Submaran S10 Overview



UNMANNED MARITIME SYSTEMS

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- Submaran: A highly ruggedized, autonomous surface and sub-surface vessel.
- Wind and solar powered
- Autonomous surface and underwater capability
- Long Range & Extended missions
- Easily deployable
- Sensor and payload agnostic



MARKET OVERVIEW



Commercial	Government	<u>Scientific</u>
 Communications Gateway Hydrography Oceanography Meteorology Fisheries Production Environmental Mgmt. Telecommunications Asset Mgmt. Security Oil and Gas Production 	 Communications Gateway Hydrography Oceanography Meteorology Fisheries Mgmt. Environmental Mgmt. Telecommunications Security Oil and Gas Mgmt. Defense* Intelligence* 	 Communications Gateway Hydrography Oceanography Meteorology Fisheries Research Environmental Research Debris field Mgmt.
Defense*		Intelligence*
 Hydrography Oceanography Meteorology Environmental Mgmt. Maritime Domain Awarenes 	SR Security Anti Submarine Anti Mining ss (FIS) • Measurer • Asset Tra	tel (SIGINT) tronic Intel (ELINT) munication Intel (COMINT) ign Instrumentation Signals INT) nent and Signature Intel (MASINT) cking



OCEANAERO / SUBMARAN S10

Submaran S10: UUSV (unmanned, underwater, surface vessel) Production: Q1 2015 Wind and Solar-powered freedom

- Surface speed 5+ knots
- Submerges to 10m
- Payload: 23kgs
- 300w peak/50w
- Stability adjusted
- Auxiliary thruster
- Multi-mission capable
- Scalable design
- Length: 4.14M
- Height: 2.45M Wingsail up
- Draft: 1.2M



Surface Water temp





Sinking a Sailboat

- Ballast trim tanks filled to "buoyancy neutral" stage
- Electric thruster is reversed to flood vehicle to $\sim 60\%$
- Vehicle is now neutrally buoyant
- Adjust ballast to slightly beyond neutral
- Vehicle now uses electric motor and ruddervators to dive to depth

SINGLE PLATFORM, MULTI-FUNCTION OCEANAERO



Depicts future Submaran S200 capability

AREA SURVEILLANCE





- Provide visual confirmation via mast mounted camera
- Submerge to avoid detection

800

1000

CURRENT SURVEY





ADCP

• eed of operation: Between 3 & 5 ots overcoming the current flow.

nd and Solar power: Long erational timeframes while providing nty of sensor power.

bmersible operations: Submerge d operate avoiding adverse weather.



COMMUNICATIONS





Higher speed of operation: Expanded footprint servicing a large number of sub-sea systems.

Wind and Solar power: Allows for long operational timeframes while hosting a variety of communications systems.

Submersible operations: Allows Submaran to avoid adverse weather and continue to gather data.

A PEEK INSIDE











- Open ocean waypoint navigation
- Autonomous tack and jibe
- Cross track 3 meters
- Autonomous "go to" & "loiter"
- Tested with towed bodies
- Mast mounted payloads

Final pre-production version



S10 VESSEL





SUBMERGING SEQUENCE



Approximately 8 minutes to submerge to 10 meters

TESTING WATER TIGHT SYSTEMS





SUBMARAN DIFFERENTIATORS



- Hybrid design Sail, Electric and Buoyancy gliding
- Faster: than other competitive unmanned platforms
- Autonomy & Ease of Deployment: Helps reduce required manpower
- Submerging capability



• Stealth and Survivability.

TOWED SENSORS



3 True Wind Angles (TWA)

- 50, 100, 130 degrees
- Wind from 8-17 knots
- Baseline and with Large Tow Body



WAYPOINT NAVIGATION





Tests are designed to test waypoint accuracy, tracking and sailing against all points of the wind.

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USER INTERFACE





MISSION PLANNING





MISSION TRACKING







THANK YOU

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