

“FIVE WAYS” and a “TOR”

A Topographic Surveyor’s Tale

With Digressions!



Reflections of Major (Dr.) R.J. (Bob) Williams [Retired]

[Sapper, Corporal, Sergeant, Staff-Sergeant, Lieutenant, Captain, Major]

Topographic Surveyor – Cartographer – Senior Research Scientist

Compiled 2024

Trig stations – Five Ways and Nimbuwah

A trilateration survey

From July to October 1967 Central Command Field Survey Unit (later to become 4 Field Survey Squadron of the Royal Australian Survey Corps) conducted **Project C4 Eastern-Arnhem Land NT**, where 317 **Aerodist** lines measuring 17,300 line miles (27,840 kilometres) were successfully completed.

This was possibly the most productive **Aerodist** project.

Aerodist was an airborne electromagnetic distance measurement system.

A **triangulation station**, also known as a **trig station**, is a fixed surveying station, used in geodetic surveying.

Topographic surveyor

A **Topographic Surveyor's** role was to conduct geodetic surveys, topographic surveys, photogrammetrically compile and cartographically complete topographic maps, acquire aerial mapping photography and to distribute topographic products for land operations.

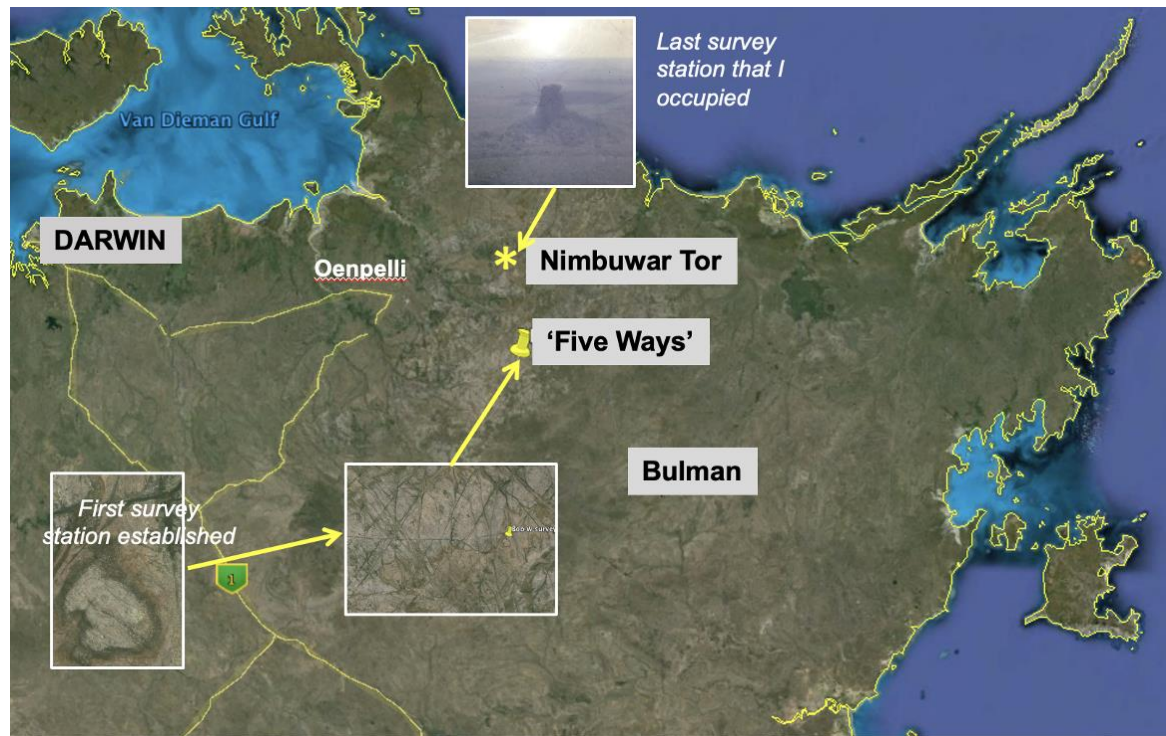


Survey Operation Arnhem Land, NT

Aerodist, Barometric heighting
& Air Profile Recording

1967

My first survey operation as a topographic surveyor was in Arnhem Land, Northern Territory in 1967. The survey was by AERODIST (airborne surveying equipment). I was sent to the point (13°00'S – 133°30'E that I named "Five Ways") by helicopter where I stayed for fourteen days (the first 24 hours by myself). I and a partner prepared an area for a drop zone for a fuel dump by RAAF Hercules and prepared the area for the ground mark [**'Five Ways'**].



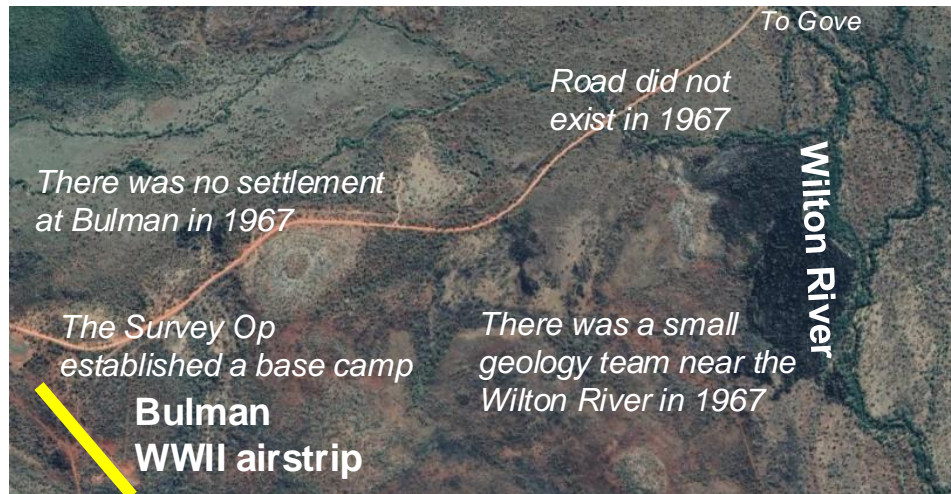
Survey Operation Arnhem Land, NT

The Last 'Explorers' Surveyors from Fortuna

1967 My 'Five Ways' survey point was north west of Bulman Airstrip (an old World War 2 strip) from where a major part of the survey was controlled.

My experience included being a driver and member of a party that tried to retrace a very old survey from Bulman to Gove. We had 2 International Mark III trucks and 2 Land Rovers. We crossed the Wilton River by driving a Land Rover down the bank, into the shallow part of the river, winching it up the other side, then used it to pull the other vehicles across.

On Day one we must have only covered 30 km (from memory). Day 2 we struck 'Annie Creek's' 'black soil' plain and got bogged several times. Navigating by standing on the front seat of a truck and stood through the hatch. We tried to miss the main obstacles – termite mounds. We punctured a fuel tank (fibre-glass) which forced us to turn around and return to base.



'Five Ways'
Named after gorge intersection



Digression

The journey to become a Topographic Surveyor

Digression

The journey to become a Topographic Surveyor

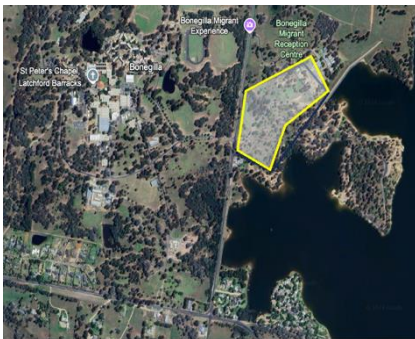
I enlisted in the Australian Regular Army on 15 June 1965 and, along with other recruits, boarded a steam train for the trip from South Brisbane to Sydney. The train had a stop at the Border Loop siding near Mount Lindesay on the Macpherson Range to fill its water tanks.

After an overnight stay we boarded the next overnight steam train from Sydney Central to Wagga Wagga and bused to the Army's Recruit Training Centre at Kapooka. A Nissen hut (similar to those on the right) would be my accommodation for three months – Winter at Kapooka – Cold, wet and miserable.

I arrived with my group one week prior to the first intake of National Servicemen; considered to be needed for requirements of the Vietnam War. In that week we were “guinea pigs”. We lined up and had haircuts; timed! We received injections; timed! We had clothing issued; timed! This was in preparation of the arrival of hundreds of “Nashos”.

In September we had our Corps allocation and march-out parade. The National Service platoons went before the allocation board first. Our “regular” platoon was last; and with a surname beginning with “W” I was near last and told that the Army Survey Corps had their full allocation. I was told that Artillery corps has “surveyors”, so off I went to the School of Artillery at North Head, Manly, Sydney (photo on right). I topped my Basic Artillery training course and posted to 4 Field Regiment; being formed for operation in Vietnam. The unit was at Wacol, Queensland.

Early in 1966 I met my Engineer uncle who asked why I was in the Artillery corps and I told him the story. He told me to talk to my commanding officer and explain that I was “corps enlisted” into the Army Survey Corps. I was subsequently posted to the School of Military Survey at Bonegilla, Victoria on the shore of Lake Hume.



The Basic Topographic Survey course was of 6 months duration; with no breaks. Even on weekends we would be assigned tasks.

As I arrived in April I, and a few others, did general duties until the course commenced in early July. As the School had only a few months before relocated from Balcombe on the Mornington Peninsula, Victoria the tasks involved cleaning rooms, raking leaves, “painting rocks”, etc.



Nissen huts 1960s



School of Artillery 1960s



School of Military Survey 1966 - Ex- Migrant camp

Training to become a Topographic Surveyor begins

Training to become a Topographic Surveyor begins - 1966

29/66 Basic Topographic Surveying Course



Plane table mapping



Slotted template assembly



Tavistock theodolite



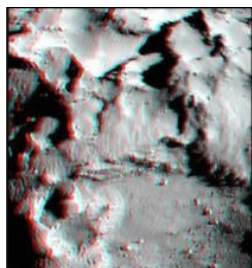
Wild T2 theodolite



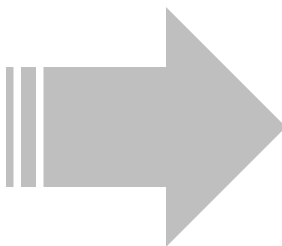
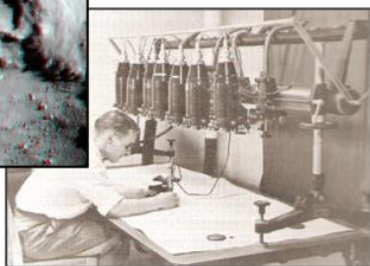
Tellurometer

Topographic survey trade training courses – the technologies

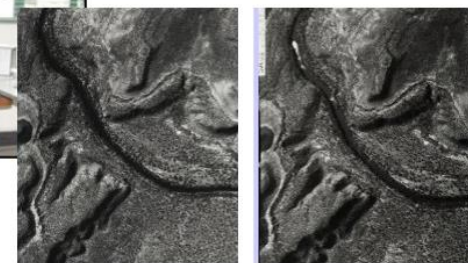
Plane tabling, Chaining, Slotted template assembly, Levelling, Theodolite & Tellurometer traverses & triangulation, Astronomical surveying, Multiplex stereo-plotter, Wild B8 stereo-plotter



Multiplex Stereo-plotter



Wild B8 Stereo-plotter



1966 - UK Military Map Grid (Clarke 1858) → Australian Map Grid (ANS 66)
The transition for series mapping from the Imperial System of Measurement to the Metric System

Training to become a Topographic Surveyor begins – More than a classroom course

The School of Military Survey Bonegilla, Victoria



There were twenty members on the course; eighteen Sappers (Private Army soldiers) and two civilian technicians from the Division of National Mapping (NATMAP).

With a relatively large course and a new site for the school required much practical work. For example, we established 13 new Trig Stations which later on would be part of a Photogrammetric Test Range.



Peter May (NATMAP)



What a view over Lake Hume – except when there is fog and low cloud below!



*Snow at Mount Lockhart, VIC
Peter May & John Barry (NATMAP)*



Tellurometer set up at a Trig Station



Establishing tracks to new Trig Stations – those darn thistles!



Snow at the School of Military Survey – 15 July



My Arrival at Fortuna Villa, Bendigo

My home for some years

1967 -

I arrived at **Fortuna** on 9 January 1967 after being posted to Bendigo from the School of Military Survey (SMS), Bonegilla, Victoria in December on completion of my six month Basic Topographic Survey course. The picture (on right) is my first view of the Villa.

New soldiers, on arrival at Fortuna, spent their first few weeks doing general duties; mowing lawns, doing kitchen duties, general clean up jobs, etc.

My accommodation would be in a tent (in photo on right) on the side of our parade ground. Imagine that in winter in central Victoria. My accommodation at SMS was in a small room (photo at far right) at Bonegilla which was previously part of the Bonegilla Migrant Centre.

Our motor vehicle yard was well equipped with vehicles for field survey operations. There was a number of trucks plus two Bell Boy boats.

My preference for my posting on completion of my trade training was AHQ Survey Regiment because Topographic Squadron undertook major field survey operations; hence the vehicles. I was soon to find that 1966 was the last year that the Regiment would undertake survey tasks to New Guinea.

The Regiment was to, however, send a Detachment of thirty (or so) to Central Command Survey Squadron for a major survey operation in the Northern Territory. I was a member of the party.



Studebaker trucks



*Land-rovers
Short and long wheel bases*



*Mark 3 International
trucks*

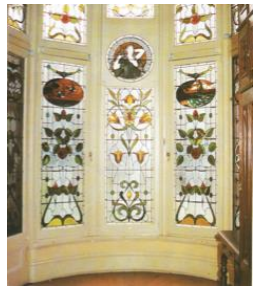


Volkswagon Kombi



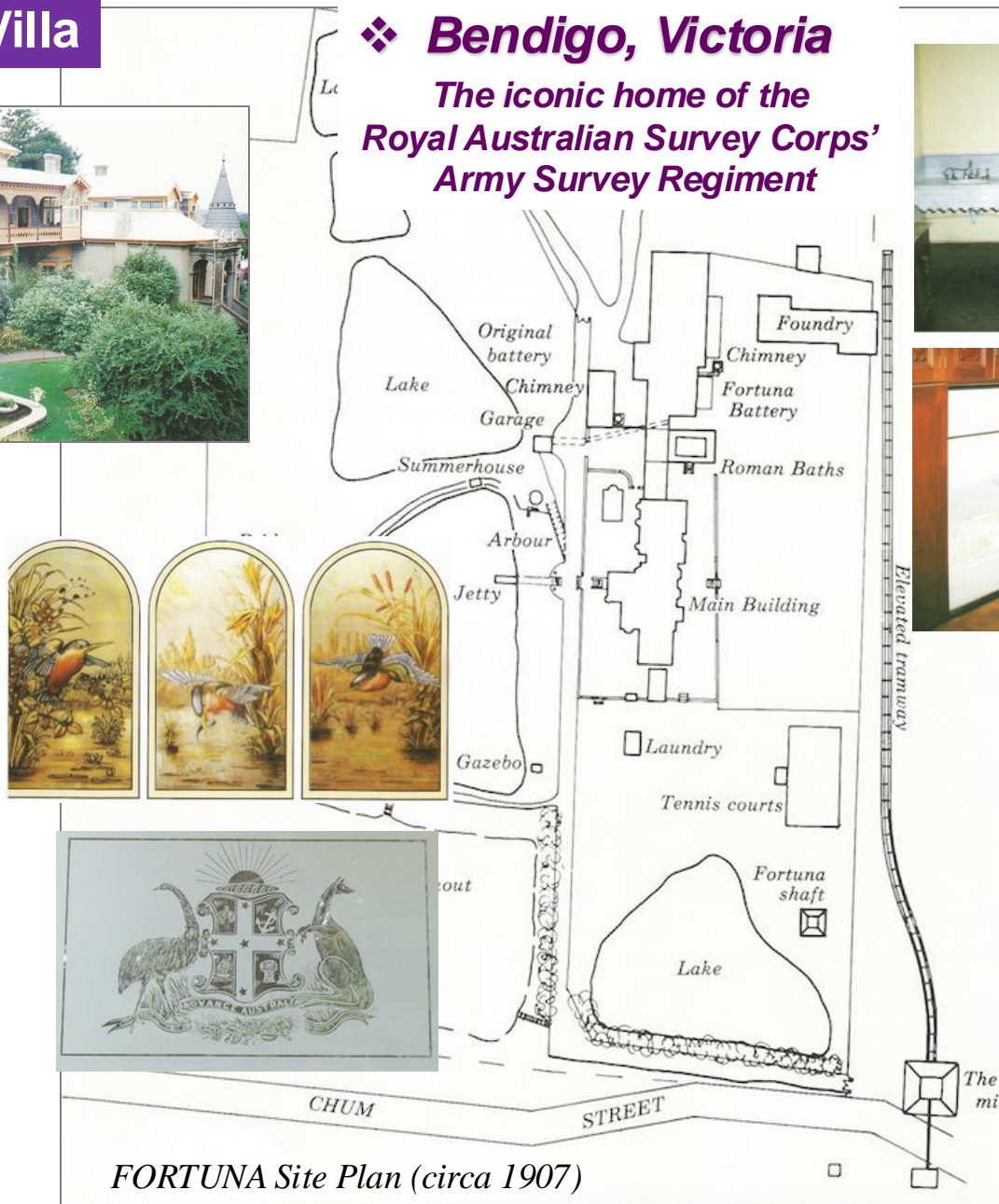
Bell Boy boats

Fortuna Villa



❖ Bendigo, Victoria

*The iconic home of the
Royal Australian Survey Corps'
Army Survey Regiment*



FORTUNA Site Plan (circa 1907)



ENTRANCE HALL
RECEPTION ROOM
MUSIC ROOM
PASSAGEWAY
STATUARY
DINING ROOM
BILLIARD ROOM
CONSERVATORY
BEDROOMS
MASTER WITH EN-SUITE

STAIRCASE BALLROOM
BALCONIES MANSARD
ROMAN BATH
GUEST (PRINCE'S) ROOM
TUNNEL
COACH HOUSE
BATTERY
POMPEII FOUNTAIN



Digression

Research and development of new technology

When I arrived at AHQ (Army Headquarters) Survey Regiment it incorporated all aspects of map production from field survey through to printing. A new organisational structure reflected the change. As well as Regimental Headquarters there were now three distinct squadrons: Topographic, Cartographic and Lithographic Squadrons.

In the 1960s, the Regiment became the Corps' centre for **research and development of new technology**. The Regiment was fortunate to have soldiers dedicated to excellence. One exceptional officer was Captain George Hann who had been employed on architectural work prior to joining the Corps in 1940. He was in charge of photogrammetry operations modifying the Multiplex system. The **science of photogrammetry** progressed rapidly under his leadership. Frank Bryant, who worked under George, considered him a '*real innovator*'. In 1962, Warrant Officer Frank Bryant was sent to the Victorian Lands Department to learn to use their WILD photogrammetric plotting equipment. In the first use of **computers** for the Survey Corps, Frank also learnt to compute the results on an IBM 1620 at IBM Headquarters in Melbourne.

A Digression further back

A revolution in surveying

1950s - Projects XYLON and CUTLASS. The close liaison with the U.S. Army Map Service, which was established during the war, was sustained and applied to cooperative projects in the post war period. One result, Project Xylon, was the survey and mapping of New Britain. A complete perimeter traverse of over 800 miles was made using a "**Ship-Shore**" method of triangulation using simultaneous and synchronized observations from shore stations to a beacon on a ship at anchor off shore.

In the **1960s**, many projects, such as Project Quarterstaff (a lunar occultation survey in 1964-65 aimed at accurate measurements of long geodetic lines), and Project Pageos (aimed at obtaining geodetic information through observation of **artificial earth satellites**) required the participation of small teams of Survey Corps personnel specially trained to assist with observations.

Others, such as Projects Secor, Anna and Transit (also **geodetic satellite programs**) required the establishment of temporary tracking stations on Australian soil, usually with some local survey assistance to connect triangulation for position determination purposes. Still others, such as Hiran (an **airborne electronic survey program** by the US Air Force taking in New Guinea and north-eastern Australia), and Southpaw (an aerial photography program conducted by the US Navy in Australia and New Guinea), yielded benefits in the form of information and data, while requiring limited direct participation.



Preparation for Project C4 Eastern-Arnhem Land NT

Duration - July to October 1967
Climate - Darwin
Training - Radios – a critical skill
Training - Cooking skills
etc

The Harry Wright Driving course

Warrant Officer Harry Wright conducted training on our vehicles including International Mark 3 4x4 truck and short and long wheelbase Land Rovers.

Two unique aspects included driving on mullock heaps and scrub, and a multi day drive through Victoria.

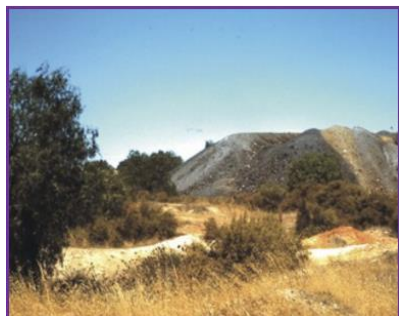
Mulluck heaps had relatively flat tops but steep slopes so driving up and down was not easy as there were 'blind spots'. The soft soils enabled skills that would be required for driving on *bull dust* in NT.

The drive through Victoria took us down to Melbourne city, through the central business district to Albert Park drill hall; then through Gippsland and onto Omeo where we had stretchers on the floor in the Court House. Just out of the small town Harry drove a vehicle off the road and into a creek. Recovery skills were needed. Then followed the track up to Hotham Heights where there was snow on the road. So, it was time for a vehicle to be put on its side just off the edge of the road. We then headed back to Bendigo.



Darwin statistics

Statistics	Jul	Aug	Sep	Oct
Temperature				
Mean maximum temperature (°C)	30.7	31.5	32.7	33.3
Mean minimum temperature (°C)	19.3	20.4	23.0	24.9
Rainfall				
Mean rainfall (mm)	1.1	4.5	16.3	70.4



Mullock heap and shrubs
Bendigo, February 1963
Bendigo Historical Society



Mount Hotham



View to Mount Feathertop

Bendigo to Darwin

In early July the Bendigo surveyors travelled to Melbourne's Essendon Airport for the flight to Adelaide on commercial aircraft.



A TAA Douglas DC-9-31 at Essendon Airport in 1971, wearing the 1964-1969 Whispering T-Jet colour scheme used exclusively on DC-9s and Boeing 727s

Wikipedia

Project C4 Eastern-Arnhem Land NT gets underway

Project Team Headquarters
Northern Command
NT Darwin Larrakeyah Barracks

An initial task involved constructing a large map of Arnhem Land using 4 mile to the inch maps. Many maps were little more than “artist’s impression” based on simplistic drainage system representation.

Another task involved setting up the work room where analysis and computation of data would be done.

Our accommodation was far more “basic” than the Headquarters building being two stories with ablution rooms, laundries, etc on the ground floor. The second level just had large rooms with rows of basic metal beds.



NOTE - I have used the word “tale” in the title. This is because much information is from “memory” and, so, may not be correct – as for the photos of the aircraft above.

I did have a lot of information on this project; boxes of photographs of terrain, people, assets, and so on. Unfortunately I loaned this to someone a couple of decades ago. I didn’t get them back.

Darwin to Bulman Airstrip

I was a member of a convoy of half a dozen vehicles (Land-rovers and trucks) tasked to travel to Bulman's old World War 2 airstrip to clear the strip for operation and setting up a forward base for survey operations – a distance of over 600KM.

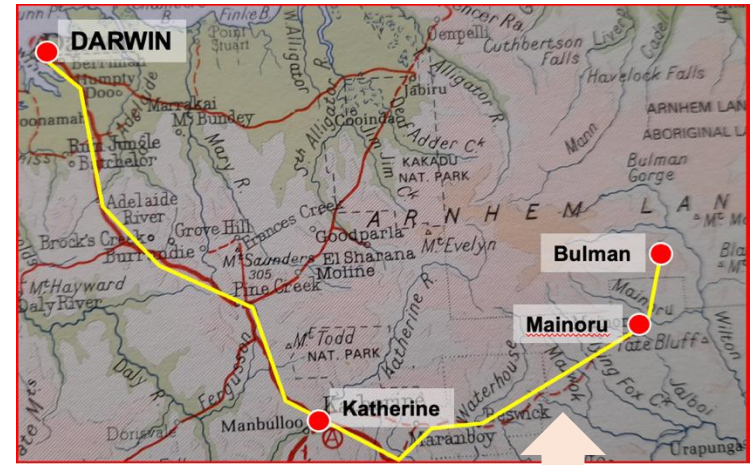
Prior to leaving Darwin we were given briefs on a range of topics including possible contact with aborigines, animals including water buffalo, crocodiles, etc.

We did not carry any weapons.

We stopped at Katherine. The town had a low-level bridge which was used by vehicles and a high-level bridge which part of the old railway. It could be used by vehicles in times of flooding.



Historical photos from Katherine Times



Once leaving the Stuart Highway at Maranboy we encountered sections of *Bull dust* (very fine powdery dust, almost like talcum powder). Our convoy spread out to allow the dust to settle and would stop to regroup every half hour or so.

Unfortunately, one vehicle had a close encounter with a road train which rolled over. So, we had an unexpected job to help herding cattle. We didn't help much!



A typical 1960s road train in NT

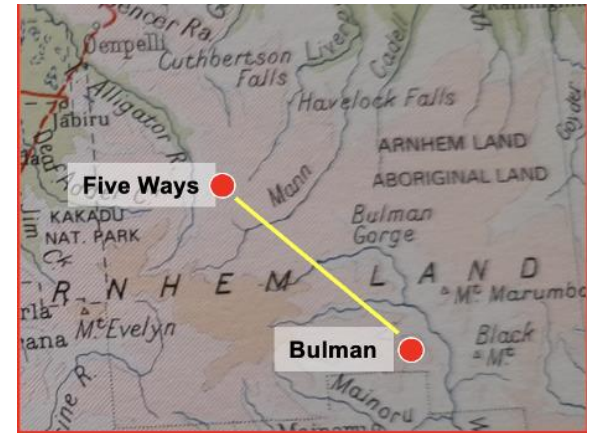
Five Ways

13° 00' S 133° 30' E 320 M

I was sent to the point (13°00'S – 133°30'E that I named “Five Ways”) by helicopter where I stayed for fourteen days (the first 24 hours by myself). I and a partner prepared an area for a drop zone for a fuel dump by RAAF Hercules and prepared the area for the ground mark [‘**Five Ways**’].

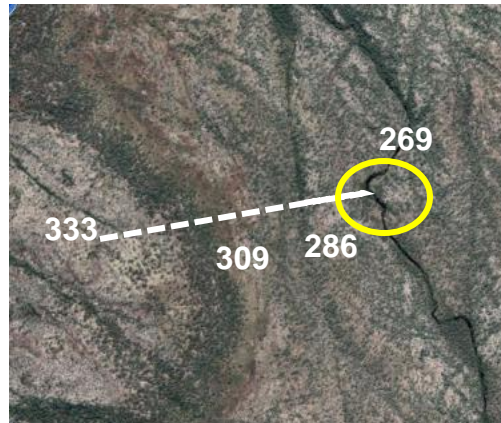


My first task was to set up an antenna for my radio. This was our “lifeline”; our connection with the base camp.

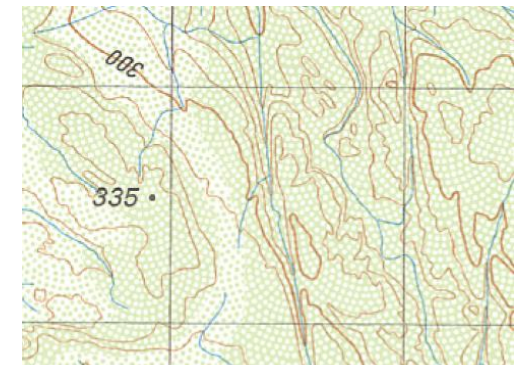


During my first call I was informed that our second helicopter had a fault and out of service and our resupply would be limited. A couple of days later, we (a partner – Artillery Corps surveyor) were told that there was fresh water below (yellow circle) so, with only a compass and pencil and paper for sketches, we ‘**navigated**’ a path down and had then to ‘**navigate**’ back up the escarpment. We didn’t have photography nor a map – that is why we were there – to produce them.

I kilometre (KM) to water –
as the “crow flies”
with a descent of 64 metres
With
A struggle back up with a
Jerry Can of water



GOOGLE EARTH

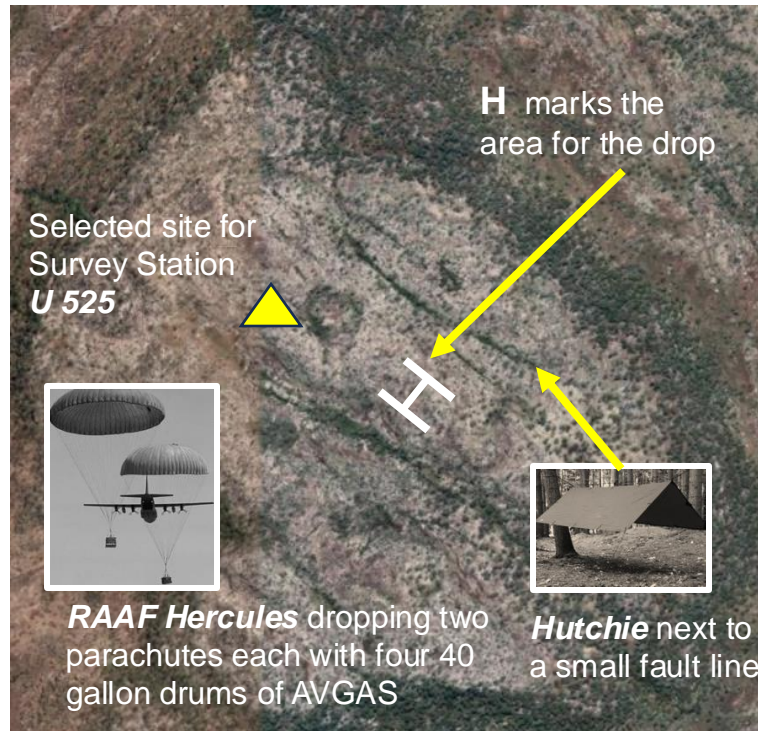


5671-4 FIVE WAYS

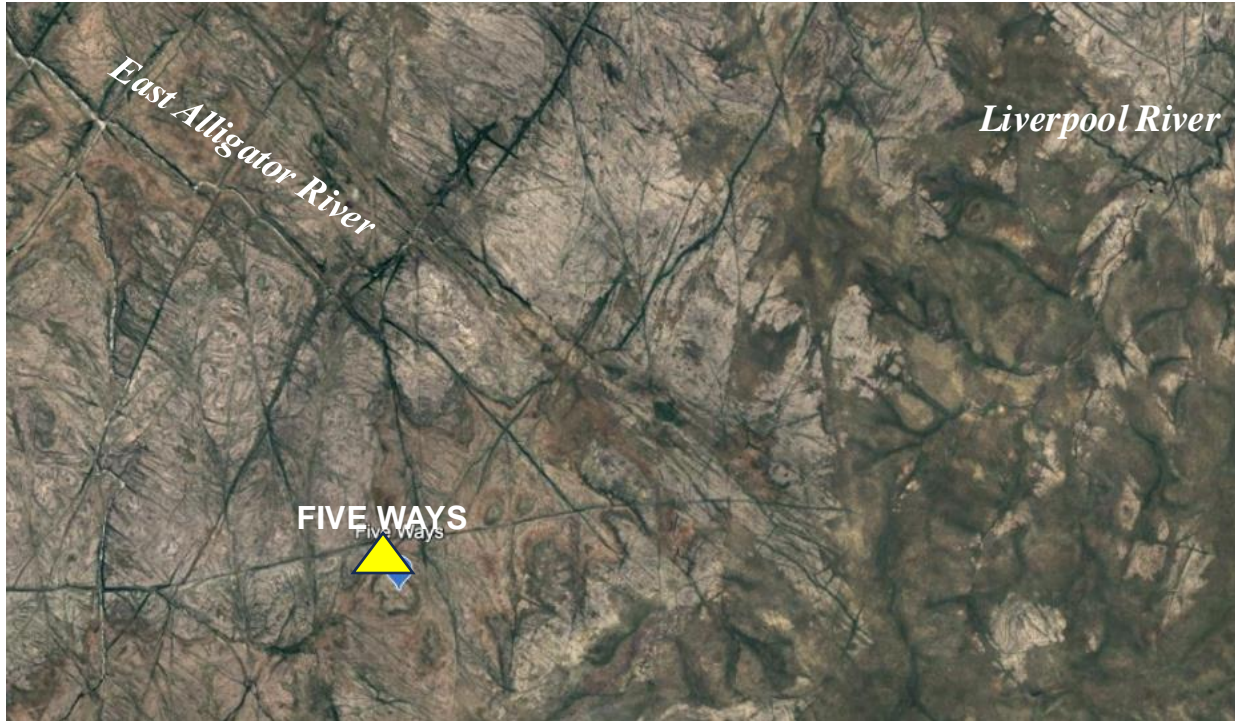
Five Ways

13° 00' S 133° 30' E 320 M

Preparation for an important site for a fuel dump, a cleared helicopter landing area, and site selection for a survey station



My small party's job was to prepare the site for surveying and logistics needs. We did not actually establish and mark the station. That was left to the next team to visit the site. We were relocated to the main base at Darwin for processing and document tasks.



ACCESS By helicopter from OENPELLI MISSION airstrip of 143° magnetic for 90KM.

STATION MARK Consists of a RA SVY bronze plaque, 7.6cm in diameter, stamped "U 525", set in concrete poured in situ at ground level.

REFERENCE MARKS

The RM consist of 3 x 6mm diameter brass rods, set in concrete poured in situ to protrude 15cm above ground level.

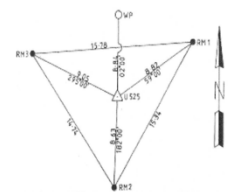
WITNESS POST

A 6cm GI pipe, capped and stamped "U 525", set in concrete to protrude 1.5m above ground level.

SITUATION "U 525" is situated in a large rocky clearing, 9KM east of *EAST ALLIGATOR RIVER*, 15KM west of *LIVERPOOL RIVER*, and 1.5KM SW of the intersection of 5 fault lines.

PHOTO PANELS

White plastic panels.



Five Ways

13° 00' S 133° 30' E 320 M

Distances between FIVE WAYS & other stations in KM
e.g. PIMPLE 101.1KM



Google Earth – Background image and Placemarks

National Mapping Council of Australia Station Summary 4522 – U 525 FIVE WAYS

Project Team Headquarters, Darwin

I was allocated to the Survey Computations Section which included a warrant officer and a number of corporals and sappers. Our work ensured that the lines measured met data quality specifications as well compiling station reports.



Meanwhile at Main Base Gove (Nhulunbuy)



Central Comd Fd Svy Unit
Warrant Officer Class One
Pat Wood BEM (right) and
Sapper Harry Dunn do
similar work in the
Operations Section tent
(Photo: 4 Fd Svy Sqn)



The AERODIST MRC2 Remote (on the tripod) antenna could be mounted on a 20 foot pole tower. The antenna direction was controlled by wires/ropes to the two arms under the dish at right angles. The antenna elevation could be changed to the vertical for aircraft height checks (right photo). (Photos: 4 Fd Svy Sqn)



Aero Commander VH-EXX at Gove NT.
AERODIST antenna pods in the rotated
raised position are on the aircraft fuselage.
(Photo: 4 Fd Svy Sqn)

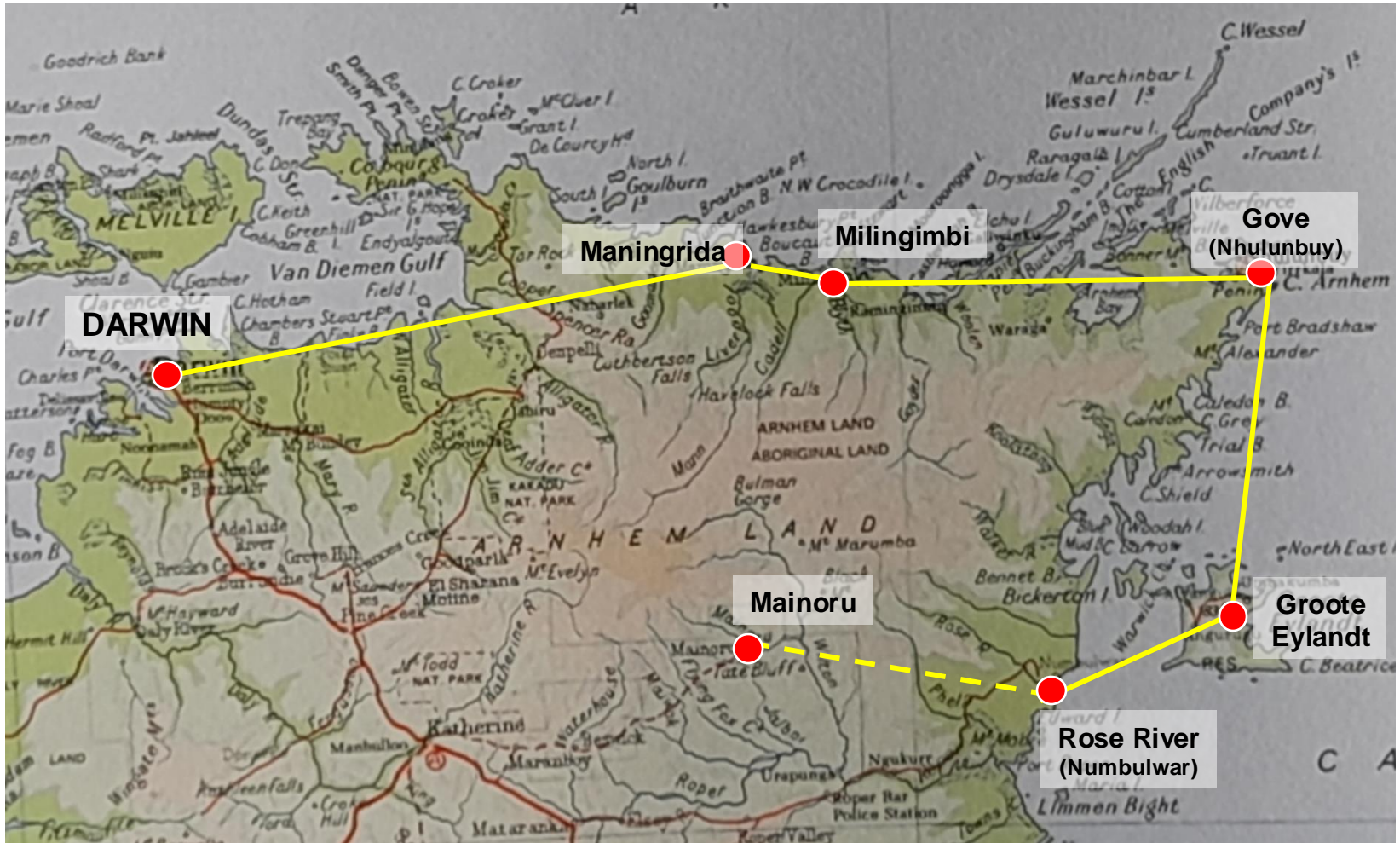
Darwin to Rose River (Numbulwar)

After a few weeks in the Survey Computations Section I was relocated to a forward base at Rose River (Numbulwar). The flight, visiting several missions around the coast, was operated by MacRobertson Miller Airlines (MMA) with meals served with crockery and silver cutlery.



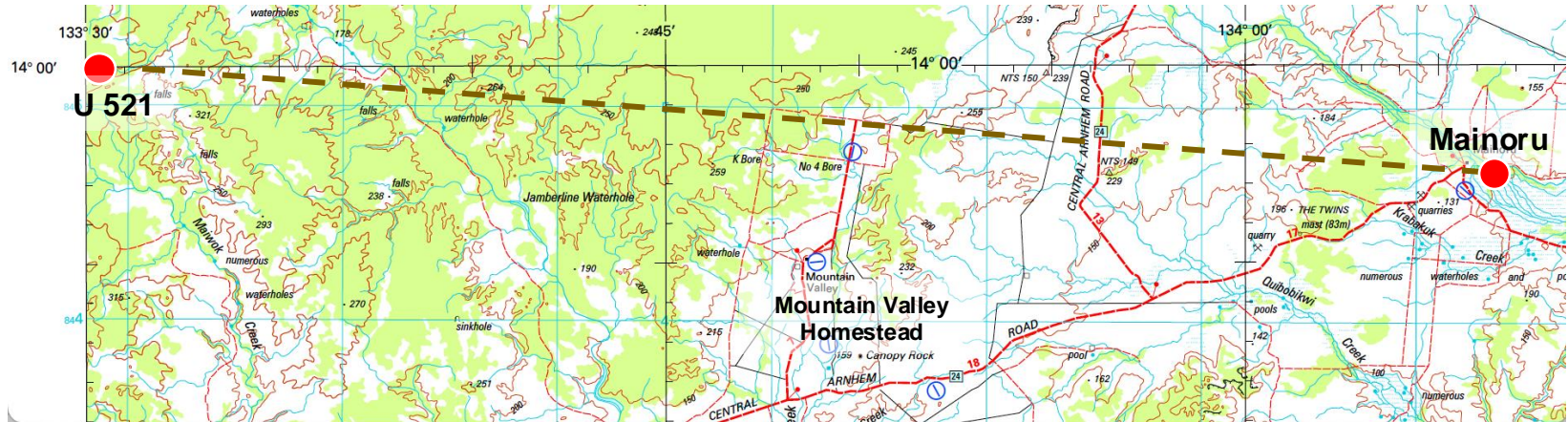
MMA
Douglas DC-3 service

My job at Rose River was with the Survey Computations Section. After a couple of weeks the base was relocated to Mainoru Homestead on the Mainoru River.



Mainoru – U 521

I was sent to the point (14°00'S – 133°30'E) by helicopter where I stayed for a number of days.



STATION MARK Consists of a RA SVY bronze plaque, 9cm in diameter, stamped "U 521", set in a precast concrete block to clear ground level by 2.5cm.

LOCATION "U 521" is located on a low stony hill approximately 64km on a bearing of 270° magnetic from Mainoru Homestead.
NOTE: the Name "Column" was probably given in 1968.

ACCESS By helicopter from Mainoru Homestead

REMARKS Firewood available. No fresh water was found at the site. Water suitable for washing was found 100m SE of station.

A GRASS FIRE

We (my partner and I) were notified from a helicopter that there was a slow moving grass fire approaching us and to back burn around our site.

We moved our *hutchie* and goods to near the edge of a small escarpment. For three evenings (the cooler part of the day) we spread our back burn area several hundred metres.

THEN, the fire petered out!

Mainoru – Oenpelli

On completion of our role at U 521 I was taken back to Mainoru and then transferred to Oenpelli Mission. The Cessna 206 (from memory) deviated slightly to fly over “Five ways” and flew low over the East Alligator River Gorge – *absolutely amazing!*



Cessna 206



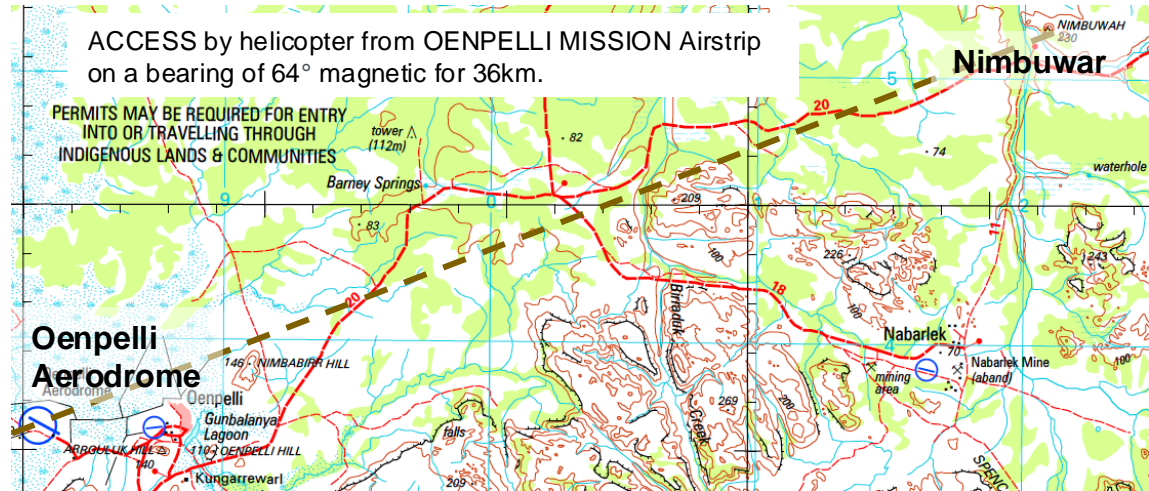
This image gives an aerial view of the Oenpelli Mission **Date:** 1967
Source: National Archives of Australia

A Tor - Nimbuwah

12° 11' S 133° 21' E 230 M

NIMBUWAH is a sacred site

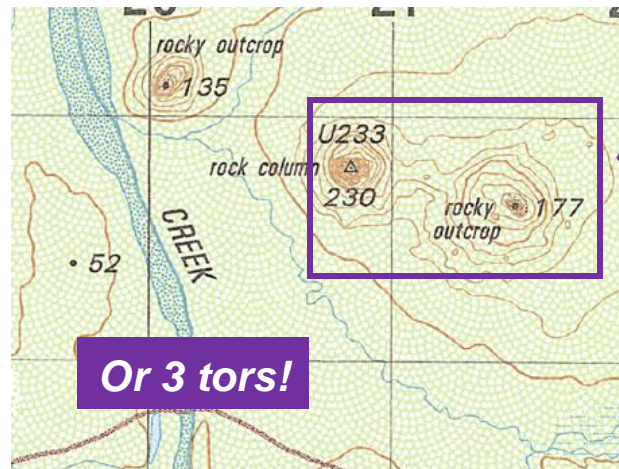
The last survey station I occupied was Nimbuwah; a tor, a rock column. My partner and I were flown there by helicopter where we stayed for three days before being returned to Oenpelli.



U 233 was established by the Royal Australian Survey Corps in July 1961

STATION MARK Consists of a RA SVY bronze plaque, 7.6cm in diameter, stamped "U 233", concreted into a cleft in natural rock. A 1.2m wide by 1m high rock cairn surrounds the Station Mark.

SITUATION "U 233" is situated on the highest point on NIMBUWAH, a prominent rock pinnacle, 35km ENE of OENPELLI MISSION, and 13km north of Narbarlek mining camp.



NOTE: The quality of this picture is poor. This was my last photo on my last roll of film. It was probably slide 22 on a 20 slide film. It didn't have a frame.

Measurements were made to: DUJRAGA PIMPLE and SMOKEY HOLLOW

Tor Rock & Nimbuwah

At Oenpelli I was told that my small team (2) would be flown **east** to Tor Rock. We were told that the new name is **Nimbuwah**.

Back in 1961

“Surveying in the outback presented many unusual problems, as at Tor Rock, east of Oenpelli, NT. During a first order traverse of the area, a small detachment was landed by helicopter on the summit to establish a survey station – only to be stranded there when the helicopter became unserviceable”.
F.D Buckland (1961)

In June 2024

I sought clarification of the name Tor Rock from the Northern Territory Land Information Group as to whether Nimbuwah is Tor Rock?

The same day, 24 June, I received a message from the place names team and it thinks that Nimbuwah Tor is Tor Rock.

This raised discussion between groups and the following day I was updated:

*“Thanks for this very interesting information; however I don’t believe that **Nimbuwah** and **Tor Rock** are the same place.*

***Tor Rock** is situated about 40km N of Gunbalanya, while **Nimbuwah** is reported to be a sacred site of three tors about 40km NE of the community near Cooper Creek and visible from the Gunbalanya - Maningrida Road. This is consistent with the Army topographic maps surveyed in the 1990s”.*

I am thankful to the Senior Surveyor and the Place Names team in the Department of Infrastructure, Planning and Logistics, Northern Territory for their interest in my request and the prompt reply.

The story of its name

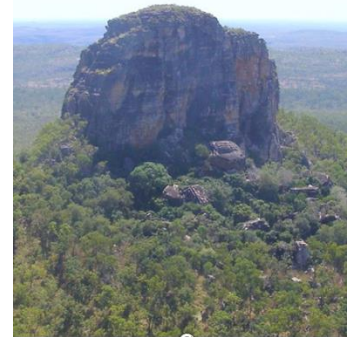
Tor Rock, east of Oenpelli
Frank Buckland



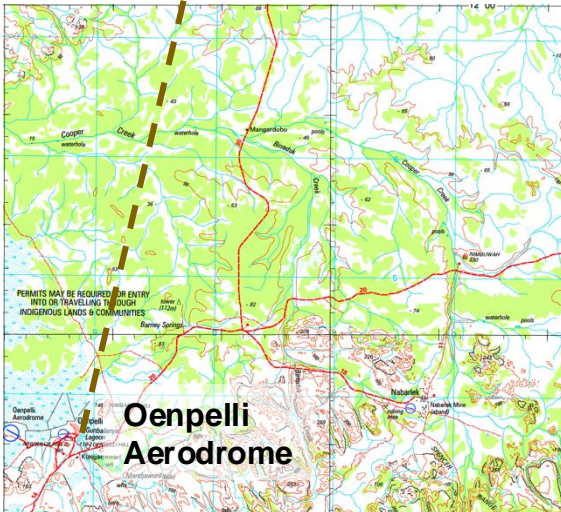
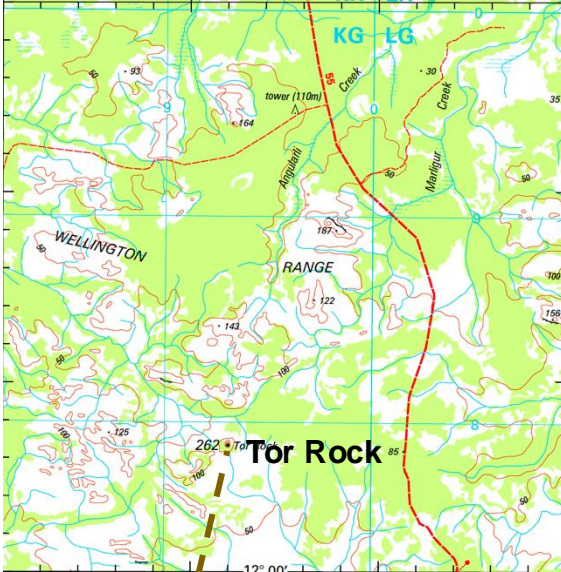
The Survey Station was established by the Royal Australian Survey Corps on July 1961

So, where is Tor Rock?

U 234 was established by the Royal Australian Survey Corps in July 1961



Tor Rock is situated about 40km N of Oenpelli Aerodrome



Access and Locality Sketch:

Particulars of station marking and beacon:

Station Mark : Consists of a RA Svy plaque set in concrete in situ at ground level and stamped U 234.

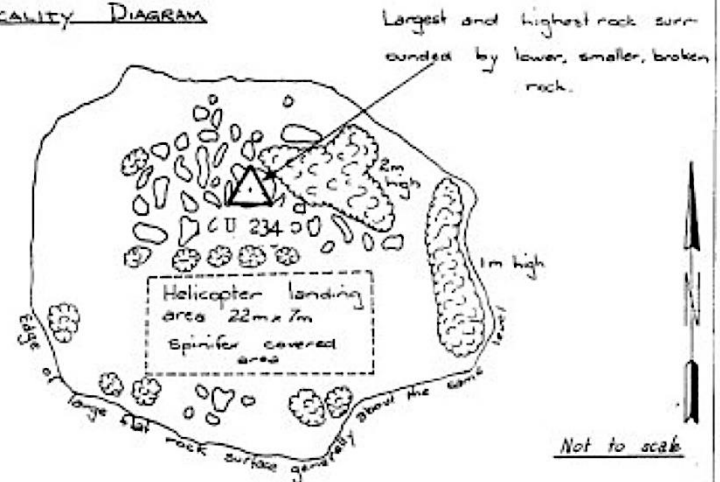
Reason : Nil.

Location : U 234 is located on the highest point of a great flat mesa formation approx 100 metres above the surrounding country in the South of the WELLINGTON RANGES 12 km North of OENPELLI MISSION. The hilltop consists of rocky outcrops, sparse spinifer and 2 - 3m tall grass.

Access : By helicopter from OENPELLI MISSION straight on a bearing of 360 mag for a distance of 40km.

Remarks : Wood on NW side but not abundant. Road not approx 100 metres, below and an hour's walk from the aerodrome. U 234 was reoccupied by RA Svy in 1964.

LOCALITY DIAGRAM



Oenpelli to Darwin

We said farewell to the wonderful people of Oenpelli Mission and some of our aboriginal friends; albeit for only a few days. Again, my photos are lost.

I was flown by our Cessna 206 back to Darwin. I had the control for a short period – of course that couldn't happen today!

Landing at Darwin International Airport our very small plane took some time to get to the end of the strip running up the dashed line that was wider than the plane!

Our reunion

It was time for the team to gather together; a time to complete documentation tasks; a time to pack our equipment; a time to prepare for our journey home; and a time to 'party' after month's of surveying in a remote land – a **truly remote land!**

Back to our home units

I hoped that that I would be picked to be in the group that drove our vehicles down the Stuart Highway but that didn't happen. I, with others, flew from Adelaide to Edinburgh (Adelaide) on a RAAF Hercules.

I think that the Bendigo contingent continued to Laverton (Melbourne).

In any event the final trip would be in the back of trucks to Fortuna (Bendigo).

So it was 'luxury' travel to commence the major survey operation and 'basic' travel' back home!



Survey Operation Arnhem Land, NT

The experience was just AMAZING!

And so ends a **TOPOGRAPHIC SURVEYOR'S TALE.**

Digression

Embracing change – Topo Sqn would change to Aero Trig Sqn

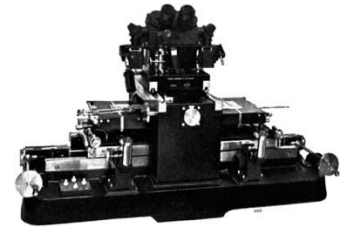
On return to Fortuna I worked with WO Frank Bryant on analytical photogrammetry in the new Aero-Triangulation Squadron (Aerotrig) with its newly acquired equipment.

1968 First invented in the UK in 1930s the **Cambridge Stereo-Comparator** was used as 'proof of concept' for analytical photogrammetry.

I, along with Jon Dean, used this equipment to measure points in the Lake Murray area of Papua.

Frank had a vision for the future and had a strong supporter in the Directorate of Survey – LTCOL Jim Stedman. At a **1971** planning conference "Steddie" outlined 'details of advanced techniques in the **field of photogrammetry**' and envisaged '**computer graphics** and ultimately **automated mapping systems**'.

Frank was appointed project officer for **Automap 1**, the first digital mapping project in the Survey Corps which was put out for tender in **1974**.

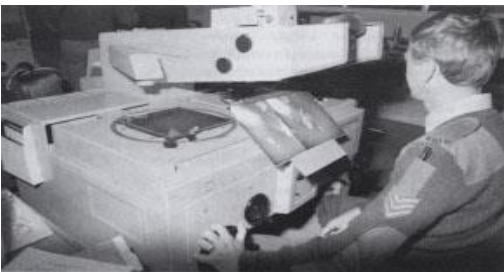


Permitted accurate observations to be measured on aerial photography for the purpose of aero-triangulation of strips of photography.

Used as 'proof of concept' for analytical photogrammetry

1969

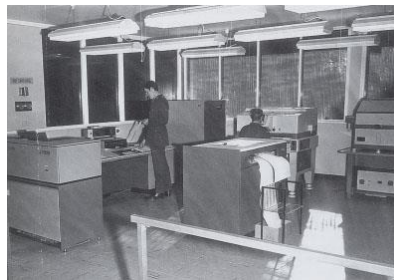
**Carl Zeiss Jena
Stereo Comparator**



Used to measure three dimensional photo coordinates from film diapositives. The capability was needed to provide aero-triangulation data for WILD B8 stereo-plotters.

1970

**IBM Mini Computer
IBM 1130**



Allowed programs to be written for the automatic plotting of grids and graticules.

1970

**Calcomp 718 Digital
Coordinatograph Flat-bed Plotter**



Used for grids, graticules and base compilation sheets with aerial triangulated model control.

Desi Asaris and Kalen Sargeant

**In 1969 Francis (Frank) Bryant was made a member of the Order of the British Empire (MBE)
For his services to photogrammetry**

rasvy.org



ASSOCIATIONS ▾ NOMINAL ROLL ▾ HISTORY ▾ RESOURCES ▾ GALLERY



Links to

A short history of the Royal Australian Survey Corps – 1915 to 1996

Links to

THE ROYAL AUSTRALIAN SURVEY CORPS AERODIST YEARS 1964 – 1975 By Peter Jensen

Home page

- [Topographic maps | Geoscience Australia](#)
- [Defence Surveyors UK](#)
- [Military Survey Branch RE Association](#)
- [Survey Station Summaries – Australia](#)

Links to

Topographic maps [source of clips of maps]

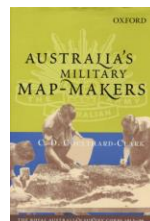


Australian Government
Geoscience Australia

Links to

<https://geodesyapps.ga.gov.au/historic-geodetic-benchmarks/>

Christopher Coulthard-Clark's
Australia's Military Mapmakers
Oxford University Press, Melbourne, 2000
ISBN 0 19 551343 6



Valerie Lovejoy's
Mapmakers of Fortuna
A History of the Army Survey Regiment
Ex-Fortuna Association, Bendigo, 2003
ISBN 0 646 42120 4

