



NASA Johnson Space Center Aircraft Operations Division

- 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





Gulfstream G-III (1)

- **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



Flight Hours and Dates	Potential Payloads in Discussion
140 flt hrs/year in 2016-2020	Oceans Melting Greenland (OMG)
35 flt hours in 2016	Hawaii Volcano Study
20 flt hours in 2015	Alpine Glacier Study, Western US



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



Flight Hours and Dates

300 flt hrs/year in 2019-2024

Potential Payloads in Discussion

Operation Ice Bridge



WB-57 (3)

- **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



N940
1966-1989



N941
1997-Present



- 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

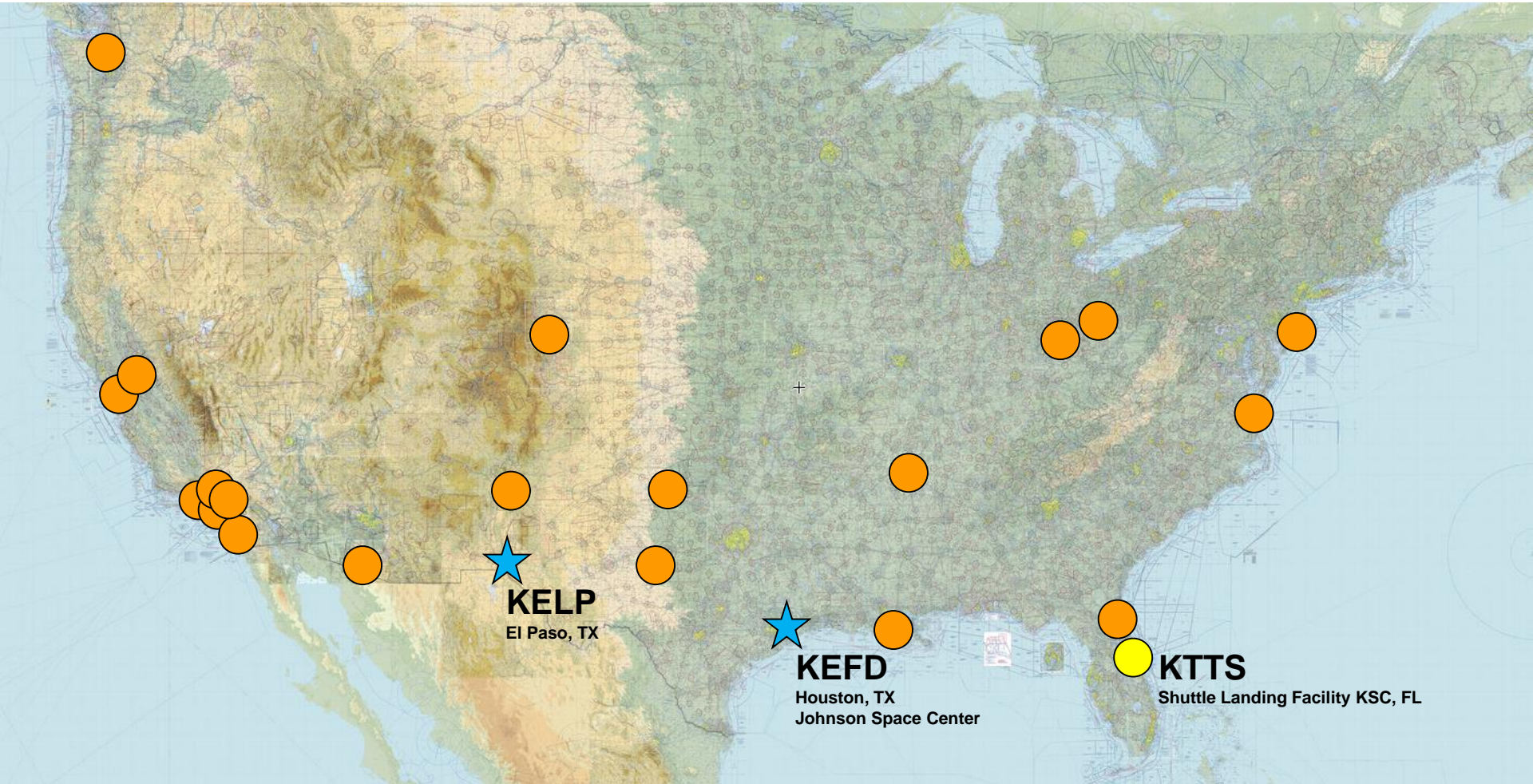


Super Guppy Team

- 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?

