The Future of Telecoms in the US Academic Research Fleet 2019-04-25

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Topics:
- Transition Information
- Unifying Satcoms Projects
- Other Near-term Goals
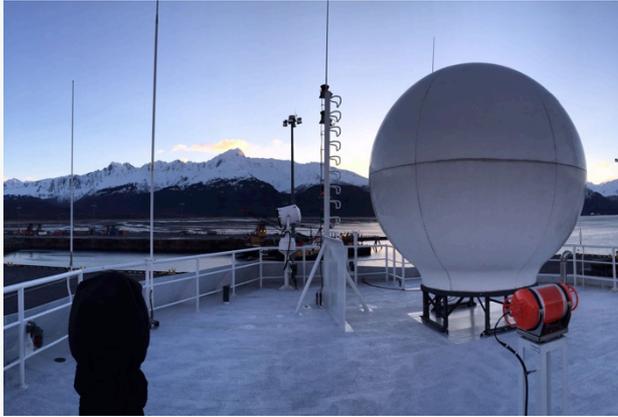- Team
- Future Goals and Issues

Transition Information

- The Inmarsat contract, historically run out of WHOI, is shifting to SIO.

- We have been working with WHOI toward a smooth transition and thank them for their support.

- The current Inmarsat contract, with World-link, ends Dec 2019.

- We are presently exploring what vendor can provide the best plan for UNOLS that balances security, capability and cost-effectiveness.

- We are building our team during the rest of 2019, so no substantive change is expected prior 2020.

UC San Diego

Unifying Satcoms Projects

Making discrepant systems to appear the same to operators

Unifying Projects

HiSeasNet has been extending institutional networks to ships since its inception, which enables operators to more readily provide assistance to onboard personnel from afar.

Part of adopting a commercial system will entail doing the network engineering to make this possible. The plan is to work with the commercial vendor to handle this, eliminating the need for ship operators to have to think about the differences between multiple systems. This will both allow for use of standard network-engineering grade failover choices, as well as provide flexibility when considering adding or changing to different network systems.

It will also allow for apples-to-apples comparison, since metrics collection can be unified.

Unifying Projects

We will be evaluating systems to install on a vessel-by-vessel basis, working with operators to determine vessel needs, in combination with operational expense.

Our goal is to work with our programs and operators to ensure all installed satellite communication systems are capable of 99% uptime (362 days/year capability) through multiple domes or top-of-mast placement.

Other Near-term Goals

- Network integration (as mentioned)

- Network security - as capacity increases, security risk goes up proportionately

- Oversight - working with SatNAG, providing meaningful metrics and allow fact-driven decisions about satcom resource allocations

- Flexibility - we want the capability to migrate to any commercial system while minimally disrupting ships' networks

The Satcoms Team

HiSeasNet began as a 50% FTE position in 2002. As needs of the fleet have evolved, it has been recognized that more personnel are needed to functionally serve the Academic Research Fleet. Part of our plan is to recognize that need and add personnel to our satcoms projects.

Our future approach is to have specialists whose focus is on our satcoms effort while also allowing them to participate in other departmental goals that overlap with their skillset.

A mix of personnel will allow for mature operations and development of capabilities, which sets us up to expand research agendas in ocean geoscience and networking.

The Satcoms Team Plan

Lee Ellett	Department Manager	15%
Jon Meyer	Information Systems Manager	66%
Kevin Walsh	Systems Integration Engineer	100%
Kenneth Olsen	Information Systems Analyst	60%
Mark Pumphrey	Information Systems Analyst	30%
TBD	Comm & Network Tech Analyst	100%
TBD	Information Systems Analyst	30%
TBD	Applications Programmer	50%
TBD	Fund Manager	100%

The Satcoms Team contact

We use Slack as a primary communication tool

We maintain a wiki about satcoms at hiseasnet.ucsd.edu/wiki

We maintain an internal issue tracking system for HiSeasNet and are active plans to deploy a customer-facing portal that can be accessed via web or email to file specific issues for satcoms-related matters.

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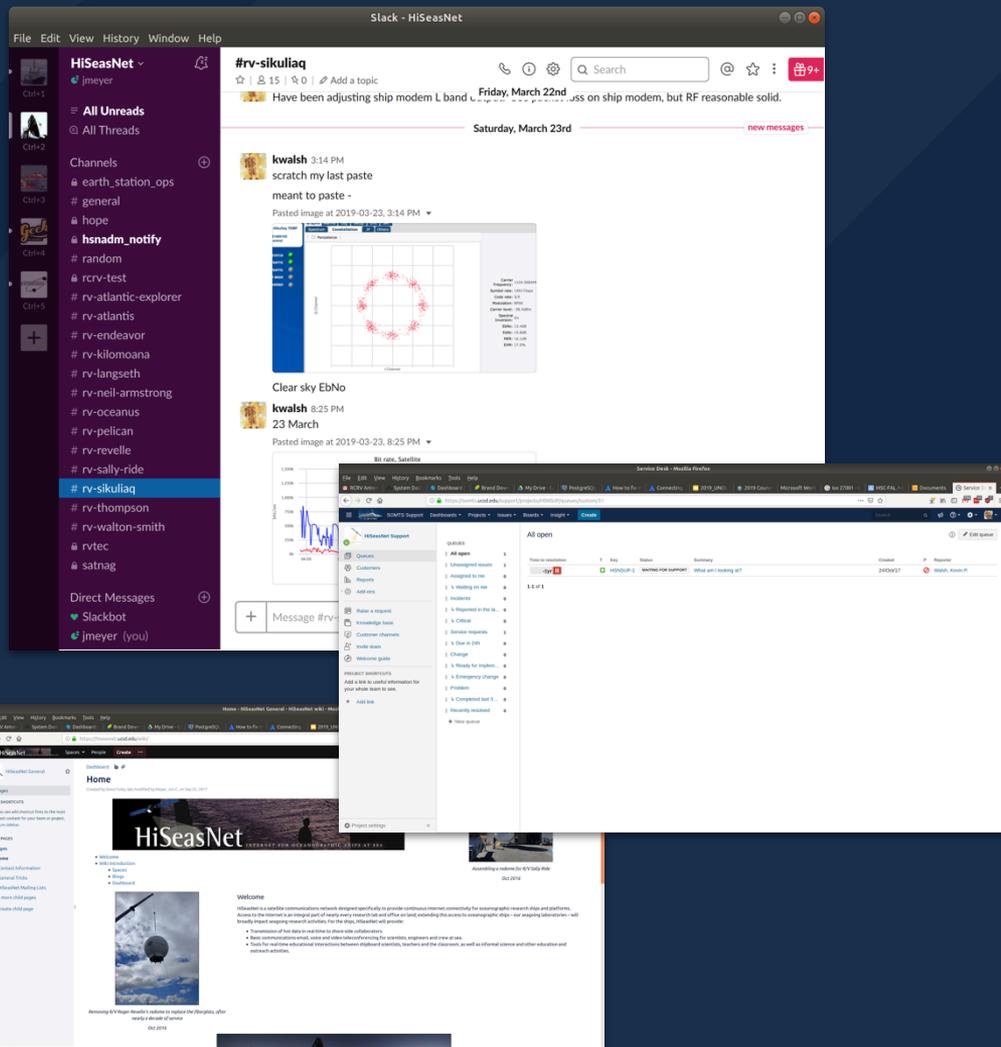
Future Goals

There are several goals we have an eye on that are in the foreseeable future…

Future Goals: Low Earth Orbit and/or Medium Earth Orbit

- Satellite constellations, once deployed, will allow for worldwide access, though some solutions will have coverage gaps in the ocean.
- Launches have started in 2019; we are a few years away from seeing fully functional constellations.
- Closer proximity, so power requirements are less.
- Ka-band is the intended spectrum for delivery from above, to earth -- compatible with our Inmarsat radomes.
- Some vendors intend to only sell spectrum, allowing for private and secure networks -- similar to HiSeasNet, present-day.
- >1Gbps speeds will be possible.
- We may need to partner with other field programs to consolidate expenses.
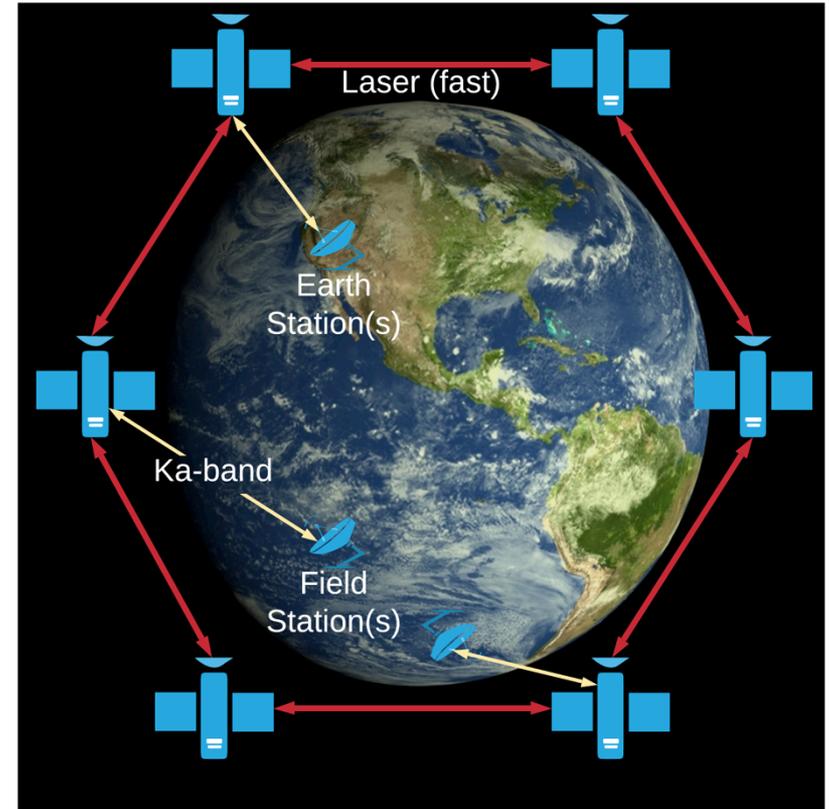
Future Goals: C-band and 5G

C-band frequency spectrum (4-8GHz) is in high demand with geostationary satellites.

5G is looking for available spectrum and wants to consume some of C-band for this. While ocean going use may not be an issue, we are likely to see an interference issue in worldwide ports if we continue to use C-band.

We will stay abreast of this issue as we target solutions going forward.

https://en.wikipedia.org/wiki/5G#Spectrum
https://en.wikipedia.org/wiki/C_band_(IEEE)

Future Goals: IPv6

- The world is essentially out of IPv4 network space
- IPv6 is already being used for popular websites
- Satcoms needs to be able to serve both spaces