The RAN's

Seahawk S70B

V5

By Kim Dunstan

During the Korean War the Royal Australian Navy (RAN) Fleet Air Arm first used RN and USN helicopters. In 1953 Bristol Sycamores were purchased with other types following including the anti-submarine Westland Wessex and Sea King helicopters. In the early 1980s the strategic focus changed with a wider use of helicopters in the fleet - setting a new course for the RAN Fleet Air Arm.

The decision to order the Sikorsky Seahawk S-70B-2 helicopters in the 1980s came at a critical time following the ruling not to buy a new aircraft carrier but instead to install helicopter 'Flights' on small ships. The Seahawk was the most advanced anti-submarine helicopter available with an all-weather, multi-tasking ability. So, when equipped with tailored avionics it gave the RAN a state-of-the-art machine which remained in service until December 2017

The switch to helicopters was a major transformation for the RAN both ashore and afloat. For 29-year the S-70B-2 Seahawks served with distinction ashore and afloat in a challenging maritime environment making a vital contribution towards boosting the fleet's capabilities and effectiveness.

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Sikorsky S-70B-2 Summary

Performance subject to conditions

Manufacturer:	Sikorsky Aircraft Co. Stratford, CT, USA
Type:	Anti-submarine, anti-surface targeting and utility helicopter (RAWS)
Number:	16 x S-70B-2 helicopters
Crew:	Three aircrew - Pilot, TACCO/Observer, Sensor Operator
First delivery:	03 February 1989 at NAS Nowra
Rotor width:	16.36m (53ft 8in) *note
Height:	5.18m (17ft)
Length:	(Rotors turning): 19.76m (64ft 10in)
Power:	2 x GE T700-401C turboshaft engines, from 1,662 to 1,940 shp
Cruise speed:	148 kt; 274 km/h; 170 mph
Max speed:	180 kt; 333 km/h; 207 mph
Endurance:	3.5 to 6 hours
Ceiling:	3,657m; 12,000 ft
Weapons:	2 x MK 46 torpedoes; Cabin door 7.62mm or 12.7mm MG

**Note: the beam of the FFG was 14.3m (46.9 ft); FFH 14.8m (48.5 ft).*✈

The Helicopter Solution

In the early 1980s when the RAN disposed of its aircraft-carrier HMAS Melbourne and fixed-wing assets. The focus moved to embarked helicopter 'Flights' on the new Adelaide Class FFG and Anzac Class FFH guided-missile frigates. The aim was to increase the frigates over-the-horizon targeting (ASST) ability and anti-submarine warfare (ASW) capability. This was a task the Sikorsky Seahawk had shown it could do well yet able to perform utility tasks, search and rescue, cargo lift and personnel transport duties.

During the selection process other helicopters were evaluated including the Westland 30 and Lynx 3, the Aerospatiale AS332 Super Puma and AS365 Dauphin. But the Seahawk had advantages as it was built for shipboard use - serving aboard USN FFG-7 ships – therefore with a new sensor suite it would meet RAN needs. Importantly the Seahawk was robust, with numerous safety features, endurance and payload advantages, superior weapon and sensor systems, with the size to include additional equipment to meet future needs.

The Seahawk Advantage

The RAN Seahawk was based on the S-70 airframe a variant of the US Navy's Seahawk SH-60F (evolved from the US Army's UH-60A Black Hawk). The USN Seahawk underwent considerable modification before entering service in 1984. Changes included a rotor brake; underside cargo hook and RAST probe; extra riveting and corrosion protection; modified main undercarriage and fuselage tail-wheel, and a radome under the cockpit. A new rotor head with auto-fold main rotor blades, plus the folding tail-pylon and stabilator were important changes. Cabin door and window arrangements were changed. A rescue hoist was fixed above the cabin door with a 61-metre cable capable of lifting 272 kg. The underside cargo hook could lift a 2,770 kg sling load; cabin cargo limit was 1,200 kg (subject to space). Due to the extra equipment and weight the engines and transmission were upgraded. These and numerous avionic changes were included in the RAN S-70B-2.

HELICOPTER CONTENDERS

A decision is expected soon on a new type of helicopter for use on the RAN's guided missile frigates and as a fleet utility aircraft. The total program envisages between 30 to 40 aircraft introduced over a decade.

In this article, Commander HARRY JULIAN DSC looks at the two final contenders — the US Sikorsky S.70B SEAHAWK and the UK Westland LYNX 3:

THE SEAHAWK AND THE RAST

DEVELOPMENT

PHYSICAL SIZE

SEAHAWK, or

. . . LYNX III?

WEAPON SENSOR SYSTEM

RECOVERY ONBOARD

FLYING QUALITIES

OPERATIONAL CAPABILITIES — THE BALANCE

LYNX3 AND PAWS

DEVELOPMENT

PHYSICAL SIZE

WEAPON SENSOR SYSTEM

RECOVERY ONBOARD

FLYING QUALITIES

Old salts ahoy

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Click below to read additional notes on the evolution of the Seahawk project and its progression.

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The Tender Process

Acquisition of S 70B – 2 helicopters (a Sea Hawk variant) was the end result of NPB 1308, a program referred to as 'The Destroyer/ Utility Helicopter Project'. An office to develop the project was formed early in 1982 and was led by CAPT Tony Hunt.

The RAN had already commissioned two FFG 07 Frigates and would have commissioned all four before the S-70B-2 contract was finally signed in August 1985. The aircraft Carrier HMAS *Melbourne* had just been de-commissioned in 1982, but there was still debate about a replacement.

The hope that HMS *Invincible* would be acquired by the RAN was dashed as a result of the Falklands war. Prime Minister Thatcher declined to continue with the sale and the Australian Government of the time did not take up the offer of Britain to build a same-of-class vessel at the same price. During the 80s and 90s Australia was embracing the 'Continental Defence strategy – no carrier required. Interestingly, a project team was already in the UK undertaking Logistics analysis for the replacement vessel.

In short, the helicopter role was to cover:

- Anti – submarine warfare/Anti-surface surveillance and targeting (ASW/ASST);
- Search and Rescue (SAR);
- Vertical Replenishment; and
- Utility, including a trooping capability.

Sikorsky, Aerospatiale, Westlands Helicopters and Kaman all indicated that they would be prepared to reply to a formal request for tender.

The RAN specified performance parameters for aircraft endurance and speed, shipboard performance (Sea State 5 take-offs and landings from an FFG-7) radar target size and range, MAD performance, sonobuoys to be used; FLIR, ESM (the latter two were not pursued in the subsequent project scope); navigation performance, alert timescales from cold to airborne, and an anti ship capability.

Sikorsky proposed a variant of its SH-60B; Westland proposed an uprated version of its RN Lynx; Aerospatiale proposed variants of its SA365 Dauphin and the AS332 Super Puma; and Kaman made an unsolicited bid with the SH-2 Sea Sprite.

The Lamps 1 (SeaSprite) response from Kaman was rejected mainly due to age and capability (1982). Also, Australia also still saw itself as operating on occasion outside the US defence umbrella and did want to rely on the LAMPS2 Data Link to interpret radar, ESM and acoustics, as our preference was to operate covertly in hostile environments. (LAMPS 2 relied on specialist interpreters to monitor the SH-60B systems).

Westlands proposed a new version of the Lynx with a 30% upgrade in AUW, three operators, a 9 sonobuoy maximum load with a 4 buoy launcher, a towed MAD and the Sea Fox Radar, and the standard Lynx ESM plus the Sea Skua missile. The Lynx did not, however, meet the endurance requirements.

Sikorsky offered a Collins weapon system based on the Coast Guard Dolphin installed in an S-70 airframe with new uprated engines, MEL radar with SeaSkua, CAE internal IMADS, internal 9 sonobuoy launcher with a 25 sonobuoy stowage in the aircraft locally reloaded, and a CDC acoustic processor based on a cut down version of the BARRA processor installed in the Nimrod ASW and the RAAF Orion. They proposed the RAST system to meet the launch and recovery requirements. They configured the aircraft for 3 operators (Pilot, Tacco and Senso).

Aerospatiale proposed a Super Puma as the high end solution with the French MPA system installed from a Breguet Atlantic and the AS-15 missile system. Performance wise, this was the most attractive weapons system. The low end was the Dauphin version with the AS15 anti ship missile system, two crew and an inability to meet the endurance requirements.

We negotiated with Westlands for a Lynx 3 system, Aerospatiale for the Super Puma, and Sikorsky for an S-70 system.

Aerospatiale got knocked out early as in response to a query from the project office, Aerospatiale stated that the static rollover angle for Super Puma was 17° – this being confirmed twice before we stopped their evaluation. The committee did not complain as the French were still releasing buckets of sunshine in Moruroa atoll, with the Australian Labour Government objecting.

The Project Office negotiated two contracts with A level Technical Specs and an ILS Plan (Lynx and Seahawk) as part of the high / low mix still being debated.

However during deliberations, the Aircraft Carrier acquisition for HMS *Invincible* fell through, *Melbourne* was marked to be withdrawn from service to be scrapped, the Trackers (S2G) were grounded and the Skyhawks were under discussion to give to New Zealand. Analysis proved that the Lynx did not have the capability to meet endurance, search area and ASW capability. With the loss of our carrier, the ASW mix was proposed to be Dipping Sonar Sea Kings with the Seahawk replacing the Trackers, and with new standard missiles to cover for the Skyhawks.

FLIR and ESM were removed for later acquisition as was the anti ship missile. The final version of the contract was signed on 15 July 1985 by LCDR Duncan Morehouse, as both Tony Hunt and Andrew Craig (the initial Project Director) had already proceeded on annual leave. ✈

The RAN S-70B-2 Seahawk

The Sikorsky S-70B was the basic export model used by several countries for their navies and adapted to suit their particular needs. Because the RAN S-70B-2 had so many complex modifications it required full prototype testing and certification.

On 15 July 1985 the RAN signed the final contract for eight Sikorsky S-70B-2 Seahawks. The main role was anti-submarine warfare (ASW) and anti-surface surveillance and targeting (ASST) with a Role Adaptable Weapons System (RAWS); plus search and rescue (SAR); vertical replenishment and utility duties. The auto flight-control system provided reliable day and night shipboard performance. The contract allowed for Australian electronics and aerospace industries to participate. A further eight S-70B-2s were ordered in May 1986, bringing the total to 16 Seahawks.

To support ASW and surface targeting the S-70B-2s were equipped with powerful communication, navigation, radar, sensor processors and data-bus links, extending the combat radius of the host ship, with links to aircraft they operated with. Additional tasks included vertical replenishment, cargo lift, troop insertion, Medivacs and fire-fighting, allowing the S-70B-2 to cover a wide range of missions.

RAN S-70B-2 Features

For surface surveillance the S-70B-2 had MEL SuperSearch radar linked to a powerful processor capable of monitoring multiple surface targets. The Rockwell Collins data link could transmit in real time to the parent ship and assist the ship's missiles to reach distant targets. For submarine detection the S-70B-2 used the AS/SSQ Barra sonar buoy (30 active or passive), also an internally mounted CAE Electronics AN/ASQ-504 magnetic anomaly detector (MAD) connected to data processors.

The avionics suite was leading edge technology that enabled the Seahawk to operate autonomously as the eyes of the parent ship providing the Principal Warfare Officer in the Operations Room with an immediate outline of what was happening.

During the Gulf War AN/AAQ-16 FLIR (forward looking infra-red) and AN/AAR-47 missile warning system were fitted. Other modifications included AAQ-27 FLIR, AES-210 and AAR-54 early warning systems and ALE-47 CMDS counter measures. Pylons on both sides of the fuselage could carry a Mk46 homing torpedo (max two) or 455 litre auxiliary fuel tanks. For offensive operations a 12.7mm or 7.62mm machine gun was on pintle at the cabin door.

The RAST (Recovery Assist Secure Traverse) system helped touchdown/launch operations on the FFG and FFH frigates in sea states up to 4/5. For touchdown the Seahawk hovered over the deck lowering a messenger cable that picked-up the ship's haul-down cable, connecting it to a probe on the Seahawk's underside. When centred over the deck the pilot would lower the aircraft and be winched down. Held fast by a Rapid Securing Device (RSD) on the deck the main rotor and tail pylon were then folded. Using a guide-track the helicopter would be winched into the ship's hangar.

For take-off the reverse applied; with cable detached, RSD open, and tie-down chains removed the Seahawk could fly off. Note: early FFGs HMAS *Adelaide, Canberra* and *Sydney* flight decks were modified for RAST. Later FFGs came with Fight III decks and RAST installed - as were *Anzac* class FFH frigates.

Sikorsky Starts Assembly

The initial plan was for the first two RAN S-70B-2s to be built at the Sikorsky plant at Stratford, Connecticut, in the USA. Because airframes

SIKORSKY NEWS

UNITED TECHNOLOGIES SIKORSKY AIRCRAFT

SEPTEMBER 1985

Sikorsky Wins $158.8 Million Australian Helicopter Contract

Sikorsky Aircraft has signed a $158.8 million contract to provide an initial eight multi-mission helicopters for the Royal Australian Navy (RAN).

Designated the S-70B-2, the Role Adaptable Weapons System (RAWS) helicopter is a derivative of the SH-60B SEAHAWK that Sikorsky produces for the U.S. Navy.

The multi-mission helicopter retains all the reliability, performance and flight characteristics that have been demonstrated in the Sikorsky SH-60B SEAHAWK.

The S-70B-2 was selected by the Australian Department of Defense in October 1984, following an intensive international competition.

"This contract is a very important one in proving we can expand our helicopters in international markets," said Sikorsky President and Chief Executive Officer William F. Paul. "We look forward to close and long-term relationships with our Australian allies in the military, government and in industry."

The S-70B-2 is powered by

General Electric T700-GE-401 twin-turbine engines, and is compatible with the FFG-7 Class Frigate's Recovery Assist, Securing and Traversing (RAST) system, which provides mechanical assistance for ship landings at sea.

The helicopter will have a role-adaptable avionics system developed by Rockwell-Collins.

N24-001 and N24-002 were prototypes Sikorsky kept them for compliance testing. The remaining six units (N24-003 to 008) were to be shipped in kit form and assembled by Hawker de Havilland (HDH) at Bankstown, NSW - but ended up being assembled in the USA.

Setbacks with the new sensor system and production issues in the US caused delays. When the first airframe kits (N24-003 & 004) arrived at Hawker de Havilland (HDH) in January 1988, the factory was fully committed with a large RAAF/Army Black Hawk order. Due to the complexity of the S-70B-2 work and labour shortages HDH had to re-negotiate the contract. So the (N24-003 & 004) kits were returned to the Sikorsky plant at West Palm Beach, Florida, to be assembled.

This means Sikorsky produced the first eight helicopters in the US (two at Stratford and six at West Palm Beach, with Sikorsky finalising some work at NAS Nowra). The second assembled batch of eight (N24-009 to N24-016) were shipped from Sikorsky at West Palm Beach, Florida, to Aerospace Technologies of Australia (ASTA) at Avalon, Vic. for component fitting, final inspection and test flying.

Sikorsky factory, Stratford, Connecticut. RAN Build aircraft #1. L-R. CMDR Vic Battese, Sikorsky Technician, CMDR Chris Chamberlain,CAPT Andy Craig (RAN Project Director), Sikorsky technician. 13 Feb 1987. Read more about the Project later in this publication. ✈

S-70B-2 Technical Snags

One of the problems the S-70B-2 project team faced was the perception the RAN aircraft was just another Seahawk with a few changes - it was much more. The S-70B-2 was in many ways a forerunner in the development of modern weapon systems which integrated a range of sensors to improve situation awareness and decision making. A major issue for the S-70B-2 was the development of complex new software, which required lengthy testing before becoming fully serviceable. The huge inventory of spare parts and stores was a massive undertaking identifying and labelling more than 35,000 items - many unique to the S-70B-2.

SITU training - Preparing The Way

SITU was the Seahawk Introduction and Transition Unit formed at NAS Nowra on 08 February 1988. Its role was to prepare for the arrival of the Seahawk helicopters and the recommissioning of HS 816 Squadron four years later. A key aim was to have fully-trained aircrews for the Seahawks; other activities involved FFG dummy deck training on the airfield; developing S-70B-2 Landing Safety Officer (LSO) simulator programs; assisting the Software Support Centre to prepare simulator programs for aircrew training and the upkeep of Seahawk software.

Seahawk roll-off 02 Feb 1989: Having been shipped from the Sikorsky plant at Florida in the USA, Seahawk N24-005 is guided down the loading ramp of this container ship at Sydney's Darling Harbour on 02 Feb 1989 ready to be loaded onto a semi-trailer for delivery to SITU at NAS Nowra (inset). Photo Andy Craig. ✈

In July 1988, RAN Seahawk aircrew and maintainer training began in the USA at the Sikorsky Training School Stratford and USNAS Maryport, Florida. Aircrew were away for about a month and maintainers engaged in technical training were away for four months. On return to NAS Nowra a study group set-up training programs for aircrew and maintainers.

Meanwhile SITU networked with support units located at HMAS *Albatross* such as the Air Warfare Systems Centre (AWSC) which focussed on synthetic simulator training for the Seahawk; the Australian Joint Acoustic Analysis Centre (AJAAC), and the RAN Tactical Electronic Warfare Support Centre (TEWISS) which dealt with fleet operations.

Seahawks Arrive at NAS Nowra

On 03 February 1989 the first RAN Seahawk (N24-005) arrived at HMAS *Albatross* (NAS Nowra). Others of the first batch followed with Sikorsky finishing some work at Nowra. The official Seahawk rollout ceremony took place at NAS Nowra on Wednesday 04 October 1989. Additional Seahawks arrived at the air station over

My Time With The S-70B-2 Purchasing Team

As details about the first RAN Sikorsky Seahawk acquisition programme tend to be limited the following will cast some light on the subject of spare parts.

I was seconded to the Spares Assessment and Procurement Team for the first Sikorsky Seahawk helicopter ordered in the early 1980s. The team was made up of serving naval technical sailors and civilian navy purchasing officers, plus a cataloguer. As it happened I became a member of the Purchasing Team which was located in the Sikorsky factory at Stratford, Connecticut, in the USA.

We arrived in dribs and drabs and I was amongst the last arriving in August 1985. We were given time to get ourselves settled-in and to find accommodation, sorting out telephones, banking accounts and all those little things that are necessary for ordinary living – then it was down to hard work.

The object was to determine the type and quantities of spares required to support the aircraft for three years. Using US Military purchasing protocols, the Assessing Team would determine the type of spares and the quantity for each category. This information would then be passed to the Cataloguer and the Purchasing Team.

The Cataloguer would register Australia with the US Cataloguing System as a user and the Purchasing Team would then start the purchasing process. The aircraft was broken down to its major assembly items, ie: engines, airframes, avionics, etc and each allocated to a Purchasing Officer.

Three requests for quotations would then be sent out to known suppliers and one to the Australian Embassy in Washington to be posted on the public information board. Each quotation would have a closing date and quotations received would be locked in a safe until the closing date.

Quotes would then be passed to the relevant Purchasing Officer who would raise a comparison chart for each item comparing compliance, price, date of delivery and any other item. The Purchasing Officer would then raise a purchasing order on the successful supplier and continue to monitor progress of the order to finality.

My secondment was initially for three years but the project went beyond that. Some chose to stay on until the project was complete while others, me included, chose to come home after the three years was up.

Jim Parsons ✈

1989/90; with N24-002 and N24-001 arriving in 1989 and 1991 respectively (after prototype trials in the U.S.); N24-003 was the last to be delivered in September 1991. RAN serial numbers were from N24-001 to N24-016; side codes 870 to 885.

The RAN Seahawks operated with a crew of three. The S-70B-2 cockpit had a full instrument panel set-up for NVG night vision, with Pilot in the right-hand seat and Tactical Coordinator (TACCO) left hand seat. The Sensor Operator (SENSO) was seated in the rear cabin with the sensor and data processors. The Senso also managed internal and external cargo loads and the rescue hoist.

Seahawks Deployed to the Gulf

SITU's early programs involved preparing 'Flight' crews for service on frigates. This was fortunate as the Seahawks were unexpectedly deployed to the Persian Gulf. On 02 August 1990 Iraq forces invaded Kuwait marking the start of the first Gulf War. On Monday 13 August 1990 HMAS *Adelaide, Darwin* and *Success* departed Sydney Harbour for the Gulf joining taskforce DAMASK 1 in support of a UN Security Council trade embargo. Both FFGs had embarked a Seahawk from SITU and a Squirrel helicopter from 723 Squadron.

Although the Seahawks were not yet cleared for RAN operational service they performed safely and efficiently as all aircrew were well trained and experienced. The role of DAMASK 1 was to intercept ships entering and leaving the Gulf and to check cargo for contraband.

On 23 July 1992, HS 816 Squadron was re-commissioned at NAS Nowra with SITU being absorbed into the squadron. Thereafter 816 Squadron became the front-line S-70B-2 Seahawk squadron ashore and afloat.

Frigate Embarkations

Prior to the arrival of the S-70B-2s at NAS Nowra several 'Flight' training teams, consisting of aircrew and maintainers, were embarked on the *Adelaide* class frigates. The smaller 'interim' Bell 206B and AS350B Squirrel helicopters were used for lead-in training, giving 'Flight' teams valuable operational experience on the FFG frigates. When a frigate was allocated a 'Flight' it came with a S-70B-2, six aircrew (two x 3 aircrew) and nine maintainer-flight deck teams.

Between 1990 and 2017 the Seahawk S-70B-2s were routinely embarked on the *Adelaide* and *Anzac* class frigates for operational duty in the Gulf War, and Middle East region (1990-2001). The Seahawks also did Peace Keeping duties elsewhere. Although the FFGs could carry two Seahawks it was normal to embark one unless the mission required two; whereas the

First Of Class Flying Trials

The departure of two S-70B-2 Seahawks for the Gulf War in 1990 delayed plans to establish safety limits for S-70B-2's operating on the 'Adelaide' class FFG frigates. Although the RAN Seahawks were accepted into service on 02 July 1992, formal Ship Helicopter Operating Limits (SHOL) trials were required. However fleet requirements stalled the

Gulf task force aircraft

Five aircraft from Naval Air Station Nowra have joined the Middle East task group.

Two Seahawk and three Squirrel helicopters flew out to join the ships at sea this week.

Each ship of the task group will carry a Squirrel, while the frigates HMA Ships ADELAIDE and DARWIN will also carry a Seahawk.

There are two crews for each Seahawk, with a crew comprising one pilot, one tactical co-ordinator and one sensor operator.

Each aircraft is supported by nine maintenance sailors. This means a total of 30 personnel from the Seahawk Introduction and Transition Unit will be embarked.

Although the Seahawks were not in RAN operational service all aircrew are highly experienced aviators with a minimum of 1,000 flying hours each.

Many of the aircrew have more than 3,000 flying hours.

The aircraft are configured at an operational level and are fully role adaptable.

Before flying out, the Squirrels had a change in appearance; normally blue and white they were painted grey for camouflage over the weekend August 11-12.

All Squirrels flights are being crewed as standard flights with two officer aircrew, that is, a pilot and observer.

In support of each Squirrel there is one senior sailor and four junior sailor maintainers for a total of 21 personnel from 723 Squadron embarked in the three ships.

The boys have nick-named the aircraft 'battle budgies'.

All aircraft will work-up continuously during the trip to the Middle East. In particular the Squirrel and Seahawk will be developing tactics to interoperate with each other.

The Seahawk people will be on a steep learning curve, concentrating on night deck-landings.

The Sea Kings of 817 Squadron also supported the activities of the Squirrels and Seahawks. They were used in a utility role loading personnel, stores and aircraft spares from Nowra.

AND the birdies join in ... Seahawk pilot Lieutenant Brad White with wife, Gabrielle and daughter Amy at HMAS ALBATROSS. Picture: WRRO Sharina Brogan.

Main: The Seahawk was normally crewed by three: a pilot, in the front right hand seat, a Tacco, in the front left, and a Sensor Operator (Senso), shown here in the back. Above centre: For boarding and ship interdiction, the Seahawk could be fitted with a 12.7mm machine gun. ✈

process until 04 March 1994 when SHOL trials commenced aboard HMAS *Sydney* (IV) FFG-3 conducted by the RAN Aircraft Maintenance and Flight Trials Unit and the Air Operations Division of the DSTO who analysed the combined forces on ship and helicopter.

During the trials HMAS *Sydney* recorded ship motion, sea state, wind speed and direction; whereas the S-70B-2 recorded its instruments, flight controls and dynamics, to establish safe operating parameters. Analysis of the data provided a model for the S-70B-2's which set the Ship Helicopter Operating Limits for the 'Adelaide' class frigates. The trials involved over 100 separate flight tests in varying sea states which ended on 30 March 1994. The fact no S-70B-2s were ever written off due to accidents on the FFGs speaks well for the SHOLs process.

Seahawks Join Front Line HS816 Squadron

When HS 816 Squadron was re-commissioned at NAS Nowra on 23 July 1992 several Seahawks were already embarked on FFGs. Having taken over the functions of SITU, 816 Squadron became the home for the S-70B-2s until they were delisted in December 2017.

816 Squadron became responsibility for training S-70B-2 aircrews. It also attended to a wide range of secondary tasks including personnel transport, search and rescue (SAR), cargo lift and utility duties – plus assisting civil powers during floods, bush fires and other emergencies.

When a Seahawk embarked on a frigate it came as a 'Flight' with its own aircrew and maintainers. The aircrew consisted of a pilot (aircraft captain), observer (tactical co-ordinator) and sensor operator. The focus for 816 Squadron was preparing aircrew for embarkation and a major component was the Operational Flying Training (OFT) course, which involved many hours of flying time and simulator training, building aircrew skills and experience in everyday incidents, emergency situations and developing operational tactics.

The OFT also concentrated on flight deck operations. Pilots were required to operate on ships in any weather, sea state, day or night. They needed to be 'deck qualified' in order to become aircraft captains. Observers faced a demanding OFT course lasting about a year, when qualified they become a Tactical Coordinator (TACCO). Sensor Operators training was rigorous as apart from operating sensors they have wide ranging duties. Maintainers in specialist trades received detailed training for the S-70B-2 with attention given to safely issues on the ships flight deck.

RAN S-70B-2 Activities

The RAN Sikorsky S-70B-2 was a popular machine affectionately known as the 'Bravo'. During their time with the RAN they operated on ships and ashore performing a wide variety of operational and extra-curricular duties – the following is a sample:

On 02 August 1990 Iraq invaded Kuwait. On 13 August 1990, (at 72-hours' notice) Seahawk 'flights' were embarked on HMAS *Adelaide* (II) and *Darwin* (I) for operations in the Gulf of Oman in support of Operation DAMASK 1 for interdiction and boarding duties.

HMAS *Canberra* (II) began a refit in August 1990 which included RAST modifications to the flight deck and hangar as part of a modernisation project to enable the ship to embark the Navy's new Sikorsky S-70B-2 Seahawk helicopters.

In December 1990 HMAS *Sydney* (IV) and her S-70B-2, with DDG HMAS *Brisbane* (II), began service in the UN Middle East Area of Operation in the Arabian Sea for interdiction and boarding.

On 23 July 1992, HS 816 Squadron is recommissioned at HMAS Albatross, Nowra, NSW, taking over SITU and all S-70B-2 operations at NAS Nowra including shipborne 'flight' detachments.

In July 1992 two S-70B-2 Seahawks embarked on the FFG HMAS Canberra (II) for the first time (following her refit) joining the international maritime exercise RIMPAC 92 operating in waters off Hawaii. Then exercises with the USN off the coast of San Diego.

In October '92 HMAS Canberra (II) departs for the Gulf to join DAMASK VI patrolling the North Red Sea and later the Mediterranean.

816 Squadron S-70B-2 helicopters continued to operate in the Gulf and North Red Sea in support of UN operations until 2001. DDG and DDH frigates continue to be deployed to the Middle East Region for many years.

Public relations activities included participating in air shows, school visits, Coral Sea remembrance ceremonies, major sporting events, and flying a huge flag over Sydney Harbour. Assorted VIP transfers include a US Secretary for Defence, the Governor of NSW, various Admirals, even a Parliamentary Works Committee.

In January 1994 large bushfires in NSW saw the Australian Defence Force involved in firefighting. In addition to providing ground crews aircraft from all three services were involved including four RAN Seahawks which used water buckets to fight fires through the central and north coast of NSW as far south as the Eurobodalla and Shoalhaven plus evacuations, cargo and personnel transfers.

On 01 January 1995 a Seahawk from HMAS *Darwin* rescued Isabelle Autissier a solo yachtswoman from her stricken yacht *Ecureuil* which lost its mast 800 nautical miles (1,481 km) SSW of Adelaide while competing in the 1994/5 BOC Challenge. Guided to the site by an RAAF P3C *Darwin's* Seahawk flew 50 nm to the yacht and winched Ms Autissier to safety.

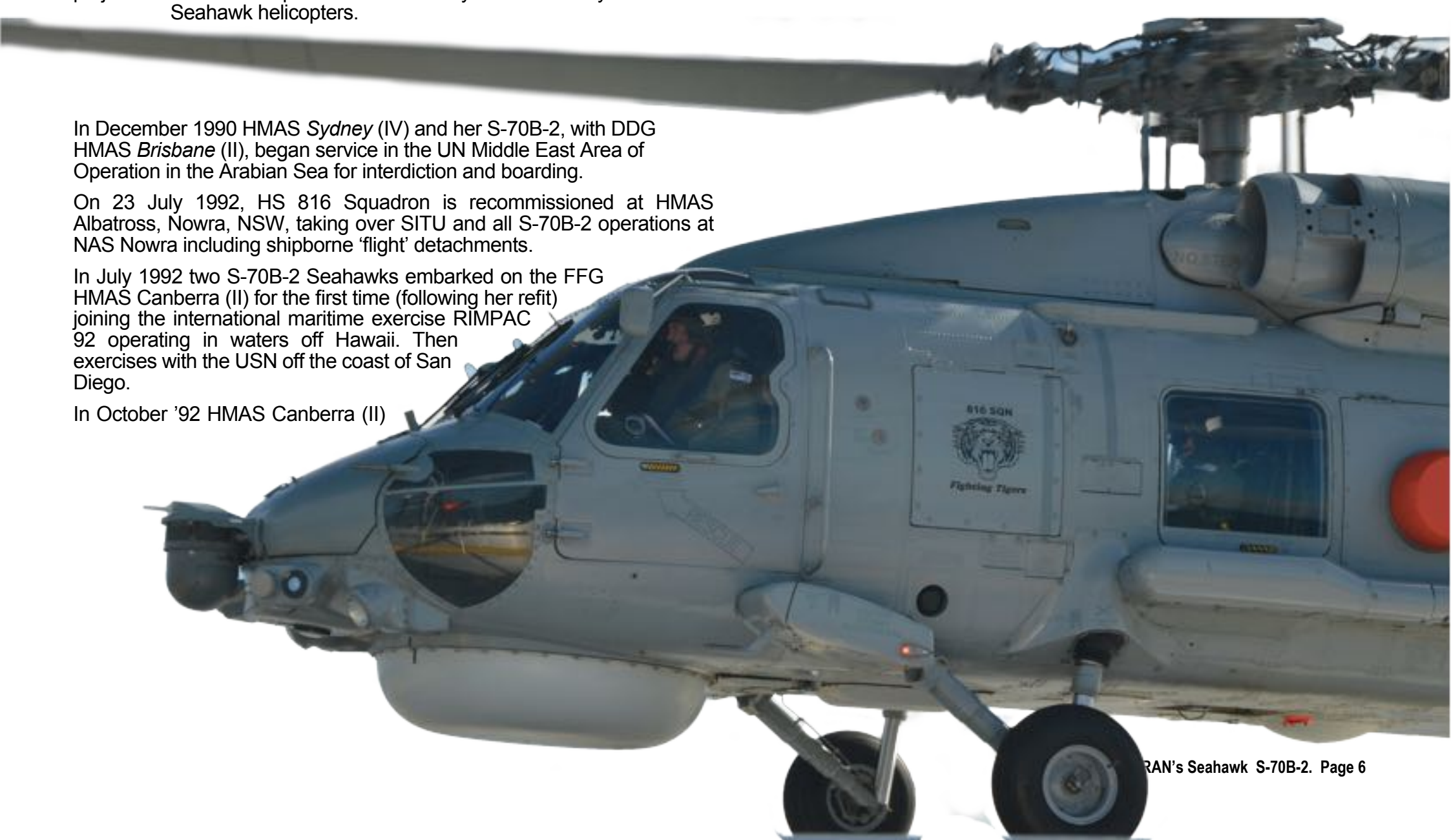
On 06 January 1997 distress beacons deep in the Southern Ocean alerted that two yachts were in trouble. HMAS *Adelaide* sail south and with advice from an RAAF Orion the first yacht was found on 9 January with the ship's Seahawk rescuing Thierry Dubois from a life-raft dropped by the RAAF. Next, *Adelaide* located Tony Bullimore's yacht rescuing him after he swam out from under his upturned vessel.

In October 1997 HMAS *Anzac* (III) with the tanker HMAS *Westralia* (II) found an illegal fishing vessel in the Southern Ocean and embarked a steaming party. *Anzac's* Seahawk then inserting a boarding party aboard another illegal fishing boat, with *Westralia* taking charge of both fishing vessels escorting them to Fremantle - while *Anzac* continued patrolling.

More S-70B-2 Tasks

In February 1998 HMAS *Newcastle* and *Westralia* began Operation STANHOPE searching for illegal fishing vessels. On the 19th of that month the fishing vessel *Big Star* was apprehended and boarded 9 nm inside the EEZ (exclusive economic zone). Rough seas during the boarding overturned the rigid hull inflatable boat (RHIB) requiring a rescue by the Seahawk helicopter. On 22 February *Westralia* escorted *Big Star* to Fremantle while *Newcastle* continued to search.

In 1989 the Sydney to Hobart Yacht Race was lashed by a severe storm along the NSW South Coast. Six sailors perished with yachts capsizing or being disabled. Seahawk 870 and 875 and several Sea King helicopters engaged in search and rescue operations with ADF and civil organisations with 55 sailors rescued. The aircrew of 875 were awarded bravery citations after rescuing of four people from the yacht *Winston Churchill* in extremely difficult conditions.



On 16 August 2001 HMAS *Melbourne's* Seahawk Tiger 78 rescued 19 people after an inter-island ferry sank off the coast of Malaita in the Solomon Islands. LSA Poole using a 'buddy strop' was able to hoist 12 survivors who were taken ashore, with the S70B returning to pick-up five more. The helicopter was able to direct a rescue vessel to the site which rescued 50 more people.

On 23 July 1992, HS 816 Squadron was recommissioned at HMAS *Albatross*, Nowra, NSW, the Squadron took over SITU and S-70B-2 operations at NAS Nowra and ship detachments.

In July 1992 two S-70B-2 Seahawks embarked on the FFG HMAS *Canberra* (II) for the first time following her refit joining the maritime exercise RIMPAC 92 operating in waters off Hawaii. *Canberra* then exercised with the USN off the coast of San Diego.

The good work of 816 was recognised when awarded the prestigious McNichol Trophy for 1992; a prize given for the most effective squadron in the Fleet Awards.

816 Squadron Seahawks Tigers 72, 74 and 81 were involved in continuous fire-bombing during the huge bushfires at Canberra in January 2003. The aircraft used 3,600-pound capacity buckets for water bombing from 14 to 26 January. At one stage the fire was on 35 km front causing massive damage. Helicopters were also sent to assist with fires along the NSW South Coast.

In March 2003 the Second Gulf War began along with the support of RAN ships including 816 Squadron Seahawks already deployed in the Persian Gulf region.

Cyclone Larry hit Far North Queensland in March 2006 causing extensive flooding and damage to buildings and crops. 816 Squadron Seahawks together with other ADF forces ferrying in supplies and rescuing people trapped by flood waters.

In August 2012 the first Seahawk S-70B-2 airframe was withdrawn from service.

In January 2014 HMAS *Toowoomba's* Seahawk assisted in the search for Malaysian Airlines MH370 which disappeared in the Indian Ocean without trace, the cause of which remains unsolved.

In February 2016 HMAS *Darwin's* S-70B-2 provided relief at Kaikoura, a coastal town on the South Island of New Zealand, following a 7.8 m earth quake. Apart from the ships company helping ashore the ship's S-70B-2 distributed emergency supplies and checked surrounding communities.

On 29 August 2017 having completed the final embarkation in HMAS *Arunta* the ship's Seahawk flight returned to 816 Squadron at HMAS *Albatross* (NAS Nowra). This was the last S-70B-2 embarkation - superseded by the Seahawk MH-60R .

Farewell the S-70B-2

The gradual withdrawal of the RAN Seahawk S-70B-2s began with the first in August 2012 and the last delisted on 01 December 2017. After 29-years in service and more than 100,000 flying hours without a loss – a truly outstanding record.

The need for a new helicopter was reinforced by concerns about the number of submarines in regional oceans. This led to a government call for tenders in February 2010 for a new ASW combat helicopter - with the Sikorsky Lockheed Martin MH-60R (Romeo) being short listed and adopted in 2013.

In the end eleven of the S-70B-2s were sold by tender to Skyline Aviation Group Pty Ltd, Lake Macquarie Airport, NSW, who planned modify them for aerial firefighting. ✈

The FFG's could carry two Seahawks, but normally embarked one unless mission required two, whereas the FFH's could only embark one S-70B-2.

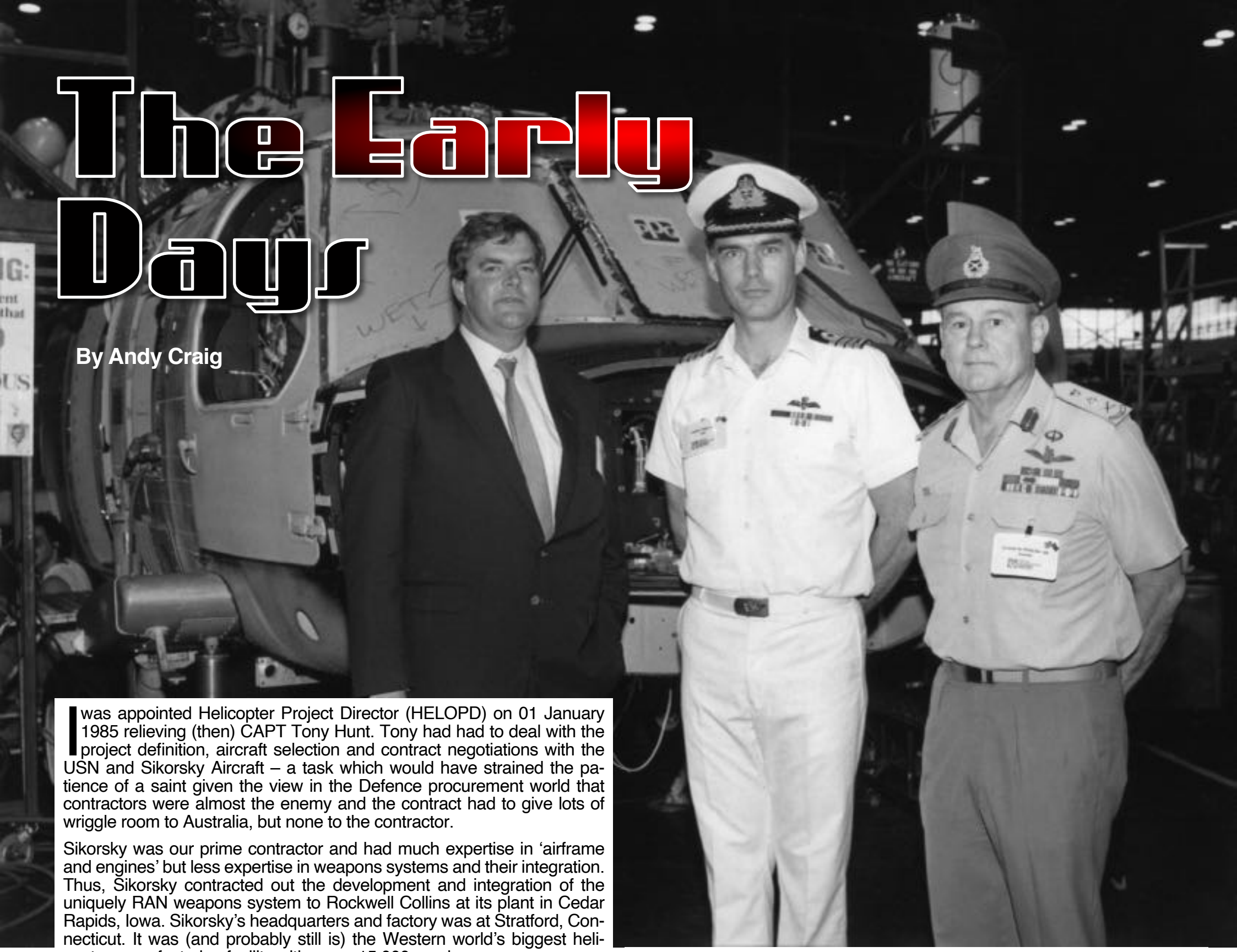
Adelaide class FFGs:
HMAS Adelaide (II) FFG1; Canberra (II) FFG2; Sydney (IV) FFG3; Darwin (I) FFG4; Melbourne (III) FFG5; Newcastle (I) FFG6.

Anzac class FFHs:
HMAS Anzac (III) FFH150; Arunta (II) FFH151; Stuart (III) FFH152; Paramatta (IV) FFH154; Ballarat (II) FFH155; Toowoomba (II) FFH156; Perth (III) FFH157.

The Seahawks also visited larger support ships with flight decks for special tasks or deck endorsement including the LHDs, as shown above ✈

The Early Days

By Andy Craig



S-70B-2 Plant at Stratford. Left to right, the Hon Kim Beasley (Minister of Defence), CAPT Andrew Craig (Project Director and Author of this article) and CDF General Sir Phillip Bennett. ✈

I was appointed Helicopter Project Director (HELOPD) on 01 January 1985 relieving (then) CAPT Tony Hunt. Tony had had to deal with the project definition, aircraft selection and contract negotiations with the USN and Sikorsky Aircraft – a task which would have strained the patience of a saint given the view in the Defence procurement world that contractors were almost the enemy and the contract had to give lots of wriggle room to Australia, but none to the contractor.

Sikorsky was our prime contractor and had much expertise in 'airframe and engines' but less expertise in weapons systems and their integration. Thus, Sikorsky contracted out the development and integration of the uniquely RAN weapons system to Rockwell Collins at its plant in Cedar Rapids, Iowa. Sikorsky's headquarters and factory was at Stratford, Connecticut. It was (and probably still is) the Western world's biggest helicopter manufacturing facility with some 15,000 employees.

By the time I took on the job, the design work was well underway and Sikorsky had built mock-ups of the aircraft layout.

Staff and Office

Tony Hunt had a very modest staff and occupied an unattractive internal office in what was then Russell Building F. This was entirely unsatisfactory for the growing project staff and the office was moved to the third floor of Northbourne House on the corner of Northbourne and MacArthur Avenues. This had the advantage of being (in Canberra terms) quite distant from Russell Offices – which meant that, to some extent, we could control the amount of unsolicited help we got from the various agencies which believed they had a finger in the project pie. It also provided room to accommodate the project staff which ultimately grew to about 15.

My deputy, CMDR Tony Baker AFC, joined the staff soon after we moved to Northbourne House. Tony and I had done our flying training with the US Navy together some 20 years earlier. He was a test pilot and his expertise was of great value to the project. His immediately prior posting was for three years with the USN Seahawk project in the US Naval Air Systems Command as the Test and Evaluation and Pre-planned Product Improvement Manager. His experience was invaluable to the Australian project.

The staff also included operational and weapons system experts, engineers, logisticians and admin support staff.

In due course an in-country office was established at Sikorsky's plant at Stratford, Connecticut. It was headed up by Commander Vic Battese ably supported by Commander Chris Chamberlain (AEO) and a number of technical sailors.

Command and Control

I reported to the Chief of Naval Materiel (RADM Barrie West) but there were many other agencies which had a finger in the project pie – some legitimately and some simply because they thought they should. The Defence procurement world was much involved in the finance and contracting aspects as were the Directorate of Naval Aviation Policy (DNAP) on operational matters and the Directorate of Naval Aircraft Engineering (DNAE) on technical matters. We had operational and technical experts on the HEOPD staff which made liaison with the Navy Office agencies relatively straightforward.

The civilian staff from the procurement world were a different kettle of fish. Many had been around for years and were well familiar with the British 'system' but less so with the US 'system' – which they tended to regard with dark suspicion because of its particular characteristics and their unfamiliarity with them.

Sikorsky was used to dealing with the US Navy but its people were quite unfamiliar with the ADF 'systems'. Thus, Sikorsky was on a pretty steep learning curve. The US 'system' held Sikorsky accountable through regular program reviews but largely kept out of the day to day running of the various programs. By contrast, those in the Australian 'system' demanded much more involvement in day to day running of the program and, initially, these demands bypassed the project office causing much confusion and questioning of 'Who is in charge?' This was eventually sorted out and agencies wanting to contact Sikorsky had to work through the project office.

One example was the mechanism for paying Sikorsky. Payments were usually tied to various milestones which, due to the complexity and novel aspects of the project, often had to be adjusted through no fault of Sikorsky's. In such circumstances the US Navy re-calculated the payment schedule using the 'time value of money' technique. Sikorsky was quite familiar with this and happy to use it, but it did not appear to have been previously used in ADF procurements, notwithstanding the fact that it was in wide use in civil contracts. The initial approach from the Australian bean counters was to apply a penalty to such adjustments which Sikorsky found peculiar and unacceptable – the more so when the adjustment was no fault of the company's. It turned out that, while the project office was familiar with the 'time value of money' technique, the procurement bean counters were quite unfamiliar with it. Eventually, advice was taken from (I be-

***Top**: Sikorsky factory, Stratford, Connecticut. S-70-2 Cockpit Simulator. CMDR Vic Battese, RAN contingent (sitting); CAPT Andy Craig, RAN Project Director, Bill McClure, Sikorsky VP Systems Integration and Russ Berry, Sikorsky RAN Project Manager 13 Feb 1987.*

***Middle**: inspecting the lower hull section of one of the RAN's Seahawks.*

***Lower**: Seahawk N7265H begins radome clearance tests at the Sikorsky West Palm Beach on 04 Dec 1987 using the simple expedient of pieces of balsa wood attached to the radome, to see if they made contact with the ground.* ✈

lieve) the ANU business school which endorsed the use of the technique and matters settled down.

While nominally answering to one master (CNM) the reality was that the project office trod a series of fine lines across a number of agencies which caused initial teething problems but were largely overcome as the footwork became more adept and people became more familiar with the new ways of doing business.

Orders

After an extensive selection process, the ADF had ordered 32 x S-70B-2 Seahawks for the RAN - to replace the Sea Kings and to be delivered in two tranches of 16. The helicopters were by far the most sophisticated ever ordered for the RAN. The second tranche of 16 x S-70B-2 was cancelled quietly and without warning in late 1988 – to the consternation of Sikorsky which had built its profit from the RAN purchase into the second tranche of aircraft.

Simulator

HELOPD was also responsible for the acquisition of the flight simulator. This required reviewing the received bids, creating a short list, visiting the short-listed companies to assess capability and, ultimately, awarding the contract. Tony Baker and I undertook the capability assessment in the second half of 1985.

One of the more interesting companies was a Swiss company in Interlaken. It built tank and aircraft simulators from truck parts including the hydraulic actuators from tip trucks to give 6 axes of motion. The prices quoted were significantly less than those from the mainstream simulator manufacturers. The rendering of the visual panels and the simulation of the weapons system aspects were not as good as the mainstream manufacturers.

The simulator was eventually ordered from Singer-Link which had its main facility in Stratford, Connecticut within convenient distance of the Sikorsky plant. The simulator business was sold to CAE of Canada in July 1988 which complicated the program but was not too disruptive as CAE was well experienced in the simulator business and was familiar with the Australian requirement having been one of the short-listed companies.

Some Challenges During the Procurement Phase

Airframes/Engines: Design and build of the 'airframe and engines' was comparatively straightforward and reflected Sikorsky's considerable experience in this area. The first flight of the first S-70B-2 took place at Sikorsky's West Palm Beach (Florida) facility on 04 December 1987

Radome: The design and size of the radome did provide some challenges as the clearance between the ground and the radome was such as to create a risk that the radome would hit the ground in the event of a hard landing. Much work was undertaken to design the radome and 'tune' the main landing gear to ensure that this would not happen.

Source Code: Australia (rightly) insisted that it must have the source code to the aircraft software. Coding was in ADA of which the Americans were very protective. We eventually got approval with the argument turning on: Australia was a reliable partner who could be depended upon to provide appropriate security for the code. It would not be provided to any other nation As we were paying for it, we were entitled to get it and Australia's determination to have it had been a fundamental element of the purchase contract.

Provision of the source code was a 'make or break' element of the contract. It turned out that the Pentagon had got up-tight about the source code issue and had leaned on Sikorsky and Collins without discussing the matter with the Foreign Military Sales (FMS) people. The FMS people were familiar with the contract and Australia's position and the issue went away once everybody was on the same page.

Weapons System: Design and integration of the weapons system presented some challenges. Essentially, the task was to get the MAD, radar, Barra sonobuoy system, weapons (Mk 46 torpedo) and data link properly integrated and 'talking' to each other. After a few false starts, Rockwell Collins rose to the challenges but it took a lot of liaison between Collins, Sikorsky, the project team and the equipment providers to get it all together.

Australian Industry Participation: AIP was a vexed issue for the project as it complicated the provision of some parts required for assembly of the air-

craft in Australia. The Australian made parts were invariably much more expensive than US sourced parts and were usually supplied late. That said, AIP was a political favourite so there was no way it could be avoided.

Considerable savings could have been achieved by building the aircraft in the US and shipping them to Australia but the Australian assembly and test was a major element of AIP and was non-negotiable.

The theory was understandable – achieve technology transfer to Australia and assist Australian companies to provide sovereign capacity and, perhaps, enter the US market. In the event, the production runs of parts in Australia were too small to achieve economies of scale. Sikorsky did try to include some companies in its supply chain but the same products could always be acquired less expensively through Sikorsky's US suppliers. I am not aware of any long-standing benefit from the AIP program.

By the time I handed over the project to CAPT Jack Lutze on 01 Oct 1987 most of the major decisions had been made and production was proceeding apace at Sikorsky with the majority of the aircraft to be assembled in Australia – Hawker de Havilland (HdeH), Bankstown for the Blackhawks and Aerospace Technologies of Australia (ASTA) in Melbourne for the Seahawks.

The Australian assembly certainly delayed the ultimate delivery of the aircraft largely due to: Transport and logistic delays; Delays in the provision of Australian manufactured parts; Delays with assembly often occasioned by industrial relations issues within HdeH and or ASTA.

Sikorsky, as prime contractor, was responsible for the timely delivery of the aircraft and had some difficulty coming to grips with the Australian industrial relations system in place at HdeH and ASTA. For example, if delays were experienced at the Sikorsky plant at Stratford, additional workers were called in and the production line could run a 24 hour/three shift operation 7 days a week to make up time. HdeH ran a nine to five, one shift operation Mondays to Fridays and the concept of a two shift (much less three shift) operation was quite foreign to them and was difficult to achieve.

Thus, if delays were incurred, there was no way of making up the time and late delivery of the aircraft was inevitable. ASTA suffered the same problems. The Australian 'system' accepted the assembly delays as an expected part of doing business with Australian industry but enthusiastically penalised Sikorsky for the delays over which the company had absolutely no control.

Finally ….

I paid off on 28 Feb 1988 and joined Sikorsky Aircraft. I was sent immediately to the Sikorsky plant at Stratford, Connecticut and put in charge of a production line building Seahawks for the US Coast Guard – a learning curve of some steepness! To avoid any potential conflict of interest, I had nothing to do with the Australian program.

I returned to Australia in August of 1988 and became Managing Director of Sikorsky Aircraft Australia Limited (SAAL) responsible for the assembly and delivery of both Blackhawks and Seahawks. It was an interesting transition from being on the Government side of the contract to the Contractor's side. Having become accustomed to the capacity and flexibility of the Sikorsky operation in the US, it was a bit depressing having to deal with the much lesser capacity and inflexibility of both HdeH and ASTA.

The first Seahawk to arrive in Australia (Aircraft #5, serial N24-005, Side No 874) was manufactured and assembled by Sikorsky and shipped to Australia. It was unloaded at Darling Harbour on 02 February 1989 and trucked down to NAS NOWRA the following day.

The Blackhawk program was well ahead of the Seahawk program – unsurprisingly as the aircraft was basically 'engines and airframe' without the complexities of the Seahawk sensor and weapons system. The Blackhawks formally entered RAAF service at a ceremony at RAAF AMBERLEY attended by the then Minister for Defence, The Hon Kim Beazley MP, on 15 September 1988.

Shortly after the commissioning of the Blackhawks, the second tranche of both Blackhawk and Seahawk was quietly, and unexpectedly, cancelled. This caused considerable consternation in Sikorsky as the profit for both programs was built into the second tranche. Much lobbying to reverse the decision was undertaken – to no avail. Amongst other consequences, Sikorsky's ambitions to build its South East Asian operating hub in Australia were dropped – a pity as it would have done much for Australia's aerospace industry.

A personal consequence was that I left Sikorsky in April 1989, moved to Brisbane and lost track of the helicopter programs.

Andy Craig - 27 Sep 2022. ✈

***Above**. Seahawk 005 arrives at NAS Nowra, having survived both the sea voyage from the United States, and the road trip from Sydney.*
***Below**: The Seahawk Introduction and Transition Unit (SITU) with N24-005 in the background prior to the official 'roll out' ceremony at NAS Nowra on 04 October 1989. With OIC CMDR Tony Baker at the front. ✈*

A Test Pilot Perspective

by Mike Curry

Life as part of a Defence Project Team (particularly one stationed overseas) is, in many quarters, considered to be a "Jolly" but is in fact far from that idealistic image. As the Project Test Pilot in the S-70B-2 Resident Project Management Team (RPMT) based at the Sikorsky Factory at Stratford, Connecticut, I can attest to the fact that the period November 1986 to April 1990 in the USA plus the period April 1990 to April 1992 as Resident Project Manager and Test Pilot at Avalon in Victoria were the most stressful, arduous and confrontational years of my Naval career.

Split between Sikorsky in Stratford, Connecticut and Rockwell Collins in Cedar Rapids, Iowa, the RPMT was stretched to its limits attempting to cope with endless test periods (some months long) at Cedar Rapids, daily flight testing at Stratford and endless meetings with Sikorsky Management in attempts to resolve Specification Non-Compliances. Sixteen and eighteen-hour days were not uncommon and indeed the norm. This was mainly due to the time difference between USA and the Australian Project Office in Canberra, requiring most "In House" discussions between the various elements of the project to be conducted during telephone conference calls after completion of a full day in the USA.

Type Acceptance (although with many identified discrepancies) was finally achieved in May 1989, with the First aircraft (N24-002) being accepted on 13 September 1989 at Stratford, Connecticut. Focus then shifted, with the Project Test Pilot and Project ASQ flying to Australia where a further three aircraft were accepted at NAS NOWRA (HMAS ALBATROSS).

A Formal "Roll Out Ceremony" was performed at HMAS ALBATROSS on 04 October 1989, where Government, RAN and Contractor dignitaries were present to formalize the occasion.

In deference to all the formality and apparent successful delivery alluded to at the formal roll out, there followed many months of flight testing, TDS software testing and contract compliance discrepancy correction negotiations for the Project Team at Canberra, Stratford and Avalon in order to achieve delivery of a final and acceptable S-70B-2 product.

Despite all of the above, however, I believe we in the RPMT, achieved great success through our determination and professional input during the oversight of development and our thoroughness and diligence during Type and Aircraft Acceptance testing which culminated in the delivery of a very capable and modern aircraft combat system to the RAN; one which has proudly been in service for 28- years. This achievement was despite much opposition from the Prime Contractor, Major Sub-Contractors and sadly often from within our own Department.

This latter fact, (that of internal resistance to the RPMT insistence on Specification Compliance) was made more apparent by the fact that despite the selfless efforts of the RPMT members, not one of the Management, Operational or Technical Team members were recognized in any Formal way by The RAN, Defence Department or Government for their selfless effort and devotion to duty over such a protracted period.

CMDR Mike Curry RAN (retired)

Top. *L-R. Sikorsky Systems Tester (name unknown). LCDR Garry Kerr, LCDR Duncan Morehouse and LCDR Mike Curry.*

Lower. *S-70B-2 test pilots, Bob Spaulding Sikorsky and LCDR Mike Curry RAN. Seahawk N24-002 (civil code N7265Y) was also part of the prototype test program conducted by Sikorsky at Stratford. On completion of tests it became the first-of-type S-70B-2 accepted by the RAN, on 13 September 1989. Photo via Mike Curry.* ✈

A TIMELINE – Test Pilot Involvement

Nov 86

Although serving at USNATC Patuxent River, Maryland as The USN LAMPS Mk III Test and Evaluation Manager, LCDR Mike Curry was attached to the S-70B-2 RPMT for the purpose of attending Project Design Reviews. This arrangement allowed the RPMT access to a Test Pilot input while allowing him to maintain flight currency and to enhance his knowledge of the SH-60 family of aircraft.

Jan 87

LCDR Curry joined the RPMT at Stratford, Connecticut as the S-70B-2 Project Test Pilot.

Most of 1987 was spent doing Reviews and initial Bench Testing of the Tactical Data System (TDS) at Cedar Rapids.

Dec 87

Development flight testing started at Stratford.

N24-001 was the first of the S-70B-2 aircraft to come off the production line and was to be the First Prototype S-70B-2. Since the New Type had not yet achieved certification nor acceptance by the Commonwealth, it was designated as EXPERIMENTAL CATEGORY with a registration N7265H.

Apr-Jun 88

Initial Integration flight testing concentrated on LR80 AHRS / AFCS compatibility flight testing and LR80 AHRS Navigation Modes testing.

Jun 88

It was revealed that Sikorsky intended to retain the RADOME as part of the external airframe configuration for the UTILITY configuration, despite the fact that the RADAR was not identified as part of the Utility Configuration in the RANRAWS Specification.

This called into question the “Ground Clearance” during operations from rough terrain while conducting envisaged Utility Operations. Inspection of technical drawings could not satisfactorily answer this question so a flight test program to establish ground proximity during MAX Decent Rate Landings on MAX Angle Slope landings was necessitated.

This test program was conducted during this period in the configuration shown in the photograph. Varying Lengths of Balsa Wood were glued to the RADOME at the 12, 3 6 and 9 o’clock positions. These would snap off if ground contact occurred.

The results determined that although clearance was minimal, no ground contact was experienced and thus Specification Compliance was agreed.

Oct 88

Navigation Aid Testing commenced on N7265H.

The VOR / ILS accuracy during initial testing indicated airframe shielding when tracking towards the VOR Station (+/- 45 degrees of the nose).

A Trial & Error program of relocating the VOR Antenna was conducted during this period, resulting in many patches to aircraft skin at previous antenna locations.

Oct88 to Feb89

A considerable amount of flight testing was achieved during this period with the major problem area being AFCS integration and behavior.

Feb-May 89

RAN S-70B-2 Type Acceptance Flight Testing completed.

RAN/RAWS TDS Software Version B/L 84? Accepted by Project but with in excess of 350 identified discrepancies requiring correction prior to Block 2 (The eight Avalon assembled aircraft).

May 89

Because of the many Airframe modifications and patches to prototype N24-001, Sikorsky decided to offer the second prototype N7265Y (N24-002) as the first aircraft for formal acceptance.

Aug-Sep 89

N7265Y (N24-002) Entered formal “First of Type” Acceptance Flight Testing.

13Sep89

N24-002 accepted as First of Type. EXPERIMENTAL Category removed.

S-70B-2 group photo Stratford 13 September 1989, following the hand-over ceremony for the first RAN Seahawk S-70B-2 aircraft N24-002 where the logbooks were presented to the RAN project director CMDR Chris Chamberlain by Sikorsky VP Mr Clark Harris (standing front and centre in black suit next to Chris Chamberlain) – on the far RHS is Dan Libertino, Sikorsky Manager International Military Sales with glasses and objects in hand. Mike Curry is on the far left. ✈

15Sep89	N24-002 flown by RAN Crew (LCDR Mike Curry & LCDR Garry Kerr) to Naval Air Test Centre Patuxent River in order to conduct: • EMI / EMC Testing. • MAD Testing.
26Sep89	Acceptance flight testing shifted to HMAS ALBATROSS. N24-007 Enters Acceptance Flight Testing.
02Oct89	**N24-007 Accepted at NAS NOWRA**
04Oct89	Formal Roll Out Ceremony at HMAS ALBATROSS. CNS taken for Familiarization Flight (centre picture, right). Considerable Coverage in local Press.
Oct 89	**N24-009 Accepted at NAS NOWRA**. Project Test Pilot – LCDR Mike Curry endorsed as S-70B-2 Instructor Pilot (IP) in order to qualify two Australian based QHIs. This was to allow progression of aircrew qualifications to support HS-816 formation.
9-19 Oct89	QHI Conversion and Qualification flight training conducted.
20Oct89	**N24-004 Accepted at NAS NOWRA**
21-31 Oct89	Continuation of Flight Testing and Development of correction of the various discrepancies identified during Type Acceptance continued at Stratford, so the RAN Project Aircrew returned to USA.
Nov 89	Testing at NATC Patuxent River (N24-002): • EMI/EMV. • MAD.
17Nov89	RAN 871 (N24-002) flown back to Stratford from NATC Patuxent River.
Jan90	New MAD Software Testing at Stratford (N24-002)
17Feb90	N24-002 returned to PAX River for MAD Flt Testing.
20Feb90	During the period N24-002 was at PAX River, the opportunity was taken to brief the US Naval Attaché (RADM Carwardine) on the new capability and took him on a Familiarization Flight.
21Feb90	N24-002 flown to Savanah, Georgia and landed on the dock in preparation for containerization for shipping to Australia.
Feb-Apr 90	Project Test Pilot relocated to Avalon, Victoria to take up the position as Resident Project Manager and Test Pilot at the ASTA Facility, Avalon.
2Apr90	Production Flight Testing at Avalon commenced.
Apr-Dec 90	Acceptance testing at Avalon progressed, although with difficulty. The major problem being the lack of avionics (DGU,s / BSIU,s / LR80 AHRS) in the correct configuration status to allow acceptance. Considerable Program Management discussions were held in order to resolve this issue but it remained an ongoing problem during the entire Block 2 aircraft test and acceptance process. During this time, however, the following aircraft were accepted and ferried to NAS Nowra: N24-008; N24-005; N24-010; N24-006; N24-011; N24-012.
Jan-Feb 91	Test Pilot back to USA. Acceptance Testing combined with some TDS software corrective testing was conducted on N7265H (N24-001) at Stratford, Connecticut.
Jan-Feb 91	N24-001 Accepted at Stratford, Connecticut.
Jan-Feb 91	N24-001 flown to Savanah, Georgia and landed on the dock in preparation for containerization for shipping to Australia.
Jan-Feb 91	N24-013 and N24-014 enter Acceptance Testing at Avalon. Resident Project Manager, Avalon (LCDR Mike Curry) posted to Canberra as Deputy Program Manager / Operations Manager DAVPROJ-N. Remainder of Acceptance Testing flights at Avalon were flown by LCDR Jack Kinross.
Mar-May 92	March to May 1992 Formal Flight Testing of LR80 (Mod 10) AHRS at NAS Nowra. LCDR Mike Curry - TP and Ops Manager DAVPROJ-N. LCDR Morehouse -ASQ and DAWSC; LCDR Garry Kerr – ASQ and HS-816 Squadron; LCDR Parrot – ASQ and AWSC; LCDR(RES) Neil Austin – AWSC. ✈

Moments of Humour and Frustration…

As can be expected during a complex and lengthy test evaluation process, there were moments of humour and frustration. Mike Curry recalls some of them:

Within the TDS, software calculations bizarrely allowed Present Position determination to exceed Latitude values of 90° North and South. When this error was pointed out to Rockwell, their response was – Quote: *"There is No Specification Requirement that limits Latitude Values between Zero and Ninety degrees"*. At this stage, the RAN test team walked out until sanity was restored some time later.

Delivery of Spare Parts

The ILS Team had responsibility for determining and acquiring the necessary spares inventory to support flight operations in Australia post acceptance. As a result, some long lead items were purchased and shipped to Australia in advance of aircraft delivery. These spares were sent for storage in Naval Stores. When the aircraft were finally at HMAS ALBATROSS, a demand for new aircraft batteries was lodged only to be told, to the dismay of the ILS team, that there were no batteries in stock. It was discovered that these stock items had not been demanded in the last 12 months and were not identified as S-70B-2 parts and therefore disposed of.

AFCS Configuration Control and Testing

The S-70B-2 was deemed to incorporate the same Automatic Hover Approach and Departure profiles as those developed for the USN SH-60Y. At the time S-70B-2 AFCS integration was being addressed, Sikorsky were in the process of consolidating the various versions of AFCS software in service within the USN SH-60 family of aircraft, into a common AFCS that would incorporate all the various software modules and be called based on which aircraft variant the AFCS Box was installed. The problem was that the Individual Platform Teams within Sikorsky were still developing specific software modules for their individual platform. This manifested itself, almost disastrously, during S-70B-2 AUTO Hover Approach and Departure testing when a Blackhawk variation that compensated for the poor location of the pitot tubes on the Blackhawk airframe was activated in the S-70B-2. This resulted in a Full Power / Full Left Pedal control input and a resultant wild climbing spiral departure, turning down wind from the hover into a 30kt wind.

AHRS / CN 1314 Mix of Attitude References

For some reason during the Specification development stage of the project, it was decided that replacement of only one CN 1314 Gyro by an LR80 Inertial Attitude Heading Reference System would be adequate. This decision plagued the project throughout Type and First aircraft Acceptance and continued to limit the S-70B-2 Embarked Night and IFR capability until the delivery and acceptance of the LR80 (Mod 10) in May 1992. The problem was twofold:

- The inaccuracy of AHRS Alignment while embarked. The AHRS would not enter its "Fine Alignment" until thirty minutes of level flight with Doppler input had been achieved. This meant that the AHRS was not fully aligned at the point of Take Off from the deck and thus Attitude accuracy was not adequate when compared with the CN 1314 Gyro. This resulted in AFCS Degraded Alerts during a critical phase of flight.
- During the aggressive nose up attitudes adopted during the AUTO Approach to Hover Profile, the LR80 and CN1314 often provided attitude outputs to the AFCS that were outside the AFCS Compare Limits. This again resulted in an AFCS Degraded Mode at a very critical phase of flight.

RADOME Ground Clearance

The test program to confirm adequate Radome ground clearance when operating from unprepared sloping ground during Utility Configuration operations required several varying lengths of balsa wood to be glued to the Radome at the 12, 3, 6 and 9 o'clock positions. The concept was that these strips of balsa would snap if ground contact occurred. The funny story, however, was that a photograph of the S-70B-2 in this test configuration found its way to Lloyds Aircraft Register and it was reported that the new RAN Aircraft was fitted with a new antenna configuration suspected to be a classified EW suite. ✈

What was RAST?

The Seahawk was the first RAN helicopter to come with a specialised deck landing system for ships fitted to utilise it.

RAST - or Recovery Assist Secure And Transverse, comprised a special messenger cable which was lowered from the bottom of the aircraft. This was , attached by deck handlers to a special haul-down cable that passed through the RAST Trap (the square object shown in the photo to the right).

Once the cable was attached to the messenger it was pulled up into the aircraft until it locked into the aircraft system.

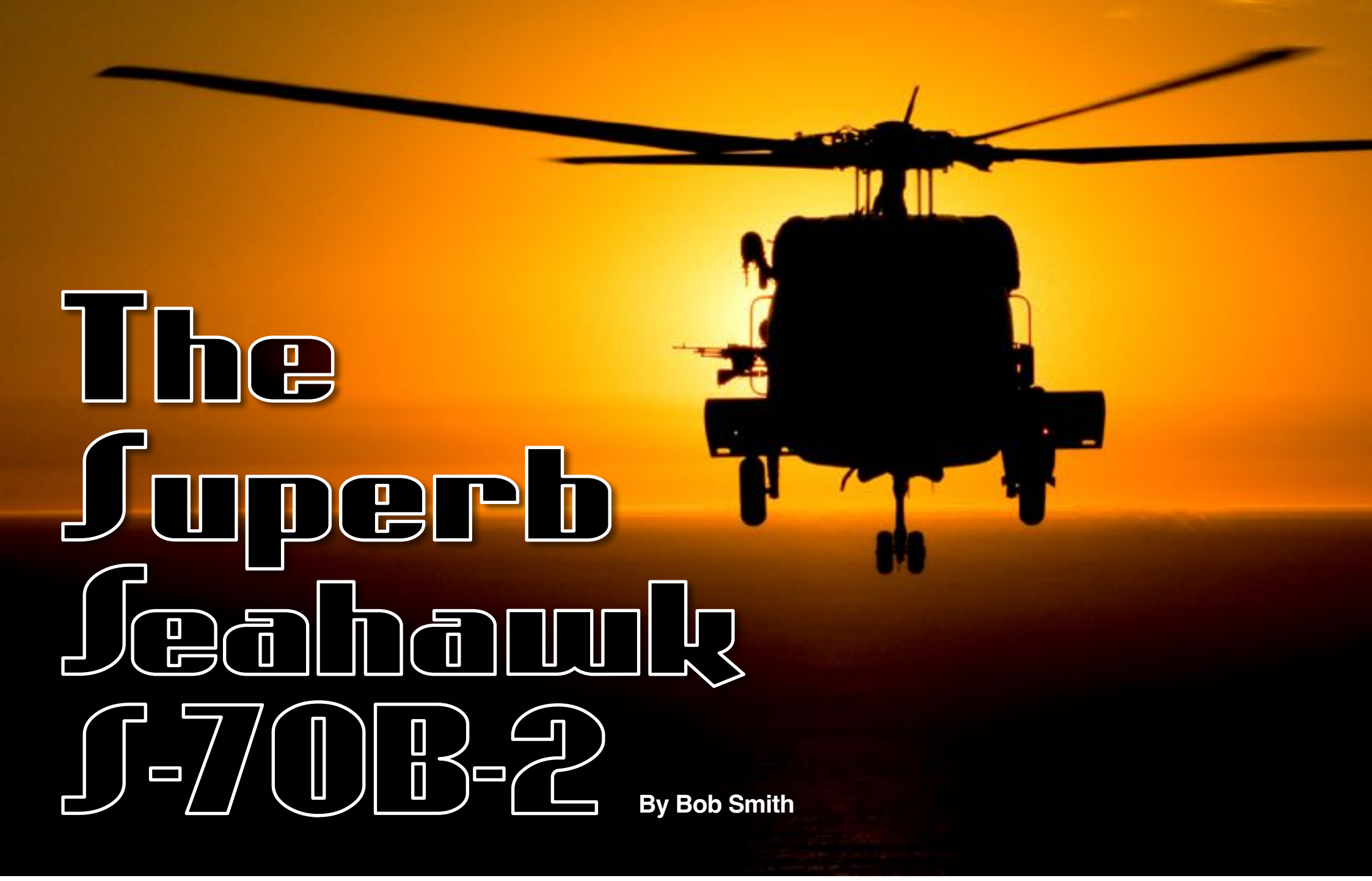
The LSO on board the ship then took up the slack, waited for the pilot to call ready, then activated the haul down which pulled and aligned the aircraft onto the deck. Once on deck the cable was clamped by the RAST Trap, thus securing the aircraft firmly onto the deck without the need for additional tie-down chains or straps.

The Trap could then act as a shuttle, moving along the rail embedded in the deck to pull the aircraft safely into the hangar. To ensure correct alignment a tail probe also engaged the rail.

The first three FFGs delivered to the RAN were not equipped with RAST, but Darwin, Melbourne and Newcastle were delivered as 'Flight 3' ships with the system embedded, which included stabilisers and an extended Flight Deck. The earlier vessels were upgraded to Flight 3 standard during subsequent refits. Anzac Class frigates were also fitted with RAST (a single track), and the most recent DDGs (Hobart Class) are also so equipped.

You can see a brief description of the system in action later in this article, under Barry Trapp's submission. ✈

Right and Below. *When shut down on the deck in rough weather the RAST was always supplemented by additional lashings, but it really came into its own during landing, and when moving the aircraft into or out of the hangar.* ✈



The Superb Seahawk S-70B-2

By Bob Smith

RAN Helicopter Project – USA

Being a member of the Initial Support Procurement Team (ISPT) for the S-70B-2 was one of the most interesting times I spent in the Navy. The ISPT was part of the RAN Helicopter Project Team located at the Sikorsky works in Stratford Connecticut from July 1985 to December 1989. It was a remarkable experience and I gained a lot of detailed knowledge about the S-70B-2 during this early production stage.

The ISPT had the task of reviewing the assembly of the S-70B-2 aircraft and assessing what spares needed to be procured and the stock levels required to maintain and support the aircraft when it entered operational service in the RAN.

The major differences between the USN SH-60B Seahawk and S-70B-2 was installation of the SuperSearcher radar with associated modifications to the sensor systems and removal of the port-side sonobuoy launcher – which meant the configuration of the RAN aircraft wasn't finalised until mid-1986.

The spares assessing team worked for three years to complete a line-by-line analysis of logistic support analysis reports for the 187,000 individual components used to make the S-70B-2 an operational helicopter, including all its sensor systems and ground support equipment.

Interestingly the SH-60B airframe, which was modified to become the S-70B-2, only entered operational service with the USN five months earlier (Feb-1985) prior to the arrival of the project team. So it was a new approach for the RAN to purchase an aircraft so early in its operational service with other nations.

Construction Monitoring and Testing

The project team was able to monitor construction of all 16 airframes at the Sikorsky facility. Commencing with the initial build of the fuselage deck, the Seahawks were essentially built upside down until approximately half way along the assembly line, thus enabled installation of electrical harnesses and hydraulics which were eventually sealed into the fuselage hull.

The structure was then rolled over and the upper fuselage, tail cone and engineering deck was completed prior to fit-out of main oleos, engines, gear-boxes and the rotor head. Windows, furnishings and electrical fit-out was completed before the aircraft leaved the assembly line and entered the fit-out facility for installation and testing of the type-specific electrical and electronic equipment.

Because the S-70B-2 radome was approximately twice the depth of the SH-60 radome, the size of the S-70B-2 radome was the cause of some reservation as it was considered possible that the structure could impact with the deck during landing, particularly during ship operations. The test flight airframe (which I believe was to become 871) was fitted with detector assemblies – a combination of wooden 'probes' and wires connected to an onboard data recording system – around the radome which would record any impact that occurred during the various landing tests. The concerns were unfounded and I'm not aware of any instance of radome impact throughout the S-70B-2's operational service.

After initial test flights above New York sound, the test airframe moved to West Palm Beach, Florida where intensive operational testing was completed. Airframe one remained at Stratford and was used as the test and integration bed to complete software testing of the sensor and weapons systems. Over the next two years, the remaining aircraft were built and prepared in kit form for transport and eventual assembly in Australia.

Transferring to Canberra

The project team left the USA in December 1989 and set up office in Canberra. The ongoing task of procuring spares, GSE and avionics test equipment along with the all-important Pack-Up Kits (PUKs) comprising spares, tools and GSE for embarked operations continued over the next three years. The pace of procurement was dramatically escalated when the Australian Government committed warships, with embarked Seahawks, to the Persian Gulf in 1991 for Operation Damask.

NALO, the Project Office and SITU scrambled to assemble two PUKs from those spares already received and held at Zetland (navy stores) and *Albatross*. Additional Foreign Military Sales (FMS) funding was provided to escalate the procurement of essential components including engines, gearboxes, rotor blades and black boxes.

HS 816 Squadron training & experience

I joined 816 Squadron in 1993 as the CPOATV, commencing my preparation and training for Flight Senior Maintenance Sailor (FSMS) qualification. Throughout the following year I was heavily involved in a 600 hr servicing and major repair of one of the Damask aircraft that returned with severe corrosion. This required strip-down, repair treatment and rebuild of major areas of the cabin, tail cone and equipment racks. Essentially it provided squadron maintenance unit staff with invaluable experience and, most importantly, awareness of those areas critical to successful monitoring and prevention of corrosion as future maintainers on embarked flights.

FSMS training was largely self-driven with the onus placed on the individual to gain the required experience and knowledge of the aircraft's operating and ground handling constraints, extensive cross-trade awareness and the ever-present administration and regulatory frameworks surrounding maintenance and engineering activity both ashore (on detachments) and embarked. As a young SMNATC, I would never have dreamed that I would one day be managing and conducting aircraft weighing operations,

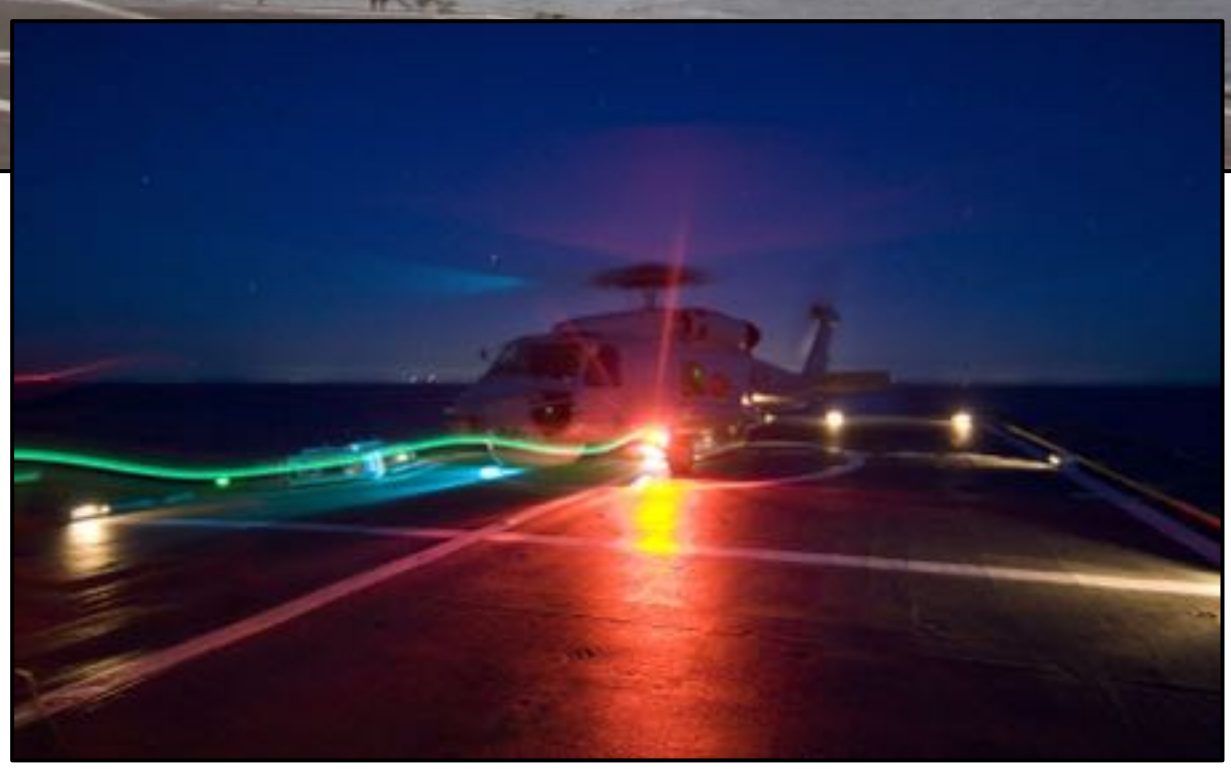
vibration analysis and rectification, hydraulics troubleshooting etc.

Apart from training there was more valuable experience. In January 1994, all 816 personnel in the local area were recalled from Christmas leave in response to bushfires which had broken out along the east coast of NSW. Predominantly short-staffed maintenance teams worked 8 on - 8 off watches for two weeks turning around Seahawks which were carrying out rescues and water bombing operations in areas as far afield as the central coast to the far south coast.

Having completed my training, I was awarded my FSMS ticket after 'surviving' the FSMS selection board chaired by CMDR Ian Newbery, who was CMDR (E).

Embarked Operations – HMAS *SYDNEY*

I was posted to HMAS *SYDNEY* as FSMS in March 1994. As she had just returned from a DAMASK deployment, I was extremely fortunate to post into an embarked flight of experienced maintainers who knew their ship and their aircraft. Just as well. *SYDNEY* was sailing for RIMPAC 94 and an intensive ASW program awaited us.



SYDNEY's embarked aircraft was 872 (N24-003) and she had earned the name of 'Christine' having acquired this moniker because of eerie similarities to the supernaturally possessed car in the Steven King novel and movie of the same name. 872 was a tremendous aircraft and performed exceptionally well, but she had some quirks that, on occasion, made life very difficult for the flight maintainers. She was notorious for refusing to blade-fold when the ship was about to enter OOW manoeuvres or when a clear deck was needed for VERTREP from already inbound helos and we needed her off the flight deck ASAP.

It's interesting that on our way to Hawaii and during our RIMPAC operations, DSTO scientists were onboard, monitoring our daily routines. At one stage, *SYDNEY* was involved in a four-day ASW operation with Christine launching approximately every 4-6 hours after refuel, turn-round inspections and sonobuoy reloads. With the ship constantly at defence watches, regularly going to action stations for damage control exercises and conducting RAS and VERTREP evolutions, sleep for the maintainers was precious and cat-naps on gym mats in the hangar became ops normal.

The DSTO scientists noted that the maintainers were rarely getting more than 90 minutes of unbroken sleep and suggested a trial period where the maintenance team were split into two watches, supplemented by the ships flight deck team, operating under the defence watch routine of the rest of the ship's company. I believe the report from the scientists at RIMPAC '94 ultimately led to the development of Navy aircraft maintainers' crew rest regulations.

Pearl Harbour and RIMPAC

On our arrival at Pearl Harbour, *SYDNEY* underwent de-perming at the USN de-perm range outside of Pearl Harbour. Christine was disembarked to Barber Point NAS before we docked and we spent three days un-

loading all sensitive equipment (including a full sonobuoy stowage), de-perming and then restoring the ship.

As many readers would know, RIMPAC is typically conducted in phases of 7-14 days culminating in the war phase of the exercise. On the second last day of Phase 1, Christine developed high EGT and surging of the port engine. The team worked through the night to replace the engine and prepare Christine for ground run and test flight prior to entry into Pearl Harbour (no aircraft operations were allowed when in port). Engine run and test flight were scheduled for 0600 as our port entry was scheduled for 0800.

The Spanner Episode

With Christine on deck and rotors spread, ready to go, the final check was… tool control closed. Yep! You guessed it… a missing open-ended spanner! As Christine was being searched it was recalled that a stoker had asked to borrow a tool to make a quick repair to some equipment in the other hangar. A check of the loan book revealed who had the tool and he was piped to the hangar. The clock was ticking.

Stoker arrives and remembers that he had the tool in his other overalls… the overalls that were in the laundry. Stoker and maintainers run to the laundry and after finding the mess laundry bag began searching through the overalls. Clock still ticking and Pearl Harbour is growing larger on the horizon.

Finally a victorious team return to the hangar with the missing open ender. Too late. First programmed activity for commencement of Phase 2 was an engine run and flight test.

Phase 2 completed with all sorties achieved except for the final night when, over MC1, the pipe "Aircraft PAN PAN PAN. Prepare to recover Seahawk. Assume action stations for potential crash on deck" rang out. Christine's AFCS computer had thrown in the claw… big time, and the crew was limping her back. She landed without incident, much to the relief of the fire teams spread along the main passageway… each member with eyes like duff bowls.

Authorised for one flight only, Christine disembarked to Barbers Point prior to our entry into Pearl Harbour. The maintenance crew spent the next four days driving to and from Barbers Point to repair the AFCS harness which was causing the issue and to take the opportunity to complete a 300 hourly service.

More RIMPAC war games

At commencement of Phase 3, having recovered Christine we headed to the missile range, receiving war shot Mk. 48 torpedoes. During this phase, we were to operate two Seahawks from *SYDNEY* and we received HMAS *DARWIN's* aircraft, much to the chagrin of the ship's company who had gotten used to using the port hangar as a gym and general stowage. *SYDNEY's* maintainers completed two days of ASW operations with two S-70B-2s which included torpedo drops on two occasions.

The war phase was completed without much incident and, compared to the work ups and preparations we went through on our way to Hawaii, it was somewhat subdued. All I can say is that there weren't many sonobuoys left in the stowage when we sailed back into Pearl Harbour.

With a week alongside after the exercise, the ship's company became aware of some of the bargains available at the Navy Exchange. When we departed Pearl Harbour on our return to Australia, the port hangar was filled with around 50 pushbikes and – believe it or not – 15-20 4-stroke lawn mowers.

The Salt Water Shower

Returning to Australia, we stopped in Vanuatu for a two-day visit. At about 0300 in the morning of our first night, I was woken by a pipe over MC1… "Safeguard! Safeguard! Safeguard! Flood! Flood! Flood! Flood in the starboard hangar!" Myself and the CPO Stoker, after colliding in our 6 pack as we rolled out of our racks, charged aft to be confronted by a fog of salt spray coming down the main passageway.

We opened the hangar door to the sight of Christine enjoying a salt-water shower from a broken fire main coupling that fed the CWIS magazine. After the fire main was isolated, we moved her out onto the deck and commenced drenching her with any product we could find that would assist in displacing the salt water and hosing her down with fresh water. Fortunately, about 30 minutes after we got her on deck we were hit with a downpour of rain that lasted over two hours giving her a fresh-

water deluge that we would never have been able to deliver.

816 Squadron: 1994–97

I was promoted to Warrant Officer in August 1994 and posted from *SYDNEY* to 816 Squadron as Assistant AEO until December 1997.

During the 1994 Christmas leave period, we needed to recall a maintenance crew to prepare an aircraft for urgent transit to meet HMAS *DARWIN* in the southern ocean to assist in the rescue of a solo round-the-world sailor. The team worked through the night to prepare the aircraft and it launched as scheduled, ultimately meeting *DARWIN* and conducting a winch rescue and subsequently flying the yachtswoman to Adelaide before returning to *Albatross*.

The Assistant AEO role was wide and varied, the primary activity was negotiating with the squadron operations and training officers for aircraft to meet fleet sorties and training requirements while ensuring progress of scheduled maintenance of all the squadron's aircraft. This along with the administrative, reporting and regulatory activities was part of the organisation needed to keep the squadron operating which takes up most of the AAEO's time.

Fortunately, as AAEO, I also had the task of managing maintenance of deployments and short-term fly-aways and, with the Squadron AEO, conducting at-sea Flight Senior Maintenance Sailor (FSMS) assessments of CPOs who were preparing to assume the FSMS billet on a ship.

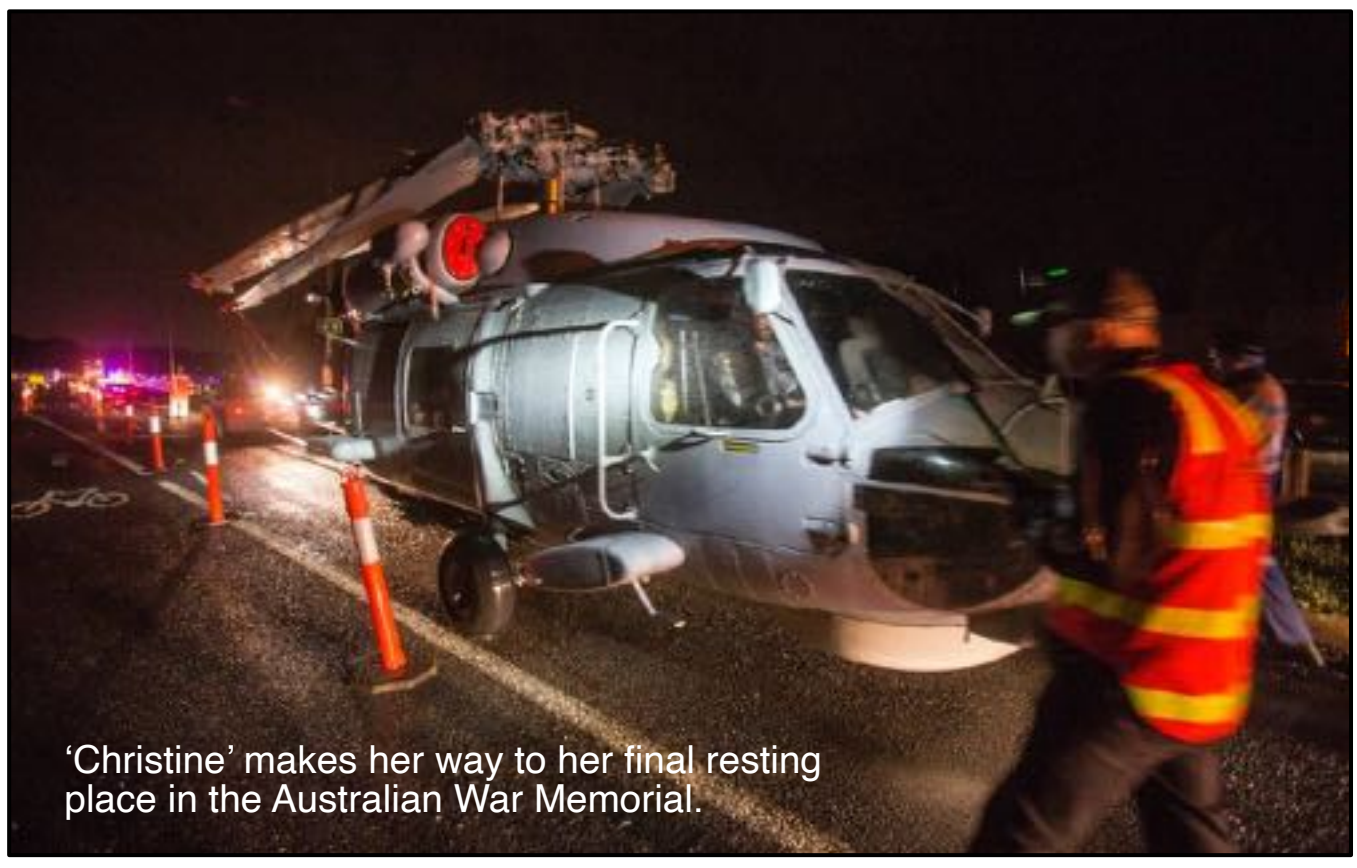
The FSMS assessments were usually conducted while a ship was undergoing work-ups and, after a while I became a de facto member of the Sea Training Group (Wreckers) and I became a deft hand with smoke generators and flash-bangs. My only gripe about that relationship is that I always seemed to be given the AMR flood role, and I expended far too much energy after multiple occasions lugging a burst pipe simulator down to the bowels of the ship.

Looking back

The low light of my time as AAEO was in December 1995 when, tragically, **LEUT Geoff Brooks** was fatally injured during a winching exercise. The subsequent Board of Inquiry determined that the winch strop D ring had separated through dynamic roll-out resulting in a modification to rescue strops and winch hooks to prevent similar accidents in the future.

One highlight. We were flying across the Eyre Peninsula during a two aircraft transit to Western Australia to conduct ASW exercises, when we received a mayday call from a downed aircraft that had crashed in heavy scrubland. We arrived overhead and, as I was sitting in the winch seat, I was elected to be winched down to assist in recovery of the uninjured pilot.

The aircraft was a crop-duster and the pilot had already disassembled his spraying equipment in the hope that we could transport him and his spraying gear back to base. After explaining to him that there was very little available space in the cabin of the helicopter and that he would only have space for himself and his log book, I got him into the strop and he was winched aboard, closely followed by myself. I believe that I am one of only a few – if not the only – maintainer that has been presented the Sikorsky Rescue Pin.



'Christine' makes her way to her final resting place in the Australian War Memorial.

The S-70B-2 has proven itself as a very successful airframe and provided valuable service to the RAN and Australia throughout its operational service. Its multi-role capability and the ability for crews to change role configurations quickly made it a common sight across the fleet and above natural disasters across the country.

Personally, my time with the Seahawk was a highlight of my naval career and I look back on those times, and the people I shared them with, fondly. Reminiscing will be easy too. . . Christine has followed me to Canberra and taken her place in the Australian War Memorial.

Flying the Sikorsky S-70B-2 Seahawk

By Brett Dowsing

Having completed the JSSC, which I thoroughly enjoyed, my family and I spent Christmas 1991 in Canberra, packed up our house in Gowrie, ACT and drove across the Great Dividing Range to Nowra, NSW for me to join the Seahawk S-70B-2 SITU on 20 January 1992. The posting specified for S-70B-2 conversion 16 March to 12 June, followed by orders to assume the duties and responsibilities of Officer in Charge of the Seahawk Introduction and Transition Unit (SITU) to date 15 June 1992 and Commanding Officer HS 816 with effect from 19 June 1992.

SITU had been stood up on 8 February 1988 under Commander Tony Baker, AFC, a highly experienced aviator and test pilot. He was a quietly confident leader who was very highly respected across the aviation community. When I joined, SITU was commanded by Commander Alex Wright who, like Tony Baker, was extremely well thought-of both internally in the Unit and more broadly in the Fleet Air Arm. He was a very experienced Sea King pilot and Qualified Helicopter Instructor. SITU had certainly thrived under both of these officers and was more than ready for commissioning when I succeeded in mid-1992.

Uniquely though, as a result of the ADF's commitment to Middle East security associated with Gulf War 1, SITU had embarked Seahawk Detachments in FFGs deployed to the Middle East Area of Operations (MEAO) since 1990. Most SITU personnel had deployed on at least one of these Detachments, and were continuing to do so during my conversion to the S-70B-2. All of this was before the Squadron had commissioned and before the S-70B-2 had been formally accepted into operational service!

Adding to this uniqueness was the fact that the S-70B-2 had been designed for and was to be operated as a single pilot in the right seat with an Observer (Tactical Operator) in the forward, left seat and an Observer/Aircrewman (Sensor Operator) in the aircraft's cabin. Philosophically, and reflecting the design advances under a strong Observer team, it was to be flown and operated along the lines of the S-2G Tracker aircraft rather than the Navy's two-pilot Sea King helicopter. This was also very different to the operational philosophy of the USN with its SH-60R Seahawks, which reflected the two-pilot methodology and with all data analysis being effected in ship-borne systems. The SH-60Rs were operationally tethered to the Task Group ships and operating under tactical control whereas the RAN's S-70B-2 had been designed for autonomous detection, analysis, prosecution and operation.

Those who had flown in Sea Kings were the natural inheritors of Seahawk albeit, whilst returning to anti-submarine warfare (ASW), it was without a dipping sonar capability and reliant on active and passive buoys along with an integrated magnetic anomaly detector (IMAD) to detect and track submarine targets. Notwithstanding, Sea Kings were still on the Fleet Air Arm's inventory and being used in utility roles post relinquishing the offshore counter-terrorist role to Army in 1990. Therefore, SITU had developed a comprehensive course to qualify utility, single-pilots to multi-engine, aviation warfare capabilities along with those who had previously served in HS 817 Squadron's Sea Kings.

My first Operational Flying Training (OFT) flight occurred on 18 March 1992 under the command of LEUT Tom Smillie on N24-003 (72). Over the remainder of March and through April and June, I progressed the first four phases of conversion both on the aircraft and in the simulator. It was a full-on period of learning with in excess of 30 hours flying each month including a detachment to Cairns. During this deployment on 8 May 1992, I achieved my Utility Captaincy check with LCDR Leigh Costain. On Friday 15 June 1992, SITU farewelled its very popular OIC, Commander Alex Wright and I then relieved him following a long-lunch with the Unit's officers.

Commissioning HS 816 Squadron

While my conversion course continued through July, the Unit was still supporting two embarked Detachments, one in the MEAO and one enroute for Exercise RIMPAC off Hawaii, whilst also preparing for the commissioning of the Squadron. Almost invisibly, the S-70B-2 Seahawk was accepted into naval service on 2 July 1992. We were still progressing towards acceptance into operational service, notwithstanding already achieving war service and being deployed to the MEAO and to major ex-

BOSS TIGER HANDS OVER

After almost two years as Officer-In-Charge of the Seahawk Introduction and Transition Unit (SITU), Commander Alex Wright has handed over command to Commander Brett Dowsing.

CMDR Wright supervised the delivery of the S-70B-2 Seahawk helicopters and preparations of SITU and its aircraft for acceptance into naval service.

He also oversaw and participated in the embarked S-70B-2 Flights for Gulf Operations – no mean feat and one that utilised almost all of SITU's complement, including that from the Air Warfare Systems Centre (AWSC) and the Seahawk Simulator, reports our correspondent.

Remaining within NAS Nowra environs, CMDR Wright has taken up his new position as the Station's Commander Air.

CMDR Dowsing has completed his S-70B-2 conversion and joins from four years service in Navy Office Warfare Directorates and undergoing the Joint Service Staff College.

Previous commands include HMA Ships BUCCANEER and GLADSTONE, alternating with HCT25 Senior Pilot and Flight Commander positions.

On July 2, Chief of Naval Staff, Vice Admiral Ian MacDougall accepted the S-70B-2 and AWSC into naval service noting there remained some capability and equipment deficiencies.

These shortfalls are to be rectified by July 1994 when, in accord with CNS' directive, these assets are to be accepted into operational service.

On the road to this occasion, HS816 Squadron commissioned on July 23 and came under the Maritime Commander's command.

CMDR Dowsing (left) accepting command from CMDR Wright

***Above**. Brett Dowsing (Left) 'takes the weight' of SITU from Alex Wright in June of 1992. The Seahawk was officially accepted into Naval Service the following month, notwithstanding that a number of aircraft had already been deployed on small decks for operations in the Middle East.✈*

ercises in foreign waters. We were still receiving aircraft from the second tranche that were being assembled at Aerospace Technologies Australia (ASTA) at Avalon in Victoria and I think the final four aircraft were placed in reserve over the last half of 1992. As such, SITU had 12 aircraft on inventory when we commissioned HS 816 Squadron on 23 July 1992.

Leading up to the commissioning we did several media associated events including interviews, tours of the aircraft and Squadron facilities and some formation flying locally for news stations and magazines. Of course, we were practicing our parade drill and organising the hangar and support arrangements for visiting VIPs, families and friends. On the day, it all went well with the Minister for Defence (MINDEF) (Hon Robert Ray MP), Chief of Navy (Vice Admiral Ian MacDougall AC, RAN) and several other dignitaries present. We paraded the Squadron, read out the Commissioning Order, cut the cake, demolished the smorgasbord, drank the wines and sent everyone home by mid-afternoon.

One of the more entertaining occurrences associated with this ceremony, involved the aforementioned dignitaries and Albatross's Chief Cook and Chief Steward. We had been allocated $12,000 for the food and drinks from CN's office and when the first suggested menu included cocktail frankfurters, party pies and beers, the two Chiefs were sent away to come back with a "more appropriate" representation. On the day, the tables were groaning under the weight of seafood, ice sculptures, hors d'oeuvres and champagne, wines and beers. Inviting MINDEF and CN to lead off on selecting their luncheon, I was advised by CN that a plate of party pies and "smallie boys" (cocktail frankfurters) with a couple of beers would suffice for the pair of them. At this point the Chief Steward and Chief Cook brought forward the platter of requested food and beers, placed them on the table in front of the Minister and CN and winked to me. Both Chiefs had previously served on the Admiral's personal staff when he was Maritime Commander and knew exactly what would be required. Their wry smiles told the story and I learnt a lesson in listening to and better knowing your senior sailors. Needless to say all the attending Squadron members (particularly the junior sailors) , their wives and guests, thoroughly enjoyed the lobsters and champagne!

Back to the Job

Once Commissioned, the Squadron transitioned from being under the operational control of the Project to being under command of the Maritime Commander. At that time, the Directorate of Naval Aviation was winding down and therefore almost no policy development and oversight of the Fleet Air Arm existed. Commodore Naval Air Station Nowra was also Commanding Officer HMAS *Albatross* and Naval Officer-in-Charge Jervis Bay; importantly, this position also had administrative control of the Naval Air Squadrons. Initially, the position was filled by an aviator (Commodore Rob Partington, AM, RAN) and the command-and-control arrangements, while relatively loose, were not overly an issue. Later, when Commodore NAS reverted to a non-aviator it became somewhat testing, and impacted my career.

Pressure was on to build Flights for embarkation in the six FFGs. Thus the challenge for the Squadron was to both train and to operate. At the outset, this necessitated balancing the priority between building and maintaining a training program that encompassed pilots, tactical coordinators, sensor operators and maintainers, while also ensuring that the Flights that were being required were not denuding the Squadron of its training staff.

HS 816 was a large Squadron with 12 aircraft on direct inventory and a further four in preservation reserve. We were also growing to a staff of around 160 personnel with two Detachments at sea with a further 28 personnel. At any time, we would have between 3-10 aircrew and 15-20 maintainers under training. We also had one USN pilot (Lieutenant Curtis Shaub, USN) attached and a Sikorsky liaison technician (Greg Mitchell) appointed to assist with establishing the S-70B-2 in operational service.

To meet these priorities and recognising the interdependencies, we decided to reconfigure the Squadron along traditional aviation lines but with an emphasis of functionality and a blend of ship-based command lines. As such, the training function was placed under the Senior Pilot and the operational side of the Squadron under the Senior Observer; the Senior Technical Officer ran maintenance and engineering, including logistics. A new Executive Officer position, who was an aviator and Deputy Commanding Officer, sat across the three functional areas and the Administrative Staff. While more hierarchical, there was direct accountability for out-

HS 816 SQUADRON

COMMISSIONING ORDER

The Chief of Naval Staff has directed that Her Majesty's Australian Naval Air Squadron, HS 816 is to commission at Nowra on 23 July 1992. Accordingly, you are to proceed to commission the squadron for service in the Royal Australian Navy in accordance with the provisions of orders and instructions issued by higher authorities.

On commissioning, HS 816 Squadron will be under the full command of the Maritime Commander Australia. You are to bring to my notice any reason you may have for discontentment with the state of training, standards or welfare of squadron personnel or with the general state of squadron aircraft and equipment.

May God's blessing be upon HS 816 Squadron hereby established as your endeavours to uphold the highest traditions of the Royal Australian Navy in the service of Her Majesty Queen Elizabeth II and of Australia meet with success and happiness.

Given under my hand this Eighteenth day of June 1992.

Above. The Commissioning Order for HS816 Squadron, June 1992. The Squadron's motto was "Imitate The Action of the Tiger," taken from Shakespeare's play on Henry V - viz: "Once more unto the breach, dear friends, once more; or close the wall up with our English dead! In peace there's nothing so becomes a man as modest stillness and humility, but when the blast of war blows in our ears then imitate the action of the Tiger; stiffen the sinews, summon up the blood, disguise fair nature with hard favour'd rage; then lend the eye a terrible aspect." Below. A fine shot of a Seahawk landing on an FFG in the Gulf. ✈

comes and a greater reliance on coordination to achieve these outcomes. And our focus to provide capable Flights for operation in the FFGs was at the forefront of our requirements.

The generation and training of these Flights came under the auspices of the Senior Pilot but, of course, the coordination of Fleet assets for such training once basic conversion had occurred, fell to the Operations Staff under the Senior Observer. Likewise, coordination of support for the Flights, once embarked, came under the Flight Cell's responsibility to the Senior Observer. Little changed for the Senior Technical Officer who was responsible for the maintenance of the shore-based aircraft and his personnel, but he was also responsible for the technical authorities exercised by the Flight Senior Maintenance Sailors at sea.

Additional challenges were also placed on the Squadron to provide aircraft and support personnel to the Aircraft Maintenance and Flight Trials Unit (AMAFTU). These requirements allowed development and expansion of the flight and operating envelopes of the S-70B-2 to the Fleet's ships, and the test and evaluation of the various systems within the aircraft. Similarly, we were also supplementing the training staff in the Air Warfare Systems Centre where the aircraft's systems were enhanced and training conducted on the three-axis simulator. The juggling of personnel across all these requirements was a constant challenge and, while highly visible internally to the Squadron, was largely invisible and under-appreciated externally.

The Fleet Environment

Earlier in my career, I had been heavily involved in the introduction of B206 Kiowa Detachments and AS350B Squirrel Flights as an interim capability pending the arrival of S-70B-2 Seahawks. The introduction of the Seahawks into the Fleet was a quantum addition to the ships' capabilities both in support and when the aircraft operated independently. Capable of anti-submarine warfare (ASW), anti-surface surveillance and targeting (ASST) along with weapons carriage and utility roles, the Seahawk also proved a lot more demanding of the FFGs' support requirements than the previous light-utility helicopters. Early in their establishment as embarked elements, there was a degree of push-back in some of the FFGs while pressure from Navy Office and Maritime Headquarters was for early embarkation and progress towards acceptance into operational service.

The Recovery Assist, Securing and Traversing (RAST) capability fell under the ship to maintain and the embarked element to operate. The Deputy Supply Officer was normally trained and employed as the Helicopter Control Officer (HCO) and the Ships Company provided trained tie-down crews. Designated aviation compartments had to be regained after ships' companies had occupied them during periods of aviation absence. And the Operations and Bridge teams had to be brought up to aviation awareness standards and re-introduced to the demands and impositions to safely operate their organic aviation capability.

Additionally, Fleet assets were also required to support the training requirements of HS 816 Squadron, and this was substantial. FFG and other flight decks were required at specific periods of the training curriculum; similarly certain environmental requirements also were needed to build up competencies. Submarines were required to exercise the Taccos and Sensos in passive and active acoustics as well as prosecution tactics. P-3 Orion maritime aircraft were required to practice and develop mutual support operations.

All of these assets had their own priorities and it required a lot of early planning and liaison to optimise these exposures. More than once I had to take an aircraft to Sydney to emphasise the priority of access for OFT progression and the importance in achievement for a n upcoming embarkation. Usually, we won these guments but we then also had to face the wrath of the ships company of a ship delayed an early return to port or a period of steaming over a weekend while we conducted deck landing practice sorties (DLPs). Similarly, I clashed more than once with Commander Submarines when requesting certain underwater profiles during the night watches to train our crews. The submarines expected us to provide detection and prosecution profiles for their training during daylight hours but were reticent to give us access during their night recovery periods.

After a while, all of these issues were sorted (our night profiles were constrained to passive tracking only) and we gradually began to generate the increased numbers of Flights and develop our requirements in a more predictable manner, and having them included in the upcoming year's Fleet Program.

Above and Below. *The S-70-B would be the only aircraft which served operationally in the RAN before it was officially accepted into Naval Service. This was driven by need: Australia had committed forces to the Multi-National Force imposing sanctions on Iraq, in response to that nation's invasion of Kuwait. With the first ships steaming to the Area of Operations at only 72 hours notice, there was frenetic activity to get the Seahawk to sea as part of the endeavour.* ✈

Deployments and Unusual Occurrences.

With the submarines based in WA, at least once or twice a year we would do a training detachment to that State with three to four aircraft. The Helicopter Support Facility at HMAS *Stirling* hadn't been built at that stage and because the submarines were often operating between Albany and Perth, we could be deployed from NAS Nowra to operate from the civilian airports of Albany, Bunbury or Jandakot. We would fly low-level west with refuelling stops at Mildura, RAAF Edinburgh, Ceduna, Forrest, Kalgoorlie depending on the headwinds, and we'd return, usually at 9000 ft AMSL, to maximise our ground speeds and minimise our refuelling stops. Over and back we'd normally have an overnight stop at either Ceduna or RAAF Edinburgh.

A semi-trailer load of sonar buoys would be delivered to the West and the Squadron's Maintenance Truck would make its way across the continent being available to support any aircraft unserviceability enroute. Being part of this maintenance team was much sought after as they only had to align to milestone timings and had three separate nights in hotel rooms enroute. We raffled these positions amongst those that the AEO and WO believed deserved it. To their credit there were no misadventures during my tenure, although there is a story about a Wildebeest that still haunts one team doing the Cannonball Run (Warrant Officer Frank Arena can expand)!

Once established in the West, normally for about two to three weeks, we would be flying concentrated periods with maybe a weekend off over the deployment. All personnel performed brilliantly – we worked hard and we played hard, but the job got done. We rotated our training personnel and instructors between NAS Nowra and where ever we were operating from to minimise restrictions on progressing the students at different levels of their conversions. This took a lot of planning and execution by both the Training and Operations staff, and flexibility by those under training. Almost every flight was a training flight and every maintenance evolution was being used to progress training and experience for embarked operations.

While HS 816 was a new capability for the Navy, two other major capabilities were also being built at that time – the Collins Class submarines in Adelaide and the Anzac Class frigates in Melbourne. The Squadron deployed four aircraft

Top, L & R. *Flypasts were an important part of any ceremony, and as the latest addition to aviation capability it was appropriate for the Seahawks to pay respect to new submarines and surface ships coming on line, as shown here for the Collins and Anzac classes respectively.* ***Lower.*** *The flypast of 723 Squadron in July of 1994 chalked up another 'under the bridge' event for the Fleet Air Arm. It was to lift the spirits of two of the Squadron's officers who were in Royal North Shore hospital undergoing treatment for cancer.* ✈

for the inaugural launching of Nuships *Collins* and *Anzac* on 28 August 1993 and 16 September 1994, respectively. Both of these detachments were a lot of fun and all participants knew that we were part of a significant growth in Navy's capabilities. And we got to tour the Barossa Valley and visit RAAF Bases Laverton and Point Cook, and HMAS *Cerberus* near Melbourne. There are still cartoons on the ceilings of the Port Adelaide RSL and the aforementioned Officers' Messes courtesy of the artistic skills of the former Lieutenant Commander Tony Dalton, and the human-ladder skills of the Squadron's officers.

But it was not all "beer and skittles" and we suffered a couple of sad occasions on the Squadron. Early 1993 our very popular and competent exchange officer from the USN had to return home to the USA having been diagnosed with bowel cancer. After immediate surgery, LEUT Curtis Shaub was flown back to Hawaii for further treatment while his wife, Kate, oversaw the finalisation of movement arrangements with the assistance of the Squadron. Curtis happily recovered and went on to command his own Seahawk Squadron in the USN and retired having also commanded an Amphibious Task Group as Commodore. He was replaced in November 1993 by LEUT Ricky Groenenboom, USN who continued the invaluable support and connection initiated by Curtis.

Separately, two other Squadron aircrew were also diagnosed with different forms of cancer and were interned in Sydney's Royal North Shore Hospital for treatment. While the successes of these treatments were ultimately only marginal, LCDR Laurie Beaven and LEUT Leigh Godlonton were accorded a Squadron flypast of eight Seahawks late in their hospitalisation before the formation flew under the Sydney Harbour Bridge and past Garden Island Dockyard enroute back to NAS Nowra. We're pretty sure that flypast on 11 July 1994 was somewhat uplifting for them though we were saddened in the following years when they both succumbed to their diseases.

Probably most sadly, one of Sydney Flight's junior sailors succumbed to undetected depression and committed suicide while detached to NAS Nowra in early 1994. This grievous loss was felt for several months particularly by the Flight members and his immediate friends in the Squadron.

Early in the new year of 1994, the Squadron detached four Seahawks to RAAF Base Richmond to assist in fighting extensive bushfires to the west and north of Sydney. The emergency caused the recall of all personnel to despatch the aircraft and support crews to operate in unison with Sea Kings and Squirrels from HS 817 and HC 723 Squadrons respectively. We rotated crews and flew spares and equipment from the Squadron to the detachment throughout the next couple of weeks fighting the fires. Teamwork between the squadrons, introduction of water bombing and the usual mantra of "getting the job done" all combined for enhancing the FAA's reputation for flexibility, adaptability and effectiveness. Unsurprisingly, it also set a precedent to approach the FAA on broader civil emergencies over the following years.

This was evidenced only a few months later when two Seahawks were dispatched at short notice to operate with HMAS *Sydney* in searching for a missing light aircraft operating on a scheduled service from Sydney to Lord Howe Island. Tragically, some wreckage was discovered but there were no survivors, including a newly married, honeymooning couple.

While the Sea King was probably a much more suitable aircraft for the purpose, our Seahawks were often called to provide VIP transport particularly between NAS Nowra, Sydney and Canberra. Where possible these were linked to training but this was rarely appropriate and these tasks normally fell to the senior staff of the Squadron. Over my tenure, the VIPs flown included the Governor General, Governor of NSW, Minister for Defence, CINC US Pacific Fleet and most of the RAN's admirals.

The Embarked Flights

All the way through these occurrences, the Squadron continued its primary role of generating and embarking Flights for the FFGs. The challenges were mentioned earlier but over my tenure we could see the change in attitude and build in support to enable this activity. My personal interaction with the ships' Commanding Officers of intended embarkations and also that of my senior aviators, went a long way in smoothing the way.

Left. *An S-70B-2 off Garden Island, WA showing its Mid-Life Upgrades including FLIR, ESM/ECM and SAR Emergency Location Beacon.* ***Below****. A Seahawk over the deck of an RAN Anzac Class frigate, which could only carry one aircraft. Note the RAST shuttle immediately below the fuselage.* ✈

Similarly, engagement with the senior staff officers of Maritime Command and inclusion in Fleet processes assisted with this cultural change. The Fleet Aviation staff became crucial in this liaison.

We became more engaged in the training processes for the ships and their command teams. We presented to Commanding Officer Courses, Principal Warfare Courses and Air Controller Courses. We updated and improved the scope of visits to the Squadron and we ensured our personnel also started attending such courses as students.

Use of the Air Warfare Systems Centre (AWSC) with its simulators assisted immensely in these aspirations alongside the obvious priority of training our aviators. Similarly, the Flight Deck Procedural Trainer (FDPT) also contributed to instigating greater understanding of the Fleet Air Arm by ships' personnel. But nothing substituted for Flight personnel contributing to ships' communal duties and the ability to either bring necessities to the ship or to urgently get a medical or compassionate case ashore, to break down any intransigent attitudes by ships companies to their incoming Flight.

The earlier interim B206 and AS350 Detachments and Flights had pioneered this work, but the formulating S-70B-2 training Detachments and embarked Flights still had to "punch through a pain barrier," and they did it well.

There was always a sense of pride, tinged with slight apprehension, when a Flight flew from the Squadron lines to first embark in their allocated ship. And there was always a relief and welcoming when the Flights returned from a deployment even if only for a short period; the maturity and confidence of those returning was always a source of great satisfaction not only in the individuals but also in recognition that the Fleet Air Arm was rebuilding its raison d'être.

As said earlier, when we commissioned, two S-70B-2 Detachments were embarked in FFGs. The Squadron was chartered with providing six Flights, one for each of the FFGs. We had generated four Flights by the time I left at the end of 1994 and a fifth was being constituted. Over the period we had also provided replacement personnel for several of the existing Flights. While many of the junior aviators and sailors might not have had any previous embarked experience, nearly all of the senior members of the Flights at least had had the benefit of service at sea in the interim B206 and AS350 Detachments and Flights. This helped enormously in the integration of our S-70B-2 Flights.

Flights Versus Detachments

Perhaps one of the more vexing issues confronted early in the Squadron's existence was the question of what we called our embarking elements and to whom the aviators belonged for command and administrative purposes. Flights and Detachments had distinctive implications and whether posted or loaned to the ships had different immediate and potentially future impacts as well. Flights implied that there was a transfer of full command from the Squadron to the ship whereas a Detachment meant that there was a transfer of tactical control but the Squadron retained command and administrative responsibilities. Similarly, payment of sea-going allowances and family relocation provisions were linked to postings and postings were to a particular and nominated unit.

The situation was further complicated by the lack of an authoritative Directorate of Naval Air Warfare, which was being run-down at that time. Similarly, this was exacerbated by the fact that, at least initially, we had more FFGs than Flights.

The ships, of course, preferred full command responsibility and this was the initial intention and basis for the number of aircraft and manning structure. However, from a Squadron perspective, the Detachment modus operandi provided far greater flexibility to transfer the aviation capability between ships and align experience to mission requirements. Similarly, provision of Detachments could allow the Squadron to utilise this arrangement to swap people around for training and/or experience-building requirements.

In the end, we bowed to the Flight arrangement largely because of the allowance implications, but it was somewhat prostituted when higher priority deployments arose and Flights were relatively regularly posted between ships, and the Squadron was largely left catching up with these movements. As the Flight numbers built, this became less problematic in

meeting FFG requirements, but once the FFHs started joining the Fleet and the SH-2G Sea Sprite program was cancelled, this issue returned. However, this was down the track from my considerations.

Moon Base Alpha, Kiwis, Computers and Navy Quality Management

SITU/HS 816 Squadron were established in HMAS *Albatross*' Command Building when the Base's commanding officer and staff shifted into the more centrally located and purpose-designed building in 1991. The aircraft and maintenance personnel were located across the road in J Hangar.

With the demise of the aircraft carrier HMAS *Melbourne* in June 1982 and the fixed-wing squadrons of the Fleet Air Arm between July 1982 and August 1984, the Navy was reliant on the Air Force for Fleet training requirements and air protection. By the end of that decade, it was apparent that Air Force was unable to meet these requirements due to its own priorities and the RNZAF were contracted to supply these services from February 1991. 2 Squadron RNZAF relocated from New Zealand with six A4K/TA4K Skyhawk aircraft to NAS Nowra, which in an ironic twist, saw the return of several ex-RAN Skyhawks to their old air station.

The Kiwi Contingent of about 60 personnel shared both Moon Base Alpha and J Hangar with HS 816 and the accord couldn't have been more harmonious. Indeed, most of us thought that other than the accents, we had seen a return of one of the Fleet Air Arm squadrons. There was a unified sense of operational purpose that emanated from these two Squadrons and a close level of camaraderie and cooperation quickly developed. Some of us even got a ride in the back of a Skyhawk and had the pleasure of introducing the Kiwis to helicopter flying, which was not as easy as they thought!

The S-70B-2 had about 25 computers within her systems, some of these having gestations from the US space industry. But, within the Squadron and across the shore-based areas of the Navy, computerisation was only just developing. Local area networks (LAN) and connection more broadly with other Navy networks (WAN), was progressed across the Squadron, largely led by the enthusiastic, younger members of the Squadron. In this, LEUT "Budgie" Parrott and Lieutenant Commander Tony Dalton on the aircrew-side of things and Sub-lieutenant Scott Lockey from our maintenance personnel, deserve a special mention. They persevered where many of us were frustrated by these challenges and were ready to walk away from this automation.

But this form of communication and data development was also a part of CN MacDougall's vision of Navy Quality Management (NQM) that was thrust on all elements of the Navy in a bid to modernise our culture and effectiveness as a fighting force. This was the era of "good ideas!" The only problem was that NQM was implemented doctrinally with no real understanding of cultural change management, and to many, at least initially, was seen purely as an imposition. It was assumed that having said that it would bring increased efficiencies and effectiveness, the outcomes would naturally follow! The seniors, including those at MHQ and at the Naval Air Station, blindly and bluntly sought these outcomes with little or no understanding of the associated complexities or inter-relationships, and were therefore of little or no example themselves.

Fortunately, the Squadron had a bright young engineer (LEUT Charlie Cowley) who had done a university elective on Quality Management and explained what preconditions would be needed for the successful introduction of NQM, at least at a local level. We worked closely on his advice and were making good inroads into cultural change within the Squadron, but found our more senior organisations defensive and almost dismissive, which was the antithesis of what NQM espoused. After a while we formed two NQM teams in the Squadron; one for actually achieving quality improvement within and a smaller team for just feeding nebulous ideas up the chain of command to keep them satisfied that we were ticking their box and to leave us alone to progress real initiatives.

Regrettably, this did not set me up well with the second Commodore of NAS Nowra (a civil qualified private pilot) under whom I served. The tensions continued with the increased imposition of his initiatives, which were not accompanied by explanation and had the very real potential to negatively impact the operational requirements of the Squadron. Representation to higher authorities at the time led to a "closing of the ranks" and a degree of ostracism. The outcome was two "not yet" recommendations for promotion and I spent a further ten years as a Commander. This has been the only negative of my career even though some of the jobs over that decade, were fantastic.

Manning and Spares

Perhaps one of the more challenging aspects that confronted the Squadron during my tenure related to the materiel side of things. Essentially, at the time of project negotiations through to aircraft delivery, Sikorsky was touting that the maintenance man hours to flying hour would be a ratio of 14 to 1. By the time I had finished my command this figure had more than doubled. This was important as our manning and spares support figures were based on the purported ratio and therefore short. In turn, this placed significant strain on the Squadron but particularly our maintainers.

The increasing ratio also reflected equipment meantime-between-failures was shortening and there was a lack of certain spare-parts either from the original manufacturer or in the Navy's stores holdings. Most of these issues related to the integrated sensor and data-base systems in the aircraft rather than the flying components of the S-70B-2. That many of these sub-systems were from foreign manufacturers, rather than Sikorsky itself, exacerbated issues once a failure occurred. This then led to pressure to commence robbery action between aircraft in an attempt to meet availability requirements.

Fast roping was the accepted method of inserting a boarding party onto a vessel in the shortest possible time, as was the case here onto the merchant vessel Grand Ocean 1. When available a second aircraft - often an AS350B Squirrel - would hover nearby with its 7,62mm machine gun, just to keep an eye on things. ✈

In the mid-1980's the Fleet Air Arm had experienced a similar situation with its Sea King helicopters whereby spares shortages and financial support for overhaul requirements were severely constrained. In turn, this led to almost continuous robbery action to meet operational and reputational requirements. This failure resulted in increasing maintenance man hours, with decreasing aircraft availability and subsequent loss of morale. It took a massive injection of capital to rectify this situation and return the Sea Kings to operational availability.

With the benefit of this experience, we had to be much more disciplined and robbery action only occurred after detailed consideration. But it did occur to meet absolute priorities.

Of course, the balance between maintaining the welfare of our maintainers and the operational priorities of the Fleet coupled with the sustainability of our training program, was a constant command tension and required frank and fearless representation to the resource managers of the Navy. Over time, I believe the commanding officers of HS 816 who followed probably also had similar challenges but I would like to think that we certainly provided the bedrock for ameliorating these effects.

Legacy

Over my HS 816 command, I was blessed with an extraordinary group of personnel across the Squadron, but I'd be remiss if I didn't single out the officers and the Flight Senior Maintenance Sailors.

Command of an air squadron vice that of a warship is different in many ways but the basic principles, values and accountabilities are very similar. The main difference is that command within a ship is usually constrained to those in the ship and can be approached as a singular unit. Command of a squadron can, and usually does, relates not only within the squadron but those who might be deployed well away from that support and advice. Aircraft captains and Mission Commanders are exercising command and control accountabilities respectively in their own right, while also simultaneously exercising responsibilities delegated from the squadron. Most of the former will relate to the safety and operation of the aircraft while the latter relate more to the reputational, administrative and technical aspects. In the aviation world these are hoisted on very young and junior shoulders.

Similarly, the FSMS' share the burden of technical authority usually in isolation from their squadron and its engineering officers. They are called upon not only to exercise accountabilities for the technical airworthiness of their assigned aircraft but become much more responsible for decisions within the engineering realm additional to those of a maintenance nature. These decisions can be crucial and can require immense courage to enact in situations of operational pressure.

Many of the officers under my command over that period on HS 816 Squadron rose to high positions within the Navy and Defence, and many of the Senior Sailors also rose to the most senior Warrant Officer positions within the Fleet Air Arm. Tim Barrett rose to be Vice Admiral and Chief of Navy; Mark Campbell to Rear Admiral along with Peter Laver; Tony Dalton attained Rear Admiral and then became a Deputy Secretary; Scott Lockey, Chris Smallhorn and Curtis Shaub (USN) became Commodores; Glenn Armstrong, Dave Cunningham, Ian Daley, John Schonberger, Frank Arena, Ken Steinman, Dwayne Unwin, Mouse Than, Bruce Tarvitt and Cocky Roach amongst others all became Warrant Officers and many served as Command Warrant Officers.

LCDR Leigh Costain was awarded a Chief of Navy Commendation for his professionalism and contributions during his tenure in SITU and HS 816 Squadron. LCDRTony Dalton was awarded a Maritime Commander's Commendation for his simultaneous training services to HS 817 and HS 816 Squadrons. Australia Day medallions were awarded to LEUT Bob Mayes, PO Steve Gibson and LS Bill Peters. CPO Dwayne Unwin won the prestigious Commodore Partington Award for his contributions to the professionalism of the Fleet Air Arm. The Squadron was awarded the McNichol Trophy for most effective Squadron in the 1992 Fleet Awards.

Of course, many of the more junior officers and sailors who also served in HS 816 during my tenure, were entitled though not individually recognised but went on to successful and rewarding careers in their own right, and I was equally proud of their achievements.

Personal

Being in command while learning to fly and operate a new aircraft is not an enviable situation. The challenges are consuming and it requires significant effort to maintain effective skills on all of the aspects of both commanding and flying. Add the other environmental issues as mentioned earlier, and this required vigilance throughout the tenure.

My abilities were severely tested a little over halfway through my command when the most junior of my Qualified Helicopter Instructors (LEUT Jeff Koneman) failed me on an annual Instrument Flying Test. This took great courage on his part and after a period of remedial training, I resat and passed the test under a more senior instructor (LCDR Tony Dalton) some weeks later. Their debriefs and insights had picked up a trend whereby the ground-based requirements of the command had diluted my concentration and maintenance of my personal flying skills. Thereafter, I and my senior team, ensured that I delegated more widely and I got to do more appropriate flying sorties to "keep my hand in." It was a valuable lesson and one I heeded for the remainder of my career.

As my time in command drew to an end in December 1994 and I prepared to hand over to CMDR Mal Wright, I believe that HS 816 was well established and progressing towards our ultimate goals in establishing the six ships' Flights and formal acceptance of the S-70B-2 into operational service. I was proud of our achievements over the 30 months of my command but was also conscious that organisationally the Fleet Air Arm needed to establish an overarching specialist headquarters to ensure that doctrinally and materially the Fleet's aviation capability was sustained. As such, one of my last acts was to submit these thoughts and proposals to higher authority. With similar thoughts being espoused by others, most notably CDRE Graham Sloper, AM, RAN, the Commander Australian Naval Aviation Force (CANA) was established 1 March 1996 under CAPT Keith Eames, RAN for these purposes.

Early on Thursday 15 December 1994, I launched in N24-008 (77) with LEUT Andrew Johnson as my Tacco for an ASW serial with Fleet units off Jervis Bay; four and a half hours later we landed on, taxied into the lines at the Squadron and shut down. It was my last operational flight in an S-70B-2 and the last entry in my logbook that commenced on 14 January 1977 when I started the flying phase of my Pilots Course. I had achieved just under 600 hours on the Seahawk of which over 460 were as aircraft captain, and had enjoyed only one incident during this tenure – a full-blown set of vertigo during a night ASW sortie 100nm to the west of Perth; the Tacco, LEUT Arthur Heather, proved his flying skills that night!

The following day, at lunchtime, I handed over command to Mal Wright having been feted to champagne and canapes with my Executive Officer, LCDR Mark Ogden and Air Engineering Officer, LCDR Rod Roberts and our wives at JB Bombing Range Observation Post – they too were being posted to new positions away from the Squadron. Over the next couple of weeks, my wife and I packed up our house at Vincentia, farewelled our friends and transferred to Darwin arriving in the last days of December for me to take-over from CMDR Warren Johnson as Chief of Staff, HMAS Coonawarra.

Final Note

On 1 December 2017 at NAS Nowra, Sonia and I proudly witnessed the retirement of the AS350 Squirrel and S-70B-2 Seahawk from the Navy. I had been intimately involved in the first years of service of both aircraft types and was extremely proud that, from then and notwithstanding their operation in the challenging environment at sea, not one of these aircraft had been lost. It was a remarkable achievement and a tribute to all who flew, maintained and supported them in the Fleet Air Arm over the following 33 and 28 years respectively. My association with both aircraft types and their service in the Navy was certainly one of the privileges of my career.

Perth WA. Sep 22. ✈

S-70B-2 Rimpac 1990

by Barry Trapp

RIMPAC 90 Rotor Head secured: In 1990, enroute to Hawaii, during First of Class trials for the embarked Seahawk in HMAS Adelaide, a hard landing resulted in the need for a rotor head change - a job usually handled by a land-based maintenance workshop but completed by the Adelaide Flight team: L to R – Barry Trap, Dale Butcher, Ian Daley, Bill Peters, David Doherty, and Henry Sweetland.

RIMPAC 90 Waimea: During liberty at Pearl Harbor the opportunity was taken to enjoy the surf at Waimea Bay.✈

Prelude

It had been just over 18 months since the last of the maintainers had returned to NAS Nowra from either Stratford, Connecticut or Mayport, Florida in the US for the initial S-70B-2 type courses. In that time frame we had set up the foundations of the Seahawk Introduction and Transition Unit (SITU) into what would become HS816 Squadron. The maintenance team had been welcomed back from the States and were lodged in a brand-new purpose-built two-story maintenance facility located on the runway side of and linked by a covered walkway to J Hangar.

Desks, chairs and even toilet paper were not provided at the time of tenancy - all of which required a level of resourcefulness to acquire. The initial budget to do this was $200 which was nearly expended on the first purchase of toilet paper. So, the initial maintenance and supply team had the pleasure of setting up a new Fleet Air Arm Squadron truly from scratch, not a pen, desk, tool, spare or maintenance publication was available.

Tool Control was created with all the shadow boards, complete with shiny new Snap-On tools – don't think any of us had seen brand new tools at a Squadron before, well certainly not me anyway! The GSE section was set up and laid out nicely, as was the ready use store, resplendent with clear storage boxes and labels, as well as a table tennis table. The decks in the maintenance admin building were polished to within an inch of their lives.

As the SITU maintenance and supply team had no aircraft or publications, table tennis became a relief from the day-to-day repetitive nature of buffing floors and wiping tools clean that have never been used. There were always some crates being delivered that required unpacking, which was like Xmas to some, every other week. Some of those who were handier with wood working would help with disposing of the boxes and crates, only to see some of them return in a different form that would be used around the squadron as racking or some form of furniture in the hangar.

We made good use of the opportunity to team build whenever we could. Sport and BBQs were definitely a part of the culture in the early days, and I wouldn't be too far off the mark if I said SITU won just about every HMAS Albatross sporting trophy up for grabs in late 1988 and into 1989. Some of the more elite of us also represented the navy in inter-service sport or the state in combined service for their chosen fields. Others, from Chiefs down completed Ship's Diver courses and spent many a Wednesday in Jervis Bay catching scallops and the like or cleaning up the rubbish in and around Creswell wharf.

It was only a matter of time before this idyllic but boring lifestyle came to an end and we would have to start putting into practice what we had learnt in the States. Seahawks were starting to be delivered and required support putting them together – although I'm sure the Sikorsky team had that covered.

The first eight aircraft were delivered on container ships and were transported to Nowra on low loaders. Teams would rotate up to the docks in Sydney to oversee the unloading from the car carriers and loading of the aircraft onto the low loaders. They would come off the ship when the Dockers got to it and I remember that convincing the truck drivers the aircraft needed to be supported by kneeling blocks and tie downs was a whole other form of diplomacy that, thankfully, CPO Rob (Bert) McNeil was able to put into practice.

There was recognition early in the piece of the importance that something had to be done to maintain our knowledge and build experience if we wanted to hit the ground running when we actually started flying. CPO John (Shonners) Schonberger organised a rotation for our guys to work with the newly formed 5th Aviation Regiment in Townsville. They were operating the S-70A-9 Blackhawks, and this would be seen as a good opportunity for us to maintain some technical mastery whilst helping our Air Force and Army brethren maintain their new aircraft. Note that the Air Force initially introduced Blackhawk into service and was in the process of handing them over to Army to maintain at this time. This was followed up with regular Air Force and Army personnel exchanges to SITU / 816 Sqn. The exchanges were a great experience and the learning invaluable, so much so that several of us rotated through on more enduring exchanges in later years.

Workups

The day finally came in early 1990 when we were told an aircraft would be going to sea to conduct First of Class Flight Trails (FOCFT) on HMAS Adelaide II (FFG01) as part of RIMPAC 90. Clearly there needed to be a

maintenance team to support such a trip. The team was selected and we had a few months to get coursed up in Nuclear, Biological and Chemical Defence Training (NBCDT) / Damage Control, Flight Deck Handling and preparing the ship to receive her first S-70B-2. Of all the challenges we faced, none was bigger than overcoming the ship integration issue after we said the gym and bike storage areas would need to be removed from the starboard hangar so us Birdies could park a helicopter in there. They already had to put up with a Squirrel taking up space in the other hangar. Needless to say, the ship's company took it in their stride, although I'm quite sure we were not the most welcome of guests for a period of time. The gym was placed in the aft sonobuoy room and that became the standard for FFGs.

So, storing ship – wow! There were three storerooms on an FFG assigned for embedded aviation spares. Mick Cleasby, from the project team, helped with identifying the parts we would need and where they would go. It took us a good couple of weeks to get this set up the way we wanted. Determining where to put all the test equipment and GSE was another issue! There were stowages around the hangars and on the hangar bulkheads. Some of the equipment had evolved since the concept and the stowages were no longer the right sizes for some of the equipment, but we improvised and adapted them to suit to ensure we were sea ready.

Embarkation

Everything was secured for sea so when we joined the ship the night before sailing we ventured out to toast a good trip and new era of the Fleet Air Arm with a few pre-sailing refreshments, as you do the night before you sail.

It was just before lunchtime when we reached Sydney Heads and turned about 45 degrees to port and set sail for Hawaii. It was really happening: "Hands to Flying Stations", nets lowered, FOD walks completed, and Rapid Securing Device (RSD) ranged in the middle of the flight deck near the centre line "H" circle.

We had seen the RSDs as a part of our training, but this was the first time many of us had seen one in action in real life. Questions like "How is the pilot going to land a probe into that thing?", "How are we going to align the aircraft to get in the hangar?" and lots of "What the hell are they thinking?" was asked. Anyway with the aircraft inbound, it was time to stop wondering and start doing. I was on earthing wand duties and Henry (H) Sweetland would marry the Messenger and Haul down Cables. How hard could that be?

Well, we went out to the RSD and waited for the aircraft to hover over the top of us and begin to lower the messenger cable. And lower the Messenger Cable it did. When was it going to stop?! It reminded me of that Far Side cartoon where the spider is sitting on a branch after being scared by another and his web is all over the ground. There was Messenger Cable everywhere!

Somehow we got the Haul down Cable hooked up without being caught up in all the loose Messenger Cable and went back inside the hangar to prepare for chocks and lashings. The aircraft was successfully pulled down into the RSD and the Jaws were closed and the aircraft "trapped". Needless to say all went fairly well and we accepted the practice as advertised, just had to be careful that the Messenger cable didn't wrap around anybody's neck.

We continued Deck Landing Practice (DLP) for the next couple of hours with various ship's company coming for a look through the hangar personnel access door peepholes to see what was happening.

One activity we did that I am so happy we never did after this trip was wiping down the tail oleo and removing the salt build up from the gland seal of the strut. This involved the pilot hovering the aircraft in a 5-foot hover over the rear of the flight deck at the end of the last flight of the day, one of us earthing the aircraft, one person spraying OM-15 on the strut and another wiping the salt off. It was bad enough during calm weather but when it got a little bumpy it was quite dangerous - especially when the sonobuoy antenna was tapping you on the head or shoulders. Well done to WO Jeff (Bungy) Williams for designing the tail oleo wiper, which was an enduring modification until withdrawal date of the aircraft.

Then it came time to shut down. That all happened without a hitch. We were told we were going to practice straightening, stowing and ranging. Bear in mind, only one or two of us had ever done this before and when we saw the tail wheel tyres trying to be peeled from the rims during the alignment phase this was hard for us to comprehend that this was all good. Those readers who have been on an FFG with Seahawks will understand what I mean.

The Rapid Securing Device at work. The messenger cable has been lowered and attached to the RAST probe, which is being pulled into the aircraft - you can see it just under the fuselage. Once it has been secured the Haul Down cable, shown here being held by the figure in the green hat, will be tensioned and then, when the pilot is ready, the aircraft will be pulled onto the deck, aligning with the RAST trap on the LHS. ✈

For those that haven't, I'll briefly explain the process. With the aircraft Recovery Assist Secure and Traverse (RAST) probe in the RSD trap, and with two straightening cables attached to the port and stbd tail cone tie down points, the aircraft is moved slightly forward or aft, depending on where the RAST probe is in relation to the deck, as the tail is pulled to either fully port or stbd. This looks horrendous and most birdies on first seeing this activity think the tail cone will be permanently deformed or in the worst case ripped off. The aircraft is then moved forward, and the jaws of the RSD are allowed to travel while the tail cone is pulled in the opposite direction to that of the first manoeuvre; and low and behold the aircraft is lined up with the RSD track and can now be pulled into the hangar via the RSD cables.

It was a long first day and by the time we were ready to finally stow the aircraft the weather had taken a turn for the worse. A couple of us found ourselves looking over the side of the ship at the phosphorescence in the water and, adding excellent fishing burley that once looked like a nice lunchtime scran. The aircraft was put to bed, and we did the same thing.

First Of Class Flight Trials

The next day presented itself well with a bit of swell, not always following, and a fair breeze. All the better for FOCFT. Finally, some opportunity to validate the Ship Helicopter Operating Limits (SHOL) and test some handling limitations for the pilots. You could see the team from the Aircraft Maintenance and Flight Trials Unit (AMAFTU) rubbing their hands in glee as they prepared all their orange equipment on board for this very purpose and were not afraid to use it. The aircraft was equipped with the instrumentation and onwards we went. DLPs; Recovery Assisted, Free Deck, Clear Deck, changes to pitch and roll, changes to relative wind. You name it, the team did it.

FOCFT continued into the night with deteriorating weather. There was lightning in the distance and we were being hit by squalls now and then.

The RSD maintenance stoker came up to the hangar as a part of his rounds. He looked through the peephole in the door to hangar and asked, "What is the white cable down the side of the aircraft?" He was promptly told it was the HF antenna, to which he replied, "Should it be flapping around like that?"

OK, that had our attention. The WO got up and had a look and I can only imagine what was running through his mind when he passed the message to the Landing Signalling Officer (LSO) to request the aircraft be secured on deck and shut down until we could determine the issue.

Long story short; the cameras and instrumentation fitted to the aircraft identified the flying pilot pulled back on the cyclic during a landing sequence where the aircraft lurched forward after the RAST probe had impacted the RSD behind the trap mouth. The change of the rotor disk angle was sufficiently quick enough, noting the airframe couldn't react, that it dipped down far enough to strike the HF stanchion and intermediate gearbox fairing incurring a sudden stoppage of the Main Rotor Head (MRH). The Naval Aircraft Logistics Office (NALO) provided direction that the aircraft was not to be flown until advice had been provided by the OEM, Sikorsky.

Well, we couldn't just sit around and do nothing, so we hit the books. What was involved with a sudden stoppage? What could we do at sea? The answers and more would be known very soon.

While some of the guys continued their research others went about repairing what we could. Bill Peters and Dale (Butch) Butcher got some fibreglass and repaired the fairing, complete with French Grey finish. Dave (Doc) Doherty and I filled the dent in the leading edge of the main rotor blade abrasion strip while H and Ian (Skills) Daley looked at replacing the HF long wire. That was all good for a morning's work, now what?

Word worked its way back through the channels that confirmed the aircraft had experienced a sudden stoppage requiring a MRH replacement when we got to Hawaii – great!

For the next week and a bit we made ourselves scarce where we could and when we couldn't we helped out with whole of ship jobs like café party, scullery, watch on deck and relieving the ship's company Flight Deck Team to support the Squirrel (AS350B) flying ops. We also took the time for some very important planning for the MRH change out and some of the finer details, like, working out where we were going to put the main rotor blades. This was broken up with a distraction of that age old tradition of Crossing-the-Line. Those who hadn't crossed the line did so in the finest of graces and, those who had, made it their goal for the day to ensure it was memorable for all.

Needless to say, that was a wrap for the FOCFT for this deployment.

Alongside Pearl Harbour

The ship arrived at our berth in Pearl Harbour, greeted not by Hula dancers as you would expect but by a big box sitting on the wharf housing our Main Rotor Head alongside other smaller boxes for the ship itself. All the post sailing wash down was carried out and then "Liberty men not required for duty" was piped. We had the dubious honour of receiving some advice from the crew as they stepped ashore and we started dismantling the aircraft. Pay backs for the hangar, and another first for us all.

The blades were removed using a block and tackle coupled to the aft Replenishment At Sea (RAS) Jackstay station and then placed in cradles built by the Chippies – yes, we still had those then. It was pretty late in the afternoon by that stage and for the sake of everyone's morale we stepped ashore to the Pianola Café on the base, or the Howdy Doody Bar as it became more affectionately known.

We started removing the MRH the next day. First by removing the damper accumulator and slip rings, followed by disconnecting the rotating scissor bolts securing the lower pressure plate and, finally, we removed the lower pressure plate bolts. The pressure plate is secured to the shaft extension by 18 bolts forcing two conical half bearings captured in a cage against the corresponding face of the shaft extension; the mating faces are angled in a kind of morse taper. Torquing the lower pressure plate bolts against the main rotor head nut ensured a friction bond was transferred by the split cones into the shaft extension.

When the pressure plate was released, to say the 'BANG' from the cones letting go scared the bejeezus out of us is an understatement – remember the spider?

RIMPAC 90 HMAS Adelaide Flight comp: HMAS Adelaide Flight maintainers for RIMPAC 1990: Back L to R: WOATWL Jeff Williams; CPOATA Rob McNeil; CPOATC Ian Daley; POATWL Rod Walsh; LSATWL Terry Bulley; POATA David Doherty. Front L to R: LSATA Dale Butcher; ABATA Barry Trapp; LSATA Henry Sweetland; LSATA Bill Peters. ✈

We took our time; reading, planning, doing, checking and repeat. Finally in the afternoon of the second day and after shuffling the aircraft forward and back along the RAST track the MRH was hoisted clear and lowered onto a makeshift cradle. Good job by all and just in time for the first of our Shore Patrol duties!

We spent the next few days working from sunup until sunset installing the MRH and all the finer details that go along with the job. Our good run came to an end when we tried but couldn't line up the indexing marks of the shaft extension and lower pressure plate; it always seemed to be a tooth out of alignment or something. We received some advice from the Sikorsky guys who indicated that near enough was good enough and there was sufficient tolerance to align the blade fold indexing. So, we continued, only to find out that now the lower pressure plate wasn't seating evenly. More frustration and some hours later we finally seated the pressure plate through small incremental changes of the torque wrench. We were there that long I wouldn't be surprised if our body outlines were burnt into the paint around the MRGB fairings.

The main rotor damper accumulator was installed. The blades were fitted not long after. Following the charging of the accumulator, it was now up to Terry (Ted) Bulley and Rod (Snog) Walsh to adjust the blade fold micro switches. They were in the groove! There were some lock wiring skills on show that afternoon, let me tell you!

We finally had the aircraft in a state where we could fold and spread and go for our first ground run – track and balance then vibes. Problem was there was no aircraft ground running permitted alongside, therefore, we would have to wait until we sailed… in a couple of days. Time for some much-needed team and morale boosting activity.

So, what does everyone do whilst in Hawaii? Surf, beers and convertible Mustangs come to mind.

We hired three Mustangs between 8 of us and set off into Waikiki. We were in our element; formation driving with coordinated roof opening and closing as we drove through the finest tourist streets of Hawaii. We all wanted to see and do as much as we could so headed over to Waimea Bay for some surf – cowabunga dudes! With some re-purposed serving trays on loan from a famous family restaurant we set off for a well-earned break at a well-known break. So good!

The afternoon was becoming a bit long in the tooth by the time we set off back to Pearl Harbour to reunite with the ship, our home, and change for a night on the town. We continued with the formation driving along the highway back to Pearl and even chanced our luck with some RAS serials along the way – that being, "Replenishment At Speed". By the time we got back and changed I think we only made it as far as the Howdy Doody Bar on base.

Getting Back to Business

The ship sailed as planned and we began a slow, frustrating and arduous day trying to track and balance the Seahawk whist underway. I wouldn't say it was a first to track and balance a S-70B-2 but it was certainly our first underway and our lack of experience showed. We were not making much progress and it was finally decided that a limited crew would head off to Barber's Point to complete the track, balance and vibes. The WO, Butch and Bill headed ashore the next day to smooth the aircraft. Must have done all right because they were back on board the following day. There was a change out of crew with Doc making way for CPO Rob (Bert)

McNeil to join.

Now that the aircraft was serviceable, we had to continue with our support for the qualification of the Magnetic Anomaly Detection (MAD) system whilst the guys from Canadian Aviation Electronics were accessible. The complete Seahawk Flight disembarked from the ship and worked from NAS Barber's Point where we shared a hangar with HSL-37, a Sea Sprite Squadron with the US Navy. Our aircraft was required to be locked each night and it wasn't long before someone forgot the keys. Not a good look but the emergency exit windows received a functional check that morning.

We prepared the aircraft for several flights over the week to use the Pacific Missile Range Facility (PMRF) and also another track and balance and vibe run to give the newly arrived aircrew more confidence in the serviceability of the aircraft and the maintenance team – no problem; within limits and we cracked on. Even managed a NAVEX that a couple of us were privileged to experience – thank you

Throughout the week we worked hard and took every opportunity to play some sport or shop at the PX in between flights and maintenance. We introduced some of the HSL-37 guys to touch football on the beach, which, somehow, turned into a game of tackle before it was decided to keep the peace with a BBQ on the beach; certainly beat the steel beach BBQs we had recently experienced onboard on the way over.

We continued to work out of Barber's Point even when the ship berthed after her first sea phase of RIMPAC, although the Shore Patrol and duty watch roster was always there to remind us of where we belonged. It wasn't long before the second sea phase was upon us and Adelaide sailed again while we set off for NAF Barking Sands, Kauai, for more testing and evaluation.

Kauai was beautiful and green and wasn't suffering from the tourist commercialism of Oahu. Barking Sands was so different to Barber's Point where it wasn't subject to the same operational tempo of its sister unit. So much so we had the airfield and a hangar to ourselves. Anyway, we kept up the testing of the MAD and aircrew had access to the PMRF until the system was given the thumbs up. It would be fair to say that at the end of this activity we were all fairly "boffed up" on degaussing and rivet replacement.

We joined the ship for the final sea phase of RIMPAC. Having worked ashore for the previous few weeks we needed to become more familiar with Seahawk flight deck ops on FFGs.

Bert McNeil's first introduction to Recovery Assisted landings at sea also made way for some improvements to the way we operated on the flight deck. He joined me on the flight deck during one of the landings, the spider web of Messenger Cable was lowered, I earthed it and Bert grabbed the probe to marry with the Haul down Cable. Now, I'm still not sure how this happened, but the Messenger Cable managed to wrap around the CPO's neck – not a good look for me! In a moment of fight or flight I managed to untangle the cable and we cleared the deck. Bert reckons he has never done or supervised another RA since. I think the experience must have left him a tad tense. He worked with the aircrew on timings and signals from the LSO regarding the lowering of the Messenger Probe to ensure no-one was put in that situation again.

Homeward Bound

We finished the MAD system testing and RIMPAC with little to no fanfare, did the last of our Shore Patrol duties and left the shores of Hawaii behind us for the Polynesian islands of Tahiti and Tonga.

Tahiti was nice and as we were the first Australian ship to visit Papeete in something like 20 years, they pulled out all stops to welcomes us. The Seahawk hangar was used as the hula girls changing room. Pity they didn't inform us beforehand that they were getting changed there as the we would have closed the hangar doors; many a sailor had a view of a Tahitian beauty not generally seen since Captain Cook sailed that way a few centuries ago.

Some of the ship's company had their better halves meet them for the weekend. Green mountains and scenery, a nice Polynesian French Provençal feel to the town, but the black sand really held the heat and was a little hard to get used to after the white sands of Hawaii. We made the most of it, though, and a few of us hired a car and drove around the island. Very nice.

Our greeting in Tonga was just as welcoming. The ship was only alongside for a couple of days so had to make the visit worthwhile. The officers and senior sailors hosted a cocktail party on board on the first night, which, I had duty and helped with the service. This was reciprocated the next day at the Tongan naval base and hosted by the Crown Prince of Tonga.

The next day was gorgeous so a few of the ship's company and the qualified birdies (Bert, Butch and I) went diving for the day. I had never dived in waters so clear! I looked up from 20 metres and could see the outline of our dive boat as clear as day. Diving around the coral reefs and quays was an absolute blast and, to this day, I would recommend it to anyone. When we returned, we found out that the junior sailors were having their own cocktail night on the ship. Short Leave Cards were handed in and we enjoyed a night reliving some of the stories from Hawaii over a few frothies. Was a great night!

I don't remember too much happening that is worthy of writing down on the return trip to Sydney. I remember it got cold quick and the ocean became lumpier. The aircraft disembarked before we pulled alongside Fleet Base East and we set about organising all the equipment to be relocated back to the Squadron, but that could wait until next week.

Lessons Learned and Wrap Up

The next few weeks back at the squadron were a bit of a blur; leave, reviewing the things we did, documenting them for the purpose of writing up SOPs and other learning opportunities, donning anti-flash whilst we spun some good Class 3 warries, oh yeah, and corrosion control. We learnt that "wet assembled" is not the same for Seahawks as it was with Wessex and Sea Kings!

It really only seemed to be a few weeks getting back to the normality of squadron (SITU) life when late on a Friday morning (Birdies will understand the significance of a Friday routine) the then Prime Minister, Bob Hawke, announced that Australia would be sending 2 frigates and a supply ship with Squirrel and Seahawk helicopters embarked to support the Multinational Naval Force then assembling to enforce sanctions in the Middle East against Iraq, following the annexation of Kuwait.

But that is a story for another time… Barry Trapp. ✈

Memories of the S-70B-2

by Chris Young

Of my time with the S-70B aircraft I recall two specific chapters. The first was my involvement with HS816 squadron which entailed a considerable amount of discussion surrounding who would ultimately crew the aircraft.

I was the first CPOA posted to HS816 Squadron and joined as the Training Development Officer. Initially, I was not qualified on the S-70B and therefore did not perform any flying duties. This would later change as the Squadron undertook a new direction with the addition of Aircrewmen moving into the Sensor Operator's position in the 'back seat' of the aircraft.

The Aircrewman Question

As it happened my connection to the Seahawk program began before being posted to 816 Squadron. In the lead-up to and in the early days following re-commissioning, the final crew composition had not been finalised. At the outset, it was decided that in addition to the Captain of the aircraft two Observers would undertake the tactical coordinator and Sensor Operator roles.

The argument back then was that non-commissioned aircrew would not be able to perform the duties of Sensor Operator due to the highly technical and complex nature of the roll. The Warrant Officer Aircrewman together with a number of others continued to prosecute the case for the inclusion of Aircrewmen in the Seahawk.

During this time there was an abundance of uncertainty surrounding the future prospects of, and indeed the need for, Aircrewmen in the Fleet Air Arm. This prompted me, along with the others, to contribute my own proposal detailing the benefits of using Aircrewmen in the Seahawk Sensor role. Chief among them the fact that the United State Navy used non-commissioned aircrew in the same role very effectively.

Finding a Way Forward

At the time I made the submission I was a Petty Officer in the HS748 Electronic Warfare Flight. In addition to the EW role the 748 was used for transport duties and on many occasions with Senior Naval Officers as the passenger. On one trip our passenger happened to be the Fleet Commander.

As it turned out some years earlier his aide and I had served together in HMAS *Wewak*. Following the usual catch-up on our time together in *Wewak* we ended up on the topic of Aircrewmen not being considered in the Sensor Operator's role and the submission I had earlier put forward to the Fleet Commander. I briefly covered what I considered to be the benefits of our inclusion in the Seahawk.

Later in the flight the aide advised me the Admiral would like to see me for what I thought would be a request for in-flight refreshments. To my surprise, the Admiral invited me to take a seat, which I immediately did of course. While I do not recall the exact conversation it went along the lines of "I understand you have some ideas about putting Aircrewmen in the Seahawk. I'd like to hear them." As a result, the Admiral instructed me to forward my submission to his office directly, which I did.

Joining HS816 Squadron

Not too long after that I was posted to HS816 along with a number of other Aircrewmen. As our numbers grew I became qualified on type for the Seahawk performing flight duties in the Utility/SAR role, which brings me to the second notable occasion with the S-70B. As a qualified Aircrewman I was lucky enough to be a member of the crew involved in the rescue of the French yachtswoman Isabelle Autissier on the 1st of January 1995. The other Aircrewman chosen to make up the 'back seat' element of that rescue was Petty Officer Shane Pashley.

Ms Autissier was a competitor in the BOC Round The World Challenge yacht race, sailing her $1 million 18-metre yacht *Ecureuil Poitou Charentes 2*. But in the Cape Town to Sydney leg, deep in the southern Indian Ocean, the yacht was dismasted during a storm and later hit by a rogue wave which smashed watertight compartments. Disabled and drifting some 800 nautical miles (1,481 km) SSW of Adelaide, Isabelle activated an emergency position indicating radio beacon (EPIRB) which triggered the search and rescue operation.

Meanwhile, together with my wife Vicki, our sons Lloyd and Tyson, I was preparing to drive from our home at Cambewarra NSW to Brisbane for the Christmas leave period. Just prior to leaving I received a phone call recalling me to NAS Nowra for an important task.

The Trans-Australia Flight

Subsequently at 1700 on 29 December 1994, in Seahawk N24-008 with a highly trained crew we departed NAS Nowra to fly across the country heading for Albany Western Australia to rendezvous with HMAS *Darwin*. (CMDR Davyd Thomas). We logged 14.8 hours from Nowra to Albany. Meanwhile *Darwin* was making good progress making its way from Fleet Base West. On 30 December we departed Albany at 1630 and flew 150 nautical miles south touching down on *Darwin* 1.7 hours later.

After securing the Seahawk we all settled into our respective messes. I acquainted myself with the Chiefs' mess and a number of other newcomers to the ship. Some had been seconded from other billets in WA as many of *Darwin's* crew were on Christmas leave and could not make it

back to the ship in time for her urgent departure. In the true spirit of the Navy not a single person I met had anything negative to say about how we all found ourselves sailing away from Australia and our loved ones at such short notice.

The French embassy had arranged an interpreter to accompany us to overcome any possible language difficulties that we may encounter. I can't be sure but presumably at the request of the Australian Government or RAN. I don't remember his name, but I certainly remember him telling his story. He recounted how the embassy had chosen one of his colleagues who it seems was not entirely enamoured with the prospect of spending his New Year's Eve at sea.

Our interpreter's first sober memory of the incident was waking up on an Australian warship heading into the rising and falling Southern Ocean. Apparently his countryman found him in a bar, and given his relaxed disposition, very easily persuaded him to take his place. A number of civilian personnel including the interpreter had been chosen to accompany us on the rescue with the media scrambling to get a seat.

Preparing For The Rescue

Following a short break the remainder of the passage south was spent preparing for the rescue. In the very early hours of the 1st of January 1995 we briefed the sortie and launched the Seahawk from the deck of HMAS *Darwin* at 3.15 am. LCDR Mark Campbell, an Observer with years of experience, coordinated with the RAAF P3C Orion on station to safely navigate us to the distressed yacht.

I remember arriving at *Ecureuil* and seeing Ms Autissier in her bright orange wet weather gear looking wholly ready to be extracted from her damaged yacht and the unrelenting ocean. As a crew we assessed what lay before us and decided on our approach.

After conning the aircraft above the yacht I winched a very cool, calm and collected Shane Pashley down to *Ecureuil's* deck. There was very little time in between the wave sets. It was a matter of timing where the ocean acquiesced enough to allow me to put Shane down, to gain his footing, secure Isabelle into the rescue strop then signal to me they were ready to lift.

My job was to keep the aircraft overhead and ensure that I didn't allow the winch cable to become entangled with any fittings on the yacht, or worse, wrap around Shane and/or Isabelle. Moreover, I had to ensure I didn't allow Shane to swing like a pendulum and become a human wrecking ball, knocking her into the water compounding an already precarious situation.

Winched Aboard The S-70B-2

Once secured and the thumbs-up given I winched them both to the door and helped them inside the aircraft to the safety of their seats. After strapping Isabelle into her seat and checking for any obvious injuries I offered her hot soup which had been prepared by the chefs back onboard. She clasped the container with both hands and was grateful.

Next, competing with the aircraft noise, I asked her what she would like for breakfast on our return to the ship. Her request of bacon and eggs would be an easy order for the galley crew to arrange. LCDR Campbell navigated us back to the ship where Shane and the interpreter escorted Isabelle to the hangar, which was abuzz with an entourage of media, other personnel and the all-important medical team.

Importantly the rescue went to plan. The Seahawk S70B flew some distance from *Darwin* to the stricken yacht. The round trip from launch to land-on with a grateful Isabelle was just 48 minutes - job done.

Departing the rescue scene *Darwin* set course for South Australian waters. On 02 January about 300 nm south of Adelaide we launched the Seahawk from the flight-deck flying Isabelle to RAAF Base Edinburgh for onward travel.

Return To NAS Nowra

Our overnight stay at the RAAF base was where I saw my first media coverage of that rescue. It seems the Australian Defence efforts were making world news which was news to me. After leaving Edinburgh at 0900 on the 3rd of January 1995 we finally landed at the Naval Air Station, HMAS *Albatross*, 6.1 hours later.

From an aviation perspective, being able to complete that task was testament to the professionalism of the squadron maintenance teams who ensured the aircraft was at all times serviceable and available to deliver all that was required of it. Of course there were numerous others behind the scenes that I never got to meet that made all of the wheels turn smoothly.

I look back on my time in HS816, and indeed my time in the Navy, with great pride to know I was able to play a small part in a very big machine that makes magic like that just happen. ✈

Onboard DARWIN after the rescue – back row l to r: CPOATC Tony Grogan, SBLT Shane Craig, CPOA Chris Young, LCDR Tony Dalton, LCDR Mark Campbell, POA Shane Pashley, LSATWL Ron Pritchard, ABATA Chris Coglan. Front row: ABATWL Chris Tonkin, French interpreter, ABATWL Chris Lofts, LEUT Chris Mushan, Isabelle Autissier, LEUT Nick Turvey, ABATA Danny Geal. These men made up the aircrew and maintenance team which rescued the stricken solo yachtswoman. All photos courtesy "The West Australian" newspaper.

Ex-RAN S-70B-2s on display

Should you wish to see one of the former RAN Seahawk S-70B-2 helicopters the following museums have one on display:

870 is found at the Fleet Air Arm Museum at Nowra, NSW.

872 is located at the Australian War Memorial, Canberra.

875 is on display at the Australia National Maritime Museum, Sydney.

References and Acknowledgements

816 Squadron history; RAN Navy News; Defence Science & Technology Organisation; Sikorsky Archives; Australian War Museum; The Canberra Times; Navy Quarterly - Spring 1992; Pacific Defence Reporter Oct 1983; Shephard's Defence Helicopter Dec 1989; Australian Aviation Jan/Feb 1997; NATOPS Flight Manual SH-60B; Air Vectors; Wikipedia.

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'Imitate the action of the Tiger'

With tighter budgets, the ability to use FAA aircraft for PR events became increasingly restricted, but the delivery of the trophy for this NRL World Cup Grand Final match in November 2008 was too good a recruiting opportunity to miss - seldom would an event have a captive audience of this size. Inset: CMDR Chris Smallhorn, CO HS816, delivers the trophy to NRL officials. Regrettably, the match didn't go the way of Australia, with New Zealand taking the honours. ✈