GEOSPATIAL ENGINEERING COMPETENCIES

Specialist Hydrospatial Competencies

March 2023 revision

Notes:

Each of the activities under the competencies must be signed-off to the standard that the applicant has achieved – more details and explanation of the levels (A, K, E and B) are contained in the quick guide to competencies.

Optimum standards of competencies:

These are the optimum levels of achievement that an applicant needs to achieve for the grades of Technical Member or Member.

The optimum standard is given against each activity statement

There is a little flex in the optimum standards, so if an applicant is not able to achieve the optimum standard in a few activities, this can be balanced out by exceeding the optimum standard elsewhere in the competencies.

Experienced applicants may be able to sign off all the competencies in one go, but we would expect trainees and apprentices to do this over the duration of their training period. Competencies may be updated annually, so if you are working on a particular revision you should be aware that you need to be familiar with the latest revision at the time of review and may be questioned on these.

Revisions 2023: This is an extensive update

Name of Supervisor	Name of Applicant
Supervisor's signature	Date

GEHS01		Competency	Hydrospatial Surveys				
				Date of assessment			
	Optimum Standard		Activity Details	A	K	E	B
ITEM	TECHNICAL MEMBER	MEMBER					
A	3 at E, 3 at K, Rest at A	3 at B, 3 at E, rest at K	Bathymetric Survey (from surface or subsurface) of water bodies: offshore and/or inland waters (e.g. rivers, canals)				
B			Seismic Surveys (reflection or refraction)				
C			Topographic Survey (e.g. coastal, harbour and quayside areas, bridges)				
D			Dimensional Control and Calibration Surveys (e.g. Vessels and Structures with associated sensors)				
E			Construction Support Operations (e.g. prelay surveys, wind farm installations, cables/pipelines, metrology, as-builts, decommissioning)				
F			Monitoring Sea/Riverbed level and changes (e.g. long-term seabed movement, dredging support)				
G			Engineering Inspection Surveys (e.g. Pipeline Inspections via visual/photogrammetric inspection, out of straightness and condition surveys)				
H			Environmental Surveys				

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I			Rig Moves (e.g. semi-submersible, jackups)				
J			Geophysical Surveys (e.g. sub-bottom profiling, sampling)				
K			Target / Object Detection Surveys (side scan sonar, magnetometer etc)				
L			Airborne or Satellite Derived Bathymetry Surveys				
M			Other (please define activity)				

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GEHS02		Competency	Hydrospatial Science				
				Date of assessment			
	Optimum Standard		Activity Details	A	K	E	B
ITEM	TECHNICAL MEMBER	MEMBER					
A	K	B	Oceanography including tidal theory, currents, water column parameters (temperature, salinity and density), weather factors				
B	K	B	Electromagnetic waves for: Navigation e.g. GNSS Radio waves; Bathymetry / Inspection e.g. Light Detection and Ranging (LiDAR)				
C	E	B	Surface Positioning methods (e.g. GNSS modes, Traverse, Radiation) for structure, vessel/USV positioning and integrated, multi-sensor position solutions				
D	E	B	Subsurface Positioning: SONAR systems (e.g. USBL, LBL) and integrated, multi-sensor position solutions; Bathymetry (e.g. Echosounders); Acoustic theory, Speed of Sound				
E	K	B	Coordinate Reference Systems: horizontal and vertical datums, transformations, projections. Spatial Reference Identifiers (SRID) e.g. EPSG. Geoid models, VORF				

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F	A	K	Sea / Riverbed composition and sub composition, sampling techniques. Basic geotechnical engineering and geology				
G	K	B	Hydrographic Specifications and error propagation e.g. Order of Survey, Total Vertical & Horizontal Uncertainty				
H	K	E	Communication Standards: e.g. NMEA, RTCM, NTRIP; and Computer Networking: e.g. basic Network Topologies, TCP/IP, WiFi, Cloud Services				
I	K	B	Appropriate statistical principles and tests e.g. probability, propagation of variances, least squares, kalman filters				
J	K	B	Maritime Law and Governance and its application to hydrospatial operations e.g. UNCLOS, MARPOL, GMDSS, Environmental Agency, Canals & River Trust.				
K	K	K	Collection and management of national, regional or world-wide multi-disciplinary datasets (via e.g. crowdsourcing), Marine Spatial Data Infrastructures				

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GEHS03		Competency	Surveying Operations				
				Date of assessment			
	Optimum Standard		Activity Details	A	K	E	B
ITEM	TECHNICAL MEMBER	MEMBER					
A	K	B	Planning: specification, acoustics, hazard identification and risk assessment, environmental concerns, vessel capability, weather and tide planning, logistics				
B	K	B	Installation of Survey positioning systems (surface and subsurface) and interfacing with external systems (e.g. Vessel Dynamic Positioning) as appropriate				
C	K	K	Use of different survey platforms, vehicles e.g. ROVs AUVs, USVs				
D	E	B	Acoustic scanning systems e.g. Profilers, Single or Multibeam Echosounders				
E	E	B	Calibration and verification of sensors, both surface and subsurface e.g. GNSS, Gyros, Motion Sensors / INS, USBL, Echosounders, LBL				
F	K	B	Establishment of vessel CRS, installation of sensors and offset measurement relative to CRP				

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G	E	B	Setup of Online acquisition & Navigation systems including e.g. SONAR and quality control parameters, video systems				
H	K	B	Processing workflows, reductions and corrections e.g. tides				
I	K	K	Uncrewed and remote operations, tracking, semi and fully autonomous vehicles				
J	E	B	Data storage methods and backup strategies e.g. RAID, LTO, Cloud based systems				

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GEHS04		**Competency**	**Charts, Models & Data Integration**				
				Date of assessment			
	Optimum Standard		**Activity Details**	A	K	E	B
ITEM	**TECHNICAL MEMBER**	**MEMBER**					
A	E	B	Preparation and production of hydrographic charts and/or engineering drawings to appropriate standards e.g. IHO or Company				
B	K	K	Vessel Navigation Systems e.g. ECDIS, AIS				
C	E	B	Preparation and production of other output types e.g. point clouds, DTMs, photo mosaics, photogrammetric products				
D	A	K	Other Engineering Survey task specific outputs e.g. Cross Sections, DEMs of Difference				
E	K	E	Integration of multiple data sources, use of GIS				

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