

Satellite Sensor System Requirements

1.0 - SCOPE

This document identifies requirements for a Satellite Sensor System that will orbit the Earth with the objective of providing ground-based observers with detailed information on objects in space. An effort has been made to characterize what is needed and not how to do it. All requests for clarifications should be sent directly to the program contracting administrator.

2.0 - SYSTEM BOUNDARY

The system boundary for the Satellite Sensor System will be the satellite that will be placed in orbit. As such, it is expected that the system will 1) receive ground station observation requests, 2) observe objects in space, and 3) send object data back to a ground station. Activities associated with reception, observation, and transmission involve information that will effectively cross the system boundary.

3.0 - SYSTEM REQUIREMENTS

Satellite Sensor Systems must be capable of receiving object requests from a family of ground stations arranged on Earth. Each request will be archived to permit placing data tags (date, time, requester ID, position observed in space, etc.) just prior to data transmission back to Earth. Each request will include a pointing position that must be converted onboard to a command for the sensor's control subsystem.

After the sensor is properly aligned with the object to be observed, the system will collect raw data and store this data for processing. There are two reasons for raw data storage: first, a processing step that follows should operate only on complete raw data packs and second, in the event that the subsequent data processing fails, this failure must be detected and the original raw data must be retrieved making it possible to repeat the failed action. Complete raw data packs collected should then be processed to extract key entity attributes. Processed data should be stored for the same reason identified for raw data. Complete processed data packs should then be formatted in preparation for transmission to the ground. Formatted data packs should be stored to permit retrieval and retransmission in cases where downlinks are temporarily compromised and a failed transmission has been detected. Formatted data sent to ground stations should be tagged with the appropriate request information to properly categorize request number, time of day, pointing coords., etc.

Operational needs demand that the Satellite Sensor System must be able to respond to three back-to-back requests in 400 seconds (average response time). To ensure that development time will not be excessive, offerers must demonstrate that their system design will be able to take advantage of an existing power supply where electrical capacity will be 17 watt-hours for executing this three-request scenario. At no point in time should the system use more than 200 watts. Past experiences with data processing systems of this type suggest a 0.8 probability of success each time data is processed and a 0.7 probability of success each time data is transmitted back to Earth.