

REAL TIME TIDAL MEASUREMENTS ASSIST SURVEY IN ONE OF WORLD'S BUSIEST NARROW STRAITS

Alphecca Systems provided real time access to tidal measurements during a high-accuracy survey in the Strait of Malacca. The survey, which took place between February and April 2010, was carried out by the former GEMS Survey Ltd on behalf of the International Maritime Organisation in the vicinity of One Fathom Bank.



One Fathom Bank Lighthouse

The Strait of Malacca separates the Indonesian island of Sumatra from Peninsular Malaysia, and is also one of the World's busiest shipping lanes. In addition, the tidal regime changes significantly throughout the strait, with the amplitude reaching a maximum close to One Fathom Bank.

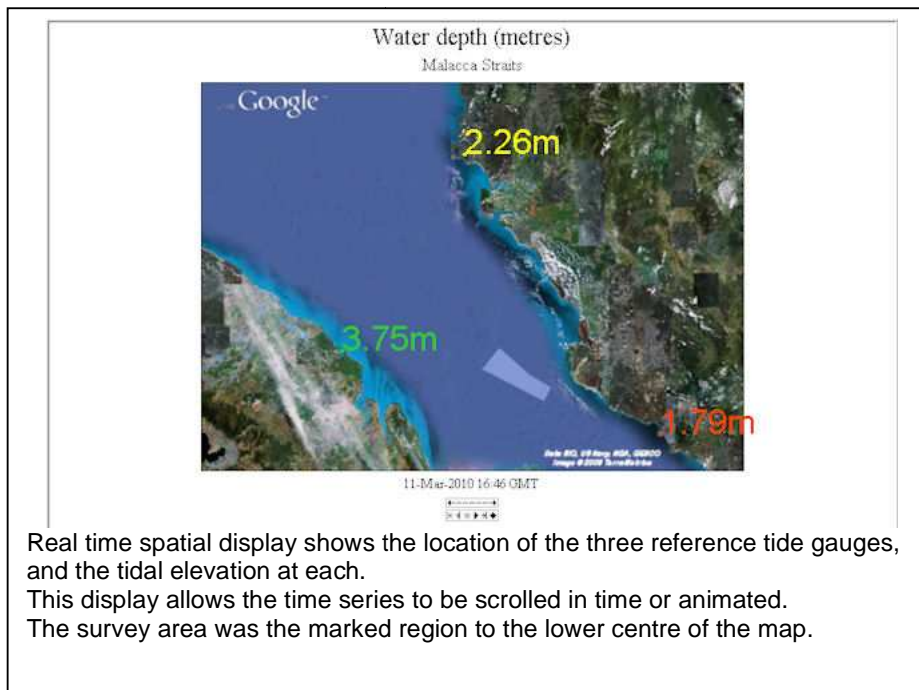
Tides were measured using Valeport 740 instruments at three locations selected for their proximity to the Strait and for the reliability of the GPRS service; one at Bagan Asahan in Indonesia and the other two in Malaysia at Port Dickson and Marina Island.

Harmonic analysis of observed tidal elevation from the three sites and the survey area shows that the dominant components are M2 (Lunar semi diurnal) and S2 (Solar semi diurnal) with periods of 12.42h and 12h respectively.

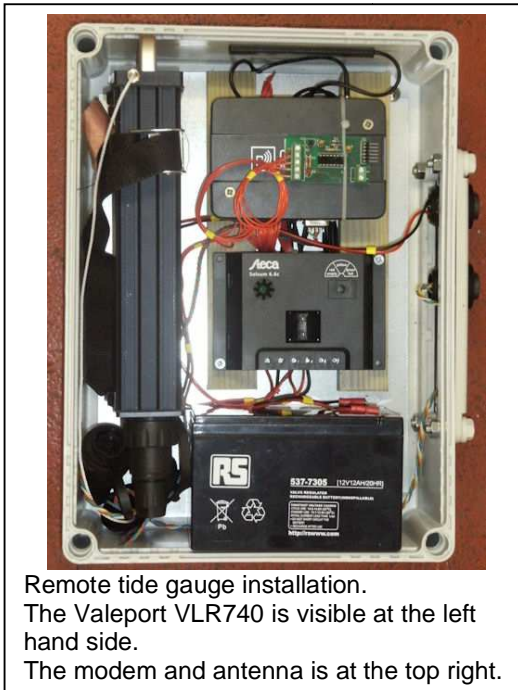
A comparison of just these two components' amplitudes at the different locations provides an idea of the spatial variation:

Location	S2 Amplitude (metres)	M2 Amplitude (metres)
Marina Island	0.35	0.74
Port Dickson	0.42	0.82
Bagan Asahan	0.49	1.03
One Fathom Bank	0.63	1.25

As well as changes in amplitude, the phase of the constituents also change so that high water appears to travel down the Strait, arriving first at Marina Island to the North; then passing Bagan Asahan followed by One Fathom Bank and finally arriving at Port Dickson in the South about three hours later.



Data recorded by the instruments were transmitted directly to Alphecca Systems' ARTEMeS server in the UK using solar-powered GPRS modems programmed with special ARTEMeS firmware.

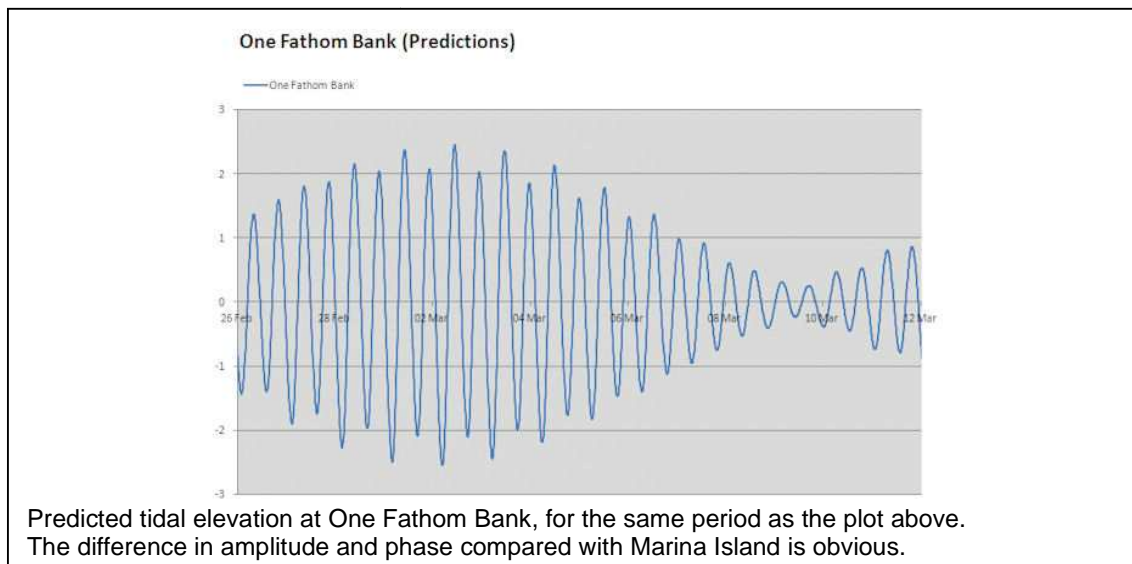
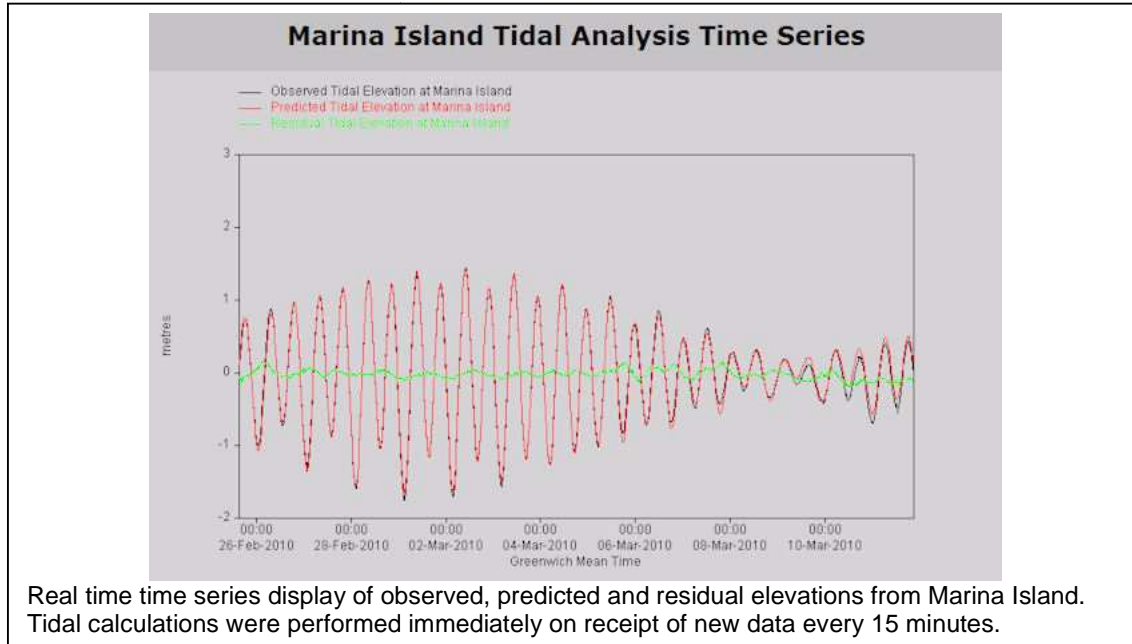


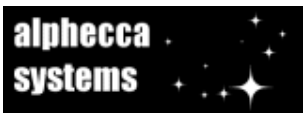
On receipt at the acquisition server, the raw tidal measurements were immediately subjected to quality control tests and compared with predicted tidal elevation from pre-prepared constituents. Data acquired to the server in real time included the raw data as well as predicted and residual components.

In addition to the measured water levels at the tide gauge locations, estimates of tidal elevation in the actual survey area were also calculated in real time.

Enhanced estimates of tidal elevation at One Fathom Bank were derived from harmonics and spatial interpolation of tidal surge calculated from the three reference tide gauges, and made available through Alphecca Systems' Downloader tool for survey post processing.

The estimates were also made available for real time processing using a special web page that output just the most recent estimate as a simple text value.





Environmental data acquisition for the global network

ARTEMeS is a web-based real time system that offers unique server-side processing capability in addition to highly interactive and scientifically sound display components.

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