Satellite Communications Summary

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Two types of satellite communications have been utilized by UNAVCO: Iridium and VSAT.

Iridium is a satellite communication system that allows users to place voice and data calls from remote locations any place in the world using a handset about the size of a cordless home phone. Calls can be made to land line telephone systems, cell phones, or other Iridium phones. Internet access is also available through Iridium's ISP or other ISP's, using an L-Band Transceiver (LBT) at the remote site in place of the Iridium phone. An LBT provides an asynchronous data port and is fully Hayes compatible, meaning that it can be treated as a standard phone modem. Iridium access is available to non-DoD government users (i.e., NSF) at reduced rates through a Department of Defense (DoD) contract. As a result of DoD security issues, however, not all connection options are available to NSF users.

VSAT (Very Small Aperture Terminal) is a satellite communications system that allows users to send data, voice, and video signals via ground transceivers. Signals must be sent and received by VSAT transceivers; the signal is rebroadcast by a VSAT hub.

Information on satellite communications used by UNAVCO

Iridium

Iridium allows up to 2400bps, suitable for GPS data downloads. It is the only communications system with global coverage, suited for the most remote sites where no other communications options are practical. Purchase with audio board disabled. Use SYN-DC-936 DC-DC power converter with serial connection and 20 gauge power wires. Average power draw is ~1.0 Watt when downloading ~1MB data per day. Iridium modem is sensitive to antenna cable losses; keep overall cable loss between modem and antenna < 3dB.

Iridium comms for GPS systems have been operational since 2005 with the Trimble NetRS receiver. Iridium comms are currently deployed in 50+ locations in Antarctica and Greenland for the POLENET project, UNAVCO/PASSCAL Remote Stations MRI project, and several other PI projects. At present, the Iridium/NetRS system must incorporate a timer switch.



- Communications Hardware Used by UNAVCO in Polar Applications

- NetRS Receiver and Iridium Modem Configuration (example from polar applications)
- How to establish Iridium communications from an XP computer to a UNAVCO polar remote GPS station
- Iridium and GPS Antenna Interference Test (.pdf, 2008)
- GPS Data (BINEX) Streaming via Iridium Short Burst Data (SBD) Mode Preliminary Report (.pdf, 2007)
- Power Draw Profile for a Trimble NetRS and Iridium System
- Summary of Iridium for Remote GPS Data Telemetry (.pdf, 2003)

VSAT



- How to configure an Ashtech Z-12 to stream for VSAT
- Very Small Aperture Terminal (VSAT) Communications System Project
- Real Time GPS Data Transmission Using VSAT Technology (paper, GPS Solutions, V5 N4, pp. 10-19, 2002) (abstract only) (full .pdf)
- UNAVCO/IRIS/NASA Collaborative Effort to Utilize VSAT Technology for Remote Data Transfer (poster, 2002) (abstract only) (full .pdf, 8.7 MB)
- Joint UNAVCO/IRIS/NASA Remote Seismic/GPS/VSAT Installations (poster, 2002) (abstract only) (full .pdf, 5.8 MB)
- Universite des Sciences et Techniques de Mauku (USTM)/UNAVCO/IRIS/NASA Collaborative Effort to Utilize VSAT Technology for Remote Data Transfer (poster, 2001) (abstract only) (full .pdf, 16.4 MB)
- UNAVCO Facility VSAT Information, Contacts, and Emergency Shutdown Procedures (2000)

- Pictures of VSAT system set up at the NCAR UNAVCO facility in Boulder [historical]

- Nanometrics Seismological Instruments (external link)

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