

Integrated UAV marine operation planning for surveillance, oil spill observation and arctic ice management

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Marine operations are currently driven towards more challenging environments, such as the arctics, that are further away from the coasts, harsher weather, and require all day/year operations. The use of unmanned aerial vehicles (UAVs) to support such operations is a rapidly emerging research topic that calls for fundamental research in cyber-physical systems. One of the main challenges is due to very limited permanent communication infrastructure (e.g. limited to Iridium satellite links that have very low bandwidth, low capacity and high latency). Heterogeneous networks of UAVs, satellites and surface ships that utilize ad hoc networking, relaying and delay-tolerant networking as enabling technologies can be integrated with mission and motion planning functions. We will present recent research results on the integrated planning of UAVs motion taking into account task assignment, communication requirements subject to communication path loss constraints, optimal estimation of distributed phenomena using payload sensors, as well as conventional constraints such as vehicle capabilities, fuel, anti-collision, and anti-grounding.

Further details can be found in the following references:

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