

***Submarine Requirements Brief  
to  
Center of Excellence for Research in  
Ocean Sciences***



**John Burdette  
COMSUBPAC N8B**

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**John Burdette, CSP N8B, [john.burdette@navy.mil](mailto:john.burdette@navy.mil), (808) 473-5651, Pearl Harbor, HI**

# ***Priority Submarine S&T Requirements\****

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- 360 degree tactical control
- Communications and interoperability
- Submarine cost reduction
- Extended reach for mine warfare and ISR
- Warfighter performance
- Global strike
- Stand and fight in the contested littorals

\* Not in priority order

# ***360° Tactical Control***

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- Technologies to rapidly establish and maintain tactical control in all directions within a specified range in all directions
- Affordable hull-mounted sensors
  - Localization
- Collision avoidance aids

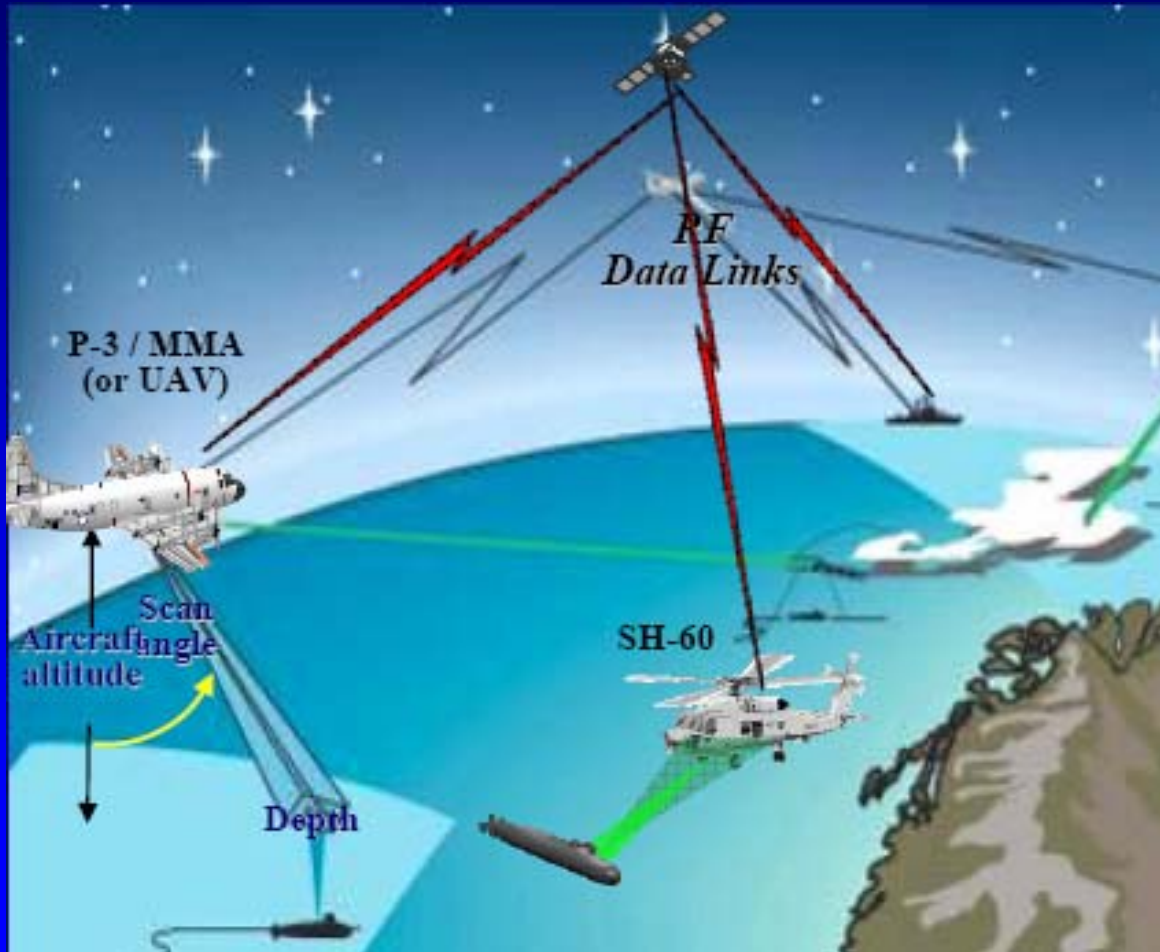
# ***Communications and interoperability***

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- Two-way communication between joint command function and submarine at tactical speeds and depths
  - Low data rate (near term)
  - High data rate (far term)
  - Minimize reliance upon consumables
  - Minimize vulnerability to intercept

# Goal: Cross Platform Interoperability

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Mixture of phenomenologies and protocols tailored to mission and platforms

# ***Submarine Cost Reductions***

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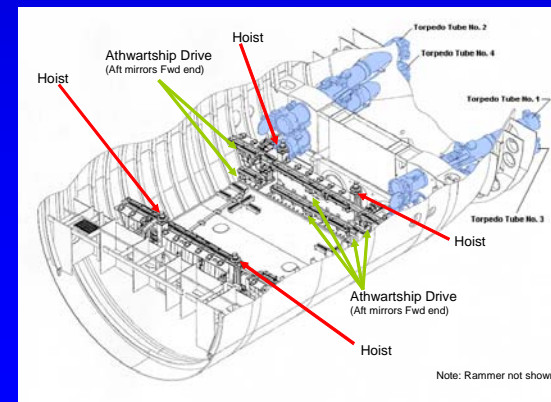
- Reduce cost for submarine design
- Reduce non-recurring cost submarines
  - < \$2B
- Reduce manning requirements
- Reduce recurring maintenance requirements
  - Corrosion prevention

# Cost Reduction in Design Construction, Operation and Maintenance

## Improved Construction Techniques



## Improved Design Tools/ Science



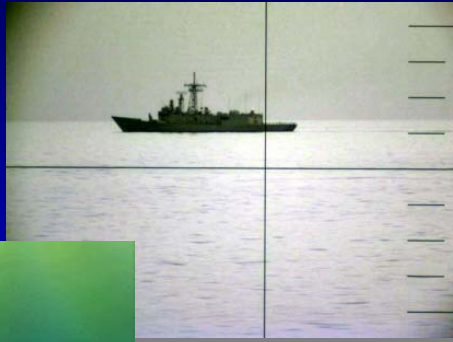
# ***Extended reach for MCM & ISR***

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- Assured access in mine danger areas
- Enhanced underwater navigation systems
- Enhanced track and mission planning
- Over-the-horizon targeting
- Improved imaging and electronic warfare capabilities

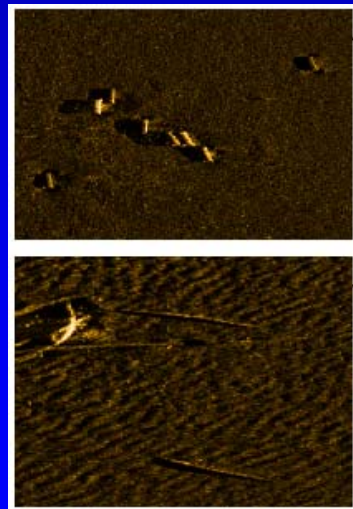
# Autonomous Vehicles for ISR

Periscope is primary ISR sensor



Overhead imagery from a UAV

Side-scan sonar from a UUV



# *Warfighter Performance*

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- Rapidly process large volumes of contact information and navigational constraints from a variety of sources
- Improve accuracy, consistency and speed of tactical decision making
- Improved training tools and methods

# ***Information Processing and Command Decision Making***

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**Virginia Control Room.  
Are there too many displays?**

**Does more data = better  
decisions ?**



**Diesel on USS Virginia.**

**How can I train people to  
run and maintain it?**

# *Summary*

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- The Submarine Force continues to push the envelope in technology development
- Tasking continues to evolve on the basis of changes in operational requirements
- Tactical control, safety of ship, communications, MCM/ISR sensors, command decision making and cost reductions are current items of interest.