

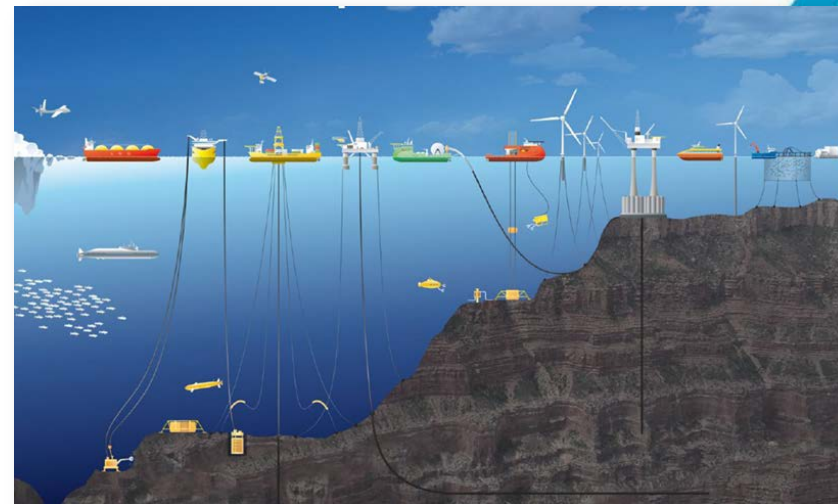
“Facilitating disruptive innovation – The Norwegian approach”

Svein David Medhaug



Norway

The world's most advanced Sea nation & a Maritime Superpower

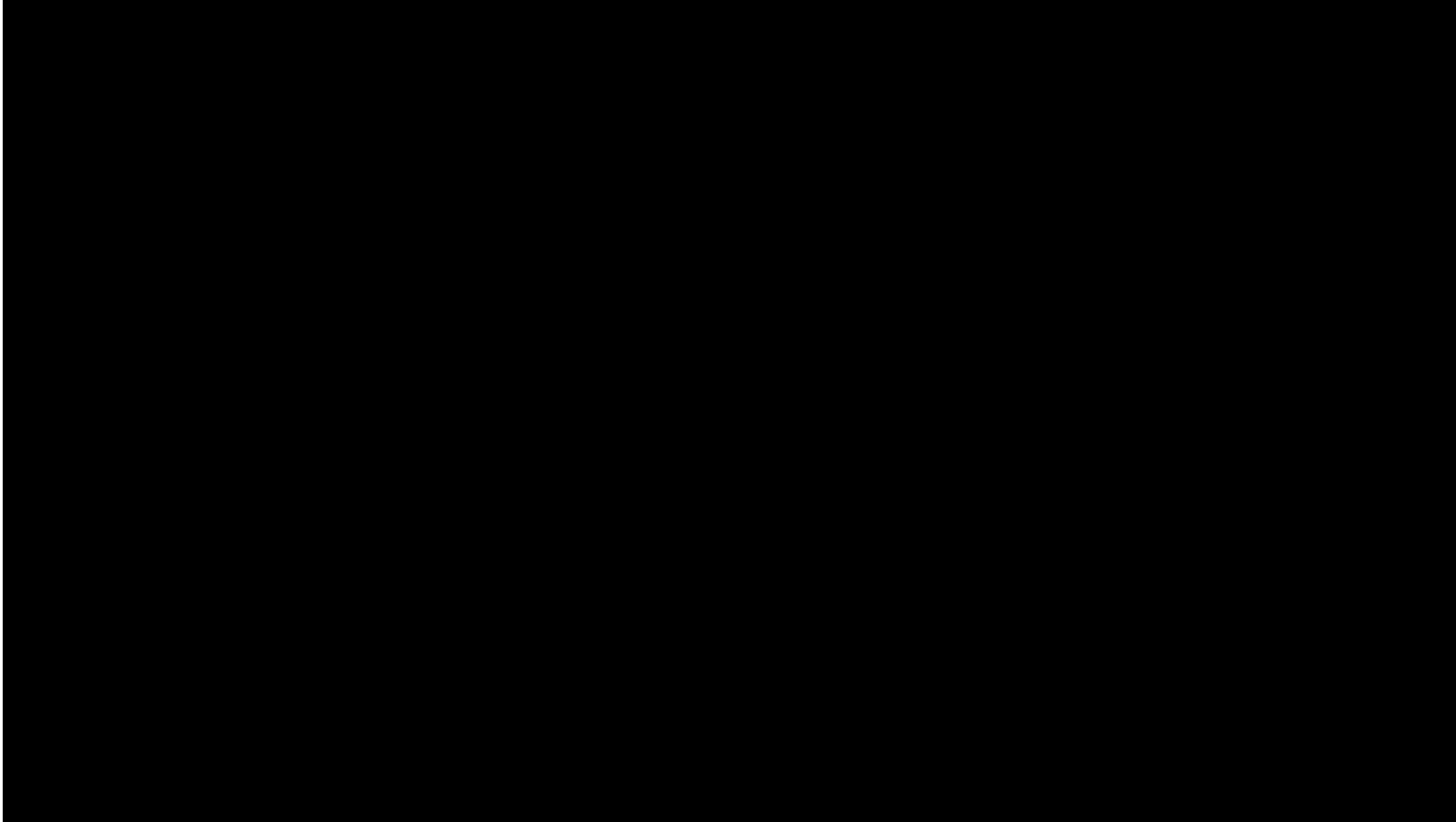


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Innovation and new technology





Innovation and new technology

Maritim Strategi



Hav Strategi





Innovation and new technology

- Environment
- Expertise
- R&D
- Innovation
- Blue growth
- International conditions
- UN's Sustainable Development Goals





The Norwegian model - "The maritime cluster"

- A knowledge based Norway
- The complete and unique cluster;
 - Developers
 - integrators
 - equipment suppliers
 - distributor
 - Operator / Ship-owner
 - R & D
 - Authority
 - among others
- National cooperation in a international marked

Collaboration = Success

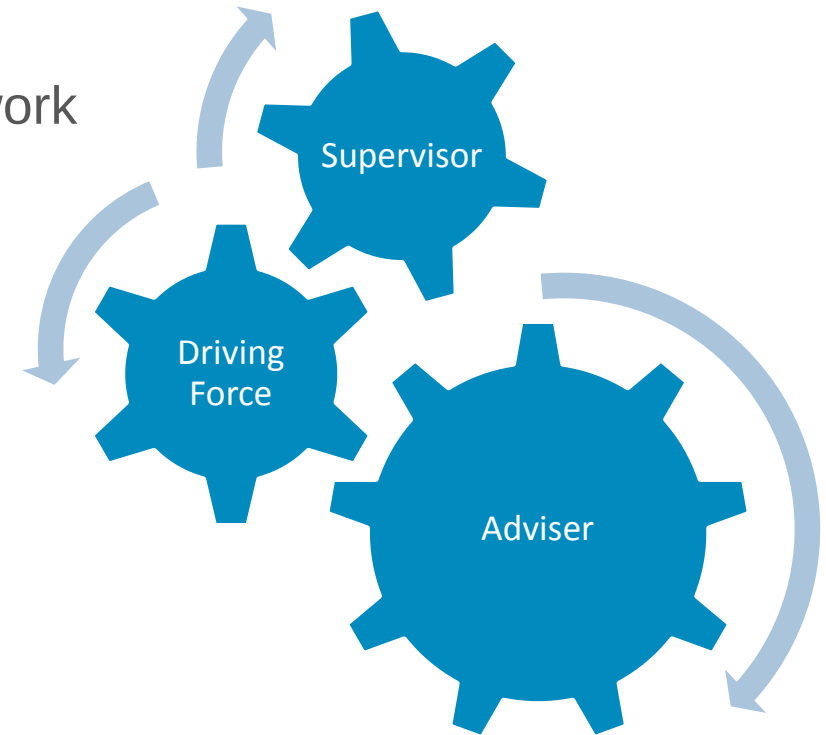
The Norwegian model - "The maritime cluster"





Contribute to making National innovation to international standard

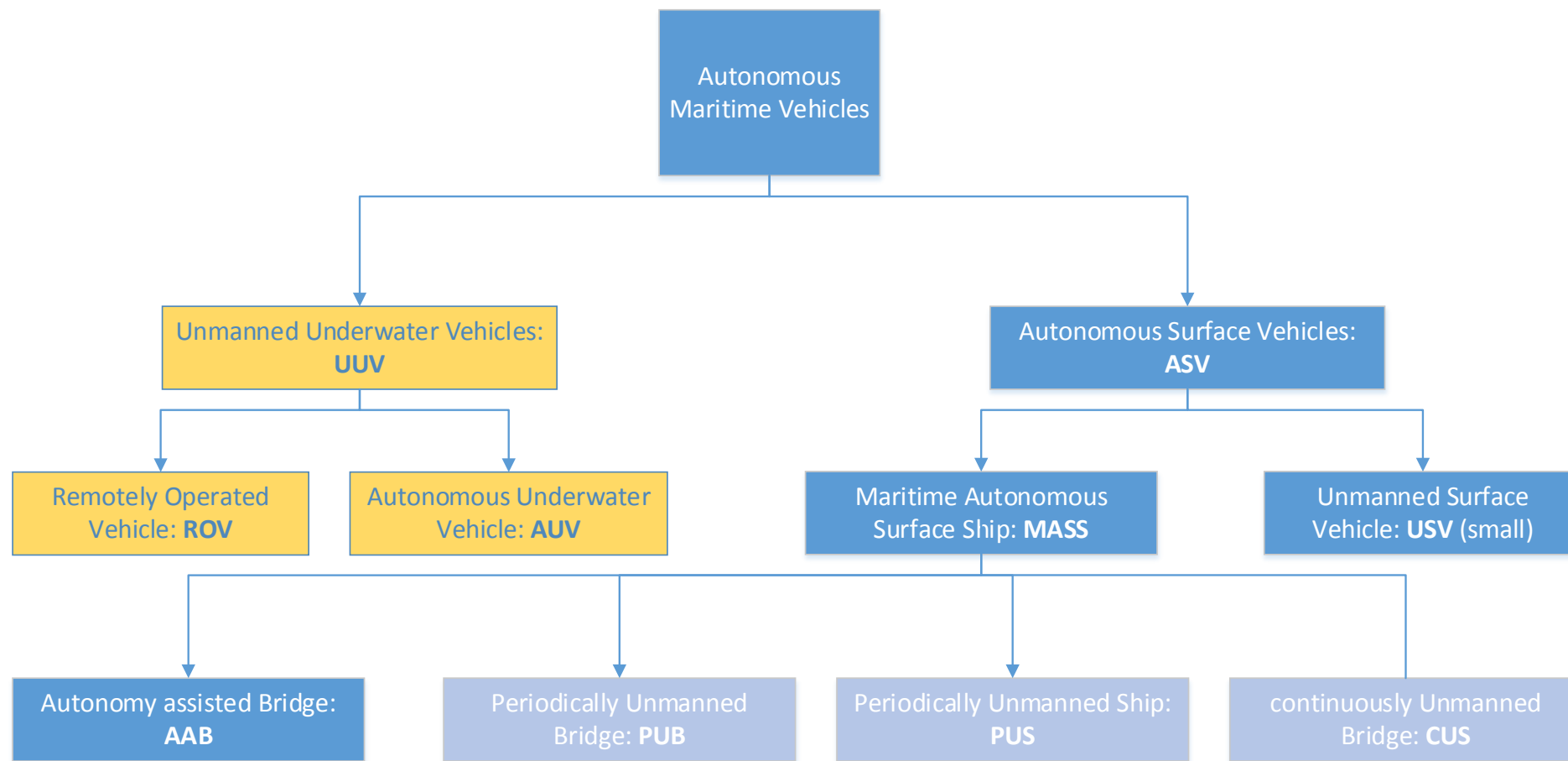
- Stimulate innovative thinking
- Coordinate and facilitate
- Actively participate in international forums
- Invite the industry to participate in the Authority's international work
- Take initiative
- Participate in development projects







Autonomy – Autonomous Maritime Vehicles





Operational autonomy levels

Four operational autonomy levels;

1. Decision support
2. Automatic
3. Constrained autonomous
4. Fully autonomous

	Manned bridge	Unmanned bridge - crew on board	Unmanned bridge - no crew on board
Decision support	Direct control No autonomy	Remote control	Remote control
Automatic	Automatic bridge	Automatic ship	Automatic ship
Constrained autonomous	-	Constrained autonomous	Constrained autonomous
Fully autonomous	-	-	Fully autonomous

Challenges – with Autonomy

- Legislations
 - COLREG
 - 1978 STCW Convention and Code
- Radio Spectrum
 - Frequencies/ ITU (WRC)
 - Bandwidth
 - Coverage
- Responsibility, Liability and Insurance.
 - Master, owner..
- Geographical restrictions.
- Technical



Benefits

- Cost
- Safety
- Security
- Environmental
- Efficiency
- Digitalization
- Reliability
- Human errors
- Continuous trade— Non-stop process
- optimal Logistic
- Shore based control stations



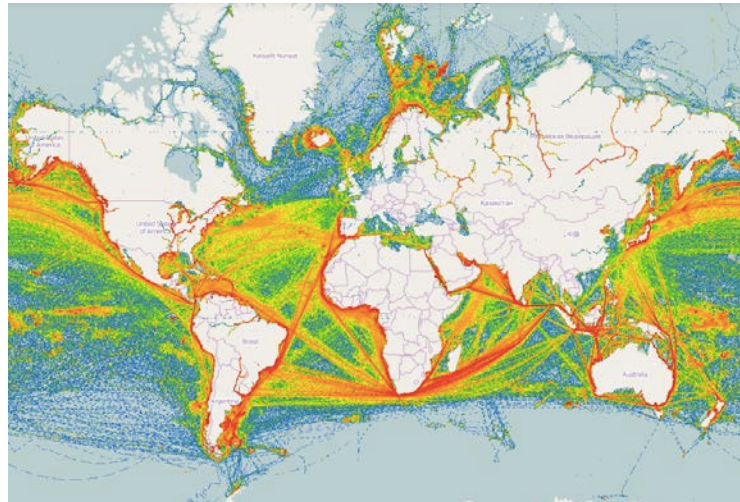
Why - The Goal!

- Safety, Security and efficiency
 - Blue economy in a green ocean
 - Environmental
 - Norwegian achievements in a international perspective
 - UN's Sustainable Development Goals
 - International legislation
-
- “Look to Norway”



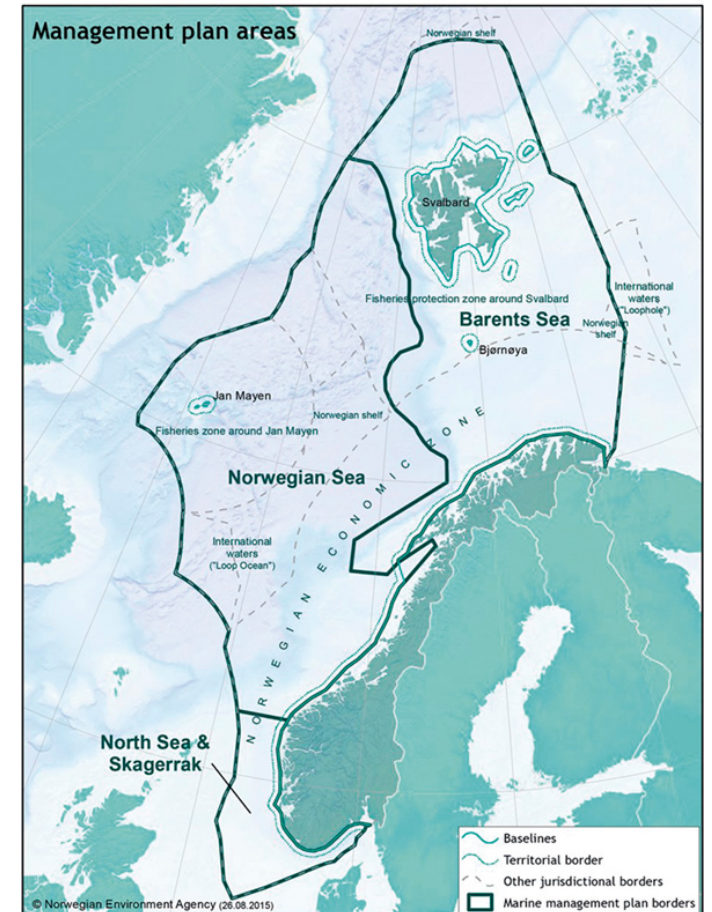
How to reach the goal...

- **National engagement**
- **International adjustments**



How to reach the goal.

- Finalizing a national approach, showing the world how to do it.
 - National engagement
 - National legislations
 - Restrictions and exemptions
 - Circulars and Instructions
 - Class rules
 - Guidance
 - Implemented national regulations





How to reach the goal..

- Working in parallel with national achievements towards an international legislation regime
- International adjustments
 - International legislation
 - Bilateral agreements between coastal administrations
- IMO
 - Finalizing scoping exercise
 - Defining maritime autonomy



International Labour
Organisation





How to reach the goal...

- Joint action
- Harmonizing class rules and legislation
- Combined effort for the benefit of innovation and new sustainable technology
- Take advantage of the edge and the lead of the Norwegian model and maritime industry
- The Key factor is cooperation

Collaboration = Success

Conclusion

The Goal is Not Autonomy!, but;

- Safety, security, efficiency and environment.
- The industry need to;
 - find a common ground, define and decide the way ahead.
 - Dedicated areas of testing
 - Norway will promote sustainable technology and concepts.
- Cooperation is of grate essential, and;
 - Harmonization of instruction from flag and class rules

CONCLUSION



Thank you for your attention!

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