Image-based 3D modeling of the Bremen "Cog"
Abstract - STSM report

Purpose of the STSM

This STSM is the first of a series of missions in the framework of case study of « 3D model of the Bremen Cog » (2014-2016). The purpose was the production of a 3D model through SFM Photogrammetry in order to determine if a systematic acquisition protocol could be developed and reproduced by the museum staff.

The interest of such a protocol would be to enable a 3D monitoring process of the Bremen Cog, operated by the museum staff.

The main objectives are:
- the production of an image-based 3D model
- the extraction of Digital Elevation Models (DEM)
- the identification of technical issues
- the determination of recommendations for future acquisitions

This STSM is motivated by the need to document the boat.

Image-based 3D modelisation of the « Bremen Cog »

Several photo acquisitions of the entire boat known as « Bremen Cog » were operated during 3 days in Bremerhaven (Germany) in order to define a precise and reproducible protocole. This mission was technically challenging because of the surroundings of the boat (changing light, concrete structures, metal structures, size of the boat) and because of the need to get it as simple as possible so that it would be repeated easily by the museum staff.
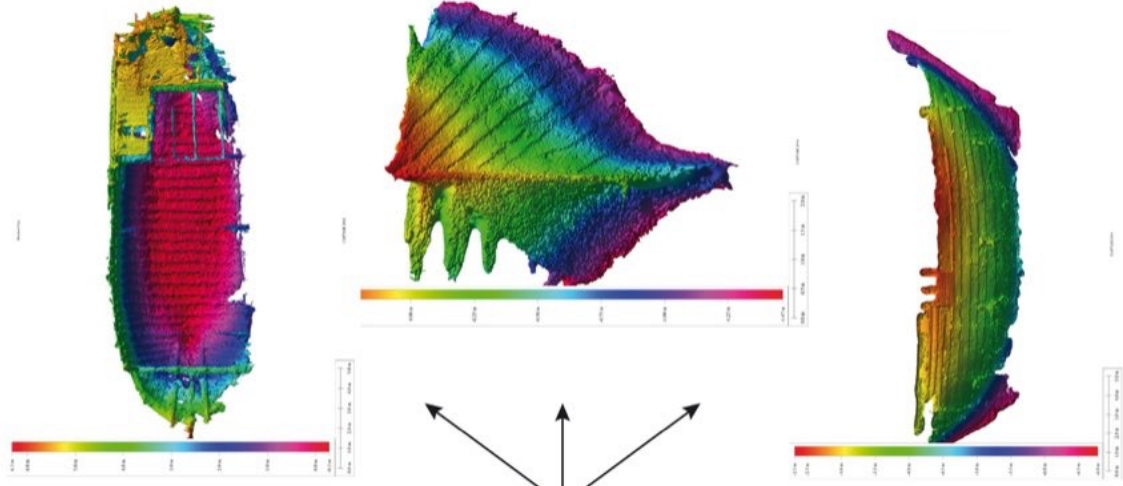
In order to reach the objectives, several acquisitions techniques and different cameras and camera lenses were tested on site. Then a simple protocole was established and was tested with the staff. The datasets acquired were then processed in Dijon (France) during 4 weeks. Comparisons were made between the different datasets in order to confirm the protocole established on site. Different kind of results were extracted from the 3D models produced such as 3D animations of the Bremen Cog and digital elevation models of its different surfaces.
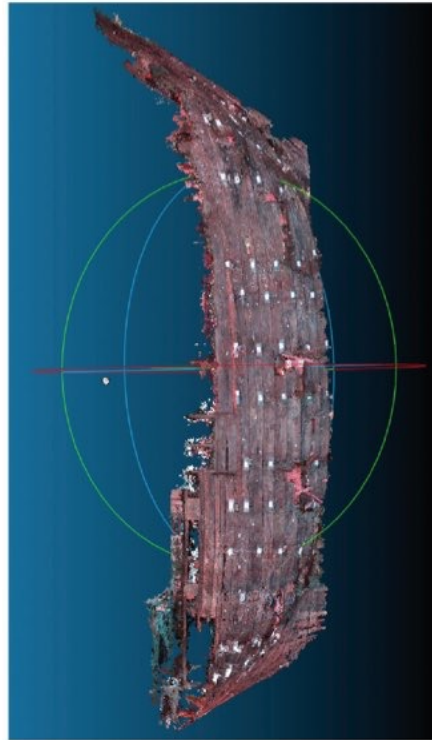
3D monitoring

Further acquisitions will be operated by the museum staff thanks to the protocole developed during this STSM. The 3D models produced will be compared to the first 3D model thanks to fixed markers placed near the boat during the STSM. The comparison of the models will enhance deformations of the cog through time. Indeed, one of the main issue for its conservation is to understand how the Bremen Cog is deforming and how wood pieces evolve.
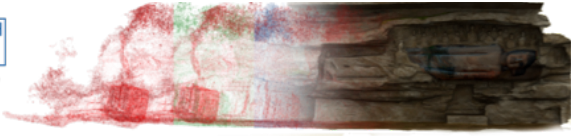
2D digital elevation models

3D point cloud

2D photos