SubSeaSail Gen6 and Gen6 Mini Base Platform Specifications

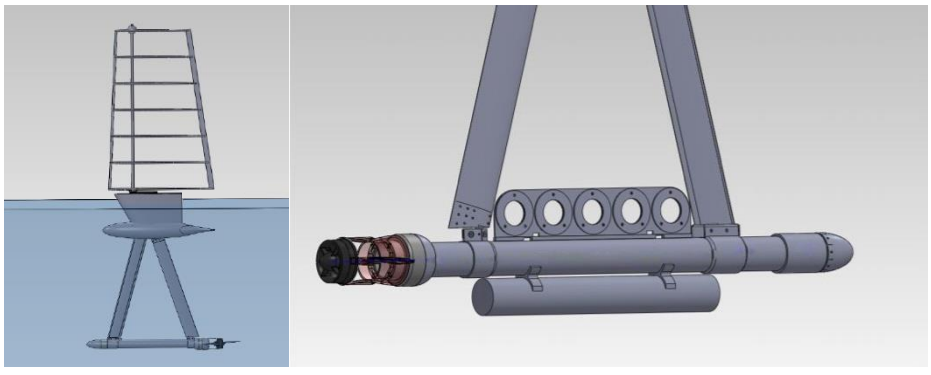
Long Range, Autonomous, Semi-Submersible Technology

SubSeaSail

Wind-Propelled, Solar-Powered Unmanned Semi-Submersible Sailing Vessels (USSVs)
ENGINEERED for SIMPLICITY

The SubSeaSail™ USSV is a very economical, long-duration sensor and payload platform. SSS systems are engineered for simplicity with unique patented and patent-pending technologies. Wind is the primary source of propulsion with a thruster for station-keeping in low/no wind conditions and propulsion for near-shore navigation. Solar panels charge nickel metal hydride (NiMH) battery arrays to power sensor packages, payloads and thruster. The platform is capable of full autonomy, swarming, and manual modes. Unique features of the SSS platform include:

- **A hull below the surface with wingsail above (patented):** This reduces friction/drag with very little wake and a very low visual signature – or high visual signature if preferred.
- **The passive wingsail control mechanism (patented):** No electronics, lines, or pulleys are required to optimally position the sail with respect to the wind direction, speed and desired path. This feature significantly reduces cost and complexity, while increasing reliability. A single electro-mechanical servo for the rudder is the only moving part required for sailing control.
- **Solar power options:** Choose from power generation with a solar panel wingsail, or a transparent wingsail and solar deck at the waterline for a lower visual signature, or a combination of panels on the deck and wingsail.
- **Scalable and variable:** SSS is able to develop variants including catamarans that sail below and above water and, when scaled up, will be able to deliver fuel and sail onto the shore when summoned.
- **Broad applications:** ASW; C4ISR; cargo pre-positioning and delivery; communications gateways; ocean sensing; protection of Exclusive Economic Zones and Marine Protected Areas; targets & decoys; UUV delivery, launch, landing, and recharging; UXO/MCM, among others.



SubSeaSail system (left) – Passive chemical filter set and additional payload (right)

SubSeaSail platforms have been successfully tested for days in high sea states and 25+ knot winds off New Zealand and San Diego. Version Gen6(S) is capable of fully submerging to 10m depth. A recently delivered system included passive chemical detection and CTD/turbidity sensors. Potential partners include manufacturers of UUV and UAS platforms, sensor and payload providers, as well as opportunities to collaborate in academia, commercial, and defense applications.

SubSeaSail = Sustainable Ocean Observation

We address the above UN 2030 Sustainable Development Goals

SubSeaSail Gen6 Base Specifications *[Gen6 Mini Specifications in Brackets and Italicized]*

General Configuration				
	Wingsail	**Vessel**	**Total**	**Note**
Height *[Gen6 Mini]*	~152cm (59.84") *[95cm (37.40")]*	~152cm (59.84") *[88cm (34.65")]*	~304cm (119.69") *[185cm (72.83")]*	The Gen6 and Gen6 Mini are two of many possible configurations using the SubSeaSail patented technologies. Contact SSS for larger variants (such as catamaran versions) to accept additional payload capacity, higher max speed, communication protocols, etc.
Length *[Gen6 Mini]*			150cm (59.06") *[88cm (34.65")]*	
Width *[Gen6 Mini]*			25cm (9.84") *[14cm (5.51")]*	
Weight *[Gen6 Mini]*			28kg (61.6lb) *[14kg (30.86lb)]*	
Endurance			Indefinite	Wind and solar sources required.
Depth Rating			10m	Optional ballast system for Gen6 [*not available for Mini*]
Propulsion				
				Note
Wind	Primary			
Thruster	Back-up			For transit and no wind station-keeping.
Max Speed (sailing)	0.5-3.0 knots			Wind power. Additional speeds available. Contact SSS.
Max Speed (thruster)	2 knots			Up to 30hrs duration with no battery recharge.
Onboard Power				
				Note
NiMH Battery Bank *[Gen6 Mini]*	450W/hr capacity *[320W/hr capacity]*			Trickle-charged by solar panels.
Solar Deck	10W peak			Surface deck configuration can be combined with solar wingsail option for maximum power generation [*solar deck not available; solar wingsail required for Mini*]
Solar Wing	30W peak			
System Operating Load	0.6W/hr			Total load required for sailing (no thruster).
System Max Power	5A at 13.2Vdc			
Electronics				
Computer System	PIC CPU, XBEE Wifi, 9603 Iridium, Serial, Micro SD, IMU			
IMU	MEMS 3 axis accelerometers, gyros, magnetometers			
GPS	12 channel			
Auxiliary Power & Comms Port				For external sensors and payloads.
Navigation				
				Note
GPS Accuracy	3m horizontal dilution of precision (HDOP)			
Station Keeping	30m radius			0.5 knot current.
Payload				
				Note
Max Payload *[Gen6 Mini]*	20kg (neutrally buoyant) *[10kg (neutrally buoyant)]*			Optional payload capacity available.
Peak Payload Power	20W			Optional payload power available.
Max Continuous	5W			Optional max continuous available.
Ports	12V, RS232, battery charge			Payload interface, pass-through.
Communications				
				Note
Iridium 9603	Remote command, control, reporting			
WiFi	Local command, control, mission, and reporting			
Custom	Cellular, freewave			Options available.
User Interface				
Chart-Based GUI	Windows PC compatible, waypoint and course navigation, programmable inclusion zones, follow course and hold/loop, station-keeping at target, text and visual status indicators, SMS and email alerts			
Manual	Full manual control via PC/tablet			
Options				
CTD/Turbidity	RUDICS	Magnetometer(s)		**Note**
Water speed	Cellular	Mast camera		This is a partial list of potential add-ons. All options may not be compatible with both systems.
AIS receiver	Custom comms	Swarming		
Comms ports	Sonar	Temperature		
Motions output	Hydrophone(s)	Salinity		

Sailing offshore

With solar wingsail

Catamaran variant

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