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Develop Guidance on Human Factors and Ergonomics in VTS

(Task 3.3.1, 2014-18 Work Programme)

# purpose of the document

The purpose of this document is to provide support to Task 3.3.1 - Develop Guidance on Human Factors and Ergonomics in VTS as part of the Committees 2014-18 Work Programme.

In February 2015 the Australian Maritime Safety Authority led a workshop in Melbourne, Australia to support the development of a guidance document on human factors and ergonomics in VTS.

The workshop reviewed the paper VTS 38/10/3/1 (previously submitted by Australia) that identified a framework that could contribute to the work of the Committee in progressing Task 3.3.1.

IALA held a workshop on Human Factors and Ergonomics in October 2015 in Gothenburg, Sweden to provide further information to the Working Group.

This document reflects on the results of that workshop and how those results might alter a framework for Guidance on Human Factors and Ergonomics in VTS.

## Related documents

This document is a modified version of VTS 38/10/3/1.

VTS 38/10/3/1 sourced information from a number of documents including:

* American Bureau of Shipping (2003) publication Guidance Notes On Ergonomic Design Of Navigation Bridges,
* IACS Rec.95 (2007) Recommendation for the Application of SOLAS Regulation V/15 Bridge Design, Equipment Arrangement and Procedures (BDEAP).

The document also uses definitions from MSC.1/Circ.1512: Guidelines on Software Quality Assurance and Human Centred Design for E-Navigation. This document should be read in association with the Report from the IALA Workshop on Human Factors and Ergonomics held in Gothenburg, Sweden, 12-16 October, 2015.

# Background

Human factors is the scientific discipline concerned with the application of what we know about people, their abilities, characteristics and limitations to the design of systems they use, environments in which they function and interact, and jobs they perform to optimise human well-being and overall system safety and performance. Human factors and the ‘human element’ (as it occurs in the maritime domain) are terms that are often used interchangeably.

IALA held a workshop on Human Factors and Ergonomics in October 2015 in Gothenburg, Sweden to examine the issue of human factors within the VTS environment. .

# Discussion

The proposed guideline would typically include an introduction, background and scope. This would utilise references relevant to IALA and other documents/standards. These parts have not been included in this INF paper.

We also note that Annex D of the Report of the IALA Workshop on Human Factors and Ergonomics in VTS, held in Gothenburg in 2015, contains material that might be considered relevant to the introduction for this guidance.

The introduction could also reasonably set out a suite of key principles that are current in the field of human factors and ergonomics that might guide the more detailed parts of the document. We suggest this should be based on twelve key principles:

**General Principles of Human Factors and Ergonomics**

All activity with respect to the implementation of VTS (including design, installation and management thereof) should occur with due recognition of the implications for the human element, with the aim of:

1. Facilitating the tasks to be performed by the VTS team and allied services in making full appraisal of the situation to support the objectives of the VTS authority including primary and ancillary tasks;
2. Promoting effective and safe joint activity between the VTS team and allied services;
3. Adopting the principles of safety culture and recognising the need to manage organisational change using a structured approach;
4. Adopting the principles of human centred design; accounting for human capabilities and variability;
5. Recognising the implications of providing VTS services within a complex socio-technical system;
6. Enabling the VTS team and allied services to have convenient and continuous access to essential information which is presented in a clear and unambiguous manner, using standardized symbols and coding systems for controls and displays;
7. Supporting, where appropriate, the harmonized collection, integration, exchange, presentation and analysis of marine information by electronic means to enhance berth‑to-berth navigation and related services;
8. Indicating the operational status of automated functions and integrated components, systems and/or sub-systems;
9. Allowing for expeditious, continuous and effective appraisal of situations and associated decision-making by the VTS team and allied services;
10. Preventing or minimizing excessive or unnecessary work and any conditions or distractions which may cause fatigue or interfere with the safe performance of VTS team and allied services;
11. Minimizing and managing the risk of human error and detecting such error if it occurs, through monitoring and alarm systems, in time for the VTS team and allied services to take appropriate action;
12. Acknowledging the gap between work as planned (in policies, procedures and associated documents) and work as conducted (in normal operations) and making appropriate efforts to narrow this gap.

We suggest that these principles should be added as an introduction to the guideline

**Human Performance and Variability**

* Stress
* Fatigue/ Fatigue Management
* Staffing levels and roster arrangements
* Workload
* Situation awareness/Distributed Cognition
* Acknowledging and Managing individual differences
* Decision-making and sense-making in VTS
* Error, Error management and Normal Operations
* Team Work / Maritime Resource Management and Joint Activity
* Communications
* Occupational/Workplace Health and Safety

**The VTS Physical Environment**

* Noise
* Lighting
* Heating, Ventilation and Air Conditioning
* The physical space

**Human-Centred Design**

* Principles of Human Centred Design
* Using an Human-Centred Design Approach
* Associated Design Standards (referencing: Work-station functionality, arrangement and layout; console and workspace design; design of alarms and warnings

**Procedures, Codes and Job Aids**

* Hand-overs (shifts, sectors)
* Coding
* Operating and Emergency Procedures
* Labels, Placards and Job Performance Aids

**Organisational and Safety Culture**

* Quality management and Safety Culture
* VTS Safety Management
* Implementation and management of change in a VTS
* Organisational and safety culture
* Incident and accident reporting
* Internal accident and incident Investigation
* Use of Performance Indicators in Quality and Safety Management
* Recruitment, Selection and Retention
  + Psychometric testing

**Facilities**

* Food and Refreshment
* Sanitary Facilities
* Interior Décor

A number of other documents might be considered as appendices in such a guideline. These include checklists for those using the guideline during procurement/tendering process.

# Action requested of the Committee

The Committee is requested to consider items provided in this document in progressing Task 3.3.1 - Develop Guidance on Human Factors Management in VTS.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)