GRC Aircraft Operations Office

Glenn Research Center

Glenn Research Center

Aircraft Operations





Mission

- Provide safety, operational, and engineering oversight to all GRC research experiments involving flight, including non-NASA controlled aircraft/UAS.
- Manage, operate, and maintain GRC based research and research support aircraft/UAS.
- Manage the operation and maintenance of the GRC Hangar and associated systems and equipment.
- Provide support for transient aircraft/UAS, including NASA, military, civilian, and other Government agencies.

Flight Operations Staff



Staff Capability

- -Pilots
- -Engineering
 - Mechanical
 - Electrical
- -Maintenance
- -Fabrication
 - Electrical
 - Mechanical











NASA Glenn Aircraft Operations



Learjet 25



S-3B Viking



T-34C Turbo-Mentor





Learjet Model 25 Right Side







Inside Right Windows



Inside Right Window Close Up



www.nasa.gov



Learjet Model 25 Left Side Photos











Learjet Model 25 Viewports





Learjet Model 25 Right Side Fuselage Pod





Learjet 25 Great Lakes Environmental Mission





Learjet 25 CO2 Sounder



National Aeronautics and Space Administration

CO2 Sounder/ NASA Glenn Lear-25 ARM Site Field Deployment







Photos from DOE ARM Site deployment: Background - NASA Glenn Lear 25 takeoff from Ponca City Airport on 12/7/08 (Graham Allan photo) Left- Goddard field experiment team Right - DOE Cessna aircraft with in-situ CO2 sampling equipment





An initial Plot of the airborne flight patterns above the ARM site from airborne GPS data and Google Earth





Learjet 25 Solar Cell Calibration







National Aeronautics and Space Administration

Learjet 25 Microgravity







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APPTE

NASA Glenn Research Center S-3B Viking Aircraft

Glenn Research Center



The NASA S-3B Viking aircraft is a highly modified version of the Lockheed-Martin S-3B aircraft which flew operationally in the U.S. Navy for more than 30 years. Originally designed for the carrier-based anti-submarine warfare mission, the aircraft utilizes two fuel efficient General Electric TF34 turbofan engines enabling long range and mission endurance. The NASA S-3B is capable of carrying a wide variety of research sensors and equipment either internally or in a pod-mounted configuration on either of two wing pylons. The aircraft features a modern avionics suite and state-of-the-art research stations to accommodate two inflight researchers in addition to the two pilots. An installed Inmarsat BGAN (Broadband Global Area Network) system brings with it the capability to transmit voice and data in real time from the aircraft to ground stations providing seamless network coverage across most of the world's landmass.









S-3B FLIGHT ENVELOPE

- ALTITUDE:
- Surface to 40,000 ft msl
- AIRSPEED: 100 450 KIAS (0.79m limit)
- ENDURANCE: Up to 7 hours with external fuel tanks, 5 hours with internal fuel only
 - RANGE: Up to 2500 nm with external fuel tanks, 1800 miles with internal fuel only
 - G-LIMITS: + 3.5 to 1.0 g
- PAYLOAD: Up to 2500 lbs per wing pylon, Up to 4000 lbs in bomb bay
- GROSS WT: Max takeoff gross weight of 52500 lbs, empty weight approximately 27500 lbs
 - CREW: 2 pilots + 2 researchers
- COMM: VHF, UHF, SATCOM (INMARSAT BGAN Broadband Global Area Network)
- NAV: Military GPS/INS and Commercial GPS (WAAS)



Electrical Capacity	115 Volts AC 60 Hz: 14 KVA
	115 Volts AC 400 Hz: 200 amps
	28 Volts DC: 600 amps
External Capacity	2 Wing Mounts
	Two (2) External Sensor Pods
	Two (2) Heated Bomb Bays
	Approximately 28" width 90" length 25" high
	Approximatory 20 math, 00 longin, 20 mgh
	Art Sensor Area
Internal Capacity	Avionics Bay
	Approximately 75" width 90" length 36" high
	Approximately to wrath, so length, so high







115 Volts AC 60 Hz: 14 KVA
115 Volts AC 400 Hz: 200 amps
28 Volts DC: 600amps
2 Wing Mounts
Two (2) External Sensor Pods
Two (2) Heated Bomb Bays
Approximately 28" width, 90" length, 25" high
Aft Sensor Area
Avionics Bay Approximately 75" width, 90" length, 36" high







Standard Mount – Both wings



Electrical Capacity	115 Volts AC 60 Hz: 14 KVA
	115 Volts AC 400 Hz: 200 amps
	28 Volts DC: 600amps
External Capacity	2 Wing Mounts
	Two (2) External Sensor Pods
	Two (2) Heated Bomb Bays
	Approximately 28" width, 90" length, 25" high
	Aft Sensor Area
Internal Capacity	Avionics Bay
	Approximately 75" width, 90" length, 36" high









Cargo pod that has been previously modified for use by NRL/NOAA on P-3 aircraft





GRC has four cargo pods available for modification as desired to support future research requirements



Electrical Capacity	115 Volts AC 60 Hz: 14 KVA
	115 Volts AC 400 Hz: 200 amps
	28 Volts DC: 600amps
External Capacity	2 Wing Mounts
	Two (2) External Sensor Pods
	Two (2) Heated Bomb Bays
	Approximately 28" width, 90" length, 25" high
	Aft Sensor Area
Internal Capacity	Avionics Bay
	Approximately 75" width, 90" length, 36" high



Aft Sensor Area (Tubes depicted are removable)





Heated Bomb Bay



Electrical Capacity	115 Volts AC 60 Hz: 14 KVA
	115 Volts AC 400 Hz: 200 amps
	28 Volts DC: 600amps
External Capacity	2 Wing Mounts
	Two (2) External Sensor Pods
	Two (2) Heated Bomb Bays
	Approximately 28" width, 90" length, 25" high
	Aft Sensor Area
Internal Capacity	Avionics Bay
	Approximately 75" width, 90" length, 36" high



Small Instrument/Sensor Location



AERIAL REFUELING

PROBE

SEARCH RADAR ANTENNA

(EXTENDED)

LAUNCH

CREW ENTRANCE HATCH

(RIGHT SIDE)

BAR



S-3B Viking Research Capabilities

RACKS R&L

GENERAL PURPOSE

DIGITAL COMPUTER

 \mathbb{Q}

AFT PRESSURE SONOBUOY

CHUTES

BULKHEAD

A
ps
ds
5
, 25" high
-
, 36" high



MAST Pod Overview







- Length: 153.8"
- Width: 25.71"
- Weight: 517 lb. (including sensor payload)
- Aircraft Interface:
 - 14" or 30" MIL STD wing store suspension
 - MIL STD power, data, and video connections
- Core components:
 - Argon ST 14" Aeroscout gimbal with VNIR hyper spectral imaging system
 - Argon ST Common Data Acquisition System (CDAS)
 - C-MIGITS GPS/INS navigation suite (sub-meter accuracy)
 - Gigabit ethernet switched network
 - 28VDC filtered power supply
 - L band video transmitter (ROVER compatible)
 - 19" vibration isolated racks (forward and aft)
 - Center nadir imaging bay

Optional components:

- Argon ST Daedelus Airborne Multispectral Scanner (AMS) – installed in nadir bay
- Extensibility/Modularity:
 - Gigabit ethernet and CDAS provide a backbone command/control and data collection system for installed payloads
 - Mission-tailored, gimbal-installed hyper spectral cameras
 - Adaptable nose and tail bays support a wide array of imaging, radar, or antenna payloads
 - Center nadir bay
 - Significant size, weight, and power (SWAP) margins for additional research system installation

National Aeronautics and Space Administration

S-3B Multi-Mission Advanced Sensor Testbed (MAST)













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Twin Otter DHC-6 Research Capabilities

Electrical Capacity	115 Volts AC 60 Hz: 16 amps
	115 Volts AC 400 Hz: 35 amps
	28 Volts DC: 80 amps
External Capacity	Five (5) External Hard Wing Mounts + Various Small Instrument Mounts
Internal Capacity	Three (3) Internal Research Hardware Locations
	Front Section, Main Fuselage, Rear Fuselage
	Overhead Hatch
	Picture Window







Inside View of Overhead Hatch



Twin Otter DHC-6 Research Capabilities

Electrical Capacity	115 Volts AC 60 Hz: 16 amps
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	Front Section, Main Fuselage, Rear Fuselage
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	Picture Window







Twin Otter DHC-6 Research Capabilities

Current Installation – Looking Forward



Rack #1 Video Suite



Rack #2 Data Acquisition



Standard Racks Reconfigured to Meet Customer Needs



T-34C Mentor Research Capabilities







T-34C Mentor Research Capabilities







NASA Glenn Research Center Aircraft Operations

Points of Contact

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