# SONAR SURVEYING OF CAVERNS AT THE MARKHAM SALTDOME AND 3D MODELING OF THE ENTIRE CAVERN FIELD

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## Abstract

The echometric surveillance of caverns is especially important with regards to their safe and effective operation. As opposed to brine production caverns, storage caverns are generally subject only to convergence and they do not undergo large and irregular changes of shape under normal conditions. Echometric surveillance is therefore primarily employed to obtain proof of the cavern stability and convergence.

Applying the state-of-the-art sonar technology it is possible during an echometric survey to measure and process the geometry of relevant parameters such as speed of sound, pressure and temperature with a single tool run. Today, specialized software allows us to present all the cavern field data in a common computer model, starting from the sonar survey results over the surface situation, and the well courses until the geology.

In the first instance of the presentation the techniques used for surveying caverns as well as the survey procedure are described in general. Subsequently some interesting results of individual sonar surveys are presented.

By example of the Markham salt dome it will be shown what benefits a cavern field model can bring to the cavern operators. Beside the application for 3D-presentation purposes such models can be helpful for the correlation of survey results with geology and also for the support of planning tasks among others.

The modeling takes place with the CavInfo Software Suite Professional, which has specifically been developed for the presentation of cavern fields. The software allows the user virtual excursions through the 3D-model on surface as well as sub-surface. In the spatial representation of one or several caverns the observer can move outside or inside the caverns. It will be shown how 3D-animations can be produced.

**Key words:** Cavern Mapping, Computer Modeling, Computer Software