AN/KPQ-1 RADAR
South Vietnam
Detachment 131 Divisional Locating Battery
South Vietnam 1966 - 1970

This document records a brief history of the mortar locating radars used by Detachment 131 Divisional Locating Battery in South Vietnam.
PART 1
General information

This document aims to record the history of the mortar locating radar set AN/KPQ-1 during deployment with 1st Australian Task Force in South Vietnam from April 1966 until June 1970. Although concentrating on the AN/KPQ-1 and the radar operating personnel, the role and input of the other components that completed the Australian mortar locating system cannot be overlooked, and must be mentioned in part to obtain an overall appreciation of the tasks undertaken.

The three components of the mortar locating system were:

A. The AN/KPQ-1 radar,
B. The Task Force Artillery Intelligence Office, and
C. The Listening Posts.

1. Introduction.

In 1966 131 Divisional Locating Battery prepared a Detachment of troops to join 1 Australian Task Force in their deployment to South Vietnam. The Detachment would be officially known as Detachment 131 Divisional Locating Battery South Vietnam. This was abbreviated to Det 131 Div Loc Bty SVN (for this document Det 131 will be used as identification.)

The Detachment comprised;

a. Task force Artillery Intelligence Office (TFAIO),
b. A Radar Section (comprising two (2) AN/KPQ-1 mortar locating radars),
c. An Artillery Survey section, and
d. A Royal Australian Electrical and Mechanical Engineers attachment, officially titled, Detachment 131 Divisional Battery Workshops South Vietnam (abbreviated to Det 131 Div Loc Bty WKSPS SVN). (For this doc 131 WKSPS will be used.)

2. Warning Order.

In 1966 131 Divisional Locating Battery (131 Div Loc Bty) RAA was located at the Kokoda Lines, Holsworthy Army Base near Liverpool, NSW.

The 131 Div Loc Bty routine orders part 1 dated 9 March 1966 warned for overseas service 70 RAA and 5 RAEME members of the unit.

TFAIO Arty Int Operators and LP. (19)

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3. The mortar locating System

The mortar locating system employed by the Australian forces in South Vietnam (SVN) to locate, identify and produce data on enemy mortars, comprised three components. The listening posts (LP’s) which were the physical ‘eyes and ears’, who initiated the sequence of events by a mortaring report (mortrep), which contained magnetic bearings to the sound or flash of an enemy mortar when heard or seen firing. The Task Force Artillery Intelligence Office (TFAIO) plotted on large scale maps the incoming data supplied by LP’s and other data received from all arms reports. Information sent by other arms often arrived late as there was in many cases no direct link to the TFAIO, however, the data was important to build the overall picture of enemy artillery activity. The raw data was then merged to produce a suspected area for the radar to search. The AN/KPQ-1 mortar locating radar (see Annex A Characteristics) electronically searched the suspected area and in the advent of an active enemy mortar, map co-ordinates of the firing position were obtained. This information was sent in form of a Location Report (locrep) normally by radio, to TFAIO at Task force Artillery Headquarters (Arty Tac) enabling artillery units/infantry mortar units to launch Counter Battery (CB) actions as required. Air Strike by allied planes was an alternative method that could be employed in the CB role and this occurred on a few occasions. The elapsed time from the initial report of mortars to CB fire being initiated would normally have been around five (5) minutes.

Contrary to popular belief of the time, the radar did not conduct a continuous search for mortars, being manually directed over a suspected enemy mortar firing position, the electronic signature of hostile projectiles (or our own if required) was identified by an operator, on an oscilloscope type screen called an “A scope”, manually intercepted on the screen by the operator and automatically tracked (followed electronically). The computer required approximately 8 seconds of track time to accumulate trajectory data on the weapon fired, the computer operator then manually extrapolated on the computer back along the
trajectory of the tracked projectile to it’s origin (or firing position). The locations of the firing weapons were then presented to the operator in digital form of map data Easting’s, Northing’s and Height by the computer.

The A-scope on the AN/KPQ-1

The A-scope with targets as operator would see them

Noise or Clutter on A-Scope. This would occur during rain or poor sighting of radar.

**A-SCOPE:** [A-scan], A cathode-ray oscilloscope [CRT] used in radar systems to display vertically the signal amplitude as a function of time (range) or range rate. Targets are displayed as perpendicular deflections on the time scale. Sometimes referred to as Range (R)-Scope. Note; the A-Scope display is obsolete.

When the Australian forces were deployed to (SVN) in 1966, the AN/KPQ-1 mortar locating radar had been in service with the Australian Army for less than 18 months therefore, knowledge of it’s use and deployment requirements were unknown to the majority of the Army and little known to the artillery units with whom it would operate . Unfortunately this lack of knowledge resulted in the junior officers and some senior officers expecting the radar to perform in a manner for which it was not designed. At a few Australian Fire Support Bases (FSB) acceptance of the equipment was not forthcoming. An example of the non-acceptance or lack of knowledge is clear, when in early 1968 the radar No.1 was approached late at night at a fire support and patrol base (FSPB) by an infantry major and ―ordered‖ to shut the generator off as his men could not sleep and it was giving the location of the FSPB away. It did not seem to occur to him that the 105mm guns at that precise moment were firing Harassment and Interdiction missions (H&I’s). From discussions with radar operators it is clear the radar was far better received in American fire support bases (FSB’s), where a good deal of co-operation was obtained, however, they had been introduced to mortar locating radars many years before.

A point that should be made clear is that TFAIO had two (2) meanings:

1. It referred to the office which was attached to the Artillery Tactical Headquarters (Arty Tac) and where the Artillery Intelligence Operators (Arty Int Ops) plied their trade. Ie: Task Force Artillery Intelligence Office.
2. It also was the title given to the Officer Commanding Det 131 being the highest ranked Artillery Intelligence Officer in the Task Force. Ie; Task Force Artillery Intelligence Officer.

**4. Radar Identification.**

All individual components of the AN/KPQ-1 radar systems carried an identification plate. These plates carried manufactures identification codes and were stamped with an Australian identification number (ID) being; A (Australia) and a numeral i.e. 1 (A1)

Originally all components of an individual radar system carried the same identification plate numbers. Although over the years many individual radar units became intermingled within the systems, the A/numeric code stamped on the pedestal identification plate was the main identification for each system.
The log book always travelled with the pedestal unit. The reason was that the pedestal contained a memory drum on which active hours were recorded. For Example ‘The A6 Radar may have an A2 transmitter receiver (TX/RX) unit and an A5 computer unit but providing the pedestal is stamped A6 then it is classified as A6 Radar. (Or Alpha 6)

At North Fort National Artillery Museum (NSW), in the Locating Artillery section, stands a skeleton AN/KPQ-1.
The identification plate on the computer unit identifies it as A12 computer. Stamped roughly after the word serial.
This Computer would have originally been part of the A12 system which saw service in SVN.
The pedestal of this system is stamped A4 therefore the system is classified as A4 Radar

There were 6 Systems (radars) that operated in SVN. The radars when in SVN were referred to by the Det 131, as Alpha, Bravo and Charlie radars, however, from May 1967 Det 131 WKPS referred to the radars by the serial numbers. To try and eliminate confusion, this document will refer to the radars as Alpha, Bravo or Charlie followed by their serial number if known e.g.: Alpha (A6).

5. South Vietnam
Arrival in SVN

Alpha and Bravo Radars arrived in SVN loaded on their vehicles on the deck of the HMAS SYDNEY with 3 radar operator/drivers, unloading at Vung Tau between 1 and 4 May 1966. The remainder of the advance party flew in by Qantas jet on 4 May, with the main body touching down on the 20 May.

With no acclimatization the radar section conducted ‘shake out trials’ in the then South Vietnam Police Barracks compound at Vung Tau. Both radar sets were non-operational (not functioning correctly). At about the same time a third radar arrived in crates, it is not clear if this radar arrived on board the HMAS SYDNEY or was flown in. This radar became known as Charlie Radar and was held by Det 131 WKPS as a slave radar for testing and for spare parts for the two operational radars (this set was also not functioning correctly).
On **22 May** both Alpha and Bravo radars, although suffering numerous problems, were classified as ‘operational’

On the **6 June 1966** (6/6/66) the radar section moved by road convoy from Vung Tau with 1st Field Regiment RAA as part of the 1st Australian Task Force (1 ATF) to Nui Dat, an area dominated by a small hill in the Phuoc Tuy province (YS 43-67 on Route-2, 60 km east south east of Saigon, 35 km north, north, west of Vung Tau, 8 km north east of Baria and 14 km south, south, west of Ngai Giao.). This would become the home and main base of the radars for the remainder of their tenure in SVN.

### Deployment of radars at Nui Dat in the Phuoc Tuy Province

#### Alpha Radar

Alpha Radar was originally deployed with 105 Field Battery (Fd Bty), and after much testing a new location between 161 Fd Bty Royal New Zealand Artillery (RNZA) and the Engineers in the south east sector of the 1 ATF base was selected. This site was approximately 20 metres from the southern perimeter fence. The radar members were housed with the surveyors Det 131 in the Engineer lines, situated in part of an abandoned rubber plantation and rationing was conducted through the engineer messing facilities.

Alpha Radar’s command post had been dug below ground and completed by the end of June 1967. An unforeseen problem of flooding in the command post during the wet season, required engineer assistance and the deployment of water pumps. Alpha Radar site was moved to a new position late 1968

![NUI DAT - 1968](image)

The Ariel Photo of Nui Dat shows approximate radar positions (photo taken early 1968)

#### Bravo Radar

Bravo Radar was originally deployed with 103 Fd Bty on the then main access route. This area, with some adjustments, became the permanent location for Bravo Radar.

Preparation of Bravo Radar site began and with the fresh memory of Alpha Radars’ problem with flooding, this became a permanent site built mainly above ground, with a thick concrete roof and heavy sandbagging. Members of Bravo Radar were rationed with 103 Fd Bty and would continued to be rationed with each successive gun bty
Testing in 1967 proved that Bravo Radar site had better aspect angles and gave greater coverage of Nui Dat area.

After many tests, the maximum range at which a projectile could be tracked was around 7,000M on all systems which was well below the manufacturers stated range of 10,000M. This was due in part to the fact that the surrounding landscape did not allow for screening or cresting angles which was a technical requirement to enable the radar to reduce ‘clutter’ (Electronic interference) on the screen thereby gaining a clearer view for the operator of the projectiles electronic signature.

To afford greater overall coverage of Nui Dat from enemy mortar attack, a reconnaissance was conducted at the HORSHEOE feature with a view to establishing a third or alternate radar site. The reconnaissance consisted of deploying to the HORSHEOE with a radar selecting a number of possible sites and testing the ability of the radar to track. Interviews indicate this took two days and three sites were tested and “a co-operative infantry mortar section fired for us”

(a) Initial Problems

In July with the radars still experiencing consistent problems, representatives of Det 131 (Capt Townley) and Det 131 WKSPS (WO1 Prenter), travelled to Da Nang where the US Marine Corps were believed to operate AN/KPQ-1 radars. On their arrival at 12th Marine Regt Da Nang, they were informed that all seven of the unit’s radars had been returned to the United States in June 1966. A Marine Corps report stated that the first AN/KPQ-1 was introduced into Vietnam in December 1964, building up to seven equipments by July 1965, however it was found that never more than four equipments were serviceable at one time. The representatives were informed that the MPQ-4A mortar locating radar was the replacement for the ‘aging’ AN/KPQ-1.

Some spare parts for the AN/KPQ-1 had been left in the country by the Americans and were obtained by Det 131. During the remainder of 1966 and the early part of 1967 many problems confronted the Det 131 WKSPS radar mechanics. Maintaining one (1) radar operational was a real problem. Not only were parts for the radars scarce, the generators were also causing problems. By the end of 1966 a decision was reached requiring the replacement of two radars, with two of the current radars RTA for a complete rebuild as there were no facilities for rebuild in SVN. At the same time a request for new modified generators was made.
In May 1967, two replacement AN/KPQ-1 radar systems arrived directly from USA. They had been flown into Saigon, re-loaded on a Caribou transport plane for the journey to Nui Dat. The equipment was accompanied by an American Officer (believed to be Capt. A McLean) conversant with the electronics of the radar, who would stay until the systems were classified as operational. Also working with the American was RAEME representative from Australia (believed to be Maj Young).

Thanks to Det 131 WKSPS documentation, these systems are identified as A6 and A7. Further from this documentation it is established that Alpha and Charlie Radars were RTA for complete rebuild. From this same source it is now easy to identify Bravo Radar, the last of the original radars, as A12 which became the slave Charlie Radar. By the end of June 1967, for the first time since arrival in SVN, all three systems were operational.

6. Generators.

The Bucknell generator used to power the radar, had many teething problems. The major problem with this generator was its inability to work for extended periods under full load or in enclosed areas, apparently sucking in its own exhaust gases and over-heating. Close sandbagging for protection of this equipment could not be carried out. In November 1966 all Bucknell generators had been RTA. Six new modified Bucknell diesel generators arrived in SVN in Feb 1967 and proved moderately successful in powering the radars, with two generators being issued to each of the radars.

The Onan Generator and McColll Generators were investigated as possible replacements, however, neither worked well under load and both were petrol powered. The American helicopters used to carry/move the radars would not carry 44 gallon drums of petrol.

The Onan generator was used to run the air conditioning units in the radar command posts at Nui Dat and for testing the radars by 131 WKPS.
7. Operational Transport.

The radars used two methods of transport for operational deployments in SVN, vehicle or road transport and air movement/transport:

A. Vehicle or road transport

Each Radar Section contained seven landrovers, one with the Section Commander (a general service vehicle long wheel base), three with each Radar Detachment. This was augmented by Det 131 WKSPS supplying a radar special purpose vehicle for the radar mechanic. The three radar detachment vehicles included a general service (GS) vehicle capable of carrying troops, although when loaded left little or no room for passengers, (see following photo of the GS vehicle fully loaded) and a trailer fitted to carry the generator, and two special purpose radar vehicles to carry components of the radar. They were capable of carrying only the driver and a passenger in the front seats.

A typical road move for the AN/KPQ-1 and support staff, as seen in photo (Alpha Radar (A6) departing the HORSESHOE feature 8 January 1968 at the completion of Operation FORREST). The first vehicle in line is the Det 131 WKPS radar mechanic with extra spares and a second generator, one radar operator would normally travel in the front seat of this vehicle (referred to as the ‘shotgun’). The following three vehicles are the radar detachment vehicles and trailers. The three radar vehicles were required to carry not only the radars but also the radar manning of 11 personnel and their kit, defence stores, rations and at least one- 44 gallon drum of generator fuel. Therefore any road move would usually mean that the section commander’s vehicle (last vehicle in picture) would be employed to ease congestion and carry some of the radar crew.

b. Air Movement/Transport

In October 1967 the special fibre glass 18 X 10 Ft Air Dispatch (AD) platform/pallet for the planned air deployments, arrived in country and trial lifts of the radar equipment began using Charlie (A12). On completion of the trials, the AD equipment was handed to Det 131 for maintenance and storage. A Helicopter Landing zone (LZ) was cleared near Alpha Radar site and all AD equipment was maintained and stored there. Nearly all air deployments were conducted in 1968 with road deployment being the main method of deployment in 69.

The airlift of the equipment was accomplished in two lifts by CH-47 Chinook helicopters:

Lift One
(a) **Internal**

The radar section with personal equipment. The number would vary depending if an LP or the Section Commander were travelling with the radar. Normally 8 radar operators plus 4 LP operators.

(b) **External.**

The AD pallet with the complete dismantled Radar loaded onto its normal vehicle body platforms, which had been removed from one set of vehicles, strapped to the AD pallet and placed inside a cargo net for external lift.

**Execution:**

The Chinook would land, radar section personell would board. The Chinook would then hover over the external load where the radar NO.1 would ‘hook up’ the load and then the No.1 would be dragged/lifted into the chinook through the open lifting bay by the loadmaster. This system worked well until at one extraction from a FSB where AD personnel were appalled that somebody not qualified would do this ‘hook up’ operation and ordered the radar No.1 into the Chinook. They then carried out the ‘hook up’, unfortunatley they stood on the Antenna unit (being central) cracking two dishes and then the lift straps caught a “feed horn” on the antenna ripping it out. On another extraction an infantry section was loaded on board with the radar operators by higher orders, and when the pallet was about 15 meters above the ground the radar pallet was released by the loadmaster as there was to much weight on board. Both these actions added to the never ending effort to maintain operational radars. (for photo sequence of LIFT 1 see Annex – AIR LIFT 1 SEQUENCE)

**AD PALLET**

Original layout plan from Det 131 reports.

**Lift Two**

(a) **External. (Recommended from trials)**

The FFR land rover complete with trailer.
1 x generator (on trailer) and second generator in vehicle.
1 X 44 Gal Drum of fuel for radar generator and smaller equipment lashed inside the vehicle.
The external **Lift Two** was recommended when conducting trials, however, in the first lift (of Lift Two) in late 67 the Chinook came down to low and ‘sat’ on the trailer causing extensive damage to the trailer and the generator exhaust pipe (which extends above the generator), pierced the Chinook causing damage to the underside of the helicopter.

**Lift Two** became internal. Two generators were loaded with one on the trailer and the other in the rear of the vehicle (as per recommendation). The 44 Gal fuel drum travelled in the cargo net of **Lift One**. Trials of backing the vehicle with generator trailer onto the Chinook proved time consuming and difficult for the driver moving a heavily loaded generator trailer up a narrow ramp. The method employed was to carry two or three extra radar operators with this load, drive onto the Chinook and once in the air, unhook the trailer from the vehicle. On landing the trailer would be manhandled off the Chinook and once clear of the back, the vehicle would be reversed off and re-hooked up to the trailer as the Chinook flew off.

This method proved successful and was used during air movement in 1968.

It is probably interesting to note here, that the method of backing the trailer up the ramp and into the Chinook was still being taught to radar operators many years after the Vietnam War. This training method was conducted at the helicopter mock-ups that had been built at Holsworthy Training area NSW. The trailer and Landrover used in this training were far from fully loaded.

Det 131 WKPS devised a third method of transport as in photo. This allowed Det131 WKPS to move the AN/KPQ-1 around task force area to test servicability. They also used this method to conduct reconnaissance for a new radar site for Alpha Radar. The generator is shown in the landrover to rear. The truck was on “loan” from American Gun Bty. Possibly the only “self-propelled radar” in existance at that time.
8. Radar deployment

The layout for a radar site at a FSB, as shown here, was first suggested in Det 131 Operational Reports November 1966, however, it is doubtful that this was ever achieved. The radar detachment was at the mercy of the FSB defence officer and Gun Position Officer (GPO), and deployed as best it could in the area that was assigned. The technical requirements of the radar were generally a secondary consideration. The generator had to be kept as far away as possible from command posts, gun detachment Tanoy (speaker system used by guns to communicate orders), Listening posts and FSB strong points.

At nearly all FSPBs the radar section commander or the radar No.1 accompanied the unit recce/advance party. This did not preclude the fact that by the time of arrival of the radar many adjustments had been made. It generally meant that the radar was the last to fully deploy. Normally this meant the radar was brought into action where it landed/arrived and then on many occasions moved and adjusted to suit the FSB.

To balance this there were a few GPO’s who treated the radar and crew as a seventh gun which inevitably led to smooth deployments. A good working relationship between the radar No.1 and the GPO was imperative to a successful deployment, as the radar section commander was not always available to deploy the radar. The method employed by the majority of radar No.1’s was to concentrate on deploying the antenna, leveling and surveying then the remaining radar units were deployed within the restrictions of the FSB.

Although classified as ‘Man Portable’ (see Annex B - Units and Weights) the radar would take 90 minutes to bring into ‘Action’ even by a well drilled radar section (see Annex C - Manning) this included the initial survey of the antenna/pedestal unit which required to be on the same grid as the guns. After reporting ready, preparation of the site began e.g. sleeping areas, weapon pits and the digging of the command post.

‘Ready’ meant the equipment was fully operational had been tested and was ready to track/record enemy mortars. The ready report was sent by radio to the TFAIO which included the grid reference of the radar pedestal. The radar was not ready or in action until survey was complete. The No.1 of the radar was responsible for conducting initial survey.
9. The Listening Posts

The TFAIO organisation provided for the establishment of two LP per radar and Det 131 established 4 LPs to cover 1ATF base and these were to prove invaluable to the task force over the years. The cost of this support has never been recognised nor has the ability of the Det 131 to adapt its numbers to meet the situation. The manning for each LP was a junior NCO (Bdr or many cases L/Bdr) and 3 Gnr Arty Int operators. This figure would fluctuate dramatically depending on the units other commitments. With the units surveyors often called upon to carry out LP duties. There were many occasions when manning was critical that senior gunners were called upon to act as LP No. 1s.

It must be understood that the LP operated 24 hours a day, 7 days a week and 365 days per year. Generally the LP operator worked 2 hours on duty and 4 hours off with one day off each month, and four days R and R per year.

The frustrations of these long hours sometimes caused upsets especially when an incident such as movement on the wire was observed but no response was permitted. In many cases the operators never received any feedback for the work they did.

Similarly the operators sense of humour was not always appreciated. An incident which bear recording at this point, one Christmas eve an LP reported movement and the HQ requested further information. The LP then told of movement to the east, hard to identify but appeared to be approaching. This continued for sometime, until eventually the LP reported it appeared to be a wagon drawn by animals. There are several animals pulling it, one has something red and bright on it and the driver is dressed in a red suit with a white beard. At that time the penny dropped in the HQ and a less then complimentary rocket came back.

Although LPs were rebuilt several times, they remained in almost their original sites for the entire tenure of Det 131.

**LP1. - Alpha LP (Radio Call Sign 31A) - established on a high point of Nui Dat hill with almost a 360 degree view of the surrounding country.**

**LP2 - Bravo LP (Radio Call Sign 31B) - established on a high point at the horseshoe feature, again it had excellent views back to Nui Dat**
LP3 - Charlie LP (Radio Call Sign 31C) - established on the south eastern side of the base near the perimeter.

On many operations LP3 would be closed and form the basis of operational LP/s. Operation LPs were normally supplemented with unit Surveyors after they completed their initial survey tasks.

LP4 - Delta LP (Radio Call Sign 31D) - established on the south western side of the base near the perimeter. Under rebuild

Had great views of the western area surrounding the Task force. Sleeping was difficult as it was co-deployed with the US medium/heavy Gun Batteries.

Photo: Robert Billiards 1967

View from Horseshoe LP31B – road to Nui Dat in Foreground – Photo: Richard Chaplin -1970

A view from LP31A – Looking south/west. Photo: Phillip Sheedy - 1968

10. The mortar threat - NVA and VC

The mortar was ideally suited to the terrain of SVN and the tactics of the North Vietnamese Army (NVA) and, in particular, the Viet Cong (VC) (An irregular military force operating in SVN). Being extremely portable and simple to operate a well trained mortar team could set up a mortar, fire off a number of rounds at maximum range and be moving away from the firing site before the first rounds impacted on the target. Such manoeuvrability severely restricted allied counter-mortar fire or retaliation by air.

Because of the mobility and VC employment of the mortars, the AN/KPQ-1 radar was restricted in its ability in locating these mortars, requiring initial sighting/sound reports normally by the LP’s and search bearings from the TFAIO. Although this process was rapid, on short attacks, the mortar had generally finished firing and had left the area before, in many cases, before the radar could place its beam over the suspected area. Under more sustained attacks the radar would on most occasions produce results.

The Americans introduced to the Vietnam war the system of the fire support base and fort like installations of their major base areas, which the Australian forces also adopted. The mortar proved particularly adept at attacking these types of targets as mortars were far more accurate and had a greater rate of fire than the more destructive rockets.

The NVA and the VC used a variety of mortars in SVN, ranging in calibre from 50mm to 120mm. The country of origin of these weapons was Russia, the Peoples republic of China (PRC) and North Vietnam (NVN).
The 82mm mortar was the standard calibre of the communist block, however, the PRC and NVN produced 81mm mortars mostly as copies of the American M1. These weapons were mainly for use by the VC, with the PRC manufacturing 81mm fragmentation projectiles based on the American M43A1 ammunition. Because of an allied misconception that all enemy medium mortars were 82mm, the 81mm mortar used by the VC on many occasions was more than likely reported as an 82mm. The NVN M1 copy 81mm was popular with the VC being capable of dismantling into three man portable loads. (baseplate, bipod legs and barrel section)

The weapons most used by the VC against Australian troops were the 81mm & 82mm mortars (classified as medium mortars) as they combined high portability with firepower. The 60mm mortar was probably used more by the NVA (FSB CORAL) but did seem to appear more often in the later half of the Australian involvement. Because of its short range, therefore, limited time of flight, the 60mm mortar proved extremely difficult to ‘track’ by the radar, the AN/KPQ-1 radar required a minimum of 8 second of track time (or Time of Flight of the projectile).

When observing the table below, it becomes clear as to why these weapons were ideal for the hit run method that was one of the tactics successfully employed by VC forces. With the most used types of weapons combining range, high rate of fire and light weight

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<th>Type of Mortar</th>
<th>Firing Weight (Mortar with bomb)</th>
<th>Range (min 100 meters)</th>
<th>Rate of fire</th>
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<td>20 kg (44 lb)</td>
<td>1,530m (1,673yd)</td>
<td>20-30 rounds per minute (RPM)</td>
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<td>60mm mortar - CHICOM Type 63</td>
<td>12.3 kg (27 lb)</td>
<td>1,820m (1,990yd)</td>
<td>15-20 rpm</td>
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<td>81mm Mortar – CHICOM NVA - M1 Copy</td>
<td>57 kg (114 lb)</td>
<td>3040 meters</td>
<td>15-25 rpm</td>
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<tr>
<td>82mm mortar - CHICOM Type 20</td>
<td>57 kg (114 lb)</td>
<td>3040 meters</td>
<td>15-25 rpm</td>
</tr>
<tr>
<td>82mm Mortar - SOVIET M1937</td>
<td>57 kg (114 lb)</td>
<td>3040 meters (min 100 meters)</td>
<td>15-25 pm</td>
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**Time to relax**

**At the Locators Lounge – early 68**  
(later renamed the James Menz Club)

**LP 31D at play - 67**

**L-R** – I. Finlay, I. Amos, C. Dreis, K. Woodbine, G. Holden, W. Franklin  
Photo:Phil Sheedy

**L-R** – E. Marques, P. Fletcher, B. Blink, G. Blackwell, B. Guzda, K. Peisley  
Photo supplied by: Eric Marques
Photo at left – At the sand bag point

Can you name them?

Photo supplied by – John Dellaca

31 May 1970 - James Menz Club (Nui Dat)

Standing from left - Craig Stott (backlighted by window), Pete Ravelje (blurred face - Bty HQ), Grant Perrins (cigarette in mouth - Radar), Bdr Mal Musgrave (Radar), John Lucas (Radar), LBdr Mick Davis (Arty Int), Robert Hargraves (moustached and with beer in right hand). Burt Jacka (Radar - white shirt),
Front centre- Bdr William Slape talking to "Big Willie" (real name not known), Front and smiling - Al Wheatley (Radar).
RH corner face only - Chris Chapple (Radar).

Dec 67 – Opening Bty Club –The Locaters Lounge – where you there?

Photo: Ron Royal

March 68 – renaming the Bty Club
L-R - Radar Sec Comd Lt Willis Wight, Gnr Mick Bohl (LP), Gnr Wally Franklin (Rad Op)
Photo: Phil Sheedy

End Part 1
Part 2

Radar Operations

1 ATF Operations in which the radar/s participated

Artillery Tactical Headquarters (Arty Tac) Nui Dat, the nerve centre of all Australian Artillery operations. Co-located with Det 131 Task Force Artillery Intelligence Office.

The following Det 131 members Al Adams, Grahame Dignam, Bert Blink, Max Troynar, Ron Evans, Geoff Blackwell, Paul Dickson, Bob King, Pete Fletcher, Ernie Newbold, Bob Bruce, and Nick Proskurin all served in Arty tac at some stage of their tour. Many did duty in LPs and and some in Det 131 orderly room.

1966

23 Apr – Appointment: Officer Commanding Det 131 (TFAIO) Captain James H. Townley.

06 June - About 2000hrs the first location of an enemy mortar by Det 131 radar in SVN occurred when an Australian clearing patrol was fired upon by an enemy mortar south east of Nui Dat. After a long day of moving and setting up, Alpha Radar was conducting tests and was actually laid on a bearing, which coincided with the direction of the firing mortar. Although the computer was not functioning correctly and the servo drives for the antenna failed to work, Alpha was able to determine a range and bearing from which the grid reference could be obtained. The radar No.1, Sgt Don Simmons, sent in a Locrep to Arty Tac and at the same time alerted his mates in 103 Fd Bty to come to a stand-by bearing. Arty Tac confirmed the threat and ordered 103 Fd Bty to commence CB fire resulting in the mortar position becoming silent. Although Sgt Don Simmons was congratulated for his quick thinking, he was also reminded firmly that there was a correct reporting method, which must be used in future. No further information is obtained as to number of rounds fired or any follow up search of the suspected position.

09 June – 1ATF Nui Dat receives its first enemy mortaring incident. Locreps are recorded by a radar. No record on the number of rounds fired or any actual damaged caused. Air strikes are conducted by the USAF on the locrep, which was the deserted village of Long Phouc. Army Intelligence also suspected this to be a Viet Cong base. Result of Air strike: 12 houses were destroyed and 22 damaged. Estimated 3 enemy killed.
12 June – An enemy mortaring incident occurred with a locrep obtained by a radar recording the baseplate near the village of Hoa Long. It is believed to have been fired at an Australian infantry patrol. No record of CB fire recorded.

17 August. - Appointment: Officer Commanding Det 131 (TFAIO) Captain Barry L. Campton.

Prelude to a Battle.

2:43 am. - Det 131 Listening Post (LP) 31 Alpha reports ‘Mortrep’ (Mortars firing report). The Task Force is put on alert.
2:44 am. - Det 131 LP 31 Charlie reports Mortrep.
2.45 am - Bravo Radar (A12) is ordered a search bearing, Alpha Radar out of action. Bravo Radar reports ‘searching’
2:50 am - 1 Fd Regt artillery conduct counter bombardment (CB) fire. This first engagement was fired on information supplied by Det 131 LP’s and co-ordinated with the prepared CB fire plan by TFAIO.
4:10 am - 1 Fd Regt CB fire ceases.

Bravo Radar (A12) failed to record a locrep (a location of a mortar) although many bombs were ‘seen’ on the screen. Because of clutter the radar (The radar screen was classified as being ‘swamped’ with noise) could not electronically lock on to a bomb long enough to record a firing point. This was probably the first real test of the radar, not only the number of projectiles on the screen but heavy rain created a large amount of ‘electronic clutter’ on the screen which also confused the operators creating an impossible task of tracking any projectile. This was an inherent problem of the radar.

1 ATF base at Nui Dat was heavily mortared and at first light a search of the task force area by Det 131 Artillery Intelligence operators (Arty Int Ops), from reports received, located 67 mortar craters many in pristine condition and crater analysis was conducted. The actual number of mortars fired at the base was not recorded or not known. Strangely the calibre of the mortar/s is not recorded.

The southern edge of 103 Fd Bty and 161 Fd Bty RNZA reportedly received a number of rounds of incoming enemy fire (the number reported ranged from seven to twelve), five craters where found which proved to be 75mm artillery shells. Shell fragment identification and subsequent information from infantry patrol of the suspected firing site, believed this weapon to be a WWII Japanese 75mm mountain gun.

Mortar craters were located within 100m of both Bravo Radar living area and Alpha Radar command post site. The number of these last craters were not recorded.

As a result of the enemy mortaring 24 1ATF personnel were wounded (2 seriously) Among the recorded wounded were:

L/Bdr Karl Doehrmann 131 Div Loc Bty WIA 17 August 66 Arty Int Operator; Shrapnel wounds.
Gnr Terrence Hayes (Lofty) 131 Div Loc Bty WIA 17 August 66 Radar Operator; Shrapnel wounds.

USA 15 Field Artillery Regiment web caption reads - 75mm Japanese WWII mountain gun captured by Americans during Tet 68 and captured Ammo.
18 August - Operation SMITHFIELD commenced, this was the start of Battle of LONG TAN, included in the infantry patrol orders was an order to search out and confirm the suspected mortar base plate positions located by TFAIO from reports by LPs and the crater analysis team and other sources.

Once the battle had commenced, many Det 131 personnel, including radar operators, assisted the gun batteries in carrying ammunition to the guns from the ammo supply areas, thus enabling the gunners to continue their support of the infantry during this battle.

Venturing out.

06 November - Operation HAYMAN was the first operation, in which a radar set was deployed outside Nui Dat.

This was a preliminary battalion operation, to cordon and search Lang Phuoc Hoa (an area of about 0.5 sq km in area, with an estimated population of 500), on Route 15, eighteen km south west of 1ATF base. This was followed by a battalion search-and-destroy operation covering the adjoining Long Son Island.

At this time the unit had no operational radars, however, sent a complete radar section by road with 103 Fd Bty. This was done to:

A. Test the units resupply system for rations, fuel and stores.
B. To enable local Commanders to appreciate the problems of a radar deployed in their area.
C. To train operators in site duties and maintenance in the field.

From records it is unclear as to what radar system this was, an assumption could be made that it was Charlie Radar, as WKPS were working overtime trying to produce two working radars. At this time, since the unit had insufficient working radar generators, a 2KVA generator was used to simulate the noise factor. The radar section was ordered to shut this off after three nights as it created ‘too much noise’.

12 November - Operation HAYMAN ended the radar returned to Nui Dat by road.

1967 – From Zero to Operational.

January to May - all radars were classified as non-operational. The radar operators were employed in a myriad of occupations that included; LP operations, TFAIO, cordon and search with the Civil affairs, perimeter defence and checkpoint duties. Also in this period the preparation of the Nui Dat radar command posts were ongoing.

02 January – Sgt Frank Halliday replaced Sgt D Simmons as Alpha Radar No.1.

11 January – 2Lt. Willis Wight replaced 2Lt. A Opie as Radar Section Comander.

02 March – WOII Ron ‘Chalky’ Royal became first Detachment Sergeant Major (DSM) for unit.

17 April - Appointment: Officer Commanding Det 131 (TFAIO) Captain Warwick R. Hamilton.

04 May – Sgt Edmond (Ted) Doust replaced Sgt F Lennon as Bravo Radar No 1.

June - replacement radars had arrived in SVN and classified as operational, the unit had a changeover of replacement radar operators who all had to be acclimatized and trained in radar deployment.

31 August - Operation AINSLIE commenced in the Phuoc Tuy province, III Corps, the northern Area of Operations (AO) 16 km north of 1ATF base, a route clearing, resettlement and search-and-destroy operation, in conjunction with 11th Armoured Cavalry (US). Bravo Radar (A7) deployed by road to the

Authors Note: Although the caption above identifies weapon as Japanese, it may be in error as the weapon more closely resembles the American 75mm Pack Howitzer M1, Which saw service with US, UK, and Australian troops in WWII. It may also been supplied to the French and left behind in Vietnam. The photo (AWM072309) on right depicts Australian gunners using the M1 during WWII. There is no suggestion that the Americans did not capture this weapon from the VC.

It is shown here as an illustration as being the type of weapon suspected of firing on Nui Dat on 17 August 66.
HORSESHOE feature – YS4962 to support the operation. Supporting artillery A Bty 2/3 5th Arty (US), A Bty 1/83d Arty (US)

**04 September** - Bravo Radar (A7) return to Nui Dat. No record of any mortaring incidents. On return of Bravo, Alpha Radar (A6) moved by road to a FSB ALLANBROOK - YS 4578, 1 km west of Route 2, 11 km north of Nui Dat, 5 km west-north-west of Ngai Giao, to give further support. This is the first record of operational radar moving out of Nui Dat/HORSESHOE locations on active participation. Supporting artillery 108 Fd Bty and 161 Fd Bty. Det 131 deployed two LP’s one staffed with Det 131 Surveyors.

**23 September** - Operation AINSLIE ended and Alpha Radar (A6) returned by road to Nui Dat. No mortaring incidents recorded. Both radars moved into their new locations at Nui Dat.

**27 October** - Operation SANTA FE, a search-and-destroy operation, on a co-operating multi-brigade basis; the LATF AO was 266 sq km centred 14 km north-north-west of Xuyen Moc, and astride portions of routes 327, 328 and 330.

**03 November** - Bravo Radar (A7) carried out the first operational air movement of a radar when it deployed by air into FSB LION which was established at Thua Tich – YS 6181. Supporting artillery 108 Fd Bty and 106 Fd Bty

**06 November** - An enemy mortaring incident occurred during a ground attack on FSB LION, Bravo Radar (A7) recorded seeing nine (9) mortars on screen but only one locrep was recorded. From the TFAIO report about 20 mortars (calibre not recorded) were fired at FSB Lion, while a gun Bty was conducting H&I’s. Many of the mortar rounds fell short of the FSB and many base personnel were unaware that the mortaring had taken place.

No report on any action arising from this locrep. Det 131 Arty surveyeors were acting as perimeter defence for the radar at this time and came under small arms fire. There was also one Det 131 LP deployed.
16 November - Bravo Radar (A7) returned to Nui Dat by air.
18 November - Operation SANTA FE concluded.

Results - Casualties:
Own: Aus - KIA 3, WIA 8; US - (3/5th Cav) - KIA 2, WIA 14.
VC - KIA 38, wounded/escaped 9, PW 5.

There were 54 weapons, 3000 rounds of ammunition captured, large numbers of mines and grenades destroyed, over 6 tonnes of rice and a large quantity of medical supplies either captured or destroyed; also 69 camps, 813 bunkers, 237 military structures and 1600m of tunnel were destroyed.

26 November - Operation FORREST commenced – this was classified as a rice denial operation in an AO in the Phuoc Tuy province west of the 71 easting and south of the 83 northing.
Alpha Radar(A6) under command of Sgt Ted Doust deployed by road with 108 Fd Bty to the HORSESHOE feature in support.
27/28 November - Long Dien came under enemy mortar fire, Alpha Radar (A6) recorded six (6) Locreps, however, no record of resulting action can be found.

13 December – Sgt James Lawler replaced Sgt Halliday and becomes Bravo radar No.1

21/22 December - The Army Republic Vietnam (ARVN) outpost of XA BANG was mortared twice, radars were ordered search bearings, neither radar reported ‘seeing’ any bombs and no locreps were recorded. Crater analysis by Det 131 Arty Int operators, the next day confirmed the mortaring as 60mm mortars. It was recorded as 20 rounds fired in first attack and 12 rounds in second attack.

Alpha section was ordered to build a command post at the HORSESHOE feature and stay until Operation FORREST was complete. The HORSESHOE feature was actually the rim of an extinct volcano and composed of solidified lava and granite rock, so digging a command post took a great deal of work. A request went out for engineer jackhammers to break through the rock a request that was granted. Another hazard of building this command post was the myriad of small black scorpions that inhabited the area. A number of the radar operators reported bites which caused redness, localised swelling and a touch of nausea. No long term ill effects were reported.

25 December – Alpha radar section would spend XMAS at the HORSESHOE, with drinks supplied by W (whiskey) company New Zealand Infantry.
1968 – The longest year.

02 January - To assist in Operation FORREST, Bravo Radar (A7) deployed by road to FSPB ALLENBROOKE (YS4577) with 106 Fd Bty.

06 January - Bravo Radar (A7) returned to Nui Dat. No mortaring incidents were recorded.

08 January - Operation FORREST ended and Alpha Radar (A6) returned to Nui Dat.

Results: Casualties:

Own: KIA 4, WIA 35;

VC: KIA 47, wounded/escaped 17, PW 42, detainees 360. Captured were 108 weapons, a significant quantity of ammunition, 11 mines and 10 grenades, 300 lbs of documents and 0.5 tonne of rice.

(Source: AWM95-3-7 4 Fd Regt Narrative 1 – 31 Dec)

10 January - Operation DUNTROON commenced as a blocking action in the Phuoc Tuy Prov, III Corps, followed by a search-and-destroy operation, in co-operation with 1st Infantry Brigade (US). The 1ATF AO for both actions totalled 120 sq km.

11 January - Bravo Radar (A7) deployed by air from Nui Dat into FSB BERRYMAN - YS 39-86, 5 km south west of the Courtenay Rubber Plantation, 20 km north, north west of NUI DAT and 13 km north west of Ngai Giao. Other artillery units deployed in that FSB were 161 Bty RNZA, 108 Bty RAA and B Bty 2nd/35th US Arty. Det 131 LP was also deployed.

Radar Ops disembarking FSB BERRYMAN – Photo E. Newbold
While no enemy mortar fire was recorded on Australian units in and around FSB BERRYMAN the LP reported mortar firing to the east of the FSB to which the radar produced a locrep. The location was bombarded using B Bty 2nd/35th US Arty’s 155mm guns. The next day a Cavalry patrol located a hurriedly vacated VC base camp at the grid reference of the Locreps.

**21 January** - Operation DUNTROON ended and Bravo Radar (A7) was extracted by air at 0730 am and returned to Nui Dat.

**Results**: Casualties:

*Own*: WIA 3;

*VC*: KIA 13. Crew-served weapons (3) and 15 small arms, 6 RPGs, 1800 lbs of rice, some equipment and documents were captured, while 800 m of tunnel complex and a number of RPG rounds, grenades and anti-tank mines were destroyed.

**24 January** - Operation COBURG commenced - a reconnaissance-in-force operation in AO Columbus, of 386 sq km between the Song Dong Nai and Route 1, east of Long Binh. It was intended to deny enemy access to suitable sites from which to bring 122 mm rocket fire on to Long Binh or Bien Hoa airbase complex.

Bravo Radar (A7) with Sgt Ted Doust as No 1 deployed by air to FSPB HARRISON (Grid YT1617). No mortaring incidents were recorded at this FSB. Two LP’s were also deployed.

**29 January** - Appointment: Officer Commanding Det 131 (TFAIO) Captain Phillip M. Perrin.

**31 January** - Bravo Radar (A7) redeployed by air to FSPB ANDERSEN (Grid YT208128), in War Zone D, 22 km due east of Bien Hoa and 7 km south east of FSPB HARRISON.

FSPB ANDERSEN was deliberately sited on a low bull-dozed hill astride a known VC main avenue of communication. Det 131 also deployed in FSPB ANDERSEN a Listening Post (LP) made up mainly of Det 131 surveyors and for the first time a forward TFAIO which would control the radar, LP’s and co-ordinate data directly with the supporting Artillery.

**01 February** - Nui Dat came under enemy mortar fire during the Tet offensive with 20 rounds reported to the TFAIO. Locreps were recorded by Alpha Radar (A6) and within 8 Minutes the suspected base plate position and possible escape routes were engaged by 105mm Bty and 8” howitzers. An infantry patrol was sent to the base plate position the following morning and reported that it appeared to have been rapidly vacated. The enemy left behind 25 X 81mm mortar bombs. It was also reported that possibly three separate mortars were used, identified from the indentations of mortar baseplates in the ground.

**02 February** – Sgt Lawler Replaced WOII Ron Royal as unit DSM. Bdr A. Dodds commands Alpha radar as No.1.

**18 February** - Following 150 round enemy mortar barrage, two (2) waves of VC attacked FSPB ANDERSEN resulting in 8 Aussie KIA and 22 WIA. At least 5 rounds straddled the 131 LP which was situated on the perimeter in the northern section of the FSPB. During this attack LBDR Jimmy Menz was killed and Gunner M.H. (Dutchy) Van Driel wounded as a result of the mortar fire. Both were surveyors manning the LP.

Bravo Radar (A7) recorded 5 mortar Locreps with three separate locations, which resulted in CB fire by infantry mortars and 105mm guns. Confirmation of mortar base plate positions from infantry patrols at Grid YT221125; YT220125;YT213120. This proved the locreps to be accurate to 25 metres of the firing points. An unexpected find at grid YT 220125 were a number of charge bags (exact number not recorded) and a primer for a 120mm mortar not previously used against Australian troops.

The radar received many unwarranted remarks, after the first attack, being blamed as a marker for enemy targeting (this remark was consistently levelled at the radar), even though the radar itself received no battle damage in this or subsequent attacks on FSPB ANDERSEN. After the first enemy attack, the radar detachment was ‘ordered’ to build a dummy radar close to the southern perimeter, this was completed using an empty 44 gal drum some star pickets to hold up ration pack cardboard, cut to the shape of the radar.
dishes. This object was then lightly sandbagged around the base. It may be noted that no enemy fire (mortar or rocket) came close to this object or the radar which might suggest these items were not the targets of the enemy.

**20 February** - A second attack occurred on FSPB ANDERSEN and was similar to the first in that a ground attack occurred after an initial mortar barrage. The number of rounds fired in this barrage appears not to be recorded but from eye witness accounts, estimated between 60 and 80 mortar bombs, however, there were many rocket (RPG) and grenade explosions at this time which could easily be mistaken for mortars. Bravo Radar (A7) produced a number of locreps on which CB fire was initiated. The Det 131 LP became involved in the ground attack when incoming small arms fire struck their position. The LP was also responsible for directing our own infantry mortars onto one of the enemy attacking formations. The following morning two unfired RPG 7’s were found in that location.

![FSPB Andersen](image)

**28 February** - FSPB ANDERSEN was attacked for the third time again a similar pattern emerged, with a mortar barrage followed by a ground assault. It had been well observed that preceding the first two attacks a red flare had been fired by the enemy. On the report of a red flare from Det 131 LP, Bravo Radar (A7) laid the beam on the LP’s bearing to the red flare and as luck sometimes plays a part, an enemy mortar opened firing from this general area, the result being that the radar for the first time was able to produce a locrep almost as soon as the first round detonated inside the FSB. The TFAIO was able to conduct CB fire well within a few minutes of the first round being fired. It is believed that only 10 to 15 mortar rounds impacted on the FSB and the remainder of explosions were RPG’ and grenades. The firing position was the same as one used in a previous attack - YT213120.

In all attacks infantry mortars were used as first response for CB fire and proved very effective. 161 Fd Bty RNZA (105mm), 3 RAR, TF tactical HQ, ‘A’ Troop of ‘A’ Squadron, 3rd US Cavalry, Engineer Troop and 155mm howitzers of “B” Bty 2nd/35th US Arty were deployed there during those battles.

Whilst at FSB ANDERSEN Bravo Radar (A7) had confirmed locreps of a 122mm rocket firing, which was engaged by eleven (11) Batteries over the III Corps fire direction net.

**1 March** - Operation COBURG ended, Bravo Radar (A7) and all Det 131 personnel returned to Nui Dat.

**Results**

**Casualties:**

- **Own:** 17 KIA, 1 NZ KIA, 57 WIA, 8 NZ WIA, 1 US KIA, 6 US WIA
- **Enemy:** 167 KIA (BC), 7 KIA (Poss), 27 WIA, 5 POW.

**Material:**

- **Captured:** 9 crew served weapons, 94 small arms, 10 RPG2 launchers, 3 RPG7 launchers, 5 transmitter/receiver radios, 2 compasses, and 3500 lbs of rice.
- **Destroyed:** 49 RPG2 rockets, 8 RPG7 rockets, 9 RCL rounds, 13 claymore mines and 99 grenades.

(Source: AWM95, 1/4/80 - 1-31 January 1968)

**2 April** – Bdr Colin Gordon replaced Bdr A Dodds as No1 on Alpha radar
2 April – Bdr. Keith Ayliffe replaced Sgt Ted Doust as No1 on Bravo radar.

21 April - The Allied Operation THOAN THANG ‘Complete Victory’ the largest unit level battle involving Australian soldiers in the Vietnam War, commenced. This was a reconnaissance-in-force operation in AO's totalling 398 sq km.

In the first 3 weeks of Operation THOAN THANG, Alpha Radar (A6) was deployed into the following FSB’s co-deployed with 102 Fd Bty RAA and a Det 131 LP;

- HARRISON YT1716.
- WATTLE YS3591.
- CLOWES YS3963.
- ANDERSEN (for second occupation).

During this phase of the operation there were two LP’s deployed by Det 131, one LP deployed with 102 Fd Bty and one deployed with 161 Fd Bty RNZA at FSB EVANS (YT 22-06) which "sat firmly astride a known VC trail to and from Saigon," 5 km south-south -east of FSB ANDERSEN, 22 km east of Bien Hoa. Det 131 TFAIO was deployed at Bien Hoa where it controlled the radar and LP’s.

05 - 13 May - A North Vietnamese offensive similar to the TET offensive took place this was dubbed “The mini Tet offensive”, attacking 109 towns and cities throughout South Vietnam. In the course of that offensive, 5,270 Communists, 154 Americans and 326 South Vietnamese were killed.

13 May – 2Lt Gordon Williams replaced 2lt Wight as Radar Section Commander

13 May - Bdr Keith Ayliffe becomes No.1 of Alpha radar. Bdr Gordon returns to Nui Dat to command Bravo radar

**Battle of FSPB CORAL, BALMORAL and COOGEE**

May and June - For twenty-six days, units of the 1 ATF fought a series of actions around FSB's Coral, Coogee and Balmoral against an enemy actively looking for a fight. Further reading on the Battle of Coral is available in the book - *The Battle of Coral* - Lex McCauley - Hutchinson Aust - ISBN 0 09 169090 0

12 May - Alpha Radar (A6) was air lifted along with 102 Fd Bty and an LP from FSPB ANDERSEN into FSPB CORAL XT 9329 in AO SURFERS. FSPB CORAL was intentionally sited on a major enemy trail just inside the western edge of War Zone D, 20 km north, north west of Bien Hoa and 22 km east, south east of Ben Cat. Det 131's second LP was air lifted with 161 Fd Bty RNZA to a position approximately 1500m east of FSPB Coral.

13 May – At approximately 0130hrs the major NVA attack commenced on FSPB CORAL.

Alpha Radar (A6) suffered extensive enemy rocket/mortar shrapnel damage to Antenna, RX/TX unit cables, stack, a generator and a vehicle, all were made unserviceable. The radar detachment were on the western perimeter of the FSB and as such provided the defence for this area, fortunately the ground attack came from the north and north east, however the detachment came under heavy mortar and rocket fire and of course the small arms fire which cut through the entire FSB. The enemy broke off contact at about 0630hrs.
A road convoy from Nui Dat arrived about midday. Part of this convoy contained two vehicles from Det 131 and one vehicle from 131WKSPS. Apart from a change of a number of radar and LP personnel, the vehicles contained replacement radar units and parts from Charlie Radar (A12). The forward TFAIO arrived by road from Bien Hoa and deployed with 12 Fd Regt Tac HQ. (See Annex D - FSPB CORAL manning - Det 131 Div Loc Bty.)

A remark overheard from a 102 Fd Bty Bdr on the morning after the first attack. “The locating radar made good aiming points for the NVA mortar and RPG teams and it is not good to have your pit anywhere near them”

161 d Bty RNZA along with Det 131 LP moved to FSB COOGEE 4.5 Km west of FSB CORAL

Alpha Radar (A6) was moved to a new position at FSPB CORAL, a forward position north in front of the guns. This position proved to be unsatisfactory in tracking mortars fired at/into FSPB CORAL.
On the morning of the 13 May 1968, with the nights battle just dying out and enemy still believed to be in the area, the LP which had spent a sleepless night with 161 Fd Bty RNZA travelled unescorted to FSPB CORAL, a distance of about 1.5 Km
The lead figure in photo is Stan Briggs followed by Ken ‘Bluey’ Peisley with John Bayford at rear (closest to camera). After a short stay at CORAL the LP departed to FSPB COOGEE (by air)

Photo: John Dellaca (Fourth member of the LP)

16 May - A second enemy Attack occurred by an estimated VC battalion group supported by RPG and mortar. Contact was made at 0345hrs and broken at 0730hrs, Alpha Radar (A6) screen was cluttered with a large amount of shells/mortar/rocket/ traces that it was unable to secure a locrep.

20 May – Sgt Norman Lindroos assumes command of Bravo radar Nui Dat as No. 1.

25/26 May - FSPB CORAL came under attack again at the same time as FSPB BALMORAL was being attacked. Alpha Radar (A6) recorded locreps on mortars attacking FSPB BALMORAL. No results are recorded.

27/28 May - FSPB BALMORAL again was attacked, with Alpha Radar (A6) recording locreps. No results known. FSPB CORAL received incoming RPG and 75mm Recoilless rifle and possibly 60mm mortars.

May - a replacement radar was requested to replace Alpha Radar (A6) as it had reached its expected life span of 4000hrs, however with the battle damage it had incurred, it was imperative to have a replacement radar.

05 June - Operation THOAN THANG ended and all Det 131 sections returned to Nui Dat.
It is interesting to note that no crater analysis was conducted at FSPB CORAL for the simple reason that very few craters were left untouched, a collecting frenzy occurred with soldiers from all units including members of Det 131 removing tailfins as souvenirs. Crater Analysis was conducted at FSPB Balmoral with the Arty Int Operators uncovering not only 60mm mortar craters but also fragments from a number of armour piercing 75mm recoiless rifle rounds. The photo is of the OC of Det 131 (Capt. Phillip Perrin) at FSPB Balmoral conducting crater analysis, which produced a fuse from a 75 mm recoiless rifle which had armour piercing capabilities. Photo supplied by: Phillip Perrin

June - Charlie Radar (A12) replaced Alpha Radar (A12). A6 radar was then crated for RTA.
23 June Alpha Radar (A12) was deployed by air to FSB Concord YT0317 during Operation TOAN THANG 11 in AO BIRDSVILLE
18 July - Alpha Radar (A12) returned to Nui Dat. No enemy mortar activity was recorded during this period.
19 July – Bdr K Ayliffe replaced Sgt N Lindroos as No.1 Bravo radar. Sgt N. Lindroos assumed control of Alpha radar as No.1.
26 July – Bdr Colin Gordon became No.1 Alpha radar replacing Sgt N. Lindroos

29 July - Operation PLATYPUS commenced, with Alpha (A12) moving by air to FSB AVENGER (YS454838) on the west side of Route 2, 15 km north of NUI DAT, 5 km south east of FSB COOLAH in the Cu Bi Rubber Plantation in AO KIMBERLEY. Alpha Radar (A12) was deployed with Alpha Bty 2/35 Arty (US), to be joined later 161 Fd Bty RNZA.
05 August - An odd note to this sequence is that the with no radars in Nui Dat, the provincial capital Baria was mortared, receiving about 20 rounds of 81mm enemy mortar fire.
08 August - The new radar (A8) arrived in country; this became the slave ‘Charlie Radar’.
(A12) returned to Nui Dat.
28 August - Operation DIAMANTINA began and Bravo Radar (A7) was deployed by air to FSPB LONGREACH (YS525767) 10 km north, north east of NUI DAT, 3 km west of FSB WILTON, 1 km east of Ngai Giao and 7 km east of Route 2 in AO COBAR.

September - Although information is sketchy about this period, it appears that Bravo Radar (A7) returned to Nui Dat and the LONGREACH site was re-occupied by Alpha Radar (A12) (by road) sometime on Operation HAWKSBURY, however, 1 RAR Duty Officer's log for Operation HAWKSBURY (AWM95, 7/1/91 Part 4 - 12-14 September 1968), states the name of this FSPB is LOWREACH (LONGREACH ??) YS5276. Note grid references are the same.
12 October - Operation CAPITAL, reconnaissance in force in AO DICKSON began.
Bravo Radar (A7) moved by road to deploy in FSPB LION (YS613815).
1/2 November - An enemy Ground and mortar attack occurred with Bravo Radar (A6) recording a number of locreps which were engaged by the guns of 102 Fd Bty.
An infantry patrol became lost during Bravo Radar (A6) stay at FSB LION. By having a Helicopter hover over the patrol a fix was determined by the radar.
19 November - Operation CAPITAL ends. Bravo Radar returns by road to Nui Dat.
03 December - Operation GOODWOOD commences to achieve rapid destruction of enemy 3/271 Battalion or other VC elements in the AO, and any enemy instillations/assets discovered.
3/271 Battalion was, according to intelligence sources, believed to have recently received large numbers of North Vietnamese replacements. The battalion was estimated to include between 250 and 300
men, and was well equipped. Located in the Hat Dich area, the battalion was believed to be occupying a number of permanent base camps, complete with numerous trench systems, bunkers and underground tunnels.

To achieve this, a forward 1ATF base was deployed at FSB JULIA YS2281 which was situated north of the village of Thai Thein, on Route QL 14, with Armoured support and three (3) Artillery FSPB were deployed:

- a. FSPB DYKE YS2780 104 Fd Bty.
- b. FSPB CHESTNUT YS2280 A Bty 2/35 Arty (US) and C Bty 2/40 Arty (US). From discussions, it is believed a radar was deployed here but as yet unable to confirm this.
- c. FSPB AVENGER YS4583 161 Fd Bty (after initially deployed at HORSESHOE).

Alpha Radar (A12) deployed by air to FSB JULIA along with a forward TFAIO and an LP. This was the last air deployment of the radar, as according to records, the AD equipment special base had “fallen apart” and could no longer be used.

05 December – LP and other sources report mortar firing, search bearing sent to radar. Alpha (A7) records two (2) locreps at YS475623 and YS484626. At 2204hrs 104 Fd Bty fires on YS475623 and at 2329hrs fires on YS484626 resulting in six secondary explosions reaching a height of approximately 150ft. Bright green and orange flames were also observed.

09 December – Bdr Terrence ‘Lofty’ Hayes replaced Bdr Keith Ayliffe as No.1 Bravo radar.

Although the radar was air lifted into FSB JULIA, It would leave by road transport. The photo shows the special vehicle platforms stacked and waiting to be reassembled to their respective vehicles. The AD fibre glass platform had ‘fallen apart’ and from this point all movement of the radars was by road.

30 December – Alpha Radar returned to Nui Dat

By the end of 1968 the Sound Ranging base had been established at Nui Dat, this was to allow for both radar systems to be deployed outside Nui Dat at the same time.

1969 – Winding down?

With the introduction to Det 131 Sound Ranging Base, trials and control of Sensor equipment and large searchlights with infra red capabilities, the emphasis on the radars seemed to decline with no mention of the radars in reports from January. It is highly probable that one radar remained in Nui Dat and one radar was deployed at the Horseshoe.


17 February – Operation FEDERAL commenced, once again operating outside Phuoc Tuy Province to secure the major bases of Long Binh, Bien Hoa and the capital Saigon from an impending offensive. However, unlike the previous two NVA offensive episodes—Operation COBURG in January and February
1968, and Operation THOAN THANG I in May 1968 which had both involved large-scale attacks on Australian positions, Operational FEDERAL was less intensive and was limited to ambushing and patrolling, with none of the Australian fire support bases subjected to attack. AWM 95-1-4-140

19 February – Operation GOODWOOD ended.

Bravo (A7) was deployed to FSB DUSTER (YT 1211) Bien Hoa, which is described as the HQ of 2/5 Arty Bn US. FSB DUSTERS believed to be named after the major defence armament for the base, the 40mm SP guns, which were officially referred to as DUSTERS.

Alpha (A12) deployed by road to FSPB MARTINE (YS2575). It is difficult to find any information on these two FSBs in discussion with ex radar operators it is concluded that both these FSBs were US named and controlled.

It is suspected, although not documented that the radars were on loan to the Americans as added protection from rocket and mortar attacks on the major bases of Long Binh and Bien Hoa particularly with the threat of another Tet offensive.

At this stage the radars were no longer air portable and the sound ranging base at Nui Dat was functioning well and afforded a greater range of security from enemy rocket and mortar attacks to the Australian Task force base.

The documents record Alpha (A12) was located near a US MPQ-4A mortar locating radar system. This system was classed as a second generation mortar/weapons locating system and from radars operator reports was superior to our system. No enemy locrps were recorded during this period, however, operators were successful in tracking and recording a number of allied weapons.

The 40mm SP gun (referred to as ‘Dusters’) came in a number of configurations,

1. Single gun
2. Twin (two) guns, and
3. Quad (four) guns.

Their general purpose was to supply perimeter defence for American instillations; FSPBs and major bases.

10 March - Operation OVERLANDER a reconnaissance in force operation commenced with both radars Deployed in the Bien hoa area.

17 March – Lt Paul Tys replaced 2Lt Gordon Williams as radar section commander.

01 April - Bdr Paul Butcher replaced Bdr Colin Gordon as No.1 Alpha radar.

17 April - On completion of Operation OVERLANDER both radars returned by road to Nui Dat.

18 April - Bravo (A7) deployed to Bien Hoa by road. Reports indicate Bravo (A7) remained at Bien Hoa for the remainder of the month and Alpha (A12) remained at Nui Dat.
From this point it is impossible to identify the radars by serial number, as they are now simply referred to as “AN/KPQ-1 radar”

08 May - Sgt James “Zeke” Ritchie No1 Alpha radar
08 May - Operation REYNELLA commenced to deny access into populated areas by VC from areas such as Long Hai Hills YS4455 and Long Green YS5054.

11 May – An AN/KPQ-1 radar deployed to FSB THRUST - YS 50-54 23 km NE of Vung Tau, on the southern edge of Route 326, 4 km south of Dat Do, 4 km north west of the coast and 15 km south, south east of Nui Dat, Phuoc Tuy Prov, III Corps.

06 Jun – 0015hrs - FSB THRUST hit by 20 to 30 mortar rounds (calibre not recorded), resulting in 1 KIA and 9 WIA, 9 RAR. The enemy mortars fired while 105mm guns of 161 Fd Bty at SPB THRUST were conducting H&I mission. Although bearings were reported by the LP, no Locrep was recorded. No CB fire took place. There is mention of a tower being built by Det 131 for the use by LP. There is an offhand mention that it was referred to as the ‘leaning tower of Pisa’, however, no photo appear to exist and official records contain only scant mention.

0815hrs – The Battle of BINH BA commenced. (a village about 4 Km north of Nui Dat)

1525hrs - An unknown number of enemy rockets impacted outside 1 ATF perimeter.
1655hrs - An unknown number of enemy rockets impacted outside 1 ATF perimeter.
1925hrs - An estimated nine rockets impacted in the area to the NORTH of 1 ATF perimeter.
2032hrs - An estimated four rockets impacted in the area to the NORTH of 1 ATF perimeter.

There was no damage or casualties reported. No record of any locreps from either SRG or radars.

07 June - Battle of Binh Ba ended.
The baseplate position from the FSPB THRUST previous mortaring (6 Jun) was located by an infantry patrol.

10 June – Det 131 Counter Battery Fire Plan in support of 1 ATF Base rewritten and renamed ‘FIREBALL’ (original Fire Plan ‘CRACKERBARREL’). Main alterations were new targets and newer groupings of targets.

15 June – 2030hrs LP reports Mortar firing. 7 rounds of unknown calibre impacted near FSPB THRUST without causing casualties or damage. No record of Locreps, CB fire or crater analysis. Operation REYNELLA ends. There is no mention of the radar returning to Nui Dat.

14 July - Operation MUNDINGBURRA commences to assist in the security of the population within Long Dien and Dat Do. 105 Fd Bty deploy to FSPB THRUST. There is no mention of an AN/KPQ-1 radar deploying at this time, however, as we have evidence of the radar being at this location at this time, raises the possibilities that it remained here after Operation REYNELLA or was redeployed here at the commencement of this operation.

03 August – Baria reported incoming mortar and rocket fire. Locreps were produced to say the primaries were coming from grids YS3670, YS3771 and YS3770. There is no record on who or what
produced these locations (radar or sound ranging base). The Locations placed them into an area where B Bty 2/35th were firing into. These grids were then engaged by both B Bty and 161 Fd Bty.

04 August – Det 131 Arty Int Operators conducted crater analysis in Baria with the result that the fire received was identified as 105mm. A subsequent investigation ordered by the CO revealed 161 Fd Bty had been adjusting a target to the south of Baria had fired the rounds.

08 August - 0045hrs FSPB THRUST received approximately 12 rounds of enemy 82mm mortar fire. 105 Fd Bty fired a CB mission with unknown results. Also not recorded where the CB data came from.

2 Aust WIA were ‘Dusted Off’. (a term for medical evacuation by helicopter.)

15 August - Operation MUNDBURRA ended FSB THRUST
The AN/KPQ-1 radar at FSPB THRUST moved back to Nui Dat. (AWM 3-6-17)

26 August - Appointment: Officer Commanding Det 131 (TFAIO) Captain Brian W. Kennedy.

31 October – Operation KINGS CROSS, A reconnaissance and ambush operations commenced deployment into AO GRACE centre of mass YS3082 Phuoc Tuy Province
one (1) AN/KPQ-1 Radar deployed by road to FSPB CAPE YS3082.

01 December – one (1) AN/KPQ-1 radar deployed at HORSESHOE.

12 December - Operation KINGS CROSS ends. Radar returned by road to nui dat from FSPB CAPE The AN/KPQ-1 radar deployed at HORSESHOE moves by road to FSB BARBARA YS4577

15 December - 105 Fd Bty at Nui Dat engaged a suspected mortar base plate position. Locrep 419732 from AN/KPQ-1 radar at FSB BARBARA. Results not known.

31 December - The AN/PKQ-1 radar redeployed from FSB BARBARA by road to HORSESHOE.

1970 - The end of an era.

Official records of the AN/KPQ-1 radar lack necessary detail for this period and I am grateful to Richard Chaplin for allowing me to use extracts from his diary, these extracts are identified in italics and RC at the end.

January – May – An AN/PKQ-1 radar located at HORSESHOE feature
An AN/PKQ-1 radar located at Nui Dat (AWM 3-6-22)

Not much changed over the years. The sign remained the same, the lines never changed only the command post seems to have acquired new sand bags and a coat of paint.

18 January - 12 to 15 enemy mortar rounds (no calibre recorded) fired into Horseshoe, mortrep obtained by Det 131 LP and locreps produced by radar and sound ranging. CB fire conducted by C/2/35 US 155mm SP onto suspected mortar base plate position - YS394716. No further information recorded
2 February - At 0145 Hrs four (4) Radar operators at Nui Dat, are affected from gas from an unknown source near the radar. Investigations failed to find the source or identify the gas. The operators were fully recovered 24 hrs later and reported no ill effects.

“In the evening just after I had completed the Ist Shift manning the Nui Dat Radar Unit I had retired to bed at 0130. After about 15 minutes I felt a horrible feeling in my nose like breathing pepper or something acidic, made me feel nauseous, and my eyes started to water. I heard Burt Jacka sniffing as well and realised that it wasn’t just me. It was then that I realised that it was probably gas. I grabbed my gas mask, and by then the alert had been given and everybody headed to the bunkers or command post with rifles and ammunition just in case it was a ground attack – it wasn’t as it turned out and we were stood down.” – RC

4 February – “Burt Jacka and I travel a Shotguns on a convoy with the Engineers and a crane to Xuyen Moc where Australian Engineers were building a new Town Hall for the village.” - RC

9 February – “Caught the 0715 helicopter in to Nui Dat from the Horsetoe FSB and built a covered entrance to the Nui Dat Radar Unit Command Post, paint it yellow, and installed a red light at the entrance. Caught 1745 chopper back to the Horseshoe FSB.” – RC

Nui Dat, South Vietnam. March 1970. Adelaide Army sponsored concert party’s finale at Luscombe Bowl. The entertainers on stage are, left to right: Tammy (of the brother and sister act, Ricky and Tammy), Bev Harrell, Ricky, the Wills Sisters, Ann and Sue. The show was rated tops by hundreds of off-duty troops who packed the bowl. Copyright AWM.

20 February – “Catch chopper into Nui Dat and watch the Show at the Bowl – Bev Hamel, The Wilson Sisters, and Ricky and Tammy. At night B52s conducted an air strike on the Long Greens after Aussie troops had large contacts during the previous days. The ground shuddered and the mountains glowed red.” - RC

21 February - B52 strike on the Long Hai Hills in support of 8 RAR. Following the B52 strike and intensive artillery fire, three rifle companies, with tanks and cavalry still in support, redeployed to the Long Hai Hills

22 February – “On last shift we did some Impact Point identification for friendly mortars firing on suspected VC activity reported by Tipsy 25.” – RC. (Note: refers to a ground surveillance radar possibly AN/TPS-25)
Authors Note: The US had a number of types of Ground surveillance radar (GSR) systems in SVN among them were the aging AN/TPS-25 (sometimes referred to as Tipsy 25) and the newer AN/PPS-5. Both had a range of about 10000M and were used to detect movement. (Vehicle, human and animal movement could be detected.)

24 February – “Go out with a Protection Party for the 131 Div Loc Bty Survey Unit. Travel in APCs and have a very rough ride through the undergrowth. See 3 monkeys and a deer. During our clearing patrol we nearly lost one of our men (Warren Jeanke) who got left behind but luckily he was quickly noticed as missing. We retraced our tracks and found him. After we had been in the area for about 3 hours we heard firing about half a mile away and found out it was one of our infantry patrols coming straight for us. We then found out that we had not had permission to be in the area. We immediately travelled hell for leather out of the area leaving clouds of dust behind us. In our haste the APC I was on hit a tree branch containing a large ants nest and they went everywhere including into the APC. A fumigating grenade was used to kill them but everything then was covered in yellow dust! Later in the day myself, Vic Cicollela and Lt Paul Tys went out of the base to check on a reported blind mortar that turned out to be an Illumination Mortar. “ -RC

1 March – “Battery BBQ – plenty of good food and beer followed by a football match between the Nachos and the Regs – punches and blood everywhere!” – RC

6 March – “Part of a Protection Party for the Survey team – hot and very dusty.” - RC

7 March - 4 Field Regiment RAA arrived in SVN and in the first Commanders monthly report, there is a report that “one radar was located at Nui Dat and the other at HORSESHOE”

4 Fd Regt Standard operation procedures (SOP’s) had an allowance for a Radar Section Commander and a Radar No. 1 to accompany their recce party. (AWM95 – 3-7-10)

“Watch the parade for the change-over from 1 Field Regiment to 4 Field Regiment. Film – Thoroughly Modern Millie. -2200hrs – 77 degrees Fahrenheit.” - RC

15 March – “Service Horseshoe radar unit generator. Return to Nui Dat in jeep the long way and through (sic “Throw”!) tins of (FSB Horseshoe) C Rations out the back for the local children along the way – they love it! Test Nui Dat radar’s ability to track US Battery 155 shells and it works reasonably well.” - RC

19 March - “Go to Vung Tau (Peter Badco Club) for the day however about a mile from the Nui Dat gates we are shot at from the rubber trees – a bullet passes very close to Chris Chapple’s head. A short time later our vehicle breaks down and we need to be towed the rest of the way to Vung Tau. Spend the day in the pool and surfing. When we get back to Nui Dat we find that the Radar Unit had been in operation since 1400 as there were contacts in the Warbies and one New Zealander had been killed.” – RC
20 March - Van Kiep (YS3690) reports incoming mortars. Radars produce Locreps at Grid 381632 which is engaged by C/2/35 US Arty. Results unknown. This is the last known recording of an enemy mortar locrep by an AN/KPQ-1 in SVN.

“Mal Musgrave gets a LocRep from the Horseshoe Radar Unit and choppers verify about 30 Vietcong. US Husky Charlie Battery fire 124 X 155 rounds at the target. The Commanding Officer is pleased with the Radar Units performance and at last we are getting some recognition.” - RC

29 March – “In afternoon prepare radar for an Air Burst Registration but the guns decide not to do it in the end – so play cards with Chris (Chapple) and Mal (Musgrave) down in the CP (Command Post).” - RC

31 March - “Go to FSB Anne with and Sgt Peter O’Donnel as he had not seen a FSB (neither had I apart from the Horseshoe). Very dusty indeed – the worst I have experienced to date. Go through Ban Jar (a North Vietnamese settlement). Do Air Burst Registration in the afternoon.” - RC

4 April – “Come in from Horseshoe for 2 days as I have night off. Do an Air Burst Registration for the Yanks artillery, and they say they will do their calculations...so I leave. Then they change their minds, and Bdr Mal Musgrave has to follow my previous calculations as he could not find me – I was playing table tennis!” – RC

25 April - “After a short Anzac Day parade in 102 degrees Fahrenheit and high humidity the whole Nui Dat crew went out to the Horseshoe to set up a new Command Post on higher ground to protect it when the wet season arrives. A bulldozer helped by pushing large amounts of soil against the command post walls to provide added protection (and nearly destroyed it in the process!) The new CP is much larger than the original and much cooler.” – RC

The last new site for the radar at the Horseshoe. Completed 25 April 1970, ceased operations on 18 May 1970. Pictured on right is Jeff Bassford doing what all good radar operators did – posed with the radar. Photos: Richard Chaplin

27 April - “Go back to the Horseshoe and move all the equipment from the old CP to the new CP including setting up the radar unit in its new location. Burn all old ammo boxes and sand bags. On 30 April most of the detachment again go to the Horseshoe for the morning to move the generators.” - RC

29 April - “Hear that Radar units may be pulled out of SVN with 8 RAR in August/September as will 27 men from our battery.” - RC

12 May - “Catch chopper from Horseshoe to the Dat – pick up a carton of “goffas” and a box of C Rations for the Horseshoe crew. Also learn that one radar unit will be pulled out within 14 days and the other soon after.” - RC

18 May - The AN/PKQ-1 radar at the Horseshoe was closed down/came out of action for the last time in SVN.
“WO Perry advises that the Horseshoe FSB Radar Unit is to be pulled out that day, and Sgt Black and I go to the Horseshoe to assist and oversee dismantlement of the radar unit.” - RC

19 May - The AN/PKQ-1 radar located at Nui Dat came out of action/closed down for the last time being the last operational AN/KPQ-1 mortar locating radar in SVN.

“Radar unit at Nui Dat pulled out. On the same day the radar units crew were advised that they would soon be on 107 Battery Strongpoint duty, work in Arty Tac, and may also have some role in Civil Aid.” - RC

20 May - “Worked all day cleaning both radar units and then was advised by DSM (WO Perry?) and Sgt Black that they will need to be transported to Vung Tau by truck for steam cleaning and boxing up prior to shipping to Australia. I was advised that myself plus 6 others from the radar section would be going to Vung Tau with the radar units and would likely spend a few days there assisting with the final cleaning/boxing prior to the units being shipped back to Australia.” - RC

1 June - All radars (although not specifically mentioned, believed to be Alpha, Bravo and slave radar Charlie) and their equipment including vehicles were RTA in accordance with the first phase of the Australian withdrawal from SVN. (AWM – 3-7-12)

After the withdrawal of the radars, what happened to the radar operators can be summed up by the following statement from an ex Det 131 radar operator SVN:

“I was in the Dat from Jan 1970 at the time John Gorton announced staged withdrawal plans for the troops, resulting in 131 closing down the radar and returning some other equipment including vehicles. I remember cleaning all the local dirt out of everything to be returned as this was important for Australian quarantine purposes. One of the Landrovers was so hard to clean we painted it (over the dirt).

I remained on duty and ended up cruising with armoured, participating in protection parties and patrolling with the grunts including a night ambush operation. A group of us remaining 131 people also manned a forward observation post for a period in a bombed out monastery on top of a small but steep hill called Dihn Co, near the Long Hai’s. No radar but an infra red searchlight, lots of fireflies and great views. This was an active area with artillery rounds regularly going over the top and on one occasion machine gun rounds coming in from a grunt contact below. I believe that it was possibly at Dinh Co that 131 concluded its locating role in SVN” - Chris Chapple.

The Last Officer Commanding appointed to Det 131.

This was the end of the story for the radars but not for Det 131,. The Sound Ranging Base closed in October 70, and during this period the Det Surveyors were transferred to 12 Fd Regt. Records show that Detachment 131 Divisional Locating Battery (SVN) officially closed on 31 July 1971
Sensors take over Bravo radar site

Capt T Ford and Lt J Evans prepare a sensor unit

Photo: Kevin Browning.

Photo of operations map removed from radar command post on its closure
Radar Synopsis

A. The original two systems, which arrived in SVN May 1966, were identified only as Alpha Radar and Bravo Radar. With the original ‘Slave’ radar named Charlie.
B. Alpha Radar and Charlie Radar were returned to Australia (RTA) as unserviceable in April/May 1967.
C. Bravo Radar then became the slave Charlie Radar which allowed for identification as A12.
D. Radar system A6 was known as Alpha Radar from May 1967 to June 1968.
E. Radar system A7 known as Bravo Radar from May 1967 to RTA June1970
F. Charlie Radar A12 replaced Alpha Radar June 68. This system therefore remained in SVN from May 1966 to RTA June 1970 longer than any other System. It also rotated through the unit as firstly Bravo Radar (66/67), then Charlie Radar (67/68) and finally, Alpha Radar (68/70).
H. From April 1969 all official identification of the radars cease and they were refered to as Nui Dat radar or Horseshoe radar. Even radar operators were unsure as to which radar they were on for example a quote from Richard Chaplin “Although my diary records that on arrival in Vietnam I worked on Alpha radar located at Nui Dat, a photograph I took of the Nui Dat radar has a large sign next to the Command Post identifying the Nui Dat radar as “B” Radar Detachment; so presumably FSB Horseshoe was Alpha”

Attachments:
Annex A - Characteristics
Annex B - Unit and Weight table
Annex C - Manning radar section
Annex D - FSPB CORAL manning
Annex E - AIR LIFT 1 - SEQUENCE
Annex F - Artillery tracked successfully by AN/KPQ-1
Annex G – Last radar section SVN

Acknowledgements:

Ian Finlay – Radar Op - SVN 67-68
Robert Wilson – Arty Int Op – SVN 67-68
Terry Erbs. – Surveyor – SVN 68-69
John Delacca. - LP Op – SVN 68-69
Robert Billiards. - LP Op – SVN 67-68
Ron ‘Chalky’ Royal (Deceased). - DSM- SVN 66-67
John Strautins. - RAEME Radar Mech. - SVN 68-69
Keith Ayliffe. - Radar Op – SVN 67-68,70
Chris Chapple. - Radar Op - SVN 70
Kevin Browning – Surveyor – SVN 68 – 69. 71
Richard Chaplin – Radar Op – SVN 70

Bert Blink. – LP Op. – SVN 67-68
George Lane. – Radar Op – SVN 66-67
Ernie Newbold. – LP Op – SVN 67-68
Warrick Brooker – Surveyor – 67-68

Many Thanks to all who participated. K.A
For the reader’s interest, the 1 Field Regiment Commanders Diary Narrative 1 – 31, Dated May 66 contains a request to change the name from Det 131 Div Loc Bty to 1 ATF Locating Troop.

Edited by:

John Posener

All care has been taken to ensure that the information contained on this document is factual, accurate and unbiased. Please report any discrepancies stating the source document and/or reference.

Facts and events have been sourced from eye witnesses, books, document, creditable web sites and official War Diaries.

Direct enquiries to

Keith Ayliffe – Email – aylif @westnet.com.au
Bibliography.

B. Det 131 Div Loc Bty WKSPS Monthly and equipment reports 66-67-68,
C. Australian War Memorial - AWM95 series Australian Army commanders' diaries [Vietnam] Artillery units
   a) 1 Field Regiment
   b) 4 Field Regiment
   c) 12 Field Regiment
   d) Det 131 Div Loc Bty
E. Maps – Vietnam 1:50,000. Series L7014
   Sheets
   a) 6330 – 1
   b) 6331 – II
   c) 6430 I and II.
   d) 6431 – III
F. Web Sites
   d) http://www.husky235.org/
   e) VC and NVA weapons Vietnam - http://www.skysoldier17.com/vc_weapons.htm
G. Personal diary – Richard Chaplin – Ex Det 131 SVN, and
H. Eye witness accounts (from ex members Det 131 Div Loc Bty).
# Characteristics

**AN/KPQ-1 Mortar Locating Radar**

## Radar Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>X Band (3 cm wavelength) This placed the equipment in the Beta radiation level</td>
</tr>
<tr>
<td>Pulse Duration</td>
<td>0.8 micro sec</td>
</tr>
<tr>
<td>Peak Power Output</td>
<td>140 KW</td>
</tr>
<tr>
<td>Pulse Repetition Frequency</td>
<td>1100 pps ± 10%</td>
</tr>
<tr>
<td>Range</td>
<td>Normal operation 8000 metres. Maximum 10,000 metres</td>
</tr>
<tr>
<td>System Accuracy</td>
<td>CPE of 50 metres at 8,000 metres</td>
</tr>
<tr>
<td>Antenna Rate of Travel</td>
<td>89 mils per second during automatic track</td>
</tr>
<tr>
<td></td>
<td>445 mils per second during manual target acquisition</td>
</tr>
<tr>
<td>Antenna Beam Width</td>
<td>Overall pattern 320 mils wide; 89 mils high</td>
</tr>
<tr>
<td></td>
<td>approximately</td>
</tr>
<tr>
<td>Display</td>
<td>Type A - 5 inches</td>
</tr>
<tr>
<td>Intermediate Frequency</td>
<td>30 MHz</td>
</tr>
<tr>
<td>Power Supply Input</td>
<td>115V - 400 Hz - 3 phase</td>
</tr>
<tr>
<td>Modulator High Voltage</td>
<td>115V - 400 Hz - 3 phase - 4 wire conductor</td>
</tr>
</tbody>
</table>

## Supply Input, Total Power Consumption

<table>
<thead>
<tr>
<th>Power Input</th>
<th>Standby power</th>
<th>2.6 KVA.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiate power</td>
<td>4.25 KVA.</td>
<td></td>
</tr>
<tr>
<td>Radiate and full slew</td>
<td>4.6 KVA.</td>
<td></td>
</tr>
</tbody>
</table>

## Computer Characteristics

| Power Input | 120/208V - 400 Hz - 3 phase - 750W. |

## Space Coverage

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Minus 10,000 metres to plus 10,000 metres from radar.</td>
</tr>
<tr>
<td>Y</td>
<td>Minus 10,000 metres to plus 10,000 metres from radar.</td>
</tr>
<tr>
<td>H</td>
<td>Minus 5,000 feet to plus 20,000 feet from radar.</td>
</tr>
</tbody>
</table>

## Computer Input/Output Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-Input</td>
<td>DC voltage; scale: 44V equals 10,000 metres.</td>
</tr>
<tr>
<td>Y-Input</td>
<td>DC voltage; scale: 44V equals 10,000 metres.</td>
</tr>
<tr>
<td>H-Input</td>
<td>DC voltage; scale: 44V equals 20,000 feet.</td>
</tr>
<tr>
<td>Conversion Scheme</td>
<td>Converted from analogue to digital information for use in the computer.</td>
</tr>
<tr>
<td>Output Indicators</td>
<td>3 mechanical counters automatically driven by digital servo loops</td>
</tr>
<tr>
<td>Counter Range</td>
<td>0 - 99,999 metres in X and Y</td>
</tr>
<tr>
<td></td>
<td>0 - 99,999 feet in Ht</td>
</tr>
</tbody>
</table>

## Power Source

| Generator | 6.25 KVA - 120V - 400 Hz ± 10 Hz - 3 phase - 4-wire conductor |

Page 41 of 49
# Unit and Weight Table

## AN/KPQ-1 Mortar Locating Radar - Photos supplied by John Posener

<table>
<thead>
<tr>
<th>Unit</th>
<th>Unit Name</th>
<th>Weight of unit</th>
<th>Number of men required to lift unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Antenna Group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Antenna unit</strong></td>
<td>(Plus carrying pallet)</td>
<td>Four (4) man lift</td>
</tr>
<tr>
<td></td>
<td>291 lbs Or 131 Kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Antenna pedestal</strong></td>
<td>(plus carrying pallet)</td>
<td>Four (4) man lift</td>
</tr>
<tr>
<td></td>
<td>327 lbs Or 148.324 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Tripod</strong></td>
<td>225 lbs Or 102.058 kg</td>
<td>Four (4) man lift</td>
</tr>
<tr>
<td></td>
<td><strong>Receiver/Transmitter (RX/TX)</strong></td>
<td>148 lbs Or 67.1316 kg</td>
<td>two (2) man lift</td>
</tr>
<tr>
<td></td>
<td><strong>Power Supply (PSU)</strong></td>
<td>144 lbs Or 65.3173 kg</td>
<td>two (2) man lift</td>
</tr>
<tr>
<td></td>
<td><strong>Modulator</strong></td>
<td>150 lbs Or 68.0388 kg</td>
<td>two (2) man lift</td>
</tr>
<tr>
<td></td>
<td><strong>Electronic Control Amplifier (ECA)</strong></td>
<td>115 lbs Or 52.1631 kg</td>
<td>two (2) man lift</td>
</tr>
<tr>
<td><strong>The Stack</strong></td>
<td></td>
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<tr>
<td><strong>Computer</strong></td>
<td>180 lbs Or 81.6466 kg</td>
<td>two (2) man lift</td>
<td></td>
</tr>
<tr>
<td><strong>Control Indicator (CI)</strong></td>
<td>100 lbs Or 45.3592 kg</td>
<td>two (2) man lift</td>
<td></td>
</tr>
<tr>
<td><strong>Cables</strong></td>
<td>3x Cable hand reeling machines</td>
<td>156 lbs each Or 70.7604 kg</td>
<td>two (2) man lift for each reel</td>
</tr>
</tbody>
</table>

*Note: The Antenna without the pallet required to be lifted above head height to connect with the pedestal. This was accomplished by two men with a third guiding the antenna to its locking position.*
The AN/KPQ-1 mortar locating radar

Photo supplied by Kevin Browning
Manning radar section.

Manning for the radar section was:
Radar Section Commander: Lieutenant.
Section SGT: SGT.
Driver: BDR or L/BDR.
Signaler (RAA): GNR.

Each radar Comprised: (Alpha radar, Bravo radar)
Radar No. 1: SGT (Note. In many cases the Radar No 1’s were senior BDRs)
Radar No. 2 (2i/c): BDR or L/BDR
Radar Operator: GNR
Radar Operator: GNR
Radar Operator: GNR
Radar Operator: GNR
Driver: GNR
Driver: GNR
Driver: GNR
Signaler (RAA): GNR.
Signaler (RAA): GNR.
Radar mechanic (RAEME): SGT (more likely a CPL)

A total of one (1) Officer and twenty six (26) other ranks (OR’s).

It is important to note that whether it occurred prior to arrival in country or while in country, all drivers and signalers were cross-trained as radar operators. All members of the section were required to do shifts on the radar as an operator to enable the radar to function on a 24 hour basis. On operations two men would man the radar normally in two hour shifts, when a search order or ‘stand to’ was in force the normal manning was two operators, a signaler, Radar No. 1 or 2i/c and RAEME radar mechanic. With members on R&R, R&C, normal administration duties and preparing for RTA or arriving in country, it is doubtful that either radar ever had a full compliment.

Radar members performed many different tasks on a regular basis, the following three photos supplied by Ian Finlay show radar operators on checkpoint duty and clearance patrol at Horseshoe feature. Center photo features L/Bdr Ian Finlay on checkpoint duties.
**FSPB CORAL manning**

*Detachment 131 Divisional Locating Battery RAA SVN*

<table>
<thead>
<tr>
<th><strong>TFAIO</strong></th>
<th><strong>Alpha Radar (A6)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>(attached to 12 Fd Regt Tac HQ)</td>
<td></td>
</tr>
<tr>
<td>Capt. Phil Perrin (OC Det 131)</td>
<td>2/Lt Gordon Williams</td>
</tr>
<tr>
<td>Sgt Jim Lawler</td>
<td>Bdr Keith Ayliffe</td>
</tr>
<tr>
<td>L/Bdr Peter Dealy</td>
<td>Bdr Colin Gordon</td>
</tr>
<tr>
<td>Gnr Alan Robb</td>
<td>L/Bdr Frank Pepper</td>
</tr>
<tr>
<td>Gnr Peter McKie</td>
<td>L/Bdr Ian Finlay</td>
</tr>
<tr>
<td>Gnr Robert Wilson</td>
<td>L/Bdr Iain Kennedy</td>
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<tr>
<td></td>
<td>Gnr Wal Franklin</td>
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<tr>
<td></td>
<td>Gnr Ian Amos</td>
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<tr>
<td></td>
<td>Gnr Murray Smaile</td>
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<tr>
<td></td>
<td>Gnr Gordon Malcolm</td>
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<td></td>
<td>Gnr Dennis Dye</td>
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<tr>
<td></td>
<td>Gnr Ken Jones</td>
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<tr>
<td></td>
<td>Gnr John Ianson</td>
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<td></td>
<td>Gnr Alan McDonald</td>
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<td></td>
<td>Gnr Tony Coutts</td>
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<tr>
<td></td>
<td>Gnr Phil “Doc” Sheedy</td>
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<td></td>
<td>Gnr Vic Claxton</td>
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<td></td>
<td>Gnr Brian Mitchell</td>
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<table>
<thead>
<tr>
<th><strong>Listening Post 31E</strong></th>
<th><strong>Listening Post 31F</strong></th>
<th><strong>RAEME</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>L/Bdr Eric Marques</td>
<td>Gnr John Dellaca</td>
<td>Cpl John Strautins</td>
</tr>
<tr>
<td>Gnr Geof Blackwell</td>
<td>Gnr Ken Piesley</td>
<td>Cpl Joe McNiel</td>
</tr>
<tr>
<td>L/Bdr Neville Wortlehock</td>
<td>Gnr Stan Briggs</td>
<td>Cpl Stephen Palmer</td>
</tr>
<tr>
<td>Gnr Michael Bohl</td>
<td>Gnr John Bayford</td>
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</tr>
<tr>
<td>Gnr Gary Leplaw</td>
<td>Gnr Neil Kesley ?</td>
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</tr>
</tbody>
</table>

**Authors Note:** *The above list is not an official list, as no record was kept of Det 131 Div Loc Bty members deployed to FSB CORAL. It must be noted that many changes of personnel occurred during the Det 131 deployment at CORAL. Members were returned/replaced for various administration reasons, such as RTA, leave and medical.*

*This list was compiled from the memory of those who took part and may or may not be accurate. At a reunion which took place in Canberra ACT in 2008 of which many of the people named above attended, it was agreed to be a fairly truthful representation.*
AIR LIFT 1 SEQUENCE

Incoming Chinook C-47.
Dust swirls around Radar and LP operators as they await
to depart FSPB ANDERSEN for deployment into FSPB
CORAL on the 12 May 68
Photo by John Delacca 131 LP operator

Chinook Lands to take on internal load passengers.
To the right on ground the radar waits to be hooked up for
external load

Photo by Ian Finlay radar operator

Radar operators and 4 LP operators board the Chinook

Photo by John Delacca 131 LP operator

Radar external load hooked up by radar No. 1
(Bdr Colin Gordon was No.1 for Alpha radar (A6), at this time,
It is assumed that he is pictured ‘hooking up the radar.)

Photo by Ian Finlay radar operator

And away we go!

Photo by Ian Finlay radar operator
Artillery successfully tracked by AN/KPQ-1 in SVN

Throughout the documents there are numerous references of the radars successfully tracking many types of artillery weapons, not only enemy weapons but our own or friendly fire. Weapons being recorded as ‘Tracked’ were:

**ENEMY**

- **Chicom 81mm mortar and 82 mm mortar used by the VC as the main artillery piece.** Many of the locreps and mortreps claimed both weapons as an 82 mm mortar. Range: 3040 meters (minimum 100 meters)

- **VC/NVA 122 mm rocket bipod firing system.** The 122mm rocket possessed the longest range; three to eleven kilometers, of any of the rockets fired at the allies and was used extensively by the NVA and VC.

- **Captured 122 mm rocket in Det 131 enemy weapons museum which was located at Nui Dat.**

- **122 mm rocket fragments fired into Bien Hoa firing positions were recorded by Alpha Radar (A6) during Op COBURG**

- **Mortar M1943 120mm Range: 5700 meters (minimum 400 meters)** Ammunition for this weapon was found after attack on FSPB ANDERSEN and may have been fired during the attack. Charge bags found at a grid reference reported by Alpha (A6) radar

- **122 mm rocket fragments fired into Long Binh firing positions were recorded by Alpha Radar (A6) during OP THOAN THANG**

**Allied forces**

- **M2 60 mm Mortar US** Tracked at Bien Hoa under ideal conditions. maximum range:1,820m (1,990yd)

- **Web photo 120 mm Mortar US. Tracked at BIEN HOA**

- **155 mm Self propelled Gun US.** Photo A Bty 2/35 FSPB CORAL

- **155 mm towed Guns US.** Photo Bien Hoa

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*Continued*

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Artillery successfully tracked by AN/KPQ-1 in SVN

175 mm self propelled Guns US.  
Locally known as ‘long Tom’.  
1st 83rd Arty Bn Nui Dat 
Photo P. Sheedy  
40 mm Bofor (twin Duster) rounds. US. 
Photo 
5/52 AA BTY (US) 
At FSPB CORAL 
Photo K. Ayliffe

8 inch Self Propelled guns US.  
(1ST 83RD Bn US Artillery Nui Dat) 
Photo P. Sheedy

Much of the allied artillery tracked was conducted as training for radar operators. There were many official requests to conduct a fall of shot or air burst registration missions to obtain an MPI (Mean Point of impact) for US Gun Batteries. All proved successful recording MPI’s within 50 meters of target. Most difficult weapon to track was the 60mm mortar, mainly because of its short time of flight. There is no record of the radars conducting similar activities for Australian Guns.
## Last Radar Section Vietnam

Names supplied by Richard Chaplin Diary

<table>
<thead>
<tr>
<th>Name</th>
<th>Service Dates</th>
<th>Previous Service Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lt Paul Tys</td>
<td>17 Mar 69-18 Mar 70</td>
<td>Gnr. Chris Chapple 20 Jan 70 13 Aug 70</td>
</tr>
<tr>
<td>WO Donald Perry</td>
<td>16 Apr 70 - 19 Nov 70</td>
<td>Gnr. Dave Negus 24 Feb 70 – 13 Aug 70</td>
</tr>
<tr>
<td>(DSM?)</td>
<td></td>
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</tr>
<tr>
<td>Sgt James “Zeke”</td>
<td>8 May69 – 30 Apr 70</td>
<td>Gnr. John Lucas 20 Feb 70 – 11 Feb 71</td>
</tr>
<tr>
<td>Ritchie</td>
<td></td>
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<tr>
<td>Sgt Paul Butcher</td>
<td>01 Apr 69 – 25 Mar 70</td>
<td>Gnr. Warren Jaenke 20 Feb 70 – 11 Feb 71</td>
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<tr>
<td>Sgt Lindsay Black</td>
<td>29 Apr 70 – 27 Aug 70</td>
<td>Gnr. Peter Sali 24 Feb 70 – 18 Feb 71</td>
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<tr>
<td>(replaced Sgt Ritchie)</td>
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<tr>
<td>Sgt Peter O’Donnell</td>
<td>24 Mar 70 – 5 Nov 70</td>
<td>Gnr. Chris Brazier 24 Feb 70 – 25 Feb 71</td>
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<td>(replaced Sgt Butcher)</td>
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<tr>
<td>Bdr Mal Musgrave</td>
<td>03 Jun 69 – 04 Jun 70</td>
<td>Gnr. Ron Boaler 20 Feb 70 – 11 Feb 71</td>
</tr>
<tr>
<td>LBdr Rick Davis</td>
<td>20 Jan 70 - 30 Jan 71</td>
<td>Gnr. Alasdair Gough 24 Mar 70 - 4 Mar 71</td>
</tr>
<tr>
<td>LBdr Richard Chaplin</td>
<td>20 Jan 70 – 13 Aug 70</td>
<td>Gnr. Jeff Bassford 29 Apr 70 - 14 Apr 71</td>
</tr>
<tr>
<td>Gnr. Peter Bennett</td>
<td>26 Aug 69 – 4 Jun 70</td>
<td>Gnr. Max McPherson 27 Nov 69 – 5 Nov 70</td>
</tr>
<tr>
<td>Gnr. Laurie Mion</td>
<td>1 Apr 70 – 3 Dec 70</td>
<td>Gnr. Norbert ‘Norm’ Kroll 27 Nov 69 – 5 Nov 70</td>
</tr>
<tr>
<td>Gnr. Stewart Telford</td>
<td>20 Jan 70 – 03 Dec 70</td>
<td>Gnr. Vito ‘Vic’ Ciccolella 16 Dec 69 – 17 Dec 70</td>
</tr>
<tr>
<td>Gnr. Peter Bremner</td>
<td>16 Aug 69 – 16 Apr 70</td>
<td>Gnr. Grant Perrins 27 Nov 69 – 4 Jun 70</td>
</tr>
<tr>
<td>Gnr. Al Wheatley</td>
<td>17 Sept 69 -04 Jun 70</td>
<td>Gnr. Pete McGann 27 Nov 69 – 19 Nov 70</td>
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<tr>
<td>Gnr. Leon “Tex”</td>
<td>26 Aug 69 - 13 Aug 70</td>
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<tr>
<td>Djatschenko</td>
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<tr>
<td>RAEME radar mechanics</td>
<td></td>
<td></td>
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<tr>
<td>Sgt Alan Bensley</td>
<td>04 Jun 68 - 18 Jun 69</td>
<td>Cpl. Ewan ‘Ernie’ McLeod 9 Jul 70 – 5 Nov 70</td>
</tr>
<tr>
<td></td>
<td>27 Jan 70 – 30 Jan 71</td>
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</tbody>
</table>