GLA Joint Navigation Requirements Policies

General Lighthouse Authorities
The United Kingdom and
Republic of Ireland

Delivering 2020 The Vision

Document Management

Policy		Issue Number	Date
1.	Document Management Policy	1	11/2007
2.	Navigation Policy	1	11/2007
3.	AtoN Review Process	1	11/2007
4.	The User Consultation Process	1	11/2007
5.	Navigational Risk Management	1	11/2007
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Organisation & Document Management

Introduction

The GLAs share a common Vision Statement:

'To deliver a reliable, efficient and cost-effective Aids to Navigation service for the benefit and safety of all Mariners.'

The GLAs work together to achieve common objectives and policies regarding their areas of responsibility.

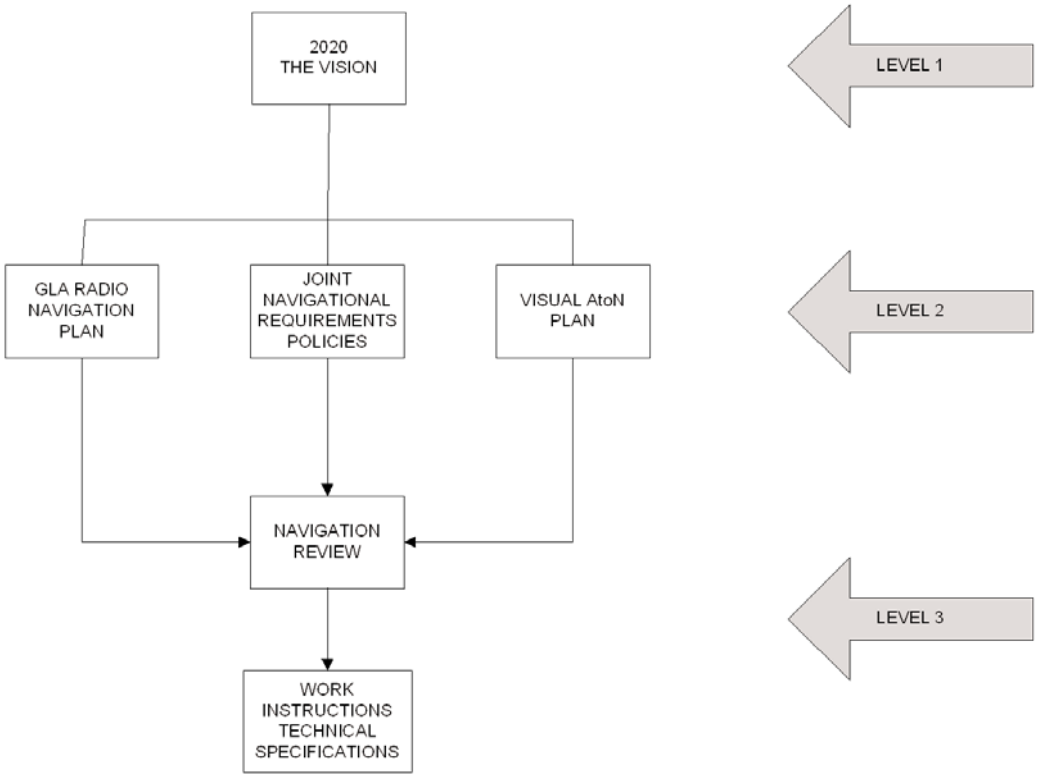
The GLAs have a structure of Committees reporting to the Joint Co-ordinating Group (the Chairmen and Chief Executives) as follows:

The GLAs operate three levels of common documentation with regard to Aids to Navigation (AtoN) Requirements:

Level 1 – Strategy '2020 – The Vision'
Level 2 – Documents – Joint Navigation Requirements Policies
Radio Navigation Plan
Visual AtoN Plan
AtoN Review
Level 3 – Navigation Review and Work Instructions e.g. GLA DGPS Operators Manual

GLA Joint Navigation Requirements Policies

These can be depicted as follows:



Level 1 & 2 documentation is available via the GLA websites, or can be sought directly from the Navigation departments of the individual GLAs.

A distribution list is at Annex A. Organisations on the distribution list will be advised by e-mail of updated issues of any individual policies.

Background

The three GLAs comprise the Commissioners of Irish Lights (CIL), the Commissioners of Northern Lighthouses (NLB), and the Corporation of Trinity House (THLS).

The GLAs consult regularly with each other to ensure the seamless provision of a modern cost-effective mix of Aids to Navigation around the coasts of the UK & Ireland.

Definitions & Acronyms

AtoN	Aid(s) to Navigation
GLA	General Lighthouse Authority
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IGC	Inter-GLA Committee
JCG	Joint Co-ordinating Group

Requirements

The GLAs will co-operate in the compilation and dissemination of common documentation with regard to AtoN Requirements.

Each Level 1, 2 & 3 document issued by the GLAs will have an issue date, sponsor and a review period. The issue date and sponsor will be annotated on the footer of every document and the review period will be not more than five years. Each Document will have an Inter-GLA Committee (IGC) who will be responsible for its publication and review.

Each policy document within the JNRP has a common structure as follows:

- Introduction
- Background
- Definitions & Acronyms
- Requirements
- Service Level Parameters (where applicable)
- References

Service Level Parameters

The current Joint Navigation Requirements Policy documents issued by the GLAs are:

1. Document Management Policy

Navigation Policy

2. Navigation Policy
3. AtoN Review Process
4. The User consultation process
5. Navigational Risk Management
6. Wreck Marking & Removal

Superintendence & Management of Local Aids to Navigation

7. Superintendence & Management of LLAs
8. Offshore Oil & Gas
9. Offshore Renewable Energy
10. Aquaculture
11. Coastal Development

Service Provision

12. Service Availability
13. e-Navigation
14. DGNSS
15. eLoran
16. AIS
17. Monitoring of Aids to Navigation

Research and Radionavigation

18. Research and Radionavigation

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Navigation Policy...

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NAVIGATION POLICY

Introduction

The GLA's Navigation Policy is:-

To determine that the Aids to Navigation (AtoN) provided by the General Lighthouse Authorities of the United Kingdom and Ireland in the interest of general navigation and local AtoN provided by Local Lighthouse Authorities, Harbour Authorities and Offshore Operators, meet the requirements of the present and changing needs of all mariners and that AtoN comply with internationally accepted standards.

Background

The coastlines within the GLAs' areas of responsibility rank with the most heavily trafficked and hazardous in the world. The coastlines vary from isolated rocks and the steep Atlantic coastline to the low lying relatively featureless coastline of South East England, off which are shifting sandbanks and channels. The tidal ranges in GLA waters are significant and currents can reach well in excess of four knots in a number of places.

Man made hazards such as wrecks and structures in the sea add to the difficulties of navigation in the GLA areas. Overall, the weather adds significantly to the hazards of navigation; there are frequent gales and periods of low visibility.

Ships carrying hazardous cargoes and high-speed passenger vessels regularly transit the GLA areas. A number of Traffic Separation Schemes have been established and there are areas where heavy concentrations of crossing shipping traffic may be encountered.

The economies of the United Kingdom and Ireland depend heavily on sea trade. More than 95% of imports and exports move by sea, and 28% of the movement of goods within the area is by sea. A very considerable proportion of shipping bound to and from the ports of Northern Europe also passes our shores. The fishing fleets and an increasing number of leisure users must also be able to navigate in safety. It is paramount that all of these ships transit our waters in safety. Our priorities are:-

- The safety of life at sea
- The safe passage of shipping
- The protection of the marine environment for our own and future generations
- The maintenance of trade

Definitions & Acronyms

AtoN	Aid(s) to Navigation
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities

Requirements

The GLAs will work together, and in conjunction with IALA, to develop standards regarding appropriate levels of service for the provision of Aids to Navigation.

NAVIGATION POLICY

The GLAs will work together, and with Local Lighthouse Authorities and other service providers, to ensure a seamless mix of Aids to Navigation are provided around our coasts.

Each GLA shall be responsible for determining appropriate levels of service provision of Aids to Navigation within their Area of Responsibility.

Selected GLA AtoN will be monitored and controlled to meet navigational, operational and legal considerations.

Each GLA shall provide a user forum for discussions of changes to AtoN to meet the changing needs of all mariners. User Consultation will be regulated and controlled in accordance with the User Consultation Procedure.

Each GLA is responsible for determining the relevant Availability Categories and Casualty Response Priorities applicable to individual AtoN, based on IALA guidance. These individual AtoN Casualty Response priorities, which are for the guidance of the individual GLA, are not necessarily intended to indicate a timescale for rectification.

Local AtoN shall be maintained such that the Availability criteria, as agreed and applied by the GLAs, is met at all times. Each authority responsible for the provision of local AtoN shall establish procedures for responding to casualties to local AtoN.

The GLAs shall specify a station's assigned position in WGS84 format and to at least 3 decimal places of a minute.

Service Level Parameters

Formal inspection/audit of all AtoN will be effected by the GLAs to confirm that AtoN provided meet the needs of the mariner and that they comply with internationally agreed standards.

A report of annual audits and local inspections of local AtoN Availability Statistics and Response times to casualties shall be carried out by the GLAs and be submitted to the relevant Government Minister.

References

- IALA Aids to Navigation Guide (Navguide), Edition 5, 2006 (Section 6.1)
- Merchant Shipping Act 1894 (ROI)
- Merchant Shipping Act 1995 (UK)
- Harbours, Docks and Piers Clauses Act 1847
- Coast Protection Act 1949
- Port Marine Safety Code

ATON REVIEW PROCESS POLICY

Introduction

The General Lighthouse Authorities (GLAs) Navigation Policy requires that the AtoNs they provide meet the requirements of the present and changing need of all mariners. User requirements change with time and changes in technology. It is necessary to review AtoN provision on a regular basis to assess current and future requirements in order to provide a basis for planning the provision of a cost effective AtoN system that will meet present and future requirements.

Background

In many countries, the network of aids to navigation has been built up over centuries. It should be recognised that the nature of shipping is continually changing and this means that the aids to navigation infrastructure to assist safe passage requires periodic review to ensure that the AtoNs provided are appropriate. The rate of change varies geographically and within the GLA area it is considered that a Strategic Plan (ie 2020 The Vision) and Operational Plan (i.e. 5 year AtoN Review) caters for the review requirements. It is paramount that all ships transit our waters in safety. The priorities are:-

- The safety of life at sea
- Safe passage of shipping
- The protection of the marine environment
- The maintenance of trade

Definitions & Acronyms

GLA	General Lighthouse Authority.
AtoN	Aid to Navigation
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities

Requirements

The GLAs will jointly undertake a Review of Aids to Navigation provision every 5 years with a projected forward strategic vision for 15 years. The most recent Review was 2020 The Vision published in August 2004.

The GLAs will jointly and separately undertake an Operational Review of aids to navigation provision every 5 years. Each GLA will review the AtoNs in its own area of responsibility and joint consultations will be conducted over areas of common or overlapping interest. A chartlet depicting areas of common interest is appended. The most recent operational review was published in 2005.

Each GLA will continually assess the AtoNs within their jurisdiction on an ongoing basis to ensure a timely and appropriate response to any changing circumstances that may affect the safety of the mariner.

The Operational Review criteria are as follows:

ATON REVIEW PROCESS POLICY

- To ensure that the AtoNs provided by the GLAs are cost effective and continue to meet the present and changing need of all mariners and comply with internationally accepted standards.
- To assess developments in the field of navigation and their likely effect on the GLAs AtoN requirements.
- To assess shipping traffic, including changing patterns of trade, and vessel types and volumes within the GLAs areas, together with the sensitivities of the marine environment within which this traffic operates.
- To identify and assess hazards e.g. developments in offshore renewable energy.
- To specify the type and mix of AtoN required such that the degree of risk requires and the volume of traffic and protection of the environment justifies.
- To consult widely with users regarding the proposed AtoN provision.
- Each GLA shall be responsible for determining appropriate levels of service provision of Aids to Navigation within their Area of Jurisdiction.

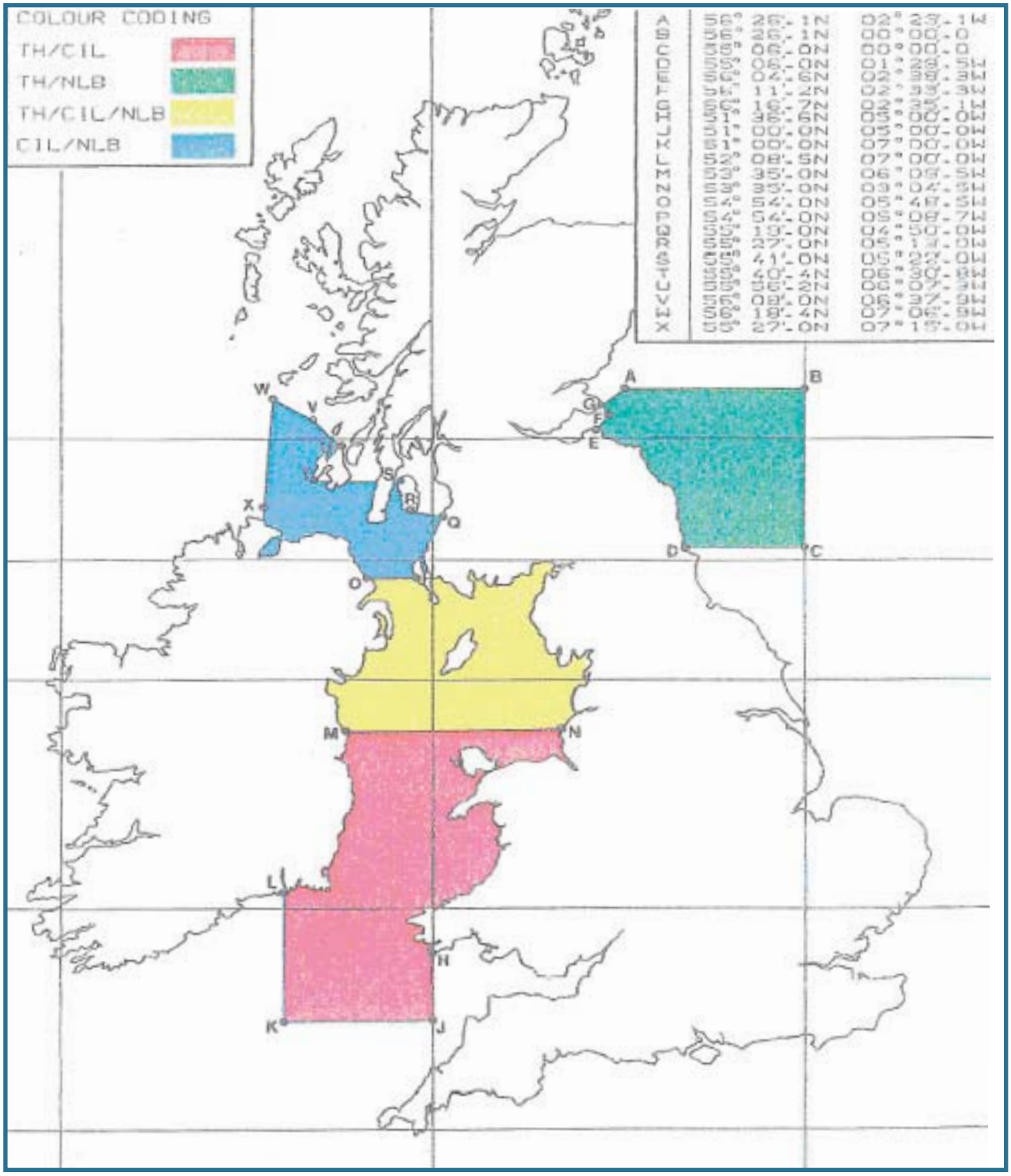
Service Level Parameters

The GLAs will undertake and publish their strategic and operational reviews as specified above.

References

- IALA Aids to Navigation Guide (Navguide), Edition 5, 2006 (Section 6.1.2)
- 2020 The Vision, Marine Aids to Navigation Strategy, GLAs 2004.

Appendix - GLAs Areas of Consultation



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USER CONSULTATION PROCESS POLICY

Introduction:

The General Lighthouse Authorities (GLAs) attach great importance to the formulation of joint policies for aids to navigation (AtoN) provision in consultation with their users.

Three levels of user consultation are employed as follows:

- Joint User Consultative Group
- GLA User Group
- Local User Group

Background:

Joint User Consultative Group (JUCG)

The JUCG is drawn from Merchant, Fishing, Leisure and Specialist marine bodies with authority to speak on Marine Navigation, to discuss the broader policy matters involved in the determination of the provision of Aids to Navigation.

The JUCG terms of reference are:-

- To provide a user forum for the discussion of major policy matters of mutual concern in the field of aids to navigation.
- To enable the GLAs to formulate policy consistent with the users' requirement and resources available and to make recommendations to Government.
- Chief Executives and appropriate senior officers of selected organisations are invited to participate at this forum.
- JUCG concerns itself with strategic issues rather than individual aids to navigation.

GLA National User Group

Each GLA has established a user group within its own area of responsibility to ensure that there is comprehensive representation of marine interests concerned with aids to navigation provision. The role of the GLA user group is:

- To provide a user forum for the discussion of marine matters relating to aids to navigation.
- To provide the user group with a forum to raise issues for consideration by the GLA.

USER CONSULTATION PROCESS POLICY

Local User Group

Local User Groups will be consulted as appropriate to discuss or obtain advice on a specific issue.

Definitions & Acronyms:

GLA	General Lighthouse Authority
AtoN	Aid to Navigation
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
JUCG	Joint User Consultative Group

Requirements:

The JUCG is consulted on:

- User requirements for systems of AtoN.
- The technical merits of various systems of AtoN.
- Major GLA Policy in providing AtoN
- IMO Resolutions and IALA Recommendations and Guidelines
- National Statutory Requirements affecting AtoN
- Changes in technology on board and ashore.

The GLA User Group is consulted on:

- Significant alterations to AtoNs
- Proposals for new projects
- Lists of significant events.
- Policy decisions
- Technological advances affecting AtoNs
- Current and planned AtoN reviews

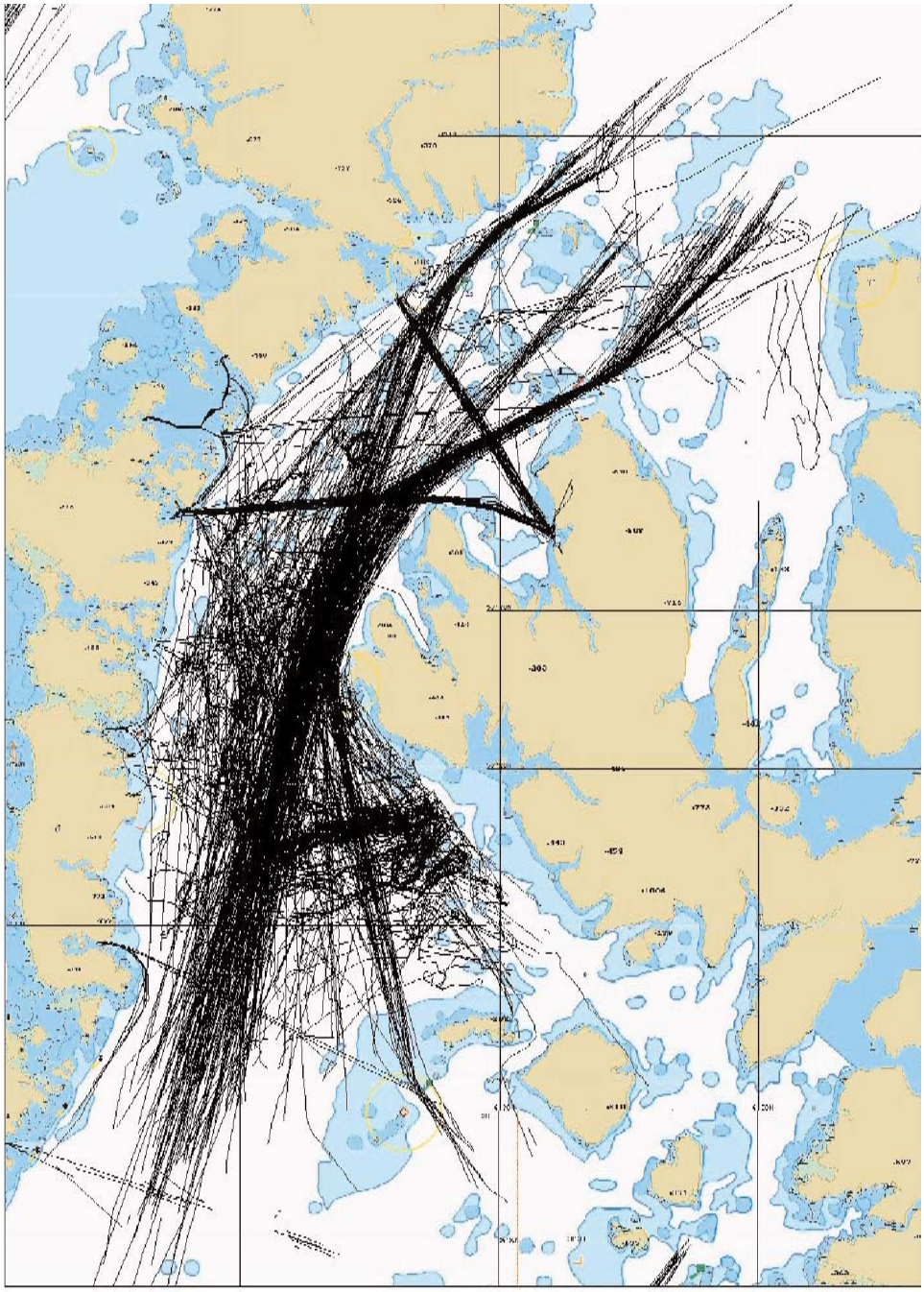
A Local User Group meeting may be convened, or a consultation process instigated where a specific matter of importance requires further clarification or promulgation.

Changes to GLA AtoNs not requiring prior external consultation eg adjustments to buoy positions as a result of a survey or known shoaling and minor changes to characteristics for technical or operational reasons, may be relayed to user groups as appropriate.

References:

- IALA Aids to Navigation Guide (Navguide), Edition 5, 2006 (Section 6.1.2.4)

NAVIGATIONAL RISK MANAGEMENT POLICY



Sample radar tracking tool

NAVIGATIONAL RISK MANAGEMENT POLICY

Introduction

Risk management is a term applied to a structured (logical and systematic) process for:

- identifying, analysing, assessing, treating, monitoring and communicating risks for any activity, and;
- achieving an acceptable balance between the costs of an incident, and the costs of implementing measures to reduce the risk of the incident happening.

Background

The Risk Management process described in the IALA Guidelines comprises five steps that follow a standardized management or systems analysis approach:

a) Identify risks/hazards;
b) Assess risks;
c) Specify risk control options;
d) Make a decision; and
e) Take action

To assist with the management of navigational risk, IALA have endorsed the qualitative (PAWSA) risk management tool and are currently reviewing the quantitative (IWRAP) tool, for use by their members. The two models may be used individually, sequentially or in parallel.

Definitions & Acronyms

AIS	Automatic Identification System
AtoN	Aid to Navigation
GLA	General Lighthouse Authority
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IWRAP	IALA Waterways Risk Assessment Programme
PAWSA	Ports and Waterways Safety Assessment
RYA	Royal Yachting Association
USCG	United States Coast Guard

Requirements

Each GLA will institute a system of delegation to ensure that decisions appertaining to navigation issues are delegated to an appropriate level of experience and qualification.

Each GLA will apply formal navigational risk assessment and management procedures to AtoN planning as considered appropriate, and will monitor and communicate actions and effects of any changes to the users.

The GLAs will monitor international developments in navigational risk assessment with a view to using appropriate tools as required. Such tools may include:

- The USCG/IALA PAWSA Model
- The IALA IWRAP Model
- Ship Routeing Patterns software
- Radar tracking tools
- The RYA Shipping Atlas

NAVIGATIONAL RISK MANAGEMENT POLICY

- AIS derived traffic data
- User Consultation
- Voyage Simulation techniques
- Local / National data
- Geographic Information Systems
- Charts & Sailing Directions
- Aerial & Satellite photography

Each GLA will ensure that the Mariner is notified of navigational risks resulting from AtoN changes or failures.

References

- IALA Aids to Navigation Guide (Navguide), Edition 5, 2006 (Section 6.1.3)
- IALA Recommendation O-134, On the IALA Risk Management Tool for Ports and Restricted Waterways, May 2006
- IALA Guideline 1018, On Risk Management, June 2000

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WRECK MARKING AND REMOVAL POLICY

Introduction

Where any vessel is sunk stranded or abandoned and there is no harbour or conservancy authority having power to raised, remove or destroy the vessel, the General Lighthouse Authority for the place in or near which the vessel is situated shall, if in the authorities opinion the vessel is, or is likely to become, an obstruction or danger to navigation, have the powers to:

- take possession of, and raise, remove or destroy the whole or any part of the vessel,

- light or buoy the vessel until it is raised, removed or destroyed.

Definitions & Acronyms

AIS Automatic Identification System
IALA International Association of Marine Aids to Navigation and Lighthouse Authorities.
GLA General Lighthouse Authority

Requirements

The GLAs shall give timely consideration to all the circumstances of a reported wreck and where necessary safely and expeditiously endeavour to locate and survey the wreck, with a view to forming an early Opinion as to whether the wreck is, or is likely to become, an obstruction or danger to navigation. If the Opinion is in the affirmative and the wreck is not in or near the approach to a harbour or conservancy authority with wreck removal powers, the GLAs may:

- take immediate possession, mark and subsequently remove or disperse the wreck as appropriate and practicable in all the circumstances, in accordance with the powers conferred by the relevant Section of the Merchant Shipping Acts.

- where appropriate, consider in prior consultation with relevant Government department, the possession and dispersal of a wreck which lies outside territorial waters.

In determining the specific marking requirements the GLAs will consider the use of all available means to warn the Mariner including guard ships, emergency wreck marking buoy(s), cardinal marks, racons and AIS as appropriate.

The GLAs will ensure that appropriate action is taken to inform the Mariner of the new danger through Navigation Broadcasts and Notices to Mariners via the relevant authority.

The GLAs will seek recovery of the expenses of surveying, marking and removing or dispersing the wreck in each case where possession is taken, where feasible.

WRECK MARKING AND REMOVAL POLICY

References:-

- Salvage & Wreck Act 1993 (ROI)
- Merchant Shipping Act 1894 (ROI)
- Merchant Shipping Act 1995 (UK)
- Harbours Docks and Piers Clauses Act 1847
- SOLAS Convention 1974 – Chapter V.
- IALA Aids to Navigation Guide (Navguide), Edition 5, 2006 (Section 7)
- IALA guidelines 1046, on the response plan for marking of new wrecks June 2005
- IALA Recommendation O-133 on Emergency Wreck Marking Buoy – December 2005
- GLAs' Emergency Response Criteria – October 2002
- IMO Convention on the Removal of Wrecks, 2007

Superintendence & Management of Local Aids to Navigation...

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SUPERINTENDENCE & MANAGEMENT OF LOCAL LIGHTHOUSE AUTHORITIES (LLAs) POLICY

Introduction

The GLAs are required to ensure that aids to navigation (AtoNs) provided by Local Lighthouse Authorities meet the requirements of the present and changing needs of all mariners and that their AtoNs comply wherever possible with internationally accepted service availability criteria.

Background

The Merchant Shipping Acts define that it shall be the duty of the GLA for any area to inspect all lighthouses, buoys and beacons situated within their area belonging to or under the management of any local lighthouse authority; and make such enquiries about them and their management as they think fit.

A GLA may, within their area, direct a LLA to lay down buoys; remove or discontinue any lighthouse, buoy or beacon; or make any variation in the character of any lighthouse, buoy or beacon.

The GLAs are required to make the results of their inspection known to the LLA.

The GLAs are required to make the results of their inspections of LLAs known to the appropriate Government Minister.

Under the Port Marine Safety Code, all LLAs are required to maintain their local AtoN in accordance with the availability criteria laid down by the GLAs and these AtoNs must be subject to periodic review. In addition, the characteristics of these AtoNs must comply with guidelines and recommendations laid down by IALA.

Definitions & Acronyms

GLA	General Lighthouse Authority
AtoN	Aid to Navigation
LLA	Local Lighthouse Authority
PMSC	Port Marine Safety Code
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities

Requirements:

Each GLA will organise a programme of regular inspections of all local aids to navigation within their area of jurisdiction.

Such Inspections may comprise of:

- Physical inspection of the AtoNs provided by a LLA both by night and day.
- Requirement for the LLA to make a regular return of the performance of their AtoNs which will include availability statistics.
- Confirmation that the deployed AtoNs comply with IALA recommendations and are fit for purpose.

In addition to the above noted inspections, LLAs may also be audited against the requirements laid down in the Port Marine Safety Code for provision of AtoNs. Such an audit may include:

SUPERINTENDENCE & MANAGEMENT OF LOCAL LIGHTHOUSE AUTHORITIES (LLAs) POLICY

- Regular review of Safety Management System including AtoNs
- Evidence of formal risk assessment
- Availability of AtoNs according to IALA standards
- Casualty response
- Maintenance procedures
- Sample inspection re colour, range and daymark integrity to ensure that the deployed AtoN is fit for purpose.

Service Level Parameters

Each GLA will produce an annual report noting the results of Inspections undertaken, and other relevant activities concerning local aids to navigation. The report will be submitted to the relevant government department, as required by the Merchant Shipping Acts.

Each GLA will produce reports of audits undertaken and will supply such reports to the relevant LLA. Any non-conformities with the Merchant Shipping Acts or Port Marine Safety Code will be clearly identified within the report, and follow up action will be undertaken as required. The results of audit may also be included in the Annual Report.

References

- Port Marine Safety Code - DETR March 2000
- Merchant Shipping Acts – 1894 and 1995
- IALA Aids to Navigation Guide (Navguide), Edition 5, 2006 (Section 6.1.2.1)

OFFSHORE OIL & GAS POLICY

Introduction

The Offshore Oil & Gas industry is a major economic activity in the North and Irish Seas, and is increasing in the Atlantic area.

Offshore installations represent collision hazards to shipping, with potential subsequent explosion, fire or pollution hazards. In addition undersea pipework represents a hazard to fishing vessels engaged in bottom trawling.

Offshore Oil installations require a Safety of Navigation consent from National Government. The relevant GLA is consulted regarding marking and lighting issues in this process.

Background

Offshore Oil installations are marked in accordance with IALA recommendations or National regulations, principally with lights flashing morse 'Uniform' and fog signals of the same character. Mobile platforms should also be marked in accordance with the International Rules for the Prevention of Collisions at Sea. Platforms may also utilise radar, AIS or standby vessels to advise approaching vessels of collision hazards.

Specific undersea hazards are generally marked with lit yellow special mark buoys. Pipelines are marked on Admiralty charts and automatic proximity warning devices are available to the fishing industry.

Definitions & Acronyms

AIS Automatic Identification System
IALA International Association of Aids to Navigation and Lighthouse Authorities

Requirements

The GLAs will work together, and in conjunction with IALA, to develop legislation regarding appropriate levels of marking and lighting of Offshore Installations. In particular, the GLAs will seek to have third party providers of Aids to Navigation, including Offshore Oil & Gas Operators, included within the definition of Local Lighthouse Authorities within the relevant Merchant Shipping Act

Each GLA will monitor Offshore Oil & Gas developments within their area of jurisdiction, through the seaward inspection process. Any deficiencies of lighting or marking will be reported to the relevant Operator and National Government department.

Each GLA will seek the influence the Safety of Navigation consent process within their area of jurisdiction, in order to minimise interaction between Offshore Oil & Gas installations and other users of the sea.

Each GLA will seek to establish links with the Offshore Oil & Gas industry and other relevant parties, and will promote appropriate levels of marking and lighting of Offshore Oil & Gas installations, to provide greater safety of navigation for vessels within their area of jurisdiction.
Service Level Parameters

OFFSHORE OIL & GAS POLICY

Each Offshore Oil & Gas Installation shall be inspected by the relevant GLA on an annual basis and the results communicated to the Offshore Operator and relevant Government Department.

References

- IALA Recommendation O-114, Marking of Offshore Structures, May 1998
- DoT Standard Marking Schedule for Offshore Installations, 1994 (UK)
- Coast Protection Act 1949 (section 34) (UK)
- International Rules for the Prevention of Collisions at Sea, 1972, as amended

OFFSHORE RENEWABLE ENERGY POLICY

Introduction

The GLAs recognise that development of Renewable Energy Projects is a fundamental part of the UK and Irish Government strategy to reduce reliance on fossil fuels, reducing carbon emissions accordingly.

EU policy requires at least 20% of energy requirements are met by renewable energy sources by 2020. UK and Irish waters contain a large proportion of European wind and wave energy resources.

Background

There are three types of offshore renewable energy devices in use, under development and under consideration:

- Wind Turbines
- Tidal
- Wave

Wind turbine developments run from a single turbine to fields of several hundred devices. In general the turbine towers are pile driven into the seabed but floating structures with appropriate moorings are also being considered.

Wave and Tidal devices can be piled towers with underwater turbines or surface/subsurface structures anchored to the seabed. These devices are often semi or completely submerged and may be of significant size and hazard.

To meet Government deadlines the numbers of devices and size of fields required will be substantial.

Definitions & Acronyms

The GLAs will seek to influence International and National Policy regarding the siting and marking of offshore renewable energy devices.

The GLAs will organise the regular inspection of all offshore renewable energy sites to confirm compliance with marking requirements.
The GLAs will assign availability requirements to, and collate availability returns from, offshore renewable energy providers.

References

IALA Recommendation O-117, On the Marking of Offshore Windfarms, December 2004

IALA Recommendation O-131, On the Marking of Offshore Wave and Tidal Energy Devices, June 2005

IALA Recommendation O-114, On the marking of offshore structures, May 1998

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AQUACULTURE POLICY

Introduction

Aquaculture, or fish farming, represents a major economic, and growing, activity on the remote West Coasts of Ireland and Scotland, and in the outer island groups, with over 1,000 sites active in these areas.

Current aquaculture technology is limited to inshore areas, which limits the interaction of larger vessels with sites, however these sites pose a significant navigational hazard to inshore fishing and leisure traffic, and it is incumbent on the GLAs to monitor the lighting and marking of these sites.

Background

Aquaculture sites may farm finfish, such as salmon or trout, in rings or cages, usually with an attached barge supplying automatic feeding. Alternatively shellfish, usually mussels, may be farmed on longlines or fixed nets. Oysters may also be farmed on trestles in the intertidal zone. Each of these sites poses direct or indirect dangers to navigation, of collision with solid objects, or by fouling propellers on longlines or trailing lines. Aquaculture sites may also restrict channel width or obstruct charted anchorages.

Aquaculture sites are generally marked with lit or unlit yellow Special Mark buoys or poles. Feed barges are generally marked with an anchor light appropriate to the vessel size. Other aids to navigation (eg. Lateral or Cardinal marks) may be used in appropriate circumstances. The site areas are charted, however the actual sites may be dormant and the marking is not usually depicted on Admiralty charts.

Aquaculture sites generally require planning approval through the Local Authority, a site lease, discharge consents from the relevant Environmental Agency and a safety of Navigation consent from National Government. The relevant GLA is consulted regarding the marking and lighting issues in some of these processes.

Definitions & Acronyms

IALA International Association of Marine Aids to Navigation and Lighthouse Authorities

Requirements

The GLAs will work together, and in conjunction with IALA, to develop legislation regarding appropriate levels of marking and lighting of aquaculture sites. In particular, the GLAs will seek to have third party providers of Aids to Navigation, including aquaculture operators, included within the definition of Local Lighthouse Authorities within the relevant Merchant Shipping Act

Each GLA will monitor aquaculture developments within their area of jurisdiction, through the seaward and landward inspection processes. Any hazards resulting from deficiencies of lighting or marking will be reported to the relevant site operator and National Government department.

Each GLA will seek the influence the Safety of Navigation consent process within their area of jurisdiction, in order to minimise interaction between aquaculture sites and other users of the sea.

AQUACULTURE POLICY

Each GLA will seek to establish links with the aquaculture industry and other relevant parties, and will promote appropriate levels of marking and lighting of aquaculture sites, to provide greater safety of navigation for vessels within their area of jurisdiction.

Service Level Parameters

Not applicable

References

- IALA Recommendation O-116, On the marking of fish farms, Edition 2, June 2007
- Coast Protection Act 1949 (section 34) (UK)
- Merchant Shipping Act 1894 (ROI)
- Merchant Shipping Act 1995 (UK)

COASTAL DEVELOPMENT POLICY

Introduction

Coastal developments below the High Water Mark generally require approval from the relevant government department. This department is required to form an opinion as to whether the application will cause or is likely to result in obstruction or danger to navigation, and either refuse consent or give consent subject to conditions, having regard to the nature and extent of the obstruction or danger which would otherwise be caused or be likely to result.

It is normal practice for the government departments to consult with interested parties, and the relevant General Lighthouse Authority is invited to make recommendations regarding the provision of any lights, signals or other aids to navigation.

Where such recommendations are accepted and incorporated into the consent granted to the developer, such aids can then be considered to be Local Aids to Navigation. Any failure by the developer to implement requirements incorporated within their consent should be referred to the relevant government department for enforcement action.

Background

Coastal Developments are generally classed as:

(a) the construction, alteration or improvement works on, under or over any part of the seashore lying below the level of mean high water springs,

(b) the deposition of any object or any materials on any part of the seashore, or

(c) the removal of any object or any materials from any part of the seashore lying below the level of mean low water springs, if the operation causes or is likely to result in obstruction or danger to navigation.

Definitions & Acronyms

AtoN Aid(s) to Navigation
IALA International Association of Marine Aids to Navigation and Lighthouse Authorities

Requirements

The GLAs will work together, and in conjunction with IALA, to develop legislation regarding appropriate levels of marking and lighting of coastal development sites. In particular, the GLAs will seek to have third party providers of Aids to Navigation, included within the definition of Local Lighthouse Authorities within the relevant Merchant Shipping Act.

Each GLA will monitor coastal developments within their area of jurisdiction, through the seaward and landward inspection processes. Any hazards resulting from deficiencies of lighting or marking will be reported to the relevant site operator and National Government department.

COASTAL DEVELOPMENT POLICY

Each GLA will seek the influence the Safety of Navigation consent process within their area of jurisdiction, in order to minimise interaction between coastal developments and other users of the sea.

Each GLA will seek to promote appropriate levels of marking and lighting of all coastal developments within their area of jurisdiction, to provide greater safety of navigation for vessels within their area of jurisdiction.

Each GLA shall review any applications submitted to them, and develop appropriate recommendations, noting the following considerations:

a) Nature and duration of foreseeable hazard
b) proximity to known shipping routes
c) nature and volume of local traffic
d) other activities or potential developments within the surrounding area
e) available sea-room and alternative routing options
f) prevailing meteorological and local hydrological conditions
g) potential mitigation measures, which may include temporary or permanent AtoN; local or National press releases, Notices or Mariners or Navigation Warnings; and depiction on charts.

Service Level Parameters

Applications for Coastal Developments will be responded to in accordance with each GLA's internal correspondence procedures.

Each Coastal Development will be assessed and, if considered necessary, a post-installation site inspection will be undertaken.

References

- Coast Protection Act 1949 (section 34) (UK)
- Merchant Shipping Act 1894 (ROI)
- Merchant Shipping Act 1995 (UK)

Service Provision...

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SERVICE AVAILABILITY POLICY

Introduction

The GLAs aim to provide levels of service availability of Aids to Navigation, as the volume of traffic justifies and the degree of risk requires, and in keeping with best international best practice.

Background

IALA provides a method to categorise and calculate aids to navigation availabilities for both individual aids to navigation and systems of aids to navigation:

CATEGORY	AVAILABILITY OBJECTIVE	CALCULATION
1	99.8%	Availability Objectives are calculated over a three-year continuous period, unless otherwise specified
2	99.0%	
3	97.0%	

Category 1: An Aid to Navigation (AtoN) or system of AtoN that is considered by the Competent Authority to be of vital navigational significance. For example, lighted aids to navigation and racons that are considered essential for marking landfalls, primary routes, channels, waterways or new dangers or the protection of the marine environment.

Category 2: An AtoN or system of AtoN that is considered by the Competent Authority to be of important navigational significance. For example, it may include any lighted aids to navigation and racons that mark secondary routes and those used to supplement the marking of primary routes.

Category 3: An AtoN or system of AtoN that is considered by the Competent Authority to be of necessary navigational significance.
The Recommendation also states that the absolute minimum level of availability of an individual aid to navigation should be set at 95%.

Definitions & Acronyms

AIS Automatic Identification System
AtoN Aid to Navigation
BPNS Buoys of Primary Navigational Significance
DGNSS Differential Global Navigation Satellite Service
IALA International Association of Marine Aids to Navigation and Lighthouse Authorities

Requirements

The GLAs have further defined the IALA Availability Categories as follows:

Category 1 (99.8% Availability)

Lights of vital navigational significance (usually 15nm range or greater) including key Direction, Leading and subsidiary lights

SERVICE AVAILABILITY POLICY

Lights marking major hazards, waypoints or situated in areas of heavy traffic

Lights fitted to buoys marking new wrecks
Racons

The Assigned Position of :
- Major Floating Aids
- Buoys equipped with racons
- Buoys marking major waypoints
- Buoys marking new wrecks

Buoys marking IMO Traffic Separation Schemes/Deep Water Routes

Other Buoys of Primary Navigational Significance

DGNSS
Note: *The GLAs provide a DGPS service in accordance with IALA recommended availability and is based on overlapping coverage between adjacent stations. In the event of failure of one transmitter, service to the mariner is maintained from the adjacent stations. A DGPS service failure is considered to occur only when adjacent stations have failed. IALA recommends presentation of DGPS Service availability taken over a two-year period.*

Category 2 (99.0% Availability)

Lights including Direction, Leading and subsidiary lights not assessed as Category 1 stations
Lights fitted to buoys marking IMO Traffic Separation Schemes/Deep Water Routes, other than Category 1 stations.
Cardinal buoy topmarks
Position of buoys marking existing wrecks and minor waypoints

Category 3 (97% Availability)

Buoy lights other than Category 2
Fog Signals
Daymarks/Unlit beacons
Position of buoys other than Category 1 or 2 buoys
AIS (pending assessment of achievable availability)

Each GLA shall calculate the availability achieved for each Aid to Navigation, and publish overall performance achieved as a Key Performance Indicator in their Annual Report.

References

- IALA Aids to Navigation Guide (Navguide), Edition 5, 2006 (Section 6.1.4)
- IALA Recommendation O-130, On categorisation and availability objectives for short range aids to navigation, December 2004
- IALA Guideline 1035, To Availability and Reliability of Aids to Navigation, Theory and Examples, Edition 2, December 2004
- IALA Guideline 1037, On data collection for aids to navigation performance calculation, December 2004

e-NAVIGATION POLICY

Introduction

e-Navigation is a concept defined by IMO as "e-Navigation is the harmonised collection, integration, exchange, presentation and analysis of maritime information onboard and ashore by electronic means to enhance berth-to-berth navigation and related services, for safety and security at sea and protection of the maritime environment."

Background

Today, around 80% of all accidents at sea are attributable to human error, ships are getting both larger and faster and traffic is becoming more congested. e-Navigation is intended to make safe navigation at sea both easier and safer, by improved data presentation onboard and better data exchange between ship and shore-based infrastructure. The fundamental components of e-Navigation are considered to be:

a) worldwide availability of vector electronic charts (ENCs), to agreed international standards
b) failsafe position, navigation and time inputs into onboard and shore support systems
c) reliable worldwide data communications between vessels and ship-shore

Definitions & Acronyms

AIS	Automatic Identification System
AtoN	Aid to Navigation
DGNSS	Differential Global Navigation Satellite Service
ENC	Electronic Navigation Chart (to IHO standard)
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IHO	International Hydrographic Office
eLoran	enhanced LOng RANge Navigation (service)

Requirements

The GLAs will work together, and in conjunction with Governments and IALA, to develop the e-Navigation concept.

The GLAs will provide component services of e-Navigation, including AtoN AIS, DGNSS and eLoran, to agreed International Standards.

The GLAs will promote new technologies developed as components of e-Navigation, to provide greater safety of navigation for vessels within their areas of jurisdiction.

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DGNSS OPERATING POLICY

Introduction

The GLAs jointly operate a network of Medium Frequency transmission sites for Differential GNSS, based on former radio beacon and Decca Navigator stations. The sites continuously assess the performance of all GPS satellites in view, to warn users of erroneous ranging messages (the 'integrity function') and to improve the accuracy of calculated positions, to a minimum range of 50 nautical miles from the coastline. The network incorporates 14 transmission sites, 3 control centres and 6 remote monitoring sites. The GLAs continue to monitor the progress of GLONASS as it is gradually upgraded and the future plans for the introduction of Gallileo.

Background

Differential GNSS (DGNSS) functions by having a fixed receiver at a known ground-based reference station that continually calculates the current GNSS errors and transmits corrections to the pseudo-range measurements taken by mobile receivers operated by users of the system. The system has been adopted by the international Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and implemented by some 40 authorities worldwide. DGNSS improves both the integrity of the GNSS signal and the repeatable 95% accuracy.

Definitions & Acronyms

DGNSS	Differential Global Navigation Satellite Service
DGPS	Differential Global Positioning System
GNSS	Global Navigation Satellite Service
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities

Requirements

The GLAs will work together to achieve IALA standards for broadcast availability, continuity, accuracy and integrity, by operating and maintaining their individual system components, and by liaising with regard to planned and unplanned system outages.

The GLA DGPS service is operated as an integrated network with each GLA continuously monitoring the performance of their own transmission sites, and system co-ordination via a single System Director. In the event of a Control Centre failure, responsibility for, and control of, that GLA's stations will be temporarily passed to another Control Centre.

Each GLA will staff the DGPS service with:

- Monitoring staff
- Maintenance staff
- Two on-call Duty Officers, participating in a joint-GLA out-of-hours rota
- A System Manager

The professional Head of Engineering of one of the GLAs (the 'System Director') will co-ordinate the activities of the System Managers and will report to the Chief Executives regarding service performance. The System Managers will report to the System Director on a monthly basis.

The GLAs will jointly carry out monitoring, maintenance, periodic signal validation and both internal and external audit of the service provided.

DGNSS OPERATING POLICY

The GLAs will review developments in the field of DGNSS in order to provide a service compatible with best international practice.

Each GLA may also enter into agreements with other National Administrations providing DGNSS services.

Service Level Parameters

1) Accuracy. The absolute horizontal accuracy should be better than 5m at the 95% probability level within the coverage area.
2) Integrity. The criterion for issuing an integrity warning to users will be an error of greater than 5m persisting for more than 20 seconds. The integrity warning is transmitted in the header of every message. The maximum time for issuing an integrity warning to the user from the time the integrity criterion is breached is 10 seconds.
3) Integrity Failure. An integrity failure of the system is defined as a failure to detect an out of limits situation within 10 seconds of its occurrence.
4) Availability. The GLAs have set a target for signal availability of their DGNSS Service of 99.8% level measured over two years.
5) Continuity. The probability that the service will continue to function for a period of any 3 hours without failure is 99.97%, excluding downtime periods advertised in advance.
6) Coverage. Overlapping dual station coverage will be maintained at a signal strength of 50μV/m (±3dB) out to a minimum range of 50 nautical mile from the British and Irish coasts.

References

- GLA Memorandum of Understanding regarding Differential Global Positioning Services, September 2000.
- GLA DGPS Operators' Manual, Issue No 5
- GLA DGPS Maintenance Manual, Issue 6.1
- GLA DGPS System Managers' Manual, Issue No 6
- IALA Recommendation R-115, On the provision of maritime radionavigation services in the frequency band 283.5-315kHz in Region 1 and 285-325 kHz in region 2 and 3, December 1999
- IALA Recommendation R-121, For the performance and monitoring of a DGNSS Service in the band 283.5 - 325 kHz, December 2004
- IALA Recommendation R-135, The Future of DGNSS, December 2006
- IALA Guideline 1016, On bilateral agreements and inter-agency memorandums of understanding on the provision of DGNSS services in the frequency band 283.5 325kHz, June 2001.

eLORAN POLICY

Introduction

The GLAs consider it essential to provide a terrestrial alternative source of PNT (position, navigation and time) information to reduce the mariner's dependence on GNSS. As part of this requirement we will transmit an eLoran signal in conjunction with our European partners, initially on a trial basis.

Background

eLoran is the latest evolutionary step in the 100kHz terrestrial radionavigation system known as Loran (Long Range Navigation). The early 1990s saw the next evolutionary step to what we can now call Modernised Loran. This included: the deployment of modern, solid-state transmitters; improved clock synchronisation allowing all-in-view, time-of-arrival positioning (similar to GPS); and improved Additional Secondary Factors (ASFs) computation.

e-Loran is the latest evolutionary step, improving the performance to meet the needs of 21st century users. It assumes the use of solid-state transmitters and all-in-view, time-of-arrival positioning. A messaging capability is included at each transmitter and this can be used to disseminate UTC timing, differential Loran or other data. Major technological advances now allow us to measure or model the ASFs with unprecedented levels of accuracy and to store them in the receiver. Differential Loran (DLoran) monitoring stations can also be deployed in areas where the highest levels of performance are required to correct for short-term fluctuations in propagation errors due, say, to seasonal climate variations or weather fronts. This delivers performance improvements of better than one order of magnitude, allowing accuracies of the order of 10m (95%) to be achieved.

Definitions & Acronyms

AIS	Automatic Identification System
ASF	Additional Secondary Factor
DLoran	Differential Loran
eLoran	Enhanced Loran
EC	European Community
ERNP	European Radio-Navigation Plan
GLA	General Lighthouse Authority
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
LORAN	LOng RAnge Navigation (System)

Requirements

The GLAs will work with international partners to establish viable, long-term institutional and commercial arrangements for a European eLoran service. This includes encouraging and supporting the realisation of the European Radio-Navigation Plan (ERNP) through an EC communication and the implementation of recommendations pertaining to Loran, as currently published by the EC. It also includes seeking wider support from other user segments and public sector domains in order to share future costs on an equitable basis.

eLORAN POLICY

In concert with their European partners, the GLAs will extend their initial trial eLoran signal transmission and develop differential Loran the measurement of ASFs in order to support general navigation. The GLAs will also investigate the dissemination of time and frequency by eLoran to underpin the timing and frequency requirements of AIS and synchronised lights.

The GLAs will continue their ongoing marine trials and publish the results to our users, stakeholders and international partners as well as encouraging the development of eLoran user equipment.

References

- IALA Aids to Navigation Guide (Navguide), Edition 5, 2006 (Section 3.2.7)

AUTOMATIC IDENTIFICATION SYSTEM (AIS) POLICY

Introduction

AIS has the potential to enhance the functionality of existing Aids to Navigation, improve monitoring, provide early marking of new dangers and meet the marking needs of specialised users.
Improved traffic analysis using AIS data will allow for more accurate assessment of the level of AtoN service required to meet the needs of the Mariner.

Background

AIS is a mandatory carriage requirement on all SOLAS ships over 300gt and ships engaged in international voyages.

AIS is an integral component of e-Navigation and is an evolving technology with regard to Aids to Navigation.

AIS has the potential to be a highly effective AtoN, however it's full potential onboard is still limited by the frequent absence of Radar/ECDIS overlay and the limitations of the Minimum Keyboard Display.

The GLAs recognise that a significant number of Marine Users are not required to carry or use AIS equipment, and will therefore be unable to benefit from AIS AtoN information.

Definitions & Acronyms

AIS	Automatic Identification System
AtoN	Aid to Navigation
ECDIS	Electronic Chart Display Information System
GLA	General Lighthouse Authority
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
SOLAS	Safety of Life at Sea (Convention)

Requirements

The GLAs will monitor developments in AIS technology and usage.

The GLAs will develop and implement a programme to install AIS on selected fixed and floating AtoN

The GLAs will monitor the performance and effectiveness of AIS:

- as an AtoN indicating identity, real time position and status information
- as a platform for enhanced services such as meteorological or hydrological information
- as an AtoN monitoring tool
- as a synthetic AtoN (where a nearby base station transmits the message but it appears to the mariner to have come from the aid)
- as a virtual AtoN (where there is no physical aid to navigation on the water but a message is transmitted from a shore station which appears on the ship's receiver as an AIS target).
- as a traffic analysis tool

AUTOMATIC IDENTIFICATION SYSTEM (AIS) POLICY

The GLAs will work closely with the National Administrations to make AIS Data and Transmission facilities available to each other and to maximise the potential of AIS.

The GLAs will collectively lobby for the adoption of AIS as a mandatory display requirement within radar and/or ECDIS displays and e-navigation presentations.

The GLAs will make use of AIS traffic monitoring benefits to assist with Aid to Navigation reviews.

References

- 2020 The Vision, Marine Aids to Navigation Strategy, GLAs 2004
- GLA Radio Navigation Plan, 2007
- GLA AIS Strategy Document, March 2007
- IALA Aids to Navigation Guide (Navguide), Edition 5, 2006 (Section 3.4)
- IALA Recommendation A-124, On Automatic Identification System (AIS) Shore Station networking aspects relating to the AIS Service Ed1.2 (includes Annex F on FATDMA), December 2005
- IALA Recommendation A-126, On the Use of Automatic Identification system (AIS) in Marine Aids to Navigation, Edition 1.3, June 2007
- IALA Recommendation A-123, On the Provision of Shore Based Automatic Identification Systems (AIS), Edition 2, June 2007
- IALA Guideline 1050, On the Management and Monitoring of AIS Information, December 2005
- IALA Guideline 1028, On the automatic identification system (AIS) - Volume 1 - Part 1 operational issues, December 2004
- IALA Guideline 1029, On universal automatic identification (AIS) - Volume 1 - Part 2 technical issues, December 2002

MONITORING OF AIDS TO NAVIGATION POLICY

Introduction

To enable the provision of effective Aids to Navigation Service, it is the policy of the GLAs to monitor and control selected AtoN to fulfil each service's navigational, operational and legal requirement.

Background

Remote monitoring and control of distant or isolated AtoN can improve the quality of service provided by decreasing response times to a casualty. Monitoring can also allow for trend analysis of AtoN performance, allowing early prediction of failures, and hence precautionary attendance on site to prevent failures. It can also save on the cost of responding to what is later found to be a false outage report.

Definitions & Acronyms

AtoN	Aid to Navigation
GLA	General Lighthouse Authority
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities

Requirements

The GLAs will progress the development of monitoring and control requirements for selected AtoN.

The GLAs will ensure that the most expedient reaction to a casualty can be progressed by having in place a monitoring system on significant AtoNs..

To further improve the safety of the mariner, selected fixed and major floating Aids will have remote control to enable switch over to secondary AtoN provision or switch off if appropriate.

Selection of secondary systems is in general automatic except for off station light systems for MFAs.

References

- IALA Aids to Navigation Guide (Navguide), Edition 5, 2006 (Section 6.1.8.3)
- IALA Guideline 1008, On Remote Monitoring and Control of AtoN, October 1998

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Research and Radionavigation...

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RESEARCH & RADIONAVIGATION POLICY

Introduction

The core business of the tri-GLA Research & Radionavigation (R&RNAV) directorate is the research and development of physical and radio aids to navigation (AtoN) and support systems and their integration to support the GLAs' mission to deliver a reliable, efficient and cost-effective AtoN service for the benefit and safety of all mariners.

Background

R&RNAV activities will address five areas:

- Administration including career development for R&RNAV team members;
- The delivery of projects aligned to the objectives stated in the GLAs' Strategic Plans as appropriate
- Interaction with the tri-GLA stakeholders (i.e. TH, the Commissioners of Irish Lights, the Northern Lighthouse Board, the UK Department for Transport and the Irish Department of Transport)
- External liaison with various entities (e.g. IALA, MCA, industry) to progress the objectives of the GLAs
- The development of technology strategy, together with the GLAs, for radionavigation and physical AtoNs and their integration

Definitions & Acronyms

AtoN	Aid to Navigation
DR&RNAV	Director of R&RNAV
GLA	General Lighthouse Authority
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IGC	Inter-GLA Committee
MCA	UK Maritime and Coastguard Agency
R&RNAV	Research & Radionavigation
TH	Trinity House
UK	United Kingdom

Requirements

- The GLA Chief Executives shall maintain a GLA R&RNAV Directorate to be their source of research and a centre of excellence for radionavigation, lights, support systems and their integration.
- The GLA Chief Executives shall appoint a tri-GLA Director of R&RNAV (DR&RNAV).
- DR&RNAV shall report to the GLA Chief Executives at least twice per annum.
- DR&RNAV shall report to the Executive Chair of Trinity House for day-to-day matters.
- DR&RNAV shall attend Executive Committee Meetings of all three GLAs as appropriate.
- DR&RNAV shall be a member of IGC3 (Navigation), IGC5 (Engineering) and IGC7 (Radionavigation).

RESEARCH & RADIONAVIGATION POLICY

- R&RNAV shall maintain its tri-GLA identity with the support of the GLA Chief Executives.
- R&RNAV shall be hosted by Trinity House and shall use Trinity House's back-office functions (finance, human resources, IT, management information systems etc).
- R&RNAV shall contract through Trinity House when required and shall ensure that the preamble to such contracts references "The General Lighthouse Authorities of the United Kingdom and Ireland's Research & Radionavigation Directorate contracting through The Corporation of Trinity House" or similar.
- There shall be an annual R&RNAV policy meeting attended by the GLA Chief Executives, R&RNAV Directors/Senior Managers and appropriate GLA Directors to agree on R&RNAV policy including its strategic objectives.
- R&RNAV Strategic Objectives shall be stated in the Trinity House Strategic Plan as a minimum.
- R&RNAV shall publish a workplan to deliver the R&RNAV strategic objectives.

References

None

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Produced by the
General Lighthouse Authorities of the
United Kingdom and the Republic of Ireland

Marine Operations Department
Northern Lighthouse Board
84 George Street, Edinburgh EH2 3DA

Navigation Directorate
Trinity House
Tower Hill, London EC3N 4DH

Marine Department
Commissioners of Irish Lights
16 Lower Pembroke Street, Dublin 2