STATEMENT OF NEAL A. BLAKE, DEPUTY ASSOCIATE ADMINISTRATOR FOR ENGINEERING, FEDERAL AVIATION ADMINISTRATION, BEFORE THE HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY, SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE, RESEARCH AND ENVIRONMENT, CONCERNING FAA AVIATION WEATHER REQUIREMENTS. MARCH 21, 1985.

Mr. Chairman and Members of the Subcommittee:

I am Neal Blake, FAA's Deputy Associate Administrator for Engineering. I am pleased to appear before you as part of a panel concerning the Next Generation Weather Radar (NEXRAD) program. Since the ability to provide timely and accurate weather information to pilots is critical to aviation safety, the FAA has a vital interest in the NEXRAD program.

The FAA currently obtains radar weather data from two sources: National Weather Service weather radars and FAA air traffic control radars. Data from these radars are provided to the meteorologists at our air traffic control centers and to our En Route Flight Advisory Service personnel through special digitizing equipment which is part of our air traffic control system. This data, while certainly useful, is limited. For example, only precipitation intensity is displayed by the radar. Some information on winds and turbulence is currently obtained from other sensors and reporting sources. Within a 10 to 15 miles radius around radar sites weather data on the radar display is generally obscured because of "ground clutter." Further, the flow of data from the radars must periodically be interrupted for up to 20 minutes to permit the local

National Weather Service meteorologists to obtain weather height information. During this time, no weather radar data is available to the FAA or other users.

Air traffic controllers can obtain some weather information from their air traffic radars, but this data is limited because these radars are optimized for aircraft detection rather than weather detection. While useful for determining areas of precipitation, these radars do not provide wind velocity or height information.

In order to improve hazardous weather detection, reduce flight delays, and improve flight planning, the FAA has participated with the National Weather Service and the U.S. Air Force Weather Service in the program to develop and deploy the NEXRAD system.

In general terms, FAA's NEXRAD requirements can be broken out into five areas: detection requirements; signal processing requirements; weather product generation requirements; display requirements; and reliability/maintainability requirements. The NEXRAD detection requirements are such that the system will have sufficient power to detect very weak signals without precipitation, such as gust fronts, and will be able to detect light to moderate precipitation out to about 200 miles range. In the signal processing area, the NEXRAD is required to eliminate any signals which can contaminate the measurement of weather phenomena, such as ground clutter or interference from other radars, aircraft, birds, and automobiles.

The weather product generation requirements for NEXRAD are directed towards converting the basic weather measurements made at a number of elevation angles into usable products concerning hail, turbulent areas, tornadoes, and gust fronts. Because we expect many improvements in this area in the future, the NEXRAD radar product generator will be a programmable computer with a large amount of expansion capability. The FAA central weather processor will collect data from many NEXRAD systems and mosaic these data into one composite picture for presentation to FAA users. The NEXRAD reliability/maintainability requirements assure the system will rarely fail and that, when it does, automatic diagnostics can be used to permit repair in a half-hour or less.

The FAA coverage requirement for NEXRAD is to provide hazardous and routine weather radar data for all altitudes above 6,000 feet throughout the continental United States, except for the mountainous areas in the western U.S. where coverage will be above 10,000 feet.

Aviation weather products to be provided by the NEXRAD system include information on winds, wind shear, turbulence, thunderstorms, storm movement predictions, precipitation, hail, frontal activity, icing conditions, mesocyclones/tornadoes, and hurricanes. Meteorological algorithms exist for many of these products, and we are devoting considerable research activity into the development of wind shear and icing algorithms.

In addition to the kinds of weather products which will be generated by NEXRAD, we are also vitally concerned with the way the information is provided to aviation system users. Air traffic controllers, flight service station specialists, and pilots are neither meteorologists nor do they typically have time to interpret weather data which is provided them. Therefore, processed weather radar products must be presented to these users in a concise, easily understandable format. Center weather service unit meteorologists also require fully automated weather radar products, particularly since they may be responsible for weather coverage in several states serviced by 25 or more weather radars. To accommodate this need for automated weather radar products, we are incorporating the capability to mosaic all weather radars within a center's coverage into one composite picture.

In order to generate fully automated products, however, the basic weather radar data must be free of the kinds of contamination I spoke about earlier. The NEXRAD system, through sophisticated signal processing, is designed to assure that "clean" data is fed to the weather product generator. This is a critical point, since it is this very capability of the NEXRAD system to provide uncontaminated Doppler data and to generate fully automated weather products which distinguishes it from research Doppler weather radars and from the existing commercial Doppler weather radars we have seen. We will, of course, continue to monitor the development of commercial systems and software to determine their application to aviation needs.

In short, the NEXRAD system has been carefully tailored to meet the stringent kinds of requirements we must have to meet our aviation safety responsibilities. As NOAA conducts its review of the NEXRAD program, we expect to closely monitor their efforts to assure that our aviation weather needs are fully met.

That completes my prepared statement, Mr. Chairman. I would be pleased to respond to any questions you might have at this time.