SUNFISH Specifications
SUNFISH, Inc.
3511 Caldwell Lane, Del Valle, TX 78617
www.sunfishinc.com
June 29, 2020

BASIC FEATURES:

Physical Characteristics:	Full 6 degree-of-freedom Hovering AUV
Dimensions	Length: 161 cm Width: 47 cm Depth: 20 cm
Weight (in air)	37 kg
Ballast	Neutrally buoyant in water (proprietary carbon-carbon design)
Performance:	
Max Range:	5 km* (optional boost to 10 km)
Max Operating Depth	200 m standard (optional 1 km**)
Max Speed	1.0 m/s in longitudinal direction (programmable cruise speed)
	0.4 m/s perpendicular to vehicle principal plane
Station Keeping Accuracy	+ / - 5 cm in XYZ in any orientation
Water Temperature Operating Range	-5C to + 45C
Navigation:	
Dead Reckoning Drift (50% CEP, typical)	0.04% of distance traveled
Dead Reckoning Drift (Max)	0.22% of distance traveled
Mapping:	
Multibeam sonar range	150 m standoff range; 480 beams x 120 degree swath
Multibeam sonar range resolution	0.02%
Multibeam sonar cross range resolution	1.3%
Camera resolution	HD 1920 x 1080
Camera frame rate	60Hz interlaced, 30Hz progressive
Software:	
Autonomous Mission Planner	Allows for user-defined scripted missions in 6 DOF to be uploaded to the vehicle
Hover Control	Allows full 6 DOF hovering in any attitude about a point in XYZ space
Automatic Return	Ability to return to previously located points in 3D space
Data download and playback Post-Processor	Allows user to download and replay the mission and visualize mapping and image data. Also allows for data export to third party formats.
Automated Abort	Vehicle will re-trace its pre-programmed trajectory to its starting point in the event of a self-diagnosed abort condition

* Max range is an approximate under still water conditions
** Dimensions and weight only apply for a 200m depth rating

SUNFISH Specifications
SUNFISH, Inc.
3511 Caldwell Lane, Del Valle, TX 78617
www.sunfishinc.com
June 29, 2020

OPTIONAL FEATURES:

Performance Upgrades:	
Range Boost	Allows up to one independent battery pack to be added to the vehicle. Each pack increases range by 5 km.
Max Operating Depth	Internal housing available for: 200m or 1 km service depth. Standard is 200 meter depth rating.
Data Link	
Armored Fiber	Gigabit Ethernet data link over fiber via an armored (Kevlar) 1 mm surface-fed fiber, length TBD by customer. Maximum length determined by surface support capacity.
Spooled Fiber	Gigabit Ethernet data link over Kevlar fiber fed from the vehicle. Maximum length 4.5 kilometers.
Advanced Navigation	
3D SLAM	Real-time 3D SLAM implemented in local code on the vehicle. Navigation accuracy in the presence of a "feature-rich" localized environment to be +/- 5 cm and +/- 1m in general terrain.
USBL / acoustic modem add-on	USBL and acoustic package (for improved return-home and auto-docking accuracy)
SatCom / GPS add-on	On-vehicle satellite data link and GPS receiver (for emergency location and limited bandwidth data uplink in remote locations – useful for locating a lost vehicle in open water)
Optical beacon add-on	On-vehicle emergency location strobe
Radio transponder add-on	On-vehicle ADF radio location transponder
Advanced Software	
Real-time Joystick Control	Adds 6 DOF joystick control to the vehicle (requires either of the Data Link options described above)
Standoff Tracking Behavior	Allows vehicle to automatically track an object at a specified standoff range and pointing angle while mapping along the object
Real-time Obstacle Avoidance	Builds a real-time 3D map around the vehicle and allows user to select a safe keep-out range within the map.
Real-time 3D Situational Awareness Visualizer	Allows Mission Control to see what the vehicle sees in 3D space during a mission. The vehicle is accurately positioned and oriented to scale within the 3D map it creates. This option requires the presence of either of the Data Link options listed above.
Intelligent Abort Behavior	Vehicle will assess its 3D map and current status and, in the event a mission abort is determined, will select its own optimal return route to maximize probability of return
Exploration Mode Behavior	Autonomously explores an unknown environment, creates 3D maps at prescribed resolution; requires obstacle avoidance module

*   Max range is an approximate under still water conditions
** Dimensions and weight only apply for a 200m depth rating

SUNFISH Specifications
SUNFISH, Inc.
3511 Caldwell Lane, Del Valle, TX 78617
June 29, 2020

CUSTOM ADD-ONS:

Environmental Sensors:	
CTD	Vehicle-external conductivity, temperature, and depth aqueous sensor suite
pH	pH add-on sensor module
Redox	Redox add-on sensor module
DO	Dissolved oxygen add-on sensor module
PAR	Photosynthetic Active Radiation add-on sensor module
Turbidity	Aqueous turbidity add-on sensor module
Chl Fluor	Chlorophyll fluorescence add-on sensor module
DOM Fluor	DOM fluorescence add-on sensor module
Custom	Custom add-on sensors (e.g. ion-specific microelectrode sensors)
Water Sampler:	
Un-filtered	Onboard water sampler will draw and store a water sample from the water column. Custom variations will allow multiple smaller samples to be made on a single mission.
Filtered	Onboard water sampler will draw a water sample from the water column and pass through a filter paper. The filter paper is recoverable at the conclusion of the mission.

*   Max range is an approximate under still water conditions
** Dimensions and weight only apply for a 200m depth rating