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COMMISSION STAFF WORKING DOCUMENT

IMO – submission to the 93rd session of the Maritime Safety Committee (MSC) meeting in London from 14-23 May 2014 concerning an unplanned work programme item on the adoption of the GNSS system established under the EU's Galileo programme into the WWRNS

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PURPOSE

1. This document contains a proposal for a new work programme item concerned with the adoption of the GNSS system established under the EU's Galileo programme (hereinafter: 'Galileo') within the IMO's World-Wide Radio Navigation System (WWRNS). In order for Galileo to be utilised by the maritime industry, for navigation and other applications, its use must be approved by the MSC of IMO.

BACKGROUND

2. The EU Member States and European Commission recognise that the WWRNS is an established and mature system, utilising both the GPS and GLONASS GNSS constellations. Furthermore, the Chinese Bei Dou system is currently in the application phase for approval.
3. The application of Galileo to the WRNSS must follow the IMO's application procedure. The procedure involves submitting a request to the MSC. The aim of the request is to produce an unplanned output that will see Galileo's application feature on the agenda of the next meeting of Navigation Communication and Search and Rescue (NCSR) sub-committee. The NCSR, formerly the NAV sub-committee, will provide a technical assessment of Galileo and report their recommendation back to the MSC. The MSC can then approve the NCSR's recommendation on the suitability of Galileo for adoption within the WWRNS. In September 2013, at the NAV 59, the Commission has already presented an Information Paper detailing the status of Galileo, outlining its technical capabilities and how they align to IMO objectives, and announcing the intention to submit the application of Galileo into the WWRNS.
4. The adoption of Galileo as an additional GNSS within the WWRNS will provide additional equipment options for mariners seeking to be equipped. In concert with GPS and GLONASS, Galileo will improve service availability, thereby improving the reliability of shipborne receiver equipment. This also reduces the risk due to failure in a single GNSS constellation or due to use of single frequency signals. Galileo will thereby provide improved navigation capability to the maritime community in reducing risk to seafarers and improving safety at sea.
5. As a further feature, Galileo includes a global Search and Rescue (SAR) service that will form a key element of the COSPAS-SARSAT MEOSAR system. Satellites are equipped with a transponder able to relay identified distress signals from maritime users to regional rescue co-ordination centres, which will then initiate the rescue operation. This contribution of Galileo will enhance the accuracy of distress beacon localization. In addition, Galileo will offer a new service consisting of the

acknowledgement of the distress call by the rescue centre. This service, presented to the joint ICAO/IMO working group on SAR in September 2011 and August 2012, is acknowledged as a major improvement of SAR services.

UNION INTEREST

6. Galileo is a flagship programme of the European Union, developed to provide access to highly reliable and accurate information on position, velocity and time to EU citizens and worldwide. Funding for the deployment and operation of Galileo has been secured within the Multiannual Financial Framework 2014-2020 of the European Union.
7. The acceptance of Galileo into the IMO's WWRNS would be in line with objectives set out in regulations including:
 - Regulation (EC) n° 683/2008 of the European Parliament and of the Council on the further implementation of the European satellite navigation programmes (EGNOS and Galileo), OJ L 196, 24.7.2008.
 - Communication from the Commission "Action Plan on Global Navigation Satellite Systems (GNSS) Applications" COM (2010) 308 final, 14.6.2010.

Therefore, the issue lies within the EU's areas of interest.

PROPOSAL

8. The Commission proposes that MSC 93 should be asked to include a new work programme item for Galileo's recognition as part of the WWRNS.

ANNEX



MARITIME SAFETY COMMITTEE
93rd session
Agenda item XX

MSC 93/20/X
14/5/14 - 23/5/14
Original: ENGLISH

WORK PROGRAMME

Proposal for a new unplanned output on the adoption of the Galileo GNSS into the WWRNS

Submitted by Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom and the European Commission

SUMMARY

Executive summary: This document constitutes a proposal for the inclusion of an unplanned output in the NCRS Sub-Committee's work program to recognise the GNSS system established under the EU's Galileo programme (hereinafter: 'Galileo') as a component of the IMO's WWRNS.

Strategic direction: 5.2

High-level action: 5.2.4

Planned output: No related provisions

Action to be taken: Paragraph 21

Related documents: MSC-MPEEC.1/Circ.4/Rev.2, MSC-MEPC.7/Circ.1, Resolutions A.577(14), A.915(22), A.947(23), A.1046(27), MSC.233(82), European GNSS OS SIS ICD and NAV 59/INF.7.

Background

1 As a follow up to the INF paper (NAV59/INF.7) submitted to the former NAV Sub Committee at its 59th session, this document is submitted in accordance with MSC-MPEEC.1/Circ.4 'The guidelines on the organisation and method of work of the Maritime Safety Committee and the Marine Environment Protection Committee and their subsidiary bodies' which outlines the procedure for the submission of new unplanned outputs. The proposal has been aligned to resolution A.xx(28) 'High-level action plan of the organisation and priorities for the 2014-2015 biennium'. The strategic directions and high-level actions that are relevant are covered below. Resolution A.915(22) 'Revised maritime policy and requirements for a future Global Navigation Satellite System (GNSS)' and resolution A.1046(27) 'World-Wide Radio Navigation system' are also considered in this paper.

2 GNSS is currently widely utilised by the international maritime community for navigation purposes. The IMO has already recognised GPS and GLONASS as meeting the required standards in order to be used as a component of the World-Wide Radio Navigation

System (WWRNS). Performance standards for shipborne radio equipment have already been developed for GPS, GLONASS and Galileo (MSC.233(82)).

3 Galileo is an independent GNSS currently being developed by the co-sponsors. Once operational, Galileo will be able to provide a GNSS position fix independently, or in conjunction with GPS and/or GLONASS. The Galileo Open Service will be free of charge for use by the maritime community and is intended to be provided on a continuous basis over the long term. Should there be any change to the services offered to IMO, such changes will be notified, as required in resolution A.577(14). The Galileo programme is developed and operated under full public funding.

Development Plan and Intended Performance of Galileo

4 The first two satellites of Galileo have been launched in October 2011, followed by two more in October 2012. This completed the In-Orbit Validation (IOV) phase of the programme. Additional satellite launches are planned during 2014 and 2015 with the objective to achieve an initial operational capability with a partially deployed constellation of around 18 operating satellites. This initial phase will provide a global service when used in combination with existing GNSS. The services will then be improved, with the addition of more satellites, until Full Operational Capability (FOC) is achieved. At FOC, Galileo will consist of 27 operational satellites including 3 active spares.

5 Satellites will be positioned in three circular Medium Earth Orbit (MEO) planes at 23,222 km altitude above the Earth, and at an inclination of the orbital planes of 56 degrees to the equator. Galileo will provide open service signals in the E1 (1575.42 MHz in overlay with GPS) and E5 (1191.795 MHz) frequencies, fully interoperable with other GNSS.

6 Galileo will provide a positioning and timing capability on a worldwide basis. It will offer a level of performance better than current single-frequency GNSS thanks to its architecture, signal design and dual frequency service. The Galileo service will be fully compliant with the accuracy levels expected to conduct coastal navigation and port approach operations.

Is the subject of the proposal within the scope of IMO's objectives?

7 It is planned that Galileo will be able to achieve independently a horizontal accuracy of 4m with a minimum availability of 99.5% over the entire lifetime of the system. This makes the Galileo Open Service suitable for Navigation in Ocean, Coastal, Port Approach and Restricted Waters, and Inland Waterways as per IMO regulation A.915(22) and A.1046(27), with integrity provided by Receiver Autonomous Integrity Monitoring (RAIM) techniques (as per IMO resolution MSC.233(82)). This performance will be further enhanced when considering user equipment processing simultaneously other GNSS. Finally, Galileo may also be used in combination with differential correction techniques to support port operations. The subject is, therefore clearly within the scope of the IMO's objectives.

How is the proposed item related to the scope of the Strategic Plan for the Organization and how does it fit into the High-Level Action Plan?

8 It is the opinion of the co-sponsors that the adoption of Galileo as an element of the WWRNS is in line with strategic direction 5.2 'Enhancing technical, operational and safety management standards' and therefore fits into section xxx of the High Level Action Plan set by the IMO, within resolution A.xx(28) 'High-level action plan of the organisation and priorities for the 2014-2015 biennium'.

9 The assessment of Galileo as an element of the WWRNS is justified by high-level action [5.2.4] 'Keep under review measures to improve navigational safety, including ships' routing, ship reporting and monitoring systems, vessel traffic services, requirements and

standards for shipborne navigational aids and systems and long-range identification and tracking (LRIT)'.

Need or compelling need

10 IMO approval is required to allow the use of Galileo for maritime navigation. Galileo will complete the 'Early Services' phase by early 2015. The co-sponsors are willing to provide the Maritime Safety Committee and relevant sub committees with all relevant data as regards the performance that will be achieved when Galileo comes into operation.

Analysis of the issues and implications involved, having regard to both the costs to the maritime industry, as well as the associated legislative and administrative burden, at global level

11 Galileo is funded entirely by the co-sponsors, encompassing all development, implementation and operating costs. Galileo will be fully interoperable with other GNSS. The policy of the Galileo service being free of direct costs is applicable to maritime users. Performance standards for Galileo receivers have already been approved by the IMO, and are therefore not considered in this request. The administrative burden to the Organization and to Member States is anticipated to be minimal. A completed checklist for "identifying administrative requirements and burdens", in accordance with MSC-MEPC.1/Circ.4/ Rev.2, is provided in annex 1.

Benefits which would accrue from the proposal

12 The adoption of Galileo as an additional GNSS within the WWRNS will provide additional equipment options for mariners seeking to be equipped and in concert with GPS and GLONASS will improve service availability and reliability of shipborne receiver equipment. This also reduces the risk due to failure in a single GNSS constellation or due to use of single frequency signals. Galileo will thereby provide improved navigation capability to the maritime community in reducing risk to seafarers and improving safety at sea.

13 As a further feature, Galileo includes a global Search and Rescue (SAR) service that will form a key element of the COSPAS-SARSAT MEOSAR system. Satellites are equipped with a transponder able to relay identified distress signals from maritime users to regional rescue co-ordination centres, which will then initiate the rescue operation. This contribution of Galileo will significantly enhance the time to localise and the accuracy of distress beacon positioning. In addition, Galileo will offer a new service consisting in the acknowledgement of the distress call by the rescue centre. This service, presented to the joint ICAO/IMO working group on SAR in September 2011 and August 2012, is acknowledged as a major improvement of SAR services.

Do adequate industry standards exist?

14 Performance standards for Galileo receivers have already been approved by the IMO (MSC.233(82)).

15 Industry standards have already been developed by IEC for Galileo receivers: *Maritime navigation and radiocommunication equipment and systems – Global navigation satellite systems (GNSS) – Part 3: Galileo receiver equipment – Performance requirements, methods of testing and required test results (IEC 61108-3)*.

16 The Galileo Signal In Space Interface Definition Document has also already been published (http://ec.europa.eu/enterprise/policies/satnav/galileo/files/galileo-os-sis-icdissue1_revision1_en.pdf)

Scope of the proposal and output

17 The scope of the proposal and the requested output is the recognition of Galileo as a component of the WWRNS.

Human element

18 This proposal is in line with the IMO's current objectives and factors appropriately the human element guidance and principles as required by IMO resolution A.947(23). The completed human factors checklist from MSC-MEPC.7/Circ.1 is set out in annex 2.

Priority and target completion date

19 Galileo will complete its 'Early Services' phase by early 2015 and as receiver standards are already in place, the co-sponsors recommend that the approval of Galileo be rated as high-priority. This would allow the maritime community to utilise Galileo from its onset, so that mariners may benefit from the improved performance as soon as possible.

Committee and/or subsidiary body(ies) essential to complete the work

20 The work should be assigned to the Sub Committee on Navigation, Communication and Search and Rescue (NCSR).

Estimation of the number of sessions needed to complete the work

21 The co-sponsors hope that Galileo can be approved within two meetings of the NCSR Sub-Committee.

Action requested of the Committee

22 The Committee is invited by the co-sponsors to include this proposal in the agenda of the next NCSR Sub-Committee's meeting as a new unplanned output..

ANNEX 1

CHECKLIST FOR IDENTIFYING ADMINISTRATIVE REQUIREMENTS AND BURDENS

AND

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|--|---|---|
| <p>The Checklist for Identifying Administrative Requirements and Burdens should be used when preparing the analysis of implications required of submissions of proposals for inclusion of unplanned outputs. For the purpose of this analysis, the terms "administrative requirements" and "burdens" are defined as in resolution A.1043(27), i.e. administrative requirements are defined as an obligation arising from future IMO mandatory instruments to provide or retain information or data, and administrative burdens are defined as those administrative requirements that are or have become unnecessary, disproportionate or even obsolete.</p> <p>Instructions:</p> <p>(A) If the answer to any of the questions below is YES, the Member State proposing an unplanned output should provide supporting details on whether the burdens are likely to involve start-up and/or ongoing cost. The Member State should also make a brief description of the requirement and, if possible, provide recommendations for further work (e.g. would it be possible to combine the activity with an existing requirement?).</p> <p>(B) If the proposal for the unplanned output does not contain such an activity, answer NR (Not required).</p> | | |
| <p>1. Notification and reporting? Reporting certain events before or after the event has taken place, e.g. notification of voyage, statistical reporting for IMO Members, etc.</p> | <p>NR <input checked="" type="checkbox"/></p> | <p>Yes <input type="checkbox"/> Start-up <input type="checkbox"/> Ongoing</p> |
| <p>Description: (if the answer is yes)</p> | | |
| <p>2. Record keeping? Keeping statutory documents up to date, e.g. records of accidents, records of cargo, records of inspections, records of education, etc.</p> | <p>NR <input checked="" type="checkbox"/></p> | <p>Yes <input type="checkbox"/> Start-up <input type="checkbox"/> Ongoing</p> |
| <p>Description: (if the answer is yes)</p> | | |
| <p>3. Publication and documentation? Producing documents for third parties, e.g. warning signs, registration displays, publication of results of testing, etc.</p> | <p>NR <input checked="" type="checkbox"/></p> | <p>Yes <input type="checkbox"/> Start-up <input type="checkbox"/> Ongoing</p> |
| <p>Description: (if the answer is yes)</p> | | |
| <p>4. Permits or applications? Applying for and maintaining permission to operate, e.g. certificates, classification society costs, etc.</p> | <p>NR <input checked="" type="checkbox"/></p> | <p>Yes <input type="checkbox"/> Start-up <input type="checkbox"/> Ongoing</p> |
| <p>Description: (if the answer is yes)</p> | | |
| <p>5. Other identified burdens?</p> | <p>NR <input checked="" type="checkbox"/></p> | <p>Yes</p> |

_____Description: (if the answer is yes)

ANNEX 2

CHECKLIST FOR CONSIDERING HUMAN ELEMENT ISSUES BY IMO BODIES

Instructions:
 If the answer to any of the questions below is:
 (A) **YES**, the preparing body should provide supporting details and/or recommendation for further work.
 (B) **NO**, the preparing body should make proper justification as to why human element issues were not considered.
 (C) **NA (Not Applicable)** - the preparing body should make proper justification as to why human element issues were not considered applicable.

Subject Being Assessed: (e.g. Resolution, Instrument, Circular being considered)
Deployment of Galileo for the international maritime community

Responsible Body: (e.g. Committee, Sub-committee, Working Group, Correspondence Group, Member State)
Sub-Committee on Navigation, Communication, and Search and Rescue (NCSR)

| | |
|---|---|
| 1. Was the human element considered during development or amendment process related to this subject? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| 2. Has input from seafarers or their proxies been solicited? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| 3. Are the solutions proposed for the subject in agreement with existing instruments? (Identify instruments considered in comments section) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| 4. Have human element solutions been made as an alternative and/or in conjunction with technical solutions? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| 5. Has human element guidance on the application and/or implementation of the proposed solution been provided for the following: | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| • Administrations? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| • Ship owners/managers? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| • Seafarers? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| • Surveyors? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| 6. At some point, before final adoption, has the solution been reviewed or considered by a relevant IMO body with relevant human element expertise? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| 7. Does the solution address safeguards to avoid single person errors? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| 8. Does the solution address safeguards to avoid organizational errors? | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA |
| 9. If the proposal is to be directed at seafarers, is the information in a form that can be presented to and is easily understood by the seafarer? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| 10. Have human element experts been consulted in development of the solution? | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA |
| 11. HUMAN ELEMENT: Has the proposal been assessed against each of the factors below? | |
| <input type="checkbox"/> CREWING. The number of qualified personnel required and available to safely operate, maintain, support, and provide training for system. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| <input type="checkbox"/> PERSONNEL. The necessary knowledge, skills, abilities, and experience levels that are needed to properly perform job tasks. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| <input type="checkbox"/> TRAINING. The process and tools by which personnel acquire or improve the necessary knowledge, skills, and abilities to achieve desired job/task performance. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| <input type="checkbox"/> OCCUPATIONAL HEALTH AND SAFETY. The management systems, programmes, procedures, policies, training, documentation, equipment, etc. to properly manage risks. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA |
| <input type="checkbox"/> WORKING ENVIRONMENT. Conditions that are necessary to sustain the safety, health, and comfort of those on working on board, such as noise, vibration, lighting, climate, and other factors that affect crew endurance, fatigue, alertness and morale. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA |
| <input type="checkbox"/> HUMAN SURVIVABILITY. System features that reduce the risk of illness, injury, or death in a catastrophic event such as fire, explosion, spill, collision, flooding, or intentional attack. The assessment should consider desired human performance in emergency situations for detection, response, evacuation, survival and rescue and the interface with emergency procedures, systems, facilities and equipment. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA |

| | |
|--|---|
| <input type="checkbox"/> HUMAN FACTORS ENGINEERING. Human-system interface to be consistent with the physical, cognitive, and sensory abilities of the user population. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA |
| <p>Comments: (1) Justification if answers are NO or Not Applicable. (2) Recommendations for additional human element assessment needed. (3) Key risk management strategies employed. (4) Other comments. (5) Supporting documentation.</p> <p>The justification as to why human element issues were not considered NO or NA (Not Applicable) is as follows:</p> <p>(8) This will not have effect on organizational procedures and hence errors.</p> <p>(10) It was not considered necessary to engage specialist support as the human element benefits are quite straightforward in this proposal.</p> <p>(11d) Not considered appropriate.</p> <p>(11e) Not considered appropriate.</p> <p>(11f) Not considered appropriate.</p> | |
