Link	Topic #	Title	Objective	Business Area	LM POC	Email Address	Phone
View Online	8.1.1F	Improving Outcomes of Marine Aquaculture via Genomic Approaches	In comparison to human medicine or land based agriculture, the genomic basis for improving marine aquaculture breeding outcomes is in its infancy. Most aquaculture facilities rely on batch spawning and trial and error. There is little chance of identifying individual parents and the specific genetic traits that provide eggs and larvae with superior qualities of growth, feed conversion and disease resistance. The sequencing of the human genome took 10 years and 3 billion dollars. The cost of genome sequencing has declined to <10 days and < 1,000 per human genome. Perhaps more important non-model genomes such as abalone, yellowtail (Seriola sp.) bluefin tuna, and rock scallop can be developed based on linkages to data bases from better studied biomedical model organisms such as the zebrafish. NOAA resource managers and the aquaculture industry seeks assistance in developing high-throughput, low cost methods to conduct pedigree analyses, and to identify and routinely screen for functional genes associated with favorable growth characteristics and genes associated with disease sensitivity and resistance.	LM Missiles and Fire Control (MFC)	John Fontana	john.c.fontana@lmco.com	407-356-3968
View Online	8.1.2F	Developing Technologies for Offshore Aquaculture in the United States	Offshore aquaculture refers to aquaculture in the waters between state maritime boundaries and the end of the Exclusive Economic Zone (EEZ). Offshore aquaculture has the potential to complement wild harvest fisheries, increase our domestic supply of safe, healthy seafood and contribute to resilient coastal communities and economies. There is huge opportunity for offshore aquaculture development in the United States. The U.S. EEZ is the largest in the world, spanning a wide range of ocean conditions and habitats. Less than 0.01% of the U.S. EEZ could potentially produce up to 600,000 metric tons or more per year of an equally wide range of farmed aquatic species. Dozens of commercial operations around the world currently use offshore aquaculture technologies, and U.S. companies, investors, and farmers have participated in this global aquaculture industry by exporting technology, equipment, seedstock, services, investment and feed.				
View Online	8.1.3F	Orthogonal Stereo Camera System for Visual Fish Surveys	NOAA Fisheries is mandated to provide the best scientific information available to establish conservation and management measures for the sustainability of our Nations living marine resources and healthy oceans. One national priority relevant to this mission is the need resolve data-limited fish assessments. Many of the data-limited assessments result directly from the inability to effectively sample rocky and reef habitats. The scientific community has relied on camera systems deployed along the bottom to provide counts and measures for assessments. One research approach is the accurate synchronization of paired stereo cameras which provide the counts and precise length measurements of fish during camera surveys. Another research approach is the use of multiple synchronized pair stereo cameras where their view fields are orthogonally arranged and stitched to provide a 360 degree horizontal view to eliminate double counting targets while providing accurate length measures (to 0.5 cm accuracy). Research has demonstrated that the use of paired stereo cameras with sufficient accuracy in synchronization and stitched view fields have significantly improved abundance estimates for assessments; however to date, commercially available stereo camera systems lack the accuracy in synchronization and stitched view fields for scientific data collections. There is consensus (and market) among fisheries scientists within the agency and among the international scientific community regarding a need for an off-the-shelf (easy to use turn-key) orthogonal stereo camera system with accurate synchronization and stitched view field capabilities that could be widely deployed to improve visual fish survey operations to resolve data-limited stock assessments in difficult to sample reef and rocky habitats.	LM Missiles and Fire Control (MFC)	John Fontana	john.c.fontana@lmco.com	407-356-3968
View Online	8.2.1N	Affordable, lightweight, wireless-control ROV for sustained observation of benthic ecosystems	Conserving coastal places provides economic benefits to local communities. These communities rely on dollars spent on activities such as recreation and tourism. NOAA's National Ocean Service works to conserve marine areas and preserve the economic benefits of these special places to local communities through its coastal management and place-based conservation programs. National Marine Sanctuaries are mandated to fulfill this placed-based conservation and through our research we are working to understand the natural and anthropogenic changes and interactions occurring at Gray's Reef.	LM Missiles and Fire Control (MFC)	John Fontana	john.c.fontana@lmco.com	407-356-3968

View Online	8.2.2N	Lionfish Control	The western Atlantic Ocean, Caribbean Sea, and Gulf of Mexico are currently experiencing a rapidly expanding and seemingly uncontrolled invasion by Indo-Pacific lionfish. In the last 15 years, populations have grown beyond our ability to control them by traditional response modes diver removal, for example. Impacts to reef communities are being observed in many locations, with predation rates that can remove up to 70% of the forage base of other reef fish. Lionfish now occupy depths down to 1000 feet, and are in very high densities in many places, the vast majority of which are below diving depths, and they appear to have no currently functioning natural controls. Lionfish have been caught in deep water in some traditional traps, principally lobster traps, and some by hook-and-line, but in insufficient numbers to control populations.	LM Missiles and Fire Control (MFC)	John Fontana	john.c.fontana@lmco.com	407-356-3968
View Online	8.2.3D	Sensor System for Measuring Oxygen Demands in Natural Wateres	Occurrences of large volumes of hypoxic or anoxic waters, also known as dead zones, are widespread in the United States, including the Gulf of Mexico, the Great Lakes, the Chesapeake Bay, the Long Island Sound, and coastal waters off Oregon and Washington. A capability to monitor and forecast the locations of these dead zones is highly desired from the standpoint of ecosystem and water quality management.	LM Missiles and Fire Control (MFC)	John Fontana	john.c.fontana@lmco.com	407-356-3968
View Online	8.2.4D	Innovative Multi-Platform Sensor for Marine Debris andObject Detection and Mapping	Detecting and mapping objects and debris in our oceans, coastal areas and marine navigation routes has been a difficult problem. Advancements in sensor and measurement technologies are drastically needed. Marine debris and pollutants pose significant navigational and environmental threats. The tsunami on March 11, 2011 making landfall in Japan produced 5 million tons of debris in the ocean, and it is believed that more than 1 million tons of debris are still floating. This debris significantly threatens marine navigation and coastal environments. As the downhill flow rate of the Greenland glaciers further increases (doubled in the last decade), a larger number of icebergs are being calved. With the warming trend in ocean temperatures, these icebergs are melting at a faster rate and calving to produce smaller icebergs that are more difficult to detect. The same is occurring in the southern ocean. Wind and ocean currents are transporting these icebergs into shipping routes, posing significant threat to marine navigation. With the warming trend, sea ice is also changing affecting navigational paths. Routine monitoring of these changes is urgently needed. Melting sea ice also plays a role in climate change. Accurate knowledge of sea ice extent and location is needed for climate studies and forecasting. Accidents at sea, be it marine vessels, cargo or aircraft, require an ability to rapidly search large regions for debris in order to focus search & rescue and recovery resources. Identifying the location of the debris allows the search & rescue area to be reduced significantly and thereby improving chances of finding survivors, minimizing cargo loss and reducing costs in these efforts. NOAA seeks innovative sensor and measurement technology that can be deployed from manned and unmanned ships and aircraft, as well as satellite platforms in the future, that can provide accurate detection and	LM Missiles and Fire Control (MFC) LM Mission Systems and Training, Under Sea Systems (MST USS)	John Fontana Jon Bell	john.c.fontana@lmco.com jon.c.bell@lmco.com	407-356-3968 401-849-0124 x144
View Online	8.2.5R	Autonomous direct measure of carbonate ion in saline waters	Chemical changes in seawater result from the uptake of carbon dioxide (CO2) either as a result of rising atmospheric CO2 levels (i.e. ocean acidification), or as a result of enhanced respiration particularly within coastal waters. These changes include increasing concentrations of dissolved inorganic carbon (DIC), the production of carbonic acid (e.g. acidification), an increase in the partial pressure of seawater CO2, and shifts in the ratio of bicarbonate to carbonate ion availability whereby carbonate ion concentration decline with increasing CO2 levels. How these changes affect marine life is a prominent issue for contemporary oceanography and marine resource management. Geological evidence reveals dramatic changes in marine life as a consequence of past events where similar rates of CO2 increase occurred and experimental studies indicate that a broad range of contemporary taxa are sensitive to such changes. Documentation of the chemical changes accompanying ocean acidification is a key element in acquiring the environmental intelligence needed to foster a resilient society. Carbonate ion concentration is a particularly important variable with regards to ocean acidification as a number of important impacts to marine calcifiers are often attributed to its decrease. However, rather than being directly measured, carbonate ion is generally calculated from two of the four major CO2 system parameters: pH, pCO2, DIC, and total alkalinity resulting in a propagation of error associated with the two measured parameters as well as the dissociation constants used to solve the carbonic acid system from them. Direct measurement using existing ion selective electrodes (ISE) significantly lack the sensitivity or precision needed for marine science or monitoring applications. Spectrophotometric methods are available remain laborious and not available at this time for	LM Missiles and Fire Control (MFC)	John Fontana	john.c.fontana@lmco.com	407-356-3968

View Online	8.2.6R	Laser-Based Analyzer for Methane, Carbon and Hydrogen Isotopic Measurements in the Deep Sea	Development of laser-based sensors that are capable of measuring chemical species (gases and isotopes) will greatly enhancing the ability to understand biogeochemical processes in a range of ocean environments from the deep sea to coastal environments. Laser-based platforms can provide highly sensitive and precise measurements and be designed to target isotopic species. Laser-based platforms are particularly well suited to gas and stable isotope measurements but currently are large in size and have power requirements limiting the ability to deploy them in the deep sea. The development of smaller, more compact, and less power-hungry instruments will allow new in situ studies of biogeochemical processes in the ocean, including surveys of hydrate-hosting continental shelf sediments or hydrothermal vent settings. Other advances will come from the utilization of different lasers, different sensing schemes, new detectors, and targeting a variety of chemical species. Atmospheric sensors exist that utilize laser-based spectroscopy for such gases as methane, CO2, and N2O. Many such sensors are currently being used for surface water analysis, but very limited work has been done to push the technology into submersible sensors	LM Missiles and Fire Control (MFC) LM Mission Systems and Training, Under Sea Systems (MST USS)	John Fontana Jon Bell	john.c.fontana@lmco.com jon.c.bell@lmco.com	407-356-3968 401-849-0124 x144
View Online	8.3.1C	Ultra-High Precision Measurements of Atmospheric Methane Stable Isotope Rations	Atmospheric methane (CH4) is the second most important contributor to radiative forcing, and monitoring its concentration is vital for understanding changes in Earths climate. Interpreting variations of atmospheric CH4 allows for determination of its sources and sinks. However, concentration measurements alone generally do not provide enough information on specific methane sources and sinks, which is required to develop predictive capability for climate-carbon-cycle feedback processes. On the other hand, measurements of ratios of stable isotopes of CH4 can provide more information on processes responsible for observed variations of CH4. Currently NOAA collaborates with University of Colorado scientists to make ultra-high precision laboratory-based measurements of 13C:12C, and 2H:1H of CH4 using isotope ratio mass spectrometers. These devices are labor intensive and require significant pre-processing of samples. Direct optical methods (i.e. spectroscopy) have potential to greatly streamline this process if small volumes can be used and measurements can be made with as good or better precision and stability than existing mass spectrometric techniques. Instruments with such characteristics are not currently available in the marketplace.	LM Missiles and Fire Control (MFC)	John Fontana	john.c.fontana@lmco.com	407-356-3968
View Online	8.3.2D	High Stability Atmospheric Carbon Dioxide and Methane Analyzer	Atmospheric carbon dioxide (CO2), and methane (CH4) are the dominant contributors to man-made radiative forcing, and accurate measurements of their concentrations are vital for understanding changes in the Earths climate, and for providing independent verification of emissions. Atmospheric transport models are used to infer emissions and removals of atmospheric gases from their observed dry-mole fractions. Monitoring the vertical variations of the dry-mole fraction of CO2 and CH4 in the atmospheric column as well as at the surface will enable scientists to validate and improve the transport models in addition to providing improved estimates of emissions. Vertical profiles also serve as a way to directly test the accuracy of satellite total column estimates, without having to rely strongly on the validity of transport models. At present there are very few highly accurate (calibrated) vertical profiles of greenhouse gases in the atmosphere. The problem would be solved with a light weight instrument certified by the FAA for deployment on commercial aircraft	LM Missiles and Fire Control (MFC)	John Fontana	john.c.fontana@lmco.com	407-356-3968
View Online	8.3.3D	Airborne instrumentation	Atmospheric methane (CH4) is a significant precursor to O3 on a global scale and is a short-lived climate-forcing agent, second only to carbon dioxide (CO2). Near-term mitigation of methane emissions is a major component of current international policy discussions. However, substantial gaps exist in the understanding of methane sources, confounding the development of scientifically sound mitigation strategies.	LM Missiles and Fire Control (MFC)	John Fontana	john.c.fontana@lmco.com	407-356-3968

View Online	8.3.4N	Ship mounted remote profiling of oceanographic Properties	NOAAs goals of (1) resilient coastal communities and economies, (2) healthy oceans, (3) a weather-ready nation, and (4) climate adaptation and mitigation, all hinge upon the depth of intelligence gathered about the dynamic ocean environment. Key oceanographic information drives climate and weather models, provides bench marks for how the ocean is changing, and is also important for other forms of coastal intelligence such as hydrography. A time varying and fully three dimension understanding of the subsurface ocean temperature and salinity is fundamental to improving our understanding of this important boundary condition, yet many measurements rely on inefficient in situ instrumentation beyond the top few meters of the ocean. Fine-scale ship based measurements are dependent on observations using equipment to sample vertically through the water column at a fixed location, or on hull-mounted and towed-sensor equipment for measurements along transects at a quasi-fixed depth. Such instrumentation is expensive in terms of either the time spent for the deployment and recovery or in terms of expendable probes that are simply dropped not recovered. Ship-based remote sensing to measure efficiently an extended region of the sub-surface oceanographic profiles would offer a huge improvement.	LM Missiles and Fire Control (MFC) LM Mission Systems and Training, Under Sea Systems (MST USS)	John Fontana Jon Bell	john.c.fontana@lmco.com jon.c.bell@lmco.com	407-356-3968 401-849-0124 x144
View Online	8.3.5R	Miniaturized CO detector for airborne use on small UAVs	Carbon monoxide (CO) is a primary atmospheric pollutant emitted by combustion sources such as automobile engines and forest fires. CO has an indirect effect on climate through its role as a sink for hydroxyl radical that results in ozone formation and lengthening the atmospheric lifetime of methane. Due to its principal combustion sources and reasonably long (months) lifetime, CO is widely used as a tracer for studying the regional and long-range transport of pollution from such sources as urban	LM Mission Systems and Training, Ship and Aviation Systems (MST SAS) LM Missiles and Fire Control (MFC)	Jeffrey Poulin John Fontana	jeffrey.poulin@lmco.com john.c.fontana@lmco.com	- 407-356-3968
View Online	8.4.1W	Unmanned Aerial Vehicle (UAV) Applications Supporting the NWS Mission	Unmanned aerial vehicles (UAVs) are a technology supporting an explosive rate of private sector innovation. This project focuses on unmet need of every branch of NOAA, but particularly the NWS, which will then branch outward to numerous state and local government entities (e.g. Emergency Management, Department of Transportation, US Forestry Service, Coast Guard etc.), and to private entities supporting the government entities. The project, in particular, focuses on UAV utilizations that can directly save lives, as well as indirectly save lives through improved forecasts, warnings, and public alerts.	LM Mission Systems and Training, Ship and Aviation Systems (MST SAS) LM Missiles and Fire Control (MFC) LM Mission Systems and Training, Under Sea Systems (MST USS)	Jeffrey Poulin John Fontana Jon Bell	jeffrey.poulin@lmco.com john.c.fontana@lmco.com jon.c.bell@lmco.com	- 407-356-3968 401-849-0124 x144
View Online	8.4.2W	Satellite Environment Space Weather Products	Satellite systems are susceptible to the low-energy and high-energy particle environment in space, which can cause surface charging, bulk charging, and single-event upsets in electronic devices. Currently real-time data and numerical models are available to provide information on the conditions in space and the likelihood that the recent conditions could be responsible for anomalous spacecraft effects. In addition to the particle data available from the current NOAA Geostationary Operational Environment Satellites (GOES), the next generation satellite series beginning with the launch of GOES-R in 2016 will include a broader suite of low- and high-energy charged particle measurements. It is desired to improve the 80 utilization of the real-time data and models and to develop new products and services that address specific needs of the satellite industry.				
View Online	8.4.3W	Satellite ground station network for real-time space weather data	The Nations critical infrastructure and economy are increasingly susceptible to the impacts of space weather. Leadership at the highest levels of government, including DHS, DoD, and the White House, are involved in efforts to prepare and respond to severe space weather outbreaks. Some of the most critical real-time space weather data comes from satellites both near Earth and at various locations around the solar system. Data from geosynchronous or geostationary satellites are fairly easy to acquire in real-time as it requires only one downlink site on the ground. Data from LEO and MEO satellites often have 60-90 minute latency between satellite and the operational data processing sites. This is typically due to the lack of satellite downlink sites and the time between when the data is acquired by the sensors on the satellite and when the satellite can downlink the data to a site on the ground. Similarly, satellite out in the solar wind such as ACE or DSCOVR at the first Lagrange point (L1) or at other points such as the fifth Lagrange point (L5) require a number of downlink sites around the world in order to provide continuous real-time data links. Current satellite downlink options are being met by a number of different solutions. Some solutions require international partnerships. Other existing solutions for satellites constellations such as COSMIC II are not adequate for providing real-time data with less than 15 minute latencies.				

View Online	8.4.4D	L-Band Radio Frequency Interference Filtering	The Middle Class Tax Relief and Job Creation Act of 2012, Section 6401 (a), (3) directed the Secretary of Commerce to identify 15 MHz of U.S. government use spectrum suitable for repurposing, i.e., sharing with commercial wireless carriers. The Secretary of Commerce identified 1695 1710 MHz as the band to be designated for sharing with the wireless carriers. In order to ensure the continued successful capture of satellite meteorological data, while providing opportunity for the wireless carriers to also operate in the band, NOAA is seeking innovative approaches to potentially mitigate interference signals from wireless user equipment (UE), such as, handheld smart phones and devices in close proximity to NOAA/NWS satellite ground stations. An effective interference mitigation approach will ensure the uninterrupted flow of critical meteorological data from Low Earth Orbiting (LEO)/Polar Orbiting Environmental Satellites (POES) and Geostationary Operational Environmental Satellite system (GOES) satellites once spectrum sharing begins. The wireless carriers could begin commercial use of the frequency soon. Additionally, it is likely that in the future there will be more spectrum auctions, which may require additional spectrum sharing between the government and wireless telecommunications industry. The Radio Frequency Interference Monitoring System (RFIMS) program was initiated to investigate mitigate the risk associated with sharing the frequency band. A key aspect of the project will be to investigate opportunities to filter/separate out interference, rather than simply monitor it and identify it. The filtering of interference as opposed to simply monitoring for interference provides for a	LM Mission Systems and Training, Under Sea Systems (MST USS)	Jon Bell	jon.c.bell@lmco.com	401-849-0124 x144
View Online	8.5.1TT	NOy Cavity Right-Down Instrument	The Patent Pending NOAA NOy-Cavity Ring-Down Spectrometer is a sensitive, compact detector that measures total reactive nitrogen (NOy), as well as NO2, NO and O3 using cavity ring-down spectroscopy (CRDS). This product is unique in that the optical cage system holds four optical cavities (with associated sample cells) and a laser together, allowing a measurement of all four trace gases simultaneously and with a robust calibration in a small package. The NOAA CRDS is compact and has lower power, size, weight, and vacuum requirements than chemiluminescence-based instruments while approaching equivalent sensitivity, precision and time response.	LM Missiles and Fire Control (MFC)	John Fontana	john.c.fontana@lmco.com	407-356-3968
View Online	8.5.2TT	Smart Module for Communications Processing and interface	Engineers at NOAAs National Data Buoy Center have developed a patent-pending data collection and reporting system, the Smart Module for Communications Processing and Interface, for use on data buoys or similar ocean- or land-based platforms where environmental data are being collected. The benefit of the Smart Module design is that it may be readily retrofitted to a data buoy, weather station, or other similar applications, in order to add additional data acquisition capabilities or features, without disturbing existing communications and data logging equipment at the location. This saves both time and money for testing and certifying new equipment at existing data gathering sites, some of which may be quite remote and difficult to access. By eliminating the risk of compromising an entire system by adding new components, the Smart Module makes adding new capabilities to existing platforms relatively simple and extremely cost effective.	LM Mission Systems and Training, Under Sea Systems (MST USS)	Jon Bell	jon.c.bell@lmco.com	401-849-0124 x144
View Online	8.5.3TT	System for Monitoring, Determining, and Reporting Directional Spectra of Ocean Surface Waves in Near Realtime from a Moored Buoy	NOAA and a number of other scientific and academic institutions have built and maintained an extensive national network of buoys with the purpose of providing more accurate weather and water forecasts to the public. As a part of this network, NOAA engineers have developed a System for Monitoring, Determining and Reporting Directional Spectra of Ocean Surface Waves from a Moored Buoy, which was awarded a US patent in 2009.	LM Mission Systems and Training, Under Sea Systems (MST USS)	Jon Bell	jon.c.bell@lmco.com	401-849-0124 x144
View Online	DOE16-22b	Integrated Circuits for Cryogenic Operation					
View Online	DOE16-22b	Radiation-hard Ultra-low-jitter Transient Digitizer ADC					
View Online	DOE16-22b	Radiation-hard, low-cost, single-chip multi-channel readout integrated circuit (ROIC)					
View Online	NIH RFA-HL-14-011	Advanced hand-held, real-time detector for Listeria monocytogenes and other pathogenic agents					