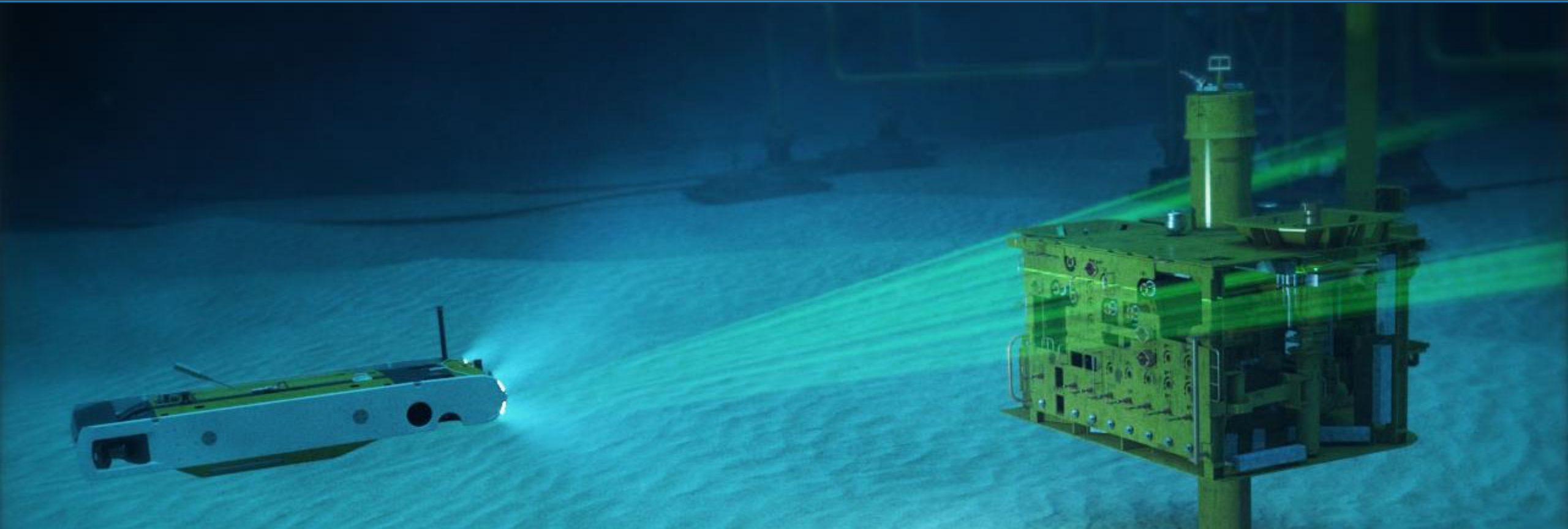


Supervised Autonomous System for Deepwater Inspection, Maintenance, and Repair

Neil Herbst, Program Manager, Subsea IMR Services

28 March 2019

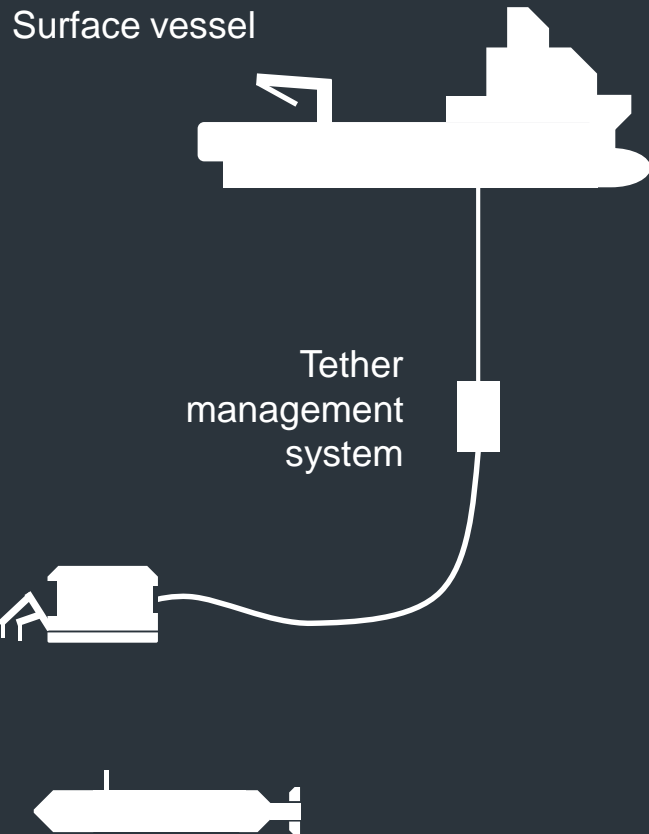


Agenda

- IMR Services Today
- OneSubsea IMR Program
- uROV Platform
- What's Next
- Questions

IMR Services Today

\$3B+ market
~60% vessel spend



Large market share
Remote operated vehicle (ROV)

Small market share
Autonomous underwater vehicle (AUV)

Insp^ection Visual, SONAR, LiDAR, etc.
Maint^enance Changeout, cleaning, etc.
Re^air Installation, refurb, etc.

Current ROV market challenges



Cost of deployment



Extensive ship-based crew



Contingent on weather



Implementation of new technology

OneSubsea IMR Program

Three Strategic Pillars



OPEX
Reduction

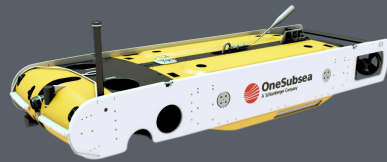


Advanced
Sensing



Digital
Enablement

Current Technology Initiatives



uROV Platform

50% cost reduction over
legacy IMR services



**Subsea LiDAR
Extensions**

High-resolution 3D mapping
with data layers



**Data Management &
Analytics Platform**

Data delivery and
digitalization

uROV – untethered ROV

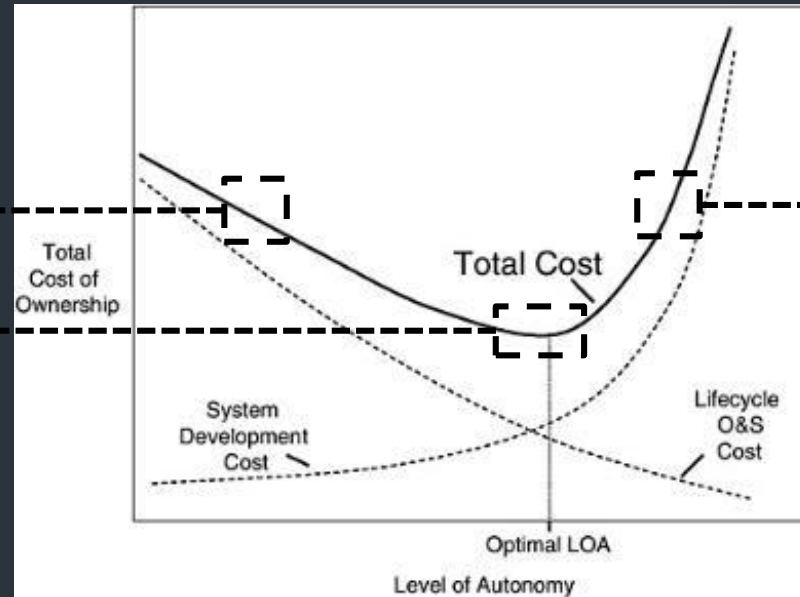
ROV

“Joystick control”

- Legacy approach
- Expensive deployment
- Data through tether



*Autonomous Vehicles in Support of Naval Operations 2005,
National Academy of Sciences*



AUV

“Fire and forget”

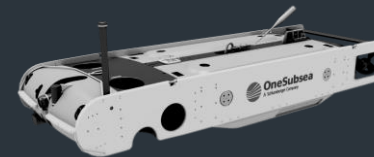
- Future of IMR
- Trust issue around sensitive infrastructure
- Development cost



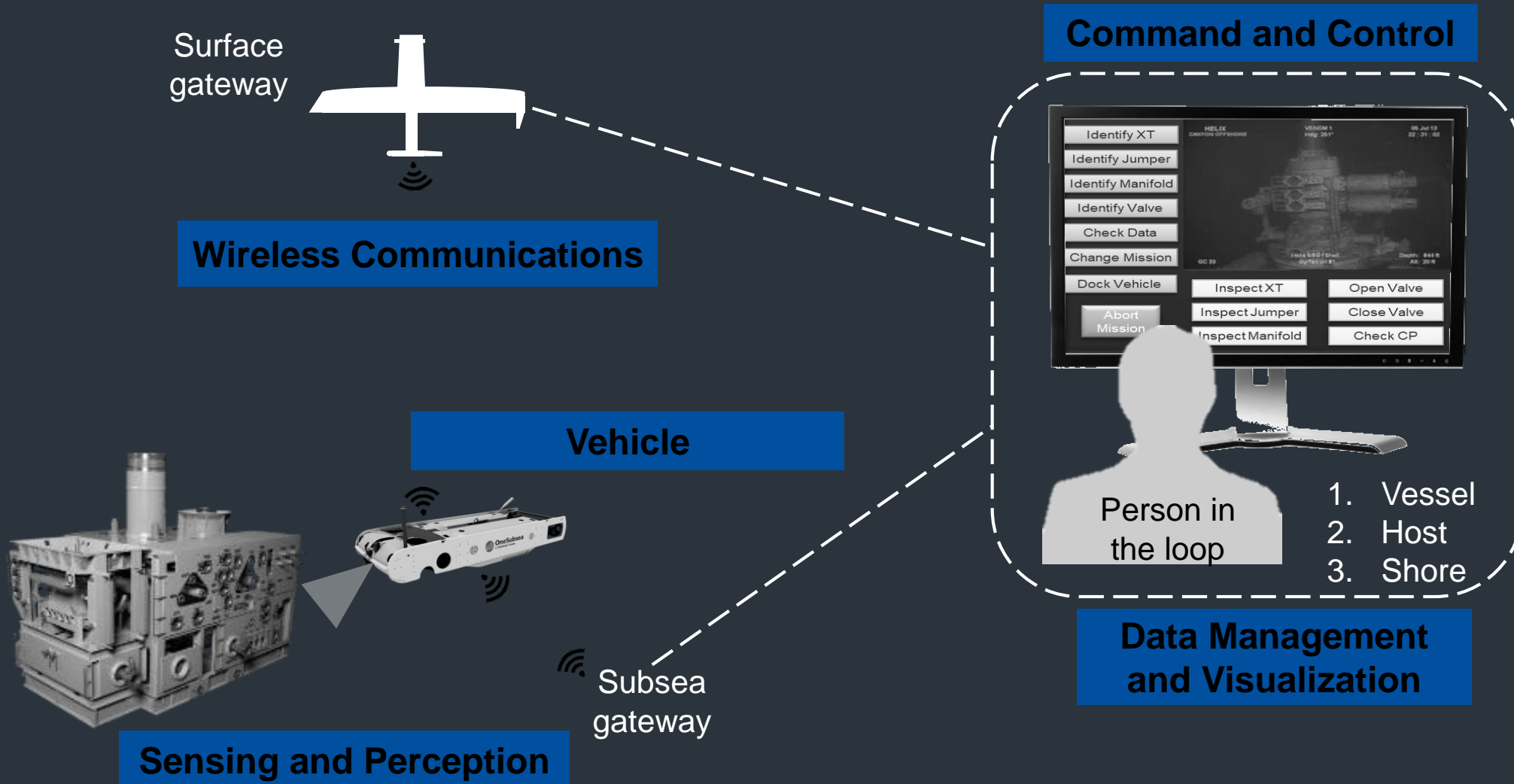
OneSubsea uROV

“Supervised autonomy”

- Pragmatic approach
- Prescribed real-time data
- Agile



uROV – Supervised Autonomy



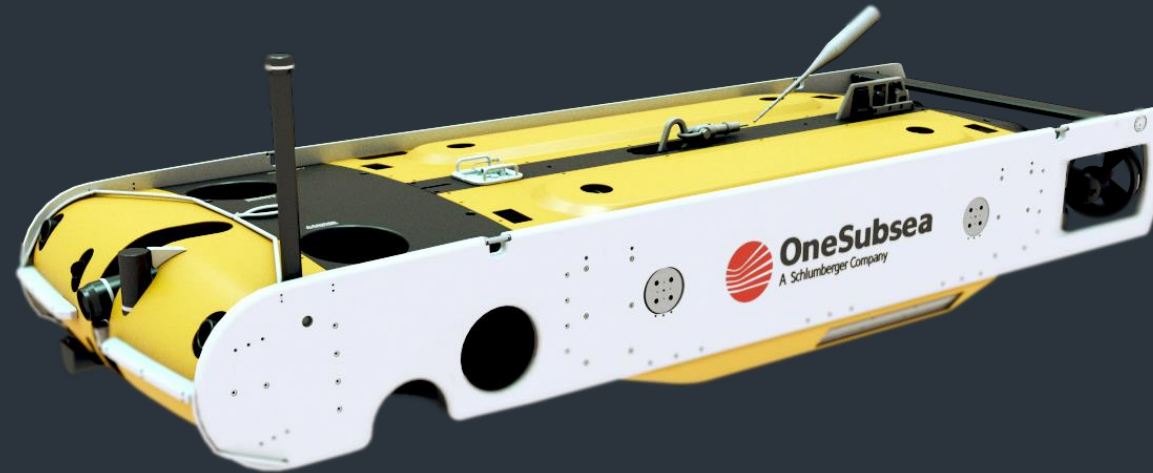
uROV Technology Blocks

Wireless Communications

Command and Control

Data Management
and Visualization

Sensing and Perception



Vehicle

uROV Technology Blocks

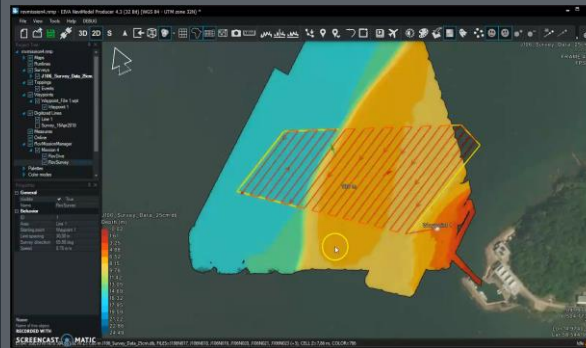
Wireless Communications

World record live underwater video transfer



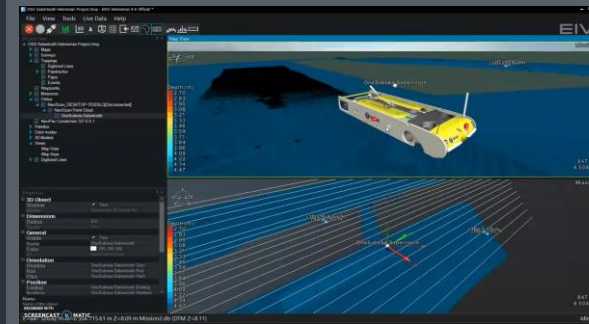
Command and Control

3D and adaptable mission planning and control



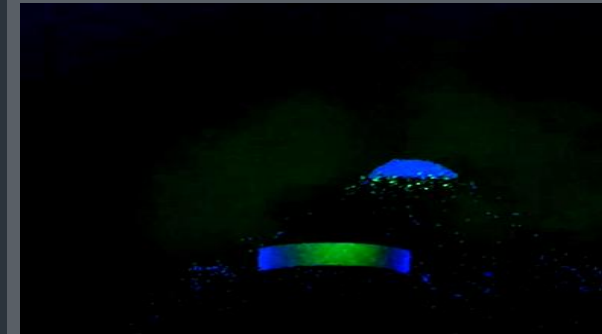
Data Management and Visualization

Real time data quality control and visualization at surface

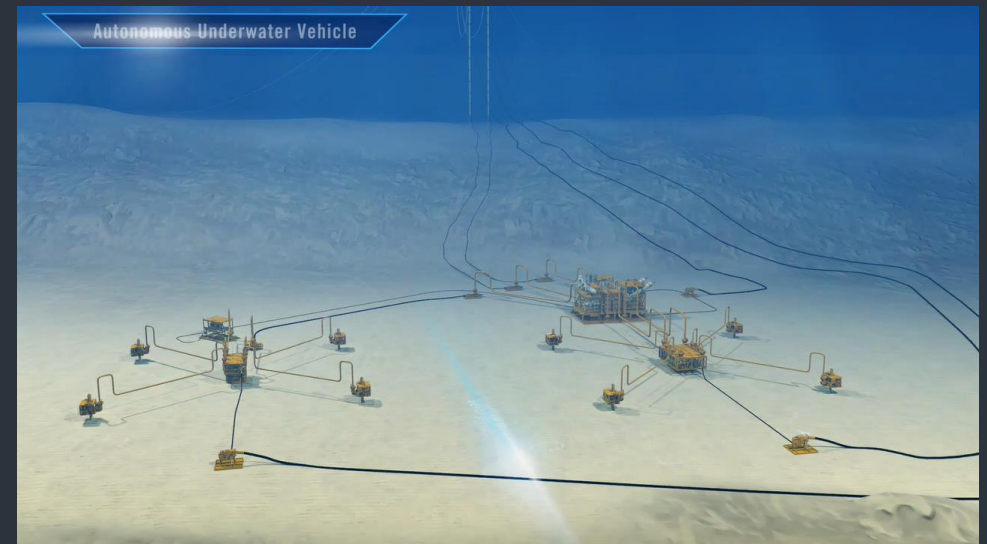
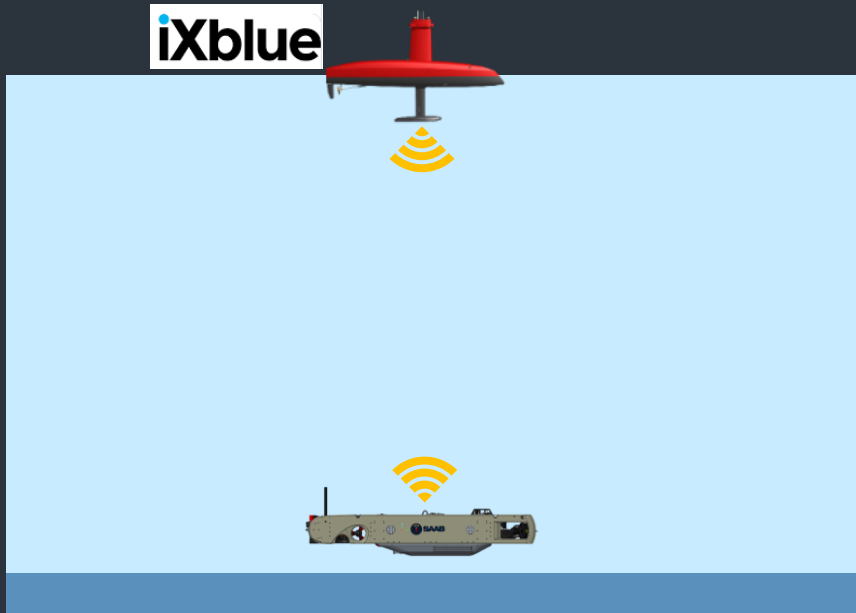
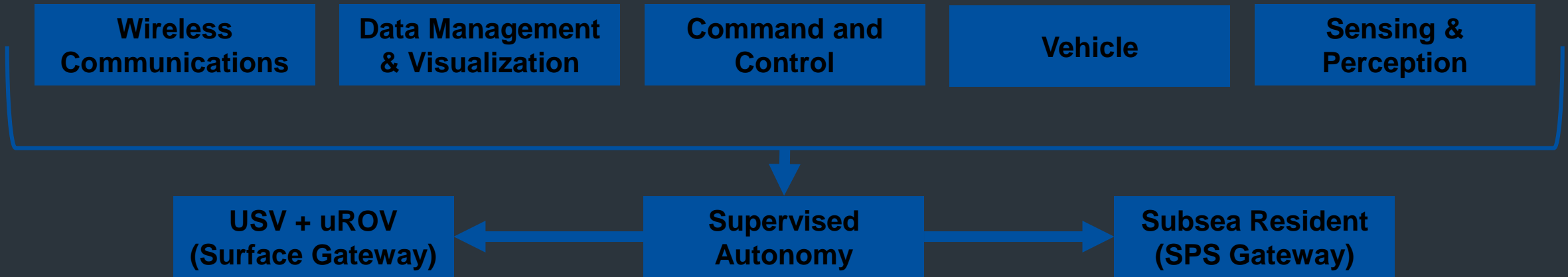


Sensing and Perception

Advanced sensing hardware for feature identification



What's Next



Thank You and Questions

Acknowledgements

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