

MULTIBEAM PROCESSING TRAINING

Software – QPS Qimera is used for teaching purposes. Even if not using QPS Qimera, the principles of WHAT must be done are the same for any software package. Temporary Qimera licenses can be provided as part of the training.

Module 1 – Data Processing – Software Exercise

- Quick Workflow – Get In & Get Out. Import data, run quickly through steps to create basic product, review and clean point cloud and export. Detailed step through of the workflow is covered in the data “sniff test” later in this module.
- User Interface and User Experience – key concepts
 - Docks – Some are unnecessary
 - Navigation in Scene, 2D and 3D
 - Visibility vs selection
 - Vertical Exaggeration in 3D (default of 6x)
 - Important key shortcuts and modifiers:
 - §Shift to temporary switch to Explore mode
 - §Alt + LMB to reposition selection
 - §Ctrl + scroll wheel to zoom vertically
 - Custom Workspaces – Example of how to create AutoClean layout
- **Sensor data** – name the sensors, explain why they’re important (e.g. why SV at head and SV profiler?)
- **Importing**, checking quality as you go, checking yourself as you go. Data “sniff test” – Check the ingredients
 - Position
 - Motion
 - Surface sound speed
 - SVP
 - Vessel configuration, including sensor uncertainties
 - Multibeam
 - Geodesy
- **SBET processing – Import, QA, “gotchas”**
 - GPS week
 - Vessel
 - Virtual sensors, location of the SBET (what location on the vessel does this measurement represent?)
 - Geodetics
 - SMRMSG file

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- **Module 2 – Data Cleaning – Software Exercise**

- Visualization tips and tricks
 - Shallow layer
 - Color by uncertainty
 - Colormap: QPS but use negative mirror value as lower threshold to force Green, Yellow, Red.
 - Colormap: Midwater, clamp on top end
 - Colormap: Copper – everything even tone except problem areas
 - Shading
 - §Exaggerate cast shadows vertical scale
 - §Default shading azimuth to 305 instead of 315 to work around shading bug

- **3D and 2D views**

- **Manual methods – Swath, Slice, 3D**

- **Selection modes for Editors**

- **Important options for Slice Editor**

- **Automated methods – Filters – Spline, Outlier (1D) (aka “Clip Mean Height” in AutoClean), Outlier (3D), Cluster**

- **Setting filter areas and exclusion zones**

- **Critical thinking when cleaning**

- Sidelobes – What are they, how do they influence bottom detection, what geometries do they occur in
- How to avoid overcleaning?
- How to avoid accidental removal or distortion of objects or important seafloor features?
- How to clean towards a spec?
- How to choose the right tool for the job?
- Tracking progress to ensure thorough review – Grid Edit Overview, “Checked” flag
- How to review what has been rejected to check your work or the work of others? “Has Rejected Flag”

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• **Module 4 – Troubleshooting Common Errors**

- Use Qimera to "break the data", value to online and offline people. What to look for online (what kinds of displays, visualization decisions for high chance of noticing problems).
- Top 5 Common Multibeam Errors – How to recognize them
 - Sign conventions for XYZ offsets and data entry errors, motion sensor sign conventions
 - Timing
 - Acoustic interference: Mechanical, electrical other acoustic sensors, weather, turbidity
 - Under sampled SVP, inadequate sampling of oceanography
 - Poor quality patch test field procedure, site selection or errors in processing
 - Forget to apply patch test results, incorrect application or double application

• **Module 5 – Patch Testing – Lecture & Software Exercise**

- Patch test theory – Line geometry. Ideal scenarios.
- How to plan? Single head only
- How to evaluate, examples of bad roll and good roll, bad pitch and good pitch, etc
- Group exercise, everyone evaluates patch test, compile group results and discuss
- How to assess – Before and after assessment. How to prove it did a better job. SD grids, spot check on positional alignment.
- Where to put the values? In INS? In MBES? Offline only? Pros/Cons of each.

• **Module 6 – Advanced Topics**

- Sound velocity profiles, some survey areas have challenging oceanography, how to evaluate, how to assess suitability, different strategy options. TU Delft add-on.
- Vertical and Horizontal shift tools. What do to when positioning is sub-optimal.
- Open Discussion.

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