EFFICIENT.EFFECTIVE.RESPONSIVE.

EXPLOITING COMMERCIAL ACTIVITIES IN THE UNDERWATER DOMAIN

Combined Naval Event
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BRIEFING POINTS

- The challenges of COTS solutions for future naval requirements
- Revolution in the undersea domain
- The impact of energy restrictions
- What next?
- Conclusions

NSPA at a glance

NATO OTAN

NATO Support and Procurement Agency (NSPA)

MISSION - We are the lead organisation for multinational acquisition, support and sustainment to NATO nations

VISION – To enable the Alliance to maintain peace and security by providing innovative and sustainable capabilities

GOALS

OUTPUT

DEVELOPMENT

Adapt the Agency to the evolving strategic environment and exploit emerging business areas

ACQUISITION

Be the first choice for acquisition of multinational systems in order to deliver innovative and sustainable capabilities

INPUT

RESOURCES

Demonstrate stewardship of customer funding that ensures transparency and builds trust & flexibility

PROCESSES

Standardise, automate & streamline business processes to deliver excellence to our customers

PEOPLE

Attract, develop & empower our diverse & high performing workforce using modern & flexible tools

VALUES

INTEGRITY

ACCOUNTABILITY

PROFESSIONALISM

INNOVATION

CUSTOMER FOCUS

COTS SUPPORT TO NAVIES

A dedicated Maritime Logistics Support Partnership focused on providing support to naval forces, units, ships, and personnel

Naval Operational Support (NOS)

- Provision of Port (Husbandry) Services
- Provision of Fuel Services
- Provision of Miscellaneous Operational Services

Naval Technical Support (NTS)

This is the focus today

- Supply or Service requirements
- Project requirements
- Naval Project Groups
- Plus other Support Partnerships who support maritime requirements (Surveillance C2, D3, ammunition, etc..)

Trial Member

Observers: Albania, Iceland, United States

INNOVATION & CHANGE

- **Future revolution:**
  - **Technology**
  - **R&D**
  - **Energy**
- **Modern warship is a complex cyber-social-physical system**

steam to electricity

Sat-Nav

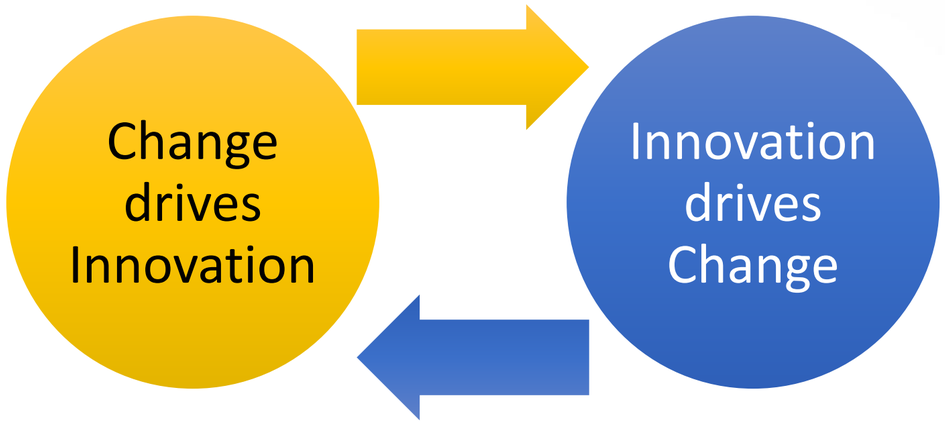
Automation

- **Unimaginable changes and innovation on how we have to support!**
- **How to support this now and in the future?**

THE REALITY IS…

Setting cyclical arguments aside, consider the following:

- Change and Innovation go hand in hand
- The same needs are driving a dramatic shift in warfighting in Ukraine and future capabilities.
- **Cooperation** + **Competition**



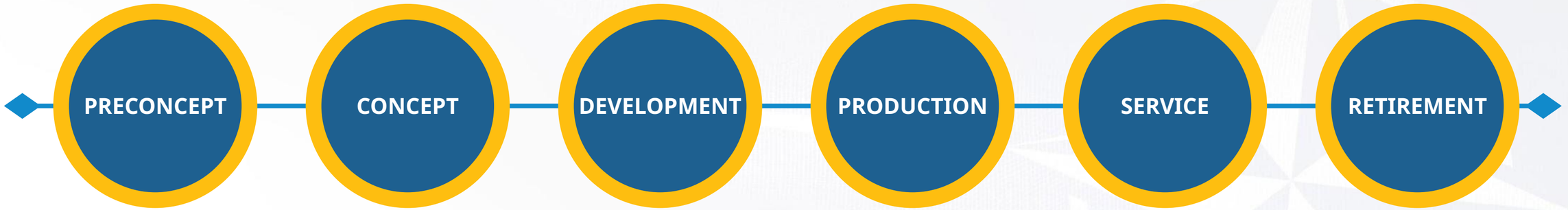
FUTURE CAPITAL SHIP: A VISION (I)

- **Domain Information knowledge**
- **Command and Control. Open architectures. System of systems.**
  - ✔ Combat system = platform
- **Speed of decision**
- **Multi-configurable**
- **Cyber resilient**
- **Autonomy on Naval RPAS, AUV vehicles and naval platform**
- **Future Naval propulsion**
  - Energy Production
  - Energy Storage
  - Smart grids connection ashore
- **Reduced (de-centralised) crew**

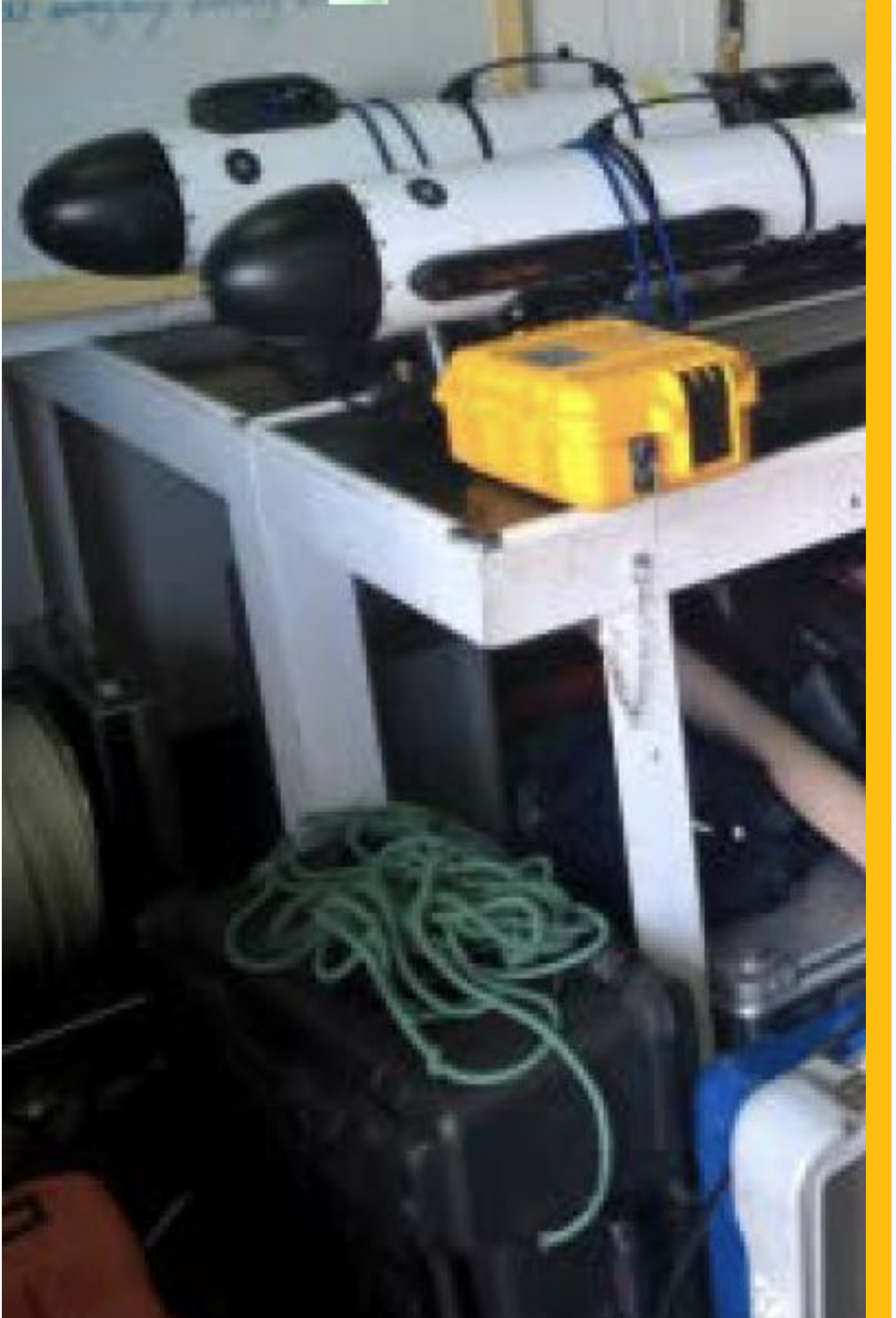
FUTURE CAPITAL SHIP: A VISION (II)

- **Re-definition of Energy**
  - ✔ Hypersonic weapons
  - ✔ Hyper energy weapons
- **Directed Energy weapons (the never ending magazine)**
- **Counter COTS Capabilities. Counter-swarm**
- **Interoperability**
- **The importance of the Underwater Domain dominance**
- **…NATO's Climate Change Agenda?**

WHAT IT MEANS FOR ACQUISITION AND LIFE CYCLE

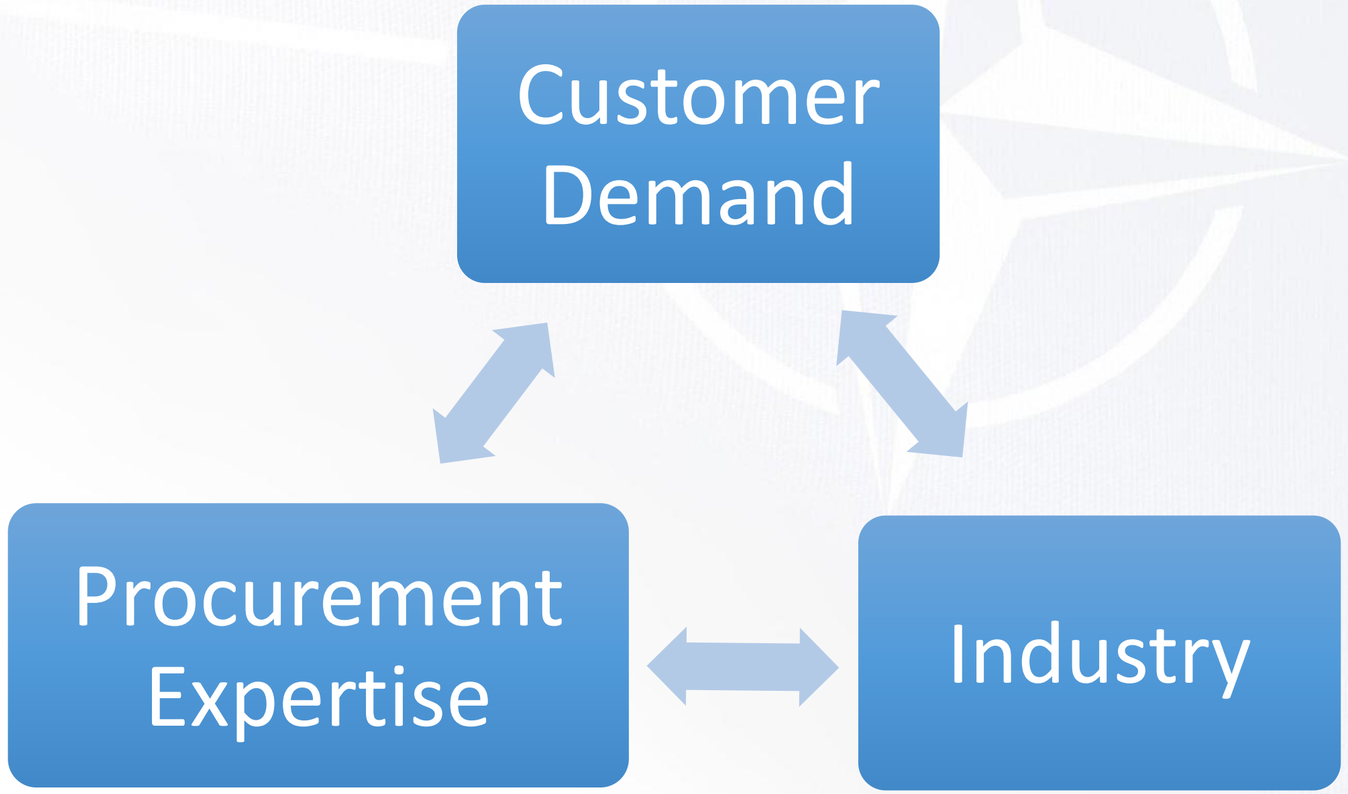


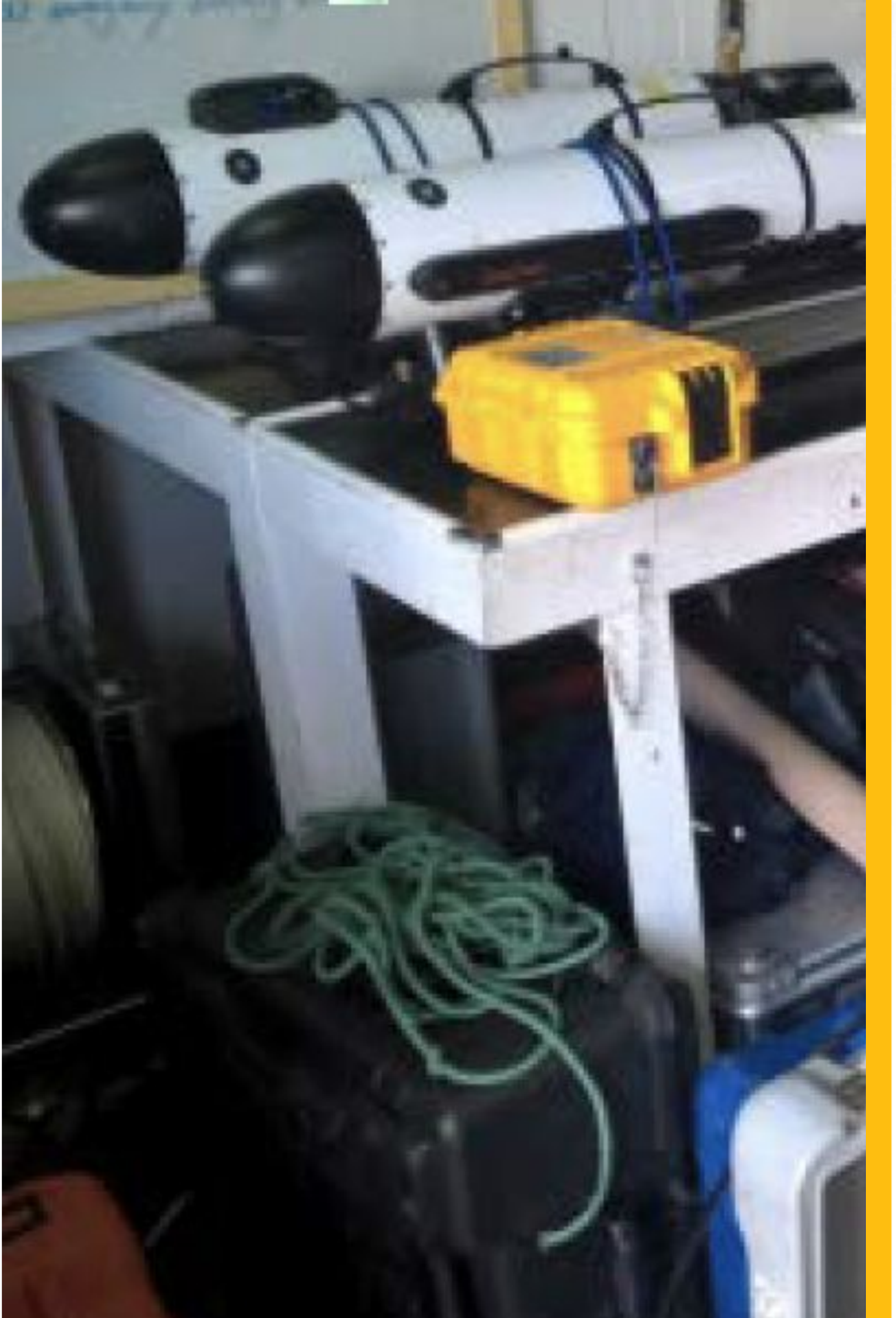
- **Pre-concept and Concept** very agile. Crucial
- Production: +Digital Twin…
- **Predictive** maintenance
- **Additive** manufacturing
- **Mid life** upgrades concept (software)
- Longer Operative cycle
- **Re-think of D3**



PROCUREMENT: THREE PILLARS

Successful procurement rests on three pillars, all equally critical to success, and fully open to collaboration





PROCUREMENT: WHAT NEXT?

If the past year has taught us nothing, then we are already behind the curve.

- Hard lesson that **National procurement** chains and defence industrial bases are struggling to keep up
- "**wartime" procurement** requires a degree of effectiveness, efficiency and responsiveness not seen in decades
- To quote NATO's Secretary General, "we need to speed up. We **need to do more**."

If we do not, and if we fail to come together now, we will certainly struggle over the next decades as innovation drives us into a form of support that we are wholly unfamiliar with.

PROCUREMENT EXPERTISE

NSPA well positioned to receive customer requirements

- **Flexible procurement regulations**
- **High standards of ethics and integrity, shared and promoted with business partners**
- **A centralized database containing past, present and potential vendors, including performance and capabilities**

registration free https://nspa.nato.int/business/procurement

UNDERWATER BATTLESPACE

- **Modern technologies are leading the charge toward PLUG and PLAY unmanned and/or autonomous underwater solutions**

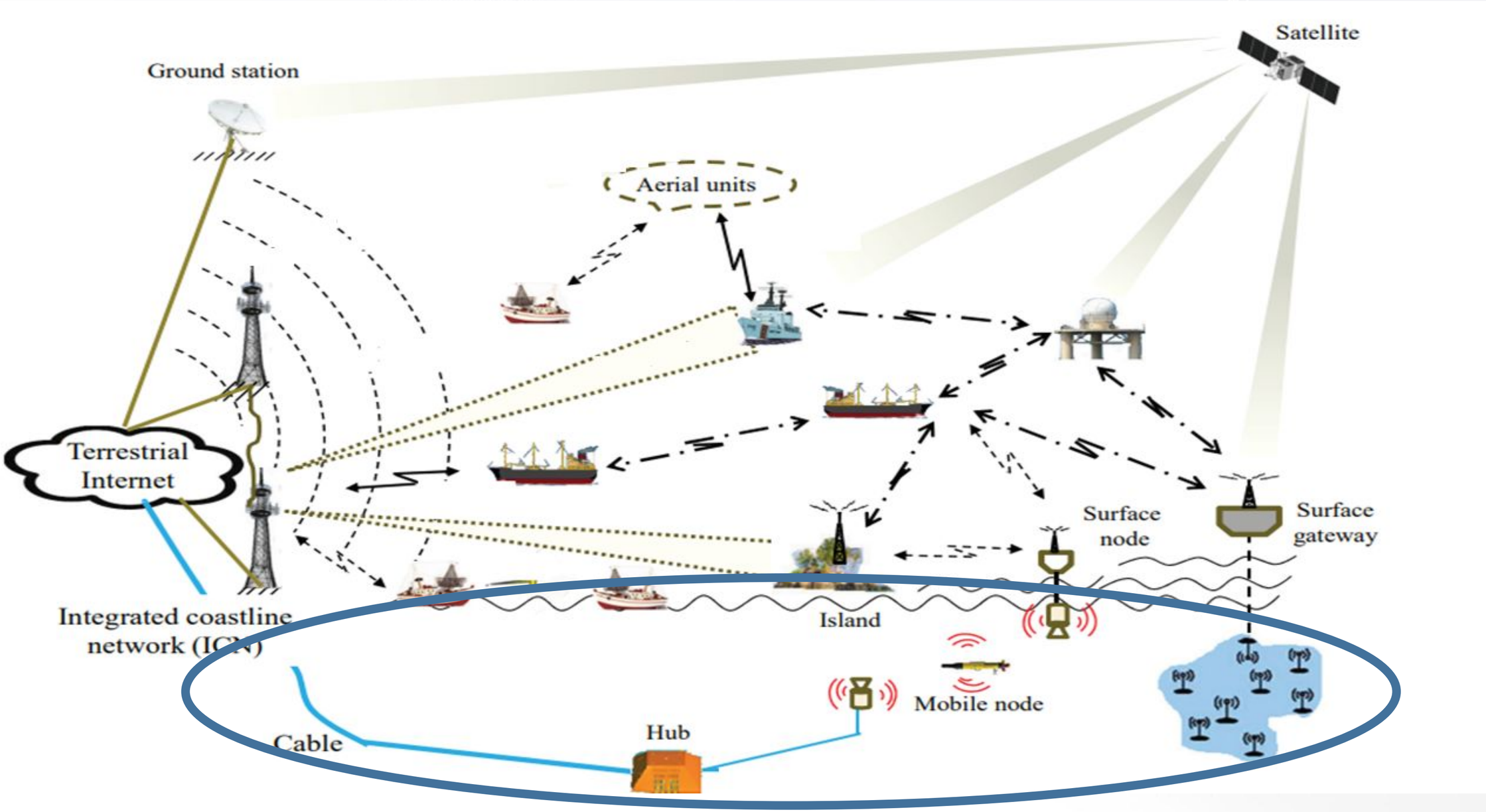
A UUV/AUV system advantages:

- Cost effective
- Able to operate in severe **tactical/adverse environmental** conditions
- Payload modularity

But still has some challenges:

- Reliance on data transmission/deck cycle
- Range and duration still limited
- Limited **interoperability**
- Limited ability to process and transmit data, and feed the operating picture

INTERNET OF MARITIME AND UNDERWATER THINGS

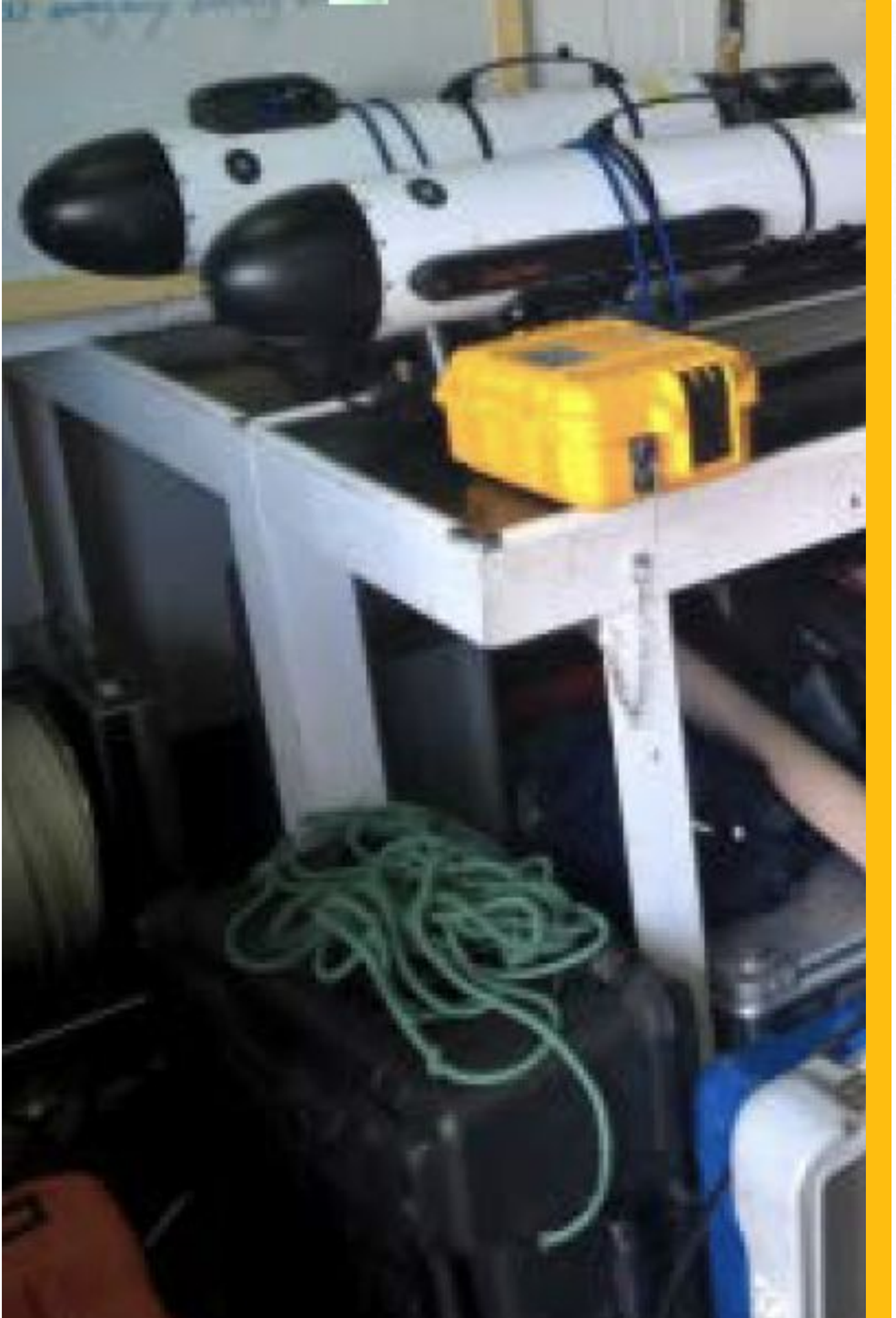


NSPA EXAMPLES

In recent years NSPA has procured a number of systems for various navies, however:

- these have been **one-off** requirements limited to the delivery of the system without further consideration of through life sustainment, future developments, etc.

- **They have been largely ROV type systems, or tethered, with exclusive communications to their support platform and limited interoperability**



WHERE WE NEED TO FOCUS

From the Customer Perspective

- Transition from one-off individual requirements toward an **alliance focused system of networked, interoperable capabilities**
- **Cost reduction, collaboration, and a coordinated approach to the challenges of dominating the underwater domain**

Collectively with Industry

- Focus on innovations such as Artificial Intelligence, quantum sensors, quantum communication Networked solutions that can work collectively in surveillance, data gathering, offensive and defensive actions
- Focus on **open source software** that can provide a common operating picture
- **Increase AUV autonomy (in terms of range, mission execution, oper. cycle.) that is capable of surviving the current trend away from carbon based fuels**

THE ENERGY PROBLEM

- **Zero-Carbon Objective 2050 (by 45% reduction in 2030)**
- **Fossil Fuels**
- **Bio-Fuels**: (biogas, biodiesel, alcohol)
- **Zero Carbon Fuels**: (Hydrogen, Ammonia),

ENERGY LIMITATIONS

A look at Alternative Marine Fuels

- 3 % of all global **CO2 emissions** are created by international shipping industries.
- MARITIME FLEET IS A **BIG POLLUTER**
- IMO MATCHED new CO2 and (GHG) emissions limits for between 2030 and 2050.
- **Commercial shipping industry** is exploring development of dual & triple fuel engines and investing in the use of alternative marine fuels

IMO REGULATIONS ARE ONLY PART OF THE CHALLENGE, AND AGREEMENTS SUCH AS THE ENERGY CHARTER TREATY, EUROPEAN GREEN DEAL AND NATO CCS TARGET WILL HAVE A DIRECT IMPACT.

MILITARIES NEED TO GO GREENER, WHILE…

OPERATIONAL EFFECTIVENESS NEED TO BE PRESERVED!

OTHER OPTIONS

- **Nuclear:**
  - Clean, reliable, and gives incredible range, but problematic on disposal. Not universally available.

- **Fuel Cell (hydrogen, ammonia)**
  - Quiet, cool, vibration free, and about 60% efficient.
  - Hydrogen fuel cells proven in submarines, and ammonia is growing in popularity.

- **The way ahead?**

  - No single alternative fuel is ready to replace all traditional marine fuels across the industry.
  - Industry is coalescing around a few solutions.
  - Dual and multi-fuel vessels are growing in popularity.
  - Requisites are more **ENERGY demanding**
  - **NSPA intends to work with Navies and Industry over the next years to help <u>transition</u> into alternative fuels**

CONCLUSIONS

- **Undersea domain, the forgotten… the new trend**
- **More COTS, more Emerging and Disruptive Technologies**
- **More Platforms, more expendable, more affordable**
- **Man-Machine Interoperability**
- **NATO Climate Change Action Plan: a challenge …and an opportunity!**
- **Operational Energy. Transition**