

Satellite Technology Basics

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March 27, 2007



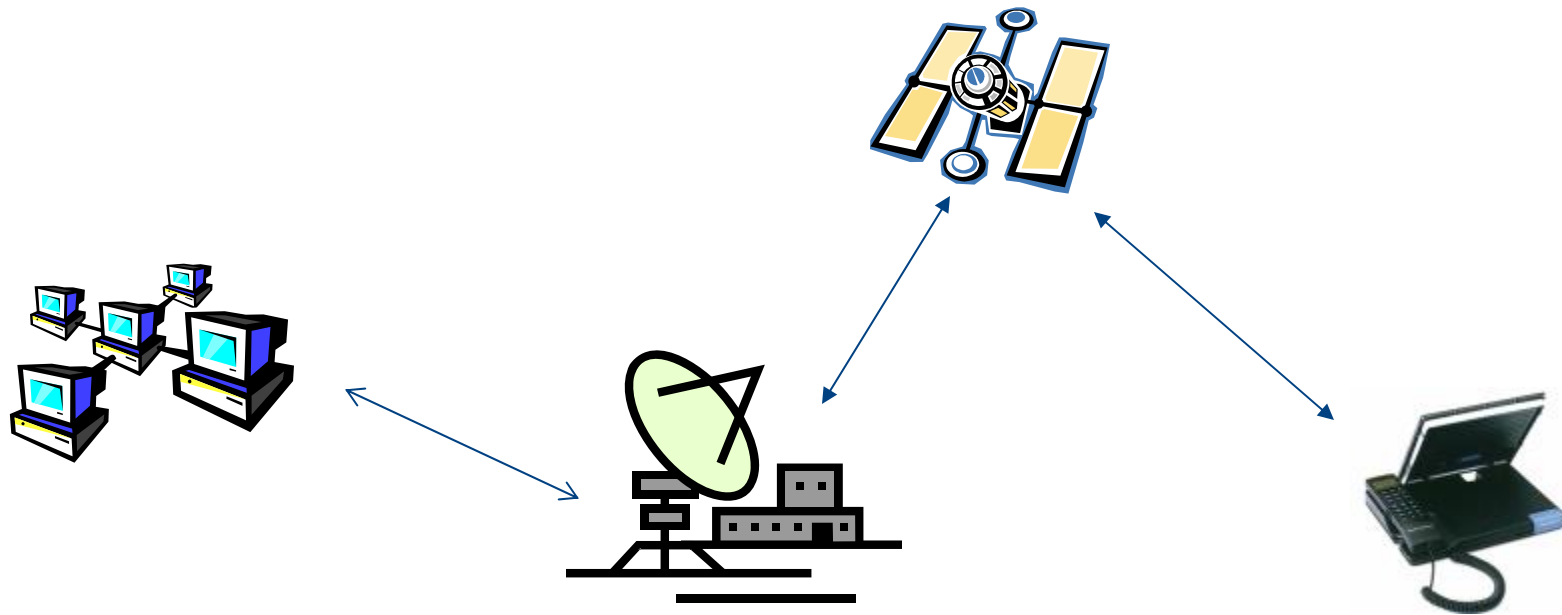
Why Satellite?

- Voice and data service completely independent of local terrestrial infrastructure
- Not (generally) dependent on use of local power supply (BUT make sure batteries are charged!)
- Easy to deploy on short notice
- Provides full range of voice and data communications options; if you can do it by wire, you can do it by satellite (with limitations)



Satellite Technology

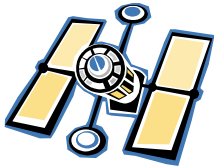
What is it, and how does it work?



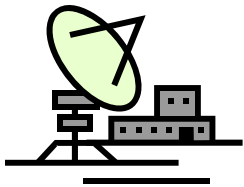
Satellite Network Elements



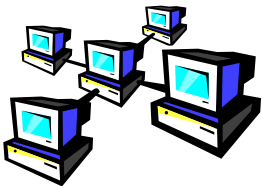
User Terminal — Device used in the field to connect to satellite network; can be “mobile” or “fixed” depending on site, needs, etc



Satellite – Located in orbit, either low earth or geostationary



Hub Station – Takes signal from satellite and switches it to the PSTN, Internet, or private network



Public or Private Network – The prime communications target

User Terminals

- Types of terminals vary with the satellite system to be used:
 - Mobile Satellite Systems use proprietary terminals
 - Fixed Satellite Systems (Ku-Band, Ka-Band, C-Band) use standard antennas



Satellite Systems

- Numerous satellite constellations in orbit

- **Mobile Satellite Service:**

- Inmarsat
- Iridium
- Globalstar
- MSV

- **Fixed Satellite Service**

- Intelsat
- SES Americom
- Loral Skynet
- New Skies



Hub Facilities

- Operated by numerous companies
- Different stations contain different modem systems
- Connection at hub to PSTN, Internet, private networks



Enabling Secure Broadband
Access Anywhere, Anytime.

So What Does It All Mean?

There are numerous options available for companies looking for satellite solutions. Each option has its positives and its negatives.

Mobile Satellite Services

- Characterized by small- to medium-sized voice and data terminals; terminals are proprietary to the particular network
- Benefits: Relatively small, easily transportable, operate on internal batteries; relatively easy to train field personnel
- Negatives: Relatively high airtime costs, slow data speeds; proprietary equipment not switchable to other systems; latency (geo)

Inmarsat System

- Distributed by resellers such as Stratos
- State-of-the-art I-4 satellite network (geo)
- Many flavors of service: new services (BGAN) and older (GAN, Mini-M)

 <p>BGAN Voice, Fax, Data Data up to 492 kbps Full range of IP services</p>	 <p>GAN (M4) Voice, Fax, Data Data up to 64 kbps</p>	 <p>Mini-M Voice, Fax, Data Data up to 2.4 kbps</p>
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Iridium System

- Distributed by resellers
- 66 low earth satellites; fleet growing older; next generation system announced at Satellite 2007
- Very small terminals; no latency issues; true global coverage, including the poles



Globalstar System

- Capabilities similar to Iridium; 48 satellites vs. 66; Globalstar coverage is less extensive globally
- Similar size, specifications, and pricing
- Faster data speed; comparisons have shown voice quality superior to Iridium
- Questions abound about coverage and satellite life



Globalstar GSP 1600

Voice and Data

9.6 kbps data speed

MSV

- Push-to-talk technology
- Voice and Data
- North America only
- Dispatch radio via satellite



Fixed Satellite Services

- Several flavors exist: C-Band, Ku-Band, etc. System of most interest is “VSAT” – Very Small Aperture Terminals. Antennas are about 1.2 meters in diameter and operate anywhere in U.S.
- VSAT can be fixed (e.g. banks, gas stations) or transportable
- Antennas that must be set up in a fixed position prior to use; generally non-proprietary: can be used with variety of satellite networks in same band

VSAT

- Positives: “Transportable”, easy to set up, high data speeds, interchangeable; technology is ubiquitous; cheaper data rates than MSS; very easy FCC licensing process
- Negatives: High initial cost; requires external power source; not truly “portable”; requires time to set up; subject to “rain fade”: i.e., poor quality in rain or fog

“Fly-Away” VSATs

- Offered by numerous companies in many flavors
- Support full range of IP services
- Transportable in cases; can be set up and aimed in several minutes
- Excellent data throughput, up to 4 Mbps



C-Band Fixed Satellite



- Large dish systems, generally must be permanently installed
- High bandwidth (video, true high-speed data), resistant to rain fade, global beam coverage
- Big, expensive, FCC licensing requirements much stricter than Ku-Band

New Technology: RaySat



- In-Motion VSAT System: special low-profile phased array antenna mounts on vehicles/trains; can be fully utilized while vehicle is in motion
- Designed for military/first responder use
- FCC application pending for U.S. use

RaySat StealthRay Antenna

Data speeds 1-14 Mbps up/

512 kbps return; std Ku-Band

Mountable on any vehicle

Uses vehicle power supply



Using Satellite Technology In the Field

- Hurricane Katrina experiences: PLAN, TRAIN, PREPARE
- Assess your needs “before” a disaster strikes, not after
 - Iridium phones disappeared from supply lines
- Check status on regular basis: keep batteries charged!
- Train personnel on use of equipment *before* disaster strikes, *not* after! Know how to deploy and use.
 - Iridium dialing codes example

Most Important Points To Take Away:

- ✓ **Make the use of satellite technology a regular and integral part of your emergency planning and training program.**
- ✓ **Plan out your needs, buy the equipment now, maintain it regularly, and train, train, train on its deployment and use.**

For Further Information

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