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UK & NATO

Damage Control Firefighting & Recoverability keynote

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Today's Key points

- **Why DCFF remains of importance to NATO (and nationally)**
- **Review of Why DCFF is important to ship designers**
- **Why this conference is important for Current and Future Capability**

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1) NATO

- We await your outputs

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1b. SDCG ToR (AC/141(SDCG)N(2013)0003)

The mission of the NNAG's SDCG is :

- To be the agent of transition for integrated maritime advanced technology developed by NATO technology development groups and NATO Industrial
- Advisory Groups, providing integrated modelling and simulation of maritime platform mobility, survivability and warfare mission support
- To assess and recommend Joint Requirements (DAT and LTCRs) to the CNAD
- To assess and recommend Maritime Capability Requirements supporting the NATO Defense Planning Process (NDPP) and DAT to the NNAG
- To define Maritime Operational Problematic Areas dealing with Material to the MC through modelling and simulation
- To evaluate Maritime Capabilities; Tactics and Technologies (Mobility, Survivability, War Fighting Support) for NDPP
- To identify and integrate Joint Capability Requirements (eg, CBRN, Unmanned Vehicles)
- To cooperate in ship design, ship capabilities modelling and simulation, mobility and survivability capability, and war-fighting survivability capability.
- To share in experience and opportunity to develop processes and guidelines: supporting intrinsically governmental functions - design through certification
- To collaborate in requirements development, cost estimation, performance verification & validation and safety certification though application of numeric and physical modelling methods.
- To identify technology and operational challenges presented by emergent challenging warfighting and natural environments (extreme temperatures, extreme wind and waves, unique military threats)
- To share in stewardship of naval architectural design capability.

Sponsor incl:

- NSC (ANEP-77)
- NSmC (ANEP-102)
- Naval Boat Code
- ANEP-43
- ANEP-68

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2) Survivability

- Why Recoverability matters in Designer and Regulators

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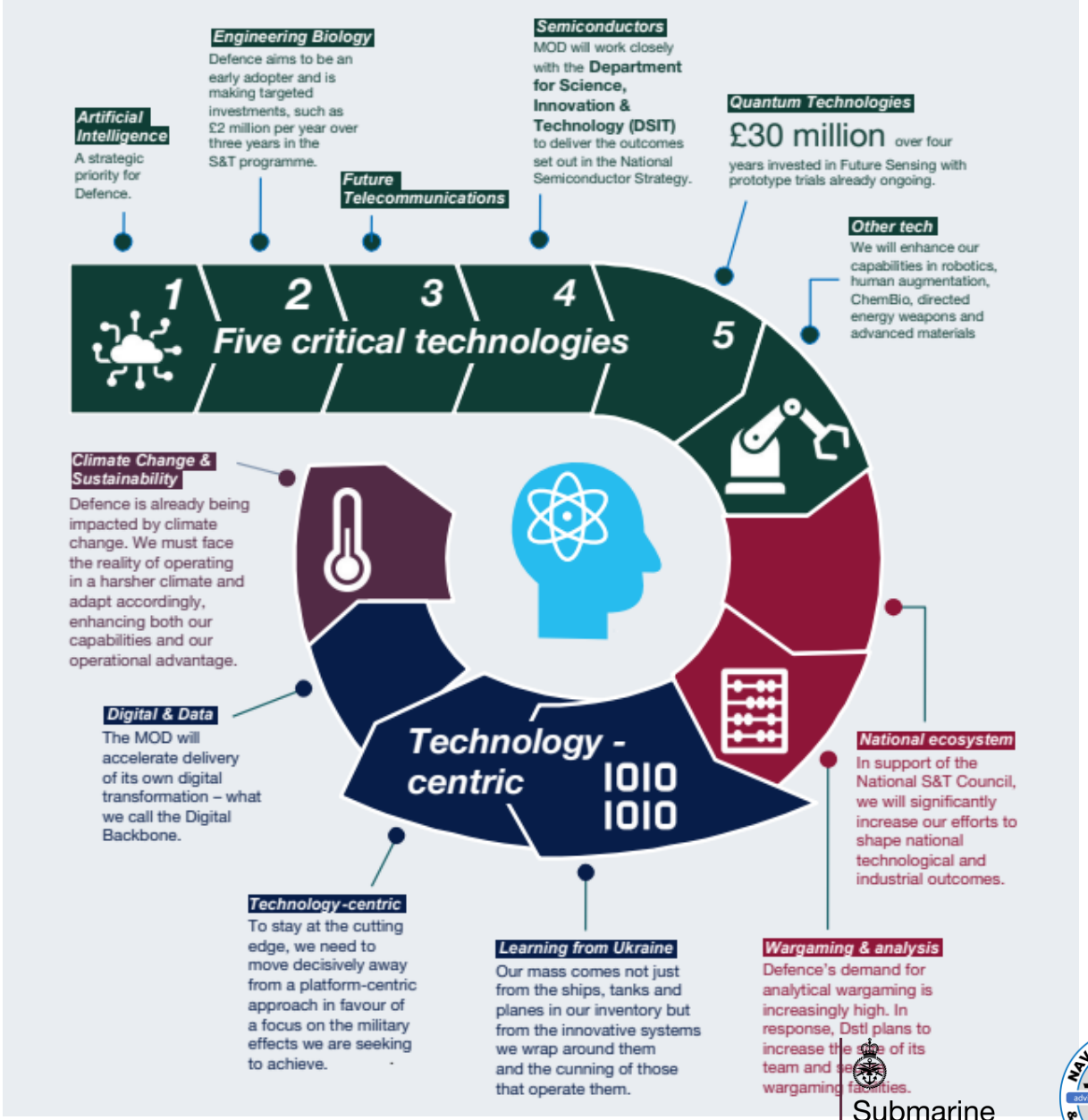
2a. UK Acquisition Reform

- Pace and agility
- Prioritising timely delivery over perfection
- Growing value on time
- Max 5 years to deliver acquisition (3yr digital), proportionate
- Set up acquisition programmes for success
- Reinforce the role of technical experts
- Defence kite marks (standards)
- Integration Design Authority
- Improve delivery professionalism
- Cadre of professional SRO



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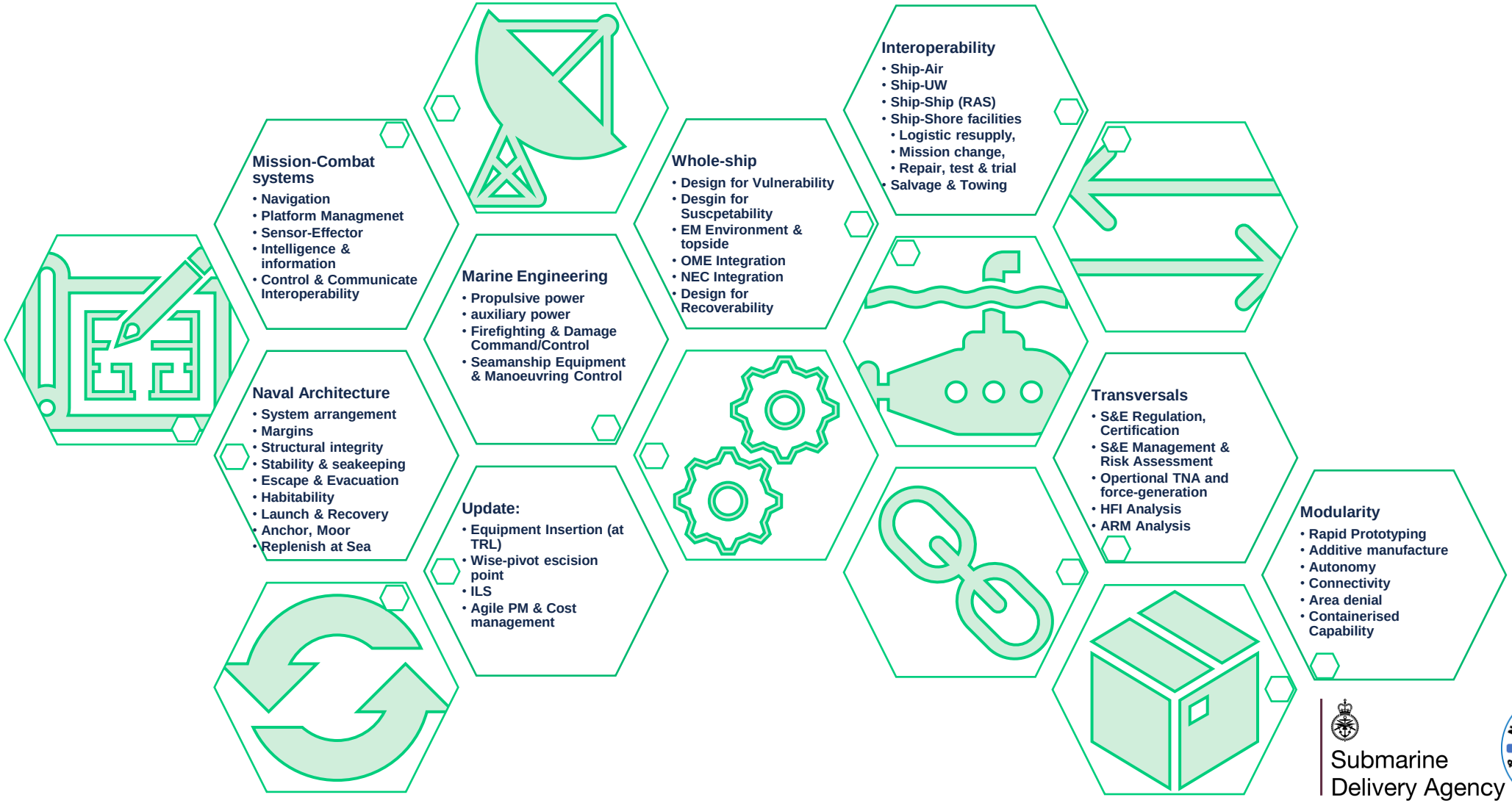
2c. Design and Maritime Engineering



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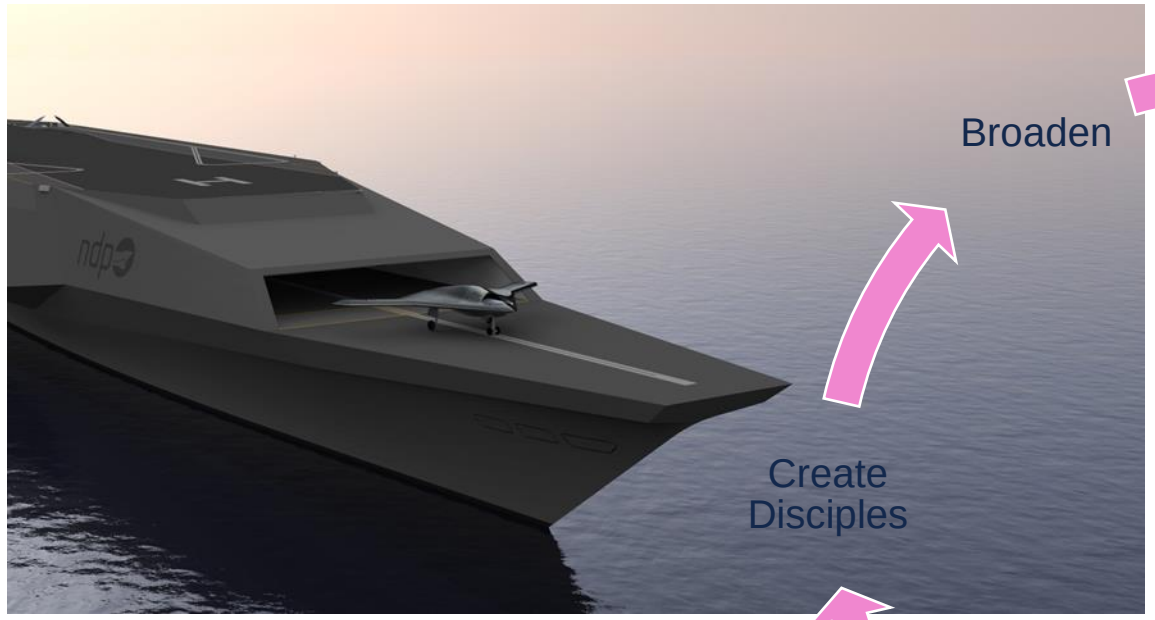
2c(i). Building a Community of Interest



Broaden

ID Capacity

Broaden Capacity

ID Capability

Mentor & Develop

Create Disciples

Ministry of Defence

de&s

ndp

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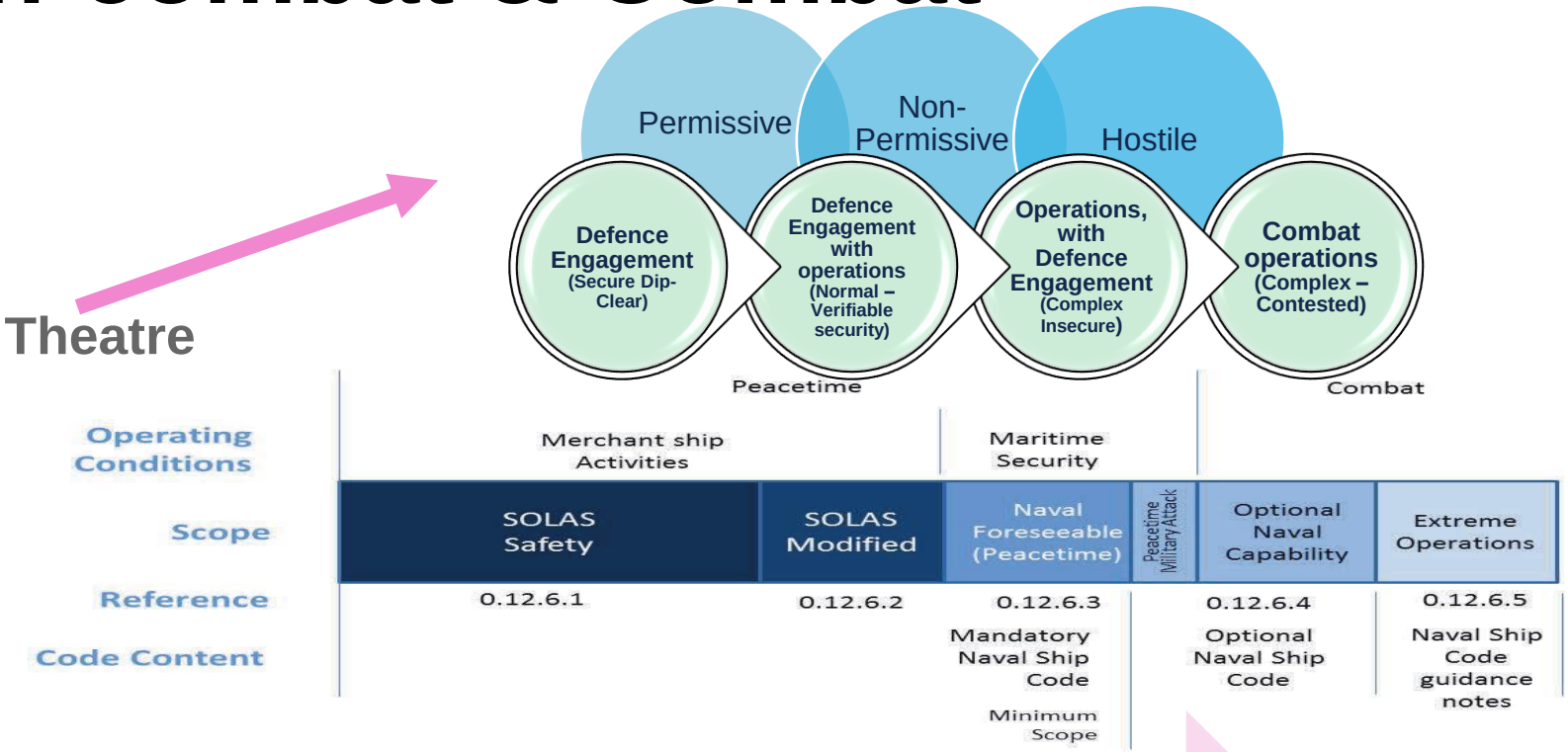
2d. Non-combat & Combat

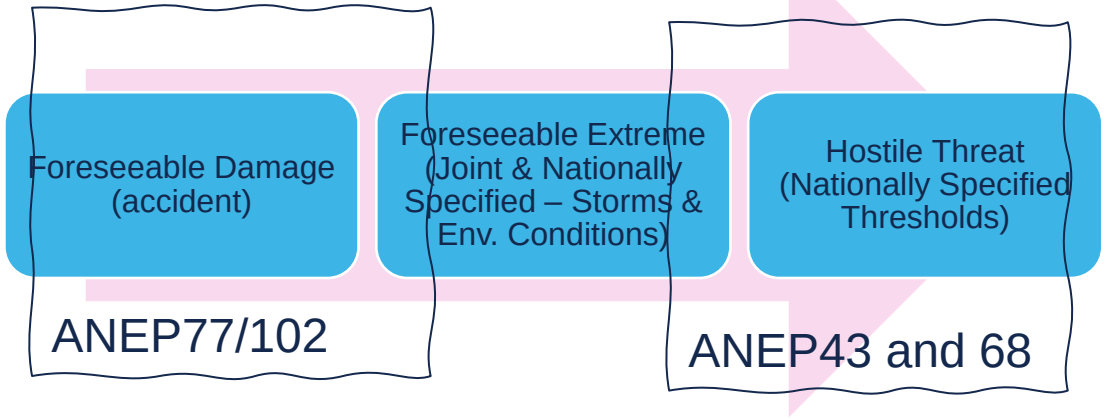
MarOpsC

JDN-1/17 – Theatre Entry



JDN-1/15 Defence Engagement

UK-NA Certification



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2e. Survivability Onion (+)

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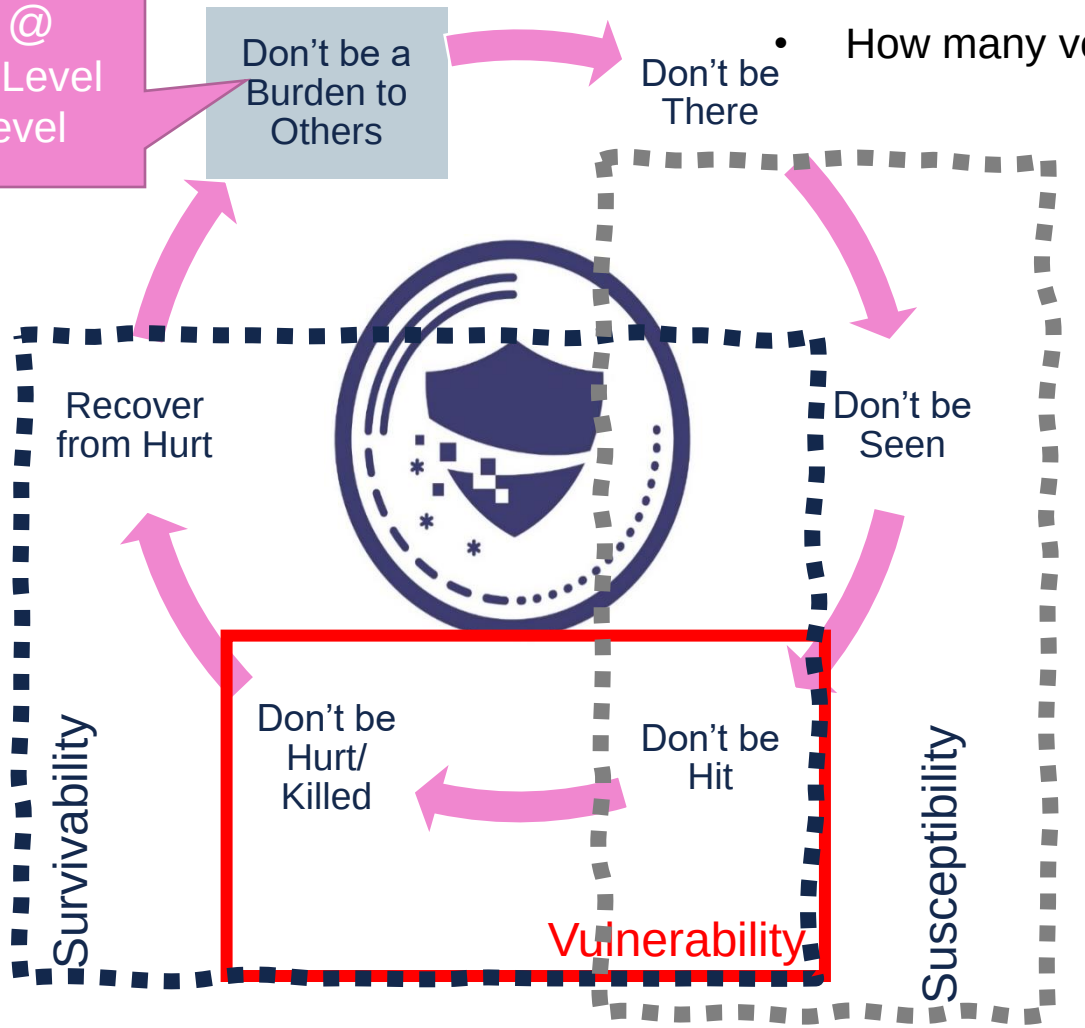
2e(i). Survivability remains Important

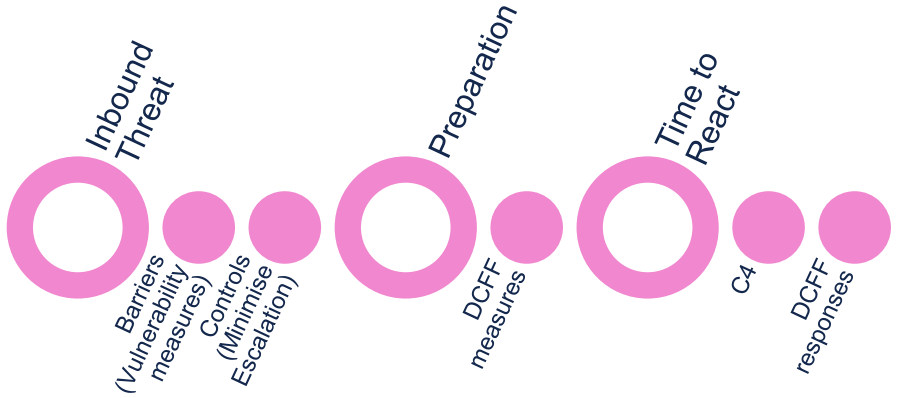
- Chances of being hit remain significant – and are increasing
  - Since 1945: Artillery and anti-ship missile launches
    - How many vessels sunk in action (all weapons)?

For a Task @
- Platform Level
- Flotilla Level

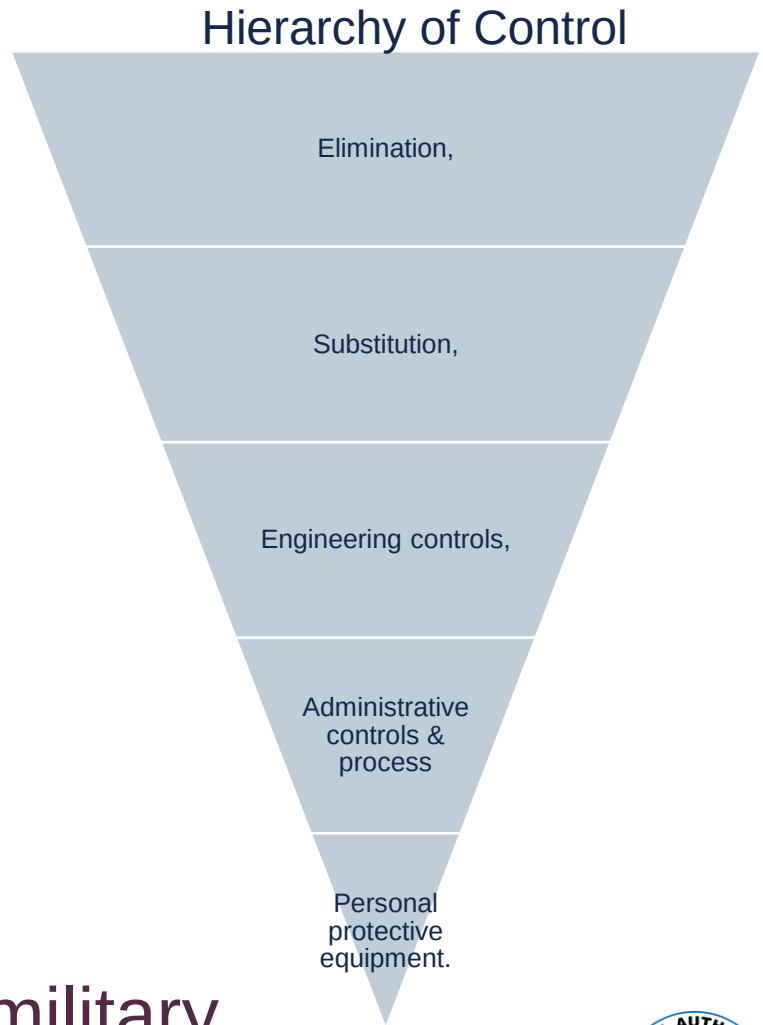


- **500+** anti-ship missile launches fired in action
- **120+** vessels sunk in action (all weapons)
- Incr. FIAC, Drone & Autonomous Threat

2g. What is a Recoverability?



- Anything that restores capability.
- Resilience to full performance or at least for a minimum performance (to fight hurt) & restore
- Strong linkages to safety barriers and controls (engineering solutions)
- Strong linkage to force collective training and military CBRNDC



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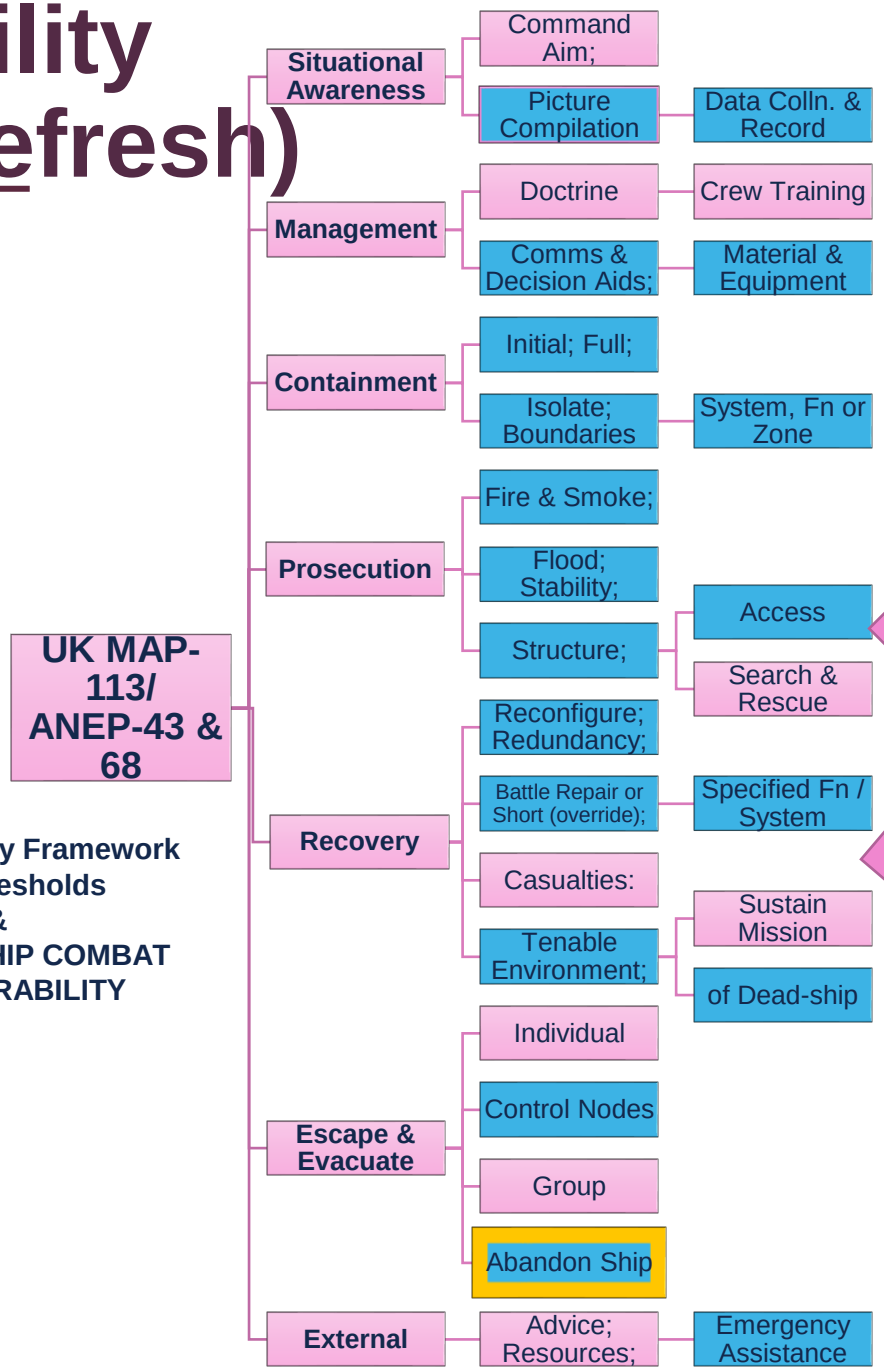
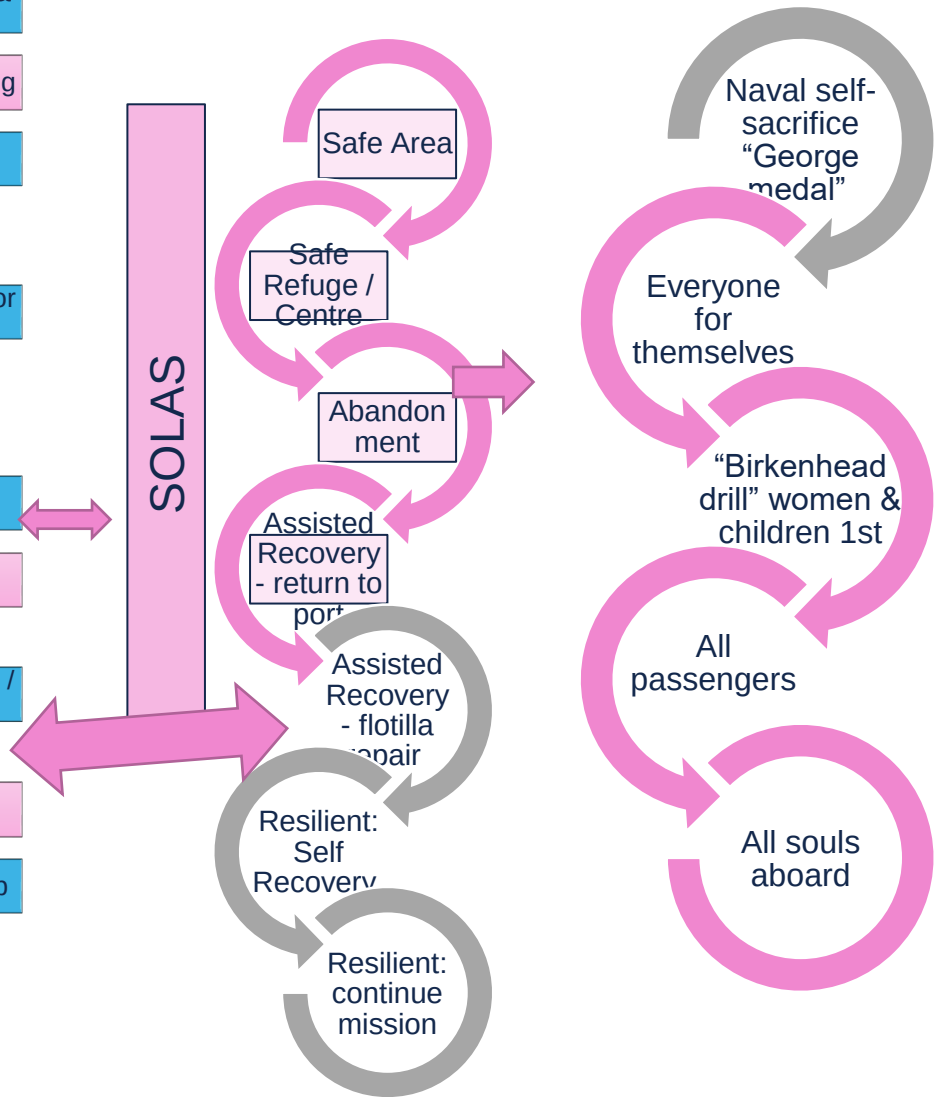
Recoverability Doctrine (refresh)

& The Military Delta



Recoverability Framework and Thresholds & ANEP-68: SHIP COMBAT RECOVERABILITY



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3) The Future

- Why Recoverability matters in Designer and Regulators

3.a Better Design

- **Arrangement and Principles of the Code**
  - •Part 1 contains the Naval Boat/Ship/ Submarine Code,
    - • Part 1 is the Code of specified mandatory requirements.
    - • It is separated into Chapters, each addressing a specific functional area.
      - •An overall safety Goal in Chapter 0 (Tier 0). Each subsequent chapter then has a goal for the specific subject area,
      - • Tier 1, a set of Functional Objectives (FO's),
      - • Tier 2 and Performance Requirements (PR's),
      - • Tier 3 that in greater levels of detail, issues to meet the overall Goal of the Code.
      - • Chapter 0 provides a process by which a Naval Administration may demonstrate compliance (Chapters I to XI inclusive).
  - •Part 2 contains the Solutions to the Naval Boat Code and
    - •Part 2, Tier 4 relies on the selection of an appropriate civil or naval standard (Foundation Safety Standard)
    - • Part 1 is agreed by the Naval Administration .
      - • Where a commercial safety standard has been selected, gap analysis with the Concept of Operations, to ensure military activities can be acheiieved and/or compromise military features.
      - •The areas not included in a civil standard are defined as "Military Deltas"[JM5] ..
  - •Part 3 contains the Justification and Guidance on the Naval Boat Code, as shown in Figure P1-3.
    - •Part 3, Tier 5, provides INSA guidelines and justifications on the Naval Boat Code and is informative only.

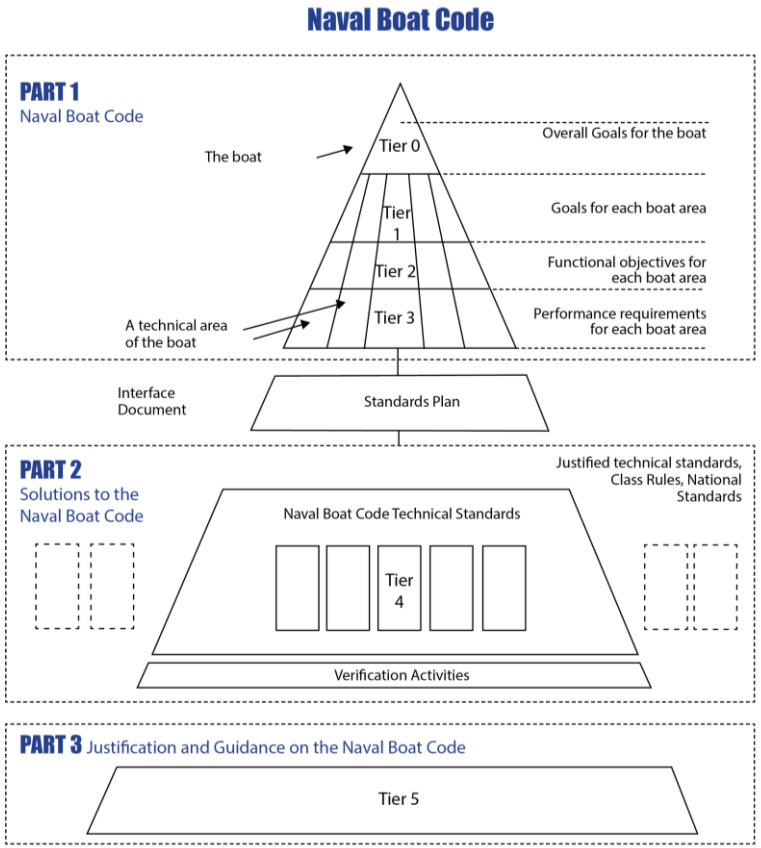

Figure P1-3: Arrangement of the Naval Boat Code

Part 1 Stds

Part 2 Stds

Part 3 Stds

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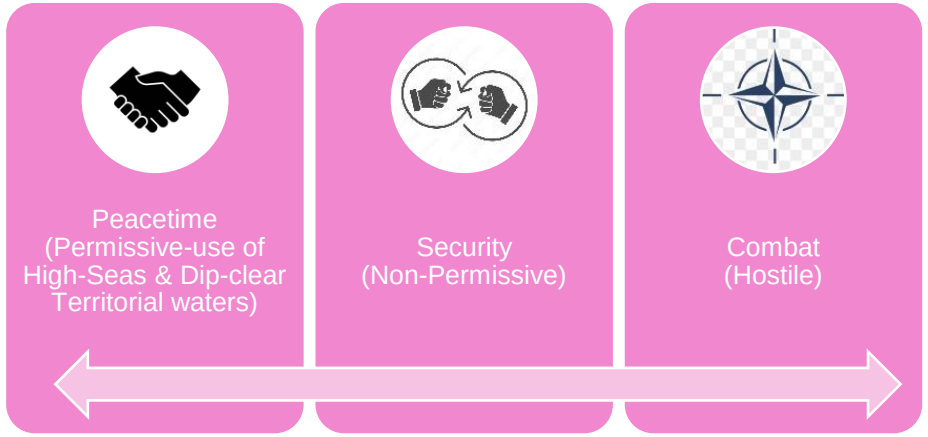
3b. Hazards, Threats and Operational context

Foreseeable Hazard & Threats



Which notations and solutions fall into which column or row?

Different ships design intent and ship types have different performance

- Normal Operating Conditions
- Foreseeable Damage from Hazards (Accidental)
- Foreseeable Damage Design-baseline Hazards (Extreme)
- Extreme Design-baseline Threats (Hostile)

- The support community may have a different world view to the policy or user (military) community
- Risks can rarely be transferred.(in truth)
- Safe to Operate risk exposure rarely shifts to “operate safely”, planni decisions,
- It can easily impact the Operating envelope (risk) is clear to make the judgement
- Using the “right” standards improves clarity on available margins, and so capability resilient to known hazards and threats

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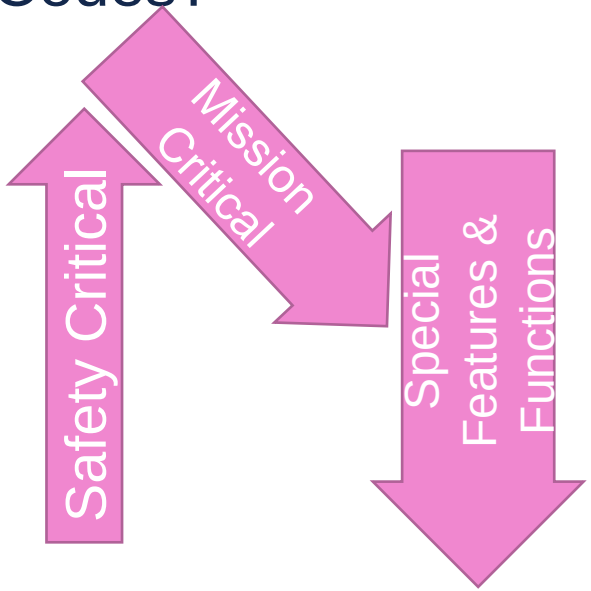
3c. Context of Solutions and INSA Codes

Can we map solutions to this matrix, and thereby simplify the Codes?



For Each Ship Type		Peacetime Operations	Maritime Security	Combat Operations
Basic	**Intended Operating Conditions**	Within NSC	Within NSC	Asymmetric (terrorist) only
Operational	**Foreseeable Damage conditions**	Within NSC, (incl. Design limt)	Within NSC, (incl. Design Limit)	Defined by National Naval Administration
Design	**Extreme Damage Condition**	Within NSC	Within NSC	Defined by National Naval Administration
Military	**Extreme Threat Conditions**	Asymmetric (terrorist) only	Defined by National Naval Administration	Defined by National Naval Administration

Table 1: INSA Distinction between Safety Hazards & Threat

- Use of the different categories can help shape risk-based thinking !
- but when is it best practice for them to be used ?

[1] INSA: **Foreseeable damage** could be caused by one's own cargo or weapons, navigational hazards (collision, grounding), naval exercises (certain types of navigational exercise, replenishment at sea, landings, boat operations, etc.), system failures or mal-operation.

[2] INSA: **Extreme damage** could be experienced as a result of environmental conditions in excess of the defined foreseeable conditions and for which the boat is required to survive. Some capabilities will be compromised as a result. *NB: Extreme damage includes damage that could be caused by exposure to environmental conditions that the vessel has not been designed for or the operators not trained for*.

[3] INSA '**Extreme threat damage'** may result following extreme conditions or threats. Note: Such damage includes that caused by hostile weapon attacks and extreme acts of aggression (UK Survivability policy sets thresholds for different ship types).

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NBoatC WG 2024 Achievements

Summary:

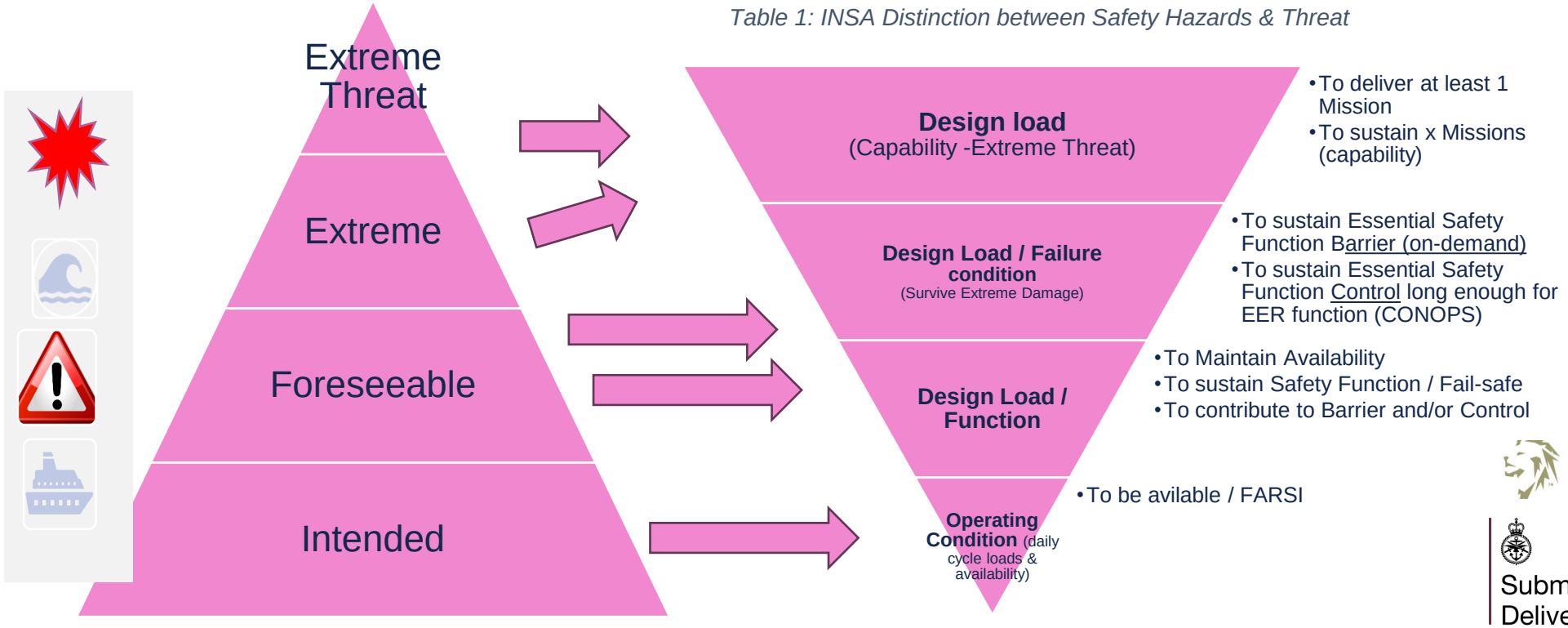
Survivability and Baseline Resilience:

Survivability - The capability if a weapon system to continue to carry out its designated mission in a combat threat environment. (NATO ANEP 43 Ship Combat Survivability. Components or survivability: susceptibility, vulnerability and recoverability.)

3d. What am I aiming at?

- Four levels

Table 1: INSA Distinction between Safety Hazards & Threat



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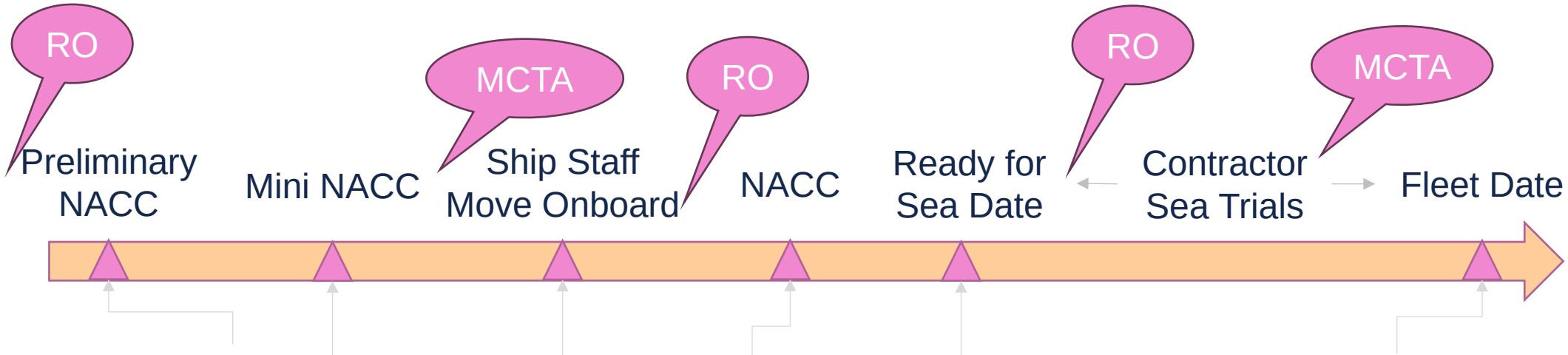
3e. When can it make a difference?

Back



- Identify responsibilities.
- Inspection and programme
- Submissions to be received at ??.
- Decisions points to issue certificate.

- Shipyard
- SSMOB
- RFSD
- CST
- SARC

When do Ship Staff use the vessel as a place of work and to live. Fire-sensing & Fighting systems to be assured.

Issue of Certificate ahead of RFSD

The point at which the ship needs to be demonstrated as safe to operate as a seagoing vessel.

Naval Authority certification should be issued with all hazard areas extant at this point :

The point when the ship is handed back to Navy Command as an operational unit.

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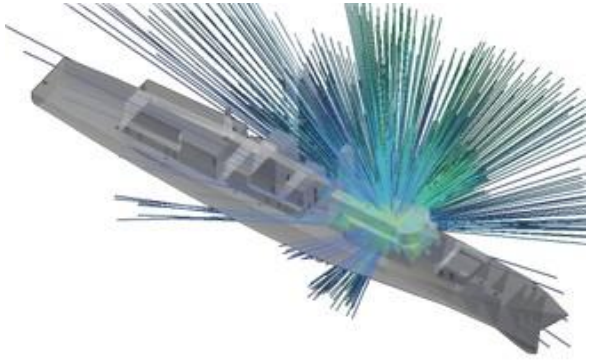
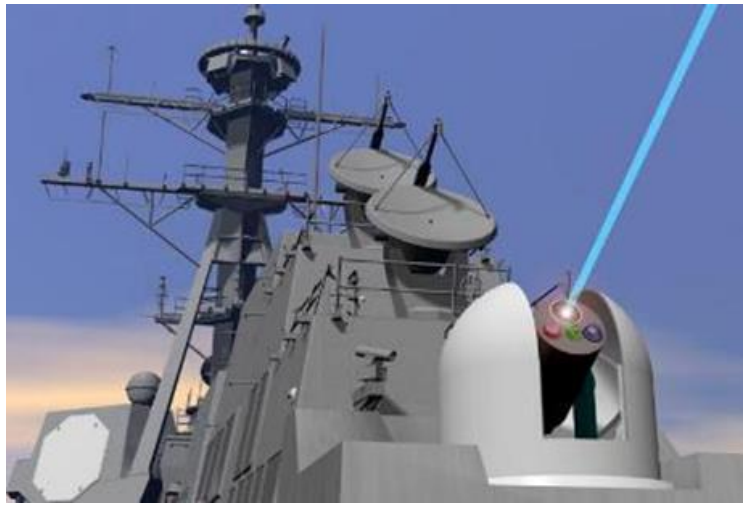


Future

Better Ship design by:

- IBIS (Internal battle Intelligent Software)
- NATO Industry white paper on DC
- Smart self-diagnostic systems
- Self-healing systems
- “Old-school” Survivability
  - Simulation, Modelling and validation by trials
- “Old-school” Safety



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- Conclusions?

  - What you do matters and only becomes apparent at the end of a mission
  - Its important to the UK
  - Its important to the front li ne

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