REASSESSMENT OF RESPONSE TO AVIATION SAFETY RECOMMENDATION A90-88

WEATHER OBSERVATION SERVICES

Background

The Board's report 90-SP002 entitled *Report of a Safety Study on VFR Flight into Adverse Weather* was undertaken to address the reality that accidents in which the aircraft was operated under Visual Flight Rules (VFR) into adverse weather conditions occur regularly, claiming a disproportionately high number of fatalities each year. They involve professional pilots, private pilots and business pilots who fly general aviation aircraft and chartered commercial aircraft, including fixed-wing aircraft and helicopters.

The regularity with which these accidents have occurred, and the seriousness of the continuing loss of life, prompted the Canadian Aviation Safety Board (CASB) to initiate a comprehensive and systematic examination of the issue. In March 1990, when this report was nearing completion, the CASB was replaced by the Transportation Safety Board of Canada (TSB), under whose auspices this report was published on 13 November 1990.

During the last two decades, a number of foreign government agencies have undertaken measures to more fully understand these types of accidents. Recent studies emphasize both the complex decisional nature of continued VFR flight into adverse weather and the often fatal consequences. This safety study is the first comprehensive review of the topic in Canada in recent years, and builds upon these earlier works.

Board Recommendation A90-88 (13 November 1990)

The adequacy of weather recording, forecasting and briefing as it pertained to VFR-into-IMC[1] accidents was examined. Limitations in the accident data sometimes hampered the analysis of this issue; however, weather forecasting was found to be generally accurate, and inaccuracies seldom played a significant role in the occurrences.

Weather observation sites logically tend to be located at or near airports, where the regular measurement of weather phenomena is required for aircraft movements. Conversely, few observation sites are located in sparsely inhabited areas. In mountainous terrain, local conditions may vary widely from valley to valley, and differ significantly from the general area forecast. Such variations, particularly if they occur en route, are apt to go undetected.

Advances in technology are leading towards automated measurement of weather phenomena. Transport Canada plans to have an Automated Weather Observation System (AWOS) partially in place by 1993. However, it will be well into the new century before fully functioning AWOS are installed at the locations initially designated for AWOS across Canada. TC will initially

[1] Involving an aircraft governed by Visual Flight Rules (VFR) which initiated or continued flight into Instrument Meteorological Conditions (IMC)

locate AWOS only in support of IFR operations; once these IFR sites are in-place, a limited number of observation sites may be positioned in locations such as selected mountain passes to support VFR operations. The Board is concerned that TC's introduction of AWOS to support IFR operations only may not take adequate account of the Canadian accident experience, and may not be the most effective utilization of this technology.

The Board recognizes that AWOS sites will not be in-place for many years. Presently, TC maintains a limited number of contract weather observation sites, particularly in British Columbia. Local inhabitants under contract are trained to operate basic weather observation equipment. Thus, at relatively little expense, TC disseminates information about adverse weather conditions at remote, en route locations which otherwise would go unreported.

The Board believes that while AWOS is being introduced in the next decade, additional manned observation sites would be an inexpensive means of enhancing the reporting of adverse en route weather in the sparsely-settled regions, particularly in mountainous terrain. Accordingly, the Board recommends that:

> The Department of Transport examine the policy for the contracting of manned weather observation services with a view to expanding the service in remote locations of highest risk.
>
> A90-88

Transport Canada Response to A90-88 (21 March 1991)

Transport Canada agrees that the provision of VFR weather services could enhance the reporting of en route weather but staffed weather stations are not, as suggested in the report, considered to be inexpensive. The essential elements, required to record ceiling and visibility, are expensive and contribute to an estimated cost of $200K per year for a 24 hour/7 day operation.

The policies for the provision of these services in all areas, including those contracted to provide this information in high risk or remote locations, are covered by the Surface Weather Observations section 103.308 of TP 9474 ANS Policy Document and are further elaborated on in TP 7411 Aviation Weather Services and Criteria.

An examination of Transport Canada's policies confirms that these standards and criteria do allow for the provision of VFR weather observation services and that weather observations and an area forecasts are provided in some areas strictly for VFR operations. These policies are considered to be adequate.

Development of Board Assessment of TC Responses to A90-88

The last recorded reassessment of Transport Canada’s response to A90-88 stated the following:

> AWOS has had a history of technical problems and in the late 1990s; TC put a temporary moratorium on commissioning stand alone AWOS sites. The Aviation AWOS Performance Evaluation Group, established in 1995 to "determine the extent to which AWOS meets aviation requirements" concluded in 1997 that AWOS performance has markedly improved and recommended the TC moratorium be lifted. It could not be

> determined the extent to which AWOS have been installed in high risk mountainous areas nor to what extent staffed weather observation sites would/should have prevented the 32 mountainous region accidents from the recent 1995-2004 data. To date, TC has apparently not taken the specific action recommended by A90-88; therefore the assessment remains "Unsatisfactory".
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> However, from recent data, it could not be determined if the need for expanded weather observation services, as espoused by the 1990 TSB Study, was still valid. As such, the TSB will, through ongoing and/or future investigations, attempt to determine if such a deficiency still exists, and if required, make "new" recommendations. "Further Action is Unwarranted" with respect to A90-88 and the Status is set to "Inactive".

Consequently, the assessment was rated as **Satisfactory in Part** and assigned an **Inactive** status.

Board Review of A90-88 Deficiency File Status (01 October 2010)

The Board requested that all inactive aviation recommendations with an assigned rating other than **Fully Satisfactory** be reviewed to determine if their Deficiency File Status was appropriate. After an initial evaluation, it was decided that several such recommendations required that a deficiency analysis update be conducted to confirm if the associated risks remained substantial.

A90-88 Deficiency Analysis Update (12 October 2011)

As stated in the TSB's last reassessment of Recommendation A90-88, AWOS experienced technical problems in the late 1990s. User dissatisfaction with AWOS inadequacies such as false reports of low clouds, reports of clear weather when there was reduced visibility, lack of icing or freezing precipitation, missing or late sequences. Reliability was a concern and many users did not trust AWOS reports. The subsequent moratorium on the installation of new AWOS sites was followed by a policy that a site-specific study be conducted to demonstrate that there was no lessening of safety and that the users concerns were addressed before a new AWOS site installation could go forward.

Additionally, in March 2005, Transport Canada published an exemption to its Canadian Aviation Regulation (CAR) 804.01 (c) allowing for the use of existing AWOS stations as long as certain criteria were in place. None of the criteria related specifically to the provision of manned weather observation services in remote locations of highest risk as described in Recommendation A90-88. Essentially, the exemption sanctioned the use of AWOS generated information while NAV CANADA set about to replace the legacy AWOS with equipment that would meet the standards set out in CAR 804.01 (c).

After much research and development NAV CANADA began replacing the legacy AWOS with a more advanced, regulatory-compliant automated weather observation system. The new AWOS would use the latest in sensor technology and be designed to enhance reliability. An example of such design improvements include a wind sensor that is less vulnerable to weather in that it uses heated probes with no moving parts, so freezing rain, fog or wet snow do not impair the data flow. Until all of the replacement automated weather systems are commissioned (planned for late 2012), a mixture of both legacy AWOS and replacement AWOS systems will exist across the country.

The occurrence record would suggest that Transport Canada's approach to managing the limitations of existing AWOS sites while NAV CANADA introduces improved AWOS equipment has successfully reduced the risks associated with Recommendation A90-88.

Therefore, the reassessment is changed to **Fully Satisfactory.**

Next TSB Action (12 October 2011)

As further action is unwarranted, the Board changes the Deficiency File Status to **Inactive**.