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| IALA Guideline |

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Guideline on VTS Digital Communications – DRAFT 2024-03-14

For VTS56:

* Revise Pictures
* Rename/change the “Part A,B,C,D” part
* Revise S100
* Revise “document purpose”
* Revise Route exchange part
* Definition of Route and Voyage, sailing plan, route plan vs VTS route plan VTS Sailing Plan

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Revisions to this document are to be noted in the table prior to the issue of a revised document.

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# INTRODUCTION

High level principles for the development of the guideline:

* Operational Guideline
* For different levels of automation
  + focus on situations where human is in the loop
* Focus on the digital information exchange between VTS and vessels, incl. ROC
  + allied services not included
  + FAL - Port Call reports not included
* Use of concrete use-case examples, similarly as in GL 1132
* Focus on current technologies and available specifications
  + Giving concrete examples of current best practices, e.g AIS ASM messages, UKC systems, advance reporting.
* No detailed system requirements.

Effective communication is an essential component for operations in the maritime domain and is achieved when the intended meaning of the sender and the perceived meaning of the receiver is the same.

VTS providers should ensure that VTS operators are aware which vessels have received information provided digitally so the VTS operator does not provide this information by VHF voice as well. In case a vessel has not received it digitally, it is the task of the VTS operator to provide information by VHF voice in the conventional way

Modern technologies enhance the method of communication in a digital way. Digital communication has advances compared with traditional voice communication. Digital communications enable us to communicate quickly and effectively without the risk for misunderstanding. Digital communication can be used with human interference, but also can be used in automated processes without human interference.

To provide digital communication in globally harmonized away in a common understanding of the operational procedures and standardised technical services are necessary.

This guideline describes the operational procedures and services which are exclusive for Vessel Traffic Service (VTS) as defined in Maritime Service 1 (MS 1) “Description of maritime services in the context of e-navigation (IMO circular MSC.1/CIRC.1610/rev.1). This guideline does not describe the services which might be used by the VTS but belong under the responsibility of other international bodies.

In the following documents essential principles for the safe and efficient digital communication are mentioned and are used as a base for this Guideline:

* IMO Resolution *A.1158(32) Guidelines for vessel traffic services* states:

*“Effective harmonized data exchange and information-sharing is fundamental to the overall operational efficiency and safety. VTS providers are encouraged to make use of automated reporting where possible.”*

* IMO circular *MSC.1/Circ 1595 E-navigation strategy implementation plan – update 1* states:

“As shipping moves into the digital world, e-navigation is expected to provide digital information and infrastructure for the benefit of maritime safety, security and protection of the marine environment, reducing the administrative burden and increasing the efficiency of maritime trade and transport.”

and that of the prioritized e-navigation solutions is:

*“improved communication of VTS Service Portfolio (not limited to VTS stations).”*

* IMO circular MSC.1/CIRC.1610/rev.1 *Descriptions of maritime services in the context of e-navigation* defines the purpose of MS 1 Vessel traffic Services (VTS) states:

*“The purpose of this digital Maritime Service is to support the provision of VTS to participating ships by providing information in a digital format. Information could be presented in appropriate systems on board and ashore in order to create the means to reduce the administrative burden and information overload, reduce miscommunication due to external interference, simplify work procedures, promote sustainable shipping and increase navigational safety*.”

* IALA Discussion paper “Implications of Maritime Autonomous Surface Ships (MASS) from a VTS perspective” states:

“*Consensus is that new/additional guidance will be required, particularly in the short term for VTS digital communications”*

and

“*The advent of MASS will invariably be associated with VTS managing ‘big data’, interacting with MASS using digital means, and possibly centralised, distributed and/or virtualised VTS ‘centres’ in the future”.*

* Expectations in the IALA Discussion paper “Future VTS” states:

“*Interaction between VTS and ships (conventional ships, MASS and remote-control centres) will primarily be through digital communications/data exchange for:*

* *‘Ships (conventional and autonomous)’ to provide reports and information required by a VTS.*
* *VTS to provide ‘ships’ with information on factors that may influence ship movements and assist ‘onboard[[1]](#footnote-1)’ decision-making.*
* *VTS to issue advice, warnings, and instructions to achieve its purpose.*

*The interaction between ‘ship’, those responsible for the ships transit / navigation and ‘ship operators’ will commence outside delineated VTS areas.”*

# DOCUMENT PURPOSE

The purpose of this guideline is to assist authorities implement practices specified in IALA Recommendation R1012 VTS Communications associated with ensuring digital VTS communications are harmonized through the use of standard messages and operational procedures.

The technical services used to deliver digital information to vessels are still under development, the operational requirements descripted in this document can be used for further development of these technical services.

This document gives guidance on the exchange of VTS information by electronic means between a VTS and vessels navigating in the VTS area, including Remote Operation Centers. Information on the VTS interaction and information exchange with allied or other services can be found in the IALA Guidelines:

* G1102 VTS interaction with allied or other services
* G1130 Technical aspects of information exchange between VTS and allied or other services

# DOCUMENT STRUCTURE

This document consists of four parts:

* Part A sets out the general principles for digital communications;
* Part B provides more general guidance on message composition, delivery and interpretation
* Part C provides guidance VTS Digital services
* Part D identifies a number of current technologies used to exchange VTS information

# PART a general principles of vts digital communications

## Managing a mix of traditional VHF voice, digital communications, and automated data exchange

The digitalisation of information will diversify the communication means between shore authorities and vessels and will affect VTS procedures regarding exchange of information. While VTS interaction with ships has traditionally almost exclusively been via VHF voice communications it is expected that digital communications will largely be replace VHF voice in the future.

The voice communication focuses on utilizing digital technology for data transmission. While digital data communication encompasses a wider range of methods for exchanging digital information across different platforms.

In addition to voice communications VTS can provide information in a digital format. The use of digital communication could reduce workload by automating repetitive tasks, which could lead to reduction of the VHF traffic, communication barrier and the risk of misunderstandings. Digital communications also have the opportunity to disseminate information as well as consolidate and process the information for better decision support. and should be effective, timely and consistent always making relevant information available for navigators.

Messages can be conveyed to an individual ship or all ships. This not only includes person-to-person but also person-to-machine, machine-to-machine and machine-to-person. The change of communication and interaction to digital can also in many situations utilise automated processes.

The introduction of digital communication marks a dualistic operational phase for VTS. The gradual advent of technical services results in potential increase in VTS workload, as the same tasks must be executed using both the new and old methods side by side. However, over time, digital communication holds the potential to reduce workload by automating repetitive tasks and voice communication.

### Time critical messages

However, VTS should remain the primary contact with vessels for urgent and important messages. To mitigate time critical and emergency situations and to ensure the safety of life at sea the use of VHF voice communications will be required in addition to digital communications.

### Publishing information on digital VTS services

The number of digital services can variate from VTS to VTS. Information on the available digital services from each VTS should be available to the mariners. Some of the digital services should also be discoverable by on-board navigation systems.

### Ensuring that all vessels have the information

It should be noted that not all vessels are capable of receiving information in digital format. Provisions should therefore be made to ensure that less capable vessels are receiving the information they require. At the same time the advent of MASS will bring additional challenges for the communication. VTS interaction with the entity in command of a MASS, such as Remote Control Centres, need to be defined. Not all vessels will be capable of processing voice communications.

Provisions should therefore be made to ensure that these vessels are receiving the information they require by other means.

### Information originating from sources outside of VTS

When transitioning to digital communications some of the information provided to vessels today by VTS may be provided directly to vessels from other sources. This can include for example hydrographic and environmental information, Information on AtoN’s and Maritime Safety Information (MSI). It should be ensured that the information provided to the vessels is available to VTS.

### Route exchange

The route and schedule (The current format, IHO S421, used for rote exchange also containing schedule information) is a key element of the vessel's voyage and can be used to optimize safety and processes, as well as for the interaction of participants and stakeholders. The core element of the voyage plan is a route. The exchange of routes between ship to ship and ship to shore may improve: situational awareness for the purpose to facilitate;

* + reduced number of accidents and incidents (proactively de-conflicting situations when intentions are known and shared);
  + optimized resource utilization by knowing the intentions of other actors;
  + secured passages by knowing the intentions of other actors;
  + predictability of arrivals and departures by early information sharing enabling better planning for involved actors leading to reduced idle time for resources;
  + just-in-time operations by enabling stakeholders and service providers to be efficiently organized for handling vessel movements, port resources, and hinterland connections.
    - VTS reporting of arrival/departure times and the specific route in the VTS area.
    - One of the core means for future MASS and other highly automated vessels to communicate intentions and creating its sailing plan,
    - Contributor of berth to berth navigation and JIT operations.

It its envisioned that a large number of proposed services within not only the VTS domain will need, use, compute, communicate route and schedule information such as Weather routing, Pilot Routes/passage plans, Ice navigations services, Fleet management, Remote operations, Reporting, Costal surveillance and many other use cases, they are not included here god dammit!

### Cyber security

From the VTS point of view the digital data exchange is secure (ref. to GL cyber security) unless the system indicates the data quality is insufficient due to reduced cyber security level. The VTS personnel will revert to voice communication and the conventional way of working. For cases in which cyber security is impaired and not system detectable, VTS personnel should receive training how such cases might be observed and detected.

4.1.7 Technical failures

In case the digital data communication service suffers a technical failure, two options can be considered. First option is to revert to the conventional way of working with voice communication. However it is foreseeable that the VTS operators will not be able to revert back to the conventional way of working serving the amount of traffic at hand. So, option two is to have technical requirements to have a redundant digital communication system or a back-up system (with limited functionality but still allowing digital communication). The first option will require more training for the population of VTS personnel while the second option will require more technical systems in place.]

## The intent of messages.

The added benefit of digital communication is having the information in standardised structure, ensuring that the same information is available to all actors when required and designed in a way to minimise misinterpretations and to provide common situational awareness. This includes machine-to-machine communications between VTS, vessels and other external sources.

The intent of messages conveyed to actors should be the same, irrespective of whether it is by voice or digital means. Digital communications should have the same procedures as the voice communications. Digital communication should be processed the same way as voice communications, acknowledgement of the messages might be needed in some cases, especially in safety critical situations.

According to IALA G1132 VTS Voice Communications and Phraseology “*Closed-loop communication should be used to confirm that messages from VTS personnel are correctly received and understood”*.

To achieve closed-loop communication in digital communications different types of responses should be implemented:

* Delivered: system acknowledges message reception
* Received: human operator acknowledges message reception
* Approved: human operator approves the content of the message

VTS providers should ensure that the digital services have up-to -date information.

# part b message composition, delivery and interpretation

At present digital VTS services are delivered to vessels through various systems. VTS related information, such as VTS area and reporting requirements, navigational warnings, meteorological data, recommended routes etc. is mostly mainly offered through websites maintained national and regional authorities. However, in order to ensure harmonisation and interoperability of these services in different regions standardised data models and technical services are required.

Services provided directly to ships may be further subdivided into data intended to be used during navigation and data used during voyage planning phase.

## S-100

The IMO e-navigation strategy implementation plan (MSC.1/Circ.1595) states that IMO Common Maritime Data Structure (CMDS) used for digital maritime services should be based on the IHO S-100 data model.

The S-100 standard is intended for the development of digital products and services for hydrographic, nautical and geographic information communities. It consists of several parts based on geospatial standards developed by ISO Technical Committee 211 (ISO/TC211).

IALA was granted governance the S-200 domain, in co-operation with the IHO. A supervisory structure has been established (IALA Guideline G1087) that uses the range S-201 to S-299 for product specifications compliant with the IHO S-100 standard, covering fields within the IALA remit, including Marine Aids to Navigation (AtoN), Vessel Traffic Services (VTS), positioning systems and communication systems.

The S-100-based services delivered by VTS can be divided into services that provide (almost) real-time, dynamic data and to services that provide static data that is updated less frequently. The information provided by real-time services includes, for example, navigational warnings and discrepancies of AtoN’s, as well as weather observations. Static information can include basic VTS information, such as limits of VTS area and/or reporting requirements.

Some of the S-100-based product specifications can also be used in a variety of services. The most significant of these is the ECDIS Route Plan Product Specification S-421 (IEC 63173-1) published by IEC. The S-421 Product specification also includes several use cases

In November 2022, the IMO MSC approved an update to the ECDIS performance standard, according to which the use of ECDIS compatible with S-100 products as a navigation system on board will be permitted from the beginning of 2026 and mandatory for new installations from the beginning of 2029..

The updated Performance Standard also states that ECDIS should be capable to carry out exchanging of route plans in a simple and reliable manner. This means that primary navigation system on board can be capable for route exchange from the beginning of 2026 and makes the functionality mandatory for new installations from the beginning of 2029.

However, it is expected that due to the slow renewal of ships' navigation systems, there will not be extensive equipment compatible with S-100 products on board in the next few years. In this case, data may also be presented in other systems intended to support navigation.

Refer to IMO e-nav strategy

ADD reference to Common Shore side e-navigation architecture

ADD picture from WG2 defining architecture for digital VTS services

## AIS/VDES messages

# Part C VTS DIGITAL services

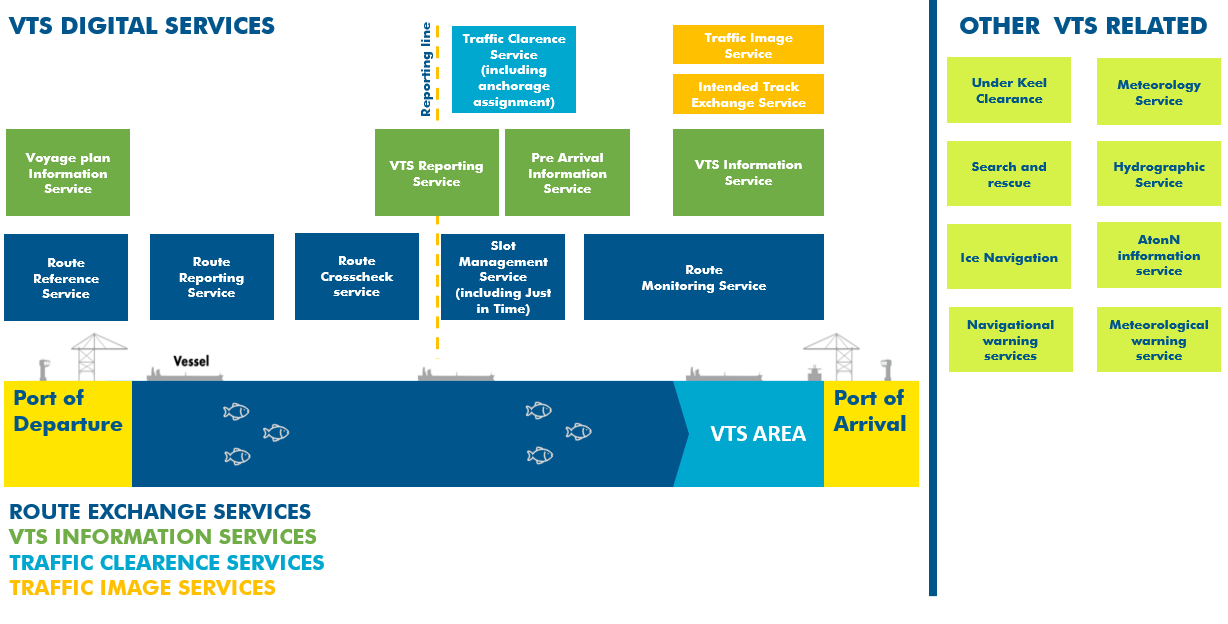
This paragraph will describe the use cases and operational descriptions for potential technical services identified in the domain of Maritime Services for VTS. The technical services are not limited, if needed further technical services can be added.

The description for Maritime Service 1 - Vessel traffic service (VTS) list several different potential Technical Services associated with the Maritime Service. These Technical Services can be divided into VTS-specific services and services developed within other Maritime Services. This guideline only focus on the VTS-specific technical services under the remit of IALA; MS 1 VTS.

Technical services are needed to coordinate a seamless combination between different product specifications. Information provided using S-100 based product specifications is brought together by technical services to deliver a Maritime Service. IALA G1128 gives guidance on how to make specifications of e-Navigation Technical Services. A Maritime Service (MS) can be implemented by one or more e-Navigation Technical Services.

It its envisioned that a large number of proposed services within not only the VTS domain will need, use, compute, communicate route and schedule information such as Weather routing, Pilot Routes/passage plans, Ice navigation services, Fleet management, Remote operations, Reporting, Coastal surveillance and many other use cases.

## VTS Specific Technical Services



Currently identified VTS specific Technical Services are:

### Traffic clearance Service including anchorage assignment

Traffic clearance refers to the process of ensuring that there is sufficient space and time for vessels to navigate safely through an area, taking into account other vessels, obstructions, regulatory and environmental factors. The Traffic Clearance Service (TCS) provides vessels with permission to proceed, impose conditions or deny clearance and or assists ships into anchorage positions by assigning anchorage areas. Within this service the VTS authority(s) is responsible for coordinating, authorizing, and monitoring the passage of vessels through the areas. Its primary purpose is to ensure the safe and efficient flow of vessel traffic by ensuring vessels comply with regulations, managing traffic and minimizing the risk of collisions or incidents.

#### Use Case 1

Use-case (name): Departing vessels from berth or anchorage

Description: Vessel sends prior to its departure the intended ETD and route through the VTS area to the VTS. The VTS validates the intended ETD and route and approves or sends a denial or a proposal with recommended information on when the vessel can leave the berth/anchorage. The vessel approves the recommended route.

Actors: Mariner, ECDIS/on board system, VTS

Frequency of Use: Typically triggered before sailing in the VTS area.

Pre-conditions: The service instance is known to the on-board system, or the on board system has access to a service registry in which the service instance can be discovered. The time before activating this use case depends from VTS to VTS.

Nominal sequence scenario:

1. Vessel wants to leave berth/anchorage
2. The vessel sends message (ETD or route plan) through its system to the service and requests traffic clearance to leave berth/anchorage
3. If vessel's schedule is suitable VTS [go to step 7]
4. If vessel's plan (ETD or route plan) is not suitable, VTS sends denial or a proposal with recommended information on when vessel can leave the berth/anchorage.
5. Service delivers response to the vessel
6. The vessel acknowledges revised ETD and sends response to the VTS or creates new plan [go to step 2]
7. Berth/anchorage location with ETD are acknowledged by the VTS and sends approval
8. The vessel leaves berth/anchorage

Post-conditions: The vessel's intended ETD and route are incorporated in the VTS system.

If the route cannot be agreed, VTS operator contacts the vessel by other means.

*Proposal for use case*

*Possible non-nominal scenarios:*

1. *The vessel changes its plans and re-issues its clearance request to VTS which overrules the originally  issued request*
2. *The VTSO has to retract the clearance approval due to changes in the ops situation after it has been approved by VTS.*
3. *VTS has additional conditions on the already approved clearance, VTS will contact the vessel by other means, for example voice comm.*

#### Use Case 2

Use-case (name): Entering or passing through a VTS area

Description: Vessel request for Traffic Clearance entering of passing through a VTS area but has no destination within the VTS area.

Actors: Mariner, ECDIS/on board system, VTS

Frequency of Use: Typically triggered before vessel enters VTS area

Pre-conditions: The service instance is known to the on-board system, or the on board system has access to a service registry in which the service instance can be discovered.

1. Nominal sequence scenario: Vessel is about to pass through the VTS area
2. The vessel sends message (ETA or route plan) through its system to the service and requests traffic clearance to proceed through the VTS area from the service
3. If vessel's planned route and schedule is suitable, [go to step 7]
4. If vessel's planned route or schedule is not suitable, VTS sends denial or a RTA to the vessel through the service
5. Service delivers response to the vessel
6. The vessel acknowledges revised ETA and sends response to the VTS or creates new plan [go to step 2]
7. Route with ETA are acknowledged by the VTS and sends approval,
8. The vessel enters the VTS area

Post-conditions:

#### Use Case 3

Use-case (name): Arriving vessels taking berth

Description: Vessel outside the VTS area request for Traffic Clearance to a berth within the VTS area.

Actors: Mariner, ECDIS/on board system, VTS

Frequency of Use: Typically triggered before vessel enters VTS area

Pre-conditions: The service instance is known to the on-board system, or the on board system has access to a service registry in which the service instance can be discovered.

1. Nominal sequence scenario: Vessel is about to enter the VTS area
2. The vessel sends message (ETA at berth location and/or route plan) through its system to the service and requests traffic clearance to proceed to the predefined berth from the service
3. If vessel's planned route and ETA is suitable, then VTS send acknowledgement [go to 7]
4. If vessel's planned route or ETA is not suitable, VTS sends denial or a RTA to the vessel through the service
5. Service delivers response to the vessel
6. The vessel acknowledges revised ETA and sends response to the VTS or creates new plan [go to step 2]
7. Berth location with ETA are acknowledged by the VTS and sends approval
8. The vessel enters the VTS area

Post-conditions:

#### Use Case 4

Use-case (name): Arriving vessels heading for anchorage

Description: Vessels from outside the VTS area request for Traffic Clearance to an anchorage within the VTS area.

Actors: Mariner, ECDIS/on board system, VTS

Frequency of Use: Typically triggered before vessel enters VTS area

Pre-conditions: The service instance is known to the on-board system, or the on board system has access to a service registry in which the service instance can be discovered.

1. Nominal sequence scenario: Vessel is about to enter the VTS area
2. The vessel sends message (ETA at anchorage location and/or route plan) through its system to the service and requests traffic clearance to proceed to the predefined anchorage from the service
3. If vessel's planned route and ETA is suitable, then VTS send acknowledgement [go to 7]
4. If vessel's planned route or ETA is not suitable, VTS sends denial or a recommended plan to the vessel through the service
5. Service delivers response to the vessel
6. The vessel acknowledges recommended plan and sends response to the VTS or creates new plan [go to step 2]
7. Anchorage location with ETA are acknowledged by the VTS and sends approval
8. The vessel enters the VTS area

Post-conditions:

#### Use Case 5

Use-case (name): Transit within a VTS area

Description: Request for traffic clearance while the vessel is already in the VTS area.

Actors: Mariner, ECDIS/on board system, VTS

Frequency of Use: Typically triggered before vessel makes use of a VTS area

Pre-conditions: The service instance is known to the on-board system, or the on board system has access to a service registry in which the service instance can be discovered.

1. Nominal sequence scenario: Vessel wants to leave berth or anchorage.
2. The vessel sends message (ETD or route plan) through its system to the service and requests traffic clearance to leave berth/anchorage and take other berth or anchorage in the area.
3. If vessel's schedule is suitable VTS, [go to step 7]
4. If vessel's schedule is not suitable VTS sends a denial or proposal which may include additional information on when vessel can leave the berth/anchorage
5. Service delivers response to the vessel
6. The vessel acknowledges revised ETD and sends response to the VTS or creates new plan [go to step 2]
7. ETD and ETA with location are acknowledged by the VTS and sends approval
8. The vessel leaves berth/anchorage

Post-conditions:

#### Use Case 6

Use-case (name): External influence to change traffic clearance by VTS

Description: When an approved Traffic Clearance changes due to external causes a new clearance should be agreed.

Actors: Mariner, ECDIS/on board system, VTS

Frequency of Use: Typically triggered when approved Traffic Clearance changes and new clearance is necessary.

Pre-conditions: The service instance is known to the on-board system, or the on board system has access to a service registry in which the service instance can be discovered.

1. Nominal sequence scenario: Approved plan needs changes due external influences, like weather conditions, delay or occurring hazardous situation
2. VTS or vessel sends request to amend of the approved plan
3. Vessel creates new plan and sends new request via Use case 1-5

Post-conditions:

### Traffic Image Service

A Traffic Image Service (TIS) is designed to share the traffic image between VTS and vessels. Within this service the VTS authority(s) will provide a vessel its traffic image and/or receive the traffic image from the vessels in the area, to create a shared traffic Image. It will offer real-time visual representation of vessels and their intentions.

### Intended Track Exchange Service

Intended Track Exchange Service (ITES) is primarily designed for vessels to exchange the track. Vessels can share their intended tracks and navigational intentions with other vessels and with VTS authorities, promoting safety by allowing for better situational awareness and collision avoidance. It aid vessels in track planning and decision-making to avoid potential conflicts. Within this service the VTS authority receive and review intended tracks from vessels operating in the VTS-area, allowing the VTS operator to intervene promptly in case of potential safety hazards and navigational issues.

### Voyage Plan Information Service

A Voyage Plan Information Service (VPIS) is designed to assist ship operators and mariners in planning and executing voyages safely and efficiently. Within this service the VTS authority(s) provide comprehensive information to help vessels navigate from departure point to its final destination while considering various factors and potential hazards. The primary purpose is to enhance navigation safety, optimize route planning, and ensure compliance with regulations. This information includes: local port information, regulations, restrictions, reporting requirements, fairway information, and VTS area.

### VTS Reporting Service

The VTS Reporting service is designed for vessels to report to the VTS area. When the vessel sails to the VTS reporting line at the destination port, it will send an arrival report to VTS. With this service the VTS authority(s) can prepare the arrival of the vessel.

### Pre Arrival Information Service

The Pre Arrival Information Service complements the Voyage Plan Information Service (VPIS) during the final stages of their voyage. Within this service the VTS authority(s) will provides mariners specific and real-time information as vessels approach the VTS area and offers data and insights crucial for a safe and efficient voyage. This information includes more detailed information about the current status of the port, including: berth availability, port congestion, local restrictions and data on tide, currents, and their effects on navigation within the area.

### VTS information service

The primary aim of a VTS Information Service (VIS) is to assist ships in navigating safely within the port area. Within this service the VTS authority delivers specific information on navigational situations and warnings within the VTS area. Such as suspension or change of routes, information on uncharted obstacles such as dangerous wrecks, diving operations, crane activities or ships not under command

### Route Reference Service

With the Route Reference Service (RRS) coastal and or VTS authority(s) offer predefined routes and waypoints, in electronic format. RSS is designed to assist mariners in their voyage planning to define the suitable route on commonly used passages, such as shipping lanes, approaches to ports, and coastal routes.

### Route Service Exchange

Vessel sends prior to its arrival the intended route through the VTS area to the VTS. If the route includes schedule use case can also be used together with VTS traffic clearance service.

1. One of the following
   1. VTS personnel does not agree with changes (go to use case 2)
   2. VTS system implements the changes

#### Use case 1

Use-case (name): Initial Sharing of the Route from Vessel to VTS

Description: Vessel shares route with VTS before entering VTS area, leaving from berth/anchorage, departing from port/anchorage.

Actors: VTS System, ECDIS, Mariner, Route Exchange Service

Frequency of Use: Once per route (from anchorage/berth to anchorage/berth)

Pre-conditions: Route is planned

Nominal sequence scenario:

1. The route is planned in ECDIS/ECS by the mariner
2. The ECDIS/ECS should send the route before departure but must be shared at latest according to local rules

2. The ECDIS/ECS sends intended route which should include but not to be limited to

* Ship Identification Information
* Waypoints
* Schedule

1. VTS system sends “received” acknowledgement automatically

Post-conditions: VTS receives vessel´s initial route

#### Use case 2

Use-case (name): VTS gives route recommendation to vessel

Description: VTS gives route recommendation to vessel

Actors: VTS System, VTS personnel, Mariner, ECDIS

Frequency of Use: Current limited use, grow significantly over time

Pre-conditions: Route is crosschecked by VTS system and VTS personnel and route requires changes

Nominal sequence scenario:

1. VTS personnel creates the recommendation for vessel
   * VTS system can assist VTS personnel to create the route recommendation
2. VTS system sends back the recommended route to ECDIS (planning station)
   * Route can contain changes to waypoints and/or schedule
3. Vessel sends “route received” acknowledgement automatically
4. One of the following
   1. Vessel does not agree with changes (go to use case XXXXXX)
   2. Vessel implements the changes

Post-conditions: Vessel implements changes to route

#### Use case 3

Use-case (name): Updates are restricted to geometry

Description: VTS system requires updates for whole route or restricted by geometry

Actors: VTS System, ECDIS

Frequency of Use: Maximum few times per route

Pre-conditions: The initial route has already been sent and approved (use case 1)

Nominal sequence scenario:

1. VTS system informs ECDIS what data is expected when route changes

#### Use case 4

Use-case (name): Vessel´s route changes

Description: Vessel wants to change its waypoints and/or schedule

Actors: VTS System, VTS personnel, Mariner, ECDIS

Frequency of Use: When ever necessary according to local rules

Pre-conditions: The initial route has already been sent and approved (use case 1)

Nominal sequence scenario:

1. Mariner makes changes to waypoints and/or schedule
2. ECDIS sends updated information to VTS system (use case 3)
3. VTS system sends “received” acknowledgement automatically

Post-conditions: VTS receives vessel´s updated route

#### Use case 5

Use-case (name): Vessel does not arrived to VTS as planned

Description: Vessel changes route and does not arrive to VTS area as part of this route (use case 1)

Actors: VTS System, VTS personnel, Mariner, ECDIS

Frequency of Use: When route is change so that vessel does not enter geometry area

Pre-conditions: The initial route has already been sent and approved (use case 1) and vessel is outside of the geometry area

Nominal sequence scenario:

1. Mariner makes changes the route where no waypoints are located inside geometry area
2. ECDIS sends cancellation to VTS system
3. VTS system sends “received” acknowledgement automatically

Post-conditions: Route is terminated in VTS system

#### Use case 6

Use-case (name): VTS approves the route

Description: VTS personnel approves without changes

Actors: VTS System, VTS personnel, Mariner, ECDIS

Frequency of Use: At least once per route

Pre-conditions: Route is crosschecked by VTS system and VTS personnel and route does not require changes

Nominal sequence scenario:

1. VTS personnel marks the route “ok” on the VTS system
2. VTS system sends approved to ECDIS
3. ECDIS displays the route approval to mariner

#### Use Case Y

Use-case (name): Departing vessels from berth or anchorage within the VTS area

Description: Vessel intends to leave berth or anchorage and shares intended route wVTS.

Actors: Mariner, ECDIS/ECS, VTS

Frequency of Use: Triggered before leaving berth or anchorage or when an update is available.

Pre-conditions: Vessel is on the anchorage or at the berth. Vessel is still sailing and is already providing route information about its departure.

Nominal sequence scenario:

1. The route is planned in ECDIS/ECS by the vessel

2. The ECDIS/ECS sends (intended) route, which includes the schedule [including ETD], to VTS *(route for monitoring / ECDIS -status)*

3. VTS sends route received acknowledgement automatically.

4. The data is rendered and available in the VTS system

Post-conditions:

#### Use Case X

Use-case (name): Arriving vessels outside the VTS area heading for berth or anchorage in the VTS area or transits the VTS area.

Description: Vessel intends to enter a VTS area and shares intended route with the VTS.

Actors: Mariner, ECDIS/ECS, VTS

Frequency of Use: Triggered before entering the VTS area to a berth or anchorage in the VTS area or when an update is available.

Pre-conditions: Vessel is sailing outside the VTS area. Or Vessel still in other port or anchorage and is already providing route information about its arrival.

Nominal sequence scenario:

1. The route is planned in ECDIS/ECS by the vessel

2. The ECDIS/ECS sends (intended) route, which includes the schedule [including ETA], to VTS *(route for monitoring / ECDIS -status)*

3. VTS sends route received acknowledgement automatically.

4. The data is rendered and available in the VTS system

Post-conditions:

### Route Crosscheck service

The purpose of Route Crosscheck Service (RCS) is to validate a planned or monitored route from the vessel and compare the information with expertise of the VTSO and its information regarding the specific VTS area ((traffic separation, depth, speed restrictions…, etc). When the VTS receives a route from a vessel the VTS should be able to execute a Route cross check. The cross-checking may be done before the vessel’s departure or before arrival at a certain geographical area (for example a VTS area). The cross-check can include, but is not limited to, Under Keel Clearance (UKC), air draft, no violation of no-go areas, MSI and compliance with mandatory routing.

When a ship’s route is sent to VTS, the VTS will review the intended route and verify if the route is in accordance with all general and local area information and regulations. Additionally, necessary changes can be sent as a recommended route from shore side actors to the ship

### Slot Management Service including Just in Time

Slot Management Service (SMS) is primarily designed to regulate and coordinate the allocation of berthing slots and arrival/departure times for vessels in port in advance of entrance. Within this service the VTS authority(s) provide a specific timeslot towards the vessel and allocates vessels in a time window to ensure safe and sustainable voyages into the VTS area and extends the ability for VTS to organize vessels approaching and departing from the VTS area, reducing congestion and conflicts near port entrances and exits and implementing Just in Time arrival concepts.

### Route Monitoring Service

The Route Monitoring Service (RMS) is used to monitor vessels that they stay within the planned schedule and corridor as defined in the route plan. Within this service the VTS authority(s) will identify irregular or suspicious vessel activities, such as vessels that may be deviating from their routes or schedules, allowing the VTS operator to intervene promptly in case of potential safety hazards and navigational issues.

## Other Technical Services associated with Maritime Service 1 – Vessel Traffic Services (VTS)

### Meteorology Service

The service supports the provision of information which could include the speed and direction of the prevailing wind, direction and height of the waves, visibility, atmospheric pressure, the formation of ice, etc.

### Meteorological warnings Service

The service supports the provision of warnings concerning gale, storm, tsunami, restricted visibility, etc.

### Hydrographic Service

The service supports the provision of information which could include factors such as the stability of the seabed, sea depth, the accuracy of surveys, tidal ranges, tidal streams, prevailing currents and swell, etc.

### AtoN information Service

The service supports the provision of Aids to Navigation information for end-users (primarily navigators).

### Navigational warning Service

The service supports the provision of safety-related messages such as dangerous wrecks, obstacles not otherwise promulgated, diving operations, vessels not under command, etc.

### Ice navigation Service

The service provides information regarding best route, waiting positions, preparations for assistance, position in convoy, the last reported route, time for departures from port is important for the Icebreaking services.

### Under Keel Clearance Service

### Search and rescue Service

# part D BLA BLA BLA

## ~~IALA GUIDELINEs~~

~~G1081 Provision of virtual Aids to Navigation~~

~~G1155 The development of a description of a Maritime Service in the context of e‐ navigation~~

~~G1157 Web service based S-100 data exchange~~

~~G1143 Unique identifiers for maritime resources~~

## ~~IHO~~

~~S-100 …~~

~~[S-127, S-129?]~~

## ~~IEC~~

~~IEC 63173-2 Secure exchange and communication of S-100 based products (SECOM)~~

## ~~IMO~~

~~SN.1/Circ.289 Guidance on the use of AIS application-specific messages~~

# DEFINITIONS

The definitions of terms used in this Guideline can be found in the *International Dictionary of Marine Aids to Navigation* (IALA dictionary) at <http://www.iala-aism.org/wiki/dictionary> and were checked as correct at the time of going to print. Where conflict arises, the IALA Dictionary should be considered as the authoritative source of definitions used in IALA documents.

# abbreviations

This section should be typed with the **Abbreviations** style. The acronym or initialism is typed and then tab is pressed so that the style inserts the appropriate tabs and paragraph spacings e.g.:

NGO Non-governmental organization

VTS Vessel Traffic Services

The list should be typed in alphabetical order. The text automatically aligns as an indented paragraph until carriage return is hit and then the next term can be entered.

# references

References are sources directly referred to in the running text and should be given a sequential number, starting at 1. The reference number should be included as close to the referenced text as possible and included as a number within square brackets.

The reference should be listed in the References section in the following syntax using the **Reference** **list** style:

[Author surname,] <space> [initial.] <space> [year] <space> [title.]

For example:

“Hawking also suggests ways that quantum mechanics can be combined with the theory of special relativity [1]. This text builds on his discussion of the instability of black holes described in *A Brief History of Time* [2].”

should be included in the reference list as follows:

1. Hawking, S. (2001) The Universe in a Nutshell.
2. Hawking, S. (1988) A Brief History of Time.

The **Reference list** style will add a number for the reference as soon as you start typing the text and the paragraph will automatically align with the first line of text. Press return to enter a new reference in the list.

# Further reading

Any texts that are recommended to the reader without direct reference in the text should be listed within this section using the same syntax as the reference list. Sources should be listed using the **Further reading** style.

1. Einstein, A. (1905) Relativity: The Special and General Theory of Relativity
2. Idle, E. (1984) The Galaxy Song

# Index

**No index entries found.**

1. BLA BLA BLA II

~~The following use cases are examples to provide input for the development of technical service specifications (WG2).~~

~~General descriptions on exchange of routes in the S-421 format in described in the Annex of S-421 description in detail.   
  
The below Use Cases include examples of data needed, consult document~~ *~~VTS51-9.1.6.1 - Appendix 1, MS 1 - 3, Information requirements~~* ~~for further possible datasets needed.~~

1. *‘onboard decision-making’ refers to the “responsible entity” for the ‘ship’* [↑](#footnote-ref-1)