



RADASCAN APPLIED TO VESSEL UNDERWAY REPLENISHMENT AT SEA DP OPERATIONS

Dr. Dominic Pearce
Marine Division
Guidance Navigation Ltd
Leicester, UK



DYNAMIC POSITIONING CONFERENCE
October 12-13, 2010
OPERATIONS

RadaScan System Components



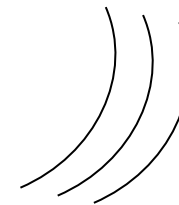
Vessel Mounted Sensor



Marine Display and Computer



Ship Mounted Transponders



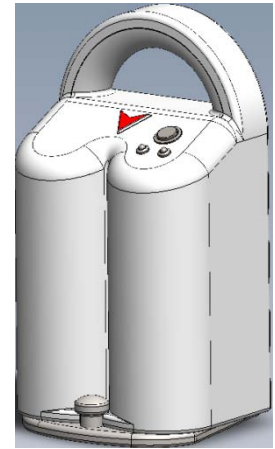
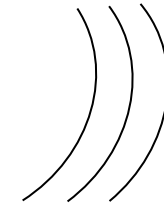
Mini RadaScan System Components



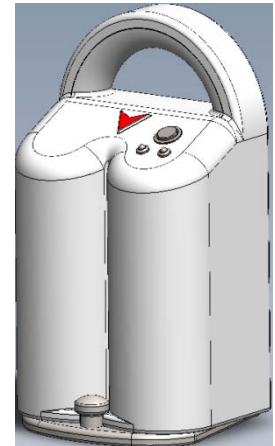
Vessel Mounted Sensor



Marine Display and Computer



Ship Mounted Transponders



RadaScan Installations



RadaScan System Specification

- ▶ 3W FMCW radar at 9.2-9.3GHz (radiolocation band)
- ▶ 360° scanning with 1Hz data rate
- ▶ Range 10m - 1000m line of sight
- ▶ 1.2m diameter dome



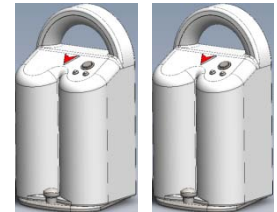
Mini RadaScan System Specification

- ▶ 3W FMCW radar at 9.2-9.3GHz (radiolocation band)
- ▶ 360° scanning with 1Hz data rate (3Hz planned)
- ▶ Range 10m - 200m line of sight
- ▶ Range 200m – 350m careful setup
- ▶ 0.5m diameter dome
- ▶ Portable installation

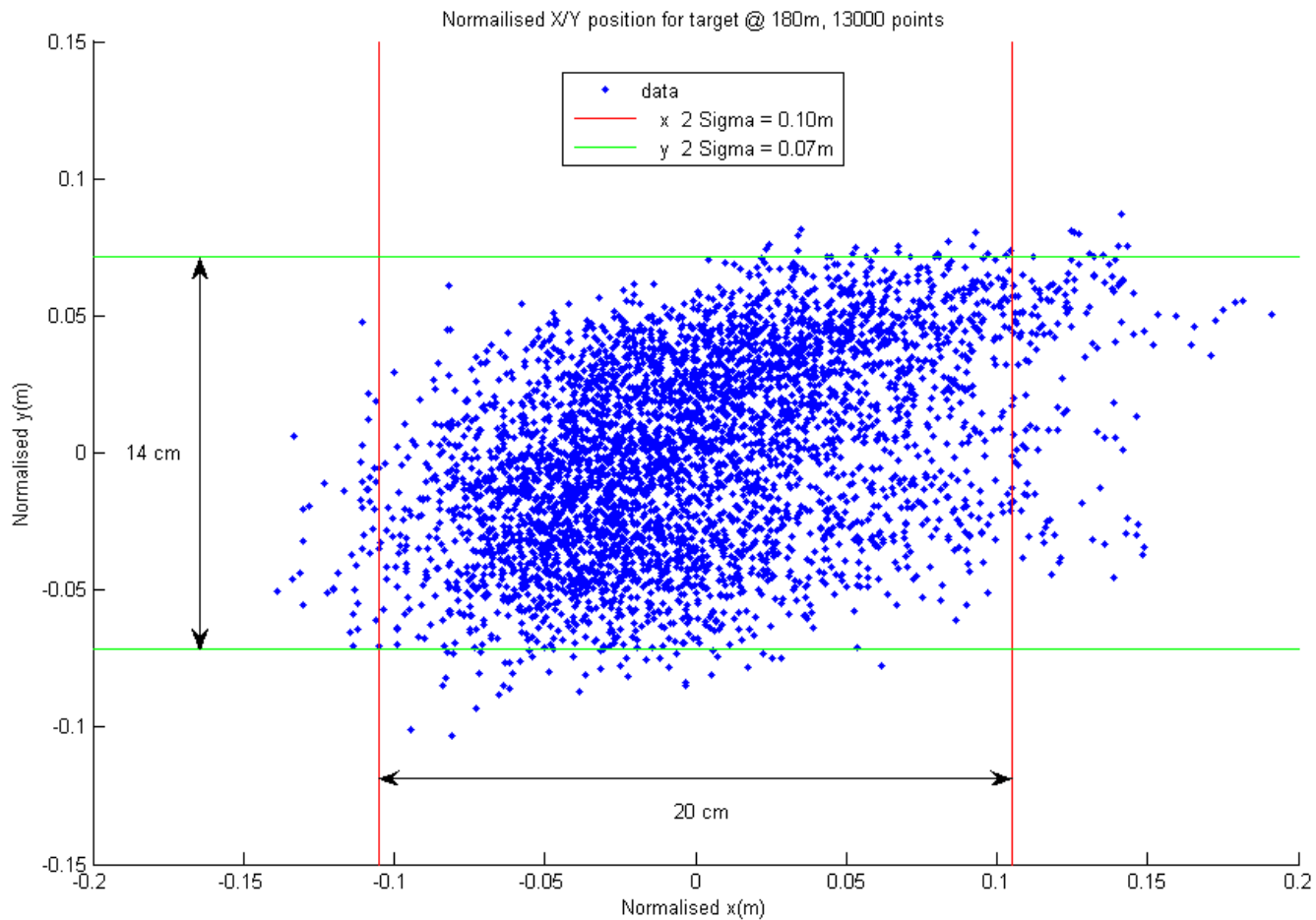


System Specification (transponders)

- ▶ “sees” only RadaScan transponders
- ▶ Rotate polarisation by 90
- ▶ Add unique ID by modulation to reflection
- ▶ Demodulation of ID at receiver rejects clutter using communication style processing techniques
- ▶ 12 month Fixed battery life option
- ▶ Mini Transponder rechargeable, one month between charges
- ▶ All transponders are compatible



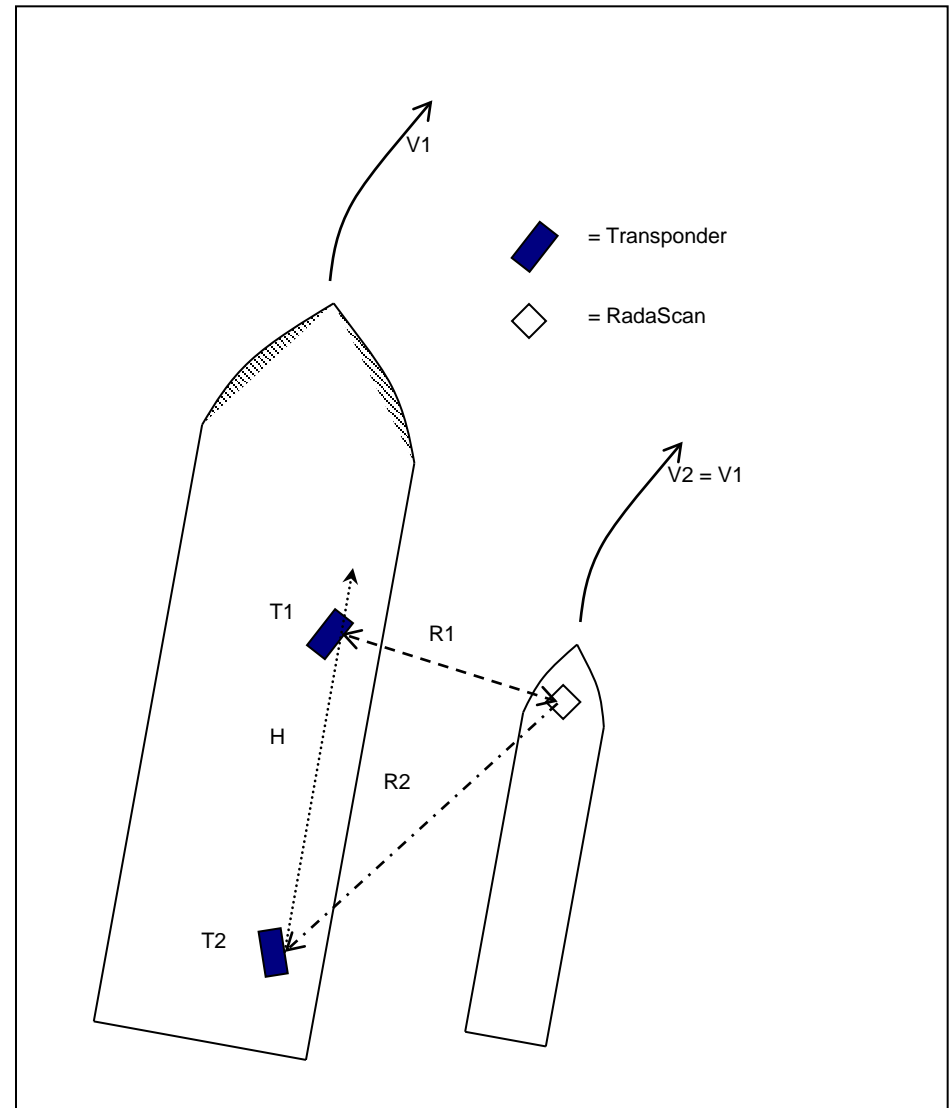
Position Measurement Repeatability



Data measured statically at the GNL test range

Replenishment at Sea

- ▶ Transfer personnel & materials between two vessels.
- ▶ Supply vessel controlled by Dynamic Positioning, position and heading supplied by RadaScan
- ▶ Match forward velocity and maintain lateral separation.



Replenishment at Sea Trials

February 2009

Vessels:

USCGC Mellon, a 378' High Endurance Cutter (HEC)

HOS Gemstone, a 300' Offshore Supply Vessel (OSV)

Dynamic Positioning (DP):

Gemstone fitted with L3 DP System

Position control solely from the RadaScan system

Manoeuvres:

Straight Line, 45 & 90 degree turns at 8-12 knots

Vessel separation: 60 feet.

RAS – USCGC Mellon



RAS – Transponder placement



RAS – HOS Gemstone – RadaScan placement



RAS – Vessels Holding Station at 12 knots



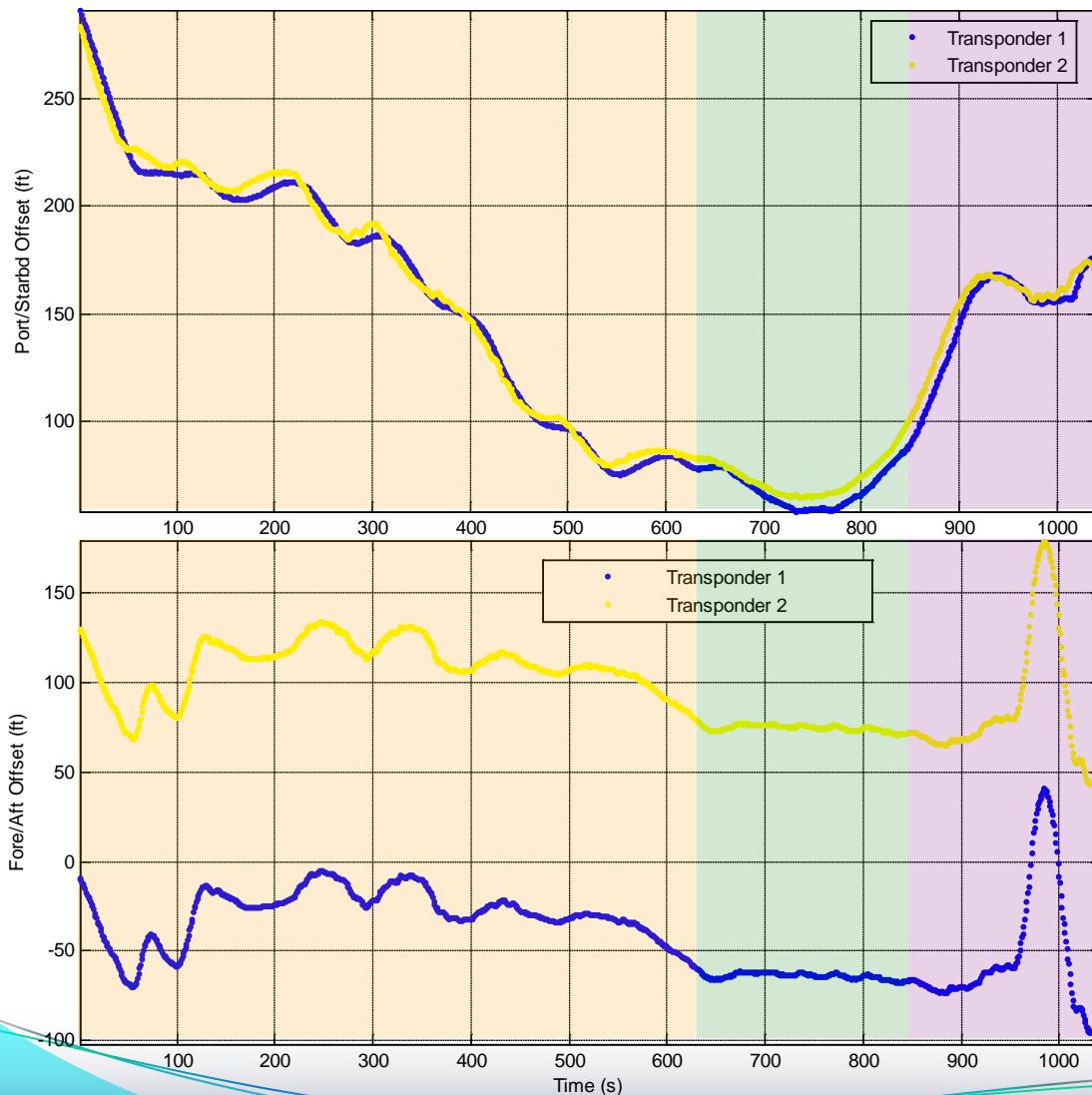
RAS – Crane extended between two vessels



RAS – HOS Gemstone Wake Trail during turn




RAS – RadaScan Data



Key

 Slow approach of the HOS Gemstone

 Final approach and hold for RAS manoeuvre. Fore/Aft control to within 2'

 Break away of HOS Gemstone.

Conclusions

- ▶ RadaScan has been shown to be a reliable sensor for RAS operations and is suitable for difficult weather conditions where laser systems struggle.
- ▶ Dynamic positioning combined with microwave sensor technology has been shown to be the way forward for RAS operations.



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