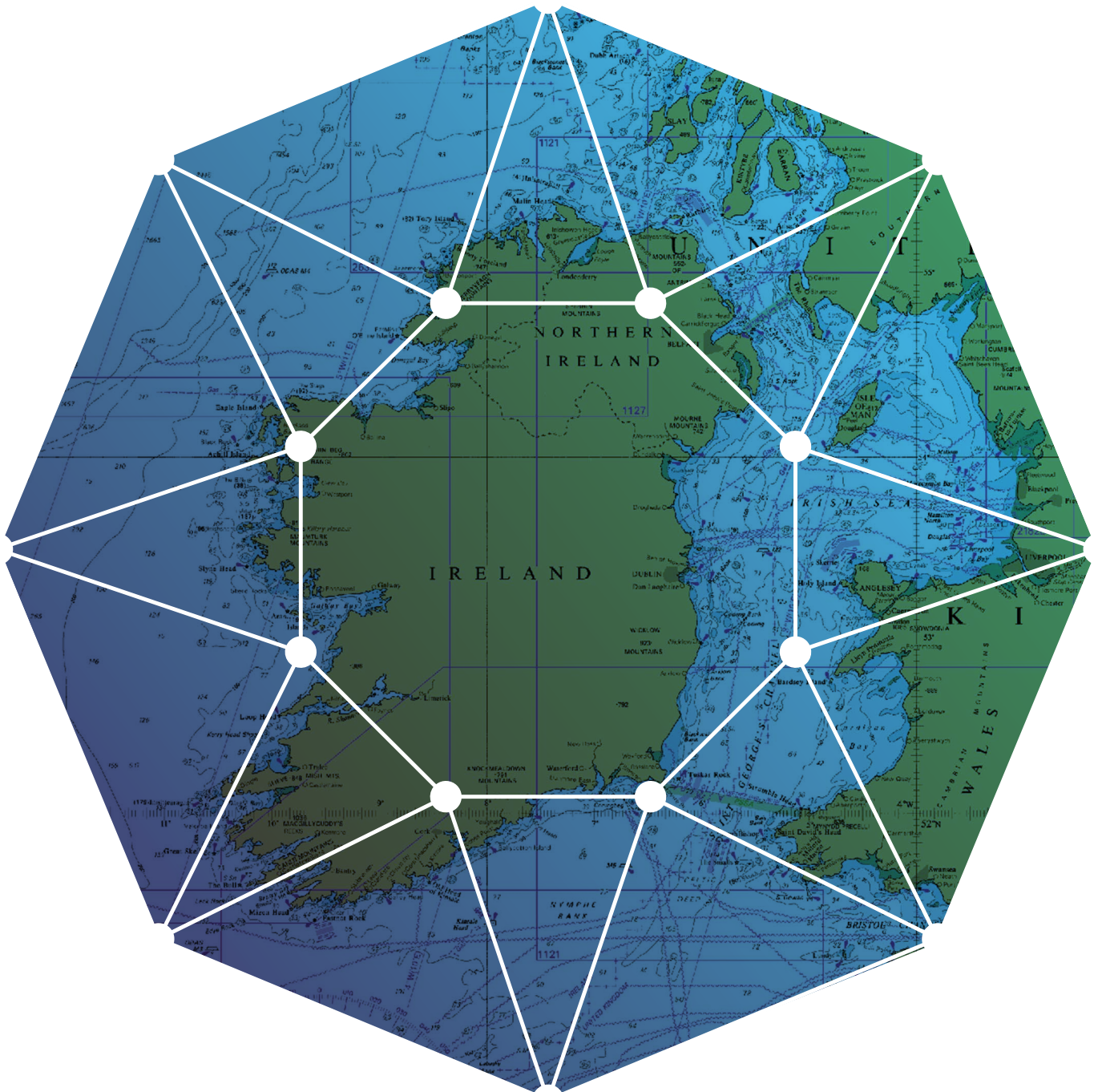


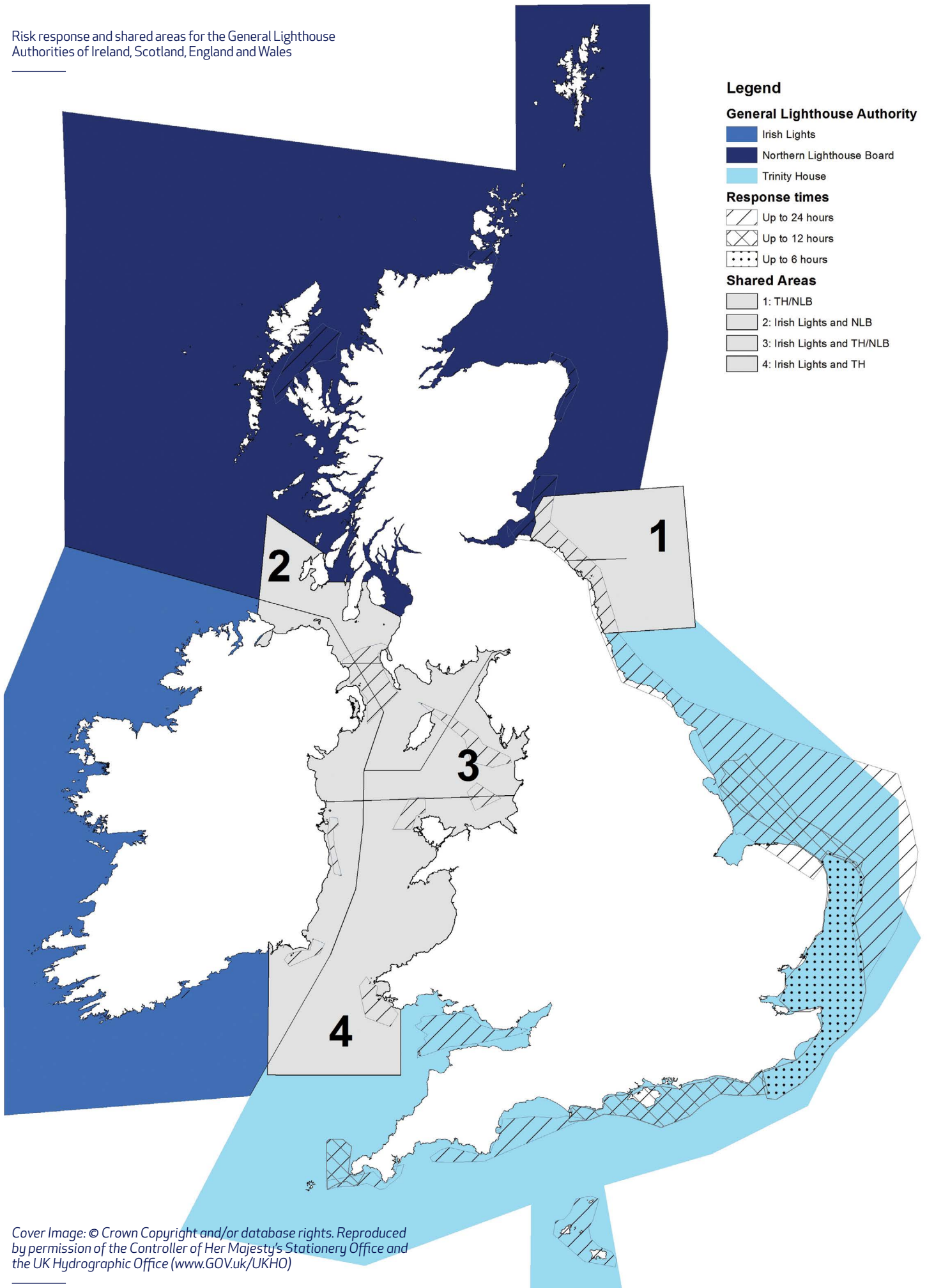


Commissioners of
IRISH LIGHTS | Navigation
and Maritime
Services

Irish Lights Strategy 2018–2023

Safe Seas – Connected Coasts





Contents

Foreword	02
Executive Summary	04
01 International Trends and Drivers of Change	10
02 Maritime Business Matters	12
03 External Stakeholder Feedback	14
04 Building on Success	18
05 Irish Lights Strategy 2018–2023	20
06 Implementing the Strategy	52
Glossary of Terms	58

Foreword



Chairman's Statement

I am pleased to present the Irish Lights Strategy 2018–2023 'Safe Seas – Connected Coasts' supporting our vision which is 'to protect lives, property, trade and the environment by delivering Next Generation Maritime Services, at the interface of navigation, technology, engineering and data management'.

This strategy will ensure that Irish Lights continues to lead the delivery of a suite of modern, reliable, efficient and cost effective navigation, safety and maritime services for the benefit of all stakeholders.

As the provider of General Aids to Navigation around the island of Ireland, Irish Lights has a long and respected track record of service to the maritime community dating back to 1786. In more recent times, the context in which that service must be delivered has changed. This is due to rapid technological advances, pressures on the marine and coastal environment and more diverse stakeholder needs, requiring a greater emphasis on collaboration across agencies and with international organisations. This creates both opportunities and challenges which are proactively addressed in this strategy.

Irish Lights is responsible for Aids to Navigation across the entire island of Ireland. We are governed by arrangements set out in the Merchant Shipping Acts which have resulted in a very close and long standing working relationship with our sister organisations in the UK - Trinity House and the Northern Lighthouse Board. These arrangements are fundamental to the successful operation of Irish Lights and significant stakeholder benefits accrue in terms of quality of services, economies of scale and related cost efficiencies. The Board of Irish Lights would like to acknowledge the Boards, Management and Staff of Trinity House and NLB for their co-operation and support. Irish Lights would also like to express its appreciation to Ministers and officials from the Department of Transport, Tourism and Sport, the Department for Transport UK, Transport Scotland and partners from many government agencies and industry stakeholders who have worked with us over the years.

We are excited to continue our progress through our new strategy and look forward to collaborating with all of our stakeholders in taking it forward.

John Coyle

Chairman



Chief Executive's Statement

This document sets out Irish Lights strategy for the period 2018–2023. Its backdrop is a major process of change undertaken in the last five years, a process seen by stakeholders as being successfully achieved. Today our organisation is in a strong position operationally, financially and from a governance perspective.

The successful delivery of our 2012-17 strategy reflects the achievement of employees in delivering on a process of change which has allowed us to put in place a solid platform for the future. I want to take this opportunity to pay tribute to the exceptional effort of the entire team at Irish Lights in this regard.

Over the past year, this strategy development process has involved detailed technical and market research. We received very substantial feedback from external stakeholders (national and international) on the continued need for a range of Aids to Navigation (AtoN) and allied maritime services and on opportunities to enhance services and deliver additional value. This important feedback is incorporated into the strategy and I want to thank everyone who gave their time and expertise to contribute to its formulation. The preparation of the strategy has been influenced by, and advanced in partnership with the extended Irish Lights team.

This strategy places a strong emphasis on positioning Irish Lights to play a leadership role in the delivery of next generation navigation and safety services for the benefit of our stakeholders. This will require us to develop our core expertise at the interface of navigation technology, engineering and data management and to proactively engage with international leaders and those innovating in the development and provision of new and emerging solutions. We will collaborate independently and through our GLA partners with companies and public institutions to develop expertise and experience and utilise international networks to influence outcomes that deliver on our strategic objectives. This integrated approach will form a critical input to our delivery of high quality, public and commercial services and is a central element of our planning for 2018–2023.

Irish Lights has been delivering safety at sea for mariners around the island of Ireland for over 200 years. Drawing and building on this proud tradition, today's Board, Management and Employees are pleased to present this comprehensive strategy for how we intend to continue providing a quality service to all our stakeholders through the years 2018–2023. We thank all those who have contributed to its formulation and look forward to working with you to deliver on its full implementation.

Yvonne Shields

Chief Executive

Executive Summary



Aids to Navigation

A Critical National Infrastructure

Aids to Navigation (AtoN) are a Critical National Infrastructure for the maritime sector. This is due to their direct impact on the safety of navigation which facilitates commerce (with over 90% of goods transported by sea), protects lives, property and the environment of our seas and coastlines. Irish Lights provides a reliable, technologically advanced, fixed and floating infrastructure supporting associated data and monitoring services, which is essential for all those who operate around the island of Ireland.

Building on the platform of change that has been delivered over the last five years, Irish Lights is excited to chart the next stage of its evolution. We have accordingly set ourselves six ambitious outcomes to deliver over the period 2018–2023. These outcomes reflect the modern role of Irish Lights delivering navigation, safety and allied maritime services and supporting the growth of the maritime economy.



Targeted Outcome 1: **Safety of All**

Irish Lights will continue to focus on the delivery of reliable and value-for-money navigation and safety services. We are committed to listening to stakeholders and being proactive and innovative in our approach to the development of these services for the safety and benefit of all. We are proud to operate an extensive network of aids to navigation services around the island of Ireland and to provide a depth and breadth of expertise at the interface of navigation, engineering, technology and data management. Our relationship with Trinity House and the Northern Lighthouse Board ensures that we harness knowledge, share resources and achieve economies of scale to deliver to maximum efficiency. As a modern organisation we are committed to working with partners in the public and private sectors to develop our role as a key member of the value chain of maritime safety services on the island of Ireland.



Targeted Outcome 2: **International Leadership**

The nature of AtoN services is that they must be internationally standardised to serve a global industry. Technology development and convergence requires that, over the period of this strategy Irish Lights exercises a far broader international influence than was the case in the past. We will do this by proactively engaging with international bodies such as the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), International Maritime Organisation (IMO), International Hydrographic Organisation (IHO) and International Telecommunication Union (ITU), to achieve early influence on developments related to policy, regulation and standards that impact on navigation safety and through sharing information, expertise and resources to the benefit of all parties.

	<p>Targeted Outcome 3: Technology and Innovation</p>	<p>Across the maritime sector there is recognition of the increasing pace of technological development and the role technology and innovation can play to improve safety and performance. In delivering this strategy, Irish Lights will continue to lead on the adoption of new technology and the development of innovative approaches that deliver safety and economic benefits for the maritime sector. We will contribute to the work of our colleagues in R&RNAV (the General Lighthouse Authorities Research and Development Team) working with them to ensure outcomes which deliver value in terms of improved services, efficiencies or revenue. We will actively engage with companies that innovate in our areas of interest in the development, trial and implementation of advanced engineering, communications and data solutions.</p> <p>We will continue to engage in ongoing consultations with regulators, providers and users as appropriate. In particular we will ensure user input into the selection and development of emerging technology and service solutions.</p>
	<p>Targeted Outcome 4: Collaboration and Partnership</p>	<p>Irish Lights works closely with a matrix of local, national and international partners who collaborate with us to enable us to deliver a diverse suite of services. Essential to our success is our relationships with key maritime agencies and local authorities around the coast of Ireland and Northern Ireland. Over the period of this strategy we will strengthen our existing partnerships to support the delivery of key services and where necessary, form new partnerships for added value and commercial service delivery.</p>
	<p>Targeted Outcome 5: Supporting the Development of the wider Maritime Economy</p>	<p>Ireland and the United Kingdom are maritime nations that rely heavily on seaborne trade, a high quality marine environment and a diverse range of maritime economic activities to underpin development in coastal areas. There is significant commitment to the maritime sector across both islands with investment, trade and employment growth projected. Over the period of this strategy Irish Lights will seek to strengthen the contribution that it makes to the wider maritime economy by targeting our expertise, asset base and proven technological capabilities to deliver maximum value and public good services in the interests of our stakeholders, coastal communities and the wider economy.</p>
	<p>Targeted Outcome 6: Safeguarding the Past</p>	<p>While our focus in this strategy is very much on the future, we know that in facing this future we are building on the ingenuity and resilience of the people who worked in Irish Lights over the generations. Moreover we have in our stewardship a tangible legacy of the past in the unique set of heritage assets which we own and these have significant value and potential in the development of tourism, education, research and community based initiatives. Over the period of this strategy, we will continue to build on the international success of our 'all island' tourism initiative, Great Lighthouses of Ireland, and we will work with third parties to protect, develop and promote our unique archive and heritage assets for the benefit of the Irish public.</p>
	<p>Positioning for the Future</p>	<p>As the strategy unfolds over the period 2018–2023, we will work closely with all stakeholders to meet their evolving needs and to achieve our vision of positioning Irish Lights to deliver next generation maritime services.</p>

New Strategy: Safe Seas – Connected Coasts

Our Mission:

Safe Navigation at Sea

To be a leading and innovative provider of reliable, efficient and cost effective navigation and maritime services for the safety of all.

Our Vision:

Next Generation Maritime Services

To protect lives, property, trade and the environment by delivering next generation maritime services at the interface of navigation, technology, engineering and data management.

‘Safe Seas – Connected Coasts’ 2018–2023, broadens the focus Irish Lights had in its last strategy from three Pillars to five Focus Areas of activity. It underlines the primacy of our AtoN activity and strengthens our commitment to new activities, which were developed in the last five years and are demonstrating real potential and tangible results.



Our 2018–2023 strategy places an emphasis on innovation in service provision and asset utilisation and takes account of a diverse range of stakeholder needs in the face of ongoing technological change and an increasingly multifaceted maritime and coastal environment. In delivering this strategy Irish Lights will:

1. Continue to **meet International Standards** in the delivery of AtoN.
2. Recognise the **interdependency of (marine) AtoN and (shipboard) Navigation Aids** and the need to address the implications as we develop our services.
3. Plan for **new technological advances** and the **convergence of electronic data services and communications** with a view to making the most of opportunities that will arise over time to develop new services for the benefit of safe and efficient navigation.
4. **Achieve early influence with international bodies** such as IALA, IMO, IHO and ITU over policy, regulation and standards that impact on navigation safety.
5. Contribute to the development of **resilience in navigation** by ensuring that undue reliance is not placed on any one navigation system.
6. Collaborate with Trinity House, Northern Lighthouse Board and other partners to deliver appropriate and timely **risk and incident response** across Ireland and the UK.
7. **Manage and mitigate cybersecurity risks** in order to protect AtoN as a critical national infrastructure facilitating trade and commerce, fishing, offshore energy and tourism and leisure activities.
8. **Build on the successful delivery to date of commercial services** to third parties by making optimal use of the expertise and experience of our employees and any reserve asset capacity.
9. Work in partnership with the wider maritime sector, government departments and agencies and commercial operators to **deliver maximum value for the investment employed in Irish Lights**.
10. Recognise the **strategic value of our heritage assets** to the tourism sector and local communities.

Taken together these commitments recognise the need to balance the continued delivery of high quality, reliable AtoN services with ongoing innovation for the benefit of a wide range of stakeholders.

Focus Areas at a Glance

	<p>Focus Area 1:</p> <p>Provision of General Aids to Navigation around the island of Ireland</p>	<p>Strategic Objectives:</p> <ul style="list-style-type: none">• Continue to lead on the innovative use of new technology to deliver reliable, low maintenance visual and electronic systems to the level required by users.• Implement technologies and approaches that reduce environmental impact and enable adaptation to climate change.• Ensure our assets, coastal networks and communications infrastructure is secure, resilient and scalable.• Continue to implement appropriate business continuity arrangements and upgrade technologies and solutions to deal with the increasing cyber security threat landscape.• Play a leading role supporting the assessment of new national and international developments and advising and/or adopting future systems which benefit our stakeholders.
	<p>Focus Area 2:</p> <p>Local Aids & Other Navigation Services</p>	<p>Strategic Objectives:</p> <ul style="list-style-type: none">• Deliver an efficient and proactive local aids to navigation service to third parties to ensure the achievement of IALA standards for local aids around the coast.• Provide timely and appropriate advice on request from Local Lighthouse Authorities on navigation risks and mitigations.• Provide authoritative advice and expert services to ensure that navigation risks around the coast pertaining to new developments or potential dangers are fully reviewed and minimised.• Achieve the level of international and national influence required to ensure that appropriate navigation standards and technologies are developed and/or adopted to facilitate the future of safe navigation in an increasingly multi-faceted maritime environment.
	<p>Focus Area 3:</p> <p>Commercial Services</p>	<p>Strategic Objectives:</p> <ul style="list-style-type: none">• Position Irish Lights as a high quality provider of commercial services targeting markets where we can capitalise on our expertise, experience and infrastructure.



Focus Area 4:

Value Added Services to contribute to the Wider Maritime Economy

Strategic Objectives:

- Provide reliable access to accurate, near real time, weather and sea state observations, at selected locations, aiding greater safety for all at sea.
- Collaborate with other organisations across government to share relevant data and build capacity to contribute to national climate change monitoring, adaptation and resilience planning.
- Proactively collaborate with government and other stakeholders to ensure that the need for safe navigation is fully understood and taken into account at all stages of Maritime Spatial Planning process.
- Collaborate with others to further improve the availability and standard of hydrographic data for Irish and UK waters with a view to targeted updating of nautical charts for safe navigation.
- Collaborate with other agencies to promote and facilitate increased maritime incident response capability.



Focus Area 5:

Tourism, Heritage and Community Engagement

Strategic Objectives:

- Positively impact on coastal communities and the wider public by promoting and protecting our maritime heritage assets for use in tourism and other national and local development initiatives.

The detailed approaches and actions which we will implement to deliver on each of the strategic objectives above are contained in Section 5 of this document along with the anticipated impacts and benefits of each on stakeholders.



Integrated navigation and positioning

01

International Trends & Drivers of Change

The sea has always posed unique challenges to even the most experienced mariners due to the risks associated with its physical – and often unpredictable – characteristics. While technology is recognised as a key enabler for safety at sea, the advance of new technologies also brings with it new challenges. Technological solutions are progressing at an increasing rate and the digital age has revolutionised communication and the distribution of information, disrupting traditional business models in shipping and global transport logistics.

These complex changes coincide with a challenging period for shipping as the principal global trade carrier. These challenges will continue throughout the period of this strategy and new challenges and opportunities will also emerge. With a forecast doubling of the world economy by 2040, this is likely to result in the growth of vessel numbers, with implications for maritime safety services, such as the provision of AtoN, vessel traffic services and increased shipping traffic management and monitoring. The digital age is making enhanced ship-shore and shore-ship connectivity a reality, stimulating growth in communication and data services and in the use of technology for ship navigation, asset control and for AtoN and related services.

The impact on maritime safety is multi-faceted. The size of ships' crews has declined; however, the size and complexity of ships have increased. Proper consideration of human factors remains all important. The effective use of technology, watch keeping standards and human-centred design of ship bridges are all emerging as significant safety issues. The deployment of Marine Autonomous Surface Vessels (MASS) also known as unmanned vessels, is on the horizon with implications for traditional manned vessels and for overall shipping traffic safety.

Vessels not covered by the SOLAS Convention (non-SOLAS vessels) operate in both the fishing and recreational sectors and are significant users of both visual and electronic AtoN. Vessels that are not covered by SOLAS or other mandatory carriage requirements can take advantage of emerging new technologies and systems. However, the use of non-type approved systems can also present a safety risk if the information provided is incorrect or poorly presented. The availability and functionality of such systems will continue to increase and there is a distinct recognition amongst users that formal standards are needed, particularly

in relation to charting. There is also concern that rapid technological developments like mobile applications and other electronic service devices lack reliable verification of their compatibility with generally accepted standards. Furthermore, they could distract from the vital role of critical core safety systems, such as the Global Maritime Distress and Safety System (GMDSS) as the last lifeline for seafarers in peril at sea. Providing the correct mix of navigation services to these sectors is critical, especially considering that statistically they present the highest risk of incidents.

Safeguarding ocean health and sustainable development have become closely intertwined policy goals at the global level, as reflected in the 17 Sustainable Development Goals (SDGs) adopted by the United Nations in 2015¹. Goal 14 calls on nations to “conserve and sustainably use the oceans, seas and marine resources for sustainable development”. Irish Lights has an important role to play in the provision of technologically advanced AtoN and associated data and monitoring systems to support safety of navigation and future proofed maritime services for all stakeholders. Access to a robust and resilient AtoN infrastructure will allow the development of additional value added services at incremental cost. Existing AtoN infrastructure can also be used as an adaptable platform from which to deploy distributed environmental monitoring solutions and support the realisation of UN sustainable development goals. These key international trends and drivers were fully considered in devising this new strategy.



Supporting trade and commercial activity
Image credit: Gary Belcher

02

Maritime Business Matters

Ireland and the United Kingdom are maritime nations and rely heavily on seaborne trade, a high quality marine environment and maritime economic activity.

In 2016, it was estimated that ocean related economic activity in Ireland had a turnover of €5.7 billion and contributed €1.8 billion in terms of gross value added to Ireland's economy, employing over 30,000 full time equivalents. Turnover increased by 23% over the period 2014–2016 driven by increased activity in shipping, the seafood sector, coastal tourism and the coming on line of the Corrib gas fieldⁱⁱ. The last five years have seen a significant step-up in the commitment to maritime policy and developmental initiatives with the Irish government publishing its first Integrated Marine Plan 'Harnessing Our Ocean Wealth' in 2012ⁱⁱⁱ. The implementation of the plan is overseen by a cross-departmental group and in 2017 the government reinforced its commitment with the establishment of a new Marine Development Team (MDT) focused on delivering agreed business development goals for the sector.

In the UK, the maritime sector is defined differently and comprises shipping, ports and a diverse range of maritime service businesses. These activities make a huge contribution to the UK economy generating £40 billion in turnover and supporting 185,000 jobs in 2015^{iv}. Maritime activities in the Northern Ireland are focused on ports, shipping, fishing, aquaculture and offshore renewable energy and make an important contribution to regional jobs and the economy. The UK published its *Maritime Growth Strategy* in 2015^v and it continues to gain momentum with Brexit stimulating a renewed focus on ports, exports and developing trade.

Key developments in the maritime area which will impact on this strategy include:

- Implementation of *Harnessing Our Ocean Wealth* and the *UK Maritime Growth Strategy*.
- Implications of Brexit on ports and trade patterns, fishing industry, environmental and maritime regulations.
- Publication of Ireland's Marine Area and Foreshore (Amendment) Bill – which will facilitate the advancement of marine development projects.
- Implementation of the recommendations from the Aquaculture License Review.

- Implementation of Marine Strategy Directive in Ireland and Northern Ireland.
- Implementation of Maritime Spatial Planning in Ireland by 2021 – aligned to the implementations of the National Planning Framework.
- Establishment of Marine Protected areas in Ireland and Northern Ireland.
- Continued reform of the Common Fisheries Policy.
- Continued development of the Wild Atlantic Way, Ireland's Ancient East, Causeway Coast tourism initiatives.
- Implementation of the National Heritage Strategy 2017–2022.
- Implementation of next phase of the Offshore Renewable Energy Development Plan.
- Implementation of the National Development Plan 2018–2027.
- An increased need for real time Ocean Observation Systems to deliver observation data from space and at sea.
- Harmonisation of maritime data – therefore reducing the cost of assembling and standardising the data necessary to design, build and operate coastal infrastructure.
- Information and asset sharing to address increasing threats e.g. smuggling, cross border crime, illegal activity.
- Climate change mitigation and reduction of carbon footprint.

In conclusion, what clearly emerges is the very extensive and growing spectrum of activity taking place in multiple arenas of the maritime economy in Ireland and the UK. The ongoing increase in maritime activity, resulting impact on safety of navigation and the potential for delivery of new services are key factors for this Strategy.



Fisheries - A major user of AtoN.
Image credit: Killybeg's Fishermen's Association

03

External Stakeholder Feedback

Irish Lights has a wide range of external stakeholders including:

	Irish and UK governments and agencies		Commercial customers and suppliers
	Ports, harbours and local authorities		Trinity House and Northern Lighthouse Board
	Ship owners, bridge teams, ships' agents and freight forwarders		IALA and International Navigation Services providers
	Fishing and leisure vessels, their crews and owners		Third level and other research institutions
	Commercial offshore energy operators, aquaculture and other developers		Coastal communities and the wider public

To inform the preparation of this strategy an extensive stakeholder consultation was undertaken to gain input on the following:

- Performance of Irish Lights and the quality of its services.
- Safety or navigation issues impacting on the sector.
- Stakeholder challenges, developments and opportunities ahead.

- A better understanding of potential market demand and requirements for commercial services.

Consultations took place with key national and international organisations. Broader focus group meetings were held with representatives of the SOLAS, leisure, and fishing sectors. A full list of consultees is set out in Appendix 1.

Focus Group Feedback from Users of AtoN

Commercial SOLAS Vessels

The Global Positioning System (GPS) is the primary means of navigation and the sector highlighted concerns regarding satellite vulnerability and the need for effective back up. While the value and importance of electronic aids was fully acknowledged, the sector strongly endorsed the need for continued provision of Visual AtoN and the requirement for officers to be trained in visual navigation techniques.

There was strong concern expressed regarding electronic chart displays and information systems (ECDIS) standards and the proper use of ECDIS. Ergonomic bridge design, data presentation and data overload are all continuing issues. While these issues are central to e-Navigation, they remain a concern for users. The need for more effective training,

particularly for new equipment was voiced strongly by this group. There was also a call for industry guidance on cybersecurity.

There were mixed views on e-Navigation, with vessel owners looking for tangible value to be demonstrated by way of enhanced vessel efficiency or safety. It was considered that there is likely to be a future need for improved surveillance and management of vessel traffic and that Vessel Traffic Services (VTS) could increasingly contribute to efficient information management.

Fishing & Aquaculture

A key message from this group was that coastal navigation infrastructure including lighthouses and buoys are in

continuous use by fishermen for safe navigation purposes. The fisheries sector is heavily reliant on Visual AtoN in addition to electronic AtoN.

This group expressed concerns about the fear of collision brought about by a lack of understanding and training amongst some maritime users. Safety concerns also include fishing pots being set in navigational channels along with poor visibility of fish farms. There was a view that near misses are not always reported and a forum which brings together representatives of all sectors on an annual basis could discuss safety concerns and provide a fuller understanding of each sector's vulnerabilities.

Leisure

The group was of the view that there is still a focus on traditional methods of navigation in this sector including buoyage and paper charts. The importance of Visual AtoN was emphasised not just for marking the actual hazard but also for safe navigation techniques such as following transits with two objects in line or for clearing bearings to ensure the vessel is on the safe side of the line to an object. There was an acknowledgement that electronic navigation aids have made sailing very accessible to the unskilled and concern was expressed about the lack of mandatory navigation training.

The leisure sector is very open to advancements in technology such as the sequencing of lights for added conspicuity. Electronic automatic identification systems (AIS) AtoN are seen as very useful for positive identification purposes. There was a view that there is a difficulty in getting the right safety information to the right people and that there is a lack of awareness in the leisure community of some of the information channels that exist. The importance of bridging this gap was highlighted.

International Aids to Navigation Providers

Feedback indicated general agreement on the key issues and emerging solutions. A mix of satellite navigation systems and Visual/Radar AtoN is seen as sufficient for resilience in navigation, but there is a shared interest in the development of other AtoN, NavAids and data services. Cybersecurity and effective use of technology are seen as major emerging issues with a shared view that human factors, training standards and good operational practices are key to risk reduction and/or mitigation.

Due to the advancements in Space Based Augmentation Systems (SBAS), there are mixed views on the extent of future requirements for DGNSS (Differential GNSS) which

is a ground based solution. As the requirement for resilient positioning evolves a combination of ground and space based augmentation solutions may have a role.

There were differing opinions on the pace of development of Maritime Autonomous Surface Systems (MASS). While most countries expect an increase in small autonomous craft, the timescale for emergence of MASS in international trade is not yet clear. A number of IALA partners are involved in MASS trials and Norway, in particular, is moving forward with a large SOLAS vessel demonstrator.

The impact of technology on ships' bridges and the implementation of e-Navigation will necessarily require changes to the training of ships' personnel. Some IALA members believe a more fundamental change is required to move from bridge teams acting as navigators to a changed role where personnel monitor the technology that carries out this role. On balance a navigation requirement is likely to continue beyond the period of this strategy. Issues highlighted elsewhere in this strategy regarding technology and human factors will include consideration of the extent of automation.

Consultation and Feedback from Local Authorities and Local Lighthouse Authorities

Aids to Navigation that are not under the management of Irish Lights come under the jurisdiction of Local Lighthouse Authorities (LLA). LLA have authority over local aids to navigation in their area and are typically a Harbour, Port, National Utility Operator, or Local Authority. Local Aids may be provided by the LLA themselves, or by other bodies or individuals subject to statutory sanction consent by Irish Lights. The local aid provider has responsibility for the provision and maintenance of the AtoN. Irish Lights has a statutory duty to inspect and superintend over 3,200 local AtoN. Of these some 859 are associated with aquaculture operations which are included under the jurisdiction of the LLA.

As part of the consultation process, Irish Lights met with representatives of 18 Local Lighthouse Authorities.

In general, all recognised the importance of Local AtoN and the role they play in ensuring safe navigation. Feedback highlighted that a better understanding of Irish Lights role in the superintendence of Local AtoN would be beneficial. In addition, whilst the importance of safety of navigation in local waters was widely accepted as a priority, it appears that specialist training and education around AtoN management would assist Local Lighthouse Authorities in delivering an improved service to the mariner and create operational efficiencies.

Several Local Lighthouse Authorities also identified the need for specialist navigation expertise and consultancy, from time to time, as a service to support them to provide quality navigation services that are efficient, fit for purpose, functional and meet the needs of the modern mariner. Such services could also aim to support procurement specifications for AtoN selection, provide specialist engineering consultancy around upgrading and modernising lighthouses and navigation lights and contribute to navigation risk assessments as part of any port/pier developments.

Local Authorities also indicated the potential for collaborative opportunities to leverage synergies particularly with respect to the development of maritime tourism opportunities where appropriate, to support and grow local economic development.

Feedback from Government Departments and Agencies

A range of government departments and agencies were consulted. This provided a clear and detailed understanding of the future plans and concerns of the principal government departments and agencies operating in, or with an interest in the maritime sector in Ireland and the UK. These outcomes underlined the need for closer cooperation and collaboration to ensure effective delivery of mutual objectives.

In key policy areas relating to safety, risk, data, infrastructure and security, existing levels of common

activity were identified in areas such as safety promotion, traffic monitoring, advice and risk analysis; e-Navigation; and incident/pollution response. The meetings highlighted the need to work collaboratively at national and international level on these issues.

The importance of hydrography and charting for the future use of our maritime space emerged strongly from the consultations. Key areas of potential cooperation in survey (including resurvey programmes), risk assessment and data provision, standardisation and integration were identified. A collaborative approach to these issues will be important to the delivery of safer navigation and future e-Navigation services such as dynamic charting.

Consideration of the need for better management and monitoring of maritime resources highlighted the need to improve effectiveness through cooperation. Shared requirements for sea state and environmental monitoring; hydrographic modelling; and marking or monitoring of sea areas will require a collaborative approach to delivery and must align with the outputs required for Maritime Spatial Planning.

Recent policy initiatives by commercial and non-commercial state bodies to develop their heritage assets for the public good were highlighted. The success of the Great Lighthouses of Ireland initiative was highlighted by tourism agencies and Local Authorities. The need for further collaboration by agencies at national, regional and local level to harness support and investment was underlined.

Conclusion

The extensive feedback from a broad spread of key stakeholders contains clear and consistent messages.

- All stakeholders attach a priority to the need for both visual and electronic AtoN.
- There is a consensus on key technologies, issues and emerging solutions.
- The impact of new technology will need to be carefully monitored and understood to inform regulation, development and practice.
- International partners and the commercial shipping sector emphasised the need to progress the delivery of tangible e-Navigation benefits.
- There was strong support for training and a focus on human factors across all sectors.
- A forum for the exchange of navigation and safety issues encompassing all sectors would be welcomed.
- Mechanisms to increase practical co-operation amongst agencies and the wider maritime sector are needed to leverage expertise, data, infrastructure and technical resources.
- Data sharing across the sector is essential to generate added value and inform decisions.
- There is a demand for specialist navigation safety advice and risk assessment services to support a range of policy and commercial activities.
- There is a strong interest in the development of maritime heritage assets at local level.



Maidens Lighthouse. An off-grid Station powered by solar energy.

04

Building on Success

Irish Lights launched its 2012–2017 Strategy – *Charting Our Future Course* at a time when the economic collapse had resulted in significant challenges for shipping, the wider maritime sector, the economy and the public finances. The strategy was aimed at delivering a major Organisation Change Programme focused on positioning Irish Lights as a high quality provider of an essential public safety service, at an economic cost, funded by a diverse range of stakeholders and customers.

The strategy was structured under three pillars:

- **Pillar 1:** Streamline marine AtoN provision and delivery.
- **Pillar 2:** Deliver new commercial services
- **Pillar 3:** Exploit Irish Lights' coastal technology & communications networks.

Pillar 1 which reflected the core safety mission of the organisation was the primary focus of the strategy with pillars 2 and 3 focusing on commercial and value added services.

In terms of performance 2012–2017, operationally we delivered consistent year on year high standards of AtoN availability exceeding IALA standards. We continued to modernise and introduce new technology using the latest light source and solarisation technology, improving services and reducing costs. Our coastal network was enhanced with new monitoring and communications upgrades. Our local aids service was strengthened and stakeholder engagement intensified. A trial MetOcean service was established to deliver real time weather observations to enhance safety information for a wide range of maritime users. A new all island, lighthouse tourism brand was launched across 12

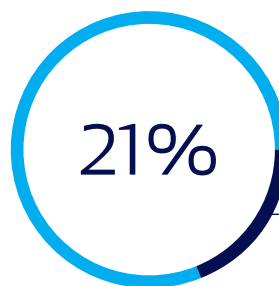
sites, financed largely by European Union grant aid which has resulted in 140,000 visitors to lighthouses in 2017 and 19,000 available bed nights in lighthouse accommodation.

The organisation was restructured to align to the new strategic direction and implementation supported by training and development for employees. Running costs have been reduced by €3.3 million or 21% since 2012, which followed a reduction of €5.7 million over the previous four years. Cost efficiency targets of 11.8% measured by consumer price index (CPI) were achieved and a broadening of commercial activities resulted in average income over the five years of €1.8 million - up 100% on the starting levels.

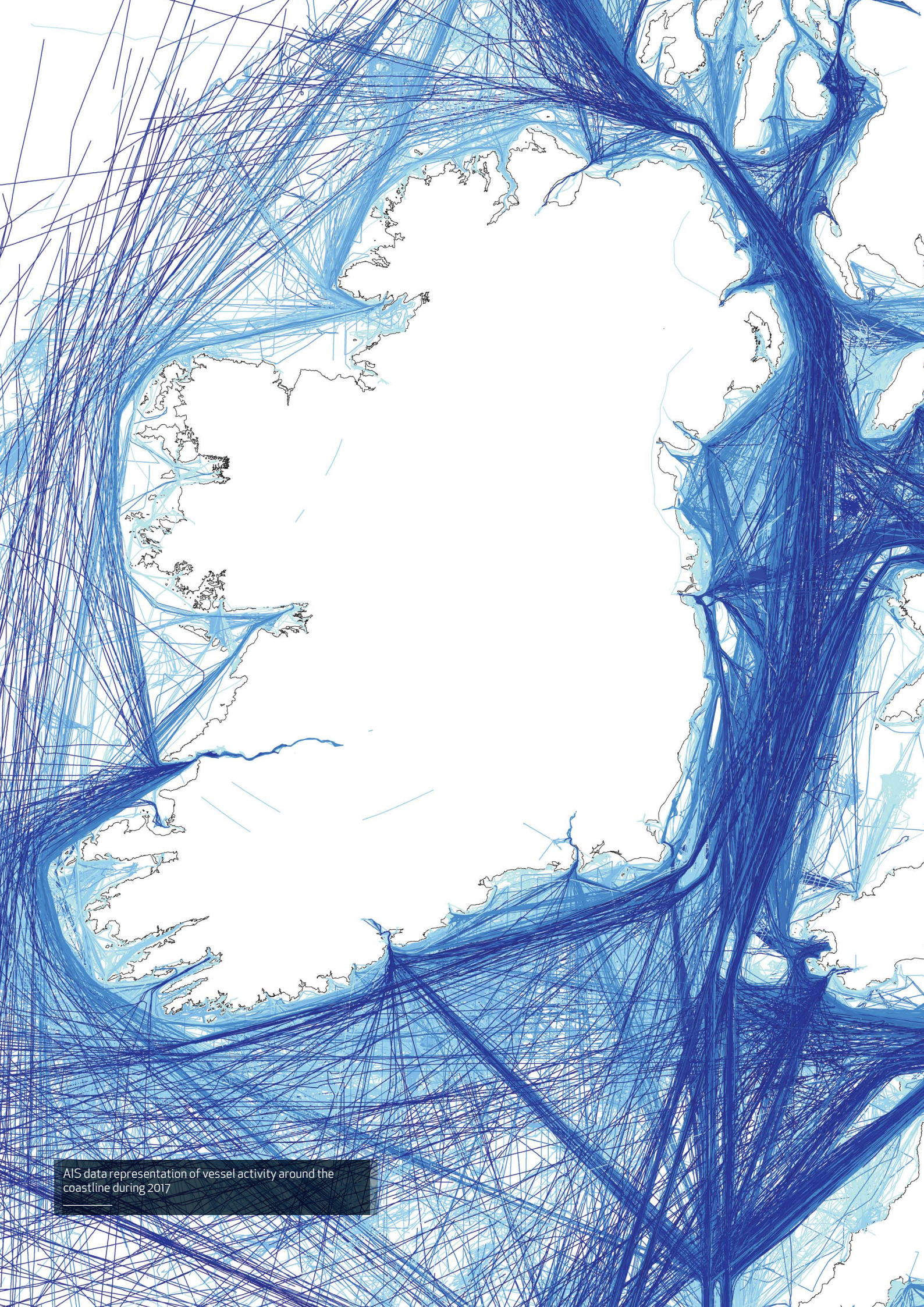
The combination of streamlined operations together with the carefully considered selection of new technology has provided Irish Lights with the operational platform to continue to offer world class AtoN and value added services to the maritime community. The new strategy builds on the success of our previous strategy *Charting our Future Course 2012–2017* by broadening our focus from 3 Pillars to 5 Focus Areas of Activity, strengthening our commitment to initiatives which are underway and demonstrating real potential or tangible results.



3 Year Availability of Major Aids



Reduction in running costs



AIS data representation of vessel activity around the coastline during 2017

05

Irish Lights Strategy 2018–2023

Our 2018–2023 strategy places an emphasis on innovation in service provision and asset utilisation and takes account of a diverse range of stakeholder needs in the face of ongoing technological change and an increasingly multifaceted marine and coastal environment. In delivering this strategy Irish Lights will:

1. Continue to **meet International Standards** in the delivery of AtoN.
2. Recognise the **interdependency of (marine) AtoN and (shipboard) Navigation Aids** and the need to address the implications as we develop our services.
3. Plan for the emergence of **e-Navigation** and the **convergence with electronic data services and communications** with a view to making the most of opportunities that will arise over time to develop new services for the benefit of safe and efficient of navigation.
4. **Achieve early influence with international bodies** such as IALA, IMO, IHO and ITU over policy, regulation and standards that impact on navigation safety.
5. Contribute to the development of **resilience in navigation** by ensuring that undue reliance is not placed on any one navigation system.
6. Collaborate with Trinity House, Northern Lighthouse Board and other partners to deliver appropriate and timely **risk and incident response** across Ireland and the UK.
7. **Manage and mitigate cybersecurity risks** in order to protect AtoN as a critical national infrastructure facilitating trade and commerce, fishing, offshore energy and tourism and leisure activities.
8. **Build on the successful delivery to date of commercial services** to third parties by making optimal use of the expertise and experience of our employees and any reserve asset capacity.
9. Work in partnership with the wider maritime sector, government departments and agencies and commercial operators to **deliver maximum value for the investment employed in Irish Lights**.
10. Recognise the **strategic value of our heritage assets** to the tourism sector and local communities.

Taken together these commitments recognise the need to balance the continued delivery of high quality, reliable AtoN services with ongoing innovation for the benefit of a wide range of stakeholders.



Focus Area 1

Provision of General Aids to Navigation around the island of Ireland





Focus Area 1

Irish Lights has statutory responsibility for the provision of General Aids to Navigation to ensure safe navigation around the island of Ireland. General aids comprise a mix of AtoN systems designed to enable those at sea to determine their location; they also mark hazards to ensure safe navigation.

AtoN systems include visual aids such as lighthouses, buoys, beacons and electronic aids including satellite navigation augmentation systems, radar beacons (racon) and radio based Automatic Identification Systems (AIS). A combination of visual and electronic systems is required to meet different user needs and capabilities. AtoN requirements are the subject of major five yearly reviews, with the next review due in 2020. Ireland, as a member state of the International Maritime Organisation (IMO) and a Contracting Party to the International Convention for the Safety Of Life At Sea (SOLAS), 1974, as amended, has a legal obligation to undertake to arrange for the establishment and maintenance of aids of navigation, taking account of the volume of traffic and the degree of risk to safety. Delivery of this requirement is subject to a periodic international audit, in accordance with the IMO’s mandatory audit requirements for all its member States.

The strategy for the provision of general aids to navigation is to continue to provide reliable, low maintenance visual and electronic AtoN systems to the level required by all mariners in line with the UK and Ireland Marine AtoN Strategy to 2030 *Navigating the Future*^{vi}.

Analysis indicates that no new IALA approved systems will become operational in the next five years. However, this strategy anticipates that new systems will come on stream over the next 10–15 years and Irish Lights will continue to work with the GLA R&RNAV unit, IALA and other research and industry partners as appropriate to inform the development and operational implementation of new technology and service solutions. This strategy recognises the utility and vulnerability of satellite navigation systems and will ensure that other means of navigation (namely visual and electronic) are available to all mariners.

Provision of General Aids to Navigation around the Island of Ireland

Visual Aids	Electronic Aids	Coastal Networks & Communications Technologies	Future Developments
Lighthouses	AIS Aids	Coastal Monitoring Networks	Space Based Sat Nav Systems
Beacons	Racon	Communications Infrastructure (VHF, Wireless 3G/4G/5G and broadband)	Terrestrial Back Up for Sat Nav Systems
Daymarks	Sat Nav Augmentation Systems		Visual AtoN
Buoys			Nav Aids
			Comms and Data Services

Strategic Objectives

- Continue to lead on the innovative use of new technology to deliver reliable, low maintenance visual and electronic systems to the level required by users.
- Implement technologies and approaches that reduce environmental impact and enable adaptation to climate change.
- Ensure our assets, coastal networks and communications infrastructures are secure, resilient and scaleable.
- Continue to implement appropriate business continuity arrangements and upgrade technologies and solutions to deal with the increasing cyber security threat landscape.
- Play a leading role supporting the assessment of new national and international developments and advising and/or adopting future systems which benefit our stakeholders.

Visual Aids to Navigation

Visual Aids	Action Programme 1	Impact and Benefits
Lighthouses, Beacons, Daymarks, and Buoys	<p><i>Coastal Infrastructure & Service Provision</i></p> <ul style="list-style-type: none"> • Adopt and adapt new technological solutions as part of our 20 year lighthouse capital investment programme, with upgrades to stations every 10 years. • Implement daymark improvements where cost benefit is justified. • Provide a reliable, flexible, low maintenance, floating buoy infrastructure. • Provide additional value added services utilising existing infrastructure e.g. remote environmental monitoring etc. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Leading on the utilization of LED technology and renewable energy solutions. • Leading on the delivery of good environmental practice e.g. removal of diesel and mercury. • Working with third parties to identify and deliver a multi-functional, power efficient buoy platform which will meet AtoN and future value added service requirements. • Implementing innovative power storage solutions and adopting new materials. • Assessing and developing cost effective solutions which can facilitate positive heritage outcomes. 	<ul style="list-style-type: none"> • Improved performance and reliability of service to mariner. • Increased efficiencies and maximum return on investment. • Improved visibility of daymarks to promote safer navigation close to shore. • Improved environmental impact and reduced carbon footprint. • Reduced vulnerability to climate change and increased service resilience. • Use of core infrastructure to generate valuable data to enhance safety and to monitor the maritime environment. • New developments arising from adopting innovative approach. • Protection of heritage assets.



Focus Area 1

Electronic Aids to Navigation

Our strategy for the provision and development of our existing systems is outlined below. Electronic AtoN include existing systems such as AIS (automatic identification system), Racons (radar beacons), Space Satellite Systems and associated ground based (DGPS) or space based (EGNOS) augmentation systems.

Provision of Existing Electronic Systems	Action Programme 2	Impact and Benefits
AIS Aids to Navigation	<ul style="list-style-type: none"> Continue to lead on the provision of AIS AtoN – Real, Virtual and Synthetic. Expand and enhance the current AIS network. Implement enhanced monitoring and reporting services, data services and remote control. Monitor and assess new developments. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> Working with the Irish and UK Coast Guard and IALA to address service provision needs and security. 	<ul style="list-style-type: none"> Improved AtoN monitoring. Innovative AtoN services for AIS vessels. Additional tools and data services for safe navigation.
Racon	<ul style="list-style-type: none"> Continue to provide service as required. Evaluate the utility of radar positioning services and next generation radar. Continue to identify key developments for Radar navigation. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> Working with R&RNAV and IALA on development of Racon/Radar technology. 	<ul style="list-style-type: none"> Ability to identify AtoN in high traffic density areas. Identify landfall or positions on inconspicuous coastlines. Automated positioning from radar target matching.
Satellite Navigation (ground based) Augmentation Services i.e. DGPS	<ul style="list-style-type: none"> Continue to provide a ground based GPS augmentation service (DGPS). Determine the extent to which emerging space based augmentation systems will replace the ground based DGPS system. Determine the requirements for the DGPS system beyond 2022 in light of space based alternatives. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> R&RNAV and IALA technology assessments. 	<ul style="list-style-type: none"> More accurate and resilient positioning. Enhanced space based satellite navigation systems through provision of integrity monitoring.

Coastal Networks & Communications Technologies

Irish Lights operates a number of all island technology networks and communications technologies (VHF, wireless 3G/4G/5G and broadband) which underpin our service delivery. Our strategy is to continue to invest in, upgrade and extend our networks with additional scalability, resilience and security enhancements embedded to enable further developments in core service delivery, e-Navigation and the provision of value added services.

Coastal Networks and Communications Technologies	Action Programme 3	Impact and Benefits
Coastal Monitoring Networks	<ul style="list-style-type: none"> • Upgrade the AIS base station network. • Continue migration from SCADA to AIS for AtoN monitoring. • Extend the number of buoys monitored by AIS. • Extend monitoring to other infrastructure assets. • Increase the resilience of the monitoring network (Disaster recovery/business and cyber security). <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Working with maritime industry partners, GLA partners and 3rd party cyber security specialists. 	<ul style="list-style-type: none"> • Future proofed AIS network with increased coverage and service provision. • Increased remote control capabilities. • Integration and rationalisation of monitoring solutions – economies of scale. • Increased monitoring capability supporting new data services for Irish Lights and 3rd parties. • Enhanced security and protection of the network infrastructure, data and information services.
Communications Infrastructure	<ul style="list-style-type: none"> • Upgrade the communications infrastructure as service provision enhancements become available and affordable (eg. satellite and 5G communications). • Test and develop new services using VDES (VHF Data Exchange System). • Explore the adoption of emerging technologies (LPWAN – low powered wide area networks) to facilitate data transfer and remote control capabilities where communication links are limited or unavailable. • Review the potential for the integration of all currently available comms infrastructure (eg. range, bandwidth etc) and systems being developed (eg. maritime connectivity platform) for e-Navigation. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Working with industry partners, GLA partners, researchers and industry. 	<ul style="list-style-type: none"> • More resilient communications links offering increased data transfer capability, added service provision and cost efficiencies. • Ability to deliver enhanced data services and increased data transfer rates from our coastal infrastructure (fixed and floating). • Provision of a test bed for innovators.



Focus Area 1

Future Developments

A range of new systems and technologies will impact on the provision of services by Irish Lights in the future. By 2023 four new IMO World Wide Radio Navigation Systems will become operational. Given the trend towards increasing adoption of new technology and on board navigation aids, coupled with improvements in communications speed and availability, consideration will be given to future systems. It will become necessary to consider these systems in an overall navigation and service delivery context as they are becoming increasingly interdependent. This strategy

envisages the increasing digitalisation of the global shipping industry and an important role for Irish Lights in influencing the development of emerging systems and practices that impact on the safety of navigation. This will require collaboration with Irish, UK and international partners to influence key decision making groups, to ensure alignment between policy and operational requirements. Active participation in IALA and relevant Irish, UK and EU bodies is central to the strategy, through which we can influence other international organisations such as IMO, IHO and ITU.

Future Developments	Action Programme 4	Impact and Benefits
<p>Space – Satellite Navigation Systems</p> <p><i>During the period of this strategy IMO World Wide Radio Navigation Systems will increase to four</i></p>	<ul style="list-style-type: none"> • Monitor the use of multi-system receivers and the impact and benefits they will offer for the provision of AtoN services. • Explore opportunities to better integrate space based augmentation data with data from Irish Lights infrastructure. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Engaging with the European GNSS Agency on the maritime use of the European Galileo satellite constellation. • Working with R&RNAV and IALA. 	<ul style="list-style-type: none"> • Improved position integrity and redundancy through provision of data via multi-system receivers.
<p>Terrestrial back-up for satellite navigation systems</p>	<ul style="list-style-type: none"> • Continue to assess the requirement for additional terrestrial back-up systems. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Participating in international development activity. 	<ul style="list-style-type: none"> • Resilience in navigation. • Consistent and robust international delivery of AtoN and Nav Aid services.

Future Developments	Action Programme 4	Impact and Benefits
Visual AtoN	<ul style="list-style-type: none"> • Innovative use of coded identification signals and automatic adaptation to vessel type or environmental conditions. • Integration of visual AtoN into multi system receiver outputs. • Assess and address requirements for emerging vessel types and autonomous vessels. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Participation in test and demonstration projects at international level via R&RNAV and IALA. • Engaging with Irish and UK policy makers to ensure the alignment of policy and operational requirements. 	<ul style="list-style-type: none"> • Integration of visual AtoN to e-Navigation. • Improved decision making and bridge team engagement with visual AtoN. • Support for new sectoral developments such as autonomous shipping.
Navigation Aids	<ul style="list-style-type: none"> • Assess the impact of the growing convergence of AtoN, Nav Aids and Data Services. • Assess the impact of inertial systems, ePelorus, astro-navigation, bathymetric positioning, millimetre wave Radar, quantum, geomagnetic and pulsar technologies. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Actively monitoring and influencing international developments. • Engaging with Irish and UK government departments and agencies to facilitate exchange of data and information. 	<ul style="list-style-type: none"> • Provision of integrated maritime navigation services to improve effectiveness and efficiency for commercial shipping operations. • Clearly defined future AtoN and Nav Aid provision.
Communications and Data Services	<ul style="list-style-type: none"> • Recognise the critical role of improved communications as an enabler for e-Navigation. • Adopt agreed international data exchange standards eg. Common Maritime Data Structure (CMDS). • Test and develop appropriate systems for adoption in Ireland. • Engage with the development of data interfaces and product specifications for emerging e-Navigation Maritime Services. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Engaging with international standards bodies, industry user groups, technology developers and suppliers. • Leading test and demonstration activities in Ireland in conjunction with third level and industry partners. • Aligning with the implementation of the e-Navigation Strategy Implementation Plan (SIP). 	<ul style="list-style-type: none"> • Additional data services supporting safe navigation. • Improved ship to shore connection and shared maritime picture. • Improved vessel and sea area management. • Additional potential uses of data for logistics, route planning, administration, incident response, pollution control, security and surveillance.



Inshore Navigation
Image credit: David Brannigan



Focus Area 2

Provision of Local Aids and other Navigation Services



Focus Area 2

Irish Lights provides a wide range of navigation services as shown in the diagram below

Provision of Local Aids and other Navigation Services

Existing Local Aids Services	Other Navigation Safety Services	New Developments
Standards and Compliance	Risk Assessment and Advisory Services	e-Navigation
Inspection and Audit by Irish Lights	Wreck Response and Marking	Vessel Traffic Management
Statutory Sanction and Consent Process		Marine Autonomous Surface Systems



Navigation challenges in shared sea space

Local Aids Services

Aids to Navigation that are not under the management of Irish Lights come under the jurisdiction of Local Lighthouse Authorities (LLA). LLA have authority over local aids to National Utility Operator navigation in their area and are typically a Harbour, Port or Local Authority. Local Aids may be provided by the LLA themselves, or by other bodies or individuals subject to statutory sanction consented by Irish Lights. The local aid provider has responsibility for the provision and maintenance of the AtoN. Irish Lights has a statutory duty to inspect and superintend over 3,200 local

AtoN. Of these some 859 are associated with aquaculture operations which are included under the jurisdiction of the LLA. Our strategic approach to Local Aids is that they must meet the same IALA standards as General Aids and there should be no difference in the level of service provided. Local Lighthouse Authorities are required to provide returns to Irish Lights, explanations or information concerning their AtoN. Irish Lights operates an AtoN management system via a web portal which facilitates LAtoN Management, consent applications and quarterly reporting.

Strategic Objectives

- Deliver an efficient and proactive local aids service to third parties to ensure the achievement of IALA standards for local aids around the coast.
- Provide timely and appropriate advice on request from Local Lighthouse Authorities on navigation risks and mitigations.

Local Aids Services	Action Programme 5	Impact and Benefits
Standards and Compliance	<ul style="list-style-type: none"> • Improve LAtoN standards. • Provide greater clarity on the duties and responsibilities of LLA. • Strengthen compliance as appropriate. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Working with relevant Government Departments and LLA. 	<ul style="list-style-type: none"> • Better compliance with agreed standards for safe local navigation.
Inspection and Audit by Irish Lights	<ul style="list-style-type: none"> • Undertake 2 yearly inspections of all local aids. • Ensure LLA are following appropriate procedures and support them in delivery of obligations. • Achieve better two-way flow of information between Irish Lights and LLA. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Implementation of enhanced information management /portal system for on-line tracking and reporting. 	<ul style="list-style-type: none"> • Improved delivery of safe navigation at local level. • Reduced risk of accidents and incidents. • Improved support to LAtoN providers. • Reduced insurance claims.
Statutory Sanction and Consent Process	<ul style="list-style-type: none"> • Process applications in the minimum time possible and support and assist applicants throughout the process. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Provision of responsive, user friendly services (including online). 	<ul style="list-style-type: none"> • Timely permissions which fully address navigation safety.

Other Navigation Services

Irish Lights provides a range of other maritime safety services set out below. Our strategy envisages an increase in this activity driven by the introduction of Maritime Spatial Planning and increased renewable offshore energy activity. New services may emerge over the lifetime of the strategy and these are considered below.



Focus Area 2

Strategic Objective

- Provide authoritative advice and expert services to ensure that Navigation Risks around the coast pertaining to new developments or potential dangers are fully reviewed and minimised.

Existing Navigation Services	Action Programme 6	Impact and Benefits
Risk Assessment and Advisory Services	<ul style="list-style-type: none"> • Maintain continued focus on risk assessment for individual and AtoN systems. • Strengthen relationships required for the interchange of policy assessment and advice. • Encourage the establishment of contact groups to improve information exchange. 	<ul style="list-style-type: none"> • Appropriate deployment of AtoN in areas of navigation need. • Information exchange between competent authorities and developers. • Greater clarity on methods for enhancing compliance and LAtoN requirements.
Wreck Response and Marking	<ul style="list-style-type: none"> • Collaborate with GLA partners and commercial operators to ensure the appropriate resources are available as required. 	<ul style="list-style-type: none"> • Timely response to wreck marking and new dangers within required timeframes. • Use of visual and electronic solutions.

New Developments



Focus Area 2

Strategic Objective

- Achieve the level of international and national influence required to ensure that appropriate navigation standards and technologies are developed and/or adopted to facilitate the future of safe navigation in an increasingly multi-faceted maritime environment.

Future Developments in Navigation Services	Action Programme 7	Impact and Benefits
e-Navigation	<ul style="list-style-type: none"> • Advance the roll out of e-Navigation to support broader service provision in the maritime sector. • Support the development of harmonized standards, systems and services. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Engaging with IMO and IALA on developments and emerging services. • Sharing our expertise and experience with service developers. 	<ul style="list-style-type: none"> • Identification and implementation of tangible and practical benefits to support safe navigation and maritime services.
Vessel Traffic Management	<ul style="list-style-type: none"> • Monitor developments in coastal traffic management and provide advice on systems and approaches as appropriate. • Support assessment by government and other authorities in Ireland and the UK. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Engaging in the vessel traffic management work being undertaken at IALA. 	<ul style="list-style-type: none"> • Improved traffic and sea space management.
Marine Autonomous Surface Systems (MASS)	<ul style="list-style-type: none"> • Consider AtoN requirements for emerging MASS and impacts. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Participating in working groups with government departments, agencies and international bodies. • Participating with industry in research and testing projects. 	<ul style="list-style-type: none"> • Timely permissions which fully address navigation safety.



Irish Lights Vessel Granuaile Coastal Operations



Focus Area 3

Provision of Commercial Services





Focus Area 3

The use of reserve capacity to secure commercial income is an important contributor to Irish Lights funding, generating in the region of 12% of overall net costs. This strategy will build on the performance of recent years to position Irish Lights as a quality, provider of commercial services targeting a wide range of customers in the maritime and related sectors.

We will continue to build on our key strengths in the following areas:

- Comprehensive fixed and floating infrastructure and flexibility in the use of organisational assets including our property, technology platforms and multi-functional vessel (Granuaile).
- Highly experienced team with specialist navigation, engineering, electronic and ICT expertise, maritime operations, deployment, maintenance and related technologies.
- Deep local knowledge and presence around the coast.
- Reliability and quality reputation for service delivery.
- Strategic partnership and close operational relationship with Trinity House and Northern Lighthouse Board with access to economies of scale, resource pooling and operational back-up to leverage opportunities.
- Access to specialised R&D support.
- Relationships with strategic partners and stakeholders nationally and internationally.

Irish Lights, coast wide floating and fixed infrastructure and its associated data and communications network are a very significant strategic resource; currently being utilised to deliver commercial and value added benefits to the coastal communities in which we operate. The future pace and extent of these services will be determined by the requirements arising from EU directives, local, regional and national development plans, and business and community needs.

Provision of Commercial Services

Commercial Services				
Ship Charter	Buoy Services	Property	Technology and Data Services	Consultancy services, training and advice

Commercial Services

Strategic Objective

- Position Irish Lights as a high quality provider of commercial services targeting markets where we can capitalise on our expertise, experience and infrastructure.

Commercial Services	Action Programme 8	Impact and Benefits
Ship Charter	<ul style="list-style-type: none"> • Broaden customer base and seek opportunities in the areas of subsea operations, hydrographic survey, cable route/repair, remotely operated underwater vehicle (ROV) operations, marine renewable energy, research and oil/gas sectors. 	<ul style="list-style-type: none"> • Availability of high quality vessel, with deep water ROV capability. • Availability of experienced crew offering client support services. • Local knowledge and presence around the coast.
Buoy Services	<ul style="list-style-type: none"> • Provide services in design, build, placement, monitoring and maintenance of steel buoys. • Compete for deep water buoy contracts. • Offer complementary services in areas including environmental monitoring. 	<ul style="list-style-type: none"> • Access to specialist expertise in buoy design, build, installation, maintenance and monitoring. • Access to floating and fixed infrastructure for data and technology services. • Complete maintenance management service. • Access to specialist mooring expertise and know how. • Provision of repair and refurbishment facilities.
Property	<ul style="list-style-type: none"> • Promote third party rental of properties. • Build rental revenue through Great Lighthouses of Ireland and other initiatives. • Facilitate equipment hosting services. 	<ul style="list-style-type: none"> • Access to unique heritage properties. • Access to power and connectivity in coastal locations. • Access to strategically located, secure sites of advantage for offshore renewable energy.



Focus Area 3

Commercial Services	Action Programme 8	Impact and Benefits
Technology and Data Services	<ul style="list-style-type: none"> • Provide access to our coastal and associated communications infrastructure to support developments across a range of domains in the national interest including security, safety, surveillance and environmental monitoring. • Provide technical expertise and advice on asset deployment in areas with poor communications coverage. • Investigate potential over the horizon long range communications solutions to extend communications coverage and facilitate a new range of activities further out to sea. • Utilise our coastal technology network for monitoring, asset tracking, data transfer and virtual or physical marking of marine areas. • Support R&D activities of third parties in the areas of equipment hosting, marine deployments, communications, data transfer and product testing services. • Utilise proven experience to deliver innovative, secure, often bespoke 'total solution' projects in the marine environment. 	<ul style="list-style-type: none"> • Access to significant coastal network of fixed and floating communications and data management infrastructure on a cost effective basis. • Access to specialist expertise in the maintenance and management of coastal data and communications infrastructure. • Supporting marine site assessments with real time sea state observations. • Maintenance, monitoring and tracking of equipment. • Engineering versatility and flexibility with significant experience of challenging deployments and environments. • Extend communications coverage at sea to enable new data capture and information provision.
Consultancy Services & Training and Advice	<ul style="list-style-type: none"> • Provide consultancy services in navigation advice and risk assessment for other public and private organisations. • Deliver advice and training to improve local risk assessment and the quality of AtoN provision to help third parties deliver safe and efficient services at sea. 	<p>Access to specialist expertise in the areas of:</p> <ul style="list-style-type: none"> • AtoN health check. • Navigational risk assessments. • Planning and design services. • Improved LAtoN management. • Ship navigation assessments.



Focus Area 4

**Provision of Value Added Services
to contribute to the development
of the Wider Maritime Economy**



Focus Area 4

Value added services are defined as opportunities for Irish Lights to contribute to the wider maritime development agenda by extending core services on a cost recovery or marginal cost basis or by engaging with partners in new activities which leverage our assets in the public interest. Building on work to date and stakeholder feedback, Irish Lights has identified key areas for the provision of value added services.

Provision of Value Added Services

Value Added Services

Met and Coastal Data

Maritime Spatial Planning

Surveying and Charting

Maritime Incident Response



ILV Granuaile deploys Techworks Marine Environmental Monitoring Buoys - supporting Alexandra Basin Dublin Port re-development project
Image credit: Techworks Marine

Irish Lights Met and Coastal Data Services

Irish Lights currently provides a limited Met and Coastal Data Service which will be further developed as part of this strategy. The service is delivered to a broad base of users and stakeholders as a value added service leveraging the core AtoN infrastructure and AIS network at 12 locations around the island of Ireland. Sites were selected primarily from a safety of navigation perspective; criteria included the volume and range of users and traffic volume in the vicinity, sea state conditions and proximity to potential offshore renewable energy or aquaculture sites.

As part of this strategic review, three primary consumer groups were consulted namely, SOLAS vessels, Fisheries and Leisure & Recreation (including smaller passenger vessels). Feedback clearly indicated a growing proportion of people and businesses involved in coastal and maritime

activities are actively using the MetOcean data service and value it as a source of useful information.

Access to timely and accurate weather observations (in addition to forecasts) was identified as an important input for passage planning, “sail no sail” decisions and pilot services to determine boarding and disembarkation plans. The data could also be used to enhance operational efficiencies for offshore activities, to provide information for leisure activities and to assess the accuracy of current forecasts. A valuable spin off is the availability of sea state observations as an input to monitoring climate change impacts around the coast. This data can be further utilised to contribute to local and regional climate resilience plans, as required under the National Adaptation Framework.

Strategic Objectives

- Provide reliable access to accurate, near real time, weather and sea state observations, at selected locations, aiding greater safety for all at sea.
- Collaborate with other organisations across government to share relevant data and build capacity to contribute to national climate change monitoring, adaptation and resilience planning.

Value Added Service	Action Programme 9	Impact and Benefits
Met and Coastal Data Services	<ul style="list-style-type: none"> • Provide access to reliable, near real time weather and sea state data for planning purposes. • Enhance the quality and availability of MetOcean data around the coast. • Develop a comprehensive data archive. • Act as an advocate, sharing relevant data and supporting other organisations in communicating the importance of safety at sea. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Upgrading existing services and infrastructure to enhance the current offering to customers and stakeholders. 	<ul style="list-style-type: none"> • Enhanced decision support for safer navigation and related maritime activities. • Easy and flexible means of access to data supporting end user requirements. • Proactive and responsive consumer data service. • Access by third parties to a comprehensive data archive to support site characterisation needs. • Availability of data to support local and regional climate adaptation plans.

Maritime Spatial Planning

All EU coastal member states must have a Maritime Spatial Plan in place by 2021. Currently in Ireland the majority of planning, licensing and regulation of maritime-based activity is carried out on a sectoral and demand driven basis. Maritime Spatial Planning (MSP) seeks to create a more rational approach balancing demands for sectoral development and the interaction between maritime uses with the need to protect the maritime environment and achieve social and economic objectives in a planned and transparent manner. MSP is a planning process and will need to be integrated with consent, enforcement, monitoring and re-evaluation. The competent authority for MSP in Ireland is the Department of Housing, Planning and Local Government and responsibility for Northern Ireland lies with the Department of Agriculture, Environment and Rural Affairs.

Irish Lights supports the development of maritime spatial plans. We recognise the growth in maritime related and vessel activity around the coast and the need to embrace the requirements of many new and emerging stakeholders. Irish Lights is uniquely placed to facilitate input to MSP from the SOLAS, fishing and leisure vessels. In particular we will ensure that the importance of safe and efficient navigable shipping channels which are crucial to trade, is recognised and that these needs are given the status they deserve within MSP.

International and coastal shipping has very specific needs that must be factored into maritime plans. Irish Lights will work with DTTAS and other relevant bodies to be an effective voice for safe navigation and its requirements.



Focus Area 4

Through our involvement in navigation assessments for projects in the offshore renewables, oil and gas sector and with the aquaculture industry, we will continue to support these sectors and their MSP requirements. Fishing and Leisure activity are the other sectors where Irish Lights maintains active user contact and where we will support MSP requirements.

Environmental protection is key to the sustainable growth of the maritime sector. MSP will provide a significant opportunity to improve the management of the use of our maritime space and act as a regulator for achieving and/or maintaining Good Environmental Status (GES) which is a requirement set out in the Marine Strategy Framework Directive (MSFD). Through our participation on the Integrated Marine Monitoring Programme Working Group for MSFD, Irish Lights is actively engaged in ensuring that navigational safety is included in both frameworks for MSP and GES.

Strategic Objectives

- Proactively collaborate with government and other stakeholders to ensure that the need for safe navigation is fully understood and taken into account at all stages of Maritime Spatial Planning process.

Value Added Service	Action Programme 10	Impact and Benefits
Navigation Advice, Risk Assessments and Information	<ul style="list-style-type: none"> • Provide analysis and guidance on safe navigation. • Ensure need for safe navigation and its consequences are fully understood. • Promote stakeholder engagement to inform views. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Active participation in national and regional fora with expert input. • Facilitating stakeholder dialogue. 	<ul style="list-style-type: none"> • Resolution of potential navigational conflicts. • Provision of data for the preparation of Maritime Spatial Plans. • Completion of risk assessments and identification of mitigation measures.

Value Added Service	Action Programme 10	Impact and Benefits
Marking of Marine Zones	<ul style="list-style-type: none"> Provide expertise and infrastructure to identify, mark and monitor exclusion or safety zones. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> Provision of expertise and infrastructure. 	<ul style="list-style-type: none"> Efficient and effective marking of activity or protected zones at sea. Identification of hazards. Provision of cost effective technology solutions.
Hydrodynamic Modelling for Ports and Harbours	<ul style="list-style-type: none"> Support hydrodynamic modelling requirements for ports, harbours and other locations to meet Water Framework Directive, MSFD, Maritime Spatial Planning or other regulations. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> Collaboration and provision of expertise and infrastructure. 	<ul style="list-style-type: none"> Support informed decisions. Provision of advice. Provision of added value or commercial services.

Surveying and Charting

Irish Lights has a long and trusted relationship with the UK Hydrographic Office (UKHO) who provide the official paper and electronic charts and other publications covering the Irish Coast. Over many years Irish Lights has provided information on AtoN and hydrographic survey data to UKHO and acted as a channel for the submission of other data. In recent years, there have been developments that have greatly improved the arrangements for the update of Irish

charts and publications. These include the output from the Irish National Seabed Survey and INFOMAR programmes and Irish membership of the International Hydrographic Organisation where we are represented by the Department of Transport, Tourism and Sport. In the UK the MCA managed Civil Hydrography Programme continues to provide the required update data.

Strategic Objective

- Collaborate with others to further improve the availability and standard of hydrographic data for Irish and UK waters with a view to targeted updating of nautical charts for safe navigation.

Value Added Service	Action Programme 11	Impact and Benefits
Survey and Charting	<ul style="list-style-type: none"> Survey mobile areas of seabed for AtoN positioning purposes. Support INFOMAR and Civil Hydrography Programmes. Support the development of targeted re-survey programmes. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> Collaboration with GSI, MI, DTTAS, MCA, UKHO. 	<ul style="list-style-type: none"> Correctly positioned AtoN. Harness collaborative efforts to deliver cost effective data for charting and hydrography needs. Support improvements in standards of coastal charting and hydrography programmes.



Focus Area 4

Maritime Incident Response

Irish Lights infrastructure and expertise is an important element of the response capability for major maritime incidents. The Strategic Emergency Management: National Structures and Framework (2017)^{vii} sets out the breath of resources required to respond to a range of major maritime incidents. The collective expertise, personnel and infrastructure of Coast Guard, Irish Naval Service, An Garda Síochána, Irish Lights, Marine Institute, Local Authorities, Harbour and Port Authorities, RNLI, Geological Survey,

and a host of other organisations in Ireland and the UK may be required depending on the nature of an incident. A recent informal inter agency review underlined the need for familiarisation, exercises and joint training to maximise the impact of joint operations should an incident occur. From a strategic perspective, our approach is to strengthen ties with relevant agencies to ensure that there is clarity on the role, responsibilities and capabilities of each organisation.

Strategic Objective

- Collaborate with other agencies to promote and facilitate increased maritime incident response capability.

Value Added Service	Action Programme 12	Impact and Benefits
Maritime Incident Response	<ul style="list-style-type: none"> • Participate with other agencies and partners in collaborative exercise and training initiatives. • Establish formal agreements to facilitate co-operation. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Strengthening formal and informal relationships with relevant agencies as set out in the Strategic Emergency Management: National Structures and Framework. 	<ul style="list-style-type: none"> • Cost effective deployment of state assets and expertise. • Effective response to incidents and emergencies.



Focus Area 5

Community Engagement, Tourism and Heritage





Focus Area 5

Throughout its history, Irish Lights has recognised its obligations as a guardian of maritime heritage. Through our presence on the coast we seek to positively impact on coastal communities through provision of the services outlined earlier in this strategy and through the use of our coastal infrastructure for tourism and heritage activity. We also hold archive records which have proven to be of significant historical value, artefacts and equipment for display in museums and visitor centres.

The national strategy *People, Place And Policy - Growing Tourism To 2025*^{viii}, launched in March 2015, highlights the importance of our natural scenery, physical environment and physical heritage as areas in which the state has a key role to play, through preservation of that which is irreplaceable and the development of that which enhances the visitor’s overall experience. Irish Lights will continue to seek to

preserve key elements of its heritage reflecting the history and traditions of the organisation and will work with third parties to fund and present our unique heritage to the wider community. We recognise the strategic value of our heritage assets to the tourism sector and to local communities from a development perspective.



Fanad Lighthouse - part of the Irish Lights Great Lighthouses of Ireland initiative
Image credit: Martin Fleming



Great Lighthouses of Ireland: Map of locations

Explore the
Great Lighthouses
of Ireland

- BALLYCOTTON 
 - BLACKHEAD 
 - CLARE ISLAND 
 - FANAD HEAD 
 - GALLEY HEAD 
 - HOOK 
 - LOOP HEAD 
 - RATHLIN WEST 
 - ST. JOHN'S POINT DONEGAL 
 - ST. JOHN'S POINT DOWN 
 - VALENTIA ISLAND 
 - WICKLOW HEAD 
-  Accommodation available



Focus Area 5

Great Lighthouses of Ireland

In 2015, recognising that lighthouses and associated buildings can be harnessed for local tourism, Irish Lights established the Great Lighthouses of Ireland (GLI) initiative. This innovative all-island tourism project preserves key maritime heritage assets and has facilitated a range of third parties to fund and present these assets to the wider community.

In addition to generating income, the project allows Irish Lights to reduce its maintenance burden and liability, protect its heritage, and communicate its services and corporate message to a wide audience, while also supporting local economic development in coastal communities.

GLI features 12 operational lighthouses located in breathtaking coastal locations with most open all year to the public. The sites are operated by independent operators and supported by Irish Lights under an 'all island' Brand Partnership. They offer visitors the chance to visit or stay in a lighthouse, discover its history, appreciate the spectacular natural world around them, see the technology at work in a lighthouse today and meet the people who are passionate about these unique places.

The GLI brand has been developed and positioned as a signature experience that supports and delivers on the coastal propositions of Fáilte Ireland, Tourism Northern Ireland and Tourism Ireland. These include the Wild Atlantic Way, the Causeway Coastal Route, the Mourne Coast and Ireland's Ancient East. GLI operators see great merit in working collectively to develop and drive the GLI brand.

Irish Lights recognises that in many cases lighthouse tourism projects constitute a 'Public Good' which is of general benefit to everyone. GLI operators are accepting a significant challenge in taking on such old buildings and it is our intention to support them and associated third parties to secure additional resources to protect, develop and promote these unique assets for public benefit.

Heritage Properties

A significant number of Irish Lights properties are designated as "Protected Structures" in Ireland under the Planning & Development Act 2000 and associated Planning & Development Regulations or "Listed Buildings" in Northern Ireland under the Planning (NI) Order 1991. These designations place a legal responsibility on Irish Lights to ensure that such structures are not endangered through harm, decay, damage or neglect. Our strategy is to maintain our operational property and property designated for alternative use to a standard appropriate to its use and status, and in compliance with the requirements imposed by statutory designations.

Irish Lights Artefacts Collection

The Baily Museum was opened in 1997 to provide a secure location for the storage and display of Irish Lights artefacts. Private visits and tours are facilitated by a part time Curator. In addition to the artefacts stored and displayed at the Baily Museum, Irish Lights loans artefacts to other small museums and heritage/visitor centres. Artefacts are on loan to 13 museums and to the Irish Landmark Trust. It is intended to continue managing loaned artefacts on this basis to ensure their integrity and ownership.

Irish Lights Historical Archive

Irish Lights archives and records are stored in a secure offsite facility. These records date from the early 1800's and over the years Irish Lights has donated material to educational establishments and state institutions on a permanent basis. An appraisal of the archive was completed by archivists in 2017. The study described the archive as an incredibly rich resource, not just for the history of AtoN, but also for the social, political, military, engineering, architectural and maritime history of the island of Ireland over 200 years. It identified the scale of work envisaged to

properly catalogue, curate and digitise an archive of this complexity. The assessment recommended the archive be maintained as a whole, as the research value lies in the completeness and interconnectedness of the collection. Cataloguing will take place on a phased basis over several years because of the size and complexity of the archive. Conservation and cleaning of archive records will be required before acceptance into a curated archive environment.

Strategic Objective

- Positively impact on coastal communities and the wider public by promoting and protecting our maritime heritage assets for use in tourism and local development initiatives.

Community, Tourism and Heritage Services	Action Programme 13	Impact and Benefits
Local Tourism Development Great Lighthouses of Ireland	<ul style="list-style-type: none"> • Build on the success of the GLI brand to maximize the strategic value of our heritage properties and link this in a structured way to our history, archives and artefacts. • Maximise and leverage support from all Tourism Agencies to grow domestic and international visitor numbers to GLI sites. • Develop a countrywide, regional and community support base to champion the further development of the GLI brand and link to associated visitor experiences at local level. • Ensure that site development accommodates requirements of protected structures and listed buildings in a positive and compliant manner. • Work proactively with interested developers and local communities to explore appropriate funding opportunities to support ongoing developments. <p><i>Will be delivered by:</i></p> <ul style="list-style-type: none"> • Provision of ongoing support to the GLI Brand Partnership. • Co-operation and support from national agencies and local authorities. 	<ul style="list-style-type: none"> • Ensures that maritime heritage is protected and sensitively developed in a sustainable manner. • Communicates value of history, archives and artefacts of Irish Lights. • Reduced maintenance and increased value for Irish Lights. • Increased revenue and sustainability of sites which strengthens the product and experience on the ground. • Delivers new opportunities for local economic development. • Spin off economic benefits of local communities.



Focus Area 5

Hook Lighthouse, part of the Great Lighthouses of Ireland Initiative
 Image credit: Fran Byrne



Community, Tourism and Heritage Services	Action Programme 13 (cont)	Impact and Benefits
Surplus Heritage Property	<ul style="list-style-type: none"> Comply with statutory obligations with regard to preservation of protected structures and listed buildings. Seek alternative uses that are both income generating and sympathetic to the heritage of the property. If no longer required for operational purposes and no alternative use can be found we will withdraw from the property in a responsible manner in accordance with agreed policy guidance. 	<ul style="list-style-type: none"> Alternative use of maritime heritage properties will be fully evaluated. Heritage assets will be managed responsibly within the context of available resources.
Storage and Display of Irish Lights Artefacts	<ul style="list-style-type: none"> Collaborate with third parties to find a permanent site for artefacts collection which will be open to the public. 	<ul style="list-style-type: none"> Protect maritime heritage. Education and outreach. Support for local museums and heritage/visitor centers.
An archive of Irish and International importance	<ul style="list-style-type: none"> Achieve the long term preservation and active use of the archive. Irish Lights will work with a range of partners to identify opportunities to have the archive professionally curated, secured, stored and catalogued to an international standard. 	<ul style="list-style-type: none"> Archive will available in digital format for research, scholarly work and to support tourism and education activities.



Operations at Irish Lights

06

Implementing the Strategy

This strategy sets out a clear direction for Irish Lights over the period 2018–2023. The Board and Management of Irish Lights will attach a key leadership focus to its effective implementation. The goal will be ensuring that the vision and strategy set out for the years 2018–2023 will be delivered in a tangible, timely and effective way to the benefit of all stakeholders.

Supporting and Developing Employees

The greatest enabler for the implementation of this strategy is the skilled and dedicated work of Irish Lights employees. This strategy reflects the pride felt within Irish Lights at the delivery of our maritime safety service and the commitment to continuing to be a flexible and innovative organisation which can deliver that service into the future. Providing a great place to work is fundamental to the future success of the organisation. The elements of our employee strategy are set out below.

Shared Values

Irish Lights strategy will be delivered by holding true to the values of the organisation. Our Values set the foundation for our interactions with our stakeholders, customers, suppliers and the community. These values, which are the cornerstone for the success of the organisation, are as follows:

 Professionalism	 Quality
 Respect	 Innovation
 Trust	 Collaboration

Professional Growth and Development

Irish Lights will actively encourage the career long professional growth and development of employees. This process will be enabled by a Competency Framework which was developed in house to reflect the specific needs of the organisation. Continuous Professional Development is important for all employees and this strategy will seek new ways of introducing and encouraging ongoing learning. The strategy will consider appropriate opportunities to provide apprenticeship and internship positions.

Leadership and Personal Responsibility

Strong leadership will be a key focus and is extremely important for the achievement of this strategy. Development opportunities will be provided to leaders through formal and informal upskilling, coaching and mentoring.

Safety and Wellness

As a maritime safety organisation, Irish Lights considers the safety and wellbeing of our employees and others who engage with our organisation to be fundamental to this strategy across all objectives. This commitment applies equally to physical and mental health and to safety in the workplace. Our policies actively promote and protect employee health and wellbeing and we provide an extensive occupational health service.

Building a Resilient and Delivery Focused Organisation

Valuing and Retaining Corporate Memory

The knowledge and experience of our workforce is an invaluable asset. Succession planning, skills and knowledge transfer are essential building blocks to ensure a seamless continuity of service for Irish Lights and to ensure that the vast knowledge and experience of our talented workforce is passed on.

Knowledge Management

Irish Lights will conduct assessments across key priority areas identifying knowledge and skills that are essential for delivering our existing role and future strategic ambitions. Knowledge and skills transfer occurs formally and informally via training and development, documentation of processes/procedures and mentoring. Document management processes and procedures and information systems will be reviewed and updated to ensure that information and knowledge bases are centrally stored, integrated and accessible to relevant personnel in a timely and structured manner.

Anchoring Excellence

Through the contribution of our employees, Irish Lights has long been the hallmark of excellence in the provision of AtoN. In more recent times, Irish Lights has demonstrated the same levels of quality in delivering new commercial and maritime services. We will strive to support the development of high performing teams by fostering a culture of responsive leadership at all levels throughout the organisation. We will continue to invest in our team and support all employees. As an organisation we are dedicated to achieving excellence, welcome challenges, change and innovation, embrace leadership and value team ethos.

Operational Implementation of the Strategy

The key elements of the operational implementation programme are detailed below and include; Capital Programmes, Maintenance, Buoy Production, Monitoring & Reporting, Granuaile Services, R&D and Innovation.

The impact of climate change on coastal weather and sea conditions is an important design consideration in the delivery of this strategy. In recent years we have seen a number of significant weather events and our strategy is based on a continuation of this pattern.

Capital Programme

The lighthouse capital programme is based on a general pattern of 10 year intervention projects and 20 year capital projects. The cycle can be adjusted to take account of opportunities for cost reduction linked to advances in technology. We will continue our strategy of consolidating stations to achieve a minimum operational footprint with energy efficient light sources and solar/battery or mains/battery power. Consolidation delivers improved service to the mariner, significantly reduced running costs and improved environmental performance through the removal of diesel generators and mercury. To date, 60% of our stations have been consolidated and by 2025 all stations will be mercury free and almost all will be fully powered by renewable energy or mains from a renewable supplier.

Maintenance Programme

Maintenance is the key to reliable and cost effective delivery of the AtoN service. Our strategic maintenance objective is to achieve a maximum of one day routine annual maintenance at all consolidated stations. Provision is included for non-routine requirements and extended work such as station painting. Close attention will also be paid to the potential benefits of using unmanned air (drones) and surface craft to support our work.



Dublin Bay Buoy delivering met and coastal data services



New lightsource – old lens – perfect fit
Image credit: SeaLite

Buoy Programme

Irish Lights buoys are required to deliver a reliable service to the mariner while operating in difficult weather and sea conditions. Buoys remain at sea for eight years subject to condition based assessment. Key strategic considerations for our buoy network include assessment of use of plastic buoys, further extension of time at sea, provision of MetOcean or other sensors, use of Self-Contained Lanterns/AIS, further improvements in the use of renewable energy and power storage and the selective use of virtual and synthetic AtoN where appropriate.

Monitoring and Reporting

Monitoring, tracking and reporting on status, performance and availability of our coastal assets is a key enabler of our core services. In addition to servicing our own AtoN requirements, our monitoring and reporting systems will play an increasingly important role in the provision of data services to support commercial and value added activities. Our monitoring strategy is to provide expert monitoring solutions across the Irish Lights asset portfolio to facilitate service delivery for Irish Lights and the wider maritime community. Irish Lights infrastructure has been migrating towards AIS based monitoring and this strategy will see completion of that process and the implementation of a new monitoring system.

This strategy recognises the importance of the VHF Data Exchange System (VDES) to the provision of improved data services including Application Specific Messages, MetOcean data, AtoN control messages, and as part of future Maritime Services.

Granuaile Services

Our ship the ILV Granuaile is a critical asset for the delivery of our Strategic Objectives. Recent independent reviews have confirmed that the ship should not require replacement until after 2025. We will review future requirements and conduct a cost/benefit exercise in 2021.

From an AtoN and Risk Response perspective, the Granuaile is an important asset for all three GLA. Other activities include Buoy Maintenance, Outage Response, Lighthouse Replenishment, Hydrographic Survey, Wreck & Risk Response, AtoN Confirmation and NavAid test Bed activities.

Research Innovation and Development

R&D activity is very important to the delivery of many of our strategic objectives. Successful implementation of the identified AtoN and data services will require targeted R&D activity both in house, through the R&RNAV GLA research team and in collaboration with IALA and other national and international partners. The strategic challenge is not just to put in place the requirements to 2023 but to position the organisation for delivery of post 2023 requirements. Our R&D strategic roadmap includes activity on LED Light Sources, Adaptive Visual Signals, R-Mode, VDES, Data Standards, Unmanned Devices and Navigation Aids. R&D activity in other parts of the maritime sector will also be monitored to ensure that full advantage is taken of complementary developments.

Communications

Irish Lights is committed to clear and transparent communications for external stakeholders and employees. Our communications strategy will focus on delivering the following key objectives:

Services for Safe Navigation... we will

- Promote safety of navigation and its benefits for people, property, the economy and the environment.
- Promote the AtoN network as critical national infrastructure to support the maritime sector.
- Promote the importance and reliability of the AtoN and maritime safety services provided by Irish Lights.
- Raise awareness of key Irish Lights activities nationally, locally and internationally.

Innovation... we will

- Demonstrate how new technology, business and process innovations enhance our core, commercial and ancillary services.
- Promote the AtoN network as a national operational asset capable of being used for data and information dissemination, technology and business development purposes.

Heritage... we will

- Harness the strong public interest both locally and nationally in the respected heritage of Irish Lights and continue to promote and leverage the Great Lighthouses of Ireland project and other heritage initiatives.

For Stakeholders... we will

- Promote the services that Irish Lights provides for the safety of all.
- Deliver proactive, consistent, engaging and value-for-money communications to all external stakeholders and customers about the core services being delivered by Irish Lights.
- Promote the recognition of Irish Lights service as a part of the value chain of maritime safety agencies of the Republic of Ireland and Northern Ireland.
- Promote the value of the integrated service with Trinity House and The Northern Lighthouse Board to the mariner and other stakeholders.

For employees... we will

- Communicate a better understanding of the roles, activities and expertise of colleagues across the organisation.
- Celebrate key personal and professional achievements in the extended team.
- Promote the depth and breadth of knowledge and expertise that currently sits within the organisation and highlight ongoing achievements.
- Keep sight of the importance our employees place on the reputation and values of our organisation and ensure this is clearly communicated.



The Fastnet Lighthouse - Part of the Irish Lights Network of 66 Operational Lighthouses
Image credit: John Finn

Governance

Irish Lights is governed in accordance with arrangements that have been established for the three General Lighthouse Authorities who report formally to the Secretary of State for Transport (UK). A Framework Document sets out the business and financial relationship between the DfT and the GLA. The Framework Document sets the rules and guidelines required for the exercise of the GLA statutory functions duties and powers, the conditions under which public funds are paid to the GLA and how the GLA are to be held to account for their performance. As part of this process, Irish Lights consults the Irish Department of Transport Tourism and Sport on all major decisions including its annual Corporate Plan and related funding.

Irish Lights along with Trinity House and the Northern Lighthouse Board is funded from the General Lighthouse Fund (GLF) which was created in 1898 to provide funding for the three GLA. The primary source of funding for the GLF is Light Dues collected in the UK and the Republic of Ireland. Irish Lights generates additional revenue from commercial activities and receives income from the Irish Exchequer to ensure its expenditure in Ireland is wholly met from Irish sources.

Value for Money

A key guiding principle for Irish Lights is to ensure that it delivers on its mission in a manner that provides value for money for all of our Stakeholders. Our track record of reducing running costs over nine successive years by 42% cumulatively demonstrates that this principle is embedded in our culture. This strategy recognises that Irish Lights has reached the bottom of its cost curve and, while the new strategy will require some additional resources, our cost base will be largely influenced by modest inflation increases.

Opportunities to enhance value for money will continue to come from the use of technology, innovative design and collaborative procurement with the other GLA/Government Agencies, aligning our procurement to take advantage of framework initiatives and following best public procurement practice.

Measurement and Reporting

Planning for Delivery:

The strategic objectives set out in this document will be actioned via the approval of Annual Plans and associated budgets. Our Annual Corporate Plan is reviewed in detail and approved by the Board of Irish Lights, peer reviewed by other GLA under the auspices of the Joint Strategic Board (JSB), and reviewed by key stakeholders including relevant government departments and industry.

Key Performance Indicators:

To ensure performance to the highest operational level Irish Lights has adopted standards set by IALA. Key metrics are set for each category of AtoN and includes Availability, Mean Time between Failures and Mean Time to Repair. Other operational performance measures include outputs from superintendence and management of LLAs and their AtoN. Financial running and capital costs are measured and reported against the approved sanctions. Commercial income is measured and reported against budgeted targets. A measure of the real cost performance taking inflation into account, known as CPI-X, assesses our cost competitiveness over a five year time horizon.

Transparency and Accountability:

Irish Lights has a comprehensive system of reporting designed to ensure management actions remain aligned to strategy and the targets set in the Annual Corporate Plan. Each year Irish Lights prepares an Annual Report and Accounts which are consolidated into the GLF Accounts and laid before Parliament in the UK. The Annual Report and Accounts are also submitted to the Irish Charities Regulator.

Glossary of Terms

AIS	Automatic Identification System (radio based AtoN and communications network)	ITU	International Telecommunications Union
AtoN	Aids to Navigation (external to a vessel)	IRCG	Irish Coast Guard
COLREGS	Collision Regulations	JSB	Joint Strategic Board (Representatives of the three GLA)
CPI-X	Consumer Price Index	LAtoN	Local Aid to Navigation (responsibility of an LLA)
DfT	Department for Transport (UK)	LLA	Local Lighthouse Authority
DGNSS	Differential Global Navigation Satellite System	LED	Light Emitting Diode
DGPS	Differential Global Positioning System	MASS	Marine Autonomous Surface Systems
DTTAS	Department of Transport, Tourism and Sport (ROI)	MCA	Maritime Coastguard Agency (UK)
ECDIS	Electronic Chart Display and Information System	MI	Marine Institute (Ireland)
EGNOS	European Geostationary Navigation Overlay System	MDT	Marine Development Team (Ireland)
e-Navigation	IMO concept defined as “the harmonized collection, integration, exchange, presentation and analysis of marine information on board and ashore by electronic means to enhance berth to berth navigation and related services for safety and security at sea and protection of the marine environment.”	MetOcean	Meteorological and Oceanographic (Weather and sea state measurements)
EU	European Union	MSFD	Marine Strategy Framework Directive
GALILEO	European GNSS (not an acronym)	MSP	Maritime Spatial Planning
GES	Good environmental status	Nav Aids	Navigation Aids (On board the vessel as opposed to external to it)
GLA	General Lighthouse Authority	NI	Northern Ireland
GLF	General Lighthouse Fund	NLB	Northern Lighthouse Board
GLI	Great Lighthouses of Ireland	RACON	(RA)dar Bea(CON)
GMDSS	Global Maritime Distress and Safety System	RNLI	Royal National Lifeboat Institution
GNSS	Global Navigation Satellite System	ROV	Remotely operated vehicle
GPS	Global Positioning System (US)	R&D	Research and development
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities	R-Mode	Ranging mode
ICT	Information and communications technology	R&RNav	Research and Radio Navigation (GLA Research Directorate)
IHO	International Hydrographic Office	SDG	Sustainable Development Goals (United Nations)
IMO	International Maritime Organisation	SLA	Service Level Agreement
IMSAS	IMO Member State Audit Scheme	SOLAS	Safety of Life at Sea (IMO Convention)
INFOMAR	Integrated mapping for the sustainable development of Ireland’s marine resources	TH	Trinity House
		UKHO	UK Hydrographic Office
		VDES	VHF Data Exchange System
		VHF	Very High Frequency (Radio waves)
		VTS	Vessel traffic Services
		WFD	Water Framework Directive

ⁱ Transforming our World: The 2030 Agenda for Sustainable Development. United Nations, 2015.

ⁱⁱ Ireland’s Ocean Economy Report 2017. Socio-Economic Marine Research Unit, NUI Galway.

ⁱⁱⁱ Harnessing our Ocean Wealth – An integrated Marine Plan for Ireland. July 2012. ISBN: 978-1-902895-54-3.

^{iv} The economic contribution of the UK Maritime sector. A report for Maritime UK. Centre for Economics and Business Research. September 2017.

^v Maritime Growth Study: keeping the UK competitive in a global market Moving Britain Ahead. Department for Transport 2015.

^{vi} 2030 Navigating the Future. UK and Ireland’s marine Aids to Navigation (AtoN) Strategy.

^{vii} The Strategic Emergency Management: National Structures and Framework 2017.

^{viii} National Tourism Strategy – People, Place and Policy – Growing Tourism to 2025.

Appendix 1: Stakeholder Consultations

Note the stakeholder feedback represents a summary of group discussions and does not necessarily reflect the views of individual focus group attendees or their organisations.

1. User Focus Groups

Commercial and SOLAS vessels

- Arklow Shipping
- Dublin Port
- International Chamber of Shipping
- Irish Chamber of Shipping
- Irish Ferries/Matrix
- Irish Institute of Master Mariners
- Irish Naval Service
- Mainport
- P&O Maritime

Fishing & Aquaculture

- Bord Iascaigh Mhara
- Irish Fish Producers Organisation
- Killybegs Fisheries Organisation
- Marine Harvest
- Ocean Trawlers
- South and West Fish Producers Organisation

Leisure

- Dublin Bay Cruises
- Dublin Bay Sailing Club
- Dun Laoghaire Marina
- Cape Clear Ferries
- Irish Cruising Club
- Kinsale Yacht Club
- National Yacht Club
- Port of Kinsale (Cork County Council)
- RNLI
- Royal Irish Yacht Club
- RYA NI
- Sail Cork
- Volvo Regatta

2. International Aids to Navigation Providers

- Australia – Australian Maritime Safety Authority
- Denmark – Danish Maritime Authority
- Finland – Finnish Transport Agency
- IALA
- Japan – Japan Coastguard
- Korea – Ministry of Oceans and Fisheries
- Norway – Norwegian Coastal Administration
- Portugal – Direcção de Faróis
- Turkey – Directorate General of Coastal Safety
- USA – United States Coast Guard
- UK – Trinity House and Northern Lighthouse Board

3. Local Authorities and Local Lighthouse Authorities

- Ardglass (NIFHA)
- Belfast Harbour Commissioners

- Carlingford Port
- Carrickfergus – Mid and East Borough Council
- Clare County Council
- Coleraine Harbour Commissioners
- Donegal County Council
- Fenit Port – Kerry County Council
- Galway Port Company
- Glenarm – Mid and East Borough Council
- Greenore
- Kilkeel Harbour (NIFHA)
- Mayo County Council
- Newry, Mourne & Down Borough Council
- Portavogie (NIFHA)
- Portrush – Causeway Coast and Glens
- Shannon Foynes Port Company
- Sligo County Council

4. Government Departments and Agencies

- Bord Iascaigh Mhara
- Defence Forces – Irish Naval Service
- Department of Communications, Climate Action and Environment (DCCA)
- Department of Transport Tourism & Sport
 - » Irish Coastguard
 - » Marine Survey Office
 - » Irish Maritime Administration
- Department for Transport (DfT)
- Fáilte Ireland
- Geological Survey of Ireland – INFOMAR
- Inland Waterways Authority
- Marine Institute
- Maritime and Coastguard Agency – UK
- Met Éireann
- Met Office – UK
- National Maritime Information Centre – UK
- Sea Fisheries Protection Authority
- Sustainable Energy Authority of Ireland
- Tourism Ireland
- Tourism Northern Ireland
- United Kingdom Hydrographic Office
- Waterways Ireland

5. Research, Development and Innovation

- CISCO Ireland
- CONNECT SFI Research Centre
- Enterprise Ireland
- Ericsson Ireland
- Irish Marine Innovation Network
- Irish Maritime Development Office
- Marine Development Team
- NUJ Maynooth
- Research and Radio Navigation Group, GLA Directorate
- Sea Level Research
- SmartBay Ireland
- VT Networks
- 8West Software and Business Development

Irish Lights in Numbers



General Aids To Navigation (Irish Lights)

General Aids (Total) 2018		342
Buoys		116
AIS AtoN		113
Lighthouses		66
Racon		22
Beacons		21
DGPS stations		3
Virtual AtoN		1



Local Aids to Navigation (Local Lighthouse Authorities)

Local Aids to Navigation (Total) 2018		3,272
Local Aids - Non-aquaculture		2,413
Local Aids - Aquaculture		859
Aquaculture sites		1,511
Local AtoN inspected by Irish Lights 2017		1,612
Statutory sanctions issued 2017		86
Local Lighthouse Authority Audits 2017		60

Commercial Services

Contract AtoN (2017)	37
Contract ship charter Granuaile 2016/17 (days)	73

Tourism and Heritage (2017)

Great Lighthouses of Ireland locations around the Coast	12
Available bednights	19,000
No of visitors to GLI sites since 2014	200,880

Related statutory activities (2017)

Notices to mariners issued by Irish Lights	10
Radio navigation warnings issued (via Coastguard)	80

Value Added Services (2017)

Coastal stations reporting weather observations in near real time	12
No of sensors deployed collecting real time environmental data	39
No of weather observations tweeted by coastal station twitter profiles (monthly average)	2,189
No of automated data communications received from coastal weather stations (monthly average)	85,000

Energy efficiency and renewables

% of off-grid lighthouse stations powered by solar energy	88
% energy savings achieved across the organisation since 2009	36
% decrease in total CO ₂ emissions since 2009	35



Commissioners of
IRISH LIGHTS | *Navigation
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