

Systems Development Super-sonic Airborne Tri-gimbal InfraRed System (SATIRS)

Features

- Three Axis, High Torque, Inertially Stabilized Gimbal
- Short, Mid, and Long wave IR Cameras
- IR Spectrometer
- Visible Light CCD Camera
- Real-Time Data Display System
- Distributed Digital Data Acquisition and Recording System
- Fiberoptic Data Transmission

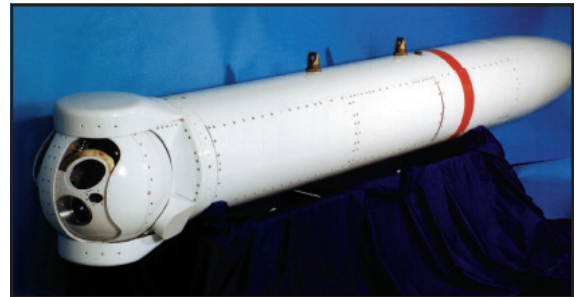
Description and Operation

The SATIRS pod is the Systems Development Department's second generation airborne instrumentation pod. The SATIRS derives many proven attributes from its predecessor, the BASES pod. The SATIRS is a highly flexible airborne test platform that is packaged in an aerodynamically shaped 22 inch diameter pod. The SATIRS may be carried on the left, right, or centerline station of an F-15 or other aircraft having 30 inch stores mounting lug spacing. Designed for tests involving high performance fighter aircraft, the SATIRS has been proven at airspeeds of MACH 1.2 at an altitude of 35,000 ft. In addition the pod has been flown on a UH-1 helicopter for missions involving low altitude or ground-based targets.

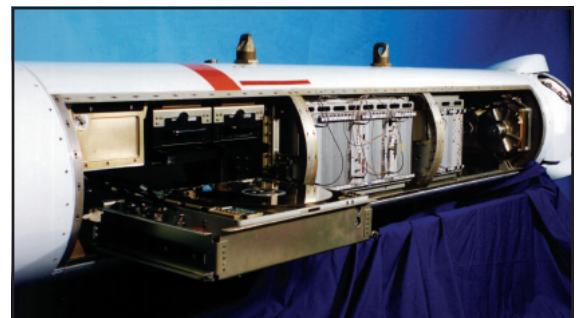
The SATIRS pod consists of a three-axis stabilized gimbal system containing four payload bays, a high pressure gas coolant system, a digital data acquisition and recording system, an optional video tracking system, and a real-time data display system.

Payloads can be pointed in almost any direction with the gimbal's roll, azimuth, and elevation axes. The high torque design permits stabilized control of payloads protruding into the airstream even at supersonic speeds. The gimbal can be pointed manually through the cockpit joystick control, slaved to an external control source (i.e. missile guidance control unit configured as a payload), or slaved to a video tracking system. The gimbal can be caged in several user-definable positions through use of the cockpit hand controller.

On-board high pressure nitrogen (800 in³ at 3500psig) is available for cooling infrared sensors. One common configuration includes longwave and shortwave IR cameras, an IR spectrometer, and the missile seeker being tested. Other payload configurations can be supported as well.



SATIRS Pod



SATIRS Pod with the doors removed

A CCD camera whose field of view matches the IR camera may be used as a source for monitoring, tracking, and recording. Alternatively, any of the other cameras that produce RS-170 video can be used. A record of system status is overlaid on the video by the real-time display system. By boresighting the other sensors to the selected camera and controlling the gimbal by the video tracker, the entire sensor suite can be locked on a target while the pilot and backseat operator view the scene in the visible band.

The SATIRS pod has a distributed digital data acquisition and recording system. Video from each IR camera and the spectrometer are digitized, combined with IRIG time code and other auxiliary data measured from the pod, and recorded on an airborne instrumentation tape recorder. Data acquired from the Payload Electronics Unit, and the Central Electronics Unit are distributed through the pod to the digital data formatter and data display units by way of a fiber-optic ring network. The data can be reduced with a data reduction system also available from the Systems Development Department.

Specifications:

VIDEO

- Visible CCD Camera RS-170, 7° FOV
- Video Recorder 2 VHS format
- Infrared Cameras
 - 25 Fields/sec, 4:1 interlace, 0.7mrad IFOV
 - LW: 7°x 7° FOV 8-12μ
 - MW: 7°x 7° FOV 3-5μ
 - SW: 7°x 7° FOV 1-3μ

Each camera has a remotely operated filter and aperture mechanism for narrowband measurement and varying amplitude targets.

ELECTRICAL

- Stall Torque
 - Elevation 200 ft-lbs
 - Azimuth 360 ft-lbs
 - Roll 75 ft-lbs
- Slew Rate 30°/s for Az, El, & Roll
- Acceleration (fully loaded)

- Elevation 456°/s
- Azimuth 140°/s
- Roll 270°/s

- Look Angles
 - Elevation ±25°
 - Azimuth ±160°
 - Roll ±180°

DIGITAL DATA ACQUISITION SYSTEM

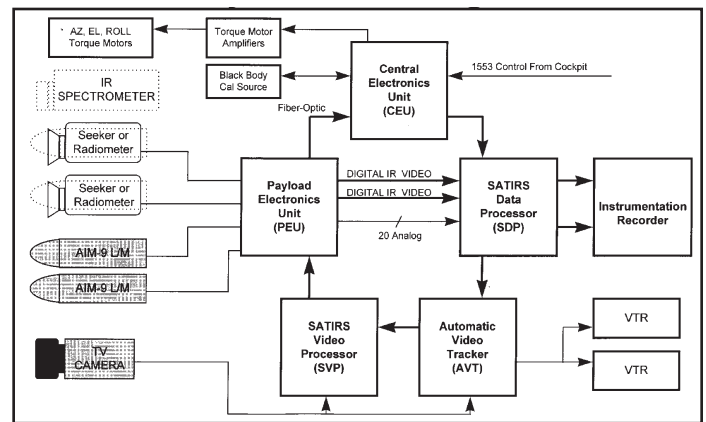
- 10-bit/pixel video data stream & pod auxiliary data
- VME based real-time data acquisition & data display system
- IRIG B time code
- 28-track airborne digital instrumentation recorder

POWER REQUIREMENTS

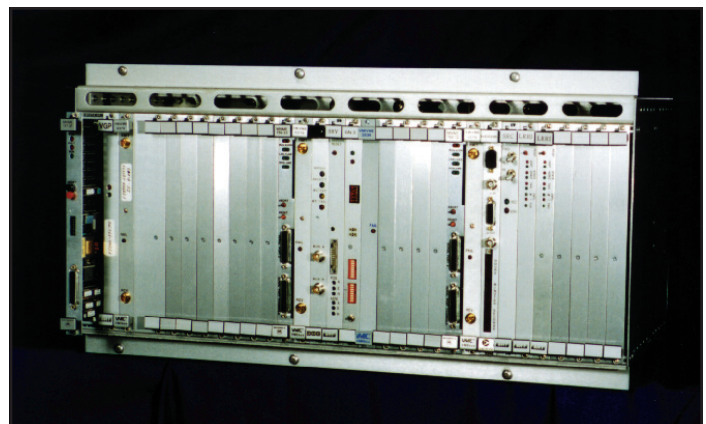
- 28VDC
- 115VAC, 3ø, 400Hz

MECHANICAL

- Length: 14ft., 3.5 inches
- Diameter: 22 inches
- Weight: 1250 lbs.



System Block Diagram



VME Avionics Chassis

For more information, please contact:

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