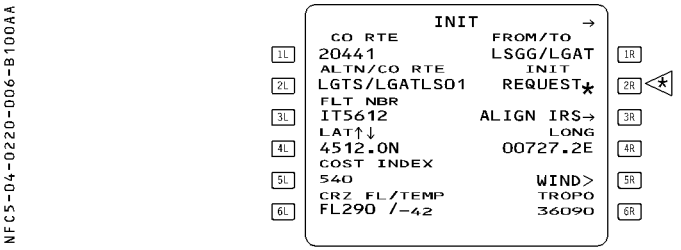
The FMGS is able to string together different types of legs corresponding to specific patterns (such as DME arc legs, or procedure turns) that are heading or track referenced. These are defined in the database : The pilot cannot create these legs.
Departure and arrival procedures, defined in the database, may be divided into several parts, as illustrated in the following drawing.



FLIGHT PLAN CONSTRUCTION

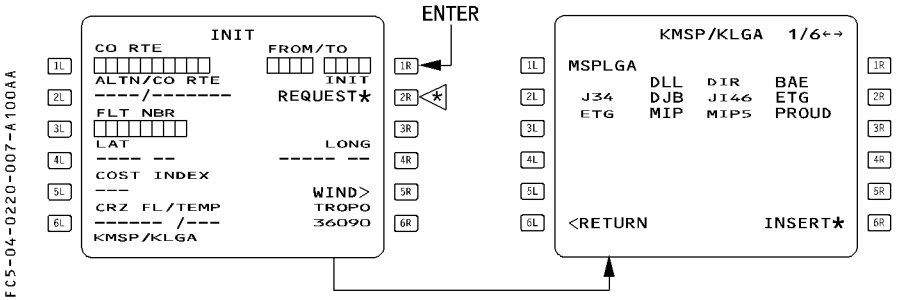
There are three ways to define the route :

(1) It is a company route, it is in the database, and it is known by the crew.
The pilot enters the name of the CO RTE into the 1L field of the INIT A page. This action enters all elements of the flight plan. The database usually includes an alternate route associated with the destination.



(2) It is a company route and it is in the database, but the crew does not know it is there.

The pilot enters a city pair in the 1R field. The ROUTE SELECTION page automatically appears and permits the crew to review all stored routes between the two cities before selecting one of them.



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(3) There is no company route between the two cities.

The pilot enters the city pair in the 1R field. The ROUTE SELECTION page appears and displays "NONE".

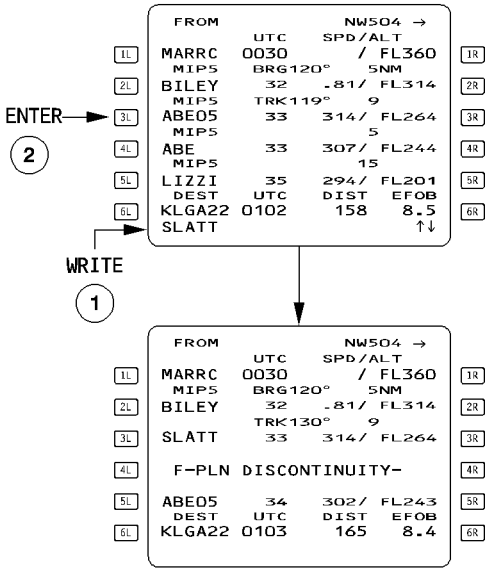
The pilot has to manually construct the entire flight plan.

Refer to the procedure explained in 4.05.10.

LATERAL REVISION

The crew can revise the lateral flight plan in three ways :

(1) Insert a new waypoint directly on the F-PLN page, or delete a waypoint from it.



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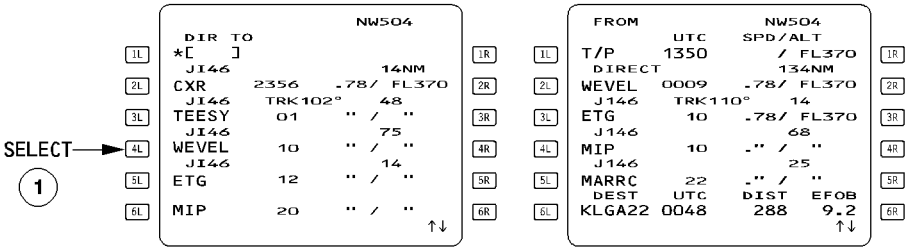
When the pilot enters a new waypoint, the following waypoint moves down the flight plan, with a discontinuity shown between it and the new one.

(2) Add a DIR TO.

The crew can change the "TO" waypoint of the active leg. The active leg then goes from present position (T/P) to the waypoint selected or inserted as the new "TO" waypoint.



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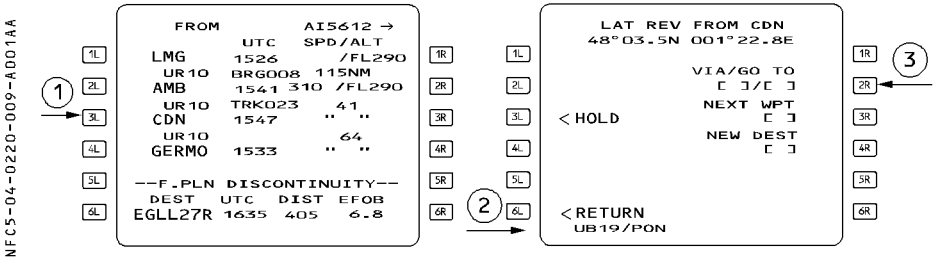
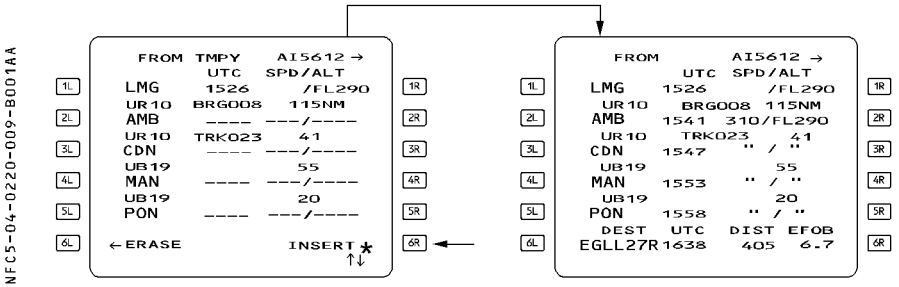
(3) Create a temporary flight plan, then insert it as a revision to the active flight plan:

The crew does this when selecting, deleting, or modifying several waypoints of an airway
R or procedure at once.

The purpose of the temporary flight plan is to enable the pilot to review the revision on the MCDU and on the ND before inserting it into the active flight plan.



A temporary revision is displayed for a check and/or new modification.
Inserting it will modify the active flight plan.



R Refer to the FCOM 4.04 for a detailed explanation.

VERTICAL FLIGHT PLANNING

Data entry

The vertical flight plan gives the FMGS all the data required to calculate performance and predictions. This data either comes from the data base automatically or is entered manually by the pilot.
There are three categories of data :

- **Strategic data, which applies to the overall flight profile**
  Cost Index (CI)
  Cruise Flight Level (CRZ FL)
  Zero-Fuel Weight (ZFW)
  Zero-Fuel Center of Gravity (ZFCG)
  Block Fuel
- **Tactical data for the flight phases**
  * Phase switching conditions
    Setting of the thrust levers to takeoff-go-around (TOGA) or FLEX positions
    Reaching acceleration altitude (ACCEL ALT)
    Entering cruise (top of climb, T/C)
    Initiation of descent (top of descent, T/D)
    Passing a deceleration pseudo waypoint (DECEL PSEUDO WPT)
    Touchdown
  * Speed profile
    V2
    Economy climb speed or Mach (ECON CLB SPD/MACH)
    Preselected speed or Mach (SPD/MACH PRESELECTION)
    Economy cruise Mach (ECON CRZ MACH)
    Economy descent Mach or speed (ECON DES MACH/SPD)
    Approach speed (VAPP)
  * Vertical limitations
    Speed limits (SPD LIMIT)
    Speed and altitude constraints (SPD AND ALT CSTR), time constraint (if installed)
- **Weather data**
  Winds (for climb, cruise, descent, approach)
  Sea level atmospheric pressure (QNH) at destination
  Surface temperature (TEMP) at destination
  Temperature at cruise flight level

FLIGHT PHASES

The vertical flight plan is divided into flight phases. For each phase, the FMGS computes the optimum speed or Mach Profile.
These flight phases are :
Preflight - Takeoff - Climb - Cruise - Descent - Approach - Go-Around - Done.

R

FLIGHT PHASES	OPTIMUM SPEED PROFILE	SWITCHING CONDITIONS TO NEXT PHASE
PREFLIGHT	/	SRS takeoff mode engaged and N1 > 85 % (EPR ≥ 1.25) or Ground Speed > 90 knots
TAKEOFF	V2 (V2 + 10)	At acceleration altitude or by engagement of another vertical mode.
CLIMB	ECON CLB SPD / MACH	Reaching cruise FL
CRUISE	ECON CRZ MACH	No step descent, and distance to destination < 200 NM
DESCENT	ECON DES MACH / SPD	– Overflying (DECEL) pseudowaypoint with NAV (or LOC*/LOC) mode engaged and altitude < 7200 ft AGL – Manual activation of the approach phase.
APPROACH	Vapp (GS Min)	1. To Go-Around : When thrust levers at TO.GA detent, or 2. To Done : 30 seconds after landing, or 3. To Climb : When inserting a new CRZ FL.
GO-AROUND	Vapp or current SPD, whichever is greater. Green Dot at ACC ALT	1. To Approach : Manual activation of the approach phase, or 2. To Climb : Above acceleration altitude by – Selecting ALTN, or – inserting NEW DEST and CRZ FL
DONE	/	To preflight : When INIT or PERF key depressed.

Note : During the preflight phase, the pilot inserts the flight plan, which includes all data needed for the flight.
During the done phase, the FMGC erases the data entered for the flight.
If the descent or the approach phase is inadvertently activated (manual approach phase activation, for example), the pilot may reselect a CRZ FL on the PROG page to reactivate the CRZ phase.

VERTICAL REVISION

The pilot uses vertical revisions to enter or modify
- the speed limit in the climb and descent phases
- constraints on altitude or speed
- a step climb or a step descent
- new wind data
- a time constraint (optional)

The vertical revision page is accessed by pressing a right hand select key of the flight plan page.

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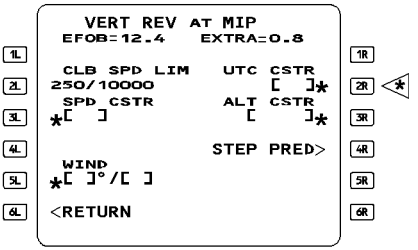

VERT REV AT CRUISE WPT

VERTICAL CONSTRAINTS (SPEED, ALTITUDE, TIME)

The pilot enters constraint on speed and altitude either to comply with ATC requests and specified procedures or in response to operational judgment.

Speed limit

A speed limit is associated with altitude as a maximum speed below a specified altitude (only one in climb and one in descent).

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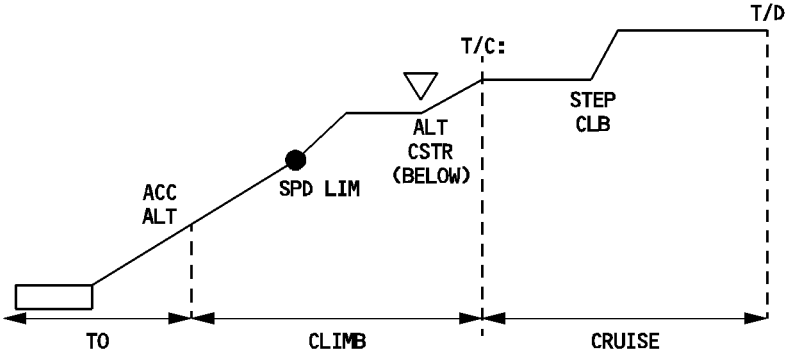
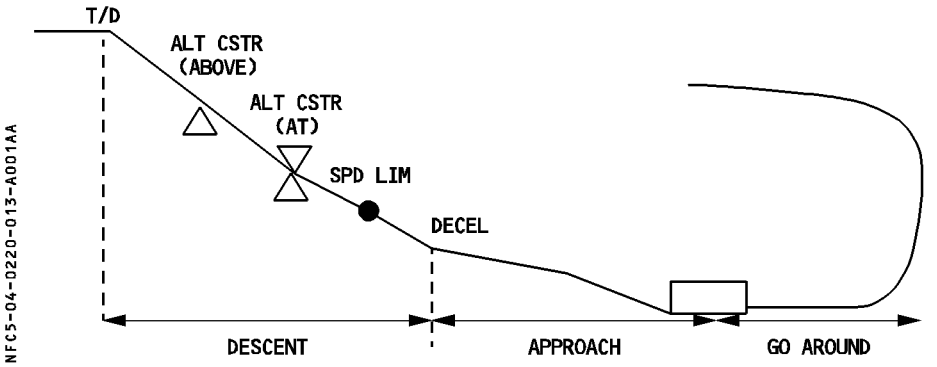




Altitude constraint

Altitude constraints may be attached to specific waypoints in the climb, descent, or approach phases.

To meet the altitude constraint, the aircraft must fly over the waypoint at an altitude equal, above or below the altitude constraint as specified by the crew or the database.

An altitude constraint is considered as missed if the system predicts more than 250 feet of difference between the constraint value and the predicted aircraft altitude.

Altitude constraints are observed in CLB or DES or APP NAV-FINAL modes.

Note : The database may contain an altitude constraint window (two altitudes between which the aircraft must fly passing over a given waypoint), but the flight crew cannot enter such a constraint manually.

Speed constraint

Speed constraints may be attached to specific waypoints in the climb, descent or approach phases. To meet the speed constraint, the aircraft must fly over the waypoint with a speed equal or less than the speed constraint.

A speed constraint is considered as missed if the system predicts an aircraft speed 10 knots greater than the speed constraint.

Speed constraints are observed when NAV mode is engaged and speed target is managed. Otherwise speed constraints are disregarded.

Time constraint

Time constraint (optional) may be attached to any waypoint except the "from" waypoint.

Note : No constraint can be associated with go around waypoints.

PERFORMANCE FUNCTION

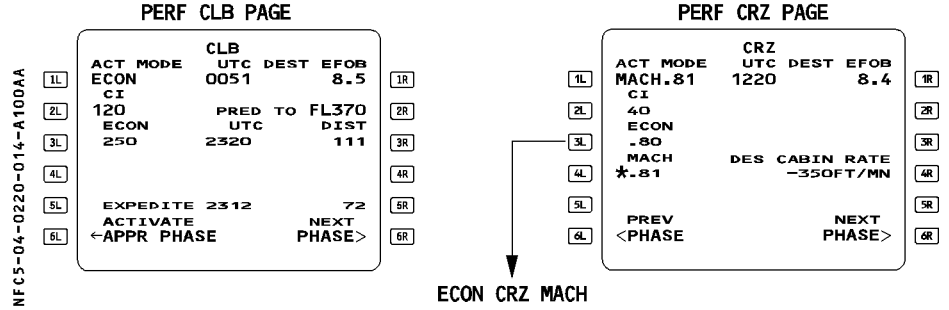
The performance function :
- Optimizes a flight plan
- Computes predictions

FLIGHT OPTIMIZATION

The optimization function computes :
- The best target speed for climb, cruise, and descent (ECON SPD/MACH).
- The best descent path from the cruise flight level to the destination airfield.
- An optimum flight level (for pilot's information).

BEST TARGET SPEED

It is computed by the FMGS (except for V2). The best target speed (ECON SPD/MACH) is the basis for the managed speed profile.
ECON SPD/MACH is a function of :
· Cost index (CI)
· Cruise flight level (CRZ FL)
R · Gross weight
· Wind and temperature models
The computer processes the ECON SPDs for the climb and descent phases before the initiation of the flight phase, and freezes the values once the flight phase becomes active. The computer continually updates ECON CRUISE MACH (SPD), taking into account current weather conditions and modifications to the flight plan.
If the cruise FL is below FL 250, ECON CRUISE SPEED is computed.
If the cruise FL is above FL 250, ECON CRUISE MACH is computed.



WIND PROFILE

To obtain the best predictions, the pilot must enter the wind for the various flight phases and specifically for waypoints in cruise.

ON GROUND : During flight planning "initialization", enter the winds for the climb and cruise phases using the HISTORY WIND and WIND pages. Enter, manually or with ACARS, different wind values in the climb and cruise phases. The system will compute a wind for all waypoints of the F-PLN using linear interpolation between manual/ACARS entries.

The wind profile will be displayed on the F-PLN B page, and is called forecast wind profile. Pilot or ACARS entries are displayed in large font, and system-computed winds in small font.

The forecast wind profile will be used to compute fuel and time predictions, as well as ECON speed/Mach targets.

IN FLIGHT : The system updates the predictions and the current ECON speed, using the measured wind at the present position. It combines actual wind and forecast winds to compute the wind ahead of the aircraft, but this is totally transparent to the crew.

During cruise, the pilot will enter the descent winds and the approach wind. The system will update the final predictions, compute the best descent profile and best speed in descent and approach.

OPTIMUM FLIGHT LEVEL

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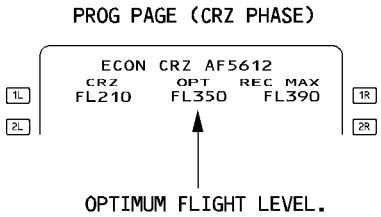


The optimum flight level (OPT FL) indicates the most economic flight level for a given cost index, weight, weather data. It is continuously updated in flight.

R The OPT FL is a compromise between fuel and time saving : Its computation may show
R steps due to slight GW, ISA, or wind changes. As a result, the pilot may observe jumps
R in OPT FL.
R The computation of the OPT FL considers the wind entries made at the different altitudes
R (normally at the different CRZ FL).
R When flying the subsequent CRZ FL, the OPT FL proposed by the PROG page may be
R affected by the wind entries made at the previous CRZ FL ; these winds are automatically
R propagated and may be significantly different from the actual winds.

Note : For simplification purposes, the FCOM/QRH gives the OPT FL at a given Mach number. It does not consider the cost index, therefore the FMGS and the FCOM/QRH valves are different.

BEST DESCENT PATH

The vertical flight path is computed to minimize fuel consumption, while satisfying the various altitude constraints and the descent speed profile, in order to reach VAPP at 1000 feet.

The computer calculates the descent profile before the descent phase is initiated, taking into account :

- All lateral and vertical flight plan data
- The descent and approach winds, as inserted into the DESCENT WIND page and PERF APPR page, and the required maximum cabin rate of descent.

During descent, the descent profile is updated, only if the flight plan is modified, or if data for the APPR phase (WIND, VAPP, or LDG CONF) are changed.

COST INDEX (CI)

This is a fundamental input for the ECON SPEED or ECON MACH computation. ECON SPEED and ECON MACH reduce the total flight cost in terms of flight time and fuel consumption (and not only in terms of fuel saving).

The airline's operations department usually defines the cost index, to optimize each company route.

The pilot does not ordinarily modify the cost index during a flight.

CI = 0 corresponds to minimum fuel consumption (Max Range).

CI = 999 corresponds to minimum time.

CI = Long Range Cruise (Refer to 4.05.50).

COMPUTATION OF PREDICTIONS

The system calculates various predictions for the active flight plan and updates them continually during flight as functions of :
- Revisions to the lateral and vertical flight plans
- Current winds and temperature
- Present position versus lateral and vertical flight plans
- Current guidance modes

The MCDU and the ND show these predictions, each of which is based on specific assumptions.

Predicitions displayed on the Navigation Display (ND)

These predictions consist of :

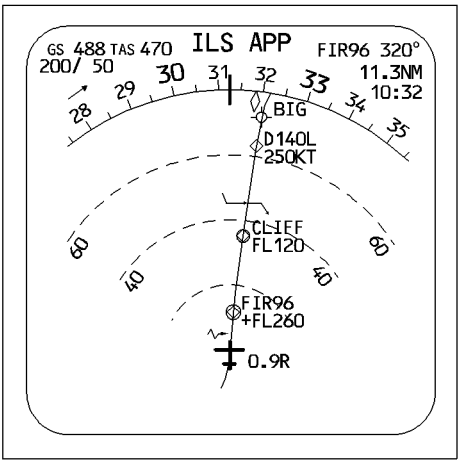
· symbols positioned along the lateral flight plan (NAV mode engaged) or the track line (NAV mode not engaged). These symbols (named as pseudo waypoints) and their meanings are :

Pseudo waypoint	Definition
	Level symbol, at the (top of climb or level-off) position where the aircraft will reach : – the FCU selected altitude (blue) or – the constrained altitude, if it is more restrictive than the FCU altitude and if appropriate modes are engaged (magenta).
	Top of descent or continue descent symbol : – top of descent (always white) – continue descent symbol (white if DES is not armed, blue if it is)
	Start of CLIMB symbol : – white if CLB is not armed – blue if CLB is armed
	Intercept point symbol : – the point where the aircraft is predicted to intercept the descent path, if there is any vertical deviation when the aircraft is in DES mode (white if DES is not engaged, blue if it is)
●	Speed change symbol : – the point at which the aircraft will initiate an automatic ACCEL or DECEL from current speed to a new computed speed if it encounters a SPD LIM, SPD CSTR, or HOLDING SPD (magenta)

R

Pseudo waypoint	Definition
Ⓓ	Decelerate point symbol magenta : – Indicates the point at which the aircraft will start an automatic deceleration toward VAPP (and thus switch to the approach phase). Although the symbol is always displayed, automatic deceleration only occurs if in managed speed and NAV or approach mode is engaged.
○	ALT CSTR symbol set around the constrained waypoint : – Magenta, when the ALT CSTR is predicted to be satisfied – Amber, when the ALT CSTR is predicted to be missed – White, when the ALT CSTR is not taken into account by the guidance, and the NAV mode is engaged.
◠	Energy circle symbol (green arc) centered on the a/c position and oriented to the current track line. Represents the Required Distance to Land. Only displayed in descent and approach phase when a selected lateral mode is engaged (HDG or TRK)
Crosstrack error XX.X R or XX.XL (X is a number	The crosstrack error displays the lateral deviation between the aircraft position and the track of the F-PLN active leg. The value is limited to 99.9 NM left or right.

· Predicted time of arrival at the TO WPT is located at the upper right-hand corner of the ND. It assumes direct distance from a/c position to the TO WPT and current ground speed.



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As a general rule, the ND indicates what the aircraft will fly with the current active FG modes.

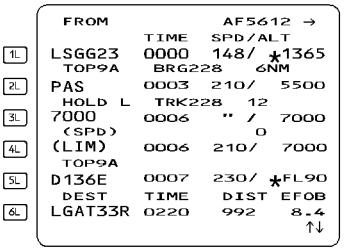
For example :

- The continuous green line on the ND represents the track the aircraft is currently flying :
  - If HDG/TRK is engaged, the track line is green and the flight plan is dashed.
  - If NAV mode is engaged, the green line is the flight plan.
- If the speed target is manually selected, the speed-change symbol is no longer displayed because it will not be taken into account.
- When the aircraft is not following the vertical flight plan (OPCLB, OPDES, V/S) but the NAV mode is engaged, the system disregards any altitude constraints and puts white circles around the waypoints that have these constraints and positions level symbols accordingly.
- Pseudo waypoints are adjusted each time predictions are updated.

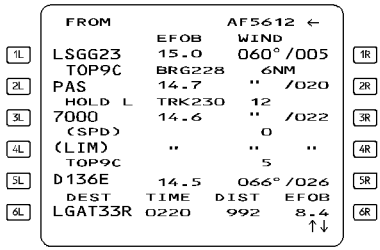
PREDICTIONS DISPLAYED ON THE MCDU

The predictions displayed on the MCDU assume that AP (or FD order) is controlling the aircraft and flying it along the preplanned lateral and vertical flight plan.
Therefore :

- If the aircraft is guided along the flight plan (managed guidance), the MCDU predictions correspond exactly to what the aircraft is doing.
- If the aircraft is not guided along the flight plan (selected guidance), the MCDU predictions assume that it will return immediately to the flight plan, intercepting at a predetermined angle, and will then proceed under managed guidance.
- If the aircraft does not fly the managed speed profile (ECON, SPD CSTR ...), the MCDU predictions assume that it will remain at the present selected speed/Mach until it reaches the next SPD CSTR or SPD LIM or enters the next flight phase.



F-PLN A



F-PLN B

NFCS-04-0220-019-A001AA

TYPE OF PREDICTIONS

	MCDU PAGE :
Pseudo waypoints : T/C, T/D, S/C, S/D, I/P, SPD LIM, DECEL	F-PLN A and B
TIME / SPD / ALT at each WPT and pseudo-WPT	F-PLN A
ETA / DIST TO DEST along F-PLN / EFOB at destination	F-PLN A and B
EFOB / T-WIND at each WPT and pseudo-WPT	F-PLN B
Constraint symbol * at each constrained WPT (TIME / SPD / ALT)	F-PLN A and B
Altitude error in case of missed ALT constraint	VERT REV
EFOB / EXTRA FUEL at each WPT	VERT REV
TIME / EFOB at destination	FUEL PRED / PERF CLB / CRZ / DES
TIME / DIST to a selected altitude	PERF CLB or DES
Fuel prediction prior engine start	INIT B
REC MAX FL	PROG
TIME / EFOB at Alternate	FUEL PRED
XTRA FUEL for various Alternates	ALTN
VDEV vertical deviation from vertical flight path	PROG
Required Distance to Land ◁*	PROG
Direct Distance to Destination ◁*	PROG

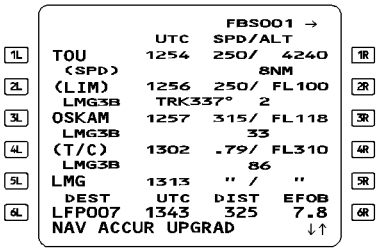
Required distance to land and Direct distance to destination are not displayed on FMGS GPS standard (A3 or B3).

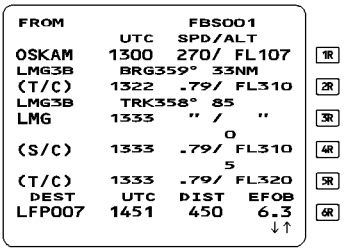
EXAMPLES OF MCDU PREDICTIONS

The following MCDU pages display some of the prediction types.

Pseudo-waypoints :
Top of Climb (T/C), top-of-descent (T/D), start of Climb (S/C) or start of descent (S/D) for step Climb/descent, speed limit (SPD LIM), deceleration to approach phase (DECEL)

Time, speed and altitude predictions
TIME/SPD/ALT for all waypoints and pseudo waypoints.





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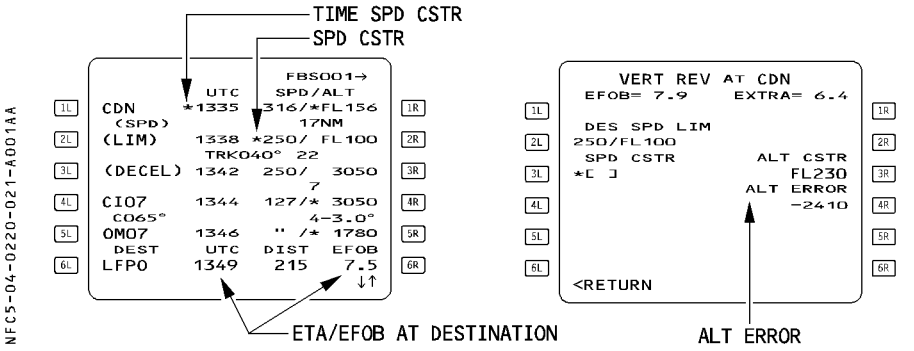
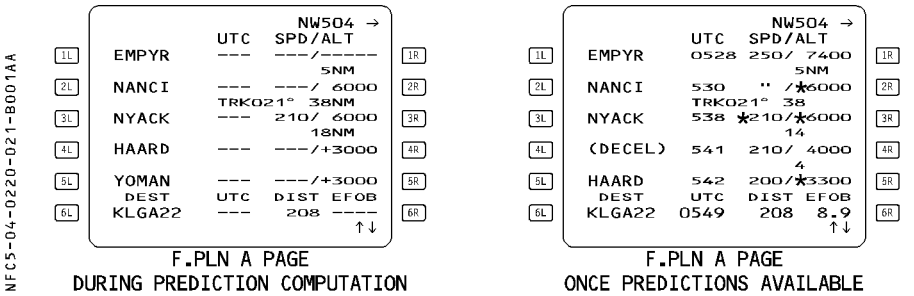


CONSTRAINT SYMBOLS (star)

When a time speed or an altitude constraint is part of the vertical flight plan, it appears on F-PLN A page only at the time of insertion or while predictions are not yet available.
Once available, time speed and altitude predictions are displayed for all F-PLN waypoints: when a speed or an altitude constraint is in effect at a waypoint, a star symbol appears adjacent to the speed or altitude prediction. If the star is magenta the constraint is predicted to be matched. If the star is amber, the constraint is predicted to be missed.



Note : If an altitude constraint is predicted as missed, the system tells you what will be the error at the specific waypoint.

VERTICAL DEVIATION

During descent, the system indicates, how far you are from the computed descent profile (PFD and MCDU) and predicts where you may rejoin it. VDEV on the PFD and PROG page, predictions on MCDU F-PLN page, symbols on the ND display, enable assess to the vertical
R position versus the computed flight profile.
R

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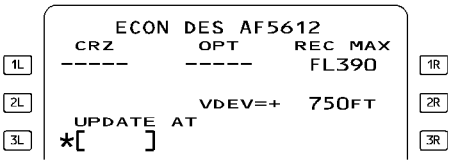


OPERATION RULES CONCERNING PREDICTIONS

- The pilot must properly update the flight plan data during the flight, in order to obtain accurate and meaningful predictions.
- The pilot should rely on the navigation display for short-term predictions. It indicates what the aircraft will do under the currently engaged modes (selected or managed).
- The pilot should rely on the MCDU for long-term predictions, when managed guidance is active or about to be reengaged.

MANAGED TARGETS

When the aircraft is using managed targets, the flight management and guidance system (FMGS) guides it along lateral and vertical flight paths and speed profiles computed by the flight management function (FM) from data in the MCDU.
FM manages the guidance targets.

SELECTED TARGETS

When the pilot is using selected targets, the FMGS guides the aircraft along lateral and vertical flight paths and speed profiles to meet targets that the pilot has selected manually on the FCU.
The pilot selects the guidance targets.

MODE REVERSIONS

All mode reversions are how described in FCOM volume 1 (1.22.30).

FLIGHT GUIDANCE MODES

Lateral and vertical modes may be :
- armed
- engaged
- disengaged

Autothrust modes may be :
- armed
- active
- disconnected

LATERAL MODES

R

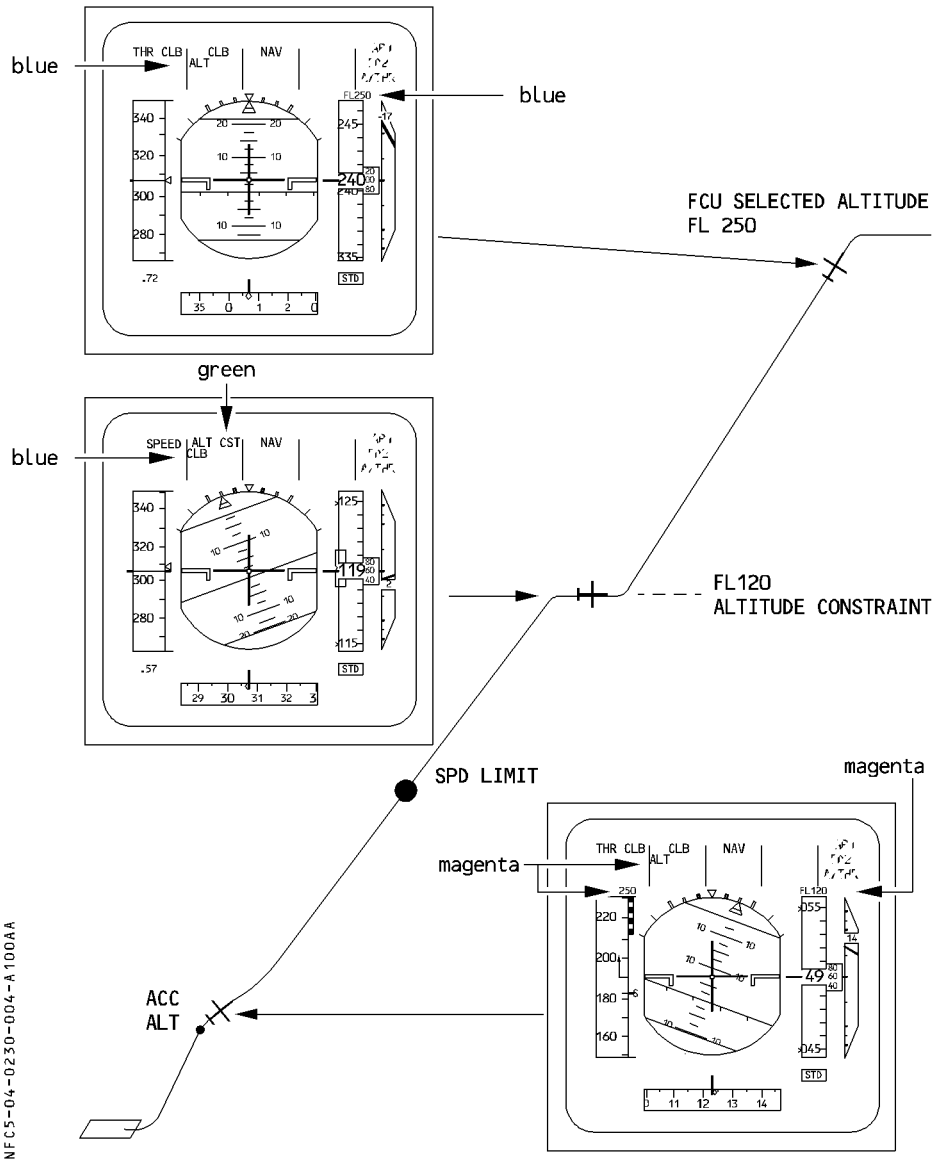
MODE	TYPE	GUIDANCE	REMARK
RWY	MANAGED	Mode used at takeoff to guide the aircraft along the runway centerline, using LOC.	Triggered by the thrust levers at FLX or TOGA position.
RWY TRK	MANAGED	Mode used to guide the aircraft along the track the aircraft was following at mode engagement.	
NAV	MANAGED	Mode used to guide the aircraft along the lateral F-PLN. Available above 30 feet after takeoff.	Automatically armed at takeoff, unless HDG/TRK is preset. In that case, RWY TRK engages after takeoff.
HDG-TRK	SELECTED	Mode used to guide the aircraft on a heading or a track selected by the crew. The target value is displayed in the FCU window.	*Note : HDG/TRK is called "basic mode" because it is a backup mode for certain situations :* *– F-PLN discontinuity entry.* *– AP engagement with no FD.* *– Loss of F-PLN.*
LOC* LOC APP NAV	MANAGED	Mode used to guide the aircraft on the lateral approach path (LOC or F-PLN approach path).	Selected by pressing APPR pb on the FCU ; the mode that engages depends upon the selected approach in the F-PLN. *Note : For LOC only approach, do not select the FCU's APPR pushbutton, but rather the LOC pushbutton.*
LAND	MANAGED	Common mode engaged below 400 ft RA during an automatic ILS approach.	Engaged, only if LOC mode and G/S mode are already engaged.
GA TRK	MANAGED	Mode used to guide the aircraft along the track the aircraft was following at mode engagement.	Triggered by the thrust levers at TOGA with Slats/Flaps in, at least, CONF 1.
ROLL OUT	MANAGED	Mode used to guide the aircraft on the runway, following an automatic landing.	FD rollout symbol is displayed on the PFD at touchdown.

VERTICAL MODES

R

MODE	TYPE	GUIDANCE	REMARK
SRS	MANAGED	Mode used at takeoff or Go Around to maintain SRS speed (V2, V2+10, VAPP ...).	Triggered by the thrust levers at FLX or TOGA position. Disengages automatically at ACC ALT or when another VERT mode is engaged.
CLB	MANAGED	Mode used to climb towards FCU SEL ALT along VERT F-PLN taking into account ALT CSTR. Available only if NAV engaged. The A/THR is in THRUST mode (CLB).	The speed target may be either selected or managed. If managed, SPD CSTR, SPD LIM, and HOLD SPD are taken into account. ALT mode is always armed ; displayed in magenta if the next level off is predicted at an ALT CSTR, and in blue if the next level off is predicted at the FCU selected altitude
DES	MANAGED	Mode used to descend towards FCU SEL ALT along the computed descent path taking into account ALT CSTR. Available only if NAV engaged. The A/THR may be in THRUST or SPD mode.	
OPEN CLB OPEN DES	SELECTED	Mode used to climb/descend directly to the FCU selected ALT. These modes disregard all ALT CSTR. The A/THR is in THRUST mode (CLB/IDLE)	The speed target may be either selected or managed. ALT mode is systematically armed and blue. Altitude target is blue on PFD.
EXPEDITE ◁	SELECTED	Mode used to increase the vertical speed by selecting green dot in climb or .80/340 KT in descent.	Used to expedite a climb or a descent towards a specific level.
ALT CSTR* ALT CSTR	MANAGED	Mode automatically engaged when reaching an ALT CSTR before the FCU SEL ALT.	CLB/DES mode are systematically armed (blue).
ALT* ALT ALT CRZ* ALT CRZ	SELECTED	Mode used to maintain a level flight at the FCU selected altitude.	Soft ALT mode engages when FCU selected altitude = CRZ FL Soft ALT is part of the managed guidance.
V/S-FPA	SELECTED	Mode used to guide the a/c along a vertical speed or a selected flight path angle.	Altitude target is blue on PFD. V/S-FPA is a basic mode. (Refer to HDG/TRK remark).
GS* G/S FINAL	MANAGED	Mode used to guide the a/c along the final approach path (GS or non ILS)	Selected by depressing the APPR pb on the FCU. The mode engaged depends upon the selected approach in the F-PLN. Linked to APPR common mode (APPR pb).
FLARE	MANAGED	Common mode which provides the alignment to the runway center line on the yaw axis and the flare on the pitch axis.	Engages below 50 ft RA as a function of the current vertical speed.

CLIMB MODE


blue
THR CLB
CLB
ALT
NAV
blue
FCU SELECTED ALTITUDE
FL 250
green
blue
SPEED
ALT CST
CLB
NAV
FL120
ALTITUDE CONSTRAINT
SPD LIMIT
magenta
magenta
THR CLB
CLB
ALT
NAV
ACC
ALT
NFC5-04-0230-004-A100AA

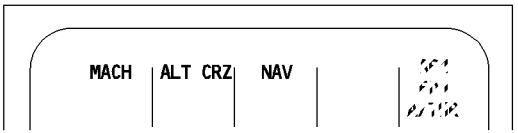
When CLIMB mode is engaged (always associated with lateral NAV mode), the system takes into account all constraints defined by the database or manually entered by the crew. Nevertheless this mode has the following particularity :
When the aircraft is in CLB mode and the system predicts that it will miss an altitude constraint, it will not modify the target speed in an attempt to meet it.
In this case, the pilot may select an appropriate speed in order to meet the ALT CSTR.

SPECIFIC MODES IN CRUISE PHASE

· SOFT ALTITUDE MODE (CRUISE)

The soft altitude mode engages when the aircraft reaches the FCU altitude set as the cruise flight level (entered in the F-PLN or on PROG page).
The soft altitude mode corrects minor deviations from the Mach target by allowing a ± 50-foot variation from the CRZ FL. This feature improves fuel efficiency and passenger comfort and minimizes the changes in thrust.

NFC5-04-0230-005-A100AA



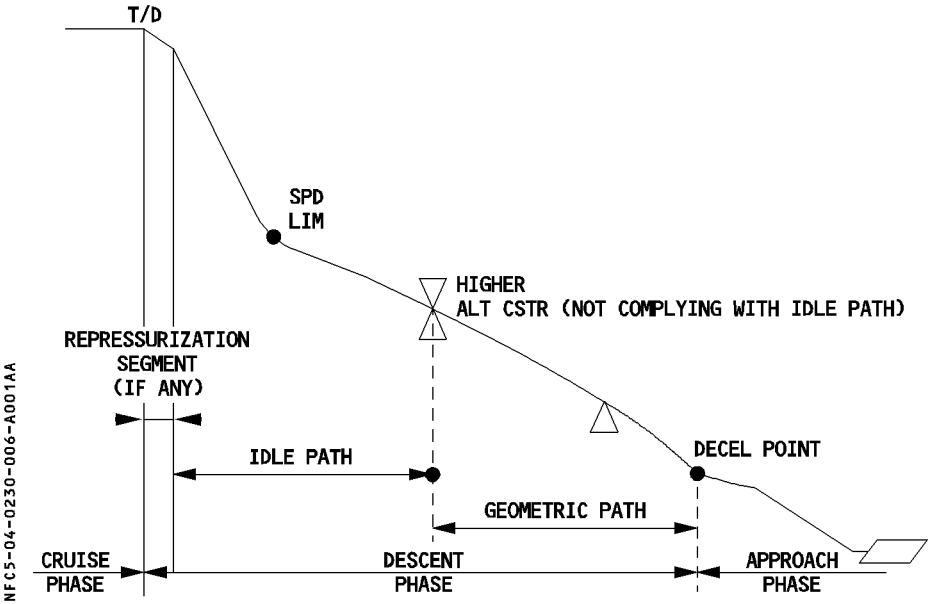
Typical FMA in CRZ with soft altitude mode engaged

· STEP CLB or STEP DES

The pilot inserts a step when he is planning to change the cruise flight level. The system responds by displaying predictions for the new situation.
If the pilot inserts a step at a waypoint, the system displays a start-of-climb or descent (S/C or S/D) pseudo waypoint on the ND and the MCDU.
The flight crew can insert only one step at a time. (It can insert a second step only after the aircraft has executed the first one).

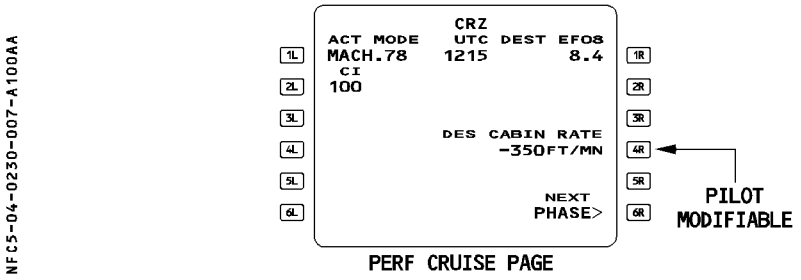
DES MODE

The DES mode guides the aircraft along the descent path computed by the FMGS.
The system computes this flight path backwards from the deceleration point up to the top of descent (T/D) with respect to the speed and altitude constraints .
Internally, the computer divides the descent path into various segments, depending on the relative positions of the constraints. It starts at top of descent (T/D) by setting up an "idle" segment that takes the aircraft down to the first constraint, and follows this with "geometric" segments between constraints.



REPRESSURIZATION SEGMENT

The top of descent (T/D) may be updated if the pilot modifies the cabin rate of descent (default rate is – 350 feet/minute).
If the flight crew enters a lower cabin rate, the system computes a repressurization segment that takes into account the additional time needed for repressurization.

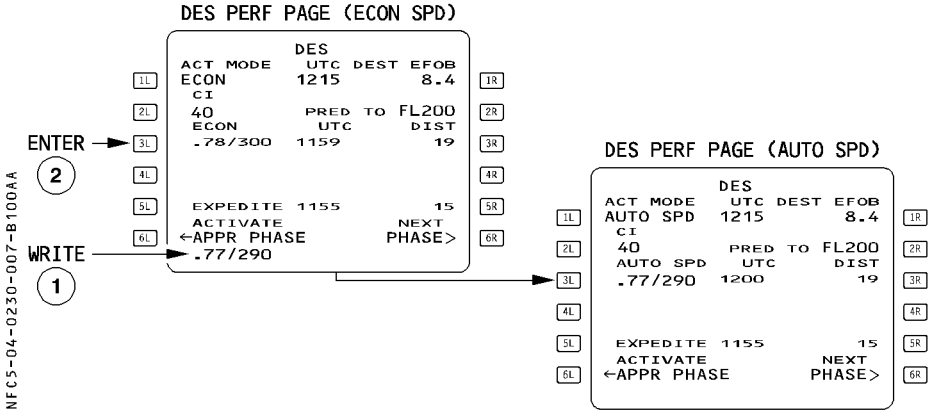


PERF CRUISE PAGE

DESCENT SPEED PROFILE

The descent speed profile is usually the ECON SPD profile, amended by any speed constraints and speed limit contained in the flight plan.

R Before the descent phase is active, if the pilot does not intend to fly the ECON speed/Mach
R profile, a different speed or Mach can be entered to amend the speed profile :
This selected speed/Mach is called AUTO SPD. It is obtained by entering a Mach number
R and/or a speed in the ECON field of the PERF DES page (3L key).
R



R If the pilot reverts to the SELECTED speed/MACH mode during descent, the profile is not
R modified and the aircraft flies the same profile at the FCU-selected speed/MACH value.
Basic managed SPD/MACH profile in DES mode is :

* ECON MACH, or AUTO MACH
* ECON SPD, or AUTO SPD
* SPD CSTR (if any)
* SPD LIMIT
* GD/S/F/VAPP
* VAPP TARGET

GUIDANCE IN DES MODE

The aircraft will not start its descent automatically when reaching the top of descent (T/D). In order to initiate the descent, the pilot will set the clearance altitude then push the ALT selector knob. The aircraft will descend immediately.

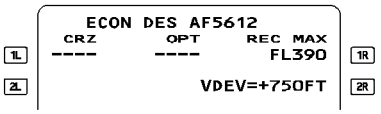
* If the top of descent is not reached, the aircraft descends at a constant V/S converging on the descent path.
* If the aircraft is at or beyond T/D, it descends at idle thrust.

· During the descent :

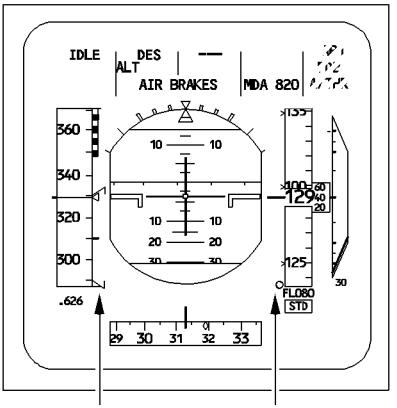
The pilot will see a vertical deviation symbol (VDEV) along the ALT scale on the PFD and a VDEV value on the PROG page, so that the aircraft's vertical position can be monitored versus the calculated descent profile.

The aircraft may deviate from the DES profile while DES mode is engaged if :

– unexpected wind conditions is encountered.
– anti-icing is turned on.
– the lateral flight plan is changed.



PROG PAGE



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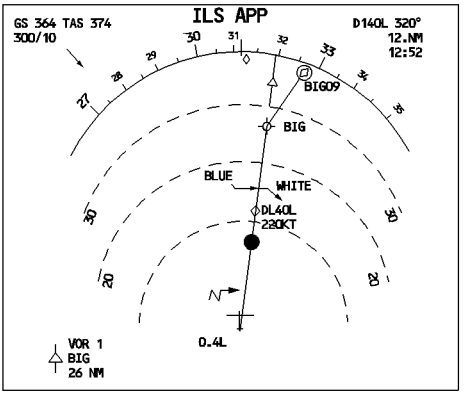
- When the speed is managed, a target speed range displayed on the PFD defines acceptable speed variations around the nominal descent speed target.
  - If the aircraft is above the descent profile, the speed increases toward the upper limit of the target speed range as the aircraft converges on the descent profile. If this does not increase the descent angle enough, the aircraft deviates from the descent profile. (A/THR is at IDLE).
  - If the aircraft is below the descent profile, the aircraft maintains the target speed until it reaches the vertical profile. The lower margin becomes effective when the aircraft is on the descent profile but has to lose speed in order to stay on it.
- The ND shows an intercept symbol ∿→ that indicates the position where the system predicts that the aircraft will be back on the descent profile. When the aircraft is above the descent profile, the prediction is based on the assumption that the pilot will extend half speedbrakes. If necessary, the message "AIRBRAKES" (old FMGC standard) or "MORE DRAG" comes up on the PFD and the MCDU, and remains there as long as more drag (speedbrakes) is still required. The pilot should respond to this message by deploying half speedbrakes.



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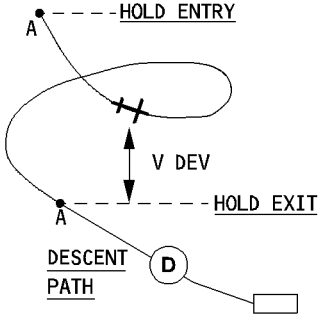
Note : With DES mode engaged, extending the speedbrakes does not necessarily increase the descent rate. It does so only if the aircraft is above profile.

- **When in a holding pattern**

The DES mode commands V/S = – 1000 feet/minute while A/THR maintains the holding speed. The current VDEV is the vertical deviation from the altitude at which FM predicts the aircraft will be when it reaches the exit fix.

Until the pilot exits the hold, the FMGS in DES mode will maintain V/S = – 1000 feet/minute considering downpath vertical constraint. This means that the aircraft will not descent below the next altitude constraint, neither the FCU selected altitude. If the aircraft reaches the next altitude constraint it will level off and ALT CSTR mode will engage.

R



NFC5-04-0230-010-A001AA

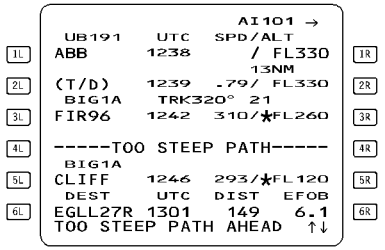
- **Too steep path**

A descent segment is called "too steep path" when FM predicts that the descent segment between two constraint waypoints is impossible to fly at the planned descent speed with 1/2 speedbrakes extended.

When this occurs :

The MCDU displays no predictions between the upper and the lower points of the too steep path.

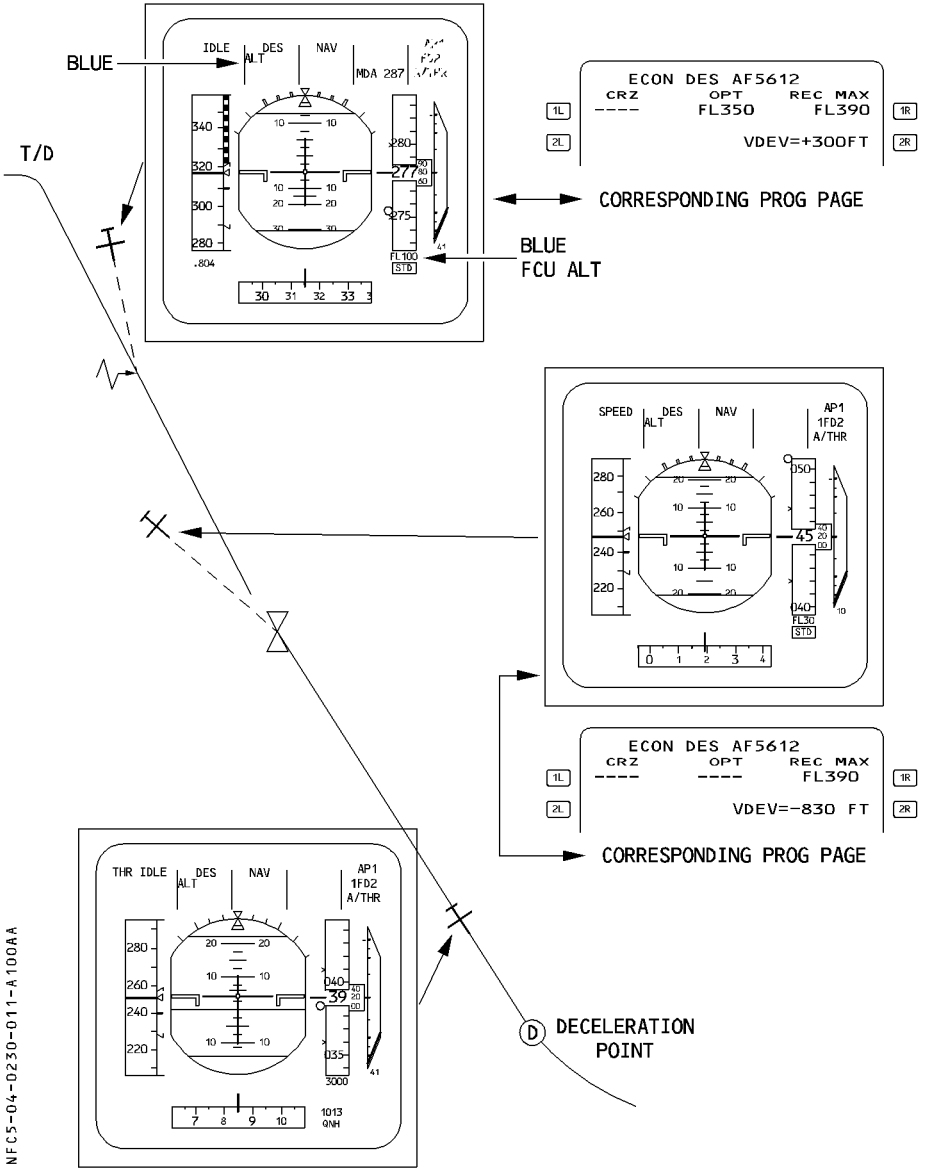
Relevant message "TOO STEEP PATH" is displayed on MCDU.



NO PREDICTIONS BETWEEN THE UPPER AND LOWER POINTS

NFC5-04-0230-010-B001AA

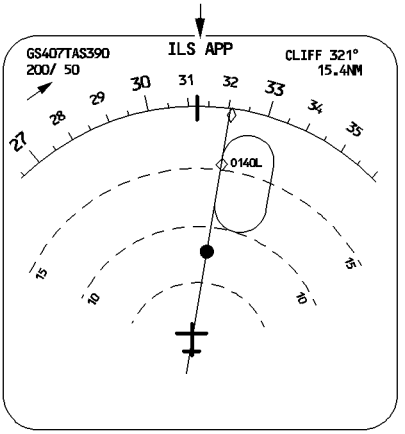
DES MODE PROFILE



APPROACH MODES

R The aircraft can fly different types of approaches :
R — Precision approaches : ILS, MLS.
R — Non-precision approaches : VOR/DME, VOR, NDB (if ADF installed), RNAV.
R — Non-precision approaches using a Localizer only : LOC, LOC B/C.
R The crew uses an ARRIVAL lateral revision to insert these approaches into the flight plan.
R For precision approaches, the crew uses the APPR pushbutton on the FCU to arm or R engage the guidance modes LOC and G/S.
R For non-precision approaches, the crew uses the APPR pushbutton on the FCU to arm or R engage the guidance modes APP NAV and FINAL, except for LOC and LOC B/C approaches, R where the crew only uses the LOC pushbutton to arm or engage the LOC mode.

THE TYPE OF SELECTED APPROACH IS DISPLAYED ON THE TOP SIDE OF THE ND



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APP NAV - FINAL MODES

When a non precision approach is selected in the active flight plan, and the APPR pushbutton is pressed, APP NAV and FINAL will arm.
If NAV mode was currently engaged, APP NAV mode engages immediately.
FINAL mode will engage when, APP NAV being engaged, the aircraft trajectory intercepts the non precision flight profile (usually a descending leg).
(Refer to FCOM 1.22.30) “NON PRECISION APPROACH mode”.

FLIGHT MODE ANNUNCIATOR (FMA)

The purpose of the FMA is to display the guidance modes of the aircraft. The FMA shows the A/THR and AP/FD modes, as well as the engagement status of these systems and their ILS approach capabilities.
The AP/FD and A/THR use only the guidance modes displayed on the first line.

· **The first line displays :**
* A/THR and AP/FD engaged modes in green
* Landing capability in white (CAT 1, CAT 2, CAT 3 DUAL or CAT3 SINGLE)
* AP engagement (AP1, AP2 or AP1 + 2) in white

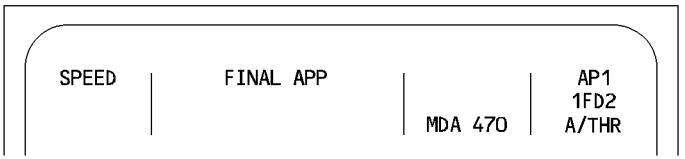
R *Note : CAT1 is the lowest capability displayed in that field.*
R *CAT1 covers different requirements including raw data.*

· **The second line displays :**
* Armed mode in blue except ALT mode when it is armed because of an altitude constraint (magenta).
* Preset speed or Mach when it is selected by the crew.
* FD engagement in white. (1FD2 ...).

· **The third line displays :**
* MDA/MDH or DH/NO DH in blue followed by the value entered manually by the pilot.
* A/THR status in white when active, in blue when armed.
* Operational messages

For a detailed description of all indications displayed on the FMAs. (Refer to 1.22.30).

NFC5-04-0230-013-A100AA



TYPICAL FMA DURING NON PRECISION APPROACH

– Both FMAs are driven by the master FMGC
– Each new annunciation is boxed for 10 seconds.
For a detailed description of the FMAs. (Refer to 1.22.30).

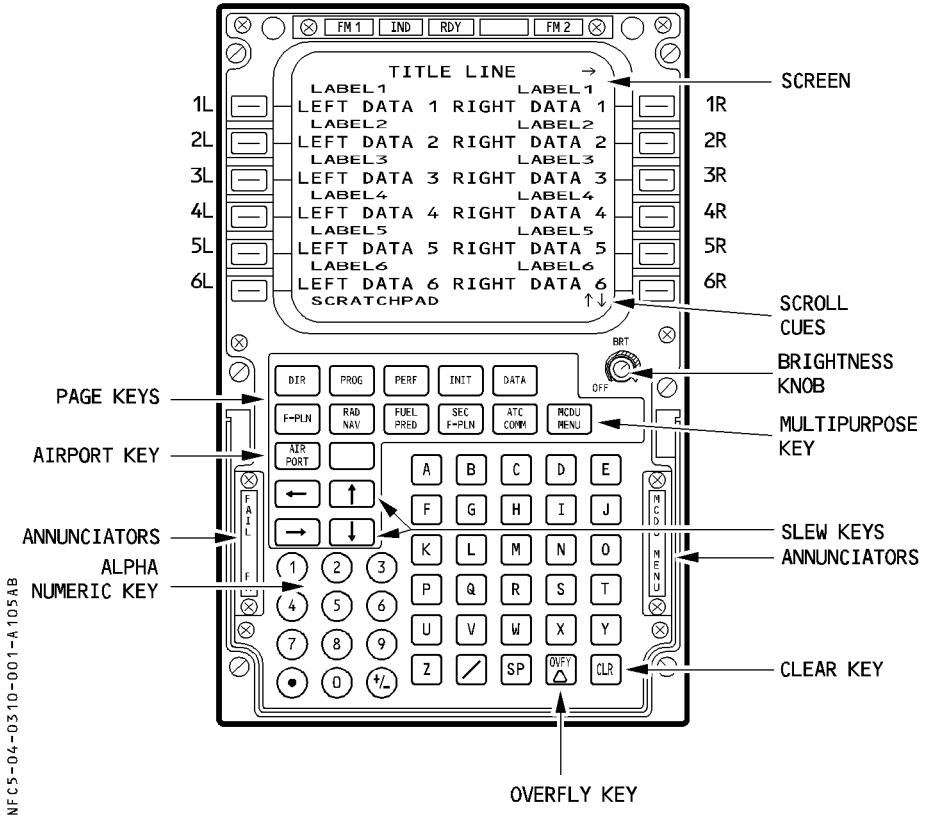
03.00 CONTENTS

03.10 INTERFACE VIEWS

03.20 MCDU PAGES DESCRIPTION

03.20 MCDU PAGES DESCRIPTION (cond't)

MCDU



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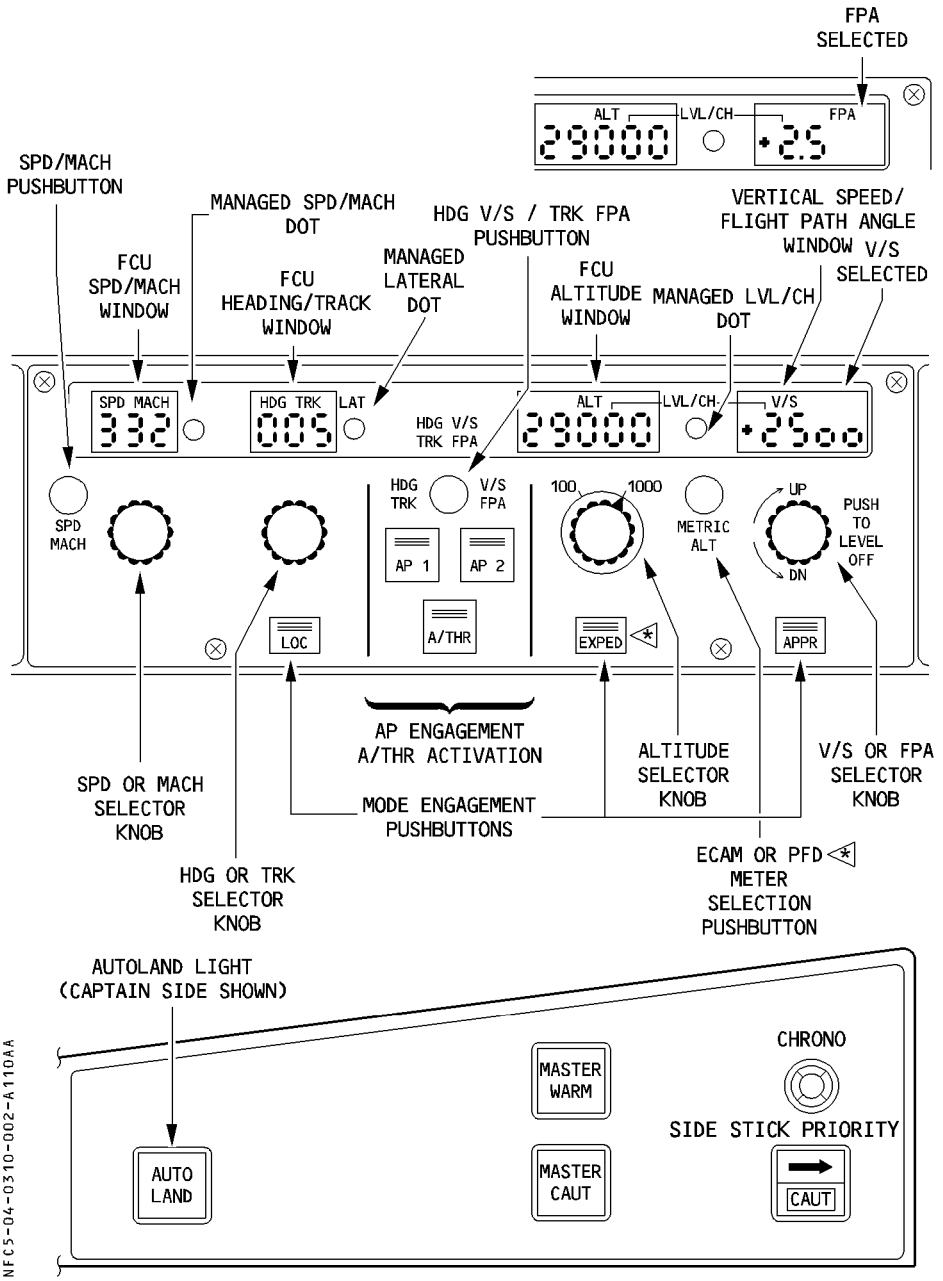
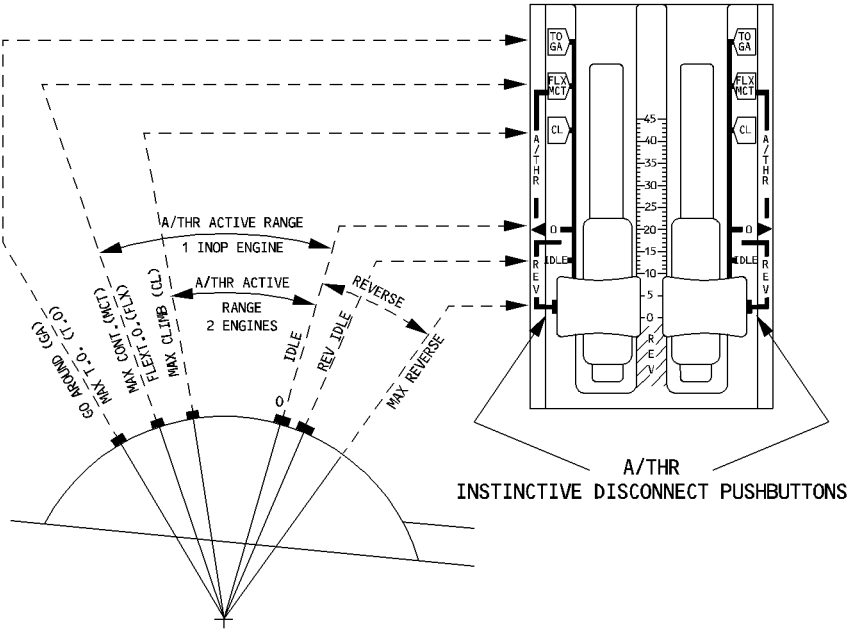
FLIGHT CONTROL UNIT (FCU) AND AUTOLAND LIGHT

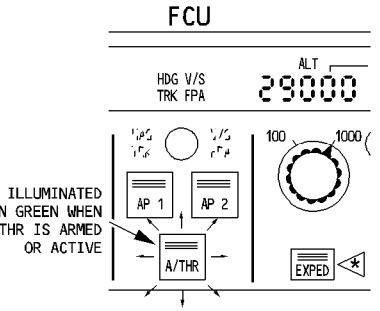
R

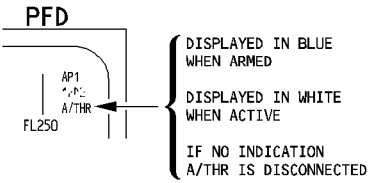


THRUST LEVERS

R



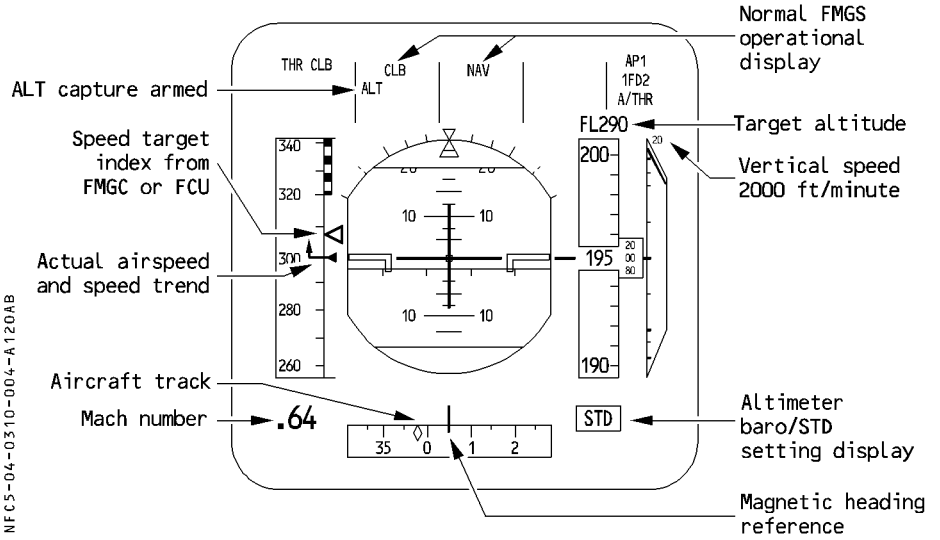




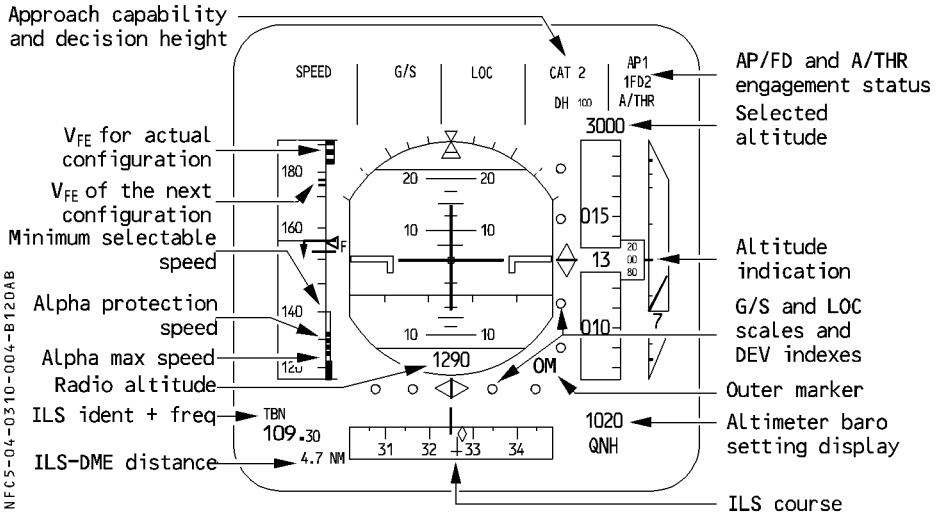
NFC5-04-0310-003-A001AA

PRIMARY FLIGHT DISPLAY (PFD)

CLIMB PHASE



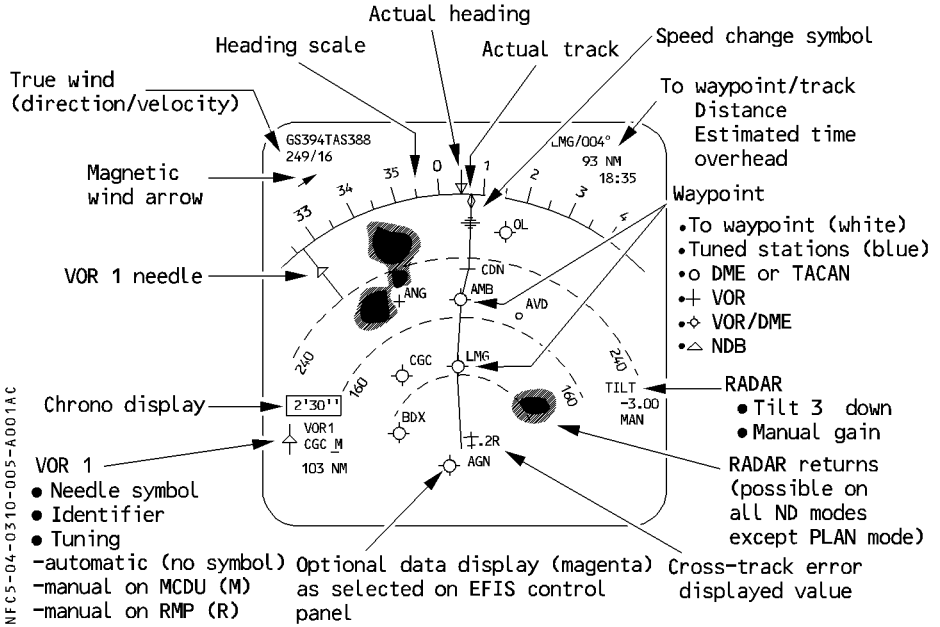
APPROACH PHASE



For details refer to FCOM 1.31.

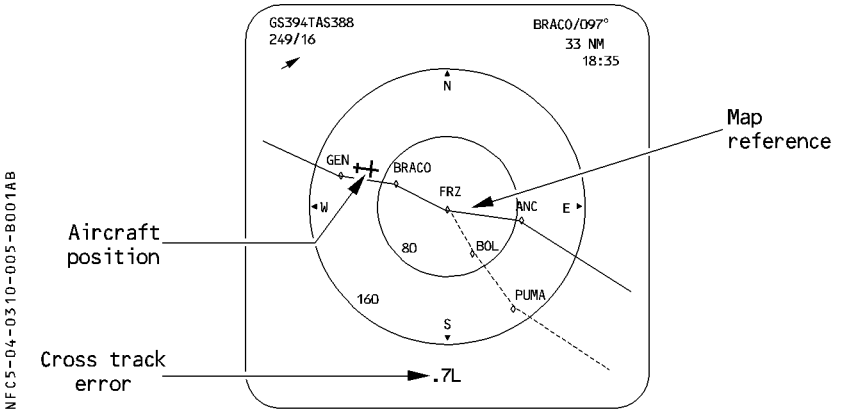
NAVIGATION DISPLAY (ND)

ARC MODE



NFC5-04-0310-005-A001AC

PLAN MODE

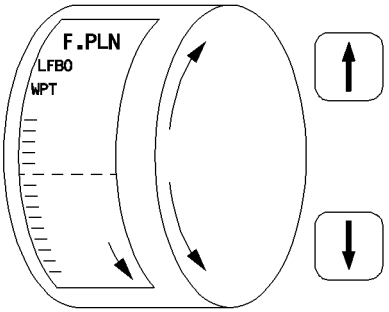


NFC5-04-0310-005-B001AB

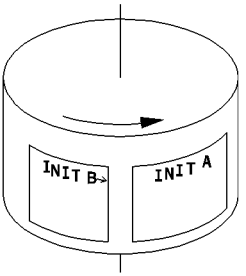
For details refer to FCOM 1.31.

GENERAL

The FMGS (flight management and guidance system) displays information on various "pages". When a page cannot display all the information assigned, it cues the pilot to call up additional information.
There are three types of pages, and each type has its particular way of cuing the pilot to call up additional information.



FIRST TYPE



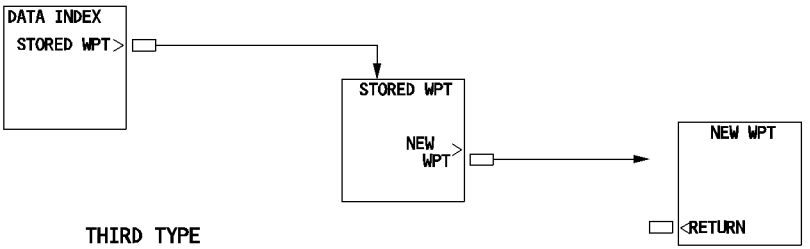
SECOND TYPE

NFC5-04-0320-001-A001AA

First type
When this page cannot display all the information on the screen simultaneously (more information than the six pairs of lines on the screen can hold), the pilot can scroll the page up or down.
When this is the case, the screen displays a ↑↓ symbol in its bottom righthand corner (F-PLN pages, secondary F-PLN page, departure/arrival pages,...).

Second type
When successive pages hold the information, the pilot presses the "NEXT PAGE" key to call up these pages sequentially.
In this case, the page displays an arrow in the top righthand corner of the screen (INIT pages).

Third type
When successive pages hold different types of information, the pilot calls these up by pressing the key adjacent to the prompts >, < or *.

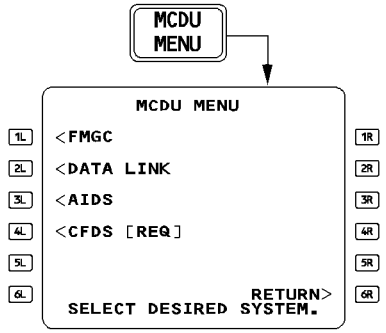


THIRD TYPE

NFC5-04-0320-001-B001AA

MCDU MENU PAGE

This page lists the various systems to which the pilot can gain access through the MCDU.



NFC5-04-0320-002-A001AA

The pilot selects a system by pressing the key adjacent to the name of that system. The screen shows the name of the selected system in green, all others in white.
If the MCDU cannot establish communication with the selected system, it displays "TIME OUT".
When a system calls for pilot attention, the MCDU displays "REQ" next to the system name, and the "MCDU MENU" annunciator lights up.
When the pilot presses the key next to the name of the system that requires attention, the "MCDU MENU" annunciator light goes out.

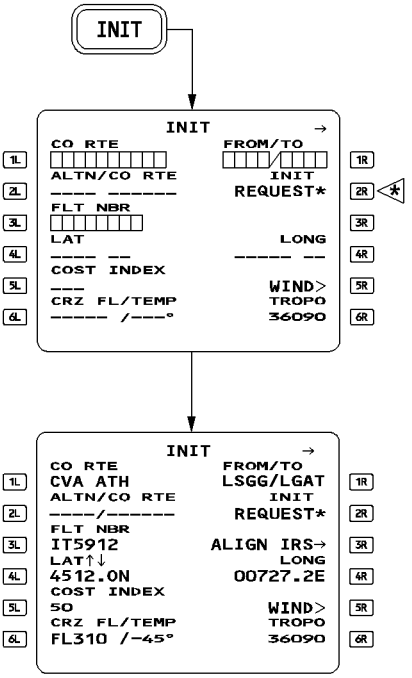
Note : When the MCDU is communicating with a system other than the FMGC, the pilot should use the MCDU MENU page to revert to the FMGC system.
The MCDU may freeze if the pilot tries to gain access to a system directly by selecting it with an access key.

INIT A PAGE

The pilot uses the INIT A page to initialize the flight plan and align the inertial reference system.

- The pilot accesses this page by pressing the INIT key on the MCDU console, but only during the preflight phase.
- The pilot may also call up this page by :
  - Pressing the "NEXT PAGE" key on the MCDU console, while on the INIT B page, or
  - Pressing the key next to "RETURN" or "INSERT" on the route selection page.

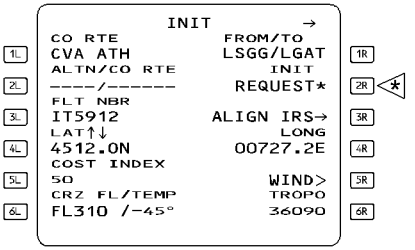
R - When in the done phase, the pilot may press the INIT key to begin the next preflight
R phase.



NFC5-04-0320-003-A100AA

[1L] CO RTE	If the flight crew enters a company route number, the screen displays all data associated with that route (8 or 10 characters, depending on the pin program). Inserting the CO RTE into the RTE selection page also enters the CO RTE number in this field.
[2L] ALTN/CO RTE (blue)	This field is dashed until a primary destination is entered in the 1R field. If a preferred alternate is associated with the primary destination, it is displayed in this field with the company route identification. The crew may enter an alternate and a company route manually. If preferred alternate is not associated with the primary destination, NONE is displayed in this field. When the alternate route and the primary destination do not match, the MCDU scratchpad displays “DEST/ALTN MISMATCH”. If the primary destination is changed, this field is modified accordingly.
[3L] FLIGHT NUMBER	The flight number appears in this field automatically if it is stored with the company route. The flight crew may modify it or enter a new number here.
[4L] LAT	The latitude of the departure airport reference point appears here. The flight crew may modify it by slewing or overwriting.
[5L] COST INDEX	This is usually stored in the data base along with the company route. The flight crew may modify it or enter a new value here. It defaults to the last entered value if a value is not stored in the data base.
[6L] CRZ FL/TEMP (cruise flight level and temperature)	The cruise flight level is usually stored in the data base along with the company route. If not, it has to be entered manually. If no cruise flight level is entered, the system will not furnish predictions while the aircraft is on the ground. The flight crew has to enter the temperature at cruise flight level in order to refine the predictions. Otherwise these are computed for ISA conditions. (If no sign is entered, the system uses plus).

NFC5-04-0320-005-A100AA



[1R] FROM/TO

This field enables the pilot to enter a city pair (ICAO codes for city of origin and destination). This entry automatically deletes any previously entered company route, and calls up the route selection page. If one airfield of the pair is not in the database, the display changes to the NEW RWY page.

[2R] INIT REQUEST ◁*

This prompt is displayed, if the pilot did not enter an active flight plan, or entered a flight number or a company route that is not in the aircraft database. Selecting this prompt sends the ground a request for active flight plan initialization (downlink message). When the star is not displayed, a downlink message cannot be sent.

The uplink flight plan is automatically inserted in the active flight plan, prior to engine start, provided an active flight plan does not exist.

After engine start, the uplink flight plan is sent to the secondary flight plan and manually inserted or rejected. (Refer to 4.04.40).

[3R] ALIGN IRS

This field only displays this legend if the LAT and LONG fields are filled in, and at least one of the inertial reference systems is in ALIGN status (IRS in NAV position and alignment process not over). If the pilot presses this key when its field is displaying this legend, the present coordinates are sent to the IRSs, and this completes the alignment process.

[4R] LONG

This field displays the longitude of the departure airport reference point. The pilot may modify by slewing or overwriting.

R [5R] WIND >

R The pilot presses this key to access the climb wind page, unless a temporary flight plan exists. In this case, the

R scratchpad displays "TEMPORARY F-PLN EXISTS".

[6R] TROPO

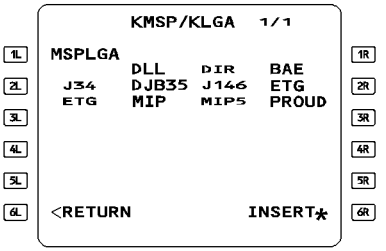
The default tropopause altitude is 36090 feet. The pilot can use this field to modify it (39000 feet maximum).

ROUTE SELECTION PAGE

This page displays all the company routes, stored in the database, that are associated with the inserted city pair. It can be called up manually, or displayed automatically.

- Manually : The pilot presses the FROM/TO or ALTN key on the INIT A page, when a city pair is displayed.
- Automatically : The system displays it, when the pilot enters a city pair, defines an
R alternate on the INIT A page of the active or secondary flight plan, or when the flight
R crew enters an OTHER ALTN on the alternate page.

NFCS-04-0320-006-A001AA



TITLE	Idents for the city pair are inserted on the INIT A page. (The numbers in the upper righthand corner are the total number of company routes from this city pair stored in the database).
[1L]	This field shows the name of the company route displayed on the page. NONE appears, if there is no company route for this city pair.
Line 2 to Line 5	These fields display the various elements of the company route : Waypoints in large green font, and airways in small white font.
[6L] RETURN	The pilot presses this key to return to the INIT A page.
R [6R] INSERT R or SELECT	This prompt displays an amber INSERT (blue for the secondary flight plan), if the pilot accessed the page from the INIT A (or secondary INIT A) page. It displays SELECT (blue) if the crew accessed the page from the alternate page. The pilot presses this key to insert the displayed company route in the respective flight plan and to return the display to the accessing page.

R *Note : The pilot can slew the display to show the rest of the route, if one page does*
R *not show it all, or to display other company routes for this city pair.*

LEFT INTENTIONALLY BLANK

WIND PAGES

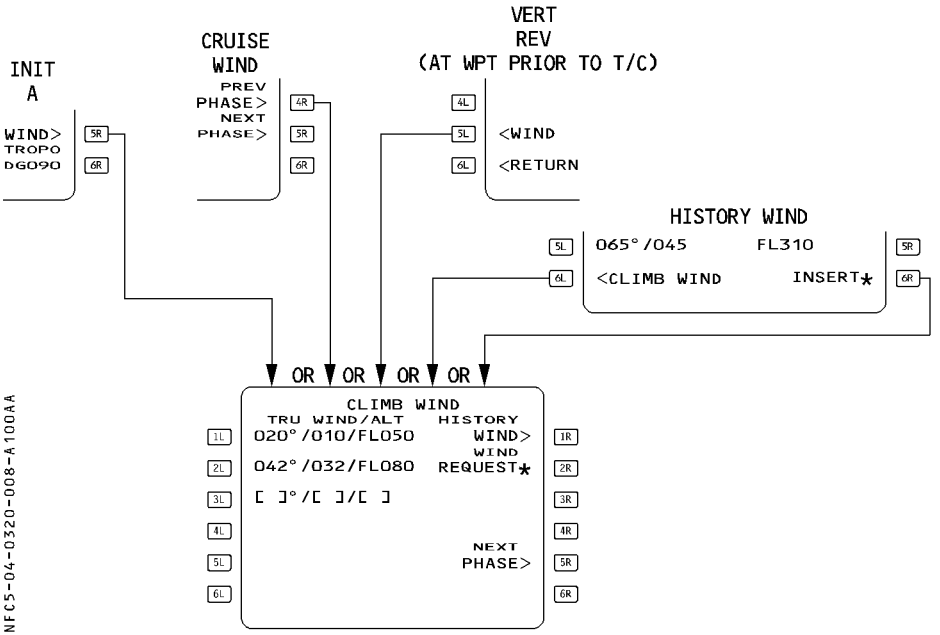
Winds in climb, cruise, descent and approach are necessary to provide the pilot with reliable predictions and performance. Wind pages enable the pilot to enter and/or review the winds propagated by the FMGS or sent by ACARS for the various flight phases.

Note : On WIND pages, wind direction is always true referenced.

CLIMB WIND PAGE

This page enables the pilot to enter and/or review predicted wind vectors (direction and velocity) at up to 5 different levels.

CLIMB WIND page is accessed from :



NFC5-04-0320-008-A100AA

TITLE — CLIMB WIND in large white font.

[1L] TRU WIND/ALT to [5L] — This field displays the winds, entered at various climb altitudes : In blue before climb phase activation, and in green after climb phase activation.
This field may also display history winds or uplink winds.
Large blue brackets are displayed before any wind entry.
Pilot-entered and uplinked winds are displayed in large font.
History wind data is displayed in small font.
Upon sequencing the top of climb, the climb winds are deleted.

Note : Climb winds are not deleted, when the origin airport is changed.

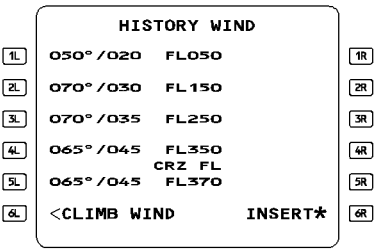
[1R] HISTORY WIND — Displayed in preflight phase only. This key calls up the history wind page. This page is not modifiable (small green font), but can be inserted into the CLIMB WIND page by using the 6R key and modified accordingly.

[2R] WIND REQUEST ◁* — Pressing this key sends a request for ACARS winds. (Refer to 4.04.40). This prompt is only active on ACARS-equipped aircraft.

[5R] NEXT PHASE — Pressing this key calls up the CRUISE WIND page, or the DESCENT WIND page, if no cruise waypoint exists.

HISTORY WIND PAGE

NFCS-04-0320-009-A100AA

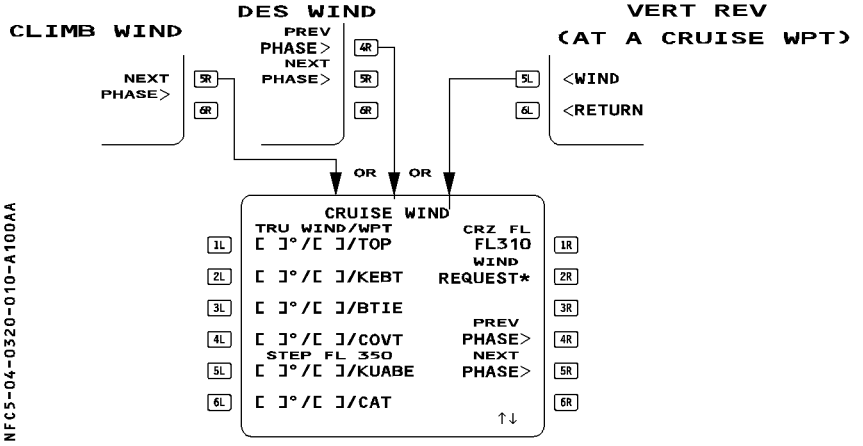


[6L] CLIMB WIND — This key reverts the display to the CLIMB WIND page.

[6R] INSERT — This key inserts the history wind values into the CLIMB WIND page.

CRUISE WIND PAGE

This page displays the wind (direction and velocity) for each cruise waypoint.
Cruise wind page is accessed as following.



NFCS-04-0320-010-A100AA

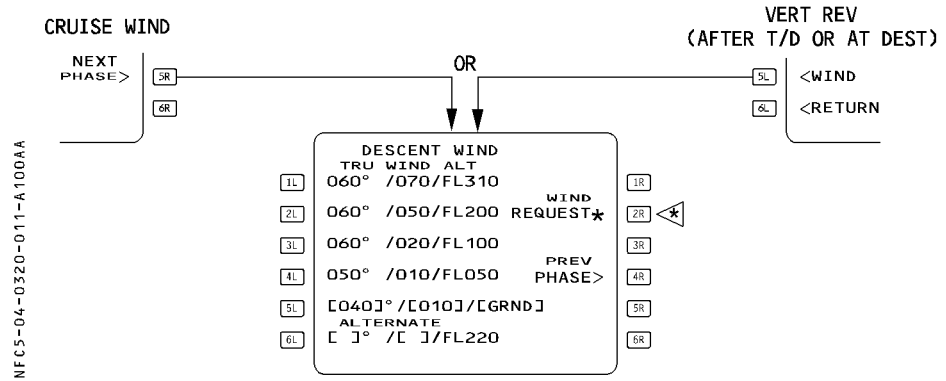
TITLE	CRUISE WIND in white large font.
[1L] TRU WIND/WPT to [6L]	These lines display the cruise wind at associated waypoint. Winds are sorted in waypoint flight plan order. The crew cannot modify the waypoints on this page. Step flight level is displayed in the label line of the first waypoint of the step. Any modification of the cruise wind page modifies the winds of the flight plan B page accordingly Both uplinked winds and pilot entered winds are displayed in blue large font. Wind data are modifiable during the cruise.
[1R] CRZ or STEP FL	This field displays in green large font, the predicted flight level of the [1L] waypoint. If a cruise flight level is not defined, dashes are displayed.
[2R] WIND REQUEST *	Pressing this key sends a request for ACARS winds. (Refer to 4.04.40)
[4R] PREV PHASE	This prompt is displayed in Preflight, Takeoff, Climb and Done phases. Pressing this prompt calls up the CLIMB WIND page.
[5R] NEXT PHASE	Pressing this prompt calls up the DES WIND page.

Any new entry performed on the CRUISE WIND page is immediately inserted into the corresponding flight plan. Predictions are dashed on the F-PLN pages during the recomputation time.
CRUISE WIND page reverts automatically to F-PLN page if a temporary flight plan is created or the secondary flight plan is activated.

DESCENT WIND PAGE

This page allows the pilot to define and display the winds used for computing the descent profile.
The pilot calls it up by selecting NEXT PHASE on the CRUISE WIND page or WIND prompt on VERT REV page.

R



NFCS-04-0320-011-A100AA

[1L] to [5L] — This displays inserted winds or uplinked winds in blue large fonts prior to activating the descent phase (modifiable values) and in green colour after descent phase activation (not modifiable values).
An entry of "GRND" in the "ALT" field is seen as the wind at ground level. This wind is copied on the PERF APPR page (and corrected for the magnetic variation).
A clear action on one key reverts the line to blue bracket.

[6L] ALTERNATE — This field is displayed only when an alternate is defined.
The pilot entered value or uplinked value is displayed in blue large font. Always modifiable by the pilot.

[2R] WIND REQUEST* — Pressing this key sends a request for ACARS winds. (Refer to 4.04.40)

[4R] PREV PHASE — Pressing this key calls up the CRUISE WIND page. The field is erased after the top of descent has sequenced.

Note : Descent winds and alternate wind are deleted if the destination airport is changed.

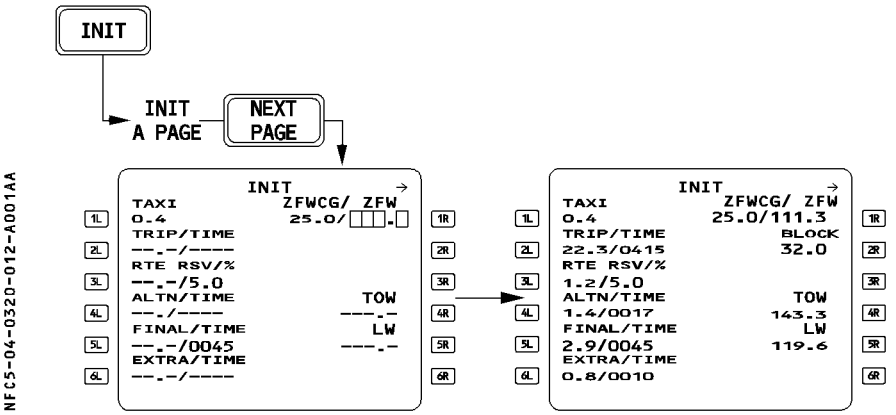
INIT B PAGE

The pilot uses this page to initialize gross weight and center of gravity before starting the engines.

The pilot can call it up from the INIT A page by pressing the NEXT PAGE key (or the [→] key depending on the MCDU keyboard) on the MCDU console, as long as both engines have not been started.

This page automatically reverts to the FUEL PRED page after the first engine is started.

R The FMGC computes its predictions based on the FOB indicated by the FQI (or FAC as
R backup) from that moment on.



[1L] TAXI — This is the taxi fuel, which defaults to a preset value, (usually 200 kilos or 400 pounds). The pilot can change the value through this field.

[2L] TRIP/TIME (green) — This field displays trip fuel and time when predictions become available.
The pilot cannot modify this data.

[3L] RTE RSV/% (blue) — This field displays the reserve fuel for the route and the corresponding percentage of trip fuel. It may be blank, if such is the policy of the operator. The pilot can enter either a route reserve or a percentage, and the system then computes the nominal value automatically.

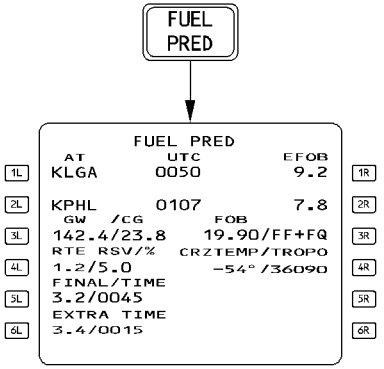
[4L] ALTN/TIME (green)	This field displays alternate trip fuel and time, assuming that Cost Index = 0 and that the aircraft flies at the default cruise flight level. This field displays its information in a small font, and the flight crew cannot modify it.
[5L] FINAL/TIME (blue)	This field displays hold fuel and time associated with continued flight to the alternate airport (or destination airport if no alternate is defined). The pilot may enter a final fuel or time (at alternate or destination) and the system will compute associated holding fuel/time available. Assumptions include a racetrack pattern 1500 feet above the alternate airport, with the aircraft in the clean configuration at green-dot speed (or in accordance with airline fuel policy established in the database).
[6L] EXTRA/TIME (green)	This field displays the amount of extra fuel and the available time it represents for holding over the alternate or primary destination if the pilot did not define an alternate. EXTRA FUEL = BLOCK – (TAXI + TRIP + RSV + ALTN + FINAL) The field displays this information in a small font, and the flight crew cannot modify it.
[1R] ZFWCG/ZFW	This field displays the location of the zero fuel weight CG. It is an optional entry that defaults to 25%. The pilot can modify this data. The zero fuel weight is a mandatory entry that allows the system to compute speed management and predictions.
[2R] BLOCK	The block fuel in this field is a mandatory entry that allows the system to predict the estimated fuel on board (EFOB).
[4R] TOW (green)	This field displays the computed takeoff weight. The pilot cannot modify it (small font).
[5R] LW (green)	This field displays the computed landing weight at the primary destination. The pilot cannot modify it (small font).

Note : If the pilot enters a number in field 1R or 2R that exceeds the limits, the field displays "ENTRY OUT OF RANGE" and does not accept the value .

FUEL PREDICTION PAGE

The pilot presses the FUEL PRED key on the MCDU console to display fuel prediction information at destination and alternate, as well as fuel management data after the engines are started.

R



NFCS-04-0320-014-A100AB

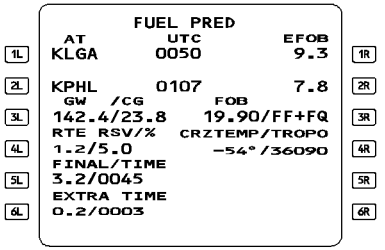
Line 1
AT-UTC/TIME-EFOB
These fields display predictions of time and fuel to the primary destination. TIME is displayed before takeoff, UTC predictions after takeoff. After the pilot enters an estimated takeoff time (ETT), UTC is displayed.

Line 2
AT-UTC/TIME-EFOB
These fields display predictions of time and fuel to the alternate airport. See 4.04.10 for details.

[3L] GW/CG
GW
The system updates gross weight continually during the flight. If no zero fuel weight has been entered, the screen displays amber boxes next to this key : the pilot must enter information in these boxes in order to obtain a speed profile, speed computations, and predictions. The field displays dashes as long as the system is not calculating fuel on board.
CG
The system updates center of gravity location continually along the flight path.
The pilot can modify both GW and CG.

[4L] RTE RSV/%
This field displays the route reserve fuel and the corresponding percentage of trip fuel. The field may be blank, depending on the fuel policy of the operating airline. The pilot can change the entry, the system will compute a nominal value automatically.

NFCS-04-0320-015-A100AA



[5L] FINAL/TIME — This field displays the amount of fuel available for holding and the amount of hold time that will be available over the alternate airport (or primary destination if no alternate is defined). The pilot may enter either a final fuel or a time, although the system computes a nominal value automatically. The system assumes that the holding will be in a racetrack pattern 1500 feet above the alternate airport, with the aircraft in clean configuration at green dot speed (or will obey the "airline fuel policy" of the data base).

[6L] EXTRA/TIME — This field displays the amount of extra fuel and the resulting time available for holding over the primary destination.
EXTRA FUEL = BLOCK – (TAXI + TRIP + RSV + ALTN + FINAL)
The pilot cannot modify this field (displayed in green, small font).

[3R] FOB — This field displays the fuel on board, computed :
- with information from the fuel flow and fuel quantity sensor (FF + FQ), or
- from FF only (enter/FF to deselect FQ), or
- from FQ only (enter/FQ to deselect FF)

The pilot can modify this number.

[4R] CRZ TEMP/TROPO — This field displays the temperature at the cruise flight level and the altitude of the tropopause.
The pilot can modify both values.
This field is dashed when the aircraft sequences the top of climb.

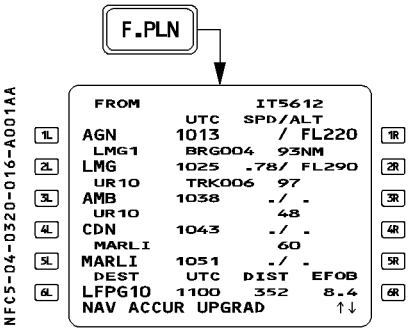
Note : All fields except [4R] show dashes until the pilot starts an engine.

FLIGHT PLAN PAGES

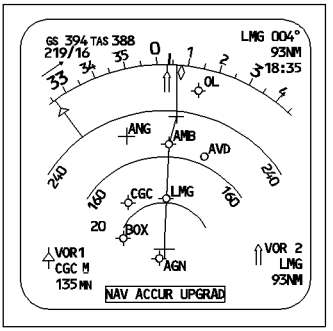
These pages display all waypoints of the active and alternate flight plans, along with associated predictions.
The pilot can make all revisions to the lateral and vertical flight plans through these pages: he presses the left key to revise the lateral flight plan and the right key to revise the vertical flight plan.
He presses the F-PLN key on the MCDU console to gain access to the A page of the active flight plan.

FLIGHT PLAN A PAGE

The A page displays time, speed, and altitude predictions for each waypoint of the active flight plan.



CORRESPONDING ND



TITLE	FLIGHT NUMBER (blank if no flight number has been entered) This line may display yellow TMPY if a temporary flight plan exists, white OFST if a lateral offset is flown or yellow OFST if a lateral offset revision is pending.
Line 1 to Line 5 WPT, UTC, SPD, ALT	These lines display consecutive waypoints along with associated predictions of time, speed or Mach and altitude for each. TIME is displayed before takeoff and UTC after takeoff. After the pilot enters an estimated takeoff time (ETT), UTC is displayed. The time and flight level display at the FROM waypoint (first line of the flight plan) are values that the system memorized at waypoint sequencing.
[1R] SPD/ALT	The field dedicated to SPEED or MACH is blank at the FROM waypoint except at airport of departure. (V1 is displayed associated with runway elevation).

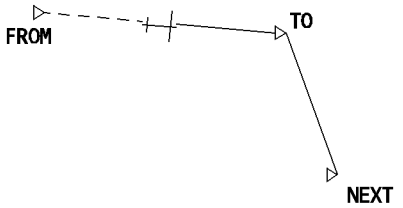
Line 6,
DEST UTC/TIME
DIST, EFOB

DIST is the distance to the destination along the displayed flight plan.
EFOB is the estimated fuel on board at destination.

R The sixth line is permanent, and is displayed in a white font once
R predictions are available, except when a TMPY F-PLN is displayed
R or, in some cases, when an ALT CSTR is entered ("*CLB or DES*"
R prompt appears).

Note : The predicted altitude at a waypoint is related to the QNH below the transition altitude, and is given as a flight level above the transition altitude.

NFC5-04-0320-017-A001AA



The generic flight plan page displays the FROM waypoint (last waypoint to be overflown) on the first line, and the TO waypoint (in white) on the second line. The FROM/TO flight plan leg is called the active leg.
The flight crew can use the scroll keys to review all flight plan legs down to the last point of the alternate flight plan. The AIRPORT key serves as a fast slew key. The pilot can press it to call up the next airport (DEST, ALTN, ORIGIN) to be displayed on the flight plan page.
In order to return to the beginning of the flight plan page, the pilot presses the F-PLN key on the MCDU console.
The display shows the name of the leg between two waypoints and the distance between them on a line between the lines that identify them. During an approach, this in-between line also defines the angle of the final descent path. For example, "2-3°" indicates that the leg is two nautical miles long, and the flight path angle is –3°.
The display shows the bearing between FROM and TO waypoints, as the bearing from the aircraft position to the TO waypoint. It shows track (TRK) between the waypoints shown in lines 2 and 3. This is the outbound track of the next leg.
If the database contains a published missed-approach procedure, or if someone has inserted one manually, the display shows it in blue after the destination runway identification. It turns green when the go-around phase becomes active.
After the last waypoint of the missed approach, the display shows the alternate flight plan in NAV mode.
When airborne, the flight crew can clear or modify the TO waypoint by using the DIR key on the MCDU console.

Predictions

The system calculates and displays predictions for all waypoints.
It uses current wind to compute predictions for the TO waypoint, and uses predicted winds
R for computing all others.

Constraints

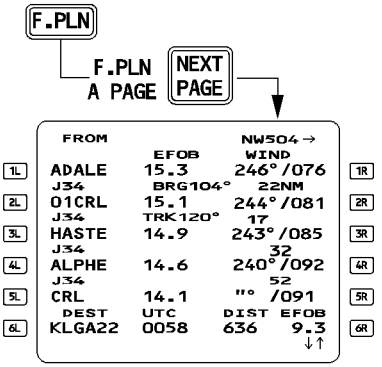
R The database may define an altitude constraint and speed constraint for each waypoint of the climb, descent, and approach phases, or the pilot may insert such constraints manually.
R (Except at origin, destination, FROM and pseudo waypoints).
The constraints are displayed in magenta as long as predictions are not completed.
Once predictions are available, constraints are replaced by speed and altitude predictions preceded by stars. If the star is magenta the system is predicting that the aircraft will match the constraint (altitude within 250 feet, speed not more than 10 knots above the constraints). If the star is amber, the system is predicting that the aircraft will miss the constraint and the MCDU displays "SPD ERROR AT WPT" message.

Pseudo waypoints

R Pseudo waypoints are geographical positions corresponding to an event in the vertical flight plan ; T/C (top of climb), T/D (top of descent), SPD/LIM (speed limit), DECEL (deceleration for approach) etc. The display shows them as waypoints in parentheses.

FLIGHT PLAN B PAGE

This page displays fuel predictions and forecast winds at each waypoint.
The pilot calls it up by pressing the NEXT PAGE key when the display is showing the A page.



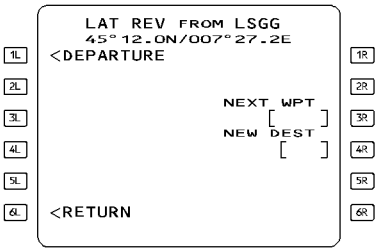
NFCS-04-0320-019-A001AA

TITLE	FLIGHT NUMBER (blank if no flight number has been entered)
Line 1 WPT-EFOB-WIND to Line 5	These lines display consecutive waypoints and associated fuel predictions, and the forecast wind profile. The direction of forecast winds is relative to true north. Forecast winds include winds entered by the pilot (large font) and the resulting interpolated winds at intermediate waypoints (small font).
Line 6 DEST-UTC/DIST-EFOB	Identical to F-PLN A page.

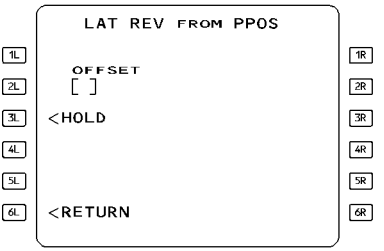
Note : The system interpolates manual wind entries in order to forecast winds throughout the flight plan.

LATERAL REVISION PAGES

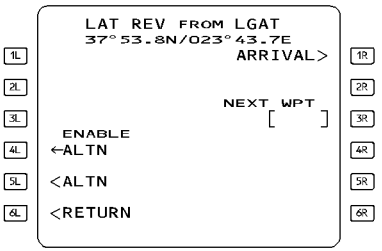
These pages give the pilot a list of the lateral flight plan revisions he can use to change the flight plan beyond a selected waypoint.
The pilot calls up these pages from the flight plan pages (A or B) by pressing the left key adjacent to the selected waypoint.
Different lateral flight plan revisions are available for different waypoints.



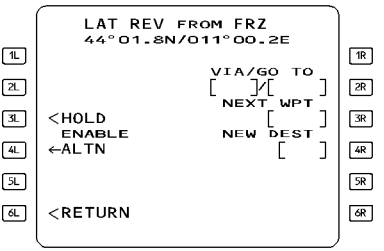
LAT REV AT THE ORIGIN



LAT REV AT THE FROM WPT



LAT REV AT THE DESTINATION



LAT REV AT A WPT

NFCS-04-0320-020-A001AA

TITLE — The ident of the waypoint or airport selected for revision, along with its latitude and longitude.
If the selected waypoint is the FROM waypoint, the title omits the aircraft latitude and longitude, and displays “PPOS” (present position) instead.

[1L] DEPARTURE — This prompt gives the pilot access to the departure pages, where he can select runways, SIDs, and TRANSs and insert them.

[2L] OFFSET [ ] This prompt allows the pilot to enter a lateral offset, left or right, in the flight plan.
The offset may be from 1 to 50 NM.
When the pilot enters an offset, the OFFSET field becomes yellow, and the 6L and 6R fields display ERASE and INSERT.
The pilot can delete an inserted offset by pressing the CLR pushbutton, by entering a zero for the amount of the offset, or by selecting a DIR TO.

[3L] HOLD This prompt gives the pilot access to the hold pages.

[4L] ENABLE ALTN This prompt allows the pilot to switch to the alternate flight plan at the selected revision waypoint and use it as a new active flight plan.
The system never displays this prompt at the FROM waypoint.

[5L] ALTN This prompt gives the pilot access to alternate airport page.
The system displays it only at the destination.

[6L] RETURN This prompt returns the display to the flight plan page.

[1R] ARRIVAL The pilot uses this prompt to call up the arrival pages, where he can select and insert RWY, APPR, STAR TRANS and VIA.

[2R] VIA/GOTO (1) This prompt allows the pilot to insert an airway (VIA) between the revised waypoint and another waypoint (GOTO)

[3R] NEXT WPT (1) The pilot uses this prompt to enter the next waypoint.

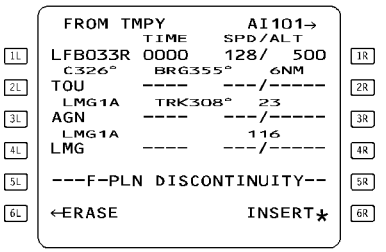
[4R] NEW DEST (1) The pilot uses this prompt to enter a new destination.

[6R] INSERT The system displays this prompt when the pilot has created a temporary flight plan.
The pilot can use it to activate the temporary flight plan.

(1) For details, see the chapter 4.04.

TEMPORARY REVISION

When the pilot selects a lateral revision, the system creates a "Temporary F-PLN" and displays it in yellow on the MCDU and as a yellow dashed line on the ND to allow the pilot to review the data before inserting. As long as the temporary flight plan is not inserted, the previous flight plan is still active and the system guides the aircraft along it.

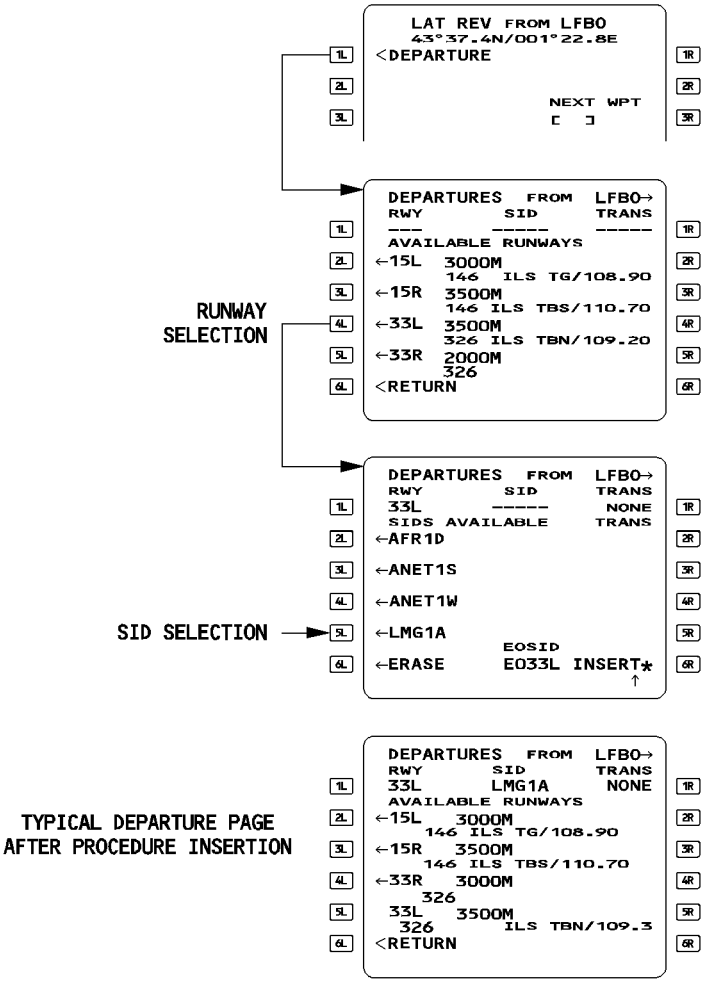


TEMPORARY F-PLN A PAGE

NFC5-04-0320-021-A001AA

DEPARTURE PAGES

These pages allow the pilot to review departure procedures (RWY, SID, TRANS) and enter them into the active flight plan.
The pilot calls them up by pressing the 1L key when the display is showing the lateral revision page for the origin.
Three pages are available : RWY, and SIDS and TRANS (if any).
The pilot calls up each page sequentially either by selecting a data item (such as RWY) or by pressing the NEXT PAGE key on the MCDU console.



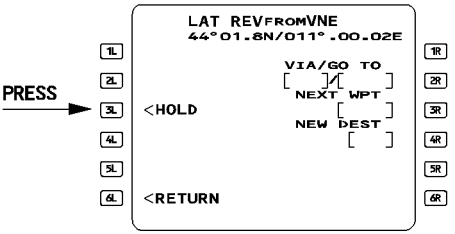
NFCS-04-0320-022-A001AA

	Line 1 RWY, SID TRANS	This line displays the RWY, SID, and TRANS in green after they have been inserted into the active flight plan. They are displayed in yellow, if selected but not yet inserted. If nothing has been selected or inserted, the line displays dashes.
R	[2L] RWY/SIDs to [5L]	These fields display selectable and selected RWYs or SIDs (including EOSID and NO SID option). The pilot can slew each list. Selectable RWYs and SIDs are displayed in blue with an arrow. Once a RWY or SID is selected, the arrow disappears. A RWY or SID, already inserted in the flight plan, is displayed in green. The display shows the length, heading, and, if available, the ILS ident and frequency for each runway.
	[6L] ERASE or RETURN	The pilot presses this key to erase a selected data item and revert to the previous selection. If the pilot erases the page, the display reverts to the active flight plan page. The display shows RETURN, instead of ERASE, when the pilot has not created a temporary flight plan.
	[2R] TRANS to [5R]	This field displays the selectable and selected enroute transitions in blue and green respectively. They are blank, if there are no transitions.
	[6R] INSERT or BLANK	The pilot uses this key to insert a temporary procedure into the flight plan. The page reverts to the active flight plan page when the insertion is completed. It is associated with RETURN (6L).
	[6M] EOSID	Once a runway is inserted into the flight plan, this field displays any ENG OUT SID for that runway. If there is none, it displays NONE.

HOLD PAGES

These pages allow the pilot to review and modify the holding pattern parameters at the selected revise waypoint. The holding pattern data may come from the data base or may be defaulted to standard dimensions.
The pilot calls up these pages by pressing the HOLD key on the LAT REV page for the waypoint. Three different HOLD pages are available :

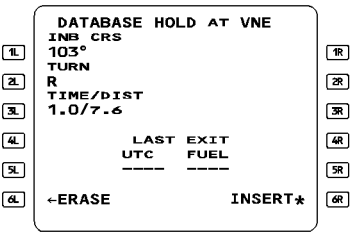
NFC5-04-0320-024-A001AA



- **DATABASE HOLD AT...**

  The data base has a holding pattern for the selected revise waypoint, but has not been inserted in the flight plan yet.

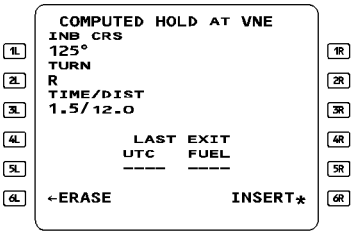
NFC5-04-0320-024-B001AA



- **COMPUTED HOLD AT...**

  The database has no holding pattern for the selected revised waypoint.
  The system proposes default holding pattern data.

NFC5-04-0320-025-A001AA



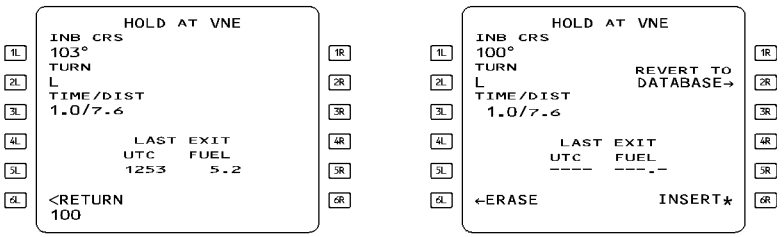
INB CRS = INBD TRK of the F-PLN leg leading to the revised waypoint.
TURN = Turn direction right.
TIME on outbound leg is 1.5 minutes above 14000 feet, 1 minute below 14000 feet.
[2R] field shows "REVERT TO COMPUTED", when the pilot has modified the holding pattern.

- **HOLD AT...**

  The flight plan contains a holding pattern that was defined by the pilot from an existing database or computed hold.
  If the pilot has modified holding pattern data from the database, the field next to [2R] displays "REVERT TO DATABASE" or "REVERT TO COMPUTED", to enable the pilot to revert to default parameters.

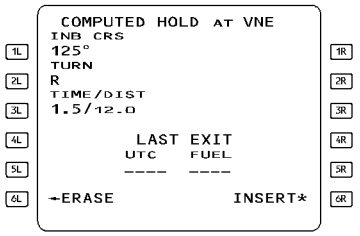
R

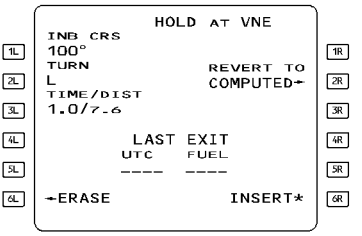
NFC5-04-0320-025-B001AA



Example : The pilot modifies the inbound course.

NFCS-04-0320-026-A001AA





[1L] INB CRS — This field displays the inbound course of the holding pattern. The data may be modified.

[2L] TURN — This field shows the direction to turn in the hold (L or R). The data may be modified.

[3L] TIME/DIST — This field shows the time and distance for the outbound leg. The data may be modified.
Time and distance are dependent values that the system calculates from the predicted true airspeed which, in turn, depend upon the holding speed (speed for maximum endurance, ICAO speed limit, or constraint speed, whichever is lower).

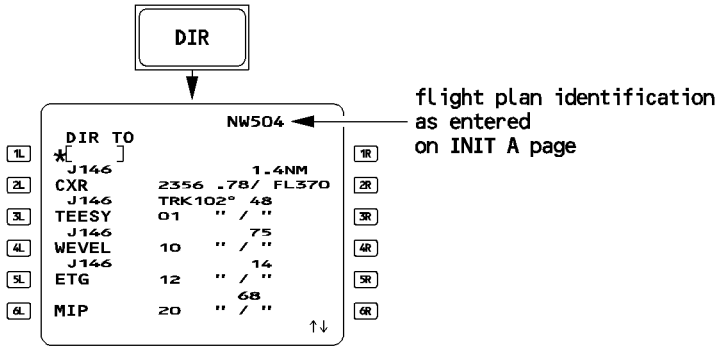
[6L] ERASE
or
RETURN — The pilot presses this key, when the field shows "ERASE", to erase the holding pattern.
The pilot presses this key, when the field shows "RETURN", to return to the LAT REV page, if the hold is already inserted in the flight plan.

[2R] REVERT TO DATABASE
or
REVERT TO COMPUTED — The pilot presses this key to delete manual modifications to the database hold (or computed hold), and to revert to the database (or computed) holding data.

[6R] INSERT — The pilot presses this key to insert the hold into the active flight plan.

LAST EXIT UTC FUEL — This field displays the time at which the aircraft must leave the holding pattern, in order to meet fuel policy criteria (extra fuel = 0). The system also displays the estimated fuel on board at that time.

DIRECT TO PAGE



NFC5-04-0320-027-A001AA

Pressing the "DIR" key under the MCDU screen brings up this page. The [1L] key on this page is the DIR TO key. The pilot presses it to modify the flight plan by creating a direct leg from the aircraft's present position to any selected waypoint. When in NAV mode, the pilot must use this key to modify the active leg or the TO waypoint. Pilot cannot call up this page when the aircraft's present position is not valid.

[1L] DIR TO — Pressing this key activates the DIRECT TO function, routing the aircraft from present position to the waypoint inserted in the scratchpad. The pilot can identify the waypoint to be inserted by using its identifier, its latitude and longitude, place/bearing/distance, or place-bearing/place-bearing.

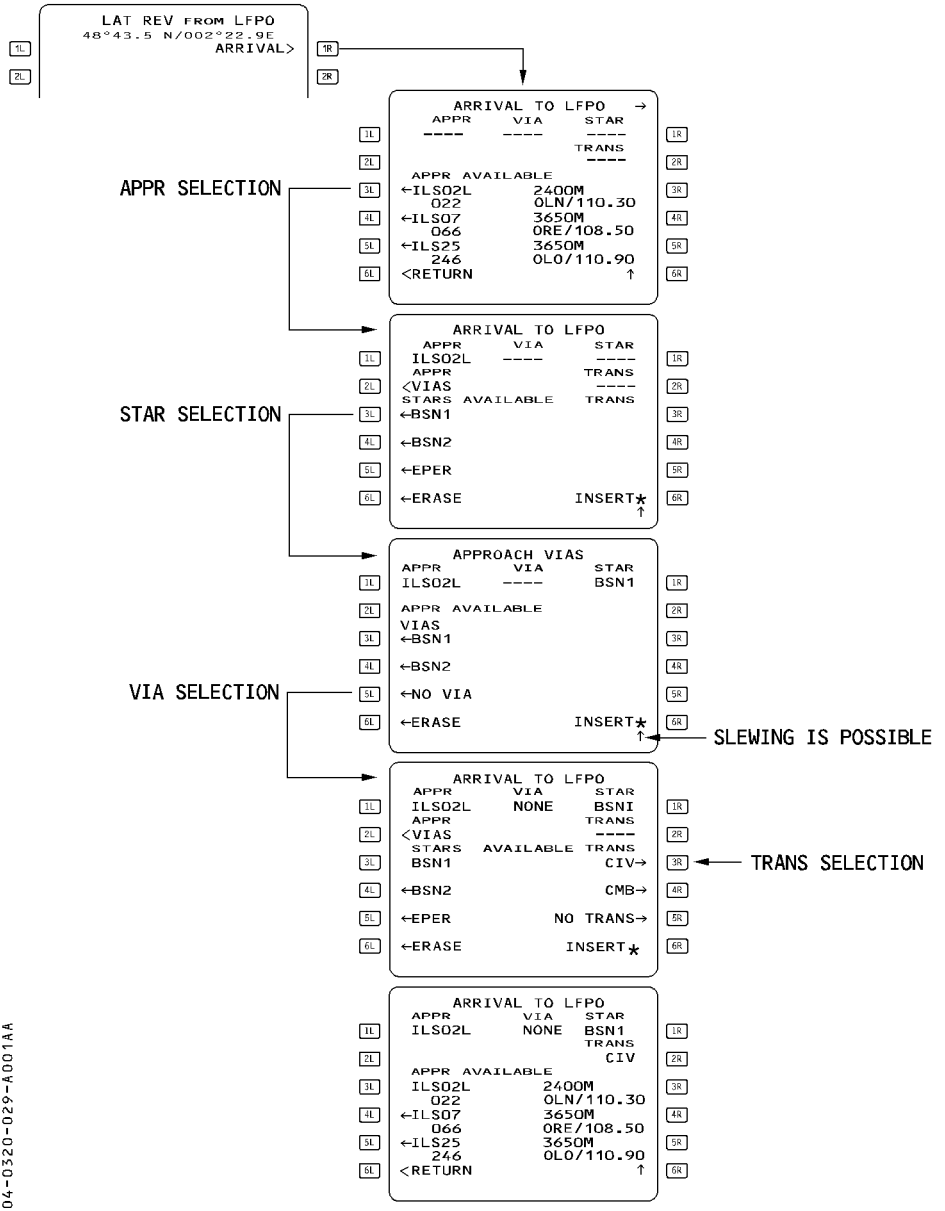
Line 2 to Line 6 — These lines display the active flight plan with time/speed/distance predictions. The display may be slewed ↑↓.
Pressing any key activates the DIRECT TO function from present position to the waypoint adjacent to that key.

R

ARRIVAL PAGES

These pages allow the pilot to review arrival procedures (approaches, VIAs, STARs, TRANS) and enter them into the active flight plan.
The pilot calls them up from the LAT REV page for the destination by pressing 1R key.
Three pages, APPR, STAR, and VIA, are available, along with a fourth, TRANS, if there are any transitions.
The pilot calls up each page sequentially either by selecting a data item (such as APPR) or by pressing the NEXT PAGE key on the MCDU console.

Line [1L] - [1R] [2R]	This line displays the APPR, VIA, STAR, and TRANS in green if they have been inserted in the flight plan, and in yellow, as temporary flight plan, if they have been selected but not yet inserted. It displays dashes or NONE if nothing has been selected or inserted.
[2L] APPR VIAS	The pilot presses this key to call up transitions from the last point of the STAR to first point of the approach.
[3L] to [5L]	These fields list selectable and selected APPRs, STARs, and VIAs. The flight crew can slew the pages, when necessary. Selectable APPRs, STARs, and VIAs are displayed in blue with an arrow. Once the pilot has selected an APPR, STAR, or VIA, the arrow disappears. After the APPR, STAR, or VIA is inserted into the flight plan, it is displayed in green. For each approach the display shows runway length, heading, and the frequency and identifier of the ILS when ILS is available.
[6L] ERASE or RETURN	The pilot presses this key to erase selected data and revert to the previous selection. The page reverts to the LAT REV page. The field displays "RETURN" instead of ERASE when the flight crew has not created a temporary flight plan.
[3R] TRANS to [5R]	These fields display selectable and selected en route transitions (if any). They are blue when selected, and become green when inserted into the active flight plan.
[6R] INSERT	The pilot presses this key to insert the temporary procedure into the active flight plan. The page reverts to the active flight plan page when this happens.

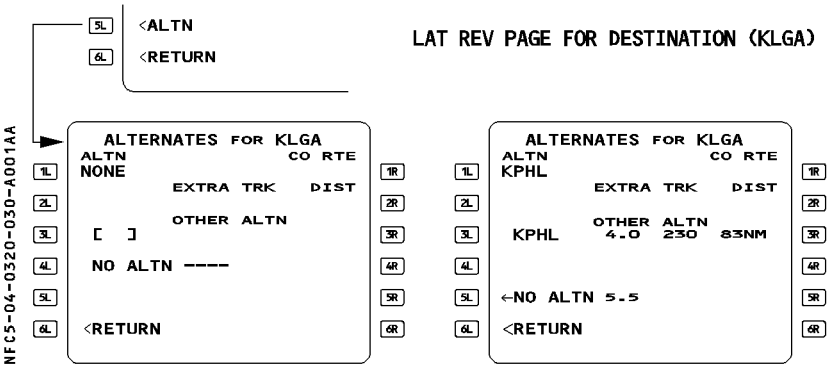


TYPICAL ARRIVAL PAGE
WITH SELECTED DATA

NFC5-04-0320-029-A001AA

ALTERNATE PAGE

This page allows the pilot to review the alternate airports in the NAV data base that are paired with the destination, and also permits the pilot to define additional alternates, if needed. (Alternate airports are linked to the destination). The pilot calls up this page with the ALTN prompt from the lateral revision page for the destination.



TITLE	Destination airport (large green font)
[1L] ALTN	This field displays the selected alternate - in green if it is active, yellow if it is temporary. NONE is displayed if NO ALTN option is selected or if the destination has no alternate.
Line 2 to line 5	These lines display the identifications of alternates (up to 6) the extra fuel required to get to them, and the great-circle track and distances to them from the destination. If the data base contains a company route between the destination and the alternate, the distance shown is an airway distance (not a great-circle distance). When the data base defines a preferred alternate, Line 2 displays it (if no slewing has been performed).

[4L] OTHER ALTN — The pilot can enter an airport identifier in the brackets (Line 3). If that airport is not stored in the data base, the NEW RUNWAY page appears for the pilot to use in defining it.
If it is stored in the data base, the ROUTE SELECTION page appears, and the pilot can use it to select the best route.
The pilot may enter a distance in the DIST field of the OTHER ALTN prompt in order to get preliminary fuel predictions. However, once he has selected the alternate airfield as a temporary alternate and then inserted it, the ALTN distance reverts either to the airway distance if he has selected a company route, or otherwise to the direct distance to the alternate.
The pilot can use OTHER ALTN to overwrite and replace the previous OTHER ALTN.

NO ALTN — The pilot uses this key to select the NO ALTN option.

[6L] RETURN or ERASE — The pilot presses this key to make the display revert to the LAT REV page.
Pressing this key erases the temporary selection.

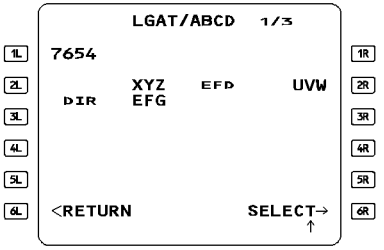
[1R] CO RTE — The pilot presses this key to display the active company route between the destination and the selected alternate.

[6R] INSERT — Pressing this key activates the temporary selection.

ROUTE SELECTION PAGE FOR ALTERNATE

This page allows the pilot to review the company route between the destination and the alternate, and select a different route, if that seems appropriate.
This page comes up automatically when the flight crew enters an ident in the OTHER ALTN field.
See "Route Selection" page for a description of this page.

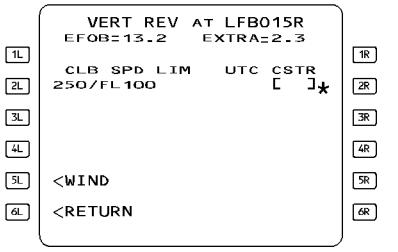
NFCS-04-0320-031-A001AA



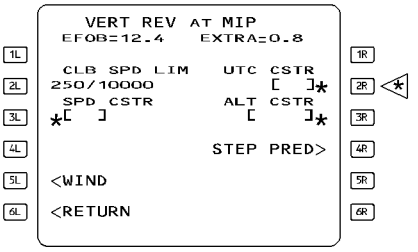
[6R] SELECT — When the pilot presses this key the display reverts to the alternate page. (The distance between the destination and the alternate is then the airway distance).

VERTICAL REVISION PAGES

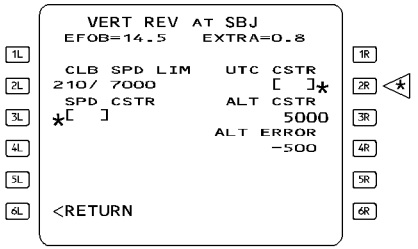
These pages contain the menu of available vertical flight plan revisions that can be applied at a selected waypoint.
The pilot calls up these pages from the flight plan A or B pages, by pressing the righthand key next to the selected revise waypoint.
The flight crew may make several different vertical revisions (although some may not be available at all waypoints) : Speed limit, speed constraint, altitude constraint, wind, estimated takeoff time, step climb, and step descent.



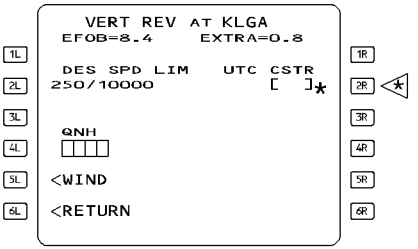
VERT REV AT ORIGIN



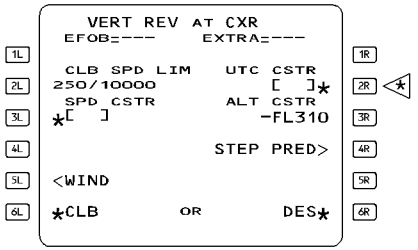
VERT REV AT CRUISE WPT



VERT REV AT WPT IN CLIMB.
(ALT CSTR ENTERED AND
PREDICTED MISSED)



VERT REV AT DEST



VERT REV AT WPT
(PREDICTIONS NOT AVAILABLE)

NFCS-04-0320-032-A105AA

	TITLE	"VERT REV AT [location]" (Second line shows remaining fuel and extra fuel at the revised waypoint).
	[1L] "TOO STEEP PATH BEYOND" (amber)	This message is displayed if the waypoint is part of a leg with too steep a descent path.
R R	[2L] CLB/DES SPD LIM (magenta)	This field displays the speed limit applicable to the climb or descent phase. It displays it in a large font when data has been inserted manually and in a small font when data comes from the database. The speed limit comprises a speed and an altitude.
R R	[3L] SPD CSTR (magenta)	This field displays any speed constraint assigned to the revised waypoint. It applies to climb and descent waypoints. It is in a large font when inserted manually, and in a small font when it comes from the database. It is not displayed at the origin airport, a FROM waypoint, a speed limit pseudo waypoint, or the destination airport.
R	[4L] QNH	This field functions only when the revised waypoint is the primary destination. It allows the pilot to enter the sea-level atmospheric pressure. This field is identical to the QHN field of the PERF APPR page.
R R R	[5L] WIND (blue)	The pilot press this key to access to the wind pages. Any wind direction entry into the wind pages, should be relative to true north. The first wind page that is displayed, corresponds to the selected waypoint e.g. climb page if the selected waypoint is a climb phase waypoint. A CLR action reverts it to brackets.
	[6L] RETURN or CLB	The pilot presses this key to return to the last displayed flight plan page. When displayed, pressing this key assigns the constraint to CLB phase and inserts it into the vertical flight plan. The page reverts to the flight plan page.

[2R] UTC CSTR — This field displays this legend at all waypoints except the FROM waypoint.
- At origin it enables the pilot to enter an estimated takeoff time.
- At any waypoint it enables to enter one time constraint. (Only one for the entire flight plan).
  It will be entered as HH MM (HH hours, MM minutes). Maximum entry is clock time + 20 hours.

[3R] ALT CSTR (magenta) — This field displays the altitude constraint assigned to this revise waypoint.
It uses a large font when the constraint is entered manually, a small font when it is from the data base.
A CLR action reverts it to brackets.
The constraint may be :
- "At", entered as XXXXX (FL180, for example)
- "At or above", entered as + XXXXX or XXXXX + (+ FL310, for example)
- "At or below", entered as – XXXXX or XXXXX – (– 5000, for example)
- A "window" constraint.
  The altitude window consists of two altitudes between which the aircraft should fly. The crew cannot manually enter a "window" constraint.

[4R] ALT ERROR (green) — When the aircraft misses a predicted altitude constraint, this field displays the difference between the altitude constraint and the predicted altitude.
If, for example, "– 500" appears in this field in green, the aircraft will reach the waypoint at an altitude 500 feet below the constraint altitude.

or — It applies only to waypoints in the climb and descent phases.

STEP PRED — This legend appears for waypoints in the cruise phase and gives the pilot access to the step prediction page.

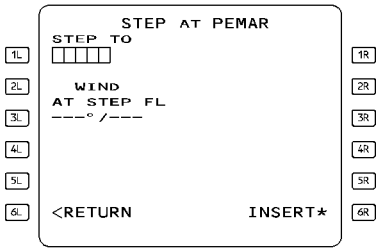
[6R] DES — When this field displays "DES", pressing this key assigns the constraints to the descent phase and inserts them into the vertical flight plan. The page reverts to the F-PLN page. (See Note, below).

Note : Altitude and speed constraints may apply to climb, descent or approach phase, but never to cruise phase.
Fields 6L/6R display "CLB/DES" when the revise waypoint is a cruise phase waypoint and the FMGS needs to know if the new constraint is to be applied in climb or descent phase. The FMGS will modify the cruise phase accordingly.
These 2 prompts also display "CLB/DES" when the predictions are not computed. (top of climb and top of descent not yet defined).

STEP PRED PAGE

This page allows the pilot to insert a step climb or a step descent altitude into the flight plan.
The pilot calls it up from the vertical revision page by pressing the STEP PRED prompt, which is displayed at all fixed waypoints of the cruise segment except the FROM waypoint.

NFCS-04-0320-035-A001AA

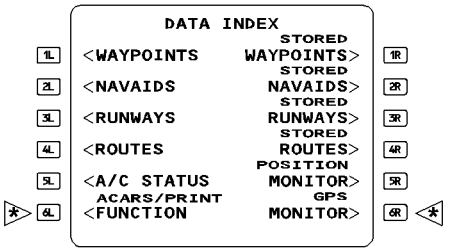


TITLE	STEP AT — (the selected vertical revise waypoint at which the step is to be initiated)
[1L] STEP TO [boxes]	This is the step altitude entry field. If the step altitude is higher than the cruise flight level, the step is a step climb. If the step altitude is lower than the cruise flight level, the step is a step descent.
[3L] WIND AT STEP FL — °/ —	This field allows the flight crew to enter and display a wind for the step altitude. This can be the wind as calculated by the FMGC (small blue font) or as entered by the pilot (large blue font). If the flight crew clears a pilot-entered wind, the value reverts to the calculated wind. The pilot cannot clear the calculated wind.
[6L] RETURN	If the pilot presses this key the page reverts to the previously displayed vertical revision page.
[6R] INSERT	If the pilot presses this key the system inserts the step and reverts to flight plan page.
or DELETE STEP	This prompt is displayed after a step FL entry only. If the pilot presses the key while this legend is showing, the step is deleted and the display reverts to the vertical revision page.

DATA INDEX PAGE

This page lists the navigation data entered in the FMGS.
The pilot enters those items labeled "stored" and can modify them. The pilot can call up the others, but cannot modify them.
The pilot calls up this page by pressing the DATA key on the MCDU console.

NFC5-04-0320-036-A001AA



[1L] WAYPOINTS	These keys call up descriptions of waypoints, navaids, runways, and routes stored in the data base so that the pilot can review it.
[2L] NAVAIDS	
[3L] RUNWAYS	
[4L] ROUTES	
[5L] A/C STATUS	This key calls up the aircraft status page.
[6L] ACARS/PRINT ◁ FUNCTION	This key calls up the PRINT function pages and the ACARS function pages.
[1R] STORED WAYPOINTS	These keys call up waypoints, navaids, runways, and routes that the flight crew has stored, allowing the crew to review them and to store them in or delete them from the data base. They are erased automatically in the done phase when a specific pin program is activated.
[2R] STORED NAVAIDS	
[3R] STORED RUNWAYS	
[4R] STORED ROUTES	
[5R] POSITION MONITOR	When the flight crew presses this key, the display shows all essential navigation data.
[6R] GPS MONITOR ◁	This key calls up the GPS MONITOR page. Displayed if the GPS option is installed.

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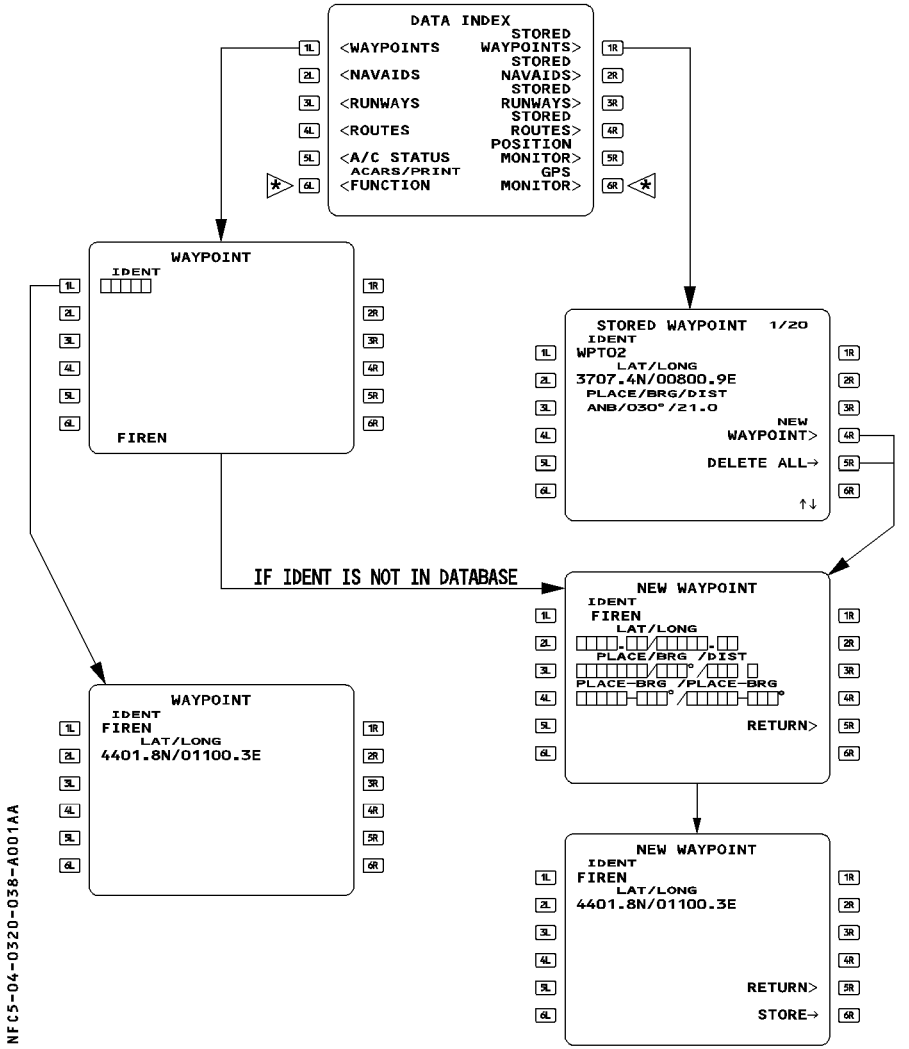
WAYPOINT/STORED WAYPOINT/NEW WAYPOINT PAGES



NFC5-04-0320-038-A001AA

WAYPOINT PAGE

– The pilot can call up this page by pressing the 1L key, on the DATA INDEX page. The display then shows waypoint information associated with the identifier the flight crew inserts in the [1L] field.
From this page, it is possible to call up any waypoint not stored in the stored waypoint list, if they belong to the active, temporary, or secondary flight plan.

STORED WAYPOINT PAGE

The pilot calls up this page by pressing the 1R key, on the DATA INDEX page.
This page displays waypoints defined and stored by the pilot. It lists each stored waypoint, alongwith a number that shows the relative order in which it was inserted in the database. This number is displayed in the upper righthand corner of the page. For example, "1/20" indicates that the waypoint was the first of 20 stored.

R [1L] IDENT — To delete a waypoint, the pilot clears the 1L ident display.

R [2L] LAT/LONG — Latitude and longitude of the waypoint are displayed in this field.

R [3L] — This field displays either a PLACE/BRG/DIST or a PLACE-BRG/PLACE-BRG, depending on how the waypoint was defined.

[4R] NEW WAYPOINT — The pilot presses this key to call up the NEW WAYPOINT page.

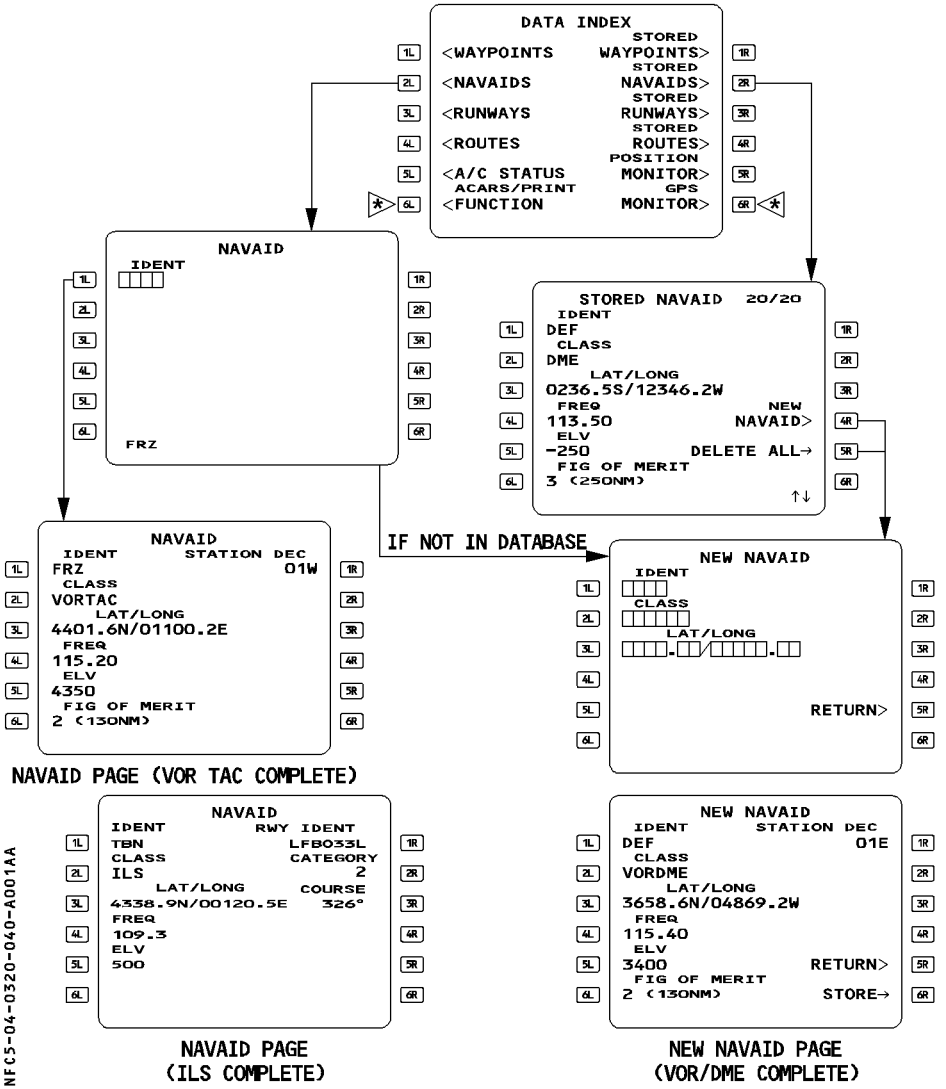
[5R] DELETE ALL — The pilot presses this key to delete all the waypoints stored by the flight crew, except those currently used in the active or secondary flight plan. ("F-PLN ELEMENT RETAINED" appears on the MCDU).

NEW WAYPOINT PAGE

– The pilot calls up this page by pressing 4R, on the STORED WAYPOINT page.

R – The pilot can use this page to define and store up to 20 waypoints. Entering an additional
R waypoint deletes the first one.
The pilot defines a waypoint by entering its ident in the data field next to 1L, then by entering its position in the amber boxes : Latitude and longitude, place/bearing/distance from a waypoint (or place) in the database, or place-bearing/place-bearing (bearings from two different waypoints in the database).
The STORE prompt appears next to 6R when the boxes are filled in, and the pilot presses the key to store the waypoint in the database.
If the pilot enters the waypoint's position as place/bearing/distance, or place-bearing/place-bearing, the FMGC computes its latitude and longitude.

NAVAID/STORED NAVAID/NEW NAVAID PAGES



NAVAID PAGE (VOR TAC COMPLETE)

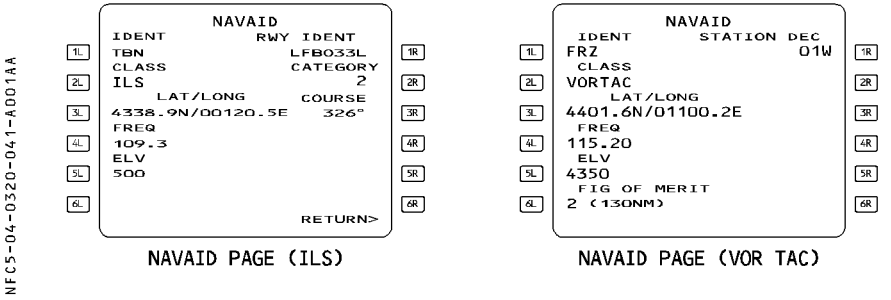
NAVAID PAGE (ILS COMPLETE)

NEW NAVAID PAGE (VOR/DME COMPLETE)

NFC5-04-0320-040-A001AA

NAVAID PAGE

The pilot calls up this page by pressing 2L on the DATA INDEX page.
This page displays the navaid information associated with the identifier the pilot inserts in the [1L] field.



NAVAID PAGE (ILS)

NAVAID PAGE (VOR TAC)

NFC5-04-0320-041-A001AA

[2L] CLASS — This field identifies the navaid as VOR, DME, VOR DME, VORTAC, NDB, LOC, ILS, or ILS DME.

R

[4L] FREQ — This field displays the frequency of the selected navaid.

[5L] ELV — This field gives the elevation of the navaid in feet above sea level. It is not displayed for VOR or NDB.

[6L] FIG OF MERIT — This field shows how far out the FMGS can autotune a VOR, VOR/DME, VORTAC, or DME for display or for computing position.

0 : up to 40 NM
1 : up to 70 NM
2 : up to 130 NM
3 : up to 250 NM

[1R] STATION DEC or RWY IDENT — This is the magnetic declination in the navaid area (used only for VOR, VOR/DME, and VORTAC). The field displays this, if the navaid is an ILS or ILS/DME.

[2R] CATEGORY — This field shows the navaid's category, if it is an ILS or ILS/DME.

R [3R] COURSE — This is the localizer course, if the navaid is an ILS or a LOC.

[6R] RETURN — This prompt is displayed, if the page has been accessed from the SELECTED NAVAID page. The pilot presses this key to return to the SELECTED NAVAID page.

STORED NAVAID PAGE

The pilot calls up this page by pressing the 2R key on the data index page.
He uses this page to display or delete navaids he has defined and stored.

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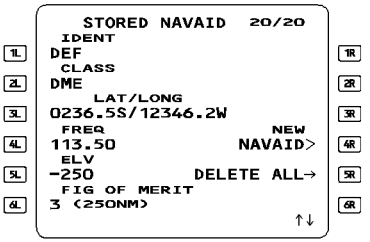

A number in the upper right hand corner of the screen shows the relative order in which the navaids were stored. (For example, 3/7 means third out of seven stored).
Slew keys give the pilot access to the different stored navaids.

[1L] IDENT — The pilot deletes a stored navaid by entering its ident in this field, then pressing the CLR key at the bottom of the MCDU control panel.

[5R] DELETE ALL — The pilot presses this key to erase all the stored navaids except those currently in use in the active or secondary flight plan. (The MCDU displays "F-PLN ELEMENT RETAINED.").

NEW NAVAID PAGE

The pilot calls up this page by pressing 4R on the stored navaid page.

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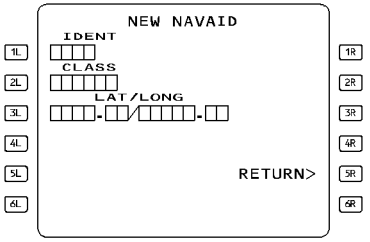
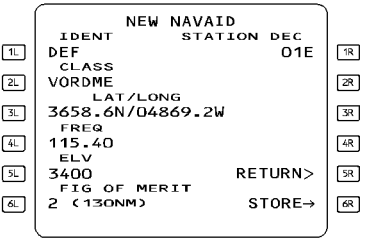


EMPTY NEW NAVAID PAGE



NEW NAVAID PAGE
(VOR/DME)

It can be used to define and store up to 20 navaids. The navaid elements must be entered in two steps :

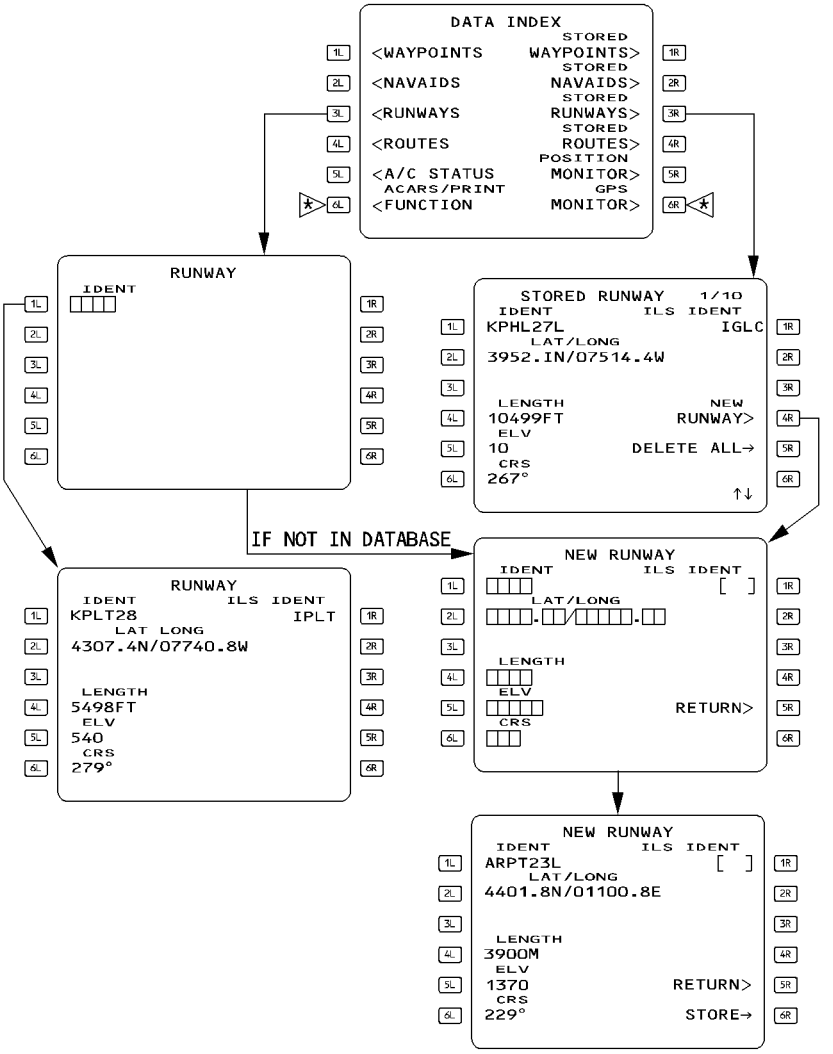
1. Enter the data in the lines of amber boxes.
2. Enter frequency, elevation, figure of merit, and station declination or ILS category and course, if applicable.
   The STORE prompt appears next to 6R, when all the amber boxes are filled. The pilot presses 6R to store the new navaid.

Note : The pilot cannot create an ILS/DME or an uncollocated navaid.
If the runway associated with the ILS has been entered through the new runway page, the ILS course, ILS ident, and runway ident are already displayed on the new navaid page when it comes up (copied from the new runway page). For details, see the new runway page info below.

[1R] STATION DEC — The pilot must enter the magnetic declination, if the prompt is displayed.
This prompt is displayed only for VOR, VORTAC or VORDME.

R [3R] COURSE — If the navaid is an ILS or LOC, enter the course.

RUNWAY/STORED RUNWAY/NEW RUNWAY PAGES



NEW RUNWAY PAGE
(MANUALLY COMPLETED)

NFCS-04-0320-044-A001AA

RUNWAY PAGE

This page displays the following information :

[1L] IDENT	The runway ident, which comprises the airport identification and the runway direction, uses six or seven digits (Example : CYYZ 24L and LFRJ 08).
[2L] LAT/LONG	The latitude and longitude of the runway threshold.
[4L] LENGTH	The runway length in meters (m) or feet (ft), in four digits (9999 ft).
[5L] ELV	The threshold elevation in feet above sea level.
[6L] CRS	The runway course (degrees magnetic).
[1R] ILS IDENT	The LOC or ILS identifier.

STORED RUNWAY PAGE

The pilot uses this page to display or delete defined and stored runways. The stored runways are listed and numbered in the order in which they were inserted. The number is displayed in the upper righthand corner of the page. (For example, 2/4 means the runway is the second of four stored runways).
The pilot can delete any stored runway from the database by displaying its ident in the 1L field, then by pressing the CLR key on the MCDU control panel.

[5R] DELETE ALL	The pilot presses this key to erase all the stored runways, except those used in the active or secondary flight plan. (The MCDU displays "F-PLN ELEMENT RETAINED").
[1L] to [6L]	These fields are similar to the RUNWAY page fields.

NEW RUNWAY PAGE

The pilot can use this page to define and store up to 10 runways.
When the pilot enters an ILS/LOC ident in the [1R] field, the new navaid page comes up. When the pilot has entered and stored the necessary data in the new navaid page, the new runway page reappears.
The new runway page and the new navaid page (ILS/LOC) are not independent :

- When the flight crew first defines the ILS/LOC (on the new navaid page), the new runway page, when called up, already displays the RWY course, RWY ident, and ILS ident (copied from the new navaid page).
- When the flight crew first defines the runway (on the new runway page), the new navaid page, when called up, already displays the ILS course, ILS ident, and runway ident.

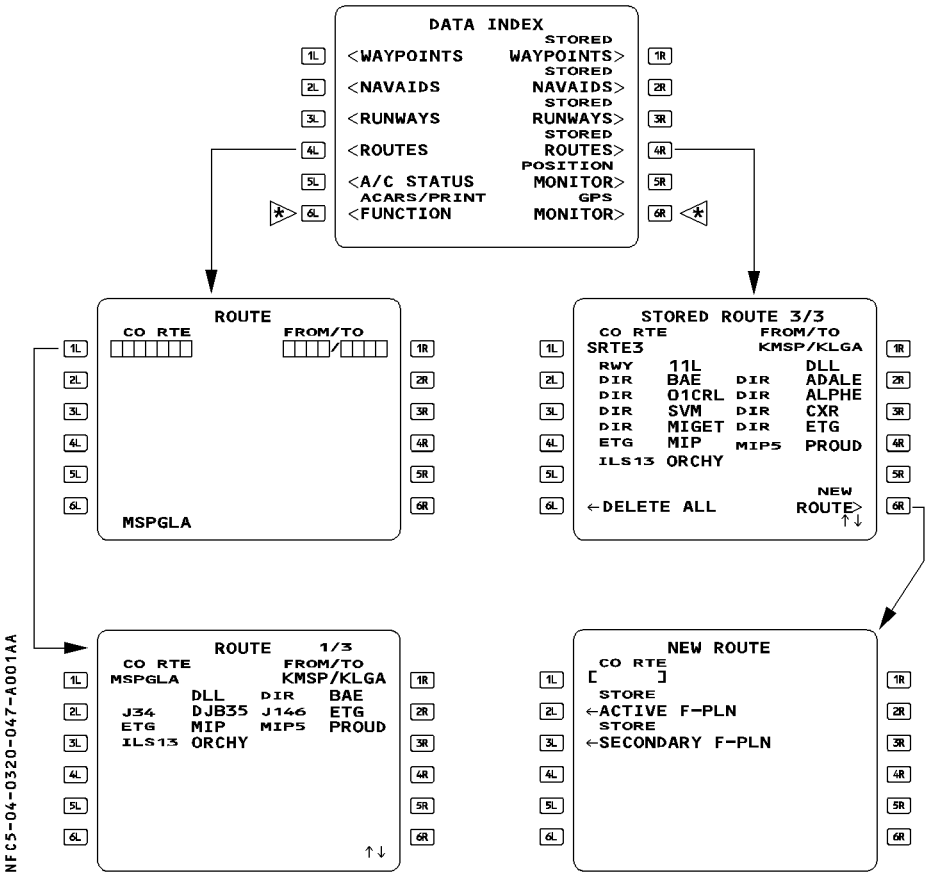
The pilot must enter the two runway directions on two different new runway pages (LFRJ 08 and LFRJ 26) to allow the flight plan to select either one.

R *Note : When 10 runways are stored, entering a new stored runway deletes the first one*
R *of the list (1/10).*

[1L] to [6L] Enter information about the new runway.
[1R] ILS IDENT Enter the ILS/LOC ident. The NEW NAVAID page comes up.
[5R] RETURN When displayed, pressing this key return to NEW NAVAID page.
[6R] STORE This prompt appears only when all the amber boxes have been filled.

R *Note : – NEW RUNWAY entry :*
R *A new runway cannot be added to an airport defined in the database. This has been done to comply with regulations requiring no manual database modification.*
R *– The NEW RUNWAY may be used as departure or destination but no SID or STAR*
R *can be associated or stored with this runway. Therefore the pilot will use it as*
R *an "independent" airport.*
R *A new runway is identified by the 4 letter ICAO airport identifier although all six*
R *or seven digits must be entered.*

ROUTE/STORED ROUTE/NEW ROUTE PAGES



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ROUTE PAGES

(Not-modifiable)

[1L] CO RTE — Any company route ident entered in this field causes all the elements of the route to be displayed.

Line 2 to Line 6 — These lines display the various elements of the route, including waypoints and airways.

[1R] FROM/TO — This field is automatically fitted when the pilot enters the ident for a company route. When the pilot enters a city pair manually, the MCDU displays "NOT IN DATA BASE" if the city pair is not in the navigation data base. If the city pair is in the data base, the CO RTE field displays the first route stored (small font, blue). If more than one route is stored, the pilot can slew to see the different routes.

STORED ROUTE PAGE

R The pilot can store up to 3 new routes.

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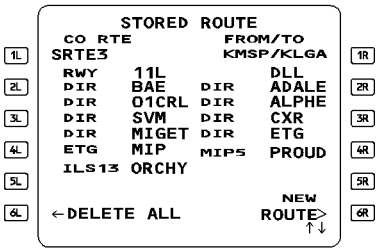


[1L] CO RTE — This field identifies the stored route. Clearing this field deletes the stored route.

Line 2 to Line 5 — The fields in these lines are identical to the corresponding fields in the route page.

[6L] DELETE ALL — Pressing this key deletes all routes previously stored by the crew.

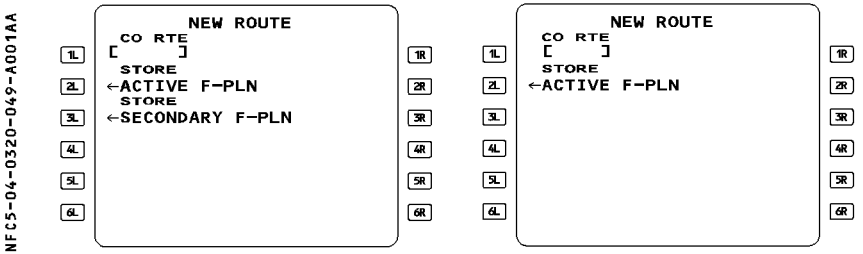
[1R] FROM/TO — This identifies the city pair of the stored route.

[6R] NEW ROUTE — Pressing this key calls up the new route page

R *Note : Stored routes are automatically erased in the DONE phase when a specific pin*
R *program is activated.*
R *When the pilot wants to enter a fourth route, the message "STORED ROUTE*
R *FULL" is displayed and a route has to be deleted prior to inserting a new one.*

NEW ROUTE PAGE

The pilot calls up this page by pressing the NEW ROUTE key on the stored route page. The pilot can use it to store up to three new routes that have been defined already in the active or secondary flight plan.



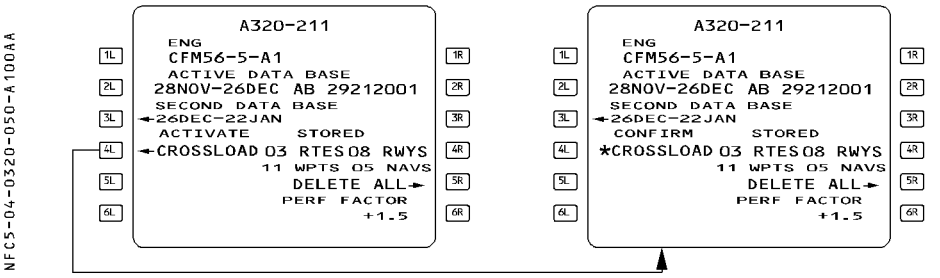
[1L] CO RTE	This field allows the pilot to enter a new company route ident. If that ident has already been assigned, the entry is rejected.
[2L] STORE ACTIVE F-PLN (blue)	Pressing this key stores parameters of the active flight plan as new route. The display shows this prompt when the system contains a FROM/TO, but only during preflight.
[3L] STORE SECONDARY F-PLN (blue)	Pressing this key stores parameters of the secondary flight plan as new route. The display shows this prompt when the system contains a FROM/TO and the secondary flight plan has not yet been sequenced.

Note : — *If it has not already been named, a stored route is named automatically when stored : SRTE 1 or 2 or 3, for example.*
Several elements of the flight plan are not retained when the route is stored :
- *Pilot entered holds*
- *Offset*
- *Pilot entered constraints*
- *Modifications to terminal procedures*
- *Pseudo waypoints*

The MCDU then displays "REVISIONS NOT STORED".

AIRCRAFT STATUS PAGE

The system automatically displays this page at power up, but the pilot may also call it up by pressing the DATA key on the MCDU console.



TITLE — AIRCRAFT TYPE

[1L] ENGINE TYPE — The system uses this to calculate predictions.

R *Note : When the same performance database is used for various aircraft configurations,*
R *the aircraft type displayed may differ from the actual aircraft.*

[2L] ACTIVE DATABASE — The validity period and part number are displayed in large font.

[3L] SECOND DATABASE — The validity period is displayed in small font. The pilot can press the 3L key to switch to the second database as the active database.

CAUTION

Cycling the database erases the primary and secondary flight plans, as well as the stored data. The flight crew must never do this in flight.

[4L] ACTIVATE CROSSLOAD — This key is available, if the content of FMGC's database differs one from the other.
Pressing this key changes the legend to "CONFIRM CROSSLOAD". Pressing the key again starts the crossloading, and transfers the database from one FMGC to the other.

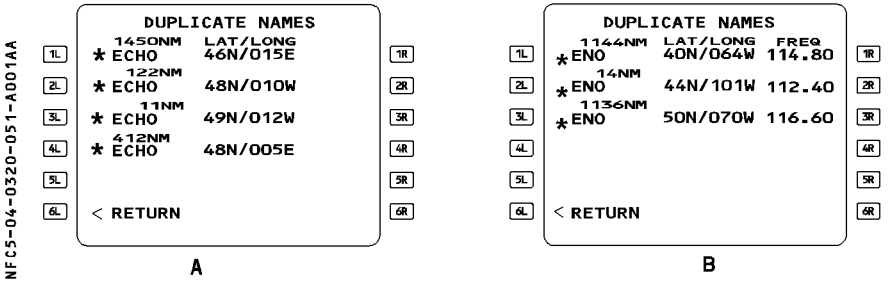
[4R] STORED — This field displays pilot-stored data in large green font. The field is blank, if no data is stored. (The system automatically erases this data at the done phase, when a specific pin program is activated).

[5R] DELETE ALL — The pilot presses this key to delete all pilot-stored data, except data that is part of the active and secondary flight plans.

[6R] PERF FACTOR — This factor can only be modified while the aircraft is on ground.

DUPLICATE NAMES PAGE

This page, which appears automatically, allows the pilot to select a specific waypoint, airport, or navaid when the data base holds more than one under the same identifier.



The pilot presses the key adjacent to a waypoint, navaid, or airport to select it as the one to be entered. When the pilot has finished, the page reverts automatically to the page displayed previously.

LAT/LONG column
This column lists the rounded off latitudes and longitudes, of the different points using the same identifier.

FREQ column
This column lists the frequencies of the navaids, if any.

DISTANCE (shown above identifier)
Each of these distances is the distance from present position to the waypoint displayed directly underneath.

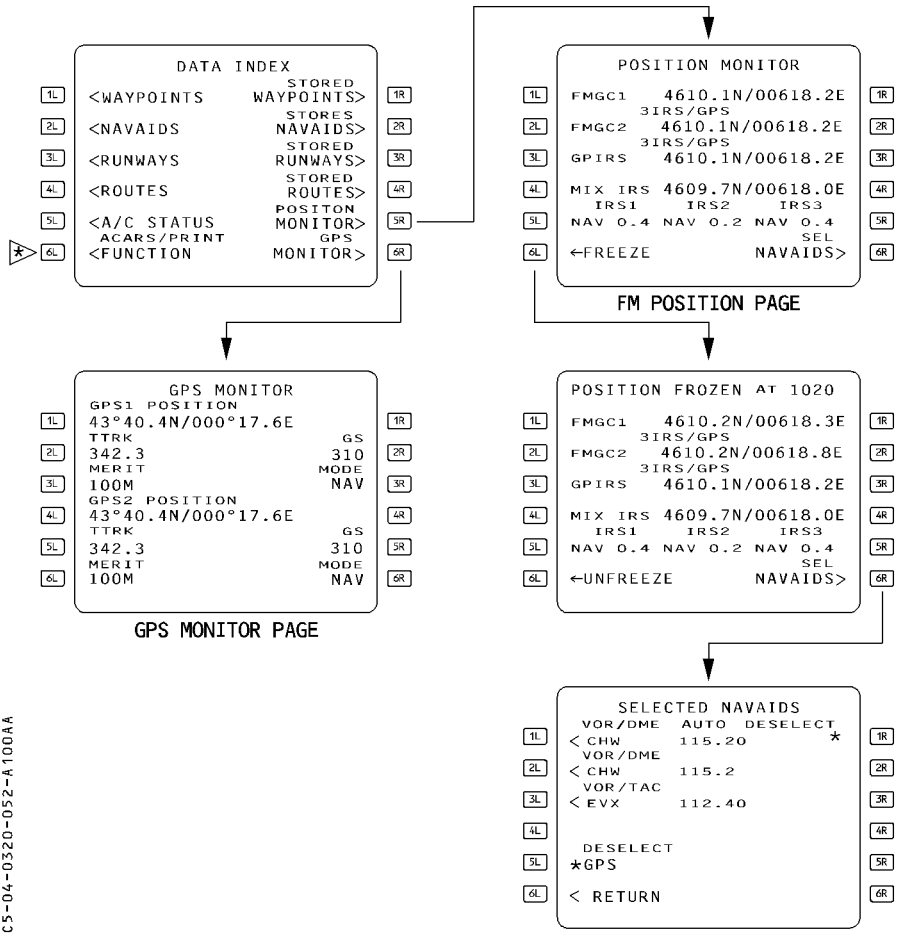
Note : The DUPLICATE NAMES page is not displayed when 2 waypoints with the same ident belongs to the same airway. The system selects the first waypoint found in the database.

POSITION MONITOR PAGE

This page displays all the different positions that the FMGC has computed with the different methods of navigation available. It also shows which method obtained each position. (The positions should be almost identical).

The pilot calls up this page by pressing the 5R key on the data index page.

R



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POSITION MONITOR AND POSITION FROZEN PAGE

Line 1 FMGC OWN	This line shows the latitude and longitude as calculated by the onside FMGC, and the navigation methods used by the FMGC for that calculation (Example : "3IRS/DME/DME").
Line 2 FMGC OPP	This line shows the latitude and longitude, as calculated by the opposite FMGC, and the navigation methods it used.
Line 3 RADIO or GPS or GPIRS	This line shows the latitude and longitude calculated by the onside FMGC from selected radio navaids (Example : DME/DME, VOR/DME, or LOC) or from GPS or GPIRS.
Line 4 MIX IRS	This line shows the latitude and longitude of the weighted mean inertial reference system (IRS) calculated by the onside FMGC from the available IRSs.
Line 5 IRS 1,2,3	This line shows the deviation in nautical miles of each IRS position from the onside FMGC position. It also displays the IRS mode, which can be INVAL, ALIGN, NAV or ATT. *Note : INVAL is displayed when an ADIRS has failed or the IRS position is not refreshed.*
[6L] FREEZE/UNFREEZE	The pilot presses this key to freeze (or unfreeze) all the data displayed on the page. When the data is frozen, the title of the page specifies the time at which it was frozen.
[6R] SEL NAVAIDS	The pilot presses this key to access the selected navaids page.

SELECTED NAVAIDS PAGE

MODIFIABLE ONLY FOR DESELECTION

Line 1	This line displays the navaid, tuned for display purposes, and the tuning mode (AUTO, MAN, or RMP).
Line 2 and 3	These lines display the navaids, if any, tuned for the calculation of radio position and the tuning mode by the FMGC.
[4L]	This field displays the tuned ILS, if any.

[5L] DESELECT/SELECT GPS

The crew presses this key to manually select or deselect the GPS for position computation. Upon transition to the DONE phase, the prompt returns to DESELECT status. If the pilot deselects the GPS, "GPS IS DESELECTED" is displayed when the aircraft is less than 80 NM from the top of descent, or in approach phase.

[6L] RETURN

The pilot presses this key to return to the POSITION MONITOR page.

[1R] DESELECT to [6R]

The pilot deselects a navaid by entering its identifier in one of these six fields. Once deselected in this way, the navaid can no longer be tuned manually through the entry of its ident, nor can it be autotuned for display or determination of the position for the rest of the flight.

The deselection is cleared :

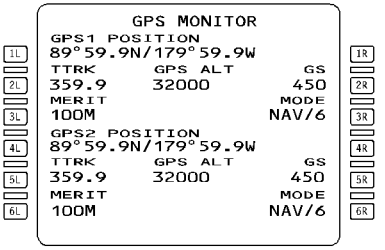
- Manually, by a CLR action into this field, or
- Automatically upon transition to the done or preflight phase, or upon activation of the second database.

The pilot may deselect as many as six stations.

GPS MONITOR PAGE

This page displays the GPS data. The pilot calls up this page by pressing the GPS MONITOR prompt of the DATA INDEX page.

NFCS-04-0320-055-A105AA



Line 1 and 4 GPS 1,2 — POSITION

[2L] and [5L] TTRK — GPS 1, 2 True Track

[3L] and [6L] MERIT — GPS 1, 2 Figure of Merit (M or FT) (meters or feet)

[2R] and [5R] GS — GPS 1, 2 Ground Speed

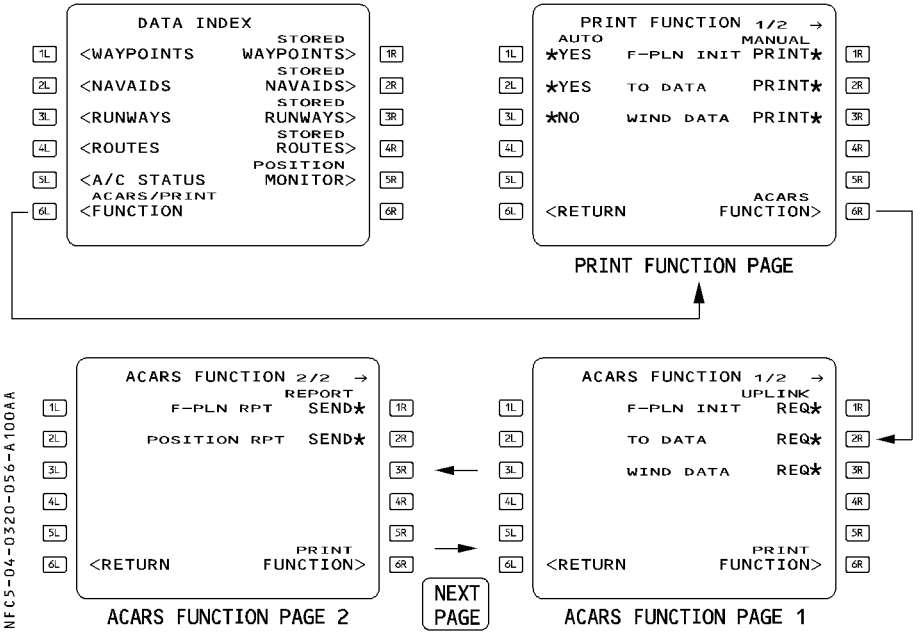
[3R] and [6R] MODE — GPS 1, 2 mode : INIT, ACQ, NAV, TEST, FAULT or ALTAID.

- INIT : system initialization
- ACQ : satellite acquisition
- NAV : normal mode
- TEST : system test
- FAULT : invalid system
- ALTAID : degraded mode. GPS uses aircraft imputs for computation purposes.
  and :
  Number of satellites tracked.

R [2] and [5] GPS ALT : GPS altitude is displayed for informational purposes only.
R It is not used by the FMGS. No guarantee can be given
R regarding its accuracy.

ACARS FUNCTION PAGE

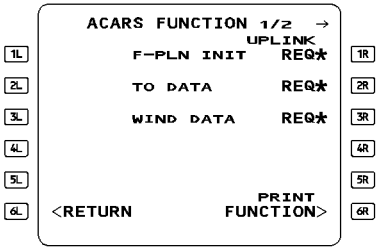
The ACARS FUNCTION pages display the functions that enable the crew to send manual requests or reports to the ground.
All functions, displayed on pages 1 and 2, may be inhibited via a pin program of the NAV database policy file.
The ACARS/PRINT FUNCTION prompt is displayed on the DATA INDEX page. Pressing this key displays the PRINT FUNCTION page, from which the ACARS FUNCTION page can be accessed.



Page 2 of the ACARS FUNCTION is accessed by using the NEXT PAGE key on page 1, and vice versa.

ACARS FUNCTION PAGE 1

NFC5-04-0320-057-A100AA



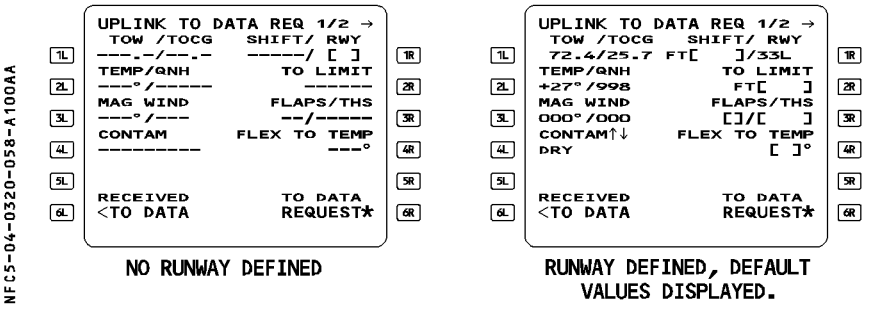
TITLE	ACARS FUNCTION 1/2 in white
Line 1 F-PLN INIT REQ*	Pressing this key sends a request for flight plan to the ground (downlink message) INIT REQUEST prompt of the INIT A page provides the same function.
Line 2 TO DATA REQ*	Pressing this key sends a request for takeoff data. Displayed in DONE and PREFLIGHT phases. TO DATA REQUEST prompt of the UPLINK TO DATA REQ page provides the same function.
Line 3 WIND DATA REQ*	Pressing this key sends a request for wind data. WIND REQUEST prompt of the CLIMB, CRUISE, and DESCENT WIND pages provides the same function.

Note : If "REQ" is not followed by a star, the request cannot be sent (downlink message).
When a function (line 1 or 2 or 3) is deactivated using the NAV database policy file, the corresponding line is blank.

[6L] RETURN	The pilot presses this key to make the display revert to the DATA INDEX page.
[6L] PRINT FUNCTION	The pilot presses this key to access the PRINT FUNCTION page. (Refer to PRINT function page).

UPLINK TO DATA REQ PAGES

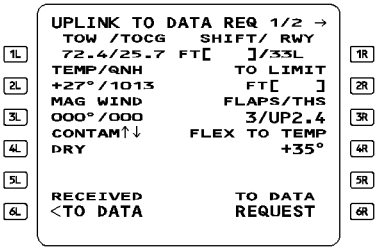
This page allows the pilot to send a request for takeoff data for up to 2 runways. There is one page for each runway. The page is accessed from the PERF TAKEOFF page or from the UPLINK XXX TO DATA page by pressing UPLINK TO DATA prompt.



NFC5-04-0320-058-A100AA

TITLE	White
[1L] TOW/TOCG (green)	This field is dashed until a runway is defined in [1R] field. The TOW/TOCG is defaulted to the values of INIT B and FUEL PRED pages. If not available, dashes are displayed. Not modifiable by the pilot.
[2L] TEMP/QNH or QFE (green/blue)	This field is dashed until a runway is defined in [1R] field; TEMP = defaulted to SAT, not modifiable by the crew BARO = defaulted to FCU selection, pilot modifiable
[3L] MAG WIND (blue)	This field is dashed until a runway is defined in [1R] field, displays the wind at the origin. Modifiable by the pilot.
[4L] CONTAM (blue)	This field is dashed until a runway is defined in [1R] field. The display is defaulted to DRY. The slew keys allow the crew to modify the runway contamination. DRY, WET, 1/4 WATER, 1/2 WATER, 1/4 SLUSH, 1/2 SLUSH, COMP SNOW.
[6L] RECEIVED TO DATA	This field calls up the UPLINK MAX (or FLX) TO DATA page that displays the data received by ACARS.

NFC5-04-0320-059-A100AA



[1R] SHIFT/RWY (blue)
This field is dashed until a runway is defined in the F-PLN. If a runway is defined in the F-PLN, it is automatically filled :
SHIFT = value from PERF TO page or blue bracket if no value defined.
RWY = F-PLN departure runway
This field is modifiable by the pilot.

[2R] TO LIMIT (blue)
It is dashed until a runway is defined in [1R] field.
It displays blue brackets [ ] when a runway is defined.
The pilot may enter a length considering obstacles on the runway.

[3R] FLAPS/THS (blue)
This field is dashed until a runway is defined in [1R] field ; then defaulted to values from PERF TO page. Blue brackets are displayed if PERF TO page has no defined values.

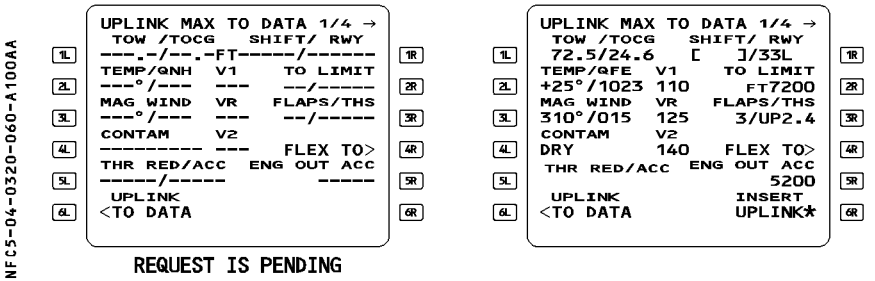
[4R] FLEX TO TEMP (blue)
This field is dashed until a runway is defined in [1R] field ; then it is defaulted to values from the PERF TO page. Blue brackets are displayed it PERF TO page has no defined values.
This field is modifiable by the pilot. The pilot may enter a FLEX TO temperature (FXX).

[6R] TO DATA REQUEST* (amber)
Pressing the key sends the takeoff data request message to the ground.
The star disappears when the request is sent. The star is displayed again when data are available.

Page 2/2 is a page used for requesting a second runway data.

Note : — *If the UPLINK TO DATA REQ page 2 is accessed (page 1 being filled), the fields of this page are filled with default values after entry of a runway in [1R]. Baro and wind are common with page 1.*

UPLINK MAX TO DATA PAGES



REQUEST IS PENDING

This page is accessed via the UPLINK TO DATA REQ page, by pressing the RECEIVED TO DATA key.

There is a set of 2 pages (MAX TO DATA and FLEX TO DATA) for each of the 4 uplinked runway data. Uplinked data is displayed in green (not modifiable by the pilot).

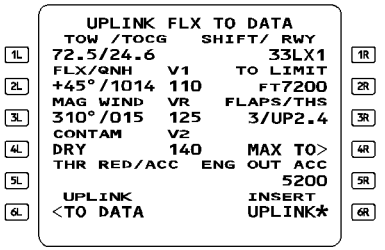
	[1L] TOW/TOCG	Uplinked reference Takeoff Gross Weight and Takeoff Center of Gravity.
	[2L] TEMP/QNH (or QFE)	Uplinked assumed Temperature and Baro Setting.
	[3L] MAG WIND	Uplinked takeoff runway wind.
	[4L] CONTAM	Uplinked takeoff runway contamination.
	[5L] THR RED/ACC	Uplinked Thrust Reduction and Acceleration altitudes.
	[6L] UPLINK TO DATA	Pressing the key calls up the UPLINK TO DATA REQ page.
	V1, VR, V2	Uplinked takeoff speeds.
	[1R] SHIFT/RWY	Uplinked TO runway ident, runway intersection, and position shift.
	[2R] TO LIMIT	Uplinked runway length remaining.
	[3R] FLAPS/THS	Uplinked FLAPS/SLATS CONF and TRIM position.
	[4R] FLEX TO	Pressing this key calls up the UPLINK FLEX TO DATA pages.
R	[5R] ENG OUT ACC	Uplinked engine-out acceleration altitude.

R [6R] INSERT UPLINK* Uplinked Takeoff data is available for insertion.
R Selecting this prompt inserts the following data on the
R PERF TO page :
R – V1, VR, V2
R – THR RED/ACC, ENG OUT ACC altitudes
R – MAG WIND
R – FLAPS/THS
R – SHIFT
R – FLEX
R The display reverts to the PERF TO page, and the asterisk
R disappears.
R This field is not displayed, if the runway does not match
R the active runway, or if the uplinked TOW/TOCG differs
R from the current TOW/TOCG (if it already exists). The
R "CHECK TAKEOFF DATA" message is displayed on the
R MCDU scratchpad.

R *Note : All previously received data is replaced by the new uplinked data.*

UPLINK FLX DATA PAGES

NFC5-04-0320-061-A100AA

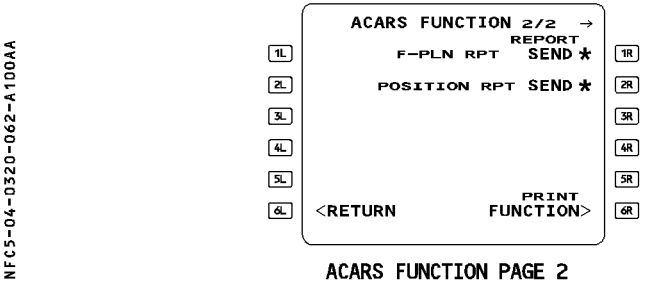


[2L] FLX/QNH or QFE Uplinked assumed Flex Temperature and baro setting.

[4R] MAX TO Pressing the key calls up the MAX TO DATA page.
For all other fields, refer to the MAX TO DATA page.

All other fields are identical to the UPLINK MAX TO DATA page.

ACARS FUNCTION PAGE 2



NFC5-04-0320-062-A100AA

ACARS FUNCTION PAGE 2

Line 1 F-PLN RPT SEND — This key, when depressed, sends the flight plan report to the ground.

Line 2 POSITION RPT SEND — This key, when pressed, sends a Position Report to the ground.

Note : — *No report can be sent if "SEND" is not followed by a star*
— *When a function (line 1 or 2) is deactivated through the navigation database policy file, the corresponding line is blank.*

[6L] RETURN — The pilot presses this key to make the display revert to the DATA INDEX page.

[6R] PRINT FUNCTION — The pilot presses this key to access the PRINT FUNCTION page.

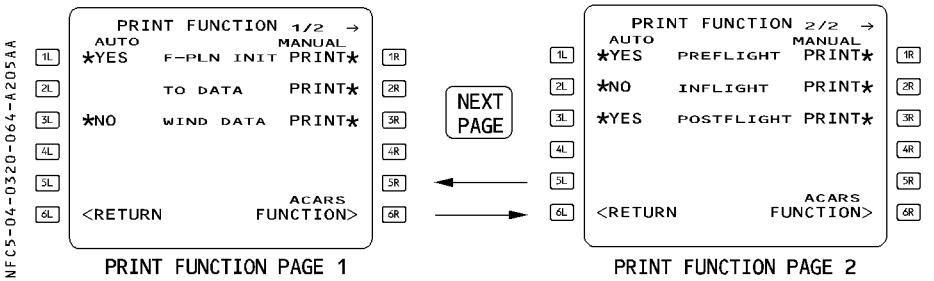
LEFT INTENTIONALLY BLANK

PRINT FUNCTION PAGES

The PRINT FUNCTION pages enable the crew to print the data relative to the current flight. These data comes from 2 different sources :

– ACARS uplink messages
– Active data from the current flight.

The pilot may access these pages from the "DATA INDEX" page by depressing the [6L] key "ACARS/PRINT FUNCTION".



PRINT FUNCTION PAGE 1 PRINT FUNCTION PAGE 2

PRINT FUNCTION PAGE 1/2

This page displays the status of the automatic printing capabilities for the uplink messages (left colum) and the status of the manual printing of the current active data (right column).

Left column

AUTO

* YES (blue)	Line 1 : Uplink messages relative to F-PLN INIT data are automatically printed when received. Line 2 : Uplink messages relative to takeoff data are automatically printed when received. Line 3 : Uplink messages relative to wind data are automatically printed when received.
* NO (blue)	When "NO" preceded by a star is displayed in front of a line, the automatic printing is deselected. The pilot can reactivate it by depressing the left key of the line.
NO (without a star)	The automatic printing is internally deselected for the data of the line. The pilot cannot reactivate it manually.
Blank	The ACARS function is not available for this line. Uplink message cannot be received nor automatically printed.

Right Column

MANUAL — Displays the status of the manual printing capability of the active data (and not the ACARS uplink data)

PRINT * (amber) — Pressing the right keys prints the following active data :
- Line 1 Active flight plan init data
- Line 2 Active takeoff data
- Line 3 Active wind data

If the star is not displayed, the printing is not possible.
When the key has been pressed, the star is removed until the data are printed.

[6L] RETURN — Pressing this key reverts the display to the DATA INDEX page.

[6] ACARS FUNCTION — Pressing this key reverts the display to the ACARS FUNCTION page.

PRINT FUNCTION PAGE 2/2

This page describes the printing capabilities of the reports displayed on line 1 to 3.

Left column

AUTO (white)

* YES (blue) — Line 1 : the PREFLIGHT report is automatically printed at engine start
Line 2 : the INFLIGHT report is automatically printed at takeoff.
Line 3 : The POSTFLIGHT report is automatically printed at engine shut down.

* NO (blue) — The report displayed on the line is not automatically printed. You can reactivate the function by pressing the left key of the line.

R NO (without a star) — The automatic printing is deactivated internally for the report. The pilot cannot reactivate it.

Right column

R MANUAL — Pressing a right key prints the report displayed on the line.

R PRINT * — If the star is not displayed, the printing is not possible.
When the key is pressed, the star is removed until the report is printed.

PERF PAGE

The flight plan is divided into several phases :

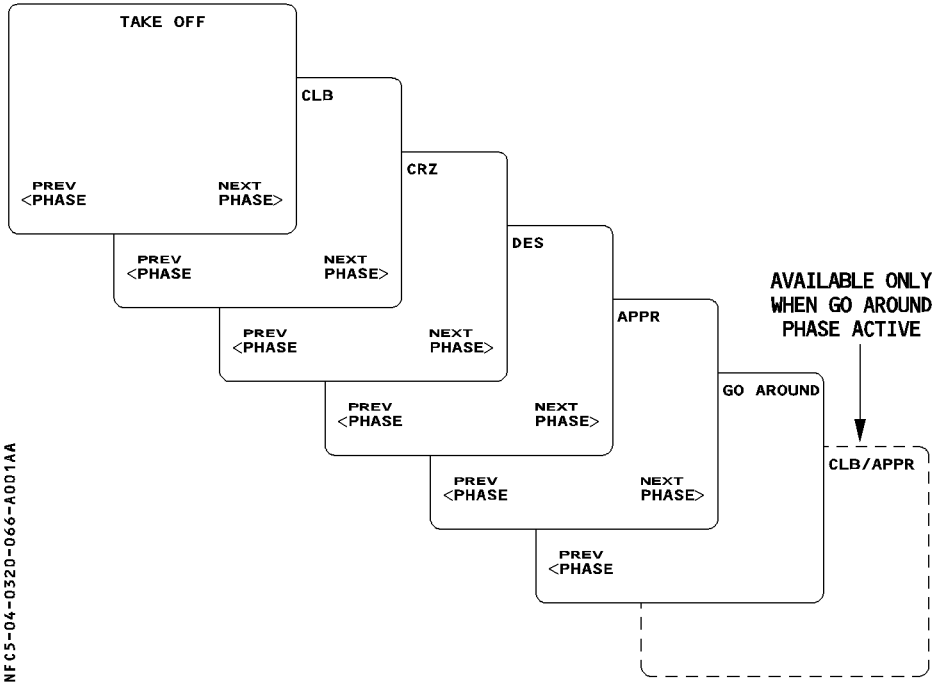
R PREFLIGHT, TAKEOFF, CLIMB, CRUISE, DESCENT, APPROACH, GO-AROUND, DONE.

Each phase except the preflight and done phases has a performance (PERF) page. The PERF pages display performance data, speeds related to the various phases, and predictions.

Pressing the PERF key on the MCDU console calls up the performance page for the current active phase. Performance pages relating to phases already flown are not available.

In the preflight and done phases, pressing the PERF key brings up the takeoff performance page.

Pressing the PERF key in the done phase makes the phase transition to the preflight phase.

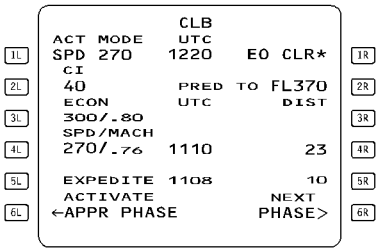


R The FMGS flight phases are not related to the FWC flight phases.

Line 6	Fields may display two different prompts, depending upon whether the phase is active or not.
[6L] PREV PHASE	To review the performance page for the previous phase. The prompt is unavailable on the takeoff performance page. It is also unavailable for phases already flown.
[6L] ACTIVATE APPR PHASE	To activate, then confirm, the APPR phase. Available only on the page corresponding to the active phase.
[6R] NEXT PHASE	To review the performance page for the next phase.

R *Note : "EO CLR" prompt*

- *When the FMGS detects an engine-out condition, the system automatically calls up the performance page for the current flight phase (except when this occurs*
R *before the diversion point during takeoff or no EOSID exists in the flight plan) and displays "EO CLR*" in the [1R] field.*
If the pilot presses the [1R] key , the system reverts to the normal processing (with no engine failed) and suppresses the EO information. (Refer to 4.04.10).
R – *If the engine-out condition is detected before the diversion point at takeoff, a*
R *temporary flight plan is created.*



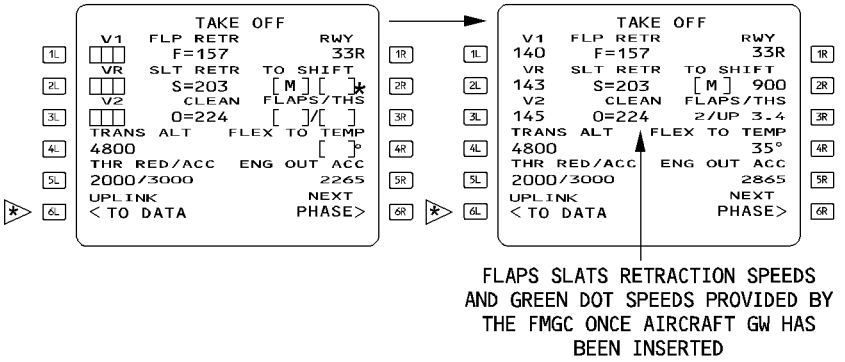
CLIMB PHASE ACTIVE
ENGINE OUT IS DETECTED

NFC5-04-0320-067-A001AA

PERF TAKEOFF PAGE

During the preflight phase, the pilot presses the PERF key to call up the takeoff performance page.

R



NFCS-04-0320-068-A001AB

TITLE

TAKE OFF white large font when the takeoff phase is not active, green large font when it is.

[1L] V1
[2L] VR
[3L] V2

The boxes are amber as long as the pilot does not make entries in them.
The pilot can modify any entry as long as the takeoff phase is not active.

Note : If the pilot does not enter V2, the SRS mode will not be available at takeoff.

R [4L] TRANS ALT
(transion altitude)
[5L] THR RED
R (thrust reduction altitude)

The pilot calls this up from the database after the origin airfield is defined. The pilot can modify it.
This is the altitude at which the pilot should reduce the thrust from TOGA/FLX to MAX CLIMB (CL detent) with all engines operative.

R — "CLB" or "LVR CLB" appears on the FMA flashing amber.

R — The default thrust reduction is 1500 feet above the runway elevation.
— The pilot can modify this altitude : the minimum is 400 feet above the runway elevation.

ACC
(Acceleration altitude)

This is the altitude at which the climb phase is triggered.
- The target speed jumps to the initial climb speed.
- The default value is 1500 feet above runway elevation.
- The flight crew can modify the value. The minimum value is 400 feet above runway elevation, though it is always higher than or equal to THR RED.

Note :
- *A clearing action reverts both values to the defaulted ones.*
- *When the crew selects an altitude on the FCU that is :*
  - *below ACC, it brings the ACC down to this altitude.*
  - *below THR RED, it brings THR RED and ACC down to this altitude. (The 400 feet minimum still applies).*

[6L] UPLINK TO DATA ◁*

Pressing this key accesses the UPLINK TO DATA REQ page. Only displayed in the preflight and done phasess, when ACARS is installed.

[1R] RWY

This field shows the takeoff runway selected on the active flight plan.
The flight crew cannot make an entry through this field. The field shows dashes, if no runway has been inserted into the flight plan.

[2R] TO SHIFT

This field shows the distance in meters or feet between the aircraft's takeoff position and the runway threshold. The flight crew uses it to update the FMGC navigation computation. (Its values are limited to the length of the runway).

[3R] FLAPS/THS

This is an optional pilot entry for the positions of the flaps and the trimmable horizontal stabilizer (THS) at takeoff.
It is for information only (no action). The flight crew can modify it until takeoff by entering "UP X.X" or "X.X UP", or "DN X.X" or "X.X DN" for the THS.

[4R] FLX TO TEMP or ◁* DRT TO or FLX TO

The pilot inserts the FLX TO temperature for FLX takeoff setting purposes or a derated thrust (if installed). It can only be entered during preflight.
The system sends it to the FADEC and displays the entered data on the upper ECAM display.
The TEMP value is always entered in degrees Celsius.

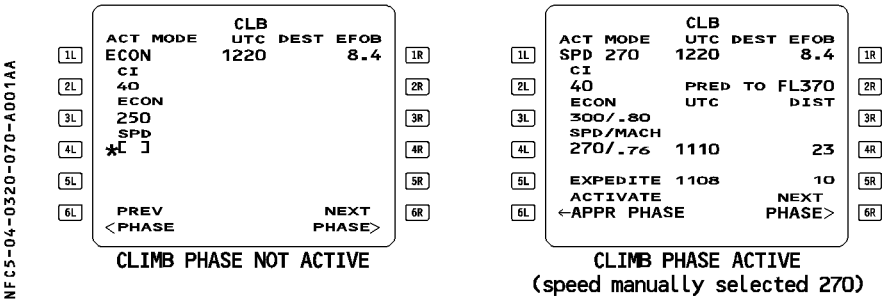
[5R] ENG OUT ACC R

This field displays the engine-out acceleration altitude, as defined in the database, or entered manually by the flight crew. This is for display only. It cannot be cleared.
The above ACC altitude rules of [5L], apply to this field.

[6R] NEXT PAGE

This key calls up the climb performance page.

PERF CLIMB PAGE



CLIMB PHASE NOT ACTIVE

CLIMB PHASE ACTIVE
(speed manually selected 270)

NFC5-04-0320-070-A001AA

R The system calls up this page when an engine out is detected before the top of climb.

TITLE — CLB in a white large font when the climb phase is not active and in a green large font if it is active.

[1L] ACT MODE — This field displays the active target speed (ECON, selected SPEED/MACH, EXPEDITE ◁✱|).
The pilot cannot modify it through this field.

R [2L] CI (Cost Index) — This field displays the cost index as initialized on the INIT A page or defaulted from the database.

[3L] ECON — ECON is the optimum speed, considering time and fuel cost ratio for the active flight plan, weather data, cruise flight level, and aircraft gross weight. Speed limits and speed constraints, if any, may prevent the aircraft from flying at the ECON speed.
The system switches from airspeed to Mach number automatically at the SPD/MACH crossover altitude.

[4L] SPD or SPD/MACH or blank

If climb phase is not active :
The pilot can enter a preselected speed.

If climb phase is active :

R This field displays the selected or preselected SPD or MACH target.
The pilot cannot modify it directly in this field, but can adjust it with the SPD/MACH selection knob on the FCU.
Pushing in the FCU SPD/MACH selection knob to revert to managed speed, the system selects (or reselects) ECON SPD/MACH and [4L] is blank.

*Note : When the CLB phase is not yet active, a * symbol appears next to the selectable speed.*
It allows the pilot to preselect a specific speed, either ECON, or a manually-entered speed, as the initial CLB speed target.

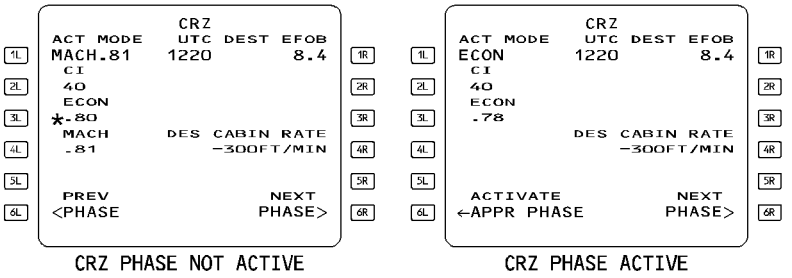
Example :

ECON ** 250* *SPD* *210*	*The preselected active speed target is 210 knots (no asterisk). Pressing the [3L] key selects the ECON speed.*

R	[5L] Blank or	This field is blank, as long as the aircraft is in preflight.
R	EXPEDITE ◁|	This field displays this legend, when the takeoff or CLB phase
R		is active. (The pilot cannot engage EXPEDITE from this field).
	[6L] PREV PHASE	1. This field displays this legend, if the climb phase is not active.
	or	The pilot presses this key to call up the takeoff page.
	[6L] ACTIVATE	2. The field displays this legend, if the climb phase is active.
	APPR PHASE	Pressing this key once displays "CONFIRM APPR PHASE*". Pressing it again activates the approach phase.
	[1R] TIME/UTC,	Before takeoff, this field displays the flight time to destination
	DEST EFOB	and the predicted remaining fuel on board.
		After takeoff, it displays the predicted arrival time at destination (UTC) and the remaining fuel on board. If the crew enters an estimated takeoff time, the field displays automatically the predicted arrival time (UTC) at destination.
	[2R] PRED TO...	This field displays the target altitude for the predictions shown in 3R, 4R, or 5R. – Defaults to the FCU altitude. – Modifiable to any altitude below CRZ FL.
	[3R]	These fields show predictions for the target altitude selected in
	or	[2R] for the current vertical mode and target speed.
	[4R]	[3R] field : ECON speed predictions
		[4R] field : Manually-selected SPD predictions
	[5R]	[5R] field : EXPEDITE mode ◁| predictions
R		Fields [3R] [4R] [5R] are only displayed, while the takeoff or climb phase is active.
	[6R] NEXT PHASE	The pilot presses this key to call up the cruise page.

PERF CRUISE PAGE

NFCS-04-0320-072-A100AA



TITLE	CRZ in white, large font, when cruise phase is not active, in green, large font, when it is.
[1L] ACT MODE	This field shows the active speed/Mach target (ECON, MACH or SPD XXX). The pilot cannot modify it through this field.
[2L] CI	This field shows the cost index as initialized on the init A page or defaulted from the data base, or as inserted in this field by the crew.
[3L] ECON	ECON is the optimum speed or Mach, in terms of time and fuel cost ratio, related to the active flight plan, weather, cruise flight level, and gross weight.
[4L] SPD/MACH or Blank	If cruise phase is not active : The pilot can enter a preselected speed or Mach number. If cruise phase is active : This field is blank.

*Note : When the cruise phase is not active, a * symbol appears beside the selectable speed (or Mach).*
This allows the pilot to preselect a specific speed (or Mach), either the ECON value or a value entered manually.
Example :

ECON [3L]	*The preselected active Mach target is .78 (no star)*
** .80*	*Pressing the [3L] key selects the ECON Mach.*
MACH [4L]	
.78	

[6L] PREV PHASE or
[6L] ACTIVATE APPR PHASE

The pilot can press this key to call up the climb page, if the cruise phase is not yet active.
This field displays this legend if the cruise phase is active.
The pilot presses the key once to change the legend to "CONFIRM APPR PHASE*".
A second press activates the approach phase.

Note : If the pilot activates the approach phase inadvertently, it can reselect the cruise flight level into the progress page to reactivate the cruise phase.

[1R] TIME/UTC DES EFOB

Before takeoff this field displays the flight time to destination and the predicted remaining fuel on board. If the crew enters an estimated takeoff time, the field displays automatically the predicted arrival time (UTC) at destination. After takeoff is displays the predicted arrival time at destination (UTC) and the remaining fuel on board.

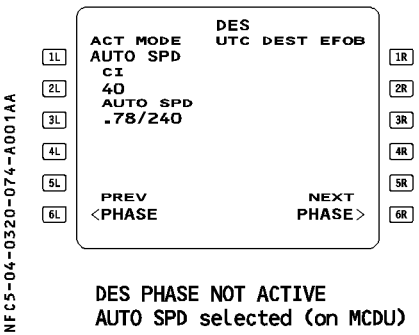
[4R] CAB RATE

This field displays the defaulted value of the cabin altitude descent rate used for computing the descent path and if necessary deletes a repressurization segment.
The flight crew may modify the value.
A clear action reverts to the default value. CAB RATE being a negative value, "minus" is not a necessary entry.

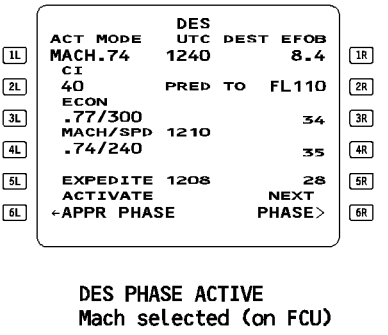
[6R] NEXT PHASE

This key calls up the descent page.

PERF DESCENT PAGE



DES PHASE NOT ACTIVE
AUTO SPD selected (on MCDU)



DES PHASE ACTIVE
Mach selected (on FCU)

NFC5-04-0320-074-A001AA

TITLE — DES in a white large font when the descent phase is not active and in a green large font, when it is active.

[1L] ACT MODE — This field displays the active speed target (ECON, AUTO SPD, SPD XXX or MACH. XX, EXPEDITE). The flight crew cannot modify it through this field.

[2L] CI — This field displays the cost index, as initialized on the init A page or defaulted from the data base, or inserted in this field by the flight crew. The flight crew cannot modify it when the descent phase is active.

[3L] ECON/AUTO SPD — If the descent phase is not active :
This field displays "ECON" in blue, along with the associated economy descent Mach or speed, also in blue, before the flight crew makes any entry. The crew may overwrite the ECON DES MACH/SPD by entering a Mach number or a speed in this field. The title then reverts to "AUTO SPD".
To compute the top of descent and descent path, the system uses a descent speed profile that is either ECON MACH/SPD or AUTO MACH/SPD, plus SPD CSTR, SPD LIM, GD etc...

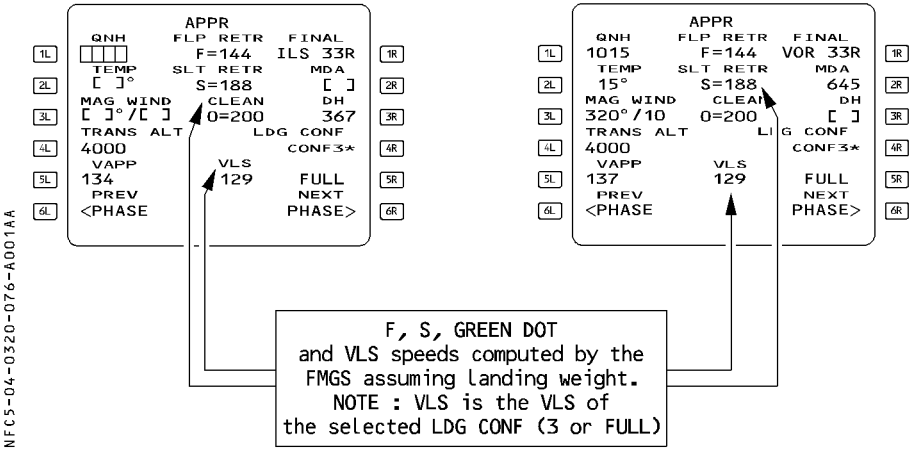
Note : Auto MACH/SPD is a selected value entered by the crew but it will be used as a managed MACH/SPEED to compute and fly the descent profile when the speed target is managed.

If the descent phase is active :
The flight crew cannot make an entry in this field.
The display shows ECON (upper line), .XX/XXX (lower line) or AUTO SPD (upper line), .XX/XXX (lower line).

[4L] MACH/SPD	If the descent phase is not active, this field is blank. If the descent phase is active : This field displays the speed or Mach target when the flight has selected a Mach or a speed manually. The system then displays the speed or Mach target in the speed window of the flight control unit (FCU) and in the [1L] field. The flight crew cannot modify the value in this field. The pilot can adjust it with the SPD/MACH selector knob on the FCU when the speed/Mach has been selected manually. Pushing in the FCU speed selector knob activates the managed SPD/MACH target, which is either ECON or AUTO SPD. [4L] is then blank.
[5L] EXPEDITE ◁|	This field displays this legend if the descent phase is active. The
or	flight crew cannot select the expedite mode through this field.
BLANK	The field is blank as long as the descent phase is not active.
[6L] PREV PHASE	This key calls up the cruise phase page if the descent phase is
or	not yet active.
ACTIVATE	This field displays this legend if the descent phase is active. If
APPR PHASE	the flight crew presses the key once, "CONFIRM APPR PHASE*" appears. Pressing it a second time activates the approach phase.
[1R] TIME/UTC	Before takeoff, this field displays the flight time to destination
DEST EFOB	and the predicted remaining fuel on board. If the crew enters an estimated takeoff time, the field displays automatically the predicted arrival time (UTC) at destination. After takeoff, it displays the predicted arrival time at destination (UTC) and the remaining fuel on board.
[2R] PRED TO...	This field displays the target altitude for the predictions in [3R] [4R], or [5R] . The display defaults to the altitude selected on the FCU. The flight crew can modify it to any altitude lower than present altitude.
[3R]	These fields display altitude predictions down to the target
or	altitude selected in [2R], computed for the current vertical
[4R]	mode (DES or OP DES, EXPEDITE) and the indicated target speed. The [3R] field shows predictions for the ECON or AUTO SPD/MACH profile. The [4R] field shows predictions for a SPD/MACH selected manually.
[5R]	This field displays predictions for EXPEDITE mode. Fields [3R] [4R] [5R] are displayed only when DES phase is active.
[6R] NEXT PHASE	Pressing this key calls up the approach page.

PERF APPR PAGE

R



NFCS-04-0320-076-A001AA

TITLE — APPR is in large white font, if the approach phase is not active ; it is in large green font, if it is.

[1L] QNH — This field displays brackets, when the aircraft is more than 180 NM from the destination. Inside 180 NM, a mandatory amber box appears. The pilot must either enter the QNH in hPa (three or four digits), or in inches of mercury (two digits, decimal point, and two more digits).
The system interprets :
. 1003 as 1003 hPa ;
. 29.92 as 29.92 inches.
The pilot can modify this entry at any time.
The system uses the QNH to compute the cabin repressurization segment.

[2L] TEMP — This field displays the temperature at destination. The field displays brackets until the pilot enters the temperature. The pilot can modify this figure.
The system uses this temperature to refine its computation of the descent profile (ISA model).

[3L] MAG WIND
The flight crew enters the magnetic wind in knots at the destination in this field. The system transmits any entry made in this field to the vertical revision and flight plan B pages (which display wind direction as true, not magnetic).

[4L] TRANS ALT
This field displays the transition altitude taken from the data base (small font) or entered by the flight crew (large font). The flight crew can modify it at any time.

[5L] VAPP
The FMGC computes this approach speed, using the formula: VAPP = VLS + 1/3 of the headwind components (limited to VLS + 5 as a minimum and VLS + 15 as a maximum).
The flight crew can modify VAPP. A clear action reverts VAPP to the computed value.

Note : VLS = 1.23 VS1G of the selected landing configuration (full or 3).

[6L] PREV PAGE
This field displays this legend if the approach phase is not active.
Pressing this key calls up the descent performance page.

[1R] FINAL
This field displays the approach specified in the flight plan. The flight crew cannot modify it through this field.

[2R] MDA/MDH
This field displays the minimum descent altitude (or minimum descent height if the QFE pin program is activated), with associated brackets. The flight crew inserts the value, which it can modify at any time.
If the flight crew makes an entry in [3R] or changes the approach, it clears this figure.

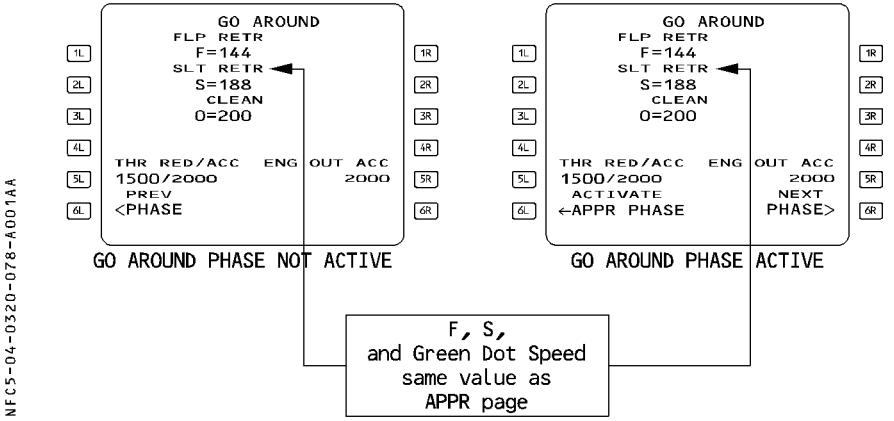
[3R] DH
If the flight plan includes an ILS approach, this field displays "DH" and empty brackets. The flight crew inserts the decision height. The system will accept an entry of "NO". If the flight crew inserts an MDA or an MDH, this erases the decision height, and this field reverts brackets. The DH range is 0 to 700 feet.

[4R] LDG CONF CONF 3
The flight crew can select configuration 3 by pressing the 4R key.
This moves the * down to the [5R] field, which is displaying "FULL".

[5R] FULL
The flight crew can use this key to select Configuration FULL when necessary. configuration FULL is the default landing configuration.

[6R] NEXT PHASE
Pressing this key calls up the go-around performance page.

PERF GO AROUND PAGE



NFC5-04-0320-078-A001AA

TITLE

GO AROUND in a white large font if the go-around phase is not active, in a green large font if it is.

[5L] THR RED ACC

This field displays the thrust reduction altitude and the acceleration altitude.

Thrust reduction altitude

- Altitude at which thrust must be reduced from takeoff/go-around thrust to maximum climb thrust
- "CLB" or "LVR CLB" flashing on flight mode annunciator.
- Defaults to 1500 feet above destination runway elevation.
- Can be modified by the crew (minimum 400 feet above destination runway elevation).

Acceleration altitude

- Altitude at which target speed jumps to green-dot speed (see the note below).
- Defaults to 1500 feet above destination runway elevation
- Can be modified by the crew but always equal to or higher than thrust reduction altitude.

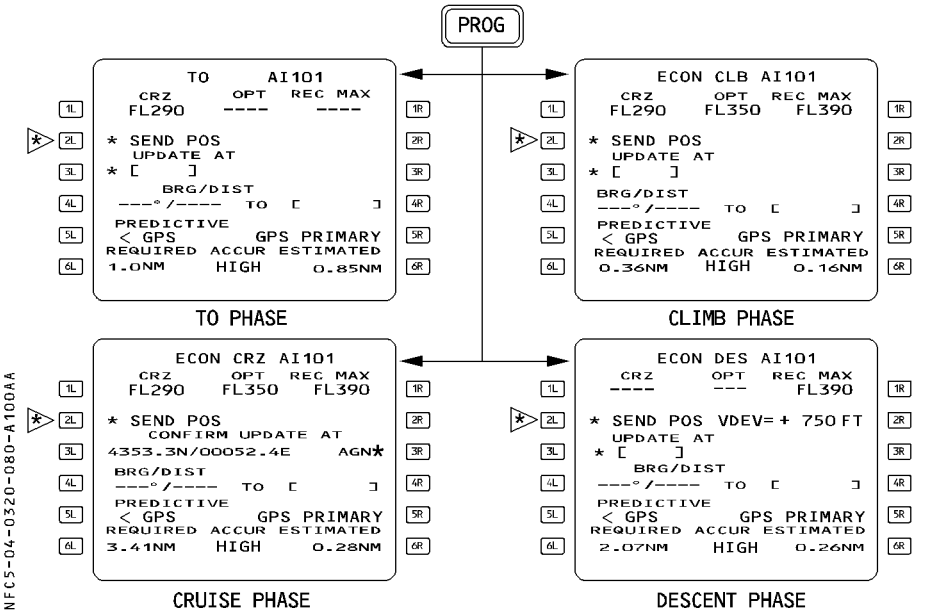
[6L] PREV PHASE or	This field displays this legend if the go-around phase is not active. Pressing the key calls up the PERF APPR page.
ACTIVATE APPR PHASE	This field displays this legend if the go-around phase is active. Pressing it once makes "CONFIRM APPR" appear. A second press activates the approach phase.
[5R] ENG OUT ACC	This display has the same characteristics as the display beside the 5R key on the takeoff page. It is for display only, and the pilot can modify it.
[6R] NEXT PHASE	Pressing this key calls up the PERF APPR page.

Note : When the go-around phase is active, if the pilot enables ALTN or if the pilot inserts a new destination in the active flight plan and a new cruise flight level on the progress page, the go-around phase shifts automatically into the climb phase. (The target speed jumps from green dot speed to initial climb speed).

PROG PAGES

The progress page is a multifunction page that allows the pilot to :
- Select a new cruise flight level.
- Crosscheck the Flight Management (FM) system's navigation accuracy, and validate it.
- Update the FM position.
- Monitor the descent.

R



TITLE — Different for each flight phase (see above diagrams). The vertical phase is in large green font. The flight number is in large white font. The EO is in large amber font, if the engine-out condition is detected.

Line 1 CRZ (blue) — This line shows the cruise flight level inserted on the INIT A page, or directly in this field, in blue. If the flight crew uses the FCU to select an altitude that is higher than that displayed in this field, the system changes the displayed number to match the value selected via the FCU.
The flight crew cannot insert a flight level that is lower than the FCU-selected altitude.
This field displays dashes, when the descent or approach phase is active.

OPT

This field shows the optimum flight level (in green), based on the present gross weight, cost index, and temperature.
It displays dashes :
– In cruise, when the aircraft is less than 15 NM from the top of descent :
– When an engine-out is detected.

REC MAX

This field shows the recommended maximum altitude (in magenta), based on the present gross weight and temperature. It gives the aircraft a 0.3 g buffet margin, a minimum rate of climb at MAX CL thrust, and level flight at MAX CRZ thrust. It is limited to FL 391. With an engine-out, it shows the recommended maximum EO altitude, computed for long-range cruise speed, anti-icing off.

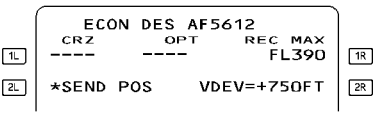
R

[2L] SEND POS (blue)

The flight crew may send a position report by pressing the key adjacent to this field.
The report will include ETA at "TO" waypoint and NEXT waypoint.

[2R] V DEV

This field is displayed during descent and approach, when NAV mode is engaged. It shows the vertical deviation between the present altitude and the altitude at which the aircraft would be, if it were on the descent path.



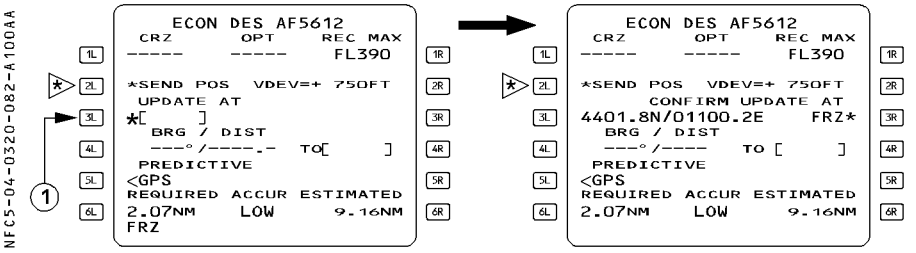
NFCS-04-0320-081-A100AA

Line 3 UPDATE AT

The flight crew can update the FMGC position through this field, by entering either the ident for a waypoint, a navaid, an airport, a latitude and longitude (L/L), a place/bearing/distance (PBD), or a place-bearing/place-bearing (PBX).
When the field has received this data, it changes its format to : "CONFIRM UPDATE AT", followed by the LAT/LONG and IDENT of the inserted position with an asterisk.
When the aircraft overflies the location, the flight crew presses the right-hand key adjacent to the asterisk to confirm the update.

Note : If no ident has been inserted, the field displays "ENTRY", instead of an ident.

R



Line 4 BRG/DIST

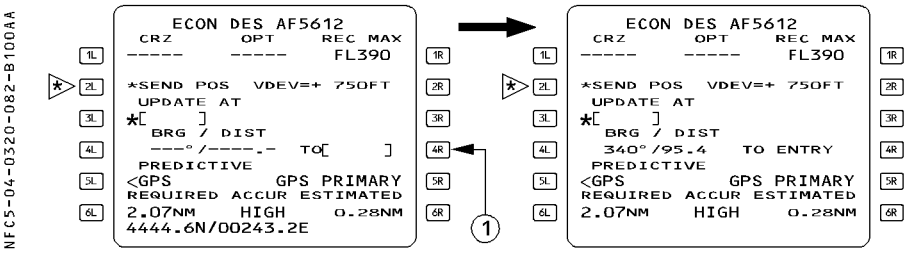
The pilot can enter an airport, a waypoint, a navaid, or a runway on this line. The pilot may enter each as an ident, a latitude/longitude (L/L), a place/bearing/distance (PBD), or a place-bearing/place-bearing (PBX). The field then shows the FMGC-computed bearing and the distance of this site from the aircraft's present position. The last distance digit is in 1/10 of a NM. If it does not have an ident, the point is called "ENTRY".

Example :

BRG/DIST

340°/95.4 to ENTRY

R



[5L] PREDICTIVE GPS
This prompt gives access to the PREDICTIVE GPS page.

[5R] GPS PRIMARY
This prompt is displayed, when the FMS navigation mode is GPS PRIMARY. When GPS PRIMARY is not available, or the navigation mode is not GPS/IRS, this field is blank.
The scratchpad displays the relevant "GPS PRIMARY" message, when this prompt appears ; and, "GPS PRIMARY LOST", when the field turns to blank.

[6L] REQUIRED
This field displays the default value for the required navigation accuracy level, and it can be modified by the flight crew. Provided no pilot entry has been made, the default value changes according to the actual flight area (En route, terminal, approach, refer to 1.22.20).

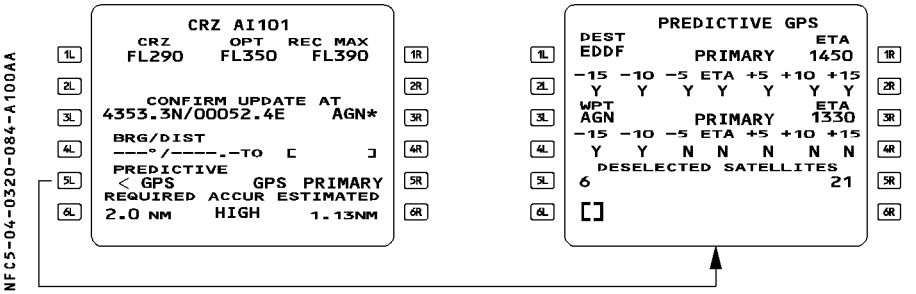
R
ACCUR
HIGH/LOW
This field shows the Flight Management (FM) system's estimate of navigational accuracy. "HIGH" indicates that the FMS estimates that the navigational accuracy matches the accuracy criteria of the area currently flown. "LOW" indicates that the criteria is not matched.

[6R] ESTIMATED
This field displays the current estimated navigation accuracy value (EPE), as computed by the FMS.

PREDICTIVE GPS PAGE

Note : This page is only operative with Honeywell GPS.

The pilot accesses this page by pressing the PREDICTIVE GPS prompt of the PROG page. This page displays information relative to predictive availability of GPS PRIMARY at destination and at any waypoint selected by the crew.



[1L] DEST — Destination airport as currently selected in active flight plan. Not modifiable. This field shows dashes when no destination airport exists.

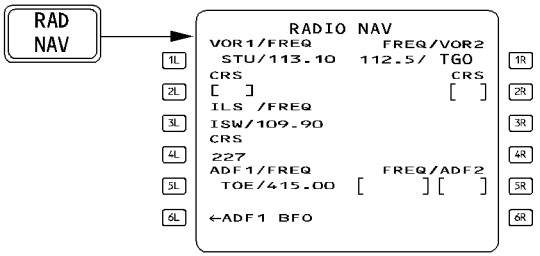
[1R] ETA — This field is defaulted to the estimated arrival time as computed by the FMS (blue small font). The pilot may enter a value in this field (blue large font). Amber boxes are displayed when no prediction exist or crew entry has been cleared.

Line 2 PRIMARY Y/N — Predicted primary status at destination airport at the following times :
estimated time of arrival ± 5, 10, 15 minutes.
Availability of GPS PRIMARY at corresponding time is indicated by Y when PRIMARY is predicted to be available and by N when GPS PRIMARY is not predicted to be available.
These fields are blanked when destination [1L] or time [1R] is not defined.

[3L] WPT	The pilot may enter a reference waypoint in this field. Blue brackets are displayed when no entry has been made.
[3R] ETA	When a reference waypoint has been entered in [3L], amber boxes are displayed. The crew is requested to enter a reference time in this field.
Line 4 PRIMARY Y/N	Equivalent information to [2L] / [2R] displayed for any pilot selected waypoint. Corresponding time of arrival is also displayed.
Line 5 DESELECTED SATELLITES and Line 6 SATELLITES	Allow the pilot to deselect up to four satellites by inserting the corresponding satellite number, the number is then displayed in blue large font. When deactivated, the satellites are not considered for predictive GPS availability at destination or at selected waypoint. The deselection is cancelled when the entry is cleared (blue brackets are displayed) or the field is overwritten by a different satellite number.

RADIO NAV PAGE

This page allows the pilot to select or verify the radio navaids tuned for display purposes only.
Among these navaids are VOR, VOR/DME, TAC, VORTAC, ILS, and ADF.
If either RMP is set on NAV, this page is blanked on both MCDUs.



NFC5-04-0320-086-A001AA

Line 1
VOR1/FREQ FREQ/VOR2
: This line displays the identifiers and frequencies of VOR1 and VOR2, whether they are autotuned or tuned manually.
To tune one VOR manually, the pilot inserts the ident or frequency. If the ident is not in the database, the new navaid page comes up. A "clear" action reverts the selection to the autotuned navaid.

Line 2 CRS
: This line displays courses for the navaids in Line 1. The pilot can enter the courses manually through these fields.

[3L] ILS/FREQ
: This field displays the ident and frequency of an ILS. It is autotuned if this ILS is associated with the departure runway, or if the flight plan shows an ILS approach selected for the destination. The ILS may also be entered manually. When the manually entered ILS differs from the ILS that would be autotuned, "RWY-ILS MISMATCH" appears.

[4L] CRS
: This field displays the course associated with the ILS in line 3. It comes up automatically when an ILS is autotuned or if an ILS has been manually tuned via its ident. Otherwise the course must be entered manually.

Line 5 ADF1/FREQ FREQ/ADF2	This line displays the identifiers and frequencies of ADFs 1 and 2. The pilot can use the ident or the frequency to tune the ADF manually. If he uses the frequency, he must always include a decimal point (as 370.).
Line 6 ADF1/BFO BFO/ADF2	When an ADF is selected, these fields display an ADF/BFO prompt. The flight crew presses the key once to erase the arrow and put the ADF in BFO mode. A clear action brings the arrow back and cancels BFO.

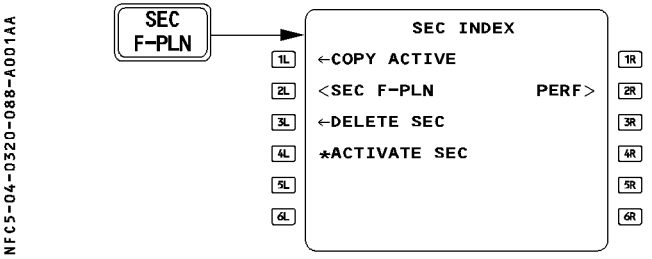
Note : – *The autotune function works only for navaids stored in the data base.*
– *When tuning manually, the operator should use the ident rather than the frequency unless the navaid is not in the data base.*
– *Manually tuned frequencies are displayed in a large font.*
– *Second ADF is optional.*

SECONDARY PAGES

The SEC F-PLN key on the MCDU console allows the pilot to call up the secondary index page and the secondary flight plan page. The secondary flight plan is generally for a diversion, for predictable runway changes for takeoff or landing, or for training.
There are two types of secondary index pages. The type selected depends on the presence of a secondary flight plan.

SECONDARY INDEX PAGE

A SECONDARY FLIGHT PLAN IS ALREADY DEFINED



NFC5-04-0320-088-A001AA

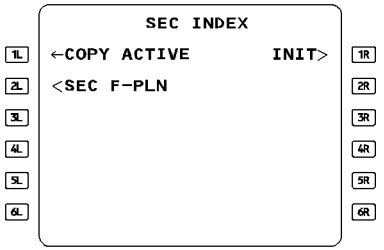
[1L] COPY ACTIVE (blue)	The pilot presses this key to copy the active flight plan into the secondary flight plan and erase the previous secondary plan.
[2L] SEC F-PLN (white)	The pilot presses this key to call up the secondary flight plan pages.
[3L] DELETE SEC (blue)	The pilot presses this key to delete the current secondary flight plan.
[4L] ACTIVATE SEC (amber)	The pilot presses this key to activate the secondary flight plan as the active flight plan.

Note : "ACTIVATE SEC" appears routinely if the HDG/TRK mode is active. If the NAV mode is active, "ACTIVATE SEC" appears only if the active and secondary flight plans have a common active leg.

[1R] INIT	This field displays this prompt when the secondary flight plan is not defined as a copy of the active flight plan. Pressing this key calls up the secondary INIT page.
[2R] PERF (white)	The pilot presses this key to call up the performance pages for the secondary flight plan. When the active flight plan has been copied, the field displays this prompt only if the first lateral leg of the secondary flight plan is identical to the active leg of the primary flight plan.

A SECONDARY FLIGHT PLAN IS NOT DEFINED

NFC5-04-0320-089-A105AA



[1L] COPY ACTIVE (blue)	The pilot presses this key to copy the primary active flight plan into the secondary flight plan.
[2L] SEC F-PLN (white)	The pilot presses this key to call up the secondary flight plan pages.
[1R] INIT (white)	The pilot presses this key to call up the secondary INIT page. It is similar to the active INIT page, but blue brackets replace all the amber boxes.

SECONDARY FLIGHT PLAN PAGES

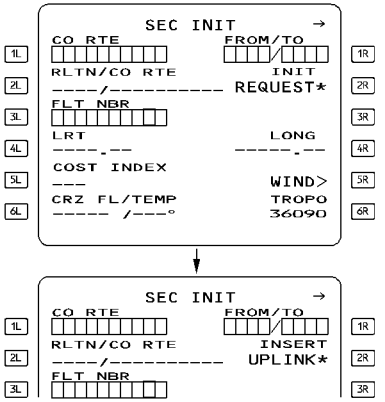
The secondary flight plan A and B pages are identical to those for the active flight plan, but are sequenced automatically only when the secondary is copied from the primary and their active legs are identical.
Pages for the active and secondary flight plans differ from each other as follows :

Secondary lateral revision pages :
- ERASE and INSERT are not displayed.
- OFFSET is not available.

Secondary init A and B pages :
- They use blue brackets instead of amber boxes.
- They have no align prompt.
- They do not provide for slewing or entering data in the 4L-4R fields (airport reference).
- They have no history wind page.
- They have no temporary flight plan pages.
  Predictions become available as soon as the FMGS receives data relevant to the secondary flight plan.

Secondary INIT A page is also used to request or display an uplink INIT message received after engine start.

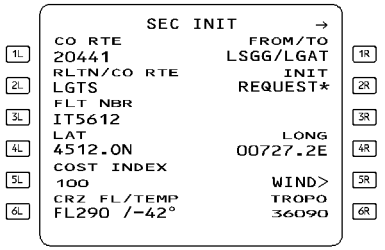
This uplink INIT message can be cleared or inserted as SECONDARY INIT data.



NFC5-04-0320-090-A100AA

[2R] INIT REQUEST*
[2R] INSERT UPLINK *

Enable to request init data from the ground or,
A downlink message has been received following a request.
The message can be cleared or entered in the SEC INIT page.



SECONDARY INIT A PAGE
AFTER UPLINK MESSAGE
INSERTION.

NFC5-04-0320-090-B100AA

MCDU MESSAGE LIST

Messages displayed on the MCDU are of two types and displayed in two colors.
Type I : a direct result of a pilot action
Type II : information about a situation or a call for pilot action
Type II messages are stored in a first-in/first-out message queue (5 messages max.)
They are suppressed if correct data is entered or when they no longer apply.
The flight crew can clear all messages by pressing the CLEAR key on the MCDU console.
Amber : important
White : less important

MESSAGE	TYPE/COLOR	CONDITIONS
A/C POSITION INVALID	II/A	The aircraft position has become invalid. If the message has been cleared and the flight crew attempts to call up the HOLD at PPOS or DIR TO page while the aircraft position is still invalid, then the message is displayed again.
ACT RTE UPLNK ◁| (ACARS msg)	II/W	A flight plan is stored in the active flight plan.
ALIGN IRS	II/A	Appears when the IRS are ready for alignment, but the INIT A page is not displayed on either side of the flight deck. The ALIGN IRS message requires that one of the flight crew call up the INIT A page and take whatever action it calls for.
ALT F-PLN DELETED	II/W	The Alternate Flight Plan has been deleted automatically. This occurs when the flight plan memory is full and the system attempts to store more data in it.
AWY/WPT MISMATCH	I/W	The pilot has attempted to enter a VIA or a GO TO on the LAT REV page, and the new point is not on the entered airway.
CABIN RATE EXCEEDED	II/W	This message appears when the aircraft gets within 200 NM of the destination and the computed rate of descent makes it impossible for the cabin to be repressurized at the maximum rate.
CHECK A/C POSITION	II/A	The radio position is more than 12 NM from the IRS position while the DME/DME/Inertial or VOR/DME/inertial position mode remains valid.
CHECK ALTN WIND ◁| (ACARS msg)	II/W	The uplinked alternate cruise differs from the default alternate cruise flight level.

MESSAGE	TYPE/COLOR	CONDITIONS
CHECK APPR GUIDANCE "CHECK APP SEL" is displayed on EFIS PFD (W)	II/W	Displayed when a non-ILS approach is part of the flight plan and the flight crew has tuned an ILS manually on the RAD NAV page. This is to remind the crew that the available guidance modes for the approach are APP NAV and FINAL. Displayed : – in cruise when less than 100 NM from top of descent – at initiation of descent phase – in the descent and approach phases
CHECK CO RTE ◁* (ACARS msg)	II/W	The uplinked company route identifier differs from the one specified in the request.
CHECK DATA BASE CYCLE	II/W	The current date does not match the effective date of the active data base, and someone attempts to enter a FROM/TO or CO RTE.
CHECK DEST DATA ◁* (ACARS msg)	II/A	The aircraft is at 180 NM from destination and the destination QNH, TEMP or WIND displayed on the PERF APPR page received by ACARS uplink has to be checked. If a modification of these parameters is performed creating a conflict with previous data, the message is triggered again.
CHECK FLT NUMBER ◁* (ACARS msg)	II/A	The uplinked flight number differs from flight number specified in the request.
CHECK GW	II/A	The gross weights computed by the flight management computer and the flight augmentation computer disagree by more than 7 tonnes (7.7 U.S tons). 5 tons for Full standard FMGS.
CHECK QFE	II/A	This appears at the transition from QNH to QFE reference, when the QFE altitude differs by more than 100 feet from the altitude predicted with the QNH set on the MCDU by means of the airport elevation in the NAV data base.
CLK IS TAKEOFF TIME	II/W	This appears when the flight crew has entered an estimated takeoff time (ETT) and actual time is equal to ETT.
CROSS LOAD COMPLETE ◁*	II/W	The crossload of database from one FMGC to the other one was successfully completed.
CROSSLOAD ABORTED ◁*	II/W	Message displayed on the transmitting MCDU indicates an error in the transmitting process.

MESSAGE	TYPE/COLOR	CONDITIONS
CRZ FL ABOVE MAX FL	II/W	This appears when the flight crew enters a cruise altitude that is above the computed maximum altitude.
CSTR DEL ABOVE CRZ FL	II/W	This appears when a flight plan altitude constraint has been deleted because the flight crew has inserted a cruise flight level or step-down altitude that is at or below the flight plan constraint.
CSTR DEL UP TO WPT01	II/W	This appears when constraints get deleted because the aircraft transitions to a go-around flight phase before the FMGS sequences the flight plan destination.
DECELERATE Also displayed on PFD	II/A	The aircraft is still in cruise phase and managed speed after it reaches the top of descent, and it has not begun the descent.
DEFAULT STATE ASSUMED	II/W	This appears when all initialization data has been cleared after a very-long-term (VLT) power interruption. The flight crew should see this only when powering up a new MCDU.
DELETING OFFSET	II/W	This appears when the system is deleting an offset automatically, which it does under certain specific conditions, such as : – change of active leg due to lateral revision. – termination of next leg at destination runway (must join trajectory for final approach)
DES/ALTN MISMATCH	I/W	The flight crew attempts to enter an alternate CO RTE (which starts at an origin that is not the primary flight plan destination).
DIR TO IN PROCESS	I/W	The flight crew calls up the vertical or lateral revision page on one MCDU while the direct to page is displayed on the other MCDU.
DISCONT AHEAD	II/A	The aircraft is in NAV mode and is 30 seconds away from a lateral discontinuity, or the flight crew makes a modification less than 30 seconds before the aircraft is to reach a lateral discontinuity.
ENTER DEST DATA	II/A	The flight crew has not entered wind, QNH, or temperature for the destination, and the aircraft is 180 NM out.
ENTRY OUT OF RANGE	I/W	The flight crew attempts to enter data that is out of the range specified for the selected field.

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MESSAGE	TYPE/COLOR	CONDITIONS
FLT NBR UPLINK ◁* (ACARS msg)	II/W	A flight number has been added to the uplink flight plan without previous request.
F-PLN ELEMENT RETAINED	I/W	The pilot attempts to delete stored navaids, waypoints or runways that are contained in any flight plan or that are being tuned.
F-PLN FULL	II/W	There is not enough memory in the flight plan allotment for the computer to accept more flight plan data.
FMS1/FMS2 A/C STS DIFF	II/W	This message always precedes a transition to independent mode, and appears at power-up if the system detects a difference in one of the following : – NAV Data Base Serial Number – Performance Data Base – FM Operational Program – Aircraft and Airline Program Pins
FMS1/FMS2 GW DIFF	II/W	Onside and offside aircraft weight differ by 2 tons or more.
FMS1/FMS2 POS DIFF	II/A	Onside and offside positions differ by 5 NM (0.5 NM if GPS installed) or more.
FMS1/FMS2 SPD TGT DIFF	II/W	Onside and offside target speeds differ by 5 knots or more.
FORMAT ERROR	I/W	A data entry does not meet the specified entry format for a given field.
GPS PRIMARY LOST ◁* (also displayed on ND)	II/A	Displayed when GPS PRIMARY mode is lost.
GPS PRIMARY ◁*	II/W	Displayed when the FMS is transitioning to GPS PRIMARY.
GPS IS DESELECTED ◁*	II/A	This message appears when GPS has been manually deselected and the aircraft is 80 NM before the top of descent or in approach phase.
INDEPENDENT OPERATION	II/A	The FMGCs are operating independently of each other.
INITIALIZE WEIGHTS	II/A	The zero-fuel weight or block fuel (FOB) is undefined after engine start.
INVALID FLT NBR ◁* UPLINK (ACARS msg)	II/W	The uplink message contains a valid flight plan but no flight number.
INVALID PERF ◁* UPLINK (ACARS msg)	II/W	Performance uplink message has been rejected.
INVALID RTE ◁* UPLINK (ACARS msg)	II/W	An error was detected in the uplink message and it is rejected.

MESSAGE	TYPE/COLOR	CONDITIONS
INVALID TAKEOFF ◁* UPLINK (ACARS msg)	II/W	The current uplink takeoff data message is rejected.
INVALID WIND◁* UPLINK (ACARS msg)	II/W	The current uplink wind message is rejected.
IRS ONLY NAVIGATION	II/A	The aircraft is not in an approach or terminal area and : – the aircraft has been in IRS mode for more than 10 minutes, or – the aircraft is in IRS only and starts the descent phase.
LAT DISCONT AHEAD	II/A	The next leg is a discontinuity and the aircraft is 30 seconds from flying the leg.
LIST OF 10 IN USE	I/W	The flight crew has tried to enter more than ten stored runways into the data base, and all of the first ten are included in a flight plan or a pilot-stored route.
LIST OF 20 IN USE	I/W	The flight crew has tried to create a PBD, LAT/LONG, or PB-PB, or store a pilot-defined waypoint or navaid when 20 are already in use (in a flight plan or pilot-stored routes).
NAV ACCUR DOWNGRAD (also displayed on ND)	II/A	NAV accuracy has been downgraded from HIGH to LOW. (See FMGS principles for an explanation).
NAV ACCUR UPGRAD (*EFIS ND)	II/A	NAV accuracy has been upgraded from LOW to HIGH.
NEW ACC ALT-HHHH	II/W	The acceleration altitude has been changed.
NEW CRZ ALT-HHHHH	II/W	The cruise altitude has been changed.
NEW THR RED ALT-HHHH	II/W	The thrust reduction altitude has been changed.
NO ANSWER TO ◁* REQUEST (ACARS msg)	I/W	A crew request, was previously sent to the ground and no answer has been received for 4 minutes.
NON UNIQUE ROUTE IDENT	I/W	The flight crew has tried to enter on the new route page a company route ident that is identical to an existing company route ident (pilot-defined or in the data base).
NOT ALLOWED	I/W	Data entry is not allowed in the selected field, or a selection action (LSK push or mode push) is not allowed.
NOT ALLOWED IN NAV	I/W	An attempt to modify the TO waypoint is made while in NAV mode.

MESSAGE	TYPE/COLOR	CONDITIONS
NOT IN DATA BASE	I/W	The pilot is trying to enter or call up a company route ident, a FROM /TO pair, a place defined by place-bearing-distance (PBD) or place-bearing/place-bearing (PBX), or an airport navaid, waypoint runway, or navaid frequency (including pilot-defined elements) that is not in the current data base.
NOT XMITTED ◁* TO ACARS (ACARS msg)	II/W	A pilot request or a pilot report was sent but the communication was not established or not acknowledged.
ONLY SPD ENTRY ALLOWED	I/W	The pilot is trying to enter a Mach number for a preselected speed value on the CLIMB page.
OPP FMGC IN PROCESS	II/W	The offside FMGC is unhealthy, and the FM system mode is SINGLE. The message indicates that the MCDU on which the message is displayed is being driven by the FMGC on the other side.
PAGE UPDATE IN PROCESS	I/W	The pilot presses a key on the flight plan page while predictions are being updated.
PERF DATA ◁* UPLINK (ACARS msg)	II/W	Performance data are received from ground.
PLEASE WAIT	I/W	Resynchronization between both FMGCs is in progress.
PRESS MCDU MENU KEY	II/W	The SUBSYSTEM (TIMEOUT) page is displayed and the system which was selected does not respond.
PRINTER NOT ◁* AVAILABLE	II/W	A printer communication error has been detected while printing a report. The printing is terminated.
RESET IRS TO NAV	II/A	The system has an initial position for IRS alignment, or the initial position has changed since IRS alignment, but none of the IRSs are in align mode.
REVISIONS NOT STORED	II/W	This message, displayed when a pilot-defined route or company route (active or secondary flight plan) is stored, indicates that the following elements are not retained : – Pilot-entered holds – Offsets – Modifications to terminal area procedures – Pilot-entered constraints – Pseudo waypoints

MESSAGE	TYPE/COLOR	CONDITIONS
RTE DATALINK IN ◁* PROG (ACARS msg)	I/W	A flight plan modification is performed after a F-PLN INIT request has been sent. This message is displayed until the uplink is entirely received.
RWY/ILS MISMATCH	II/A	– During climb, cruise, descent, approach, or go-around, the ILS frequency entered on the RAD NAV page does not match the ILS associated with the destination runway. – During preflight or takeoff, the ILS frequency entered on the RAD NAV page does not match the ILS associated with the takeoff runway.
SEC F-PLN DELETED	II/W	The secondary flight plan has been deleted automatically because the memory entries exceeded the capacity of the computer memory used for flight plans.
SEC RTE UPLINK ◁* (ACARS msg)	II/W	A flight plan is stored in the secondary flight plan.
SELECT DESIRED SYSTEM	II/W	The MCDU displays its MENU page.
SENSOR IS INVALID	II/W	– The pilot has selected FF or FQ, or FF + FQ, or FQ + FF on the FUEL PRED page and the sole sensor or both of the selected sensors are invalid, or – The flight crew has entered fuel on board only, and the FF sensor is invalid.

MESSAGES	TYPE/COLOR	CONDITIONS
SET SPEED AUTO ("SET MANAGED SPD" is displayed on PFD)	II/A (W)	The target speed is selected for the current phase, but there is no preselected speed for the next flight phase. When this is so, this message is displayed at transitions from climb to cruise, and from climb or cruise to descent. The message is always displayed at the transition to descent from climb or cruise if selected speed is active. It is not displayed if managed speed is active.
SET HOLD SPEED (also displayed on PFD)	II/A (W)	This instruction appears when the aircraft is in selected speed, the pilot has inserted a hold in the flight plan, the aircraft is 30 seconds or less from the point where it must start decelerating toward hold speed, and the selected speed differs from the hold speed by more than 5 kt.
SET VFTO ("SET GREEN DOT" displayed on PFD)	II/A (W)	This message appears when the following conditions are all met : – Engine-out condition – Climb phase – Aircraft in selected speed mode – FCU-selected speed equal to or greater than green-dot speed + 10 kt,and ALT* or ALT not active, or FCU-selected speed equal to or less than green-dot speed – 10 kt.
SPECIF NDB UNAVAIL	II/A	The NDB to be autotuned (specified for a NDB approach) has been deselected.
SPECIF VOR-D UNAVAIL (also displayed on ND)	II/A	The VOR, VOR-DME, or VORTAC to be autotuned (specified for an RNAV or VOR approach) has been deselected.
SPD ERROR AT WPTXX	II/W	In lateral managed flight, the system predicts that the aircraft will miss a speed constraint by more than 10 kt. When the prediction changes to bring the miss within 5 kt, the message is cleared.
SPD LIM EXCEEDED	II/A	The aircraft is more than 300 feet below the speed limit altitude and more than 10 kt over the speed limit.
STEP ABOVE MAX FL	II/W	The pilot has entered a step altitude that is above the predicted maximum altitude.
STEP DEFINED AT WPTXX	II/W	The system has a step in it, and the step prediction page is called up at a revise point other than that where the step is defined.

MESSAGES	TYPE/COLOR	CONDITIONS
STEP DELETED	II/W	A step has been deleted due to : – an engine out or – the insertion of another step or – a prediction that the step cannot be flown (too near the top of descent).
STORED ROUTE FULL	I/W	The system already contains three pilot-defined routes. (Only three are allowed.)
SYSTEM RNP IS XX.X ⋖*	II/A	Displayed when the RNP value, manually entered in the PROG page is larger than the RNP value associated with the current flight area (FMGS default value, refer to 4.02.20 position accuracy). It is also displayed when the RNP value associated to the current flight area becomes smaller than the manually entered RNP value.
TAKEOFF DATA ⋖* UPLINK (ACARS msg)	II/W	A takeoff data message is received.
TMPY F-PLN EXISTS	I/W	The flight crew has selected any LS key (except ERASE or INSERT) or attempted a flight planning operation on the secondary flight plan while the system is displaying a temporary flight plan.
TIME CSTR DELETED ⋖*	II/W	A time constraint is deleted automatically, or the flight crew enters a second time constraint, deleting the first one.
TIM CSTR EXISTS ⋖*	I/W	The crew attempts to clear an ETT (estimated takeoff time) computed by the FMGS.
TIME ERROR AT WPT XX ⋖*	II/W	While the aircraft is not airborne, or is airborne and in NAV mode, the FMGC predicts that it will miss a time constraint by more than two minutes.
TIME TO EXIT	II/A	The aircraft must leave holding immediately to satisfy fuel reserve requirements. (Extra fuel is zero).
TOO STEEP PATH AHEAD	II/A	The system displays this message in cruise phase if the aircraft is within 150 NM of its destination or in descent or approach phase and in NAV mode and the descent profile contains a segment that is too steep.
TUNE BBB FFF.FF	II/A	The system cannot autotune the VOR for approach or position because of a manual VOR selection.

MESSAGE	TYPE/COLOR	CONDITIONS
UNKNOWN PROGRAM PIN	II/W	The system has been unable to initialize because of an incompatible or undefined aircraft pin program combination (A/C type, engine type, VMO/MMO parity) in the FMGC software.
UPLINK INSERT IN ◁* PROG (ACARS msg)	II/W	Displayed when an uplink message is currently inserted in the FMGS.
USING COST INDEX-NNN	I/W	The system contains a flight plan, and the flight crew tries to enter a zero fuel weight or a gross weight into it before defining a Cost Index (CI). The FMGC defaults to the cost index from the last flight.
VERT DISCON AHEAD (also displayed on PFD)	II/A	The aircraft is in CLB or DES mode, the next leg has a segment that is too steep, and the aircraft is less than 30 seconds from the discontinuity.
WAIT FOR SYSTEM RESPONSE	II/W	The MCDU displays the SUBSYSTEM WAIT page.
WIND DATA UPLINK ◁* (ACARS msg)	II/W	Uplink wind message have been received.
WIND UPLINK EXISTS ◁* (ACARS msg)	I/W	A flight plan modification (active or secondary) is attempted when uplink winds are not inserted yet.
WIND UPLINK PENDING ◁* (ACARS msg)	II/A	A temporary flight plan exists or a DIR TO page is displayed and a wind uplink is received and stored.
XXXX IS DESELECTED	I/W	The flight crew attempts to enter a deselected navaid through the RAD NAV or PROG page.

ATSU messages displayed on the MCDU scratchpad

The ATSU messages comprise the ACARS messages given in the MCDU MESSAGE LIST and the messages listed below :

MESSAGE	TYPE/COLOR	CONDITIONS
COMMAND NOT AVAIL	I/W	This appears when the crew selects a command that is not available
DEFAULT VHF SP LIST	II/A	When the ATSU cannot scan the customized list of service providers this message appears to indicate that the ATSU selects automatically a defaulted list.
ENTER A/C REGISTER	II/A	This appears when the aircraft registration number is not available. The crew should then enter this parameter. (Refer to 3.04.46).
ENTER A/L IDENT	II/A	This appears when the airline identification number is not available. The crew should then enter this parameter. (Refer to 3.04.46).
ENTER VHF3 SCAN MASK	II/A	This appears when no service provider has been selected. The crew should select a service provider. (Refer to 3.04.46).
FAILED COMMAND	I/W	This appears when the crew selects a command that the ATSU can not execute.
PRINT FAILED	II/W	This appears when a print command is unsuccessful.
PRINTER MSG RECEIVED	II/W	An uplink message has been received on the printer.
BUTTON PUSH IGNORED	I/W	This appears when the crew presses a MCDU key that is not active.
VHF3 SWITCH IMPOSSIBLE	II/A	The switch between VHF3 data mode and VHF3 voice mode is impossible
VHF3 VOICE ONLY	II/A	This appears when the VHF3 is available in voice mode only.

MCDU DATA FORMAT LIST

The following chart lists all the data the pilot may enter on the MCDU.
It also shows the acceptable format for the various data items, the acceptable range, the units of entry, and the MCDU pages on which the data can be entered.
The following codes are used to indicate various data formats :

A : letters
N : numbers
X : letters and numbers

R

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
ACCEL ALT	See ALT		ft (MSL)	TAKEOFF (ACT/SEC) GO AROUND (ACT/SEC)
ALT	NNNN or NNNNN (leading zeros must be included)	Max alt = 39000 Entry is rounded to the nearest 10 feet	ft (MSL)	PERF CLB PERF DES
ALT CSTR	Same as ALT	Same as ALT	ft (MSL)	VERT REV F-PLN A SEC F-PLN A
AIRWAYS (VIA)	XXXX	If not in data base «NOT IN DATA BASE» is displayed	N/A	LAT REV AIRWAYS ◁
ARPT	AAAA 1 character minimum. 4 maximum.	If AAAA is not in the data base airport file New Runway page is displayed		INIT A (ACT/SEC) LAT REV ALTN F.PLN A-B (ACT/SEC) WAYPOINT DIR TO
BLOCK FUEL	NN.N leading zeros may be omitted.	0-14 without center tank 0-21 with center tank or 0-30.8/0.46	Thousands of Kg or thousands of Lb	INIT B (ACT/SEC)
CABIN RATE	- NNN (- may be omitted)	100 - 999	ft/min	DES FORECAST or CRUISE PERF. PAGE ◁
CG	NN.N	8.0 - 45.0	% MAC	INIT B. (ACT/SEC) FUEL PRED
CHANNEL ◁	NNN	500-699		NEW NAVAID RAD NAV
CLASS (navaid)	AAAAAA (refer to RANGE for exact inputs allowed)	VOR DME VORDME VORTAC LOC, ILS NDB ILSDME MLS ◁ TACAN ◁	N/A	NEW NAVAID
CO RTE	XXXXXXX 7 or 10 characters (pin program)	If not in the NAV data base, a message will be displayed	N/A	INIT A ROUTE SELECTION NEW ROUTE ALTERNATE

ACT/SEC = active or secondary

R

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
COST INDEX	NNN may be entered as 1-3 digits ; leading zeros lay be omitted	0 to 999	Kg/Min or 100 lb/Hr	INIT A (ACT/SEC) PERF CLB (ACT/SEC) PERF CRZ (ACT/SEC) PERF DES (ALT/SEC)
CRS	Same as INB CRD	Same as INB CRS	degrees	RADIO NAV NEW NAVAID NEW RUNWAY
CRZ FL	Must be entered as FLIGHT LEVEL	Maximum FL (see flight level)	Hundred of ft	INIT A (ACT/SEC) PROG
CRZ TEMP	See TEMP		See TEMP	INIT A (ACT/SEC) FUEL PREDICTION
CRZ WIND	See WIND DIR/MAG	See WIND DIR/MAG	See WIND DIR/MAG	INIT A (ACT/SEC) FUEL PREDICTION
DH	NNN	0-700 No is accepted if an ILS APPR is selected	ft	PERF APPR (ACT/SEC)
DIST	NN.N leading and trailing 0's may be omitted.	0-99.9 or 0-999 (or 9999 ◁)	NM NM	HOLD ALTN
DRT TO ◁	"D"NN	Eight possible values		PERF TAKEOFF
EFF WIND ◁	± NNN "+" may be entered as "T" or "TL" "–" may be entered as "H" or "HD" Leading zeros may be omitted If no sign is input, "+" is taken	0-500	kts	CLOSEST AIRPORT EQUI-TIME INIT A SEC INT A
ELV	± NNNN if no sign, + assumed Leading 0's may be omitted	Entry displayed to nearest 10 ft – 400 to 20470 ft (RWY) (or - 1000 to 20470 ft ◁) –2000 to 20470 (NAVAID)	ft (MSL)	 NEW RUNWAY NEW NAVAID
ETT/RTA ◁	HH:MM:SS	00:00:00 to 23:59:59	Hour HH Min MM Sec SS	RTA

R

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
FF/FQ Sensors	One or both may be entered, Both – /FF + FQ or – / FQ + FF Fuel flow – /FF Fuel Quantity – / FQ		N/A	FUEL PREDICTION
FIG OF MERIT	N	0-3	N/A	NEW NAVAID
FINAL/TIME	Only one may be entered at a time. NN.N or (NNN.N ◁) for FINAL NNNN for TIME	FINAL 0-10.0 (or 0-100 ◁) or 0-22.0 0-90 TIME	Thousand of kg or Thousand of lb minutes	FUEL PRED INIT B
FLAPS		0,1, 2, or 3		TAKEOFF
FLEX TO TEMP	1. If Derated TO option not implemented : same as TEMP 2. If Derated TO option is implemented : F NN		NN in degrees centigrade	TAKEOFF
FLIGHT LEVEL	FLNNN or NNN Leading zeros on NNN may be omitted	Max FL = 390 (or Max FL = 410 ◁)	Hundreds of ft (MSL)	F-PLN A-B, PROG VERT REV INIT A (ACT, SEC) PERF CLB PERF DES STEP PRED STEP ALTS ◁
FLIGHT NUMBER	XXXXXXXX The 8 alphanumeric are not mandatory	N/A	N/A	INIT A F-PLN A-B
FOB	NN.N (leading zeros may be omitted)	Same as BLOCK	Thousands of kg or Thousands of Lb	FUEL PREDICTION
FREQ	NNN.NN ILS/VOR NNN.N NDB	108.00 - 117.95 190.0 - 1750.0	MHz KHz	PROG. NEW NAVAID RADIO NAV
FROM/TO	AAAA /AAAA	AAAA must be in data base or message will be displayed	N/A	INIT A (ACT/SEC)
GW	NN.N Leading and trailing zeros may be omitted	35-99.9 or 77.2 - 218	Thousands of kg or Thousands of Lb	FUEL PREDICTION

ACT/SEC = active or secondary

R

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
IDLE FACTOR ◁	± N.N Leading and trailing zeros may be omitted	– 9.9. +9.9	%	A/C STATUS
INB CRS	NNN Leading zeros may be omitted. An entry of 360 is displayed as 0.	000-359	Degrees	HOLD
LAT	DDMM.MB or BDDMM.M DD – degrees, MM.M – minutes, B – direction. Leading zeros may be omitted but the direction (B) is necessary. Latitude is displayed as DDMM.MB	B : N or S 0 ≤ DD ≤ 90 0 ≤ MM.M ≤ 59.9	Degree minutes tenths of minutes	INIT A (ACT/SEC)
LAT/LONG	LAT/LONG Same as LAT and LONG except both must be entered with "/" in between	Same as LAT and LONG	Same as LAT and LONG	F-PLN A-B (ACT/SEC) PROG NEW WAYPOINT NEW NAVAID DIR TO LAT REV NEW RUNWAY
LENGTH	NNNN Leading zeros may be omitted	1000-8000 m 3282-9999 ft	Meters or feet	NEW RUNWAY
LONG	DDDMM.MB or BDDDMM.M DDD – degrees MM.M – minutes B – direction. Leading zeros may be omitted but the direction (B) is necessary	B : E or W 0 ≤ DDD ≤ 180 0 ≤MM.M ≤ 59	Degree minutes tenths of minutes	INIT A
MACH	.NN The decimal point is necessary. Trailing zeros are not necessary	MAX = .82 MIN = .15	Mach Number	F.PLN A (ACT/SEC) PERF CLB PERF CRZ PERF DES
MACH/SPD	MACH and SPD must be entered with "/" between (see MACH and SPD formats)	Same as MACH and SPD	Same as MACH and SPD	PERF DES (ACT/SEC)

ACT/SEC = active or secondary

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
MDA	Same as ALT	Ldg elevation to ldg elevation + 5000	ft (MSL)	PERF APPR (ACT/SEC)
MDH	± NNNNN	0 – 5000	ft (AGL)	PERF APPR (ACT/SEC)
NAVAID	XXXX	Any alphanumeric	N/A	PROG NEW NAVAID NAVAID F.PLN A-B (ACT/SEC) LAT REV DIR TO RADIO NAV SELECTED NAVAIDS
OFST	NNB or BNN NN offset distance B direction	B : L or R 1 < NN < 50	NM	LAT REV
PERF FACTOR	NN.N leading or trailing zeros may be omitted (± N.N)	– 10.0 to + 10.0 (or – 9.9 - + 9.9 ◁)	N/A	A/C STATUS
PLACE/BRG/DIST	PLACE can be any data base ARPT, NAVAID or WAYPOINT - BRG must be a 3 digit entry without decimal digit. An entry of BRG = 360 is displayed as 0.	PLACE - If not in data base, a message «NOT IN DATA BASE » is displayed BRG - 000-360	N/A degrees	LAT REV (ACT/SEC) NEW WAYOINT PROG DIR TO F-PLN A-B (ACT/SEC) STEP ALTS ◁
	DIST is NNN.N where leading zeros may be omitted ; all 3 parameters must be entered with "/" between	DIST - 0-999.9	NM	
PLACE-BRG/ PLACE-BRG	Same as above, A couple PLACE-BRG is entered with a dash in the middle. 2 couples have to be entered with "/" between	Same as above	Same as above	Same as above

ACT/SEC = active or secondary

R

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
PLACE/DIST ◁*	PLACE : same as for PLACE/BRG/DIST DIST : same as for PLACE/BRG/DIST	PLACE : same as for PLACE/BRG/DIST DIST : 0–999–9	N/A NM	F–PLN A and B SEC F–PLN A and B LAT REV NEW WAYPOINT DIR TO STEP ALTS
QNH	NNNN (leading zero may be omitted).	950-1050 (or 745-1050 ◁*)	Hecto-Pascals (hPa)	PERF APPR (ACT/SEC)
	NN.NN (leading and trailing zeros may be omitted).	28.06. - 31.01 (or 22.00 - 31.00 ◁*)	In.Hg	
RADIAL IN ◁*	NNN(T) 3 digits entry	000–360	Degrees	DIR TO
RADIAL OUT ◁*	NNN(T) 3 digits entry	000–360	Degrees	DIR TO FIX INFO 1 and 2
RTE RSV	may be entered as fuel or percentage of trip fuel	Fuel 0- (0.0) 0-21.7 % : 0-15	thousands of kg thousands of lb	INIT B (ACT/SEC) FUEL PRED
RWY	AAAANND			
	Where AAAA is same as ARPT.			RUNWAY NEW RUNWAY F.PLN A-B
	NN is runway number (2 digits) must be entered			
	D is L or R to be included only when there is more than one runway with the same number at ARPT.			
SAT/ALT ◁*	TEMP/ALT	See TEMP and ALT	N/A	CRUISE WIND
SET HDG ◁*	NNN/N (leading and trailing zeros may be omitted) will always be displayed as NNN/N	000,0 – 360.0	Degrees	IRS MONITOR
SLOPE ◁*	NN.N	00.0–90.0	Degrees	NEW NAVAID
SPD	NNN (must be 3 numerics)	MAX = 350 kt MIN = 100 kt	kt (CAS)	SEC F.PLN A PERF CLB PERF CRZ (ACT, SEC) PERF DES

ACT/SEC = active or secondary

R

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
SPD CSTR	Same as SPD	Same as SPD	kt (CAS)	F.PLN A (ACT/SEC) VERT REV (ACT/SEC)
SPD LIM	SSS/NNNNN SSS is a speed NNNNN is an ALT or FLIGHT LEVEL (see ALT and FLIGHT LEVEL)	SSS same as SPD	kt/ft (MSL)	VERT REV (ACT/SEC)
SPD/MACH	See MACH/SPD	Same as MACH and SPD	Same as MACH and SPD	PERF DES (ACT/SEC)
STATION DEC	NND Where NN is the declination and D is the direction. Leading zeros may be omitted. D is not required for an entry of zero declination.	NN : 01-99 D : E or W	Degrees	NEW NAVAID
STEP ALT ◁	SNNN or NNNS (where NNN is in Flight Level) or SNNNNN or NNNNNS (where NNNNN is in ALT) Leading zeros may be omitted	Same as Flight Level or ALT	Same as Flight Level or ALT	F–PLN A
TAXI	N.N Leading or trailing zeros may be omitted	0-9.9	Thousands of kg	INIT B (ACT/SEC)
TEMP	± NN If no sign, + assumed	± 99	Degrees celsius	INIT A (ACT/SEC) FUEL PRED PERF APPR
THR RED ALT	See ALT	400 ft AGL mini	ft (MSL)	PERF TAKE OFF
THS	AAN.N or N.NAA where AA is UP or DN	max UP 7.0 max DN 5.0 increment .1	degrees	PERF TAKEOFF
TRANS ALT	See ALT			PERF GO AROUND
TIME	N.N	0-9.9	Minutes	HOLD

(ACT/SEC) = active or secondary

R

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
TIME MARK. ◁	HHMM	HH : 0–23 MM : 0–59	Hours Minutes	F–PLN A and B
T.O. SHIFT	NNNN	1-Length of origin runway	m or ft	PERF TAKEOFF
TRIP WIND	See EFF WIND		kts	INIT A SET INIT A
TROPO	Same as ALT	Same as ALT (or 60 000 ◁)	ft	INIT A FUEL PREDICTION SEC FUEL PREDICTION
UTC CSTR	HH MM Where HH are hours and MM are minutes. Leading zeros may be omitted 1 or 2 digit entry is interpretated as minutes	HH = 0.23 MM = 0.59	Hours and minutes	VERT REV
V1	Same as SPD		kt (CAS)	PERF TAKEOFF (ACT/SEC)
V2	Same as SPD		kt (CAS)	PERF TAKEOFF (ACT/SEC)
VR	Same as SPD		kt (CAS)	PERF TAKEOFF (ACT/SEC)
WIND	Same as WIND DIR/VELOCITY	Same as WIND DIR/VELOCITY	Same as WIND DIR/VELOCITY	F.PLN B (ACT/SEC) FUEL PREDICTION
WAYPOINT	XXXXX - may be from . 1-5 (1-7 ◁) characters for waypoint. Acceptable as waypoint IDENT : ARPT NAVAID WAYPOINT LAT/LONG, PLACE BRG/ PLACE BRG and PLACE/BRG/ DIST PLACE /DIST ◁ may be entered to define a waypoint			WAYPOINT NEW WAYPOINT F.PLN A and B (ACT/SEC) LAT REV PROG DIR TO FIX INFO ◁ 1 AND 2 EQUI–TIME POINT ◁ STEP ALTS ◁ PREDICTIVE GPS ◁

(ACT/SEC) = active or secondary

R

DATA NAME	FORMAT	RANGE (X is input)	UNITS	DISPLAY PAGE
WIND DIR/WIND MAG	NNN/NNN Both must be entered ; leading zeros may be omitted. An entry of WIND DIR = 360 is displayed as 0.	WIND DIRECTION 0-360 WIND MAG 0–200 (or 0–500 ◁*)	Degrees Kt	INIT A PERF APPR (ACT/SEC) STEP PRED WIND F-PLN B VERT REV
WIND DIRECTION/ MAG/ALT	NNN/NNN/FL NNN or NNN/NNN/NN NNN	Direction and Velocity as above Minimum ALT 1000	FL in hundred of ft, ALT in ft	DES FORECAST WIND PAGES ◁*
ZFW	NN.N OR NNN.N Leading and trailing zeros may be omittted	35.0-80.0 or 77.1 - 176.0	Thousands of kg or thousands of Lb	INIT B (ACT/SEC)

(ACT/SEC) = active or secondary

4.04.00 CONTENTS

4.04.10 LATERAL FUNCTIONS

4.04.20 VERTICAL FUNCTIONS

4.04.30 OTHER FUNCTIONS

4.04.40 ACARS FUNCTION

GENERAL

The lateral revision function allows the pilot to create or modify the following parts of the flight plan :

- airway
- waypoint
- new destination
- holding pattern
- offset
- alternate

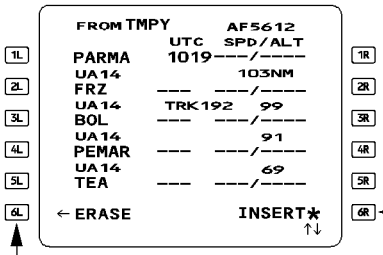
  Each time the pilot activates one the revisions listed above, he accesses to a temporary flight plan that allows to check the modification before inserting it in the active flight plan. The pilot selects these functions by pressing the left line select key on F-PLN A or B.
- Direct to and overfly functions are accessed through MCDU keys. No temporary flight plan is created with these functions.
- "Update at" capability is a specific function that manually update the FM position. It does not use a temporary flight plan, but the crew must confirm the insertion before it is activated.

TEMPORARY F-PLN (TMPY)

When a pilot makes a lateral revision to the F-PLN, the FMGS creates a temporary flight plan. This is a copy of the active F-PLN, but is corrected by the lateral revision in progress. The aircraft continues to follow the active F-PLN until the temporary revision is inserted. The revision appears in yellow characters on both MCDUs and NDs.

- Lateral and vertical revisions cannot be made to a temporary F-PLN.
- Only one temporary F-PLN may be accessed at a time.
- The "DIRECT TO" function, when used, erases a temporary F-PLN.

R
- When a DIR TO is in process, a temporary revision cannot be displayed on the other MCDU.
- A TMPY F-PLN changes the title of the flight plan pages. (TMPY appears in all titles).
- No predictions are computed for a temporary flight plan (Dashes are displayed).



Press 6R to insert the TMPY F-PLN into the active F-PLN

Press 6L to erase a TMPY F-PLN (the crew does not want to activate the lateral revision)

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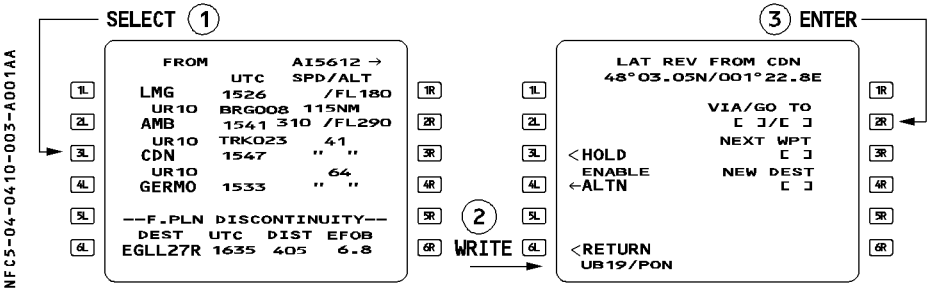
Temporary data are displayed first in yellow (ND and MCDU). Once inserted they become active and are displayed in green.

INSERTING AN AIRWAY WITH "VIA/GO TO"

The pilot can insert into the active flight plan, an airway going from a revised waypoint to another waypoint. If the end waypoint belongs to the active flight plan, the computer does the stringing automatically. If the end waypoint does not belong to the flight plan, the computer leaves a discontinuity between this waypoint and those farther along the active flight plan.

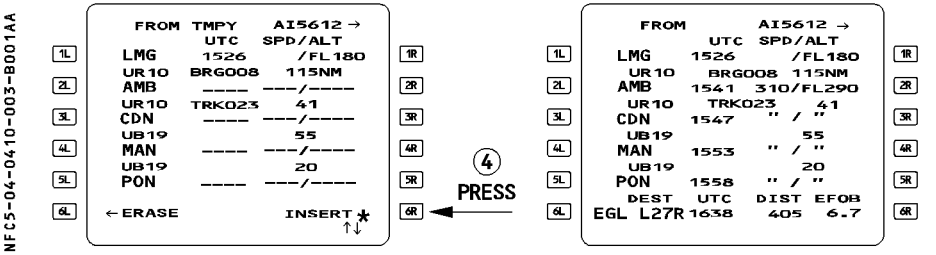


– SELECT the revised waypoint (here CDN).

– WRITE the airway and the ending waypoint in the scratchpad (here UB19/PON).

– PRESS [2R] to insert the airway and ending waypoint into the VIA/GO TO field.
The MCDU displays TMPY in yellow and lists the waypoints en route to the ending waypoint.

– PRESS [6R] to insert the temporary flight plan. Clear the flight plan discontinuity as necessary.



Note : 1. If the revised waypoint or the end waypoint does not belong to the airway, the MCDU displays the message "AWY/WPT MISMATCH".

R *2. If two waypoints with the same ident belong to the same airway, the DUPLICATE*
R *NAMES page will not be called and the system selects the first one in the*
R *database.*

INSERTING A WAYPOINT

The pilot can insert waypoints by two methods :
- directly into the flight plan. All modifications go directly into the active flight plan. No temporary flight plan is created.
- by means of a lateral-revision "NEXT WAYPOINT", a process that creates a temporary flight plan.

The second method allows to check the temporary flight plan before inserting it.

WAYPOINT IDENTIFICATION

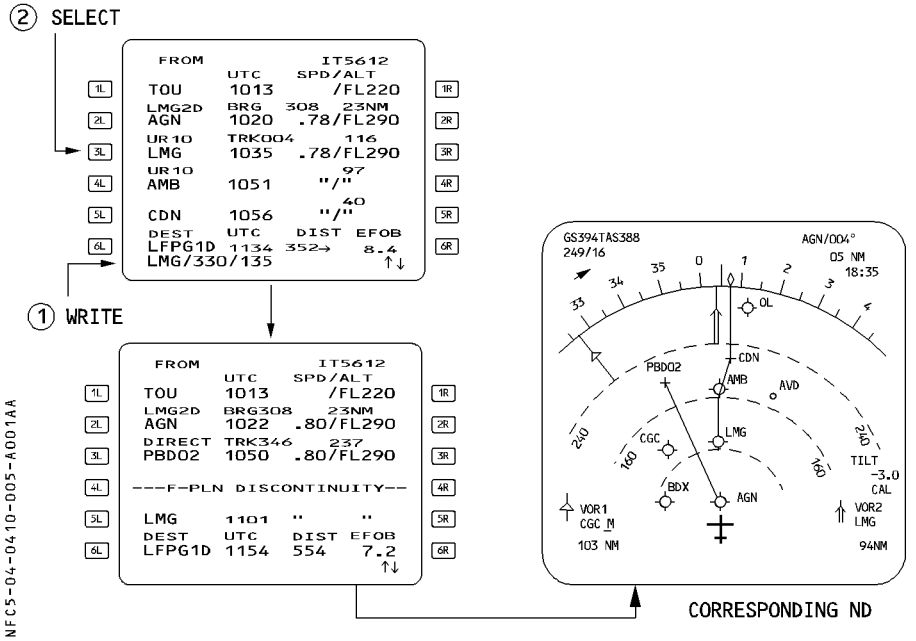
The pilot can identify a waypoint by :
- Its identifier (if it is in the navigation data base)
- A Latitude/Longitude (LL)
- A Place/Bearing/Distance (PBD)
- A Place-Bearing/Place-Bearing (PBX)

Note : If a slash or a dash is not entered properly, the Multifunction Control and Display Unit displays a "FORMAT ERROR" message.

When the Flight Management Guidance System receives a waypoint not in the data base, it identifies it as LLxx or PBD xx or PBX xx (xx is a two-digit number between 01 and 20) and stores it in the stored waypoints file of the data base.

Note : When NAV mode is engaged, the crew cannot modify the "TO" waypoint (active leg) using the waypoint insertion function. If the crew wants to modify it, it will use the DIR TO function.

WAYPOINT INSERTED DIRECTLY IN THE FLIGHT PLAN



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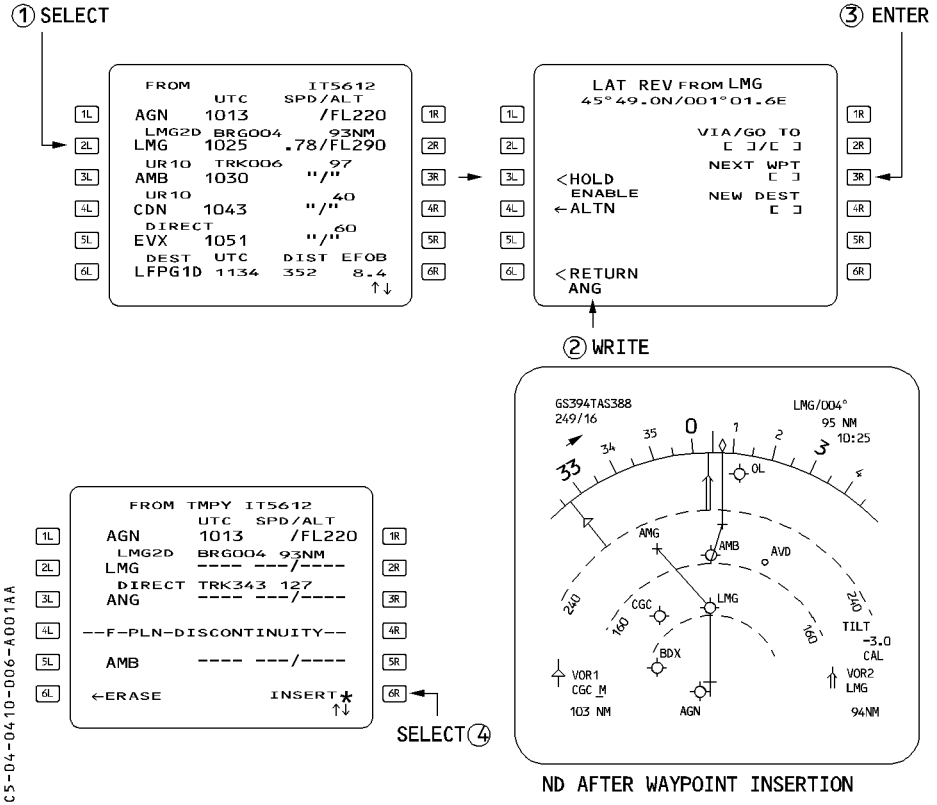
– **WRITE the waypoint identifier or LAT/LONG, Place/Bearing/Distance or Place-Bearing/Place-Bearing into the scratchpad. (Example : Place : LMG, Bearing: 330°, Distance : 135 NM)**

– **PRESS the appropriate key to enter the waypoint into the flight plan. The rule is that the new waypoint appears next to the pressed key, and the previous waypoint moves down the flight plan path.**

This operation creates a discontinuity between the new waypoint and the previous one. The new flight plan will have to be cleared of the discontinuity and some waypoints erased.

WAYPOINT INSERTED THROUGH THE USE OF "NEXT WAYPOINT"



ND AFTER WAYPOINT INSERTION

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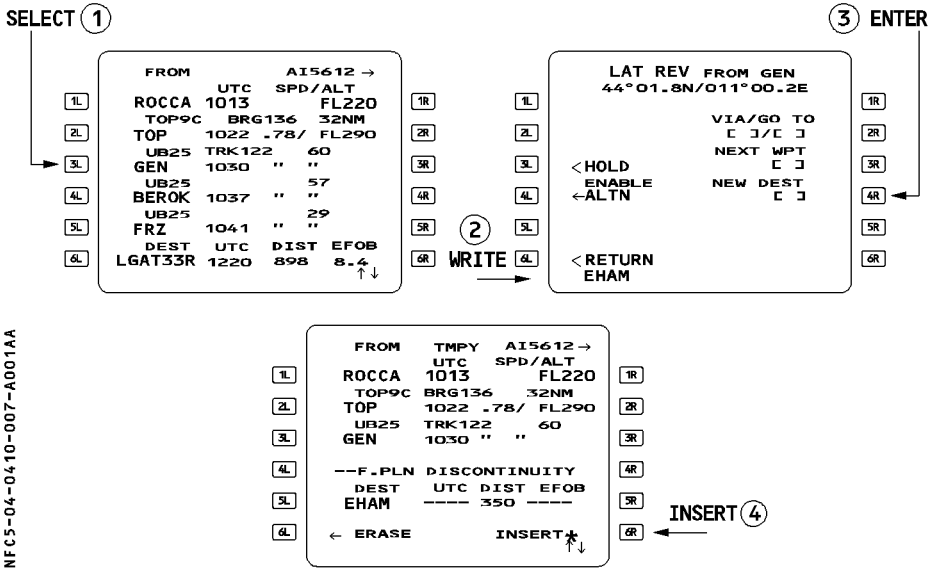
- **SELECT the lateral revision (LAT REV) function at an appropriate waypoint.**
- **WRITE the waypoint identifier, or LAT/LONG, or Place/Bearing/Distance, or Place-Bearing / Place-Bearing into the scratchpad.**
- **ENTER it in the brackets under NEXT WPT (next waypoint).**
- **INSERT the temporary flight plan by depressing the [6R] key.**
- **CLEAR the F-PLN discontinuity as appropriate.**

INSERTING A NEW DESTINATION

The pilot may define a new destination and insert it through the lateral revision page. The pilot may then call up the new destination from any waypoint along the flight plan except the FROM waypoint, the destination, and the missed-approach waypoint. When the new destination has been inserted, a flight plan discontinuity appears between the revision waypoint and the new destination. All waypoints beyond the revision waypoint (including the previous destination and associated missed approach) are deleted.



NFCS-04-0410-007-A001AA

- **SELECT the lateral revision function at an appropriate waypoint.**
- **WRITE the new destination in the scratchpad.**
- **ENTER it in the brackets under NEW DEST**
- **INSERT the temporary flight plan [6R] key, and complete the flight plan to the new destination.**

HOLDING PATTERN

Holding pattern description, associated guidance and flight crew procedures are put together in this chapter.
The flight management and guidance computer (FMGC) has three types of holding pattern that the pilot can use in a flight plan.

HOLD TO FIX (HF)

The holding pattern is always part of an arrival or departure procedure. The aircraft flies it once and then exits the holding pattern automatically at the fix. The predicted speed in the holding pattern is the lowest of ICAO speed limit, max endurance speed, or any speed constraint.
Guidance to the fix in the holding pattern is similar to that on any leg of a flight plan. The HF patterns are part of the navigation database and cannot be created by the crew.

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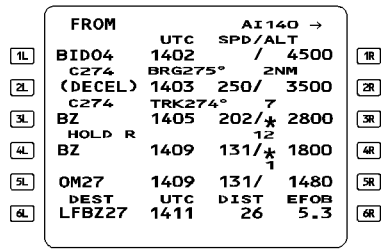
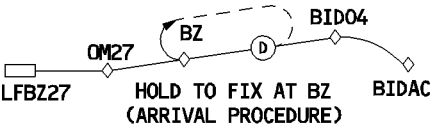
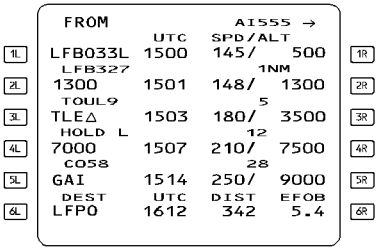
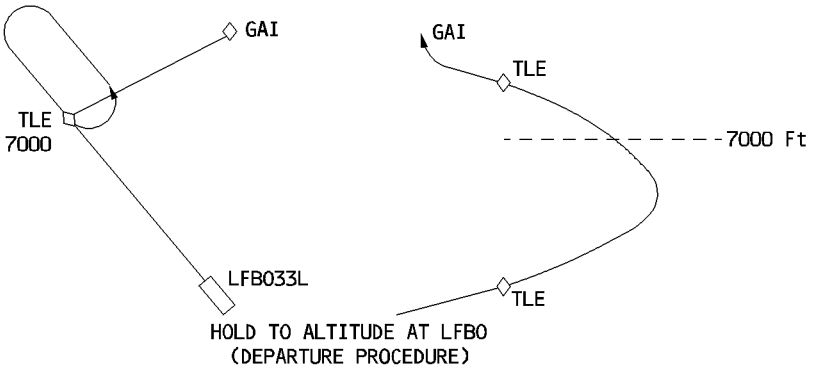




HOLD TO ALTITUDE (HA)

The HAs are in the navigation database as part of arrival or departure procedures and cannot be created by the crew.
The aircraft flies the hold until it reaches the specified altitude. Then it exits the hold automatically at the fix.
The predicted speed for the holding pattern is the lowest of the ICAO speed limits, the max endurance speed or any speed constraint.
The size of the holding pattern is a function of the predicted speed.
Guidance in a hold to altitude (HA) is similar to that for any leg of a flight plan.





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HOLD WITH MANUAL TERMINATION (HM)

This type of holding pattern may be part of an arrival procedure, or the flight crew may enter it at present position or at any flight plan waypoint.
The pilot will use this type of holding pattern to comply with a defined procedure or a clearance limit or to meet an operational need (such as losing altitude, holding for weather improvement, or absorbing an ATC delay).
This type of holding pattern is exited under pilot decision and not automatically.
There are 3 types of HM, all are modifiable.

DATABASE HOLD

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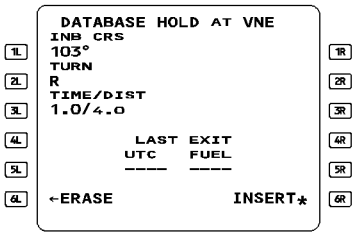
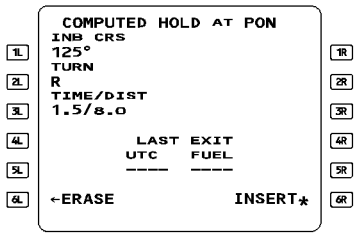


If the holding pattern is part of the database, it is named DATABASE HOLD and all its associated data (inbound course, turn direction, time/distance) are defined in the data base. Flight crew can modify this data.

COMPUTED HOLD AT ...

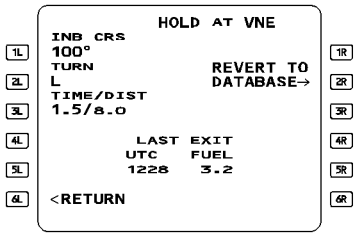
NFC5-04-0410-010-B001AA



If the holding pattern is not in the database, the FMGC designs a holding pattern and proposes it to the pilot. The associated data consists of default values that the pilot can modify.

HOLD AT ...

NFCS-04-0410-011-A001AA



If the pilot inserts into the active flight plan a holding pattern that is manually corrected from a hold defined by the FMGS, the screen displays a "HOLD AT ..." page. The field 2R displays REVERT TO DATABASE or REVERT TO COMPUTED to restore the database data if necessary.

PREDICTIONS AND GUIDANCE ASSOCIATED WITH AN HM HOLDING PATTERN (HOLD WITH MANUAL TERMINATION)

Before deceleration

Although the hold is inserted into the flight plan, the FMGS does not take it into account for predictions until the aircraft enters the hold.

However, if the hold is not deleted by the crew, the FMGS schedules a deceleration point and displays it on the ND.

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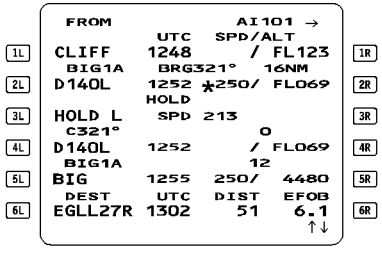
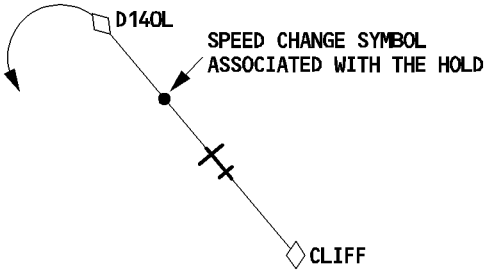
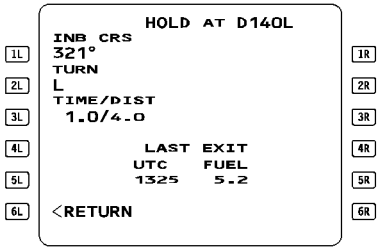




NFC5-04-0410-012-A001AA



The FMGS predicts the estimated time and amount of fuel remaining at which the aircraft must exit holding so as to comply with fuel policy specified on the fuel prediction page. When the aircraft enters the holding pattern, the FMGS revises all predictions and assumes the aircraft to fly one turn of the holding pattern.
All predictions are revised for one more holding circuit at holding fix overfly.

Upon reaching the speed change pseudo waypoint
The FMGS either causes the aircraft to decelerate to the hold speed (if managed speed is active and NAV mode engaged), or displays "SET HOLD SPD" (set hold speed) on the MCDU and primary flight display if the crew had selected a speed target.
The hold speed is the lowest of :
– maximum endurance speed
– ICAO limit holding speed
– speed constraint (if any).
The flight plan predictions for time and fuel do not yet consider that the hold will be flown, however, the navigation display shows the hold entry and holding pattern trajectory.

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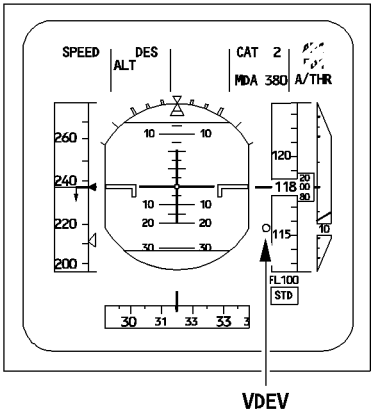
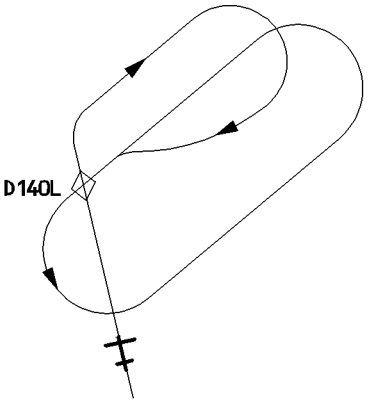
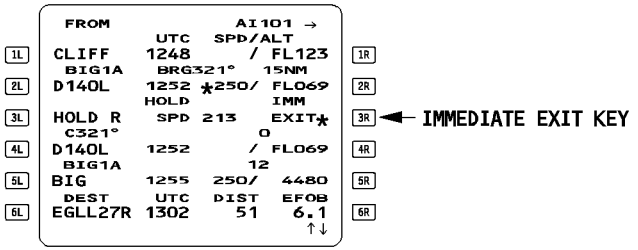




Deceleration receives priority, so that when the aircraft is in descent with the descent mode engaged, it will deviate above the descent path to decelerate. (VDEV becomes positive on the progress page).
The flight plan page displays an immediate exit prompt.
If the pilot presses the key next to "IMM EXIT" before arriving at the holding fix, the aircraft will not enter the holding pattern, but will resume its phase-related managed-speed profile.

NFCS-04-0410-013-B001AA



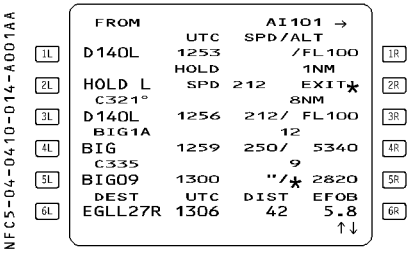
After reaching the hold entry fix

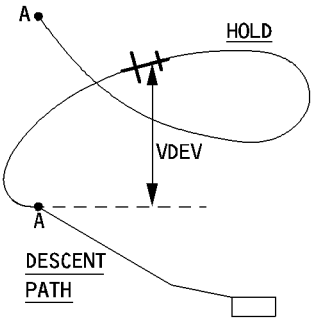
The aircraft enters the hold. The system assumes that the aircraft will fly one turn of the holding pattern and revises the predictions accordingly.
When the holding pattern was defined by a leg time (and not a leg distance), the system revises the size of the hold as a function of the target speed.

- If managed speed is active, the system uses the predicted holding speed to calculate the size of the holding pattern.
- If the selected speed is active, the system uses the target speed the pilot selects at the entry fix sequencing to calculate the size of the holding pattern.

– The VDEV displayed on the primary flight display and the PROG page while the aircraft is flying in the HM (hold pattern with manual termination) is the difference between its current altitude and the altitude at which it should be when it reaches the hold exit fix in order to be positioned properly on the descent path.

R



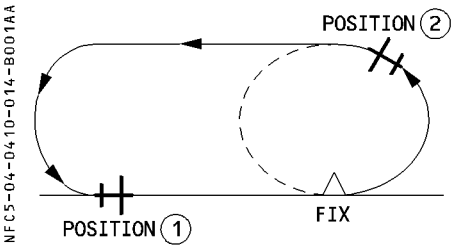


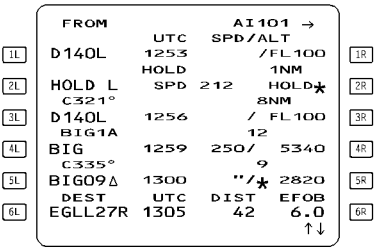
With IMM EXIT pressed (aircraft in the holding pattern)

The predictions and guidance assume that the aircraft is returning immediately to the hold fix.

Sequencing the hold fix, the aircraft exits the holding pattern and resumes its navigation.

R The flight plan page displays "RESUME HOLD*" instead of "IMM EXIT*".





HOLD EXIT PROCEDURE

R **– Position 1 : If "IMM EXIT" pressed, aircraft will exit at next fix overfly.**

R **– Position 2 : If "IMM EXIT" pressed, aircraft will make an immediate turn to the fix**
R **where hold will be exited.**

If managed speed is active, the computer sets the target speed to the applicable speed of the current phase (for example, speed constraint, ECON speed, or speed limit).

The computer then bases its predictions on the assumption that the flight will continue on the descent path if the aircraft is in a descent.

If DES mode is engaged, the following rules apply :

- The holding pattern is never included in the descent path computation.
- The pilot cannot enter altitude and speed constraints at the hold exit fix. (This is only allowed at the hold entry fix).
- The vertical guidance in the HM during the descent phase calls for a constant – 1000 feet per minute, but the computer considers altitude constraints that will take effect farther down the flight path as it calculates vertical guidance and predictions. The
R system will not allow the aircraft to descent below the next altitude constraint, neither
R the FCU selected altitude. If the aircraft reaches the next altitude constraint, it will level off and the altitude constraint mode will engage.

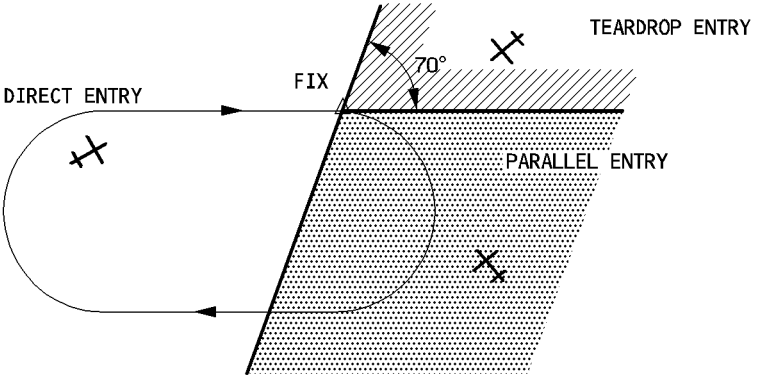
With RESUME HOLD pressed

If the pilot presses the key next to "RESUME HOLD", the aircraft remains in the holding pattern, and the display again shows "IMM EXIT".

After that, each time the aircraft flies over the holding fix, the system updates the predictions for one more holding circuit.

HOLDING PATTERN ENTRIES

The FMGS offers three types of entry into holding patterns :
1. Direct entry
2. Teardrop entry
3. Parallel entry



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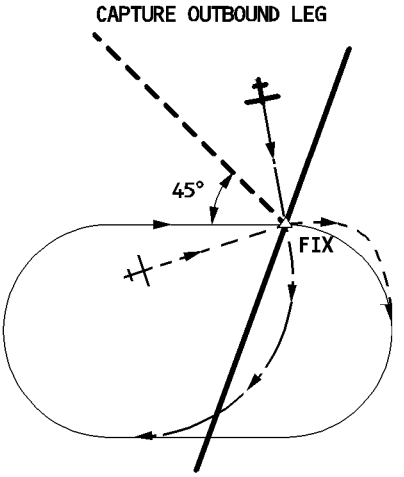
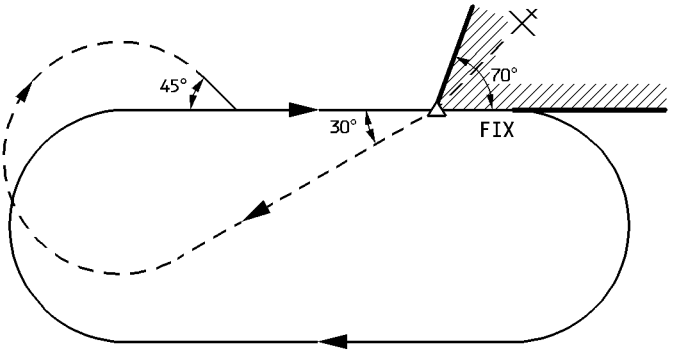
1. The direct entry



NFC5-04-0410-016-B001AA

2. The teardrop entry



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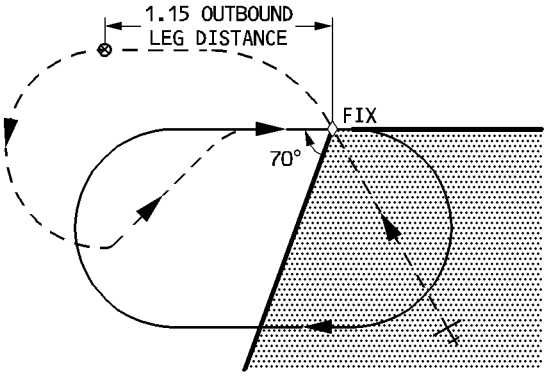
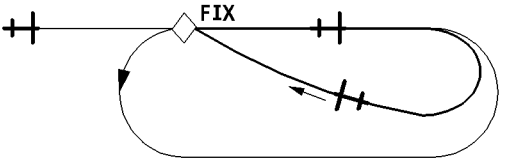
3. The parallel entry



NFC5-04-0410-017-B001AA

Note : If the leg the aircraft is flying toward the holding fix is on a "limit" between a teardrop entry and a parallel entry, the FMGC may compute and display either of the two entries. The pilot should keep this in mind and not assume that the FMGC is malfunctioning.

If the flight plan leg toward the hold entry fix is on a course that is the reciprocal of the inbound course of the holding pattern, the aircraft will fly a parallel entry.



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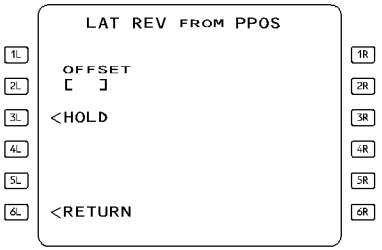
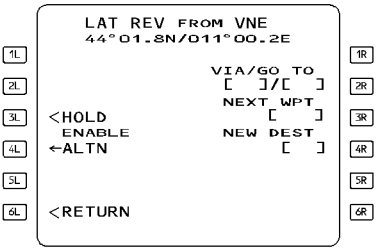
PROCEDURE TO INSERT A HOLD (HOLD WITH MANUAL TERMINATION)

The HOLD prompt allows the pilot to enter a holding patten with manual termination (HM) at the revised waypoint or at present position.
The pilot accesses the HOLD page from a lateral revision at the present position (PPOS) or at a waypoint. The MCDU displays HOLD-associated data : inbound course (INB CRS), TURN direction, TIME/DISTANCE and LAST EXIT time, and fuel to reach the alternate with the required fuel reserve.

NFCS-04-0410-018-A001AA



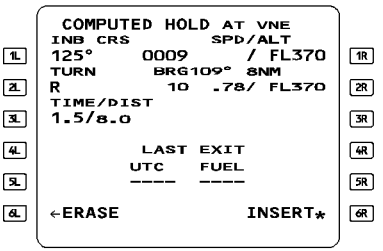
LAT REV AT PRESENT POSITION



LAT REV AT A WPT

- **SELECT lateral revision at present position (PPOS) or at applicable waypoint.**
- **PRESS HOLD prompt, [3L] key.**
- **CHECK and (if necessary) MODIFY the HOLD data.**
- **CHECK the temporary flight plan and INSERT it, if appropriate.**

NFCS-04-0410-018-B001AA



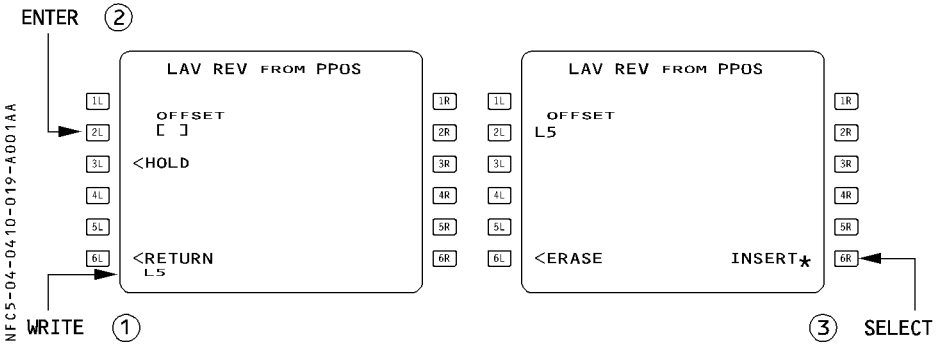
PROCEDURE TO DELETE A HOLD (HOLD WITH MANUAL TERMINATION)

- **CLEAR the HOLD directly in the flight plan as it can be done for a normal waypoint.**

OFFSET

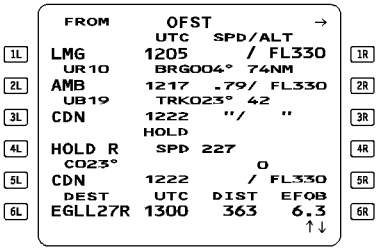
Offset allows the pilot to define a lateral offset to the left or right of the active flight plan. Once inserted, the offset applies from present position (PPOS) all along the flight plan to the first waypoint (WPT) at which a holding pattern is defined, or to the last waypoint before the runway.
In most cases, the pilot will use it en route because of an ATC clearance or to avoid bad weather expected along the flight-plan route.
Accessed from lateral revision (LAT REV) at the present position page, an offset may be defined between 1 and 50 nautical miles in one-nautical-mile steps.
After inserting the offset in the flight plan, the flight plan page shows OFST in its title, and the navigation display shows the offset flight plan in a solid green line and the original flight plan in a dashed green line.
The offset is cleared :
Automatically (holding pattern, approach)
Manually with the clear (CLR) key.

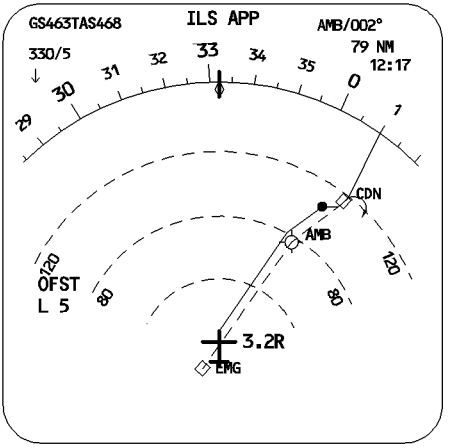
Note : If the pilot enters an OFFSET when the aircraft is too close to the TO waypoint, the FMGS may refuse to accept it, in which case the MCDU displays the message "ENTRY OUT OF RANGE".



INSERTING AN OFFSET

- **SELECT LAT REV at FROM waypoint.**
- **WRITE the required offset value and direction (for example, L5 or 5L).**
- **PRESS [2L] to enter the offset into the OFFSET field.**
- **PRESS [6R] to activate the OFFSET.**





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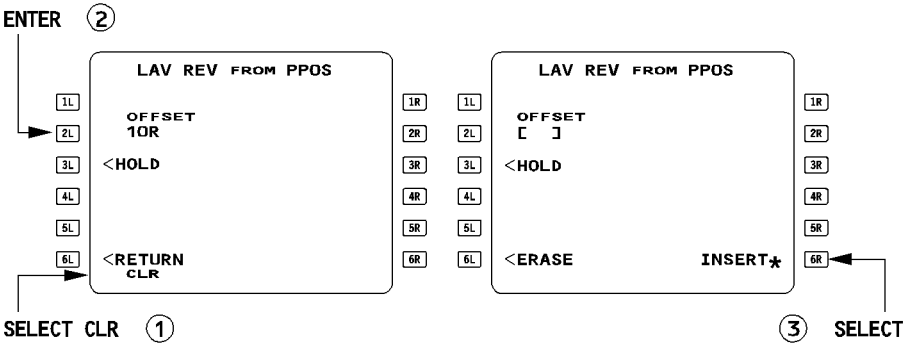
MANUAL CANCELLATION OF OFFSET

There are two normal methods for cancelling an offset :

- **1. SELECT DIR TO a waypoint (the next waypoint, for example)**
- **2. SELECT a Lateral Revision (LAT REV) at FROM WPT**

  – CLEAR THE OFFSET field.

  – PRESS [6R] to activate the temporary flight plan (cancelling OFFSET).



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ALTERNATE FUNCTION

The ALTERNATE FUNCTION performs two actions :
- It reviews and defines alternate airports and inserts them into the flight plan.
- It allows a diversion to be activated through the ENABLE ALTN command.

REVIEW AND SELECTION OF ALTERNATE AIRPORT

Several alternate airfields may be stored in the data base and assigned to a destination. When the pilot selects a company route (CO RTE) (or a city pair), the computer strings the preferred alternate into the active flight plan.
The pilot may review the alternate airports on the ALTN page, and if the one selected is not suitable because of weather or fuel considerations, another alternate may be strung into the active flight plan.

R The pilot may define an additional alternate airport into the list, if necessary.
The ALTERNATE page shows the track and distance (airway or direct) between the destination and the alternate, as well as fuel management data (EXTRA fuel, assuming the associated airfield is the alternate airport). This data will help the pilot change the preferred alternate, if necessary.

R Access the ALTERNATE page through the ALTN prompt on LAT REV at destination.

R Alternate airfields are attached to the destination.

ENTERING NEW ALTERNATE INTO THE F-PLN

If the preferred alternate is not suitable, proceed as follows :

– SELECT the F-PLN key on MCDU

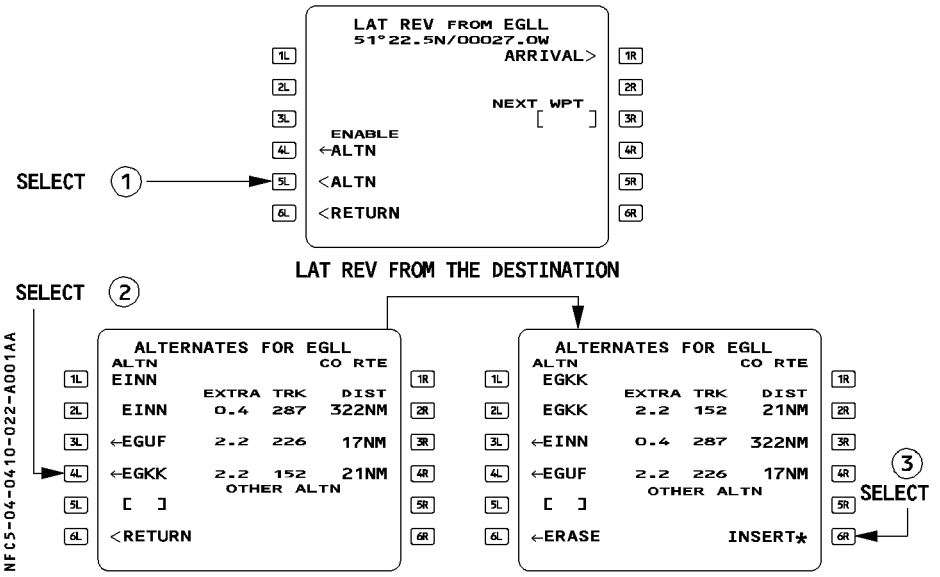
R **– SELECT LAT REV at destination.**

– SELECT ALTN [5L] key.

– SELECT an AIRFIELD IDENTIFIER

– INSERT the temporary flight plan

Note : If weather and destination airfield conditions allow it, you may select "NO ALTN", fuel predictions will be computed without alternate fuel.



SELECTION OF OTHER ALTERNATE

Fuel management information to another alternate airfield may be obtained by selecting the OTHER ALTN field.

R — **SELECT LAT REV at destination.**

— **SELECT ALTN [5L] key.**

— **ENTER the airfield ident into the brackets.**
- If the airfield is not in the data base, the NEW RUNWAY page appears automatically.
- If the airfield is in the data base and there is a company route (CO RTE) to it, the ROUTE SELECTION page appears automatically.

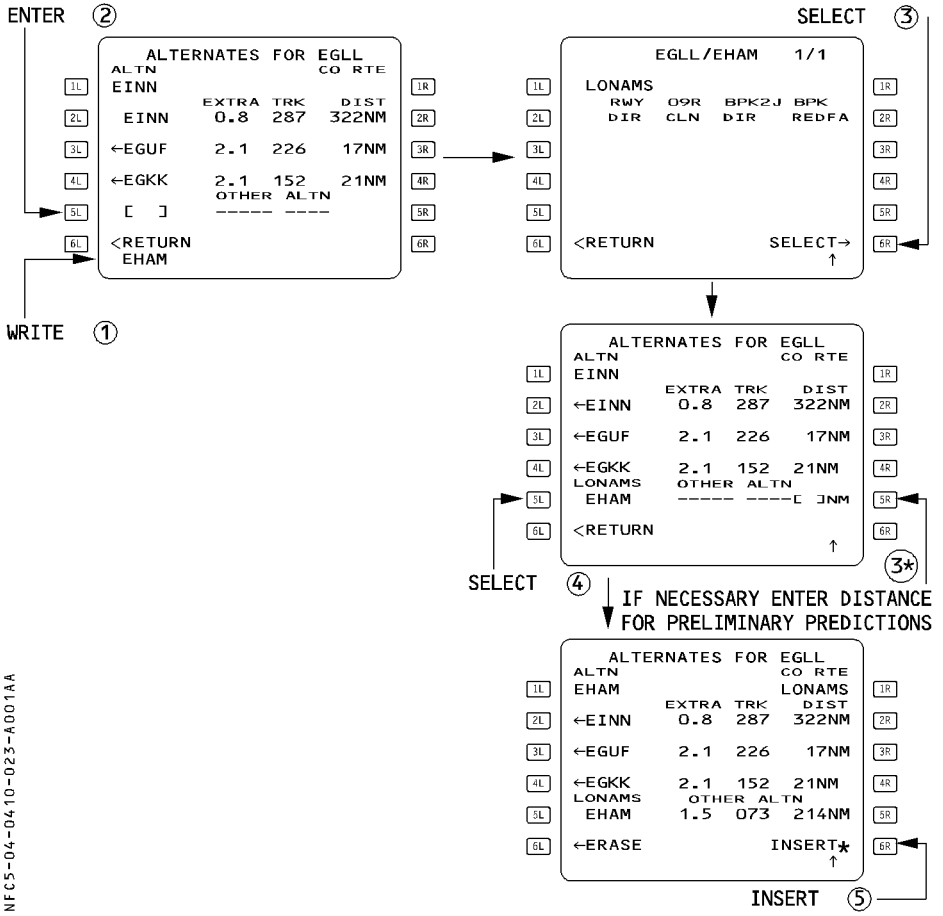
— **SELECT the route as appropriate or RETURN to the ALTN page.**

— **ENTER the distance into the brackets (if required). XTRA fuel and track (TRK) will appear.**

— **SELECT the other alternate (OTHER ALTN) as a primary alternate if it is convenient. (EXTRA fuel and DIST revert to AIRWAY distance).**

— **INSERT it if you want to have it as a primary alternate.**

Note : – *The pilot can always overwrite the "OTHER ALTN". The new "OTHER ALTN" then replaces the previous one, which is lost.*
– *The pilot can select OTHER ALTN as a primary alternate (active flight plan) to replace any alternate on the initial list.*
– *If the pilot selects the other alternate as a primary alternate and overwrite the OTHER ALTN field by entering a new airport, the first one will remain a primary alternate and the system will memorize a second OTHER ALTN.*



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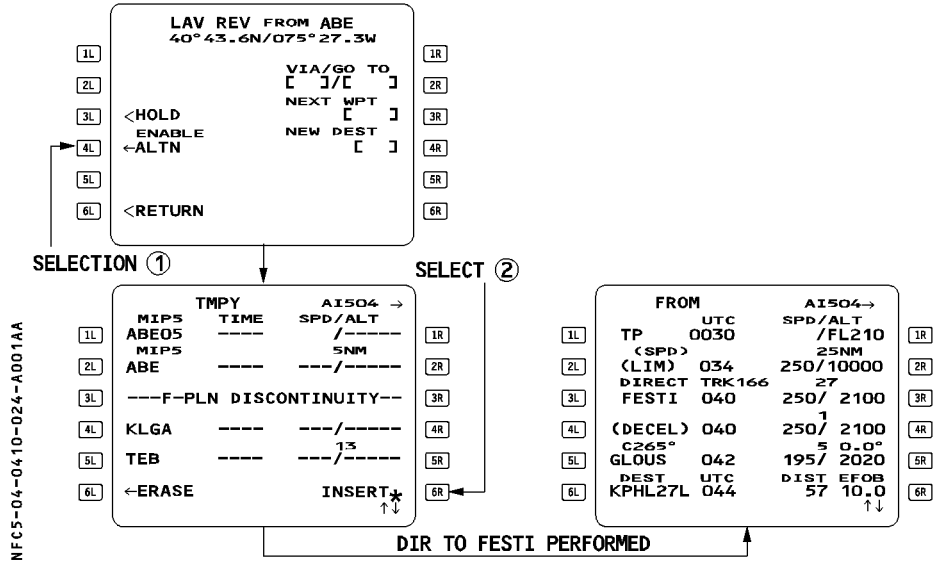
PREDICTED DATA FOR ALTERNATE

Data predictions are based on :

* Aircraft weight being equal to landing weight at primary destination
* Flight at flight level 220 if the airway distance is less than 200 NM, otherwise at flight level 310
* Cost index 0
* Constant wind
* Constant delta ISA (equal to delta ISA at primary destination)
* Airway distance for a company route, otherwise direct distance. (Manually entered distance for OTHER ALTN, used for preliminary predictions)

ENABLE ALTN

This allows the pilot to initiate a diversion by entering the alternate flight plan just after the revision waypoint (with a discontinuity).
The pilot may have to adjust the resulting flight plan (use "direct to", or add or suppress waypoints), depending upon the circumstances.



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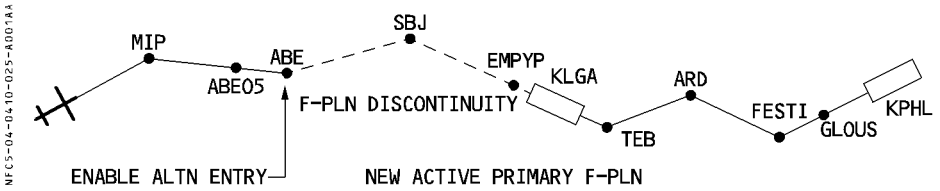
TO ACTIVATE THE PRIMARY ALTN :

- **SELECT a LAT REV at the "TO" waypoint (or at another suitable waypoint)**
- **PRESS the ENABLE ALTN key**
- **INSERT the temporary flight plan**
- **ENTER an appropriate waypoint in DIRECT TO and adjust the flight plan.**
- **ADJUST the cost index on the PERF page and the defaulted cruise flight level (CRZ FL) on the PROG page, as required.**



When ENABLE ALT is pressed at ABE, a flight plan discontinuity is created from ABE down to destination and the alternate route is linked to the active flight plan.

DIR KEY (DIRECT-TO FUNCTION)

The pilot uses the "Direct To" function to define a direct leg from the present position to any waypoint on the active flight plan or to any waypoint.

R The designated waypoint may be entered by its identifier (if it is stored in the database) or by a latitude/longitude, place/bearing/distance, or a place-bearing/place-bearing. When the pilot uses DIR TO, the present position (PPOS) becomes the "FROM" waypoint and the

R active flight plan shows it as T-P (turn point). The pilot must not use DIR TO on the ground.

Note : If the autopilot or flight director is in the heading/track or localizer mode, the "DIR TO" function engages NAV mode.

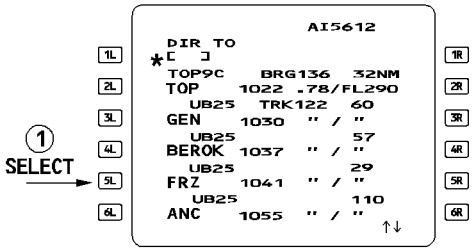
PROCEDURE

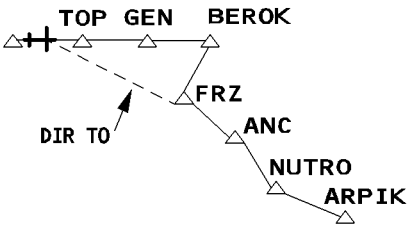
Case 1. The "TO" waypoint is in the flight plan

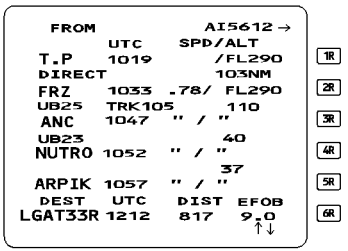
Example : DIR TO FRZ

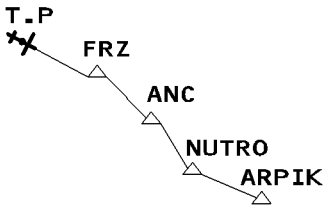
– PRESS the DIR key on the MCDU.

– PRESS the line select key next to "FRZ"









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RESULTING F-PLN AND ND DISPLAY

Note : The system does not create a temporary flight plan when a DIR TO is used, the flight plan modification being immediately inserted.

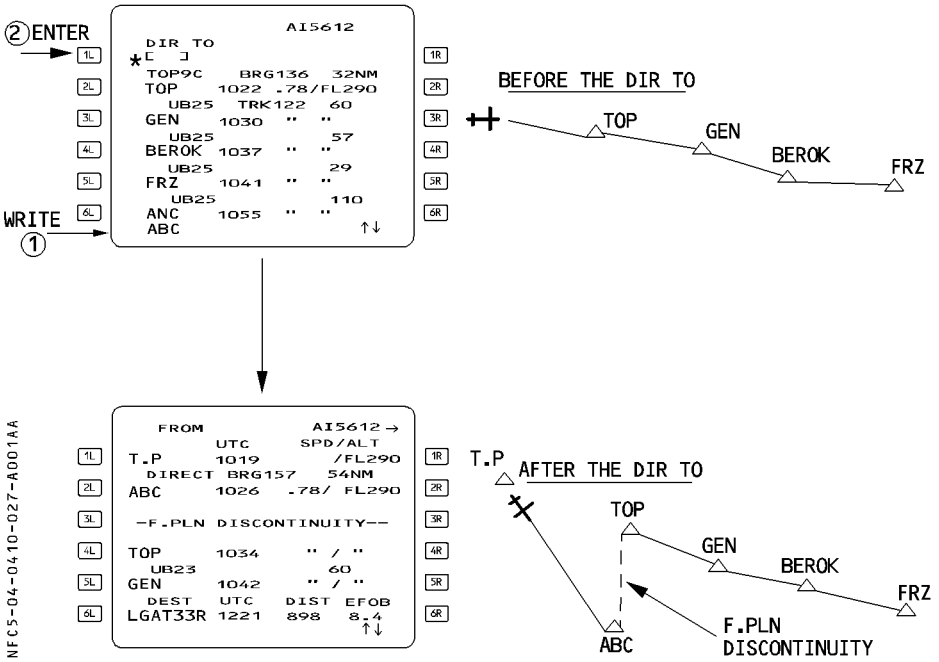
Case 2. The "TO" waypoint does not belong to the flight plan

Example: Direct to ABC (ABC being an ident, LL or PBD or PB/PB)

– PRESS the DIR key.

– WRITE "ABC" into the scratchpad.

– PRESS [1L] to enter "ABC" in the "DIR TO" field.



Clear the discontinuity and the waypoints that are not included in the new flight plan.

CAUTION

– If the pilot is flying a manual leg (part of a SID or STAR), the flight plan page dislays "F-PLN DISCONTINUITY", preceded by "MANUAL" (see below).
These legs are specific heading or track legs flown with no defined end waypoint.

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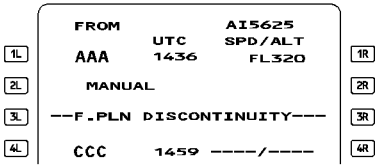

– When the pilot encounters a flight plan discontinuity or if a major reset occurs, the flight plan page displays "PPOS – F-PLAN DISCONTINUITY", and the pilot looses managed guidance in both the lateral and the vertical plans.
The autopilot or flight director reverts to the basic HDG V/S (or TRK FPA) modes. Predictions remain available and are based on the assumption that the aircraft will fly a direct leg from its present position to the next waypoint.

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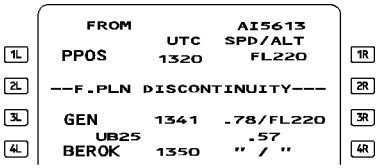


– In both of these cases, the only way to get back to a standard flight plan is to perform a "DIR TO" to a designated waypoint.

R – Following a DIR TO, the message "MAP PARTLY DISPLAYED" may appear on NDs if the
R new flight plan includes a very long leg. Please refer to 1.31.45. for description. When
R this message comes up, enter an intermediate waypoint to shorten the leg.

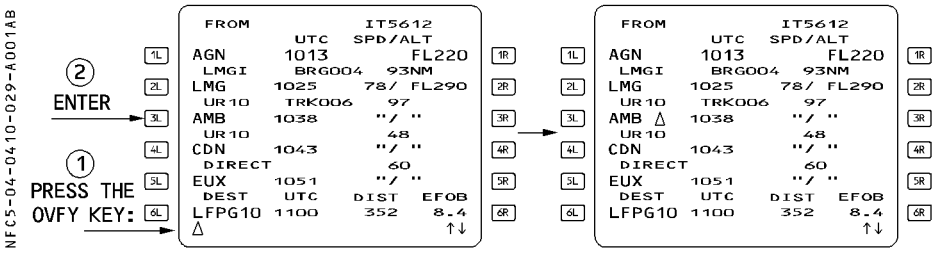
OVFY (OVERFLY) KEY

The overfly key programs the Flight Management Guidance Computer to fly over a specific waypoint or navaid. To use it :

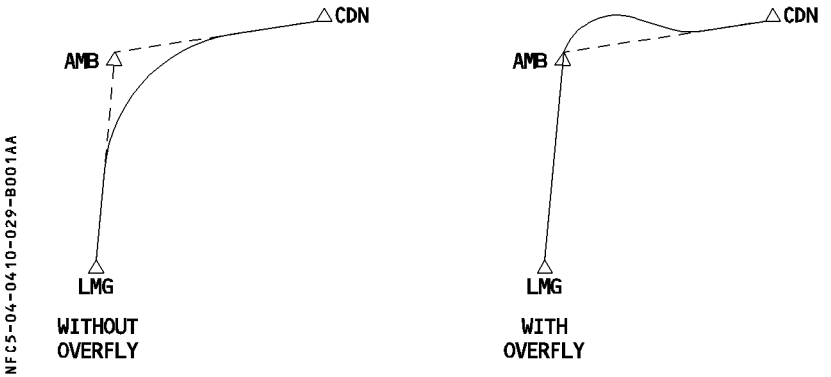
- **PRESS the "OVFY" key.**
  A "△" appears in the scratchpad.

- **INSERT it by pressing the key adjacent to the waypoint to be overflown. [3L] in this example.**

R



The pilot cannot cancel the overfly program. If you do not want to fly over the point you have entered, use DIR TO (direct to) the next waypoint or the heading mode, whichever is more suitable.

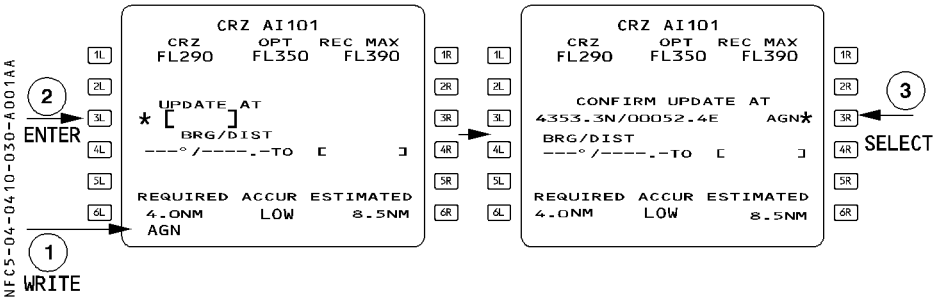


The overfly function allows you to fly over a specific waypoint, and then returns the aircraft to the great circle track.

"UPDATE AT"

The pilot uses "UPDATE AT" on the progress page to manually change the position the FMGC has computed (FM position and bias).
Use this function with extreme caution : it is apt to be inaccurate because it relies on the pilot's estimating when a designated position has been reached.

R



- **WRITE the ident for the navaid (or waypoint, or airport) or the coordinates or the PBD or PBX at which update is intended.**

- **PRESS [3L] to enter the ident in the "UPDATE AT" field. The coordinates of the point, along with its identifier (or "ENTRY" if the identifier is not in the data base), appear in that field.**

- **PRESS [3R] to activate the update when you estimate that you are at the position.**

  Note : The system reinitializes the Estimated Position Error computation when a position update is performed. This may lead to the appearance of a "NAV ACCUR DOWNGRAD" or "NAV ACCUR UPGRAD" message.

CAUTION

If the "UPDATE AT" does not take effect properly, it corrupts the FM position.

- In an area with good radio navaid coverage :
  - If the update error is small, subsequent radio position updating will correct the FM position.
  - If the update error is large, the system will reject any radio updating because its internal "reasonableness test" will reject the various navaids. Thus the FM position will only be the MIX IRS position corrected by the position bias determined at the time of the update, and the error will be maintained.
- In an area without proper navaid coverage, radio position updating is not available and the FM position, if incorrect, will remain incorrect until a new manual update is performed.
- Therefore, the pilot should use "UPDATE AT" only in case of a major position problem such as :
  - on the ground, no flight plan appears on the navigation display and ARC/ROSE NAV mode is selected .
  - A "CHECK A/C POSITION" message appears and the position monitor page indicates an obvious position mismatch.

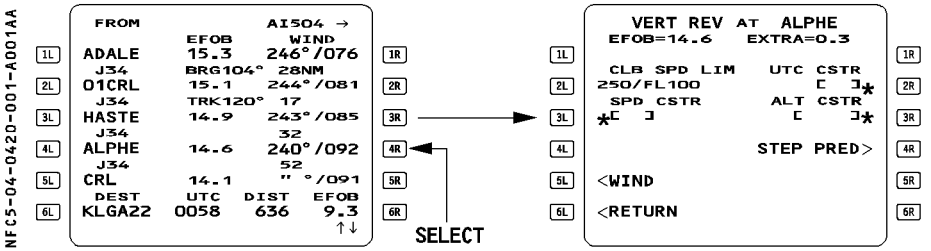
◁ When the GPS PRIMARY is operative, the FM position will always converge towards the GPS position at a rate depending on the aircraft altitude. Therefore when GPS PRIMARY is operative, an "update at" that is innacurate will have a temporary effect on the FM position.

GENERAL

The vertical revision function allows the pilot to modify the following parts of the flight plan:

- Speed limit
- Speed and altitude constraints
- Wind
- Time constraint (optional)
- Step climb or step descent

The pilot selects these functions by pressing the right key on flight plan A or B.



Note : Chapter (4.04.20) only describes the 2 following functions, wind and time constraint.
For other vertical revision functions refer to next section (4.05).

TIME CONSTRAINT

A time constraint (TIME CSTR) is a time requirement to be met over a specified waypoint of the lateral flight plan, including destination but excluding the origin and FROM waypoints.

At most, two time constraints may exist : one in the active flight plan
one in the secondary flight plan.

When a second time constraint is entered in a flight plan, the first one is deleted.

The time constraint entry is not allowed in Engine Out mode or once the aircraft is in descent or approach phase or go around.

A time constraint is displayed in magenta as long as the predictions are not computed.

Once the predictions are available, the time constraint value is replaced by the predicted time at the related waypoint, highlighted by a star (*) :

– if the TIME CSTR is predicted as matched, the star (*) is magenta
– if the TIME CSTR is predicted as missed, the star (*) is amber.

No specific symbol is provided on the ND.

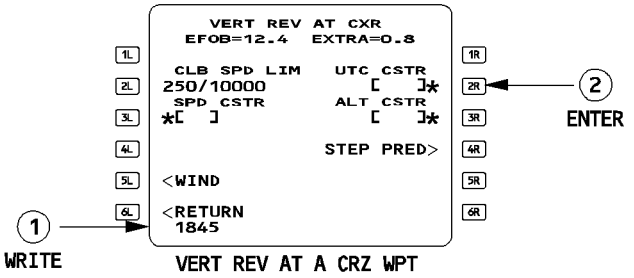
A time constraint is cleared as any other constraints. If a time constraint is automatically deleted, a "TIME CSTR DELETED" message is displayed on MCDU.

TIME CSTR entry

– SELECT the F-PLN Key on MCDU

– SELECT a VERT REV at revised WPT

– WRITE the TIME CSTR into the scratchpad then ENTER it
The display automatically reverts to the F-PLN A page.



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WIND

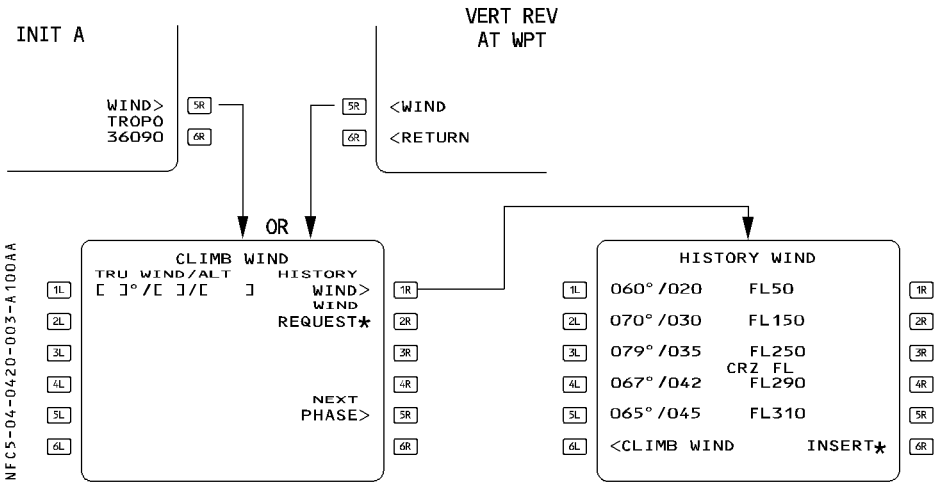
In order to receive the best predictions, the pilot must enter wind values for the different phases and for various waypoints of cruise phase.

ENTERING THE CLIMB WINDS (F-PLN INITIALIZATION)

When completing the INIT A page, the pilot will enter the winds by depressing the WIND prompt. He will access the different wind pages using NEXT PHASE key and PREV PHASE key. He will slew the CRZ WIND page to access the various waypoints of the cruise winds. The pilot will enter wind data as follows :

- for CLB phase ; by inserting either the HISTORY WIND data (as recorded during the last descent) or by inserting winds (at up to 5 altitudes) on the CLB WIND page.
- for CRZ phase ; by inserting winds at various CRZ waypoints on the CRZ WIND pages.
- for DES phase ; by inserting winds (at up to 5 altitudes) on the DES WIND page
- for the ALTN F-PLN, an average wind may be entered on the DES WIND page for alternate cruise flight level.

Note :
- *Cruise wind and alternate wind prompts are not displayed on the FUEL PRED page with this standard.*
- *Wind can be automatically received (and inserted) through ACARS system (Refer to 4.04.40)*
- *Once inserted, the F-PLN B page displays the forecast wind profile at all waypoints using interpolated values from manual entries.*



WIND ENTRY RULES

When from an empty field, a wind entry is performed, direction/velocity/altitude (or flight level) must be entered simultaneously. One entry in each bracket.
Overwriting a wind cancels the previous one.
Wind data can be cleared, the field reverts to brackets.
All winds except the PERF APPR page wind (Tower wind) are true north referenced.

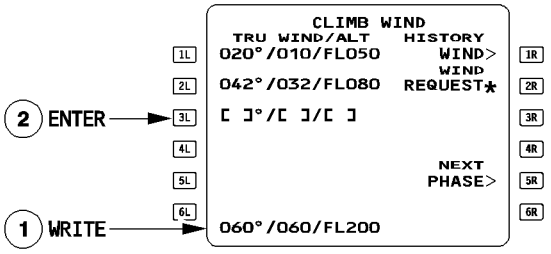
ENTERING THE HISTORY WIND (F-PLN INITIALIZATION)

The pilot may insert the history wind but cannot modify this page.
If convenient, PRESS the (6R) prompt to insert. After insertion, the [6R] prompt is suppressed but the page still displays the wind values for information.

ENTERING THE CLIMB WIND (F-PLN INITIALIZATION)

If previous history winds are not convenient or have to be modified :

- **SELECT CLIMB WIND page from INIT A page or VERT REV page.**
- **WRITE new winds into the scratchpad and ENTER**



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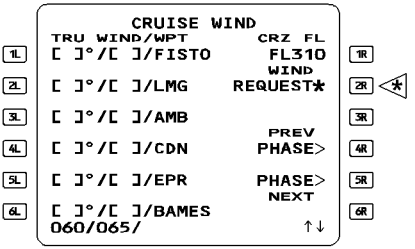
CLIMB WIND cannot be modified when the climb phase is active.
At climb phase transition, wind data switch from blue to green colour and any attempted modification will trigger the "NOT ALLOWED" message.
The system interpolates winds between 2 entered levels.

ENTERING THE CRUISE WINDS

At flight plan initialization the cruise wind page displays all cruise waypoints with empty brackets. In flight, only down path waypoints are displayed.

NFC5-04-0420-005-A100AA



CRUISE WIND PAGE AT F-PLN INITIALIZATION

- **SELECT VERT REV at WPT**
- **PRESS the WIND prompt**
- **(If necessary) SELECT NEXT PAGE**
- **SLEW until relevant waypoint is displayed.**
- **WRITE and ENTER the new wind data into the scratchpad.**
  WIND may be entered through ACARS pages system. (Refer to 4.04.40)

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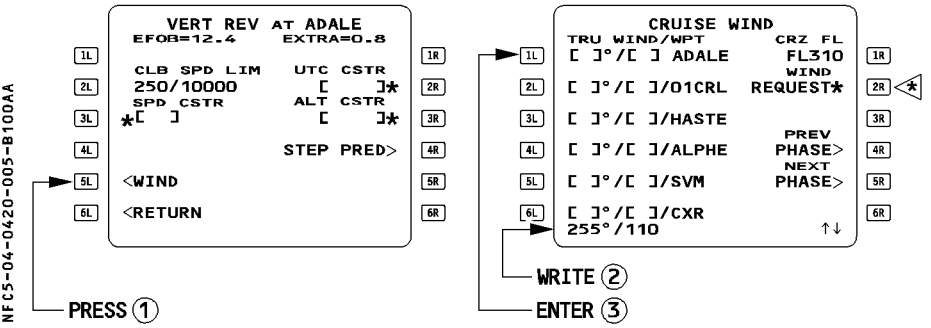


The crew will modify the entered winds in flight if a significant difference is expected (greater than 30 kt or 30°).

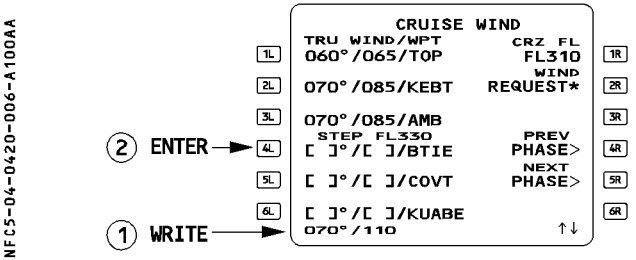
Note : — *Cruise wind may be entered directly into F-PLN B page. These entries are automatically transferred to cruise wind page.*
— *The CRUISE WIND page displays only ACARS or crew entered data. It never displays computed or propagated data (F-PLN B page only).*

ENTERING A STEP CLIMB/STEP DESCENT WIND

If a step climb or a step descent is scheduled, the wind at the step level shall be entered for prediction purposes.

– **SELECT CRUISE WIND page.**
Slew until the step waypoint is displayed.

– **WRITE the wind into the scratchpad and ENTER.**



If the pilot does not enter the step wind, the FMGS continues to use the wind entered for the cruise flight level.
Clearing the manual entry reverts to brackets, but the FMGS will use the wind at cruise flight level for predictions and performance.

ENTERING THE DESCENT WINDS

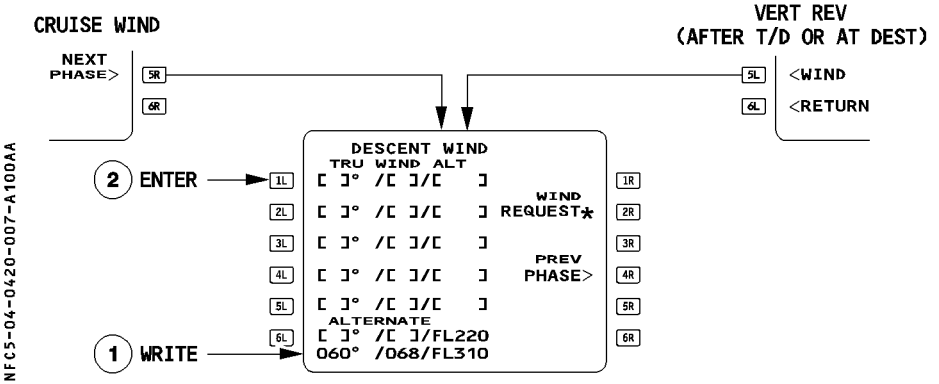
The pilot will enter as many as one wind at 5 different FL or altitudes. This wind data will be used for descent profile and prediction computation.
From the vertical revision page or from the CRUISE WIND page :

– **PRESS the WIND prompt.**

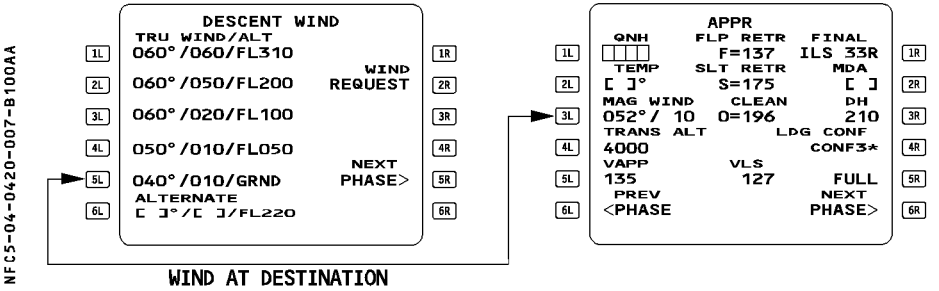
– **SELECT the DESCENT WIND page.**

– **ENTER up to 5 different "wind/altitude".**

R *Note : It is recommended that at least one descent wind be entered at cruise FL.*
R *If no wind is entered, the system will assume a zero wind value (displayed on*
R *F-PLN B page) at TOD.*



A wind is written as true direction/velocity/flight level or altitude in feet.
If the crew enters "GRND" in the altitude field, the system uses the associated wind as wind at destination.
The descent profile is corrected as well as the tower wind entered in the PERF APPR page. (The wind direction is then modified of the magnetic variation).



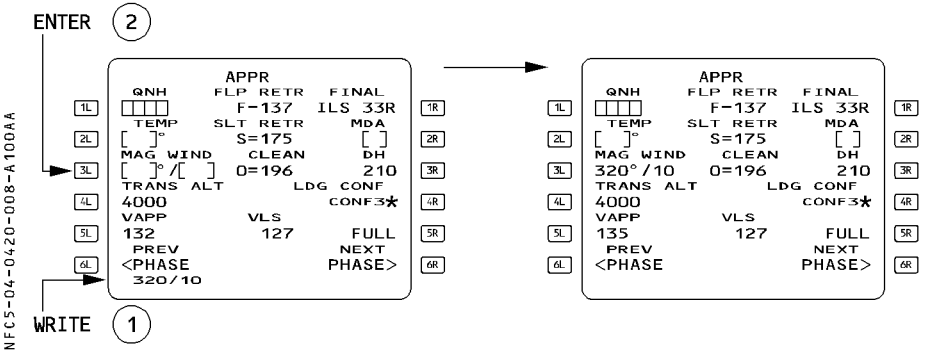
When the winds have been entered, the F-PLN B page displays the forecast wind profile at all descent waypoints using values it has interpolated from manual entries. Descent winds are not modifiable when descent, approach or go around phase is active. At descent phase transition, wind data switch from blue to green colour and any attempted modification triggers the "NOT ALLOWED" message.

ENTERING THE ALTERNATE WIND

Alternate wind is entered in the DESCENT WIND page. The altitude is defaulted to FL 220 or 310 but can be corrected. If an alternate wind is not defined, the predictions are computed with a wind defaulted to zero.
Alternate wind can be modified at any time.

ENTERING THE APPROACH WIND

The wind at destination is entered on the PERF APPR page 3L field. It is a magnetic referenced wind, copied in true reference into DESCEND WIND page at ground level (GRND) and F-PLN B page at destination. A ground entry into DESCENT WIND page is in the same way, copied to F-PLN B page and PERF APPR page (Magnetic) automatically. This wind is modifiable in descent and approach and go around phase.



- **SELECT the PERF key on the MCDU**
- **DEPRESS the NEXT PHASE key (6R)**
- **WRITE QNH and ENTER it**
- **WRITE the surface wind (magnetic) into the scratchpad and ENTER it.**

Note : – At each wind entry, the descent profile is recomputed, therefore it is recommended to enter all winds, temperature and QNH at the same time to minimize recomputation time.

EFFECT OF REFERENCE BAROMETER SETTING

GENERAL

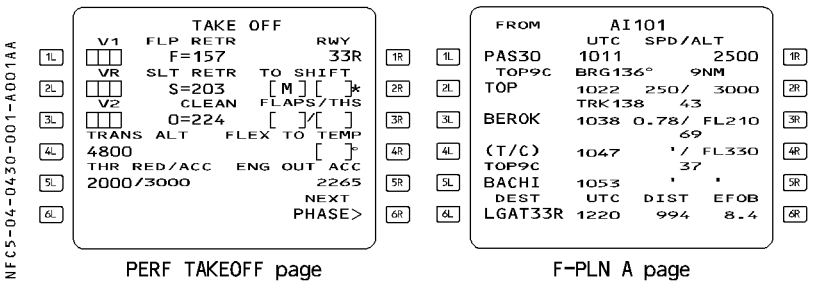
The baro reference selector of the E.I.S (Electronic Instrument System) allows the pilot to use the standard barometric reference (STD), sea level atmospheric pressure (QNH), or atmospheric pressure at airfield elevation (QFE option) for the barometer setting.
The selected value is displayed in the baro reference display window of the EFIS control panel and on the Primary Flight Display (PFD) below the altitude scale.
The barometer setting is used as a reference for the altimeter of the PFD and for the PFD target altitude. In flight, it affects the predicted altitudes on the MCDU and the descent path computation.

MCDU ALTITUDE PREDICTIONS

The FMGS predicts at each waypoint of the flight plan an altitude that is a function of all data in the lateral and vertical flight plans.

On the ground

The altitude predicted at each waypoint is displayed as altitude in feet above mean sea level (AMSL) when it is below the transition altitude and as flight level when it is above the transition altitude. The altitude constraints are also displayed, and they follow the same rule (feet or flight level).
The predicted altitude is equal to the airport elevation plus the height you must attain in order to reach the waypoint in the applicable mode (climb or descent).



PERF TAKEOFF page — F-PLN A page

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In flight

The predicted altitude is equal to the aircraft altitude (as a function of the barometer setting), plus or minus the height you must attain to reach the waypoint in the applicable mode (climb or descent).

– In climb :

Altitude predictions and constraints are displayed as altitude in feet above mean sea level (AMSL) at, or below, the transition altitude, and as the flight level above it.

For example : If the transition altitude is 5000 feet and you insert an altitude constraint
R as 8000 feet, the MCDU F-PLN A page displays it as FL80.

– In descent :

If "STD" is selected on the EIS control panel, altitude predictions and constraints above the transition level are displayed as flight levels, and those below the transition level are displayed as altitude AMSL.

If sea level standard pressure (QNH), or field elevation pressure (QFE option), is selected on the EIS control panel, altitude predictions and constraints are displayed as altitudes AMSL, regardless of the transition altitude.

For example : If the transition level is FL50 and you insert an altitude constraint of
R 8000 feet into the MCDU, the MCDU F-PLN A page will display it as FL80, if "STD" is selected, and as 8000 feet, if "QNH" (or "QFE" option) F-PLN A page is selected.

TARGET ALTITUDE ON PFD

The PFD target altitude may either be :

– The altitude selected on the FCU, or

– A flight management altitude constraint, if the climb mode or descent mode is engaged and the system predicts a level-off at a constraint that comes before reaching the FCU altitude.

The PFD target altitude depends on the barometer setting :

– If "STD" is selected, the target is a flight level.

– If "QNH" or "QFE" is selected, the target is an altitude or height.

The aircraft will level off accordingly.

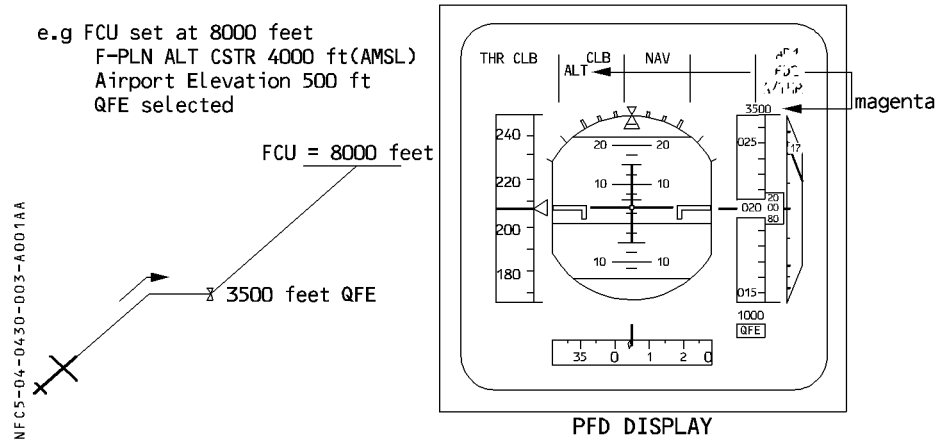
Note : – *If the pilot changes the barometer setting during ALT* or ALT CST*, the aircraft may overshoot the target altitude, because the current value has been changed. However, the ALT* and ALT CST* modes allow the aircraft to regain the FCU altitude. As a general rule, avoid changing the barometer setting when in ALT* or ALT CST*.*

– *In aircraft equipped to use field elevation pressure (QFE option), switching from STD to QFE (or vice versa) in ALT CST* green changes the target value and may revert the vertical mode into V/S mode.*

Note for aircraft with QFE (Field Elevation Pressure) pin program

If you select "QFE" on the EFIS control panel :

- The MCDU predictions follow the basic rules (altitudes are AMSL below the transition level, flight levels above it).
- The altitude constraints on the MCDU follow the basic rules.
- The target altitude on the PFD is QFE related :
  - If the target altitude has been selected by the FCU, the aircraft will level off there.
  - If the target altitude is an altitude constraint, the PFD automatically shows that constraint as corrected by the airport elevation.



PFD DISPLAY

PROCEDURES

a) The altitude constraints in departure and arrival procedures should be defined in the navigation database or by the pilot on the MCDU :
   - in terms of altitude AMSL below the transition altitude
   - in terms of flight level above the transition altitude

   If a departure procedure defines an altitude constraint as an AMSL altitude above the
R transition altitude, you must convert it to STD, because the system and guidance will treat it as a flight level whenever you select the standard barometer setting.

b) In climb you should switch from QNH (or QFE) to STD on both EFIS control panels simultaneously when you reach the transition altitude.
   All MCDU altitude predictions and altitude constraints and all PFD altitude targets will be displayed as flight levels.

c) In descent, when ATC clears you to an altitude below the transition altitude, you can select QNH (or QFE) on both EFIS control panels simultaneously.
   All MCDU altitude predictions and contraints and PFD targets are now altitude AMSL.

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CLEAR KEY (CLEARING FUNCTION)

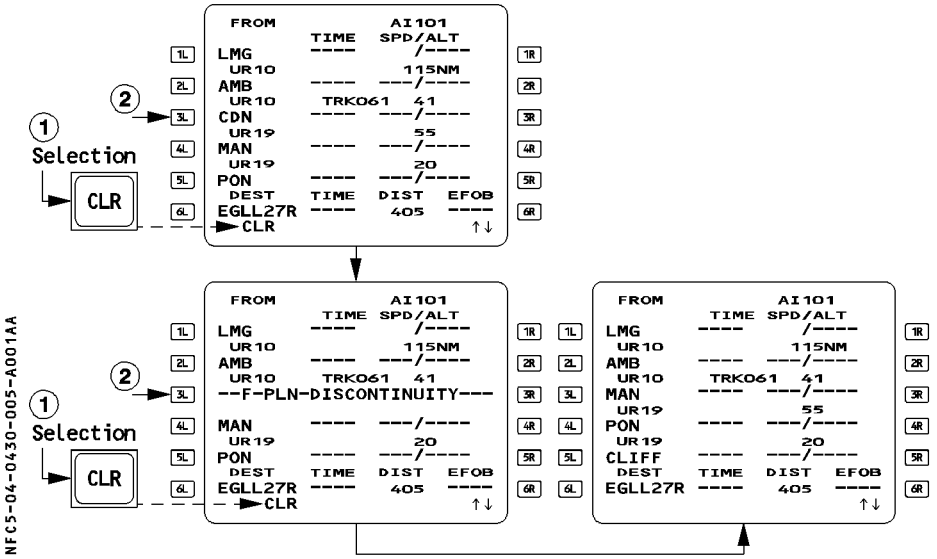
CLEARING THE SCRATCHPAD OF DATA OR MESSAGES

Press the "CLR" key with a single brief touch to erase the last alphanumeric character inserted in the scratchpad.
Press the key for more than three seconds to erase all the data inserted in the scratchpad.
If the scratchpad is empty, it displays "CLR".

CLEARING DATA FIELDS

Clear a data field by pressing the "CLR" key, the scratchpad displays CLR, then select the prompt for the field you want to clear (3L for example).

- You cannot clear all data fields :
  - If the field contains data that has a default value or a value computed by the FMGC, the data reverts to this value.
  - Any attempt to clear the defaulted value has no effect.
- Clearing a constraint on the F-PLN page deletes both the speed constraint and the altitude constraint associated with the waypoint.
- If you clear a data field that is a waypoint in the flight plan (primary or secondary), you delete this waypoint from the flight plan and create a discontinuity. The discontinuity can also be cleared in a similar way.



HOW TO EXECUTE A DIVERSION

The FMGS will assist the pilot if it becomes necessary to divert to an alternate airport.

DIVERSION TO PREPLANNED ALTERNATE AIRPORT

This would probably occur at the end of the cruise phase, during descent or go-around. The pilot can use this method for diverting if the primary flight plan includes an alternate flight plan from destination to a suitable alternate airport.
When decided to divert to the alternate airport from a given waypoint, simply execute an "ENABLE ALTN" (enable alternate) revision :

- **SELECT "LAT REV" at a given waypoint**
- **PRESS the "ENABLE ALTN" key**
- **INSERT the temporary flight plan (TMPY F-PLN).**
- **ADJUST the resulting active flight plan.**
  (Refer to 4.04.10).

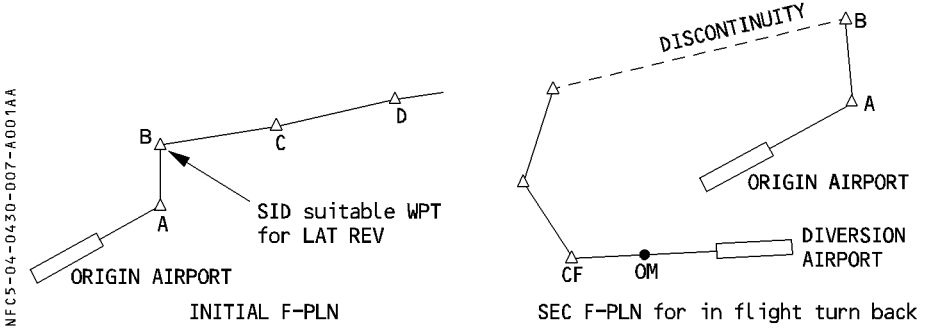
DIVERSION TO ANY ADEQUATE AIRPORT

May occur if any unexpected event requires a diversion.
In this case use either a secondary flight plan or a lateral revision for a new destination.

USING THE SECONDARY FLIGHT PLAN FUNCTION

Use the SEC F-PLN function if a secondary flight plan for diversion has been prepared :

– **While the aircraft is on the ground,**
you have prepared the lateral path you would expect to use in case of an early in flight turn back (major failure after takeoff or during initial climbout), or the lateral path you would expect to use to land at a nearby diversion airport (weather at origin airport requires a takeoff alternate).



– **SELECT the "SEC F-PLN" key on the MCDU.**

– **DEPRESS the "COPY ACTIVE" key.**

– **SELECT "LAT REV" at a waypoint with a suitable SID.**

– **ENTER the ident of the diversion airport as the new destination.**

– **ENTER the expected approach and route.**

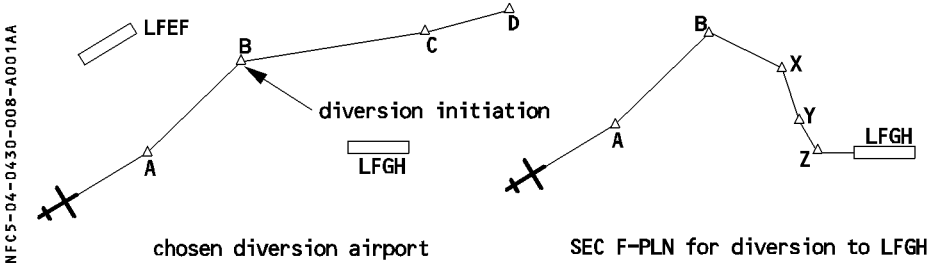
– **DEPRESS the PERF prompt on SEC INDEX page.**

– **SELECT the PERF APP page of the secondary F-PLN.**

– **ENTER the QNH and wind.**

– **SELECT the landing configuration.**

– **Once the aircraft is in the cruise phase,**
consider the adequate diversion airports as the aircraft proceeds along the route of the active flight plan : use the "EFIS AIRPORT" feature of the navigation display for this. Enter a diversion airfield as the destination for the secondary flight plan and adjust the routing (changing it as necessary as cruise phase progresses).



– **SELECT the "SEC F-PLN" function key on MCDU.**

– **PRESS the "COPY ACTIVE" key.**

– **SELECT "AIRPORT" on the EFIS control panel.**
Choose an adequate diversion airport and diversion initial waypoint.

– **SELECT "LAT REV" at the chosen waypoint.**

– **ENTER the new destination.**

– **MODIFY/COMPLETE the lateral flight plan.**

For both of these cases , initiate the diversion as follows :

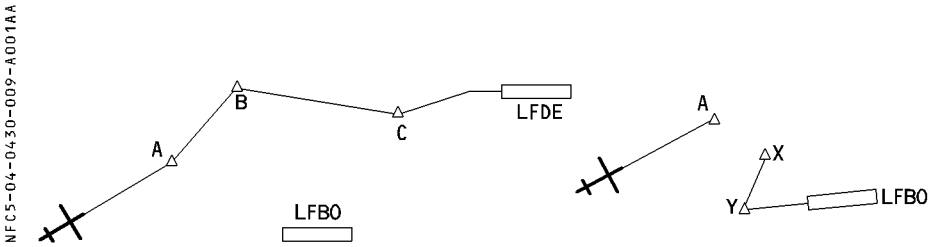
– **SELECT the "SEC F-PLN" key on MCDU.**

– **DEPRESS the "ACTIVE SEC" key.**

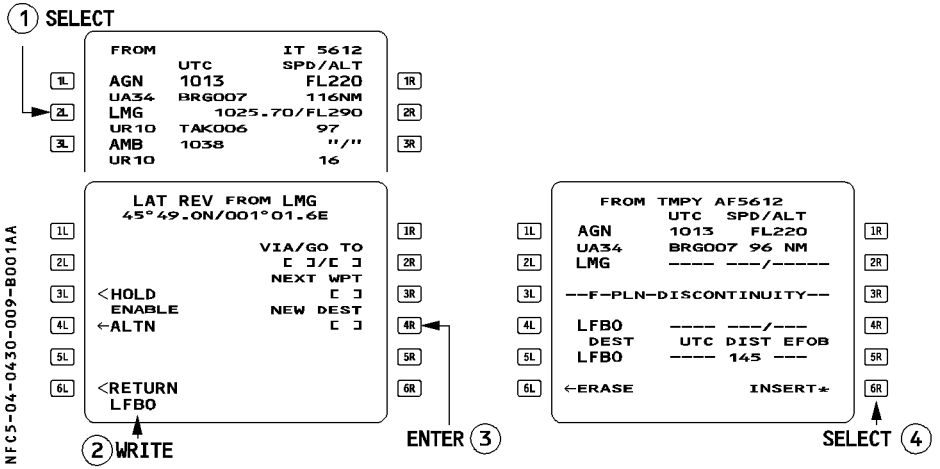
– **USE the DIR TO function to go to the waypoint of the new active flight plan.**

USING NEW DESTINATION FUNCTION

If the pilot has not prepared a diversion in the secondary flight plan, the "NEW DEST" function allows to make the required change on the active flight plan.
Because the pilot will probably have to initiate the diversion quickly, the revision waypoint will probably be the "TO" waypoint.
You will have to adjust the resulting active flight plan in order to have proper routing to the destination and have the applicable performance data entered.



- **SELECT "LAT REV" at the "TO" waypoint.**
- **ENTER the ident for the new destination.**
- **INSERT the temporary flight plan.**
- **COMPLETE the lateral flight plan to the diversion**
- **ENTER performance data as applicable.**
- **When you initiate the diversion, use "DIR TO" the appropriate waypoint.**



ENGINE OUT

When the FMGS detects an engine-out condition, the following occurs :

FLIGHT MANAGEMENT PART

- CLIMB mode, if active, reverts to OPEN CLIMB mode.
- The managed target speeds is immediately set to a value that depends upon the flight phase.
- All preselected speeds entered in the MCDU are deleted.
- Step climb (or step descent), if entered, is deleted.
- Predictions are lost (except in descent and approach phases). When they are lost, the prediction field shows dashes.
- Predictions on the secondary flight plan are lost, if it is a copy of the active flight plan.
- The PROG page shows the engine-out maximum recommended (E.O. MAX REC) altitude.
- The system automatically calls up the current performance page, which has the E.O. CLR (engine-out clear) prompt displayed in the 1R field (except during takeoff, before the diversion point is reached).
  If the crew presses the E.O. CLR, the 2 engine predictions and performance will be restored. Reverting back to one engine-out performance is not possible, unless the system detects a new E.O. condition. Therefore, the pilot should not press the E.O. CLR key, if an actual engine-out is detected.
- In the descent and approach phases, the system automatically restores two-engine predictions. The descent mode is available.
  It is not permitted to use the autopilot to perform non precision approaches in engine-out in the following modes : FINAL APP, NAV V/S, NAV/FPA. Only FD use is authorized.

FLIGHT GUIDANCE PART

- All selected modes remain available (the "HDG/TRK", "V/S", and "OPEN" modes, for example).
- In the speed reference system (SRS) mode, the takeoff speed target is V2, or the current speed if it is higher. The magenta triangle indicates V2 in all cases.
- The system limits autopilot (AP) and flight director (FD) bank angles during takeoff and approach phases as follows :
  · 15° when the aircraft speed is below the maneuvering speed (F, S, or Green Dot speed)
  · Normal AP/FD bank angle above maneuvering speed.

Note : The engine-out bank angle limits apply, when the FG part of the FMGS has detected an engine-out. It cannot be cleared by the crew through the MCDU E.O CLEAR prompt.

AUTOTHRUST

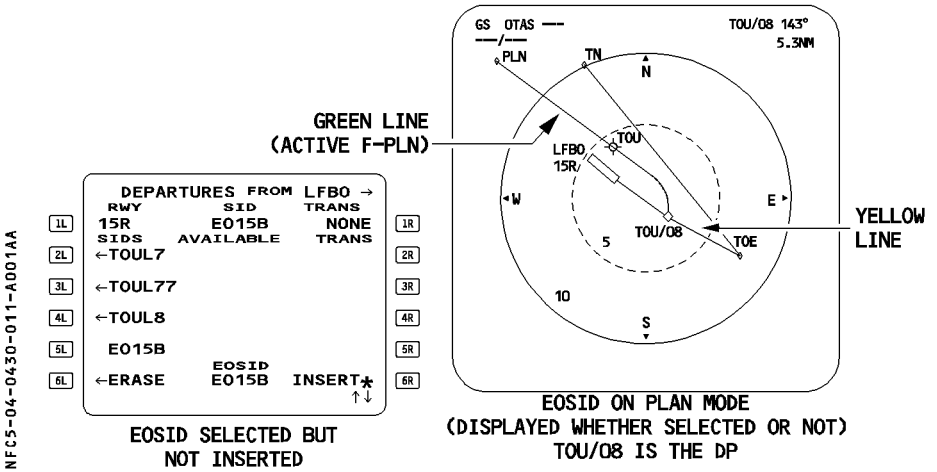
The system extends the active range of the active engine from idle to maximum continuous thrust (MCT instead of CL thrust).
The Flight Mode Annunciator requests maximum continuous thrust on the live engine at a time that depends on when the engine-out occurs.

ENGINE-OUT CONDITIONS

The FMGS considers the aircraft to be in an engine-out condition, when one of the following conditions is present and the aircraft has commenced takeoff or is in flight :
- One engine master switch off, or
- N2 below idle, or
- One thrust lever angle is below 5° with the other above 22°, or
- The FADEC shows an engine fault.

ENGINE-OUT SID

An engine-out standard instrument departure (EOSID), when defined in the database, is always for a specific runway. It is indicated on the bottom line of the SID page for that runway, and you can select it manually.
The pilot can review the SID either by selecting the PLAN mode on the navigation display (solid yellow line), or by selecting it on the SID page. In the latter case, the navigation display shows the SID as a temporary flight plan.
The last point, if any, that is common to both the SID and engine-out SID is called the diversion point (DP).



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WHEN AN ENGINE-OUT CONDITION OCCURS BEFORE THE DIVERSION POINT

The MCDU automatically shows the engine-out SID as a temporary flight plan on the F-PLN page and on the ND. The EOSID can be inserted or erased.

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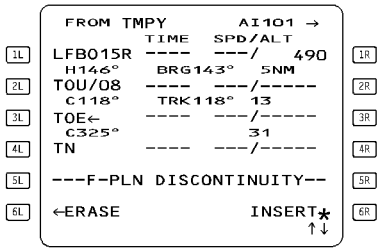

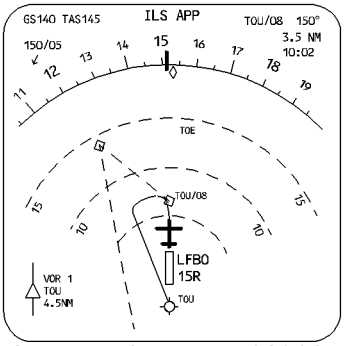

active F-PLN in green solid line
EOSID in dashed yellow line

WHEN AN ENGINE-OUT CONDITION OCCURS AFTER THE DIVERSION POINT

The navigation display shows the engine-out SID as a yellow line for your information. If necessary :

- **SELECT "DIR TO" a waypoint on the engine-out SID flight plan**
- **ADJUST the flight plan that results.**

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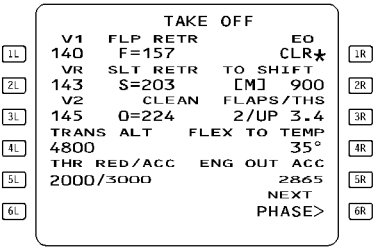
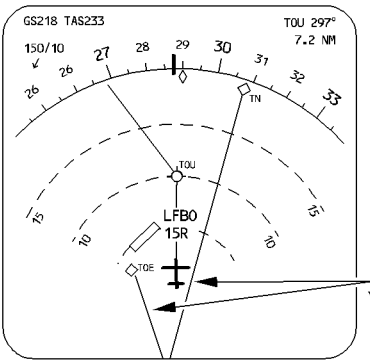
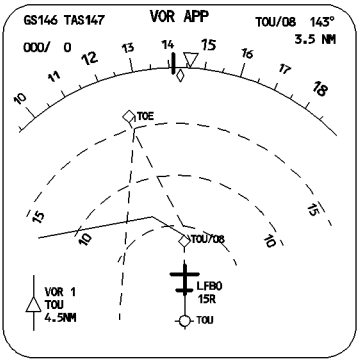




EOSID
YELLOW LINE

BELOW THRUST-REDUCTION (THR RED) ALTITUDE

* The managed target speed changes to V2.
* The PROG page displays the engine-out maximum recommended altitude.
* The PERF TO page comes up on the display automatically with the "EO CLR" prompt in the 1R field.
* The MCDU and the navigation display show the engine-out SID as a temporary flight plan, or the navigation display shows it for information only, depending upon the diversion point location.



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Procedure

When the aircraft reaches the engine-out acceleration altitude

— PUSH in the V/S knob to level off.

— CLEAN up your configuration as the speed increases toward target speed.

When the aircraft is clean and has reached Green Dot speed, "LVR MCT" flashes on the FMA,

R **— PULL out the altitude selector knob to resume the climb.**

R **— MOVE the thrust lever for the live engine to "MCT" detent.**

ABOVE THRUST REDUCTION (THR RED) ALTITUDE

* The managed target speed changes to V2.
* "LVR MCT" flashes white on the flight mode annunciator.
* The PROG page displays the engine-out maximum recommended altitude.
* The PERF TO page displays the "EO CLR*" prompt in the 1R field.
* The navigation display shows the EOSID.

Procedure

– MOVE the thrust lever of the live engine to the MCT detent.

– PUSH in the V/S knob or select V/S = 0.0 to level off.

– CLEAN UP configuration as the speed increases.
When you reach Green Dot speed :

– PULL out the altitude selector knob to resume the climb.

Note : – If it is necessary, you can move the thrust lever for the live engine to the "TOGA" detent. The flight mode annunciator will display "LVR MCT" flashing white when you reach Green Dot speed.

ENGINE-OUT IN CLB PHASE (above acceleration altitude)

ENGINE-OUT OCCURS WHILE AIRCRAFT IS ACTUALLY CLIMBING

* The managed target speed changes to Green Dot speed.
* "LVR MCT" flashes white on the Flight Mode Annunciator.
* The climb mode reverts to open climb (OP CLB) and the aircraft slowly decelerates down to Green Dot speed.
* The MCDU shows the PERF CLB page with an "EO CLR*" (clear engine-out) prompt.
* The PROG page shows the engine-out maximum recommended altitude (EO MAX REC ALT).

Procedure

– MOVE the thrust lever of the live engine to the MCT detent.

– SET the altitude on the Flight Control Unit to an altitude below the engine-out maximum recovery altitude, as cleared by ATC.

– INITIATE a diversion, when cleared to do so.

ENGINE-OUT OCCURS WHILE THE AIRCRAFT IS FLYING IN ALT MODE AT AN ALTITUDE SET ON THE FLIGHT CONTROL UNIT

* The target speed is set to engine-out cruise speed (EO CRZ SPD), computed at the altitude set on the Flight Control Unit, but limited by the limit speed (SPD LIM), if there is one.
  Other consequences and procedures are similar to previous engine out climb.

ENGINE-OUT IN CRUISE PHASE

* The system sets the managed target speed to the higher of engine-out cruise Mach number or speed, or current speed.
* "LVR MCT" (or MCT) flashes on the Flight Mode Annunciator.
* The PERF CRZ page appears with the "EO CLR*" (clear engine-out) prompt.
* The PROG page displays the engine-out maximum recommended altitude (EO MAX REC ALT).

Procedure

R **– Perform engine out abnormal procedure.**

R **– Refer to FCOM Vol 3 "SINGLE ENGINE OPERATIONS"**
R * For standard strategy, use Chapter 3.06.30
R * For obstacle strategy, use Chapter 3.06.40
R * For fixed strategy, use Chapter 3.06.50

R **– Initiate a diversion if necessary.**

R *Note : The engine-out descent strategy requires disconnection of the autothrust, and*
R *descent in OPEN DES mode.*
R *Disconnecting the autothrust prevents an automatic setting of THR IDLE ; therefore,*
R *the autopilot will fly the target speed in OP DES mode, with a thrust manually*
R *selected by the crew.*
R *When reaching the FCU-selected altitude, or whenever normal descent is resumed*
R *to a lower altitude, reengage the autothrust.*

ENGINE OUT IN DESCENT PHASE

* The managed target speed remains unchanged (ECON DES Mach number or speed, with any speed limitations).
* "LVR MCT" (or MCT) flashes on the Flight Mode Annunciator.
R * The PERF DES page appears, showing the "EO CLR*" prompt.
* The PROG page displays the engine-out maximum recommended altitude (EOMAX REC ALT).

Procedure

– MOVE the thrust lever for the live engine to the MCT detent.

– If necessary, SELECT a suitable flight mode for descent.

– DISCONNECT the autothrust and ADJUST thrust if necessary.

ENGINE-OUT IN APPROACH PHASE

* The aircraft maintains approach speed (VAPP).
* "LVR MCT"(or MCT) flashes on the Flight Mode Annunciator.
* The PERF APPR page appears, showing the "EO CLR*" prompt.
* The PROG page displays the engine-out maximum recommended altitude (EO MAX REC ALT).

Procedure

– MOVE the thrust lever for the live engine to the MCT detent.

CAUTION

Below maneuvering speed (F, S, Green Dot), the autopilot or flight director (AP/FD) cannot order a bank angle greater than 15°. Above maneuvering speed, normal AP/FD bank angle is available.

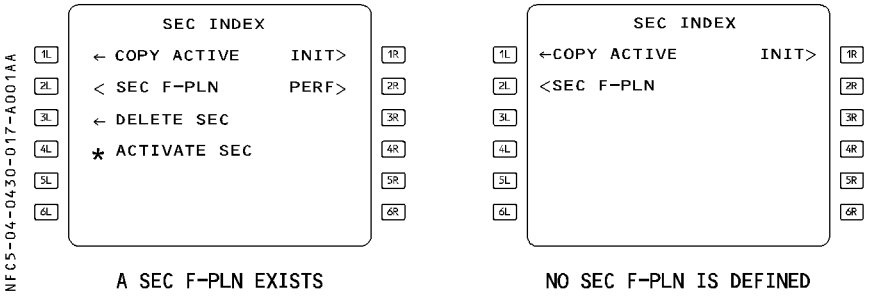
ENGINE-OUT IN GO-AROUND PHASE

The results and procedures for takeoff phase apply, except that the displays do not show the engine-out SID.

SECONDARY FLIGHT PLAN

The secondary flight plan is an alternative flight plan that you can activate when required. It may include all the vertical elements except history wind.
With respect to the secondary flight plan, you can :

- Construct it independently.
- Copy it from the active flight plan.
- Delete it completely.
- Activate it as primary flight plan using ACTIVATE SEC prompt.



A SEC F-PLN EXISTS

NO SEC F-PLN IS DEFINED

- The screen displays the "ACTIVATE SEC" prompt in flight :
  · when the heading (track) mode is engaged, or
  · when the navigation mode is engaged if the active legs of the primary and secondary flight plans are common.
- The screen displays the "INIT" prompt if the secondary flight plan is not a copy of the active flight plan.
  The secondary flight plan sequences with the active flight plan when it is a copy of the active.

The navigation display shows the secondary flight plan in white.

· In PLAN mode you can use the slew keys to review it (as you would for the primary flight plan).

Predictions

The system computes predictions using the same performance methods and performance factor it uses for the active flight plan. However, it predicts pseudo waypoints only for the
R MCDU, not for the Navigation Display (ND).

– Computation of predictions when the secondary flight plan is a copy active of the primary

The predictions are computed in the following cases :

· during preflight if the origin airports are similar (takeoff runway may be different)
· during takeoff, climb, or cruise phase if the active leg is also the first leg of the secondary.
· until the top of descent is reached. (Top of descent of primary or secondary, whichever comes first).

After top of descent, secondary predictions are lost when the systems detects an engine failure.

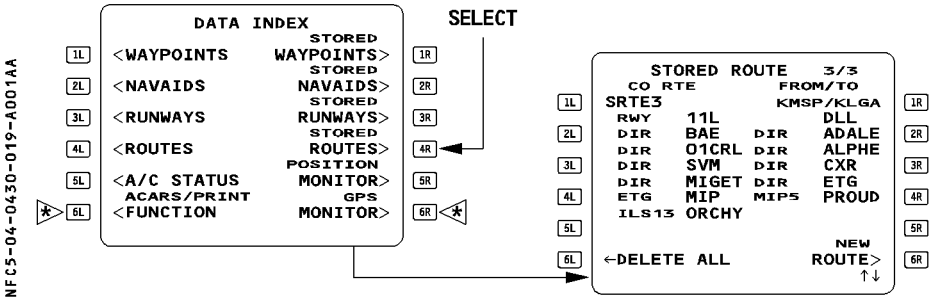
– The pilot may use the secondary flight plan in the following situations :

· At takeoff when an alternate takeoff runway is probable.
· In flight to prepare a diversion.
· In flight when an alternate landing runway is probable.
· To prepare the next flight.

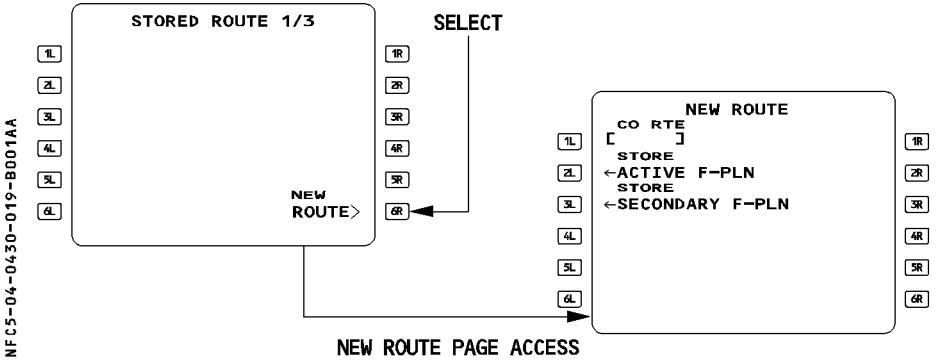
Note : The procedures used for the secondary flight plan are similar to those of the active flight plan.

STORED ROUTE FUNCTION

The stored route function allows the pilot to store or review as many as three different routes defined in an active or secondary flight plan.
This also allows you to store a company route that is not yet in the database but is expected to be flown several times (a charter route, for example).
Access the STORED ROUTES page from the DATA INDEX page.



A stored route can be reviewed by using the slew key.
In order to store a new route, first define the route through the active flight plan (on the ground only) or the secondary flight plan (on the ground or in flight) then proceed as described below.



HOW TO STORE THE ACTIVE FLIGHT PLAN (DURING PREFLIGHT ONLY)

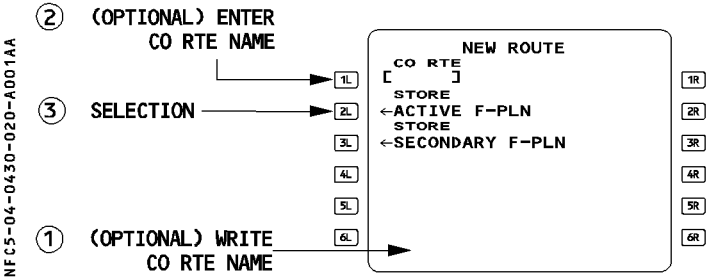
– SELECT the DATA key on MCDU

– PRESS the "STORED ROUTES" key

– PRESS the "NEW ROUTE" key

– ENTER the name of the company route (optional).

– PRESS the "STORE ACTIVE F-PLN" key



HOW TO STORE THE SECONDARY FLIGHT PLAN

– SELECT the DATA key on MCDU

– PRESS the "STORED ROUTES" key

– PRESS the "NEW ROUTE" key

– ENTER the company route name (optional)

– PRESS the "STORE SECONDARY F-PLN" key

Note : 1. In either case, you may only store a company route if the active or secondary flight plan is complete from origin to destination.

R *2. If you do not enter a name, the FMGS automatically names the stored route as "SRTE 1 (or 2 or 3)" when it is stored.*

3. The system does not retain several elements of the flight plans, when they are stored :
- *Pilot-entered holds*
- *Offsets*
- *Pilot-entered constraints*
- *Modifications to a terminal procedure*
- *Pseudo waypoints*

When this happens, it displays "REVISIONS NOT STORED".

R *4. If three routes are already stored the system will reject a new entry and display*
R *"STORED ROUTES FULL" on the MCDU. Delete one stored route by clearing the CO RTE name before inserting a new one.*

FLIGHT PLAN INITIALIZATION THROUGH ACARS

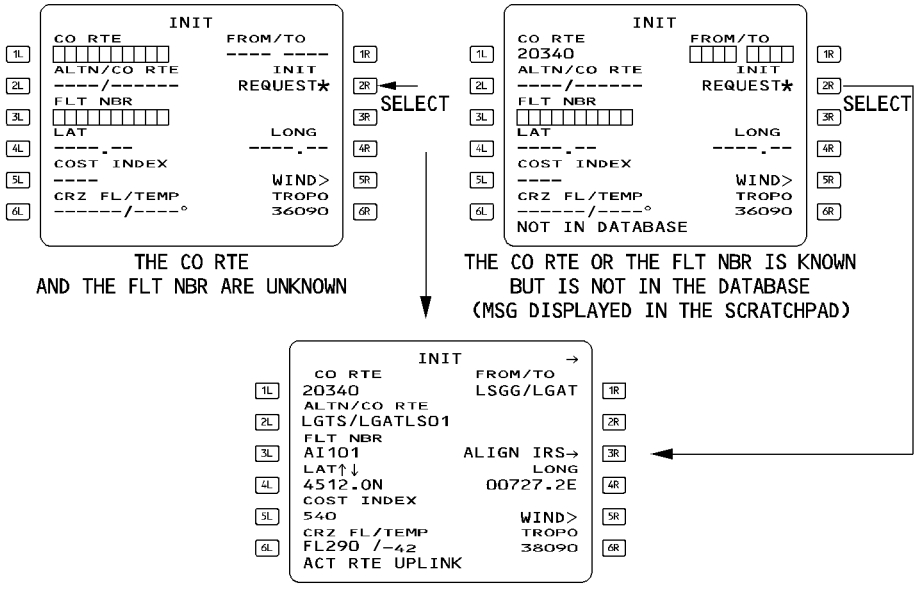
REQUEST FOR ACTIVE FLIGHT PLAN INITIALIZATION BEFORE ENGINE START

Before engine start, the pilot may request a route for the active flight plan. When the route is received, "ACT RTE UPLINK" message is displayed on the MCDU indicating that the flight plan has been received and automatically inserted.
After engine start, it is not possible to initialize directly the active flight plan since the received flight plan is automatically routed into the secondary, and the MDCU displays "SEC RTE UPLINK".

PROCEDURE

– **DEPRESS the INIT REQUEST * prompt.**
  – The start (*) disappears, all data fields are dashed except :
    · CO RTE, FLT NBR if previously displayed and
    · default values.

  The star is not displayed when the FMGS cannot communicate with the ACARS. No request can be sent.
  When an active flight plan exists, INIT REQUEST prompt is removed from the active INIT page and no request can be sent for the active flight plan. If a flight plan is entered manually after the request, the uplink message is routed to the secondary.



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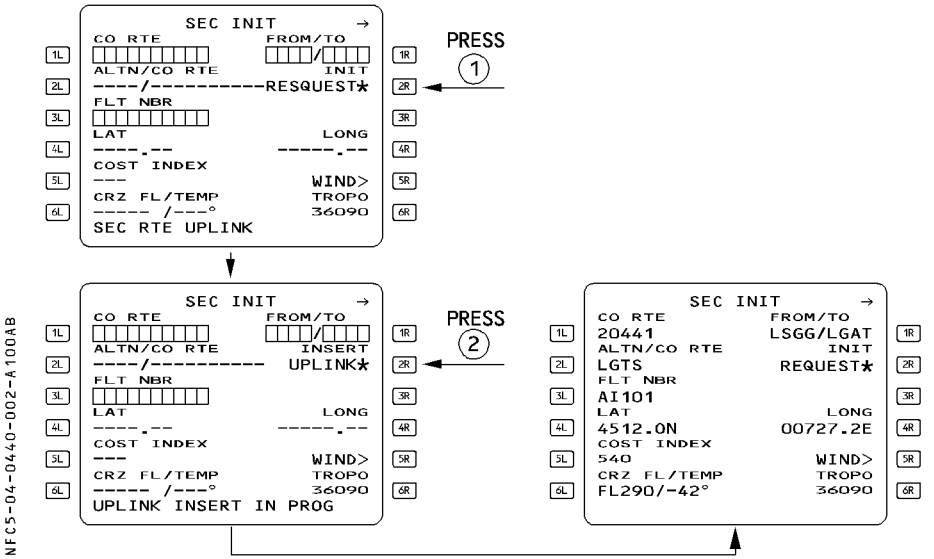
REQUEST FOR SECONDARY FLIGHT PLAN

A request for secondary flight plan can be initiated anytime. Any flight plan received after engine start is automatically routed into the secondary flight plan.
When the flight plan is received, a message "SEC RTE UPLINK" is displayed on the MCDU scratchpad. The secondary route is stored and not processed until it is inserted by the crew.

PROCEDURE TO INSERT OR REJECT A SECONDARY FLIGHT PLAN

When the uplink message is received, the INIT REQUEST prompt of INIT A page is replaced by INSERT UPLINK (2R field). Pressing the 2R key will insert the flight plan into the secondary. Clearing the prompt will reject it.
If a temporary flight plan or a DIR TO is in progress, the uplink insertion is not accepted until the temporary flight plan or the DIR TO is completed.



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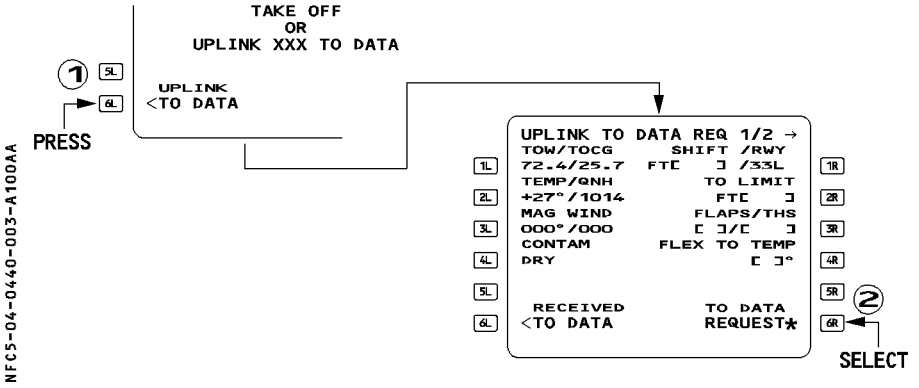
TAKEOFF DATA

The takeoff data may be requested in preflight or done phase for the active flight plan only. It is always associated with the active flight plan message.

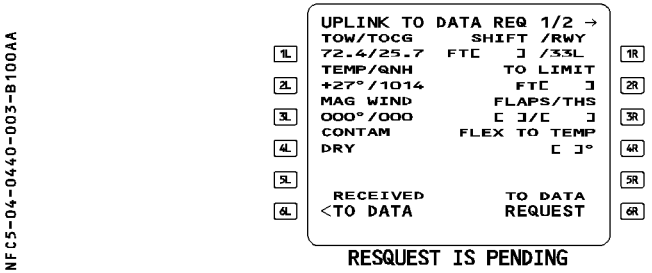
REQUEST FOR TAKEOFF DATA

In order to obtain takeoff data from the ground station :

- **SELECT UPLINK TO DATA [6L] key.**
- **SEND the request by pressing "TO DATA REQUEST" [6R] key.**

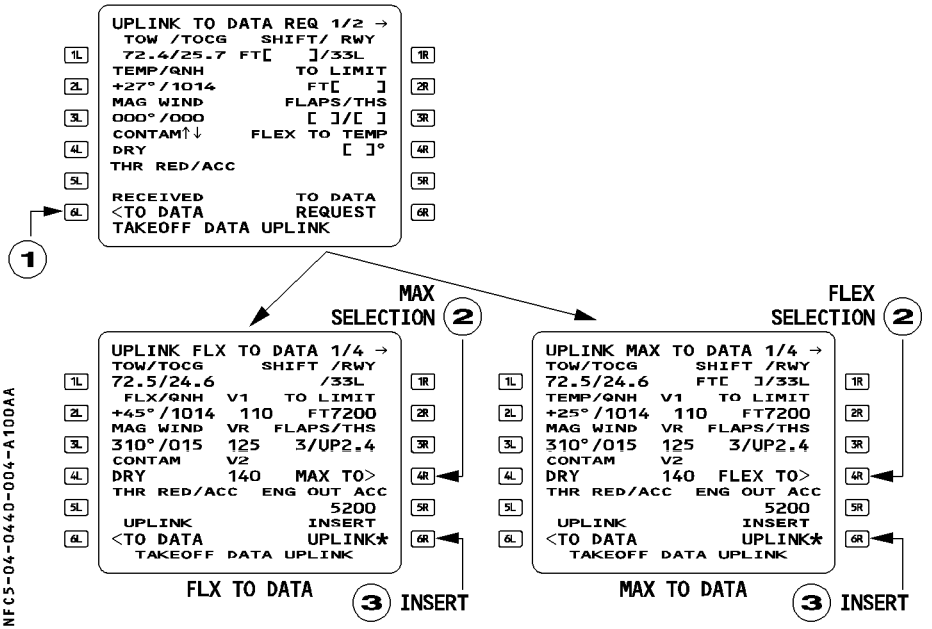


When TO DATA REQUEST is sent, data of the TO DATA REQ page are locked in and the star displayed on 6R field is removed.



PROCEDURE TO INSERT UPLINK TAKEOFF DATA

– PRESS the 6L key "RECEIVED TO DATA" when the message TAKEOFF DATA UPLINK is displayed.



This displays the uplink data on 2 different pages : UPLINK MAX TO DATA
UPLINK FLX TO DATA

– SELECT the data corresponding to the thrust to be used (MAX or FLEX) by pressing [4R]

– SELECT the active runway data by slewing the pages (1/4... 4/4).

– PRESS the [6R] key "INSERT UPLINK"

UPLINK MAX TO DATA and UPLINK FLX TO DATA pages are not modifiable.
If the takeoff data displayed on this page are not relevant to the active runway entered in the flight plan, the INSERT UPLINK prompt is not displayed.

When the takeoff data have been inserted, the PERF TO page is amended of the new data.

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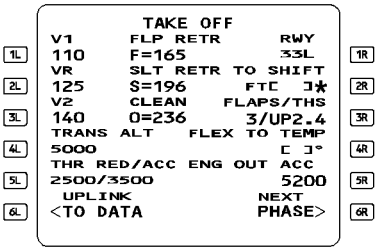
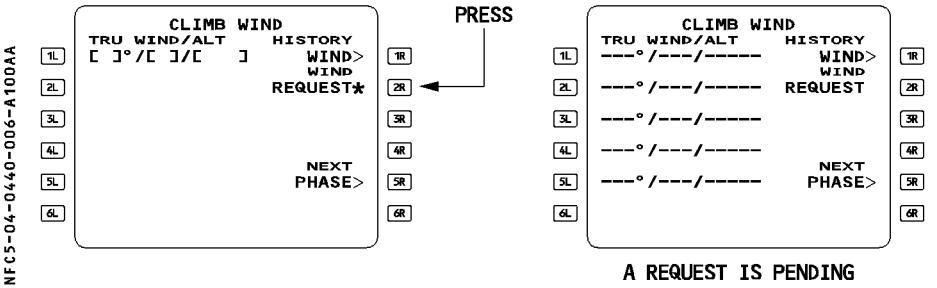


WIND DATA

REQUEST FOR WIND DATA

To send a wind request, press the "WIND REQUEST" selection key of any wind pages. This request is automatically sent to the ground for one or more flight phases and for the selected flight plan (primary or secondary). The content of the wind request message is not dependent on the selected wind page (CLIMB, CRUISE or DESCENT) but on the flight phase in progress.

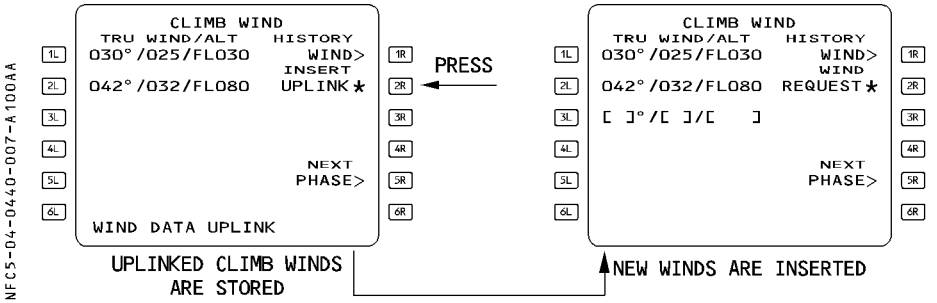
- For active flight plan or secondary flight plan that is a "COPY ACTIVE", a wind request sent by the crew :
  - * during preflight or takeoff phase, initiates a demand for climb, cruise, descent and alternate winds.
  - * during climb and cruise phase, initiates a demand for cruise, descent and alternate winds.
  - * during descent/approach and go around, no wind request is possible.
- For secondary flight plan that is not a "COPY ACTIVE" there is no restriction linked to flight phase.



When the amber star following the "WIND REQUEST" is not displayed, the FM is not able to communicate with the ACARS and the pilot cannot send any request. When a temporary flight plan is active or a DIR TO is selected, an uplink message cannot be displayed and the "WIND UPLINK PENDING" scratchpad message remains displayed until the action is completed.

PROCEDURE TO INSERT WIND DATA

When the uplink message is received, the 2R field is modified, amber "WIND REQUEST" is replaced by "INSERT UPLINK*" in blue color. This prompt, when pressed, enables the pilot to insert the uplink wind data, phase per phase.
To access, review, insert or delete the uplink wind data of other phases, the pilot uses "NEXT PHASE" or "PREV PHASE" key.
If the pilot is not satisfied with the uplink winds, he will delete the winds, phase per phase clearing the "INSERT UPLINK" prompt. This will delete all uplinked winds of the selected flight phase.



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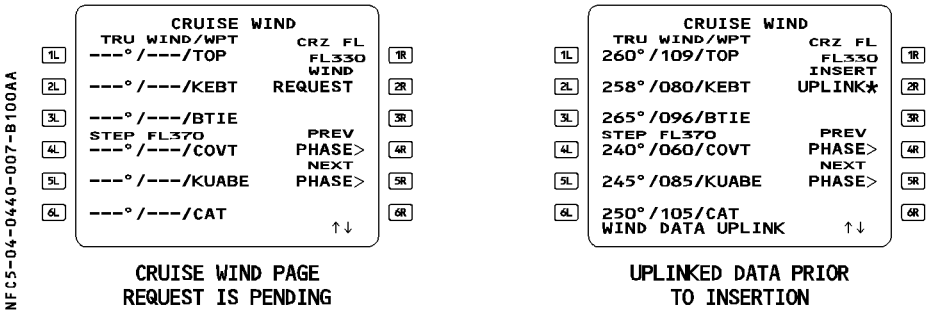
CLIMB WIND page

When a request is pending, the history WIND page cannot be accessed.
When the climb phase is active, the crew cannot request neither modify the climb winds of the active flight plan or secondary flight plan if it is a copy active.

CRUISE WIND page



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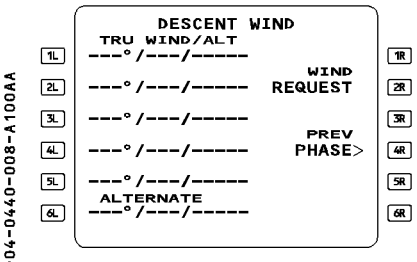
A wind request sent during cruise phase will apply for downpath waypoints of the cruise, descent, approach and alternate phases.

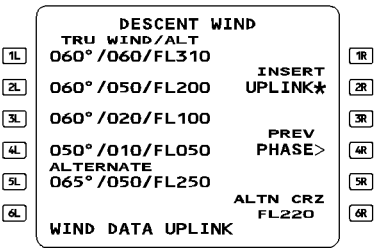
- If the uplink message contains more data and waypoints than the flight plan, the winds at extra waypoints are not considered and automatically discarded. This is transparent to the pilot.
- Clearing the INSERT UPLINK* prompt deletes all uplink wind data of the cruise phase. Cruise page reverts to the previous data.

DESCENT WIND page

The procedures to insert, review or delete descent winds during preflight, climb or cruise phase are described in the above wind general procedure.



DESCENT WIND PAGE
REQUEST IS PENDING



UPLINKED DATA
PRIOR TO INSERTION

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If the alternate wind is not available, dashes are displayed in the field.
In descent, approach or go around phases, the pilot cannot request or modify the descent winds of the active flight plan or secondary flight plan if it is a "COPY ACTIVE".

05.00 CONTENTS

05.05 INTRODUCTION

05.10 COCKPIT PREPARATION

05.15 BEFORE PUSH BACK OR START

05.20 TAXI

05.30 TAKEOFF

05.40 CLIMB

05.50 CRUISE

05.60 DESCENT

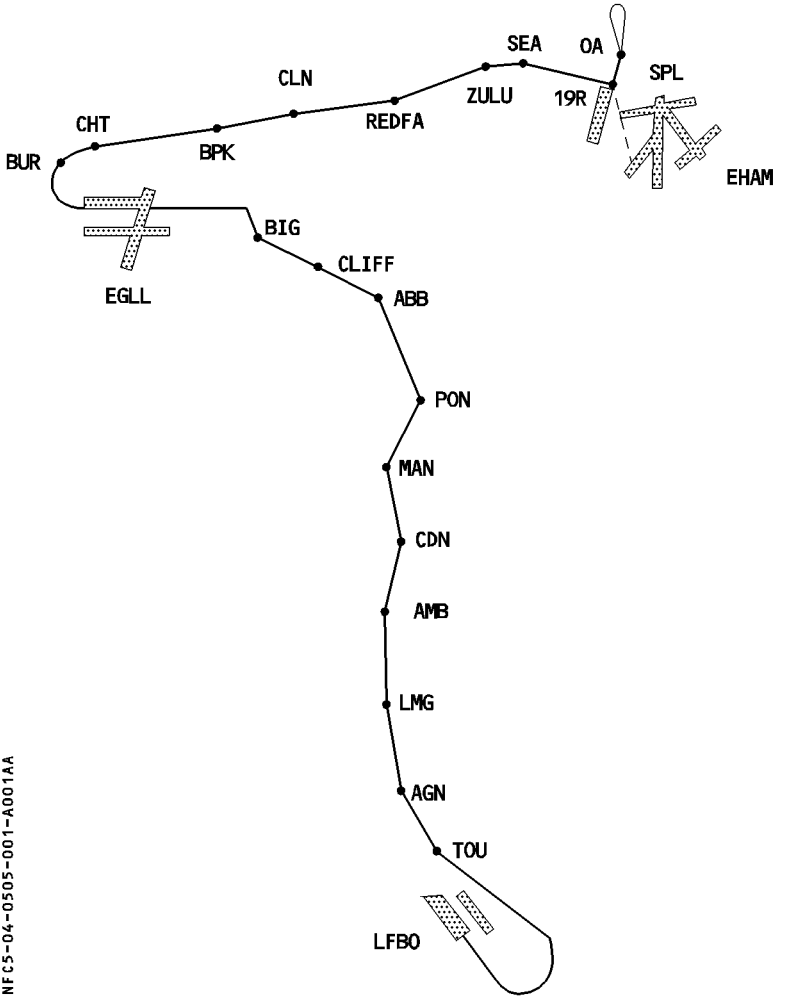
05.70 APPROACH

05.80 GO AROUND

INTRODUCTION

Note : This chapter is an amplification of the SOP. Anytime it was feasible, the same chapters and the same titles of paragraph were retained.

The following discussion of the FMGS uses this flight plan as an example.



NFC5-04-0505-001-A001AA

FMGS INITIALIZATION

CHECKING THE CLOCK DATE

— **CHECK the CLOCK DATE and ADJUST if necessary.**
If the date in the active database does not match the clock date, the MCDU displays "CHECK DATA BASE CYCLE". If this message appears, check the period of validity in the second database and select it, if required.

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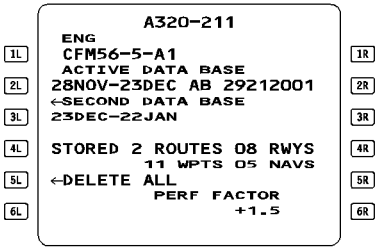


CAUTION

Cycling the database deletes the active and secondary flight plans. Do not cycle it while airborne because doing so will delete the flight plan, eliminate all speed predictions, and blank the ND. If the aircraft is in managed speed, Green Dot becomes the speed target.

CHECKING stored WAYPOINTS, NAVAIDS, RUNWAYS, or ROUTES

— **PRESS the DATA key.**

— **SELECT, successively, as required :**
· STORED WAYPOINT
· STORED NAVAIDS
· STORED RUNWAYS
· STORED ROUTES

— **CHECK the contents of each of these data storages and DELETE items, as appropriate.**

NAVAIDS DESELECTION

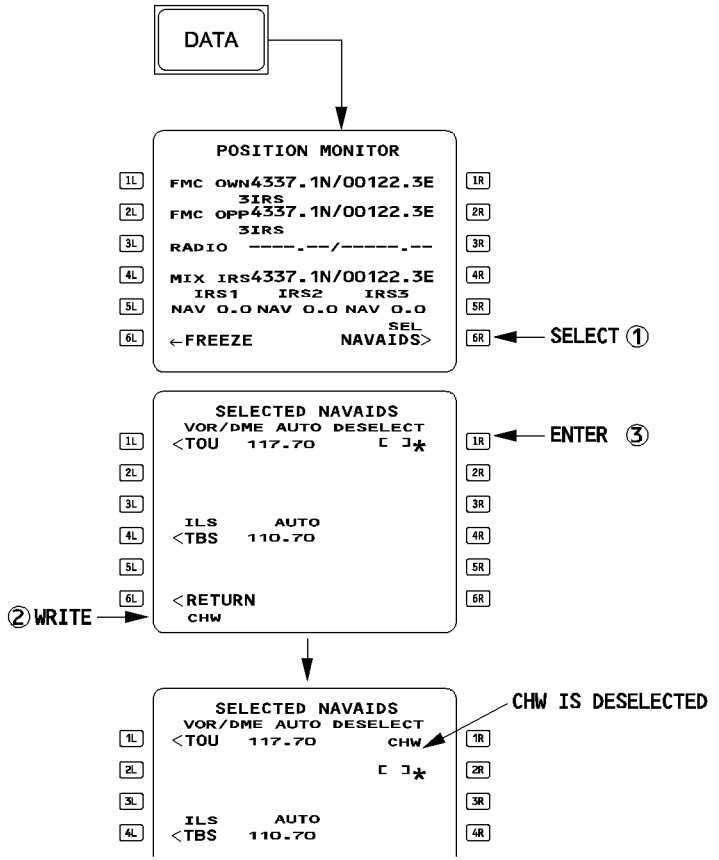
If NOTAMS indicate that selected navaids are unreliable or unserviceable, deselect them as follows :

– PRESS the DATA key

– SELECT the POSITION MONITOR page

– SELECT the SELECTED NAVAIDS page

– Under "DESELECT", INSERT the navaid identifier into the brackets.
The pilot can make only six deselections.



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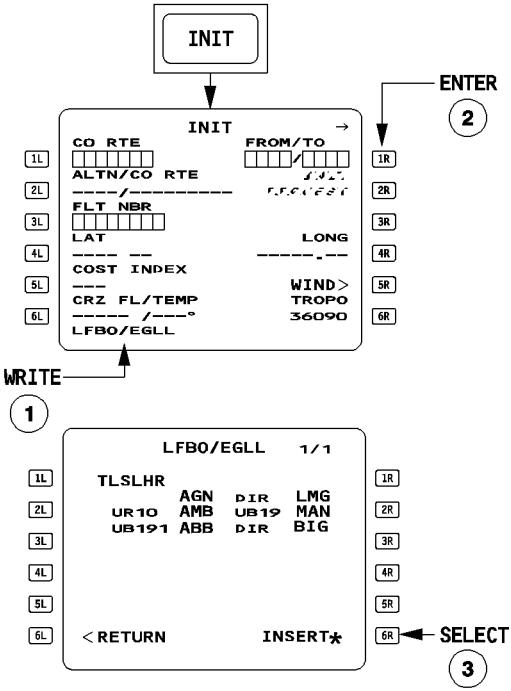
FLIGHT PLAN INITIALIZATION

– Follow SOP instructions when the route is a company route stored in the database.

● **If the company route is unknown, proceed as follows :**



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– **WRITE a "FROM/TO" city pair, then ENTER it**

– If one or more company routes run between the cities, the ROUTE SELECTION page appears and defines them.

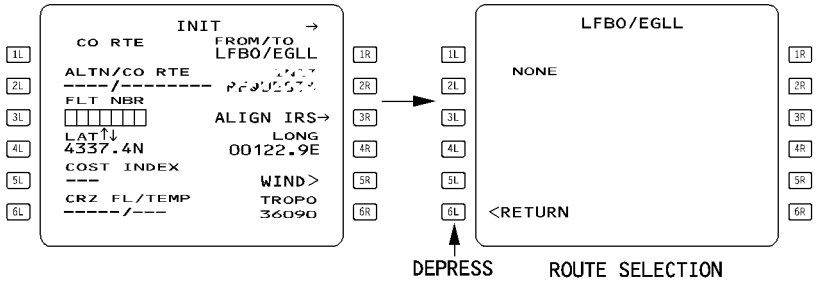
– **INSERT the preferred company route**

- **If the database does not contain a company route :**
  The flight plan must be constructed manually :

  – **PRESS the INIT key**

  – **ENTER a city pair in the FROM/TO field.**
  The ROUTE SELECTION page comes up with "NONE"

  – **SELECT RETURN [6L] key then construct the flight plan manually.**



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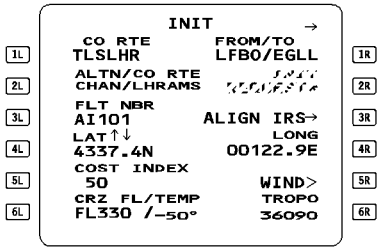
If waypoints, navaids or airports are not in the nav database, the pilot must define and store them manually, using the "data stored" function.

ALIGNING IRS

· The pilot can enter latitude with N or S preceding or following the value (for example, N4350.5 or 4350.5N), and longitude with E or W preceding or following the value (for example, E00364.5 or 364.5E, W11020.3 or 11020.3W).
Leading zeros may be omitted.



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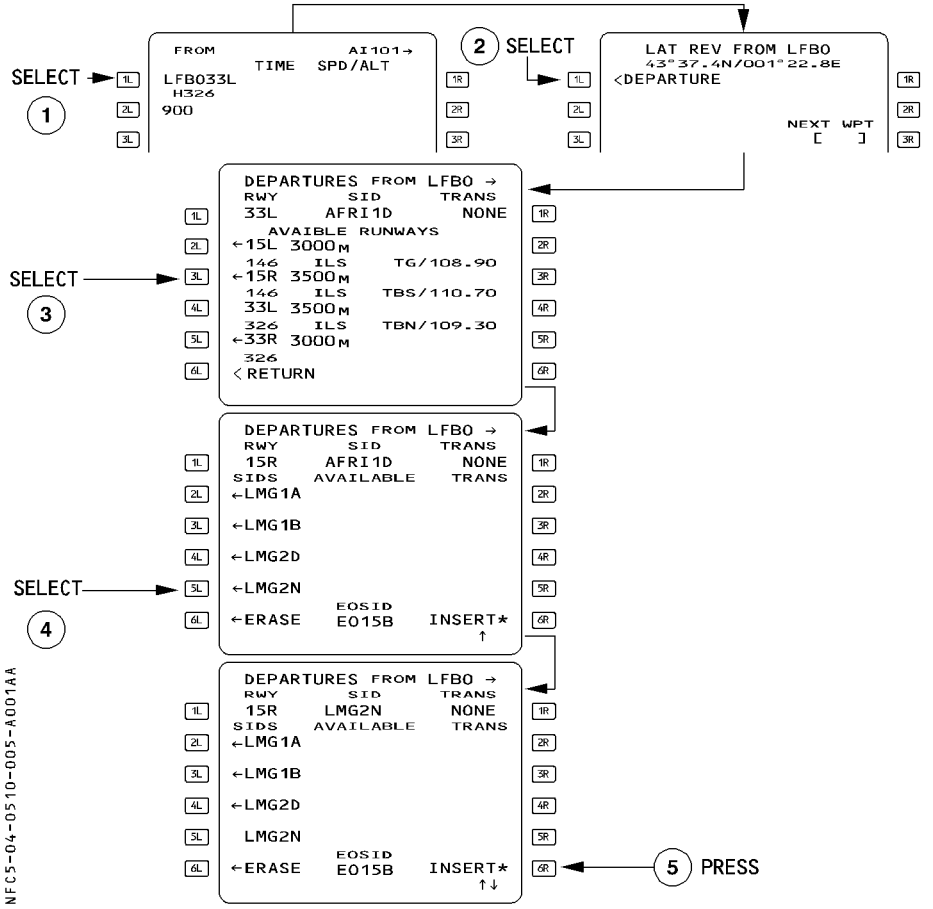
· If the airport reference point is modified after the completion of the alignment, the MCDU displays the message "RESET IRS TO NAV". During stop over, it should be considered as a reminder for a quick realignment.

- **If the "RESET IRS TO NAV" message comes up later :**
  - Check the latitude and longitude shown on the INIT A page against the position of the IRSs in NAV MODE on the Inertial System Display Unit (overhead panel).
  - If these positions differ, RESET the ADIRS CDU mode by switching the selector switches OFF and back to NAV within five seconds. (All three IRSs must be switched OFF and then all three switched to NAV.)

LATERAL FLIGHT PLAN

SELECTING A DEPARTURE



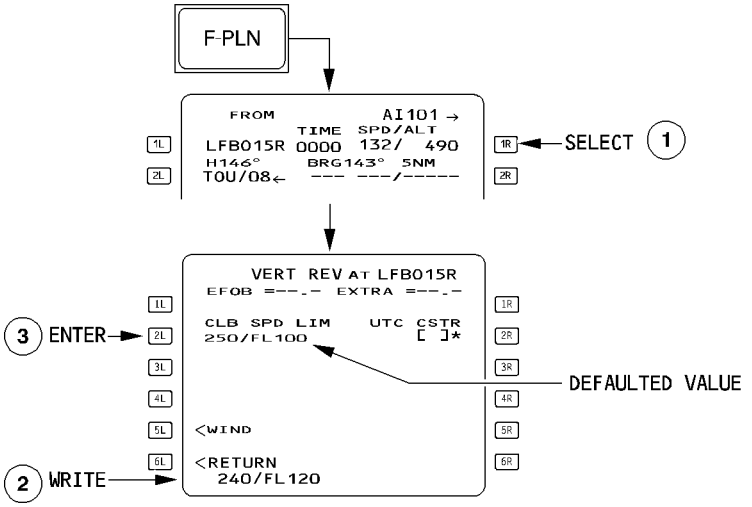
You may use the [NEXT PAGE] key to gain access to the listings of runways, SIDs, and transitions.

Procedure

- **PRESS the F-PLN key on MCDU**
- **SELECT the DEPARTURE prompt [1L] key**
- **SELECT the RWY in USE, SID and TRANS**
- **CHECK the resulting temporary F-PLN**
- **If it is correct, INSERT it using [6R] key.**
- **If it is not correct, ERASE it using [6L] key.**

VERTICAL FLIGHT PLAN

– ENTERING/MODIFYING A SPEED LIMIT



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– PRESS the F-PLN key on MCDU

– SELECT the VERTICAL REVISION at FROM waypoint

– WRITE a new speed limit/altitude and ENTER.

The pilot can insert one climb speed limit and one descent speed limit into the vertical flight plan, or modify or clear the limits that are already in it.

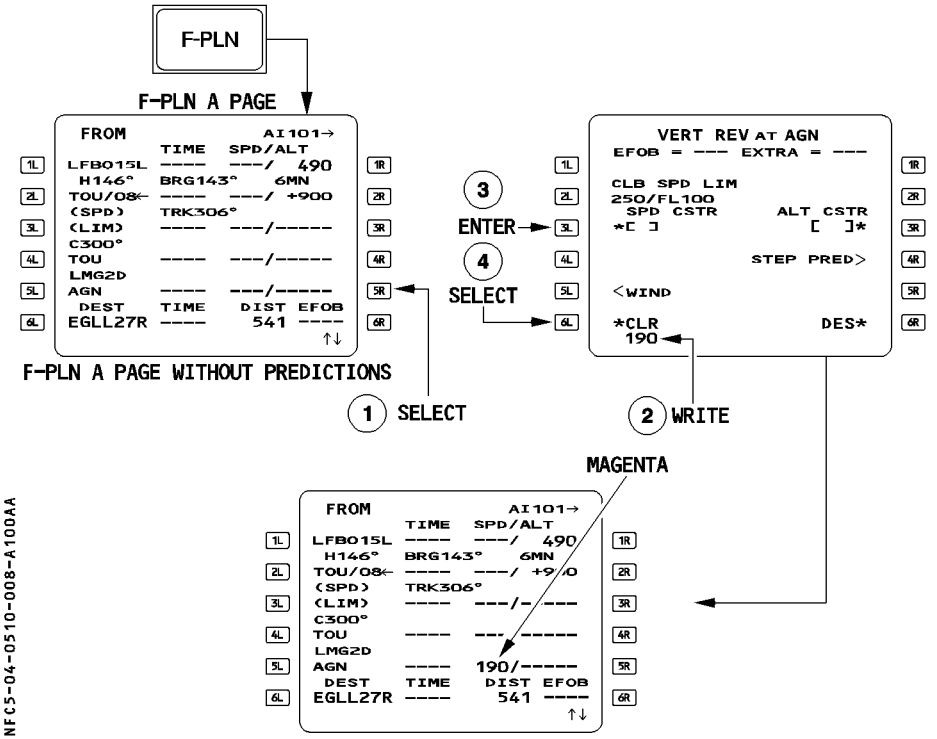
The speed limit is defined by a speed and an altitude (for example, 230/9000), which means that the managed speed target will be limited by the speed limit when the aircraft flies below the specified altitude.

250 knots at 10,000 feet is the default speed limit in the vertical flight plan in both climb and descent. The vertical revision page presents the climb speed (CLB SPD) limit if the revised waypoint belongs to a SID or is between departure and top of climb.

The vertical revision page shows the descent speed (DES SPD) limit if the revised waypoint belongs to a standard terminal arrival route (STAR) or is between top of descent and destination.

It can be deleted by a clear action, field reverts to brackets. It can also be cleared directly on the F-PLN A page by clearing the SPD LIM pseudo waypoint.

ENTERING A SPEED CONSTRAINT



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Procedure

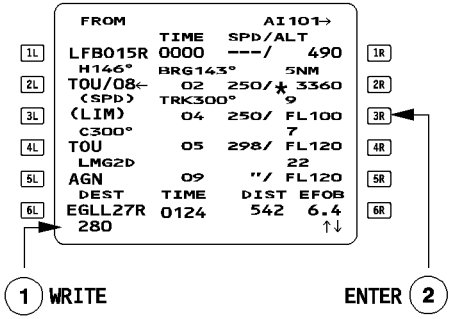
- **PRESS the F-PLN key on MCDU**
- **SELECT the VERT REV page at revised waypoint**
- **WRITE the speed constraint value into the scratchpad and ENTER it in 3L.**
- **INSERT the constraint using the appropriate *CLB or DES* prompt when displayed. If CLB and DES are not displayed, insertion occurs when the value is entered in 3L.** The system displays the climb (CLB) or the descent (DES) prompt at [6L] or [6R] when the predictions are not yet available or when the waypoint is part of the cruise phase as originally defined.

When predictions are not yet available, the constraints are displayed on the F-PLN A page in magenta.
When predictions are available, the speed constraint is highlighted by a star (*).
* If the predicted speed matches the constraint, the star is magenta.
* If the prediction is that the aircraft will miss the speed constraint, the star is amber.
If a speed constraint cannot be met (by more than 10 kt), the FMGS generates the message "SPD ERROR AT WPT XX".

A speed constraint may be assigned to any waypoint in the climb or the descent phase except the FROM, origin, or destination waypoints, and any pseudo waypoint.
When a speed constraint is assigned to a waypoint, the constraint will limit the managed speed target as follows :
— In takeoff or climb phase until you pass the constrained waypoint.
— In descent an approach phase, after passing the constrained waypoint.
Speed constraints are observed by the FMGS when NAV mode and speed managed are active.

ENTERING A SPEED CONSTRAINT THROUGH F-PLN A PAGE

You may also enter a speed constraint through the F-PLN A page.



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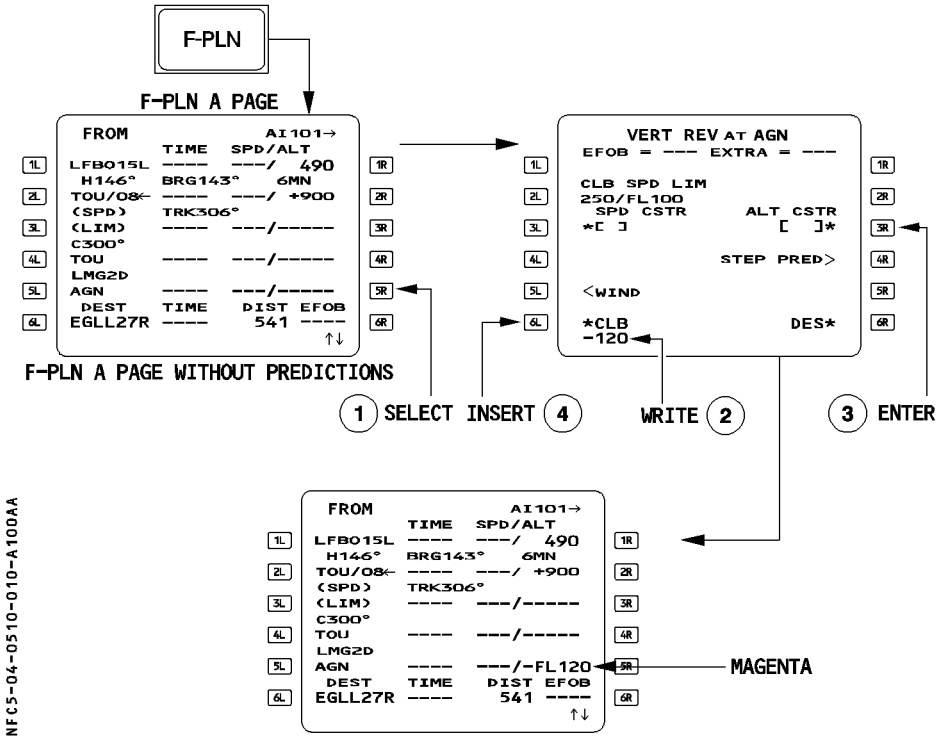
Note : You may delete the constraint using the clear key on the relevant right hand key. However if there is an altitude constraint assigned at that point, the clear action deletes it too.

ENTERING AN ALTITUDE CONSTRAINT



Procedure

- **PRESS the F-PLN key on MCDU**
- **SELECT the "VERT REV" page at the revised waypoint**
- **WRITE an altitude constraint into the scratchpad and ENTER it in 3R**
- **INSERT the constraint using *CLB or DES* prompt when it is displayed. Otherwise the value is inserted when it is entered in 3L field.**
  The system displays the *CLB or DES* prompt when the predictions are not yet available or when the waypoint is part of the cruise phase as originally defined.

R *Note : In case of QFE operations, the height constraints must be converted and entered*
R *as an altitude in feet.*

You or the database may assign an altitude constraint to any waypoint in the climb or descent phases except the FROM, origin, or destination waypoints, or any pseudo waypoint.
An altitude constraint may be defined as an "at", an "at or above", or an "at or below" constraint. In certain procedures, the database may define an altitude constraint as a window in which the aircraft should fly.

– Enter "AT" constraints with no sign.

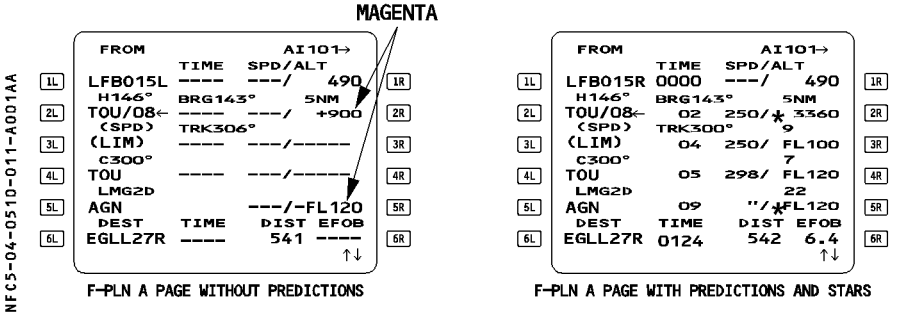
– Enter "AT or ABOVE" constraints preceded by a + sign (+FL 130, for example).

– Enter "AT or BELOW" constraints preceded by a – sign (–15000, for example).

– enter four or five-digit number when entering altitude. Include the lead zero (0500 feet, for example).
For flight level, enter a two- or three-digit number, with or without the letters "FL". The lead zero is optional. (Examples : + FL120 or +120 ; –FL090 or –90 or –090)

– Enter the altitude value as either altitude or flight level ; the MCDU displays the selected value as an "ALT" or "FL," as appropriate for the transition altitude.
The constraint must be higher than the thrust reduction altitude and lower than the cruise flight level.
Once inserted in the flight plan, the altitude constraint (ALT CSTR) is displayed in magenta as long as predictions are not available.
When predictions are available, the altitude constraints are replaced by the predicted altitude at relevant waypoints highlighted by a star.

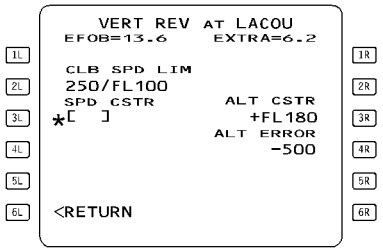
* If the predicted altitude matches the constraint the star is magenta. If the predicted altitude is missed (by more than 250 ft), the star is amber.



NFC5-04-0510-011-A001AA

The vertical revision page displays "ALT ERROR", along with the difference between the constraint and the predicted altitude at the revised waypoint.

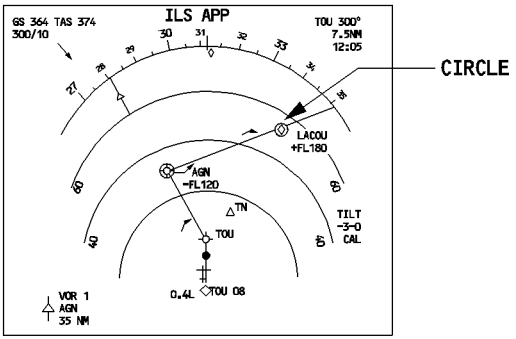
NFC5-04-0510-012-A001AA



ND display

An altitude-constrained waypoint is marked by a circle (○) on the navigation display.
This circle is white when the guidance does not take the altitude constraint into account.
It is magenta if the guidance system takes the altitude constraint into account and predicts that it will be matched.
It is amber if the guidance system takes the altitude constraint into account and predicts that it will not be matched.

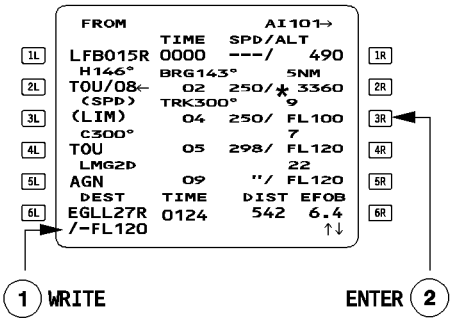
NFC5-04-0510-012-B001AA



The aircraft should be at or below FL120 at AGN and above FL 180 at LACOU.

Entering an altitude constraint through F-PLN A page

The pilot may also enter an altitude constraint directly through the F-PLN A page.
When entering the value into the scratchpad do not forget the slash e.g. /–120 or /–FL 120.
If the slash is omitted the value will be considered as a speed constraint if it is within the range value.

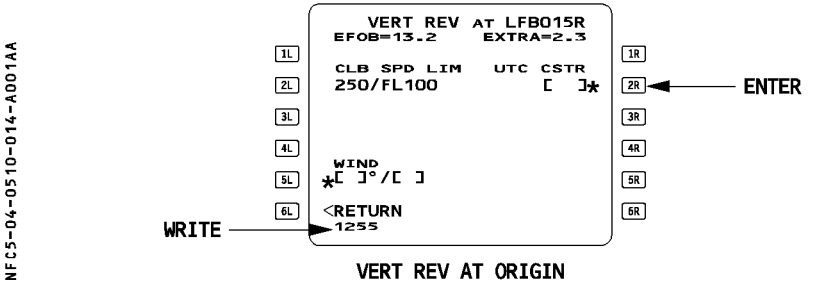


NFC5-04-0510-013-A001AA

Use CLR to delete them directly from the flight plan page, as well. However, if there is also a speed constraint assigned at that waypoint, the clear action deletes it too.

ENTERING AN ESTIMATED TIME OF TAKEOFF

The estimated takeoff time (ETT) is a time entered during preflight at the origin airport. The computer then uses this time as the start time for predictions. The system accepts it during the preflight phase if the ETT is later than the time at which you enter it.



VERT REV AT ORIGIN

Procedure

– PRESS the F-PLN key

R **– SELECT the VERT REV page at departure.**

R **– WRITE the estimated takeoff time into the scratchpad and ENTER it in 2R.**

The display reverts automatically to F-PLN A page.

If the aircraft has not taken off by the time entered as estimated takeoff time, the MCDU displays the message "CLK IS TAKE OFF TIME", meaning that the system will replace your estimated takeoff time with the actual time.

When beginning takeoff roll, the system automatically adopts that clock time as the takeoff time.

If the origin airport is changed or the clock time is not valid, the system automatically deletes the estimated takeoff time.

FLIGHT PLAN CHECK

· CHECK the EOSID on the ND plan mode (yellow line).

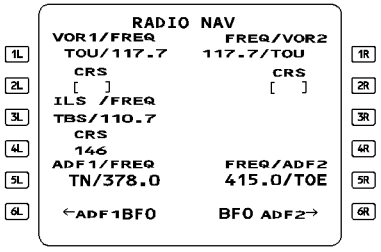
Note : If the details of the EOSID require review, select the EOSID as a TMPY F-PLN and review it as TMPY. Then ERASE it.

SECONDARY F-PLN

Refer to 4.04.30 for details.

RADIO NAV

Whenever a navaid ident is correctly decoded, in agreement with that published, no audio check is necessary.
Morse decoding is displayed on the ND for VOR/DME, VOR/TAC, DME, ADF, and on the PFD for ILS.
Preferably use the identifier for navaid entry.
If the ADF ident is not in the database, be sure to include a decimal point when tuning the frequency (e.g 315. or 325.7).



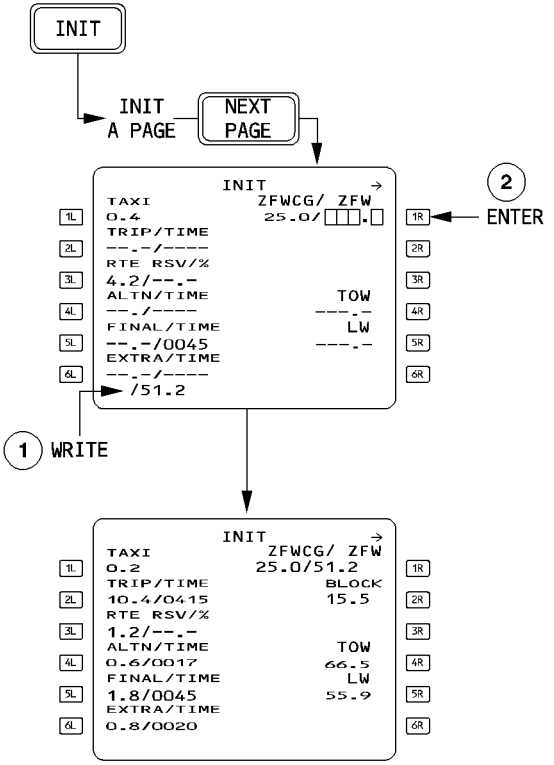
NFC5-04-0510-015-A001AA

R *Note : Whenever, the runway ILS is intented to be retained for guidance after the takeoff*
R *phase, it is recommended to manually tune the ILS by its identifier.*

FMGS DATA INSERTION

GROSS WEIGHT INSERTION

The flight system must have a number for aircraft gross weight (GW) in order to perform all the performance computations.



NFC5-04-0510-016-A001AA

Procedure

- **CHECK/MODIFY the ZFWCG**
- **ENTER a ZFW**
- **ENTER a BLOCK FUEL**

– CHECK/MODIFY the TAXI FUEL.

– CHECK/MODIFY the RTE RSV.

– CHECK/MODIFY the FINAL/TIME.

R *Note : – As long as the final loadsheet is not available, the crew may insert the*
R *estimated ZFW/ZFWCG in order to get fuel, time, and altitude estimates.*
R *The ZFWCG and ZFW must be updated with the final loadsheet.*
R *– Insert the ZFWCG/ZFW/BLOCK fuel preferably after F-PLN completion. If*
R *inserted before F-PLN completion, the FMGC automatically recomputes the*
R *predictions at each F-PLN change, including weight or wind changes. Thus,*
R *F-PLN completion takes more time than normal.*

TAKEOFF WITH NO GROSS WEIGHT (GW) ENTRY

– If a GW is not entered, or if the FMGS loses the number because of a power interruption, managed speed will only be available for the takeoff phase, and, then, only if V2 has been inserted.
After engine start, the MCDU displays "INITIALIZE WEIGHTS".
If the pilot does not respond, the following occurs :
– At takeoff, the speed reference system (SRS) mode remains active until the aircraft reaches acceleration altitude (ACC ALT), or engages another vertical mode.
– When the aircraft leaves the SRS mode, the target speed becomes the current speed and is no longer managed.

Note : If the AP/FD has reverted to ALT or V/S or FPA, the associated A/THR mode is SPEED. In that case, the system will probably reduce thrust, because the speed will be equal to or greater than the target speed.

● **To regain a normal speed target, the pilot must :**

– SELECT the appropriate climb speed on the FCU and PULL out the knob.

– INSERT fuel on board (FOB), if necessary, and GW on the FUEL PRED page.

– PRESS the SPD pushbutton on the FCU to get a managed speed target.

R **INSERTING GW AND CG AFTER ENGINE START**

R The pilot must enter the ZFW and ZFWCG on the INIT B page before engine start. If this
R is not done, the pilot can enter the GW and CG after engine start on the FUEL PRED page.

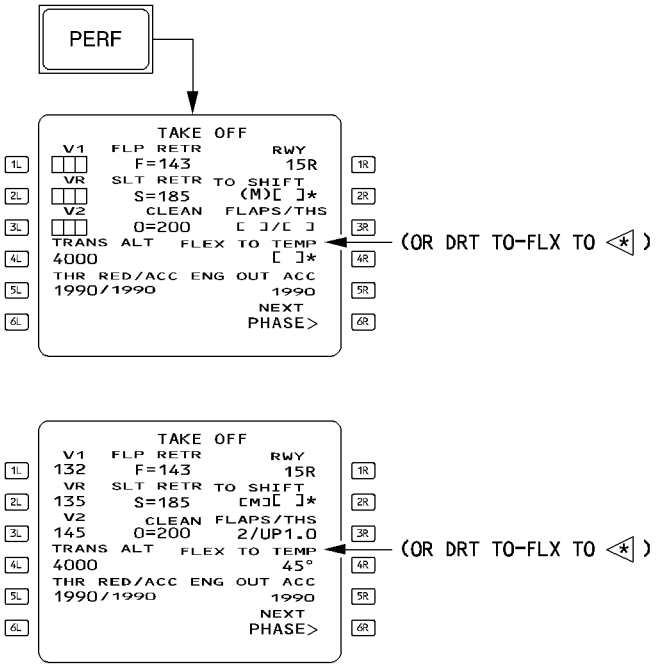
R **– ACCESS to the FUEL PRED PAGE.**

R **– INSERT the GW and CG. This allows performance computation.**

R **– MODIFY if necessary the CG. The CG is defaulted to 25 %.**

TAKEOFF DATA INSERTION

R



NFC5-04-0510-019-A001AB

Procedure

- **PRESS the PERF key on the MCDU.**
- **WRITE successively and ENTER : V1, VR, V2.**

R

- **WRITE successively and ENTER T.O. SHIFT and FLX TEMP or DRT TO ✱**
  (see procedure next page)
- **CHECK/MODIFY the THR RED ALT* (Thrust reduction altitude).**
- **CHECK/MODIFY the ACC ALT* (acceleration altitude).**
- **CHECK/MODIFY the ENG OUT ACC* (engine out acceleration altitude).**
- **CHECK/MODIFY the TRANS ALT* (transition altitude)**
- **CHECK V1, V2 on PFD ****

* Altitudes less than 400 feet above airfield elevation cannot be selected.

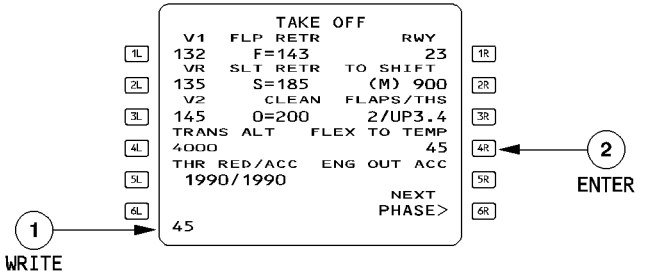
** If the PFD does not display V2 at the top of its speed scale, check that at least one FD is ON.

R ENTERING A FLEX TEMPERATURE

R — **WRITE the desired flex temperature in the scratchpad and ENTER it in [4R].**

R — **CHECK the thrust limit mode and N1 rating limit on ECAM.**

R

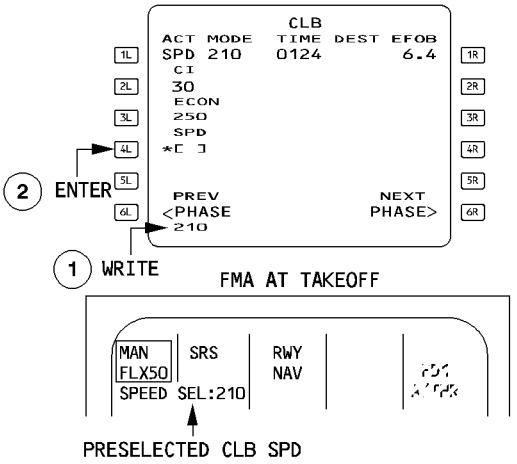


NFC5-04-0510-020-A001AA

CLIMB SPEED PRESELECTION

If the managed speeds for the initial climb are not suitable, the pilot can preselect an appropriate climb speed on the "PERF CLB" page, as long as the climb phase is not active.
The CLB SPD preselection applies when :

- ATC specifies an initial climb speed.
- The initial climb speed must be lower than normal because :
  - There are to be turns greater than 120° in the initial climb out.
  - Obstacle clearance, or some other situation, requires a high climb angle.
  - The airfield has a risk area to be quickly cleared (birds reported, for example).



NFCS-04-0510-021-A100AA

Procedure

— PRESS the PERF key on the MCDU.

R The PERF TAKEOFF page is displayed.

R **— SELECT the "NEXT PHASE" [6R] key to display the CLB page.**

— WRITE a climb speed and ENTER it.

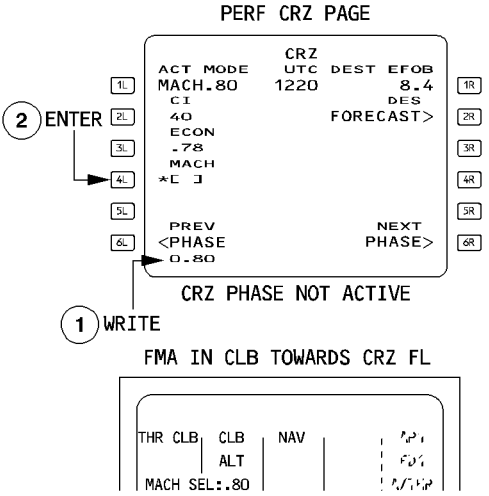
— To revert to managed speed, select ECON by pressing [3L].

When the aircraft is transitioning into the climb phase, the preselected value becomes the target speed :

- The selected speed target is active.
- The primary flight display shows the target speed in blue.
- The FCU's speed window displays the new speed or Mach number.

CRUISE MACH (SPEED) PRESELECTION

The pilot preselects a cruise Mach when a Mach number other than the ECON cruise Mach number is required.
When the aircraft transitions to the cruise phase, the speed target symbol goes to the preselected value and MACH (or SPD) becomes selected (blue target on PFD, target MACH shown in the speed/Mach window of the FCU).



NFCS-04-0510-022-A100AA

Procedure

– **PRESS the PERF key on the MCDU.**

R – **PRESS the "NEXT PHASE" [6R] key on the MCDU, until the CRZ page is accessed.**

– **WRITE a cruise Mach (or speed) in the scratchpad and ENTER it in [4L].**

– **To revert to managed speed, PRESS [3L].**
When the cruise phase is active, you cannot preselect a cruise Mach or speed.

ENTERING A HEADING/TRACK PRESET FUNCTION

The heading/track preset allows the pilot to preset a takeoff or go-around heading or track before commanding the aircraft to take up that heading or track (manual activation).
The flight crew can enter a heading or a track preset while the aircraft is on the ground and until takeoff.

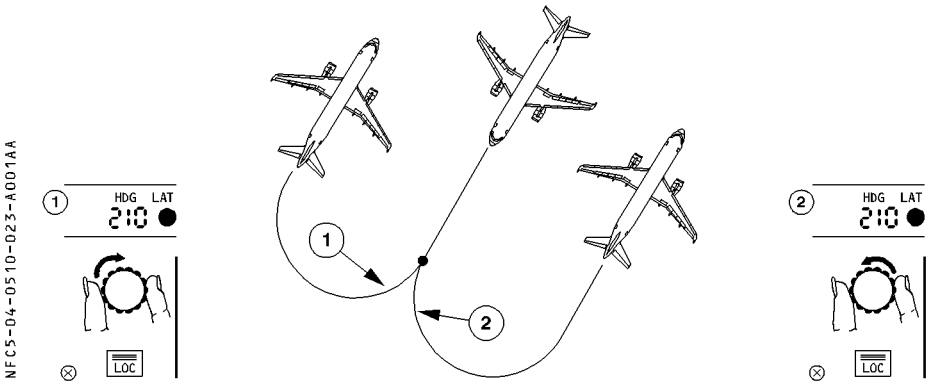
Procedure

Before takeoff :

– **SET the appropriate HDG or TRK in the FCU window.**
This disarms the navigation mode and allows the runway mode to remain engaged after takeoff.

After takeoff :

– **PULL HDG/TRK selector knob.**
The heading or track mode engages on the preset value.

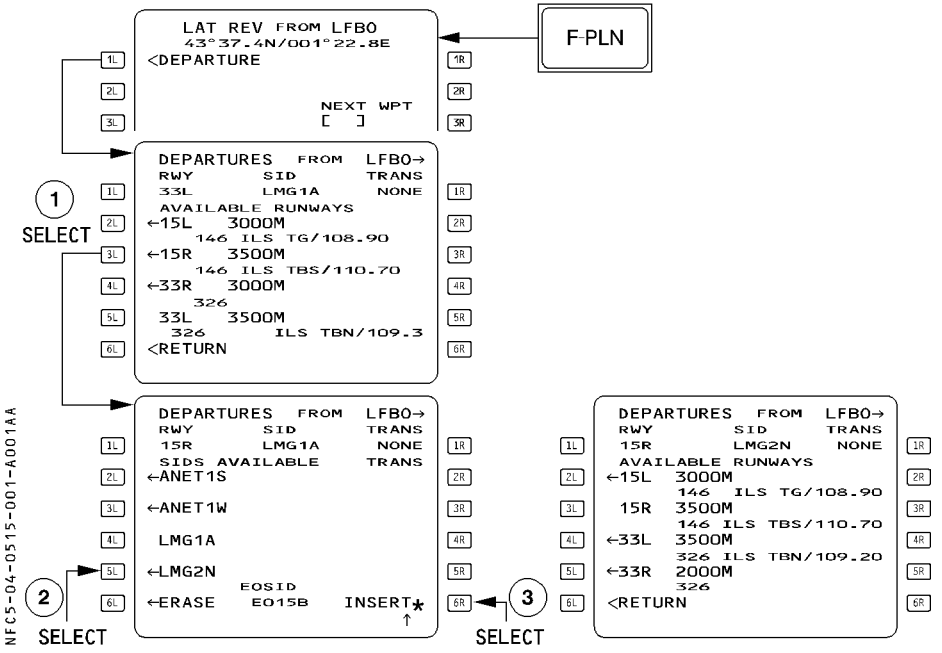


The direction in which the pilot rotates the HDG/TRK selection knob usually determines the direction of the turn. A left rotation (decreasing heading) produces a left turn ; a right rotation produces a right turn.
However, when a heading has been preset before takeoff or go-around, the direction of the turn will be such as to cause the shortest turn at the moment of engagement.

CANCELLING THE HEADING/TRACK PRESET FUNCTION

The pilot can cancel the heading preset by pushing the HDG/TRK selector knob back in again. This engages or arms the NAV mode.

CHANGE OF RUNWAY



– **PRESS the F-PLN key on MCDU**

– **SELECT the LAT REV page at origin**

– **SELECT the DEPARTURE prompt [1L]**

– **SELECT the new RWY in use**

– **SELECT the appropriate SID and TRANS.**

– **CHECK the resulting temporary F-PLN and INSERT it.**

R – **ENTER the new V1, VR, V2, FLX TO TEMP (or derated thrust if installed) and**
R **CONFIGURATION as appropriate.**

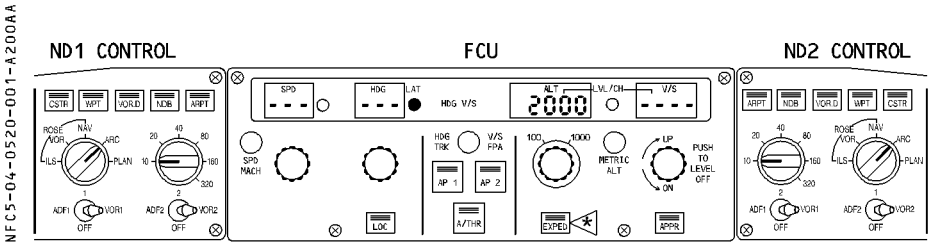
Note : If the previously selected SID is compatible with the new runway, it appears automatically in the temporary flight plan. Any revision the pilot may have made to the previous SID will not be transferred.
If the pilot still wants it, he has to reenter it.

TAKEOFF FROM INTERSECTION

- **Use RTOW or FCOM to revise takeoff parameters :**
- **PRESS the [PERF] key on MCDU**
- **ENTER the takeoff shift**
- **ENTER the new V1, VR, V2, FLX TEMP, or CONF, as appropriate**

Note : The insertion of the shift in takeoff position permits the system to make an accurate revision to its navigation data at takeoff.

FCU SELECTION FOR TAKEOFF

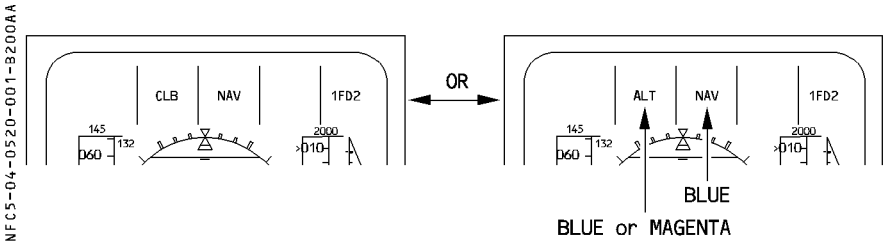


Procedure

- **ENSURE that HDG – V/S modes are selected (change over pb).**
- **CONFIRM or SELECT the first cleared altitude**
- **CROSS CHECK on PFD the target altitude**
- **CONFIRM both FDs ON**

FMA MODE CHECK

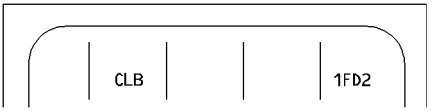
- **CHECK that the FMA CLB (or ALT) mode is armed**



Note : ALT (in blue or magenta) may be displayed instead of CLB if the FCU altitude or a constraint is set at or below the acceleration altitude.

If a HDG/TRK was preset, NAV is disarmed.

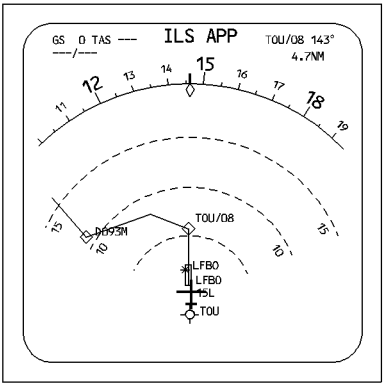
NFC5-04-0520-002-A100AA



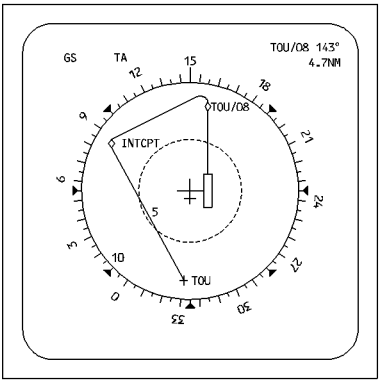
R SELECTING A NAVIGATION DISPLAY

R SET the minimum range to display the first waypoint after departure or as required for
R weather radar.

NFC5-04-0520-002-B100AA



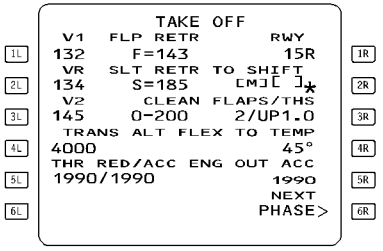
ARC mode
FOR DEPARTURE IN GENERAL DIRECTION
OF RUNWAY HEADING



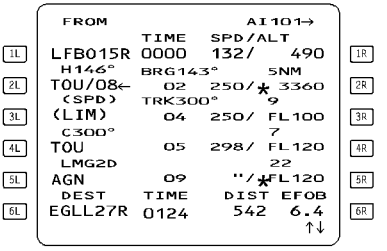
Rose NAV mode
FOR DEPARTURE IN DIRECTION OPPOSITE
TO THAT OF RUNWAY HEADING

R SELECTING TAKEOFF DISPLAYS FOR PILOT'S AND COPILOT'S MCDU

NFC5-04-0520-002-C100AA



PF SELECTS PERF T.O. PAGE



PNF SELECTS F-PLN A PAGE

MONITORING THE TAKEOFF

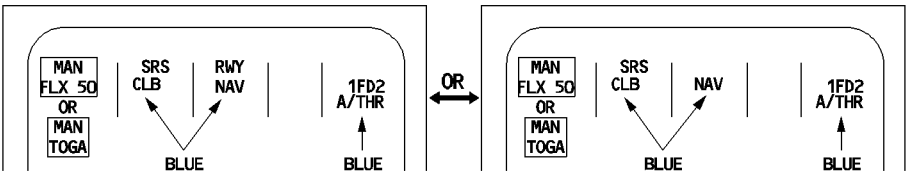
- **At power set (thrust levers in FLX or TOGA position)**

  – **CHECK that the navigation is updated to the runway threshold by verifying that the aircraft symbol is centered on the runway threshold of the navigation display.**

  – **CHECK the FMA for appropriate mode selection**

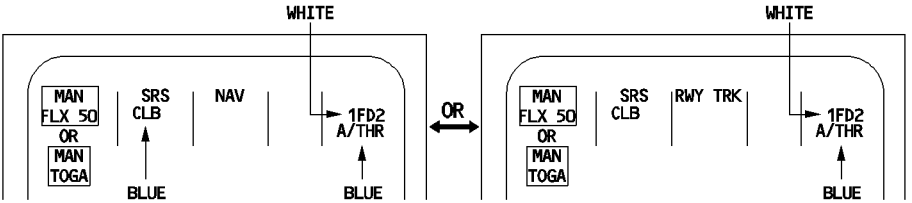
  Note : RWY mode appears if an ILS is tuned to a station corresponding to the departure runway. Otherwise no lateral mode comes up until the aircraft has lifted off.

NFC5-04-0530-001-A120AB



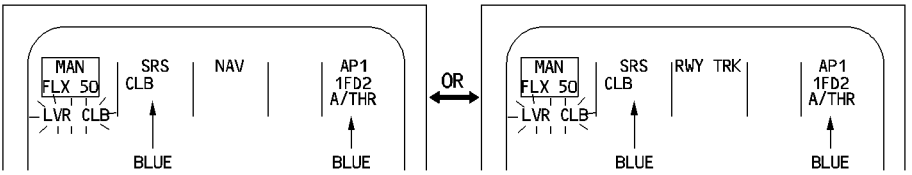
- **At 30 feet**
  - If NAV is armed, it engages automatically.
  - If NAV is not armed, RWY TRK mode engages and remains displayed until the crew selects another lateral mode.

NCF5-04-0530-001-B120AB



- **At 100 feet**
  You may engage AP1 or AP2.
  The FMGS has an internal delay that prevents the AP to be engaged during 5 seconds after lift-off.
- **At thrust reduction altitude**
  "LVR CLB" flashes in the first column of the FMA

NFC5-04-0530-002-A120AB



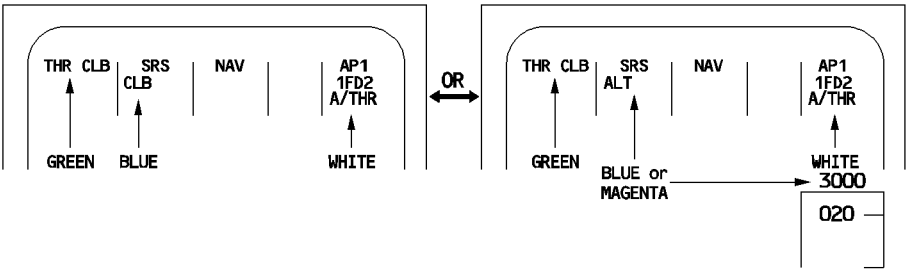
Procedure

– **SET the thrust levers to the CL detent**
A/THR activates automatically

– **CHECK that A/THR turns to white in the 5th FMA column.**

– **CHECK that THR CLB appears in green in the first column.**

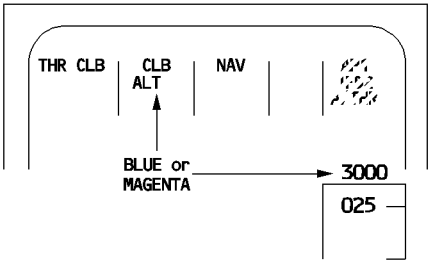
NFC5-04-0530-002-B120AA



Depending on the next level off altitude, CLB or ALT is armed and displayed in the second column.
ALT is armed :
– in blue if the next predicted level-off is the FCU-selected altitude (target altitude blue at the top of the ALT scale)
– in magenta if the next predicted level-off is an ALT CSTR (target altitude magenta at the top of the ALT scale)

● **At acceleration altitude**

The vertical phase automatically switches to climb.
CLB mode engages. The target speed jumps to initial climb speed on the PFD.



NFC5-04-0530-003-A100AA

Procedure

– CHECK that "CLB" appears in green in the second FMA column.

- The speed reference system (SRS) mode remains engaged until CLB phase is engaged, which occurs at ACCEL ALT or at any other vertical mode engagement, whichever comes first.
- If during takeoff the FCU altitude is set below the current aircraft altitude, the system ignores the FCU altitude and the aircraft remains in SRS mode until the pilot selects an altitude above the aircraft altitude or engages any other mode.

R **PRESELECTING A HDG OR A TRK**

Procedure

● **If a HDG or a TRK was preselected on the ground :**

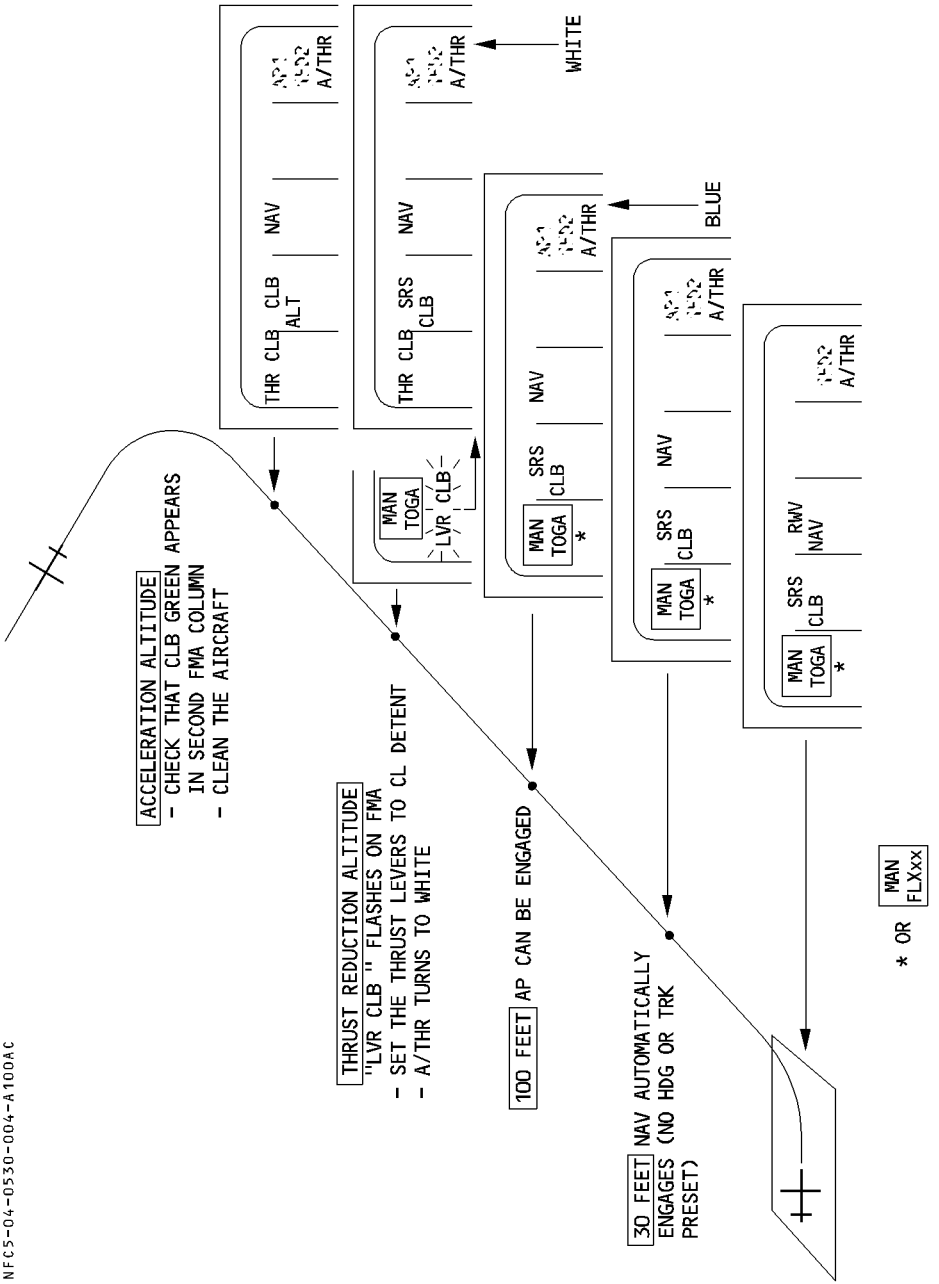
– PULL OUT the HDG/TRK selector knob when required

– CHECK that the HDG/TRK mode is active and displayed on the FMA

When a HDG or TRK is preset, OP CLB mode will engage at the acceleration altitude. (CLB mode is not available in HDG/TRK mode).

NORMAL TAKEOFF PROFILE

R



NFCS-04-0530-004-A100AC

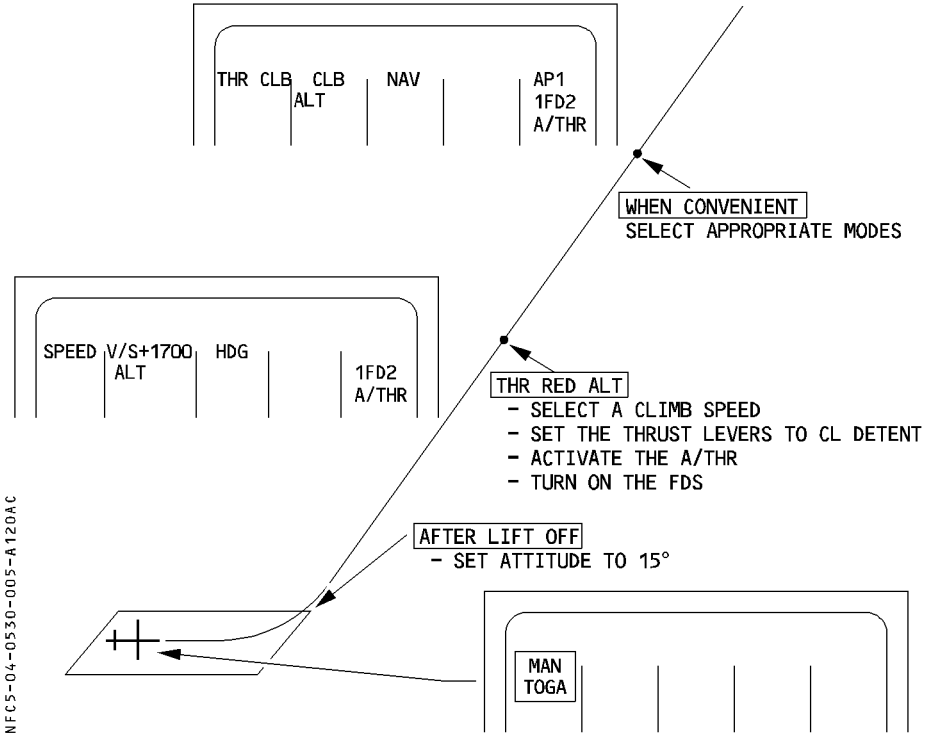
NO FLIGHT DIRECTOR TAKEOFF

If a takeoff is initiated without FDs, the system responds as follow :

- There are no FD bars.
- There is no A/THR arming.
- There is no guidance available.
- The target speed on the PFD is that selected on the FCU or is defaulted to 100 kt.
- Setting the thrust levers to the CL detent does not activate A/THR.

Note : Do not engage the autothrust prior to selecting a target speed on the FCU.

R



Procedure

– Establish initial climb of 15°

● **When reaching the thrust reduction altitude (THR RED ALT) :**

– SELECT a climb speed.

– SET the thrust levers to CL detent.

– ACTIVATE the autothrust.

– TURN ON the FDs (basic modes engage).

– SELECT appropriate mode.

– Failure of both FDs after the start of takeoff :
- The FD bars disappear.
- The FCU window displays the target speed, which synchronizes on V2, or the current speed (if it is higher).
- The autothrust remains armed.
- At thrust reduction altitude, LVR CLB flashes. If the pilot set the thrust levers to the CLB detent, the autothrust becomes active in selected SPD mode (no FDs selected). If the current speed is greater than the target speed, the thrust decreases.
- At acceleration altitude the target speed does not change, since it is selected.

TAKEOFF WITH NO V2 ENTRY

If V2 is not inserted, the speed reference system (SRS) will not engage for takeoff.
Five seconds after lift off, V/S mode will engage. When V/S engages the current airspeed becomes the FCU target speed.
To regain a normal speed target, the pilot must :

– SELECT the appropriate climb speed on the FCU and PULL out the knob.

● **At ACC ALT :**

– PUSH the A/THR pushbutton on the FCU.

– SET the thrust levers to CL detent.

– PUSH in the SPD selector knob to get a managed speed target.

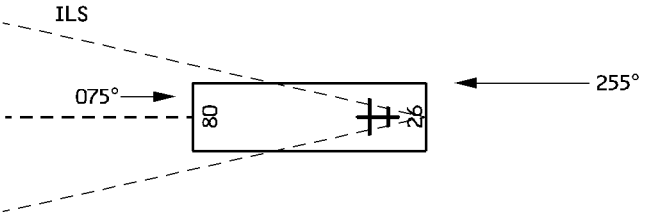
R **TAKEOFF USING THE LOCALIZER OF THE OPPOSITE RUNWAY**

R If the localizer of the ILS associated with the opposite runway has to be used for
R takeoff :

R **– SELECT the RAD NAV PAGE.**

R **– INSERT the ILS frequency.**

R **– INSERT the course corresponding to the runway.**
R



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ILS ON RUNWAY 075
BACK COURSE TAKEOFF ON RUNWAY 26
INSERT CRS = 075

R **– DESELECT the ILS (LS) pushbutton on the FCU.**
R Since the PFD displays reverse deviation.

R **– SELECT ROSE-ILS on one ND.**

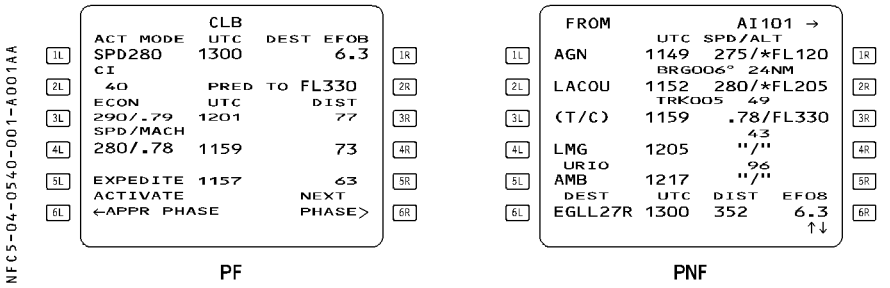
TAKEOFF IN GPS PRIMARY MODE ◁*

For certain airports, where the difference between local coordinate system and WGS 84 (geodetic standard used by GPS, FMS) is not negligible, a map shift may occur after takeoff. It is caused by the FM position update to the runway threshold coordinates at takeoff thrust application.
When departing from these airports, consider deselecting the GPS for takeoff. This will delay the map shift until reselection of the GPS, which is recommended when a safe altitude is reached.

MONITORING THE CLIMB PHASE

The PF MCDU should display the PERF CLB page allowing him to monitor the climb.

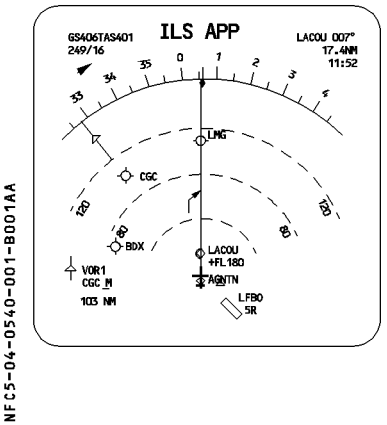
R The PNF MCDU should display the F-PLN page to allow the pilot to monitor time, speed and
R altitude predictions. This page also displays matched or missed information for constraints.
R



R — CHECK vertical mode CLB if NAV is engaged.
R — CHECK vertical mode OP CLB if HDG/TRK is engaged.

MONITORING THE ND (ROSE NAV or ARC)

Displays the lateral and vertical paths, in the current AP/FD active modes.



THE ↗ BLUE SYMBOL INDICATES WHERE THE FCU ALTITUDE WILL BE REACHED.

THE ↗ MAGENTA SYMBOL INDICATES WHERE THE NEXT F-PLN ALT CSTR WILL BE REACHED.

IF THE FCU ALTITUDE IS SET AT NEXT ALT CSTR, THE ↗ SYMBOL IS BLUE.

○ SYMBOL AROUND WAYPOINT INDICATES AN ALTITUDE CONSTRAINT :

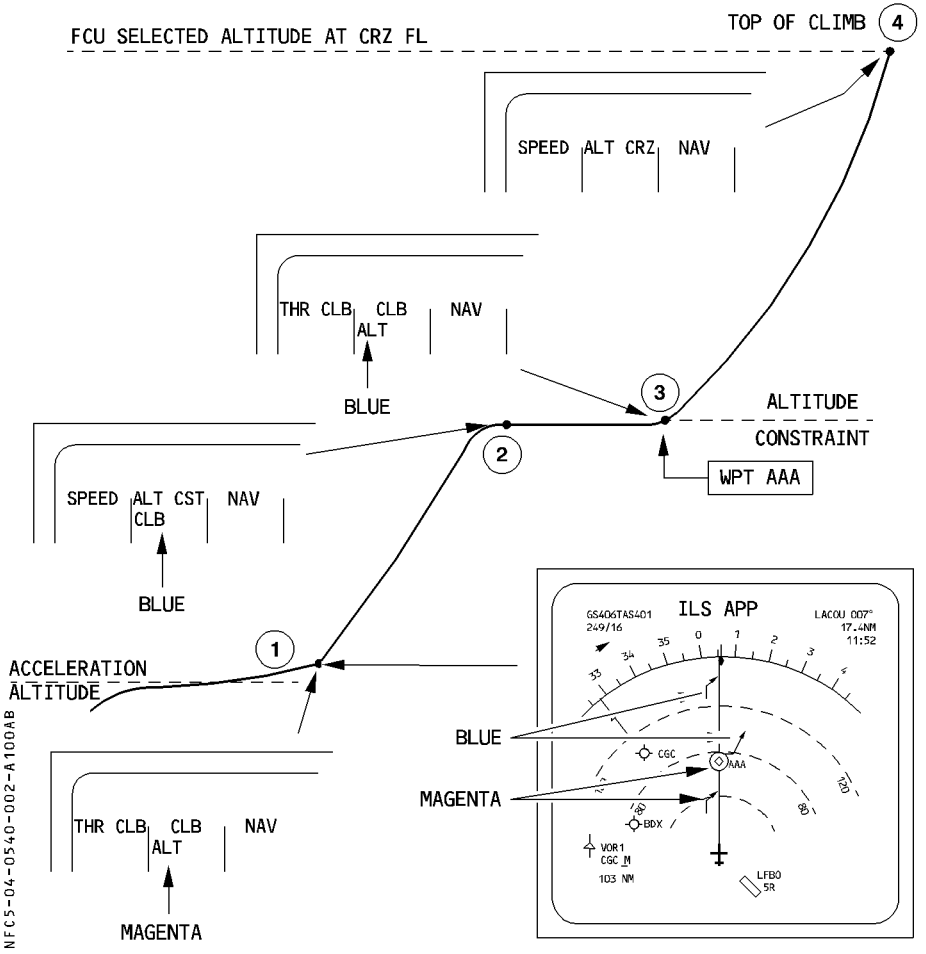
WHITE : DISREGARDED IN THE CURRENT AP/FD MODES
MAGENTA : PREDICTED AS MATCHED IN THE CURRENT MODES
AMBER : PREDICTED AS MISSED IN THE CURRENT MODES.

MONITORING THE AP/FD MODES and FMA

If CLB mode is engaged, the flight mode annunciator (FMA) and the navigation display (ND) show the tactical situation as follows :

CASE 1

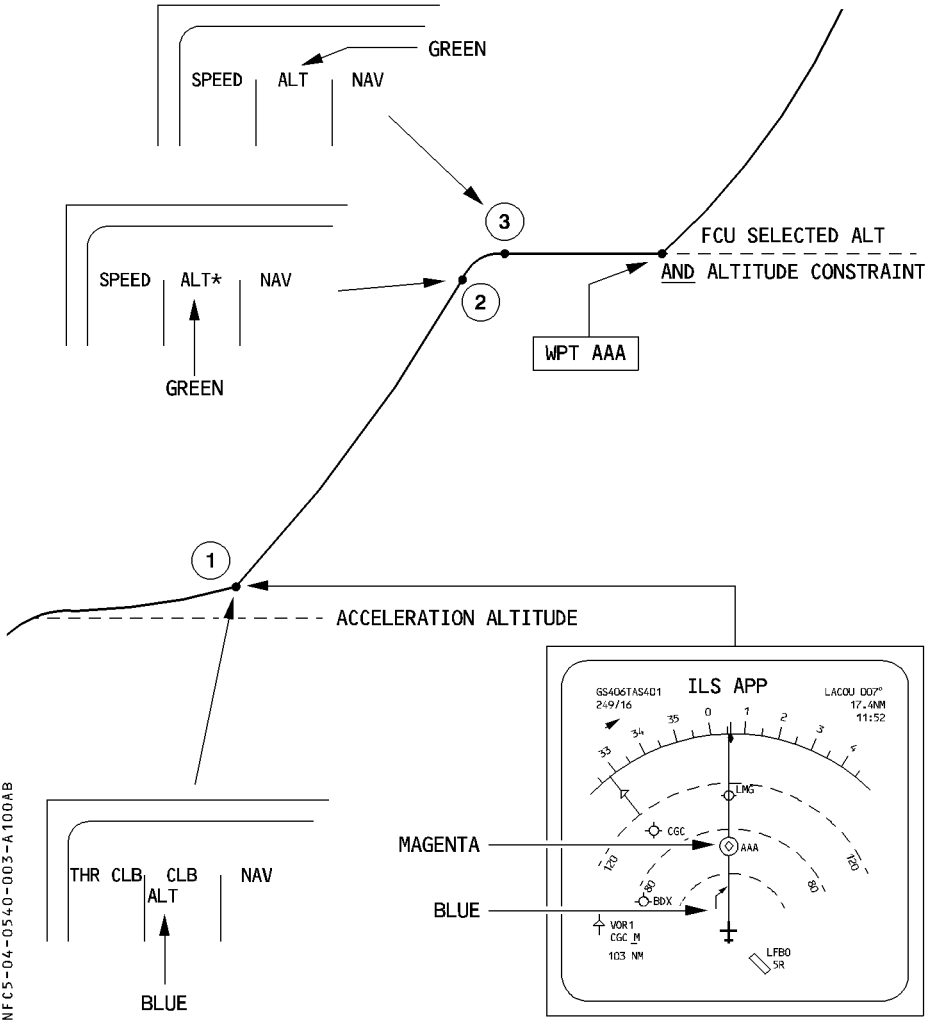
The FCU selected altitude is set above the next altitude constraint



CASE 2

The FCU selected altitude is set at the next altitude constraint

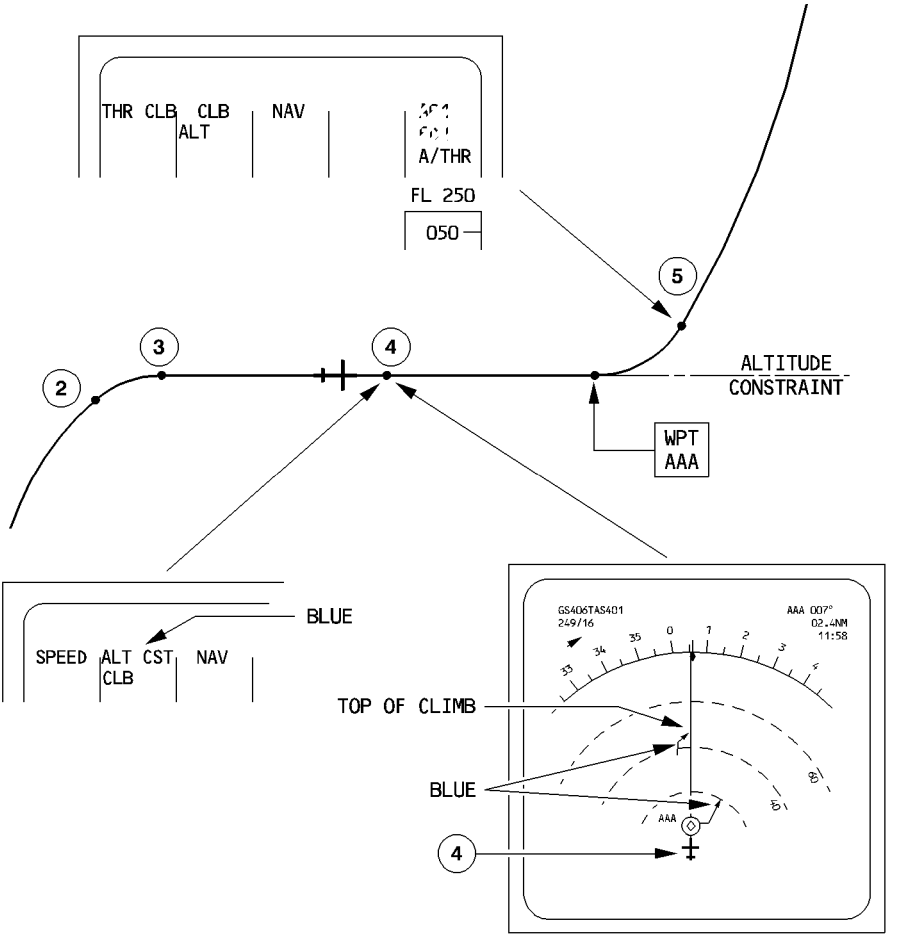
This aircraft will automatically levels off at this altitude.



To resume the climb automatically when the waypoint AAA is reached, apply the following procedure during the level off (Position 4) :

– SELECT the FCU altitude to the next constraint (if any) or the cruise FL.

– PUSH the FCU ALT selector knob to arm CLB mode.



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Recommendation :

– To ensure that you will not miss the next constraint, it is recommended to select the FCU altitude to the next constraint as described above.

MONITORING THE CONSTRAINTS

SPEED, ALTITUDE and TIME constraint can be checked using MCDUs. Each constraint is preceded by a star that indicates if the constraint is matched (magenta star) or missed (amber star).

Altitude constraint

If an altitude constraint is predicted as missed, use the following procedure :

- **SET the FCU ALT to the next ALT CSTR**
- **CHECK the position of the level off symbol on the ND (blue arrow) with respect to the waypoint with the constraint.**
- **DECREASE the target speed until the constraint is met.**

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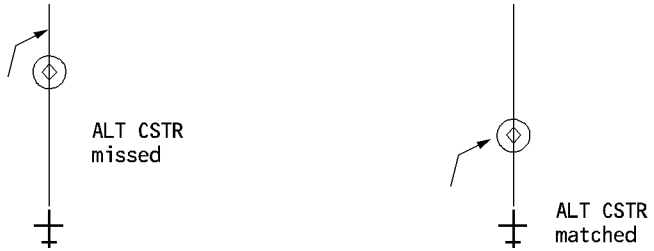


Speed constraint

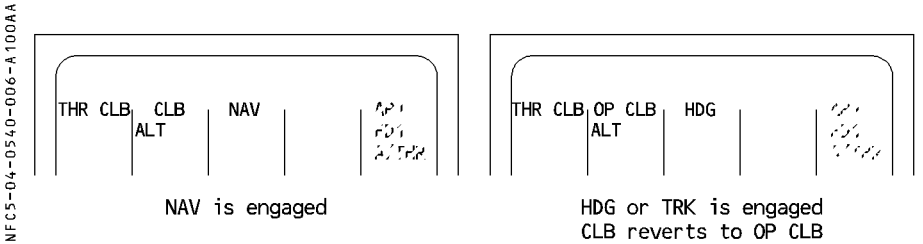
- **CHECK the SPD CSTR predictions on the MCDU.**
  - A magenta or amber star (*) indicates that the aircraft will match or miss the constraint.
    If the aircraft is to miss the constraint by more than 10 kt, the MCDU scratchpad displays "SPD ERROR AT WPT ---- ".

"CHECK GW" message.

Refer to 4.06.20. ABNORMAL PROCEDURES

HDG/TRK MODE ENGAGEMENT

If HDG/TRK is engaged, the guidance does not consider any F-PLN constraint. Therefore if the flight crew disengages NAV, CLB mode reverts to OP CLB.



NAV is engaged

HDG or TRK is engaged
CLB reverts to OP CLB

SPEED SELECTION

If a specific speed is required :

- TURN and PULL the SPD selector knob. (This changes the target speed to blue on the PFD speed scale).
- Predictions on the F-PLN page assume that the speed remains selected until the next SPD LIM or SPD CSTR, or the next phase, whichever comes first.

LEFT INTENTIONALLY BLANK

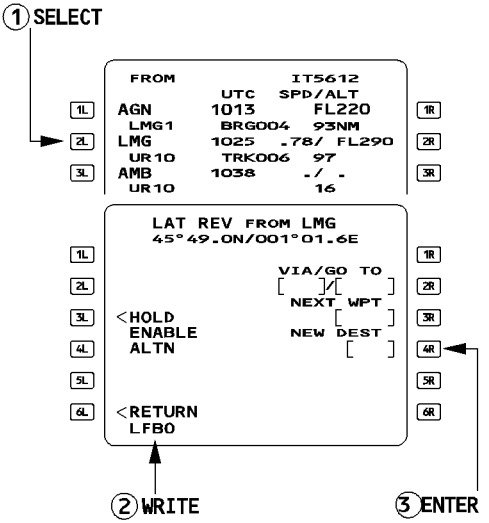
IMMEDIATE RETURN TO ORIGIN AIRPORT

If the SEC F-PLN has been prepared for an immediate return to the airport of origin :

– ACTIVATE the SEC F-PLN.

– PERFORM a DIR TO the appropriate waypoint.

If no SEC F-PLN has been prepared for an immediate return to the airport of origin :



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– PERFORM a lateral revision at TO waypoint

R – ENTER the departure airport ident in the NEW DEST field and INSERT the
R temporary flight plan.

– PERFORM a lateral revision at the new destination

– SELECT : APPR – STAR – VIA – TRANS and INSERT

● When cleared to divert :

– PERFORM a DIR TO the suitable waypoint.

– ENTER QNH, WIND, MDA/MDH, LDG CONF.

– CHECK RAD NAV page.

REACHING CRUISE FLIGHT LEVEL

Upon reaching the cruise flight level, the pilot should be sure that the FMA displays "ALT CRZ" or (——) in its second column, which ensures that the aircraft is at cruise flight level.

R The FMGS engages the "soft altitude" mode 2 minutes after the cruise flight level is
R captured and Mach stabilized. "Soft altitude" mode allows the aircraft to deviate ± 50 feet
R from the target altitude to minimize the thrust variation and reduce the fuel consumption.
R If the FMA does not display ALT CRZ or —— at the assigned flight level, soft altitude mode
R will not engage and the predictions will be computed at the preplanned flight level. This will
R occur when the ATC assigned flight level is lower than the preplanned flight level entered
R on the PROG page.

It the FMA does not display ALT CRZ or (——) at the assigned FL (as may occur when the ATC-assigned FL is lower than the preplanned FL selected initially) :

— **PRESS the [PROG] key.**

— **ENTER the current cruise flight level.**

Note : If the current cruise flight level is above the preplanned FL, selecting the FCU updates it automatically.

"SET SPD AUTO" (or "SET MANAGED SPD")

If the climb phase was flown in selected speed and if the cruise phase is planned to be flown in managed speed (ECON MACH/SPEED), "SET SPD AUTO" (or "SET MANAGED SPEED") appears on the PFD and MCDU as a reminder.

— **PRESS the FCU speed selector knob to activate the managed Mach.**

MONITORING THE NAVIGATION ACCURACY

On aircraft equipped with GPS PRIMARY, the navigation accuracy check is not required as long as GPS PRIMARY is available. ◁*

Otherwise, navigation accuracy shall be checked periodically in cruise.

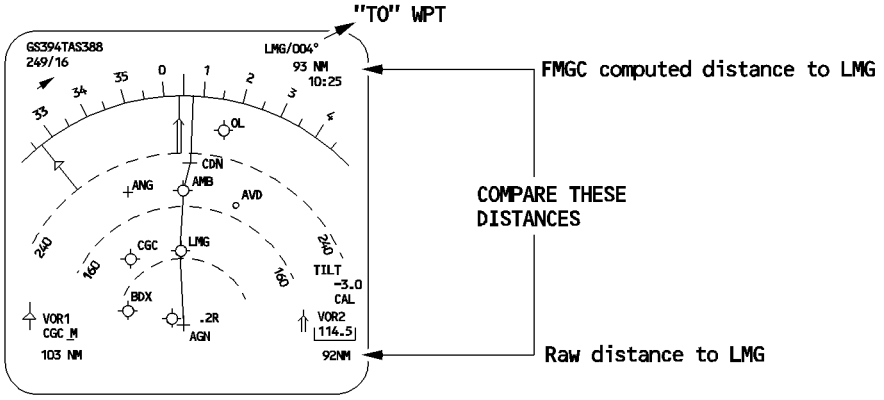
The PROG page displays an estimated accuracy as being high or low (center of sixth line). "HIGH" means that the FMGS estimates the FM position accurate enough to meet the EN ROUTE criteria.

– "LOW" means that the pilot must compare raw data from tuned navaids with corresponding data computed by FM and shown on the ND or MCDU PROG page. The appearance of the message "NAV ACCUR DOWNGRAD" on the MCDU calls for a similar crosscheck.

Note : The pilot should make such a comparison periodically, even if the PROG page is displaying "HIGH" and navaids are available : this allows him to quantify the FM position error.

The method for checking the accuracy is explained in the SOP and in 4.02.20.

A quick check is explained here below when the TO waypoint is a DME type. (VOR/DME or VOR/TAC or DME or TAC)



POSITION DISCREPANCY

If there is a discrepancy between the raw data position and the FM position :

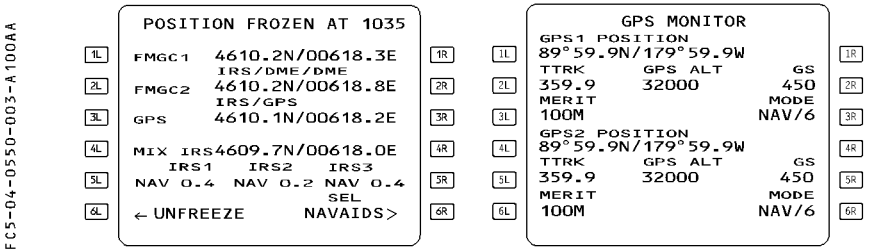
– PRESS the [DATA] key on the MCDU.

– SELECT the POSITION MONITOR page.

– SELECT "FREEZE".

On the other MCDU : Select the GPS MONITOR page.

R



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MONITORING THE PREDICTIONS

The F-PLN page and FUEL PRED page show fuel and time predictions. These predictions are meaningful if the flight plan and entered winds are accurate enough.

Procedure

– UPDATE the F-PLN to show accurate predictions.

– Periodically CHECK the wind on the F-PLN B page, and update it when the current wind is significantly different.

– Monitor the fuel by checking :
· Estimated fuel on board (EFOB) at destination (F-PLN page)
· EFOB at alternate and extra fuel (FUEL PRED page)

- **If the extra fuel is negative, modify successively the following data until the extra fuel becomes null or positive :**

– CHECK current cruise flight level versus the optimum level (OPT FL)
If advisable, REQUEST reassignment to the OPT FL (or OPT FL + 2000)

– Decrease the cost index down to zero if necessary (MIN FUEL)

– SELECT another ALTN on the ALTN page and CHECK whether or not XTRA FUEL becomes positive.

– Continue to check different alternates until you find one for which XTRA FUEL is null or positive.

- **When an alternate is not necessary, you may select "NO ALTN" option :**

– CHECK the required conditions (weather, runways, etc.) for NO ALTN.

– SELECT "NO ALTN" on the ALTN selection page.

– ADJUST FINAL TIME on the FUEL PRED page.

– CHECK XTRA FUEL.

The pilot must ensure that the aircraft flies the cruise flight level entered on the PROG page, then the aircraft will :

– Fly at ECON CRZ MACH.
– Benefit from the soft altitude (SOFT ALT) mode.
  Present accurate predictions.

This shows on the flight mode annunciator (FMA) :

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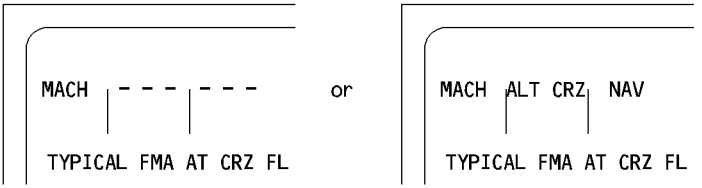
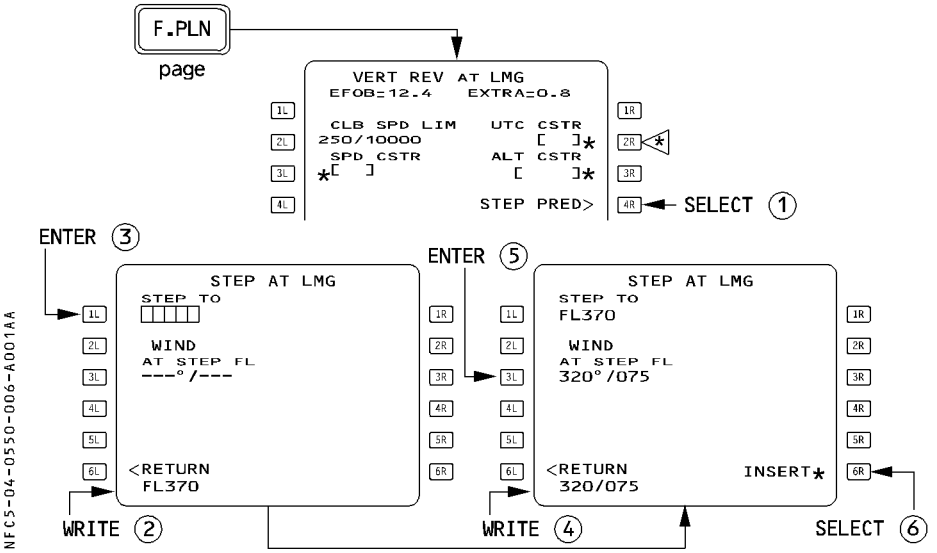


ENTERING A STEP CLIMB OR A STEP DESCENT

You may use the STEP PREDICTION page to enter one step climb or one step descent at any waypoint of the cruise phase except the "FROM" waypoint.

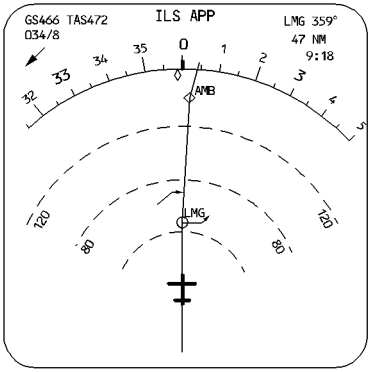


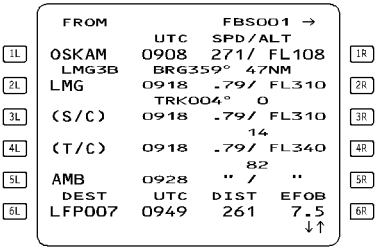
Procedure

- **PRESS the F-PLN key.**
- **SELECT "VERT REV" at the waypoint where you want to climb.**
- **WRITE a step altitude into the scratchpad and ENTER it.**
- **WRITE a wind (if it is significantly different from the initial cruise-flight-level wind) into the scratchpad and ENTER it.**
- **INSERT the step.**
- **CHECK the predictions.**

The FM uses the step climb or the step descent to recompute the predictions.
The ND shows symbols for the start of climb or descent and the top of climb or bottom of descent. The MCDU shows associated pseudo waypoints.
The step automatically revises the cruise flight level.
The crew must initiate the climb or the descent by pulling out or depressing the altitude selector knob. CLB or OP CLB will engage in climb, DES or OP DES in descent. DES mode engages with a constant vertical speed of – 1000 ft/min.

If the aircraft passes the step waypoint without commencing a climb or a descent, the system deletes the step from the vertical F-PLN automatically ("STEP DELETED" appears) and recomputes the predictions.
The system will not accept a step climb or descent if it does not ensure at least one minute of flight time at the new altitude.





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If no step wind is entered, the wind used at the new CRZ FL is automatically defaulted to the wind at the previous flight level.

IMMEDIATE CHANGE OF LEVEL IN CRUISE

When the pilot changes his flight level without inserting a step :

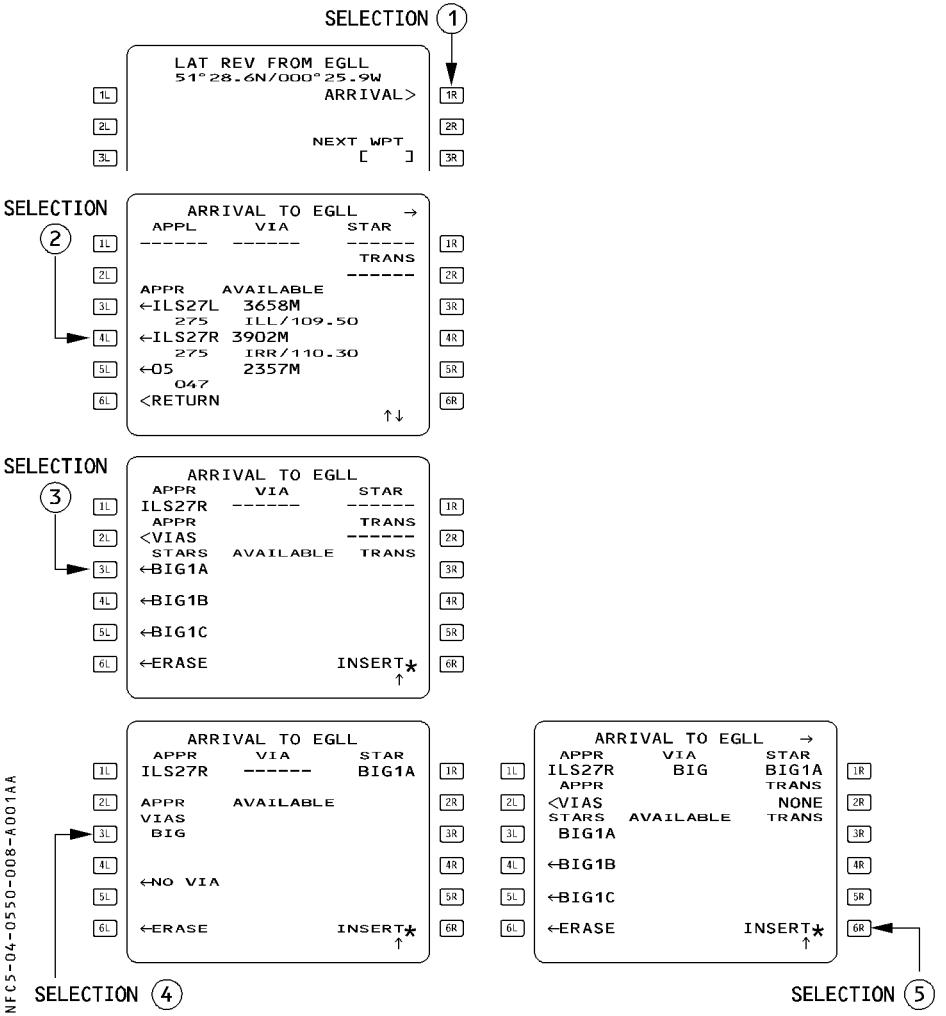
- If the FCU-selected altitude is above the previous CRZ FL, the CRZ FL on the PROG page changes to the new flight level.
- If the FCU-selected altitude is lower than the previous CRZ FL and if the distance to DEST is more than 200 NM, the CRZ FL on the PROG page changes.
  In that case Mach target is managed as follows :
  - At the start of the descent, the Mach target is the managed Mach number at the initial cruise flight level.
  - When the aircraft reaches the new flight level, the Mach target switches either to the Mach number for the lower CRZ FL, or to the speed for the lower CRZ FL if the aircraft reaches the crossover altitude. This logic prevents the aircraft from exceeding Vmo during descent.
- If the FCU-selected altitude is lower than the previous CRZ FL and the aircraft is within 200 NM of its destination, the system activates the descent phase.
  The pilot may reactivate the cruise phase by entering a new cruise flight level in the PROG page.

PREPARATION FOR DESCENT AND APPROACH

The preparation for descent and approach consists of :
- Entering PERF and WIND data
- Defining the lateral and vertical F-PLN
- Checking the tuning (auto or manual) of the appropriate navaids

After receiving the arrival information, the flight crew should use the following procedure.

REVISION OF LATERAL F-PLN



– PERFORM a lateral revision at destination

– SELECT an ARRIVAL

– SELECT an APPROACH, a STAR, a TRANSITION, a VIA.
When the pilot selects successive items, the page are automatically sequenced. But pressing NEXT PAGE key brings up the APPR and STAR page successively.

– CHECK the temporary revision including the missed approach.

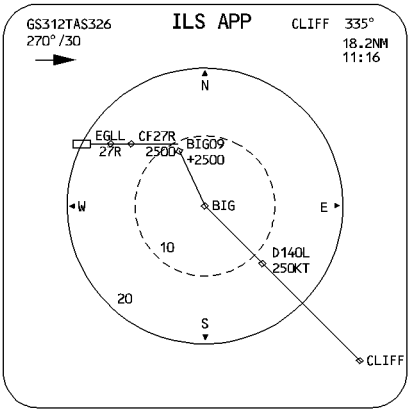
– INSERT the temporary revision, [6R] key.

REVISION OF VERTICAL FLIGHT PLAN

– CHECK the speed and altitude constraints as displayed on the ND. (Use the CSTR pusbutton).

– ENTER any additional speed or altitude constraints using the vertical revision page.
In order not to be too fast when commencing approach, you may insert a speed constraint at the FAF (Final Approach Fix).
When all computations are completed.

– REVIEW the flight plan using the approach chart.
When the destination runway changes and if the previously selected STAR is compatible with the new runway, the system selects it automatically in the temporary F-PLN. If the flight crew has entered any revision or constraint on this STAR, it will not be transferred. The pilot must reenter it in order to retain it for this approach.



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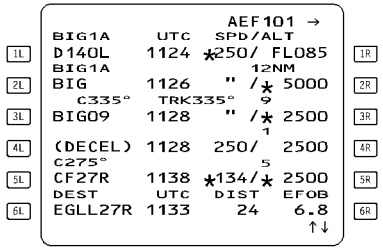
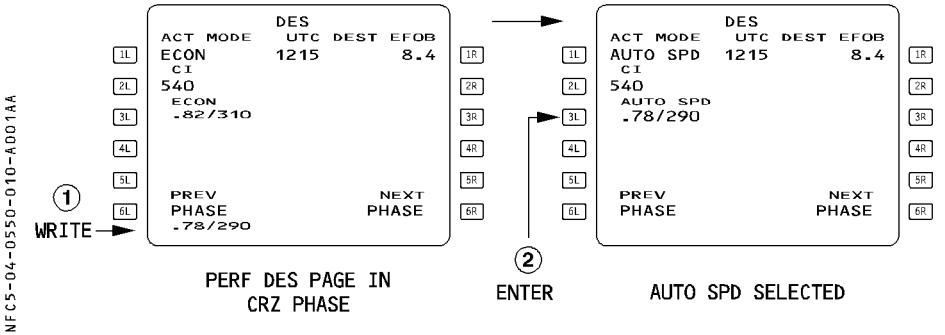


ENTERING THE WINDS FOR DESCENT

Refer to 4.04.20.

ENTERING AN AUTO SPEED

As long as descent phase is not active, the PERF DES page may be used to select either a speed or a Mach number or both to replace the optimum descent speed. This speed is the called Auto speed.
The Flight Guidance Computer then uses your Auto speed instead of the ECON Speed for computing the descent profile and determining the Descent Managed Speed profile.
When the system switches to the descent phase, it sets the managed target speed to the auto speed. From there, you may modify the speed by using the FCU selector knob only.
R Once in descent phase, the pilot cannot select the ECON speed again.



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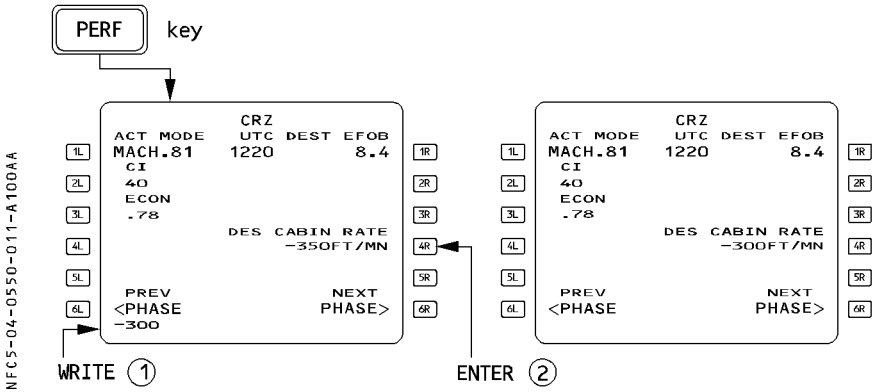
Procedure

- **PRESS the PERF key on MCDU**
- **SELECT "NEXT PHASE" prompt**
- **WRITE the speed for the descent into the scratchpad and ENTER it**
  The field 3L displays AUTO SPD value.

MODIFICATION OF THE CABIN RATE



Procedure

- PRESS the PERF key on MCDU
- SELECT CAB RATE [4R] key.
- WRITE the new cabin rate into the scratchpad
- ENTER it in the [4R] field.

ENTERING THE APPROACH DATA

– From PERF DES page, SELECT "NEXT PHASE" [6R] key to display the APPR page.

– ENTER QNH, TEMP, WIND at destination (magnetic north reference). MDA/MDH or DH

R (The PFD displays the MDA/MDH or DH only after the descent phase has been activated.)

– CHECK and, if necessary, MODIFY

· LDG CONF (landing configuration)
· Vapp (the FM-computed value may be modified)
· TRANS ALT (transition altitude)

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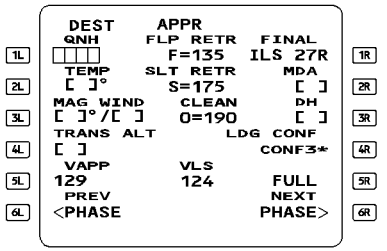

The scratchpad displays "ENTER DEST DATA" if the approach page is not completed when the aircraft is 180 NM from destination.

– SELECT "NEXT PHASE" in order to display the GO AROUND page.

– CHECK and, if necessary, MODIFY the THR RED ALT and the ACC ALT.

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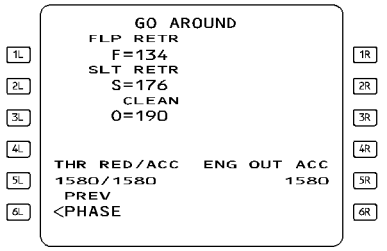
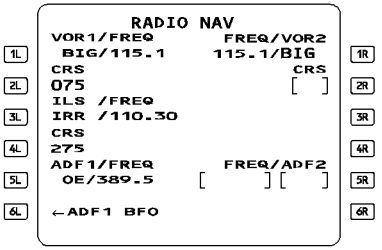


SELECTING THE RADIO NAVAIDS

– **CHECK or SELECT the NAVAIDS appropriate for the approach.**
For an ILS procedure, the ILS will be autotuned.
NDBs must be manually entered.

Note : When the destination has a VOR/DME, ENTER it manually in the VOR field. ENTER its identifier in the BRG/DIST field of the PROG page. This allows you to perform a permanent NAV accuracy check.



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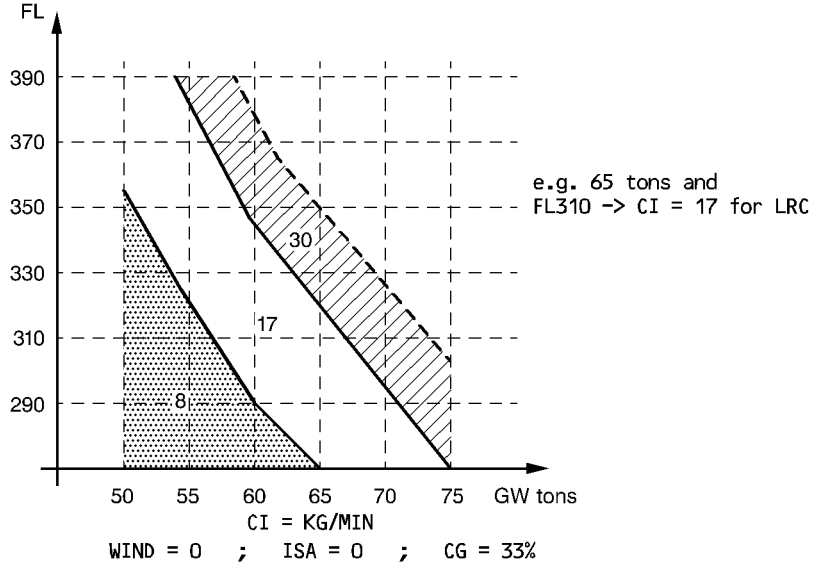
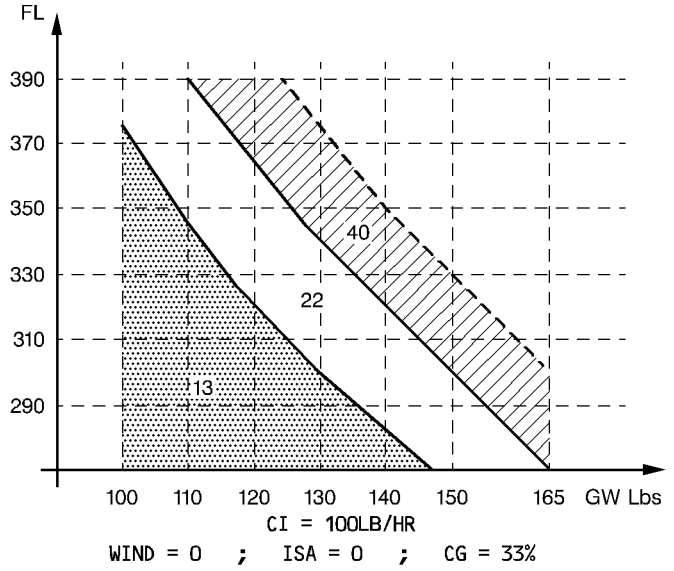
COST INDEX FOR LONG-RANGE CRUISE

The cost index for a long-range cruise Mach number depends on the actual gross weight of the aircraft and the flight level and wind. The pilot can use the graphs on this page to find an approximate value for it.





NFCS-04-0550-014-A001AA

R **DESCENT INITIATION**

The top of descent, displayed on the F-PLN page (T/D) and on the ND (¬↘), is a position that the system calculates, assuming that the aircraft will begin its descent in DES mode with managed speed, and that the system will guide the aircraft along the descent profile computed with all the vertical F-PLN data (ALT CSTR, ECON or AUTO MACH/SPD, SPD CSTR, SPD LIMIT) to reach VAPP at 1000 FT AGL.

R *Note : The ND does not display the top of descent ¬↘ when HDG (or TRACK) mode is engaged.*

Procedures

When the aircraft reaches the top of descent (F/D) :

- **SELECT the altitude target.**
- **PUSH the ALT selector knob. DES mode engages.**
- **CHECK the FMA annunciators.**

R **DESCENT MONITORING**

DES MODE ENGAGED

When DES mode is engaged, NAV mode is engaged, and the system takes into account all altitude and speed constraints.
The key parameter for monitoring the descent is the vertical deviation (VDEV) displayed on the PFD and on the PROG page, which indicates whether the aircraft is on, above, or below the descent profile.

Procedure

– **SET the ATC cleared altitude on the FCU (considering also what is the safe altitude).**
If the lowest safe altitude is higher than the ATC-cleared altitude, check with ATC that this constraint applies.
If it is confirmed, SET the FCU altitude to the safe altitude until it is safe to go to the ATC-cleared altitude.

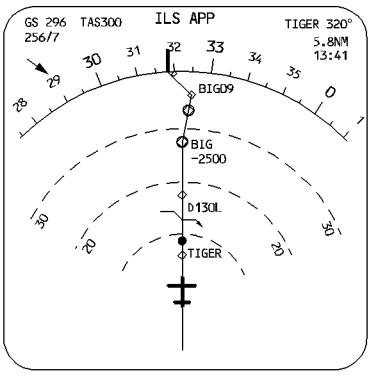
– **MONITOR the vertical deviation (VDEV) on the PFD and the PROG page.**

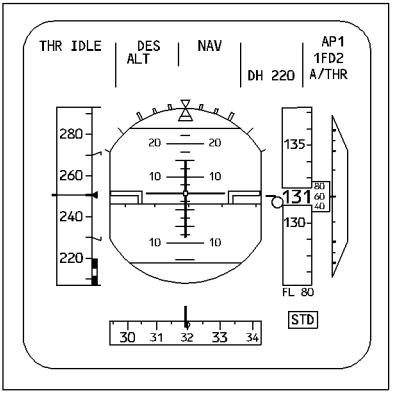
– **MONITOR the speed change that occurs when the aircraft reaches a speed change symbol (magenta ball) under managed speed.**

– **MONITOR the FMA (ALT*, ALT CST*, ALT, ALT CST) when the aircraft reaches level symbols.**

- **If the aircraft is on the descent profile**
The aircraft is considered to be on the vertical profile when it is within 50 feet of it. VDEV is close to zero, and the system predicts that it will match constraints until the aircraft levels off at the next FCU altitude.

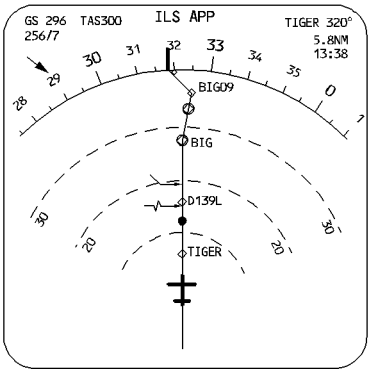
– **MONITOR the predicted descent point after the next level-off.**
The A/THR adjusts the thrust for the particular segment. The first FMA column may display “THR IDLE” or “SPEED”.

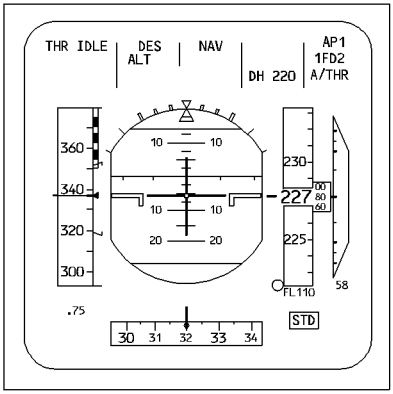


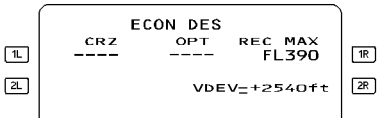


NFC5-04-0560-002-A100AA

- **If the aircraft is above the descent profile**
  VDEV is down on the PFD and positive on the PROG page.
  The A/THR sets IDLE thrust and the AP increases speed by calling for down elevator.
  If the aircraft reaches the upper limit of the managed speed range, the aircraft diverges and maintains the upper limit speed.







NFCS-04-0560-003-A100AA

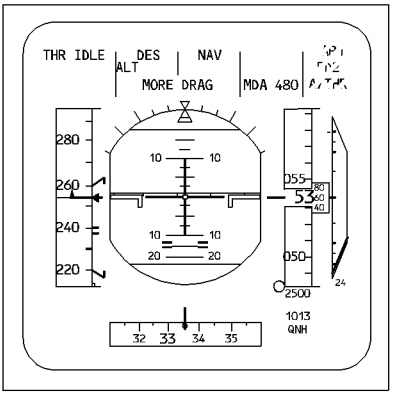
Procedure

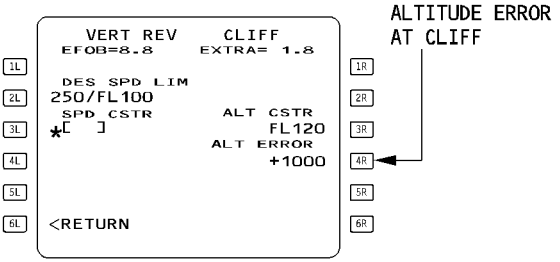
– **SELECT a descent speed higher than the upper limit when possible.**

– **MONITOR the intercept symbol ∿↦ .**
When this symbol reaches the next ALT CSTR waypoint "MORE DRAG" appears on the PFD indicating that speedbrakes must be extended in order to match the next altitude constraint. This is an advisory message.

Note : When DES mode is engaged, the speed brake extension will not necessarily increase the descent rate. It does so only if the aircraft is above the profile. If the aircraft is on or below the profile : the system will add thrust to keep the aircraft on profile and within the speed target range.

If an altitude constraint is predicted to be missed by more than 250 feet the vertical revision page shows ALT ERROR at the waypoint.





NFCS-04-0560-004-A100AA

If a speed constraint is predicted to be missed by more than 10 knots :

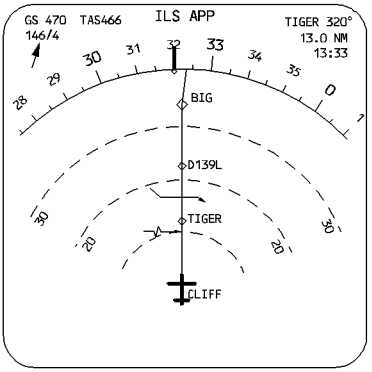
- **SELECT an appropriate speed.**
- **RESUME managed speed when the aircraft is back on the descent path.**

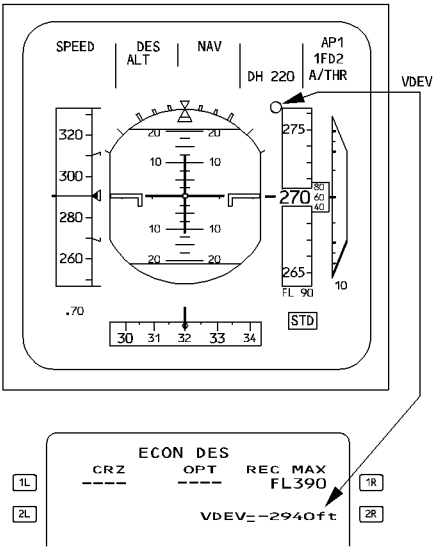
- **If the aircraft is below the descent profile**

R VDEV is up on the PFD and negative on the PROG page. The system maintains the target speed (managed or selected speed).

– MONITOR the intercept symbol ([^v>]) on the ND and any leveling off at the next ALT CSTR.

The A/THR is in speed mode with a –1000 ft/min rate of descent until the profile is regained.





NFCS-04-0560-005-A100AB

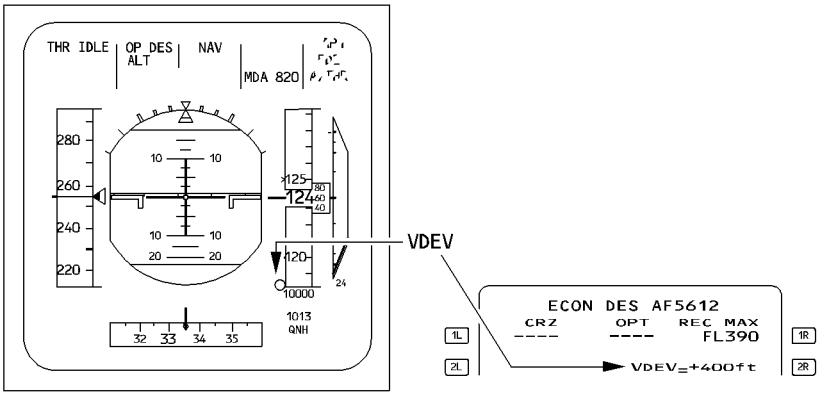
If the rate of descent has to be increased (ATC requirement) :

– SELECT OP DES mode

– INCREASE the target speed or extend the speedbrakes.

OP DES, V/S or FPA MODE ENGAGED

– In either case, the aircraft is no longer guided on the descent profile and altitude constraints are disregarded. If NAV mode is engaged the ND displays a white circle on waypoint with an altitude constraint. If NAV mode is disengaged, the circle is removed.
– The PFD still shows VDEV for reference purposes.
– The target altitude is always the FCU selected altitude (shown in blue).
On the ND, level-off symbol is blue (no constraint). If NAV mode is engaged and the speed target managed, speed constraints are considered.



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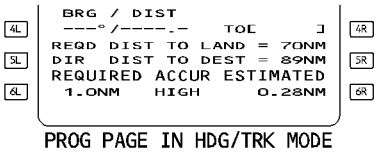
R Vertical position may also be assessed by comparing the required distance to land and the
R distance to destination.The required distance to land is the distance to descend from the
R present level down to VAPP at destination elevation, taking into account current speed,
R speed limit (if any) wind compensation and an approach segment at VAPP.
R Depending on aircraft configuration, the required distance to land is displayed :
R – on the MCDU progress page, when HDG or TRK mode is engaged.
R



PROG PAGE IN HDG/TRK MODE

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R – on the ND by the energy circle, when HDG or TRK mode is engaged. It is displayed as
R a green arc oriented on the current track and centered on the aircraft current position.

Note : Altitude and speed predictions displayed on the F-PLN a page assume an immediate return to DES mode.

Procedure

– SET the FCU altitude as cleared by ATC, while considering the applicable safe altitude.
If the next safe altitude is higher than the ATC-cleared altitude, check with the ATC to verify that this constraint applies.
If confirmed, set the FCU altitude to the safe altitude, until it is safe to fly at the cleared altitude.

– MONITOR the speed target, when the aircraft reaches the speed change symbol.

– MONITOR the FMA ALT*, ALT, upon reaching the level symbol.

R **– When in HDG/TRK mode, MONITOR the energy circle (if installed) on the ND.**
The MCDU F-PLN page presents SPD/ALT constraint-matching predictions, which assume that DES mode is immediately re-engaged.

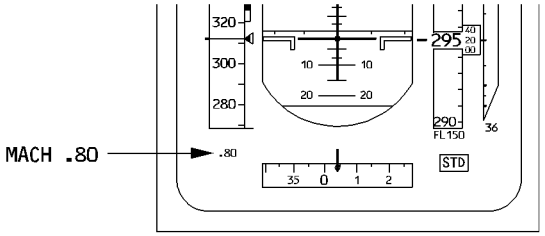
– CHECK the predictions before re-engaging DES mode (in order to resume the descent profile).

Note : VDEV is available on the PFD even in HDG mode ; it is a valuable tool for monitoring the descent, as long as crosstrack error (XTK) is less than five nautical miles.
The aircraft automatically decelerates for approach, only if it flies over the DECEL pseudo waypoint with NAV mode engaged (or LOC, LOC).*

EXPEDITE DESCENT ◁*

When ATC requires a rapid descent :

– DEPRESS THE EXPED pushbutton
Flight guidance (FG) pitches the aircraft to acquire and maintain 0.80/340. FG orders a pitch rate that produces no more than 0.15 g. The pilot can use this mode to initiate an emergency descent. To resume normal descent, PUSH the ALT selection knob or engage any other vertical mode.



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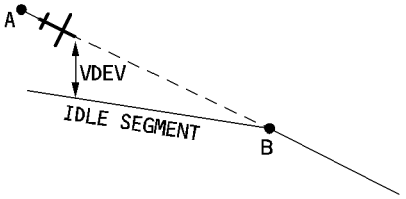
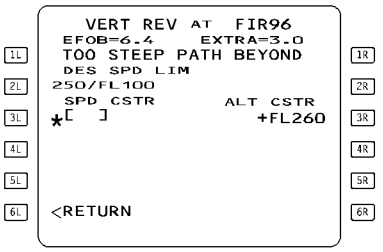
MONITORING THE NAVIGATION IN THE TERMINAL CONTROL AREA

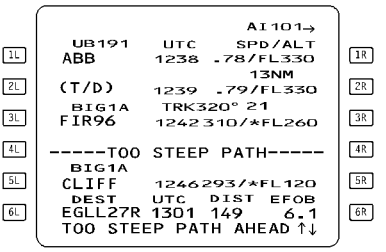
If the MCDU message "SYSTEM RNP IS XX.X" is displayed, you will verify the manually entered RNP value in the REQUIRED field of the PROG page and clear or modify it, if it is not in accordance with the RNP value specified in the area (Nav or approach chart).

TOO STEEP PATH

"TOO STEEP PATH AHEAD" appears on the MCDU scratchpad when the system predicts this situation and TOO STEEP PATH is displayed on the F-PLN page.
When the aircraft is crossing the first waypoint of a TOO SPEEP PATH, the system computes a flyable descent profile (with an idle segment). The VDEV makes a jump because it is related to a new profile.







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F.PLN A PAGE WITH A TOO STEEP PATH

Procedure

When passing the first waypoint of the TOO STEEP PATH :

- **MONITOR VDEV and predictions at the next CSTR waypoint.**
- **If required, EXTEND the speedbrakes before seeing the "MORE DRAG" (or "AIRBRAKES") message.**
- **CONSIDER using a holding pattern, if necessary.**

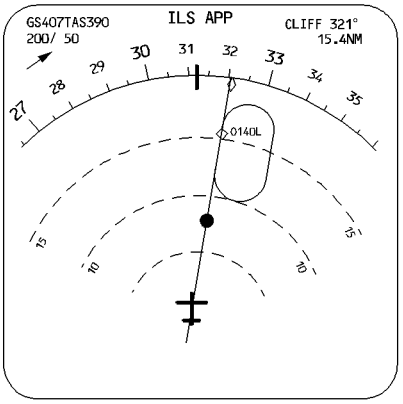
HOLDING PATTERN

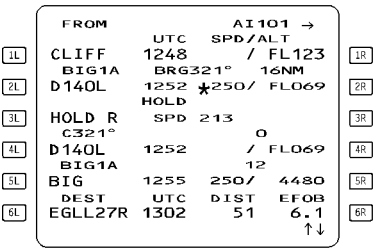
A hold may be required during the descent and manually inserted.

Procedure

- **PRESS the F-PLN key.**
- **SELECT the lateral revision page.**
- **SELECT the HOLD prompt.**
- **CHECK the HOLDING data, and MODIFY it if necessary.**
- **CHECK the temporary flight plan and INSERT the holding pattern in it.**

Note : If the holding fix is close to the DECEL pseudo waypoint and the speed is managed, manually activate the approach phase to change the managed target speed to approach speed (VAPP). This will avoid having an increase of speed not appropriate.





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MANUAL TERMINATION

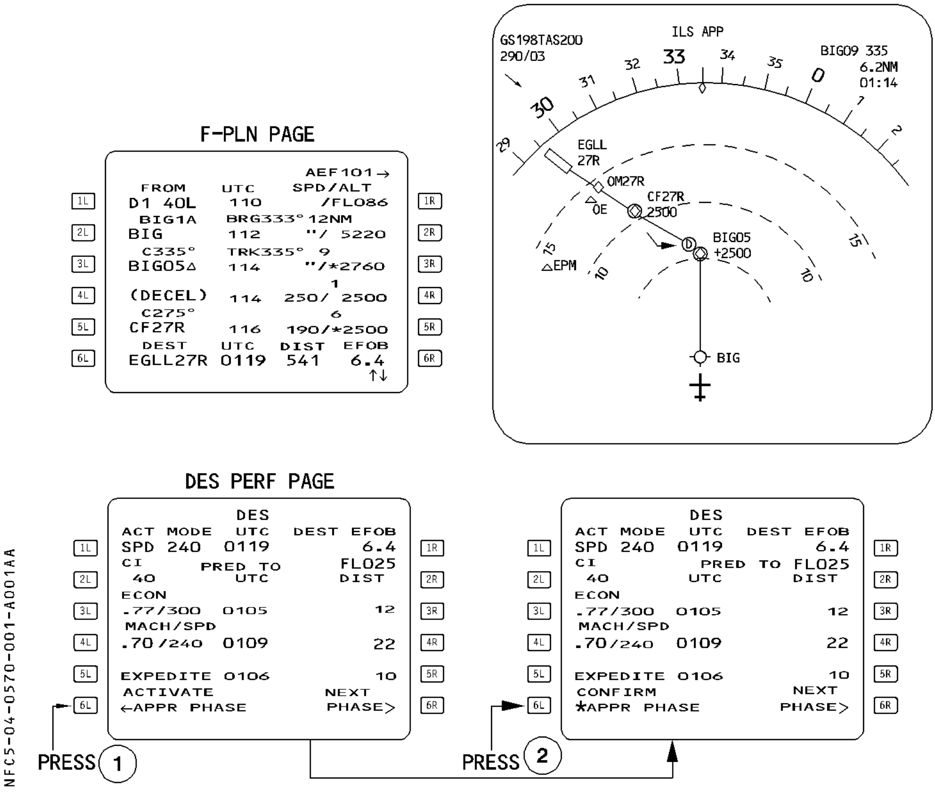
You should not use DES mode when entering a leg with manual termination. Manual termination, which is defined as a track or a heading with no termination, is always part of a database procedure.
The computed descent flight profile may not be adequate when flying this type of leg.

INITIAL APPROACH

UPON REACHING THE INITIAL APPROACH AREA

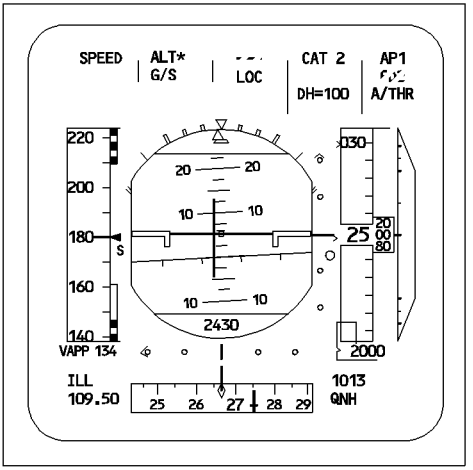
- Approach phase will activate automatically when flying over the DECEL pseudo waypoint with NAV, APPR NAV or LOC* or LOC mode engaged.
- You will activate manually the approach phase on the PERF page if :
  - · HDG or TRK mode is engaged or
  - · if you are flying a go around or
  - · if an early deceleration is required

R



MANAGED SPEED

– **CHECK that managed speed is active : MONITOR the target speed.**
During the approach, the autothrust limits the speed of the current configuration. (GD, S, F, VAPP).



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If ATC requires a specific speed :

– **SWITCH to selected speed (turn and pull the speed selector knob on the FCU).**

– **ADJUST the aircraft configuration accordingly.**

● **If ATC orders successive step descents down to the final approach flight path :**

– **Use the V/S or FPA mode.**

– **MONITOR VDEV.**

NAV ACCURACY

As required by the SOP.
Without installed GPS and when no DME is available for the accuracy check, use HIGH/LOW on the PROG page.
In this case, consider a "HIGH" to be equivalent to a positive crosscheck.

ATC CLEARANCE

– **MODIFY the F-PLN, RAD NAV, and PERF APPR data to agree with the latest clearance and landing information.**

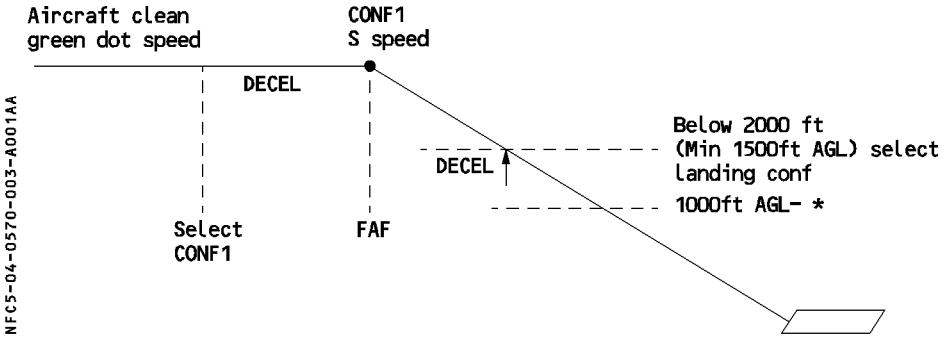
ILS APPROACH

INTERMEDIATE/FINAL APPROACH (ILS approach entered in the F-PLN)

The preferred technique for flying an ILS approach is to fly a decelerated approach using the AP/FDs, the LOC and G/S modes, A/THR in the SPEED mode, managed speed target is recommended.

Decelerated approach

The decelerated approach technique brings the aircraft down to 1 000 feet, at VAPP. In most cases, the interception of the final descent path is achieved with Conf 1 at S speed.



* The approach must be stabilized at approach speed (minimum ground speed) in the landing configuration before reaching 1 000 feet AGL.

APPROACH MODE ACTIVATION (LOC - G/S)

When cleared by ATC and when appropriate :

– **DEPRESS the APPR pushbutton to arm the APPR mode for the approach entered in the flight plan.**

Note : If a NON PRECISION approach is selected in the active flight plan and if the pilot manually tunes an ILS on the RAD NAV page, the MCDU and PFD display "CHECK APPR GUIDANCE". This message is a reminder to the pilot that, although an ILS is tuned on RAD NAV page, the available approach guidance modes are APP NAV - FINAL when the APPR pushbutton is pressed in on the FCU.

The FCU APPR pushbutton arms or engages LOC and G/S modes, if :
- An ILS approach is entered in the flight plan, or
- No approach, or only a runway, is entered in the flight plan, and an ILS is manually-tuned on the RAD NAV page, or
- Both RMPs are set to NAV, and an ILS is selected.

AUTOLAND

– CHECK that the FMA displays the aircraft capability (CAT2 or CAT3) for the intended ILS approach.

– MONITOR the radio automatic callout.

- **At 350 feet RA :**

– CHECK that "LAND" is displayed on the FMA.
R If LAND is not displayed, do not perform an autoland. A go-around must be
R performed, if visual references are insufficient.

– CHECK ILS course.

- **Between 50 and 40 feet RA :**

– CHECK that "FLARE" is displayed on the FMA.

- **At approximately 30 feet RA :**

– CHECK that "IDLE" is displayed on the FMA, and that autothrust starts to reduce thrust toward IDLE.

- **At 10 feet, "RETARD" callout comes up :**

– MOVE the thrust levers to IDLE.
Autothrust disconnects.

- **At touchdown :**

– CHECK that "ROLL OUT" appears on the FMA.

- **At the end of the Rollout :**

– Disengage the autopilot.
If an AP is not disengaged at the end of the rollout, and the pilot uses the nosewheel steering tiller to taxi the aircraft off the runway, the autopilot will steer the aircraft back to the localizer when the tiller is released.

MANUAL LANDING

- **at DH**

  – DISCONNECT the APs. SPEED mode remains engaged.

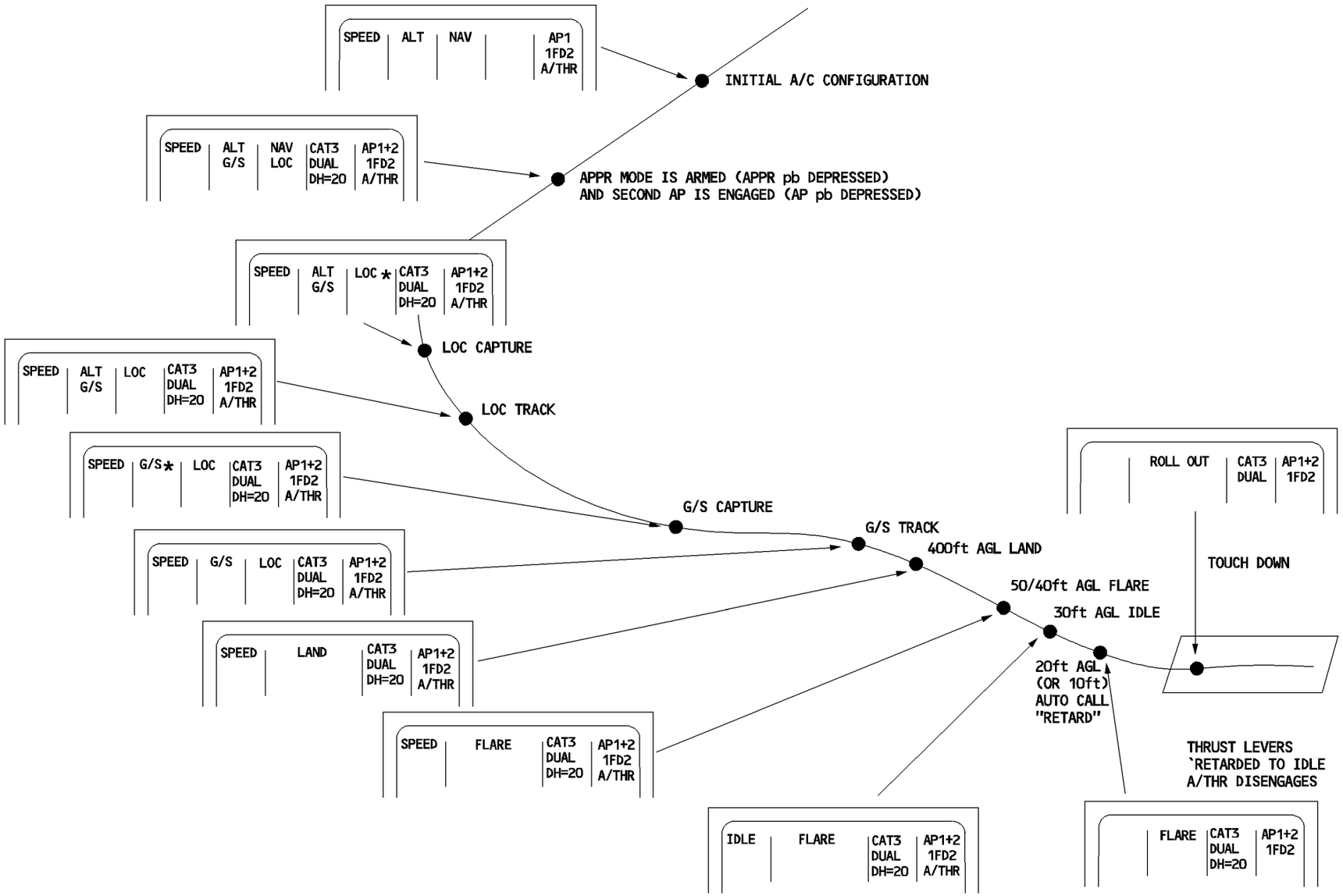
- **At 20 feet "RETARD" automatic call out comes up**

  – MOVE the thrust levers to IDLE if they are not there already. (The A/THR disconnects).

- **At touch down**
  "ROLL OUT" appears on the FMA and the yaw bar comes up on the PFD.

R *Note : The retard call out is only a reminder when a manual landing is performed.*

STANDARD ILS AUTOMATIC APPROACH



EARLY SELECTION OF APPROACH MODE LOC - G/S

Pressing the APPR pushbutton arms LOC and G/S.
The RA signal is not valid above 8200 feet AGL (TRT), or 5000 feet AGL (Collins). If the aircraft is cleared for an ILS approach, when it is higher than 8000 feet AGL or 5000 feet AGL (Collins), proceed as follows :

- **PRESS the APPR pushbutton on the FCU.**
- **When aligned on the localizer, check LOC and G/S engagement :**
  - **CAT 1 is displayed on the FMA. (Radio altimeters not yet valid).**
  - **Check that the FMA displays the correct capability for the intended approach, when the aircraft is below 5000 feet AGL.**

GLIDESLOPE INTERCEPTION FROM ABOVE

If the aircraft is above the glideslope, the system will not capture the G/S automatically. The pilot must bring the aircraft onto the glideslope beam, and select an appropriate V/S to intercept it. Refer to the SOP.

DATA LOCK

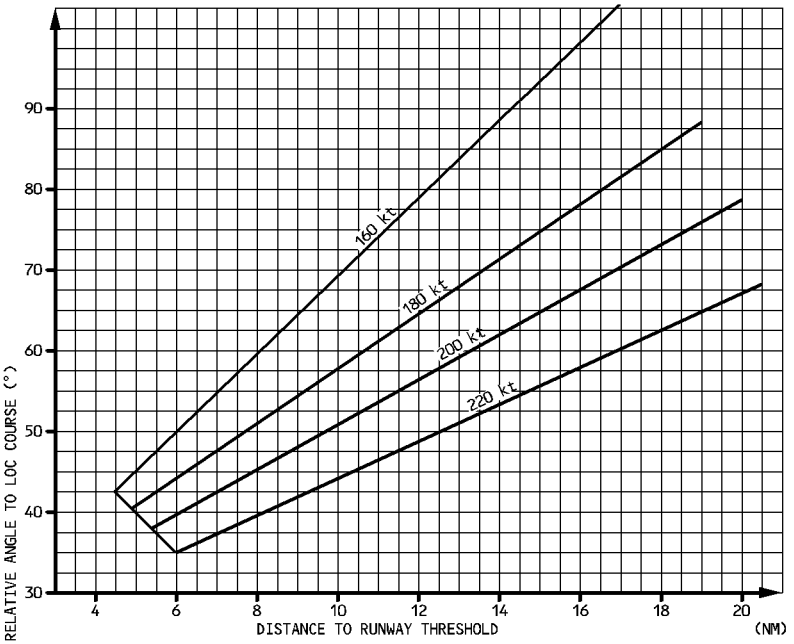
When the aircraft reaches 700 feet RA with APPR mode (LOC and G/S) armed or engaged, the ILS freq and course are frozen in the receiver.
This function (ILS tune inhibit) is available, when at least one AP/FD is engaged. Any attempt to change the ILS frequency or CRS, via the MCDU or RMP, does not affect the receiver.
If the speed is managed, the system does not accept any modifications the flight crew may enter on the PERF APPR page (surface wind, selected landing configuration, or VAPP) for speed guidance purposes below this altitude.
When the aircraft reaches 400 feet RA, LAND mode engages. The flight crew can only disengage this mode by engaging the GO AROUND mode.

USE of RMPs for ILS/DME

If both FMGCs fail, you will tune the ILS frequency on both RMPs simultaneously. If the ILS has a DME, the PFD will not display the DME distance. In this situation you will fly without DME information. If necessary, increase the DH accordingly.

LOC BEAM CAPTURE

The pilot must always monitor the capture of a LOC beam. During this evolution the associated deviation indications on the PFD and ND must indicate movement toward the center of the scale. The pilot can avoid making a false capture by being careful not to arm the LOC too early.
The following graph shows the angle of interception versus distance that ensures that any overshoot will be less than 1.3 dot.



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The capture begins when the deviation is two dots or less. It is programmed to line the aircraft up on the beam with a single overshoot, even when the intercept angle is large.

Note : ICAO requires loc beam to ensure a normal capture within 10 NM and +/– 35 degrees of the course centerline. Some current ILS systems just meet the requirement and are subject to false capture outside these limits.

R GLIDE SLOPE CAPTURE

R When APPR (LOC-G/S) modes are armed very early (well outside the normal G/S capture
R envelope), a spurious G/S* engagement may occur. This spurious G/S capture will order a
R pitch up, if the aircraft is below the glide beam, and a pitch down attitude, if the aircraft
R is above the glide beam.
R This causes the aircraft to leave its current trajectory : e.g. if ALT hold, the aircraft will quit
R the target altitude.
R Whenever the pilot notices the pitch movement, or the spurious G/S*, or the trajectory
R deviation, he will immediately disconnect the AP, if engaged, to reestablish a normal
R attitude and will disengage APPR mode.
R It is then recommended to arm/rearm APP (ILS) mode within the normal capture zone.

R *Note : ICAO defines the envelope where the quality of the G/S signal ensures a normal*
R *capture. This envelope is approximately 2° above and below the correct glideslope*
R *path angle, horizontally within 8° of the ILS centerline and out to a distance of 10*
R *NM.*

SWITCHING FROM NON ILS TO ILS APPROACH

If an ILS approach is possible when a non ILS was previously scheduled, use one of the following procedures :

1. Use a secondary flight plan to prepare the alternate ILS approach, time permitting.

– COPY the ACTIVE flight plan.

– REVISE the ARRIVAL : insert the ILS approach and the applicable STAR/VIA.

– On the RAD NAV page, TUNE in the ILS manually.

– REVISE the PERF APPR page.

2. ATC changes the clearance from the non-ILS to the ILS approach.

- **If a secondary flight plan has been prepared :**

  – ACTIVATE the SEC F-PLN and adjust.

  – Follow subsequent standard procedures.

- **If a secondary flight plan has not been prepared :**

  – REVISE the ARRIVAL on the primary F-PLN, inserting the ILS approach.

  – REVISE the PERF APPR page.

  – Follow subsequent standard procedures.

CAUTION

If the pilot decides to fly the ILS approach without revising the arrival of the primary flight plan (a non ILS approach is in the F-PLN), LOC and G/S modes will not be available when he presses the APPR pushbutton.
Consequently, he should :

R · Manually TUNE in the ILS on the RAD NAV page : CHECK that the "CHECK APPR
R GUIDANCE" message comes up.
· Press the ILS pushbutton and select ROSE ILS on the EIS CONTROL panel.
· Use HDG, V/S or TRK, FPA modes to fly the ILS.

TASK SHARING DURING CAT I, CAT II and CAT III APPROACH AND LANDING

FCOM 3.01.22 provides all limitations regarding CAT I, CAT II and CAT III approaches and landings. This includes precautions to be taken when performing autoland on CAT I ILS beam with good visibility.

Anytime a precision approach is performed the PNF must announce that a flight parameter is being exceeded if :

- During glide beam capture
  - Pitch attitude becomes lower than – 2.5° or greater than + 10° (nose up).
  - Vertical speed exceeds + 500 feet/minute or – 1250 feet/minute.
- During final approach
  - Speed goes below speed target – 5 knots or above speed target + 10 knots (announce "SPEED").
  - Pitch attitude goes below – 2.5° or above 10° (announce "PITCH").
  - Bank angle becomes greater than 7° (announce "BANK").
  - Descent rate becomes greater than 1000 feet/minute (announce "SINK RATE").
  - There is too much LOC or GLIDE deviation (announce "LOCALIZER" or "GLIDE").

If the pilot has any doubt about the autopilot guidance, he should use the instinctive disconnect pushbutton to disconnet the autopilot, or should commence an automatic go around.

The pilot may perform a CAT II/CAT III approach if :

- The FMA displays the corresponding category.
- The required systems and functions are operative.
- The airfield installation is authorized for such a category.
- You are qualified for the specific approach.

CAT III approach

AUTO CALL OUT RA is mandatory.
A/THR in SPEED MODE is mandatory.

Note : AUTO CALL OUT is not mandatory for CAT 2 approach : the PNF may perform this function.

TASK SHARING FOR CAT I APPROACH (or better)

R

PF	PNF
At 350 ft AGL (or RA)	
· Check ILS course on PFD · Announce "LAND GREEN" when displayed on FMA	
At Decision Altitude (or Decision height) + 100 ft*	
	· Announce "Hundred above"
At Decision Altitude (or Decision Height)*	
	· Announce "Minimum"
If external visual references are sufficient	
· Announce "LANDING"	
If automatic landing not performed	
· Disconnect the APs and perform the landing	· Monitor CALL OUT or announce as appropriate : 300ft 200ft 100ft 50ft 30ft 20ft 10ft
· At "RETARD" annunciation, retard thrust levers to IDLE if not yet performed	
If automatic landing performed	
refer to CAT III without DH	
If external visual references are insufficient	
· Announce "GO AROUND" and execute	

(*) : Decision Height if QFE is used.

Note : CAT I minimum (DH or DA) is always baro referenced and should be entered in the MDA/MDH field of the PERF APPR page. Auto callouts "hundred above" and "minimum" will not be provided.
These auto callouts "hundred above" and "minimum" are activated by the radio altimeter only when a DH is entered into the DH field of the PERF APPR page for precision approaches (CAT II, CAT III).

TASK SHARING FOR CAT II/CAT III APPROACH WITH DH

R

PF	PNF
At 350 ft RA	
· Check ILS course on PFD · Commence outside scanning · Announce "LAND GREEN" when displayed on FMA	
At Decision Height + 100 ft	
	· Monitor AUTO CALL OUT "Hundred above"
At Decision Height	
	· Monitor CALL OUT "Minimum".
If external visual references are sufficient	
· Announce "LANDING"	
If Automatic landing not performed	
· Disconnect the AP's and perform the landing	· Monitor CALL OUT or announce as appropriate : 200ft 100ft 50ft 30ft 20ft
· At "RETARD" annunciation, retard thrust levers to IDLE if not yet performed	10ft "RETARD" auto call out*
If Automatic landing is performed	
refer to CAT 3 without DH	
If external visual references are not sufficient	
· ANNOUNCE "Go-around" and EXECUTE	

* "RETARD" auto call out comes up at 10 feet if LAND mode is engaged with one or two APs engaged. Otherwise it is announced at 20 feet.

TASK SHARING FOR CAT III APPROACH/LANDING WITH NO DH

R

PF	PNF
At 350 ft RA	
· Check ILS course on PFD · Announce "LAND GREEN" when displayed on FMA	
At 100 ft RA	
· If no failure is detected, announce "LANDING"	· Monitor AUTO CALL OUT
At 40ft RA	
	· Check FLARE on FMA and announce
At 30ft RA	
· Monitor thrust reduction and flare by flight instruments	· Monitor AUTO CALL OUT
At 10ft RA	
AUTO CALL OUT "RETARD"	
· RETARD both thrust levers to IDLE · Monitor lateral guidance by external reference	· Monitor engines parameters
At TOUCH DOWN	
	· CHECK ROLL OUT on FMA and announce
· Select and control reverse thrust	· Check reverse green and announce · Announce 70kt
· Disengage the APs at the end of the Roll out (when leaving the runway at the latest)	

LANDING CATEGORIES

Each FMGC computes its own landing category : CAT1, CAT2, CAT3 single, and CAT3 dual and displays the corresponding landing category on the FMAs.
Each category depends upon the availability of aircraft systems and functions.
When the landing category downgrades, a triple clic aural warning is activated.

FAIL-OPERATIONAL AUTOMATIC LANDING SYSTEM

An automatic landing system is fail-operational if, in the event of a failure below alert height, the remaining part of the automatic system allows the aircraft to complete the approach, flare, and landing. A CAT 3 DUAL system is a fail-operational automatic landing system.

Note : In the event of a failure, the automatic landing system operates as a fail-passive system.

FAIL-PASSIVE AUTOMATIC LANDING SYSTEM

An automatic landing system is fail-passive if, in the event of a failure, there is no significant out-of-trim condition or deviation of flight path or attitude, but the landing is not completed automatically. A CAT3 single system is a fail-passive automatic landing system.

Note : With a fail-passive automatic landing system the pilot assumes control of the aircraft after a failure.

Below 100 feet (radio altimeter), the FMGS freezes the landing capability until LAND mode is disengaged or both APs are off.
Therefore a failure occuring below 100 feet does not change the category of the system.

R ALERT HEIGHT

R The alert height is the height above touch down, above which a CAT3 autoland would be
R discontinued and a missed approach executed, if a failure occured in either the airplane
R systems or the relevant ground equipments.
R Below the alert height, if such a failure occurs, the flare, touchdown and roll out may be
R accomplished using the remaining automatic system.

WARNINGS FOR ILS APPROACH

AUTOLAND warning

With "LAND" or "FLARE" green on the FMA and at least one AP engaged, the AUTOLAND red light appears on the glareshield when the aircraft is below 200 feet RA and one of the following events occurs :

- The autopilots are lost, or
- The aircraft gets too far off the beam (LOC or G/S flash on PFD), or
- Loss of LOC signal above 15 feet, or loss of glide signal above 100 feet (transmitter or receivers).
- The difference between both radio altimeter indications is greater than 15 feet.

When the Autoland light comes on, Autoland must be discontinued (Refer to 4.05.70 p. 17, 18, 19).

Warning of excessive beam deviation

This warning is a flashing of the LOC and G/S scales on the PFD and ND ROSE ILS. It occurs whenever :

- G/S deviation is greater than 1 dot (above 100 feet RA).
- LOC deviation is greater than 1/4 dot (above 15 feet RA).

Warning associated with ILS "landing capability"

Any downgrading in the aircraft's capability for automatic approach and landing sounds a triple-click aural warning.

Failure of both localizer and glideslope receivers

The PFD and ND (rose ILS mode) display red LOC and G/S flags (if the ILS pushbutton has been pressed green). LOC and G/S scales disappear from the PFD.
If LOC or G/S modes are engaged and at least one AP/FD is engaged

- The AP disengages.
- The FD reverts to its HDG - V/S or TRK - FPA modes.

Failure of localizer or glideslope transmitter (when captured)

- The corresponding index is lost.
- The LOC and G/S scales flash.
- The corresponding FD bar flashes.

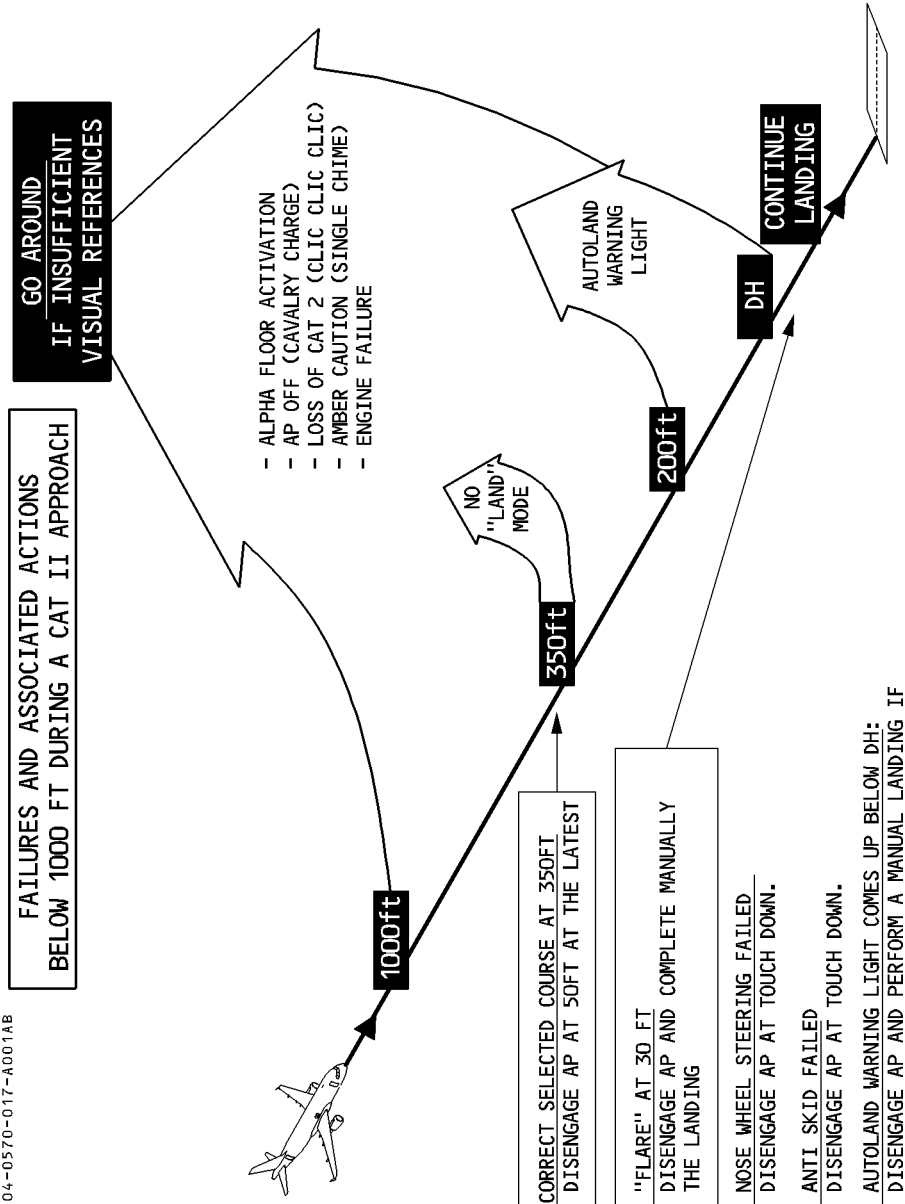
The FMA retains the LOC and G/S modes : If the transmitter failure is temporary, the APs are able to regain these modes. If the failure is long-term, or if it occurs when the aircraft is below 200 feet RA, this allows the aircraft to perform a GO AROUND with one or 2 autopilots engaged.

FAILURES AND ASSOCIATED ACTIONS ABOVE 1000 FT FOR CAT II or CAT III

R

FAILURE (for multiple failures, the most limiting applies)	ACTION TO BE PERFORMED ABOVE 1000 FT	LANDING CATEGORY
ONE ENGINE OUT	Complete ECAM procedure.	CAT III SINGLE
LANDING CAPABILITY DECREASE	Try to recover	As displayed on FMA
LOSS OF A/THR	Switch AP, and try to reengage	CAT II (if A/THR not recovered)
NOSE WHEEL STEERING		CAT III SINGLE (DH = 50 feet) Disengage AP at touch down
ANTI SKID		CAT III SINGLE Disengage AP at touch down
AMBER "CHECK ATT" ON TWO PFDs	Check with standby horizon, use switching to recover (no switching below 1000 feet)	CAT III SINGLE (if the warning disappears) CAT I (if not)
AMBER "CHECK HDG" ON TWO PFDs AND TWO NDs	Check with standby compass, use switching to recover (no switching below 1000 feet)	
RED "HDG" ON ONE PFD AND ONE ND	Use switching to recover (no switching below 1000 feet)	
RED "ATT" ON ONE PFD		
RED "SPD" ON ONE PFD		
DIAGONAL LINE ON ONE PFD AND ONE ND		
RED "RA" ON TWO PFDs	AP and FD not available	CAT I (minimum RVR as per regulation)
SLATS/FLAPS FAILURE (LESS THAN CONF 3)		CAT I Disengage AP at or above 500 feet

R



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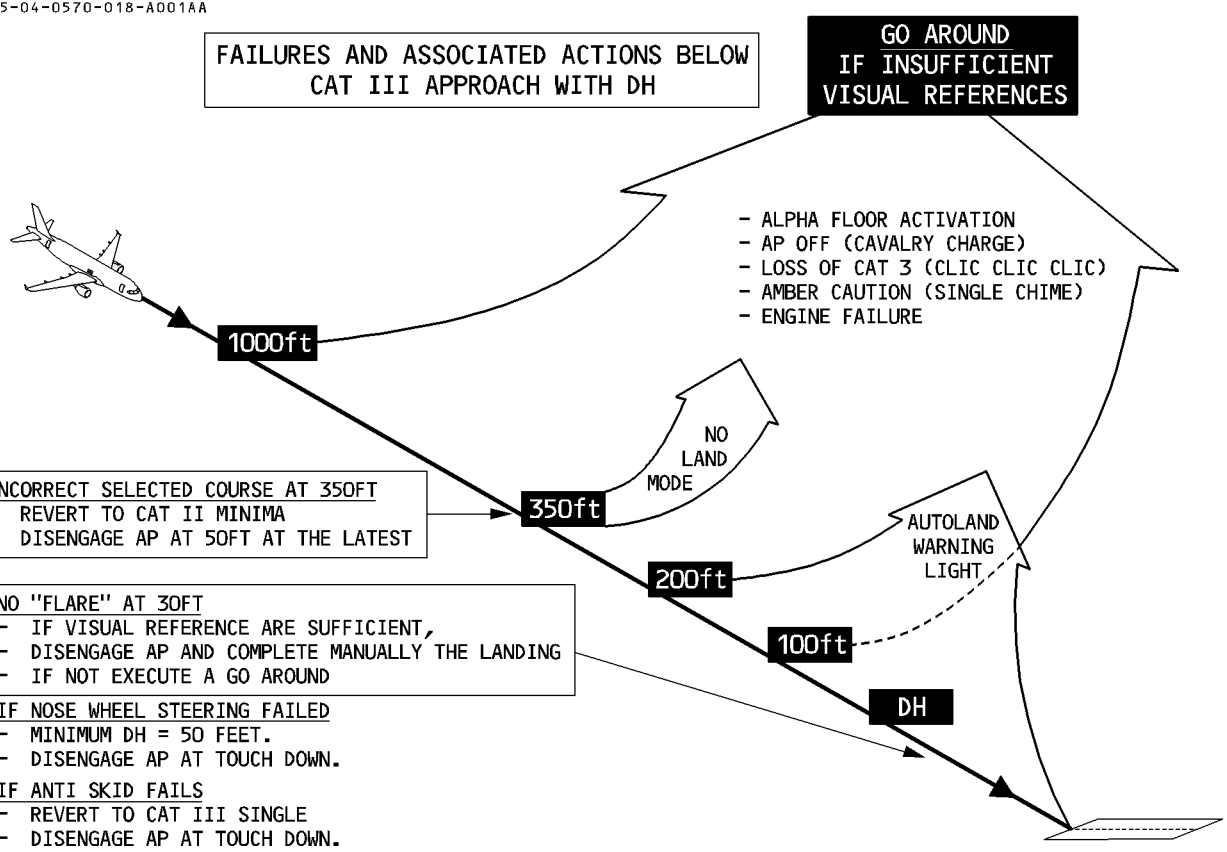
FAILURES AND ASSOCIATED ACTIONS BELOW CAT III APPROACH WITH DH



INCORRECT SELECTED COURSE AT 350FT
- REVERT TO CAT II MINIMA
- DISENGAGE AP AT 50FT AT THE LATEST

NO "FLARE" AT 30FT
- IF VISUAL REFERENCE ARE SUFFICIENT,
- DISENGAGE AP AND COMPLETE MANUALLY THE LANDING
- IF NOT EXECUTE A GO AROUND

IF NOSE WHEEL STEERING FAILED
- MINIMUM DH = 50 FEET.
- DISENGAGE AP AT TOUCH DOWN.

IF ANTI SKID FAILS
- REVERT TO CAT III SINGLE
- DISENGAGE AP AT TOUCH DOWN.

IF AUTOLAND WARNING LIGHT COMES UP BELOW DH:
- A GO AROUND MUST BE PERFORMED UNLESS THE VISUAL REFERENCES ARE SUFFICIENT FOR A MANUAL LANDING.

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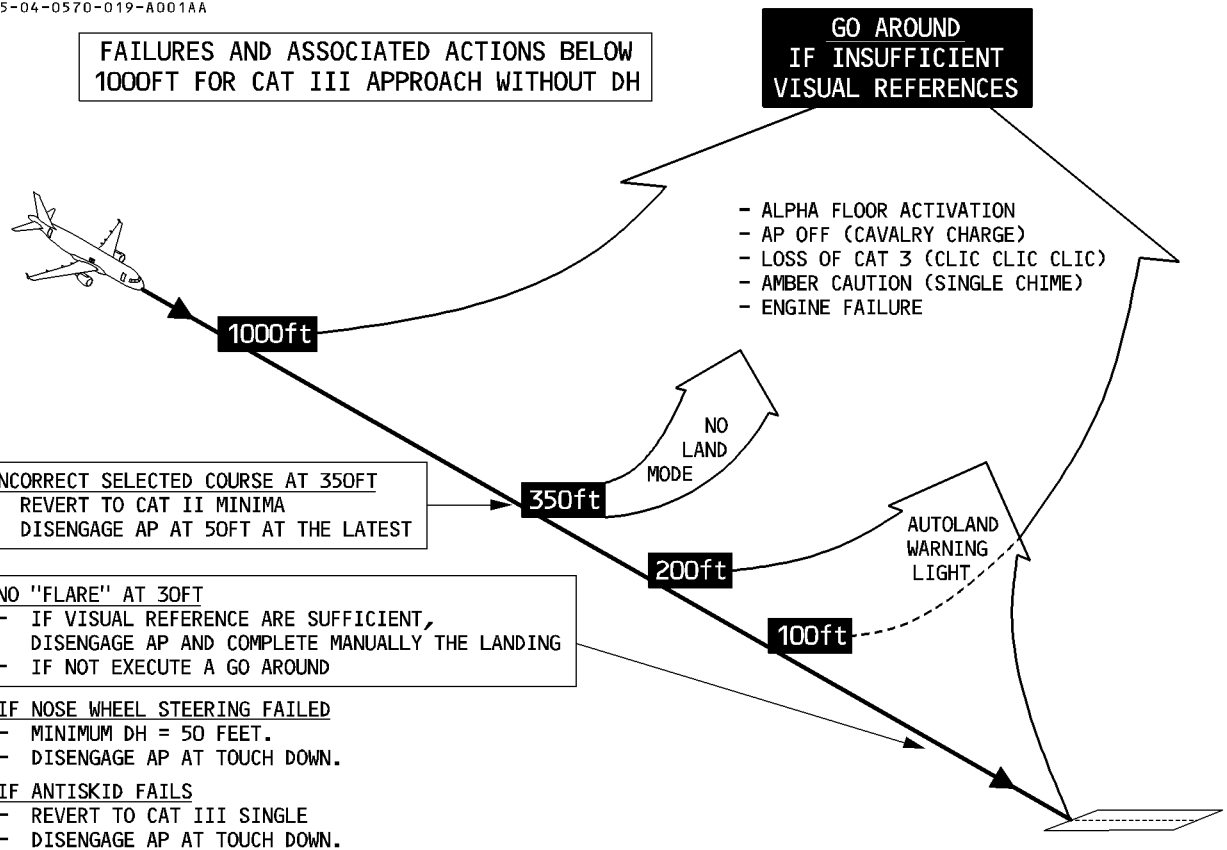
FAILURES AND ASSOCIATED ACTIONS BELOW 1000FT FOR CAT III APPROACH WITHOUT DH



INCORRECT SELECTED COURSE AT 350FT
- REVERT TO CAT II MINIMA
- DISENGAGE AP AT 50FT AT THE LATEST

NO "FLARE" AT 30FT
- IF VISUAL REFERENCE ARE SUFFICIENT, DISENGAGE AP AND COMPLETE MANUALLY THE LANDING
- IF NOT EXECUTE A GO AROUND

IF NOSE WHEEL STEERING FAILED
- MINIMUM DH = 50 FEET.
- DISENGAGE AP AT TOUCH DOWN.

IF ANTISKID FAILS
- REVERT TO CAT III SINGLE
- DISENGAGE AP AT TOUCH DOWN.

IF AUTOLAND WARNING LIGHT COMES UP:
- A GO AROUND MUST BE PERFORMED UNLESS THE VISUAL REFERENCES ARE SUFFICIENT FOR A MANUAL LANDING.

BACK-COURSE LOCALIZER APPROACH

The pilot must fly a back-course localizer approach with the ND in its ILS rose mode.

Procedure

– **PRESS the RAD NAV key.**

– **ENTER the ILS IDENT.**
If the ILS is in the database, the system tunes the proper frequency and the front course.

Note : This may trigger the "RWY/ILS MISMATCH" message. Disregard it.

● **If the ILS is not in the database**

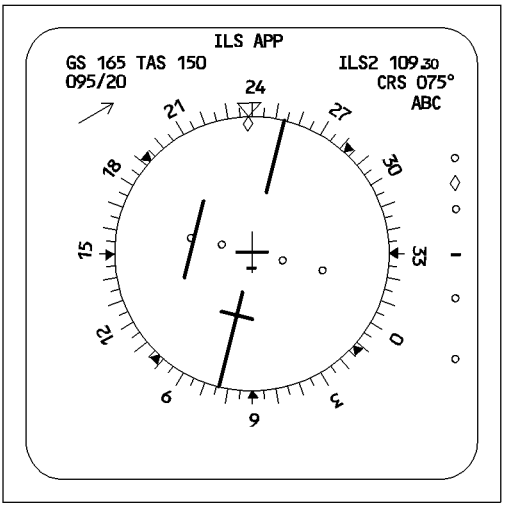
– **SET the appropriate frequency and SET the FRONT CRS into the CRS field.**

– **On the EFIS control panel, SELECT the ILS ROSE mode.**
The display shows the correct LEFT/RIGHT information for the beam deviation

CAUTION

DO NOT select ILS through the ILS pushbutton switch : doing so makes the PFD show reverse deviations.
DO NOT arm the LOC or APPR modes.

– **The flight director may be used with the TRK-FPA or HDG - V/S modes.**



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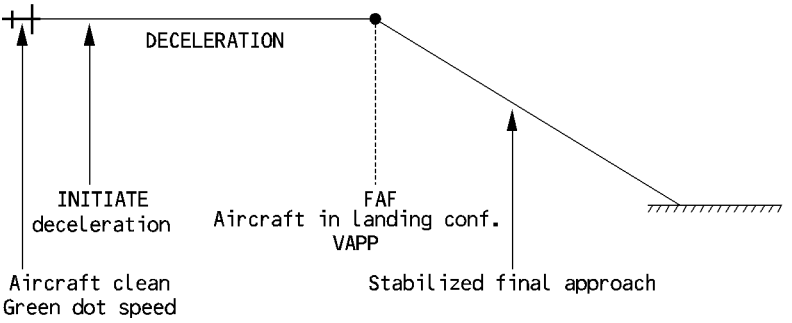
NON PRECISION APPROACH

APPROACH SPEED TECHNIQUE

Airbus recommends the stabilized approach procedure to perform non precision approaches.

STABILIZED APPROACH

The "stabilized approach" brings the aircraft to intercept the final descent path in the landing configuration and at VAPP.
Managed speed is best for the stabilized approach and VAPP should be inserted as a speed constraint at the final approach fix.



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GPS OVERLAY APPROACH WITH REFERENCE NAVAIDS SERVICEABLE

In a GPS overlay approach, the aircraft is laterally guided along the trajectory of a published VOR or VOR/DME or NDB or NDB/DME approach using the GPIRS position data instead of radio navaid data. The GPS overlay approach is flown in GPS PRIMARY navigation mode with radio navaids tuned and raw data displayed on the ND.
Perform a managed guidance approach (APP NAV - FINAL modes) with the following recommendations:

– CHECK that GPS PRIMARY is displayed at least for the FMCG to be used.

● If during the approach GPS primary is lost or the ECAM warning "FM/GPS POS DISAGREE" is triggered :

– CHECK raw data

● If the raw data are correct :

– CONTINUE the approach

● If the raw data display excessive deviations :

– SELECT HDG V/S or TRK-FPA using navaid raw data for guidance

GPS STAND-ALONE APPROACH OR OVERLAY APPROACH WITH REFERENCE NAVAIDS UNSERVICEABLE

In a GPS stand-alone approach the aircraft is laterally guided along the trajectory using the GPIRS position data solely. The waypoints of the trajectory are purely referenced in coordinates (WGS84 or equivalent) and are not defined by means of radio navaids. The GPS stand-alone approach is flown in GPS PRIMARY navigation mode without the assistance of radio navaids.
Perform a managed guidance approach (APP NAV-FINAL modes) with the following recommendations.
Before the flight, check the availability of the GPS satellites : if 22 or less are operative, check the availability of the GPS primary mode at destination using the Litton ground prediction programme.

– GPS PRIMARY must be displayed on both MCDUs before starting the approach.

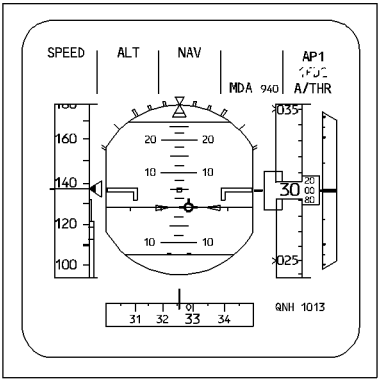
● If GPS PRIMARY is lost on one side during the approach :

– Use the other side

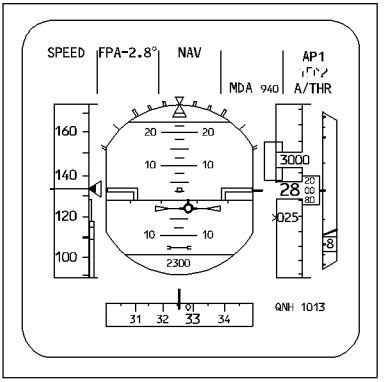
● If GPS PRIMARY is lost on both sides or if "FM/GPS POS DISAGREE" ECAM warning is triggered during the approach :

– PERFORM a Go around

R NON PRECISION APPROACH - MANAGED LATERAL SELECTED VERTICAL GUIDANCE R



PFD in intermediate approach, FPD and FPV selected. The pilot did not press the APPR pushbutton, the V DEV scale is not displayed.(If GPS is installed, the V DEV scale is displayed when the approach phase is active).



PFD when established on final path: The vertical guidance is the final path angle, as selected by the pilot (FPA); the lateral guidance is computed by the FM (NAV).

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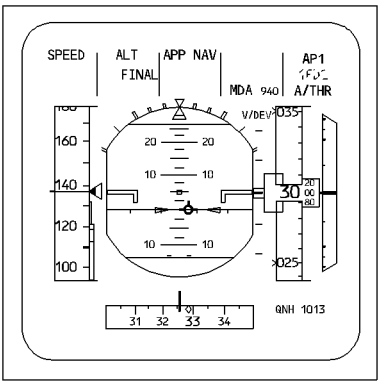
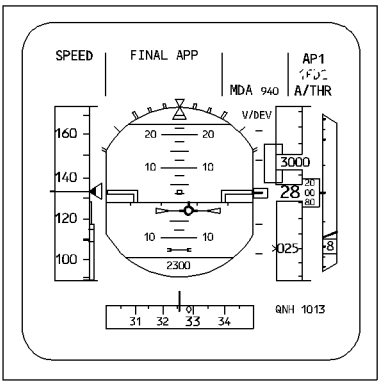
R NON PRECISION APPROACH - LATERAL AND VERTICAL MANAGED GUIDANCE R



PFD in intermediate approach, FPD and FPV selected. The pilot has pressed the APPR pushbutton, the FINAL managed mode is armed, the V DEV scale is displayed.(If GPS is installed, the V DEV scale is displayed when the approach phase is active).
Each V DEV graduation indicates 100 feet, the rectangle shows the computed vertical path versus the aircraft position.



PFD when established on final path: The lateral and vertical guidances are managed by the FM (FINAL APP).

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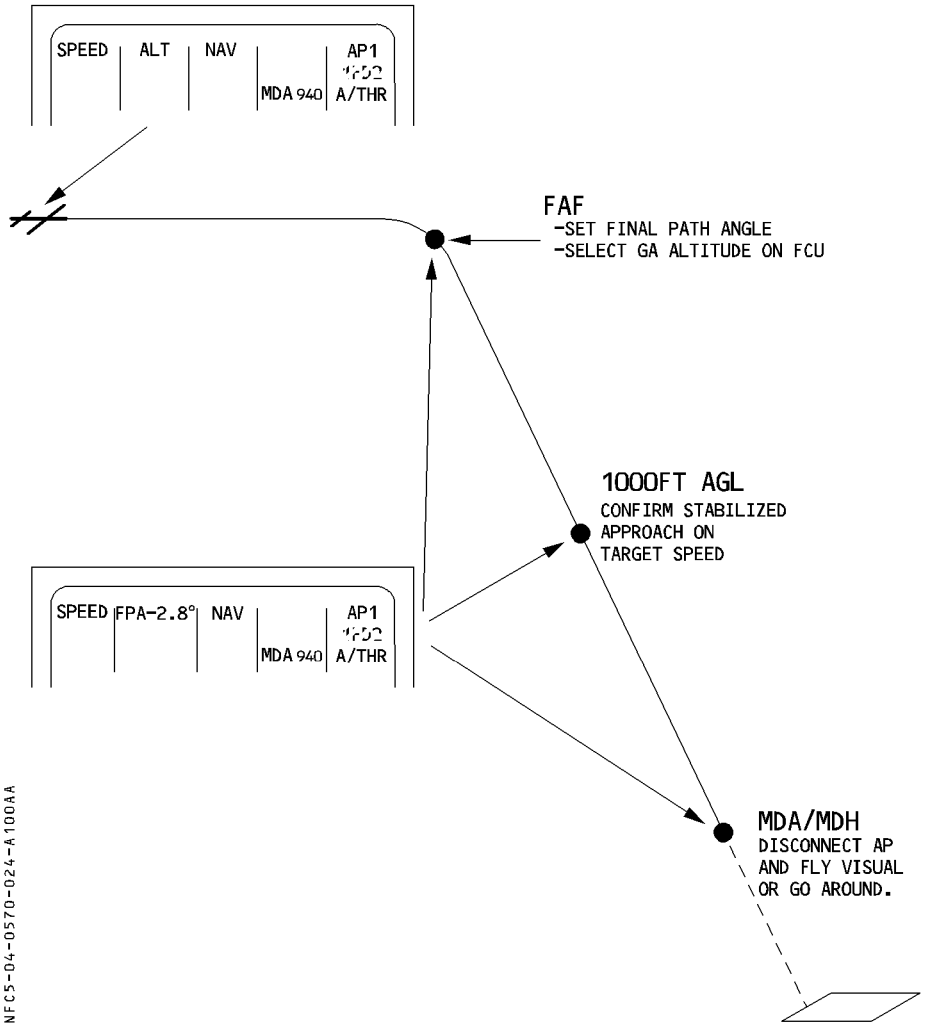
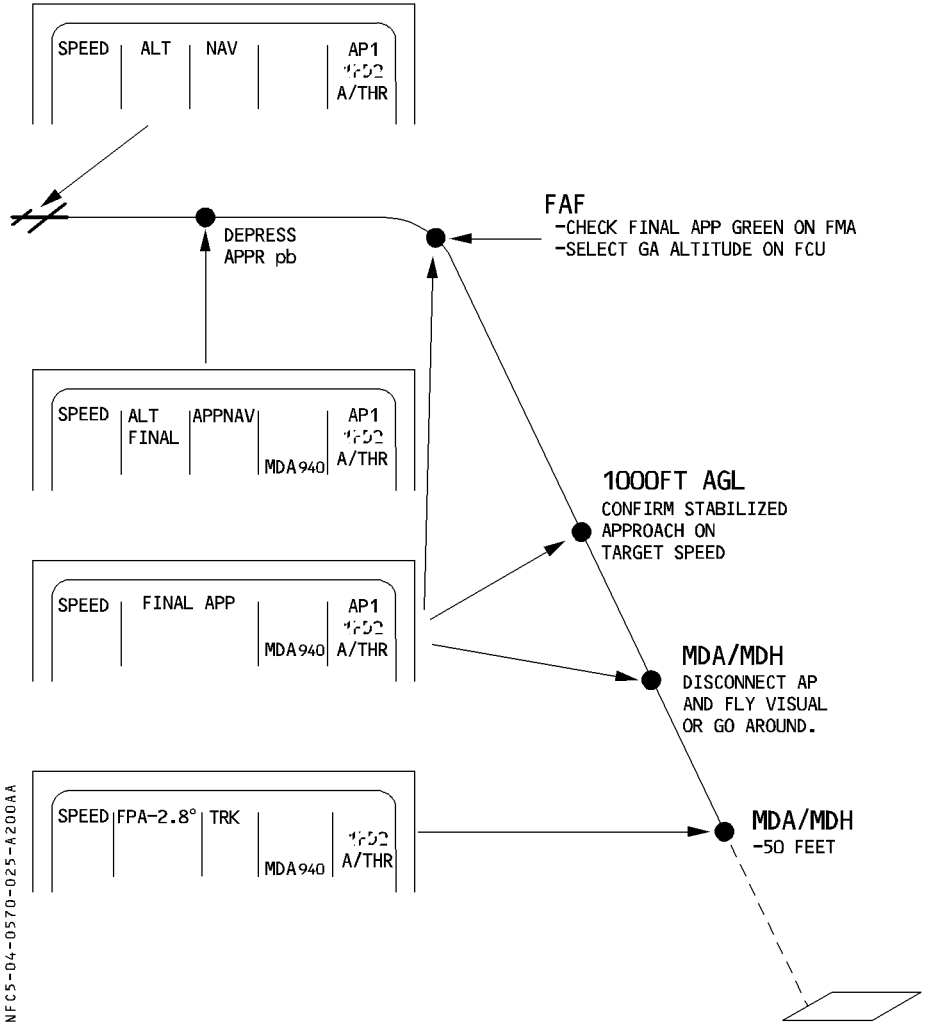
R **NON PRECISION APPROACH PROFILE - MANAGED LATERAL AND SELECTED VERTICAL**
R **GUIDANCE**
R



NON PRECISION APPROACH PROFILE - LATERAL AND VERTICAL MANAGED GUIDANCE



CAUTION

R When FINAL APP NAV modes are engaged, the AP/FD will disengage at MDA/MDH - 50 ft (if entered) or 400 feet AGL if no MDA/MDH entered.
The FDs will revert to basic modes (HDG-V/S or TRK-FPA).

SELECTED NON PRECISION APPROACH

R The non precision approach is flown in selected modes (TRK-FPA or HDG-V/S) when :
R * the approach is not stored in the database or
R * GPS PRIMARY is lost and the nav accuracy check is negative.

INTERMEDIATE APPROACH

Procedure

- **USE TRK-FPA mode**
- **SELECT ND in the ROSE VOR mode**
- **KEEP the autothrust active**
- **USE managed speed**

FINAL APPROACH

Upon reaching the final approach fix

- **SELECT a final approach track on the FCU**
- **SELECT an FPA (flight path angle) to the final descent path angle**
  Anticipate the selection of FPA to smooth the interception of the final path.

  Note : If the pilot is using the AP, select the final FPA approximately 0.3 NM before the final approach fix.

- **SELECT a go around altitude on FCU.**
- **USE raw data to monitor aircraft position and flight path.**
- **AT MDA/MDH**

● **If visual references are acquired**

- **DISCONNECT the autopilot and continue the approach visually.**

● **If visual references are not acquired**

- **INITIATE a go around**
  If the aircraft has arrived at MDA/MDH prior to reaching the missed approach point, a level off may be performed while searching for visual reference.
- **At MAP at the latest, go around.**

NON DIRECTIONAL BEACON (NDB) APPROACH TYPE

When the flight plan calls for an NDB approach, the system automatically tunes the ADF, only when the aircraft is passing the first fix of the approach. Therefore, it is convenient to manually tune the ADF earlier (before activating the approach phase).
Fly a Non Directional Beacon (NDB) approach as any non precision approach.

LOC APPROACH TYPE

– SELECT the LOC pushbutton in intermediate approach, to arm the LOC mode.

R

CAUTION

Do not select the APPR pushbutton.

– SELECT the ND in ROSE ILS mode.

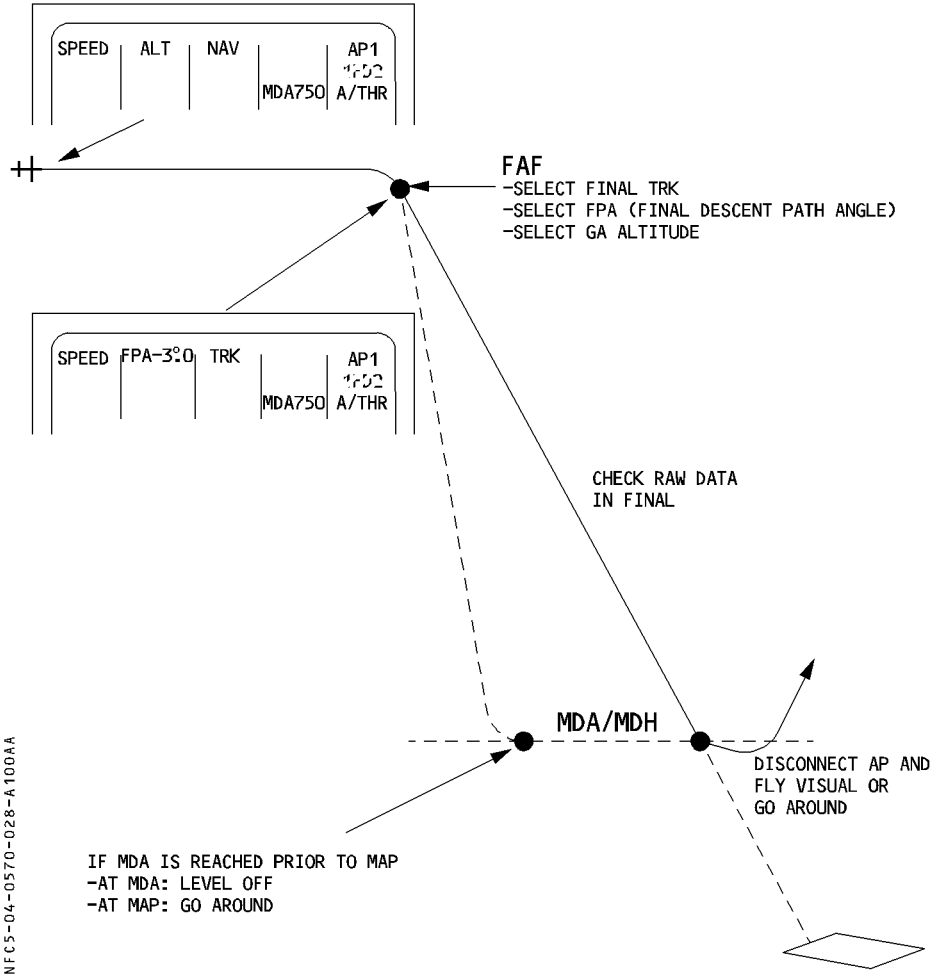
- **Upon reaching the final approach fix :**

  – MONITOR LOC engagement.

  – SELECT the FPA to the final descent path angle.

R R *Note : In case of a dual Radio Altimeter (RA) failure, the LOC pushbutton can still be used to arm the LOC mode, as it does not depend on the RA signal.*

NON PRECISION APPROACH PROFILE - SELECTED GUIDANCE



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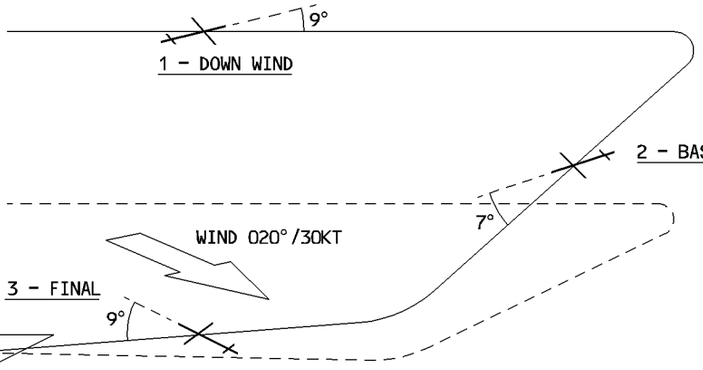
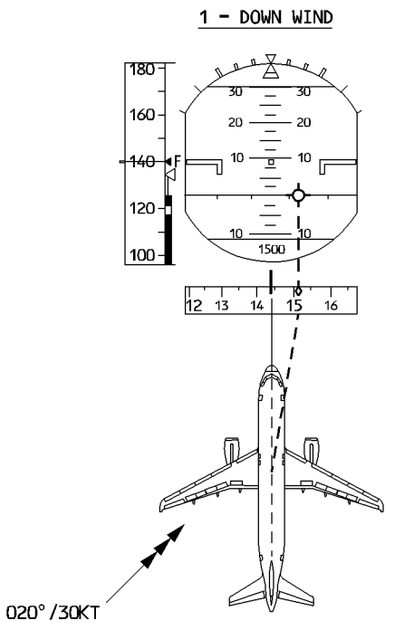
CIRCLING APPROACH

If the pilot chooses not to follow the SOP procedure, select both FDs OFF and fly visually.
If the runway in use is not the flight plan runway, the ground speed and the VAPP will not be computed properly, and the speed on final may be higher than excepted.
Therefore, select the approach speed directly on the FCU.

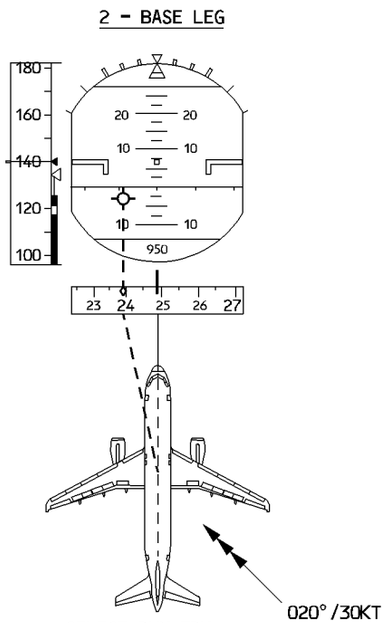
VISUAL APPROACH

When flying visual, the pilot may select an appropriate STAR and RWY in use on the MCDU.
The ND displays the extended runway centerline five nautical miles out from the runway. This helps the pilot during the final turn.
Along with the FPV, the PFD displays a track bug that may help the pilot to fly the downwind leg and intercept final. The FPV should be flown laterally with reference to the track bug.

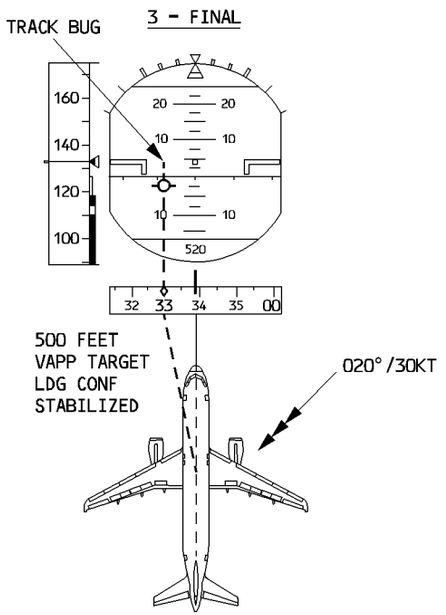




FPV ALIGNED ON THE HORIZON
FOR LEVEL FLIGHT
9° RIGHT DRIFT DUE TO CROSS
WIND FPV IN LINE WITH THE
TRACK BUG SELECTED ON THE
FCU



SELECT RWY TRK
WITH FCU SELECTOR
MAINTAIN A CONSTANT
SLOPE.
FLAPS 3-F SPEED



2°5 GLIDE SLOPE
9° LEFT DRIFT
FPV AND BUG ALIGNED
RWY AXIS MAINTAINED

MONITORING THE GO AROUND

Engage the GO AROUND phase and modes by setting the thrust levers to TOGA position if at least CONF1 is selected.
When the GO AROUND phase is engaged, the previously flown approach is automatically strung back in the flight plan at the end of the missed approach procedure.
In the GO AROUND phase, the system makes no predictions. Consequently, CLB and DES modes are not available, and the pilot must observe constraints.
When the aircraft leaves the GO AROUND phase, all predictions and modes become available again. In go around, the managed speed is green dot.

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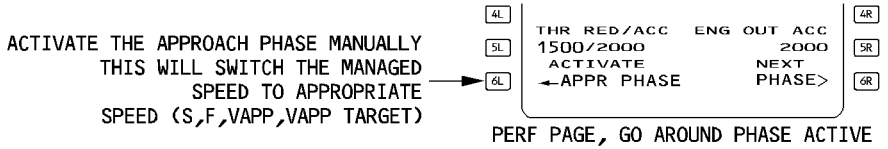


PERF PAGE, GO AROUND PHASE ACTIVE

HEADING/TRACK PRESET FUNCTION IN GO AROUND PHASE

The pilot can use the heading/track preset whenever LOC*, LOC, LAND, FINAL or GA is engaged.

- **SET the appropriate heading or track value in the window of the FCU.**

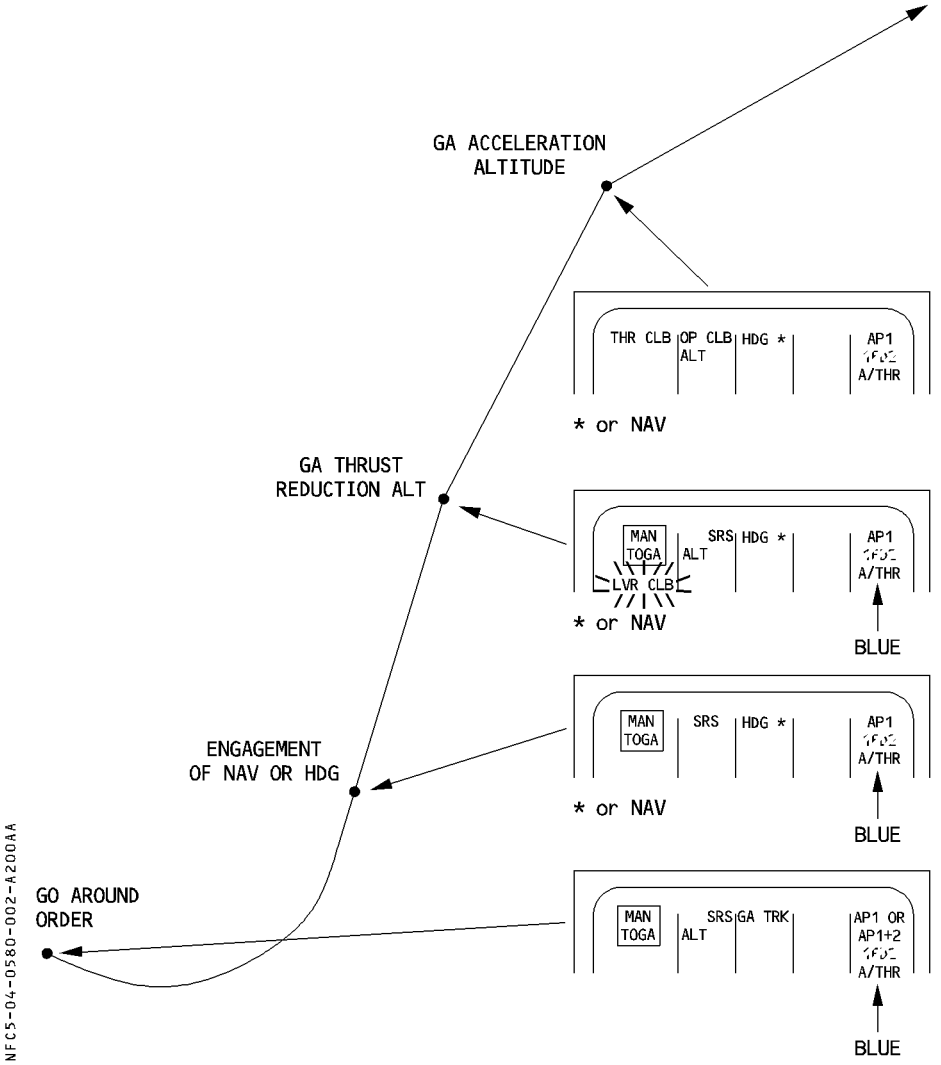
- **When necessary, PULL the HDG/TRK selection knob to engage the mode on the preset value.**

GO AROUND WITHOUT SETTING TOGA THRUST

Performing a go around without setting the thrust levers to TOGA will sequence the destination and erase the active flight plan when flying over or abeam the airport (less than
R 7 miles) and prevent engaging go around mode. If TOGA thrust is not required, proceed as
R follows in order to avoid flight plan loss :
R – SELECT TOGA thrust temporarily.
R Go around mode and go around phase will engage.
R – RETARD thrust levers as required.
R – COMPLETE normal go around procedure.

GO AROUND PROFILE

– **Apply SOP procedures**



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MISSED APPROACH : TRY AGAIN

If the pilot intends to fly another approach to the destination
– The flight plan has all the data necessary for the missed approach.
– Green Dot is the target speed.

- **When cleared by ATC to follow the missed approach procedure :**

  – ENGAGE NAV mode or

  – TURN and PULL the HDG selector knob to set a heading
  HDG or TRK or NAV modes can be engaged only above 100 feet.

- **When entering the initial approach area**

  – Activate the approach phase on the MCDU PERF GO AROUND page.

  - **If the APPR phase is not activated :**
    – Managed approach speed will not be available.
    – The system will not furnish predictions.
    – MDA/MDH/DH displays will not appear on the PFD.

MISSED APPROACH : DIVERT

- **If the crew decides to divert to the alternate :**

  – ENABLE ALTN, preferably at the TO waypoint.

- **When cleared to a waypoint**

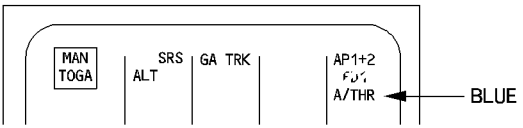
  – PERFORM a DIRECT TO.

The system reverts automatically to CLB phase and modifies the target speed from Green Dot to initial speed.
The system automatically sets the CRZ FL at the defaulted alternate CRZ FL (FL 220 or 310), and retains the previous cost index.
The pilot may adjust these as necessary.

Note : Diversion may also be initiated by entering a NEW DEST in the LAT REV page at the TO Waypoint or using the secondary F-PLN if prepared. Refer to 4.04.10.

TASK SHARING DURING A GO-AROUND

PF	PNF
-Announce "GO AROUND, FLAPS" simultaneously set thrust levers to TO GA	Retract flaps one step and monitor engine parameters
-Monitor the flight path	



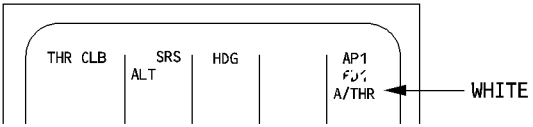
When rate of climb is positive

	-Announce "POSITIVE CLIMB"
-Announce gear retraction	-Retract the gear and confirm "GEAR UP"

When LVR CLB flashes on FMA

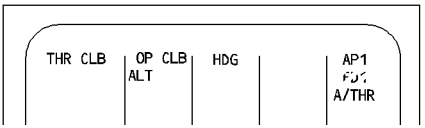
-Set thrust levers to CL detent	During CAT2,CAT3 Announce 200ft and 300ft

-Push or Turn/pull HDG/TRK sel knob on FCU according to ATC clearance



At go around acceleration altitude

-Turn/pull ALT sel knob on FCU according to ATC request.OP CLB engages.
-Select speed as appropriate.



A call out must be done by the PNF as follows:

"BANK": if bank angle becomes greater than 7°
"PITCH": if pitch attitude becomes greater than 20° or less than 10° up
"SINK RATE": if there is no climb rate

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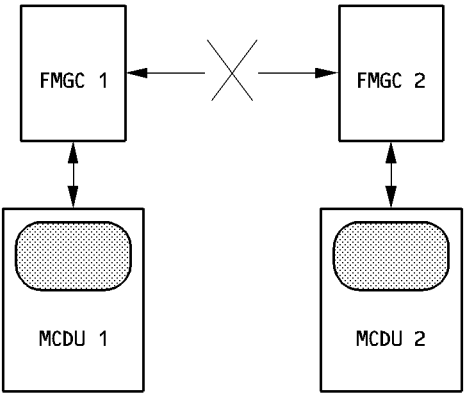
INDEPENDENT MODE



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The system automatically selects this degraded mode under specific abnormal conditions. (e. g. different database validity on both FMGCs).
While this occurs, the "INDEPENDENT OPERATION" message is displayed on both MCDU scratchpads.

R On the POS MONITOR page (and GPS MONITOR page ◁*▷), FMGS position (and GPS
R position ◁*▷ from the opposite FMGC is not displayed.
On the RAD NAV page (and PROG page, if the FMGS GPS is not installed), navaids tuned on the opposite MCDU are not displayed. Corresponding fields are blank.

Procedures on ground

If each FMGC is loaded with a different database, the FMGS will only operate in independent mode.

- **CHECK the database number and validity.**

- **CROSSLOAD ◁* the database to restore the dual operation.**
  Crossload function is an optional function, operative in the preflight or done phase, when an independent operation is detected.

Procedures in flight

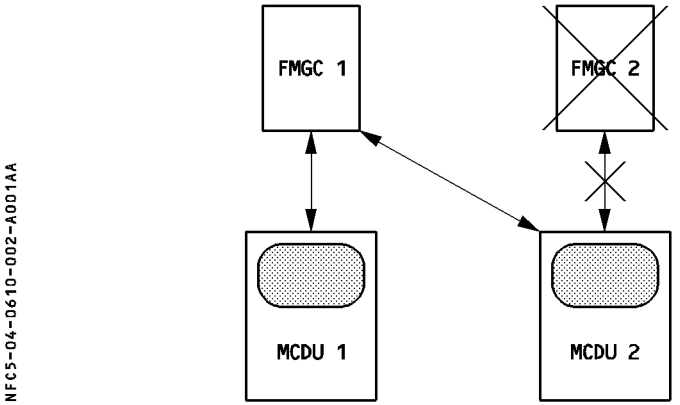
- **Do not switch the navigation databases.**

- **Make the same entries on both MCDUs to have both AP/FDs similar orders.**
  – Both FGs being valid, 2 APs may be engaged for CAT II or CAT III operations.

R ● **In the event of a go-around and when the second AP is disconnected :**

R **– ENSURE that the FMGC in command has correct flight plan orders and an**
R **updated nav database.**
R – Airbus does not recommend pulling one FMGC circuit breaker to force the system
R to operate in SINGLE mode.

SINGLE MODE



The system automatically selects this degraded mode when one FMGC fails.
While this occurs, the failed FMGC displays "OPP FMGC IN PROCESS" on the MCDU scratchpad. The corresponding ND displays the "SELECT OFFSIDE RNG/MODE" amber message.
Both POS MONITOR pages display the same position (operative FMGC position).
Both FDs are driven by the same FMGC.
Any entry on either MCDU is sent to the operative FMGC.

Procedures

● **If a transient failure triggers a single mode of operation :**
DO NOT USE the MCDU(s) until the PLEASE WAIT message is suppressed.

– Set both NDs on the same range and mode to display the same information from the operative FMGC.

– When convenient, you will reset the failed FMGC using the procedure described in this chapter.

AUTOMATIC FMGS RESET AND RESYNCHRONIZATION

FM RESET

When the FM software cannot work properly or receives instructions to perform impossible operations, it automatically resets itself. A resynchronization with the other FM always follows.

When the reset is a minor one, the system will recover by itself. One single reset lasts 2 to 3 seconds maximum followed by 25 seconds of resynchronization.

When the reset is a major one :

- Resets recur at short intervals (several in two or three minutes).
- The memories are cleared, leading to the loss of F-PLN, GW, CI, CRZ FL, MCDU-entered speeds and navaids and to database switching.

FM RESYNCHRONIZATION

An FM resynchronization automatically occurs after an FM reset but it may occur independently each time self comparisons between FM1 and FM2 reveal discrepancies.

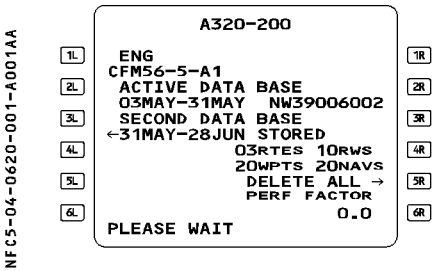
One single resynchronization lasts approximately 25 seconds.

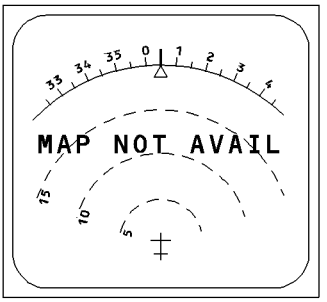
If 5 several resynchronizations occur within 5 minutes, independent mode commences.

FMGC STATUS DURING A RESET/RESYNCH

While a RESET/RESYNCH occurs :

- The ND shows "MAP NOT AVAIL".
- The MCDU reverts to the A/C STATUS page, with "PLEASE WAIT" displayed in the scratchpad.
- Autotuning of Navaids (VOR, DME, ADF) are lost on the failed side.
- AP and managed modes may be transiently lost (reversion to HDG/V/S or TRK/FPA).
- If the pilot presses a key while the scratchpad is showing "PLEASE WAIT", there is no change at MCDU level. This is normal, and the crew should no respond by pulling the MCDU circuit breaker.





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SINGLE RESET or DUAL RESET WITH AUTORECOVERY

If the RESET/RESYNCH succeeds, all functions are recovered.

R *Note : When a FMGC is recovered, its FD if previously engaged, is also recovered and its*
R *status is displayed on the FMA.*

Procedure

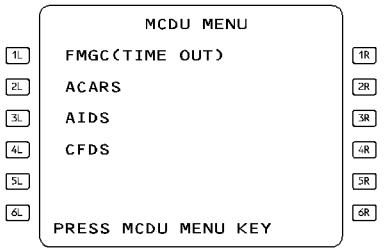
– RESELECT the convenient MCDU page.

– REENGAGE managed modes and the AP.
WAIT one minute after the "PLEASE-WAIT" message has disappeared, before engaging the AP/FD of the failed FMGC.

R **– If "MAP NOT AVAIL" remains displayed, along with "SET OFFSIDE RNG/MODE"**
R **on one ND, temporarily SELECT a different mode on the corresponding EIS**
R **control panel.**

SINGLE LATCH

If five successive resets occur, the failing FMGC will latch, and single mode operation commences.
While failed, the following occurs :
– The failed ND side displays "MAP NOT AVAIL" and "SELECT OFFSIDE RNG/MODE" (if the NDs are not both in the same mode or range).
– The MCDU reverts to the MENU PAGE and shows an "FMGC TIME OUT" prompt.
– If the AP and FD were previously engaged on the failed side, the AP and FD disengage and the right-hand column of the FMA shows that the operating FD is offside. The ECAM displays the "AP OFF" warning, and the master warning light and audio remind the pilot of the AP disengagement.
– All functions are restored on the operative side.



MCDU MENU PAGE on the failed side

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Procedure

– Select the same range and mode on both NDs to give the failed ND side something to display.

– **Select any function key on the affected FMGC MCDU. (The page will come up displaying "OPP FMGC IN PROGRESS").**
Both MCDUs are now being driven by the other FMGC, and only one AP/FD is available. The system works in SINGLE Mode.

– **Perform a manual reset of the failed FMGC when convenient.**

DUAL RESET WITH LOSS OF DATA AND AUTORECOVERY

Three successive dual resets without result erases all pilot-entered data (F-PLN, GW, CRZ FL, CI...).
When FMGS recovery is obtained :
– Database cycle may have switched.
– The FM position bias is lost. The FM position returns to the MIX IRS position.
– Autotuning the VOR/DME is restored, based on the aircrafts' IRS position.
– FMGS tuning of the ILS and ADF is not possible.
– Lateral and vertical managed mode cannot reengage.
– The "CAB PR LDG ELEV FAULT" ECAM message is displayed.
– A map display may be lost on one ND.

Procedure

When the system has recovered :

– **SELECT the initial database.**

– **SELECT DIR TO the required downpath waypoint.**

– **SELECT LAT REV at the downpath waypoint and redefine the DESTINATION.**

– **SELECT the FUEL PRED page and enter GW.**

– **SELECT the PROG page and enter CRZ FL.**

– **SELECT the PERF page and enter CI.**

– **CHECK or reengage (as appropriate) the relevant speed/Mach target and vertical mode.**
Redefine the flight plan for the remainder of the flight, as the opportunity to do so presents itself.
A manual FM position update should be considered, if MIX IRS and actual positions differ from more than 20 NM.

R – **If "MAP NOT AVAIL" remains displayed, along with "SET OFFSIDE RNG/MODE"**
R **on one ND, temporarily SELECT a different mode on the corresponding EIS**
R **control panel.**

– **PERFORM a NAV accuracy check, when possible.**

DUAL LATCH

– Both FMGCs are inoperative. FM and FG capability are lost.
– Both NDs display "MAP NOT AVAILABLE". Navaid tuning is not performed.
– AP/FD, A/THR are lost.
– FMGC (TIME OUT) subsystem page is displayed on both MCDUs.
– The following messages are displayed on the ECAM :
"CAB PR LDG ELEV FAULT"
"AUTO FLT AP OFF", if AP was engaged
"AUTO FLT A/THR OFF", if A/THR was engaged.

Procedure

– **FLY raw data.**

– **TUNE necessary navaids using the RMPs.**

– **PERFORM a manual reset of both FMGCs.**

Note : A recovery will result in the loss of all pilot-entered data.

Note for all FMGS automatic resets

– A single or double FM auto-reset does not affect an ILS approach below 700 feet AGL. ILS frequency is locked and AP/FDs remain engaged.
– Above 700 feet, the loss of ILS tuning due to a dual reset will cause a loss of LOC and G/S, and the disengagement of APs and FDs.
– During a non ILS approach, if the master FMGC fails, AP/FD and managed modes are lost and FDs engage in basic modes.

MANUAL RESET OF FMGCs

The FMGC may, on rare occasions, require manual resetting. If this occurs in flight, reset one FMGC at a time.

MANUALLY RESETTING ONE FMGC

- Before resetting FMGC 1 (or 2), SWITCH OFF FD 1 (or 2).
  After applying external power or APU generator power, wait two minutes before resetting the FMGC circuit breakers.
- Pull the CB of the affected FMGC and reset it after five seconds. The circuit breakers for the FMGC's are :
  – AUTO FLT/FMGC 1 M16 ON 121 VU, or B2 ON 49 VU, with Mod 20748.
  – AUTO FLT/FMGC 2 M17 ON 121 VU

CAUTION

Always wait 1 minute after the "PLEASE WAIT" message disappears from the MCDU, before engaging or re-engaging the FDs and the AP of the reset FMGC.

MANUALLY RESETTING BOTH FMGCs

When the aircraft is on the ground with engines stopped, the pilot crew may attempt a double and simultaneous CB resets when a single CB reset has failed.
Apply the procedure described above to both FMGCs.

ERRONEOUS PREDICTIONS

The FMGS may display temporary erroneous predictions that can affect various data such as ECON speed/Mach, optimum flight level, fuel or time predictions.
If erroneous predictions are observed :

On ground :

– **Check the cruise temperature (sign and value), the gross weight and the cruise flight level.**

On ground or in flight :

– **REENTER the same cost index to restart a computation or**

– **MAKE a COPY ACTIVE then activate the secondary or**

– **MAKE a DIR TO the "TO" waypoint**
(In descent or approach, a cost index change does not restart a computation).

SPURIOUS ENGINE OUT INDICATION

A spurious engine-out indication will be triggered on aircraft fitted with IAE engines, when one engine reverts from EPR to N1 mode.

Procedure

- **PRESS the EO CLR prompt of the MCDU PERF page**
- **RE-ENGAGE previous vertical mode**
- **RE-ENTER preselected speeds (if any). No other consequences are to be expected.**

CAT 3 DUAL INOPERATIVE

If "CAT 3 DUAL" is displayed in INOP SYS without any other failure being detected :

- **CHANGE the AP in command. It may allow the CAT 3 DUAL function to be recovered.**

If this procedure fails :

- **SET FAC 1 pushbutton to OFF, and back to ON**
- **WAIT for FAC 1 fault ECAM warning to disappear, and**
- **APPLY the same sequence for FAC 2.**

FM/GPS POS DISAGREE MESSAGE ◁*

This ECAM message is triggered when either one of the FM positions differs from either of the GPS positions by more than 0.5 minutes of latitude or longitude.
This may occur when an update of the FM positions is performed automatically by the FM (Takeoff update or loc update in approach with unprecise airfield or navaid position within the database), or manually by the pilot (manual update). For procedure, refer to abnormal procedure 3.02.34 and QRH.

"CHECK GW MESSAGE"

"CHECK GW MESSAGE" appears on the MCDU when the gross weight computed by the FM and that computed by the FAC disagree by more than seven tons (16055 LB). When this message appears :

- **CALL UP the MCDU FUEL PRED page and CHECK the current GW (= main engine start weight from load sheet – fuel used) and correct it if necessary.**

- **If the current GW on the MCDU is correct. (FM characteristics speed displayed on the MCDU are correct).**
  DISREGARD the computed FAC characteristics speed (Vls, F, S, Green Dot) and refer to speeds given in the QRH.
  (FM characteristics speed displayed on the MCDU are correct).

- **If the load sheet seems to be the cause of the discrepancy**
  COMPARE FAC and QRH speeds, and select the most appropriate.

R ## "AUTO FLT A/THR OFF MESSAGE"

R "AUTO FLT A/THR OFF MESSAGE" may be displayed on the ECAM during cockpit
R preparation when the FCU A/THR pushbutton has been used on ground to arm and disarm
R the A/THR. (It is sometimes performed for maintenance purpose).

R **Procedure before engine start :**

R – **ARM the A/THR with the FCU pushbutton to clear the message.**
If one engine is started, the FCU pushbutton is inhibited until takeoff and the crew cannot clear the message.

R **Procedure after engine start :**

R – **WAIT until takeoff initiation, the warning will automatically disappear when the**
R **thrust levers are set to FLX or TOGA.**

R *Note : If the warning comes up after engine start, envisage an A/THR failure.*

MCDU LOCKED or BLANK

1. When one MCDU locks up, or becomes blank, all FMGS functions remain available, but the pilot cannot enter information into the MCDU, and cannot call up any MCDU pages for display.

   Procedure
   – PULL the CB for the locked or blank MCDU, and PUSH it back in after 10 seconds.

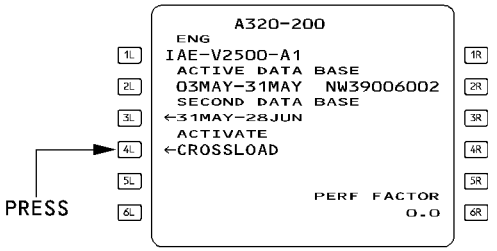
   Note : During a RESET/RESYNC, if the crew presses a key while the scratchpad is showing "PLEASE WAIT", there is no change at the MCDU level. This is normal, and the pilot should not respond by pulling the MCDU CB.

2. When both MCDUs are simultaneously locked up, the failure is usually due to an FMGC software anomaly.

   Procedure
   – Pull the FMGC1 CB and push it back in after 10 seconds. If unsuccessful, reset the FMGC2 CB.

CROSSLOAD OF NAV DATABASE

Both FMGCs are sometimes loaded with 2 different NAV database. The DUAL mode of operation is not possible until both FMGCs receive the same database.
This may occur when a spare FMGC is loaded on an aircraft very lately before the flight. The crossload procedure will be applied to restore the DUAL mode of operations.
CROSSLOAD can be initiated during preflight or done phase only.
The MCDU to be used is the MCDU of the FMGC loaded with the correct NAV database.



AIRCRAFT STATUS PAGE

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Procedure :

- **PRESS"ACTIVATE CROSSLOAD" key, on the sending MCDU [4L].**

- **PRESS "CONFIRM CROSSLOAD" key displayed in the same field [4L].**
  Crossloading is initiated and "CROSSLOAD IN PROCESS" is displayed on both MCDUs. While crossload is in process, the current percentage of crossload completion is displayed and the FMGCs can not be used.

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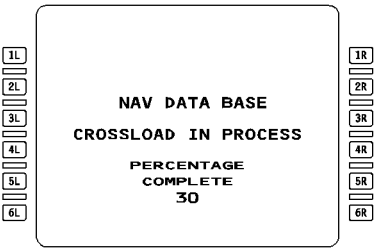

CROSSLOAD PAGE

Note : If flight phase transitions from PREFLIGHT or DONE while crossload is in process, the crossload is aborted. If crossload is unsuccessful "CROSSLOAD ABORTED" is displayed on the both sides and the receiving side MCDU displays "NDB LOAD INCOMPLETE". This message is also displayed following a failed or incomplete data base loader operation.

Upon successful completion of the crossload, "CROSSLOAD COMPLETE" message is displayed on the MCDU. A RESYNCH occurs and both MCDUs return to the AIRCRAFT STATUS page.

FMGC RESPONSE TO FAILURE CASES

This table shows how the FMGC responds to failures in other parts of the system.

R

FAILURE CASE	AP/FD	A/THR	LANDING CAPACITIES
FIRST IRS FAILURE	NO EFFECT	NO EFFECT	CAT 3 SINGLE
SECOND IRS FAILURE	TOTAL LOSS	TOTAL LOSS	RAW DATA
FIRST ADC FAILURE	NO EFFECT	NO EFFECT	CAT 3 SINGLE
SECOND ADC FAILURE	TOTAL LOSS	TOTAL LOSS	RAW DATA ONLY
FIRST LGCIU FAILURE	NO EFFECT	NO EFFECT	NO EFFECT
SECOND LGCIU FAILURE	TOTAL LOSS EXCEPT IN LAND MODE	TOTAL LOSS	RAW DATA ONLY EXCEPT IN LAND MODE (CAT 2 MAX)
LOSS OF ONE FMS COMPUTATION	LOSS OF ONE AP/FD/ATS EXCEPT IN APPR mode BELOW 700 FT AND GO-AROUND MODES		NO EFFECT BELOW 700 FT
FIRST SFCC FAILURE	NO EFFECT	NO EFFECT	NO EFFECT
SECOND SFCC FAILURE	TOTAL LOSS EXCEPT IN LAND MODE	TOTAL LOSS	Raw data EXCEPT IN LAND MODE (CAT 2 MAX)
FIRST RADIOALTIMETER FAILURE	NO EFFECT	NO EFFECT	CAT 2
SECOND RADIOALTIMETER FAILURE	TOTAL LOSS OF ILS APPR MODE	NO EFFECT	ILS APPR* MODE INOP
TOTAL LOSS OF THE FCU	TOTAL LOSS EXCEPT IN LAND AND GO AROUND	TOTAL LOSS	RAW DATA EXCEPT IN LAND MODE (CAT 2 MAX)
FIRST ILS RECEIVER FAILURE	NO EFFECT	NO EFFECT	CAT 1
SECOND ILS RECEIVER FAILURE	TOTAL LOSS IN APPR mode (ILS)	NO EFFECT	(ILS) APPR MODE INOP
FIRST ELAC FAILURE	NO EFFECT	NO EFFECT	CAT 3 single
SECOND ELAC FAILURE	TOTAL LOSS OF AP	NO EFFECT	CAT 1

R * LOC mode can be armed through the LOC pushbutton.

R

FAILURE CASE	AP/FD	A/THR	LANDING CAPACITIES
FIRST FAC FAILURE	NO EFFECT	NO EFFECT	CAT 3 SINGLE
SECOND FAC FAILURE	TOTAL LOSS OF AP EXCEPT IN LAND MODE BELOW 100 FT AND BEFORE ROLL-OUT	TOTAL LOSS	CAT 1 NO EFFECT BELOW 100 FT if previously CAT 2/3
FIRST YAW DAMPER OR RUDDER TRIM FAILURE	NO EFFECT	NO EFFECT	CAT 3 SINGLE
SECOND YAW DAMPER OR RUDDER TRIM FAILURE	TOTAL LOSS OF AP EXCEPT IN LAND MODE BELOW 100 FT AND BEFORE ROLL-OUT	NO EFFECT	CAT 1 NO EFFECT BELOW 100 FT if previously CAT 2/3
FIRST BSCU FAILURE	NO EFFECT	NO EFFECT	NO EFFECT
SECOND BSCU FAILURE	NO EFFECT	NO EFFECT	CAT 3 SINGLE
TOTAL LOSS OF ONE FADEC	NO EFFECT	TOTAL LOSS	CAT 2
LOSS OF EPR (IAE ONLY)	NO EFFECT	LOSS OF A/THR	CAT 2
FIRST FWC FAILURE	NO EFFECT	NO EFFECT	CAT 3 SINGLE
SECOND FWC FAILURE	NO EFFECT	NO EFFECT	CAT 1
LOSS OF PFD DATA ON ONE SIDE	NO EFFECT	NO EFFECT	CAT 1
TOTAL LOSS OF ONE FMGC	LOSS OF ONE AP/FD	LOSS OF ONE ATS	CAT 3 SINGLE
DOUBLE HYDRAULIC FAILURE	TOTAL LOSS OF AP	NO EFFECT	CAT 1

07.00 CONTENTS

07.10 GENERAL INDEX

1. GENERAL INDEX

- The following index lists the main terms used in the FMGS chapter.

A

F

M

N

O

P

Q

R

W

Z