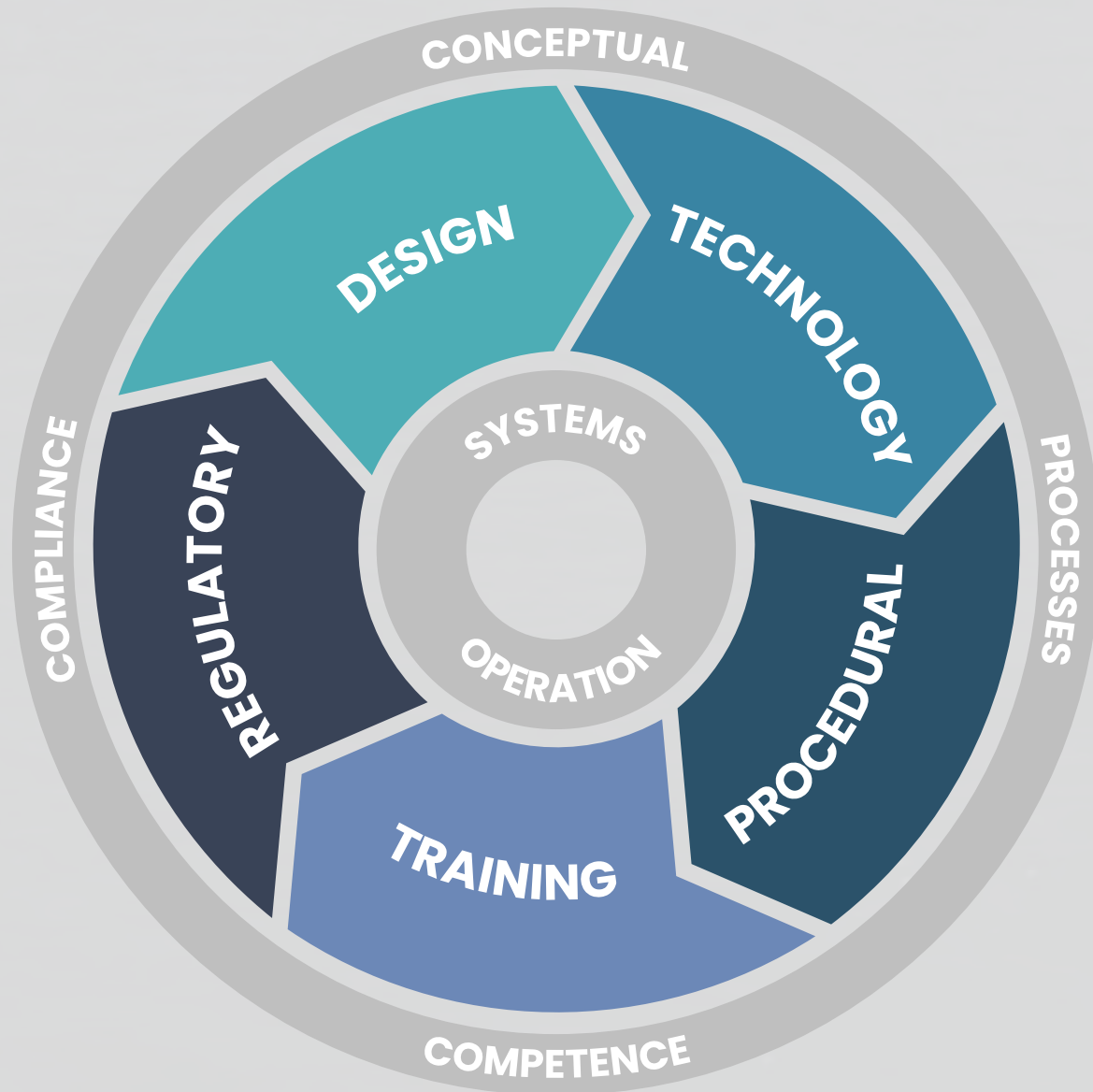




**MASS: TOMORROW'S
TECHNOLOGY,
TODAY**



MASS: FROM CONCEPT TO OPERATION



DESIGN & BUILD

Vessel design and commissioning appropriate to safe remote operations. Reliability, redundancy, efficiency.

TECHNOLOGY

Technology standards and development meeting the needs of remote operations and providing equivalent or superior solutions to traditionally-onboard tasks

PROCEDURAL

Robust Safety Management tools (procedures, checklists and supporting tools) to facilitate and assure remote operations and ensure safety and efficiency

TRAINING/PEOPLE

Approved and adapted training to mitigate novel methods of vessel operation and de-risk the human element

REGULATORY FRAMEWORK

National/International frameworks to allow commercial operations



What are Fugro's challenges in USV operations?



Design & Build: more in-water experience is needed to perfect designs



Technology: has advanced so dramatically that it is not holding up USV operations any longer



Procedures: are fundamentally changing to be fit for the digital world



Training & People: competency systems are changing to transfer offshore mariner competencies to onshore & digitally supported competencies



Regulatory landscape is now the biggest challenge

What Are ZELIM'S Operational challenges

- ❑ How does MASS intend to meet its obligations under UNCLOS Article 98
Duty to render assistance



WHAT ARE SEA-KIT INTL OPERATIONAL CHALLENGES?

- ▲ Build: Lack of key component availability/long lead-times
- ▲ Tech: LEO Satellite network roll out will accelerate sector growth
- ▲ Procedural: Requirement of guard vessels negate key benefits of USV's, SOLAS and carbon footprint
- ▲ Training: Shortage of skilled electrical engineers, redeployment of offshore skills to onshore.
- ▲ Regulatory: Global regulatory standards need to be in place. Regulation is currently the primary barrier to sector growth and emission reduction

For IMO and MS Consideration

Interpretation or update of **COLREGS** for small USVs (lookout, etc)

USVs are diverse. Regulations on construction, operation, and staffing should be **risk-based** to accommodate this diversity.

Clarity of **IMO's intent** for global framework vs national regulations

ECDIS and navigation information carriage requirements did not anticipate USVs-need clarity from IMO and IHO on USV navigation requirements.



What are Ocean Infinity's challenges?

Design & Build: Design and build standards lacking. Barriers to Convention-sized MASS design and build.

Technology: Remote applicability within Performance Standards and Codes

Procedures: Need for pragmatic bridging of IMO and Industry requirements.

Training and People: Training for tomorrow, today. Stovepipe of maritime talent.

Regulatory Landscape: Differing unilateral landscapes – lack of global standard. Coastal State acceptance. Timeline for regulatory framework not meeting commercial readiness.



SUMMARY COLLECTIVE 'WHAT KEEPS US AWAKE AT NIGHT'

We are all commercial operators with different commercial targets but we all want the same thing - a thriving, safe industry.

Standards and Frameworks

- We are all **responsible operators** that want to design and operate **safe MASS**.
- Without a pragmatic but comprehensively regulated industry, this safety we all strive to attain is at risk –. At best – **stifled growth**. At worst – **needless incidents**.

People

- Myth that MASS is all about technology. **People at the heart** of MASS development, operation, growth from RSE Level 1 to 4.
- **Training and Competence development** needed today to meet today's needs. Tomorrow's needs much greater. **Shortage of people**.

Realising Potential of MASS

- We will not help **decarbonisation** and meet IMO **2030 targets** if the ecosystem is unresponsive to continued development
- Existing timelines and **anticipated introduction of regulatory frameworks not aligned with pace** of development and potential of MASS



SUMMARY COLLECTIVE ‘WHAT WE NEED’

IMO Ambassadors for such low carbon technology and action to happen now, on a collaborative, wide-scale, global level.

Collaboration

- Initiatives such as this seminar to have **direct knowledge sharing, input and collaboration** across the spectrum – industry, academia, regulators, manufacturers
- **Learning from existing barriers, hurdles, incidents and lessons** to enable growth in a safe, controlled and evolutionary manner

Regulatory Doldrums

- **Global approach.** Strength of the IMO setting global frameworks.
- **Flexibility in approach.**
 - MASS is not a ship type but a mode of operation. Rescue Craft vs 4m survey USV vs large merchant cargo vessel.
 - MASS operational modes. Line of Sight vs Over the Horizon.

Industry vs Technology Pace

- **Picking up the pace** of regulatory adaptation to MASS – reality is it is here now
- **MSC.1/Circ.1455** – 2013. Forms the basis of several Flag state approaches to MASS technology – ‘alternatives and equivalents”. 9 years of learnings in safe novel technology implementation.

