

Fusing navigation: ECDIS, drones flights and aviation¹

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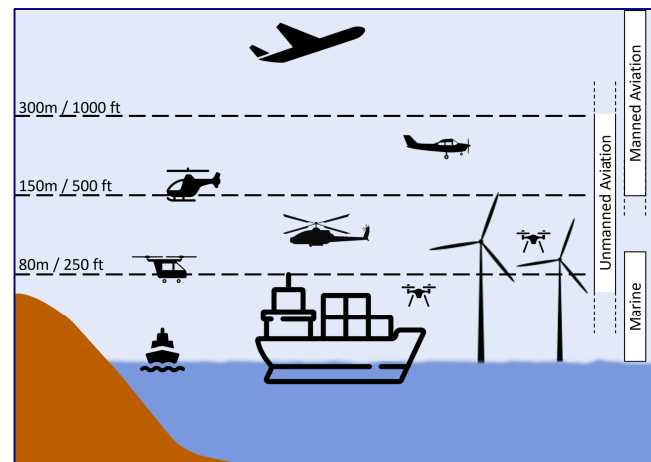
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ECDIS² is the global platform in maritime navigation. Its common base is the ENC, electronic navigational chart, which has replaced paper charts. Actually, it's globally agreed standard S57 is to be updated to the new S-100 family of standards. This opens integration of many more information, environmental data, even in real time (forecasts?) like surface currents, waves etc. being displayed as separate layers (S-111 etc.).

Nowadays, marine operations for offshore oil & gas or wind parks are supported on the water (supply vessels, tug boats, survey vessels, etc.), and receive additional support from the air, mainly helicopters and – this is new – from drones. Classically, there is the maritime space and the airspace (aviation). Both are vertically separated. Maritime space, apart from underwater operations, takes place 2-dimensionally on the water surface and aviation takes place in the airspace above 500ft (150m), usually higher than 1000ft (300m).

Both worlds are highly professional and internationally harmonised. However, apart from military applications, today the two worlds are separated. This applies to both the technical infrastructure and the legal framework, which in the maritime sector is defined, regulated and controlled by international bodies like IMO, IHO, IALA, EMSA. The situation is similar in aviation.



¹ Preprint of a contribution to the Hydro 2024 international conference, <https://hydro2024.com/>

² ECDIS = Electronic Chart Display and Information System. ECDIS is the internationally established workhorse in shipping, the same working platform on the bridge, with the pilots and on the control tower of the Vessel Traffic Services (VTS).

More and more drones will play a role in complex operations. The trajectories of drones may overlap with both the maritime and aviation sectors. Collisions with manned aviation and with ships (antennas, superstructures, containers) must be avoided. This results in new challenges that need to be addressed. For the foreseeable future, the world of aviation and the maritime world will not be integrated, but there should be a certain level of awareness for each other.

Consequently, there is no common situational picture shared among all partners in complex operations. However, information about the mission and trajectories should be shared between the two worlds. Concerning the maritime, the data could be displayed as an additional layer in ECDIS, whenever needed.

Concrete tasks for the maritime:

- Definition of the required information from drones or from aviation in general, prioritising it.
- Importing this data in near real time, defining the interface, visualisation of the trajectories of flying objects on ECDIS, with direction and speed, plus flight altitude. Filters or alarms, e.g. with regard to flight height, might be helpful.
- Visualisation of data surveyed by flying drones

This calls for new applets within ECDIS to import and display this additional information. International bodies like IHO are open to define and add new S-100 numbers for these new types of information. The advantages are at hand: no costs for additional hardware, little investment in training people, as ECDIS is already well established. Concerning aviation it is a similar situation. Information about ship traffic might be critical for drones. Providing this data via ECDIS interfaces (direct or via web) opens new opportunities for e.g. mission planning, providing a safe navigation across water. Integrating the newcomer “drones” in reliable standards adds to the safety gain.

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Most Relevant Theme(s):

A common situational picture for the maritime, for drones and the aviation airspace