



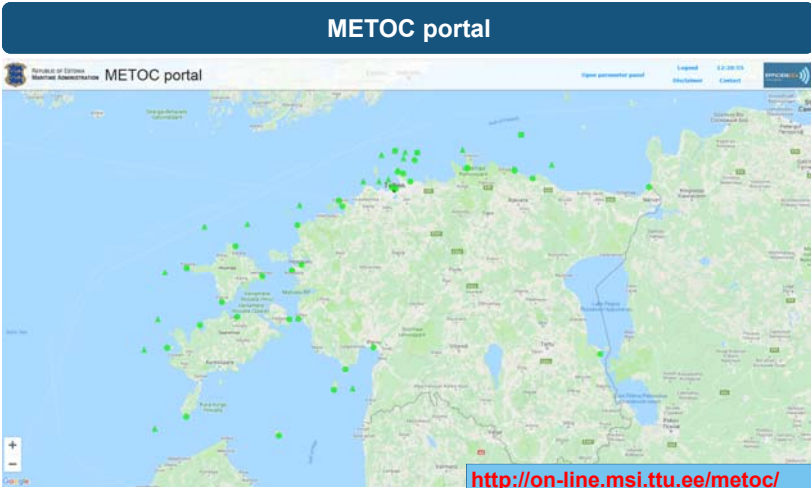
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- For marine navigation, there is a need to have the most accurate, timely and relevant information – both actual and forecasted – describing the meteorological and oceanographic (METOC) aspects of the environment. For example, comprehensive weather and flood forecasting and oceanographic features such as wave heights, temperature, salinity, surf and tidal movements, which can seriously affect marine navigation.

- The need for these products is great and rapidly increasing as maritime commerce continues to grow. Ships are getting larger, drawing more water and pushing depth limits to derive benefits from every last inch of draft. A major challenge is to improve the efficiency of marine navigation and commerce, while reducing risks to life, property, and the environment. With increased marine commerce comes increased risks to the environment, making marine navigation safety a serious concern.

- There are numerous web portals and databases, providing situational awareness on present and future environmental conditions, by integrating data and information from across different platforms, for use by decision-makers, including researchers, government managers, industry, the military, educators, emergency responders, and the general public.

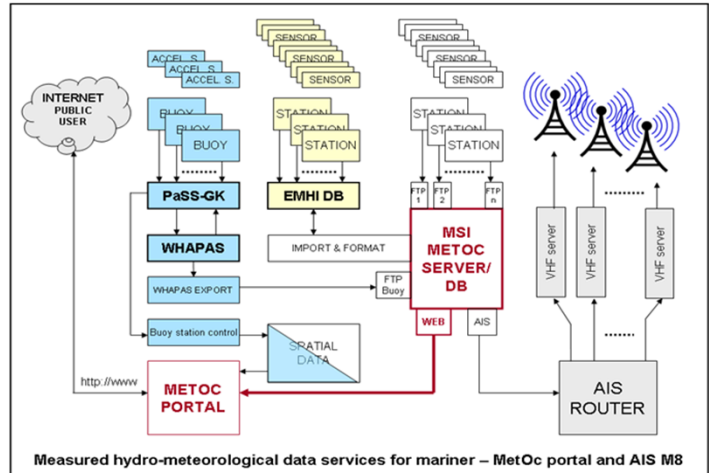
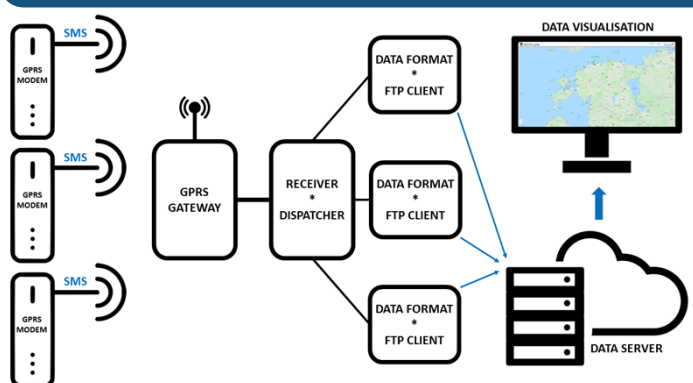
- In order to make information available to users to help them make decisions around their marine activities, data collected by offshore buoys, tide gauges, vessels etc. are often shared in real-time. This typically means within 1 hour from when the observation is made. Radio, phone or satellite communications are used to send the data back to a central repository to make them available in near real-time.



<http://on-line.msi.ttu.ee/metoc/>

General layout of the METOC system showing on-line data flows from different providers, software blocks and servers with output into eNavigation

The general scheme of data flow in operational oceanographic on-line data system of the Marine Systems Department at Tallinn University of Technology



Measured hydro-meteorological data services for mariner – MetOc portal and AIS M8

METOC portal overview

- Nowadays automatic weather and ocean measuring platforms already have on-line data transfer ability, which allows us to build on-line measuring networks. However, different organizations often have different data flow principles, protocols, etc, but systems that are network capable can also be integrated with modern data harvesting and compilation technologies.
- In Estonia, there are several organizations running operational weather and sea measurements, ranging from harbours to the state hydrometeorological agency.
- With METOC, an effort has been made to build up a data acquisition platform able to take in different on-line sources of hydrometeorological data, organize data into a unified database system and launch a public webpage.
- In addition to the provision of public access to data from various measuring equipment from different institutions, the information measured, is converted in the portal to a similar, comparable form.
- Most important information from meteorological stations are wind data (wind speed/gusts and direction), but also air temperature/pressure, humidity, visibility and rain accumulation are measured and presented in METOC portal. Buoys give information about wave height and period.
- This data can be seen online in form graphs as well in numeric format and are stored in data files. In addition, many stations give information about sea level, salinity, current speed/direction.
- For presentation of real time data of the METOC system, a special web solution has been developed and realised and is active at the address <http://on-line.msi.ttu.ee/metoc/>.
- Provided data is shared in real-time, in 5 minute intervals, which makes this a unique and useful tool for navigation purposes compared with other similar portals, where the real-time data is transmitted hourly.

Portal data sources

- Stations of Department of Marine Systems at Tallinn University of Technology
- Estonian Environment Agency Estonian Weather Service (EWS)
- Navigation buoys of Estonian Maritime Administration (EMA) linked with Wave Height and Period Analysis Software (WHAPAS) by SABIK AS
- Different harbours

Summary

- Users need operational oceanographic data for decision support via one-stop-shop products, giving right parcel of data in time moment.
- Development of e-Navigation tools in the Baltic Sea area in frame of EfficientSea project created novel navigation support tools.
- Oceanographic on-line data and wave heights obtained from conventional navigation buoys are transmitted via AIS (Automatic Identification System) message M8 to nearby ships, automatically.
- Web-based METOC portal <http://on-line.msi.ttu.ee/metoc/> was designed and launched, showing data from over 50 real time data sources, run by different organisations in Estonian coastal sea.
- More than 1200 active users of the system have been recorded so far, with over 120 000 clicks over three years.

Navigation in METOC portal



- Pointing at station window pops up with the station's name, data provider and the parameters available from this particular station, also the date and time of the latest measurement are shown.
- All parameters in this first menu are clickable and the next screen view opens with some history of the selected parameter. The default time window is 10 days, but the upper row allows choosing 1, 2, 5, 10 and 30 day periods.

