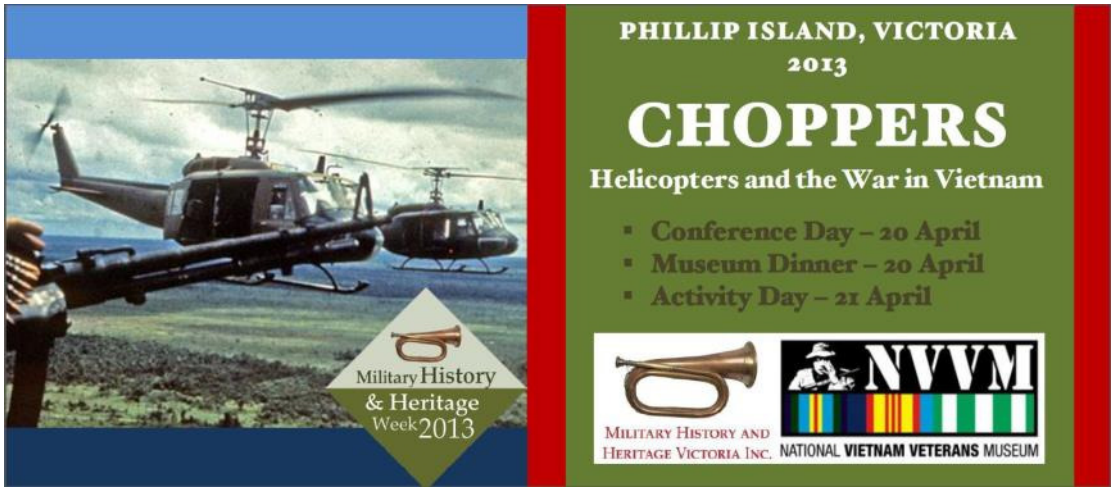


CHOPPERS: HELICOPTERS AND THE VIETNAM WAR

MILITARY HISTORY AND HERITAGE VICTORIA INC.

THE PROCEEDINGS OF THE CONFERENCE HELD AT THE NATIONAL VIETNAM VETERAN'S MUSEUM, PHILLIP ISLAND BY MILITARY HISTORY AND HERITAGE VICTORIA

20 APRIL 2013

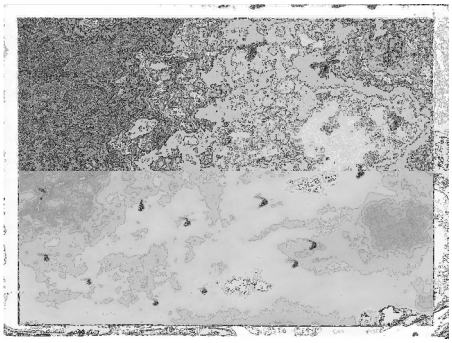
Proudly supported by: BIG SKY PUBLISHING

Huey Support in Vietnam

Air Vice-Marshall E M Weller, AM (RAAF Retired)

At the outset, I need to qualify this presentation to the extent that it is based on my personal experiences as the Senior Engineering Officer of No 9 Squadron (9SQN) during its operations in Vietnam in the period November 1970 to November 1971.

Here is a formation of 9SQN's full complement of sixteen Iroquois helicopters over Vung Tau in November 1971 a month or so before its departure from Vietnam after five and a half years of active service. Occasionally, all sixteen aircraft were flown on operations but perhaps the image can draw us to think of the support needed to keep those aircraft mission worthy and that's the objective of this presentation. Iconic though the Iroquois might have been to the Vietnam conflict, the Huey couldn't have flown unless it had been adequately supported.



So my scope will include the factors which impacted on how support was organised and conducted, the maintenance regime for the aircraft, some crucial technical and sustainability issues, command and control issues and finally, the drawing of some conclusions and lessons that might be gained from the commitment of a unique aircraft to a battle field environment for 5.5 years.

In my judgement there are three overriding factors that affected the support of the 9SQN Huey; one, the RAAF of the sixties, two, the Huey itself as a platform and thirdly, the operating and support environments.

The RAAF of the sixties was a decade removed from its last war and thus its support policies were largely a product of World War 2 and Korea but being varied by the aviation technologies of that era and also by the developing tendency of its combat aircraft to be of US origin. As importantly, the RAAF of the sixties was a very busy air force characterised by one, having forty percent of its operational force committed to South East Asia. And two, a halcyon period of aircraft acquisitions and the consequent introduction of advanced aircraft. The RAAF's technical capability was enhanced by a significant degree of in-house' logistics in its maintenance squadrons and aircraft and stores depots that, as I will argue, acted as a valuable reserve capacity force. An in-house airfield construction squadron also proved an invaluable capability.

With commitments to the Five Power Defence Arrangement in South East Asia, fighter squadrons at Butterworth required manpower support from Williamtown parent squadrons whilst the three squadrons permanently deployed on active service in Vietnam, 2SQN - Canberra, 9SQN – Iroquois and 35SQN – Caribou, also needed personnel rotations from Australian based squadrons. Additionally, a fighter squadron was based at Ubon for part of

this time. To meet these needs, the RAAF's size was about 24,000 and yet the organisation and its people were under strain to meet a range of competing and diverse obligations.

So into this pressure cooker of an air force, the Huey was introduced as a new capability in the early sixties and within four years, committed to active service with 9SQN. Its design is known well enough but from a support viewpoint, it can be characterised as a mechanical contrivance with a relatively simple design of the fifties that involved much rotating componentry, shafting and bearings exposed to the elements. It had limited avionics, a basic 'teeter' main rotor with an unstable control system that required 'hands-on' flying and no auto pilot or automatic hovering system, no anti threat (air or ground) capability and very limited crashworthiness.

Conversely, the Huey had several notable operational characteristics that aided support; it was highly interoperable and a genuine utility helicopter adaptable to varying roles in its standard configuration or through local modification. Moreover, the Huey was relatively reliable, dependable and maintainable and battle damage tolerant.

In considering the operational and support environments, I need to outline the nature of 9SQN in 1971. The squadron had been deployed in Vietnam for four years and thus was reasonably well established in respect of facilities and procedures. Its unit aircraft establishment was set at sixteen aircraft with twelve general purpose 'slicks' for army support and four gunships in that dedicated role. Daily, the on line requirement was for nine slicks and three gunships. A very challenging annual rate of effort of 14,000 hours meant that each tail number accrued almost 1000 hours in a year and set a punishing schedule of regular scheduled maintenance.

Despite the Huey's simplicity, the operating and support environments had a large and adverse impact on support. With a high operational tempo, the aircraft required significant maintenance. The nature of operations with short sortie times and frequent shutdowns created high usage rates particularly for engines, gearboxes and batteries. Many sorties involved high all up weights that required engines and transmissions to be operating at maximum power. Indeed, a gunship with full fuel and ammunition generally lifted off at maximum all up weight or if the truth be known at some 500lbs higher.

The impact on engines can be gauged by a single statistic; that is, in the five years of 9SQN Vietnam operations, only one engine achieved its scheduled overhaul life. All others were unscheduled removals often for loss of power or oil leaks and this was despite the use of an engine repair shop that allowed compressors to be cleaned and blading replaced.

Role changes were frequent although often the utility of the Huey simply allowed reallocation of the aircraft without configuration change. But the change of a slick to gunship or vice versa involved significant effort that often had to be undertaken at short notice and sometimes at Nui Dat. Battle damage repair and aircraft recovery obviously became necessary as a result of operations. Significantly, a high rate of serviceability was needed and an average of 91% was actually achieved across the five years of Vietnam operations.

From a support perspective, the environment was largely a product of the geographical positioning of the squadron at Vung Tau airfield in Phuoc Tuoy province (about 10 minutes flying from Nui Dat). There has been some conjecture about the basing of 9SQN at Vung Tau rather than Nui Dat, but in reality and from a maintenance perspective, it was a wise decision that provided a secure base where maintenance could be safely carried around the clock.

By 1970, squadron maintenance was conducted in a good hangar purpose built by No 5 Airfield Construction Squadron together with adequate hard standing, perforated steel plate (psp) taxiways and sound aircraft revetments. These were quite good facilities and far removed from the tentage of early days in 1966. A forward maintenance and rearm facility together with a 'dust-off' pad was used to provide support to during squadron operations. The weather was monsoonal with very predictable wet and dry seasons that were always hot with heavy rain in the wet and much dust in the dry. Dust, sand and water impacted on the exposed bearings and shafting of the Huey.

An extremely important factor was that support and indeed operations, were conducted under conditions of absolute air superiority. That is and other than for infrequent periods of high security risk from enemy ground forces, maintenance could be safely carried out 24 hours a day under lights if necessary with little interruption. Life would have been much more difficult for maintainers and for field recoveries if there had been 'red' air around to contend with as for example, endured by RAAF squadrons in Malaya during World War 2.

As you can see, the hangar, which was shared with 35SQN was really very good. The hangar here is in the middle of the image with doors open beside the PSP taxi way & the aircraft revetments on the other side of the taxiway. This shows the daily 'C' servicing aircraft and here is a main transmission being installed.

This is an interesting shot taken in early days with a Bravo model in deep repair; really, that's a fairly standard level of disassembly for the major 'D' servicing conducted by 9SQN – note the innovative use of ammunition boxes and sand bags as trestles.

I turn now to the maintenance regime applied to the aircraft in Vietnam. Firstly, 9SQN was a fully independent squadron with an extended maintenance capability to support the Huey in country and without further assistance from Australia. It had component workshops for engines, avionic and armament equipment together with a machine shop and sheet metalworking facilities. These latter capabilities particularly were crucial for battle damage and together with skilled tradesmen, got us out of a hole on numerous occasions. I reiterate that the aircraft was not supported at all from Australian sources. That provided challenges to a senior engineer; he was isolated and on his own as were some of his tradesmen,

Logistic support was provided by US Army in what was an early form of outsourcing known as cooperative logistics; that is, the supply of the three staples of military aviation capability, spares, fuel and ammunition, were provided by the US. This policy of course was only feasible because of the interoperability of the Huey.

With a very intense operating tempo and the constant challenge of battle damage repair, a characteristic of 9SQN maintenance was the sheer unrelenting pressure for serviceable aircraft. It was made worse when an aircraft was lost on operations and the 12 on line aircraft had to be found from a reduced holding. It was rarely possible to adjust maintenance arbitrarily because the overall program of maintenance or ‘ aircraft stagger’ as we call it, simply had to be maintained to ensure that long term availability was not jeopardised for the sake of a short term benefit. After all, this squadron was in country for over five years. No short term fixes! It was not good enough simply to generate aircraft for missions; the long term preservation of the asset had to be assured.

Because of the high usage rates and the arduous operating environment, the 9SQN Huey was serviced on a scheduled basis at half the peacetime maintenance periodicities; that is, the aircraft was serviced twice as much as in peace. All those rotating components, the bearings and shafting exposed to the elements just simply needed cleaning and adjustment more frequently. Moreover, the aircraft simply became filthy with dirt, dust and human residue; many a fitter had the unpleasant job to meet an aircraft at the end of the strip with the fire tanker and hose it out.

Consequently, and with the additional arising of battle damage repair, the maintenance workload was roughly twice that of a peacetime squadron. Interestingly though, the maintenance workforce was not correspondingly twice as large mainly because RAAF ground crews responded magnificently to the challenge and worked far more efficiently and for longer hours.

To meet that high workload, the maintenance crews worked a 6 day week on a nominally eight hour day that often stretched into the night and sometimes to the early hours of the next day. With operational aircraft away for 10 to 12 hours, daytime was devoted to scheduled maintenance and major rectification together with the ever present rescue. Aircraft return around 6pm was a frenetic period as unserviceability’s from the day were assessed and the night devoted to fixing minor faults for the next day’s flying. Armament work with the

cleaning and servicing of eight mini guns and about 30 M60's was just simply hard, dirty work that had to be done after aircraft return. .

I must pay tribute here to the skills of the RAAF technical tradesmen and the demonstrated need for those technicians to have skills gained in previous employment in RAAF deeper maintenance facilities. And not just aircraft technicians but general fitters, welders, metal and machinists were also essential. I can personally testify that but for the skill of a metalworker then a battle damaged tail boom attachment repair of a particular gunship just would not have been achieved.

The practice of carried forward unserviceability's (CFUs), meaning the authorised delay for the correction of a fault, simply could not be tolerated in Vietnam. As a utility helicopter, the 9SQN Huey had to be fully serviceable at all times to meet operational exigencies and the wide variety of roles and missions likely to be encountered during a given days flying.

Operational necessity required that the 9SQN Huey be modified and also that some peacetime operating procedures be altered. Some of these were quite simple such as false floors, steps etc. but the most significant modification was the gunship development. This modification which provided 9SQN with a gunship capability to meet Australian Task Force requirements, is well described by Chris Clark in 'The RAAF in Vietnam'. Basically, it involved the fitment of two mini guns on pylons beside the forward doors and two rocket launchers also on pylons beside the main doors together with ammunition storage on the floor and a sighting system. The gunship also had two m-60 guns either side rather than the one gun per side for the slick configuration. Here is a picture of tail number A2-377 in gunship configuration in its Vung Tau revetment.

Thanks to Robin Klitscher, this image shows the original internal ammunition storage system; it was basically several rows of ammunition cases. This configuration worked well for a couple of years although it was time consuming to load and sustained some stoppages. So in 1971, the Squadron armament officer, John Payne, designed a new storage system with two large bins as shown here. These had the advantage of being reasonably easy to load off aircraft and importantly, led to an increased reliability with a lower stoppage rate.

Despite opposition from Department of Air, hot refuelling was adopted in early 9SQN operations to avoid the time consuming

shutdown and start-up of the Huey. Eventually, DEPAIR relented and agreed and hot refuelling was safely adopted as a SOP. Here is the refuel line at Kanga pad Nui Dat. Fuel at JP4 standard was supplied by the US Army and it was of a consistent acceptable standard.

Occasionally, when the squadron was operating at distances from Nui Dat, mobile refuelling sites with drum fuel were established. In this picture, we are well north in Phuoc Tuy province providing fuel and a basic rectification capability.

As an aside and half an hour after this was taken, the CO WGCDR Pete Mahood (who was later tragically killed in a flying accident in Australia) landed with a hydraulic warning light on. The flight manual bold type proclaimed 'land as soon as possible and investigate'; problem was that we had no equipment to analyse the failure and if not fixed, the aircraft would have to be changed over and somehow recovered to Vung Tau. So with fluid levels ok and no obvious leaks, Weller took a punt on it being an indication fault. I grabbed a spanner and went down the back to locate the pressure transmitter switch and gave it a healthy but well calibrated whack with the spanner. I looked up the front to see Mahood's hand out the window signifying 'thumbs up' and I walked nonchalantly out of the rotor disc exchanging an 'eyes up' with the SNCO; the war went on.

I had similar fortune when one SQNLDR Klitscher put a Huey down with a hydraulic failure near a village well out in the province at about 4pm. Fortunately, we had correctly anticipated the likely failure and had the required spares for the rescue. My major problem was that the technician's interest was diverted by a comely young thing bathing in the village tub. 'Heh guys, we have got to get out of here by dusk'.

Really, the Iroquois was reasonably durable and could absorb an amount of battle damage; after all, there's a lot of air in a Huey airframe. Much of the battle damage was easily fixed bullet holes in skin but vital systems also were reasonably durable. In one incident for example, the outer combustion casing of an engine was holed by an AK47 bullet and yet the pilot still pulled maximum gearbox rating of torque from the engine to extricate himself. The damage that really did cause an engineer to lose sleep was when vital flying instrumentation and avionics systems were damaged or structural damage occurred.

Life could get really frenetic for maintainers in the middle of a hot and extensive engagement when operators were pushing for aircraft and fuel and ammunition. For example, I recall a day at Nui Dat when four aircraft came into the rearm pad in the space of five minutes all with battle damage. One gunship had a bullet hole through a main rotor blade; that aircraft was assessed as serviceable for the day and released back to operations. Another gunship had a tail boom attachment fitting severed so that it could not fly and had to be stripped of its

gunship configuration and another slick turned immediately into a gunship. One had to balance the competing imperatives of today and its operations and the long term fleet capability.

In general, active service is not the time when capability and airworthiness requirements can be reduced. If ever a military pilot needs a serviceable and airworthy aircraft, it's in combat. In Vietnam, a simple fault such as a chip light warning was not welcomed at any time but certainly not at the bottom of a gunship pass or during a slick's night dust-off.

One of the great logistic support measures that 9SQN benefited from its cooperative logistics with the US Army was a Floating Aircraft Maintenance Facility (FAMF); this was a ship set up as a virtual aircraft depot with workshops and test equipment. So whenever the FAMF was off shore from Vung Tau, then operations would supply an aircraft and we would be dropped off to test and calibrate a difficult fault. It was a really excellent arrangement and the ship's company would do anything for Aussies particularly when we presented our slabs of VB.

Field recoveries and rescues were frequent as aircraft inevitably became un-flyable on operations. The fault was assessed as much as possible from reports and a team of specialists assembled and flown to the site. In general, pilots were able to choose a relatively secure area with friendlies around. I was always very relieved to see a ring of Centurion tanks or APC's around a downed Huey as I approached in the rescue aircraft. But sometimes, there would be nobody around and then one valued the Intel reports at that morning's briefing because frankly rescue teams were vulnerable and had limited offensive or defensive capability.

The first priority was to get the aircraft flyable and recover to a secure area before night fall such as a fire support base (not a preferred option due to limited security) or Nui Dat but the preferred option was to get it to Vung Tau. Sometimes, damaged aircraft were not flyable and then we resorted to Chinook uplift; this was not a preferred option either because the early Chinook A models of that era had a tendency to call mayday and then the first emergency procedure was to drop the external load. Some aircraft were simply not recoverable and were left where they crashed. Such aircraft were A2-767 in the Long Hay incident where CPL Gillespie was tragically killed and also the aircraft in which FLTLT Lofty Lance died.

Co-operative logistics was quite outstanding in terms of quantity of supply; we were relatively close to the warehouses of Bien Hoa and if you couldn't get it through normal means then a slab of VB in the right place would work wonders.

However, quality was a different story and serious discrepancies frequently jeopardised maintenance. It was largely caused by poor storage conditions where one could open an engine or main rotor hub container to find the urgently needed spare heavily corroded or the can half full of water. Faults were generally caught on pre-installation checks but that added to the maintenance workload and if the spare part was needed at midnight for tomorrow's flying then availability and operations could be jeopardised. So co-operative logistics was most convenient but it carried severe risks and also impacted on maintenance efficiency. Of

course, Australia was paying handsomely for this service and our technicians were quite aware of this so they became very adept at obtaining a part if they thought that 9SQN had been 'ripped off'.

Occasionally, we had to use a second hand part and then it was case of raiding the Bien Hoa boneyard Most often these were battle damaged structural items not normally replaced in peacetime. The RAAF accounting system allowed 9SQN to treat all spares in Vietnam as 'C' Class consumables and that was a very effective arrangement that reduced stores accounting workload although it resulted in some profligacy of usage. Spares accounting can become very fluid on active service; in one case, even the numbers of aircraft on squadron establishment became uncertain in one case. An early Bravo model was damaged and written off and then some clever maintainers built an aircraft from two incomplete aircraft and lo and behold there was one aircraft extra; DEPAIR never did quite come to grips with that. A2-1024 is now on display in the Australian War Memorial!

With an up-rated engine and the gunship modification, 9SQN's Hotel model Huey was a different configuration than Australian based Iroquois so all technicians required some training on arrival in Vietnam. This was largely effectively achieved by on-the-job training but it did mean that ground crews needed a month or so to settle into the different aircraft and squadron routine.

Since the skills of the technical workforce were critical for the support of the 9SQN Huey, then its management also was crucial not just in 9SQN but across the whole paradigm of the RAAF training system ranging from the initial technical training at RAAFSTT through field training at the parent 5QN and including the mentoring and experience building in deeper maintenance at aircraft depots. There was thus about a three year lead time for a technician to get the necessary training and experience for 9SQN.

A tour of duty in Vietnam was 12 months and personnel were changed on a rolling basis with two people roughly arriving and departing per week. This system ensured that experience levels were maintained and it certainly meant that there was no 'A' team for Vietnam

So where did these people come from and what was the source of reserve capacity that enabled this very significant rotation of forces to proceed for over five years? After all, 5SQN was very keenly balanced with experienced people back from 9SQN to impart their knowledge and experience to those in 5SQN preparing for deployment so not all 9SQN veterans could return to 5SQN. Effectively, it was the RAAF's organic intermediate and deeper maintenance that provided a critical mass as a reserve capacity and enabled RAAF to not be forced to resort to multiple deployments for its personnel.

Even with this very sensible system, there was an amount of fragility in 5SQN as the parent. Squadron reacted to the pressure of training air and ground crews for Vietnam service. Two fatal accidents occurred in the late sixties at 5SQN and although the causes were not positively identified, there were serious discrepancies in technical maintenance at 5SQN to the extent that the RAAF was on the verge of losing technical airworthiness control of its home based Huey fleet.

Command and control of 9SQN has been a controversial issue and whilst that has largely related to operational matters, there were some difficulties with technical command and control. Firstly and under the RAAF's command and control rules of the day, when 9SQN went to Vietnam, it separated from Headquarters Operational Command (HQOC) and came under the command of Department of Air. What this meant for the technical elements of 8SQN was that they were immediately divorced from HQOC's technical oversight capability of audits and staff inspections.

This resulted in a certain amount of meddling by RAAF authorities in 9SQN's day to day business. For example, the authority to conduct hot refuelling took ages to be authorised because RAAF authorities with no understanding of the operational issues and simply refused to recognise the operational need. Similarly, HQSC issued technical directives that impinged on operational availability for what were based on the most spurious of technical justification.

Some minor command and control difficulties were encountered with the ATF by the CO of 9SQN and also OC RAAF Base Vung Tau. These largely related to the need for aircraft to be changed during a day's operation for maintenance purposes. Some senior Army officers thought that to change the aircraft they were using was an affront to their authority!

It has to be said that although the national and political will for Australia's involvement was quite strong in the early days of 9SQN's deployment in Vietnam that had changed very markedly towards the end. Indeed with churches, academia and the union movement firmly opposed to the war, it was not a very pleasant time to be in uniform and certainly not to admit to being involved in the war. Unfortunately, it was not just the serviceman who took the brunt of the opposition but also his wife and children. There were times when I also wondered whether the RAAF itself had the will for the helicopter commitment to the war. After all, there were many other exciting things to do in the RAAF with Mirages being introduced and the F111 planning going on.

Let me draw some lessons from this that might have some relevance for the future commitment of aircraft in the immediate battlefield environment:

a. In an allied commitment to a conflict, it's of enormous value to one, have an aircraft that can truly be interoperable with other forces both operationally and logistically and two, to have an aircraft with a design of proven ability to operate in the harsh conditions of a battlefield and the associated severe environmental conditions. These aspects should be high on the priorities of the ADF's capability planners and source selection.
b. The RAAF's relatively successful service in Vietnam really validated its contemporary technical policies of the time. That is, the RAAF took a new aircraft type and technology and applied it to a difficult war using its existing technical doctrine, policies and processes.
c. High standards of serviceability are required in active service and combat conditions lead inevitably to heavy maintenance workloads. It is dangerous for Defence planners to assume that contingency maintenance can be invoked on a

basis of reduced workloads and asset preservation is necessary in addition to mission generation effort.

d. Co-operative logistics can be valuable in terms of providing a convenient means of supply for spare parts but it can also cause difficulties and jeopardise mission and airworthiness.
e. Technicians with deeper maintenance experience are of particular value in combat support conditions; their skills are essential in battle damage repair.
f. Even with interoperable aircraft, the RAAF has to do things autonomously at times and this means that squadron technical complements need some design and fabrication capabilities.
g. For a long term combat deployment, a reserve capacity is critical to provide a source of personnel for rotation and supplementation of the force. The RAAF's deeper maintenance facilities were able to provide this strategic capability during the Vietnam conflict.

Finally, can I conclude by saluting the Huey; it was a very supportable aircraft in Vietnam and it continued to serve the ADF for another thirty five years!