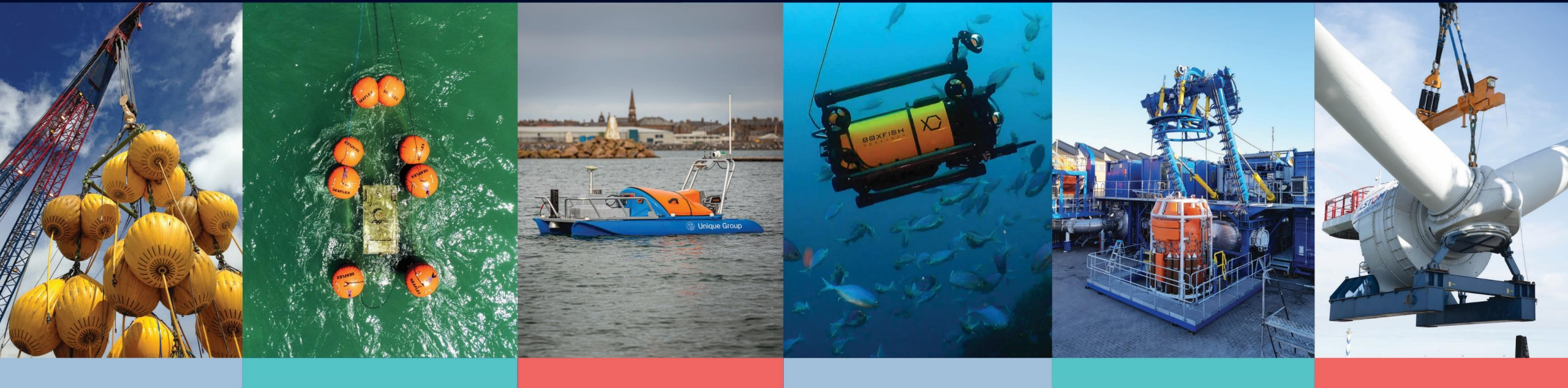


Navigating the Future: USV Sustainability



Unique Group

Jack R. Dougherty, MSM
Global Head of USV, Unique Group



Oceanology'24

USV Market Outlook

USV’s currently generate **2 billion per year** globally and estimated to increase by an average of **5%** per year to 2030.

Global USV Market Forecast by Application (\$Millions)

Application	2022	2023	2024	2025	2026	2027	2028	2029	2030	CAGR % (2023-2030)
Defense	1504	1560	1619	1680	1744	1811	1880	1952	2026	3.8
Commercial	528	570	614	662	713	767	825	887	954	7.6
Total	2032	2130	2233	2342	2457	2578	2705	2839	2980	4.9

Rise of Autonomy



Increased Safety



Increased Seaways Logistics



Work-life Balance



Reduced Carbon Emission



Customer Satisfaction



Human Limitations

Conventional vs. Autonomous Survey



\$15,000 per day

\$5,000 per day



Advantages of Autonomous Systems



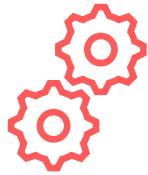
Survey Duration



Operational Efficiency



Data Quality



Configurable Payloads

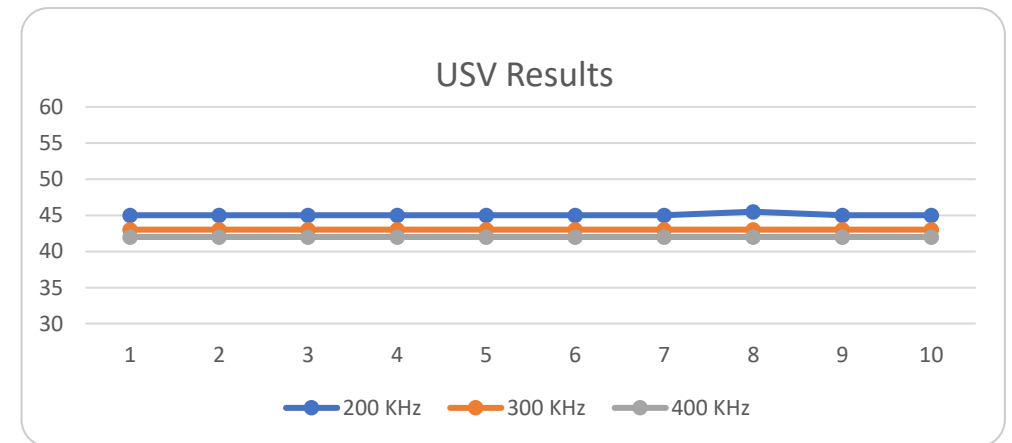
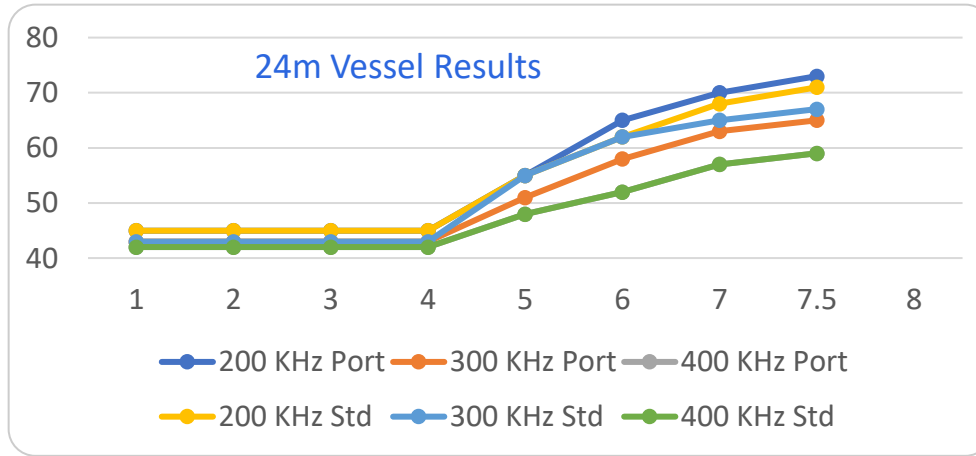


Noise Level

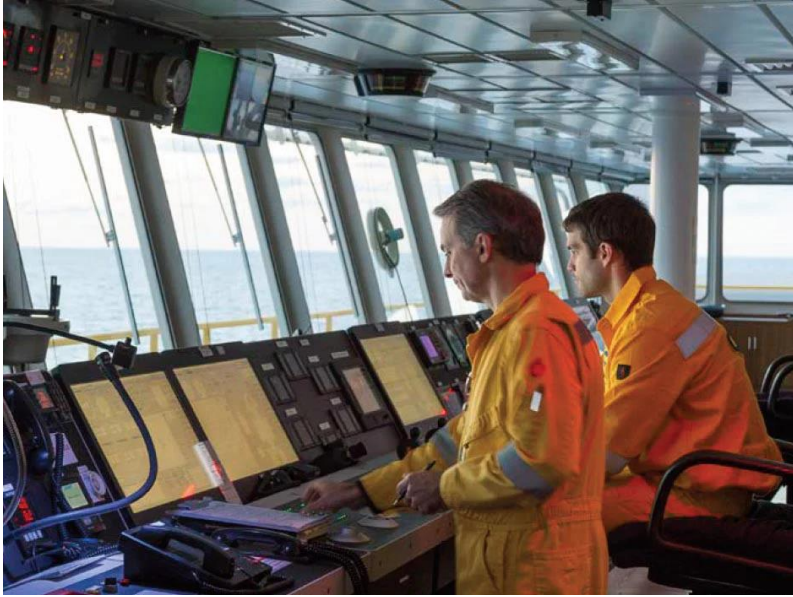


**Ease of Mobilization
& Operation**

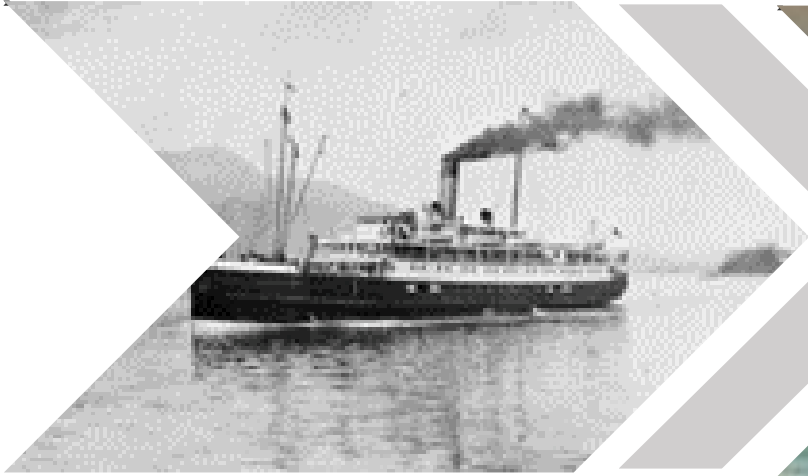
Noise Levels



But what about the modern mariner?



Maritime Technology Shift



Steam Vessels (Manual)



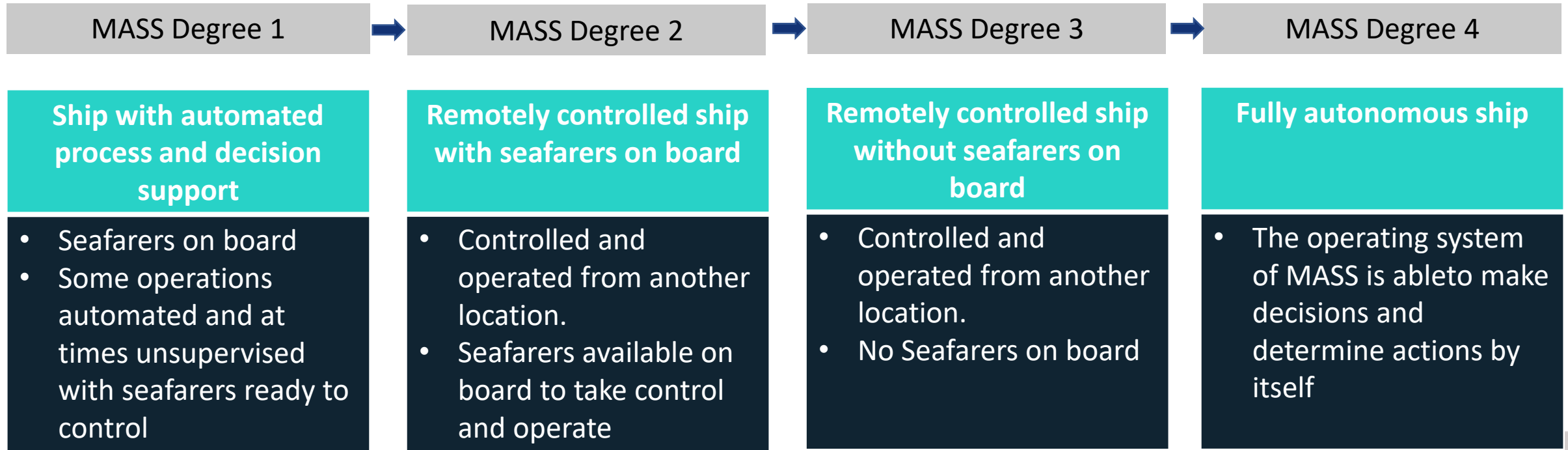
Commercial (Semi-Automated)



Digitalisation

- Safer
- More efficient
- More sustainable operations – where **data and connectivity** are key enablers

IMO Levels of Autonomy, May 2021



Pillars of Autonomy



Vessel Capabilities

- Equipment Operation
- Navigation/Maneuver
- Sense & Analysis Environment
- Manage Mission
- Sense & Analysis Equipment



Communication

- Land-based
- Vessel to Vessel
- Vessel to Shore



Remote Ops Centre

- Remote Control
- Autonomous Operation
- Mission Planning
- Fleet Management



Situational Awareness



Conspicuity

- Lidar & Radar
- Thermal Cameras
- Artificial Intelligence
- Radar Reflectors
- AIS Transmission

Autonomous Systems & Collaborators



Future Roles for Mariners in the Autonomous Vessel Revolution



Thank you

