

Cross-Domain UxV Collaboration Scenario Development with MOOS-IvP

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MOOS-DAWG '15

Naval Undersea Warfare Center

OBJECTIVE

MOOS simulation development for a cross domain multi-agent exercise

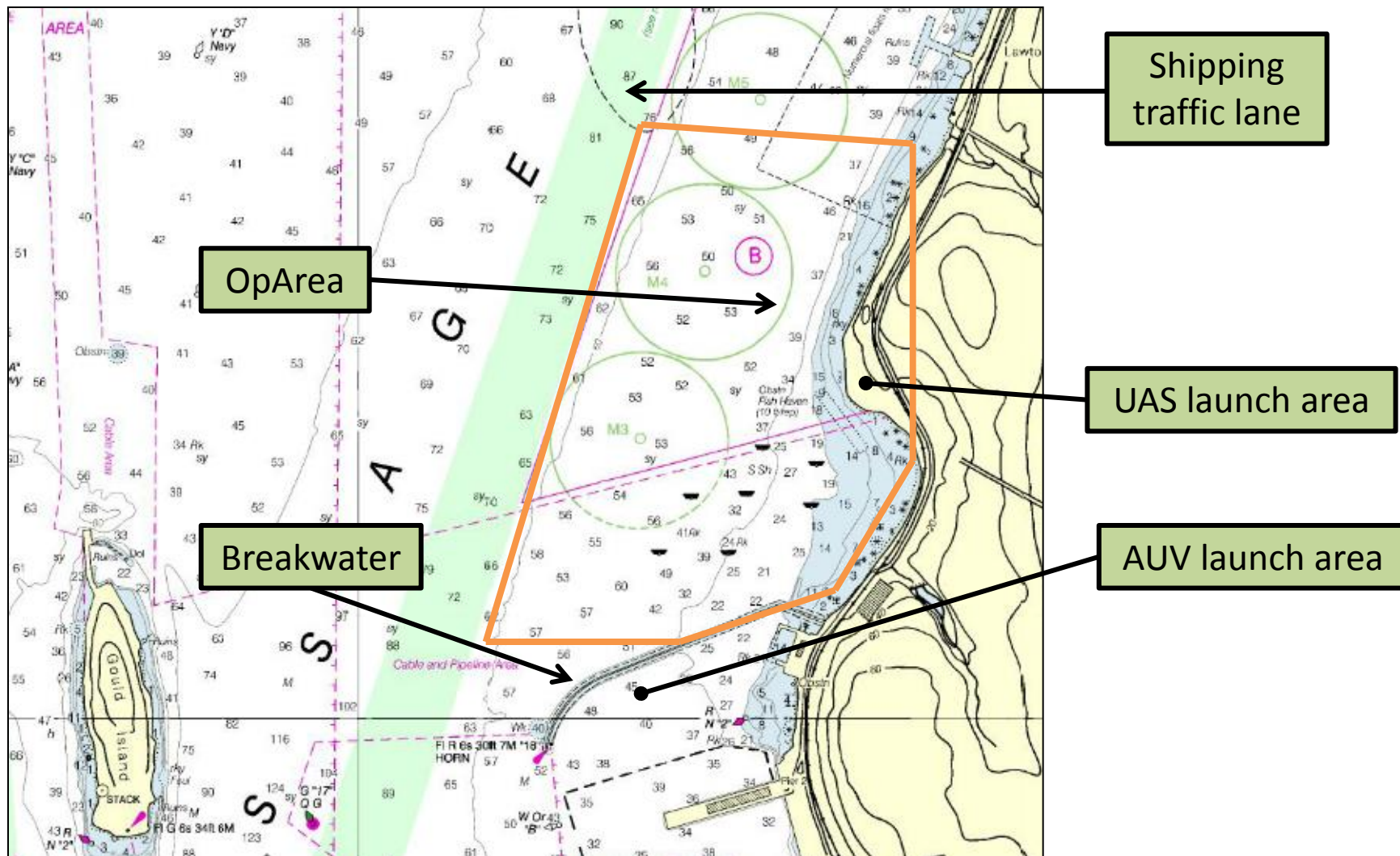


Mission: Execute a multi-agent exercise in an op-area with realistic constraints.



Scenario

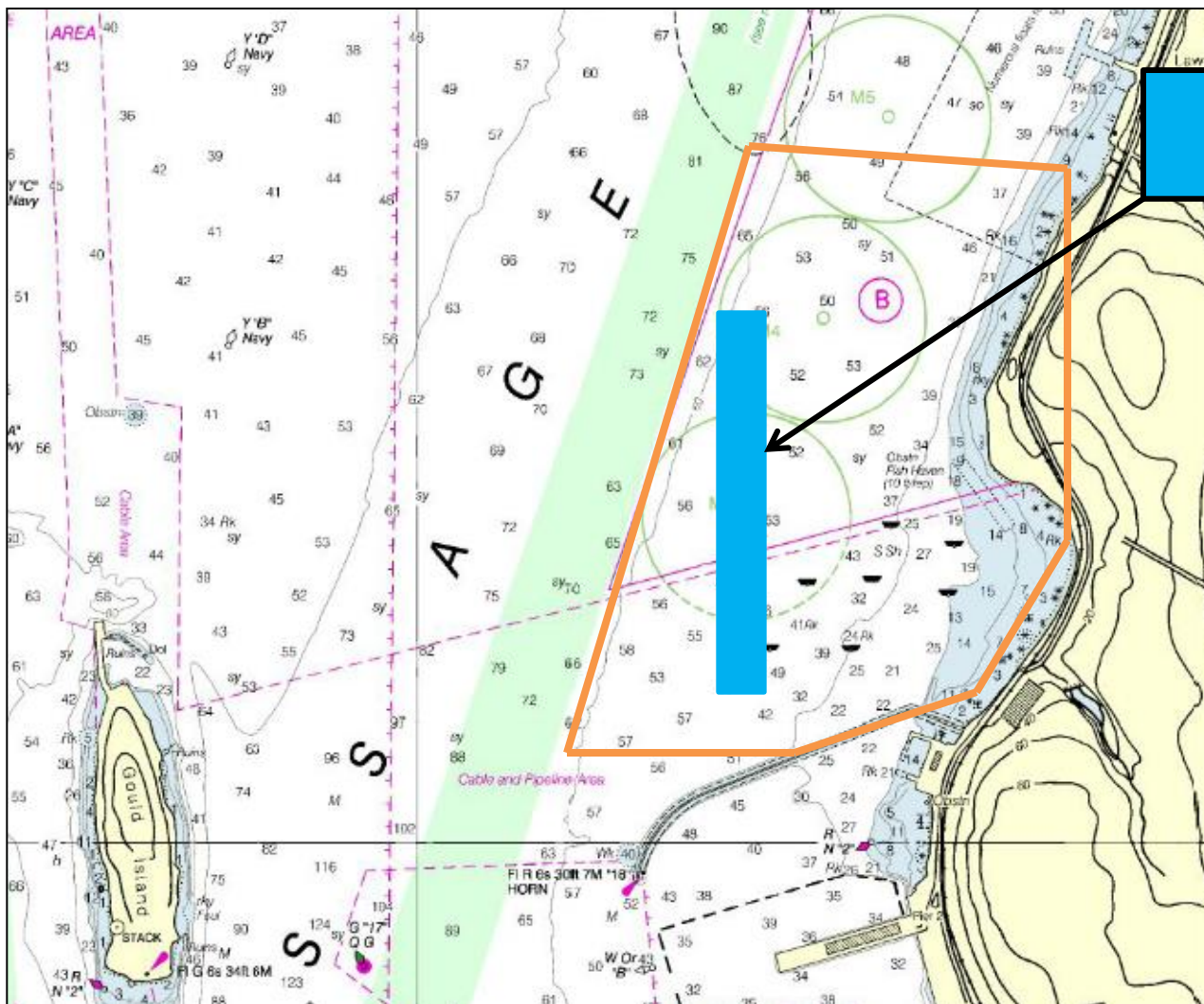
Op-Area: Narragansett Bay, RI



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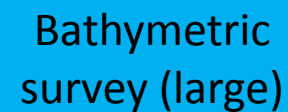
Scenario

Mission A



Bathymetric
survey (large)

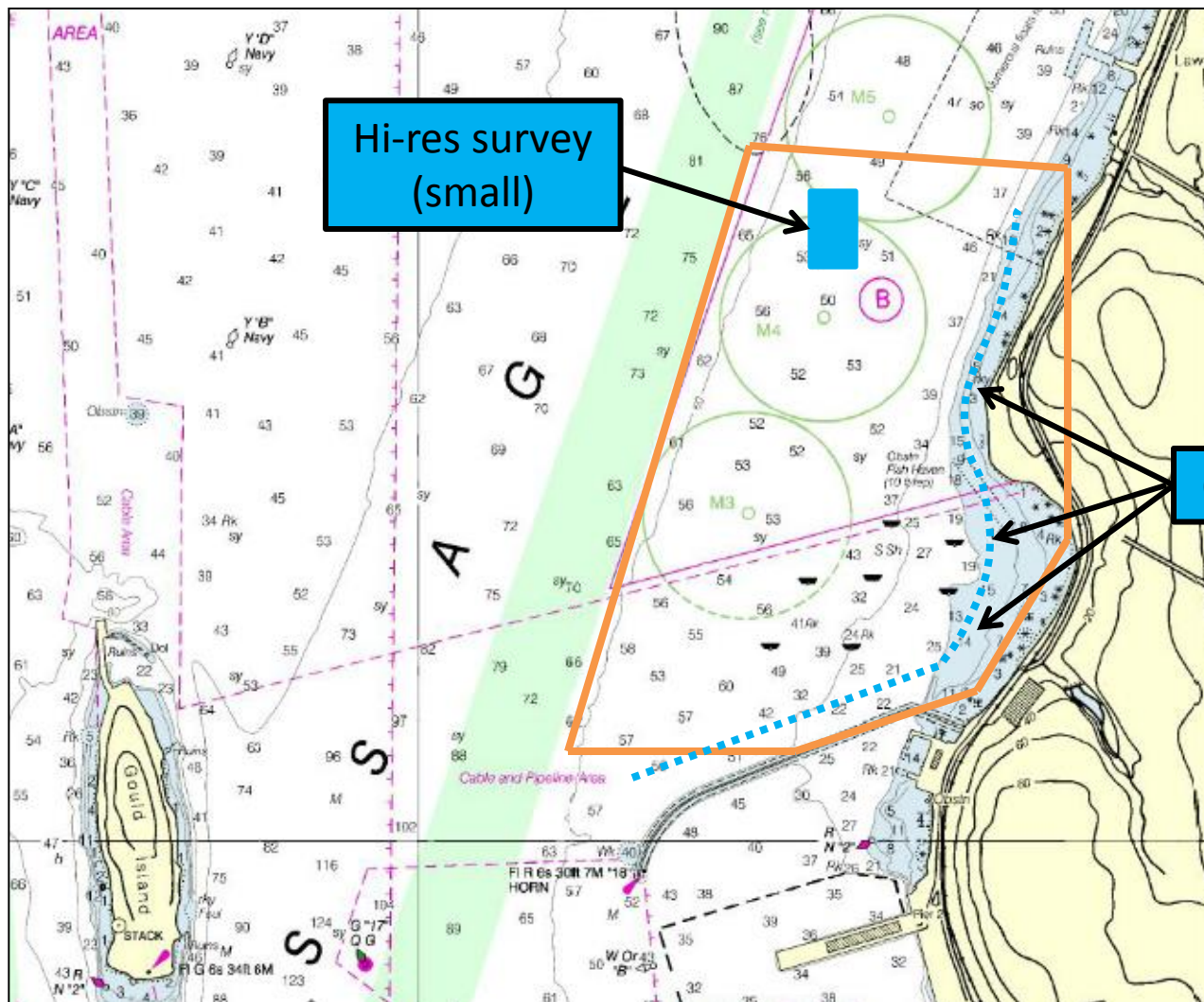
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Scenario

Mission C

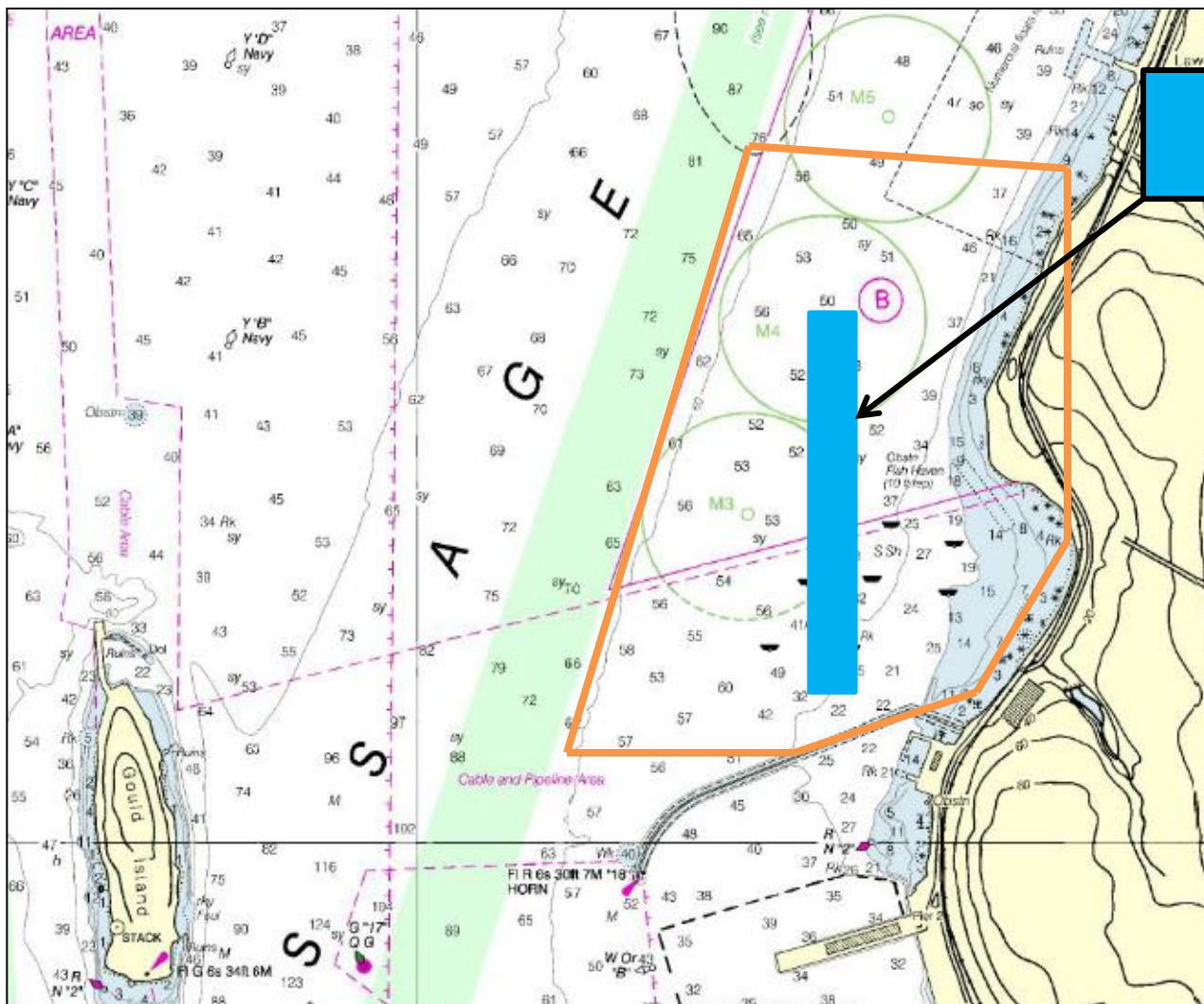


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Scenario

Mission E

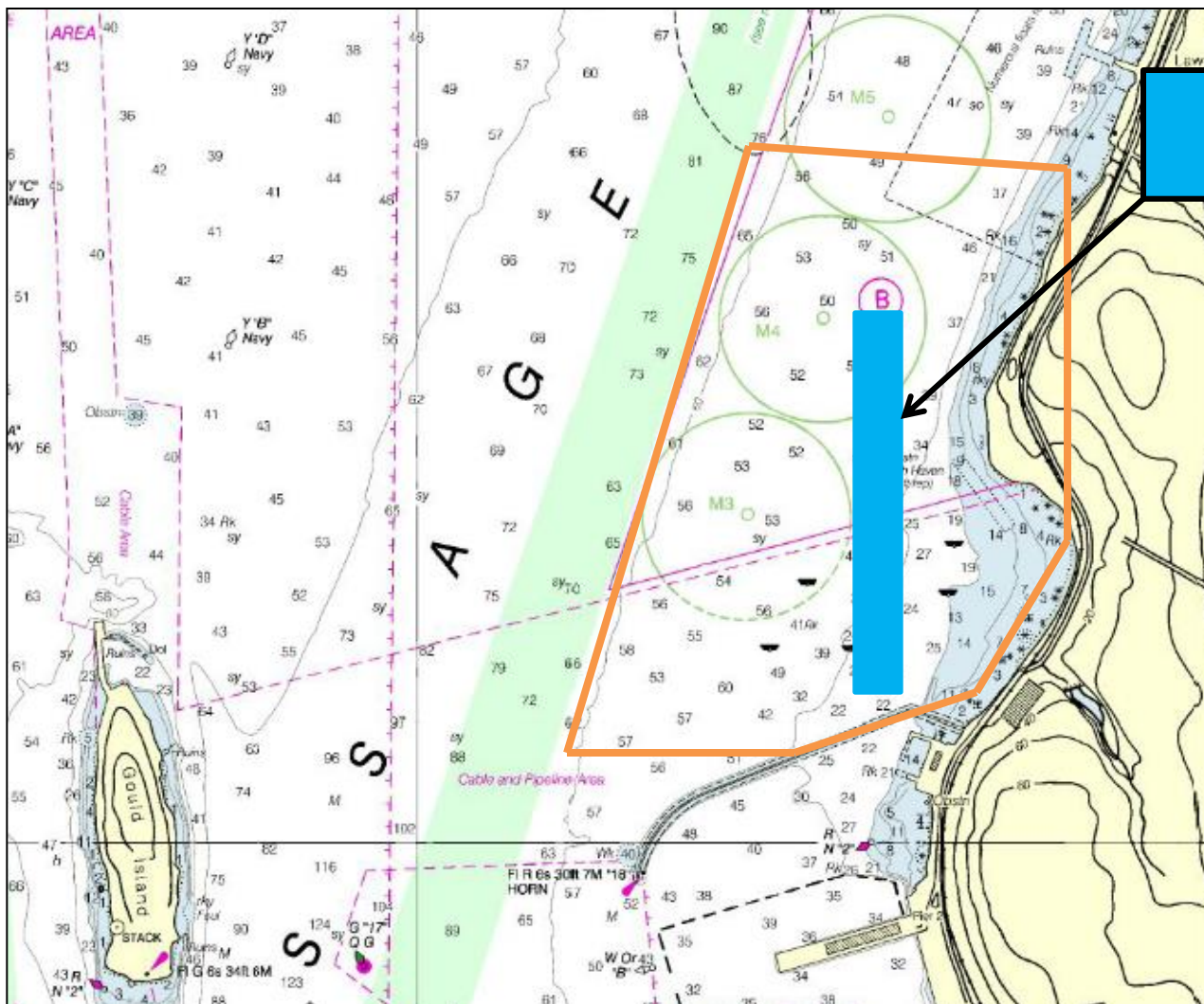


Bathymetric
survey (large)

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Scenario

Mission F



Bathymetric
survey (large)

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Scenario Timeline

AUV

AUV 1- 4 Launch

- AUV 1- 4 Complete Egress/Initiate loiter
- AUV 1-4 relay status to UAS

- AUV 1/2 execute MISSION A/B
- AUV 3/4 execute MISSION C/D

- AUV 3/4 complete MISSION C/D
- Park and relay status and MISSION C/D data to UAS

- AUV 3/4 execute MISSION E/F

- AUV 1-4 abort current missions and execute SAFETY mission.

- AUV 1-4 abort SAFETY mission and resume prior mission.

- AUV 1-4 complete missions
- Park for recovery
- Relay status and MISSION E/F data to UAS

UAS

Launch

- Task AUV 1-4 with MISSION A/B/C/D
- Relay AUV 1-4 status to shore-based C2 node

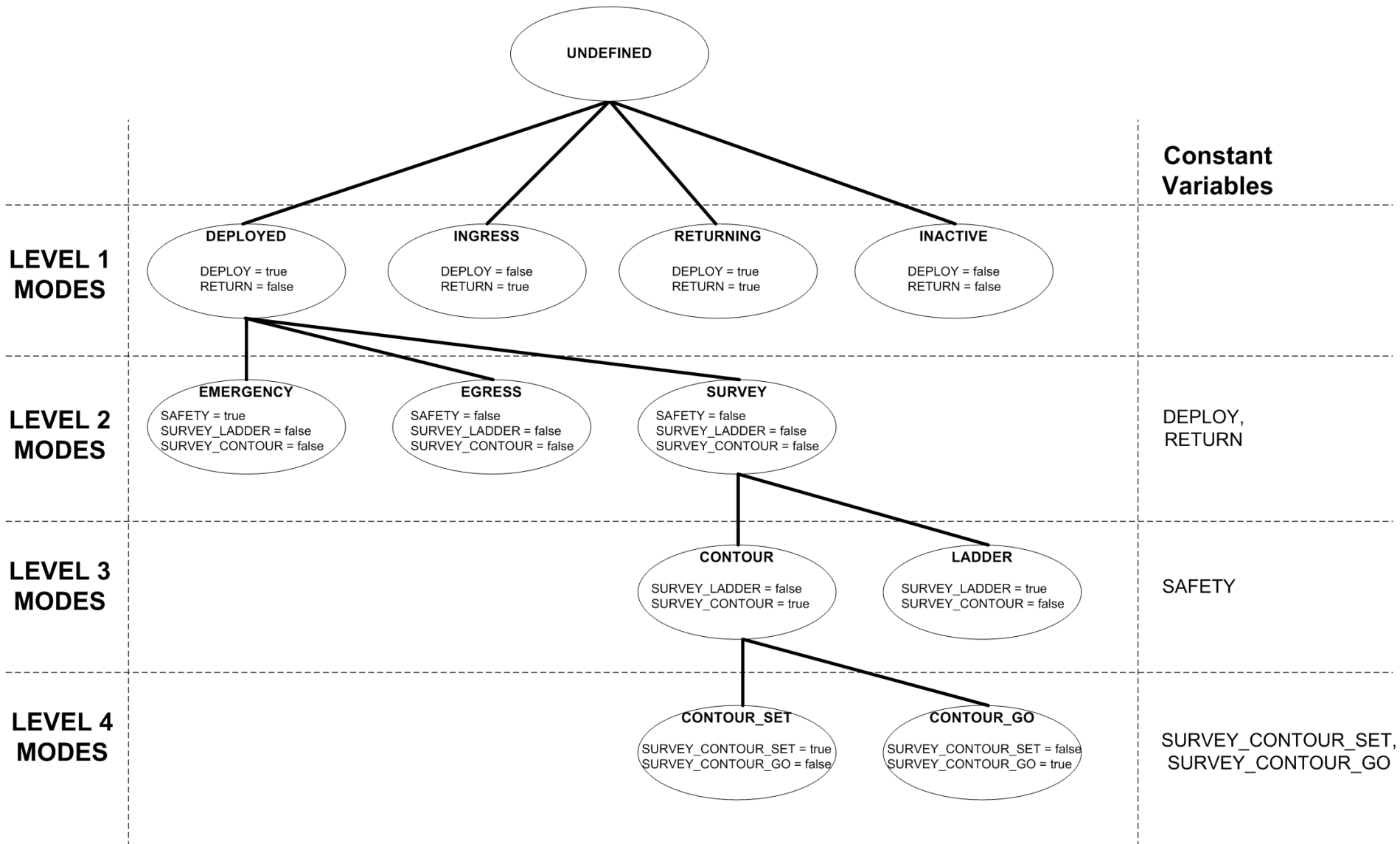
- Relay AUV 3/4 status and MISSION C/D data to shore-based C2 node
- Re-task AUV 3/4 with MISSION E/F

- Re-task AUV 1-4 with SAFETY mission

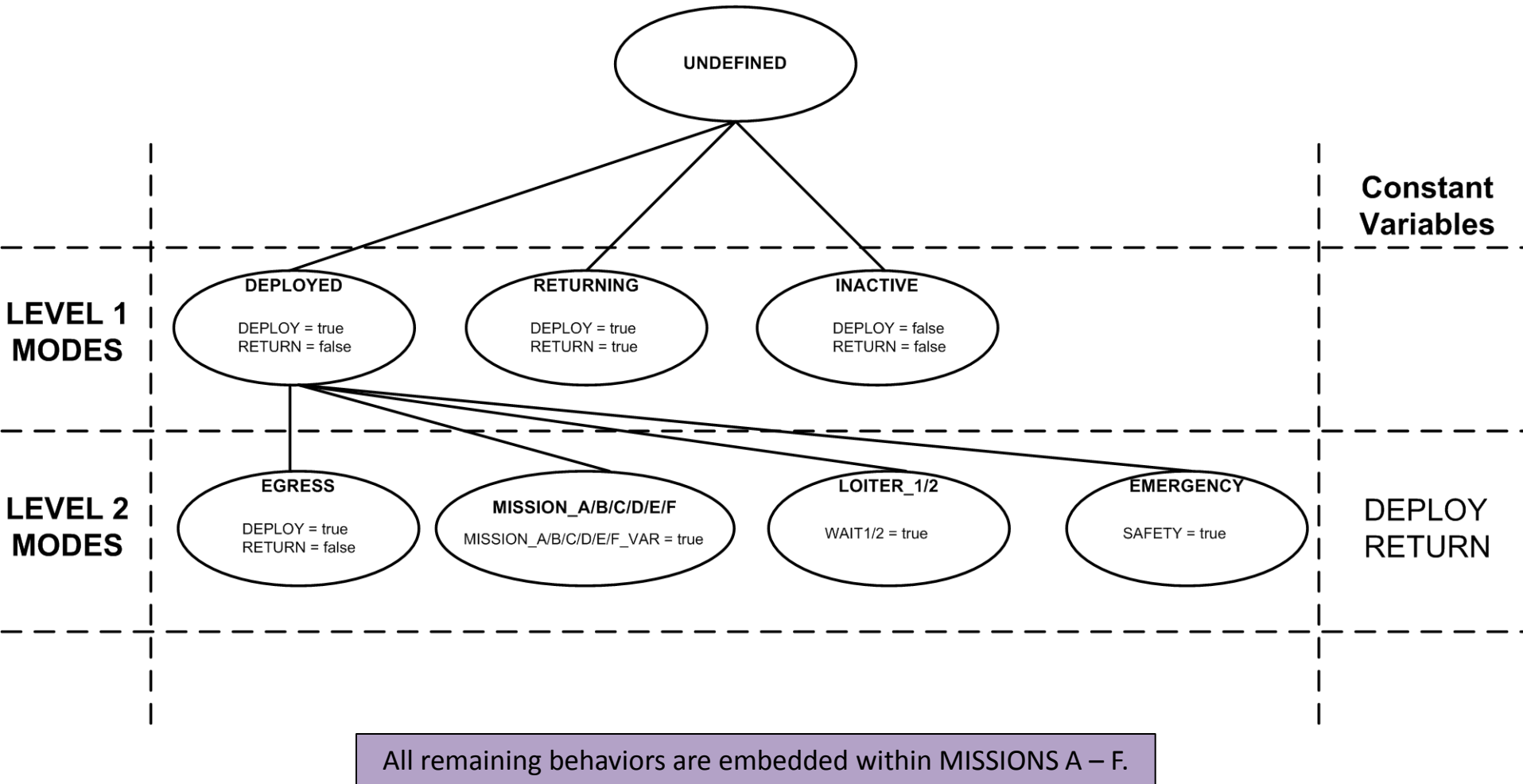
- Re-task AUV 1-4 to abort SAFETY mission and resume prior mission.

- Relay AUV 1-4 status to shore-based C2 node
- Prepare for recovery

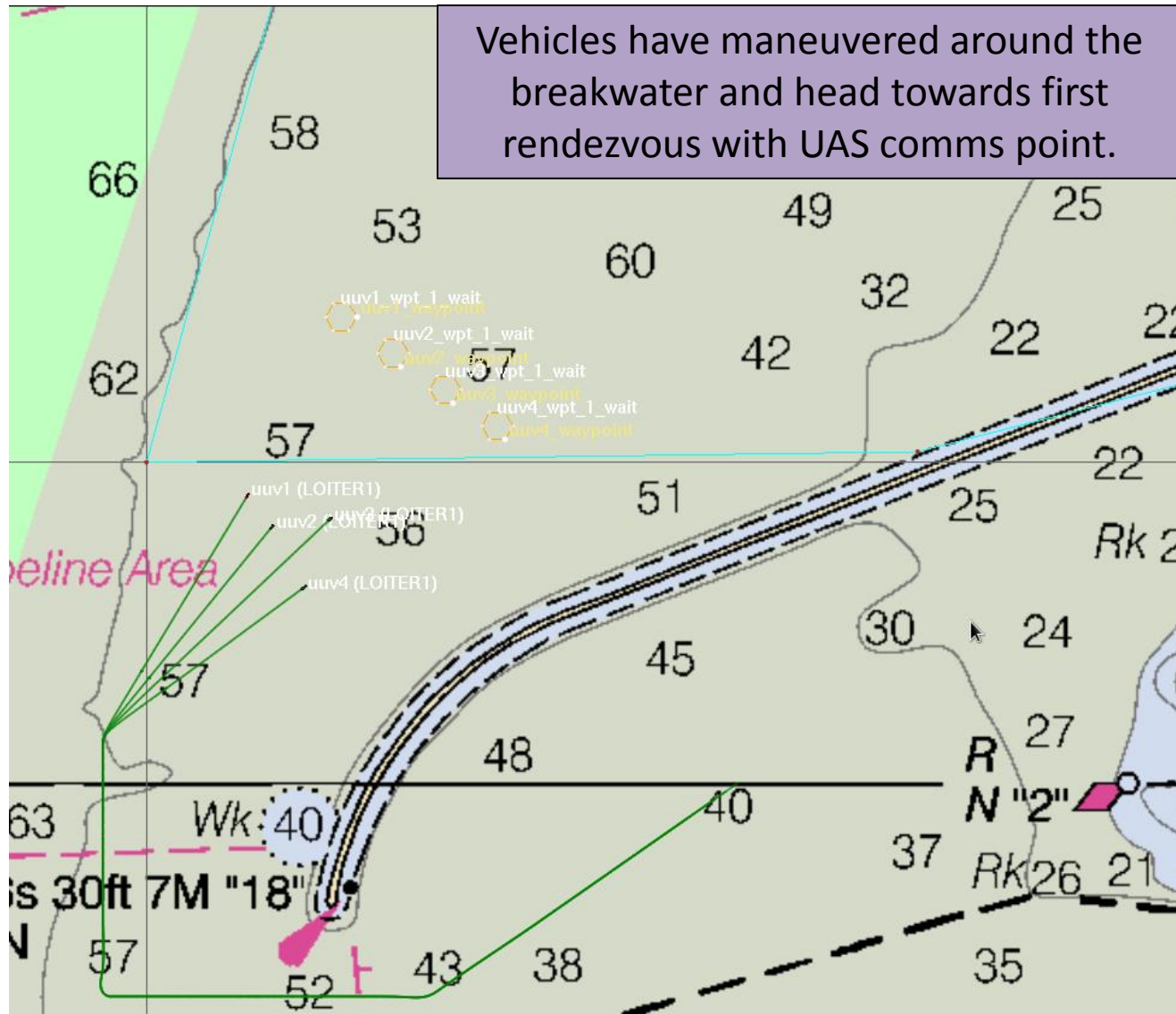
Initial HMD



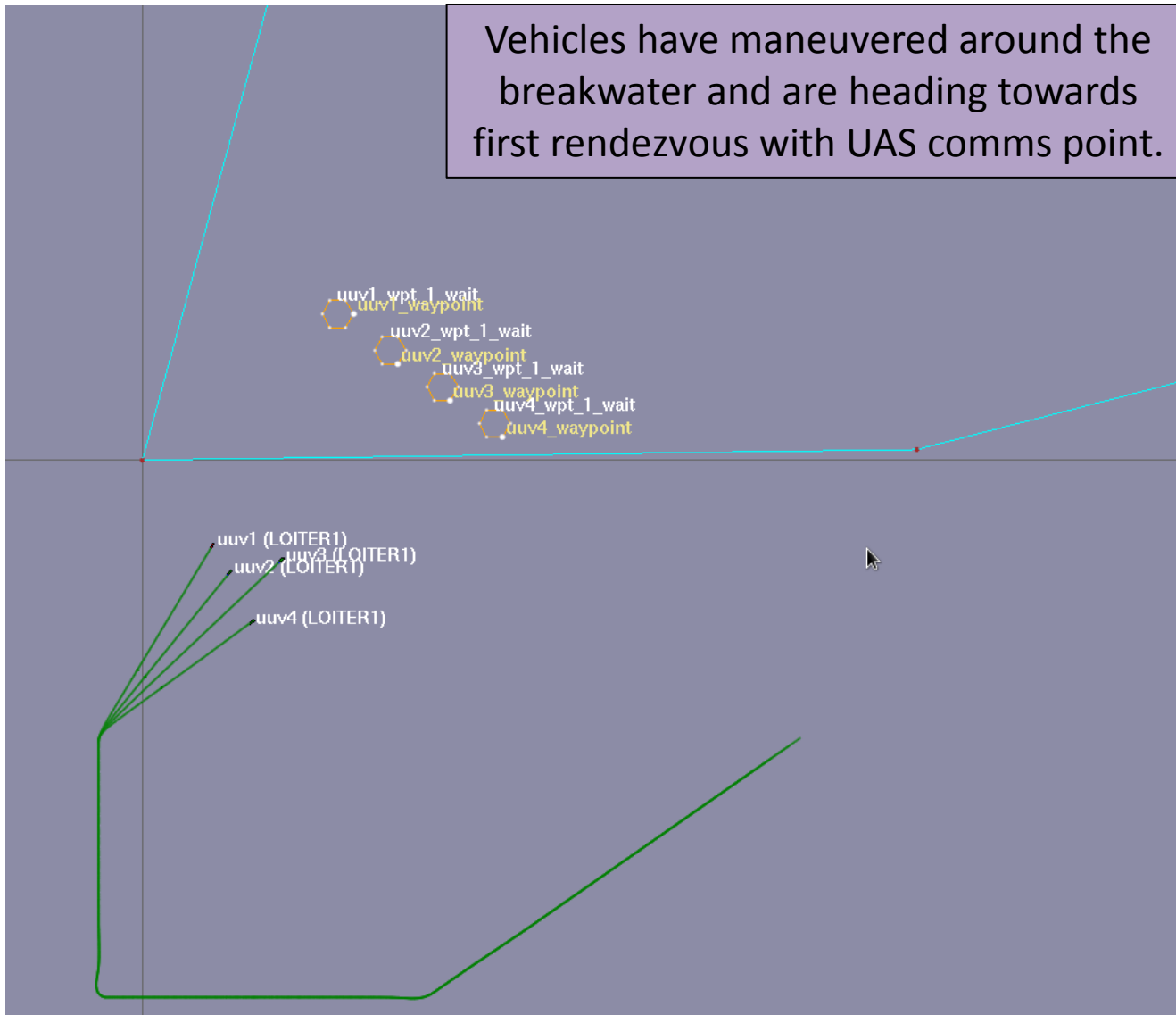
Updated HMD



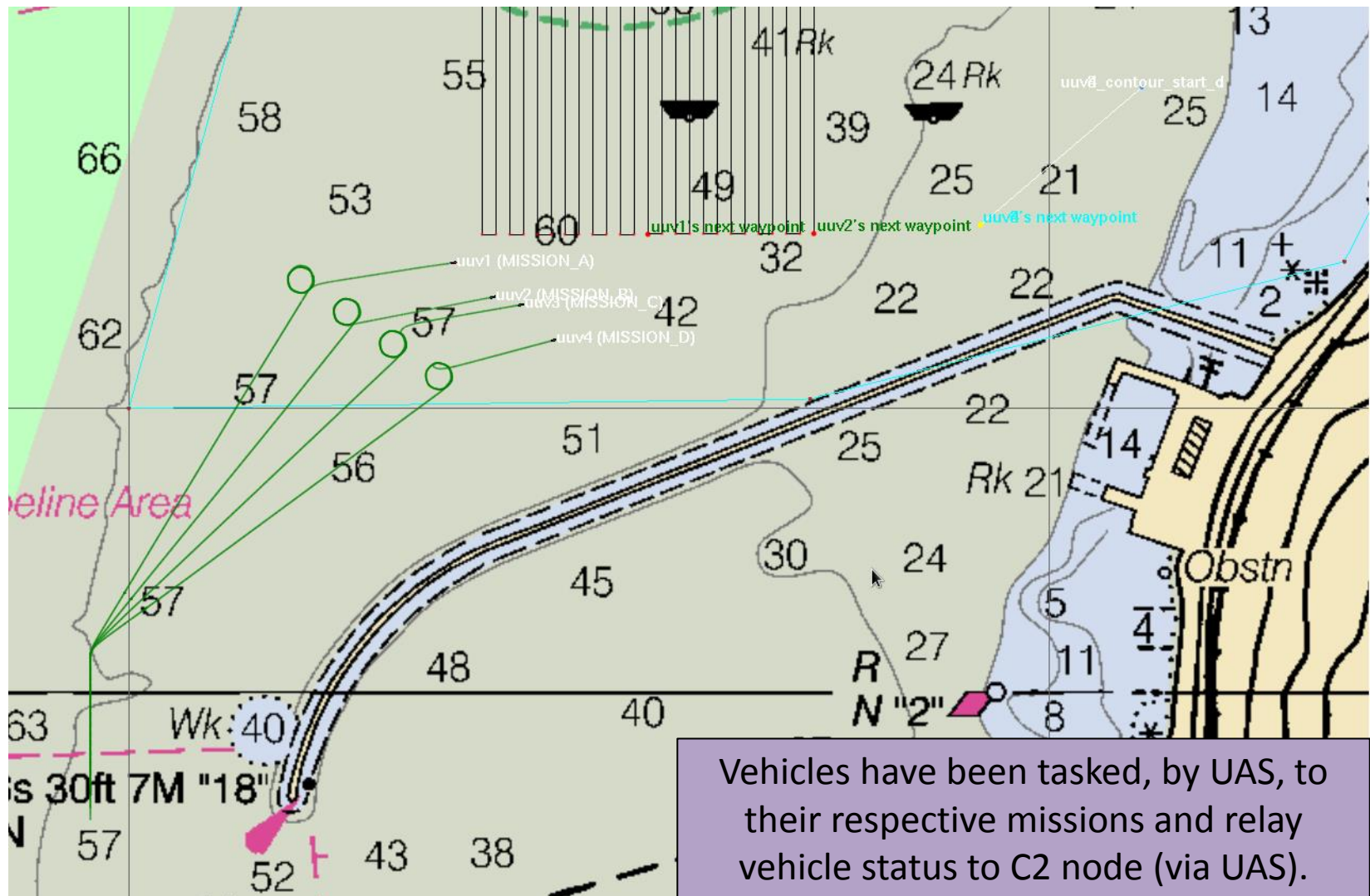
Prior to field tests



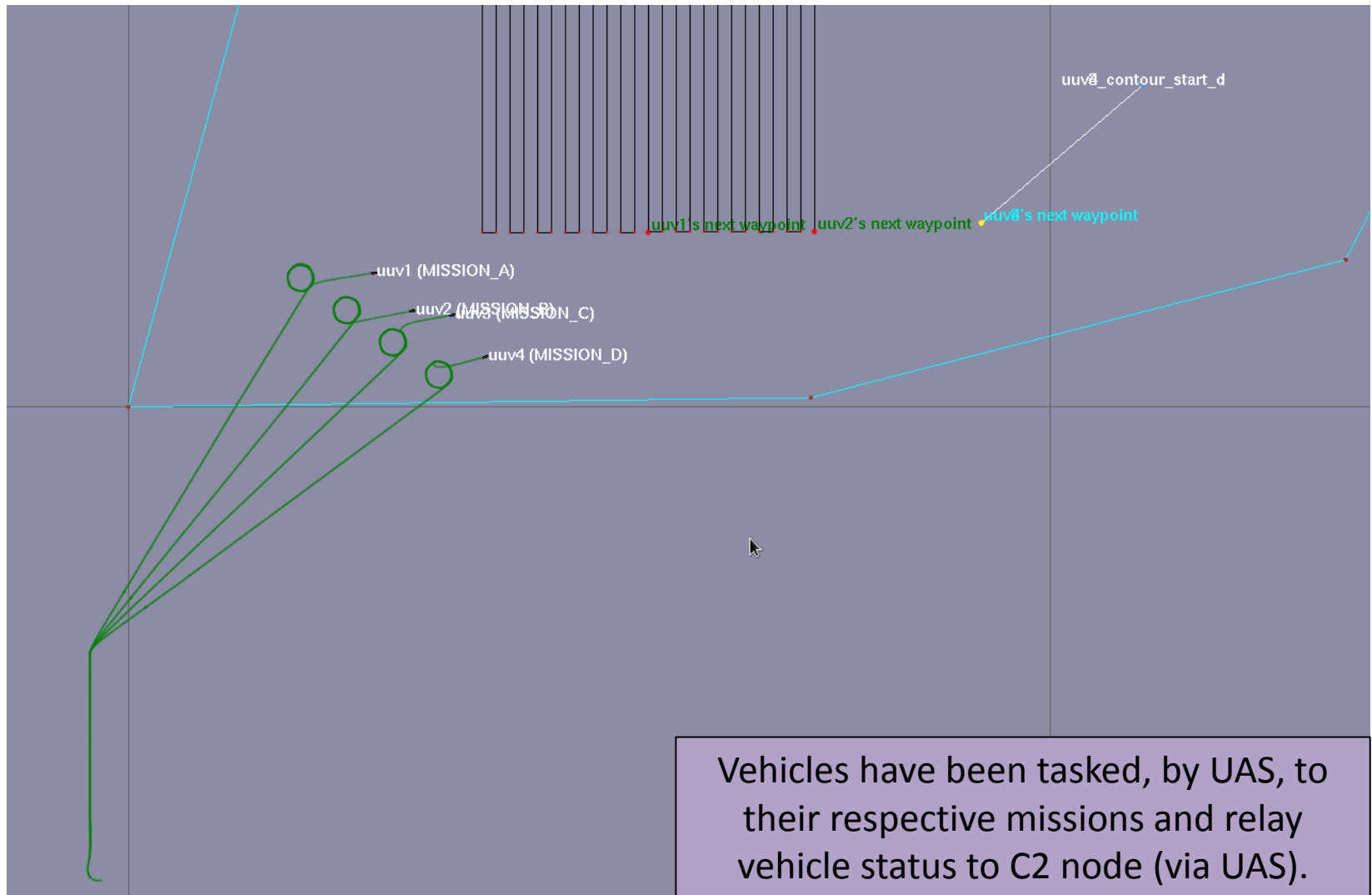
Prior to field tests



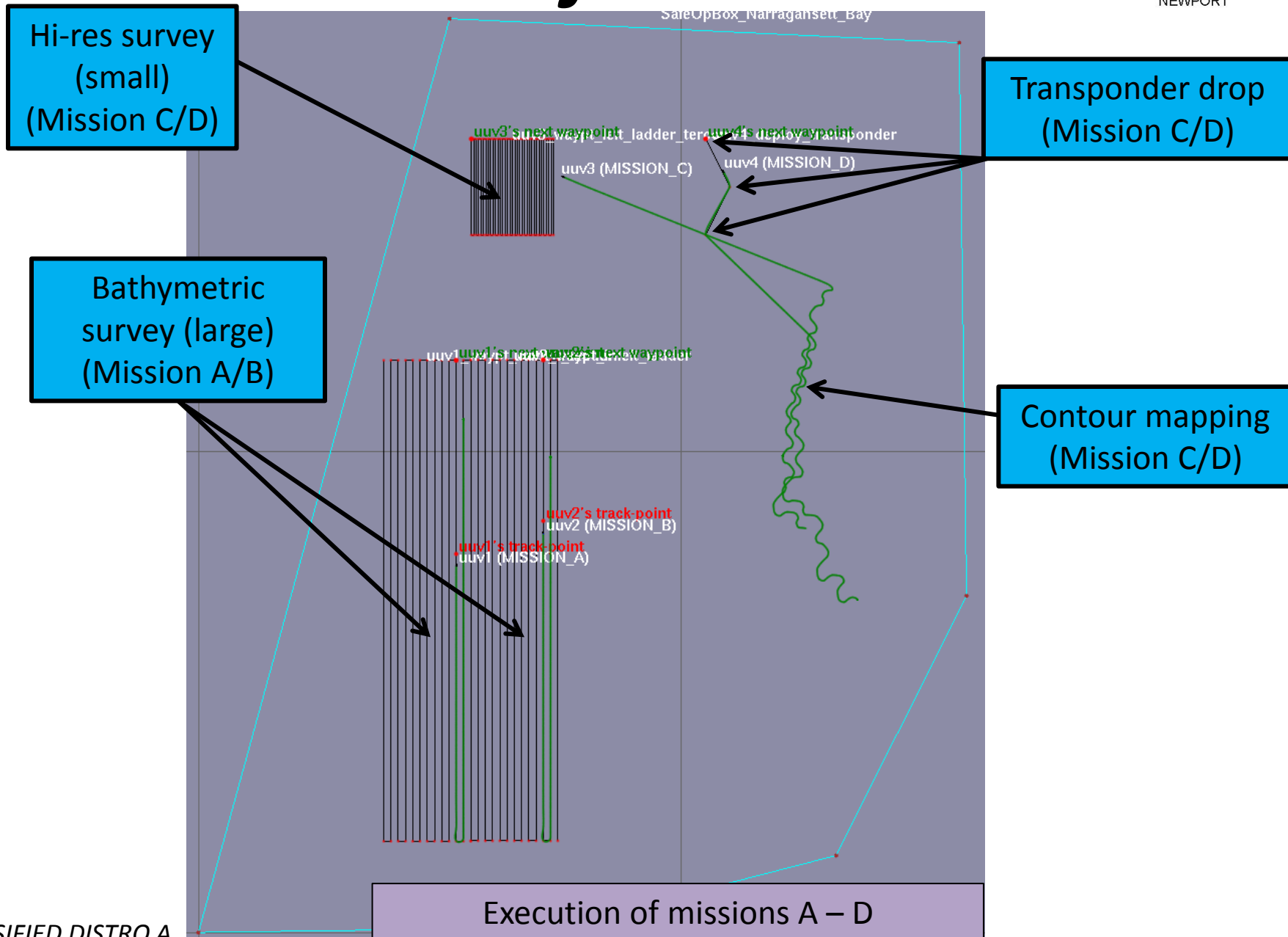
Prior to field tests



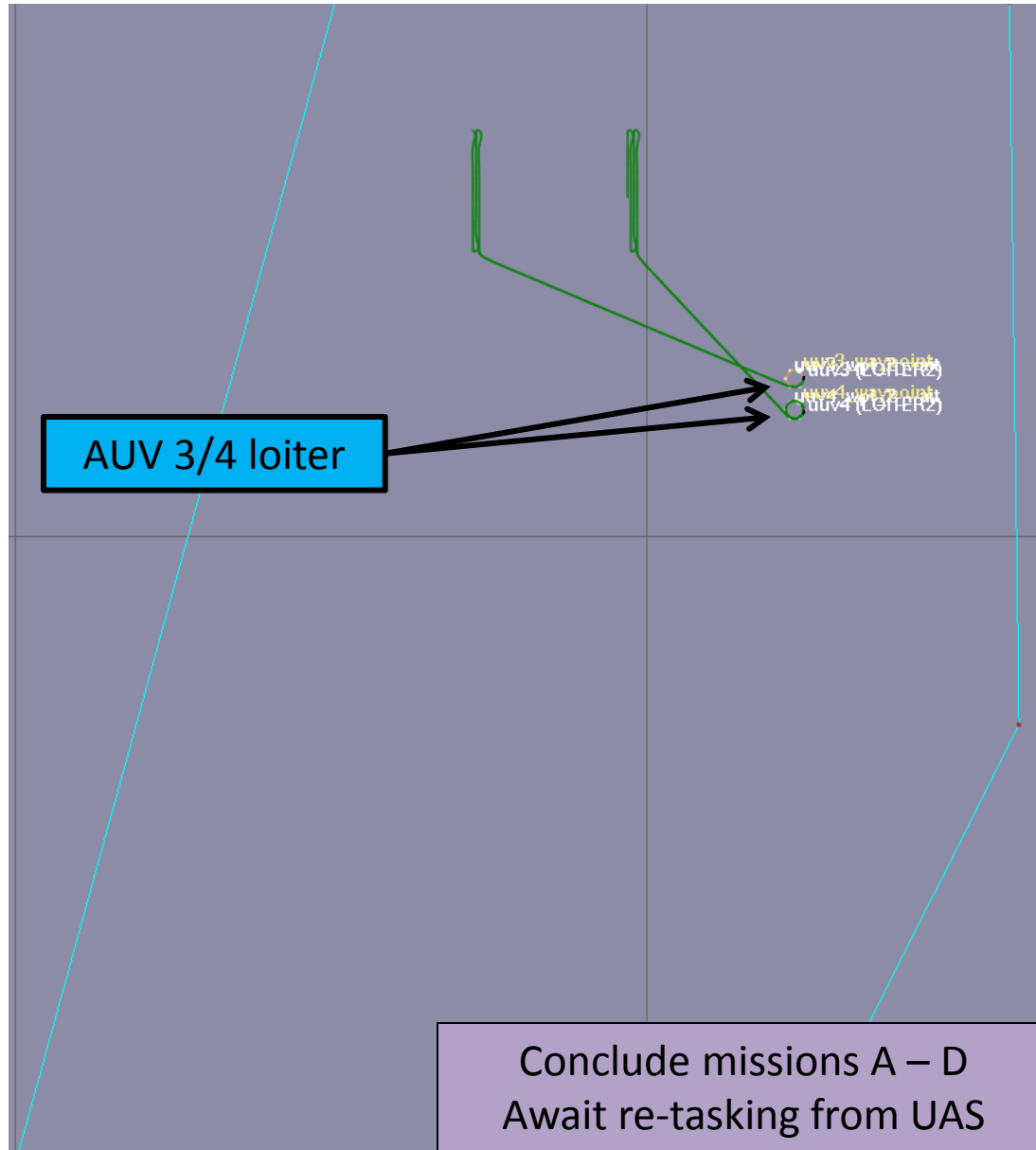
Prior to field tests



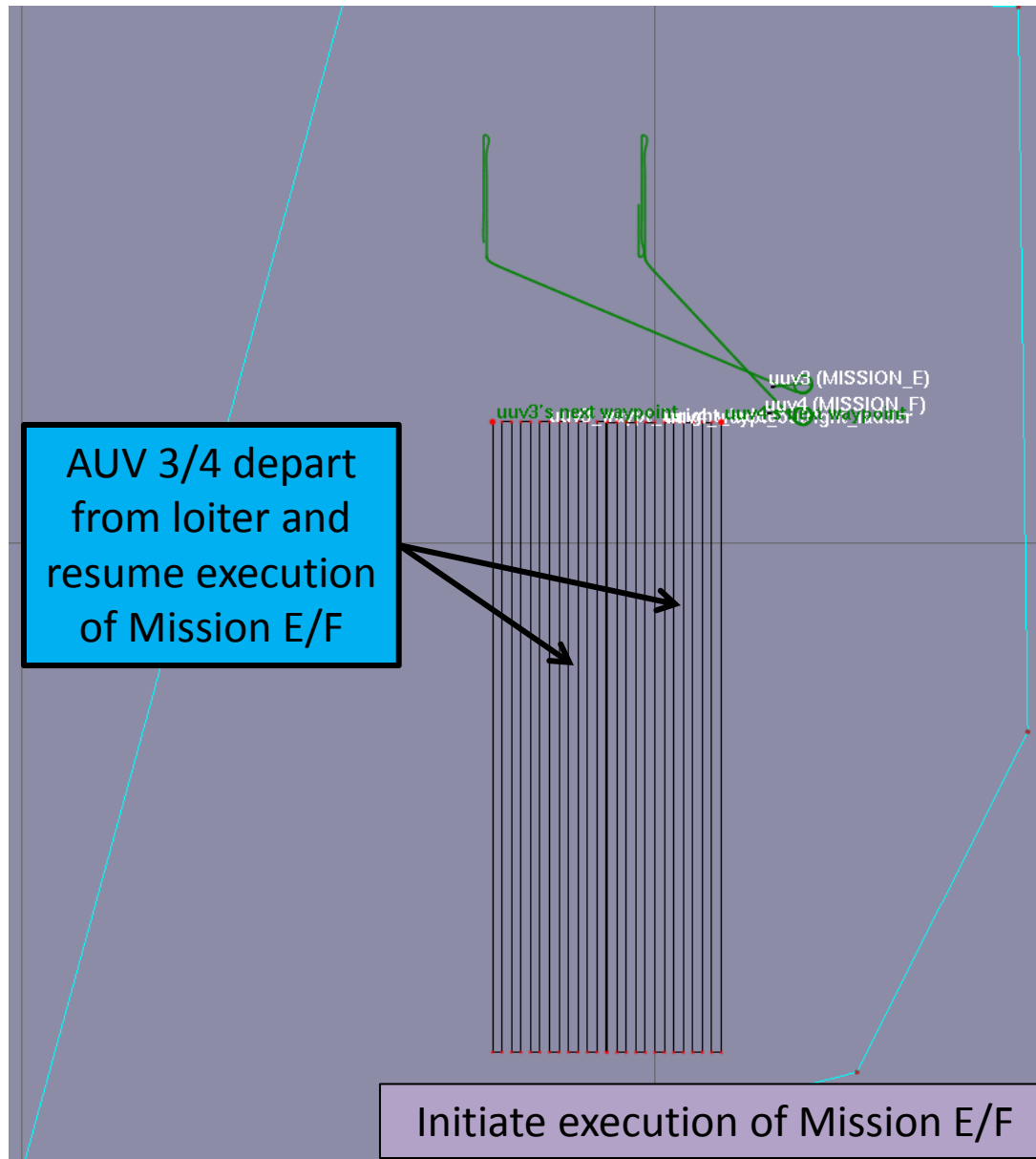
Prior to field tests



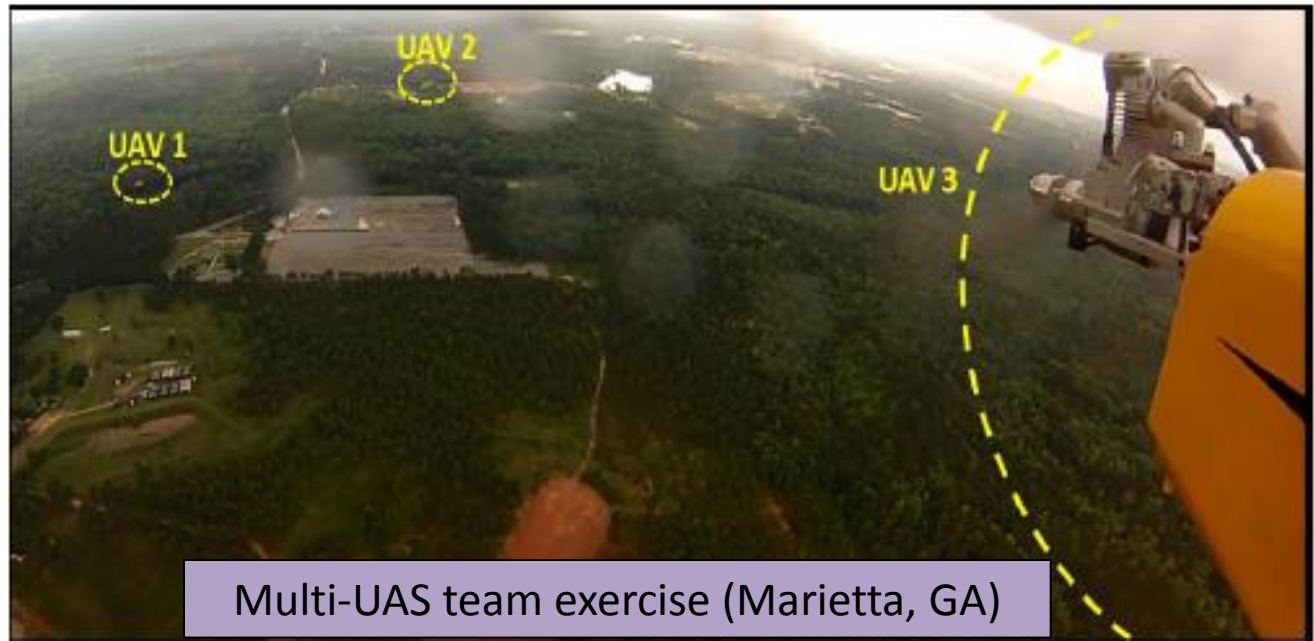
Prior to field tests



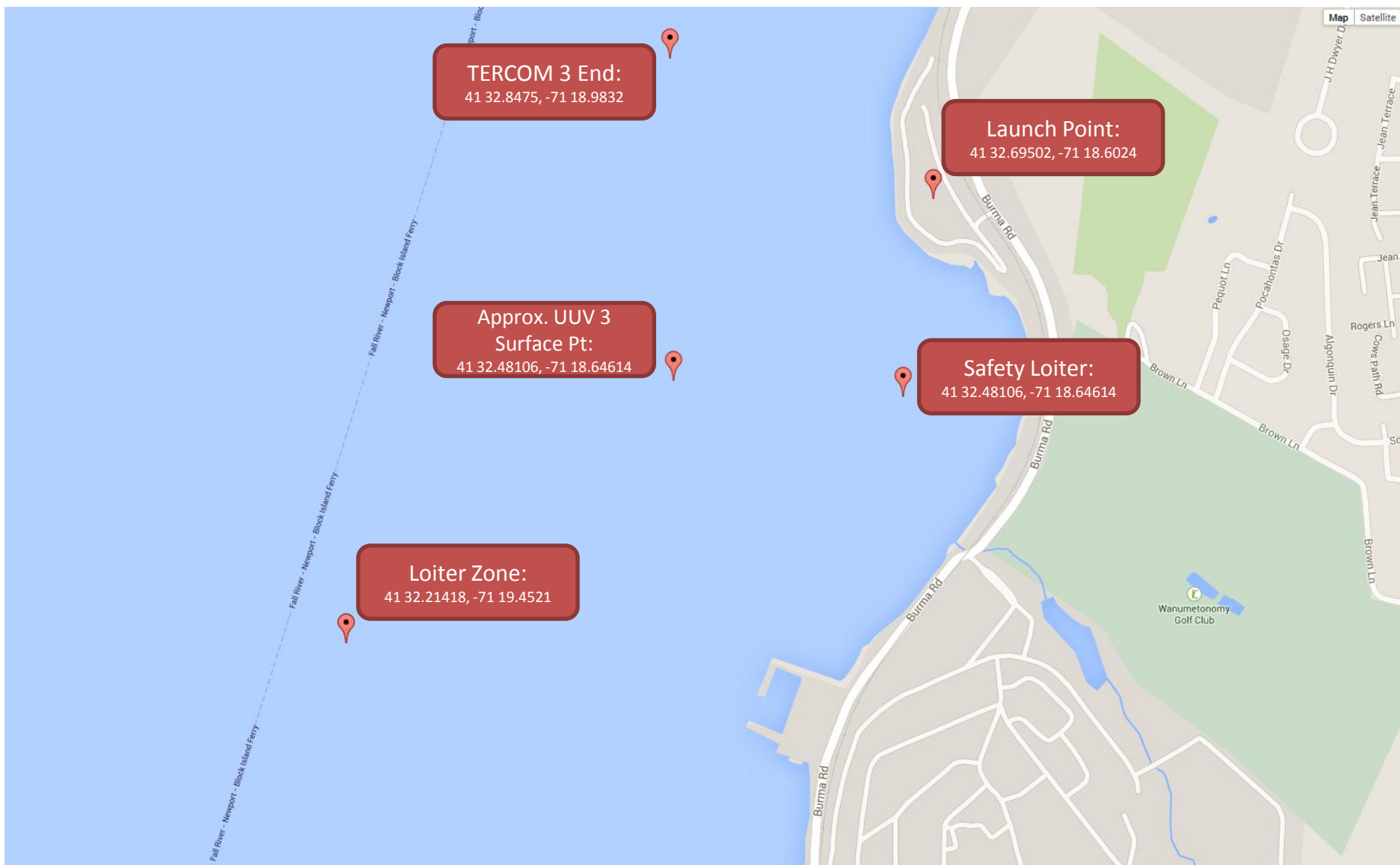
Prior to field tests



GTRI UAS Team

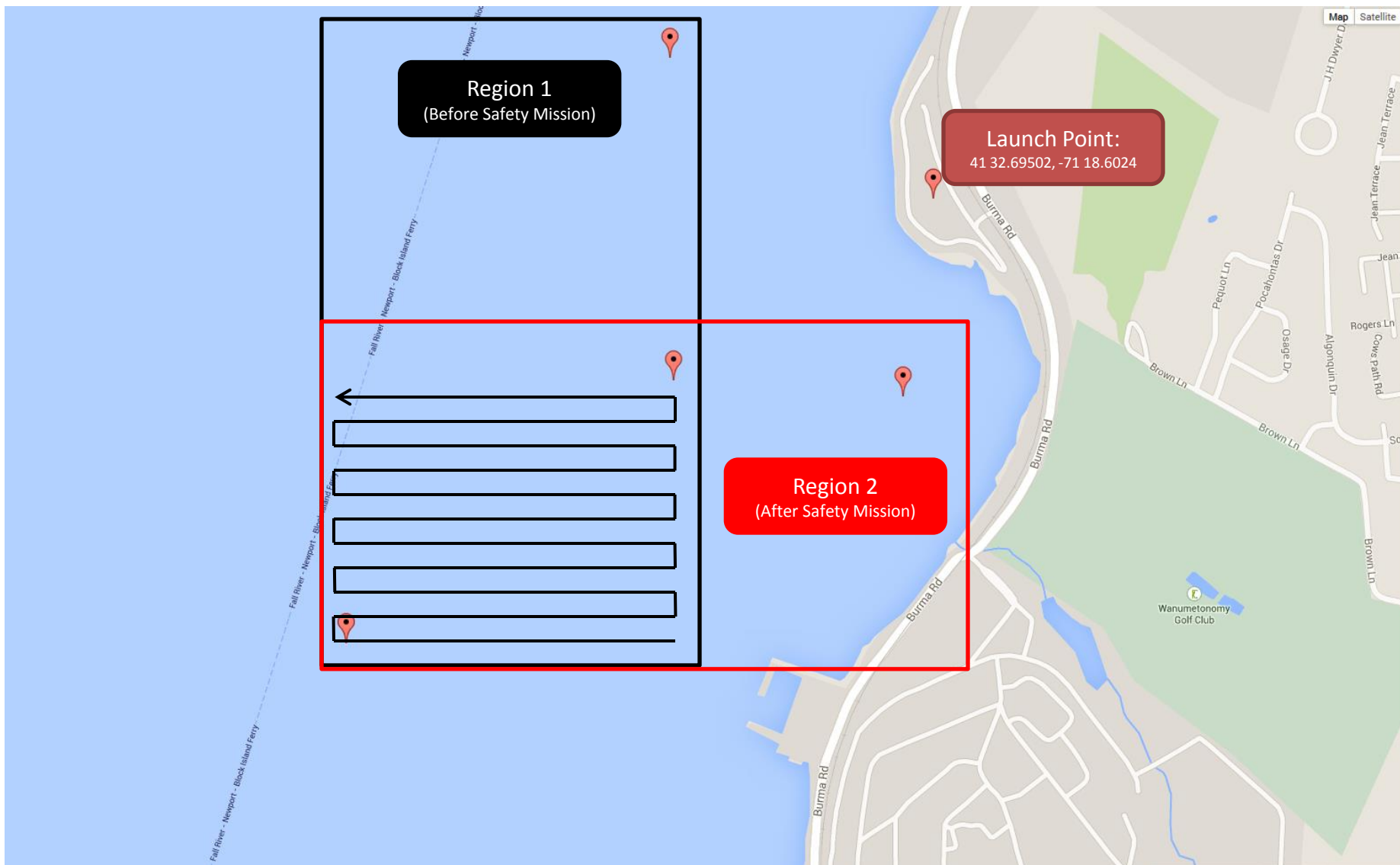


UAS Points of Interest



UNCLASSIFIED DISTRO A

UAS Patrol Region



UAS Mission Simulation



Field test features

- *Max speed: 3 kts*
- *Max depth: $\sim 1 - 11$ m*
- *Max time on behavior: 1h 25min*
- *Max contour mapped: 6m*

Field test challenges

- *Communication*
 - *Acomms*
 - *UAS-to-UUV (gateway)*
- *Joint Architecture for Unmanned Systems (JAUS) Standard*

Acknowledgments

- *Georgia Tech Research Institute*
 - *Charles Pippin*
- *NUWC North Range & Code 70 Ops Support*

Thank you...