Established in 2007 as a major initiative of the University of Victoria, Ocean Networks Canada (ONC) operates world-leading ocean observatories for the advancement of science and the benefit of Canada. The observatories collect data on physical, chemical, biological, and geological aspects of the ocean over long time periods, supporting research on complex Earth processes in ways not previously possible.

The observatories provide unique scientific and technical capabilities that permit researchers to operate instruments remotely and receive data at their home laboratories anywhere on the globe in real time. These facilities extend and complement other research platforms and programs, whether currently operating or planned for future deployment.

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CELEBRATING 10 YEARS OF PIONEERING OCEAN SCIENCE.

Cast your mind back to 2006. A NASA probe went into orbit around Mars, Twitter was born, and the iPhone was still just a twinkle in Steve Jobs’ eye.

It was also the year that Ocean Networks Canada (ONC) made history by installing the world’s first interactive real-time portal into the ocean. This allowed scientists, policy-makers, educators, and the public to “enter” the ocean from anywhere, at any time.

On 8 February 2006, the world’s most advanced cabled seafloor observatory was successfully installed in Saanich Inlet near Victoria, British Columbia and live data began streaming from instruments on the seafloor to computers around the world. This around-the-clock access to the ocean revolutionized ocean research.

Previously, gathering ocean data was limited to research expeditions—ocean scientists on board research vessels taking isolated measurements that provided a snap shot perspective of the ocean. Now, after 10 years of observatory science, ONC has accumulated the longest high resolution time-series of data that monitors the physical health of the ocean.

1990s Dreams began to coalesce around the technological realities of cabled seafloor observatories that could solve some of oceanography’s most difficult problems.

2000-01 Canadian and U.S. partnerships were formed and feasibility studies were conducted. The University of Victoria joined the partnership in 2001.

2002 The Canada Foundation for Innovation funded NEPTUNE and VENUS; matching funds came from the British Columbia Knowledge Development Fund.

2004 NEPTUNE and VENUS staff and organization were set up; design of the observatories and data management system began.

2006 VENUS, the world’s first advanced 24/7 seafloor, cabled observatory, was installed in Saanich Inlet.

2007 VENUS expanded into the Strait of Georgia; the University of Victoria established ONC, a not-for-profit society, to oversee the governance and management of the NEPTUNE and VENUS observatories.
2009 NEPTUNE, the 800km power and Internet connected cable loop off Canada’s west coast, went live.

2009 ONC was established as a Centre of Excellence in Commercialization and Research to strengthen Canada’s international leadership role in ocean observing science and to accelerate the growth of new technology.

2011 The first coastal radar was installed on British Columbia’s coast to measure ocean current speeds and direction.

2012 The University of Victoria consolidated NEPTUNE, VENUS and the Commercialization Centre under ONC; the first BC Ferry was equipped with ONC instrumentation.

2012 The first Arctic Ocean community observatory was installed in Cambridge Bay, Nunavut.

2013 ONC’s Centre of Excellence for Commercialization and Research was renewed with a $4.1M grant and renamed the ONC Innovation Centre.

2014 ONC began hosting data from the Atlantic Ocean for research and development of tidal energy by collaborating with the Fundy Ocean Research Centre for Energy.

2015 Innovative technologies were launched; the Community Fishers App won the Economist award; and the new Underwater Listening Station supported the Port of Vancouver’s initiative to decrease the impact of shipping on marine mammals.

2015 ONC delivered a specialized App when Environment and Climate Change Canada requested a customized web weather portal for the Pan Am Games.

2016b ONC received funding from Emergency Management BC to install the technology that will deliver a system for earthquake early warning.

2016b ONC’s new vision was launched; observing systems were installed in Tofino, Campbell River, Kitamaat Village, Prince Rupert, and the Strait of Georgia.

“ONC was named one of the 10 most ambitious experiments in the Universe.”

POPULAR SCIENCE MAGAZINE, 2011.
In 2015, Ocean Networks Canada (ONC) conducted a detailed strategic review to align with the expanded stakeholder community that includes new scientific areas of research (e.g., along the British Columbia coast, and in the Arctic Ocean and the Bay of Fundy) and other partners (e.g., ports, industry, and governments).

This retrospective look resulted in a fresh strategic vision that requires ONC to deliver on its goals through directed actions by all staff. Together, these elements—ONC’s new vision, key goals, and actions plans—form the foundation of ONC’s strategy for the years 2016 to 2021.

Vision

Ocean Networks Canada enhances life on Earth by providing knowledge and leadership that deliver solutions for science, society, and industry.
Key Goals

1. Seek to become indispensable to the federal and provincial governments and the national and international ocean science community; ONC is the go-to organization for ocean science.

2. Continue to develop and deliver world-leading ocean data, products, and services; ONC is a bridge between academia and commerce.

3. Expand infrastructure nationally; ONC has a network of underwater observatories around the country.

4. Develop leadership capabilities; ONC becomes a united and focused organization that attracts and retains top performers.

Actions

To reach these goals over the next five years, ONC will:

• Build on its world-leading reputation and awareness;
• Create invaluable partnerships;
• Attract stable, ongoing funding;
• Deliver reliable infrastructure;
• Lead with innovative solutions;
• Diversify and provide big data and analytics;
• Expand the user community; and
• Create an engaging culture.
Launched in 2014, Smart Ocean Systems™ made significant progress in 2015 with the installation of ocean monitoring systems in Tofino, Campbell River, Kitamaat Village, Prince Rupert, and the Strait of Georgia.

**Tofino, BC**  
**Nuu chah nulth Territory**
A WERA remote sensing system was installed to scan for large events such as tsunamis and storm surges. Using 12 land-based antennas with a range up to 80 km, the WERA system specializes in over-the-horizon radar technology to monitor surface currents, waves, and wind direction.

**Campbell River**  
**Kwakwaka’wakw + Coast Salish Territory**
A community observatory equipped with a weather station and camera onshore and cabled subsurface instruments that monitor water quality, listen for whales and vessels, and provide live-stream video from an underwater camera was installed. This location is also equipped with an automatic identification system antenna to track large vessels in the region. Nearby, at the Cape Mudge lighthouse on Quadra Island, is a WaMoS radar system capable of measuring surface currents, wave heights, and wave direction.

**Kitamaat Village**  
**Haisla Nation**
Located at the head of Douglas Channel, a community observatory equipped with a weather station and camera onshore and cabled subsurface instruments that monitor water quality, listen for whales and vessels, and provide live-stream video from an underwater camera was installed. This location is also equipped with an automatic identification system antenna to track large vessels in the region.

**Prince Rupert**  
**Ts’msyen Territory**
On Digby Island, a community observatory equipped with a weather station and camera onshore and cabled subsurface instruments that monitor water quality, listen for whales and vessels, and provide live-stream video from an underwater camera was installed. Nearby, a radar system provides data on sea surface currents and a co-located automatic identification system antenna tracks ships in Chatham Sound. Further south, a second radar installation at Ridley Island provides two additional complementary radar systems—one to work with the Digby Island radar to extend coverage of the region’s sea surface currents, and another to measure waves within a shorter range. Automatic identification system antennas at both Digby and Ridley Islands also track large ships in the region.

**Strait of Georgia**
In the southern Strait of Georgia, three CODAR systems were installed to expand the range of available sea-state data spanning the mouth of the Fraser River, the entrance to Port of Vancouver, and the well-travelled passage leading to Juan de Fuca Strait. It will also help validate regional tidal...
Local Observations. Global Connections.

Coastal communities are facing a wide range of rapid ocean changes. Access to up-to-date scientific data enables communities to make informed decisions about their own coasts. ONC fosters ocean literacy by collaborating with Indigenous knowledge holders and local experts to develop resources and programs for students, citizen scientists, and community leaders.
Ocean Networks Canada’s (ONC) Expedition 2015, Wiring the Abyss, was an ambitious operation with three ships involved in 24/7 operations and maintenance work at all eight sites on the observatories.

Thanks to the telepresence capability on two of the ships, people from around the world watched the live, deep sea robot dives from their computers and submitted questions in real time for the duration of the 24-day expedition. In addition, 14 live, televised telepresence sessions were conducted with schools, colleges, and community groups from as far away as Hawaii.

Highlights of the expedition:

• The deployment of the eleventh set of pigs in the Strait of Georgia for forensic scientists at Simon Fraser University to estimate time-of-death information vital to homicide investigations;
• Collecting 3D photography of major vent fields at Endeavour for visiting scientist Tom Kwasnitschka from GEOMAR in Kiel, Germany;
• Deploying a test tiltmeter built by the Geological Survey of Canada in preparation for Woods Hole Oceanographic Institution’s tiltmeter installation at Cascadia Basin in 2016. The tiltmeter measures tectonic strain along the Cascadia subduction zone;
• Testing a microbial fuel cell for the U.S. Naval Research Lab, which will use the power of microbes to generate electricity to power autonomous instrumentation in the future;
• Downloading data from the autonomous tsunami meter bottom pressure recorders at Cascadia Basin, including data from the Haida Gwaii tsunami;
• Servicing moorings in the Juan de Fuca Strait that support data collection for Victoria’s Capital Regional District sewage outfall;
• Deploying eight hydrophones for the Fraser Port Authority’s listening station project ECHO to study the impact of ship noise on marine mammals; and
• Installing autonomous instruments at Barkley Canyon to continue long-term monitoring while this site was offline (reconnected in June 2016).
Watch our Wiring the Abyss Video.

“I am thrilled to be bringing E/V Nautilus to Canada to support these advanced observatories that align with our mission to explore the world’s ocean utilizing live telepresence capabilities; to develop innovative technology to enable exploration; and to inspire and educate the public and the next generation of explorers.”

BOB BALLARD, PRESIDENT, OCEAN EXPLORATION TRUST.

BY THE NUMBERS (AS OF MARCH 2016)

50+ Instrumented sites.

850+ km of seafloor backbone cable.

9,000+ Measurement sensors.

10 Radars installed.

3 BC Ferries instrumented.

2 Water profilers.

1 Glider.
UNDERSTANDING OUR CHANGING OCEAN.

An updated Science Plan 2016-2021 that provides strategic focus for the observatories’ research and commercialization, and supports the expanded stakeholder community including new scientific areas of research, was completed.

Science Theme Leaders were assigned. Their strategic activities will increase the scientific output and impact of the Ocean Networks Canada (ONC) infrastructure and provide strategic advice on the development of new research initiatives across ONC’s four main science themes:

• Understanding human-induced change in the northeast Pacific and Arctic Oceans;
• Life in the environments of the northeast Pacific and Arctic Oceans;
• Interconnections among the seafloor, ocean, and atmosphere; and
• Seafloor and sediment in motion.

Crabs everywhere!
A mystery caught on camera.

High resolution video cameras on ONC’s seafloor observatories offer a rare glimpse of undersea life in the Pacific Ocean. The keen eye of a citizen scientist who was watching ONC’s live video footage witnessed a mass migration involving thousands of tanner crabs one February afternoon. What is even more extraordinary is that this ocean citizen scientist, Michael, a post-office worker, lives deep in the American heartland in Minnesota, 1000 miles from the ocean. Michael alerted ONC’s science team by email and initiated what became a leading-edge conversation about what caused this abundant migration of crabs.

Spring bloom arrives early this year.

Every spring, plant-like cells known as phytoplankton will grow in numbers so rapidly and to such an extent that in many coastal areas—such as British Columbia’s Strait of Georgia—the water will become visibly green. The 2015 bloom, which peaked on 11 March, was the earliest seen since 2005.

Mystery migration of 100s of tanner crabs on NE Pacific seabed intrigues scientists. #cdnsci.

Watch our Crabs everywhere video.
Three BC ferries monitor the Strait of Georgia.

Sensors on a third ferry were added to ONC’s mobile assets. With instrumentation in each ferry’s hull and a weather station on deck, scientists can now observe ocean surface properties continuously while the ferries transit the Strait between Vancouver and Vancouver Island. The Strait is a vital waterway and is of great interest to scientists around the world. The Fraser River is the single largest influence on the nature and character of the Strait, and has a great impact on ocean circulation and marine life, including the salmon and herring fisheries.

Barkley Canyon under the microscope.

At Barkley Canyon, a submarine canyon and continental slope, ONC collects a vast amount of data from eight instrument platforms that, for the last five years, have attracted scientists from around the world and across disciplines. In January 2015, ONC’s link with the node was lost due to a trawling incident, halting all data delivery from this site. In October 2015, ONC hosted a Barkley Canyon Refresh Workshop that brought researchers from across North America and Europe to review science goals and areas requiring additional study, and to develop a plan for the future of Barkley Canyon observing once the node was repaired.
Visiting scientist collects extensive photogrammetry of Endeavour hot vents.

Tom Kwasnitschka, a deep sea volcanologist from Kiel, Germany, spent six months with ONC and sailed on the 2015 expedition to collect photogrammetry of the Endeavour hot vents. Armed with this data, he built 3D models of the vent structures that help scientists observe changes in the geology and biology over time. Part of Tom’s future vision is to ingest the data into a virtual simulator so that, one day, humans truly can experience walking on the seafloor.

These crime solvers are real pigs.

After nine years, three locations, and major publications, forensic scientists Lynn Bell and Gail Anderson retrieved pig carcasses #15 and #16 from the Strait of Georgia observatory. Sheldon Dickie, analyst with the Department of Defence, says, “This work supports fatality investigations by police, adding considerable depth of scientific evidence in fixing the time of death.”

Young scientist maps how animals respond to decreasing oxygen.

Jackson Chu is a PhD candidate at the University of Victoria who has a passion for seeking answers to the mysteries of the ocean at his doorstep, including how changing oxygen levels affect animals in the ocean. “Ocean animals, including those of cultural and economic value, require oxygen to live,” explains Chu, “but oxygen is slowly decreasing from the oceans because of climate change. The west coast of North America is especially a hot spot for expanding hypoxia, or waters that have insufficient oxygen to support life.”

Chu is the lead author on a paper with Dr. Verena Tunnicliffe (professor in Biology and the School of Earth and Ocean Science at the University of Victoria and Canada Research Chair in Deep Ocean Research) that was published in the journal, Global Change Biology (April 2015).
What the Blob is telling us about ocean warming.

In the fall of 2012, a season or two before the Blob showed up, the Arctic Ocean had the lowest summer sea ice extent on record. Because of the open water, a significant amount of heat was released into the atmosphere that weakened the polar vortex and changed the shape and position of the jet stream, so much so that fewer storms occurred in the northeast Pacific, keeping the water warmer than normal.

When the abnormally warm patch of water—which quickly became known as the warm Blob—first appeared in early 2014, scientists observed disrupted weather patterns such as warmer than normal weather in British Columbia, droughts in California, warm wet winters in Alaska, and record cold winters in the northeast, all consistent features associated with a shifting and meandering jet stream.

The reduced storm activity also resulted in a reduction in mixing of deep ocean waters with surface waters that in turn reduced the nutrient supply to the surface waters. Cold-water species such as salmon and herring were impacted, while warm-water species migrated towards the Blob.
Award-winning study compares the Cascadia subduction zone to offshore Japan.

In January 2016, University of Victoria Master’s student, Dawei Gao, won an Outstanding Student Poster Award at the 2015 American Geophysical Union Fall meeting. His co-authored paper on earthquake dynamics explored the question: What would happen if the Cascadia subduction fault (off the west coast of Canada) ruptured or broke in the same way as the 2011 Tohoku earthquake?

Dawei’s work is a vital piece in the development of a comprehensive earthquake and tsunami early warning and response system for the west coast. ONC’s tsunami project is using 75 of Dawei’s simulated tsunami models to help produce earthquake-generated tsunami inundation maps that show the amount of flooding expected at different areas along the coast.

British Columbia Government takes action on tsunami preparedness.

ONC received $50,000 from Emergency Management British Columbia in March of 2015 to continue the work of developing tsunami inundation maps to assist long-term planning in vulnerable coastal communities.

Ocean Networks Canada (ONC) installed a specialized coastal radar system to detect tsunamis generated by earthquakes immediately offshore Vancouver Island that can provide warnings to communities at risk like Port Alberni, which suffered tsunami damage in 1964.  
Credit: Alberni Valley Museum Photograph Collection PN13805, photo by Tebby Charles.
ONC’s data contribute to the Pacific Tsunami Warning Centre.

**Supporting the latest research in tsunami modeling.**

Ali Abdolali, a young tsunami scientist with a PhD in coastal engineering from the University of Delaware, has a passion for pursuing mysteries of the unexplored deep sea. His findings were highlighted in the *Journal of Geophysical Research: Oceans*, March 2015.

Abdolali’s research group used ONC data collected and archived during the 2012 Haida Gwaii tsunami off Canada’s west coast to examine how precursor or “pressure” waves may inform tsunami early warning systems. According to Dr. Abdolali, there are few deep sea observatories like ONC that are equipped with bottom pressure recorders and hydrophones that are also capable of providing the required sampling frequency he needed for his research.

**Earthquake Early Warning.**

The west coast of North America is at risk from a major earthquake. An early warning alert of up to 90 seconds could save lives and protect infrastructure. In February 2016, ONC received $5 million in funding from Emergency Management British Columbia to install by 2019 the technology that will enable an earthquake early warning system for southern British Columbia.

With this funding ONC is expanding its seismic sensor network both on land and on the seafloor off the coast where large earthquakes occur. Leveraging the capabilities of Oceans 2.0, ONC is currently developing a software platform that will deliver an alert to decision-makers. These vital seconds of warning will provide time to take protective action such as: closing gas valves, slowing trains, stopping surgeries, evacuating traffic tunnels, opening firehall and ambulance doors, and moving people to safe locations to take cover.
EXPANDING CANADA’S FOOTPRINT IN THE ARCTIC.

Expanding the Cambridge Bay observatory—year three!
During its third year of delivering data from the Arctic Ocean, the Cambridge Bay observatory was upgraded with a new platform and expanded suite of instruments and sensors that monitor the health of the Arctic Ocean. The platform now hosts three times as many sensors as the original version deployed in 2012.

Based on the success of the Cambridge Bay platform, Ocean Networks Canada (ONC) is proposing to grow a network of similar coastal observing systems that will serve a growing need for continuous environmental monitoring in Arctic waters, from the Bering Sea to Baffin Island.

Cabled observatory slated for Hudson Bay.

In July 2015, ONC received funding to partner with the University of Manitoba as part of the new Churchill Marine Observatory that will install an environmental monitoring system on the seafloor where the Churchill River enters Hudson Bay. This new multidisciplinary arctic research facility will investigate technological, scientific, and economic issues related to marine transportation, and oil and gas development in the arctic.

“Understanding the effects of global climate change and protecting this fragile ecosystem, as well as greater comprehension of the disappearance of sea ice in the summer, are vital for all citizens, not just in Manitoba or Canada but across our planet.”

GREG SELINGER, PREMIER OF MANITOBA.
Understanding sea ice: ONC coordinates the safe passage project.

ONC was asked to take a lead on a project funded by Polar Knowledge Canada to improve our understanding of sea ice processes, especially those critical to arctic transportation. The project is a collaboration leveraging existing coast observation, modelling programs, and community relationships to document the variability of ice cover in Cambridge Bay, Dease Straight, and Deception Bay in Hudson Strait.

Young Arctic researcher crazy for marine invertebrates.

Julie-Ann Dorval, a 24-year-old oceanography Master’s student at the University of Quebec, researches the ecology of marine invertebrates in the Canadian Arctic using video samples from ONC’s Cambridge Bay observatory.
What Big Data tells us about the ocean and how it drives innovation.

Long-term, continuous scientific data from the ocean environment are gathered by Ocean Networks Canada (ONC) and made available through Oceans 2.0, ONC’s a powerful online data management system.

Oceans 2.0, combined with high-performance computing, allows ONC to provide ocean analytics that assist researchers, communities, industry, and policy-makers in making evidence-based decisions in Canada and globally.

ONC designs weather portal for the 2015 Pan Am Games.

To help athletes and coaches make important decisions that would affect their performance, ONC provided Environment and Climate Change Canada with a customized web portal for the Pan Am Games that displayed up-to-the-minute weather forecasts and alerts. The weather data portal allowed coaches from 41 international sporting federations to prepare their athletes for possible storms, wind, and heat—whether they were trimming sails, swinging a golf club, or running the marathon.

ONC proved its ability to deliver a solution quickly and provide the expertise to handle large data sets sourced automatically from fixed stations, vehicles, and lake buoys to stream wide-ranging, real-time weather information to up to 1,200 people a day.
January quakes cause jitters in British Columbia.

On 7 January 2015, a magnitude 4.8 earthquake rattled houses in Tofino on Vancouver Island’s west coast shortly after dark. It was one of over 170 quakes to strike the British Columbia coast during the first three weeks of the year. And, while this crustal quake caused minimal damage, it gave residents in coastal communities good cause to consider their earthquake and tsunami response plans. There is a one-in-ten chance that the west coast of Canada will experience a megathrust quake—over magnitude 8.4—within 50 years.

The magnitude 4.8 quake was monitored by three NEPTUNE observatory sites at varying distances from the epicenter. Seismologists who use ONC data study the multiple phases of seismic energy waves to better understand this dynamic tectonic environment. The first waves measured are the fastest but not the most destructive. With this information, early warning systems can anticipate the size and potential impact of the damaging waves that follow and provide up to 90 seconds of warning before ground shaking starts.

New interactive dashboard to explore earthquakes around the world.

ONC developed a new interactive dashboard that lets users explore earthquakes occurring anywhere in the world, like these two recorded in 2015:

- 20 October 2015 at 21:52:02 (UTC). A magnitude 7.1 earthquake occurred near the Vanuatu Islands in the south Pacific’s volcanically active region located on the Ring of Fire.

ONC’s ocean bottom seismometers clearly detected the 7 January 2015 earthquake as is shown by the spikes illustrated above.
New app helps citizen scientists collect ocean data.

In 2015, Ocean Networks Canada (ONC) and the Pacific Salmon Foundation teamed up with citizen scientists to increase the quality and range of oceanographic data being collected through a new mobile app called Community Fishers. The app, developed by ONC, allows fishers and volunteer citizens participating in the Pacific Salmon Foundation’s “citizen science program” to collect data and upload it to ONC’s world-leading data management system, Oceans 2.0. Once uploaded, the data are archived, processed, visualized, and provided for use to scientists and the public around the world.

The app was chosen as one of the top 12 submissions in The Economist’s Ocean Innovation Challenge, which asked for ocean solutions to help alleviate the tension between growth and sustainability. Community Fishers won the online “social edition” competition, earning ONC a complimentary seat at the 2015 World Ocean Summit in Portugal in June.
Prototype Equipment Design takes ONC innovation from a concept to reality.

A collaboration between Prototype Equipment Design and ONC will design and build the world’s first calibration system for the most sensitive hydrophones on the market—Canada’s icListen LF smart hydrophones. These ultrasensitive acoustic sensors detect sounds that are below the range of existing calibration systems, such as those made by earthquakes, underwater landslides, large baleen whales, and the rapidly growing undersea shipping noise that can impact marine ecosystems and environments.

Founded in 2001, with beginnings in the University of Victoria’s Engineering Lab, Prototype Equipment Design is a full-service machine shop based on Canada’s west coast that consistently meets the demanding needs of the military, aerospace, medical, and scientific industries in providing customized equipment design and production.

A game changer for ocean instrumentation.

AML Oceanographic Ltd. of Sidney, British Columbia developed a novel anti-biofouling system using ultraviolet light. AML’s prototype was successfully tested on Folger Pinnacle, ONC’s shallowest location and a site heavily impacted by biofouling.

Listening station to study impact of ship noise on whales.

ONC collaborated with the Port of Vancouver and JASCO Applied Sciences to deploy a hydrophone listening station that monitors underwater vessel noise in the Strait of Georgia. Underwater noise has been identified as a key threat to at-risk whales.

“We are working together with scientists, shipping industries, conservation and environmental groups, First Nations individuals, and government agencies to take proactive action and improve conditions for whales.”

DUNCAN WILSON, VICE PRESIDENT OF CORPORATE SOCIAL RESPONSIBILITY AT THE PORT OF VANCOUVER.
ENGAGING AND EDUCATING.

Vancouver Aquarium opens its first deep sea hydrothermal vents exhibit.

On 7 October 2015, the Vancouver Aquarium opened its first deep sea exhibit featuring the “black smokers” located 300 km offshore from Vancouver Island. Known as the Endeavour hydrothermal vents, in 2003 Fisheries and Oceans Canada designated them as Canada’s first marine protected area. With funding from Fisheries and Oceans Canada, Ocean Networks Canada (ONC) worked with the Vancouver Aquarium on this remarkable project.

In 2015, Fisheries and Oceans Canada also funded ONC to produce a video on the Endeavour hydrothermal vents for education and outreach, in both French and English.

Watch our Endeavour hydrothermal vents video.

ENGAGEMENT IMPACTS

128
Community educational events hosted.

328
K-12 educators involved.

3000+
Youth reached.

57
Coastal and Indigenous communities engaged.

World Oceans Day—engaging citizen scientists from British Columbia to Ontario.

The theme for World Oceans Day 2015 was “healthy oceans, healthy planet.” Millions of people around the world took time to celebrate in many different ways.

ONC joined community events along the British Columbia coast, from Vancouver to Prince Rupert, and in Canada’s national capital. ONC’s president, Kate Moran, enthusiastically joined the World Wildlife Fund’s ocean showcase event.

Vancouver Aquarium
@vanaqua • 14 Oct 2015

Come see our new hydrothermal vent exhibit & learn how @Ocean_Networks scientists are studying them.
Teens dive deep at the 4th Annual Ocean Science Symposium.

ONC’s 4th Annual Ocean Science Symposium brought together 55 students and 20 teachers from 16 schools across British Columbia. This fun, interactive experience offered participants an opportunity to discover the ocean through dynamic presentations and exciting hands-on experiences. Teens and teachers left with a new understanding of the mysteries of the deep, from sea ice and climate change to ocean engineering and hydrothermal vents.

“Building an ROV with other teachers was a highlight for me,” says science teacher Brian Cameron who travelled with two students from Prince Rupert’s Charles Hays Secondary School. “Too often teachers assume that things will work fine and they don’t test the lesson plan to find out where the difficulties will be when it’s time for the students to make the same attempt.” Brian adds, “Since the symposium, I have been actively using ONC video feeds, data, and resources in my classroom to inspire and inform my students.”

Engaging communities with scientific research.

By making scientific data readily available, community members can better understand their local ocean environment, and use the data to inform community priorities and inspire future generations to care about the ocean.
IN THE NEWS.

Social Media Highlights

@Ocean_Networks
5,385 Followers.

/OceanNetworksCanada
5,034 Likes.

/OceanNetworksCanada
407K Views.

/photos/OceanNetworksCanada
53K Views.

/company/ocean-networks-canada
754 Followers.

@ocean_networks is on Instagram!

Watch a live stream from the R/V Sikuliaq while ROV Jason dives […]

The dinner plate jellyfish belongs to the genus Solmissus, […]

Even in August, ocean temperatures in Cambridge Bay […]
Unique media stories (online, print, television, and radio).

What ‘the blob’ tells us about ocean warming

Smart Oceans project useful for resource industry

Absurd Creature of the Week: This isn’t a spider, but it does have genitals in its legs

Even West coast Canada’s declining salmon population has its own app

Listening station in Strait of Georgia to monitor noise impact on whales
Ten years ago, Ocean Networks Canada (ONC) made history by installing the world’s first interactive, real-time portal into the ocean. This year marks a decade of exploration, innovation, expansion, and 24/7 monitoring of our ocean. A major initiative of the University of Victoria and one of four Canada Foundation for Innovation Major Science Initiatives, ONC operates world-class ocean observatories off the west coast of Canada, in the Arctic, and in other coastal areas, collecting data on physical, chemical, biological, and geological aspects of the ocean. These data support research on complex Earth processes in ways not previously possible for the advancement of science and the broader benefit of Canada.

ONC’s Smart Ocean Systems™ are a paradigm shift in science and ocean monitoring, and this year marked a major advancement in ONC’s ability to provide science for research purposes and sound decision-making. Smart Ocean Systems™ ocean analytics data products were expanded, increasing marine and public safety by delivering information on ocean health critical for the assessment of cumulative human and climate change impacts. By allowing continuous, year-round, sub-second observations with hundreds of measurement types accessible by any audience through the Internet, Smart Ocean Systems™ will continue to design, test, and operate new research and products using ONC’s assets.

Underpinning the scientific data and the broader data products is ONC’s advanced data management system, Oceans 2.0, which was advanced through funding from CANARIE and has been recognized by the International Council for Science as part of the World Data System. Oceans 2.0 remains on the leading edge of sophisticated technology and enables more rapid delivery of data products so that coastal and offshore areas of Canada can be managed safely, following environmentally sound approaches.

This year, ONC submitted its first mid-term review to the Canada Foundation for Innovation that resulted in an increase in funding for the observatories, which is testament to the dedication and skills of the ONC staff.

Since 2006, ONC has proven the viability of the fundamental concepts and technology for cabled observatories. A decade of operational experience in ocean observation systems gives ONC a unique experience base to provide expert advice to groups seeking to implement ocean observing systems and provides leaders with the data they need to make informed decisions about coastal management, conservation, marine safety, climate change, and earthquake and tsunami detection.

For the foreseeable future, ONC’s observatories will continue to provide unique scientific and technical capabilities that permit researchers to operate instruments remotely and receive data at their home laboratories anywhere on the globe, and will continue to collect and distribute critical data to help communities, governments, and industry make informed decisions.

My sincere thanks to the dedicated and passionate staff at ONC, as well as to the volunteers on the Board of Directors and the various Advisory Boards and Committees, for making this year a resounding success.

Jim Roche

MESSAGE FROM THE BOARD OF DIRECTORS
This year marked real growth for Ocean Networks Canada (ONC) with the installation of Smart Ocean Systems™ along the British Columbia coast, an expanded observatory in Cambridge Bay, and a successful award for installing another observatory in Churchill, Manitoba in partnership with the University of Manitoba. Growth was also seen in ONC’s user base, from 7,960 distinct users on our data portal at the start of the fiscal year to 11,428 at its close. And our partnerships grew by leaps and bounds, starting with a renewed collaboration with the Province of British Columbia to install a sensor network for earthquake early warning. Other new partners include Polar Knowledge Canada for delivering sea ice forecasts in the Arctic, the US National Oceanic and Atmospheric Administration for delivering tsunami inundation maps for Canada’s west coast, First Nations for monitoring their local ocean waters, and the Marine Environmental Observations, Prediction, and Response Network Centre of Excellence for supporting researchers using ONC’s observatories.

ONC’s Innovation Centre had its best year ever. The team exceeded both their annual and cumulative three-year revenue targets by securing $10.7M in contracts under the Smart Ocean™ business plan. ONC’s Smart Ocean Systems™ represent a new wave of ocean analytical technologies that will enable safer marine shipping; better responses should marine accidents occur; real-time monitoring of ocean health for early mitigation should problems arise; alerts to the public for earthquake early warning, tsunamis, and storm surges; and protection of precious marine life. In the upcoming year, ONC will be completing the first of a series of Smart Ocean™ Systems data products that will help to position Canada as a country that values and protects its ocean and coasts through the application of these high tech solutions.

The efforts over this year reinforced the great pride I have in leading this truly inspirational enterprise. ONC’s success is only possible because of the dedicated Board of Directors, together with the exceptional staff and very strong teams, who make ONC an innovative organization that is on track to achieve our new vision: enhancing life on Earth by providing ocean knowledge and leadership that deliver solutions for science, society, and industry.

Kate Moran
DISCOVER THE OCEAN. UNDERSTAND THE PLANET.

The ocean covers 70% of the Earth’s surface and is a critical component of our planetary life support system. Human pressures are impacting the ocean at an ever-increasing pace, and understanding this change is vital to ensuring our planet’s sustainable future.

Equipped with world-leading observatory technologies, Ocean Networks Canada is a global community of researchers who are uniquely positioned to contribute to this urgent cause. Now...when it matters most.

OCEAN NETWORKS CANADA IS FUNDED BY THE CANADA FOUNDATION FOR INNOVATION, GOVERNMENT OF CANADA, UNIVERSITY OF VICTORIA, GOVERNMENT OF BRITISH COLUMBIA, CANARIE, AND IBM CANADA.