Un-tethered Test Capability: Improving Airborne Test Efficiency

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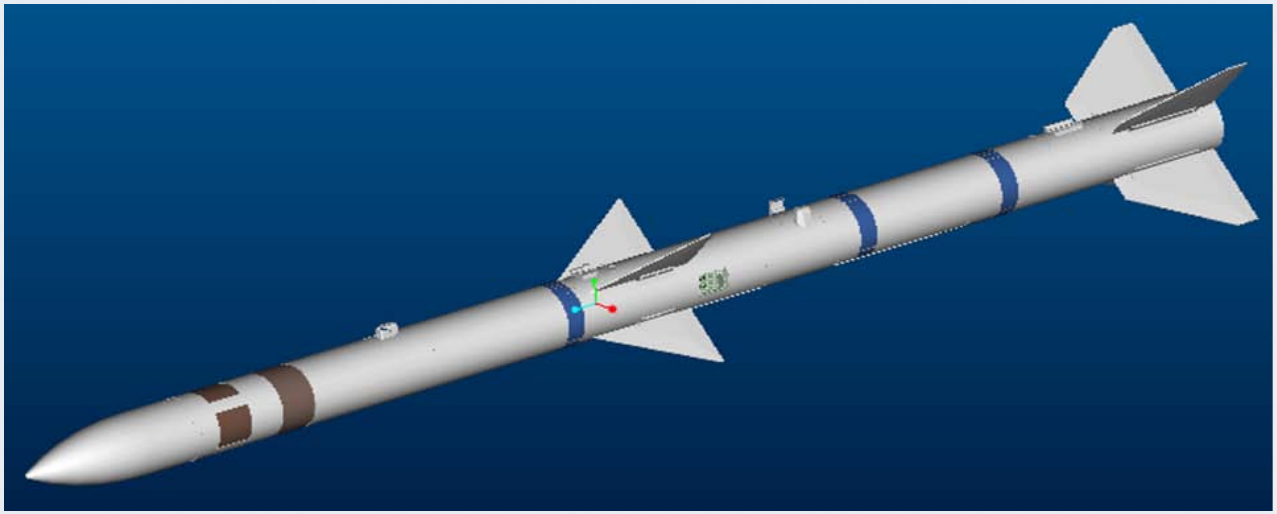
Joint Range Instrumentation Pod (JRIP)

- Background
  - Designed, Developed, Fabricated by 846th Test Support Squadron, Eglin AFB, FL
- Purpose
  - Receive and Record Weapon Telemetry
  - Collect and Record TSPI Data
- Unique Features
  - Un-tethered Test
  - Non-intrusive and Compatible

Non-intrusive, Compatible Instrumentation

- Same shape, weight, balance as AIM-120A/B



Non-intrusive, Compatible Instrumentation

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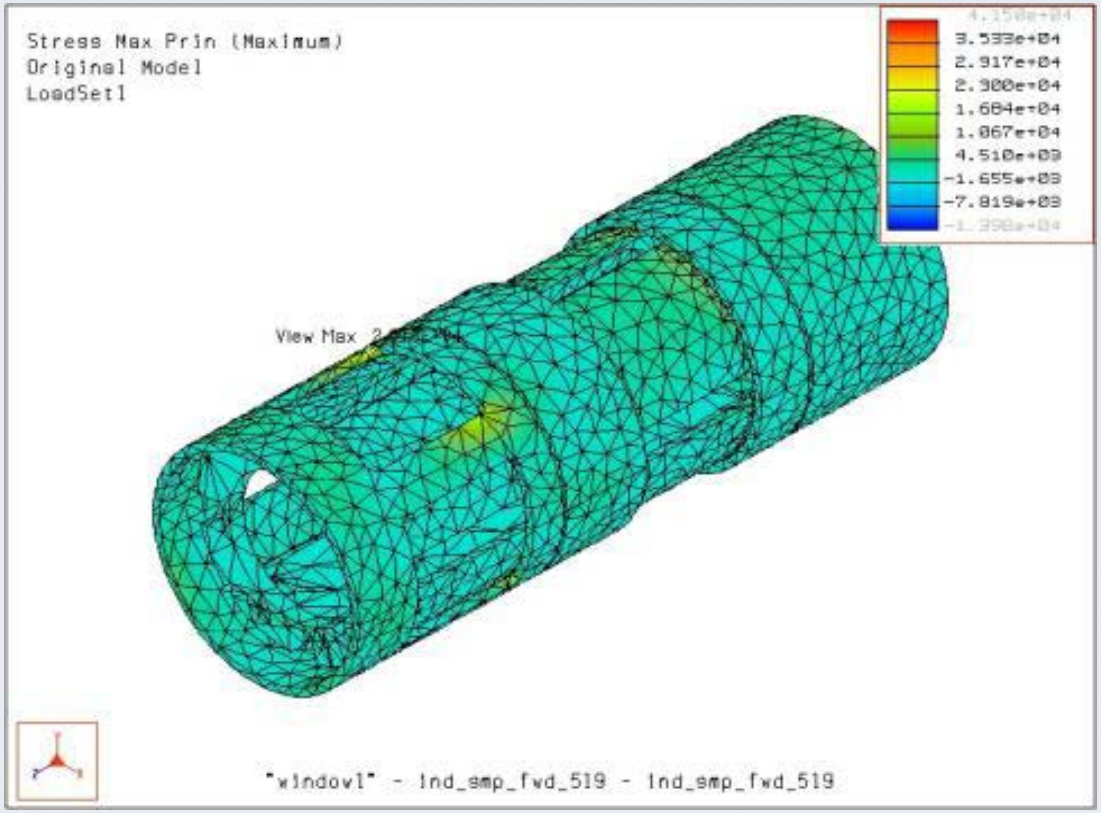
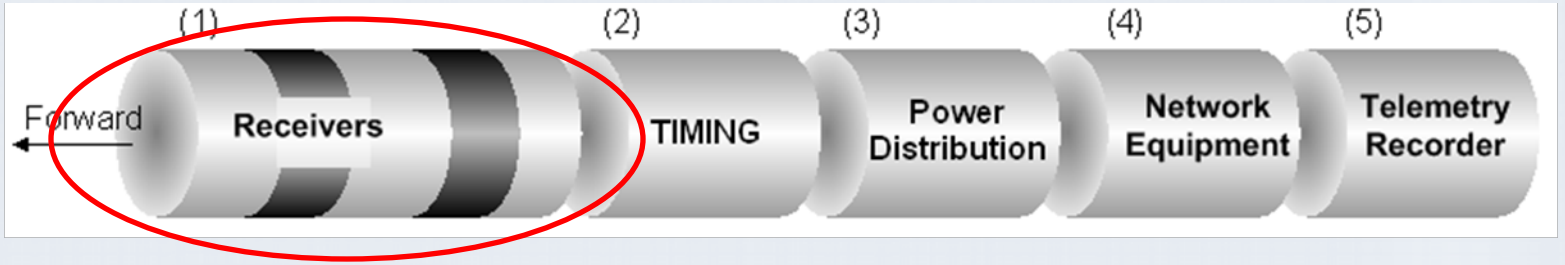


Non-intrusive, Compatible Instrumentation

- Same shape, weight, balance as AIM-120A/B
- Self-contained pod
  - Power via 1776 or AIM-9X connections

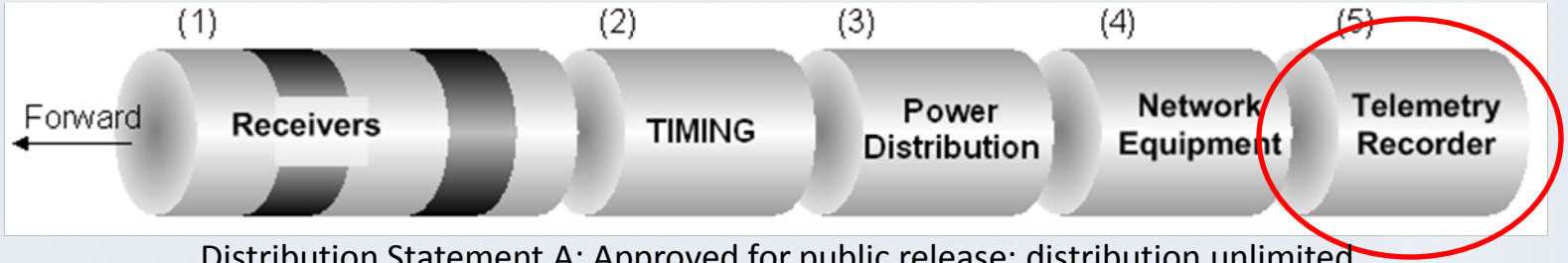
Un-tethered Test

- Tray 1: **Receivers**
  - Modulations: **PCM/FM and SOQPSK**
  - Max Data Rate: **20 Mbps**
  - Operating Frequencies: **Lower L, Upper L, S Bands**



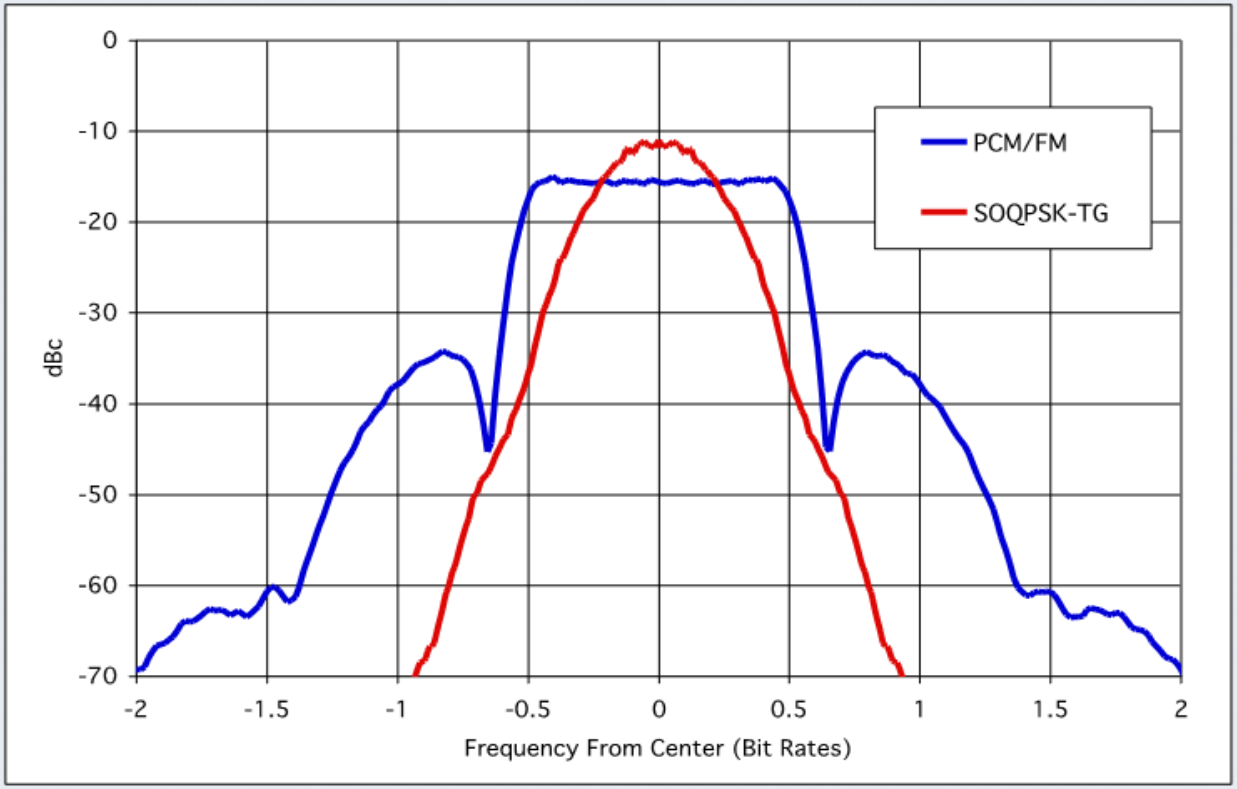
Un-tethered Test

- Tray 5: **Recorder**
  - Total Memory: **32 GB**
  - Media: **Compact Flash Cards (2)**
  - Max Record Time @ Max Data Rate: **~1.7 hrs**
  - Format: **IRIG-106 Ch. 10**



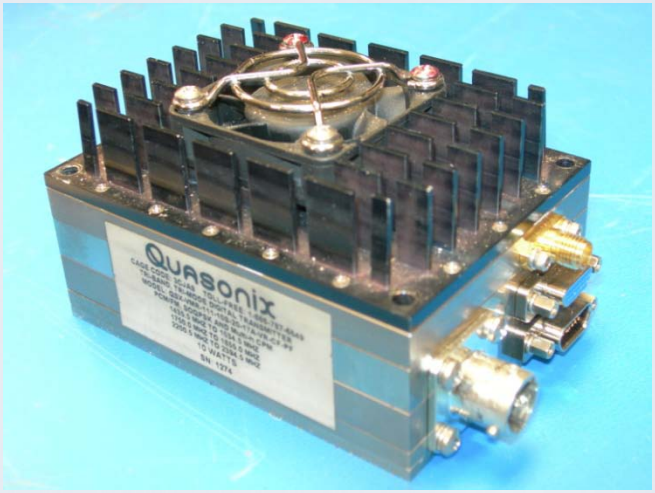
PCM/FM vs. SOQPSK

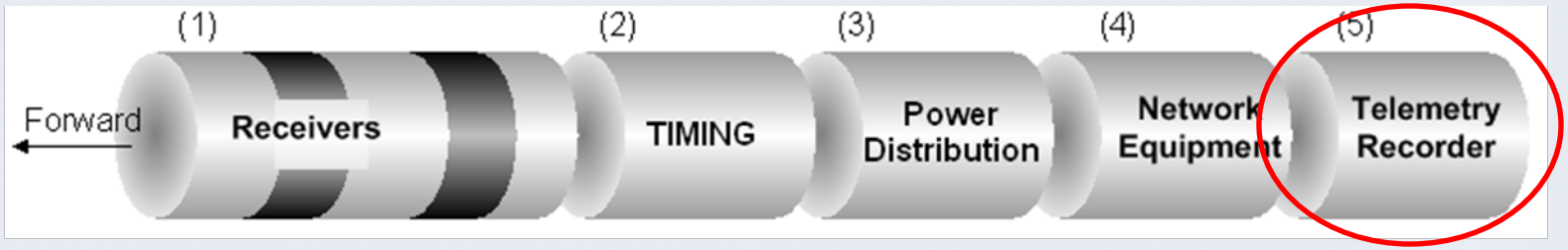
- Flight test losing parts of frequency spectrum
- Need to fit more data into less space



Supplementing Ground Range

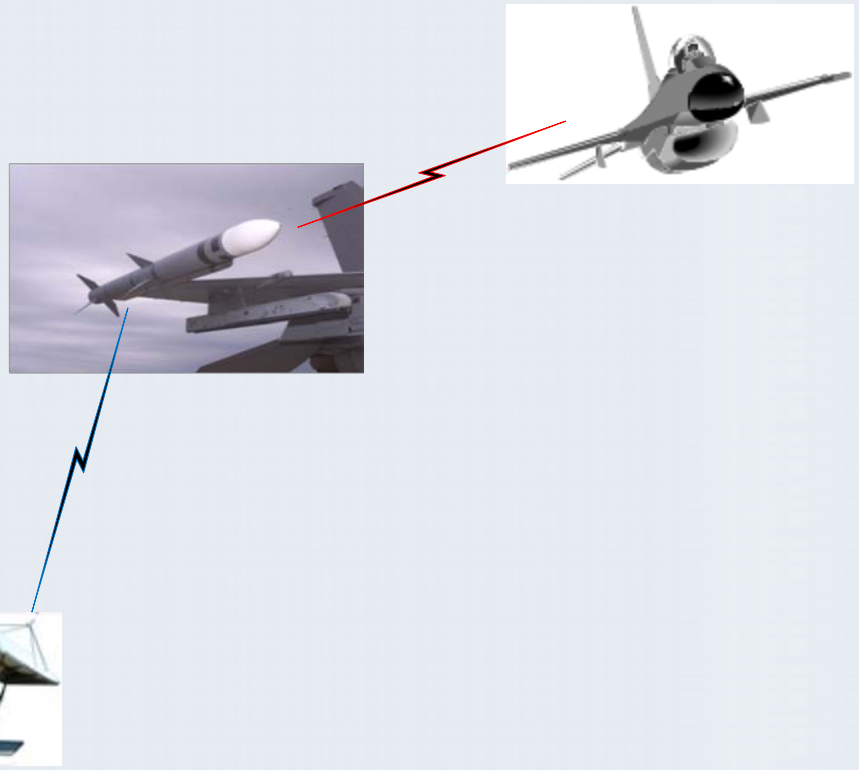
- Tray 5: **Transmitter**
  - Modulations: **PCM/FM and SOQPSK**
  - Max Data Rate: **20 Mbps**
  - Operating Frequencies: **Lower L, Upper L, S Bands**

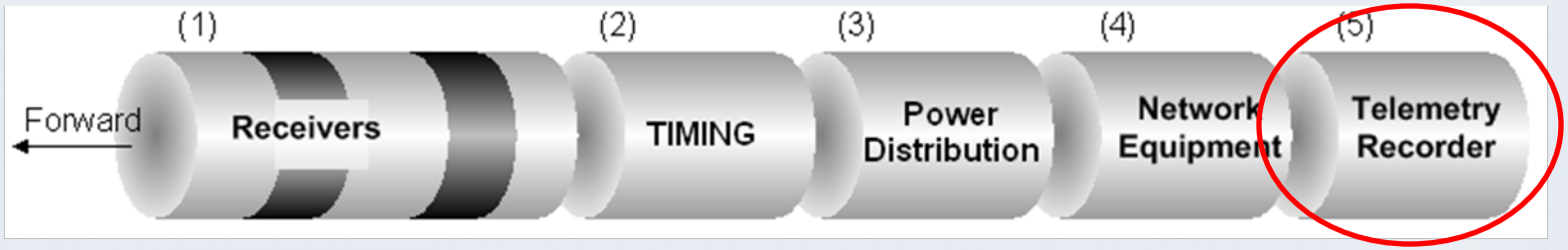




Supplementing Ground Range

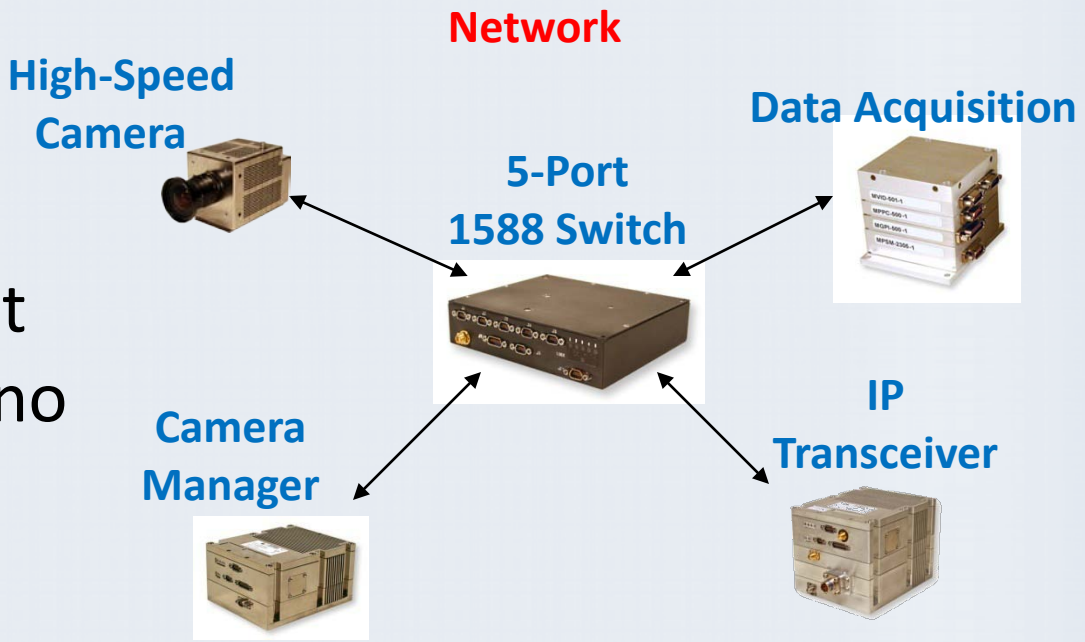
- Test Item to JRIP: **SOQPSK**
- JRIP to Ground Receiver: **PCM/FM**

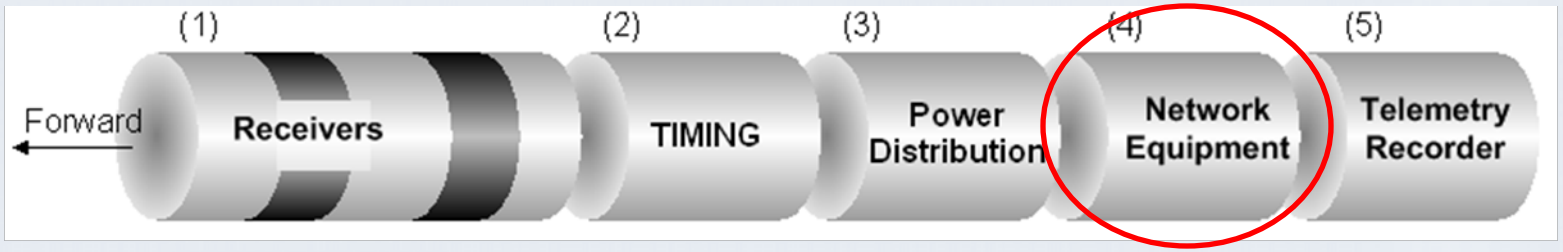




Unique User Equipment

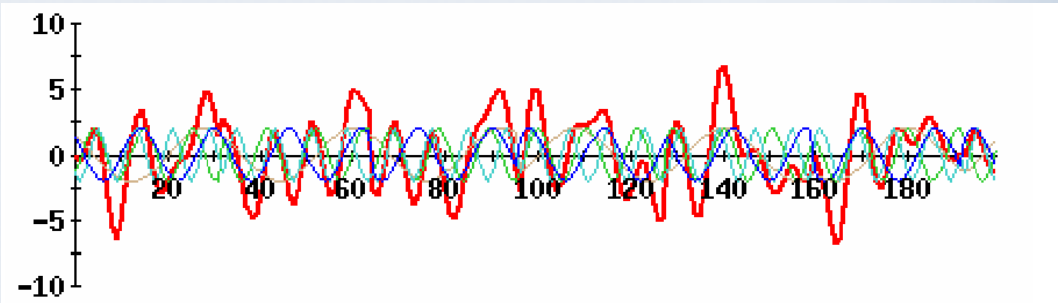
- Tray 4: **User Equipment**
  - Allows user to install unique test equipment with no aircraft modification

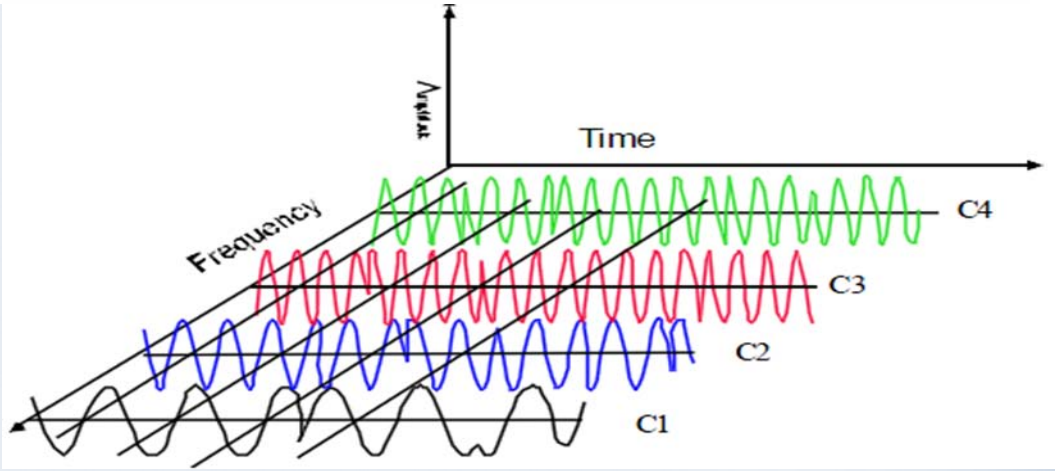


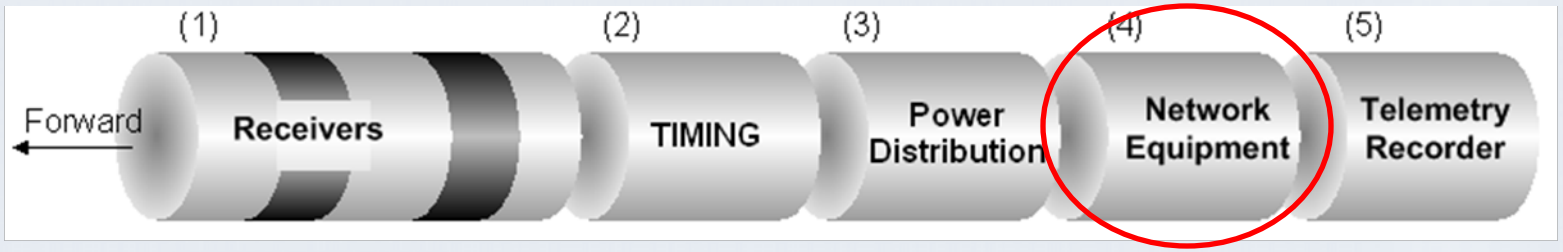


User Tray

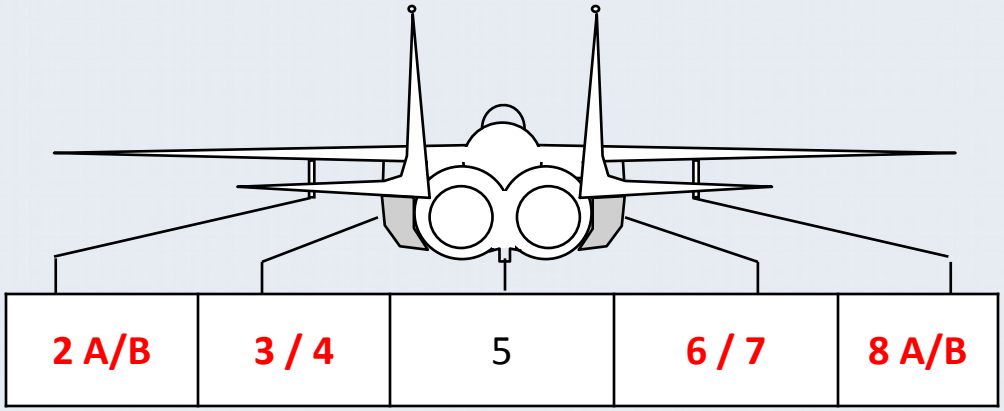
- Orthogonal Frequency Division Multiplexing (OFDM)
  - Allows multiple data streams on one frequency
  - Network-based instrumentation







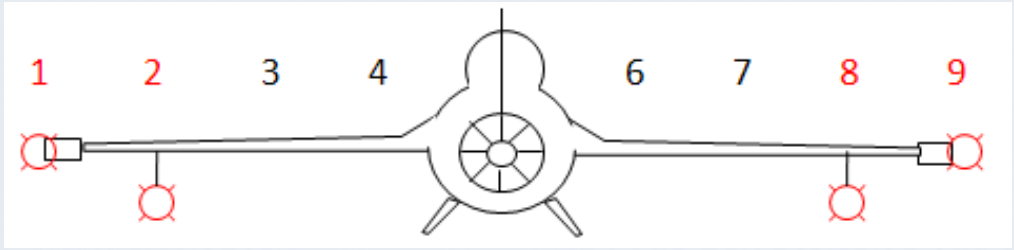
Operation



F-15 C-E Stations

2A/B, 3*, 4*, 6*, 7*, 8A/B

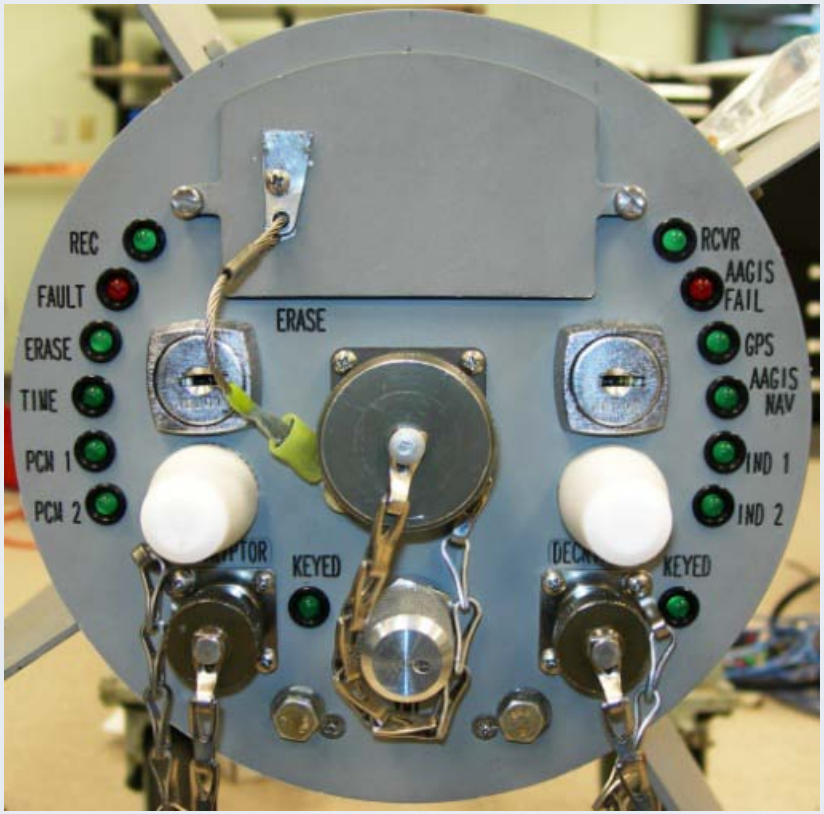
*MIL-STD-1776 Connection only

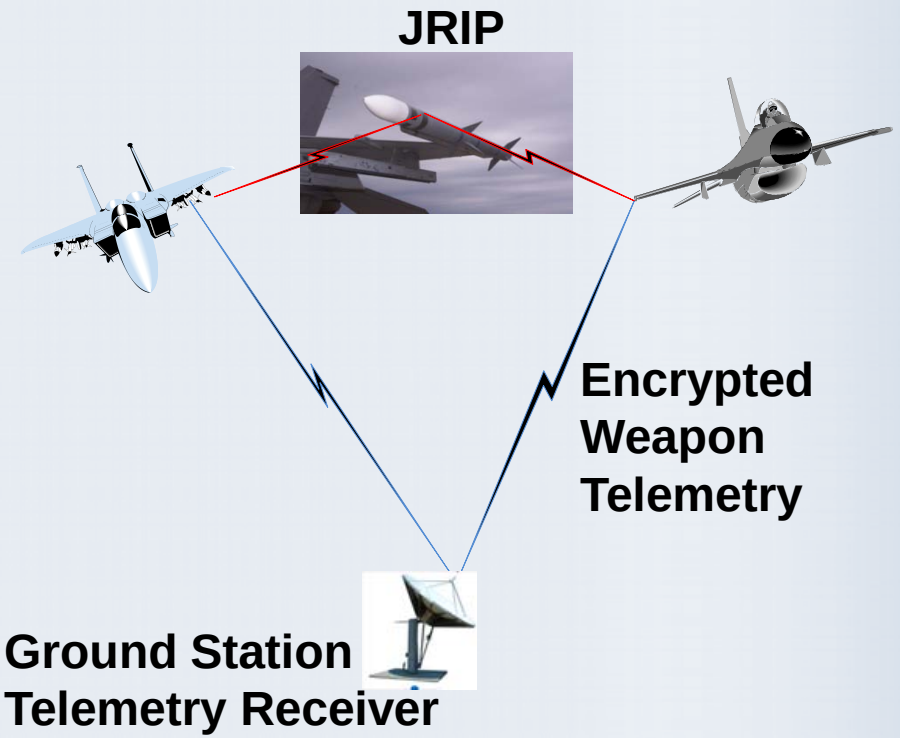


F-16 Stations

1, 2, 8, 9

Operation





- **JRIP programmed and set to record before taxi**
- **Receives, records and re-transmits data during mission**

Summary

- Receives and records weapon telemetry, TSPI data, aircraft performance data and targeting parameters
- Can re-transmit data to the ground
- Dedicated space for user equipment

Un-tethered, Non-intrusive, Compatible Instrumentation Pod

Questions

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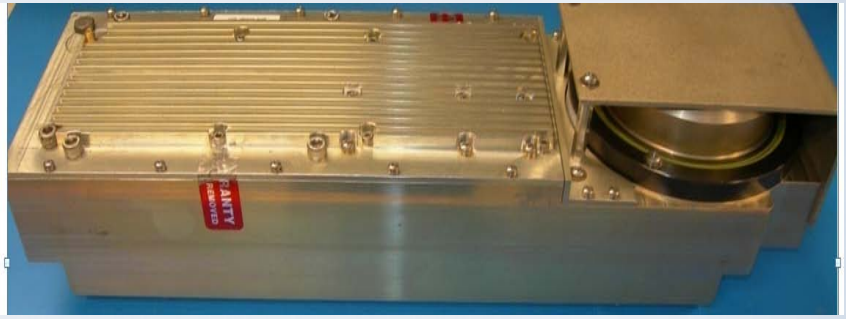
AAGIS



The ASEI Advanced GPS / Inertial System (AAGIS) is the navigation subsystem in the JRIP Pod that provides real-time and post-mission TSPI data.

The major components that make up the AAGIS subsystem are as follows:

- Honeywell HG-1700 Inertial Measurement Unit (IMU)
- Novatel OEM4 G2L Dual-Frequency WAAS Enabled GPS Receiver
- Navigation and INS/GPS Integration Filter software developed by ASEI Inc.

AAGIS utilizes a Dual Frequency (L1/L2) Wide Area Augmentation System (WAAS) capable receiver from Novatel with the following performance specifications:

Position:	**Horizontal:**	**1.0 m CEP (with SBAS corrections to the GPS receiver)**		
Vertical:		**3.0 m CEP (with SBAS corrections to the GPS receiver)**		
Velocity:		**0.1 m/s RMS (with GPS)**	**Max Altitude:**	**18288 m**
Max Velocity:		**514 m/sec**	**G's:**	**4g sustained track**
Attitude:	**Pitch/Roll:**	**0.1 deg RMS**	**Heading:**	**0.2 deg RMS**

Measurements from the GPS receiver are used to correct an inertial navigation solution at a 1 Hz rate utilizing a 15-state Kalman Filter