OmniAccess
Marine Network Solutions

VSAT communications enabling survey USV operations beyond line of sight

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Autonomous duo to map sea floor

The international GEBCO-NF team has combined two highly automated vehicles - one surface, one submersible - to survey the deep ocean. The group will use the technology to try to win the Shell Ocean Discovery XPRIZE. The Uncrewed Surface Vehicle (USV) was developed by boat designers Hushcraft in the UK. Video courtesy of Hushcraft.

13 Sep 2018

Share

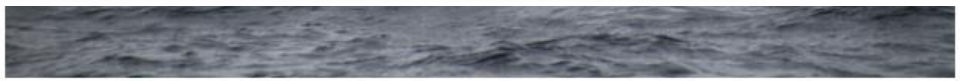
terrorist kills, like

one that took out

Anwar al-Awlaki c

Qaeda in the Arab

Peninsula or Paki



The robotic boat became the first to travel across the Atlantic in an unmanned journey. CREDIT: OFFSHORE SENSING

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By Hasan Chowdhury

4 SEPTEMBER 2018 • 6:08PM

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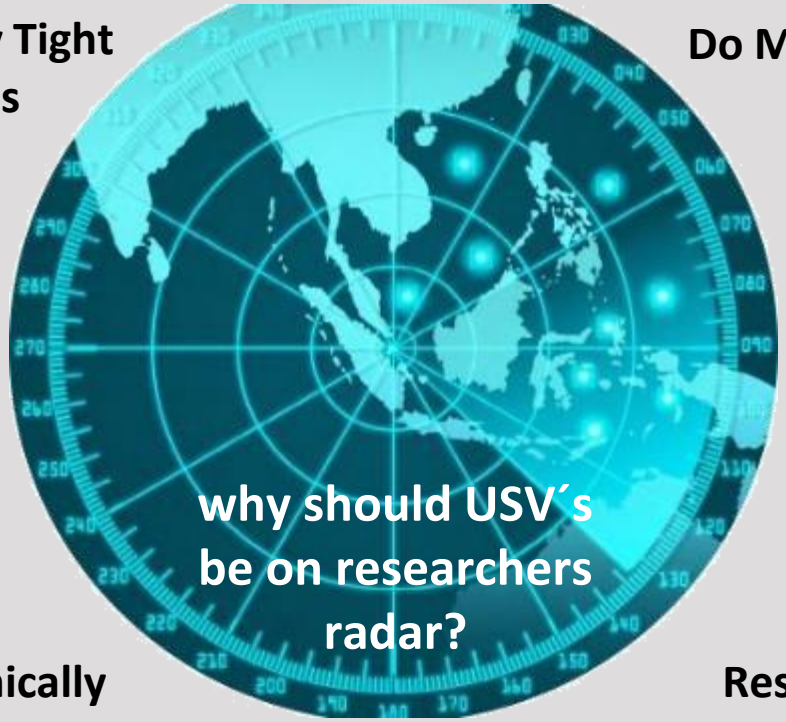
USV´s for Ocean research: a huge opportunity

Current paradigm

USV's paradigm

Increasingly Tight Budgets

Do More with Less



Repetitive Missions

More Time to Analyze Data

Geographically Dangerous

Research in Dangerous Locations

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Current Classes of USVs

	Cargo	Heavy Duty	Medium	Self-Contained	Portable
					
RANGE	Long Range	12 hours – 7 days	Up to 30 days	Indefinite Range	Very Short Range
COMMS	BLOS	BLOS or LOS	BLOS or LOS	BLOS	LOS
POWER	Fuel or Battery	Fuel or Battery	Battery	Solar / Wind / Wave	Battery
APPLICATION	**Shipping**	**AUV, ROV Launch Site** **Surveillance** **Towed Array**	**Science (Limited)** **AUV, ROV Launch Site** **Surveillance**	**Science** **Seafloor-to-Space Network** **Surveillance**	**Science** **Surveillance**

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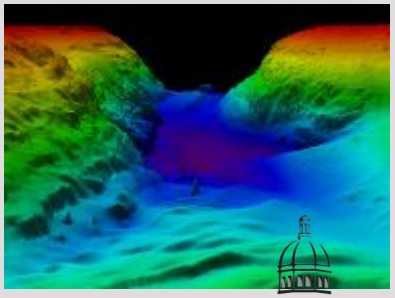
Some Missions Already Using USVs

Heavy Duty



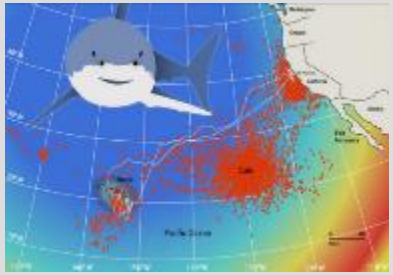
THE UNIVERSITY OF SOUTHERN MISSISSIPPI

PROVIDER

USER

ASV unmanned marine systems

Self-Contained

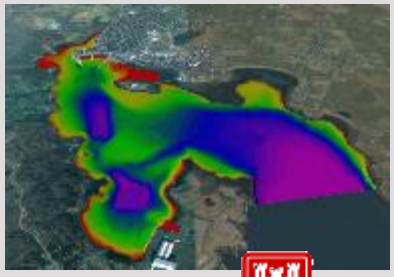


PROVIDER

USER

LIQUID ROBOTICS
A Boeing Company

Medium



US Army Corps of Engineers

PROVIDER

USER

Sea Robotics

Portable

VIRGINIA TECH

PROVIDER

USER

CLEARPATH ROBOTICS

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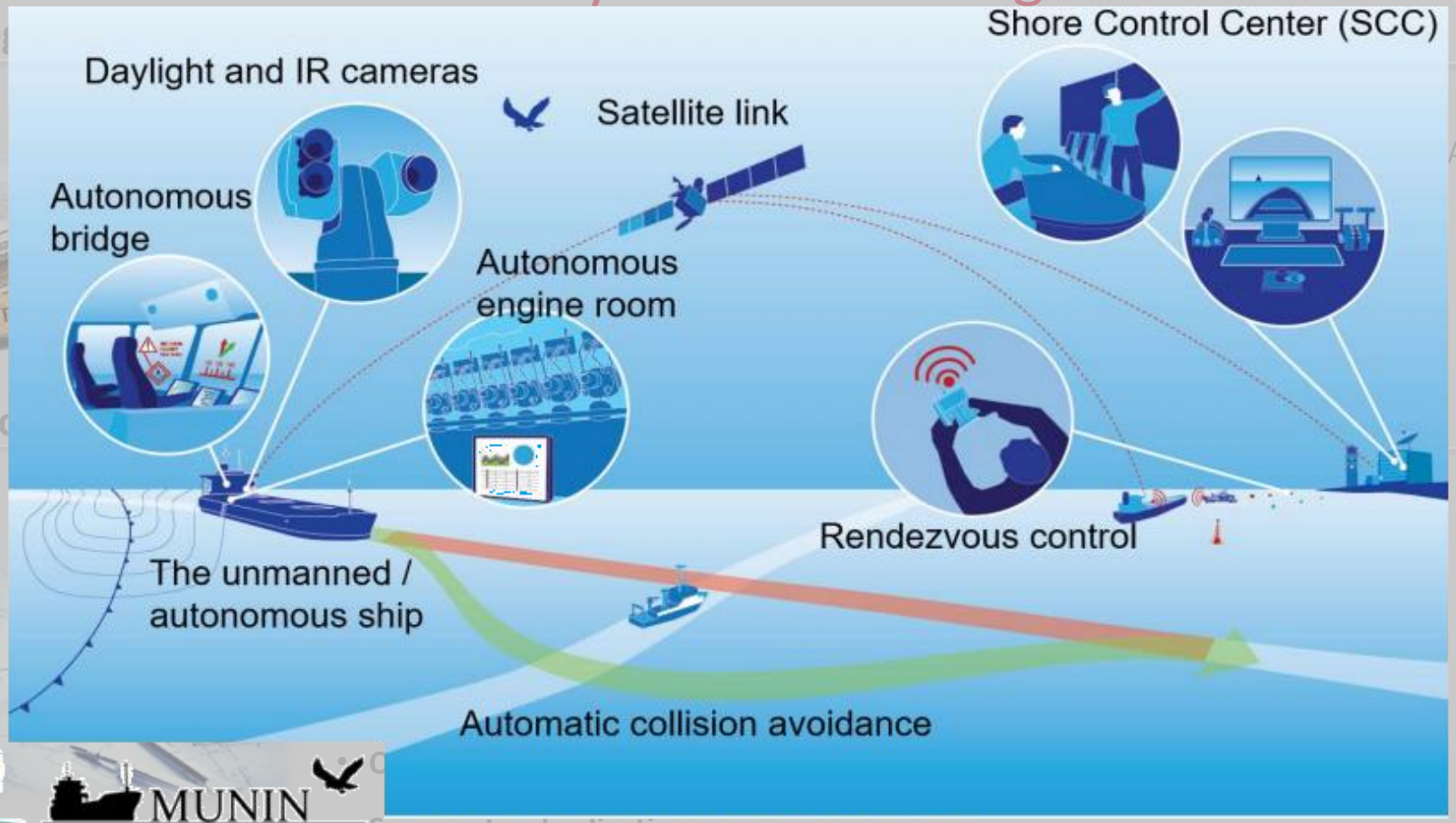
Hurdles for the Industry to Breakthrough



MUNIN 2012-2015

http://www.unmanned-ship.org/munin/

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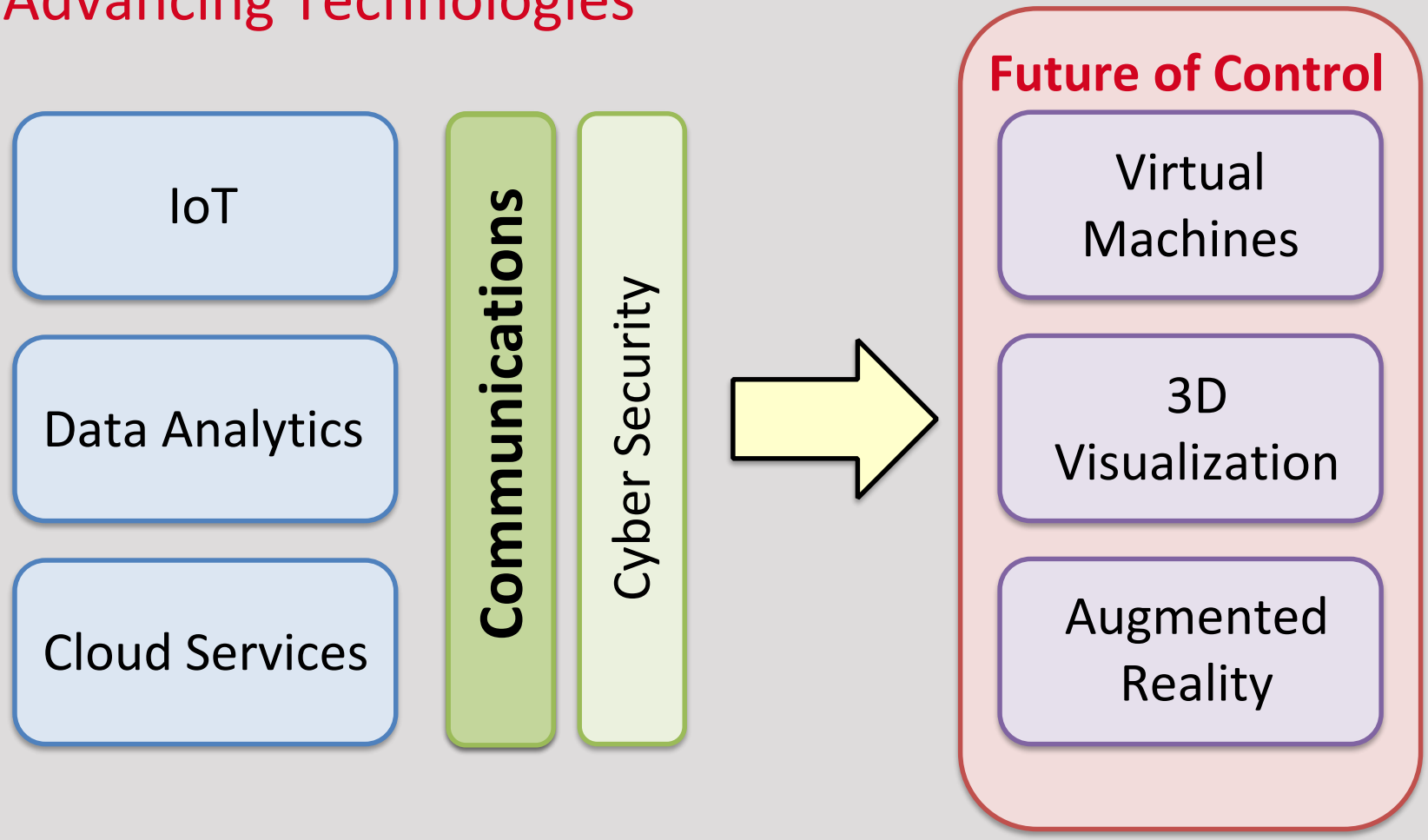
Advancing Technologies



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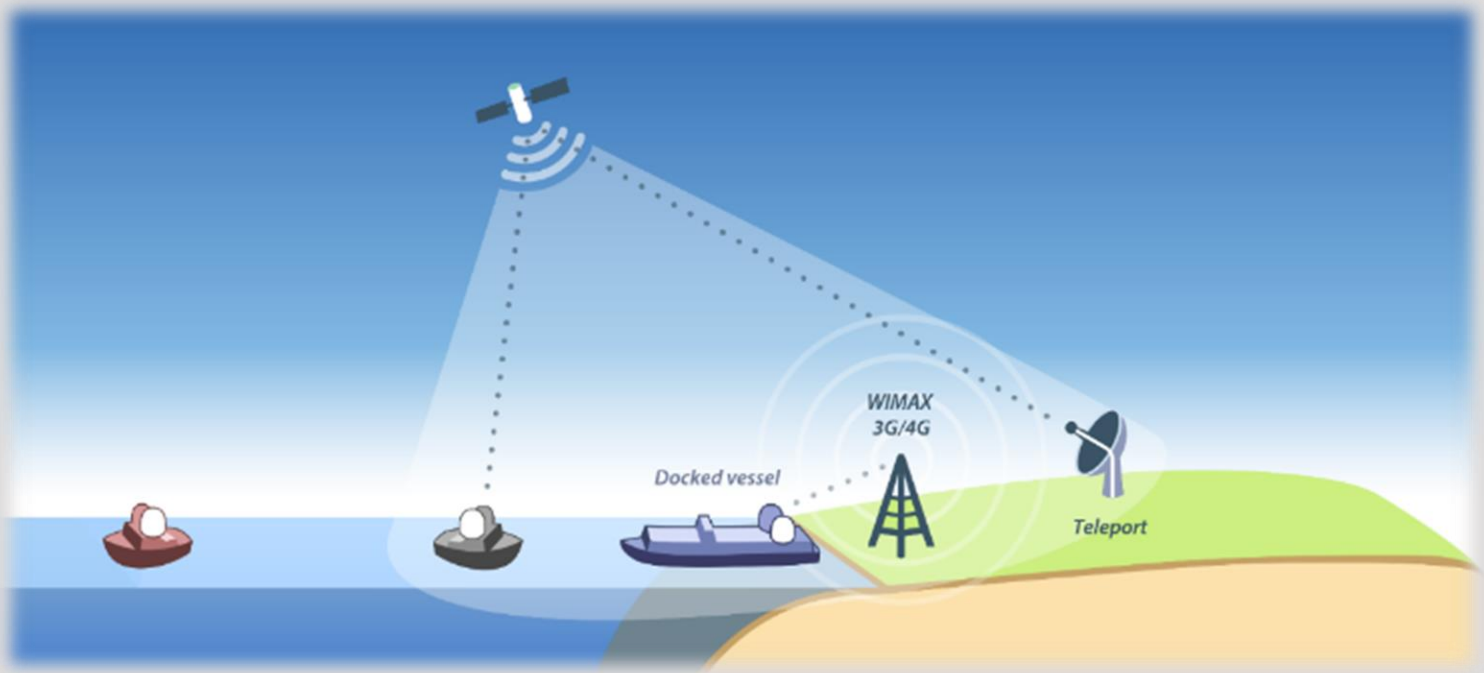
High-Bandwidth everywhere: SATCOM



In the current state of broadband communications, mobile wireless terrestrial communications could be an option for USVs near shore, while satellite represents the only consistent option for data communications at high seas

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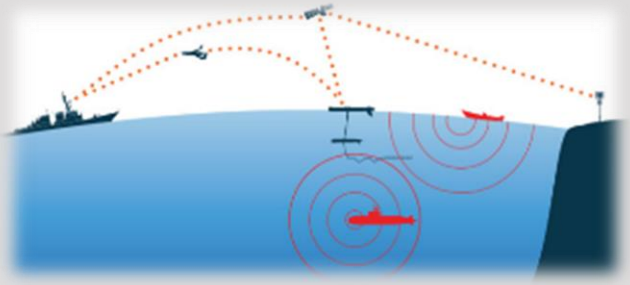
Connectivity Demands for USVs

Large and extra large BWs

Bidirectional

Security

Flexibility



Service continuity

24/7 worldwide support

Worldwide coverage

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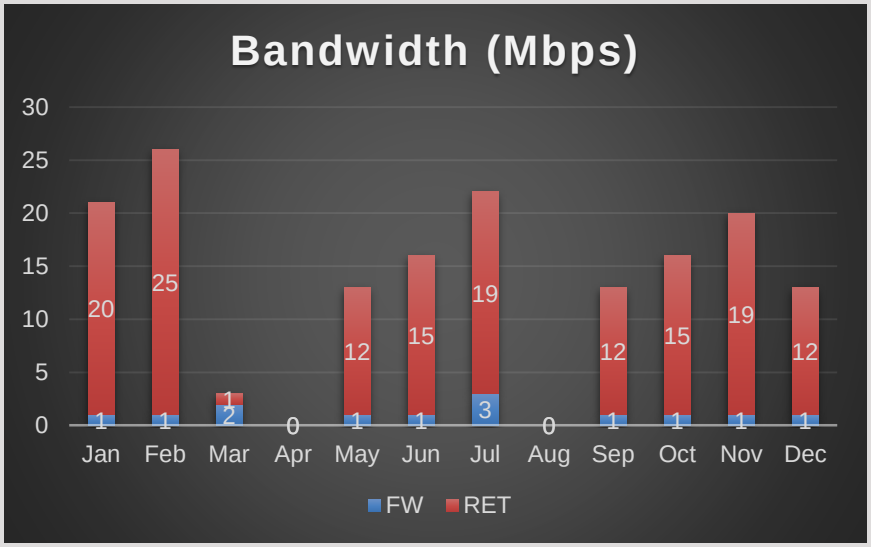
Expected Needs of USVs



GLOBAL COVERAGE

Hard to Reach Locations

FLEXIBLE DEMAND

Uplink Dominate Supported

As Needed Suspension Periods

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Redundant Infrastructure

VSAT

Six Hubs strategically located in Spain, Germany, US, Hawaii and Australia with global NMS

Teleport redundancy, internal redundancy, UPS and redundant satellites

Redundant data-centres (AMS and London) ensuring an SLA of greater than 99.7% as demanded by USVs

99.7%

+

Other Coms

Inmarsat FX and Iridium Certus with improved supportability tools (remote monitoring and control)

Worldwide MPLS network with Gigabit throughput capabilities

Private APN (Access Point Name) for 3G/4G communications where available

Backup

Total

Integrated Communications Solution provided with a single user interface/point of contact allows for a streamlined and high quality experience

≈100%

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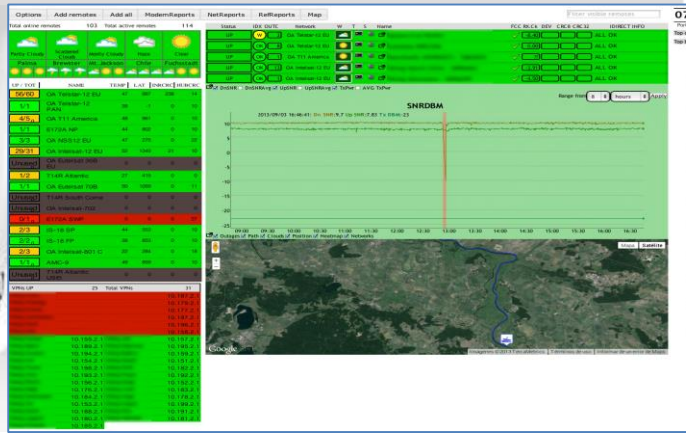
24/7 Service: Network Operation Centre

- 24 hours a day, seven days a week, 365 days a year.
- 25 highly specialized engineers (3 shifts), and complemented by the travelling onsite technicians team.
- NOC staff certified for the VSAT platform (iDirect), antenna systems (Cobham, Intellian, Orbit), Iridium, Inmarsat and IT systems (Cisco, Xiplink etc.)
- Currently operating +32 Ku band and 6 C band VSAT networks spread over +18 Satellites

NOC Engineers + Field Engineers = <u>24/7 Full Support</u>



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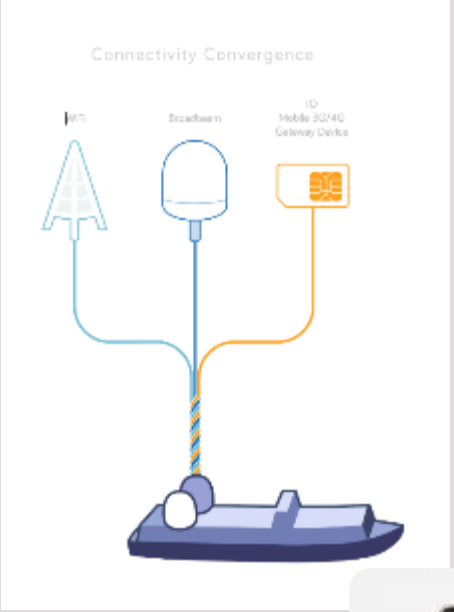
Monitoring & control tools



User segmentation and network management

Plexus Controller

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Complications with Current VSAT Solutions

Heavy

Many Moving Parts

Energy Intensive

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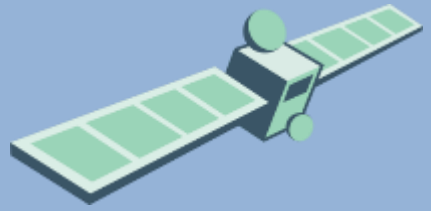
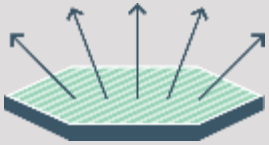
A Road Map to the Future

USV

Today	Mid-Term	Long-Term
 High Throughput Satellites	 5G	 LEO Earth Low Earth Orbit
 60 Centimeters Antennas	 Mesh Networks	 Flat Panel Arrays

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Proven Experience

Research Perfected

Research Vessels

+

USVs

Experience in 60 Centimeters

- > 70 Vessels
- Providing High Bandwidths
  - Shore to ship 30 Mbps
  - Ship to shore 10 Mbps
- Near global coverage (incl. Antarctica)

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Our Technological Future

PHASOR

- Strategic agreement in place from 2014
- In Sept 2016 September Phasor demonstrated the transmission of live HD video over the Intelsat 903 satellite from its test site in Essex, UK to our teleport.
- Following a test a bigger Rx antenna in one of our cruise vessels

KEPLER

Store and forward LEO

OmniAccess to Begin Testing and Trials on Telesat's Recently Launched Phase 1 LEO Satellite

Modem evolution

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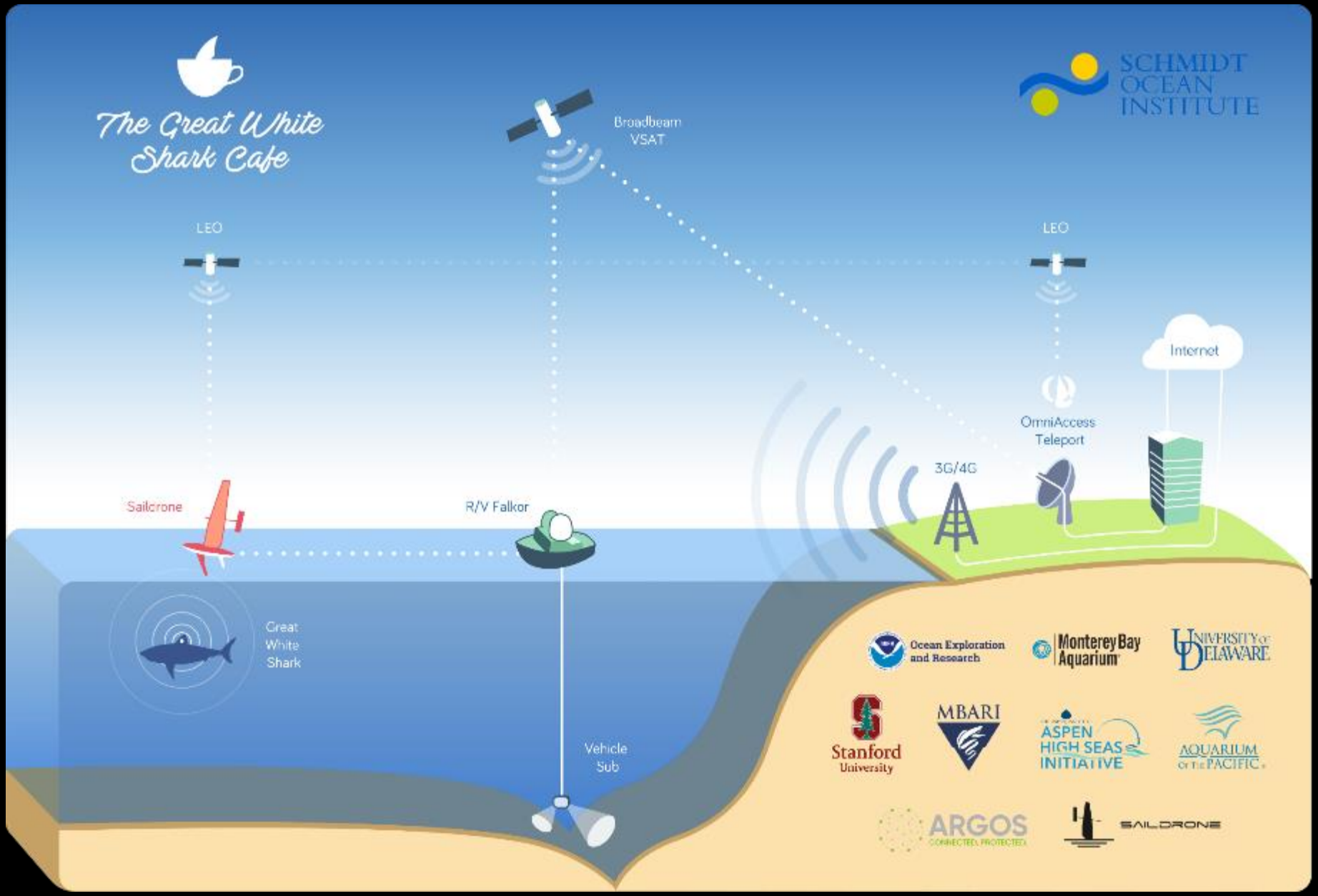
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Broadbeam VSAT
LEO
LEO
Internet
OmniAccess Teleport
3G/4G
Sailcrone
R/V Falkor
Great White Shark
Vehicle Sub
Ocean Exploration and Research
Monterey Bay Aquarium
University of Delaware
Stanford University
MBARI
ASPEN HIGH SEAS INITIATIVE
AQUARIUM OF THE PACIFIC
ARGOS
SAILDRONE

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Conclusions

Unmanned Surface Vehicle revolution is on the horizon and already arriving

VSAT services are mature enough to serve in demanding operational environments such as USVs

Recent technology evolutions enable consistent forward and return throughputs unthinkable some years ago

Current VSAT services are **already** enabling USV based survey missions

Thank You!

Jorge Calvin

Senior Account Manager

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