STAR TRACKING FOR MAPPING - AN ACCOUNT OF ASTROFIX SURVEYS BY THE DIVISION OF NATIONAL MAPPING DURING 1948-52

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Abstract

Accepting the proposition that maps provide information which usually lessens the uncertainty of what lies outback of the ranges and beyond the creeks, the dry lakes and over the sandridges, then this paper, in keeping with the Congress theme of "Reducing Remoteness", reviews the Division of National Mapping's field survey programme of astronomical observations for fixing position (astrofixes), barometer heighting and airphoto identification used for compilation of the 4 mile to 1 inch and 1:250 000 R502 map series. Background information is given for the 1948-52 period, when most of the astrofixes were done and it is hoped this account may also serve to cover the gap in recording Natmap's field surveying activities prior to Mr. R.A. Ford's excellent series of articles in "The Australian Surveyor" in 1979.

Introduction

At a roadhouse called "Frewena" about 155 km east of Tennant Creek on the Barkly Highway to Camooweal there is a survey station NM H1, an astrofix, the first survey point established on 13 May 1948 by the National Mapping Section as it was then known. So the survey activities of Natmap began. In fact this station was recorded first as DH1 but, because of the similarity to existing traverse stations on the Stuart Highway which included the family name initial of the surveyor who observed particular sections, for example 'H' for Hope, 'K' for Knight, 'R' for Rimington and 'T' for Tidy, it was decided to incorporate NM for National Mapping when numbering astros. Some years later the survey station numbering system was changed with the letter ‘A’ denoting astro following NM, and another letter corresponding to the State or Territory where the astro was located, for example, NMA/G/123 for a Natmap astro in the Northern Territory.

The Natmap party of 3 - Messrs G.R.L. Rimington, Chief Topographic Surveyor, D.R. Hocking, Field Assistant (Survey) and D.V. McKay, Driver (Survey) left Melbourne on 3 May 1948 travelling in a Chevrolet 1 ton truck to Quorn where the truck was loaded on to a flat-top rail wagon for Alice Springs. The survey party spent a most interesting and enjoyable 2 days on the "Ghan" train trip from Quorn to the Alice - a journey of some 1200 kilometres. Where else will a train driver wait while passengers replenish their "provisions" from the wayside bush pubs at Maree, Oodnadatta and so on along the line?

After purchasing stores and collecting some important items of equipment, including a Wild T2 Theodolite No 7028 from the survey store in the old jail with the aid of Mr. Ted Warton, Assistant Surveyor with Lands and Survey, the party left the Alice and headed north along the bitumen - the Stuart Highway. See Figure 1.

The Survey party hands usually gave a cheer when travelling north on the bitumen past Kelly Well which is about 20 degrees south latitude because the basic wage in 1948 rose

from £6-1-0 south to £6-10-9 north of the 20th parallel. The marginal differences per week in addition to the basic wage were:

Chainman, survey	£0-19-0
Survey hand	£0-10-0
Driver, survey	£2-18-0

Figure 1. Heading North, G. R .L. Rimington and D. McKay alongside the Chev 1 ton truck at the Devils Marbles on the Stuart Highway, 1948.

Background

> *"Persistent unauthenticated sources*
> *Speak of its inexhaustible resources,*
> *Plan it in detail, guess how far it stretches;*
> *…….*
> *…but the sketches contain no reference to the official grid."*
>
> John Manifold
> 'Travellers' Tales'

The Natmap survey programme initially concentrated on the Barkly region with one of the objectives being to provide through the 4 mile map series a reliable topographic base for the Northern Australia Regional Survey being undertaken by the then Commonwealth Scientific and Industrial Research (CSIR) party which was conducting an ecological study of the Barkly region.

> *"In order that the country might be subdivided in a fundamental rather than superficial way ...."*
>
> (Christian at al. 1954)

The general instructions for the Natmap survey were contained in a minute of 29 April 1948 from the then Deputy Director of National Mapping, Mr. B.P. Lambert, to the Chief Topographic Surveyor:

"Mapping Barkly Tableland."

"In connection with the activities of Mr Hocking's party, it is suggested that it would be desirable at least to obtain an astrofix in the vicinity of each intersection of 4 mile sheets, one in the vicinity of the centre of each 4 mile sheet, and one near each permanent feature such as homesteads, etc.

This desirable will, of course, be subject to practical difficulties of identifiable detail etc.

In connection with barometer heighting, it would appear desirable to run a base barometer at each base camp and arrange for circuits to commence and finish on the base, with both feet and pressure scales being recorded in addition to temperature readings.
(not possible under flying camp conditions, D.R.H.)

The C.S. and I.R. parties may be operating in different areas at times, in which case it may be possible to arrange for them to undertake barometer traversing and assist in marking up the necessary topographic detail.

It will be very desirable to establish the gradient of river courses and general height of the edge of the tableland together with the elevations of the highest points which are likely to be critical to air navigation in any particular locality."

In view of these major ecological and mapping survey activities being undertaken in 1948 it is interesting to reflect on the following extract which is part of Dr H.I. Jensen's innovative and farsighted report of more than 70 years ago as Director of Mines, Northern Territory contained in the 1912 N.T. Journal on page 89:

"Recommendations and Conclusions:

There can be no doubt that a detailed investigation of portions, at any rate, of the Northern Territory would be of great advantage to mining. It is, however, strikingly apparent, that elaborate geological work must be preceded by a trigonometrical survey. With the exception of a narrow belt along the railway line and transcontinental telegraph line, there is a lack of astronomically fixed points from which geological survey can be commenced. Further it would facilitate greatly the work of geological survey if such physiographic features as water courses, ranges of hills, and cliffs, peaks, plains and timber belts were delineated on the map prior to the commencement of geological work.

In many parts of the Northern Territory, photographic surveying (photogrammetry) could be utilised for the execution of such work with a considerable degree of exactitude, and with great speed.

It might be mentioned that a topographical survey of the Territory is as essential for the rational subdivision for pastoral and agricultural purposes, as it is for geological purposes. To the intending settler or agriculturalist, a block consisting entirely of open treeless plains, without a water hole or water course, is an uninviting proposition. When the timber belts and water

courses, and stony grounds are accurately mapped the country can be designed and plotted into various areas, each containing water, timber belts, and good soil, in such a way that the interests of intending settlers are truly regarded."

Farsighted indeed! Not many people in Australia knew about photogrammetry in 1912.

One of the main reasons for close co-ordination of the CSIR and Natmap parties was the scarcity of aerial photographs in 1948 and with only one set of photos being available for each map area these were left or collected from police stations, homesteads and even transferred with careful forward planning at major outback events, such as the never to be forgotten Rankin Races where much useful information could be obtained under most enjoyable circumstances.

Astrofixes

The first three astrofixes were observed using the well known method of position lines to obtain latitude and longitude (War Office, 1958). The main advantage of the position line method is that stars can be observed through breaks in the cloud, preferably in each quadrant and a fix obtained in relatively bad weather. However, before the days of programmable hand-held calculators, the calculations using logarithms were lengthy with the result, good or bad, not being known until the position lines were plotted.

With clear skies more often than not during the May to October dry season in the latitudes of central Australia, a switch was made to Rimington's method of observing meridian transits for longitude and zenith distances for latitude (Rimington, 1944). The advantages are that observations to 10 stars, 5 pairs of north and south stars, could be done in 1-1½ hours starting soon after identifying Sigma Octantis which allowed the meridian to be set and the computations for three out of the five pairs were often completed during supper. Figure 2.

Figure 2. Setting up for the Astrofix observation at Bluey W.H., Station NMH100, between Robinson River and Calvert Hills Homesteads, 1949.

Rimington's method depends on the fact that if the assumed meridian was the true meridian then the observed difference in sidereal times of transit between a pair of stars, one north and the other south, would equal the difference between the Right Ascensions of that pair of stars.

Corrections for the difference between assumed and true meridian are made to the times of transit of the stars to give Local Sidereal Time of transit which minus Greenwich

Sidereal Time of transit equals longitude expressed in time.

The observing method consisted of recording the times the star crossed the horizontal stadia wires, early stadia face right and late stadia face left with the mean giving time of transit of the assumed meridian. The zenith distance, ZD, was read on face left and a simple calculation of ZD plus correction for refraction and the star's declination gives latitude.

The skill in observing required accurate timing with stopwatch comparisons against the chronometer then transiting the telescope, adjusting diagonal eyepieces, setting the meridian, locating the star, reading ZD then stopwatch and chronometer comparisons for the late stadia crossing. For a star near the celestial equator that series of operation had to be done in about 2 minutes compared with the south stars which dawdled between the stadia wires taking 3-6 minutes or more to cross.

The astrofix was accepted if three pairs of star observations were within 0.3 seconds of time for longitude and the latitude range for the north and for the south stars did not exceed five seconds of arc. The estimated reliability of an astrofix position was about 100 metres. With practical experience some refinements were made to Rimington's original method, such as the Sigma Octantis graph for obtaining azimuth (Division of National Mapping c 1970).

When using the slotted template method for extending the map control, the best position for an astrofix depends on the airphoto coverage being used, with the observation point selected so as to appear on six photos, three in each run and as close as practicable to the centre of the common overlap.

Figure 3. Eric Crisp marking a Coolabah tree at Flemington Racecourse claypan near the centre of the Mount Drummond map area previously named Murphys Creek.

Special care needed to be taken in positively identifying the astrofix or reference point on the aerial photograph as many an accurate observation has been wasted as map control because of an inaccurate photo identification. Before leaving for the next astro it was usual to do a locality sketch and mark the station by blazing a suitable tree with a broad arrow, NM for National Mapping, the observer's initial and astrofix number. See Figure 3. Back in the office the complete observation of 5 pairs was computed, checked and a summary sheet prepared for the survey records. See Figure 4.

The following extract from my rough diary for two days in the Frew River map area east of Hatches Creek was fairly typical:

"1949 May 18 Wednesday. 0830 hours moved on still west of north to

floodout of Hanlon Creek. Bad stake country in floodout and both Commers staked. Detoured north east then north around floodout, west for 3 miles then west of north to Poison Creek floodout. Bad scrub all the way and both Commers and Jeep staked Mended 2 Jeep tubes - tough job as tyres had not been off before and they were very rusty. No observation - 8/10th cloud. Over the air heard of rain down Alice way and strong wind sprang up later taking the aerial, breaking 3 sections.

May 19 Thursday. Brought comps up to date, mended staked tyres, identified position on photos and prepared for the night's observation as the weather was clearing. Yarned for a long time after lunch - talking war and fight! Started observing early and completed comps about 10 o'clock then helped Ted sort out his pairs as for some reason they strayed quite a bit although the mean was close to mine and his adopted meridian very close to true. No contact with the wireless - haven't got the output. NMH 77, Poison Creek floodout."

The official diary entries read:

"May Wednesday 18th. Moved on to Poison Creek floodout via Hanlon Creek floodout. Six staked tyres between Hanlon and Poison Creeks. No ob. 8110th cloud Aerial broken by wind.

Thursday 19th. Repaired tyres - Jeep tyres much worn. Observed Station No. NMH77."

Equipment

A Wild T2 theodolite was used for the star observations with a Mercer half second beat chronometer and Doxa stopwatch being used for timing the star transits. The chronometer was compared before and after the observation against the one second beats of WWV National Bureau of Standards, Washington D.C. or WWVH, Hawaii time signals on the AWA 3BZ wireless receiver.

During 5 field seasons the Mercer chronometer, which was gimbal mounted in a sponge rubber lined box, travelled with gimbals locked on the floor in the front of the truck and in spite of this rough travelling maintained a fairly constant rate of 1-3 seconds a day. Times change! Compare this with my $25 digital wrist watch which has gained about 3 seconds a month during the past 4 years and does not need winding every morning and evening.

The 3BZ wireless was a mass of valves, condensers and wires in a bulky metal box about 30 x 30 x 50 cm with a separate speaker, and constantly needing replacement of a valve called -6V6. So long as the aerial was well placed the WWVH time signals were usually clear on 10 MHz and only faded during October, but these days, the days of the transistor, WWVH and of course the more accurate Australian VNG signal booms in on a radio which can be carried in the pocket - including the batteries!

Barometer Heighting

Atmospheric pressures were read from a battery of four Short & Mason 5" aneroid barometers and, in later seasons, altitudes from Kollsman aircraft type altimeters, at creek crossings, homesteads, bores, airstrips and generally along the track at four mile

intervals ie, every one inch on the map. Figure 5.

DEPARTMENT OF THE INTERIOR — NATIONAL MAPPING SECTION

Astronomical Station No. N.M.M86 at FLEMINGTON RACECOURSE on 4 mile to 1 inch Map MURPHY'S CREEK E/53/12
CLAY PAN

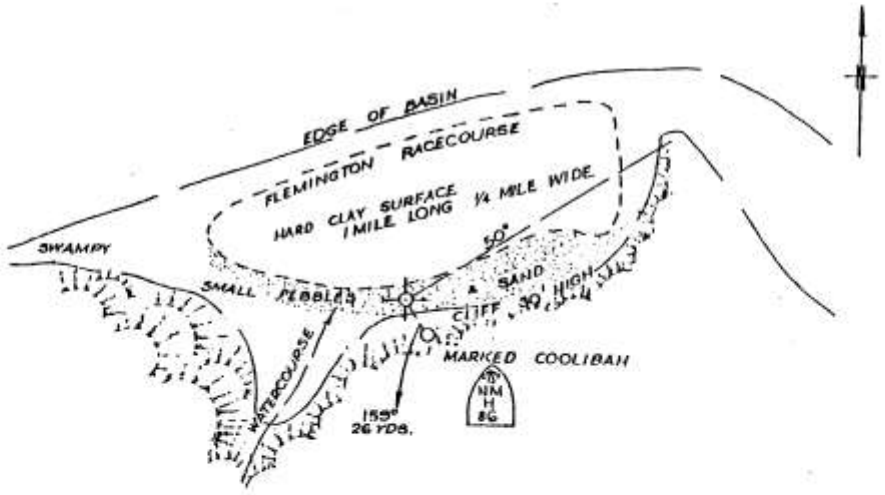
	Latitude	Longitude	T.M. Co-ordinates. Zone 5		T.M. Co-ordinates. Zone	
			Easting	Northing	Easting	Northing
Observation Station	18°23'53".4	137°02'52".2	521 093.86	2 690 023.31		
Photo Reference Points						
Convergence	Zone 5 + 00°19'47".96		Zone			

Magnetic Declination ..... Means of Determining Heights Aneroid Barometers

Observer D.R. Hocking Booker A.E. Crisp Date 20th June, 1949 Field Book N.M. 33
Computer J. Jackson Checker D.R. Hocking Date 14th September, 1949 Comp. Book J 1
Instruments:—*Theodolite* WILD T2 No. 17937 *Chronometer* MERCER No. 17601
Time Signals:—*Station* W.W.V.H. *Reception* 2025 Good. 2215 Fair.
Weather Strong S.E. breeze Estimated Reliability of Results +/— 3 Seconds of Arc
Map SVI 181 MURPHY'S CREEK Run No. 7 Photo No. H 5283 Description
Quadrant D X 0.89 Y 1.25 Diagonal 1.53

Method of Marking Station Marked Coolibah

LOCALITY DIAGRAM OF OBSERVATION STATION
AND REFERENCE POINTS



Chief Topographic Surveyor,
National Mapping Section,
Department of the Interior.

Figure 4. NMH86 Astrofix Station Summary.

Relying on the usually smooth pressure gradient during the dry season over the low relief of central Australia, heights were obtained using a long-range barometer heighting method of interpolating from three selected meteorological stations some 600 km apart; for example Tennant Creek, Mount Isa and Alice Springs for heighting in, say, the

Sandover River area. The original Kew mercury barometer atmospheric pressure readings were obtained from the Meteorological Bureau, corrected for index error, gravity and temperature then plotted as time-pressure curves for the three selected stations to allow pressures to be read for any particular time. Simple analysis of the pressure in a specified plane above the field observation which when compared with the pressure recorded at the field station gave a pressure difference and hence the field station height. This method was applied by Rimington following work done by Squires (1947).

Figure 5. Reading the Aneroid Barometers. Note headlamps on the Commer truck turned aside to protect the glass and bulbs. (Norm Hawker is doing the reading – Ed.)

The accuracy of this method of heighting was difficult to assess; however, comparison of heights obtained for the same point on different days, even different years agreed usually within 15 metres. There was no doubt about the interest at the time in these heights, maybe a case of anything is better than nothing, with the heights being used, apart from topographic mapping and ICAO aeronautical charting, for Professor E. Sherborn Hills' model of Australia, sub-artesian water table studies and river gradients.

Aerial Photography

Aerial photographs used in this survey were obtained by 87 Squadron of the Royal Australian Air Force using a Fairchild K17, 230 x 230/150 mm camera in a Mosquito aircraft at 7,600 metres giving a nominal photo-scale of 1:50 000. A major aerial photography programme was undertaken by the RAAF 87 Squadron in Northern Australia during 1947-52. Some idea of the size of this operation can be gained from the fact that during the 1948 season the RAAF photographed approximately 650,000 square kilometres of Northern Australia (Vincent 1984).

The RAAF 87 Squadron continued to acquire aerial photography for Commonwealth purposes until 1953 when Natmap was given the responsibility and arranged for aerial photography to be obtained under contract.

Existing Mapping Information

The existing survey and map information available in 1948 was rather sketchy, consisting of the N.T. small-scale 800 chain, 10 mile to the inch series and the Army 8 mile to the inch, 1:506,880 series emergency mapping; as John Manifold wrote - although to be fair I think he had the maps of the more remote World War II campaign areas in mind –

> *'The standard map admits it doesn't know.*
> *The hinterland, you see, is barely tinted,*
> *Not contoured in; besides, this sheet was printed for eyewash sake,*
> *in peacetime, years ago!*

Although the draftsmen were preparing photo-index maps as quickly as possible after the photo coverage became available, these took some time to reach us in the field, and in order to get an idea of the country where the astrofixes were to be done, it was sometimes necessary to lay out the photos which meant finding a reasonably flat spot out of the wind, a supply of stone paperweights and making a rough "shingle mosaic" of the photographs. There were usually 15 runs with 40 photos in each run covering a four mile map area, 1½ degrees of longitude by 1 degree of latitude, a total of 600 photos with 60% endlap or 300 when every second photo was laid down.

To highlight the lack of reliable topographic information and keeping in mind the practice of naming map sheets after a major feature within the map area, it is interesting to note that the Sandover River, which is a major feature, flowing east on Elkedra map divides into three floodout channels which end about 10 km from the adjoining map to the east which is *named* Sandover River.

A great deal of useful information was obtained from the local people and we were happy to reciprocate whenever possible. Natmap worked in the southwest area of the Sandover River sheet with N.T. Administration, Chief Field Officer Les Clough, Field Officer Dick McBride and Charlie Simmons and later with Doug Macinnes in the Wave Hill-Victoria River Downs Area providing astrofix position information for pastoral lease resumptions. See Figure 6.

Transport

Years ago I heard this story in the Territory about the man from down south who asked an old blackfellow how far it was to the homestead. "It all depends" was the careful

reply, "if you foot walk it's a long way; if you horse ride it's not so far; but by crikey, in a motor car you're there already"! Maybe so, or nearly so, but that same motor car could have been bogged in the very next creek until pulled out by the blackfellow with his horses.

Figure 6. Charlie Simmons, Don McKay and Dick McBride at Mount Hogarth, NMH33, Sandover River country, 1948.

These days it is hard to imagine the difficulties experienced in getting 4-wheel drive vehicles for off-road survey work. The 2-wheel drive Chev 1 ton truck did over 20,000 km during the 6 months 1948 field season with more than half this distance being either over rough bush tracks or off the track.

Much trouble and many delays were caused by bogging in sand or mud, broken springs, engine failures and of course punctures particularly towards the end of the field season when the tyres were wearing thin. After bashing out northwest of Tennant Creek through fire burnt scrub a brief, one line restrained diary entry for a really bad day reads: "Five punctures in a mile. No Observations!"

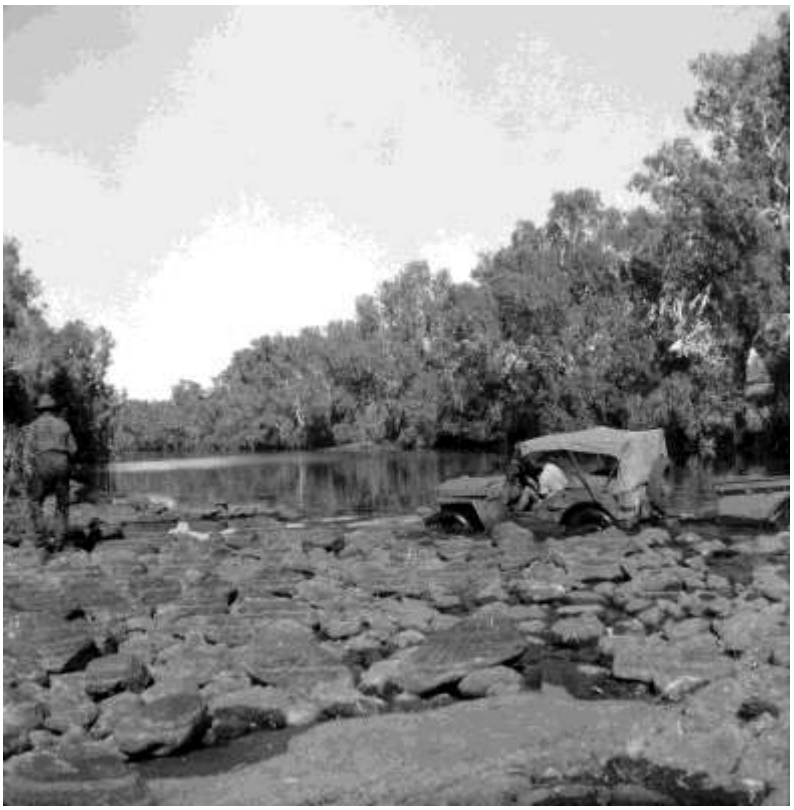


Figure 7. Jeep and trailer crossing the Bluey Creek en route to Calvert Hills H.S., 1949.

Figure 8. Donegan alongside some unusual stones near Karns Creek northeast of Calvert Hills H.S. The local aborigines said "They grew there!"

Another factor which sometimes caused either delays or changes to the field work programme was the need for petrol coupons in Queensland during 1948-49 because the monthly ration of 200 gallons was often late coming from the Canberra transport depot.

With two survey parties in the field for the 1949 season, two new 25 cwt, 4-cylinder, 14 HP Commer trucks were provided and in addition a 1942 Ford Jeep and trailer which looked as though it had done a lot of hard work. Nevertheless, it was 4WD and after the worries of the previous season it was good to have more than one truck in the party. Figure 7. The extra vehicle paid off during a particularly hard, rough trip in the Gulf country from Borroloola to Burketown going east via Robinson River and Calvert Hills and returning nearer the coast via Pungalina and Seven Emus where, according to Jack Keighran it was the first time motor vehicles had travelled between these two homesteads. We had the advantage of having an aborigine named Donegan, who was at one time a police "boy", join the party for nine weeks in this area. Figure 8. Donegan saved the field party much time and trouble as he knew the coastal country thoroughly and we were able to follow the old wagon tracks, main pads and on the way he provided names of waterholes, wells, yards and other landmarks. In spite of picking the best track with the Jeep towing the Commer through some of the bad stretches, the gear box on the Jeep eventually failed at the Wearyan River 65 km east of Borroloola. The party was able to continue in the Commer to Tennant Creek where a new gear box airfreighted from Melbourne was collected. Returning to the Wearyan the old gear box was replaced and the Jeep "back on the road" three weeks and 1500 km after the breakdown.

Figure 9. Short-wheel base Land Rover and Jeep trailer. Note the 900 x 13 tyres on the Rover and the wireless dust cover.

Figure 10. The AWA 3BZ teleradio transceiver

A marked improvement occurred in the transport supplied for the 1950 season with two new International KB5 trucks and two new short wheel base 4WD Land Rovers and trailers being shared between the two field parties, each of three men. These new vehicles performed well that year and again in 1951-52 when there were four observing parties, with the Internationals going only as far off the tracks as was reasonable and being used as supply bases with two Land Rovers and trailers working out from each International - a most satisfactory arrangement.

In 1951 the Natmap survey party caused a mild sensation in Alice Springs arriving in town with big 900 x 13 tyres fitted to some of the Land Rovers. Figure 9. These tyres which ran at a low 8 pounds per square inch pressure meant that with the strips of ARC mesh carried in the trailers the parties could go just about anywhere off the road, however, after a while these large low pressure tyres caused severe wheel wobble particularly on the bitumen and while still excellent in the sandridge country eventually caused serious damage to the steering and were discarded during the following year in favour of the 750 x 16 tyres.

Communications

After having only a wireless receiver during 1948, a portable transceiver built by the Radio Section, Department of the Interior was provided in 1949. The call sign allotted was 8ZI (Zebra Item) and the purpose of the set was to:

- Receive time signals.
- Contact the flying Doctor Service in an emergency.
- Form a speedy method of communication between the field parties and between the field parties and Melbourne by means of telegrams sent through one of the Flying Doctor base stations.

The departmental wireless set was not satisfactory and during 1950-52 the AWA, 3BZ Teleradio transmitter and receiver were used with varying results due to weather conditions and valve, vibrator and circuit breakdowns caused by rough travelling conditions. Still it was reassuring when working in isolated areas to know that contact could be made with the FDS, if not always directly then through the nearest homestead Traeger pedal wireless set. Figure 10. During 1951-52, four portable radios were in use, one to each observing party with call signs - 8ZH, 8Z1, 9JT and 9JV.

Figure 11. Connellan's fortnightly service de Havilland Dragon Rapide at Borroloola, 1949, with one of the well-known characters of the area, Roger Jose, unloading freight.

Special mention should he made of the Flying Doctor base operators at that time, namely Graham Pitts, 8US Alice Springs, Vernon Kerr, VJI Cloncurry, Fred Rile, 851 Wyndham and Frank Basden, 8SK Broken Hill who were very patient and considerate when listening out for the weaker portable radio transmitters.

The difference in communications between those days and now is particularly striking. I am not sure it is always for the better, as there was a lot in favour of only getting the occasional letter or telegram from the office during a six month field season compared with the current trend of day to day telephone calls between office and field.

Another important form of communication in Northern Australia was provided by Connellan Airways based at Alice Springs and much of our mail and supplies came on Connellan's aircraft, not only spare parts for the radio and vehicles but also fresh fruit and vegetables. Figure 11.

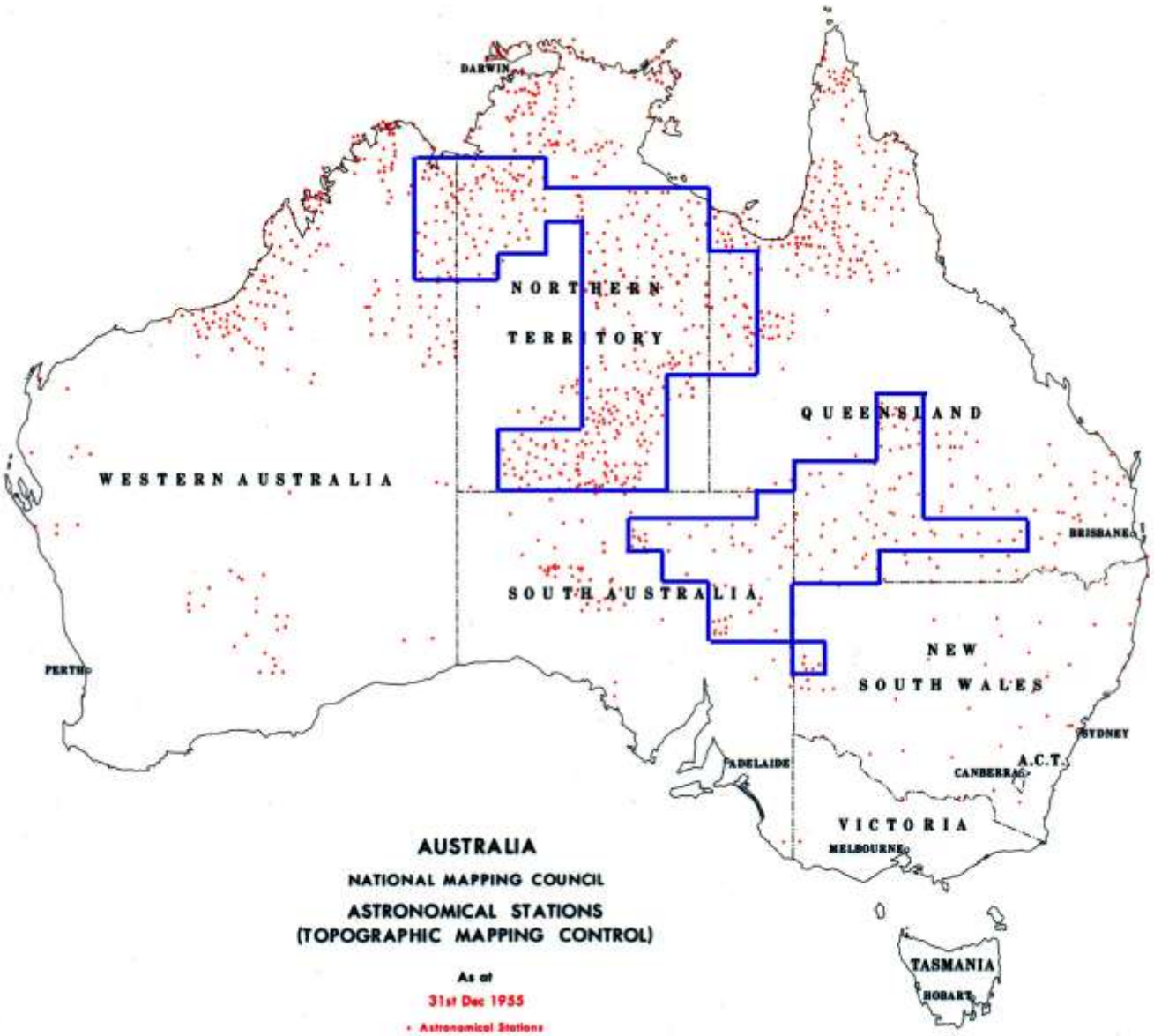


Figure 12: Areas where Astrofixes observed during 1948 - 52.

NMP/66/24

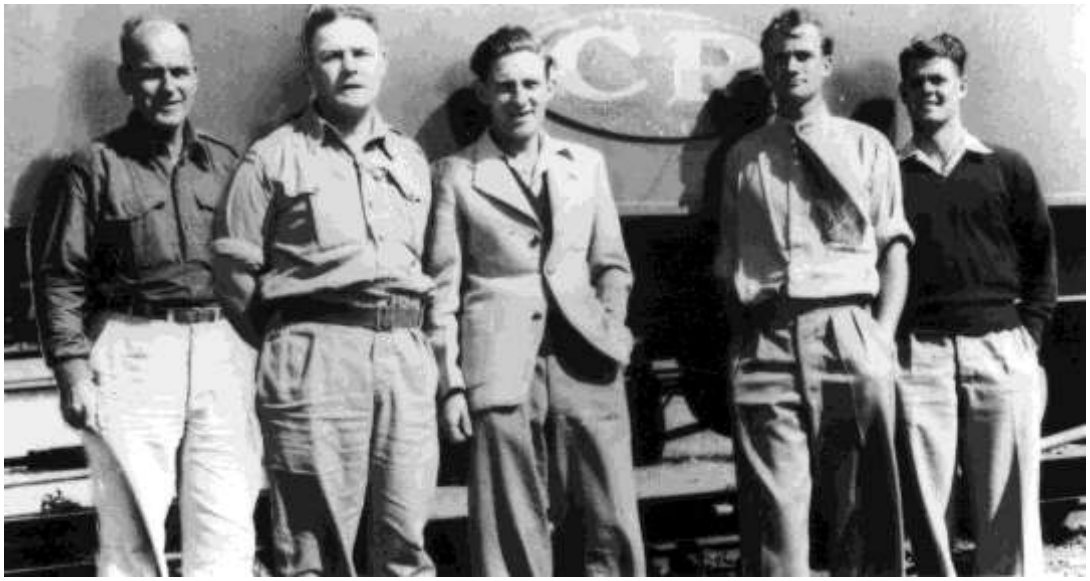


Figure 13. 1949 party members alongside "The Ghan" heading north to the Alice. L to R, Jerry Whitlock, an old Territorian who, with his wife Ena started the Frewena Roadhouse at 6A Bore on the Barkly Highway, Ted Caspers, Don Graham, Dave Hocking and Eric Crisp.

Figure 14. 1950 Field Party. L to R standing: Reg Ford, Phil Lennie, Ted Caspers and Dave Hocking. Front row: Bill Griffiths and Clyde Denton.

Summary

During the 1948-52 period, 480 astrofixes were observed primarily to provide planimetric control for 78 x 1:250 000 maps covering an area of approximately 1.3 million square kilometres. See Figure 12.

Some of these astrofixes were used in the preparation of Aerodrome Approach Charts for Oodnadatta, Leigh Creek and Longreach. The Oodnadatta work was done using the old Trimetrogon aerial photographs.

In addition a few sheets of one mile to one inch mapping were required in the Tennant Creek and Harts Range areas of the N.T. by the Bureau of Mineral Resources. Astrofixes were used to control this mapping together with photo-identified points of the local trigometric network and the Stuart Highway traverse station points in the Tennant Creek area.

The main purpose of the astrofixes was to control assemblies of slotted templates which provided photogrammetric control for plotting planimetric detail on map compilation sheets for the R502 map series. Although adequately recorded, this aspect of mapping by Natmap has not been published.

Also during the 1948-52 period, about 4500 barometer spot heights were obtained and thousands of aerial photographs were annotated with map detail in the field to assist with the photo interpretation during compilation of the maps in the office.

Astrofixes and Field Party Members 1948-52

1948 Barkly Tablelands N.T. - Old, Gulf, Victoria River Districts and Tennant Creek Area

	G.R.L. Rimington	Chief Topographic Surveyor (2 weeks)
NMH1 - H66	D.R. Hocking	Field Assistant (Survey)
	D.V. McKay	Driver (Survey)

1949 Broken Hill Area

NMH67- H74	D.R. Hocking	Survey Computer
	M. Nancarrow	Survey Assistant, Zinc Corporation

1949 Barkly Tablelands, Gulf District and Harts Range Area

NMH75 - H109	D.R. Hocking	Survey Computer OIC Field Operations
	A.E. Crisp	Cadet Draftsman (Canberra)
	W.H. Whitlock	Driver (Survey)
NMC1 - C39	E.J. Caspers	Field Assistant (Survey) Party Leader
	D. Graham	Driver (Survey) to mid Sept. 1949
	W.E. Stroud	Driver (Survey) Oct. 1949

1950 Ord-Victoria River Area N.T. and Kimberly District W.A.

NMH110 - H133	D.R. Hocking	Survey Computer OIC Field Operations
NML1 - L9	P.H. Lennie	Field Assistant (Survey)
	W.T. Griffiths	Cadet Draftsman (Canberra)
NMC40 - C68	E.J. Caspers	Field Assistant (Survey) Party Leader
NMF1	R.A. Ford	Field Assistant (Survey)
	C.V. Denton	Cadet Draftsman (Canberra)

1950 Stuart Highway Traverse, Wild T4 La Place Observations

H168	D. Fominas	Geodetic Computer (Canberra)
R602	T. Trevillian	Cadet Draftsman (Canberra)
T356	G. Murray	Driver (Survey)

1951 Alice Springs District

NMH134 - H163	D.R. Hocking	Surveyor Grade 2 (A/g) OIC Field Operations
	F.J. McCoy	Field Assistant
NML10 - L39	P.H. Lennie	Field Assistant (Survey) Party Leader
	L. Hay	Cadet Draftsman (Canberra)
	J. Jaggers	Field Assistant
NMC69 - C99	E.J. Caspers	Field Assistant (Survey) Party Leader
	R.G. Foster	Draftsman (Photogr)
NMF2 - F35	R.A. Ford	Field Assistant (Survey) Party Leader
	W.J. Dingeldei	Field Assistant
	J. Carrucan	Field Assistant

1950-51 Roma, Mitchell and SW Queensland

NMA1 - A47	F.J. Arnold	Surveyor (Canberra)
	F.N.C. Hartge	Field Assistant

1952 Leigh Creek, Oodnadatta and Longreach
A/D Approach Charts: Birdsville, Lake Eyre and SW Queensland Channel Country

NMH164 - H179	D.R. Hocking	Surveyor Grade 2 (A/g) OIC Field Operations
NMM1 – M2	F.J. McCoy	Field Assistant
	J. Jaggers	Field Assistant
NML40 – L58	P.H. Lennie	Field Assistant (Survey) Party Leader
	C.A. Graham	Cadet Draftsman (Canberra)
NMC100 – C121	E.J. Caspers	Field Assistant (Survey) Party Leader
NMX1 – X8	R.G. Foster	Draftsman (Photogr)
	J. Carrucan	Field Assistant
NMF36 – F54	R.A. Ford	Field Assistant (Survey) Party Leader
NMD1 – D10	W.J. Dingeldei	Field Assistant

Acknowledgements

I wish to thank the members of the field parties during those early years on the astrofix surveys - the party leaders, bookers and drivers who worked long hours before the ‘allowance in lieu of overtime’ (AILOT) was paid and lived under fairly rough camping conditions moving on almost everyday.

Thanks are due to the people in the Melbourne office, especially to G.R.L. Rimington or 'Rim' as he was affectionately known, who provided the prompt support his field men will always remember and be grateful for, also to "Joe" Lines who, as 2 IC in Melbourne managed amongst other things to keep the field parties happy by forwarding regularly, often on trust, the monthly ration of tobacco.

Other people in the office who should be thanked include Alan Booth and staff in Canberra for the early airphoto index maps and Bill Trevena with his team in Melbourne for the airphoto mosaics; also Alan Thomson and Ken Johnson for the Tennant Creek Recce Map which in 1948 was one of the earliest Natmap efforts using the photogrammetric method of radial line plotting of map detail from aerial photographs.

We were always most appreciative of the support when needed closer to the scene of field operations given by the N.T. Administration Alice Springs survey staff, Ted Warton, Ashley Graham, Phil Binet and later the Surveyor in Charge, Morrie Hocking (no relation).

Lastly a personal thank you to "BPL" Bruce Lambert, the Director of National Mapping for nearly 30 years who, in 1947, interviewed a young man who had done a bit of surveying during the war and whose hobbies included astronomy and collecting maps.

Retrospect

Obviously an account such as this describing events which occurred more than 30 years ago depends a great deal on memories refreshed by the diaries and correspondence which have survived various well-meaning but short-sighted attempts at "getting rid of the rubbish" usually associated with moves to new offices. The importance of these documents is not generally appreciated. Fortunately I managed to rescue my diaries and letter books which explains in part the unavoidable emphasis in this narrative on the activities of the field parties I worked with. In this regard there is much good advice, which could well be included in instructions to young surveyors, contained in a rare book by Ortelius printed 400 years ago in 1584:

> *"If in our perigrinations and travels, we shall observe and note in our tables, or papers, those things which doo occure and seeme worthie of regard, we shall make our journies and voyages in great measure pleasant and delectable unto us: not thinking that our diligence can search and mark anything in any place, which other men before us have not seene, but to discourse and recorde any thing, rather than to passe the way, and spend the time in idleness: and with all by this means, this commoditie is reaped, that whatsoever the eye seeth, is the easier and the better remembered, if it be once written. And when the time commeth, that we make an ende of our travels, and personall view of forren parts, it will be a singular pleasure unto us, whensover we are so disposed to recognize, and recount those things which we have seen, quietly in our chambers,* ***without any trouble of journie or toile of bodie."*** *(My emphasis!)*

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Later Acknowledgements

At the time of original publication, in 1985, Dave Hocking was a Councillor and Past President of the Australian Institute of Cartographers; Chairman, Federal Executive, Australian Photogrammetric and Remote Sensing Society; and a Chief Project Surveyor with the Division of National Mapping. He started his surveying and mapping career in the Army on active service in the Middle East, New Guinea and Borneo during World War 2 and had worked with Natmap since early 1948 on the field and office tasks necessary to compile topographic maps using aerial photographs and, more recently to revise them. During the 1960's he received Associate Diplomas in Cartography and Land Surveying from the Royal Melbourne Institute of Technology.

Permission to reproduce Dave’s paper was kindly provided by his estate represented by Mrs Iris Hocking and his son Peter. The digital reproduction of all the photos used in the original paper and attached as Annexure A, were provided by Peter and are greatly appreciated.

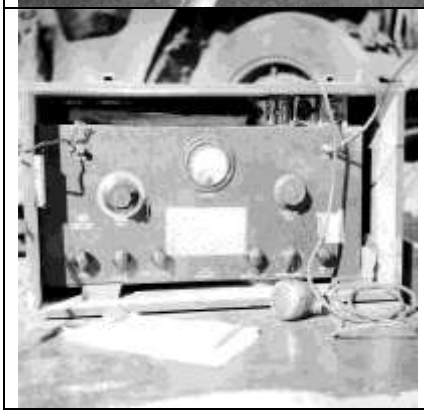
The Institution of Surveyors, Australia, also kindly granted their permission for reproduction of this paper as it first formed part of the Proceedings of the 27th Australian Survey Congress, Alice Springs, as Paper 3, pp 13-26.

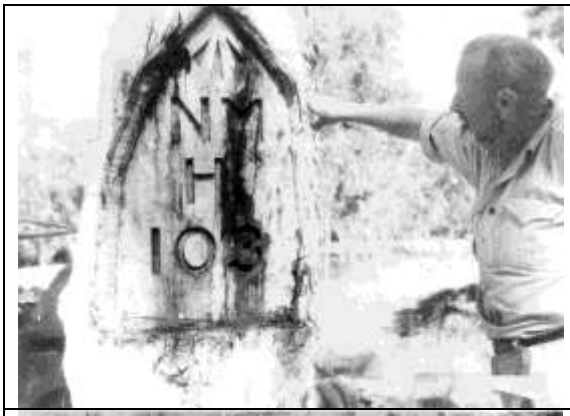
Annexure A

These photos were not part of the original paper but are included here to further illustrate activities of this era. Unfortunately few of these photos were annotated so captions may not be totally accurate but are as descriptive as possible.

	Dave Hocking, Phil Lennie, Ted Caspers illustrating an Astro-Fix
	Equipment check-out/training in astronomical observations
	AWA 3BZ transceiver with watches and chronometer set up for time check
	Connellan Dragon Rapide at Boroloola

	Vehicles loaded on train at Quorn to be transported Alice
	Possibly Innaminka with Eric Crisp, Ted Caspers & Don Graham front to rear
	Baro (barometer) heighting - Bill Griffiths booking
	Baro (barometer) heighting – Bill Griffiths booking

	Self explanatory
	Phil Lennie & Dave Hocking atop "Ayers Rock" reading messages left by previous climbers
	AWA 3BZ radio equipment
	AWA 3BZ radio equipment
	AWA 3BZ radio equipment

	Bruce Lambert (later Director National Mapping) at NM H103
	G.R.L Rimmington (Rim) and unknown at unknown
	1949 at Gastralobium Creek, NT
	Obviously NOT an “Eco-tour”

	Dave Hocking

Copy of Station Summary for NM H1 as mentioned in the paper's introduction.

1948 S.Son Aerial Photo ed

DEPARTMENT OF THE INTERIOR — NATIONAL MAPPING SECTION

Astronomical Station No. N.M.H1 at FREWENA Road House on 4 mile to 1 inch Map ALROY E/53/15

	Latitude	Longitude	T.M. Co-ordinates Zone 5 Easting	T.M. Co-ordinates Northing	T.M. Co-ordinates Zone Easting	T.M. Co-ordinates Northing	Height (Feet)
Observation Station	19° 26' 03".39	135° 24' 10".95	331 437.66	2 564 834.36			721
Photo Reference Points							
Convergence	Zone 5	-00° 11' 55".07	Zone				

Magnetic Declination ____ Means of Determining Heights Aneroid Barometers

Observer D. R. Hocking Booker D. McKay Date 21 May, 1948. Field Book N.M. 6/18

Computer D. R. Hocking Checker C. P. L. Rimington Date 24 June, 1948. Comp. Book R. 7

Instruments:—*Theodolite* WILD T2 7028 *Chronometer* MERCER 17601

Time Signals:—*Station* W.W.V.H. *Reception* Good

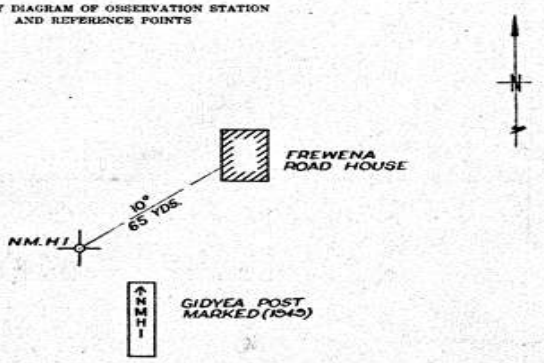
Weather Clear Estimated Reliability of Results +/— 3.0 Seconds of Arc

Map SVY 178 ALROY Run No. 8 B Photo No. X 5554 Description

Quadrant A X 2.91" Y 0.78" Diagonal 3.01"

Method of Marking Station Cairn and Marked Pole

LOCALITY DIAGRAM OF OBSERVATION STATION AND REFERENCE POINTS



Chief Topographic Surveyor,
National Mapping Section,
Department of the Interior.