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Module F - Display of information received via Communication Equipment		
1 Purpose		
1.1 This module on display of information ensures that the INS can properly display ~~the~~ information received via communication equipment/system and ~~the~~ information (e.g. CCRS, ship reporting, route exchange, etc.) received from INS can be properly output to communication equipment or ~~and transmitted to~~ shore-~~-~~bases system or other ships.	1.1 This module on display of information ensures that the INS can properly display information received via communication equipment/system~~ and information (e.g. CCRS, ship reporting, route exchange, etc.) received from INS can be properly output to communication equipment or shore- bases system or other ships~~.	The IHO does not support the extension of the scope of the module beyond the display of information received via Communication Equipment and understands that this extension should be subject to the reconsideration of the output as agreed by the NCSR and endorsed by the MSC.
2. Scope		
2.1 This module is to ensure that the information received via communication equipment can be processed, filtered, routed and displayed ~~properly~~ based on the navigator/user operational needs and tasks; while at the same accommodate ship-shore and ship-ship communication needs.	2.1 This module is to ensure that the information received via communication equipment can be processed, filtered, routed and displayed based on the navigator/user operational needs and tasks~~; while at the same accommodate ship-shore and ship-ship communication needs~~.	Refer to comment on paragraph 1.1.
2.2 This module applies to existing and future	2.2 This module applies to an INS which	In accordance with the comments above, the

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communication equipment/system: namely, Digital selective calling (DSC), NAVTEX, Inmarsat ship earth station, Inmarsat enhanced group call (EGC), HF narrowband direct printing (NBDP), VDES, NAVDAT, etc. , which should be equipped with appropriate digital interface. ~~This module applies to the procession and display of information received from digital communication equipment as defined in SOLAS Chapter Ⅳ. Meanwhile, this module encourages the use of other available communication equipment.~~	includes an interface to [*wording / list to be agreed by the relevant communication experts*]~~existing and future communication equipment/system: namely, Digital selective calling (DSC), NAVTEX, Inmarsat ship earth station, Inmarsat enhanced group call (EGC), HF narrowband direct printing (NBDP), VDES, NAVDAT, etc. , which should be equipped with appropriate digital interface~~.	module does not apply to the communication equipment themselves but to the information received by the INS.
3 Definition		
~~For the purpose of this module the definitions in Appendix 1 apply.~~ **3.1 Navigation Safety-Related Information**		The definition should be included in Appendix 1 to be consistent with the format of the other modules.
Information received via communication equipment/system, including distress, urgency, safety messages and other information relating to the safety of navigation such as ENCs, nautical publication and their updates.	Information received via communication equipment/system, including maritime safety information, search and rescue information ~~distress, urgency, safety messages~~ and other information relating to the safety of navigation such as ENCs, nautical publication and their updates.	It is proposed to use the terminology defined in IMO Circular MSC.1/Circ.1310 as amended.

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4 General requirements		
4.1 Functional requirements		
4.1.1 Input		
4.1.1.1 The INS should have the functionality to distinguish the navigation safety-related information from ~~ordinary business~~ non-navigation safety-related information (i.e. general radio communications). ~~received via communication equipment~~.	4.1.1.1 The INS should have the functionality to distinguish the navigation safety-related information from non-navigation safety-related information ~~(i.e. general radio communications)~~.	Referring to "general radio-communications" may cause confusion noting that they can be used to transmit navigation safety-related information (such as ENC and their updates).
4.1.1.2 The INS should store, combine, process and analyze the navigation safety-related information ~~from connected navigation sensors and communication equipment~~.		
4.1.1.3 In order to avoid information overload and lack of situational awareness, the INS should store and forward navigation safety-related information ~~received via communication equipment~~ to appropriate navigation equipment at the right time (considering the priority of navigation safety-related information, the current navigational tasks, etc.). Reception of new information should be indicated, and the information should be stored and available for processing at the selection of the operator.		The IHO does not identify any further clarification of the notion of "right time" in the proposed amendments. The view of the IHO is that the process should be driven by the operator and the system should simply alert the operator when new information are received.

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4.1.1.4 The INS should provide manual selection function for navigation safety-related information. ~~received via communication equipment,~~ ~~a~~According to the different type conditions (such as select information along the planned route, in an area of interest, with a certain time span, according to the type of information, the subject matter, etc.) set by operator, INS should output and display the selection in list form. At the same time, INS should provide continuous prompts until the selected information are acknowledged by the bridge team.		The requirement that the system provides continuous prompts seems redundant with the requirement that "reception of new information be indicated" in paragraph 4.1.1.3. The IHO suggests that paragraphs 4.1.1.3 and 4.1.1.4 be consolidated together.
~~4.1.5 In order to promote the navigational safety and facilitate information management, INS should contain a specific area of display for navigation safety-related information which includes a message list.~~ ~~4.1.6 When navigation safety-related information received via communication equipment, INS should provide continuous prompts until they are acknowledged by the bridge team.~~ 4.1.1.5~~7~~ The alarms and indications should comply with ~~Module C and~~ resolution MSC.302 (87). ~~the IMO performance standards for multiple communication equipment.~~		

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4.1.2 Output		See comment on paragraph 1.1
4.1.2.1 INS should provide user with manual and automatic selection mode when multiple communication equipment/system are available.		
4.1.2.2 In manual selection mode, INS should provide a list of available communication equipment/system.		
4.1.2.3 In automatic selection mode, INS should automatically select an appropriate communication equipment/system to transmit information to the shore-based or other ship, considering channel quality, bandwidth, information type, urgency degree, cost and other factors.		
4.2 Data exchange and interface		
4.2.1 The INS should contain a gateway which connects to ~~multiple~~ communication equipment and system. The gateway should support~~s~~ ~~duplex~~ bidirectional communication between ~~navigation equipment~~INS and communication equipment/system~~, unless connected simplex communication equipment~~.		
4.2.2 Interfac~~e~~ing ~~between INS and communication equipment~~to, from the gateway should comply with		

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international standards for data exchange and interfacing as appropriate[1] .~~,~~ Meanwhile,~~ and~~ the gateway should support TCP/IP ~~p~~Protocol Suite and Ethernet interface.		
4.2.3 The data exchange protocol and interface between INS and communication equipment/system should ~~be able to~~ support existing distress, urgency and safety messages as defined in GMDSS. In the future, the data exchange protocol and interface should support common maritime data structure (CMDS) under the S-100 framework, and ~~meet the application requirement of~~ Maritime Service Portfolios (MSPs).		The IHO has reservation on referring to “future” requirements.
4.3 ~~Cyber~~ Information security		
4.3.1 In ship-ship and ship-shore communication, ~~The functionality of cyber~~ information security (i.e. encryption, authentication, digital signature, etc.) should be ~~provided~~ ensured when gateway provides output to or/and accepts input from communication equipment and system~~exchanging the data between INS and communication equipment~~, if necessary, ~~consider~~ using a firewall.		
4.3.2 In ship-to-ship and ship-to-shore communication, the use of secret key should comply		

[1] Refer to the IEC 61162 series

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with MSC.1/Circ.1526.		
4.3.3 In ship-to-ship and shore-to-ship communication, the source of the received information should be authenticated by gateway automatically. Only information passing this authentication should be processed by or displayed in the INS.		
4.4 Integrity and validity		
4.4.1 The integrity and validity checks should be provided for the information received via communication equipment automatically.		
4.4.2 The validity and integrity of data received via communication equipment should be checked and verified before being used or displayed.		
4.4.3 The INS should provide a warning, if integrity verification and validity checks are not possible or failed.		
5 Display of information		The IHO considers that this paragraph should be put on hold until the guidelines on the harmonized display of navigation information received via communications equipment are available.
5.1 Display of information should comply with the standardized data structure, symbols and format of		See comment on paragraph 5.

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text.		
5.2 Where possible, INS shall share the same symbology and icon display characteristics as the associated communications and navigation equipment. The interface of display ~~should~~ may support S-Mode.		See comment on paragraph 5. The IHO has reservation on referring to the S-Mode which is not yet specified.
~~**6 Output**~~		
~~6.1 INS should provide user with manual and automatic selection mode when multiple communication equipments are available.~~		
~~6.2 In manual selection mode, INS should provide a list of available communication equipments.~~		
~~6.3 In automatic selection mode, INS should automatically select an appropriate communication equipment to transmit information to the shore-based at right time (considering channel quality, bandwidth, information type, urgency degree, cost and other factors).~~		