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| **marine Aids to Navigation statistics**  **IALA Questionnaire 2017** |
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Executive Summary

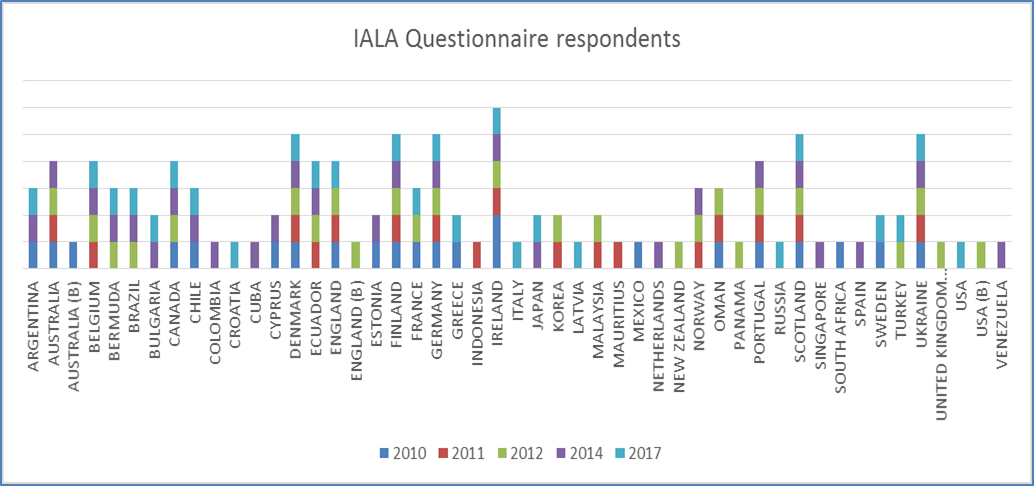
Every four years, IALA carries out a survey to determine trends in the provision of Marine Aids to Navigation. Up until 2014 the survey was carried out annually.

The objective of the survey is to provide statistics on marine aids to navigation for which IALA National Members are responsible. The statistics are based on a general questionnaire which was prepared by the IALA Aids to Navigation Requirements (ARM) Committee and reflects matters of interest to IALA members.

The questionnaire includes sections on organisational responsibility, personnel engaged in AtoN provision, AtoN management of both fixed and floating AtoN, sound signals, radio AtoN, VTS, service delivery, AtoN lights and power supply equipment, and funding.

This report provides statistics and trends up to 2017 using surveys carried out by IALA in 2010, 2011, 2012, 2014, and 2017.

Responses were received from 25 administrations in 2017 representing approximately 30% of IALA National Members. Respondents include both national and regional AtoN providers.



The questionnaire and report provide valuable information on the present status and trends in AtoN provision worldwide.

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**Report on analysis of the IALA Questionnaire 2017**

# Introduction

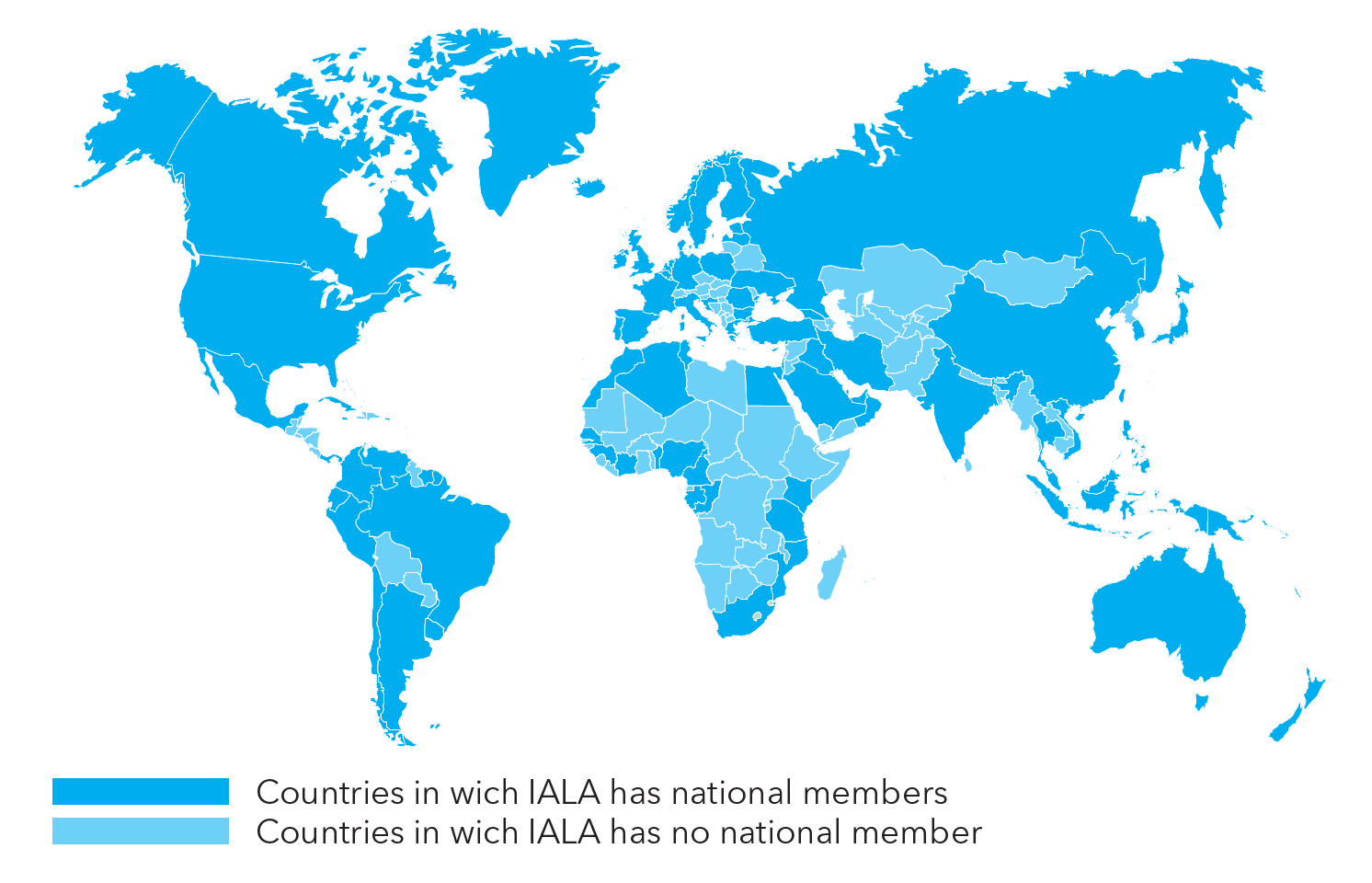
Every four years, IALA carries out a survey to determine trends in the provision of Marine Aids to Navigation. Up until 2014 the survey was carried out annually.

The objective of the survey is to provide statistics on marine aids to navigation for which IALA National Members are responsible. The statistics are based on a general questionnaire which was prepared by the IALA Aids to Navigation Requirements (ARM) Committee and reflects matters of interest to IALA members.

This report provides statistics and trends up to 2017 using surveys carried out by IALA in 2010, 2011, 2012, 2014, 2017.

# IALA Membership

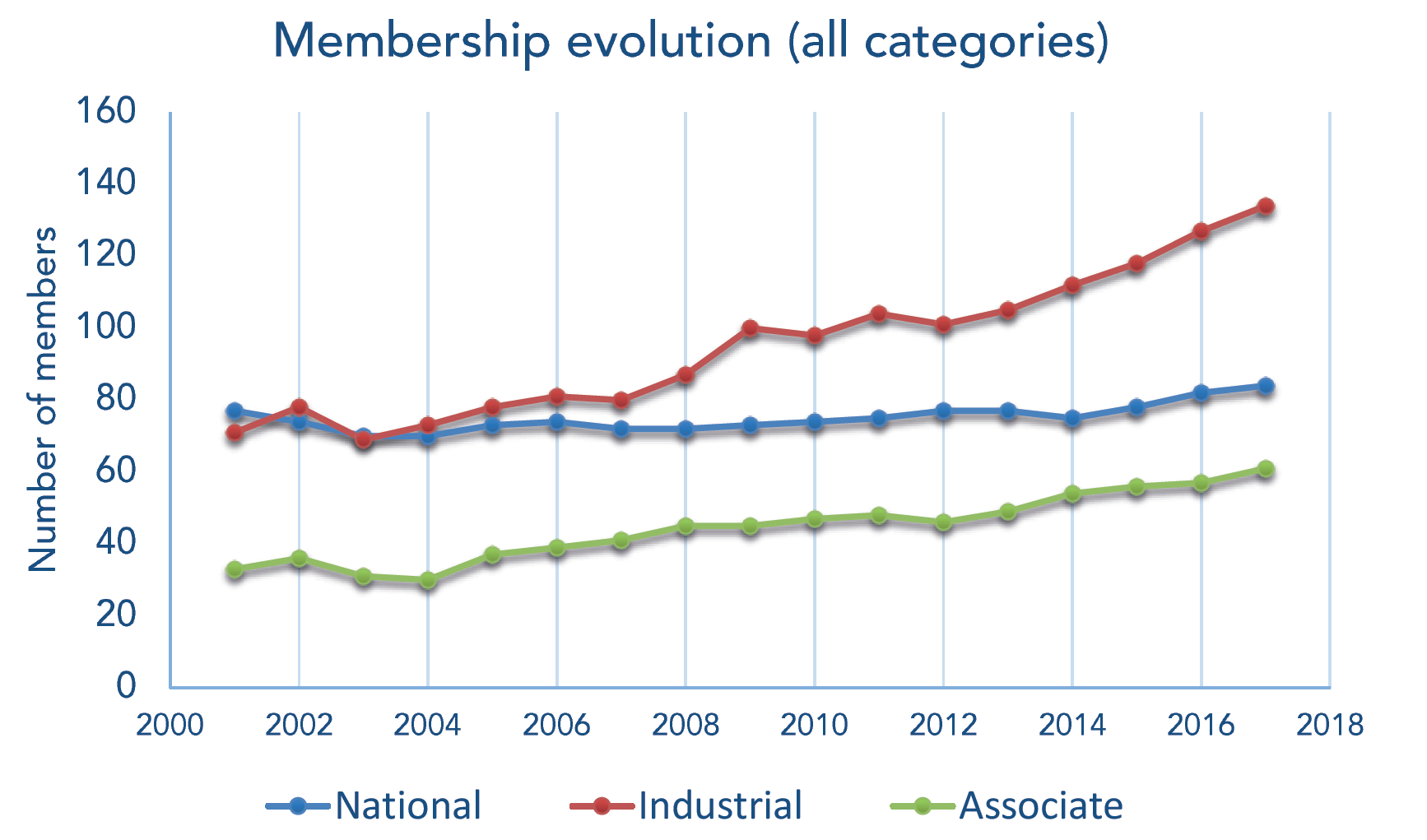
IALA membership is summarised in the following figures.



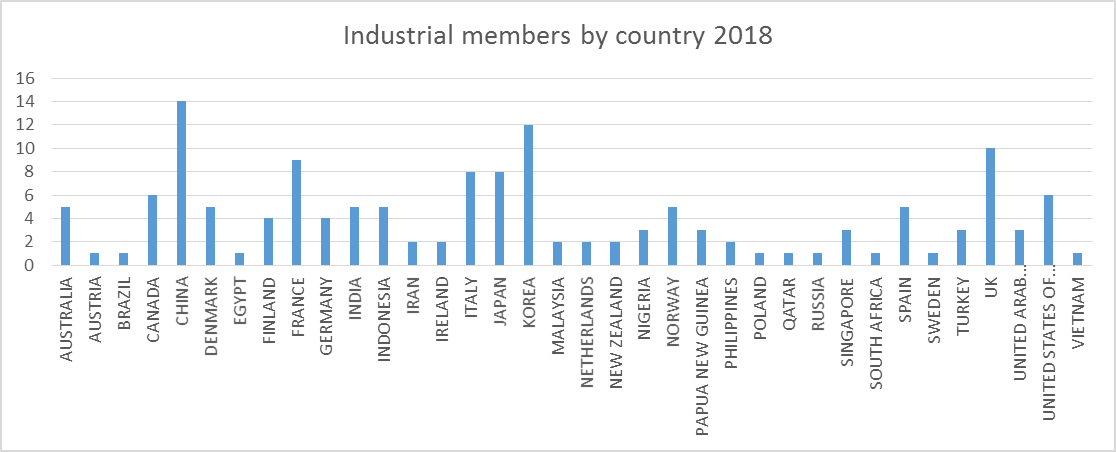
Countries in which IALA has national members

Countries in which IALA has no national members

1. IALA membership 2017



1. IALA membership evolution



1. Industrial members by country 2018

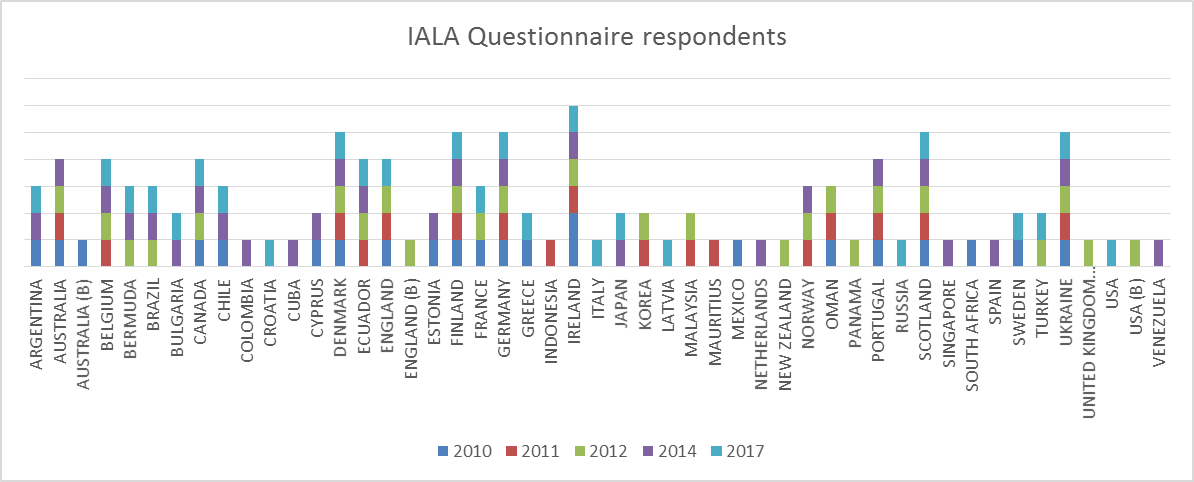
# Questionnaire Methodology

In 2017 a questionnaire in MS Excel spreadsheet format was distributed to all IALA National Members. The responses were summarised into an Excel spreadsheet database structure and combined with the responses from the questionnaires in 2010, 2011, 2012, 2014. Excel tools were used to analyse and present the data.

In order to normalise the data to show trends average and percentage summaries have been used as detailed in the report sections below.

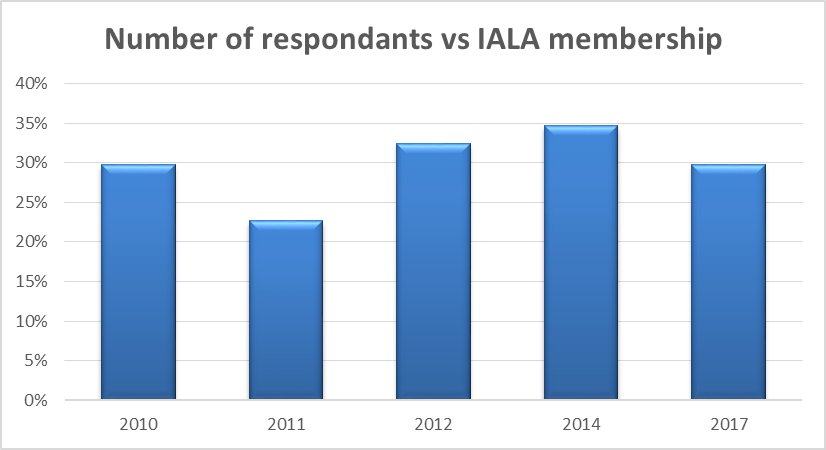
# Respondents

Responses were received from 25 administrations in 2017. Respondents to all surveys from 2010 to 2017 are shown in Figure 4. Respondents include both national and regional AtoN providers. A full list of respondents is shown in ANNEX B.

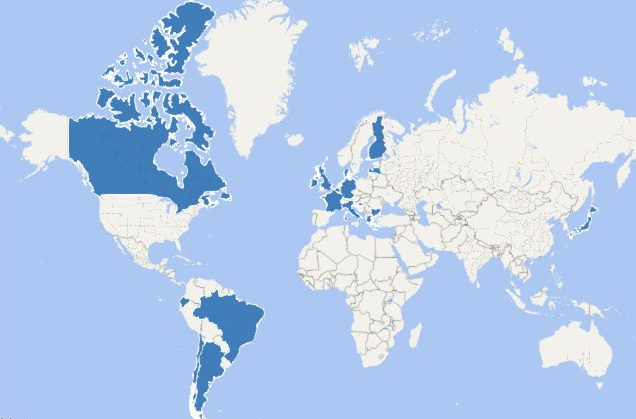


1. IALA Questionnaire respondents 2010-2017

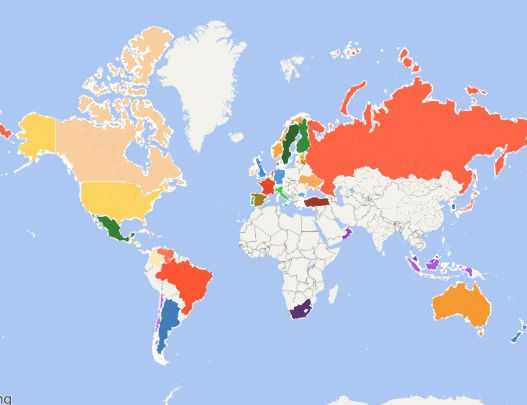
The number of respondents per year is shown in Figure 5. Approximately 30% of IALA National Members respond to each questionnaire.



1. Number of respondents vs IALA membership



1. Countries that responded to the 2017 questionnaire

Over the period 2010 to 2017 46 countries responded, representing 55% of IALA National Members in 2017.

1. Countries that responded to one or more questionnaires 2010 to 2017

# Organisation Responsibility

## Organisation responsibility



## AtoN category responsibility

Questions regarding responsibility for different categories of AtoN was first asked in 2014. Hence data was available for this review from 2014 and 2017. Data from 2017 was used where available while data from 2014 was used for those respondents who did not respond in 2017.

Respondents were requested to provide the number of AtoN in the three IALA AtoN Categories for which they were directly responsible and for the total number of AtoN nationally. The results are tabulated in ANNEX C.

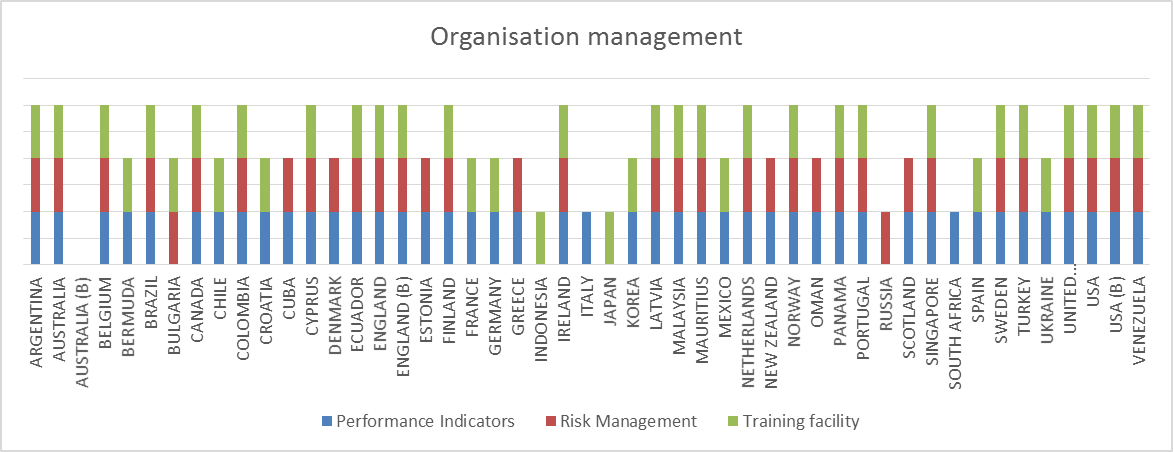
# Quality Management

## Quality management tools

Based on the surveys from 2010 to 2017, the number of respondents using quality management tools is shown in Table 1. Use of performance indicators, risk management tools and training facilities is shown in Figure 8.

1. Summary of quality management tools used by respondents

|  |  |  |
| --- | --- | --- |
|  | **Total** | **%** |
| Performance Indicators | 44 | 90% |
| Risk Management | 35 | 71% |
| Training facility | 38 | 78% |



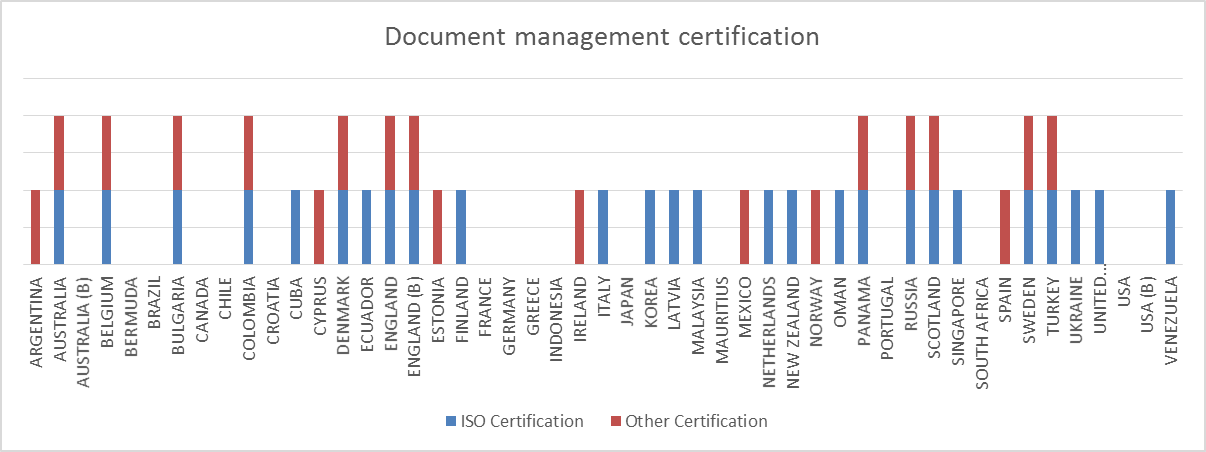
1. Organisation management

## Document management

Based on the surveys from 2010 to 2017, 67% of respondents reported that they use some form of document management system. Table 2 shows the breakdown. 24% reported that they use both ISO and other document management systems.

1. Summary of document management certification

|  |  |  |
| --- | --- | --- |
|  | **Total** | **%** |
| ISO certification | 26 | 53% |
| Other certification | 19 | 39% |
| Certification to some standard | 33 | 67% |



1. Document management certification by country

Other document management systems reported are shown in Table 3.

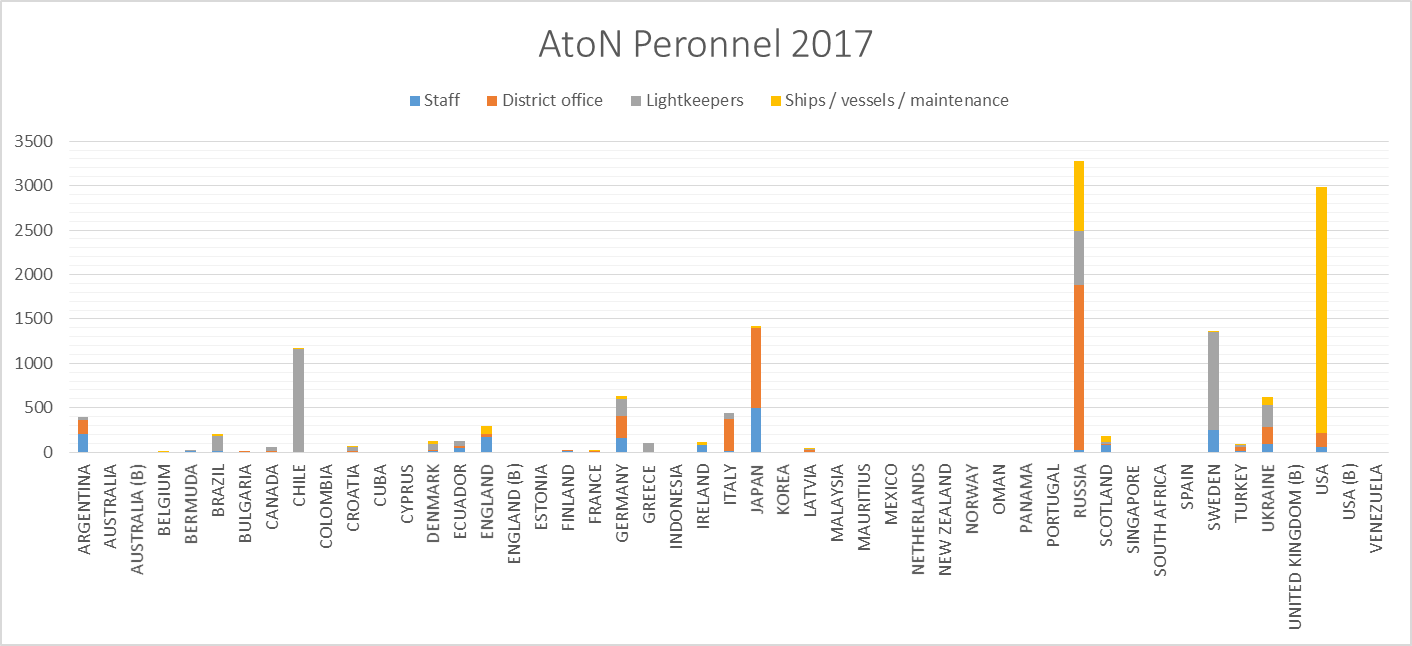
1. Other document management systems

|  |
| --- |
| Ecoports Certification |
| EFQM |
| EFQM |
| ISM |
| ISO 14001 |
| ISO 9001 /14001 / ROSPA LEVEL 5 |
| ISO EN TRAMITE DE RENOVACION |
| ISO9001, ISO14001, AS/NZS4801 |
| Non certified quality management system |
| NTCGP 1000 E 150 |
| QM is based on ISO 9001 but not certified |
| ROSPA (Safety) |
| Service Quality System (AENOR) |

# Marine Aids to Navigation Staff

Personnel involved in AtoN provision is divided into four groups – office staff, district depots, lighthouses/ lightkeepers, ships/vessels/maintenance. 2017 was the first year with the question on ships/vessels/maintenance so there is no trend for this category.

The number of personnel engaged in AtoN provision in 2017 is shown in Figure 10.



1. AtoN personnel 2017

The total number of personnel engaged in AtoN provision over the years 2010 to 2017 is shown in Table 4. Since different administrations with different staffing arrangements and significantly varying numbers of employees respond each year it is difficult to establish a trend from the absolute numbers.

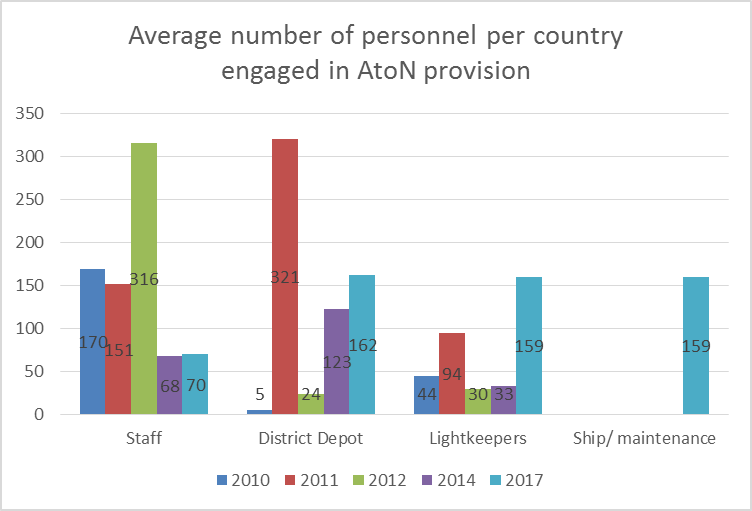
1. Total number of personnel engaged in AtoN provision

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **2010** | **2011** | **2012** | **2014** | **2017** |
| Staff | 3731 | 2567 | 7892 | 1761 | 1755 |
| District Depot | 106 | 5458 | 590 | 3197 | 4047 |
| Lightkeepers | 968 | 1604 | 738 | 857 | 3986 |
| Ship/ vessel / maintenance |  |  |  |  | 3984 |
| Total excl ship/ maintenance | 4805 | 9629 | 9220 | 5815 | 9788 |

The personnel numbers are normalised into the average number of personnel per country in Table 5 to provide a view of trends. The differing numbers of AtoN provided by respondents skew the results somewhat.

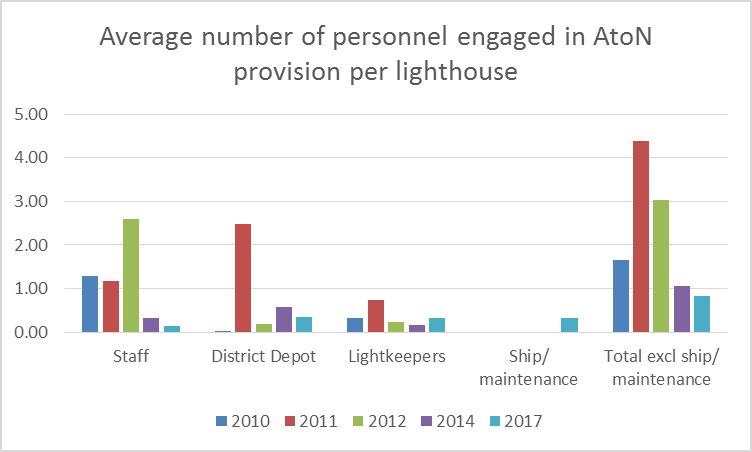
1. Average number of personnel per country engaged in AtoN provision

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **2010** | **2011** | **2012** | **2014** | **2017** |
| Staff | 170 | 151 | 316 | 68 | 70 |
| District Depot | 5 | 321 | 24 | 123 | 162 |
| Lightkeepers | 44 | 94 | 30 | 33 | 159 |
| Ship / vessel / maintenance |  |  |  |  | 159 |
| Total per country excl ship/ maintenance | 218 | 566 | 369 | 224 | 392 |



1. Average number of personnel per country engaged in AtoN provision

The personnel numbers are normalised into the average number of personnel per lighthouse in Figure 12 to provide an alternative view of trends. This is probably the most reliable indicator of manning trends but is still subject to the individual respondents in any given year.



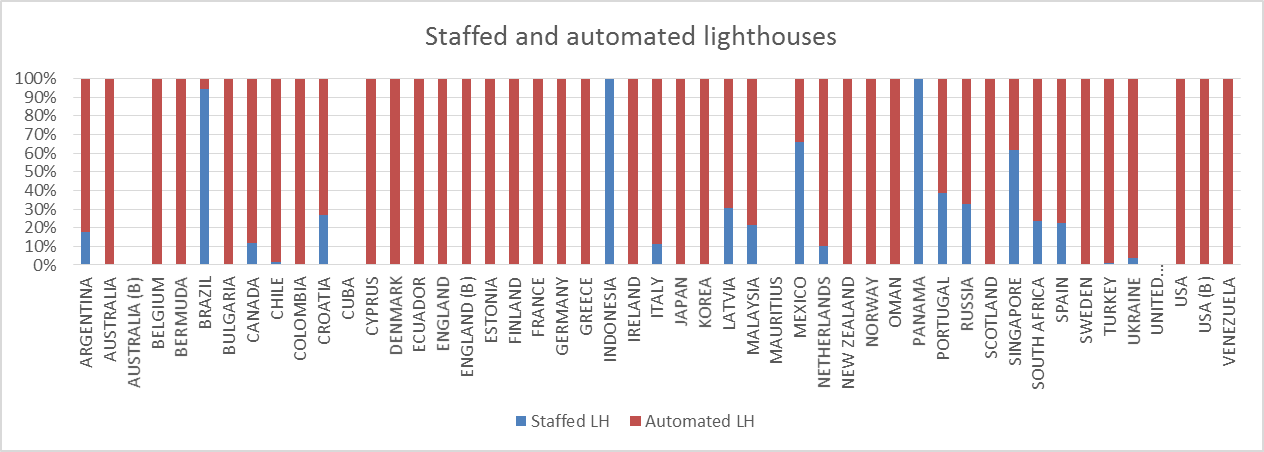
1. Average number of personnel engaged in AtoN provision per lighthouse

# Fixed Aids to Navigation including Lighthouses

## Staffed and automated lighthouses

Where available, the number of lighthouses was taken from the 2017 responses. Where 2017 data was not available, the most recent data from each respondent was taken back to 2010.

Overall 93% of lighthouses are reported to be automated.

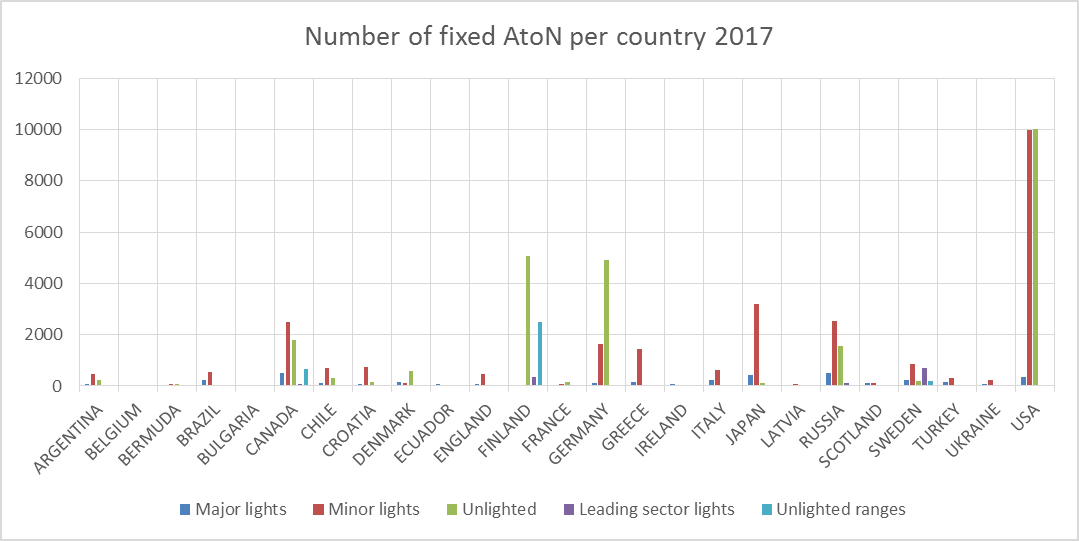


1. Percentage staffed and automated lighthouses

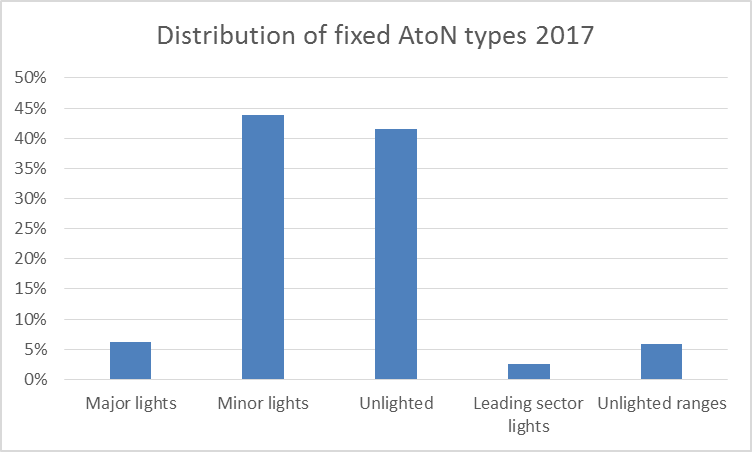
## Number of fixed AtoN

The number of fixed AtoN reported in 2017 is shown in Figure 14. The numerical values are shown in ANNEX D. Fixed AtoN are categorised as follows:

* Major lights (nominal range of 10 NM or over);
* Minor lights (nominal range under 10 NM);
* Unlit fixed aids (daymarks only);
* Leading lines: (Sector lights, Lit ranges, Unlit ranges).

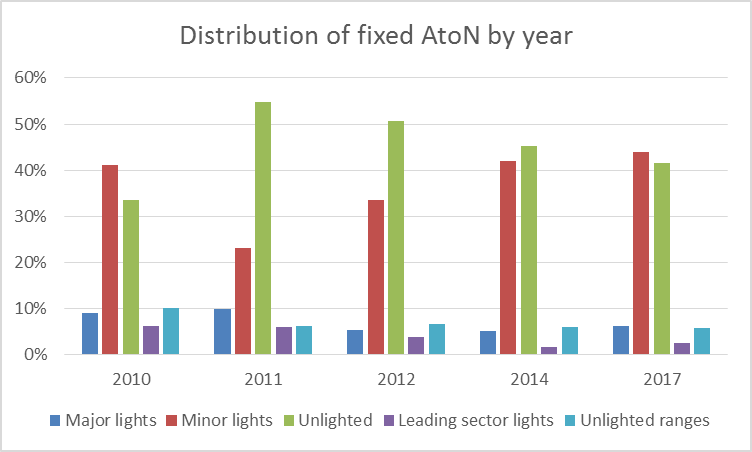


1. Number of fixed AtoN per country 2017

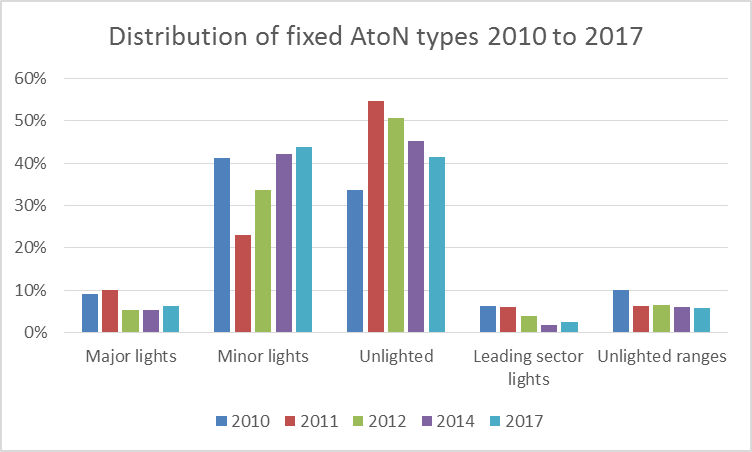


1. Distribution of fixed AtoN types 2017

## Trends in fixed AtoN



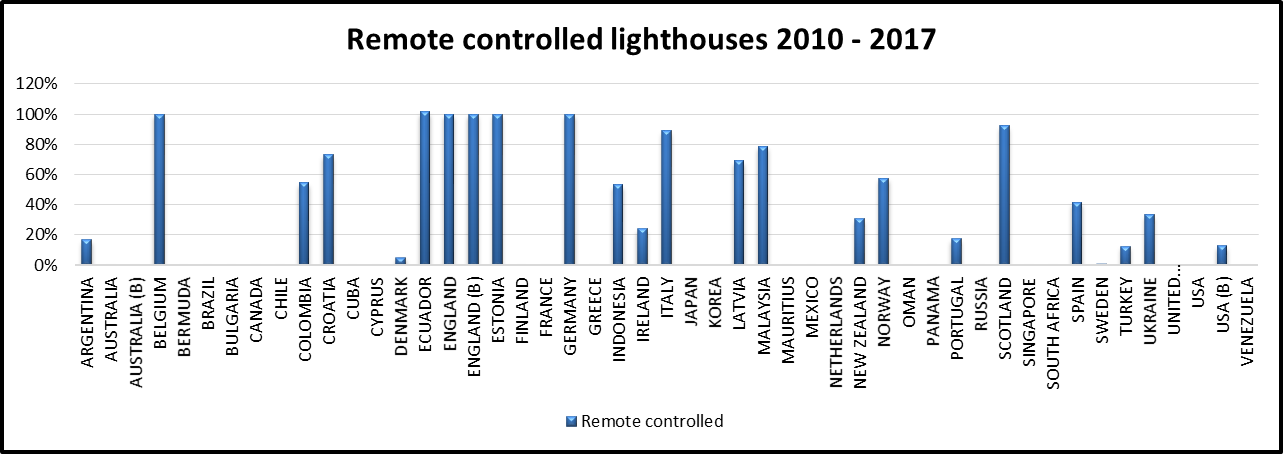
1. Distribution of fixed AtoN by year



1. Trends in fixed AtoN 2010 to 2017

## Remote controlled lighthouses

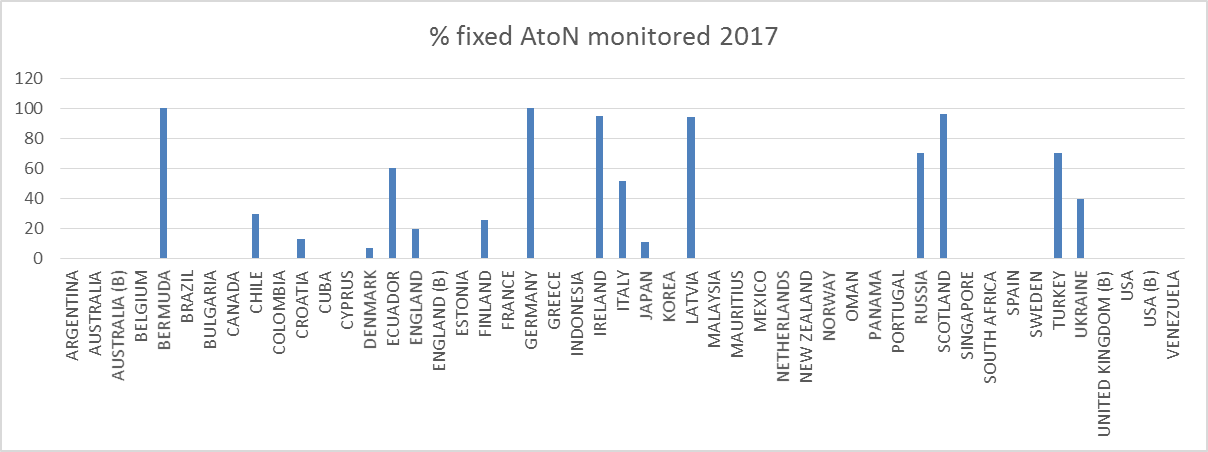
In general 12% of lighthouses are reported to be remotely controlled. A distinction is made between remote control and remote monitoring and the question only addresses remote control. The use of remote control as reported by all respondents from 2010 to 2017 is shown in Figure 18.



1. Remote controlled lighthouses

## Remotely monitored fixed AtoN

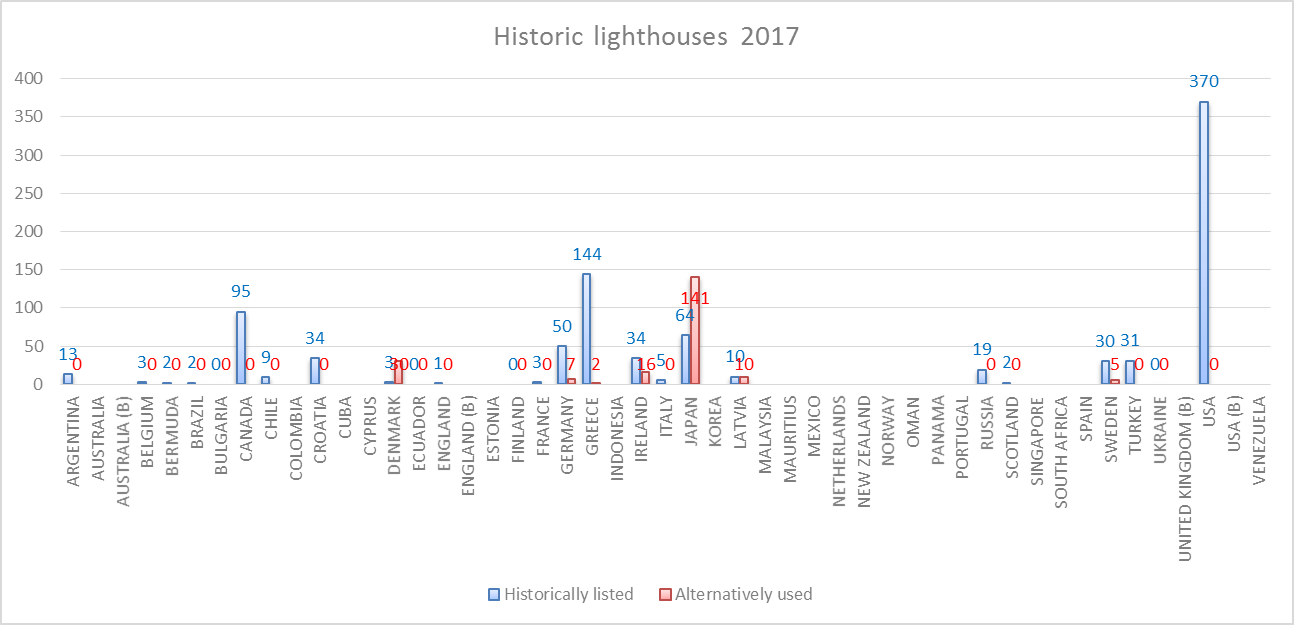
In 2017 respondents reported monitoring of fixed AtoN as follows.



1. Percentage of fixed AtoN monitored

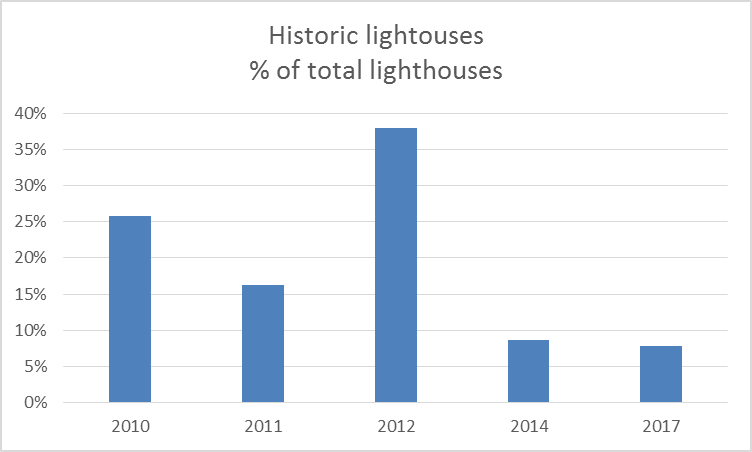
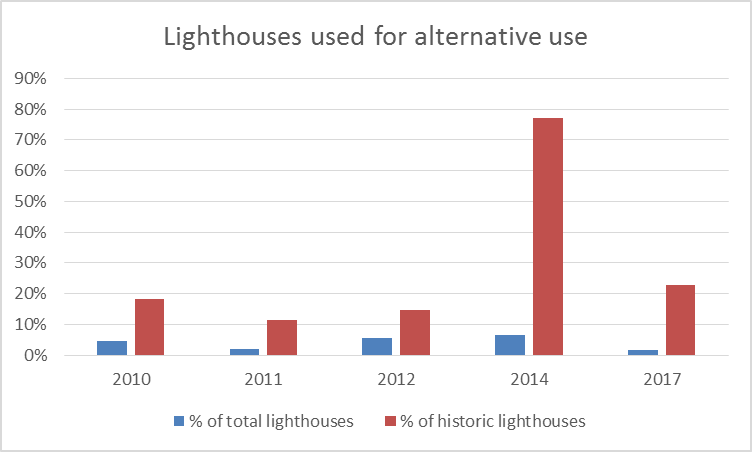
## Historic lighthouses

Historic lighthouses are those with legal protection as historic monuments.



1. Historic lights and alternative use

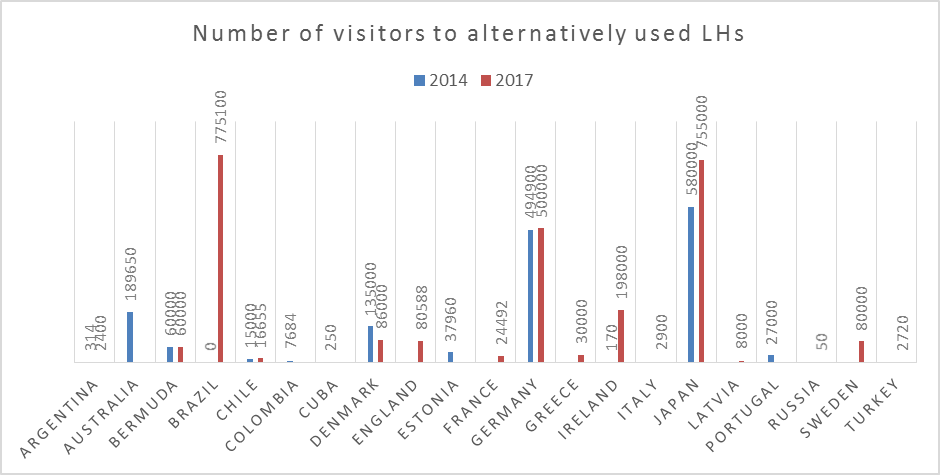
Trends for historic lighthouses and alternative use from responses 2010 to 2017 are as follows.



1. Trends for historic lighthouses and alternative use

## Visitor numbers

Visitor numbers to alternatively used lighthouses was reported in 2014 and 2017. Visitor numbers per alternatively used lighthouses were reported as follows.

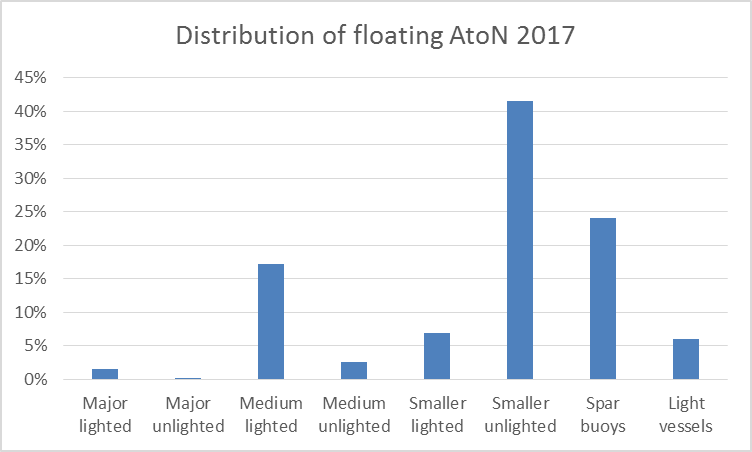


1. Number of visitors to alternatively used lighthouses

# Floating Aids to Navigation

Consideration of floating AtoN is divided into lighted and unlighted with spar buoys considered separately. A full list of floating AtoN reported in 2017 is shown in ANNEX E. Floating AtoN are classified as follows.

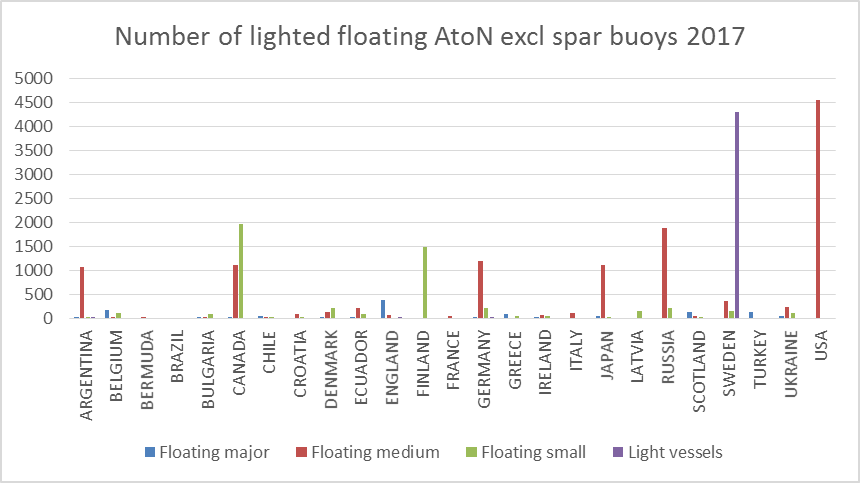
* Major lighted (3m diameter or greater)
* Major unlighted (3m diameter or greater)
* Medium lighted (1.5-3m diameter)
* Medium unlighted (1.5-3m diameter)
* Smaller lighted (less than 1.5m diameter)
* Smaller unlighted (less than 1.5m diameter)
* Spar buoys
* Light vessels



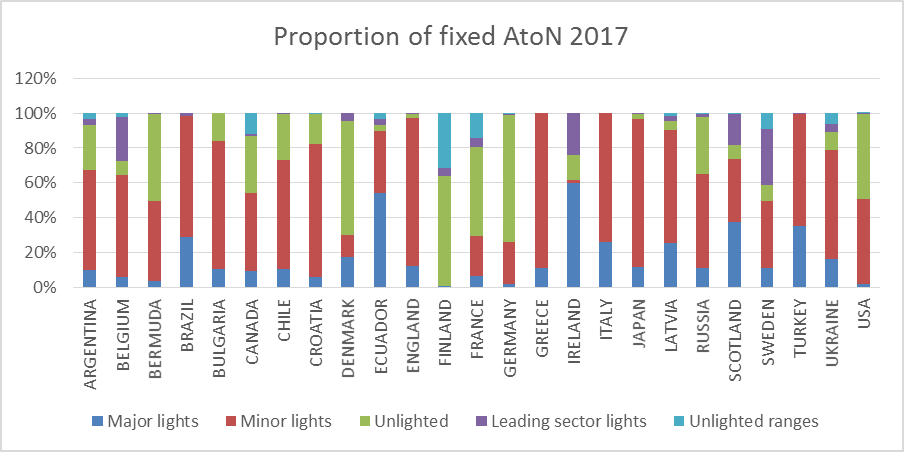
1. Distribution of floating AtoN 2017

## Lighted floating AtoN

The number of lighted floating AtoN reported in 2017 is shown in Figure 24.



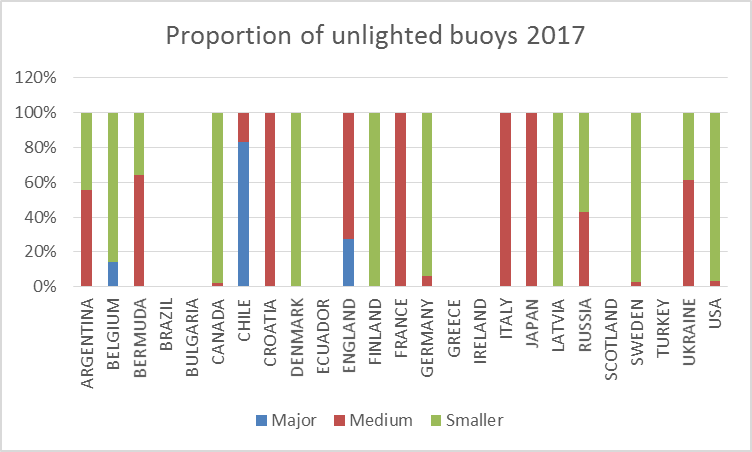
1. Number of lighted floating AtoN excluding spar buoys 2017



1. Distribution of fixed AtoN per country by proportion

## Unlighted floating AtoN

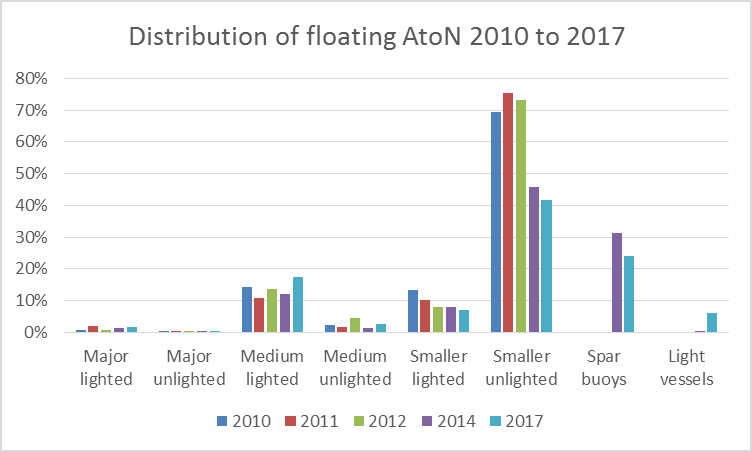
Actual number of unlighted buoys is shown in ANNEX E.



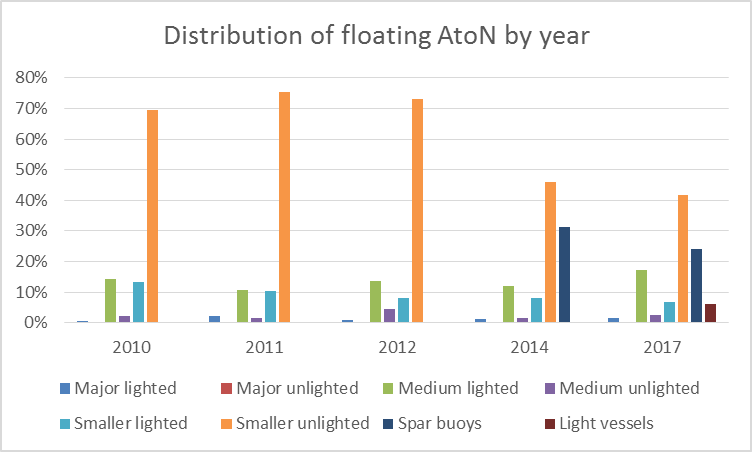
1. Proportion of unlighted buoys per country 2017

## Trends in floating AtoN

Based on the responses to questionnaires from 2010 to 2017, the following pattern of floating AtoN was indicated. Please note that reporting on spar buoys and light vessels commenced in 2014.



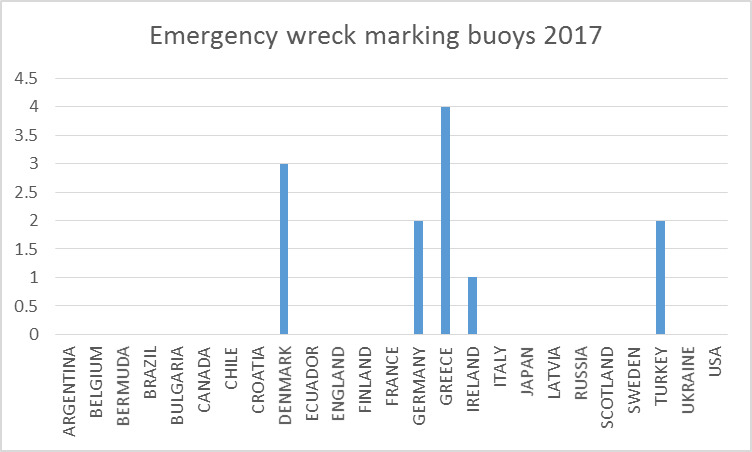
1. Percentage distribution of floating AtoN by AtoN type 2010 to 2017



1. Percentage distribution of floating AtoN by year

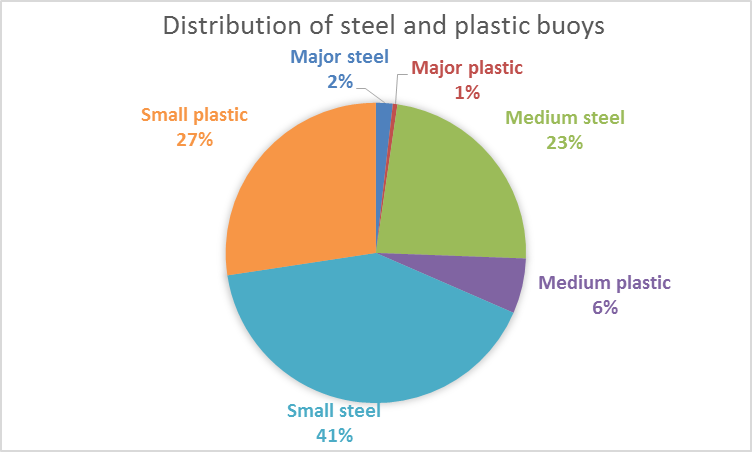
## Emergency wreck marking buoys (EWMB)

Emergency wreck marking buoys deployed in 2017 is shown in Figure 29.

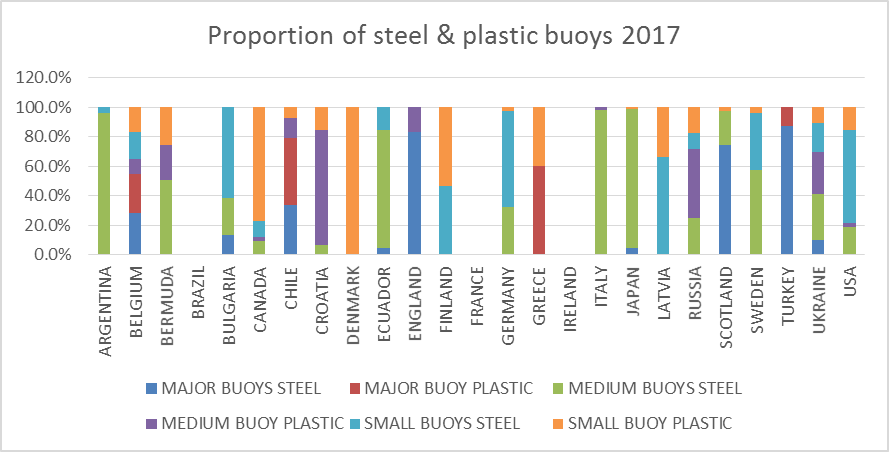


1. Emergency wreck marking buoys deployed in 2017

## Buoy construction – steel vs plastic

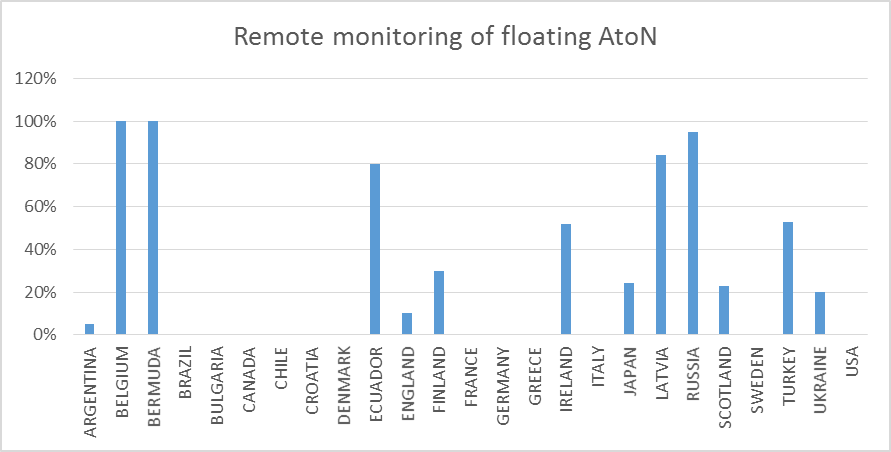


1. Proportion of steel and plastic buoys 2017



1. Proportion of steel and plastic buoys per country 2017

## Remote monitoring of floating AtoN



1. Percentage of floating AtoN with remote monitoring

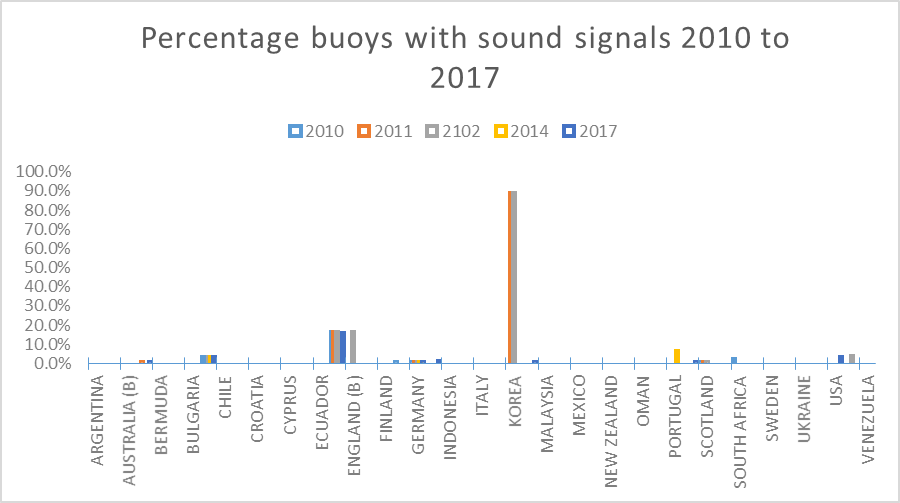
# Sound Signals

The following numbers of sound signals were reported in 2017.

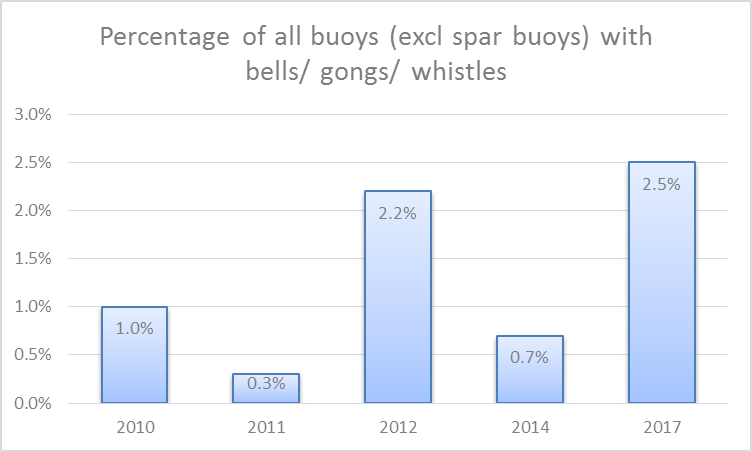
1. Number of sound signals 2017

| **Country** | **Bells and Gongs** | **Whistles** | **Fog Horns** |
| --- | --- | --- | --- |
| Argentina | 0 | 0 | 16 |
| Belgium | 3 | 0 | 2 |
| Canada | 233 | 113 | 121 |
| Chile | 0 | 0 | 6 |
| Croatia | 0 | 0 | 7 |
| England | 60 | 11 | 23 |
| Germany | 3 | 7 | 9 |
| Greece | 2 | 0 | 4 |
| Latvia | 1 | 0 | 0 |
| Russia | 5 | 0 | 11 |
| Turkey | 0 | 0 | 11 |
| Ukraine | 0 | 0 | 3 |
| USA | 610 | 170 | 237 |

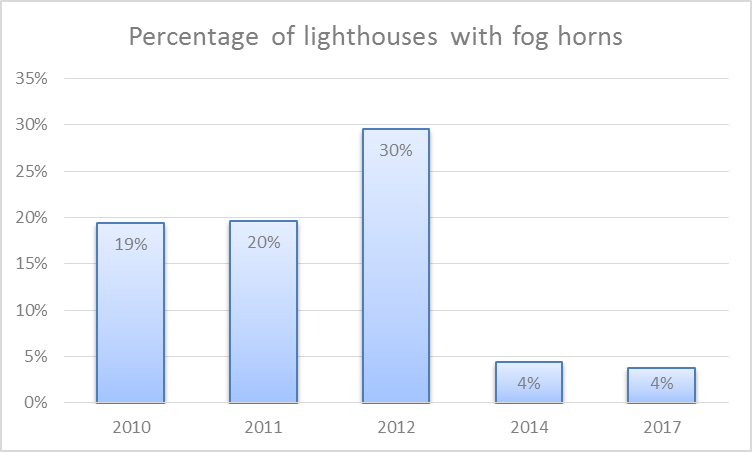
Trends for sound signals for the period 2010 to 2017 were reported as follows.



1. Percentage of all buoys (excluding spar buoys) fitted with sound signals (bells, gongs, whistles) 2010 to 2017



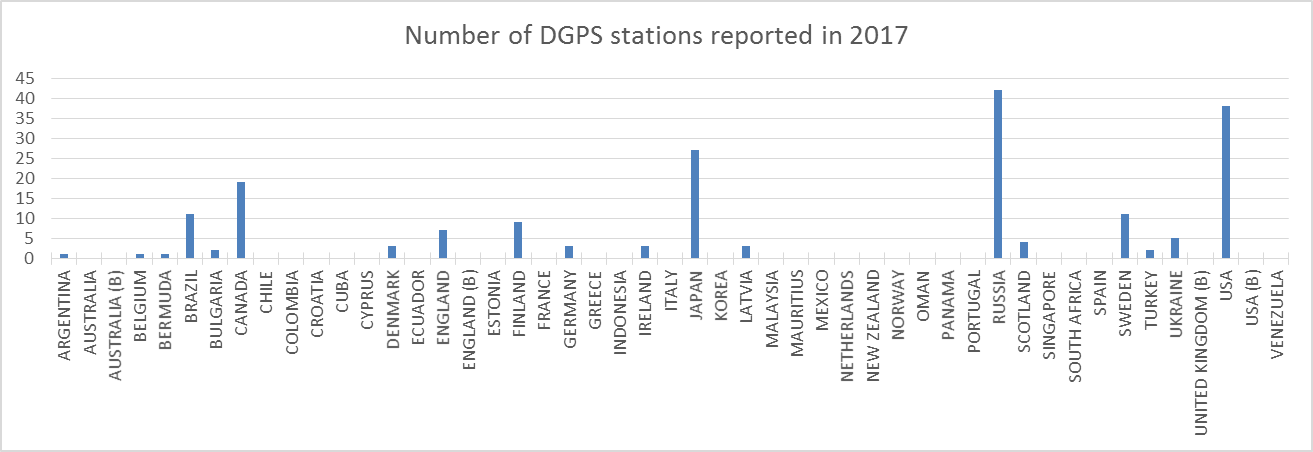
1. Percentage of all buoys (excluding spar buoys) fitted with bells, gongs, whistles



1. Percentage of lighthouses with fog horns 2010 to 2017

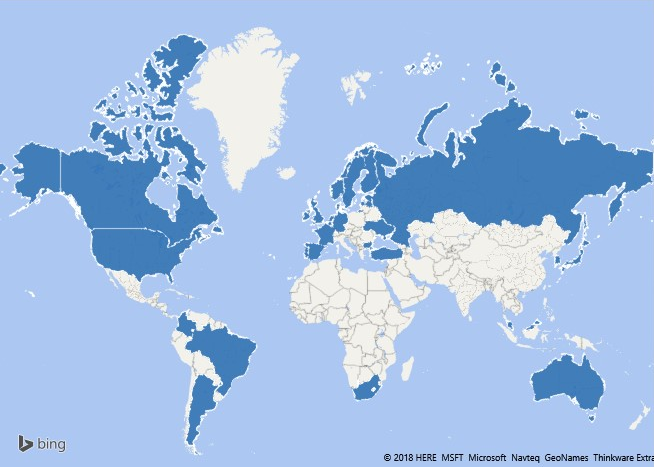
# Radio Aids to Navigation

## Differential GPS

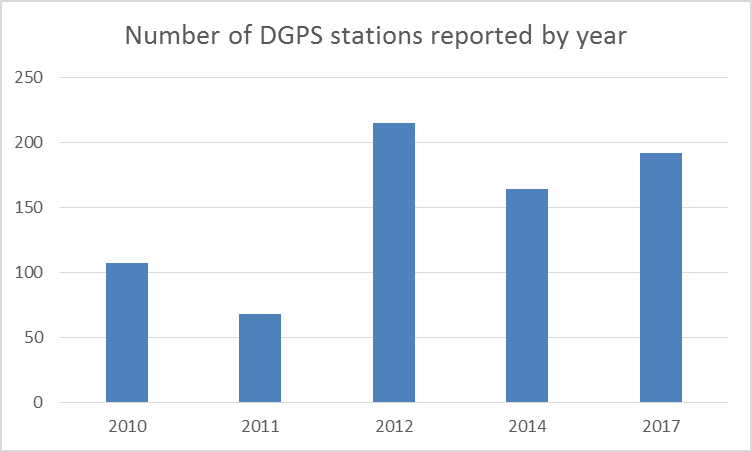


1. Number of DGPS stations reported in 2017

Respondents from 2010 to 2017 reported DGPS service as shown in Figure 37.



1. DGPS service worldwide based on 2010 to 2017 questionnaires



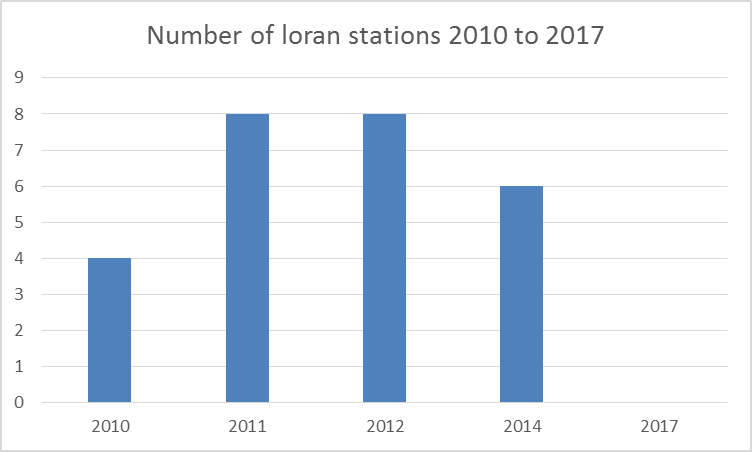
1. Number of DGPS stations reported by year

## Loran

Respondents from 2010 to 2017 reported Loran service as shown in Figure 39.



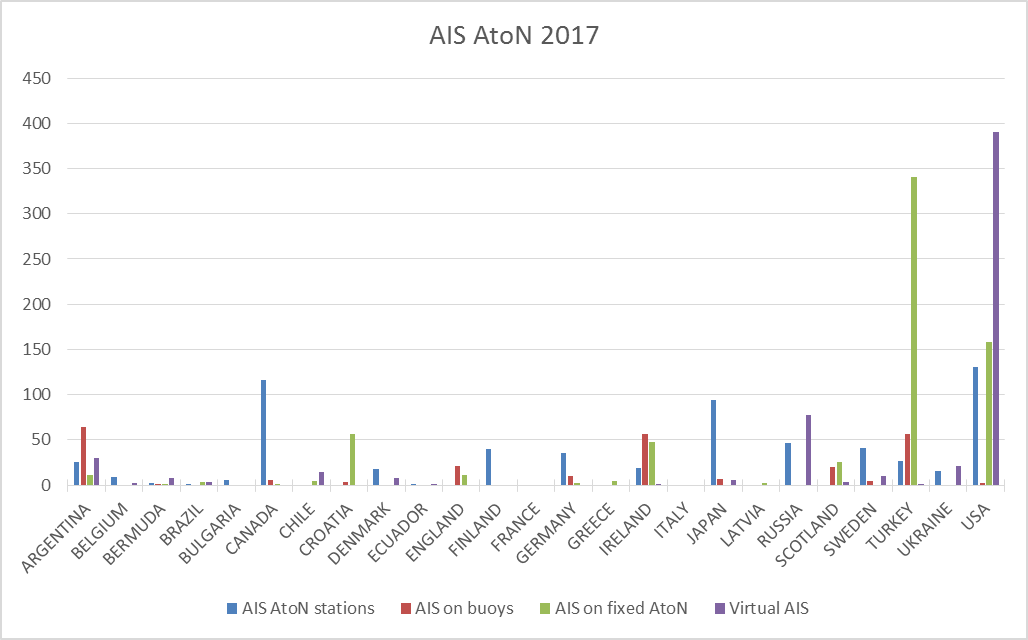
1. Loran service based on 2010 to 2017 questionnaires



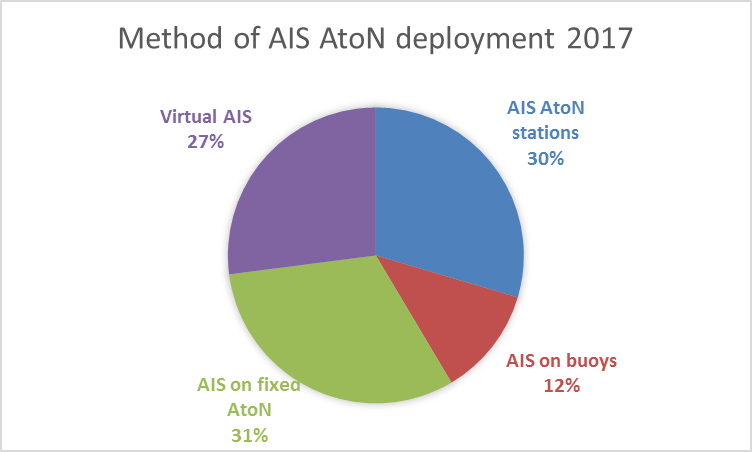
1. Number of Loran stations reported from 2010 to 2017

## Automatic Identification System (AIS)

The use of AIS AtoN is summarised in Figure 41. No AIS repeaters were reported.



1. Deployment of AIS AtoN reported in 2017

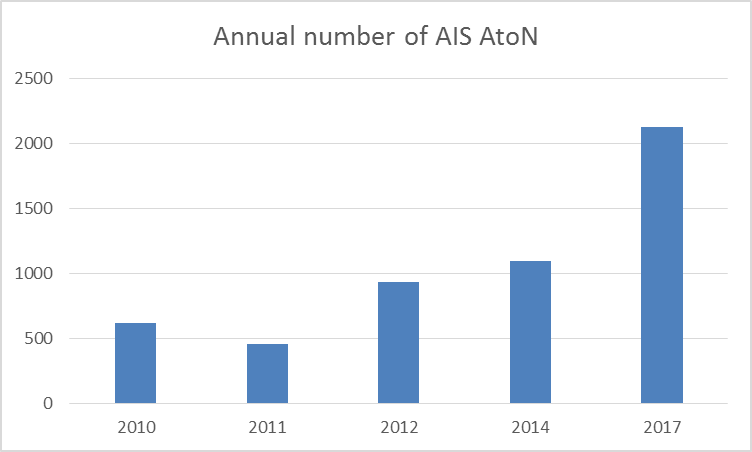


1. Method to AIS AtoN deployment 2017

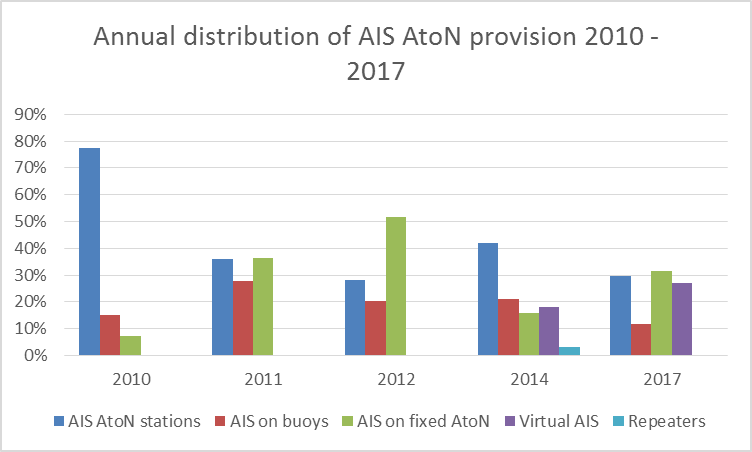
Use of AIS AtoN as reported from 2010 to 2017 is shown in Figure 43.



1. Deployment of AIS AtoN (base station, fixed station AtoN, buoys AtoN, Virtual AIS AtoN) 2010 to 2017

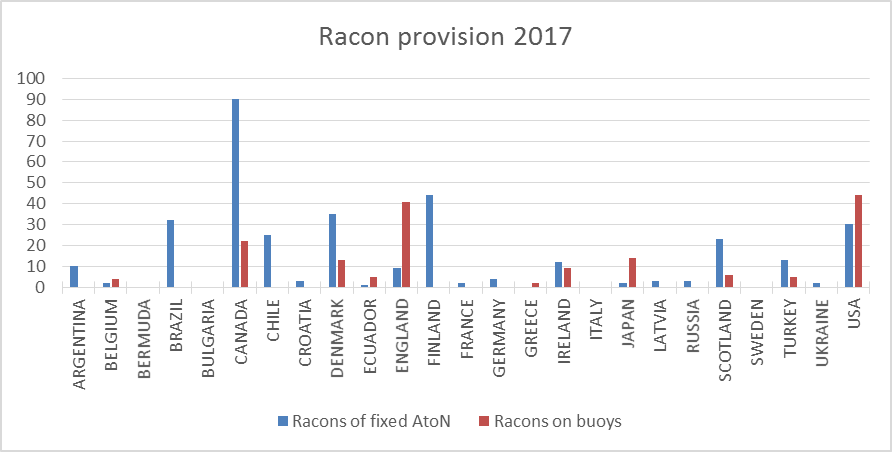


1. Annual number of AIS AtoN

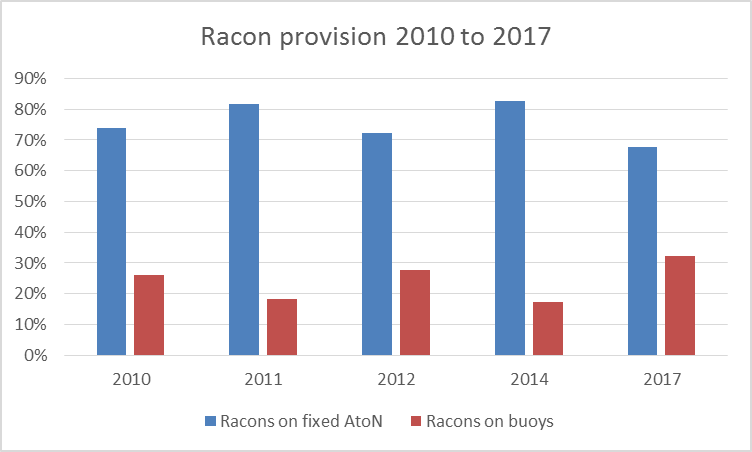


1. Annual distribution of methods of AIS AtoN provision 2010 to 2017

## Racons

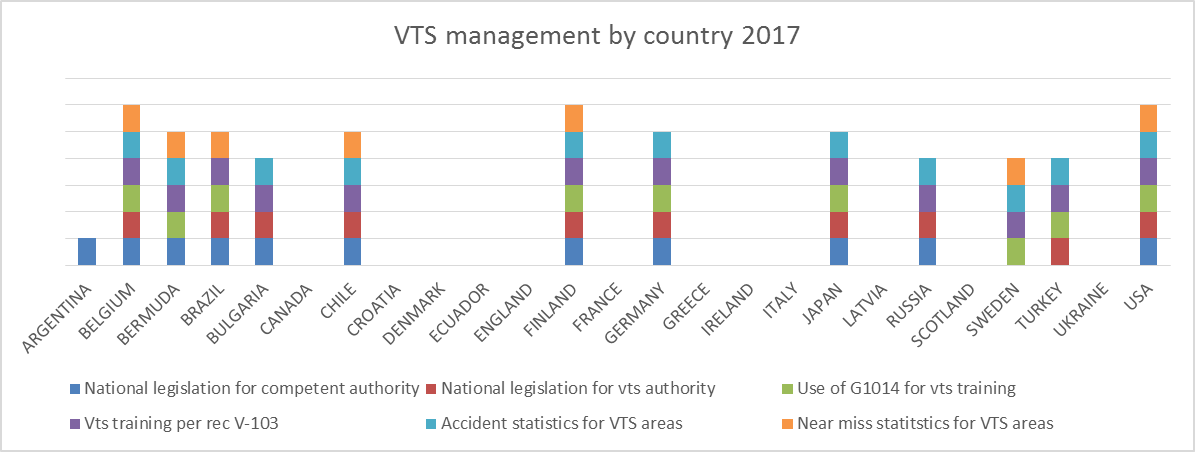


1. Racon provision 2017

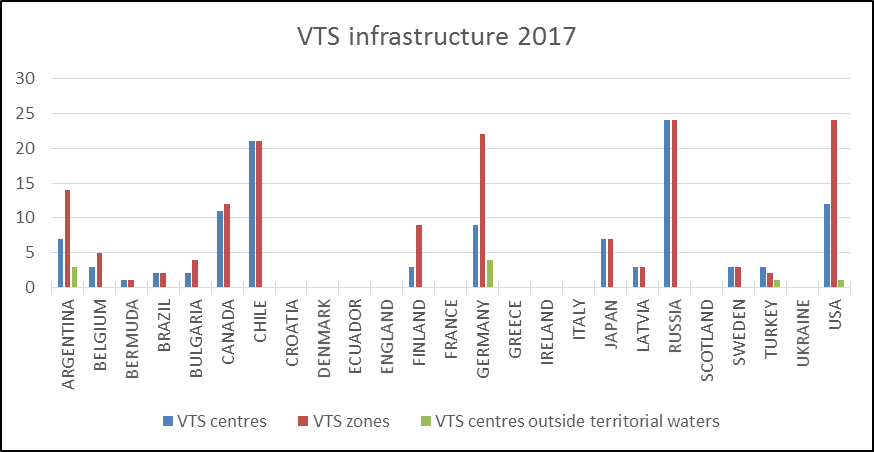


1. Racon provision on fixed AtoN and buoys 2010 to 2017

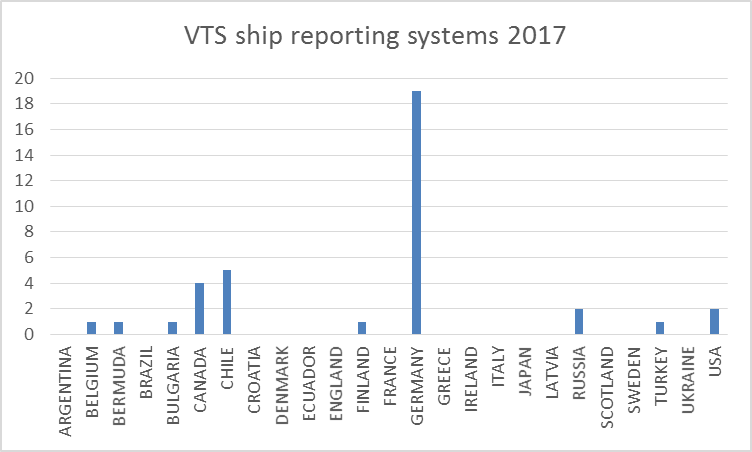
# Vessel Traffic Services



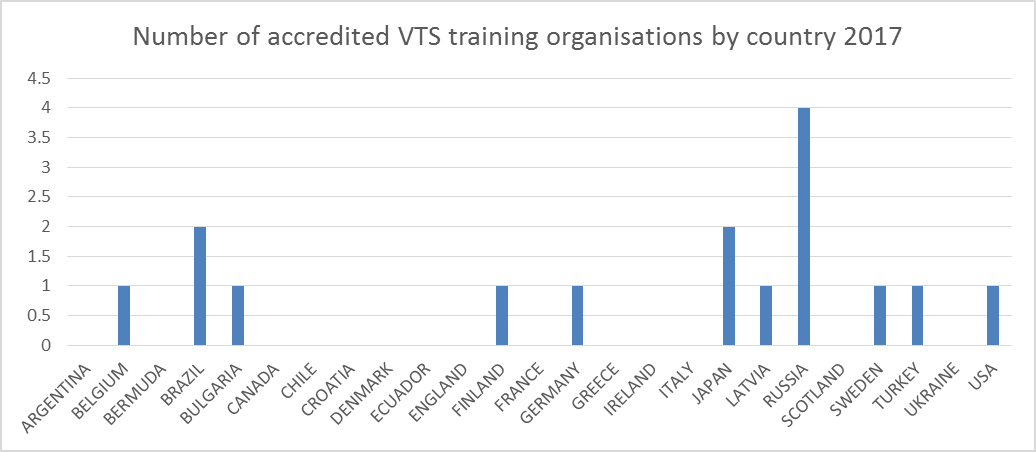
1. VTS management by country 2017



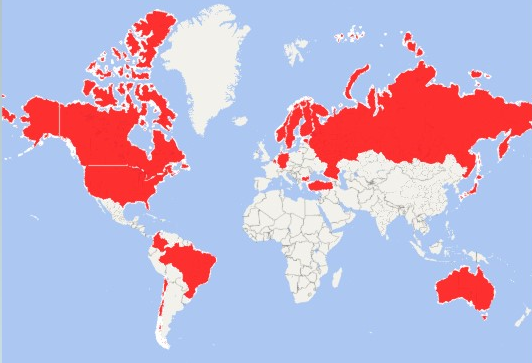
1. VTS infrastructure 2017



1. Number of ship reporting systems by country 2017



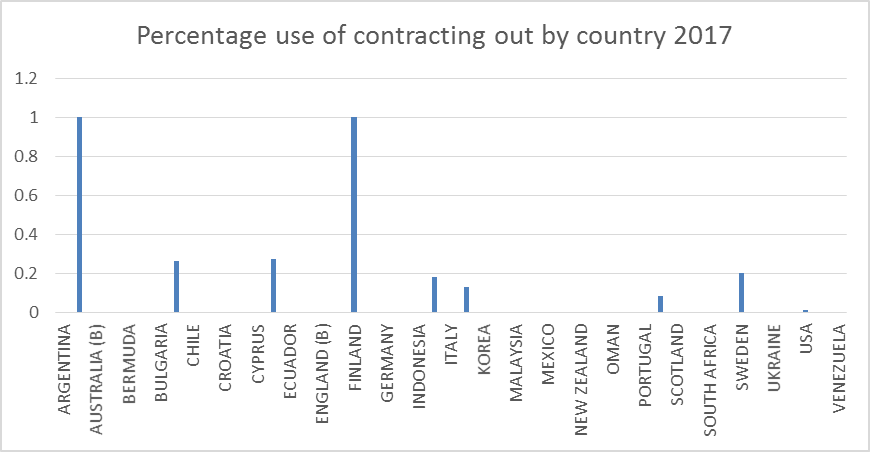
1. Number of accredited VTS training centres by country 2017



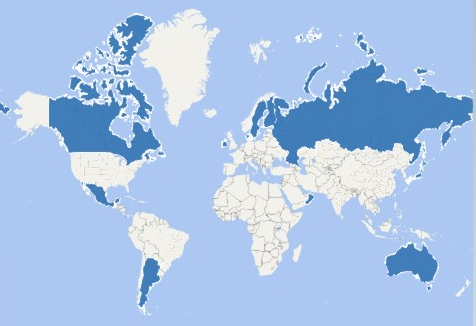
1. Countries reporting VTS management arrangements 2010 to 2017

# Service Delivery

## Contracting out

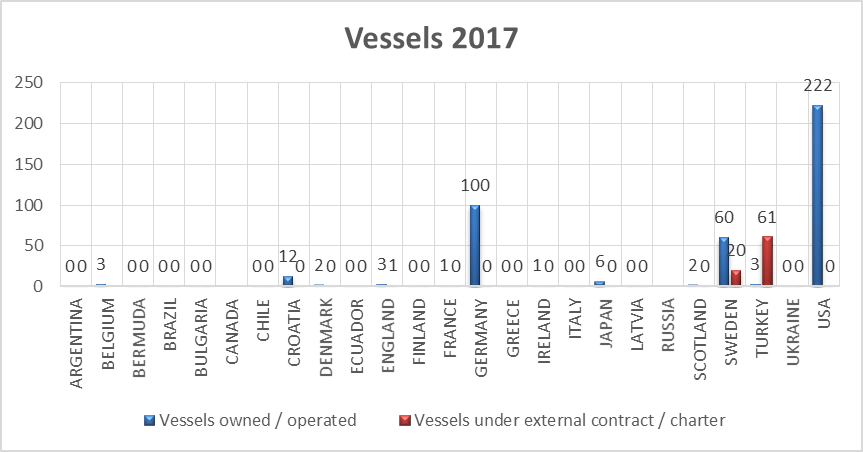


1. Percentage use of contracting out by country 2017



1. Countries using contracting out for some or all AtoN 2010 to 2017

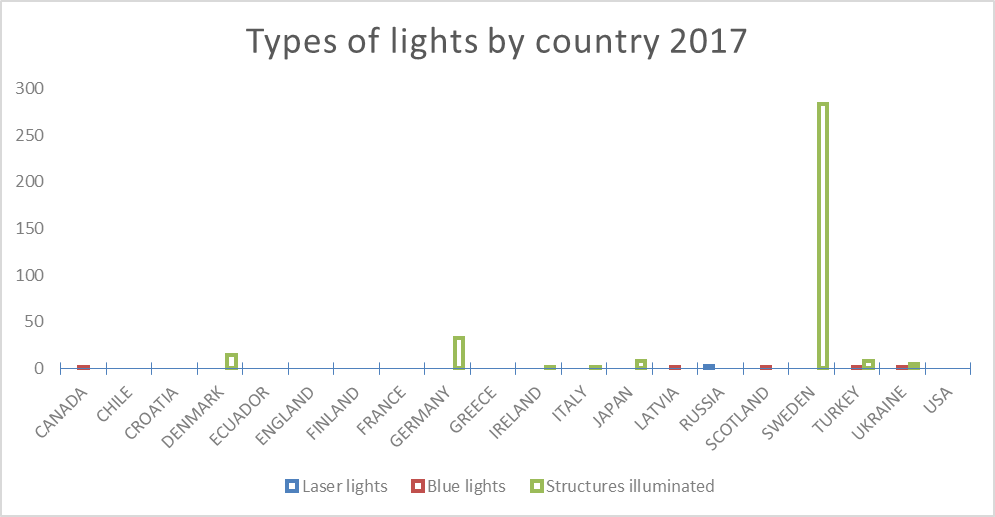
## Vessels



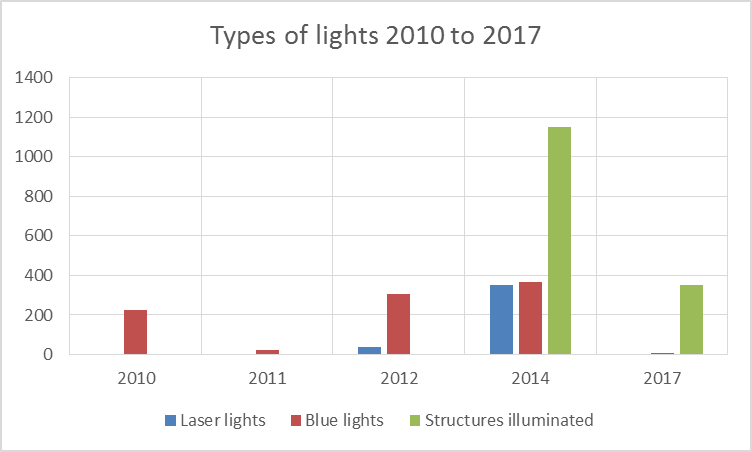
1. Vessel provision by country 2017

# Equipment

## Types of lights

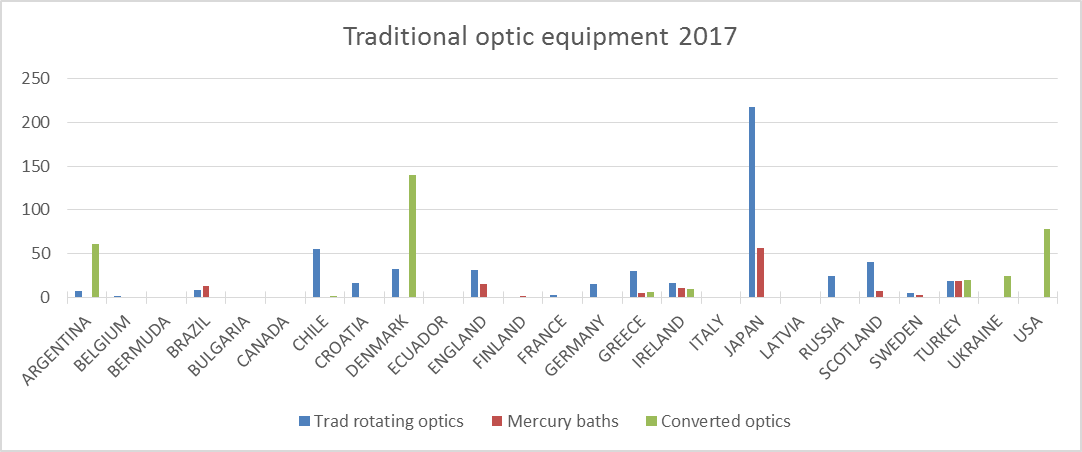


1. Types of lights by county 2017



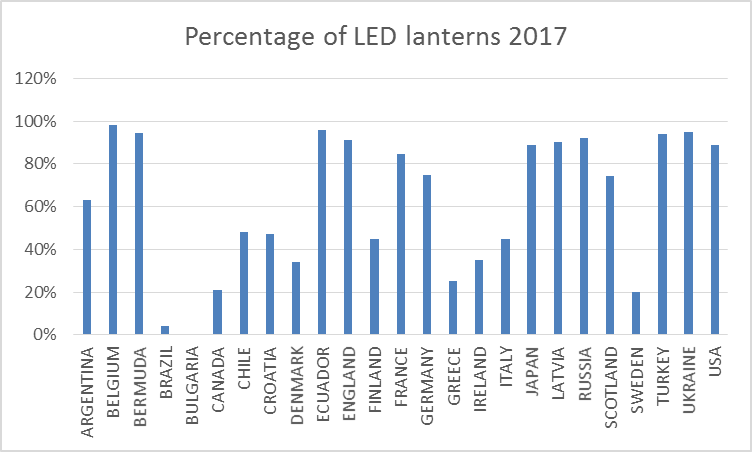
1. Types of lights 2010 to 2017

## Traditional optic equipment



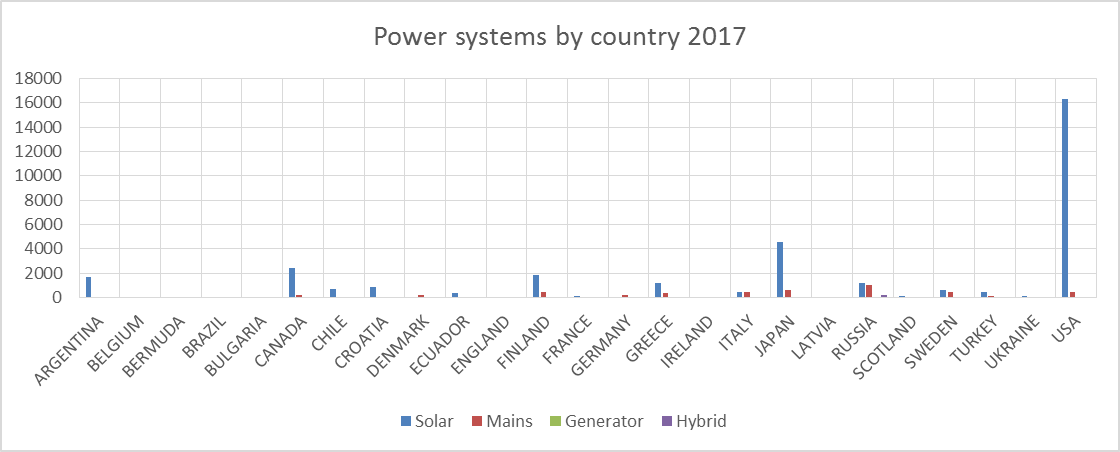
1. Use and type of traditional optic equipment 2017

## LED lanterns

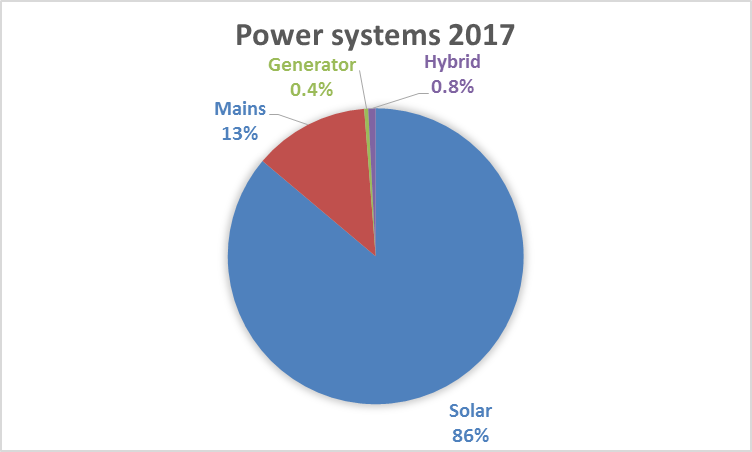


1. Percentage of LED lanterns by country 2017

## Power systems



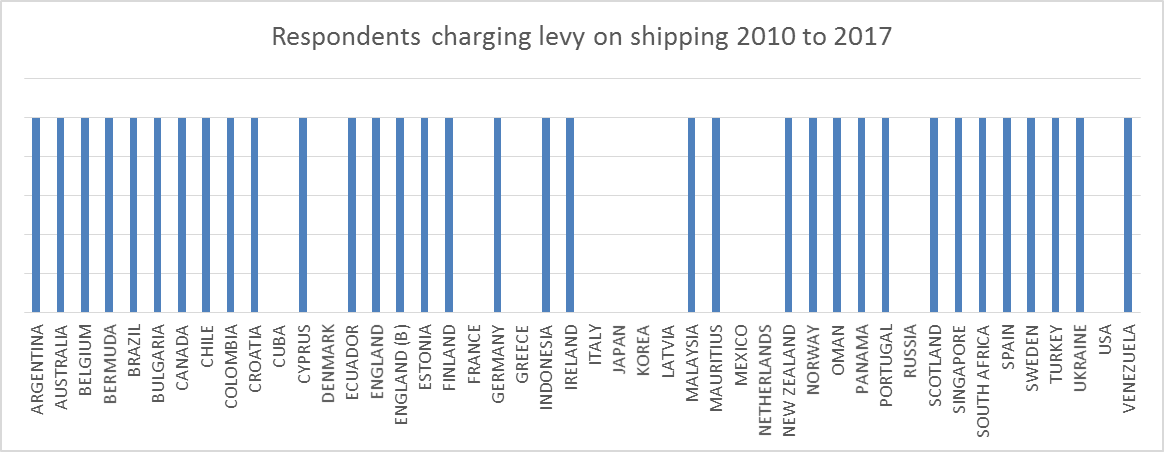
1. Power systems by country 2017



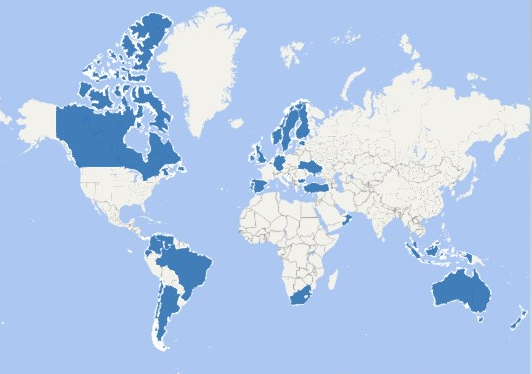
1. Trends in power systems 2017

# Finance

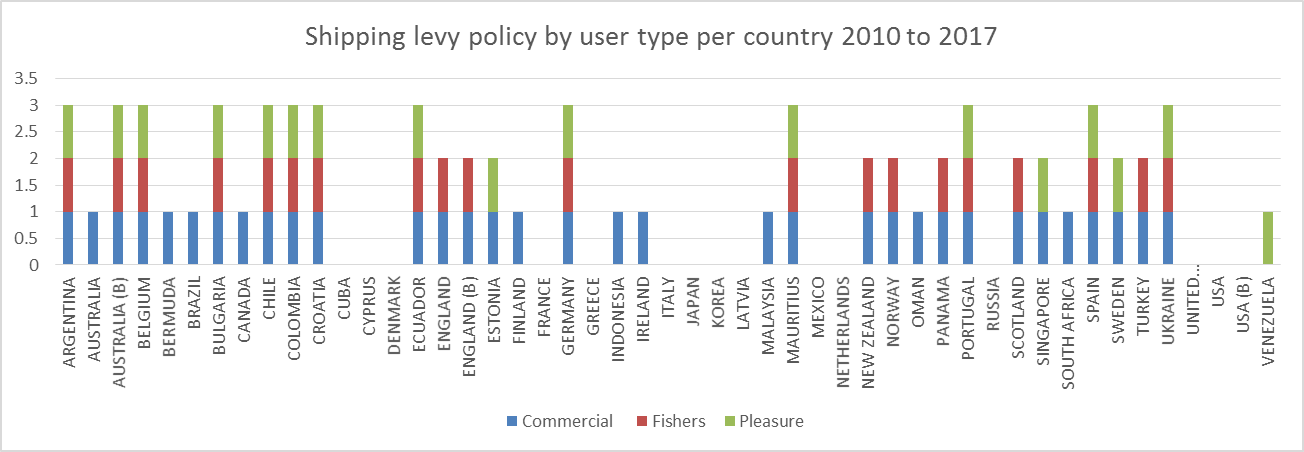
Based on the questionnaires from 2010 to 2017, a levy on shipping is charged as follows.



1. Respondents charging a levy on shipping 2010 to 2017

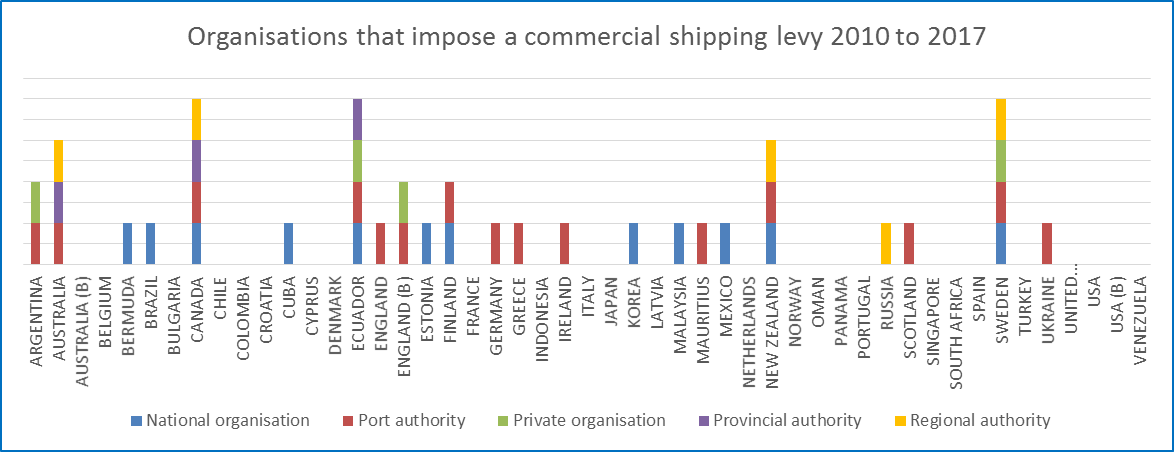


1. Countries charging a levy on shipping 2010 to 2017

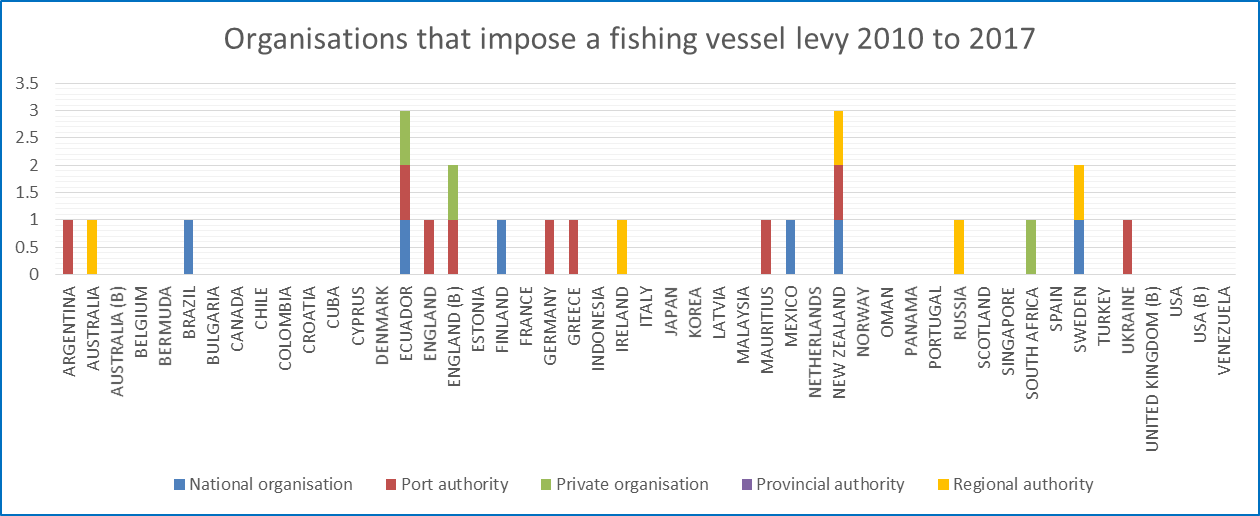


1. Shipping levy policy by user type per country 2010 to 2017

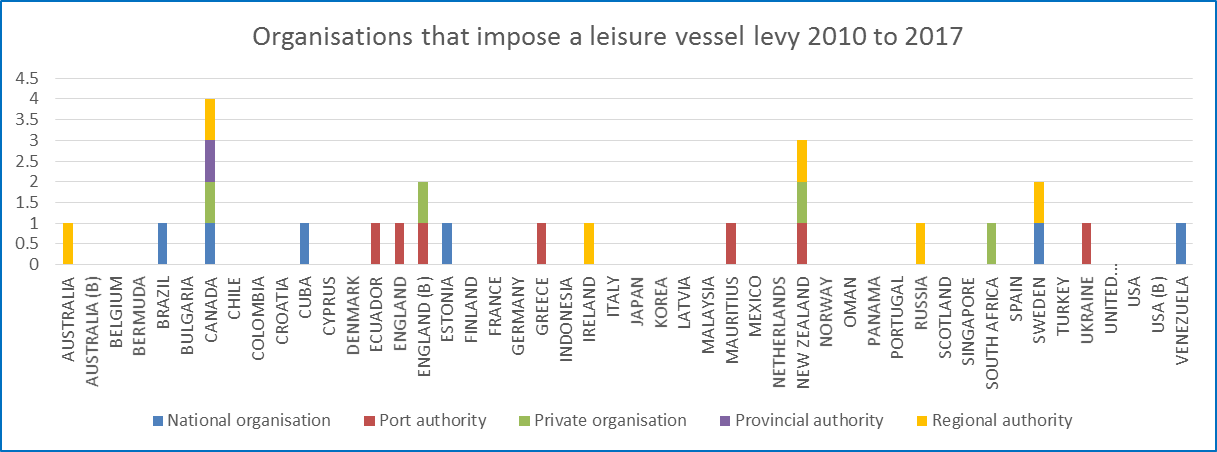
The chart in Figure 65 shows shipping organisations in each country that impose a levy on shipping.



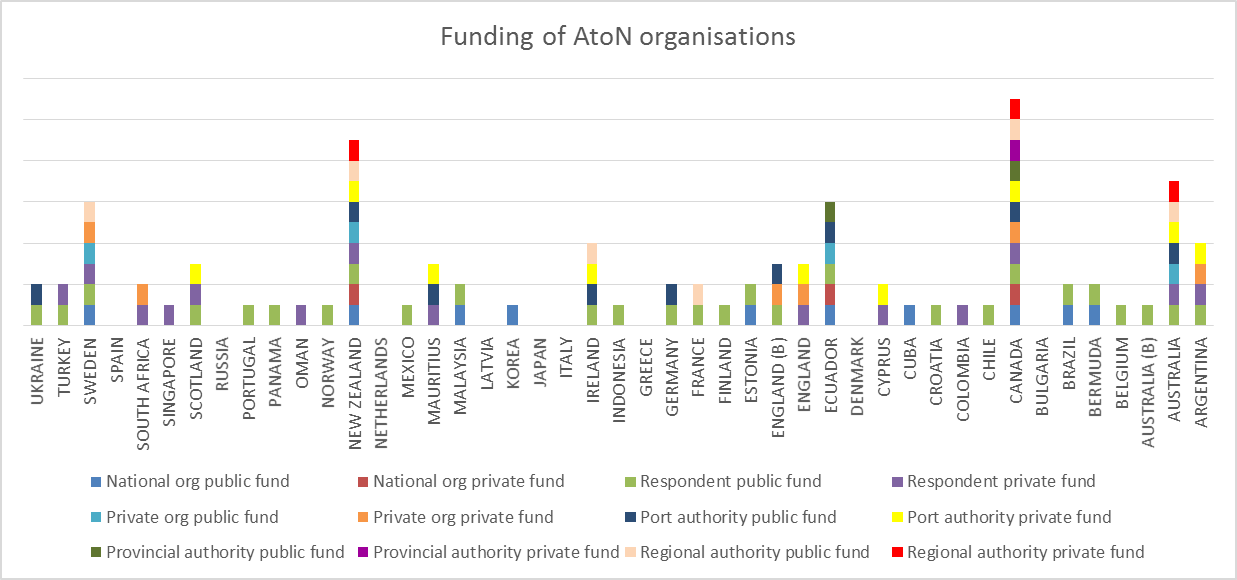
1. Organisations that impose a commercial shipping levy by country 2010 to 2017



1. Organisations that impose a fishing shipping levy by country 2010 to 2017



1. Figure 61 Organisations that impose a leisure shipping levy by country 2010 to 2017



1. Funding of AtoN organisations
2. IALA Questionnaire 2017

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **IALA QUESTIONNAIRE ON MARINE AIDS TO NAVIGATION YEAR: 2017** | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | | | |  |  |  |  |  |  |  |  |  |  |  |
|  | | | | **COUNTRY NAME:** | | | | | |  | (please insert the country name here) | | | |  |  |  |  |  |  |
|  | | | | | | | | | |  |  |  |  |  |  |  |  |  |  |  |
| **ORGANIZATION** | | | | | | | | | |  | **LEVY ON SHIPPING (Marine Aids to Navigation service fees)** | | | | | | | | | |
|  | NAME OF YOUR ORGANIZATION: | | |  | | | | | |  |  | | Do these organizations charge any fees to users? | | When do mariners pay fess? (free text) | | What types of ships pay fees? | | Do these organizations use public (State) funds and/or private funds? | |
| TYPE OF YOUR ORGANIZATION: | | |  | | | | | |  |
| TYPE OF AUTHORITY: | | |  | | | | | |  |
|  | | | | | | | | | |  |
| **QUALITY MANAGEMENT (Does your organization use:)** | | | | | | | | | |  | **Your organization:** | | |  |  | | Commercial |  | Public |  |
|  | PERFORMANCE INDICATORS | | |  |  | ISO CERTIFICATION | | |  |  |  | | | | Fishing |  | Private |  |
| RISK MANAGEMENT TOOLS | | |  |  | OTHER CERTIFICATION | | |  |  | Leisure |  |  | |
|  | | | | | | | | | |  | **Other organizations within your country:** | National organization: | |  |  | | Commercial |  | Public |  |
| **ORGANIZATION RESPONSIBILITIES (Please select one or more):** | | | | | | | | | |  |  | | | Fishing |  | Private |  |
|  | AtoN PROVIDER | | |  |  | VTS | | |  |  | Leisure |  |  | |
| SUPERVISION OF AtoN PROVIDERS | | |  |  | AQUACULTURE | | |  |  | Private organizations: | |  |  | | Commercial |  | Public |  |
| AtoN TRAINING | | |  |  | OFFSHORE PETROLEUM | | |  |  |  | | | Fishing |  | Private |  |
| HYDROGRAPHIC SERVICES | | |  |  | SEA DUMPING | | |  |  | Leisure |  |  | |
| PILOTAGE | | |  |  | RENEWABLE ENERGY | | |  |  | Port authorities: | |  |  | | Commercial |  | Public |  |
| AIS | | |  |  | MARINE SPATIAL PLANNING | | |  |  |  | | | Fishing |  | Private |  |
|  | | | | | | | | | |  | Leisure |  |  | |
| **MARINE AIDS TO NAVIGATION STAFF (Please give numbers):** | | | | | | | | | |  | Provincial authorities: | |  |  | | Commercial |  | Public |  |
|  | MAIN OFFICE: | | |  |  | LIGHTHOUSES: | | |  |  |  | | | Fishing |  | Private |  |
| DISTRICT DEPOTS: | | |  |  | SHIPS / VESSELS: | | |  |  | Leisure |  |  | |
|  | | | | | | | | | |  | Regional authorities: | |  |  | | Commercial |  | Public |  |
| **MARINE AIDS TO NAVIGATION (Please give numbers for each category):** | | | | | | | | | |  |  | | | Fishing |  | Private |  |
|  | **Directly responsible for:** | | | |  | **Total national:** | | | |  | Leisure |  |  | |
|  | AtoN category 1 | |  |  | AtoN category 1 | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AtoN category 2 | |  |  | AtoN category 2 | |  |  | **GENERAL COMMENTS AND FUTURE INTENTIONS (please use the free text box below)** | | | | | | | | | |
|  | AtoN category 3 | |  |  | AtoN category 3 | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | | | | | | | | | |  |  | | | | | | | | | |
| **FIXED MARINE AIDS TO NAVIGATION INCLUDING LIGHTHOUSES (Please give numbers):** | | | | | | | | | |  |
| **LIGHTHOUSES:** | | Staffed: |  | Automated: |  | Remote controlled: |  | Alternative- ly used: |  |  |
|  |  |  |  |  |  |  |  |  |
| With legal protection as historical monuments |  | Open to public: |  | Number of visitors last year: |  |  | |  |
|  | | | | | | | | | |  |  |  |  |  |  |  |  |  |  |  |
| **MAJOR LIGHTS (nominal range of 10 NM or over):** | | | | |  |  | | | |  | | | | | | | | | |
|  | | | | | | | | | |
| **MINOR LIGHTS (nominal range under 10 NM):** | | | | |  |  | | | |
|  | | | | | | | | | |
| **UNLIT FIXED AIDS (daymarks only):** | | | | |  |  | | | |
|  | | | | | | | | | |
| **LEADING LINES:** | | Sector lights |  | Lit ranges |  | Unlit ranges |  |  | |
|  | | | | | | | | | |
| **PERCENTAGE MONITORED:** | | | |  |  | | | | |
|  | | | | | | | | | |
| **FLOATING MARINE AIDS TO NAVIGATION (Please give numbers for each category):** | | | | | | | | | |
|  | **Major size (diameter of 3.0 M and over):** | | | | | | | | |
|  | Lit: |  | Unlit: |  | Steel: |  | Plastic: |  |
| **Medium size (diameter of 1.5 to 3.0 M):** | | | | | | | | |
|  | Lit: |  | Unlit: |  | Steel: |  | Plastic: |  |
| **Smaller size (diameter under 1.5 M):** | | | | | | | | |
|  | Lit: |  | Unlit: |  | Steel: |  | Plastic: |  |
| **Other buoys:** | | | | | | | | |
|  | Spar buoys: |  | lightvessels |  |  | Emergency wreck buoys: (deployed in 2017) | |  |
|  | | | | | |  |
|  | | | | | | | | | |
| **PERCENTAGE MONITORED:** | | | |  |  | | | | |
|  | | | | | | | | | |
| **SOUND SIGNALS** | | | | | | | | | |
|  | Bells/Gongs |  | Whistles: |  | Fog signals |  |  | | |
|  | | | | | | | | | |
| **RADIO AIDS TO NAVIGATION** | | | | | | | | | |
| **Differential GPS (DGPS)** | | | Number of stations: | |  |  | | | |
|  | | | | | | | | | |
| **Loran** | | | Number of transmitters: | |  |  | Number of chains: | |  |
|  | | | | | | | | | |
| **Automatic Identification Systems (AIS)** | | | Base stations: | |  |  | | | |
| Repeaters: | |  |
| On fixed aids: | |  |
| On buoys: | |  |
| Virtual AIS deployed: | |  |
|  | | | | | | | | | |
| **Racons** | | | Installed on fixed aids: | |  |  | Installed on buoys: | |  |
|  | | | | | | | | | |
| **Comments:** | | | (e.g. future trends…) | | | | | | |
|
|
|
|
|  | | | | | | | | | |
| **VESSEL TRAFFIC SERVICES (VTS). Does your organization have:** | | | | | | | | | |
|  | National legislation for the appointment of a competent authority: | | | | | | |  |  |
| National legislation for the appointment of a VTS authority: | | | | | | |  |
| Use of IALA Guideline 1014 on Accreditation and Approval Process for VTS Training: | | | | | | |  |
| VTS personnel trained according to IALA recommendation V-103: | | | | | | |  |
| Accident statistics for the VTS areas: | | | | | | |  |
| Near-miss statistics for the VTS areas: | | | | | | |  |
|  | | | | | | | | | |
| **Number of VTS centres:** | | | | | |  |  | | |
|  | | | | | | | | | |
| **Number of VTS areas:** | | | | | |  |  | | |
|  | | | | | | | | | |
| **Number of SRS:** | | | | | |  |  | | |
|  | | | | | | | | | |
| **Number of VTS centres operating outside territorial waters:** | | | | | |  |  | | |
|  | | | | | | | | | |
| **Number of organizations accredited for VTS training:** | | | | | |  |  | | |
|  | | | | | | | | | |
| **SERVICE DELIVERY (please give numbers)** | | | | | | | | | |
|  | Marine Aids to Navigation under external contract (in percentage): | | | | | | |  |  |
| Vessels owned/operated: | | | | | | |  |
| Vessels under external contract/ charter: | | | | | | |  |
|  | | | | | | | | | |
| **EQUIPMENT** | | | | | | | | | |
| **Additional questions on service equipment (please give numbers):** | | | | | | | | | |
|  | Laser lights in service: | | | |  | Traditional rotating optics: | | |  |
| Blue lights in service: | | | |  | Mercury baths: | | |  |
| LED lanterns in service (in percentage): | | | |  | Converted optics: | | |  |
| Structures illuminated: | | | |  |  | | | |
|  | | | | | | | | | |
| **Power systems (please give numbers):** | | | | | | | | | |
|  | Solar: |  | Mains: |  | Generator: |  | Hybrid: |  |  |

1. Questionnaire respondents 2010-2017

| **Country** | **2010** | **2011** | **2012** | **2014** | **2017** |
| --- | --- | --- | --- | --- | --- |
| Argentina | 1 |  |  | 1 | 1 |
| Australia | 1 | 1 | 1 | 1 |  |
| Australia (B) | 1 |  |  |  |  |
| Belgium |  | 1 | 1 | 1 | 1 |
| Bermuda |  |  | 1 | 1 | 1 |
| Brazil |  |  | 1 | 1 | 1 |
| Bulgaria |  |  |  | 1 | 1 |
| Canada | 1 |  | 1 | 1 | 1 |
| Chile | 1 |  |  | 1 | 1 |
| Colombia |  |  |  | 1 |  |
| Croatia |  |  |  |  | 1 |
| Cuba |  |  |  | 1 |  |
| Cyprus | 1 |  |  | 1 |  |
| Denmark | 1 | 1 | 1 | 1 | 1 |
| Ecuador |  | 1 | 1 | 1 | 1 |
| England | 1 | 1 | 1 |  | 1 |
| England (B) |  |  | 1 |  |  |
| Estonia | 1 |  |  | 1 |  |
| Finland | 1 | 1 | 1 | 1 | 1 |
| France | 1 |  | 1 |  | 1 |
| Germany | 1 | 1 | 1 | 1 | 1 |
| Greece | 1 |  |  |  | 1 |
| Indonesia |  | 1 |  |  |  |
| Ireland | 2 | 1 | 1 | 1 | 1 |
| Italy |  |  |  |  | 1 |
| Japan |  |  |  | 1 | 1 |
| Korea |  | 1 | 1 |  |  |
| Latvia |  |  |  |  | 1 |
| Malaysia |  | 1 | 1 |  |  |
| Mauritius |  | 1 |  |  |  |
| Mexico | 1 |  |  |  |  |
| Netherlands |  |  |  | 1 |  |
| New Zealand |  |  | 1 |  |  |
| Norway |  | 1 | 1 | 1 |  |
| Oman | 1 | 1 | 1 |  |  |
| Panama |  |  | 1 |  |  |
| Portugal | 1 | 1 | 1 | 1 |  |
| Russia |  |  |  |  | 1 |
| Scotland | 1 | 1 | 1 | 1 | 1 |
| Singapore |  |  |  | 1 |  |
| South Africa | 1 |  |  |  |  |
| Spain |  |  |  | 1 |  |
| Sweden | 1 |  |  |  | 1 |
| Turkey |  |  | 1 |  | 1 |
| Ukraine | 1 | 1 | 1 | 1 | 1 |
| United Kingdom (B) |  |  | 1 |  |  |
| USA |  |  |  |  | 1 |
| USA (B) |  |  | 1 |  |  |
| Venezuela |  |  |  | 1 |  |
| **Grand Total** | **22** | **17** | **25** | **26** | **25** |

1. AtoN Responsibility by IALA Category

| **Number of AtoN** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Directly responsible** | | | **National** | | |
| **Country** | **Category 1** | **Category 2** | **Category 3** | **Category 1** | **Category 2** | **Category 3** |
| Argentina | 381 | 1326 | 272 | 381 | 1326 | 272 |
| Australia | 960 | 1762 | 5470 | 960 | 1762 | 5470 |
| Belgium | 0 | 0 | 0 | 0 | 0 | 0 |
| Bermuda | 10 | 100 | 32 | 10 | 100 | 32 |
| Brazil | 3274 | 1748 | 1337 | 3274 | 1748 | 1337 |
| Bulgaria | 0 | 0 | 0 | 0 | 0 | 0 |
| Canada | 1861 | 10774 | 4672 | 1861 | 10774 | 4672 |
| Chile | 70 | 837 | 739 | 70 | 837 | 739 |
| Colombia | 135 | 92 | 0 | 135 | 92 | 0 |
| Croatia | 270 | 374 | 305 | 270 | 374 | 305 |
| Cuba | 0 | 0 | 0 | 0 | 0 | 0 |
| Cyprus | 0 | 0 | 0 | 0 | 0 | 0 |
| Denmark | 186 | 1971 | 4382 | 186 | 1971 | 4382 |
| Ecuador | 64 | 289 | 70 | 64 | 289 | 70 |
| England | 154 | 949 | 10733 | 154 | 949 | 10733 |
| Estonia | 176 | 345 | 626 | 176 | 345 | 626 |
| Finland | 0 | 0 | 0 | 0 | 0 | 0 |
| France | 0 | 0 | 0 | 0 | 0 | 0 |
| Germany | 1837 | 3930 | 4850 | 1837 | 3930 | 4850 |
| Greece | 140 | 1092 | 363 | 140 | 1092 | 363 |
| Ireland | 69 | 592 | 1964 | 69 | 592 | 1964 |
| Italy | 150 | 1662 | 1174 | 150 | 1662 | 1174 |
| Japan | 975 | 2783 | 2719 | 975 | 2783 | 2719 |
| Latvia | 123 | 93 | 92 | 123 | 93 | 92 |
| Netherlands | 165 | 1665 | 2222 | 165 | 1665 | 2222 |
| Norway | 0 | 0 | 0 | 0 | 0 | 0 |
| Portugal | 53 | 86 | 939 | 53 | 86 | 939 |
| Russia | 1622 | 2501 | 476 | 1622 | 2501 | 476 |
| Scotland | 423 | 1344 | 784 | 423 | 1344 | 784 |
| Singapore | 0 | 70 | 100 | 0 | 70 | 100 |
| Spain | 334 | 1097 | 1482 | 334 | 1097 | 1482 |
| Sweden | 563 | 373 | 167 | 563 | 373 | 167 |
| Turkey | 240 | 180 | 191 | 240 | 180 | 191 |
| Ukraine | 119 | 106 | 502 | 119 | 106 | 502 |
| USA | 1281 | 10092 | 22544 | 1281 | 10092 | 22544 |
| Venezuela | 0 | 406 | 0 | 0 | 406 | 0 |

1. Number of fixed AtoN 2017

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Country** | **Major lights** | **Minor lights** | **Unlighted** | **Leading sector lights** | **Unlighted ranges** |
| Argentina | 82 | 477 | 213 | 29 | 27 |
| Belgium | 3 | 30 | 4 | 13 | 1 |
| Bermuda | 5 | 64 | 70 | 1 | 0 |
| Brazil | 217 | 525 | 0 | 10 |  |
| Bulgaria | 2 | 14 | 3 | 0 | 0 |
| Canada | 522 | 2489 | 1801 | 73 | 656 |
| Chile | 113 | 682 | 292 | 4 | 0 |
| Croatia | 58 | 748 | 169 | 0 | 6 |
| Denmark | 150 | 106 | 569 | 37 | 0 |
| Ecuador | 65 | 43 | 4 | 4 | 4 |
| England | 66 | 453 | 13 | 1 | 0 |
| Finland | 45 | 0 | 5063 | 367 | 2505 |
| France | 19 | 70 | 153 | 16 | 43 |
| Germany | 108 | 1653 | 4925 | 49 | 12 |
| Greece | 171 | 1424 | 0 | 0 | 0 |
| Ireland | 65 | 2 | 16 | 26 | 0 |
| Italy | 222 | 641 | 0 | 0 | 0 |
| Japan | 437 | 3184 | 107 | 17 | 0 |
| Latvia | 27 | 69 | 5 | 3 | 2 |
| Russia | 510 | 2546 | 1543 | 101 | 11 |
| Scotland | 105 | 101 | 23 | 50 | 1 |
| Sweden | 242 | 861 | 210 | 718 | 210 |
| Turkey | 172 | 314 | 0 | 3 | 0 |
| Ukraine | 59 | 231 | 39 | 17 | 22 |
| Usa | 350 | 9978 | 10020 | 18 | 33 |

1. Number of Floating AtoN 2017

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Country** | **Major lighted (3m dia)** | **Major unlighted (3m dia)** | **Medium lighted (1.5-3m dia)** | **Medium unlighted (1.5-3m dia)** | **Smaller lighted (<1.5m dia)** | **Smaller unlighted (<1.5m dia)** | **Spar buoys** | **Light vessels** |
| Argentina | 7 | 0 | 1070 | 68 | 24 | 54 | 25 | 1 |
| Belgium | 179 | 1 | 32 | 0 | 110 | 6 | 7 | 0 |
| Bermuda | 0 | 0 | 30 | 46 | 0 | 26 | 26 | 0 |
| Brazil | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bulgaria | 18 | 0 | 35 | 0 | 86 | 0 | 0 | 0 |
| Canada | 16 | 13 | 1115 | 121 | 1962 | 7398 |  |  |
| Chile | 52 | 35 | 8 | 7 | 8 | 0 | 23 | 0 |
| Croatia | 0 | 0 | 78 | 12 | 16 | 0 | 0 | 0 |
| Denmark | 3 | 0 | 119 | 0 | 211 | 33 | 620 | 0 |
| Ecuador | 12 | 0 | 218 | 0 | 82 | 0 | 0 | 0 |
| England | 382 | 3 | 68 | 8 | 0 | 0 | 0 | 9 |
| Finland | 0 | 0 | 0 | 0 | 1487 | 88 | 16111 | 0 |
| France | 0 | 0 | 52 | 83 | 0 | 0 | 0 | 0 |
| Germany | 10 | 0 | 1192 | 179 | 204 | 2708 | 150 | 2 |
| Greece | 81 | 0 | 0 | 0 | 54 | 0 | 0 | 0 |
| Ireland | 8 | 0 | 69 | 0 | 42 | 0 | 0 | 0 |
| Italy | 0 | 0 | 114 | 13 | 0 | 0 | 0 | 0 |
| Japan | 53 | 0 | 1118 | 21 | 16 | 0 | 166 | 0 |
| Latvia | 0 | 0 | 0 | 0 | 149 | 20 | 20 | 0 |
| Russia | 0 | 0 | 1881 | 591 | 207 | 783 |  |  |
| Scotland | 125 | 0 | 39 | 0 | 4 | 0 | 0 | 0 |
| Sweden | 0 | 0 | 359 | 3 | 160 | 108 | 70 | 4308 |
| Turkey | 125 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ukraine | 51 | 0 | 236 | 69 | 110 | 44 | 1 | 0 |
| USA | 0 | 0 | 4545 | 598 | 0 | 18527 | 0 | 0 |

