Case Study

Platform Structure Survey using SVS

In summer 2003, SRD were contracted to conduct a high-resolution bathymetric survey as part of a seabed debris clearance operation, prior to the emplacement of a jack up rig. The area surveyed included the proposed rig approach corridor and its anchor pattern, plus detailed examination of the proposed final location close to an existing platform. As part of the survey workscope, SRD were also required to survey the section of seabed beneath the platform in the immediate vicinity, to gather as much information as possible on clearance of template slots and the future installation of a spoolpiece.

The survey was carried out using SRD's Seabed Visualisation System (SVS) deployed through the moonpool of a 21m survey catamaran

See Figure 1.

Figure 1. Catamaran MV "Humber Surveyor"

The SVS is a flexible swathe bathymetry system whose transducer elements can be configured to suit specific applications. In this case, SVS hardware comprised three sets of separate sonar transmitters and receivers – one central vertical pair, and two lateral oblique pairs – the whole arrangement giving a swathe coverage equivalent to approximately 3 x water depth.

The platform was in 25m water depth, and close passes of the vessel (using only one oblique set of SVS transducers) produced some interesting results, which were effectively a by-product of the main survey objectives. The system was able to image the lattice structure of the platform jacket, and from some editing of data was able to isolate these sonar reflections from the bathymetry data.

See Figures 2a and 2b.

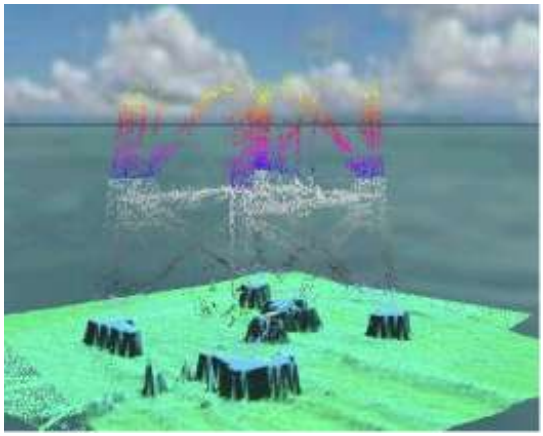


Figure 2a. 3D View of Platform and Seabed Data

The SRD visualisation software *SRDView* allowed the presentation in 3D space of the platform jacket structure (from the water surface level down to seabed) and the surrounding digital terrain map (DTM) of seabed topography.

Infinitely variable views of the subsea scenario are available to the user. These are illustrated on the animated "fly through" sequence provided separately, which is produced from captured images within *SRDView*. The animation also shows the superimposed CAD image of the as-built jacket structure.

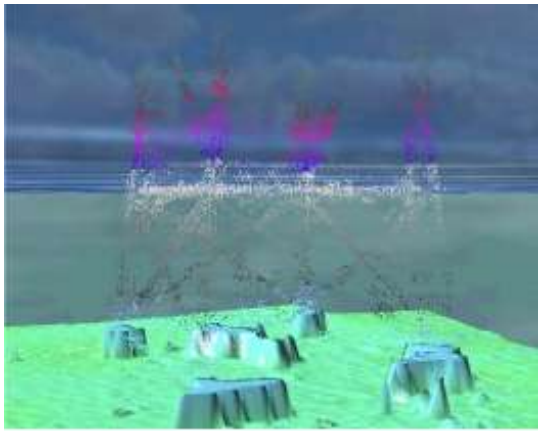
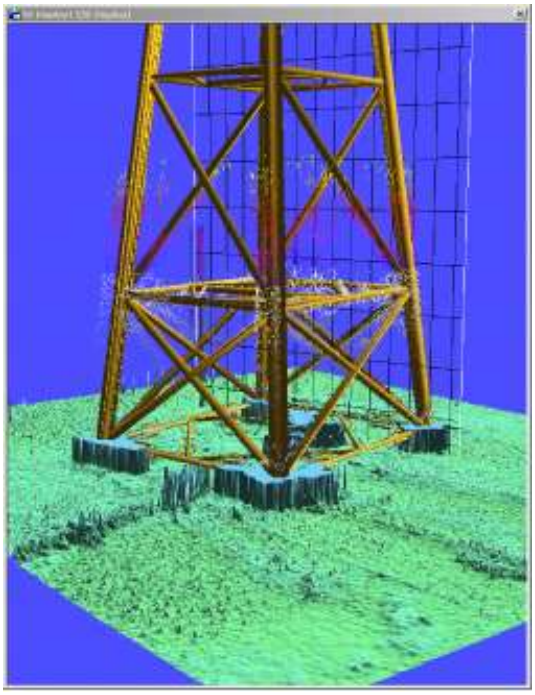


Figure 2b. 3D View of Platform and Seabed Data

As with all other SVS datasets, the software allows the user to view plan, profile and 3D aspects. In this case, there was particular interest in determining the height above seabed of the lowest horizontal member within the jacket structure, along a particular face of the platform.

Accordingly a vertical section line was created on the plan view in the appropriate location. This plane of investigation, displayed as a black lattice, is illustrated in Figure 3.

Figure 3. Vertical section along platform face



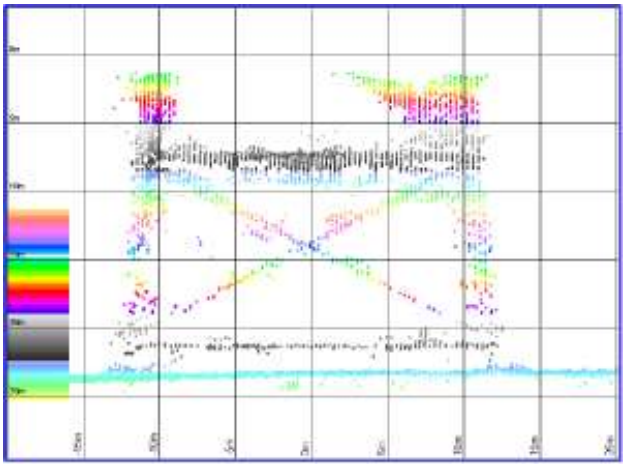


Figure 4. Profile of sonar data of platform face

The resulting profile display (Figure 4). shows the sonar returns which occur along the vertical plane. From this display it was evident that the clearance above seabed of the lowest member was 1.5 metres. This information was fed back to the client in order for him to assess the feasibility of diver access.

The Seabed Visualisation System sensors have been deployed from a variety of vessel types, the most common mounting arrangement being via fixed overside rig. The absence of towed instrumentation minimised potential hazards in the vicinity of structures and improves positional accuracy of results.

For this application, the system is available in a range of operational frequencies from 53kHz to 300kHz. The optimum frequency would be selected on the basis of water depth.