Integrating Proven Technologies for Autonomous Detection & Mitigation



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ASV Global Path To Autonomy





ASV Launched Aerial Drone Imagery



Using ASV-launched drones for:

- Real-time oil seep/spill detection
- Real-time mapping over water
- Time-lapse monitoring

Hundreds of images collected during each flight Images are geo-registered and stitched together fused into large a large "orthomosaic," image of the water Aggregating multiple ortho's over time, patterns in the oil sheen can be detected From this, locations of oil leaks were hypothesized The UAS survey reduced the search area from 965,000 square meters to ~ 5300 square meters (18,000% reduction) in the Summerland coastal area



- Autonomous precision drone landing Autonomous recharging and docking
- On a moving ASV
- At sea!

Autonomous Mission Planning for Optimized Oil Mapping & Recovery

Scout, Detect, Map and Recover with ASVs

- Conduct scouting missions with a C-Worker 12 - 40' Autonomous Surface Vehicle (ASV) paired with UAS replacing large OSRV platforms (and aircraft)
- ASV launched aerial drone imagery collection for scouting and mission planning (UAS Dock, & Recharge)
- Realtime, persistent open water mapping, oil seep/spill detection, and time lapse monitoring
- Computer vision algorithms employed to automatically detect oil on the water
- Increase on water duration with unmanned recovery









Cooperative Autonomous Mission Planning for Optimized Oil Recovery

Scout, Detect, Map and Recover with Multiple ASVs

- Conduct scouting missions with multiple a C-Worker 12 - 40' Autonomous Surface Vehicle (ASV) paired with UAS replacing large OSRV platforms (and aircraft)
- ASV launched aerial drone imagery collection for scouting and mission planning (UAS Dock, & Recharge)
- Realtime, persistent open water mapping, oil seep/spill detection, and time lapse monitoring
- Computer vision algorithms employed to automatically detect oil on the water
- Increase on water duration with unmanned recovery

Hazard Mitigation: Reduce exposure with 80% fewer personnel on the water
Cost Reduction: Reduce labor cost and recovery equipment fleet size
Improve Efficiency: Autonomously detect and recover more product







