GENERAL-AVIATION'S VIEW OF PROGRESS IN THE AVIATION WEATHER SYSTEM

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AOPA represents a wide variety of aviation interests among its 265,000 members who are a cross section of the 730,000 active pilots today. Our members own and fly the majority of the 210,000 civil aircraft registered for personal, business, and commercial purposes. We fly more than five times as many hours annually as do the air carriers (into nearly 13,000 airports). General-aviation fuel taxes are funding both the operation and capital improvements of the FAA's National Airspace System and help to reimburse the aviation programs of the National Weather Service.

The Continuing Impact of Weather on Aviation Safety

For all of its sheer mass of activity statistics, general-aviation inevitably is the most vulnerable to hazardous weather. Our members generally fly in the weather the whole route, unlike air carriers which can fly above most en route weather. To quote from the November 1984 Report of the House Subcommittee on Investigations and Oversight entitled, "The Impact of Weather on Aviation Safety:"

"Weather has long been known to be a contributing factor in about 40 percent of air accidents. Air carrier accidents get the most public attention, but general-aviation accidents result in the most casualties. Adequate and timely weather information is not reaching the pilot in the cockpit; often pilots do not get the hazardous weather information available from the National Weather Service." The report continues, "These comments made in 1975 illustrate the life-costing criticality of unavailable or misleading weather information, the weak links in communications and observation that prevent the transmission of timely and accurate weather information, and the inability of federal agencies to improve this situation."

That was a decade ago. What progress has been made in the aviation weather system since then? The good intentions of the FAA and NWS are borne out by good studies and good plans. For example, the FAA's Aviation Weather System Plan is evolving into an excellent guide to planned improvements and user requirements. Unfortunately, fairly straightforward improvements seem to drag into long-term programs. FSS Automation, AWOS, NEXRAD, High-Altitude EFAS, DUAT, and Voice Response System are all examples of the "moving target" syndrome.

Meanwhile, technology charges ahead both in the private sector and in the government's own think tanks. The irony is that just when there appears to be light at the end of the tunnel for a long-term government project, the private sector often produces cheaper, better alternative products which must fight uphill against the "not-invented-here" (NIH) syndrome.

Since this workshop seeks to educate its participants to real-world problems faced by aviation users, we have hope that your approaches to aviation weather services will indeed be "service" oriented rather than merely "program" oriented.

SPECIFIC CONCERNS: Weather Collection, Processing, Products and Dissemination

While AOPA generally approves of the direction that the Automated Weather Observation System (AWOS) program is headed, the glacial pace of actually getting the units out to the field is unacceptable. While we appreciate the amount of research and development required to provide a machine capable of meeting NWS Part 121 (airline) observation and forecasting requirements, we need at least a basic modular AWOS now to satisfy Flight Standards requirements at unmanned locations with instrument approach procedures. We do not see any air traffic locations to be a priority for AWOS at this point until the flight standards locations receive at least the equivalent of an AWOS-1 (no ceiling or visibility) unit. The planned 400 flight standards units and estimated 400 Airport Improvement Program units will still yield a shortfall of more than 100 airports with instrument approach procedures without weather observation service. In addition, the impending loss of remote altimeter authorization for airports with instrument approaches in mountainous areas is a further, recent impetus to getting simple sensors out there where they are needed most.

The reason that AOPA is not as concerned about getting AWOS to FAA tower and FSS locations is that there is a provision for adequate replacement service throughout the contract weather observation program. Although the goal is to eventually have AWOS replace these observers, we feel the intervening period can be spent profitably in getting basic AWOS-1 deployed to unmanned locations as mentioned above.

Meanwhile, the AWOS-3 (full observation capability) can be perfected to bring it up to the "equal or better service" standard required for replacement of human observers. Although we feel certain of FAA's commitment to support a contract observer program, there are many unanswered questions for which we hope there will soon by answers:

- Who in FAA will arrange and supervise these contracts?

- What will govern their hours of observation coverage?
- Will they be around to take "specials" as needed?
- How long will these contracts last?
- Will their observations be available through the airport's UNICOM frequency, if a non-tower location?
- Will FAA retain certain Flight Service Stations in mountainous areas and Alaska where neither AWOS nor contract observers are feasible, as Administrator Engen of FAA has recently testified?

Of great concern to us are the continuing efforts of NWS to withdraw from both the observation and dissemination roles of the aviation weather system. For example, the Nebraska Plan of cooperative NWS/FAA/state-supported supplemental observations has been damaged in many places because of NWS withdrawal from the program. Alaska just lost seven formerly joint NWS/DOD observation points, while the State of Minnesota and FAA have been unable to expand the Minnesota Shared Weather Observation Plan beyond six of 14 planned sites since NWS has pulled out.

There is a growing awareness that many more observation points are needed nationwide to improve the accuracy of terminal and area forecasts, but lack of capacity in the Service A, AFOS, and 604 circuits have helped constrain the addition of more reporting locations to the system. Again, the State of Minnesota will be taking matters into its own hands shortly with a grid network of "mini-AWOS" sensors across the state tied to its own communications network. The rest of us have to hope that weather circuit capacity improvements through NADIN and the WMSC-Replacement are finally in sight.

Let us now turn to forecast products themselves–area forecasts, terminal forecasts, and winds aloft forecasts. In short, they all need some more work. Although weather forecasting will always remain somewhat of an imprecise science, we simply need more accurate information on icing conditions, convective activity, precipitation, low clouds, fog probability, and frontal passages. We know that much money and effort has been expended on exotic products such as the Automated Route Forecast (ARF), but we have the nagging feeling that it may be victim of "garbage in–garbage out" if basic forecast processes are not improved.

Area and terminal forecasts would benefit directly from more observation points, earlier hours at part-time locations, and more frequent observations. AWOS and Aviation Surface Observation System (ASOS) will obviously be the ultimate solutions to these needs, but again, holding the line on human observations until then is needed.

Area forecasts presently suffer from a disorganized format on Leased Service A, making it difficult for the briefer to grasp the entire picture. Private sector aviation computer services (avcomps) vendors report that it is a major task to clean up the area forecast mess before releasing this data to their customers. We would expect that any FAA-sponsored Direct User Access Terminal (DUAT) service would have a presentation as well organized as that of the private sector avcomps vendors.

Due to the twice-daily frequency of upper-air soundings, it is not uncommon for winds aloft forecasts to rely on raw data more than ten hours old. The promise of improvements through profilers, and AMDAR and ASDAR automatic airborne winds aloft relay are encouraging. Since benefits to general aviation are dependent on the participation of air carriers and, to a lesser extent, corporate jets in the latter two programs, we can only lend our support.

Pilot Reports (PIREPs) are still falling through the cracks in the collection, processing, and dissemination phases. PIREPs will always be of vital importance to general aviation to complete the often incomplete picture painted by a preflight briefing. A single PIREP confirming icing conditions aloft received in time can be enough to keep a number of non-equipped aircraft on the ground or to seek a safer altitude or route. Although we understand that the FAA mounted a substantial controller PIREP awareness and solicitation program within recent years, the momentum must be maintained. Pilots for their part are happy to give PIREPs if they have the opportunity and if they think their reports will indeed be distributed. Although improvements in communications and switching systems will be delayed until a low-cost cockpit weather display system is authorized for use in the National Airspace System. Although both controllers and EFAS specialists should have the latest weather information including PIREPs at their fingertips, hard IFR conditions will almost certainly always jam voice ATC and EFAS frequencies.

This leads us to their entire spectrum of in-flight weather dissemination. A full eight years after the Southern Airways Flight 242 accident near New Hope, Georgia, there is virtually no progress in cockpit weather displays on the part of the Federal Government. We have seen the FAA/Mitre VOR ground-based radar uplink come and go, satellite radar display experiments in the private sector, the NASA/Kavouras F-106 cockpit radar display, and very shortly, a ground-based six-level color ground-based weather radar display in a State of Minnesota King Air.

Besides graphic products, we sorely need basic alphanumeric displays as well. It is bad enough that EFAS still has only one nationwide voice frequency, but serious thought should be given to making EFAS facilities providers of digital cockpit weather data as well as voice.

Speaking of EFAS, we have no objections to EFAS consolidation to conform

to Air Route Traffic Control Center (ARTCC) boundaries if it leads to closer coordination with associated Center Weather Service Units (CWSU). However, EFAS consolidation, like Flight Service Station (FSS) consolidation, requires adequate staffing, training, and communications outlets.

We welcome the expansion of the Hazardous In-flight Weather Advisory Service (HIWAS) as a needed supplement to controller and EFAS-delivered advisories. However, we are troubled by the simultaneous erosion of both NDB and VOR Transcribed Weather Broadcasts (TWEB). To again cite the 1984 House Report "The Impact of Weather on Aviation Safety": "The subcommittee recommends that FAA assume responsibility for actively disseminating weather information to general aviation pilots through the Flight Service Stations." HIWAS is a step in the right direction, but it cannot replace the comprehensive picture that TWEB provides.

The continuing deficiencies in the FAA's preflight weather dissemination system need no introduction. Briefly, the Flight Service Automation System (FSAS) is a classic example of a "moving target" completely missing the mark of satisfying user needs.

Readily available improvements to the existing system have been held hostage to FSS consolidation, which in turn is held hostage by the snail's pace of FSS automation.

Meanwhile, we have continuing problems with telephone briefing access due to staffing, equipment, and toll rates; trouble-prone Leased Service A Systems; inadequate recorded telephone products; and lack of timely, quality graphics products. It may be to our advantage to have new FSS hubs open as soon as possible to take advantage of new telephone equipment and Model I automation when it becomes available. Model II graphics for the FSS are so far downstream as to be irrelevant at this point. The FAA must now take steps to buy or lease commercially available color weather graphics displays for the FSS briefer.

We can say little about the Interim Voice Response System (IVRS), another "moving target", until we finally see it in operation. A nationwide telephone voice response system has been badly needed for some time to offload the FSS briefer; if IVRS works, consideration should be given to expanding the contract to cover more territory. If IVRS does not work, there are similar commercial systems available for government procurement.

However, it is essential that the aviation user community actively push to make "near-term" DUAT service a reality. We simply cannot be asked to wait until 1991 for nationwide DUAT coverage through Model II. For one thing, Model II funding

is doubtful at this point, FSS consolidation is under way, and private sector stands ready today to provide this important service for the FAA.

After seemingly endless debate and study, we are pleased to see that the FAA is apparently moving off dead center with regards to a DUAT service. We concur with the FAA's "Proposed Near-Term DUAT Policy" which surfaced during a December 17 meeting of the FAA Administrator with the National Avcomp's Council (NAC). We also agree with NAC's approach to providing FAA DUAT services, which would be for monthly FAA reimbursement for any vendor delivering the basic FAA DUAT "product".

The one deficiency so far in the proposed DUAT policy is the omission of financial incentives for state and local governments to provide "pilot self briefing facility" hardware. The FAA's FSS Modernization Plan of 1978 originally called for some 3500 airport-located Pilot Self Briefing Terminals (PSBT) to access FAA-provided data. Because pilots cannot take their home and office terminals with them, the FAA must complete the loop and stimulate the equipage of airports with DUAT terminals. Minnesota and Wisconsin, of course, got tired of waiting for the FAA to act and went to some trouble to provide their own DUAT service.

Thunderstorms

The last topic to address is detection, warning, and avoidance of thunderstorms. We have already mentioned the unmet need of uplinking ground-based radar data to properly equipped aircraft in flight. But the majority of general aviation aircraft, which will not have either a cockpit weather display system (CWDS) or airborne radar, will have to rely on good preflight briefings and in-flight advisories to avoid thunderstorms.

We have the following recommendations to improve the severe weather safety situation:

- All FSS must be equipped with color weather radar displays. These data can even be provided now through personal computer terminals with proper software. It is unconscionable that eventual FSS consolidation be used as an excuse to keep briefers and pilots in the dark. Storm Detection (SD) reports are a poor substitute for radar imagery. The concept of equipping only 44 of 61 Automated FSS hubs with RRWDS radar displays is completely unacceptable.

- We agree with the House Oversight Subcommittee that TRACONs should have the benefits of color weather radar. It is encouraging to see that color weather radar displays will be evaluated at the Memphis, Kansas City, and Boston towers.

- FAA, Air Force, and NWS should continue NEXRAD development, but should devote attention to commercially available terminal Doppler radars that are ready for testing now.

- We know of few pilots or controllers who place much faith in Low-Level Wind Shear Alert System (LLWSAS); its funding should be shifted to terminal Doppler radar procurement for towered airports.

- For all of its advantages, ground-based weather radar should be backed up by lightning detection systems. There are many available now that could be added later to existing AWOS units. In the meantime, we are encouraged by the interagency cooperation that has enabled Bureau of Land Management/U. S. Forest Service lightning detection networks to be fed into the National Severe Storms Forecast Center in Kansas City.

Conclusions

While AOPA and general aviation, as a whole, continue to have both high expectations and frustrations with the aviation weather system, we realize that cooperation among all sectors is necessary to improve the situation. While those in government, married to certain long-term projects, may not really want to hear about alternative solutions to our problems, as aviation consumer advocates, we owe our members nothing less. Most of the programs proposed for aviation weather needs are adequate and acceptable, and we must get on with them.