

# NFAS Nettverksmøte

Trondheim, Powerhouse, 2022-06-08

# Agenda

- Internasjonal utvikling på MASS: IMO, standarder og våre konkurrenter (Ørnulf Rødseth, NFAS)
- Utvikling av "Risk-Based Assessment Tool for MASS (RBAT MASS)" for EMSA (Remi Pedersen, DNV)
- UML-basert metodikk for beskrivelse og dokumentasjon av MASS (Lars Andreas Wennersberg, SINTEF)

11:15 - Pause 15 minutt

- USV versus MASS: Bør NFAS også inkludere USV? (Børge Kjelstad, Maritime Robotics)
- Nye løsninger for person-sikkerhet for autonom passasjertransport – AUTOSAFE (Even Ambros Holte, SINTEF & Øyvind Smogeli, Zeabuz)

12:20 - Lunch 50 minutt

- Verktøy for hurtig kost-nytte beregning for autonome transportløsninger (Håvard Nordahl, SINTEF)
- Oppdateringer fra SFI AutoShip (Mary Ann Lundteigen, NTNU)

14:00 - Pause 10 minutt

- Remote & Autonomous System of Systems – A Systems Engineering Perspective (Torgeir Fjellidal, Kongsberg)
- Autonomi er svaret – hva var spørsmålet? (Birgit Thorsen, Ocean Autonomy Cluster)

# ISO vocabulary for MASS

## ISO/TS 23860:2022(E)

### Ships and marine technology — Vocabulary related to autonomous ship systems

- Technical Specification: Still under development
- Developed by ISO TC8/WG10 – Around 40 persons involved
- Based on work in AEGIS and AUTOSHIP
- Under publication – a few weeks to go

# ISO vocabulary for MASS

## 3.1.1

### **automatic**

process or equipment that, under specified conditions, **can** function without human control

## 3.1.3

### **autonomy**

processes or equipment in a ship system which, under certain conditions, **are designed and verified to** be controlled by automation, without human assistance

# ISO vocabulary for MASS

## 3.1.5

### **autonomous ship system**

elements that interact to ensure effective functioning of the autonomous and non-autonomous processes and equipment that are necessary to perform the ship's operation or voyage

## 3.1.8

### **remote control centre**

site remote from the ship that can control some or all of the autonomous ship system processes

## 3.1.9

### **uncrewed**

ship with no crew onboard

# ISO vocabulary for MASS

## 3.3.6

### **operational envelope**

conditions and related operator control modes under which an autonomous ship system is designed to operate, including all tolerable events

## 3.3.1

### **tolerable event**

technical or operational event for which there is a designed response that keeps the system within its operational envelope

## 3.3.3

### **fallback state**

designed state that can be entered through a fallback function when it is not possible for the autonomous ship system to stay within the operational envelope

# ISO vocabulary for MASS (informative)

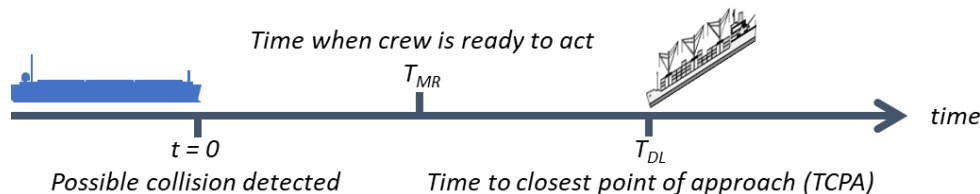


Table 1 – Degrees of automation

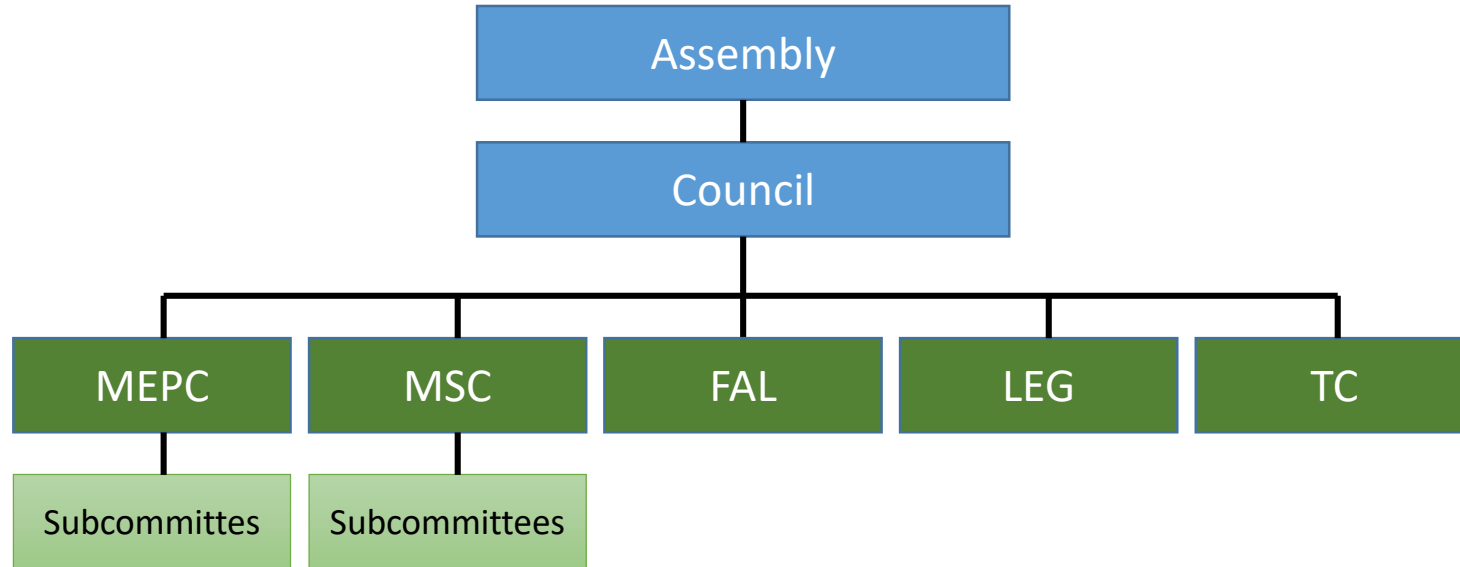
A0	Low, $T_{DL} \approx 0$	Direct control of rudder and speed
A1	Partial, $T_{DL} > 0$	Autopilot, auto-crossing
A2	Constrained, $T_{DL} > t$	Autonomous sailing with human supervision
A3	Full, $T_{DL} = \infty$	Autonomous sailing without human supervision

Table 2 – Degrees of human control

C3	Continuous, $T_{MR} \approx 0$ sec	Operator or crew actively in control
C2	Supervising, $T_{MR} \approx 30$ sec	Supervising one ship onboard or from RCC
C1b	Discontinuous, $T_{MR} \approx 2$ min	Supervising many ships from RCC
C1a	Available, $T_{MR} \approx 20$ min	Periodically unmanned bridge, e.g. crew sleeping onboard
C0	None, $T_{MR} = \infty$	No crew or operators are available

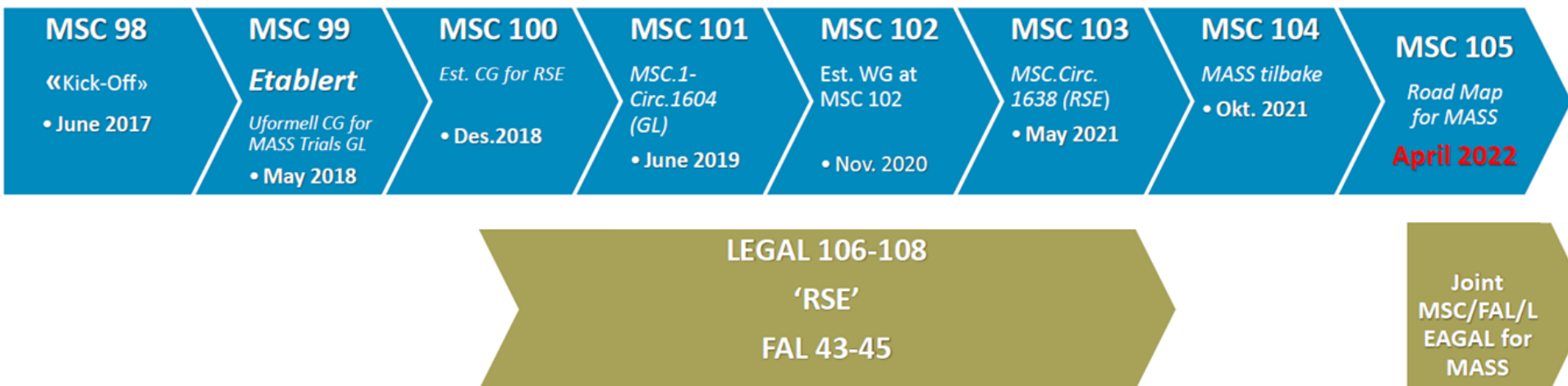
	C4	C3	C1	C0
A3	OA	CA	CA	FA
A2	OA	CA	CA	
A1	OA	OA		
A0	OE			

# IMO Structure





# IMO developments on MASS



Original: Svein David Medhaug

# IMO Roadmap

<b>MSC 105</b> (20 to 29 April 2022)	<ul style="list-style-type: none"> <li>• Etablere en felles forståelse</li> <li>• Enes om "Roadmap"</li> <li>• Terminologi ??</li> <li>• ToR for en joint MSC/LEGAL/FAL arbeidsgr.</li> <li>• ToR for CG for MASS frem mot MSC 107</li> </ul>
<b>MSC 106</b> (2 to 11 November 2022)	<ul style="list-style-type: none"> <li>• Revidere arb. Fra MSC 105</li> <li>• Begynne å sette rammeverket for en "mandatory and/or non-mandatory MASS Code"</li> <li>• Begynne å drafte et «goal-Based» instrument</li> <li>• Vurdere andre underkomiteers og hoved komiteers involvering, samt andre org, som ILO, ISO, IHO, IALA, IMSO</li> <li>• <b>Oppdatere «Road Map»</b></li> </ul>
<b>MSC 107</b> (1st half 2023)	<ul style="list-style-type: none"> <li>• Revidere arb. fra MSC 106</li> <li>• Fortsette å drafte mot en «goal-Based» instrument (MASS Code)</li> <li>• Videre vurdere andre underkomiteers involvering</li> <li>• Arbeidsgruppe og intersesjonal joint MSC/LEGAL/FAL arbeidsgr.</li> <li>• <b>Oppdatere «Road Map»</b></li> </ul>
<b>MSC 108</b> (1st half 2024)	<ul style="list-style-type: none"> <li>• Revidere arb. fra MSC 107</li> <li>• Fortsette å drafte mot en «goal-Based» instrument (MASS Code)</li> <li>• Arbeidsgruppe og intersesjonal joint MSC/LEGAL/FAL arbeidsgr.</li> <li>• <b>Oppdatere «Road Map»</b></li> </ul>
<b>MSC 109</b> (2nd half 2024)	<ul style="list-style-type: none"> <li>• Drafte ferdig ny MASS Code</li> <li>• Identifisere fremtidig arbeid</li> <li>• <b>Oppdatere «Road Map»</b></li> </ul>
<b>MSC 110</b> (1st half 2025)	<ul style="list-style-type: none"> <li>• Vedta MASS Code</li> <li>• Fullføre gjennomgangen av eksisterende IMO-instrumenter</li> </ul>

Original: Svein David Medhaug

# CG on Voluntary MASS Code

## TERMS OF REFERENCE (ToR) OF THE WG (frem mot MSC 107)

1. Consider **key principles and common understanding** of the purpose and objectives for the new instrument;
2. **Commence** the development of a **non-mandatory goal-based MASS Code**, taking into account the potential gaps and themes identified, the scope and framework of the non-mandatory Code, as well as documents MSC 105/7/2, MSC 105/7/3, MSC 105/7/6, MSC 105/7/7, MSC 105/7/8 and MSC 105/7/9;
3. consider the common potential gaps and/or themes identified during the Regulatory Scoping Exercise (RSE) (MSC.1/Circ.1638, section 5), focusing on the **high priority items** (MSC.1/Circ.1638, paragraphs 6.11.1 to 6.11.3);
4. if time permits, develop MSC MASS positions on the following points with the intention that these are submitted to a **Joint MSC/LEG/FAL MASS Working Group in the future** (MSC.1/Circ.1638, paragraphs 6.11.1 to 6.11.3), which include, but are not limited to:
  1. consideration, together with relevant documents, whether to amend the definition for **MASS and degrees of autonomy** (including the respective definition);
  2. meaning of the terms master, crew or responsible person;
  3. remote control station/centre; and
5. determination of the **remote operator** as a **seafarer**, and advise on a way forward in addressing them;
6. limit the development of the non-mandatory **MASS Code to cargo ships** with a view to considering the feasibility for application to passenger ships at a future stage; and
7. submit a written report to MSC 107.

Original: Svein David Medhaug