WP 4: Supervision, monitoring and control

Tilsyn, overvåking og kontroll av våre farvann

MarSafe North
Maritime Safety Management in the High North

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With assistance of most parties

WP 4 - Objectives

- ✓ Requirements and challanges, considerations and findings
- ✓ Information integrity, information providers/sources
  -- a concept for integrity checking
- ✓ Concepts for collecting and integrating traffic data from different sources; The use of integrated independent traffic data to build a real-time traffic image along a transport corridor
- ≈ Establish a data warehouse / data mart holding historical integrated and independent traffic data along a selection of transport corridors
- ✓ Use of descriptive statistics e.g. traffic analysis
- ✓ Trends, visions and future needs
- ✓ What is left to do

Information quality and integrity..

Information / Data is relevant in it's right context;

- Operative data must be 'real time' (SAR, VTS, traffic monitoring 'Nowcasting' etc)
- Planning and predictions ('Forecasting') may be on 'near real time data' and statistics
- (Incident) investigations, science, statistics often works fine on historic recorded data

The information chain....

Upstream **Downstream**

Provider / Source → **Channel** → **Consumer / User**

Do we collect the '**true state**'?

-calibration

-coding

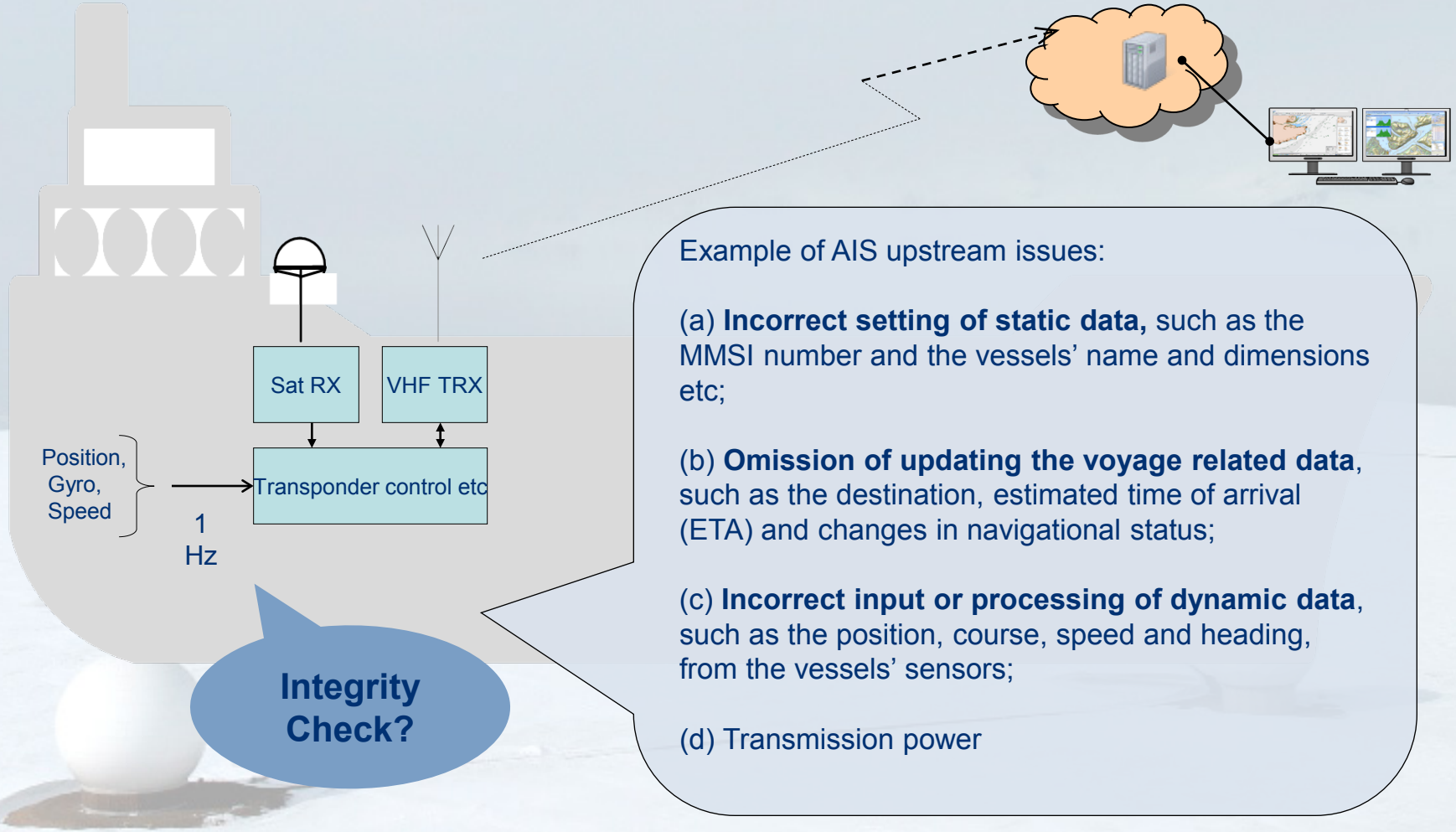
Will the information be presented **completely**?

Garbage in – Garbage out

Example: Will two 'identical' systems show identical positions?

Example AIS

Reporting and data communication systen over VHF



Example of AIS upstream issues:

(a) **Incorrect setting of static data,** such as the MMSI number and the vessels' name and dimensions etc;

(b) **Omission of updating the voyage related data**, such as the destination, estimated time of arrival (ETA) and changes in navigational status;

(c) **Incorrect input or processing of dynamic data**, such as the position, course, speed and heading, from the vessels' sensors;

(d) Transmission power

Integrity checking

- AIS data **consistency check** (content/Database/position/signal)
- **Validation/Authentication** of GNSS signal (Spoofing check; SoL)
- **Multi-source consistency** – compare position reports from more than one source

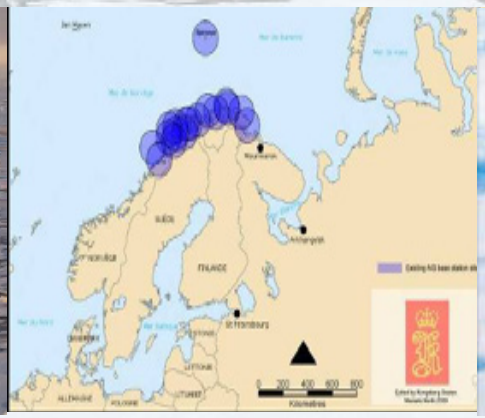
- Smart 'up-stream' integrity work will reduce problems downstream.
- Downstream, -combine information from more than one source.

Trends, visions and future needs

Future **VTS / VTM / VTMIS** are to be more proactive to handle increased tasks and service demands including extended decision support and alert capabilities

Remote assistance, Pilot aids Route planning/validation, time slot control etc

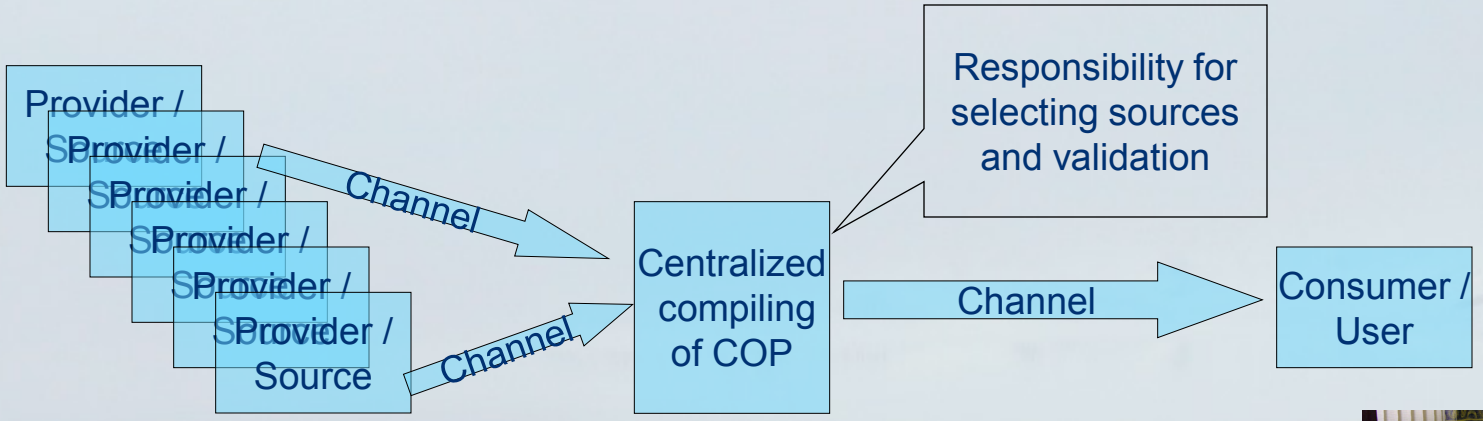
Satellite based AIS increase coverage and update rate will increase with number of satellites in use.

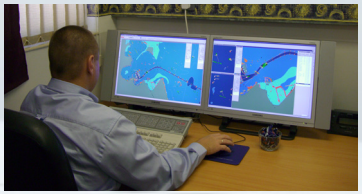


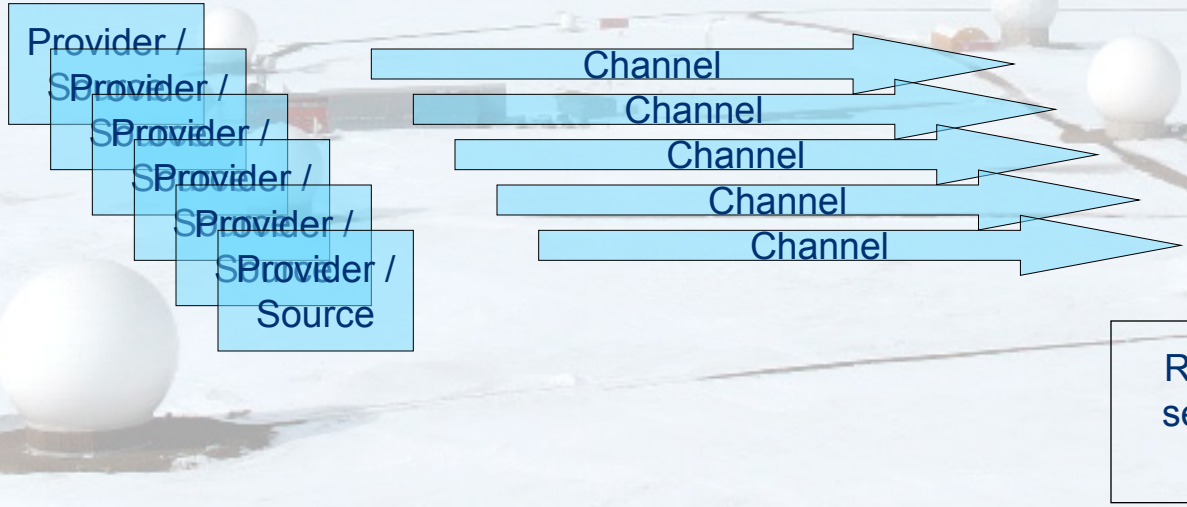
e-Navigation Challenges

- Existing traditional systems are often designed to operate for one specific purpose (*stovepipe and isolation*) like SAR, VTS, Police, Ambulance etc
- Systems need to interoperate with additional additional stakeholders (*interoperability and service orientation*)
- **Integrity matters will be more in focus**

Responsibility for the Common Operating Picture, COP







Vardø Trafikksentral – Vessel Traffic Services (VTS)

- **Monitoring all ships in the Norwegian Coastal Waters**
- **Information exchange with European Maritime Safety Agency (EMSA)**
- **Linked to regional VTS centers**

The KONGSBERG C-Scope VTS System

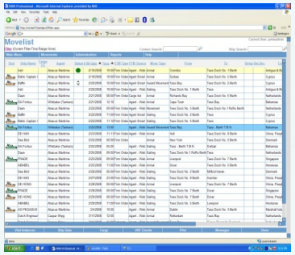
Operator terminals goes mobile

AIS Base Station(s)

Hydro
nsor(s)

VTS/Operations Centre

Radar(s)



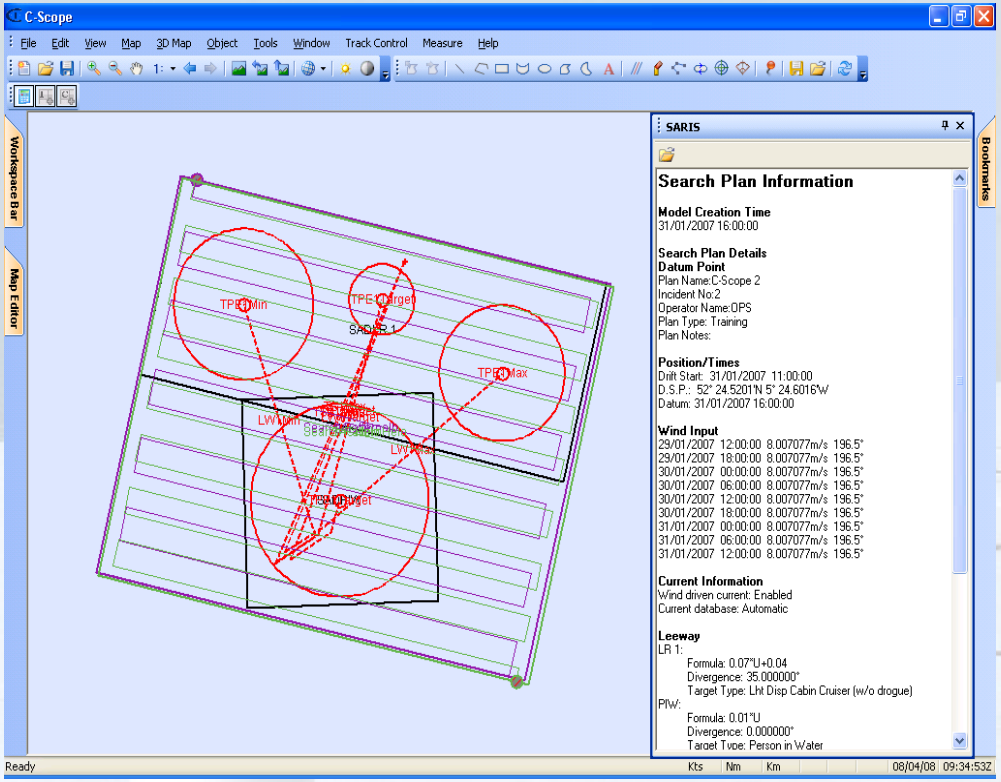
Data bases

VTS Traffic Image/ Common Operating Picture

VTS Traffic Image/COP & Information source(s)

Example -Emergency Response;

Search and Rescue -- Oil spill

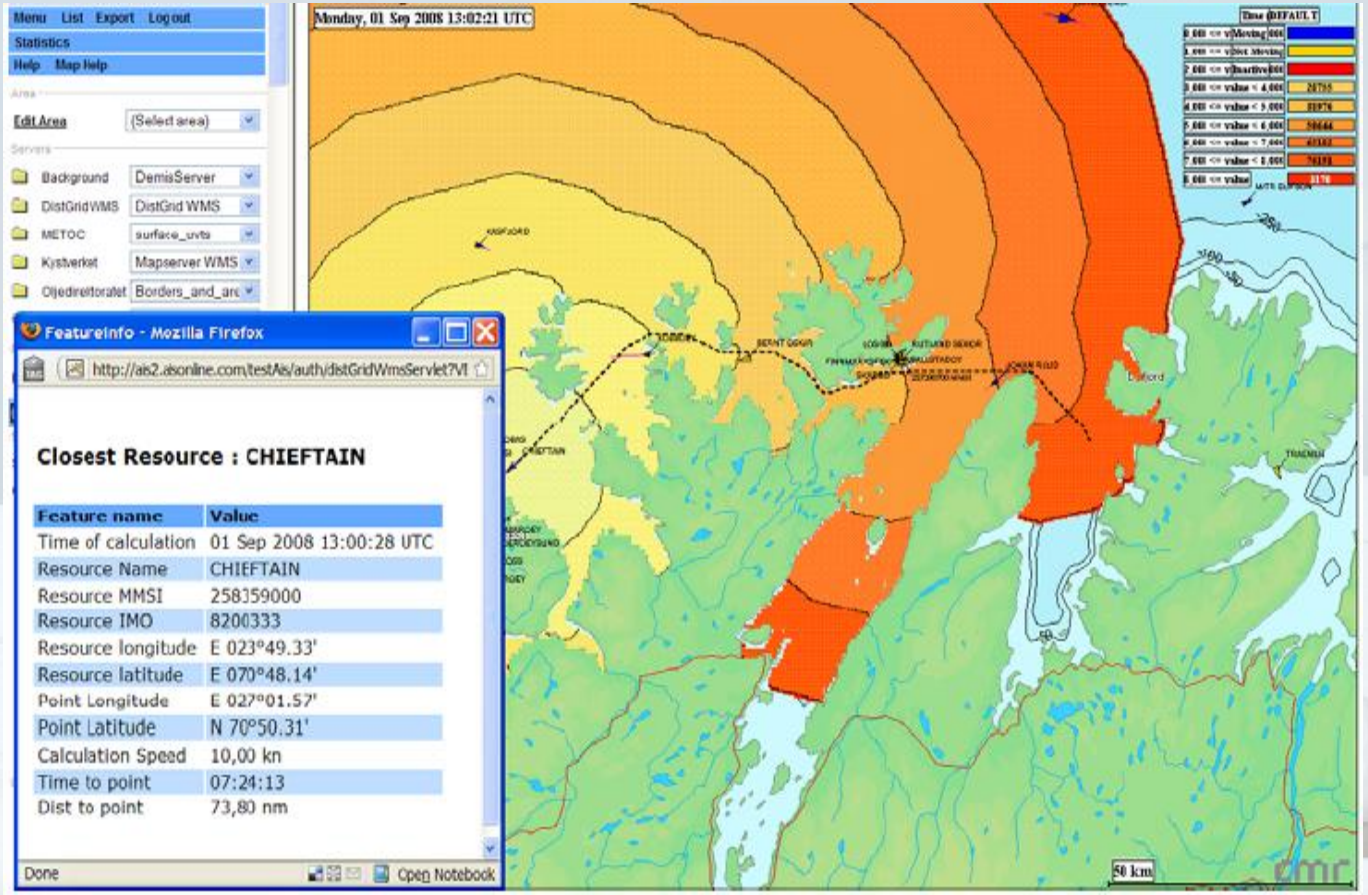


SAR search pattern imported and overlaid onto the real-time VTS Traffic Image

Search patterns/areas are distributed to all units involved such as:

- Police
- Fire
- Ambulance
- VTS Centre(s)
- Allied Services

Example -Emergency Response;
Resource management



Closest resource - response calculation

The need of further work….

- **Integrity and security**; elaborate a plan to implement ‘upstream’ integrity enhancements (e.g. certification of transponder installations)
- **Common Operating Picture**
  -Techniques for merging/fusing/presentation of information collected from a extend set of information providers
- Ad Hoc **networking and mobile data providers** (e.g. UAVs)
- **MMI** (look and feel) for user to form adequate presentation and controls to be similar for all users – What about mobile terminals?
- **Telemetry** of critical vessel status data
- Agile communication concept; Availability –Bandwidth - Price
- Pilot assistance /remote piloting
- Architecture