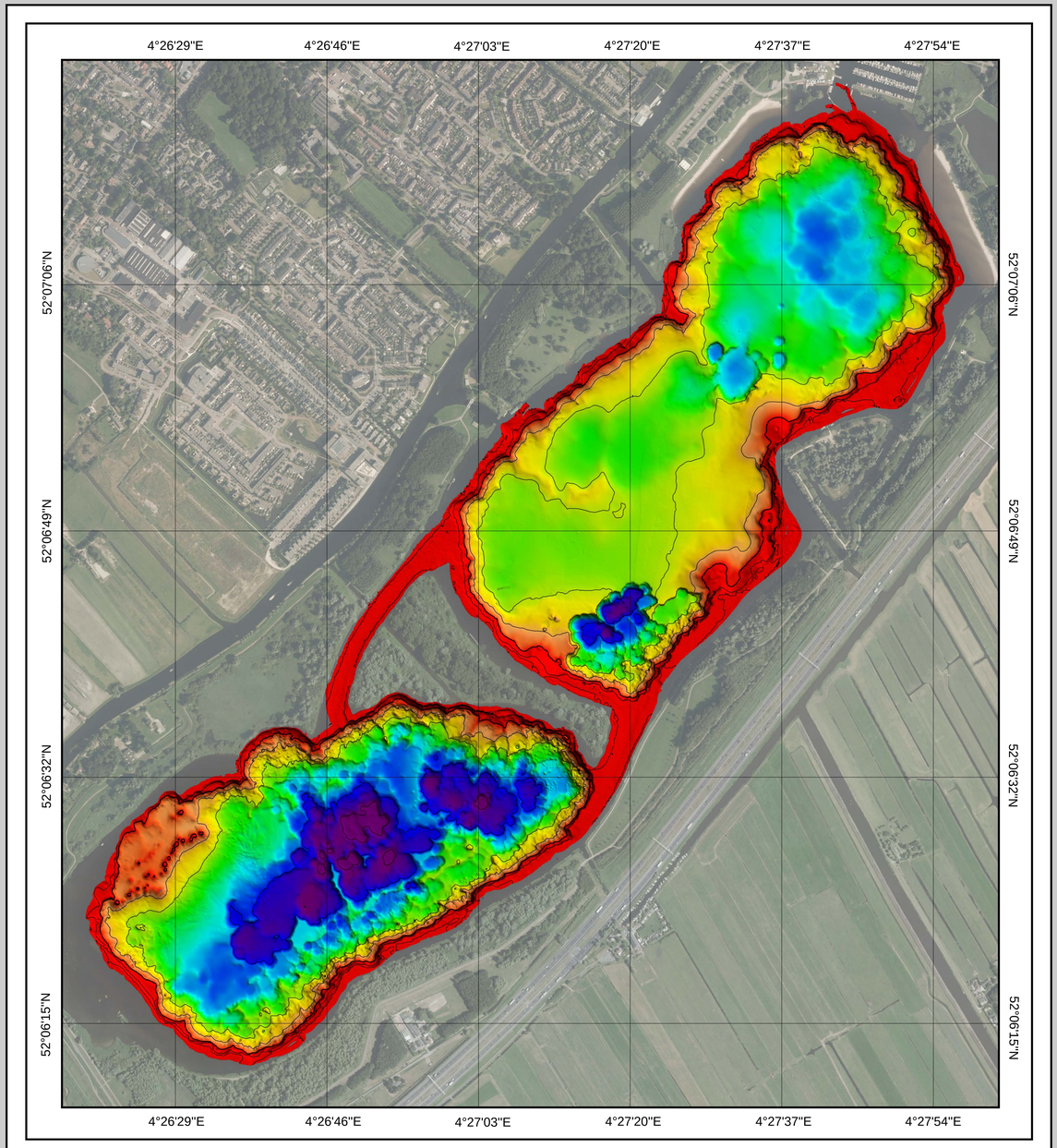
TELEDYNE CARIS Everywhereyoulook™

Lake Survey 2017



Shaded Bathymetric map with Satellite imagery from Vlietland Lake, The Netherlands

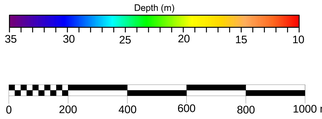
Survey and Chart details:

Location:	Leidschendam, The Netherlands
Survey Date:	26th to 30th of June 2017
Survey Vessel:	Boskalis' Mostly Harmless
Multibeam Sonar:	R2Sonic 2024
Raw Data Format:	XTF
Horizontal Datum:	World Geodetic System 1984
Vertical Datum:	Vlietland Lake Level
Projection:	Universal Transverse Mercator (UTM 31N)

Executed by the Maritime Institute Willem Barentsz students:

Job Admiraal, Larua Dijkstra, Issa Al Issa,
Dorus la Maître, Hanna Nengerman,
Ige Rozema, Ahmed Sheekh-Ahmed, Lennard van Tol,
Lex Veltman, Jelle de Vries, Jesper Walraven, Anna Wagemans,
Marnick Zijlstra, Herman Zweering

Bathymetric scale:



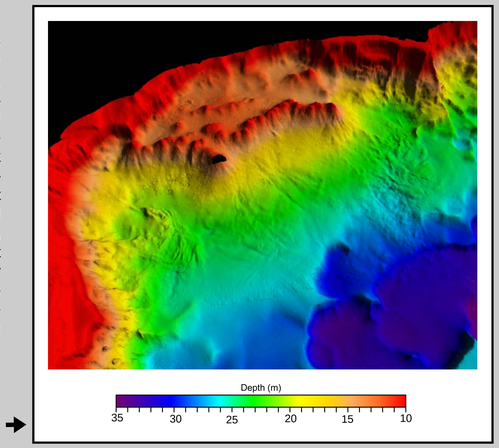
Satellite imagery source: http://geodata1.nationaalgeoregister.nl/luchtfoto/wms?request=GetCapabilities

TELEDYNE CARIS Everywhereyoulook™ · Boskalis · Fugro · Maritiem Instituut Willem Barentsz · Kongsberg

Introduction:

For the fifth year in a row, the Lake Survey was held in the Netherlands. This year Teledyne CARIS collaborated with Boskalis and Fugro in a one-week all-encompassing practical survey week. From 26 to 30 June 2017, 14 students worked with some of the most advanced equipment and technology that is currently available in the market. The organising committee had prepared a week with a varied programme. Practical sessions, demonstrations and presentations covered various subjects that the students are likely to encounter in their professional careers. After 5 days full of mobilisation, calibration, demonstration, information, innovation and recreation, it was time for an evaluation. Another successful edition for the third-year students of Ocean Technology from the Maritime Institute Willem Barentsz (MIWB) gave the students extra motivation to complete their studies in preparation for a career as a surveyor.

Figure 1: Overview of the bathymetric results from the Lake Survey 2017, Contour lines (black), Satellite imagery in the background.



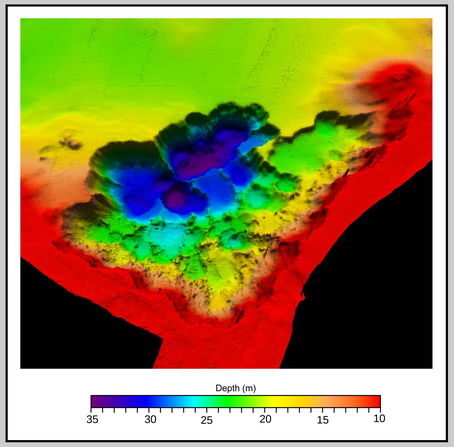


Figure 2: Variable Resolution surface in 3D. Left: Sand deposits in southern part. Right: Sand excavation in northern part.

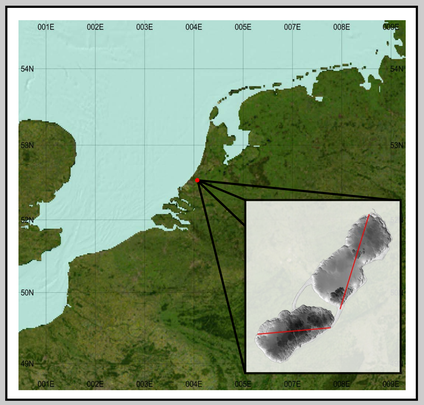


Figure 3: Location of the survey area in the Netherlands. Red profile lines show the location of depth cross sections in figure 4. Source: GEBCO WMS service http://www.gebco.net/data_and_products/gebco_web_services/web_map_service/mapserv?

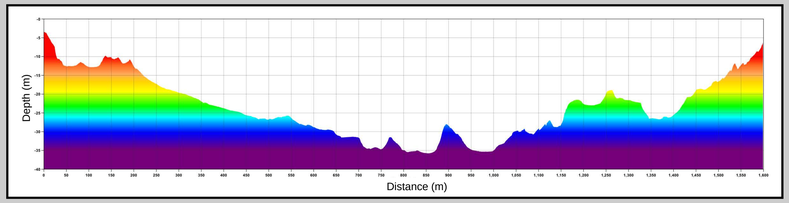
Methods:

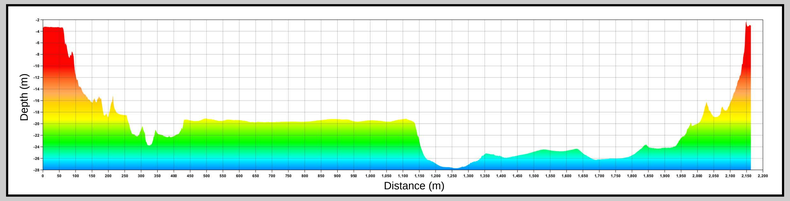
The Vlietland Lake has proven to be very suitable for the Lake Survey. As the area of operations was already known from previous editions, there was opportunity to spend time with the students discussing new concepts and ideas. Utilising two survey boats and training rooms, all three organising parties adopted an innovative subject to focus on throughout the week. Nevertheless, hydrographic surveying remained the core element of the week.

To this end, an R2Sonic 2024 was pole-mounted on Boskalis' Mostly Harmless and the collected data was processed by the students with CARIS HIPS and SIPS. Furthermore, Kongsberg was invited to present their wireless network system and the Rijnland District Water Control Board provided a lecture about the emergence and history of the Vlietland.

Teledyne CARIS processed all data in near real-time with CARIS Onboard. An automated workflow produced a clean and fully attributed Digital Elevation Model, which became available to the students in the processing room for final analysis. The local wireless network was set up with Kongsberg's Maritime Broadband Radio (MBR) between the boat and the shore. To allow external interested parties to view the progress on the week's survey, the network was extended globally by establishing a 4G connection. Live updated data was available throughout the week for monitoring and analysis to anyone that requested the link to the service. The results and possibilities raised some questions from the students about their future role as a surveyor, before realising that it will only become more interesting. They are now able to efficiently operate multiple survey platforms from any location in the world.

Figure 4: Depth profile cross sections (for location see figure 3). Top: Southern Lake E - W, bottom: Northern Lake SW - NE





Results:

The entire lake has been surveyed in the permitted time. An area of 1,248,178 m2 was covered within the week. 169 lines with a total length of 53,963.59 metres were run during 12 hours and 37 minutes and 19 seconds of effective data logging with an average speed of 4.88 kilometres per hour or 2.64 knots. A total of 273,159,000 soundings were recorded with depths ranging between 0.55 and 36.89 metres.

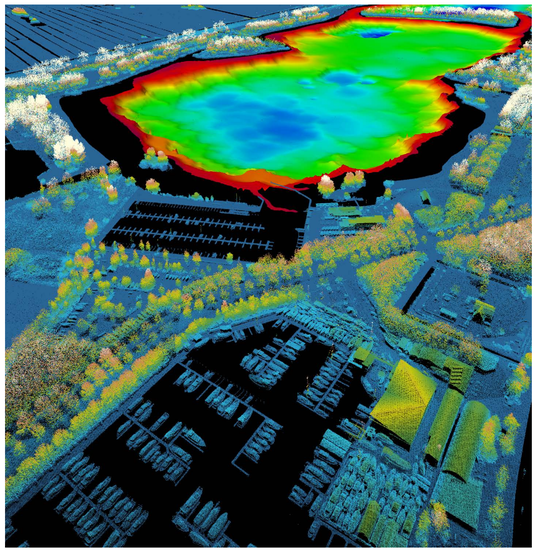
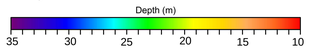
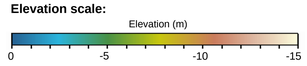


Figure 5: 3D view on the northern lake with a LiDAR point cloud. The points with 'water' classification from the LAZ files has been filtered.

Bathymetric scale:



Elevation scale:



Source: https://www.pdok.nl/nl/ahn3-downloads
Contents: Point cloud, Format: LAZ