



MARITIME SAFETY COMMITTEE
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WORK PROGRAMME

A coordinated approach to the implementation of the e-navigation strategy

Note by the Secretariat

SUMMARY

<i>Executive summary:</i>	This document proposes a coordinated approach to the implementation of the e-navigation strategy. It includes a proposal for a joint plan of work for the COMSAR, NAV and STW Sub-Committees for the period 2009-2012
<i>Strategic direction:</i>	5.2
<i>High-level action:</i>	5.2.4
<i>Planned output:</i>	5.2.4.4
<i>Action to be taken:</i>	Paragraph 17
<i>Related documents:</i>	NAV 54/25 and MSC 85/26 (paragraphs 11.18 to 11.24 and annexes 20 and 21)

Introduction

- 1 At its eighty-fifth session, the Committee:
 - .1 approved the Strategy for the development and implementation of e-navigation, as set out in MSC 85/26, annex 20;
 - .2 approved the Framework for the implementation process for the e-navigation strategy along with a time frame for implementation of the proposed e-navigation strategy, as set out in MSC 85/26, annex 21; and
 - .3 endorsed the NAV Sub-Committee's decision that the Chairmen along with the Secretaries of the COMSAR, NAV and STW Sub-Committees should jointly develop a coordinated approach to implement the proposed e-navigation strategy.
- 2 Consequently, the Committee agreed to include, in the work programme of the COMSAR, NAV and STW Sub-Committees, a high-priority item on "Development of an e-navigation strategy implementation plan", with four sessions needed to complete the item, assigning the NAV Sub-Committee as a coordinator.

Development of an e-navigation strategy implementation plan

3 The ultimate output of the joint work by the COMSAR, NAV and STW Sub-Committees over the period 2009-2012 is the delivery of an e-navigation strategy implementation plan, which, after its adoption by the Committee, should lay the foundation for the (phased) implementation of e-navigation itself.

4 The strategy implementation plan should at least include:

- .1 identification of responsibilities to appropriate organizations/parties;
- .2 transition arrangements;
- .3 a phased implementation schedule along with possible roadmaps to clarify common understanding necessary for the implementation;
- .4 priorities for deliverables, resource management and a schedule for implementation and the continual assessment of user needs;
- .5 proposals for a systematic assessment of how new technology can best meet defined and evolving user needs;
- .6 a plan for the development of any technology and institutional arrangements necessary to fulfil the requirements of e-navigation in the longer term;
- .7 proposals on public relations and promotion of the e-navigation concept to key stakeholder and user groups; and
- .8 identification of potential sources of funding for development and implementation, particularly for developing regions and countries and of actions to secure that funding.

5 In order to prepare the strategy implementation plan several steps are required, such as capturing evolving user needs, developing an architecture and undertaking a gap analysis, a cost-benefit analysis and a risk analysis. These elements should provide a common and informed foundation for the creation of a detailed strategy implementation plan. On completion of the e-navigation strategy implementation plan, its implementation could begin in 2012.

Step 1: user needs

6 The first step in the development of a strategy implementation plan is the identification of users and their requirements. The identification of the initial user needs has been completed by NAV 54 and includes the groups of functions/services needed to meet primary navigational needs based on a structured, systematic and traceable methodology that leads to tangible operational benefits. More detailed user needs, in particular scaled solutions, may need to be developed as a part of the overall implementation plan. The initial user needs should be further reviewed and prioritized by 2009.

Step 2: architecture

7 The overall conceptual, functional and technical architecture will need to be developed and maintained, particularly in terms of process description, data structures, information systems, communications technology and regulations. The architecture should include the hardware, data, information, communications technology and software needed to meet the user needs. The system architecture should be based on a modular and scalable concept. The system hardware and software should be based on open architectures to allow scalability of functions according to the needs of different users and to cater to continued development and enhancement. This initial architecture should be ready for a coordinated review by 2009 and completion by 2010.

Step 3: gap analysis

8 The NAV Sub-Committee has already started a preliminary gap analysis. Taking into account the human element throughout the process, further gap analyses should focus on technical, regulatory, operational and training aspects. It is recognized that these aspects are inter-related and need to be considered in a coordinated manner. The initial gap analysis needs to be completed by 2010.

9 The gap analysis should focus on the following elements:

- .1 technical gap analysis, comparing the capabilities and properties of existing systems with the architectural requirements to identify any technology or system development that might be needed, based solely on the user needs. This should result in a programme of development work that needs to be done to provide technology solutions to user requirements in their entirety;
- .2 regulatory gap analysis, particularly identifying gaps in the present frameworks that need to be filled, e.g., in the provision of services in international waters. Based on this analysis, any institutional reform that is needed should be proposed for implementation;
- .3 operational gap analysis, to define a baseline concept of operations that could be used based on the integration of existing technology and systems and the extent to which implementation of e-navigation could enhance operations; and
- .4 training gap analyses will logically follow the others to ensure that any technology or systems introduced as a component of e-navigation will include an appropriate level of instruction for the individuals that will be entrusted with its operation.

Step 4: cost-benefit and risk analyses

10 Cost-benefit and risk analyses should be an integral part of the plan. They should be used to support strategic decisions if, as and when certain functions need to be enabled. The analyses should address financial and economic aspects as well as assess the impact on safety, security and the environment. This should be completed by 2011.

Coordinated approach to the implementation of the e-navigation strategy

11 Recognizing that the development of an e-navigation strategy implementation plan needs a joint effort by the COMSAR, NAV and STW Sub-Committees, MSC 85 endorsed the

NAV Sub-Committee's decision that the Chairmen along with the Secretaries of the COMSAR, NAV and STW Sub-Committees should jointly develop a coordinated approach to implement the proposed e-navigation strategy.

12 The ultimate strategy implementation plan should be a result of the joint effort by the involved Sub-Committees. Within the framework established by the e-navigation strategy, all three Sub-Committees will follow the above four steps, as appropriate, and each from their own focus:

- .1 NAV: overall coordination; navigational aspects (equipment, ship reporting and vessel traffic management);
- .2 COMSAR: communication and SAR aspects (equipment, procedures); and
- .3 STW: training aspects¹.

13 The Chairmen of the involved Sub-Committees, in co-operation with the Secretariat, have prepared the joint plan of work attached as an annex to this document, which clearly identifies the timelines including the planned outputs for each relevant Sub-Committee. In the preparation of the joint plan of work, careful thought has been given to identifying the specific work and planned output for each meeting of the NAV, COMSAR and STW Sub-Committees over a period of four years, i.e. from 2009 to 2012.

14 The proposed schedule is ambitious. The work of NAV and COMSAR might need to be supplemented by intersessional work by correspondence and, if necessary, by a joint working group to attain real benefit from the outcome of the corresponding sessions of COMSAR, NAV and STW. The joint plan of work identifies the need and a general indication of the terms of reference of such groups.

15 Moreover, in order to anticipate and call for timely contributions both from Member Governments and relevant IGO/NGOs, the joint plan of work has tried to conceptualize the expected outputs and inputs for all relevant meetings in the forthcoming years.

16 The plan also broadly identifies what specific tasks IMO, having the lead as to the governance of the e-navigation concept, might wish to delegate, as appropriate, to other competent outside organizations, e.g., IALA, IHO, IEC, ISO, CIRM and others.

Action requested of the Committee

17 The Committee is invited to consider and approve the annexed joint plan of work for the COMSAR, NAV and STW Sub-Committees, in order to enable NAV 55 in July 2009 to set in motion the coordinated and planned development of an e-navigation strategy implementation plan.

¹ The e-navigation strategy identifies training, competency, language skills, workload and motivation as essential. Alert management, information overload and ergonomics are prominent concerns. These aspects of e-navigation will have to be taken into account in accordance with IMO's Human Element work.

ANNEX

**A COORDINATED APPROACH TO THE IMPLEMENTATION OF THE
E-NAVIGATION STRATEGY.**

**Proposed joint plan of work for the COMSAR, NAV and STW Sub-Committees
for the period 2009-2012**

A COORDINATED APPROACH TO THE IMPLEMENTATION OF IMO'S E-NAVIGATION STRATEGY SUMMARY OVERVIEW: TIMELINE + PLANNED OUTPUTS				
Y	Q	meeting	output	year deliverable
2009	2	MSC 86	Approval of joint plan of work (coordinated approach) Coordination meeting Chairmen COMSAR, NAV, STW and Secretariat	<ul style="list-style-type: none"> ▪ Identification and prioritization of user needs
	3	NAV 55	Finalization of user needs; Initial identification of system architecture; Start performance of initial gap analysis; Decision on methodology for C/B- and risk analyses.	
2010	1	COMSAR 14	Identification of system architecture; Performance of initial gap analysis; Performance of initial C/B- and risk analyses.	<ul style="list-style-type: none"> ▪ Description of system architecture; ▪ Initial gap analysis
	1	STW 41	Answers to questions related to initial gap analysis; Answers to questions related to C/B- and risk analyses.	
	2	MSC 87	Coordination meeting Chairmen COMSAR, NAV, STW and Secretariat	
	3	NAV 56	Finalization of initial system architecture; Completion of initial gap analysis; Completion of initial C/B- and risk analyses.	
	4	MSC 88	Coordination meeting Chairmen COMSAR, NAV, STW and Secretariat	
2011	1	COMSAR 15	Performance of further gap analysis; Performance of further C/B- and risk analyses.	<ul style="list-style-type: none"> ▪ Final gap analysis; ▪ Cost-benefit analysis; ▪ Risk analysis
	1	STW 42	Answers to questions related to further gap analysis; Answers to questions related to C/B- and risk analyses	
	2	MSC 89	Coordination meeting Chairmen COMSAR, NAV, STW and Secretariat	
	3	NAV 57	Finalization of gap analysis; Finalization of cost-benefit and risk analyses; Provisional outline/draft of the Strategy Implementation Plan.	
2012	1	COMSAR 16	Relevant input to NAV 58 with regard to the finalization of the Strategy Implementation Plan.	<ul style="list-style-type: none"> ▪ e-navigation Strategy Implementation Plan
	1	STW 43	Relevant input to NAV 58 with regard to the finalization of the Strategy Implementation Plan.	
	2	MSC 90	Coordination meeting Chairmen COMSAR, NAV, STW and Secretariat	
	3	NAV 58	Finalization of the Strategy Implementation Plan	
	4	MSC 91	Adoption of the Strategy Implementation Plan	

E-NAVIGATION: A COORDINATED APPROACH TO THE IMPLEMENTATION OF IMO's E-NAVIGATION STRATEGY					
Step/Element	Objective	Time frame	Work S/C's	WG/CG	External input
User needs	<p>The first step in the implementation process, i.e. identifying the initial user needs, has been completed and includes the groups of functions/services needed to meet primary navigational needs based on a structured, systematic and traceable methodology that leads to tangible operational benefits.</p> <p>More detailed user needs, in particular scaled solutions, may need to be developed as a part of the overall implementation plan.</p> <p>In order to capture evolving user needs, it is important that the implementation strategy elements remain under review. A structured approach will be required to capture evolving user needs, making use of the existing agreed methodology, to incorporate any ensuing changes into the strategy and implementation plan.</p>	Completed by 2009	<p>NAV 55 (2009):</p> <ul style="list-style-type: none"> to review and finalize the development of more detailed user needs. 	Establishment of a WG on e-navigation	<p>IALA has continued to work on the issue of user needs during September 2008 and will continue to do so during March 2009. It is expected that IALA would put in a paper to NAV 55 on this issue.</p> <p>The EU project on Maritime Navigation and Information Services (MarNIS) will be completed early 2009. It is expected that the EU will submit a paper to NAV 55 to report on the relevant outcomes of the project.</p>

E-NAVIGATION: A COORDINATED APPROACH TO THE IMPLEMENTATION OF IMO's E-NAVIGATION STRATEGY					
Step/Element	Objective	Time frame	Work S/C's	WG/CG	External input
Architecture	<p>Development of the overall conceptual, functional and technical architecture, particularly in terms of process description, data structures, information systems, communications technology and regulations.</p> <p>Preliminary work on architecture has been undertaken and reported on in NAV 53/13.</p> <p>The architecture should include the hardware, data, information, communications technology and software needed to meet the user needs.</p> <p>The system architecture should be based on a modular and scaleable concept. The system hardware and software should be based on open architectures</p> <ul style="list-style-type: none"> ▪ to allow scalability of functions according to the needs of different users; and ▪ to cater to continued development and enhancement. 	Coordinated review by 2009; Completed by 2010.	<p>NAV 55 (2009):</p> <ul style="list-style-type: none"> ▪ to review the preliminary work on architecture (NAV 53/13); ▪ to specify/plan the further work needed on architecture; ▪ to identify existing systems and new navigation technologies supporting user needs and complying with equipment performance standards; ▪ to define conditions for the selection of hardware and the development of corresponding software. 	<p>Establishment of a WG on e-navigation</p> <p>Establishment of a CG:</p> <ul style="list-style-type: none"> • to continue work on this task • to provide an interim report for consideration by COMSAR 14; • to provide a final report for consideration by NAV 56 <p>COMSAR 14 to establish a WG on e-navigation</p>	<p>Invite Member Governments:</p> <ul style="list-style-type: none"> • to actively participate in the CG; • to submit relevant views, proposals and comments to COMSAR 14 and NAV 56, as appropriate <p>Invite the Industry (ICS, CIRM, IACS, a.o.) and User Groups (IFSMA, ITF, IMPA, a.o.):</p> <ul style="list-style-type: none"> • to actively participate in the CG; • to submit relevant views, proposals and comments to COMSAR 14 and NAV 56, as appropriate <p>Invite IALA:</p> <ul style="list-style-type: none"> • to continue its work on the shoreside infrastructure; • to actively participate in the CG; • to report to COMSAR 14 and NAV 56, as appropriate.
			<p>COMSAR 14 (2010):</p> <ul style="list-style-type: none"> ▪ to consider the interim report of the Correspondence Group; ▪ to identify existing systems and new communication technologies supporting user needs and complying with equipment performance standards; ▪ to define conditions for the selection of hardware and the development of corresponding software. 		
			<p>NAV 56 (2010):</p> <ul style="list-style-type: none"> ▪ to consider the recommendations of COMSAR 14 concerning the various components of the system architecture; ▪ to consider the final report of the Correspondence Group; ▪ to consolidate and finalize the initial system architecture. 	Establishment of a WG on e-navigation	

E-NAVIGATION: A COORDINATED APPROACH TO THE IMPLEMENTATION OF IMO's E-NAVIGATION STRATEGY					
Step/Element	Objective	Time frame	Work S/C's	WG/CG	External input
Gap analysis	<p>Preliminary gap analysis has already been started by NAV.</p> <p>Taking into account the human element throughout the process, further gap analyses should focus on technical, regulatory, operational and training aspects. It is recognized that these aspects are inter-related and need to be considered in a coordinated manner.</p>	<p>Initial gap analyses: 2010; Full gap analyses: 2011</p>	<p>NAV 55 (2009):</p> <ul style="list-style-type: none"> to identify existing systems that could be integrated into the e-navigation concept; to perform a gap analysis relating to technical, regulatory and operational aspects. 	<p>Establishment of a WG on e-navigation</p> <p>Establishment of a CG to continue work on this task</p>	<p>Invite Member Governments, the Industry and User Groups to submit relevant views, proposals and comments to COMSAR 14 and NAV 56, as appropriate.</p>
			<p>COMSAR 14 (2010):</p> <ul style="list-style-type: none"> to identify existing systems that could be integrated into the e-navigation concept; to perform a gap analysis relating to technical, regulatory and operational aspects. 	Establishment of a WG on e-navigation	<p>Invite IALA [and IHO]:</p> <ul style="list-style-type: none"> to perform a gap-analysis on the shoreside aspects; to report to COMSAR 14 and NAV 56, as appropriate.
			<p>STW 41 (2010): see Note</p> <ul style="list-style-type: none"> to address specific questions/issues raised by NAV and/or COMSAR. 		
			<p>NAV 56 (2010):</p> <ul style="list-style-type: none"> to complete and consolidate the initial gap analysis 	<p>Establishment of a WG on e-navigation</p> <p>Re-establishment of the CG to continue work on this task</p>	<p>Invite Member Governments, the Industry and User Groups to submit relevant views, proposals and comments to COMSAR 15 and NAV 57, as appropriate.</p> <p>Invite IALA [and IHO] to finalize its gap-analysis on the shoreside aspects and to report to COMSAR 15 and NAV 57, as appropriate.</p>
			<p>STW 42 (2011): see Note</p> <ul style="list-style-type: none"> to address specific questions/issues raised by NAV and/or COMSAR. 		
			<p>COMSAR 15 (2011):</p> <ul style="list-style-type: none"> to finalize its technical, regulatory and operational gap analysis. 	Establishment of a WG on e-navigation	
			<p>NAV 57 (2011):</p> <ul style="list-style-type: none"> to finalize the full gap analysis. 	Establishment of a WG on e-navigation	

Note: STW has already reviewed the training and certification requirements for deck officers. In this context, training in ECDIS and knowledge, understanding and proficiency relating to appreciation of system errors and thorough understanding of the operational aspects of modern navigational systems have been included for deck officers. These requirements are expected to enter into force on 1.1.2012.

E-NAVIGATION: A COORDINATED APPROACH TO THE IMPLEMENTATION OF IMO's E-NAVIGATION STRATEGY					
Step/Element	Objective	Timeframe	Work S/Cs	WG/CG	External input
Cost-benefit and risk analyses	<p>Cost-benefit and risk analyses should be an integral part of the plan. They should be used to support strategic decisions as and when certain functions need to be enabled.</p> <p>The analyses should address financial and economic aspects as well as assess the impact on safety, security and the environment.</p>	Completed by 2011	NAV 55 (2009): <ul style="list-style-type: none"> to consider and decide on methodologies to be used for the analyses; to identify facts and data needed to perform the analyses. 	Establishment of a WG on e-navigation Establishment of a CG to continue work on this task	Invite Member Governments, the Industry and User Groups <ul style="list-style-type: none"> to collect, process and submit relevant facts/ data; to submit relevant views, proposals and comments to COMSAR 14/NAV 56.
			COMSAR 14 (2010): <ul style="list-style-type: none"> to perform initial analyses for communication and SAR issues. 	Establishment of a WG on e-navigation	
			STW 41 (2010): <ul style="list-style-type: none"> to address specific questions/issues raised by NAV and/or COMSAR. 		Invite IALA [and IHO]: <ul style="list-style-type: none"> to perform a cost-benefit and risk analysis on the shoreside aspects; to report to COMSAR 14 and NAV 56, as appropriate.
			NAV 56 (2010): <ul style="list-style-type: none"> to perform initial analyses for navigation and VTM issues; to consolidate the outcome of its initial analyses with that of COMSAR. 	Establishment of a WG on e-navigation Re-establishment of the CG to continue work on this task	Invite Member Governments, the Industry and User Groups <ul style="list-style-type: none"> to collect, process and submit relevant facts and data; to submit relevant views, proposals and comments to COMSAR 15 and NAV 57. Invite IALA [and IHO]: <ul style="list-style-type: none"> to finalize its analyses on the shoreside aspects; to report to COMSAR 15 and NAV 57, as appropriate.
			COMSAR 15 (2011): <ul style="list-style-type: none"> to perform further analyses for communication and SAR issues. 	Establishment of a WG on e-navigation	
			STW 42 (2011): <ul style="list-style-type: none"> to address specific questions/issues raised by NAV and/or COMSAR. 		
			NAV 57 (2011): <ul style="list-style-type: none"> to perform further analyses for navigation and VTM issues to consolidate and finalize the cost-benefit and risk analyses. 	Establishment of a WG on e-navigation	

E-NAVIGATION: A COORDINATED APPROACH TO THE IMPLEMENTATION OF IMO's E-NAVIGATION STRATEGY					
Step/Element	Objective	Timeframe	Work S/Cs	WG/CG	External input
Implement- ation plan	The final Strategy Implementation Plan should at least include: .1 identification of responsibilities to appropriate organizations/parties; .2 transition arrangements; .3 a phased implementation schedule along with possible roadmaps; .4 priorities for deliverables, resource management and a schedule for implementation and the continual assessment of user needs; .5 proposals for a systematic assessment of how new technology can best meet defined and evolving user needs; .6 a plan for the development of any technology and institutional arrangements necessary to fulfil the requirements of e-navigation in the longer term; .7 proposals on public relations and promotion of the e-navigation concept to key stakeholder groups; .8 identification of potential sources of funding for development and implementation, particularly for developing regions and countries and of actions to secure that funding.	Completed by 2012	NAV 57 (2011): ▪ to provisionally outline/draft the Strategy Implementation Plan on the basis of the e-navigation strategy and of completed and ongoing work.	Establishment of a WG on e-navigation Re-establishment of the CG to continue work on this task Consider the need for a (joint NAV-COMSAR-STW) Intersessional WG meeting in 2012 (before NAV 58)	Invite Member Governments, the Industry, User Groups and all other interested organizations to submit relevant views, proposals and comments to COMSAR 16, STW 43 and NAV 58, as appropriate.
			COMSAR 16 (2012): ▪ to address specific questions/issues raised by NAV 57; ▪ to comment on the provisional outline/draft Strategy Implementation Plan as prepared by NAV 57.	Establishment of a WG on e-navigation	
			STW 43 (2012): ▪ to address specific questions/issues raised by NAV 57 and/or COMSAR 16; ▪ to comment on the provisional outline/draft Strategy Implementation Plan as prepared by NAV 57.		
			NAV 58 (2012): ▪ to finalize the Strategy Implementation Plan; ▪ to submit the draft Strategy Implementation Plan to MSC 91 for its approval and adoption.	Establishment of a WG on e-navigation	

A COORDINATED APPROACH TO THE IMPLEMENTATION OF IMO'S E-NAVIGATION STRATEGY OVERALL PLANNING 2009-2012 BY STRATEGY ELEMENT																
	2009		2010					2011				2012				
Meetings	MSC 86	NAV 55	COMSAR 14	STW 41	MSC 87	NAV 56	MSC 88	COMSAR 15	STW 42	MSC 89	NAV 57	COMSAR 16	STW 43	MSC 90	NAV 58	MSC 91
User needs	joint plan of work	final	Correspondence Group					Correspondence Group				2012: Intersessional WG?				adoption
Architecture						final										
Gap analysis						initial					final					
C-B and risk analysis						initial					final					
Strategy Implementation Plan											outline				final	