

**Republic of Iraq
Ministry of Higher Education and scientific Research
University of technology
Department of Building and Construction Engineering
Water and Dams Engineering Branch**



Using Echo sounder to draw contour maps for the bed of Habaniyahlake

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**Annual Project Submitted to the Department of Building and
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fulfillment of Requirement for Degree of B.Sc. in Building and
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CHAPTER

ONE

INTRODUCTION

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1-1 General :

Depth determination is a fundamental task for a hydrographer, which requires specific knowledge of the medium, of underwater acoustics, of the plethora of devices available for depth measurement, of complementary sensors for attitude and heave measurement and proper procedures to achieve and meet the internationally recommended standards for accuracy and coverage.

1-1-1 Lead line and sounding pole:

were the earliest methods used for directly measuring water depth. Their easy principles of operation ensured their continued use over many centuries as shown in figure (1-1) :



Fig 1-1 (Lead line and sounding pole method)

1-1-2 Single beam echo sounders:

derived from military sonars, were a major development and have been used in hydrographic surveying since the mid 1900s.as shown in figure (1-2) :



Fig 1-2 (single beam sounder surveys)

During the last decade, hydrographic surveying has experienced a conceptual change in depth measurement technology and methodology. Multibeam echo sounders and airborne laser sounding systems now provide almost total seafloor coverage and depth measurement. The high data density and high acquisition rates have led to huge bathymetric data sets and much ancillary data.

1-2 The state of the art of the depth measurement equipment:

- 1- Single beam echo sounders have reached a sub-decimetre accuracy in shallow water. The market offers a variety of equipment with different frequencies, pulse rates etc. and it is possible to satisfy most users' and, in particular, the hydrographer needs.**
- 2- Multibeam echo sounder technology is developing rapidly and offers great potential for accurate and total seafloor search if used with proper procedures and provided that the resolution of the system is adequate for proper detection of navigational hazards.**
- 3- Airborne laser sounding is a new technology which can offer substantial productivity gains for surveys in shallow, clear water. Airborne laser systems are capable of measuring depths to 50 m or more.**

Figure(1-3) shown Several depth measurement equipment.

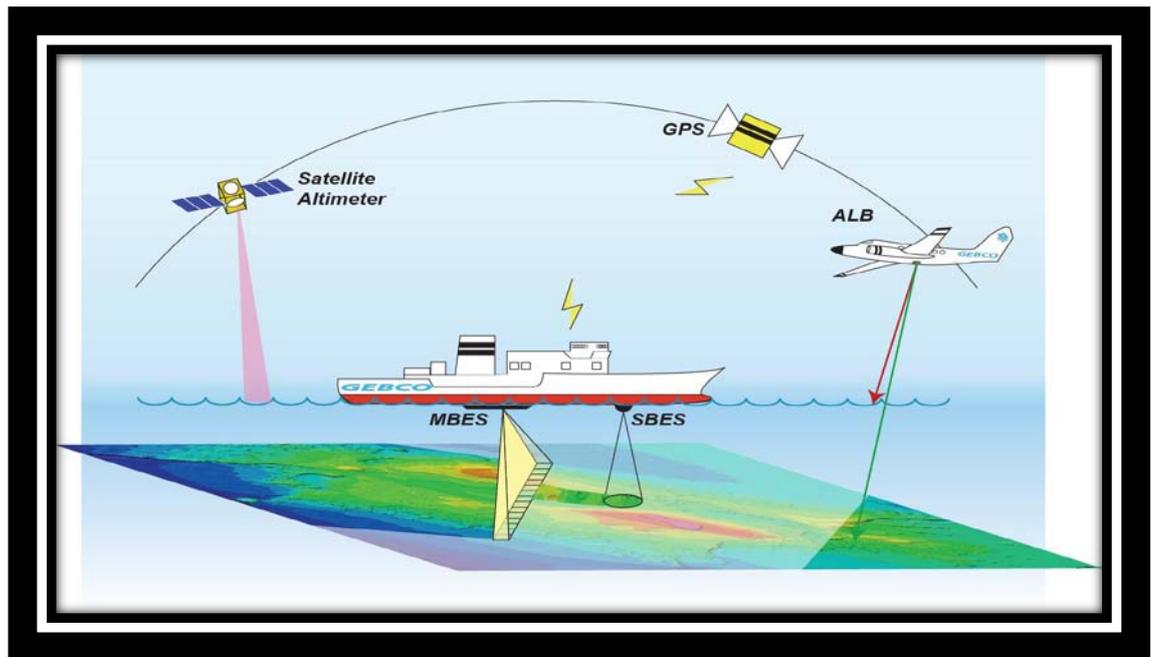


Fig1-3(technology and methodology Multibeam echo sounders and airborne laser sounding systems)

1-3The aim of the project :

There are at least two reasons why it is important to know the depth of the water below the surface: to prevent running the vessel aground and to be able to relate scientific findings to the depth of the water from which samples are taken. Many water quality parameters such as temperature and dissolved oxygen vary with depth as well as with the time of day. The depth of light penetration, which is influenced by turbidity, has an effect on the productivity of plants in an aquatic ecosystem. Various depths in a lake or river host different assemblages of benthic (bottom-dwelling) organisms. Plankton and fish move from one depth to another based on changing environmental conditions.