Australian Government
Australian Maritime Safety Authority

Marine Autonomous Systems

Thoughts from AMSA

Nick Lemon
Manager Systems Safety

Australian Government
Australian Maritime Safety Authority

Scope

- What does AMSA do?
- Unmanned and autonomous in Australia
- International and national engagement
- Our challenges

Australian Government
Australian Maritime Safety Authority

Safe and clean seas, saving lives

Canberra, Australia

Plan on a page

Everything we do must contribute to the achievement of our vision and mission.
Our plan on a page helps us to align and identify the contribution our focus areas, core business and change program make towards achieving our strategic goals, meeting our strategic challenges, and ultimately, delivering our vision and mission.

Purpose

Who we serve: The Australian community.

Purpose: As Australia's national maritime regulatory body, we promote the safety and protection of our marine environment and combat ship-sourced pollution. We provide the infrastructure for safety of navigation in Australian waters, and maintain a national search and rescue service for the maritime and aviation sectors.

Vision: Safe and clean seas, saving lives.

Mission: Ensuring safe vessel operations, combatting marine pollution, and rescuing people in distress.

Values

Professional:
We act with integrity and are pragmatic in our approach.

Collaborative:
We value and respect others and work together to achieve our objectives.

Dedicated:
We are committed to AMSA's mission and responsive to the needs of our customers and stakeholders.

Accountable:
We take responsibility for our decisions and actions.

1 Strategic challenge 1

Managing risks to safety and the environment

- 1.1 Focus area 1.1: Ensuring regulated vessels are operated safely and meet standards
- 1.2 Focus area 1.2: Preventing pollution from shipping
- 1.3 Focus area 1.3: Supporting safe navigation
- 1.4 Focus area 1.4: Contributing to and implementing international conventions
- 1.5 Focus area 1.5: Ensuring seafarer standards and welfare

Strategic goals

1.1 Ensure safe shipping in Australian waters
1.2 Minimise emissions and discharges from ships in the marine environment
1.3 Deregulate and streamline without impacting safety
1.4 Develop a contemporary regulatory and compliance model
1.5 Implement a modernised regulatory scheme for international trading and foreign vessels
1.6 Develop a predictive, integrated intervention capability to ensure the safety of people and vessels
1.7 Comply with international standards for training certification and watchkeeping
1.8 Promote a maritime safety culture that leads to positive behavioural change
1.9 Influence international standards and behaviours of key flag states and trading partners

Strategic risk

SR2. Failure as a regulator—regulatory scheme or compliance and enforcement arrangements fail to prevent an incident with major or significant consequences
SR7. Failure to listen and effectively engage with customers and stakeholders

2 Strategic challenge 2

Delivering, implementing and enhancing the national system for domestic commercial vessel safety

- 2.1 Focus area 2.1: Operating model
- 2.2 Focus area 2.2: Service delivery
- 2.3 Focus area 2.3: Regulatory framework
- 2.4 Focus area 2.4: Information technology and funding arrangements

Strategic goals

2.1 Promote continuous improvement in marine safety and public confidence in the safety of marine operators
2.2 Facilitate the development of an industry culture to ensure the effective identification and management of safety risks
2.3 Reduce regulatory burden without compromising safety

Strategic risks

SR1. Failure to deliver a National System—that is financially sustainable and delivers the aims and objectives required by government
SR2. Failure as a regulator—regulatory scheme or compliance and enforcement arrangements fail to prevent an incident with major or significant consequences
SR7. Failure to listen and effectively engage with customers and stakeholders

3 Strategic challenge 3

Providing incident preparedness and response

- 3.1 Focus area 3.1: Pre-emptively intervening to assure vessel safety
- 3.2 Focus area 3.2: Saving lives daily through search and rescue (SAR)
- 3.3 Focus area 3.3: Delivering an effective incident response capability
- 3.4 Focus area 3.4: Delivering an effective marine pollution response capability

Strategic goals

3.1 Prevent incidents occurring wherever possible with best use of domain awareness
3.2 Save lives by coordinating aviation and maritime search and rescue
3.3 Respond efficiently and effectively to maritime environmental emergencies

Strategic risk

SR3. Failure as a response organisation—search and rescue or maritime environmental emergency response arrangements are inadequate
SR7. Failure to listen and effectively engage with customers and stakeholders

4 Strategic challenge 4

Ensuring a vibrant and progressive organisation

- 4.1 Focus area 4.1: Workforce engagement, development and safety
- 4.2 Focus area 4.2: Good governance
- 4.3 Focus area 4.3: Sound financial management
- 4.4 Focus area 4.4: Reliable and responsive information technology

Strategic goals

4.1 Have a professional, flexible and engaged workforce that is change ready
4.2 Use technology to improve the services we deliver to do business anytime, anywhere
4.3 Deliver our services with the available funding
4.4 Have effective and efficient processes and systems
4.5 Be an employer of choice and an exemplary corporate citizen
4.6 Apply our integrated management system across the organisation

Strategic risks

SR4. Failure to maintain a safe working environment
SR5. Failure to maintain systems of internal control
SR6. Failure to maintain stable and reliable information technology infrastructure and systems

- Our people – a professional, flexible and engaged workforce is the key to successfully delivering our vision and mission
- Data and information—helps us to target all the services we deliver

Strategic enabler (E)
Collaborating with our community

Focus area E1
Working with international organisations and other nations

Focus area E2
Working with partner organisations

Focus area E3
Developing stakeholder relationships

Focus area E4
Community education

Enabler goals

EG.1 International standards reflect Australian expectations and international standards are reflected nationally
EG.2 Improve and promote maritime safety and environmental protection in our region
EG.3 Have a strong regional voice in international fora
EG.4 Regional approaches align with agreed international priorities
EG.5 Informed and engaged community on maritime issues, search and rescue issues, and our role
EG.6 Effective engagement with communities to promote maritime safety
EG.7 To be respected and trusted
EG.8 Increase stakeholders' understanding of their responsibilities under the National System
EG.9 Create opportunities for people to provide relevant information and feedback
EG.10 Increase safety knowledge and practices among people who work with commercial vessels

Australian Government
Australian Maritime Safety Authority

Unmanned and autonomous vessels

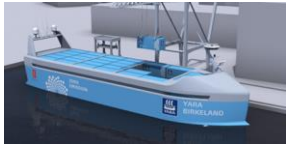
DRAFT

Autonomous and Unmanned vessels

Unmanned
Always monitored and under positive control, but ***no human onboard***

Autonomous
capable of independent decision making without involvement of a human operator
Humans may be on board and/ or in a remote location

- Unmanned Underwater Vessel (UUV)
- Unmanned Surface Vessel (USV)
- Autonomous Underwater Vessel (AUV)
- Autonomous Surface Vessel (ASV)
- Maritime Autonomous Surface Ship (MASS)



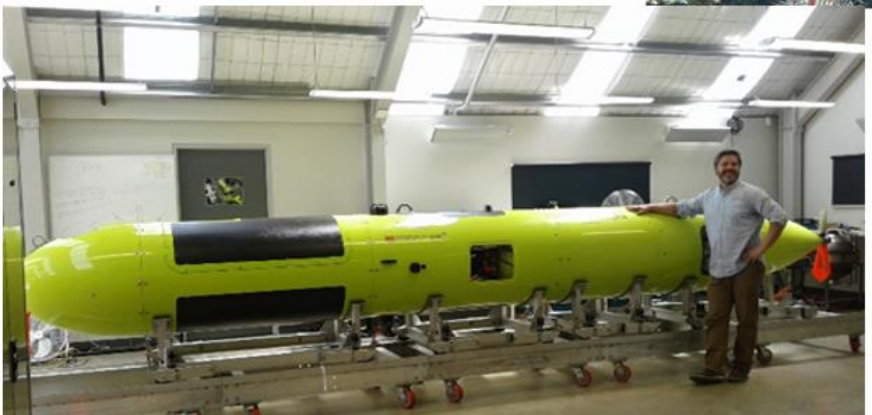
IMO INTERNATIONAL MARITIME ORGANIZATION

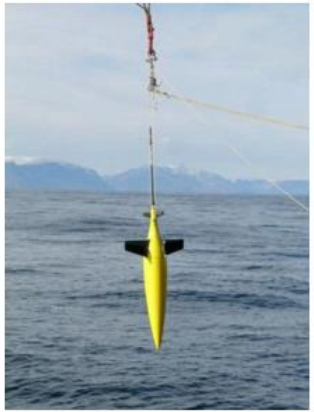
Regulated by Domestic and/ or International Law

Australian Government
Australian Maritime Safety Authority

In Australia today: Sub-surface

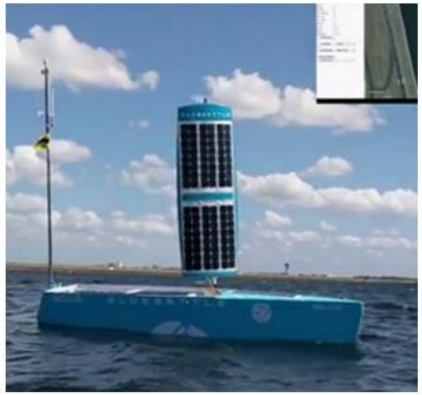

Photo by Ben Allsup, Teledyne Webb Research)





Australian Government
Australian Maritime Safety Authority

In Australia today: Surface



Australian Government
Australian Maritime Safety Authority

Autonomous Warrior 2018

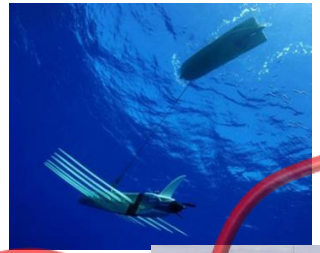
- 05-23 November 2018
- Surf, Sub-Surf, Air, Ground
- Defence led, but Commercial Vessels participating
- AMSA Regulations applied to many of the vessels
- Specific Exemption process
- Test our regulatory approach
- Identify high level regulatory principles
- Develop precedence
- Test our procedures and shape future framework

Australian Government
Australian Maritime Safety Authority

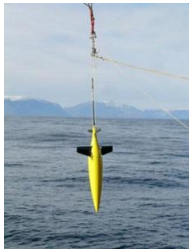
The problem - Where do they sit?

Scientific Equipment

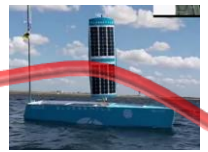
Defence...



RAV/ Foreign



Domestic Commercial Vessel



Ships Equipment

Australian Government
Australian Maritime Safety Authority

Building a precedence

- Gaining experience
- Educating industry
- Regulating where necessary
- Shaping internal procedures
- Identify areas where change may be necessary with our laws

Australian Government
Australian Maritime Safety Authority

Policy settings *(concepts and ideas)*

- Categorising vessels by weight and speed – kinetic energy = associated risk
- Recognise key risks
  - risk of collision, and
  - risk of damage to the environment
- As safe, if not safer than manned vessels
- Safety assurance and ability to survey is essential, but doesn't need to be done by the safety regulator – e.g. ROs
- Flexible and adaptive to changes in technology
- The risk carried by owners and masters is different to that of the Safety Regulator- this must be acknowledged by both to agree an appropriate regulatory approach
- Our approach will be based on our understanding of the operational context
- A hobbyist mentality will not deliver a sufficiently rigorous approach to safety

Australian Government
Australian Maritime Safety Authority

Decision making processes

- What type of vessel? DCV, RAV, Foreign
  - Reg. treatment is significantly different
- How can each vessel be regulated based on its risks?
- At what point does the safety regulator need safety assurance from a competent Recognised Organisation?
- Set the precedence now with regulatory treatment, and shape regulation of the future?

Australian Government
Australian Maritime Safety Authority

Australia's interests in MASS

- Uniqueness: marine environment, geographically remote and some unique industries
- Significant benefits to Australia through embracing proven automation
- Actively promote the use of technology that enhances safety and efficiency in shipping
- Ethical and socially acceptable approach, which allows for transitioning – meaningful human control.

Australian Government
Australian Maritime Safety Authority

MSC100/5/6- Levels of automation

Levels of autonomy and control Combining levels of autonomy and control that relate to the way that a ship is configured and operated enables unambiguous classification for the purposes of safe and efficient operation and regulation.			Operational control (Qualified deck and/or engine personnel)*	
			B0	B1
			No qualified operators on board but qualified operators available at a remote location	Qualified operators on board
Level of autonomy (Technical)	A0	**Manual** Manual operation and control of ship systems and functions, including basic individual system level automation for simple tasks and functions.		*A0 – B1*
	A1	**Delegated** Permission is required for the execution of functions, decisions and actions; the operator can override the system at any stage.	*A1 – B0*	*A1 – B1*
	A2	**Supervised** The qualified operator is always informed of all decisions taken by the system. Permission of the qualified operator is not required for the ship system to execute functions, decisions and actions; the qualified operator can override the system at any stage.	*A2 – B0*	*A2 – B1*
	A3	**Autonomous** The qualified operator is informed by the system in case of emergency or when ship systems are outside of defined parameters. Permission of the qualified operator is not required for the ship system to execute functions, decisions and actions; the qualified operator can override the ship system when outside of defined parameters. Provided the boundaries of the ship system are not exceeded, "human control" becomes "human supervision".	*A3 – B0*	*A3 – B1*

Australian Government
Australian Maritime Safety Authority

Our challenges

- Safety assurance
- Testing and certification of systems, infrastructure and technology
- Do traditional relationships need to change?
- Regulatory flexibility/balance – prescriptive v's goal based
- The placement of liability……

Australian Government
Australian Maritime Safety Authority

Thankyou