

Camera/Lighting System

Iver3 Option

The Iver3 offers an easy path for the integration of new equipment, sensors, and software and is used by a number of research groups who make significant modifications to their vehicles. In an effort to speed customer development projects, L3 has developed an updated camera/lighting system as a standard option on the Iver3 vehicle. This system can be bundled with a second Single-Board-Computer (SBC) to create a powerful hardware/software solution for implementing machine-vision-based behaviors.

The on-board vehicle control software, Underwater Vehicle Console (UVC), interacts with the camera system through a custom-built API that has been tightly integrated to provide a seamless process for camera configuration and testing. A preview mode allows the operator to view real-time streaming images from the camera system, and simple controls allow direct modification of camera parameters such as exposure duration, gain, strobe triggers, and other camera parameters.

Accompanying each image is a record of vehicle state information at the time of image acquisition including a timestamp, vehicle position, depth, altitude, roll, pitch, heading, and more. This data can be overlaid directly on the image (as in Fig. 3) or injected into the image Exchangeable Image File Format (EXIF) metadata in the User Comment field.



Figures 4 & 5: Actual images taken with on-board camera

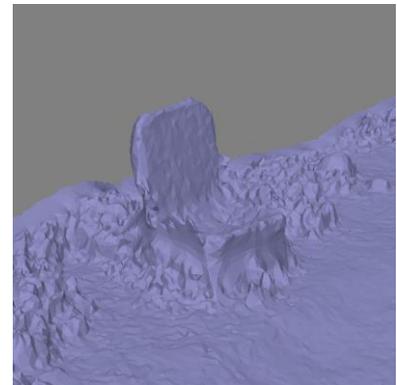


Figure 1: Isometric view of the optically-restored 3D structure computed via epi-polar reconstruction

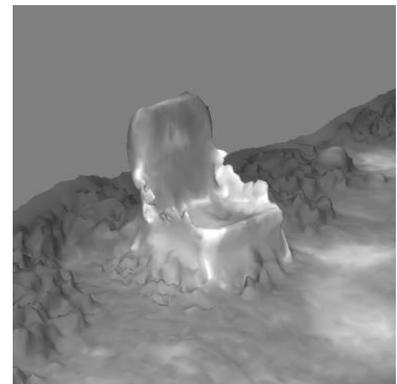


Figure 2: Shaded 3D view of the same region

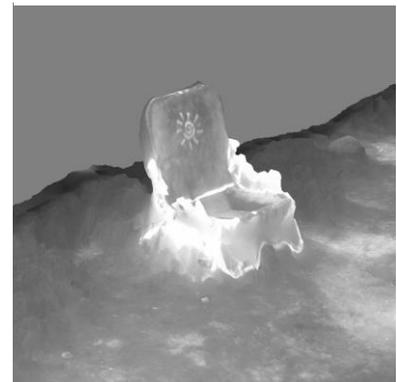


Figure 3: The original high-resolution source images are used to both create the 3D reconstruction and texture the final 3D product