AvSTAR

Aventech
Satellite
Tracking and Reporting

The AvSTAR system is a full-featured solution for remote monitoring of airborne and ground-based vehicles. Mobile assets can be monitored from anywhere with AvSTAR: from the office, operational field base, hotel room, or even home. All that is required is a PC or laptop running a web browser and an Internet connection. Position reports are plotted on base maps or satellite images for immediate geo-referencing of vehicle ground tracks. The AvSTAR system supports auxiliary inputs to relay meteorological data and equipment status information from other on-board systems. Web-based graphing and data analysis tools are used to retrieve this data for both real-time and post-operation analysis.

Advanced Technology for Operations Management

Three major components comprise the AvSTAR system: the onboard data management system, the data transmission system, and the AvSTAR server.

Onboard Data Management System (ODMS)

The ODMS collects data from a variety of onboard systems such as: GPS, AIMMS-20 (meteorology), laser or radar altimeters, flow controllers, switches, etc. This data can be input utilizing an integrated high-speed Controller Area Network (CAN) interface, four RS-232 serial ports, or ten digital input/output pins. An embedded microprocessor assembles packets and sends them to the data transmission system using an internal modem. If no external GPS device is available, an optional internal WAAS-enabled GPS board allows the ODMS to act as a stand-alone positioning unit.

Data Transmission Network

Data is transmitted to the AvSTAR server by one of two possible options: the Iridium Short Burst Data (SBD) satellite network or cellular data networks. The Iridium network consists of 64 LEO (low earth orbit) satellites in which one satellite will always be in-view of your mobile asset and four other satellites at the same time. Data is relayed between Iridium satellites to the nearest ground station. Data is then sent from the ground station via the Internet to the AvSTAR server. This ensures fast, reliable, error-free point-to-point data transmission from air or ground vehicles, anywhere in the world.

Digital cellular networks offer the most cost-efficient option for ground vehicles as data transmission charges are a tiny fraction of that for sending data by satellite. Cell coverage can be problematic in remote areas so this option is not for every application. However, the low data costs of cellular transmission means the ODMS can be configured with a much higher reporting frequency to increase resolution and achieve true real-time tracking in areas with good wireless service.

AvSTAR Server

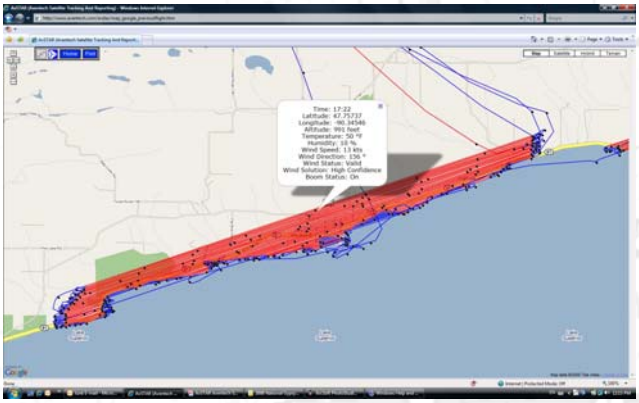
Data from either satellite or cellular systems are forwarded to the AvSTAR server through the Internet. The server then decodes, sorts, and archives this information in a database. Your password-protected data becomes available to you after logging in. It is sorted by aircraft or vehicle registration, operation date, and time. Previous vehicle data can be recalled and displayed, a mission can be replayed, or a mission in progress can be tracked in real-time.

The benefits of AvSTAR are delivered without special software. An Internet connection and standard web-browser application are all you need to view your data. Each flight or ground track can be displayed over one of several possible user-selectable map backgrounds. Currently supported backgrounds include: USGS topographic maps, Google road maps, Google terrain maps, USGS aerial imagery and Google satellite imagery. Unique to AvSTAR, user-supplied Shapefiles can be used to generate background map imagery. Integrated pan and zoom controls allow you to generate optimal views of vehicle tracks and the chosen background map. Tracks are colour shaded depending on a switch status from one of the ODMS digital inputs, which can be used to represent spray-boom or fogger on/off status.

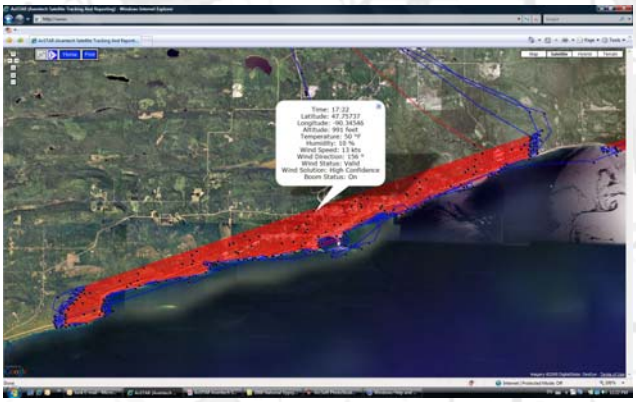
As a powerful feature of AvSTAR, vehicle tracks can be exported in Shapefile format to permit analysis with any GIS application of your choice.

AvSTAR delivers for airborne and ground applications

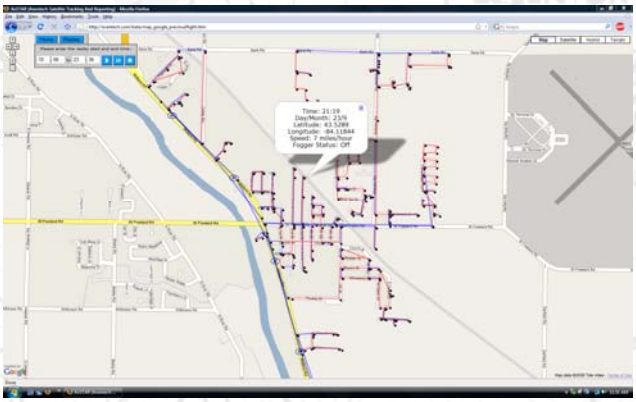
Aventech Satellite Tracking and Reporting



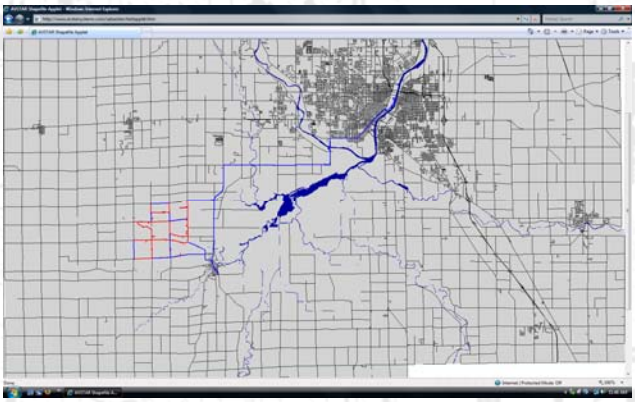
Aircraft Flight Path overlaid on Google Map with Flight-Data Pop-up Display



Aircraft Flight Path overlaid on Google Satellite Imagery



Fogger-Truck Path overlaid on Google Maps with Data Pop-Up Display



Shapefile Map Import Capability

Features

- AvSTAR data management system interfaces easily with onboard systems via its integrated RS-232 serial ports, CAN port, or digital inputs/outputs
- Optional embedded WAAS GPS board available to allow the AvSTAR hardware to function as a stand-alone positioning unit.
- Fast, reliable data transmission using the Iridium satellite system
- Cellular packet data transmission option available
- Access your operational data from anywhere, all that is required is an internet connection and PC or laptop with a web browser
- Position data displayed as a flight or ground track over several GIS background options
- All recorded variables can be plotted using AvSTAR's integrated graphing features
- AvSTAR data management system supports Aventech's AIMMS-20 system for advanced meteorological measurement
- AvSTAR data management system supports or can be easily customized to support data from other onboard systems such as GPS navigation systems, laser and radar altimeters, boom on/off switches, etc.
- AvSTAR acts as a secure storage, backup site for your operational data
- Includes USB FLASH drive interface for automatic data recording with up to 8GB storage capacity

Technical Specifications

AvSTAR Data Management System (Version 2.0)

Mechanical:

Dimensions:	8.0" L X 5.0" W X 2.5" D (203 mm X 127 mm XX 64 mm)	
Weight:	~4.0 pounds (1815 g)	
I/O Interface:	RS-232 Serial Ports	12 pin Male Hirose HR30 Series
	CAN Port	6 pin Female Hirose HR30 Series
	Digital I/O Port	12 pin Female Hirose HR30 Series
Iridium Antenna:	SMA Female	
GPS Antenna :	SMA Female	
Cooling:	Convection	
Enclosure:	Anodized Aluminum	

Electrical:

Input Voltage:	12 - 37 VDC
Current:	
Avg Standby:	130 mA (w/o opt GPS), 235 mA (w opt GPS) @ 12 VDC
Avg Transmit:	250 mA (w/o opt GPS), 355 mA (w opt GPS) @ 12 VDC
Peak Power-up:	725 mA (w/o opt GPS), 830 mA (w opt GPS) @ 12 VDC

Iridium RF:

Operating Frequency:	1616 to 1626.5 MHz
Duplexing Method:	Time Division Duplex
Multiplexing Method:	TDMA/FDMA
Link Margin Downlink:	13 dB Average
Link Margin Uplink:	7 dB Average

Data I/O:

Hardware Interface:	4 RS-232 Serial Ports
	1 CAN (Controller Area Network Port)
	10 Digital I/O Lines
SBD Mobile Originated:	340 Bytes/message
SBD Mobile Terminated:	270 Bytes/message

Environmental:

Operating Temperature:	-22 ^{o}F to +140 ^{o}F (-30 C to + 60 C)
Operating Humidity:	< 100 %RH

Web Browser Requirements:
Microsoft Internet Explorer version 6 or higher, Mozilla Firefox version 2 or higher

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