25 FLIGHT SERVICES

FAA flight service stations (FSSs) provide accurate and timely aviation weather, aeronautical information, and flight planning assistance to commercial, general aviation (GA), and occasionally military pilots. Most military flight plans are entered into the NAS by military base operations (MBO) interfaces with FSSs. Disseminating this information is critical to safe and efficient operation of the NAS. Functional enhancements include the following capabilities:

- Increase pilots' ability to access information via automation sources, both prior to flight and while airborne
- Enhance the ability of FSS specialists to utilize current information (i.e., notices to airmen (NOTAMs) and hazardous weather advisories) when briefing or assisting pilots
- Modernize communications while retaining in-flight voice services and associated infrastructure as a governmental function
- Provide access to a NAS-wide information network for obtaining and distributing flight-specific data and aeronautical information
- Provide interactive aids that improve the user's ability to execute flight plans, thereby facilitating a more collaborative role for users in obtaining NAS information, such as special use airspace (SUA) status, and traffic density
- Standardize domestic and international flight and weather information.

In the future, the responsibility for NAS flight services will be shared between the government and the private sector. Efforts are currently underway to further define the services provided by FSS specialists and the private sector.

25.1 Flight Services Architecture Evolution

Today, pilots can obtain services directly from an FSS via telephone or by using personal computers to obtain weather and preplanning services from commercial or FAA systems. A number of states and localities provide this arrangement via self-service kiosks, which provide remote, automated access to everyone, as well as convenient on-airport access by pilots. Commercial enterprises will continue to be active in providing preflight services (for a fee) in the near term. As pilots become more self-reliant, the number of specialist-provided, preflight transactions (briefings and flight plan filings) will decline. The rate of decline cannot be predicted, but GA use of direct user access terminal (DUAT) service has grown steadily. In addition, the trend for states to contract with commercial vendors to supplement FSS-provided services is likely to continue.

25.1.1 Flight Services Architecture Evolution—Step 1 (1998)

Currently, flight services are provided to pilots via any one of the 61 automated flight service station (AFSS) facilities or remotely via the DUAT service in the continental United States. Additionally, 14 manual FSS facilities are located in Alaska.

The flight service automation system (FSAS) Model 1 Full Capacity (M1FC) system was deployed in the late 1980s. The FSAS consists of:

- Two aviation weather processors (AWPs) that supply a uniform set of global flight planning and alphanumeric weather data
- Approximately 1,500 flight service position consoles used by FSS specialists
- User access to weather briefings and flight plan processing via DUAT service.

As the original FSAS system offered limited capabilities, it was later augmented with a graphic weather display system (GWDS) and the DUAT service to supplement pilot access to the information available in the FAA automation systems.

Current preflight and in-flight service functions include:

- Filing instrument flight rules (IFR), visual flight rules (VFR), and defense (military) visual flight rules (DVFR) flight plans
- Providing VFR flight following, and initiating and coordinating search and rescue (SAR) activities
- Providing broadcast messages
- Providing user access to weather briefings and flight plan processing via DUAT service

PART III

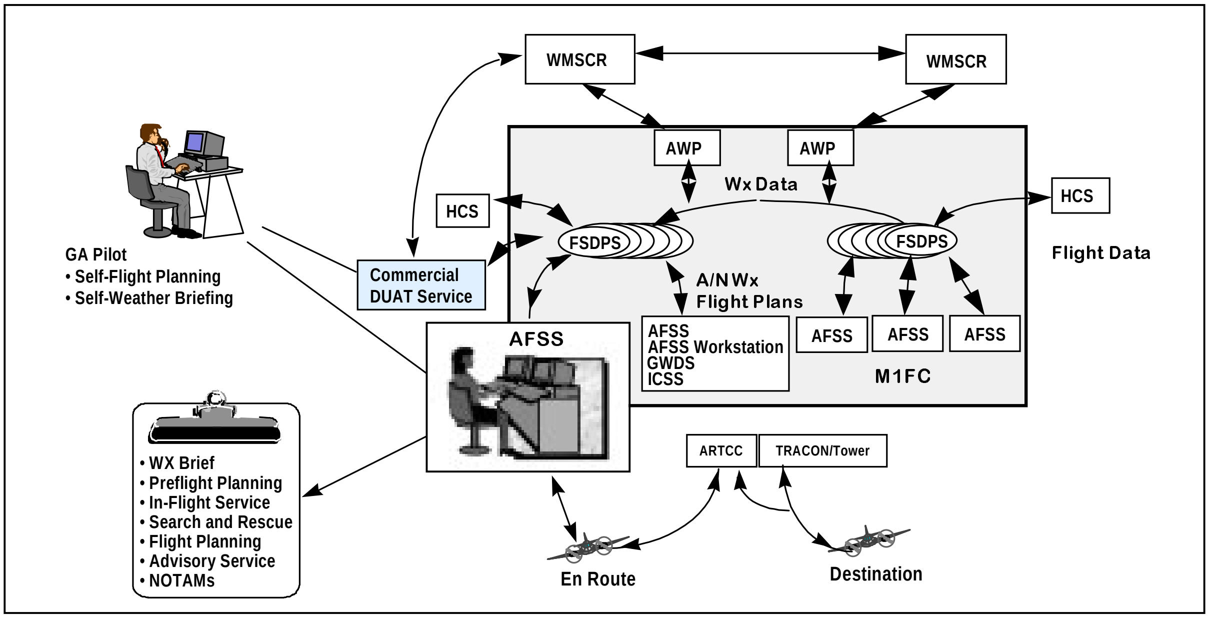

Figure 25-1. Flight Services Architecture—Step 1 (1998)

- Disseminating NOTAMs
- Processing and disseminating pilot reports (PIREPs)
- Providing emergency services
- Providing other services as requested.

Figure 25-1 depicts the current flight services architecture. The ensuing architecture discussion addresses changes within the FSAS structure.

25.1.2 Flight Services Architecture Evolution—Step 2 (1999–2005)

Almost immediately in Step 2, the Operational and Supportability Implementation System (OASIS), a new commercial-off-the-shelf (COTS)-based capabilities system, will replace the existing AFSS automation (i.e., FSAS). OASIS will allow pilots to self-brief and to file flight plans directly. For those pilots unable to self-brief or who require direct contact, flight service specialists will be available. OASIS will be provided as a leased service and includes a reliable, open systems compliant hardware and software system configuration. Figure 25-2 illustrates the near-term, Step 2 architecture for flight services.

OASIS contains significant computer-human interface (CHI) improvements that provide standardized products to both the specialist and the pilot. The existing FSAS display will be replaced with a graphical user interface, enabling automated information retrieval while enhancing processing and storage performance. Initially, OASIS provides greater coordination and checking of flight plans with the Host/oceanic computer system replacement (HOCSR).

The FAA is undertaking an initiative called Safe Flight 21 to demonstrate and validate an integrated set of capabilities leading to Free Flight. An overview of Safe Flight 21 is provided in Section 6, Free Flight Phase 1, Safe Flight 21, and Capstone. Flight information services (FIS) transmits noncontrol information such as weather data, NOTAMs, and SUA information. Safe Flight 21 demonstration validations (DEMVALs) for FIS and weather services will involve specific operational improvements for different aircraft types operating at various altitudes under IFR and VFR flight plans. The DEMVALs will also include the impact of FIS/weather data link on air traffic control procedures, pilot-controller responsibility for severe weather separation, and collaborative decisionmaking. Weather support to Safe Flight 21 will be provided by the weather and radar processor (WARP) and OASIS and tailored in accordance with each DEMVAL.

As pilots become more self-reliant and depend less on direct contact, in-flight services (e.g., in-flight weather support, VFR flight following, and

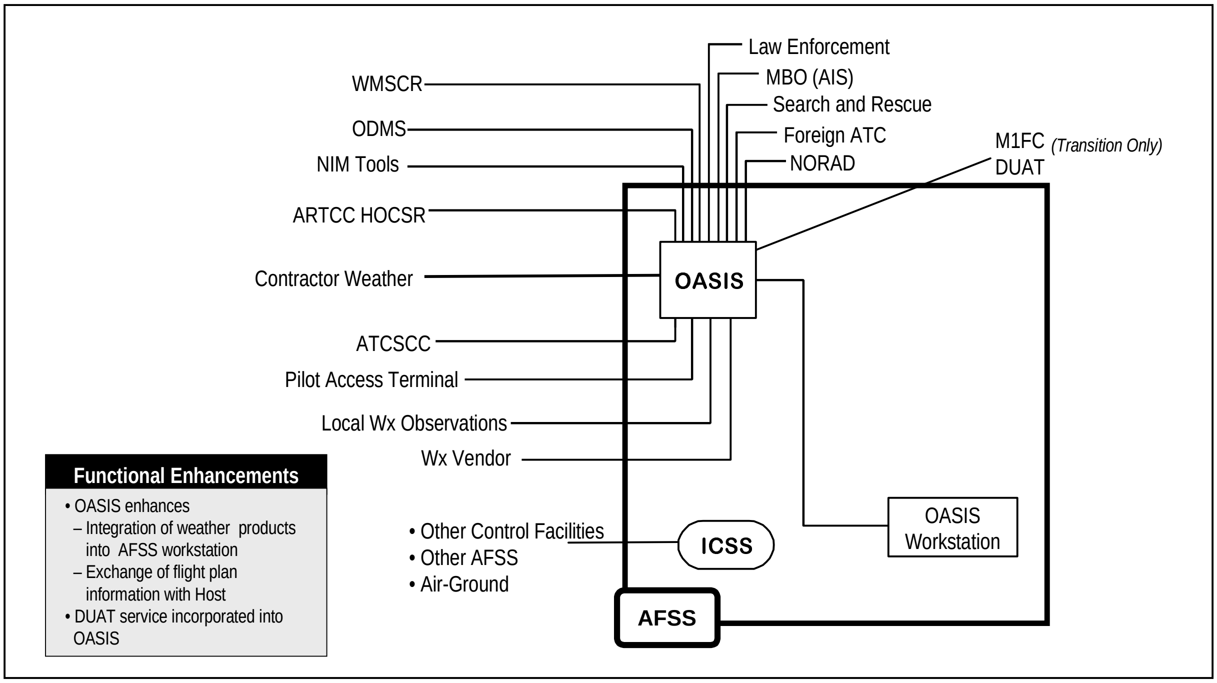

Figure 25-2. Flight Services Architecture—Step 2 (1999–2005)

search and rescue support) will ultimately become the principal focus of the flight service specialist.

Late in the period, enhanced local information sharing will be implemented in OASIS to provide data storage and data sharing according to the NAS-Wide Information Service (see Section 19, NAS Information Architecture and Services for Collaboration and Information Sharing).

25.1.3 Flight Services Architecture Evolution—Step 3 (2006–2015)

Retrieval of information in AFSSs will be quicker as the ability to exchange information with other facilities matures by the middle of Step 3 (see Figure 25-3). In this step, flight plans will be replaced by the flight object (see Section 19 for additional details about the flight object). The flight object contains the pilot's known flight path or profile, the discrete identification code, and all information necessary to initiate SAR if needed. This information is available throughout the NAS. For aircraft equipped with satellite navigation systems and using ADS-B, the NAS-wide information network will have the capability to automatically identify a successful landing, close a flight plan inadvertently left active in the system, or provide last known position.

Access to and retrieval of flight planning information will be continuously available to users and service providers via the NAS-wide information network. The following information will be available:

- Current SUA status
- Current NAS infrastructure status
- Predictions of traffic density based on the current flight trajectories filed and active in the system
- Current or planned route structure revisions needed to alleviate demand imbalance or avoid hazardous weather.

By the middle of Step 3, flight service automation will be fully integrated into the NAS-wide information network (see Figure 25-3). Access to flight planning and flight filing information by users will be via this network. FSS specialists will provide information to aircraft in flight, as necessary, predominately via data link.

Connectivity between the AFSS and other facilities will migrate to the NAS-wide information network. The integrated communications switching system (ICSS) infrastructure will transition to digital technology and the voice switch replacement system (VSRS). Air-ground voice commu-

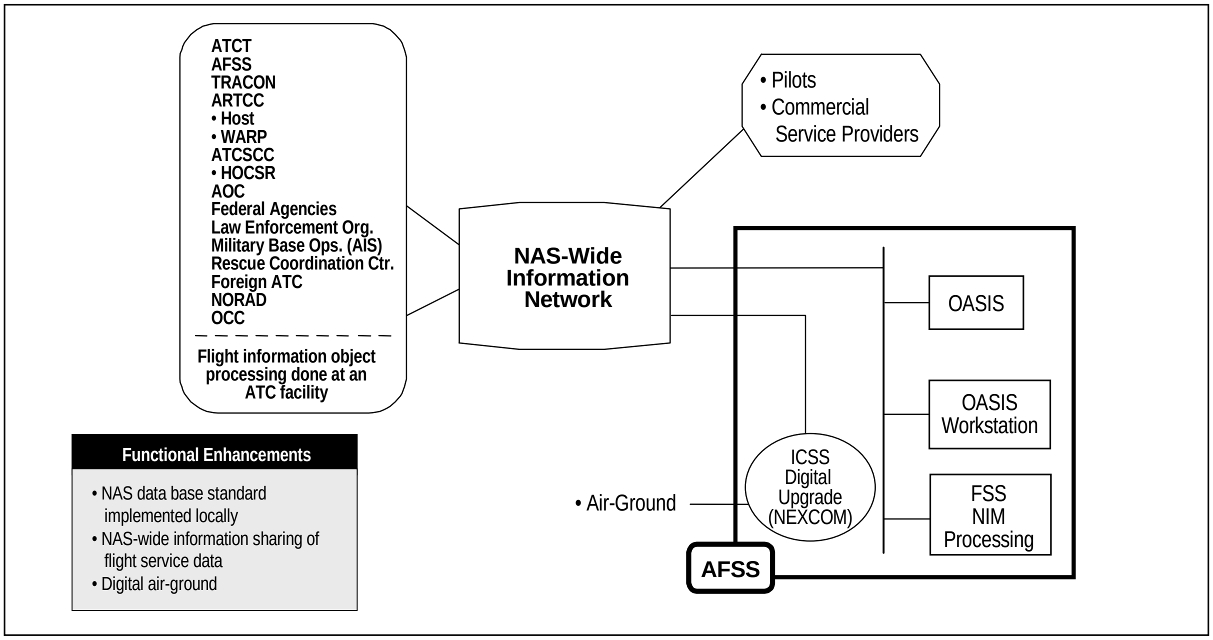

Figure 25-3. Flight Services Architecture—Step 3 (2006–2015)

nications will be provided via the next-generation air-ground communications system (NEXCOM) operating in analog mode. Transition to digital mode will depend on user equipage (see Section 17, Communication).

As the flight plan is formulated, the planner will reference the network data base for information about current and predicted weather conditions, traffic density, restrictions, and status of SUAs. When the flight plan is filed, it is automatically checked against actual and predicted NAS conditions. Potential problems will be displayed automatically to the planner or user and flight plan alternatives will be provided.

During the middle of Step 3, flight service research efforts will be implemented as OASIS is upgraded. These tools include decision support systems (DSSs) to assist preflight planning and suggest alternate routes in the event of hazardous weather, conflicts with SUA use, and in response to NOTAMs and other NAS constraints. Research initiatives realized during this period involve improvement of SAR support services by incorporating aircraft identification and position received from an emergency locator transmitter (ELT), referenced to the Global Positioning System (GPS) into NAS data bases, enhancing SAR support. Other research efforts will help determine the criteria for implementing the time-based trajectory flight profile (flight object) that will eventually replace the flight plan.

25.2 Summary of Capabilities

OASIS replaces obsolete FSAS equipment and software. It also incorporates the functionality of DUAT service and GWDS. Commercial enterprises will likely continue to be active in providing preflight services for a fee.

With full implementation of the NAS-wide information network, NAS users everywhere can access distributed data bases of weather, NOTAMs, SUA information, and the flight object. By virtue of making the distributed data bases readily accessible, this network greatly enhances various FSS functions such as route de-conflicting, self-briefing, and SAR services. In this flight services architecture, users and providers rapidly acquire any information they need, and flight services become a shared responsibility of the flight service specialist, the pilot, and commercial vendors. Figure 25-4 summarizes the evolution of flight services capabilities.

25.3 Human Factors

Flight service functions are not expected to change dramatically as new information automation systems are put into service. However, there

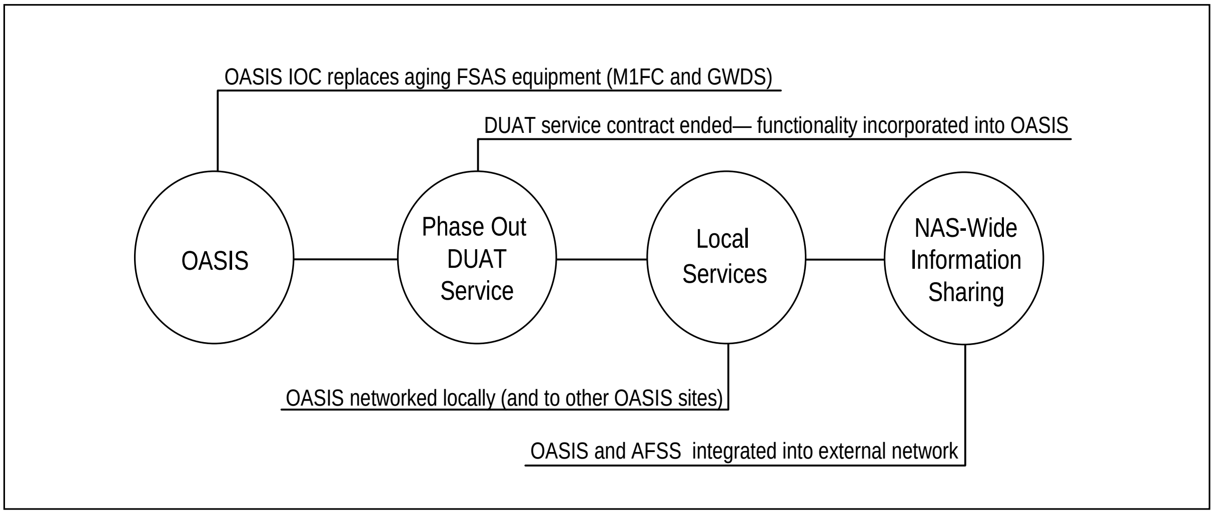

Figure 25-4. Flight Services Capabilities Summary

will be a change in the specialists' focus toward providing services to those without direct access and those needing additional assistance. While the introduction of OASIS is expected to improve the human interface and eliminate many of the problems encountered with the current system, future systems will provide flight service specialists and users with enhanced situational awareness by increasing the quality of service provided. The human factors effort will ensure that specialists have the required information displays and distribution tools, training, and procedures to enhance flight services. This effort will focus on:

- Improving automation capabilities for pilots to receive and use critical flight and weather information from multiple NAS facilities, especially when airborne
- Designing information displays and distribution methods and procedures to increase pilots' (and flight service providers') situational awareness and interpretation of available data
- Coordinating human factors standards for display and distribution among international elements to harmonize aeronautical information, flight trajectory data, and traffic density
- Conducting simulations to devise procedures (and training) for real-time trajectory information updates for improved traffic prediction and management

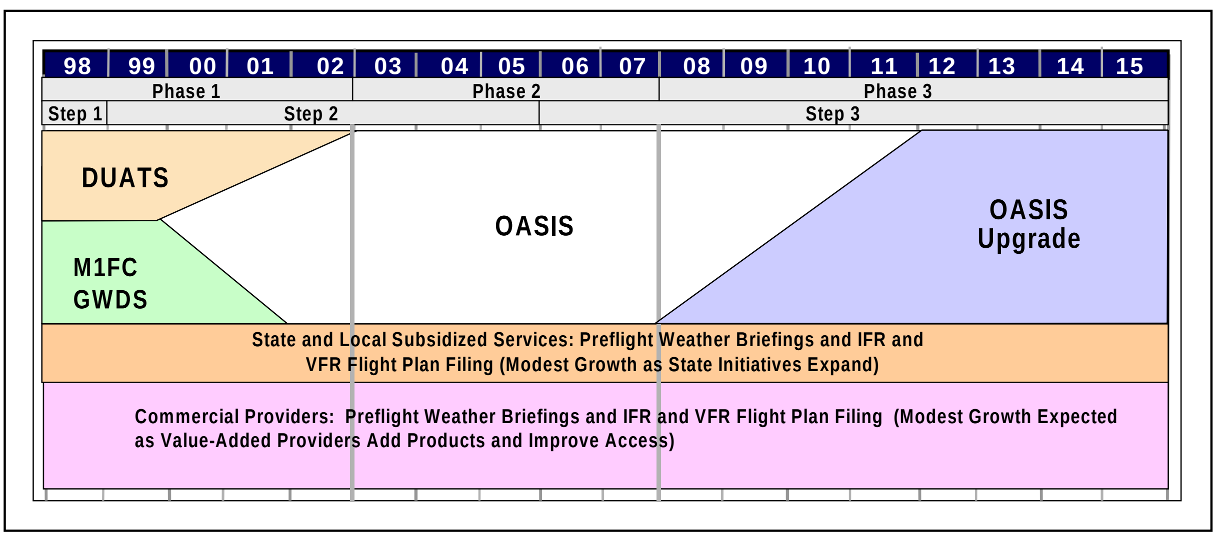

Figure 25-5. Flight Services Transition

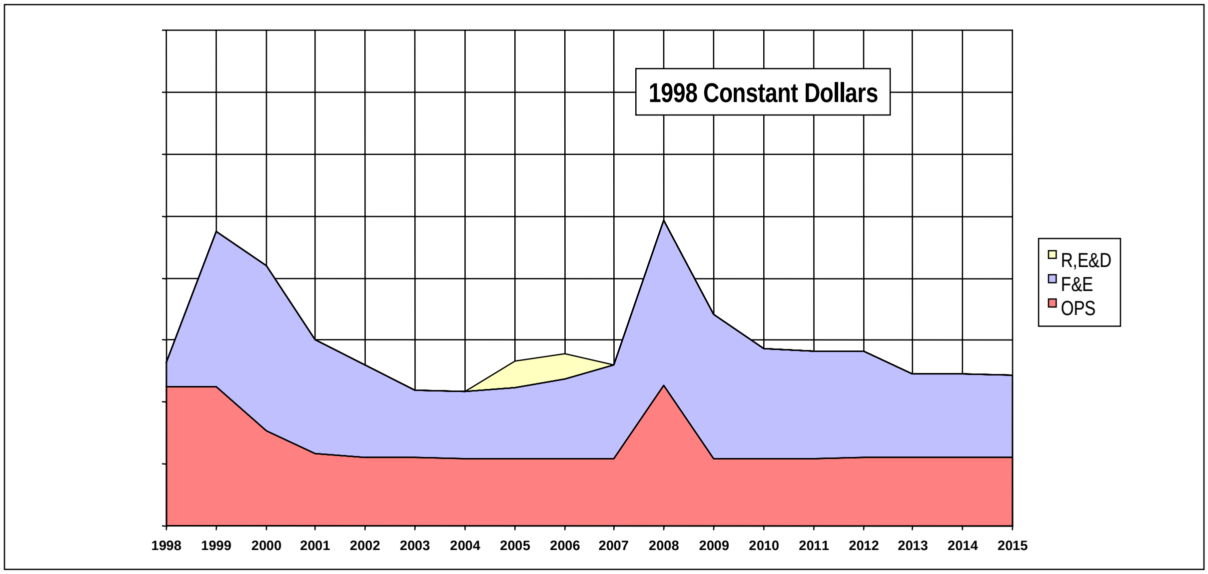

Figure 25-6. Estimated Flight Services Automation Costs

- Designing error-tolerant decision support tools and interactive aids that facilitate user collaboration in obtaining and using NAS flight planning and flight profile information.

25.4 Transition

The flight services transition is depicted in Figure 25-5. The major transition milestones are:

- Existing M1FC/GWDS is replaced by OASIS.
- DUAT service is phased out as its functionality is incorporated into OASIS.
- Local information services are enhanced.
- FSAS is fully integrated into the NAS-wide information network.

25.5 Costs

The FAA estimates for research, engineering, and development (R,E&D); facilities and equipment (F&E); and operations (OPS) life-cycle costs for flight services from 1998 through 2015 are presented in constant FY98 dollars in Figure 25-6.

25.6 Watch Items

Implementation of OASIS will enhance pilots' ability to self-brief and file flight plans directly, which will require a reevaluation of the roles and responsibilities of FSS specialists.