VOLUME 5, NUMBER 1, FEBRUARY 1980

aviation

FLIGHT SERVICE STATION MODERNIZATION

The Western Union Leased Service A System an Interim Report

by

Terry T. Lankford
Chairman
Aviation Committee

1. INTRODUCTION

Almost as soon as the Federal Aviation Administration (FAA) took over most of the Pilot Weather Briefing responsibility from the National Weather Service (NWS) in 1964, the Service A Telecommunications System has been out of date. Since that time proposal after proposal has been made by the FAA and user groups to update the weather dissemination system. However, even now, most FAA Flight Service Stations are still using the old Models 14 and 28 electromechanical teletype equipment. This equipment, though modified over the years, is still only able to print 100 words per minute (wpm).

In November 1978, the FAA approved an interim Service A system that was tested at the Chicago FSS. The system, developed by Western Union, and known as the "Leased Service A System (SAS)", will be installed in 150 FSSs by May 1981.

The SAS is designed to update the FSS Service A system until software and hardware specifically designed for the FSS can be developed and installed by the mid 1980s. This equipment, which includes graphics similar to the NWS AFOS system, will be tailored to fulfill the FSS's pilot-briefing role.

2. THE SYSTEM

The SAS consists of a Western Union GS-200 Controller, a number of KVDT B500 "BEEHIVE" keyboard display terminals, and Model 40 receive-only printers. The Controller contains two Micro-processors and two disk-storage units. It is connected to the Weather Message Switching Center (WMSC) in Kansas City MO by a dedicated 2400-baud circuit.

The Controller stores almost all aeronautical and weather information needed by the FSS briefers. With a few exceptions, all Service A routine material is stored. However, the Controller can store up to 450 sequence reports (SA), many more than is routinely transmitted on Service A. The Controller also stores up to 25 TWEB Route Forecasts and as many as 30 locally developed Collectives.

The KVDT B500 keyboard display terminals display the data to the FSS specialist for dissemination to the pilot. The specialist can use the terminal as a dedicated request/reply circuit and call up specific items or one of the locally-developed Collectives. Also, the terminals can be used to enter weather reports, pilot reports (PIREP) and Notices to Airmen (NOTAM).

At least three Model 40 receive-only

printers will be installed at each location. The "History Printer" prints all data sent by WMSC to the Controller. This data can be used in case of system malfunction, and is saved for 15 days for aircraft investigation purposes. The "Supervisor Printer" receives Weather Advisories (Convective SIGMETs, SIGMETs and AIRMETs), National Flight Data Center-Notices to Airmen (FDC NOTAM), Circuit Notices, and certain other data. A third printer is used as a backup, and to print any needed data.

3. SYSTEM OPERATION

The WMSC loads the Controller with forecast data -- Area Forecasts (FA), TWEB Route Forecasts, Terminal Forecasts (FT), and Winds and Temperatures Aloft Forecasts (FD) -- at scheduled times. Amended forecasts, and SIGMETs and AIRMETs, transmitted upon receipt by WMSC, automatically update the Controller's files.

SAs are transmitted hourly, beginning at about H+03. The first group of reports is a priority list consisting of SAs most used by facilities on the circuit. Normally, all the SA reports are loaded by about H+10 to H+15. Special reports (SP), PIREPs, and NOTAMs not appended to the hourly reports are transmitted periodically during the hour and added to the appropriate station's file.

System malfunctions generally are one of two types -- either a system HALT, or an IDLE condition. A system HALT is a failure of local equipment and results in a total loss of the locally-stored data base. This appears to happen rarely, and normally the System can be restored in 5 to 15 minutes. However, it usually takes about an hour to restore the entire data base. IDLE conditions occur when the Controller, for whatever reason, is not in contact with the WMSC. The local data base remains intact, but data can neither be received nor transmitted to the WMSC. Generally, IDLE conditions last for only a few minutes, and occurrences are becoming less frequent.

Data such as SAs, SPs, PIREPs and NOTAMs can be entered through any of the KVDTs. SAs are entered between H+56 and H+03. Other data can be entered at any time.

4. SYSTEM ADVANTAGES AND DISADVANTAGES

The System has many advantages over Service A. The most apparent are speed, the ability to develop local Collectives, the increased availability of data at the local level, housekeeping, and the speed and ease of entering data.

The speed advantage is obvious. Twice as many SAs are loaded and available to the briefer in half the time it would take using Service A. Also, time is saved because the data is instantly available to the briefer through the KVDTs. This eliminates the need for weather data to be distributed manually to the briefing positions. For the same reasons, most forecast data is available to the briefer 5 to 15 minutes earlier than is possible using Service A. When the Controller's files are updated with SPs, PIREPs, NOTAMs, and most amended forecasts, this information is also instantly available.

The locally-developed Collective is the biggest plus for the System. The Controller can store up to 30 Collectives, each with up to 25 items. The Collectives can be made up of any meteorological or aeronautical material transmitted from WMSC (SAs, FTs, FDs, TWEBs, etc.). Each facility can develop and tailor its Collectives to its own Flight Service area. As a result, collectives can be designed: using the briefing format required by the FAA's Flight Services handbook; along major briefing routes allowing the briefer to summarize weather data; and eliminating superfluous information.

Because of the storage capacity of the Controller, two or three times as much data can be stored at the facility than was possible with Service A. This means that the briefer rarely has to request data from WMSC. However, if data is required from WMSC, the System provides each facility with the equivalent of a dedicated request/reply circuit. This will be

The Western Union "Leased Service A System", with Controller (center-right), Keyboard Display Terminal, and Supervisor Printer (right).

especially good for those facilities that did not originally have a dedicated circuit.

Another advantage of the System to the briefer, and ultimately to the user, is the elimination of the need to sort and post SPs, PIREPs, NOTAMs and most amended forecasts. In other words, this housekeeping will have been done away with. It also benefits the user in two ways. More specialist time can be directed toward briefing the pilot; and, the meteorological and aeronautical information provided will be much more current.

Data can be entered from any KVDT. This allows any specialist receiving a pirep to enter it directly into the system. Also, it can be entered at any time instead of the usual 20 and 40 minutes past the hour or with the hourly weather. The same is true for SPs and NOTAMs.

System reliability appears to be acceptable and improving. Although quite a few problems arose during initial circuit set-up, it appears that equipment reliability will be as good as Service A, perhaps even better. After the first installation at the Fresno CA FSS, system halts occurred only about once a month, and

The KVDT B500 Keyboard Display Terminal

they are happening less often than that. Idle conditions occur for shorter periods and are also becoming less frequent.

At present the biggest disadvantage of the System is the hourly SA reload. Rather than replacing SA for SA, when the first SA is received all the SAs in storage are dumped. This leaves about 2 to 5 minutes when most of the SA data base is lost. Another problem arises when a station or circuit does not report. Then, the old reports are lost from storage. They are still available on the "History Printer", but their retrieval is quite time-consuming and inconvenient. The solution, of course, is to change the program to replace SA for SA; this is being considered.

The last major disadvantage is a System Halt, which loses the entire local data base. When this happens, it usually takes 5 to 15 minutes using backup Service A and request/reply circuits to resume normal operations. And, as with the other problems, this also is becoming infrequent.

5. AUTOMATION AND SPECIALIST ACCEPTANCE

The System will hardly change the number of FSS specialists required to do pilot briefing. There will be a slight increase in specialist productivity mainly from the elimination of certain housekeeping chores. However, briefers will still be working one-on-one with pilots; and the time needed to relay aeronautical and weather information will still be the same.

Specialist acceptance of the System at Fresno has been excellent. There were problems at first with the setup and the locally developed Collectives; this made briefing awkward and slow. And, as one specialist put it, "... we were expecting panacea." But after these problems were solved, and specialists were able to look objectively at the System, not one wanted to return to the old Service A.

There has been some criticism of the System from the FSS union, the National Association of Air Traffic Specialists (NAATS). Much of it apparently stemmed from the initial problems we had at Fresno. This is to be expected with any new system.

6. CONCLUSIONS

During initial setup and training, specialist productivity will decrease, because of the initial shakedown of the System, and the time needed for specialists to become familiar with the equipment. The same thing happened during the first Enroute Air Traffic Control Center's Flight Data Processing automation, in the late '60s and early '70s.

Once the System is in place, and the facilities have designed their locally stored Collectives, productivity will increase slightly. This is, again, because certain housekeeping tasks will be eliminated. So the specialists will have more time for their primary function, pilot briefings. Also, the System's speed and ease of entering data will save time.

The briefing positions will need little further training. For the most part, SAS will use the current procedures and formats of Service A and request/reply circuits. However, to operate the Controller will require some more training; this can be done at the facility level. The training is necessary to enable specialists to deal with equipment malfunctions, and to show the facility staff how to change and update stored data. This adds flexibility to the system. Facilities will be able to update information to serve better the constantly-changing aviation user's needs.

The aviation weather user will benefit from the System in two ways. First, the SAS will increase productivity somewhat; and second, except for certain limitations, it will greatly increase the availability of current meteorological and aeronautical information.

After decades, FSS automation is here. True, it is a small first step; but it is the first step. The FAA is virtually bringing the Flight Service Station from 1959 into the 1980s.