TRINITY HOUSE

COMMERCIAL

Commercial Services

About Trinity House

Trinity House is the General Lighthouse Authority (GLA) for England, Wales, the Channel Islands and Gibraltar. It provides and maintains more than 600 aids to navigation ranging from lighthouses and buoys through to the latest satellite navigation technology.

Additionally, Trinity House inspects over 11,000 local aids to navigation provided by port and harbour authorities, and those positioned on offshore structures. Increasingly Trinity House undertakes commercial work helping to fund its obligations as an aids to navigation provider.

Along with the other two GLAs for the United Kingdom and Ireland, Trinity House is funded by the General Lighthouse Fund. The fund is supported by Light Dues, a fee levied on commercial shipping calling at ports in the United Kingdom and Ireland.

Trinity House is also a major maritime charity, operating as a separate entity to the GLA. The charity is wholly funded by its endowments. It spends approximately £6 million every year on the welfare of mariners, education and training of future seafarers, promoting safety at sea and fulfilling its role as a Deep Sea Pilotage Authority.

How the GLAs are funded

The General Lighthouse Authorities for the United Kingdom and Ireland are funded by a system called Light Dues.

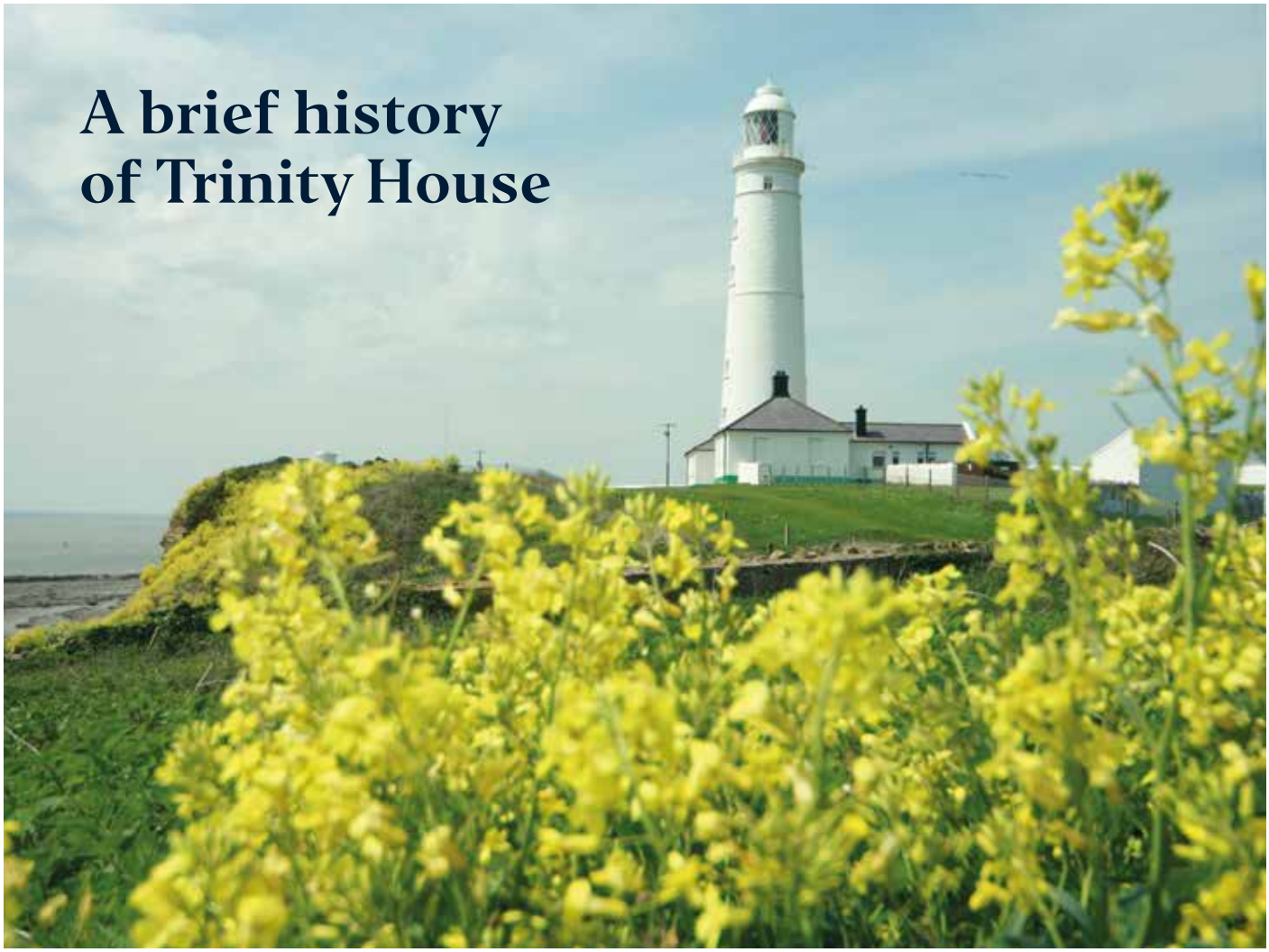
Light Dues rates for the UK are set by the Secretary of State for Transport under Section 205 of the Merchant Shipping Act 1995. The Irish Government sets the level of Light Dues in Ireland under the Merchant Shipping (Light Dues) Act 1983.

Light Dues are payable by vessels using a UK or Irish port and are collected by Trinity House Lighthouse Service electronically and placed in a central account, the General Lighthouse Fund.

Most Light Dues are payable based on the cargo capacity of a vessel (registered net tonnage) and payable for the first nine visits to a UK or Irish port per year.

The Commissioners of Irish Lights, the Northern Lighthouse Board and Trinity House Lighthouse Service are all funded from the General Lighthouse Fund which receives no funding from the UK exchequer. The Republic of Ireland Government make an annual contribution to meet the cost of maintaining aids to navigation in Ireland.

A brief history of Trinity House



Although its origins are lost to obscurity, it is clear that when the 'Masters, rulers and mariners of the King's Navy in the Thames and other places' presented a petition to King Henry VIII on 19 March 1513, this charitable Guild was already in possession of a well-established great hall and almshouses, close to the Naval Dockyard at Deptford on the River Thames.

The petition — concerning the incorporation of that fraternity *"so that they might regulate the pilotage of ships in the King's streams"* — resulted in Henry granting a Royal Charter on 20 May 1514 to 'The Master Wardens and Assistants of the Guild Fraternity or Brotherhood of the most glorious and undivided Trinity and of St. Clement in the Parish of Deptford Strond, in the County of Kent', commonly referred to as the Corporation of Trinity House.

Initially responsible for the welfare of decayed seamen and the regulation of pilots on the Thames, the Brethren of Trinity House assumed a reputation for expertise in a great number of maritime matters, and so their formal duties grew to include — among other things — the victualling and manning of the King's ships and the dredging and sale of ballast from the bed of the Thames river.

Queen Elizabeth I would soon recognise the achievements of this *"company of the chiefest and most expert masters and governors of ships"* with an Act of Parliament in 1565 allowing them to set up *"so many beacons, marks, and signs for the sea… whereby the dangers may be avoided and escaped, and ships the better come into their ports without peril."* Elizabeth would also grant the Corporation its Coat of Arms, in 1573.

In 1604, the charter was amended by James I to reflect the significantly expanding workload of the 13 Brethren; the number of Brethren was increased to 31, who became the Elder Brethren, and the remainder became the Younger Brethren. Today the Corporation is comprised of a fraternity of over 300 Brethren drawn from the Royal and Merchant Navies and leading figures in the shipping industry. Since 2011, HRH The Princess Royal has been Master of Trinity House.

The same charter would also confer on Trinity House rights concerning compulsory pilotage of shipping and the exclusive right to license pilots in the River Thames. Until its responsibility for District Pilotage was transferred to Port and Harbour Authorities under the 1987 Pilotage Act, Trinity House was the Pilotage Authority for London and over 40 other districts, including the major ports of Southampton and Harwich.

From 1594 until the last years of the 19th century, Trinity House earned

money for the welfare of distressed seamen and the local poor by selling dredged material from the Thames to sailing vessels requiring ballastage after discharging their cargoes in the port of London. With the rapid growth of shipping, ballastage was a very profitable business until the introduction of steel ships capable of holding sea water ballast.

Although the 1565 Seamarks Act gave the Corporation the right to erect lighthouses and beacons, as well as the right to claim dues from ships passing them, it did not exercise this right until over 40 years later. With the increase in shipping along the Newcastle to London coal route, collisions and the shoals along the coast had accounted for severe ship losses, notably around the sands between Lowestoft and Winterton. A petition for a lit seamark was drawn up by shipowners of the east coast, who claimed that *"no doubte but everyman that tradethe the North partes will willingly contribute thereunto."*

The resulting lighthouse was the first to be built by Trinity House: a pair of wooden towers at Lowestoft, with candle illuminants, to act as 'leading lights' *"for the direction of ships which crept by night"*, erected in 1609. The King's Privy Council allowed for a levy of four pence on ships passing the light, to cover the cost of maintenance and fuel.

The next two hundred years saw a proliferation of lighthouses, many run privately for profit. The reliability of many of the private lights left much to be desired and so in 1836 legislation was passed placing all remaining privately-owned lights under the management of Trinity House.

Over time, the function of building, maintaining and manning seamarks evolved into the Lighthouse Service, which required a Support Vessel Service, six district depots around the coast and a fleet of as many as 90 lightvessels. Trinity House's commitment to providing an economical service to the mariner meant that, in the late 20th century, the number of depots and lightvessels were reduced, and the lighthouses were switched over to automatic operation.

The lighthouses, lightvessels and buoys are now watched over from Harwich, Swansea and St. Just, and the headquarters at Tower Hill, London, which has stood since 1795.

The Corporation continues its original role as a charity today, dispersing as much as £6 million annually for the welfare and education of mariners. In many ways the Corporation is still the same guild of Master Mariners that was incorporated in 1514, and to this day it operates from the renewed Royal Charter drafted by the Corporation's Master Samuel Pepys in 1685.

Advances in aids to navigation technology

The development of lighthouses

Early lighthouses could be very ineffectual as they gave mixed signals. There was no regulation of the brightness or position of the light and they rarely marked the real hazards seafarers faced. Being generally fuelled by wood or coal they were also highly dependent on people keeping the fire burning.

The real breakthrough with marking dangers came when Henry Winstanley built the first lighthouse on Eddystone Rocks. Pioneers in the field of building lighthouses on hazardous rocks were also Smeaton (Eddystone) and Stevenson (Bell Rock in Scotland). Yet while the towers themselves were impressive constructions of interlocking rock, the light emitted wasn't much better than previously shone.

The Smeaton tower was lit by a candelabra, which gave out poor luminosity, but was better than the oil lamp he had previously used. The soot the burning of the oil lamp gave off defeated the object of having a light. When Trinity House acquired the tower in 1807 it replaced the candelabra with 'Argand' lamps, named after the Swiss inventor Ami Argand who discovered that the effect of placing a burning oil wick in a glass tube was a significantly brighter flame as the confined space meant the flame had to draw in more air to keep alight. This light was further improved when the Argand lamp was fuelled by the cleaner-burning sperm oil.

The use of reflectors to not only increase the light's intensity but to help differentiate the light from its neighbours was the next breakthrough and improved navigation for the exhausted seafarer. Bending brass sheets in to arcs helped refract the light and in the 19th century Swede Johan Nordqvist devised a way of making the apparatus turn using a clock-like mechanism and pendulum creating the first flashing lights. The sources of the light changed including the use of electricity in selected lighthouses from the late 1800s and the use of paraffin from the early 1900s.

Following this the advances came in the form of improvements to glass lenses which concentrated the light in a horizontal beam, a method which can still be seen today.

Technology now sees the sources of electricity developed with some of the 66 lighthouses under Trinity House's jurisdiction having

1882: The present Eddystone Lighthouse (the fourth to be established), designed by Sir James Douglass, is completed

1940: The Trinity House headquarters in London is destroyed during the Blitz. The house is faithfully restored in 1953

1958: Almshouses for retired mariners are built at Walmer, Kent, the latest in a tradition predating even our first Royal Charter

1969: First reliefs of Lighthouse Keepers by helicopters are trialled

1977: Last oil burning light removed from a Trinity House lighthouse at St. Mary's Bay, Tynemouth

1982: Eddystone Lighthouse becomes the first Trinity House rock lighthouse to be converted to automatic operation; THV *Patricia* is delivered

1989: Lightsmen are withdrawn from the Channel station, the last manned Trinity House lightvessel

1993: The conversion of Trinity House buoys to solar power is completed

1994: Lundy North becomes the first Trinity House lighthouse to be converted to solar powered operation

1998: Keepers are withdrawn from North Foreland, the last manned Trinity House lighthouse

2002: The Differential Global Positioning System (DGPS) network provided by the General Lighthouse Authorities becomes operational

2006: THV *Alert* enters service, becoming Trinity House's first Rapid Intervention Vessel

2007: THV *Galatea* is delivered, the most advanced vessel ever built by Trinity House

2008: Development of e-navigation concepts such as AIS, eLoran and DGPS begins

2011: Lighthouse modernisation completed; new power systems reduce CO_2 emissions. HRH The Princess Royal elected Master

2014: Trinity House celebrates 500 years of service to the mariner

2025+: The General Lighthouse Authorities' strategy for the UK and Ireland's marine aids to navigation for 2025 and beyond is realised

been adapted to solar power or scheduled to be converted in the next few years.

Technology also allows lighthouses to be monitored remotely from the Planning Centre in Harwich 24 hours a day, with access by maintenance staff available to the most remote lighthouses by helicopter.

Daymarks

To make lighthouse structures more visible in daylight, lighthouses on shore are usually painted white, while stations on low lying land or at the foot of chalk cliffs are often striped with red or black to make them more conspicuous.

Hazard warnings in poor visibility

Early warning systems concentrated on the use of sound, for example by the use of cannon fire and detonations. Light vessels used a hand-turned emitter that passed air over a reed creating a mournful sound.

One of the lesser known feats of William Thomson (soon to become the first Baron Kelvin) is the discovery of the use of compressed air to make an audible warning. The success of his design of the massive iron trumpet installed at Trevose Head (Cornwall) in 1913 brought about the development of the diaphone, an ear splitting emitter providing the basic fog signal during most of the 20th century.

Air driven fog horns have been replaced by electrical diaphragm emitters which do not require heavy engines and so are more suitable for use at automated lighthouses.

Radar technology

Audible fog signals have their limits and the racon, a development that stems from the success of radar uses radar as a beacon ('racon' comes from shortening these words). Simply, the racon responds electronically to the signal coming from a ship's radar. The response shows on the radar screen informing the ship's crew of not only a 'nearby' hazard, but identifies the hazard location and the site of the racon. Racons are very power efficient, remaining passive until they are activated by a ship's radar signal.

Global Positioning Systems (GPS)

The advent of GPS has witnessed improvements in the monitoring of aids to navigation. Mariners use GPS to navigate their way around the world.

Advances in technology have also meant that aids to navigation can be monitored remotely and Trinity House manages its aids from its Operations and Planning Centre in Harwich.

The General Lighthouse Authorities' (GLAs) marine Differential Global Positioning System (DGPS) is a satellite based navigation system.

It is the newest element of the mix of visual, audible and electronic aids to navigation provided by the three GLAs.

DGPS is a network of 14 ground-based reference stations providing transmissions with coverage of at least 50 nautical miles around the coasts of the United Kingdom and Republic of Ireland. It is an open system – available to all mariners – and is financed from light dues charged on commercial shipping and other income paid into the General Lighthouse Fund.

Key Dates:

1514: Royal Charter granted by Henry VIII to the Corporation of Trinity House; Sir Thomas Spert is the first Master

1566: Elizabeth I grants to Trinity House the power to build lighthouses and other seamarks for the protection of seafarers

1594: Elizabeth I confers upon Trinity House ballastage rights on the Thames, an important early income for the charity

1604: James I grants Trinity House rights concerning the compulsory pilotage of shipping, and the exclusive right to license pilots in the River Thames

1609: We builds our first lighthouses at Lowestoft, to protect shipping along the coast of East Anglia

1676: Renowned diarist and Naval Administrator Samuel Pepys is elected Master of Trinity House

1685: James II issues a renewed Royal Charter to Trinity House; this document is still the foundation of our authority today

1698: Eddystone becomes the first rock lighthouse in Europe, built by Henry Winstanley; it is destroyed by a storm in 1703

1732: The first lightvessel in the world is moored near the Nore Sands at the mouth of the River Thames

1759: The third Eddystone Lighthouse is built; pioneering civil engineer John Smeaton uses dovetailed stone blocks in the shape of an oak tree

1796: Our current headquarters are built at Tower Hill. Today the Grade I Listed building is one of London's most prestigious venues

1803: The Blackwall workshops are established by the Thames, becoming a hub for engineering and lighthouse keeper training

1836: Trinity House is given compulsory powers to acquire and maintain all private lighthouses

1838: Grace Darling, the daughter of the keeper at Longstone Lighthouse, rows out to save nine victims of the wrecked Forfarshire steamer

1858: Electricity introduced to the first Trinity House lighthouse at South Foreland

Provision and maintenance of aids to navigation

Our business is the provision and maintenance of aids to navigation.

Whether your requirement is for a hire buoy to mark an obstruction for a short or long-term period, upkeep of a varied mix of aids to navigation, condition survey and report on assets or redesign of a lighting system, Trinity House is your experienced partner of choice.

After consultation to better understand your needs and with the option of a site survey, our experts will deliver a cost effective solution for your aid to navigation systems. A dedicated account manager will manage your project from conception to commissioning and acceptance through to commencement of our proposed lifecycle maintenance plan. We believe in carrying out the right maintenance at the right time, be it predictive, condition-based or reliability centered to extend the working life of your asset and reduce any downtime. We are happy to maintain your own aids to navigation or provide a total turnkey operation that includes both provision and maintenance, providing safe and reliable operation of your aids to navigation ensuring compliance with statutory obligations for availability.

Trinity House provides on-station cleaning, examination, maintenance and exchange plus shore-based repair, refurbishment and replacement. We take a flexible approach based on your requirements and our proposed life-cycle maintenance plan will deliver excellent value for money.

Whether you need one-off support or a service level agreement for examination and maintenance for your buoys, beacons and lights, Trinity House will ensure that your assets continue to function as specified.

Trinity House services include the following options for the maintenance of your navigation assets:

Asset condition survey

A cost-effective and independent assessment of the essential and medium–term maintenance requirements of your buoys, moorings, lights, structures and beacons. Our survey report covers key areas such as reliability, availability and recommended maintenance.

Refurbishment agreement

An agreed programme of repair and repainting of buoy bodies and superstructures at Trinity House workshops, using certificated craftsmen, plus refurbishment of navigation lamps, batteries and power systems by our skilled technicians.

On-station service agreement

The periodic cleaning, examination and preventative maintenance of buoys, moorings and sinkers using our specialised fleet of vessels plus the scheduled examination and maintenance of fixed lights, structures and beacons using our highly trained mobile craftsmen.

Outsourcing agreement

On and off-station maintenance of navigation buoys, moorings, sinkers, lights, structures and beacons utilising the complete range of Trinity House mobile craftsmen, workshops, specialist equipment and vessels.

Each of these options can be tailored to individual requirements to ensure the best possible solution for the customer.

Our expertise and management system, which is certificated to ISO9001 for Quality, ISO14001 for Environmental Management, and BS8800 for Safety Management, ROSPA QSA Level 5 and the ISM code, ensure that key issues of safety, environmental protection and quality assurance are routine considerations at all times.

Please contact us to discuss your particular requirements.

Wreck marking and the Emergency Wreck Buoy

Wrecks

Trinity House has a statutory duty under the Merchant Shipping Act 1995 to mark and, if appropriate, remove wrecks which are a danger to navigation.

Once located, wrecks are surveyed to determine whether they are a danger to other vessels. If so the wreck will be marked with buoys to warn shipping of the danger whilst arrangements are made for the wreck to be dispersed.

The Emergency Wreck Buoy

On Saturday, 14 December 2002, the car carrier *Tricolor* and the container vessel *Kariba* collided. The collision occurred when both vessels were about to enter the north-south shipping route through the English Channel.

The *Kariba* struck the *Tricolor* on the port side. The car carrier quickly took on water, capsized and sank.

Two days later the German cargo vessel *Nicola* struck the wreck of the *Tricolor*. Tugs pulled the cargo ship from the wreck on the same day.

On Wednesday, 1 January 2003, the *Tricolor* was struck for a third time. On this occasion, the Turkish tanker *Vicky*, carrying 77,000 tons of gas oil, hit the wreck.

These wrecks in the Dover Straits in 2002 brought into sharp focus the effective responses required to adequately and quickly mark such new dangers and prevent collisions. Responsible Authorities needed to assess their areas of responsibility and rapid response capability as part of their contingency planning.

THV *Alert* & the Emergency Wreck-Marking Buoy

The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) recommendation O-133 details the specification of the Emergency Wreck-Marking Buoy.

The Emergency Wreck-Marking Buoy is designed to provide high visual and radio aid to navigation recognition. It is placed as close to the wreck as possible, or in a pattern around the wreck, and within any other marks that may be subsequently deployed.

THV *Alert*, delivered in 2006, is Trinity House's Rapid Intervention Vessel, deployed primarily to cover the southeast coast of the UK where she will be able to respond rapidly to any maritime incident – including marking wrecks.

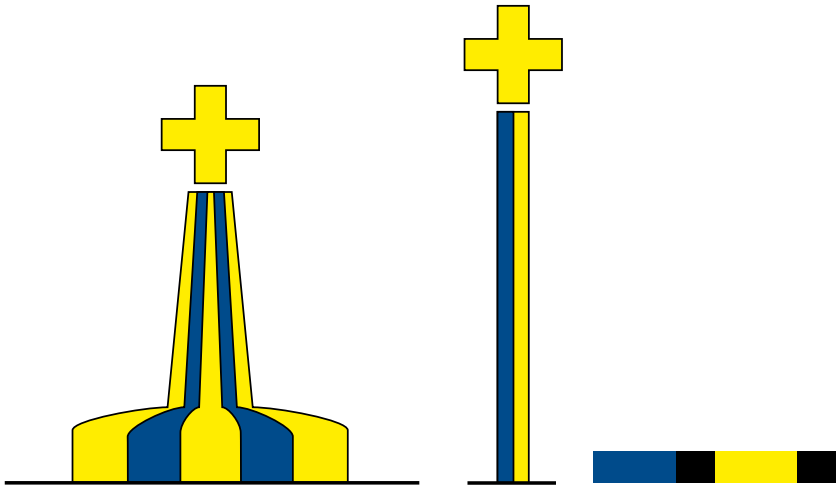
The Emergency Wreck-Marking Buoy is maintained in position until:

- The wreck is well known and has been promulgated in nautical publications;
- The wreck has been fully surveyed and exact details such as position and least depth above the wreck are known;
- A permanent form of marking of the wreck has been carried out.

Characteristics

The buoy has the following characteristics:

- A pillar or spar buoy, with size dependant on location.
- Coloured in equal number and dimensions of blue and yellow vertical stripes (minimum of 4 stripes and maximum of 8 stripes).
- Fitted with an alternating blue* and yellow flashing light with a nominal range of 4 nautical miles where the blue and yellow 1 second flashes are alternated with an interval of 0.5 seconds.
- If multiple buoys are deployed then the lights should be synchronised.
- Consideration should be given to the use of a racon Morse code “D” and/or AIS transponder.
- The top mark, if fitted, is to be a standing/upright yellow cross.



* The light characteristic was chosen to eliminate confusion with blue lights to identify law enforcement, security and emergency services.

Buoys

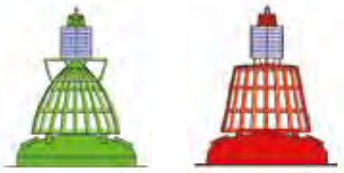
Trinity House maintains around 450 buoys, as well as performing the important role of inspecting those maintained by port and harbour authorities, utility companies and by oil/gas rig and wind farm operators.

Trinity House buoys are moored to the sea bed using a sinker constructed from cast iron with weights varying between 1 tonne and 8 tonnes. The sinker is placed on the Assigned Position (AP). The weight of the sinker and the length of chain used to moor the buoy depend on several factors including the type of buoy, depth of water, strength of tide and the exposure of the buoy.

Most Trinity House buoys have two mooring eyes to which shackles are attached to two pieces of chain forming a bridle. The bridle runs down to a swivel which allows the buoy to rotate and prevents the bridle from being twisted and dragging the buoy under the water. From the swivel, a length of chain (known as a riser) runs to a sinker on the sea bed.

Buoys are essential in providing the mariner with visual orientation and spatial awareness. They also provide hazard, channel and waypoint marking. Equipment can be added to buoys to provide additional services such as the transmission of AIS, meteorological and hydrological data.

Types of Buoys



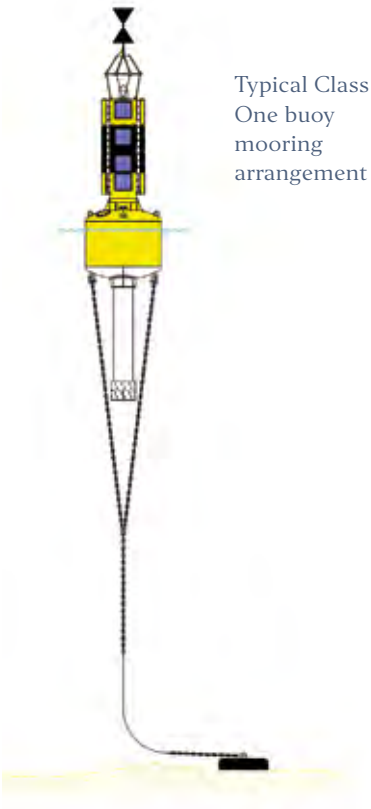
Lateral Marks

Used generally to mark the sides of well-defined, navigable channels.

They are positioned in accordance with a Conventional Direction of Buoyage. They indicate the Port and Starboard hand sides of the route to be followed. They are coloured Red (Port Hand Marks) and Green (Starboard Hand Marks).

General Direction of Buoyage

Around the British Isles the General Direction of Buoyage runs North along the West coast and through the Irish Sea, East through the English Channel and North through the North Sea (the opposite in IALA system B, for example in the USA).



Typical Class One buoy mooring arrangement

From left to right: North Cardinal, East Cardinal, South Cardinal, and West Cardinal Class Two buoys

Cardinal Marks

Used in conjunction with the compass to indicate the direction from the mark in which the deepest navigable water lies, to draw attention to a bend, junction or fork in a channel, or to mark the end of a shoal. The mariner will be safe if they pass North of a North mark, South of a South mark, East of an East mark and West of a West mark.

Cardinal Marks are also used for permanent wreck marking whereby North, East, South and West Cardinal buoys are placed around the wreck. In the case of a new wreck, any one of the Cardinal buoys may be duplicated and fixed with a Radar Beacon (RACON).

Special Marks

Not primarily intended to assist navigation but are used to indicate a special area or feature, the nature of which is apparent by referring to a chart or Notice to Mariners. Special Marks are used in the marking of cables and pipelines, including outfall pipes and recreation zones. Data Buoys are also classed as Special Marks. They are coloured yellow.

Isolated Danger Marks

Used to mark small, isolated dangers with navigable water around the buoy. Typically used to mark hazards such as an underwater shoal or rock.

They are coloured Black and Red.

Safe Water Marks

May be used mid-channel, as a centreline or at the point where land is reached. These buoys (as the name suggests) indicate the presence of safe, navigable water all around the buoy. They may also indicate the best point of passage under a fixed bridge. These buoys are coloured Red and White.

Emergency Wreck Buoys

These buoys provide a clear and unambiguous means of marking new wrecks. This buoy is used as a temporary response, typically for the first 24–72 hours. This buoy is coloured in an equal number of blue and yellow vertical stripes and is fitted with an alternating blue and yellow flashing light.

Vessel Services

Trinity House is an acknowledged maritime specialist operating UK registered purpose built vessels equipped to the highest technical standard and manned by professionally qualified merchant marine officers and crew.

Vessel activities are coordinated and monitored around the clock by our Operations and Planning Centre.

Our vessels are available for short term contracts and one off jobs to provide efficient and cost effective marine support for a wide range of services including:

- hydrographic surveys including bathymetry, side scan, sonar and wreck investigations
- aids to navigation provision, deployment, maintenance, repair and examination
- research platforms for deployment and recovery of scientific equipment
- sampling projects
- marine hazard search and marking
- lifting, towing and accurate positioning of marine equipment
- recovery and re-establishment of off-station aids to navigation
- sea trials of electronic and specialty equipment
- helicopter support
- safety boat assignments
- guard duties for cable and pipe laying projects

Trinity House operates a variety of vessels to suit your requirements:

- THV *Alert*
- THV *Galatea*
- THV *Patricia*

THV *Galatea*

THV *Galatea*

Trinity House's Multi Functional Tender (MFT), *Galatea*, has been designed with buoy handling, wreck marking, towing and multibeam and side scan hydrographic surveying capability. At 84.2 metres long, *Galatea* has accommodation for an additional 22 people. With DP2, high specification survey equipment, a 30t lift crane, a through hull instrument tube, a large working deck with container lock facility and 230v or 400v plug-in supply, a helicopter landing pad and a high speed workboat, *Galatea* is available 24/7 for a wide range of projects.

THV *Alert*

THV *Alert*

Trinity House's Rapid Intervention Vessel (RIV), *Alert*, has been designed with buoy handling, wreck marking, towing and multibeam and side scan hydrographic surveying capability. At 39.3 metres long, with high specification survey equipment, DP1 dynamic positioning and a maximum speed of 17 knots, *Alert* is deployed primarily to cover the South East Coast where she can respond rapidly to any maritime incident. In addition, with her large working deck and through hull instrument tube, she is an ideal research platform for deployment of scientific equipment and sampling work. Available 24/7 with accommodation for an additional 4 people, *Alert* can be utilised for a wide range of projects.

THV *Patricia*

THV *Patricia*

Trinity House's Multi Functional Tender (MFT) *Patricia* works around the coast of England, Wales and the Channel Islands undertaking aid to navigation maintenance work, towing, wreck location and marking amongst other projects. At 86m long, *Patricia* has accommodation for an additional 20 people and benefits from a helicopter-landing pad.

The vessel has a 20 tonne main crane capacity and 28 tonne bollard pull and towing winch, she is also survey capable and available 24/7 for a wide range of projects.

THV *Patricia* – Specification

Port of Registry	**London**
Year Built	**1982**
Call Sign	**GBTH**
Length Overall	**86.3m**
Breadth Moulded	**13.8m**
Depth Moulded	**6.9m**
Draft	**4.4m**
Air Draft	**32.0m**
Service Speed	**12kts**
Fuel Consumption at 12kts	**500ltrs/hr**
Bunker Capacity	**04t**
Fresh Water	**283t**
Endurance	**21 days**
Bollard Pull	**28t**

PROPULSION – MACHINERY

Main Engines – 4 x Ruston 6RKcZ 750 kW @750 RPM

Auxiliary Diesel – 2 x Ruston 4AP230Z 240 kW @600 RPM

Propulsion Motors – 2 x 1120 kW @ 250 RPM

Bow Thruster – 360 deg Whitegill – 7 tonnes 690 kW @ 480 RPM

Propellers – 2 x Fixed pitch, outwards turning

WORKBOATS

9m heavy duty workboats x 2

RIB 5.4m 50hp

CRANES

Speedcrane 20t SWL (offshore

Stores Crane 1t

CAPSTANS & WINCHES

2 x 14t max pull – chain to 44mm

Towing Winch 30t max pull

DECK FACILITIES

Main Deck Area – 80m^2

Pressure Wash – 350bar/5000psi

Tween Deck – Storage & workshops

Hold – Storage & load handling

ACCOMMODATION

Single Cabins:	34
Double Cabins:	6
Office:	1
Conference Room:	1
Mess Room:	1
Recreation / TV Rooms:	4
Changing Room:	1
Workshop:	1
Gymnasium:	1

FLIGHT DECK

'D' Value 11.9m

Max load 10,000kg

HYDROGRAPHIC SURVEY

Kongsberg EA 400SP 38/200KHz

Geo Acoustics Side Scan Sonar 2094

SIMRAD EA500, Side Scan

COMMUNICATION

GMDSS Area 2

Satcoms – Sat-C V-sat 4003 Broadband

Sailor SC4000 Iridium, Nera Sat-B

VHF R/T DSC – Sailor RT 5022

MF/HF SSB – Sailor HC4500

NavtexRx – JRC NCR 333

Internet Access points – all cabins

NAVIGATION EQUIPMENT

ECDIS – Sperry VisionMaster FT

Radars – Decca Marine Bridge Master x 2

Dual-Axis Speed Log – Consilium Navigation SAL SD 1-6

DGPS – SIMRAD GN33 and SIMRAD Shipmate GN30

Loran – Furuno LC 90 mk2

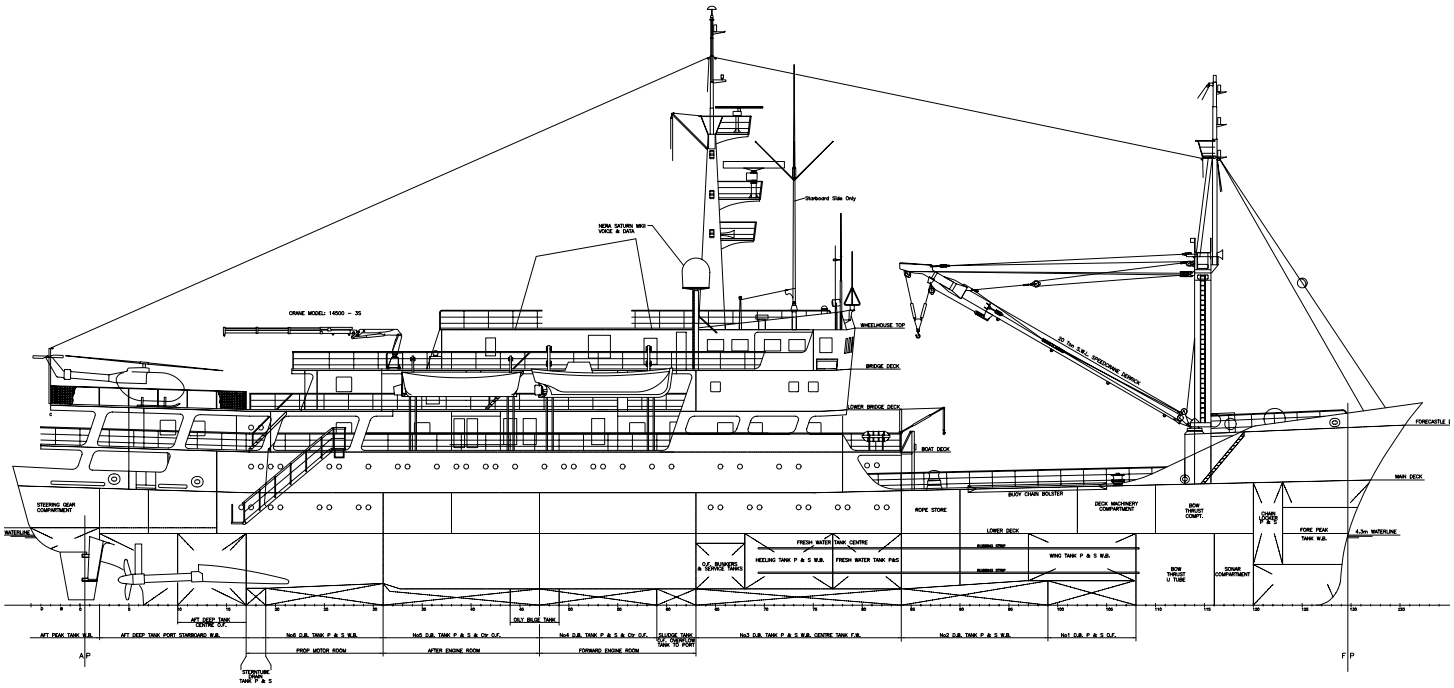
Gyro Compass – Simrad GC80

TMC magnetic Compass– John Lilley and Gillie Type SR2

Auto Pilot – Raytheon Compilot 20

Echo Sounder – SIMRAD EA500

AIS System – JRC AIS JHS-182



THV *PATRICIA* SPECIFICATION

Trinity House's Multi Functional Tender (MFT) *Patricia* operates around the coast of England, Wales and the Channel Islands undertaking aid to navigation maintenance work, towing, wreck location and marking amongst other projects. At 86m long, *Patricia* has accommodation for an additional 20 people and benefits from a helicopter-landing pad. With a 20 tonne main crane capacity and 28 tonne bollard pull and towing winch, she is also survey capable. Available 24/7, *Patricia* is available for a wide range of projects at a competitive rate.

BUILD STANDARD

Lloyds Register • 100 A1 • Lloyds Machinery Certificate, Unmanned Machinery Space Certificate, Lloyds

Environmental Policy and Lifting Appliance. Complies with requirements for UK MCA Class V111 vessel.

Lloyds Ship Emergency Response Service.

THV *Galatea* – Specification

Port of Registry	London
Year of Build	2007
Call Sign	MRDQ7
Length Overall	84.2m
Breadth Moulded	16.5m
Depth Moulded	7.2m
Draft	4.3m
Air Draft	30.0m
Maximum Speed	17kts
Service Speed	12kts
Fuel Consumption at 12 kts	670ltrs/hr
Bunker Capacity	296t
Potable FW	170t
Technical FW	144t
Jet A1 Fuel Capacity	6,000ltrs
Endurance	35 days
Intering Stabilizer System Anti-Heeling System	
Bollard Pull	33t

PROPULSION – MACHINERY

3 x Wartsila 8L20 @ 1710 kVA
2 x Wartsila 4L20 @ 860 kVA
Stern Azimuths –
2 x Rolls Royce 1500 kW
Bow Thrusters –
2 x Rolls Royce 750 kW

DYNAMIC POSITIONING SYSTEM

Kongsberg K-Pos DP-21
(IMO DP Class II)

WORKBOATS

30 kts Pacific 28 with cabin for 6 pax.
Steel Workboat – 9m heavy duty

CRANES

Liebherr Crane – 30t @ 22m (offshore)

Palfinger Crane knuckle boom – 1.6t @ 18.0m (offshore)

Stores Crane x 2 – 1.45t @ 10.0m (offshore)

CAPSTANS & WINCHES

2 x 15t max pull – chain to 44mm
Towing Winch 40t max pull
Tugger Winches x 2 – 5t max pull
Karm forks x 2

DECK FACILITIES

Main Deck Area – 550m^2
ISO 20' and ISO 10' Container Lock Down matrix
Electrical Power – AC 50Hz 220V; 400V Supplies
Pressure Wash – 350bar/5000psi
Moon Pool – 1.2m^2
Tween Deck – Storage & workshops
Hold – Storage & load handling

ACCOMMODATION

Single Cabins:	22
Twin Cabins:	9
Office:	1
Conference Room:	1
Mess Room:	1
Recreation /TV Rooms:	3
Changing Room:	1
Workshop:	2
Gym:	1

FLIGHT DECK

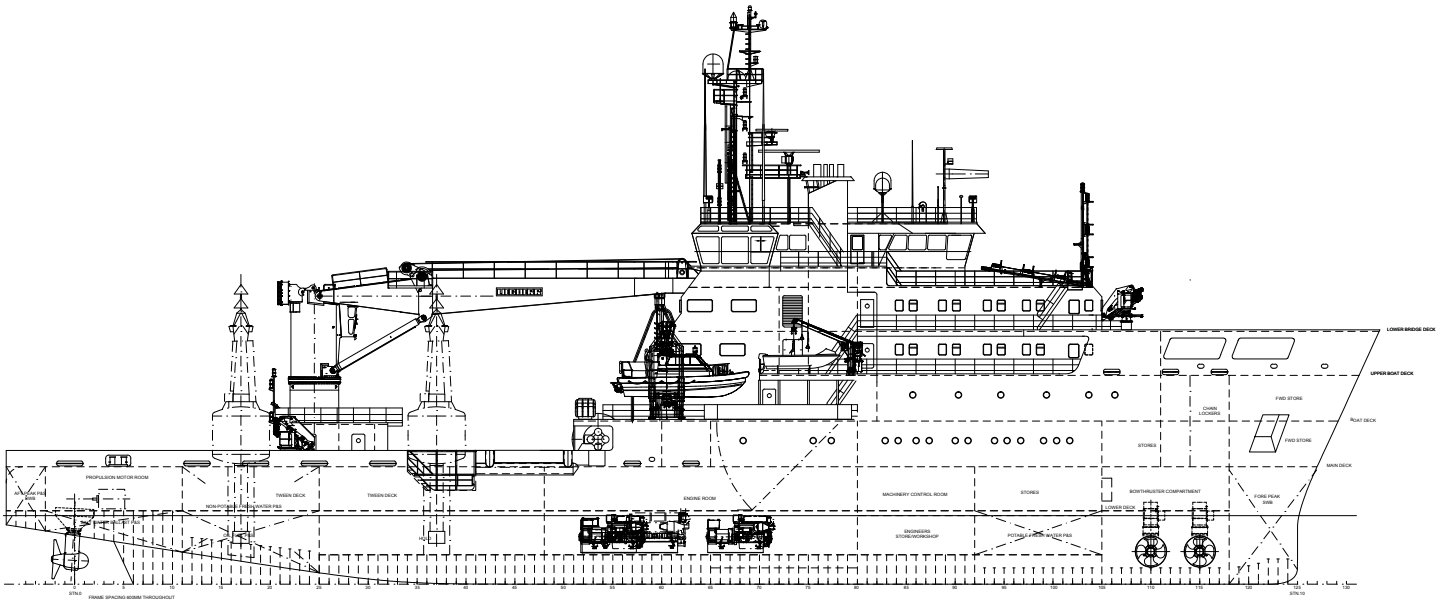
Helicopter Deck – 'D' Value 13.0m
Refuelling Facility

HYDROGRAPHIC SURVEY

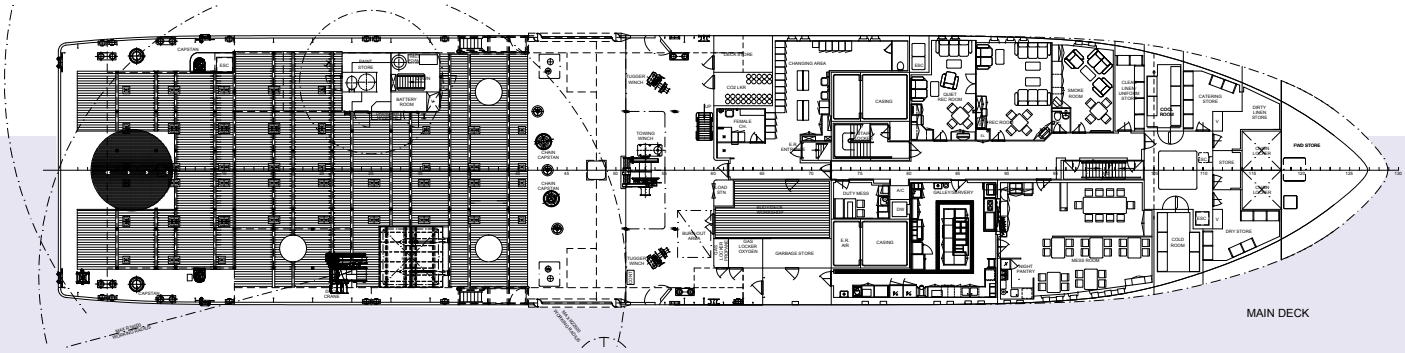
Kongsberg Simrad EM2040C
Multi beam E/S
Kongsberg Simrad EA 400 E/S
PosMV Positioning
Simrad SEN-218377 SVP
Kongsberg TD304 Tide Gauge
Simrad SL 30/35 Sonar
Simrad GeoAcoustics Side Scan

COMMUNICATION

GMDS Area 2
Satcoms – Sat-C H2095C High Speed Data/Voice
Iridium – Sailor ST4110 Voice
MF/HF SSB – Sailor HC4500 R/T DSC
MF/HF SSB – R/T DSC
Weather – FAX 207 Facsimile
Navtex Rx – McMurdo ICS NAV5plus
VHF R/T DSC – Sailor RT4722
Internet Access – all Cabins



PROFILE



MAIN DECK

NAVIGATION EQUIPMENT

ECDIS/NAV – F/AIS-R4
Radars – Decca Bridge Master x 2
Dual-Axis – SRD500 Speed Log
DGPS – 2 x MX Marine MX 420/8
Gyro Compass – 3 x Navigat 2100 Fibre Optic
TMC Magnetic – Navipol 1 Compass
Auto Pilot – NaviPilot 4000 Digital Adaptive Autopilot
Echo Sounder – ES 5100-01

THV *GALATEA* SPECIFICATION

Trinity House's Multifunctional Tender (MFT), *Galatea*, has been designed with buoy handling, wreck marking, towing and multibeam and side scan Hydrographic surveying capability. With DP2, high specification survey equipment, a 30t lift crane, a 1.2m^2 moon pool, a large working deck with the facility to lock containers on deck and 230v or 400v plug-in supply, a helicopter-landing pad and a high speed workboat, *Galatea* is available 24/7 for a wide range of projects at very competitive rates.

BUILD STANDARD

Lloyds Register • 100 A1 • LMC UMS MCM EP LA CAC DPAA IMO CLASS II (Lloyds Machinery Certificate, Unmanned Machinery Space Certificate, Machinery Condition Maintenance, Lloyds Environmental Protection, Lifting Appliance and Crew Accommodation Comfort Standard). Complies with requirements for UK MCA Class VII vessel. GMDSS sea area A2.

THV *Alert* – Specification

Port of Registry	London
Year of Build	2006
Call Sign	MLPH9
Length Overall	39.3m
Breadth Moulded	8.0m
Depth Moulded	4.0m
Draft	2.7m
Air Draft	18.0m
Maximum Speed	17kts
Service Speed	12kts
Fuel Consumption at 12 kts	360ltrs/hr
Bunker Capacity	42t
Fresh Water	12t
Endurance 3,000nm @ 12kts	1,500nm @ 15kts
	5 days working on site
Bollard Pull	28t

PROPULSION – MACHINERY

Main Engines – 2 x Caterpillar Diesel 1492 kW @ 1600 RPM

Auxiliary Generators – 2 Caterpillar C90 Diesel 155 kW @ 1620 RPM

Bow Thruster – HRP 155kW @ 1620 RPM

Propellers – 2 Kamewa variable pitch 50 XF5/4

Running on BIOGEAR XP Environmentally Acceptable Lubricant (EAL)

DYNAMIC POSITIONING SYSTEM

Kongsberg C-Pos LR DP (CM)

WORKBOAT

RIB 5.4m 50hp

CRANES

Palfinger Knuckle Boom –
3.5t @ 10m
2.2t @ 15m

Winch 3.3t SWL

CHAIN / TOWING WINCH

Chain Capacity 100m x 38mm
Max pull 40t

DECK FACILITIES

Main Deck Area – 88m^2

2 x ISO 10' Container Lock Down Matrix

Electrical Power – 230V and 400V Supplies

Pressure Wash – 350bar/5000psi

Through Hull Instrument Tube – 0.6m diameter

Hold – Storage & workshop

ACCOMMODATION

Single Cabins:	2
Twin Cabins (Bunks):	4
Crew:	6
Spare Berths:	4
Mess Room:	1
Changing Room:	1
Showers:	2
Toilets:	3

HYDROGRAPHIC SURVEY

Multi beam E/S –
Kongsberg Simrad EM 2040C

Echo Sounder –
Kongsberg Simrad EA 400

RTK Pos MV Oceanmaster RM

SVP – Valeport Modus (Fixed Unit)

SVP – OSIL Smart AML

Sonar – Simrad SL 30/35

Side Scan – Simrad GeoAcoustics

COMMUNICATION

GMDSS Area 2

Satcoms – Sat-C H2095C

Iridium – Sailor ST4110

MF/HF SSB – R/T DSC Sailor CU5100

Navtex Rx – Furuno NX700

VHF R/T DSC – 2 x Sailor RT4822

VHF – Sailor RT6210

Internet Access – All cabins

NAVIGATION EQUIPMENT

ECDIS/NAV – Sperry Marine

Radars – Vision Master FT

- Sperry Marine Vision – Master FT X-Band
- Sperry Marine Vision – Master FT S-Band

Dual-Axis Speed Log – Consilium SAL SD4-2

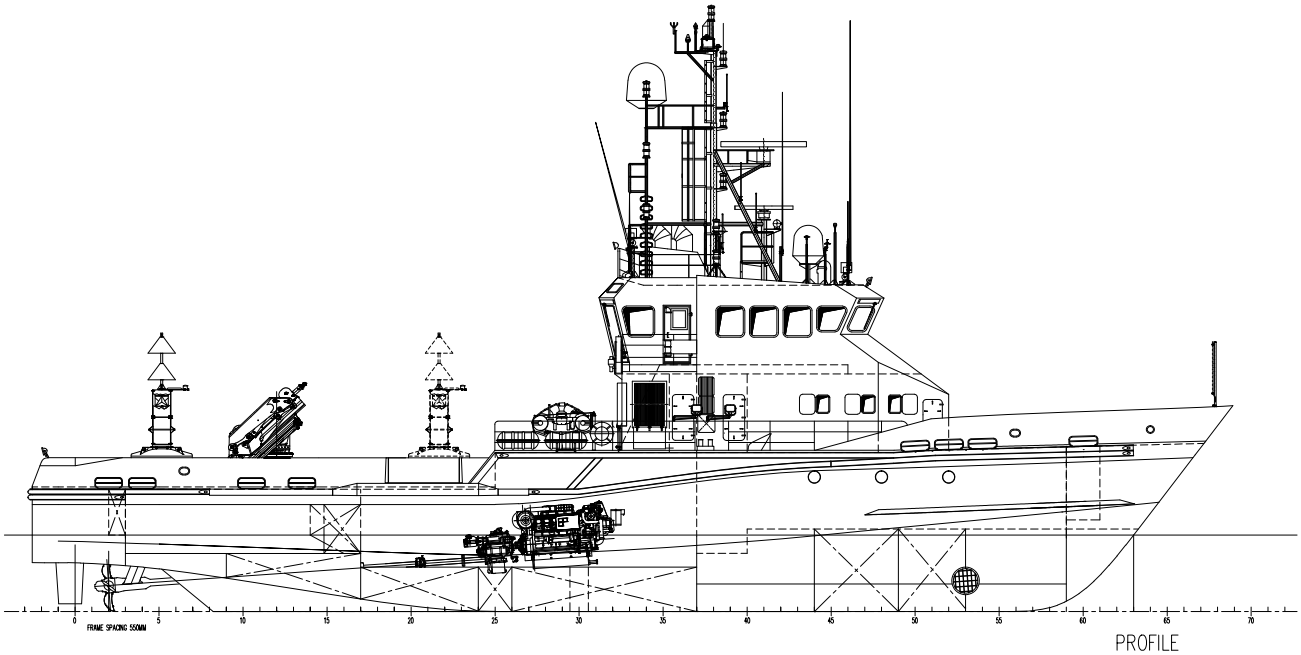
DGPS – 2 x Litton Marine LMX 420

Gyro Compass – Sperry Navigat Fibre Optic

TMC Magnetic Compass – Sperry Navipol 1

Auto Pilot – Sperry NaviPilot 4000 l

Echo Sounder – Sperry ES 5100-01



THV *ALERT* SPECIFICATION

Trinity House's Rapid Intervention Vessel (RIV), *Alert*, has been designed with buoy handling, wreck marking, towing, multibeam and side scan hydrographic surveying capability. With DP1, high specification survey equipment and a maximum speed of 17 knots, *Alert* is deployed primarily to cover the South East Coast where she can respond rapidly to any maritime incident.
In addition, with her large working deck and 0.6m diameter through hull instrument tube, she is an ideal research platform for deployment of scientific equipment and sampling work. Available 24/7 with accommodation for an additional 4 people, *Alert* can be utilised for a wide range of projects at very competitive rates.

BUILD STANDARD

- 100 A1, SSC Workboat, Mono, LA, EP,
- LMC, UMS, DP (CM)

Descriptive note: Shipright (MPMS, SERS, IHM)

Complies with requirements for UK MCA Class VIII vessel.

MV *Mair*, Barry Docks, West Glamorgan – Specification

Displacement 150T
Crane 17 t/m (3.7T at ships side)
LOA 24.35m
Bow thruster
Beam 6.4m
3000psi waterjetting plant
Draft 2.4m
Welding and burning plant
Speed 10.5 knots
2 x 440v generators
Range 1000 miles
Workboat code Category 2; licensed for 12 passengers plus crew

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BRIDGE EQUIPMENT

Radar, Chart plotter, VHF.

ACCOMMODATION

Cabins: 3 x twin, 3 x single
Galley
Lounge

SURVEY EQUIPMENT DETAILS

DEPTH MEASUREMENT

Ceestar Survey Echo Sounder 200 kHz 8 degree beam width @ 3dB

Lowrance 50/200kHz echo sounder
Beam width 50 kHz 45º @-3dB
200 kHz 12º @-3dB

Valeport Digital Sound Velocity Profiler. Range 1400 to 1600 m/s. Resolution 0.001 m/s. Accuracy +/- 0.05 m/s. Acoustic frequency 2.5 Mhz, single pulse

POSITION FIXING

Simrad NSO Marine Processor Plotter with Simrad MX575C antenna.

SURVEY SOFTWARE

Hypack

SIDESCAN

Lowrance Structure Scan Dual Frequency 455kHz/800kHz

Sonar Output Power Max WRMS: 500W, WPK: 4000W W

Sidescan Specifications:

Max Range: 455 kHz (500ft — 250/side) 800 kHz (300ft —150/side)

Downscan Specifications:

Max Depth: 100 ft (800 kHz); 300 ft (455 kHz)

OFFSHORE RIB

SPECIFICATION

7 metres LOA
3-metre beam
Twin 90hp o/b motors
Max speed 38 knots
MCA Workboat code for 6 persons 20miles.
DGPS chart plotter
Echo sounder
Computer with Hypack survey package
Sidescan sonar
Structure scan sonar
VHF radios
Road/launching trailer.

OFFSHORE RIB SURVEY EQUIPMENT DETAILS

Depth Measurement

Ceestar Survey Echo Sounder
200 kHz 8 degree beam width @ 3dB
Lowrance 50/200kHz echo sounder
Beamwidth 50 kHz 45º @-3dB
200 kHz 12º @-3dB
Fox-121 waterproof panel PC
Simrad NSE 12 chart plotter
Valeport Digital Sound Velocity Profiler
Range 1400 to 1600 m/s, Resolution 0.001 m/s
Accuracy +/- 0.05 m/s, Acoustic frequency 2.5 Mhz, single pulse
Transducer drafts calculated by bar check
Ceestar 200kHz – 0.55m, Lowrance 50kHz – 0.55m

Position Fixing

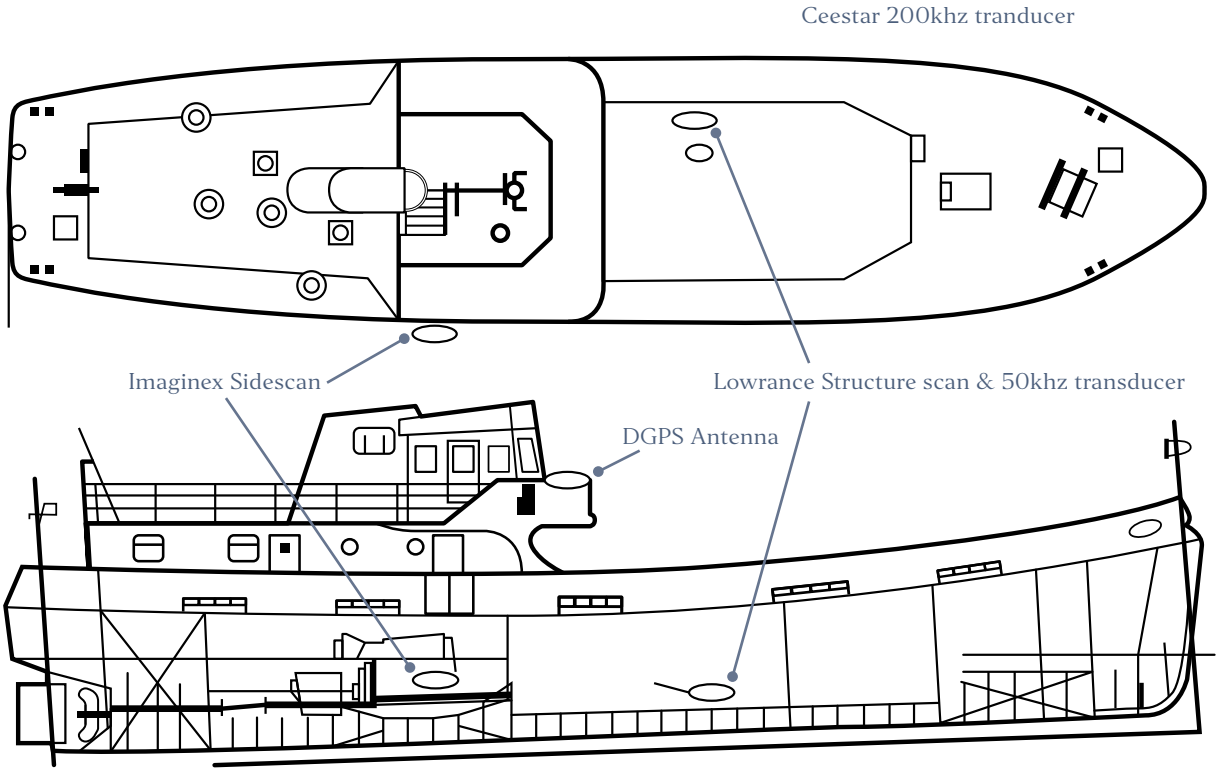
Simrad MX575B D/GPS Compass. Heading accuracy of 0.5º
Position updates up to 5 Hz Heading updates up to 10 Hz
Integrated DGPS sources including WAAS, EGNOS, and Beacon
Sub-meter DGPS accuracy. No offset required; DGPS antenna is positioned directly above transducers.

Survey software

Hypack

Sidescan Equipment

Lowrance Structure Scan Dual Frequency 455 kHz and 800 kHz



Sonar Output Power Max WRMS: 500W, WPK: 4000W W

Sidescan Specifications:

Max Range: 455 kHz (500ft — 250/side) 800 kHz (300ft —150/side)

Downscan Specifications:

Max Depth: 100 ft (800 kHz); 300 ft (455 kHz)

OTHER EQUIPMENT / FACILITIES

6 Metre Heavy Duty Inflatable

Carrying capacity 5 tons

5.5 Metre Heavy Duty Inflatable

50hp O/B motor

Kept on board Mair

5.5 Metre Heavy Duty Inflatable

50hp outboard motor

Kept in boat house on trailer

4m Fibre Glass Boat

Boarding boat kept on running mooring in Barry outer harbour.

Towing vehicle

Toyota Land Cruiser

Storage container

12m x 3m steel container with security locks with 24 sq.m of adjoining land

Used for storing equipment, inflatable boats for access to Mair.

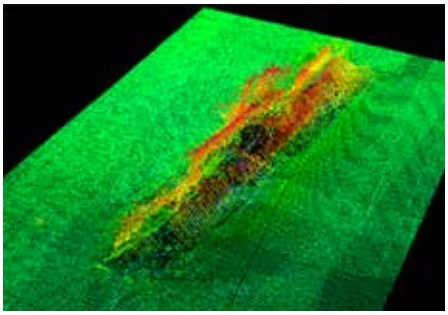
Loading berth

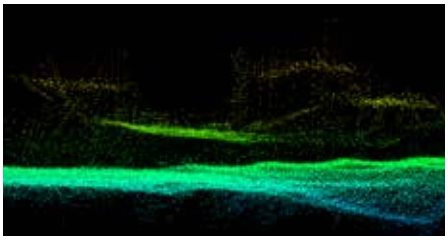
The outer harbour berth for loading heavy equipment is accessible for 6 hours around high water. There is a caged storage compound and a small secure concrete building.

Potable water supply

Lifting Frame

Tenancy agreement for lifting frame (SWL 3T).

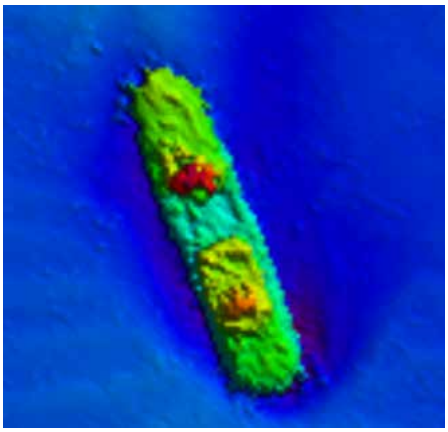




Hydrographic Surveying

An important aspect of safe maritime navigation is having good quality bathymetry information.

All three Trinity House vessels are equipped with marine surveying equipment and we can bring our expertise and services to organisations seeking hydrographic surveying. We can currently provide a survey platform for a customer provided surveyor.



Capabilities are summarised below:

THV *ALERT*

Multi Beam Echo Sounder
Kongsberg Simrad EM 2040C

Single Beam Echo Sounder
Kongsberg Simrad EA 400

Wreck-Finding Sonar
Simrad SL 30/35

Side Scan Sonar
Simrad GeoAcoustics

Survey Software
Kongsberg SIS & CARIS HIPS/SIPS

THV *GALATEA*

Multi Beam Echo Sounder
Kongsberg Simrad EM2040C

Wreck-Finding Sonar
Simrad SL 30/35

Survey-Capable Work-Boats
Simrad SL 30/35

Side Scan Sonar
Simrad GeoAcoustics

Survey Software
Kongsberg SIS & CARIS HIPS/SIPS

THV *PATRICIA*

Portable hydrographic single-beam echo sounder with side scan facility.

Monitoring Services

Subject to the capabilities and configuration of the monitoring system fitted to the Aid to Navigation by the customer, Trinity House offers the following surveillance services using condition-monitoring systems:

- A high quality remote monitoring service, based in Harwich, of Aids to Navigation using the Trinity House Central Monitoring and Control System, available on a 24 hour, 365 day coverage basis.
- Continuous check that all systems are operational including:
  a) Lights on / off
  b) Light failure
  c) Audible Warning-Emitter failures
  d) Trending of battery voltages
  e) Data will be logged for audit purposes within the Central Monitoring and Control System (CMCS)
  f) Other analogue or digital parameters as required
- Failures will be promptly reported to the client's nominated contact.
- In addition to Aids to Navigation, monitoring of any equipment e.g. fuel tanks, water tanks, battery systems, is possible.
- Capability to provide reports on Aids to Navigation availability for compliance purposes and the performance of the customer's equipment according to their requirements.
- Interrogation of any anomalies to ensure proactive interventions can be actioned, if appropriate.
- An on-call TH Duty Engineer is available to support the Operations Officer in the event that clarification is required.
- The CMCS is a robust, resilient system with a multiple server architecture over two geographically separated locations with multiple backups to ensure the retention of data.
- High resilience – the TH Monitoring Centre can relocate to London if issues are experienced at the primary monitoring location, by use of proven Disaster Recovery Procedures resulting in minimal monitoring downtime.
- The system currently supports four communication types:
  1) PSTN for shore based stations with access to the telephone network
  2) PAKNET radio for off-shore, island or shore based stations without access to PSTN
  3) GSM for stations with cellular coverage
  4) Satellite, using the Iridium network for remote stations, which allows global coverage
- Please note that although the monitoring system is always operational, monitoring systems may be interrupted due to circumstances beyond the control of Trinity House.

  These may include but are not limited to:
  a) Failure of satellite to receive/ forward transmissions due to Space Weather.
  b) Loss of MCA AIS coverage
- A failure of monitoring will be assessed by the Operations Officer with Engineering and IT Support available 24 hours in the event of technical disruptions to the monitoring service.
- If our monitoring system detects a potential failure of an Aid to Navigation, (beyond an agreed period to meet customer requirements), the Operations Officer will request a visual report from passing or adjacent assets, e.g. passing vessels. If confirmed, the client will be advised and a Navigation Warning will be promulgated to advise all vessels operating in the area.
- Renewal of licences – Trinity House will maintain and renew the appropriate licences for any monitoring systems as required to meet customer requirements.
- Trinity House can manage any legislative reporting such as Notice to Mariners.

Leisure Services

Trinity House offers a broad range of opportunities from lighthouse weddings to corporate venue hire and voyages.

Patricia voyages

Patricia is the Trinity House flagship, which carries passengers as she completes her vital work. This hugely popular holiday experience means guests can view her normal duties, which involve the maintenance of navigational buoys, the attendance and refuelling of offshore lighthouses and dealing with emergencies, including the marking of wrecks.

With just six cabins, few guests are able to experience a voyage and this, coupled with the type of work the ship undertakes, makes a voyage aboard *Patricia* a truly unique experience.

Patricia has high quality accommodation for up to twelve people in six double-bedded cabins. Each is individually designed with en-suite bathrooms.

There is ample room on board to relax and passengers have a dedicated lounge opening out to a viewing deck. The elegant dining room accommodates guests comfortably.

Passenger bookings are handled by:

WildWings (incorporating Strand Voyages), Davis House, Lodge Causeway, Bristol, BS16 3JB
T: +44 (0)117 96 58333
E: thvpatricia@wildwings.co.uk
www.wildwings.co.uk

Lighthouse visitor centres

A number of Trinity House Lighthouses are open to the public. As part of a great recreational or educational day out, visitors can cruise through the Farne Islands to Longstone Lighthouse, descend the steep cliffs to the isolated South Stack Lighthouse or visit Southwold Lighthouse in the heart of the quaint Suffolk seaside resort.

Trinity House operates 9 lighthouse visitor centres, each with its own unique history:

Alderney – Channel Islands
Flamborough – Yorkshire
Lizard – Cornwall
Longstone – Northumberland
Portland Bill – Dorset
St. Catherine's – Isle of Wight
South Stack – Isle of Anglesey
Southwold – Suffolk
Start Point – South Devon

For opening times and further information including our Health & Safety policy please visit our website
trinityhouse.co.uk or contact
+44 (0) 1255 245156

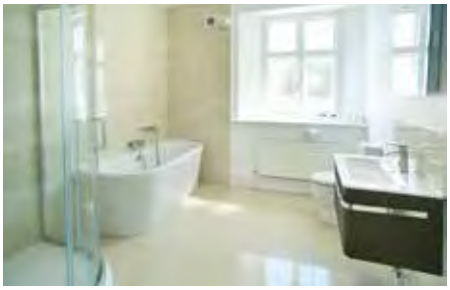
Lighthouse cottages

A number of our former Lighthouse Keepers cottages have been transformed into prestige accommodation for the discerning holiday-maker.

Each cottage has been fully refurbished and modernised with every modern convenience. Set amongst some of our most beautiful coastal scenery, the cottages provide the perfect opportunity to rest and re-charge your batteries.

For further information / bookings:

Rural Retreats
www.ruralretreats.co.uk or
T: +44 (0) 1386 897814



Nash Point weddings

Nash Point Lighthouse, situated on the beautiful South Wales coastline, holds a licence under the Marriage Act 1949. It is an ideal venue for small intimate ceremonies for a maximum of 25 people.

For further information / bookings:

Trinity House
www.trinityhouse.co.uk or
T: +44 (0) 1255 245156

TRINITY HOUSE

For all enquiries please contact

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