1 Simple Network Management Protocol (SNMP) Interface

Control and monitoring of the antenna system is provided by the ACMU through SNMPv2. In this document, SNMP OIDs and named constants are shown in blue italicized text. For example, *objectID*.

- The system MIB is defined by file: **AERO-SAT-ACU-MIBv2.txt**, part number **19748**.

- All AeroSat-specific textual conventions are defined by file: **AERO-SAT-MIB.txt**, part number **19747**.

1.1 SNMP Reported Units and Numeric Formats

All angle measurements are expressed in hundredths of degrees when using SNMP. This includes latitude, longitude, roll, pitch, heading, azimuth, elevation and polarization. For example, a latitude of 42.81° would be represented as 4281.

NOTE

The MIB documents listed under the **Associated Documents** section are the ultimate authority.

Additional units are expressed as follows:

- Altitudes are expressed in feet.

- Temperatures are expressed in hundredths of degrees C.

- RF levels are expressed in thousandths of dB.

- Voltages are expressed in hundredths of volts.

- Currents are expressed in microamps.

- Elapsed times are expressed in seconds.

The MIB describes each OID supported by the system including the data type and access level. The entire MIB, or portions of the MIB, can be inspected using the **snmpwalk** command.

OIDs can be manipulated by any client application using standard **snmpget** and **snmpset** commands as follows:

```
snmpwalk -v 2c -c public -M +/usr/share/snmp/mibs 192.168.64.10
snmpget -v 2c -c public -M +/usr/share/snmp/mibs 192.168.64.10 ascAdminState.0
snmpset -v 2c -c public -M +/usr/share/snmp/mibs 192.168.64.10 ascAdminState.0 = 1.
```

1.2   High-Level Control and Monitoring

High-level controls are available for each of the major subsystems and operate in an identical fashion for all subsystems. Administrative state, (**xxxAdminState**), is the top level control for each subsystem. **AdminState** OIDs provide the on and off control for each subsystem.

Setting the **AdminState** of a subsystem to *enable* puts the subsystem in an active mode causing it to actively control whatever function the subsystem is responsible for (for example, if the navigation data subsystem is enabled, it will monitor navigation data and predict the aircrafts position and attitude). Setting a subsystem's **AdminState** to disable causes the subsystem to go dormant. A disabled subsystem will not actively control or perform its designated function.

For example, if the LPT subsystem is disabled, transmit is forced off and the subsystem will not honor requests to transmit or monitor transmit enable prerequisites.

Table 1.1 describes the two **AdminState** OIDs that provide subsystem control.

Table 1.1 — Administrative State OIDs

Subsystem Control	OID	Description
Administrative State	**xxxAdminState**	All subsystems can be enabled or disabled by setting the appropriate **AdminState** to *enable* or *disable*. Individual subsystem behavior is discussed in Section 1.2.1. All instances of **AdminState** are persistent across system resets and power cycles.
Last Administrative State Change	**xxxLastAdminStateChange**	The interval between administrative state changes is tracked for each subsystem at the corresponding **LastAdminStateChange**.

The second aspect of subsystem control is Operational Status (**xxxOperStatus)**. Operational status OIDs report the current status of a specific subsystem.

- Subsystems that are admin-enabled and operating normally will report an operational status of *enabled*.
- Abnormal operation is reported as either *warning* or *fault*.
- A subsystem may briefly transition through the states of **init** or **shutdown**. If the subsystem is admin *disabled*, it will report an operational status of *disabled*.

Table 1.2 is a generic summary of operational statuses:

<div align="center">Table 1.2 — Generic Operational Statuses</div>

Subsystem Operational Status	OID	Description
Operational Status	`xxxOperStatus`	The operational status of each subsystem is available through the appropriate `OperStatus.` The possible states are: `enabled` — Normal system operation. `disabled` — An inactive system. `init` — The system is initializing. `warning` — A non-fatal (recoverable) error exists. `fault` — Service is interrupted, possibly by a non-recoverable error. `standby` — The system is in stand-by mode. Not currently used. `shutdown` — System shutdown. Operational status depends on `AdminState`.
Last Operational Status Change	`xxxOperStatusChange`	The interval between operational status changes is tracked for each subsystem at the corresponding `LastOperStatusChange.`
Last Administrative State Change	`xxxLastAdminStateChange`	The interval between administrative state changes is tracked for each subsystem at the corresponding `LastAdminStateChange.`

1.2.1   Subsystem Hierarchy and `AdminState` Description

All subsystems have a parent/child relationship like that in a tree organization. The setting of `AdminState` at any node has the effect of setting the admin. state of all child nodes. The top most node or subsystem is ASC (Antenna System Control). Setting `ascAdminState` to disable will disable every subsystem, effectively shutting down all normal operation of the ACMU.

Table 1.3 lists the subsystems that can be enabled or disabled via **AdminState**. The table includes the subsystem hierarchical relationship and the definitions for the enabled and disabled states of each subsystem.

Table 1.3 — Subsystem Enabled/Disabled Administrative States

Subsystem	OID	Enabled State	Disabled State
ASC (Antenna System Control)	ascAdminState	All system control functions are permitted.	All system control functions are prohibited.
Point	pAdminState	Calculate and utilize pointing data.	No new pointing data calculated. Uses previous data.
Nav (Navigation)	navAdminState	Update navigation data when labels are received.	Process labels. Do not update location or orientation.
Gimbal Gimbal Azimuth Gimbal Elevation Gimbal Polarization	gmbAdminState gmbAzAdminState gmbElAdminState gmbPolAdminState	Gimbal motor control is permitted.	Gimbal motor control is prohibited.
Align (Alignment)	alnAdminState	Alignment will be performed when all required data is available, (automatic or manual).	Automatic and manual alignment requests are prohibited from executing. If a request is already in progress, it will abort the alignment process.
Modem	mdmAdminState	Attempt to establish regular communications with the modem.	Cease regular communications with the modem.
RFMon (RX Signal Monitor)	rfmAdminState	RX signal strength will be monitored and provided to the system.	RX signal strength will not be provided to the system.

Subsystem	OID	Enabled State	Disabled State
Track	`tAdminState`	Tracking offsets will be computed and utilized by the system.	Tracking offsets will not be computed and will not be utilized by the system.
ACState (Aircraft State)	`acsAdminState`	Enables aircraft dynamics to be monitored and `ACState` to be updated.	Disable aircraft dynamics monitoring and `ACState` updates from occurring.
BIM (Built-In-Monitoring)	`bimAdminState`	The `AdminState` object defined for BIM in the MIB is not yet utilized.	The `AdminState` object defined for BIM in the MIB is not yet utilized.
LPT (Low Power Transceiver)	`ahpAdminState`	The transmitter can be turned on or turned off when commanded by the Antenna Control System and permitted by all other gating factors/subsystem.	The transmitter is turned off and cannot be turned on.

1.2.2   Antenna System Control

1.2.2.1 [A] High-Level Controls

The following are Antenna System high-level controls:

- `ascAdminState`

- `ascLastAdminStateChange`

- `ascOperStatus`

- `ascLastOperStatusChange`

1.2.2.2 Transmit

The system turns on the transmitter as soon as it locks onto the selected satellite. You can override this by setting **ascTransmitEnable** to disable. This OID is an overarching control used to disable transmit. When set to *enable* internal operational monitoring may temporarily disable transmissions.

1.2.2.3 Transmit-Inhibiting Events

Various events may cause the system to temporarily stop transmitting to the satellite.

- Loss of satellite lock or loss of communication with the modem.

- Loss of communication with the LPT.

- Dynamic flight, which exceeds the physical limits of the antenna system.

- Gimbal position errors.

- Navigational/INS data invalid or lost.

- Restrictions on pointing. This includes mechanical limits of gimbal axis, line-of-sight obstruction by aircraft or earth, and entry into Transmit Disable pointing angle zones.

- Polarization angle exceeds allowed limit.

- Loss of power for more than 50 msec.

- Setting the **AdminState** of the following subsystems to *disable*:

  - Antenna system control

  - Navigation

  - Low-Power Transceiver

  - Track

  - RFMon

For safety reasons, the default operation of the unit is to disable transmit operations on the ground. To enable transmission at ground level *ascTransmitOnGround* must be set to *enable*. When set to *disable* transmissions will be allowable on takeoff as the aircraft speed exceeds 50 knots.

The minimum altitude at which the system can operate can be set at **ascTransmitAltitude**. The default value for minimum operational altitude is 10,000 feet.

To allow the system to transmit below the specified altitude **ascTransmitBelowAltitude** can be set to *enable*.

NOTE

The default value is set to *disable*. It will revert to *disable* after the aircraft attains the minimum operational altitude.

The current status can be found at **ascTransmitStatus.**