



# The Royal Australian Survey Corps 1915-1996

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# *Outline*

- Beginnings
- First World War
- Between the wars
- Second World War
- Role and functions after the war
- Chronology after Second World War
- Reorganisation of military survey arrangements 1990s

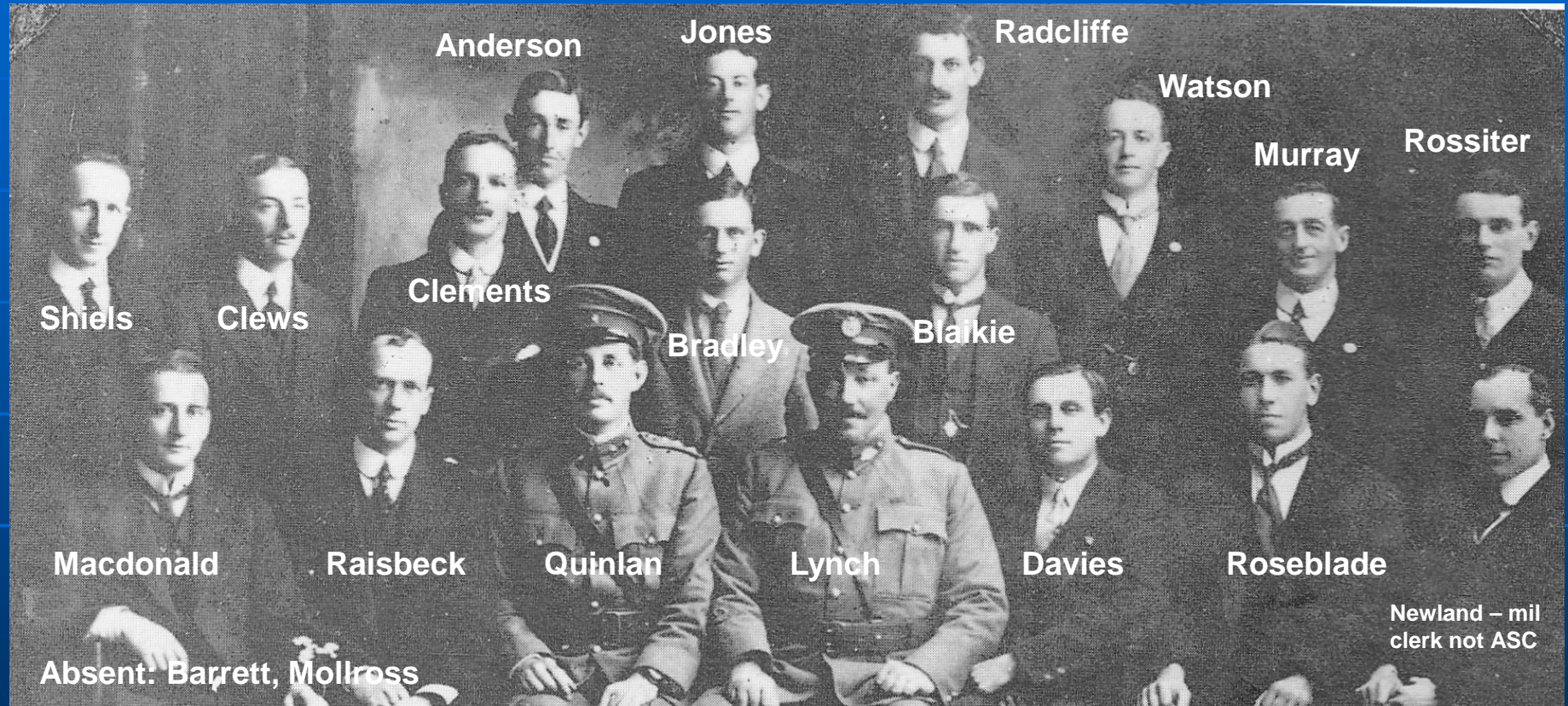


# Beginnings

- June 1915 - Order-in-Council signed by the Governor-General Sir Ronald Munro Ferguson
  - “1. A Corps to be called the Survey Corps shall be raised as a unit of the Permanent Military Forces.*
  - 2. All officers, W.O.’s, N.C.O.’s and men now serving with the Survey Section of the Royal Australian Engineers shall be transferred to the Survey Corps with their present ranks.”*
- 1 July 1915 – Australian Survey Corps formed through Military Order 396 of 1915 – 19 original members
- Lieutenant Quinlan first Survey Officer, Australian Survey Corps - later gave credit to the 1914 Director of Military Operations Major Brudenell White as being the ‘father’ of the Survey Corps



# *Australian Survey Corps - 1 July 1915*







# *First World War*

- Australian Survey Corps was not part of the AIF
- Defence of Australia work program under the General Staff
- 15 members enlisted in AIF and AN&MEF - served in Middle East, France and New Guinea
- Warrant Officer Murray awarded the Distinguished Conduct Medal for bravery while plane-table surveying between the lines in Middle East
- Only 6 members in Australia from late-1917 to continue 1-mile mapping program
- Most AIF members returned to Survey Section RAE/Aust Survey Corps after the war



# *20 years between the World Wars*

- 1919 - 1-mile Aust program continued by plane-table
- 1920 – Aust Survey Corps suspended - all members (14) transferred to Survey Section RAE
- 1923 – air photography to complement plane-tabling
- 1929 – Defence and State SG discussed ‘facilitating’ map production
- 1931 – first map (Albury) from significant amount RAAF air photo (graphical methods of perspective rectification) – identified disparity between NSW and VIC survey triangulation networks
- 1932 – Aust Survey Corps reformed, 14 members
- 1933 – adopted the British modified grid, Trans Mercator projection
- 1934 – commenced program to connect eastern state geodetic networks, one datum – Sydney observatory, Clarke 1858 spheroid
- 1935 – Aust Survey Corps increased to 25, military training by RAE for new recruits
- 1936 – overlapping air photography using the Arundel radial line method replaced plane-table topographic surveys (first map Sale 1-mile), slotted template for mechanical/graphical adjustment of aerial photo blocks
- 1936 – Officer Commanding appointed (Vance), rank raised to Major
- By 1937 – 81 Aust 1-inch maps including 18 revised
- 1938 - Three Year Programme, establishment increased to 97, strength only 50 at outbreak of war



# Second World War

- Sep 1939 – Instructions for War – Survey (emergency mapping program with States, expansion to war establishment), highlighted deficiencies in Survey Staff direction and training
- 1940 – emergency mapping programme commenced with the States
- Militia units raised
- 1941 – AIF 2/1 Corps Field Survey Company to Middle East
- Eleven AIF Survey Corps units – Survey Officers on 12 headquarters
  - Middle East, Darwin, New Guinea, Dutch New Guinea, Borneo, QLD, NSW, VIC, WA
  - Survey Sects part of 7<sup>th</sup> and 9<sup>th</sup> Infantry Divs landings Borneo
- End of war - 1700 positions, 862 men and women outside Australia
- 1447 maps produced – 739 outside Australia
- 16 soldiers died, all commemorated on AWM Roll of Honour
- Efforts commended by General Macarthur and Chief General Staff. Prepared *Instrument of Surrender* in Borneo
- War efforts recognised by the King granting the title 'Royal' to the Australian Survey Corps in 1948



# *Survey Corps Role and Functions*

## **Role – post-Second World War**

- provide geodetic survey, topographic information (paper and digital products), aeronautic and hydrographic charts to land forces (later – all forces)

## **Functions - post-Second World War**

- geodetic survey (theatre grid)
- topographic survey (map compilation)
- topographic information production – standard mapping, revision, battlemaps, training area and exercise mapping, intelligence, photomaps, special products, digital products
- aeronautic chart production for Air Force
- map, aeronautical and hydrographic chart printing
- map, chart and digital information storage and distribution





# *1945+ after Second World War*

- 1945 – member of National Mapping Council
- 1946 – 1950 – assistance to post-war nation building projects
- no intent to revert to poor preparedness of pre-1939. Army had re-learned lesson that systematic mapping best done in peace - task of permanent forces since 1910
- 'core' force of about 460 (permanent) structured to support the Army of the day and as base for expansion - adapted for peace scaled down Second World War organisation
- 1946-1968 – Govt policy of 'forward defence' (international map exchange agreements, map stores, 1:250,000 strategic mapping Aust)
- 1947 – Australia/US cooperative mapping agreement
- 1948 – granted the title 'Royal' by King George VI for its work in Second World War
- 1948 – School of Military Survey established
- 1949 – new crest replaced the original 1915



# 1950s

- 1951 Army report (Brown) – Survey Corps collaboration with other Commonwealth agencies
- 1952 – map compilation by anaglyph stereo-plotters (aerial photography) – multiplex replaced Arundel 1936 method
- 1953 – large format cartographic camera
- 1953 – national service, two Topo Survey Companies
- 1954 – commenced military surveys Papua New Guinea (to 1995)
- 1955 – Government approval of Aust/TPNG geodetic survey and 4 mile/1:250,000 topo map national programs
- Chief of General Staff agreed that the Survey Corps would work on defence priority parts of 'general' surveys and mapping projects when not required for solely Defence work
- 1956 – decimal/metric scale mapping, interoperability with major allies
- 1956 - cartographic scribing replaced fair drawing, first map Mildura 1:50,000
- 1957 – geodetic traverse (theodolite+EDM) replaced triangulation and field survey transport by helicopter
- 1957 – women soldiers return to Survey Regiment (first since 1946)
- 1959 – last 1 mile map produced



# 1960s

- World geodetic systems (1961+) surveys
- 1962 – wide angle aerial survey cameras, optical/mech stereo plotters
- 1962 – Aust geodetic survey nearly finished – turned attention to 1:100,000 mapping of TPNG, radar airborne profile recorder deployed to TPNG West Irian border
- 1963 - analytic aerial triangulation and computer generated grids
- 1964 – trilateration (airborne EDM) replaced traverse, vehicle mounted ground elevation meter
- 1965 – motto approved “Videre Parare Est” (to see is to prepare)
- 1965 – Cabinet agrees to national 1:100,000 mapping program
- 1966 – 1971 – A Sect 1<sup>st</sup> Topographic Survey Troop, ATF Vietnam
- 1966 – basic TPNG geodetic control finished, tied to DNM high order surveys and US HIRAN global network
- 1966 – adopted AGD66/AMG for Aust/TPNG
- late 1960s-1970s - Map Depot, Singapore
- 1968 Army - significant increase in establishments
- 1968 – completed Army commitment to Aust 1:250,000 program, 216 maps
- 1969 – Defence policy of self-reliance against sporadic attacks and small raids on Australia’s mainland (1:100,000 mapping program)



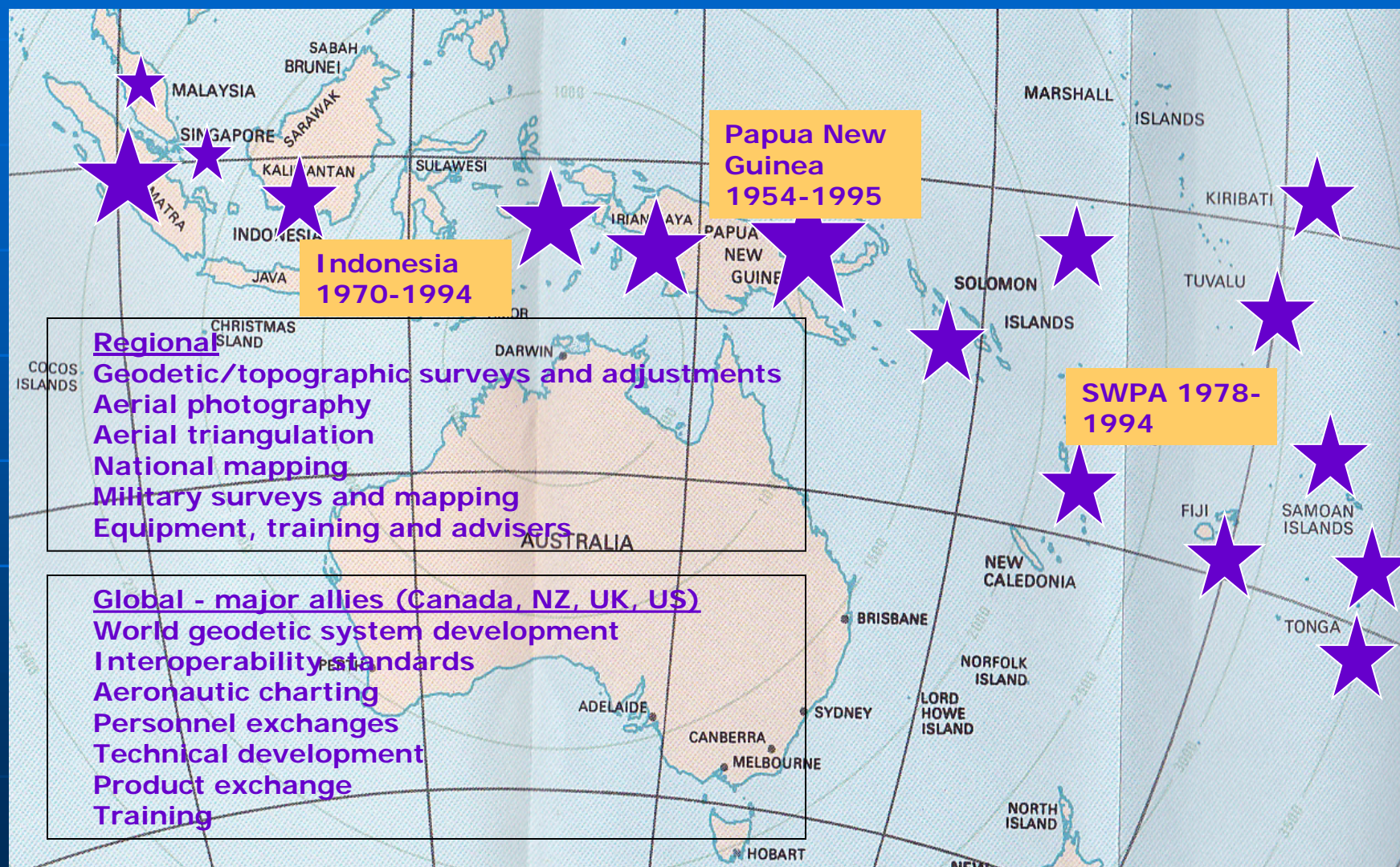
# 1970s

- 1970 – 1994 - defence cooperation with 11 regional countries
- 1973 – NMC adopted specification for 1:50,000 standard maps – full Aust effort after completing PNG 1:100,000 maps in 1980
- 1974 – Cyclone Tracey, Darwin, rapid response photomaps, RAAF photography
- 1974 – satellite positioning (USNNSS) replaced airborne trilateration
- 1974 – airborne laser terrain profiler replaced barometry for heighting
- 1975 – WGS72 added to maps as supplement info
- 1976 Defence White Paper – concepts of low-level conflict of raids and escalated conflict of small forces on Australia (1:50,000 defence mapping program)
- 1976/78 – Automap 1 computer assisted cartography including new map symbolisation (conceived 1969+)
- 1978 – trades rationalisations to match new technologies
- 1972 and 1976 – two ADF members killed on survey operations in Papua New Guinea and Indonesia, both are commemorated on the AWM Roll of Honour





# Regional and Global Defence Cooperation







# 1980s

- 1980 – completed Army commitment to PNG 1:100,000 maps
- 1981-1988-1994 – adopted WGS84
- 1982 – completed Army commitment to Aust 1:100,000 program, 862 maps
- Reviews - 1981 (Moran) Commonwealth agencies, 1985 (Richardson) Commonwealth agencies, 1986 (Dibb) Defence, 1987 (Auditor-General) audit of Survey Corps
- 1987 – GPS/IPS replaced USNNSS
- 1986 – Automap 2 computer assisted cartography, topographic databases and digital products – Govt awards for innovation by Corps officers and soldiers
- 1987 Defence White Paper - identified regional areas of direct military interest and wider strategic interest (collaboration with major allies, Defence Cooperation Program) - credible contingencies, Australia (1:50,000 defence mapping program)
- 1980s - contingency plan mapping Fiji (1987), Vanuatu (1988)
- 1987/88 Army (Baker/Byrnes) review of Survey Corps
  - major restructure – more emphasis on combat support force, reduction in field survey units, overall reduction
  - create a multi-purpose digital topographic data base for military GIS and mapping
- 1988 – appointment of Colonel-in-Chief Her Royal Highness Princess of Wales (Diana), opening of new Corps Museum



# 1990s

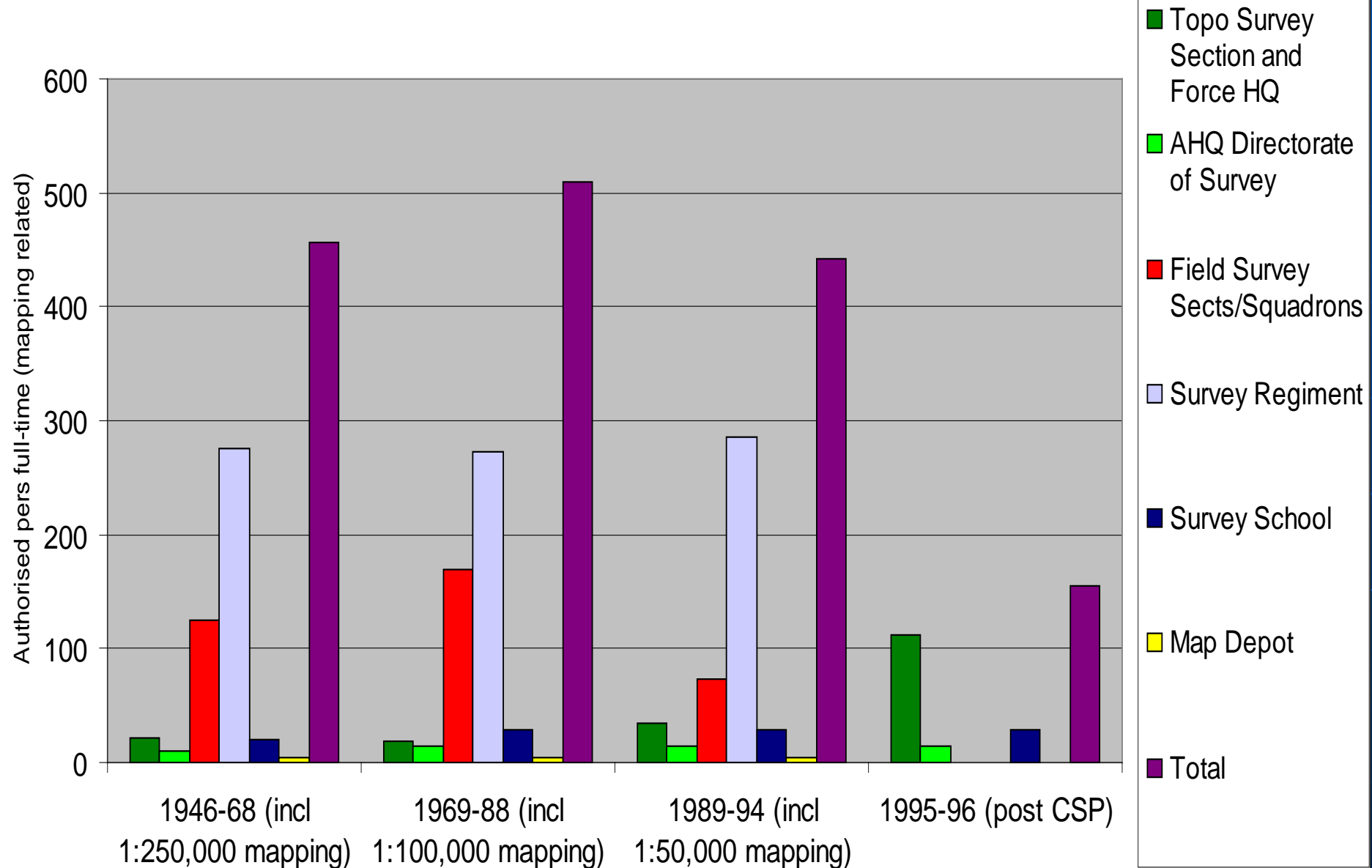
- 1990 – five colour one-pass print press
- 1990 – 75<sup>th</sup> anniversary, statement in Senate and Aust Post first day cover
- 1990 - Digital Chart of the World - digital geospatial information exchange and product standards
- 1990 (Wrigley) – Defence and the Community (Commercial Support Program – CSP) mentioned Army survey/mapping
- 1991 – Defence Force Structure Review (reduction in personnel)
- 1992/95 – Project PARARE – multipurpose digital topographic database for military GIS and map production, approval subject to CSP review
- 1993/94 - Army decisions
  - increase (+250%) 'core' topographic survey in combat support force (1<sup>st</sup> Topographic Survey Squadron)
  - 'non-core' activity (systematic standard mapping – mainly Australia) subject to CSP review - awarded to in-house option, established the Army Topographic Support Establishment, savings of about \$11m/year, reduced military survey related positions by 60% to 155
  - retain strategic 'core' military survey for Defence operations until it could be transferred to Defence Intelligence - realised in 2000 (Defence Imagery and Geospatial Organisation - DIGO)



# 1990s

- 1993 – Automap 2 upgrade 'Newheart'
- 1993 – 1995 personnel on UN peacekeeping Cambodia and Bosnia-Herzegovina
- 1995 – large format print press – rapid high volume print on demand (close of Army Map Depot)
- 1995 – Army decision
  - integrate Royal Australian Survey Corps and Royal Australian Engineers and transfer personnel to Royal Australian Engineers with effect 1 July 1996
  - Royal Australian Survey Corps disbanded 2003
- 1996 – Survey Corps produced 1,960 of 2,700 1:50,000 Defence maps

# Royal Australian Survey Corps organisation after Second World War







# Systematic mapping programs Australia – after Second World War

	1:250 000 (Series R502) national mapping program	1:100 000 national mapping program	1:50 000 defence mapping program
<b>Timeline</b>	1957-1968	1968-1980	1976-1996
<b>Maps published</b>	216 – 27 per year (revision as military spec JOG from 1:100,000 program)	862 – 72 per year (revision from 1:50,000 program)	1960 of 2700 required, 110 per year (revision as required)
<b>Personnel/year</b>	400	500	490
<b>Trained/year</b>	32	96	44
<b>Major survey systems and methods</b>	Triangulation, traverse, astronomy, barometry	Traverse, AERODIST, TRANSIT, barometry, WREMAPS II	Traverse, TRANSIT, WREMAPS II, GPS, IPS
<b>Air Photo</b>	K-17, National RC9	National RC9	Defence RC10
<b>Major mapping systems</b>	Slotted templates, multiplex, A9/B9/B8, carto scribing	Analytic aerotrig, B8, manual carto, Automap 1	Automap 1, Automap 2





# Summary

- Australian Survey Corps born out of paucity of military survey for defence of Australia
- Significant contributions during wars and operations other than war and to national programs
- Enduring mapping standards for military and civilian topographic maps since 1910
- After Second World War, Army agreed to assign Survey Corps assets to national survey and mapping programs when not required for solely Defence purposes
- Corps always well resourced by Army – quality personnel, training and equipment - always produced quality product
- Survey Corps led many technical developments
- Rapid technological developments (1990+) along with force structure reviews and severe Army budget cuts drove rationalisation of the survey force, with more emphasis on the combat support survey force



# Conclusion

- *The Survey Corps official history 2000* “Australians as a whole might still be blissfully unaware and hence unappreciative of the debt of gratitude owed to the generations of surveyors who have helped make possible the enviable standard of living generally enjoyed today across the country. Should that situation ever change, and the story receive the wider recognition that it deserves, then the part within that tale occupied by military map-makers is worthy of special acclaim by a grateful nation.”
- *The Governor-General 2009* “Since 1915 the Survey Corps has not just been a major contributor to the tactical success of the Australian Army in two World Wars and other conflicts, it has played an outstanding role in the building of this nation, the Commonwealth of Australia, and the building of other nations such as Papua New Guinea.....Although the Corps is no longer, its legacy provides the ethos, the distinguished history and the enduring sense of high professionalism of our military surveyors of today.”



# Questions

*videre parare est*