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International Association of Marine Aids to Navigation and
Lighthouse Authorities (IALA)
c/o The Secretary General
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FRANCE

Subject
CARPET software

Dear Sir,

First of all I would like to thank you very much for your letter dated 28 September 2010.

TNO is very honoured by the fact that the CARPET software plays a prominent role in IALA documentation in which the performance of VTS radar systems is considered.

TNO also recognizes the fact that recent developments in VTS and navigational radar systems are not conveniently covered by the present release of the software (version 2). A list of required additions according to one of our radar experts, Mr. A. Theil, is given in an appendix to this letter. TNO would appreciate a dialogue with IALA to discuss the required additions and their urgency.

TNO is currently investigating the possibility to raise funds in order to implement the proposed additions into a new version of CARPET. We would appreciate if IALA could support the 'business case' and we therefore kindly ask IALA to express their views in this matter.

Yours faithfully,



Dr. Henri Werij
Director of Research
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Date
1 February 2011

Our reference
TNO-060-DHW-2011-00278

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Your reference
Your letter
dated 28 September 2010

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Trade register number 27376655

Appendix

Proposal for additions to CARPET version 2

Arne Theil
31-1-2011

Date

1 February 2011

Our reference

TNO-060-DHW-2011-00278

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Coherency

Though CARPET version 2 supports coherent waveforms and signal processing (Doppler processing), transmit schemes with burst-to-burst pulse length agility cannot be simulated in a straightforward manner. The new release of CARPET must provide flexibility with respect to agile waveforms (pulse length, PRF and RF agility). Frequency diversity in combination with proper processing will lead to a decrease in clutter level and hence an increase in sensitivity.

FMCW (Frequency Modulation Continuous Wave)

Nowadays, affordable FMCW navigation radars have entered the market. The new version of CARPET must support FMCW waveforms.

Sensitivity Time Control (STC)

STC can have impact on the detection capability, as the receiver noise floor will vary over time (range).

Beam squinting

The effect of the frequency diversity concept (squinted beams) must be modeled.

Extended target

Apart from point targets, CARPET must be able to consider extended targets as well. VTS radar systems generally have good resolving properties in both range and azimuth angle. Typical targets (ships) are therefore extended.

Tracking

CARPET should be able to determine the probability to establish a firm track.

'In situ' radar performance assessment

Effects of terrain screening and of land clutter can be considered by consulting terrain altitude and terrain type data bases. Public releases of such data are nowadays available, such as SRTM (Shuttle Radar Topography Mission). Related to this subject, the new release of CARPET must be capable of providing maps that reveal detection capability and resolving properties (spatial resolution). Sustaining multiple radars and different approaches to combine radar output (e.g., plot or track level fusion) is also required.

Integration with display software

It might be worthwhile to integrate CARPET with the display software that is used by the operators. Thus, operators get the ability to view 'predicted radar coverage.'