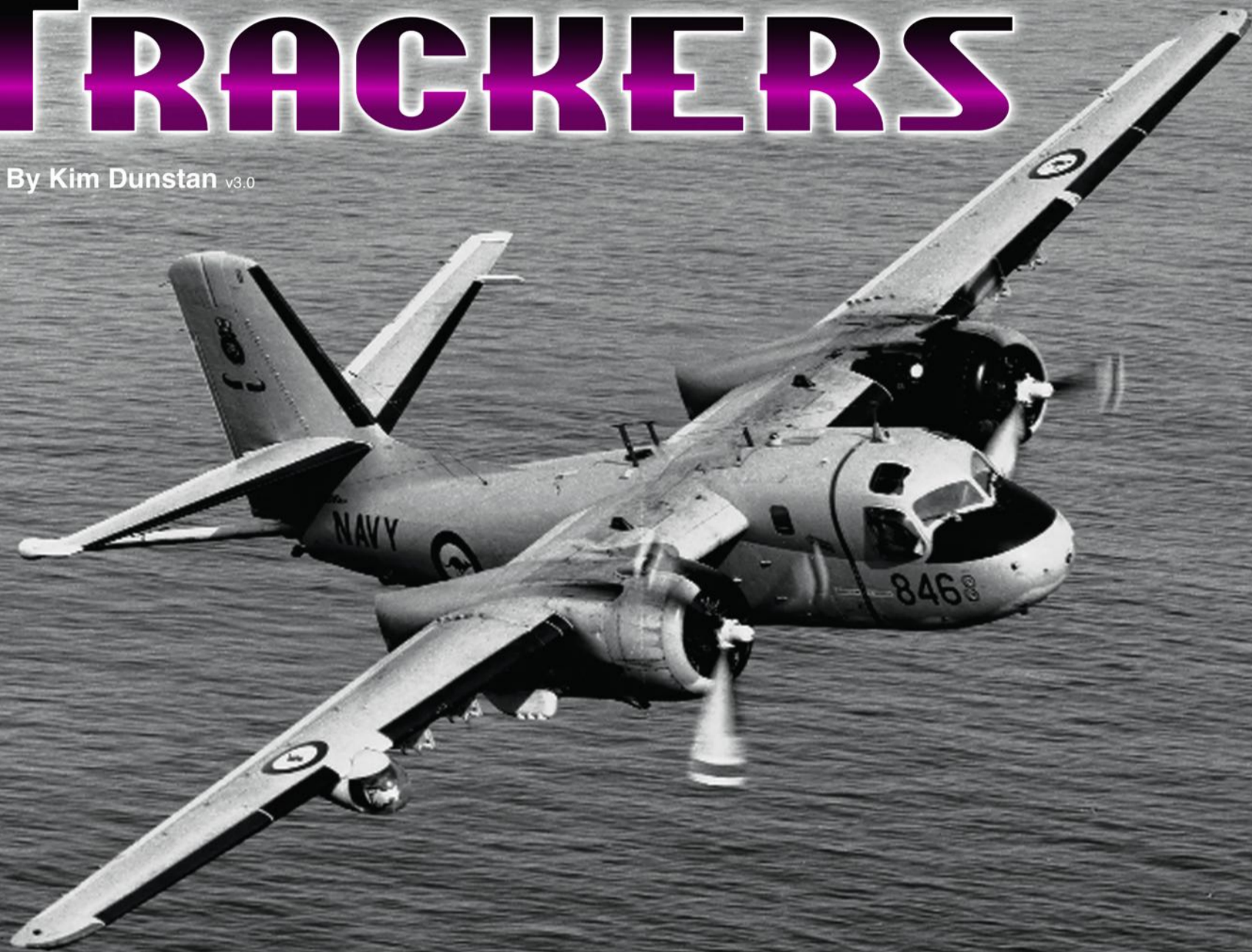


# The RAN's **S2 GRUMMAN TRACKERS**

By Kim Dunstan v3.0



In 1967 the Grumman Tracker S-2E/G replaced the Fairey Gannet AS-1 as the Royal Australian Navy's long-range fixed-wing Anti-Submarine Warfare (ASW) aircraft. The Tracker was an outstanding aircraft, designed specifically for carrier operations. Sturdy and reliable, the Trackers were well suited to their ASW role, serving on the carrier HMAS *Melbourne* (II) and at RANAS Nowra. Other duties included coastal surveillance and fishery patrols from 1975 to December 1980. After 17 years of exceptional service, the RAN retired the Trackers in 1984.

## CONTENTS

Main Article .....	1
Flying the Tracker (Part 1).....	7
Flying the Tracker (Part 2).....	11
Flying the Tracker (Part 3).....	15
History in Pictures.....	16
Airframe Histories .....	37



### The Replacement Problem

During the late 1950s Royal Australian Navy (RAN) began searching for replacements for its dated Fairey Gannet and DH Sea Venom aircraft. Because the next generation of naval aircraft had increased in size and weight, HMAS *Melbourne* was regarded as too small and a larger aircraft carrier was needed – requiring a significant financial outlay. As the Government was heavily committed to Army and Air Force re-equipment programs the outlook was not favourable.

In November 1959, the Defence Minister announced that the RAN Fleet Air Arm (FAA) would be disbanded when the Gannets and Sea Venoms were due to retire (in 1963). That plan was reversed two years later however, in the face of mounting 'Cold War' tensions, SEATO commitments and concerns with Soviet influence in the region. Instead, the Government decided to equip the FAA with Westland Wessex anti-submarine helicopters, and to operate *Melbourne* as an ASW helicopter carrier.

### RAN FAA Revival

In 1963, with the Indonesian 'Confrontation' and communist aggression in South East Asia continuing to create instability, the life of the Gannets and Sea Venoms was extended for another four years. Furthermore, the efforts of the Naval Board to restore the FAA's offensive and defensive capabilities began to attract attention, but the idea of buying a larger aircraft carrier was vetoed due to costs and manpower shortages.

Instead, a search for replacement aircraft suitable for *Melbourne* was carried out, with two USN aircraft shortlisted. One was the Grumman Tracker which had operated from *Melbourne*'s sister ship HMCS *Bonaventure* since 1957. The other was the A4 Skyhawk.

In May 1958, a Tracker S-2F from USS *Philippine Sea* completed a proving trial on *Melbourne*. This was repeated on 7 July 1964 with two S-2E Trackers from Subic Bay.

In November 1964 Cabinet approved the purchase of the Trackers, including modifications to *Melbourne*. Then, following a USN Skyhawk A4 proving trial on our carrier in May 1965 the Skyhawks were approved, together with the up-grading of the Westland Wessex helicopters to Mk 31B standard.

### The Pilot Shortage

The purchase of the S2Es and the A4s secured the future of fixed-wing operations in the RAN FAA but exposed a shortage of pilots caused by the 1959 decision to disband the FAA.

Because the RAN did not have an entry-level pilot training school, trainees had previously been sent to the RAAF at Point Cook for a Basic Flying Training Course. However, in mid-1960s, the RAAF was over-stretched training pilots for Vietnam and the F-111s, and was unable to accommodate the number of pilots the Navy required. The solution was to engage a leading aero club with highly qualified ex-service instructors to conduct the RAN's introductory fixed-wing training.

In 1966, the first (non-RAAF) group of Midshipman trainee pilots began a three-week Primary Flying Training Course with the Royal Victorian Aero Club at Moorabbin Airport south of Melbourne. The course involved 25 hours of ground instruction and 15 hours of flying training in DHC Chipmunk two-seat single engine basic trainers – with graduates 'graded' for further training. Those who did not pass the pilot test had the opportunity to become Observers.

Pilots who qualified were sent to the US Navy Air Station at Pensacola, Florida, for Basic Flying Training with T-28 and T-34 aircraft, and then to

'12 The Age, Friday, June 10, 1966

## Navy to use Vic. club to train pilots

**CANBERRA.** — The Royal Australian Navy is to use a civilian aero club to train pilots for its new fighter-bomber, the Sky Hawk, and anti-submarine aircraft, the Grumman Tracker.

The R.A.N. has called in the Royal Victorian Aero Club to train more than 20 navy midshipmen.

The American-built Skyhawks and Grumman Trackers are scheduled to be in service with the navy's carrier HMAS Melbourne in 1968.

The navy has been forced to use the club because the RAAF cannot train the number of men the navy requires by 1968.

The air force has to train more men itself to man the 24 F-111A bombers it is buying.

The navy midshipmen will each be given 15 hours' flying training at the Moorabbin aerodrome between June 20 and July 24.

Instructors will use Chipmunk aircraft from the Royal Victorian Aero Club to train the new pilots.

This will be the first time a civilian group has co-operated with the navy in flying training.

Midshipmen who pass the tests will be trained for up to 18 months in the United States flying Skyhawks, Grumman Trackers or helicopters.

It is expected that about 15 of the initial intake will attend flying schools at Pensacola in Florida and Corpus Christi in Texas.

Midshipmen who do not pass the flying test will be given the opportunity of training as observers for the new aircraft.

Late last year ten navy officers — six pilots and four observers — began a two-year flying course in Canada in Grumman Trackers.

When they return next year they will train Tracker crews in Australia.

### U.S. TRAINING FOR MIDSHIPMEN

The Navy has given two ex-sailors, with a mania for flying, a golden opportunity to achieve two ambitions.

The two are former E.M.'s now Midshipmen Peter Ey, of Elizabeth, South Australia and Graham Goodson, of Osborne, South Australia.

Both want to become pilots and both want to see America.

Last Thursday, Ey and Goodson, left with five other Midshipmen for the United States to undergo 18 months flying training for the R.A.N.'s new Tracker and Skyhawk aircraft.

Ey and Goodson, accompanied by Midshipmen P. James (Glenhuntley, Vic.), L. O'Donoghue (Whyalla, S.A.), M. Macauley (Brunel, Borneo), K. Vote (Meadowbank, N.S.W.), and T. Supple (Wayville, S.A.), are the first group to be fully training in the U.S.

The R.A.N. has other Fleet Air Arm personnel undergoing conversion courses in Canada.

Before leaving for the States, the Midshipmen completed preliminary flying training with the Royal Victorian Aero Club.

Under club instructors and using the club's Chipmunk aircraft, the Midshipmen passed practical tests involving 15 hours flying time at the Moorabbin aerodrome.

Each of the Midshipmen volunteered for pilot training in March of this year. Ey and Goodson transferred from their branch as Electrical Mechanics.

THIS INFORMAL photograph of the seven Midshipmen was taken at Nowra prior to their departure for the United States. (L. to R.): L. J. O'Donoghue, Whyalla, SA; T. F. Supple, Wayville; G. W. Goodson, Osborne; P. R. Ey, Elizabeth, SA; M. E. Macauley, Brunel, Borneo; P. J. James, Glenhuntly, Vic.; and K. J. Vote, Meadowbank, Sydney.

**Top:** Amidst a cloud of steam from Melbourne's catapult, a marshaller directs this Tracker forward, in preparation for launching. **Middle:** The decision to use a civilian Aero Club in Victoria to provide ab-initio training in 1966 was a novel departure from the norm, born of necessity. Only one intake used this stream, who subsequently went on to the US (Pensacola and Corpus Christi) for more advanced training in a military environment and on military aircraft. **Lower.** In the meantime experienced aircrew had been sent to Nova Scotia for a two year training course on RCN Trackers. On return they formed the RAN Tracker Training Unit. (All newspaper clippings courtesy of Trove). ➔

Corpus Christi, Texas, to fly Trackers (some pilots switched to A4 Skyhawks; others returned to Nowra for helicopter training). The USN training lasted about 18-months covering basic instruction through to carrier deck qualifications (at San Diego). The RAN pilots and aircrews were well regarded and set a high standard.

In 1965, a group of RAN pilots and observers (experienced Fairey Gannet and Sea Venom aircrew) were sent to HMCS Shearwater, Nova Scotia, for a two-year training course on Royal Canadian Navy (RCN) Trackers. On return to NAS Nowra they formed the RAN Tracker Training Unit, complete with simulator and weapons system trainer. The unit was attached to 851 Squadron (recommissioned in September 1968) training Tracker pilots, observers, and aircrew. *[Note: The last aircrew intake trained by the RAAF also went to Canada for Tracker training. Before departing they gained some twin-engine experience flying the RAN Dakotas at Nowra.]*

In the meantime experienced aircrew had been sent to Nova Scotia for a two year training course on RCN Trackers. On return they formed the RAN Tracker Training Unit. (All newspaper clippings in these pages courtesy of Trove).

#### Maintainer Instruction

Early in 1966 a group of senior maintainers from Nowra arrived at the USN North Island Naval Air Station, at San Diego, California. The task was to learn about the Trackers systems, in readiness to become instructors on return to Australia. The aim being to build a high level of maintainer expertise at RANAS Nowra – ready for the arrival of the Trackers and Skyhawks.

The main body of RAN maintainers arrived in the US in mid-1966 for detailed Tracker and Skyhawk instruction; including 'hands-on' experience attached to USN squadrons. There was much to learn about these aircraft – apart from new airframes and engines, the advanced avionics and ASW equipment required fresh skill sets. Because the USN aircraft stores and supply system was entirely different to that in the RAN, it took time to adjust to. Most of the maintainers returned to Australia on Melbourne – embarking at San Diego on 27-31 October 1967, together with the new aircraft. The training assistance provided by the USN and company instructors was comprehensive, and the friendly cooperation was much appreciated.

#### The Trackers Arrive

On 20 September 1967 Melbourne departed Sydney Harbour to collect the Trackers and Skyhawks from the USA. Sailing via Pearl Harbour, Vancouver, Los Angeles, and San Francisco. Melbourne berthed at San Diego where the aircraft were embarked on 27 and 30 October 1967.

On the 31st Melbourne sailed for Australia via Pearl Harbour and Suva, arriving at Jervis Bay on 21 November where 10 Skyhawk A4Gs were disembarked. On arrival at Sydney the following day, the 14 Tracker S-2Es were taken by road to Mascot for servicing, then flown to Nowra.

With the arrival of the Trackers at Nowra, the process of forming the squadrons began. The primary Tracker unit, VS816 Squadron, was recommissioned on 10 January 1968 and immediately began exercises to bring the unit up to front-line standard. Melbourne was undergoing an extended refit over this period so it gave the squadron the opportunity to work-up with some serious training off the NSW south coast.

One of the issues the squadron had to deal with was flying the Tracker with one pilot (five to six hours was not unusual). Whereas the USN and RCN Trackers operated with a pilot and co-pilot in the cockpit, the RAN opted to have a TACCO (Tactical Coordinator) in the co-pilot's seat. Although the Tracker had an effective autopilot to ease the pressure, lengthy day/night missions were not unusual, often flying in poor weather at a low level, placing a lot of pressure on the pilot. The up-side was the TACCO was in close contact with the pilot. This system worked well – demonstrating the high standard of training and cooperation in the cockpit.



## Grumman Tracker Basics

**Manufacturer:** Grumman Aircraft Corp., USA

**Type:** All weather carrier ASW & Surveillance

**Engines:** 2 Wright Cyclone R-1820-82WA 9-cylinder radials

**Max speed:** 243 knots

**Cruising speed:** 130 knots

**Service ceiling:** 6,700 m (22,000 ft)

**Range:** 1,173 nm, or about 9 hrs duration.

**Wingspan:** 22.12 m (72 ft 7 in.)

**Height:** 5.33 m (17 ft 6 in)

**Length:** 13.26 m, (43 ft 6 in)

**Empty weight:** 8,319 kg (18,315 lbs)

**Loaded:** 10,630 kg (23,435 lbs)

**MTOW:** 11,860 kg (26,147 lbs)

*Note: Performance figures subject to conditions. →*



*Above: RAN officers training in Canada inspect a RCN C52F tailwheel assembly. Left to right: S/Lt Vickeridge, Lt Levigne (RCN Instructor), S/Lt Dunhill, Lt. Herman and S/Lt Coles. Below. Wearing its nose bra to protect it from the elements, this Tracker will make the long journey back to Australia as deck cargo. Unlike the Skyhawks, which were unloaded at Jervis Bay, the Trackers were taken to Hawker de Havillands facility at Bankstown (Sydney), before being flown down to HMAS Albatross in the following days. →*



### Tracker Basics

Naval aircraft manufacturer Grumman Aircraft Engineering Corporation, of Bethpage NY, was awarded a US Navy contract in 1950 to develop a purpose-built 'hunter-killer' anti-submarine warfare (ASW) aircraft. The prototype was the G-89 – a twin engine design capability of carrying weapons, surveillance and detection equipment and a search radar. This evolved into the XS2F Tracker which became designated as the S2-F, known throughout its life as the 'Stoof' (S-two-F).

The S2 first flew in 1952 and commenced service with the USN in 1954. It was an immediate success with variants produced until 1967. In all, more than 1,200 Trackers were built, including 99 built under licence by the De Havilland Canada for the Royal Canadian Navy. Orders for the Tracker came from 14 other countries.

The Tracker was a high-wing monoplane, powered by two Wright R-1820-82, 9-cylinder, air-cooled, radial piston engines, each producing 1,525 hp; fitted with Hamilton Standard 3-blade variable pitch propellers. The wings had large Fowler-type flaps, spoilers, outer wing leading-edge slots; and a searchlight under the starboard wing. The wings folded over the fuselage to assist flight deck and hangar stowage. The Tracker's heavy-duty tricycle undercarriage and tail-mounted arrestor hook were essential for carrier operations.

Designed for ASW and surveillance work, the Tracker included AN/APS-88 search radar in a retractable radome, aft of the bomb bay. To sense underwater objects a Magnetic Anomaly Detector (MAD) boom was extended from the tail. The S-2E/G had a AQA4/AQA7 sonics system and carried up to 32 SSQ41 (passive) and/or SSQ47 (active) acoustic sonobuoys – ejected from the rear of the engine nacelles. ECM radar direction finders were located in the wing tips. The bomb bay variously carried homing torpedoes or depth charges. Underwing hardpoints carried depth charges, rockets, or other munitions.

### The S-2E/G Variants

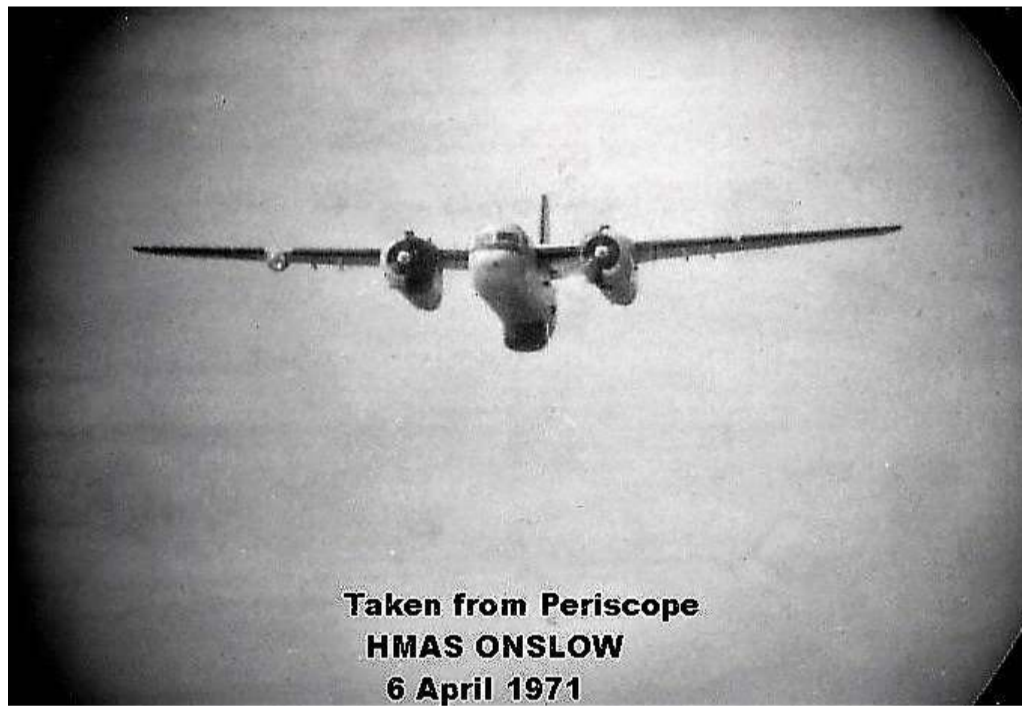
RAN Trackers had a crew of four: Pilot and Observer/TACCO in the cockpit; plus two electronic operators in the rear cabin. The S-2E/G incorporated several modifications that made them larger and heavier than the earlier S-2A models. This including a 45.7 cm (18 inch) fuselage extension aft of the cockpit, increased fuel capacity, streamlined engine nacelles, upgraded avionics and ASW gear, slightly wider wings, and increased tail surfaces. There was little variation between the S2E, with which the RAN was initially equipped, and the S2G (that came later), other than internal equipment fit. Trackers were the largest fixed-wing aircraft to operate from Melbourne.

The RAN's Trackers were distributed over two Squadrons: VS816 was the front-line unit operating from RANAS Nowra or at sea on Melbourne, whilst VC851 concerned itself with shore-based training.

### Purpose Built & Dependable

The Tracker was light and responsive on the controls, and able to manoeuvre safely at low level and speeds – essential in ASW work. The two

*Above.* With the hook retracted, this Tracker is about to do a Touch and Go landing aboard Melbourne. *Middle.* A Tracker as seen from the periscope of HMAS Onslow. *Bottom:* Overflying an Australian Oberon Class boat. →



**Taken from Periscope  
HMAS ONSLOW  
6 April 1971**





Wright Cyclone engines, although based on a 1930/50s design, were powerful and reliable. Trackers could fly on one engine, and to counter the asymmetric thrust in this configuration, a 'single engine rudder assist' (SERA) facility was built-in. This consisted of two parts: at the rear was the 'main rudder' and trim tab; forward was the 'auxiliary rudder' attached to the vertical fin. When the SERA was activated both rudders worked together to double to size of the rudder. As a rule, the SERA was switched on for take-off and landings, and off for cruising.

Forward vision in the cockpit was good and the bubble side windows provided side and downwards vision. Rear vision was limited by the engines. An early concern during landings on HMAS *Melbourne* was the short distance between the starboard wingtip and the flight deck island, but precision landings and care avoided any problems.

The Tracker carried advanced avionics and ASW equipment which included the Jezebel sonar-buoys (hydrophones), a magnetic anomaly detector and radar; operated by two specialist crew members in the rear cabin. During ASW exercises excellent results were achieved when working together with the updated Westland Wessex HAS 31B helicopters, and later with the Sea King helicopters, both of which used dunking sonar. Working as a team to optimise performance, the Trackers flew the long-range ASW patrols with the helicopters providing close-in coverage – both performing day and night exercises in all weather.

#### Flight Deck Drills & Embarkation

HMAS *Melbourne* completed her long-term refit early in 1969, which included numerous modifications for the Trackers and Skyhawks. In March, with the ship sailing off Jervis Bay, work-up exercises began with Trackers from Nowra doing 'touch and goes,' arrested landings and catapult launches in an intensive program. Once the Air Group completed their flight deck qualifications the squadrons embarked and immediately began series of day and night time exercises; preparing for deployment to SE Asian waters and various coalition exercises.

#### Tracker Tasks

Anti-submarine patrols and surveillance were key tasks for the Trackers. Although never used in combat, the Trackers were part of a strong deterrent policy during the 'Cold War' years. The RAN's commitment to SEATO, FESR, ANZUK and ANZUS defence alliances involved regular exercises with allied navies. Due to Australia's proximity to South East Asia and regional security threats, collective defence was an important aspect of Australia's defence strategy – and a major reason behind the government's decision to bolster the FAA's defensive and strike capability.

On patrol the Tracker's rear mounted radar dome would be lowered to detect surface vessels and submarines (air scoops on the fuselage cut radome vibration). If a suspicious target was located a marker flare or a pattern of sonar-buoys (hydrophones) could be dropped to listen for submarine noises. The magnetic anomaly detector (MAD) could detect minor variations in the magnetic field created by a submerged submarine; enabling the operator to distinguish it from a whale or school of fish.

While 816 Squadron was at sea embarked on *Melbourne*, Nowra-based 851 Squadron was busy training Tracker aircrews and conducted Fleet Requirement Unit (FRU) duties; assisting ships with radio and radar calibrations and gunnery exercises. In addition to coastal surveillance, search and rescue missions were conducted using a 'G' Dropper positioned under a wing (containing a large inflatable life-raft). Other coastal tasks involved patrolling the economically important Bass Strait oil fields; and fur-

*Pilot's eye view. This tracker is approaching HMAS Melbourne for a landing. The angled flight deck is clear and the mirror landing sight, amidships on the port side, can just be seen in the photo. Photo: Nick Thorne. →*

ther afield, fishery protection patrols covered Australia's northern shores, operating variously from Broome and Darwin, March 1975 to December 1980.

#### The Nowra Hangar Fire

At about midnight on 4 December 1976, a fire destroyed all but three of the RAN S-2E Trackers stored in 'H' hangar at RANAS Nowra, crippling both VS816 and VC851 Tracker squadrons. Of the 12 Trackers in the hangar 6 were destroyed, three were damaged beyond repair, two were repaired and returned to service and one salvaged as a training aid. The only aircraft to escape the inferno was in Sydney being overhauled. The heat of the fire was so intense that a large part of the hangar roof collapsed. A court-marshal found the junior sailor who started the fire to be mentally unstable. You can see an account of the police investigation [here](#), and read the conclusions of the Board of Inquiry [here](#).

Earlier in October 1976 the had RAN ordered six surplus, low-mileage, S-2E Trackers from a USN storage facility. As delivery was being arranged at the time of the fire, a further ten airframes were added to the order – all sixteen the upgraded S2-G models. In less than four months they were selected, prepared for delivery, flown to San Diego and transported to Australia aboard HMAS *Melbourne*. The RAN had not only restored its ASW/Surveillance capability in an astonishingly short time, but improved it as well. You can read that story in our article 'Phoenix Rising'.

#### Multi-National Exercises

During their service life with the RAN the Trackers participated in regular naval exercises with the South East Asia Treaty Organisation (SEATO); the Far East Strategic Reserve (FESR); ANZUK; the biennial RIMPAC exercises, and 'Kangaroo' exercises – with other joint, multi-nation exercises taking place at various intervals. Generally, the ANZUS navies were the main participants, but other regional navies were often involved.

Each year from the mid-1950s to the early 1970s the RAN participated in SEATO and FESR exercises conducted in South East Asian waters. From the late 1960s HMAS *Melbourne*'s Trackers and Westland Wessex helicopters featured in the ASW 'war games'. The Trackers repeatedly demonstrated their value when working in conjunction with the helicopters. These challenging and realistic multi-national exercises were especially important during the 'Cold War' years, when Soviet submarine activity was a serious concern.

In 1971 *Melbourne* participated in the inaugural RIMPAC exercises hosted by the US Navy; reaching Pearl Harbour on 25 October, joining navy units from the USN, RN, RNZN, and Canada – where the Trackers reaffirmed their outstanding wide-area search qualities. Other manoeuvres in Australian waters, and multi-nation exercises in SE Asian and Pacific waters were regular events, building inter-service cooperation and experience.



But *Melbourne* did much more by 'showing the flag', visiting Hong Kong, Japan, and other South East Asian ports. Calls were also made at Manus Island and Rabaul, until 1975, when Papua New Guinea became independent. Much of *Melbourne's* time at sea was spent testing the ship's systems and aircraft in a constant round of intensive exercises, all designed to maintain a high level of efficiency in the ship's crew and her Carrier Air Group.

#### Proud Service Record

Despite the Grumman Tracker's 'retro' appearance, pilots considered it pleasant to fly, and they were highly valued as ASW aircraft and superior to the Fairey Gannets they replaced. The RAN Trackers were active during the latter part of 'Cold War,' ensuring Australia had an effective anti-submarine 'seek and destroy' capability in the event of hostilities. In home waters duties included coastal surveillance, illegal fishing patrols, and search and rescue missions. The Trackers were rugged, first-rate aircraft serving the RAN from 1967 until 1984 when fixed-wing flying in the FAA ended. At that point rotary-wing Westland Wessex and Sea King helicopters took over the ASW role, but the Trackers are remembered for their splendid service record. Several Trackers are on display at aviation museums, including the Fleet Air Arm Museum, at Nowra, NSW.

#### Postscript

On 25 February 1982, the Minister for Defence announced that HMAS *Melbourne* was to be placed in 'contingent reserve' and that the RAN would take delivery of HMS *Invincible* in 1983. But, when the April-June 1982 Falklands War intervened, the *Invincible* deal was cancelled. On 30 June 1982 *Melbourne* was decommissioned and moved to the dolphins at Athol Bight, Sydney Harbour – having worked long and hard since commissioning in 1955.

In March 1983 the incoming Labor Government announced it would not purchase a replacement aircraft carrier, putting an end to carrier-borne fixed-wing operations in the RAN. Since then various ships in the RAN fleet have been modified to embark ASW helicopters. →

*Above.* The aftermath of the "H" Hangar fire at HMAS Albatross in early December 1976. Part of the hangar roof has collapsed and the remains of several Trackers can be seen inside it. Naval personnel were able to get some of the aircraft out and these are parked on the hard-standing to the left. (Navy image). →

The hangar fire in December 1976 almost wiped out the Fleet Air Arm's fixed-wing surveillance and anti-submarine capability. But within an extraordinarily short time it had not only been rebuilt with a greater number of airframes of more advanced design. Read the story of how the RAN achieved this by clicking on the button below, and then selecting "Phoenix Rising" from the list.

[Read "Phoenix Rising"](#)

#### References

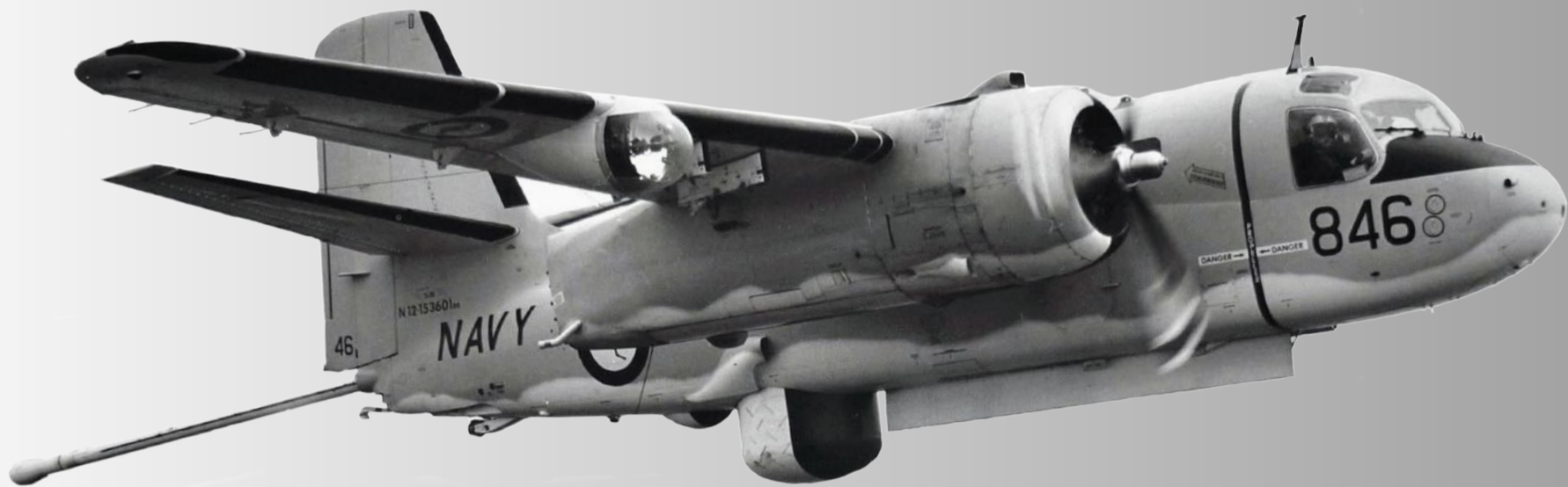
- HMAS Melbourne Reports of Proceedings
- Australian Defence Review 1972
- National Archives of Australia
- Flying Stations, ANAM, Allen & Unwin
- 'Wings Across The Sea', Ross Gillett, Aerospace Publications
- Wikipediapcraft Carriers 1929-1982, Vince Fazio
- Flight International, 6 March 1982
- Sea Power Navy News archive
- 816 & 851 Squadron histories
- Air Enthusiast No 61, Willing Tracker
- Horatio J Kookaburra, Flickr
- ADF Serials
- ANL Trove. →

*A patrolling Tracker, with its MAD boom extended and radome lowered, deploys a sonobuoy on its quest to find a submarine. (Navy image).*



# FLYING THE TRACKER

Part 1 by Owen Nicholls



*The following article was written for the HARS magazine "Phoenix." It therefore targeted an audience unfamiliar with the basics of deck operations - but it still contains a wealth of detail for more Navy-oriented readers. It is reprinted here with the author's kind permission. ➔*

## The Ship

A question I am often asked is "what was it like flying the Tracker from Melbourne?". The answer I give is: "very demanding, immensely satisfying and fun (by daytime), but a deadly serious business on a dark night". I have never met a fixed wing navy pilot who thinks night carrier operations are fun, and that includes pilots I have spoken with from the Australian, British, American, Canadian, Dutch and French Navies.

Before going on to talk about flying the aircraft off and back onto the carrier, it is important to have some understanding of the ship itself and how things worked to make these operations possible.

HMAS *Melbourne* was not a big ship; displacing 20,000 tons fully loaded with an overall length of 214 metres (702 feet) when built. Contemporary American carriers are about 100,000 tons. *Melbourne* was the lead ship of six Majestic class light carriers; laid down in April 1943 and launched in February 1945, too late for World War II. With the end of the war construction ceased until 1946 when it resumed in a stop start manner before being completed in 1955. During this period many major changes from the original design were incorporated including an angled flight deck, mirror landing sight and steam catapult. When *Melbourne* was finally completed she was one of the most modern carriers in the world, although the Majestic class were still amongst the smallest.

When originally designed she would have been expected to operate single engine aircraft around the size of the Fairey Firefly and Hawker Sea Fury. These had wingspans of around 12.5 metres (41 feet). When delivered she had an air group of Sea Venom all weather jet fighters and Fairey Gannet anti submarine warfare (ASW) aircraft. The latter had a wingspan of 16.5 metres (a little over 54 feet). When you compare these with the Tracker's 22 metre (72 ft 7 inch) wingspan you can see we were operating a much bigger aircraft than was ever envisaged in the ship's design. Other Navies (Argentina, Brazil, Canada and the Netherlands) also operated Trackers from similar sized carriers, although many of these had angled decks with a bigger landing area offset than *Melbourne*'s 5.5 degree angled deck, which moved their landing centreline further away from the ship's island superstructure. The United States Navy of course operated Trackers from carriers, the "smallest" typically being the 37,000 (full load) ton Essex class ASW carriers.

## The Angled Flight Deck

So why is there an angled flight deck? Before the British invention of the angled flight deck after World War II, all take-offs and landings were carried out along the longitudinal axis of the ship from stern to bow. This meant that when an aircraft had landed it created an obstruction on the flight deck for following landings. This problem was solved by taxiing the aircraft to a parking area on the forward end of the flight deck. To protect parked aircraft from landing aircraft a barrier was raised between the parking area and arrestor wires. This worked reasonably well providing landing aircraft always caught an arrestor wire. Failure to do so meant the landing aircraft would plough into the barrier with

inevitable damage, or worse still, bounce over the barrier into parked aircraft with resulting carnage and mayhem. Sadly, this was not uncommon. By modifying the ship to have a landing area angled from the starboard side at the stern to an overhanging angle on the port side, aircraft could land and then taxi to park on the starboard side at the forward end of the flight deck, leaving the angled deck clear. Then, in the event of not engaging the arrestor wires the pilot of a landing aircraft could add power and go around for another approach.

## Mirror Landing Sight

A second British invention incorporated during *Melbourne*'s prolonged construction was the mirror landing sight. Guidance for pilots during their approach to land on carriers had in the past been given by a Landing Signals Officer (LSO) to use the American term, or Batsman (British term) who signalled corrections to the pilot by hand signals with table tennis like bats in his hands. This was not precise enough or fast enough with the higher approach speeds of modern aircraft.

The mirror landing sight as fitted to *Melbourne* consisted of a number of orange lights (source lights) that shone into a curved mirror that had a horizontal line of green lights (known as datum lights) fitted each side of the mirror. The pilot receives very accurate glide slope (ie the aircraft is high, low or on the correct flight path) by viewing the reflection of the orange source lights in the curved mirror. The lights appear as a circular orange dot (nicknamed the "meatball" or "ball" for short) in the mirror. If the ball is exactly in line with the green datum lights the aircraft is on the correct glide slope, if above the aircraft is high, and if below the aircraft is low. The mirror sight is visually acquired about half way around the base turn and it is used all the way to touchdown. It is very sensitive, and fine corrections in descent path are required. Additional lights are two large red "wave off" lights that can be activated by the



*Right. This stern shot of HMAS Melbourne gives a good idea how small the deck was compared to the aircraft that operated from it. ➔*



LSO or Flying Control position (“FLYCO” – the equivalent of a control tower); and “cut” lights, a vertical set of three green lights on the right side of the mirror that can be activated by the LSO to signal a Tracker pilot to close the throttles just prior to landing. The green datum lights and centred meatball can be seen on the port or left side of HMAS Melbourne in the angled flight deck photograph above. The various lights I have described are shown in the photograph on the next page.

### Steam Catapult

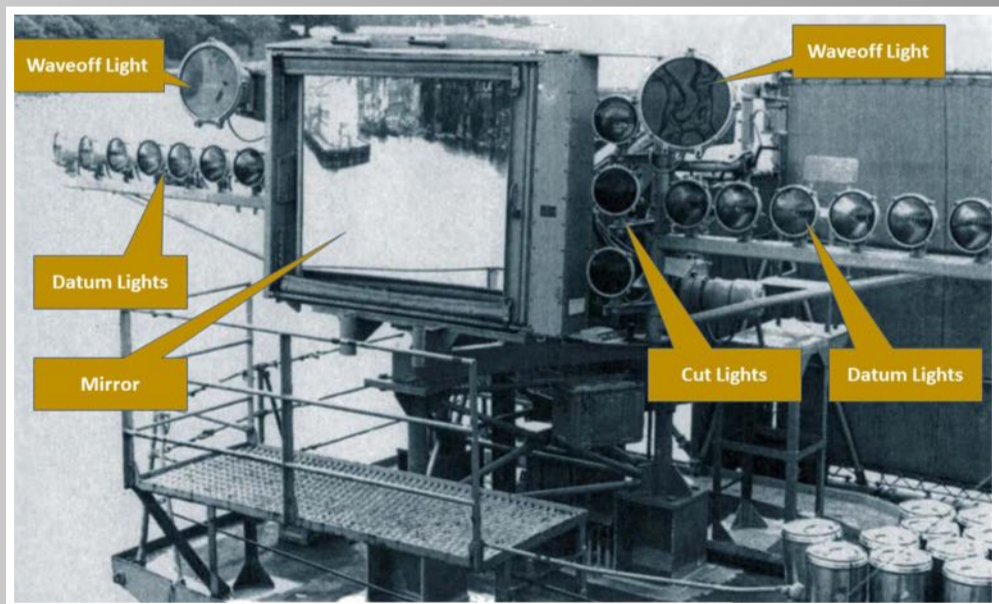
Melbourne had a single steam catapult on the port (left) side of the flight deck (viewed looking towards the bow). It extended back down the flight deck from the bow for around 30 metres (100 feet) but had a stroke of 27.5 metres (90 feet). This meant that from a stationary start the launched aircraft is airborne in slightly less than the 95 foot wingspan of one of the HARS Dakotas. Contemporary American carriers have 250 to 325 ft long catapults.

Steam catapults provide a smoother acceleration and can launch heavier and faster aircraft than their hydraulic predecessors. They work by harnessing the energy produced by the ship’s boilers.

Steam is stored under pressure in a large reservoir. Beneath the flight deck are two long cylinders side by side. Each cylinder has a slot along its length at the top of the cylinder. Pistons in each cylinder are connected crosswise to a forward facing hook (“the shuttle”) that runs along a track embedded in the flight deck. The slots in the cylinders have flexible sealing strips on each side of the slot that come together to minimise steam loss but permit the shuttle to move forward under steam pressure during aircraft launch.

When an aircraft is to be launched it taxis forward to the catapult and a holdback cable is attached to the aircraft at one end and the flight deck at the other. The fitting on the aircraft end of the holdback incorporates a weak link that will break under load.

The shuttle is then retracted by a hydraulic system from the bow end of the catapult to a position under or slightly in front of the aircraft. With the aircraft connected to the shuttle by a launch strop (also called a bridle), the shuttle is tensioned forward by the hydraulic system and the aircraft runs up to full power with the brakes off. The only thing stopping it moving is the holdback. The catapult launch valve is then opened admitting steam pressure from the reservoir into the cylinders. The holdback weak link breaks and the aircraft accelerates down the flight deck to flying speed. The catapult pistons are brought to a rapid stop by a water brake system and the catapult readied for the next launch if required.



**Main Photo, Top.** With all checks complete and engines at full power, this Tracker is poised ready for launching. All that is required is for the catapult launch valve to be opened. **Above Middle.** Another shot of a pilot’s eye view of an approach to HMAS Melbourne clearly shows the angled Flight Deck. **Lower.** The Mirror Landing Sight fitted to Melbourne. The parabolic mirror can be seen in the centre of the device, with the row of datum lights either side of it. The device gave the pilot a very accurate and stabilised indication of whether he was correctly established on the glideslope, or was high or low. **Left.** HMAS Melbourne with the USS aircraft carrier Enterprise. The diminutive size of the Australian ship can be easily judged, especially when perspective is taken into account. . ➔





## The Aircraft

Before a Tracker pilot got anywhere near landing on the carrier he undertook an intensive and demanding training program ashore at the Naval Air Station Nowra (NAS Nowra). This began with a series of comprehensive briefings on carrier flying, normally given by one of the Landing Signals Officers (LSOs). This was followed by a flying phase of seemingly endless Field Carrier Landing Practice or FCLP as it was abbreviated. This term displaced the previous generation British aircraft term of Mirror Assisted Dummy Deck Landings or MADDLS.

During FCLP the aircraft was flown in a quite tight low level circuit, 300 feet above ground by day or 500 feet at night. The runway had a painted rectangular outline approximating the size of HMAS *Melbourne's* angled flight deck on the left side of the runway. Just to the left of the runway edge was a mirror landing sight (see previous page) that was very similar to the system on the ship. LSOs would position themselves on the grass abeam the touchdown area with a radio equipped vehicle and all the connections to the mirror's cut and wave off lights. As you can imagine, this gave a fair recreation of the shipboard operation, although of course there was no deck movement.

### Approach Assessments

On every carrier approach, both at the ship and FCLP at Nowra the pilot was assessed and critiqued. The LSOs graded each approach as follows:

- "OK Underline" – a perfect approach, generally under extreme circumstances. Naval Aviators often have hundreds of carrier landings without ever receiving this grade.
- "OK" – a pass with only very minor deviations from centreline, glideslope and speed.
- "Fair" – a pass with one or more safe deviations and appropriate corrections.
- "No Grade" – a pass with gross (but still safe) deviations or inappropriate corrections. Failure to respond to LSO calls will often result in this grade.

Each approach can attract LSO comments in any of six parts as follows:

- "The 90" – when the aircraft has approximately 90 degrees of turn until lined up with the centreline.
- "The Start" – generally from when the aircraft crosses the wake and/or the pilot "calls the ball" at around  $\frac{3}{4}$  of a mile.
- "The Middle" – from about  $\frac{1}{2}$  to  $\frac{1}{4}$  mile.
- "In Close" – from about  $\frac{1}{4}$  mile to  $\frac{1}{10}$  mile
- "At the Ramp" – from when the aircraft crosses the round-down of the flight deck until touchdown
- "In the Wires" – from touchdown until stopped

As you can see, this can amount to a considerable amount of information which is captured in a curious form of LSO shorthand writing with letters, symbols and abbreviations. It is like another language. The LSO dictated this evaluation to an LSO writer who recorded it. The LSO by then was assessing the next approaching aircraft. It was a fast paced workload. At the end of the sortie each pilot was debriefed on every approach. Each pilot's approach records were kept and the LSOs analysed them for any trends to try to nip any bad habits in the bud. This was not trivial or nit picking – it was important and necessary for safe operations at sea.

### Flying the Tracker

To join the FCLP pattern the aircraft would either join the circuit from a normal take-off, or if returning from a training sortie to do FCLP after say, a navigation exercise it would join through "low initial" (from a position three

miles from the end of the runway at circuit height to run down the non circuit side of the runway and turn "downwind". Either way, the pilot would configure the aircraft for landing – hook up, wheels down and full flap with the speed back to landing speed. Unlike normal field approaches, the aircraft was stabilised at its final configuration and touchdown speed while on downwind. At the chosen place (dependant upon wind) the pilot rolled into the base turn – an exactly level turn "on speed". A touch of additional power was required to maintain the exact speed in the level turn. In my early days on the Tracker this was exactly 90 knots but later, when the RAN introduced the LSO activated "cut lights" on the mirror, this increased to 95 knots.

At around the 90 degree position (half way round the base turn) or shortly after, the pilot would acquire the "meatball" (orange light) in the mirror. Ideally the ball would be in the centre of the mirror in line with the green datum lights. A radio call of aircraft side number, "ball" and pilot name was then made. If the ball was not acquired the pilot would call "Clara" on the radio and the LSO would advise whether the aircraft was high or low. A slight power reduction was then required to initiate descent, but remember that at this stage the aircraft is not tracking directly to the runway so further reduction was necessary as the aircraft approached the centreline. If the ball was low in the mirror on acquisition, the power reduction was delayed a little until the ball was centred. From the time the ball was acquired, the pilot's life consisted of three things which became a continuous silent chant – "meatball, line-up, airspeed". This is where the pilot's training became a skill and then, probably, an art. Fine corrections, not over controlling and not creating new problems by fixating on a deviation were required.

If the LSO did not activate the cut lights the meatball was flown all the way to touchdown. If the cut lights illuminated the pilot would close the throttles which with the natural stability of the aircraft would cause the nose to drop. A slight check back with elevator would slightly lower the tail. At the ship this would lower the arrestor hook towards the deck and hopefully an awaiting arrestor wire. Landing on the centreline was critical as I will amplify when talking about landing on the ship at night.

Touch and go landings were flown with a typical session of FCLP having six to eight approaches a demanding period of concentration. Night FCLP was generally similar but with the circuit height 200 feet higher than the day circuit.

### Out to the Ship

When the budding carrier pilot was deemed ready to go out to the ship for day landing qualification he went out with a carrier qualified experienced Tracker pilot. This was an advantage for us over our Skyhawk compatriots – the two seat Skyhawk was unable to operate from *Melbourne*.

### Deck Landings

I do not particularly remember the first touch and go landings on the carrier I experienced as a co-pilot but I do recall the first arrested landing. When the arrestor wire had brought us to a stop on the flight deck, there was a totally alien sensation of being stopped but with a sensation of movement as the ship continued forward through the sea. It felt weird at first but of course I then became accustomed to it.

Finally, the day came for my first deck landings. This was the most challenging flying I had done so far in my career. An early problem I had was a tendency to fly up the wake of the ship, aligned with the axial deck instead of crossing the wake and the converging on it as I approached the ship aligned with the angled deck centreline of the landing area.

After a series of touch and go landings, the call "hook down" came from FLYCO (Flying Control – the carrier equivalent of a control tower) for my first arrested landing. It was an event of much satisfaction.



*Above Left.* This Tracker has been correctly marshalled onto Melbourne's single catapult and braced ready for take off. *Above Right.* Once pressure is released into the catapult piston the weak link in the holdback fitting breaks, and the aircraft is flung into the air (above right). →

**Right.** View from the Planeguard helicopter, which during daylight operation hovered off the port bow ready to rescue aircrew in the event of a ditching. →

### Catapult Launch

The aircraft was taxied out of the landing area under the control of the ship's Air Department marshalls, members of the RAN's Aircraft Handler branch, or "Bears" as the branch personnel were nicknamed. Taxi signalling was passed from one marshaller to another up the deck, the final marshaller standing astride the catapult track. The catapult marshalls were "the best of the best". Accurate alignment of the aircraft on the catapult was vital – a few inches left or right would require the aircraft to be pulled back by tow motor and re-loaded. In a tactical environment this would not please the ship's captain as it would mean the ship having to maintain a longer into wind course, probably taking the ship away from the main body of units in a task group. As well as normal marshalling signals the catapult marshaller would indicate fine corrections with a sideways movement of his head. The taxiing was very precise.

The aircraft would come to a stop, correctly aligned, with the mainwheels against chocks which raised hydraulically out of the flight deck. The catapult marshaller then handed off control of signalling to the Flight Deck Officer (FDO). The catapult holdback was then fitted and the chocks were lowered, and the aircraft would move forward a few feet until stopped by the holdback. The FDO then signalled for the pilot to add a little power, sufficient for the nose wheels to rise up off the deck a few inches with the aircraft resting on its small solid rubber tailwheel. This allowed the catapult shuttle to be retracted from the forward end of the catapult track back to a position under the aircraft behind the nosewheels.

Members of the flight deck engineering party then attached the catapult bridle. This was a heavy wire cable about a metre and a half long with an eye at one end to hook onto the catapult launch hook on the underside of the fuselage, and the other end on the catapult shuttle. The engineer sailors (stokers) were working under the aircraft between two whirling propellers. Dangerous, disciplined work! They would signal the catapult operator who was standing below flight deck level with his head and shoulders above flight deck level inside a retractable box like structure called the "howdah". The howdah had a flat steel top and armoured glass side window. It was raised for catapult launches and lowered flush to the deck when not in use.

The catapult operator then tensioned the shuttle forward a little to maintain the aircraft's nose high attitude with no slack in the catapult bridle. With all preparations complete and all ground personnel clear of the aircraft and a green light signal from FLYCO (the equivalent of a control tower), the FDO would wave a small green flag in his right hand above his head to signal the pilot to increase power to take-off power. Inside the aircraft the crew would brace themselves in their seats for the launch. The pilot would hold the elevators and ailerons in a neutral position with his left elbow firmly braced into the front of his left hip. His right hand was up high on the aircraft throttles with his fingers wrapped around the throttles and the throttle catapult grip – a small inverted T handle that lowered from the overhead panel in front of the throttles. This prevented power reduction during the acceleration of the catapult stroke.

So the aircraft was sitting at full power on what amounted to a loaded gun. The noise level was intense, and the FDO was still waving the green flag above his head. When the pilot was satisfied that the aircraft was ready for



launch he signalled the co-pilot with a nod of the head and the co-pilot then saluted the FDO to signify this. The FDO checked the launch path ahead of the aircraft was clear, that the FLYCO signal light was still green, that the Tracker crew or anyone else were not signalling for the launch to be cancelled, and finally, that the deck pitching motion was such that the aircraft would launch with the ship's bow pitching up. The FDO then dropped to a crouching or bending position with his green flag touching the deck. The catapult operator pressed the catapult launch button. Steam was then admitted into the catapult cylinders causing the weak link in the holdback fitting to break and the aircraft to accelerate down the catapult track becoming airborne at the end of its stroke. Inside the aircraft the launch was a brutal push back into the seat, although having said this, a heavily loaded Skyhawk had a bigger kick.

If at any stage before launch with the aircraft on the catapult and full power signalled there was a problem requiring the launch to be cancelled the pilot must maintain full power. The co-pilot would shake his head, "cancel cancel cancel" would be transmitted on aircraft radio and also on the flight deck crew radio headsets. The FDO would continue to signal full power but bring the red flag in his left hand up above his head (previously it was held behind his back). On seeing the red flag come up the catapult operator would move the shuttle back which would cause the bridle to fall off the aircraft launch hook onto the deck. Only then would the FDO signal the pilot to reduce power. This is perhaps the ultimate self discipline in aviation – sit strapped to a loaded catapult, perhaps with an engine on fire and maintain full power!

### Night Operations

Night operations are very similar to what is described above – except it is dark (at times a gross understatement). It can be very dark out at sea if there is cloud cover to obscure stars and no moon. Illuminated yellow wands replaced hands for marshalling signals and the FDO had red and green wands to replace his flags. Off the end of the catapult stroke it was pure instrument flying for the pilot, only 50 feet above the sea.

For approach and landing the aircraft had some special lighting to enable LSOs to do their job. Firstly, there were two small yellow lights on the port (left lower side of the fuselage, one just behind the nose wheel well and one forward of the tail wheel. The LSOs used these in conjunction with the aircraft's approach lights to determine the aircraft's attitude and alignment



**Above Left.** A Tracker on short finals, with its hook extended for a full stop landing. In the next few seconds one of two things will happen - either it will catch one of the six arrestor wires and be brought to a rapid stop, or it will miss them and do a 'bolter', where full power is applied to claw the aircraft back into the air. **Right.** An RAN Tracker makes a touch and go on the larger deck of a foreign Carrier - possibly HMS Eagle or Hermes which both visited Australian waters in '68/69. A good number of people are on the superstructure, enjoying both the spectacle and the Aussie sunshine. →

during the approach. The approach lights were a group of small coloured lights (red, amber and green) in the leading edge of the left wing. These lights give an indication of airspeed (slow, normal or fast) around a mean speed of 95 knots.

As stated before, night carrier landings were very demanding. Landing on the centreline at night could be particularly challenging, especially if the ship was at an angle to the sea swell and had a corkscrewing motion. Had the aircraft drifted off the centreline? Or was it the ship corkscrewing, in which case the deck would move back. Very difficult to tell on a completely black night. I have heard many statements about the Tracker's starboard wing tip clearance from parked aircraft or equipment when landing. From accurate scale drawings I have determined this clearance to be very close to 10 feet, or a bit over three metres. Similarly, with the aircraft on the correct glideslope, the arrestor hook was a little under seven feet, or two metres, above the flight deck at the stern. The flight deck curved downwards at the ship's stern, this area being known as the round-down or ramp. If the hook hit the ramp it was known as a hook strike, and if the aircraft hit this area it was a ramp strike, which would almost certainly be catastrophic and fatal for a Tracker and its crew.

After the night landing, if the Tracker was the last to land, the pilot might have to park in "shit spot". This was a tight parking position immediately in front of the carrier's island superstructure. After clearing the arrestor wires and folding the wings the pilot would taxi past the island and then turn right 90 degrees to taxi to the edge of the deck, all under the signals of highly experienced marshallers with their yellow wands. When the nose-wheel was about half a metre from the deck edge the marshaller would point his left wand vertically downwards and continue to wave his right wand. The pilot would then lock the left wheel and pivot the aircraft 90 degrees to align it parallel to the centreline of the ship. The parking spot was aptly named, particularly if you add a wet deck and the ship starting to roll as it turned out of wind to resume its desired course.

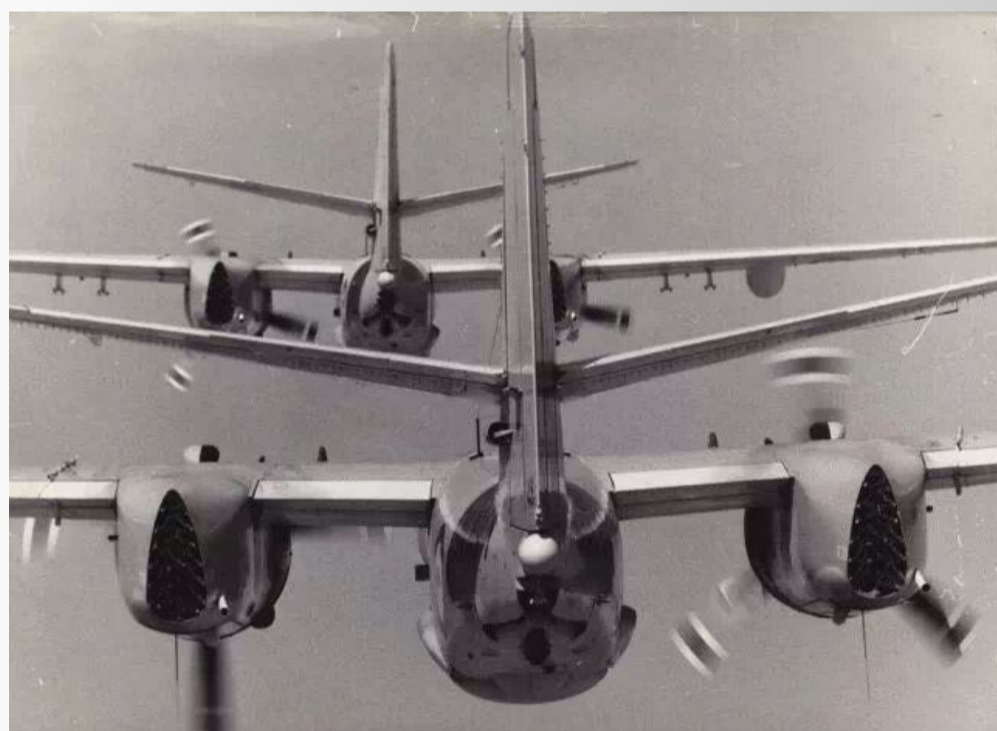
We only lost one Tracker on flight operations, when attempting to land in the early hours of the morning of a very dark night the aircraft experienced a "bolter" (failure to engage an arrestor wire) and settled into the sea on the go round. Pages 82 and 83 of a Defence Science and Technology Organisation article on accident investigation make interesting reading on this accident. They can be found [here](#).

Flying onto and off an aircraft carrier, particularly one as small as HMAS Melbourne, was professionally very satisfying but highly demanding. Naval aviators are a very proud bunch and are often not afraid to say so, as depicted in the following tongue in cheek post lifted from Facebook!

Owen Nicholls. →



# FLYING THE TRACKER



**H**MAS Melbourne was steaming into the wind in the placid water of Jervis Bay. Al Videan was now my co-pilot, checklist card in hand. I was in the left seat of the Tracker, and I was expected to get the aircraft safely aboard. Tense and excited, I turned towards the ship for my first carrier landing.

Approaches to HMAS Melbourne were flown from the 'Charlie pattern', which was the equivalent of the traffic circuit of a land airfield, but the Charlie was flown at just three hundred feet – or one hundred metres – above the waves by day, and a little higher at night. I flew upwind with the grey-green bulk of Melbourne sliding by to my left. After a short interval, I turned in front of her in a level continuous turn onto downwind, airspeed dribbling back. The ship was steaming on her 'aircraft recovery course'. I had now established our Tracker on a short, downwind leg (short because the ship itself was moving ahead), and there was just enough time to carry out the pre-landing checks before another left turn towards the final approach path.

Not what one would normally do in a land-based aircraft, I had already slowed the Tracker to its landing airspeed of 95 knots and trimmed the controls. Before that I had extended the landing gear and set the big flaps to 'full'. But I had left the arrestor hook retracted. This was to be

## Part 2 by Mark Carr

a 'touch and go' landing on Melbourne's deck. Now counterpointing the engines' roar was the buzz of the propellers set at high rpm in an unsynchronised 'rowrr, rowrr, rowrr.' This was standard procedure in order to have the aircraft set up for a 'wave-off', a touch and go or an unplanned 'bolter' where instant response and power from the Cyclones would be vital. The hatches directly above our seats were slid open as they were for all operations at the deck, in order to be able to escape after a ditching. Day or night, rain or shine, the open hatches gaped above our heads when we operated 'at the deck', with the blare of the engines and the buzz of the propellers even louder, and the buffet of the airflow above adding to the noise and distraction.

After mere seconds, I had to turn towards the carrier at the pattern's 'base' position (that the Navy called the 'one-eighty'), but strangely, it was from almost directly abeam the ship: I had remembered that Melbourne would move forward as I turned towards the approach to her deck. It was an odd sensation to be turning in from immediately abeam a landing point. With the aircraft set up and trimmed for its landing speed, I was free to concentrate on 'crossing the wake' and picking up the ball as the aircraft carrier steamed forward.

The instructors had emphasised that a landing carrier pilot had to positively cross the ship's wake in order to correctly align with the final approach track. Melbourne's landing area was angled that five degrees to the left to enable 'touch and go' or 'boltering' aircraft to safely clear all those obstacles to its right: the grey and black towering steel of the island, the pack of chained-down aircraft, and any launching aeroplane at the catapult. The eye was always drawn to the arrow-straight wake, but this was deceiving because it ran from the fore-and-aft axis of the ship. With the landing area angled to the left, pilots had to positively cross the carrier's wake well to its right in order to line their aircraft up properly with the yellow stripe of the landing centreline. Melbourne's captain, eyeing the wisp of steam leaking from the catapult track that ran to the bow, would have set a course so that the 'wind over the deck' comprising the natural ocean breeze and the airflow generated by the ship's forward progress would blow the white plume directly down the angle of the landing area.

In a level turn towards the ship at three hundred feet with the wake positively crossed, I picked up the 'meatball', which was the orange



blur that, at that moment, sat below the green lines of the datum lights on either side.

'Eight Four Five Ball, Carr, twenty two hundred,' Alan radioed to the LSO.

'Roger, ball,' he replied. I kept the level turn going, nudging the throttles up to maintain that precious ninety-five knots. Now the ball was climbing towards the datum lights as I flew to the glide slope... I needed to catch it and come back with the power to descend with it and, at the same time, level the wings – a little blip on the elevator trim to compensate for the power change ... Then, I had to watch that 'line up', which was critical, as there were only three and a half metres between the right-hand wingtip of a Tracker on the centreline, and the steel of the island, or less if you drifted to the right. After that, I checked the speed ... The scan 'meatball, line up, airspeed' had been dinned into us. My gloved fingers 'walked' the throttle levers back and forth in tiny movements and the engines' buzz rose and fell while I 'flew the ball', keeping it centred between the green lights, catching it with power if it sank, more power to get it back to centre, and then a little power off to keep it there, an endless cycle of almost automatic movements as the glide path defined by the ball funnelled in. It was like flying formation on an aircraft that got closer and closer, the adjustments becoming smaller and more exact while the carrier loomed.

Airspeed was critical. Too fast, and the 'flatter' attitude of the aircraft as it approached the deck would cause the dangling arrester hook at the tail to be higher, increasing the chance of missing the wires: a bolter. In the event of an arrest, the excessive speed would place even more strain on the aging ship's arresting gear. Being slow was not worth thinking about: a more nose-up aircraft attitude, more drag, less control and excess power available. That would put speed near the stall: a potential disaster for a carrier aircraft and, indeed, the ship itself, hence the technique of having the aircraft at its landing speed prior to turning towards the carrier, requiring only small adjustments of trim with power changes, which allowed a pilot to concentrate on his approach.

I was now in the 'groove' (the final approach path), but the ball had sunk low.

'A little power,' the LSO radioed.

I corrected as I would have done during Field Carrier Landing Practice (FCLP) at Nowra, and the ball settled between the green lights while the ship bloomed, and then I backed off the power to keep it there, but not so much as before. I tried to block out the distraction of the open hatches and concentrated on the ball, the thick yellow stripe that

marked the centreline of the landing area and the Tracker's air speed indicator. I was ever aware of the curved steel of Melbourne's green-grey stern that was topped with the dark lip of the round down. To my left, the blue and white Wessex slid out of my peripheral vision as we closed towards the carrier's creaming wake and a stream of funnel smoke.

'Right for line up,' came from the LSO as I drifted a little to the left, seduced by the wake. Hurriedly, I corrected the aircraft to the right, making sure to keep the ball level with the green lights as the glideslope narrowed and became ever more sensitive. Now I was 'in close', and for the first time, I felt through the controls the 'burble' of the disturbed air near Melbourne's stern. Fly the ball! There was the sulphurous smell of the stack gas. The deck loomed in the windscreen, grey sea beyond. Now the ball was dropping a little again. It was too late to put it where it should be, all I could do was to just stop it dropping further. Another correction for line up ... still a little left, but now the 'cut' lights flashed on. I was to come aboard by smartly pulling the throttles back to idle while holding that nose attitude which would tend to drop, still watching the line-up. Ker-rashh! The Tracker fell and its main wheels hit the steel, the high-pressure tyres and shock absorbers soaking up the impact. The little nose wheels were forced onto the deck with a bang and a rattle just below our feet, then it was up with the throttles in an instant for the touch and go, ensuring not to over-boost those powerful engines. The Tracker leapt back into the air. The few metres of deck ahead fell away as the grey-green of the island with its black masts and radar flashed past our right, and again we climbed away over the marbled surface of the bay. It had all happened so quickly. I banked left for another pattern. There was more work on the throttles and trim to stabilise level at 100 metres from the water, and Alan set the propellers' RPM. While I made the turn, the ship had moved further into the wind, so again, 'downwind' was short. I set the Tracker up for landing as I had done previously, but now established in the 'Charlie' pattern, there were even fewer seconds of 'straight and level' before it was time to turn again towards the carrier as she steamed inexorably away. Three more times I would come aboard for a touch and go, the arrester hook staying retracted, but at last Flyco radioed, '845 hook down.' The arrester hook would be extended for one arrested landing. After that we would taxi up to the catapult, then launch for Nowra.

Again came the now-familiar burble and smell of sulphur as we neared the gently rolling stern of the ship. The 'cut' lights flashed, and I smartly pulled the throttles back to idle. The Tracker fell a few feet, its nose high, and the main wheels hit the deck, but just before impact, the dangling arrester hook at the tail caught a wire. The hook bit, and Alan and I were flung forward against our harnesses. Then the nose wheels



crashed down with even greater force than previously, and the aircraft snaked a little as the wire ran out, the hook now horizontal behind, and the deceleration violent. In no time, we were rolling back slowly as the arresting wire rebounded. White-jerked sailors rushed up to us, one giving frantic signals: 'brakes on' – now that the wire was clear of the hook – and 'hook up', so Alan pushed up the hook-shaped lever on the overhead panel into its niche behind the throttles. My feet trembled on the brake pedals as I maintained pressure on them to ensure that our aircraft did not move in the tight confines of Melbourne's deck. I was mindful of the knife edge before a twelve-metre fall to the water. Now the 'bear' was waving at me to taxi forward with no time to be lost, because the carrier would soon have to be turned around in the confines of Jervis Bay. While I taxied, Alan called the 'challenges' of the checklist and I made the 'responses'.

Now we were at the catapult. The handler used little movements of his head to guide us in aligning the Tracker, its engines beating at idle, with the catapult track: the steaming rust-red slot in the deck that ended at Melbourne's square bow. Unseen, other handlers looped the wire stop that joined the aircraft's belly hook with the catapult's shuttle. Sharp steel propeller blades would be slicing by just centimetres from their heads. A sailor slid one end of a frangible steel 'hold back' fitting into a slot under the Tracker's tail, its other end clipped to a fitting in the deck. The catapult would soon be 'tensioned up' by the 'stokers' of the catapult crew, who would gently nudge steam valves to move the huge pistons slightly to pull on the stop. Now that was done, and the aircraft slowly tilted and sat cocked up on its little tail wheel, the twin nose-wheels high off the deck. Under the tension on the aircraft's launch hook, we were now restrained only by the hold-back fitting at the tail. Now, I doubly made sure that my feet were off the brakes. A petty officer had been standing just outside Alan's window directing the sailors with his signals, but now he stood clear, to be replaced by the flight deck officer, who was holding an incongruous little flag on a stick which he now waved in circles above his head. This was the signal for me to set full power. I pushed the throttles up and the gentle motion of the ship was now unnoticeable as the Tracker quivered at full power. The tall fin and the wide tailplane would be vibrating furiously behind. Noise blared through the open hatches as my right hand held the throttles forward at maximum permissible boost. I had two fingers curled around the pull-down catapult grip. I knew that the acceleration of the launch would be so violent, that gripping this little inverted T-shaped handle would prevent my arm from involuntarily pulling back on the throttles during the catapult stroke. We remained 'in tension' and at full power while I checked the instruments and warning lights in the vibrating panels as best as I could.

In the event of an engine fire or failure just before starting the take-off roll on a land airfield, a pilot can reduce the engine power to idle and sort things out. But not so when under tension on the catapult of an aircraft carrier. Then, there is no guarantee that the device will not fire should the launch need to be 'aborted': one of the unique hazards of

naval aviation. Against all logic and survival instincts, in the event of a major problem, all a pilot can do is to remain at full power on what engines were available, violently shake his head, call 'cancel, cancel, cancel' over the radio, and hope that the impending launch can be stopped. A fire? Still, he must remain at full power in case the catapult fires and he is hurled from the deck regardless: he has to try to keep the aircraft flying clear of the ship for at best a diversion to land or, at worst, a ditching. Following a cancelled launch, only when the flight deck officer himself steps directly in front of his aircraft can a carrier pilot be reassured that the catapult will not fling his aircraft from the ship. The wire stop would have fallen from the belly hook after gentle movements of the deck shuttle under control of the catapult crew. Now the pilot can reduce power, plant his feet firmly on the brake pedals, and deal with the problem.

But this time there were no warning lights, and the engine instruments looked good. We were ready. I nodded at Alan, whose left hand backed up my right on the throttles. We pressed our heads back into the headrests and he gave the Flight Deck Officer the standard signal that we were ready to launch: a snappy salute. The FDO continued to twirl his little flag in the air as he checked Melbourne's bow, which nodded gently in Jervis Bay. When the moment was right, his flag went down to touch the deck: the signal to the catapult crew to initiate the launch sequence. My fingers tightened further around the catapult grip. A heartbeat later, the catapult fired.

It is difficult to describe the feeling of accelerating from zero to flying speed in the space of thirty-four metres. A giant hand seemed to slam us forward and, momentarily, our bodies were subject to almost 3 g of force – three times our weight – but unlike the force that had crushed me down into my seat when manoeuvring the Macchi, this force was horizontal. I had sat through Alan's launches previously, but it was still a bizarre feeling as the Tracker accelerated violently down the deck, shuddering with a higher and higher frequency as the speed built up over just a few seconds. The increasingly frantic rattle of the landing gear could be heard over the noise of the engines and bizarrely, the flight controls instantly came alive in my hand. I concentrated on the horizon, with my helmet forced back into the headrest and making sure that I held that catapult grip to maintain those throttles at full power. With the carrier's steel deck having raced away beneath us, now there was nothing but water below and the horizon ahead – we were flying.

Simultaneously, we felt a 'thump': it seemed as if the aircraft had slammed to a halt in mid-air. But all that had happened was that the stop that joined us to the catapult had let us go. The cessation of the violent acceleration had fooled the body into thinking that everything had stopped. I concentrated on setting the climb attitude. The momentary violence of the launch had flung us from a world of oscillating grey steel and white and yellow jacketed figures into a routine climb over the sea. We brought the Cyclones back to climb power, and turned for the shore. Mark Carr. →

*A busy day on Melbourne's Flight Deck.*

*It looks to be early in the morning as the shadows are long. Five Trackers are fired up and wait to be launched - perhaps to disembark somewhere. Behind them is a Wessex - maybe the spare for Planeguard duties - in case the scheduled aircraft becomes unserviceable. To the left are a number of Skyhawks which also appear to be manned up, waiting their turn. There are a good number of 'goofers' in the island, eager to see the launch.*

*In the foreground the Flight Deck party are preparing for the serial. The "Howdah" is in its raised position and personnel are gathering Bridles which they will need for the forthcoming catapult launches. At first glance they might seem disorganised but every person there is highly trained and knows their role.*

*Aside from the obvious dangers of fast moving machinery and propeller/jet blasts, what you can't see are the environmental factors: the wind rushing over the deck and the constant and deafening levels of noise, all of which combine to make it an extremely hazardous area. There was no margin for carelessness or complacency in what was widely regarded as one of the most dangerous workplaces in the Navy. →*



# FLYING THE TRACKER

## Part 3

### Night Operations, HMAS Melbourne

For what it's worth, I thought I'd share some memories of embarked tracker ops in Melbourne's last cruise Mar to Jul 1981.

I'd been lucky enough to get the last pilots appointment to VS816 (pier head jump) just before we embarked for a mother's last deployment "up top". A memorable Squadron environment famous for having, if memory serves, 14 Sub lieutenant aircrew, 4 lieutenants and only 3 Lieutenant Commanders under boss Terry Ford. Perhaps a bit low on experience you might imagine, but bags of enthusiasm and plenty of social. Just Trackers and Wessex Pedro on this cruise; the penultimate deployment for Melbourne.



Deck quals for all us new nuggets had taken place over the preceding 9 months, but still plenty of experience yet to be gained, most notably night quals. The older blokes told plenty of dits about the horrors of night deck ops, but as it turned out it was a doddle! Steady deck, prayers answered with a sweet night flyers moon providing all the horizon you could ask for, and the only distraction was the flare of the boss lighting a cigarette in the right hand seat as we turned base. So 2 trips with a grown up in in the RHS under benign conditions and I was night qualified. Easy work!

So come 26 Mar, I launched with SOBS (in 844 – will she ever fly again?) for 3 hours of low level manoeuvres with DLP on recovery. First thing I noticed was the deck motion as we manned up. Soon after the cloud cover extinguished the moon; as black as only embarked Navy pilots can know it, and so I found myself in an environment outside my experience.

Already fatigued, we commenced recovery, with Larry Mills intoning "decks pitching". I couldn't help but notice the other aircraft in the Charlie pattern consistently waving off or bolting.

Now my turn. First pass managed a decent touch and go. Second pass my first ever bolter. That was scary enough. Calls off "10° attitude and "power" ringing in my ears kept me out of the water.

Thanks Larry.

Third pass was a horror. Can't remember much other than the ball and all centreline lights abruptly disappeared and Larry called a wave off, backed up by a bright red glow from somewhere near the mirror. Time for some coaching from the LSO. "When I waved you off I was looking DOWN on you! Do that again and you're bingo." Great.

Confidence duly bolstered, I asked the tacco for any advice. With eyes larger than saucers he informed me he hadn't night flown for 5 years, and promptly ziplipped. Feeling quite alone now, as I rolled out in the groove, I started counting the children of my crewmembers, and felt so much better to know how many young lives depended on me.

This was a sweet approach now though. Rails pass. Got it nailed. In close, just had to pull the eye focus in to check the ASI for 95knots. On speed; fine, look out through the windscreen again – and the ship had disappeared! Some lights showed down under my left elbow through the bottom of the port bulging side window. To Wave off now would take out the island. So – idle, full left aileron, lots of rudder, close eyes and full backstick.

I think it was a taxi wire. We looked at the hook deck marks the next morning, and mine was 12 feet right of centreline, dragging left. Just as well, as we only had 8ft wingtip clearance on the island if on the centreline. I couldn't see the deck edge as we pulled up. Port prop was definitely over the 'oggin. Take a later wire and the port wheel would be over the edge.

Marshaller out immediately (how slick were those boys!), waving me forward to the cat for another launch. Just as I was having second thoughts, Flyco drawled, mercifully, "now we've got you, think we'll keep you. Shutdown, fold sh@t spot"

Toughest night I ever knew. Turns out mine wasn't the worst pass that night either! The great thing about a small ship with a tiny air group was that you could identify your hookmark the next day. That chip on the round-down 80' short of 1 wire definitely wasn't mine!

Well, I could go on about the cat failure on my 21st birthday, and bore you ad-infinitum, but that'll have to wait for another dit session.

Absolute privilege to have done it and lived to tell the tale. Thinking of mates and those brave colleagues who went before who weren't so lucky. RIP.

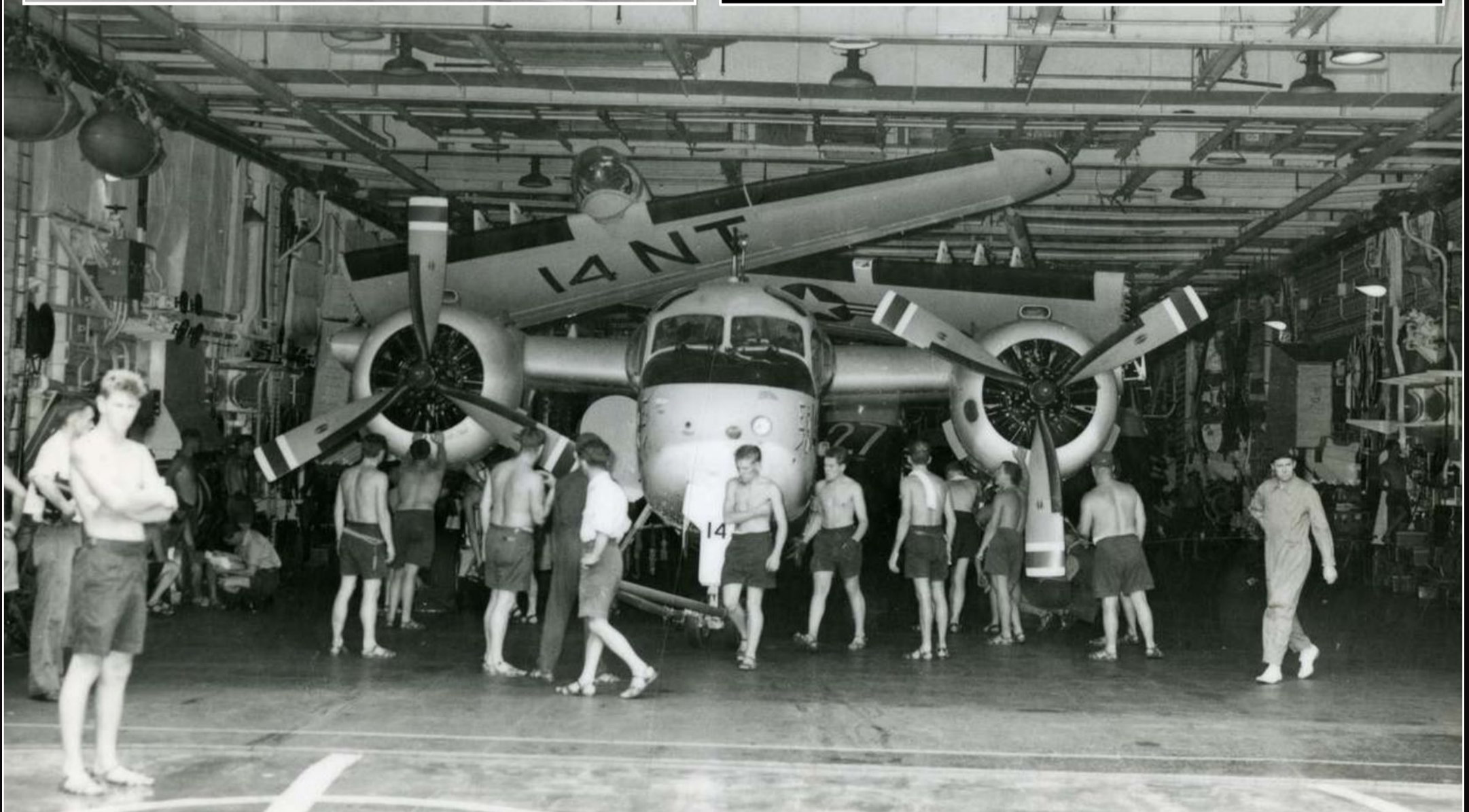
AD. →

# HISTORY IN PICTURES



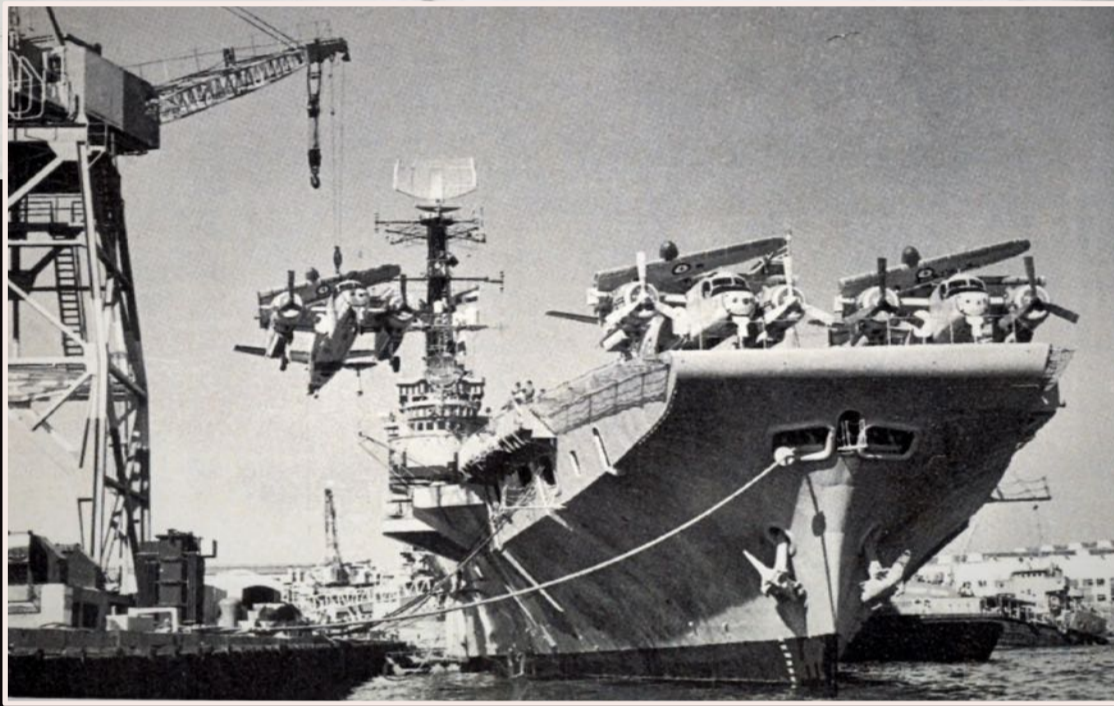
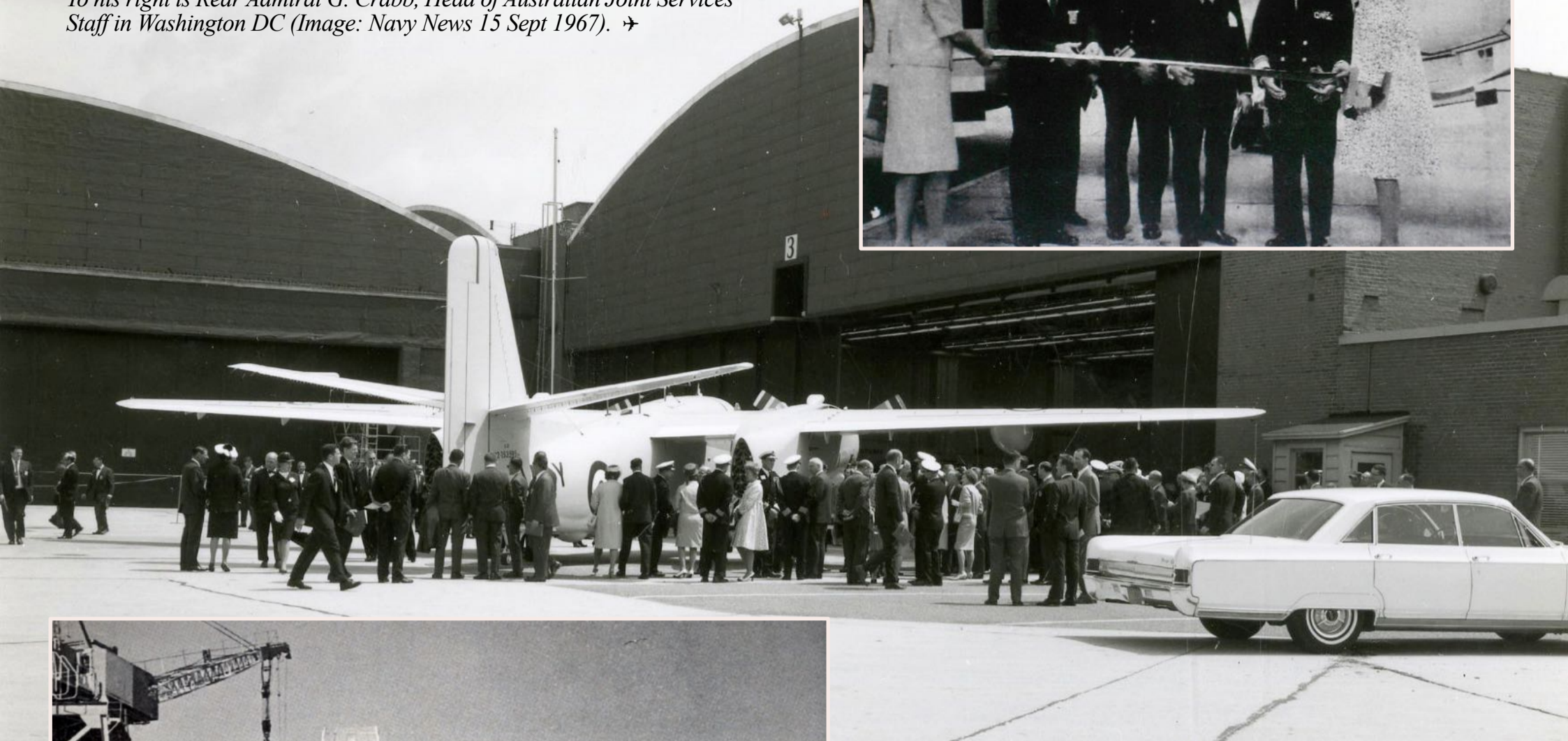
*Above: When consideration was being given to what aircraft might replace the Venoms/Gannets, occasional Traker visitors to HMAS Melbourne were welcome, as they afforded an early look at the type and helped answer questions about their operability aboard such a small carrier. The first of these visits was an S2-F from VS-21 Squadron (USS 'Philippine Sea') in 1958. The photo has a certain vintage touch with the Sea Venom radar dome in the foreground. (RAN photo).*

*Below. Another visitor; date unknown. What better way to check hangar clearance than to take it below? The image dramatically indicates how little room there was for the Traker. (Navy image). →*





Right: The first of the new Trackers was officially handed over to the RAN at the Grumman Company plant, Long Island on 23 May 1967. The Australian Ambassador in the US, Mr J.K. Waller, is seen cutting the ribbon. To his right is Rear Admiral G. Crabb, Head of Australian Joint Services Staff in Washington DC (Image: Navy News 15 Sept 1967). →



In 1967 the RAN purchased 14 S-2E Trackers, plus two additional airframes for instruction purposes, making a total of 16 in the initial batch. Their procurement ran in parallel with the initial acquisition of A4 Skyhawks (which were delivered at the same time). The Skyhawk program was beset by problems, mainly in the provision of spares. By contrast, the Tracker program ran like clockwork. Left & Below: Navy News of 04 August 1967 reports on aircrew training. →

## Tracker aircraft

Royal Australian Navy air crews are undergoing advanced training at North Island, San Diego, U.S., and will form the nucleus of the first RAN Tracker Squadron.

The Trackers will replace Gannet anti-submarine aircraft and will operate initially at H.M.A.S. ALBATROSS, the Naval Air Station at Nowra, N.S.W., and subsequently at sea in the aircraft carrier H.M.A.S. MELBOURNE.

MELBOURNE will sail to the United States later this year to take delivery of the Trackers and 10 Skyhawk fighters which will replace Sea Venom fighters.

• Picture shows the first flight in the U.S.A. of an R.A.N. Tracker. The Tracker is a twin-engined anti-submarine aircraft with a crew of two pilots, a Naval observer and an aircrewman.

It is fitted with the most modern submarine detection equipment and will significantly improve the anti-submarine capabilities of the R.A.N.



Above (top): S/Lt V. Vanek, RCN, checking the landing gear of a CS2F Tracker with S/Lt Ross Dunhill RAN of Brisbane.

Under: Two RAN officers, Lt.Cdr R. McKenzie (right) and Lt. P. Adams, who are undergoing training in Utility Squadron 32, based at Shearwater, Nova Scotia. Twelve RAN pilots and Observers served in squadrons or undertook training at Shearwater. →

## AIRCRAFT FOR F.A.A.

The RAN Flagship, the aircraft carrier HMAS MELBOURNE, returned to Australia from the US on November 22 with 24 new aircraft for the Fleet Air Arm.

The 14 S-2E Tracker anti-submarine aircraft and 10 A-4G Skyhawk fighter-bomber aircraft are valued at nearly \$20 million.

MELBOURNE unloaded the Skyhawk aircraft at Jervis Bay, after which they were taken by road to the Naval Air Station, Nowra.

The Tracker aircraft were unloaded in Sydney and flown to Nowra.

The Trackers and Skyhawks will replace Gannet and Sea Venom aircraft which have flown from HMAS MELBOURNE since her commissioning exactly 12 years ago.



Skyhawk fighters being unloaded from HMAS MELBOURNE on to lighters at Jervis Bay.



The aircraft carrier MELBOURNE framed in the background at Jervis Bay as trucks carrying the Skyhawks leave for the flying base at HMAS ALBATROSS, Nowra.

HMAS Melbourne at sea, bringing her cargo of new Trackers back to Australia. After brief visits to Pearl Harbour and Suva she shaped course for Jervis Bay where the Skyhawks were dispatched via barges for subsequent road transit to Nowra. Melbourne then made her way to Sydney, where the Trackers were trucked to Mascot airport. The ship's ROP doesn't have much to say about unloading her Trackers, other than it was at a Sydney wharf and was complete by early afternoon on Friday 24th November. →

**Below.** With no flying aboard there would have been time on peoples' hands during the long transit across the Pacific. It was certainly enough to enjoy a traditional 'Crossing The Line' ceremony between Hawaii and Fiji (Below) (Photo: M. Fogarty).

Meanwhile, work had been done regarding transport (right). Apparently HMAS Sydney was originally intended as the pick-up vessel, with options being examined to either offload the aircraft in Jervis Bay or Sydney for HdH in Bankstown. A penscript note in the margin of the letter indicates that the Rydalmere to Bankstown road route was 'unsatisfactory'. In the event, HMAS Melbourne did the fetching and carrying, and the aircraft were then trucked to the nearby Mascot airport facility for flight preparation. →



Trackers ferried to Australia 1967

from M Fogart



Superintendent,  
Aircraft Maintenance and Repair Branch  
H.M.A. Naval Establishment,  
GARDEN ISLAND.

2nd March 1967.

Chief Superintendent of Supply,  
GARDEN ISLAND.

TRANSPORTATION OF TRACKER/SKYHAWK TO H.M.A.S. ALBATROSS.

The Tracker and Skyhawk aircraft being purchased from the U.S.A. are programmed to be decanted from H.M.A.S. SYDNEY in Jervis Bay. The aircraft will be loaded onto a lighter, ferried to the Marine Section and thence taken by low loader to H.M.A.S. ALBATROSS.

2. It is possible that this method could prove extremely hazardous should the weather become inclement during the period the aircraft are scheduled to be off loaded. To cater for this eventuality it is considered prudent at this stage, to investigate the possibilities of an alternative method of delivery of these aircraft to Nowra.

3. The most realistic alternative method would appear to be to decant the aircraft onto a lighter in Sydney Harbour, ferry them to the Naval Stores Depot at Rydalmere and transport by road to Hawker de Havilland, Bankstown. The aircraft would then be de-preserved, serviced and flown to the Air Station.

4. To this end it is requested that an investigation be undertaken to ascertain the feasibility of transporting a Tracker aircraft by road from Rydalmere to Hawker de Havilland, Milperra Road, Bankstown. The overall dimensions of these aircraft are as follows:-

	<u>Tracker</u>	<u>Skyhawk</u>
Length	43' 6"	41' 4"
Width	27' 4"	27' 6"
Height	16' 8"	15' 0"
Tailplane width	26' 11"	11' 4"

5. A front profile of a Tracker aircraft is currently under construction at the R.A.N. Air Workshops at Randwick and on completion will be secured to a truck and used to prove the route the aircraft are planned to take between the Marine Section, Jervis Bay and H.M.A.S. ALBATROSS. This profile could be made available by 2nd March to test the proposed Rydalmere - Bankstown route, if required.

6. If the proposed investigation indicates that this method is feasible and it is then desired to prove the route with an actual aircraft on the low loader, it is advised that an instructional Tracker plus low loader could be made available for this purpose providing the trial could be conducted before 20th March, 1967.

*9/8/67 will be necessary that... with approval... contact.*  
 S.S.A.  
 D.N.B. (T)  
 4th 1.0  
 8.8.  
 5-MAR 1967  
 SUPERINTENDENT,  
 AIRCRAFT MAINTENANCE & REPAIR.



The Grumman Tracker aircraft is lifted from Sydney Harbour at Pyrmont yesterday.—Picturegram.

The delivery of Trackers to the RAN did not go without at least one mishap, as reported by the Canberra Times on 10 Nov 66 (left). The image is of very poor quality, but the accompanying article reported as follows: "The... Navy's first modern Grumman Tracker anti-submarine aircraft made an inauspicious debut in Sydney today (the previous Wednesday). For more than five hours it rested on the bottom of the harbour, 36 feet under water, whilst civilian and naval officials devised [a] means of salvaging it. The Tracker, one of the latest produced by the Grumman Aircraft Company, New York, was being hoisted from a wharf ramp at Pyrmont onto a flat-topped lighter when the loading hawser snapped.... The machine, which was without engines and equipment, will be taken next week to the naval air station, HMAS Albatross, where it will be cut into sections to train mechanics and air frame fitters who will eventually handle the new aircraft."

The article failed to mention that the Tracker was one of two bought specifically for training. This particular one, 151646, was obtained as an incomplete and damaged airframe, having been ditched into Long Island Sound during a pre-delivery test flight from the Grumman factory. The S-2E never flew again after this accident and it was acquired by the R.A.N. with the specific intention of cutting it up to provide components for training purposes. The severed nose section of the S-2E resides with the Naval Aviation Museum at Nowra to this day. Given this aeroplane was ditched prior to delivery and spent another four hours on the bottom of Sydney Harbour, it is noteworthy for probably having spent more time in the water than in the air!→



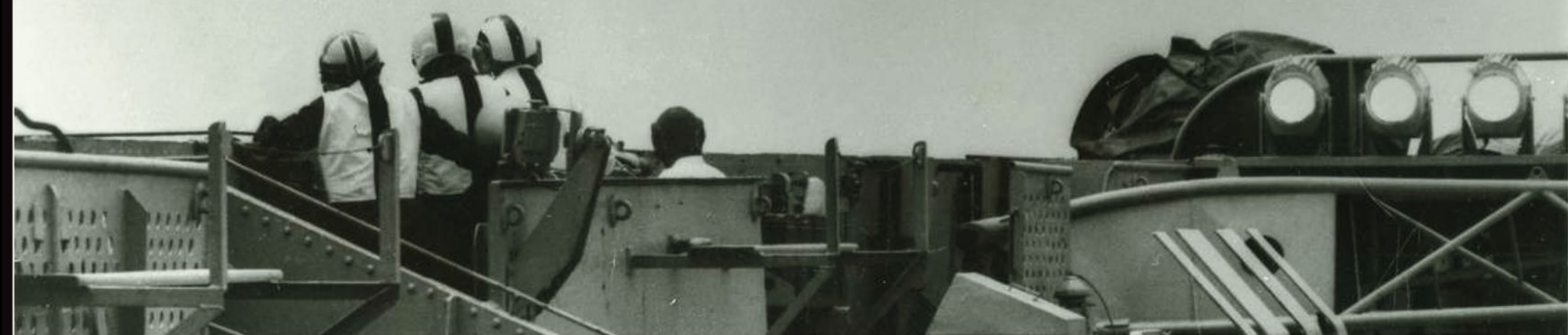
Left: The S2Es were de-inhibited and prepared for flight by RAN maintenance personnel before being ferried down to Nowra. The first pair arrived on 30th November 1967 and the two crews were greeted with champagne to mark the occasion. Pictured are LCDR Ron Mackenzie, accepting a glass of bubbly, who commissioned 816 Squadron with the task of working it up to operational standard. Behind him (obscured) is John Van Gelder. LCDR Peter Adams is in the centre and the figure behind the PO WRAN steward is CMDR Ken Duncan, who was the XO of Albatross and acted as a copilot (to Peter Adams) for the historic flight. →

Following the first pair, the remaining aircraft were ferried down in pairs (by Adams and Mackenzie who were the only qualified Tracker captains at the time), with the final aircraft landing at Albatross on 4th December 1967.→

The Trackers were not to return to HMAS Melbourne for nearly 18 months, as the ship went into extended refit which, amongst other things, modified her for the larger aircraft she was to operate. All that changed on 12 February 1969 when LCDRs Ron Mackenzie and Adams landed 852 aboard. They nearly didn't make it: a significant rain event at Nowra the night before resulted in minor flooding at the runway intersection and the airfield was closed. By lunch time limited operations were approved and the Tracker departed for the ship. Although 816 Squadron had been commissioned for over a year (since 10 Jan 68) few pilots had any deck-landing qualifications, so it was a welcome relief to be able to operate to the ship again. Progress was patchy, however, as problems were experienced in Skyhawk catapult bridle strikes and a shortage of bridles for the Trackers forced delays. →

Right: The first operational deck landing of an RAN Tracker aboard Melbourne. From left to right: Tony Hunt (AEO), Peter Adams and Paul Hamon. Absent from the picture is Ron Mackenzie, the pilot in command. →

Below: A general shot of a Tracker on short finals to Melbourne's Flight Deck. It was a worthy successor to the old Fairey Gannet, with better time-on-task, a good radar and improved sensors including a Magnetic Anomaly Detector (MAD). →



- 1 Starboard navigation lights
- 2 Wing tip ECM fairing
- 3 Starboard aileron
- 4 Aileron tab
- 5 Static dischargers
- 6 Aileron hinge control
- 7 Fixed leading edge slot
- 8 Aileron and spoiler control rods
- 9 Leading edge de-icing boots
- 10 Steerable searchlight, 85 million candlepower
- 11 Spoiler actuators
- 12 Starboard spoiler panels, open
- 13 Outboard single slotted Fowler-type flap
- 14 Wing fold actuators
- 15 Hinge link
- 16 Starboard wing fuel tanks; total fuel capacity 627 Imp gallons (2,850 litres)
- 17 ECM antenna housing
- 18 Carburettor intake
- 19 Starboard wing stores pylons (three)
- 20 Engine cowling panels
- 21 Wright R1820-82WA nine cylinder radial engine
- 22 TACAN aerial
- 23 Cockpit overhead switch panel
- 24 Engine cowling nose ring
- 25 Propeller hub pitch change mechanism
- 26 Hamilton Standard three-bladed variable pitch propeller
- 27 Propeller blade root de-icing boots
- 28 Windscreen panels
- 29 Windscreen wipers
- 30 Pilot heads (two)
- 31 Hinged nose cone
- 32 Environmental control system equipment
- 33 Taxiing lamp
- 34 Fresh air intake
- 35 Nosewheel leg door
- 36 Torque scissor links
- 37 Twin nosewheels
- 38 Nose undercarriage leg strut
- 39 Nosewheel steering control
- 40 Retraction strut
- 41 Cockpit floor level
- 42 Hydraulic brake accumulators
- 43 Rudder pedals
- 44 Control column
- 45 Instrument panel
- 46 Cockpit radar display
- 47 Instrument panel shroud
- 48 Pilot's ring and head sight
- 49 Co-pilot's seat
- 50 Cockpit roof ditching hatch, port and starboard
- 51 Bulged (downward vision) side window panel
- 52 Pilot's seat
- 53 Cockpit rear bulkhead

- 54 Cockpit section framing
- 55 Adjustable seat mounting
- 56 Underfloor control linkages
- 57 Nosewheel doors
- 58 Weapons bay doors
- 59 Centre-line catapult strap hook
- 60 Crash barrier hook
- 61 Underfloor weapons bay, port side only
- 62 Footrest
- 63 Slipping cabin floor section rods
- 64 Chart case
- 65 Fuselage main longeron
- 66 Radar operator's display

- 67 Radar control panel
- 68 Internal step
- 69 Radar operator's seat
- 70 Cabin window panel
- 71 Instrument and display consoles
- 72 MAD operator's seat
- 73 Starboard side crew entry door
- 74 Ditching hatch, port and starboard
- 75 Anti-collision light
- 76 Aerial mast
- 77 Hydraulic reservoir
- 78 Avionics equipment racks
- 79 Torpedo carrier and release unit
- 80 Centre section front spar
- 81 Avionics equipment
- 82 Wing spar/fuselage attachment joints

- 83 Port wing fuel bay tanks
- 84 Centre section fuel tanks
- 85 Central flap drive unit
- 86 DF loop aerial
- 87 Starboard inboard flap segment
- 88 Nacelle tail fairing
- 89 Sonobuoy launch tubes (10)
- 90 Avionics equipment cooling air inlet ducts
- 91 Cabin rear bulkhead
- 92 Aft avionics racks
- 93 Flap shroud ribs
- 94 Port inboard flap segment
- 95 Life raft inflation bottle
- 96 Life raft stowage
- 97 HF aerial cables
- 98 Electronics power amplifier
- 99 Radar electronics equipment
- 100 Rear fuselage frame and stringer construction
- 101 Fin root fillet construction
- 102 Fin/tailplane attachment joints
- 103 Leading edge de-icing boots
- 104 Starboard tailplane
- 105 Starboard elevator

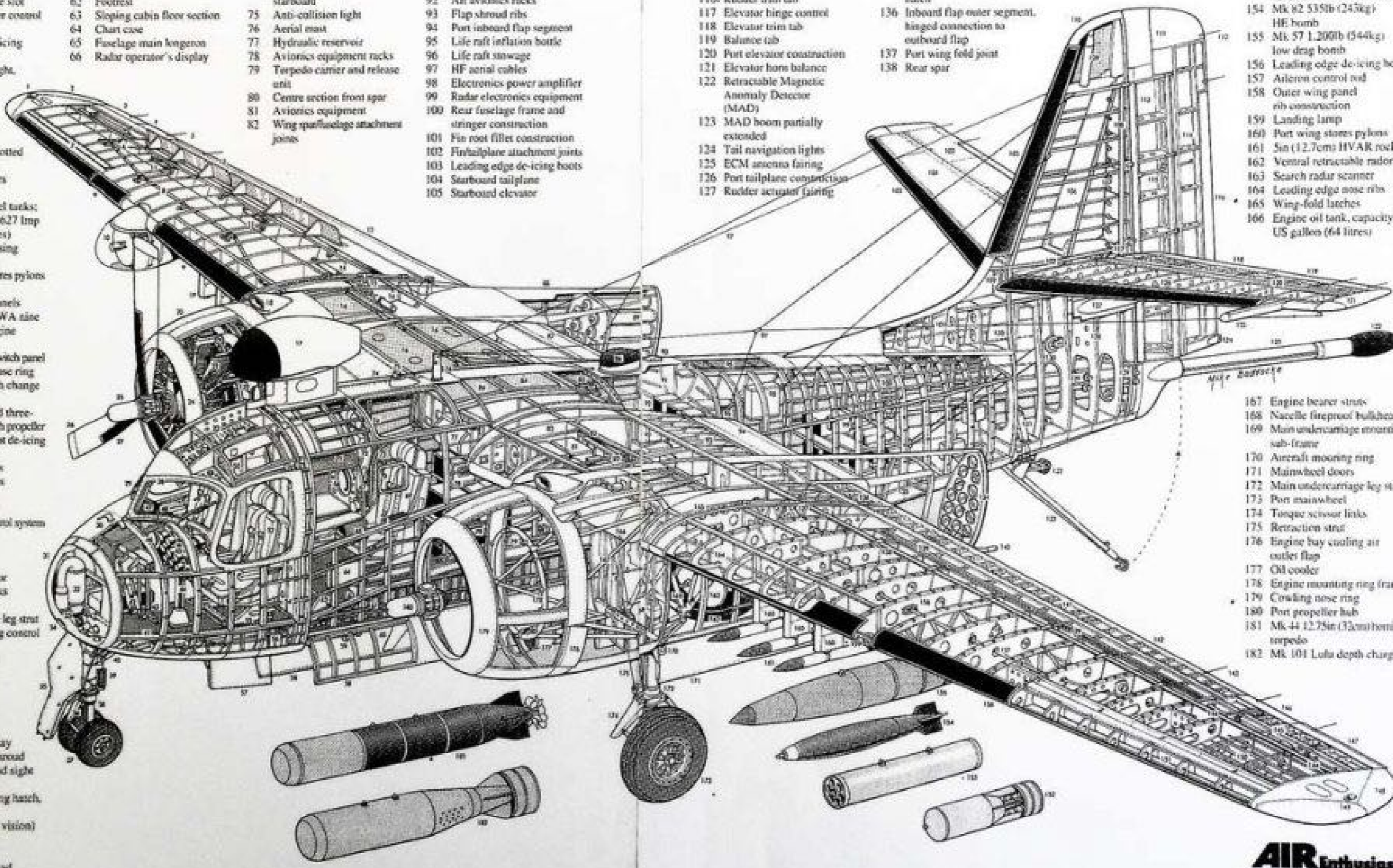
- 106 Tailfin construction
- 107 Vortex generators
- 108 Stormport
- 109 Duplex antenna
- 110 Fin tip aerial fairing
- 111 Rudder horn balance
- 112 Static dischargers
- 113 Auxiliary fore rudder
- 114 Main rudder construction
- 115 Trim tab control
- 116 Rudder trim tab
- 117 Elevator hinge control
- 118 Elevator trim tab
- 119 Balance tab
- 120 Port elevator construction
- 121 Elevator horn balance
- 122 Retractable Magnetic Anomaly Detector (MAD)
- 123 MAD boom partially extended
- 124 Tail navigation lights
- 125 ECM antenna fairing
- 126 Port tailplane construction
- 127 Rudder actuator fairing

- 128 Tail assembly attachment main frames
- 129 MAD boom roller guides
- 130 Elevator cable control
- 131 Armster hook jack and damper
- 132 Retractable tail bumper
- 133 Deck armster hook
- 134 Port nacelle sonobuoy launchers
- 135 Rear fuselage ventral access hatch
- 136 Inboard flap outer segment, hinged connection to outboard flap
- 137 Port wing fold joint
- 138 Rear spar

- 139 Port spoiler housing
- 140 Fuel vent
- 141 Flap rib construction
- 142 Port outboard Fowler-type flap
- 143 Static dischargers
- 144 Aileron balance weights
- 145 Port aileron construction
- 146 Aileron trim tab

- 147 Spring tab
- 148 Wing tip ECM aerial fairing
- 149 Port navigation lights, above and below
- 150 Wing stringers
- 151 Fixed leading edge slot rib construction
- 152 Mk 54 350lb (159kg) depth charge
- 153 LAU-32B/A rocket launcher, seven 2.75in (7cm) rockets
- 154 Mk 82 535lb (243kg) HE bomb
- 155 Mk 57 1,200lb (544kg) low drag bomb
- 156 Leading edge de-icing boot
- 157 Aileron control rod
- 158 Outer wing panel rib construction
- 159 Landing lamp
- 160 Port wing stores pylons
- 161 5in (12.7cm) HVAR rockets
- 162 Ventral retractable radome
- 163 Search radar scanner
- 164 Leading edge nose ribs
- 165 Wing-fold latches
- 166 Engine oil tank, capacity 17 US gallons (64 litres)

- 167 Engine bearing struts
- 168 Nacelle fireproof bulkhead
- 169 Main undercarriage mounting sub-frame
- 170 Aircraft mooring ring
- 171 Mainwheel doors
- 172 Main undercarriage leg strut
- 173 Port mainwheel
- 174 Torque scissor links
- 175 Retraction strut
- 176 Engine bay cooling air outlet flap
- 177 Oil cooler
- 178 Engine mounting ring frame
- 179 Cowling nose ring
- 180 Port propeller hub
- 181 Mk 44 12.75in (32cm) homing torpedo
- 182 Mk 101 Lulu depth charge



One of the new Trackers in all its glory. With its radar dome and Mad boom deployed and the bomb bay open, this was probably a posed shot – but it shows off some of the features of the aircraft: the 70-million candle-power searchlight on the starboard wing; the underwing stores carriers; the air-scoops either side of the Radome (to direct air to the rear of it to reduce vibration and buffeting); and the retractable tail bumper that lowered with the undercarriage to protect the tail against over-zealous flaring. (Photo: R. Kenderdine).➔



## NAVY GIRLS "UP IN THE AIR"

Women in the Navy have already been to sea in submarines, trained as divers, operated small boats and transferred by jackstay between speeding destroyers.

Now a WRAN officer and two nursing sisters have set another precedent for their colleagues in the Women's Royal Australian Naval Service and the Naval Nursing Service – this time in aviation.

They recently became the first women passengers on Tracker planes to make an arrested landing and catapult-assisted take-off on the flight deck of the aircraft carrier HMAS MELBOURNE.

"It was a superb experience," said Second Officer Belinda Board, 22, unit officer WRANS at HMAS ALBATROSS.

Belinda, Senior Sister Cecily Pocock, 31, and Sister Pip Hunt, 24, flew to MELBOURNE, which was working up off the New South Wales coast, in separate Grumman S2E Tracker planes from the front-line VS 816 Squadron.

The Tracker, an all-weather twin-engine aircraft, is fitted with electronic devices for detecting submarines and can be armed with homing torpedoes or depth charges.

It can remain on patrol for up to 10 hours and carries a crew of two pilots, an observer and an aircrewman.

When approaching MEL-



BOURNE'S flight deck with its tail hook down, the Tracker catches one of the five arrested wires at about 90 knots and comes to a dead stop within 150 feet.

At launch, a steam-driven catapult, attached by a wire strop to the Tracker's undercarriage, streaks along a 112-foot track on the deck and hurls

the plane into the air at 100 knots.

The launch takes only 2½ seconds and the three women said the pressure on them was "enormous".

In the photograph LEUT Jim "Jock" Caldwell, a pilot in 816 Squadron, gives the women, from left, Cecily, Belinda and Pip, a briefing on MELBOURNE'S flight deck.

Navy News  
14 Sep 1975



**Middle Right.** Brothers in Arms - or should that be Sisters in Arms? The Tracker and Skyhawks served together and, although never used in conflict, provided a very capable deterrent. ➔

**Bottom Right:** Captured at the moment the hook engages the wire, this Tracker lands on Melbourne. With the nosewheel on the centreline there was little margin for error; but very few accidents occurred. ➔



*Above. Looking spick and span, HMAS Melbourne steams on a calm ocean whilst operating her new aircraft. A Tracker is about to capture an arrestor wire, whilst other Trackers and Skyhawks are secured in the parking areas forward and aft of the island. Once again, this photo illustrates how little room there was to operate modern aircraft aboard a light fleet carrier. (Photo: Fred Tyler). ➔*



*Below. A few seconds from touchdown on the deck of HMAS Melbourne, this rare photo gives a pilots' eye view of a daylight approach to a carrier's flight deck. The pilot was "Farmer" Talbot and the photograph was taken by the aircrewman, Graham Bates. Apparently Graham had to do a fair bit of masking during (wet) development of the image to 'burn in' the dark cockpit interior against the bright outside area – this was, of course, the pre-digital era. (Information courtesy of Bob "Timber" Mills, exCPOA). ➔*

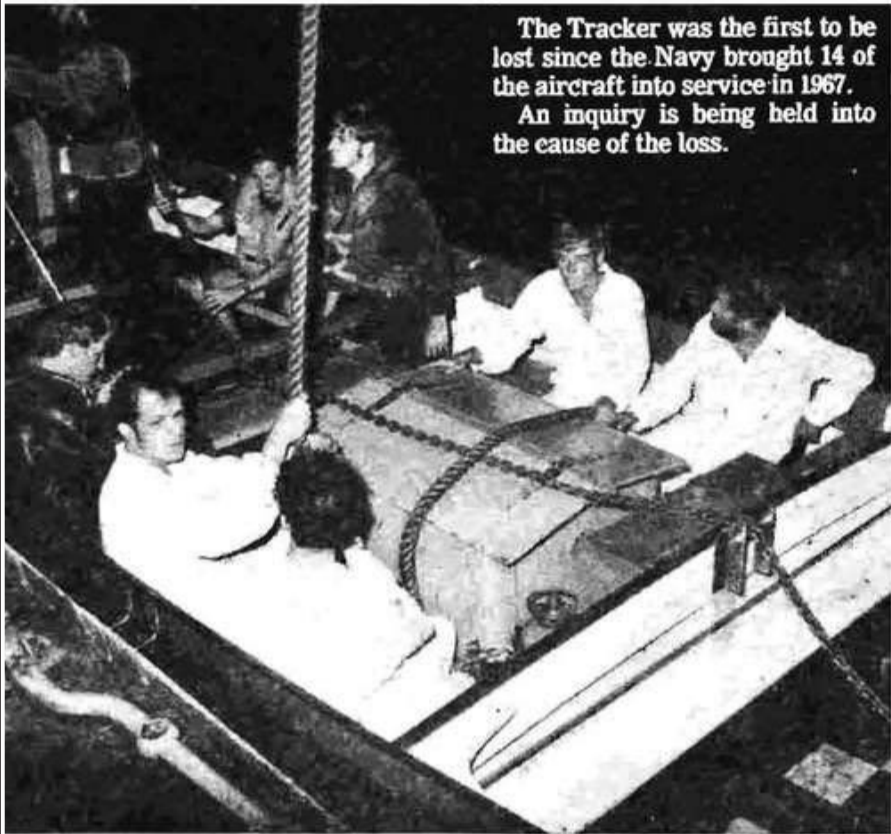
# Tracker Ditching

Only one Tracker was lost due to a flying accident, and that occurred on the night of 10 February 1975, when N12-153608 ditched into the sea shortly after a 'bolter' from HMAS Melbourne (see Navy News clipping above). All four crew members were recovered safely but the aircraft was not.

The subsequent investigation found that inadvertent flap selection by the TACCO as the primary cause of the accident, but this was subsequently overturned when it was determined the Tracker had sufficient performance margin to climb away with any flap setting. The Defence Science & Technology (Aeronautical Research Laboratory) was then asked to investigate the circumstances more than a year after the incident with no wreckage or evidentiary material available other than the testimonies of the aircrew involved. The transcript of ARL's findings – which is an excerpt from a wider publication about military accidents in general – can be read [here](#).

Below: Another viewpoint, this time from John McCormack who was an experienced Tracker TACCO. ➔

Crewmembers of the Tracker being lifted aboard MELBOURNE



The Tracker was the first to be lost since the Navy brought 14 of the aircraft into service in 1967. An inquiry is being held into the cause of the loss.

## TRACKER DITCHES IN SEA



An earlier picture of the Tracker preparing to take-off from HMAS MELBOURNE.

A Navy anti-submarine Tracker aircraft was lost early February 10 from the aircraft carrier HMAS MELBOURNE, about 88 kilometres south east of Jervis Bay.

The crew of four was picked up unhurt.

The Tracker was making a landing on HMAS MELBOURNE at about 3.25 am. It failed to stop and ditched on the port side of the ship.

The crew was picked up by the destroyer-escort, HMAS PAR-RAMATTA, before the aircraft sank and they were later transferred to HMAS MELBOURNE.

The crew, all members of 816 Squadron, were:

Lieutenant Barry John Bromfield, 29, of Moorabbin, Vic.;

Sub-Lieutenant Gregory Car Rulfs, 21, of Mackay, Qld.;

Sub-Lieutenant David John Palmer, 21, of Grays Point, NSW;

Petty Officer Joe Kroger, 33, of Nowra, NSW.

### An S-2 Tracker TACCO Recollection of Loss of 853 on night of 10 Feb 1975

"I have to say that this is my recollection as an interested party of an incident 30 years ago. I wasn't in 853, my interest was largely because I had just launched from MELBOURNE prior to 853 recovering on-board and boltering. My recollection of the crash, the inquiries and the probable cause is as follows.

It was a very black night with no horizon at all. I recall as we launched and flew away we commented how black it was, there was no light at all. We had completed a handover of 853's mission information, contact positions etc, and 853 switched to the ship's frequencies for their recovery. We then received a call from the Anti Submarine Air Controller (ASAC) saying there had been a crash on deck. A few minutes later he called again and in a jovial tone said 'no crash on deck, crash into the sea'. We then waited until much later to find out the crew had been recovered. The crash was the

subject of much discussion amongst the aircrew for some years and as I had a personal involvement I did follow the deliberations.

After the crash a Board of Inquiry was convened with then LCDR Rob Partington as the President or as a senior member. Rob was an experienced Tracker pilot, ex Gannets, who was XO of the ship that recovered the crew. He went on to retire as a CDRE and sadly died early last year in an accident involving a test flight of a home built.

I don't recall the findings of this inquiry except that I think it deduced the accident occurred because the Tacco of 853, the late Barry Bromfield, put the flaps all the way up on the bolter rather than to 1/3.

A later inquiry in about 1976/77 used the flight test results obtained by the test pilot and then OIC of AMAFTU, Ian McIntyre, which indicated that if the aircraft had been flown off the ship at the right attitude it should have had a positive rate of climb no matter what the flap setting, up or 1/3.

The 2nd inquiry explored pilot

disorientation and concluded that the pilot of 853 possibly suffered from disorientation due to the acceleration off the ship under full power inducing a sensation of the aircraft pitching up. Barry Bromfield and other crew members of 853 told me that Barry had been calling to 'get the nose up' or words to that effect before they hit the water. If the pilot's instrument scan wasn't ideal he would have pushed the nose of the aircraft down to respond to his perception of the aircraft pitching up. I also recall that this was **the first bolter 853's pilot had experienced**. I think this inquiry concluded disorientation as the most likely cause.

While Parto and Brom are no longer with us others such as Ian McIntyre, Greg Rulfs, Noddy Palmer and Joe Kroeger may be able to provide a more direct input to the discussion if we can find them. Ian McIntyre was in Canberra last I knew, Greg Rulfs with Cathay after an RAAF stint on F111s and Noddy was in Air Headquarters at RAAF Glenbrook a few years back."

Text from 'TACCO' e-mail to Dave Masterson in 2004

Charles Schoch was a Navy diver and helped to recover the crew of Tracker 153608 which ditched off Melbourne on the night of 10 February 1975. He recently sent an email recounting his role in the incident:

"...Parramatta was RESDES that night, the exercise was finished and Melbourne was recovering aircraft. I think it was about 2330 when we got the signal that an aircraft was in the water and to retrieve the crew. I had to lay out lines and drop guard rails and be ready to get in as soon as we found the crew. When we had them sighted and alongside I jumped in and swam a line around so they had something to hang onto other than me. I think Barry had a broken leg as two of the men were telling me to get him first. All good except I did not know who Barry was. There were only four people in the water including me and I did not leave anyone behind. I towed them about 20 metres to the ship and got them into slings to be hoisted onboard. Happy that it was a successful retrieval I grabbed an escape hatch from the aircraft that was floating nearby as a souvenir. That disappeared before I got back onboard. Two things I remember were, none of the men in the water said thanks but in the circumstance I can understand that. The other was that the Buffer got the commendation for the successful outcome. That's how the Navy works I guess."

(By Ed. There were four crew members: LEUT Barry Bromfield (TACCO); SBLT Greg Rulfs (Pilot); SBLT David Palmer, and POA Joe Kroeger. All were recovered into a Seaboat without injury). ➔





Left. The Trackers offered day and night capability. Any night landing on a carrier was by its nature notoriously difficult, but only one Tracker accident ever occurred (see previous page). The time-lapse photo by Peter Clever captures the last few moments of a Tracker's night landing aboard Melbourne,

Below: Sometimes rescues happened by chance rather than design, as one lucky group stranded in North Queensland found out when an RAN S2 found them. Although it was an unplanned event the newspaper article underscores the high situational awareness and professionalism of the crew. →

The Naval College on parade.

## 'THANK HEAVEN THERE'S A NAVY!'

The famous Navy saying of "thank heaven there's a Navy" had real meaning for several members of the public and their families during the past week.

In a matter of days and in four separate incidents, members of the Royal Australian Navy figured in the rescues of five people stranded on an islet off the Queensland coast, and of a man who had fallen down a cliff face on the NSW coast (story page 3); and treated two divers, victims of the "bends", following different mishaps hundreds of miles apart (story page 3).

A Navy Grumman Tracker aircraft from 851 Squadron, Nowra, figured in the chance discovery of

the five people stranded on an islet off the Queensland coast.

The tracker was on familiar-

isation sweep of the coastline in preparation for NAVY exercise "Warm Waters" in the Hervey Bay, Capricorn Channel area, off the Queensland central coast.

The pilot, LCDR Peter Adams, saw smoke drifting from the islet north of North Keppel Island and an empty small boat three miles offshore.

Captain Tom Vincent, of the Army's District Support Unit at Rockhampton, was aboard the Tracker.

He told "Navy News": "Written in the sand was a message 'no boat' and an arrow pointing out to sea.

"As we buzzed overhead, the people ran onto an opening from under a tree on the island, which would be only about 200 yards across.

"The Tracker contacted the Department of Civil Aviation for help for the four adults and a two-year-old child.

"DCA replied that Coastguard assistance would arrive in two hours.

"In a pass over the islet, a note was scrawled and dropped from the Tracker informing the people below of developments.

"Help coming in two hours . . . you owe us a beer," said the Tracker note.

"The people below scrawled in the sand the reply 'OK thanks'."

The Coastguard took the drifting boat in tow and completed the rescue.

Other crew members aboard the Tracker were LEUT. Peter Robottom and PO Max Poole.

LCDR Adams said the stranded were holidaymakers in the area.



"Help on the way" . . . the stranded holidaymakers wave in appreciation to the NAVY Tracker.

Cont. on Page 5

Right.. Doing one of its jobs. The S-2 was principally a surveillance aircraft but Search and Rescue was never far from top of the list of secondary roles. According to the Canberra Times of 16 March 1974 this was a distressed yacht some 50 miles east of Jervis Bay which had been located by the Tracker. An Iroquois helicopter captained by LEUT Dick Snell later rescued five people (three men and two women) from the vessel. A ship was diverted to tow the yacht to a safe port but was delayed by rough weather so we don't know of its fate. (RAN image)

Far Right: An unusual shot of a Tracker, which appears to include the bridle catcher/catapult strop on the bow of Melbourne (RAN image). →





*Operation SEAWATCH. We have found little in the history books about Operation Seawatch. Most accounts of the time tend to 'bundle' it with Operation TROCHUS, but in fact it took place at a different place and a different time.*

*SEAWATCH commenced around mid November 1977 in response to the increasing number of 'Boat People' arriving on our shores (the first was in April 1976 and over the next five years 2059 boat arrivals were recorded). Under the control of the Department of Transport, it involved VC851 crews and aircraft tasked with the location (and guiding to port) of refugee boats primarily coming out of Vietnam. As the operation progressed this role was expanded to include detection of illegal fishing by Indonesian and Taiwanese boats, out to the 200nm limit of the Australian Fishing Zone proclaimed on 1 November 1979.*

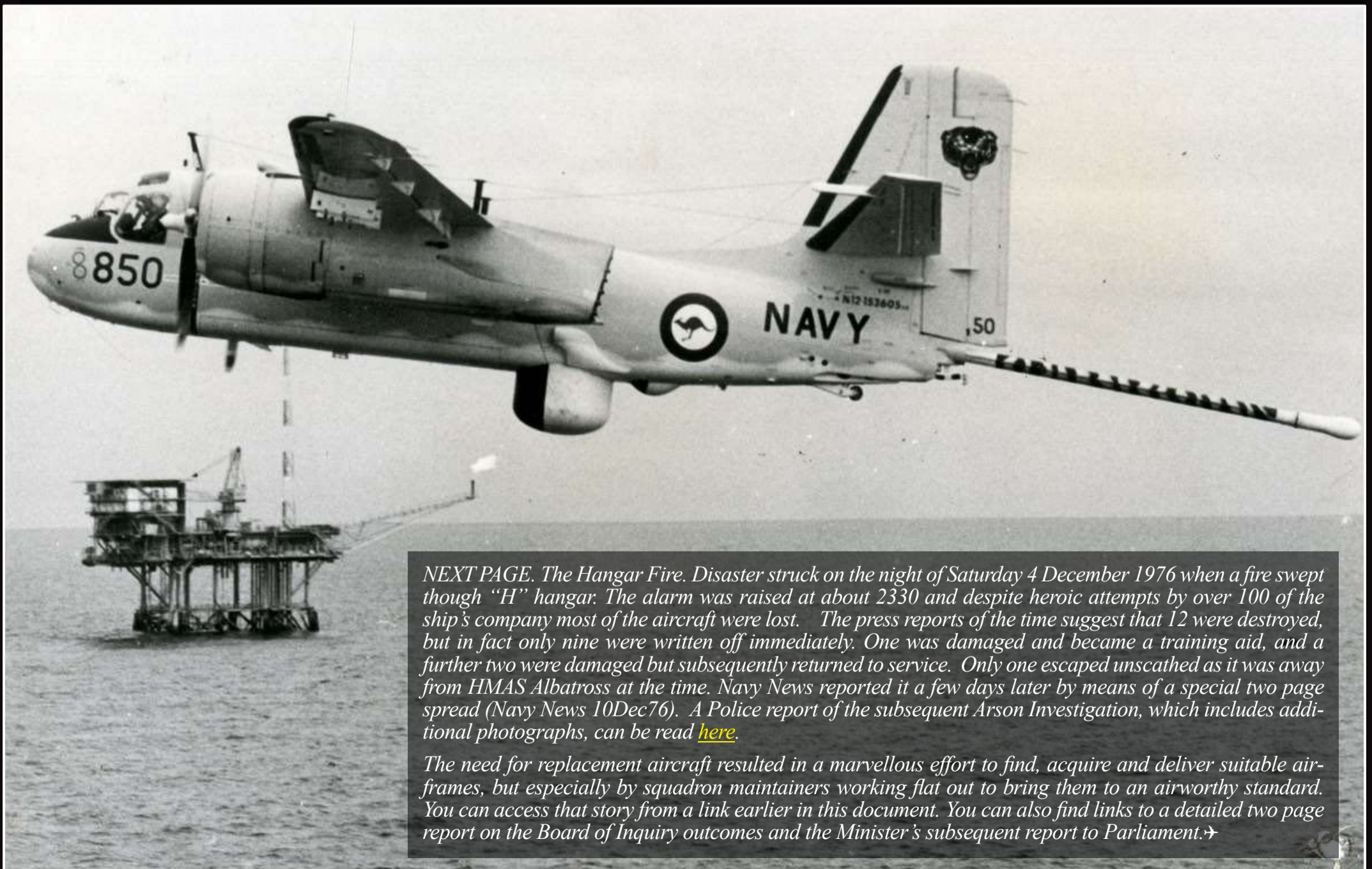
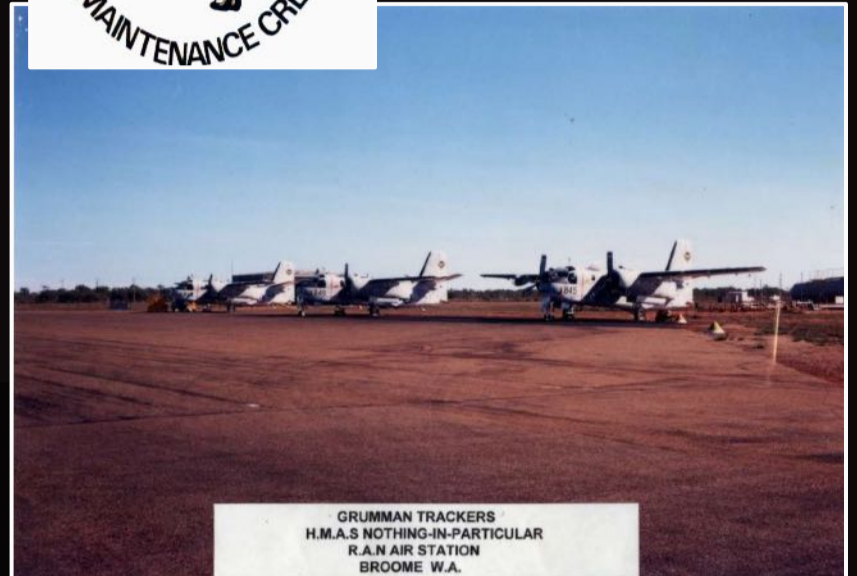
*The Fleet Air Arm's involvement in Operation Seawatch continued until at least 1980 and generally involved up to three Trackers. The role was replaced by Australian Customs Nomad aircraft specially equipped for the task. →*



*Below. A VS816 Squadron Tracker conducts a flypast during celebrations to commemorate the 40th anniversary of RAAF Base Darwin. (Photo [and image to the right] by Ben Kelly. Bottom: Tracker 153605 in Bass Strait. This aircraft was one of the original S2E airframes and was destroyed in the hangar fire, so this photograph pre-dates December 1977. Trackers were not officially assigned to Operation ESTES (Bass Strait restricted area surveillance) until 1980, so this photograph was most likely taken for PR purposes, noting that the aircraft has its radome and MAD boom deployed and has the oil rig strategically placed in the photograph. (Navy image). You can read about the cessation of ESTES in a Navy News article [here](#). →*

### Operation TROCHUS

*Not long after cyclone Tracy (Dec '74) VC851 Squadron's Trackers were tasked with Operation TROCHUS, which was surveillance of the 'top end' to combat illegal fishing. Three Trackers and one of the Squadrons HS748 communications aircraft were deployed to Broome. Originally intended to be for just one month, the Operation proved so successful that it was extended to over 18 months. VC851 was supplemented by VS816, with the two Squadrons sharing the task until mid to late 1976. By the end of that year all aircraft were repatriated to NAS Nowra – in time for the disastrous fire on 4th December 1976. →*



*NEXT PAGE. The Hangar Fire. Disaster struck on the night of Saturday 4 December 1976 when a fire swept through "H" hangar. The alarm was raised at about 2330 and despite heroic attempts by over 100 of the ship's company most of the aircraft were lost. The press reports of the time suggest that 12 were destroyed, but in fact only nine were written off immediately. One was damaged and became a training aid, and a further two were damaged but subsequently returned to service. Only one escaped unscathed as it was away from HMAS Albatross at the time. Navy News reported it a few days later by means of a special two page spread (Navy News 10Dec76). A Police report of the subsequent Arson Investigation, which includes additional photographs, can be read [here](#).*

*The need for replacement aircraft resulted in a marvellous effort to find, acquire and deliver suitable airframes, but especially by squadron maintainers working flat out to bring them to an airworthy standard. You can access that story from a link earlier in this document. You can also find links to a detailed two page report on the Board of Inquiry outcomes and the Minister's subsequent report to Parliament. →*

# PICTURES SHOW DAMAGE CAUSED BY FIRE AT THE NAVAL AIR STATION, NOWRA



## NAVY NEWS

### TRACKERS DESTROYED IN HANGAR INFERNO NAVAL PERSONNEL IN 'GUTSY' BARE-HANDED ATTEMPTS TO SAVE AIRCRAFT

Up to 12 RAN Grammar anti-submarine Tracker aircraft incinerated... NAVY personnel scrambled into cockpits to release brakes on blazing aircraft... others handed Trackers with their bare hands... Defence Minister Kilian praised their "gutsy" efforts... Board of Inquiry under way... the United States Government promised replacement aircraft... "with all possible haste"...

These were the major points to emerge following last Saturday night's \$2.5 million fire at the RAN Naval Air Station, HMAS ALBATROSS, Nowra, on the NSW South Coast. There were no injuries.

NAVY Public Relations Officer, MR. TOM JACKSON, was "on-the-spot" a few hours after the fire "at the heart out" of the RAN's anti-submarine strength. He filed his report for "Navy News": With the events of early Sunday morning, December 5, the Fleet Air Arm probably suffered the greatest blow since the late 1960s when there was a move not to re-equip the Navy's fliers.



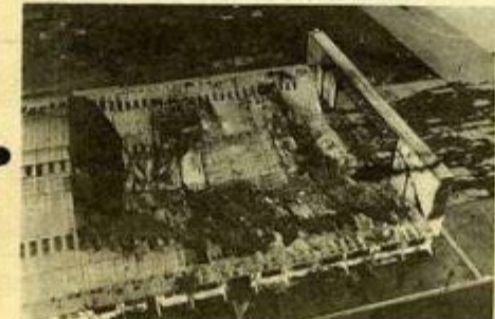
Photographs by ABPH DICK GREEN



A Naval Board of Inquiry is already in train and any comment as to the cause of the blaze could be prejudicial to that inquiry. The hard facts are that 12 of a total 13 Tracker anti-submarine aircraft were destroyed or badly damaged. The fire began about midnight on Saturday in the hangar which houses Tracker anti-submarine aircraft of the RAN's long-range anti-submarine force - 818 and 821 Squadrons. What followed was a searing explosive train of disaster. The hangar buckled and swayed to the firestorm which enveloped the aircraft.

Naval personnel raced in to attempt to save anything from the inferno and because of their heroic actions, five aircraft were pulled alike from the wreckage of the squadron's home. Six aircraft were by this time molten distortions of the sleek, potent figure which the Tracker presented in its operational capacity. As these aircraft melted into the hangar concrete, about half of the roofing crumbled down, burying the six under a chaos of shredded and white hot corrugation. Another Tracker, like a flaming torch in the night, was pulled outside and extinguished by the fire-fighting crews.

In this effort, the NAVY personnel were backed by the resources of the Nowra Fire Brigade, who slaved with the sailors against a background of searingly hot but controlled movement. They worked to move undamaged aircraft of other types from the vicinity of the Tracker hangar. Because of their efforts, there was no aircraft lost suffered by other RAN squadrons. The S2's are normally stored between operations at HMAS ALBATROSS and operate from the NAVY's flagship HMAS MELBOURNE, or ashore at other times. Indeed, HMAS MELBOURNE represented the setting of my last farewell to the Trackers.



20(26) NAVY NEWS, December 10, 1976

## MINISTER'S TRIBUTE TO FIRE-FIGHTERS' COURAGE

The Minister for Defence, Mr. D. J. Kilian, late on December 5 issued a "warm tribute" to those who pulled damaged Grammar Tracker aircraft from the inferno at HMAS ALBATROSS.



Naval advisers to the Government seek to dispel the extent of the loss. Mr. Kilian said the Board of Inquiry, set up by RADM Roake, would be due to report in the next few days.

"I don't seek to singe it," he said. "I don't seek to singe it," he said. "I don't seek to singe it," he said.

"I don't seek to singe it," he said. "I don't seek to singe it," he said. "I don't seek to singe it," he said.

"I don't seek to singe it," he said. "I don't seek to singe it," he said. "I don't seek to singe it," he said.

"I don't seek to singe it," he said. "I don't seek to singe it," he said. "I don't seek to singe it," he said.

"I don't seek to singe it," he said. "I don't seek to singe it," he said. "I don't seek to singe it," he said.

"I don't seek to singe it," he said. "I don't seek to singe it," he said. "I don't seek to singe it," he said.

"I don't seek to singe it," he said. "I don't seek to singe it," he said. "I don't seek to singe it," he said.

"I don't seek to singe it," he said. "I don't seek to singe it," he said. "I don't seek to singe it," he said.

"I don't seek to singe it," he said. "I don't seek to singe it," he said. "I don't seek to singe it," he said.

"I don't seek to singe it," he said. "I don't seek to singe it," he said. "I don't seek to singe it," he said.

"I don't seek to singe it," he said. "I don't seek to singe it," he said. "I don't seek to singe it," he said.

"I don't seek to singe it," he said. "I don't seek to singe it," he said. "I don't seek to singe it," he said.

"I don't seek to singe it," he said. "I don't seek to singe it," he said. "I don't seek to singe it," he said.



## "HEAT IN HANGAR—BLOODY INTENSE"

"Heat in the hangar was bloody intense," said one of the Naval firefighters at HMAS ALBATROSS. "It was a big fire... really big," he added.

"One of the Trackers... it is now just... intense was the heat."

Some 100 officers, sailors and local Nowra Fire Brigade firefighters converged on the scene soon after the outbreak of the blaze.

"They were throwing themselves into the end of the hangar which was not at that stage ablaze," said one eye-witness.

Depot personnel scrambled into the cockpit to release the brakes on the burning Trackers before they could be dragged from the hangar.

"The aircraft were all alight," said the eye-witness.

"They were pushing them out with their bare hands."

"They would then spray themselves and return to the hangar."

Another said reflection from the iron roof of the gable-shaped hangar had made the heat "intense."

"It was a typical team effort... though some did go beyond devotion to duty," added another eye-witness.

Among the first at the scene was Lieutenant Graham Harte, by co-incident, he had been Fire Officer at the depot for two years up to last May.

He had just returned from an Air Traffic Officers' Course and is about to take up Air Traffic Control duties.

He had the immediate support of the depot's duty domestic firefighters, Leading Seaman Porter and Able Seaman Dunlop and Thomas.

### On leave...?

If you're looking for top accommodation around the South Pacific, now you can enjoy the best for less under Travelodge's Defence Forces Leave Plan

Your Captain's Office has details

## INQUIRY UNDER WAY

The General Manager of Garden Island Dockyard, Commodore W. J. Roake, is presiding at a four-man Board of Inquiry into the loss of 12 Grammar Tracker aircraft in the fire at HMAS ALBATROSS last weekend.

Other members of the board, named by Defence Minister, Mr. D. J. Kilian, in the House of Representatives on December 5, are:



President of the Board of Inquiry, Commodore W. J. Roake, is pictured with the Chief of the Defence Force Staff, General Sir Francis Royle, and Commanding Officer of HMAS ALBATROSS, Commodore B. J. Jones.

## U.S. TO RUSH IN REPLACEMENTS

The United States administration had pledged to do "whatever they could with all possible haste" to replace the RAN Tracker aircraft lost in last weekend's fire.

Defence Minister, Mr. D. J. Kilian, told the House of Representatives on December 6.

He said a second-hand Grammar Tracker, as announced in the Government's Defence White Paper, would be acquired from the United States.

He believed their cost was \$15,000 each and that the US had up to 40 surplus Grammars at last week.

The Opposition leader, Mr. Gough Whitlam, had asked him:

"What were the Government's intentions in repatriating the Fleet Air Arm with Grammar Tracker aircraft to be a good example of an aircraft which is being replaced in the Navy's inventory?"

"I remind the Minister that after the fire at Nowra at Christmas of 1967, the Navy reported the destruction of a lot valued at \$400,000 but failed to report the destruction of an adjacent hangar with equipment valued at \$1.6 million," Mr. Whitlam said.

"As a consequence, the Fire Board gave incorrect information to the Minister and the Minister gave the Prime Minister incorrect information."

"I also ask about 'Operation Tracker' which was introduced last year by my government to counter terrorism by foreign sabotage in the North West and the possible introduction of fast and smooth divorce and which depended on Grammar Tracker aircraft operating from Nowra."

"I ask, when the fitting senseless memorandum in the New Year, is it proposed to replace the contribution made by the Tracker designed at Nowra?"

Mr. Kilian replied: "I begin by saying that nothing will be hidden from public view or public scrutiny."

"Any information given to me which is classified will be given in plain text and I would stand to complete my response to an information which would be classified verbatim."

"On the question of replacement aircraft, Mr. Kilian referred to the Defence White Paper and proposed the acquisition of a second-hand Grammar Tracker from the USA."

"Under heavy obligation to the Honorable the United States Ambassador to say that the United States Administration would do whatever they could with all possible haste to replace the aircraft."

"The aircraft is a type now being phased out by the United States authority."

## "SOLE SURVIVOR"

Before the HMAS ALBATROSS fire, the RAN had 12 Grammar Tracker aircraft purchased from the United States in 1969. TRACKER 821, the lone survivor, is now in the custody of the United States Navy.

The Tracker is a twin-engine aircraft. It is a twin-engine aircraft. It is a twin-engine aircraft.

The Tracker is a twin-engine aircraft. It is a twin-engine aircraft. It is a twin-engine aircraft.

The Tracker is a twin-engine aircraft. It is a twin-engine aircraft. It is a twin-engine aircraft.

The Tracker is a twin-engine aircraft. It is a twin-engine aircraft. It is a twin-engine aircraft.

The Tracker is a twin-engine aircraft. It is a twin-engine aircraft. It is a twin-engine aircraft.

The Tracker is a twin-engine aircraft. It is a twin-engine aircraft. It is a twin-engine aircraft.

### The Southern Softies

CANBERRA'S BEDDING SPECIALISTS

TOWNSVILLE STREET, FISHWICK, A.C.T. 2409

SEALY POSTUREPEDIC  
DAVID DAWN  
LULLABY INNERCELL  
DUNLOPILLO  
SLEEPMAKER  
MAGNET BEDDING  
TRUNDLE BEDS, FOLDING BEDS  
AND MORE

QUALITY BEDDING AT LOW PRICE

WE WILL NOT BE UNDERSOLD ON ANY REASONABLE DEAL

FREE DELIVERY IN ACT

Consult LAURIE SCUTTS for personal and understanding service.

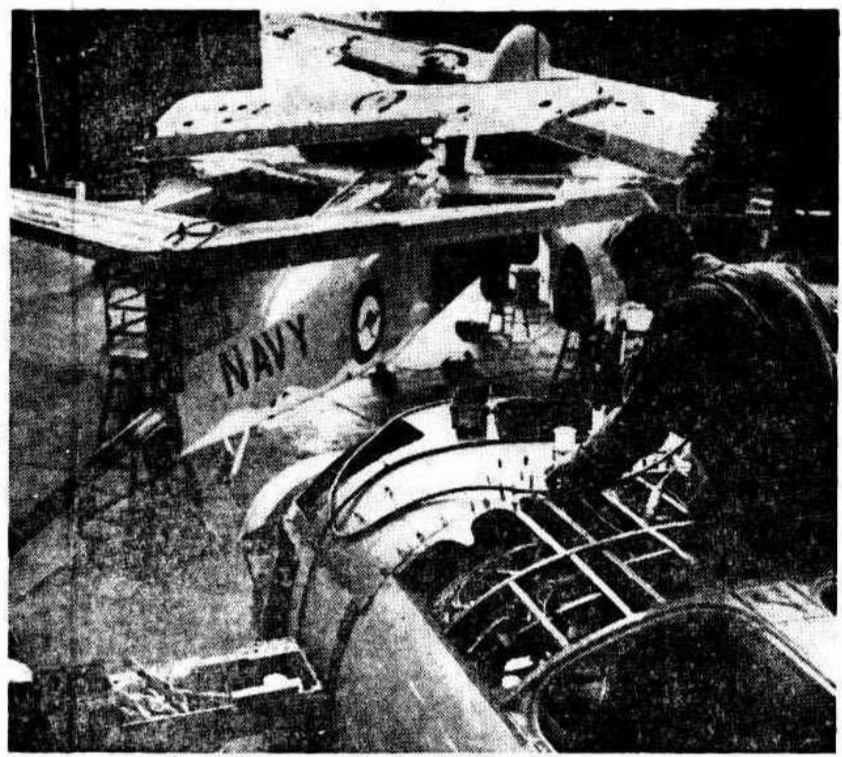
We assist with finance — Home rentals — Investments

ALLEN CURTIS & PARTNERS  
PTY LTD  
LICENSED AGENTS  
128 Bunda Street, Canberra City  
AN 583312 BN 475555

NAVY NEWS, December 10, 1976 (26) 19



**Above right.** Very few aircraft were pulled from the hangar, and none were unscathed. This photo shows four of them, and is the only known image to capture the three survivors in one shot. 845 never flew again but was used as an airframe training aid and later displayed outside the FAA museum. 843 and 849 were airlifted by Chinook to HMAS Melbourne in Jervis Bay (above) and thence by barge and road to Hawker De Havilland at Bankstown. They were repaired (right) and returned to service. 850, furthest from the camera, was deemed beyond economic repair and was scrapped. (Photo: Owen Nicholls). ➔



Experts at the Hawker de Havilland workshops in Bankstown near completion of repairs to the Grumman Tracker aircraft. Many sections, including the wings and tails, have been replaced.



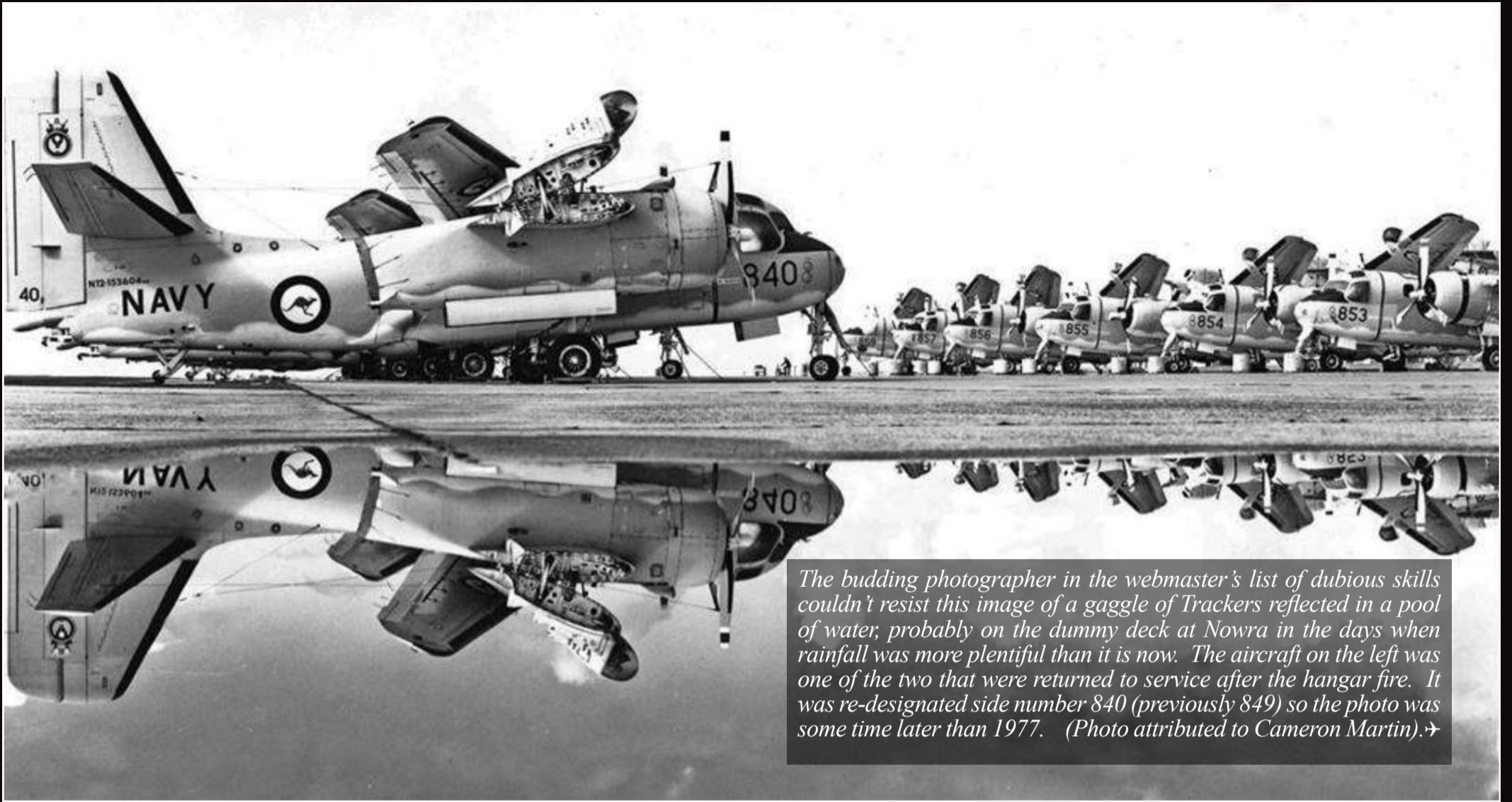
The hangar fire was a huge setback to the Fleet Air Arm: of the 13 Trackers in Service only one remained airworthy, so the priority was to restore the RAN's surveillance/ASW capability. Coincidentally, six additional S2E airframes were already on order, and arrangements were in train to collect them from the United States. The hangar fire galvanised action, however. Two days after the fire the Defence Minister, Jim Killen, announced the Government would purchase a further 10 aircraft. He then called the US Deputy Secretary of Defence and had an assurance within two hours that 16 Trackers would be available as soon as the RAN could arrange transportation for them. The replacements came from the Davis-Monthan US Air Force Base, where a large number of S2 aircraft were stored in a state of preservation in the Arizona desert. Twenty three of the best S2Gs were picked out before whittling them down to 16, at a cost of about \$73K each – a discount reportedly of the order of 97%. ➔



**Above:** The replacement Trackers were flown off HMAS Melbourne in early April of 1977, still bearing their USN markings – but they required RAN roundels to be able to fly on the Military register, so these were painted on them whilst still in transit from the States. (RAN image).

**Right.** Five replacement aircraft were placed in immediate Service at Nowra – the first job was to give them a good wash. The remaining 11 had been flown to Bankstown, where Hawker de Havilland carried out maintenance work before they were released. (RAN image). ➔



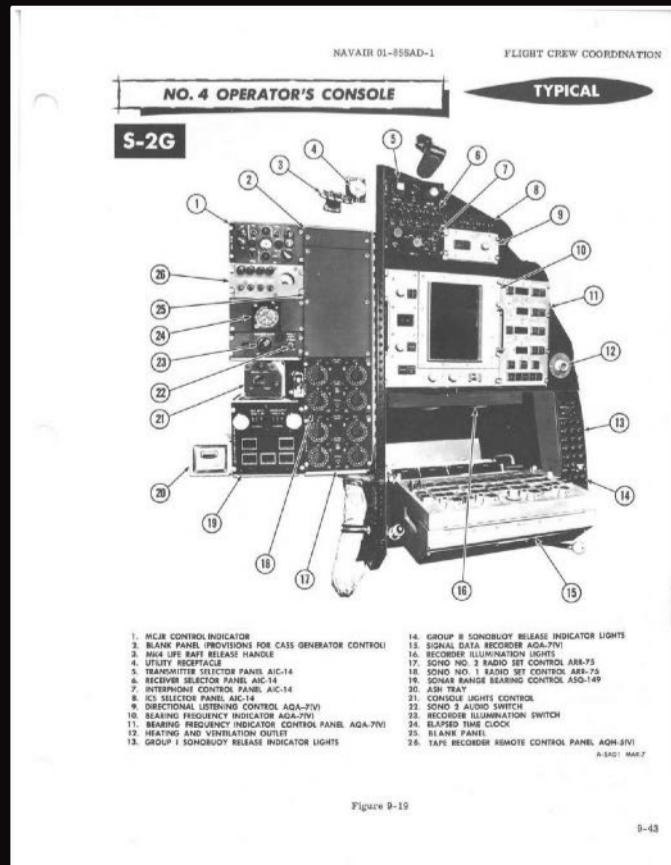
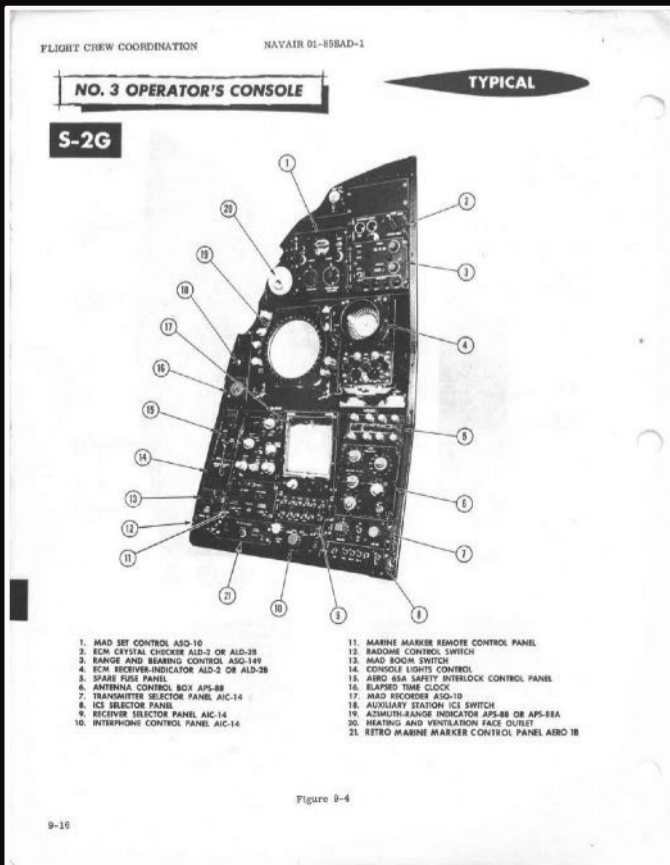


The budding photographer in the webmaster's list of dubious skills couldn't resist this image of a gaggle of Trackers reflected in a pool of water; probably on the dummy deck at Nowra in the days when rainfall was more plentiful than it is now. The aircraft on the left was one of the two that were returned to service after the hangar fire. It was re-designated side number 840 (previously 849) so the photo was some time later than 1977. (Photo attributed to Cameron Martin).➔



Left. Rear seat #3 (Left) and #4 (Right) positions in the S2G Tracker of the FAA museum. Not much information is to be found on the back-seat equipment, or the part it played in delivering capability – but of course it was essential in both the ASW and Surveillance/SAR roles, which were the bread and butter of this aircraft. Without the sensors it carried and the operators who employed them, the Tracker would not have been a fighting aircraft (Photographs: Marcus Peake).

In the image the No #3 position on the port side remains intact, and the NATOPS 'key' below the photograph will give the reader information on what each component was. The star-board (No.#4) position (left) has been stripped, however, with blanking plates where most of the equipment used to be. When the Trackers paid off in 1984 anything related to the AQA-7 sonar system was transferred to the 'O' Boats of the Submarine Force.➔





*Above.* A good shot of the cockpit of an S2E/G, lifted from an American ESO website page, somewhat ironically as it appears to have been taken in our own FAAM. The cockpit layout was conventional with the captain sitting in the left seat but the aircraft capable of being flown from either. Instruments were, of course, analogue. the fold up centre console can be seen in the 'up' position to aid access to the seats; when rotated downwards is provided mostly armament control functions – for example, sonobuoy release, torpedo depth selection and so on. We would welcome a more informed description of the image, should anyone wish to do so. Image courtesy of FLECOMPRON TWO. ➔



*Above.* Another shot of a Tracker cockpit in flight. Image via David Stephen on the 'Friends of the RAN Grumman Tracker' page. ➔



*Left.* Apart from the single ditching in 1975, very few Tracker accidents occurred during their operational history with the RAN. One exception was when a nose wheel gear collapsed during an arrested landing. Melbourne was in transit from Bombay to Sri Lanka on 29 August 1977, on her way home from the Spit Head Queen's Jubilee deployment. The aircraft was lifted by ship's crane and moved to the hangar for inspection, which determined that shore repairs were necessary.



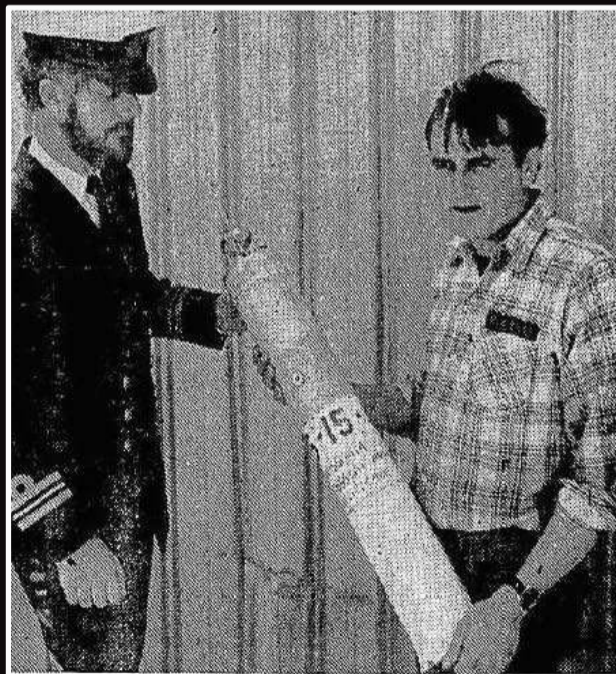
The aircraft was stripped and subsequently lifted off Melbourne's deck by RAAF Chinook for transportation to the Hawker De Havilland facility at Bankstown, an evolution that occurred during a families day trip out of Sydney on 5th October 1975. It was subsequently repaired and returned to service. (Photos: Ian Gibson). ➔



*Top: For anyone who worked on or flew Trackers, the photo would bring back fond memories: of the distinctive sound of the Wright Cyclones under full power, and the unmistakable late afternoon silhouette of a Tracker about to touch down.*

*Middle (three) photos: Another day, another launch. Taken from the left hand seat of the Wessex Plane Guard helicopter, a Tracker takes to the skies. The Tracker was designed from tip to tail to be a carrier borne aircraft, so deck operations were its bread and butter. On the left the Tracker is ready in all respects to go: the bridle is tensioned, the flight deck crew in a safe position and the aircraft sits on its tail bumper, nose in the air, primed for the launch. A moment later it is flung into the sky, accelerating to about 110 knots as it crosses Melbourne's bow.*

*Above: Only two RAN Squadrons operated the Tracker – VC851, for Training and Comms, and VS816 which was the operational Squadron. The photo below shows VC851 some time between Feb 78 and Jan 80, when LCDR Bob "Windy" Geale was the Commanding Officer (front centre, with a beard). We include it here not only as a snapshot of history in the story of the Trackers, but because Bob later went on to be honoured in the work he did for the FAA Museum in preserving the Fleet Air Arm's heritage. The two Squadrons were later to combine (VC851 absorbed VS816) towards the end of the era of fixed wing in the Fleet Air Arm. →*



Lieutenant Commander Barry Bromfield, of the directorate of Naval aviation policy, examining the sonobuoy yesterday with Mr Horst Kirchner, an employee of Snowy Welding Pty Ltd. The dent the sonobuoy made in the factory wall when it fell can be seen between the two men.

Canberra Times (ACT : 1926 - 1995), Friday 26 September 1980, page 3

## Sonobuoy dropped on Queanbeyan

The Navy is trying to work out why one of its Grumman Tracker anti-submarine aircraft dropped a sonobuoy on Queanbeyan yesterday.

The buoy, which weighs about 20 kilograms, fell into a factory yard while the aircraft was making an unscheduled approach to RAAF Fairbairn.

It was only after the aircraft had landed that it was noticed that the buoy was missing. About the same time

RAAF authorities received a telephone call from the factory that the buoy had fallen in Queanbeyan.

Mr Horst Kirchner, a foreman at Snowy Welding Pty Ltd where the buoy landed, said, "At about 10 o'clock, we were all working inside the factory when we heard a very loud crash. We usually make a lot of noise on the job, but this crash was much louder than anything we would have made and we stopped work to see what had happened."

*Above: A rare hiccup in Squadron safety when workmen in Queanbeyan were surprised by a crashing noise in their factory. On investigating they found a military sonobuoy in the yard. Examination of the offending aircraft found a worn latch on the sonobuoy chute, which was later replaced. Fortunately there were no injuries. (Image: Canberra Times Sept 1995). →*



This image was probably taken when the Wessex was still in Service, noting there is one on the line, but it was prophetic insofar as the S2Gs, if not already paid off, were living on borrowed time. It's also the only photo we've seen of a Tracker in company with its two direct ancestors: the Fairey Gannet to its right and the Fairey Firefly in the foreground. It's also the only American aircraft in the group, illustrating a marked split from years of traditionally buying British equipment. HMAS Albatross, in the background, is as many veteran FAA folk would remember it with F hangar on the left and the old control tower and fire station just across the taxiway. None of those buildings remain, just as none of the aircraft in the photograph are still in service. → (FAAM).



Left. Although long-gone, the RAN Tracker has a passionate group of followers who exchange photos and tales of their service when the S2 was still around. Occasionally they can't resist a tongue-in-cheek image, such as this one showing a Tracker flying under London Bridge, or breaking the sound barrier. Photo courtesy of Deb Oxy, Friends of the RAN Grumman Tracker). →

## RAN TRACKERS CEASE BASS STRAIT RIG PATROLS

RAN Tracker aircraft ceased airborne surveillance of the Bass Strait oil field on Saturday, December 31, 1983. Trackers from VS816 and VC851 Squadrons have been flying surveillance sorties around the oil rigs for the past three years.

In 1980 a merchant ship steamed through the Bass Strait oil and gas field, narrowly missing one of the oil rigs.

Had the ship collided the results could have been catastrophic, not only in the oil field itself but also in the disruption to Australian fuel supplies and, consequently, the economy.

To safeguard against this the Australian Government declared a restricted zone around the oil field, in addition to the normal safety zone around each oil rig, and tasked the Australian Defence Forces to provide surveillance of the area.

The task was to detect and if necessary deter approaching vessels of over 200 tonnes from entering the restricted area and all vessels except rig tenders from entering the 500 metre safety zone around each rig and well head.

The Royal Australian Air Force was initially given the task of providing airborne surveillance of the Bass Strait oil field in conjunction with a Royal Australian Navy patrol boat acting as a surface response vessel.

On December 24, 1988, Navy S2 Trackers commenced surveillance operations on two days out of every three with crews of the RAAF continuing to fly on the third day.

Initially the Navy task was flown by 816 Squadron and on January 11, 1992, the squadron commenced daily surveillance sorties due to the RAAF's withdrawal of its Orion aircraft from the task.

Later 851 Squadron took over from 816 Squadron.

Sorties have been flown every day since, until the Federal Government decided to cease operations on December 31, 1983.

Navy aircraft have flown over 2500 hours on Bass Strait surveillance operations.

The following signal was sent by Chief of Naval Staff to VC851 Squadron to mark the completion of the task.

Operation ESTES: "Since Navy assumed the ESTES surveillance task (MURK) only two sorties have been missed, one due to an aircraft unavailability, the other because of unsuitable weather.

"The sortie completion rate achieved by VC851 and VS816 during their long involvement with Operation ESTES reflects creditably on the professionalism of the Fleet Air Arm.

All personnel who have been involved with Operation ESTES, particularly VC851 and its members of VS816 are commended for their achievement."

Operation ESTES: "Since Navy assumed the ESTES surveillance task (MURK) only two sorties have been missed, one due to an aircraft unavailability, the other because of unsuitable weather.

"The sortie completion rate achieved by VC851 and VS816 during their long involvement with Operation ESTES reflects creditably on the professionalism of the Fleet Air Arm.

All personnel who have been involved with Operation ESTES, particularly VC851 and its members of VS816 are commended for their achievement."

**TRYING TO BE SAILORS**

**NEW RELEASE**

"Their training was shabby and they learned the hard way — in operations at"

Above. One of the Tracker's roles during the early 80s was keeping an eye on the Bass Strait oil fields, mostly for maritime safety reasons. The RAAF shared the role, but the lion's share fell to VS816 and VC851 Squadrons who flew over 2500 hours on the three-year operation.

Operation ESTES was concluded in December 1983. By then, Operation Bursa was in full swing involving Navy rotary-wing assets and SAS Tactical Assault Groups in the protection of the oil rigs from potential terrorist threats. You can read the full story of Bursa [here](#).



The Bass Strait surveillance task covered a period that marked the end of fixed wing aircraft in the RAN. HMAS Melbourne, the crucible of the Fleet Air Arm's fixed-wing force, was over thirty years old and debate had been raging for years about her replacement. A light appeared in January of 1982 when the Government agreed to buy HMS Invincible. The 'Flight International' article on the next page gives some indication of the issues that decision raised — most noticeably, what aircraft she would be equipped with. In any event, the sale was cancelled just six months later when the Falklands war showed just how important a fixed-wing strike carrier was. Hope for a Plan B lingered until March of 1983 but was finally dashed when the new Hawke government announced there would be no replacement carrier for the RAN. By then the two fixed-wing operational Squadrons (Trackers and A4s) had been disbanded, and their aircraft relegated to the training Squadrons. →



## Defence



### Invincible sets sail for Australia

Canberra—The Royal Australian Navy intends to take delivery of the ex-Royal Navy aircraft carrier *HMS Invincible* in late 1985. The decision to purchase the carrier secondhand for A\$265 million (£175 million) was announced on February 25 after continued delays and heated debate in the Australian Parliament.

Britain's decision to retain only two of the three *Invincible*-class carriers has enabled Australia to acquire the vessel at cost price, slightly cheaper than the US *Two Lima*-class helicopter carrier the RAN had planned to buy. There are hidden costs, however, and the total programme, including spares and support, test and training equipment, and a pre-delivery refit, will require an estimated £295 million.

Early availability of *Invincible* will allow the scheduled 1982-83 refit of the existing RAN carrier *HMAS Melbourne* to be cancelled, and the ship will be paid off as soon as practicable to save running costs. *Melbourne's* company will be retrained to crew the new carrier. *Invincible's* 950-strong complement, including air group, is some 300 fewer than that of *Melbourne*, but this conceals an increase in the number of skilled electronics engineers required.

#### Hot potato

The Navy is keen to retain its fixed-wing aviation expertise, but *Invincible* has become such a political hot potato that any decision on V/Stol fixed-wing aircraft for the vessel will have to wait until the situation cools. Buying or leasing British Aerospace Sea Harriers has been mooted, but the aircraft has limited performance in the hot and humid Tropics, the Navy maintains, and is at best an interim solution until the radar-equipped McDonnell Douglas AV-8B Plus is available.

Initially, the RAN will equip *Invincible* with Westland Sea King anti-submarine-warfare helicopters. Later options for the expansion of naval aviation include a second purpose-designed carrier and the conversion of merchant ships for limited V/Stol

operations. In present circumstances, however, one carrier is considered adequate, as Australia is experiencing now-familiar budget problems. There are also doubts that the RAN could man two carriers.

A limit of £3 million is to be allowed for modifications to *Invincible*. These include adding 450 tonnes of fuel to meet the operating-range requirement. Computers will be changed for US equipment, and some items will be transferred from *Melbourne* while others will be removed. There will be minor changes to the communications equipment, but the Nato Link 11 command datalink will be retained, as it is compatible with target-data transfer systems fitted to Australia's US-built destroyers, frigates, and P-3 patrol aircraft. The RAN has not yet decided whether to retain the Sea Dart surface-to-air missile system.

*HMS Invincible* will probably be renamed *HMAS Sydney* in Australian service

Australia's industry will get a share of the *Invincible* deal, including £17.5 million in offsets guaranteed by the UK Government. Local industry will receive 25 per cent of ship support work, and the vessel's Rolls-Royce Olympus gas turbines will be serviced at a facility for maintaining Olympus industrial engines in Victoria.

The RAN accepts *Invincible* with a number of defects identified during sea trials, including severe vibration at high speed. The Royal Navy had hoped to cure this problem with the second and third vessels, but there have been similar alignment problems with the second ship, *HMS Illustrious*, resulting in a delay to sea trials. The RAN hopes to cure most of the problems, possibly at the pre-delivery refit.

### Sale sparks disagreement

London—The Royal Australian Navy will pay for *Invincible* in two instalments, £90 million this year and £85 million next year. The sale may go some way to easing Britain's budget problems, which have particularly affected the Royal Navy and which are directly responsible for the decision to get rid of the vessel. The Royal Navy had hoped that the carrier would be mothballed awaiting better times, and the Service will certainly be reluctant to lease or sell some of its 34 Sea Harriers. Meanwhile the sale has started a political row in the UK which equals controversy in the Australian Parliament over the deal.

The Royal Navy's second *Invincible*-class ship, *HMS Illustrious*, will be handed over next year. The third, *HMS Ark Royal*, will not be in service until 1985. Until then, the 23-year-old *HMS Hermes* will continue in service as an ASW flagship; interestingly *Hermes* is only five years younger than *Mel-*

*bourne*. To keep *Hermes* in service will cost in the order of £40 million to £50 million. Originally she was to have been scrapped when *Illustrious* became operational. In addition, the two 12,000-ton amphibious assault ships *Fearless* and *Intrepid* will be brought back on line. At present they are mothballed at Portsmouth. The two ships were to have been paid-off this year and next year.

Countering Conservative cries that *Invincible* should not be sold, Defence Secretary John Nott says that the Navy cannot afford the air-defence and anti-submarine escorts required to protect three carriers. Nott goes further, saying that no Government of either party would order ASW carriers today. Senior Navy officers doubt that the £175 million raised will buy additional ASW frigates. Admiral of the Fleet Lord Hill-Norton is more forthright: "Mr Nott does not understand defence and shows no apparent inclination to learn."

### FAREWELL SALUTE

The RAN's anti-submarine Tracker aircraft preparing for their last flight over the NSW Shoalhaven area as a front-line squadron. The squadron is to be disbanded today and will amalgamate with second-line training squadrons at the Naval Air Station, Nowra. Full story on the paying-off of the aircraft carrier *HMAS MELBOURNE* and her two front-line squadrons on page 3. (Our cover picture by POPH RUSSELL COX).



Above. The final in-Service flight of Tracker 851 for the NAS Nowra Air Day in 1984. Left to Right: Norm Ridgeway (AEO 851); Harry Wendt (Obs/SENSO), Roger Scovell (SOBS 851) and Dick Scott (CO 851).➔



Above: A combined 851 (Trackers) and 724 (Skyhawks) shot taken on the day of the final Nowra-Canberra-Sydney-Nowra round-robin flypast by S2G and A4G (we think on 01 Jun 84), (L-R): Andrew 'Mum' Davis, Rick Neville, Peter Brown, Mal Hume, Bob 'Timber' Mills, Tony Caladine, Harry Wendt, Graham 'Dusty' Miller, Roger Scovell, Dick Scott, John Hamilton, Ray France, Dave Coote?, Mike Killingsworth, Larry Mills, Neil Austin, Neale Coulch, Deane Williams, Lynton Beggs, Sandy Nelson and Bob Jones. Photo via Al Byrne, who was flying the HS748 aircraft taking photos of the flypast.



Left. Great shot of a missed approach to Melbourne, from Flyco. Those with bionic eyes will be able to pick out the LSO with his arm raised, indicating a foul deck.➔

**Below:** There were 18 Trackers on the ORBAT when the fixed-wing axe fell (16 purchased after the fire and two salvaged from it). After their last flight the airframes marked for disposal were gathered on the edge of NAS Nowra, where they languished for almost six years. We have heard that most of the engines were bought by an overseas company but have been unable to confirm that. Eleven airframes were then bought by Hook Aviation and were individually ferried to West Sale aerodrome over an extended period ('91 to '94). There were only three serviceable engines (which diminished to two during the process), so for each ferry flight they were fitted to an airframe and then trucked back to accommodate the next aircraft. →



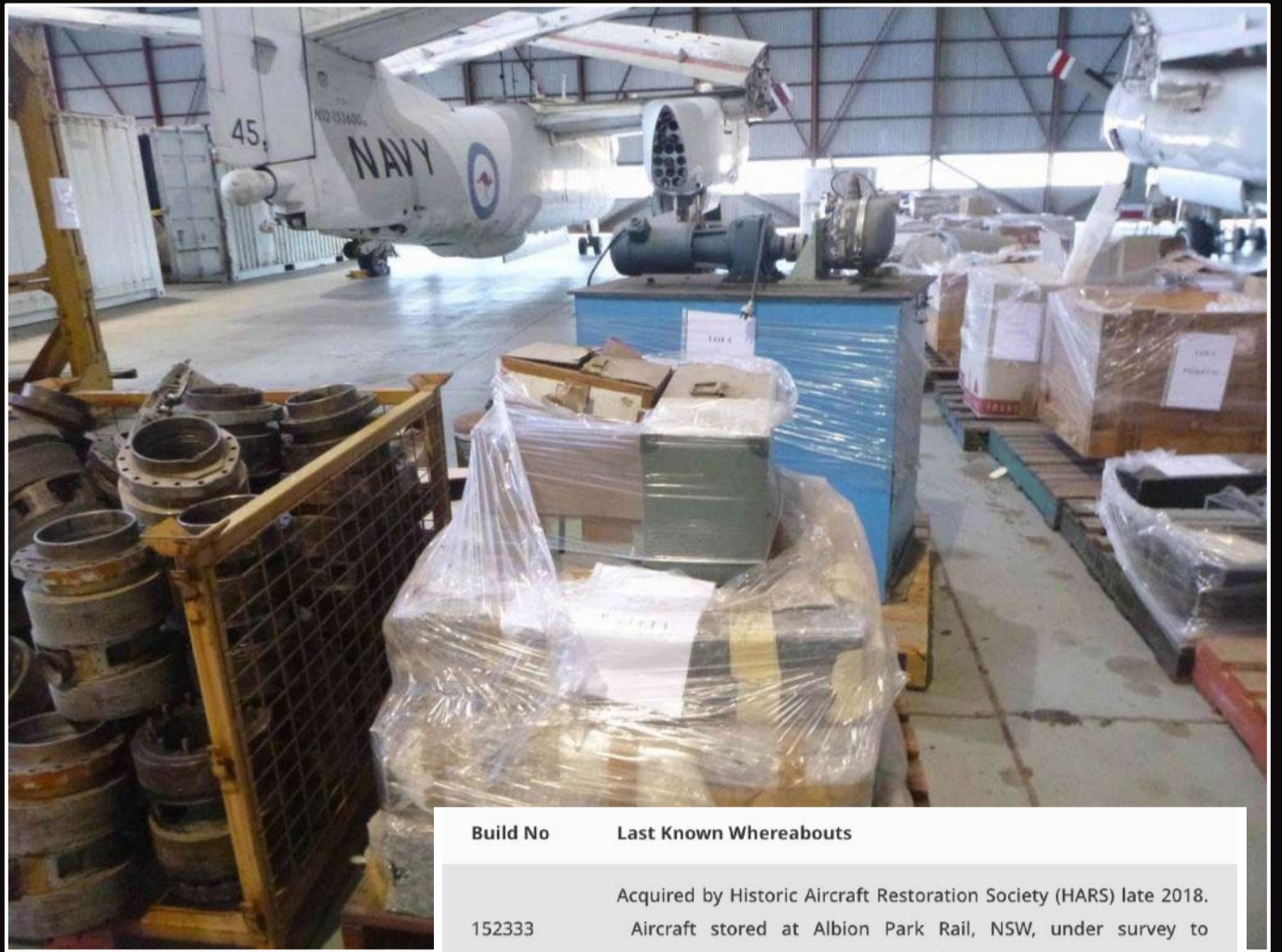
Peter Hookway wheeled and dealt in aircraft and hoped to on-sell the aircraft for firefighting or SAR duties – or even as spares. In the event, only two were on-sold or gifted – one to the Gippsland Armed Forces Museum and one to the National Vietnam Veteran's Museum (which is being restored as a static display). The others remained with Hookway and after his death were eventually disposed of by auction. Most were purchased in 2014 by an American consortium, but by then the tired airframes had been moved into the weather and there they remain, mostly broken into component spare. Of the seven that didn't go to Hookway, two went by private sale to save them from the breaker's yard, but were in the open near Nowra in a decrepit state (see update at the foot of this page). Two went to the Fleet Air Arm Museum and one to Qantas – subsequently bought by HARS and beautifully restored. The remaining two found their way to the RAN Historic Flight. →



**Right.** One of the lucky survivors. RAN Historic Flight Tracker 844 – without doubt the most photographed S2 airframe of all – doing a ground run at the Albatross Air Day in 2008. The aircraft had been cleared for fast taxi but not for flight. It was hopeful that final hurdle could be overcome, but it was not to be: the Flight was shut down just a year later and the aircraft locked in a hangar. You can read the story of the Tracker's Taxi Run [here](#). →

Following the demise of the Historic Flight, Navy engaged with the Historic Aircraft Restoration Society (HARS) to see what could be done to preserve them. The then Chief of Navy agreed a partnership between the RAN and HARS in 2009 which essentially loaned the aircraft to the latter to maintain and, where applicable, to fly them.

The Navy/HARS partnership approach to loaning the aircraft to HARS broke down in 2016 when the issue of risk and liability rose to the fore – essentially, Navy received legal advice that it could not delegate such responsibility in a loan arrangement. A decision was then made to dispose of the Historic Flight aircraft by Restricted Tender, which closed on 31 August 2018. Three organisations submitted bids and in November 2018 HARS was advised it had been the successful Tenderer. Left: Historic Flight Trackers in 'F' hangar in August 2018. They were moved to HARS early the following year and, over time, will be refurbished for static or flying displays depending on their condition. →



Right. Our take on the last known whereabouts/status of the ex-RAN Trackers. It's hard to keep track of them (excuse the pun!) so if you have more information use the "Contact Us" box below to update. Most are destined for the great scrapyard in the sky, we think, but a lucky few will survive – some to fly another day. →



It doesn't take long for them to deteriorate though. Some hope was held for 153566 (pictured above at West Sale in 2009). It was bought by a US consortium and eventually shipped to its yard near Davis-Monthan AFB, Arizona (close to where the RAN collected it). →



The state of its sister ship 153598, that was also shipped to Davis-Monthan doesn't bode well for any hope of restoration, however (image Jo Schmidt, 2015). →

Build No	Last Known Whereabouts
152333	Acquired by Historic Aircraft Restoration Society (HARS) late 2018. Aircraft stored at Albion Park Rail, NSW, under survey to determine status (but probably static).
133160	Queensland Air Museum
153582	Fleet Air Arm Museum, HMAS Albatross.
153600	Acquired by Historic Aircraft Restoration Society (HARS) late 2018. Aircraft flown to Albion Park Rail, NSW, under survey to determine long term status (but probably flying).
152334	Was a survivor but destroyed by bushfire in NSW on 31/12/19.
152800	Purchased by Hook Aviation, West Sale Victoria. Reported as sold to United Aeronautical Corporation, USA but was still in storage at West Sale when last checked.
152805	Purchased by Hook Aviation, West Sale Victoria. Current owner/status not known.
152809	Purchased by Hook Aviation, West Sale Victoria. Current owner/status not known.
152811	Purchased by Hook Aviation, West Sale Victoria. Current owner/status not known.
152812	Acquired by QANTAS for training. It was sold to HARS in 2006 and is being restored to flying status.
152837	Purchased by Hook Aviation, West Sale Victoria. Purchased by unknown bidder in the USA. Status unknown.
153566	Purchased by Hook Aviation, West Sale Victoria. Reportedly sold to United Aeronautical Corporation (USA) in 2013 and was dismantled for transportation three years later. Last reported as being in that Company's yard adjacent to Davis-Monthan AFB in September 2016.
153567	Purchased by Hook Aviation, West Sale. Sold to Melbourne/Kangan TAFE for training. Sold to National Vietnam Veterans Museum, Phillip Island (2014) under restoration for static display.
153576	Purchased by Hook Aviation, West Sale Victoria. Current owner/status not known.
153578	Purchased by Hook Aviation, West Sale Victoria. Current owner/status not known.
153597	Private owner near Albatross in a decrepit state outdoors. Survived bushfire 31/12/2019.
153598	Purchased by Hook Aviation, West Sale Victoria. Current owner/status not known.
153604	Purchased by Hook Aviation, West Sale Victoria. Current owner/status not known.



*We try to keep tabs on ex-Navy aircraft although sometimes its difficult. Not so much in the case of these two Trackers (left), which were acquired by a private buyer to save them from the graveyard on the south of HMAS Albatross. Unfortunately they suffered 20+ years in the open, not a couple of miles from there, until the bushfire on 31Dec19 sealed the fate of at least one of them. The aircraft at the back of the image is 845 (152334), a G model which he had donated to the Vietnam Veterans Museum at San Remo Phillip Island. Their team spent several weeks in August and October 2019 taking the centre wing section of the fuselage and preparing the wing and fuselage for transport to San Remo. The transport was supposed to occur in November 2019 but could not be organised in time due to the team leaders sudden illness. Ironically, the main part they needed was the fuselage to do a transplant on the S2G they have which is full of corrosion. The fuselage was destroyed by the 2019 bushfire but the the wings survived.*

*The more intact Tracker in the foreground is 842 (153597), an E-model. It was the only S2E to survive the 1976 hangar fire unscathed, due to it being at De Havillands at the time. It was, therefore, the only Tracker onboard Melbourne when it attended the 1977 Spit Head Review and the only S2 on 816 until the repaired S2Es were returned from HdH Bankstown, and the newly acquired S2Gs arrived from the States. It therefore not only survived the hangar fire, but also two bush fires in its current locality – one in 2017 and this devastating New Year's Eve conflagration of 2019. ➔*

#### *Note*

*This feature could not have been produced without the kind assistance of individuals and organisations who were prepared to help. Our particular thanks to Kim Dunstan, Ian Gibson, Terry Hetherington and Owen Nicholls and, of course, the team at ADF Serials. We have attempted to acknowledge photographs and other articles where we can, but some are 'hand-me-downs' with no source information. If you believe we have used one of yours without permission/acknowledgement please contact us through the FAAAA website. Marcus Peake August 2023.*

# AIRFRAME HISTORY

The following information is provided by [ADF Serials](#), to whom we extend our grateful thanks. The job would have been immeasurably harder had it not been for them.

Serial	Aircraft Type	Delivered	Const No.	RAN Code	Aircraft History
USN Bu.151646	S-2E	?	179C	n/a	Ex-USN Bu 151646. Never flew with RAN, was purchased purely as a training aid/instructional airframe.
USN Bu.151646	S-2E	?	179C	n/a	Ex-USN Bu 151646. Never flew with RAN, was purchased purely as a training aid/instructional airframe. Was dropped into Sydney Harbour whilst being unloaded Full details at <a href="#">RAN Grumman Tracker Instructional Airframes in Australia</a> The forward fuselage of Bu.151646 is at the FAA Museum, Nowra marked as 853.
N12-152333	S-2G	05/04/77	220C	844	Ex-USN Bu 152333 Withdrawn from service 12/08/84. Flew with RAN Historic Flight carrying civil registration VH-NVX. On demise of NHF was bought as part of a 'job lot' by the Historic Aircraft Restoration Society (HARS) and was refurbished to flying standard.
N12-152334	S-2G	05/04/77	221C	845	Ex-USN Bu 152334 Was marked as NH/713 prior to service with RAN. Withdrawn 12/08/84, Hulk at HMAS Albatross. Sold to private owner for \$200 to prevent scrapping Located on private property near HMAS Albatross Nowra
N12-152800	S-2G	05/04/77	269C	846	Ex-USN Bu 152800 Was marked as NH/107 prior to service with RAN. Withdrawn 12/08/84. Sold to Hookway Aviation and flown to West Sale Vic. 09/92. Offered for sale by Grays On-line Auctions 10/2013 Sold to United Aeronautical Corporation, USA Noted in outside storage at West Sale since at least 02/2016
N12-152805	S-2G	05/04/77	274C	847	Ex-USN Bu 152805 Withdrawn 12/08/84. Sold to Hookway Aviation and flown to West Sale Vic. Offered for sale by Grays On-line Auctions 10/2013 Sold to United Aeronautical Corporation, USA Appears to be stored inside at West Sale
N12-152807	S-2G	05/04/77	276C	848	Ex-USN Bu 152807 Withdrawn 12/08/84. Retained at HMAS Albatross until scrapped in 1995.
N12-152809	S-2G	05/04/77	278C	849	Ex-USN Bu 152809 Withdrawn 12/08/84. Sold to Hookway Aviation and flown to West Sale Vic. 02/03/92. Offered for sale by Grays On-line Auctions 10/2013 Sold to United Aeronautical Corporation, USA Noted in outside storage at West Sale since at least 02/2016
N12-152811	S-2G	05/04/77	280C	850	Ex-USN Bu 152811 Withdrawn 12/08/84. Sold to Hookway Aviation and flown to West Sale Vic. 24/10/91. Offered for sale by Grays On-line Auctions 10/2013 Sold to United Aeronautical Corporation, USA Noted in outside storage at West Sale since at least 08/2015
N12-152812	S-2G	05/04/77	281C	851	Ex-USN Bu 152812 Was marked as NH/707 prior to service with RAN. Withdrawn 12/08/84. Sold 02/02/90 to Qantas as training aid. Sold 2006 to Historical Aircraft Restoration Society. Arrived at HARS 06/11/2006. Reported will be rebuilt to flying condition.
N12-152816	S-2G	05/04/77	285C	852	Ex-USN Bu 152816 Was marked as NH/702 prior to service with RAN. Withdrawn 12/08/84. Sold to Hookway Aviation and flown to West Sale Vic. 11/91. Wears US registration N16FV although it never left Australia. Offered for sale by Grays On-line Auctions 10/2013 Sold to United Aeronautical Corporation, USA Noted in outside storage at West Sale since at least 02/2016 06/2016 dismantled for export to USA 09/2016 noted in United Aeronautical Corporation's yard adjacent to Davis Monthan AFB Arizona

Serial	Aircraft Type	Delivered	Const No.	RAN Code	Aircraft History
N12-152837	S-2G	05/04/77	306C	853	Ex-USN Bu 152837 Was marked as NH/016 with prior to service with RAN. Withdrawn 12/08/84. Sold to Hookway Aviation and flown to West Sale Vic. 15/04/94. Offered for sale by Grays On-line Auctions 10/2013 Sold to United Aeronautical Corporation, USA Noted in outside storage at West Sale since at least 08/2015 The fuselage marked as 853 at FAA Museum, Nowra is really Bu.151646
N12-153567	S-2G	05/04/77	323C	855	Ex-USN Bu 153567 Withdrawn 12/08/84. Sold to Hookway Aviation. Sold to Melbourne/Kangan TAFE 02/94. Acquired by Vietnam Veteran's Museum Phillip Island, Vic 11/2013 Currently on outside display at front of museum
N12-152837	S-2G	05/04/77	306C	853	Ex-USN Bu 152837 Was marked as NH/016 with prior to service with RAN. Withdrawn 12/08/84. Sold to Hookway Aviation and flown to West Sale Vic. 15/04/94. Offered for sale by Grays On-line Auctions 10/2013 Sold to United Aeronautical Corporation, USA Noted in outside storage at West Sale since at least 08/2015 The fuselage marked as 853 at FAA Museum, Nowra is really Bu.151646
N12-153566	S-2G	05/04/77	322C	854	Ex-USN Bu 153566 Withdrawn 12/08/84. Sold to Hookway Aviation and flown to West Sale Vic. Displayed outside Gippsland Armed Forces Museum Offered for sale by Grays On-line Auctions 10/2013 Sold to United Aeronautical Corporation, USA 02/2016 still on display at West Sale outside museum 06/2016 dismantled for export to USA 09/2016 noted in United Aeronautical Corporation's yard adjacent to Davis Monthan AFB Arizona
N12-153567	S-2G	05/04/77	323C	855	Ex-USN Bu 153567 Withdrawn 12/08/84. Sold to Hookway Aviation. Sold to Melbourne/Kangan TAFE 02/94. Acquired by Vietnam Veteran's Museum Phillip Island, Vic 11/2013 Currently on outside display at front of museum
N12-153576	S-2G	05/04/77	332C	856	Ex-USN Bu 153576 Withdrawn 12/08/84. Sold to Hookway Aviation and flown to West Sale Vic. 05/01/93. Offered for sale by Grays On-line Auctions 10/2013 Sold to United Aeronautical Corporation, USA Noted in outside storage at West Sale since at least 02/2016
N12-153578	S-2G	05/04/77	334C	857	Ex-USN Bu 153578 Withdrawn 12/08/84. Sold to Hookway Aviation and flown to West Sale Vic. Offered for sale by Grays On-line Auctions 10/2013 Sold to United Aeronautical Corporation, USA Noted in outside storage at West Sale since at least 08/2015
N12-153580	S-2G	05/04/77	336C	858 114	Ex-USN Bu 153580 Retained USN side code 114 Never flown by RAN, retained as hulk until scrapped in 1995
N12-153582	S-2G	05/04/77	338C	859	Ex-USN Bu 153582 Withdrawn 12/08/84. On display FAA Museum, Nowra NSW.
N12-153595	S-2E	27/07/67	339C	840	Officially handed over 27/07/67 in the USA prior to delivery on HMAS Melbourne 22/11/67. Written off after Nowra hanger fire 04/12/76.
N12-153596	S-2E	22/11/67	340C	841	Delivered aboard HMAS Melbourne 22/11/67 Written off after Nowra hanger fire 04/12/76
N12-153597	S-2E	22/11/67	341C	842	Delivered aboard HMAS Melbourne 22/11/67 Undamaged by the hanger fire which wrote off 9 S-2E's and damaged 3 more. It was away at the time of the fire. On board HMAS Melbourne, 'Spithead Deployment' 28/04/77 to 04/10/77 with VC816. Exercise 'Highwood' 5-20/07/77, North Sea. Withdrawn 12/08/84. Sold to private owner for \$200 to prevent scrapping Located on private property near HMAS Albatross Nowra

Serial	Aircraft Type	Delivered	Const No.	RAN Code	Aircraft History
N12-153598	S-2E	22/11/67	342C	843, 841	Delivered aboard HMAS Melbourne 22/11/67 Damaged by Nowra hanger fire 04/12/76. Repaired and put back into service. Originally coded 843 but when S-2G's arrived it was given a new code of 841. On board HMAS Melbourne, 'Spithead Deployment' 28/04/77 to 04/10/77 with VC816. Greenham Common Air Tattoo, Berkshire UK 25-26/06/77 static display. Exercise 'Highwood' 5-20/07/77, North Sea. Withdrawn 12/08/84. Sold to Hookway Aviation and flown to West Sale Vic. 12/91. Offered for sale by Grays On-line Auctions 10/2013 Sold to United Aeronautical Corporation, USA Noted in outside storage at West Sale since at least 08/2015 06/2016 dismantled for export to USA 09/2016 noted in United Aeronautical Corporation's yard adjacent to Davis Monthan AFB Arizona
N12-153599	S-2E	22/11/67	343C	844	Delivered aboard HMAS Melbourne 22/11/67 Written off after Nowra hanger fire 04/12/76
N12-153600	S-2E	22/11/67	344C	845	Delivered aboard HMAS Melbourne 22/11/67 Damaged in hanger fire 04/12/76 but not repaired, Used as training air frame and later displayed outside FAA Museum . In storage FAA Museum, Nowra NSW
N12-153601	S-2E	22/11/67	345C	846	Delivered aboard HMAS Melbourne 22/11/67 Written off after Nowra hanger fire 04/12/76
N12-153602	S-2E	22/11/67	346C	847	Delivered aboard HMAS Melbourne 22/11/67 Written off after Nowra hanger fire 04/12/76
N12-153603	S-2E	22/11/67	347C	848	Delivered aboard HMAS Melbourne 22/11/67 Written off after Nowra hanger fire 04/12/76
N12-153604	S-2E	22/11/67	348C	849, 840	Delivered aboard HMAS Melbourne 22/11/67 Damaged by Nowra hanger fire 04/12/76. Repaired and put back into service. When S-2G's arrived it was given a new code of 840. On board HMAS Melbourne, 'Spithead Deployment' 28/04/77 to 04/10/77 with VC816. Exercise "Highwood" 5-20/07/77 North Sea Nose wheel collapse 29/08/77 during this cruise, slight damage to props and nose wheel area. Transported from HMAS Melbourne to Nowra by Chinook. Withdrawn 12/08/84. Sold to Hookway Aviation and taken to West Sale Vic. 29/11/91. Offered for sale by Grays On-line Auctions 10/2013 Sold to United Aeronautical Corporation, USA Noted in outside storage at West Sale since at least 02/2016 06/2016 dismantled for export to USA 09/2016 noted in United Aeronautical Corporation's yard adjacent to Davis Monthan AFB Arizona
N12-153605	S-2E	22/11/67	349C	850	Delivered aboard HMAS Melbourne 22/11/67 Written off after Nowra hanger fire 04/12/76.
N12-153606	S-2E	22/11/67	350C	851	Delivered aboard HMAS Melbourne 22/11/67 Written off and disposed of after Nowra hanger fire 04/12/76
N12-153607	S-2E	22/11/67	351C	852	Delivered aboard HMAS Melbourne 22/11/67 Written off and disposed of after Nowra hanger fire 04/12/76
N12-153608	S-2E	22/11/67	352C	853	Delivered aboard HMAS Melbourne 22/11/67 Served with 816 Sqn RAN. Ditched 10/02/75 after night flying when doing a Bolter (missed wire and going around again) from HMAS Melbourne. The 4 crew were all rescued unhurt. Neither crew or maintenance were to blame, it was eventually proved that it was a scientific cause. <a href="#">DSTO report into accident (see page 81)</a> This was the only RAN Tracker lost during flying operations Forward fuselage section marked as 853 at FAA Museum, Nowra is really Bu.151646