Aircraft Operations Division (AOD) is a part of the Flight Operations Directorate (FOD) at Johnson Space Center.

The FOD values require our team members to always be aware that, suddenly and unexpectedly, we may find ourselves in a role where our performance has ultimate consequences.

AOD manages 26 total aircraft of 5 different types in support of numerous missions to include Space Flight Readiness Training (SFRT). AOD also operates a small number of small Unmanned Aerial Systems (UAS).

AOD has a contractor and civil service workforce of maintenance, quality, engineering, safety and operations professionals to fly, modify and maintain aircraft in support of these various missions.
JSC AOD Aircraft

• Current AOD Aircraft

  – T-38N – 18 operational, 2 in storage
  – WB-57 High Altitude Research Aircraft – 3
  – Gulfstream V – 1 (Direct Return (DR), Airborne Science Mission support)
  – Gulfstream III – 1 (Airborne Science Mission support, DR backup)
  – B377 Super Guppy Large Cargo Transport (SGT) – 1
  – UAS – 10 (varies according to missions)
T-38N Supersonic Trainer (18)

• **Primary Mission: Space Flight Readiness Training**
  - Crew members learn to operate as a team member in a highly dynamic, unpredictable environment, with real-world, life-dependent consequences

• **Skills Developed:**
  - Aerobatics, Instrument, Formation, Night Operations, Cross Country

• **Safety and Performance Improvements**
  - Redesigned Inlet
  - Redesigned Ejector
  - State-of-the-Art Ejection Seat
  - Electronic Flight Information System
  - TCAS and TAWS
  - Weather Radar
  - Flight Management System
  - Flight Director

*Flight Operations Directorate*
*NASA Johnson Space Center*
Flight Operations Directorate
NASA Johnson Space Center

- **Primary Mission:** SMD support - AirMOSS pod to study North American root-zone soil moisture – **300 flight hours/year**

- **Secondary Mission:** Backup for return astronauts from Kazakhstan to EFD after ISS missions – **up to 120 flight hours/year**

- **Recent Improvements:** ADS-B, Stage III Noise Reduction

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<thead>
<tr>
<th>Flight Hours and Dates</th>
<th>Potential Payloads in Discussion</th>
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<tbody>
<tr>
<td>140 flt hrs/year in 2016-2020</td>
<td>Oceans Melting Greenland (OMG)</td>
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<tr>
<td>35 flt hours in 2016</td>
<td>Hawaii Volcano Study</td>
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<tr>
<td>20 flt hours in 2015</td>
<td>Alpine Glacier Study, Western US</td>
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Flight Operations Directorate
NASA Johnson Space Center
**Gulfstream G-V (1)**

- **Range:** 6,500 nm (13+ hours)
- **Maximum Speed:** 0.88 Mach
- **Maximum Altitude:** 51,000 feet

- **Primary Mission:** Return astronauts from Kazakhstan to EFD after ISS missions – up to 120 flight hours/year

- **Secondary Mission:** SMD support – developing capabilities to support NASA Airborne Science missions – 300 flight hours/year

- **Recent Improvements:** 1st round of science support modifications for power, antennas, and data distribution

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<tr>
<td>300 flt hrs/year in 2019-2024</td>
<td>Operation Ice Bridge</td>
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</table>
• **Primary Mission**: High-altitude research
  • Maximum operating altitude over 60,000’
  • Pilot and Sensor Equipment Operator
  • 2,500 nautical miles, 6+hours
• High Definition Sounding System, Volcano-plumb Investigation, 2017 Solar Eclipse
• Over 100 flight hours in 2017
Super Guppy Transport

- The Super Guppy has been an invaluable asset for NASA programs, allowing for safe and timely transportation of critical space hardware
  - Recently completed airlifts of Orion and SLS flight components and test articles around the country
  - On-going support of assembly and test activities including EM-1 CSM testing at Plum Brook
• The need for large-cargo airlift capability within NASA has persisted through different Programs and missions, and will continue
  – Critical for safe, secure and timely transportation of space hardware
  – Allows programs control of transportation schedule
  – Allows programs flexibility in selecting contractors across the country
• NASA 941 Timeline:
  – 1983 Aircraft Assembly Complete
  – 1983 – 1997 Operated by Airbus
  – 1997 Acquired by NASA
  – 2008 Programmed Depot Maintenance (PDM), Tinker AFB
  – 2014 Avionics Upgrade, El Paso FOL

A total of 131 NASA airlifts
Notable Super Guppy Missions

- SOFIA 747 Fuselage
- ISS Elements
- Double T-38s
- SLS MPCV Stage Adapter
- Orion Heatshield
- Orion STA Crew Module

Flight Operations Directorate
NASA Johnson Space Center
Super Guppy Team

• Aerospace Cargo Transport Program
  – Program Manager
  – Flight Crew:
    • Pilots (4)
    • Flight Engineers (3-4)
    • Loadmasters (2)
  – Maintenance:
    • Maintenance Manager
    • Dedicated Maintenance Crew (4 people)
    • Other maintenance/quality support from Division as required
  – Engineering:
    • One dedicated Project Engineer
    • Other engineering support from Division as required
  – Other support functions from the Division
Super Guppy Mission Map
In Summary…

- AOD has been supporting NASA’s Astronaut Training Program and other aviation needs since 1962
- Over the decades, AOD has proven to be a lean and agile organization, adaptive to change as NASA missions and programs change
- Every day AOD safely flies airplanes (~10 flights a day)
Questions?