
Deliberative path planning for an autonomous unmanned surface vehicle performing MCM operations

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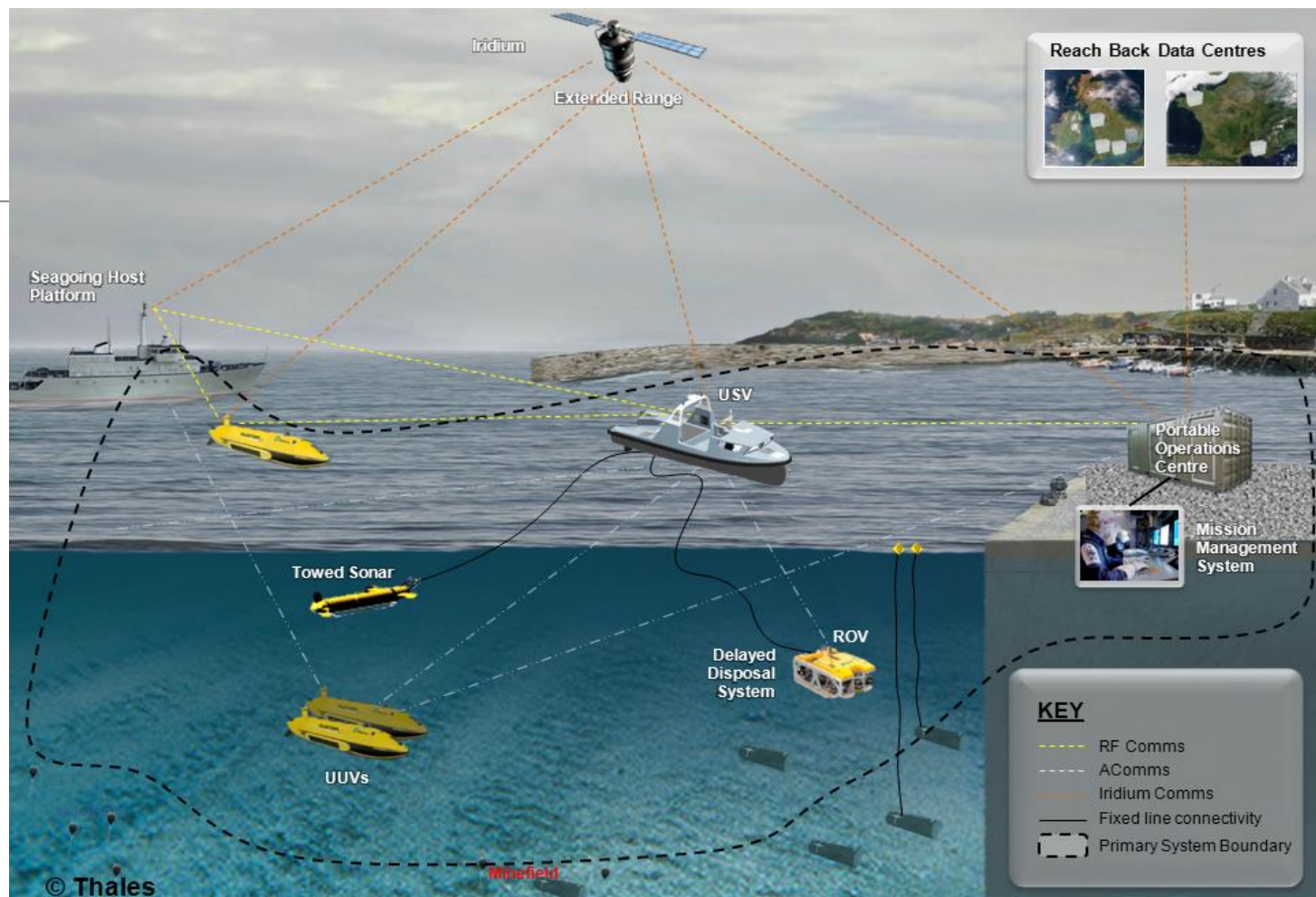
Stockholmsmässan, Sweden

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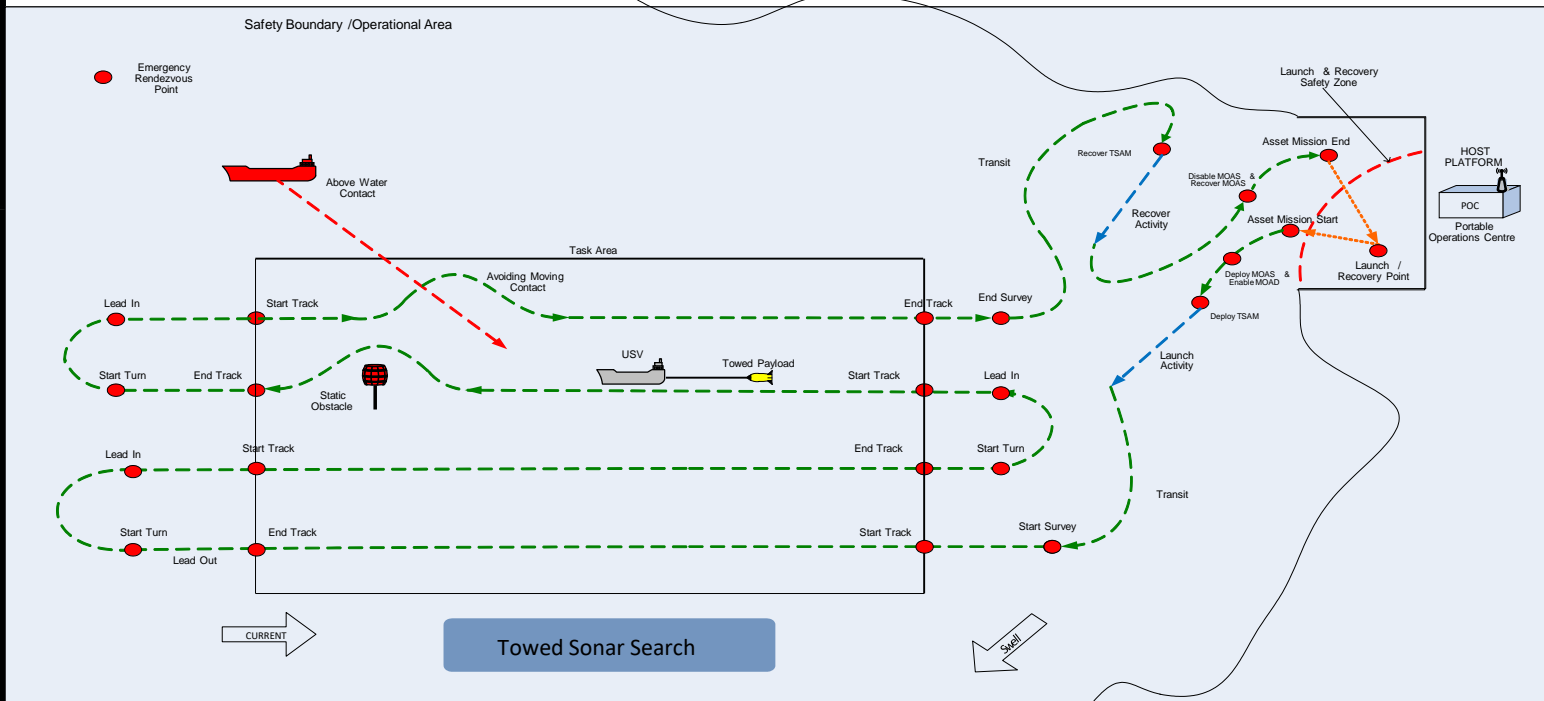
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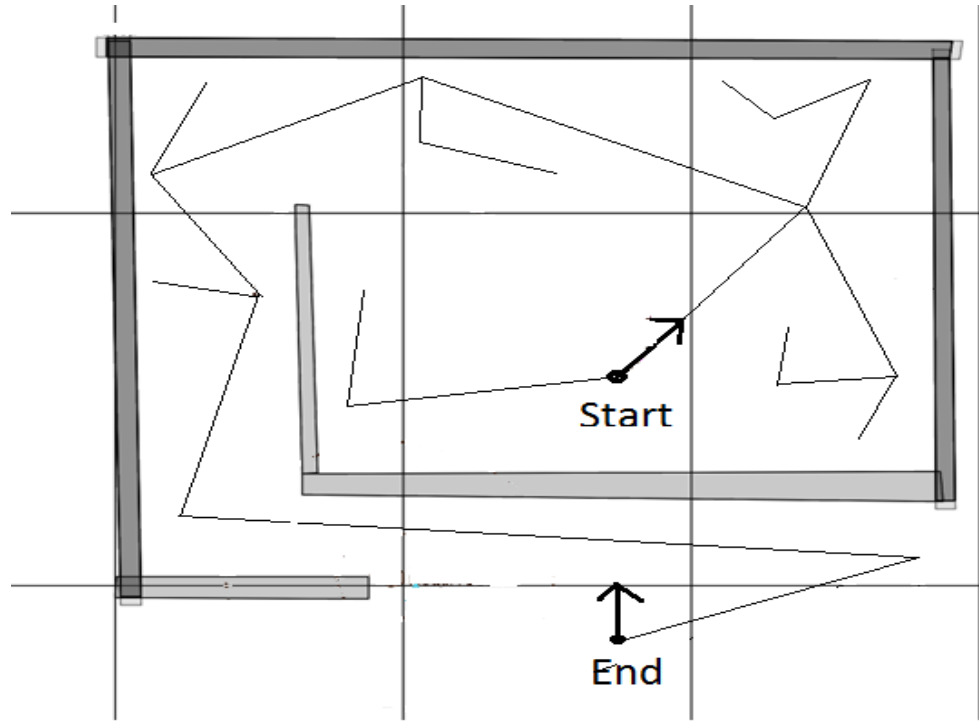
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We needed a deliberative path planner to:

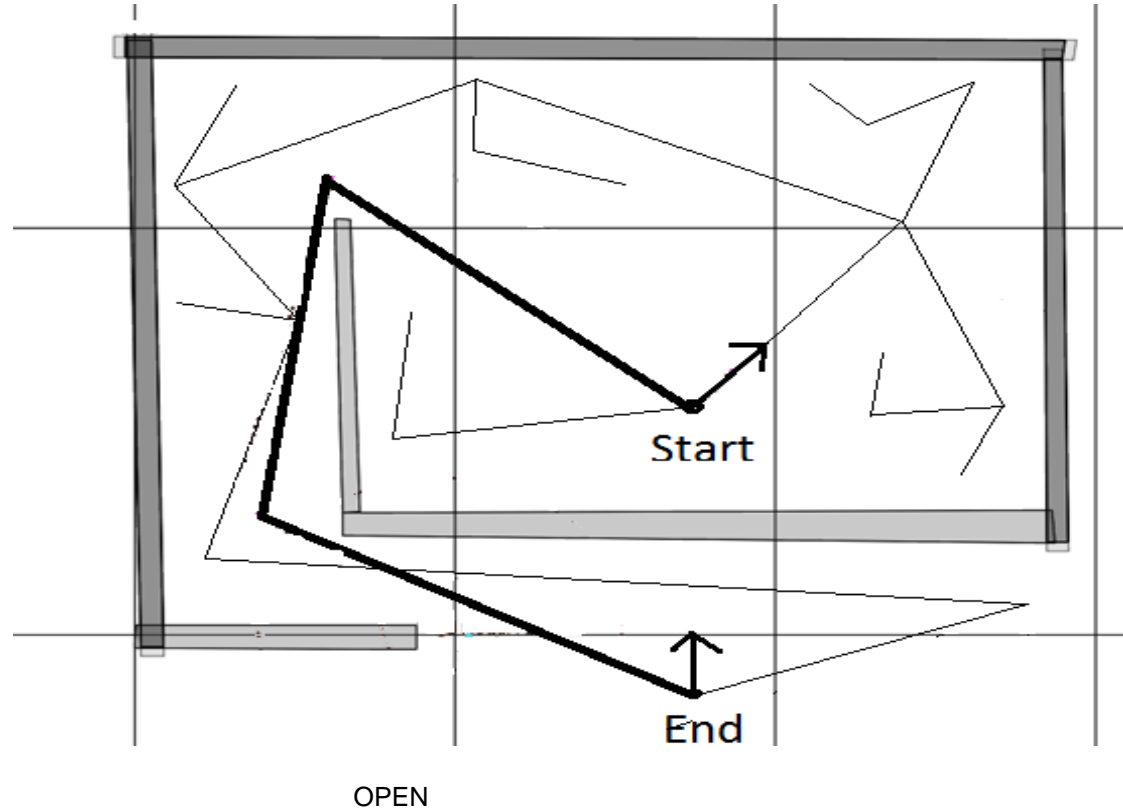
- (i) Perform a turn at the end of a survey track given only the pre-planned end of track waypoint and the next start of track waypoint taking into account the ocean current sensed by the USV at the time the turn begins.
- (ii) Perform manoeuvres for towed sonar launch and recovery where the positions and poses to be achieved are computed during the mission and depends on the prevailing swell direction sensed by the USV.
- (iii) Performing manoeuvres to resume a mission when the watch-keeper re-engages autonomous control after a period of direct operator control.
- (iv) Performing manoeuvres after a behaviour based collision avoidance manoeuvre where the USV needs to compute a path back to resume its mission_{OPEN}

Rapidly exploring random trees

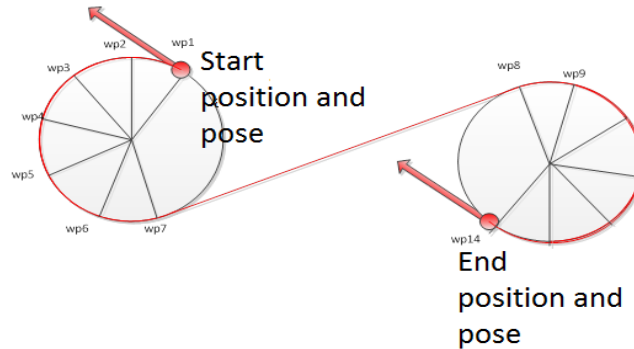
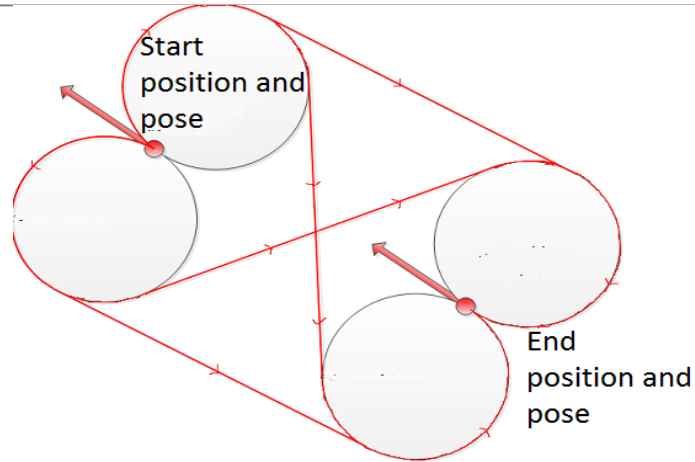


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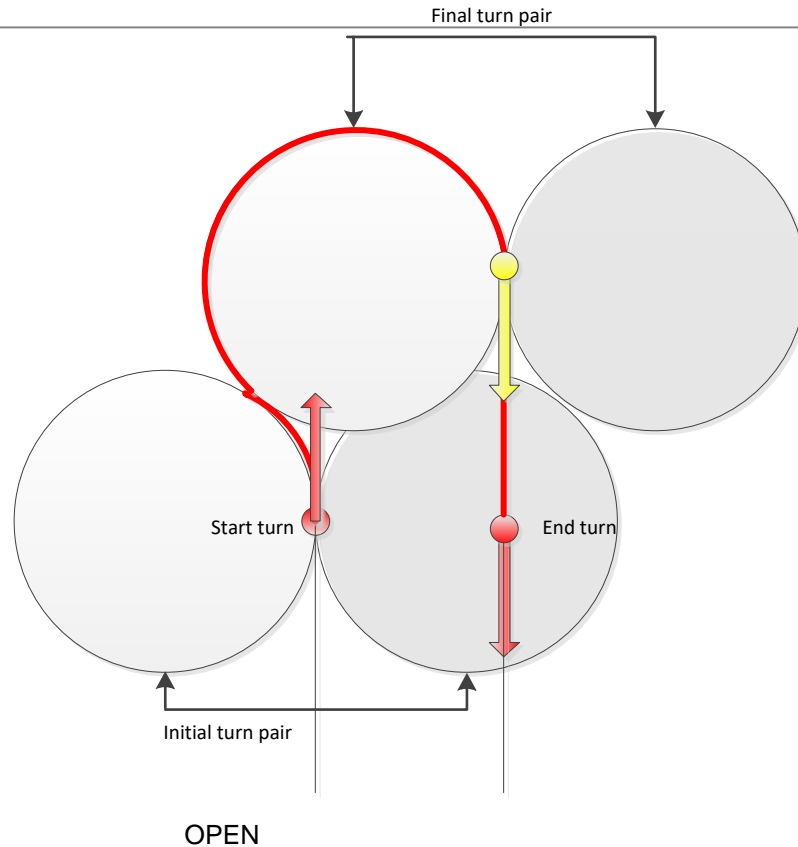
Path optimisation



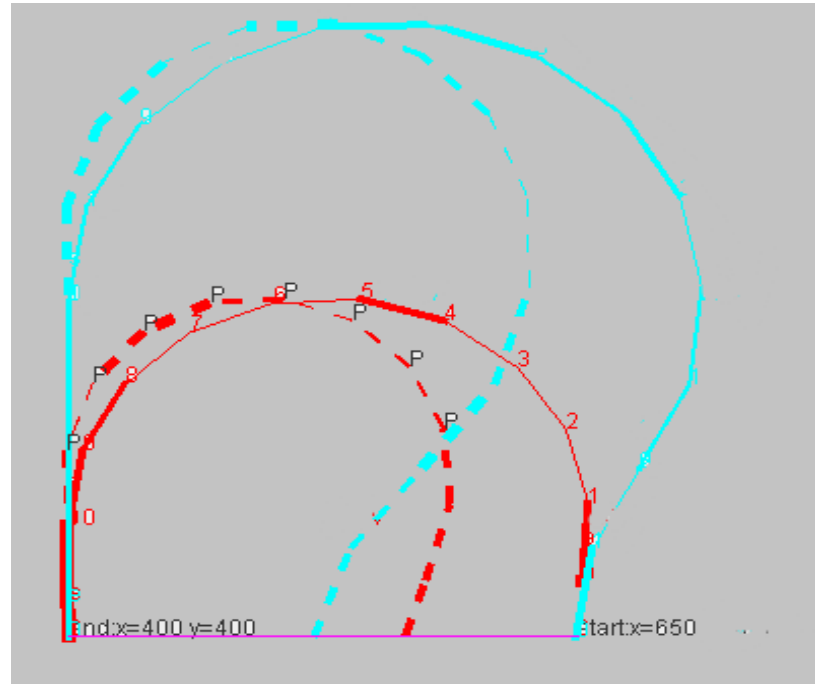
Dubin's curves



Using Dubin's curves to construct Boutakoff turns

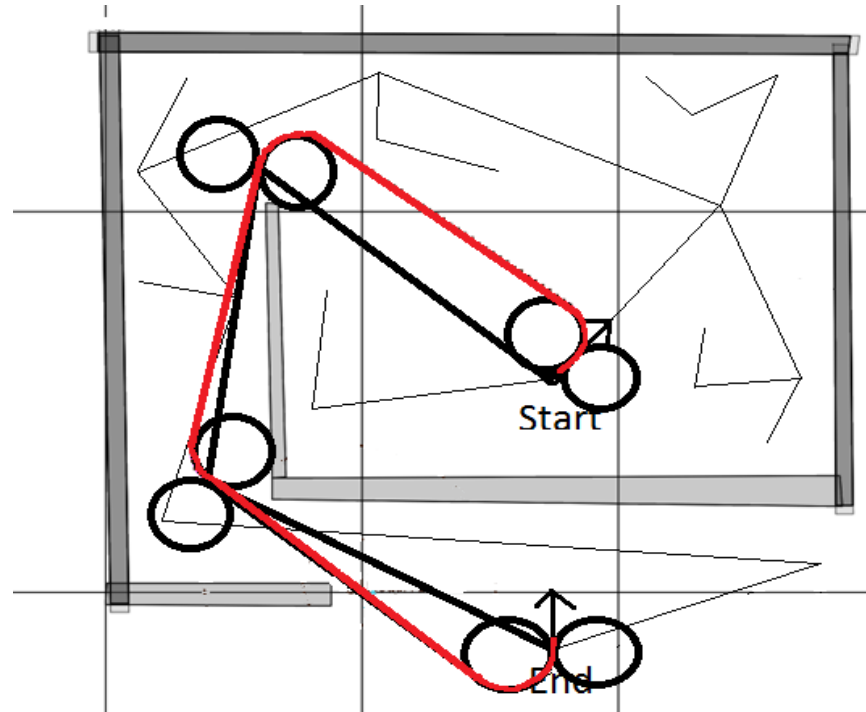


Dubin's curve drift compensation



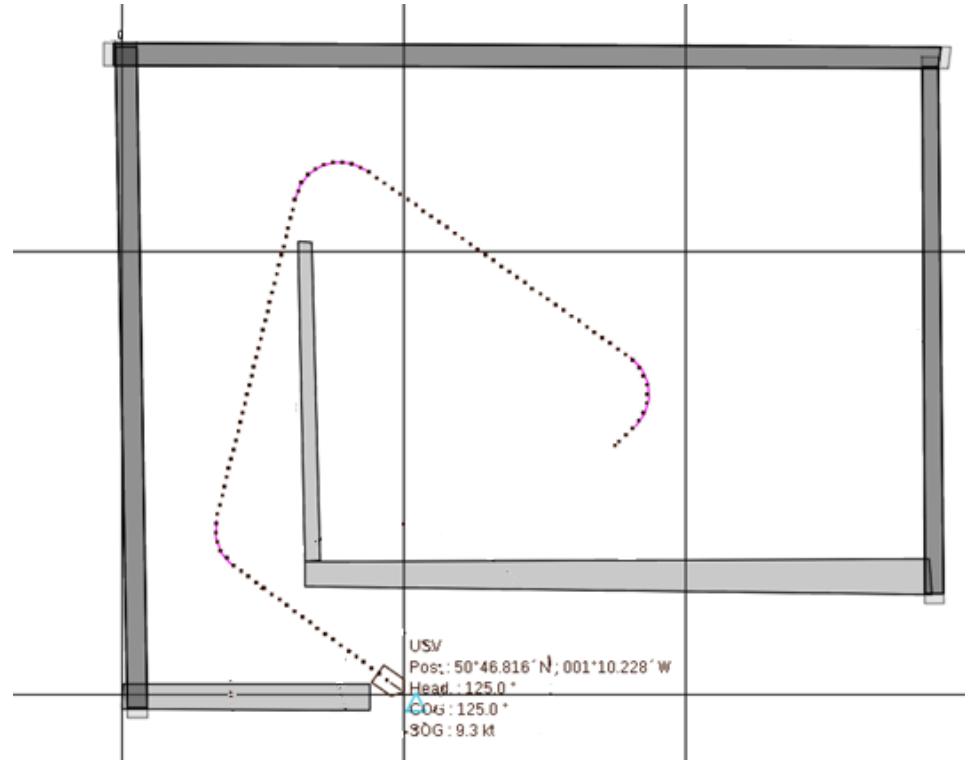
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Overlay Dubin's curves



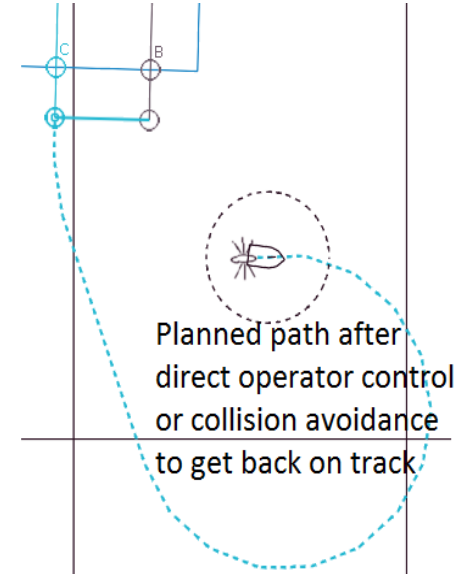
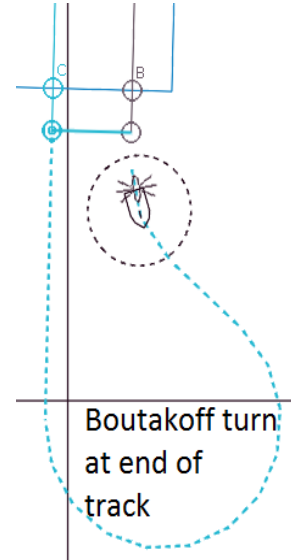
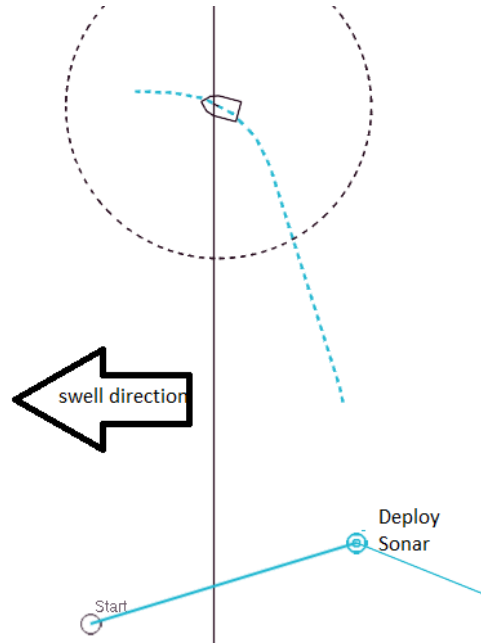
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Final path of the USV



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Various planned turns



Future Work

Prior to having the path planner static obstacle avoidance was provided by the behaviour based layer.

Today COLREGs compliant collision avoidance is provided by the behaviour based layer.

Providing COLREGs compliant collision avoidance in the path planner should be investigated.