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## **EF-Module**

- This document will describe Efficient Flow technical requirements for Onboard Systems (EF ECDIS, EF-PPUs and EF-VTSs)
- Relevant parts of this document will be used for respective procurement.
- When a meeting calculation (situation) is mentioned in the document, it also refers to crossing and or overtaking calculation (situation).

## 1. General EF Requirements

<b>Requirement Id</b>	1.1. EF General
<b>Requirement Name</b>	STM Compatible
<b>Requirement Text</b>	<p>STM Compatible, according to “STM technical specification version 2.0”</p> <ul style="list-style-type: none"> <li>Requirements R-2.1:1 to R-2.1:4, R-3.2:1 to R-3.2:2, R-3.2:4 to R-3.2:15, R-3.2:17, R-3.3:1, R-3.4:1 to R-3.4:12, R-3.4:14 to R-3.4:22, R-3.4:24 to R-3.4:28, R-3.5:1, R-3.6:1 to R-3.6:5 (R-3.6:2 and R-3.6:4 PCMF), R-3.6:7 to R-3.6:8, R-4.1:1 to R-4.1:3, R-4.1:5 and R-5.1:1 to R-5.1:6 in “STM technical specification version 2.0”, <b>shall</b> be considered to be Shall requirements to fulfil this Requirement (STM Compatible)</li> <li>Requirements R-3.2:3, R-3.2:16, R-3.4:13, R-3.4:23, R-3.6:6 and R-4.1:4 in “STM technical specification version 2.0”, <b>shall</b> be considered to be Should requirements (STM Compatible), <b>and are not necessary to fulfil.</b></li> </ul>
<b>Rationale</b>	<i>The equipment shall be STM compatible, meaning that it shall be able to follow all the “standards” in STM</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

Commented [HH1]: För Gävle o Rauma fartygen endast..

Commented [HH2]: Hur skriva? De tävlar ju inte....

<b>Requirement Id</b>	1.2. EF General
<b>Requirement Name</b>	EF Hub Service requirements
<b>Requirement Text</b>	EF Hub service requires that all ships and PPU's included, authorizes the EF Hub service to access, monitor and distribute all voyage plans
<b>Rationale</b>	<i>The EF Hub service requires access to all voyage plan in monitoring in order to facilitate sharing of ships voyage plan to all other affected stakeholders included in the EF test bed.</i>
<b>Author</b>	EF, HH, PL
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	1.3. EF General
<b>Requirement Name</b>	EF Update of voyageplan interval
<b>Requirement Text</b>	An updated (or new) voyageplan <b>shall</b> automatically be shared with other EF-actors within 1 minute after saving it.
<b>Rationale</b>	<i>In order to be able to make as accurate meeting/crossing/overtaking calculation as possible, it's important that the latest available information is used for the calculations</i>
<b>Author</b>	EF, HH, PL
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

## 2. EF ECDIS Requirements

<b>Requirement Id</b>	2.1. EF ECDIS
<b>Requirement Name</b>	ECDIS Voyageplan Schedule Updating
<b>Requirement Text</b>	Updating of schedule in voyage plan <b>shall</b> be easy to update
<b>Rationale</b>	<i>In order to get the operators to update the schedule if the ship is out of schedule, it must be simple to update</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	2.2. EF ECDIS
<b>Requirement Name</b>	ECDIS Sharing of Voyageplan
<b>Requirement Text</b>	Sharing of voyageplan with EF hub <b>shall</b> be automatic without any extra user actions
<b>Rationale</b>	<i>To ensure that all incoming ships automatically will be part of the EF Hub community and not dependent on human interaction</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	2.3. EF ECDIS
<b>Requirement Name</b>	ECDIS Meeting Point Calculation
<b>Requirement Text</b>	ECDIS Software <b>shall</b> be able to calculate meeting points by means of own ship's voyageplan and other ships voyage plan, as well as using actual speed to next waypoint, or using actual speed only (see description in the end of this document regarding calculation of ETA).
<b>Rationale</b>	To avoid <i>inadequate</i> meeting point or area a elaborative tool must be at hand
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...



<b>Requirement Id</b>	2.4. EF ECDIS
<b>Requirement Name</b>	ECDIS Presentation of Meeting points
<b>Requirement Text</b>	Presentation of Meeting points <b>shall</b> be done the similar as in Sealq Pilot software
<b>Rationale</b>	<i>To get a clear picture on where meetings, overtakings and crossing situations will take place, it's important to have a GUI that clearly show the situation without "Cluttering" the display</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	2.5. EF ECDIS
<b>Requirement Name</b>	ECDIS Meeting point Warning
<b>Requirement Text</b>	If the fairway has a section where it's unsafe to meet, a warning needs to be displayed. The software <b>shall</b> have an audible and visual warning function for the meeting point. Audible warning functionality shall be possible to turn off.
<b>Rationale</b>	<i>Automatic alarm is necessary since a OOW cannot follow all possible arising meeting situations manually</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	2.6. EF ECDIS
<b>Requirement Name</b>	ECDIS Meeting point Filtering Functionality
<b>Requirement Text</b>	Software <b>shall</b> have filtering functionality
<b>Rationale</b>	<i>Decrease operator errors due to over cluttered screen</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	2.7. EF ECDIS
<b>Requirement Name</b>	ECDIS Speed Trial Manoeuvre
<b>Requirement Text</b>	Shall be able to perform Meeting/Overtaking/Crossing Trial manoeuvre
<b>Rationale</b>	<i>In order to see what effect a speed change will have on meeting points with other ships, there need to be some kind of "Speed/Voyageplan- trial manoeuvre" functionality</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	2.8. EF ECDIS
<b>Requirement Name</b>	ECDIS ETA Calculation
<b>Requirement Text</b>	The speed calculated for ETA shall use the distance along the turn radius in the voyage plan between course legs.
<b>Rationale</b>	To enable correct ETA calculations
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	2.9. EF ECDIS
<b>Requirement Name</b>	ECDIS EF Suffix
<b>Requirement Text</b>	There shall be a suffix indicating that the ship is sharing its monitored voyage plan with the EF-Hubservice
<b>Rationale</b>	<i>Operators need to quickly identify participating/not participating ships</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	2.10. EF ECDIS
<b>Requirement Name</b>	ECDIS STM Text Format Area/Polygon Functionality
<b>Requirement Text</b>	The ECDIS <b>shall</b> be able to use STM Text format's Area/Polygon-functionality
<b>Rationale</b>	<i>In order to easily get an overview of e.g. an area where the speed should be kept to a minimum in the fairway, VTS send out such an area, and then it's important that the ship can display such an area.</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	2.11. EF ECDIS
<b>Requirement Name</b>	ECDIS Voyage Plan requirement
<b>Requirement Text</b>	The voyage plan exchanged with other users in Efficient Flow <b>shall</b> contain an updated schedule
<b>Rationale</b>	<i>The time factor is essential when planning meetings</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	2.12. EF ECDIS
<b>Requirement Name</b>	ECDIS Not following plan (in time/speed) functionality
<b>Requirement Text</b>	It <b>shall</b> be visible if other ships if one ship/ships is not following it's pre planned speeds. The limit triggering the notification shall be set in own ship ECDIS.
<b>Rationale</b>	<i>For other ships it is vital to get real time information of all deviations in the overall picture in order to better plan own action</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

### 3. EF PPU Requirements

<b>Requirement Id</b>	3.1. EF PPU
<b>Requirement Name</b>	PPU RTZ Origin
<b>Requirement Text</b>	RTZ shared with EF Hub service <b>shall</b> contain MMSI or IMO for the ship that the pilot is piloting
<b>Rationale</b>	<i>In order to calculate meeting points, it's crucial that the receiving part is 100% sure, what Voyageplan belongs to what ship.</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.2. EF PPU
<b>Requirement Name</b>	PPU Voyage Plan Format
<b>Requirement Text</b>	Voyage plans <b>shall</b> use RTZ 1.1 format when calculating meeting points.
<b>Rationale</b>	<i>Formats used must comply with STM standard</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.3. EF PPU
<b>Requirement Name</b>	PPU Speed Trial Manoeuvre
<b>Requirement Text</b>	<b>Shall</b> be able to perform Meeting/Overtaking/Crossing Trial manoeuvre
<b>Rationale</b>	<i>In order to see what effect a speed change will have on meeting points with other ships, there need to be some kind of "Speed/Voyageplan- trial manoeuvre" functionality</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.4. EF PPU
<b>Requirement Name</b>	PPU Meeting Point Calculation
<b>Requirement Text</b>	PPU <b>shall</b> be able to calculate Meeting points by means of “Piloted ship’s” voyageplan and other ships voyageplan, as well as using actual speed to next waypoint, or using actual speed only.
<b>Rationale</b>	<i>To avoid inadequate meeting point or area an elaborative tool must be at hand.</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.5. EF PPU
<b>Requirement Name</b>	PPU Voyageplan leg speed
<b>Requirement Text</b>	It <b>shall</b> be possible to plan different speeds on different legs in the voyageplan.
<b>Rationale</b>	To ensure that an ETA can be correctly calculated.
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.6. EF PPU
<b>Requirement Name</b>	PPU ETA calculation
<b>Requirement Text</b>	The software <b>shall</b> handle real time calculation of ETA and STG to one or more selected WP(s), not necessarily the last waypoint in the voyage plan. Real time calculation according to above shall include speed profile.
<b>Rationale</b>	To ensure easy voyage-planning for operator
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.7. EF PPU
<b>Requirement Name</b>	PPU Minimum number of meeting points
<b>Requirement Text</b>	The software <b>shall</b> be able to automatically calculate meeting points for a minimum of 50 targets along voyage plan.
<b>Rationale</b>	To avoid meetings at unsafe positions and to be able to maintain accurate speed
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.8. EF PPU
<b>Requirement Name</b>	PPU Meeting point Speed Trial manoeuvre
<b>Requirement Text</b>	The software <b>shall</b> be able to change the position of the meeting points to get necessary speed for own ship to meet/overtake a ship or ships on a desired and safe location.
<b>Rationale</b>	In order to plan the speed in confined waters correctly
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.9. EF PPU
<b>Requirement Name</b>	PPU Meeting Point Warnings
<b>Requirement Text</b>	If the fairway has a section where it's unsafe to meet, a warning needs to be displayed. The software <b>shall</b> have an audible and visual warning function for the meeting point. Audible warning functionality shall be possible to turn off.
<b>Rationale</b>	<i>Operator cannot manually track all upcoming incidental situations.</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.10. EF PPU
<b>Requirement Name</b>	PPU Meeting point Filtering Functionality
<b>Requirement Text</b>	Software <b>shall</b> have filtering functionality
<b>Rationale</b>	<i>An excessive amount of meeting point marks can interfere with the pilot's overview. Some kind of filtering functionality is necessary.</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.11. EF PPU
<b>Requirement Name</b>	PPU ETA Calculation
<b>Requirement Text</b>	The speed calculated for ETA <b>shall</b> use the distance along the turn radius in the voyage plan between course legs.
<b>Rationale</b>	To enable correct ETA calculations
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.12. EF PPU
<b>Requirement Name</b>	PPU EF Suffix
<b>Requirement Text</b>	There <b>shall</b> be a suffix indicating that the ship is sharing its monitored voyage plan with the EF-Hubservice
<b>Rationale</b>	<i>Operators need to quickly identify participating/not participating ships</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.13. EF PPU
<b>Requirement Name</b>	PPU Voyage Plan requirement
<b>Requirement Text</b>	The voyage plan that is exchanged with other users in Efficient Flow <b>shall</b> contain an updated schedule
<b>Rationale</b>	<i>The time factor is essential when planning meetings</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.14. EF PPU
<b>Requirement Name</b>	PPU STM Text Format Area/Polygon Functionality
<b>Requirement Text</b>	The PPU <b>shall</b> be able to use STM Text format's Area/Polygon-functionality
<b>Rationale</b>	<i>In order to easily get an overview of e.g. an area where the speed should be kept to a minimum in the fairway, VTS sends out such an area, and then it's important that the PPU can display such an area.</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	3.15. EF PPU
<b>Requirement Name</b>	PPU Not following plan (in time/speed) functionality
<b>Requirement Text</b>	It <b>shall</b> be visible if other ships if one ship/ships is not following it's pre planned speeds. The limit triggering the notification shall be set in PPU.
<b>Rationale</b>	<i>For other ships it is vital to get real time information of all deviations in the overall picture in order to better plan own action</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...



<b>Requirement Id</b>	3.16. EF PPU
<b>Requirement Name</b>	PPU functionality for sharing voyage plan
<b>Requirement Text</b>	Pilot's current voyage plan in PPU <b>shall</b> automatically be updated with MMSI/IMO of the ship that the pilot is piloting and should have the possibility to share the voyage plan with the EF Hub Service.
<b>Rationale</b>	<i>When a pilot commences pilotage the master voyage plan should be the voyage plan in the PPU not the ship. Since the pilot is in reality conning the ship, even though the PPU voyage plan can be loaded into monitoring for the ship. The PPU voyage plan is still regarded as the master in EF Hub service until the ships speed = 0 at which point the voyage plan is deleted from EF Hub Service.</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

## 4. EF VTS Requirements

<b>Requirement Id</b>	4.1. EF VTS
<b>Requirement Name</b>	VTS Meeting/Overtaking/Crossing Trial manoeuvre
<b>Requirement Text</b>	It <b>Shall</b> be able to perform Meeting/Overtaking/Crossing Trial manoeuvre
<b>Rationale</b>	<i>To avoid meeting points in an area where it's not safe to meet, an elaborative tool must be at hand</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.2. EF VTS
<b>Requirement Name</b>	VTS Virtual Voyageplan Connection
<b>Requirement Text</b>	VTS operator <b>shall</b> be able to connect a "Non STM/EF-Ship" with an VTS operator made voyageplan so that EF-ECDIS's and EF PPU's can calculate meeting point with that "NON STM/EF Ship" (i.e. the VTS system sends a VTS made Voyageplan to the EF-Hubservice AND inform the EF Hub service that, this voyage plan shall be connected to e.g, ship x). When this type of voyage plan is shared to the other ships, there shall be an indication that so is the case.
<b>Rationale</b>	<i>When actions are taken to plan a voyage with safe meeting situations, it's important to include ships that doesn't have Efficient flow compatible equipment installed and in use.</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.3. EF VTS
<b>Requirement Name</b>	VTS Voyage Plan Format
<b>Requirement Text</b>	VTS system <b>shall</b> be able to import/export voyage plans in RTZ 1.1 format.
<b>Rationale</b>	<i>Formats used shall comply with latest STM standard</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.4. EF VTS
<b>Requirement Name</b>	VTS Minimum number of meeting points
<b>Requirement Text</b>	VTS system <b>shall</b> be able to calculate a minimum of 1000 meeting points.
<b>Rationale</b>	<i>To ensure that enough calculations can be handled within the EF</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.5. EF VTS
<b>Requirement Name</b>	VTS Meeting point calculation
<b>Requirement Text</b>	EF VTS System <b>Shall</b> be able to calculate and display meeting points using ships voyage plans (including voyage plan's speed profile, both automatically and by means of using a "time slider")
<b>Rationale</b>	<i>When calculating meeting/overtaking positions the software should otherwise be using the planned ship speeds of the monitored voyage plan but as an exception the current leg should be calculated using the current speed. Otherwise the calculation is incorrect if a ship or ships needs to slow down for adjusting the meeting/overtaking position etc. Presentation example: A highlighted circle in a meeting/overtaking position. This shall be visible without simulation</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.6. EF VTS
<b>Requirement Name</b>	VTS Sharing of Voyageplan
<b>Requirement Text</b>	VTS <b>Shall</b> be able to share RTZ 1.1 Voyage plans with ship and PPU using "EF Hub Service"
<b>Rationale</b>	<i>All ships must immediately and within the process get all updated voyage plans</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.7. EF VTS
<b>Requirement Name</b>	VTS Meeting Point Warnings
<b>Requirement Text</b>	If ships are predicted to meet where it's unsafe to meet, a warning needs to be displayed. The software <b>shall</b> have a warning function for the meeting point.
<b>Rationale</b>	<i>Visually a highlighted circle indicating meeting/overtaking position could be different color or blinking or both. If audio warning is added, the situation would be hard to miss by the VTS-operator.</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.8. EF VTS
<b>Requirement Name</b>	VTS Meeting point Filtering Functionality
<b>Requirement Text</b>	Software <b>shall</b> have filtering functionality
<b>Rationale</b>	<i>An excessive amount of meeting point marks can interfere with the VTS operator's overview. Some kind of filtering functionality is necessary.</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.9. EF VTS
<b>Requirement Name</b>	VTS Voyageplan ETA calculation
<b>Requirement Text</b>	Voyage plans <b>shall</b> be possible to be planned with different speeds (Speed Profile) and radiuses on different voyage plan-legs.
<b>Rationale</b>	To ensure that an ETA can be correctly calculated.
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.10. EF VTS
<b>Requirement Name</b>	VTS Presentation of Voyageplan
<b>Requirement Text</b>	VTS software <b>shall</b> be able to present voyage plan in the normal VTS chart display.
<b>Rationale</b>	<i>Preferred visual presentation for example: voyage plan should only be visual when the ship is clicked active by operator. This is to prevent visual clutter of possible overlapping voyage plans. The active voyage plan line should be as simple and minimal as possible.</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.11. EF VTS
<b>Requirement Name</b>	VTS Simulation of Ships progress
<b>Requirement Text</b>	<b>Shall</b> be able to simulate ship's progress either using speed according voyage plan or using ship's present speed. The calculations shall take place "in the background" and warn if a meeting will take place in an unsafe area. <i>Preferred visual presentation for example: fluent time prediction managed by operator. Good example is Navielectro's J-Map software. Optional: learning voyage plan leg speeds etc. of individual ships that operates on monitored area regularly to improve prediction tool's accuracy.</i>
<b>Rationale</b>	<i>Operator needs to look forward in time (free of choice) to see how ship movements will develop</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.12. EF VTS
<b>Requirement Name</b>	VTS Sending of Meeting point
<b>Requirement Text</b>	<p><b>Shall</b> be able to send optional meeting/overtaking position to ships ECDIS.(Using STM Text format incl. pos. or area)</p> <p><i>When the software indicates that meeting/overtaking is predicted to happen in a restricted area, the VTS-operator manually choose a better position for meeting/overtaking and send it to ship's ECDIS.</i></p>
<b>Rationale</b>	<i>To be able to send what is calculated in Error! Reference source not found.</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.13. EF VTS
<b>Requirement Name</b>	VTS Navigational warning in VTS system
<b>Requirement Text</b>	<p>Optional: <b>Should</b> be able to show navigational warnings in format S-124, which are also presented in ships ECDIS.</p> <p><i>Preferred visual presentation: A Navigational warning symbol or area, detailed information when clicked.</i></p>
<b>Rationale</b>	<i>To increase VTS operators situational awareness in respect of NW</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.14. EF VTS
<b>Requirement Name</b>	VTS ATON functionality
<b>Requirement Text</b>	<b>Should</b> be able to show defects of fairway safety devices, which are also presented in ships ECDIS. <i>Preferred visual presentation for example: an exclamation mark over the defected safety devices , and the text information comes visual when the exclamation mark is clicked or cursor hovered on top of the mark.</i>
<b>Rationale</b>	<i>To increase all ships and VTS operators situational awareness in respect of fairway safety devices</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...

<b>Requirement Id</b>	4.15. EF VTS
<b>Requirement Name</b>	VTS, Ship not following plan (in time/speed) functionality
<b>Requirement Text</b>	It <b>shall</b> be visible if ships are not following it's pre planned speeds. The limit triggering the notification shall be set by the operator
<b>Rationale</b>	<i>Automatic calculation when not following voyage plan to alert deviations of voyage plan.</i>
<b>Author</b>	EF, HH
<b>Reference</b>	
<b>Related Use Case (s)</b>	...



## Glossary

**AIS:** Automatic Identification System

**ATA:** Actual Time of Arrival

**ATON:** Aids To Navigation

**ECDIS:** Electronic Chart Display and Information System

**EF Hub service:** Voyage plan Distribution service in Efficient Flow

**ETA:** Estimated Time of Arrival

**HMI:** Human Machine Interface

**NW:** Navigational Warning

**PPU:** Pilot Portable Unit, in Finland and in Sweden it's an application running on an iPad that is connected to the ship's Pilotplug (the pilot plug is a device from where certain (essential) navigational information from the ship can be obtained)

**PTA :** Planned Time Of Arrival

**Route:** Geographically specified path from Location A to Location B via a numbers of waypoints

**RTZ:** Voyage plan Exchange Format

**STG:** Speed to Go, What speed to keep to arrive at a certain location a specific time.

**STM suffix:** In STM the AIS is sending out a message that contains information if the ship is a "STM ship" or not. In other "STM-ships" ECDIS the text "STM" will visible beside the ship's name. The reason for this is so that "STM ships" can identify each other.

**Timeslider:** A functionality where the operator can "fast forward" into the future so that the operator can see how a traffic situation will develop.

**Trial Maneuver:** The trial maneuver feature simulates the effect of own ship's movement against all targets, without interrupting the updating of target information.

**Voyage plan:** Route, including speeds on different legs, it might also contain times.

**VP:** Voyage Plan

**VTS:** Vessel Traffic Services

**WP:** Waypoint

## ETA calculation

This is how we think ETA calculation should be done. Consider two ships:

Ship Alfa: Max speed 22

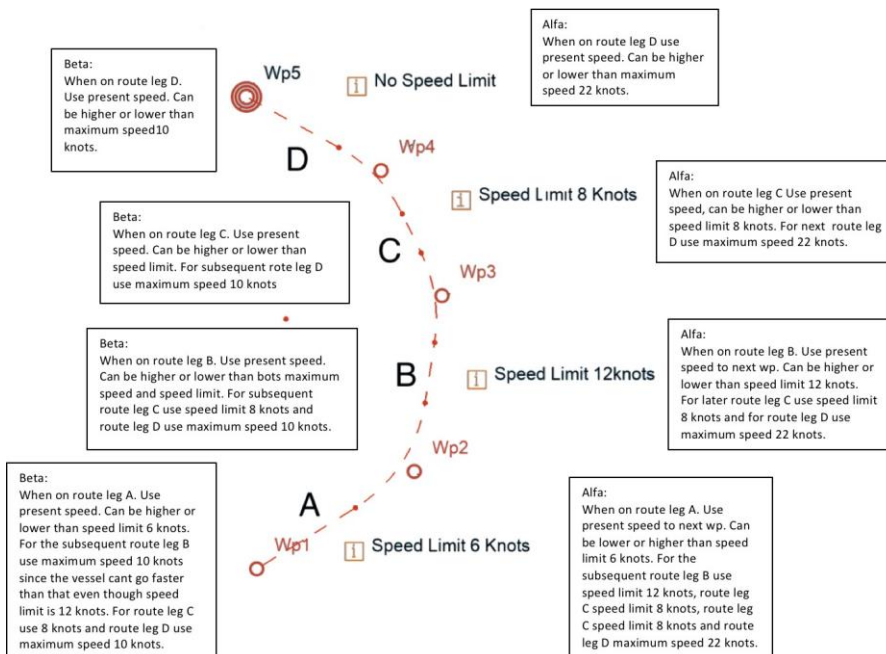
knots Ship Beta:

Max speed 10

knots

They are passing along a voyage plan. Before they have started along the voyage plan the passage time should be calculated with the maximum speed for the ships and the speed limits. To be able to calculate the ETA or passage time you need to define the maximum speed for a ship. Apparently that varies from ship to ship but can also vary from voyage to voyage for the very same ship. There are many reasons for that. For one voyage the ship might be in a hurry and their orders are to proceed as fast as they possibly can. The next voyage they might have ample time and now their orders are to proceed with economical speed to save bunkers. So the maximum speed could be given in settings, own ship and/or pilot setup.

Now they are sailing along the voyage plan starting from wp1.



Conclusion:

On actual voyage plan leg use present speed. Legs ahead use speed limits. If a ship cannot go as fast as the speed limit use maximum speed.

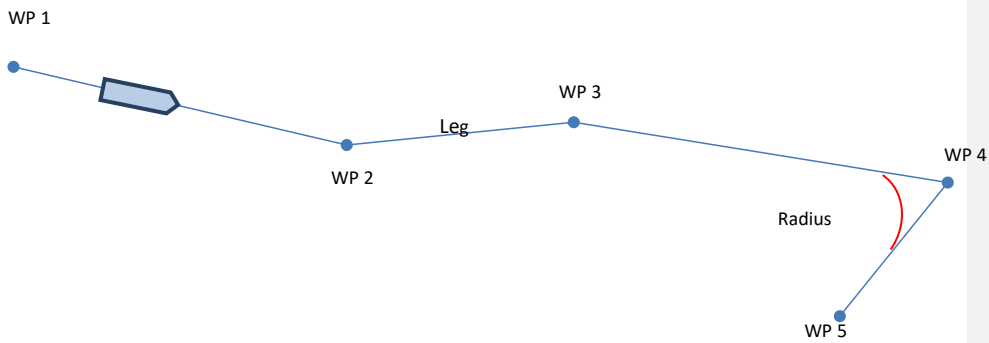


Voyage plan meeting points:

For voyage plan meeting points it should be assumed that the meeting ship must follow the same speed limits since they, at least in Sweden, are most likely set because they are compulsory. I.e. all ships must follow them.

Since there are no good way to know what the meeting ships maximum speed is use present speed on actual voyage plan leg and speed limits when speed limit is lower than actual speed.

## 1. Some more Clarification



- "Leg speed": Preprogrammed speed on a leg between two waypoints
- "Planned Speed": same as above
- "Actual speed": speed over ground that ship is doing right now
- "Max Speed": The Maximum Speed that the ship can do, that specific voyage
- "Distance": Distance shall be calculated along the radius



## **Efficient port calls and traffic Flow in narrow waters**

In STM EfficientFlow, the Baltic ports of Rauma and Gävle implement efficient port calls using real-time information. Improved traffic flow converts waiting times into increased safety and bunker savings for large ships in the narrow Swedish and Finnish archipelagos.

Making STM happen!

### **SAFETY - ENVIRONMENT - EFFICIENCY**

Swedish Maritime Administration ◦ Finnish Transport Agency ◦ Port of Gävle ◦ Port of Rauma ◦ Satakunta University of Applied Sciences (SAMK)

[www.efficientflow.eu](http://www.efficientflow.eu)

[www.stmvalidation.eu/projects/efficientflow](http://www.stmvalidation.eu/projects/efficientflow)

