

# Integrating IEC and ISO information models into the S-100 Common Maritime Data Structure

e-Navigation Underway International 2016  
February 2-4, 2016

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**MARINTEK**

Norsk Marinteknisk Forskningsinstitutt

 **SINTEF**

# The Maritime Technology Center Trondheim, Norway



Integrated operations laboratory



**MARINTEK**  
Norwegian Marine  
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of Science and  
Technology



Energy and engine laboratory



Towing tank



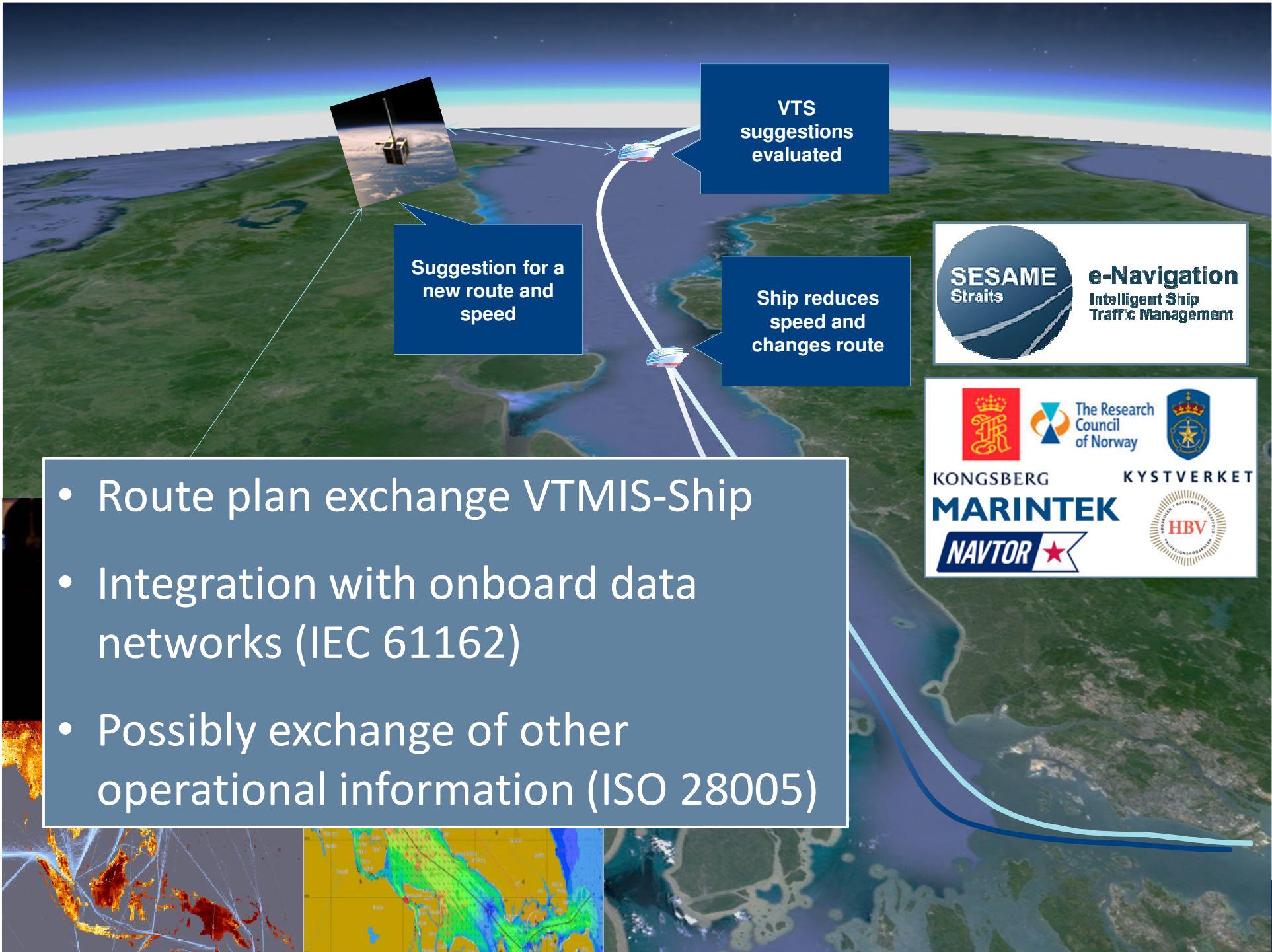
Ocean basin



Cavitation tunnel



Structural testing



VTS suggestions evaluated

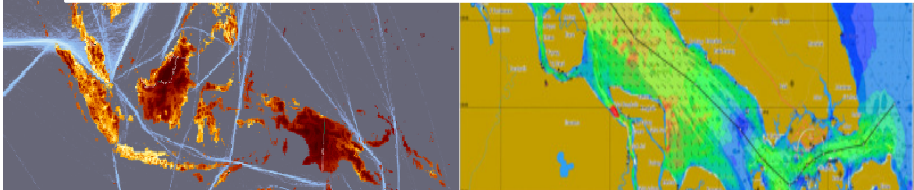
Suggestion for a new route and speed

Ship reduces speed and changes route

**SESAME Straits** **e-Navigation**  
Intelligent Ship Traffic Management

    
KONGSBERG The Research Council of Norway KYSTVERKET  
**MARINTEK**  
   
NAVTOR HBV

- Route plan exchange VTMIS-Ship
- Integration with onboard data networks (IEC 61162)
- Possibly exchange of other operational information (ISO 28005)




# Premise

The Common Maritime Data Structure (CMDSD) is a common information model for e-navigation, all its maritime service portfolios and the five prioritized e-navigation solutions.

- S1: improved, harmonized and user-friendly bridge design;
- S2: means for standardized and automated reporting;
- S3: improved reliability, resilience and integrity of bridge equipment and navigation information;
- S4: integration and presentation of available information in received via communication equipment; and
- S9: improved Communication of VTS Service Portfolio (not limited to VTS stations).



IEC TC80  
IEC 61162



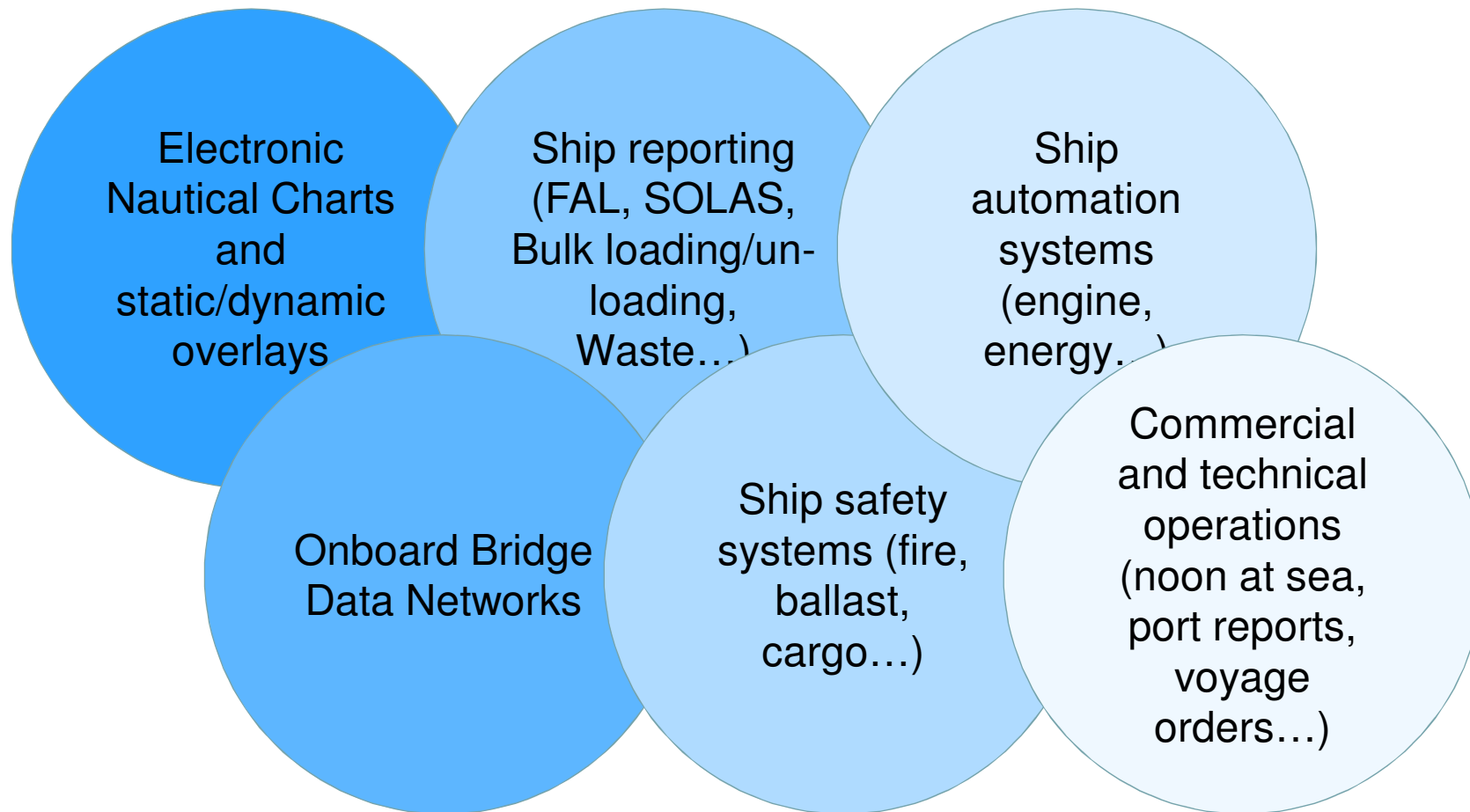
ISO, UN/ECE, WCO  
ISO 28005

However, there are other international standards already in use – also by IMO. NCSR 1/28, Annex 7

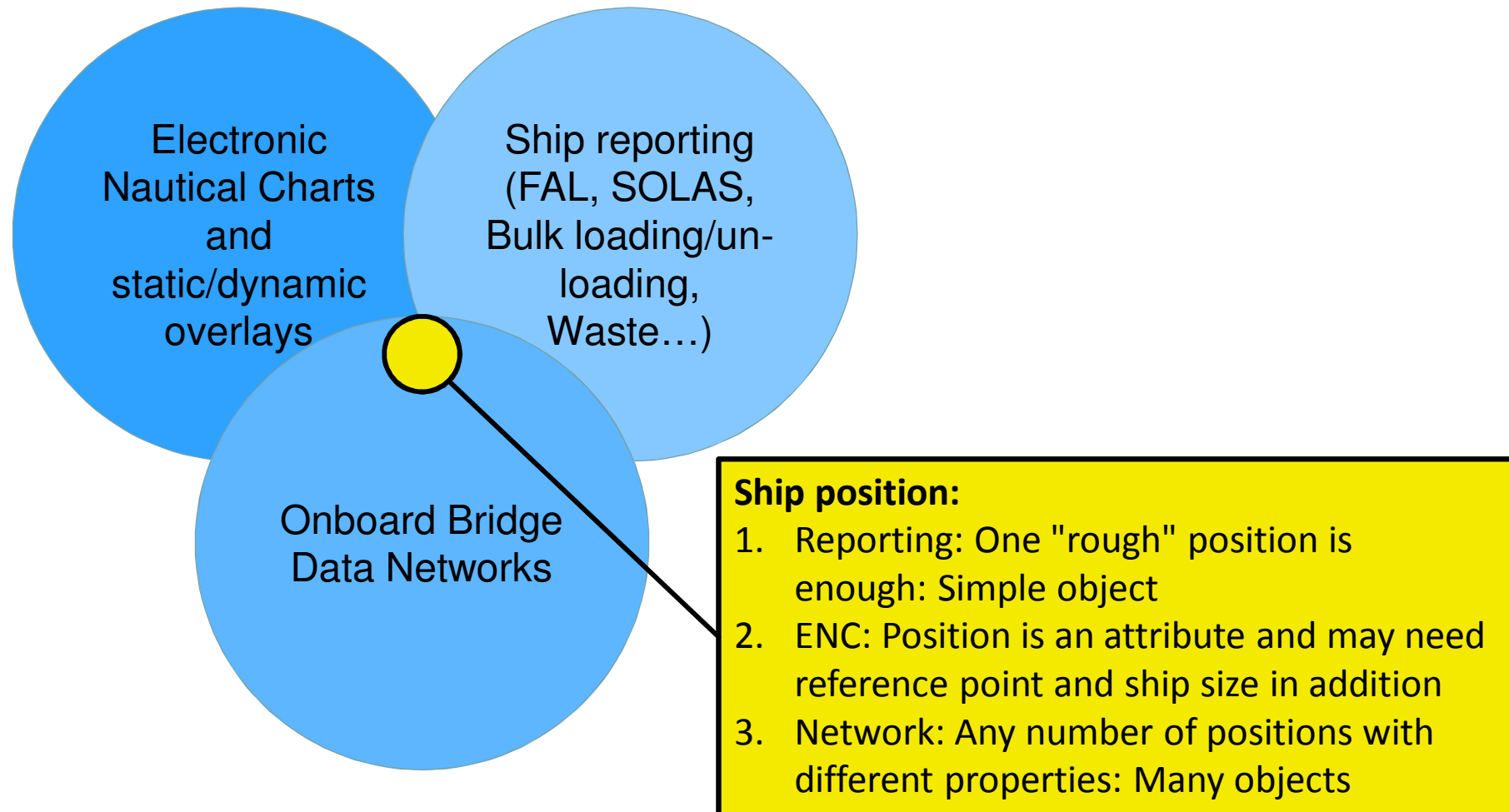
# We want to use and support the CMDS. What issues do we have to think about ?

- How do we incorporate the different domains (what domains) ?
- S-100 is a geographic information system (GIS) type information modelling framework: How can it be used for operational data (and what is operational data)?
- How to integrate existing information models (IEC 61162, ISO 28005) into CMDS?

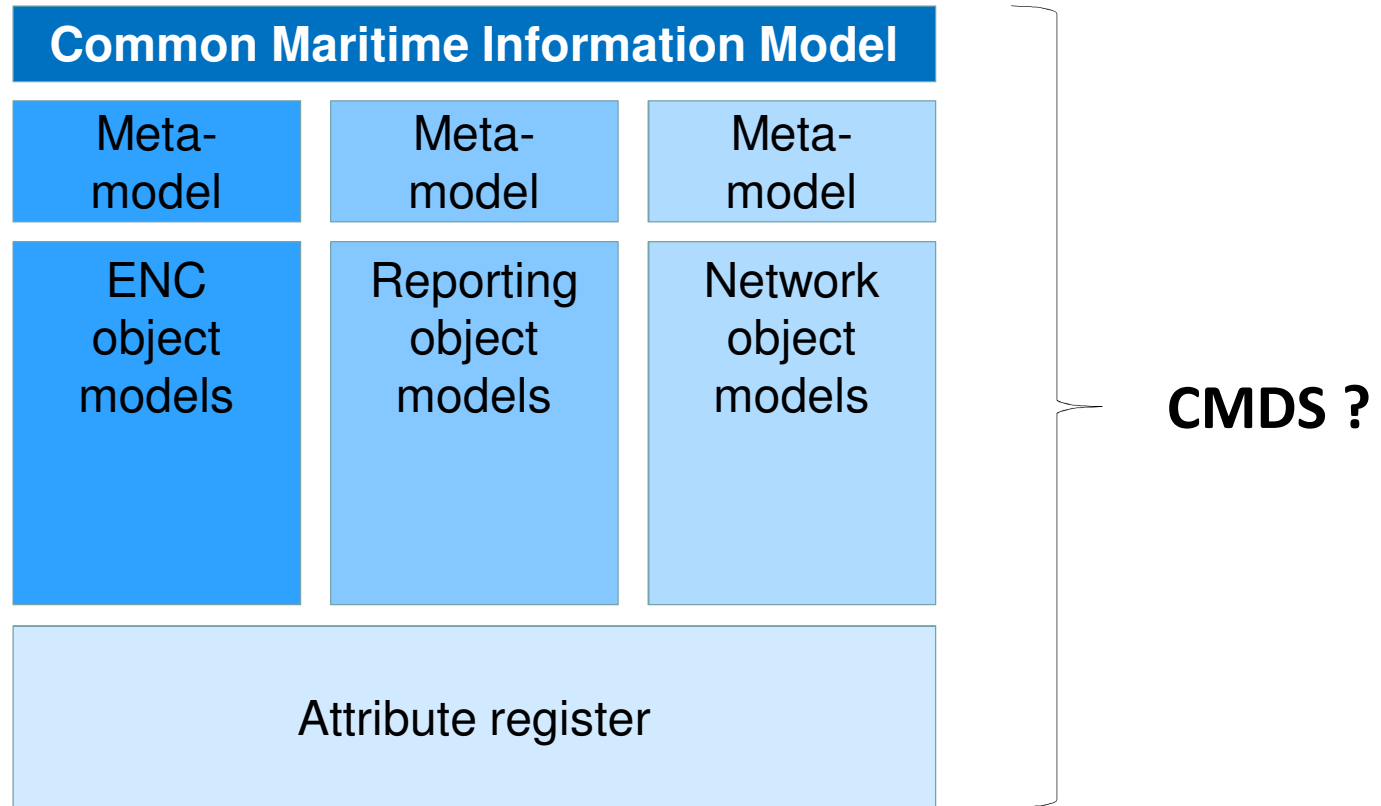
# What domains do we need to consider ?



# Problem: Semantics change between domains!



# We may need meta-models ?

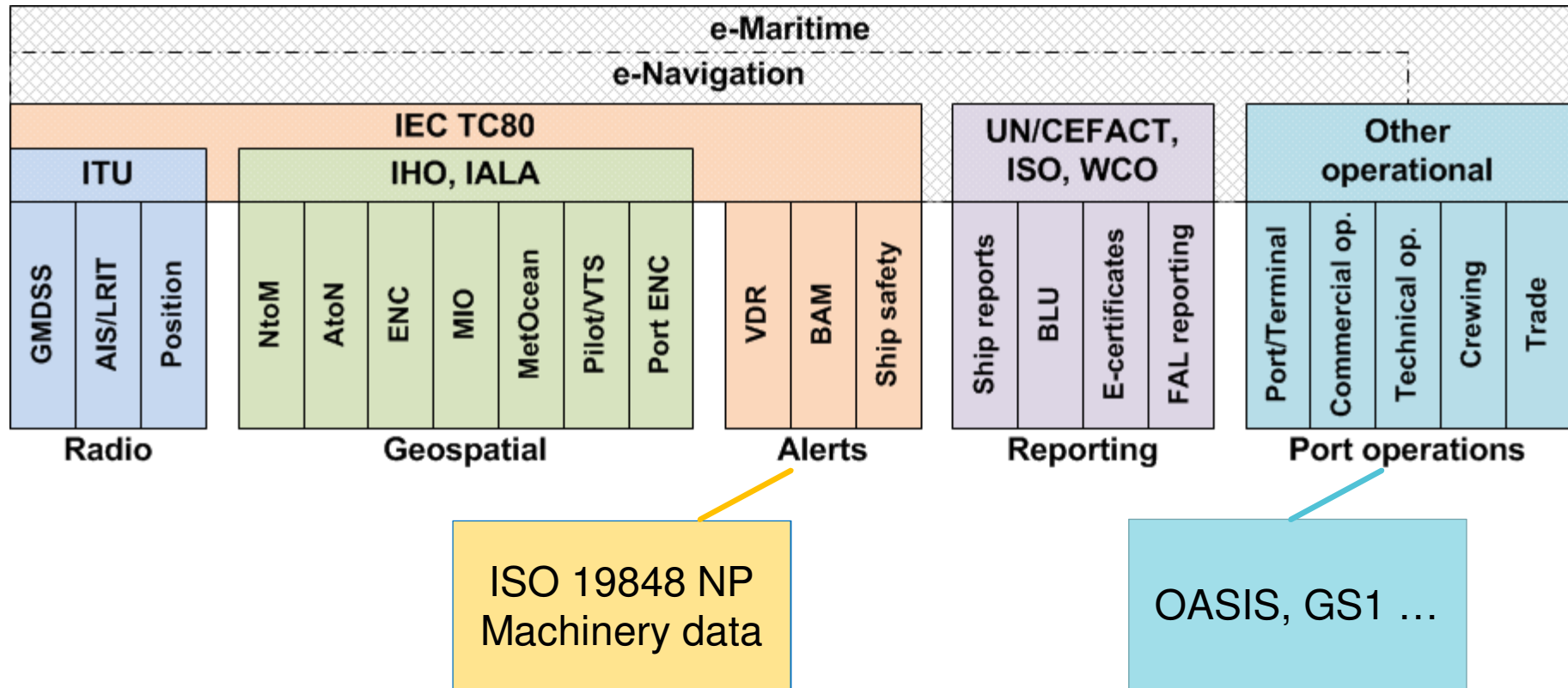




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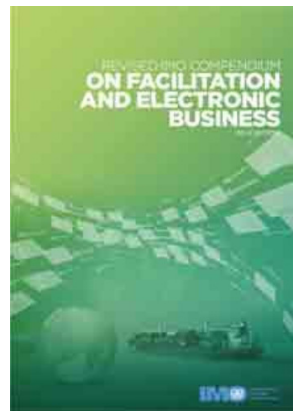
# Operational data?



- Several different information domains, not all geospatial in nature
- Links to even more domains outside e-navigation/e-maritime

# What do we do in the area of ship reporting ?

- FAL Convention issued in 1967 – Paper FAL forms
- FAL Compendium issued in 2001, covering EDIFACT based ship clearance
- New edition of FAL Compendium in 2014, also referencing ISO 28005 XML format
- WCO takes on editorial responsibility for Compendium in 2015



# In the direction of a normalized information model

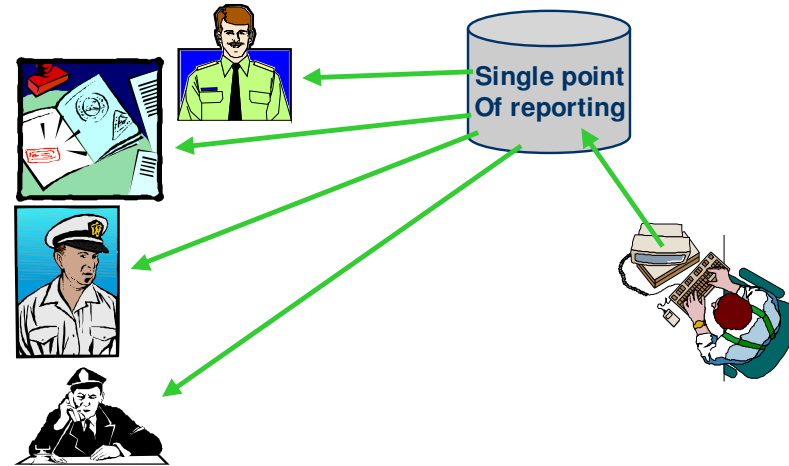
WCO details			
WCO ID	Name	Definition	Data Model Classes
130	Tariff quantity/Supplementary quantity	Quantity of the goods in the unit as required by Customs for tariff, statistical or fiscal purposes.	GoodsMeasure
131	Total gross weight	Weight (mass) of goods including packaging but excluding the carrier's equipment for a declaration.	Declaration
132	Gross tonnage	The measure of the overall size of a ship determined in accordance with the provisions of the International Convention on Tonnage Measurement of Ships, 1969	BorderTransportMeans

- Each object has stand-alone semantics as far as possible
- Standard representation (syntax)
- Reuse objects in different report types, adding more specific semantics in each

133	Description	ISO 28005 Data Type	FAL 1	FAL 2	FAL 3	FAL 4	FAL 5	FAL 6	FAL 7	ISPS	BLU	WASTE	SR cod
	Contact information of ship's agent	AgentType	X						X	X			T
	Air draught	AirDraughtType									X		
	Arrival draughts	ArrivalDraughtType									X		O
	Clean ballast water	BallastStatusType									X		
	Beam	BeamType									X		U
	Loading plan, requirements and details	BulkLoadUnloadDataType									X		
	Purpose of call	CallPurposeType								X			
	Cargo description list	CargoDataType		X					X	X			
	Brief description of cargo	CargoOverviewType								X			P
	Certificate of registry	CertificateType (RegistryCertificate)	X										
	Company name	CompanyType								X		X	T
	Crew list	CrewListType					X						
	Departure draughts	DepartureDraughtType									X		

# Product specification could be "Mandatory Reporting" No obvious portrayal ?

- Individual objects may have portrayals.
- Reporting requirement (24h, 72h, line) could be rendered in ENC as point on voyage.
- Product specification would specify how a certain reporting message can be assembled from CMDS elements.

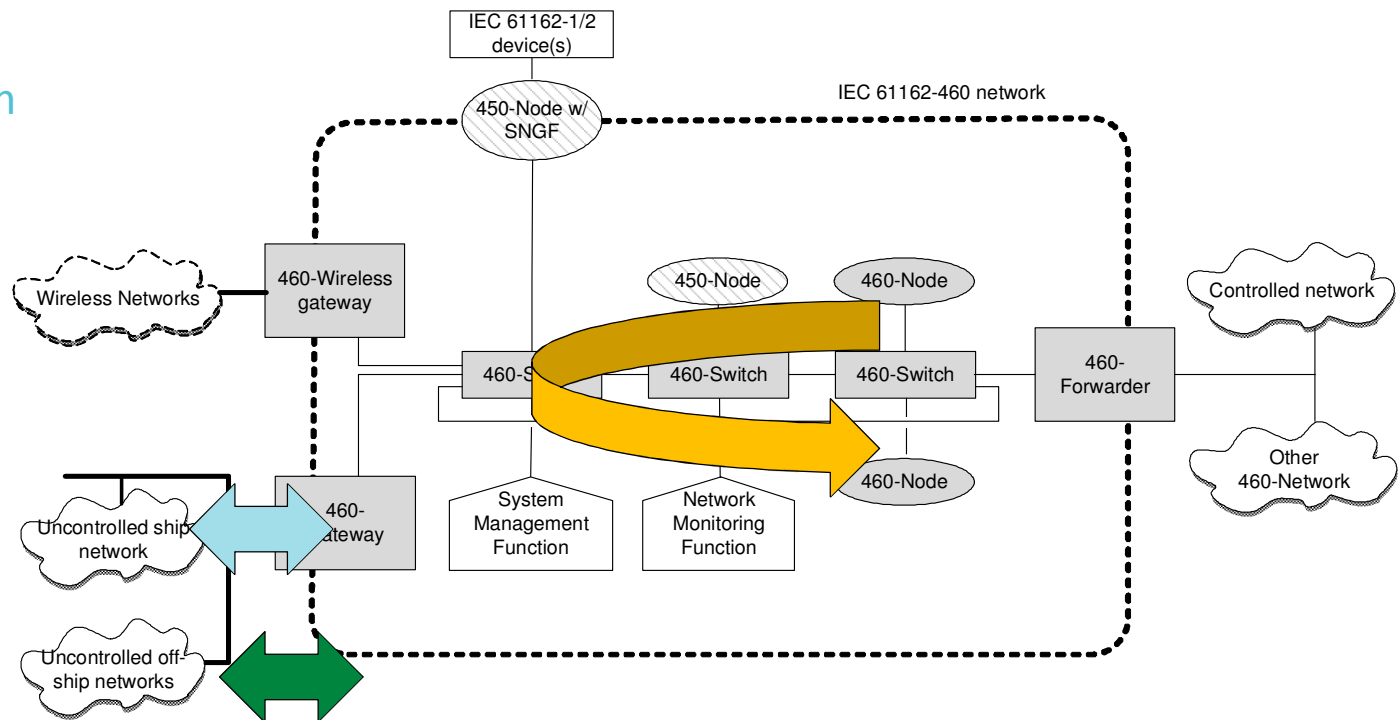


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# IEC 61162 in S-100 (in IEC 61162-460 configuration)

- Reporting to and from shore.
- Transfer to and from other ship systems.
- Describe internal data exchanges.



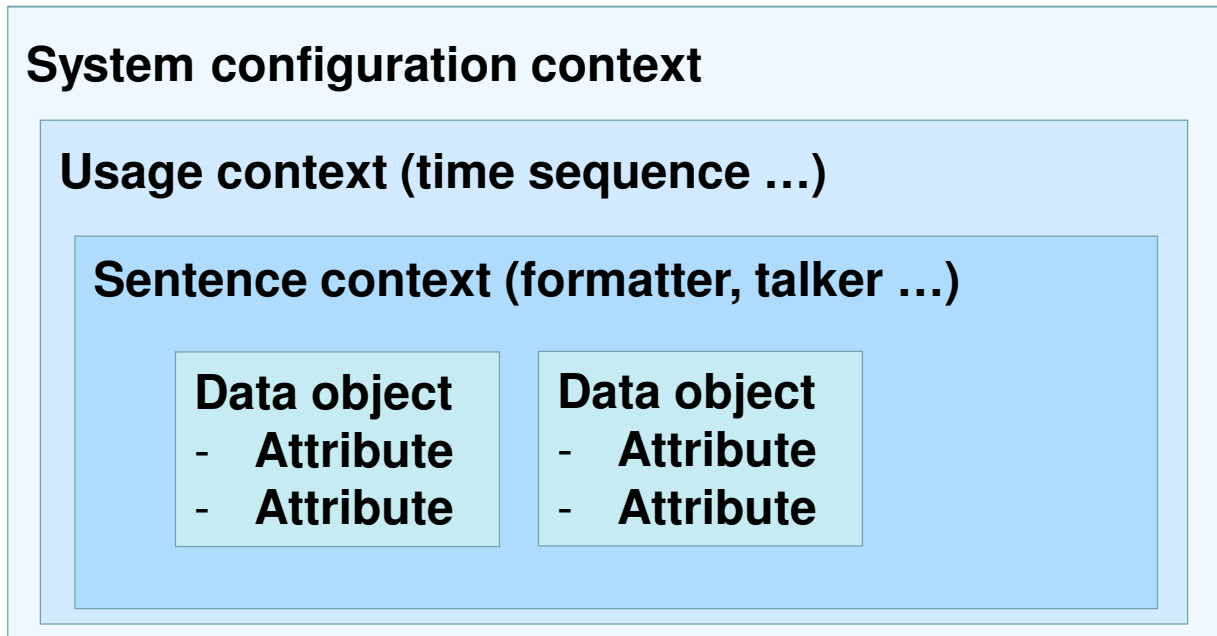
# Issues that can cause problems

- Streaming data vs. files
- Levels of detail in semantics

	Streaming	Semantic details
To/from shore		
To/from ship	(X)	(X)
Network internal	X	X



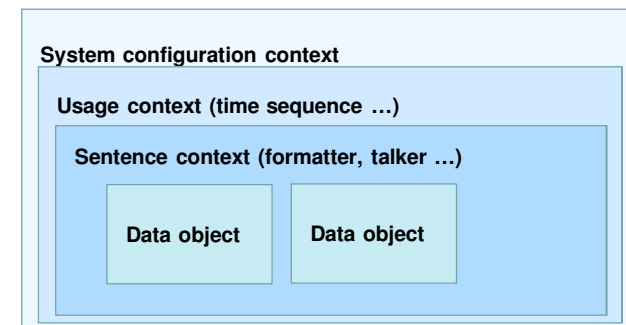
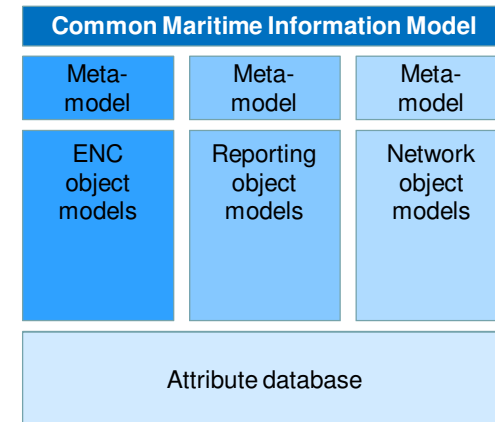
# Semantic details



- Full context may not be known: Dependent on system configuration and usage
- Complex context: Position fix is dependent on source, integration, time of acquisition, quality of signal, antenna position etc.

# Existing data model integration in CMDS

- The ISO 28005 ship reporting case is relatively straight forward. However, semantic compatibility and mapping may be an issue.
- IEC 61162 is more complex:
  - Much data is operational and not geographic (as ISO 28005).
  - Network context is complex and not necessarily known by gateway.
  - Attribute/object structure may not lend itself easily to a standard structure.
  - Streaming data is an issues also here.



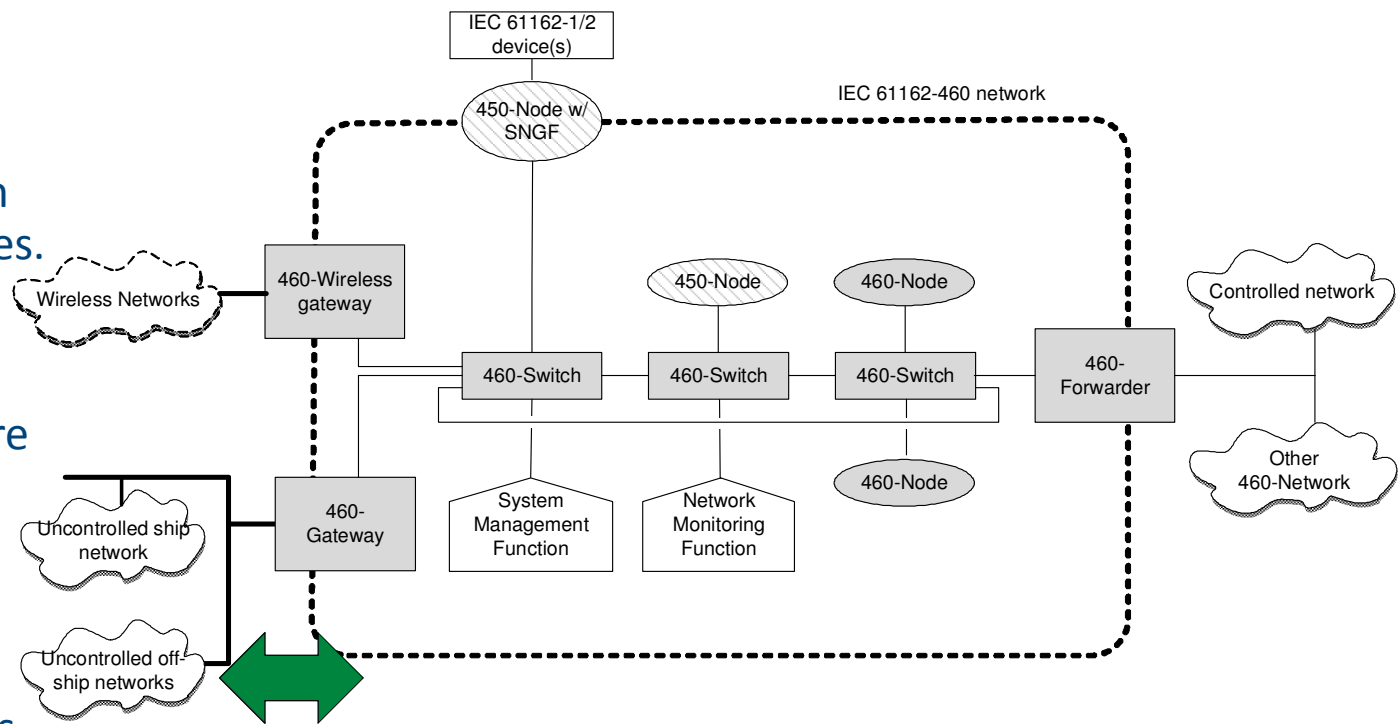
# IEC TC80 has established WG17 to look at these issues

- Will start with route exchange message from IEC 61174.

- May concentrate on ship-shore exchanges.

- Will investigate more complex methods.

- ISO TC8 will take up results and methods.



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Sorry: Only the problems and no clear solutions!

Thank you for your attention!