”Pioneer” VTS Digital Service - VTS Traffic Clearance Service

Draft for the Service Specification

13.3.2023

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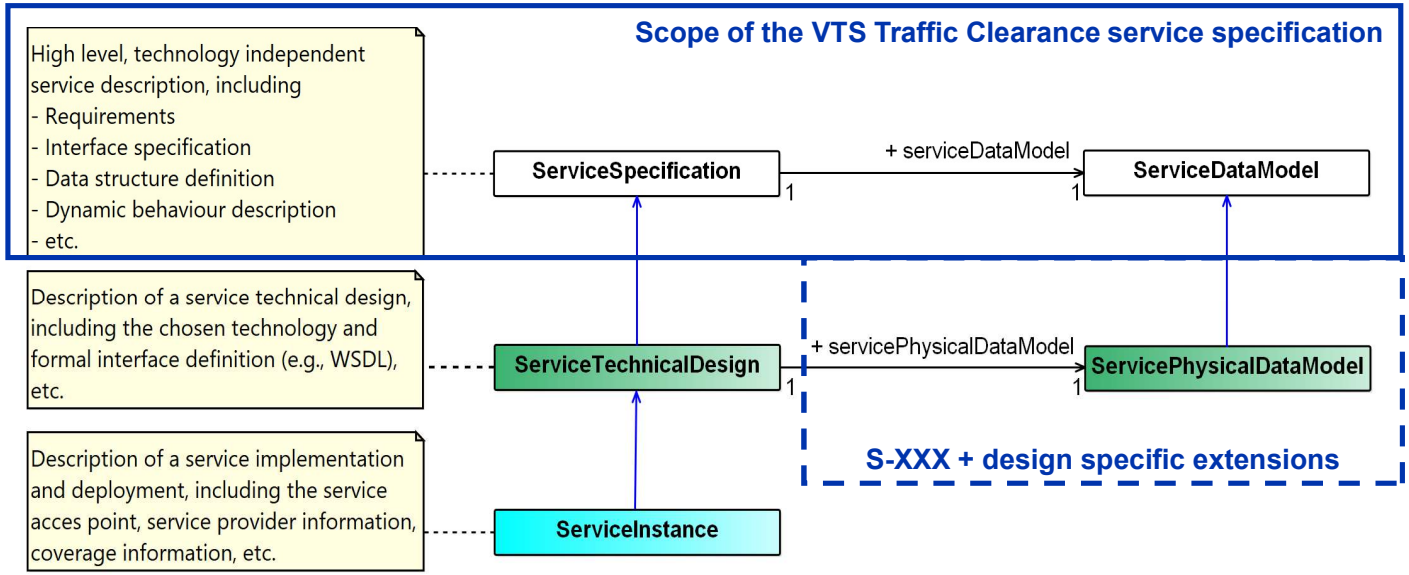
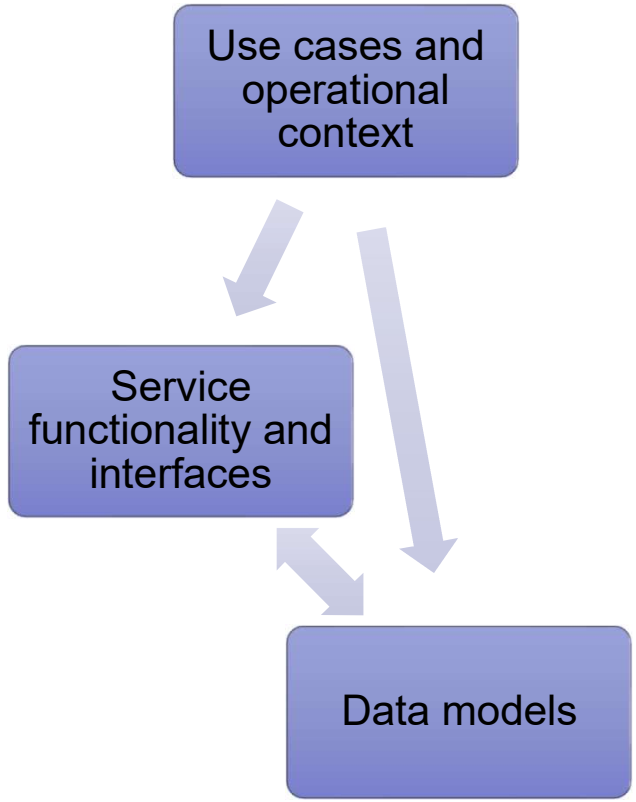
Overview of the development process of the service specifications according to G1128





Operational Context for the Traffic clearances

- One of the purposes of the VTS is to monitor and manage vessel traffic
  - Forward planning and prioritization of ship movements → Traffic clearances
- Traffic clearances can apply when a vessel is:
  - Entering or prior to entering a VTS area
  - Departing from a berth or an anchorage within a VTS area
  - Entering or prior to a fairway within a VTS area
  - Prior to commencing a manoeuvre that may be detrimental to safe navigation

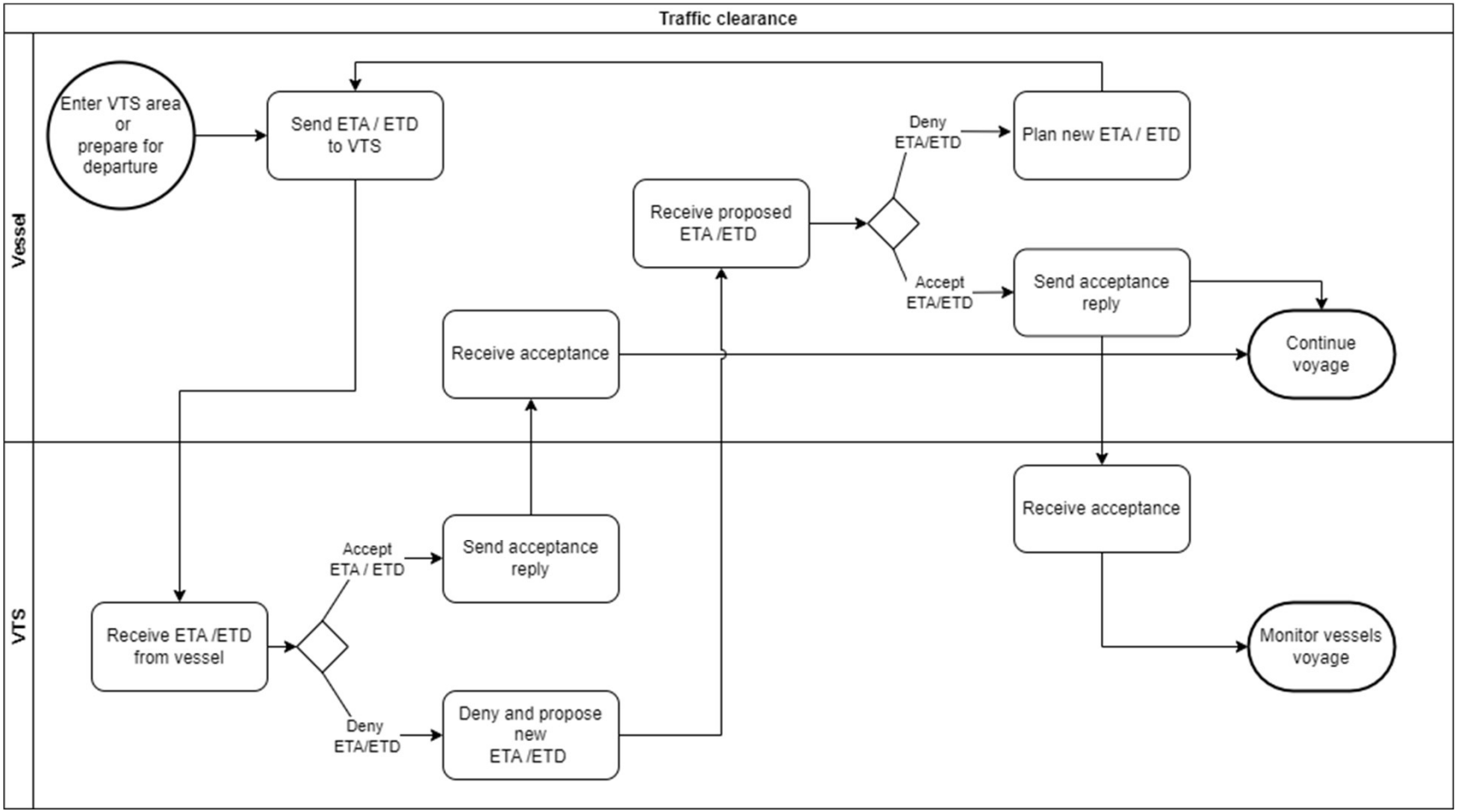
- As one of the digital VTS services the Traffic Clearance Service is a simplified service with limited information exchange about:
  - Vessel's estimated time of arrival (ETA) to a predefined location
  - Estimated time of departure (ETD) from a predefined location
  - Acknowledgements or responses to these (response can include proposal of ETA/ETD)

Use Cases for the VTS Traffic Clearance Service

- The specification draft has been developed according to the MVP (minimum viable product) principle
  - Addresses the relevant operational aspects for selected use cases, implements only the necessary features
- Currently there are two main use cases that cover the essential aspects of the Traffic Clearance Service
- Example: Use case 1 - Departing vessels, using timestamp-based service

1. Vessel wants to leave berth
2. The mariner sends ETD through vessel system to the service and requests permission to leave berth
3. VTS sends response which may include conditions on when vessel can leave the berth
4. Service delivers response to the ship system
5. The mariner acknowledges revised ETD in the ship system and send response to the VTS.

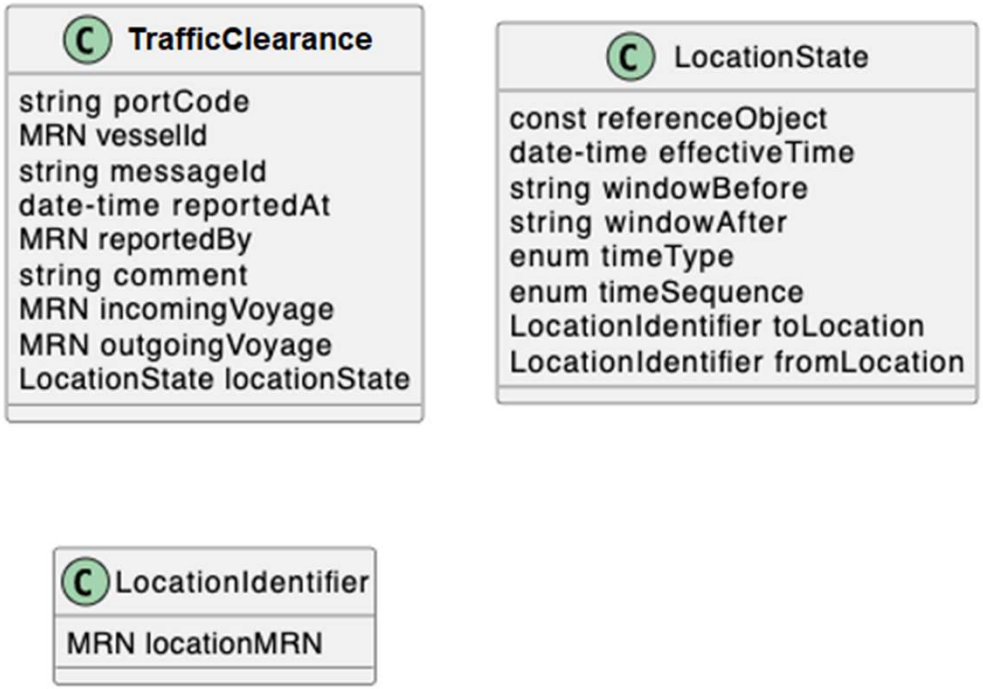
Dataflow of the Traffic Clearance Service



Relevant Standards & Guidelines

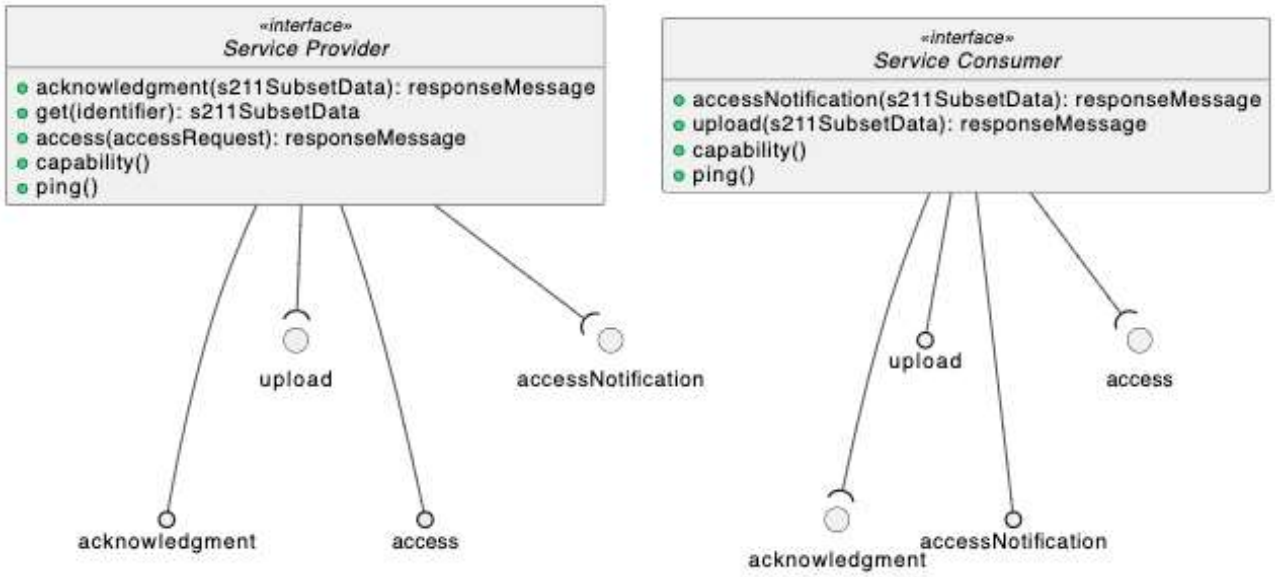
- IALA G1128 The Specification of e-Navigation Technical Services
- IALA G1157 Web Service Based S-100 Data Exchange
- IHO S-100 Universal Hydrographic Data Model
- IALA S-211 Port Call Message Format
- IEC 63172-1:2021 Maritime navigation and radiocommunication equipment and systems - Data interfaces – Part 1: S-421 route plan based on S-100
- IEC 63173-2:2022 Maritime navigation and radiocommunication equipment and systems -Data interfaces – Part 2: Secure communication between ship and shore (SECOM)
- MCC Maritime Messaging Service (draft)

The logical data model of the Traffic Clearance Service



- Service specification describes the logical data model for Traffic Clearance messages between ship and shore
  - Minimal subset of the S-XXX model specifying the data items for Traffic clearance communication
- At the beginning S-421 was used as the reference model, but for both technical and functional issues there was a need for alternative references
  - After review S-211 offered “good enough” basis for specifying a service data model
- Specification guides how different attributes of the data set should be handled and interpreted in the context of traffic clearances

Service Overview – API-based approach



- The Service Interface defines the software interfaces for exchanging the Traffic Clearances data
- Interface design is consistent with SECOM specification (IEC63173-2)
  - Exchange patterns, interface naming and management interfaces (capability, ping)
- Describes the Ship side (Service Provider) and VTS/Shore side (Service Consumer) interfaces

API-based interfaces of the Traffic Clearance Service

ServiceInterface	ExchangePattern	Definition
upload	REQUEST_CALLBACK	Interface for uploading (pushing) ETA/ETD to VTS system. Must be implemented.
acknowledgement	ONE_WAY or REQUEST_CALLBACK	Interface for acknowledgement and response from VTS system to ship of proposed ETA/ETD. Must be implemented.
get	REQUEST_RESPONSE	Interface for VTS system to request information on a specific ETA/ETD and if it has been updated.
access	REQUEST_CALLBACK	Interface for VTS system to request the ship to send a proposed ETA/ETD.
accessNotification	ONE_WAY	Interface for ship to send proposed ETA/ETD to VTS system after it has been requested.
capability	REQUEST_RESPONSE	Interface to ask for the interface capabilities. Must be implemented.
ping	REQUEST_RESPONSE	Interface check status of the service. Must be implemented.

Current phase of the work and challenges

- Accomplishments:
  - The operational context (2 primary and 2 candidate use cases)
  - The draft for the interface specification for the API-based approach (SECOM)
  - The logical data model for the service = What data the service requires from the ship and the shore
- To-do:
  - Developing further the use cases and operational needs for the ship and shore
  - The requirements for the route-based traffic clearance negotiation have to be clarified
  - The interoperability with the event-driven approach still under development (MMS)
  - Provide output for product specification work (S-211, S-212, S-421)
- Challenges:
  - Need for stronger input from ship-side, operational and technical requirements
  - The relevant standards not so easy to use for interactive/transactional exchanges (replacing voice communication)
    - SECOM SOA patterns
    - S-421 xml schema structuring