

Eye In The Sea – MARS

Functional Description

L. Frey – 09/22/2006

The EITS-MARS system is a deepwater video observatory for unobtrusive monitoring in the Monterey Canyon. The basic system consists of a frame and base, shown below in Fig. 1:

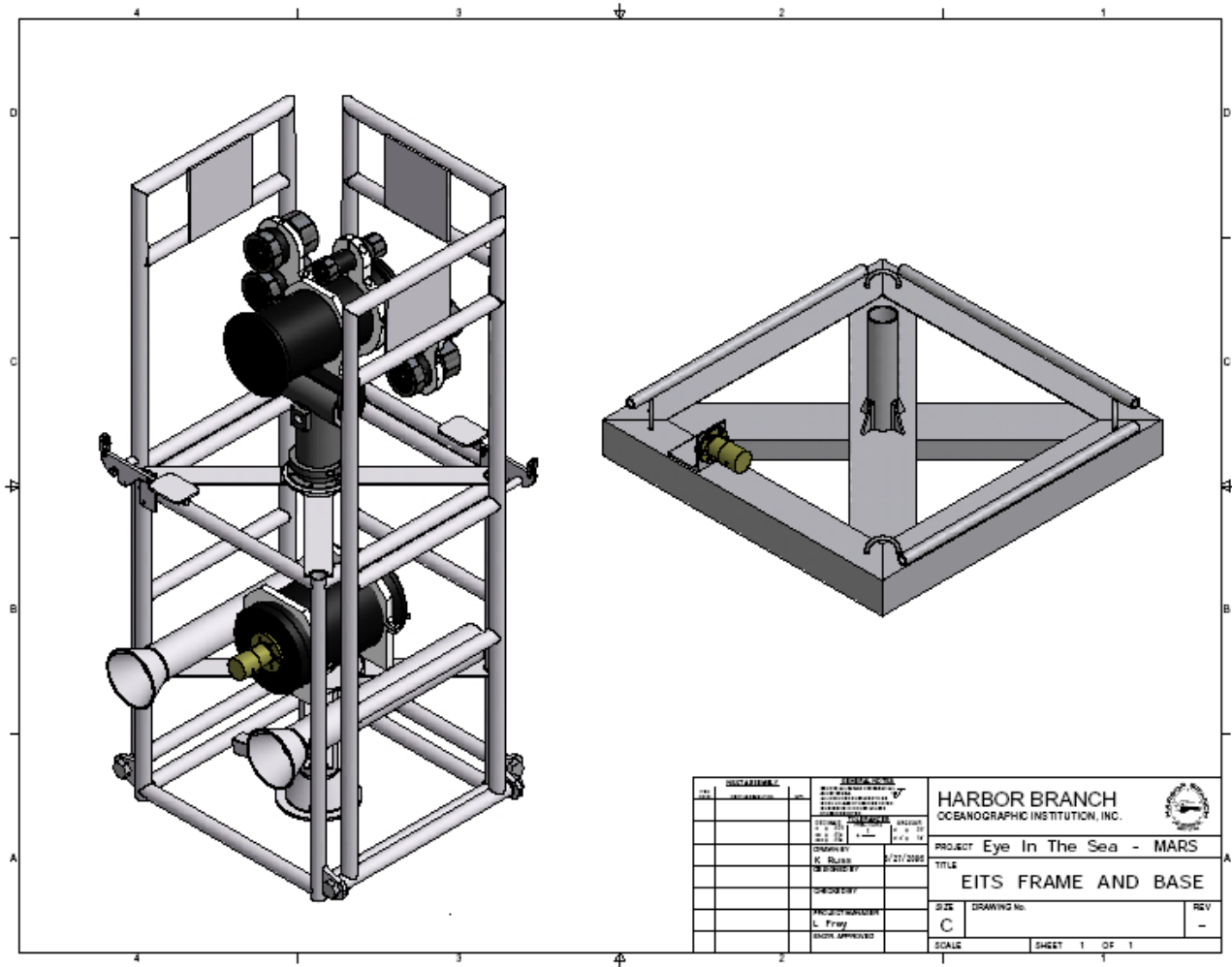


Figure 1: EITS-MARS Deployment Components

The base is deployed first, and functions as a separated anchor, such that the instrument can be removed for servicing without the need for anchor removal. There is a parking position located on the base to hold the ODI Nautilus connector harness which is connected to the MARS node while the EITS is topside.

Once deployed, the EITS frame is locked onto its base and its three leaves are opened. These leaves are used for bait deployments and ancillary instrument mounting. This configuration is shown below in Fig. 2 (ancillary instruments and bait not shown).

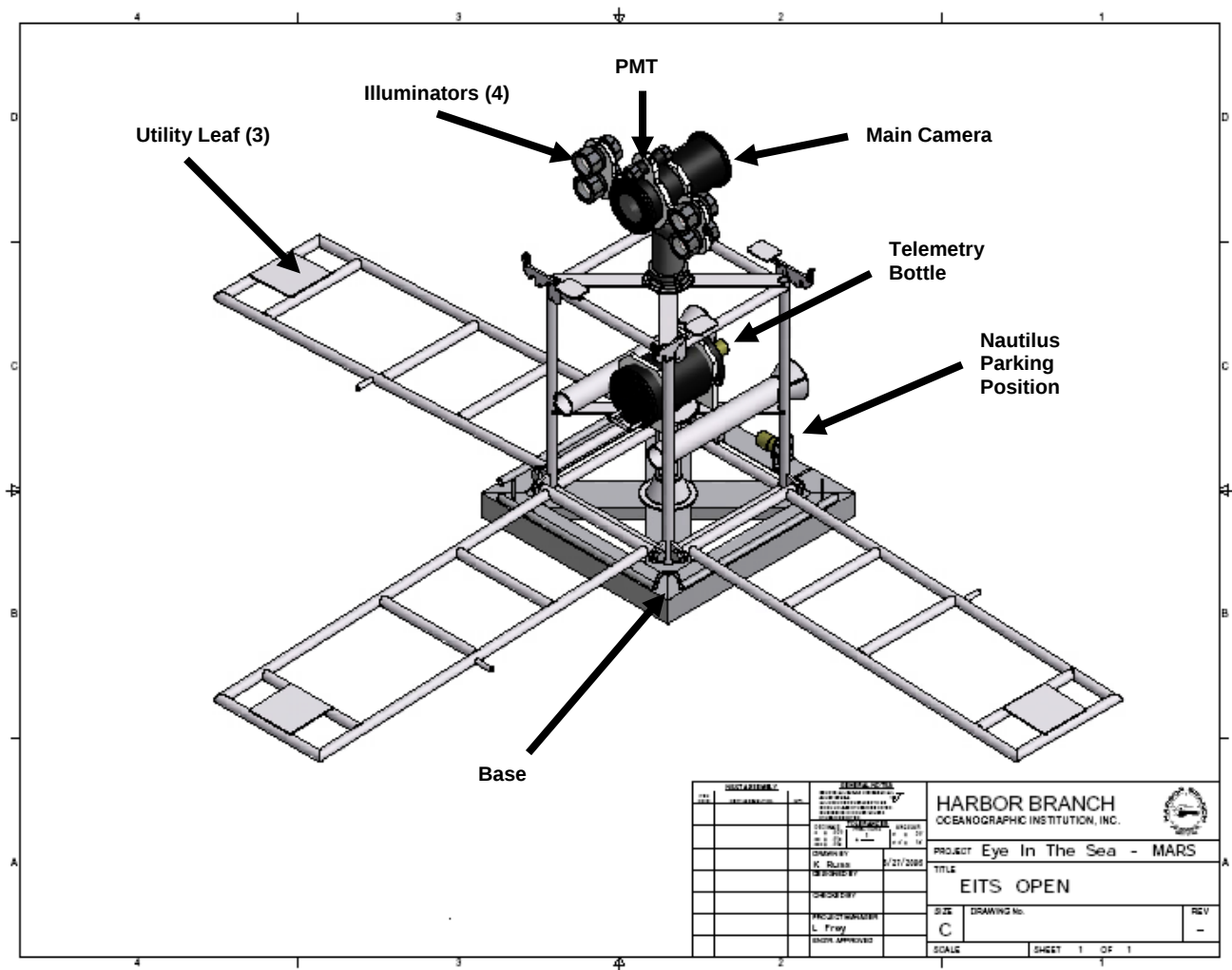
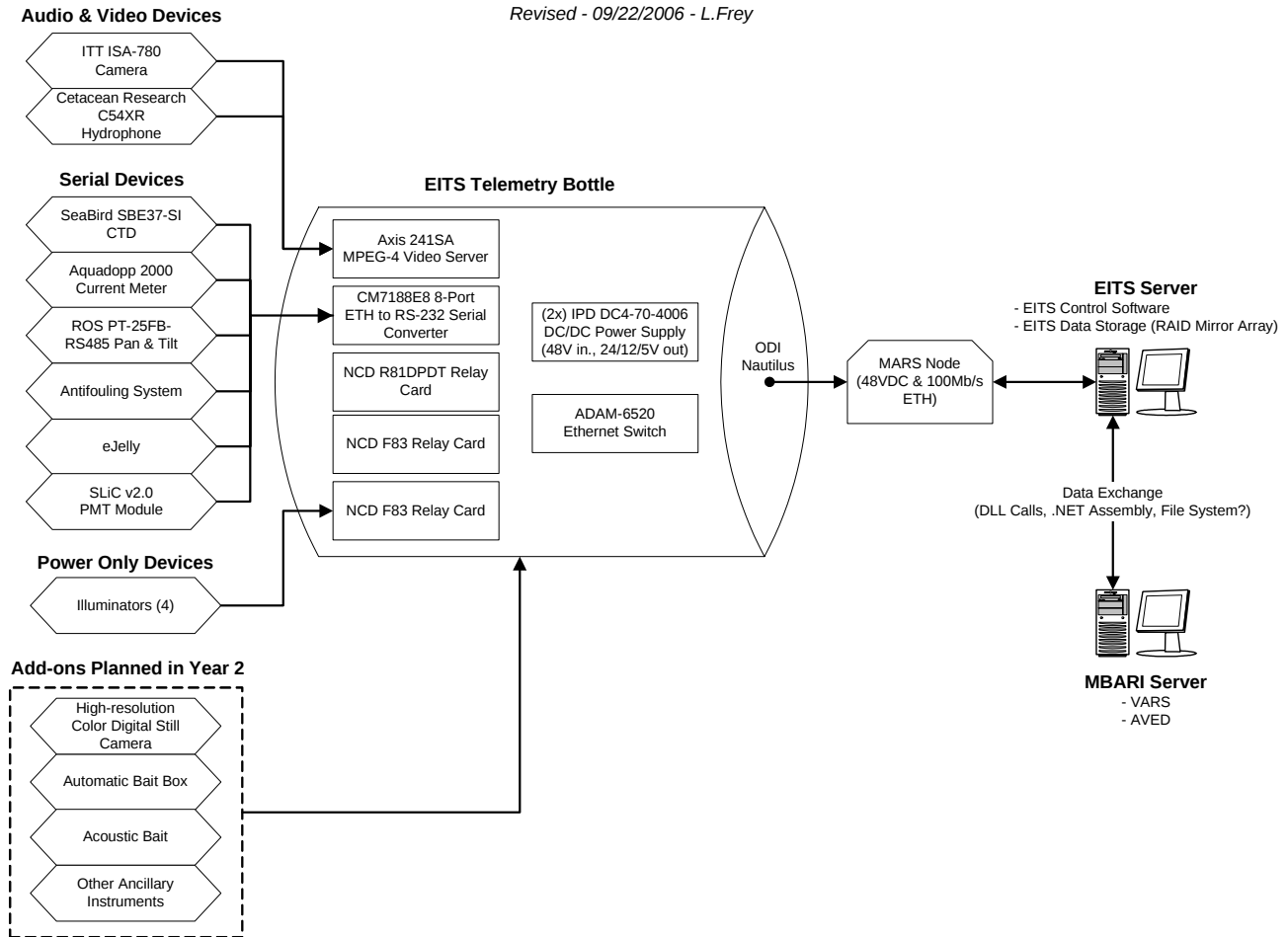


Figure 2: EITS Deployed

The EITS telemetry bottle contains all of the power management, data acquisition, and control systems for EITS. Communication is achieved via a 100 Base-T Ethernet connection with the MARS node. Power comes from an unregulated 48Vdc supply at the node and is regulated and stepped-down inside the telemetry bottle. The overall system layout is shown in the diagram below.

Eye In The Sea - MARS Top-Level System Configuration

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Audio & Video:

Audio & Video streaming and recording is achieved via an Axis 241SA MPEG-4 remote video server. Encoding parameters can be set remotely through network interface with the Axis CPU. The ISA-780 intensified camera provides auto gain functionality, and the calibrated C54XR hydrophone provides omnidirectional sound recording in the human audible range.

Ancillary Instruments:

Control & data acquisition of other instruments (Pan & Tilt, eJelly, CTD, current meter, PMT, etc) is achieved through a serial-to-ethernet converter that allows access to 8 serial devices (RS-232/422/485) via TCP socket or virtual COM port connections. Two additional serial ports (1 RS-232, 1 RS-485) are provided by the Axis 241SA Video server.

Power Control:

Power control is accomplished through 2 DC/DC power supplies which provide a regulated 24/12/5 Vdc from the 48Vdc supply, and 3 solid-state relay controllers, thus reducing obtrusive switching noise.

Illumination:

4 illuminator circuits are provided to allow illumination sources at different wavelengths and are relay-controlled.

Future Add-ons:

As shown in Fig 3, there are several add-ons planned in year 2, including a high-resolution color digital still camera (with strobe), acoustic bait, and automatic bait box. Options connectors for other ancillary instruments will be available as well for future expansion of EITS' capabilities.

Data Storage & Control:

EITS is controlled through a custom Java software package developed at HBOI, and located on the topside EITS server at MBARI. Eventually, web-based control will be implemented. Video and data is stored in the form of MPEG-4 and comma-separated text files, respectively on a built-in RAID mirror array. This is done so that as the hard drives fill-up, copies can be sent to staff at Ocean Recon and their integrity verified before wiping the copied drives.

Integration with VARS & AVED:

It is assumed that VARS & AVED will be running on a separate server which will be provided by Ocean Recon / HBOI. ... As a first thought, I was thinking that on a periodic basis, function calls will be made by the EITS software to VARS to log appropriate data. Additionally, we will operate AVED will operate on a periodic schedule of its own, retrieving unprocessed video, processing it, making entries into VARS, and perhaps storing the processed video back onto the RAID array if necessary. Obviously, these details are still the critical ones to work out, so these are just some initial thoughts. Data stored into VARS by EITS will consist of a comma-delimited string, transmitted at a frequency of *no greater than 1Hz*, with the following elements:

Field #	Name	Type Description
1	Date	mm/dd/yy
2	Time	hh:mm:ss.sss
3	Salinity (PSU)	%4.2f (xx.xx)
4	Temp (°C)	%4.2f (xx.xx)
5	Depth (m)	%6.2f (xxxx.xx)
6	Current Speed (kts)	%5.3f (xx.xxx)
7	Current Direction (deg)	%4.1f (xxx.x)
8	Event Type	%d (x)
9	Pan Position (deg)	%4.1f (xxx.x)
10	Tilt Position (deg)	%4.1f (xxx.x)
11	Illuminator States	%d (x)
12	Jelly State	%d (x)
13	PMT Gain (v)	%d (xxxx)
14	Audio Gain (dB)	%d (xxx)
15	Bait Type	%d (x)
16	Video Filename	URL
17	Audio Filename	URL
18	Biolum Filename	URL
19	other	?
20	other	?

