



Report on the Seminar on VTS Experiences and Challenges

SEMINAR REPORT 2 to 4 June 2026 Jovellanos Training Centre Gijón, Spain

Thomas Southall

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Technical Operations Manager

10, rue des Gaudines – 78100 Saint Germain en Laye, France

Tél. +33 (0)1 34 51 70 01 – Fax +33 (0)1 34 51 82 05 – contact@iala-aism.org

www.iala-aism.org

International Organization for Marine Aids to Navigation

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Executive Summary

The seminar on VTS Experiences and Challenges was held between the 2 and 4 June 2026 in Gijón.

The seminar was well attended with 108 participants from 23 countries.

The seminar considered the presentations and focus group findings and agreed the following conclusions:

1. Consider establishing a forum for operational personnel to exchange practical experience and identify common challenges.
2. Contribute to the ENG work on resilient PNT, including the development of VTS-specific guidance on GNSS interference.
3. Consider enabling the structured exchange of lessons identified, incidents and near misses, using a mechanism such as a shared database or library.
4. Consider how to highlight the positive effects of VTS and develop approaches for measuring its impact.
5. Contribute to ongoing work at IMO on SMCP, recognising the importance of effective ship–shore communication standards at both ends.
6. Maintaining operational standards in real-world conditions remains an ongoing challenge and consideration should be given on how to maintain standards between training.
7. Continue to monitor and provide guidance on the role of VTS specifically regarding the interaction with MASS.

Contents

Executive Summary	3
1. Introduction	7
2. Session 1 – Opening and setting the scene.....	7
2.1 Administration and safety briefing	7
2.2 Welcome from José Luis García Lena, Director of Spanish Maritime Rescue and Safety Agency 8	
2.3 Welcome from IALA, Omar Eriksson, Deputy Secretary-General	8
2.4 Seminar introduction, format and objective – Trond Ski, Vice-Chair of the VTS Committee	8
2.5 Keynote from Lukasz Bibik – EMSA on AIS spoofing and GNSS Interference	8
3. Session 2 – Current operational experiences.....	9
3.1 Operational Pressures in Vessel Traffic Services - Rob Clay, UK VTS Association	9
3.2 VTS Operations and Incident Response in Türkiye - Abdullah Kizilelma, Directorate General of Coastal Safety, Türkiye	9
3.3 VTS operations in the Port of Antwerp and Bruges - Kevin Vervoort, Port of Antwerp - Bruges 10	
3.4 Winter navigation in the Bay of Bothnia - Sofia Ingo, Tom Talvia, Fintraffic	11
4. Session 3 – Current equipment and risk analysis tools.....	11
4.1 AIS Spoofing Challenges / GNSS Disturbances in the Gulf of Finland - Esa Kallio, Mareena Viljanen and Jan Rosenqvist, Fintraffic	11
4.2 What is possible with current VHF band and modern VHF radios? - Roar Flaates (Jotron)	12
4.3 Cooperation between coastal VTS centres and risk assessment in the Strait of Gibraltar (SIRA model) - Younes Alahiane (Head Manager, Tangier Coastal VTS) and Said Charri (Tangier Traffic VTS, Morocco)	12
4.4 Use of IWRAP in VTS areas relating to procedures and day to day operations - José Maraver, Tarifa VTS, Spain	12
5. Session 4 - Current training experiences.....	13
5.1 From training room to reality: where standards fade Jill Van Reet, VTS Zandvliet, Belgium	13
5.2 VTS Training in Spain: Present and Future - Raquel Rojo Diaz, Jovellanos Training Centre	13
5.3 The 4 Pillars of VTS Responsibility: Delivery, Information, Authorization and Omission - Michele Landi, Italian Coast Guard	13
5.4 Human Factors Relating to VTS Personnel - Andrej Modic, Koper VTS, Slovenia	14
6. Session 5 – VTS operational challenges for the future	14
6.1 VTS, MASS and COLREGs, a need for understanding - Carlos Salinas, Jovellanos Training Centre	14

6.2	Future Ship reporting system in European waters - José Casado, Directorate General of the Merchant Marine, Spain	14
6.3	The New “VESSEO” Project in Turkish Straits and Emergency Mobile VTS Stations at Istanbul VTS - Mehmet Erdoğan, Directorate General of Coastal Safety, Türkiye	15
6.4	VTS in the era of MASS: some considerations on autonomous vessels and traffic services - Hernán del Frade, Directorate General for the Merchant Marine, Spain	15
7.	Session 6 – VTS equipment challenges for the future	16
7.1	New generation of VTS - Javier Guarch, Wartsila	16
7.2	Explainable AI - Sinikka Hartonen, Kongsberg	16
7.3	Modern VTS systems and the evolving role of digital technologies in supporting VTS day to day operations – Richard Jonker, TIDALIS	16
7.4	The Evolution of VTS: From Challenges to Solutions - Dmitry Rostopshin, DiNav Marine	17
8.	Session 7 – VTS training challenges for the future.....	17
8.1	New technologies applied to improve VTS training - Martín Bosque, Signal Software S.L., Spain	17
8.2	From Generic to Formalized Training: Standardization of a Competency-Based Model Course for Vessel Traffic Services Operators - Burçin Erlevent, Directorate General of Coastal Safety, Türkiye	17
8.3	Basic Training of VTS Operators in the Future - Mika Halttunen, Fintraffic	18
8.4	Challenges in Education: Influx of New Students, Limited Availability of Coaches, and Automation in Education – Bas Struijk, NNVO, Netherlands	18
9.	Focus Groups.....	18
9.1	From Ideas to Proposals - Operations group facilitators: Kevin Vervoort, Rob Clay	19
9.2	From Ideas to Proposals - Training group facilitators: Stefaan Priem, Keeta Rowlands	20
9.3	From Ideas to Proposals - Training Equipment group facilitators: Richard Aase, Esa Kallio	21
10.	Session 7 – Seminar results, conclusions and next steps.....	22
10.1	Closing remarks – Julián Camus Bergareche, Director of Jovellanos Training Centre	22
10.2	Closing the Seminar – Omar Eriksson, IALA Deputy Secretary-General	22
10.3	Review workshop report	23
11.	Social events and technical visit.....	23
11.1	Icebreaking event - ABBA Hotel, Gijón	23
	Visit to historical Gijón	23
11.2	Traditional regional dinner - Llagar "El Trole"	24
	Monday, 1 st June 2026	33
	DAY 1 – Tuesday, 2 nd June 2026	33
	DAY 2 – Wednesday, 3 rd June 2026	34
	DAY 3 – Thursday, 4 June 2026	35

Focus Group	36
Facilitators	36
1. Key Issues Noted	36
2. Examples of Best Practice	36
3. Gaps or Areas Requiring Further Work	36
4. Potential Tasks for the Next Work Programme	37
Task 1	37
Task 2	37
5. Headline Points	37
6. Additional Notes	37
Focus Group	38
Facilitators	38
1. Key Issues Noted	38
2. Examples of Best Practice	38
6. Additional Notes (if relevant)	40
Focus Group	41
2. Examples of Best Practice	41
3. Gaps or Areas Requiring Further Work	41
4. Potential Tasks for the Next Work Programme	41
5. Headline Points	42
6. Additional Notes (if relevant)	42

Report on the Seminar on VTS Experiences and Challenges

1. INTRODUCTION

The Jovellanos Training Centre hosted a workshop in Gijón from 2 to 4 June 2026, bringing together operational and technical stakeholders to share practical experience, identify common challenges and generate input to support the future work programme of the VTS Committee.

108 participants from 23 countries participated in the seminar plus five members of the Secretariat.



2. SESSION 1 – OPENING AND SETTING THE SCENE

This session was chaired by Trond Ski, Chair of the Seminar supported by Thomas Southall, IALA Technical Operations Manager, the Steering Committee and the Jovellanos Training Centre as host.

2.1 Administration and safety briefing

The host provided a safety and administrative briefing.

Presentations can be found on the fileshare found here as PDFs. A list of participants can be found in Annex A and the programme can be found in Annex B.

2.2 Welcome from José Luis García Lena, Director of Spanish Maritime Rescue and Safety Agency

José Luis García Lena, Director of the Spanish Maritime Rescue and Safety Agency, opened the seminar and welcomed participants to Gijón and the Jovellanos Maritime Safety Training Centre.

He outlined the role of Salvamento Marítimo, including its responsibilities for search and rescue, pollution response and vessel traffic services and noted the integration of VTS functions within several Maritime Rescue Coordination Centres. He highlighted the role of the Jovellanos Centre as Spain's national reference for VTS training.

He emphasised that the seminar would address key aspects of current and future VTS provision, including operational experiences, technological developments, training and human factors. He invited participants to contribute their experience to support ongoing work and future developments.

2.3 Welcome from IALA, Omar Eriksson, Deputy Secretary-General

Omar Eriksson, Deputy Secretary-General of IALA, welcomed participants and thanked the Spanish Maritime Rescue and Safety Agency and the Jovellanos Training Centre for hosting the seminar.

He noted that the seminar had been structured to move from current operational experience to technology, training and future challenges, reflecting the development of VTS in response to increasing traffic, emerging risks and technological change. He observed that these challenges are shared across regions, including the integration of new technologies, training requirements and the implications of automation.

He emphasised the importance of exchange between participants, noting that the seminar provided a link between operational practice and the development of international guidance. He encouraged active participation and a focus on concrete outcomes to support future guidance, training and harmonised VTS services.

2.4 Seminar introduction, format and objective – Trond Ski, Vice-Chair of the VTS Committee

Trond Ski, Vice-Chair of the VTS Committee, introduced the seminar by outlining its structure, format and objectives.

He explained that the seminar had been designed to support structured progression from the exchange of operational experience through technical and training aspects towards the identification of future challenges and potential solutions. He noted that the format combined plenary sessions, case studies and focused group discussions to support active participation.

He stated that the objective of the seminar was to facilitate the sharing of practical experience, identify common issues across VTS operations and support the development of concrete proposals to inform future work, including contributions to the work programme.

2.5 Keynote from Lukasz Bibik – EMSA on AIS spoofing and GNSS Interference

Lukasz Bibik of EMSA delivered a keynote on AIS spoofing and GNSS interference and their impact on maritime situational awareness.

He described the European maritime information exchange environment, including SafeSeaNet and EMSA's Integrated Maritime Services and explained how these systems support situational awareness through cooperation between EMSA and EU Member States. He noted that AIS spoofing and GNSS disruption, including jamming and spoofing, are increasingly frequent and can undermine confidence in the maritime

picture both ashore and at sea, with implications for navigational decision-making, risk assessment, incident response, maritime security and environmental protection.

He outlined common interference patterns, including false positions, duplicated identities and degraded or inconsistent positioning and noted that these effects can propagate into monitoring services and operational workflows affecting both competent authorities and mariners. He described the work of the EMSA–Member States AIS Spoofing Working Group, which has consolidated national experience, developed shared terminology and worked towards common approaches for detection, assessment and reporting.

He reported emerging conclusions from Member State experts, including the importance of multi-source detection, rapid validation and structured information-sharing to support coordinated responses. He noted that guidelines and recommendations are being developed for both authorities and mariners, supported by practical checklists.

He also addressed the role of Vessel Traffic Services in responding to these challenges, including the detection and verification of anomalies through sensor correlation, the provision of warnings and assistance to vessels and the maintenance of safe traffic flow under degraded positioning conditions. He emphasised the importance of strengthening resilience through equipment, procedures, training and cooperation.

3. SESSION 2 – CURRENT OPERATIONAL EXPERIENCES

This session was chaired by Trond Ski, VTS Committee Vice-chair.

3.1 Operational Pressures in Vessel Traffic Services - Rob Clay, UK VTS Association

Rob Clay presented current operational challenges affecting modern VTS, with particular focus on system reliability, workload management, fatigue, staffing pressures and operational resilience.

Drawing on original survey data collected from personnel across three VTS stations in the United Kingdom, he provided insight into the conditions faced by frontline operators and supervisors in an increasingly complex operational environment. He examined the impact of technological dependence, procedural demands and communication pressures on decision-making and used the survey findings to identify recurring concerns raised by operational staff.

He also considered the relationship between operational pressures and incident management, with particular attention to fatigue and other human factors, including their effect on situational awareness. In addition, he outlined the position of the relaunched Vessel Traffic Services Association and its commitment to supporting professional standards, operational resilience, collaboration and continuous improvement across the VTS sector.

The presentation provided an evidence-based overview of factors currently shaping the VTS profession and prompted discussion on resilience, personnel support and safety culture within VTS operations.

3.2 VTS Operations and Incident Response in Türkiye - Abdullah Kizilelma, Directorate General of Coastal Safety, Türkiye

Abdullah Kizilelma addressed current challenges in VTS operations in Türkiye, with particular focus on the Turkish Straits. He noted that these challenges are closely associated with environmental conditions, technical inadequacies on board vessels and insufficient language capability.

He described the unique morphological, hydrological and meteorological characteristics of the Straits, including narrow waterways, sharp course alterations, complex current systems and variable weather conditions, all of which create a demanding navigational environment. He noted that these natural

constraints are compounded by technical deficiencies observed on some vessels, particularly deficiencies or malfunctions in navigation equipment. He further highlighted the increased operational risk associated with engine or steering failures occurring during passage or on entry to the Straits.

A further focus of the presentation was the insufficient level of Maritime English proficiency among some ship crews. He noted that, while the Standards of Training, Certification and Watchkeeping require officers of the watch on ships of 500 gross tonnage and above to understand and communicate using Standard Marine Communication Phrases, practical limitations can still be observed in operational conditions. He explained that, in the context of the Montreux Convention regarding the regime of the Straits, these communication limitations are particularly significant given the freedom of non-stop passage and the absence of compulsory pilotage under international law.

Within this context, he identified language deficiencies as a significant safety concern requiring mitigation measures. He noted that pilotage services are considered an effective means of enhancing navigational safety and reducing communication-related risk and suggested that wider use of pilotage would help reduce operational uncertainty in the Straits.

He concluded that measures are needed both to encourage the effective use of pilotage services and to strengthen Maritime English proficiency standards, particularly for vessels navigating high-risk waterways such as the Turkish Straits.

3.3 VTS operations in the Port of Antwerp and Bruges - Kevin Vervoort, Port of Antwerp - Bruges

Kevin Vervoort provided an overview of the Port of Antwerp-Bruges, with particular focus on the Antwerp platform, the nautical chain, Vessel Traffic Services and passage planning in the context of the Oosterweel construction works.

He noted that the Port of Antwerp-Bruges was formed through the merger of the ports of Antwerp and Bruges on 22 April 2022. The Antwerp platform, located 80 km inland, covers 121 km² and includes approximately 170 km of quays. He identified the Coordination Point as the official reference point for vessel arrivals and described the nautical chain as the set of services coordinating vessel movements from the sea pilot station to berths in Antwerp. This included tidal berths, with a tidal range of approximately 5.7 metres, six locks providing access to the docks and a range of supporting services.

With regard to VTS, he explained that the service forms part of the port's nautical operations and is managed by a VTS Manager and a Performance Advisor. The team consists of seven VTS supervisors, ten VTSOII trainers, 26 VTS operators and ten passage planners. Due to the complexity of operations and the high volume of traffic, the Antwerp platform is divided into four VTS sectors, with three on the right bank and one on the left.

He identified a number of operational challenges, including the volume of communications associated with approximately 300,000 vessel movements annually, language barriers, pleasure craft operating without AIS, simultaneous lock operations and staffing shortages. He also described the training burden associated with the service, noting that VTS operators undergo intensive training lasting between nine and twelve months and that the success rate is approximately 70 per cent. He added that high stress levels contribute to staff turnover. The system is supported by 19 radars, three remote Albert Canal radars and 30 CCTV locations.

He also described passage planning arrangements through the Oosterweel construction zone. Passage was tightly managed through one-way traffic arrangements, with transit scheduled in 45-minute intervals, supported by waiting areas and mandatory registration. He noted that safety was further strengthened through joint VTS operations and additional measures applying to all vessels. Skippers were required to request passage digitally through Apics Barge, or by VHF radio or telephone and to specify their estimated

time of arrival. Up to two consecutive passages could be requested and the schedule was visible for the following three hours to allow users to anticipate periods of higher demand.

The presentation demonstrated the scale and complexity of vessel traffic management in Antwerp, the importance of coordination and technology and the arrangements introduced to maintain safe and efficient passage during major infrastructure works.

3.4 Winter navigation in the Bay of Bothnia - Sofia Ingo, Tom Talvia, Fintraffic

Sofia Ingo and Tom Talvia addressed future challenges relating to the recruitment and basic training of VTS operators in the context of wider demographic and structural change affecting the maritime sector.

They noted that declining age groups, increasing competition for maritime professionals and changing career expectations are expected to affect the future availability of VTS operators, particularly those with traditional navigational backgrounds. Against this background, the presentation considered how changes in the operational environment, increasing digitalisation and evolving competence requirements may influence future recruitment strategies and training needs.

Particular attention was given to the question of how VTS organisations can maintain high levels of operational competence while adapting to a potentially smaller pool of applicants with seagoing experience. In response, they explored a number of possible approaches, including alternative training pathways, new competence models, increased use of simulation and digital learning environments and closer cooperation between maritime education providers and VTS organisations.

They emphasised the importance of proactive planning to ensure the long-term availability of competent VTS personnel in increasingly complex operational environments. The presentation encouraged discussion on how VTS training systems can evolve to meet future operational and personnel challenges while maintaining safety and service quality.

4. SESSION 3 – CURRENT EQUIPMENT AND RISK ANALYSIS TOOLS

This session was chaired by Richard Aase, NCA - Norway.

4.1 AIS Spoofing Challenges / GNSS Disturbances in the Gulf of Finland - Esa Kallio, Mareena Viljanen and Jan Rosenqvist, Fintraffic

Esa Kallio, Mareena Viljanen and Jan Rosenqvist of Fintraffic addressed the increasing occurrence of GNSS disturbances and AIS spoofing incidents in the Gulf of Finland, noting the influence of the current security situation in the Baltic Sea region. They explained that these disruptions are affecting the reliability of the maritime situational picture in one of the busiest and most strategically significant sea areas in Europe.

From a VTS perspective, they examined the operational implications of these phenomena and presented real operational examples observed in daily VTS operations. They demonstrated how disturbances can appear in the situational picture and described how unreliable positioning data can affect traffic monitoring, risk assessment, communication with vessels and overall maritime safety.

Particular attention was given to the operational experience of VTS personnel working in the Gulf of Finland in the current geopolitical context. The speakers emphasised the importance of maintaining situational awareness, operator competence, inter-authority cooperation and resilient procedures in an environment where positioning information cannot always be assumed to be reliable.

The presentation provided operational examples and lessons identified from recent incidents and considered how VTS services can adapt to increasingly complex and electronically contested operating conditions.

4.2 What is possible with current VHF band and modern VHF radios? - Roar Flaates (Jotron)

Roar Flaates of Jotron presented developments in maritime communication systems, with a focus on the continued role of VHF and DSC as a core component of maritime safety.

He highlighted that, despite wider digitalisation, traditional coastal radio systems remain a reliable and standardised means of communication and continue to provide an essential safety layer. He described Jotron's development of customised VHF coastal radio systems for use in ports, VTS services, offshore installations and coastal surveillance, supporting communication between vessels and shore authorities.

The presentation outlined a number of technical developments, including the integration of analogue and VoIP radio systems to support gradual system upgrades, simulcast functionality to improve coverage through transmission from multiple sites on the same frequency and the use of Digital Selective Calling to support automated communication. He also noted the use of VoIP over satellite connections to extend communication range and optimise bandwidth.

Cybersecurity was identified as a key consideration, with systems designed using secure-by-design principles, including encryption, authentication protocols and alignment with relevant regulatory requirements.

Looking forward, he identified ongoing developments towards next-generation radio systems with improved performance, reduced power consumption and increased IP connectivity, supporting further digitalisation of maritime communications.

4.3 Cooperation between coastal VTS centres and risk assessment in the Strait of Gibraltar (SIRA model) - Younes Alahiane (Head Manager, Tangier Coastal VTS) and Said Charri (Tangier Traffic VTS, Morocco)

Younes Alahiane, Head Manager and Said Charri presented work on cooperation between Tarifa Traffic (Spain) and Tangier Traffic (Morocco) VTS centres in the Strait of Gibraltar, together with a risk assessment conducted using the IALA SIRA model.

They described the work as the result of close operational collaboration between the two VTS centres, reflecting the shared responsibility for managing traffic in the Strait. The assessment focused on analysing operational risks across the area and identifying key factors affecting safety.

They reported that the work produced a number of relevant conclusions and provided an example of effective cross-border cooperation between VTS services. The presentation was also intended to support further discussion, with the aim of refining the assessment and incorporating feedback for subsequent development.

4.4 Use of IWRAP in VTS areas relating to procedures and day to day operations - José Maraver, Tarifa VTS, Spain

José Maraver of Tarifa VTS presented the use of the IWRAP MkII software to support quantitative risk assessment in VTS areas.

He explained that the work was closely linked to parallel analysis conducted with Tangier Traffic VTS, with both services coordinating their approaches to risk assessment in the Strait of Gibraltar. While the Tangier Traffic work applied the IALA SIRA model, the IWRAP analysis introduced a complementary quantitative perspective.

He described how the IWRAP model was used to conduct numerical assessment of traffic risk, providing additional data to support evaluation of operational procedures and day-to-day activities. The presentation

demonstrated how combining qualitative and quantitative methods can support a more comprehensive understanding of risk in complex VTS environments.

5. SESSION 4 - CURRENT TRAINING EXPERIENCES

This session was chaired by Stefaan Priem, MDK, Belgium.

5.1 From training room to reality: where standards fade Jill Van Reet, VTS Zandvliet, Belgium

Jill Van Reet of VTS Zandvliet examined the gap between training performance and operational practice.

Drawing on experience as both a VTS instructor and operator, she highlighted that trainees often demonstrate correct application of procedures, structured communication and proactive behaviour in the training environment, but that these standards are not always maintained in operational settings. She noted that, in practice, communication may become less concise, professionalism may be affected by over-politeness and knowledge of procedures may decline over time.

She identified this divergence as a recurring challenge and emphasised the need for measures to maintain operational standards. These included the use of mentoring for newly qualified operators, the application of case studies and recordings to support reflective learning and the provision of refresher training to reinforce required practices.

The presentation underlined the need for continued attention to the transition from training to operational performance and encouraged discussion on effective methods to sustain standards in VTS environments.

5.2 VTS Training in Spain: Present and Future - Raquel Rojo Diaz, Jovellanos Training Centre

Raquel Rojo Díaz of the Jovellanos Training Centre presented the delivery of VTS training in Spain and its ongoing development.

She described the implementation of training based on IALA model courses, with adaptation to reflect operational reality and the inclusion of subject matter experts to ensure training is based on current practices and real cases. She highlighted the importance of maintaining alignment between training and operational requirements.

She also outlined the transition from traditional classroom-based approaches towards blended learning models, combining face-to-face instruction with virtual learning environments and the use of virtual reality. These developments were presented as supporting flexibility while maintaining pedagogical standards.

The presentation emphasised the need to balance the introduction of new technologies with the continued development of core theoretical knowledge required for effective VTS performance.

5.3 The 4 Pillars of VTS Responsibility: Delivery, Information, Authorization and Omission - Michele Landi, Italian Coast Guard

Michele Landi of the Italian Coast Guard examined VTS responsibility from an operational perspective.

He outlined four dimensions through which responsibility may arise: service delivery, provision of information, authorisation and omission. Using case studies, he demonstrated how these aspects can contribute to operational outcomes and highlighted examples where failures in monitoring or decision-making resulted in incidents.

He also clarified the distinction and interaction between the responsibilities of the vessel master and those of the VTS operator, noting that these responsibilities coexist and must be understood in parallel.

The presentation identified effective monitoring and a clear understanding of roles and responsibilities as important elements in safe VTS operations.

5.4 Human Factors Relating to VTS Personnel - Andrej Modic, Koper VTS, Slovenia

Andrej Modic of Koper VTS addressed human factors affecting VTS personnel, with particular emphasis on fatigue.

He noted that, while equipment failure is often perceived as the primary risk, human error is a significant contributing factor in maritime incidents. He highlighted that a large proportion of accidents involve human factors and identified fatigue as a critical element that can significantly affect operator performance.

He described how fatigue can impair the ability to process information and make decisions, even where operators may continue to function under other forms of stress. The presentation emphasised the importance of recognising and managing fatigue as part of operational risk in VTS services.

6. SESSION 5 – VTS OPERATIONAL CHALLENGES FOR THE FUTURE

This session was chaired by Thomas Southall, IALA.

6.1 VTS, MASS and COLREGs, a need for understanding - Carlos Salinas, Jovellanos Training Centre

Carlos Salinas of the Jovellanos Training Centre addressed the relationship between Vessel Traffic Services, Maritime Autonomous Surface Ships (MASS) and the International Regulations for Preventing Collisions at Sea (COLREGs).

He examined the challenges associated with applying existing COLREG provisions to close-quarters situations within VTS areas, particularly in the context of increasing levels of automation and the anticipated introduction of autonomous vessels. He highlighted that MASS represents a significant shift in the operational paradigm of maritime navigation and raises questions regarding the adequacy of current regulatory frameworks.

He suggested that amendments to COLREGs may be required to ensure that such situations can be effectively managed in mixed traffic environments involving both conventional and automated vessels.

At the conclusion of the presentation, the session chair noted that Carlos Salinas would be retiring and acknowledged his long-standing contribution to the VTS community. His work at the Jovellanos Training Centre, his engagement within the Committee and his wider influence on training and professional discussions were recognised.

He was described as a valued colleague who had consistently contributed technical insight and challenged established thinking, with his presentations noted for their entertainment, depth and clarity. On behalf of participants, appreciation was expressed for his sustained contribution over many years and best wishes were conveyed for his retirement.

6.2 Future Ship reporting system in European waters - José Casado, Directorate General of the Merchant Marine, Spain

José Casado of the Directorate General of the Merchant Marine addressed developments in mandatory ship reporting systems in European waters.

He described recent amendments to reporting systems within traffic separation schemes at Finisterre, the Canary Islands and Gibraltar and their integration into Spain's electronic reporting framework. These developments were driven by the requirements of Commission Delegated Directive (EU) 2025/811, requiring

Member States to harmonise reporting arrangements, improve data quality and ensure consistency across European systems.

He outlined Spain's implementation of electronic reporting through EMSA's SafeSeaNet system and the integration with Salvamento Marítimo's operational management systems. These developments were intended to reduce administrative workload, streamline reporting processes and minimise repetitive manual inputs for both VTS operators and vessel crews.

He noted that these changes have implications for VTS operations, particularly in relation to workload management, system integration and decision-support functions. He placed these developments within the broader international regulatory context, including work at the International Maritime Organization and highlighted the importance of operational experience in supporting future development of reporting systems.

6.3 The New "VESSEO" Project in Turkish Straits and Emergency Mobile VTS Stations at Istanbul VTS - Mehmet Erdoğan, Directorate General of Coastal Safety, Türkiye

Mehmet Erdoğan of the Directorate General of Coastal Safety presented developments related to situational awareness and operational resilience in the Turkish Straits.

He introduced the VESSEO project, which integrates electro-optic sensors, computer vision, photogrammetry, AIS and radar to support real-time vessel detection, tracking, classification and positioning. The system was developed to address limitations of traditional monitoring systems, particularly in detecting small vessels, identifying targets and maintaining awareness when AIS is unavailable. He also described the use of augmented reality interfaces and geographic information system-based visualisation to support operational decision-making.

In addition, he presented the deployment of mobile VTS stations to support operational continuity in the event of infrastructure failure or emergency situations. These mobile systems provide communication, situational awareness and coordination capabilities, supporting uninterrupted vessel monitoring and response in one of the busiest waterways in the world.

The presentation showed how integrated technologies and operational redundancy can strengthen resilience and support effective maritime traffic management.

6.4 VTS in the era of MASS: some considerations on autonomous vessels and traffic services - Hernán del Frade, Directorate General for the Merchant Marine, Spain

Hernán del Frade of the Directorate General for the Merchant Marine considered future issues associated with the introduction of Maritime Autonomous Surface Ships and their interaction with VTS.

He addressed a range of challenges, including communication with remote operation centres, the absence of onboard crew, interaction with conventional vessels, cybersecurity considerations and compliance with COLREGs. He noted that maintaining maritime safety without onboard personnel represents a significant challenge for autonomous navigation.

He also referred to the development of the recommendatory MASS Code as a supplementary framework supporting compliance with SOLAS provisions and to the experience-building phase following its introduction. He noted that limited operational experience with full-scale autonomous vessels may require the use of smaller autonomous platforms to support testing and development of future regulatory measures.

The presentation considered the changing relationship between VTS and autonomous navigation and the importance of continued experience-building and regulatory development.

7. SESSION 6 – VTS EQUIPMENT CHALLENGES FOR THE FUTURE

7.1 New generation of VTS - Javier Guarch, Wartsila

Javier Guarch of Wärtsilä addressed the need to modernise Vessel Traffic Services in response to rapid technological development and increasing operational complexity.

He noted that many existing VTS systems are based on legacy architectures which limit their ability to adapt to highly interconnected and digital environments. He explained that emerging technologies, including advanced sensors and data-driven platforms, require a shift towards more flexible system frameworks.

He emphasised the growing requirement for system integration within ports and across maritime stakeholders, including port authorities, terminal operators and external systems. In this context, he outlined the need for open and scalable VTS platforms capable of integrating multiple data sources and supporting wider digital port ecosystems.

He also identified operator workload as a key driver for modernisation, noting that increasing traffic density and information flows can lead to cognitive overload. He described how advanced VTS solutions can support improved situational awareness, automation of routine tasks and the provision of decision-support tools.

7.2 Explainable AI - Sinikka Hartonen, Kongsberg

Sinikka Hartonen of Kongsberg examined the role of artificial intelligence in VTS, with particular focus on explainable AI.

She noted that AI is increasingly used to support situational awareness, predictive analysis and simulation of traffic situations. However, she emphasised that AI systems which provide outputs without explaining their underlying reasoning may increase operational complexity rather than reduce it.

She outlined explainable AI as a necessary requirement for operational use, enabling operators to understand, assess and validate system outputs. This was described as essential to building trust and supporting safe decision-making, given that responsibility for operational decisions remains with the operator.

She also identified risks associated with poorly implemented explanations, including increased cognitive load or over-reliance on system outputs. She emphasised that explanations should be clear, relevant and aligned with operational needs, supporting situational awareness rather than introducing additional complexity.

7.3 Modern VTS systems and the evolving role of digital technologies in supporting VTS day to day operations – Richard Jonker, TIDALIS

Richard Jonker of TIDALIS addressed the lifecycle of VTS systems and the challenges of maintaining operational relevance in a rapidly evolving technological environment.

He noted that VTS systems are typically designed to meet defined operational and regulatory requirements and have an expected operational lifespan of between 10 and 15 years. Over this period, technological development can outpace system design, creating challenges in maintaining capability.

He highlighted developments including cloud-based architectures, artificial intelligence, enhanced sensor integration, improved cybersecurity and data-driven decision-support tools. These developments offer opportunities to improve safety, efficiency and situational awareness.

However, he noted that many existing systems are based on monolithic architectures, making the integration of new technologies complex and potentially disruptive to operations. He outlined the importance of strategies that enable gradual system evolution while maintaining operational continuity and reliability.

7.4 The Evolution of VTS: From Challenges to Solutions - Dmitry Rostopshin, DiNav Marine

Dmitry Rostopshin of DiNav Marine examined the ongoing digital transformation of the maritime sector and its implications for VTS.

He highlighted that increasing traffic complexity, environmental requirements, cybersecurity considerations and the emergence of autonomous and remotely operated vessels are driving the need for more integrated VTS solutions. This includes a transition towards digital platforms supporting broader maritime services.

He described the role of technologies such as S-100 based services, including route exchange, digital VTS clearances, navigational warnings and port call optimisation, in supporting safety, efficiency and environmental performance. He also identified the use of artificial intelligence, cloud-based architectures, digital twins and enhanced sensor integration as key components of future VTS systems.

At the same time, he noted that this evolution introduces operational and organisational challenges, including interoperability, cyber resilience, integration of autonomous vessels and the need for appropriate operator competence. He emphasised that successful implementation will depend not only on technology, but also on standardisation, training and the development of harmonised operational practices.

8. SESSION 7 – VTS TRAINING CHALLENGES FOR THE FUTURE

8.1 New technologies applied to improve VTS training - Martín Bosque, Signal Software S.L., Spain

Martín Bosque of Signal Software S.L. examined the evolution of VTS training and the potential application of new technologies to improve training delivery.

He noted that training has developed significantly since the introduction of full-mission simulators, with more recent portable and web-based solutions improving accessibility. However, he identified the continued challenge of managing instructor workload during simulation exercises.

He outlined the potential of immersive technologies, including virtual and augmented reality, to support training. These applications included providing trainees with a vessel perspective to improve spatial awareness, as well as enabling immersive briefing and debriefing sessions through shared digital environments.

He also examined the role of artificial intelligence, describing capabilities such as automated management of simulated traffic and communications, data-driven evaluation of training sessions including voice communications, automated generation of complex training scenarios and adaptive systems that identify individual competence gaps and generate targeted exercises.

He noted that similar technologies are being applied in related domains, including aviation and air traffic control. The presentation invited the VTS community to consider how such technologies can be adapted to meet specific training requirements.

8.2 From Generic to Formalized Training: Standardization of a Competency-Based Model Course for Vessel Traffic Services Operators - Burçin Erlevent, Directorate General of Coastal Safety, Türkiye

Burçin Erlevent of the Directorate General of Coastal Safety addressed the standardisation of VTS operator training within a competency-based framework.

He noted that, despite widespread adoption of formal training aligned with IALA standards, inconsistencies remain in training and certification processes across different jurisdictions. These included differences in

recruitment practices and the use of uniform training approaches for candidates with differing maritime backgrounds.

He highlighted the need for a shift towards more differentiated, practice-oriented and skills-based training methodologies. He outlined a proposed framework based on competency and job-specific requirements, including the development of adaptive curricula tailored to individual needs.

The presentation emphasised that improved harmonisation of training standards is necessary to support operational consistency and to enable the effective integration of emerging technologies, including autonomous vessels and shore-based navigation functions.

8.3 Basic Training of VTS Operators in the Future - Mika Halttunen, Fintraffic

Mika Halttunen of Fintraffic examined future challenges relating to the recruitment and training of VTS operators.

He noted that demographic trends, competition for maritime professionals and changing career expectations are likely to reduce the number of candidates with traditional seagoing experience. Against this background, he considered how increasing digitalisation and evolving operational requirements may influence future training needs.

He emphasised the challenge of maintaining high operational competence while adapting to a reduced and more diverse pool of applicants. Possible responses included the development of alternative training pathways, new competence models, increased use of simulation and digital learning environments and closer cooperation between training institutions and VTS organisations.

The presentation stressed the importance of proactive planning to ensure the continued availability of suitably qualified personnel.

8.4 Challenges in Education: Influx of New Students, Limited Availability of Coaches, and Automation in Education – Bas Struijk, NNVO, Netherlands

Bas Struijk of NNVO addressed human factors in VTS, with particular emphasis on fatigue.

He noted that human error is a significant contributing factor in maritime incidents and highlighted that fatigue can have a critical impact on operator performance. He distinguished between stress and fatigue, noting that fatigue can significantly reduce the ability to process information and make decisions.

The presentation identified fatigue as a key operational risk and noted the need for training and operational practices to take its impact into account.

9. FOCUS GROUPS

To support the objectives of the seminar, participants were organised into focused discussion groups addressing operations, training and equipment.

The purpose of the focus groups was to identify key issues and challenges, share examples of effective practice and consider potential tasks for inclusion in the future work programme. Outputs from the discussions were intended to contribute directly to the seminar conclusions and subsequent committee work.

Each group drew on the presentations and discussions held during the seminar and focused on practical experience and operational outcomes. Participants were encouraged to contribute actively, with discussions

structured to allow both reflection on the topics presented and the introduction of additional issues considered relevant by participants.

Facilitators guided the discussions, ensuring that contributions remained balanced, focused and structured and that key points were captured. The role of the facilitator was to support discussion rather than to provide formal conclusions during the session.

The discussions were structured around a number of guiding questions, including identification of the main challenges in each area, recognition of practices that were effective and could be shared more widely, identification of gaps in existing guidance and consideration of areas where further work may be required.

Each group recorded its outputs in a structured format, focusing on clarity and usefulness. These outputs included identified issues, examples of best practice and proposed tasks for future work. The detailed notes from the focus groups are included in Annex C to this report.

On the final day of the seminar, each group presented a summary of its findings to participants, highlighting the main conclusions and proposed tasks.

9.1 From Ideas to Proposals - Operations group facilitators: Kevin Vervoort, Rob Clay

The operations focus group examined practical challenges affecting communication, workload and operational resilience in VTS environments, drawing on both seminar presentations and participant experience.

A central theme was communication. Participants noted that Standard Marine Communication Phrases remain an essential tool, but are not sufficient in isolation to address current challenges. The effectiveness of communication was considered to depend significantly on the level of English language proficiency among seafarers, as well as the consistent application of VTS phraseology. While support was expressed for maintaining message markers, some participants observed that their use may affect efficiency in high-density traffic situations. The potential need to review and adapt existing communication practices to reflect modern operational conditions was identified.

The group also considered the increasing role of digital technologies in communication. AI-supported translation and digital communication tools were discussed, with general interest in their potential to support operations, while noting concerns regarding interoperability and the importance of maintaining direct voice communication between ship and shore. Participants emphasised that voice communication remains critical, particularly in situations involving ambiguity or non-standard scenarios.

Workload and fatigue were identified as significant and widespread challenges. Participants noted variations between organisations in terms of watch schedules, staffing levels and fatigue management practices, with no common international approach. Workload was considered a key factor contributing to fatigue, with particular concern regarding the cumulative effects of shift work and the importance of recovery and sleep quality.

A number of examples of practice were shared. These included the use of additional support roles to reduce administrative burden on operators, trials of fatigue monitoring and psychosocial health assessment and the use of workload evaluation tools. Some organisations reported identifying vessels with communication difficulties in advance to support more effective interaction. The value of operational experience and local knowledge in managing communication challenges was also emphasised.

The discussion identified several areas where further work may be required. These included review of communication practices and training, particularly in relation to language proficiency, further work on fatigue and workload management and improved clarity in operational procedures under evolving international

guidance. Participants also noted the need for continued research to support evidence-based approaches to staffing, workload and human performance.

The group identified potential tasks for future work, including consideration of communication practices in the context of emerging technologies and further investigation of fatigue, workload and staffing in VTS operations.

Annex C provides the detailed record of the operations group discussion, including specific issues, examples and proposed tasks.

9.2 From Ideas to Proposals - Training group facilitators: Stefaan Priem, Keeta Rowlands

The training focus group examined current and future challenges in VTS training, with particular attention to competence, recruitment, standardisation and the integration of emerging technologies.

A key area of discussion was the need to adapt training to reflect evolving operational risks. Participants highlighted the increasing relevance of AIS spoofing and GNSS disruption, noting that training on detection, validation and response should be strengthened. The need for supporting guidance on VTS response to such scenarios was also identified.

The group also considered the effectiveness of current training approaches. The issue of divergence between performance in the training environment and operational practice was raised, with participants noting that standards may not always be sustained once operators are in service. Approaches to address this included periodic revalidation, peer evaluation, structured use of case studies and the use of recorded communications to support self-assessment.

Recruitment and entry requirements formed a significant part of the discussion. Participants noted the ongoing reduction in applicants with traditional nautical backgrounds and considered the implications for training. Views were expressed on the need to differentiate training pathways for candidates with and without maritime experience, including the development of dedicated courses to address gaps in nautical knowledge. The potential role of aptitude testing, cognitive assessment and language testing in recruitment processes was also discussed.

The structure and delivery of training were also examined. Interest was expressed in the continued development of e-learning and remote training approaches, supported by recent work on guidelines in this area. At the same time, participants noted constraints on instructor availability, particularly where instructors also perform operational roles and highlighted variation in training duration across organisations.

The group also identified challenges related to governance and standardisation. These included the need for greater clarity in the accreditation of training organisations and the approval of courses, particularly where training is delivered across national boundaries. The role of the competent authority in these processes was identified as requiring further clarification.

Examples of practice were shared, including the development of national entry routes with differentiated training pathways, the provision of additional nautical knowledge courses, the inclusion of spoofing scenarios in operational procedures and training and the use of incident databases to support learning. Participants also highlighted the value of developing structured collections of operational cases to support training, while avoiding attribution of fault.

The discussion identified a number of areas for further work. These included updating model courses to reflect emerging operational challenges, particularly in relation to AIS and GNSS vulnerabilities, reviewing training approaches for different types of candidates and strengthening frameworks for accreditation and course approval. The potential development of shared incident-based learning resources was also identified.

A number of potential tasks were proposed for future work, including the update of model courses, the development of structured incident-based training material and revision of guidance relating to training governance and accreditation.

Annex C provides the detailed record of the training group discussion, including specific issues, examples and proposed tasks.

9.3 From Ideas to Proposals - Training Equipment group facilitators: Richard Aase, Esa Kallio

The equipment focus group examined emerging challenges associated with the development and integration of VTS systems, with particular emphasis on complexity, digitalisation and the role of new technologies.

A central theme was the increasing complexity of VTS environments, driven by the integration of multiple systems, services and external data sources. Participants noted that many existing systems are required to interface with a growing number of data inputs, creating challenges in system design, interoperability and operational usability. In this context, there was broad support for the development of modular system architectures, distinguishing between core operational systems and additional extension services, to support flexibility and manage lifecycle challenges.

The group also considered the growing role of artificial intelligence in VTS. Participants recognised the potential of AI to support situational awareness and reduce operator workload, but noted that its effective implementation depends on trust, transparency and data quality. The importance of explainability was emphasised, with participants noting that operators must be able to understand and validate system outputs. Concerns were also raised regarding governance, including data management, accountability and system integration.

Operational resilience remained a prominent theme, particularly in relation to GNSS interference, AIS spoofing and wider cybersecurity risks. These issues were recognised as continuing challenges requiring both technical and procedural responses. Participants noted that guidance in these areas remains limited and may need to be further developed.

The discussion also emphasised the importance of human-centred design in system development. Examples of practice included the use of layered information presentation to ensure that operators are provided with relevant information at appropriate levels of detail and the application of design principles aimed at reducing cognitive load. Experience to date suggested that successful implementation of advanced technologies, including AI, requires gradual introduction, sufficient operational data and continuous learning.

Participants identified several areas where further work may be required. These included the development of guidance on modular VTS architectures and system integration, operational guidance on the use of artificial intelligence and further work on detection and mitigation of spoofing and GNSS interference. Additional topics identified included digital voice communications, VoIP technologies and the potential impact of future communication systems.

The group also highlighted the need for closer coordination between operational, training and equipment perspectives when developing future VTS capabilities, particularly for cross-cutting issues such as artificial intelligence and digitalisation.

Potential tasks for future work included the update of guidance on the use of artificial intelligence in VTS, including human-centred design considerations and the development of guidance addressing modular system architectures and integration principles.

Annex C provides the detailed record of the equipment group discussion, including specific issues, examples and proposed tasks.

10. SESSION 7 – SEMINAR RESULTS, CONCLUSIONS AND NEXT STEPS

Trond Ski, Vice-Chair of the VTS Committee, presented the consolidated conclusions of the seminar, drawing on the outputs from the plenary sessions and focus group discussions.

He thanked participants for their active contributions throughout the seminar, noting that the quality of discussion and exchange had enabled the identification of key issues, examples of practice and areas for future work.

Participants were invited to comment on the draft conclusions. No comments were raised and the conclusions were therefore agreed by the seminar.

He explained that the agreed conclusions would be submitted to the VTS Committee for consideration. The identified tasks and proposals would be reviewed as part of the Committee's work planning process and, where appropriate, developed further for inclusion in the next work programme.

The seminar conclusions are:

1. Consider establishing a forum for operational personnel to exchange practical experience and identify common challenges.
2. Contribute to the ENG work on resilient PNT, including the development of VTS-specific guidance on GNSS interference.
3. Consider enabling the structured exchange of lessons identified, incidents and near misses, using a mechanism such as a shared database or library.
4. Consider how to highlight the positive effects of VTS and develop approaches for measuring its impact.
5. Contribute to ongoing work at IMO on SMCP, recognising the importance of effective ship–shore communication standards at both ends.
6. Maintaining operational standards in real-world conditions remains an ongoing challenge and consideration should be given on how to maintain standards between training.
7. Continue to monitor and provide guidance on the role of VTS specifically regarding the interaction with MASS.

10.1 Closing remarks – Julián Camus Bergareche, Director of Jovellanos Training Centre

Julián Camus Bergareche, Director of the Jovellanos Training Centre, closed the seminar on behalf of the host organisation.

He thanked participants for their engagement throughout the seminar and noted the value of bringing together operational experts, trainers and technical specialists to exchange experience and address shared challenges.

He noted the importance of continued cooperation and knowledge sharing in support of maritime safety and acknowledged the contribution of the speakers, facilitators and organisers.

He thanked participants for attending the event in Gijón and expressed the hope that the discussions and outcomes would support further work within the VTS community.

10.2 Closing the Seminar – Omar Eriksson, IALA Deputy Secretary-General

Omar Eriksson, Deputy Secretary-General, closed the seminar on behalf of IALA.

He thanked the Spanish Maritime Rescue and Safety Agency and the Jovellanos Training Centre for hosting the seminar and for their support in its organisation. He also expressed appreciation to all participants for their contributions to the discussions and focus group work.

He noted the importance of the outputs generated, including the agreed conclusions and proposed tasks and confirmed that these would be taken forward within the Committee structure to support future work.

He closed by thanking participants for their contribution to the seminar and wished them a safe return.

10.3 Review workshop report

The report was reviewed and agreed by correspondence.

11. SOCIAL EVENTS AND TECHNICAL VISIT

11.1 Icebreaking event - ABBA Hotel, Gijón



An icebreaking event was held at the ABBA Hotel in Gijón, providing participants with an opportunity for informal exchange at the start of the seminar.

The reception took place on the rooftop, allowing participants to engage in discussion while overlooking the city at sunset. Local food, including cheese and charcuterie, was provided alongside drinks and canapés. The event supported networking and initial interaction between participants in an informal setting.

The event was well received and helped establish informal contact between participants before the technical programme began.

Visit to historical Gijón

A guided visit of the city of Gijón was organised, with participants divided into two groups.

The visit provided an overview of the historical development of the city, from its origins to the modern period and offered an additional opportunity for informal exchange among participants outside the seminar programme. It provided a welcome complement to the technical programme.



11.2 Traditional regional dinner - Llagar "El Trole"



A traditional regional dinner was held at Llagar “El Trole”, an historic Asturian cider house located in the outskirts of Gijón, in the countryside of the parish of Cabueñes.

The building, originally constructed in 1935 as a cider press, reflects the region’s cider-making heritage.

Participants were introduced to local cuisine and cider practices, providing an opportunity to experience regional culture in an informal setting. The event also supported continued networking and exchange among participants outside the formal seminar programme.

Last name	First name	Country	Organisation	Email
Aase	Richard	Norway	Norwegian Coastal Administration	richard.aase@kystverket.no
Affonso	Taise	Brazil	TechnipFMC	taiseleao@gmail.com
Ait Oualil	Adil	Morocco	Tanger Med Port Authority - TMPA	a.aitoualil@tangermed.ma
Alvarez Matias	Fernando	Spain	EPE Sociedad de Salvamento y Seguridad Maritima	fernandoam@centrojevellanos.es
Barbosa	Felipe	Brazil	Porto do Açu Operações SA	felipe.barbosa@portodoacu.com.br
Bellanger	Thierry	Belgium	Port of Antwerp - Bruges	thierry.bellanger@portofantwerpbruges.com
Bibik	Lukasz	Portugal	European Maritime Safety Agency	Lukasz.BIBIK@emsa.europa.eu
Borgani	Diego Rodolfo	Argentina	Consorcio de Gestion del Puerto de Bahia Blanca (CGPBB)	dborgani@puertobahia blanca.com
Bosque Morán	Martín	Spain	Signal Software	mbosque@signalsoftware.es
Camus	Julián	Spain	SASEMAR	juliancb@centrojevellanos.es
Cankar	Ziva	Slovenia	Slovenian Maritime Administration	ziva.cankar@gov.si
Casado	Jose	Spain	Directorate General for the Merchant Marine	jasadom@transportes.gob.es

Last name	First name	Country	Organisation	Email
Charri	Said	Morocco	Ministry of Transport and Logistics - Directorate of the Merchant Marine	s.charri@transport.gov.ma
Christians	Olaf	Germany	Airbus Defence and Space	olaf.christians@airbus.com
Chwialkowski	Marcin	Poland	Maritime Office in Gdynia, Poland, Vessel Traffic Service Zatoka Gdanska	khwial@wp.pl
Clay	Robert	United Kingdom	VTSA	robert.clay@pla.co.uk
Del Frade de Blas	Hernán	Spain	DGMM / MITMA	hjdelfrade@transportes.gob.es
Díaz Ramos	Álvaro	Spain	EPE Sociedad de Salvamento y Seguridad Maritima	alvarodr@centrojavellanos.es
Dreijer	Malin	Norway	Norwegian Coastal	malin.dreijer@kystverket.no
El Haidahat	Abdellah	Morocco	National ports agency	
Erdogan	Mehmet	Türkiye	Directorate General of Coastal Safety	erdogan.mehmet@kiyiemniyeti.gov.tr
Erlevent	Burçin	Türkiye	DGCS	berlevent@gmail.com
F. Salinas	Carlos	Spain	EPE Sociedad de Salvamento y Seguridad Maritima	carlosfsalinas@centrojavellanos.com

Last name	First name	Country	Organisation	Email
Fernández	Azahara	Spain	SASEMAR	azaharafergo@gmail.com
Fernandez Barro	Ruben	Spain	Colegio Oficial Nacional de Prácticos de Puerto de España	rubenfb@practicosdevalencia.com
Fernández Martínez	Silvia	Spain	SASEMAR	silviafm@sasemar.es
Fernandez Rodriguez	Alberto	Spain	Salvamento Marítimo	albertofr@sasemar.es
Ferr	Mohamed Yacine	Algeria	Harbour master Algeirs port	ferryacinebb2@gmail.com
Figueiredo	Vasco	Portugal	Administração dos Portos de Sines e do Algarve, S.A.	vasco.mvfigueiredo@gmail.com
Fine	Mathew	USA	US Coast Guard	matt_fine@hotmail.com
Flatnes	Roar	Norway	Jotron	roar.flaatnes@jotron.com
Garrote	Alejandra	Spain	SASEMAR	
González Infanzón	Lara	Spain	Centro Jovellanos	
Guarch	Javier	Canada	Wärtsilä Voyage Canada	javier.guarch@wartsila.com
Guilherme	Edvagner	Brazil	VITÓRIA VTS - VPORTS PORT AUTHORITY	
Guy	Antony	United Kingdom	Port of London Authority	tony.guy@pla.co.uk
Halttunen	Mika	Finland	Fintraffic Vessel Traffic Services Ltd	mika.halttunen@fintraffic.fi
Hartonen	Sinikka	Norway	Kongsberg Norcontrol AS	sinikka.hartonen@knc.kongsberg.com

Last name	First name	Country	Organisation	Email
Humphrey	Scott	USA	Marine Exchange of San Francisco Bay Region	scotth@sfmtx.org
Ingo	Sofia	Finland	Fintraffic Vessel Traffic Services Ltd	sofia.ingo@fintraffic.fi
Jacobs	Scott	USA	US Coast Guard	scott.c.jacobs@uscg.mil
Jonker	Richard	Netherlands	Tidalis B.V.	richard.jonker@tidalis.com
Kallio	Esa	Finland	Fintraffic Vessel Traffic Services Ltd	esa.kallio@fintraffic.fi
Kizilelma	Abdullah	Türkiye	Directorate General of Coastal Safety	abdullahkizilelma@hotmail.com
Kuiper	Luuk	Netherlands	Tidalis B.V.	luuk.kuiper@tidalis.com
Landi	Michele	Italy	Italian Coast Guard	michele.landi@mit.gov.it
Larue	Johann	France	Airbus Defence and Space	johann.larue@airbus.com
Liverud	Kenneth	Norway	Norwegian Coastal Administration	kenneth.liverud@kystverket.no
Llado Granado	Jorge Ramon	Spain	TRAFICOPORT	jorllagra@gmail.com
Lobeto López	Juan Tomás	Spain	EPE Sociedad de Salvamento y Seguridad Maritima	jtomasll@sasemar.es
Lopez Marin	Patricia	Spain	SASEMAR	patricialm@sasemar.es
Lopez Solano	Azucena	Spain	EPE Sociedad de Salvamento y	atzunami@hotmail.com

Last name	First name	Country	Organisation	Email
			Seguridad Maritima	
Maceiras	Candela	Spain	SASEMAR	candelariamt@sasemar.es
Maraver Romero	José Cristóbal	Spain	EPE Sociedad de Salvamento y Seguridad Maritima	jcristobalmr@sasemar.es
Marchesi Rangel	Gustavo	Brazil	VITÓRIA VTS - VPORTS PORT AUTHORITY	gmarchesi@vports.com.br
Mariné Royo	Edgar	Norway	Kongsberg Norcontrol AS	
Martínez Casero	Alba	Spain	Colegio Oficial Nacional de Prácticos de Puerto de España	supervisor@valenciaportcontrol.es
Menabene	Gian Luca	Italy	Italian Coast Guard	Gianluca.menabene@mit.gov.it
Mendez	Pablo	Spain	PORT AUTHORITY OF SANTA CRUZ OF TENERIFE	
Modic	Andrej	Slovenia	Slovenian Maritime Administration	andrej.modic@gov.si
Música Caso	Jose Luis	Spain	Signal Software	jlmugica@signalsoftware.es
Naustdal Hjelm	Kasper	Norway	Jotron	kasper.hjelm@jotron.com
Naya	Aida	Spain	SASEMAR	aidanv@sasemar.es
Olsen	Knut	Norway	Norwegian Coastal Administration	knut.olsen@kystverket.no
Pérez	Jana	Spain	SASEMAR	

Last name	First name	Country	Organisation	Email
Priem	Stefaan	Belgium	Agency of Maritime Services and Coast	stefaan.priem@mow.vlaanderen.be
Régalado	César	Spain	VTs AP Tenerife Operator	cregalado@puertosdetenerife.org
Rodriguez-Carbonell	Sergio	Spain	EPE Sociedad de Salvamento y Seguridad Maritima	SERGIORC@SASEMAR.ES
Rojo Díaz	Raquel	Spain	EPE Sociedad de Salvamento y Seguridad Maritima	raquelrd@centrojavellanos.es
Romero Cuesta	Alfonso	Spain	TRAFICOPORT	amromcue@gmail.com
Rosenqvist	Jan	Finland	Fintraffic Vessel Traffic Services Ltd	jan.rosenqvist@fintraffic.fi
Rostopshin	Dmitry	Finland	DiNav Marine Oy	dmitry.rostopshin@dinav.fi
Rowlands	Keeta	United Kingdom	Maritime & Coastguard Agency	keeta.rowlands@mcga.gov.uk
Salahovic	Admir	Spain	Indra Sistemas SA	admir@indra.es
Shepherd	Nicholas	United Kingdom	Harwich Haven Authority	nick.shepherd@hha.co.uk
Ski	Trond	Norway	Norwegian Coastal Administration	trond.ski@kystverket.no
Souto	Tauane	Brazil	Porto do Açú Operações SA	tauane.souto@portodoacu.com.br

Last name	First name	Country	Organisation	Email
Struijk	Bas	Netherlands	NNVO – Dutch VTS Training Foundation	bstruijk@nnvo.nl
Suárez	Covadonga	Spain	SASEMAR	covadongasa@centrojevellanos.es
Talvia	Tom	Finland	Fintraffic Vessel Traffic Services Ltd	tom.talvia@fintraffic.fi
Thurston	William	United Kingdom	Harwich Haven Authority	wthurston43@gmail.com
Torres García	Jorge Amalio	Spain	SASEMAR	jorgetorresgarcia99@hotmail.com
Ugreninov	Jan Harald	Norway	Norwegian Coastal Administration	jan.harald.ugreninov@kystverket.no
Uyà	Àfrica	Spain	Universitat Politècnica de Catalunya - BarcelonaTech (UPC)	africa.uya@upc.edu
Van Den Bogerd	Toon	Belgium	Port of Antwerp - Bruges	toon.vandenbogerd@portofantwerpbruges.com
Van Reet	Jill	Belgium	Agency for Maritime and Coastal Services	jill.vanreet@mow.vlaanderen.be
Vervoort	Kevin	Belgium	Port of Antwerp - Bruges	kevin.vervoort@portofantwerpbruges.com
Viljanen	Mareena	Finland	Finnish Transport Infrastructure Agency	mareena.viljanen@fintraffic.fi
Villar	Rosa	Spain	EPE Sociedad de Salvamento y	

Last name	First name	Country	Organisation	Email
			Seguridad Maritima	
Villazon Alvarez	Paloma	Spain	SASEMAR	mpalomava@centrojoventianos.es
Witt	Uwe-Michael	Germany	kontor06.de	umichaw@icloud.com
Zamora	Estefanía	Spain	EPE Sociedad de Salvamento y Seguridad Maritima	estefania.zamora.fernandez@gmail.com

ANNEX B TECHNICAL PROGRAMME

Monday, 1st June 2026

Time	Activity	Venue
20:30	Icebreaking event – dress code: casual	ABBA Hotel, Gijón

DAY 1 – Tuesday, 2nd June 2026

Time	Activity	Chair / Speaker
09:00 – 10:00	Registration at the venue - Jovellanos Training Centre	
10:00 - 11:00	Session 1 – Opening and setting the scene	Chair: Trond Ski, VTS Committee Vice-Chair
10 mins	Health and Safety brief	Jovellanos Training Centre
10 mins	Welcome	José Luis García Lena, Director of Spanish Maritime Rescue and Safety Agency
10 mins	Opening address	Omar Eriksson, IALA Deputy Secretary-General
10 mins	Seminar introduction, format and objective	Trond Ski, VTS Committee Vice-Chair
20 mins	AIS spoofing and GNSS Interference	Lukasz Bibik, EMSA
11:00 – 11:30	Coffee break and family photo	
11:30 – 13:00	Session 2 – Presentations on current operational experiences	Chair: Trond Ski, NCA
20 mins	Operational Pressures in Vessel Traffic Services	Rob Clay, VTS Supervisor, UK VTS Association
20 mins	VTS Operations and Incident Response in Türkiye	Abdullah Kizilelma, Directorate General of Coastal Safety, Türkiye
20 mins	VTS operations in the Port of Antwerp and Bruges	Kevin Vervoort, Port of Antwerp - Bruges
20 mins	Winter navigation in the Bay of Bothnia	Sofia Ingo, Tom Talvia, Fintraffic
10 mins	Q&A	
13:00 – 14:00	Lunch	
14:00 – 15:30	Session 3 – Presentations on current equipment and risk analysis tools	Chair: Richard Aase, NCA
20 mins	AIS Spoofing Challenges / GNSS Disturbances in the Gulf of Finland	Esa Kallio, Fintraffic
20 mins	What is possible with current VHF band and modern VHF radios?	Roar Flaates, Jotron, Norway
20 mins	Risk Assessment in the Strait of Gibraltar (SIRA Model)	Said Charri, Tangier Traffic VTS, Morocco
20 mins	Use of IWRAP in VTS areas relating to procedures and day to day operations	José Maraver, Tarifa VTS, Spain
10 mins	Q&A	
15:30 – 16:00	Coffee break	

Report on the Seminar on VTS Experiences and Challenges

16:00 – 17:30	Session 4 – Presentations on current training experiences	Chair: Stefaan Priem, MDK, Belgium
20 mins	From training room to reality: where standards fade	Jill Van Reet, VTS Zandvliet, Belgium
20 mins	VTS Training in Spain: Present and Future	Raquel Rojo Diaz, Jovellanos Training Centre
20 mins	The 4 Pillars of VTS Responsibility: Delivery, Information, Authorization and Omission	Michele Landi, Italian Coast Guard
20 mins	Human Factors Relating to VTS Personnel	Andrej Modic, Koper VTS, Slovenia
10 mins	Q&A	
17:30	Day summary and close	Trond Ski
Free time		

DAY 2 – Wednesday, 3rd June 2026

Time	Activity	Chair / Speaker
09:00 - 10:30	Session 5 – Presentations on VTS operational challenges for the future	Chair: Thomas Southall, IALA
20 mins	VTS, MASS and COLREGs, a need for understanding	Carlos Salinas, Jovellanos Training Centre
20 mins	Future Ship reporting system in European waters	José Casado, Directorate General of the Merchant Marine, Spain
20 mins	The New “VESSEO” Project in Turkish Straits and Emergency Mobile VTS Stations at Istanbul VTS.	Mehmet Erdoğan, Directorate General of Coastal Safety, Türkiye
20 mins	VTS in the era of MASS: some considerations on autonomous vessels and traffic services	Hernán del Frade, Directorate General for the Merchant Marine, Spain
10 mins	Q&A	
10:30 - 10:45	Coffee break	
10:45 - 12:15	Session 6 – Presentations on VTS equipment challenges for the future	Chair: Richard Aase, NCA
20 mins	New generation of VTS	Javier Guarch, Wartsila
20 mins	Explainable AI	Sinikka Hartonen, Kongsberg
20 mins	Modern VTS systems and the evolving role of digital technologies in supporting VTS day to day operations	Richard Jonker, TIDALIS
20 mins	The Evolution of VTS: From Challenges to Solutions	Dmitry Rostopshin, DiNav Marine
10 mins	Q&A	
12:15 – 13:15	Visit to Jovellanos Training Centre facilities	
13:15 – 14:00	Lunch	
14:00 – 15:30	Session 7 – Presentations on VTS training challenges for the future	Chair: Michele Landi, Italian Coast Guard
20 mins	New technologies applied to improve VTS training	Martín Bosque, Signal Software S.L., Spain

20 mins	From Generic to Formalized Training: Standardization of a Competency-Based Model Course for Vessel Traffic Services Operators	Burçin Erlevent, Directorate General of Coastal Safety, Türkiye
20 mins	Basic Training of VTS Operators in the Future	Mika Halttunen, Fintraffic
20 mins	eLearning in VTS training	Bas Struijk, NNVO, Netherlands
10 mins	Q&A	
15:30 - 16:00	Coffee break	
16:00 – 17:30	Focus groups Ops, Training and Equipment	Operations group facilitators: Kevin Vervoort, Rob Clay Training group facilitators: Stefaan Priem, Keeta Rowlands Equipment group facilitators: Richard Aase, Esa Kallio
19:00 – 20:00	Visit to historical Gijón	
21:00	Traditional regional dinner, dress code: casual	Llugar "El Trole" via provided transportation

DAY 3 – Thursday, 4 June 2026

Time	Activity	Chair / Speaker
30 mins	From Ideas to Proposals - Operations	Operations group facilitators: Kevin Vervoort, Rob Clay
30 mins	From Ideas to Proposals - Equipment	Training group facilitators: Stefaan Priem, Keeta Rowlands
30 mins	From Ideas to Proposals - Training	Equipment group facilitators: Richard Aase, Esa Kallio
10:30 - 11:00	Coffee break	
20 mins	Seminar results, conclusions and next steps	Trond Ski, VTS Committee Vice-Chair
20 mins	Closing remarks	Director of Jovellanos Training Centre
10 mins	Closing the Seminar	Omar Eriksson, IALA Deputy Secretary-General

Focus Group

Operations

Facilitators

Robert Clay, Kevin Vervoort

1. Key Issues Noted

- SMCPs remain important but are not considered the complete solution to communication challenges. The main issue appears to be the level of English proficiency and understanding among seafarers as well as VTS phraseology.
- There was support for maintaining message markers, although some participants felt they can slow communications in high density traffic situations. Current SMCPs may require updating and adaptation to modern operations.
- AI assisted translation and digital communications generated significant discussion. A small majority supported the concept, although concerns remain regarding interoperability and maintaining direct ship to shore communications.
- Fatigue management, watch schedules and workload vary significantly between organisations, with no internationally agreed standards for shift lengths, rest periods or staffing levels.
- Workload was identified as a major contributor to fatigue. Participants highlighted the need for better workload assessment tools and consideration of support roles and AI assistance.

2. Examples of Best Practice

- Brazil employs additional VTS assistants to reduce administrative workload and provide operators with relief periods.
- Several organisations have conducted fatigue studies, including Tangier Med, which intends to share its findings with IALA.
- The United States is evaluating 8 hour watch systems and command centre operations to assess the impact on fatigue and work life balance.
- Turkey formally identifies vessels with poor communication abilities, allowing operators to adapt their communications accordingly.
- Belgium (Port of Antwerp-Bruges) POAB conducted a trial period on psychosocial health among VTS employees using Fitbits and submitted an input paper on this topic at a previous VTS committee meeting.
- Use of questionnaires and workload assessment tools, is being applied to evaluate operator workload and psychosocial health.

3. Gaps or Areas Requiring Further Work

- Review and update of SMCPs and message markers to reflect current operational realities and technological developments.
- Assessment of minimum English language standards and training requirements for STCW personnel.
- Development of guidance and/or minimum recommendations for fatigue management, workload assessment, watch schedules and staffing levels. However, this was recognised to be approached at a local level.
- Need for additional research into the health effects of shift work and fatigue on VTS personnel. Again, possibly at local level but suggestibly endorsed by IALA.

- Better clarification of operational procedures and service provision under the new IMO guidelines, particularly regarding differing levels of VTS service.

4. Potential Tasks for the Next Work Programme

Task 1

- Description: Review the effectiveness and applicability of SMCPs and message markers, including the impact of emerging technologies and AI assisted communications.
- Expected Output: Technical study and possible guideline update, including recommendations to IMO regarding English language competency and training standards.
- Suggested Contact: Istanbul VTS, VTSA, IALA VTS Committee

Task 2

- Description: Investigate fatigue management practices, workload assessment methodologies and minimum staffing recommendations for VTS operations.
- Expected Output: Possible guidance addressing fatigue at local level, shift patterns, workload and staffing considerations.
- Suggested Contact: POAB, Tangier Med, Fin traffic, VTS authorities with existing fatigue studies.

5. Headline Points

- SMCPs remain essential but may require updating and improved seafarer training rather than wholesale replacement.
- Fatigue management and workload are common challenges, with no internationally agreed standards currently in place.
- AI offers opportunities to support communications and reduce workload but should complement rather than replace voice communications.
- Workload and staffing levels should be reassessed using evidence based approaches.
- New IMO service definitions may require updated international operational procedures.

6. Additional Notes

- Voice communications remain important, particularly when dealing with misunderstandings or nonstandard situations, rather than using the USA suggestion of having AI create transcripts to replace VHF comms.
- Sleep quality and recovery were considered more important than simply providing breaks between shifts.
- Several participants expressed concern that written or AIS based instructions are not always monitored by bridge teams.
- Experience and local knowledge continue to play a significant role in communication effectiveness.

Focus Group

Training

Facilitators

Stefaan Priem and Keeta Rowland

1. Key Issues Noted

- VTS training on AIS spoofing: detection, validation and response. (SESSION 1, Lukas Bibik). Guidance for VTS response to hybrid threats would be welcomed (SESSION 3, Esa Kallio)
- The concept of Library of incidents (SESSION 2, Rob Clay)
- Fading standards from training room to reality (SESSION 4, Jill Van Reet) How to address this during revalidation training?
- Nautical background required yes/no (came up throughout different discussions, also in SESSION 7 by Mika). Burcin: separate model course for maritime background and non-maritime background.
- How to address decreasing numbers in applicants with nautical background (SESSION 7 by Mika). How about age limit for applicants for VTS training.
- E-learning (Tauane, Porto do Açú) -> GL on remote training has been developed.
- Bas: instructors are VTS operators as well. Availability is very limited.
- Jill: different length in training.
- Accreditation and approval of model courses. Approval of foreign training organizations. To be included in future revision 1014.
- Recruitment process: test in aptitudes and cognitive tests.

2. Examples of Best Practice

- UK Entry route: C0103-1 has nautical knowledge. One entry group is without nautical knowledge for mariners. Other group is with nautical knowledge because they don't have a maritime background.
- Belgium developed a nautical knowledge course based on C103-1.
- Spoofing. NL: awareness raised on AIS spoofing. EMSA is doing interesting work on it with. US: know who to call when spoofing is being detected. FINLAND: is included in SOPs as well as in OJT via the operational manual.
- Commission of DG Move: database of incidents
- Burçin: training specific for tasks of VTS (A, B, C, ...)? => should be designed by the C0103-2 and associated task book.

3. Gaps or Areas Requiring Further Work

- Availability of a nautical knowledge course? Different model course for trainees without/with a nautical background. Even with a fixed numbers (Burcin)

- Accreditation scheme and approval of training organizations. Revision of 1014 is necessary, also approval of courses delivered by another country. Role of competent authority needs to be clear.
- Aptitude test (apart from the guideline) and age limit on recruitment? Also language test (should be covered by IELTS).
- Update of C0103-1 model course with attention to spoofing of AIS and GNSS.
- List of cases that are relevant to VTS training. Exists in Safe Sea Net. (CHIRP in the UK)
- Fading standards. TAUANE: periodic evaluation by the peers. Keep a close eye on them. Jill: Jill: case studies with operators listening to themselves. Bas: trajectory with career path depending on how they perform. Scott: internal evaluation and external evaluation.

4. Potential Tasks for the Next Work Programme

(Keep these clear and practical where possible)

Task 1

- Description: Update C0103-1 model course with latest VTS challenges (AIS/GNSS spoofing, S100 standards)
- Expected output (e.g. guideline update, technical note, study): model course update
- Suggested contact (if applicable): Stefaan Priem – Michele Landi

Task 2

- Description: Identification and listing of major maritime incidents relevant for VTS operator training.
- Expected output: study (?)
- Suggested contact (if applicable): Jillian Carson Jackson – Stefaan Priem

Task 3

- Description: update of IALA G1014 to update the role of the Competent Authority in the accreditation of VTS training organizations and the approval of VTS training courses.
- Expected output: updated guideline
- Suggested contact: Kerrie Abercrombie

5. Headline Points

(3–5 short points to support plenary feedback and consolidation)

- The inclusion of training on AIS/GNSS spoofing in the C0103 model course program and verify whether other IALA guidance is required.
- Revise if the C0103 model course program still fits for both mariners and non-mariners entering VTS training.
- Consider the development of list of incidents that may be beneficial in VTS training (learning, no naming or shaming)

6. Additional Notes (if relevant)

Recruitment process to be supplemented with the new guideline on aptitudes for VTS operators. Verify whether this is sufficient to enhance recruitment processes.

Focus Group

Equipment

Facilitators

Esa Kallio, Richard Aase

1. Key Issues Noted

- Increasing complexity caused by integration of multiple systems, services and external data sources.
- Need for modular VTS architectures, including distinction between core systems and extension systems.
- Growing interest in AI in VTS operations, accompanied by concerns regarding trust, explainability, governance and data quality.
- GNSS interference, AIS spoofing and cyber security remain significant operational concerns.
- Need for stronger coordination between operational, training and equipment perspectives when developing future VTS capabilities.

2. Examples of Best Practice

- Human-centred design principles focusing on presenting only relevant information to operators.
- Layered information presentation, allowing users to access different levels of detail according to operational need.
- Preference for locally managed AI solutions where data security and governance requirements are high.
- Early experiences indicate that successful AI implementation requires patience, continuous learning and sufficient operational data.

3. Gaps or Areas Requiring Further Work

- Lack of guidance on modular VTS system architecture and integration of external services.
- Need for operational guidance on AI use in VTS, including explainability and trust.
- Limited guidance related to spoofing detection and mitigation of GNSS disturbances.
- Missing guidance concerning digital voice communications, VoIP technologies and future 6G capabilities.
- Need for ensuring operational alignment between IALA committees on cross-cutting topics such as AI and digitalisation.

4. Potential Tasks for the Next Work Programme

(Keep these clear and practical where possible)

Task 1

Description:

Update guidance on the use of AI in VTS, including explainability and human-centered design principles.

Expected output:

Guideline update (G1178)

Suggested contact (if applicable):

DTEC Committee in cooperation with VTS Committee and relevant policy groups.

Task 2

Description:

Develop guidance on modular VTS architectures, including core systems, extension systems, integration principles, dependencies and lifecycle management.

Expected output:

Technical guideline or architecture framework.

Suggested contact (if applicable):

DTEC Committee with participation from equipment manufacturers.

5. Headline Points

(3–5 short points to support plenary feedback and consolidation)

- Future VTS development should remain human-centred, with technology reducing operator workload.
- AI presents significant opportunities but requires trust, explainability and strong governance.
- Modular architectures offer flexibility but require clearer guidance and documentation.
- Resilience against GNSS interference, AIS spoofing and cyber threats remains a priority.
- Stronger collaboration between Operations, Training and Equipment communities is essential for successful implementation.

6. Additional Notes (if relevant)

- Discussion highlighted interest in common specifications for digital services.
- Participants noted the importance of maintaining awareness of rapidly evolving technologies and ensuring that IALA remains responsive to technological developments.
- Voice communication technologies and future mobile communication networks (5G/6G) were identified as emerging topics requiring further consideration.



10, rue des Gaudines – 78100 Saint Germain en Laye, France

Tel. +33 (0) 1 34 51 70 01 – contact@iala.int

www.iala.int

International Organization of Marine Aids to Navigation