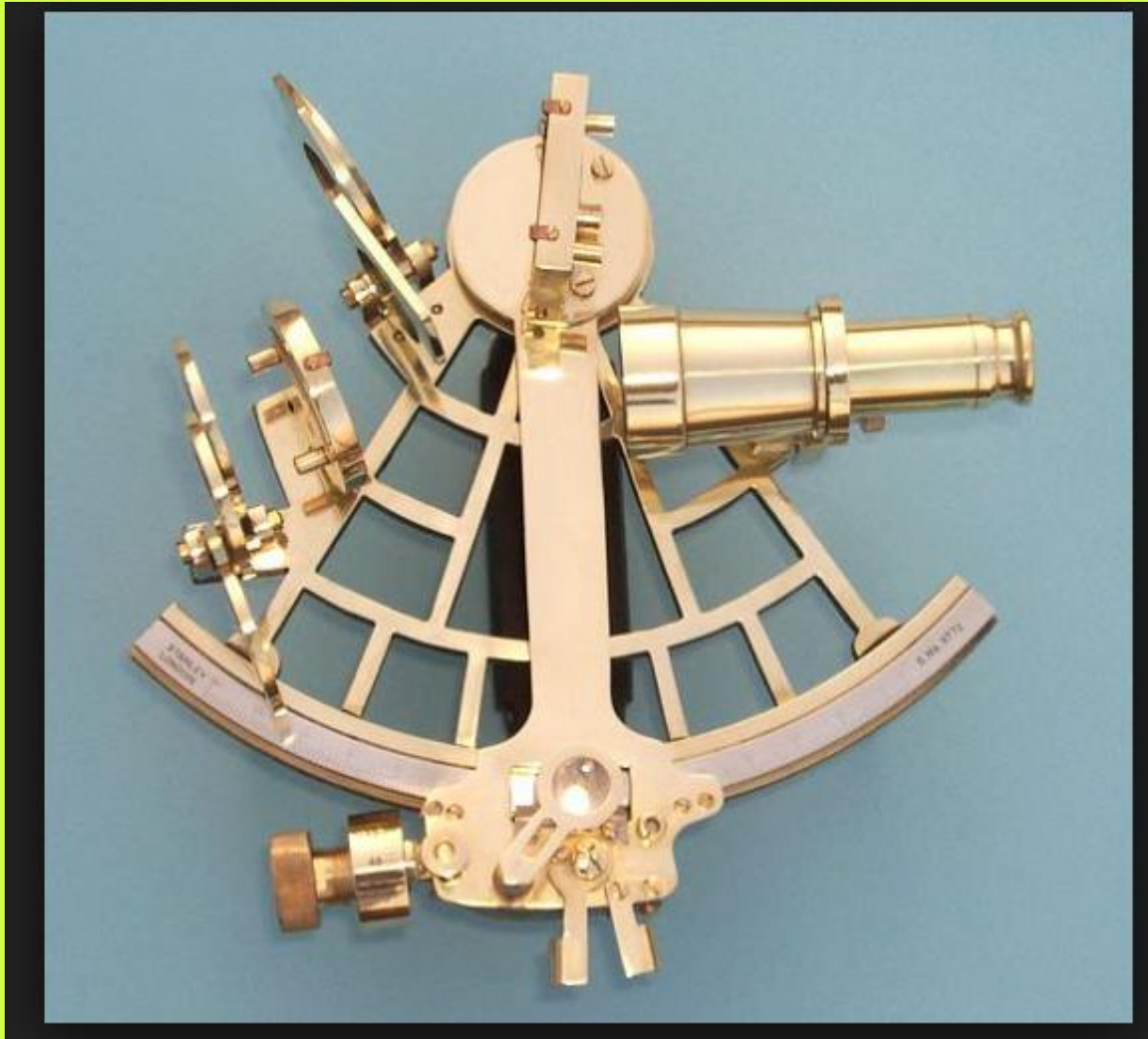


SURVEYING METHODS FOR CONTROL OF MAPPING

- **Early sea explorers and traders**
- **Position fixing and navigating equipment**
- **Accuracies, latitude, longitude**
- **Charts and maps**



A NEW CHART OF NEW HOLLAND on which are delineated NEW SOUTH WALES, and a Plan of BOTANY BAY.



London: Printed by W. Wood, in Pall Mall, 1795.

- **Explorers on land after settlement**
- **Position fixing and navigating equipment**
- **Accuracies, latitude, longitude**
- **Charts and maps**
- **Plane table surveying**

○ Mapping before 1945

- The Lands Departments of the states – emphasis on cadastral mapping but some topographical mapping was done
- The Army Survey Corp formed just before WW1 was responsible for mapping between the wars but as they saw fit and for their own purposes
- The Commonwealth Government realized that systematic topographical mapping was essential but it didn't become a priority until after WW2 when the Division of National Mapping was set up

- **Geodetic surveying**

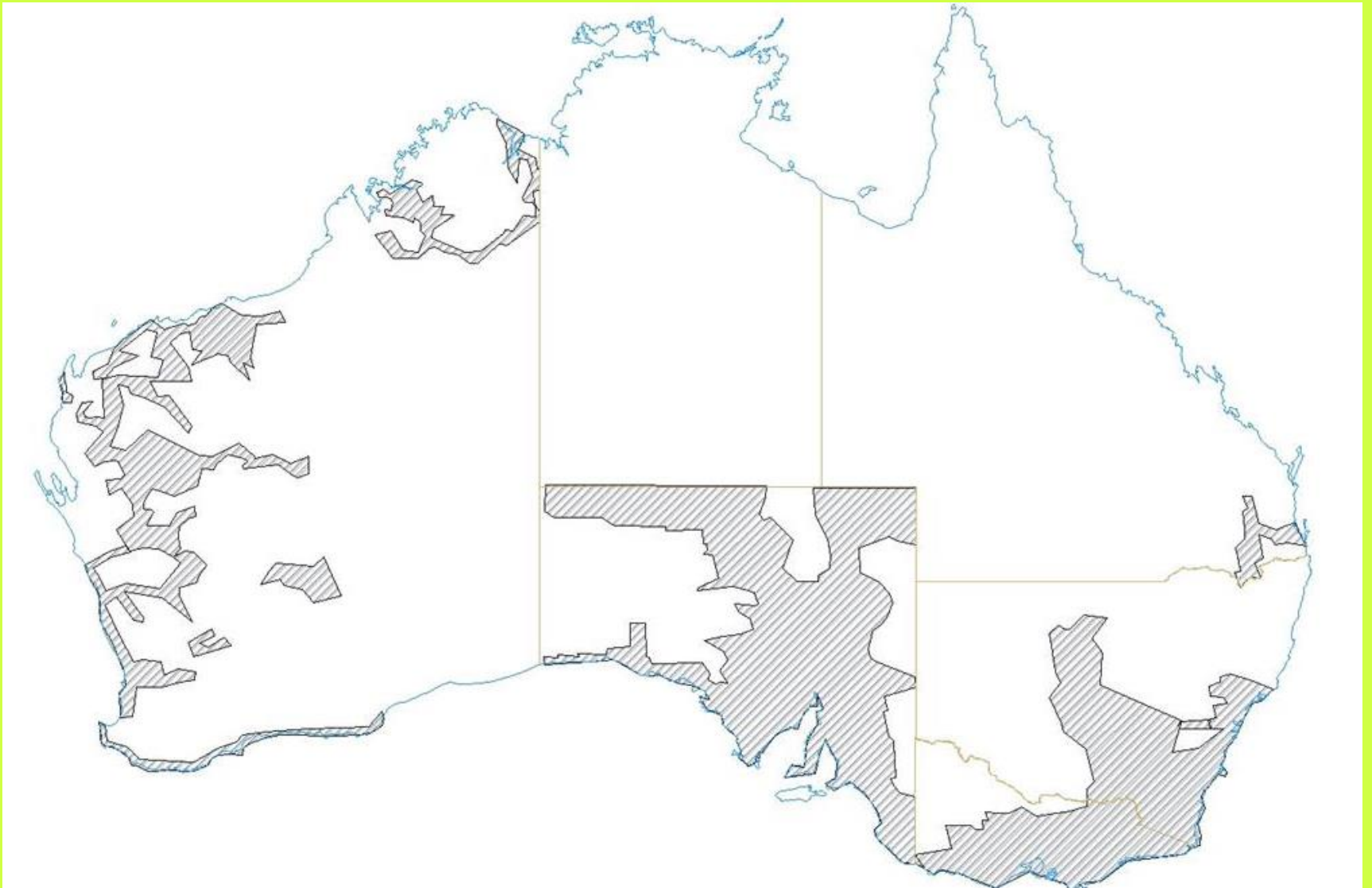
- **Triangulation** - Base lines, and Networks of triangles in which the angles were measured with theodolites

- **Traversing** - Theodolites, EDMs

- **ANS 1966 Geodetic Origin AMG 66 (UTM)**
50th birthday but dead!

- **Figure of the earth** - an oblate spheroid
 $a = 6\,378\,160$ metres $e = 1/298.25$
An Origin S $25^{\circ} 56' 54''.5515$ E $133^{\circ} 12' 30''.0771$

WGS84 and GDA 1994 (UTM)
 $a = 6378\,137$ metres $e = 1/298.257223563$



Triangulation before WW2

- **Traversing:**

It was known that the surveying method of traversing was going to have to be used to cover the rest of the continent with a frame-work of accurate survey control.

This involved measuring angles, OK, and distances, not OK until the late 50's when Electronic Distance Measurers (EDM) were introduced.

The Tellurometer using microwave carrier wave was developed in South Africa. This allowed the traversing work to get started. A huge effort was put into this work in the next 10 years by which time the whole continent had been covered. Note that this coincides with the adoption of the AGD66.

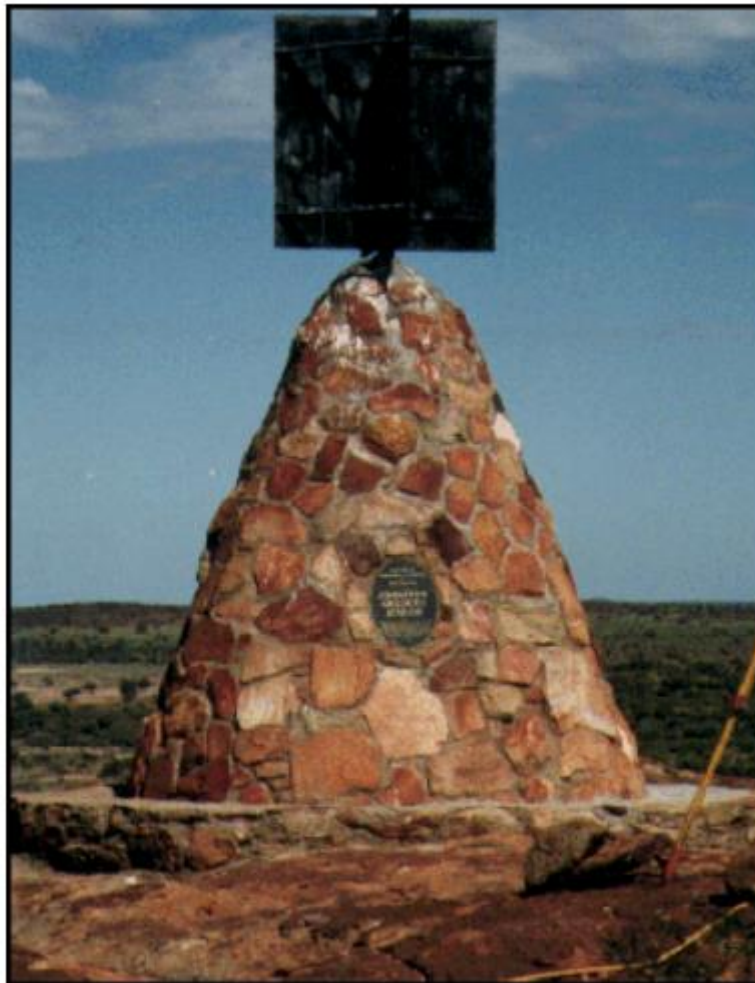
- **Traversing:**

I was involved in this work in two way. I did some of the tellurometer traversing that was run through the state triangulation networks of Victoria and NSW in the SE corner of Australia where I was working at the time with the Snowy Mountains Authority (SMA). These long traverses had to be kept on track for direction. This was done using the stars. I did three field trip in 1958, 59 & 60 observing over 25 Laplace stations at triangulation and traverse stations of the network.

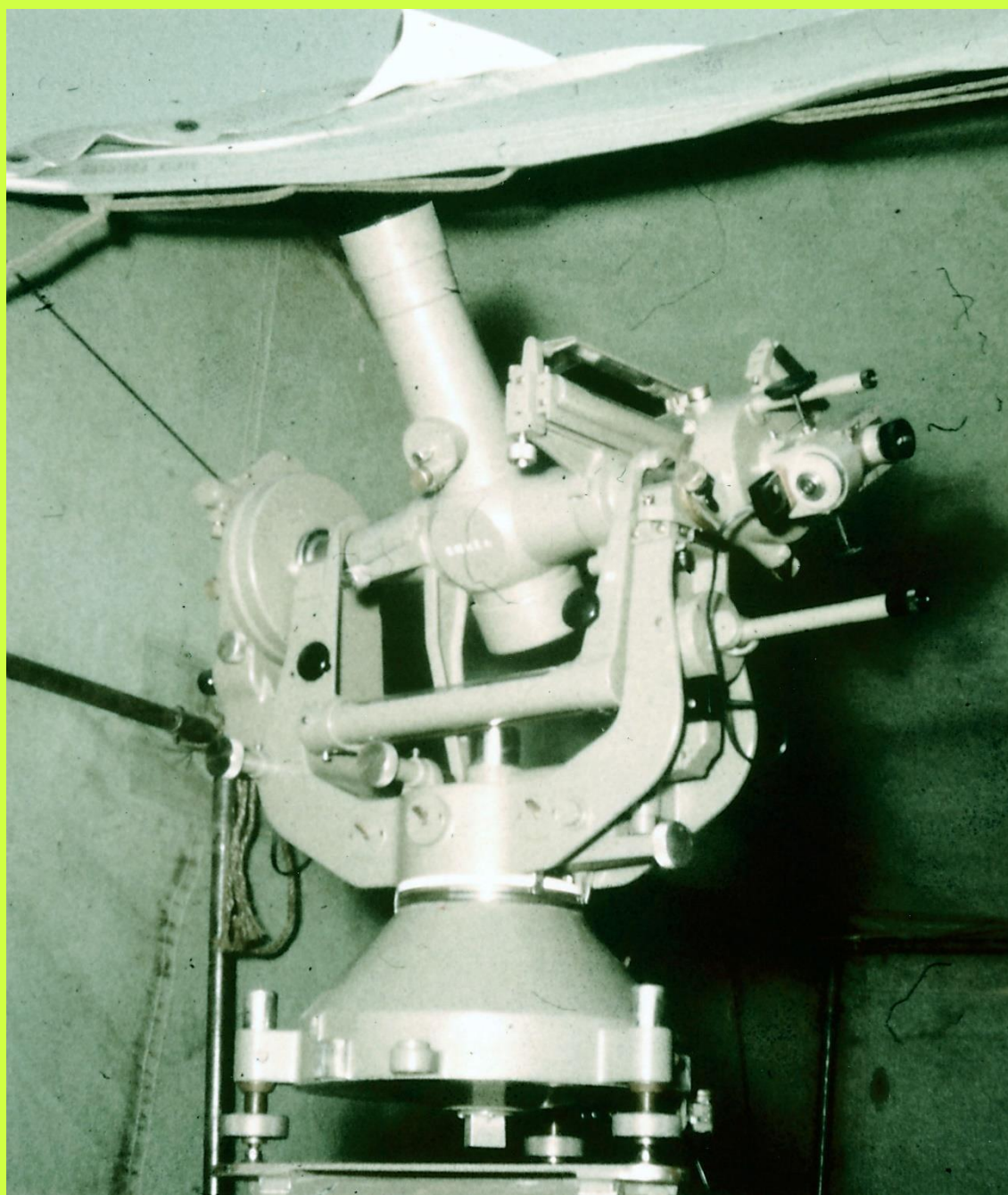
Slides show : Wild T4 theodolite

Frank with T4 on Anzac Hill, Alice Springs

Dr Peter Edwin Bardulis with T4



Australian Fiducial Network Johnston Geodetic
Station Stone marker







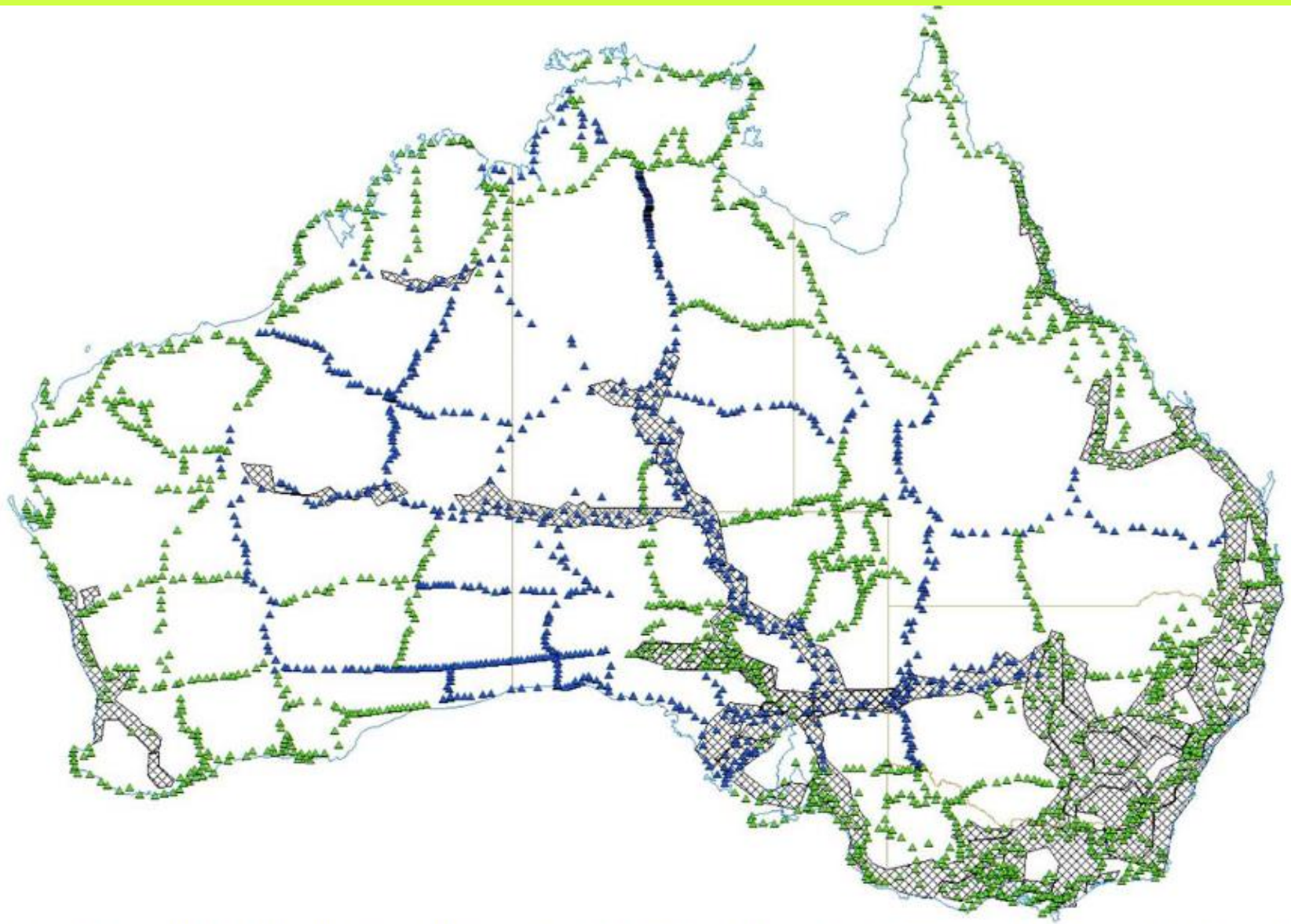


Figure 2 : Triangulation nets (hatched) and loops (blue trigs by National Mapping and green trigs by Royal Australian Army Survey Corps and States) of the Geodetic Survey as at 1966.

● Australian Control Survey Network 1966

The Division of National Mapping – Natmap

Systematic mapping of the whole of Australia

1:1 000 000 - 50 IMW and WAC map sheets

6° x 4° 1mm = 1 km

Lambert Conformal Conic Projection

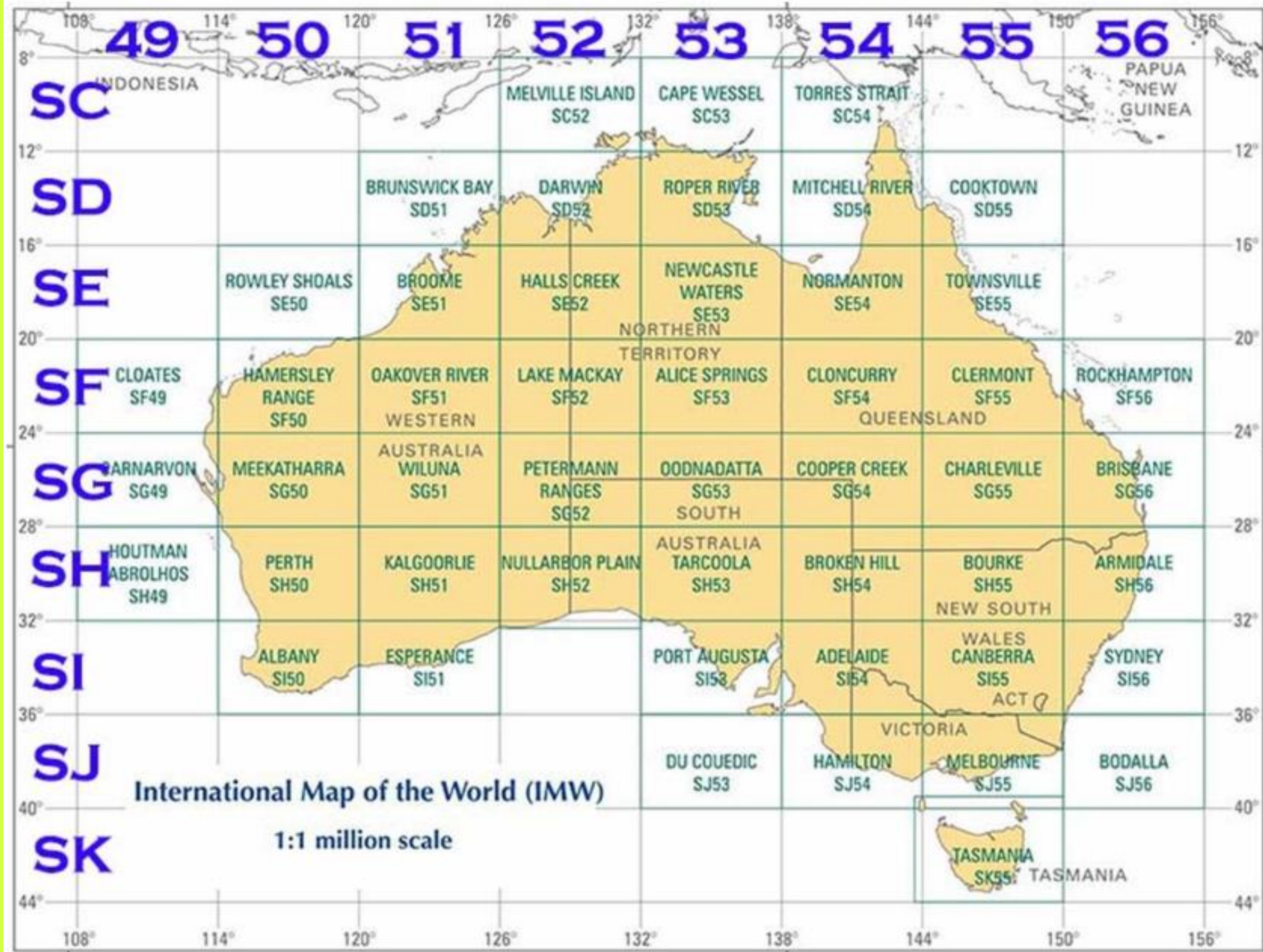
1:250 000 - 600 UTM map sheets

1.5° x 1° 1mm = 250 m

Survey control for these map series

1:100 000 - 3062 UTM maps on the AMG 1966.

Came much later



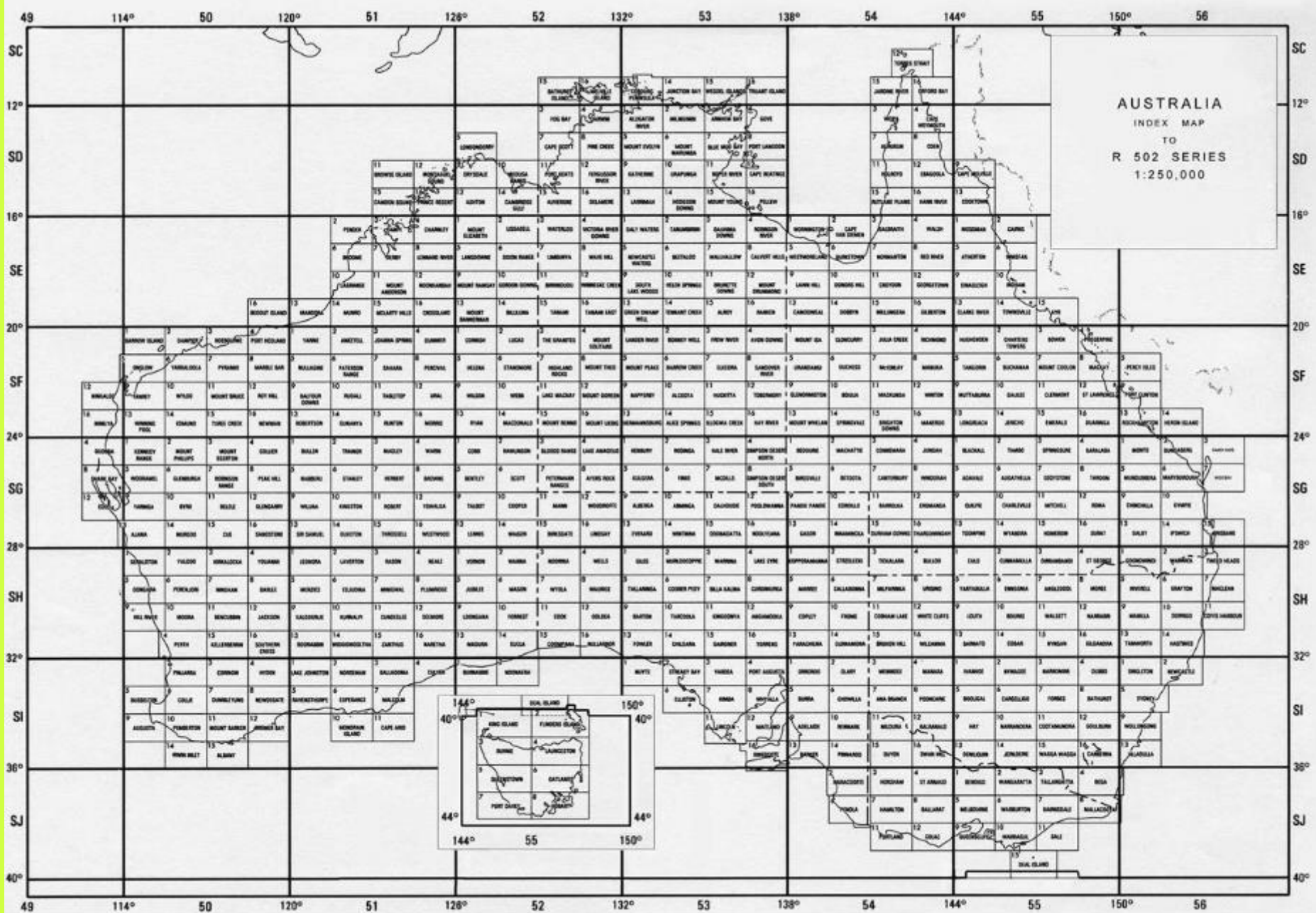
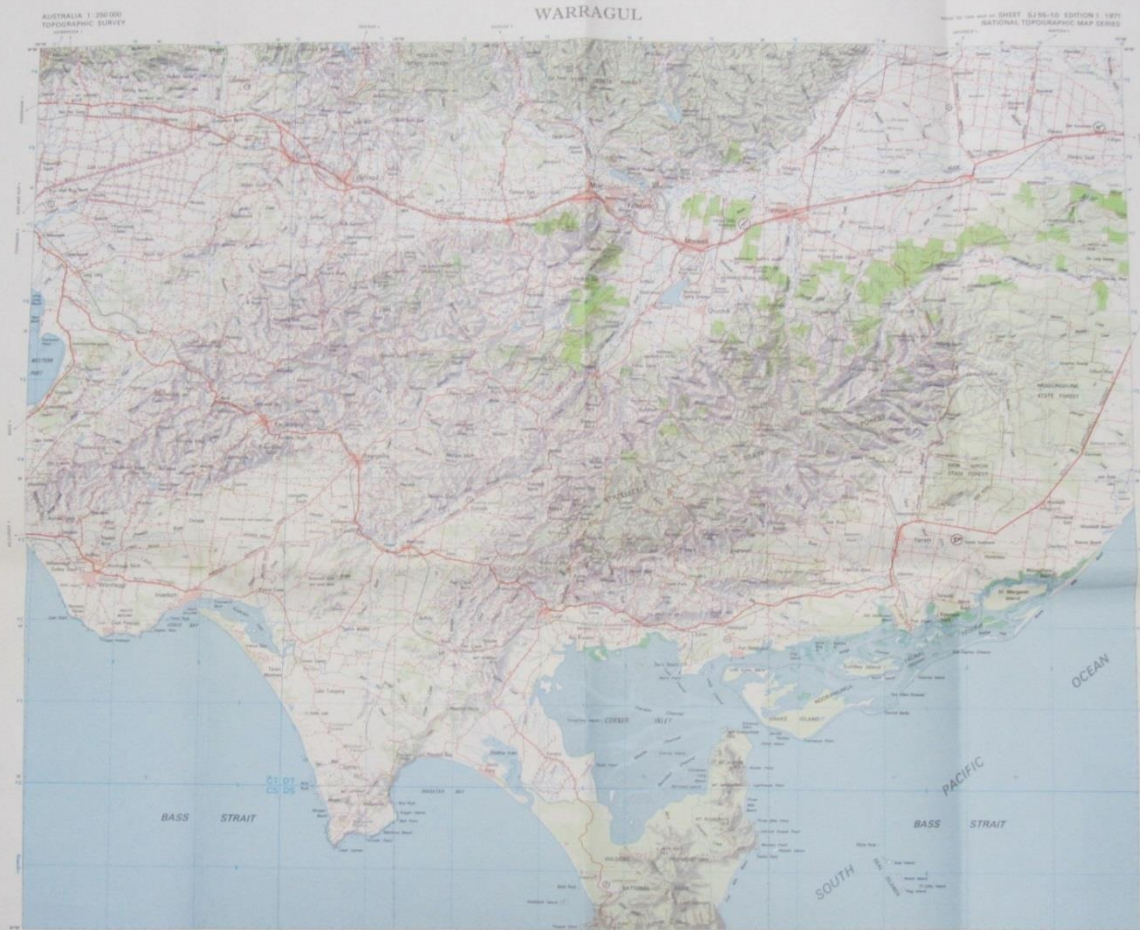


Figure 6 : Index map to the 1:250,000 scale R502 map series for Australia.



30/05/2016

SYMBOLS AND ABBREVIATIONS

1. Scale of map	1:250,000
2. Date of issue	1987
3. Date of revision	1987
4. Date of issue of this edition	1987
5. Date of issue of the previous edition	1987
6. Date of issue of the next edition	1987
7. Date of issue of the next edition	1987
8. Date of issue of the next edition	1987
9. Date of issue of the next edition	1987
10. Date of issue of the next edition	1987

Scale of map

1:250,000

Scale of map

1:250,000

Scale of map

1:250,000

Scale of map

1:250,000

Scale of map

1:250,000

Scale of map

1:250,000

Scale of map

1:250,000

Scale of map

1:250,000

Scale of map

1:250,000

Scale of map

1:250,000



Sheet 52 95-15

30/05/2016

- **On to the 1:100 000 series**

- Work on mapping control started well before the formal go-ahead was given in 1965
- The Aerodist system - 1963 tests started, 1966 field work
- Laurie McLean has written a comprehensive report on the Aerodist program which can be accessed through Paul Wise's Natmap website called www.xnatmap.org
- Aerodist program had two parts :

ground marking in which marks were established generally at one degree corners of latitude and longitude. Around 500 marks were established.





Airborne measurement

Up to 20 people were involve at one time in the field in two main parts,

The centre party operating the aircraft from an airfield

The remote station parties - up to 5 remote instruments operated by pairs of people. If we were operating in very remote country and were using helicopters then all of these people operated out of one camp.



Copyright XNATMAP



Image 3: Aerodist master unit in Graud Commander VH-EXZ circa 1966 (Nat Map image)



Plate 1 Remote equipment in use

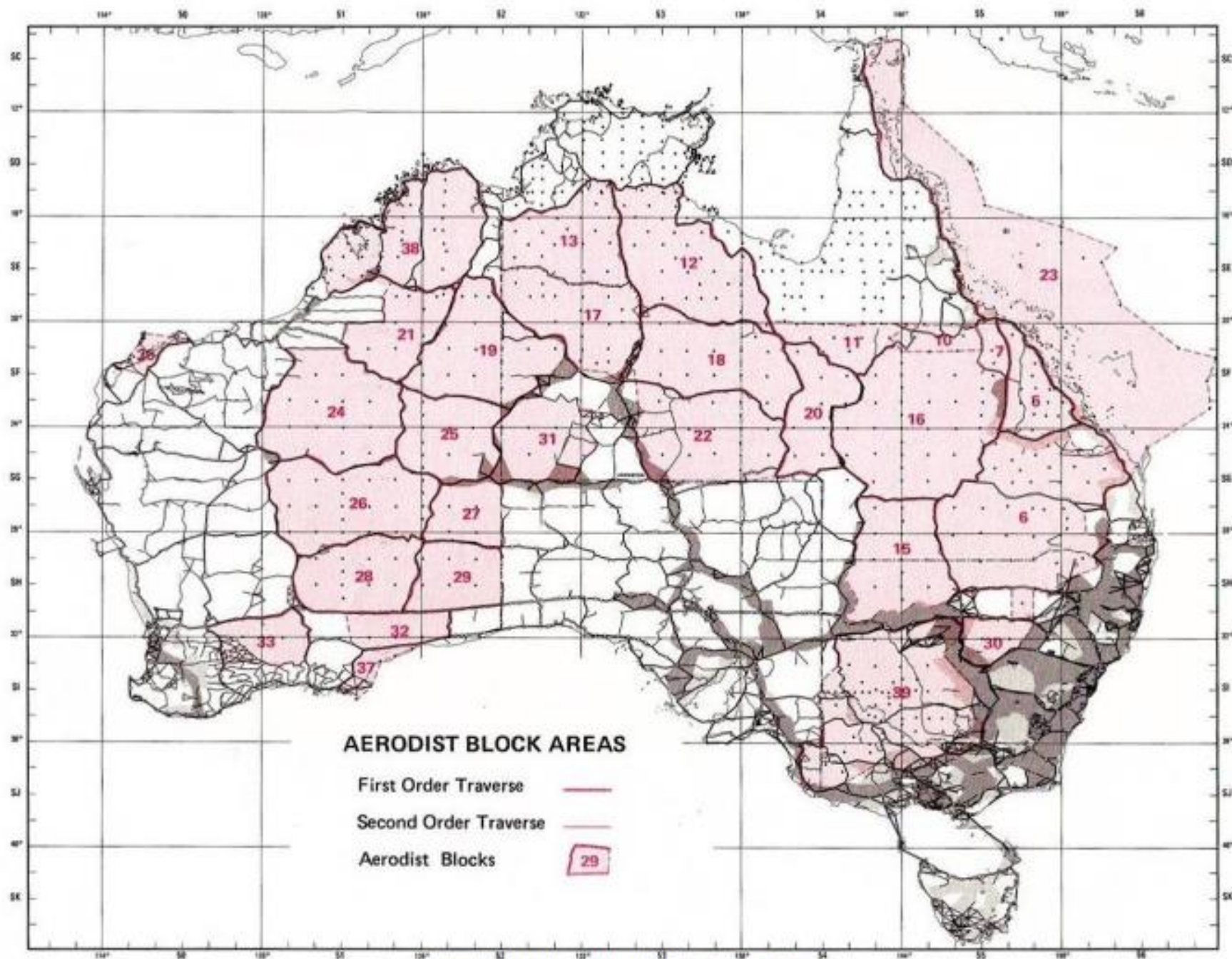


Figure 1 Final Aerodist block areas (from McMaster 1980)

● Vertical Control

- Differential levelling - spirit levelling
Natmap organized this huge task
97000 km of levelling runs were adjusted in 1971 to
give the AHD
- Laser terrain Profiling - Airborne instrument developed in
Australia



