

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: November 19, 1980

Forwarded to:

Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-80-115 through -119

On June 12, 1980, an Air Wisconsin Swearingen SW-4 crashed during an encounter with a level 5 or greater thunderstorm in eastern Nebraska. Thirteen persons were killed and two persons were seriously injured.

During its flight, the aircraft had been under the control of the Minneapolis Air Route Traffic Control Center's (ARTCC) Omaha low altitude sector, as well as other sectors within the same ARTCC. However, the Safety Board's investigation has revealed that none of the sector controllers transmitted information to the flightcrew regarding the location and intensity of the thunderstorm system in the path of the flight although other ARTCC air traffic control (ATC) and meteorological personnel had some information regarding the potential intensity characteristics of the storm system. Testimony given at a public hearing held in Omaha, Nebraska, during September 1980 indicated that the full extent of the area of precipitation and accurate intensity characteristics of convective meteorological phenomena are not portrayed on a controller's plan view display (PVD) because the weather fixed map unit (WFMU) is designed to be selective in its display of precipitation and is limited in its capability to display weather echo intensity levels. A controller's only alternative to obtain a more complete view of the precipitation in the area is to switch to the older broadband presentation; however, this equipment also does not have the capability of showing the various weather echo intensity levels. Further, the broadband presentation may not show aircraft which have already penetrated precipitation areas, essentially rendering this radar useless for purposes of vectoring aircraft out of areas of precipitation.

On February 24, 1980, a Beechcraft Bonanza BE-35 aircraft crashed near Valdosta, Georgia, during an encounter with severe thunderstorms. All the occupants aboard were killed when the aircraft experienced an inflight breakup. On August 26, 1978, two persons were killed when a Piper PA-28 aircraft experienced an inflight breakup during an encounter with a severe thunderstorm near Bolton, North Carolina. In both accidents, ARTCC controllers attempted to provide weather information and avoidance vectors around areas of precipitation observed on the PVDs by switching to broadband presentations to obtain a more complete characterization of the weather than that displayed on the narrowband WFMU.

In the investigations of the three accidents cited above, ATC personnel alluded several times to the fact that, in some instances, inconsistencies between the weather displayed on the PVD and the actual weather encountered by the aircraft limited their ability to confidently assist aircraft.

Following the accident involving a Southern Airways DC-9 on April 4, 1977, at New Hope, Georgia, 1/ the Safety Board recommended the expeditious development and implementation of a weather subsystem for en route and terminal radar environments which would be capable of providing real-time displays of precipitation or turbulence or both, and which would incorporate a multiple-intensity classification scheme (Safety Recommendation A-77-63). We believe the selective display of precipitation in the WFMU is an operationally sound concept where a limited distinction of precipitation levels is acceptable, but that it does not provide sufficient discrimination for effective and safe use of airspace in the vicinity of convective meteorological activity.

As part of its investigation of the June 12, 1980, crash, the Safety Board examined the National Weather Service (NWS) weather radar color remote displays located at the Cleveland ARTCC. We understand that the FAA intends to test the possible use of similar displays as an adjunct to the present narrowband WFMU system, and we believe such use would significantly contribute to aviation safety. For that matter, one practical application of the use of NWS weather radar information has already been demonstrated.

On the evening of September 22, 1980, an unusually large area of extreme convective weather extended from Ontario, Canada, south to Jonesboro, Arkansas. Several supervisors and controllers at the Cleveland ARTCC reported that, while experiencing difficulty in correlating the NWS radar maps with the ATC PVD maps, they were able to achieve sufficient correlation to issue advisories to aircraft regarding the extreme weather displayed on the NWS weather radar color remote displays in the center. In one notable instance, the PVD display of weather over the Detroit airport did not show the presence of the ongoing thunderstorm activity which was displayed clearly on the NWS weather radar color remote display. The controllers were able to use the NWS weather radar information to divert aircraft away from the Detroit airport. Throughout the evening of September 22, numerous air carrier flights were assisted in avoiding the weather which was characterized as severe and extreme on the NWS weather radar color remote displays. The comments by the ATC personnel involved were almost unanimously positive regarding this potential use of the NWS weather radar color display, even in the face of the problems of map correlation and weather intelligence updating which the FAA is seeking to resolve before the test program is begun.

The Safety Board is aware that the FAA's contemplated tests cannot begin until some remaining mapping graphics problems have been solved. However, we are concerned that the testing period may not be scheduled during the seasonal period when the most intensive evaluation of convective activity might be achieved. Moreover, the Safety Board is aware that, in the immediate future, the Cleveland ARTCC's Center Weather Service Unit (CWSU) is scheduled to acquire 25-inch NWS weather radar color remote displays which will enable the CWSU meteorologists to obtain real-time weather information directly from NWS weather radars. We believe that installation of these

1/Aircraft Accident Report: "Southern Airways Inc., DC-9-31, N1335U, New Hope, Georgia, April 4, 1977" (NTSB-AAR-78-3).

displays in all ARTCCs having CWSUs should be expedited to provide real-time depiction of the location and intensity of all convective meteorological phenomena affecting a center's airspace. Had such systems been in place before the accidents cited herein, the likelihood of their occurrence could have been greatly diminished.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Expedite the delivery of NWS weather radar color remote displays to all Air Route Traffic Control Centers' Center Weather Service Units (Class I, Urgent Action) (A-80-115)

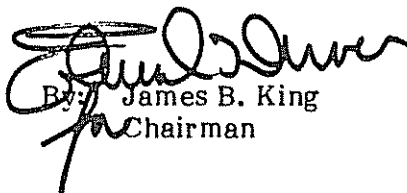
Schedule the planned testing of NWS weather radar color remote displays at the Cleveland Air Route Traffic Control Center to encompass the next season of frequent convective meteorological activity. (Class II, Priority Action) (A-80-116)

Expedite the development of appropriate graphic mapping techniques for correlation of the NWS weather radar color remote display and the air traffic controller's radar display presentation. (Class II, Priority Action) (A-80-117)

Expedite the development of an integrated weather radar/air traffic control radar single video display system capable of providing multiple weather echo intensity discrimination without derogation of air traffic control radar intelligence. (Class II, Priority Action) (A-80-118)

Require air route traffic control centers to make maximum use of the existing National Weather Service radar sites as inputs to the color remote displays at their facilities. (Class II, Priority Action) (A-80-119)

KING, Chairman, DRIVER, Vice Chairman, McADAMS, GOLDMAN and BURSLEY, Members, concurred in these recommendations.


By: James B. King
Chairman