

# LISST-HOLO

## Submersible Digital Holographic Particle Imaging System

### • Particle Images

The LISST-HOLO from Sequoia is the world's first commercially available submersible Digital Holographic Particle Imaging System. The system was developed by Dr. Alex Nimmo Smith at the Marine Institute of University of Plymouth (UK) and Sequoia holds a world-wide license for manufacture. The LISST-HOLO creates in-situ images of particles, using in-line digital holography to overcome the depth of field limitation of traditional particle imaging systems. Numerical reconstruction of the digitally recorded

### • Particle Size and Volume Concentration

holograms gives in-focus, high resolution images of all particles from 25  $\mu\text{m}$  to 2.5 mm equivalent spherical diameter throughout the entire sample volume (~2 ml). The LISST-HOLO is particularly well suited to the measurement of large, complex flocs and biological particles. The processing software, available in MATLAB as well as compiled format for non-MATLAB users, allows the automatic focusing of particle images and the extraction of size distributions. From the images, shape parameters can be computed

and particles may be manually identified, e.g. as plankton or flocculated sediment grains. The LISST-HOLO is equipped with an external memory module on the connector endcap, capable of holding 15,000 holograms. The external memory makes for fast and easy offloading of holograms. The sampling frequency is adjustable, with a maximum sampling frequency of 2 Hz. Power is provided externally, either from an optional external battery pack or from another instrument, e.g. a CTD.



## FEATURES

- In-situ digital in-line holographic technology
- Self-contained with internal datalogger
- Ethernet connection to PC for programmable data collection—no software is needed for programming or offloading data
- Power via external battery pack (Optional, not included) or external power source (cable provided)
- Programmable data collection
- Optical path length: 50 mm standard
- Sample volume: 1.86 cm<sup>3</sup>
- Data processing yields in-focus particle images and volume distribution
- Automated firmware updates possible when instrument is connected to the Internet

## SPECIFICATIONS (subject to change without notice)

### Parameters measured

- Particle images for observation and classification
- Particle volume distribution
- Temperature
- Depth

### Size and concentration range

- 25-2500 µm equivalent spherical diameter
- Beam attenuation of 0-4 m<sup>-1</sup>

### Technology

- Solid state diode laser @ 658 nm
- 4.4 µm pixel size digital camera; 1600 × 1200 pixels

### Mechanical and electrical

- Dimensions 13.3 cm (5.25") Ø × 75 cm (29.5") L
- Weight: 9.5/3.6 kg (21/8 lbs) in air/water
- 300 m depth rating
- 32 GB internal solid state drive
- 32 GB external USB flash drive (included)
- Battery life (Optional External Battery Pack): 10,000 holograms for standard 9V, 42Ah battery
- External power input: 9VDC nominal, 6-15VDC
- Sampling frequency up to 2 Hz
- Power drain: 500 mA measuring



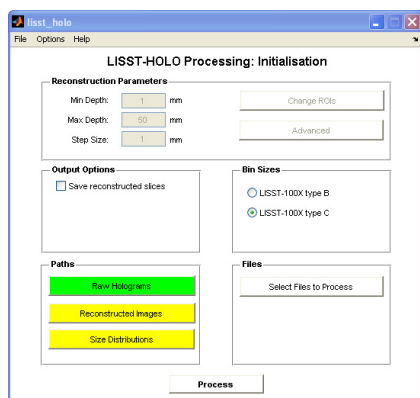
Detail of LISST-HOLO optics end



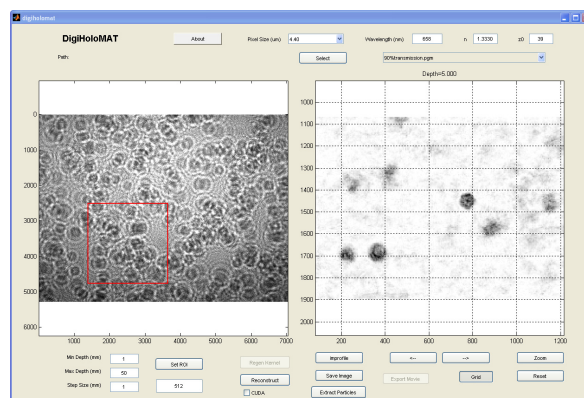
Connector endcap with external memory module for easy offloading of holograms



LISST-HOLO memory module and USB offload cable (1 set included)



Screenshot from data processing software



Detail of hologram reconstruction. Two particles, 75-90 µm in size are in focus. Grid size is 200 µm.