Current Status

Steve Foley

Scripps Institution of Oceanography

HiSeasNet Services

- Satellite bandwidth
  - Ship-to-shore: 96kbps (C-Band), 64kbps (Ku)
  - Shore-to-ship: 180kbps for 3 slots on AOR C-Band, 160kbps for 5 slots on POR C-Band, 128kbps for 2 slots on Ku-Band Beam 1, 256kbps for 4 slots on Ku-Band Beam 2, 88kbps for 1 slot on IOR
- Hub station connection to Internet
  - Direct routing through to home institution
  - Run your own IP services however you want (email, web browsing, VoIP, video teleconferencing, etc.)
- Ship and shore equipment maintenance 2x/yr

The HiSeasNet Team

- Prinicipal Investigator: Dr. Jon Berger, UCSD/SIO
- HiSeasNet Engineer: Steve Foley, UCSD/SIO
  - With help/backup from Geoff Davis and Brian Battistuz, both UCSD/SIO
- Satellite network design and equipment maintenance contract with CommSystems
  - Design and Purchasing: Ron Nitz
  - Maintenance and Equipment: Karl Kapusta

HiSeasNet Changes in 2007

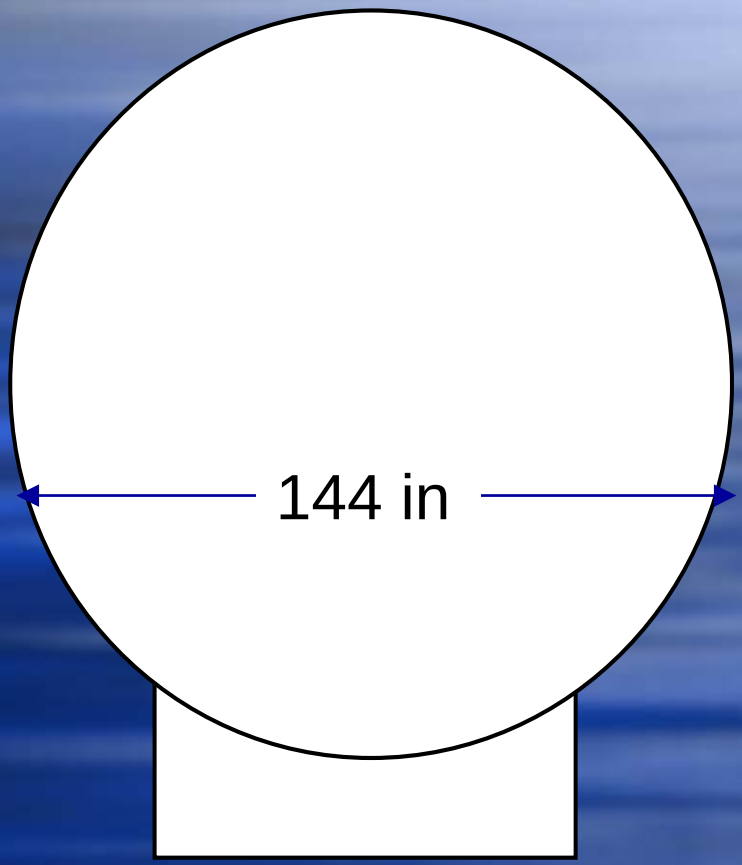
- New ships:
  - R/V Point Sur (Ku-Band)
  - R/V Walton Smith (Ku-Band)
  - R/V Oceanus (Ku-Band)
  - R/V Langseth (C-band)
- Earth Station
  - Split Ku-Band service into SatMex5 beam 1 (new beam with 2 slots) and beam 2 (old beam with 4 slots)
  - Operated Revelle out of IOR teleport since 2/07
- Web site (http://www.hiseasnet.net)
  - Added slot schedule and network diagram
  - Added file repository (drivers, guides, etc.)
  - Added FAQ section

HiSeasNet Fleet

- C-Band (2.4m dish, Global coverage)
  - Atlantis
  - Kilo Moana
  - Knorr
  - Melville
  - Revelle
  - Seward Johnson
  - Thompson
  - Langseth
- Ku-Band (North America coastal coverage)
  - Endeavor (1.2m)
  - New Horizon (1.2m)
  - Oceanus (1.5m)
  - Pelican (1m)
  - Point Sur (1m)
  - Walton Smith (1m)

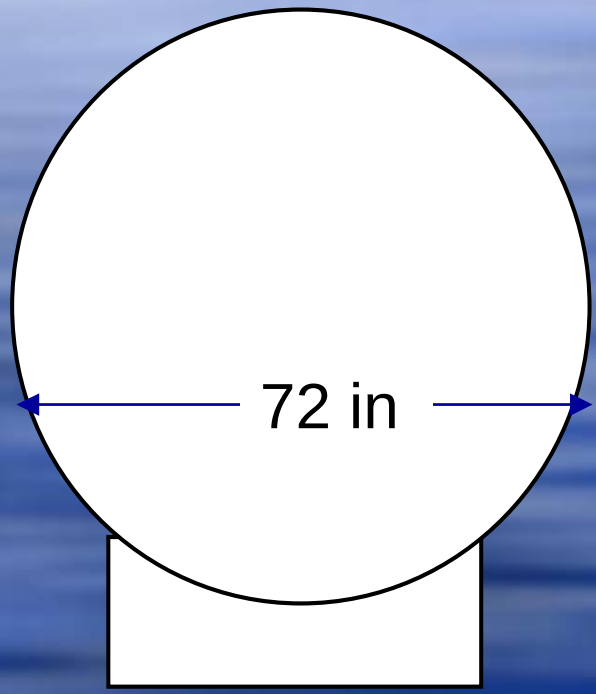
Antenna Comparisons

C-Band (9797)



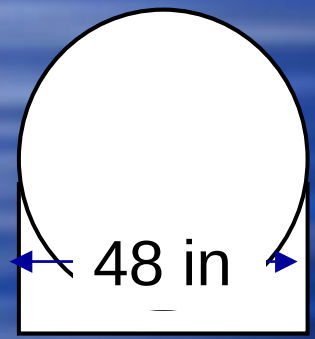
2.4m dish

Ku-Band (6006)



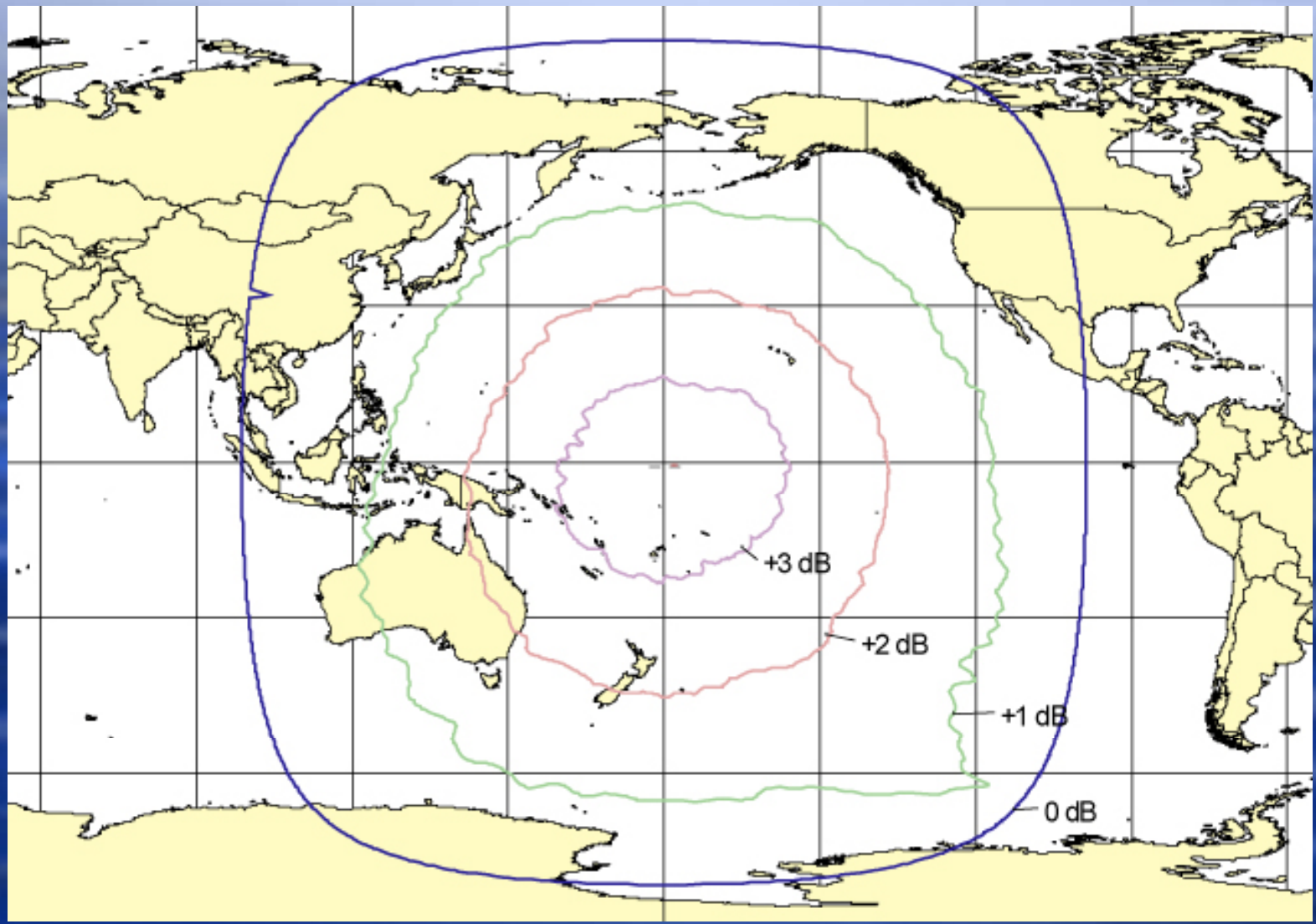
1.5m dish
400 lbs
Pedestal mount
Rx gain: 42.5dB

Small Ku-band (4006)

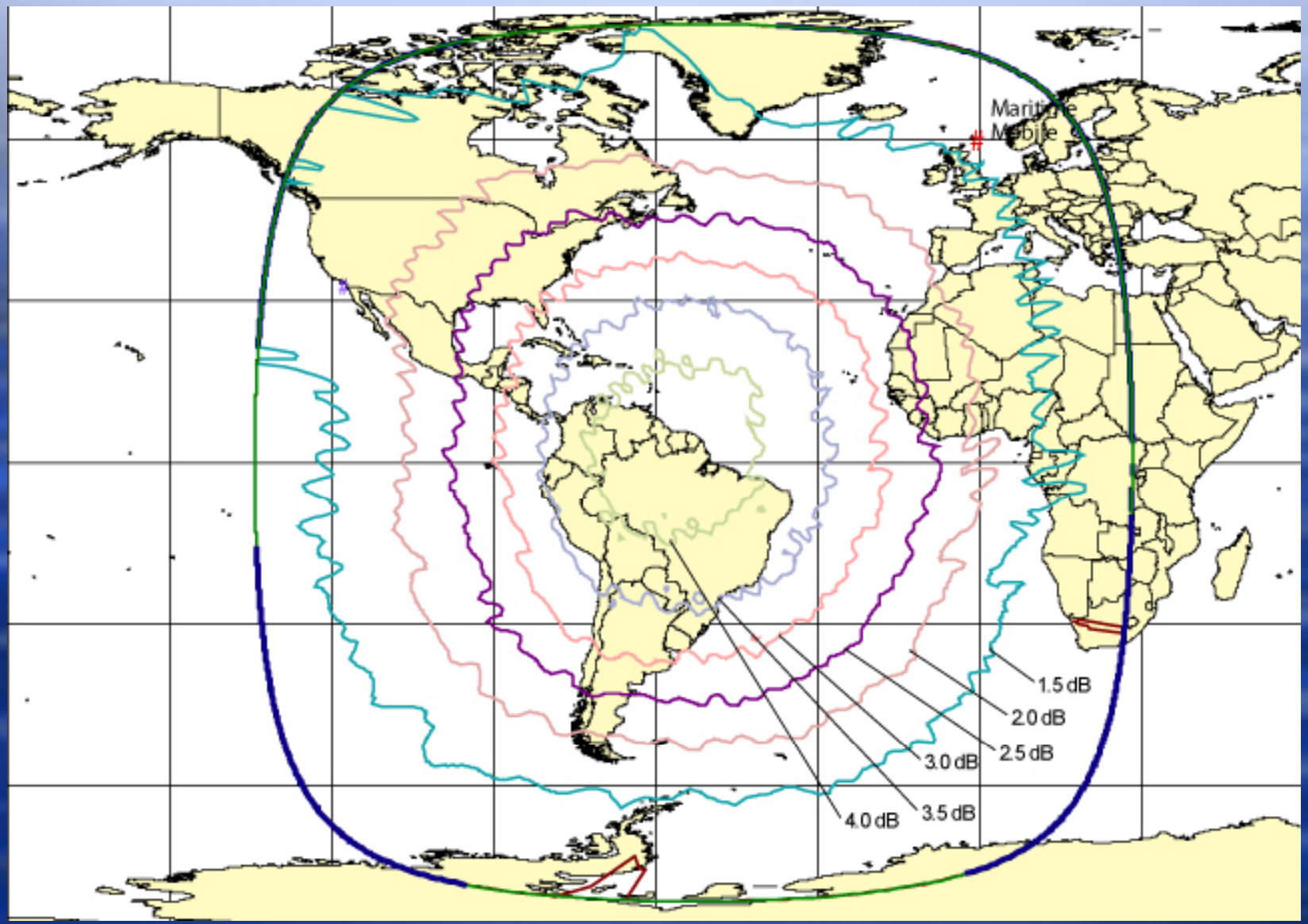


1m dish
250 lbs
Pedestal mount
Rx gain: 40.1 dB

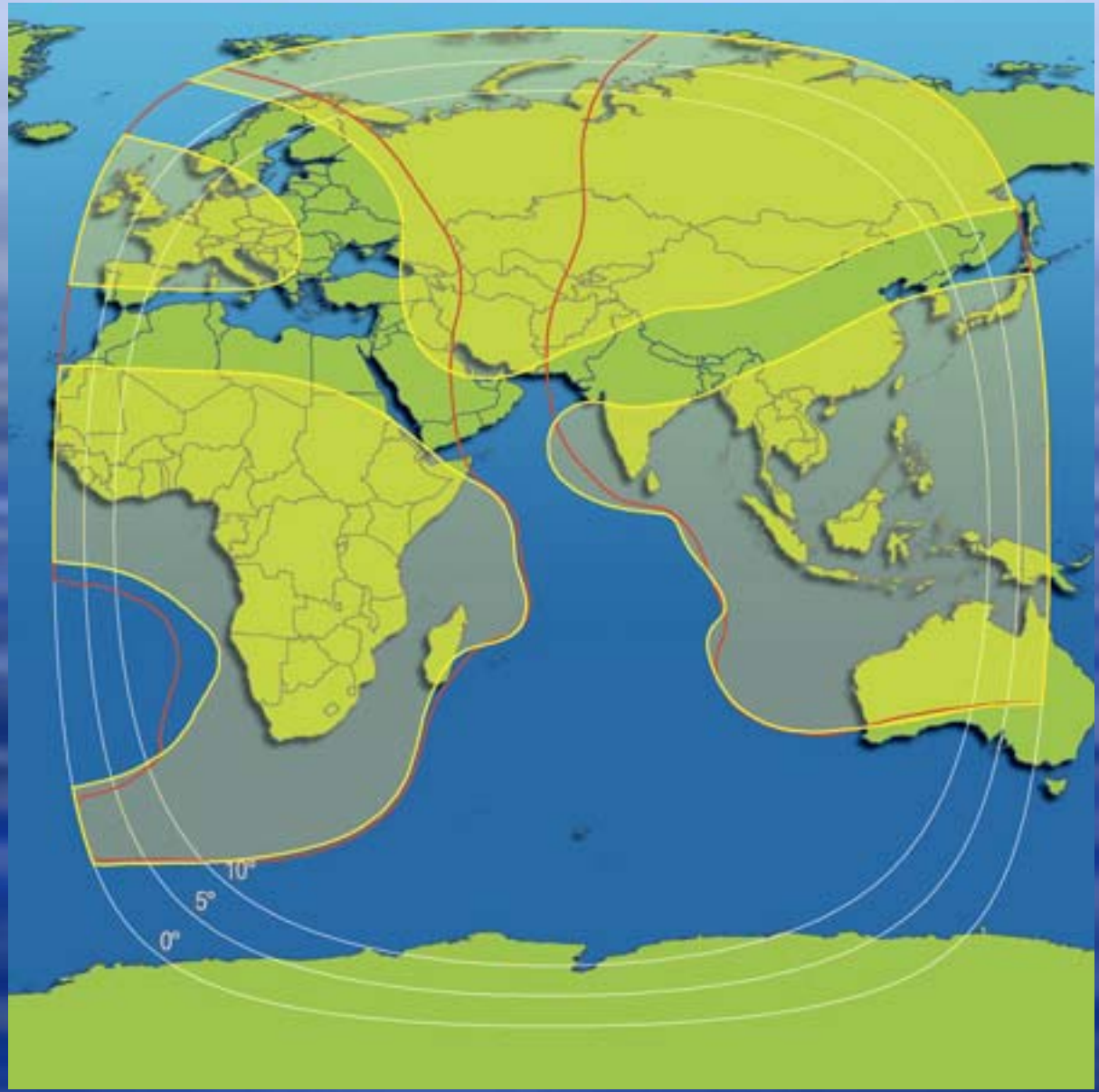
Pacific C-band Coverage



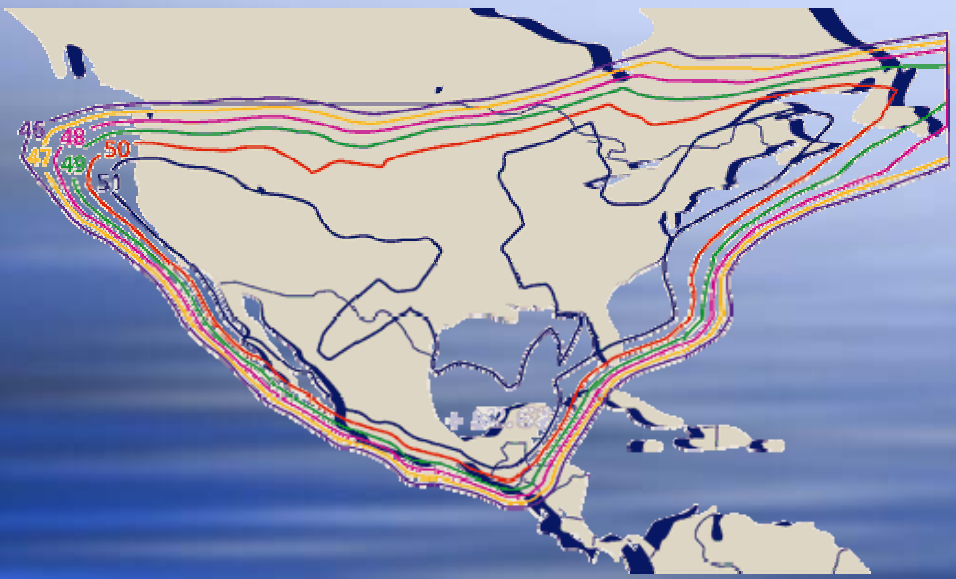
Atlantic/Eastern Pacific C-band

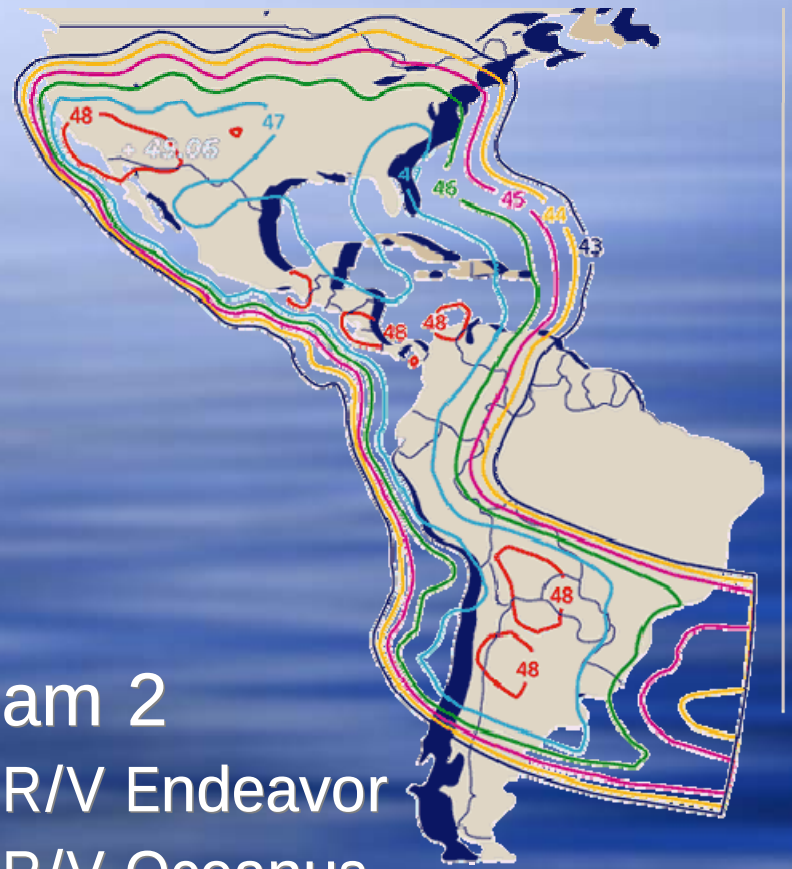


Indian Ocean C-band



Ku-Band Coverage (SatMex5)





- Beam 1
  - R/V New Horizon
  - R/V Point Sur
- Beam 2
  - R/V Endeavor
  - R/V Oceanus
  - R/V Pelican
  - R/V Walton Smith

Equipment Downtime since RVTEC 2006

Date	Location	Problem	Downtime
9/29/06	Earth Station	Ku-band tripped GFCI while Geoff and Steve unavailable	4.5 ship days
3/29/07	Earth Station	C-band router crash/failure	1 ship day
4/12/07	New Horizon	Flaky rotary joint	8 ship days
6/12/07	Knorr	Bad PCU and level cage?	0 ship days
6/19/07	Seward Johnson	Bad PCU caused flaky tracking	0 ship days
6/25/07	Seward Johnson	Bad Amplifier	4 ship day
7/10/07	Point Sur	Modem problem?	0.25 ship days
7/5/07	Thompson	El belt snapped	0.75 ship days
8/22/07	Revelle	Bad transceiver	26 ship days
9/4/07	Thompson	Canister unscrew tracking prob	0 ship days
9/30/07	New Horizon	Az motor mount broken	18 ship days
10/23/07	Earth Station	KuB2Tx attenuation jump	1.5 ship days

Maintenance Work

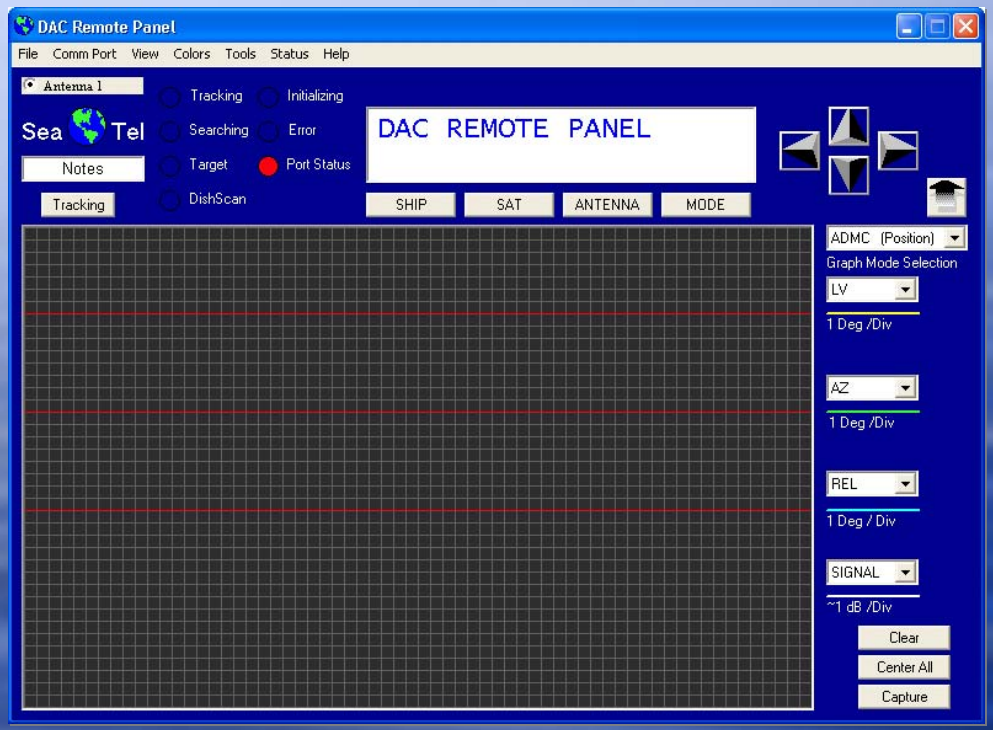
- HiSeasNet equipment support and maintenance is contracted to CommSystems. HiSeasNet staff authorizes what resources are used and when.
- Done 2x/year, roughly every 6 months.
- Done as ships and people are available. We try to combine visits or do them in San Diego to cut down on costs.
- International emergency visits are made as needed to resolve problems.
- You are welcome to pay CommSystems for anything not supported by our maintenance contract (training, upgrades, 3rd party teleport network changes, etc.)

Failures and Spares

- Most problems are user or ship related
  - Power outage, antenna repoints, gyro failure, unfamiliarity with gear, etc.
  - **Solution**: Presented training program suggestion last year, but no significant interest until recently. Is there really interest in a training program?
- RF gear failures are major cause of ship outages
  - **Solution**:
    - Have the following spares on board:
      - RF spares (transceiver, LNA, Modem): $23k for C-band, $20k for Ku-band >1m, $14k for Ku-band <1m
      - Antenna spares (Standard spares kit **plus** PCU and level cage if not in the standard kit)
    - Still have depot/earth station RF spares in SD

DAC Remote Panel

- SeaTel has released DacRemotePanel
  - Runs under Windows across a serial or IP connection to an antenna controller
  - Provides extra diagnostic plots, debug data dumps, and visibility into the pedestal control unit.
  - Officially unsupported, but seems to work well
  - An upgrade to PCDAC (but it doesn't have the antenna/ship diagram)



Satellite Shadowing

- Sometimes a mast, stack, stairway, etc. is between the antenna and the satellite
- The ensuing outage from being on a “bad heading” for extended tracks is frustrating for science and crew alike
- Options for resolving this:
  - Move the antenna higher than anything else!
  - Buy a second antenna for each ship - need $$ and space to put it
  - Move the antenna between two positions - need 2 suitable locations and a path between them
  - Remove obstructions (or don’t make them out of steel)

How do we help each other?

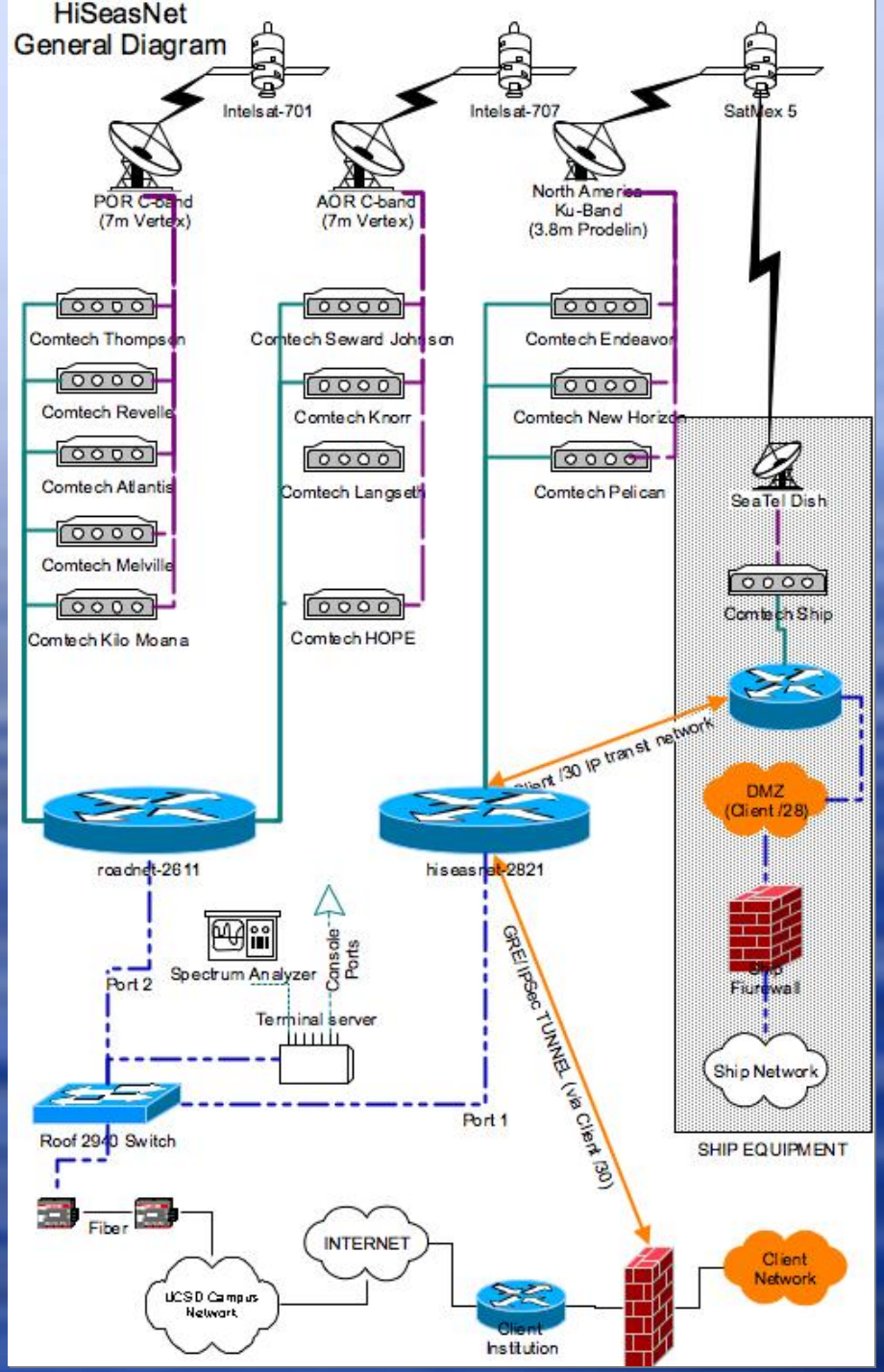
- Let us know what you are doing.
  - New IP services, devices, etc. you have tried and how well they work
  - New practical applications of HiSeasNet
  - Collaborative projects using HiSeasNet (we are happy to post links off our website and share info with other scientists)
- Be patient with us. We are **not** staffed 24/7 or any regular hours, really.
- Read maintenance reports and correct issues that are brought up.
- Let us know *well before* your ship needs to move between coverage areas.
- Install serial term servers to modem and DAC

Future Work

- A few more ships to bring online
- Possibly expand Ku-band carriers to cover more of POR. Still looking for a better footprint and another antenna at the earth station
- Work on training program if there is interest
  - Multi-day, hands-on and classroom training for geared at HiSeasNet techs
  - Will involved theory, troubleshooting, procedures, operations, monitoring, etc.
- More documentation, troubleshooting guides, etc.
- Continue routine maintenance/upgrades of all equipment

Questions? Comments?

Typical Ship Network Setup



High Level Network View