

# NOAA BACKGROUNDER



## The Shrike Commander Rockwell Aero Commander AC-500S

### NOAA's Snow Survey Platform



#### A WORD ABOUT NOAA. . .

The National Oceanic and Atmospheric Administration (NOAA) conducts research and gathers data about the global oceans, atmosphere, space and sun, and applies this knowledge to science and service that touch the lives of all Americans.

NOAA warns of dangerous weather, charts our seas and skies, guides our use and protection of ocean and coastal resources, and conducts research to improve our understanding and stewardship of the environment which sustains us all.

A Commerce Department agency, NOAA provides these services through five major organizations: the National Weather Service, the National Ocean Service, the National Marine Fisheries Service, the National Environmental Satellite, Data and Information Service, and Office of Oceanic and Atmospheric Research; and numerous special program units. In addition, NOAA research and operational activities are supported by the Nation's seventh uniformed service, the NOAA Corps, a commissioned officer corps of men and women who operate NOAA ships and aircraft, and serve in scientific and administrative posts.

For further information: NOAA Office of Public Affairs, 14th Street and Constitution Avenue NW, Room 6013, Washington, D.C. 20230. Phone: (202) 482-6090

Each year, significant runoff from snow melt can cause flooding — sometimes severe — of streams and rivers. In recent history, snow melt caused two flooding events that produced significant damage and/or loss of life. Major flooding in Virginia, New York, Vermont and on the upper reaches of the Ohio River in January 1996 produced \$1.5 billion in damages and cost 33 people their lives. In April 1997, the Red River of the North flood produced \$4 billion in damages with no loss of life.

Without snow water equivalent measurements like those collected by NOAA's Shrike Commander aircraft for the National Weather Service, loss of life and damage estimates could have been much greater for these two events. Knowing snow water equivalents — or the water content of snowpack — in a given region is essential for timely, hydrologic forecasting.

#### Snowpack Data Collection Goes Airborne

The art of measuring the water content of snow has advanced significantly from the days when weather service employees simply used ruler to measure snow depth. Light, fluffy snow contains less water than wet, slushy snow. For this reason, the water content of snowpack rather than the snow depth is needed for hydrologic forecasting. Airborne measurements of snow water equivalent are precise and accurate.

Armed with a sophisticated gamma radiation spectrometer loaded in the aircraft, the Shrike is the world's finest airborne snow survey platform. The gamma radiation spectrometer, developed and custom built by NOAA scientists, is one of the most sensitive airborne gamma radiation detectors ever produced in the world. It enables the aircraft to measure the very low levels of natural occurring gamma radiation from trace elements of potassium, uranium and thorium radioisotopes in the upper 20 cm of soil. Water mass in the snow cover blocks the terrestrial radiation signal. The deeper the snow, the weaker the signal picked up by the sensors. Consequently, analysts can use the difference between airborne radiation measurements made over bare ground and snow-covered ground to calculate a mean areal snow water equivalent value with an error of less than one cm.

Water equivalent snow measurements are invaluable to the hydrologists of NOAA's National Weather Service, who use the airborne snow water equivalent data to estimate snow melt runoff and provide early warnings of potential flooding. Agencies within the U.S. state governments, the Environment Canada, and the U.S. Army Corps of Engineers also use the snow water equivalent data collected by the Shrike as a water resource management tool, estimating reservoir recharge and predicting river flow rates into various bodies of water like the Great Lakes.

## A Multi-Purpose Research Platform

The Shrike Commander is a light, twin engine aircraft powered by two, Lycoming 290 HP, air cooled, reciprocating engines. Over the years the Shrike Commander aircraft has developed a great reputation for its fine performance as a small cargo transport and personnel carrier in the commercial fleet. The relatively large payload capacity of this aircraft, along with fantastic performance at low altitudes and slow airspeeds, has also made the aircraft extremely valuable as a research and data collection platform for NOAA. Equipped with modern navigation equipment, high capacity electrical output capability and sensitive scientific equipment, the Shrike serves as a multi-role research and data collection platform for NOAA and other government agencies within the United States and Canada.

With a max cruise speed of nearly 200 mph and range near 800 miles, the Shrike is a superior platform for conducting not only snow surveys, but other types of aerial surveys. A custom mounted video camera in the aircraft's tail cone allows for down-looking video to be collected. From the cabin, large windows allow passengers or crew to take still photographs, shoot video using a hand held video camera, or make visual observations to assess flood damaged areas or to conduct marine mammal and sea turtle surveys. In rapid response mode, the aircraft can be dispatched to any area within the country and Canada in a matter of hours to assess environmental impact of natural disasters or other environmental tragedies like oil spills. On occasion, the aircraft is used to patrol the large expanses of National Marine Sanctuary waters, allowing sanctuary managers a snap shot view of the vessel traffic or marine life contained within the sanctuary limits.

The Shrike Commander's versatility and relatively low operating cost make it one of the most efficient platforms in NOAA's aircraft fleet.

Further information regarding the Snow Survey Program can be obtained by accessing the National Operational Hydrologic Remote Sensing Center web site at <http://www.nohrsc.nws.gov>.

## Aircraft Operations Center

The Shrike Commander is maintained and operated by NOAA's Aircraft Operations Center located at MacDill Air Force Base in Tampa, Fla. The AOC, part of the Office of Marine and Aviation Operations, is charged with the management of NOAA aircraft, personnel, budget and facilities in support of the assigned fixed-winged and rotor-winged aircraft. Commissioned officers from the NOAA Corps, the nation's smallest uniformed service, manage AOC and fly and navigate NOAA hurricane and research aircraft.



## AIRCRAFT SPECIFICATIONS

Type:	Shrike Commander AC-500S
Engines:	Lycoming IO-540 E1B5 (Piston)
Crew:	2 Pilots and up to 5 Scientists/Technicians
Ceiling:	18,000 feet with supplemental oxygen; 12,500 without
Operational Airspeeds:	90-160 Knots
Electrical:	Two 28-volt 100 amp Alternators:
Scientific Power:	115 VAC at 60 Hz, 28 VDC
Take-Off Weight:	6,750 lbs
Range:	720 nm
Duration:	4 hr 45 min at normal cruise, 6 hr 10 min at maximum endurance

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For further information, please contact Lori Bast, NOAA Aircraft Operations Center Public Affairs, at (813) 828-3310, ext. 3072, or visit our web site at [www.aoc.noaa.gov](http://www.aoc.noaa.gov).