Cobham Antenna Systems | SATCOM
Cobham SATCOM Land, Air and Sea Capabilities

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<tr>
<td>![Land Image]</td>
<td>![Sea Image]</td>
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*Images and equipment showcasing Cobham’s capabilities in land, sea, and air communications.*
Entities doing business as Cobham SATCOM

* Cobham SATCOM responsible for land, sea and air markets is doing business as:

- **Land**
  - TracStar Systems

- **Sea**
  - Sea Tel

- **Air**
  - Comant Industries
  - Omnipless

- **Technology**
  - Cobham Technical Services / ERA Tech. Ltd.
    (Antennas & Electronic Systems R&D. Testing & Approvals)
Cobham SATCOM Marine Systems – Sea Tel, Concord, CA

**Technologies /**  
**Products / Services**

- Coastal Series Television Receive Only Antenna Systems (36.8 cm, 45.7 cm, 61 cm, 76 cm)
- 04 Series Television Receive Only Antenna Systems (76 cm, 1 m, 1.27 m, 1.93 m)
- 97 Series Television Receive Only Antenna Systems (2.1, 2.4, 3.6 m)
- 06 Series USAT and VSAT Antenna Systems (60 cm, 1 m, 1.5 m)
- 97 Series VSAT Antenna Systems: (2.4 m High Gain Off Set, 2.4 m, Ring Focus, 3.7 m)
Sea Tel: Sub 1m series

2406: 3-Axis, 24" (60cm) reflector in 39" radome, Co/Cross Pol, Ku Band system

USAT 24: 2-Axis, 24” (60cm) reflector in 29” radome, Cross Pol, Ku Band system

USAT 30: 2-Axis, 30” (75cm) reflector in 34” radome, Cross Pol, Ku Band system

3011: 3-Axis, 30” (75cm) reflector in 40” radome, Co / Cross Pol, Ku Band system
Medium size VSAT >1m systems

4010, and 5010
4009 and 5009
1 m and 1.2m

6009 Ku and 6009 C
1.5m
Large systems

97 Series VSAT ANTENNAS

Tx/Rx
9707
9797
9711
9711 QOR
14460

All C Band in all bands. Ku in all bands and C/Ku versions
X band range

3 axes of stabilization
Compact 1.0 meter, 1.5 meter and 2.4 meter system
RHCP / LHCP selectable feed
Various BUC options
Waveguide for low TX path loss, > 120dB filtering
Meet the most demanding operating conditions
Integrated IMU with MEMS technology.
Ka band systems

60cm designs
and
1m Ku to ka upgradable antennas
Designed to Meet Demanding Conditions

- MIL: MIL STD 901D
- MIL: MIL STD 461E
- MIL: MIL STD 464
- MIL: MIL STD 167-1
- IEC: IEC 60721
- IEC: IEC 60945

>99.9% Uptime

>34 Years Leadership

Design for long life under demanding conditions
Powered by Sea Tel
Communications and TV-at-Sea™

TV at Sea
Comms at Sea
### Markets
- General Aviation
- Business Jet
- Regional Jet
- Commercial Aircraft
- Helicopters

### Major Customers
- Cessna Aircraft
- Cirrus Design
- Robinson Helicopter
- Rockwell Collins
- Honeywell
- Bombardier
- Bell Helicopter
- Raytheon
- Aircell

**Comant communication, navigation, GPS and satellite antennas for use on general aviation, business jet, helicopter and commercial aircraft.**
Aero Antennas

- Compact tail mount antennas for business jets
- Phased array antennas for fuselage top mount
Boeing (737, 767, 777, 787 and 747-8)
Airbus (SA, LR, A350, A380, A400M and C295)
Russian: Yak-40/42; Ilyusin-62/96; Tupolev-134/154 and Antonov-124
Dassault (FalconJets), Gulfstream (G350+), Dornier (228/328Jet)
Lockheed C-130 and Alenia C27J

HGA-8000
### Airline Customers

- Emirates
- KLM Royal Dutch Airlines
- Etihad Airways
- British Airways
- Qatar Airways
- Air France
- Turkish Airlines
- EgyptAir
- LAN
- DHL
- Korean Air
- Air China
- Air New Zealand
- Malaysia Airlines
- Ethiopian Airlines
- FedEx
- GE Capital Aviation Services
Cobham Antenna Systems
Cape Town, South Africa

- Design and manufacture of Inmarsat Aeronautical Products
  - Antenna systems
    - Low, Intermediate and High Gain Antennas
  - SwiftBroadband systems
    - Single channel ultra-light to 4-channel high throughput

- Major OEM Customers
  - Airbus
  - Boeing
  - Rockwell Collins
  - Embraer
  - Dassault
  - Gulfstream

- Marketplaces
  - Air transport
  - Business Jet
  - Safety & Security
  - Military

- AS9100 Rev C certified facility
Class 6 multi-channel systems

SB800 - two channels, each up to 432kbps/channel

For more details, visit www.cobhamswiftbroadband.com
Class 6 single channel systems

SB400 – One channel, delivering up to 432kbps

For more details, visit www.cobhamswiftbroadband.com
Class 7 multi-channel system

SB600 – two channels, each up to 332kbps/channel

For more details, visit www.cobhamswifftbroadband.com
Class 7 single channel systems

SB300 – One channel, delivering up to 332kbps

For more details, visit www.cobhamswiftbroadband.com
Class 15 single channel system

Class 15: SB200: up to 200kbps/channel

For more details, visit www.cobhamsb200.com
Cobham SB200 system

Built in GPS receiver and antenna enable stand-alone operation (no navigation inputs required from other aircraft systems)
Cobham new lightweight SDU-73UL

Flange mounted for simplified installation
Less than 1 kg (2.2 lbs)
Half size of next smallest Inmarsat SDU
2 x Power Over Ethernet; 2 x POTS
Monitor & Control function via RS232 or Ethernet

<table>
<thead>
<tr>
<th>Antenna</th>
<th>System Weight</th>
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<tbody>
<tr>
<td>Class 15</td>
<td>LGA-3000</td>
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<tr>
<td>Class 7</td>
<td>IGA-5006</td>
</tr>
<tr>
<td>Class 6</td>
<td>HGA-6000</td>
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</tbody>
</table>
The Australian Customs and Border Protection Service operates SBB on Bombardier Dash-8 aircraft to relay video and other surveillance information to ground bases for analysis.

Embraer uses SBB on the legacy 600 and 650 to provide cabin connectivity to passengers, including e-mail, internet to PCs and handheld wi-fi enabled devices.

NASA uses SBB on their KingAir B200 to relay test system telemetry to ground control stations.
The US Military uses SBB on the UH-60 helicopters to relay surveillance information to ground control.

The German Luftwaffe uses S64 (and is evaluating SBB) on the CH-53 helicopters to relay surveillance information to ground control.

The Russian Ministry of Emergencies uses SBB on Mi-8 helicopters to relay situational information and coordination instructions to ground rescue teams.

An unidentified customer uses SBB on Bell-412 helicopters to relay situational information and coordinate surface teams activities in Customs and Border Control applications.
Various Surveillance operators uses SBB on the Diamond DA-42 to relay surveillance information to ground control.

The Solar Impulse around the world attempt selected Cobham SBB to relay video and telemetry to and from the aircraft.

Cobham is busy putting together an SBB solution for cabin connectivity for the Qantas Boeing 717 fleet.

Cobham responded with an SBB solution to a number of airlines RFIs and RFPs for the supply of lower cost dedicated cabin connectivity solutions. Further announcements will be made by Q2 2011.
Cobham SATCOM Land Systems – Orlando, FL

Company Background

• Located in Orlando, FL

• 30,000 Sq. Ft. state-of-the-art engineering, manufacturing and test facility

• 80 employees

• Design and Manufacture State of the Art, low cost inertial stabilization and tracking systems since March 1999

• Extensive background in stabilized tracking antenna systems and telecommunications for consumer, commercial and government markets.

• Acquired by Cobham, PLC in Sept. 05

TracStar is The Leader in Development, Manufacture and Distribution of LandMobileSatelliteCommunications Products.
Network Services

- **DHS Network**
  - iDirect & DVB/RCS Networks
  - 400+ Subscribers
  - Voice Termination
    - Currently 1509 DIDs
  - Largest commercial DHS network in US

- **Private Network for USG**
  - 2 Geographically
    - Redundant HUBS
  - Currently 100+ remotes
  - COOP, Mobile Health, Disaster Recovery
  - Video, Phone, Fax,
    - Public & Private Network
  - Standardized terminals
    - based on proven TracStar products

- **DoD Network**
  - Private VNO on W7 for 5 remote Users
  - Airborne Spread Spectrum network
    - Shared network service to C130
2004 Hurricane Season – Florida Has 150 Mobile Sites

- Multiple Major Storms
- 4 Hurricanes hit the State of Florida
  - Charley
  - Frances
  - Ivan
  - Jeanne
- Three storms with at least 115 mph (185 km/h) sustained winds
2005 Katrina

- Hurricane Katrina of the 2005 Atlantic hurricane season was the costliest natural disaster, as well as one of the five deadliest hurricanes, in the history of the United States.
- Among recorded Atlantic hurricanes, it was the sixth strongest overall.
- At least 1,836 people lost their lives in the actual hurricane and in the subsequent floods, making it the deadliest U.S. hurricane since the 1928 Okeechobee hurricane.
- Total property damage was estimated at $81 billion (2005 USD), nearly triple the damage wrought by Hurricane Andrew in 1992.
FEMA MERS – On-Call Communications

* FEMA: Federal Emergency Management Agency
2008 China Earthquake

- Deadly earthquake that measured at 8.0M and 7.9M
- Centered in the Sichuan province of China
- Killed at least 68,000 people.
- Left about 4.8 to 11 million people homeless.
- Deadliest earthquake to hit China since the 1976 Tangshan earthquake.
- Strong aftershocks continued to hit causing new casualties and damage.
2008 China Earthquake

COTM vehicle providing voice services to allow families to contact love ones.

COTM vehicle being used to survey damage to the region.
2010 Haiti Earthquake

- Catastrophic magnitude 7.0M earthquake.
- At least 230,000 people had died.
- Roughly 300,000 been injured.
- Over 1,000,000 made homeless.
- Vital Infrastructure necessary to respond to the disaster was severely damaged or destroyed.
  - all hospitals in the capital
  - air, sea, and land transport facilities
  - communication systems
2010 Haiti Earthquake

Providing communication for Troops.

Relief works using communications gear provided by Cobham to coordinate their efforts and supplies.
California Highway Patrol
Incident Command Vehicles

The ICV is a fully contained response vehicle equipped with a mobile CHP command which includes the JPS ACU-1000 Gateway system comprised of intelligent interconnects, radio over IP and voice over IP (VoIP) technology, radio/telephone interface units.

Provides rapid response to incidents for command and control.
Fire Command

- Both small and large command centers
- Provides communications and command capabilities at the incident location
- Rapidly Deployed and Moved in active Incidents
- Provides large range of capabilities
Response Control & Support
Centralized Request/Assignment/Support

• Land Systems Capabilities
  – NIMS/ICS Trained Personnel
  – Response Expertise/Past Experience
  – Liaison with Global VSAT Forum (GVF) for Satellite Industry related In-kind donations.
  – SHARES/HF Interoperability with Federal & NGO Relief Agencies
  – Central Coordination Center for Response Efforts/Requests.
    • Central Clearing House For Requests
    • Prioritization of Requests
    • Central Reporting/Record Keeping of Donation/Equipment
Vehicle Mounted COTP Antenna Systems (0.75m to 2.4m)

The TracStar auto-deploy auto-acquire vehicle mount antenna systems allows personnel with little or no satellite experience to operate mobile VSAT satellite communications equipment.

- Available COTP terminals from sizes of 0.75 m till 2.4 m.
- Capable for Ku, Ka, C or X Band operations
- Equipped with Solid Carbon-Fiber Reflector—High EIRP - High-Performance and Light-weight
- Fully-Compliant for FCC, Intelsat, Eutelsat, Asiasat
- Mounts Accommodates Redundant Configurations & Feed-Mounted HPA.
- Rugged & Reliable Positioner — Zero-Backlash Roto-Lok® Cable Drive - high precision and stiffness. Unrivaled Az Range of 400°, El. of 0-90°, Pol. 95°.
- Safe and easy set-up, no calibration required. Built-in GPS, compass, level compensation, and satellite receiver – does not need modem to acquire satellite. Automatic polarization alignment.
- Controller Options include Direct Point and inclined orbit satellite tracking.
3.8M Multi-band Trailer (C, Ku, X)

Full range of Multi-band Manual Point Tripod Mount Flyaway Antenna Systems

**LOW COST 1.0m & 1.2m portable Back-Pack Antennas:**

- Feeds for Ku, C and X Bands Available
- Pre-Assembled Tripod Base Mount with Pull Pins
- Fine-Tune Azimuth / Elevation Adjustment
- Sturdy Boom Accommodates Various BUCs
- 6-Piece Dual Skin Aluminum Reflector
- Durable Nylon Back-Pack Case(s)
- 10 Minute Setup

**1.0m, 1.2m & 1.5m High Performance “Diamond Shaped” Flyaway Antennas:**

Those antenna provides a high level of surface accuracy, rugged stiffness, precision and economy not found in similar products.

- Ku-band Optics Eutelsat Type Approved
- Ku, Ka, C & X Band Feeds available
- Reflector - Four piece segmented honeycomb carbon fiber reflector.
- Quick Disconnects for LNB, BUC, Feed Assembly
- Easy to Transport (4 to 6 cases, terminal dependent)
- Easy Setup < 15 minutes
Portable Fully-Automatic Satellite Acquisition Flyaway Antenna Systems, (0.75m to 2.4m)

The TracStar auto-deploy auto-acquire fly-away antenna systems work with any satellite modem and just depending on the antenna size are compatible with any Ku, Ka, C and/or X band networks.

**Antennastandardconfiguration:**

- **v"** Any Multi-Band requirement: Ku, Ka, C & X-Band.
- **v"** Reflector sizes: 0.75m, 0.96m, 1.0m, 1.2m, 1.6m, 2.0m and 2.4 m.
- **v"** Rugged Positioner - Patented Roto-Lok high precision and stiffness, low backlash drive system.
- **v"** Feed Auto Sensing changes controller band settings when feeds are changed.
- **v"** BUC Mounting with Quick Deploy on Feed Boom or Rear of Reflector.
- **v"** Safe and easy installation, no calibration required.
- **v"** Setup Time < 30 minutes

**TracStarAntennaController:**

Industry standard setting one push-button operation with Automatic Satellite Acquisition and Cross-Pol. Adjustment, integrated GPS, Compass and Level Sensors and user configurable satellite selection for primary and secondary satellites.
Antenna Controller Unit (ACU)

**TracStar Controller**
- Auto-Deploy/Auto-Acquire
- One Button Deploy/Stow
- Built in RF Tuner
- Built in Compass
- Built in GPS Antenna
- Built in Levels
- Auto-Pol Adjust
- Signal Strength Indicator
- Ku/C/KA/X Band Satellites
- All Satellite Modem
- Multiple Data Satellites
- Multiple Ref. Satellites
- DirectPoint™ Mode
- No External Computer Req.
- No Calibration Required
- No Compass Acquisition
- High EL / Look Angles

*Inclined Orbit Options

**Industry standard setting one push-button operation with Automatic Satellite Acquisition and Cross-Pol. Adjustment, integrated GPS, Compass and Level Sensors and user configurable satellite selection for primary and secondary satellites.**
The Light VSAT Terminals (0.6m – 0.75m)

These unique Cobham SATCOM LVT tripod systems (Light VSAT Terminal) provides a heavy duty ruggedized self contained and lightweight man-portable terminal for Ku, Ka and X band operations. They can be configured to meet any unique quick-deploy communication needs.

Those systems are designed for use by:

- Military rapid deployment, SATCOM on the pause applications.
- Federal, State and Private Security Agencies.
- Portable News Feed and Video Uplink Services

Key Features:

- Multi-Band capable with polarization manual selection.
- Reflector Sizes: 0.3m, 0.45m, 0.60m & 0.75m, 6-8 Segments
- Integrated RF equipment: 10 W (X-Band), 4, 8, 25 W (Ku-Band), and 12/4 W (Ka-band).
- Positioner 2 Axis: Elevation over Azimuth.
- Deploy: Manual with pointing tool assist
- Deploy: Auto - future
- Tripod options: Low & High Profile. No tools needed.
- Lightweight (case dependent): <50 lbs (22.68 kg).
- Inter-operational for any modem technology.
- Assembly time: 5 minutes.
Innovative Manual Pointing Tools

• iPhone based
  • Position, Az, El, Signal strength via
  • Modem comms for signal/network lock
    • Wireless
    • Wired (future)
    • Modems supported (near term)
      – iDirect
      – Hughes
      – Comtech

• Hardware Based
  – Three axis sensor (Az/El) plus compass
  – GPS
  – RF Tuner
  – User interface
  – Modem comm port, RS232 or Ethernet
Ruggedized ODU & Modem

• TracODU is a weatherized outdoor unit
  • Integrated iConnex e800 satellite router
  • Robust applications for TRANSEC, AES etc
  • Accessible console and RX monitor ports
  • Ability to connect to an external GPS antenna

• TracModem is an outdoor modem
  – Integrated iDirect e850mp satellite router
  – The e850ROM NEMA enclosure is designed to be lig
  • Robust applications for TRANSEC, AES etc
  • Accessible console and RX monitor ports
  • Ability to connect to an external GPS antenna
Live Remote Interface
About the Live Remote Interface

The TracStar Live Remote Interface (LRI) allows the user to easily remotely control and monitor satellite auto-acquisition operations and other important antenna system parameters.

The **LRI** includes the following functionality:

- Ethernet-based (wired or wireless) access to Antenna Controller Unit (ACU)
- Convenient modification of parameters including satellite setup, scan and mode settings, and modem setup
- Create custom profiles for satellite modems and data satellites
- One-Button “Run/Deploy” and “Stop” from any web browser
- Automated Mitigation of Adjacent Satellite Interference (ASI)
- Built-in displays of current antenna acquisition operations, alert status, signal-to-noise ratio, signal strength, azimuth, elevation and polarization.
- System Diagnostics

Multi-Browser Compatible
SV360 Satellite TV In-Motion Antenna

Satellite TV In-Motion Antenna

• Fast / reliable access to the satellite TV.
• Fully automatic (DVB) technology
• Multiple satellites Use
• HDTV
• Patented rotary joint Design for continuous Tracking
• Single coax cable for antenna installation

*North America Use Only
The emergence of the newest Ka- satellites means additional capacity, connectivity and control.

Ka- enables customers to maximize and extend their communications networks, saves money and expands bandwidth to allow IP networking capabilities.

### KA Band Capable Product List

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<th>MVS Med</th>
<th>COTM</th>
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<td>VEHICLE MOUNT</td>
<td>In Development</td>
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<td>TracStar1200CF</td>
<td></td>
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<tr>
<td>LVT750VM</td>
<td>TracStar1600CF</td>
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<table>
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<th>FLY AWAY</th>
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<td>TracStar1200 FA</td>
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<td>TracStar1200P2/P4</td>
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<td>TracStar750P5</td>
<td>TracStar1250P4</td>
<td>TracStar2400 FA</td>
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<td>TracStar1000P6</td>
<td>TracStar1600 FA</td>
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<tr>
<td></td>
<td>TracStar1600P4</td>
<td></td>
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<tr>
<td></td>
<td>TracStar1800 FA</td>
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</tbody>
</table>

All Systems are Multi-Band Capable -Depending on Model (Ku, Ka, X).
(1.6 to 2.4M also C-Band Capable)
µSat™ Portable VSAT Terminal with Flat Panel Array Antenna.

µSat™ is a portable VSAT terminal, designed to enable high data rate communications over any X-band military satellite network.

• The terminal is contained within a single airline checkable hard case #IATA std.# 560 x 450 x 250 mm, < 23kg.

• The terminal employs a dual folded printed flat panel array antenna, designed to allow ease of pointing and at the same time avoid interference with adjacent satellites.

• Satellite pointing angles calculated from position information from internal GPS receiver

• The terminal’s side-lobe performance is equivalent to that of the 1.2m reflector flyaway system. Side-lobes meets MIL-STD-188-164A.

• EIRP: 44dBW minimum, G/T: 9dB/K minimum

• Data rate: Up to 10 Mbps. (In high gain spot beam on SkyNet 5, using ¾ turbo QPSK). Inter-changeable Modems available.

• DC&AC power
Satellite Communication-on-the-Move: iMVS920M

**In-Motion VSAT Technology:**

- Tracks satellites at vehicle speeds greater than 95mph.
- Built and Designed for Military Wheeled Vehicles
- Enterprise / Commercial Organizations
- News Gathering and Multi-Media production crews

**FEATURING:**

- High-speed Internet access
- VoIP communications
- Teleconferencing
- Wide area private network extension
- Video broadcasting
- Rapid acquisition and re-acquisition
- Worldwide Ku-Band Capable
- Works with most L-Band modems
## Reflector/Pedestal
- **Size**: 45 cm Elliptical Equivalent
- **Mount Geometry**: Elevation over Azimuth
- **Polarization**: Linear Phase Shift

## Travel
- **Azimuth**: 360° continuous
- **Elevation**: 20-70
- **Polarization**: 95

## Tracking
- **Acceleration**: >200 m/s²
- **Velocity**: >100 m/s
- **Meets FCC Part 25.222**

## Antenna Characteristics
- **Transmit Frequency**: 13.75–14.5 GHz
- **Receive Frequency**: 10.95–12.75 GHz
- **EIRP (Typical with Radome)**:
  - 25 Watt 47.5 dBW
  - 40 Watt 49.5 dBW
  - 80 Watt 52.5 dBW
- **G/T (Typical with Radome)**: 11.5 dB/K

## Weights & Measures - Antenna System-
- **Weight** (25W or 40W BUC included):
  - 142 lbs (64.4 kg)
- **Dimensions**:
  - 45" x 11.5" (114.3 x 29.2 cm)
COTM Markets

Growing demand for land-based communications on the move (COTM) with applications in:

- Military
- Border protection
- Security
- Disaster recovery
Low profile roof mounted antenna:
Antenna Design

• Every antenna design is a compromise
  – Size - Shape
  – Weight
  – Gain
  – Mobility is an Expanding Market
  – Off Axis Emissions

• ASI is a Antenna, System and Network Design Issue
  – Antenna
    • G/T
    • EIRP

• Network Design
  – Data Rates
  – Modulation Design
  – Occupied Bandwidth
iMVS920M Antenna Characteristics

- Antenna is 92cm wide by 15cm tall
- Tx Gain = 34.8dBi  Rx Gain = 33.2  G/T = 11.5  XPI = 25dB Typ

This rectangular antenna geometry reduces ASI compared to circular antenna within defined geographic locations relative to the satellite position.
Antenna theory of operation

- Acquisition and tracking control software currently is capable of acquiring and then maintaining satellite position while mounted on a land vehicle that is stationary or in-motion while traveling on improved or unimproved road conditions.
- Designed to have minimal moving parts to compensate for changes in vehicle platform movement.
- Accelerates at greater than 200 degrees per second squared in both azimuth and elevation planes.
- Operates with electromechanically steered azimuth, elevation & polarization positioners.
- After initial acquisition, antenna system remains locked and pointed at the satellite even in the event the satellite line of site has been obstructed (blockage).
- For momentary blockages minimal scanning is used, where more elapsed time dependent sequences use gradient scale scanning techniques. For example,
  - Continual blockage for up to 3 minutes re-acquisition is less than 10 seconds
  - Continual blockage for up to 10 minutes, re-acquisition is less than 20 seconds.
- Designed to compensate for changes in either pitch, roll or yaw direction.
- Travel 360 degrees continuously in the azimuth direction, changes 20 to 70 degrees in the elevation direction and rotates +/- 95 degrees linear polarization.
Antenna theory of operation

**Standard Acquisition Process:**
Upon power up and reception of modem communications, the satellite acquisition is typically less than a minute operation in most cases.

- The system performs a self-calibration of all three axes (Azimuth, Elevation, and Polarity).
- The system acquires GPS for high-precision geographic location information. Using GPS and other internal sensors, the system determines if it is stationary or in-motion.
- If the system determines that it is stationary, the polarization offset and the elevation look angle to the desired satellite is calculated, based on geographic information from the GPS data.
- The system then sets the polarization offset and adjusts the elevation look angle to the required settings and performs an azimuth sweep while looking for satellite frequency energy.
- If energy is detected, the system will pause for a moment to allow the modem to acquire the desired network.
- If there is no network indication from the modem, the system will continue the azimuth sweep until the network satellite is found.
- If the system determines that it is in-motion, the polarization offset and both azimuth and elevation angles can be calculated, based on geographic information from the GPS.
- The system then sets the polarization offset and adjusts the elevation look angle to the required settings and performs a 12-degree azimuth sweep around the calculated azimuth value until the system receives a network indication from the modem.
Networks - Modems & Bandwidth

- The TracStar IMVS450 is designed to work with all types of modems and networks, ‘HOWEVER’ COTM applications are highly dependent upon satellite and modem characteristics to ensure overall successful operation for the desired applications.
  - Transmit *Up to 4Mbps / Receive *Up to 45 Mbps *(Network Dependent)
  - Data Rate Performance is a function of the satellite Link (Beam EIRP & G/T) and modem configuration.
    Maximum EIRP Density Allowed without Waivers (FCC 13.5 dBw/4Khz / ITU 19.5 dBw/4Khz)

- General Reference of Network / Modems Architecture for the IMVS450
  NOTE: Each satellite modem and hub configuration are specific to successful operations.
  - Comtech – CDM570L and CDM625 (NOTE: CDM600 –NO – Hub side only)
  - ViaSat – Archlight
  - iDirect – iNfinity 7000 & 8000 Series (5000 Series possible, NO-3000 Series)
  - iDirect – Evolution 8350 Series (in Legacy Mode /DVB-S) NO-Evolution X3 & X5
  - Hughes – HX200
  - Gilat SkyEdgeII
  - Advantech - 5000 Series
  - SATPath

- *BEACON Receiver Options May Be Available for other modem types.
  Tracking carrier configurations may be considered for initial primary testing for applications.

**Satellite and modem characteristics in partnership with satellite operators and network providers are required to be verified, tested, for use according to the local, regional and governmental guidelines.
Interference Mitigation Features of the iMVS series

Low profile elliptical beam antenna

• TracPSD™, Power Spectral Density Control
• Transmit Inhibit
Transmit Inhibit

• Accurate antenna pointing through the use of advanced control systems utilizing GPS, step tracking and various sensors provides a pointing error that is less than 0.5

• If the antenna controller detects a pointing error greater than 0.5, a transmit inhibit command is sent to the BUC and all emissions are ceased within 100ms.

• This transmit inhibit is maintained until the controller detects that the pointing error is reduced to less than 0.5.

• Transmit inhibit is also initiated by the antenna controller if the modem loses lock.
Product Characterization

- Cobham Land Systems (TracStar)
  - Have numerous requests from customers to operate our antennas on Intelsat and other Satellite Operator Fleets

  - Recognize Satellite Interference is a Serious Issue

  - It is costly and time consuming to have these antennas ‘characterized’ on multiple satellite operators fleets

  - It is beneficial to Satellite Operator and Cobham to have our antennas ‘characterized’ so that they are operated properly and do not cause interference while operating and do not cause interference to other Satellites

  - Therefore Cobham are proposing a characterization test for Intelsat witnessed by an independent trusted third party like the GVF

  - We hope to then go on to an ‘Intelsat Qualification’ test phase to streamline future projects for mutual customers
TracNet: System Chaining Capability

• Designed to connect seamlessly to TracStar’s antenna providing tactical mesh over satellite;
• Satcom vehicles in proximity with one another need not use satellite link to communicate with one another thus saving operational cost and satellite bandwidth;
• Control of the deployed mesh is achieved using the inbuilt web browser or Live Remote Interface.
Example of Use (1)
Example of Use (2)

Cobham SATCOM-on-the-Move (TracStar IMVS920) satellite reach back to networks viewing the long range communication with surveillance transmission from Aerial (UAV/Helicopter/Aircraft) Downlink Video & Data received at the vehicle with the Cobham Surveillance (MAA Antenna Array).
Non-Line of Sight broadcast & Mesh Surveillance
Fluid Mesh Convoy Situation Awareness Solution
Non-Line of Sight Fluid Mesh Solutions
multiple mesh systems operating on adjacent frequencies
Case Studies (1): Water Work

Scenario:
Group of 5
Survey & inspection of water dam
Emergency response management
Sending images and videos to HQ
Case Study (2): Forestry

- **IP Mesh Links**
- **Satellite Links**

**UAV**
- Video to COTM

**Command Vehicle**
- Net node – 192.168.0.4
- IP Phone – 192.168.0.42

**COTM Vehicle at disaster area**
- Net node – 192.168.0.2
- IP Phone – 192.168.0.22

**Net node**
- 192.168.0.1
- Camera – 192.168.0.11
- Phone – 192.168.0.12

**video / audio to COTM**
Case Study (3): Border Patrol

- Video Links
- Satellite Links

SOLO 4

Diagram showing the connection between SOLO 4 devices and a satellite via video and satellite links.
End of Presentation
Thank You