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Cyber in the Maritime Transportation System

Piloting perspective



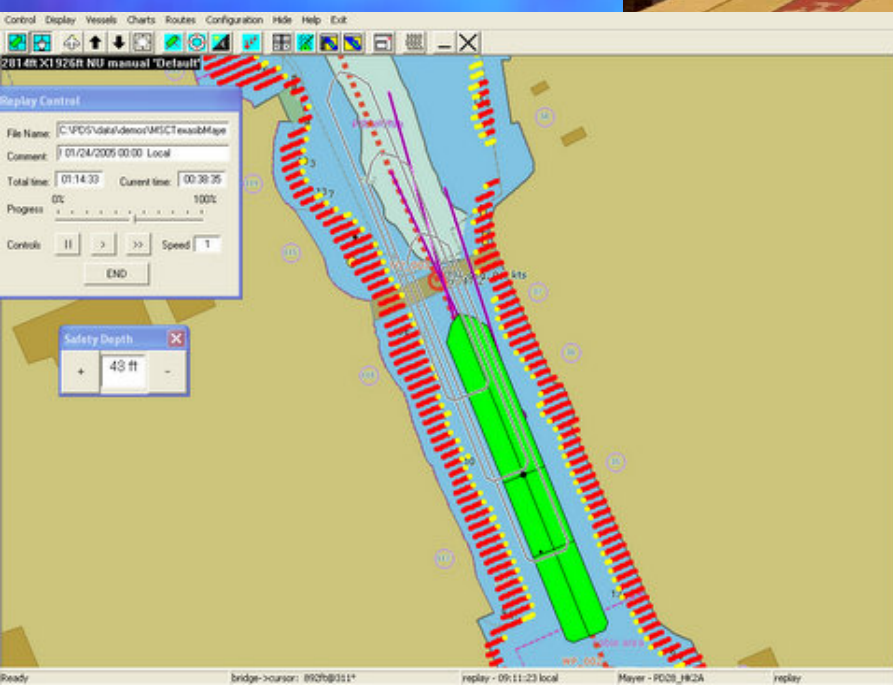
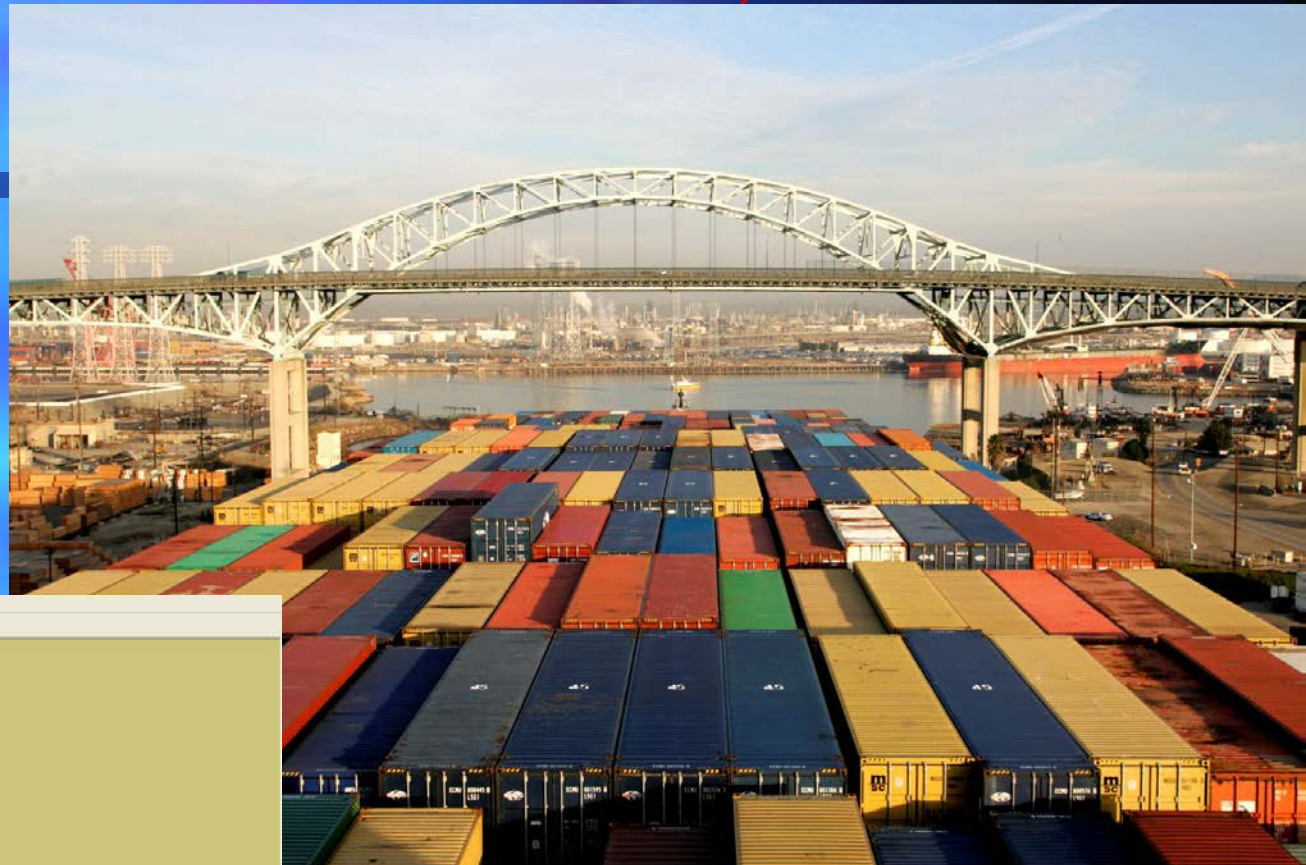
Pilots rely on precision navigation systems



[Video](#)



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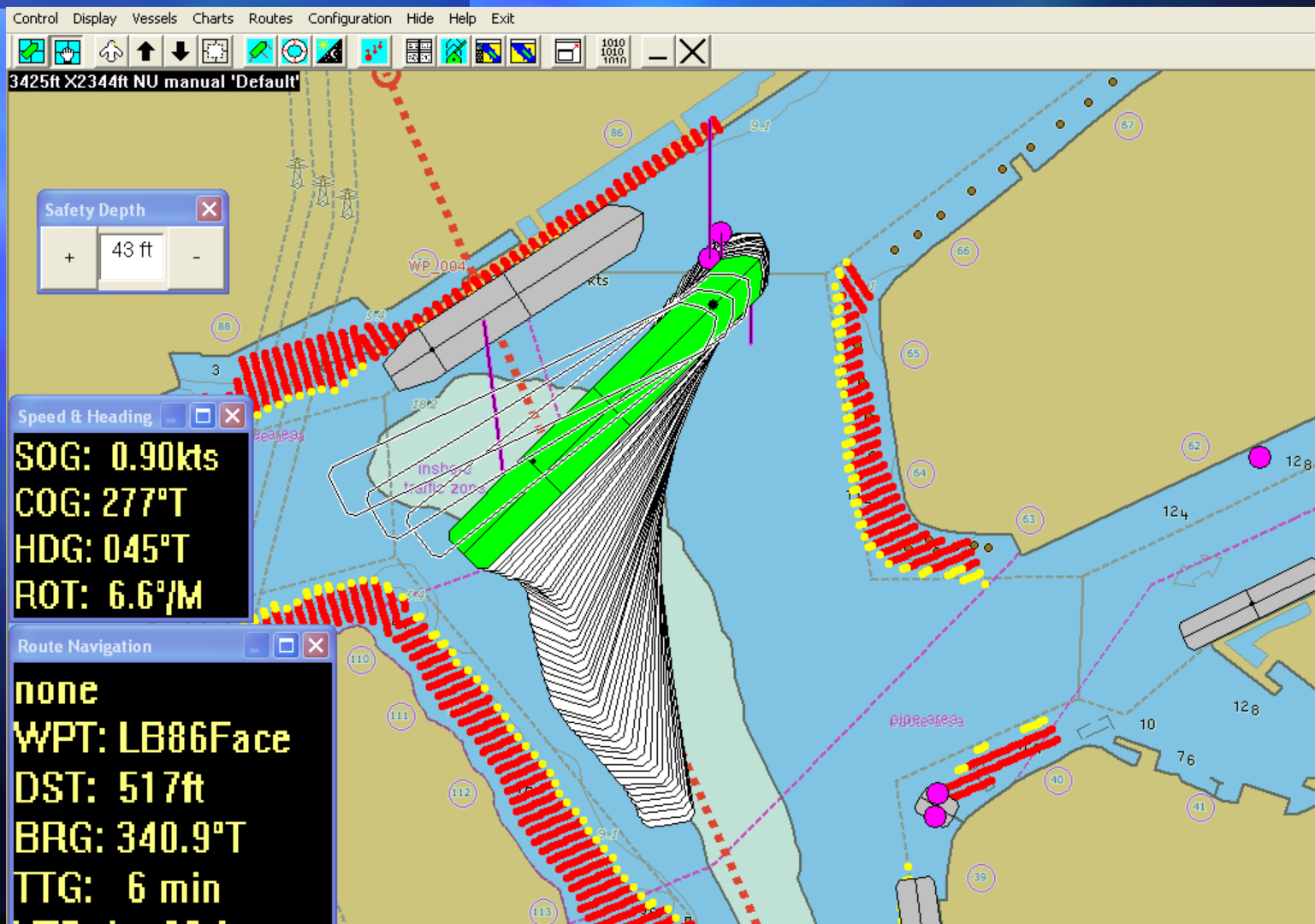


Precision piloting with
DGPS PilotMate system.



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PilotMate - DGPS





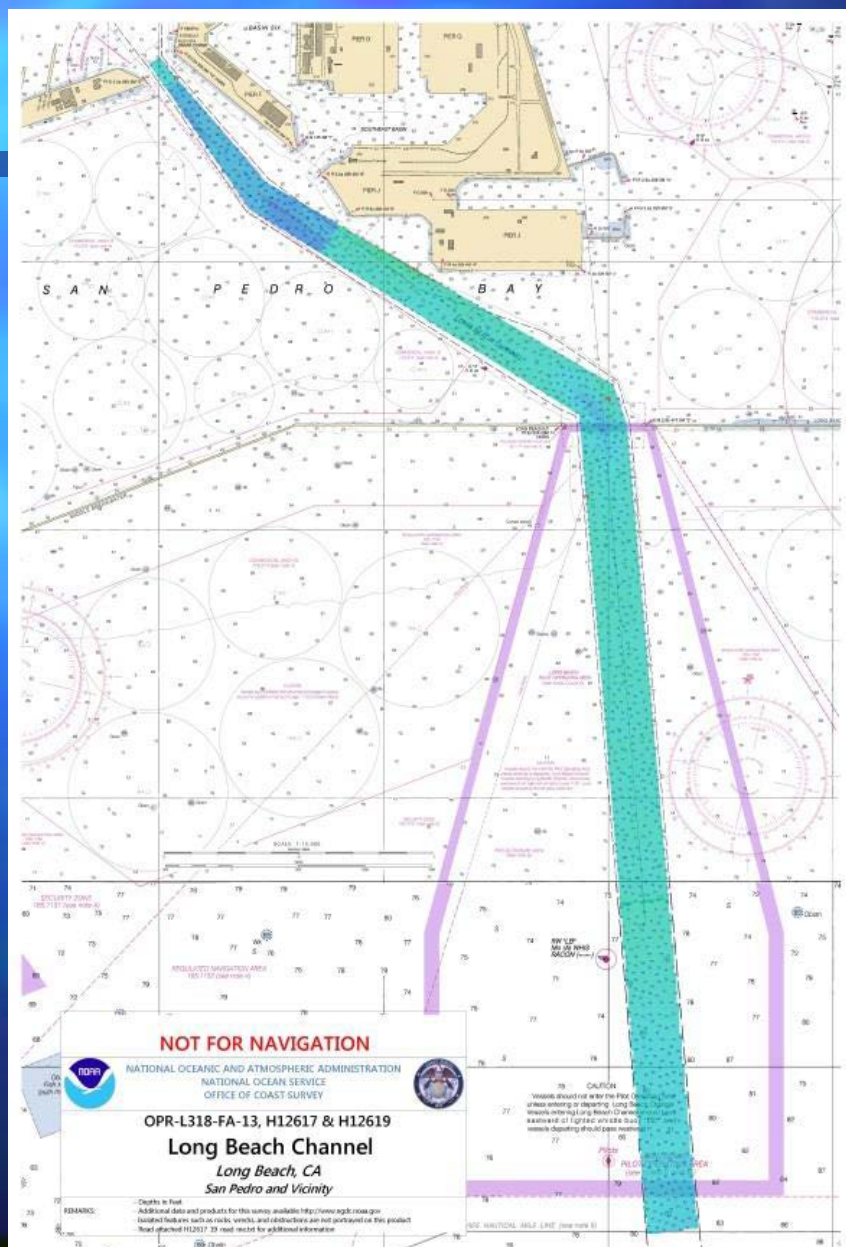
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Challenges of VLCC's and ULCC's Entering Long Beach

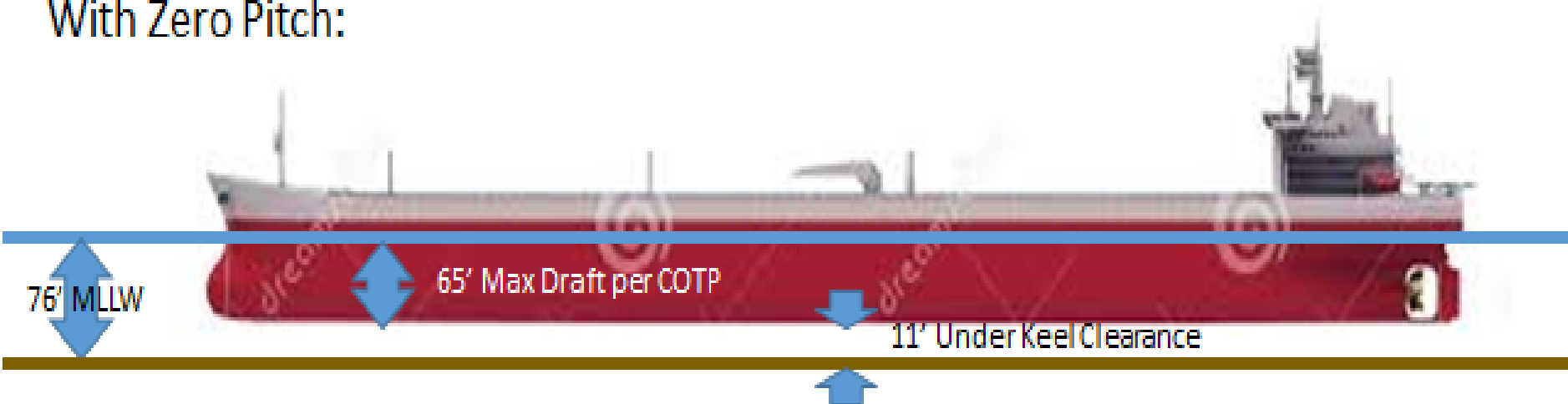




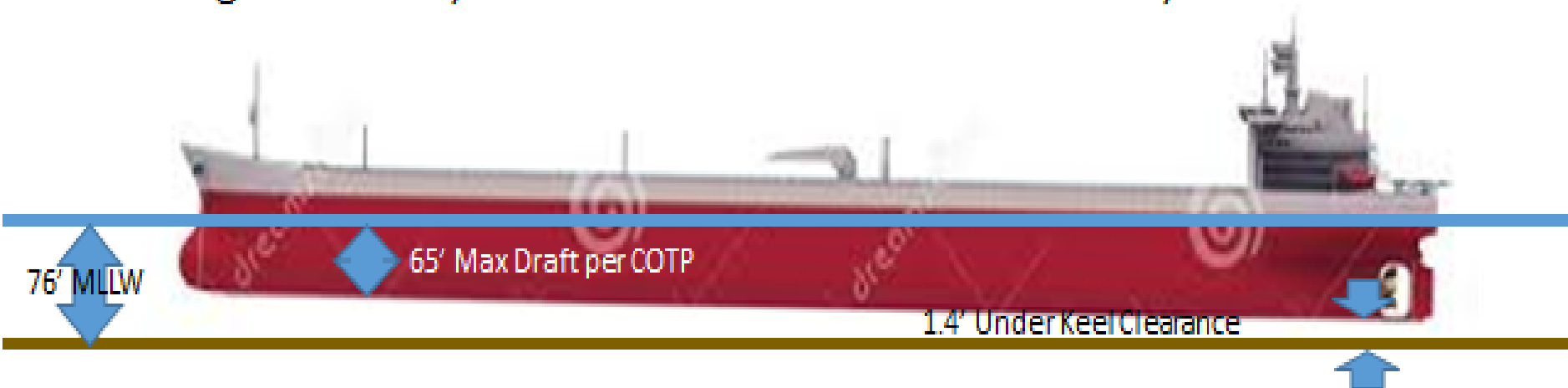
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With Zero Pitch:



With 1 degree of Pitch, there is a 9.6' increase in draft for a 1,100 foot tanker:



POLB dredged to 76 feet from approach channel to Pier 121 (Tesoro and Pier 121 Users)



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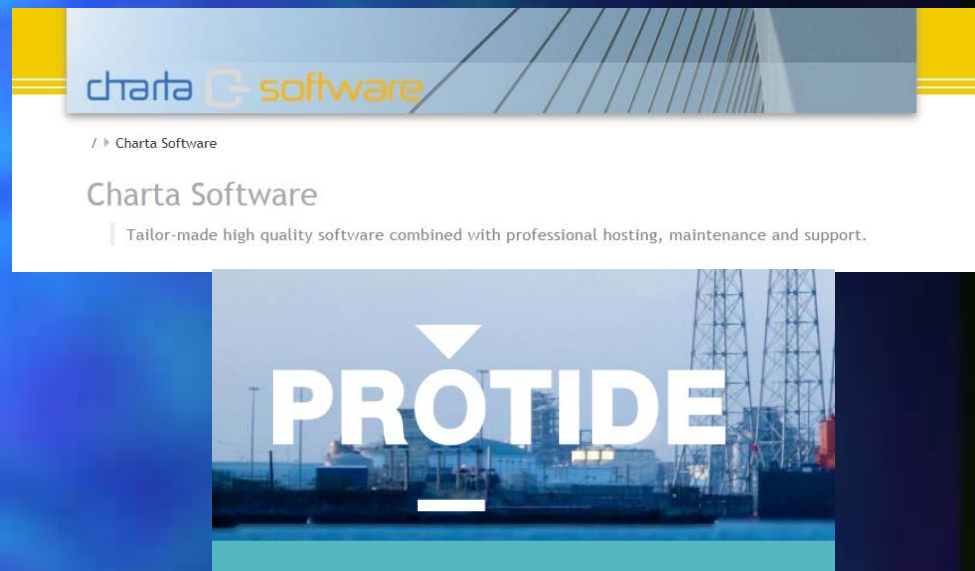
Dynamic Under Keel
Clearance project

PROTIDE takes predicted:

- ✓ water levels,
- ✓ currents,
- ✓ wave conditions,
- ✓ channel depth,
- ✓ course,
- ✓ ship dimensions, and
- ✓ vertical ship motion (roll/pitch/squat)

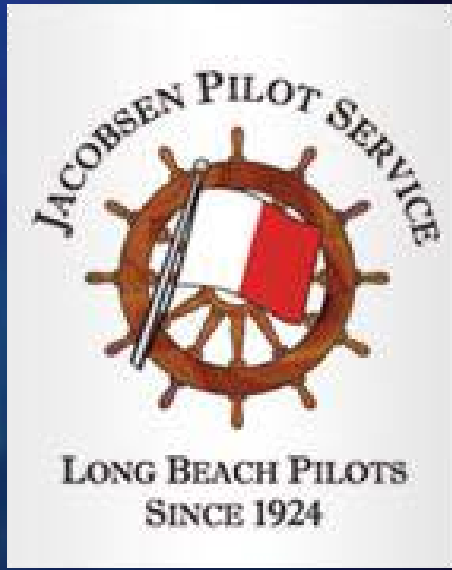
...and calculates the under keel clearance & bottom touch probability.

PROTIDE is now used in three harbors in the Netherlands to support the operational process (Port of Rotterdam, Port of Amsterdam & the Eemshaven).





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PilotMate DGPS

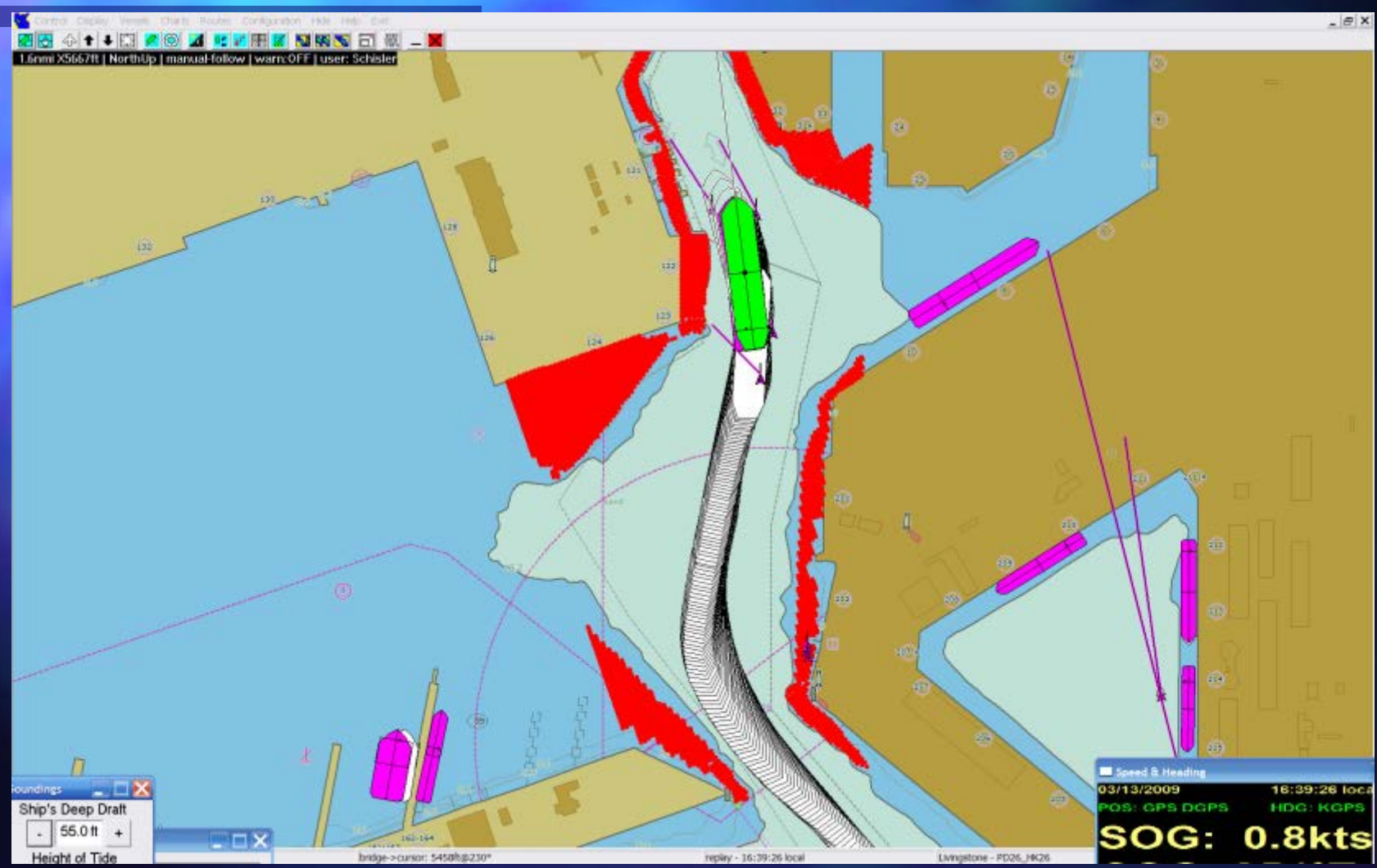






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Recordings and playbacks





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PilotMate - DGPS





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FOG & PilotMate - DGPS





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Simulator Training – 13,000 TEU





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Pilot's concerns

- Cyber Attacks
 - GPS systems
 - Navigation Equipment
 - Corporate network
- GPS
 - Jamming and Spoofing



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THANK YOU

