DOT/FAA/DS-89/28

National Airspace System

Direct User Access Terminal (DUAT) Service Operational Concept

NAS-SR-DUAT

U.S. Department of Transportation
Federal Aviation Administration

DOT/FAA/DS-89/28

Advanced System Design Service
Washington, D.C. 20591

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16. Abstract

This concept of operations is one of a set that in total will describe the operation of the National Airspace System (NAS) when the projected upgrades are completed. The Direct User Access Terminal (DUAT) is a Federal Aviation Administration (FAA) program that will enable pilots to obtain self-briefings and submit flight plans, much as they receive these services from Flight Service Stations (FSSs) and Automated FSSs (AFSSs) today; however, DUAT will be provided by the private sector. This document describes DUAT Service capabilities and interactions between the user, the DUAT Service, and NAS subsystems. It is intended to provide a common perspective for personnel engaged in DUAT-related activities.

17. Key Words	18. Distribution Statement
general aviation, preflight briefings, self-briefings, route development, flight plan filing, FAA services, vendor services	

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

1.1 Background

The Direct User Access Terminal (DUAT) Service is a Federal Aviation Administration (FAA) initiative which exploits inexpensive commercial computer and communications technology to meet the increasing demand for FAA flight planning services by off-loading service demand.

The DUAT Service will permit General Aviation (GA) pilots and others to obtain flight planning assistance from FAA systems using personal computers or terminals. This service is provided in the private sector by DUAT vendors. The Government supplies much of the weather and aeronautical information used by the vendors' systems in providing briefings to pilots. Using this information, a pilot develops a flight plan proposal. The DUAT Service error and format checks this proposed flight plan, to the extent that it is able, outside the FAA's National Airspace System (NAS), and then files the flight plan for NAS validation. Other anticipated services include data retrieval and archival capabilities as well as the ability to encode or decode location and corresponding identifiers.

This operational concept document has been developed using an established standard format and is consistent in structure with a series of operational concepts written about various sections of the NAS System Requirements Specification (NASSRS).

1.2 Objective

The purpose of this document is to present an operational concept for the DUAT Service that outlines the Service's basic capabilities and describes necessary interaction between the DUAT Service and the NAS.

A NAS Operational Concept is intended as an interpretive tool to support the transition from NASSRS to NAS design. This operational concept is intended to faithfully reflect and clarify the requirements in the NASSRS in order to provide an operational perspective for system development, implementation, testing, and evaluation. It provides to management and technical personnel of the FAA and other involved organizations a general description of how the DUAT Service will operate.

1.3 Scope

The DUAT Service has been privatized; but contractors will still be required to provide certain basic services to the pilot. In various NAS documents, these basic services are still considered NAS functions. DUAT Service contractors will have the option of providing other "value-added" services in addition to the basic services. Accordingly, this operational concept focuses on the interfaces and basic services considered part of the NAS functionality and will not discuss in detail the contractors' optional "value-added" services.

DUATs are mentioned only indirectly in the NASSRS. "The NAS shall provide a communications capability between selected operating, supervisory, maintenance, and administrative positions at FAA facilities and other public/private communications facilities." (NASSRS, 3.6.2.B) "The NAS shall provide auto-answer capabilities for dial-up data communications by users through interface to commercial telephone lines for filing flight plans and amendments, requesting and receiving terminal and area-specific weather data, and other related purposes." (NASSRS, 3.6.2.B.7) "The NAS shall provide this information [status of Special Use Airspace] to commercially available devices such as personal computers in commercial telephone lines." (NASSRS, 3.2.10.E.3) Section 3.1.4, Flight Plan Submission and Evaluation, lists the various means by which flight plan information will be available to the user. One means is "via direct inputs from commercially available input devices, over commercially available communications systems." Section 3.1.4.B.2 more specifically notes that users will file flight plans "directly from input/output devices, such as portable computers or terminals." The term Direct User Access Terminal is never explicitly used.

An aspect of the DUAT Service that is inconsistent with other parts of the NAS, and therefore other operational concepts, is the absence of specialists. This is consistent, however, with one of the DUAT Service's goals of off-loading service demand by directly accessing the user. The DUAT operational concept will still be approached in the same manner as the other operational concepts in this series; connectivities and relationships between the user, relevant facilities, subsystems, and information passed, will be described.

1.4 Methodology

The methodology used in providing perspective and insight into this operational concept provides information in a number of different ways. The material focuses on four different kinds of diagrams and/or accompanying descriptive information described below:

1. Operational Block Diagram/Description. The operational block diagram illustrates the connectivity between major elements of the NAS, i.e., processors, specialists/controllers, and the user, for those elements that support the service. The operational block diagram in this Operational Concept is extracted from the overall NAS Operational Block Diagram.

   a. Each specialist/controller (if any) is indicated by a number. This number remains the same in every operational concept.

   b. Dotted lines segregate facilities.

   c. Solid lines show digital data flow. Voice data flow is not shown.

   d. The blocks within each facility are the major processors.

2. Operational Flow Diagram/Description. The operational flow diagram and associated description for each specialist/controller provides more detail about the inputs, processes, outputs and interfaces for each operator. Operational flow diagrams are used to functionally describe the products and services of individual specialists/controllers. The diagrams show major actions only. Principal features of an operational flow diagram include the following:

   a. Dotted lines segregate facilities.

   b. White boxes indicate specialist/controller/user functions. Shaded boxes indicate hardware.

   c. The functions listed by lower case alphanumeric characters in the white and shaded boxes are explained in the text.

3. Operational Sequence Diagram/Description. The operational sequence diagram and associated description show a typical sequence of steps taken by operators/users in providing the service. Principal features of an operational sequence diagram include the following:

   a. Users and specialists/controllers involved with providing the service are listed along the vertical axis. When required for clarity, other FAA facilities may also be listed on the vertical axis.

   b. The horizontal axis represents time. Sequential events or functions performed by an operator/user are indicated within separate boxes. Events which may occur simultaneously or near-simultaneously are shown vertically. The numbers on the right side of the blocks refer to numbers in the text.

   c. Decision points or points where alternate paths may be followed are indicated by a diamond shape.

   d. Circles are connectors and indicate exit to, or entry from, another diagram. Circles with an alphabetic character connect either to another sheet of the same diagram or to another diagram; the relevant figure number is listed underneath if connection is to a different diagram.

4. Operational Scenario/Description. The operational scenario and associated description depict a specific predefined situation and illustrate a particular subset of the generalized operational sequence or an unusual situation not covered by the operational sequence diagrams. Principal features of operational scenario diagrams include the following:

   a. Users and specialists/controllers involved with providing the service are listed along the vertical axis.

   b. The horizontal axis represents time. Sequential events or functions performed by an operator/user are indicated within separate boxes. The numbers on the right side of the blocks refer to numbers in the text.

1.5 Document Organization

The remainder of this document is devoted to the main body, contained in Section 2, which is organized into six subsections. Section 2.1 provides an Operational Block Diagram which pictorially illustrates the connectivities required to provide DUAT Service functions. Section 2.2 elaborates by identifying the inputs, outputs, processes and interfaces necessary to provide the information flow for DUAT Service functions. Section 2.3 presents the functions, uniquely independent of specialists, that are provided by the DUAT Service. Section 2.4 offers in table form the correlation between NASSRS requirements pertaining to the DUAT Service and the subsections of this document where these requirements are addressed. Section 2.5 graphically illustrates the range of typical DUAT Operational Sequences. An Operational Scenario describes a hypothetical situation involving DUAT services in Section 2.6.

2.0 OPERATIONS

2.1 Support

Direct User Access Terminal (DUAT) Service operations are supported by systems comprised of processors, terminals, and a communication network. DUAT processors (i.e. computers) are furnished by DUAT vendors. DUAT users have terminals to access the DUAT Service processor(s). These terminals may belong to the user or the vendor. They can be personal computers, "smart" work stations, or "dumb" terminals. Leased line telephone services supplied by DUAT vendors will link DUAT vendors with National Airspace Data Interchange Network, Phase II (NADIN II) gateways, for communication with National Airspace System (NAS) subsystems via NADIN II. Each DUAT vendor will provide a standard "toll-free access" Service to pilots nationwide. The DUAT Service overview is presented in Figure 2-1.

One of the main benefits of the DUAT Service is its ability to by-pass the use of specialists. It enables the user to directly access selected flight planning services 24 hours a day avoiding unnecessary delays. Direct support will be provided by components of the DUAT vendor system, while Federal Aviation Administration (FAA) systems will provide information sources and sinks, as well as supply the connectivity that DUAT vendors will require for operation. An Operational Block Diagram, Figure 2-2, shows these components and their connectivities.

2.2 Information

This section summarizes information generated by and received while performing DUAT Service functions. Figure 2-3, an Operational Flow Diagram, pictures the basic interactive communication flow between a vendor's DUAT Service and the NAS subsystems on which it depends for support. The FAA requires that DUAT vendors use FAA information sources, information sinks, and communications, in providing FAA services. The vendors are at liberty to use other sources, sinks, and communications in providing vendor "value-added" services. The latter are outside the scope of this operational concept, however. The following paragraphs elaborate on specific information provided by the pilot, the DUAT vendor, and FAA systems.

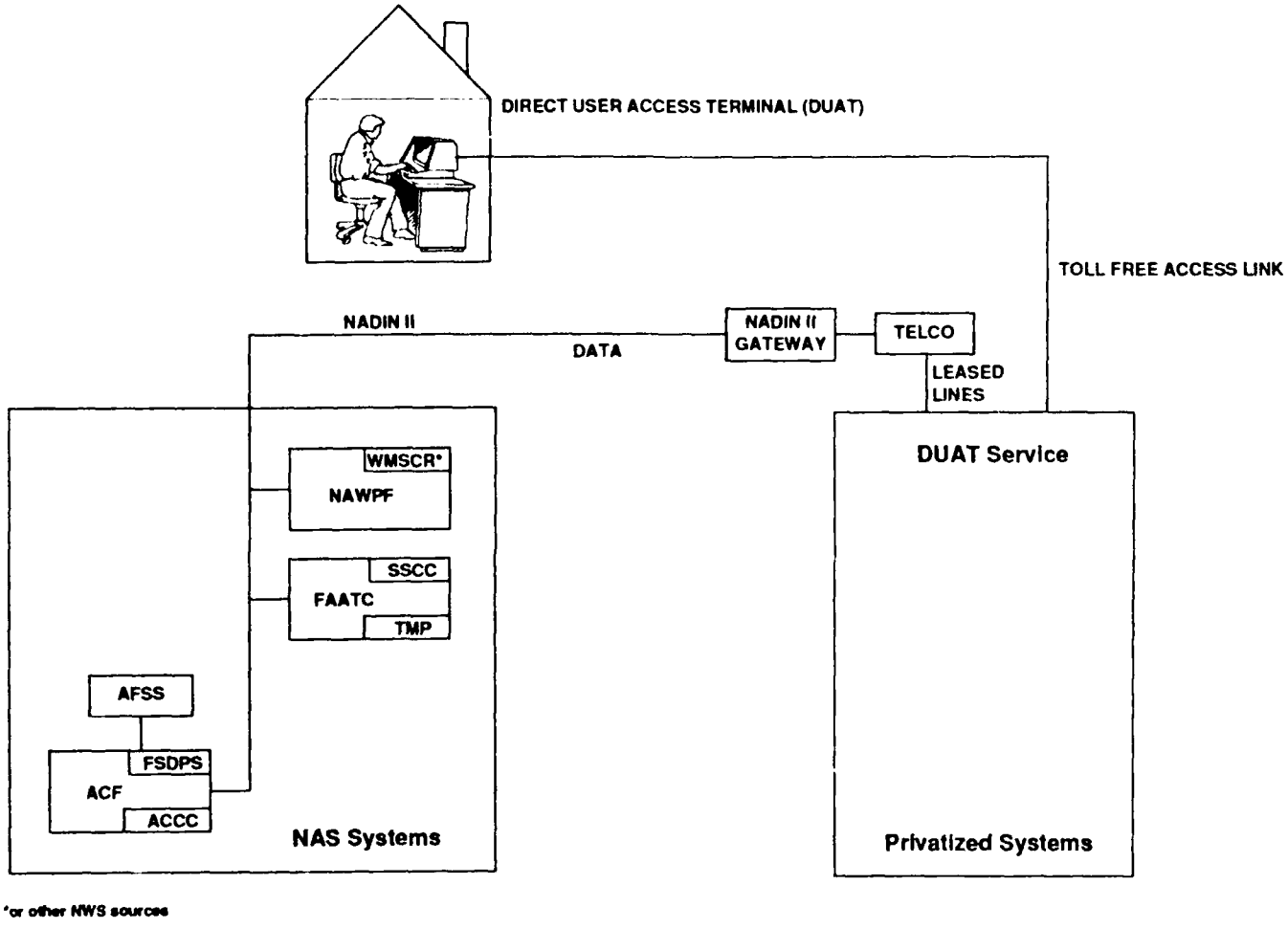

FIGURE 2-1
OVERVIEW OF NAS/USER INT RFACE
FOR DUAT OPERATIONS

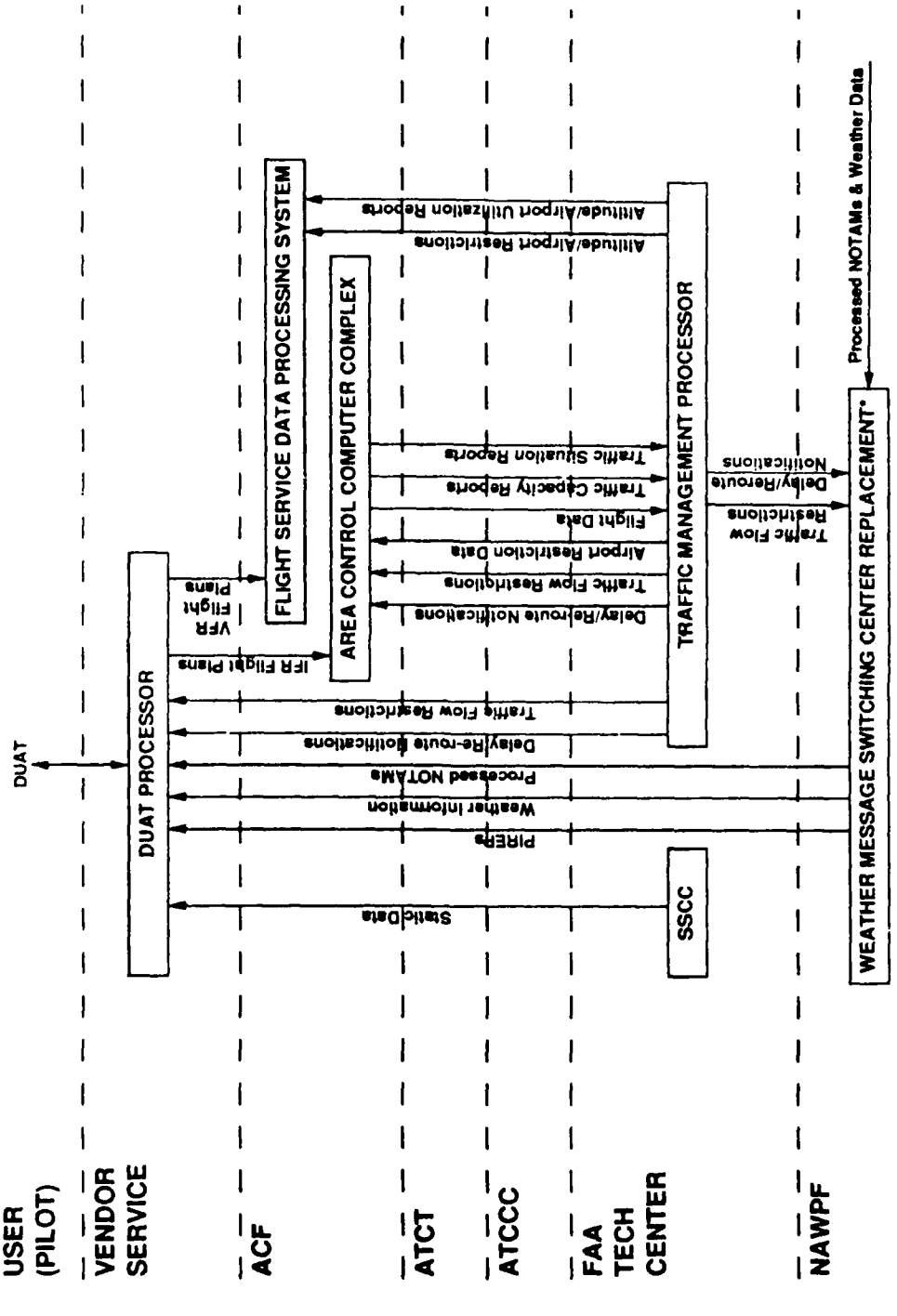

FIGURE 2-2
DUAT OPERATIONAL BLOCK DIAGRAM

*or other NWS sources

NOTE: This diagram is derived from the NAS Operational Diagram

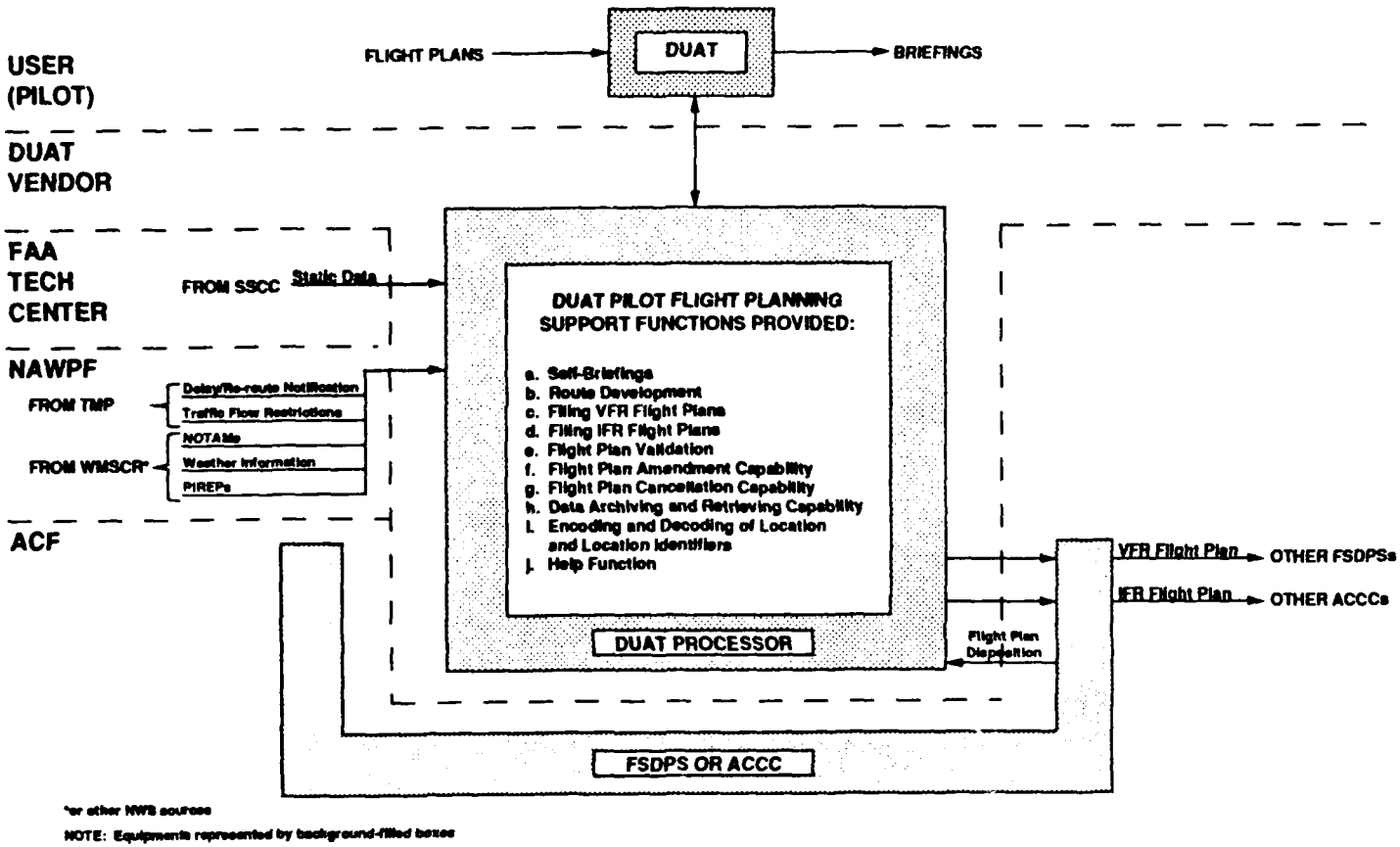

FIGURE 2-3
DUAT OPERATIONAL FLOW DIAGRAM FOR FLIGHT PLANNING SUPPORT FUNCTIONS

2.2.1 Information Pilots Will Provide

Upon validation of the pilot's name and pilot certification number with the Airmen File maintained and provided by the FAA to the DUAT processor, an access code and password will initially be issued by the DUAT Service. The user must provide this access code and a password to use the DUAT Service.

In order to obtain a route briefing the pilot must be prepared to provide the following:

- point of departure
- cruising altitude
- destination
- route of flight
- proposed departure time

In order to file a flight plan through a DUAT Service, the pilot must be ready to enter all the information that the FAA normally requires, which includes the following items:

- message type (i.e., Instrument Flight Rules (IFR) or Visual Flight Rules (VFR))
- aircraft identification
- type of aircraft and equipment on board
- true airspeed
- departure point
- departure time
- requested altitude
- route of flight
- destination
- time en route
- remarks
- fuel on board
- alternate destination
- pilot's name, address, and telephone number, and the aircraft's home base
- number of persons on board
- color of the aircraft

Route definition will include some combination of the following:

- location identifiers
- fix radial distances
- navigation aids
- airports
- latitude and longitudes defining intermediate legs
- Victor, Jet, or Area Navigation routes
- Standard Instrument Departures (SIDs)
- Standard Terminal Arrival Routes (STARs)[1]

DUAT vendors are at liberty to use whatever interactive flight plan input protocol they deem mutually appropriate and convenient to the user and the DUAT Service.

When a DUAT Service notifies a pilot that it has encountered input that is unacceptable, the pilot may submit some other input.

The user may exit the Service's flight planning process at will.

2.2.2 Information DUAT Vendors Will Provide

The DUAT Service will store information on the:

- pilot
- aircraft
- date
- time of day

of the DUAT transaction for archiving purposes.

The Service will be able to store and regenerate user specific static data at the user's request to avoid repetitious re-entry of information.

When a DUAT Service requires input from the pilot, the Service will issue a request.

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[1]DUAT Specification, 8 April 1987, 3.4.4.4.1.

When the DUAT Service encounters input that is unacceptable with regard to syntax, format, or content, it will immediately notify the user and proceed to interactively resolve the error.

2.2.3 Information FAA Will Provide

In regard to flight planning applications, a DUAT Service will receive at least part of its weather products and Notices to Airmen (NOTAMs) from the Weather Message Switching Center Replacement (WMSCR), traffic management advisories which include delay/reroute notifications and traffic flow restriction advisories from the Traffic Management Processor (TMP), and static information from the System Support Computer Complex (SSCC).

DUAT Service vendors may receive most of their dynamic National Weather Service (NWS)-generated weather products directly from the NWS or from some other source, or many choose to also receive these products by way of the WMSCR.

Dynamic weather data that will be provided (but not necessarily by the FAA) include:

- Surface Observations (SA)
- Terminal Forecasts (FT)
- Area Forecasts (FA)
- Weather Warnings (e.g. Significant Meteorological Information (SIGMETs))
- Pilot Reports (PIREPs)
- Radar Weather Reports (SD)
- Winds and Temperature Aloft Forecasts
- NOTAMs[2]

Some of the data that the DUAT Service requires in order to provide self-briefings will be received at regular intervals; however, these intervals will vary widely. For example, major categories of static information are updated and distributed on a 56-day cycle, while surface observations are distributed hourly. Weather information such as SIGMETs and NOTAMs will be distributed as they are received.

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[2]DUAT Specification, 8 April 1987, 3.3.2.2.

The NAS will provide acknowledgments upon receiving flight plans transmitted by the DUAT Service via NADIN II. If an acknowledgment is not received from the Flight Service Data Processing System (FSDPS) regarding transmission of a VFR flight plan within 10 minutes, the flight plan should be filed via a different method.[3] Similarly, if the Area Control Computer Complex (ACCC) does not respond within 10 minutes, the IFR flight plan should also be filed using another method.

The NAS will provide flight plan acceptance and rejection notifications to the DUAT Service.

2.3 Functions

The DUAT Service will provide a core of capabilities termed "FAA services." FAA services will enable the pilot to conduct flight planning aided by local, route and selected weather self-briefings. The user can then develop, submit, validate, file, amend, and cancel domestic IFR flight plans or domestic VFR flight plans through the DUAT. The DUAT will also provide data archiving and retrieval capabilities as well as an encoding (determining location identifiers from locations that are input) and decoding (determining locations from location identifiers that are input) capabilities. Extra features or "value-added services" can be offered by the vendors. Individual vendors will interpret the needs of the segment(s) of the aviation community to which they direct their marketing; value-added vendor services may therefore differ from Service to Service.

Figure 2-3, an Operational Flow Diagram, shows the flight planning support functions provided by the DUAT Service. These functions are expressed in greater detail in the following paragraphs.

[3]This method may vary. Presumably if the user is logged on and alerted by the Service of the difficulty in the filing process, the user can telephone the flight plan in to the Automated Flight Service Station (AFSS). A vendor service may provide an alternate method of filing.

a. Provides Self-Briefings.

A DUAT Service will provide information on present and forecast conditions in U.S. airspace through static flight data and dynamic weather data. Local briefings and route briefings at high or low altitudes--containing information such as traffic flow restrictions and delay/reroute notifications, selected NOTAMs,[4] PIREPs, as well as other selected weather products--will aid pilots in planning their flights.

After the pilot has defined an acceptable route, the DUAT Service will use FAA-supplied static data to identify all "weather reporting locations" within some parameter distance (typically, 50-100 miles) of that route. The DUAT Service will then retrieve FAA- and NWS-supplied information concerning these weather reporting locations, and use this information to tailor a route briefing for the pilot's use.

b. Route Development.

There are two basic (FAA required) approaches to route development. The first method mandates that the pilot devise a specific route and enter it manually into the DUAT. After proposing this flight plan, the pilot waits for verification. The second approach allows the pilot to select from preferred IFR low and high altitude routes maintained on file by the DUAT Service after entering a proposed departure point, time, altitude, and destination. The pilot may accept the recommended route, whereby the route data is automatically entered, or choose to propose his own.

c. Filing Domestic VFR Flight Plans.

After a DUAT Service has locally validated a domestic VFR flight plan, the Service will file a flight plan proposal with the AFSS associated with the airfield where the flight will originate. To do this, the DUAT Service will transmit the flight plan proposal to the "parent" FSDPS of the appropriate AFSS. A VFR flight plan proposal consists of the following:

- type of flight (i.e., VFR)
- aircraft identification
- aircraft type

[4]Current NOTAM-Ds and unpublished Flight Data Center (FDC) NOTAMs.

- departure point
- destination
- proposed departure time/estimated time of arrival (ETA)

The rest of the flight plan is retained at the DUAT Service. The FSDPS will check the flight plan proposal for acceptability. If no problems are found, it will pass uneventfully through the FSDPS.

Once accepted, the flight plan proposal will then be stored on the departure list of the departure point's tie-in AFSS and made available to flight service specialists at that AFSS via their Automated Flight Service Station Work Stations (AFSSWSs). In addition, an acknowledgement will be returned to the DUAT Service when the flight plan is filed.

If the flight plan is rejected, a message will be sent to the DUAT Service stating the reason(s) the plan is unacceptable.

An acceptance or rejection message will be directed to the originating DUAT.

When the flight plan is activated, a flight plan notification message consisting of the following:

- aircraft identification
- aircraft type
- destination
- ETA
- remarks (if any)

is sent from the "departure" AFSS to the "destination" AFSS by way of the FSDPS(s). The FSDPS serving the destination will place the aircraft on the in-bound list for the appropriate AFSS.

d. Filing Domestic IFR Flight Plans.

After a DUAT Service has locally validated a domestic IFR flight plan, it files (at a parameter time before the proposed departure time) a flight plan proposal concerning that flight with the ACCC that is responsible for the airfield where the proposed flight originates. The ACCC will then check the flight plan proposal for acceptability.

If acceptable, the ACCC will store the flight plan proposal for reference by controllers within the local Area Control Facility (ACF). The ACCC will transmit the flight plan proposal to "downstream" ACFs/ACCCs as the aircraft traverses its planned route.

If the flight plan is not acceptable, the ACCC will send the DUAT Service a rejection message.

The acceptance or rejection message will be delivered to the originating DUAT.

e. Provides Flight Plan Validation.

Once the flight plan is entered, the DUAT Service will proceed to review or validate it to the extent that it is able. The flight plan will be error and format checked; all the flight plan data blocks must be filled with acceptable entries. Once the DUAT Service validates a complete flight plan, it will proceed to file it. This does not mean, however, that the flight plan as proposed is certain to be acceptable to the NAS, nor that the pilot will automatically receive a clearance to carry out the proposed flight plan as is. Information not within the DUAT Services' purview such as certain Air Traffic Control (ATC) delays, weather delays and reroutes, etc., may require the NAS to reject a proposed flight plan.

f. Provides Flight Plan Amendment Capability.

The contractor's DUAT Service enables the user to amend a flight plan prior to transmission to the NAS. An IFR flight plan can be amended via the DUAT up to a parameter time before the proposed time of departure and before it has been sent to the ACCC. Similarly, a VFR flight plan can be amended via a DUAT up to a parameter time prior to departure given that it has not been sent to the FSDPS.[5]

[5]DUAT Specification, 8 April 1987, 3.4.4.1, 3.4.4.5.1, 3.4.4.5.2.

g. Provides Flight Plan Cancellation Capability.

The contractor's DUAT Service enables the user to cancel a flight plan prior to transmission to the NAS.[6]

h. Provides Certain Data Archiving and Retrieving Capabilities.

The DUAT Service's processor will be used for data storage and retrieval. Archived data of DUAT transactions may be used in such FAA applications as search and rescue, and event reconstruction.

The DUAT Service will provide an Airmen File in order to validate authorized users. Pilots' last names and pilot certificate numbers are listed there and updated every six months by the FAA.

i. Provides Encoding and Decoding of Locations and Location Identifiers.

The DUAT Service will enable the user to access the Encode/Decode function from any function requiring a destination, route of flight, alternate airport, or departure point. Through this function, a DUAT Service will encode and decode location identifiers upon request. Given an airport name, city, weather reporting location or Navigation Aid (NAVAID), and the state (optional), the DUAT Service will provide the user with the following appropriate location identifier:

- airport
- NAVAID
- weather reporting station identifier
- associated airport and NAVAID name
- associated city name
- two-letter state identifier

Conversely, a location identifier can be decoded by the DUAT Service. Up to ten identifiers may be requested at a time.[7]

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[6]DUAT Specification, 8 April 1987, 3.4.4.1.

[7]DUAT Specification, 8 April 1987, 3.4.5.

j. Provides a Help Function.

A help function is provided for the user. Since there is no direct interaction with a specialist, this is a necessary explanatory feature. Access to the function will be available whenever input is needed from the user. It will clarify field sizes, required format, and data type (which could include alphanumeric and/or non-alphanumeric characters).

2.4 Correlation With Operational Requirements

Table 2-1 summarizes the correlation of the operational requirements paragraphs of NAS-SR-1000 related to the DUAT Service with the paragraphs describing the functions being performed by the DUAT Service in this operational concept. All DUAT paragraph numbers of NAS-SR-1000 are listed; paragraphs which are introductory in nature, do not state an explicit operational requirement, or which reference other portions of NAS-SR-1000 are indicated with a dash. The fact that a correlation is shown between a requirements paragraph and a paragraph describing the DUAT Service functions performed should not be construed as indicating that the requirement is completely fulfilled.

2.5 Operational Sequences

Figure 2-4, an Operational Sequence Diagram, illustrates how a pilot might use a DUAT Service's FAA service in planning a flight via the DUAT Service. During such a session, the user can ask for and receive a self-briefing and can develop and submit a flight plan. If the user chooses to submit a flight plan, the DUAT Service will check it, and if it appears to be problem-free, will file the associated flight plan proposal with the NAS parameter time before the proposed departure time. When considered by the NAS, the flight plan will be either accepted or rejected.

This Operational Sequence Diagram generically describes the FAA services to be offered by a DUAT Service; the variety of interactions between the pilot, the DUAT Service, and the NAS, supporting the flight planning process, are illustrated. (For example, as encouraged by the FAA, a pilot usually will file a flight plan only after receiving a self-briefing but, as reflected in the DUAT Service capabilities depicted in the Operational Sequence Diagram, it is not required.)

TABLE 2-1
DUAT OPERATIONAL REQUIREMENTS CORRELATION

NAS-SR-1000 Paragraph / Paragraph	Support	Information	DUAT Functions									
	2.1	2.2.1 2.2.2 2.2.3	2.3	2.3.a	2.3.b	2.3.c	2.3.d	2.3.e	2.3.f	2.3.g	2.3.h	2.3.i	2.3.j
3.1.1.H.2 User Access to Weather Information via Commercial Communication Links	X	X	X	X									
J Weather Information 24 Hours a Day	X	X		X									
3.1.2.C Aeronautical Information Available Continuously	X	X		X									
3.1.4 Flight Plan Submission and Evaluation	–	– – –	– – – – – – – – – – – – –										
.A Flight Plan and Amendments Processing	–	– – –	– – – – – – – – – – – – –										
.A.1 User Direct Entry/Specialist Entry						X	X		X				
.A.2 Domestic/International				X	X	X	X						
.A.3 IFR/VFR Flight Plans						X	X						
.A.4 Multiple Flight Plans and Stopovers		X											
.B Direct User Access to Flight Plan Information	–	– – –	– – – – – – – – – – – – –										
.B.1 Direct User Input						X	X		X				
.B.2 Direct/Easy Filing						X	X						
.C Preferred Routes					X								
.C.1 NAS/User Preferred Routes					X								
.C.2 User Preferred Altitude Profiles					X								
.C.3 Ability to Duplicate Repetive Information		X											
.D Interactive Validation of Flight Plans		X											
.D.1 Format and Logic Check		X				X	X	X					
.D.2 Error Notification		X X											
.D.3 Accept/Reject Notification						X	X						
.E.1 Capability to Amend Active Flight Plan									X				
.F.3 Processing in Correct Time Sequence						X	X						
.G Interfaces	–	– – –	– – – – – – – – – – – – –										
.G.1 With Direct Access User Systems	X												
.G.2 Access to NAS	X												
.G.4 Computer Security									X				
.H Response Time	X												
.J Cancel or Close Flight Plans which have been Entered into the System									X				
3.6.2.B.7 Auto-Answer Data Communication for Flight Plan Filing, Weather Requests, and other Information			X	X		X	X		X				

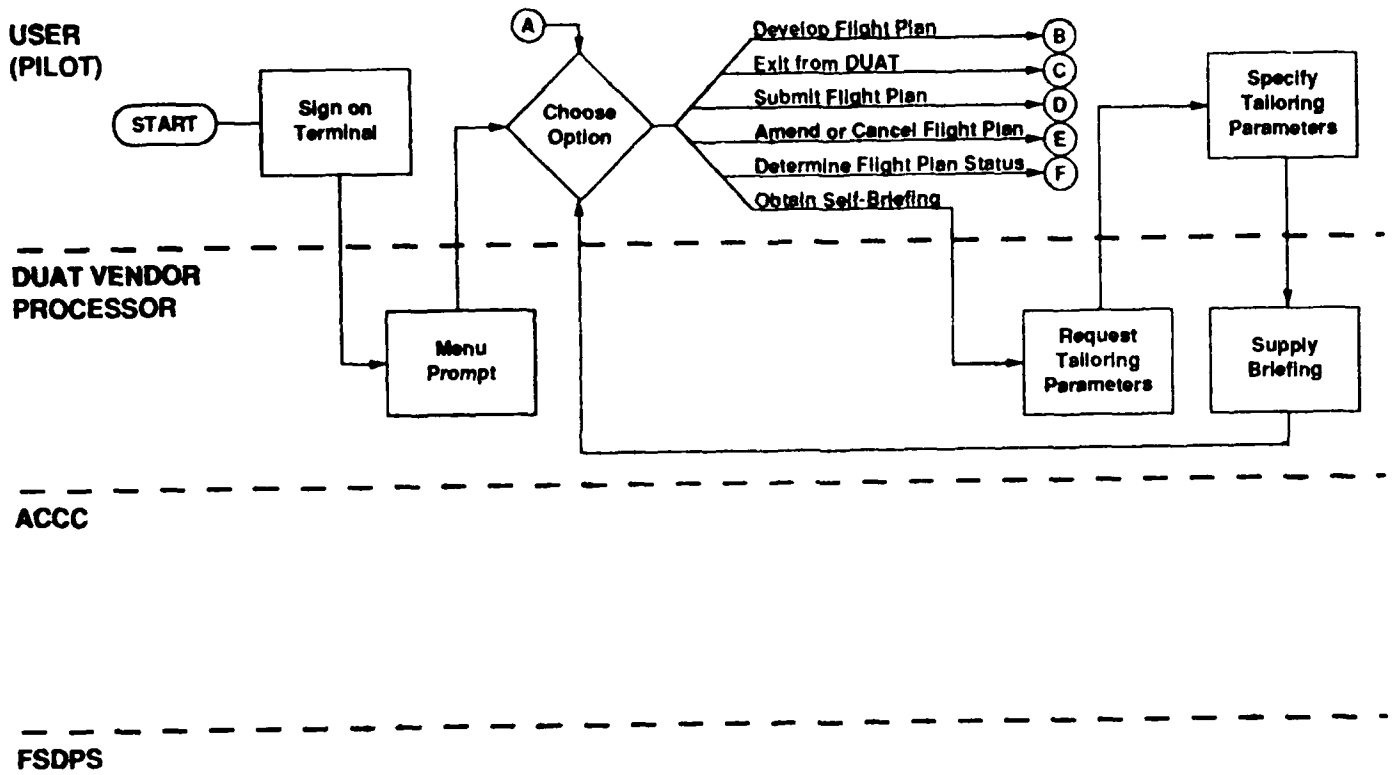

FIGURE 2-4
DUAT OPERATIONAL SEQUENCE DIAGRAM

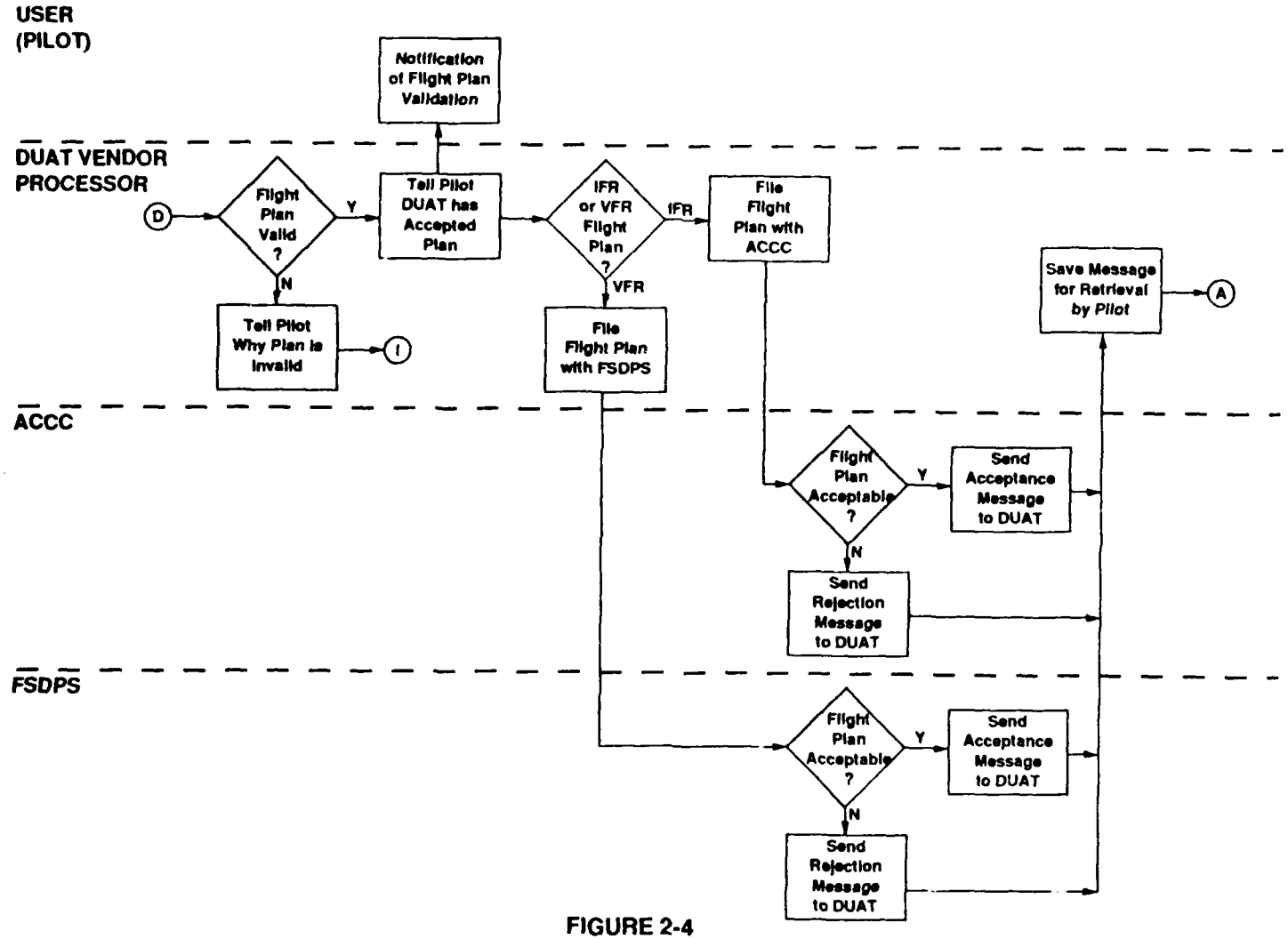

FIGURE 2-4
DUAT OPERATIONAL SEQUENCE DIAGRAM
(CONTINUED)

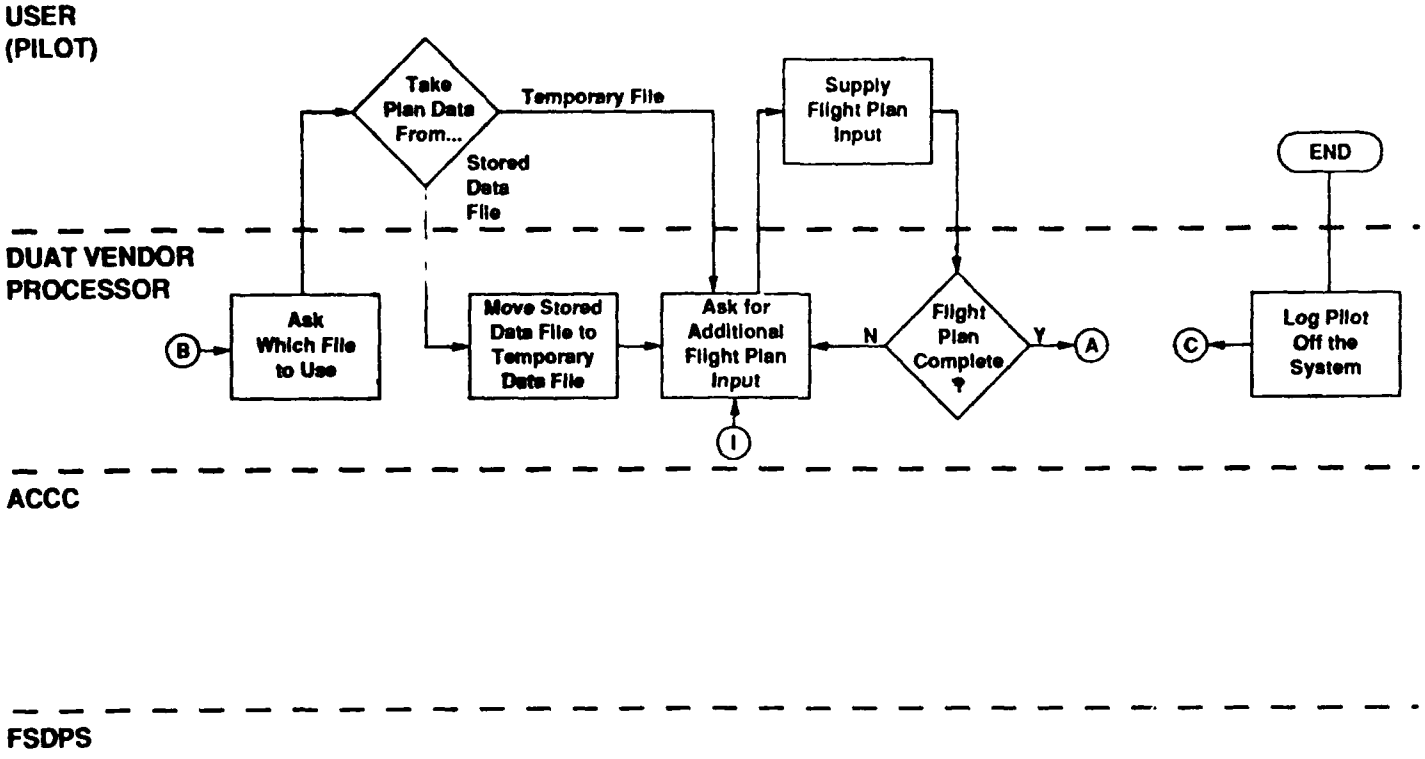

FIGURE 2-4
DUAT OPERATIONAL SEQUENCE DIAGRAM
(CONTINUED)

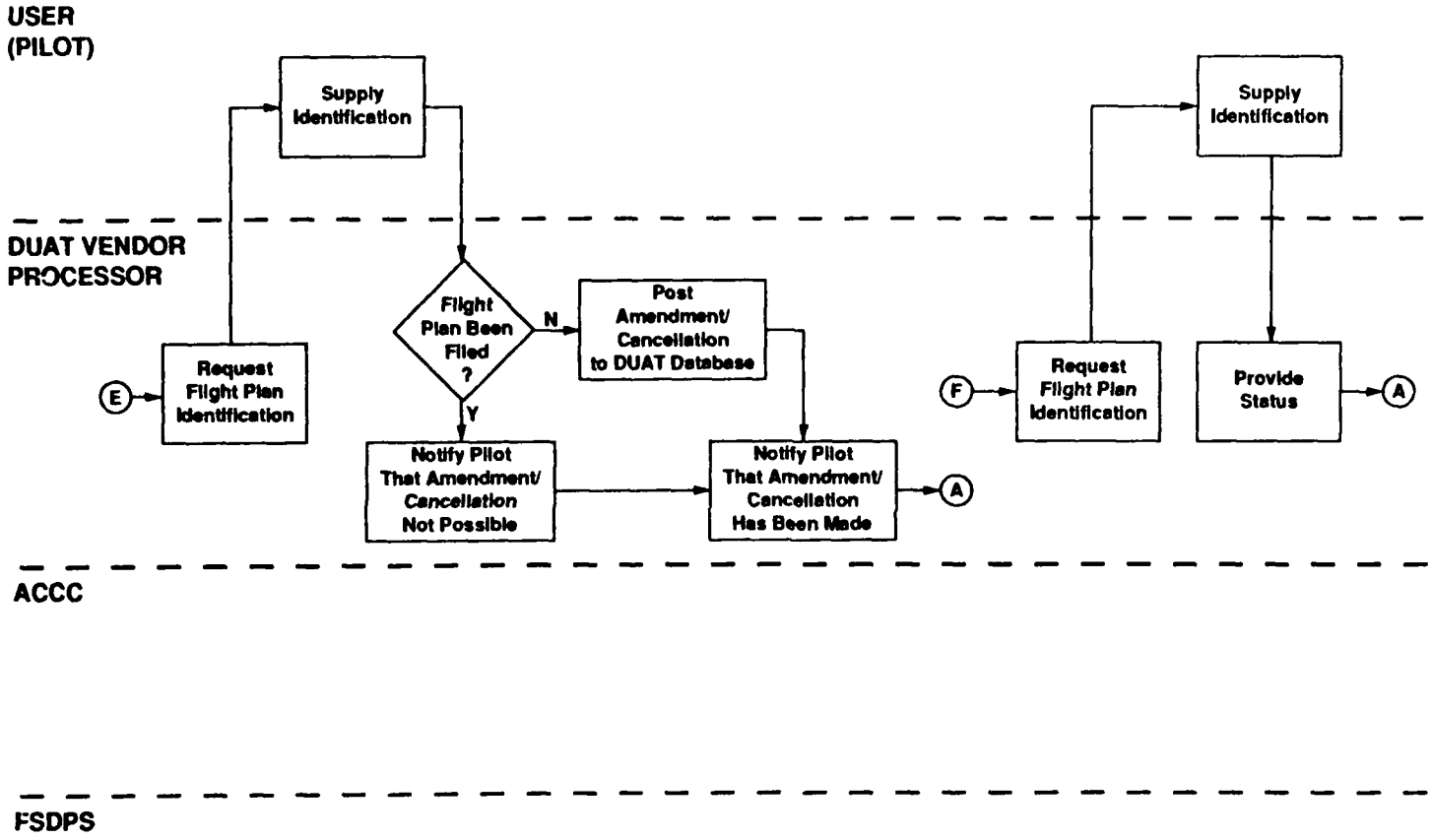

FIGURE 2-4
DUAT OPERATIONAL SEQUENCE DIAGRAM
(CONCLUDED)

2.6 Operational Scenario

Figure 2-5 presents an operational sequence for a specific hypothetical instance of flight planning using a DUAT Service. This figure is more detailed than the Operational Sequence Diagram and should be relatively self-explanatory; however, a textual description follows. This scenario was chosen to be as representative as possible of the range of DUAT flight planning services.

In the selected scenario, an air charter pilot has contracted to fly a party from Manassas Municipal Airport in VA, to Salisbury-Wicomico County Regional Airport near Salisbury, MD. The flight is to leave early in the morning. The pilot chooses to do his flight planning the evening before at home on his personal computer.

He activates his personal computer, which is now functioning as a DUAT by contacting the DUAT Service via a toll-free connection (1). Once the pilot has successfully identified himself to the DUAT Service, he is presented an initial display that identifies the primary services the system offers (2). From this DUAT menu, the pilot chooses the self-briefing option (3). The service responds by asking the user to select one of three options: local briefing, route briefing, or selected weather for specific locations (4). This pilot opts for route briefing (5), after which the service offers the choice of a high- or low-altitude briefing (6). The pilot selects the low-altitude option (7).

At this point the DUAT Service requests that the pilot specify the route to be followed (8). The options are stored file, temporary file, and new route (9). The pilot knows that his temporary file is empty because he just signed on. He wishes to retain his preferred route from Manassas to Tri-Cities Airport, NC in his stored file for future use since it is his most common destination.[8] Hence, the pilot selects "new route" (10). The Service responds by asking that the pilot now define and enter the route (11). He enters "W10" (Manassas Municipal Airport's standard identifier) as the starting point, "SBY" (Salisbury-Wicomico's) as the ending point, and Victor routes, fixes, navigational aides, and latitude/longitude pairs to define intermediate legs, as appropriate (12).

[8] Storage of the users' one or more preferred routes is not a clearly specified FAA service that the DUAT processor must support; however, it is reasonably assumed that the vendor will provide for this capability.

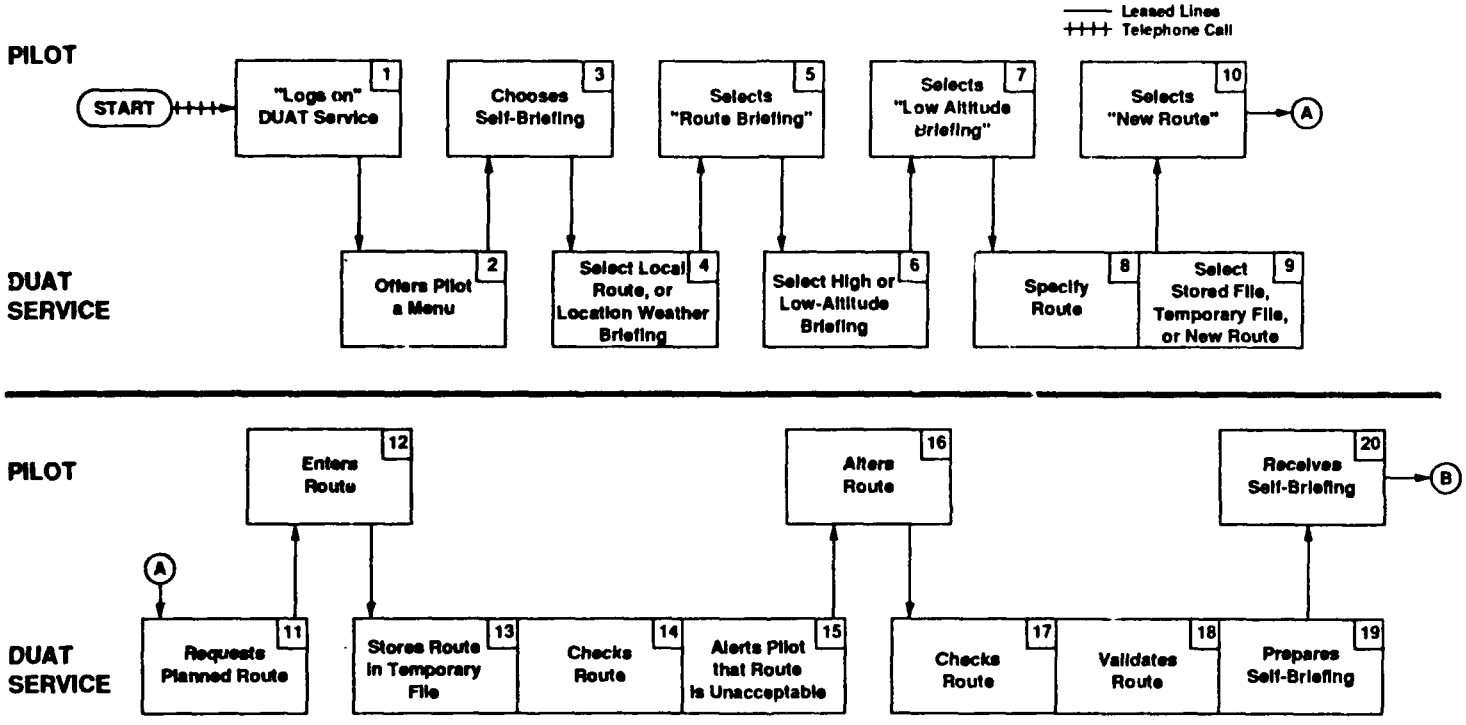

FIGURE 2-5
DUAT SERVICE OPERATIONAL SCENARIO

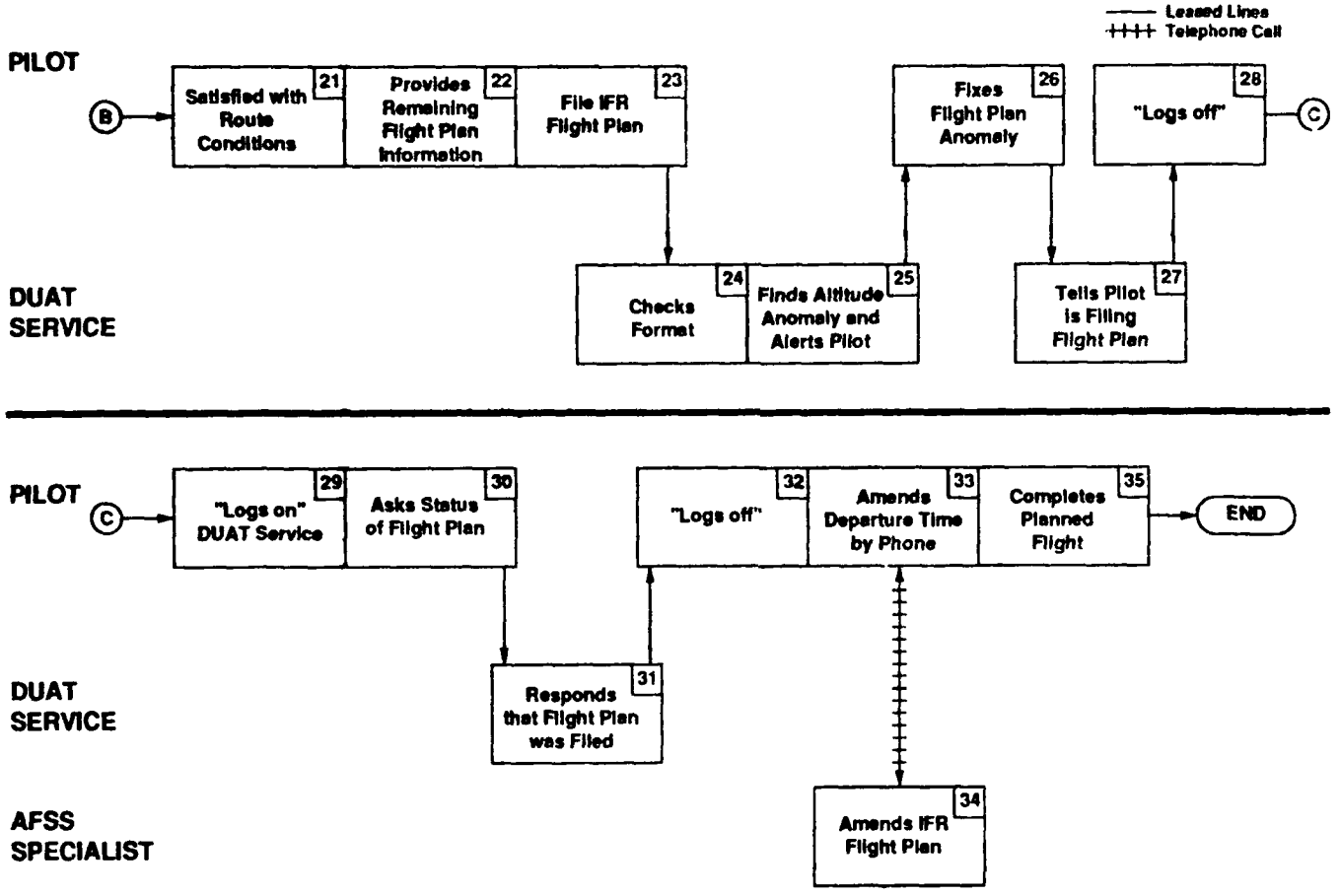

FIGURE 2-5
DUAT SERVICE OPERATIONAL SCENARIO
(CONCLUDED)

Once the pilot has specified a route, it is loaded into his temporary file (13). The DUAT Service then refers to FAA-supplied static data to validate the route information that the pilot provided--checking that the legs defined are connected, i.e. that the route is contiguous and "makes sense" in terms of getting from the point of origin to the point of destination (14). If the route fails this test, the DUAT Service will elicit acceptable corrections from the pilot (15 through 18).

After the pilot has defined an acceptable route, the DUAT Service tailors the pilot's requested self-briefing to that route (19). After the pilot has viewed the self-briefing material (20), the DUAT returns to its initial display and queries the user again.

The pilot bases his decision on the information he receives during the route self-briefing. If the briefing reveals unsatisfactory flight conditions, a briefing can be requested concerning an alternate route, further information can be sought via a different type of briefing, or the flight planning process can be aborted altogether. In this case, the charter pilot is satisfied with the reports concerning his specified route, and he decides to use this route as the basis for his flight plan (21). Noting that the route will take him through the very congested and complex airspace which surrounds Washington, DC, and that the ceiling is forecast to be relatively low that morning, he decides to file an IFR (as opposed to a VFR) flight plan.

Although the route is stored in his temporary file the pilot must provide other necessary information such as planned time of departure. He supplies the remaining information with his interactive terminal (22).

The pilot indicates to the DUAT Service that he now wishes to file the completed flight plan stored in his temporary file (23). The DUAT Service proceeds to scan all flight plan fields that have not been validated already, checking format, vocabulary, completeness, reasonableness, and adherence to restrictions (24).[9] All checks must be in consonance with FAA rules, regulations, and accepted practice. Examining the "Cruising Altitude" field, the DUAT Service notes that the pilot has entered "80000," which is greater than the 18,000-foot ceiling on low-altitude flight. The

[9]Since the pilot has elected to use the temporary file as the basis for the flight plan, the route does not require validation as part of this process; it was validated earlier, when the pilot entered it in requesting a route briefing.

Service notifies the pilot of this anomaly and requests an acceptable replacement (25). The pilot responds with "8000"--which was the original intention (26).[10]

The DUAT Service accepts this response, completes its validation review without finding further problems, and notifies the pilot that it is filing the flight plan (27). The pilot logs off the DUAT terminal deciding not to wait for the disposition message from the NAS, but to retrieve it later (28).

The morning of the flight, the pilot turns on the DUAT terminal. After logging in (29), he asks the status of the flight plan submitted the afternoon before (30). The DUAT Service responds that it has been accepted (31). It is noted that at a parameter time before the requested departure time, the ACCC system automatically re-checks the pilot's flight plan. Detecting no new problems, it issues a clearance and sends it to the tower at Dulles International Airport.[11] No message concerning this clearance decision is sent to the DUAT Service.

As the pilot is about to leave for Manassas Municipal Airport, he receives a call that two of his passengers will be a half-hour late. This necessitates a flight plan amendment to alter the departure time. Since the flight plan has already been filed with the Leesburg ACF by the DUAT Service, an amendment cannot be submitted using the DUAT. Accordingly, the amendment is filed by telephoning the AFSS responsible for the Manassas Airport (33). The AFSS transmits the amendment to the Leesburg ACF, where the ACCC accepts it and issues an amended clearance. The AFSS specialist passes this to the pilot (34).

The pilot brings his portable personal computer which will be convenient for developing the return flight plan.

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[10] This exchange is included for illustration only. What error checks a given DUAT Service will make, and how it will dispose of anomalies, is implementation-dependent.

[11] Manassas Municipal Airport is currently untowered. Clearances are therefore issued by the tower at Dulles International Airport.

The pilot completes the planned flight without incident, arriving on schedule at Salisbury-Wicomico (35). Since this is also an untowered airport, controlling authority lies with Patuxent Approach and Departure Control when open. Patuxent Approach Control will be monitoring the flight and will automatically close the flight plan or the pilot will call the appropriate AFSS to close it.

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GLOSSARY OF ACRONYMS

ACCC	Area Control Computer Complex
ACF	Area Control Facility
AERA 2	Automated En Route Air Traffic Control, Phase 2
AFSS	Automated Flight Service Station
AFSSWS	Automated Flight Service Station Work Station
ATC	Air Traffic Control
DUAT	Direct User Access Terminal
ETA	Estimated Time of Arrival
FA	Area Forecast
FAA	Federal Aviation Administration
FDC	Flight Data Center
FSDPS	Flight Service Data Processing System
FSS	Flight Service Station
FT	Terminal Weather Forecast
GA	General Aviation
IFR	Instrument Flight Rules
NADIN II	National Airspace Data Interchange Network, Phase II
NAS	National Airspace System
NASSRS	NAS System Requirements Specification
NAVAID	Navigational Aid
NAWPF	National Aviation Weather Processing
NOTAM	Notice to Airmen
NWS	National Weather Service
PIREP	Pilot Report
SA	Surface Weather Observations
SD	Manual Digitized Radar Summary
SID	Standard Instrument Departure
SIGMET	Significant Meteorological Information
SSCC	System Support Computer Complex
STAR	Standard Terminal Arrival Route
TELCO	Telephone Company
TMP	Traffic Management Processor
VFR	Visual Flight Rules
WMSCR	Weather Message Switching Center Replacement