Introduction to these Guidelines

Like all technicians who work in the marine environment, hydrographic survey technicians must possess a wide range of knowledge and skills for this growing field. Hydrographic surveying is important in a variety of marine activities such as mineral resource management including oil and gas, fishery management, submarine cable routes, marine archeology, search and recovery efforts, and safe navigation.

Hydrographic survey technicians work long hours – sometimes in stressful situations. They must learn to use a variety of tools and equipment, ranging from sonar systems to computers and peripherals, GPS, sampling equipment, and deck equipment.

Individuals who do the same general job functions may have a range of quite different titles. These may include survey technician, surveyor, survey party chief, physical scientist technician, geophysical operator, sonar supervisor, or field engineering aide.

The wide scope of educational courses desired or required reflect the depth of knowledge and skills expected of this position. These courses include oceanography, physics, computer skills, navigation, marine mechanics, geophysical surveying (including echosounders, sub-bottom profiling, etc.), and underwater acoustics.

The work of a hydrographic survey technician can be broken down into four main job functions: conducting pre-cruise logistics and survey planning, conducting field operations, managing data, and maintaining equipment. Within each of these categories there are a series of varied tasks that must be performed. For example, conducting field operations involves everything from troubleshooting field equipment to deploying equipment to maintaining field logs. In another example, managing data involves formatting and organizing data as well as contributing to cruise reports.

Personal characteristics of a hydrographic survey technician

The workshop participants who helped develop these Knowledge and Skill Guidelines felt that the following personal characteristics described a good hydrographic survey technician:

- Tolerant of seasickness
- Able/willing to be away from home for extended periods of time
- Willing to live in Spartan living conditions
- Skilled at interpersonal relationships
- Willing to work long hours
- Flexible
• Able to deal with stress
• Physically fit for work at sea
• Aware of safety issues
• Skilled at solving problems
• Able to make decisions
• Willing to relocate
• Able to manage personal life – families, family obligations

**Tools and equipment typically used**
• Side-scan sonar
• Multibeam sonar
• Echosounders
• Motion compensators
• Gyrocompass
• Computers and peripherals (plotters)
• Data acquisition systems
• Global positioning systems (GPS)
• Acoustic positioning systems
• Hand tools
• Deck equipment
• High-pressure air compressors
• Sound velocity profilers
• Power supplies (up to 400 volts AC)
• Hydraulics
• ROVs
• Bottom samplers
• Core samplers
• Marine radios
• Winches
• Wheelhouse equipment (radar)
• Still, video, and digital camera equipment
• Fiber optics
• Telemetry systems
• Land-based survey equipment
• SCUBA

**Job titles**

*Entry Level:*

Survey technician
Assistant survey technician
Surveyor
Geology technician

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Electronics technician
Marine technician
Hydrographic technician
Physical scientist technician
Geophysical technician
Physical science aide
Geophysical operator
Field engineering aide
Ocean technician
Technician

Experienced:

Supervisor
Civil engineering technician
Researcher
Sonar supervisor
Lead electronics technician
Senior survey technician
Hydrographer/oceanographer
Survey party chief

Basic courses desired or required

- Oceanography
- Geology
- Physics
- Basic statistics (mean, standard deviation)
- Computer skills (e.g., C++ or Visual Basic, MATLAB, NT, Excel, word processing, CAD, 3D computer programs, scripting language, GIS, the Internet)
- Creating a display of the product
- Algebra, trigonometry, and geometry (not calculus)
- Electronics (AC/DC, digital)
- Navigation (“rules of the road”)
- Piloting
- Marine mechanics – mechanical skills
- Basic course in conventional surveying (basic mapping and surveying – land surveys)
- Geophysical surveys (seismic) – echosounders, sub-bottom profiling, handling cores, coring, bottom grabs
- Underwater acoustics

Future trends

- Continuing education will be increasingly important, especially computers
- There will be an increase in remote sensing techniques (e.g., LIDAR)
• The need in this field will triple in the next five years and then stabilize
• Companies will need to diversify (use the same technology in different applications)
• Growth will occur with basic government funding rather than venture capital
• Industry will have a continuous need for workers
• Jobs will be in the civilian sector because the mindset of government is changing
• It will be the government’s responsibility to make contractors successful
• There will be a long-term trend of more private companies doing government contracts
• Industry will need younger people coming in
• Data integration – combining various data sets (USGS, LUMCON, etc., all do data differently – must be able to combine these data sets) will become more important
• Data management will become more important
• More surveys will be done from small boats
• Technicians will need to be aware of more and more technologies

What to do in order to stay current on industry trends
• User conferences/training sessions (e.g., Hypack, ArcView, Triton Elics)
• Training sessions (Reson) – short courses – “packaged” learning – MATE organizes through industry

Read periodicals
• Sea Technology
• Oil & Gas Journal
• Maritime News
• National Fisherman
• Sea Technology Directory
• Underwater Magazine
• Ocean Systems
• Point of Beginning
• GPS World
• Geo Info
• Seahorse
• Hydrographic Journal
• International Hydrographic Review
• International Dredging Review
• NASA Tech Briefs
• Manufacturers’ newsletters

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