

DISCOVER THE OCEAN. UNDERSTAND THE PLANET.

OCEAN NETWORKS CANADA QUASI REAL-TIME UNDERWATER MONITORING AND CONTROL SYSTEMS

OCEAN
NETWORKS
CANADA

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Ocean Networks Canada

ICOE, 2014-11-05

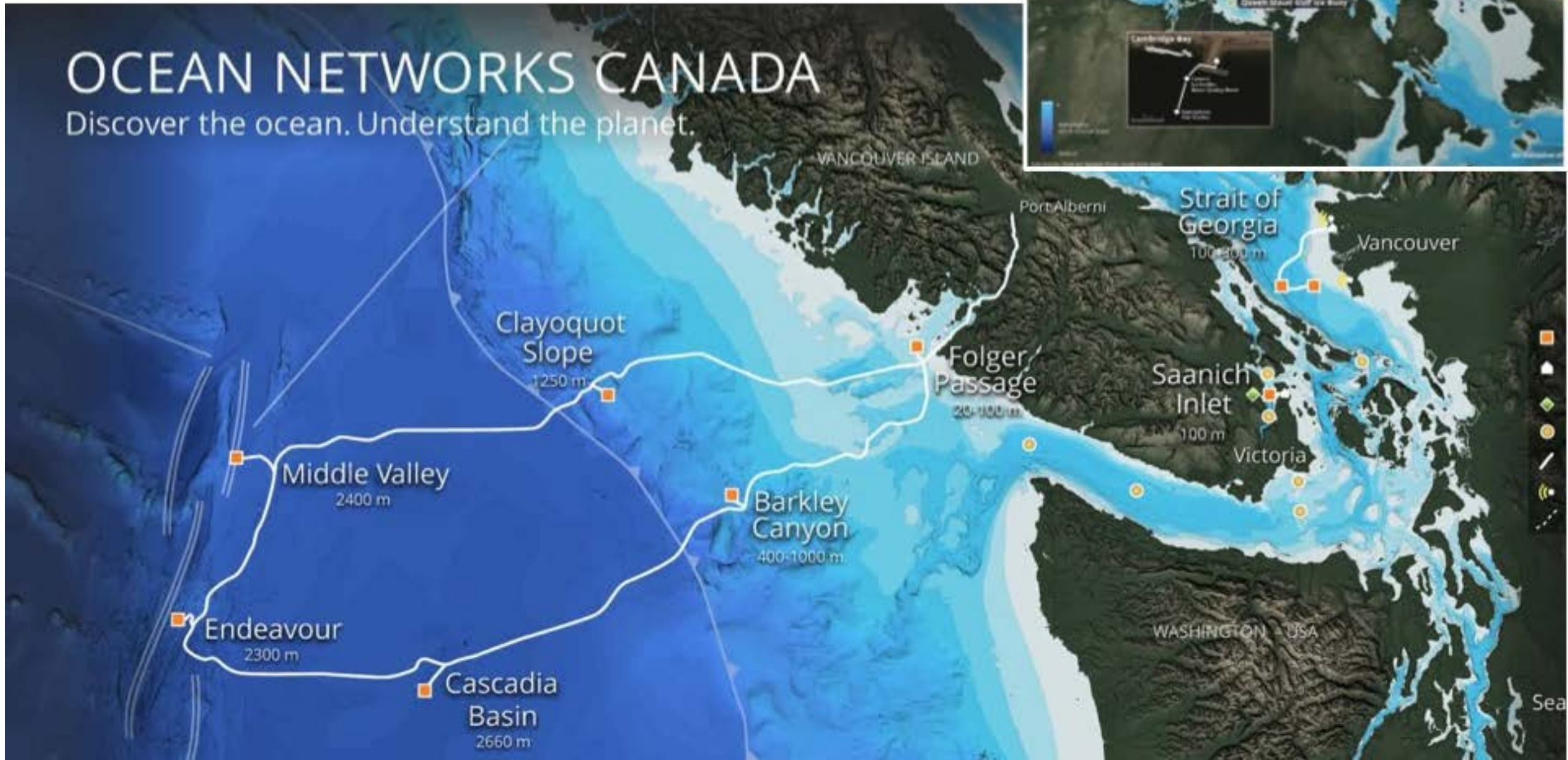
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DISCOVER THE OCEAN. UNDERSTAND THE PLANET.

OCEAN NETWORKS CANADA

Discover the ocean. Understand the planet.



CABLED OCEAN OBSERVING SYSTEMS

- ❖ Hierarchical layering of infrastructure to extend the Internet from coast to the deep sea
- ❖ Telecom grade electro-optic cable
- ❖ High bandwidth data communications
- ❖ Over 100kW of power, distances over 1000km
- ❖ Real time access to network of hundreds of sensors
- ❖ High temporal sampling over long time periods
- ❖ Unprecedented understanding of marine environment and domain awareness

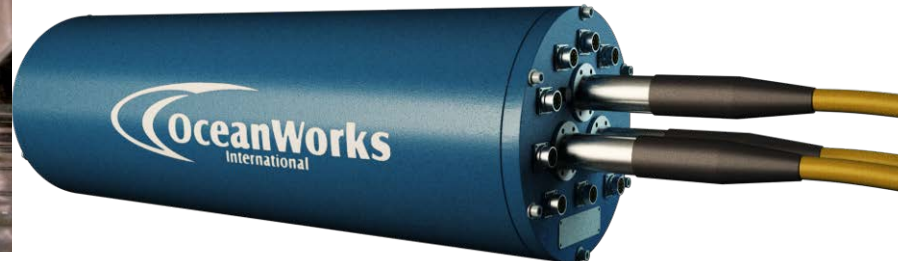
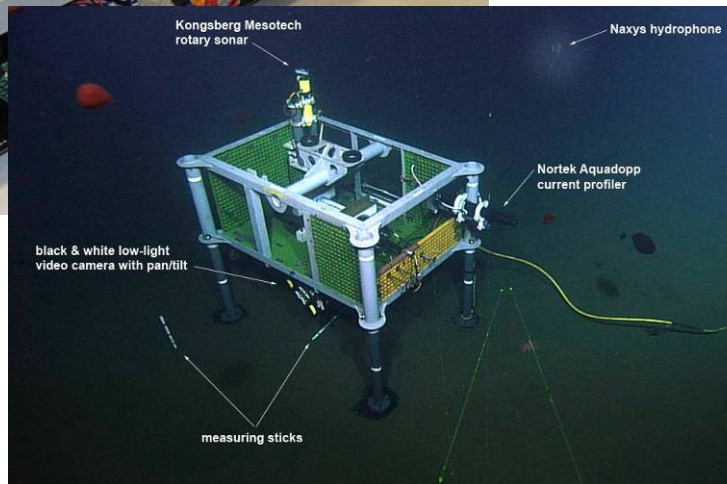
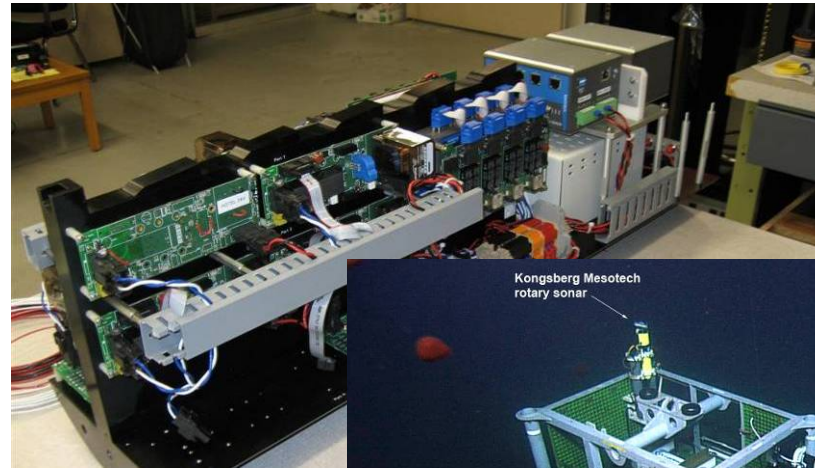
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PRIMARY INFRASTRUCTURE

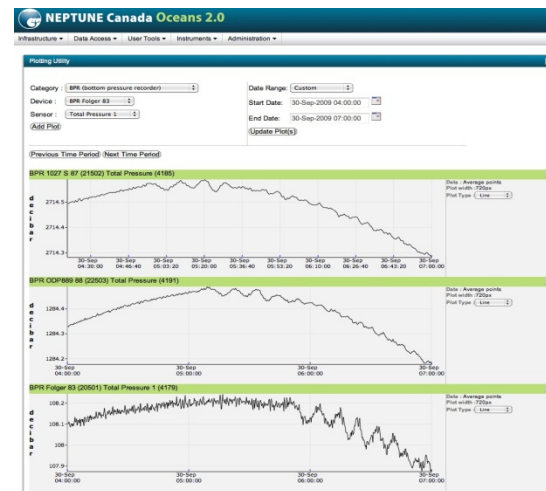
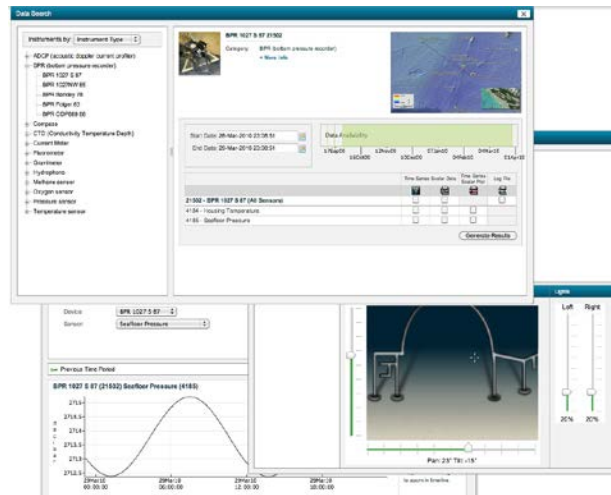
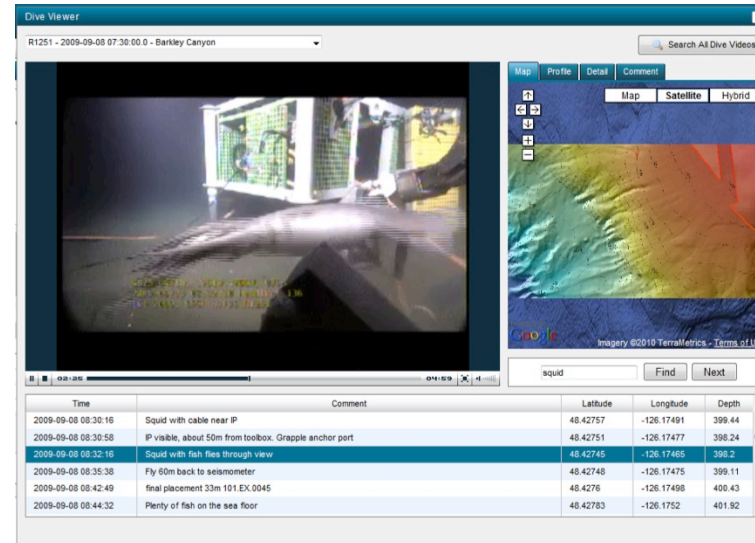
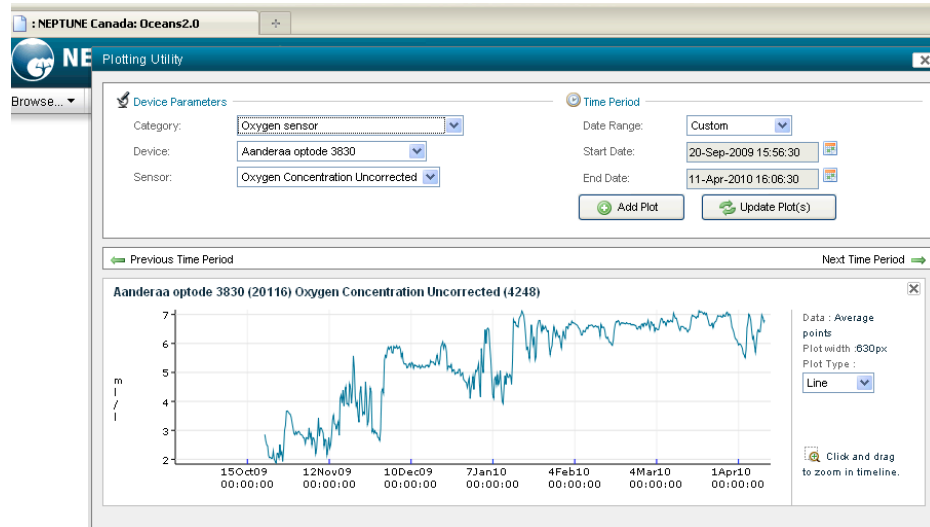
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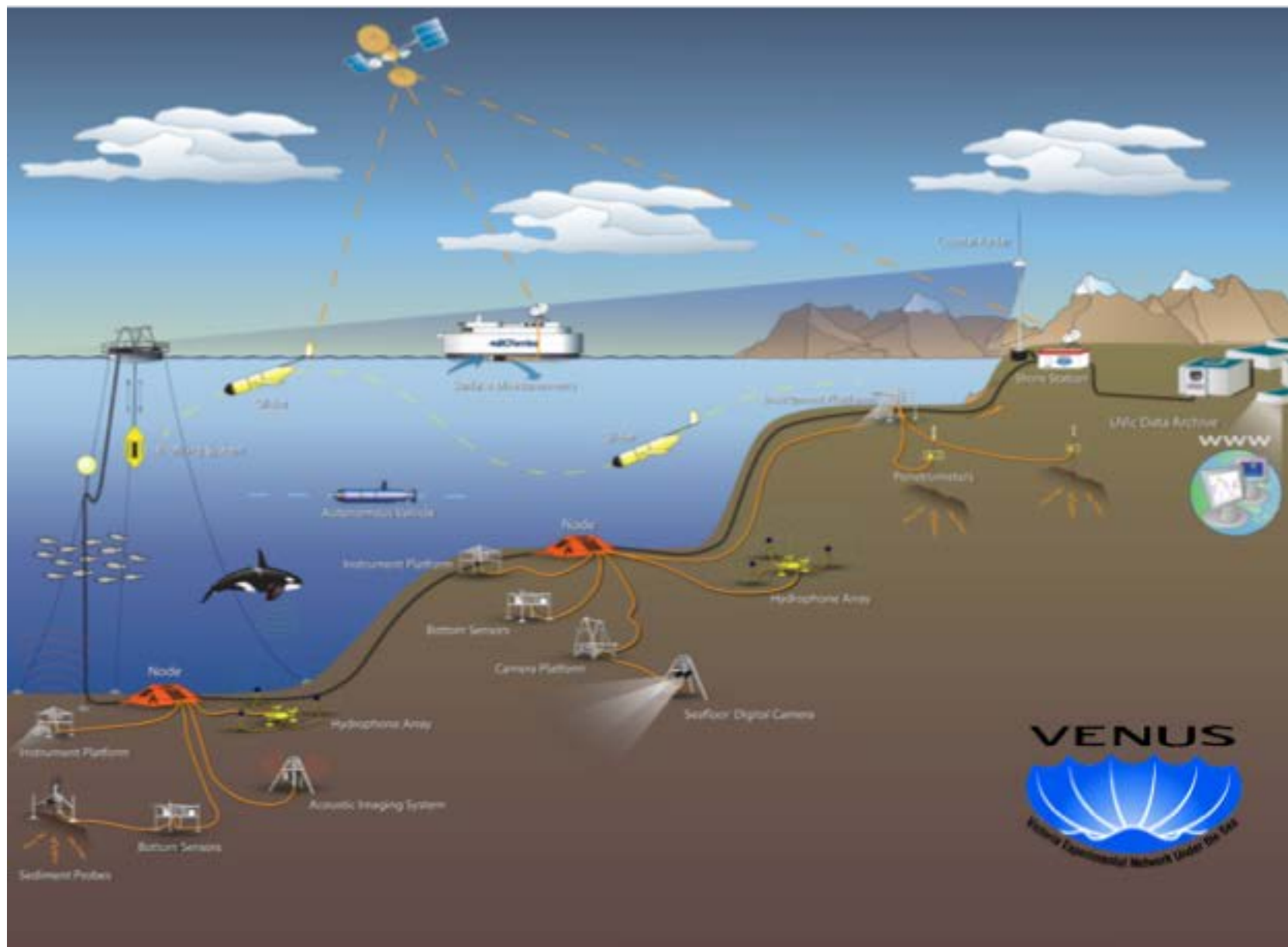


SECONDARY INFRASTRUCTURE



OCEANS 2.0





VENUS

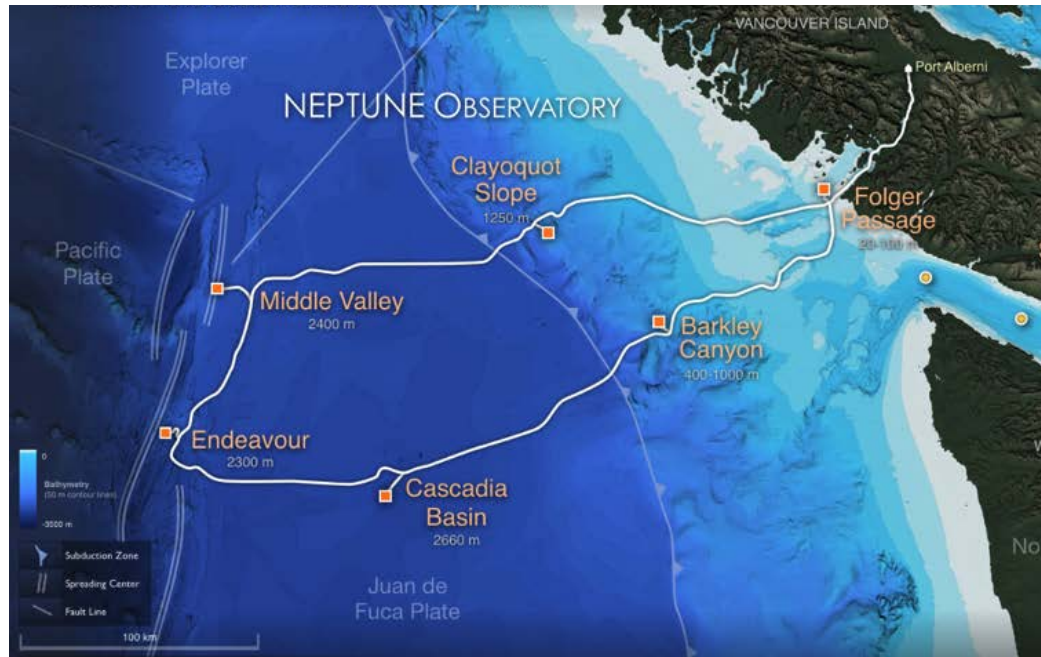


- Operational since 2006
- 44km electro-optic cable
- 2Gbit data
- 6kW power
- 80 sensors
- 4 Primary Science Sites
- 40-300m

Major research themes

- Tracking events
- Zooplankton & fish behaviour
- Marine mammal communications
- Water currents & ocean renewal
- Sediment dynamics
- Testbed for coastal technologies

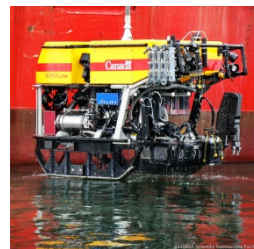
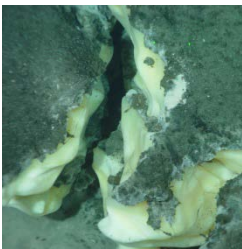
NEPTUNE



- Operational since 2009
- 800km electro-optic cable
- 32Gbit data
- 160kW power
- 300 science sensors, 1200 engineering sensors
- 5 Primary Science Sites
- 10-2700m

Major research themes

- Climate change
- Plate tectonics
- Gas hydrates & crustal fluids
- Deep sea ecosystems
- Engineering & computational science
- Testbed for deep ocean technologies



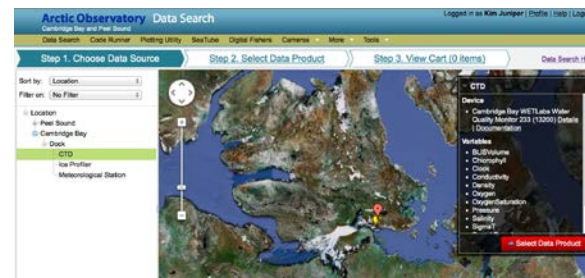
CAMBRIDGE BAY



- Operational since 2012
- 100m electrical cable
- 100Mbit data
- 200W power
- 10 sensors
- 7m
- Satellite com backhaul

Major research themes

- Arctic climate change
- Ice behavior
- Marine mammal behavior
- Testbed for Arctic sensor technologies



ONC NEPTUNE USERS: 2013

FEATURE | DEEP NETWORK

Global reach Last year, NEPTUNE's online viewing portal logged some 275,000 visits, including visits from both researchers and curious Web surfers. Visitors came from all over the world. The 10 nations with the highest number of visits are shown below and right. SOURCE: OCEAN NETWORKS CANADA

- | | |
|------------------|-------------------|
| 1. Canada | 6. United Kingdom |
| 2. United States | 7. France |
| 3. Ukraine | 8. Germany |
| 4. Russia | 9. Spain |
| 5. China | 10. India |



SMART OCEAN SYSTEMS™



SMART
OCEANS
BC

SMART OCEANS BC

- ❖ Marine safety
- ❖ Public safety
- ❖ Baseline and long term environmental monitoring
- ❖ Work with industry partners to develop showcase of Canadian technologies monitoring the BC coast
- ❖ Create operational data products

OCEAN NETWORKS CANADA INNOVATION

SMART OCEAN SYSTEMS™

OCEAN NETWORKS CANADA INNOVATION


PACIFIC OCEAN

Environment Sensors	
■	Installed
□	Smart Ocean

Marine Safety Sensors	
▲	Installed
△	Smart Ocean

Public Safety Sensors	
★	Installed
☆	Smart Ocean

Existing/Potential Marine Terminals	
●	Liquefied Natural Gas
●	Tidewater Oil Exports

AN INITIATIVE OF  University of Victoria
Data Sources: Smith and Sandwell, USGS Coastal, GeoBase

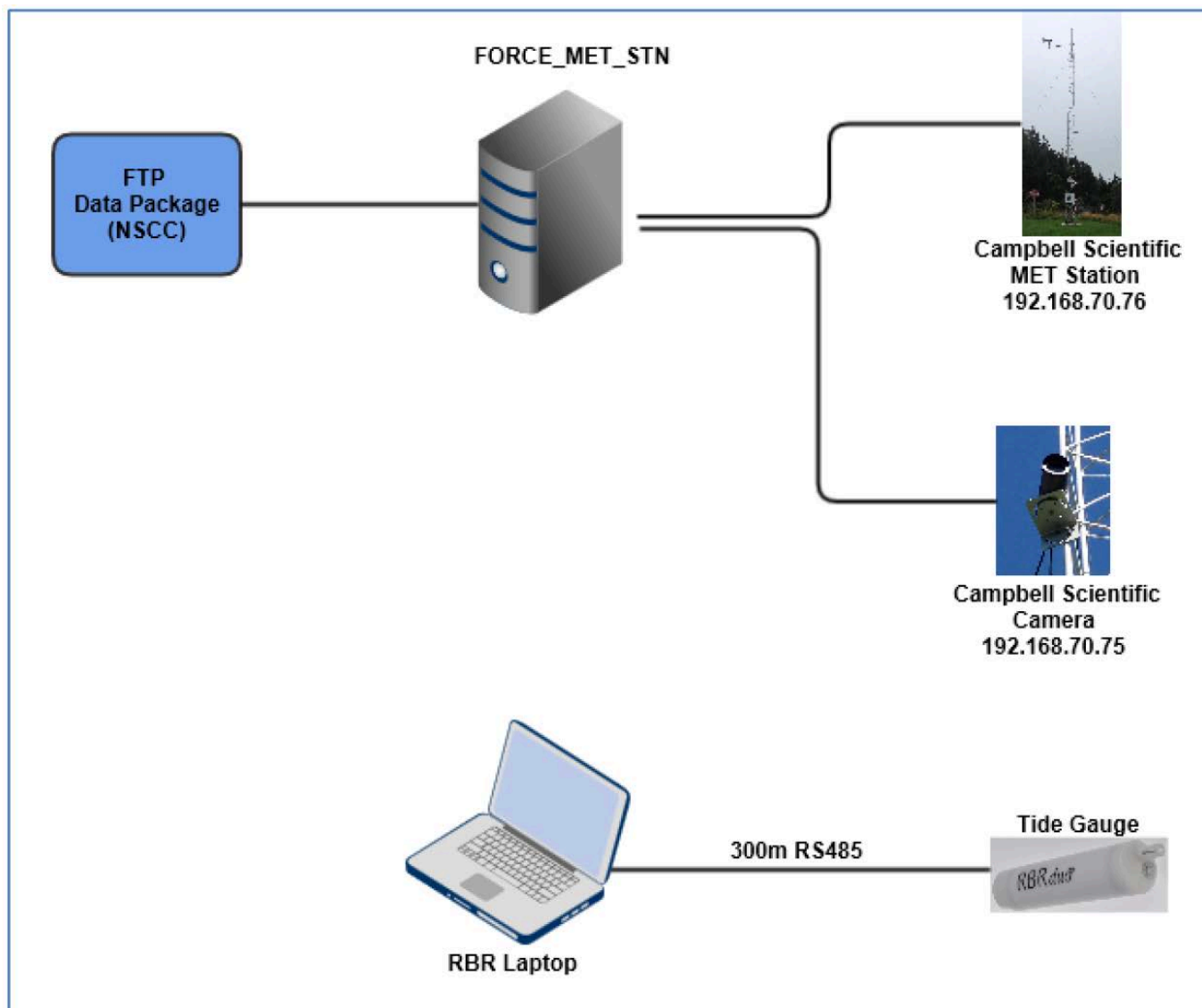
Sensor systems

- ❖ Surface currents
- ❖ Sea state
- ❖ Hydrophones
- ❖ Water Quality
- ❖ Tsunami
- ❖ Earthquake Pwave
- ❖ AIS
- ❖ Weather

FORCE

FORCE PLATFORM PROJECT

- ❖ Ongoing environmental monitoring
- ❖ Assess performance of tidal energy devices
- ❖ Assess effect on the environment



COLLABORATE. PARTICIPANT. INNOVATE.

THANKS!

Scott McLean – Director, ONC Innovation Centre

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