Analysis of Radar within Coast Guard Vessel Traffic Services

Dr. Hugh Roarty
Rutgers University
VTS Traffic Volume

Vessel Traffic Services
Total Transit Data 2017-2020

- New York
- Berwick Bay
- Houston / Galveston
- LA / Long Beach
- Louisville
- Lower Mississippi
- Port Arthur
- Prince William Sound
- Puget Sound
- San Francisco
- St. Marys River

Total Transits

1/1/17, 5/1/17, 9/1/17, 1/1/18, 5/1/18, 9/1/18, 1/1/19, 5/1/19, 9/1/19, 1/1/20
Research Project Overview

• VTSs need to distinguish two separate targets of 20 m or greater in length when they are 50 m apart at a sensor to target distance of 3 nm or 500 m apart at a sensor to target distance of 24 nm
3 nmi
Radar Use Within VTS

• Anchorage Monitoring
• Small vessel detection (non VTS users)
• Ship and Barge breakaways
• Debris monitoring
• Monitoring Aids to Navigation (ATON)
• AIS failure
• Monitoring aspect ratio of vessel
Research Project Overview

Image courtesy of
Mr. John Moore
Electronics Materials Officer (VTS)
MSU Port Arthur
# Milestones and Performance Metrics

<table>
<thead>
<tr>
<th>No.</th>
<th>Milestone</th>
<th>Percentage completed</th>
<th>Completion Date</th>
<th>New Plans / Contingency</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>Kick-off meeting to discuss project plan, objectives, and outcomes</td>
<td>100%</td>
<td>Jan 2020</td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td>Release Request for Information</td>
<td>25%</td>
<td>June 2020</td>
<td></td>
</tr>
<tr>
<td>M3</td>
<td>Select recommended radars</td>
<td>0%</td>
<td>Dec 2020</td>
<td></td>
</tr>
<tr>
<td>PM1</td>
<td>Gather requirements from at least 6 VTS centers and HQ</td>
<td>100%</td>
<td>Apr 2020</td>
<td></td>
</tr>
<tr>
<td>PM2</td>
<td>Submit RFI to at least 5 vendors</td>
<td>25%</td>
<td>Jun 2020</td>
<td></td>
</tr>
<tr>
<td>PM3</td>
<td>Recommend at least 2 radars for consideration</td>
<td>0%</td>
<td>Dec 2020</td>
<td></td>
</tr>
</tbody>
</table>
COVID19 Impact – Contingency Plans

• The ability to travel to the VTS centers ceased mid March
• Conducted 4 on site meetings with VTS centers (New York, Louisville, Houston and Port Arthur)
• Since lockdown have conducted phone interviews with 4 of the VTS (New Orleans, Puget Sound, San Francisco and Berwick Bay)
• Briefed the Coast Guard HQ team last week on status of research to receive feedback and define future analysis
End User Engagement

**LT Eric Romero**  
CG-741 Office of Shore Forces  
Weekly contact

**Mr. Brian Page**  
CG-761 Office of Sensor Capabilities  
Monthly contact

**LT Dan Dougherty**  
Command, Control, and Communications Engineering Center (C3CEN)  
Phone Interview in February 2020

**LT CMD Russ Hall**  
CG-771 Office of Requirements & Analysis  
Monthly contact

**Mr. Darin Mathis**  
CG-NAV  
Monthly contact

Mr. Greg Hitchen  
CWO2 Virgil Bankes  
VTS New York

Mr. Nick Frascella  
VTS Louisville

Mr. Steven Nerheim  
Mr. Johnny O’Rourke  
VTS Houston

Mr. Scott Whalen  
Mr. John Moore  
VTS Port Arthur

LCDR Thao Nguyen  
Mr. Tony Jones  
Mr. George Petras  
VTS New Orleans

Mr. Laird Hail  
Mr. Xavier Villarreal  
VTS Puget Sound

Mr. Robert Blomerth  
Mr. Scott Humphrey  
ELC2 Tom Bound  
VTS San Francisco

LT Tim Veach  
Mr. Don Boudreaux  
VTS Berwick Bay
Sensor Inventory

- 99 cameras and 47 radars in ten Coast Guard VTS (LA/LB and Tampa excluded)
Research Work and Accomplishments

• Boundaries of All VTS entered into GIS and Google Earth

• Radar and camera locations entered for New York, Houston, Port Arthur, New Orleans, Louisville, Berwick Bay, Puget Sound and San Francisco

• The coverage zones for each sensor have been estimated and verifying now

• Radar specifications for the 47 radars have been collected
Research Work and Accomplishments
Diversity of VTS Environments

Berwick Bay  Houston  Louisville
Diversity of VTS Environments

New York City  Port Arthur  Lower Mississippi
Vessel Traffic Service Coverage

<table>
<thead>
<tr>
<th>Location</th>
<th>Miles per Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Louisville</td>
<td>2</td>
</tr>
<tr>
<td>Berwick Bay</td>
<td>4</td>
</tr>
<tr>
<td>Houston-Galveston</td>
<td>5</td>
</tr>
<tr>
<td>St Mary's River</td>
<td>12</td>
</tr>
<tr>
<td>Lower Mississippi...</td>
<td>22</td>
</tr>
<tr>
<td>New York City</td>
<td>2</td>
</tr>
<tr>
<td>Port Arthur</td>
<td>11</td>
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<tr>
<td>Tampa</td>
<td>0</td>
</tr>
<tr>
<td>Prince William Sound</td>
<td>10</td>
</tr>
<tr>
<td>Los Angeles-Long...</td>
<td>0</td>
</tr>
<tr>
<td>San Francisco</td>
<td>0</td>
</tr>
<tr>
<td>Puget Sound</td>
<td>14</td>
</tr>
</tbody>
</table>
VTS New York Camera Coverage

Coverage (square nautical miles)

Remote Site

AFK  AGB  APA  ASE  BTY  BAX  BAX  BAX  BAX  ECL  EHP  ENY  EPM  ETN  EWI  GIX  GIX  LTN  MHX  MHX  NLN  NLN  NPT  NPT  SHX  SHX

1  0  3  1  7  8  8  8  1  2  2  1  1  1  12  13  3  2  2  12  12  8  8  17  16
Anticipated Project Impact and Transition

1. Capability Analysis Study Plan
2. Capability Analysis Report
3. Mission Needs Statement
4. Concept of Operations
5. Analysis of Alternatives
Plans for the next year

• Develop GIS for remaining VTS locations
• Release Request for Information (RFI) to radar vendors
• Model current and potential future radar performance in HTZ Warfare
• Analyze responses from radar vendors

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INSTRUCTIONS FOR MSC PI RESEARCH PROJECT PRESENTATION

Please prepare slides for 15 minutes of presentation and 10 minutes for questions and answers. Use the following MSC slide template. Presentations will be held via Webex.

Your presentation should include:

- Title slide
- Project Overview and Objectives
- Milestones
  - “(a milestone chart with the major milestones and due dates from approved workplans and a specific indicator as to whether the milestone is on track as planned. If it is not, they should specifically state why, how they are handling it and the impact (e.g., new anticipated date of completion and whether it impacts ability to complete other milestones or the project on time). If they need to make adjustments, please encourage them to be forthcoming and proactively work those adjustments with us.”
  - INSERT A SLIDE FOR COVID19 IMPACT ONLY IF THIS APPLIES TO YOUR PROJECT. “Specifically state potential impacts to work from SARS-COV-2 (e.g., labor if students cannot return, travel dependent research, schedule or output impacts) and their proposed mitigation/alternate plans for completing the work. - They should especially identify if the intended outputs would need to change due to these impacts.”
- Engagement with end users.
- Research activities, findings and outcomes to date.
- Anticipated impact of the project and Transition of your project’s outcomes.
- Plans for the next year (remaining milestones, beyond this project?)

Please include the DHS acknowledgement/disclaimer on last slide. The use of images from your work is highly encouraged.

Please send your completed presentation to MSC@stevens.edu, no later than May 6, 2020.