

A SAFER SHIPPING ROUTE IN THE GREAT BARRIER REEF

LADS Passage and Fairway Channel

Co-operation between the Australian Hydrographic Service (AHS) and the Australian Maritime Safety Authority (AMSA) has resulted in a new, shorter and safer shipping route in the Great Barrier Reef (GBR), formally opened in mid-2004. LADS Passage is named after the Royal Australian Navy's (RAN) Laser Airborne Depth Sounder (LADS) Flight that conducted the majority of the hydrographic survey work for identifying the new route.

LADS Passage and Fairway Channel spans 90 nautical miles and deviates from the Inner Route between Cape Direction and Cape Melville, bypassing the Princess Charlotte Bay area. Subsequent studies of the hydrographic surveys by AMSA proved that LADS Passage and Fairway Channel offered a navigationally safer and simpler route. AMSA completed an "aids to navigation network" in 2004, further improving the safety of the region. Australia's Great Barrier Reef has been declared a Particularly Sensitive Sea Area (PSSA) and, as such, measures to maximise maritime safety are given very high priority. The Inner Route of the GBR is widely accepted by mariners as being a navigational challenge due to its length and confined and shallow waters. There had long been speculation that better and shorter routes might exist in the area extending through the hundred nautical miles between Cape Direction and Cape Melville. This is in the northern section of the reef. RAN surveying vessels undertook several minor and isolated surveys in the 1970s and 1980s. These, in conjunction with analysis of emergent Landsat satellite imagery, increased confidence that another route might exist. However, it was not until the RAN commissioned its LADS Flight in 1993 that modern hydrographic surveying in this area became possible.

Laser Technology

Before the advent of laser-sounding technology exploration in the GBR was hampered by inherent risks to survey vessels, and therefore to the environment, and the time taken to operate surface vessels in such confined waters. The use of LADS avoids this, and has been predominant in the identification of what is now known as LADS Passage. The use of the Navy's LADS combined-laser technology, installed in a F27 aircraft, enables hydrographic surveying to be conducted quickly and accurately, surveying large areas ranging in depths from two to approximately fifty metres, depending on water turbidity. The aircraft flies 500 metres above sea level and meets all Australian laser safety standards. The laser is eye-safe at this minimum altitude, and a safety mechanism prevents it from operating when the aircraft descends below a set altitude, and over land.

LADS was used between November 1993 and December 1995 to undertake Hydrographic Instruction 221: Bunker Reef to Fairway Channel. Australian Navy surveying ships Paluma, Mermaid and Flinders assisted by establishing the necessary tidal stations and essential geodetic requirements within the region. By the end of the survey LADS had covered an area of over 4,000 square nautical miles. Subsequent to the LADS surveys, several navy hydrographic vessels were used to confirm least depths in navigationally critical areas where there are shoals and the depth is less than 20 metres. These surveys were carried out between 1996 and 2000. The combined work, using both airborne and surface surveys, culminated in the location of a new route approximately 90 nautical miles long. The route is inherently safer and has reduced the voyage between Cairns and Cape York (north-eastern tip of Australia) by approximately 21 nautical miles. Merchant ships also encounter fewer fishing vessels in LADS Passage and Fairway Channel than they did through the old route via Princess Charlotte Bay.

The new shipping route was named "LADS Passage" in recognition of the efforts and endeavours of the LADS Flight and the work of the Navy's Hydrographic Service. The Australian Hydrographic Service, having completed the surveys of LADS Passage between 2002 and 2004, produced new charts and a new edition of chart Aus 834.

Reducing Risks

In tandem with surveying and charting activities, AMSA carried out several studies to establish the practicality of the new route. Priority and urgency for a formal assessment increased through a recommendation of the Federal Government's Review of Great Barrier Reef Ship Safety and Pollution Prevention Measures in 2001. Det Norske Veritas (DNV) was tasked to prepare a quantitative comparison of the navigational risks in both the existing and new routes. The risk model considered the relative risks for a representative range of different types and sizes of vessels. Influencing factors included channel depth and width, navigational difficulty, distance to grounding if an alteration of course was not made, and the degree of reliance on navigational equipment.

Using simulation and a panel of maritime experts, the primary finding of the DNV analysis was that the new route would be a simpler and safer passage. Overall, the use of LADS Passage would reduce the navigational risk by approximately 30%. A more immediate and tangible benefit was that using LADS Passage and Fairway Channel would potentially provide savings in bunker costs through reduced steaming time of about 1 to 1.5 hours. Given that about two thousand ships transit the GBR Inner Route each year, this is a significant

saving.

Aids to Navigation

To provide added safety and guidance to mariners in LADS Passage, AMSA prepared to establish lights and markers. The location and benefit of these aids to navigation were validated on a simulator at the Australian Maritime College in Launceston, Tasmania. The simulation established that the proposed network (developed in consultation with GBR coastal pilots) would provide a high degree of navigational safety to all ships when using LADS Passage and Fairway Channel. Apart from verifying the integrity of the proposed aids to navigation network, the simulation exercises also re-confirmed that the new route was safer than the Inner Route overall. It may be noted the simulation demonstrated that two fast container ships with draughts of 12 metres could safely pass each other, even in areas with restricted sea room.

The "aids to navigation programme"™ was completed in mid-2004 at a cost of approximately \$Aus 6.5M, funding provided by the maritime industry via AMSA's navigation levy on shipping. This work required further localised hydrographic surveying, including the collection of tidal stream data and seabed topography to assist the design and construction of the navigation aids. The aids to navigation network consists of nine fixed structures and five buoys. Hydrographic surveying skills were required to ensure the correct location, optical height and alignment of sector lights. All nautical charts and publications affected by the inclusion of the aids to navigation network in LADS Passage and Fairway Channel were updated, and LADS Passage was formally opened for maritime traffic on 4th July 2004.

During its first twelve months of use LADS Passage has provided an increased level of navigation safety for 1,294 vessel transits (vessels greater than 70 metres in length) saving an estimated 3,200 tonnes of fuel and 1,941 hours (81 days) of ship steaming time.

Acknowledgement

A similar article appeared in Position, the Australasian magazine for surveying, mapping and geoinformation, upon which some of this text is based.

<https://www.hydro-international.com/content/article/lads-passage-and-fairway-channel>
