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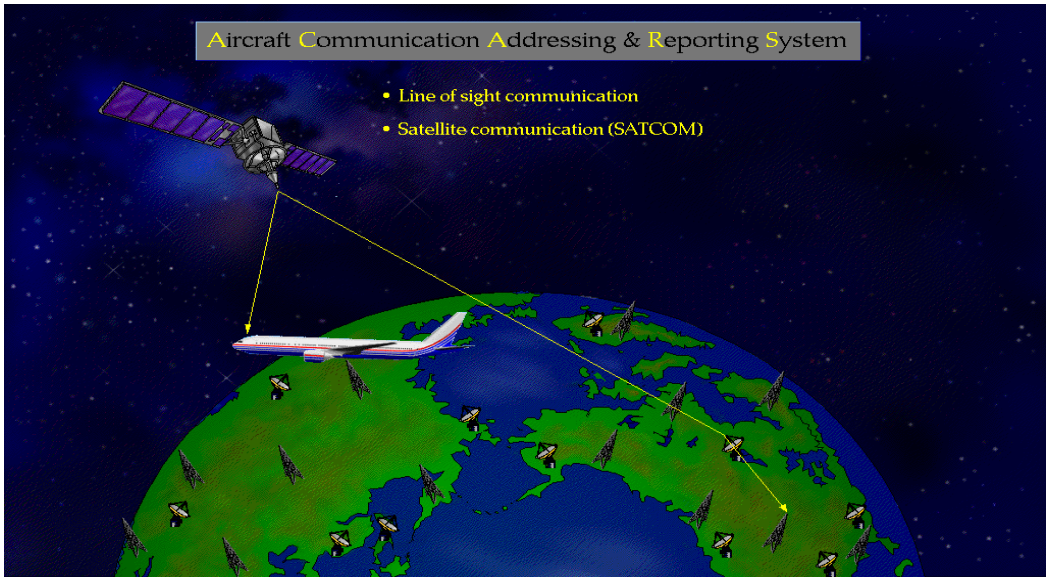
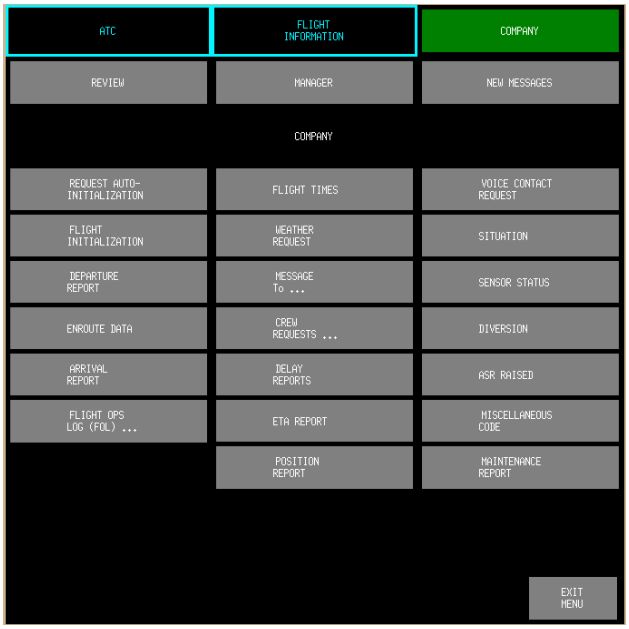
ACARS DATALINK - Pilot User Manual

Boeing 777 Etihad Airways





FDCF Block Point 14

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Document Description

ACARS (**A**ircraft **C**ommunications, **A**ddressing and **R**eporting **S**ystem) is a two way Aircraft Ground Data Link. It provides a permanent link to the **ETIHAD** home base either via VHF or through **SATCOM** (**Sat**ellite **Com**munications System) and allows the exchange of information relevant to your flight.

SECTION 1

PART 1 - General Description of B777 ACARS and FDCF system (pg.7)
- o Onboard systems interface
- o FDCF menus
- o ETIHAD FDCF design justification

PART 2 - Describes FDCF AMI configuration and new feature highlights (pg21)

PART 3 - Datalink Transactions: Routine crew procedures for completing ACARS-FOL (pg.27)

Menu step guide for the use of ETIHAD FDCF customized format for operational requirements and ATL/FOL data downlinks that Provides mainly the following functions:
- ♦ Automatic transmission of flight- and block times
- ♦ Transmission of **ETIHAD FOL** (**F**light **O**perational **L**og) data

PART 4 - Datalink Transactions: Non-Routine tasks/Miscellaneous Reports/Requests (pg.55)
- ♦ Weather information
- ♦ Transmission of pre-defined requests or messages
- ♦ Free text messages
- ♦ Transmission of aircraft and engine related routine or non-routine maintenance data (e.g. engine readings, fault codes etc.)

SECTION 2

Downlink pages are used by the flight crew to request information which contains ATC Clearances or ATIS reports. The crew may request oceanic or departure clearances or request ATIS information.
- ♦ Departure Clearance (DCL)
- ♦ Oceanic Clearance (OCL)
- ♦ Digital-Automatic Terminal Information services (d-ATIS)

This section describes how retrieve digital ATIS and pre-departure clearances and ORCA RCL. This function is available for selected airfields only.

PART 1 - Flight Information Functions - General description (pg.77)
PART 2 - Using the Flight Information Functions (pg.89)
PART 3 - Creating an ATIS Request (pg.93)
Creating an Oceanic Clearance Request (PG.96)
Creating a Departure Clearance Request (pg.98)

Acronyms

- **DCMF – Data Communications Management Function**
- **FDCF – Flight Deck Communication Function**
- **FMF – Flight Management function**
- **AMI – Airline Modifiable Information**

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SECTION 1

Part 1

1.1.0 General Description

Figure 1

Boeing 777 aircraft have the capability to send and receive data over ACARS (Aircraft Communication Addressing and Reporting System) during flight.

Recognising the potential for efficient data transmittal and process automation, Etihad now looks to achieve consistency in the ACARS output from entire fleet with the implement and extension of the customised AOC database on the B777 with the deployment of the customised AIMS FDCF DCMF AMI on the 777 fleet to replicate the new features added to the company system.

1.1.1 User Characteristics

The customised FDCF and DCMF AMI software program will be used on the flight deck by aircrew, and from time to time by engineering staff for troubleshooting. The outputs from FDCF, in the form of reports transmitted to the ground over ACARS will be consumed by in-house operational users and by ground systems in a number of departments, including Flight Operations, Finance, Fuel Plus and Ground Operations monitored by IT.

The ACARS Flight Operations Log (FOL Report) is designed as a replacement for the paper based ATL in use at the moment. The customised FDCF will provide menus to gather the data fields listed as company requirements, and at the end of the flight leg, the FDCF will print a formatted report of the ATL/FOL, and send a downlink of the FOL data fields.

1.1.2.0 ON-BOARD SYSTEM DESCRIPTION

1.1.2.1 The Communication display

The Communication display provides the crew interface with the Data Communication Management System (DCMS). The DCMS supplies these 3 functions

- The printer driver control
- The Onboard Local Area Network (OLAN) control
- The ACARS datalink management

1.1.2.2 DCMS

The DCMS uses these 2 AIMS functions;

- The data communication management function (DCMF)
- The flight deck communication function (FDCF)

The DCMS connects to many components of other systems to support its functions, such as Flight Deck printer, Maintenance access terminal (MAT), Brouter, Side Displays, Accept/reject/cancel buttons, Control Display Units (CDUs), Cursor control devices (CCDs), Display Units (DUs), Radio tuning panels (RTPs), VHF radios, Satellite data unit (SDU).

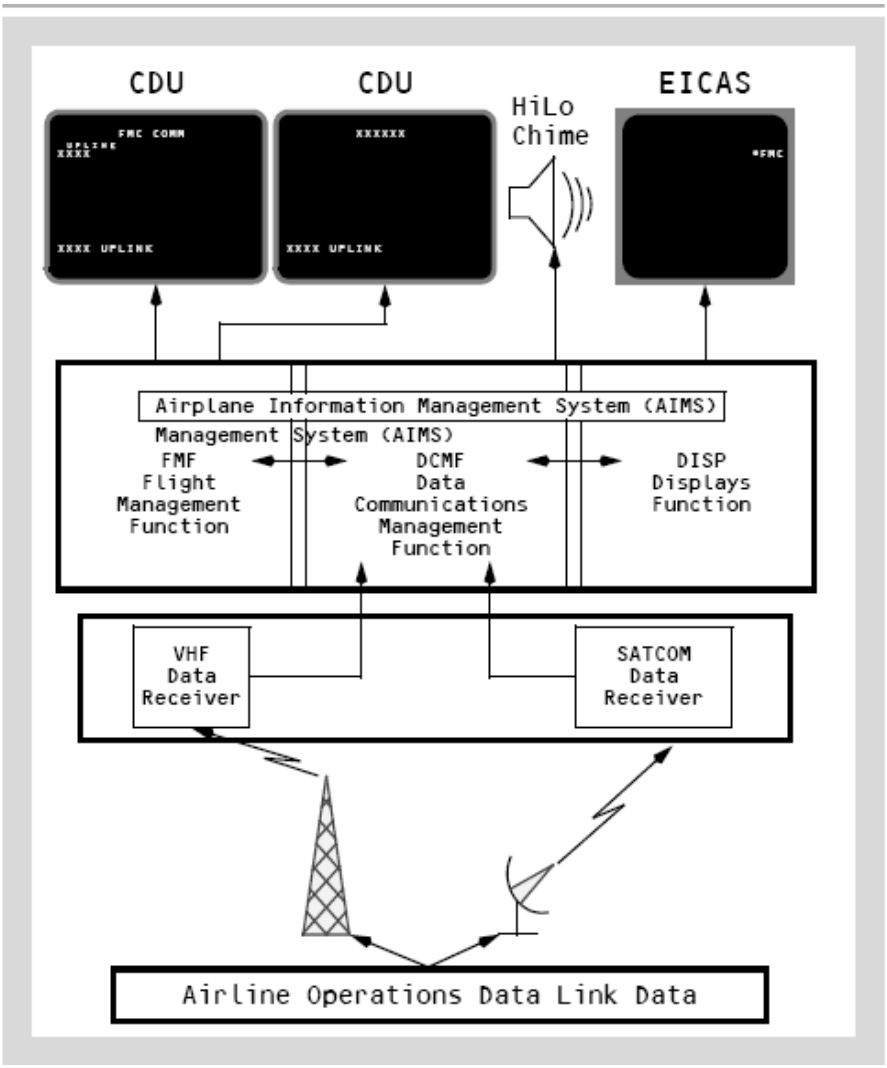


Figure 2

1.1.3 Air-Ground Data Communication Platform

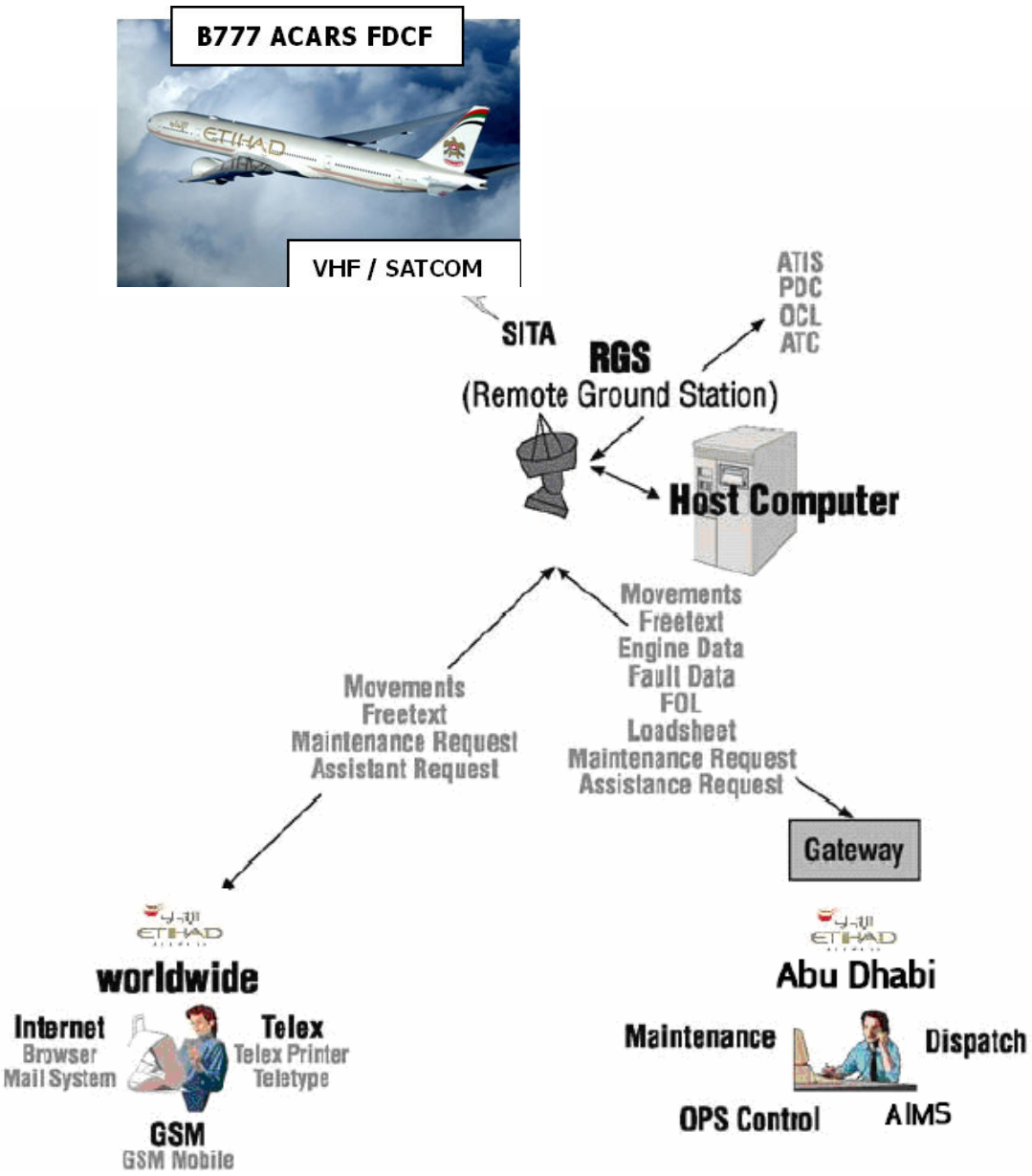


Figure 3

1.1.4 Ground System

The communication between aircraft and ground is routed via VHF or SATCOM through Remote Ground Stations (RGS) and a Host Processor.

The Host Processor provides formatting and distributing of the messages within the airline. It can also analyze and summarize information or generate reports.

1.1.5 ACARS datalink

The DCMS manages the aircraft communication addressing and Reporting System (ACARS) datalink data. The FDCF supplies the flight crew interface for control of ACARS operations. The DCMF determines if the VHF or SDU is available for the ACARS. The DCMF transmits the digital data through the available system.

The data communication system sends and receives datalink messages and may be accessed through any Multi Function Display (MFD) Flight crew can

- access received messages
- initiate downlink messages from prepared formats
- review previously received or initiated messages
- access system status and control features

ACARS (Aircraft Communication Addressing and Reporting System) is a two way Aircraft Ground Data Link system. It provides a permanent link to the Etihad home base either via VHF or through SATCOM (Satellite Communication System) and allows the exchange of information relevant to flight.

1.1.6 ACARS Menu

The ACARS Menu described in Section 1 Part 3 & Part 4 presents the customised FDCF specific requirements of Etihad and provides the following function;

- Automatic transmission of flight and block times
- Free text messages
- Transmission of Etihad ATL/FOL data
- Transmission of aircraft and engine related routine and non-routine maintenance data (e.g. engine readings, fault codes etc.)
- Weather information
- Transmission of pre-defined requests or messages

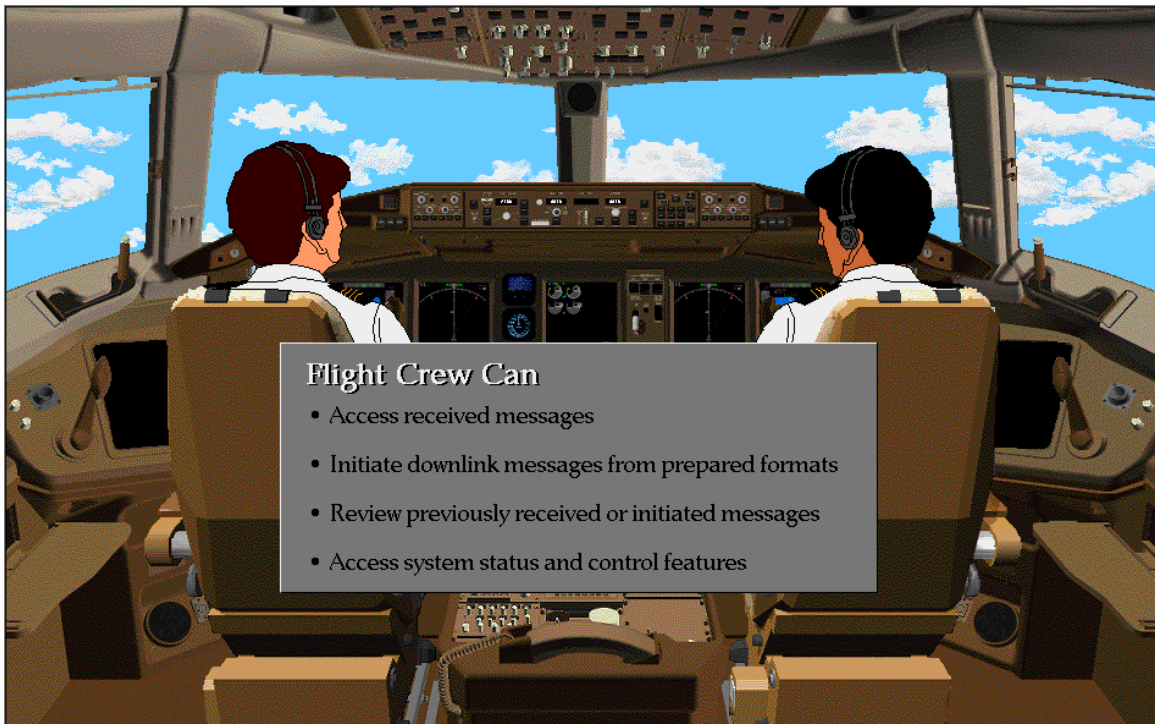


Figure 4

1.1.7 MFD (Multi Function Display)

The MFD communications functions are used to control data link features. Datalink messages not processed by the FMC are received, accepted, rejected, reviewed, composed, sent, and printed using communications functions on the MFD. Datalink communications can be established with participating ATC and company locations. ACARS and datalink radio management functions are provided through management menus.

The display select panel communication (COMM) display switch displays the communications menu on the selected multifunction display (MFD). Communications functions are selected using the curser control device. Message text entry is accomplished by entering data into the CDU scratchpad and transferring it to the appropriate area. Messages can be printed on the flight deck printer. Incoming message traffic is annunciated by EICAS communications messages.

1.1.8 ACARS Access through FDCF via COMM display

Figure 5

ACARS Access thru FDCF via COMM display

Figure 6

1.1.9 CCD (Cursor Control Device)

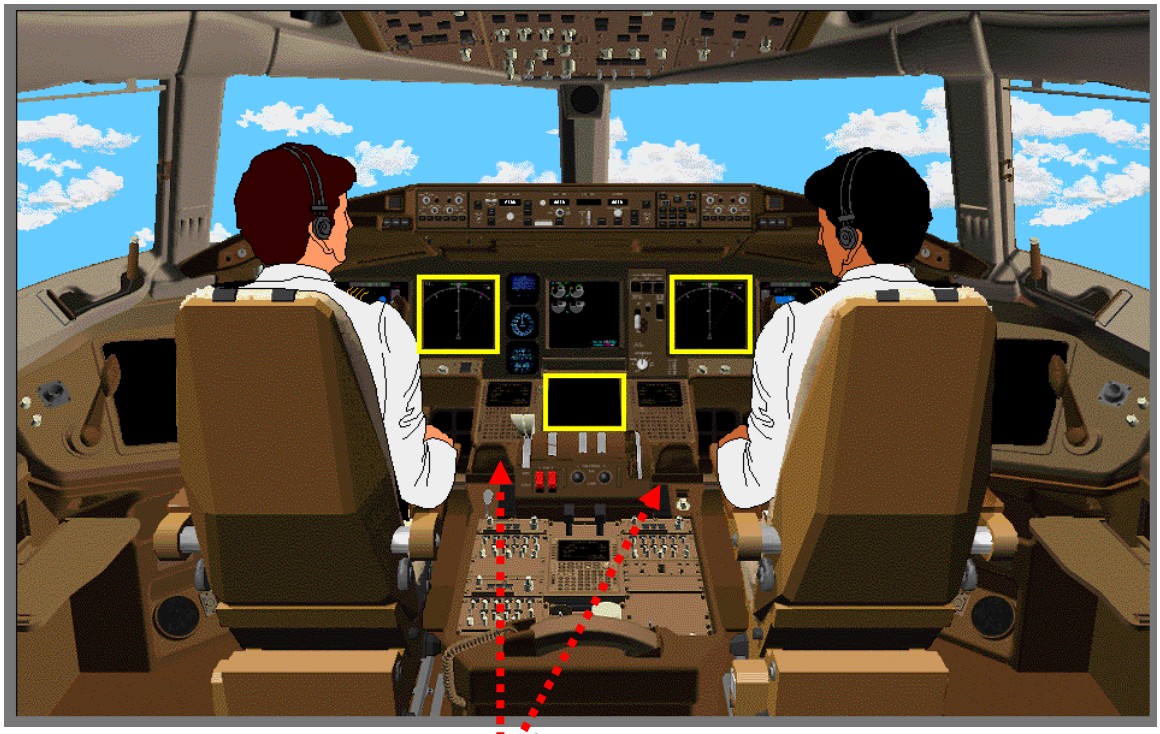
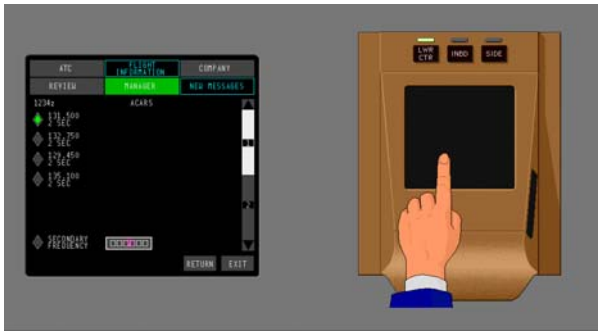


Figure 7



The CCDs permit interaction with the communications display.

Figure 8

1.1.10 Company Data Link

The airplane communications system enables two–way data link communications between the FMC and airline operations. A downlink occurs when data is transferred from the FMC and transmitted through the airplane communications system to a receiver on the ground. Data may be downlinked from the FMC either manually or automatically. An uplink is the opposite of a downlink; data is transmitted from a ground station for input to the FMC. Data may be uplinked at the discretion of the airline operations dispatcher or in response to a downlink request.

Figure 9

1.1.11 Etihad B777 FDCF AMI design modification

Company communications functions have been customised by Etihad.

- COMPANY provides for downlink messages to Etihad facilities.
- FLIGHT INFORMATION provides for downlink messages that allow request of Departure Clearance, Oceanic Clearances or Automatic Terminal Information Services (ATIS) information.

1.1.12 FDCF AMI Functionality

Etihad's Flight Deck Communication Function (FDCF) Airline Modifiable Information (AMI) has been designed to merge the functionality provided in Etihad's CMU based datalink systems with the functionality provided in the 777 Baseline FDCF AMI. This document is intended to describe the functionality of Etihad's FDCF AMI and provide as a pilot user guide to complete the ACARS e-FOL systematically during line operations.

This FDCF AMI Description Document describes the functionality within the FDCF as it is controlled by the AMI. This document also describes the details of ATC Communications, Flight Information Communications, or the Manager Functions. For a description of ATC and Flight Information Communications and the Manager function, refer to Section 2 of this document. In addition, general operational information can be reviewed from the Flight Deck Communications Function sections of B777 FCOM Chapter 5 Section 40, pg.5.40.39-5.40.44, 777 Primary Flight Displays Systems Description Documentation.

1.1.13 Purpose - ACARS FDCF AMI

Etihad has implemented and deployed a custom database (P/N A3X-EY03-R03) on its Honeywell AOC equipped Airbus fleet, and now achieves consistency in the ACARS output from the entire fleet with the customisation of the AIMS FDCF AMI and DCMF on the 777 fleet (AMI SW PN 316D-BSM-636-01). The customized software is programmed to replicate the new features required for all Etihad fleet ACARS transmissions. This document will set out the particular menus, reports and downlinks required to replicate Etihad ATL/FOL customisation.

1.1.14 Design Specifications and Constraints

Merging functionality required designing within certain constraints. The constraints include those imposed by the FDCF operational software and the ground system's datalink formats.

To assure design acceptance, Etihad Airways' Fleet Technical Manager for the Boeing 777, Etihad IT and a representative from Etihad's communications consulting firm, AviIt, were consulted throughout requirements discovery process and design reviews. All design modifications were presented and approved prior to incorporation into the newly released AMI.

As a Communication Function AMI specification document, it is designed to explicate the requirement for building the modified FDCF AMI and to capture the essence of design requirements throughout the requirements discovery process and design reviews.

1.1.15 FDCF Design Model

The participation of Etihad B777 Fleet in the extension of the customised FOL to support the automation of the ACARS FOL entry into AIMS is a coordinated effort aimed at standardisation for Etihad Operations. Adopting a prudent approach, careful assessment was employed in the modification process relevant re-designed changes to ensure that the intrinsic value of data capture for ATL/FOL AIMS was retained by mitigating ambiguity.

Proactive steps were taken work around Boeing's GBST (Ground Based Software Tool) logic units to ensure that undue limitations were not imposed on the framework, and that the versatility and capability of on-board system was preserved throughout all phases of Flight and Ground operations capturing data for current ATL/FOL entry as per company requirement whilst leaving all baseline options intact and available for current crew use and future AOC development programme. The customised FDCF design is compatible with BP14.

The efficiency of the B777 ACARS AOC on-board system stem from the superior FDCF system architecture that was designed with simplicity in mind and ease of navigation via menu cues encompassing a user-friendly concept employed to avoid unnecessary flight crew distraction from primary duties, and duplication of data entries.

The model took into consideration crew focus on main operational task, which is to conduct and manage the flight in a safe, orderly and timely manner, whilst meeting new standards of communication for FOL via AOC.

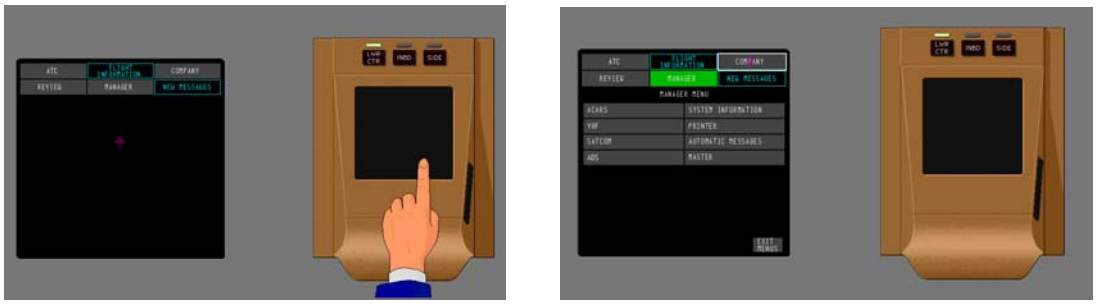


Figure 10

The resultant overview of the FDCF- GBST (ground based software tool) customized format sees minimal navigational steps and reduced multiple pages considering the size of data packets required for FOL transmissions. This concept enshrines Boeing's design philosophy of maintaining simplicity and avoids task saturation.

To ease flight crew workload, the FDCF menu format was re-design with the use of Boeing's GBST to capture essential required data in a systematic manner and in tandem with operational requirements in an interactive technique.

1.1.16 FDCF main menu

FDCF main menu was re-aligned into three segmented classifications, starting from left to right:

- Normal Flight Procedures – combination of baseline and revised & new display for FOL menus
- Frequently used menu fields – baseline, new and revised display for FOL data
- Less Frequently used menu fields – comprising mainly of baseline menus and new display for ASR recording

All facets were considered for data field interface and incorporation, and interlaced logic units were exploited for efficiency. Page scrolling format design was also accentuated to allow for;

- quick access to needed information and relevant pilot entry fields systematically
- to improve accuracy and data currency
- mitigate ambiguity

Figure 11

1.1.17 FDCF Menu Layout

The new menu layout leaves all existing baseline FDCF functions in place, and adds three new sub menus for FOL and for Messages to Ground. Other existing downlink configurations, baseline reports and OOOI logic were not modified and thus retained, allowing the Company Menu to provide access to submenus and to Downlink Displays used for viewing current FMF (Flight Management Function) system captured data and for composing and initiating the transmission of downlink messages.

Figure 12
Etihad Customised FDCF AMI Modified Menu Display

Optimisation of automatic data propagation from the aircraft system (FMF) was exploited to populate performance and other related data-fields, so crew need only to verify data before sending messages. In general, where data-fields are ‘blank’, crew entry is then required.

The pre-formatted entry fields in Flight Initialization sub-menu contain all relevant ATL/FOL information in a single page. The data can be disseminated/propagated automatically to all relevant fields in various sub-menus on the entire FDCF which is designed to alleviate unnecessary duplication of pilot entries in the multiple pages of the proposed FOL sub menu which can be a time consuming, distracting and a rather daunting task indeed from a pilot's perspective, who has to deal with a lot of other operational and safety issues.

1.1.18 General Customisation Accommodation notes:

Summary of Etihad's B777 Fleet requirement for modification of the FDCF AMI based on the specification provided includes listing of the components included in the quote.

- Where possible, pages were amalgamated into scrolling displays.
- The proposed new menu navigation layout extract contains full Company Menu navigation structure.
- The proposed layout leaves all existing baseline FDCF functions in place, but has been re-located. Three new sub menus for FOL and for Messages to Ground were created.
- Existing downlink configurations are unchanged.
- Regarding the free text message to MCC and OCC, only the downlink label is hardcoded (MCC is downlinked as label 81, OCC as label 82) These messages are identified by their labels in the SITA ACARS processor and send to the appropriate SITA address as configured in the SITA routing table. Thus, if the address needs to change at a later date, it will NOT require an updated to the AOC database. The same approach is used for B777 FDCF customisation.
- 30 minutes - Precise timing of flight leg end trigger activated. The timer extension serves to relief pressure of crew to complete FOL before auto-self-erase function initiates. This timer extension will be useful when faced with unforeseen abnormal situations, whereby crew attention may be required elsewhere on operational matters as priority.

1.1.19 Substantive changes to baseline menu:

- FOL sub menu restructured to provide scrollable multi page displays and to stay within 100 screen object limit,
- FOL End of Flight page now requests confirmation of review of FOL data from crew before FOL send is enabled.
- User friendly screen blocks, based on GBST limitations, were created to encompass company data requirements. Interface to AIMS will be responsibility of AviIT.
- Page Flip Through and navigation of pages have been substantially reduced by auto-population of data captured form initialisation pages and aircraft FMF system. Propagation of data from aircraft systems to FOL fields – required fields that can be automatically captured from aircraft systems is widely incorporated.
- New data entry fields were created to cater for "Fuel Plus" monitoring data requirements.
- Focus on Page scrolling instead of returning to main menu, based on GBST design logic.

- Existing baseline FDCF functions were left in place for future use. Departure report – airborne fuel on board – highly utilised by crew and were therefore retained, but catered in flexible format form to meet requirements.
- Baseline reports and OOOI logic are not modified.
- ASR RAISED button have been placed in “End of Flight” FOL – crew sign-off
- Navigation and to flip through pages were kept to a minimum, to embody data required for Accounts Department, Fuel Plus, ADAT, IT & Flt Ops.

1.1.20 FDCF Menu Design Logic

The customization will cater for future processes. Cluttered data fields on some pages are unavoidable and are required to cater for the above data capture requirement fro the relevant departments, including anticipated Data entry for fuel monitoring exercise by Fuel Plus.

Systematic workflow pattern was devised to coincide with Flight Phases with page scrolling emphasized where possible rather than having to return to main menu to select another page. This would be good for Flight Initialization and End of flight data entries.

1.1.21 Feedback Response:

1. Position reporting is limited to 30min intervals.
2. CM1 & CM2 adopted to avoid ambiguity as PIC& CM1 can be the same person as per operational/training requirement.
3. Current format DEPARTURE REPORT page is highly utilized by flight crew to obtain takeoff time and airborne fuel (fuel on board) for more accurate flight plan (OFP) input. With the new format, the airborne fuel is still rendered available. The DEPARTURE PAGE will be kept for the two fields with the airborne fuel maintained as well.
4. ASR raised button is placed in the ‘End of Flight FOL’ page. This can be an easy reminder for the crew prior signing off.
5. ‘GPU, ASU. STAIRS, PUSHBACK etc data fields were included as per request by Accounts Department.

SECTION 1

Part 2

1.2.0 FDCF AMI Feature Highlights

1.2.1 Flight Deck Communication Function (FDCF) Menuing System Primary Communications Menu

Using the display select control panel, the flight crew may configure one of the multi-function displays (MFD) display COMM functions (Flight Deck Communications Function and Data Communication Management Function).

Figure 13

When configured to display the COMM functions, if there are no new messages, the MFD will display the COMM main menu. The main menu is always displayed at the top of the COMM window whenever the MFD is configured for COMM.

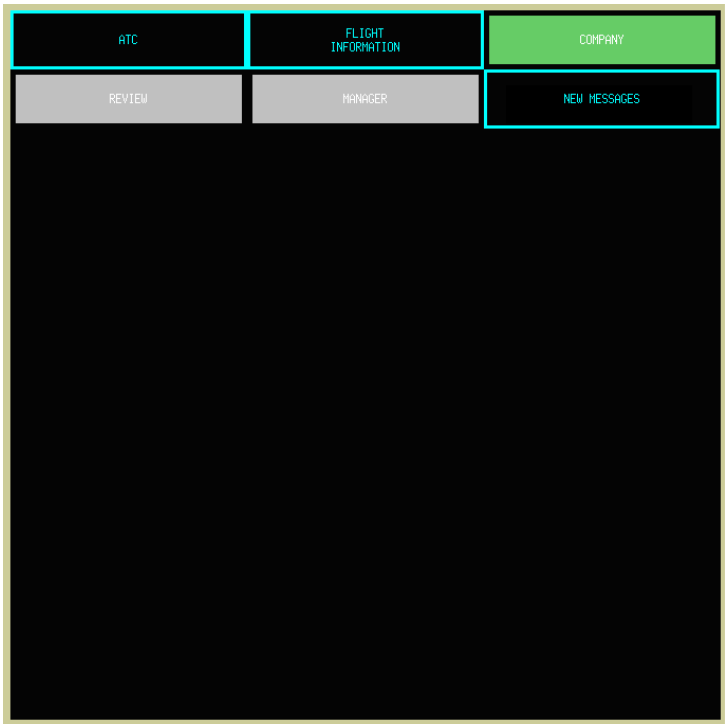


Figure 14

1.2.2 COMPANY Menu

Company downlink menus are accessed by selecting the COMPANY function. Actual menu and page layout has been determined by Etihad's menuing structure below.

Upon selection of "COMPANY" from the main COMM menu, the COMPANY menu will be displayed. The COMPANY menu with its sub-menu(s) is defined by the FDCF AMI's Company Menu component.

1.2.3 Company Menu and Sub-Menus.

The COMPANY menu structure is tiered as shown below.

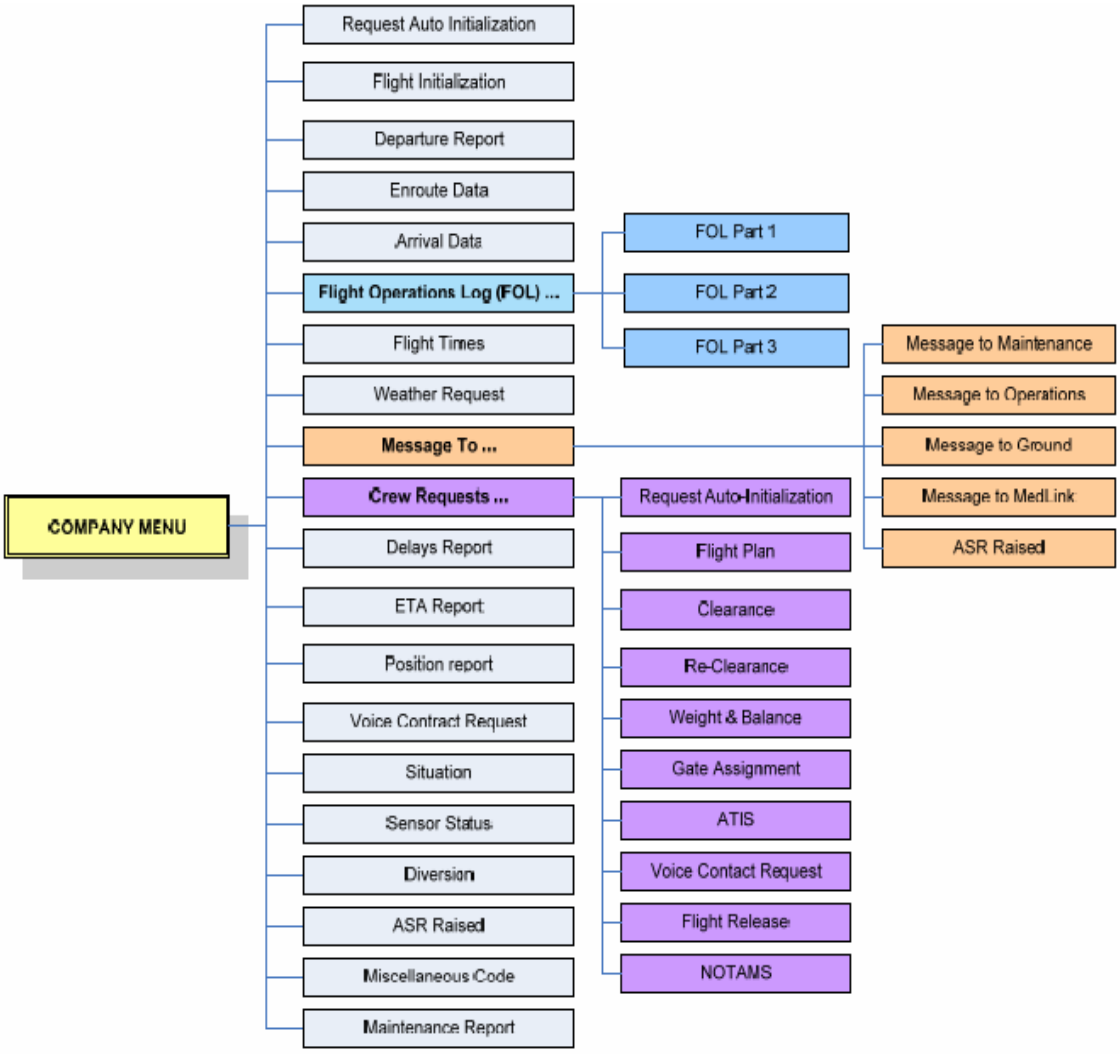


Figure 15

When COMPANY is selected from the COMM main menu the first level of the COMPANY menu will be displayed.

The menu items are displayed in the left, center or right columns of the menu, as shown below

1.2.4 "COMPANY" Menu Format

The layout of Etihad's menu is as follows:

- Displays that are expected to be accessed during the course of a normal flight are included in the left column.
- Displays that a frequently accessed are included in the center column.
- Displays less frequently accessed are included in the right column.

Figure 16

Each menu item is linked to either a sub-menu or a display component consisting of one or more pages. When selected, the linked item will be invoked. Refer to figure 2 COMPANY Menu Items, for a list of submenus or display components associated with each menu item shown on the COMPANY menu.

1.2.5 COMPANY sub-menus

The COMPANY menu has three menu items that lead to sub-menus:

- "Flight Operations Log (FOL) …"
- "Messages To …"
- "Crew Requests…"

Selecting these menu items will cause its associated sub-menu to be shown.
Refer to: "FLIGHT OPS LOG (FOL) …" is shown in Figure... Flight Operations Log (FOL) Sub-Menu
Refer to: "MESSAGES TO …" is shown in Figure ..... "Messages To …" Sub Menu.
Refer to: "CREW REQUESTS …" is shown in Figure.... "Crew Requests" Sub Menu

Figure 17

1.2.6 The Flight Operations Report

The Flight Operations Report is a comprehensive report containing all data for the current flight. This report is a mandatory report, which should be reviewed prior to transmission. Due to the amount of data to be reviewed the report is segmented into three parts, described in detail in a later section of this document.
The FLIGHT OPS LOG (FOL) sub-menu provides access to the three parts of the FOL Report.

- FOL Part 1: Display: ETI FOL P1
- FOL Part 2: Display: ETI FOL P2
- FOL Part 3: Display: ETI FOL P3

1.2.7 Message To ... Sub-Menu

During the course of the flight it may become necessary to datalink a free text message to the ground. The “MESSAGE To ...” sub-menu provides access to displays designed for sending messages to: maintenance, operation, a ground service address, or MedLink, or transmit an ASR RAISED message.
To access the “MESSAGE TO ...” sub-menu, select “MESSAGE TO ...” from the center column of the COMPANY Menu

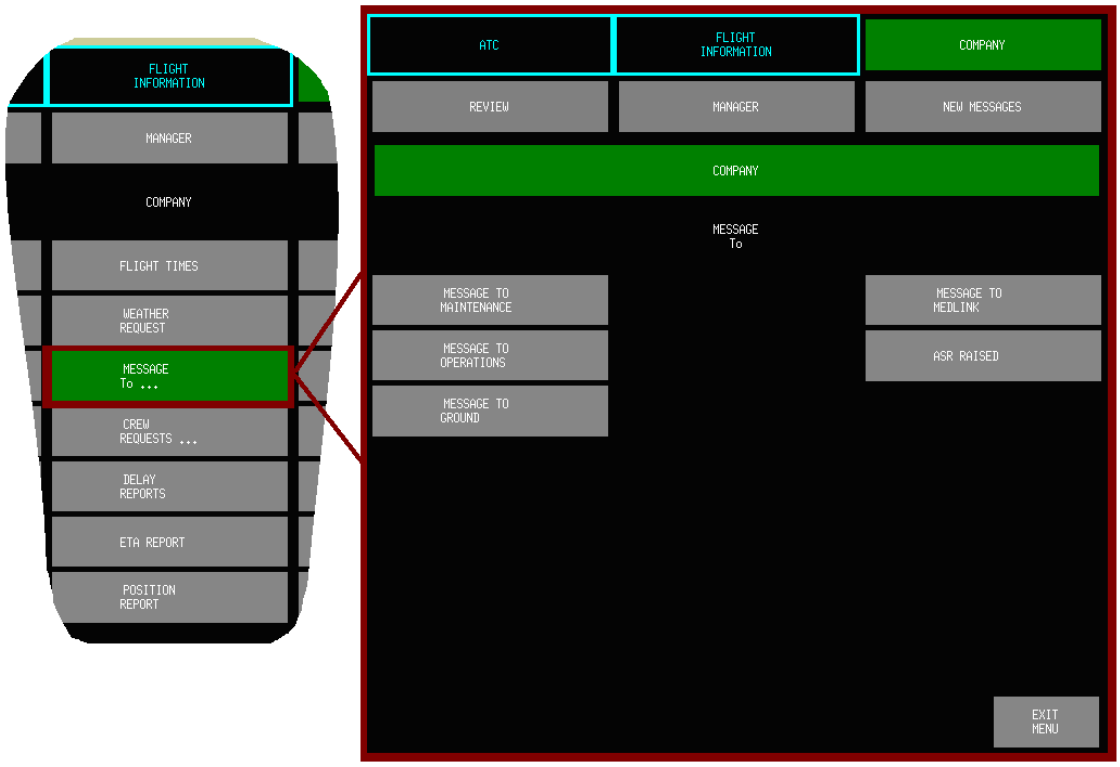


Figure 18

1.2.8 CREW REQUESTS ... Sub-Menu

The Flight Deck Communication Function Baseline AMI includes a standard set of downlink requests. Selecting the “CREW REQUESTS ...” menu item from the COMPANY menu will cause the CREW REQUESTS sub-menu to be displayed.

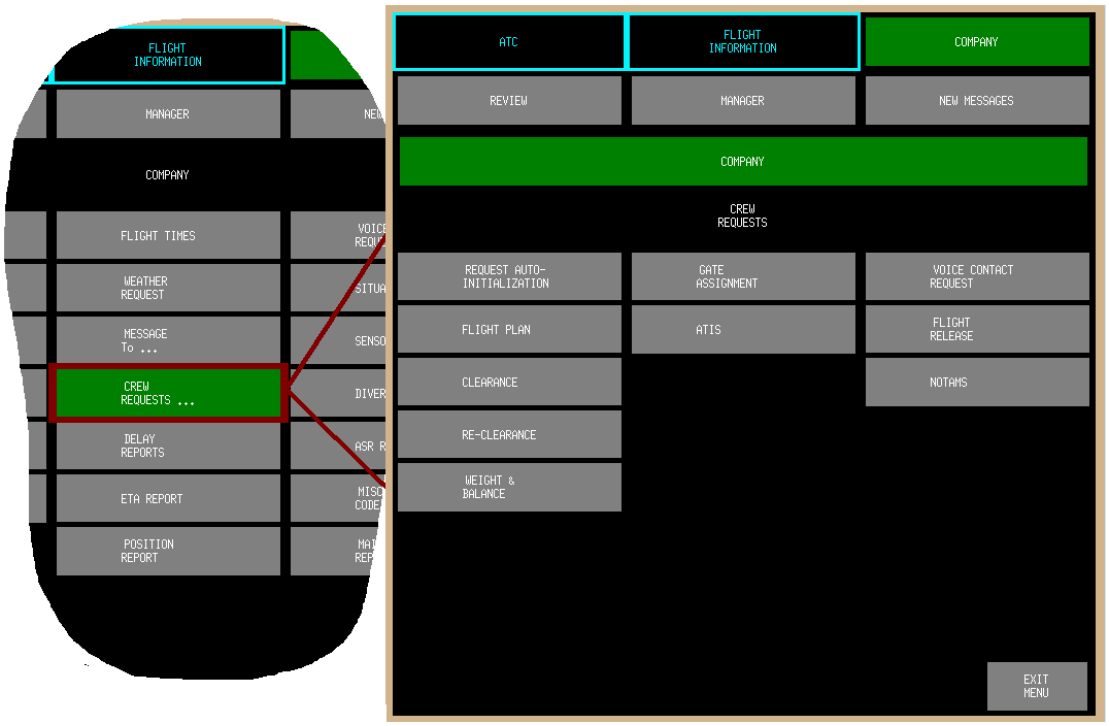


Figure 19

SECTION 1

Part 3

1.3. 0 Datalink Transactions: Routine Crew FDCF operation

- Pre-Flight ACARS set-up Menu
- Departure Report
- In-Flight Menu
- Post-Flight & FOL data

During normal line operations, only “menus” on the left column are required to be completed by crew, beginning from topmost menu, progressing downward in sequence in accordance with flight phases.

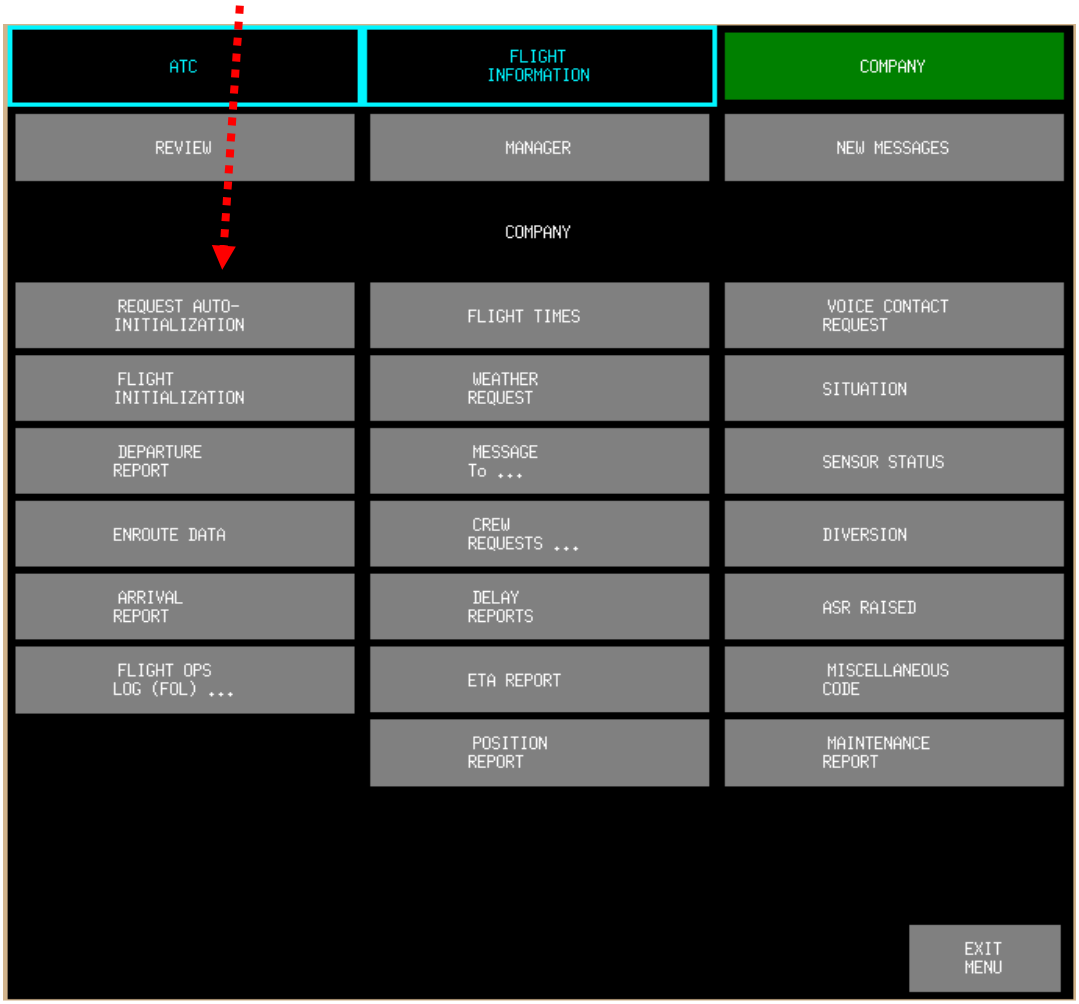


Figure 20

1.3.1 ACARS FDCF Crew Process during Line Operations

Pre-Flight Procedures	Request Auto Initialization and Flight Initialisation menus can be accessed and relevant data inserted whilst on ground during pre flight procedures. This should be accomplished only after completing CDU set-up in order to complete the initialization process of airplane systems. FMF will process and capture entered flight data values from CDU and propagate these values automatically to FDCF / ACARS encodings, prints, etc. (where appropriate)
CLIMB	Departure Report can be completed and sent at crew convenience during the climb phase of flight and during least workload period
CRUISE	En-Route Data can be accomplished anytime at crew convenience during cruise
Eng shut down Before Leaving aircraft	Arrival Report should be completed after docking aircraft and engine shutdown. Flight Ops Log (FOL) consists of several sub-menus but in general needs only to be reviewed by crew. Amendments can be made at this stage to override inaccurate, unwanted or irrelevant data. Last page of FOL : After verifying ASR = Yes or No, press Send

1.3.2 Flight Initialization Transaction

Using the Flight Initialization display pages, the flight crew may initialize the FDCF system with values used globally throughout the FDCF system. In order to reduce the workload for the flight crew, data known by the ground systems is datalinked to FDCF, which stores the data for use on/in display, datalink, printing, and logic units.

The uplinked flight initialization message may be sent to the airplane at anytime after the airplane systems have been initialized. The uplinked message may be sent as a response to a downlink request for auto initialization, or as an unsolicited uplink message.

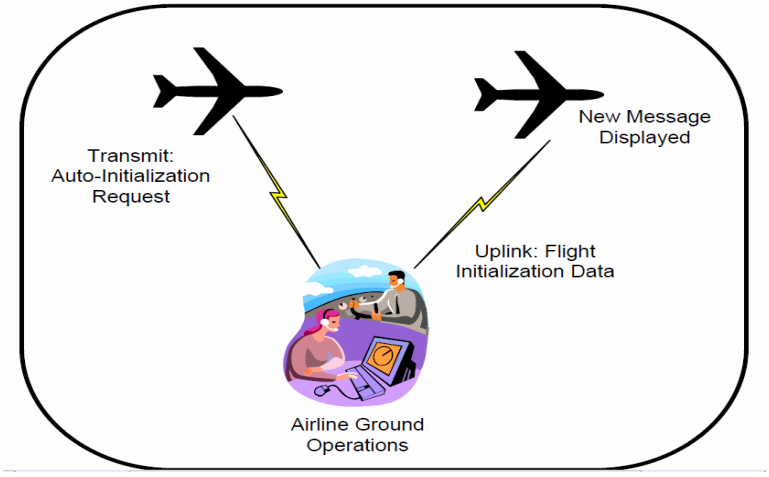


Figure 21

1.3.3.0 The Request Auto Initialization

Enter Flight Number and Flight Date. Although uplink program to interface logic units for this feature is currently under development, the FMF has the capability to process the request function. Pilot entries of Flight Number and Flight Date on this page can be extracted by FMF for FDCF use.

The Request Auto Initialization display is use by the flight crew to request an uplink with initialization data that may be used to pre-populate many of the fields shown on the flight initialization page. The intent of this downlink request message and its corresponding uplinked response message is to minimize the workload on the flight crew by automatically uplinking values already known by the ground computer systems (such as flight number, date, crew identification numbers, departure/destination stations, etc).

Figure 22
Request Auto-Init Display - Display layout

1.3.3.1 Auto Initialisation Datalink Format

When the flight crew selects the SEND button, the auto-initialization downlink message is sent to the ground system. Upon receipt of this message, the ground system will parse the message, encode and transmit an uplink with the data for the requested flight. If the crew has already started to initialize the system, the values received in the uplink will replace the entered values.
Upon selection of the SEND command button, the datalink format as defined will be transmitted.

1.3.4.0 Flight Initialization - Uplink Message

The Auto-Initialization Uplink Message format is defined above, when active.

Upon receipt of the auto initialization uplink message, the flight initialization display will be displayed as a NEW MESSAGES, accessible from the NEW MESSAGES menu item on the COMM display.

The uplinked flight initialization message display layout is identical to the Flight Initialization Display that is accessed via the COMPANY menu. The intent of showing the message as a NEW MESSAGE is to alert the crew that the data has been sent to the airplane and allow them to review the data and make any corrections that may be necessary. Modifications to the displayed uplinked message will be reflected in the Flight Initialization display accessible via the COMPANY menu.

To clear the uplinked display message from the NEW MESSAGES menu, the crew must view all pages of the uplinked message. Selecting CANCEL after viewing all pages, will remove the message from “NEW MESSAGES”.

The flight initialization display is used to enter data commonly entered at the beginning of a flight. Data on this page may be used to pre-populate other display pages, encoding definitions, and printouts.

The Flight Initialization display consists of two pages, which are navigated by use of the scrollbar on the right side of the display.

1.3.4.1 Flight Init - Page 1 of 2

The Flight Number, Departure Station, and Destination Station entry boxes will be pre-populated with the values broadcasted by the Flight Management Function (FMF), if the FMF is initialized.

Values on this page may be manually populated by the crew or via an uplink message from the ground. The values entered by the flight crew or uplinked will override the default settings.

Note:
If the default setting is overwritten, FDCF will maintain the value entered or uplinked. To reset the entry box to the default value, do one of the following:
• With an empty scratchpad, select the entry field
Or
• Select the “RESET” button on the bottom of the display page (this will reset all values on the page to their default value.

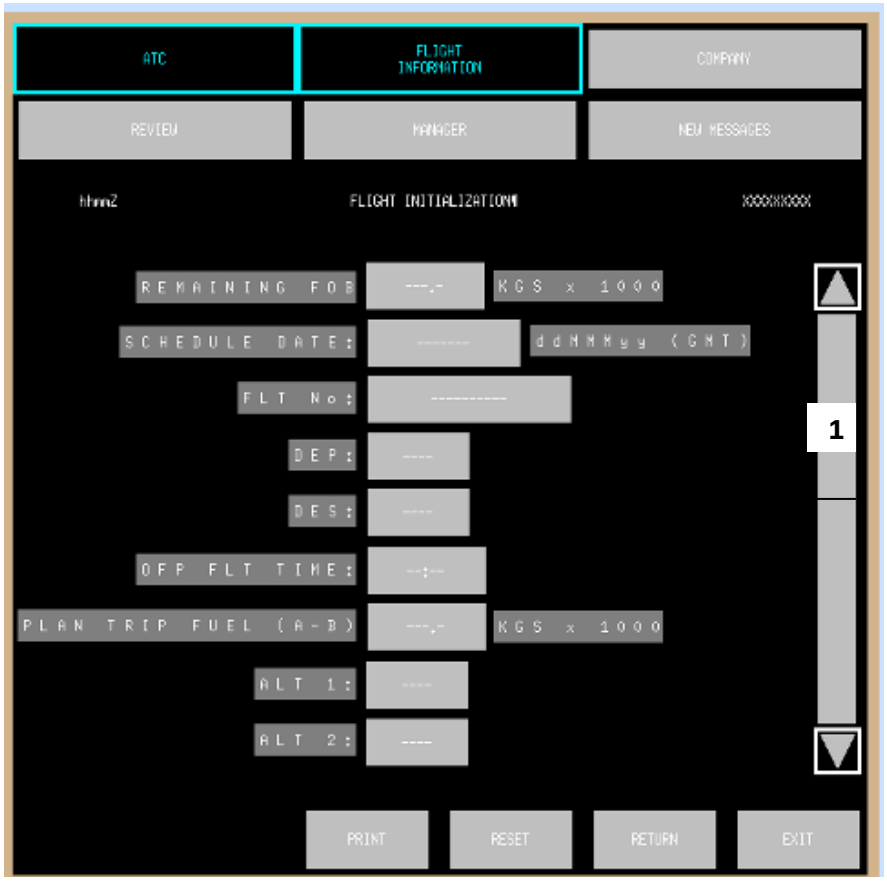


Figure 23

1.3.4.2 Flight Init: Page 2 of 2

On Page 2 of the Flight Initialization page, the crew will enter their Staff ID, Seat Number, and TC (Training Code).

The Staff ID values on this page may be pre-populated through the use of the Flight Initialization Uplink Message, described in section 3.1.2, “Flight Initialization - Uplink” The staff IDs associated with Crew Members 1 and 2 will be used to determine the takeoff and landing pilots for the flight. During initialization, the crew will enter their staff identification numbers in the fields CM 1, CM 2, CM 3, CM 4, and CM 5. It is recommended that the crew members who are tasked with takeoff and landing enter their staff IDs in CM 1 and CM 2.

Takeoff pilot and takeoff day/night selector buttons are used to set the takeoff pilot and day/night selector buttons on the Departure Display and on the Flight Operations Log display. These buttons are synchronized to assure the latest selection from any of these displays is seen when accessing one the same information on the other displays.

Landing pilot and landing day/night selector buttons are used to set the landing pilot and day/night selector buttons on the Arrival Display and on the Flight Operations Log display. As with the takeoff selector buttons, these buttons are synchronized to assure the latest selection from any of these displays is seen when accessing one the same information on the other displays.

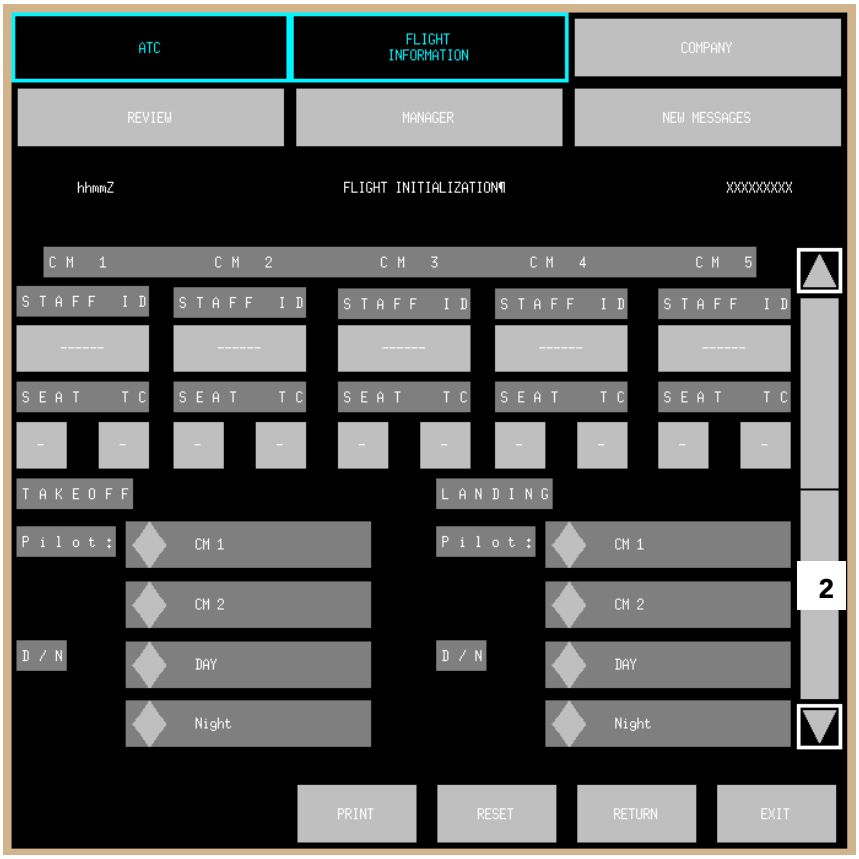


Figure 24

1.3.4.3 Flt Init - PRINT Format

Upon selection of the PRINT command button, from any of the Flight Init pages, the following will be printed:

```
hhmmZ                        FLIGHT INITIALIZATION

                  DATE:  dd    FLIGHT NUMBER: XXXXXXXXXX

    DEPARTURE STATION:  XXXX   REMAINING FOB (Kgs x 1000):  NNN.N

  DESTINATION STATION:  XXXX                OFP FLT TIME:  hh:mm

  ALTERNATE STATION 1:  XXXX     PLANNED TRIP FUEL (A-B):  NNN.N

  ALTERNATE STATION 2:  XXXX


                              STAFF ID  SEAT  TRAINING
                                                CODE
             CREW MEMBER 1    XXXXXX     N       X

             CREW MEMBER 2    XXXXXX     N       X

             CREW MEMBER 3    XXXXXX     N       X

             CREW MEMBER 4    XXXXXX     N       X

             CREW MEMBER 5    XXXXXX     N       X
```

Figure 25

1.3.5.0 Departure Report

1.3.5.1 DEPARTURE REPORT DISPLAY – Page 1 of 2

The Departure Report is intended to be used to display and enter data pertaining to the flight departure. When possible, logic units are used to collect values shown on this page. The values collected are displayed as default values in the entry box. The values collected included:
• CHOCK OFF TIME (referred to as OUT TIME in the logic units, per Boeing baseline)
• AIRBORNE TIME (referred to as OFF_TIME in the logic units, per Boeing baseline)
• AIRBORNE FUEL (referred to as OFF_FOB in the logic units, per Boeing baseline)

If the flight crew chooses to enter a value in one of these entry boxes, the entry box will continue to display the value entered. When the SEND button is selected, the value entered will be datalinked. The OUT_TIME, OFF_TIME, and OFF_FOB values will be retained for other reports and displays (such as the OOOI Reports and flight time displays). The values entered will be used in the FOL report and printout.

Takeoff Pilot: The staff numbers for CM1 and CM2, as entered on the second page of the flight initialization display, are displayed alongside the Takeoff Pilot exclusive selector buttons to assist the crew in identifying the selector button associated with the CM1 staff numbers. The Day/Night indicator is downlinked with the associated with the takeoff pilot selection: CM1 or CM2.

The SEND button will not be displayed until all required data on both pages of the Departure Report are entered.
Required Data Fields on page 1 include:

- Flaps (20, 15, or 5),
- Takeoff Pilot (CM1 or CM2)
- Day/Night

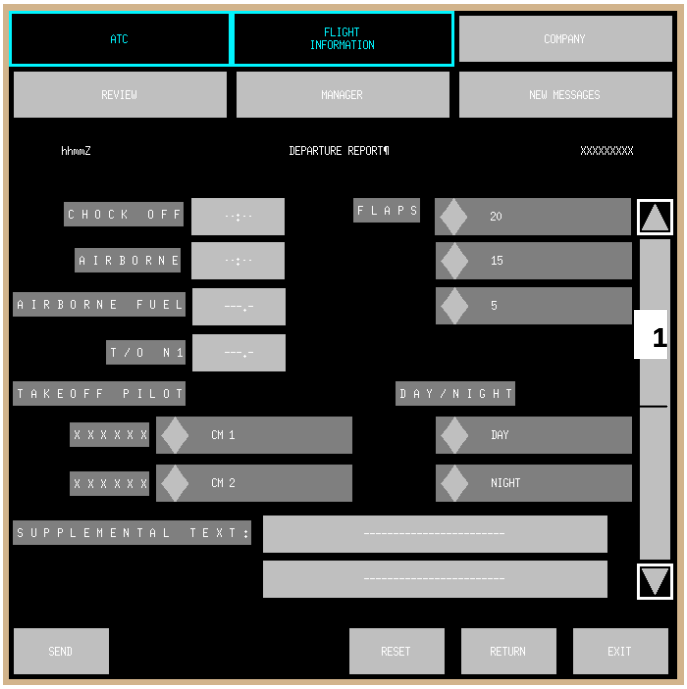


Figure 26

1.3.5.2 DEPARTURE REPORT – Page 2 of 2

Page two of the Departure report is used to enter information pertaining to airplane deicing. The values shown on this page are all entered or selected by the flight crew. If Deicing is not selected, the information pertaining to the de-icing process will not be displayed.

On the right-hand side of the display are checkboxes used to indicate the services provided at the time of departure.
Values shown on this page are included in the FOL encoding and printout. Data on this page is not part of the Departure datalink report that is transmitted when SEND is selected. All values on page one and two are retained after the SEND button is selected.

If all required fields on page 1 of the departure report have been satisfied and the DEICING checkbox is not checked, the SEND button will be displayed. When the DEICING checkbox is checked, the SEND button will not be displayed until the following required data is satisfied:

- Deicing Steps: ONE STEP or TWO STEP,
- Fluid Types: 1, 2, 3, 4

Print format
This display does not have a PRINT capability.

Datalink format
Upon selection of the SEND command button the downlink of the DOWNLINK ENCODING section of this document will be transmitted.

Figure 27

1.3.6.0 ENROUTE DATA Page 1 of 3

Page one of the ENROUTE DATA display is used to enter the fuel receipts for all boarded fuel. The crew will enter the receipt number (e.g. ADNOC 43782), quantity (in Deca-Litres) and density for each receipt received. The flight crew will select whether the fuel units are Litres or US Gallons.

A separate logic unit will calculate the total quantity received and its total weight (UPLIFT). The weight will be calculated and displayed in KGS x 1000.

Data entered and displayed on the Enroute Data display pages is stored for use in the FOL display, printout, and datalink report.

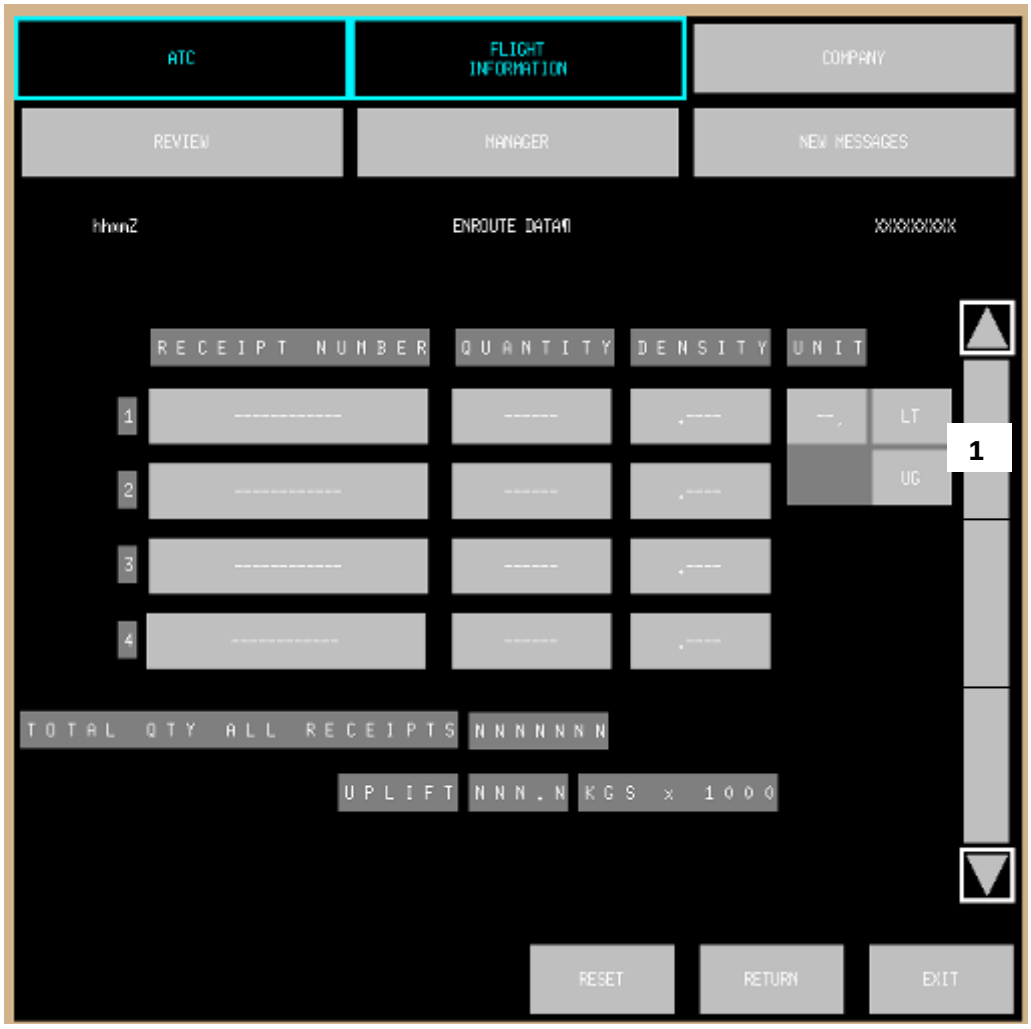


Figure 28

1.3.6.1 ENROUTE DATA Page 2 of 3

A fuel totals from the previous page is displayed at the top of page 2 of the ENROUTE DATA display. Additional fuel data is entered on this page.

1.3.6.2 ENROUTE DATA - FUELS VALUES

DEPARTURE FUEL:
Parameter ENG_START_FOB is set equal to fuel on board at the time of engine start, as captured by a logic unit. When initialized the parameter ENR_DEPT_FUEL has a default value of ENG_START_FOB.

The entry box labeled “Departure Fuel” displays the value of ENR_DEPT_FUEL.
If the flight crew enters a value into the entry box, the value of ENG_DEPT_FUEL is set equal to the entered value severing the link to ENG_START_FOB.

The following steps will reset the value of the entry box back to ENG_START_FOB:
1. Clear the scratchpad of any entered data or messages
2. Select the entry box

When the FOL message is transmitted, the value shown in the entry box will be transmitted.

1.3.6.3 ENROUTE DATA - EXTRA FUEL:

The extra fuel value is manually entered by the flight crew. Do not click on REASONS if no extra fuel is taken. Clicking on REASONS will activate corresponding pre-formatted reason fields that cannot be closed.

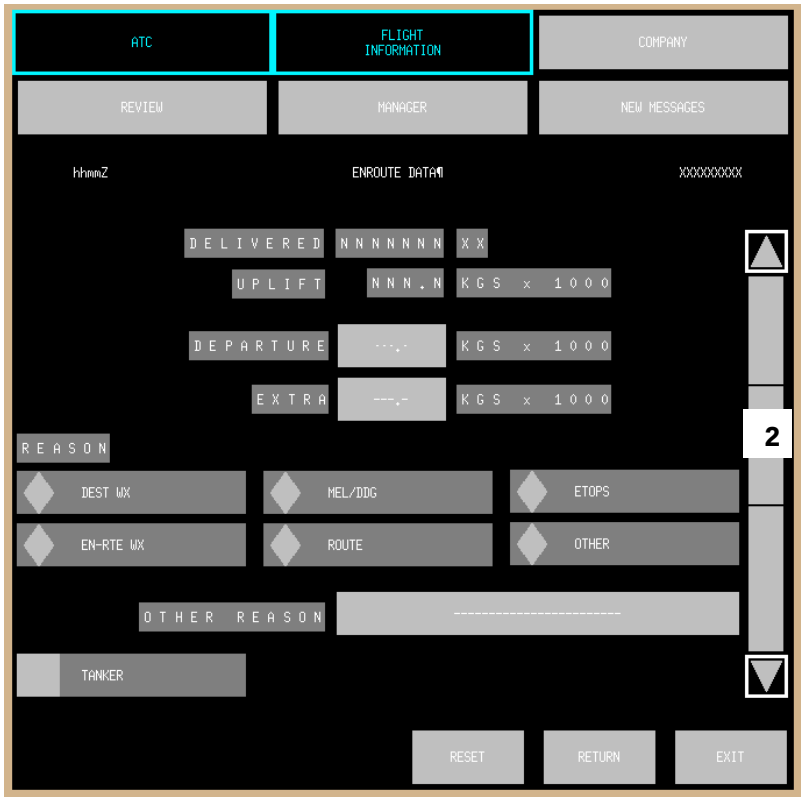


Figure 29

1.3.6.4 ENROUTE DATA Page 3 of 3

The last page of the ENROUTE DATA display is used to enter additional fuel and weight data, and delay codes and times.

FUEL and WEIGHTS: Values on this page are manually entered by the flight crew.

TIMES: all delay codes and times are manually entered. No calculations are performed to obtain time values.

Data on this page is stored for use in the FOL display, printout, and datalink report.

Figure 30

Print format
This display does not have a PRINT capability.

Datalink format
This display does not have a SEND capability.

1.3.7.0 Arrival Report Display

ARRIVAL REPORT Page 1 of 3
The ARRIVAL REPORT display is used to display and enter data pertaining to the flight arrival. The arrival report is datalinked when the flight crew selects SEND.

Baseline ARRIVAL REPORT vs. Modified ARRIVAL REPORT
The ARRIVAL REPORT display was modified from the baseline, merging together the baseline ARRIVAL REPORT with data collect to support the Flight Operations Log (FOL). When the SEND button is selected from the ARRIVAL REPORT page, only the data defined in the baseline is transmitted.

TIME:
LDG TIME: The landing time will be captured and displayed when the “ON EVENT” occurs.
CHOCK ON: The chock on time will be captured and displayed when the “IN EVENT” occurs.
COCKPIT Start/Stop Times: These times are manually entered
CABIN Start/Stop Times: These times are manually entered.

Landing Pilot:
- The crew ID associated with Crew Member 1 and Crew Member 2 will be displayed alongside the landing pilot selector buttons: CM 1 and CM 2, respectively.
- If the landing pilot was selected on the flight initialization page, the landing pilot selector button on this page will be pre-selected.
- If the landing day/night indicators were selected on the flight initialization page, the day/night selector buttons will be pre-selected.
- If the landing pilot or day/night selector buttons are changed from this page, the selections made will be reflected on the Flight Initialization Display and the Flight Operations Log display.

Figure 31

1.3.7.1 ARRIVAL REPORT – PAGE 2 of 3

The second page of the arrival report is used to enter data pertaining to an AUTO LAND. The AUTO LAND is a mandatory field, required to transmit the Arrival Report.

When selecting “YES”, indicating an auto-land was attempted, the following fields will be displayed:

- Successful/Unsuccessful (with reasons) - MANDATORY
- Landing Category (I, II, IIIA, IIIB, IIIC) – MANDATORY
- Additional Comments - OPTIONAL

If the Autoland is set to “NO” then the Successful/Unsuccessful, Landing Category, and Additional Comments fields will remain hidden.

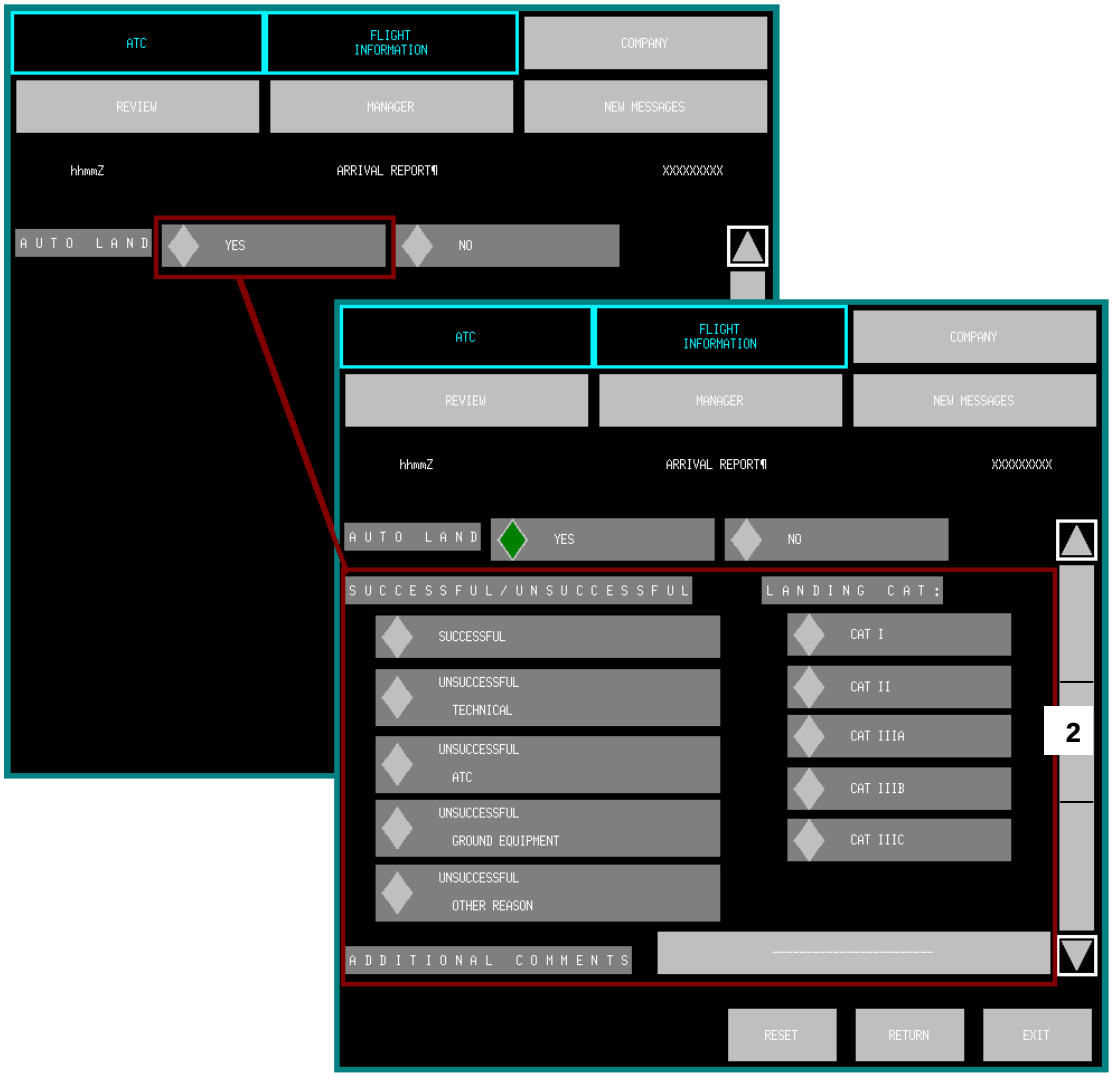


Figure 32

1.3.7.2 ARRIVAL REPORT – PAGE 3 of 3

The last page of the ARRIVAL REPORT display is used to enter the arrival fuel data.

The entry box used for FUEL BURN values for Engine 1 and Engine 2 will be pre-populated with the fuel burn values for engines Left and Right as captured at the IN event (as per CDU progress 2, fuel used data)

The ARRIVAL FUEL will default to the fuel value captured at the IN event (as per EICAS indicated fuel remaining upon eng shut-down)

If the crew enters a value into any of these fields, the value entered will be stored for use in the FOL display, printout, and datalink report.

Data entered on this page will not affect the values captured by the logic unit. The IN event data captured in the logic unit will be used in the OOOI reports and printouts.

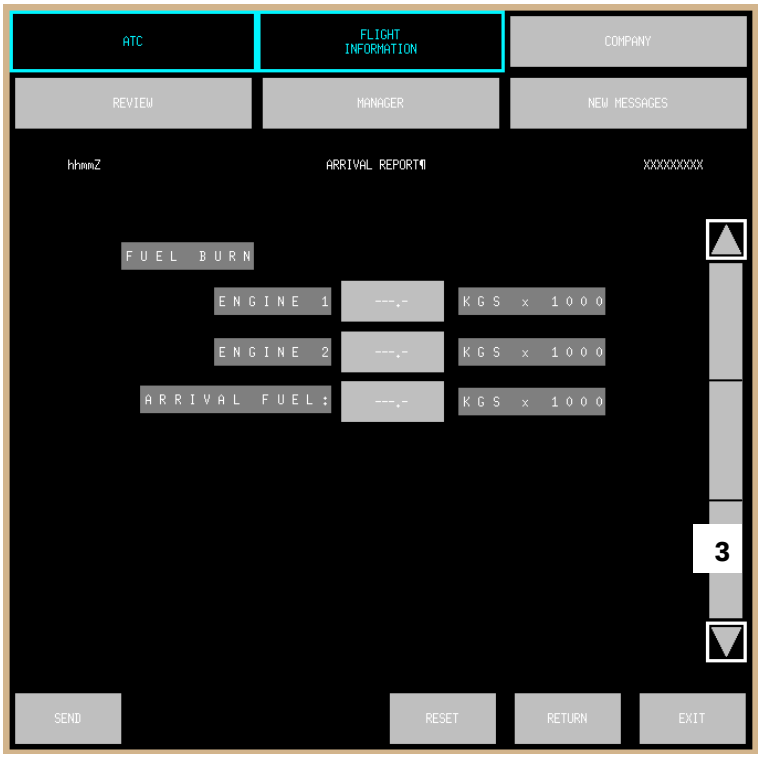


Figure 33

Print format
This display does not have a PRINT capability.

Datalink format
Upon selection of the SEND command button the downlink datalink format defined in section 5.1 Error! Reference source not found. of the DOWNLINK ENCODING section of this document will be transmitted.

1.3.8.0 Flight Operations Log (FOL)

The FLIGHT OPERATION LOG displays (Parts 1 -3) provide a summary of the flight data entered by the flight crew throughout the flight. The summary is to be reviewed by the flight crew prior to transmitting the FOL datalink report.

The FOL is a collection of all pages in the prior sections. The last page of FOL part 3 contains a checkbox that must be selected before the SEND button will be displayed. Selection of the checkbox confirms the flight crew has reviewed all parts of the FOL summary and entered all necessary data.

Refer to the FLIGHT INITIALIZATION Display (Page 1 of 2) for information on this page.

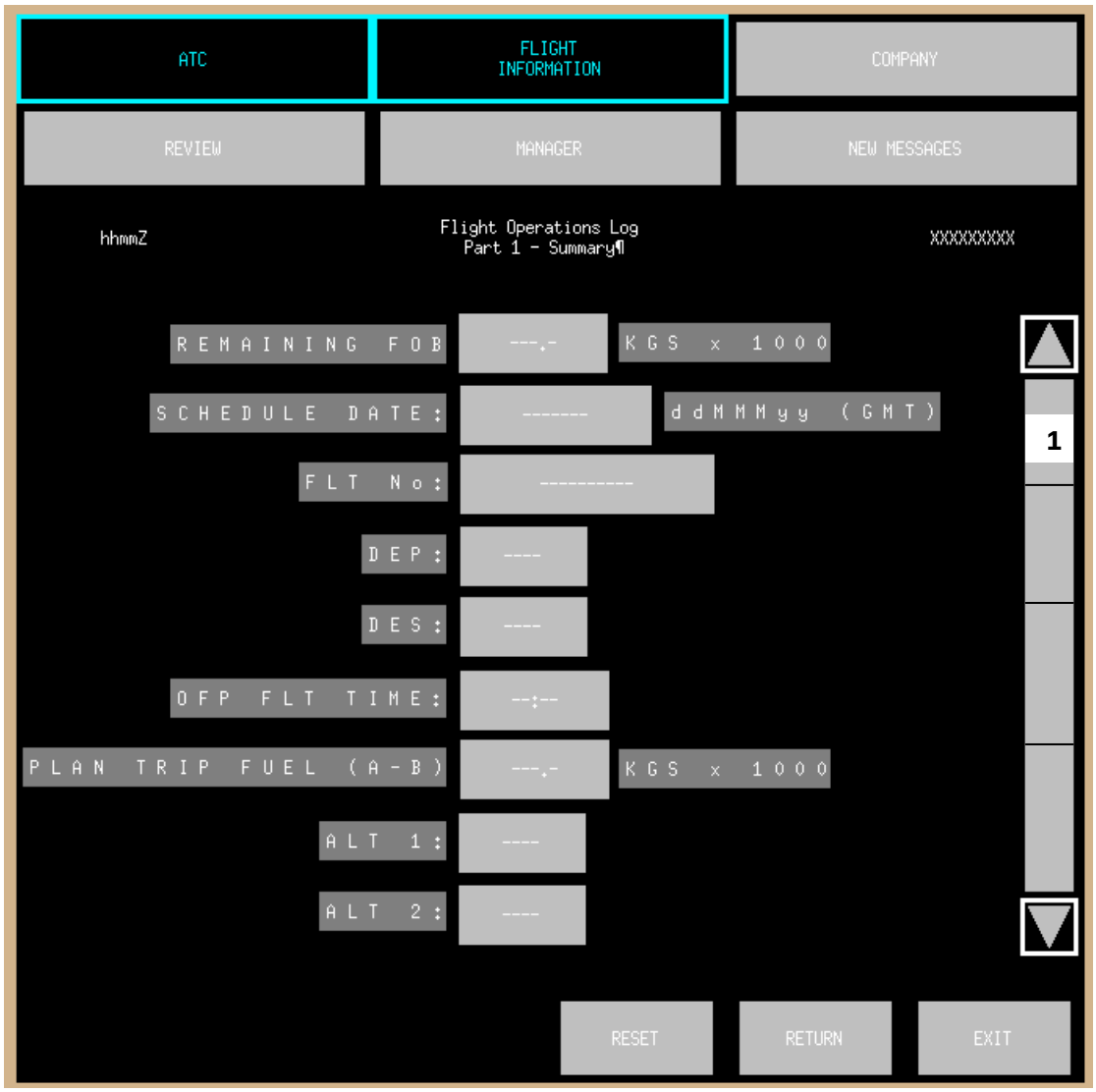


Figure 34

Note: All fields are from Flight Initialization Page

1.3.8.1 FOL Part 1 of 3, Page 2 of 4

Refer to the FLIGHT INITIALIZATION display (page 2 of 2) for information on this page.

Figure 35

Note: All fields are from Flight Initialization Page. See flight initialization page.

1.3.8.2 FOL Part 1 of 3, Page 3 of 4

Refer to the DEPARTURE REPORT display (page 1 of 2) for information on this display.

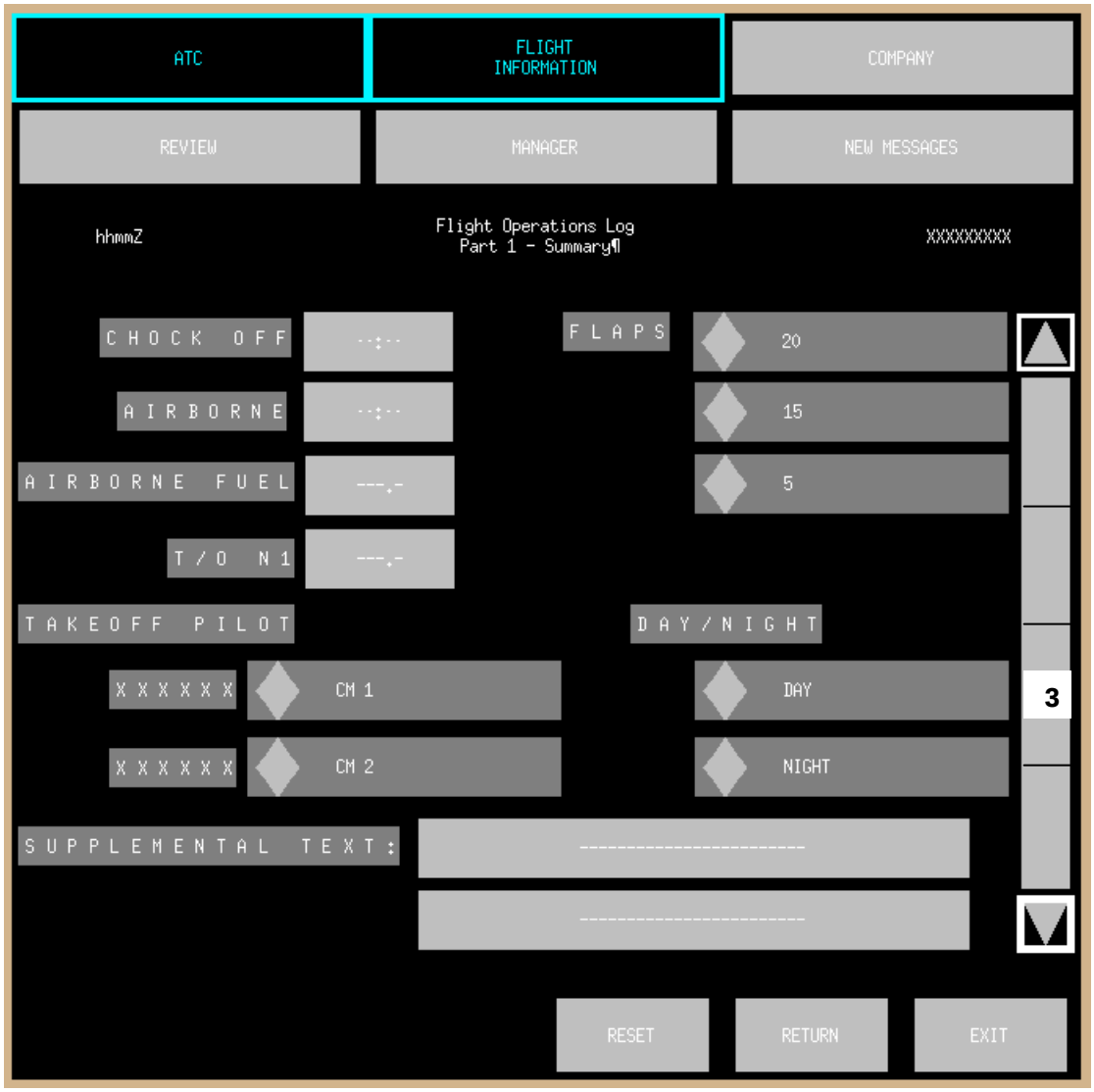


Figure 36

Note: All fields are from Departure Report Display

1.3.8.3 FOL Part 1 of 3, Page 4 of 4

Refer to the DEPARTURE REPORT display (page 2 of 2) for information on this display.

Figure 37

Print format
This display does not have PRINT capability.

Datalink format
This display does not have SEND capability.

1.3.8.4 Flight Operations Log (FOL) – Part 2 of 3

1.3.8.5 FOL Part 2, Page 1 of 3

This is the second of three parts to the FOL summary. The pages in this display are defined in the ENROUTE REPORT. The flight crew is to review all pages contained in this display to assure the necessary data has been entered or captured.

Refer to the ENROUTE REPORT display (page 1 of 3) for more specific information on this display.

Figure 38

1.3.8.6 FOL Part 2, Page 2 of 3

Refer to the ENROUTE REPORT display (page 2 of 3) for information on this display.

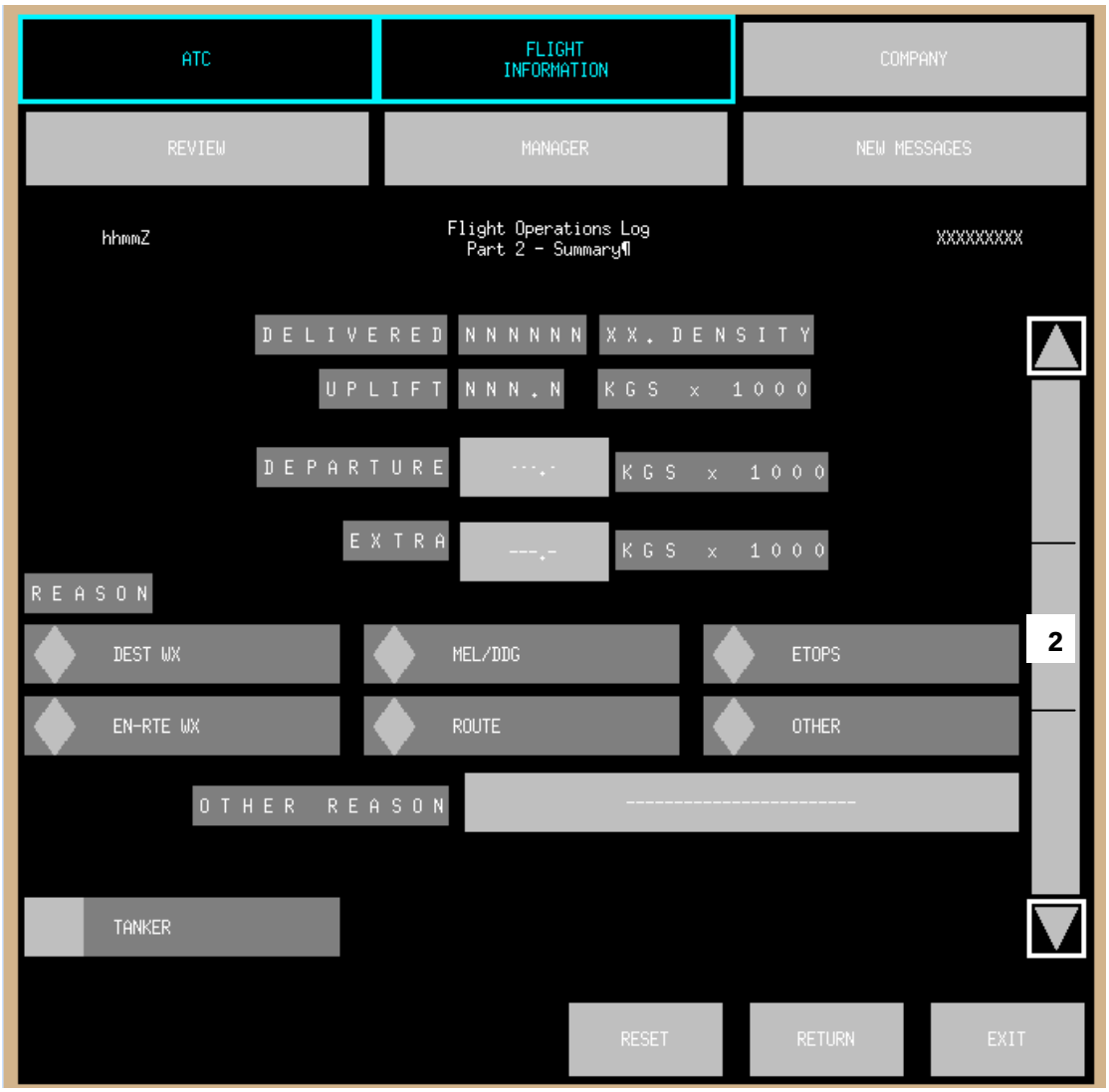


Figure 39

1.3.8.7 FOL Part 2, Page 3 of 3

Refer to the ENROUTE REPORT display (page 3 of 3) for information on this display.

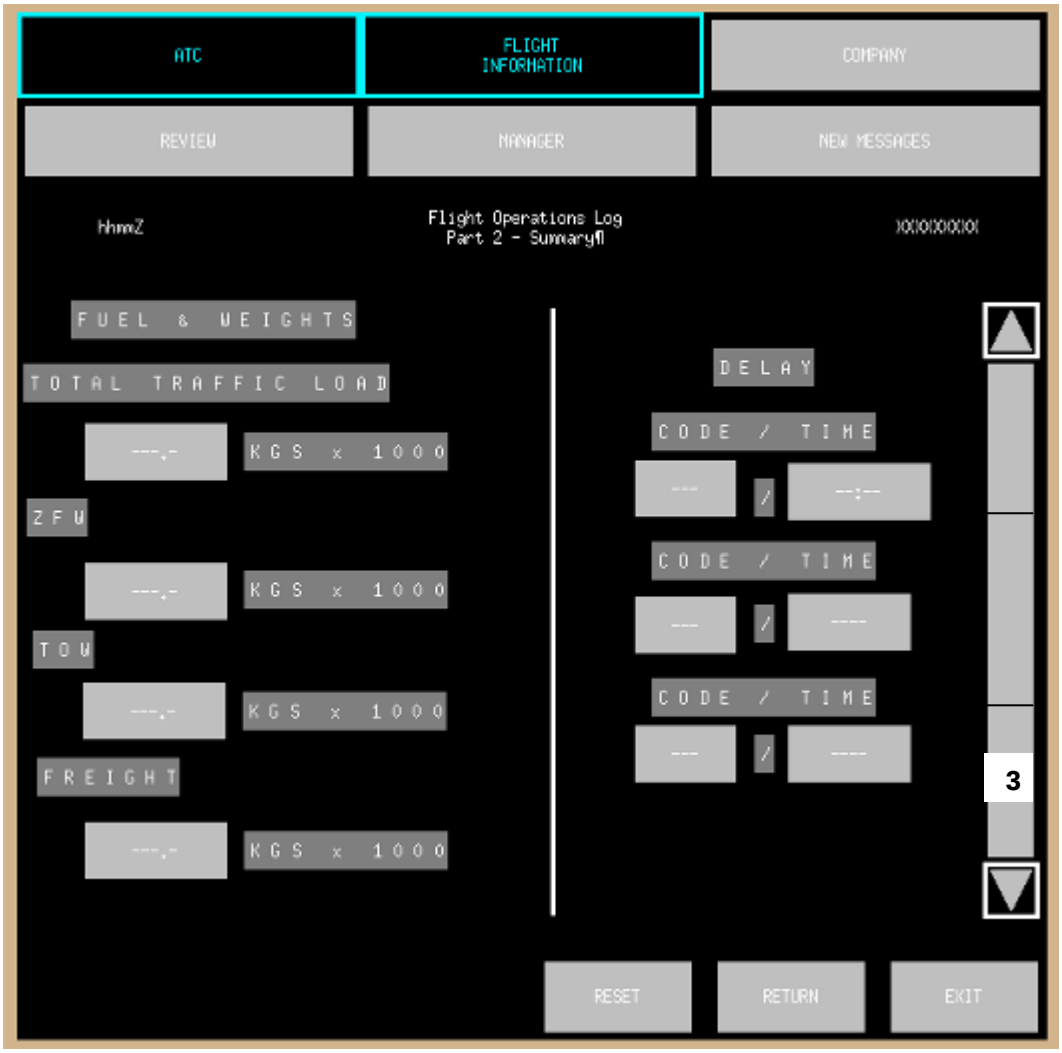


Figure 40

Print format
This display does not have PRINT capability.

Datalink format
This display does not have SEND capability.

1.3.8.8 Flight Operations Log (FOL) – Part 3 of 3

1.3.8.9 FOL Part 3, Page 1 of 4

This is the third part of the Flight Operations Log. Once all three parts have been reviewed, the crew may select to send the downlink report.

On the last page of this display the flight crew will be asked if they have reviewed all parts of the FOL. The last page will contain a mandatory checkbox that must be selected for the SEND button to be displayed. The checkbox is used to confirm all pages of the FOL have been reviewed.

Refer to the ARRIVAL REPORT display for information on this page of the FOL Part 3 display.

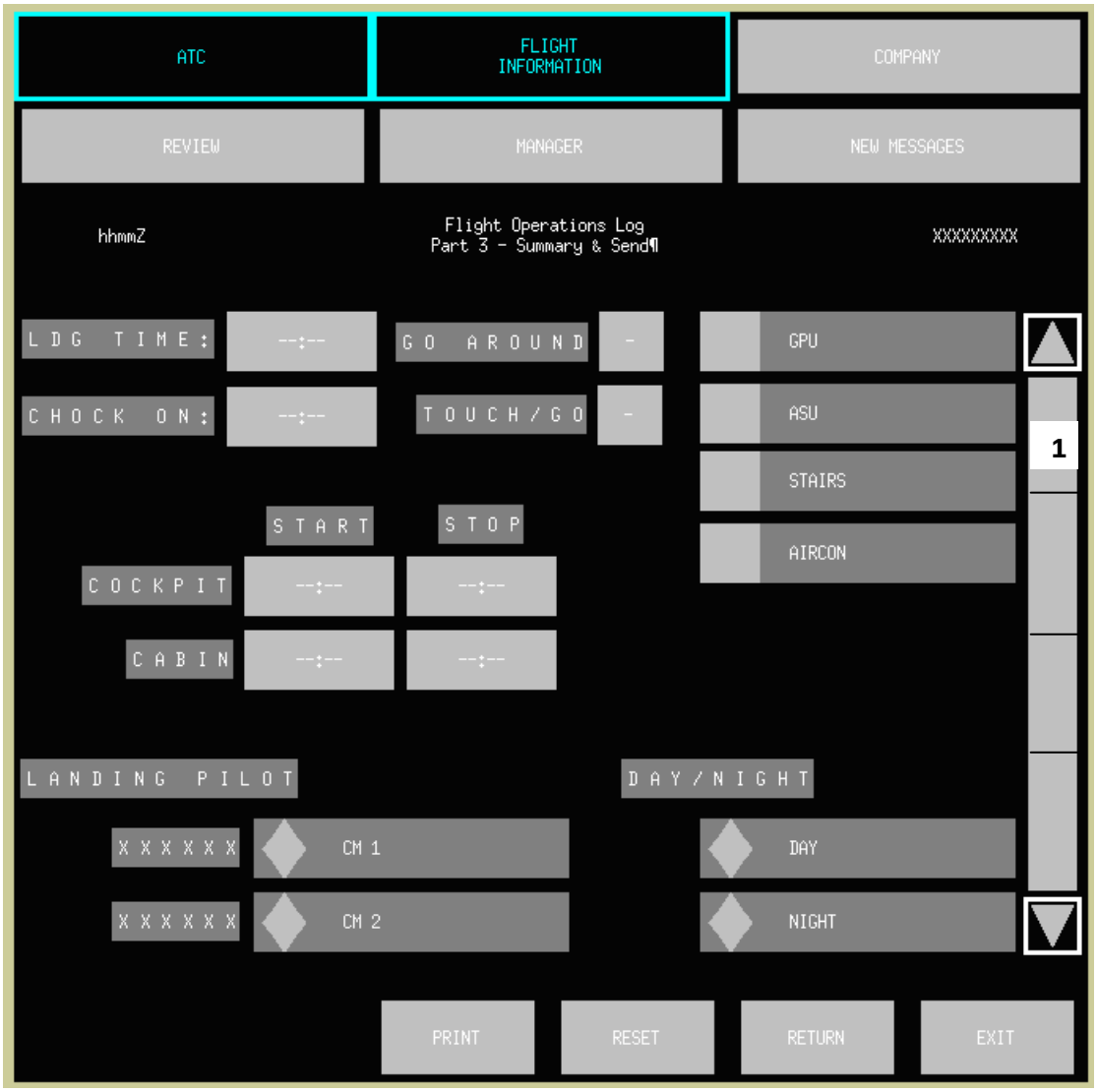


Figure 41

1.3.8.10 FOL Part 3, Page 2 of 4

Refer to the ARRIVAL REPORT display for information on this page of the FOL Part 3 display.

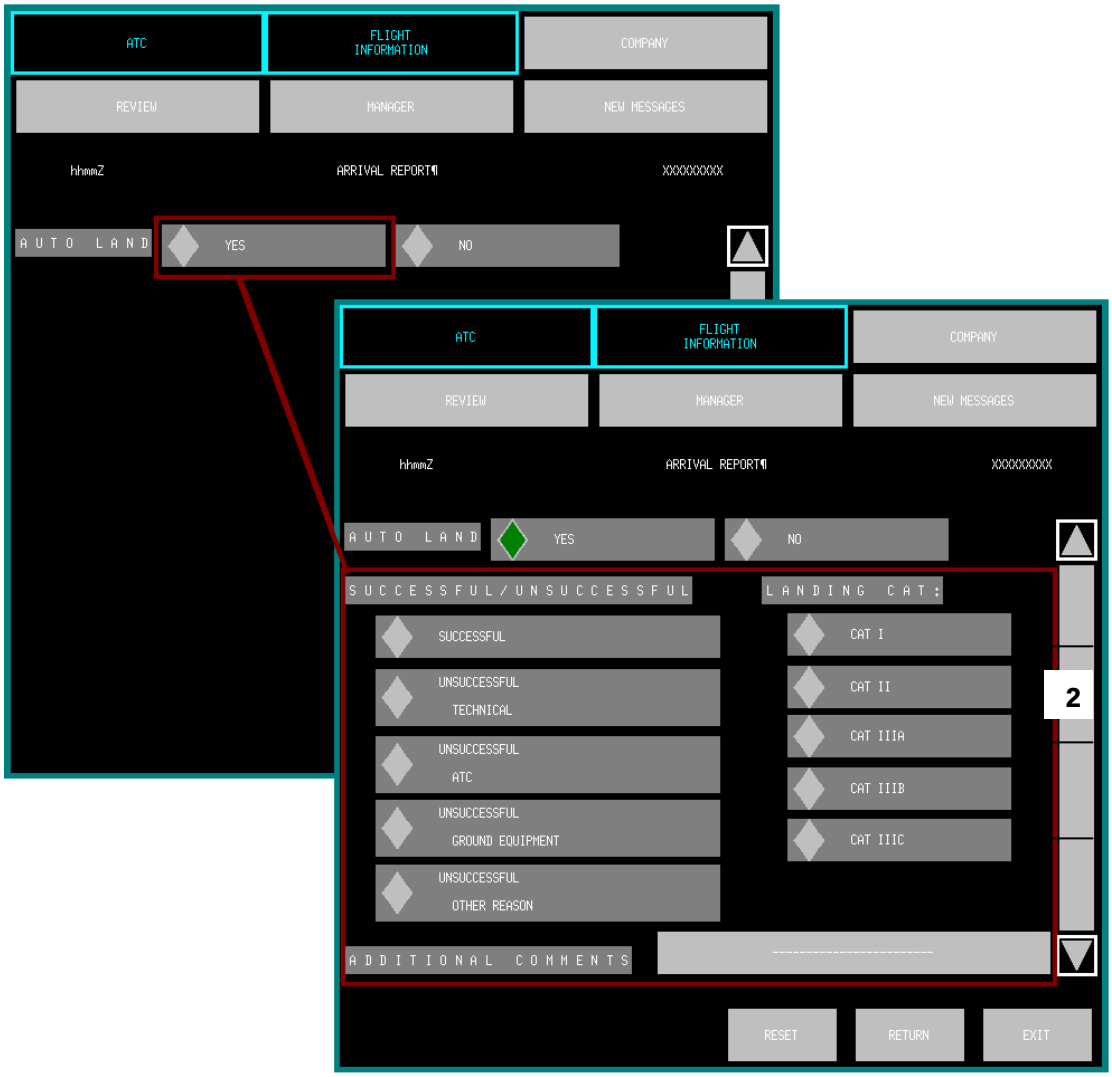


Figure 42

1.3.8.11 FOL Part 3, Page 3 of 4

Refer to the ARRIVAL REPORT display for information on this page of the FOL Part 3 display.

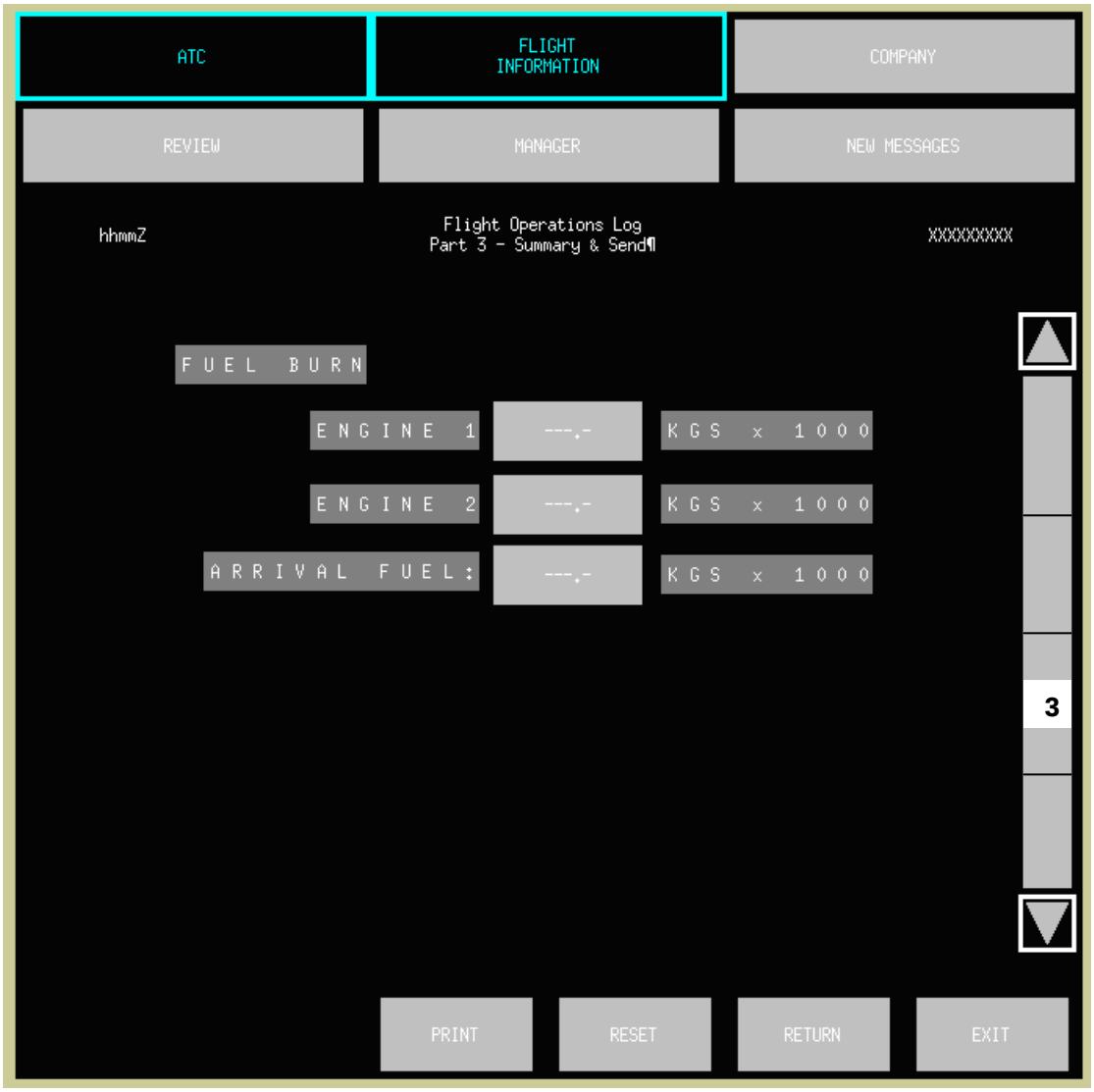


Figure 43

1.3.8.12 FOL Part 3, Page 4 of 4

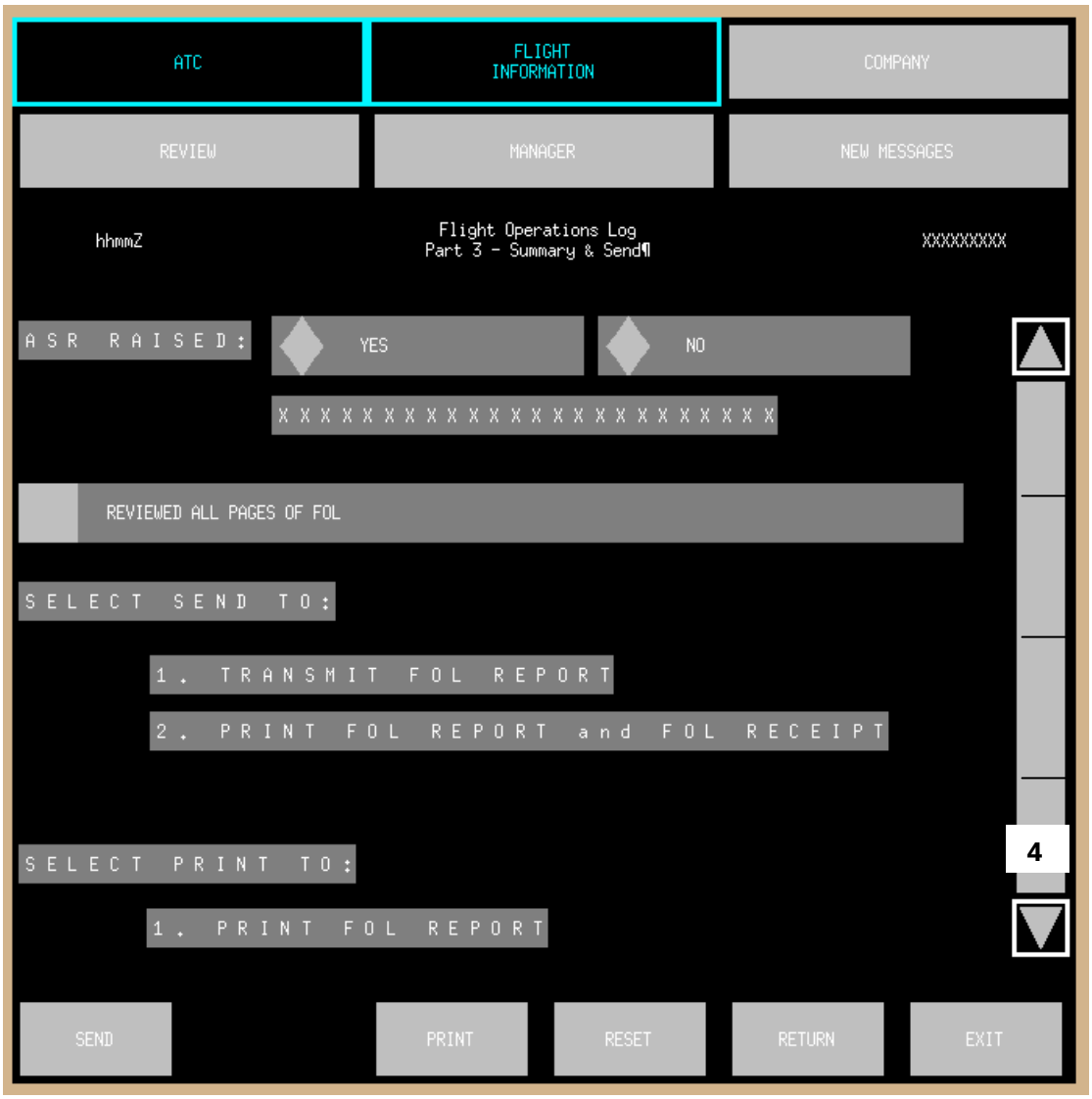


Figure 44

ASR RAISED Yes/No Selector Buttons

Displayed as Inhibited when ASR RAISED is transmitted from COMPANY MENU

From the ASR Raised Display accessible from the COMPANY MENU, the flight crew may select SEND to transmit the ASR RAISED encoding.

If this is done, the ASR downlink will be encoded and transmitted (if datalink communications are established).

At that time, the parameter: ASR RAISED exclusive selector buttons will be set to YES and the ASR Status Message will be updated to reflect the status change. To assure the ASR RAISED is not accidentally re-transmitted, the ASR Yes/No selector buttons on this page will be inhibited and the ASR Menu Item on the COMPANY Menu will be inhibited.

1.3.8.13 From the FLIGHT OPERATIONS LOG PART 3, PAGE 4:

If the ASR RAISED was not selected for transmission as described above, the ASR RAISED YES/NO buttons will be displayed as selectable and the NO selector button will be selected. The ASR status message will indicate that no ASR has been raised.

If the flight crew selects the YES command button, the ASR RAISED status message will be updated to reflect that the ASR will be sent with the FOL Report when the SEND button is selected. The buttons will remain selectable, giving the flight crew the option to re-select “NO”, which will reset the status message to indicate that an ASR has not been raised.

NOTE: The only time the ASR YES/NO command buttons are inhibited is when the flight crew sends the ASR RAISED message from the ASR RAISED Display accessible from the COMPANY menu.

REVIEW ALL PAGES OF FOL checkbox:
This is a mandatory checkbox. The SEND BUTTON

Print format – FOL Printout
Upon selection of the PRINT button the FOL Report (ETI_FOL_PRF) will be printed.

Datalink format
Upon selection of the SEND command button:

1. the FOL Report (ETI_FOL_PRF) will be printed, as shown above
2. the FOL Report (ETI_FOL_ENC, section 5.21) will be transmitted and the Boolean ETI_FOL_ENC_ENCODED will be set to TRUE

A logic unit will evaluate the boolean ETI_FOL_ENC_ENCODED

When TRUE the following will occur:

1. If the ASR has been raised and not previously sent, the ASR RAISED encoding will be encoded & sent (refer to ETI_ASR_ENC, section 5.18).
2. The FOL Print Receipt will be printed. (The receipt is only printed when the FOL message has been encoded and the DCMF parameter: DATALINK_AVAILABLE_FLAG is set to TRUE)

Logic units are continuously evaluated. Logic has been written to assure the ASR encoding and the FOL printout only occurs once during the flight.

Selecting RESET from the FOL page only affects the current page parameters & will not affect this logic unit.

1.3.8.14 FOL Print-out

```
    ETIHAD AIRWAYS     -    FLIGHT OPERATIONAL LOG

 REG          FLIGHT/S      FROM     TO      DATE      DIV TO:XXXX
 XXXXXXX      XXXXXX/XX     XXXX     XXXX    ddMMMyy     CODE:XX


 BLOCK TIME   FLIGHT TIME   DUTY TIME          DELAY
 OFF:hhmmZ    OFF:hhmm             CKPT/CAB   CODE/TIME
 ON :hhmmZ    OFF:hhmm      FROM:hhmm/hhmmZ   XXX/hhmm
     ----         ----      TO  :hhmm/hhmmZ   XXX/hhmm
     hhmm         hhmm                        XXX/hhmm


           S T T L          FUEL               MISC
 STAFF NBR./N/C/O/G         DENS  :N.NNN       PUSHBACK :X
CM1 :XXXXXX/N/X/X/X         DELIVD:NNNNNN
CM2 :XXXXXX/N/X/X/X         UNIT  :    XX      DE-ICING :X
CM3 :XXXXXX/N/X             UPLIFT:NNNNNN      FLUID TYP:N
CM4 :XXXXXX/N/X             REMAIN:NNNNNN      FLUID MIX:NNN
CM5 :XXXXXX/N/X             DEP   :NNNNNN      START OF
                            ARR   :NNNNNN      HOLDOVER :hhmmZ
                            PLAN  :NNNNNN
                            BURN               TOUCH/GO :N
                            ENG1:  NNNNNN      GOAROUND :N
                            ENG2:  NNNNNN
                            ENG3: -----        AUTO APPROACH:X/X
                            ENG4: -----        IF UNSUCCESSFUL
                                               ..REASON CODE: N
                            EXTRA :            1=TECHNICAL
                            FUEL RCPTS         2=ATC
                            1:[XXXXXXXXXXXX]   3=GND EQUIPMENT
 TRAFFICLOAD (KG)           2:[XXXXXXXXXXXX]   4=OTHER (*)
 FREIGHT:NNNNN              3:[XXXXXXXXXXXX]
 TOW    :NNNNNN             4:[XXXXXXXXXXXX]
 ZFW    :NNNNNN                 (*)[XXXXXXXXXXXXXXXXXXXXXXXX]
 PAYLOAD:NNNNNN                                TANKER: X
                                                  GPU: X
                                                  ASU: X
                                               STAIRS: X
                                               AIRCON: X
                                           ASR RAISED: X
```

Figure 45
Print Format – FOL Receipt

```
FOL SUMMARY SENT OK.

DATE     / TIME       LAT       / LON        VHF-FREQ
ddMMMyy / hhmmZ       ±NNN.NNN/  ±NNN.NNN   NNN.NNN
```

Figure 46
Flight Times

SECTION 1

Part 4

1.4.0 Datalink Transactions: Non-Routine Miscellaneous Reports and Requests

1.4.1 Flight Times

The Flight Times display page provides a means to review the Out, Off, On, and In times for the current and previous flights. In addition to the flight times, the Fuel On Board at the IN Event and the Boarded Fuel values are also displayed.

Fuel on board is displayed in metric tons. Boarded Fuel (also referred to as UPLIFT) is displayed in the unit of measurement entered by the flight crew (LT or UG) in the ENROUTE DATA page.

This page may be manually transmitted by selecting the SEND button. When the SEND button is selected the encoding: FLT_TIMES_ENC will be transmitted. Refer to the Downlink section of this document for the FLT_TIMES_ENC encoding definition.

When the PRINT button is selected, the values displayed will be printed. Refer to the PRINT format section of this document for the print layout and definition.

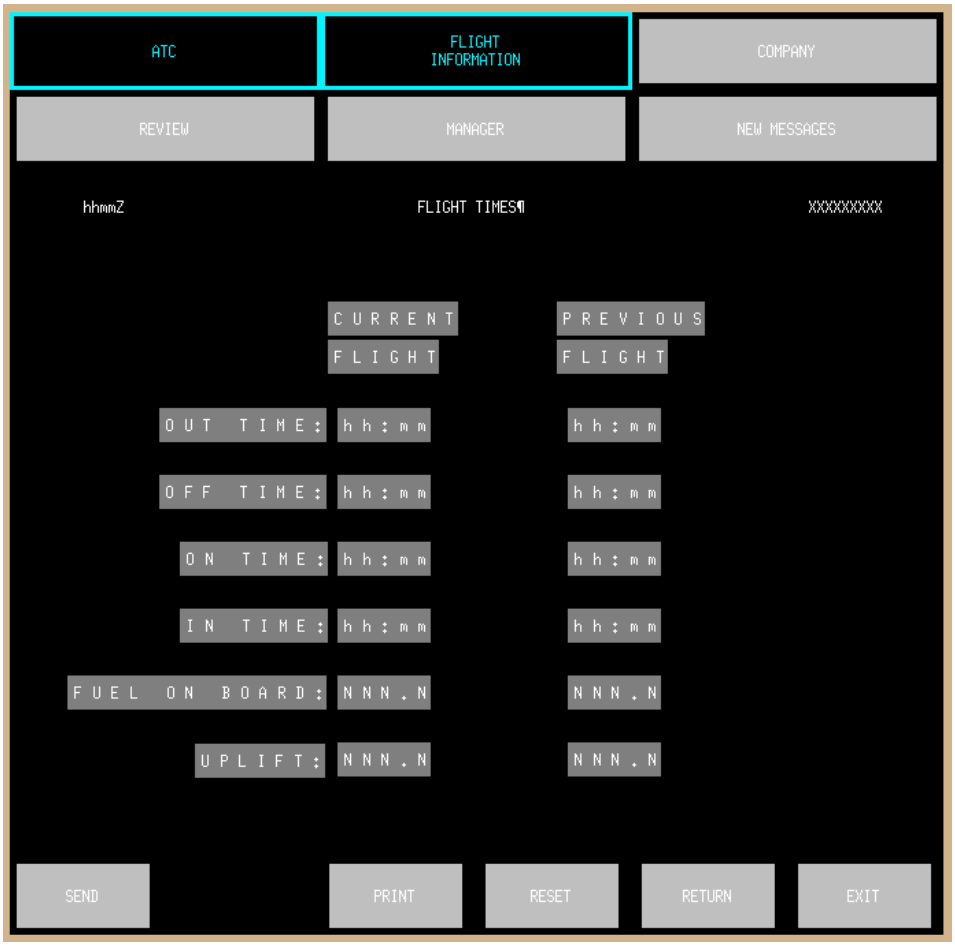


Figure 47

1.4.2 Weather Request Transaction

Using the Weather Request display pages, the flight crew may downlink a request for weather data. When the downlink request is received by the ground system, it is expected that the weather would be retrieved from a weather services department and transmitted to the requesting airplane.

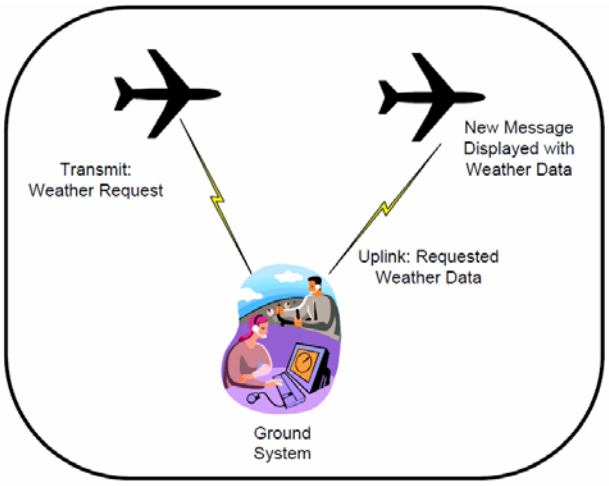


Figure 48

The Weather Request downlink page is designed to request the following types of weather reports:

- Surface Actual (METAR)
- Forecast-1 (0-9 hour forecast)
- Forecast-2 (6-24 hour forecast)
- Actual & Forecast-2 (METAR and 6-24 hour forecast)
-

The current destination station will automatically be populated in the first STATION entry box. The crew may overwrite the destination station in the entry box. The downlink request is configured to support requesting weather for up to four (4) stations.

Figure 49

1.4.3.0 Delay Report

The Delay Report display provides a means of reporting Departure, Takeoff, or Enroute Delays form a single page, using exclusive selector buttons (ESBs) to select the type of delay to be reported. Based on the selected delay type the data on the page will be change to show selections that correspond with the type of delay being reported.

The intent of this display is to be used by the flight crew to notify the airline of any delays as they are made known. The display is intended for use when delays occur prior to pushback, between pushback and takeoff, and between takeoff and the landing. Early notification of delays allows the ground support teams to re-arrange their schedules based on the information sent with the delay reports.

FDCF logic units evaluate the out-off-on-in state of the flight. When the logic unit determines the airplane is in the “IN” state the DEPARTURE DELAY selector button is pre-selected. When the logic unit determines the airplane is in the OUT state the TAKEOFF DELAY selector button is pre-selected. When the logic determines the airplane is in the OFF state, the ENROUTE DELAY selector button is preselected. Data associated with each selector button remains hidden until the selector button is selected.

The following figures show the layout of the page based on the delay type selected.

Figure 50

Upon selection of the DEPARTURE DELAY exclusive selector button, the following fields and selector buttons will be displayed:

- ESTIMATED OUT TIME entry box
- FUEL ON BOARD entry box
- REASONS exclusive selector buttons:
  - Congestion
  - Late Passenger
  - Mechanical
  - Loading
  - Late Crew
  - ATC Hold
  - Late Airplane
  - Weather
  - Other
  - Departure Delay supplemental text

The Delay Code and Time Fields will remain displayed regardless of the type of delay selected.

1.4.3.1 TAKEOFF DELAY

Figure 51

Upon selection of the TAKEOF DELAY exclusive selector button, the following fields and selector buttons will be displayed:

- ESTIMATED OFF TIME entry box
- FUEL ON BOARD entry box
- REASONS exclusive selector buttons:
  - Congestion
  - ATC RE-RTE
  - ATC Hold
  - Weather
  - Other
  - Takeoff Delay supplemental text

The Delay Code and Time Fields will remain displayed regardless of the type of delay selected.

1.4.3.2 ENROUTE DELAY

Upon selection of the ENROUTE DELAY exclusive selector button, the following fields and selector buttons will be displayed:

- ESTIMATED ON TIME entry box
- FUEL ON BOARD entry box
- REASONS exclusive selector buttons:
  - ATC HOLD
  - PERF LIMIT
  - MECHANICAL
  - FLT LEVEL
  - WX/WINDS
  - Other
  - Enroute Delay supplemental text

The Delay Code and Time Fields will remain displayed regardless of the type of delay selected.

Figure 52

Print Format
The DELAY Report page does not include print capability

Datalink Format
Upon selection of the PRINT command button the DELAY report encoding will be sent.

1.4.4 ETA Report

The Estimated Time of Arrival Report provides a means for the flight crew to manually transmit an ETA report, with current fuel on board and two lines of text.

Figure 53

Print Format
The ETA Report does not include PRINT capability

Datalink Format
Upon selection of the SEND command button, the ETA REPORT encoding, will be transmitted.

1.4.5 Position Report (to company, if required)

The Position report provides a means for the flight crew to manually transmit a position report. The data on this page is manually entered by the flight crew.

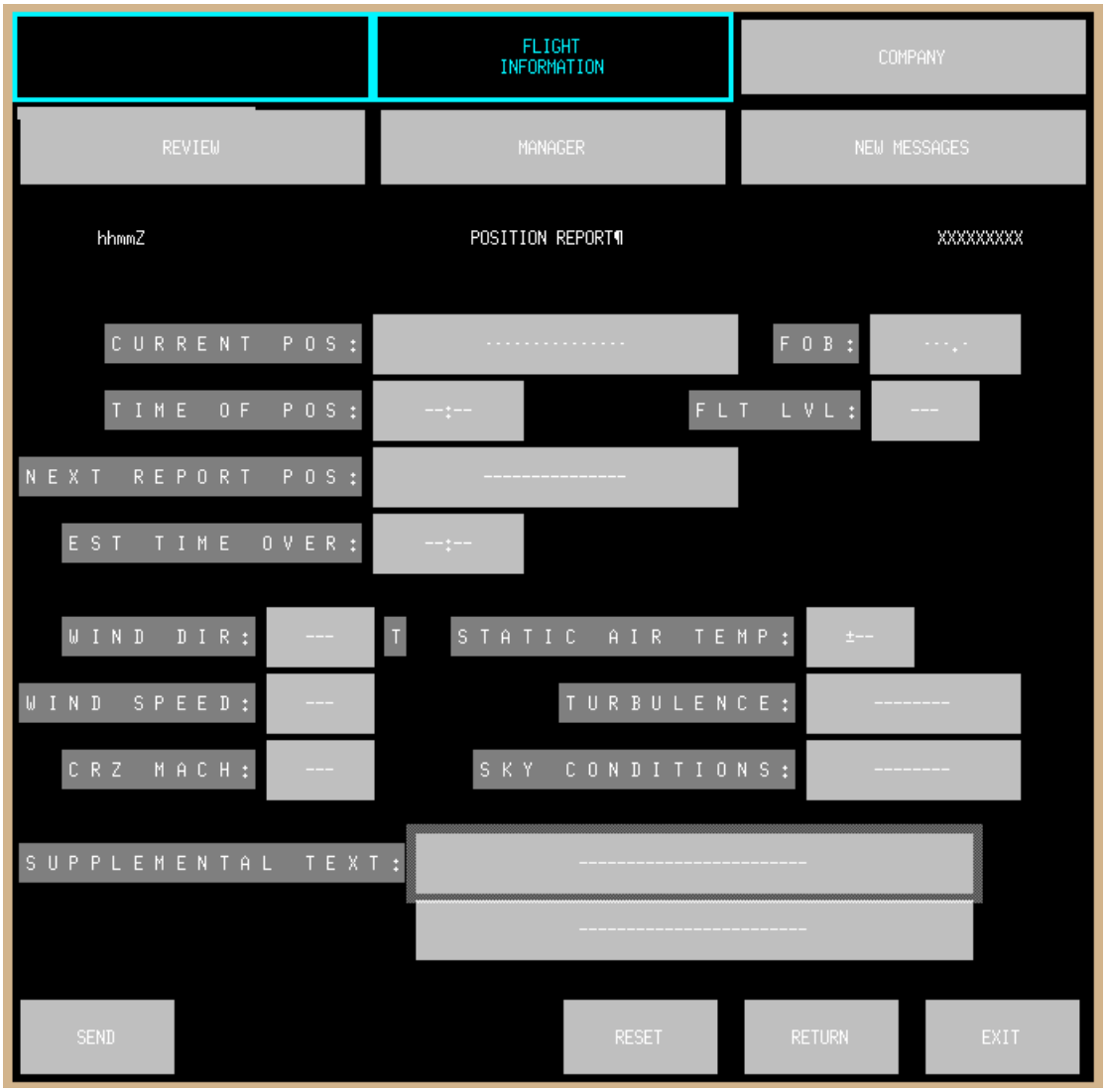


Figure 54

Print Format
The Position Report Display does not provide print functionality

Datalink Format
Upon selection of the SEND command button the POSITON REPORT datalink message will be transmitted.

1.4.6 Voice Contact

The Voice Contact Request display provides a means for the flight crew to send a request to a specific ground address requesting voice communication on the frequency entered.

Figure 55

Print Format
The VOICE contact display page does not provide print functionality

Datalink Format
Upon selection of the SEND command button the downlink message will be transmitted.

1.4.7 Situation Report

The Emergency Situation Report is used to send up to two lines of free text (24 characters per line) to the ground when declaring a situation. The free text is optional. Upon sending the message, a snapshot of the display will be captured and retained in the REVIEW Menu's "SENT …" category.

Figure 56

Print Format
The SITUATION report page does not include print capability

Datalink Format
Upon selection of the SEND command button, the Emergency Situation downlink encoding will be transmitted.

1.4.8 BAS_SENSOR_DISP

The Basic Sensor display page is used to display some basic information used by FDCF when calculating OOOI logic.

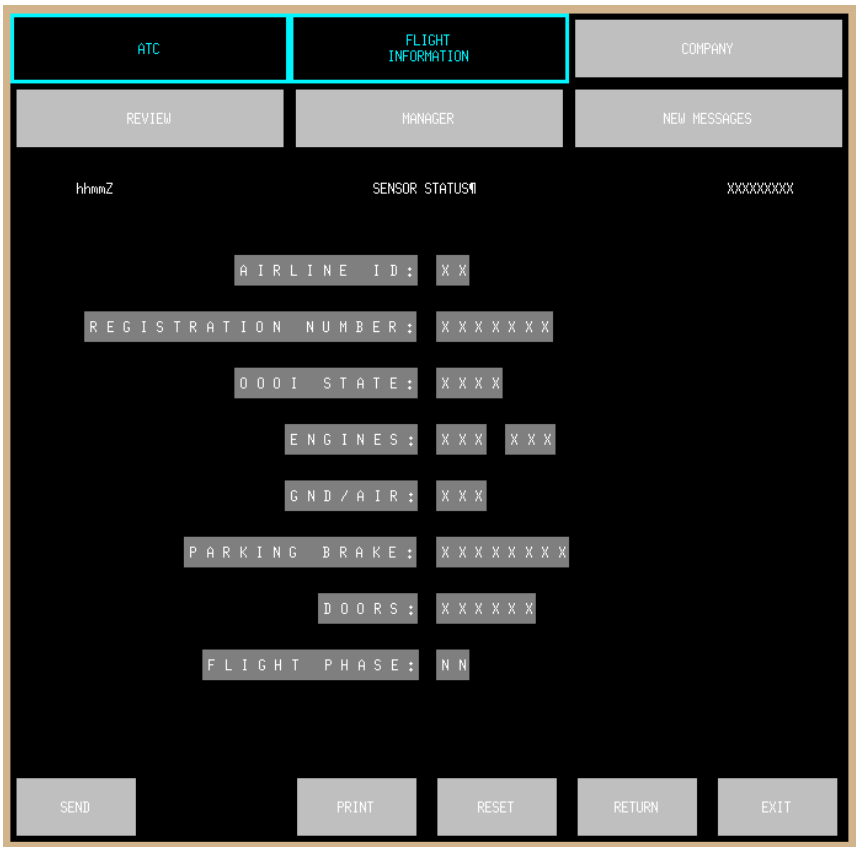


Figure 57

Print Format

Upon selection of the PRINT command button, the SENSOR Display print format shown below will be printed on the flight deck printer.

hhmmZ SENSOR STATUS

AIRLINE ID: XX
REGISTRATION NUMBER: XXXXXXX
OOOI STATE: XXXX
ENGINES: XXX XXX
GND/AIR: XXX
PARKING BRAKE: XXXXXXXX
DOORS: XXXXXX
FLIGHT PHASE: NN

Figure 58 SENSOR Print Format

1.4.9 Diversion Report

The diversion report is designed to provide a means for communicating a diversion with the new destination station, fuel on board, estimated ON time, and the airline's diversion code. In addition to the diversion code, FDCF provides exclusive selector buttons (which must be selected) to describe the reason for diverting. When OTHER is selected additional text may be entered to describe the OTHER reason. The crew may also choose to add two lines of supplemental text to better describe information pertaining to the diversion.

After sending the message, a snapshot of the message will be stored in the REVIEW menu "SENT …" category.

Figure 59

Print Format
The Diversion Report display does not provide print functionality

Datalink Format
Upon selection of the SEND command button the Diversion report encoding will be transmitted.

1.4.10.0 ASR RAISED Page 1 of 1

The ASR Raised report may be sent multiple times throughout the flight.

When the SEND Button is selected, the ASR RAISED encoding definition will be sent to the ground. When the ASR Raised encoding is sent to DCMF for transmission (or is queued for transmission) the ASR Status Message will be changed to indicate the message has been sent. After SENDING, a snapshot of this display will also be available for viewing in the REVIEW category under SENT …

The pilot-in-command entry box will be pre-populated with the crew member staff ID entered for CM 1 in the FLIGHT INITITIALISATION display page. This field may be overwritten, if necessary. All other data on the display page is “Read Only” After sending the message, a snapshot of the message will be stored in the REVIEW menu “SENT …” category.

Figure 60

1.4.10.1 ASR RAISED - Print Format

Upon selection of the PRINT Command button the ASR RAISED Print format, shown below, will be printed:

```
REG         FLIGHT/S      FROM    TO      DATE     TIME
 XXXXXXX     XXXXXX XX     XXXX    XXXX    ddMMMyy  hhmmZ

 ASR RAISED INFO SENT

 PIC : XXXXXXX
```

Figure 61

Datalink Format

Upon selection of the SEND command button the ASR Raised datalink message will be transmitted

1.4.11 Miscellaneous Code Report

The Miscellaneous Code Report allows the flight crew to enter a two character code (required) and optional text to send to the ground. The ground evaluates the miscellaneous code and determines from the code how to handle the message and text (if any) that follows. Airlines maintain a set of codes to be used with this display. After sending the message, a snapshot of the message will be stored in the REVIEW menu “SENT …” category.

Figure 62

Print Format
The Miscellaneous Code display does not include print functionality

Datalink Format
Upon selection of the SEND COMMAND button the MISCELLANEOUS CODE downlink encoding will be transmitted.

1.4.12 Maintenance Report

The Maintenance Report downlink message is used to send a free text downlink message to the ground. The maintenance report contains one line of mandatory text. The fields following are optional. After sending the message, a snapshot of the message will be stored in the REVIEW menu “SENT …” category.

Figure 63

Print Format
The Maintenance Report does not include PRINT functionality

Datalink Format
Upon selection of the SEND command button, the MAINTENANCE REPORT downlink message will be transmitted.

1.4.13.0 Message to Maintenance (MOC/MCC)

The Message to Maintenance (MOC) is a free text downlink message routed to MOC. The fields on the page are optional. Up to seven (7) lines of text (24 characters per line) may be entered and transmitted.
After sending the message, a snapshot of the message will be stored in the REVIEW menu “SENT …” category.

Figure 64

Print Format
The Message to Maintenance (MOC) does not have PRINT functionality

Datalink Format
Upon selection of the SEND command button the MESSAGE TO MAINTENANCE downlink encoding will be transmitted.

1.4.13.1 Message to Operations (OCC / NOC)

The Message to Operations (OCC) is a free text downlink message routed to OCC. The fields on the page are optional. Up to seven (7) lines of text (24 characters per line) may be entered and transmitted. After sending the message, a snapshot of the message will be stored in the REVIEW menu “SENT …” category.

Figure 65

Print Format
The Message to Operations display does not have PRINT functionality.

Datalink Format
Upon selection of the SEND command button the MESSAGE TO OPERATIONS downlink encoding will be transmitted.

1.4.13.2 Message to Ground

The Message to Ground display allow the flight crew to enter a specific ground address for routing of the message on the ground. After sending the message, a snapshot of the message will be stored in the REVIEW menu “SENT ...” category.

Figure 66

Print Format
The Message to Ground display does not provide PRINT functionality

Datalink Format
Upon selection of the SEND command button the Message to Ground downlink will be transmitted.

1.4.13.3 Message to Medlink

The Message to MedLink is a free text downlink. The fields on the page are optional. Up to seven (7) lines of text (24 characters per line) may be entered and transmitted. After sending the message, a snapshot of the message will be stored in the REVIEW menu “SENT …” category.

Figure 67

Print Format
The Message to Medlink display does not include PRINT functionality.

Datalink Format
Upon selection of the SEND command button the MESSAGE TO MEDLINK downlink encoding will be transmitted.

1.4.14.0 SUMMARY

1.4.14.1 Logic Units and Triggered Events

The following sections include the logic required to support the automatic capturing of data and triggering of reports through a flight.

Etihad has requested that data from the flight be preserved for 30 minutes after the engine shutdown and any door is opened. Etihad has enabled the Flight Deck Comm automatic reset OPC. The automatic reset normally occurs 10 minutes after engine shutdown and any passenger door is opened. As a result of the requirement to preserve data with this OPC set, special logic must be written. Anomalies will likely occur as a result of this requirement. To implement this requirement requires that the data reset during a “Master Reset” (from the MANAGER PAGE) not be affected by the “Master Reset”. As a result, any anomalies experienced during the flight may not be reset using the Master Reset function.

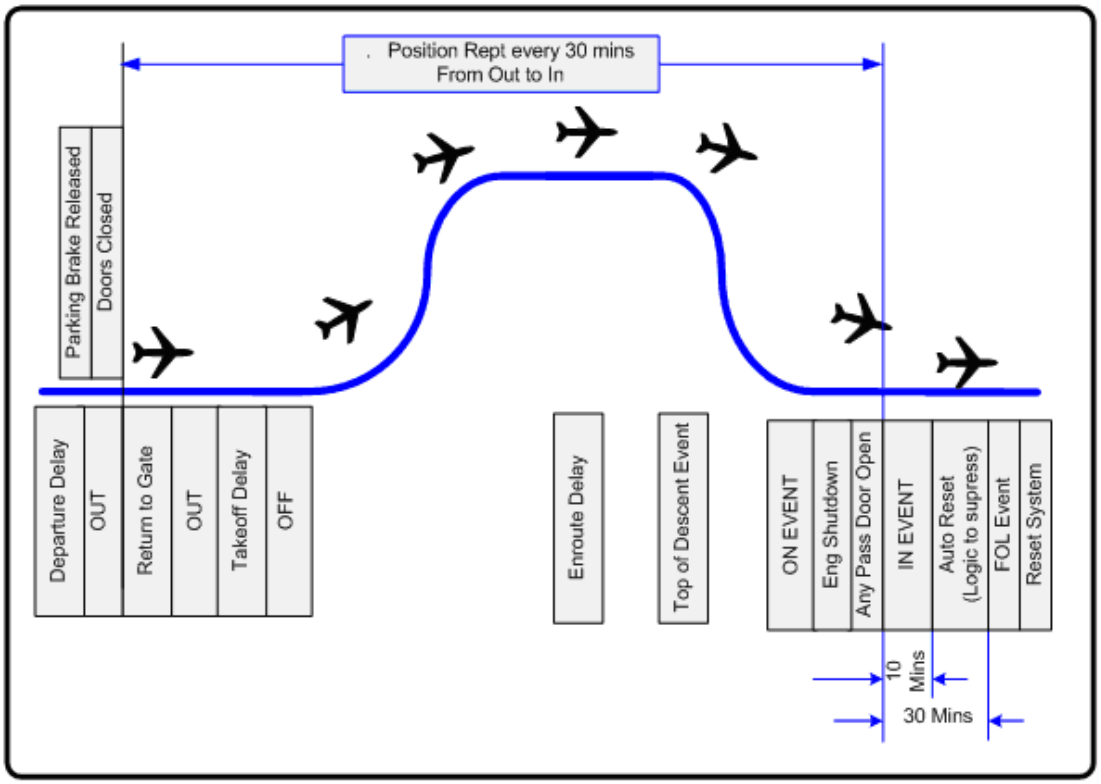


Figure 68

Note: if a second flight is initiated within the 30 minutes from the in event until the system is reset, data from the second flight will be sent as part of the FOL, and data entered when the 30 minute timer expires will be reset to system default values.

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SECTION 2

PART 1

2.0 FLIGHT INFORMATION Functions - General description

- Oceanic Clearance via FDCF - Attached to SR 1-1226248171.
- AIMS OPC Software P/N 316F-BCG-00Y-A3 (Diskette P/N 243W0003-1227).

The above specifications are applicable to Etihad 777 airplanes. In this OPC, ARINC 623 uplink/downlink message capability is enabled. As such, Etihad 777 airplanes are capable of performing ORC.

2.1.1 FLIGHT INFORMATION Downlink Display

Downlink pages are used by the flight crew to request information which contains ATC Clearances or ATIS reports. The crew may request oceanic or departure clearances or request ATIS information.

- Departure Clearance (DCL)
- Oceanic Clearance (OCL)
- Digital-Automatic Terminal Information services (d-ATIS)

The lower centre display is used for most data transactions. Input is from the keypad on the FMC.

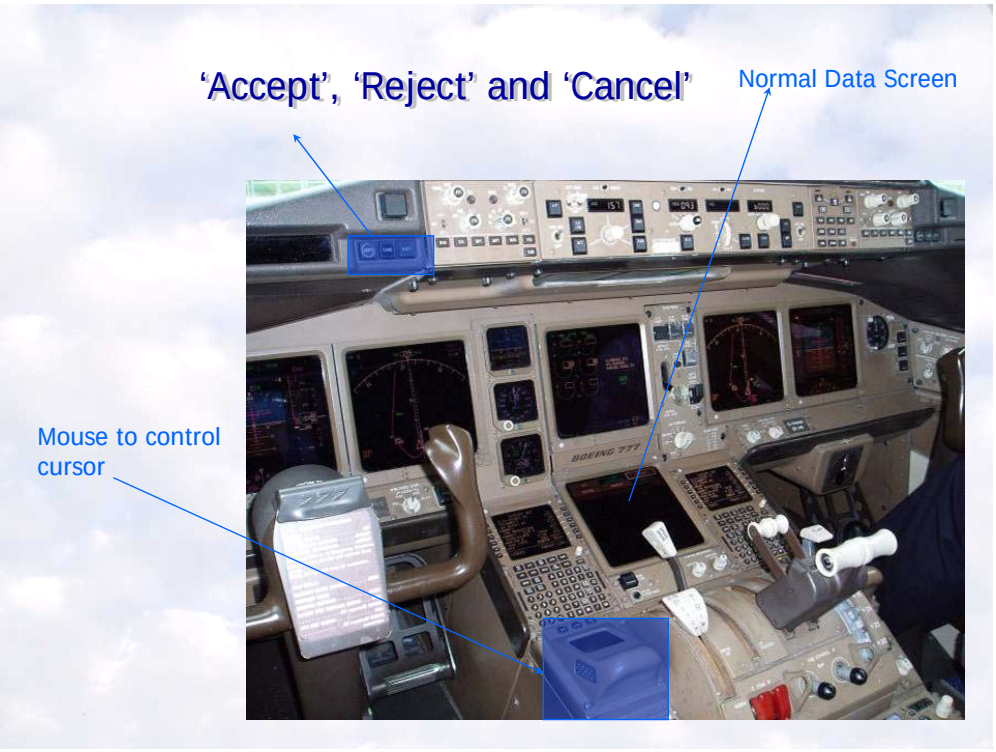

Figure 69

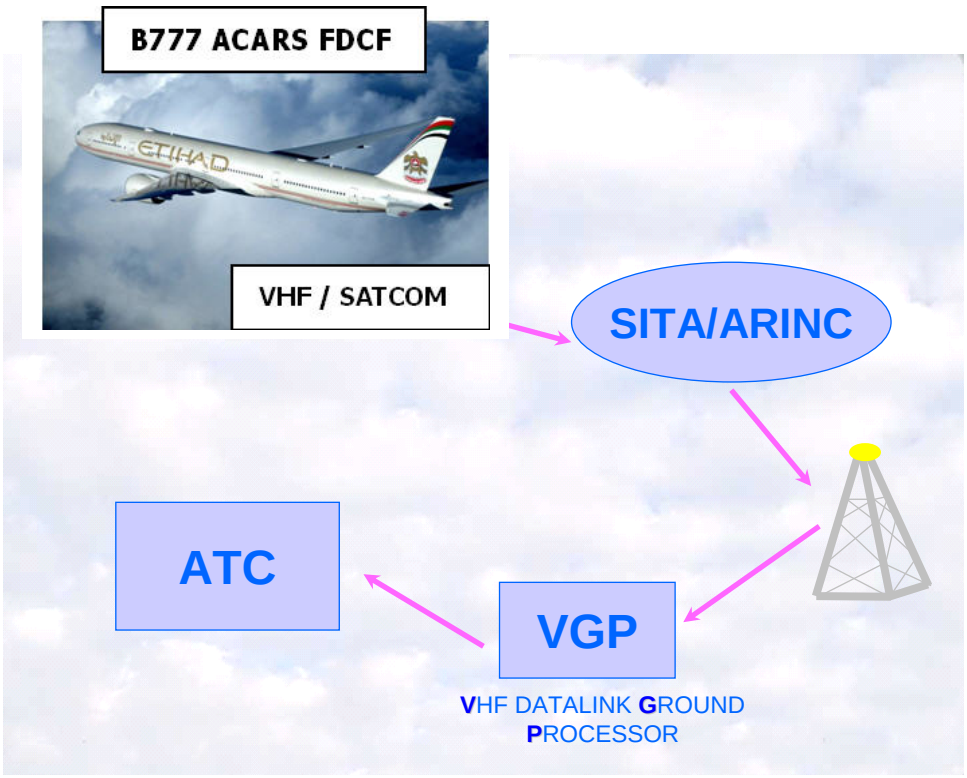

Figure 70

2.1.2 Departure Clearance Downlink Request

2.1.3 Pre-Departure Clearance (PDC)

Pilots are now able to request a (Pre-) Departure Clearance via datalink on more and more airports (if ATC equipped). The clearance is uplinked to the aircraft when the ATC system has processed it; the pilot acknowledges it electronically. Pushback and startup clearances along with taxi clearance can also be requested and obtained from ATC (if ATC equipped).

Selecting the “DEPARTURE CLEARANCE REQUEST” from the Flight Information menu will display the DEPARTURE CLEARANCE REQUEST page below. The cursor will be positioned over the FACILITY entry field. All entry boxes are mandatory entries which must be made in order to display the send button. In addition, three free text entry boxes have been included for additional information.

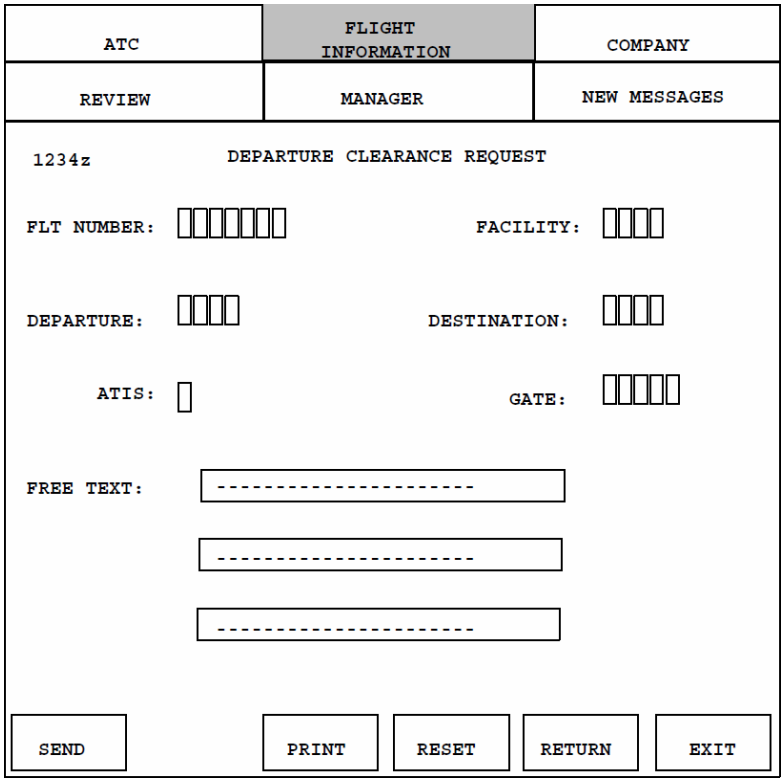

Figure 71
DEPARTURE CLEARANCE DISPLAY

FLIGHT NUMBER Entry Box

FLIGHT NUMBER:
A seven character mandatory entry box will be displayed to allow entry for Flight Number. The Flight Number will default to the FMF Flight Number if the FMF Flight Number is valid. If Flight Number is manually changed, it will back drive the FMF Flight Number on the FMF RTE page and the FDCF ATC LOGON display. (This is very similar to what happens when a flight number is entered on the ATC LOGON page. If a connection is established, the same requirements apply to the LOGON page if the flight number is changed. The connection will be automatically terminated. The flight crew would then be required to perform a manual ATC logon)

Values that are displayed in the FLIGHT NUMBER" entry box will be left justified and space filled. All of the following checks are used to determine validity of the Flight Number before it is displayed and used in downlinks:
• The Flight Number will be in the range from 4 to 7 characters.
• The first 3 characters will be alpha character ranging from (A...Z).
• The 4th to the 7th character will be alphanumeric character ranging from (0...9), (A...Z).

FACILITY:
A four character mandatory entry box will be displayed to allow entry for the Facility name. Valid entries will consist of exactly 4 characters in the range (A..Z).

DEPT:
A four character mandatory entry box will be displayed for allowing entry of the Departure Station. Valid entries shall be any 4 alpha characters (A through Z).

DEST:
A four character mandatory entry box will be displayed for allowing entry of the Destination Station. Valid entries shall be any 4 alpha characters (A through Z).

ATIS:
A one character mandatory entry box will be displayed for allowing entry of ATIS. Valid entries shall be any character A through Z.

GATE:
A five character mandatory entry box will be displayed for allowing entry of gate information. Valid entries shall be any one to five character entry of alpha (A through Z) and numeric (0 through 9) characters. Values that are displayed in the “GATE:” entry boxes shall be left justified and space filled.

FREE TEXT:
Up to three optional lines of text (24 characters per line) can be entered in the FREE TEXT entry boxes. Entry of free text results in the free text included in the downlink message.

2.1.4 Oceanic Clearance Downlink Request

2.1.5 Oceanic Clearance Downlink Request ATC facility address

EGGX for SHANWICK / CYQX for GANDER / KZWY for NEW YORK)

Figure 72

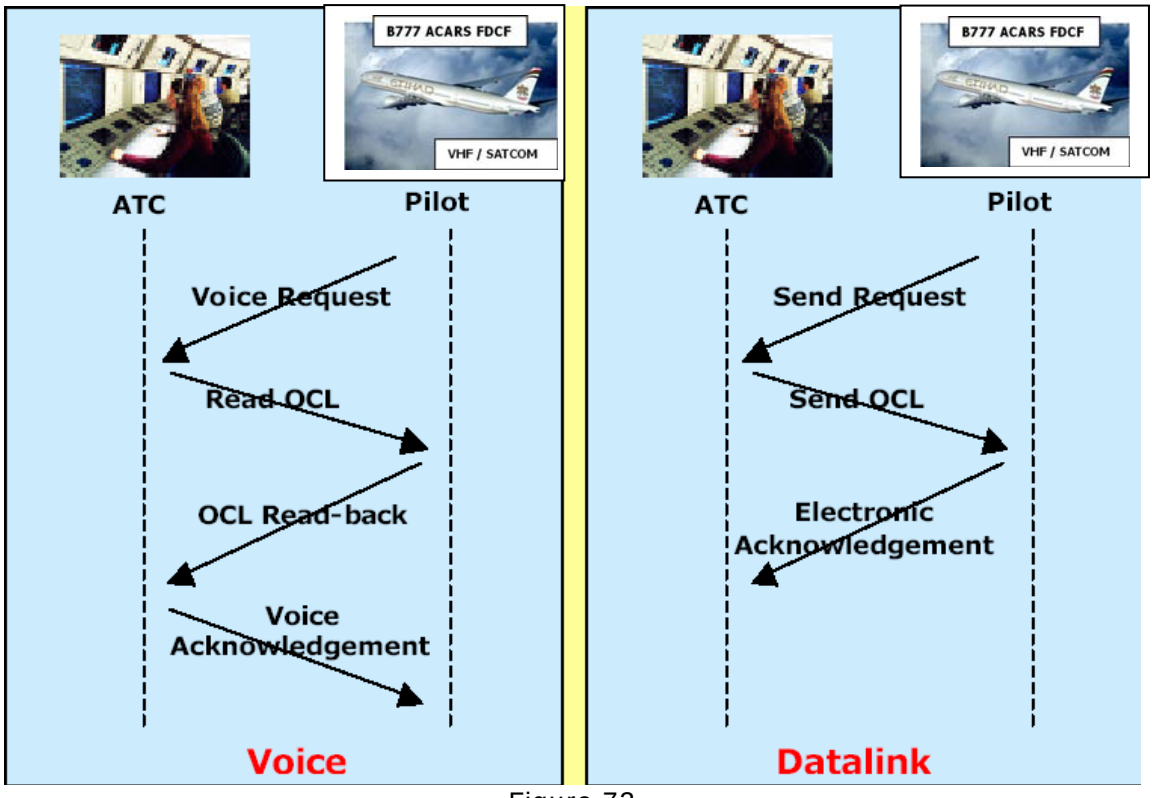

Figure 73

2.1.6 OCEANIC CLEARANCE REQUEST

Selecting the “OCEANIC CLEARANCE REQUEST” from the Flight Information menu will display the OCEANIC CLEARANCE REQUEST page. The cursor will be positioned over the ATC FACILITY entry field. All entry boxes are mandatory entries which must be made in order to display the send button. In addition, three free text entry boxes have been included for additional information.

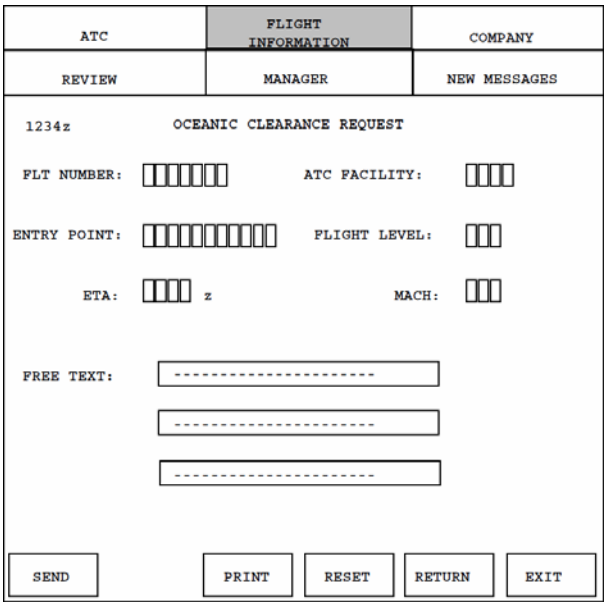

Figure 74
OCEANIC CLEARANCE DISPLAY

FLIGHT NUMBER:
A seven character mandatory entry box will be displayed to allow entry for Flight Number. The Flight Number will default to the FMF Flight Number if the FMF Flight Number is valid. If Flight Number is manually changed, it will back drive the FMF Flight Number on the FMF RTE page and the FDCF ATC LOGON display. (This is very similar to what happens when a flight number is entered on the ATC LOGON page. If a connection is established, the same requirements apply to the LOGON page if the flight number is changed. The connection will be automatically terminated. The flight crew would then be required to perform a manual ATC logon)

Values that are displayed in the FLIGHT NUMBER” entry box will be left justified and space filled. All of the following checks are used to determine validity of the Flight Number before it is displayed and used in downlinks:
• The Flight Number will be in the range from 4 to 7 characters.
• The first 3 characters will be alpha character ranging from (A…Z).
• The 4th to the 7th character will be alphanumeric character ranging from (0…9), (A...Z).

ATC FACILITY:
A four character mandatory entry box will be displayed to allow entry for the ATC Facility name. Valid entries will consist of exactly 4 characters in the range (A..Z).

ENTRY POINT:
An eleven (11) character mandatory entry box will be displayed to allow entry for Entry Point. Entries of up to fifteen characters shall be accepted. The validation process may remove up to four of the entered characters (tenths of a minute in latitude and longitude), so the maximum number that will ever be displayed is actually 11. Entries containing only one or two characters shall be considered to be invalid.

Entries containing three, four or five alphanumeric characters (A..Z, 0..9) will be considered to be valid.

Entries containing 7 or more characters will be decoded as a latitude/longitude entry and validated as such. This implies that both a valid latitude and a valid longitude must be present, with the latitude preceding the longitude.

The latitude portion of a latitude/longitude entry shall be valid if the value of the latitude is less than or equal to 90_ and if it is in any one of the following formats, where D is the direction (N or S), dd is degrees and mm is minutes:
• Ddd
• Dddmm
• Dddmm.0
• ddD
• ddmmD
• ddmm.0D

The longitude portion of a latitude/longitude entry will be valid if the value of the longitude is less than or equal to 180_ and if it is in any one of the following formats, where D is the direction (W or E), ddd is degrees and mm is minutes:
• Dddd
• Ddddmm
• Ddddmm.0
• dddD
• dddmmD
• dddmm.0D

If a latitude or longitude entry contains a trailing ".0", then the ".0" shall not be displayed or encoded in the downlink message (e.g. 4321.0N becomes 4321N).

If the direction (N, E, W or S) in a latitude or longitude prefixes the numeric part, then for display and downlink encoding purposes, the prefix will be converted to a suffix (e.g. N4321 becomes 4321N).

Values that are displayed in the "ENTRY POINT:" entry box will be left justified and space filled.

ETA:
A four character mandatory entry box will be displayed to allow entry for ETA. . Valid ETA entries will be any valid time in the range 0000 to 2359. If an ENTRY POINT has been entered, and it is a waypoint in the active route, then if an ETA has not been entered, the ETA entry box will default to the predicted ETA at that waypoint

FLIGHT LEVEL:
A three character mandatory entry box will be displayed to allow entry of flight level. Valid FLIGHT LEVEL entries will be any positive number between 0 and 500. Values that are displayed in the “FLIGHT LEVEL:” entry box shall be right justified and zero filled.

MACH:
A three character mandatory entry box will be displayed to allow entry of mach number. Valid Mach entries will be any valid Mach number between 0.4 and 0.92. Mach entries may or may not include a leading decimal point. Regardless of whether the leading decimal point is included, they shall be validated and decoded as though the decimal point was there.

FREE TEXT:
Up to three optional lines of text (24 characters per line) can be entered in the FREE TEXT entry boxes. Entry of free text results in the free text included in the downlink message.

2.1.7 ORCA Sent acknowledgement (SAMPLE)

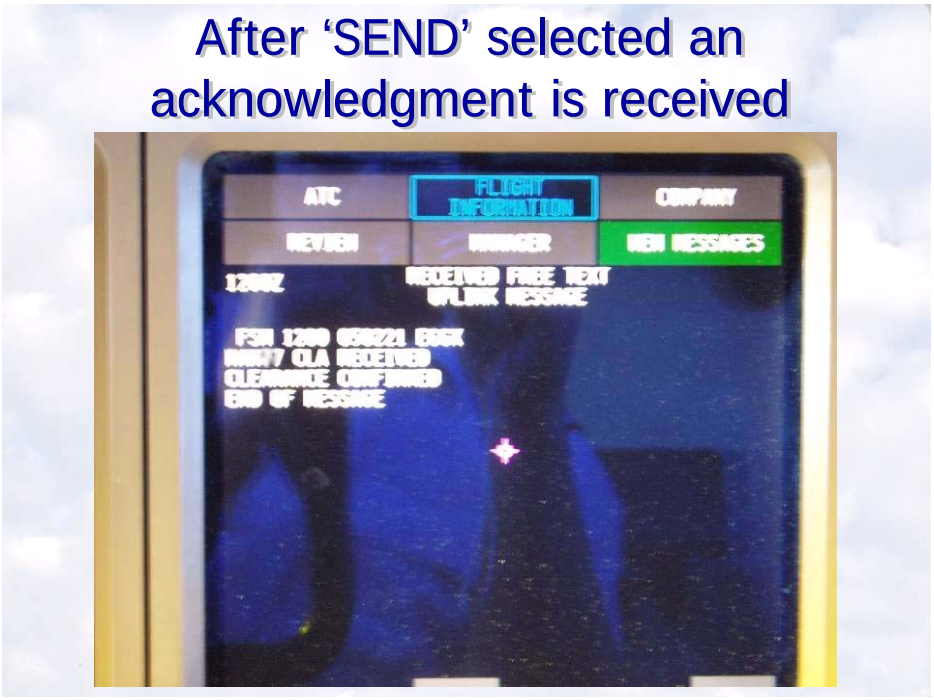

Figure 75

2.1.8 ORCA Automatic Reply (SAMPLE)

Figure 76

2.1.9 ORCA Acknowledgement of Sent ORCA Message (SAMPLE)

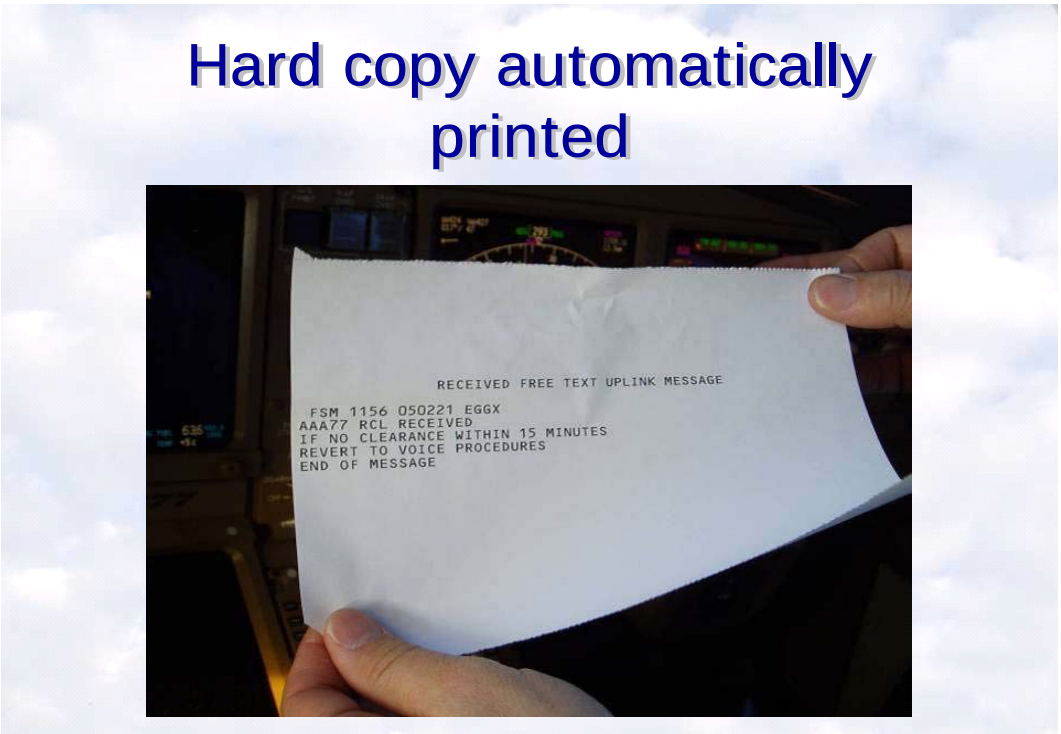

Figure 77

2.1.10 ORCA Receipt of Clearance (SAMPLE)

Figure 78

2.1.11 ATIS Downlink Request

Selecting the “ATIS REQUEST” from the Flight Information menu will display the ATIS REQUEST page. The cursor will be positioned over the Airport entry field. The three main exclusive buttons are DEPARTURE, ENROUTE and ARRIVAL. The AUTO non-exclusive selector button will only be displayed after the ARRIVAL exclusive selector button has been selected. The TERMINATE non-exclusive selector button will be also be displayed.

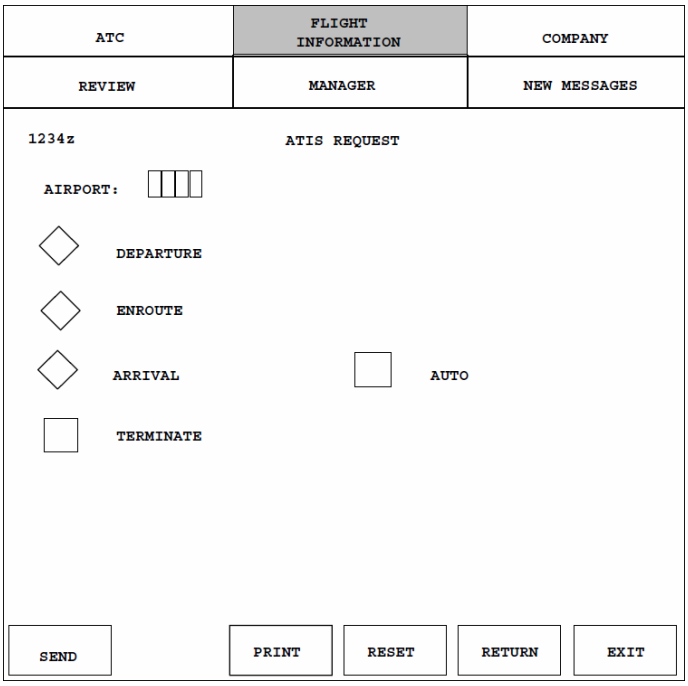

Figure 79
ATIS REQUEST DISPLAY

AIRPORT
The AIRPORT entry box only accepts airport entries. Valid entries will be exactly 4 alpha characters. If a departure airport exists in the active route, and the airplane is on the ground, the default entry shall be the FMF departure airport. If a destination airport exists in the active route, and the airplane is airborne, the default entry shall be the destination airport.

ARRIVAL:
Selection of the ARRIVAL exclusive selector button will set the Arrival/Departure Indicator to A (Arrival ATIS) when the downlink message is sent. The exclusive selector button will not be selected when the page is entered and it will default to “none selected” after the downlink has been sent.

DEPARTURE:
Selection of the DEPARTURE exclusive selector button will set the Arrival/Departure Indicator to D (Departure ATIS) when the downlink message is sent. The exclusive selector button will not be selected when the page is entered and it will default to “none selected” after the downlink has been sent.

ENROUTE:
Selection of the ENROUTE exclusive selector button will set the Arrival/Departure Indicator to E (Automatic En-route Information Service or AEIS) when the downlink message is sent. The exclusive selector button will not be selected when the page is entered and it will default to “none selected” after the downlink has been sent.

AUTOMATIC UPDATE:
The AUTOMATIC UPDATE non-exclusive selector button will only be displayed after the Arrival button has been selected. Selection of AUTOMATIC UPDATE shall set the Arrival/Departure Indicator to C (Arrival ATIS with automatic update) when the downlink message is sent.

TERMINATE:
The TERMINATE non-exclusive selector button will be available for selection on this display. Selection of the TERMINATE non-exclusive selector button will result in the following:
• The Arrival/Departure Indicator will be set to “T” (terminate automatic update of ATIS) when the downlink message is sent.
• The value in the AIRPORT entry box will be set to the one used in the last downlink of an Arrival ATIS with automatic update.
• The ATIS exclusive selector buttons will be set to “none selected”.

Selection of any one of the ATIS mandatory exclusive selector buttons will result in the de-selection of the TERMINATE non-exclusive selector button.

SECTION 2

PART 2

2.2.0 Using the Flight Information Functions

The in-flight operations of the Flight Information functions are described below:

2.2.1 Reviewing and Responding to an Uplink using Flight Information

When an uplink is received and is available for display to the flight crew, a chime will sound and the COMM medium level message, ".COMM", will be displayed on the EICAS display. When this occurs the flight crew should review the uplink and transmit a response, if a response is required.

2.2.2 Displaying an Uplink Message

All Flight Information messages are also displayed on the COMM display and are available through the New Message Menu item. In Figure 4.3.3.2.13.6.1.1-1, the two Flight Information messages (Oceanic Clearance and Departure Clearance) are available for selection.

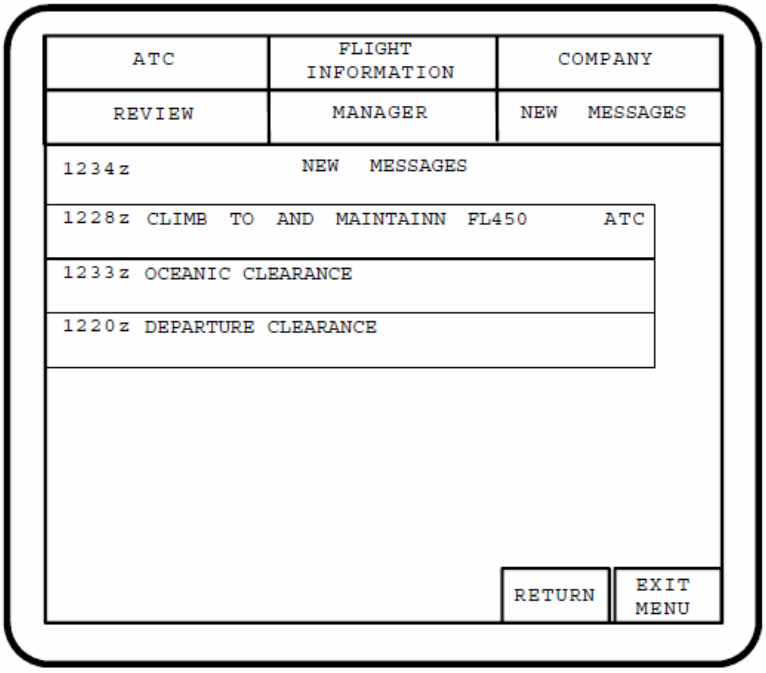

Figure 80
New Message List Box Display

2.2.3 To display a FLIGHT INFORMATION uplink message on the COMM display:

(1) Select the NEW MESSAGE main menu item.
The NEW MESSAGE list box will be displayed.
(2) Select the list box of the message which corresponds to the uplink to be viewed.
The list box with titled Oceanic Clearance is one example.
This action results in display of the HHMMz OCEANIC CLEARANCE display corresponding to the selected list box item.

2.2.4 Responding to an Uplink

If the displayed uplink message requires a response, the ACCEPT and REJECT command buttons will be displayed on the OCEANIC CLEARANCE once all the pages are viewed. The flight crew must transmit an ACCEPT or REJECT response in order to close the message.

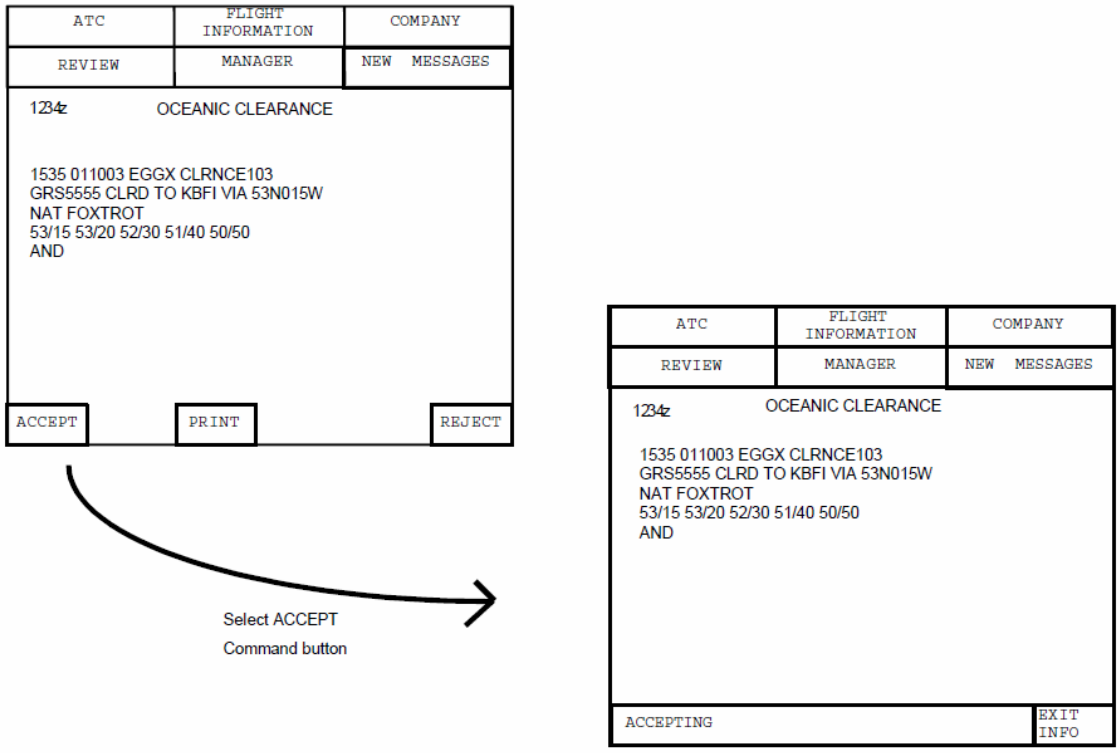

Figure 81

Accept Response to an Uplink

2.2.5 To ACCEPT a FLIGHT INFORMATION Uplink Message

(1) Select the NEW MESSAGE main menu item.
The NEW MESSAGE list box will be displayed.

(2) Select the list box of the message which corresponds to the uplink to be viewed.
This action results in display of the HHMMz OCEANIC CLEARANCE display corresponding to the selected list box item.

(3) Select the ACCEPT command button.
Note, if there is more than one page for the uplink message, all pages must be viewed before the ACCEPT command button will be displayed.
This action results in transmission of the acceptance response downlink message. The information message ACCEPTING will be displayed until the network acknowledgment is received. When the acknowledgment is received the information message ACCEPTED will be displayed.

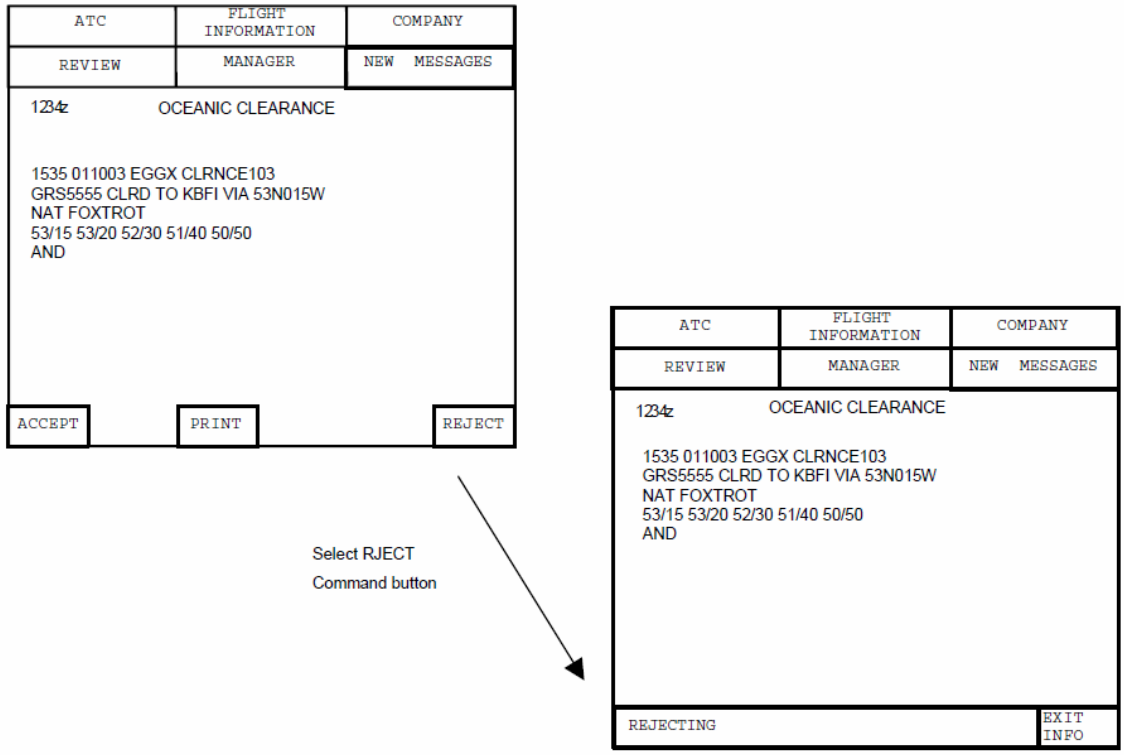

Figure 82
Reject Response to an Uplink

2.2.6 To REJECT a FLIGHT INFORMATION Uplink Message

(1) Select the NEW MESSAGE main menu item.
The NEW MESSAGE list box will be displayed.

(2) Select the list box of the message which corresponds to the uplink to be viewed.
This action results in display of the HHMMz OCEANIC CLEARANCE uplink display corresponding to the selected list box item.

(3) Select the REJECT command button.
Note, if there is more than one page for the uplink message, all pages must be viewed before the REJECT command button will be displayed.

This action results in transmission of the reject response downlink message. The information message REJECTING will be displayed until the network acknowledgment is received. When the acknowledgment is received the information message REJECTED will be displayed. The display is automatically cleared 5 seconds after the REJECT command button is selected.

2.2.7 Creating an ATIS or Clearance Request

Digital-ATIS (d-ATIS)
Traditionally, ATIS (Automatic Terminal Information Service) messages are broadcasted by each airport on a special frequency as a continuous voice transmission. Now, ATIS is becoming available over datalink at more and more airports.

Please Note:
Digital ATIS is only available at selected airports that offer this service.

Examples of D-ATIS from San Francisco Airport

2 .N648UA RA L SFO ATIS INFO K 0150Z.
16004KT 10SM OVC250 13/06 A3033. SIMO CVA IN USE. ARRIVALS EXPECT RWYS 28L, 28R. DEPG RWYS 1L, 1R. NOTAMS... ONE HUNDRED SIXTY-FIVE FOOT HIGH PILE RIVER OPERATING NORTH OF RWY 28R NEAR TAXIWAY KILO ....ADVS you have INFO K.

Figure 83

The ATC Datalink function provides the flight crew the capability to request a variety of vertical, speed, offset, and route clearance requests. The different types of clearance requests can be combined into one request message, as long as the total number of elements selected for the messages does not exceed 5. If the pilot attempts to select a sixth message element, the MESSAGE LIMIT EXCEEDED information message will be displayed.

The ATC ALTITUDE REQUEST, ATC SPEED REQUEST, and the ATC ROUTE REQUEST are accessible via menu selection from the ATC menu item.

SECTION 2

PART 3

2.3.1.0 Creating an ATIS Request

The flight crew has the capability to request ATIS information for departure, enroute and arrival phases of flight. In addition the flight crew can send a downlink which will automatically send an uplink when no information is available.

All ATIS requests can be formulated via entry and selection on the ATIS REQUEST display. Note that the requests are mutually exclusive.

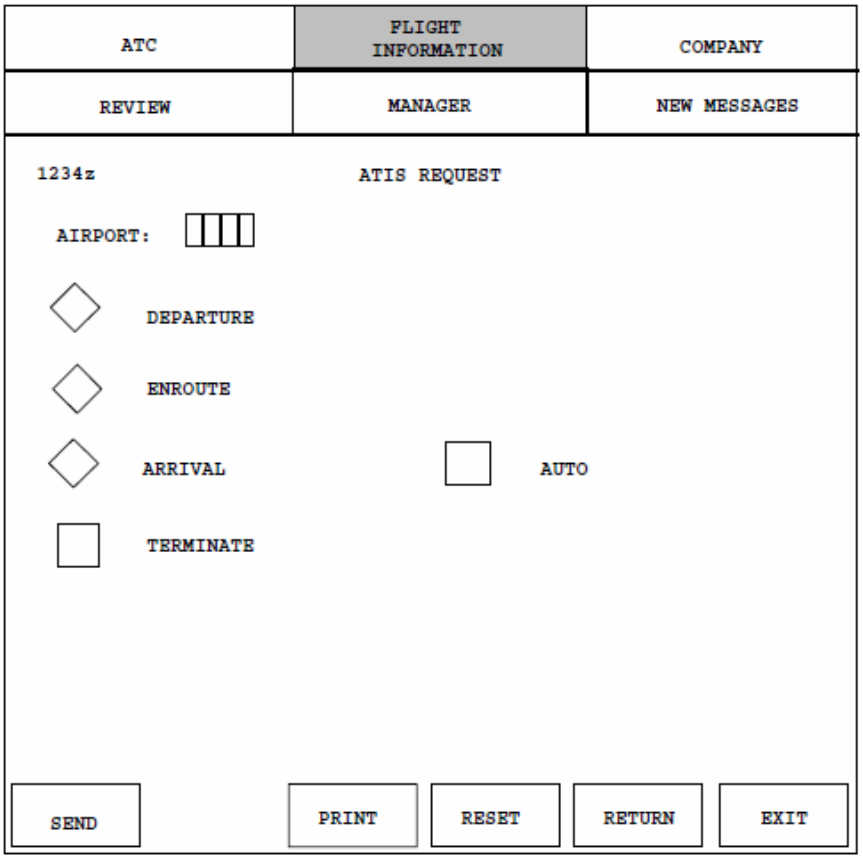

Figure 84
Creating an ATIS Request

2.3.1.1 To initiate transmission of a request to ATIS information

(1) Select the FLIGHT INFORMATION main menu item.

(2) Select the ATIS REQUEST menu item

(3) Enter the airport for which the ATIS information will be applicable.
Valid entries are 4 alpha characters.

(4) Select one of the DEPARTURE, ENROUTE or ARRIVAL exclusive selector buttons depending on what type of information is desired.

Selecting the ARRIVAL exclusive selector button result in the display of the AUTO non-exclusive selector button. Selection of the AUTO non-exclusive selector button will result in automatic uplinks of ATIS information when the message is sent.

Selecting the ENROUTE exclusive selector button results in automatic uplinks of enroute ATIS information when the message is sent.

(5) Select the SEND command button.
This action results in transmission of the request downlink message. The downlink message will be placed in REVIEW at the time the message is sent.

2.3.1.2 Terminating an ATIS Automatic Request

When an automatic downlinks is sent (either enroute or Arrival), uplink messages will be sent to the airplane when any of the uplink data changes. The flight crews have the capability of shutting the automatic messages off. This is done by sending a downlink using the ATIS REQUEST display.

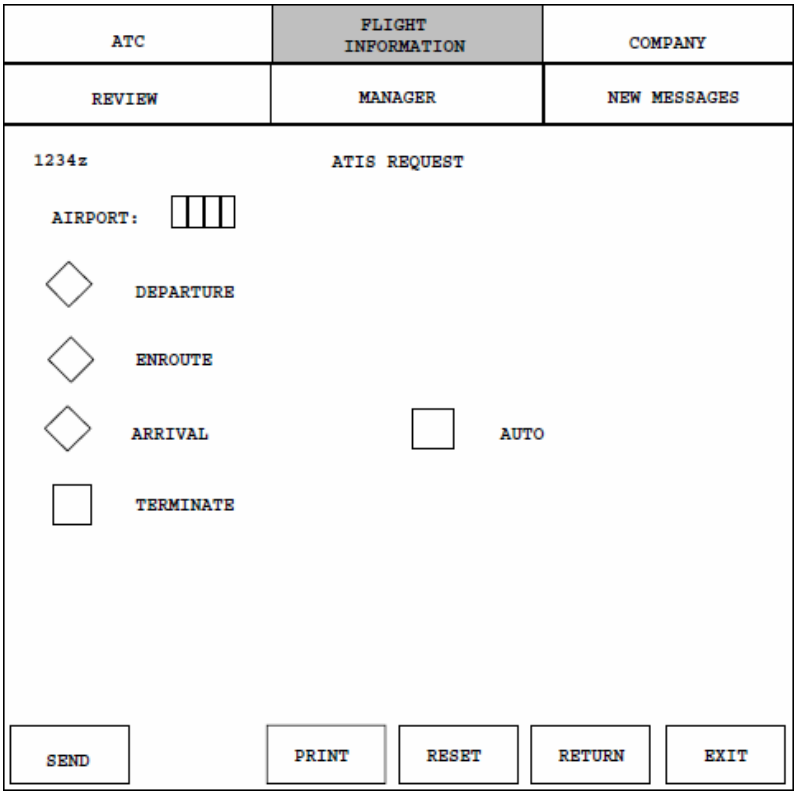

Figure 85
Terminating an Automatic ATIS Request

2.3.1.3 To initiate transmission of a request to terminate automatic ATIS information

(1) Select the FLIGHT INFORMATION main menu item.

(2) Select the ATIS REQUEST menu item

(3) Select the terminate non-exclusive selector button.

(4) Enter the airport for which the ATIS information will be applicable if the default value is not the desired airport.
Valid entries are 4 alpha characters. If step 3 is performed first, it should result in the airport defaulting to the airport of the last autodownlink sent.

(5) Select the SEND command button.
This action results in transmission of the request downlink message which should result in terminating the automatic uplinks.

2.3.2.0 Creating an Oceanic Clearance Request

The flight crew has the capability to request an Oceanic Clearance Request change.

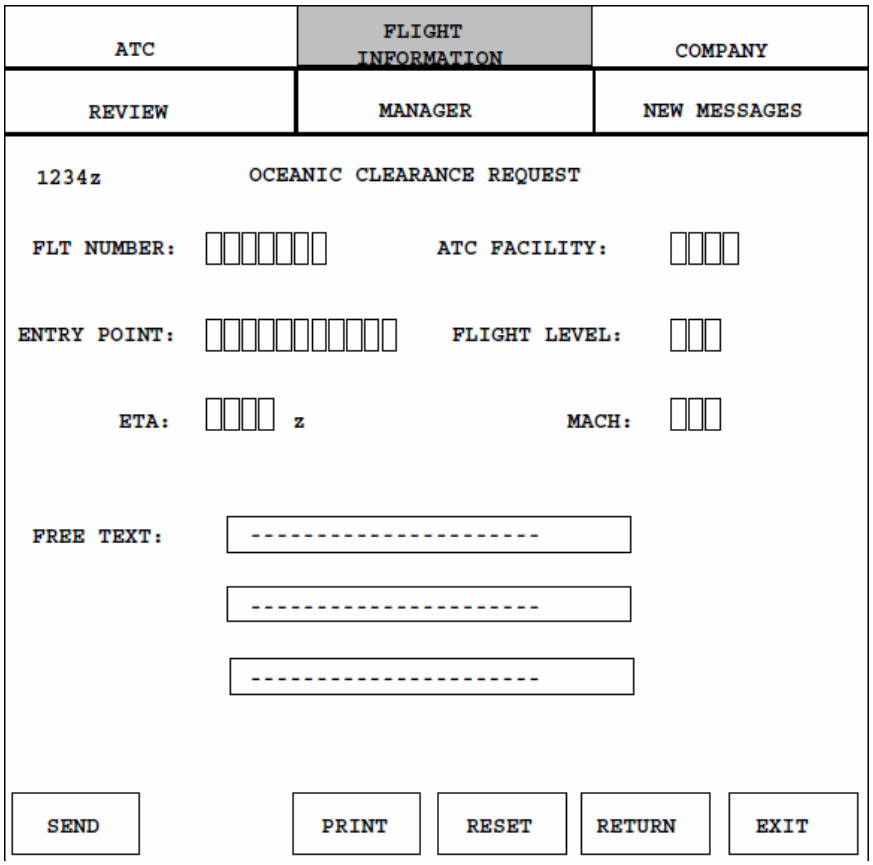

Figure 86
Creating an Oceanic Clearance Request

2.3.2.1 To initiate transmission of an Oceanic Clearance Request:

(1) Select the Flight Information main menu item.

(2) Select the OCEANIC CLR REQUEST menu item
Enter the flight number into the Flight Number entry box unless it already is defaulted to the correct value. The default value comes from the FMF as displayed on the RTE page. If an entry is made on this page, flight number back drives the flight number on the FMF RTE page and the FDCF ATC logon display. The flight number must be entered or displayed in order to SEND the message.

Enter the ATC facility. Entry format for ATC facility is exactly a 4 character alphabetical entry. This entry is required in order to send the message.

Enter the Entry Point. Entry format for entry point can be up to 15 alphanumeric characters however, only 11 of the 15 characters will be displayed. The downlink message requires no more than 11 characters. Fifteen characters were allowed for entry for down selection of latitude and longitude from the FMF for entry into this page. See Oceanic Clearance Downlink Request for more specifics as to allowable entries on this page.

Enter the Flight Level. Valid entries are between 0 and 500. Entry into this field is required to send the downlink message.

Enter the ETA. Valid entries are between 0000 and 2359. Entry into this field is required to send the downlink message.

(3) Enter the Mach value. Entry format for Mach speed is a period followed by 1 to 2 numeric digits between the ranges of .61 to .92. Entry into this field is required to send the downlink message.

(4) Select the SEND command button.
This action results in transmission of the request downlink message. The downlink message will be placed in REVIEW at the time the message is sent.

NOTE: Three free text fields are included on this display for allowing the crew to add additional information. These fields are not required to send the downlink.

2.3.3.0 Creating a Departure Clearance Request

The flight crew has the capability to request a Departure Clearance Request change.

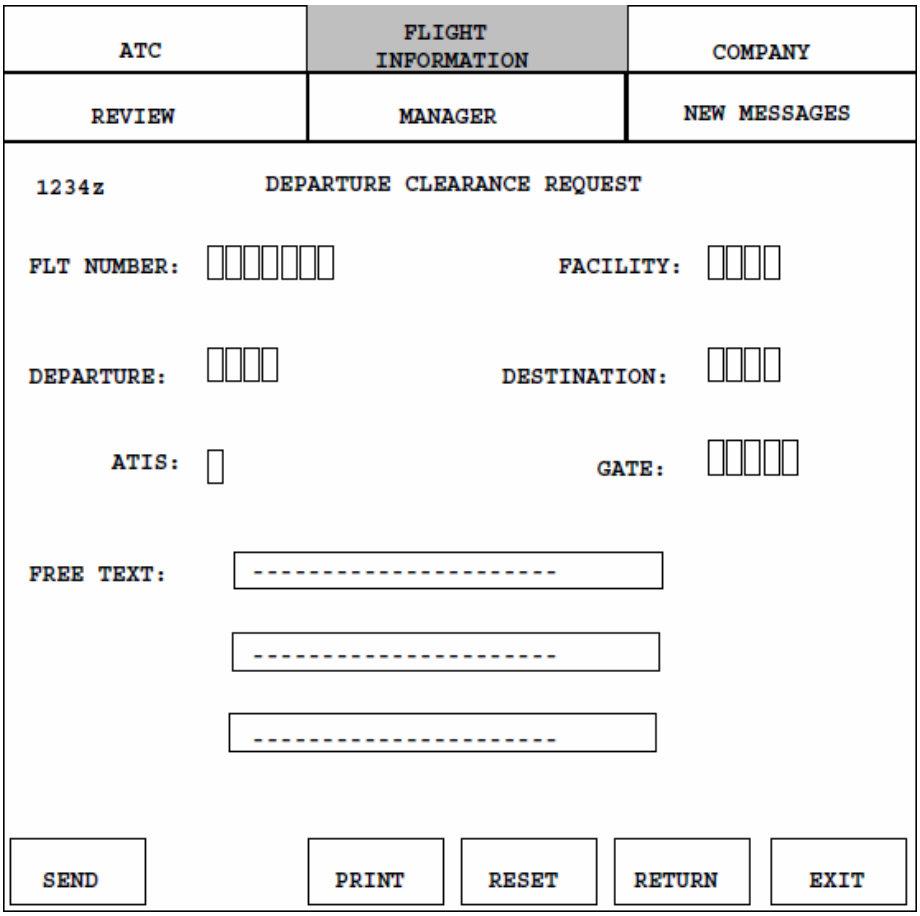

Figure 87
Departure Clearance Request

2.3.3.1 To initiate transmission of a Departure Clearance Request:

(1) Select the Flight Information main menu item.

(2) Select the DEPARTURE CLR REQUEST menu item

Enter the flight number into the Flight Number entry box unless it already is defaulted to the correct value. The default value comes from the FMF as displayed on the RTE page. If an entry is made on this page, flight number back drives the flight number on the FMF RTE page and the FDCF ATC logon display. The flight number must be entered or displayed in order to SEND the message.

Enter the Facility. Entry format for facility is exactly a 4 character alphabetic entry. This entry is required in order to send the message.

Enter the Departure Station. Valid entries are 4 alpha characters. This will default to FMF departure station. Entry into this field or a default value is required to send the downlink message.

Enter the Destination Station. Valid entries are 4 alpha characters. This will default to FMF departure station. Entry into this field or a default value is required to send the downlink message.

Enter the ATIS. Valid entries are any character between A and Z. Entry into this field is required to send the downlink message.

(3) Enter the Gate information. Valid entries are 1 to 5 alphanumeric characters. This entry is required in order to Send the message.

(4) Select the SEND command button.
This action results in transmission of the request downlink message. The downlink message will be placed in REVIEW at the time the message is sent.

NOTE: Three free text fields are included on this display for allowing the crew to add additional information. These fields are not required to send the downlink.