



Trinity House

flash

The Trinity House journal | Autumn 2017 | Issue 27



Flying visit

We join THV *Patricia* for a look at helicopter operations at Royal Sovereign Lighthouse

flash

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Welcome to your new *Flash* journal

I'd like to start by thanking the many people who provided feedback on the redesigned *Flash* that we published in spring; we're happy that so many of you responded so positively.

A number of features in this issue will touch upon the need for and provision of maritime skills and training in the UK, which Trinity House is proud to be a big part of, whether through our Merchant Navy Scholarship Scheme or through the various other works of the charity and the fraternity. In that vein, we congratulate Seafarers UK on their centenary and we hear more from them about this milestone and their work today in the partner profile in this issue.

In this issue, we'll continue to look at the people that are continually working, training and innovating in order to keep Trinity House on track.

Finally, I'd like to thank everyone who contributed to putting this journal together.

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Captain Ian McNaught

Deputy Master

Royal patronage, strong governance and centuries of experience as an investor in skills and training all play a part in this uniquely qualified maritime organisation

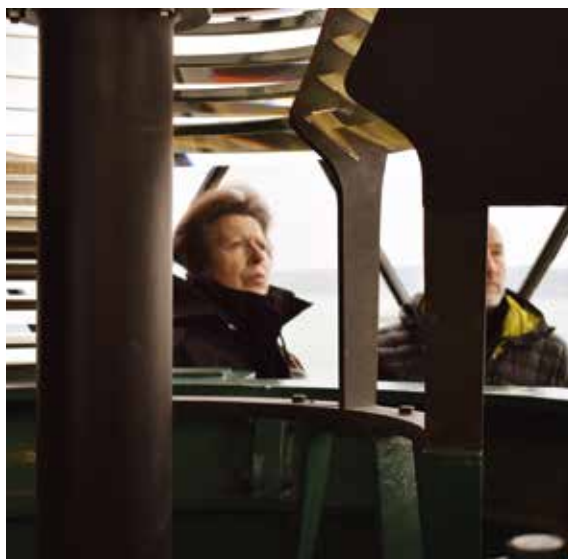
Leadership at Trinity House can take many different forms, from ship's captains to the day-to-day management of our GLA duties or direction from the Elder Brethren and the Master of the Court; in the last few months we have welcomed the Master, appointed a Non-Executive Director and changed hands at Senior Manager level.

In January I was honoured—along with a few others from Trinity House—to welcome HRH The Master to Hurst Point Lighthouse as part of her ongoing familiarisation with our vast and varied lighthouse estate. Having boarded THV Patricia at Portsmouth, the Master was her usual engaged and inquisitive self as she explored the lighthouse; the occasion was a great reminder that we are fortunate indeed in our patronage.

I'd like to welcome once again Mrs Margaret Amos into her new role as a Department for Transport-nominated Non-Executive Director of the Lighthouse Board; Margaret replaces Dawn Johnson who retired from the Board at the end of April after six years' service. Having joined Rolls-Royce as a graduate trainee in 1991, Margaret rose to the position of Finance Director—Corporate, IT and Engineering in 2016; her wealth of experience will be enormously valuable as she chairs our Audit and Risk Assurance Committee. I'd like to thank Dawn for her excellent contribution to the Lighthouse Board and wish Margaret every success in her new position.

Trinity House is proud to become the 15th member of Maritime UK, the promotional body for the UK maritime sector born out of Lord Mountevans' Maritime Growth Study. Both as a trainer of cadets and as a provider of aids to navigation, our contribution to our island nation's shipping infrastructure will help Maritime UK as it works to address the important issues facing the sector, including skills, marketing, exports and maritime strategy.

Any good organisation will tell you that a key element of governance is succession planning: managing continuity and growth through training and familiarisation. One of the subjects that readers will pick up on throughout this issue is the importance of—and need for—maritime skills and training in the UK, and I hope that readers will come away with an appreciation of Trinity House's role in this respect. Commodore Bill Walworth—Elder Brother and Chair of



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the Maritime Skills Alliance—provides the expert view on this subject, reminding us that there is much to be done to make sure the maritime sector attracts the best people. Elsewhere we hear from Ben Ashley, one of around 100 Trinity House Cadets who we sponsor every year through the Maritime Charity.

Finally I'd like to thank a number of retirees and leavers who have finished their service with Trinity House, some after a great many years; I know I speak on behalf of everyone when I thank Jon Price, Nick Dodson, Karen Potter and Tony Wright all for their sterling work and also wish their replacements all the very best in their new roles supporting the strong governance and clear direction of this corporation.

Ian McNaught

Trinity House

Review of the last six months: Looking back at highlights from Trinity House's calendar

JANUARY 2017

The Master visits Hurst Point

In her capacity as Master of the Corporation, **HRH the Princess Royal** paid a visit to Hurst Point Lighthouse in Hampshire on 26 January 2017. The visit was part of her ongoing familiarisation with our lighthouse estate. She visited the lighthouse in the company of the attendant **Jason Crane** (pictured far left) as well as Trinity House staff: **Chris Ashforth** (Lighthouse Technician, Field Ops East), **Simon Millyard** (Engineering & Operations Manager), **Captain Ian McNaught** (Deputy Master), **Commodore Rob Dorey** (Director of Operations) and **Captain Roger Barker** (Director of Navigational Requirements, out of shot).

The Master came to Hurst Point aboard THV *Patricia* from Portsmouth, having been escorted aboard by the Royal Navy's Second Sea Lord **Vice Admiral Jonathan Woodcock OBE**, a Younger Brother of Trinity House.

The Master at Hurst Point Lighthouse with Trinity House staff and local attendant Jason Crane (far left)



The Deputy Master at City of Glasgow College

JUNE 2017

City of Glasgow College graduation

The Deputy Master attended as the City of Glasgow College celebrated the graduation of almost 300 Merchant Navy Officers at a ceremony held in Glasgow Cathedral on Thursday 22 June.

Deputy Master Captain Ian McNaught was the Guest of Honour and keynote speaker. He commented that the world's future masters and chief engineers were assembled there, and added: *"It was a great honour for me to be the guest speaker at this graduation ceremony. Having been shown around the stunning*

twin city super campus it is quite obvious that Riverside campus is one of the world's greatest maritime facilities. To see the students graduate from such a college gives them a great start in their careers within the maritime fraternity."

In all, 279 Officers graduated including 135 Engineering Officers and 144 Deck or Navigation Officers. The graduates achieved Diplomas and Certificates in Marine Engineering, Marine Management Engineering, Marine Management and Nautical Science.



APRIL 2017

Trinity House joins Maritime UK

Since the publication of the *Maritime Growth Study*, Maritime UK has become the promotional body for the UK maritime sector, bringing together for the first time the UK shipping, ports, marine and business service sectors.

Trinity House becomes Maritime UK's 15th member.

Maritime UK has brought together existing organisational bodies from across the whole maritime sector to drive growth; setting up working groups to address all the important

issues facing the sector, including skills, marketing, exports and maritime strategy.

As the engine of British trade and with a world-leading marine manufacturing sector, the UK maritime industry supports over 500,000 jobs, contributes £22.2bn to UK GDP and drives exports and inward investment.

Captain Ian McNaught, Deputy Master of Trinity House, said: "Trinity House is very proud to add its name to the roster of organisations already comprising Maritime UK. Both as a trainer of cadets in our role as a charity and as a

provider of aids to navigation for the mariner as a General Lighthouse Authority, we hope that our contribution to our island nation's shipping infrastructure will help further Maritime UK's goals."

Welcoming Trinity House to Maritime UK, Chairman David Dingle CBE said: "We are delighted to welcome Trinity House into Maritime UK membership. Very few play a more active role in the life of our maritime nation. We're looking forward to working with Trinity House to promote the UK's maritime sector."

FEBRUARY 2017

Ministerial visit to Harwich depot

Trinity House welcomed The Rt Hon John Hayes CBE MP to its Harwich depot on 23 February 2017, visiting in his capacity as the Minister of State for Transport. The visit served to familiarise the Minister with the functions and operations of Trinity House—specifically our role as a General Lighthouse Authority—highlighting our ability to respond to risk in UK waters, as well as a close look at operational delivery and technological innovation.

Mr Hayes' visit also included the

state-of-the-art Planning Centre from which we monitor and operate our marine aids to navigation.

Captain Ian McNaught said: "We are grateful to the Minister for this opportunity to demonstrate our role in maritime UK. As we continue to improve the way we operate, to identify efficiencies and meet our requirements as an aid to navigation provider, it is important to reiterate our position as a vital part of our island's maritime infrastructure, and that's what we have done today."



The Minister of State for Transport in the Planning Centre



Trinity House staff at the University of Gibraltar with the newly installed optic

MARCH 2017

Optic installed at University of Gibraltar

Following the completion of the re-engineering of Europa Point Lighthouse, Trinity House presented the historical Second Order optic to the newly-opened University of Gibraltar, thereby preserving it and making it accessible for future generations of the Gibraltar community.

Trinity House personnel joined staff at the University to unveil the optic in its new home on 15 March following group tours of the lighthouse; the optic was unveiled by Trinity House's Director of Operations

Commodore Rob Dorey and Professor Daniella Tilbury, Vice Chancellor at the University of Gibraltar.

Trinity House's Director of Operations **Commodore Rob Dorey** said: "We are very happy that we could cap our successful re-engineering project with the presentation of this handsome lighthouse optic to the University of Gibraltar after almost 60 years of service to the mariner. We hope that both students and staff of the university will enjoy having this beacon on their campus for many years to come."

OCTOBER 2016

Engineering manager first to earn IALA Academy certificate

Congratulations to Trinity House's Engineering and Operations Manager **Simon Millyard**, the first participant to gain a Level 1 AtoN manager certificate through the IALA World Wide Academy (WWA) distance learning programme. Since Simon's award, **Rob Dale** and **Peter Dobson** (also members of our Engineering and Operations department) have also completed the same certificate, so we extend our congratulations to them as well. **Dr Alwyn Williams** (R&RNav) is also working through the course towards WWA certification, along with his counterparts around the world. Simon described his experience as follows:

"I have just completed the WWA Level 1 AtoN manager course by distance learning and have found it very enriching. The course content has really widened my appreciation and understanding of the whole arena of AtoN planning and provision and has given me a much greater understanding of the work of my colleagues and how it fits together to provide a first class AtoN service. The main challenge for me was allocating time for study whilst balancing work and family time as the lesson modules were sent to me so a disciplined approach is required in order to complete the course successfully. The course covers a very broad range of topics across all areas of AtoN provision and this has been very rewarding for me and I would recommend it to all AtoN managers."

JUNE 2017

Trinitytide

The annual meeting of the Court re-elected **HRH the Princess Royal** as Master of the Corporation of Trinity House for the forthcoming year at a ceremony held at Trinity House on Wednesday 7 June 2017.

Captain Ian McNaught MNM was re-elected as Deputy Master, **Captain Palmer OBE MNM** was re-elected as Rental Warden and **Rear Admiral David Snelson CB FNI** was elected as Nether Warden of the Corporation.

After the Annual Meeting the Elder and Younger Brethren attended the Annual Service at St Olave's Church, Hart Street where the Preacher was the Dean Very Reverend Dr David Ison.



The Trinitytide procession



1 ALK documentary

The Association of Lighthouse Keepers has issued a documentary entitled *Keeping Light* featuring interviews with retired lighthouse keepers and support staff from both Trinity House and the Northern Lighthouse Board. The filming took place during 2016 in several scenic locations around the country, including Nash Point Lighthouse.

The interviews and conversations—taken from a much longer series—have been produced for the ALK archive, creating a resource for anyone with an interest in the history of lighthouses and the lives of the keepers.

The 45-minute documentary can be purchased at www.alk.org.uk



2 London International Shipping Week

At time of writing, Trinity House is making preparations to attend London International Shipping Week (LISW) which takes place 11-15 September. THV *Galatea* will be moored in the Pool of London where she will play host to a number of displays of Trinity House's research and development, engineering projects and marine operations as a way of demonstrating to LISW's diverse audiences the value that Trinity House provides to our maritime nation.

More details to come in the spring 2018 edition of *Flash*, or visit <https://londoninternationalshippingweek.com> on the web and #LISW17 on social media.



3 National Fish and Chips Day

On 2 June, Trinity House's London headquarters hosted the third annual National Fish and Chip Day.

The organisers chose Trinity House as a suitably British location from which to hand out the nation's favourite dish to members of the public (and, of course, staff from Trinity House) from their brand new fish and chip van.

The day has gone from strength to strength as an awareness day, encouraging the public to eat fish and chips and also raising funds for the charity Fisherman's Mission, a beneficiary of Trinity House.



4 The inaugural Yeomen networking event

A Yeomen networking event took place at Fleetwood Nautical College on 27 March 2017, as a way of furthering the educational offering Trinity House provides to its cadets.

A mix of 14 Trinity House Engineering and Deck cadets were joined by five mentors: Elder Brother Captain Nigel Hope, Younger Brethren Captain Matt Easton, Lt Cdr David Carter and Captain Neil Atkinson and also Yeoman Sam Wright.

After a brief introduction from Lt Cdr Carter the five mentors each described how they started their respective careers at sea and their current situations, highlighting transferable skill sets. This was followed with a Q&A session.



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Coming events

A brief look at selected highlights from our forthcoming calendar

UK Chamber of Shipping Summit

4 October

Following the success of the inaugural Summit in 2016 with over 130 attendees, the 2017 Summit will take place on 4 October at The City of Glasgow College.

The UK Shipping Summit programme will convene leaders from across the shipping sector for a thought-provoking and inspiring day of keynote speeches, panels and lively debates.

The most senior UK shipping leaders will be convening with experts from industry, government and other relevant knowledge sectors in one day of lively debate, networking and thought sharing. Speakers announced so far include Guy Platten (Chief Executive, UK Chamber of Shipping) and David Balston (Director of Policy, UK Chamber of Shipping); both Guy and David are Younger Brethren of Trinity House.

For more information visit www.ukshippingsummit.com

Annual National Service to Seafarers

11 October

The Annual National Service for Seafarers, organised by Seafarers UK, will take place at St Paul's Cathedral on Wednesday 11 October.

This year is a special year, marking three centenaries: Seafarers UK (King George's Fund for Sailors), Pangbourne College, and the formation of the Women's Royal Naval Service (WRNS). The Service is our opportunity to commemorate and celebrate all seafarers from across the maritime profession, alongside representatives of all sectors in the seafaring community, including Royal and Merchant Navies, the fishing industry, commercial shipping, nautical schools, maritime youth groups and veterans' associations.

The Preacher will be Reverend Oliver Ross, who is currently the Rector of St Olave Hart Street, Guild Vicar of St Katherine Cree, Chaplain of Trinity House and Area Dean of the City of London.

If you wish to attend please contact Seafarers UK via their website at www.seafarers.uk/event/annual-national-service-for-seafarers

National Historic Ships photo competition awards

1 November

Trinity House in London will play host to the award ceremony for National Historic Ships UK's 2017 Photography Competition, which is being run for the eighth year. Entries for 2017 are encouraged from all those with an interest in maritime heritage, including schoolchildren, historic vessel owners, maritime enthusiasts and those with knowledge of traditional skills or nautical techniques.

National Historic Ships UK's Photographer 2017 will receive £1,000 to be awarded on a theme or activity involving a Registered Historic Vessel (for example, attending maritime festivals, conservation or maintenance work, maritime skills training or educational programmes held on board an historic vessel).

For more information and an online photo submission form please visit the website at www.nationalhistoricships.org.uk/pages/photography-competition.html

IALA Council 65

11-15 December

The Council of the International Association of Marine Aids to Navigation and Lighthouse Authorities will meet at its headquarters in St Germain en Laye near Paris from 11 December. The Council is the governing body of IALA, comprising 21 elected and three non-elected Councillors; the Council is elected by IALA National Members during a General Assembly and meets twice a year. At the last General Assembly, in A Coruna (Spain) in May 2014, a new council was elected. The Deputy Master of Trinity House serves on the Council as its Treasurer.

For more information about IALA, its work and its membership please visit the website at www.iala-aism.org



Mrs Margaret Amos

Lighthouse Board appointment

Mrs Margaret Amos

Following the retirement at the end of April of Mrs Dawn Johnson as a Non-Executive Director from the Lighthouse Board. Mrs Margaret Amos replaces her as one of the Secretary of State's three nominated Non-Executive Directors on the Board.

Mrs Amos was a Non-Executive Director of Derbyshire Health Care United, a position she had held since February 2015. However, she had started her career when she joined Rolls-Royce Plc. as a graduate trainee in 1990 rising to the position of Finance Director – Corporate, IT and Engineering in 2016.

On 16 May, the Court of Trinity House elected Mrs Amos as an Associate Member of the Corporation and appointed her as a member of the Lighthouse Board with immediate effect for a three year period.

Other appointments

Thomas Arculus, Head of Secretariat, Deputy Secretary

Awards

We send our congratulations to the following members of the Fraternity:

HM The Queen's Birthday Honours List:

CB

Rear-Admiral Simon Paul Williams
CVO (Younger Brother No 409)

CBE

Rear-Admiral John Robert Hamilton Clink OBE
(Younger Brother No 277)

Nautical Institute Fellowship:

At the Nautical Institute Command Seminar held at Trinity House on 7/8 May, Certificates of Fellowship (FNI) were presented to the Deputy Master

Captain Ian McNaught and to **Commander Brian Boxhall-Hunt** (Younger Brother No 343).

Obituaries

Maldwin Andrew Cyril Drummond

OBE DL Hon DSc FSA, Younger Brother No 117, on 18 February 2017 aged 84. He was admitted in 1991.

Commander Donald Bruce Cairns

OBE RD RNR, Younger Brother No 84, on 1 May 2017 aged 88. He was admitted in 1988.

Captain Peter Cobb

Younger Brother Captain Peter Cobb OBE RN passed away on 24 June aged 87. He was admitted in 1966.

New Younger Brethren

We extend a warm welcome to the following who have been sworn in as Younger Brethren of the Corporation of Trinity House:

Christopher Barry Adams,
Director and Head of
European Syndicate and
Loss Prevention–SIMSL

**Hon Commander Lance
Henry Batchelor,** Group
CEO Saga Plc

James Whiteside Gray MP,
Conservative Member of
Parliament for North
Wiltshire constituency

**Ralph James Michael Grey
MBE MNM,** Maritime
Journalist

**Peter Brenton Hinchliffe
OBE,** Secretary General,
International Chamber of
Shipping

**Commander Catherine
Elizabeth Jordan RN,**
Commander, Royal Navy

**Captain James Miles
Benjamin Parkin RN,**
Captain HMS *Bulwark*

**Captain Timothy David
Roberts,** Master MS
Prinsendam

**Professor Philip George
Rogers,** Honorary Professor,
Shipping and Logistics,
University of Plymouth

Captain Saumitr Sen,
Manager, Marine Hull &
Machinery Claims

**Captain Richard
Sherwood,** Deep Sea &
Coastal Pilot

Captain Ian Gerald Travis,
General Manager Hapo (UK)
Ltd and Master MV *Lara I*

Lambros Varnavides,
Vice-Chairman, The Baltic
Exchange

**Commander Patricia Ann
Kohn RN,** Commanding
Officer, HMS *Sutherland*

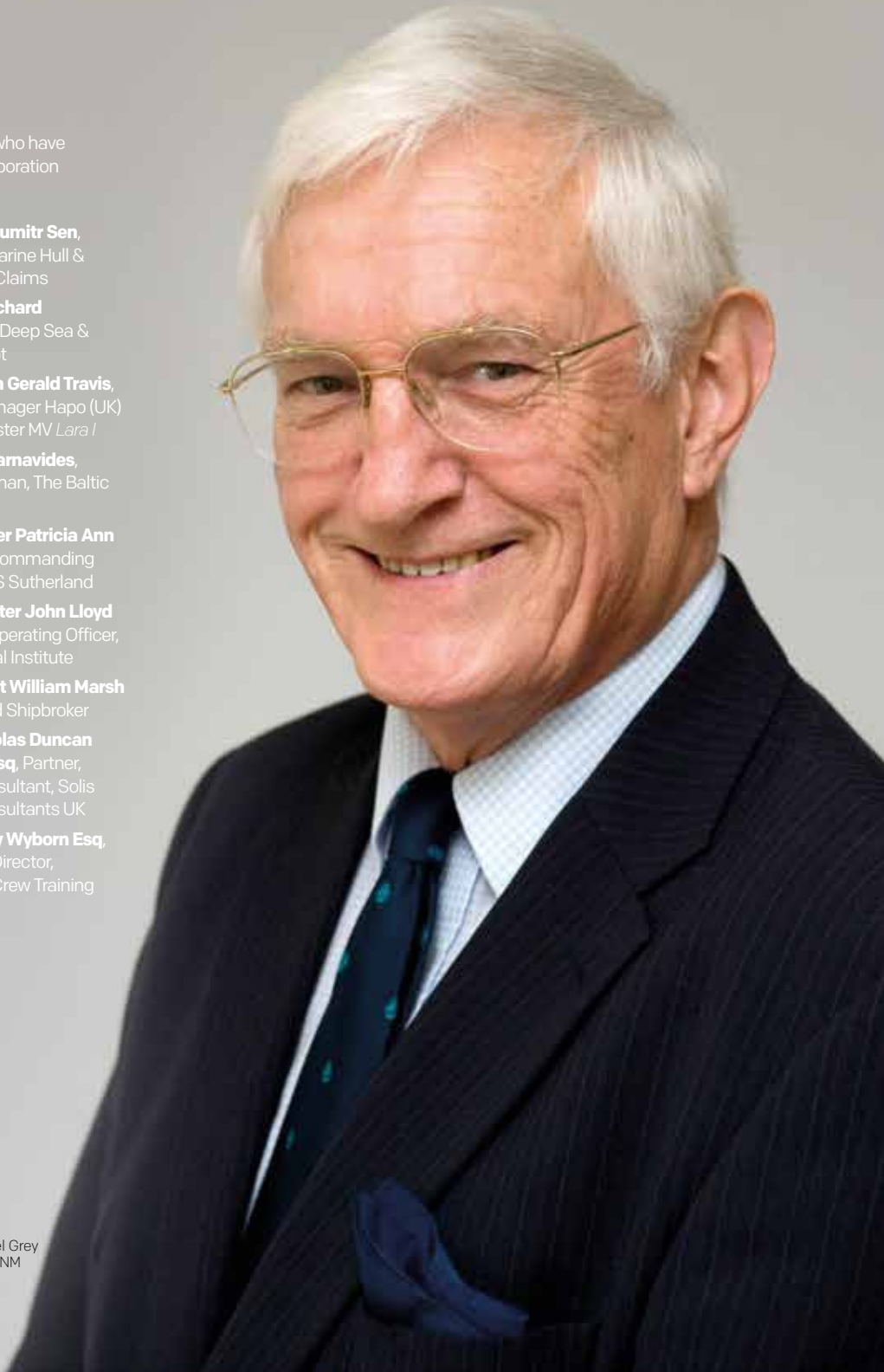
**Captain Peter John Lloyd
RD,** Chief Operating Officer,
The Nautical Institute

**Alan Robert William Marsh
Esq,** Retired Shipbroker

**John Nicholas Duncan
Simpson Esq,** Partner,
Marine Consultant, Solis
Marine Consultants UK

John Henry Wyborn Esq,
Managing Director,
Bluewater Crew Training

Michael Grey
MBE MNM





ENGINEERING REVIEW
NEW BUOYS BUILT TO CARRY METEOROLOGICAL EQUIPMENT

Keeping a weather eye open

Our Engineering & Operations Manager **Simon Millyard CEng FIMarEST** describes the benefits of using our stations as a shared platform for Met Office data

Two new buoys built in the Swansea and Harwich Buoy Yards will co-locate a statutory Trinity House station with gathering of meteorological and hydrological data for the Met Office. The two stations selected are Barrow 6 in the Thames Estuary and Mackenzie in the Bristol Channel; both have been deployed and are working well.

The new approach here was to use the recently developed Lightweight Aluminium Superstructure (LAS) on a Type 2 body for this and a single power supply to support both the aid to navigation and the Met Hydro data. The LAS has much more power generation and storage capacity than the standard Type 2 buoy and enables this extra data gathering to take place. Trinity House is responsible for providing the platform (the buoy) and the power supply, the Met Office is responsible for the weather data and transmitting it back to shore; this is a trial to see how both parties get on with sharing the station.

The Met Office has a range of weather data gathering sites around the coast, some on our lightvessels and some on their own buoy stations and we are optimistic that this co-location of a statutory Trinity House buoy station will offer a cost-effective platform to support the weather forecasting infrastructure. If proven successful then both parties will consider expanding this out to other sites. The Barrow 6 buoy has been equipped with wind, temperature, humidity,



Barrow 6 port hand lateral mark undergoing final quality checks by Paul Bailey from Harwich Buoy Yard prior to deployment

barometric pressure and sea surface temperature sensors and this data will be transmitted every hour by Iridium satellite channel back to the Met Office.

The Met Office has just ten weather observation buoys around the UK coast, meaning this area, which is vital when it comes to the understanding of weather systems transitioning from the open

ocean to the land, is particularly data sparse.

Met Office weather stations are already placed on a number of Trinity House lightvessels in the English Channel; anyone familiar with the Shipping Forecast broadcast by BBC Radio 4 will have heard lightvessels mentioned regularly.



Logistical challenge

Senior Project Engineer **Mike Yaxley** describes the project to modernise Mumbles Lighthouse in south Wales

Hi Mike, how did the need to modernise this particular station come up?

MY As is the origin of most aid to navigation upgrade projects, there was a risk of increased maintenance to support ageing equipment and supply issues for obsolete parts, so we took the opportunity to standardise equipment in line with other stations.

To identify the project requirements we consulted with other departments such as Navigation, Field Operations and Marine Operations.

What did we do that will improve the lighthouse?

MY We upgraded the site's aids to navigation and their control systems to modern standards; LED lights and standard control and monitoring equipment provide simplified maintenance and reliable performance that will extend the life of the station for a further 20 years.

This included refurbishing the solar and power system that supports the new main and standby 15NM LED lights: two equal range lights that will now reduce the urgency to respond to a main light failure. Power is provided by gel technology batteries which reduces risk and maintenance requirements

A separate phase of welfare upgrade works was also completed. We will see the introduction later this year of the new Hazard Warning Signal in a separate phase of works, again this will be completed by TH technicians.

We also removed asbestos-contaminated materials.

Tell us about the challenges you faced given the Mumbles' difficult tide patterns

MY Mumbles Lighthouse *appears* to be a fairly accessible short walk out at a suitable low tide from the beach at Mumbles Pier. The reality is about a 500-metre walk over rocks and boulders; fine for the occasional visit but not for the logistical requirements of the project. We had to consider safe access for weekly crew changes, handling

of personal gear, food and other material needs required for site.

Mumbles is an island several hundred metres offshore with one of the UK's largest tidal ranges, with no proper boat landing and a rocky foreshore. Between Mumbles island and the next island inshore there is a narrow channel that on the ebb tide produces dangerous currents.

Considering the available options it was apparent that only a boat could provide access to the island that wasn't constrained by tidal conditions or times; this required the establishment of a temporary boat landing.

We used regular contract vessel MV *Mair* as transport from Swansea marina; MV *Mair* would then steam across Swansea Bay and transfer staff the short distance to shore via their inflatable boat.

Mumbles Lighthouse wasn't built for domestic comfort; how is life for the technicians on site?

MY This was a major challenge for the project, almost a project in itself. It became apparent that it would be impossible for an installation team to stay at the lighthouse in its condition, lacking the necessary facilities for extended stays.

When reviewing the requirements of the installation we considered the equipment and materials needed for staff to live on station then put together a plan to achieve a habitable site. This plan was phased over two years: a site-enabling phase in year one and then an occupation phase prior to the project start in year two.

In year one we procured the materials and equipment needed in year two, being primarily the accommodation cabins that could be flown on site, as well as arranging for various site surveys and the necessary consents and licences from local authorities.

In year two, with the installation approaching, preparations were fairly intense. With Mumbles local to our Swansea outstation, all preparations for deployment were managed and co-ordinated there. Hugh Thomas and Ian Arthur configured one of the cabins to facilitate a shower and WC. Habitation

“MUMBLES IS AN ISLAND SEVERAL HUNDRED METRES OFFSHORE WITH ONE OF THE UK'S LARGEST TIDAL RANGES”



and project installation parts and materials were checked and packed.

Focusing on the domestic aspect, the plan was to upgrade the day room's cooking and restroom facilities. Mumbles Lighthouse does not have sufficient space within its walls for the construction of cabins so, with the permission of land owners Swansea City Council, we fenced off a secure compound outside of the lighthouse for the shower and WC unit, four sleeping cabins, three fuel tanks and overflow storage.

On the day of helicopter operations, three landing zones were managed by the HLOs Nick Chappell and Paul Thomas. Stuart Mason organised the scaffolders building the boat landing with other team members moving and storing gear as flights arrived. Two days of intense helicopter operations delivered numerous loads of equipment and materials, including five cabins, 6,000 litres of fuel and 12,000 litres of water.

Over the next few days the site was established and facilities were built that allowed staff to stay on station, allowing the welfare and navigational upgrade phases to commence.

Who's been working on the project with you?

MY The list of those involved seems endless, beginning with the project team who have worked with me, including Paul Briggs, Rob Race and Chris Harbour; there were also the various Trinity House departments carrying out their respective roles.

The ownership of the island necessitated working with outside authorities, in particular Swansea City Council and Natural Resource Wales, so the assistance of Estates Manager Peter Hill was key in providing liaison and expertise in this matter.



Field Operations supplied technicians to carry out the installation phases. This arrangement works well, bringing together in-house knowledge, experience and understanding of service operations.

The installation was managed by Chris Wroe with the day-to-day site supervision managed by our site supervisors Ian Arthur and Hugh Thomas, both of Field Operations west.

MV *Mair* and THV *Galatea* and their able crews provided transport and helicopter operations respectively, with support from the helo teams at Swansea and St Just.

All in all, it would be fair to say this was a logistical challenge that involved detailed co-ordination of a wide range of skills and resources from around the service.

Clockwise from top left: Generator set being delivered; Mumbles Lighthouse; new control room equipment



ENGINEERING REVIEW
MORE LIFTING POWER, MORE EFFICIENCY

Heavyweight lightens the load

East coast Buoy Yard Team Members **Hubert Lilley** and **Craig Neil** tell us about the experience with the new Buoy Yard crane replacement

Why did we replace the old crane? What has happened to the old crane?

HL The crane was becoming quite old. It was touch and go whether we could lift some of the items from the pier. If we had a Type 1 buoy that had lots of mud and rust then it was very close to our limits whether we can actually pick that buoy up and bring it back to our yard.

The old crane has gone back to Crowland Cranes—the company where the new crane came from—in part exchange. They were then using it in their yard as a run-around crane. It has now been sold and has an easier life trundling around lifting no more than three or four tonnes at a time.

When we are using the crane on the pier it creates a lot of interest from the public and they take lots of photos. Even while we are using it in the yard people come by to take photos.

In what ways does the new crane differ from the old crane? What are the main jobs performed by the crane?

HL The new crane has been imported from America and is a larger size and has a larger capacity for lifting and so is able to handle heavier weights. It also has a slightly longer reach on its boom.

From a slinger's point of view it is much quieter mechanically and the exhaust burns a lot cleaner so there is no black smoke coming out. It has AdBlue in it which helps to reduce harmful exhaust emissions, so it is a much greener machine.

The crane is used for most jobs within the buoy yard; moving buoys, building buoys, lifting chain, loading and unloading the ship, dropping boats and buoys into the water. It has a man cage so we also use it for access purposes. Not so long ago we had to work on the mast head on



The new crane at Harwich

THV *Patricia* and the extra length on the boom made the job much easier.

What improvements has the new crane made to your day to day work?

CN Well, for example, just recently *Patricia* came in and her crane was out of action and we had to get stuff off the far side of the ship. We could not have done it in the old crane. This crane I could set up on the pier and put out enough boom and still be able to pick up enough weight that I could pluck a buoy from the far side of the ship. This is something we could not have done with the old crane.

Because the crane is much quieter, it helps with communications from slinger to crane operator. Although we still use hand signals it is good to be able to hear one another to clarify things.

It does the same job as the old crane but much more efficiently.

So overall it is just much bigger, wider, it goes up higher, it does more and has a 35-tonne capacity. It's a big crane!

Was there further training involved? Do you have designated crane operators?

CN It was pretty much very similar to the old crane but when it was delivered a chap came down and spent two days with us to give us additional training. He let us use it and talked us through it under his guidance so that he could see what we were doing and that it was right. It has a slightly different computer system but the actual mechanical controls are very similar.

I am the crane driver but if I am not here it is Lee James who covers for me. I am currently in the process of training up one of our new buoy yard members—a chap called Paul Bailey—so further down the line he will be a secondary driver to me.



Installing the new turntable



ENGINEERING REVIEW

HARWICH'S INNOVATIVE ANSWER TO A STICKY PROBLEM

A turn for the better

Engineering & Operations Manager **Simon Millyard** describes the solution the Buoy Yard team found when the yard's buoy turntable seized up

Harwich Buoy Yard buoy preparation equipment has recently undergone a major refurbishment following the seizure of the turntable in the grit blast booth.

When buoys are returned from sea they are stripped down and the old paint on the steel body is removed back to bare steel using a chilled iron blast media. This is an unsavoury task that is shared out between all Buoy Yard Team Members in four-hour stints; the operator dons a leather suit and headmask with a forced draught breathing air supply. The old paint and any rust is carefully removed to bring the steel back to an ideal finish for the new paint to adhere to, this being critical to the longevity of the new paint; for technically-minded readers, the finish specification we use is SA2.5.

In the grit blast booth the buoy body sits on a turntable which enables the operator to rotate the body while preparing it, with a similar one in the paint booth. After ten years' hard work the bearing on the turntable seized up and this brought forward the planned overhaul of the equipment.

The first task was to remove the seized turntable which proved a more challenging task than first thought.

The rake system that rakes up and recycles the blast media for re-use was carefully removed and the mobile crane brought into position to lift the turntable; three lifting lugs were secured to the turntable and straps attached but with the eight-tonne alarm sounding in the crane cab, it would not budge.

After a little head-scratching the big overhead crane in the Buoy Shed was eyed up by Buoy Yard Supervisor Terry Graves, and a hole was cut in the ceiling of the blast booth to allow the jib in. With a load cell attached to ensure we did not overload the crane, the turntable was lifted up with ease, weighing 8.5 tonnes.

Some large steel girders were then placed underneath it then it was slid into the main buoy shed for transport to its manufacturers in Manchester for repair.

The turntable was clearly well made and this is borne out by the long service it has given in a very harsh environment; we look forward to its return to get the flow of clean buoys started again but in the meantime Swansea Buoy Yard will be helping out as there is a similar set-up there.



State of original render



Scaffolding going up



Finished render on Flatholm Lighthouse



Mesh coat applied



Spot of bother

Our west coast Technical Manager **Jim Veall** tells us about works at Flatholm Lighthouse that became much bigger than expected

It started with a spot. Having been freshly painted in July 2010, by June 2011 it was apparent that all was not right at the top of Flatholm Lighthouse. Small dark patches were appearing in the otherwise pristine white finish. As these patches were about 25m above ground level and 5m below the lantern of a tower located on a small island off Cardiff in the Bristol Channel, taking a close look to see what was happening presented some problems.

By May 2013 the patches had spread and the top third of the lighthouse looked like a candidate for an ink-blot test. Using rope-access techniques, the painting contractor who had applied the paint in 2010 found that the adhesion between the underlying rendered surface and the paint coating had broken down completely and paint was coming away in sheets.

The lighthouse on Flat Holm Island looks similar to any other white tapered tower from the outside, but the walls are about 1.5m thick at the base of the tower so the inside of the tower is much narrower than most other lighthouses. This causes the building to act rather like a cooling tower, and a change in the weather can cause condensed water to flow down the internal stairs as if someone has left a tap running. Over the years, all this moisture has permeated through the walls from the inside until it hit the impenetrable barrier of the external paint. The render beneath the paint became saturated until the paint could no longer stick. In March 2014, we decided the only way to cure the problem was to strip all the paint off to a sound surface and start again. This was planned to start in April 2015.

In order to work on the external walls the tower had to be scaffolded. This meant that 30 tonnes of scaffolding had to be delivered; not an easy task when the normal boat landing is a quarter of a mile from the lighthouse and at the bottom of 20 metres of steps. Thirty tonnes was broken down into 70 loads ready for flying

onto the island by helicopter. To add complications, a colony of black backed gulls nest on the cliffs just to the south east of the lighthouse, directly under the helicopter flight path. Once the scale of helicopter operations became apparent, we were advised that we would not be able to fly until the birds had fledged and left the island, which wouldn't be until the end of September. This meant that by the time we had the tower scaffolded and the old paint stripped off we'd be trying to apply the new paint coating as the weather starts to deteriorate in late autumn. Our only window for flying would be between October and January. In January 2016 we delivered the 70 loads, ready for when the weather improved in March.

“WE SOURCED A LANDING CRAFT WHICH COULD DELIVER THE RENDER ... TO THE LIGHTHOUSE”

In March 2016, the scaffolding was erected and the paint coating removed. Unfortunately, what lay beneath was not a pretty sight. The render that had been applied to give the stone built tower a smooth appearance was beginning to fall off over the top third of the tower, with large areas below that also loose. The “sound” surface we had expected to lie beneath the paint was not there. The render that had been applied when the tower was built in 1737 varied in thickness from 2” to ½” and had been patched, repaired and bodged for 250 years. Our sound surface lay beneath and so the render had to be removed as well. A local contractor was employed and—due to the loose and friable nature of the mud-based render—the tower was stripped in just over a week. The next task was to apply new render.

Despite being a listed building we were given the option to use various render systems but with consideration of the damp problems we'd had over the years, we decided to apply a traditional hot lime render, albeit reinforced with a nylon mesh below the external finish coat. Trying to find someone to apply such a coating became another problem; the few contractors who have suitable skills tend to be small concerns and they were already committed on other projects. By the time everything was in place we were into the autumn again, with the risk of frost damaging the render as it is applied. Another year gone. The autumn/winter of 2016 was spent working out how to get the 25 tons of new render on to the island and remove a similar amount of old render.

Due to the restrictions on helicopter flying—and following a suggestion from the warden on Flat Holm—we sourced a landing craft which could deliver the render together with a telehandler and trailer to transport the render from the west beach to the lighthouse.

In February 2017 all materials were delivered to the island, and in March, once the risk of frost was passed, four coats of fresh render were applied: one “dubbing out” coat which evens out the worst of the roughness of the stone, then the “scratch” coat which forms the overall shape of the tower. Next is the mesh coat which incorporates a nylon mesh bedded into the render to bind it all together and then the final finish coat: a thin layer to provide a smooth surface for the paint. By the middle of April the render was able to start carbonating or hardening off, a process that takes about a month as it absorbs carbon dioxide from the atmosphere.

Finally, in June 2017, with the scaffolding removed from the tower, the painters were able to return and apply a fresh coat of lime-based white paint to restore the tower to its original appearance, standing proudly in the middle of the Bristol Channel.



ENGINEERING REVIEW

VC COVERS 34 SITES FROM SWANSEA TO PLYMOUTH

The inspectors call

Engineering & Operations Manager **Simon Millyard CEng FIMarEST** describes some of his highlights of this year's annual Visiting Committee

The annual inspection tours of Trinity House's aids to navigation by the Visiting Committee are a practice that goes back centuries and which remain highly effective today.

In recent years, the Visiting Committee (or VC, as it is referred to) has evolved into part of Trinity House's formal Quality Management System which in turn contributes to the ISO9000 certification. This ensures that our systems and processes are run on a formal footing and all go towards the excellent aid to navigation availability that we provide.

A change to the reporting format this year was the incorporation of the new web-based Maintenance Management Information System MAXIMO where the inspection report is presented as a Work Order; this has proved successful in that the report is filed centrally in MAXIMO along with other Work Orders relevant to that station and has simplified the data entry during the week.

The VC is split into two weeks each year—VC1 and VC2—with the intention of covering the entire estate every two years; the Visiting Committee is comprised of Directors, Elder Brothers, Operations Managers and invited stakeholders.

This year VC1 was tasked with covering the area from Swansea to Plymouth. The inspection began with a tour of the Swansea outstation which was led by Captain Nigel Hope, EB and Director of Maritime Training; Buoy Yard Supervisor Dan Maskell; and Supplies Manager Mike Williams gave us a comprehensive tour of the facilities explaining the activities carried out and the procedures for refurbishing buoys. As with all sites visited, a record is handwritten in the Order Book and as time passes, the Order Books give a fascinating insight into the condition of the site; older books also record the living conditions for the keepers and significant events or visits. In this instance, the record from Captain Nigel Hope read: *"The level of housekeeping was high and the yard was being well managed. It was pleasing to observe the enthusiasm, commitment by those members of the yard team who*

we met and the involvement of the apprentice Charlie Kenealy with his superiors in completing his apprentice task book."

While this was going on, Party B was heading for Caldey Island, off Tenby on the South Wales coast, to inspect the lighthouse there.

By Wednesday 3 May, the full VC party had assembled on THV *Galatea* and split into three groups to cover the lighthouses around the SW Wales peninsula using all available resources from the THV *Galatea* including the workboat, helicopter and a hire car. This is an effective way to cover a large number of stations in one day.

At the end of each day, a formal review is held on board to consider the condition of the stations and any work or input required which are converted into MAXIMO work orders. After this, in preparation of the following day's visits, a Risk Analysis is presented by Director of Navigational Requirements, Captain Roger Barker, showing the range of each AtoN and the traffic density in the surrounding area. This is a good review as it places each station in context and a good discussion is held by the VC members on the next day's stations.

The week progressed well with the programme being followed which included Flat Holm and Lundy islands in the Bristol Channel and the recently modernised Monkstone Beacon. Flatholm Lighthouse had just had a new outer rendering installed following the failure of the old masonry after 150 years.

Friday saw a change of some personnel at Penzance which was carried out in a choppy sea state entailing wet luggage and clothes followed by visits to St Just Depot and Tater Du, Lizard and Pendeen Lighthouses.

The week progressed through the Isles of Scilly and along the South Coast to Plymouth where the VC was concluded on Monday 8 May after inspecting some 34 sites.

All the AtoN were found to be working correctly and generally the standards of husbandry were good which is a testament to the dedication and care given by the Trinity House staff and our team of contracted Lighthouse Attendants.

1 Captain Trevor Harris, Navigation (Examiner) Manager (right)

2 The tri-GLA helicopter

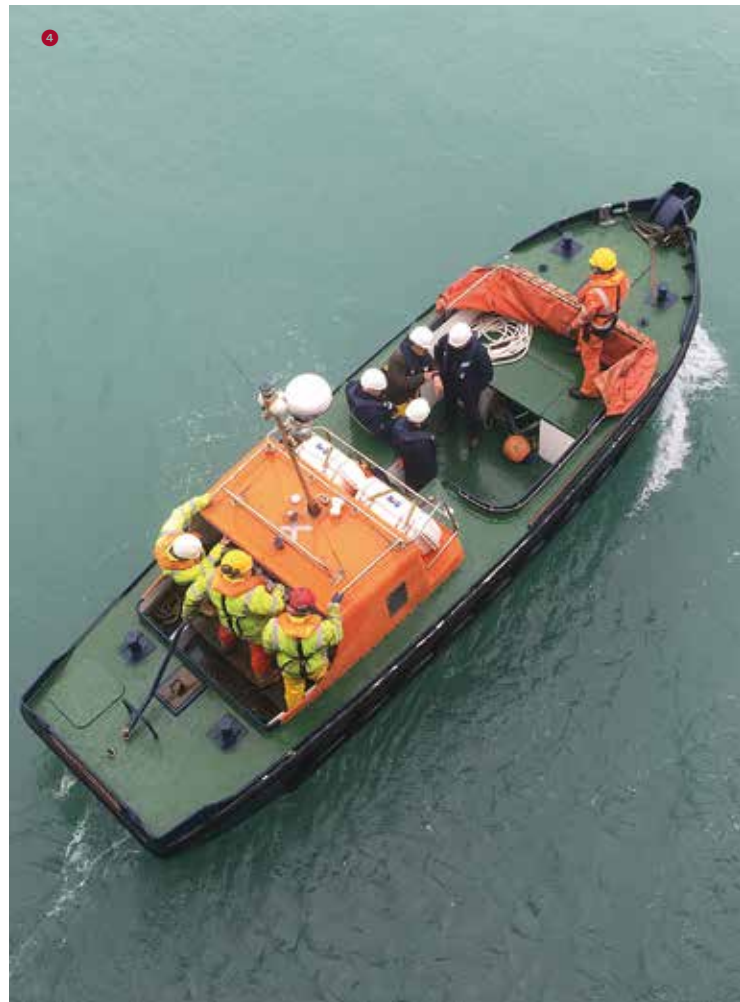
3 The lantern gallery at Nash Point Lighthouse

4 Heading out by workboat from THV *Galatea*

5 Caldey Island Lighthouse

6 Crow Point Lighthouse

Images by Commodore Rob Dorey, Director of Operations





Building a better buoy

We asked Project Engineer **Phil Hawtin** about the trials of the Type 1 buoy now that the electrical redesign has been complete

How do the types of buoys vary? How does Type 1 vary from Type 2?

PH The Type 1 buoy is the largest buoy deployed to over 30 different stations by Trinity House. It has a rectangular modular superstructure mounted onto the buoy body which houses the batteries, control and monitoring equipment and provides a mounting platform for up to 16 solar panels. At the top of the superstructure is the navigation light, Racon, various antennae and AIS (if applicable to that particular station). The Type 1 buoy also has a long weight tube mounted to the underside of the buoy body.

The Type 2 buoy is smaller and shorter than the Type 1 and it has a skirt on the buoy body rather than a separate weight tube. Being smaller means it houses fewer solar panels and therefore the power available for the aids to navigation is less in comparison.

How does the new Type 1 buoy differ from the old one?

PH From the mariner's point of view, there are no differences between the old and new version, but for those with a keen eye the navigation light and AIS unit are from different manufacturers, and so are packaged differently. All the major changes are hidden within the superstructure.

The new design encompasses two new cubicles, one housing the solar regulators and the other housing the new telemetry unit, control electronics and the GPS equipment for monitoring the buoy's position. We have removed various junction boxes and replaced them with moulded cable looms which eliminates the possibility of water ingress. The cable assemblies are now manufactured by a specialist underwater cable company, therefore all the pluggable connections can cope with water submersion, and no longer require the use of tapes for protection against water and prevention of corrosion.

We have also changed the method of regulating the solar energy by encompassing four smaller solar

regulators, one for the group of panels on each side of the superstructure. This allows the energy yield to be optimised, as invariably if one side of the buoy is facing towards the sun, two sides are at 90° to this and the opposite side is facing the wrong way, so the energy available differs per side by quite a lot.

The new telemetry unit houses a lot of the complex functionality, therefore the supporting electronics in the cubicle are simplified when compared with the old buoy. It also allowed us to utilise GSM as a telemetry medium for the buoy, which—although it has been used for lighthouses—has never been used for our buoys before. This is backed up with Iridium (Satellite comms) should no GSM network be available at the time of the telemetry system wanting to communicate back with the Planning Centre, Harwich.

What was involved in the engineering process? What decisions had to be made?

PH We began by forming a working group of various personnel from across the

company, some who had experience with the old Type 1 buoy and some who would bring a fresh technical approach for the redesign. We drafted a User Requirements Specification (URS) which detailed what the essential deliverables were and what non-essential but “nice-to-have” deliverables we should look to achieve if possible. This then fed into a Functional Design Specification (FDS), and as the design evolved we eventually ended up with the finished product.

We carried out lots of market research and talks with equipment suppliers to see what would best meet our requirements. We purchased different components and scored them against each other and against the URS, deciding what would best achieve the desired outcome. We even trialled various connectors by tying them to a ladder off the Harwich Pier, positioned so they were completely submersed at high tide and exposed during low tide, to see how well they performed.

What was the most difficult part of the trials? How were the trials carried out?

PH The first of the new design Type 1 buoy was built and tested in Harwich Buoy Yard, and was deployed to Shipwash North in December 2016, following a soak test period. As with all development projects there are niggles and the odd surprise which needed to be resolved during the testing and trial periods. This required us to work closely with the manufacturers to both understand and resolve these issues. We visited the buoy in July on board *THV Galatea*, to assess the performance of the buoy during the trial period and to rectify any outstanding problems. This visit was successful and the buoy remains deployed on station with the trial ongoing. So far the redesigned system and new equipment are all looking very promising. The feedback received from various parties has been positive and we look forward to seeing the new design eventually being rolled out across the service as and when the buoys come back into the buoy yards for refurbishment.



Buoy deployment from deck of THV Galatea





Seven decades of service

Senior Project Engineer **Paul Briggs** tells us about modernising No. 7 Lightvessel

No. 7 Lightvessel is one of the eleven lightvessels in service in operation with Trinity House. The hull was first laid in 1948 and has seen many transformations in that time, but has always been a capable and much-needed aid to navigation.

The last time this vessel had a major update was a solarisation project run from our now-defunct East Cowes depot in 2002, so the equipment on board had been in service for approximately 15 years; a typical design life for a lightvessel electrical system. It was therefore due for re-engineering in line with normal Trinity House practice, which was scheduled to be carried out in conjunction with the vessel's usual drydock period.

The following areas required update

as part of the project:

- Replace electrical and electronic systems—the old systems including all batteries and solar panels to be replaced as well as associated charging and distribution equipment. The Navigation Light and Fog Signal Control systems to be replaced as well as all other aids to navigation;
- Provide a 15NM main light and a 15NM standby light;
- Provide a new Hazard Warning Signal and improve access to the fog emitter;
- Improve the gimballed arrangement for the lights;
- Convert the vessel to an Emergency Deployment Vessel (EDV), to enable it to be configured for use on any Trinity House station, including Varne with its energy-hungry red light.

System Design

The current standard electrical system for

lightvessels was first seen on the 20-class vessels, hull numbers 19, 23 and 24 and has been successfully operating on these for the past five years or so. These vessels are much larger design than hull number 07, with more usable space for installing equipment.

The challenge for the Electrical Project Engineer Jamie Hammond was to find a home for all of the necessary cubicles and find room for the extra batteries required to make this vessel an EDV with a main and standby light.

The result was a very neat and compact control room and murette, full of power and control equipment, and a second battery room midships, where there was once an almost empty space.

Due to the long range required for the red light, we had to use a new lantern type for this vessel. The supplier had to redesign their product to ensure it was fit for use for this project, but eventually we were supplied with a lantern that would do the job.

Mechanical Engineer Chris Pearson modified the lantern room to install the new, standard lantern gimballed assembly. There was also a new hazard warning signal mounting installed towards the aft of the superstructure. This greatly improves access to the emitters for installation and maintenance.

Installation

The vessel went into drydock in July 2016 where the existing systems were removed by the ship yard. On return to Harwich, the vessel was moored alongside the Trinity House pier, the new systems were installed by contract staff from September 2017 onwards. Commissioning ran from January to February 2017 and the system soak test completed in April 2017. Despite having some issues with the delivery of solar panels and batteries which had a major impact on the installation, the vessel was delivered to plan and entered into service on 5 May 2017 on Greenwich station.



Working on the lightvessel alongside the pier at Harwich



Casting a wider net

Elder Brother and Chairman of the Maritime Skills Alliance
Commodore Bill Walworth CBE MNM RFA writes about the importance of developing maritime skills and training

Beyond my work on the Corporate Board of Trinity House I'm also proud to be Chairman of the Maritime Skills Alliance (MSA), a pan industry group to create and promote qualifications and apprenticeships across the wider maritime sector, and to champion the value of skills.

A striking feature of the MSA is the breadth of our membership: commercial shipping (MNTB) and the Royal Navy, tugs and workboats, jack-up barges and sea fishing, superyachts, the leisure sector, inland waterways, RNLI, Border Force and ports. Our partners in the MCA, RYA, the maritime education colleges and the SQA provide advice on qualifications, while charities like the Marine Society and Sea Cadets, Seafarers UK, add their expertise.

Through that broad vision we have developed an approach to qualifications which identifies the common threads in what have traditionally been seen as discrete occupations. The skill of navigation, for example, has a clear common core to it, whether you're in a fishing boat or an offshore supply vessel, a container ship or a superyacht. We use that clarity of view to ensure that there are shared modules between different qualifications, which means individuals don't need to retrain as they pursue their career and employers don't need to pay for them to do so.

In the last few years we have extended that work

to apprenticeships, using our expertise to support our members in developing what's now a very good range of well-structured opportunities across the sector. With the introduction of the Apprenticeship Levy in April this year, apprenticeships will be at the heart of our London International Shipping Week reception here in Trinity House with a call to action for employers to look hard at the opportunity they offer.

More recently we have taken the lead on people and skills matters for Maritime UK, which also covers the ship-building and ship repair, marine equipment, and maritime service sectors. I chair Maritime UK's People and Skills Working Group, and MSA Secretary Iain Mackinnon chairs a Task Group which is preparing a sector-wide Skills Strategy.

Underpinning all this skills work is a sector-wide need to attract the next generation. There is much to be done, particularly in engineering, to make sure the maritime sector attracts the best, when every other sector is working to do the same. That's our next challenge, and one which the MSA shares with Trinity House.

"THERE IS MUCH TO BE DONE, PARTICULARLY IN ENGINEERING, TO MAKE SURE THE MARITIME SECTOR ATTRACTS THE BEST"

Securing maritime data communications

R&RNAV Development Engineer **Gareth Wimpenny** writes about vulnerabilities in maritime data security and the work being done in response

In 1903 the radio pioneer Guglielmo Marconi staged a demonstration of “wireless telegraphy”. Marconi had set up his wireless transmitting equipment at a clifftop location in Cornwall and had arranged to send a message, using Morse code, more than 300 miles to an audience gathered at the London lecture theatre of the Royal Institution. At this prestigious event and in front of a crowd of onlookers, the wireless Morse code receiver tapped out its message:

“Rats Rats Rats Rats”

“There was a young fellow of Italy
Who diddled the public quite prettily”

...Marconi had become the first victim of a hacked radio message.

Fast-forward 114 years and the wireless telegraphy developed by Marconi has evolved, creating the radio communications and the Global Maritime Distress and Safety System (GMDSS) we are familiar with today. Yet many of these modern maritime systems are just as vulnerable to malicious actors as the wireless telegraphy demonstrated by Marconi at the beginning of the 20th century. Radio voice communications are vulnerable to misuse with jamming and false distress calls being two such examples. However, when computer systems communicate using radio—data communications as opposed to voice communications—the potential for harm increases.

The Automatic Identification System (AIS) is one example of maritime data communications which is vulnerable to malicious use. AIS makes use of two channels in the maritime VHF band and is primarily used as a situational awareness tool, allowing vessels to provide identification and location data from ship to ship and from ship to shore. However, AIS messages are not authenticated. This means anybody may transmit any conceivable AIS message (either by reprogramming a commercially

available AIS unit or using freely available open source software and a low-cost radio) and it will be taken at face value; displayed on any AIS receiver within range as if the message was genuine.

An example of this is shown in Figure 1 where a spoofed AIS message is generated describing a vessel whose path spells out “pwned” meaning “hacked” or “I own your system”. A simple spoofing attack such as this is unlikely to cause serious harm, and the mariner may quickly notice a discrepancy between radar returns and AIS data, which will indicate something is amiss. However, a similar spoofing of AIS messages may be used to carry out a variety of much more nefarious attacks, one of which is spoofing “AIS Message 17”.

Message 17 is used to send Differential Global Navigation Satellite System (DGNSS) corrections. The message contains GNSS pseudo-range corrections which the receiver applies to improve its estimated position. It therefore follows that spoofed AIS Message 17 broadcasts could be used to broadcast false DGNSS correction data. This would cause significant problems to the safe navigation of vessels in the vicinity as spoofed DGNSS could report the vessel’s position incorrectly, leading the crew or autopilot to correct for a non-existent

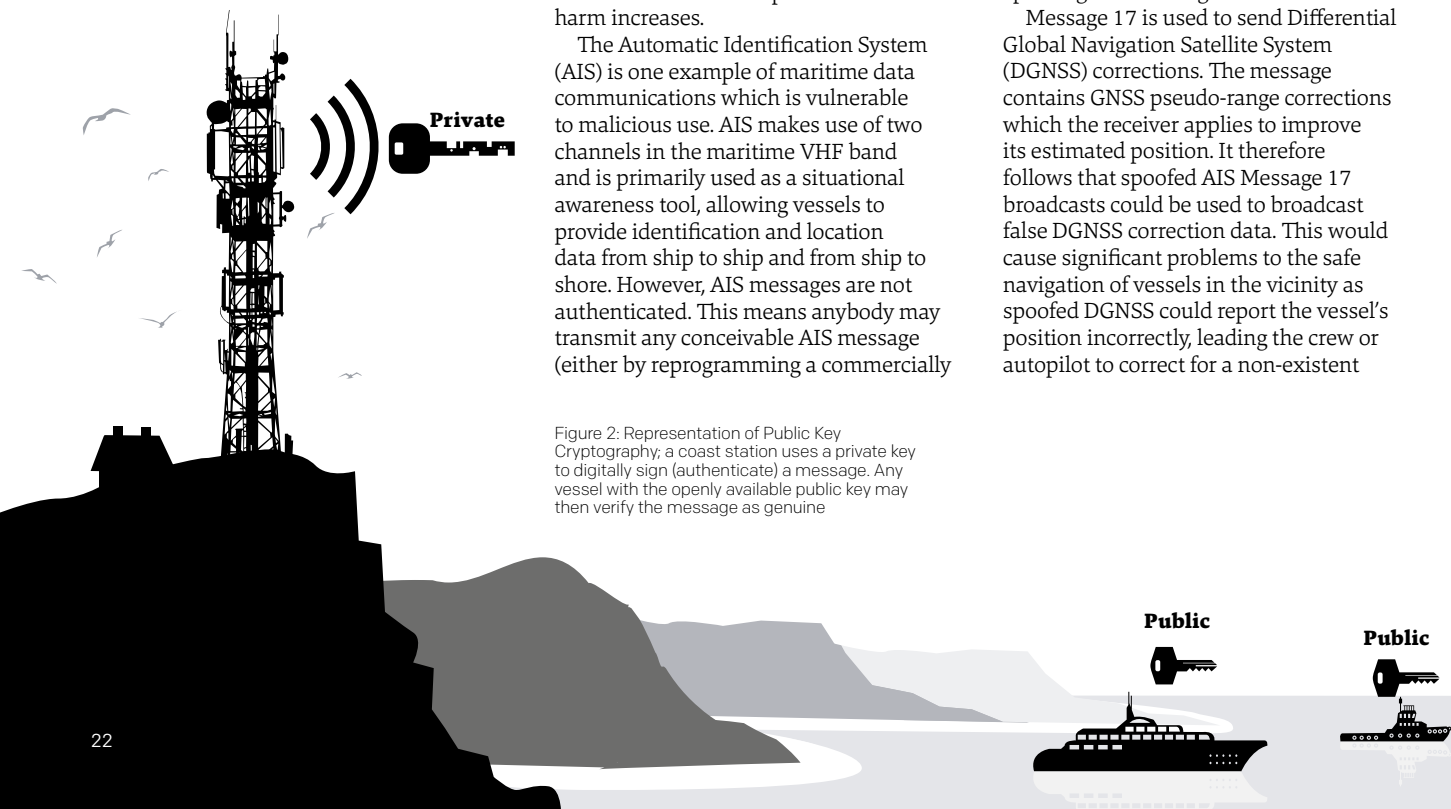


Figure 2: Representation of Public Key Cryptography; a coast station uses a private key to digitally sign (authenticate) a message. Any vessel with the openly available public key may then verify the message as genuine

Figure 1: An example of hacking AIS, a false AIS signal is generated describing a vessel whose path spells out "pwned" (meaning "hacked"). ©M. Balduzzi et.al, "Hey Captain, Where's Your Ship? Attacking Vessel Tracking Systems for Fun and Profit," *Hack In The Box*, October 2013



error and potentially lead a vessel into harm (it should be noted that AIS Message 17 is not used by the General Lighthouse Authorities, but is used elsewhere).

Spoofing attacks like the ones described may all be prevented by authenticating radio transmissions; making use of digital signatures to confirm the identity of the data provider. The most practical approach to authentication is to use Public Key Cryptography (PKC), a technique commonly used with online banking and other such activities.

PKC makes use of public and private "keys", essentially mathematical codes. The message sender uses a private key (kept secret and known only to them) to digitally sign data transmissions. Any recipient may then use an openly available public key to verify the digital signature to confirm authentication. This is represented in Figure 2. Such digital signatures prove that transmissions are authentic and originate from the vessel or entity they purport to be from and not a malicious third party.

PKC is not a new approach, it is used as part of the International Hydrographic Organisation (IHO) 'S63 Data Protection Scheme' to authenticate electronic navigational chart (ENC) data, thereby

providing the mariner with proof that their navigational charts are authentic and may be considered safe to use.

Retrofitting existing maritime communications systems—such as AIS—with PKC would require an overhaul of the current infrastructure which is unlikely to be accomplished easily. It is, however, evident that new maritime systems—and particularly those systems which may affect a vessel's ability to navigate safely—must incorporate an authentication mechanism (and almost certainly one based on PKC) as standard. This is particularly relevant to the developers of new e-navigation systems, as these systems are expected to increase the integration of ships' navigation, communications and control systems as well as provide ever larger communications bandwidths to vessels; all of which undoubtedly offer a greater potential for cyber attacks.

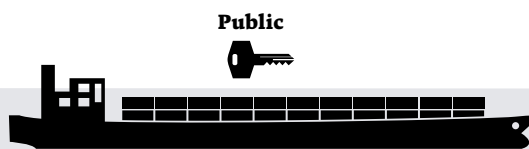
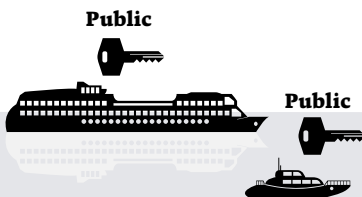
One approach to the authentication of e-navigation communications is that put forward by the Maritime Cloud. The Maritime Cloud (not to be confused with cloud computing) aims to improve data organisation, data exchange and data security by providing a set of open standards for the development of e-navigation systems. To date, the maritime cloud has been developed

through several different collaborative projects, including EfficenSea, ACCSEAS, EfficenSea 2, STM (Sea Traffic Management) and the SMART Navigation project.

A key component of the Maritime Cloud is the Maritime Identity Register (MIR). Using PKC, the MIR aims to provide every maritime entity from vessels to coastal authorities with a unique verifiable identity that may be used to digitally sign communications, providing a chain of trust to prevent spoofing and corruption. Adoption of PKC using the MIR may therefore enable the provision of authenticated maritime communications allowing the wider and safer provision of critical navigation and control systems, improving the mariner's safety.

The response of Marconi's colleagues 114 years ago was to write a letter to *The Times* claiming the hack was an incidence of "scientific hooliganism". Shortly afterwards, the perpetrator came forward, a Mr Nevil Maskelyne, who (in a similar manner to writing "pwned" using AIS data) had carried out his hack to demonstrate publicly the new communications system as being insecure. By applying authentication to modern maritime communications, hacks such as these can be prevented allowing safe and secure data exchange for all.

"IT IS EVIDENT THAT NEW MARITIME SYSTEMS—AND PARTICULARLY THOSE WHICH MAY AFFECT A VESSEL'S ABILITY TO NAVIGATE SAFELY—MUST INCORPORATE AN AUTHENTICATION MECHANISM AS STANDARD"



Never a dull day

Continuing our look at various roles around Trinity House, **Laura Sinclair** from the St Just forward operating base tells us about her work as a Field Operations Administrator

Meet the team

The team at St Just forward operating base at Land's End Airport in Cornwall looks after the lighthouses in the South Coast District. We have had an operating base at the site since 1993 for helicopter operations and expanded the office buildings in 2004 when Penzance depot was closed.

We currently have a team of 13, comprising a Technical Manager, three Senior Technicians, five Lighthouse Technicians, a Civil Technician, two Lighthouse Support Team Members and me: the South Coast Field Operations Administrator. We maintain 20 lighthouses in the South West from Lundy Island off the North Devon coast around to Berry Head in South Devon, including those in the Channel Islands. Seven of these lighthouses are offshore, requiring a helicopter for access.

What does a Field Operations Administrator do?

I have been working for Trinity House since April 2005 when I was taken on as a Technical Officer. My job title changed to Field Operations Administrator soon after and I carry out a varied range of duties, from day-to-day admin tasks to being responsible for tools and equipment stored in our shed and also carrying out helicopter work when the need arises. The majority of my work consists of supporting the Technical Manager and Senior Technicians, but I can get involved in all sorts of issues around the depot.

Due to the change in the helicopter contract, I now carry out ground crew work more often, as for the majority of the time the technicians and team members are flying offshore. I have also recently been involved in the removal of hazardous waste from Casquets and Alderney, two Channel Islands lighthouses. This involved a lot of work,

from assisting with the legal side of removing the waste to packing it up ready to be sent to the ship and also liaising with a number of different companies to organise the disposal of the waste in the Netherlands, the UK and Guernsey.

What does your day look like?

My day is certainly not the same from one to the next, especially when the helicopter is involved. The change in contract, and therefore seeing the helicopter less, means that when we do see it, we often need to get the men on to the lighthouses for maintenance in just one day. This can be tricky, especially in the winter when we are short of light. This can be worse when stormy weather plays its part in wreaking havoc on a lighthouse, particularly when helipad sections are washed off by the sea and repairs need to take place to enable work to commence on the lighthouse once again. This was particularly bad in the winter of 2014, when we saw a large number of storms hit the area.

What are your standout moments?

I sometimes get to work in unusual locations. Last year I went to Alderney and Casquets to oversee the removal of the hazardous waste. I also carry out ground crew duties at remote sites at Hartland Point in North Devon and Penlee Point near Plymouth. I think one of my favourite tasks last year was a trip to Ikea in Bristol to buy all the furniture and fittings for Sark Lighthouse cottage amenity dwelling!

All in all, I love my job and enjoy working with the team and as part of Trinity House. It can be a challenge being the only female in the team, but generally it's fine and I know I can always call Rachel in Swansea or Jess in Harwich, my fellow Field Ops Administrators, to vent any frustrations I may have!



Charity update

The **Trinity House Maritime Charity** has been looking at the future of maritime charity work while at the same time it has been busy supporting a diverse range of charitable projects providing welfare and training for mariners old and young

LEARNING

Maritime Studies qualification

Trinity House is sponsoring the process to secure accreditation for a level 3 Maritime Studies Applied General and Tech Level qualifications developed by James Bullar MBE.

The level 3 Maritime Studies qualifications are an exciting new qualification structure for learners aged 16 or over. They could either study an applied qualification, alongside other A levels and BTECs with a view to further study, or study a standalone Tech Level qualification with work based learning with the aim of a more direct route into employment.

For adult learners the level 3 qualifications in maritime studies can extend their knowledge and understanding of work in a particular part of the maritime sector into new areas. They are a suitable qualification for those wishing to change career or move into a particular area of employment after a career break.

The course has been designed to 'add value' to the straightforward school and college route, for example by signposting units to RYA and other professional maritime qualifications that seafarers need to work afloat, such as the Short Range Radio Operators Certificate (SRC); and International Maritime Organisation, Standards of Training Certification and Watch-keeping certificates (STCW Basic Training).

RESEARCH INITIATIVE

The future of maritime charities

As a member of the **Maritime Charities Group** (MCG) Trinity House—along with a great many other high-profile maritime charities such as Nautilus Welfare Fund, Greenwich Hospital Charity, Merchant Navy Welfare Board, Seafarers UK, Royal Navy, Royal Marines Charity (RNRMC), Sailors' Children's Society and more—is financially and actively supporting a new initiative by the MCG to research new directions and requirements for the future of maritime charities in the UK.

As part of this process MCG arranged a series of workshops bringing together a rich mix of participants from many different areas in and around maritime charities to build an informed view of the future.

Billed "An Expert Workshop to Explore Emerging Issues", the inaugural workshop took place in Trinity House's London headquarters on 3 July 2017; the morning session focused on exploring different views and identifying gaps and in the afternoon the delegates looked at key future implications in detail.

Facilitated by Dr Tim Jones and Dr Robin Pharoah from Future Agenda, delegates considered key changes we can all expect by 2030. Although of course the future will bring any number of potentially enormous changes, the following issues—among many others—were highlighted and debated:

- The evolving needs and aspirations of an ageing population mean that existing infrastructure may become unfit for purpose. New investments (e.g. elderly accommodation) will require future-proofing and flexibility to be built in;
- Dementia: Dementia sufferers and their families require care that is costly and complex;

the number of people in the UK living with dementia is set to rise to one million by 2025, placing additional pressures on all care service providers;

- Sea blindness: As certain beneficiary populations and industries decline and public awareness and priorities change, third-sector organisations may face public blindness to their cause, making appeals for funding and support more difficult;

- Partnerships for greater impact: To achieve leverage and impact many agencies might have to expand cross-sector and cross-national partnering, and foundations and charities may increasingly co-fund with each other;
- Digital engagement: Charities will need to capture the personal initiative and engagement which digital technology enables to drive growth and new ways of targeting social needs.

The debate on the future of our maritime charities will continue at the MCG's Supporting Seafarers 2017 conference at the Inmarsat Conference Centre, 99 City Road, EC1Y 1AX on 16-17 October 2017. For more booking details about the conference which is free to attend for maritime charities, contact mcg@seafarers.uk

"THE DEBATE ON THE FUTURE OF OUR MARITIME CHARITIES WILL CONTINUE AT THE MCG'S SUPPORTING SEAFARERS 2017 CONFERENCE"



The inaugural Maritime Charities Group workshop, at Trinity House's London headquarters



EMC Trust's young sailors aboard Moonspray

CHARITABLE GRANTS

EMC Trust Round Britain 2017

Following a grant made by Trinity House last year to cover essential training and safety equipment, the **Ellen MacArthur Cancer Trust** has undertaken its Round Britain 2017 sailing event, stopping in at Harwich and London, along with a long list of stops around the UK. Throughout May to September, the Trust's 44ft voyage yacht, *Moonspray*, will visit more than 60 coastal towns and cities with five different young people joining the crew for each leg.

The young sailors were welcomed into Harwich on Friday 14 July, marking the end of leg-eight voyage. The crew consisted of six young people who have been through treatment for cancer, four of whom joined *Moonspray* in Hull on 9 July for the sail down the coast. They are just some of the 100 young people across

17 crews who will be involved in the 2,400-mile journey. The crew were given a tour of the operations at Trinity House and also a look around THV *Galatea*.

The Trust, founded by Younger Brother Dame Ellen MacArthur DBE in 2003, looks after young people aged 8-24 from across the UK, whose lives and families have been devastated by childhood cancer and who now have to overcome significant psychological challenges and the consequences of physical disabilities in order to rebuild their lives. Sailing, seamanship and the wider environment of the Trust create a very special opportunity for recovery, the outcomes of which include an impactful growth in personal confidence and self-belief, leading to independence and a re-engagement with education and employment.

Below: EMC Trust's young sailors aboard THV *Galatea* during their visit to Harwich



Fishermen's Mission

Trinity House has issued a grant to fund the building of shower room facilities at the redeveloped **Fishermen's Mission Mini Centre** at Peterhead, Scotland. The new centres have arisen in place of the organisation's traditional centres as dictated by the changing needs of the fishing fleet. The Mini Centres provide 24-hour access to facilities including toilets, showers, self-help kitchens and office spaces. The project represents a long-term strategic investment in a facility which will serve fishermen and seafarers well beyond 2024.

High Tide Foundation

Trinity House has supported the creation of the **Shipping Cadetship Programme**, open to people aged 13-14 from the Teesside area and running over a six week period with one session per week.

The **High Tide Foundation** has been in operation for over four years, and brings together the shipping and river community on Teesside with the education sector, mainly at secondary school level, to inspire, educate and motivate young people with respect to the workplace.

Sea Change Sailing Trust

Trinity House has made a grant to the **Sea Change Sailing Trust** towards navigational and safety equipment to help with the second phase of their project to build replica Thames sailing barge *Blue Mermaid* (as reported in *Flash Spring 2017*, p24). The barge has been launched and is now being fitted out and rigged.

The Sea Change Sailing Trust aims to change the lives of young people, particularly 'NEETs' (Not in Education, Employment or Training) through sailing experiences.

CHARITY UPDATE

REGIONAL GRANT COMMITTEES

Small-community focus

Through the work of the Younger Brethren Regional Grant Committees, a number of further grants have been made, ensuring that Trinity House's presence is felt around the country with a number of projects aimed at helping smaller communities.

In the Plymouth area, Trinity House granted funds to **TMSC Rowers**, a community-focused rowing club based at the Port of Plymouth, to help buy a new gig and accessories. The club aims to make the sport of rowing available to as many local people as possible and to teach valuable water skills to our younger generations.

The **Suffolk Sea Scouts** successfully applied for funding to enable them to participate in the 2017 Tall Ships Race in the Baltic Sea, and also to enable the navigation equipment on the Adventures Offshore sail training yachts (two Oyster 49' ketches) to be upgraded and bought in line with current standards and technologies.

Trinity House has funded the coppercoating of three modern Squib-class keelboats and two Sonar-class keelboats belonging to the **East Anglian Sailing Trust (EAST)** as an alternative to anti-fouling paint. Conventionally, anti-fouling paint had to be applied annually and, done properly, required the previous coating to be abraded to prevent build-up of exhausted material and the application of two coats of the new material. Over time, a build-up of old antifouling occurs and this eventually starts flaking off, preventing the effective adhesion of the new material and reducing the effectiveness of the product. Coppercoat is the combination of a solvent-free epoxy resin and high purity ultra-fine copper.

To have the two boats professionally coppercoated not only relieves the volunteers of the difficult, time-consuming and potentially hull-damaging task of removing the old anti-fouling but leaves the boats with a sound coating that can last for up to 10 years. This represents a saving in time and money and leaves the volunteers free to carry out the other numerous maintenance tasks necessary each winter.

CHARITIES WE SUPPORT: COMBAT STRESS

Support for mentally wounded Veterans

Combat Stress was founded in 1919 to care for the shell-shocked victims of the First World War. Today, we are the UK's leading military charity specialising in the mental health of ex-Service men and women. We're providing vital support and treatment to more than 4,800 mentally wounded Veterans across the UK from the British Armed Forces and the Merchant Navy—many of whose mental health conditions are complex and long-term in nature.

We provide a lifeline to Veterans of all ages—our youngest Veteran is only 20 years old and our oldest is 101. We make a massive difference to the quality of their and their families' lives.

In our experience, Veterans wait, on average, 13.1 years from leaving the

Armed Forces before coming to Combat Stress for help. This is too long to suffer and this delay often leads to additional mental health problems, social problems and family breakdown. We are trying to reduce this timelag by addressing:

- The lack of education and understanding about Veterans' mental health issues;
- The fear of stigma and discrimination that surrounds Veterans' mental health; and
- The isolation of Veterans with wounded minds who feel alone in their suffering and are too ashamed or embarrassed to seek help.

Find out more at
www.combatstress.org.uk



©Stonemouse Photographic

Crew excursion to the
Namibian Desert for
quad biking





A career on course

Trinity House Cadet **Ben Ashley** writes about the progress he's made so far in our Merchant Navy Scholarship Scheme

I was offered a Deck Officer Cadetship with Trinity House during the early months of 2014 after going through the selection process. I am extremely grateful to have received this offer as it has enabled me to progress towards becoming an Officer of the Watch, subject to passing the MCA orals which I am about to sit. The purpose of this article is not only to express my gratitude for the wonderful opportunity this scholarship has afforded me, but also to provide feedback on the training I have received thus far.

I joined Warsash Maritime Academy in September 2014 as a Phase 1 Cadet; Phase 1 lasted from September 2014 until December 2014. During this phase I received a basic introduction to various aspects of ship life including general ship knowledge, ship and port operations and basic navigation. In addition, there was a lot of maths which stresses the importance attached to mathematical aptitude during the selection process.

Before being allowed to go to sea, I had to complete a number of short courses including Security Awareness, Personal Safety and Social Responsibility, Personal Survival Techniques, Fire Prevention and Fire Fighting and Elementary First Aid. During these short courses I was given details about the first ship I would be joining, the *Stena Europe*, a ROPAX [roll-on/roll-off passenger] ferry.

I joined this ship early in December 2014 and was on it until the end of January 2015. It was a short but difficult contract. As it was my first ship, I was apprehensive. It wasn't easy having to cross the Irish Sea twice a day in the middle of winter with 50 knot winds on a regular basis. It certainly was a baptism of fire! This was also the first time I had spent the Christmas period away from my family. Even though this ship was not my favourite,



Ben Ashley and his fellow cadets

I completed it without any doubt in my mind whatsoever. I proved to myself that if I could thrive on this ship in pretty terrible conditions, I shouldn't struggle with any other ships in my future.

Once I completed my time on the *Stena Europe*, I was given my second ship, *Al Bahia*, a large container ship that I joined shortly after finishing on the *Stena Europe*. I was on it for just under three months, finishing in mid-April 2015.

Al Bahia is a United Arab Shipping Company (UASC) container ship with Russian officers and Filipino crew. The crew were all very kind and welcoming, and I settled in well right from the beginning. There was much more excitement to this ship as I got to sail around the Mediterranean Sea and the Arabian Sea as well as two Atlantic



→ crossings. It felt a lot more like what I imagined a ship should be. I got a lot out of it in regards to navigation as well as loading/unloading a container ship.

After completing my second ship, I had a few weeks off before going back to Warsash to continue the next stage of my training. I learnt the bulk of the course during Phase 3, which included stability, meteorology, celestial and terrestrial navigation, tides, rules of the road, ship handling, law and management and navigational aids. I was at Warsash from May 2015 until December 2015, with a one-month break during August. After multiple exams and assignments, I was pleased to get all the results I had hoped for which gave me a lot of confidence going into my next and final sea phase, Phase 4.

As it was getting close to December, I was curious to find out what ship I would be on next. I was pleased to learn that I would be joining MS *Boudicca*, a Fred Olsen passenger ship. I joined this ship on 21 December 2015 and was on it for four and a half months.

This was the longest contract but I was quite happy to experience a long contract away from home to see how I would cope. During the trip, I was very lucky to do a cruise around Africa and the Indian Ocean. This was the highlight of my sea

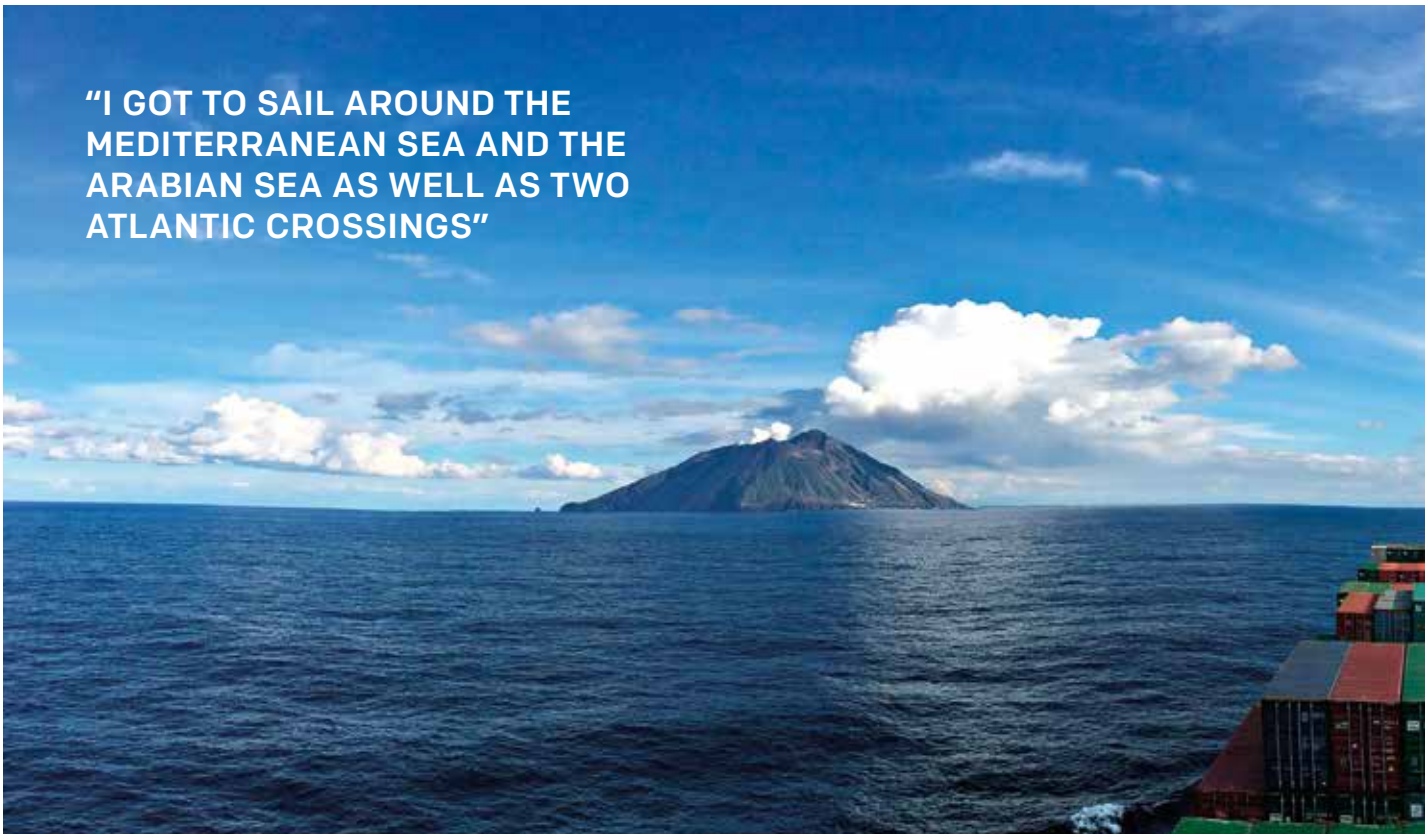
phase as I got to see and do some amazing things. I was lucky enough to visit destinations such as Namibia, South Africa, Seychelles, Madagascar, Zanzibar, Mauritius and many other beautiful places. I enjoyed being able to apply a lot of the knowledge I had learnt over Phase 3 to real life situations and this enabled me to get a real feel for the job.

I left MS *Boudicca* in April 2016 and had about five weeks off before joining my penultimate ship, HMC *Searcher*, a UK Border Force ship. When I discovered I was joining this ship I was very unsure what to expect as it is not a ship that cadets normally get to experience. Indeed, I wasn't sure if I would enjoy it, which was ironic because it turned out to be the most enjoyable ship I had been on!

HMC *Searcher* was the smallest ship I had been on by far. After a few days on board, I immediately got the sense that the ship had a really nice 'family' feel to it. Due to the lack of space you spent most of the day together, this even included cooking meals for each other. It was a great experience to see what the UK Border Force do and I found the whole job really interesting. It was nice to be accepted into the family very quickly and I was given lots of help by the Captain and the officers in progressing my training. I was quite disappointed that I was on the ship for such a short time, from the beginning of

The container ship *Al Bahia* (UASC) on its passage from Genoa, Italy, to the Suez Canal. Here it is passing Stromboli volcano headed for the Straits of Messina

“I GOT TO SAIL AROUND THE MEDITERRANEAN SEA AND THE ARABIAN SEA AS WELL AS TWO ATLANTIC CROSSINGS”



June and finishing mid-July; I think I would have benefited from a longer stint.

Once I finished my contract on HMC *Searcher*, I joined my final ship, *Commodore Goodwill*, ten days later. *Commodore Goodwill* is a RO-RO ferry with British and Eastern European officers and crew. What was different about this ship compared to other ships was the watch patterns. They were seven hours on, five hours off, five hours on, seven hours off. This was a watch pattern I had never done before and it took a little while for my body to adjust.

Commodore Goodwill was my fifth and final ship and it proved a very good final ship. I was given lots of responsibility with regards to maintaining a navigational watch, which included crossing the English Channel every day, but also mooring operations, cargo operations and maintenance of life-saving appliances and fire fighting equipment. I was able to complete my Training Record Book and get lots of practical experience with the help of the Officers and Captain.

After 12 weeks on board, which felt like a very long time considering this was a ferry, I was finally finished. I had completed my 12 months of Sea Service and was ready to go back to college for my final phase, Phase 5.

It was nice to have a six-week break before going

back to Warsash in November 2016. Once I got back, I was straight into doing more short courses. I completed a number of courses including NAEST Operational, which is a bridge simulation course, the Efficient Deck Hand course, Proficiency in Medical First Aid and GMDSS. I will be completing the remaining short courses in July 2017, which includes Advanced Fire Fighting and Proficiency in Survival Craft and Rescue Boats.

I had two weeks off for Christmas before going back to Warsash to start preparing for my SQA exams. There were two exams, Navigation and Stability, and I was delighted to find out only recently that I had passed both. I am currently studying for my MCA orals and completing my HND Part 2. Should everything go to plan, I hope to be qualified by August 2017. My aspiration is to get a third officer position with a cruise ship and subsequently I hope to work towards gaining my Chief Mate's certification.

I am extremely thankful to Trinity House for sponsoring me and giving me the opportunity to start an amazing career in which I hope to continue progressing for many years to come.

To find out more Trinity House's Merchant Navy Scholarship Scheme and careers at sea, please visit www.trinityhouse.co.uk/careers/cadet-training

UPDATE

Ben passed his MCA orals exam on 10 August, earning his Officer of The Watch Unlimited.



Opportunities of a lifetime

Trinity House runs a number of shore-based apprenticeships aimed at young people looking for a step in the right direction

We asked a few of our apprentices to share their experiences of working for Trinity House, and here's what they said.

JAMES

Former IT apprentice, now IT Junior Support Officer, Information Technology Department (Harwich)

"I decided to apply for an apprenticeship as the thought of gaining experience and qualifications while working and earning was much more appealing to me than university. I feel I learn a lot more by actually doing something and working with other people. From my apprenticeship I was hoping to gain experience in a wide range of IT work, which I now have, and I'm still learning every day.

"I enjoy a variety of aspects about my job; I love the technical side of the job where I'm setting up new equipment such as servers and installing software, but also enjoy troubleshooting and fixing problems for staff while on the helpdesk. I find it to be very rewarding after solving a problem for someone. Getting to go on site visits to London, Swansea and St Just is another aspect of the job which is very enjoyable; you get to meet new people and it's exciting to go to places I've never been before, such as Cornwall.

"I never expected to learn as much as I have and didn't realise all of the possibilities and configurations that could be made to systems to benefit a business.

"One of my favourite things I've done was to assist in the Harwich and London communications room upgrades. However, there are always interesting projects going on."

JARED

Apprentice Lighthouse Technician, Field Operations East (Harwich)

"I decided to go for an apprenticeship after hearing my friends struggle to find full-time jobs. After my apprenticeship I hope to come out with a skill set and qualifications that will help me get a job here or elsewhere.

"I enjoy travelling all around the country and having the ability to explore around the coastline.

"My favourite trip so far was the Gibraltar modernisation, where I spent a month out there and got to meet local monkeys while getting a feel for the country."

JACK

Apprentice Lighthouse Technician, Field Operations West (Swansea)

"I chose the apprenticeship route because I knew that I wanted to gain hands-on experience and expand my knowledge while learning skills on station. I hope to gain a job within Trinity House Field Operations on completion of my apprenticeship.

"I think that a Trinity House apprenticeship scheme is the perfect way to get yourself into the world of engineering.

"I enjoy the broad spectrum of skills that we cover within Trinity House, and I like the fact that every week is different, for example, installing a new lantern in North Wales one week and then checking alignment of sectors in North Devon the next. I also like the fact that I get to see parts of the world that I wouldn't necessarily get the chance to see otherwise. My highlights so far are flying to lighthouses in a helicopter, and I also like the

support and training that is available from all areas within Trinity House."

CHARLES

Apprentice Lighthouse Technician, Field Operations West (Harwich)

"I decided to apply for an apprenticeship at Trinity House, because they're a well-known company with a well-known history. And joining such a company will enhance my skills and prospects for my career.

"In Trinity House I have a lot of opportunities to learn new skills and meet new people which is very good and exciting.

"One thing that I didn't expect I'd get from my apprenticeship was having a chance to learn to drive the plants machinery and also have the chance to work on the lighthouse."

NICK

Buoy Yard Support Technician (former apprentice)

"I began my apprenticeship with Trinity House in 2011 as a Buoy Yard electrical apprentice with A Levels in psychology, sport and geography but no electrical qualifications.

"During my time I have passed an NVQ2 in performing engineering operations, City and Guilds Level 2 in mechanical engineering and BTEC Level 3 in engineering and currently undertaking a BTEC HNC in electronic engineering.

"This training has given me the skills and competence to be promoted to my current position of Buoy Support Technician in the Buoy Yard."

Coquet
Photo by Jared



Skerries, North Wales
Photo by Jack



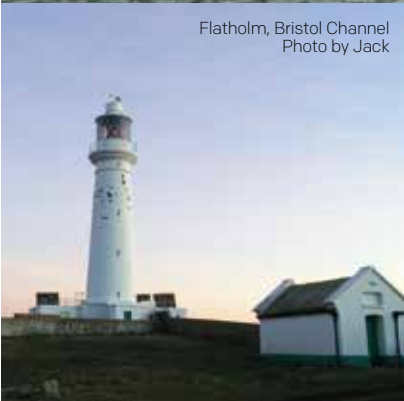
Needles
Photo by Jared



St Tudwals, North Wales
Photo by Jack



Flatholm, Bristol Channel
Photo by Jack



Bardsey, North Wales
Photo by Jack



Start Point,
South Devon
Photo by Jack

King George V
at the helm of
HMY Britannia



Partner profile: Seafarers UK

WORDS: **NICK HARVEY, SEAFARERS UK CAMPAIGNS MANAGER**

A look at how maritime charity Seafarers UK provides vital support to seafarers in need and their families and to those in maritime education or training

The charity set up in the midst of World War One to assist families of seafarers lost or injured at sea was 100 years old on 5 July. Charting its history, the charity's 'Centenary Timeline' (www.seafarers.uk/timeline), identifies milestone activities and the role of key individuals, including King George V who gave his name to what was originally known simply as the Sailors' Fund.

Over the past century, a huge range of welfare services has been provided for seafarers in, or retired from, the Merchant Navy, Fishing Fleets, Royal Navy and Royal Marines. Most beneficiaries are still from the UK and Commonwealth countries, although some grants go towards facilities—such as port-based centres—used by other international seafarers.

Rebranded Seafarers UK in 2005, the charity gives grants to help people in the maritime community by providing vital support to seafarers in need and their families, and to those in education or training who are preparing to work or serve at sea.

Seafarers UK receives no Government funding and is heavily dependent on donations, legacies and corporate support to continue giving grants of £2.5 million every year.

Former head of the Royal Navy, Admiral Lord West of Spithead, said: "*Congratulations to Seafarers UK on reaching its centenary. The make-up and*

capability of the UK's maritime sector has changed dramatically since 1917, and whilst we are still very much an island nation with serving seafarers in the Royal Navy, Merchant Navy and Fishing Fleets, the numbers of those actively involved is reducing every year.

"Within this context, there is a very important and continued role for Seafarers UK to play, both in helping to raise awareness of the need for, and existence of, training and job opportunities in the maritime sector, and in helping those still serving, but increasingly veterans and ex-seafarers, who have fallen on hard times, and their families."

In addition to supporting seafarers past, present and future, Seafarers UK campaigns to raise public awareness of the UK's dependence on the men and women who work at sea. This year, the charity's 'Seafarers Awareness Week' was 24-30 June, focusing on 'Maritime Jobs at Sea and Ashore'.

Currently, more than 100,000 UK nationals work at sea, on vessels ranging from workboats and superyachts to tankers and container ships—and of course in the Royal Navy Fleet.

Our Royal and Merchant Navies are currently crying out for new seafarers, particularly those with engineering skills, and globally there is a huge demand forecast for Merchant Navy officers of all specialisations, the best of whom are trained by the UK's renowned maritime academies and colleges.

This year, Seafarers UK also promoted 'Sea Ports for Prosperity', encouraging port and harbour operators to raise government and public awareness of their £19 billion annual contribution

“OUR UNIQUE SITUATION AND THE QUALITY OF OUR MARITIME OFFERINGS IN SEAFARING PEOPLE, PORT AND SUPPLY CHAIN OPERATIONS AND FINANCIAL SERVICES REMAINS SECOND TO NONE AND GIVES US A STRONG NEGOTIATING HAND”

to the national economy. UK ports support 344,000 jobs ashore, handling almost 500 million tonnes of freight and more than 60 million passengers every year.

Seafarers UK's Campaigns Manager Nick Harvey explained: *“As the UK finally embarks on Brexit negotiations, we are focusing our island nation's attention on the vital role our ports, harbours and seafarers will have to play in the future.*

“Increased world trade will likely increase the 90% of imports and exports currently passing through our sea ports. Merchant ships continue to grow in size, the largest now 400m long and capable of carrying more than 21,000 containers. Half our food comes from overseas and the UK is dependent on imported oil, gas and biofuel for our power stations and vehicles.

“Passenger numbers on cruise ships and ferries look set to continue to grow, albeit with industry concerns voiced about the need to retain agreeable border control relationships with our European neighbours.

“Potentially favourable adjustments to fish quotas and incursions by foreign boats in UK waters are anticipated by our fishermen, who are hoping for a bigger share of the catch in the years to come.

“Whatever the outcome of our Brexit negotiations, Britain's rock-solid relationship with the sea looks set to remain undiminished.”

Commodore Barry Bryant, Director General of Seafarers UK, commented: *“As so often in our history when facing political and international pressures, our relationship with the sea provides the strong and enduring stage from which our island and its people can make their mark, whether in trade, defence or diplomacy.*

“Our unique situation and the quality of our maritime offerings in seafaring people, port and supply chain operations and financial services remains second to none and gives us a strong negotiating hand. But they are reliant on the understanding and support of



Commodore
Barry Bryant
Director
General
Seafarers UK

the whole country. Seafarers Awareness Week strives to carry that message to every corner of our nation.”

Seafarers UK coordinates and promotes Seafarers Awareness Week in June each year, to coincide with the International Maritime Organization's global 'Day of the Seafarer' on 25 June and UK Armed Forces Day, this year headlined in Liverpool on 24 June.

To find out more, visit www.seafarersweek.uk



Seafarers UK is a charity that has been helping people in the maritime community for 100 years, by providing vital support to seafarers in need and their families. Because Seafarers UK works closely with all of the organisations that support seafarers and their dependants, we can target donations where they will make the biggest difference. Seafarers UK receives no government funding and relies on donations and fundraising to be able to carry on providing long-term aid. Without this, there simply wouldn't be the level of support we are able to provide today and that last year gave hope and help to over 170,000 seafarers, their families, and those preparing to work or serve at sea when they needed it most.

**Find out more at
www.seafarers.uk**



UK fishing fleets are one of the many recipients of Seafarers UK support



Last year Seafarers UK gave grants totalling £2.5million to 69 maritime welfare charities

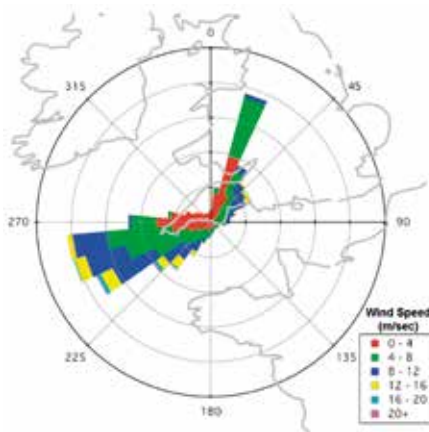
What affects the coastal air that we breathe?

Plymouth Marine Laboratory on how science at Penlee Point is helping the shipping industry monitor the success of its clean-up act

The Penlee Point Atmospheric Observatory, PPAO, is Plymouth's first long-term coastal atmospheric observatory to monitor atmospheric composition and air quality over Plymouth Sound and in the western English Channel, established as a collaborative project between Plymouth Marine Laboratory (PML) and the Marine Institute at Plymouth University.

Situated near the tip of the Rame Peninsula in South East Cornwall, the building, kindly provided by Trinity House, protects the equipment from the elements, and offers an ideal location to intercept 'clean sector' Atlantic air masses as well as polluted coastal air impacted by ship and urban emissions. The observatory is only a few tens of metres away from the water's edge and 11 m above mean sea level. Continuous observations at PPAO allow scientists to quantify the impact of anthropogenic activity on the coastal environment and additionally the influence of the sea on the nearby land.

Air pollution from ships is a major threat to human health, especially in coastal communities. Exhaust emissions containing sulfur, nitrogen oxides and particulate matter are known to cause or contribute to lung and heart disease and cancers, leading to an estimated 50,000 human deaths a year.



To reduce the impact of the millions of tonnes of chemicals ship exhausts emit, regulations were put in place at the start of 2015 by the International Maritime Organization (IMO) aiming to, in particular, considerably decrease open-ocean emissions of sulfur dioxide (SO₂). As coastal areas are impacted by emissions more than other regions, the IMO designated sulfur Emission Control Areas (SECAs), which include the English Channel and surrounding European coastal waters. Here, maximum fuel sulfur content was directed to fall from 1% to 0.1% by mass by January 2015.

In response to this, researchers at Plymouth Marine Laboratory, through their continuous long-term measurements at the Penlee Point Atmospheric Observatory,

saw an opportunity to assess the success of these regulations.

PML's Dr Tom Bell operates the PPAO with colleagues Drs Ming Yang and Frances Hopkins. Tom comments that "historically, concerns about polluted air have focused on the terrestrial environment partly because, from a carbon emissions perspective, transportation by sea is more efficient and less polluting. However, there is now recognition that the shipping industry also needs to pay attention to reducing its role in air pollution. We made measurements for seven months before regulation came into force, and continuously after. Within the area covered by the PPAO we observed a high compliance and overall reduction in the sulfur emissions being produced."

For scientists studying air pollution it is important to understand what is changing and why it is changing. The PPAO has enabled holistic and multi-faceted research, measuring the influence of the oceans on the atmosphere, and vice-versa, as well as the impact of the oceans on nearby land. This helps the team to gain a complete, long-term view of the natural composition of the air we breathe and how it is being altered by human activities such as shipping. It also facilitates an insight into how our climate is changing over time due to the influence of greenhouse gases in the Earth's atmosphere.

Current and future work is now focused on understanding the air-sea exchange of greenhouse gases that are produced in the waters around the observatory.

Above: Wind rose for Penlee Point Atmospheric Observatory. Large 'spokes' mean that winds from that direction are more frequent. Colours indicate the range and frequency of different wind speeds. At Penlee, we see a lot of winds from the South West and from the North East. It is not unusual to see wind speeds greater than 16 m/sec (> 35 mph!) at the site, particularly during winter.

Right: Dr Ming Yang installing equipment at the Penlee site

The Penlee Point Atmospheric Observatory is part of the Western Channel Observatory (www.westernchannelobservatory.org.uk). Work at the site is supported by the ACSIS (The North Atlantic Climate System Integrated Study; www.acsis.ac.uk), ORCHESTRA (Ocean Regulation of Climate through Heat and Carbon Sequestration and Transports; www.bas.ac.uk/project/orchestra) and MOYA (Methane Observations and Yearly Assessments; <http://moya.blogs.bris.ac.uk>) projects, which are funded by the UK Natural Environment Research Council. For further information, please contact Communications at Plymouth Marine Laboratory (comms@pml.ac.uk; +44 1752 633401)





ENAV Committee at IALA HQ,
St Germain en Laye, France

IALA news and activity

Dispatches from staff contributing to the various Committees of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA)

Engineering & Sustainability Committee (ENG)

Trinity House's Engineering and Operations Manager Mr Simon Millyard is the Chairman of the Engineering & Sustainability Committee (ENG). ENG is coming towards the end of its four-year work programme which concludes in 2018 at the General Assembly in Korea. A workshop on sustainable light and power for aids to navigation was held in Germany, giving education and insights into the future for this important area.

GLA R&RNAV's Principal Development Engineer for Visual Signalling, Dr Alwyn Williams, reports that the existing IALA Recommendation on effective intensity is being reviewed following groundbreaking research work by R&RNAV. He also reports that consideration was given to a suitable visual signal for the new mobile AtoN application.

Mr Neil Jones, Chairing ENG's Task Group 4 (Heritage), reports that he worked with peers from the Republic of Korea in advance of the celebration of global lighthouse heritage planned for the 2018 IALA Conference in Incheon in May; the group is also working through a revision of the IALA Conservation Manual.

Aid to Navigation Requirements and Management Committee (ARM)

Captain Phil Day (Northern Lighthouse Board's Director of Marine Operations and the ARM Chair), Trinity House's Director of Navigational Requirements Captain Roger Barker, and GLA R&RNAV's Manager, Mr Martin Bransby, represented the GLAs at the ARM6 meeting in Seattle, USA beginning on 23 April 2017. The meeting drew participation of 42 IALA Members from 20 countries and one sister organisation. ARM consists of three working groups: WG1 Navigational Requirements, WG2 Continuous Improvement and WG3 Risk Management (formerly the cross-committee Risk Management Tools Steering Group). During its deliberations, the Committee delivered a number of outputs and had a technical tour of the United States' Coast Guard cutter Henry Blake. Key outputs included—but were far from

limited to—completion and/or revision of the following recommendations and guidelines: Recommendation on Maritime Buoyage System; Recommendation on Risk Management; Guideline on the use of pictograms on Aids to Navigation; Recommendation on Disaster Recovery; Guideline on Disaster Recovery.

E-navigation (ENAV)

GLA R&RNAV Principal Development Engineer, Dr Alan Grant and, Development Engineer Dr Jan Safar and its Research Director, Dr Nick Ward, and Mr Peter Douglas (NLB) represented the GLAs at the recent IALA ENAV20 meeting. The meeting drew 137 attendees from 29 countries, considered 140 input papers and produced more than 30 output papers.

Dr Grant chairs WG5 on PNT and gave a verbal update on the GLA R-Mode interference study and its preliminary results.

IALA is preparing a document to capture its position on emerging trends and new technologies. This is captured within the Position on the Development of AtoN Services document. The ENAV committee was invited to comment and amend text within its purview, adding an annex on R-Mode.

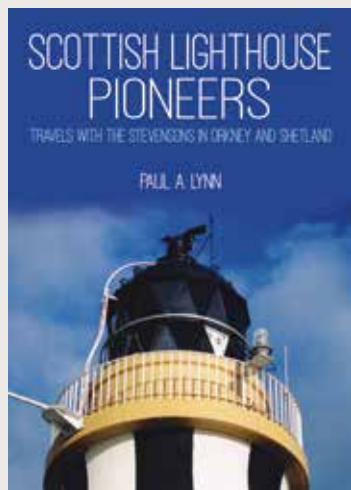
An IALA Recommendation on eLoran Service Provision and an associated Guideline with the same title were completed in this session and sent to Council for approval. The Guideline document was largely written by the GLA and captures the main aspects on the operational delivery of eLoran in one place.

WG3 noted the outcomes of the IALA AIS AtoN Workshop, held in Seoul, Korea and Safar presented on recent work on channel modelling for the VHF Data Exchange System.

IALA is a partner in the EU-funded project EfficienSEa 2 and although GLA are not directly involved, there are close connections. A report was presented to plenary on progress with IALA's contribution by the IALA Project Manager Dr Nick Ward. He also gave a status report on IALA S-200 Product Specifications, as Domain Manager.

Book reviews

A round-up of maritime publications that have been sent to us and reviewed by **Paul Ridgway**



Scottish Lighthouse Pioneers

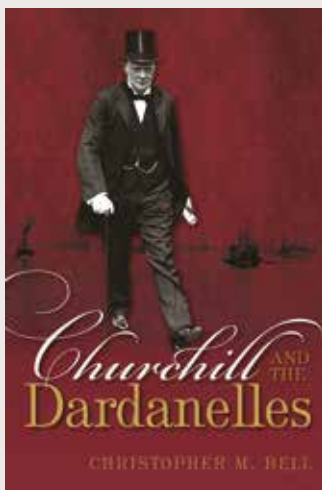
by Paul A Lynn

Whittles Publishing, paperback,
128 pages, £16.99
ISBN 978 1 84995265 1

High in merit in the roll of famous British engineers which is headed by the names of Smeaton, Wyatt, Douglass and Rennie, comes that of Robert Stevenson*. Three of his sons were well-known civil engineers of whom the youngest, Thomas, was the father of the writer Robert Louis Stevenson, 'RLS'.

Here is a personal story of that dynasty of engineers. The reader is taken across the Pentland Firth to the Orkney and Shetland Islands with descriptions of the chain of eleven Stevenson lighthouses that illuminate a vital shipping route between the North Sea, Baltic and North Atlantic, a spread of 70 islands in an archipelago of 200 nautical miles.

Most ably the book places the lives and work of the Stevenson lighthouse engineers in their social and historical context and author Lynn writes of the Stevensons as family members as well as engineers – brilliant yet fallible, tough yet vulnerable, drawing heavily on eye-witness accounts by two of Scotland's most celebrated literary sons, Sir Walter Scott and RLS himself.



Churchill and the Dardanelles

by Christopher M Bell

Oxford University Press, hardback,
452 pages, £25
ISBN 978 0 19 870254 2

This is the story of the naval and military campaign which nearly destroyed Churchill's reputation. He was First Lord of the Admiralty and with his staff planned the naval offensive of 1915 to force a passage through the strait of the Dardanelles, to attack Constantinople (now Istanbul) and create a route to Russia. For some, it was a brilliant concept that might have dramatically shortened the war and saved millions of lives.

The plan failed, however, forcing Churchill to resign, nearly destroying his political career.

Christopher Bell provides an authoritative account of the campaign's origins and execution and explains why the naval attack was launched, why it failed and how it was transformed into an even more disastrous precursor to the Gallipoli landings.

Bell untangles Churchill's complicated relationship with admirals, politicians and civil servants, and the press campaign of 1915 to destroy him and Churchill's tireless efforts in the decades after to refute the critics and convince his public that the Dardanelles campaign had nearly succeeded.



Heligoland: Britain, Germany and the struggle for the North Sea

by Jan Røger

Oxford University Press, hardback,
370 pages, £25.00
ISBN 978 0 19 967246 2

This is the story of a small island 30 miles off the German coast in the North Sea, and which was a Danish possession until 1807 when it was taken by a small British expeditionary force, to thwart Napoleon. It was later given up to Germany in 1890 in exchange for territory in Africa and the Indian Ocean.

This is a fascinating insight to the often troubled relations between the two countries from the Napoleonic Wars to the Cold War, describing also the Heligolandians and the spies and smugglers, poets and painters, sailors and soldiers between those two states.

And the Trinity House link? The island's first substantial lighthouse, replacing a Danish coal fire, was by Daniel Alexander who built it after his work for Trinity House at South Stack and Inner Farnie. The Treasury authorised an Admiralty demand for a light here; built with British labour and materials, an oil light was first exhibited in February 1811 with 24 parabolic reflectors giving a fixed white light with a range of 16 nautical miles.

Please note that we regret we are unable to take orders for the above publications

Christmastide greetings

Every year Trinity House produces a Christmas card and a lighthouse-themed calendar; these much sought-after gifts are available now to buy

The official Trinity House Christmas card

The Christmas card is printed in full colour on gloss white card with an embossed border and a paper insert. It features Christmas decorations around the main staircase at Trinity House, London and contains the greeting 'All Good Wishes for Christmas and the New Year'.

Size: approx. A5, sold in packs of ten with envelopes

Price:

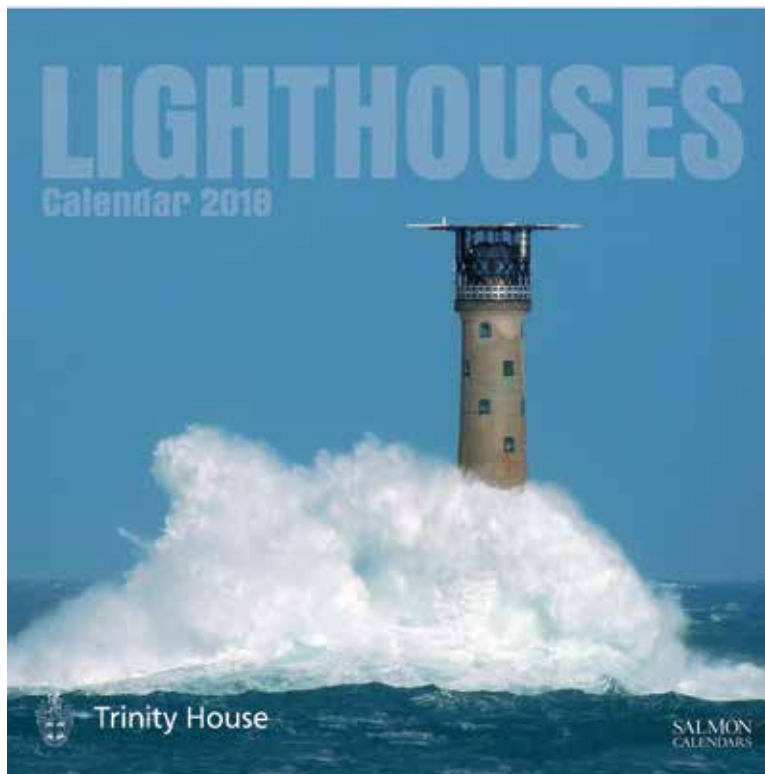
Collected*:

£10.50 per pack

Inc. P&P: £12.00 UK/

£15.50 Europe/£18.00

Worldwide



The official Trinity House lighthouses calendar 2018

The 2018 calendar features the year's best photographs of our lighthouses, compiled from entries submitted to the annual lighthouse photography competition by members of the public.

Size: 295x305mm

Price: £8.99

Collected Price: (inc. P&P) £12.50 UK
£15.50 Europe
£20.00 Worldwide

* Collection from Harwich or London offices

How to buy: Orders can be placed online at www.trinityhouse.co.uk/shop or by telephoning 01255 245156

Cherished monument of South Atlantic refuge

Head of Secretariat **Thomas Arculus** describes the fate of Cape Pembroke Lighthouse in the Falkland Islands after a recent visit

On the road out from Stanley to Cape Pembroke is a telegraph pole adorned with dozens of makeshift signs put there by visitors, pointing in the rough direction of “home” and giving the approximate distance. Cape Pembroke is the most easterly point of East Falkland and on it stands a lighthouse; a ship sailing due east would not make land until it reached Chilean Patagonia some 12,745 miles away. Reminders of the remoteness of the Falklands archipelago appear on memorials and information boards across the islands. At Cape Pembroke is a memorial for those who perished aboard the Atlantic Conveyor, sunk in May 1982 by a double Exocet missile strike. The memorial consists of a ship’s propeller and a compass rose giving distances in miles to the United Kingdom (6,661), Monte Video (1,010), Ascension Island (3,373), South Georgia (777) and Antarctica (706).

Visitors to the lighthouse can now drive the entire way—about seven miles from Stanley—on the new road which opened in December 2016, passing on the way Sparrow Cove where Brunel’s *SS Great Britain* languished between 1937 and 1969, Whalebone Cove where the iron

barque *Lady Elizabeth*—the last hulk to grace Port Stanley—rusts, and the airport targeted by Vulcan bombers sent from Ascension in 1982 on what was at the time the longest bombing run in history. To the north lies Port William with Gypsy Cove and Yorke Bay with their Gentoo and Magellanic ‘Jackass’ penguin colonies. Antoine-Joseph Pernety in 1771 on a French expedition to the islands said of the Jackass, “at the distance of an hundred paces, you would take it for one of the children of the choir in his habit... as you approach them, they look at you, turning their head to the right and then to the left, as if they made a jest of you, and muttered ‘What a fine fellow have we got here!’”

These surf-beaten golden-sandy beaches are still fenced-off with signs warning of mines scattered by the invaders in 1982. The signs are enough to deter most people which means that the little penguins are left alone. Other areas of the coast roundabout are still unsafe due to mines having been washed-out to sea and washed back in in unidentifiable places. Care is to be taken of mines and of the huge acreages of kelp surrounding the coastline. Charles Darwin visiting aboard *HMS Beagle* recorded sorrowfully the drowning of his



➤ shipmate Edward Hellyer in the kelp, “It was quite evident he had shot a bird & whilst swimming for it, the strong stalks of the sea weed had caught his legs & thus caused his death.”

Another significant danger lies a short distance offshore to the east. Only visible at low tide, the Billy Rock has claimed many victims including the barque *Levenside* (273 tons), which struck the rock in 1852; the clipper *Russell* (960 tons) which sank in 1859 after being beaten back from Cape Horn and attempting to find shelter; the barque *Fantome* which was holed on the rock but managed to limp into harbour; and the *City Of Philadelphia* (1,384 tons) which collided with the rock in 1896 in rough seas. The alarm was raised by the Assistant Keeper, Arthur Hardy, and a rescue was attempted but all 31 aboard were lost.

Other casualties included the liner *Oravia* (5,300 tons) with a crew of 150 and 261 passengers, which struck the Billy Rock in a snowstorm in November 1912. The recently opened wireless station in Stanley received the distress call and all aboard were rescued.

The first aid to navigation on the Cape was a painted wooden daymark surmounted by a flagstaff constructed in the 1840s which the Admiralty replaced in 1854-55 with a pre-fabricated cast-iron lighthouse made by William Wilkins of Long Acre. The red and white tower stood 60 feet tall. The First Order catoptric light

was first exhibited in December 1855 with a range of 14 nautical miles produced by 18 lamps using 4,500 litres of rape-seed oil per year; later, local seal oil was used. Cottages were built for the keepers at the same time. The lighthouse was subsequently maintained by the Board of Trade out of money voted by Parliament. Trinity House provided technical expertise and advice and until 1945 provided the keepers.

By 1904 the wooden foundations were rotten and in 1906 a project was commenced by Trinity House to relocate the lighthouse on new concrete foundations. The installation of a new lantern increased the height of the tower to 70 feet. Trinity House issued a notice on 4 December 1906 announcing the intention of exhibiting the new light on or about 8 June 1907. The new light character was one 0.62 second white flash of 105,000 candela intensity every ten seconds and an eclipse period of 9.35 seconds. The tower was repainted penguin-like black with a white band. The focal plane was 99 feet above MHWs and the range 16NM. The lighthouse, formerly the most southerly manned lighthouse in the world, operated continuously until it was put out of action in 1982.

Concrete steps lead up to the iron front door with its huge key. Inside can be seen the numbered cast iron plates, which were shipped out from London and bolted together on site in numerical sequence.

➊ Some of the glazing remains intact

➋ The author standing on the steps of the lighthouse

➌ Gentoo penguins are the nearest neighbours

➍ The Totem Pole signpost

➎ The view west: Lady Elizabeth in Whalebone Cove with Stanley Harbour and the mountains beyond



On the inside of the lantern dome is a compass rose attached to the weather vane above. In the lantern room the optic is missing most of its glass, but the pedestal remains intact though lacking the mercury. The lantern glazing remains intact. Also in the lantern room can be found the terminus of the old speaking tubes, which would have been used for communication between the keepers to save journeys up and down the spiral stairs. Interestingly the other known example of these is at Orfordness Lighthouse which was constructed by the same engineer, William Wilkins. In the service room below, parts of the original clockwork mechanism remain, together with paraffin and air tanks. The weight tube, from ground floor to lantern room, remains. The cottages have been demolished.

The current light that stands a short distance to the east of the old tower is a Tideland ML300 solar-powered beacon erected by the Falkland Islands Government in 1987 with technical advice provided by Trinity House.

Today—after years of withstanding the storms of the Southern Ocean—the metalwork has stained the faded paint with rust but the lighthouse still stands in its splendid position, a cherished monument to the important role played by Stanley as a free port of refuge for vessels rounding the Horn before the Panama Canal opened. Looking west in clear weather one can see beyond the sheltered waters of Port Stanley the immortal

summits of Mounts Tumbledown, Harriet, Low, Challenger, Longdon, William, Sapper Hill, the Two Sisters and Wireless Ridge. In 1834, Darwin described “a population of which rather more than half were runaways and murderers. The theatre is worthy of the scenes acted on it. An undulating land with a desperate and wretched aspect”. If he could visit Cape Pembroke now on a fine day surely he would leave with a more favourable impression.



THV *Patricia*

Here are our favourite photos from a recent shoot on THV *Patricia* during helicopter operations at Royal Sovereign Lighthouse





Trinity House is a charity dedicated to safeguarding shipping and seafarers, providing education, support and welfare to the seafaring community with a statutory duty as a General Lighthouse Authority to deliver a reliable, efficient and cost-effective aids to navigation service for the benefit and safety of all mariners

The Corporation of Trinity House

Master

Her Royal Highness The Princess Royal KG KT GCVO

Corporate Board as at 31 September 2017

Deputy Master: Captain Ian McNaught MNM

Captain Nigel Palmer OBE MNM

Captain Roger Barker MNM FNI

Captain Nigel Hope RD* RNR

Captain Stephen Gobbi MNI JP LLB

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Cover image

The tri-GLA helicopter lands materials at Royal Sovereign Lighthouse off Eastbourne in February 2017, before returning to THV *Patricia*