

TunnelMAP™

TunnelMap™ is a 3D Tunnel and Shaft Mapping system that creates precise cross sections and alignment data from the inside of a structure. The data is displayed in 3D as shown in the figures below. The data is generated real time as an ROV flies through the structure while conducting a standard video and sonar inspection.

TunnelMap™ provides the data and visualization tools to meet today's advanced engineering and maintenance needs. A growing trend in tunnel and shaft inspection is to minimize cost and risk by not dewatering. This cutting edge product is an integration of existing high end sensors and software designed to address previous limitations of positioning inside of structures. Traditional acoustic positioning only works in open water due to multipathing (echo's). TunnelMap™ addresses these issues and sets the new standard for ROV positioning and tunnel/shaft alignment in flooded structures.

Mapping System Operation

The mapping subsystem of the ROV combines the sensor data from an inertial sensor, acoustic position sensor, and high speed profiler to accurately track the position of the ROV and map the structure. The navigation part of the system calculates the exact position and attitude of the ROV realtime, and then the sonar cross section data is combined with the positioning data to create the highly accurate map. The first figure shows an external view of tunnel and shaft system. The thin white line inside of the tunnel is the exact path of the ROV. The second figure is an inside view of the model showing the path of the ROV (white line) the surface of the tunnel with a texture applied and the raw data points (upper left grid with white oval). These pictures are taken from the data viewing program. Each position point on the white line has an exact time associated so that the video, sector scan sonar plots, and pilot notes with features all correlate.

Figure #1 – External View of Tunnel and Shaft Sonar Model

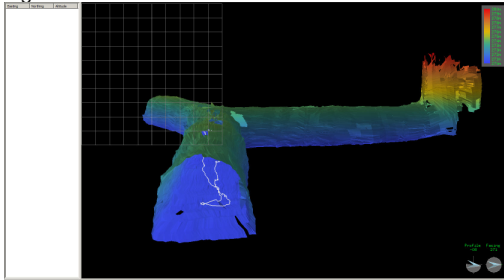
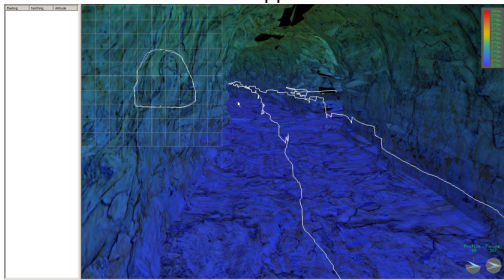


Figure #2 – Internal View of Tunnel and Shaft Sonar Model with cross section inset in upper left.



TunnelMap™ Features

- Position Accuracy: better than 0.2% of distance traveled
- Earth Referenced Position in WGS-84 format
- Export model to CAD
- Visualize Complex Structures
- Zero Visibility ROV Inspections
- Real time Position Feedback During Inspection
- Deploy from a variety of ROV's

Use TunnelMap™ CAD models for:

- Hydraulic Modeling
- Loss of Cross Section
- Locating Tunnel to Intercept with a Shaft
- Locating Tunnel for Right of Way Clearance
- Locating exact position of failures
- Debris/Sediment Accumulation Measurement
- Precise ROV Location