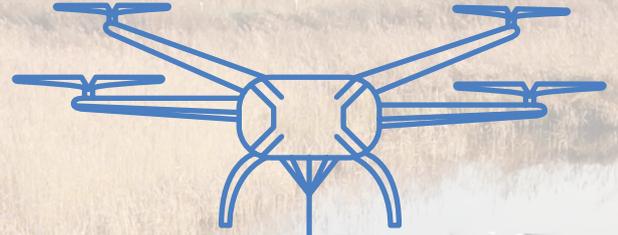
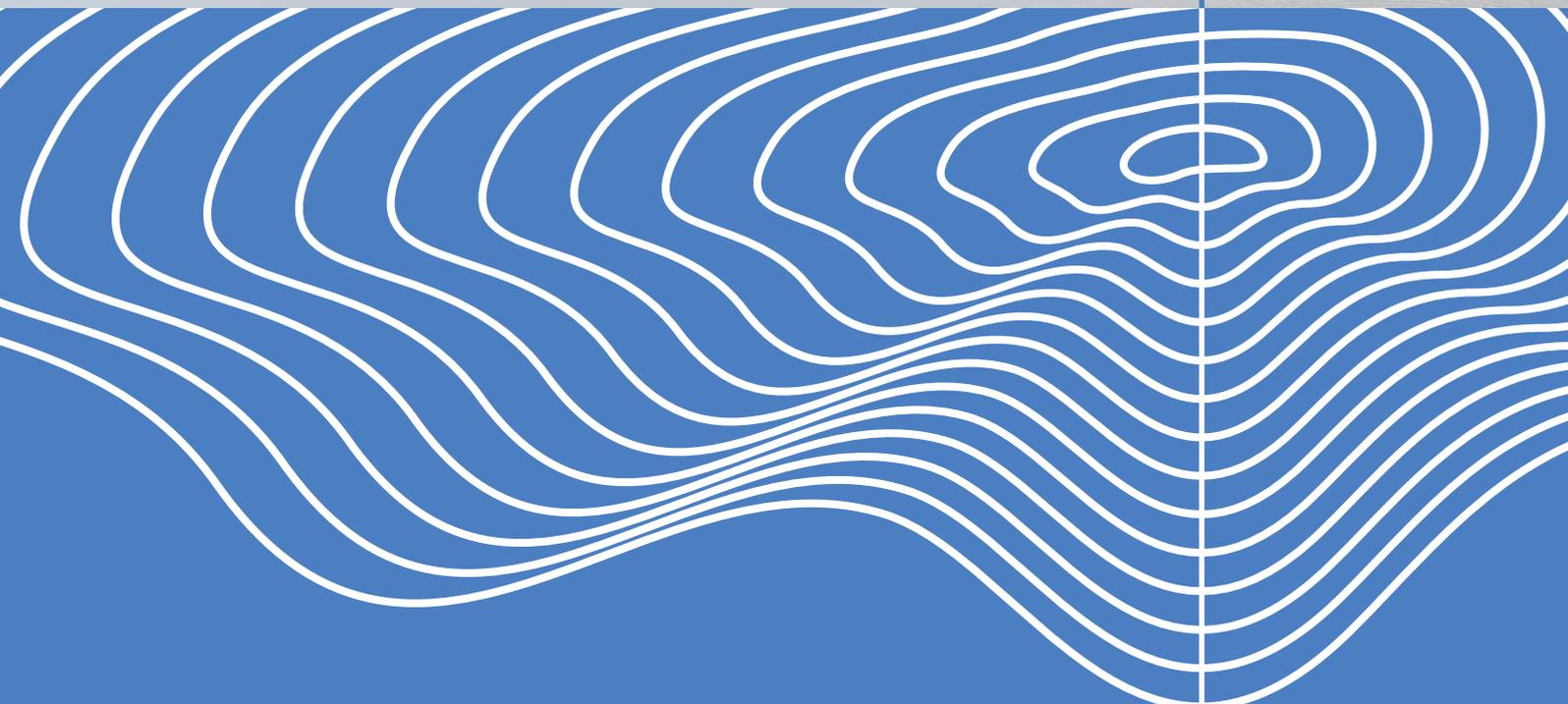


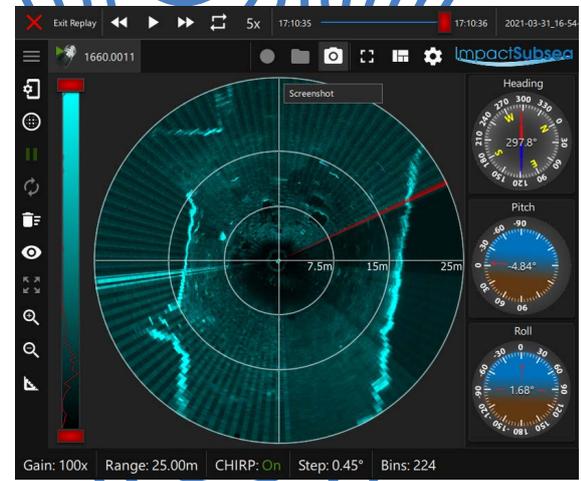
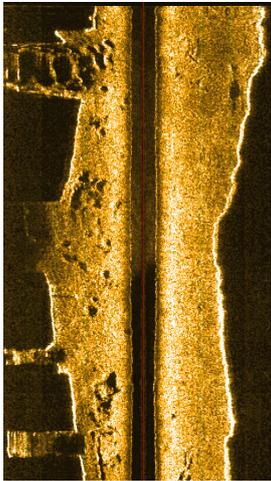
Autonomous & Robotic Systems for
Safer Underwater Searches



THURN QuickDip™ Marine Search UAV



Enabling technology for more efficient,
faster and safer searches in water



The THURN QuickDip™ + Side Scan Drone-carried Side Scan for Search & Recovery

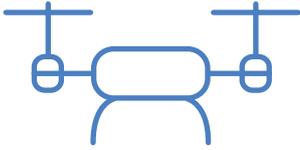
An aerial drone-carried side scan survey system for rapid low-logistics searches in shallow lakes, rivers and coasts, suitable for deployment in dangerous and inaccessible waterways.

THURN QuickDip™ Marine Search for UAV

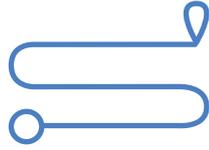
The THURN QuickDip Marine Search system provides all the tools needed for your UAV side scan and dipping sonar operations. It's designed to enable remote searches, keeping people out of the water as much as possible and minimising risk. This decreases search time and better prepares divers for targeted recovery operations. With the easy to use industry-standard software options this will help locate your target and ensure the area is cleared during the search. The software will track and display the position of the drone in real-time, create a side scan mosaic of the seabed, and locate & identify targets of

interest for further sonar or diver investigation. The real-time display provides the needed information to the search team to quickly assess the site and to make an informed decision for dive operations. For background charts users can download the latest Electronic Navigation Charts from NOAA/USACE or Admiralty Charts, or use background raster or georeferenced image maps. No need to be an expert on hydrography to use the software; the setup is simple, operation is just a few clicks, and the creation of final products can be done in the field.

Key Features:



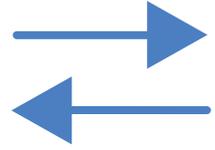
Self-contained integrated UAV system. Can be supplied with a drone or fitted to an existing asset



Manual flight operations or automated pre-planned search patterns



Options for different side scans and scanning sonars suitable for marine search operations



Real Time display of the search data provides immediate feedback to the search team to ensure that the entire area has been covered



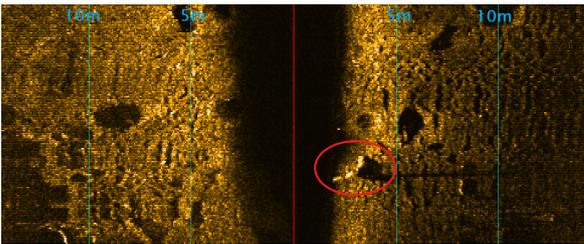
All search data is stored to allow post-mission analysis of the search to assist in reporting and improve search operations



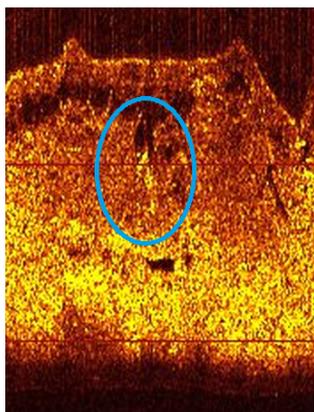
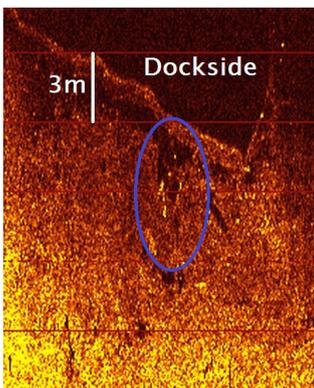
Creates a safe environment by allowing the dive team to have better situational awareness when viewing the mapped side scan data.



Allows the search team to mark and analyze targets of interest without interrupting the search progress. The coordinates of the targets can be relayed to the dive team if a target of interest is identified



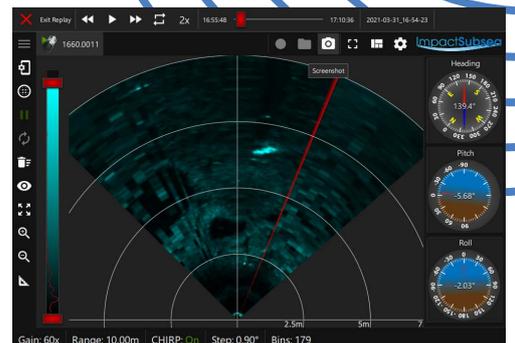
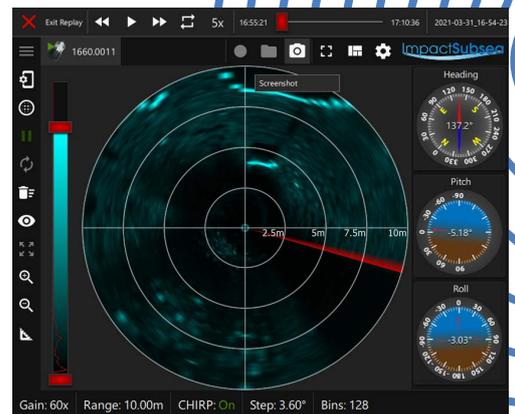
Deploying a Recovery Training Mannequin



Side Scan of Training Mannequins

Benefits:

- Fast deployment from a safe site away from the water
- Manual search mode for rapid deployment at complex sites
- Autonomous map-based search patterns ensuring full coverage of larger areas
- Quick set up for survey operations
- Individualized incident projects
- Export data to GeoTiff and Bitmap images, easy to share and import for reports
- Real-time mosaicking of sonar data, overlaid on background charts
- Increases situational awareness and safety for divers



UAV-deployed ISS360 scans of Training Mannequin

THURN QuickDip™ Marine Search Specifications:

Integrated drone-carried search system with side-scan sonar or scanning sonar and accurate GNSS (GPS&GLONASS) positioning

- Manual flight or use UgCS Pro for pre-planned autonomous search patterns
- Includes UgCS SkyHub PC and True Terrain Following (TTF) radar altimeter
- Data stored with timestamp and geo-location for postprocessing
- On-board data storage on SkyHub and real-time data link to shore
- Compatible with various drones in <25kg MToW class
- Compatible Autopilots: DJI A3, PixHawk/ArduPilot and others
- Start search within minutes of arriving on-site
- Fast UAV battery swap for multiple missions over larger areas
- Equipment weight in air: 1.8kg to 2.5kg depending on options

- Swappable Sonar Options, with rapid swap-over on-site:
 - Side Scan: Imagenex search& recovery 300kHz/850kHz
 - Scanning Sonar: ImpactSubSea ISS360 sector scanner
 - Other sonar options available, please enquire
- Supports HYPACK® Marine Search Software for UAVs:
 - Position offset to Side scan (optional) via of 'offset' driver
 - Real-time display of side scan targets
 - Real-time analysis and location reporting
 - Post search analysis and mapping
 - Background: Electronic Navigation Charts or image maps.



specifications subject to change without notice



THURN Group manufactures, integrates, sells and supports robotic & autonomous sonar survey systems for the offshore, coastal and inland waterways markets. Established in 2011, THURN is a technology development, integration and sales & service company providing systems and expertise to the seabed survey industry, selling: Polyexplore INS and LIDARs; Kongsberg Geoacoustics, Kongsberg Mesotech, and Imagenex sonar systems; OceanAlpha unmanned boats; and UgCS drone-carried lake and river survey equipment. THURN also develops, integrates and sells an expanding range of roto-copter drone and unmanned surface vessel (USV) in-water survey equipment.

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