Dynamic Positioning Committee
Marine Technology Society

DP DESIGN & CONTROLS SYSTEMS - 2

MultiFix-RxV

Improved Positioning of Large DP Platforms & Vessels

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Thales GeoSolutions
Precise Positioning Services

MultiFix-RxV

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MultiFix - RxV

- Aimed at (DP) vessels with frequent GPS interruptions
- Input: multiple GPS receivers
- Output: single set of GPS measurements
- Positions: calculated in MFX3
- Calculated to a Central Reference Point

Objective:

- ***Stable # of SVs***
- ***High quality GPS data***
- ***Stable Position***

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Receiver Verify

Validates (or verifies) pseudoranges before use

- Multiple receivers
- Multiple (close) locations
- Robust estimation
  - ➔ ~Majority voting

Potential uses

- Reliability & stability for DP
- Overcomes obstructions
- ‘Scintillation’ removal

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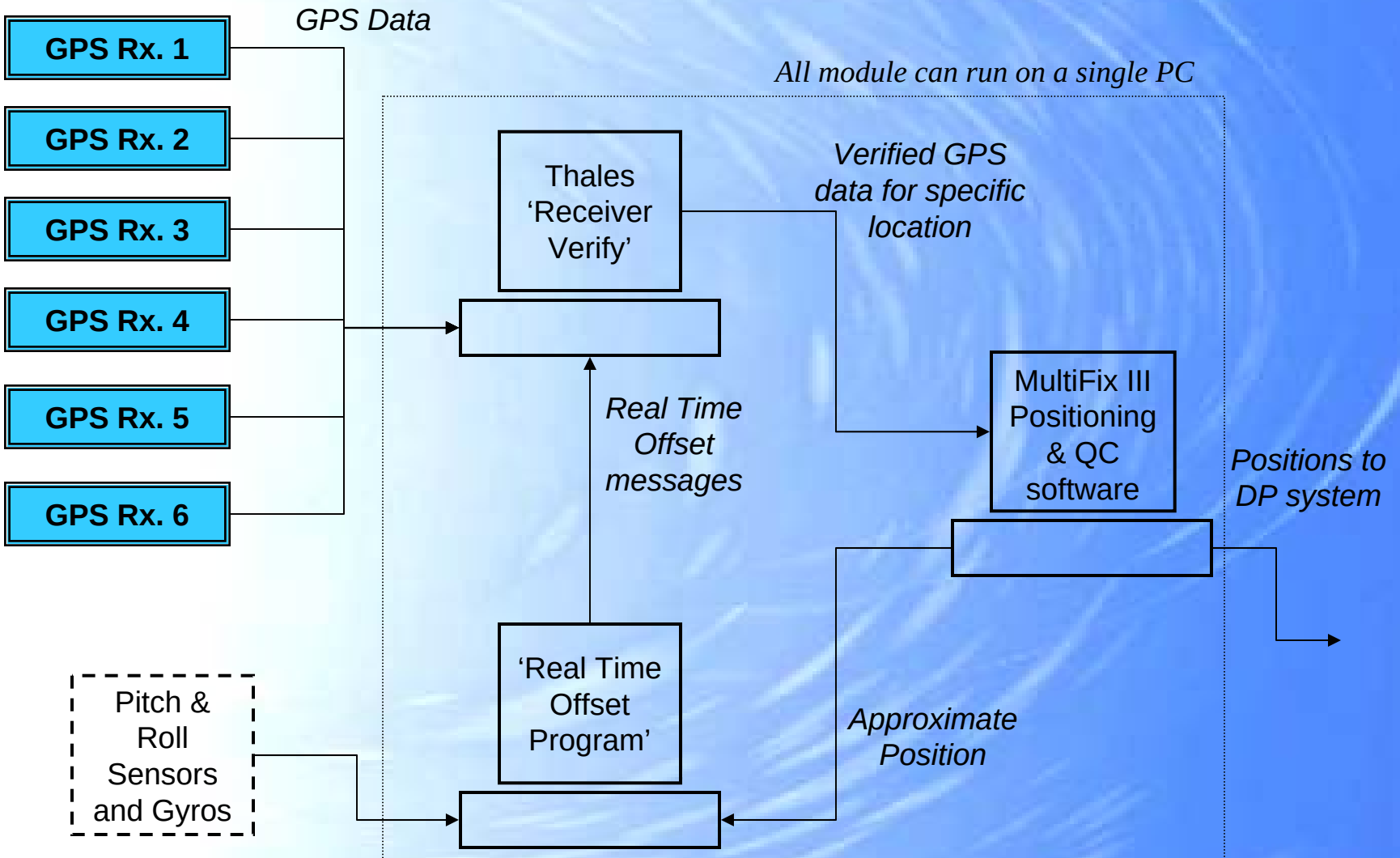
System Drawing



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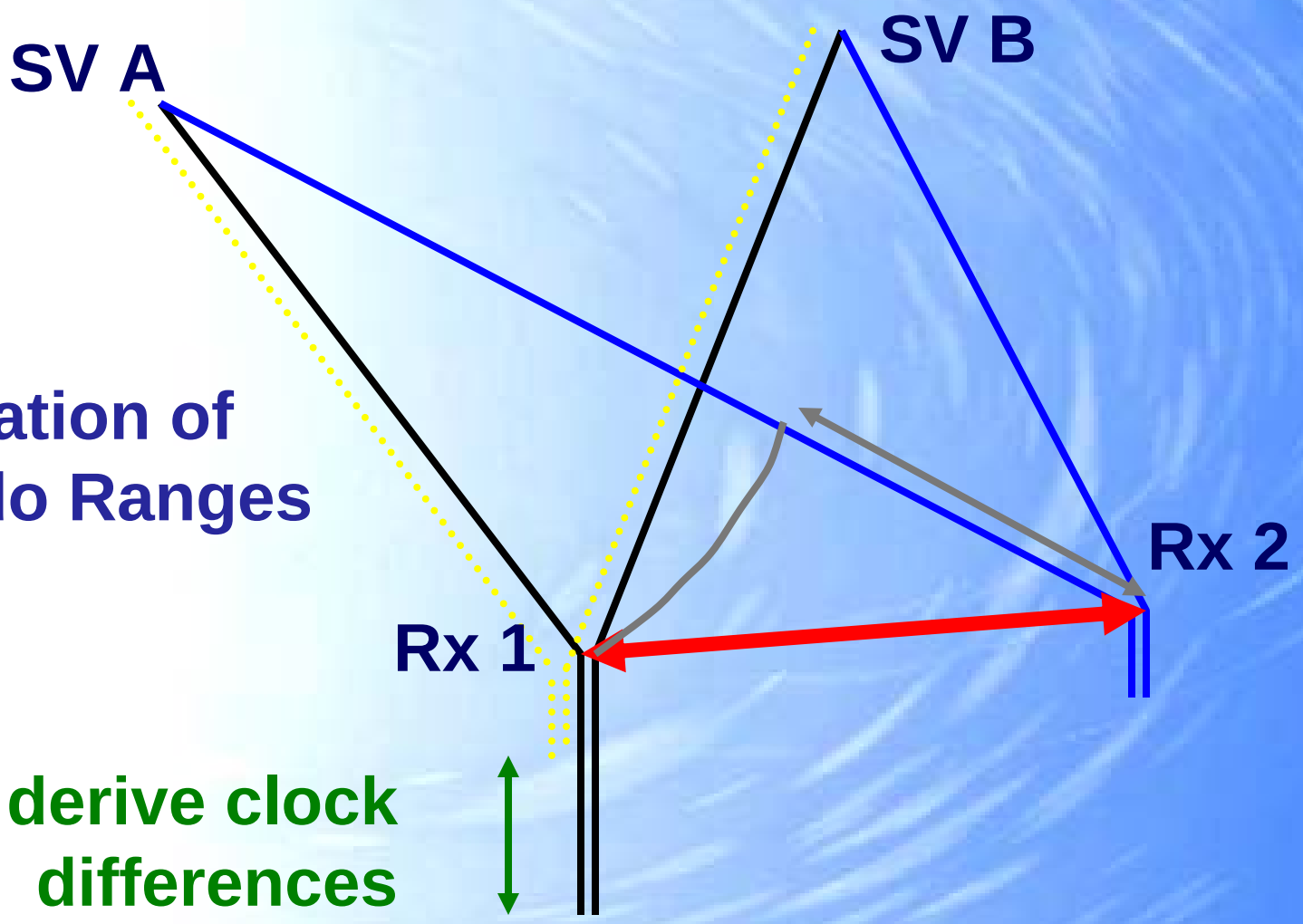
Receiver Verify Technique



Relocation of Pseudo Ranges

To derive clock differences

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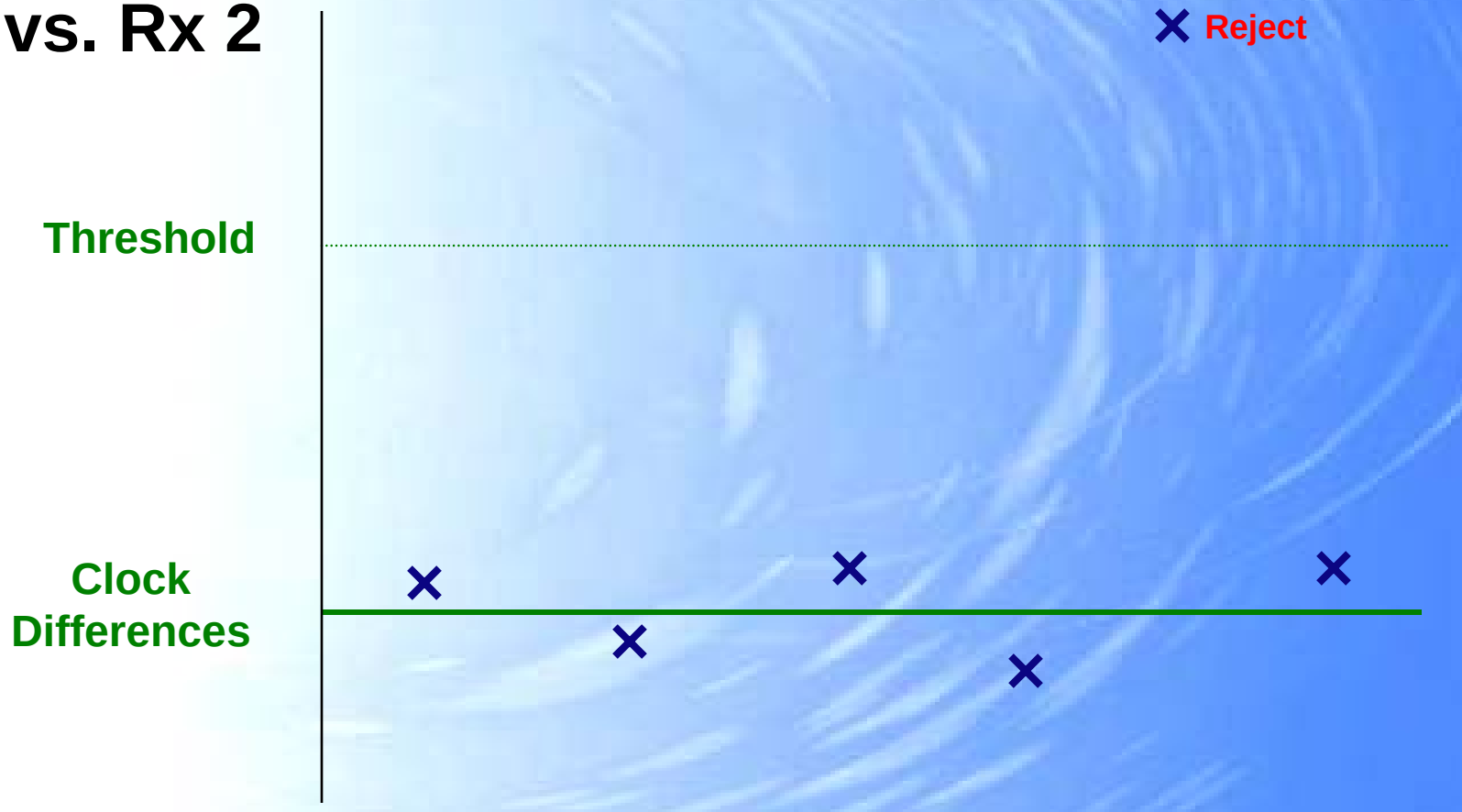
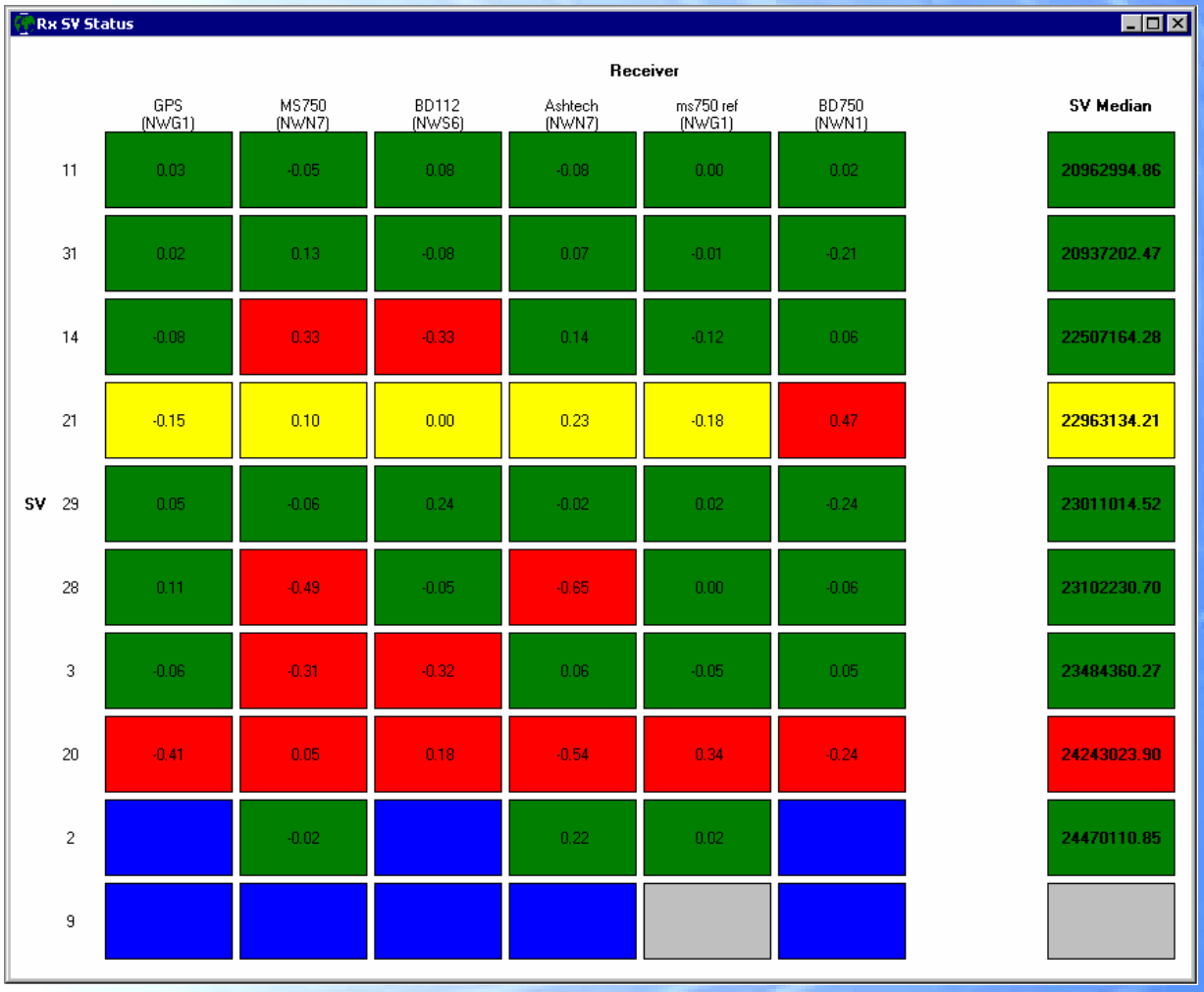
Pseudo Range Difference Analysis

Rx 1 vs. Rx 2



Status View



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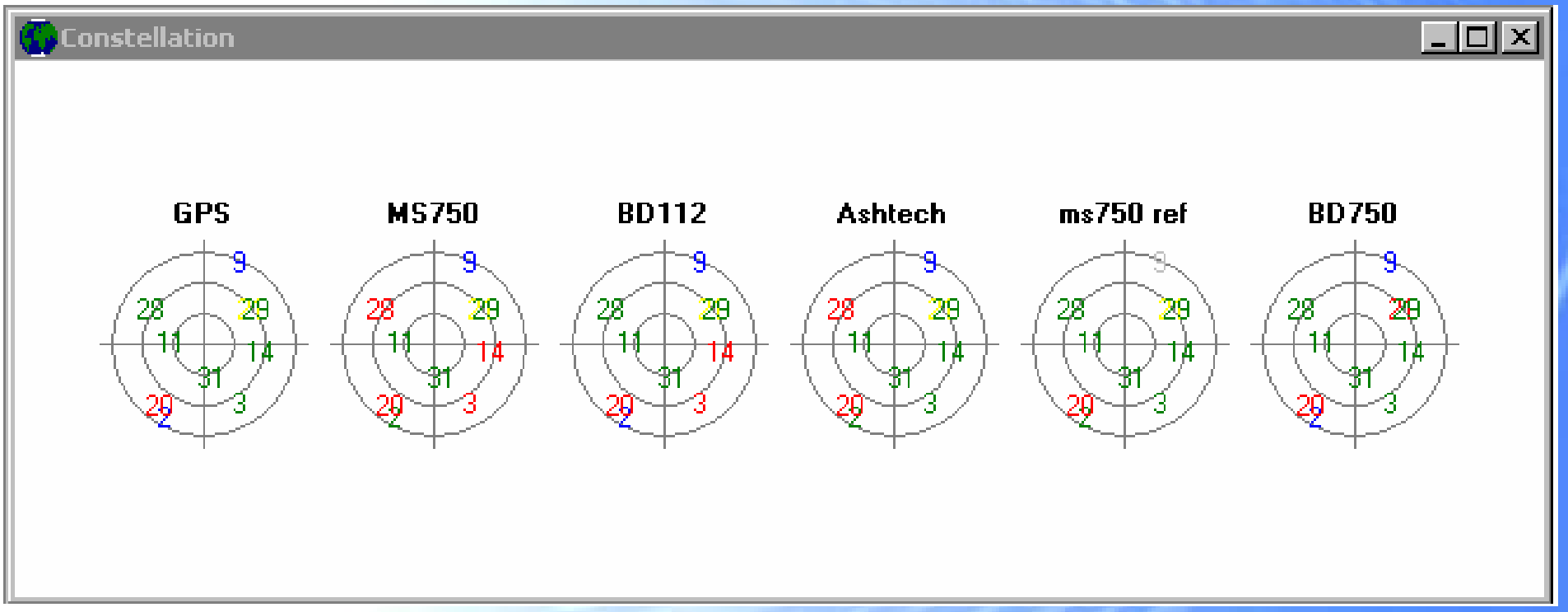
Constellation View



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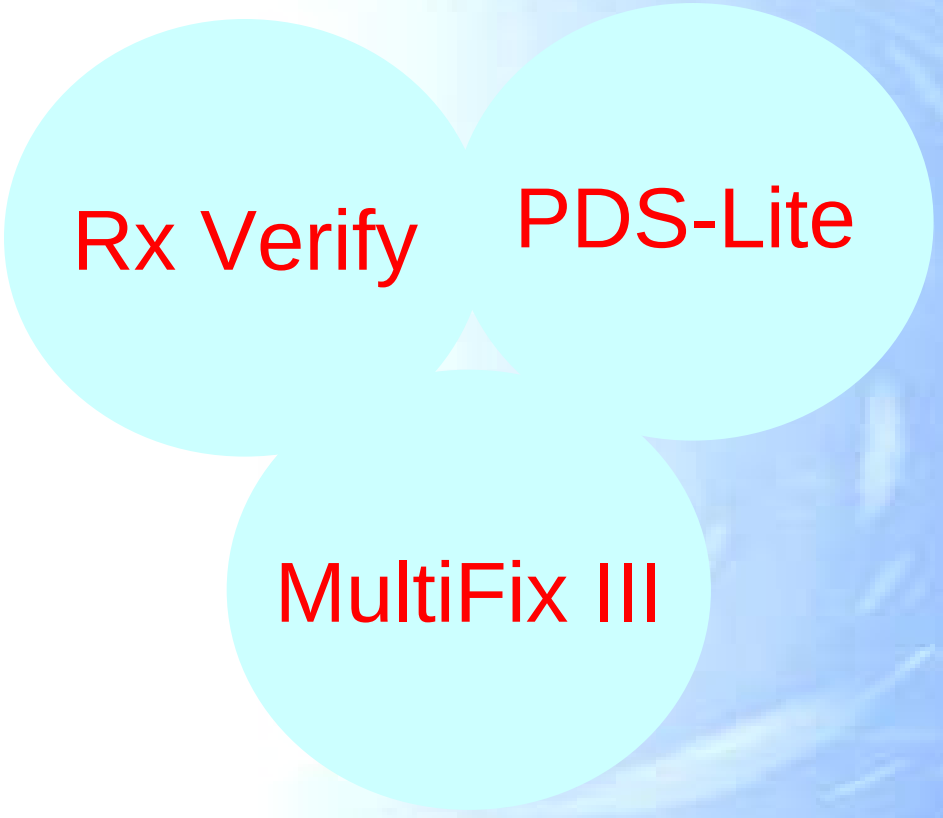
The System Concept



1) ***PDS-Lite***
   Apply dynamic GPR corrections for the GPS antenna offsets

2) ***Receiver Verify***
   Compute a GPS data set from multiple GPS receivers

3) ***MultiFix III***
   compute multiple DGPS solutions and output to DP systems

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The System Concept

- Compensate GPS antenna offsets for gyro, pitch & roll
- Compute a single point GPS position using GPS receivers from different locations
- Compute DGPS solutions and output to the DP systems
- Quality control on DGPS data

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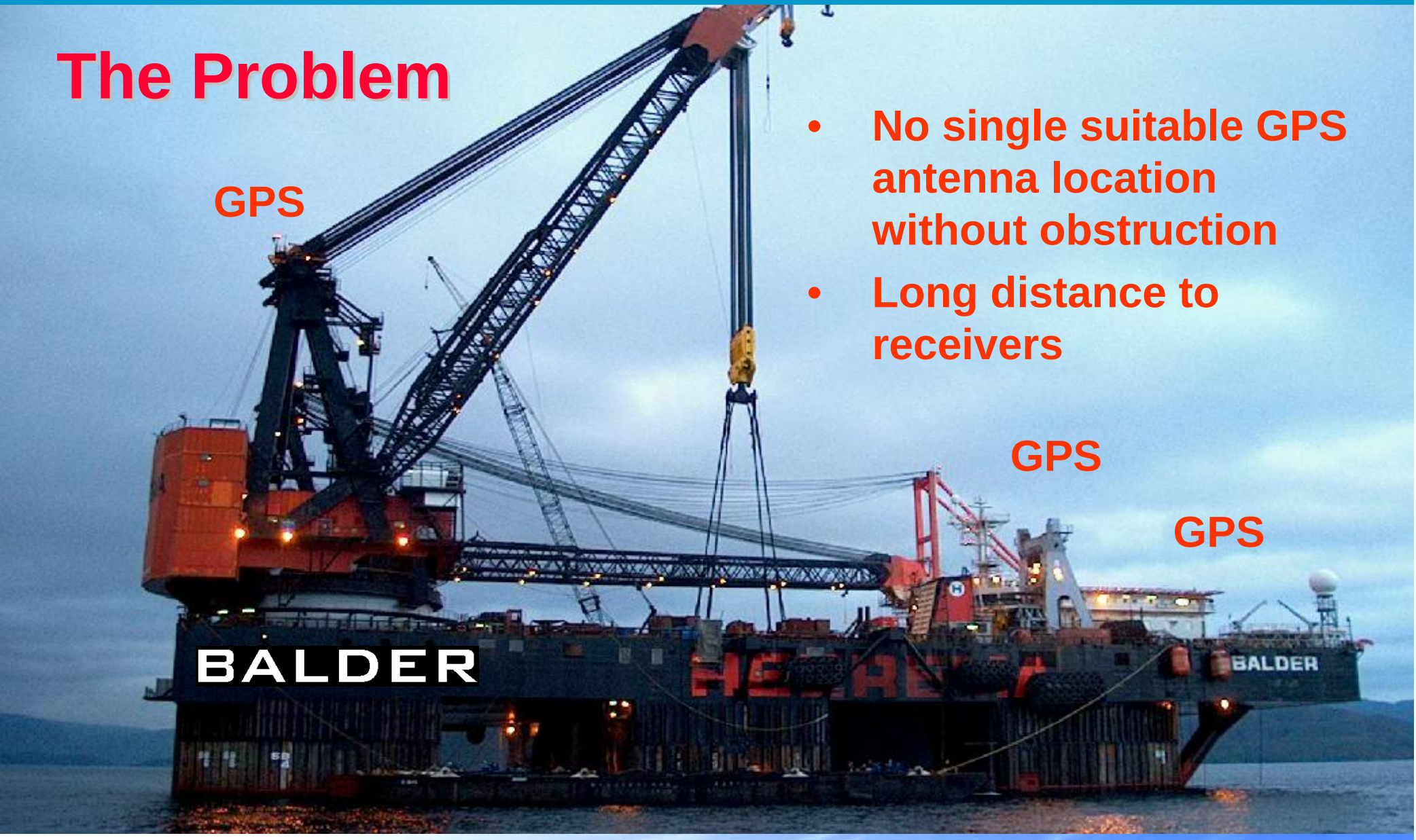
The Problem



- No single suitable GPS antenna location without obstruction
- Long distance to receivers

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Implementation of MultiFix - RxV

- 6 x GPS receivers
- 3 x Differential SkyFix receivers
- 3 x Gyro / pitch & roll
- 3 x independent MultiFix - RxV systems
- All systems networked using TCP/IP
- Long distance for data using Optical mux and Wireless Network connections
- Operated by the DP operators

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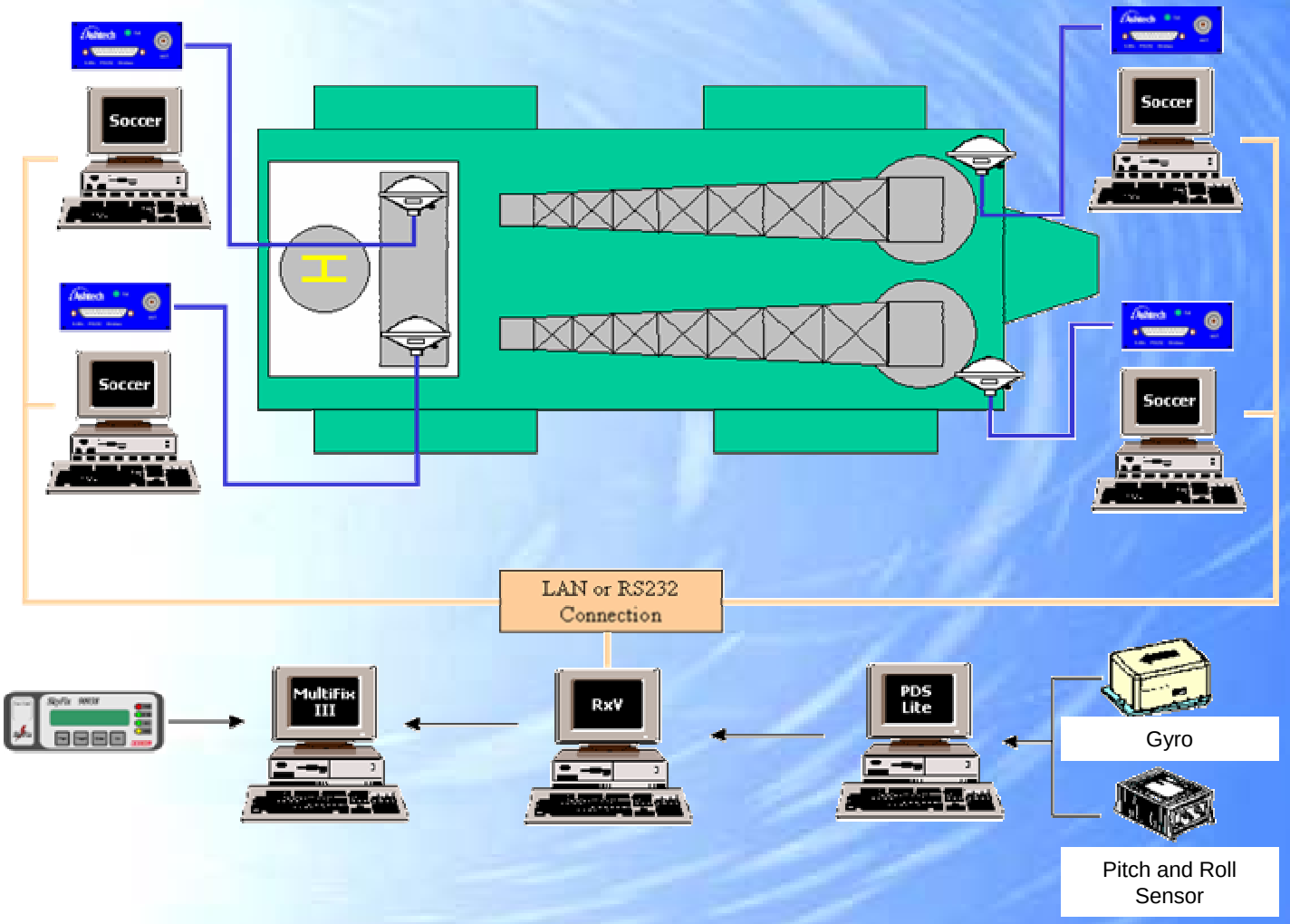
MultiFix - RxV Hardware



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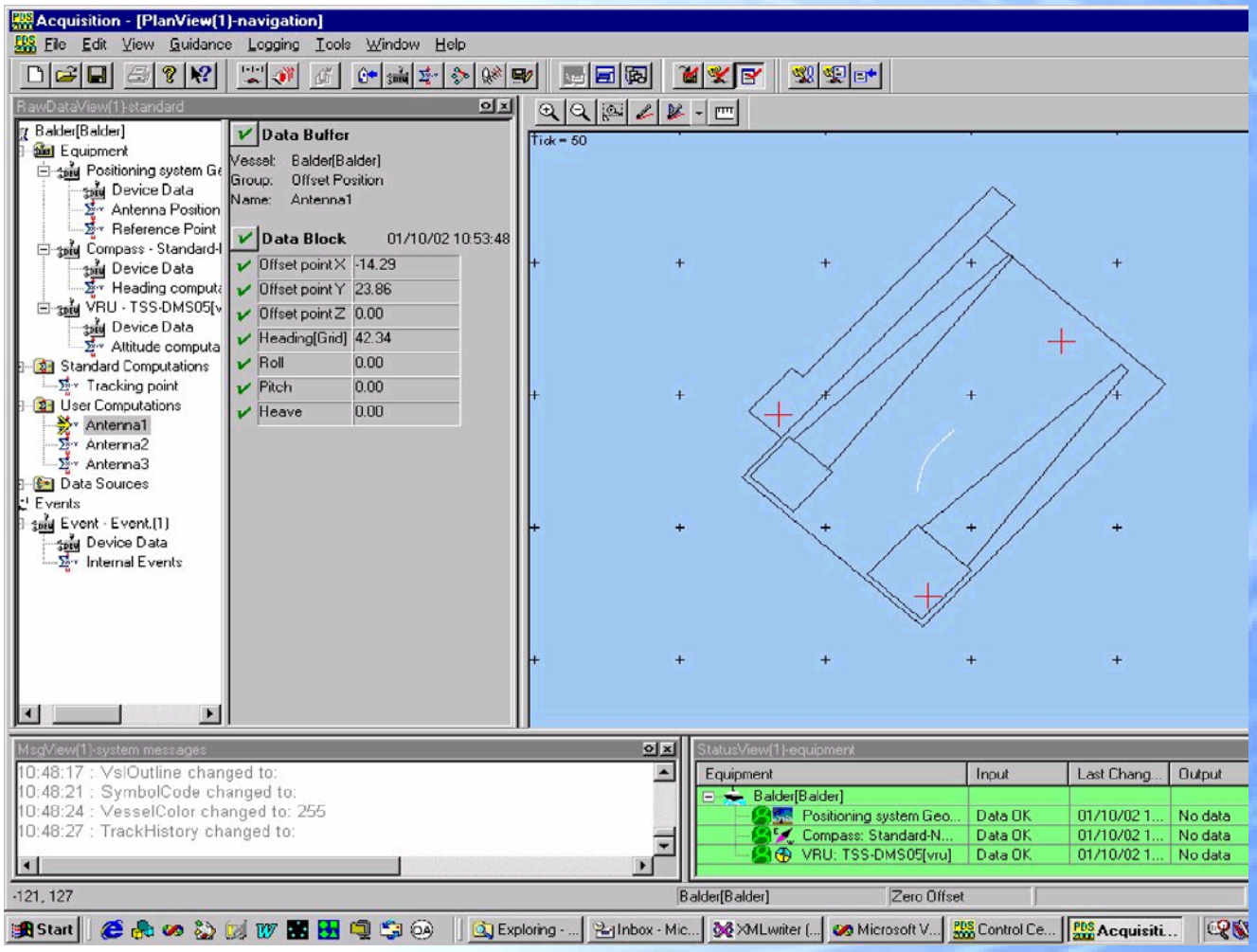
User Interface – PDS Lite



- *Information on interface status*
- *Information on dynamic offset corrections*

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Final GPS Antenna Locations

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Operational Observations

Advantages

- Position very stable & reliable
- Position not effected by variable obstructions and multipath on working platform
- DP Operators able to effectively manage system

Disadvantages

- The system in it's current configuration is complex
- Long installation time

Key Issue

- Effective Training of DPO's is a required

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Future Developments

- Utilize dual frequency GPS receivers
- Use with SkyFix-XP Decimetric SDGPS service
- Develop all-in-one software and simplify system

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