

Coping with complexity

Identifying requisite variety and unnecessary variety for VTS operators

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What to remember from this presentation

- Variation between operators is normal
- Successful standardisation is about knowing which variation to reduce and which variation to appreciate
- Applied research could be beneficial to identify variations

Motivation and background for the study



Source: Norwegian Coastal Administration

Objectives

- Identify how VTS operators use their **expert knowledge** and strategies in their interaction with vessels
- To examine if there are **variations** in the interaction with vessels between different operators



Source: Norwegian Coastal Administration

How the operators cope with complexity



Operator experience



Teamwork



Organisational knowledge



Communication



Photo: portofgothenburg.com

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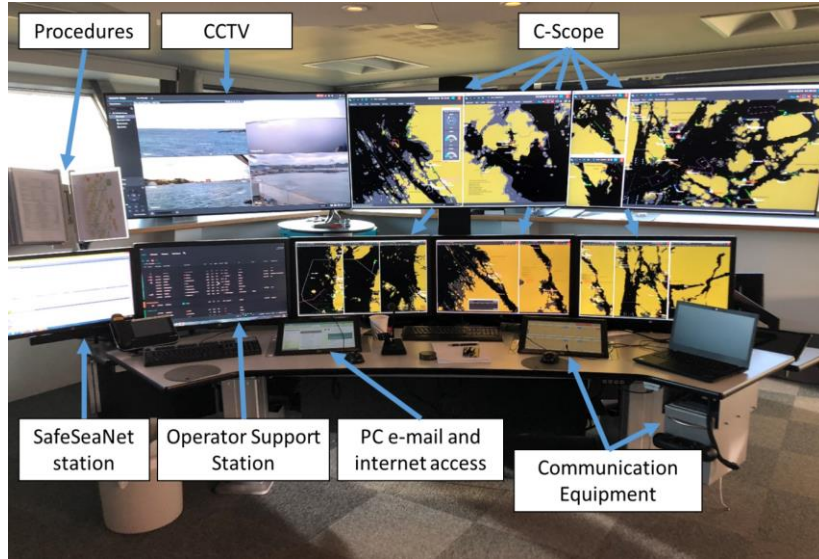
Communication



Photo: portofgothenburg.com



Organisational knowledge



- Technology development allows for more and **better functionalities to support** operators
- Functionalities **reduce workload**, and could allow for monitoring a larger geographical area
- The **constant development** and **personal interest** in new technology cause variation in how and when they are used
- **Transfer of experience** is difficult due to shift rotation



Organisational knowledge

- Most of the procedures are **prescriptive** (what), while a few are **descriptive** (when and how)
- Criteria in descriptive procedures is **well known, easy to follow**, cause **less variation** and could be **presented** on C-Scope
- Procedure where VTSOs are delegated authority to **order tug** is especially important
- VTSOs are positive about descriptive procedures, but the **variation in situations** makes it difficult to replace prescriptive with descriptive

Example of a prescriptive procedure:

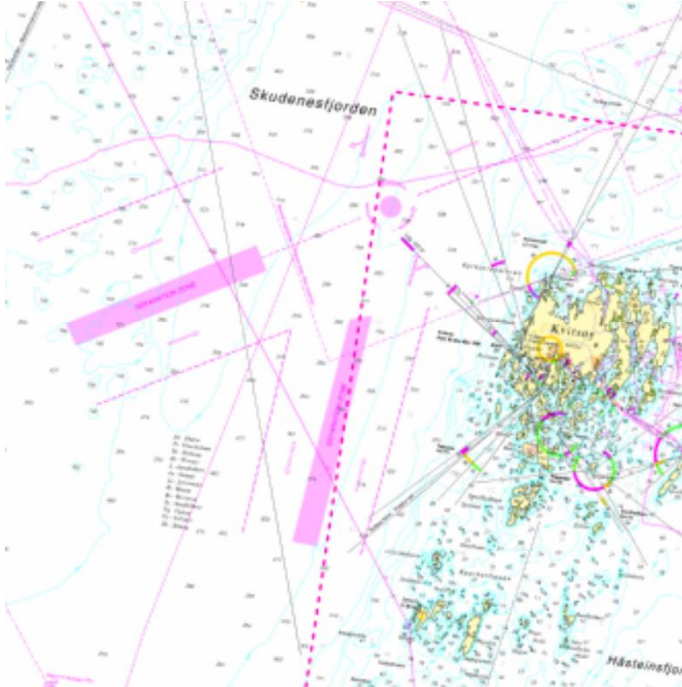
“when the VTS operator assess that it is a risk for collision, the operator should warn the vessels”

Example of a descriptive procedure:

when a forecast of wind stronger than 18 m/s (force 8) is issued the operator shall recommend the vessel to be ready for immediate start



Organisational knowledge




- TSS and restrictions in parts of the fairway **increase predictability**
- TSS is considered to **reduce the variation** in traffic and makes it **easier for crew** to communicate intentions
- Situations (deviations from plan) were **spotted earlier** in TSS than outside



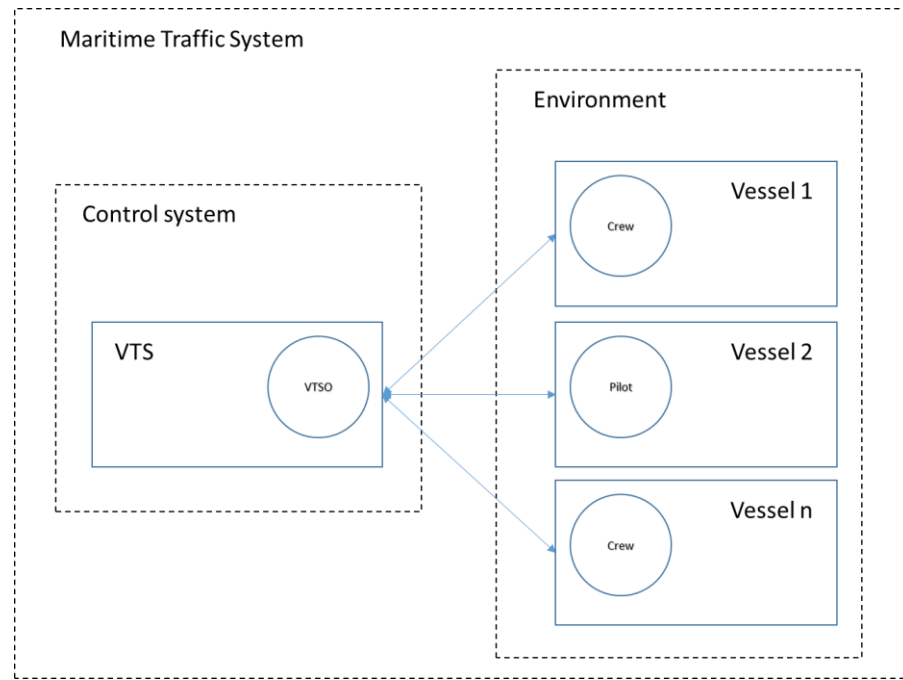
Communication

- Experienced VTSOs interpret **how** the crew communicate, not only what they say
- VTSOs say it is large variation between operators on **use of terms, what information** given and **when information** is provided, and variation is caused by their own **background and experience**
- VTSOs want the communication to be **short, concise and correct** and refer to SMCP
- **Norwegian** language is principally used
- **Message markers** are mainly used when communicating in English

Traffic Organisation 	
INFORMATION	You are cleared to enter VTS area, bound for XXX
INFORMATION	You are cleared to leave XXX, bound for XXX
INFORMATION	You are priority #X at PBG
INFORMATION	Vessel on your starboard side has a small CPA, QUESTION what is your intentions
INFORMATION	Vessel XXX is leaving XXX, INSTRUCTION wait until XXX is clear
ADVICE/INSTRUCTION	Keep minimum 0,5nm astern of XXX

Why do we need to consider variation

- VTSOs **adapt their behaviour** to meet the demands in the environment
- The VTS needs the **same or larger variety** as the environment it controls
- The risk: **standardising without understanding** the variation needed in the environment

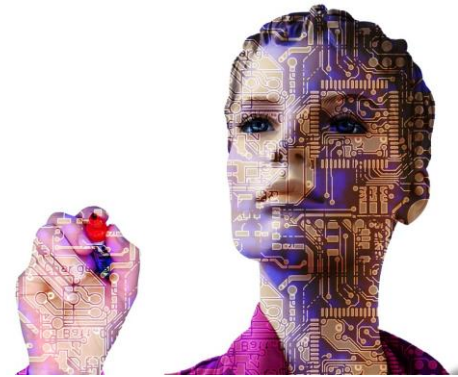


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The Future VTS

- How do we achieve joint optimisation of technology and operators?
- How could we reduce unnecessary variation?
- What services could facilitate for safe and efficient coexistence of autonomous and conventional vessels?



Source: Pixabay