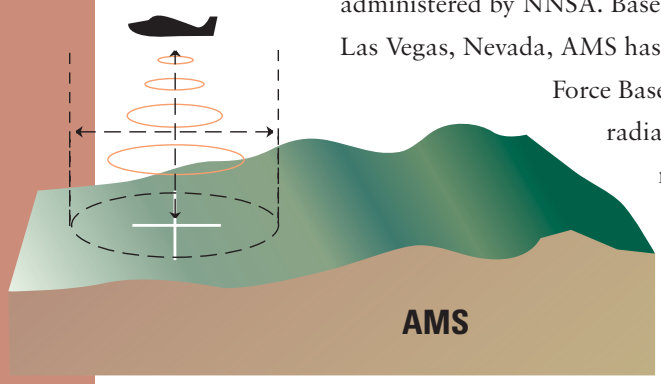
# AERIAL MEASURING SYSTEM (AMS)

The Department of Energy's (DOE) National Nuclear Security Administration (NNSA) has the world's leading scientists, engineers and technicians from over 50 years of managing the nation's nuclear weapons program. When the need arises, DOE is prepared to respond immediately to any type of radiological accident or incident anywhere in the world with the following seven radiological emergency response assets.

**AMS (Aerial Measuring System)** detects, measures and tracks radioactive material at an emergency to determine contamination levels. **ARAC** (Atmospheric Release Advisory Capability) develops predictive plots generated by sophisticated computer models. **ARG** (Accident Response Group) is deployed to manage or support the successful resolution of a U.S. nuclear weapons accident anywhere in the world. **FRMAC** (Federal Radiological Monitoring and Assessment Center) coordinates Federal radiological monitoring and assessment activities with those of state and local agencies. **NEST** (Nuclear Emergency Support Team) provides the nation's specialized technical expertise to the Federal response in resolving nuclear/radiological terrorist incidents. **RAP** (Radiological Assistance Program) is usually the first NNSA responder for assessing the emergency situation and deciding what further steps should be taken to minimize the hazards of a radiological emergency. **REAC/TS** (Radiation Emergency Assistance Center/Training Site) provides treatment and medical consultation for injuries resulting from radiation exposure and contamination, as well as serving as a training facility.

## INTRODUCTION

The Aerial Measuring System (AMS) is one of the emergency response resources, or assets, administered by NNSA. Based and operated out of Nellis Air Force Base in Las Vegas, Nevada, AMS has additional operational capability at Andrews Air Force Base near Washington, DC. The AMS aircraft carry radiation detection systems which provide real-time measurements of extremely low levels of ground and airborne contamination. AMS can also provide detailed aerial photographs and multi-spectral imagery and analysis of an accident site.




MEASURE DETECT TRACK

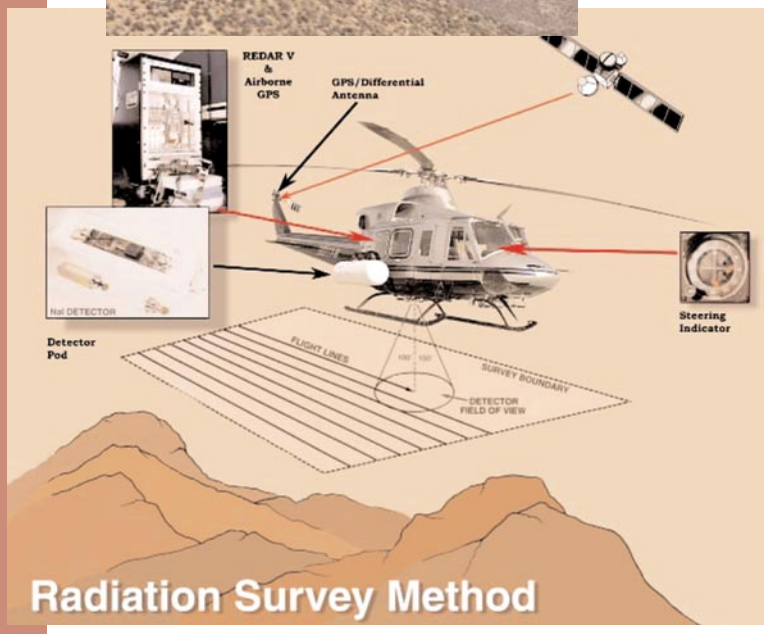
## MISSION

The AMS mission is to provide rapid response to radiological emergencies with helicopters and fixed-wing aircraft equipped to detect and measure radioactive material deposited on the ground. The AMS team of scientists, technicians, pilots, and ground support personnel combine their talents and expertise to keep AMS in a constant state of readiness to respond to a major radiological emergency.

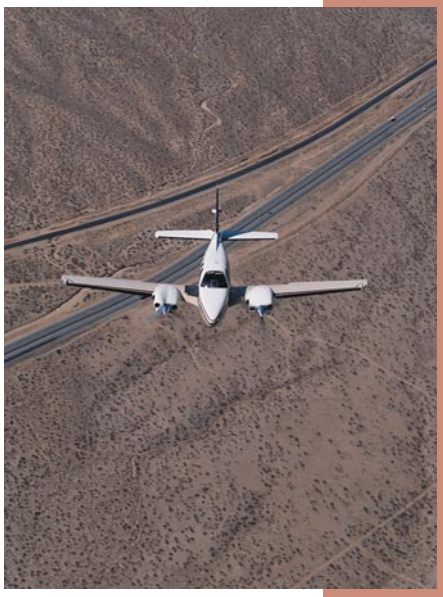
AMS uses a sophisticated radiation detection system to gather radiological information and store it on computers. These computers are used to produce maps of radiation exposure and concentrations. Detecting, tracking, and modeling of radiation is one of the first tools used to decide where to send state, NNSA, or other Federal agency ground monitoring teams.

## STEPS IN THE AMS EMERGENCY RESPONSE

In the event of an accident or incident involving radiological materials, NNSA in consultation with state and/or other Federal partners will deploy AMS immediately to the accident site. The fixed-wing aircraft will normally arrive first.




**Helicopters perform detailed surveys of ground contamination at low altitudes.**



The fixed-wing aircraft is used to determine the path of the radioactive plume and to determine the location of any ground contamination. The helicopters are used to perform detailed surveys of any ground contamination. A four-wheel drive vehicle-based radiation detection system, named KIWI, can be used to develop highly detailed maps of any ground contamination.

NNSA scientists are then able to rapidly develop maps of the airborne and ground hazards. This enables the scientists to determine ground deposition of radiological materials and to project the radiation dose to which people and the environment are exposed. This information gives officials the information they need to effectively respond to the emergency.

measure
detect
track

## ABOUT THE AIRCRAFT

Each type of aircraft has its own specialization. Fixed-wing (Beechcraft B-200 or Cessna Citation) aircraft are faster, so they can arrive at the emergency scene sooner. They provide rapid mapping of the extent and levels of contamination.

Bell 412 helicopters are slower and are able to travel at lower altitudes, typically 150 feet. This allows more detail to complete the picture than with fixed-wing aircraft. They provide detailed and highly sensitive quantitative ground data mapping of contamination. Helicopters may be brought in to the emergency scene after the fixed-wing aircraft have gathered the qualitative data to get a closer assessment.

**Fixed-wing aircraft provide ground surveys.**

## WHEN THE JOB IS DONE

After measurements of radioactive material depositions and plume tracking and sampling have been completed, the role of AMS in the emergency response is accomplished. At that time, the Manager of the DOE Nevada Operations Office, in charge of activating, deploying, and deactivating AMS elements, as directed by NNSA Headquarters, authorizes deactivation of AMS.

## OTHER AMS ACTIVITIES

In addition to responding to emergencies, AMS operates on a multi-year survey schedule developed by the DOE Nevada Operations Office. This schedule includes surveys of DOE sites, participation in interagency exercises, and work for other Federal agencies, such as baseline surveys for the Nuclear Regulatory Commission. These activities are coordinated through NNSA Headquarters.

**Specialized equipment detects and monitors radiation levels.**

AMS conducts regularly scheduled surveys to create a baseline of radiological, multi-spectral analysis, thermal imagery, and other remotely sensed data. AMS has performed baseline radiation surveys of most nuclear facilities in the country. In an emergency situation, this baseline information can be compared to current emergency data to help in assessing the amount of contamination. The AMS capability can also be used to locate lost or stolen radiological materials.

## FUTURE DIRECTION

The future for the AMS program is to move from man-intensive, specific air-frame dependent assets to remote-controlled, near real-time data production with low fixed-maintenance-cost equipment. Data and info acquired with the AMS will be transmitted and shared over intelligent data highways and networking systems. The results of these efforts will be improved scientific delivery capabilities with minimized operating costs.

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