

1 Introduction

These technical specifications detail the requirements for hydrographic surveys to be undertaken either by National Oceanic and Atmospheric Administration (NOAA) field units or by organizations under contract to the Director, Office of Coast Survey (OCS), National Ocean Service (NOS), NOAA, U.S. Department of Commerce.

The specifications described herein are based in part on the International Hydrographic Organization's Standards for Hydrographic Surveys, Special Publication 44, Fourth Edition, April 1998, specifically for Order 1 surveys. Hydrographic surveys classified as Order 1 are intended for harbors, harbor approach channels, recommended tracks, inland navigation channels, coastal areas of high commercial traffic density, and are usually in shallower areas less than 100 meters water depth. Additional details for the specific project areas, including any modifications to the specifications in this manual, will be provided in Hydrographic Survey Project Instructions for NOAA field units or the Statement of Work for contractors.

If a hydrographer has any questions on the interpretation of these Specifications or feels that there may be a "better way" to provide a deliverable, they should contact the COTR or appropriate NOAA Program Office to discuss and clarify the issue. The Specifications will continue to evolve and can only improve with the input of all users.

1.1 Definition

The term "hydrographer" as used through this document, refers to: (a) the chief of party or officer in charge, when the survey is being conducted by NOAA field units, or (b) the contractor where the work is being performed for NOAA under contract.

1.2 Changes from April 2007

Chapter 3 "Hydrographic Position Control"

1. Added reference to section 8.1 for reporting requirements in section 3.1

Chapter 4 "Tides and Water Levels Requirements"

1. Sections under 4.1 General Project Requirements and Scope have had minor clarification changes
2. Section 4.2.3 Station Installation, Operation and Removal has been updated to include additional guidance on installing and maintaining water level stations (designed or installed by contractors) and their various components according to the manufacturer's installation manual, appropriate building codes or as specified by the COTR.

3. Section 4.2.5 Bench Marks and Leveling gives clarification that "At least, geodetic third-order levels (refer to Reference 19, but 2nd order class I levels are preferred) shall be run at short-term subordinate stations operated for less than one-year."
4. Section 4.2.6 Water Level Station Documentation has been revised to state that "The documentation package shall be forwarded to CO-OPS after a) installation of a station,..." instead of "within 10 business days of a) installation of a station,...". Sections under 4.6 Data Submission Requirements have been updated significantly regarding the station documentation package (section 4.6.1) and the Project documentation and data checkoff list (section 4.1). Additionally, section 4.6.3 gives additional guidance regarding redundant DCP data and input records and section 4.6.4 gives naming guidance for hourly height, high and low, monthly means and station datum data files.
5. Section 4.6.5 Tide Reducers and Final Zoning and Final Tide Note has been revised to remove the reiterative verbiage and to include the following regarding documentation forwarded to CO-OPS: "(c) GIS compatible zoning development steps in MapInfo© or ArcGIS© format including geographical presentation of summary data and cophase/corange maps, if appropriate"
6. Section 4.6.6 Submission and Deliverables – Documentation and Time lines has been significantly revised to update the submission requirements and submission example.

Chapter 5 "Depth Sounding"

1. Section 5 Depth Sounding has been updated to include the phrase "Total Propagated Uncertainty (TPU)" instead of the previous "Total Propagated Error (TPE)" and to reference to single beam gridding requirements.
2. Section 5.1.1 Accuracy and Resolution Standards now includes a reference to the new S-44 (5th Edition, February 2008).
3. Section 5.1.1.2 Multibeam Resolution Standards has been shortened so that part of the information in this section has been added to section 5.1.1.3 to lessen some confusion with the Multibeam Resolution Standards and coverage requirements.
4. Section 5.1.1.3 Gridded Data Specifications has been revised to change the practice of creating a grid at the highest resolution possible. HSD has determined that a compromise is necessary to preserve high resolution data for navigation products without needlessly burdening NOAA field units and contractors.
5. Section 5.1.2 Coverage has been significantly altered to help clarify the Object Detection Coverage, Complete Coverage and Set Line Spacing requirements that were once in several different sections of this document. It should also be noted that the old Section 5.1.2.1 and 5.2.2.1 Demonstration of Coverage has been removed - all NOAA field units and contractors can still do this as a quality assurance practice but the coverage grid is no longer required.
6. Section 5.1.3 Corrections to Echo Soundings has been updated to replace the phrase "Heave, roll, pitch, heading and navigation timing errors (latency) corrections" with "Attitude corrections".
7. Section 5.1.3.2 Draft Corrections and all other sections previously referring to "Settlement and Squat" now refer to "Dynamic Draft".
8. Section 5.1.3.5 Error Budget Analysis for Depths was updated to clarify the reasoning behind giving error ranges and that the required depth accuracy requirements cannot be achieved if the worst error for each sensor shown below is used.

9. Sections 5.1.4.1 Multibeam Sonar Calibration and 5.2.4.1 Lidar Calibration have been updated to replace the reference to discussing procedures and results in the Data Reduction section in the Data Acquisition and Processing Report with Section A. Equipment and optional Section B. Quality Control of the project.
10. Section 5.1.4.3 Crosslines has been revised to require a general evaluation of the multibeam crossline to mainscheme agreement.
11. Section 5.1.4.4 Multibeam Sun-Illuminated Digital Terrain Model (DTM) Images has been removed - it is no longer required that NOAA field units and contractors submit two sun-illuminated DTM images. All NOAA field units and contractors can still do this as a quality assurance practice but this no longer a submission requirement.
12. Verbiage in section 5.2.1 Accuracy and Resolution Standards and 5.2.1.1 Accuracy Standards for lidar has been removed and now simply refers to section 5.1.1 since this information is the same.

Chapter 8 "Deliverables"

1. Section 8.1 Field Reports has been updated to clarify the precision of horizontal and vertical reporting requirements.
2. Section 8.1.1 Progress Sketch and Survey Outline has been revised to provide clarification for columns within the statistics spreadsheet.
3. Section 8.1.2 Danger to Navigation has been updated to require a chartlet that portrays the raster chart and the danger features with multibeam and side scan imagery of the danger.
4. Section 8.1.3 has been updated to clarify that Descriptive Report shall be submitted in Microsoft Word and in Adobe PDF (including an approval sheet with digital signature). Also, part C of Vertical and Horizontal Control in Section 8.1.3 Descriptive Report (DR) and section 8.1.4.2 Horizontal and Vertical Control Report have been updated to refer NOAA field units to section 5.2.3.2.3 in the OCS Field Procedures Manual to insure that the Vertical and Horizontal Control Report is only created only in certain instances.
5. Section 8.2.1 S-57 Attribution has been revised to include shoreline encoding information for lidar surveys. Also, the Meta-Objects: M_Qual and M_NSYS have been removed.
6. Section 8.2.2 Cartographic Specifications and Conventions - the horizontal precision reporting requirements have been removed, changed and added to section 8.1 and Generalization of Features section has been revised.
7. Section 8.3 Multibeam and Lidar Sonar Coverage has been removed - there is no longer a requirement to submit a multibeam or lidar swath coverage graphic.
8. Section 8.4 Digital Data Files - For both single beam and multibeam data - digital deliverables are required to be separated into two data types: raw and processed.
9. Sections 8.4.3 Shallow-Water Multibeam and Lidar Data and 8.4.4 Side Scan Sonar Data have been updated to require contractors, that process with Caris, to submit the fieldsheet directory so re-computation can occur, if necessary.

Appendices

1. Updated Descriptive Report Title Sheet in Appendix 3 (Figure C.1)