

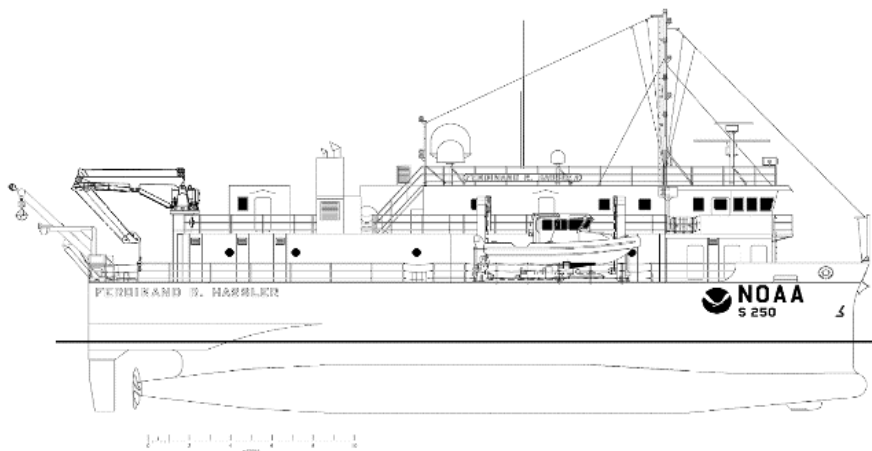
NOAA

NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
UNITED STATES DEPARTMENT OF COMMERCE

NOAA Ship *Ferdinand R.
Hassler*
Controlled Document

***Ferdinand R. Hassler* How to Start a Survey**

Standard Operating Procedures



Revision History

Date	Revision Description (Reason/What)	Updated by
07/13/2020	Original SOP from NOAA Ship TJ	NOAA Ship TJ personnel
05/21/2021	Reviewed and Updated for FH	ST Tigges
02/02/2023	Reviewed and Updated	LT Debrousse

1. Overview and Scope

Below is a general overview of what sheet managers should be doing before starting their sheets. Towards the end of the SOP there is a 'list' of responsibilities and duties that a sheet manager must perform.

2. Procedure Inputs and Outputs

Inputs: Project Instructions, 2023 HSSD, FPM, HTD, Coast Pilot, and any documents related to the sheet.

Outputs: A thorough understanding of the sheet, its requirements, and a plan for the best way to acquire data in an efficient and timely manner.

3. Procedure

Step 1 – Read the Project Instructions

All surveys begin with a set of Project Instructions. These instructions are written by the HSD Operations Branch and specify how each survey shall be conducted. The project instructions (called PIs) are located at P:\Survey_Storage\00_PROJECTS\YYYY\OPR-XXXX-FH-YY\Project_Files\Project Instructions.

The first thing to note is the naming convention for the PIs. Let's take OPR-E350-TJ-13 for example. The first three letters indicate the scale of the project. OPR = operational, and S = Special. The next letter indicates the geographic location, E = Chesapeake Bay. The first digit indicates the type of survey, 3 = navigational, while the next two are sequential numbers. Next the platform and year are indicated. So a project titled OPR-E350-TJ-13 is an Operational project, located in the Chesapeake Bay. It is a navigable survey, number 50, assigned to the *Thomas Jefferson* in 2013.

Each project is further broken down by sheet. Each sheet is given an H-number, which is always an H, followed by five numbers. There are also F-number sheets, but those are rarer for the OMAO fleet.

It is important to review and understand each section of the PI, but during the planning stage, the following sections are particularly important:

- Coverage & Limits:
 - o Ensure that you know what kind coverage your survey requires. If more than one type is listed, consult with the Field Operations Officer FOO/ OPS. Be familiar with section 5.3 and/or section 6.6 of the 2023 HSSD. Also understand what the NALL line is, section 5.3 of the HSSD.
- Feature Investigation:
 - o HSD OPS provides the field with both a Project Reference File (PRF) and a Composite Source File (CSF). It is mandatory to assess all features marked "Assigned" in the CSF for either disproval or confirmation of charted features.
 - o Know what kind of coverage is required for feature assessment, and how big the search radii are.
 - o Refer to chapter 7 of the HSSD
- Horizontal Control Requirements
 - o This section tells the field unit what kind of positioning OPS requires.
- Vertical Control Requirements
 - o This section tells the field unit the method that will be used to reduce all sounding data to MLLW. Vertical control for the majority of *Hassler* projects is VDatum.
- Shoreline and Nearshore Features
 - o This section reminds the sheet manager about the Composite Source File (CSF).

Step 2 – Review the Chart(s) PRF, CSF, and Coast Pilot

The first step to actually planning a survey is to figure out what has already been charted and to figure out what features HSD OPS has specifically flagged for development. This will require a few steps.

Step 2.1- Charts

Finding what has already been charted is as easy as looking at the chart. The ENC, or Electronic Navigational Chart. ENCs are vector databases of chart features.

- Each feature on an ENC - each buoy, each rock, each depth, each bit of shoreline, is stored as a separate element in a database;
- All features are sorted into one of three possible types: a point, a line, or an area:
 - o Point = something with one discrete position, such as a buoy, rock, or depth;
 - o Line = something with several positions link together into a line, such as the shoreline;
 - o Area = a line that encloses an area, such as an anchor berthing.
- All features also have extra data linked to them. The metadata indicates (at a minimum) the type of feature, the acquisition method, and the accuracy of the positioning:
 - o The format of the metadata is regulated by the International Hydrographic Organization (IHO);
 - o The regulations are promulgated in the document titled International Hydrographic Organization (IHO) Special Publication No. 57, "IHO Transfer Standard for Digital Hydrographic Data."
 - o S-57 has become the shorthand for referring to the metadata attached to points, lines, and areas in an ENC database.
- Read section 7.3 of the HSSD.

If S-57 still doesn't make any sense, you can ask HSD OPS, the nearest PS/ST/FOO, or a member of the bridge team. S-57 is going to be a huge part of your life as a hydrographer; it really behooves you to understand it.

Also, when reviewing charts pre-survey, always use the largest scale chart! These will have the most detail for the area in question.

Step 2.2- Ancillary Files

Determining what HSD OPS has flagged for development involves two extra files. One is called the Project Reference File (PRF); the second is called the Composite Source File (CSF). Like an ENC, the PRF and CRF are datasets of S-57 features; both files contain points, lines, and areas that OPS has decided the field must investigate.

COMPOSITE SOURCE FILE

A Composite Source File (CSF) is pulled from the ENC chart covering the project area. It contains all the features OPS has decided need verification. These features are marked by placing an 'Assigned' flag under the *asgnmt* S-57 attribute. Like the Project Instructions, a CSF is created for the entire project. It is up to the sheet manager to cull the original CSF into the start of a sheet level Final Feature File (FFF)

PROJECT REFERENCE FILE

A Project Reference File (PRF) is created by OPS and used to pass NOAA-specific information to the field unit. It contains the project outline, any junction surveys, a bottom sample plan, and all assigned AWOIS items.

When dealing with a PRF, it's very important to understand that the S-57 features in the file have been subverted by HSD OPS and no longer convey their originally intended S-57 information. In the IHO world, a crane symbol indicates a crane but in the PRF, and only in the PRF:

- ACHBRT (an *area* outlining an anchor berthing) = search radii;
- SPRING (a *point*, marking the position of a spring) = recommended position for a bottom sample;
- TESARE (an *area* outlining a Territorial Sea Area) = sheet outlines for the current project;
- TWRTPT (an *area* outlining a Two-way Route Part) = outline of junction surveys.

The sheet specific PRF should be saved in P:\Survey_Storage\00_PROJECTS\YYYY\OPR-FXXX-FH-YY\Surveys\HXXXXX\05_S57 called HXXXXX_PRF.000.

Step 2.3- The Actual Review

Once the chart, the FFF, and the PRF are open, begin your review. Determine review *in detail* each of the following.

- The depth range of the survey area;
- The location of all charted features;
- The location of any shoals, particularly dangerous shoals:
 - o Dangerous = ship < 30ft, launch < 12ft
- The location of all ATONs;
- All S-57 features flagged with asgnmt = yes:
 - o Some assigned features may be inshore of the NALL line. At this point, simply note them. They will not be developed.

Next, read the Coast Pilot (<https://nauticalcharts.noaa.gov/publications/coast-pilot/index.html>) for the charts affected by the survey sheet. Good things to note are the tide range, the set and drift of currents, and any tricky tide rips. The prudent hydrographer knows their survey like the back of their hand. This knowledge begins before acquisition. This is important because later on you will have to review the Coast Pilot for accuracy in your sheet area. If things are different than what is described in the Coast Pilot, changes need to be made. Consult with the FOO/Ops Officer and the bridge team about any concerns regarding the Coast Pilot.

Finally, determine the predicted tides and currents (https://tidesandcurrents.noaa.gov/tide_predictions.html) for your sheet. Using this information, find the predicted tides and currents for the gauges on your sheet. This will help determine under keel clearances in questionable areas.

Step 3 – Make Line Plans and Polygons

The most basic function of a line plan is to tell each platform where and how to acquire data. There are two distinct methods: lines and polygons. Lines take longer to create, but require less thought in the field. Polygons are faster to create, but require the person acquiring data to think critically.

In general, the FH uses line plans for all Side Scan Sonar acquisition. Ship MBES acquisition is usually completed using the sheet boundary as the polygon. Polygons are often used to acquire

launch MBES. Read sections 2.5.2 and 2.5.3 in the FPM for a comprehensive overview and philosophy of line planning.

Sheet Manager Responsibilities:

- Keep the Sheet QC Checksheet up to date
- Ensure all plans for the survey are created and submitted to FOO/OPS with ample time for review prior to commencement of acquisition. This includes:
 - Line plans/or Polygon Plans
 - Holiday Plans
 - Bottom sample plans
 - Feature and contact investigation plans
- Create and maintain the sheet's Final Feature File S:\YYYY\OPR-XXXX-FH-YY\HXXXXX\Data\Point_Cloud\Final_Feature_File
- Create and maintain the sheet's Reports S:\YYYY\OPR-XXXX-FH-YY\HXXXXX\Metadata\Reports
- Ensure acquisition logs are completed and concatenated into the master log (processing sections to be filled out by night processors)
- Ensure all data have been transferred and processed
- Monitor and maintain the sheet's data directory and ensure data is in the proper directories.
- Coordinate with FOO/ OPS, night processors, and watch standers to facilitate project goals.
 - Ensure watch standers are aware of the acquisition plan and have all the necessary files.
 - Coverage tiffs
 - Line/polygon plans
 - Boat sheets (for launch)
 - Ensure night processors accomplish assigned goals:
 - Process data from the previous day
 - Update mosaics and working surface(s)
 - Scan and rough-clean data
 - Create and export coverage tiffs
 - Submit stats to CHST and FOO
- QA/QC all data to be submitted
 - Flier finder
 - Holiday finder
 - AutoQC POS
 - Crossline Comparison
 - Junction analysis
 - TVU QC
 - Determine if NALL has been met
 - Ensure features have been adequately investigated.
- Report all issues/ questions related to the sheet to FOO/ OPS within one business day. This includes is not limited to:
 - Data quality issues
 - Acquisition instrument errors or failures.
 - Interesting findings
- Report any DTONs to FOO/OPS immediately.