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Defeating the Above Water Warfare Threat – An Industry Perspective

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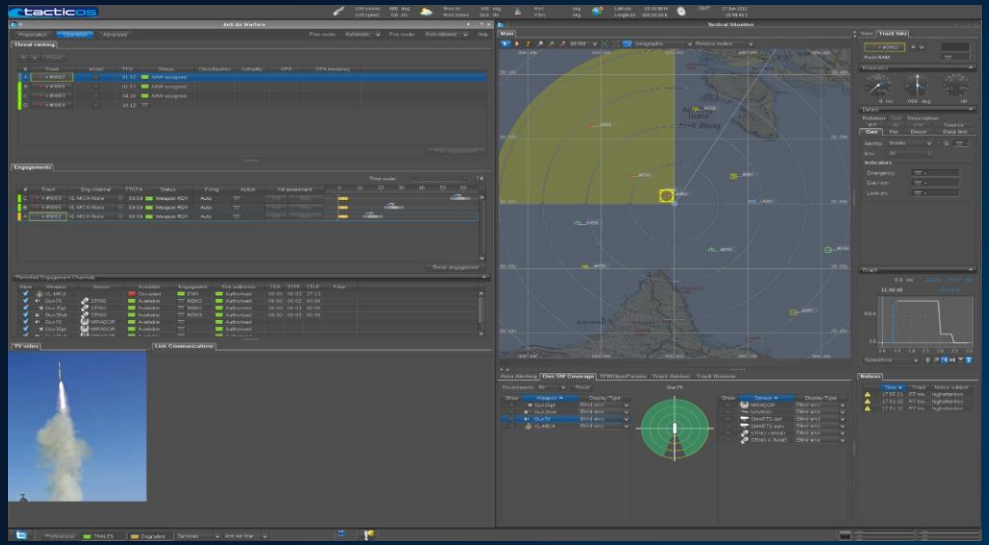
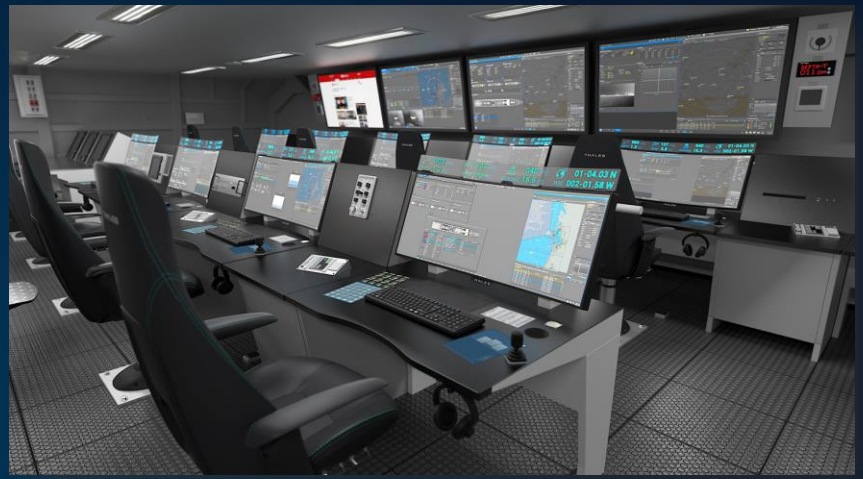
High-End Threats

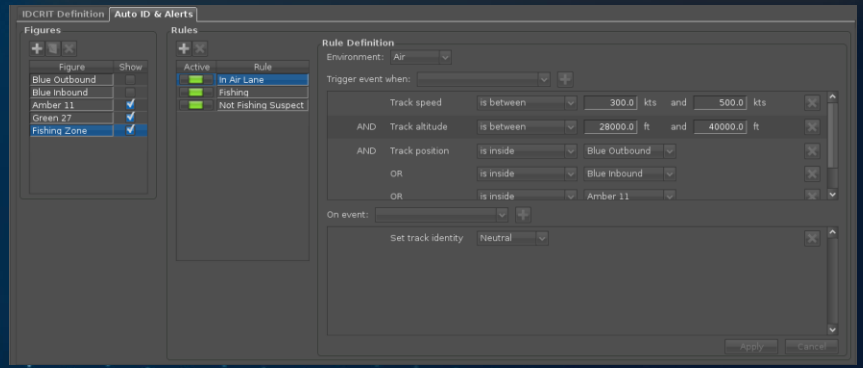
Unconventional Threats

The Inevitable Journey to Automation & Integration

Combat Management System – Automation, Visualisation & MDI







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Defeating the Above Water Warfare Threat

Defeating the AWW Threat starts with early detection

Defeating high velocity threats demands Long Range detection

Long range detection through
- Single sensor (radar, ESM, Electro-Optical sensor)
- Combination of multiple sensors on single ship
- Combination of (multiple) sensors on board multiple ships/units

- Evolving technology enables improved radar designs
  - From single transmitters and parabolic antennas to AESA flat panel radars
  - Many individual Transmit/Receive elements
  - Software controlled and software defined
  - Computing and processing power

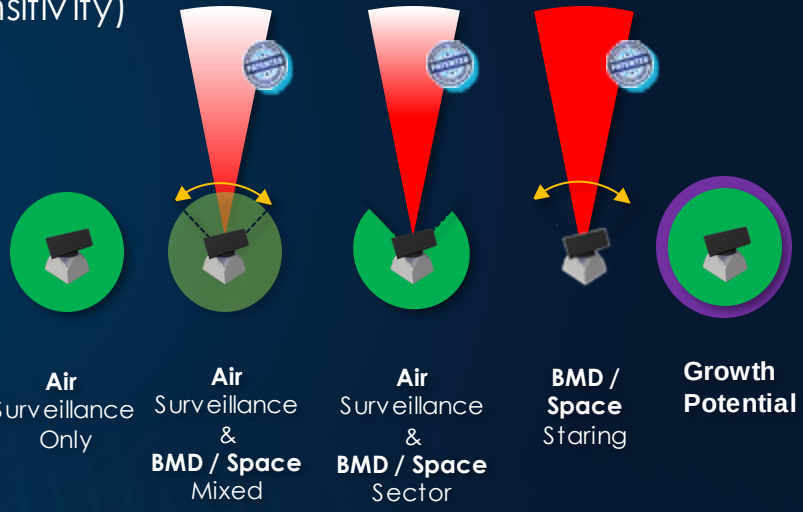
Defeating the Above Water Warfare Threat

Software controlled radars:
- Radar beam shaping
- Smart, efficient radar waveform definition
- Forward and Backward scanning
- Advanced signal data processing (increased sensitivity)

Example: SMART-L Multi Mission
- L-band AESA radar
- Rotating
- Long range

Multiple modes:
- Surface Surveillance (50 km)
- Air Surveillance (480 km)
- Ballistic Missile Defence (2000 km)
- Space Situational Awareness (2000+ km)

Software based through-life performance improvements



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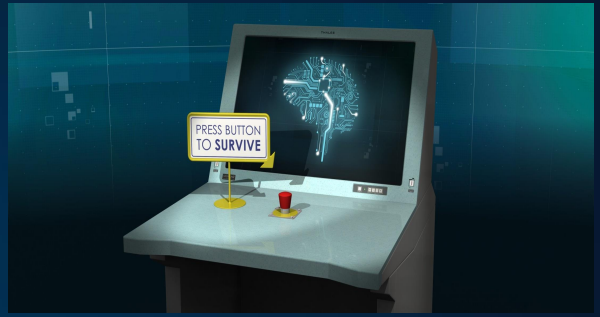
Above Water Warfare Fire Control System

High level of automation
- Assuring short response times
- Preventing operator overload

Operator-on-the loop

Flexible plug-and-play based distributed integration of sensors and effectors

Continuous Dynamic Performance Based Scheduling
- Prior to and during engagements
- Considering all options, resources, (environmental) parameters, (system status) data
- Pre-calculated effector performance and engagement effect
- Optimized scheduling, accounting for
  - P_{kill}, P_{esh}, Keep-Out-Range,
  - ammunition expenditure
  - mission objectives
  - …



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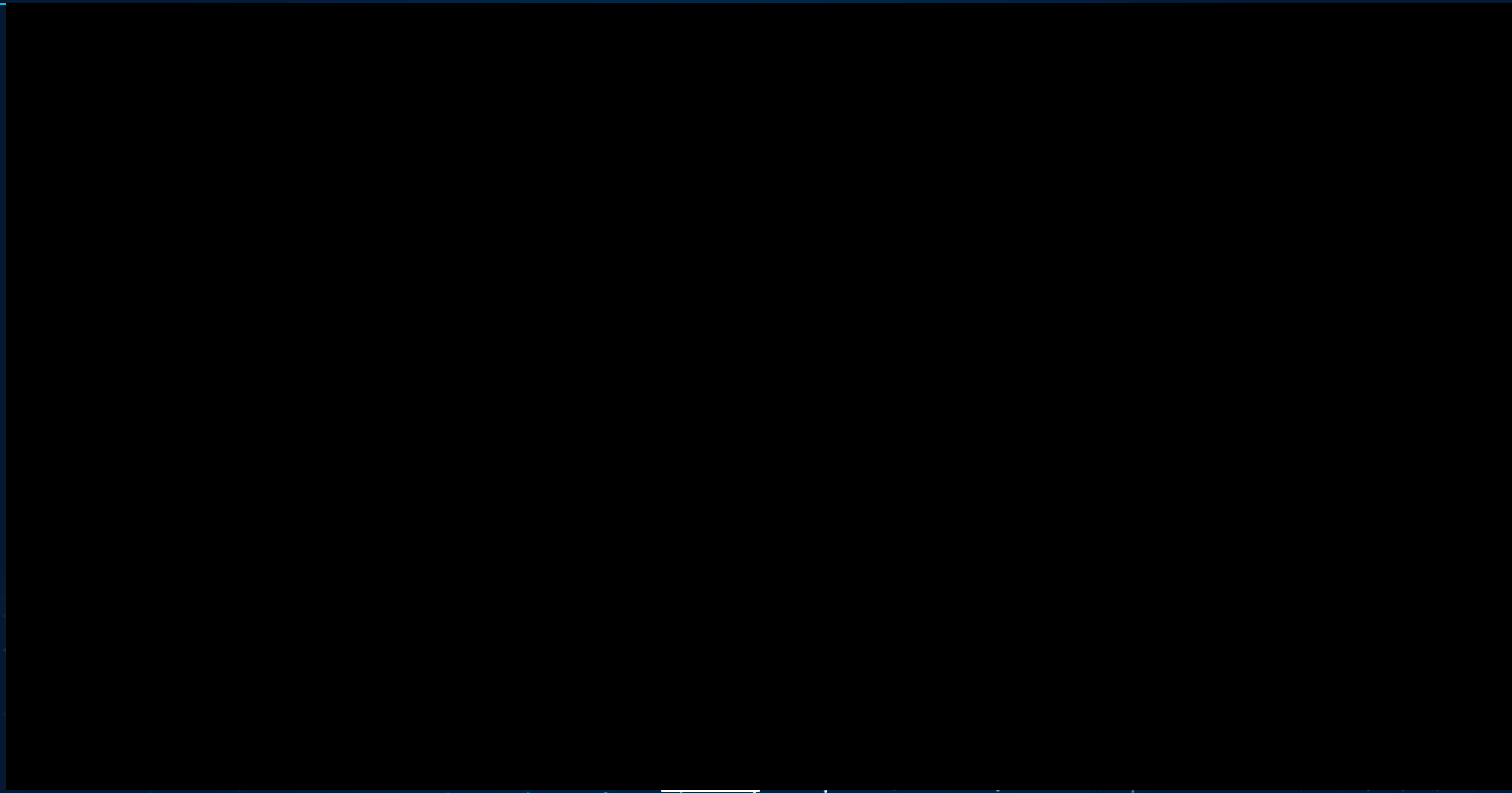
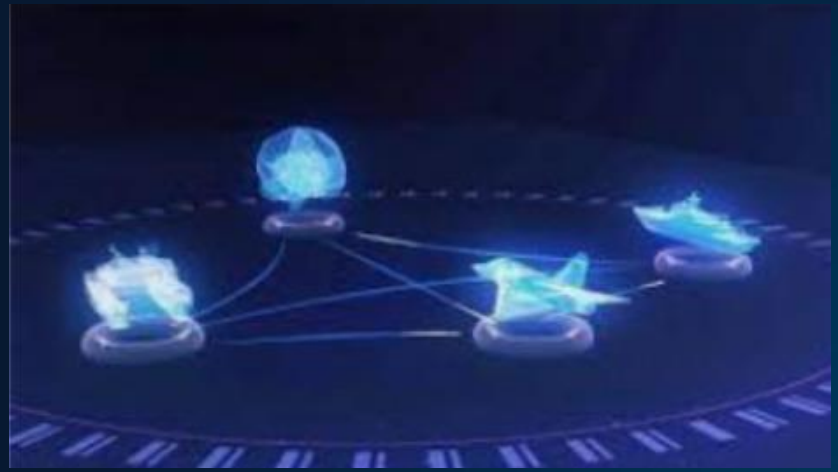
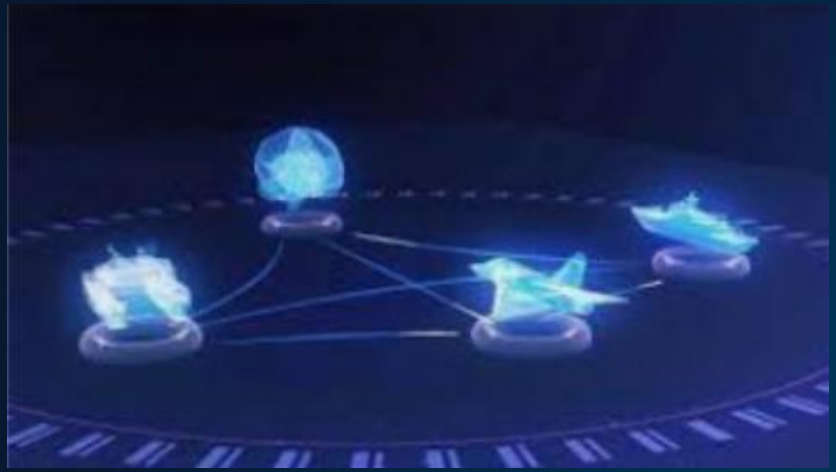
Dynamic, Performance Based Engagement Scheduling

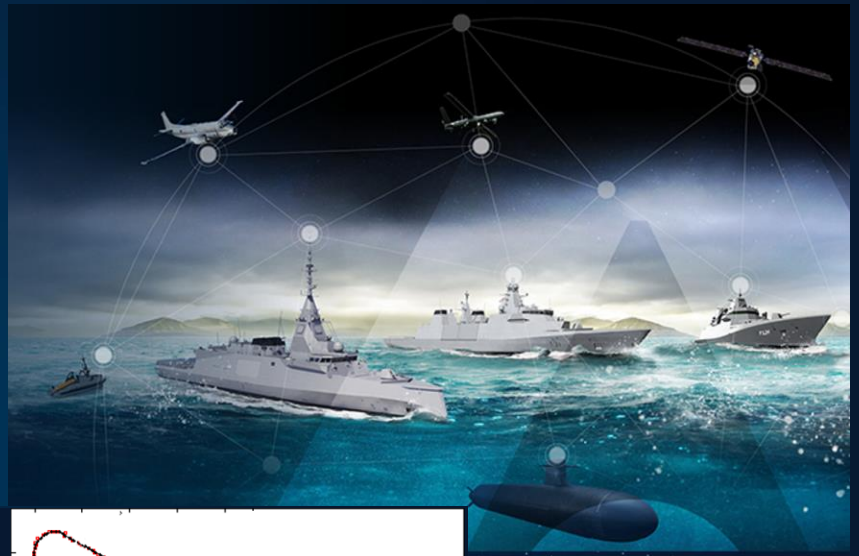


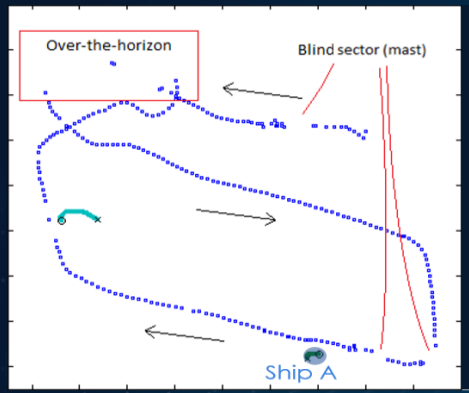
Collaborative Combat

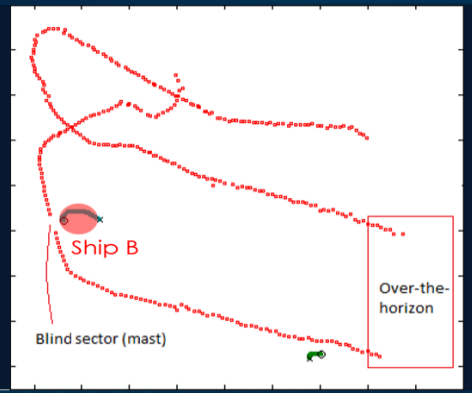


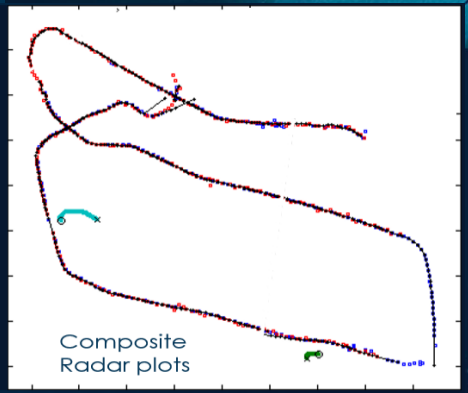
Collaborative Combat







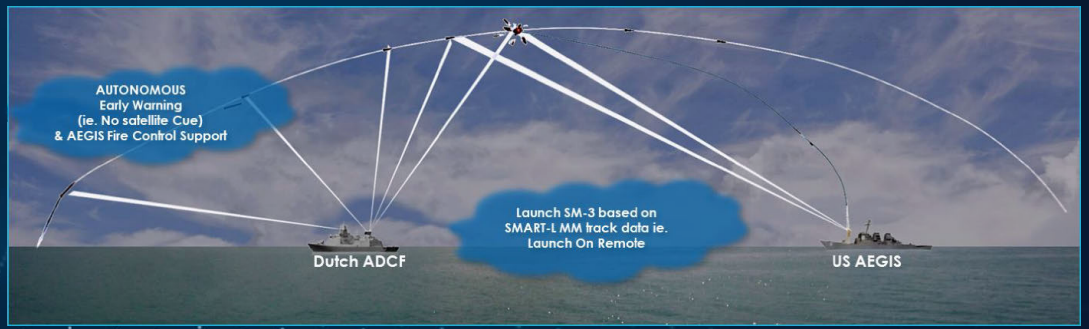




Formidable Shield 2021

Example of Collaborative Combat: USS Paul Ignatius used data feed from Thales' SMART-L MM/N on board of HNLMS "De Zeven Provincien" to conduct a successful "Launch on Remote" of SM-3, intercepting a ballistic missile well outside the earth's atmosphere.

Simple scenario, huge operational and technical accomplishment.



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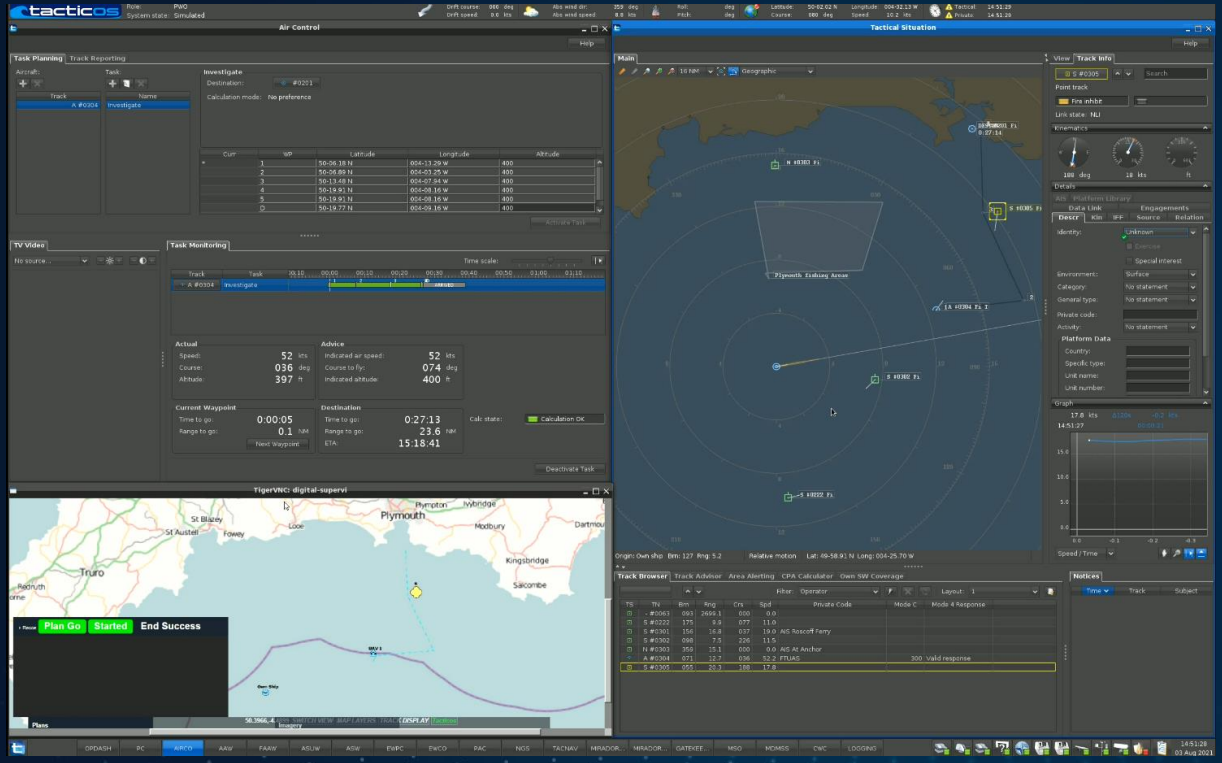
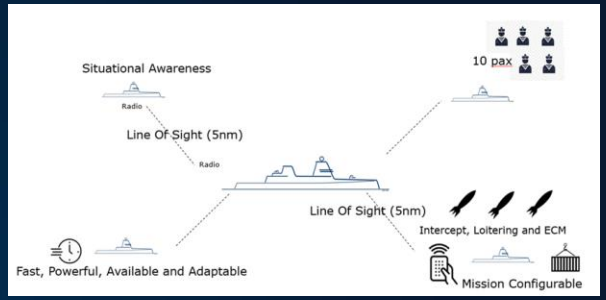
Increasing Mass and Building Lethality





RNLN TRIFIC Concept

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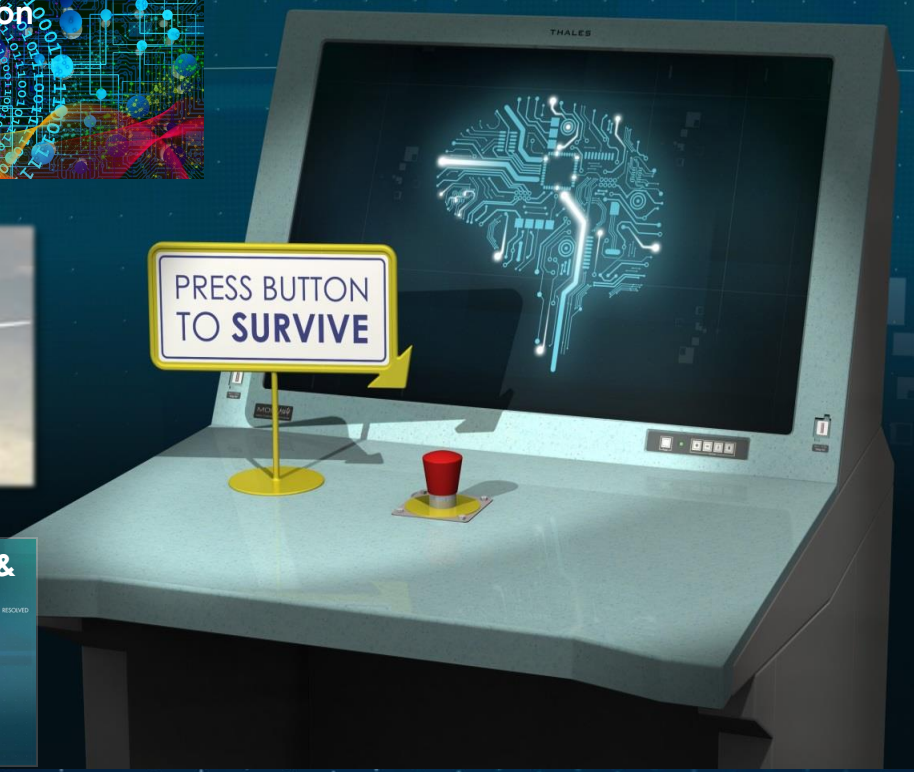
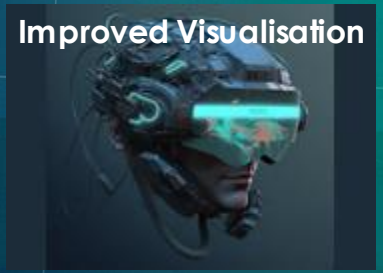
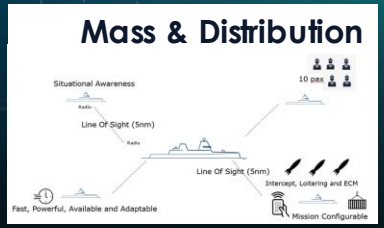
Conclusion & Questions







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