Virtual Integrated Data System

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INMARTECH 2006

Design Goals Setwork Based Convert all sensor inputs to network connection *Modular* Hardware No internal A/D computer cards Modular Software Ease of Maintenance ☞ No guru needed Sew modules don't compromise existing modules, each sensor is logged to it's own file. **OS** Independent

Components of VIDS









Sensors, Serial (Non-Polled)

POS/MV 320
GPS x2
Wind Speed & Direction x2
Barometer x2
Air Temperature x2
Air Temperature x2
Relative Humidity x2
Depth Sounder
Winch Parameters
Science Gyro
Plankton Counter

Bridge Equipment

(Single Feed)

Depth Sounder

GPS x2 ⊂

⊂ Gyro

Speed

Sensors, Serial (Polled)

Rain gauge

Sea Surface Salinity x2

Sea Surface Temperature (x2)

Sensors, Analog

Solar radiation

- PIR
- ☞ PSP
- TUVR
- PAR

Fluorometer

- Chlorophyll
- Dissolved Organic Matter
- Digital Inputs to control range

Slide 7 of 214



Sensors, Analog (continued)

Transducer Sensors 3.5 kHz array air isolation pressure ☞ Head tank levels Pumping Sensors Pump Temperature 2x *☞* Head Pressure Pre Post strainer pressure (vacuum) \sim Flow – lots Leak Sensor Pumping Controls Pump Select & Energize Strainer Select

Sensors, Network

POS/MV 320 (developmental)
ADCP (developmental)
Room Relative Humidity & Temperature

Components of VIDS







Collection Software





QuIC Metadata

Interface - Transport

Networked Sensors



Interface – Transport, Serial

Port Servers

- Converts Serial Devices to Network Devices
- Systech, Digi, Others
- Taltec TCP/Com, makes any serial device available to any computer through serial port mapping
- Provides electrical isolation
- Reduces interrupts

Port Server

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Interface – Transport, Analog

Sational Instruments, FieldPoint

- Converts Analog sensors to Network Devices
- Modular Distributed I/O
- Easy installation and maintenance
- Hot-swappable and auto-configurable
- ☞ Up to -40 to 70 °C operating range
- Programmable power-up states
- ☞ 2, 8, and 16-channel modules
- Ethernet and wireless options



Components of VIDS







Collection Software





QuIC Metadata

National Instruments LabView

- Platform Independent
- Object Oriented GUI interface
- Drag and Drop Programming
- Factory Training available
- One week training course allows personnel to modify existing modules to meet new requirements
- Initial modules, which are called Virtual Instruments (VIs)



National Instruments LabView



- CabVIEW features
 - Simple GUI creation
 - ☞I/O libraries
 - Serial
 - ☞ TCP/IP
 - DataSocket
 - JAQ

Labview Programming Environment



National Instruments LabView



- Generation Stream Stream
 - analogous to procedure or subroutine
 - ☞two parts make up a VI
 - Front panel
 - Block diagram

National Instruments LabView



- Data Sockets
 - Used to pass data between VIs programmatically
 - Layer on top of TCP/IP
 - Simplifies data transfer
 - Server orchestrates transfers

NMEA VI Front Panel

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NMEA VI Front Panel (expanded)

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Resource Usage

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EppleyPSPCollect	mtgtech	02	19,856 K	
NMEACollectionM	mtgtech	00	8,668 K	
TSGCollect.exe	mtgtech	00	21,172 K	
NMEACollectionM	mtgtech	00	33,644 K	
raingauge.exe	mtgtech	02	20,796 K	
alg.exe	LOCAL SERVICE	00	3,148 K	
wuauclt.exe	mtgtech	00	4,812 K	
svchost.exe	SYSTEM	00	3,868 K	
NMEACollectionM	mtgtech	03	13,424 K	
nisvcloc.exe	SYSTEM	00	1,708 K	
nidmsrv.exe	SYSTEM	00	3,212 K	
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Resource Usage (continued)

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Peak	476316	Nonpaged	7200
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Components of VIDS







Collection Software





QuIC Metadata

Data Storage



Data File Structure

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Components of VIDS







Collection Software





QuIC Metadata

Data Display



Master Grapher



VIDS Lister

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Components of VIDS







Collection Software





QuIC Metadata

Metadata



Software Sharing

- Available for use by UNOLS and INMARTEC community.
- Would hope that others would use and add new and improved VIs and share.

Contact Information Richard Findley

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