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Let's Solve Water

Application Note
2017, May

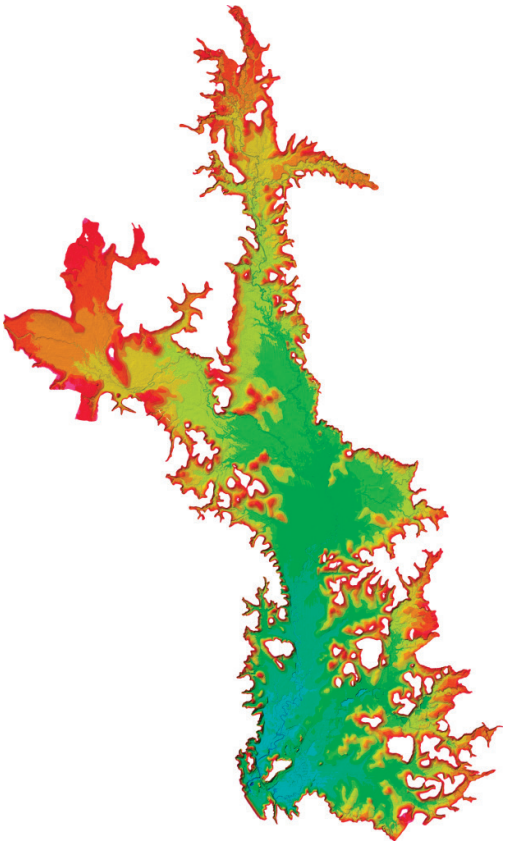
Speed of sound in water corrections for a multibeam bathymetric survey conducted with CastAway-CTD in a Malaysian reservoir

Background

The Linggiu Reservoir in Johor State, Malaysia, plays a critical role in regulating and releasing waters to the Johor River in order to "push" back a salt wedge in the downstream estuary where the main water works intake is situated.

Prior to the dam being built, during high tides in dry seasons, sea-water would intrude into the river all the way to the intake of the waterworks. The importance of the dam's role has only increased over time as more users draw water from the river allowing the salt water wedge to creep further upstream.

In 2011, a bathymetric survey of a reservoir in Malaysia was commissioned with the objective of deriving updated elevation storage curves to improve dam operations. The survey was undertaken by Greenspan Singapore Pte Ltd. in conjunction with Sea and Land Technologies Pte Ltd who provided instrumentation and technical assistance inclusive of onsite training.



A multibeam survey of the reservoir was undertaken due to the size of the reservoir and the resolution required in the contract.

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Challenge

Speed of sound in water corrections for any bathymetric survey using acoustic instruments is critical. Since the speed of sound is not constant throughout the water column, a correction needs to be applied to ensure soundings are correct. Speed of sound casts need to be taken throughout the survey, need to profile the speed of sound in the column of water and also need to be easily integrated into survey grade processing software.

Xylem Solution

For this survey, Greenspan Singapore chose the SonTek CastAway-CTD® which incorporates high frequency sampling of depth, salinity and temperature in order to calculate the speed of sound in water in the profiledcolumn.Theunithasa built in GPS which records location for each cast enabling seamless integration into survey software packages. All the required information is captured in the instrument and easily reviewed using the inbuilt colour LCD screen. After less than an hour of onsite training by Sea and Land Technologies technical staff, the survey staffs from Greenspan were confidentinthe use of the instrument for the collection of speed of sound data in the reservoir. Over 80 casts were successfully taken during the survey and used for applying speed of sound corrections to the collected bathymetric data.

Sound Velocity and Temperature Profiles collected during the survey

Customer`s Feedback

Du Wei Bing, the lead field surveyor for the project commented that the Castaway was easy to deploy and the collected data was subsequently imported into the survey software for speed of sound corrections of the multibeam data. In particular, the automatic geo-referencing of casts as well as the transmission of the data over Bluetooth rather than using cables were features that made the operation of the instrument simple.

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