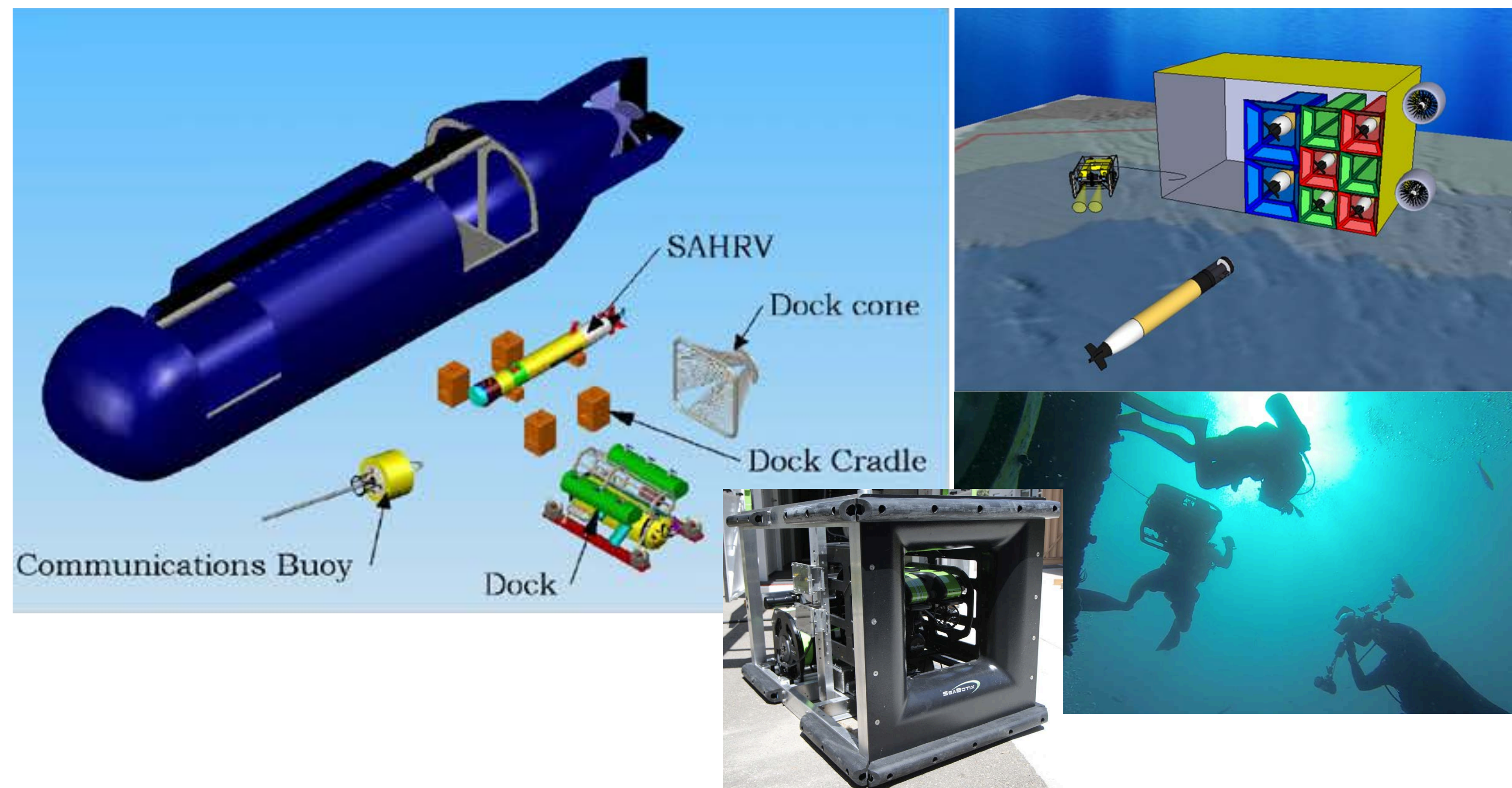


Tethered AUV Operations from a Mobile Robotic Outpost



NAVAL
POSTGRADUATE
SCHOOL



Tethered operations from a mobile base finds application in NSW, submarine operations, LDUUV, etc.

- Robots are *necessity* in the underwater domain
- Need to overcome power/range limits for widespread adoption/utility
 - Robotic outpost/marsupial robotic concepts
- Underwater localization, communications, sensing, and control remain challenging
- Close-quarter AUV operations required, and adds a significant operational capability to existing technologies
- Precise control is required for close-proximity operations, in the presence of large disturbances and during configuration changes
- Precise control requires accurate (relative) localization

- Investigate adaptive control for precise vehicle control
 - Can handle mid-mission configurations changes (e.g., intervention, object delivery and recovery)
 - Precise control without accurate model
- Investigate SONAR-based terrain-relative navigation
 - Apply Visual Odometry techniques to Imaging SONAR data
 - Flexible navigation aiding sensor
- Integrate with Navy platforms (SDV, LDUUV, Submarine) (* requires hardware investment)
- Demonstrate at NPS-NASA field experiment

- Robotic outpost overcomes power/range constraints, enables persistent presence
- Close-quarter AUV operations is of significance interest to the Navy
 - Multi-vehicle operations
 - Joint human-robot operations
 - EOD, Mobile & Salvage diving, Undersea Rescue
- Marsupial robot concept (closer-term operational concepts)
 - Robotic teammate/operations from SEAL Delivery Vehicle
 - Submarine/LDUUV operations