

## **Agenda item 9 – IALA TECHNICAL ACTIVITIES**

### **9.4 VTS**

#### **9.4.4 IALA VTS Strategy**

##### *9.4.4.2 – Strategy Paper on the Future Delivery of VTS*

### **Draft IALA VTS Strategy Paper addressing the delivery of VTS in a rapidly changing world**

#### **1 Introduction**

The IALA Council at its 53<sup>rd</sup> session approved the proposed task (*VTS34/output/8*) to develop a strategy paper addressing the delivery of VTS in a rapidly changing world.

This task included the following actions:

- 1 Develop an IALA VTS Strategy with regards to the delivery of VTS in a rapidly changing world;
- 2 Identification of possible implications for IMO Resolution A.857(20) Guidelines for Vessel Traffic Services.
  - a. Identify and document:
    - i. the strengths and weaknesses of IMO Resolution A.857(20) in setting the framework for the delivery of VTS;
    - ii. developments in VTS since the existing Resolution was agreed and emerging trends that may be anticipated over the next 10-20 years;
    - iii. possible limitations to addressing the emerging needs and developments for VTS within the existing provisions of IMO Resolution A.857(20).
- 3 Provide a draft IALA VTS Strategy Paper outline and requisite Policy Objectives for the development of VTS to meet the emerging needs and developments over the next 10-20 years.

#### **2 Background**

IALA, through the VTS Committee, deals with all aspects of VTS, including the expanding role in support to vessel monitoring for maritime safety, environmental protection and security. The Committee aims to develop and review VTS related IALA documentation on issues such as the training of VTS personnel, operational procedures, equipment requirements, the impact on the provision of services, responsibilities, the impact of new technologies and the role of VTS in security and global traffic monitoring systems.

The IALA VTS Manual 2012 (Section 0312) states:

*'IALA recognises that the trends in maritime operations towards enhanced safety, security, efficiency, accountability and environmental responsibility, together with anticipated technical advances, will result in significant future change. As a consequence and where appropriate, IALA will initiate and lead developments, influence debate, and produce relevant recommendations and guidelines that may impact on the use or management of aids to navigation, including VTS.'*

In progressing former tasks (Produce Guidelines on the provision of VTS Types of Service and Review/update/provide input to IMO on Resolution A.857(20) - Guidelines for Vessel Traffic Services) possible shortcomings and differing interpretations in the delivery of VTS in a rapidly changing world were highlighted, as requested in paragraph 1 under 2a, i, ii and iii. These are reflected in Annex B.

Furthermore, the Committee identified the compelling need for a high-level policy document describing the objectives for VTS to meet the emerging needs and developments and the adequacy of the existing international framework for VTS.

### **3 General Principles**

To develop the vision for the future delivery of VTS in the next 10 – 20 years, the following principles were agreed to be applied in a VTS Strategy paper

- the development of the Strategy on VTS should fit under the umbrella of the overall IALA Strategy 2014-2026 (approved by Council, December 2013);
- establish a mission statement for VTS based on IALA's aims;
- establish a vision on the future delivery of VTS consistent with IALA's VTS/overall mission statement;
- establish and define the goals to achieve the vision;
- as the Strategy on VTS follows the vision identify the tasks to achieve the goals;
- the Strategy will focus on "what does the maritime domain expects VTS to deliver and what does VTS deliver now";
- a strategic approach will be developed for understanding, acceptance and support of IALA's Strategy for the future delivery of VTS.

### **4 Proposed Mission statement and policy objectives for VTS**

Based on IALA Constitution (Article 2) and the current IALA strategy the following VTS Mission Statement has been developed:

*"IALA's mission for VTS is to foster the safe, economic and efficient movement of vessels and the protection of the marine environment, through improvement and harmonization of the delivery of VTS worldwide in a rapidly changing maritime environment, for the benefit of the maritime community and in support of other services."*

### **5 Vision**

Due to the increasing role of VTS and its capabilities for information management and the international nature of maritime transport where boundaries do not exist anymore, it is foreseen that:

*"Future VTS services are likely to be adopted from berth to berth to facilitate safe, efficient and economic movement of vessels and protection of the marine environment in a changing maritime domain."*

Trends, such as globalization and the extensive use of new information and communication technologies have already provided opportunities for enhanced interaction and information sharing, not only between ships and shore-based authorities, but also – with reference to Guideline 1102 on *VTS Interaction with Allied and Other Services* as approved by Council - with and between many other stakeholders.

The complexity of utilization of the manoeuvrable space for shipping is growing, threatening the maritime use of the sea. As a result, safe navigation and accessibility in many sea, coastal and port approaching areas worldwide are increasingly under pressure. The need for proactive

management of vessel traffic in these areas is rapidly growing, as well as the need for enhancement of the interaction between ships and relevant shore based authorities.

Management of operational space from a shipping perspective by evolving VTS, supported by the capabilities of e-Navigation and its Maritime Service Portfolio developments, and in conjunction with the development of guidelines for Marine Spatial Planning are seen as candidate combinations on how to deal with the challenges ahead, in order to secure future safe and efficient navigation.

The relevant conclusions of the 12<sup>th</sup> IALA VTS Symposium, Istanbul/Turkey 2012, were:

- The full potential of VTS is still to be realised, particularly when compared to similar services in the aviation world, including Maritime Spatial Planning;
- There is a compelling need to establish stand-alone communication procedures for VTS to facilitate clear and unambiguous transfer of information;
- There are clear benefits in extending VTS beyond its current limits, noting increasing co-operation between competent authorities. The delivery of VTS beyond territorial seas requires clarification and certainty.
- There is increasing awareness, public perception of, and expectation for, VTS. This places an enhanced degree of accountability on maritime administrations and their subsequent management of VTS.
- There is a compelling need for mandatory training for VTS operators in order to ensure a consistent and harmonised delivery of VTS worldwide.

Based on the above it is expected that the current tasks and traffic management functionalities of VTS, as reflected in IMO Resolution A.857(20) and in various IALA Recommendations and Guidelines, will extend and be executed in an increasingly innovative manner responding to changing user needs and public expectations.

The worldwide harmonized provision of present and future Vessel Traffic Services, their procedures and usage of technologies shall be the ultimate aim, but focus should be kept on two **basic principles**:

- the recognition that on a worldwide, regional, national or local level circumstances may differ due to for instance geographical characteristics, traffic density and diversity, accessibility, environmental conditions and the position and role of VTS in the maritime domain in a certain area;
- the determination and decision of which services, and on what level they shall be provided to shipping and other stakeholders in their areas of responsibility, will remain assigned to the relevant national, regional or local authorities.

## **6 Strategy, goals and tasks for the development of future VTS**

A general overview of the VTS strategy, its goals and relevant references to IALA's activities (tasks) has been refined and is reflected in Annex A.

## **7 A strategic approach for acceptance and support of IALA's strategy for the future delivery of VTS**

It is envisaged that a strategy and vision on the future delivery of VTS may have an impact on current legislation, responsibilities of organizations, service provision, coverage, procedures, training, technical infrastructure and equipment. It is also envisaged that this will affect IMO Resolution A.857(20), and finally SOLAS Chapter V.

Taking into account the current positions and the workload at the IMO, the support for a top-down process – SOLAS > Resolution A.857(20) > IALA Guidelines and Recommendations – is unlikely and unrealistic and therefore would restrict VTS developments in IALA.

IALA's role is to continue the development of all relevant aspects of future VTS, a role which is envisaged of growing importance by the Secretary General of the IMO in the development of a concept for a Sustainable Maritime Transportation System (SMTS).

Therefore a strategic approach has been explored and developed for understanding, acceptance and support of IALA's Strategy for the future delivery of VTS. This so-called "*gradual bottom-up*" approach, reflected in Annex C, may also be used as the main skeleton for a Communication Plan to the development process.

**ANNEX A - GENERAL OVERVIEW OF THE RELEVANT GOALS AND IALA'S ACTIVITIES (TASKS)  
IN ACCORDANCE WITH IALA'S STRATEGY  
AND THE WORKPROGRAMME 2014-2018 FOR THE VTS COMMITTEE**

**IALA VTS STRATEGIC VISION**

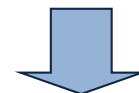
***IALA's mission for VTS is to foster the safe, economic and efficient movement of vessels and the protection of the marine environment, through improvement and harmonization of the delivery of VTS worldwide in a rapidly changing maritime environment, for the benefit of the maritime community and in support of other services.***

G1.- Worldwide harmonized use of the potential of VTS to meet new user-driven challenges and developments in the maritime domain, e.g. the concept of a Sustainable Maritime Transportation System	G2.- Worldwide harmonized, coordinated and seamless delivery of VTS	G3. - Harmonized technology framework, supportive to VTS, in accordance with international standards and developments	G4. - Harmonized training and certification of VTS personnel
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G1 S1. - Identify the consequences for VTS as affected by the new challenges and future developments in the maritime domain and provide guidance for transparent regulations.  <i>Tasks: 1.1.2, 1.1.4, 1.1.6, 1.3.1, 1.4.1, 1.4.2, new*</i>	G2 S1.- Foster extension of VTS beyond its current limits, noting increasing interaction shore/ship and co-operation between competent authorities, including the development of relevant Maritime Services Portfolios  <i>Tasks: 1.1.4, 1.3.1, 1.4.1, 1.4.2</i>	G3 S1.- Promote mandatory technical minimum standards for VTS (shore based equipment) including data and information exchange  <i>Tasks: 1.1.4, 2.1.1, 2.2.1, 2.2.2, 2.3.1</i>	G4 S1. - Develop a VTS training Manual to complement Recommendation V-103 and its model courses  <i>Tasks: 3.1.2</i>
G1 S2. - Develop worldwide management of vessel traffic in a harmonized, transparent and uniform manner  <i>Tasks: 1.1.2, 1.1.4, 1.1.6, 1.3.1, 1.4.1, 1.4.2, new*</i>	G2 S2.- Give guidance on the functional and technical implementation of inter-VTS data sharing and information exchange processes  <i>Tasks: 1.1.4, 1.3.1, 1.4.1, 1.4.2, 2.3.1</i>	G3 S2. - Promote the use of and further development of standards for traffic planning and risk assessment tools in support of VTS operations  <i>Tasks: new*</i>	G4 S2. - Promote the need for mandatory training and certification for VTSO in accordance with IALA standards  <i>Tasks: 3.1.1, 3.1.2</i>
G1 S3.- Develop guidance on legal provisions regarding data and information management for VTS and its relationship to other stakeholders  <i>Tasks: 1.4.1, 1.4.2</i>	G2 S3. - Support multiple allied and other services  <i>Tasks: 1.1.4, 1.3.1, 1.4.1, 1.4.2, 2.3.1</i>	G3 S3.- Use of harmonized validation and certification instruments for VTS worldwide  <i>Tasks: 1.1.4, 2.1.1, 2.2.1, 2.2.2, 2.3.1 - new*</i>	G4 S3. - Promote accreditation of training organizations for VTS personnel using harmonized audit instruments  <i>Tasks: 3.1.1, 3.1.2</i>
G1 S4. - Promote increased awareness among mariners concerning the delivery of services by VTS  <i>Tasks: 3.4</i>	G2 S4. - Develop stand-alone communication procedures for VTS to facilitate clear and unambiguous transfer of information  <i>Tasks: 1.3.1</i>	G3 S4. - Give guidance on the use of VTS systems, equipment and applications complying with the shore-based architecture as developed within the e-Navigation concept  <i>Tasks: 1.1.4, 2.1.1, 2.2.1, 2.2.2, 2.3.1, 3.3.1</i>	G4 S4. - Promote and develop guidance on competence-based training for VTS personnel into current IALA Recommendations, Guidelines and Model Courses and those under development.  <i>Tasks: new*</i>
G1 S5. Review and harmonize VTS related definitions and descriptions for insertion in the IALA domain of the IHO S-100 GI Register	G2 S5. - Promote and provide guidance on the evaluation of VTS performance by common accepted and harmonized quality control standards		

Tasks: 2.4, new*	Tasks: new*		
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\* foreseen new or additional tasks, further to be identified and developed after Council approval of the Strategy



VTS COMMITTEE WORK PLAN 2		Approved by Council(59)	
Strategy Technical Domain	TD#1 Operational	TD#2 Technical	TD#3 Training
1.1. VTS operations, service standards, and performance measures	1.1.2. Update the VTS Manual 1.1.3. Produce a Guideline on incident / accident / near miss reporting and recording as it relates to VTS 1.1.4. Produce a Guideline on Maritime Service Portfolios for VTS 1.1.6. Produce a Guideline on Measures to Evaluate the Effectiveness of a VTS		
1.2. Inter-VTS operations, interactions with allied and other services	1.2.1. Produce a Guideline on public and media relations in special / defined circumstances		
1.3. VTS communications	1.3.1. Produce a Recommendation / Guideline on VTS Communications		
1.4. Monitoring and evaluating developments in VTS and potential impacts on the recognized framework for VTS	1.4.1. Develop an "IALA VTS Strategy Paper" with regards to the delivery of VTS in a rapidly changing world and the possible implications for IMO Resolution A.857(20) Guidelines for Vessel Traffic Services - See also task 1.1.4 - 1.4.2. Review/update/provide input to IMO on Resolution A.857(20) Guidelines for VTS - See also task 1.1.4 -		
2.1. VTS systems technology, Sensors, Presentation		2.1.1. Produce a Recommendation on the portrayal of VTS information and data	
2.2. VTS equipment standards and performance requirements		2.2.1. Develop Guidance on the technical acceptance of a VTS system 2.2.2. Review V-128 – Operational and Technical Performance Requirements for VTS Equipment	
2.3. Inter-VTS data exchange		2.3.1. Provide a Guideline on the technical interface between VTS systems and the systems of other stakeholders	
2.4. Data populating for S-100		- See task 1.1.4 -	
3.1. Qualification, training, and certification of VTS personnel			3.1.1. Develop a Guideline on Revalidation Process for VTS Certification 3.1.2. Produce a VTS Training Manual to complement the V-103 and its model courses
3.2. Accreditation and approval process for VTS training			

3.3. Human factors		3.3.1. Develop guidance on human factors and ergonomics in VTS
3.4. VTS training for navigating officers		
3.5. Support for the WWA		See task 3.1.2

## ANNEX B

### 1 - STRENGTHS AND WEAKNESSES OF THE CURRENT IMO RESOLUTION A.857(20)

Strengths	Weaknesses
Vessel Traffic Services (VTS) are recognised under SOLAS, (Chapter V Regulation 12) as contributing to safety of life at sea, safety and efficiency of navigation and protection of the marine environment.	The Resolution is over 18 years old and was written: <ul style="list-style-type: none"> <li>• prior to last SOLAS amendment relating to VTS (textual change in 1997 and adopted in 1999);</li> <li>• prior to modern technologies;</li> <li>• at a time when VTS was in its infancy. VTS is now a mature and established partner in the maritime domain with respect to its role, function and interaction with other services;</li> <li>• at a time when the globalisation of maritime shipping had just commenced and the impact on VTS (boundaries, responsibilities, etc.) was unclear.</li> </ul>
Provides Internationally recognised guidelines for Contracting Governments / Competent authorities to authorise VTS Authorities to deliver VTS services worldwide	Although there is a mechanism to amend the Resolution it is recognized that the process often requires considerable inter-government coordination which may prevent changes in a timely manner to meet recent developments, stake-holders requirements and maintain transparency and currency.
Provides guidance as to the responsibilities and liabilities of VTS authorities	<ul style="list-style-type: none"> <li>• The definitions are in need of review and amendment as identified by IALA recent guidance.</li> <li>• In addition new definitions are also required. It has been recognized that commonly accepted and unambiguous definitions are in line with the IMO harmonization policy.</li> </ul>
Provides internationally recognised guidelines for planning and implementing a VTS	The types of services need to be more clearly defined as they currently are a source for continuous debate.
Provides internationally agreed guidelines on recruitment, qualification and training of VTS operators	It needs to provide guidance on the requirements for validity, renewal or compulsory expiry of certification.
The delivery of VTS services is transparent to mariners	Guidance is also needed for: <ul style="list-style-type: none"> <li>• the development and implementation of VTS related Maritime Service Portfolios under e-navigation</li> <li>• the management of maritime data and information,</li> </ul>

	<ul style="list-style-type: none"> <li>ensuring a legal basis for information sharing and re-use of data in accordance with national and international law</li> <li>VTS - Pilotage interoperability</li> </ul> <p>There are services which, from a mariner's point of view, appear very similar to VTS (e.g. commercial operators wind and fish farms and other offshore installations), which are provided by non-VTS Authorities, these services are not bound by the present Resolution.</p>
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## 2 - DEVELOPMENTS AND EMERGING TRENDS

<b>Developments in VTS since the existing Res. A.857(20) was agreed</b>	<b>Technology –</b> AIS, CCTV, LRIT, Satellite based AIS, Computer Technology, New Radar Technology, new Symbolology, Electronic Nautical Charts.
	<b>Communications –</b> AIS, Network technologies, VOIP, implementation of GMDSS, VHF Channelling, introduction of electronic notifications, implementation of high speed digital communications.
	<b>Guidance –</b> <ul style="list-style-type: none"> <li>Primary tasks of VTS evolved since the first development of the Res. A.857(20).</li> <li>New and reviewed IALA Recommendations and Guidelines have not been incorporated since 1997.</li> </ul>
	<b>VTS in maritime domain -</b> Increasing interaction outside traditional VTS - due to globalization of shipping and the increasing information position of VTS and its increasing communications capabilities
	<b>Legislation/regulations -</b> Implementation of <ul style="list-style-type: none"> <li>ISPS Code (Security)</li> <li>International Aeronautical and Maritime Manual on Search and Rescue (IAMSAR)</li> <li>Monitoring Guidelines on Dangerous Goods</li> <li>Guidelines on Marine Spatial Planning</li> </ul>
<b>Emerging trends that may / are to be anticipated over the next 10-20 years</b>	<b>General -</b> <ul style="list-style-type: none"> <li>Increasing public expectation for safety, security and environmental protection in the marine environment.</li> <li>Approval of the e-Navigation Strategic Implementation Plan (SIP), MSC94 2014.</li> <li>Need for operational delivery of primary tasks of VTS will grow due to increasing intensity and diversity of shipping</li> <li>Scale enlargement of ships;</li> </ul>



	<ul style="list-style-type: none"> <li>• Economies of scale in shipping;</li> <li>• Claims for alternative use of maritime manoeuvrable space (e.g. windfarms, fish farms);</li> <li>• Growing perception that the organization of maritime traffic (including most if not all types of shipping) should be further developed.</li> </ul> <p><b>Operational:</b></p> <ul style="list-style-type: none"> <li>• A shift of focus towards Traffic Organisation Service;</li> <li>• An increase of route and traffic planning, including utilisation of planning and decision making instruments;</li> <li>• Increase of routing advices (berth-to-berth) from shore to ship;</li> <li>• Worldwide increase of the number of Traffic Separation Schemes (TSSs)</li> <li>• Increasing IMO adopted Ship Reporting Systems;</li> <li>• Increasing needs for the implementation of VTS beyond territorial waters in high density traffic areas;</li> <li>• An increasing need for collaboration between neighbouring VTSs;</li> <li>• A rapid automation of VTS related port processes</li> <li>• An increasing need for linking to the logistic chain;</li> <li>• An increasing use of VTS for navigational efficiency and planning in collaboration with other nautical services;</li> <li>• An increasing need from other parties for access to information available from VTS (due to its increasing information position).</li> </ul> <p><b>Communications -</b></p> <ul style="list-style-type: none"> <li>• Digitalisation of maritime VHF frequencies is foreseen and most probably autonomous and irreversible;</li> <li>• Utilization of new technologies (under e-Navigation), including development of VDES;</li> <li>• Modernization of the GMDSS.</li> </ul> <p><b>Organization and responsibilities:</b></p> <p>The introduction of new services (development of Maritime Service Portfolios under e-navigation) may lead to</p> <ul style="list-style-type: none"> <li>• new responsibilities and liabilities of the VTS, VTSOs and the VTS Authorit(y)ies;</li> <li>• changes in the traditional operational structure of the organizations;</li> <li>• new or extra competences for VTSO on various levels;</li> <li>• the need to respond to (evolving) Quality Management Systems.</li> </ul> <p><b>Legislation -</b></p> <ul style="list-style-type: none"> <li>• Due to the increasing complexity of international maritime shipping an increase of legislation, regulations and guidelines for operating VTS are to be expected;</li> <li>• Certification of the performance of VTS is expected, the need for certification of the VTS organization may be studied;</li> <li>• The imbedding of changes in SOLAS V, Regulations 11 and 12.</li> </ul>
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	<p><b>Training and Simulation</b></p> <ul style="list-style-type: none"><li>• Due to all foreseen developments training Guidelines and Model Courses may have to be reviewed and adjusted to new operational needs;</li><li>• The requirements for competence based and simulation training will have to be further developed and increased;</li><li>• Need for an internationally recognized VTSO certification (in a system similar to STCW).</li></ul>
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### **3 LIMITATIONS WITHIN THE EXISTING IMO RESOLUTION A.857(20)**

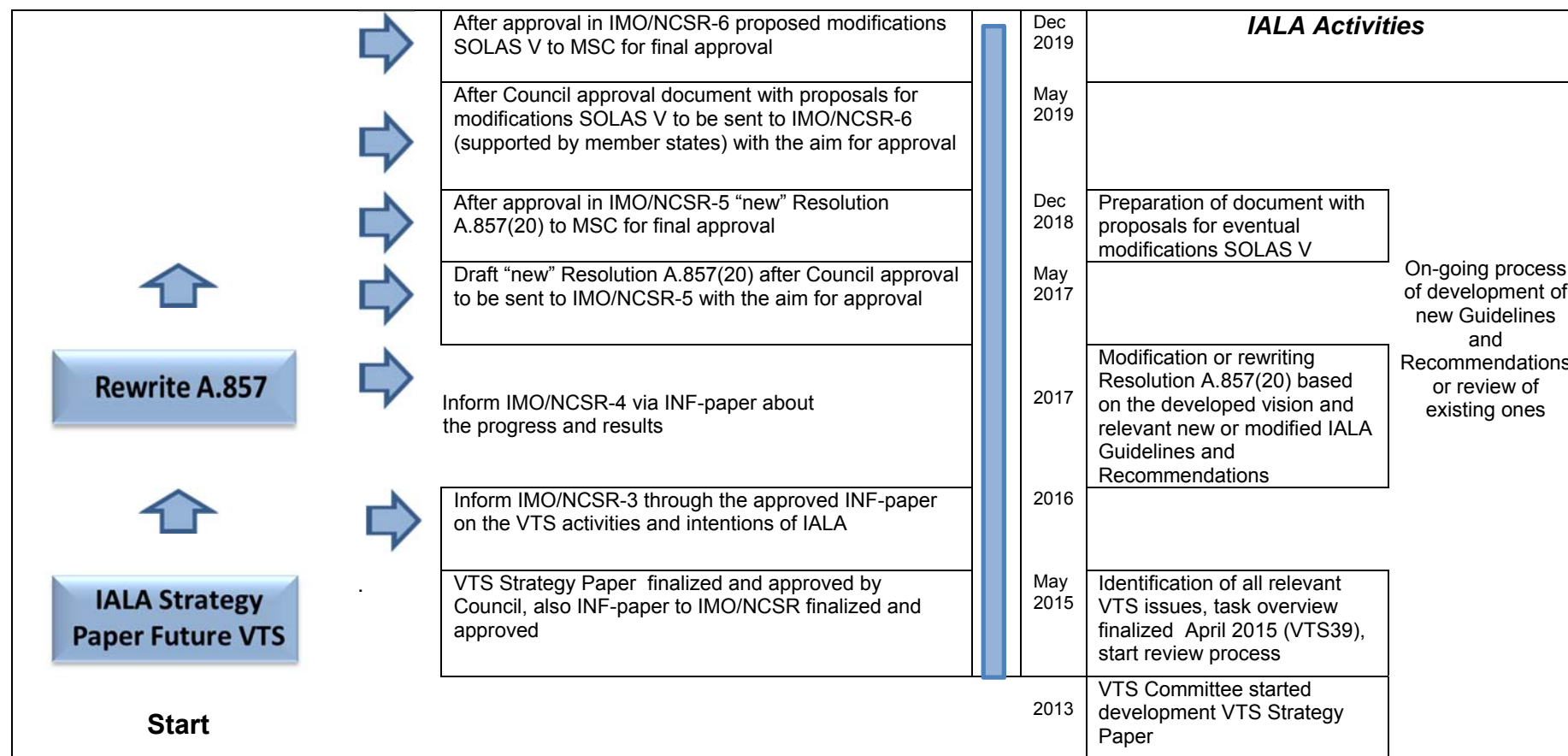
The present Resolution (written in 1997, the structure of the document has never changed) is not flexible enough and may obstruct the introduction of new items, such as the operation of NAS, VTS supporting other services (incl. security), VTS beyond territorial waters, berth-to-berth advice from shore, implementation of VTS related Maritime Service Portfolios under e-Navigation etc.

The relationship with other (also evolving) services and its consequential responsibilities and liabilities may also be constrained by the existing Resolution. Textual changes to the current Resolution will not promote the transparency and its unambiguity. Rewriting the Resolution is therefore recommended. Consequential aspects in respect to SOLAS Chapter V (Regulations 10, 11, 12) for a future delivery of VTS in a rapidly changing maritime domain need further preceding study by IALA.

## ANNEX C - A POSSIBLE STRATEGIC APPROACH FOR ACCEPTANCE AND SUPPORT OF IALA'S STRATEGY FOR THE FUTURE DELIVERY OF VTS

As indicated in chapter 7 it is unlikely and unrealistic to expect that, given the circumstances, a top-down process in the IMO – proposed modification of SOLAS >> rewriting Resolution A.857(20) >> development or modification of IALA Guidelines and Recommendations – will lead to success in the years ahead. Such a slow process will restrict VTS developments and IALA's work.

For tactical reasons a strategic approach has been explored and developed for understanding, acceptance and support of IALA's Strategy for the future delivery of VTS. This so-called **“gradual bottom-up”** approach is reflected in the high-level scheme below.



*Note: The indicative time schedule - IMO Meeting schedule and slow decision processes taken into account - may have to be adjusted as work progresses*