OSPR/Chevron Oil Spill Response Technology Workshop

San Ramon, CA

February 26 - March 1, 2019

ABSTRACTS, BIOGRAPHIES, AND CONTACT INFORMATION

Speaker name: Position:	Kjetil Aasebø Head of Section, Operations
Presentation title:	Wireless Connectivity Without Internet Connection: How the Norwegian Coastal Administration's Aircraft and Vessels Build and Share a Common Operating Picture

Abstract:

Not provided.

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Speaker biography:

Not provided.

Speaker name: Position:	**Louis Armstrong** Transport Canada, Chief of Intelligence, Surveillance and Reconnaissance
Presentation title:	Update on Transport Canada's National Aerial Surveillance Program

Abstract:

Transport Canada is the lead Federal Department responsible for preventing pollution from ships, and the National Aerial Surveillance Program (NASP) is one method by which this is achieved.

Aerial surveillance through this program reduces oil pollution at sea because ships are aware they're being watched. The NASP also works closely with the Canadian Coast Guard during oil pollution incidents to provide situational awareness. Evidence gathered by our aircraft is used to issue fines and prosecute polluters under Canadian and international law.

We also monitor shipping activities, ice conditions, and marine security, providing helpful information to other federal programs.

This presentation provides update on recent advancements made in the NASP and an outlook on system upgrades and improvements over the next 5 years.

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Speaker biography:

Louis Armstrong works for Transport Canada's Aircraft Services Directorate in Ottawa, Ontario as the Chief of Intelligence, Surveillance and Reconnaissance. As the Chief of ISR, he is the operational contact and Manager of the National Aerial Surveillance Program (NASP).

Louis started his career with the Environmental Response program in the Canadian Coast Guard in 1995 and became Manager of the NASP in 1999. From 2005 to 2009, Louis was the project manager on the modernization of the NASP's aircraft fleet and as a result was awarded the Canadian Public Service Award of Excellence for Innovation, in connection with his helping to advance Canada's surveillance program and improve its ability to spot and respond to environmental challenges at sea. Louis' main responsibilities include the day to day operations of the NASP, strategic planning for the program and management of the surveillance officers who observe, analyze, record and report marine pollution on behalf of Transport Canada.

Speaker name: Position:	**Alexander Balsley, P.E.** Project Manager
Presentation title:	Response to Moving Sunken Oil

Abstract:

The U.S. Coast Guard (USCG) Research and Development Center (RDC) has been funding projects to identify, design, and test new methods for responding to non-floating oil spills, including detection and removal of sunken oil on the bottom and suspended in the water column. Since 2017, RDC has designed, fabricated, and tested underwater barrier systems that can mitigate the movement of sunken oil along the bottom of inland and offshore environments as well as large lakes. RDC tested two different barrier systems in the Kalamazoo River and Lake Huron during April 2018. Different deployment and anchoring methods were explored in locations of differing current, depth, and bottom substrates. RDC will share data and findings from both tests as well as recommend future work in this area of oil spill response. RDC will return to the Kalamazoo River to test a third mitigation prototype (second inland mitigation prototype) in April 2019.

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Speaker biography:

Mr. Balsley has been the Project Manager at the US Coast Guard Research and Development Center since 2010 and is primarily involved with oil spill response research. He has a B.S. degree in Civil and Environmental Engineering from Northeastern University and a M.S. degree from Worcester Polytechnic Institute. He is also a registered Professional Engineer with the state of Massachusetts.

Speaker name: Position:	**Donny Beaver** Managing Partner
Presentation title:	Instant Underflow Dams to Prevent the Spread of Oil and Fuel Spills in Streams and Creeks

Abstract:

Oil or fuel spills in streams and creeks present unique containment and cleanup challenges. Floating oil moves quickly downstream, at a rate of 1-3 mph.

Conventional spill containment practices require responders to build earthen or sandbag dams to slow the water down. The dams are built around drainage pipes located near the bed of the stream. The pipes usually have "stoppers" in them to allow the water to build upstream of the dam. When the dam reaches the desired height and the spilled oil is floating on top, stoppers are removed to allow clean water to flow out through the lower dam wall.

At the same time, cleanup crews can begin to remove the floating oil upstream.

Unfortunately, this process usually requires lots of materials & labor. In many cases, it can take hours to locate all the resources needed to complete the task. In the meantime, the spill is contaminating miles of water and shoreline.

Fortunately, there is a better way. A 25-foot long WaterGate instant underflow dam can be deployed by two workers in less than five minutes. Built-in underflow valves adjust rapidly to allow clean water to pass through at the base. Cleanup can begin and end in record time.

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Speaker biography:

Donny Beaver has spent his career focused on developing better ways to clean up industrial-strength messes. He is cofounder of several environmental companies including New Pig, Sermac Industries and LeapFrog Technologies.

Currently he is managing partner at HalenHardy, LLC. HalenHardy has developed the Spilltration line of oil & fuel filtration products and is the main distributor of WaterGate dams in the USA.

He has been happily married to his high-school sweetheart, Pam, for 45 years. Their two sons, Josh and Troy are partners in HalenHardy. Donny is active as an elder, Sunday school teacher and worship team singer at Hillside Community Church in his home town of Bellwood, PA.

Speaker name: Position:	**Susan Cavoretto** Director of US Operations
Presentation title:	Slick Snake

Abstract:

(*Co-presenter: Ken Lukins*)

Introduction of SlickSnake oil containment boom. Our water activated, exceptionally lightweight, compact, hands-free boom activates in less than 3 minutes. Suitable for freshwaters – rivers, estuaries, lakes, wet lands, shorelines, harbors, docks.

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Speaker biography:

I am Director of US Operations with San Francisco based Green Bag Company and a member of a smaller production team, which works on new ideas and creative solutions intended to be developed as new product opportunity. First with reusable shopping bags, then FloodAvert – sandbag alternatives and now SlickSnake.

Speaker name: Position:	**Suzanne Chang** BSEE/Oil Spill Preparedness Division/Response Research Engineer
Presentation title:	BSEE Oil Spill Response Research Program Highlights

Abstract:

This presentation will provide an update on BSEE's Oil Spill Response Research Program. BSEE's Oil Spill Response Research Program aims to research areas of mechanical recovery, in situ burning, chemical treatments and remote sensing. This presentation will specifically highlight three recent projects that are relevant to the Pacific coast. These include:

1. Combustion Study on California Crude Oils (Project #1085)
2. Development of an Oil Recovery Efficiency Sensor (Project #1083)
3. Estimating Slick Thickness with LiDAR Remote Sensing Technologies (Project #1091)

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Speaker biography:

Suzanne Chang graduated from Texas A&M University-Kingsville, TX with a degree in Chemical Engineering. Ms. Chang started her career with the U.S. Army Materials Command in laboratory testing for materials resistance and permeation to a range of chemicals and designing mobile labs for a broad range of threat detection in the field. Ms. Chang has also worked for the U.S. Coast Guard on the regulatory requirements for the maritime commercial bulk shipping of hazardous materials, specially focusing on liquid chemicals, petroleum products, and liquefied natural gas. Ms. Chang currently works for the Bureau of Safety of Environmental Enforcement in the Oil Spill Preparedness Division Response Research Branch as a research engineer focusing on chemical treatments.

Speaker name: Position:	**David Chenault** President, Polaris Sensor Technologies, Inc.
Presentation title:	Spill Detection and Environmental Monitoring with the Pyxis IR Camera

Abstract:
The need for reliable day/night detection of oil spills in a variety of conditions has been addressed through the demonstration of the Pyxis infrared polarization camera. Testing at Ohmsett in 2016 and 2017 showed excellent performance of multiple types of crude oil, diesel, and kerosene in still water, in waves, during the day and overnight, and even showed strong detection of emulsified oil in waves. Testing in 2018 at the Taylor site confirmed the ability for ship-based detection. The promise for automated detection has now been realized for static scenes and has been demonstrated in controlled outdoor testing and in the laboratory. The most recent results and future testing will be described. We will also describe potential operational scenarios, including deployment on drone platforms, in which this technology could be exploited both for spill recovery operations as well as for automated monitoring.

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Speaker biography:

Dr. David Chenault is currently the president of Polaris Sensor Technologies, Inc. in Huntsville, AL where he is leading a team of 27 scientists and engineers developing advanced sensors, algorithms, and optical instrumentation. With his leadership, Polaris had developed devices supporting industrial and military applications including Optical Systems for unmanned and manned systems, advanced sensors for spill and object detection, autonomous monitoring, and field test collection. David has a long history in developing optical systems from the visible to the infrared while specializing in polarization based systems. Dr. Chenault is a Fellow of SPIE.

Speaker name: Position:	**Souma Chowdhury** Assistant Professor, Mechanical and Aerospace Engineering, University at Buffalo
Presentation title:	Oil Spill Monitoring and Disaster Response with Drone Swarms

Abstract:

Unmanned Aerial Vehicles have risen through the ranks to become uniquely useful tools in various remote sensing and humanitarian applications. *Swarm robotics* is a complimentary technology that enable simple inexpensive drones and their surface counterparts (ASVs) to deliver search/ monitoring/ response/ clean-up solutions that are potentially more effective than existing sophisticated manned/satellite based solutions. In our lab, we have developed multi-drone operation methods to serve time-critical applications such as *offshore oil spill mapping* and *detection of flood victims* over a wide area. Bulk of the research has focused on developing the fundamental techniques needed to provide fully decentralized operation that is scalable in terms of the number of collaborating drones, and demands frugal on-board computing and network communication needs – these methods are founded on nature inspired swarm intelligence, graph search, probabilistic modeling, image processing, and collision avoidance mechanisms. While our drone team approaches have been tested in simulation (w/ up to 50 drones) and on-board two physical quadcopter platforms, demonstrating superior performance compared to other existing published approaches, we are interested in working with industry and Government stakeholders to be able to test these methods at scale, in real life conditions. The goal of this talk is to introduce the capabilities that we have developed so far and identify potential collaboration opportunities with stakeholders in the oil spill response and related domains.

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Speaker biography:

Souma Chowdhury is an Assistant Professor of Mechanical and Aerospace Engineering at University at Buffalo, where he leads the Adaptive Design Algorithms, Models and Systems (ADAMS) Lab. He got his PhD in Mechanical Engineering from Rensselaer Polytechnic Institute in 2012 and worked as a Research Professor at Mississippi State University before joining U Buffalo. His research on evolutionary, neural, and swarm-intelligence algorithms for embodied artificial intelligence and design optimization has primary applications in i) design and autonomy of unmanned aerial vehicles or UAVs, ii) swarm robotics for environment monitoring and disaster response applications, iii) physics cognizant AI for dynamic and robotic systems. He has authored 28 international journal articles and 75 peer-reviewed conference articles in related topics. His research has been sponsored by NSF and DARPA. He is a member of the ASME, AIAA, and IEEE societies, and is responsible for organizing and chairing Data-driven Design, Multifidelity Modeling, and Artificial Intelligence sessions and workshops.

Speaker name: Position:	**T. C. Mike Chung** Professor, Penn State University
Presentation title:	i-Petrogel: A Comprehensive Solution for Oil Spill Recovery, Cleanup, and Prevention

Abstract:

I-Petrogel is a polyolefin-based oil absorbent that has the potential to provide a practical and comprehensive solution to large-scale oil spill recovery, cleanup, and prevention. In a practical test, this i-Petrogel absorbent was produced in large scale (>90 kg) in our laboratory, which showed selective absorption of ANS crude oil on open water surface with more than 40 times that of the polymer weight. In fact, i-Petrogel stops the crude oil weathering process (evaporation, emulsification, and spreading) in open water. This new absorbent is formed from two hydrocarbon polymers derived from oil molecules with an interpenetrated network (IPN) molecular structure and porous morphology capable of absorbing a broad range of oils, from refined oil products (solvents and hydrocarbon chemicals) to complex crude oils and viscous lubes. The material design maximizes its ability to absorb oil with fast kinetics and high absorption capacity. The resulting adducts (oil-swollen polymer gels), floating on water surface and containing no water, can be recovered with existing mechanical (drum-skimmer) recovery method and then refined by regular oil refining processes. In other words, this method further reduces environmental waste and pollution associated with many known collection methods.

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Speaker biography:

Mike Chung received a Ph.D Degree in chemistry at University of Pennsylvania in 1982 on conducting polymers (with Professor A. J. MacDiarmid, Nobel Laureate). He spent two years as a Research Associate at the Institute for Polymers and Organic Solids (with Professor Alan J. Heeger, Nobel Laureate), University of California, Santa Barbara. In 1984, he moved to Exxon Co., Cooperate Research, as a staff researcher. In 1989, he joined the faculty of the Pennsylvania State University as an Associate Professor in the Department of Materials Science and Engineering. In 1992, he was promoted to Full Professor. He has published 2 books, 245 papers, and 45 US and 10 international patents.

Speaker name: Position:	**Thomas M. Cullen Jr.** Administrator, Office of Spill Prevention & Response (OSPR), California Department of Fish & Wildlife
Presentation title:	1. Welcoming Remarks 2. OSPR Overview

Abstract:

Captain Cullen will welcome all workshop attendees on behalf of OSPR and then deliver a brief update on recent activities and initiatives that OSPR has undertaken since the last workshop in 2017.

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Speaker biography:

Thomas Cullen was appointed by Governor Jerry Brown as the Administrator of OSPR in June 2012. Captain Cullen directs a team of scientists, environmental specialists, game wardens, and support personnel in protecting and preserving 3,427 miles of shoreline and 7,734 square miles of State waters from oil and other deleterious substances.

Prior to his appointment, Captain Cullen served in the United States Coast Guard for 31 years. From 2008 to 2010 he served as Deputy Commander of Coast Guard Sector San Francisco, CA, where he performed a wide-range of federal authorities including Captain of the Port, Federal Maritime Security Coordinator, Federal On-Scene Coordinator, Officer-in-Charge of Maritime Inspections, and Search & Rescue Mission Coordinator in our nation's busiest and most diverse coastal region. He led 775 active duty, reserve & civilian personnel in protecting a strategic multi-port complex with the U.S.'s 4th largest container port, 9 other commercial ports, and 6 major refineries.

Captain Cullen's previous Coast Guard assignments include Chief of Response of the Eleventh Coast Guard District in Alameda, CA; Chief of Aeronautical Engineering at Air Station Cape Cod, Massachusetts; and Chief of Aircraft Systems in the Office of Aeronautical Engineering at Coast Guard Headquarters. A Coast Guard aviator, Captain Cullen flew more than 5,000 hours as pilot-in-command of the HU-25 jet aircraft. He received a Bachelor of Science in Ocean Engineering from the Coast Guard Academy and a Master of Science in Industrial Administration from Purdue University. He is also a certified Project Management Professional (PMP) and a licensed Airline Transport Pilot (ATP).

Captain Cullen and his family live in Novato, California.

Speaker name: Position:	**Zdravko Divjak** President, Blue Guard Innovations, LLC.
Presentation title:	SMALL SPILLS, BIG PROBLEMS New Technology that Prevents Oil Spills from Vessel Bilges

Abstract:

"Recreational boats and fishing vessels — not tankers and freighters — currently are the leading sources of known oil spills in Puget Sound. 1) Between 2011 and 2015, recreational vessels reported spills of almost 6,000 gallons of diesel and gasoline in Washington and many go unreported. About two-thirds of these discharges are one gallon or less. 2) Small spills, such as oily bilge discharge, accounted for an estimated 75 percent of the oil dumped into local waters over the last 10 years." University of Washington-Sea Grant 2017.

Technology that is effective, affordable, and can prevent bilge oil discharge has emerged and recently become commercially available. Blue Guard Innovations will present how the patented technology works, the significance of preventing future oil spills, and how it can be deployed in other then a vessel bilge environment.

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Speaker biography:

Zdravko Divjak was born in 1956. Received AB Physics Brown University 1978 and Graduate MBA Studies Bryant Collage 1982. Worked at General Electric, Motorola Microelectronics until 1987. From 1987 until present, Innovator and entrepreneur for Z-Communications, Inc., Trango Systems, Inc., Blue Guard Innovations, LLC.

Areas of expertise: RF & Microwave Systems, modules and components, Wireless communications, Analog to Digital Conversion and Sensor development. Manufacturing and automation.

Speaker name: Position:	**Jim Elliott** President, American Salvage Association Chief Operating Officer, Teichman Group of Companies
Presentation title:	Advancements in Non-Floating Oil Detection and Recovery

Abstract:

In 2017, the U.S. Coast Guard implemented a new Oil Spill Removal Organization (OSRO) classification for companies that have the capability to effectively detect and recover non-floating oils (NFO). In recent years, underwater oil recovery techniques have advanced from predominantly surface-supplied diver directed pumping systems and crane directed clamshells in relatively shallow waters to the use of saturation diving systems and remotely operated vehicles at greater depths. Additionally, underwater oil detection technologies have advanced significantly, permitting the accurate detection of oil in the water column, on the bottom and in the subsurface. This presentation will present an overview of the OSRO classification process and advancements in NFO detection and recovery techniques, including multi-beam sonar, real-time mass spectrometry and 3-D imaging, saturation diving systems, diver-operated systems, and remotely operated vehicle systems will be discussed. Recent case NFO response studies will supplement the discussion.

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Speaker biography:

Jim Elliott is President of the American Salvage Association and Chief Operating Officer of the Teichman Group of Companies, including T&T Salvage and T&T Subsea. He manages worldwide marine salvage, heavy lift, commercial diving and emergency response operations. With three decades of leadership experience in maritime operations, he has served as a senior Coast Guard Officer, Incident Commander, Salvage Master, Commercial Diver and Project Manager on salvage and oil spill operations from the Equator to the Arctic. He holds a Bachelor of Science in Environment Management with distinction, a Master of Environmental Policy with honors, Master of Arts in National Security and Strategic Studies with highest distinction from the U.S. Naval War College and a MBA with merit the University of London.

Mr. Elliott was an author of the American Petroleum Institute (API) Report and Operations Guide on Submerged Oil Detection and Recovery, a foundational document for the U.S. Coast Guard's non-floating oil detection and recovery policies. Additionally, he has served in senior leadership roles on multiple non-floating oil response operations, including the *ARGO, ATHOS I, DBL-152, BOW MARINER*, and *DEEPWATER HORIZON*, among others.

Speaker name: Position:	**Brian Footen** President, Fishviews, Inc.
Presentation title:	Using Reality Based Mapping and GIS for Improving Waterway Monitoring and Early Warning Systems

Abstract:

FishViews is a Service Disabled Veteran Owned Small Business (SDVOSB) working with federal, state, and local agencies to create 21st century waterway maps for visualizing, communicating and analyzing aquatic data. Using custom built collection technology FishViews creates virtual tours by processing geo-referenced imagery and data surveyed from above and below the water surface. These virtual waterway tours serve as interactive 3D GIS maps which aid in location awareness and navigation. Published at Fishviews.com these maps are easily accessed via desktop, mobile, and VR headsets. FishViews enhances location awareness by giving the user the ability to visualize spill response areas in the horizontal perspective (like street view). By combining imagery with an interactive GIS platform these visualizations can be used by waterway managers as a decision and analysis tool, civic leaders for development planning near waterways, and first responders as a training and real-time tool for disaster response. When complete these visualizations can help improve safety, expedite response actions, and virtually model outcomes saving time and money.

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Speaker biography:

Fishery Research Scientist; Federal, State and Tribal Agencies. Dual M.S. Fishery and Enviro Science, U Washington and Evergreen State College. Multiple Publications. Currently President and Co-Founder at FishViews.

Speaker name: Position:	**Oscar Garcia** Director, Water Mapping, LLC
Presentation title:	Multispectral UAS System for Detecting, Characterizing, and Mapping Oil Spills on Near Shore Environments

Abstract:

We have developed a UAS system that collects multispectral data in order to characterize oil slick thicknesses and emulsification ratios. This system consists on a UAS that carries multiple cameras that integrate 10 wavelength band sensors ranging from Ultra-Violet (UV) to Long Wave Infrared (LW-IR). This system has been originally tested at OHMSETT and at the MC-20 site in the Gulf of Mexico. More recently this UAS was put in operation during the Lake Washington Wellhead blowout in Louisiana. We will present examples of how this operational tool allowed oil spill responders to efficiently deploy containments of the floating oil (booming) and to monitor the collection of the oil in real time. Moreover, using a rapid classification algorithm, the multispectral data collected by our UAS allowed us to make a detailed high resolution classification of the oil detected on the shorelines of the affected areas. The UAS also delivered near real time oil detections that were used during the spill by the NOAA oil spill science coordinators through the ERMA system. This UAS has proven its ability to detect oil on 'hard to reach areas' and it offers a valuable option for the evaluation of affected areas impacted by the spill.

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Speaker biography:

Oscar Garcia is the Director of Water Mapping and an Adjunct Scientist at Florida State University. He is a Geosciencist graduated from the NASA Goddard Space Flight Center Graduate Certificate Program, and from Texas A&M Corpus Christi where he obtained his PhD in Coastal and Marine Science.
He specializes on Microwave Satellite Remote Sensing for oil spill detection and more recently on the utilization of multispectral UAS for mapping and characterization of oil spills. He is currently engaged with NASA, NOAA, BSEE, and EPA on the development and implementation of satellite, UAVs and UAS technologies for detection of oil spills.

Speaker name: Position:	**Jessica Garron** Science Team Lead, Alaska Center for Unmanned Aircraft Systems Integration, UAF
Presentation title:	The Alaska Oil Spill Technology Symposium 2018: Research and Collaboration in Action

Abstract:

The Alaska Oil Spill Technology Symposium (AOSTS) is the premier venue to discuss cutting-edge oil spill research, emerging technologies, protective strategies, response capabilities and capacities in Alaska. Participants span the research and response community and include key players, such as: the Alaska Department of Environmental Conservation, United States Coast Guard, Environmental Protection Agency, University of Alaska Fairbanks, National Oceanic and Atmospheric Administration, Oil Spill Response Organizations, Alaska's Regional Citizens' Advisory Councils, and large and small energy producers. This talk will highlight some of the unique research presented at the 2018 AOSTS, as well as collaborative projects that have resulted from this Arctic spill response, information exchange.

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Speaker biography:

Jessica Garron has been conducting applied research since 1996. Garron was the NEPA coordinator for over two million acres of military-held lands in Alaska, has led teams of engineers to develop streamlined data processing and distribution software for satellite-collected data, and currently is the Science Team Lead for the Alaska Center for Unmanned Aircraft Systems Integration (ACUASI). She works in conjunction with UAF researchers to pursue funding opportunities related to the prevention and mitigation of oil spills in the Arctic and is the leader of the GI permafrost and Winter Worlds outreach teams. Most of Garron's years of field and biogeochemical laboratory experience have been spent performing research in interior Alaska, and on Alaska's Seward and Kenai Peninsulas. Garron is a PhD candidate at the University of Alaska Fairbanks, and is in the process of finalizing her dissertation titled, "Integration of Remote Sensing Technologies into Arctic Oil Spill Response".

Speaker name: Position:	**Devon Grennan** President, Spill Control Association of America CEO/President, Global Diving & Salvage, Inc.
Presentation title:	Spill Control Association of America

Abstract:

- Introduction to Spill Control Association of America (SCAA)
- 2025 Strategic Vision
- Key Events:
- SCAA Annual Meeting and Conference
- Partnership Action Team
- Environmental Excellence Awards
- Monthly Newsletter
- Guiding Principles
- History and Benefits of SCAA
- Personal Experience

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Speaker biography:

Mr. Grennan joined Global in 1995 and grew up in the business by serving in a variety of roles including Marine Environmental Supervisor, Environmental Division Manager and General Manager. He was appointed President in 2009 and added the title of Chief Executive Officer in 2013. He also serves on Global's Board of Directors. Mr. Grennan's primary role is to implement Global's strategic plan, including development of partners along the West Coast and abroad, and the expansion and growth of Global's core strategic service lines. His passion is looking for ways to introduce younger generations to the maritime industry, and he is proud to continue his family's history of working on the water. He holds a Bachelors of Science degree from the University of Washington.

Speaker name: Position:	**Captain Paul Gugg** General Manager, Center for Emergency Preparedness and Response
Presentation title:	Chevron Welcome Address

Abstract:

This very brief address is intended to welcome attendees to our campus and express the company's great pleasure to be the physical host for this accomplished group sharing information on a topic important to California and so many places we as an industry operate. I plan to extend best wishes for a successful workshop and encourage the audience to let us know if they have questions or need anything while here.

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Speaker biography:

Paul Gugg is the General Manager for Emergency Management across Chevron's global operating enterprise. His team based in San Ramon and Houston works with Chevron's many business units to ensure plans and mitigative safeguards for emergency response, crisis management and business continuity are in place and functioning. Before assuming his current role, he worked in various positions within Chevron's Shipping Company. Before that he served 27 years in the US Coast Guard, retiring as Sector Commander in San Francisco, in 2010.

Speaker name: Position:	**Christian Haselwimmer** Environmental Remote Sensing Scientist, Chevron
Presentation title:	Evaluating the Use of Near Real-Time Aerial Photography Collected from BVLOS UAS and Fixed-Wing Platforms for Rapid Coastal Reconnaissance and SCAT

Abstract:

High spatial resolution aerial photography provides support for SCAT and NRDA but is limited by the length of time required to process data. Since 2017, Chevron has been evaluating the potential of American Aerospace InstiMaps© for a variety of response applications. The system collects very high spatial visible and thermal imagery and processes these data to GIS-ready image services in near real-time in the cloud, serving directly into compliant Common Operating Pictures (COPs). We present the results of two tests: 1) using a large Unmanned Aerial System (UAS) that was operated Beyond Visual Line of Sight (BVLOS) in the Santa Barbara Channel in 2017; 2) using a piloted fixed-wing platform (Cessna 107) in the Gulf of Mexico in 2018. The tests used oil simulants as targets in the near real-time for identification by GIS analysts. We developed and evaluated a simple workflow (SOAR: Shoreline Oiling Aerial Reconnaissance) using ESRI ArcGIS Online to process the near real-time imagery to identify and prioritize shoreline oiling zones leading to the development of Rapid Response Treatment Recommendations in < 1 hour. The tests demonstrate that the collection, pre-processing, and cloud-based dissemination of high resolution aerial photography in near real-time is feasible and that this has potential to support oil spill reconnaissance particularly for larger incidents where impacts may be spatially extensive and temporally dynamic.

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Speaker biography:

Christian Haselwimmer provides technical expertise to support environmental remote sensing projects including sensor and data selection, analysis and image processing for mapping projects as well as managing a variety of environmental remote sensing research and development projects that include the use of UAS. Christian holds a Masters and PhD in Remote Sensing from University College London and Imperial College London respectively. Prior to joining Chevron in 2013 he worked as a postdoctoral researcher at the Geophysical Institute of the University of Alaska Fairbanks where he led research on the use of multimodal satellite, airborne, and UAS-based remote sensing in support geothermal and environmental applications. Since 2014, Christian has been the chairman of the Geological Remote Sensing Group North America Chapter.

Speaker name: Position:	**Mark Hess** Director of Operations, Ocean Imaging, Inc.
Presentation title:	Unique Applications of Remote Sensing and Surveillance Technologies Traditionally Used for Oil Spill Response

Abstract:

(Co-Presenting with Kevin Hoskins)

The application of remote sensing and surveillance technologies in spill response has typically focused on identifying floating oil in offshore or near shore environments. MSRC and Ocean Imaging are continuously seeking out and developing alternate uses of the Level ABC system and working to enhance the role of remote sensing in oil spill and disaster response. Examples of the expansion these technologies into new and different application realms include

- The use of an aerostat with HD/IR sensors to monitor
  - oil storage tanks (adjacent to a river during flood stage) at night
  - the repair of storage tank floating roofs damaged by Hurricane Harvey
  - the repair of a pipeline ~ 200 miles off the coast of Newfoundland.
- Using TRACS as a tool to support and document the demonstration of new oil spill response technologies in the Santa Barbara Channel
- Fitting UAS with scaled-down, multi-sensor payloads specifically suited for detection of oil in the littoral, estuarine zones as well as freshwater wetlands and designing remote sensing systems better suited for mapping inland spills and mapping the habitats for post-spill damage assessment
- Modifying existing aerial remote sensing systems such as TRACS as well as developing processing and data delivery methodologies for use in fire mapping, animal surveys and even imaging lava flows.

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Speaker biography:

Mark Hess is the Director of Operations for Ocean Imaging an environmental consulting firm specializing in applied remote sensing and geospatial environmental analysis for the past 35 years. He has a degree in marine biology from the University of California at Santa Barbara and a Masters in Business from Colorado State University. Mark manages Ocean Imaging's main office in Littleton, Colorado and has been developing remote sensing systems to study and map marine and inland oil spills as well as ocean pollution for over 15 years. Mark is and has been the technical lead on research projects focused on oil spill detection and digital mapping, mapping and analyzing environmental features and habitats as detected by satellite-, aircraft- and UAS-based sensors. He is the co-developer of OI's Tactical Response Airborne Classification System (TRACS) used as a response tool to digitally map the extent and thickness of oil slicks among other applications which will be discussed during this workshop.

Speaker name: Position:	**Jeremy D. Hickman** Director of Business Development Persistent Systems
Presentation title:	Mobile Ad Hoc Networking Radios for Situational Awareness

Abstract:

As with many emergencies, response to oil spills includes personnel from many government agencies and commercial entities. Further increasing complexity, oil spills often occur in austere and remote areas far from infrastructure, making establishment of chain of command, situational awareness and dissemination of information always a challenge. Currently, the Incident Command System (ICS) typically provides for a 12- to 24-hour planning cycle for Type 1 or 2 events. Developments in Mobile Ad Hoc Networking (MANET) radios support the goal of real-time response action to oil spills that are constantly changing and highly dynamic. This provides increased efficiency, lower costs, and lower potential impact from spills. Persistent Systems is creator of a sophisticated, scalable and easy to use MANET technology, Wave Relay® and the MPU5 radio that has been fielded in many harsh and tactical environments to distribute data communications including audio, on-scene video and other sensor data in real time, plus the ability to track assets on the map as they move through the scene, specifically designed for mobile environments. The presentation discusses best practices and examples of information sharing and situational awareness for incident response via MANETs.

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Speaker biography:

As a leader from industry, Jeremy Hickman has a background in communications and has participated in the formation and management of many projects for critical infrastructure security, incident response, and government communications and surveillance. Currently Director of Business Development with Persistent Systems, Mr. Hickman has also served as a Vice President at L-3 Communications, President of EMX LLC, and in other leadership roles including at Moog and Raytheon's First Responder program.

Speaker name: Position:	**Kevin Hoskins** VP, Telecom and Information Systems for MSRC
Presentation title:	Unique Applications of Remote Sensing and Surveillance Technologies Traditionally Used for Oil Spill Response

Abstract:

(Co-Presenting with Mark Hess)

The application of remote sensing and surveillance technologies in spill response activities has typically focused on the identification of floating oil in offshore or near shore environments. MSRC and Ocean Imaging are continuously seeking out and developing alternate uses of their Level ABC system as well as working to enhance the role of remote sensing in oil spill and disaster response. Examples of the expansion these technologies into new and different application realms include

- The use of an aerostat with HD/IR sensors to monitor
  - oil storage tanks (adjacent to a river during flood stage) at night
  - the repair of storage tank floating roofs damaged by Hurricane Harvey
  - the repair of a pipeline ~ 200 miles off the coast of Newfoundland.
- Using TRACS as a tool to support and document the demonstration of new oil spill response technologies in the Santa Barbara Channel
- Fitting UAS with scaled-down, multi-sensor payloads specifically suited for detection of oil in the littoral, estuarine zones as well as freshwater wetlands and designing remote sensing systems better suited for mapping inland spills and mapping the habitats for post-spill damage assessment
  - Modifying existing aerial remote sensing systems such as TRACS as well as developing processing and data delivery methodologies for use in fire mapping, animal surveys and even imaging lava flows.

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Speaker biography:

Kevin Hoskins is the Vice President of Telecom & Information Systems for the Marine Spill Response Corporation (MSRC), the largest dedicated oil spill and emergency response organization in the nation. He has spent the last twenty-seven years building and refining MSRC's Telecom and Information Systems infrastructure and more recently was appointed the program manager of MSRC's Surveillance and Remote Sensing Services (SRS).

Prior to his employment at MSRC Mr. Hoskins completed various assignments in the United States Air Force including 5 years as a member of the White House Communications Agency, providing telecommunications support for the President, Vice President, First Lady, and Secret Service.

Speaker name: Position:	**Kevin E Kennedy** Inventor/Owner PPR Alaska
Presentation title:	Otter Series Skimmers/Creating Community Spill Response Programs Require New, Cutting Edge Technology

Abstract:

To ensure that any skimming system is versatile as well as robust, testing must be done statically and in advancing mode, in a controlled environment, as well as at sea with different types of oil. Testing must also observe ASTM guidelines where available, with little or no support logistics.

Otter Series Skimmers have been tested to ASTM guide lines F2709, tested on the Taylor Energy MC-20 spill in the Gulf of Mexico at speeds more than 4 knots and on a 1-micron sheen; tested in Ashland Wisconsin on a creosote spill; and tested in Long Beach in a Port construction pit clean-up.

The Otter Pup has an ASTM rating of over 61 barrels per hour, oil recovery efficiency of 99.55% and the in-water component weighs in at 145 pounds. It has been tested on a real spill in the ocean, with currents more than 4 knots, and waves more than 6 feet. The Otter Pup operates on a 3000 watt, 45-pound generator. It has been proven to collect Naphthene, Toluene and Benzene.

Our technology advances make a Community Spill Response Program or Fast Attack Strike Team possible in every seaside or water front community.

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Speaker biography:

Kevin Kennedy is a leading marine logistics expert in the oil & gas, mining, and fishing industries in the State of Alaska. He began his career as a Bering Sea Crab fisherman at the age of 11, and by 16, became a US Coast Guard licensed Chief Engineer. Kevin has served or taken a leadership position on many major oil spills in Alaska from the Exxon Valdez to the Selendang Ayu, and outside Alaska on the New Carissa and Deep-Water Horizon. As the founder of PPR Alaska, Kevin invented the innovative and effecient Otter Series Skimmers. As a top 10 finalist in the Wendy Schmidt Oil Clean-Up X-Challenge, his system proved itself the most efficient skimmer among competitors, posting >99% ORE while advancing at >2 knots. His Otter Series Skimmers are the only devices capable of skimming oil sheen, extracting light volatiles, as well as the heaviest of oils, and separating oil from floating ice, bottom sediments and gravel coastlines.

Speaker name: Position:	**Amy Kukulya** Research Engineer, Principal Investigator Woods Hole Oceanographic Institution
Presentation title:	Autonomous Underwater Vehicle (AUV) Capabilities for Oil Spill and Environmental Anomaly Detection in Open Water and Under-Ice

Abstract:

The increasing level of commercial marine activity in high latitudes creates an ever growing risk of oil spills. Even in logistically accessible, ice-clear oceans, characterizing the extent and nature of a spill can be difficult as the Deepwater Horizon incident highlighted. Therefore we are developing an AUV-based approach inspired by an existing small, long-range system, called the Tethys Long-Range AUV (LRAUV), in order to support the Arctic Doman Awareness Center of Excellence (ADAC).

Further advancements are also underway in autonomous underwater vehicle technology for the REMUS class vehicles, including sensor and algorithm development for three-dimensional characterization of environmental anomalies such as oil and gas.

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Speaker biography:

Amy Kukulya is a recognized authority in management and operations of autonomous underwater systems at Woods Hole Oceanographic Institution, specializing in scientific applications of AUVs. She is currently a Research Engineer in the Applied Ocean Physics and Engineering Department and Project Manager and lead technical developer for an under-ice oil detection and mapping project with the Department of Homeland Security. Working with underwater robots has brought her from the Arctic to Antarctica. Her technical skills include configuration and operation of AUV systems, including navigation, imaging capabilities, data processing techniques and troubleshooting electrical systems. She has either led or participated in over 90 oceanographic expeditions to date. Apart from her technical skills, she is passionate about promoting education/outreach initiatives, and has been named a Wowster by the MA Governor's office. She is the lead developer of SharkCam as featured on Shark Week. Her work has also been featured on several Discovery Channel and PBS productions as well as the Boston Globe, Washington Post and National Geographic Magazine.

Speaker name: Position:	**Igor Kwiatkowski** Business Development Manager, Harbo Technologies
Presentation title:	Block Spills Before They Spread and Avoid Devastating Consequences

Abstract:

The T-FENCE First Response Oil Spill Blocking System solves the main problem in fighting oil spills:

Spills turn into major disasters because there is nothing on-board or close by to stop oil from spreading. Today, by the time oil spill responders arrive with their equipment, the damage is already done.

With the T-FENCE, the world's smallest and lightest boom system, we can revolutionize oil spill response by providing immediate oil spill containment by one or two people from any vessel, pier, dock or even vehicle for inland waters.

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Speaker biography:

Igor Kwiatkowski joined Harbo Technlogies in 2018. He has 20 years of experience working in the industrial sector providing technical speciality solutions to his customers with a concentration on the Oil & Gas market vertical.

Speaker name: Position:	**Kenneth (Ken) R. Lukins, Chief, USCG (Retired)** CEO, Lukins & Associates
Presentation title:	SlickSnake

Abstract:

(*Co-presenting with Susan Cavoretto*)

Introduction of SlickSnake oil containment boom. Our water activated, exceptionally lightweight, compact, hands free boom activates in less than 3 minutes. Suitable for freshwaters – rivers, estuaries, lakes, wet lands, shorelines, harbors, docks.

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Speaker biography:

Chief Ken Lukins, U.S. Coast Guard (Retired) has 40 years' experience in Facility and Installation Security and Safety, Crisis Management, Anti-Terrorism, Anti-Piracy, Maritime Safety and Security, Environmental and Emergency Response to include Oil Spills, Chemical Releases, Natural Disaster Response, Law Enforcement/Drug Enforcement, Customs, and Immigration Operations.

Ken has provided First Responder services in Crisis Management, Security and Safety, and related Training, Drills and Support Services for the Energy, Chemical and Transportation Industries, and various governments. Ken has lead team efforts in assessing and developing security operations throughout the world, and in currently heavily engaged in assisting governments and corporations in the Middle East and Africa.

He has been responsible for developing and leading all levels of training, drills and exercises focusing on First Responders, Facility Security and Safety, Crisis Management, Anti-Terrorism/Anti-Piracy, Maritime Security and Safety, Spill Management and Chemical Response (Including HAZWOPER - Hazardous Waste Operations and Emergency Response), Equipment Deployment and Health & Safety.

Speaker name: Position:	**Trevor McDonald** Senior Sales Engineer
Presentation title:	Emergency Response with Planet

Abstract:

Planet is an integrated aerospace and data analytics company that operates history's largest commercial fleet of satellites, collecting a massive amount of information about our changing planet. Planet is driven by a mission to image all of Earth's landmass every day, and make global change visible, accessible and actionable. Founded in 2010 by three NASA scientists, Planet designs, builds and operates over 130 satellites, and develops the online software and tools that serves data to users. Decision makers in business, government, and within organizations can use Planet's data and machine learning-powered analytics to develop new technologies, drive revenue, power research, and solve our world's toughest challenges. To learn more visit www.planet.com

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Speaker biography:

I have an immense passion for the environment and for people. I love learning, meeting new people and enjoying the sunshine in Los Angeles! At Planet I am fortunate to leverage my skills and interests to identify solutions for customers' business challenges.

Speaker name: Position:	**Greg McGowan** OSPR Response Technology Program Manager
Presentation title:	Response Technology Evaluation & Advancement

Abstract:

This presentation will provide an overview of OSPR's new program to support innovation in oil spill response. New response technologies and strategies are continually being developed, but the response community is slow to embrace approaches that have not been rigorously assessed and proven effective during real world spill response conditions.

OSPR is establishing an expanded Response Technology Evaluation program that will seek to support innovation, provide for assessment of new response methods and licensing of new oil spill cleanup agents, and share information regarding new technologies with the response community, industry, and other stakeholders. This presentation will describe the structure and objectives of the new program.

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Speaker biography:

Mr. McGowan is the Response Technology Program Manager at the CDFW, Office of Spill Prevention and Response (OSPR). This program includes: Best Achievable Technology, Applied Response Technology, Fishery Closure, Oiled Wildlife, the Marine Wildlife Veterinary Care and Research Center, Geographic Information Systems, and the OSPR Spill Reporting Desk and Database. He oversees a diverse group of technical experts including spill response professionals, spatial analysts and programmers, and veterinary and wildlife care professionals. He has responded to incidents across the U.S. and abroad. Mr. McGowan joined OSPR following a career of more than 23 years as a professional ecologist, during which he led an Incident Response and Recovery Team addressing spills across North America.

Speaker name: Position:	**David McMasters** DOT/PIM Manager, Chevron Pipe Line Company
Presentation title:	Case Studies in Pipeline Spill Elimination

Abstract:

In the 2017 conference, Chevron Pipe Line (CPL) discussed technologies in use to eliminate and/or mitigate pipeline outages. These technologies included the use of Computational Pipeline Leak (CPM) monitoring, vessel encroachment monitoring and video surveillance. CPL performed an unannounced, live product withdraw test to ensure the performance validity of the CPM system. The results and learnings from the test are reviewed in this presentation.

On March 29, 2018, the Maersk Viking drifted into the geo-fenced pipeline zone trigging an alert at the Leak and Intrusion Detection Support Center (LIDSC) Console. The event and emergency response are discussed in the presentation.

CPL has been using video surveillance for approximately 5 years. The initial equipment was nearing the end of its useful life and CPL performed a study to determine if upgraded equipment and software could improve leak detection while minimizing false alarms. The results of the study are discussed in the presentation.

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Speaker biography:

David McMasters holds a B.S. in Mechanical Engineering from Oklahoma State University and an M.B.A. from the Graduate School of Business, University of Chicago. David has over 30 years of experience with major pipeline and petroleum industry corporations focused on transportation and storage of crude oil, refined products, natural gas liquids, and natural gas petroleum hydrocarbon systems. He has contributed in various capacities including engineering, design & construction, maintenance, operations, engineering management and business development. He is currently the DOT/Pipeline Integrity Manager for Chevron Pipe Line (CPL), overseeing all aspects of CPL's PHMSA/OSFM regulatory compliance. David also serves as a pipeline operator representative in the Council for Dredging & Marine Construction Safety (CDMCS) Pipeline Task Force, a joint inter-agency, public-private initiative focused on ensuring safe operations in waterways with submerged oil and natural gas pipelines through enhanced communication, collaboration and exchange of best practices among stakeholders.

Speaker name: Position:	**Jacqueline Michel, Ph.D.** President, Research Planning, Inc.
Presentation title:	Lessons Learned from In-situ Burning of Wetlands in Louisiana

Abstract:

Spills that result in heavily oiled wetlands provide unique challenges for responders because aggressive removal methods can cause additional harm and slow overall recovery of the habitat. These issues are of particular concern for spills that affect the marsh interior, where access is limited. In Louisiana, extensive wetlands are crossed by numerous pipelines and oil wells, and spills can result in heavy oiling of interior habitats, in remote locations. Thus, in-situ burning is often considered as the best response option. Monitoring of in-situ burns in wetlands has provided the scientific basis for evaluating the conditions under which a burn can speed recovery. The lessons learned from multiple burns in Louisiana will be presented, and recommendations made for how to translate these lessons to spills of oil in West Coast wetlands, both coastal and inland.

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Speaker biography:

Dr. Michel is a geochemist with over 40 years of experience in oil spill planning, response, and assessment. Much of her expertise comes from being part of the NOAA Scientific Support Team since 1978. She responds to over 50 spills per year, providing support on the resources at risk, shoreline treatment, cleanup endpoints, selection and use of appropriate chemical countermeasures, among others. She has also provided support to the NOAA Assessment and Restoration Division since 1991, having taken lead roles in over 30 NRDAs. She has extensive expertise in detection, containment, and recovery of submerged/sunken oils, response options for heavily oiled wetlands, and oil fate and effects. She has written over 250 technical reports and journal articles.

Speaker name: Position:	**Douglas Mitchell** Senior Engineering Associate
Presentation title:	Development of a Self-Propelled Camera System for Estimating Oil Thickness

Abstract:

Determining the spatial extent and thickness of an oil slick in support of oil spill response operations will improve cleanup efforts. Satellite and aircraft provided data, while useful for broad planning guidance, do not provide real-time information needed for many tactical decisions. A newly developed self-propelled camera system shows promise as a multi-purpose platform that can provide real-time information regarding the thickness and geospatial extent of an oil slick, as well as other potential applications.

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Speaker biography:

Doug Mitchell is a Senior Engineering Associate at ExxonMobil Upstream Research Company. He has been with ExxonMobil for 12 years. Dr. Mitchell stewards the oil spill prevention and response research for ExxonMobil. He has a B.S. in geophysics from Boise State University and a Ph.D. in physical oceanography from the University of Rhode Island.

Speaker name: Position:	**Vince Mitchell** Executive Vice President Lamor Corporation
Presentation title:	Vessel of Opportunity Programs and Equipment Considerations

Abstract:

Vessels of opportunity can be of great benefit in managing significant response activities. Vessel of Opportunity programs can be pre-established, maintained and kept ready to deploy or can be established at the time needed.

This presentation will look at both pre-established programs and the considerations when establishing a program when needed, with a focus on the establishment of the Vessel of Opportunity program during the Deep Water Horizon incident as an example.

Equipment considerations for selection and use by vessel of opportunity will also be examined.

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Speaker biography:

Vince Mitchell, Executive Vice President with the Lamor Corporation, has a global range and substantial operational and technical oil spill expertise spanning thirty years leading many teams, projects and operations. Working locations have ranged from the arctic conditions found in Alaska and Russian Federation to the desert conditions of the Middle East. Vince also has extensive marine experience, currently holds a U.S. master's license and initiated the vessel of opportunity program during the Deep Water Horizon incident.

Speaker name: Position:	**Shon Mosier** VP North American Sales
Presentation title:	Marine and Inland Technologies

Abstract:

"Inland Spill Technology" by Shon Mosier, ELASTEC VP, North American Sales

Shon will present available inland spill products manufactured by Elastec and discuss their appropriate deployment scenarios, features and best practices.

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Speaker biography:

Shon Mosier is VP of North American sales at Elastec. Shon has been with Elastec for 11 years.

Shon has worked closely with many pipeline and railroad companies to identify the best available spill equipment for their waterway crossings. This includes many high current and shallow waterways across the USA and Canada. Shon often performs training on Elastec equipment such as the BoomVane™, Hydro-Fire® boom and American Fireboom technologies.

Shon is also an active member of the ASTM F-20 committee, which provides standards for Oil Spill Response.

Speaker name: Position:	**Elizabeth Murphy** U.S. Coast Guard R&D Center Environment & Waterways Branch Joint Maritime Test Facility (JMTF) Manager
Presentation title:	Fresh Water In-Situ Burn Research

Abstract:

Since the 1990s, researchers performed oil spill in-situ burn (ISB) tests such as at the USCG Joint Maritime Test Facility (JMTF) and Ohmsett research institution. Responders field tested techniques during the Deepwater Horizon spill in April 2010. Yet, there are persisting and newly arising unanswered questions and methods improvement needs for ISB of spilled oil as a response option. Lack of incentives due to perceived negative effects of ISB smoke plumes on human health resulted in very little research on the impacts of ISB in freshwater environments. Previous freshwater ISB research was small scale with few oil types. Environmental responders need more data to characterize freshwater burn efficiency, interactions of burn residues with freshwater, and smoke plume/air quality. The large scale freshwater in-situ burn experiments ongoing at JMTF will test ISB of commonly transported crude and heavy (i.e. “bunker” or IFO 380) oils in the Great Lakes region. A series of ISBs will evaluate crude/heavy oil product behavior in fresh water, contaminated vegetation impacts, calm versus turbulent water influence, and air quality dynamics via remote air monitoring. Data obtained will provide science-based adaptive management approach information needed by stakeholders and the Federal on Scene Coordinator (FOSC) to adequately assess ISB as a potentially effective spill response approach to most likely spill scenarios in the Great Lakes region.

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Speaker biography:

LT Liz Murphy is a project manager in the U.S. Coast Guard R&D Center Environment & Waterways Branch in New London, CT and manages the Joint Maritime Test Facility (JMTF) in Mobile, AL where a research team conducts in-situ burn (ISB) oil spill response studies. She worked as a marine safety officer, marine science technician, and pollution responder at USCG Sectors Baltimore and Charleston. LT Murphy’s background includes work with the GA Department of Natural Resources, polar studies in the Laboratory for Remote Sensing and Geoinformatics at the University of Texas San Antonio, scientific diving, deployment as a NOAA Fisheries Observer in the North pacific and Alaska and a BSEE Protected Species Observer in the Gulf of Mexico. LT Murphy holds a B.A. in Marine Science from the University of Hawaii at Hilo and M.S. in Environmental Policy and Management from American Public University.

Speaker name: **Position:**	**Judd Muskat** Senior Environmental Scientist (Specialist), GIS Coordinator and Team Lead
Presentation title:	OSPR's Digital Data Collection Applications & ERMA

Abstract:

California has used Geographic Information Systems (GIS) for oil spill response since the early 1990s. Data input has evolved from manual digitization to real-time automation using common mobile devices. Using ESRI's Survey123 OSPR developed a tablet-based application for collecting pertinent response planning information. The Wildlife Reconnaissance App on the iPhone assists the recording, recovery and tracking of impacted wildlife. SCATalogue an iPad-based App simplifies the collection of Shoreline Cleanup Assessment Technique (SCAT) data. All response generated field data is accessible to Responders via NOAA's Environmental Response Management Application (ERMA®) a web-based data viewer used as California's Common Operational Picture (COP).

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Speaker biography:

Mr. Judd Muskat has been with the Office of Spill Prevention and Response since 1993 where he is a Senior Environmental Scientist and the Geographic Information Systems (GIS) Coordinator. He leads a team that provides GIS support for emergency oil spill response, oil spill contingency planning, Natural Resource Damage Assessment (NRDA), drills and exercises and training. Mr. Muskat has responded to many oil spills over the years including M/V Cosco Busan (San Francisco Bay), Deepwater Horizon MC-252 (Gulf of Mexico) and Refugio Beach Pipeline oil spill (Santa Barbara). Prior to his tenure at OSPR Mr. Muskat held various positions Geothermal exploration, Geotechnical and Environmental Geology, and Oil and Gas exploration and development. Mr. Muskat holds a BA degree in Geology from Humboldt State University and earned a MS degree in Geology from California State University, Northridge.

Speaker name: Position:	**Tim Nedwed** Senior Technical Professional
Presentation title:	ExxonMobil's Oil Spill Prevention and Response Research

Abstract:

Oil spill prevention is required for industry to maintain its license to operate. In the unlikely event of a large oil spill, robust oil spill response is a requirement. ExxonMobil conducts research in both oil spill prevention and response. Recent advances continue to reduce the probability of an oil spill and also enhance response capabilities.

ExxonMobil is currently developing two new technologies that could provide additional barriers against loss of well control to significantly reduce the risk of a blowout. These tools will protect drilling workers and also reduce or eliminate potential environmental impacts. In addition, ExxonMobil conducts research that has led to new technologies for enhancing oil spill response.

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Speaker biography:

Dr. Nedwed is the Oil Spill Response Senior Technical Professional Advisor with ExxonMobil Upstream Research Company (URC). He has worked for ExxonMobil for 20 years and has led the oil spill response research program for the last 14 years. Dr. Nedwed's primary expertise is on oil spill response technologies with a focus on dispersants, *in situ* burning, remote detection, and oil spill fate and effects. He is also developing innovative technologies to prevent oil well blowouts.

Speaker name: Position:	**Karl Fjelde Nevland, Børge Kjeldstad** Head of Business Development**,** CTO
Presentation title:	Unmanned Vessel for Chemical-Free Dispersion of Oil

Abstract:

Over the last years Blue Impact has been developing an Unmanned Surface Vessel (USV) that enables dispersion of surface oil slicks without any addition of chemicals. Mechanical energy from high-pressure water jets is used to pulverize oil into tiny droplets. These droplets will mix into the water column where they ultimately will be degraded by naturally occurring bacteria.

In October Blue Impact demonstrated a USV prototype for chemical-free dispersion in the 2018 Santa Barbara OSPR Seep Demo. The demonstration showed how a solution like this might be used in a real oil spill response situation. The presentation will cover how the demonstration was conducted and lessons learned. The presentation will also touch upon the 2019 verification in Ohmsett and possible next steps for the technology.

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Speaker biography:

Karl Fjelde Nevland, MSc Mechanical Engineering
Karl has been working together with Stein Erik Sørstrøm with the founding and development of Blue Impact AS from the very start. He earned his master's degree in mechanical engineering at the Norwegian University of Science and Technology and is a former Submarine Weapons Engineer Officer.

Børge Kjeldstad, MSc Naval Architecture
Børge comes from the position as co-founder and CEO in Carrycut, a Norwegian startup company with a digital marketplace for freight. Previously Børge has worked as project manager for free fall lifeboat projects in DNV GL where he also worked with maritime logistics. Børge is an active reserve officer in the Royal Norwegian Navy working with Naval Cooperation and Guidance for Shipping. Early in his career, Børge was a researcher at MARINTEK, now SINTEF Ocean which is a world leading marine technical research institute.

Speaker name: Position:	**Paul Panetta** Chief Scientist of Ohmsett Oil Spill Response Lab Director Applied Research Associates, Inc.
Presentation title:	1)Oil Spill Response Research Testing and Training at Ohmsett 2)Slick Thickness Measurements from ROV and AUV Platforms

Abstracts:

1) Oil Spill Response Research, Testing, and Training at Ohmsett

Ohmsett plays a critical role in developing and advancing oil spill response technologies. This international asset is a large wave tank, measuring 203 meters long by 20 meters wide and 2.4 meters deep with a one-meter freeboard. The tank is filled with 9.8 million liters of salt water and allows multiple wave states to be achieved with a programmable wave generator. We will discuss the wide range of Ohmsett capabilities and activities including ASTM skimmer testing, dispersant effectiveness measurements, emulsification studies, remote sensing activities and a major project involving the generation of stable emulsions and the multi-agency remote sensing activities that occurred over several weeks at Ohmsett.

2) Slick Thickness Measurements from ROV and AUV Platforms

Measuring the slick thickness is important for: directing responders to the thickest portions of the slick; in determining skimmer effectiveness; and in measuring the ISB rate and efficiency. We have been developing acoustic methods to measure slick thickness from ROV and AUV platforms for deployment during oil spills. We are able to measure slick thickness of oil as thin as ~750 micrometers and up to 15 centimeters thick in ice fields as well in over 50 wave states including harbor chop and up to sea state 3 with waves as high as 58 cm (23 inches). Slick thickness in calm waters could be accurately measured within 0.2 mm (2%) with an uncertainty of 170 micrometers of the known slick thickness of slicks that was alternatively verified. In sea state 3 the precision of the measurement was 0.4 mm, which represented a 9% variation for various oils at ambient temperatures. This thickness measurement capability has been delivered to Ohmsett and separately used to measure the burn rate and efficiency during ISB, and for herder effectiveness.

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Speaker biography:

Dr. Panetta's work focuses on acoustic and ultrasonic materials characterization for oil spill response, marine sediments, and nondestructive evaluation (NDE) applications. Dr. Panetta has developed methods and delivered equipment to measure the thickness of oil slicks using acoustic methods and is currently developing methods to measure the burn rate and efficiency during in-situ burning of oil, developing measurements of herder effectiveness, and transferring these acoustic measurements to ROV and glider platforms. His team is also developing scattering methods to measure oil droplet and gas bubble size to characterize dispersant effectiveness. He was the PI on the BSEE project to develop the BSEE Oil Spill response Technology Reediness Levels (TRLs). His work has led to five patents and many publications.

Speaker name: Position:	**Steve Potter** Managing Director
Presentation title:	A Review of Recent Research Projects in Three Areas Related to Oil Spill Response: Behavior of Conventional and Unconventional Oils, Linear Augmented ISB, and Decanting Practices.

Abstract:

Research continues in a range of areas related to oil spill response. Three recent topics include: 1) testing of the behavior of conventional and unconventional oils that are weathered using multiple processes including a wind tunnel, a rotovap, and within a circulating flume tank; 2) research and develop a linear augmented fire boom configuration along with air injection to increase burn efficiency and reduce soot emissions; and 3) a scoping study on decanting regulations and practices as part of a broad investigation of Alternative Response Measures. Summary project information will be provided.

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Speaker biography:

Stephen Potter is a senior engineer and vice-president at SL Ross. He joined the company in 1985 and has participated in most company projects related to assessing spill probability, countermeasures capabilities, and recommending response strategies.

Mr. Potter previously spent three years as a research engineer for Dome Petroleum Ltd., responsible for oil spill projects in support of Dome's Beaufort Sea exploration program. He was closely involved in the development and testing of several novel devices and techniques including skimmers, incinerators, fireproof booms, in-situ burning and subsea containment. His work with the Beaufort Sea Oil Spill Cooperative, where he supervised the routine use and maintenance of the co-op's equipment inventory, provided him with an excellent knowledge of the capabilities of commonly used spill equipment. Mr. Potter has subsequently used this practical, hands-on knowledge, along with experience with equipment development and testing, to advise government agencies and oil companies in equipment evaluation and selection and contingency planning. Since joining SL Ross he has performed research on a variety of countermeasures, including spill recovery devices for use in brash ice, techniques for dealing with spills of viscous waxy crude oils, development and testing of fire-resistant containment booms, tanker self-help techniques, development and testing of a fast-water containment boom, and techniques for pumping highly viscous oils and emulsions.

Mr. Potter is an active member and chair of the F20 committee on Hazardous Substances and Oil Spill Response within the American Society for Testing and Materials (ASTM), chairs the subcommittee on booms, and has authored standards on containment booms, skimmers, pumps, storage devices, and in-situ burning. Mr. Potter is the editor of the World Catalog of Oil Spill Response Products, which was recently published in its Eleventh Edition.

Speaker name: Position:	**David Prior** President, Extreme Spill Technology (EST)
Presentation title:	Robotic Oil Spill Recovery Vessel

Abstract:

EST has developed a globally patented, non-toxic, mechanical system to remove oil and chemicals floating on the surface of more dense liquids. Working with ANL, EST has adapted their Oleo Sponge technology to recover submerged compounds, such as Alberta dilbit. https://www.youtube.com/watch?v=zCx5bzLlRmc

A key feature of the EST system is the absence of moving parts in the recovery mechanism. The viscosity of the oil/chemical is irrelevant because the EST system does not "grab" the product. EST uses buoyancy. This allows the EST system to be economically scaled up and ruggedized to meet the most challenging conditions, including high seas and flowing ice pack in the Arctic.

The EST oil/chemical spill recovery system is fully automated. A microprocessor controls all operations. This permits an EST vessel to FULLY utilize an automated vessel system.

EST robotic vessels, protected by simple water deluge systems, can enter a burning oil/chemical slick to remove the burning compounds from the water's surface.

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Speaker biography:

David began his marine industry career in Atlantic Canada over 40 years ago. Many months of deep sea fishing at sea provided hands-on experience and informed all EST designs. He founded Sou'West Sails in 1975, where he helped outfit 12 new frigates for Canada's naval base. He founded Tryon Boatworks in 1997 to manufacture epoxy-composite aquaculture workboats, which led to a 2003 IRAP project award for building structures entirely out of recycled plastic.

David's experience in oil spill remediation technology began in 2005 while on contract with what was then called the Oil and Gas department in Dalhousie University's Faculty of Engineering. He founded Extreme Spill Technology in 2008 to develop, patent and commercialize the revolutionary design concept at the heart of EST vessels. David has published widely in the field of oil spill remediation technology, including the Canadian Naval Review and Claims Journal, and been invited to speak at conferences such as the annual Oil Spill Response Workshop (China), Offshore Arabia (UAE) and MEOPAR (Halifax).

Speaker name: Position:	**Ali S. Rangwala** Professor, Worcester Polytechnic Institute
Presentation title:	Flame Refluxer: Enhanced Burning of Oil Slicks

Abstract:

This talk will present a simple and robust system to directly burn off oil slicks in booms at higher burn rates and with lower particulate emissions compared with current in situ burning practices. The working principle of the technology, named *Flame Refluxer*^{TM}, is to transfer the collected radiative and convective heat caused by the combustion back to the fuel to create a feedback loop that sustains a significantly increased burning rate. The technology was successfully tested using field experiments at the US Coast Guard facility in Mobile Alabama in a 1.4 m diameter crude oil slick fire of 1 cm thickness. The regression rate reached a value of 17 mm/min. This is ~ 6 times more than the baseline case. The postburn residue after 10 minutes of burning was only 1.8%. Cleaner combustion was also observed with CO/CO_2 ratio reducing to 50% of baseline values. Patent: US20170073918A1 - Systems and methods for in situ cleanup of burnable materials.

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Speaker biography:

Ali S. Rangwala is a professor in the department of Fire Protection Engineering at Worcester Polytechnic Institute (WPI) (2006 – present). He has a BS in Electrical Engineering, from the Government College of Engineering, Pune, India (2000), an MS in Fire Protection Engineering from the University of Maryland, College Park (2002), and a PhD in Mechanical and Aerospace Engineering from the University of California, San Diego (2006).

Professor Rangwala's research interests include problems related to environmental safety and industrial fire and explosions.

Speaker name: Position:	**Kenny Rhame** Chief Information Officer
Presentation title:	Managing Resources in the Field

Abstract:

Effective resource management requires input from many different positions of the Incident Management Team in the Command Post and field. Mobile applications and software provide tools to fully manage resources from the start by documenting the initial call out of resources and creating resource requests in the field. Check-in recorders are positioned in the field to ensure accounting for all assigned resources. Together this information builds overall situational awareness with resource status reports and displaying resource locations on the Common Operating Picture.

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Speaker biography:

Kenny provides technical leadership as the Chief Information Officer (CIO) at The Response Group. His experience includes over 25 years in Information Technology and Security specializing in Geographic Information Systems (GIS) and Emergency Response. Kenny provides overall direction for all software development, support and information systems at The Response Group.

Kenny has filled key roles supporting all-hazard incident and crisis management events as an active member of The Response Group's Emergency Response Team.

Speaker name: Position:	**Henry Ruhl** CeNCOOS Director
Presentation title:	Ocean Observing Systems in California and their Application for Oil Spills

Abstract:

The US Integrated Ocean Observing System (IOOS) has 11 regional associations that collect, process and disseminate ocean information for society. This effort includes priorities for improving estimates and predictions of ocean conditions, improving safety and efficiency of maritime commerce, improving safety, and sustained use of ocean resources. The Central and Northern California Ocean Observing System (CeNCOOS) and Southern California Coastal Ocean Observing System (SCCOOS) operate a suite of systems that include high frequency radar (HFR) measurement of surface currents, its integration into predictive ocean current models, particle and plume tracking tools, and collection of a variety of other physical, biogeochemical, biological and ecosystems data across the state. These Regional Associations importantly integrate data from other efforts including the Coastal Data Information Program (CDIP), which includes a national network of wave buoys and related data and models. Together these tools provide a wide range of options for examining risk, establishing baseline and variations in conditions, and providing information for decision makers during events.

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Speaker biography:

Henry Ruhl has been working in the field of ocean biogeochemistry and ecosystems research since 1994. He has published more than 60 peer-reviewed papers on marine ecological research. Work has included investigating connections between climate, variations in California Current Ecosystem conditions and changes in seafloor biogeochemical and ecological conditions. He has also conducted landscape scale ecological surveys in estuaries, in and around shelf MPA sites in soft bottom and rocky reef habitats, and deep sea locations. Ruhl received a PhD in Marine Biology from the Scripps Institution of Oceanography in 2006. From 2010-2017, he served as Associate Head of the Ocean Biogeochemistry and Ecosystems group of the National Oceanography Centre of the United Kingdom. Since January 2018, Ruhl has been CeNCOOS Director.

Speaker name: Position:	**Paul A. Schuler** Director, External Affairs, Americas
Presentation title:	OSRL's Remote Sensing Capabilities and Outlook

Abstract:
Oil Spill Response Limited (OSRL) is an industry-funded global response organization. OSRL's remit is to respond efficiently and effectively to marine and land-based incidents anywhere in the world. This has led OSRL to investigate and invest in new technologies to provide information and data to support decision-making by response leadership, allow responders to be more effective, and provide feedback on the environmental effects of spilled oil, and response measures taken and not taken.

This presentation will take a retrospective look at technologies that OSRL has investigated, pros and cons of new technological capabilities, and obstacles and outlooks for future use, procurement, or access. The presentation will also introduce the Industry Technical Advisory Committee (ITAC) to the forum.

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Speaker biography:

Mr. Schuler is the Director of External Affairs for the Americas for Oil Spill Response Limited (OSRL), a global industry-funded response organization. Formerly he was CEO of Clean Caribbean & Americas (CCA). He is a recognized expert on international aspects of oil spill preparedness and response, in particular the science and use of dispersants to combat oil spills. He led CCA's response efforts on behalf of BP during the Deepwater Horizon incident and subsequently testified before a US Senate Committee on oil spill issues resulting from Cuban drilling in the Straits of Florida. He also has been involved as both an investigator and sponsor of research supporting Net Environmental Benefit Analysis (NEBA/SIMA) for oil spill decision-making and toxicity studies to determine thresholds for coral at the individual and cellular level. He is an Advisory Committee member for GOMRI CARTHE II Consortium and a member of GOMRI's Synthesis & Legacy Committee.

Mr. Schuler is a native of Babylon, NY, where was engaged in commercial clamming. He served 15 years in the US Navy.

Speaker name: Position:	**Carlton Schumacher** Sales Manager- Commercial Marine
Presentation title:	Sea Machines- Autonomous Vessel Controls for Spill Response and Site Assessment

Abstract:

Sea Machines intro and company background, followed by details pertinent to spill response.

The Sea Machines 200 & 300 are commercially available products that lend autonomous control capabilities to conventional workboats. The system can be installed during build or as a retrofit.

The system enables level three autonomous capability, allowing for unmanned or supervised autonomous command of workboats from a PC.

This system has been used in oil spill boom handling training as part of a trial with a leading oil spill response firm. In this trial, the Sea Machines system proved to be effective in increasing safety of crew and increasing the efficiency of the operation, and resources available for other tasks.

The system is also deployable for remote site assessments and gas monitoring.

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Speaker biography:

Carlton Schumacher serves as Sales Manager, Commercial Marine for Sea Machines Robotics. Prior to Sea Machines, Carlton spent many years developing sales strategies for Marine IOT & connectivity products, namely for SIREN Marine.

Speaker name: Position:	**Gordon Staples** Senior Scientist/Project Manager
Presentation title:	RADARSAT-2 Products and Services to Support Near-Real Time Oil Spill Response

Abstract:

Since the inception of the RADARSAT-2 mission, the space and ground segments have been optimized to meet near-real application requirements. In conjunction with space and ground segments, products and services have been developed to meet oil spill response needs. A summary of RADARSAT-2 modes that have been used operationally for oil spill detection is presented. For the ground segment, the time line from tasking the satellite through data processing is outlined. Examples of near-real time delivery are presented. Recent work by MDA has focused on discrimination of sheen and oil emulsion. Based on analysis of a persistent oil slick off the coast of Louisiana, the results indicate thicker (emulsified) oil detected by RADARSAT-2 was confirmed by contemporaneous data collected by UAVSAR, ASTER and WorldView-2 data. An overview of the effort by MDA to integrated RADARSAT-2 data in the DigitalGlobe cloud-based GBDX platform is presented. A key advantage of this platform rests in the ability to rapidly view and extract information on the historical spatial and temporal distribution of slicks and slick look-alikes which can serve as an aid to help discriminate oil spills from ambient slicks.

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Speaker biography:

Gordon Staples received the M.Sc. degree in ocean physics and the B.Sc. degree in honours physics and oceanography from the University of British Columbia. He joined MDA in 1993 and is currently Senior Scientist and Project Manager in the Earth Observations Systems division. He has extensive experience in radar polarimetry and the development of maritime and terrestrial radar applications. Gordon was the former President and is now Treasurer of the Canadian Remote Sensing Society.

Speaker name: Position:	**Karen Stone** Program Manager Bureau of Safety and Environmental Enforcement Oil Spill Preparedness Division
Presentation title:	Techniques and Technologies to Increase *In Situ* Burning Efficiencies

Abstract:
In Situ Burning (ISB) is an oil spill response technique that rapidly removes spilled oil from land, snow, ice or the surface of the water. Chemical combustion converts the hydrocarbons into carbon dioxide, water vapor, and carbon soot. ISB quickly and safely removes large volumes of oil from the environment eliminating the need to collect, store, transport and dispose of oil and oily wastes. Under ideal conditions, ISB can result in efficiencies between 90-98% and research is underway to further increase these efficiencies. Several current BSEE studies will be discussed focusing on new techniques and technologies that yield an increase in combustion volumes while simultaneously decreasing burn residues and harmful emissions.

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Speaker biography:

Karen Stone serves as a Program Manager and Oil Spill Response Engineer in the Oil Spill Preparedness Division of the Bureau of Safety and Environmental Enforcement (BSEE). BSEE is an agency under the U.S. Department of Interior that oversees oil production on the outer continental shelf. Her area of expertise is *In Situ* Burning (ISB) of oil as a response technique; however, she also works on research using Geographic Information Systems (GIS). Karen is a member of various industry and government committees and working groups including American Petroleum Institute's In Situ Burn Workgroup and the National Response Team's Science and Technology Committee. Karen has presented oil spill response research before diverse audiences and most recently, the International Combustion Symposium held in Dublin, Ireland for work associated with intentional wellhead ignition in the event of loss of well control (blowout). Prior to accepting her appointment with BSEE, Karen worked for refined petroleum products pipelines focusing on emergency preparedness plans required under OPA90. She also was a secondary educator in Earth & Space Science and Geographic Information System (GIS) instructor. Karen is a graduate of Marietta College with a Bachelor of Science Petroleum Engineering degree and holds a Master's Degree from George Mason University. Karen lives in Virginia and teaches a masters geology course in her spare time.

Speaker name: Position:	**Jordan Stout** NOAA Scientific Support Coordinator
Presentation title:	1) NOAA Spill Science Update 2) Fluorometry Summary for the Santa Barbara Seep Demonstration

Abstracts:

1) An update on a variety of current & emerging spill-relevant topics that NOAA's Office of Response & Restoration (OR&R) has engaged in since the 2017 OSPR/Chevron Response Technology Workshop. Whether stemming from recent incidents, emerging technologies & trends, or strategic-collaborative efforts, topics span a wide range of scientific & technical disciplines including remote sensing, oceanography, chemistry, modeling, data management, and mapping tools. This presentation will focus mainly on direct Emergency Response Division (ERD) efforts (such as incidents, training and in-house tool development) as well as broader OR&R research & methods development where NOAA's technical expertise & technologies are active.

2) In-situ fluorometry was used to monitor for oil dispersed in the water column during the recent Santa Barbara seep demonstration (October 2018). Though the USCG fluorometry equipment and SMART (Special Monitoring of Applied Response Technologies) protocols are not intended as a tool to evaluate emerging technologies, the activity provided an opportunity for real-life field deployments of USCG fluorometry kits as well as NOAA data post-processing and products. Methods and overall results will be presented along with lessons learned from the seep demonstration.

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Speaker biography:

As NOAA's Scientific Support Coordinator (SSC) here in California, Jordan provides scientific & technical support to USCG & EPA for spills of oil & hazardous materials. Jordan has been involved in supporting many significant incidents in California and throughout the nation, including the Refugio pipeline spill, *SS Montebello* assessment, XOM Silvertip pipeline spill, Japanese Tsunami response, *MODU Deepwater Horizon* (MC-252), *T/V Dubai Star*, *T/B DM932*, *M/V Selendang Ayu*, *M/V Cosco Busan*, *T/B DBL-152*, numerous hurricane responses, and many smaller incidents. He also serves as NOAA's representative on Regional Response Team 9 and the MEXUS-PAC Joint Response Team.

Speaker name: Position:	**Kirsten Trego** Executive Director, Interagency Coordinating Committee on Oil Pollution Research (ICCOPR)
Presentation title:	ICCOPR Activities Update

Abstract:

Established by the Oil Pollution Act of 1990, the Interagency Coordinating Committee on Oil Pollution Research (ICCOPR) is charged to coordinate a comprehensive and coordinated Oil Pollution Research and Technology Plan (OPRTP) and promote cooperation with industry, universities, research institutions, state governments, and other nations through information sharing, coordinated planning, and joint funding of projects.

This presentation provides an assessment of ICCOPR's progress toward meeting the research priorities outlined in the 2015-2021 OPRTP, and provides an update on ICCOPR activities.

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Speaker biography:

Prior to serving as ICCOPR Executive Director, Ms. Trego spent two years leading the implementation of the Coast Guard Commandant's Arctic Strategy. There, she coordinated cross-programmatic initiatives and worked closely with the White House Arctic Executive Steering Committee, the Arctic Council, National Security Council and the numerous federal agencies to advance the nation's strategic priorities in the Arctic. As Commander in the Coast Guard Reserve, Ms. Trego currently serves as the Senior Reserve Officer at Sector Delaware Bay, in Philadelphia, PA overseeing the readiness and performance of the Sector Delaware Bay Reserve forces to execute all Coast Guard missions in the eastern Pennsylvania, southern New Jersey, and Delaware region. Ms. Trego has extensive response experience including Hurricane Sandy, September 11 terrorist attacks, and served as Deputy Incident Commander for the Deepwater Horizon oil spill disaster.

Speaker name: Position:	**Alessandro Vagata** Director of Operations, Fototerra Aerial Survey LLC
Presentation title:	Satellite and Enhanced Airborne Spill Integrated Remote Sensing: A New Concept

Abstract:

Despite the fact that the Gulf of Mexico is among the most exposed areas in the world to pollution with more than a billion barrels of oil transported or produced every year, the U.S. spill response system is reactive, not proactive. There is no systematic early detection or surveillance system to guarantee an early warning of hydrocarbon release and thus to deter illegal activities. The current lack of application of adequate technologies for monitoring and response support can jeopardize response efforts, exacerbating damages to the gulf communities.

Moved by the idea to bridge the gap between available technologies and practice of communities resilience, the authors presents a state of the art monitoring and oil spill response system that provides technologies and strategies that can enhance the response to spills. The system, based on innovative yet mature technologies, leverages the continuous observations of satellite with airborne validation and spill modeling to provide near real-time identification and response to oil spills.

A case study of an hypothetical oil spill is presented and the decision making process involving satellite and airborne remote sensing explained including information link to the Incident Command Center.

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Speaker biography:

Alessandro Vagata, Director of Operations of Fototerra Aerial Survey, has more than 15 years of senior management experience in the aerospace, automotive, and subsea industry working in high technology programs and leading multi-million dollar projects. He's expert in engineering, product development, manufacturing and operations with deep knowledge in special mission airborne platforms, remotely operated subsea equipment, and work-class ROVs.

He earned his Master Degree in Aeronautical Engineering from the University of Pisa. He's an IFR-rated pilot.

Speaker name: Position:	**John Vogel** Geographer, Dept. of the Interior, Office of Aviation Services, Unmanned Aircraft Systems Program
Presentation title:	DOI Drone Capabilities (with a Focus on the Kilauea Eruption Response Effort)

Abstract:

The Department of the Interior (DOI) has developed an extensive unmanned aircraft systems (UAS) program, dating back to 2008 when military surplus systems were first deployed operationally by DOI employees. This presentation will briefly describe the program's history, while focusing on current and future capabilities, using examples from last summer's Kilauea eruption response effort.

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Speaker biography:

John is a graduate of UC Santa Barbara's Geography Department, and later, a survivor of a stint at the Pentagon working as an imagery analyst while an Air Force Intelligence officer. John then began a 25-year career in the U.S. Geological Survey, during which he specialized in GIS analytics and instrumentation deployments from the Aleutians to the Amazon. He began flying UAS in 2008 and joined DOI's UAS Program Office in 2017 to assist with pilot training and systems evaluation, with an occasional side trip to monitor watersheds, biocrusts, and volcanoes.