e-NAV14 Input paper

Agenda item 9.3 (AIS/VDES), 10.3 (comms) and 13.1 (test beds)

Task Number 14 ,19 and 35

http://upload.wikimedia.org/wikipedia/fr/f/fa/Logo_ESA.png

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Demonstration objective for VDES

# Summary

The emerging VHF Data Exchange System (VDES) is proposed as one method of resolving Agenda Item 1.16 of the World Radio Conference 2015 (WRC-15). The VDES would provide vessels with a minimum means to exchange information between each other and the shore using digital data links.

## Purpose of the document

This paper calls for a common *demonstration objective* for VDES, as this will stimulate technical discussions, set directions the parties taking part in the discussions on VDES. Such an objective will foster early design and development activities and prove to WRC-15 that VDES is a serious method of resolving Agenda Item 1.16,

Furthermore, if such a demonstration objective has been established, this will ease funding by various R&D agencies because developments which these agencies are asked to support, will clearly be part of a “bigger picture”.

## Related documents

**[VDES INFO]** e-NAV14-xx Brest Output 02 Draft Information Paper on VDES ver4.0

**[VDES DRAFT]** e-NAV14-xx Brest Output 03 WD Toward Preliminary Draft Rec ITU-R M.VDES]

# Background

The future VHF Data Exchange System **[VDES INFO]** is being conceived by a number of maritime stakeholders. So far, VDES-related activities are mostly focused on regulatory aspects, early system analysis and initial architectural design, see **[VDES DRAFT]**.

At a later stage, it will be required to go beyond analysis and design: there will be a need for prototyping and experimentation, in order to validate the assumptions and demonstrate the capabilities of VDES in a realistic environment.

Furthermore, it is important that VDES is demonstrated as a system, in which the terrestrial and satellite components interwork and complement each other.

This contribution calls for a common demonstration objective of VDES.

# Discussion

## How will VDES be further developed?

It is likely that the future design, prototyping and validation activities for VDES will be funded by different entities in Europe. For example, a number of R&D projects dealing with e-Navigation have been funded by national authorities and the European commission. These activities concentrated mostly on terrestrial communications, whereas the European Space Agency has been funding R&D for future satellite communication systems.

It shall also be noted that many e-Navigation projects and test beds assume that future communication capabilities will “just be there”. Communications *as such*, is often not a specific objective of such projects, but will nevertheless be a prerequisite. This contribution calls for a specific demonstration objective with regards to future maritime communications systems such as VDES.

In the near future, the European Space Agency proposes to fund a more thorough VDES system study and in addition considers to fund a small experimental satellite to validate the VDES satellite component in the VDES system context.

So far, there has not been any detailed coordination between national or European funding agencies to come to a coherent approach with regards to funding the development of the future VDES.

## The need for a VDES demonstration objective

Funding agencies and authorities can be supported in directing their R&D funding if a roadmap for the future VDES development is developed and published. A start has been made already in document **[VDES INFO]**. It is believed that such a roadmap shall include a larger-scale demonstration which can be used by other R&D projects as a target to reach and to participate in.

For example, in case IALA proposes that in Q4 2015 a demonstration shall take place in which a subset of VDES capabilities - using terrestrial and satellite VDES components - shall be validated, this would help steering the required R&D funding.

Such a demonstration objective is particularly important for the community working on the satellite component of VDES, as the satellite component development (1) has a longer lead time, and (2) will be dependent on choices made with the terrestrial VDES developments.

Setting a demonstration objective would allow:

* The various e-Navigation projects which are now being prepared for funding requests, to contribute to, participate in, or build upon such a demonstration.
* Space agencies to set aside funding for the satellite component of VDES and allow a better planning of this long-lead component of VDES, with the assurance that such developments are part of a “bigger picture” .
* Various interested parties to propose ideas to other funding agencies with something in hand, i.e. a clearly stated demonstration objective formulated by an authoritative organisation such as IALA;
* Some form of “light weight” coordination with regards to R&D funding in this field (i.e. project A takes care of VDES terrestrial prototypes, project B will make a small satellite, project C will provide applications, etc.);
* Bundling forces vis-à-vis regulatory issues;

As an example, preliminary characteristics of a demonstration have been described in Annex 1.

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# Action requested of the Committee

The e-NAV Committee can be instrumental in formulating a demonstration in which a subset of VDES capabilities is demonstrated and validated. Such a demonstration objective would support in steering R&D funding of national and European entities, allow planning for the satellite complement of VDES, and in general avoid duplication of efforts.

Furthermore, all future test beds could be identified which would possibly support such a demonstration. In addition, all maritime stakeholders shall be invited to participate in such a demonstration.

The Committee is requested to:

1. support a VDES demonstration objective;
2. provide guidance with regards to the scope, objectives, timeline and minimum requirements of such a demonstration;
3. identify which past, current or future e-Navigation test beds would be candidates to use a prototype VDES implementation;
4. make such a demonstration objective publicly known and call for participants;
5. at a later stage to monitor the actual demonstration and validation campaign;
6. at a later stage report upon the findings and issue further recommendations for the VDES development.
7. Draft characteristics of a demonstration in 4Q 2015

The following section provides an example of a future demonstration that allows demonstrating VDES terrestrial and satellite components.

**General objective**

The demonstration shall validate the use of the various VDES communication links and applications to exchange information between various classes of vessels, using terrestrial and satellite communications, within a realistic maritime (radio frequency) environment.

**Requirements**

1. The demonstration shall use a pre-agreed validation plan and operational concept.
2. Within the demonstration a minimum of 10 vessels and two coastal stations shall participate.
3. Within the demonstration VDES equipment of at least 3 different manufacturers shall participate.
4. The demonstration shall use both terrestrial and satellite components of VDES.
5. The demonstration shall take place within a realistic maritime radio frequency environment (including the use of VHF voice, AIS or other VHF equipment).
6. The demonstration shall support considerations with regards to future Polar communications or another geographic regions which is of specific interest.
7. The demonstration shall validate radio link performance, but also validate the proper functioning of various applications using these links.
8. The demonstration shall validate the security requirements of VDES.
9. The demonstration shall actively seek to demonstrate functionalities which are considered by various e-Navigation test beds and activities.
10. The demonstration shall take place between 4Q 2015 and 2Q 2016.