Jason Pre-cruise Data Planning Introduction

Scott McCue, National Deep Submergence Facility data manager

Woods Hole Oceanographic Institution, smccue@whoi.edu, 508-289-3462

Overview

The intent of this brief is to introduce future users of *ROV Jason* to more complete information sources about its data products. A multi-faceted vehicle, *Jason* is capable of carrying a wide variety of sampling apparatus and of performing many different activities. We provide several documents describing NDSF-maintained data systems and the content that *Jason* users will receive from them.

Documentation Sources

More detailed information on *Jason's* systems can be found in the National Deep Submergence Facility web pages, which are under the main web site for the Woods Hole Oceanographic Institution (http://www.whoi.edu).

      Data deliverables: https://ndsf.whoi.edu/jason/using-jason/data-products-jason/
      Jason User Manual: https://ndsf.whoi.edu/jason/using-jason/capabilities-jason/
      WHOI NDSF archive policy: http://www.whoi.edu/main/ndsf/archive-policy/
      Jason Operational Summary/Metadata: https://ndsf.whoi.edu/jason/dive-log-jason/
      Jason Sealog server: http://ndsfdh4-vm.whoi.edu/jason

Navigation

Jason's primary navigation sources are a Doppler velocity log (DVL) in combination with a fiber optic gyroscope (FOG). This information is usually augmented with georeferenced information from an ultra-short baseline (USBL) system. During a dive both histories are displayed in real time and logged by in-house softwares navest and NavG. The two histories are mathematically merged in post-dive processing to yield an improved history. For those dives that are out of DVL range, a smoothed USBL-based product is delivered.

We recommend bringing to your cruise previously collected navigation and bathymetry, with historical station positions, to increase the efficiency and productivity of your dive time. *Jason* navigators can guide you in the creation of underlays and waypoints and will incorporate this information into operational software for use in real time. Prior to your cruise, the NDSF data manager can assist you finding information and processing content.

Imagery

Jason carries a variety of video and still camera systems, generally described in the *Jason* User Manual. Please discuss your project's needs with the *Jason* team during the pre-cruise process. The *Jason* control van houses a variety of imagery capture systems that have differing behaviors depending on source and time of development.

Constant Video Recording

Three video cameras ("pilot", "brow", and "science") are captured by duplicate direct-to-hard drive recorders. Video and accompanying files are clipped at a definable time, usually 15 minutes. The codec is h.264, which provides excellent viewing quality but is less suitable for production video editing. File volumes are about 2.4GB per hour per camera. The processing of these clips requires about 15 minutes per hour of dive time. Video and subtitle files are merged in post-processing to yield a video with optional overlays, playable using software such as *vlc*.

Video Highlights

For those moments that may be processed for outreach, select activities of the dive can optionally be captured from the watchstander's choice of high definition (1080i) pilot, brow, or ultra HD (2160p/4K) science camera streams. These clips are compressed using the Apple ProRes422 family of codecs (2.7GB/3 minutes for high definition, 15GB/3 minutes ultra definition) and contain embedded time code. The resulting file is a .mov file type, playable by QuickTime and editable using NLE software such as Final Cut or Premiere.

Stills

Several sources of still images from *Jason* cameras are now available.
1. Standard still camera. Sulis model Z70, which produces 5968x3352 images in jpeg format.
2. Grabbed still images from one of the video streams from most of *Jason's* video cameras, primarily the science, pilot, or brow, or aft pan and tilt cameras, as selected by science watchstanders. The system produces color RGB TIFF images scaled to the camera image: a 4K stream results in a 3840x2160x8 bit image; a 1080i stream yields a 2740x1540x8 bit image..

Jason lighting is now improved by use of LED technology, but some limitations on camera configurations exist. In particular, downlooking captures require use of strobes that can be flashed no more quickly than every ~10 seconds. Please be sure to discuss photographic requirements in the pre-cruise process.

Still image filenames denote image capture time. A post-processed product merges vehicle navigation to image filename at the time the image was captured (.ppfx file).

Logging of Events

For the 2021 cruise season we will move to a new event log/dive summary system called *sealog*. Event hot buttons ease comment entry and standardize vocabulary, and can be modified by science watchstanders. We suggest that prior to the cruise you obtain or develop a hot button list according to the standards of your research community. The narration of your cruise will be available during the cruise from a server on the ship and post-cruise from a server at WHOI.

Bathymetry

Jason can carry a 400 kHz Kongsberg EM2040 multibeam sonar. Use of the EM2040 should be arranged in the pre-cruise process, and the chief scientist may wish to bring personnel who specialize in the production of bathymetry maps. The *Jason* at-sea data processor will produce a quick-look gridded product that is based on a first-cut renavigation and multibeam soundings that have been processed using automated scripts.

Oceanographic Sensors

Jason's additional standard sensors include a dedicated pressure sensor from ParoScientific, an Aanderaa 4330 optical optode, a magnetometer, Reson SVP, and an RTD-based temperature probe. The Seabird Seacat19v2 CTD is typically used in a free-run ASCII output mode: alternate uses of the CTD should be addressed prior to the cruise and may require a dedicated watchstander from the science party.

Deliverables

The cruise data package will be placed on hard drive and will consist of

1. all raw *Jason* sensor logs.
2. video as described above.
3. still images.
4. metadata and documentation.
5. Post-processed navigation.
6. Quick-look multibeam maps and raw multibeam ping files, when captured.
7. Sealog, provided by two methods:
   - the data package will contain the information used to populate the on-shore server, plus timestamped framegrabs and events with measurements in tabular format.
   - after the cruise on password-protectable server at http://4dgeo.whoi.edu/jason

Data Package Media

We will provide a portable hard drive system and will deliver the data package on it to the chief scientist at the end of the cruise. The standard filesystem for the package is ExFAT, which is compatible with Windows Vista and later, MacOSX Snow Leopard and later, and linux with extensions. The *Jason* data processor will provide intermediary versions of the data package (excepting video highlights) throughout the cruise via a NAS share.

The media containing the data package will be suitable for transport and temporary housing of the data, but should not be used for permanent storage. Once back at your institution, please be sure to transfer the data to enterprise quality storage.

Community Access, Archiving

The current NSF Data and Sample Policy specifies that PIs submit their cruise data to the Marine Geophysics Data System (LDEO). MGDS accepts most data vehicle data other than imagery, and has a well-established search and display system. The National Deep Submergence Facility archives all vehicle data in cooperation with WHOI Data Library and Archives; the DLA provides vehicle data in response to requests.