N992NA Payload Interface
Aircraft Summary

• General
  ⇨ Gulfstream III, N992NA
  ⇨ Operated out of Ellington Field by NASA/JSC Aircraft Operations Division (AOD)
  ⇨ Modifications were completed in 2012 to integrate an external radar payload and the supporting instrumentation
  ⇨ Modifications were completed in 2016 to add sonobuoy launch tube in aft end of aircraft
  ⇨ Cabin is configurable between science missions
  ⇨ This document contains the approved payload operating envelope and the available aircraft systems for payload interface
    – Expansion of operating envelope and systems possible through coordination with AOD engineering
Aircraft Operations Division
Johnson Space Center

N992NA Payload Interface

Aircraft Summary (cont.)

- Payload capabilities
  - External pod via belly mounted MAU-12C/A interface
  - Cabin equipment racks mounted to seat track for payload interface and operation
  - Dry-air supply to the external pod from pressurized cylinders in the cabin
  - Pressure bulkhead feed through from the cabin to payload for power, data, and signals

- Aircraft systems
  - AC/DC power
    - Both to the pod and inside the cabin
  - Flight Management System (FMS) / GPS, IRS, air data
  - Platform precision autopilot
  - Wireless intercom system between cabin experimenters and flight deck
  - Satellite phone
  - Spare GPS antennas
  - Iridium antennas
External Pod

- MAU-12C/A interface, manually operated locks, 30” hook spacing, figure 1
- Weight and center of gravity
  ⇒ 1200 lb maximum
  ⇒ Center of gravity limits, figure 2
External Pod (cont.)

- **Shape**
  - Aerodynamically shaped cylinder up to 30” in diameter and 130” long

- **Structural Integrity**
  - Must be compliant with requirements given in FAR part 25 and AOD document #8594002
    - If requirements conflict between documents, the more conservative requirement shall be applied
  - Compliance with “crash loads” given in part 25.561 is not required

- **Maximum airspeed and altitude**
  - 337 KCAS, M0.82, 45,000 ft MSL

- Disconnect panel installed in forward portion of pylon to provide electrical connection between pod and payload, figure 3
Cabin and Cockpit Equipment

- Available cabin area, figure 4

⇒ Installation of instrumentation must allow path for emergency egress
Cabin and Cockpit Equipment (cont.)

- Existing equipment racks
  - Accommodates standard 19” rack equipment, figures 5 to 6
  - 22” x 25” x 50”
  - Maximum 3450 lb or 6225 in-lb overturning moment
Cabin and Cockpit Equipment (cont.)

- Other custom equipment racks
  - Must be adapted with Gulfstream seat track and fittings
    - Seat track fitting utilizes 3/8”-24 threaded post for mounting, figure 7
      - Forward/aft spacing of fittings is 3/4” increments, figure 8
    - 2 seat tracks per side in the cabin, left and right with center aisle
      - Lateral spacing of seat tracks is 12” on center, figure 8

Figure 7

Figure 8
Cabin and Cockpit Equipment (cont.)

- Available seating
  - Aft couches, 8 people
  - Standard Gulfstream chairs, 1 person per chair
  - Two seats with locking, inertial reel harnesses to allow sensor operator to operate and monitor equipment racks during taxi, takeoff, and landing, figures 9 and 10

Figure 9

Figure 10
Cabin and Cockpit Equipment (cont.)

- Dry-air supply to pod
  - Two 1300 in³, 1950 psi cylinders installed in cabin below aft couches
  - Pressure bulkhead feed through provides routing to pod
  - Pressure delivered to the pod is adjustable between +0 to +5.5 psig (relative to cabin)
- Wireless intercom system to connect cabin experimenters with flight deck through push-to-talk button
- Yoke mounted tablets with Ethernet/GPS/Power interface
Electrical Power

- AC, 115V / 60Hz
  - Power cord (figure 12) installation on both sides of cabin provides normal household, 15 A outlets to cabin equipment racks
  - Maximum 60 A

- DC, 28V
  - Power cord installation (figure 12) on both sides of cabin provides 15 A outlets to cabin equipment racks
  - Maximum 100 A

Figure 12
Aircraft Systems

- Arinc 429
  - Air Data
    - Dual, independent sources
  - IRS
  - FMS/GPS
    - Capacity to load user defined flight plans via external thumb drive
- Discrete outputs indicating weight-on-wheels and landing gear down
- Aircell Axxess II Iridium satellite phone
- Platform precision autopilot for flying a given course at precise altitudes, +/- 5 m
Aircraft Systems (cont.)

- Installed experimenter antennas, figure 13
  - 2, GPS antennas
    - Aeroantenna Technology P/N AT2775-81W-TNCF-000-RG-39-NM
  - 3, Iridium antennas
    - Antcom Corporation P/N S5GIR1616RR-PP-XTT-1

Figure 13
Figure 14

Figure 15

Sonobuoy Tube

Aircraft Systems (cont.)