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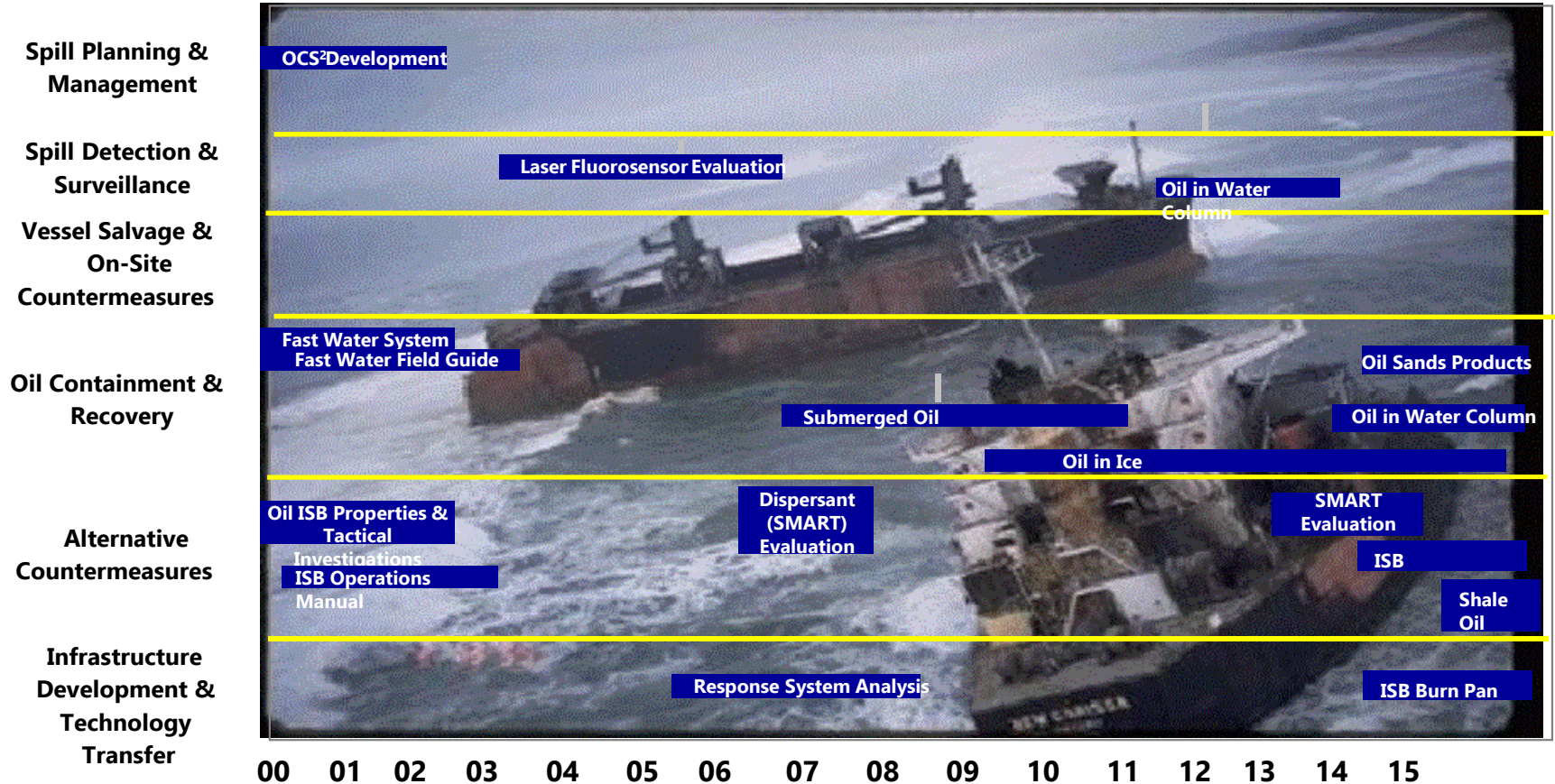
Research & Development Center

CG Research Update

RDC | Kurt Hansen (UNCLAS)
RRT 4, March 3, 2016
RRT 1, May 4, 2016



RDT&E Funded Projects 2000-Present



Response to Oil In Ice

Mission Need: A group of methodologies to minimize the damage to the environment caused by spilled oil in extreme cold regions of the Arctic and Northern U.S.

Project Objectives:

- Develop equipment and techniques that can be used successfully to detect, track and recover oil in ice filled waters in all conditions.
- Test operational deployments of equipment by conducting a series of demonstrations in the Great Lakes and the Arctic of increasing complexity.
- Evaluate state of the art for response by supporting National Academy of Science (NAS) Arctic Response Assessment.

Key Milestone / Deliverable Schedule:

Project Start.....	2 Nov 09 ✓
Great Lakes Demonstration 3.....	22 Feb 13 ✓
★ Final Great Lakes Demonstration 3 Report.....	14 Jun 13 ✓
★ Review Recommendations from NAS Report.....	25 Jul 14 ✓
★ Arctic Shield 2014 Demonstration Report.....	16 Mar 15 ✓
Decision Milestone: Follow-on work and Demo 4.....	26 Feb 15 ✓
Great Lakes Demonstration 4	May 16
★ Great Lakes Demonstration 4 Report	Aug 16
★ Final Report and Input for FOSC Guide.....	Feb 17
Project End.....	Mar 17

DELAYED UNTIL JUNE

★ Indicates RDC product.



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Sponsor: CG-MER

Stakeholder(s): D9, D17, BSEE, USEPA, PAC-7

Project #:
4701

RDC POC:
Mr. Kurt Hansen
(860) 271-2600

CG-926 Domain Lead:
Mr. Curtis Catanach

Expected Benefit:

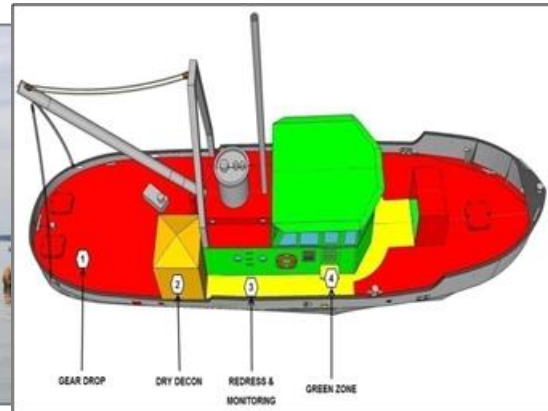
Improve operational performance/efficiency/mission execution/resiliency

Notes:

Partnering with Great Lakes Restoration Initiative (GLRI).

Developmental Tasks

DECON



Temporary Storage

Ice Management



Detection and Mitigation of Oil within the Water Column

Mission Need: Accurately detect and mitigate subsurface oil within the water column to 10,000 feet.

Project Objectives:

- Develop new spill response technologies that detect and mitigate oil within the water column down to 10,000 ft.
 - Operate in all environmental conditions.
 - Locate and mark subsurface oil for possible removal.
 - High resolution for detecting small droplets of oil.
- Technology to be capable of operating off vessels of opportunity.
- Addresses near shore and rivers.



Key Milestone / Deliverable Schedule:

Project Start.....	3 Aug 11 ✓
Start Design Phase.....	2 Apr 12 ✓
★ Detection of Oil in Water Column, Final Report: Sensor Design.....	5 Mar 13 ✓
★ Detection of Oil in Water Column, Final Report: Detection Prototype Tests	29 Jul 14 ✓
Mitigation Design development	Jan 16
★ Mitigation of Oil in Water Column, Final Report: Concept Development.....	Mar 16
Mitigation Prototype testing (Ohmsett).....	Nov 16
★ Mitigation of Oil in Water Column, Final Report: Mitigation Prototype Tests.....	Apr 17
Project End.....	May 17

★ Indicates RDC product.

Sponsor: CG-MER, BSEE

Stakeholder(s): ICCOPR

Project #:
4702

RDC POC:
Mr. Alexander Balsley
(860) 865-2600

CG-926 Domain Lead:
Mr. Curtis Catanach

Expected Benefit:

Improve operational performance/efficiency/mission execution/resiliency

Notes:

The project includes funding from a FY11 Oil Spill Research earmark.

Partnering with Bureau of Safety and Environmental Enforcement (BSEE).



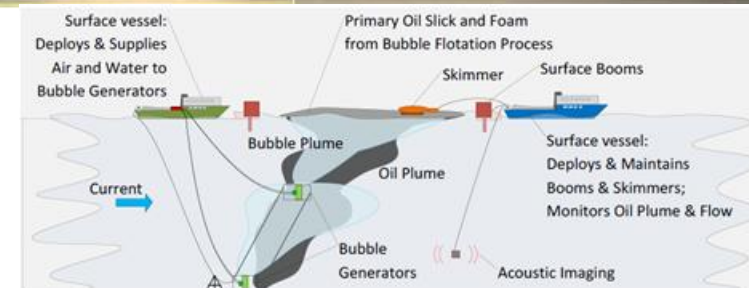
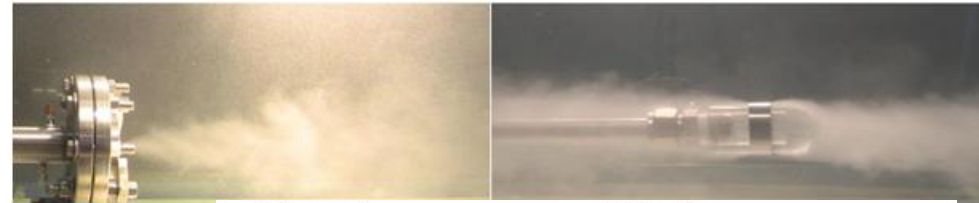
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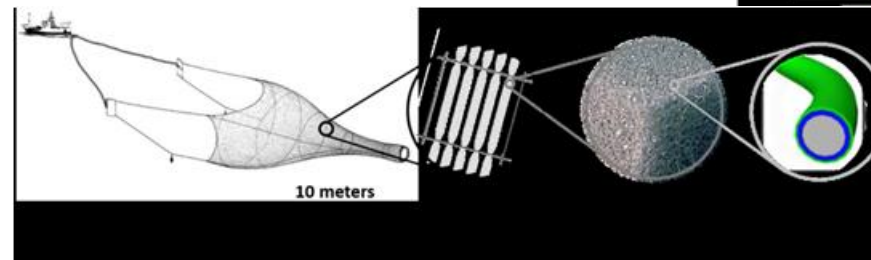
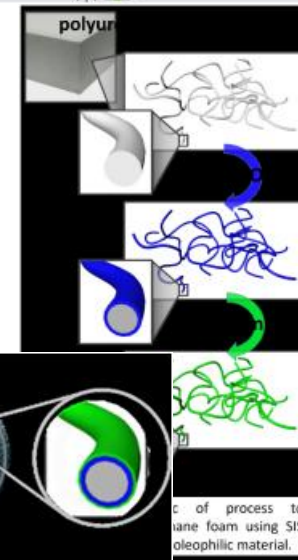
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Mitigation within Water Column

- **Dynaflow, Inc:** Subsurface Oil Recovery Using Microbubble Floatation
 - Uses cavitation and acoustics to create bubble field that could bring oil to surface



- **Argonne National Lab:** Reusable, Environmentally Benign Absorbent Foams for Oil Spill Pollution Mitigation
 - Uses patented process to develop better hydrophobic/oleophilic materials



- **Testing in Dec 16**



Improved In-Situ Burning (ISB) for Offshore Use

Mission Need: Better decision-making and operational tools for using ISB as a response option.

Project Objectives:

- Identify capability gaps that industry is not addressing.
- Determine best practices for operational use of ISB.
- Develop new equipment, such as igniters or fire boom, and procedures to support ISB.



Key Milestone / Deliverable Schedule:

Project Start	10 Feb 14 ✓
★ ISB Gaps Analysis	19 Feb 15 ✓
KDP on Project Path Forward	Nov 15 ✓
★ Initial Burn Pan Testing Results	Mar 16
★ Results of Technology Enhancements	Mar 17
Project End.....	May 17

★ Indicates RDC product.

Sponsor: BSEE, CG-MER

Stakeholder(s) NOAA

Project #:

4704

RDC POC:

Mr. Kurt Hansen
(860) 271-2600

CG-926 Domain Lead:

Mr. Curtis Catanach

Expected Benefit:

Improve operational performance/efficiency/mission execution/resiliency

Notes:

Joint funding with the Bureau of Safety and Environmental Enforcement (BSEE).

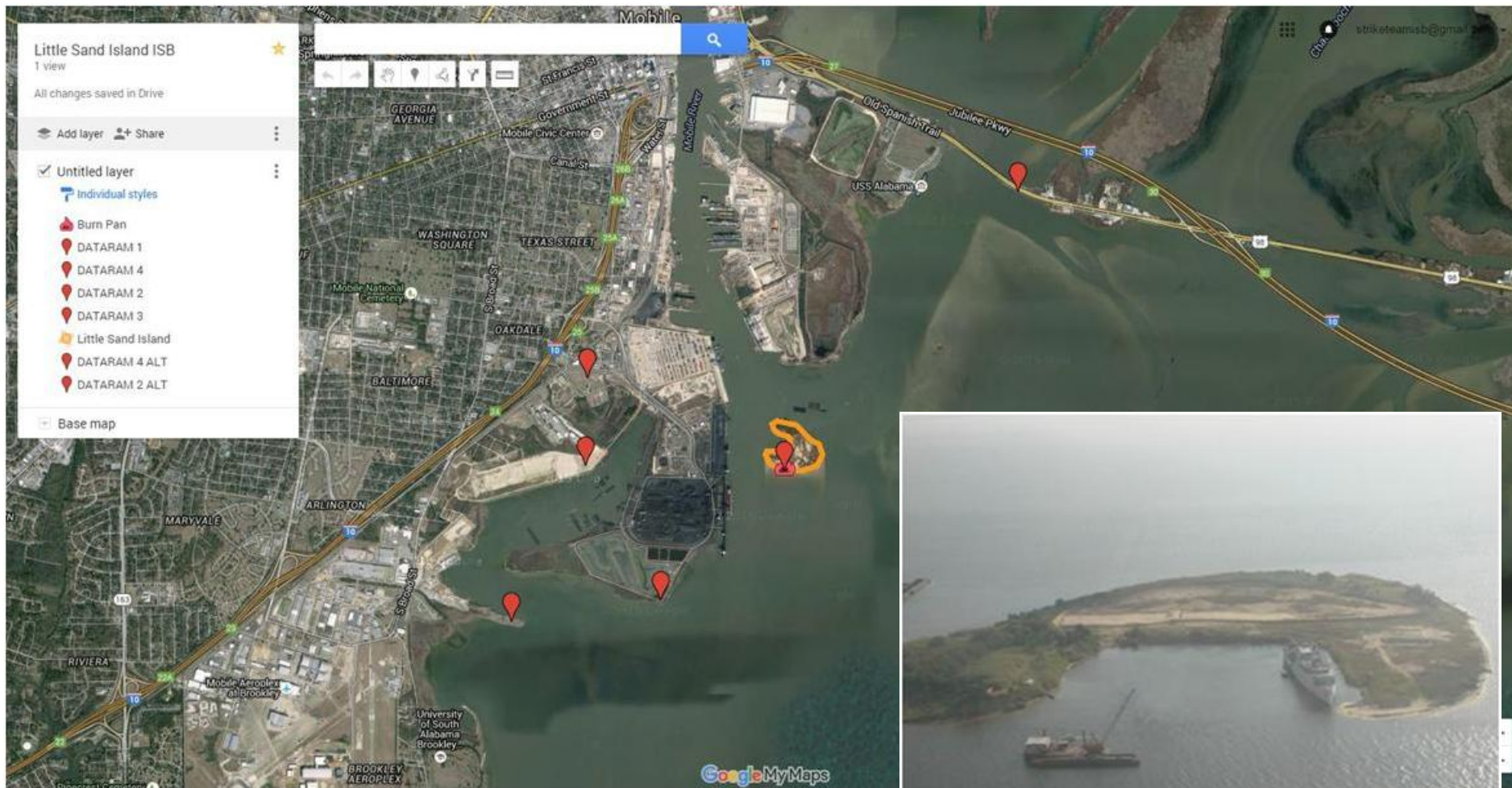


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Little Sand Island, Mobile, AL



Improved ISB



Old Views



New Views



Improved ISB



Two SMART Systems

Video



Oil Loaded



Improved ISB



Ignition



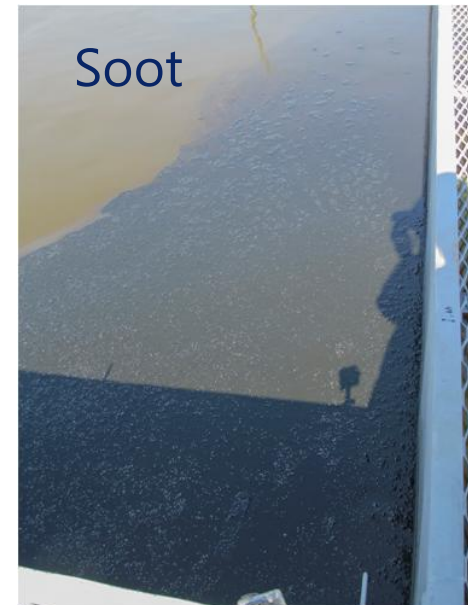
Boom After



Smoke Downrange



Full Burn



Soot

Oil Sands Products Response

Mission Need: Develop enhanced decision tools and recovery/mitigation tools for responding to spilled oil sands products.

Project Objectives:

- Develop decision making tools for Federal On-scene Coordinator (FOSC) to aid in response planning for spills of oil sand products in fresh and salt water.
- Analyze and assess behavior, response issues and strategies in fresh and salt waters.
- Build on G-MER Report “Risk Assessment of Transporting Canadian Oil Sands” available in Summer 2014.

Key Milestone / Deliverable Schedule:

Project Start	31 Aug 14 ✓
★ Response to Oil Sands Products Assessment.....	29 Sep 15 ✓
Initiate BAA.....	Mar 16
Initiate BAA II.....	Mar 17
★ Oil Sands Products Response Strategies Evaluation	Nov 16
★ Oil Sands Products Response Strategies Evaluation II.....	Nov 17
★ Input to FOSC Job Aid for Mitigation of Oil Sands Products.....	May 18
Project End	Aug 18

★ Indicates RDC product.



Sponsor:

CG-MER

Stakeholder(s) USEPA, D9, D13, NOAA

Project #:

4705

RDC POC:

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CG-926 Domain Lead:

Mr. Curtis Catanach

Expected Benefit:

Improve operational performance/efficiency/mission execution/resiliency

Notes:

Partnering with Great Lakes Restoration Initiative (GLRI).



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Oil Sands Response

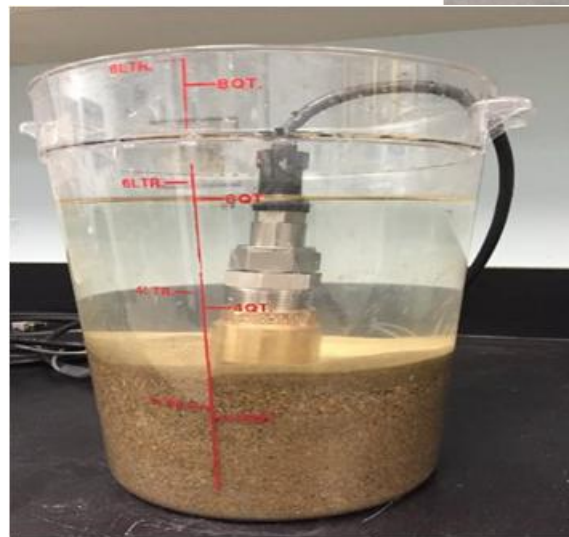
Turner Designs Cyclops-7



Probe



Test Mixtures



Robot Capability Requirements and Alternatives for National Strike Force Response Support

Mission Need: Identify alternative technologies that meet USCG needs for performing remote area assessments in unsafe environments.

Project Objectives:

- Develop operational description for robot/Remotely Operated Vehicles (ROVs): Operating concept, employment modes, operating environment, interoperability requirements.
- Identify and assess Commercial Off-the-Shelf (COTS) technology alternatives. Summarize the alternatives to support the sponsor's decisions for acquisition or further R&D.

Key Milestone / Deliverable Schedule:

Project Start.....	12 Jan 15 ✓
KDP to Pursue RFI for Commercial Robot Providers	25 Mar 15 ✓
Operational Description and Required Capabilities.....	22 Jul 15 ✓
RFI Published to Identify Potential Providers.....	5 Aug 15 ✓
★ Robot Capability Requirements and Alternatives for National Strike Force Response Support	Dec 15 ✓
KDP to determine future project work.....	Dec 15 ✓
Project End.....	Jan 16 ✓

★ Indicates RDC product.



Sponsor: CG-MER

Stakeholder(s) National Strike Force

Project #:
4203

RDC POC:
Mr. M. J. Lewandowski
(860) 271-2600

CG-926 Domain Lead:
CDR J. W. Armstrong

Expected Benefit:

Improve operational performance/efficiency/mission execution/resiliency

Notes:

Plan to use RFI.



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Shale Oil & Gas Preparedness and Response

Mission Need: Responders need best strategies, tactics, and equipment for preparedness and response to spills of shale oils and Shale Gas Extraction Wastewater (SGEWW).

Project Objectives:

- Develop an assessment characterizing the behavior of shale oil and chemical composition of SGEWW.
- Develop a scientifically sound best practices guide for preparedness and response to spills of shale oils and SGEWW for use by Coast Guard field responders and Area Committees.
- Provide decision makers with valuable reference material for use in making response policy decisions regarding the shipment of shale oil and SGEWW products via U.S. Waterways.



Source: NOAA

Key Milestone / Deliverable Schedule:

Project Start.....	1 Oct 2015
Literature Review Completed.....	Apr 2016
Gap Analysis Report.....	Aug 2016
Develop inputs for Preparedness and Response Guide.....	May 2017
★ Recommendations for Shale Oil & Gas Response Practices Guide.....	Jun 2017
Project End.....	Jul 2017

★ Indicates RDC product.



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Sponsor:

CG-MER, EPA

Stakeholder(s): LANTAREA , PACAREA, CG DISTRICTS, NSF

Project #:

4707

RDC POC:

LCDR Michael Turner
(860) 271-2600

CG-926 Domain Lead:

Mr. Curtis Catanach

Expected Benefit:

Improved Doctrine/CONOPS/TTPs

Notes:

GLRI to fund direct project costs.

Supports the Coast Guard Energy Renaissance Initiative.

Airborne Oil Spill Remote Sensing and Reporting

Mission Need: Tactics, Techniques, and Procedures (TTP) for optimizing the use of existing CG airborne C4ISR systems to support oil spill response operations.

Project Objectives:

- Baseline current CG airborne capabilities for Detecting, Mapping and Reporting (DMR) oil spills.
- Join with Bureau of Safety and Environmental Enforcement (BSEE) to explore oil thickness remote detection capability.
- Conduct airborne oil spill DMR testing.
- Document issues in CG oil spill DMR within context of hardware, operator training and environmental conditions; then work with Aviation Training Center (ATC) Mobile to develop TTPs.



Key Milestone / Deliverable Schedule:

Project Start.....	20 Nov 13 ✓
Key Decision Point to Develop Joint Project w/BSEE.....	29 Jul 14 ✓
Task 1, 2 & 3 White Paper.....	8 Oct 14 ✓
CG Sensor Field Evaluation A.....	24 May 15 ✓
CG Sensor Field Evaluation B.....	Jan 16
★ USCG Airborne Spill Remote Sensing and Reporting.....	Apr 16
★ Airborne Oil Spill Remote Sensing and Reporting TTP.....	Jul 16
Project End.....	Sept 16

★ Indicates RDC product.



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Sponsor:

CG-711

Stakeholder(s)

BSEE, CG-MER, ATC Mobile, FORCECOM

Project #:

7609

RDC POC:

Mr. Evan Gross
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CG-926 Domain Lead:

CDR Jay Armstrong

Expected Benefit:

Improved Doctrine/CONOPs/TTPs

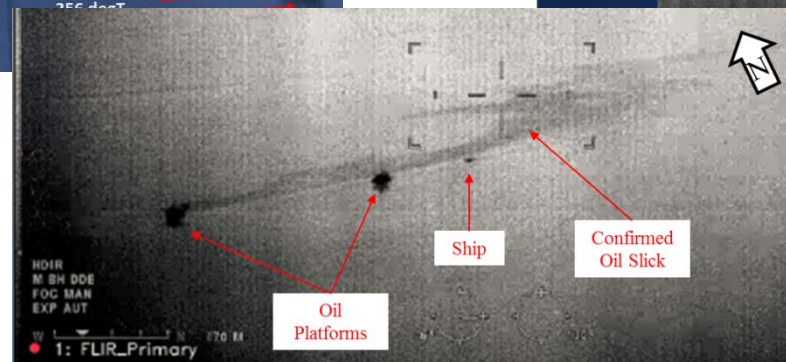
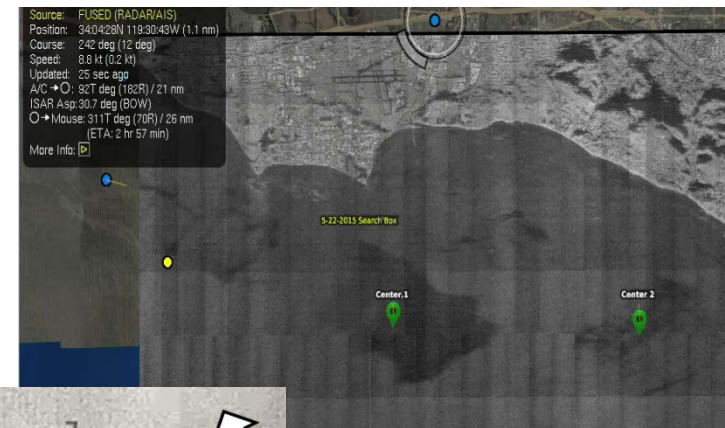
Notes:

CG Sensor Field Evaluation A & B will be joint testing with the MINOTAUR Mission System program to leverage the upgraded capability of the next fixed-wing mission system.

BSEE is co-funding this project and number 1060.

Evaluation of CG Sensors

- The May 2015 remote sensing exercise was an overwhelming success with a significant volume of quality imagery collected from handheld sensors, radar, EO/IR, and ESS systems.
- Following Government comment, BAH is working to revise the report containing the results and analysis of the field exercise utilizing the HC-130J/MH-60T/USCGC Blackfin.
- HC-144A/MH-60T/USCGC Blackfin exercise (Santa Barbara) tentatively scheduled for Spring 2016, dependent on availability of Minotaur Mission System-equipped 144A.



Mobile Asset Tracking and Reporting During an IONS

Mission Need: A flexible ad hoc interoperable communication/information system to enhance the Coast Guard's ability to respond to Incidents of National Significance (IONS).

Project Objectives:

- Prototype a flexible interoperable communication/information system, processes, and procedures to enhance the CG's ability to transfer information that will assist personnel responding to an IONS (e.g., oil spill).
- The system, processes, and procedures should make use of the equipment the responders are expected to bring to the incident such as smart phones, tablet computers, and laptops.



Key Milestone / Deliverable Schedule:

Project Start.....	9 Aug 11 ✓
★ Technical Assessment Brief for Mobile Asset Tracking and Reporting Device.....	9 May 13 ✓
★ Technical Assessment Brief: System Integration with Commercial Off The Shelf (COTS) Incident Action Plan (IAP) Software	27 Oct 14 ✓
★ Mobile Asset Tracking and Reporting Device: IONS System Test Results and Recommendations (Report).....	10 Dec 14 ✓
★ Use of NICS/PHINICS IONS during USCG Disaster Response Operations (Brief)	Aug 16
★ System Integration with COTS IAP Software Test Results and Recommendations (Report).....	Nov 16
Technology Demonstrations.....	Oct 16
Project End.....	Jan 17

★ Indicates RDC product.

Sponsor:

CG-761

Stakeholder(s)

CG-CPE, DHS S&T, Sector Detroit,
Sector New Orleans

Project #:

8105

RDC POC:

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CG-926 Domain Lead:

Expected Benefit:

Improve operational performance/efficiency/mission execution/resiliency

Notes:

Includes funding from FY11 Oil Spill Research Earmark.

Project includes use of a Cooperative Research and Development Agreement (CRADA).

Project includes Interagency Agreement (IAA) with DHS S&T/MIT Lincoln Labs.



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Questions?

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