

NOAA BACKGROUNDER

Turbo Commander AC-690A



The Gulfstream Turbo Commander (AC-690) is a stable high-winged, pressurized twin-engine turboprop aircraft that is suitable for a variety of missions. Standard configuration allows for the mission equipment, two pilots and one photographer. However, with all seats installed, four scientists and/or technicians can be accommodated in the cabin. NOAA's AC-690 Turbo Commander is utilized by the National Geodetic Survey (NGS) Remote Sensing Division and the National Weather Service (NWS) National Operational Hydrologic Remote Sensing Division. These programs facilitate coastal mapping, airport obstruction charting, photo bathymetry, photo geodesy, boundary determination, coastal wetlands mapping and snow water equivalent and soil moisture content measurements.



The aircraft seating arrangement can accommodate a maximum of five passengers in addition to the two crew members. Two single seats can be installed just behind the pilots' seats and a bench seat for three people can be placed in the aftmost portion of the cabin. Passengers have access to external viewing through any of four cabin windows, two on each side of the aircraft's fuselage at eye-level. East of the forward square-shaped cabin windows measures 16 inches wide by 16.375 inches high. The aft cabin windows, which are oblique quadrilateral in shape, measure 16.75 inches wide by 14.5 inches high at the center of the window. Partial viewing ahead can be accomplished through the cockpit window and brow windows located within the flight deck area.

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

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National Operational Hydrologic Remote Sensing Center – Snow Survey Platform

The AC-690 turbo commander aircraft is used by the National Operational Hydrologic Remote Sensing Center (NOHRSC) to conduct aerial snow survey operations in the snow-affected regions of the United States and Canada. During the snow season (January-April), snow water equivalent measurements are gathered over a number of the 2000+ pre-surveyed flight lines using a gamma radiation detection system mounted in the cabin of the aircraft. During survey flights, this system is flown at 500 feet above the ground at ground speeds ranging between 100 and 120 knots. Gamma radiation emitted from trace elements of potassium, uranium and thorium radioisotopes in the upper 20 cm of soil is attenuated by soil moisture and water mass in the snow cover. Through careful analysis, differences between airborne radiation measurements made over bare ground is compared to that of snow-covered ground. The radiation differences are corrected for air mass attenuation and extraneous gamma contamination from cosmic sources. Air mass correction is accomplished using output from careful analysis, differences between airborne radiation measurements made over bare ground is compared to that of snow-covered ground. The radiation differences are corrected for air mass attenuation and extraneous gamma contamination from cosmic sources. Air mass correction is accomplished using output from precision radar altimeter and pressure sensors mounted on and within the aircraft. Output from the snow survey system results in a mean a real snow water equivalent value within +/- one cm. Information collected during snow precision radar altimeter and pressure sensors mounted on and within the aircraft. Output from the snow survey system results in a mean a real snow water equivalent value within +/- one cm. Information collected during snow survey missions, along with other environmental data, is used by the National Weather Service (NWS) and other agencies to forecast river levels and potential flooding events due to snowmelt water runoff.

Further information regarding the snow survey program can be obtained by accessing the National Operational Hydrologic Remote Sensing Center, website at <http://www.nohrsc.nws.gov>.

NGS Remote Sensing Platform

The Gulfstream Turbo Commander is utilized by the NGS Remote Sensing Division to conduct aeronautical surveys requiring the collection of stereophotographic and remotely sensed data. These surveys facilitate coastal mapping, airport obstruction charting, photobathymetry, photogeodesy, boundary determination and coastal wetlands mapping. Depending on the scale of imagery required, the photogrammetry missions are flown at altitudes of 1,000 to 24,000 feet above ground level (AGL) using kinematic GPS survey techniques. Through post-processing techniques, such as photo-interpretation and photogrammetric measurement, NGS uses the data to develop NOAA charting products, as well as meeting a broad spectrum of user requirements.

The primary instrumentation for NGS Remote Sensing missions include:

- ✈ Wild RC-10 aerial camera
- ✈ Color weather radar
- ✈ Belly camera port with hydraulically actuated hatch
- ✈ UHF radio antenna for monitoring real-time tide gauge broadcasts for tide-coordinated photography
- ✈ Computer-controlled navigation system (CCNS-4) flight management system for precision guidance, positioning
- ✈ Daedalus multi-spectral scanner
- ✈ Scientific AC power inverter
- ✈ Trimble TNL1 3000 cockpit mounted GPS



AIRCRAFT SPECIFICATIONS

Type	Turbo Commander AC-690A		
Engines	Garrett TPE-331-5 (turboprop) 715.5 HP/each		
Crew	2 Pilots and 5 Scientists/Technicians		
Ceiling	31,000 feet (pressurized)		
Rate of Climb	2,700 feet/minute		
Operational Airspeeds	120-250 knots		
Electrical	Two 30 volt 300 ampere starter-generators	Two 24 volt lead acid batteries	
Scientific Power	115 VAC, 60 Hz		
Max. Gross Weight	10,300 lbs	Empty Weight	6,813 lbs
Useful Load	3,487 lbs (fuel, personnel, cargo)	Fuel Load	2,573 lbs
Type Fuel	Jet		
Standard Fuel Burn	Maximum Cruise Speed – 688 lbs/hr	Normal Cruise Speed – 500 lbs/hr	
	Fuel Burn for specific mission configuration will be calculated during mission planning and will vary with environmental conditions.		
Range (max. cruise) -	1468 nm	Range (normal cruise) -	1615 nm
Duration (max. cruise) -	5 hr 18 min	Duration (normal cruise) -	6 hr 28 min
Range (max. endurance) -	1698 nm	Duration (max. endurance) -	6 hr 48 min
Dimensions	Wing Span – 46 ft 7 in	Total Length – 44 ft 4.25 in	
(external)	Fuselage Height – 5 ft 7 in	Tail Height – 14 ft 11.5 in	Cabin Doors – 47 in x 26 in
	Baggage Doors – 31.25 in x 19.75 in	Cabin Height – 4 ft 5.7 in	
(internal)	Cabin Length – 14 ft 3 in	Cabin Height – 4 ft 5.7 in	Cabin Width – 4 ft .25 in
Useable Volumes	Cabin – 168 cu ft	Baggage compartment – 45 cu ft	
Additional Standard Equipment:			
Cockpit:	Hewlett Packard Precise Flight Navigation System, Color weather radar, Radar altimeter, GPS/Loran-C navigation system		
Cabin:	Camera ports w/removable flat glass (see scientific equipment for description), Wild RC-10 Camera -kinematic GPS capable, Separate survey GPS antenna; UHF capabilities		

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.

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