Testimony of

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Before the

United States House of Representatives

Subcommittee on Fisheries Wildlife and Oceans

Hearing on H.R. 2400 Ocean and Coastal Mapping Integration Act

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Ms. Chairwoman, Members of the Committee:

Thank you for the opportunity to testify today. I am here representing Fugro Pelagos, Inc.

Who we are:

Fugro Pelagos Inc. (FPI) is a premier provider of high resolution hydrographic, seabed, and coastal mapping services and one of the world's foremost hydrographic survey contractors. FPI's offices in San Diego, Anchorage, Honolulu and Stennis provide government contracting services in North America. FPI is Fugro's center of excellence for multibeam and LIDAR hydrography. The firm was selected for this lead role because of its management experience with government contracts and extensive experience in hydrographic survey projects.

While continuing to serve industry, FPI is also a major contractor to all levels of government, including the National Oceanic and Atmospheric Administration (NOAA) – National Ocean Services (NOS), Office of Coast Survey (OCS), and National Marine Fisheries Service (NMFS); the U.S. Navy; the U.S. Army Corps of Engineers (USACE); the U.S. Geological Survey (USGS), as well as numerous state agencies, local agencies, and academia.

Our experience:

FPI has nine years' experience performing hydrographic surveys in Alaska and the Gulf of Mexico for NOAA. In addition to the hydrographic survey work completed for NOAA, the firm has conducted a multitude of surveys from several platforms for various purposes, including bathymetric surveys, high-resolution geophysical hazard studies, essential fish habitat (EFH) mapping, pipeline and cable route surveys, dredge monitoring and inspection in Alaska, the Gulf of Mexico the Pacific, the Great Lakes, and down the entire East Coast. These projects have included the collection of multibeam and vertical beam echosounder, side scan sonar, hydrographic LiDAR, and all required supporting data

During Fugro Pelagos' hydrographic charting contracts, FPI and our team have spent over 1500 field days surveying, much of that time with multiple vessels or 24-hour operations. Under these contracts, FPI has:

- surveyed more than 38,500 square kilometers (including UNCLOS) of ocean floor with multibeam
- documented 2,383 detached positions (DPs)

- submitted 467 danger to navigation reports
- installed 27 tide stations
- delivered 59 smooth sheets and descriptive reports in Alaska, and

Fugro was the first contractor to conduct hydrographic LiDAR under contract to NOAA and the first to conduct combined multibeam and hydrographic LiDAR under a single project for NOAA OCS, both operations were in Alaska.

FPI has lead the industry in technical innovation in the following areas:

- the driving force behind the development of Reson backscatter (snippets)
- TrueHeave, in cooperation with Applanix
- Pelagos Precise Timing
- water level determination from kinematic altitudes (in development)
- Pelagos Survey Planning Tool

All of these innovations are now available to, and some adopted by, industry and government

In addition to the substantial specialized experience and technical competence demonstrated on charting contracts, the Fugro Team's experience includes surveys on a variety of bodies of water including: inland waterways, reservoirs, rivers, bay, coastal, and open ocean environments. The team's hydrographic specialization includes use of conventional vertical-beam and multibeam echosounding systems, side scan sonar, hydrographic LIDAR, installation of tide stations, and acquisition of supporting data.

Comments:

After we began contracting for NOAA, FPI realized that the data sets collected for the purpose of nautical charting, had enormous potential for other end users. Since 2000, FPI has been educating our various clients to the availability and utility of these high resolution multibeam and LiDAR data sets. After years of rolling out data products created from the initial NOAA data, FPI is now able to show that some of the single focused hydrographic data sets are routinely being used for other purposes. Historic data that were collected for NOAA in support of nautical charting are now being used for tsunami inundation maps and fisheries habitat maps throughout Alaska.

FPI was at the forefront of reprocessing multibeam data into backscatter, creating products that could be used for fisheries habitat mapping. FPI continues to collect backscatter data while contracting for NOAA. In addition, with the support and encouragement of FPI, the NOAA fleet also began collecting multibeam data which can be reprocessed at any time for future use by fisheries managers, the USGS and other academic stakeholders.

Fugro Pelagos is glad to finally see an effort to coordinate the mapping endeavors of federal, state, and local government entities. Right now, FPI is in the middle of a pilot project for the State of California, which mimics what is in this bill. This project, which includes direct participation by the USGS, the California Geological Survey and various agencies and Universities in the State of California, will provide the highest resolution data possible for all Stakeholders with interests within the

3.0 mile State waters. In the comprehensive meetings last week, the stakeholders included coastal geologists, ecologists, biologists, engineers, geophysicists, geodesists, and administrators. In addition, multiple Federal agencies, such as NOAA NOS OCS and the USACE are in discussions to directly participate in this team effort.

The most recent survey performed for the State of California under this project illustrates the potential for an integrated approach to mapping. During data acquisition, the surveyors found uncharted rocks. These rocks were documented and submitted to NOAA as hazards to navigation. The data set is being processed for backscatter so the data will be used for fish habitat classification and to assist in the selection of Marine Protected Areas. In addition, the data will be used by geologists looking at the coast and near shore geology including faults and tsunami hazards. Finally the data will be processed to NOAA's hydrographic standards so the data can be applied to the nautical chart.

Fugro Pelagos strongly believes that the mapping should be completed by qualified professionals, private industry partners, selected based upon qualifications as per the Brooks Act for services. We would like more definitive wording that states that the private sector will provide mapping and data processing services, and any University partnership will perform research and development and advance the use of new technology in mapping.

FPI supports joint hydrographic centers at Universities. We believe that Universities should be involved with R&D, should advance the use of remote sensing technologies and should provide graduate education and training. However, we feel that it is more appropriate for private sector contractors to provide all mapping and processing services while Universities focus on research and development. This scenario is best illustrated by The Center for Coastal and Ocean Mapping (CCOM)/ Joint Hydrographic Center (JHC). CCOM/JHC has successfully advanced the field of hydrographic mapping and processing by developing new data processing products, which are being implemented not only by NOAA, but also private industry contracting for NOAA and industry applications around the world.

We are concerned that the verbiage in the present legislation will not focus the funding toward mapping. We would like to see more restrictive language to assure that allocated funding goes toward integrated mapping and not solely toward research products.

Note that this mapping is the fundamental base layer for all integrated ocean mapping/research that is anticipated.

FPI supports the use of data repositories. The amount of data collected during an average survey is constantly increasing and final deliverables area also changing. A central collection center would also allow easier access to data for all interested parties. FPI does not support data processing centers, as the idea is neither practical nor effective. Data processing is an integral part of quality control during data acquisition, as an example, our work with NOAA requires that processing be completed in conjunction with acquiring data.

Fugro Pelagos believes it is essential that data collection and dissemination be a coordinated effort. For example, there is an extremely large data set consisting of NOAA NOS OCS Charting supported work along the Alaskan Peninsula. This could

be an excellent project for any interested geologist, however, it is not likely that anyone knows that it exists.

Concluding Statement:

On behalf of Fugro Pelagos, I would like to once again thank you for the opportunity to testify on this important bill. Our experience with the State of California illustrates that a well-planned, coordinated mapping effort can benefit numerous varied stakeholders. We would like to reiterate our strong support for this bill, but urge you to use stronger language to include the private sector, and clearly define the role of private sector in mapping and processing, while supporting universities to continue research and development efforts.

Glossary (adapted from www.csc.noaa.gov):

Multibeam sonars - are active sensors that utilize acoustic energy to collect measurements of seafloor depth and character. Multibeam sensors pulse the bottom with a series of soundings normal to the track of the vessel and record the reflected echoes in an orientation parallel to the vessel track. This produces a swath of data that, depending on specific sensor and mission requirements, is normally several times the water depth. Like other acoustic sensors, multibeam sonars normally collect data in a series of transect lines that allow sufficient sidelap to avoid gaps in coverage. As a rule, the deeper the water, the wider the swath of data collected. Since the swath width is strongly influenced by water depth, some planning of transect spacing is needed to ensure that no gaps occur where water depth decreases.

LiDAR (Light Detection And Ranging) is an active sensor, similar to radar, that transmits laser pulses to a target and records the time it takes for the pulse to return to the sensor receiver. This technology is currently being used for high-resolution topographic mapping by mounting a LiDAR sensor, integrated with Global Positioning System (GPS) and inertial measurement unit (IMU) technology, to the bottom of aircraft and measuring the pulse return rate to determine surface elevations.

Bathymetric LiDAR systems operate in a manner that is similar to their Airborne Lidar Mapping (ALM) counterpart, with one notable exception. Bathymetric systems transmit two light waves, one in the infrared and one in the green spectrum, and are capable of detecting two returns that delineate the water surface and seabed. The infrared band is quickly absorbed and is therefore used to detect the water surface, while the green band is used as the optimum color to achieve maximum penetration in shallow water. Lidar bathymetry systems operate at a much slower rate, currently around 1000 soundings per second, due to the need to generate a much longer laser pulse and higher power requirements

Backscatter Some multibeam systems can simultaneously measure the strength of the reflected sound, called backscatter. Hard acoustic returns indicate rock or gravel while softer returns indicate mud or silt. Acoustic backscatter maps can assist with determining seafloor composition. This technique has the potential to be a powerful characterization tool.