Dynamic Positioning Committee

Marine Technology Society

Sensors

Increased DP Sensor Demands

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L-3 Communications Dynamic Positioning and Control Systems

October 17-18, 2006

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L3 communications
Dynamic Positioning & Control Systems

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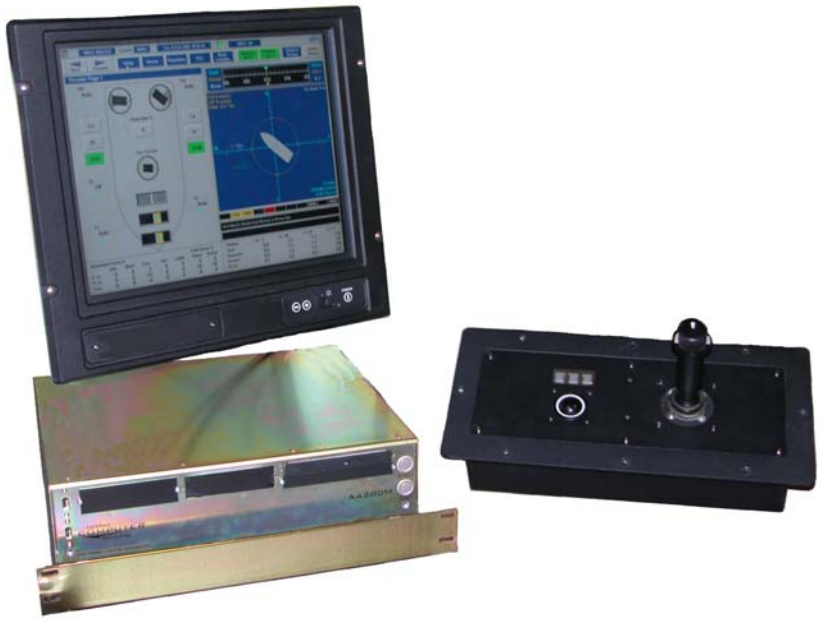
MTS DP Conference
October 17-18, 2006

- Introduction
- DP Advances
- Regulatory Guidelines
- Operational Reality
- Conclusions
- Questions

- DP System Advances
- Hardware
  - "COTS" Components
    - Workstation
    - Processing
    - I/O Modules



- DP System Advances
- Software
  - Operating System
    - More robust, supportable
  - DP Application
    - Functions
    - Graphics
    - Interfaces

• Sensor Redundancy - Regulatory View

American Bureau of Shipping (ABS)	"Two of the position reference systems may operate on the same principle. A single failure is not to affect simultaneously more than one position reference system, i.e., no common mode failures." ABS (4-3-5) Section 15.7.2
Det Norske Veritas (DNV)	"When more than one position reference system is required, at least two shall be based on different principles." DNV (6-7-3) Section C101
Lloyd's Register of Shipping (LRS)	"At least three position reference systems incorporating at least two different measurement techniques as defined in 4.3.2 are to be provided and are to be arranged so that a failure in one system will not render the other system inoperative." LRS (7-4) Section 5.3.4
Bureau Veritas (BV)	"When two or more position reference systems are required, they are not all to be of the same type, but based on different principles and suitable for the operating conditions." BV Section 4.43.14
China Classification Society (CCS)	"When two or more position reference systems are required, they are not both (all) to be of the same type, but based on different principles and suitable for the operating conditions." CCS Section 6.8.1

- Sensor Redundancy - Regulatory View
  - Sensor Update Rates
  - Sensor data stability
  - Network reliability

- Sensor Redundancy – In Operation
- Must meet differing criteria
  - Regulatory Bodies – Redundancies and "suitability"
  - Operational environment
  - Operational performance
- Baseline Sensor Suites

- OSV Sensor Suite

Sensors	Redundancies	Methods
Position	4	2x DGPS, 1x Range/Bearing, 1x THD
Heading	3	2x gyrocompass, 1x THD
Attitude	2	1x MRU/VRU, 1x THD
Wind	2	2x solid state sensor

- Drilling Sensor Suite

Sensors	**Redundancies**	**Methods**
Position	8	3x DGPS, 2x Hydro-acoustic systems (2x solutions each), 1x THD
Heading	3	2x gyrocompass, 1x THD
Attitude	4	2x MRU, 1x VRU, 1x THD
Wind	3	3x solid state sensor

- Conclusions
  - Total redundancy not realistic
  - Redundancy provided must also meet situational criteria
  - Further improvements are possible with sensors available today
  - Solid-state sensors acceptable as multiples, but redundancy is available

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Thank you for your attention

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