



## Building Black Sea VOS System

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VOS and Ships of Opportunity (SOOP) programs are a cost effective instruments for collecting oceanographic data. By contrast with VOS, SOOP is concentrated on oceanographic observations and uses oceanographic instruments which make them more reliable. SOOP is a WMO-IOC program designed for collecting oceanographic data (mainly temperature and salinity) up to 1000 meters depth by non-specialized ships using Expandable Bathy-Termograph (XBT) or Expandable CTD (XCTD). One of the main goals of EC project ASCABOS is to organise VOS programme of ship-of-opportunity for near-real time XBT and meteorological data in Black Sea by developing all managerial, methodological and technological tools necessary for a long-term, cost effective, environmentally safe and multidisciplinary VOS, applying modern technologies and developments for data collection, transmission, storage, use and dissemination. To achieve this goal, data collecting, processing and transmitting system was designed. The system was worked out by assembling the hardware and software components. Then, it was tested and tuned in laboratory and installed on ship. A short trial cruise was performed to test the system in real conditions. During this test cruise general shortcomings were eliminated and reliability of the system was assured. Data transfer as one of the most important elements of the system was tested paying particular attention. Full resolution data can be easily transmitted with a maximum delay of one day, only using GSM and Internet. A modem with USB interface and data transmission via GSM/GPRS communication 3G Broadband, UMTS and HSDPA/HSUPA was used for data transmission. It provides Internet connection near shore with a speed up to 3.6 Mbps. The tests were strictly performed and ensured an unceasing data flow. Data were transmitted in near-real time, e.g. with a delay of about

12 – 20 hours from data collection. Aiming at provision of reliable storage, fast access and wide dissemination of data collected by ship of opportunity, a VOS database was established. Data acquisition software acquires and stores data in database using data servers and database management system. A software programme allows retrieving data from database and publishing them on the project WEB-page. Thus data collected becomes accessible through the WEB. Publishing on WWW is intended to bring impact and to focus the attention of wide range of users and will be done in near real-time mode during implementation of the VOS system. The VOS programme responds to the GOOS demand for long-term monitoring of the marine ecosystems. This contributes to increase the reliability of the forecasting system making the best use of existing regular ship routes. Thus ASCABOS will re-establish the basic elements of the existing operational VOS monitoring network in the Black Sea providing a strategic forward look for advancing implementation of the basin-scale multi-parametric, autonomous, cost-effective system. This will contribute to the development of observing capabilities of the Black Sea region.