ABOVE: *Lilliana Slattery*, 2nd runner-up of the Trinity House Schools competition.

BELOW: *Jesse Tricker*, 1st runner-up, – both are students in class 2, *St Joseph's Catholic Primary School, Harwich.*

TRINITY500
SERVING THE MARINER
1514 – 2014

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Trinity House: *What's Next?*
TH500 Story Writing Competition for Schools

"As a 10 year old boy living in Harwich, I have not been around for most of the 500 years of Trinity House. But I do know how important it is and how much it has changed during the first 500 years.

I've been thinking what will change in the next 500 years of Trinity House. There will allways be a Trinity House, for every 500 years all around. Maybe there will be no buoys or lighthouses, computer systems will project lights under the sea for the ships to see. This would be amazing and you never know it might even happen! They might not even have captains and crew on the ships one day! Maybe robots or even computers will sail the ships.

But what would happen without Trinity House to navigate the ships and keep them safe on their travels? All the sailors would crash into other ships, oil will leak into the ocean and all the fish and wild life will die this would be awful and very sad it will never be cleaned up because there be too much oil and ships will no longer be able to transport food for us to live and the world will come to an end.

As I'm a little boy I dream that when I'm older I would like to work for Trinity House but not in the office. No, I want to be an inventor and create those projector lights under the sea. I think it will be very fun and it might even make me famous."

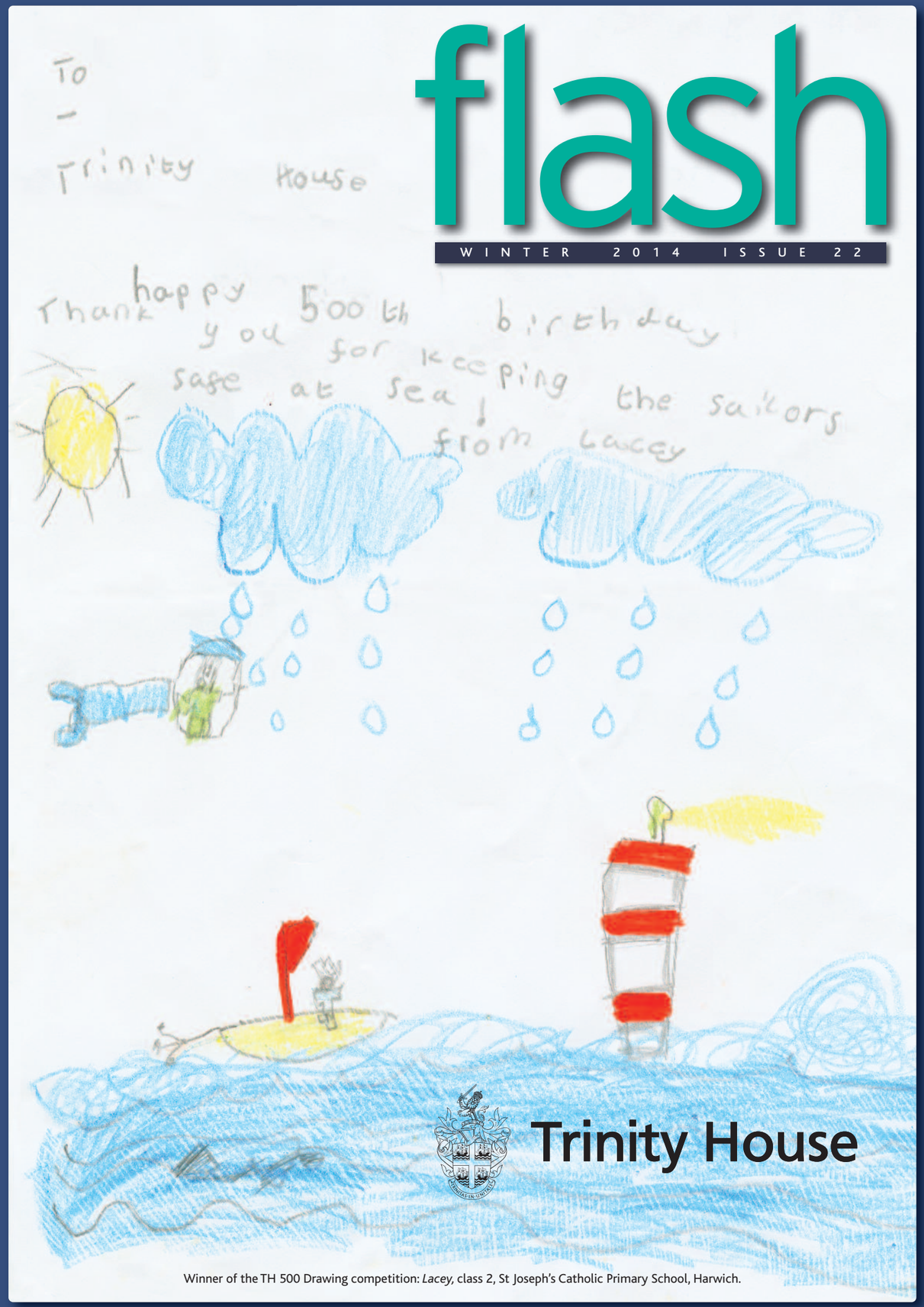
Winner – written by *Leyton Howlett.*

"Trinity House is a great company. They work really hard but they need cheering on.

I think the lighting will change because it's a bit boring. I also think that there should be colours and rainbows in the light. Also the lighthouse will be lit from outside so it guides the mariner and is beautiful to look at. The lighthouse will have high technology like pressing a button to open the doors. We will be able to visit all the lighthouses and camp on site. There will be food there so need to bring food or go back for some. There will be so many wind farms to create renewable energy that we will need to have a lighthouse for each farm so that ships and sailing boats won't crash into them."

Runner up – written by *Emma Nicholson.*

flash
WINTER 2014 ISSUE 22



Trinity House

Winner of the TH 500 Drawing competition: *Lacey*, class 2, St Joseph's Catholic Primary School, Harwich.

The Corporation of Trinity House

Master – **Her Royal Highness The Princess Royal** KG KT GCVO

Corporate Board *as at 15 September 2014*

Captain Ian McNaught MNM *(Deputy Master)*
Simon Sherrard Esq *(Rental Warden)*
Captain Nigel Palmer OBE MNM *(Nether Warden)*
The Rt Hon The Viscount Cobham
Commodore Jim Scorer RN
Captain Roger Barker
Captain Nigel Hope RD*, RNR
Captain Stephen Gobbi JP, MA, LLB
Rear-Admiral David Snelson CB, FNI
Commodore Bill Walworth CBE RFA
Commander Graham Hockley RN, *(Secretary)*

Lighthouse Board *as at 15 September 2014*

Captain Ian McNaught MNM *(Executive Chairman)*
Commodore Jim Scorer RN
Captain Roger Barker
Captain Nigel Palmer OBE
Jerry Wedge Esq
Mrs Dawn Johnson
Professor Peter Matthews
David Ring Esq
Jon Price Esq, *(Secretary)*

editor's note

This is my first issue of ***Flash*** in my new role as Public Relations and Records Manager, having previously been responsible for marshalling our five centuries of history as the Records Manager. My first job as Editor must of course be to thank the excellent Vikki Gilson for her nine years as ***Flash*** Editor and PR Manager. My second job is to thank all of our readers and contributors as well as all Trinity House staff and pensioners, without whom there would be no ***Flash*** at all. I know a great many of you and I look forward to hearing from even more of you and telling the world about the vital works you all do.

We want your articles (and your feedback); please send any submissions for the next edition of ***Flash*** to me by 16th March 2015.

Wishing you all the very best,

Neil Jones, *EDITOR*
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Our cover image displays the artwork of **Lacey,** winner of the Trinity House 500 Schools Drawing competition: *The rear cover shows* **Jesse Tricker,** 1st runner-up, and **Lilliana Slatter,** 2nd runner-up – all three are students in class 2, *St Joseph's Catholic Primary School, Harwich.*


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INTRODUCTION BY THE EXECUTIVE CHAIRMAN

Captain Ian McNaught

AS I WRITE WE ARE COMING TO THE END OF OUR 500TH YEAR which has seen much in the way of celebration and it pleases me that so many of you in the Service and in the shipping community at large were able to participate in the various events and share with us this important milestone. Following this year's Trinitytide I was able to take part in the Visiting Committee, the VC, and this year it was once again conducted in two legs. We steamed in the north east from Whitby to the Farne Islands in *Patricia* and this was followed by a passage in *Galatea* along the South Coast from the newly refurbished Nab Tower westwards to the Channel Islands and we also inspected the Greenwich automatic lightvessel en route. This tour of inspection enabled us to undertake the annual audit of some of our aids to navigation within our sea area which covers the waters of England, Wales and the Channel Islands. We were afloat for much of the time and made good use of skilfully handled ship's boats and the Trinity House helicopter.

© Trinity House

HRH The Princess Royal paid a visit to the Corporation's Harwich offices and buoy maintenance facility on 25 June.

There is no doubt that the Visiting Committee audits play an important role in corporate governance for they provide an assurance to the Lighthouse Board that the aids to navigation we provide satisfy the statutory undertakings of the Corporation as a General Lighthouse Authority.

In turn the Lighthouse Board is able to check that our finances are well spent with regard to effective husbandry of our assets and that such assets are operated to accord with safe and environmental compliance. Furthermore, we were able to appreciate the excellence of our Support Vessel fleet and its personnel who are ably complemented by staff on shore.

Wherever the team travelled there were definite signs that reflect upon the professionalism of our dedicated maintenance teams, for without them we would fail the mariner who has come to accept our very high standards created and moulded over five centuries in what have been at times extreme conditions.

Once again it was privilege to escort HRH The Master abroad in the Service when we showed her something of the work carried out at St Just Forward Operating Base, at Longships lighthouse serviced from there then, back at Harwich, where she inaugurated the Planning Centre. We were able to show her some more of what we do and staff took the opportunity to meet the Master. We know that she is a keen pharologist always eager to learn by extending her list of stations visited.

In recent months we bade farewell to Commodore David Squire who served the Corporation well not only as a Warden but as a member of the Examining Committee and as the director responsible for the smooth running of the Trinity House Merchant Navy Scholarship Scheme and its parallel bursary for professional yachtsmen. He has been succeeded on the Corporate Board by Commodore Bill Walworth who was until recently Commodore of the Royal Fleet Auxiliary and to whom we extend a warm welcome; his training role will be taken on by Captain Nigel Hope.

With regard to our charitable activities it is a pleasure to report that we continue to make grants for the benefit of seafarers and their welfare, to those who have come ashore as well as with the provision for youth, training, public safety and education. In the financial year to March 2014 we spent over £4.1million in furtherance of these objectives with more than £1.6 million by way of grants to other maritime charities.

Finally, may I take this opportunity of wishing you and your families all the best for the forth-coming festive season and to thank you once again for your unstinting support since I last wrote to you.

a review of the last six months at TRINITY HOUSE

JUNE

HRH The Master *at Harwich*

In her capacity as Master of the Corporation of Trinity House, HRH The Princess Royal paid a visit to the Corporation's Harwich offices and buoy maintenance facility on 25 June.

Her Royal Highness arrived by helicopter at the port of Harwich and proceeded to St. Nicholas' Church where a service was held to mark the 500th anniversary (quincentenary) of the Corporation's first Royal Charter, granted by Henry VIII on 20 May 1514. Trinity House staff from the various aspects of the Corporation attended, travelling from the depots at St. Just and Swansea, the Tower Hill London headquarters and two of the three Trinity House vessels, *Patricia* and *Alert*.

At the end of the service, at which the preacher was the Rt Rev Stephen Cottrell, Bishop of Chelmsford, Her Royal Highness, accompanied by Captain Ian McNaught, led a procession to the Trinity House offices for a guided tour and presentation of the new Planning Centre. The Planning Centre is the hub of Trinity House's planning and monitoring activities in its capacity as the General Lighthouse Authority for England, Wales, the Channel Islands and Gibraltar. The Royal party then went over to the buoy maintenance yard for a group photograph with some 200 staff present, many of which were then presented to the Master. The Master then signed the Visitors' Book and departed for the waiting helicopter.

Of the day itself, Captain Ian McNaught said that when speaking to HRH The Princess Royal, the latter remarked that as wonderful as it had been to celebrate our 500 anniversary – a very rare thing itself – it was also remarkable to see all the arms of Trinity House come together in one place. Captain McNaught went on to say that it was a great honour to have HRH The Princess Royal as Master of the Corporation and to see her so perfectly engaged with the staff and the functions of Trinity House.

© Mark Dalton

JULY

Lighthouse *abseiling*

Fundraising abseiling in aid of the maritime charities took place on 5 July at Southwold lighthouse, on 11 July at Nash Point lighthouse (above), and on 19 July at Portland Bill. Each event ran from 1000 to 1600 and over £5000 was raised by over 100 enthusiastic participants across the three events. Conditions started wet in Southwold then dried up, were fantastic at Nash Point, meanwhile Portland Bill saw passing showers and thunder but it was mostly sunny, according to Phillip Cruddace who coordinated the events. Relative heights are: Southwold, 31m; Nash Point, 37m and Portland Bill 41m.

IMO Secretary General *visits Harwich*

On 9 July we welcomed HE Koji Sekimizu, (centre) Secretary General of the International Maritime Organization (IMO) to Trinity House Harwich. He travelled there with Captain Roger Barker (left), Director of Navigational Requirements, and was welcomed by Martin Bransby (right), R&RNAV Manager. Captain Barker gave a briefing on Navigational Risk. This was followed by an introduction to e-Navigation by Martin Bransby. Alan Grant introduced GNSS Vulnerability and the need for Resilient PNT and Alwyn Williams provided an overview of ACCSEAS. Mr Sekimizu was given an eLoran demonstration by Paul Williams and Chris Hargreaves in the Rapid Intervention Vessel THV *Alert* alongside at Trinity Pier. In a further briefing Malcolm Nicholson spoke on Lights Developments and before our guest departed he was shown the Buoy Yard and had the aids to navigation maintenance processes that take place there explained before he departed for London in the afternoon.

St Just *flying visit*

HRH The Master visited the Trinity House St. Just depot airport on 7 July and was met by Executive Chairman Captain Ian McNaught then introduced to depot staff who talked about their various roles at the forward operating base for the Trinity House lighthouse maintenance programme. She boarded the Trinity House helicopter *Satellite* for a flight to Longships Lighthouse, accompanied by Captain McNaught and Lighthouse Manager Warren Clarke, for a tour of the tower built by Sir James Douglass in 1875. On her return she met the families of staff at St. Just. Her Royal Highness, a keen lighthouse visitor, has been heavily involved with events surrounding the Corporation's quincentenary this year. She was elected Master of Trinity House in 2011 when her father HRH The Duke of Edinburgh stepped down from the same position after 42 years

SEPTEMBER

At the Tall Ships Regatta, introduced to the Countess of Wessex by the Deputy Master, from left to right: Steven West, Seaman AB THV Patricia; Kevin Blamey, Seaman AB THV Patricia; *Martin Hamilton , 2nd Officer THV* Galatea; *James Donnelly, 2nd Officer THV* Alert.

Tall Ships Regatta *at Greenwich*

On 5 September TH No 1 Boat conveyed the Countess of Wessex along with the Deputy Master and James Stevens from Wood Wharf, West India Dock, to Woolwich Arsenal Pier at the commencement of the Tall Ships Regatta centred on Greenwich.

On 7 September the Trinity 500 Challenge for Thames Waterman cutters took place at Greenwich with Captain and Mrs Roger Barker on board. Following a row past the Old Royal Naval College escorting the Queen's Royal Barge, *Gloriana* participating cutters went into an exciting race finishing in Deptford at the Ahoy Centre, the charity that built our new cutter *Trinitytide*. Here the prize winners received Trinity House mugs, presented by Captain Barker. *Trinitytide* was second in her division and second overall of a field of 14 cutters.

Merchant Navy Day

7 September 2014 was Merchant Navy Day and in this centenary year commemorating the start of the First World War that year's memorial in Tower Hill Gardens was the focal point for the annual service. The Deputy Master led members of the Fraternity and laid the Corporation's wreath. The salute of standard bearers and a parade of wreath layers was taken by Admiral Sir George Zambellas, First Sea Lord and Younger Brother.

Photograph © Les Scriver.

Dragon boat racing *in the Docklands*

Sixteen people paddling side by side in a boat forty foot long. A drummer, sitting in the prow, beating time, a helmsman at the stern with a giant paddle, all working together as one, this is Dragon Boating and provides great fun for participants and a superb spectacle for those looking on. It is said that this ancient and fascinating sport requires no previous experience and caters for all ages and abilities in one crew, male and female

At the Docklands Sailing & Watersports Centre (London E14) a group of dragon boats paddled by representatives of the shipping community raced one another on 18 September. Our boat was the first Trinity House boat home and we were a good fifth overall. The Port of London Authority and NPL boats were first and second respectively and the boat entered by Chiltern Marine (manned by Trinity House cadets) was third.

Open House *at Tower Hill*

On 20 September between the hours of 1000 and 1500 no fewer than 846 visitors entered Trinity House during the Open House scheme when many public and private buildings throughout London were open for inspection. Geoff Boyd, Edgar King and three guides were on duty to field the many questions aired on the ground floor and first floor.

Great River Race *from Richmond to Greenwich*

Said to be London's River Marathon and the capital's largest sporting event after the London Marathon this is rowed over a 22 mile course from near the Docklands Sailing and Watersport Centre/outer Millwall Dock to Ham and teams compete from many parts of Europe; it attracts a variety of teams, from seasoned athletes to novices in fancy dress. Sponsorship provides help to disabled and disadvantaged teenagers to enable them to learn to row and sail. Our Thames Waterman Cutter *Trinitytide* took part in the Great River race against 338 other boats and did very well coming home as the first Thames Waterman Cutter, first Services, first City Challenge and the eighth fastest leaving 330 boats in her wake with a time of 2:19:55. Of the 28 Thames Waterman Cutters *Trinitytide* beat them all. According to Joe Lane, our cutter master: "*The next nearest cutter was almost eight minutes behind us and our main rivals, Port Health & NPL, were nine and ten minutes behind us. All this is thanks to our new* Trinitytide *and a solid crew working as one unit.*"

Photograph © Joe Lane.

BY **Georgina Button** *ACCSEAS Communications Officer*

e-Navigation is well on its way

IT IS A CONCEPT THAT IS WIDELY KNOWN and has become a term that can be interpreted to offer a range of solutions. It is designed to make maritime navigation safer and easier, which many see as a revolution in the way of working at sea. ACCSEAS (Accessibility for Shipping, Efficiency Advantages and Sustainability), is a project led by the General Lighthouse Authorities of the UK and Ireland with ten further partners from Denmark, Germany, The Netherlands, Norway and Sweden. This three-year project concludes with a final conference at the World Trade Centre in Rotterdam in February 2015.

IMO are expected to agree on an implementation plan for e-Navigation during this autumn, and e-Navigation itself is expected to be implemented globally during 2018 or 2019. While the International Maritime Organization (IMO), the International Hydrographic Organization (IHO) and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) provide a framework for e-Navigation, it is up to national maritime administrations to develop software, test systems and technical standards that have to play together. IMO's Secretary General Koji Sekimizu was impressed by the output from the ACCSEAS test-bed at a recent visit to the GLAs' Harwich office, and stated that ACCSEAS is an excellent project.

ACCSEAS Project Manager, Dr Alwyn Williams comments, *"e-Navigation is a technology that is not only key to improving safety and accessibility at sea, but can reduce the administrative burden for a number of paper-intensive procedures on the ship."*

Helping the mariner...

ACCSEAS' partner the Danish Maritime Authority (DMA), has been busy working with e-Navigation for several years. It is anticipated that e-Navigation will become a reality on ship bridges in a few years. Its aim is to bring together all the important navigation information in a harmonised, integrated system. Navigators can receive relevant forecasts for current, wind, waves and water levels, ports, navigation information and more, directly in the Electronic Chart Display and Information System (ECDIS) or a dedicated display. As well as supporting the mariner at sea, e-Navigation will also assist the shore-based authorities, who will be able to pull information about the ship directly from the system instead of resource-intensive reporting.

Single system

The premise of e-Navigation is to gather all the relevant information onboard a vessel, usually from different sources and separate equipment, and make it available in a single system. The purpose is to make this information available on the primary navigation system, so that the mariner has a complete understanding of the environment surrounding the vessel and its route.

With so much information potentially available to the mariner, it is critical that they are not overloaded with too much, which has the potential to be confusing. With this in mind, the navigator can set up filters so that only the information and warnings that are relevant for the route of the ship appear. e-Navigation will also help shore-based organisations, such as national authorities, shipping companies and ports, by allowing access to the harmonised set of information about the vessels. Receiving all information digitally, minimising the usual sources of error, especially the human, is expected to increase safety and efficiency of navigation. Information available through the e-Navigation system must only be available by proper secure means to ensure the integrity, and confidentiality of that information.

"The advantage of such a system is that navigators would be able to provide information about the ship to a port authority or the country's authorities at the touch of a button. All relevant agencies, even across national borders would have access to information. In other words, there is substantial simplification of the reporting work that many today see as a complex, manual and time consuming process," explained Thomas Steen Christensen, Project Manager in the Maritime Technology and Business Development department at the Danish Maritime Authority.

Prototype solutions

The solutions below are just a couple of examples of those that have been developed within the ACCSEAS test-bed. Demonstrations of these can be seen at the forthcoming final ACCSEAS conference, the 2015 event, to be held in Rotterdam and chaired by international maritime expert, Kees Polderman.

Maritime Safety Information (MSI) / Notices to Mariners

Today, navigation warnings are promulgated using VHF, Navtex and SafetyNet. There are many warnings issued and a large part of them are not relevant to the ship's position or route. It is noted that position information is given to one decimal place, which can be inaccurate when viewing on, for example, electronic charts.

It is expected that navigation warnings in the future can be output via various e-Navigation channels. This means that reception can be customised with a filter so that the warnings are current for each ship on its planned route. Positions can be given with greater resolution that is more applicable for display on an ECDIS. The process excludes human errors in the transfer of the position information from existing services to the paper chart.

Above: *Poster for the 2015 ACCSEAS Conference.*

Tactical Route Exchange

The idea of this service is that each ship broadcasts its planned route to other vessels and/or shore-based authorities, with the intention to minimise the risk of collisions. VTS centres, for example, could see all the ships' planned routes and advise, plan and take action if necessary. It would also be possible to send a route proposal from an administration to a ship. The issue of being able to transfer a recommended route from a VTS centre to a ship's ECDIS has been an intense discussion point because there may be doubt about the division of responsibilities. However, it is recognised that the master of a vessel has ultimate responsibility for the final decision on whether to accept or decline a suggested route.

The ability to transfer routes directly to the ECDIS can also be used for search and rescue (SAR) operations where a ship can transfer the search area, and search patterns directly – with an indication of where the ship will sail. The head of the operation (On Scene Commander or OSC) can continuously see all the participating ships' planned search patterns and have an overview of the areas that are wanted.

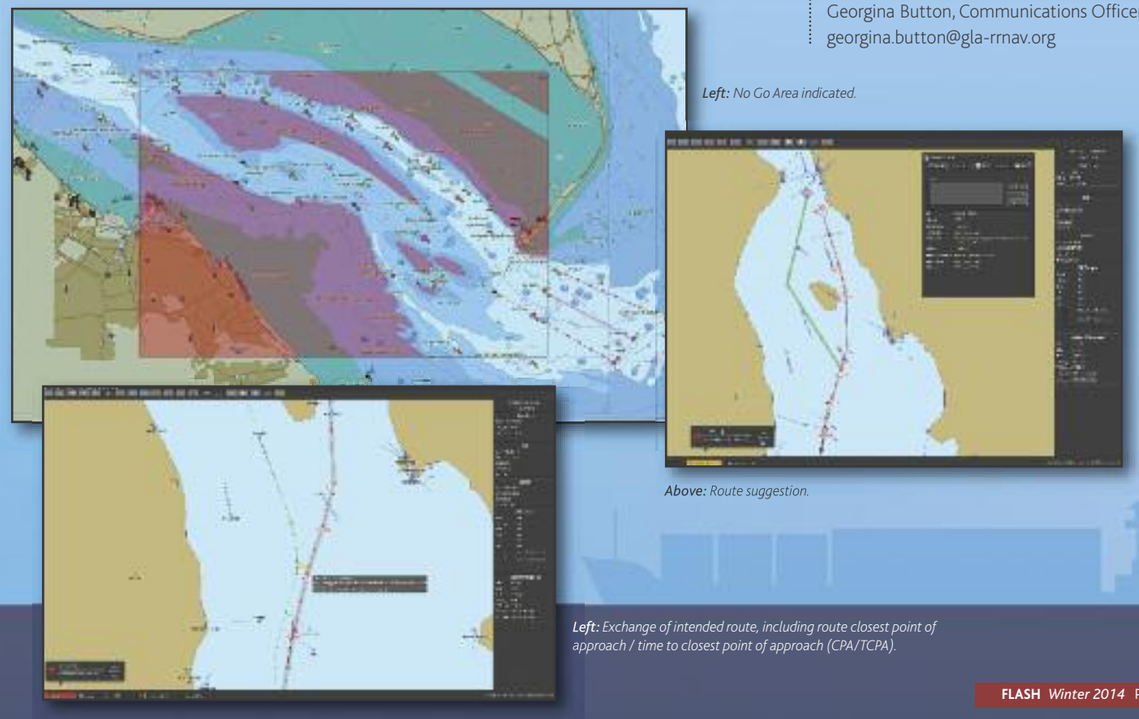
The No Go Area solution displays 'no-go' areas based on the vessel's draft, tides, weather and detailed depth data sent to the ship for viewing directly on the navigation display that can be seen as depth contours adapted to each ship.

e-Navigation will be an ongoing process where more and more equipment on-board vessels over the next few years will be ready for the concept. Mariners can therefore start to benefit from the advantages of e-Navigation as it becomes widespread. It is anticipated that the prototype communications infrastructure for the e-Navigation system, the so-called Maritime Cloud, will be completed by 2018.

"The most important thing is that the solutions will actually work on the ships, particularly that it is suited to the needs of the navigator, whilst recognising the need to support other stakeholders in the maritime and logistics world," said Mads Bentzen Billesø, himself a trained Master Mariner and who has been associated with the development of e-Navigation for over six years. Readers may wish to visit the ACCSEAS website to view all of the solutions, watch the ACCSEAS films and download the leaflet. These are available at **www.accseas.eu** or contact: Georgina Button, Communications Officer: georgina.button@gla-rrnav.org

Above: *Dr Alwyn Williams, ACCSEAS Project Manager (R&RNAV GLAs) presenting at the ACCSEAS conference, opened by HRH The Princess Royal in Edinburgh earlier this year.*

Above: *Thomas Steen Christensen presenting at this year's ACCSEAS Conference.*



Left: *No Go Area indicated.*

Above: *Route suggestion.*

Left: *Exchange of intended route, including route closest point of approach / time to closest point of approach (CPA/TCPA).*

BY **Simon Millyard,** *Engineering and Operations Manager with* **Captain Simon Robinson,** *THS Marine Operations Manager.*

NAB Tower Engineering Works ***The final Project Phase***

THE MAJOR CIVIL ENGINEERING PROJECT to renovate Nab Tower as it approaches its first century is now complete. This is the largest capital project in financial terms for any station since Royal Sovereign was built in the 1970s with a budget of £2.5 million. Nab Tower is an important physical aid to navigation and the turning point for all major shipping entering the Solent, this includes super tankers heading for Fawley refinery and huge cruise liners bound for Southampton.

Following the extensive study to decide what to do with the ageing and corroding structure, it was decided to reduce the height and diameter and then to spray it with a reinforced concrete outer coating and provide a new concrete deck. The original aid to navigation, affectionately referred to as the pepper pot, has been refurbished without the lantern glazing and the new 12 mile light with fog signal, radar beacon (racon) and AIS built on and in it. The station is designed for minimal maintenance with a design life of a further 50 years though some battery and aids to navigation upgrades will be required during this period.

Works have all been successfully completed with a good Health and Safety record by principal contractors, Bam Nuttall. Detailed attention was paid during the project to ensure that the minimum amount possible went to landfill, a comprehensive waste management plan was built up with recycling or re-use being the destination for most items taken off the Nab.

As has been mentioned elsewhere the works took longer than expected due to the presence of peregrine falcons and many days lost due to bad weather.

The new aid to navigation was craned back onto the new Nab deck by the skilful manoeuvring of THV *Galatea* alongside the lighthouse structure in July 2014. This required *Galatea* to position to within five metres of the tower and hold there in dynamic positioning mode. In order to do this safely it was necessary to position the ship to one side of the lighthouse on the tide line and very slightly across the tide so that in the unlikely event of total propulsion failure the tide would carry the ship clear. Position was maintained with the necessary precision to safely transfer the aid to navigation from the ship to the lighthouse by supplementing the Differential GPS-based POS-MV position fixing system with a short range fanbeam dynamic positioning capability.

The aid to navigation was commissioned by Trinity House technicians in August. Two temporary buoys put in place to mark the Nab during the construction phase were due to be finally removed from station before it was commissioned in October, as this edition of *FLASH* went to press.

Above: *Nab Tower at the start of the project in early 2012, a shadow of its former glory.* *Photograph ©Trinity House.*

Below: *. May 2013, the tower crane is erected and extends to the base of the old ammunition shaft. The removal of the old steel framework seen in hand.* *Photograph ©Ambrose Greenway.*

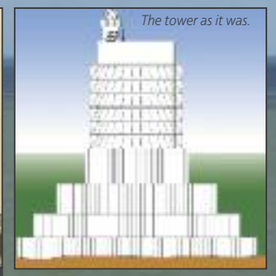
Aids to navigation

The new LED lantern is manufactured by Vega in New Zealand and delivers a 12 nautical mile all round white light. This is supported by an identical standby lantern of the same range which is powered by an independent solar array and battery bank. This style of design and installation is common in Trinity House stations and provides a high level of integrity for the systems which in turn translates to a very high aid to navigation availability overall.

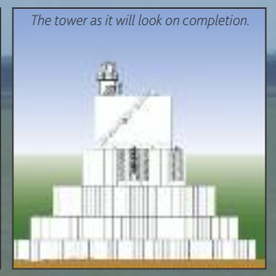
The station also has a racon (radar beacon) and an Automatic Identification System (AIS) unit to transmit and display on a ship's radar and the Electronic Chart Display & Information System (ECDIS) unit. To complement the main aids to navigation Nab Tower also has an audible warning (fog signal) with a two mile range.

Above: *Craning in the aids to navigation.*
Photograph © Captain Simon Robinson.

Nab Tower, built for the Admiralty in Shoreham from hollow concrete sections and steel in 1918.



The tower as it was.



The tower as it will look on completion.

Above & below: *July 2014 with THV* Galatea *craning on the refurbished pepper pot aids to navigation unit.*
Photograph ©Ambrose Greenway.

Main Picture: *Nab Tower at the end of the project with the new Gunite reinforced concrete outer coating. This is how passing ships will see Nab into the future with the crane and buoy removed.* *Photograph ©Ambrose Greenway.*

This article was prepared using an unpublished report authored by **Mr. Jan Šafář, Dr. Alan Grant** and **Dr. Nick Ward** of the R&RNAV Directorate of the General Lighthouse Authorities of the UK and Ireland.

Development of Virtual Aids to Navigation

THE GENERAL LIGHTHOUSE AUTHORITIES of the United Kingdom and Ireland (GLA) are comprised of Trinity House, the Commissioners of Irish Lights and the Northern Lighthouse Board and have a requirement for Virtual Aids to Navigation. Between them they have the statutory responsibility to provide marine aids to navigation (AtoN) around the coast of England and Wales, all of Ireland and Scotland respectively.

When a shipwreck or new danger is reported, the GLA will assess the location of the incident, vessel traffic in the area and surrounding depths of water to determine if further action is required. If deemed necessary a GLA vessel will be tasked to proceed to the location to assess the situation and to determine the exact position of the incident, assess the clearance depth and physically mark the danger if required. Marking of the danger may entail the use of one or more buoys or the use of the vessel itself as a guard ship, or even a combination of both.

There will always be a finite time between and incident occurring and the vessel arriving at the location and marking the danger with a physical AtoN, and as such the use of a virtual AtoN (VAtoN) is an appealing concept as it could provide a preliminary near-instantaneous warning.

The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) defines a VAtoN as *"a digital information object promulgated by an authorised service provider that may be presented on navigational systems."* This warning of a change to the navigable conditions should be provided in a form that can be received, interpreted and displayed by any class of suitably-equipped vessel in the operational area.

When used for the marking of new dangers, the exact position of the danger must be determined before deployment of a VAtoN; any error in the position could result in a mariner being guided on to, rather than away from, the danger.

As well as marking single points of interest, in a similar way to using a physical AtoN, VAtoN can be used to mark areas by showing a polygon on a suitably equipped navigational display, or even defining virtual navigation channels or routing measures.

The ability to provide Virtual AtoNs could be one of the most significant technical developments for lighthouse authorities in the short to medium term and is an important application of e-Navigation.

It is hoped that VAtoNs could reduce the risk of other vessels running into a new wreck, as happened with the MV *Tricolor* in the Channel in 2002. VAtoNs are particularly useful in situations where navigational conditions change frequently or in applications where the use of physical aids is not practical or possible; however, it should be noted that VAtoNs are not, in general, intended to replace physical AtoNs and will most often be used on a temporary basis.

The Automatic Identification System (AIS) is used to convey VAtoN information, resulting in the presentation of a new VAtoN, or several VAtoNs, on the mariners' electronic chart. In order to receive and observe VAtoNs, the mariner must have an AIS transceiver capable of decoding AIS Message 21 and a suitable means of displaying it. It is important to note that some AIS units, and some electronic charts, are not capable of processing AIS Message 21 and therefore it may take many years before all users are suitably equipped to use the service.

Captain Roger Barker, Director of Navigational Requirements at Trinity House, added a note of caution:

"AtoN are, of course, for the use of all mariners and as such a careful determination of which mariners need to see the aids in a particular location must be undertaken. Mandatory carriage requirements are such that not all vessels will see an AIS AtoN on an appropriate graphical display and this must be borne in mind when considering their use."

One of the key benefits of this technology is the ability to precisely target where this information is delivered, as it can be limited to the affected area and can be presented directly on navigation displays with low deployment and maintenance costs.

Origins and Development

VAtoN development has become possible through the deployment of networks of AIS base stations and the installation of onboard equipment with the capability of displaying the Virtual AtoN symbols. Such networks are generally provided and operated by coast guard services and these may or may not be the same authorities that provide AtoNs.

The GLA have considered several methods of providing VAtoN information; one possible means of delivery is the installation of suitable AIS units on GLA vessels, so that they can transmit VAtoNs while in the vicinity of an incident or while deploying physical AtoNs. Another option is to install suitable units permanently on shore stations in critical locations, such as lighthouses. Both approaches have been considered as part of a proof of concept project.

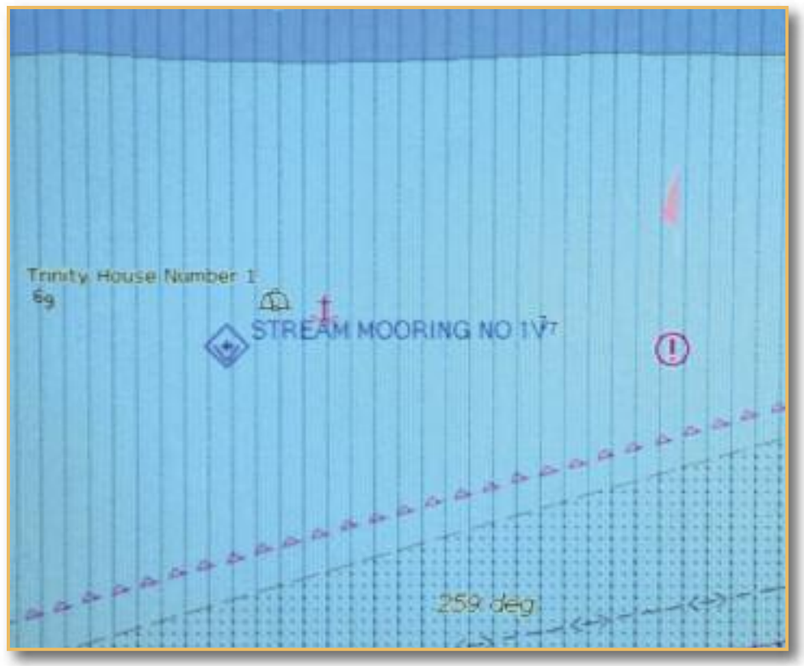


Figure 1: *ECDIS showing Virtual AtoN transmitted by THV* Alert *on to Stream Mooring No. 1.*

Deployment: Vessel Installation

An AIS AtoN unit was installed on Trinity House's Rapid Intervention Vessel *Alert* (see **figures 2** and **3**). After gaining the appropriate broadcast licence, tests were conducted while the vessel was alongside Trinity Pier in Harwich, Essex. These tests saw the vessel transmit a VAtoN over the position of Stream Moorings No. 1, about half a mile to the North-East of the vessel's location. **Figures 1** and **4** show the VAtoN displayed as a diamond with a V superimposed inside it, which is the internationally accepted symbol, on the Electronic Chart Display and Information System (ECDIS) of THV *Alert*.

Deployment: Lighthouse Installation

An AIS AtoN unit was also installed on Dungeness Lighthouse, Kent. In this test, the unit was configured and controlled from the Trinity House depot in Harwich, Essex. The result is shown in **Figure 5**, taken from a display in the Trinity House control and monitoring centre in Harwich. It should be noted that a diamond is shown on the display, rather than the correct symbol of a diamond with a superimposed V inside of it; this is not the correct symbol but is a function of the display software, and not the VAtoN information.

In order to provide VAtoNs across a wide area it will be necessary to locate these units at regular intervals along the coast or area of coverage. A separate project will consider the potential locations for a full deployment; however **Figure 6** shows the estimated coverage area for an AIS AtoN when transmitted from a lighthouse. This is defined as the geographical area within which the received power exceeds -107 dBm (assuming cable losses of 3 dB). It can be seen from **Figure 6** that the maximum range is predicted to be approximately 58 km (31 NM), which is in line with empirical observations. It should, however, be noted that this prediction assumes perfect sea conditions and in reality the true usable range may be less. Further work is required to understand the full operational range and this image should be used as an indication only.

It has been successfully demonstrated that the appropriate hardware can be installed to enable VAtoNs to be transmitted from chosen locations, whether that is from a vessel or a shore based location, such as a lighthouse. These options provide the GLA, and potentially other lighthouse authorities, with an effective way of marking new hazards rapidly and this method could now be implemented operationally.

➥ *continued on page 10.*

Figure 3. *THV* Alert *– the AIS AtoN unit was installed above the wheel-house*

Figure 2: *Close-up of the AIS AtoN installation on THV Alert.*

Figure 4: *ECDIS showing Virtual AtoN transmitted by THV Alert on to Stream Mooring No. 1.*

Development of Virtual Aids to Navigation

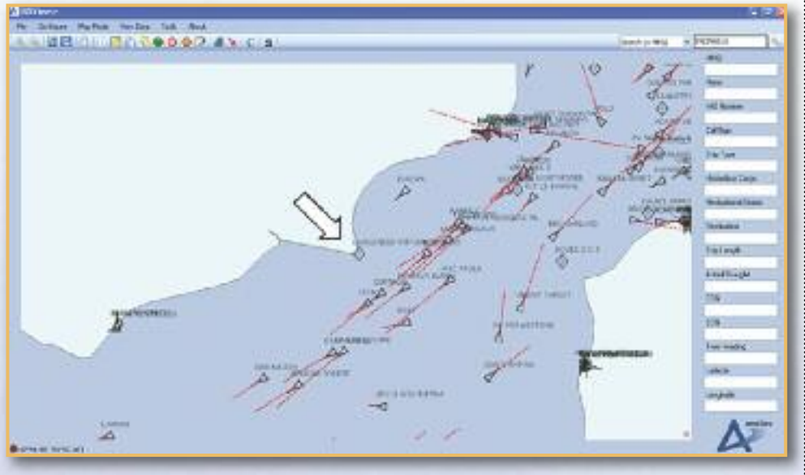
Continued from page 9.

Requirements for Communications Interface

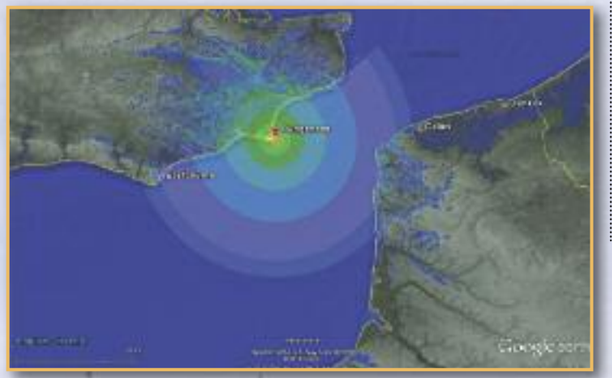
AIS AtoN units are normally configured locally using a physical (i.e. wired) connection to a PC. However, one of the main reasons for using VAtoNs is speed of deployment and in many situations this can best be achieved by remote configuration of a unit already in an, often unmanned, location. In order to enable remote configuration and control over a telecommunications network, an additional interface needed to be developed as part of the proof of concept project.

Such an interface needed to be compatible with a wide range of communication technologies, such as PSTN (Public Switched Telephone Network), mobile networks, satellite modem links and so on, as it was recognised that remote locations could be outside the coverage area of traditional communication networks. The potentially remote and harsh environments also demand rugged units with DC power supplies (to ensure compatibility with existing lighthouse battery systems) and lightning protection.

The interface also required a means of authentication to prevent unauthorised use of the AtoN units; false or misleading Virtual AtoNs could be a serious hazard in themselves.



Above, Figure 5: *Dungeness Virtual AtoN shown on a display in the Trinity House Control and Monitoring Centre.*



Right, Figure 6*: Estimated coverage area for an AIS AtoN transmitted from the Dungeness Lighthouse, assuming perfect environmental conditions, transmitter power of 12.5 W, transmitting antenna height of 40 m and receiving antenna height of 10 m.*

GLA Prototype Communications Interface Unit

The GLA developed a prototype communications interface unit to prove the concept and enable remote control. The solution, based around a commercially-available AIS AtoN unit, is comprised of four main hardware components: a PC (located at the control site); a communications module; a lightning protection unit; and the AIS AtoN with associated antennas. A schematic of the array is shown in **Figure 7**. This prototype unit was successfully demonstrated and enables the GLA to securely control the transmission of VAtoN information from their depot in Harwich.

Interference

Authorities and users should be aware that Virtual AIS AtoN transmissions, as with any other radio transmissions, are susceptible to interference, whether natural or man-made. Jamming could block the reception of VAtoN data, but would only be limited to a certain geographic area determined by the propagation characteristics of the VHF signal. Spoofing could have more serious consequences, but can be detected through careful monitoring of the transmission channel and other forms of protection.

Data integrity

A critical element of any AtoN is data integrity; it is imperative that the information provided to the mariner is correct to ensure trust in the system and to make sure the mariner is not inadvertently guided into danger, rather than away from it.

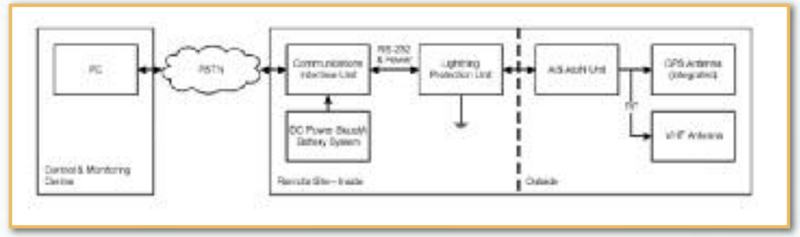
Integrity of the data has been considered by the GLA and a rigorous approach has been taken to ensure that VAtoN data provided to the mariner will be correct. At each point in the data processing chain it is cross checked and it is checked again before the VAtoN unit is activated. Once active, the VAtoN is monitored using a number of monitoring mechanisms to ensure the VAtoN appears in the correct place and conveys the correct information. This process is then repeated on cessation of the VAtoN to ensure it does disappear.

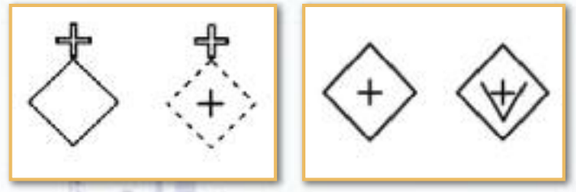
Leisure craft users

It is recognised that small vessels, including leisure craft users, are likely to use Class B AIS onboard their vessels. Depending on the equipment fitted, Class B AIS units may not have a display and therefore may need to be connected to an electronic chart to enable VAtoN information to be observed. Assuming the appropriate equipment is in place, the mariner would expect to see a similar mark to those provided in **Figures 8 & 9**, however this will depend on the equipment used.

Ongoing Development

Collaboration is ongoing with the manufacturer of the VAtoN unit with a view to commercialising the prototype interface unit; at the time of writing, the unit is being integrated with PSTN and Global System for Mobile communication (GSM) modems. The goal is to develop a generic interface to enable communication using any Hayes-compatible modems. This would facilitate integration of the AtoN unit into the GLA outstation monitoring and control systems and make the solution applicable to a wider market.





Above, Figure 7: *Overview of the implemented solution.*

Far left, Figure 8: *Real (left) and Virtual (right) AIS AtoN symbols for an Emergency Wreck Mark, as proposed in IMO NAV 59/7.*

Left, Figure 9: *Real (left) and Virtual AIS AtoN symbols as specified in IEC 62288.*

Main Picture: *THV* Alert *with THV* Patricia *in extreme background.*
© Ambrose Greenway

BY **Dr Nick Ward**
R&RNAV General Lighthouse Authorities

Report on the 2014 IALA Conference

***HE Koji Sekimizu**, Secretary General of IMO, addressed the Conference with a keynote speech in which he drew attention to the appropriateness of the venue, A Coruña, with its historic lighthouse. He emphasised cooperation between IMO, IHO and IALA. After speaking of improvements still needed for non-SOLAS vessels' safety he concluded by mentioning the challenges being faced by the maritime industry and the need for technical standards to enable further development of e-Navigation.*

***Above:** HRH The Princess Royal visited the Industrial Members' exhibition during her time with us in A Coruña. Products and services from 46 IALA industrial members were shown.*

***Below: Captain Ian McNaught**, Executive Chairman, Trinity House, was elected as Treasurer of IALA. As an innovation this was the first paperless IALA Conference with all documentation provided on tablets.*
***Lower: Juan Francisco Rebollo** of our host, Puerto del Estado, played a leading part in the conference planning and was elected President of IALA at the first meeting of the new IALA Council.*

***Above: Gary Prosser**, who has ably stewarded IALA as Secretary General since the Cape Town Conference in 2010, spoke on the achievements of the organisation over four years. At A Coruña, 90 papers were presented to a total of 558 aids to navigation experts from 62 countries. The gathering began with a Pre-Conference Seminar devoted to aspects of training on aids to navigation and VTS, presented by the IALA-World Wide Academy.*

THE FOUR-YEARLY CONFERENCE of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) was held from 25 to 31 May in A Coruña, Spain. As the site of the oldest working lighthouse in the world, the Tower of Hercules, this busy port in Galicia made an ideal venue for the conference and attracted a good attendance from all over the world.

The conference was honoured by an address from the Master of Trinity House, HRH The Princess Royal, on the occasion of the 500th anniversary of the founding charter of Trinity House. The theme of the conference, "From Torre de Hercules to e-Navigation and beyond" set the scene for a wide range of presentations, including many at the leading edge of innovation in marine aids to navigation, as well as a session on the heritage aspects of lighthouses.

Opening session

The keynote address was given by Koji Sekimizu, Secretary General of the International Maritime Organization. He noted that the IMO e-Navigation Strategy Implementation Plan had been finalised and would be considered at the Sub-Committee on Navigation, Communications and Search & Rescue in July and should be approved by Maritime Safety Committee later in the year. The next step would be to make e-Navigation a reality and IALA would have a significant contribution to make to this process.

Aids to navigation provision

The first day started with a presentation entitled "*Effective Intensity – Is it Effective?*" by Malcolm Nicholson of the General Lighthouse Authorities' Research and Radionavigation Directorate. This was possibly the most challenging and significant paper in the conference, questioning the basis on which the effectiveness of a light is calculated. Reporting fundamental research on the perception of lights, it was proposed that the length of rectangular profile flashes, such as those from LEDs could be halved, without significantly affecting the impact on the eye. The consequent reduction in energy use could be very important, particular for solar-powered installations. Alternatively, light output could be increased, without raising the costs of the supporting infrastructure.

Another impressive paper described the conversion of light buoys to LED and solar technology by the German Waterways Administration, following a systematic approach that yielded large efficiencies and cost savings.

Malcolm Nicholson followed up his earlier presentation with E-200 Explained, which described how the current documentation on the definition and measurement of lights had been developed and explaining the purpose and use of each recommendation. A revolutionary design for a new lighthouse on the breakwater of Valencia Harbour was reported. The use of carbon-fibre and modular construction was graphically illustrated in an animated video of the building process. A presentation on advances in radar aids to navigation by Paul Mueller of Tideland Signal Corporation, an IALA Industrial Member, reported the results of the successful trial on absolute radar positioning carried out by R&RNAV General Lighthouse Authorities in 2013 using THV *Alert*.

e-Navigation & beyond

The second day began with a report on the ACCSEAS Project by Dr Alwyn Williams, the Project Manager from the GLA. Several novel e-Navigation solutions were described to deal with the challenges facing shipping in the North Sea Region, which include increasing size of vessels, density of traffic and restrictions caused by windfarms. Innovative methods for exchanging information between ships and providing maritime safety information to ships were described, as well as advances in the provision of Resilient Positioning, Navigation and Timing, that underpins the whole of e-Navigation.

A related presentation by Dr Nick Ward of R&RNAV General Lighthouse Authorities and Thomas Christiansen of the Danish Maritime Authority, explained the need for a Common Maritime Data Structure to support e-Navigation and described the Maritime Cloud as a promising way to manage and deliver the information. The importance of standardised data product specifications and the use of the IHO S-100 Registry as a framework for the data structure was emphasised in several other presentations.

Dr Alan Grant of R&RNAV General Lighthouse Authorities reported the results of tests carried out in THV *Alert* with non-approved PNT devices (smart phones and tablets). In spite of impressive accuracy, there were dangers involved, in particular lack of integrity and uncertain provenance of chart data. There were also presentations on the planned Korean eLoran system and the feasibility study on R-mode positioning using MF DGNSS beacons and AIS.

Global navigation

The third day covered Vessel Traffic Services and related matters, with considerable emphasis on the consideration of human factors in the design of equipment and systems .Another major European Project, Mona Lisa 2.0 was reported, including the impressive figure of €1bn per annum in potential savings that could result from route optimisation and traffic flow management.Marine Spatial Planning was identified by the Nautical Institute and others as a topic of increasing importance and one in which light-house authorities should ensure they are involved.

Peter Douglas, Navigation Manager of the Northern Lighthouse Board, reported on new approaches to the marking of wave and tidal energy sites, which are introducing new challenges for safety of navigation.

Management

The fourth day included several papers on the increasingly important subject of Risk Management, including one from Captain Roger Barker, Trinity House Director of Navigational Requirements, on quantitative risk assessment using the IALA Waterways Risk Analysis Program (IWRAP).

A very topical paper from Link Powell of R&RNAV General Lighthouse Authorities described a Light Measurement of Tower of Hercules Lighthouse, which had been carried out earlier to assess the comparative effectiveness of R&RNAV designed LED arrays, as potential replacements for the existing light source. A demonstration of the measurement technique had been performed at the lighthouse the previous evening.

Heritage

The final day of the conference saw several presentations on methods of preservation of light-house structures and equipment, as well as approaches to the analysis and documentation of their significance in heritage terms.

Council & Assembly

There was a lively debate in the General Assembly on the proposal to transform IALA into an Inter-Governmental Organization. There were strong arguments on both sides, but there was a majority in favour of proceeding with consideration of the plan. Trinity House was re-elected to the Council, as UK National Member, and the Commissioners of Irish Lights were returned for Ireland. The Deputy Master was re-appointed as IALA Treasurer.

Conclusions

This was a very successful conference, which clearly demonstrated IALA's important role in producing new solutions as well as optimising use of resources and protecting the heritage and environment for which it has responsibility. This report has highlighted GLA contributions, but the overall standard of work reported was very high and the full report of the conference will be well worth studying.

Postscript

For the period to the next IALA Conference to be held in the Republic of Korea in 2018 the following Trinity House representatives have been nominated to the Committees:

- Aids to Navigation Engineering and Sustainability Committee (ENG), Chairman: **Simon Millyard**.
- ENG Light and Vision Working Group, Chairman: **Malcolm Nicholson**.
- ARM (Aids to Navigation Requirements and Management (formerly ANM)), Aids to Navigation Requirements Working Group, Chairman: **Captain Roger Barker**.
- e-NAV: Positioning, Navigation and Timing (PNT) Working Group, Chairman: **Dr Alan Grant**.
- Legal Advisory Panel (LAP), Vice Chairman: **Jon Price**.

***Torre de Hercules lighthouse**, A Coruña, built by the Romans and without doubt the oldest working lighthouse in the world.* Photo: Nick Ward©

BY **Stephen Durham**
HEALTH AND SAFETY MANAGER

Safety for all at sea

MUCH OF THE MEDIA AND PUBLIC INTEREST IN TRINITY HOUSE tends to centre on our lighthouses. This is to be accepted considering their iconic status on the British landscape and their history. However, not publicised so much is the sterling work undertaken by our maritime operations, still affectionately known within Trinity House by the abbreviation SVS (Support Vessel Service). Although in the past this consisted of a large fleet of vessels of various sizes and manned light vessels, today it consists of three vessels with some support from contract vessels and local boats. Between these vessels over 400 navigation buoys (plus in the region of 200 contract buoys) and 12 lightvessels are maintained, often in the harshest of weathers and all year round.

Work on deck in servicing these buoys is still a form of hard labour rarely seen in modern ships today. For example, a Type 1 plus buoy weighs some 12 tonnes and stands 15 metres from end to end. Lifting them from the water and moving them around requires good seamanship, excellent crane driving and skilful tactical manoeuvring by all on deck. Add a heaving vessel and cross winds into the equation it is soon realised such heavy lifts requires precise teamwork, particularly as it involves crew members being in close proximity to the buoy, hauling strops and chain. With chain and rope often under high tension, to ensure safety each crew member must know their role and where to be positioned exactly at any point in the operation. Failure can have dire consequences but the procedures are well rehearsed and if you ever get the chance to watch it, these guys make it look easy. Believe me, it isn't.

Despite such stringent and practiced operational procedures, on 11 January 2013, THV *Patricia* attended the Bridge buoy in the Solent. The task was to lift it for its annual inspection and affect repairs to its failing communications system, but all did not go to plan. Due to a freak occurrence of a leading line fouling the safety gate on a lifting hook and combined with adverse movement, one lifting strop released, toppling this massive buoy onto the deck. Fortunately, only minor cuts and grazes were suffered in effecting evacuation of the area and damage to the deck and buoy was only superficial, but it serves to remind how hazardous this work can be. Such incidents are very rare with health and safety on board Trinity House vessels at a high standard and this can be evidenced by the very low incidence rate.

This high standard is achieved by each vessel regularly reviewing safe systems of work in the form of standard operating procedures (SOPs) and its risk assessments. Where incidents or near misses do occur, these are investigated, SOPs reviewed and adjusted accordingly. Near miss and hazard reporting is encouraged and all employees may either submit reports on paper into letterboxes, or report on line using the new SHE Assure H&S system. Reports may be submitted anonymously, but his rarely occurs as most employees are happy to discuss their observations or findings.

Each watch in each vessel has its own safety officer and a safety committee and meetings are held regularly to discuss health, safety and welfare issues. The minutes are recorded and circulated to shoreside management on every occasion, with a feedback loop for comments and recommendations.

All this supported by a small marine operations department and marine superintendents ashore that ensure all equipment on board is maintained to schedule and to the correct standard. SVS have a proactive approach to health and safety and this has paid dividends over the years in achieving a high standard for the safe and efficient service they provide in maintaining navigational buoys and supporting the lighthouse service.

Top left: *Securing a line on a buoy's tailtube. A high standard of safety is achieved by each vessel in the Trinity House fleet regularly reviewing safe systems of work in the form of standard operating procedures.* *© Trinity House*

Top right: *Craning in the aids to navigation module during the recent Nab Tower refurbishment. Very close attention is given to the capacity of lifting gear and the means by which loads are secured.* *Photograph: ©Ambrose Greenway*

Middle left: *Releasing the shackle on a buoy sinker. Staff in the tenders work in the harshest of weathers and all year round ensuring safety of navigation for the world's mariners in our waters.* *© Trinity House*

Middle, lower left: *The seemingly innocent unmanned and automatic lightvessel holds many surprises for the inexperienced with slips and falls on the bird-fouled decks, ladders to be encountered and safe entry to be effected to enclosed spaces.* *Photograph: Captain Roger Barker ©*

Lower left: *Where incidents or near misses occur, these are investigated, standard operating procedures reviewed and adjusted accordingly.* *©Frances Baskerville, CIRM.*

Main Picture: *Helicopter operations frequently take place with vessels of the Trinity House fleet providing a speedy, safe and efficient means of conveying men and materials to our stations in the waters of England, Wales and the Channel Islands.* *© Trinity House*

BY **Malcolm Nicholson**
R&RNAV, General Lighthouse Authorities

Effective Intensity – Is it Effective? *Introducing the 'Apparent Intensity' Model.*

SINCE THE INVENTION OF FLASHING SIGNAL LIGHTS, the question of how a flash of light compares with a continuous ('fixed' or 'steady') light has been pondered. The increase in intensity or efficiency, as a result of focussing or switching the light source, is offset by the fact that a flash of light is not seen so effectively by the observer due to the inertia of human visual perception.

The currently recommended method of quantifying the effects of a flashing light on human visual perception is a photometric quantity called effective intensity, which is the 'fixed light equivalent' of a flash of light. The definition of effective intensity intends the flash to be viewed at the threshold of visual perception, but that is not how marine aids to navigation (AtoN) lights are viewed. By international agreement, the range of marine AtoN lights is calculated from an observer illuminance above the threshold of perception. Therefore, the use of effective intensity is not valid for determining the range of a marine AtoN flashing light.

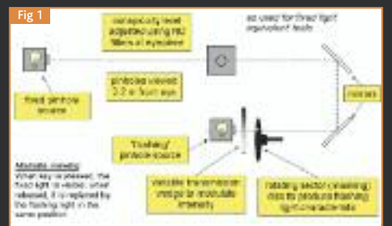
Experimental work carried out in the 1930s studied flashing lights above the threshold of visual perception (supra-threshold). Further scientific studies carried out in the 1930s and 1960s suggested modifying the Blondel-Rey model for effective intensity so that it could be used at supra-threshold levels by linking the value of illuminance at the observer to a time-constant for visual inertia (often known as a) in the equation for the Blondel-Rey model. Since the term 'effective intensity' is only valid at the threshold of visual perception, it is suggested that the term assigned to perception of a flash above threshold be 'apparent intensity'.

In 2012, the Research and Radionavigation Directorate of the General Lighthouse Authorities implemented a project aimed at repeating the 1930's experiment of Toulmin-Smith and Green (T-SG). The aim was to assess the usefulness of the successive brightness matching method for modelling the conspicuity of marine aid to navigation lights in order to quantify, and thereby improve, performance and efficiency.

The Original T-SG Experiment

The original experiment used a clockwork-driven sector disc mechanism to generate a series of light pulses. The observer was able to alternate between flashing and steady light by pressing a key. The intensity of the flashing source was then manipulated by adjusting the position of a variable transmission wedge until a visual match was obtained. From the outset it should be noted that there is a degree of ambiguity in their descriptions and also a lack of detailed raw data reported in their results. A block diagram (Figure 1) illustrates the main elements.

Fig 1



T-SG experimental set up.

Fig 2

Bentham ILFD20QH.

Fig 3

Controller used by observers.

According to their results, T-SG involved only a very limited number of observers (possibly as few as two or three) and many of their smooth curves which plot apparent intensity mask experimental noise. The mechanical set up as described would certainly lead to variations in timing and there was insufficient data to reach a conclusion over the typical variability of observers and the robustness of the conclusions.

Repeating T-S&G

Due to the unique nature of this experiment, no off-the-shelf solution was available. With the assistance of Bentham Instruments, bespoke apparatus was designed to reproduce similar conditions to those used by T-SG but using updated technology. A cross-sectional view of the resulting ILFD20QH unit is shown in Figure 2. Not shown here is the photopic matched photodiode at the surface of the integrating sphere which was used to measure light output.

A PC linked to the ILFD20QH unit via USB ran software that recorded the results. Once an experiment had begun, each observer was then able to interact via a game controller (see Figure 3) which had buttons for toggling between the steady and flashing sources and also for changing the brightness of the flashing source. The brightness of the steady source was always that specified in the experiment profile. Each new stimulus began with a zero intensity flashing light. It was not possible for observers to adjust this to the same level each time simply by tapping the up button a certain number of times.

Based on experience from a pilot study, the "next" button was disabled as it proved all too easy to press this by mistake with no easy way of recovering. Instead, the experimenter advanced stimuli via the PC user interface once the observer was satisfied with the match. After a session, the results were stored to a CSV file which included the date, observer name (if recorded), measured illuminances of the steady and flashing sources (in lux) together with details of the flashing profiles used.

Initial work was undertaken by Leeds University in 2013 using an observer illuminance of 0.2 lux. Figure 4 shows the comparison of the Leeds results compared to the original experiment. The findings presented here reveal a definite trend from the observers: for durations of less than 250 ms, flashing stimuli are perceived to be dimmer than steady lights. This means that a flashing light needs to be made progressively more intense as it becomes shorter in duration in order for it to be judged as equivalent in brightness to a steady light. In addition, it has been possible to fully define the experimental procedure and investigate observer variation – both of which go beyond the results of Toulmin-Smith and Green.

Aside from the number of observers used, one possible limitation here is that stimuli were always presented in the same order (i.e. ascending flash length). While this could potentially lead to bias, the intention here was to help reduce the considerable visual fatigue by making the task seem progressively easier.

Judging the brightness of such brief and dim sources is at the limits of human vision and not a task that most of us are used to doing!

A decision was made to repeat Leeds experiment in Harwich, using the same equipment and, where possible, the same observers.

Plots of the average of all observers as well as groups of observers are shown in Figure 5.

Fig 4

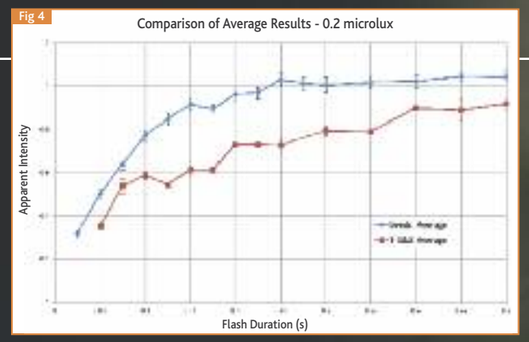
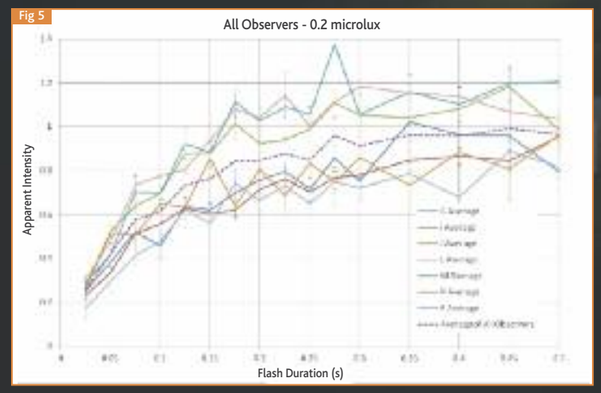
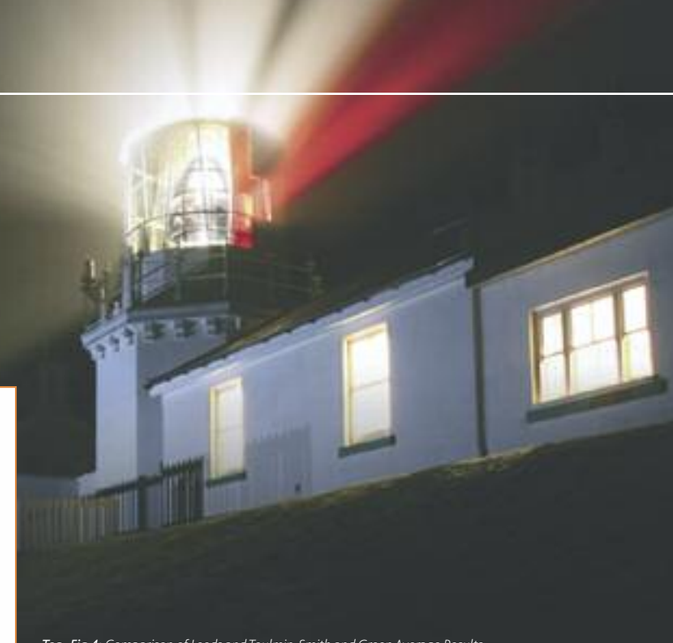


Fig 5





Top, Fig 4: *Comparison of Leeds and Toulmin-Smith and Green Average Results.*
Middle, Fig 5: *An Average Apparent Intensity Plot of Each Observer at 0.2 microlux.*
Lower left, Fig 6: *Averages of All Observations for each Experiment.*
Lower right, Fig 7: *Harwich Observers GIN &P compared with Toulmin-Smith and Green.*

Main background picture: *Whitby Lighthouse.*

Fig 6

Fig 7

The graph in Figure 6 shows the average of all observations for each of three experiments: Harwich 2014, Leeds 2013 and T-SG 1933.

By studying Figure 5 it can be seen that the Harwich observers fall into two similarly performing groups, G, I, N & P in one group and J, L & M in the second. A comparison of an average of the group with the lowest performance, GINP observers, with an average of T-SG observers is shown in Figure 7.

Conclusions

It is clear from results and from observers' comments that brightness matching of point sources is a difficult visual task. Furthermore, with successive brightness matching, the observer has to match the brightness of a point source with his memory of the previously viewed point source. Toulmin-Smith and Green's results were plausible but they were achieved with few observers, probably only one observer in some cases.

For successive brightness matching of point light sources to be made viable, it seems necessary to select appropriate observers. Observers chosen need to be consistent performers and, with marine aid to navigation safety in mind, they need to have a comparatively slow reaction time to flash perception. There is a distinct difference between results obtained from even the lowest performing observers for 0.2 microlux in Harwich and the currently recommended effective intensity model, Blondel-Rey. The use of the Blondel-Rey model with a = 0.2 seems unduly pessimistic for an observer illuminance of 0.2 microlux. Results suggest that for white flashing lights with a rectangular flash profile, a Blondel-Rey formula with a visual time-constant value of a = 0.1 seconds would be a more suitable model for determining the range of a marine aid to navigation light. The impact of using such a model would be to enable the flash duration of lights to be reduced, without reducing the published nominal range. Savings could therefore be made in energy consumption resulting in reduced costs, or longer maintenance or redundancy periods. A reduction in flash duration for solar powered aids to navigation in higher latitudes, such as cardinal buoys that use white LED lights, would substantially improve the winter minimum figure. As a general rule of thumb, for flashes up to 0.5s, the flash duration can be halved to achieve the same nominal range.

Acknowledgements

Dr Peter Rhodes of Leeds University for his valuable insight into the preliminary design of the equipment and conducting the first experiment. **Mr Ian Tutt** (Retired) for his continued interest in this subject. And for conducting the Harwich experiment.

BY **Paul Ridgway**

Trinity House and the Great War

IT WAS APPARENT THAT BY THE END OF JULY 1914 DIPLOMACY HAD FAILED and once it was clear that Germany would attack France and not respect the neutrality of Belgium, Britain would have to declare war on Germany as she was bound by treaties. We had become party to a world war, the like of which had not been seen before and so ended a period of relative peace that had prevailed since the Crimean War which ended more than half a century before.

Sir Edward Grey, Foreign Secretary on the eve of *the First World War may have said, "The lamps are going out all over Europe, we shall not see them lit again in our lifetime"* but our lights would frequently be lit for the benefit of Allied seafarers. Let us not forget the huge cost in human terms. By the end of hostilities 3,305 merchant ships had been lost with over 17,000 lives in this " War to end Wars." Royal Navy dead exceeded 32,000. In all, 96 Trinity House men lost their lives during the Great War, many on active service. A window in St Olave's Church in the City of London, where the Fraternity gathers each Trinitytide, is dedicated to their memory *(see opposite page)*.

Our Roll of Honour of that conflict is reproduced on page 20 and the names of those who have no known grave appear on the Merchant Navy War Memorial, Tower Hill and its registers are available for inspection in Reception at Trinity House.

It is important to set out the extent of the Lighthouse Service in 1914 when we had 90 lighthouses, 60 lightvessels (including spares) and 560 buoys in seven districts each with a superintendent and tenders.

Repairs to the service's steam vessels, lighthouse and lightvessel apparatus, lamps and buoys were undertaken at the London District Depot at Blackwall. A memorandum issued in the autumn of 1913 noted that: *"The workshops are found to be particularly valuable in cases of emergency arising from breakdowns and other accidents, as there is there a staff of trained mechanics specially competent to deal promptly and satisfactorily with any such eventualities.*

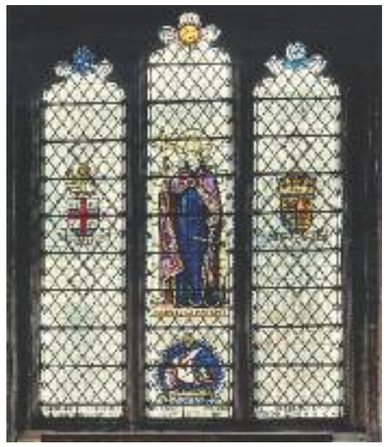
"These men are also available for transfer to the steam vessels and electric lighthouses to fill temporary vacancies occurring through illness or otherwise and it is from their ranks that the permanent engineers for the steam vessels and electric lighthouses are selected, as well as the supervisors of contracts for chain cables, steel buoys, buoy sinkers, &c., and of small works at out-stations.

"Considerable assistance is also rendered by the workshops on repayment, in connection with the upkeep of Indian and colonial lighthouses, and of seamarks for the Admiralty and certain local lighthouse authorities."

Above: *HRH The Duke of Connaught, Master of Trinity House from 1910 to 1942. THV* Patricia *(which name we perpetuate in our fleet today) was named after his daughter, Lady Patricia Ramsey. This portrait by Sir Arthur Stockdale Cope (1957 – 1940) now hangs in Trinity House.*

The Corporation's activities covered a wide field, including such distant points as the White Sea, the waters of Sierra Leone, of Malta and the Persian Gulf.

On the outbreak of war Captain (afterwards Vice-Admiral) G R (later Sir George) Mansell, Elder Brother, was appointed by the Admiralty to command and organise Keyham College for the training of special entry naval cadets; he held this appointment until the end of hostilities and from 1926 to 1935 was Deputy Master. For the duration of the war at least one of the Elder Brethren was always on duty at Trinity House, including overnight and on Sundays, in order to deal with emergencies and to carry out any Admiralty requirements.



Above: *The Corporation's memorial window in St Olave's Church, in the City of London, unveiled by HRH The Duke of Connaught, Master, in May 1921.*

The Lighthouse Service

25 lights were extinguished throughout the hostilities and these included Coquet, Whitby, Flamborough Head, Cromer and Orfordness. Some stations were lighted at the request of the Senior Naval Officer, Harwich, others were not extinguished until 1917 and yet more were operated at reduced intensity. Of course, arrangements were made to exhibit any light when required for Fleet movements. Lighthouses were painted with camouflage and only limited supplies of oil were maintained in the event of seizure by enemy submarines.

The Lightvessel Service

No fewer than 20 lightvessels were withdrawn from station including those marking the Outer Dowsing, Dudgeon, Smith's Knoll, Prince's Channel, Girdler and the North and East Goodwin Stations.

17 lightvessels remained on station with lights extinguished and the Cork was lighted on request by the Senior Naval Officer, Harwich.

15 temporary lightvessels were placed on station at various times to satisfy Admiralty demand. Some of these were on the Humber, for the use of the pilots, others to assist in the marking of the Tyne minefield and on the Dover to Calais route where, of course, the majority of the traffic was in support of the British Expeditionary Force.

In an endeavour to mislead the enemy SS *Argo* of Hull was fitted with a lightvessel mast and placed at the Sunk Station a few days before Christmas, 1914 to assist naval operations. Her position was altered from time to time and she was withdrawn in March 1915.

Service in the lightvessels was certainly hazardous and on 21 June 1916 the Corton was sunk after contact with a floating mine and the Master, William Henry Emerson Rudd, and four men: Seaman William G Chase; Seaman John Sadler; Seaman William George Joseph Stone and Lamplighter George Percy Willson were killed.

To further assist the naval authorities code flags signifying "Mines in sight" were flown. Much of the work was of a confidential nature. As part of the total security system all letters were censored yet the Master of the Nore lightvessel was convicted and imprisoned for divulging naval intelligence in private correspondence. Submarine telephone cables were fitted to enable communications with war stations on shore and this method proved of great value at times of air raids. Hydrophones were fitted to several lightvessels for the detection of submarines and to further confuse the enemy all names on lightvessel hulls were painted out. Limited supplies of oil and stores were kept on board in case of seizure by the enemy. To defend against mines all lightvessels were supplied with rifles and ammunition.

Buoyage

On the east and south coasts most of the navigation buoys were removed and of these 106 were in the

➥ continued on page 20.

Ships' companies of THVs Irene *and* Stella. Irene *was lost on 9 November 1915 when she struck a mine near the Tongue lightvessel while searching for the wreck of another vessel, with the loss of 21 lives, including the Master, Captain Hugh Leopold Phillips.*

continued from page 19.

Thames Estuary. On removal they were replaced by buoys marking the channel that had been swept of mines and this was extended from time to time until, at the end of the war, this mine-free area was marked from Dunbar to North Foreland with 205 buoys being placed up to two miles apart. More than 500 buoys, both lighted and unlighted, with 25,000 fathoms of mooring chain and the necessary sinkers had to be provided for Admiralty purposes, not only for use in home waters, but also on the Belgian coast and in foreign parts mentioned above.

The Steam Vessel Service

Withdrawal of navigation buoys, charging and replacing buoys in the War Channel, the changing of and placing temporary lightvessels, and constant changing and laying of special buoys for naval operations taxed the capacity of the Corporation's fleet to the utmost. To this was added the marking of wrecks of vessels which had been mined or torpedoed.

From 2 December 1916 until the end of hostilities one of the steamers was continuously employed on the Dover Barrage. An interesting operation was reported, date not known, when *Vestal*, working on the Northern Barrage between Orkney and Norway, moored buoys at up to 160 fathoms secured to sinkers by four inch wire moorings. As part of the continual change of buoyage required by the Admiralty from 28-30 October 1914 *Irene, Alert, Stella, Satellite, Mermaid* and *Warden* were engaged in removing 106 buoys in the Thames Estuary. From 20-22 September 1915 those vessels along with *Argus* and *Warden* moored the whole of the swept Channel buoys between Kentish Knock up the East Coast to Flamborough. Our ships were frequently fired on from the enemy occupied Belgian coast.

Sadly worse was to follow and *Irene* and *Alert* were sunk by contact with mines when on special service. *Irene* was lost on 9 November 1915 when she struck a mine near the Tongue lightvessel while searching for the wreck of another vessel, with the loss of 21 lives, including the Master.

Alert was blown up following contact with a mine in the Dover Barrage on 15 April 1917, with the loss of eleven men. After the loss of *Irene*, in 1919 *Miranda* was purchased from the Admiralty who had earlier requisitioned her from Lord Leith of Fyvie. She was taken into service with the name *Patricia*, after Lady Patricia Ramsay, daughter of the Corporation's Master, HRH The Duke of Connaught and Strathearn.

Pilotage

On 10 December 1914 all Pilotage Exemption Certificates were cancelled. Pilotage was made compulsory on all channels in the London District except where used by British merchantmen. In order to maintain an adequate supply of pilots 106 provisional licences were granted. To supplement the cutter fleet four additional vessels were required: two were purchased, *Schievan* and *Thalatta*, and two were chartered, *Selina Salmon* and *Jocelyn*. The Belgian West Hinder lightvessel was withdrawn and brought into the Thames and by January 1915 was used as a hulk for the River Pilots at Gravesend.

On 26 September 1915 the pilot cutter *Vigilant* was cruising at the Sunk station. At 1500 she struck a mine and was blown to pieces. Of eleven pilots on board eight were killed and three injured. Her crew consisted of seven men of whom six were killed and one injured. The dependants of those who lost their lives received Government pensions, in addition to which they received monies under the Workmen's Compensation Act and from the Pilots' Fund.

Wreck removal

During the Great War a very large number of vessels were sunk in the waters around our coasts and during the subsequent ten years a great many of these were dispersed by Trinity House.

Painstaking work was necessary for each had to be surveyed, a decision made as to the depth of water required over it to ensure safe passage, demolition or cutting down and further survey work took place all with the attendant contracts.

Admiralty cooperation

Throughout the war the most friendly relations and close co-operation existed between the Admiralty and the Corporation. Plenty of tasks came our way from the Admiralty who were only too anxious to afford any assistance in enabling Trinity House to carry them out, frequently providing tugs for towage, naval ratings to supplement manning lightvessels and so forth.

Top right: No 68 lightvessel at the South Goodwin station. Of composite construction the hull was 103ft length overall and the light was 40 feet above the waterline.

Above left: No 68 lightvessel at the Seven Stones station, built in 1900. an example of a class that served Trinity House well in the first half of the 20th century and, notably, through both world wars.

Above right: THV Patricia*, built in 1908 by Thornycroft of Southampton for Lord Leith of Fyvie as* Miranda*. This twin-screw coal-burning steamship was commissioned as the Corporation's yacht after the First World War.*

Main Picture: THV Patricia *renamed Vestal and seen here at the Jubilee Fleet Review, 1937.*

CORPORATION OF TRINITY HOUSE – *Roll of Honour 1914 - 1918*

NAME	RANK	DATE	REMARKS
YOUNGER BRETHREN			
ARNOT, George Henry, RNR RD	Commander	28.10.1917	*Killed on Active Service*
MURRAY, James Anderson, RNCVR	Lieutenant-Commander	06.12.1917	*Killed on Active Service*
SYLVESTER, Edward Arthur	Captain		*Killed on Active Service*
HEADQUARTERS STAFF			
PRICE-EDWARDS, Owen	Captain, Royal Fusiliers	22.06.1916	*Killed on Active Service*
ALLEN, Sydney John	Corporal, London Regiment	01.07.1916	*Killed on Active Service*
HENDERSON, Claude William	Rifleman, London Regiment	21.02.1917	*Killed on Active Service*
LIGHTHOUSE SERVICE			
PRITCHARD, Henry	Second Lieutenant		*Killed on Active Service*
ANCELL, Frederick Gordon	Serjeant, Royal Fusiliers	21.10.1915	*Killed on Active Service*
DUNSFORD, William David	Gunner, Royal Garrison Artillery	02.02.1915	*Killed on Active Service*
LONG, Harold Edward			*Killed on Active Service*
WITHERS, Arthur William	Private, Duke of Cornwall's Light Infantry	01.06.1917	*Killed on Active Service*
LIGHTVESSEL SERVICE			
BRAGG, William A.			
BROWN, William R.			
CALVER, Percy R. C.	Seaman, RNR	23.05.1918	*Killed on Active Service*
CHASE, William G.			
EDMUNDS, Arnold James			
HORSCROFT, Horace Reginald	Seaman, RNR	06.11.1914	*Killed on Active Service*
MILLER, George			
MONK, Charles			
OSMOND, John			
RUDD, William Henry Emerson	Master, Corton LV	21.06.1916	*Killed when Corton lightvessel was sunk by mine*
SADLER, John	Seaman, Corton LV	21.06.1916	*Killed when Corton lightvessel was sunk by mine*
STONE, William George Joseph	Seaman, Corton LV	21.06.1916	*Killed when Corton lightvessel was sunk by mine*
TENBETH, George Henry Mitchell	Leading Seaman, RNR	14.09.1918	*Killed on Active Service*
TUCKER, William George			
VAUGHAN, Joseph Bowen			
WILLSON, George Percy	Lamplighter, Corton LV	21.06.1916	*Killed when Corton lightvessel was sunk by mine*
WILLIAMS, Hugh			
WRIGHT, James			
STEAM VESSEL SERVICE			
PHILLIPS, Hugh Leopold	Master, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
THOMAS, Harold Frederic	2nd Mate, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
DEWAR, Henry Ritchie	1st Engineer, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
ALDERSON, Joseph	Coxswain, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
BARBER, Walter Henry	Seaman, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
BARNES, Edward Stephen	Seaman, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
BATT, Walter Edwin	Trimmer, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
BAYLEY, Robert William	Cook, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
BEAVANS, William George			
BEAVIL, Edward John			
BLAKEMORE, Alfred	Fireman, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
CHARMAN, Joseph Philip			
CLARKE, George	Fireman, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
COOK, William George	Fireman, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
EADES, George Augustus	Fireman, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
EDWARDS, Martin			
GIBBS, Ernest	Seaman, THV *Alert*	15.04.1917	*Killed when THV* Alert *was sunk by mine*
GIBBS, William Edward	Fireman, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
GODFREY, Thomas William	Seaman, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
HARVEY, Ernest George William	Seaman, THV *Alert*	15.04.1917	*Killed when THV* Irene *was sunk by mine*

NAME	RANK	DATE	REMARKS
STEAM VESSEL SERVICE			
HAZELL, Frederick William	Trimmer, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
HILL, David	Trimmer, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
JONES, Richard Sydney	Fireman, THV *Alert*	15.04.1917	*Killed when THV* Irene *was sunk by mine*
KERR, Thomas	Seaman, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
LEE, Charles	Fireman, THV *Alert*	15.04.1917	*Killed when THV* Alert *was sunk by mine*
MERRALLS, William Thomas	Fireman, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
MURRELL, Walter	Steward, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
NEWSON, George Samuel Henry	Fireman, THV *Alert*	15.04.1917	*Killed when THV* Alert *was sunk by mine*
OVENDEN, William	Seaman, THV *Alert*	15.04.1917	*Killed when THV* Alert *was sunk by mine*
PEARCE, William Leonard			
POWELL, Percival Arthur	Seaman, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
REECE, John Basil	Seaman, THV *Alert*	15.04.1917	*Killed when THV* Alert *was sunk by mine*
REEDER, Charles	Senior Fireman, THV *Alert*	15.04.1917	*Killed when THV* Alert *was sunk by mine*
REVELL, Robert Charles			
TRICKER, William James	Steward, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
WALKER, William James Kinsey	Seaman, THV *Irene*	09.11.1915	*Killed when THV* Irene *was sunk by mine*
WESTHORPE, James	Fireman, THV *Alert*	15.04.1917	*Killed when THV* Alert *was sunk by mine*
PILOTAGE SERVICE			
BLAXLAND, Thomas	Pilot, Cinque Ports	28.02.1916	
BONE, Thomas Edwin		26.09.1915	*Killed when pilot cutter* Vigilant *struck a mine*
BROWN, Andrew James		26.09.1915	*Killed when pilot cutter* Vigilant *struck a mine*
BRUHN, Charles Allan		09.01.1919	
COCKS, Charles William		16.07.1918	
COCKTON, John		15.12.1917	
COLLISTER, John Joseph		07.02.1917	
COLLISTER, William Thomas		26.09.1915	*Killed when pilot cutter Vigilant [or* Valiant*] struck a mine*
CORNHILL, Arthur Robert		26.09.1915	*Killed when pilot cutter Vigilant [or* Valiant*] struck a mine*
EALES, William Charles		21.10.1917	
FERGUSON, John		29.10.1917	
FISHER, Albert Ernest		26.09.1915	*Killed when pilot cutter* Vigilant *struck a mine*
FLETCHER, William		25.02.1916	
GANE, Charles Purcell		26.09.1915	*Killed when pilot cutter* Vigilant *struck a mine*
HASTIE, George Nelson		09.02.1917	
JONES, James Henry		26.09.1915	*Killed when pilot cutter Vigilant [or* Valiant*] struck a mine*
KENNEDY, Albert Ernest		07.08.1917	
KITSON, Reynolds Hamilton		07.06.1915	
KNOX, Alfred George John		05.03.1918	
MANSFIELD, Joseph Billett		07.01.1916	
REDMAN, Hubert James		15.04.1918	
URQUHART, Thomas Edward		26.09.1915	*Killed when pilot cutter* Vigilant *struck a mine*
WILLIAMS, Griffith			
PILOT VESSEL SERVICE			
CHARRINGTON, David	Master	26.09.1915	*Killed when pilot cutter Vigilant [or* Valiant*] struck* a mine
BARLEY, William John Fryer	Steward	26.09.1915	*Killed when pilot cutter* Vigilant *struck a mine*
CLAYDON, Robert Henry	Driver	26.09.1915	*Killed when pilot cutter* Vigilant *struck a mine*
DUNN, William			
FENNER, Frederick William	Seaman	26.09.1915	*Killed when pilot cutter* Vigilant *struck a mine*
FOOTS, Charles	Seaman	26.09.1915	*Killed when pilot cutter* Vigilant *struck a mine*
WARD, Alfred William	Driver	26.09.1915	*Killed when pilot cutter* Vigilant *struck a mine*

Fields have been left blank where specifics are unknown to us.

Here is a brief selection of photos of the staff, family and friends of Trinity House taking part in the many activities that celebrated our 500th anniversary year.

BY **Commander Graham Hockley** ROYAL NAVY
Secretary to the Corporation

The Trinity House Charities

FOR REGULAR READERS OF *FLASH* IT WILL COME AS NO SURPRISE to learn that the charitable activities of the Corporation of Trinity House were enshrined in its original charter of 1514, and in various guises the Corporation has been seeking to support needy and *"derelict"* mariners and their dependants ever since. What may not be so well known is that at the time the charter was granted by Henry VIII the Fraternity of Shipmen, that became the Corporation, already had a Hall and a number of Alms houses adjacent to the church of St Nicholas in Deptford. Thus it could be said that the Corporation is the oldest maritime charity to be in continuous existence in the country.

So five hundred plus years later what has happened? Well it is fair to say the charity has grown, originally it seems to have operated very locally providing alms house accommodation, but its work spread geographically, to cover mariners in the Thames and London then England and now most of the British Isles.

It has also expanded in what it does. It was soon found that there were insufficient alms houses for those in need; so the charity began to pay pensions, or annuities, to those needing help but who could not be given a house. Indeed, during the Napoleonic Wars this extended to the provision of a widow's pension to the wives of seamen who volunteered from London for the Royal Navy but had the misfortune to be killed whilst on active service. In the Corporation's archives there is a letter from Nelson asking the Elder Brethren to provide just such a pension for the wife of one of the ship's company of HMS *Agamemnon*, Edward Lord (*See opposite page, column 3*).

Today the Corporation comprises two charities. The Corporation of Trinity House itself and a subsidiary charity the Trinity House Maritime Charity (THMC). The dry core details of these charities may be found on the Charity Commission's website at www.charitycommission.gov.uk

However, to put flesh on these bones the original charity (the Corporation itself) is governed by its many Royal Charters and has a broad maritime remit. This includes the custody and maintenance of the Trinity House building on Tower Hill as part of our heritage. To help fund this the public rooms of Trinity House are let out commercially and this goes a good way to meet the building's costs. In addition this charity can make small grants in support of maritime charitable need. It also runs the examination and licensing of Deep Sea Pilots and provides Assessors to the English Admiralty Court, the pre-eminent maritime court in the world.

The THMC is a combination of many smaller maritime charities that were previously administered individually by the Corporation's Corporate Department. The details of these charities are contained in the book of bequests, currently on display at the Trinity House exhibition at the National Maritime Museum.

The THMC is dedicated to the provision of the Corporation's Alms House accommodation in Kent, annuities and support of charities and organisations that provide for:

- Maritime training and education
- Safety and welfare of mariners
- Safety of shipping
- Relieving the need of mariners, former mariners, their families and dependants

To fulfil these objectives it supports a number of key front line maritime charities, such as The Shipwrecked Mariners' Society, with regular annual grants. These grants total around a million pounds each year. It also runs its own scholarship scheme to train officers for the Merchant Navy, around thirty cadets a year, and the large yacht industry, six cadets annually. It then also provides *ad hoc* grants to those maritime charities that have a need to fund a one off project or have to meet unexpected demand for their services.

A recent example of the latter is the support given to the Fishermen's Mission in the wake of last winter's storms, which caused much hardship to the UK's fishermen and their families. To help the Mission cope with this sudden influx of need the THMC made grants to the Mission totalling £100,000.

All in all, the combination of these charitable actions means that the charity has a charitable spend of between £4M and £5M annually. This spend is financed through investments and the income from three farms. Of these income streams the former farm, situated in Borough (then Newington Butts), in London is the most productive. No longer producing crops it provides the charity with the rents from some 400 residences (one bedroom flats to five bedroom houses) and around twenty commercial properties, to the tune of £5M per annum.

In addition, to these regular activities the THMC has also been involved in some significant charitable projects to mark the quincentenary. The first of these was to provide the bulk of the funding towards the construction of an accommodation and facilities hub at Mariners' Park on the Mersey. The Park provides housing and care for needy mariners and their dependants and is managed by the Nautilus Welfare Fund and has been running for over 150 years. The new building known as the Trinity House Hub was opened by HRH The Princess Royal, Master of Trinity House, in April this year.

The second project has been a joint one with the Trinity House Fraternity to redevelop the RNLI Boathouse at Ramsgate so that it can accommodate the larger Atlantic 85 lifeboats. This project was opened by the Master on 10 October.

Finally, the THMC is working with the Sailors' Children's Society to help reach out to the children and families of seafarers in need, who might otherwise be unaware of the support that is available to them.

It is therefore with some sense of achievement that the Corporation can look forward to the second half millennium of its work as a charity.

Above: *Her Royal Highness attended Ramsgate lifeboat station on 10 October to meet volunteer crew, local dignitaries and officially name the new lifeboat Claire and David Delves. At the same time she re-dedicated the boathouse which has been extended. This work was funded by the Corporation. © Nicholas Leach / RNLI.*

Top right: *An illuminated document providing details of many bequests to the Corporation recorded down the years is currently on display at the Trinity House exhibition at the National Maritime Museum, Greenwich. This will close in January 2016.*

Lower right: *In the Corporation's archives there is a letter from Horatio Nelson asking the Elder Brethren to provide a pension for the wife of one of the ship's company of HMS* Agamemnon, *Edward Lord.*

Above and main picture: *Housing and care for needy mariners and their dependants is provided at Mariners' Park, Wallasey, and managed by the Nautilus Welfare Fund. A new building providing additional facilities and known as the Trinity House Hub was opened by HRH The Princess Royal, Master of Trinity House, in April. This is a significant charitable project to mark the Corporation's quincentenary.*

Navigating through life

"THE VOYAGE IN STAVROS WAS THE BEST EXPERIENCE OF MY LIFE – The Challengers got me into sailing – My week in Sir Winston Churchill was the making of me – I wouldn't be a naval architect if it hadn't been for my voyage in Malcolm Miller *– The most professional charity I've ever worked with".* These are just a few comments we hear regularly said Chris Law, Chief Executive of the Tall Ships Youth Trust (formerly the Sail Training Association). Formed in 1956, the Trust is one of the world's oldest and largest sail training charities dedicated to the personal development of young people aged 12 to 25.

Over 100,000 trainees have sailed 1.9 million nautical miles on the Trust's fleet – a 60m brig *Stavros S Niarchos*, four 22m ocean going *Challenger* yachts, a 19m catamaran and a 15m ketch. Previous vessels have included the two 37m schooners *Malcolm Miller* and *Sir Winston Churchill.*

Each year, over 3,000 sail with the Trust with 70% of the young people disadvantaged and disabled. For most, it is an unforgettable experience:-

Vikki, Youth Work Manager said: *"The voyage was a rich learning opportunity for the young people. It stretched and challenged them like no other residential outdoor experience I have used before. It was a unique experience which had a significant impact on them. The young people said they had learnt about respect and responsibility, how to listen to and understand other people's points of view, how to work in a team and how to deal with conflict. These lessons will stay with them for the rest of their lives."*

Winching on the Challengers.

Challenger Race week.

Emma, mother of **Stewart** (12) reflected: *"Stewart has special needs and was very nervous about the voyage but from the second he stepped on board I knew it was going to be a very positive experience for him. The crew went out of their way to make him feel welcome. I've seen a real change in him. He has grown in confidence, is more willing to take on new challenges and has not stopped talking about it."*

Typically, a voyage is a week long though there are also short, taster voyages. The maximum complement of the Brig is 68, 18 in the Challengers and 10 in the Cat and the Ketch. Within this, there are 48 voyage crew berths in the Brig, 12 in the Challengers, 8 in the Cat and the Ketch.

In addition to the young people, there is a small complement of permanent crew supported by a team of experienced volunteers. These come from a pool of some 1,500 regular volunteers, all of whom have sailed and been recommended by the permanent crew. Around 20% of trainees return as volunteers.

Volunteers donated over 108,000 hours to the Trust in 2013/2014.

In order to keep the ships operating and filled all year round, voyages are also available to the "young at heart" up to the age of 80. As **David** (63) says: *"It was a lifetime wish to sail on a square rigged ship. Both the permanent and volunteer crew were so organised and professional. Every task was explained in a friendly way."*

Waypoints in life

For most young people, a Trust voyage is a turning point. Living, working and eating together in such a unique, physically and mentally challenging residential environment young people don't just learn about life at sea. They learn about life itself. From the minute they step on board, young people work in watches, taking responsibility for themselves and others. Tasks include setting and stowing sails, helming, rope work, anchoring, navigation, meteorology, cleaning and maintenance, food preparation and galley work.

As a result, while on board young people develop a wide range of skills relevant to all aspects of their everyday lives including self-reliance, communication, problem solving, decision making, team working, leadership, timekeeping, social skills, awareness of health and safety. Their self-esteem soars and they learn that the more they put into a task, the more they get out of it.

Nikki (20): *"At the age of 13 I was an alcoholic – by 16 I was homeless. I caused so many problems that my local youth group banned me from their premises. But today – at 20 – I'm a youth worker at the very same group. The key turning point was my voyage – it took me away from my home environment - a light just went on in my head and I thought that's it. No more drink for me."*

Today the Trust remains a world leader in developing young people to their potential. Based on the philosophy that a mix of young people is of benefit to all, they come from a total cross section of society with the Trust providing bursaries to those who otherwise wouldn't be able to afford a voyage. This generates a group of young people who would never have met on land and who have a unique opportunity to learn about and from each other.

Trust voyages have a significant impact on young people's lives. Externally validated statistics show that after a voyage, 95% have increased self-esteem, 90% are better team players, 80% better communicators and 70% have improved problem solving skills. These are all skills which raise young people's expectations and increase their employability.

Mike (20) commented: *"I'm shy and find it hard to make friends but I gained so much confidence from the voyage – it gave me the push to go after the job I really wanted. I'm also going to sail with the Trust as a volunteer."*

Recent initiatives have included voyages for young people with Special Needs, Tall Ships Academy (training route from first experience to MCA Yacht Rating), Sail for Heroes® and multi-cultural, multi-faith diversity voyages.

Earlier this year the Trust launched a new UK-wide initiative for NEETS (young people not in employment, education or training). The Trust's voyages were seen as a key catalyst for changes in young people's attitudes and skills during the six month intervention with an exceptional 97% going into employment, education or training.

Help needed

"The Trust changes young people's lives for the better," said Chief Executive **Chris Law** *"but it is not easy. We are very proud of the high quality sail training experience we offer young people but it costs money to maintain the vessels to the highest safety standards and we are totally dependent on donations to continue our work."*

If you would like to help by making a donation or booking a voyage – go to www.tallships.org or phone their Head Office on 02392 832055 – and if you've sailed with them in the past but since lost touch, please make contact again. They'd love to hear from you.

Top: *The Brig* Stavros *has nine miles of wire and rope.*
Middle: *Chart work on the Challengers.*
Middle lower: Stavros S Niarchos.
Bottom: *Climbing the rigging.*

Above: *The Challengers from on high.*

BY **Francis Zachariae**
Deputy Director General, ***The Danish Maritime Authority***

Introducing The Danish Maritime Authority

DENMARK IS A NATION WITH PROUD MARITIME TRADITIONS. Maritime activities have historically been – and continue to be – a great source of prosperity. However, shipping and maritime activities also present a number of challenges; among these are a vast coastline and straits that are heavily trafficked or navigable only with difficulty. These challenges have been dealt with effectively for decades, but the measures have changed radically in recent years.

Who we are and what do we do?

Though the Danish Maritime Authority (DMA) is a rather new institution, with a mere 26 years of exercising public authority under its belt, the Danish maritime sector, including aids to navigation, has been regulated by the state as far back as 1567 when King Frederik II introduced maritime law. Back then, in maritime law's fledgling youth, keelhauling was among the selection of punishments the unfortunate seafarer could be subject to. Many things – including the regulatory instruments – have changed since then. However, the importance of shipping and the maritime sector as a whole in the Danish economy, history and culture has not. Today, Danish shipowners and shipping companies are among the world's largest operators of foreign gross tonnage in the world and Danish maritime companies account for almost a quarter of Danish exports with a total production of approximately DKK 260 billion (£27 billion), corresponding to almost 9% of overall production in Denmark.

The maritime sector is a great source of prosperity. But it also presents a number of great challenges in terms of aids to navigation. Amongst these are Greenland's vast and inhospitable coastline and the straits that are heavily trafficked or navigable only with difficulty: the Sound and the Great Belt.

It is among the DMA's main tasks to take active and effective measures against these challenges. However, we have other obligations besides those associated with aids to navigation. The DMA is a government agency under the Ministry of Business and Growth. It consists of the central authority, eight survey offices, including the office in Nuuk, Greenland, the Centre of Maritime Health and Safety on the island of Fanø and two maintenance and service centres.

Maritime tasks are mainly distributed between the Ministry of Defence and the DMA. Our field of responsibility covers the shipping industry and its framework conditions, the ship and its crew and the waterways. Our responsibility as a government agency applies both to the merchant fleet and the fishing industry. The surveillance of Danish waters and of civilian shipping, sovereignty enforcement, the police authority, pollution prevention, environmental surveillance, ice-breaking, etc., are the responsibility of the Ministry of Defence.

Above: *Although hydrographic surveys have been conducted in recent years, large parts of Greenland's enormous seabed remain unknown to man.*

Aids to navigation are the largest item on the overall budget. Around 50% is spent on buoys, lighthouses, radio transmitters, maintenance and servicing. The DMA operates a total of 1124 floating aids to navigation, 284 lighthouses, 4 DGPS stations, 50 racons, a Loran-C station, 2 buoy tenders and 2 maintenance and service centres. Due to the geographic scope of the Danish realm, many lighthouses and buoys are situated in remote and difficult-to-reach locations. Two examples are the lighthouses on Mykines Holm and Fuglø, respectively, in the Faroe Islands. Bispen Lighthouse at Fuglø is so difficult to reach that inspections can be carried out for only a few days each year.

Heavy, trafficked straits, and a vast coast

The tasks related to aids to navigation are extensive

➥ continued on page 30.

Main picture: *Poul Løwenørn is one of two ships working with maintenance of buoys, lighthouses and hydrographic surveys in Danish waters.*

 ➥ continued from page 29.

and diverse. However, two tasks stand out. Firstly, the Kingdom of Denmark has one of the longest coastlines in the world, primarily located in one of the world's most inhospitable regions. The area is both icy and sparsely populated, making working conditions for the crew aboard ships navigating the waters extremely difficult. Secondly, Danish waters have some of the world's heaviest traffic, in particular the straits of the Sound and the Great Belt. Not only are the straits characterised by dense traffic. The straits are also very narrow, the waters are shallow and there are tricky underwater currents.

The Great Belt and the Sound have been of major importance to Danish as well as international trade for centuries due to their strategic importance as waterways between the Baltic and the Atlantic Ocean. The Sound was a goldmine to various kings throughout the years, because of the revenue gathered from customs duties paid by passing ships – the so-called Sound Dues. The kings legitimized the Sound Dues by referring to the costs of installing and maintaining buoys and lighthouses and preventing piracy in the area. In reality, revenues exceeded the cost to an extreme degree; for long periods of time the Sound Dues made up 50% of the king's budget. Today, Denmark is a constitutional monarchy, but the obligations are somewhat the same in terms of aids to navigation. The costs, however, are covered by taxes rather than tariffs.

Every day 700,000 tons of oil are transported through Danish waters, the majority aboard ships passing the Great Belt. Add to that a highly mixed traffic, shallow waters and a tricky current and you have yourself a challenge in terms of aids to navigation. Though buoys and lighthouses remain the ships' most important tool of navigation, others have been added in recent years. The use of AIS has revolutionized aids to navigation. A good example of the use of AIS in Danish waters is at Hatter Rev, situated on the route "Tango" that passes through the Great Belt.

For a number of years, there was a series of groundings on the north side of Hatter Rev. The route crosses a sharp bend of approximately 60 degrees. As a consequence, some ships relatively often ran aground.

The establishment of the land-based AIS system revealed the ships' sailing patterns and as a preventive measure, five yellow special buoys were placed on the north side of the fairway in 2005. Not a single ship has run aground since then.

Greenland's vast and inhospitable coastline is a second challenge. The future of the waters surrounding Greenland and the Arctic in general is characterized by both great opportunities and great challenges, which all have a knock-on effect on the way we think and regulate aids to navigation. Climate changes have changed the opportunities available in the Arctic. Possibilities within primarily mining and transit, but also within the cruise industry, are emerging between the cracks in the thawing ice. However, the Arctic is a region where hydrographic surveys and international regulation are – to say the least – deficient. Risks of accidents are not significantly greater here than elsewhere, but due to the remoteness of the region and the hostile environment it is difficult to reach for rescuers, making the consequence of accidents high. The lack of international regulation does not mean there is an institutional vacuum in Greenland's waterways in terms of aids to navigation. The number of cruise liners sailing in Greenland waters has been increasing for a long period, and the DMA is ready for a scenario with heavier traffic. The International Maritime Organization's Polar Code and new national regulation are underway in collaboration with Greenland. Furthermore, the DMA has launched the information system known as ArticWeb in order to enhance safety of navigation in the region. ArcticWeb was launched on 1 January this year. It gathers information about navigation in the waters around Greenland from different authorities. From the ships' own recording of planned routes, ArcticWeb can provide an overview of the position and expected response to other ships and show current ice charts, weather, navigational warnings, etc. Ships are thus better able to carry out risk assessments as well as plan and coordinate their voyages. Furthermore, the DMA and the Ministry of Defence continue to strengthen the monitoring of the ship traffic in the Arctic.

New ways of thinking aids to navigation

On 25 February 2013, a satellite was launched in collaboration between the DMA and the University of Aalborg. The satellite receives AIS signals, thus extending the land-based system and thereby strengthening safety of navigation in outer waters. Not only do we collaborate with academia, the private sector is also an important partner. In a globalized world, the competition among the major shipping companies toughens. As a result, aids to navigation have become a competitive factor.

The collaboration between the DMA on the one hand and the University of Aalborg and the private sector on the other represents a new way of aids to navigation thinking. However, we still have an eye for traditional regulatory tools. This spring past has been characterized by a liberalization of the pilotage service. The liberalization aims to drive the prices of pilotage in Danish waters down, thereby further encouraging the use of pilots.

The future within aids to navigation is characterised by integration of traditional tools of regulation as well as new ones, such as collaboration with academia and the private sector. These collaborations force us to take on new perspectives. New perspectives which are critical for solving the difficulties faced by safety of navigation.

AIS is a revolution within aids to navigation, but the system will not be replacing buoys and lighthouses entirely. However, the buoys and lighthouses themselves have – partly driven by a desire to minimize cost, partly due to environmental concerns – gone through a tremendous development in recent years. Nonetheless, traditional means of aids to navigation – especially lighthouses – have become a part of local communities' culture and history. One example is lighthouses with revolving optics with mercury bath systems. The lighthouses could be replaced with modern, non-revolving, alternatives, but the revolving optics have a significant cultural value. In collaboration with the Technical University of Denmark, the DMA has re-designed the system, thereby maintaining the revolving optics, avoiding environmental issues related to mercury and minimizing energy consumption.

Above: *Despite a population of some 5.7 million inhabitants, the Kingdom of Denmark has more than 52,000 kilometres of coastline. The most part is situated around the sparsely populated Greenland.*

e-Navigation is another example of the measures belonging to the future of aids to navigation. e-Navigation gathers information relevant to the individual ship's current route, is designed to make navigation safer and easier and is seen by many as somewhat of a revolution. The DMA has been working with e-Navigation for some years now. The strength of the system lies in its ability to coordinate and sort relevant information to the ship, thereby minimizing sources of error – especially human ones. e-Navigation not only minimizes error, the system makes it far easier for ships to report to local and international authorities as well.

The DMA in IALA

Shipping and the maritime sector in general have always been – and continues to be – international in nature. Now, regulation of the sector is also becoming more and more international, including aids to navigation. Hence, the importance of international fora, such as the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), is increasing.

IALA is currently undergoing radical institutional changes. At the IALA Assembly in A Coruña in May this year the Assembly agreed on a milestone Resolution on the future organisational change for IALA. Denmark believes that this is a very important step for the organisation. The adoption of an international convention allows for IALA to be established as an intergovernmental organization in line with, for example, the International Hydrographic Organization (IHO). The convention will determine IALA's framework conditions, its purpose, members, general assembly and so forth. Thus, the convention will replace today's rather informal agreement on IALA's work.

The adoption of the convention would enable IALA to lay down internationally binding standards, thereby enhancing harmonisation of standards and safety and protection of the marine environment and increasing the efficiency of the work on international legislation in the area.

Although the challenges within aids to navigation – in a Danish as well as an international context – are somewhat constant, the measures taken to meet them are not. IALA's institutional changes and the prospects of digital intelligent systems, such as AIS and e-Navigation, make the DMA see a bright future for safety of navigation.

Main Picture: *Maintenance of lighthouses in remote locations, such as the one shown here at Mykines Holm in the Faroe Islands, is among the many tasks related to aids to navigation.*

BY **Anne Carnegie**
Secretary IHMA

An introduction to IHMA

THE INTERNATIONAL HARBOUR MASTERS' ASSOCIATION was established in 1996 and evolved from a number of European associations. By virtue of their role, harbour masters have often found themselves geographically isolated and have looked to neighbouring harbour masters for advice and support. The Finnish Harbour Masters' Association established in 1936 is probably the oldest European national association and perhaps the world, followed by the Dutch in 1949, the Belgians in 1971, the French in 1992, the United Kingdom in 1993, and the German and Polish Associations in 1994.

Harbour masters of the major ports of North West Europe began to meet from the 1950s and in the latter half of the twentieth century, influenced by the development of international legislation, harbour masters recognised that while their ports might vary greatly in size, operation and structure, their interests were united by common purpose. In 1985 the European Harbour Masters' Association was established and thereafter the move towards developing an international association emerged with an agreement to continue the EHMA linked to an independent international association. By the early 1990s the momentum towards developing an international association was strengthening and at Reykjavik in June 1996 the EHMA Congress voted unanimously to establish an International Harbour Masters' Association with Captain H-J Roos of Bremen elected as the first President with the aim of uniting those responsible for the safe, secure, efficient and environmentally sound conduct of marine operations in port waters into one professional body.

A sense of comradeship and shared purpose have been instrumental in bringing harbour masters together to discuss subjects of mutual interest. Considering some of the challenging relationships that harbour masters must deal with, you can understand why. Take the case of Captain John Pasley Luckraft RN, the Llanelli Harbour Master who having secured his position took an anti-drink stance and persuaded the Harbour Commissioners to ban their pilots from keeping public houses and beer shops. This and other regulations caused hardship and resentment amongst the pilots such that Captain Luckraft found himself at the mercy of a notorious gang known as the 'Rebeccas' who dressed up as women and amongst a number of civil disturbances, roused Luckraft from his sleep on the night of Wednesday 6 September 1843, threatened to burn his house down and ordered Luckraft to leave the town. The 'Rebeccas' were given half a crown each as payment from the Llanelli Harbour Pilots for their night's work. Suffice to say that relationships between harbour masters and pilots have improved since those days and the International Maritime Pilots' Associations and IHMA are sister organisations enjoying a constructive relationship.

Although references to the position of harbour master have existed for many hundreds of years, there was no commonly accepted definition of the harbour master's role until a wide-ranging review of the functions performed by harbour masters and port captains around the world led to the IHMA's definition of eligibility for membership, based on meeting one or more of four criteria: jurisdiction is exercised over the water frontage or water area of a port or port approach; a legal and / or operational responsibility for the movement of shipping may be involved; in undertaking their role they possess an authority conferred on them by law, regulations or rules; there is significant involvement in ensuring that port or marine operations within the area of their jurisdiction are carried out safely, securely, efficiently and in an environmentally sound manner.

The question of suitable qualifications for harbour masters is often discussed. The answer used to be a Master's Foreign Going Certificate of Competency and this qualification is still at the forefront of most port authorities' minds when they produce the person specification for the recruitment process. However, in the UK and elsewhere the traditional recruitment pond of Merchant Marine and Navy has contracted and at the same time, the harbour master has found him or herself taking on responsibilities beyond the marine technical and statutory role. IHMA has responded to this change through its endorsement of the International Diploma for Harbour Masters, a course which covers marine operations underpinned by a safety management system, finance, environment, pilotage, vessel traffic services (VTS), port security, emergency management, marketing, indeed every aspect of the modern manager's portfolio and is a recognised route to MBA (Harbour Masters) delivered by Middlesex University, London. IHMA has also worked closely with the Nautical Institute on its recently updated third edition of *The Work of the Harbour Master.*

As a relatively small association with just over 230 members from around the world, and with particular concentrations in Europe, South Africa, Canada and Australia, the Association is keen to continue to welcome new members who can benefit from a strong and supportive network of professionals who want to share their experiences and good practice, not least at the ever popular biennial Congress.

This year's congress held in Bruges at the invitation of the ports of Ghent and Zeebrugge reflected current harbour master interests on the theme of safe port entry.

It included updates on the latest information technology assisting assessment and promulgation of port information, harbour master perspectives on liquefied natural gas (LNG) bunkering, safe anchorages and mooring developments, emerging trends in VTS, risk and crisis management including consideration of places of refuge.

The European Harbour Masters' Committee, a regional sub-committee of IHMA, is active in a number of European projects and the IHMA's governing council responds to members' interests with its support for work on nautical port information, which currently includes co-operation with the UK Hydrographic Office on the development of web-based port information systems validated by harbour masters, and resources to help assist harbour masters manage requests for a place of refuge. IHMA works closely with its sister organisation IALA where it is represented on the VTS Committee, and is participating on work led by PIANC, the International Navigation Association, related to sustainability and environmental risk management of port infrastructure projects. IHMA values its Consultative status as a Non-Governmental organisation at IMO participating on issues related to the ship-shore interface.

Members of IHMA occupy positions in the largest and busiest ports in the world and they place high value on the support of their fellow harbour masters. They enjoy each other's company, openly share their successes and difficulties and are keen to work with sister organisations (including the pilots). As IHMA's most recently elected President, Captain Kevin Richardson, retired Chief Harbour Master of Dover said, his personal maxim while working at the world's busiest ro-ro port was *"Keep it moving... but keep it safe!"* IHMA continues to support harbour masters keep their ports safe as they perform a role that is vital for the world's international trading patterns and economic dynamism.

Acknowledgements

Captain Rinze K. Mast, *Port Technology International,* Issue No 4, 1996
Lyn John, *Rebecca and the Harbour Master,* Llanelli Community Heritage, 2014.

Below: *IHMA represents the views of harbour masters worldwide and they meet every two years at Congress, this year it was held in Bruges hosted by the ports of Ghent and Zeebrugge.*

Below: *As well as hearing a broad range of topics of interest at Congress, delegates were able to inspect VTS related products at the accompanying exhibition.*

Above: *Captain Kevin Richardson, President of IHMA, at left and Captain Amaury de Maupeou, Chairman of the European Harbour Masters' Committee.*

Background picture: *The maintenance of high standards delivered by the harbour master and port staff is manifest in many forms, for example on the wharf, with vessel traffic services, hydrography and aids to navigation provision.*

An example of a VTS port control centre, this is the Port of London Authority's installation at Gravesend.

London VTS Port Control Centre at Gravesend. VTS is one of the subjects studied by students taking the International Diploma for Harbour Masters, a curriculum endorsed by IHMA.

First World War national presentations

By Paul Ridgway

WE TAKE A LOOK at some of the museums and galleries up and down the country and report how they are commemorating this important centenary.

The National Portrait Gallery

An impressive, recently conserved portrait of First World War naval officers is now on display in Room 32 at the National Portrait Gallery for the first time since the 1960s. Through a successful public appeal in 2013, £20,000 was raised for essential conservation work on the large-scale painting, allowing it to go on rare public display as part of the gallery's programme commemorating the First World War centenary.

Measuring over five metres in length, Sir Arthur Stockdale Cope's grand group portrait *Naval Officers of World War I* (1921) is set in the Admiralty Boardroom, Whitehall, and comprises twenty-two portraits of the navy's most senior figures. It has been in storage for over fifty years due to its delicate condition which had made it unfit for public display.

Following the success of the public fundraising appeal to restore the portrait, conservation work has taken place on the painting, and its huge original frame, over a five-month period. Such is its size, a narrow entrance had to be created in the wall of the National Portrait Gallery's framing studio to allow the enormous frame to be passed into the studio in four separate parts. The vast canvas was carefully rolled into a cylinder so that it could be transported into the Gallery before being stretched and assembled onsite.

The careful removal of discoloured varnish and surface dirt that had built up on the canvas over many years has transformed the painting's appearance, revealing once more the tones in colour and subtle details that were previously masked from view. After being painstakingly cleaned, parts of the frame were re-built in areas, and its gilded surface has been restored using historically faithful techniques and materials.

Shortly after the First World War, the leading financier and public servant Sir Abraham Bailey decided to commission three group portraits to commemorate the role of the army, the navy and the politicians in bringing the war to a close. Sir James Guthrie's *Statesmen of World War I* and John Singer Sargent's *General Officers of World War I* are on continuous display in Room 30 where they form the centrepiece of the Gallery's Great War holdings. In contrast, the *Naval Officers of World War I* has not been seen for several decades.

Naval officers of World War I by Sir Arthur Stockdale Cope, 1921. © *The National Portrait Gallery*

Portrait sitters: left to right

Sir Edwyn Sinclair Alexander-Sinclair (1865-1945), Admiral.

Sir Walter Henry Cowan, 1st Bt (1871-1956), Admiral.

Sir Osmond de Beauvoir Brock (1869-1947), Admiral.

Sir William Edmund Goodenough (1867-1945), Admiral.

Sir Robert Keith Arbuthnot, 4th Bt (1864-1916), Rear-Admiral.

Sir Montague Edward Browning (1863-1947), Admiral.

Sir Christopher Cradock (1862-1914), Admiral.

Sir Horace Hood (1870-1916), Rear-Admiral.

Sir John Michael de Robeck, Bt (1862-1928), Admiral of the Fleet.

Sir William Pakenham (1861-1933), Admiral.

Sir Reginald Yorke Tyrwhitt, 1st Bt (1870-1951), Admiral.

Roger John Brownlow Keyes, 1st Baron Keyes (1872-1945), Admiral.

Sir Cecil Burney, 1st Bt (1858-1929), Admiral of the Fleet.

David Beatty, 1st Earl Beatty (1871-1936), Admiral.

Sir Trevylyan Napier (1867-1920), Vice-Admiral.

Louis Alexander Mountbatten, Marquess of Milford Haven (Prince Louis of Battenburg), (1854-1921), Admiral of the Fleet*.

Sir Hugh Evan-Thomas (1862-1928), Admiral.

Sir Frederick Sturdee, 1st Bt (1859-1925), Admiral.

Sir Arthur Cavenagh Leveson (1868-1929), Admiral.

Sir Charles Edward Madden, 1st Bt (1862-1935), Admiral.

John Rushworth Jellicoe, 1st Earl Jellicoe (1859-1935), Admiral*.

Rosslyn Erskine Wemyss, Baron Wester Wemyss (1864-1933), Admiral of the Fleet.

Elder Brethren shown thus *:

Seventh from right, with beard, seated: Louis Alexander Mountbatten, Marquess of Milford Haven (Prince Louis of Battenburg), (1854-1921), Admiral of the Fleet. His portrait hangs in the Library at Trinity House.

Second from right, seated, John Rushworth Jellicoe, 1st Earl Jellicoe (1859-1935), Admiral.

National Maritime Museum, Greenwich

Forgotten Fighters: The First World War at Sea
Currently running to November 2018.

This explores the naval and maritime dimensions of the conflict. Whereas the horrors of the Western Front have long dominated the nation's understanding of those years, and yet the war at sea was fought on an epic scale and with terrible human loss. Here are the personal stories of those who participated through a wide range of objects including weaponry, photographs, medals and ship models and the visitor is introduced to the heroism of merchant mariners to the shattering realities of naval battle, and from the Falkland Islands and the Mediterranean to the Atlantic and the North Sea.

The Royal Navy and the Merchant Navy were responsible for the protection of the nation's trade and communications network that was vital for its survival. Without the efforts of these brave seafarers, supplies and reinforcements could not have reached the soldiers in the trenches, and Britain would not have received the food and raw materials on which the nation depended. The Royal Navy was at the forefront of new technologies in the form of submarines and aircraft during the First World War, neither of which had played a major part in conflicts. The number of Royal Naval Air Service personnel grew to 55,000 from its humble beginnings of fewer than 1000, involved in the spotting and attacking of German targets on land and at sea. Beneath the waves, German U-boats posed an increasing threat throughout the war, and yet for both British and German submariners, accidents and mechanical failures were often as hazardous as enemy attack. Fighting for the Royal Navy also spilled onto the land, with thousands of reservists and volunteers serving, as part of the Royal Naval Division. From 1916 through to the end of the war, the Royal Naval Division fought alongside their comrades as infantry on the Western Front, where their casualties made up a large proportion of the navy's losses.

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The D-type merchant vessel of 1917, model to a scale: 1:96. To ensure rapid replacement of the losses caused by German submarines in the First World War, a large number of merchantmen were built on a few standard designs. These workhorses of the world's oceans were given names ranging from War Acacia *to* War Zinnia *(all active in 1917). The model represents the 'D'-type designed by S P Austin & Sons of Sunderland. It shows the defensive armament of a single 4.7 inch gun and the paravanes for protection against mines. It is of exceptional quality; the fittings, in particular, have been beautifully made.*
Illustrations © National Maritime Museum.

A superb model of a 55-foot coastal motor boat (CMB) of 1917, built by a variety companies throughout the First World War. This model was made by John Thornycroft. In 1917 the 55-foot CMB was developed to give greater range and the model shows an early version of this type on its launching trolley. They had a crew of between three and five and some were capable of 40 knots. The boat is fitted with a trough housing an 18-inch torpedo. It had been necessary to develop an apparatus which, without the weight of a torpedo tube and without detracting from the boat's sea-going qualities, would launch a torpedo at speed. A twin Lewis gun-mounting sits on top of the cockpit. The need for this anti-aircraft defence had been demonstrated when a force of the earlier CMBs was annihilated by German seaplanes. The metal device on the front of the cockpit roof is a torpedo director, for calculating deflection to allow for the enemy's course and speed before firing. Four depth charges were carried and mines could be loaded instead of torpedoes. These CMBs gave useful service operating out of Dover and the East Coast ports, but their most successful exploits came later in the Baltic, against the Bolsheviks in 1919. A large force of 55-foot CMBs sank the battleships Petropavlosk *and* Andrei Pervosvanni *and a submarine depot ship in a single raid on Kronstadt Harbour.*

Warships and searchlights
© The National Museum of the Royal Navy.

 Continued from Page 35.

Chatham Historic Dockyard

Loss & Sacrifice: Chatham, The Royal Navy and the War at Sea

A thought provoking and emotive exhibition, revealing the role played by Chatham Dockyard, its workers and the Chatham Division of the Royal Navy commemorates the centenary of the outbreak of the First World War. This runs until 30 November and introduces the long years of valour, loss and sacrifice depicted using first-hand accounts, personal effects and poignant items including paintings, pictures and poetry. All are drawn from the national collections of Imperial War Museums and the National Maritime Museum, complemented with previously unseen items from The Historic Dockyard Chatham's own collection.

***Above**: Government propaganda 1917.*
Photo by Thomas Cogley, © Chatham Historic Dockyard Trust.

Particular attention has been given to the loss of three Royal Navy cruisers: HMSs *Aboukir, Hogue* and *Cressy* were sunk by enemy submarine action on 22 September 1914 with a loss of life of 1,459. The exhibition shows brilliantly how technologies were quickly developed to fight against a new type of warfare challenging a navy that had not been seriously threatened in Home Waters since the end of the Napoleonic Wars. The First World War is often thought of in terms of mainly trench warfare. However, this was not the case. Britain's war was fought on a number of fronts – the war at sea being one of them.

Merseyside Maritime Museum, Liverpool

Lying in Canning Graving Dock, opposite the Museum of Liverpool is the port's former pilot cutter *Edmund Gardner* which has been treated by artist Carlos Cruz-Diez to demonstrate dazzle camouflage so common on ships in both world wars and introduced in the Great War. Work was carried out by painters from Cammell Laird and the cutter now bears the title *Induction Chromatique à Double Fréquence pour l'Edmund Gardner Ship / Liverpool. Paris, 2014.*

Dazzle camouflage used a painting technique introduced during the First World War. Contrasting stripes and curves create an optical illusion that break up a ship's shape and obscure its movement in the water, making it difficult for enemy submarines to identify and destroy.

Painted in bright colours and a sharp patchwork design of interlocking shapes, the spectacular dazzle style was heavily indebted to Cubist art. The inventor of dazzle painting, Norman Wilkinson, was influenced by avant-garde British painters such as Wyndham Lewis and David Bomberg. Edmund Gardner will be returned to her original livery in late 2015.

National Museum of the Royal Navy, Portsmouth.

In Portsmouth's Historic Dockyard, wherein lie Nelson's *Victory* and the preserved Victorian warship *Warrior* is to be found the monitor *M33* which served in the Dardanelles campaign. *Racing to War: The Royal Navy and 1914* is the Museum's new major temporary exhibition devoted to the outbreak of the First World War and charts Britain's naval history from its triumph in the Anglo-German naval arms race – one of the several intertwined causes of the outbreak of the War. It continues by illustrating how the Royal Navy was instrumental in the building of the Grand Fleet and looks at influential personalities such as Sir John Fisher (First Sea Lord and considered one of the most important figures in British naval history).

***Above:** The monitor* M33 *which served in the Dardanelles campaign now at Portsmouth Historic Dockyard. © Photo by Mike Sturley.*

In the Museum's permanent galleries is displayed *HMS Hear My Story* revealing one hundred years, one thousand stories, one Royal Navy in telling the many unknown and undiscovered stories from the ordinary men, women and ships that have shaped the Navy's astonishing history over the last century in an effort to bringing visitors closer than ever before to the real Royal Navy. Here there is the 4-inch gun from HMS *Lance*, which fired the first British shot of the war on 5 August 1914. This is shown with unpublished love letters from a serving Chief Stoker of the period; the first public display of Admiral Crutchley's Victoria Cross; oral testimonies and more.

Imperial War Museum, London

New First World War galleries were unveiled here in August as part of IWM's plans to transform its flagship branch during the national commemoration and thereby enabling much more of the museum's world renowned First World War collections, including art, film, sound recordings and photographs as well as larger exhibits to be seen. These galleries play a major part in our national commemorations of a war that claimed the lives of 16 million people across the globe and had an impact on the lives of millions more.

Visitors can appreciate the story of the war through the eyes of people in Britain and its empire, both on the home front and the fighting fronts. They will see how the war started, why it continued, how the Allies won and its global impact. This £40 million transformation has been made possible with the support of a number of funders, sponsors, trusts, foundations and individuals, including a grant of £6.5 million from the Heritage Lottery Fund and £5million from the Department of Culture, Media and Sport.

Stepping into the Galleries visitors are introduced to Britain at the turn of the 20th century, a maritime power dependent upon its empire, seaborne trade and the mighty Royal Navy to protect that trade. In addition the tensions and rivalries that were developing in Europe are introduced, and crucially, as the crisis of summer 1914 led to war, this exhibition shows why Britain felt it had to fight. Visitors can explore the war at sea and campaigns in the Middle East, Africa and Gallipoli, is dominated by the naval gun from HMS *Chester* at which young Jack Cornwell VC was mortally wounded in the Battle of Jutland.

Sea City Southampton

Hampshire's contribution to the First World War is revealed in a new major exhibition at SeaCity Museum, Southampton, highlighting the port's crucial role in the conflict and running to next January. Southampton was the main port of military embarkation with over eight million troops embarking over the four years of the war. Hampshire became the muster point for these soldiers and huge camps were formed in and around Southampton, Winchester and Basingstoke. In addition to the departing troops the county also saw a steady flow of refugees, prisoners-of-war and over one million wounded coming back to England.

The exhibition explores the impact on the lives of local people and businesses during this extraordinary time and follows soldiers' journeys through the county before embarking through the port to go overseas.

Exhibits include a recreated dock scene which attempts to bring the wartime wharf to life. The bell from *Mauretania*, a fine ocean liner of her day, which went on to serve as a troopship and hospital ship during the War is also shown.

National Maritime Museum Cornwall, Falmouth

Here a new commemorative case has been installed and which over the next five years will show items in the museum's collections from the First World War. Among the first items to go on display are a beaded snake which was made by a Turkish prisoner of war in 1918 and souvenirs belonging to a crew member on board the four-masted barque *Andromeda*, which was wrecked on the rocks off Killigerran Head near Falmouth in 1915.

***Above:** Liverpool pilot cutter* Edmund Gardner *in dazzle camouflage.*
©Merseyside Maritime Museum.

***Above:** At the Imperial War Museum visitors are in no doubt that Britain, as a maritime power, was dependent upon its empire, seaborne trade and the mighty Royal Navy to protect that trade. ©Imperial War Museum.*

***Above:** A recreated dock scene from the port of Southampton.*
©SeaCity, Southampton.

***Above:** Bell from the famous ocean liner* Mauretania *which served as a troopship and hospital ship during the First World War.*
©Sea City Southampton.

This year the Royal Marines celebrated 350 years since their founding in 1664 and together with our own celebrations of 500 years sportsmen of the two services met on the field of play on two occasions. The away match was held at Instow and the home game took place at Frinton on 7 August.

Joe Robinson writes:

For the second time this year the Trinity Taverners took to the cricket field against the Royal Marines, hoping to gain revenge for their narrow defeat earlier in the year. At the pleasant surroundings of Frinton, given the superb-looking wicket and the warm weather, the Taverners were delighted to win the toss and bat first. Will Cole and Jerry Wedge were our openers, and steadily gained runs against some decent but not overwhelming bowling, before Cole was well caught for 16. This bought Frinton's finest, Justin Greaves, to the wicket, who showed no regard for rank by dismissively swatting Lieutenant-Colonel Cliff Dare for four on the first ball he faced. The Taverners progressed to 80 at lunch with Wedge accumulating sensibly and Greaves scoring rapidly, achieving his fifty the over before the break.

After a superb lunch, Greaves returned to continue his assault. If his innings at Instow was about grace and elegance, this was a far more violent effort and his hundred was reached in no time at all, other than time spent looking for lost balls, including one six that not only cleared the boundary but nearly the adjoining field as well. He retired after reaching his century, followed an over later by Wedge, who suffered an ankle injury and retired for 39. Mike Jones and Martin Bransby continued adding runs, and when Bransby was out, Malcolm Nicholson joined Jones in a partnership that lasted for the rest of the innings. Jones was sedate until near the end of the innings, where he blasted three consecutive sixes. Jones was on 66 and Nicholson 27 when the Taverners called a close to the carnage, having made 283.

The Royal Marines' reply began slowly, with their opener caught down the leg side by a tumbling Bransby, before Richard Nunn clean bowled the number three. However, either side of tea the Marines launched a counter offensive through the technically correct play of Wiseman and the outright force of Oram. Catches were dropped, sixes were hit and the Taverners were suddenly in a spot of bother.

Any hopes of a Marines victory were then extinguished by Lewis Catlow, whose left arm spin dismissed both. Another brief rally was again ended by Catlow, and, with the Taverners now fielding much better, catches were now beginning to stick and stops were being made, including a tumbling one by Sir Jeremy. The Marines could still hope for a draw, but Catlow continued to spin his web, taking seven wickets in all. His sixth wicket, and the champagne moment of the day, saw John, a local favourite with the Frinton fans after the Marines arrived a day early at the ground and spent the rest of it getting to know the locals, blasted a near certain six, only for Jones to run backwards and catch the ball magnificently over his head – a piece of skill worth seeing in any cricket match. With one wicket needed for victory, Taverners captain Pat Patel returned to bowl and took the final wicket, that of Colonel Dare, to complete victory for the Trinity House team. It was a superb day, aided by good weather and good hospitality, and a fitting tribute to the respective anniversaries of both organisations. A big thank you to those who helped organise, both before and on the day itself.

A superb day, aided by good weather and good hospitality, comes to a close at Frinton.

Front row left to right: *Joe Robinson; Sir Jeremy de Halpert; Malcolm Nicholson; Lewis Catlow; Will Cole.*
Back row left to right: *Pat Patel; Richard Nunn; Mike Jones; Justin Greaves; John Hambrook; Martin Bransby.* ***Not pictured:*** *Jerry Wedge.*

Commodore Bill Walworth CBE FNI FIMarEST CMarTech

Commodore Bill Walworth was sworn in as an Elder Brother on 3 September. He served as a Cadet and Junior officer with the BP Tanker Company before joining the Royal Fleet Auxiliary in 1979. He served in a number of sea appointments, on training courses and in RFA HQ posts before taking his first command in 1994. Further command and Headquarters Management Roles followed until in 2002 he attended the Higher Command Staff Course and subsequently became Director of Operations for the RFA. In 2004 he was loaned to the UK Maritime Battlestaff to develop the UK policy for Joint Logistic Support to the NATO Response Force, before command of *Fort Victoria*.

In 2008 he was appointed Head of the RFA Service in the rank of Commodore (known as COMRFA) and Assistant Chief of Staff Afloat Support to Commander-in-Chief Fleet, responsible for the manpower and ships of the RFA and the associated budgets. He retired from the RFA in January 2014 after five years as COMRFA.

During his time in post, management of procurement and capability was devolved to the Front Line Commands and he became responsible for capital expenditure as well as in year resource for the RFA. He was a director of the Chamber of Shipping of the UK during this period, taking a leading role in the Shipping Defence Advisory Council. His appointment as COMFRA included a Treasury-driven review into the RFA and the Security and Defence Review of 2010, with the associated financial challenges. He led reduction of the RFA costs by 10% during a period of high operational activity worldwide and counter piracy in the Indian Ocean.

In 2011 he chaired a review of MoD civilian personnel with nautical qualifications, which lead to the introduction of the MoD Maritime Specialist Service (MMSS) a departmental skills alliance. He became head of service and skills champion. The new service included naval base port authority personnel, port operators, pilots, salvage and mooring personnel and boatmen. He was a member of the Dockyard Ports Board.

He is a master mariner (still current), has undertaken a number of MoD and government courses and is a qualified programme manager. A trustee of the Marine Society & Sea Cadets, he chairs the Merchant Navy Liaison Committee, and is a governor of the Marchant-Holliday School, a charitable residential school for children with special needs in Somerset. He is chair of the Maritime Skills Alliance and shortly takes up an appointment as Clerk to the Worshipful Company of Fuellers. He was for some years the Nautical Institute representative on the two Trinity House user consultative groups. He is a member of Langstone Sailing Club and Bath Rugby Old Players' Association and retains a keen interest in Rugby Union and the performing arts. He is president of Anchorites this year.

Retirement of Commodore David Squire

Commodore David Squire CBE MNM RFA retired as Rental Warden of the Corporation at Trinitytide this year. At the same time he stepped down from the Trinity House Corporate Board.

In May 2005 he was sworn in as an Elder Brother and Assistant and member of the Corporate Board following the retirement of Captain Ian Gibb in May 2005. He had been admitted as a Younger Brother in 2001 following a distinguished 35 year career with the Royal Fleet Auxiliary Service from which retired in 1999, the last five years of which were as Commodore of the RFA.

He joined the RFA on a four-year apprenticeship in 1963 and made his way to become Chief Officer by 1978. A year later he became the first civilian mariner to pass the Royal Navy Staff Course at Greenwich. After a succession of command posts he was appointed, in 1987, to the Ministry of Defence as the first RFA Staff Officer in the Directorate of Naval Warfare responsible for operational logistics and afloat support.

After 2½ years at the MoD he returned to sea in command of RFA *Argus* and later RFA *Fort George* before being promoted to Commodore and Type Commander for the RFA Flotilla. In this appointment

he was responsible to the Commander-in-Chief Fleet for 22 operationally capable ships, and an annual budget of £90million with assets of some £1.3billion.

Between service with the RFA and Trinity House he remained active in the maritime world. Amongst many appointments, he was Secretary to the Marine Accident Investigators' International Forum (MAIIF) which is an international governmental organization with observer status at the IMO.

Furthermore, he is editor of *Alert!*, the International Maritime Human Element Bulletin, published by the Nautical Institute. He is Chairman of the Merchant Navy Training Board, a member of the Council of the RNLI and Deputy Chairman of the RNLI's Operations Committee. He is a well-known authority on human element and safety of navigation issues, and has written and lectured widely on these subjects.

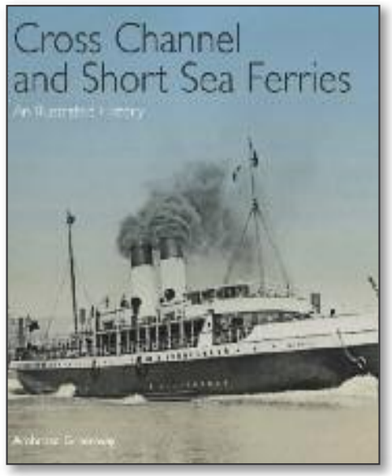
During his time as an Elder Brother David Squire has managed both the Trinity House Merchant Navy Scholarship Scheme and the Professional Yachtsman Bursary Scheme, each of which has enabled young people to take up seagoing careers. These two schemes have seen over 400 train at nautical colleges before going afloat to commence successful careers as Merchant Navy officers or in the world's fleet of large yachts.

David Squire remains a member of the Examiners' Committee until the end of the year and away from Trinity House he continues as editor of the journal of the Honourable Company of Master Mariners in HQS *Wellington*.

Cross Channel & Short Sea Ferries:

An Illustrated History

By **Ambrose Greenway** (Hardback) Published by Seaforth Publishing.192 pages; ISBN: 9781848321700 Price **£24.00**



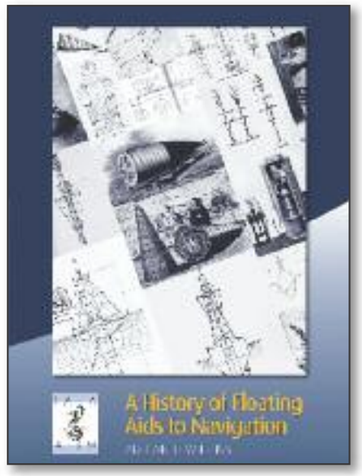
The author, an Elder Brother, is an accomplished scribe and photographer with many shipping titles to his name. This beautifully illustrated hardback is a magnificent collection of over 300 photographs covering the development of the classic cross channel or short sea passenger ferry, often described as a liner in miniature.

From the mid-19th century paddle ferries slowly evolved into screw-driven steamers but it was the advent of the steam turbine and the construction of the railway steamers The *Queen* and *Brighton* in 1903 that caught the attention of the world. Similarly-propelled ships multiplied and their use soon spread to the Antipodes, Japan, the Mediterranean and North America. In 1912 Rudolf Diesel's new oil engine went to sea in a cargo ship but it was not until 1925 that it was first employed, to widespread acclaim, in the Danish North Sea packet *Parkeston*. In 1934 it made its debut on the English Channel with the Belgian Government's handsome 25-knot motor ferry *Prins Baudouin*.

Increase in car travel from the 1930s led to the development of a car ferry accessed through bow and stern doors and the proliferation of these after the Second World War led to the eventual demise of the classic passenger ferry in the 1960s. With its informative introductory texts and abundant photographs and, detailed captions for which the author is renowned, this book will appeal to ship enthusiasts around the world and to all those who mourn the passing of the golden age of the passenger ship.

A History of Floating Aids to Navigation

By **Adrian H Wilkins** (Paperback), Published by IALA-AISM. 82 pages; ISBN: 978 2 910312 01 5 Price **€18.00**



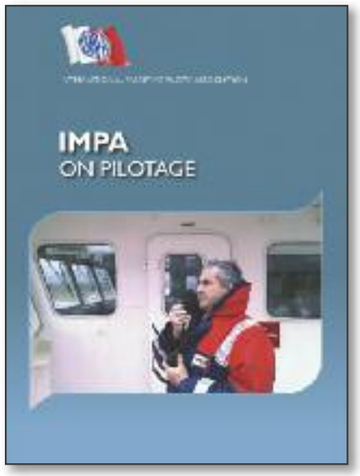
This handsome 82 page A4 publication is the fruit of 40 years' work by a professional engineer in the field of marine aids to navigation and fills a space where there is a lack of written history of buoys and early lightvessel engineering. His researches have delivered the year 1295 where the first buoys were mentioned in sailing directions for the Guadalquivir estuary leading to Seville. Others were to be found at Kampen in northern Holland in 1300. Later that century others were recorded in the waters of Texel. More were listed in the 16th century and the necessary buoy tender, of Bremen, was depicted in 1770. The first lightvessels are introduced with that established in 1731 at the Nore station where the Medway joins the Thames Estuary. Construction and development of buoys gathered momentum from simple cooperage of barrel making to the rolled and riveted steel of later years with which we are all familiar.

The first lighted buoys are described along with experiments of light sources, the development of fog signals, use of electricity, the carriage of radio aids to navigation on buoys and the short but sickening career of the LANBY. This is a valuable work on the history of marine aids to navigation (even the sparse appearance of the buoy in popular literature receives mention) and the author is encouraged to continue on this course where there is sure to be a ready readership.

Copies are obtainable on application to IALA and may be ordered on the website at: www.iala-aism.org

IMPA on Pilotage

By **The International Maritime Pilots' Association** (Hardback), Published by The International Maritime Pilots' Association. 234 pages; ISBN: 978 1 85609 635 5 Price **£75.00**



For long there have been few books on the subject of maritime pilotage and only one example comes to mind, that published by the Nautical Institute on pilotage and ship handling in 1990 and there are references in other publications such as the IALA Aids to Navigation Manual.

Here we have a valuable work outlining the legal and statutory elements of pilotage, how it is conducted and methods of ship handling along with requirements, training and certification of pilots and even an introduction to fatigue management. In addition, the important matter of pilot ladder safety is addressed. Also considered are pilot cutter evolution and the types of pilot vessels available today. Furthermore, the use of helicopters to ship and land pilots is well described. This volume provides useful background for those who need to know about one of the many maritime safety facets of the vast shipping business.

There is a valuable series of appendices. In one IMPA's position on competition in pilotage is outlined. Guidance is given to its members on the use of ECDIS and there is a reflection on IMO's e-Navigation strategy. Expertise of over 30 pilots and industry experts has helped to produce a splendid insight into the role of the maritime pilot. Guidelines are provided on the design and use of portable pilot units which are seen more and more on the bridges of the world's tonnage. IMPA has done a splendid job in bringing to the fore the work of the pilot with this exemplary book.

Quincentenary merchandise

To request an order form or to order direct please contact: **Michelle Tindall**, The Corporation of Trinity House, Tower Hill, London EC3N 4DH. **Michelle.Tindall@thls.org** or **020 7481 6924.** Payment can be made by cash, cheque, debit or credit card. All cheques are to be made payable to "Trinity House Events Ltd". **Prices for orders from overseas, Europe or Rest of the World, can be obtained on request. Please note that we do not accept American Express cards.**

The Trinity House 500 fleece

To further commemorate our quincentenary a handsome fleece is now available. This bears the coat of arms granted in the reign of Queen Elizabeth I in the year 1573 on the left breast and the TH 500 logo on the right sleeve. Sizes available are Medium, Large, XLarge and XXLarge.

The fleece retails at **£30** plus £4.25 postage and packaging for UK purchasers.

Orders should be sent to Michelle Tindall as above.

Half-pint Mug

Special edition half-pint mug commissioned from the Emma Bridgewater pottery company. **£16.00** each

Cashmere Scarf

Scarf with Trinity House arms and dates embroidered; available in dark blue or cream. **£52.00** each

Trinity House-themed £2 coin.

On 19 May the Royal Mint announced that to mark the 500th anniversary of the granting of the Charter by HenryVIII in 1514 it had produced a limited edition commemorative Trinity House-themed £2 coin in three versions; sterling silver, 22 carat gold and silver Piedfort. These coins carry a striking lighthouse design by Joe Whitlock Blundell and David Eccles. The design also appears on the circulating version of the £2 coin which you will doubtless find in your loose change soon. Each coin is edged with the words SERVING THE MARINER.

The Trinity House-themed £2 coin.

Quincentenary Coin Cover

Issued in a limited edition of 10,000 by the Royal Mint, the coin cover pays tribute to the Corporation of Trinity House in our 500th anniversary year and at the same time Southwold Lighthouse is featured as part of a seaside architecture stamp set.

This coin cover contains the £2 coin and bears the Southwold Lighthouse stamp. The front of the cover carries a photograph of Beachy Head Lighthouse while the reverse features a map of England and Wales pinpointing our 64 lighthouses. Maritime history writer and photographer Richard Johnstone-Bryden has contributed a brief summary of the origins of the Corporation, as well providing a timeline of our history and current responsibilities; this contains a quote from HRH The Prince Philip, Immediate Past Master of the Corporation. The postal location of Lowestoft on the postmark refers to our first lighthouse construction, in1609.

To obtain the coin cover visit: **www.royalmint.com** price **£15.95** (Royal Mint product code: **UKTNPNC**)

WEDDINGS

At the church of All Hallows-by-the-Tower, London EC3 on 5 July between **Stuart Turner** son of Mr and Mrs Bruce Turner of Johannesburg, South Africa, and **Zoë Richards**, Deputy Events Manager Trinity House, daughter of Captain and Mrs Derek Richards of Canterbury Kent. The reception was held in the west gallery of Tower Bridge, with a splendid view up the Thames as a backdrop. The honeymoon was spent in the Dominican Republic.

On 19 September at Colchester Registry Office **Natalie Todd**, Finance Administrator, married **Jonathan Foley**. Their event included a *Beatles* themed blessing at The Waterfront, Dovercourt the following day for all family and friends.

BIRTHS

To **Wayne Beckham**, CAD Technician, and **Katie Vodden**, a daughter, ***Beau Lilly-D***, on 16 September 2014. She weighed 6lbs 13oz.

To **Sophie Harvey**, IT Help Desk Administrator, and husband **Jay**, a daughter, ***Eva***, on 20 June 2014, She weighed 7lbs 2oz.

To **Sarah Harman**, Assistant Accountant and husband **Terry**, a son, ***Jesse James Edward Harman***, on 15 August 2014. He weighed 6lb 9oz.

To **Louise Harper**, Performance Administrator and **Mike Yaxley**, Senior Project Engineer, a daughter, ***Holly Louise*** was born 16 July 2014 at 05:23am at Colchester General Hospital. She was born early at 28 weeks and 4 days, weighing 2lb 1oz. Holly spent over 8 weeks in Special Care at Colchester Neonatal Unit before coming home on 15 September.

LIGHT UPON THE WATERS

THE HISTORY OF TRINITY HOUSE 1514 TO 2014.

When Henry VIII granted a guild of mariners a Royal Charter in 1514, he could not have foreseen the changes the organisation would witness and influence over its first five centuries. To commemorate 500 years of its foundation, the Corporation of Trinity House publishes its history in this 320-page, richly illustrated volume, told by maritime historian Captain Richard Woodman and pilotage expert Captain Andrew Adams.

(ISBN 978 0 9575991 0 9) Price **£29.95**

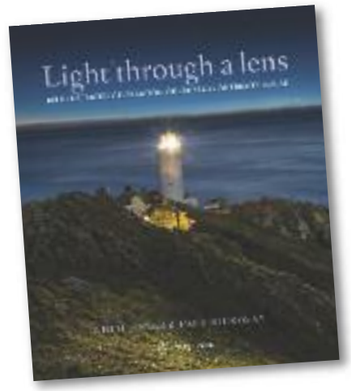
To order please contact **Michelle Tindall**; email: michelle.tindall@thls.org or **www.trinityhouse.co.uk/th500/books**

LIGHT THROUGH A LENS

AN ILLUSTRATED CELEBRATION OF 500 YEARS OF TRINITY HOUSE.

This is a hardback book by Neil Jones and Paul Ridgway, published by Bloomsbury and was launched on 11 September. Neil Jones has been Records Manager for Trinity House since 2005 and Paul Ridgway's association with Trinity House goes back four decades beginning as a PR assistant at Headquarters on Tower Hill in 1972. This is an annotated collection of illustrations of the 500 year history of Trinity House and contains rarely-seen archive photographs of Lighthouse Service operations in our waters.

(ISBN 978 1 4081 7 595 8) Price **£20.00**



LIGHTHOUSE PHOTOGRAPHIC COMPETITION

As in past years we are running a competition to find the best photographs of our lighthouses. Entrants are invited to submit pictures of any of our lighthouses. The twelve winning photographs will be published in the 2016 Lighthouse Calendar produced in association with leading calendar producer J Salmon Ltd. The photograph deemed the overall best entry will win a short break in one of the lighthouse holiday cottages.

This competition closes on 28 February 2015. Further details about the competition, including rules and an entry form can be obtained from the website: **www.trinityhouse.co.uk/photo_competition**

One of last year's images: *Southwold Lighthouse by Tim Warner.*

COMPETITION WINNER

We announce here the result of the competition draw from *FLASH 21* in the Summer.

Q Name the first Engineer-in-Chief of Trinity House?

A ***James (later Sir James) Douglass*** who held the post from 1863 to 1892.

The first correct answer drawn by the Editor on 1 September was that of **Charles Gilbert** of Belper, Derbyshire. We send our congratulations and a handsome print of a work by Peter Kent the Greenwich-based artist.

CONTACTING TRINITY HOUSE If you wish to make future contributions to ***FLASH***, please forward your information, and a photograph if possible, to Neil Jones. His contact details are on the inside front cover of this edition. *To make the most of your images in print, they should be submitted as 300dpi jpegs – the larger the image file the better – please do not embed the image within a Microsoft Word file.*
Latest date for submissions: 16 March 2015.

CHRISTMAS CARDS AND CALENDARS

This year's Trinity House Christmas card features an illustration depicting the presentation of the Royal Charter granted to the Corporation of Trinity House by Henry VIII on 20 May 1514. The pack of 10 cards is approximately A5 in size and includes matching envelopes.

These are priced per pack at **£9.50** if collected or by post at **£11.00** in the UK, **£14.50** in Europe and **£16.50** in Rest of World.

Our ever-popular Lighthouses Calendar is also now available and features entries submitted to our annual Lighthouse Photography Competition. The calendar is approximately 295mm x 305mm in size and shows some of our most famous lighthouses: *Start Point* (the cover image), *Beachy Head, Cromer, Flamborough, Hurst Point, Longships, Lundy South, Needles, Portland Bill, South Bishop, Southwold* and *Strumble Head.*

Priced at **£8.50** if collected. With post and packing in the UK it is **£13.50**, in Europe, **£15.00** or **£18.00** in Rest of World.

Calendar Cover Image: *Start Point Lighthouse by David Johnson.*

How to Order

Orders may be made online at: **www.trinityhouse.co.uk/commercial/gift_shop/christmas_cards** or **www.trinityhouse.co.uk/commercial/gift_shop/calendars** using your credit/debit card.

Christmas cards and calendars may also be ordered by telephone at **+44 (0) 1255 245156** with your credit/debit card details (during office hours).

Delivery times: Please allow up to 21 days for delivery.

Starters

Harwich

Elwood Marshall, BuoyYard Team Member, Full-time employee on 2 June.
Allan Mathieson, BuoyYard Team Member, Full-time employee on 2 June.
Zoe Barnard, Assistant Accountant, Fixed term on 16 June.
Stephen Nunn, Finance Administrator, Fixed term on 1 July.
James Rowe, Apprentice IT, Fixed term on 14 July.
Lewis Dale, Apprentice Stores, Fixed term on 14 July.
Matthew Summers, Summer Temp, Fixed term on 1 August.
Gareth Wimpenny, Development Engineer, Full-time employee on 11 August.
Katia Poulouin, Commercial Administrator, Part-time employee on 28 August.
Andrea Rodger, Purchasing Administrator, Fixed term on 8 September.

SVS

Adam Smith, Second Officer, Full-time employee on 17 July.
Adrian Sear, Seaman, Full-time employee on 27 August.
Jodie Cooke, Seaman, Full-time employee on 17 September.
Colin MacDougall, Seaman - Auxiliary, Full-time employee on 17 September.

Tower Hill

Rosemary Walsh, Navigation Department Administrator, Full-time employee on 15 September.

Swansea

Andrew Christopher, BuoyYard Team Member, (Craft), Full-time employee on 12 June.
Jack Lawson, Apprentice Lighthouse Technician, Fixed term on 26 August.

Leavers

SVS

Paul Griffin, Seaman, Full-time employee after 10 years of service.
Samantha Mason, Second Officer, Fixed term after less than one year of service.
Ian Mills, Seaman - Auxiliary, Fixed term after less than one year of service.
Mike Doyle, Second Engineer- Auxiliary, Full-time employee after less than one year of service.
Colin Clarkson, Seaman, Full-time employee after less than one year of service.
Charles Darwall, Second Officer, Full-time employee after 3 years of service.
John Gough, Seaman, Full-time employee after 6 years of service.
Luke Brett, Seaman, Full-time employee after 8 years of service.
Andrew Cage, Seaman, Full-time employee after less than one year of service.
David Pascoe, Engine Room Assistant, Full-time employee after less than one year of service.
David Welton, Seaman, Full-time employee after 1 year of service.

Harwich

Joshua Eldridge, Buoy Yard Team Member, Full-time employee after less than one year of service.
Sandra Debeer, Light Dues Administrator, Fixed term after 3 years of service.
Matthew Summers, Summer Temp, Fixed term after less than one year of service.
Laura Gadsby, Design Technician, Full-time employee after 1 year of service.
Conor Dale, Temporary Assistant - Buoy Yard, Fixed term after less than one year of service.

St Just

Douglas Milburn, Lighthouse Support, Fixed term after less than one year of service.

Tower Hill

Vikki Gilson, *pictured below,* Public Relations Manager, Full-time employee after 8 years of service.

OBITUARIES

It is with great sadness we report the deaths of:

Arthur Hodgkinson, former HEO, London on 18 October 2012, aged 69. He served 5 years.

Ronald Thomas Haydon, Blackwall Gatekeeper and Telephonist on 6 May 2014, aged 85. He served 9 years.

David Small, Mason, Swansea on 16 May 2014, aged 81. He served 30 years.

William Leonard Brooker, Welder, Blackwall on 23 June 2014, aged 92. He served 26 years.

John George Kent, Painter, Blackwall, on 9 July 2014, aged 85. He served 20 years.

Edward William Faulkner, Electrical & Mechanical Engineer, London, on 6 August 2014 aged 82. He served 6 years.

Brian Stanley David Packham, Lightsman LVS, on 22 August 2014 aged 57. He served 5 years.

Eric Kill C Eng AMIMech, born 1925, died on 1 August 2014 after a short illness at the age of 89.

Eric served his engineering apprenticeship at the North Woolwich Yard of Harland & Wolff and joined the Merchant Navy in 1946. He left in 1951 to join the Trinity House Steam Vessel Service as a Third Engineer and saw service throughout the then substantial fleet of buoy tenders culminating in his appointment as Chief Engineer of THV *Patricia* in 1960. In 1962 he came ashore to take up a position in the Engineer-in-Chief's Department which was headquartered at Tower Hill. Some four years later he transferred to the Pilotage Service as Assistant Engineer Superintendent of the Pilot Vessel Service (becoming Engineer Superintendent in 1985) which at the time he arrived was largely dependent upon the cruising pilot cutter system of pilot supply in the London and Isle of Wight Districts.

It was in the pilotage role that Eric was to have a profound effect on the system of pilot supply. Peter Thornycroft had recently designed a 40 foot GRP hull with remarkable sea-keeping qualities which appeared to have the potential to transfer pilots directly to the vessel they were serving. The system had been trialled at the Needles Pilot station using relatively slow 70 foot wooden launches where the shore-to-ship run was short. The need now was for a longer passage, at a higher speed and with fewer crew to safely serve the more distant boarding areas.

THPV Valkyrie, *built 1980.*

The pioneering design and fit out of the first 12 metre pilot launch, (known as the V Class) by Eric and his colleagues was a success that led to over 20 such vessels being built for Trinity House alone. Successful derivatives followed and many other UK authorities were soon to copy. He supervised the UK construction for many authorities abroad including Israel, The Netherlands, Sweden and Italy and this class of launch established a lead for Trinity House in the field. A later example of the class, THPV *Valkyrie*, built 1980 is *pictured previous page*.

Despite the enormous financial benefits of this transition to pilot supply by fast launch, the winds of change were being felt over the whole pilotage scenario in the UK. By 1987 legislation had been introduced to hand over pilotage responsibilities to individual port authorities and this arm of the Trinity House Service became abolished in 1988. Eric is survived by his daughter Vanessa.

Harry Holmes. On 16 January 2014 the age of 83 former Senior Electrical Engineer, Trinity House Lighthouse Service. He joined Trinity House in May 1961 and retired from the East Cowes Engineering Base in October 1992 after 31 years' service.

As a member of a team he was responsible for the electrical engineering of the total lighthouse estate which at its height numbered some 90 manned and unmanned stations. To this was added electrical installation in connection with the aids to navigation in the manned and un-manned lightvessel fleet and, furthermore, the stock of six LANBYs (Large Automatic Navigation Buoys). The latter had been manufactured as part of a lightvessel replacement programme, and were not, it should be added, without huge attendant problems with maintenance.

***Above**: Eddystone lighthouse as observed by a passenger in the Trinity House helicopter. The present tower by Sir James Douglass was commissioned in 1882 and overlooks the stump of Smeaton's tower of 1759. Photo:© Captain Roger Barker.*

During his time at Trinity House he saw the service undergo the early stages of electrification with conversion from PVB to on-site generated power. His career also saw the beginnings of light-house automation and the introduction of remote control and monitoring of stations. One station of particular interest was Eddystone which had been inaugurated in its manned state in 1882 by the then Master of Trinity House, HRH The Duke of Edinburgh. A century later to the day the present duke carried out the switching on of the fully automated station.

Adrian Wilkins, former Principal Mechanical Engineer writes: *"It is difficult to do justice to Harry's importance to the progress of engineering in Trinity House. As a deputy head of department he certainly kept things working well despite a multitude of difficulties. He provided the majority of electrical input for the LANBY build project and the develop-ment of aids to navigation and control and monitoring systems that were used in the automated lightvessels and then in the automation of lighthouses. These were initially with diesel-powered alternator systems providing the electrical power and latterly with the first solar power systems. The remote monitoring and control of the first LANBYs and lightvessels presented many new problems for our engineers and Harry was instrumental in paving the way for the very reliable systems in operation today. He was always a very friendly and helpful person to work with and provided me with much help and background information when I joined the service as a relative youngster. He carried on working with the project teams when we moved to Cowes and I think he commuted home at the weekends as he had decided not to move home to the Island."*

James Kenneth Rankin. The death was reported on 24 May 2014 of James Kenneth Rankin, former Surveyor of Shipping and Marine Engineer of the Trinity House Lighthouse Service at the age of 77. He served 29 years.

Jim Rankin joined Trinity House in the Steam Vessel Service where he served as an Engineer Officer in elements of the fleet, at one time numbering no fewer than nine district tenders. After service in the Corporation's flagship *Patricia*, *(pictured above)* built in 1938 by Smith's Dock of Middlesbrough, he came ashore to the Surveyor of Shipping and Marine Engineer's Department at HQ on Tower Hill as an Inspector of Shipping, as part of a team of eleven. Eventually they were relocated to the Minories, EC3, and then to Church Street, Harwich in the early eighties. With others he was part of a group responsible for all aspects of ship husbandry for a fleet of district tenders and lightvessels each of which had to have regular dry docking and repair, known as the DD&R. This was achieved to a tight schedule and to extremely tight budgets. It is often overlooked but of a fleet of some 30 light vessels each had to be DD&R'd every three years and the district tender fleet needed sufficient spare capacity to achieve the necessary tows to and from the repair shipyards on the west coast, the south, or in the north east: Holyhead, the Mersey, South Wales, Penzance, Southampton, the Thames, Tyne and Wear. During his time in the Department the Mermaid class were constructed by J Samuel White in Cowes, the third and current *Patricia* was built by Henry Robb at Leith *(see illustration above)* and the last tender to bear the name *Mermaid* was built by Hyundai at Ulsan in the Republic of Korea.

Photo:© Mike Page.

Central catering accommodation modifications to the Mermaid class were made in the 1970s.

Another aspect of the Inspector of Shipping's task was the design and construction of helidecks on each of the four Mermaid class district tenders and in the region of twenty lightvessels to enable the Trinity House helicopter to perfect the transfer of stores and equipment to rock and island light-houses and crew reliefs of lightvessels. Jim Rankin was involved in the first designs for lightvessel automations which involved diesel conversions. The second phase of automation for lightvessels, that of solarisation, took place after his retirement.

A dozen of these lightvessels remain in service more than 50 years after their construction, a tribute surely to their design, materials and above all the ship husbandry from the "S of S" department.