WAR IN VIETNAM – A SURVEYOR'S STORY

The Royal Australian Survey Corps at Nui Dat in its first year

1966-67

ANNEXES A – N

A personal reflection forty years later… Bob Skitch

ANNEX A

DET 1ST TOPOGRAPHICAL SURVEY TROOP
OPERATION ORDER 1/66

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DET 1ST TOPOGRAPHICAL SURVEY TROOP

OPERATION ORDER 1/66

(Issued 12 June 1966 – connexion to Nui Dat)

(scanned and transcribed from original)

1.SIT

Svy party 1 will comprise the following personnel:

Sgt S.R. CAMBELL
Cpl J.L. ROBERTS
Spr B.W. FIRNS

The party will be augmented by the following members of TF Loc Tp.

1731045 L/Bdr J.F. Selwood
3787005 Gnr J.L. Roberts
Gnr V.A. Moreau
3787689 Gnr D.P. McManus

Svy party 2 (-) will comprise the following personnel:

214295 Cpl D G P CERUTI
311459 Spr J A O'CONNOR

2.MSN

Det 1 Topo Svy is to establish a 3rd Order Position and azimuth on the feature NUI DAT GR 433 675.

3.EXEC

a. General outline

NUI DAT is to be co-ordinated by tellurometer measurement and angle observation from the 1st order point"NOUVEAU PHARE CAP ST JACQUES" GR 279 428. In carrying out this task, the reliability of the control point is to be tested by connexion between three known control points in the VUNG TAU area and by the introduction into the observed figure of astronomical azimuths.

b. Organisation

Svy party No 1 with Sgt CAMPBELL NCO I/C will carry out all necessary survey south of grid line N1,150,000. Elms of Svy Party No 2 will carry out all necessary survey north of grid line N1,150,000.

c. Tasks

The following tasks will be carried out at the stations listed

(1) NOUVEAU PHARE CAP ST JACQUES (light house) GR 279 428.

(i) Establish eccentric positions near base of lighthouse.

(ii) Measure circumference of lighthouse at height of theodolite.

(iii) Determine and mark centre of lighthouse, radial to theodolite, by bisecting the angle between the targets from the instrument position to the lighthouse.

(iv) Measure the distance from the eccentric to the position marked.

(v) Measure the following distances by tellurometer:

Ecce....CAP ST JACQUES (20 fine readings)

Ecce....THANH ecce (10 fine readings)

Ecce....NUI DAT (20 fine readings - both directions)

(vi) Observe the following directions from ecce positions.

CAP ST JACQUES (8 arcs)

NUI DAT (8 arcs)

THANH ecce (4 arcs)

Lighthouse centre point (2 arcs)

(vii) Observe the following vertical angles from the ecce position.

CAP ST JACQUES (4 FL and 4 FR) reciprocal

NUI DAT (4 FL and 4 FR) simul reciprocal

THANH ecce (4 FL and 4 FR) single direction

(2) CAP ST JACQUES 3rd order station GR 287 419.
(i) Clear ground mark and check recovery marks.
(ii) Measure the following distances by tellurometer.

Lighthouse ecce 20 fine readings

NUI DAT 20 fine readings both direction

THANH ecce 10 fine readings

VUNG TAU azimuth Mk 5 fine readings

(iii) Observe the following directions.

Lighthouse 8 arcs

Lighthouse ecce	4 arcs
NUI DAT	8 arcs
VUNG TAU azimuth mark	8 arcs
THANH ecce	4 arcs

(iv) Observe the following vertical angles;

Lighthouse ecce	4 FL and 4 FR reciprocal
NU1 DAT	4 FL and 4 FR simul reciprocal
THANH ecce	2 FL and 2 FR single direction
Azimuth Mk	2 FL and 2 FR single direction

(3) THANH 3rd order station

(i) Establish THANH 3rd eccentric west of road to enable intervisibility to lighthouse and CAP ST JACQUES.

(ii) Measure the following distances by tellurometer (remote only).

Lighthouse ecce	10 fine readings
CAP ST JACQUES	10 fine readings

(4) VUNG TAU azimuth station.

(i) Establish station in convenient locality in ALSG area.

(ii) Observe either of the following Astro observations using red light on Radar Hill as RO

(a) 8 arcs on polaris or

(b) 6 arcs W and 6 arcs E Ex meridian observation on star within 15 degrees of prime vertical

NOTE (a) is preferable to (b).

(iii) Observe angle between RO and CAP ST JACQUES.

(5) NUI DAT 3rd order Artillery station.

(i) Adequately clear and establish station

at highest point of feature to be groundmarked with RA Svy plaque set in concrete.

(ii) Measure the following distances by tellurometer.

Lighthouse ecce 20 fine readings reciprocal.

CAP ST JACQUES 20 fine readings reciprocal

Arty orientation Pt 10 fine readings single direction.

(iii) Observe the following directions:

Lighthouse 8 arcs

CAP ST JACQUES 8 arcs

Arty orientation Pt 4 arcs

(iv) Observe a sun azimuth (AM and PM) on the line to Lighthouse.

d. Barometer Calibrations.

NCO I/C of party (1) will endeavor to calibrate barometers at NUT DAT on return.
Note :- in calibration, sea level correction not to be applied.

e. Technical specifications

All survey tasks will be carried out in accordance with RA Svy practice as specified in Corps Manuals, unless otherwise directed by 0C Det.

f. Recording - To be carried out in duplicate.

g. Timings

(1) Party No 1.

(i) Tue 14 Jun 66

(a) Depart TF area NUI DAT (time to be notified)

(b) Report to HQ ALSG on arrival VUNG TAU.

(c) Establish and observe Azimuth Station. To be carried out on following nights in area if nec.

(ii) Wed 15 Jun 66

(a) Establish liaison with US Advising Team at Vung Tau and obtain clearance to proceed to Lighthouse and CAP ST JACQUES Trig,

(b) Establish and measure ecce at lighthouse.

(c) Recover and clear ground mark at CAP ST JACQUES.

(d) Establish and measure ecce at THANH.

(e) Measure all angles and distances in the figure lighthouse - CAP ST JACQUES - THANH.

(f) Measure distance CAP ST JACQUES to Azimuth Mk

Note:- Carry over of tasks of Wed to be carried out on Fri 17 Jun 66 if necessary.

(iii) Thu 16 Jun 66.

(a) Occupy Lighthouse ecce and observe and measure to NUI DAT including verticals.

(b) Occupy CAP ST JACQUES and observe and measure to NUi DAT.

Call up time for measurement 0900 at Lighthouse

(iv) Fri 17 Jun 66
Complete outstanding work

(v) Sat 17 Jun 66
Return NUI DAT

(2) Party no 2

(i) Tue 14 Jun 66.
(a) Clear and ground mark NUI DAT.
(b) Check tellurometer systems

(ii) Wed 15 Jun 66
(a) Observe sun as azimuths at NUI DAT

(iii) Thu 16 Jun 66

(a) Carry out all observations and measurements at NUI DAT

(iv) Fri 17 Jun 66

Nil

(v) Sat 18 Jun 66

(a) Computations

4. ADM and LOG

a. Transport:

Svy party No 1 augmented by personnel from TF LOC TP will take the following vehicles

Trucks ¾ ton GS 113 130	1 Topo Svy Tp
Trl ½ ton cargo	1 Topo Svy Tp
Truck ¾ ton GS	TF Loc Tp
Trl ½ ton cargo	TF Loc Tp

Party to travel with convoy NUI DAT - VUNG TAU as directed.

b. Rations and quarters:

(i) NCO/1C Party No 1 to report to HQ ALSG for direction on rationing and quarters. Party No 1 to carry normal accommodation stores including

tent Lt wt ll'xll'

tent Lt wt7'x7'

c. Weapons and Ammunition

(i) All personnel involved will carry personal weapons at all times. States of readiness as follows:-

(a) In secured areas and VUNG TAU township, empty mag on, full mag in pouch

(b) In unsecured areas and including travel between NUI DAT and VUNG TAU and whilst working in THANH locality; full mag on - working parts forward.

(c) Ammo as follows will be carried

SLR 120 rounds

OMC 180 rounds

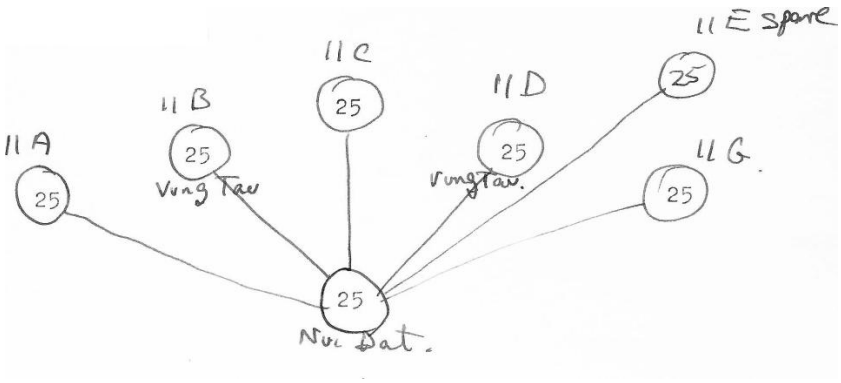
d. Stores and equipment

All stores and equipment other than compasses, prismatic, binoculars and watches will be issued on AAF F95. The articles mentioned are to be issued on AAF F12 to members nominated by NCO I/C.

5. COMD AND SIG

a. Call signs

b.



Frequency 62.5 mcs

c. Call words

13/14	GOLF	ZULU
15/16	VICTOR	WHISKEY
17/18	PAPA	ROMEO
19/20	KILO	OSCAR

d. Nick names

Light house	BRICK BAT
NUI DAT	SHORT LEG
CAP ST JACQUES	HOCKEY BALL
THANH	PIANO STRING
AZIMUTH STATION	FINE DAY
STA P	HOT COCOA
STA Q	WET CHEESE
105 Bty DIRECTOR	LONG POLE

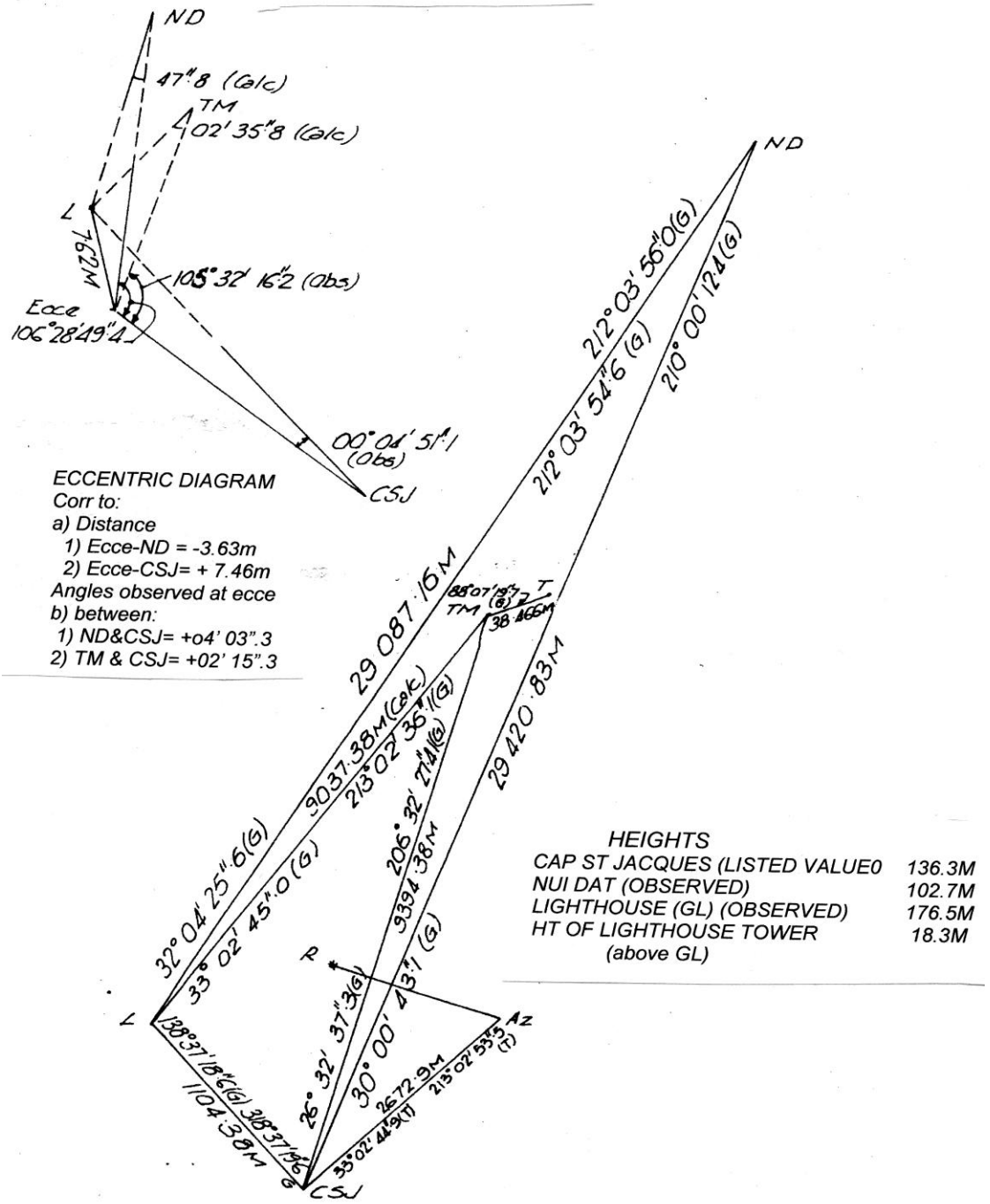
ANNEX B

NUI DAT CONNEXION

TRIG DIAGRAM

ANNEX B

NUI DAT CONNEXION
SUMMARY



HEIGHTS	
CAP ST JACQUES (LISTED VALUE0	136.3M
NUI DAT (OBSERVED)	102.7M
LIGHTHOUSE (GL) (OBSERVED)	176.5M
HT OF LIGHTHOUSE TOWER (above GL)	18.3M

NUI DAT……..……..ND
VUNG TAU LIGHTHOUSE……..L
THANH……T
THANH MINOR……..TM
CAP ST JACQUES……...CSJ
VUNG TAU AZ PT……....AZ
RADAR TOWER LIGHT……..R

ANNEX B1

NUI DAT CONNEXION

SUMMARY OF CLOSURES

ANNEX B-1

SUMMARY OF CLOSURES (continued)

(Transcribed from the hand-lettered original)

AZIMUTH

	TRUE	GRID
Observed Azimuth at Vung Tau Az Mk (8 arcs on Polaris – Range 7.0'')	295º 21' 25".0	
Observed Sun Az at Nui Dat to Lighthouse	212 º 28' 22".0	212 º 03' 54"6
Azimuth at Nui Dat to Lighthouse carried from Vung Tau Az Mk	212 º 28' 23".4	212 º03' 56".0
Misclose	1".4	1".4

GENERAL DESCRIPTION:

The feature Nui Dat was fixed from the 1st order point NOUVEAU PHARE CAP ST JACQUES (VUNG TAU LIGHTHOUSE) by telluromenter measurement and angle observation.

CONSISTENCY OF EXISTING CONTROL

To obtain an indication of the consistency of the control a connexion was also made to the third order points CAP ST JACQUES and THANH from VUNG TAU LIGHTHOUSE. The triangle so formed was measured on two sides and two angles were observed. The third side could not be measured because of radar interference from Vung Tau airfield and possibly the lighthouse. The results indicate a complete lack of consistency in the control with a tendency for the 3rd order point THANH to support the first order point VUNG TAU LIGHTHOUSE. For this reason and also because the 3rd order point CAP ST JACQUES is listed three times in the Geodetic Coordinate Listing the 1st order point VUNG TAU LIGHTHOUSE was adopted as datum for the theatre.

DETAILED DESCRIPTION OF CONNEXION:

The triangle formed by NUI DAT, VUNG TAU LIGHTHOUSE & CAP ST JACQUES was fully observed and measured, ie, all sides and all angles. Azimuth was introduced at CAP ST JACQUES & NUI DAT. For convenience and security an azimuth point was established in the ALSG area of Vung Tau Peninsula and 8 arcs on Polaris observed to the Radar Tower Light, this being a convenient RO for night observations.
At NUI DAT 8 arcs of sun azimuth were observed, (4 arcs AM and 4 arcs PM) on the line NUI DAT to LIGHTHOUSE.
At THANH a satellite station named THANH MINOR was established in a position to give intervisibility to VUNG TAU LIGHTHOUSE and CAP ST JACQUES. THANH MINOR was treated as an independent station and not as an eccentric to THANH.
At VUNG TAU LIGHTHOUSE an eccentric station was established and measurements taken to determine the relationship of the eccentric to the centre of the lighthouse. All angles and distance measurements at VUNG TAU LIGHTHOUSE were reduced to centre.

COMPUTATIONS

1. A preliminary computation of Lat, Long and Reverse Azimuth carried the true azimuth from the azimuth point to the line VUNG TAU LIGHTHOUSE to CAP ST JACQUES. Grid convergence was applied at LIGHTHOUSE.
2. The UTM coordinates of CAP ST JACQUES were computed from VUNG TAU LIGHTHOUSE and the comparison obtained between the computed and the listed values. The computed values carried from LIGHTHOUSE were adopted.
3. The triangle LIGHTHOUSE – CAP ST JACQUES – THANH MINOR was solved

to give the unmeasured side and angle. The triangle was adjusted angularly.. The sides were adjusted to maintain the sine-rule relationship with the adjusted angles.
4. The UTM coordinates of THANH MINOR were computed from CAP ST JACQUES and LIGHTHOUSE by UTM bearing and distance computation.
5. The coordinates of THANH were computed from THAN MINOR and comparisons obtained between the listed values and the values carried from LIGHTHOUSE.
6. The triangle NUI DAT- CAP ST JACQUES-LIGHTHOUSE was closed angularly.
7. The UTM coordinates of NUI DAT were computed from both LIGHTHOUSE and CAP ST JACQUES by UTM bearing and distance computation using adjusted angles and measured distances. (Misclose 0.32 metres easting: 0.01 metres northing).
8. The UTM coordinates of NUI DAT were converted to geographical values. The sun azimuth of the line NUI DAT to LIGHTHOUSE was converted to a grid bearing and the comparison obtained with the Grid Bearing carried through from LIGHTHOUSE.

ANNEX B2

NUI DAT CONNEXION

SUMMARY OF OBSERVATIONS

ANNEX B-2
SUMMARY OF OBSERVATIONS

(Transcribed from the hand-lettered original)

DISTANCES MEASURED

VUNG TAU LIGHTHOUSE		
–	NUI DAT – 20 fine readings -	29,087.16 M (Ecce Corr applied)
	CAP ST JACQUES – 20 fine readings	1,104.38,M (Ecce Corr applied)
CAP ST JACQUES		
–	NUI DAT – 10 fine readings	29,420.83M
	THANH MINOR – 10 fine readings	9,394.38M
	AZIMUTH POINT – 5 fine readings	2.672.9 M
THANH MINOR – THANH – chained		38.466M

DIRECTIONS OBSERVED

AT LIGHTHOUSE ECCE	TO	NUI DAT	00º 00’ 00”.0 – 8 arcs
(reduced to NuiDat as common RO)		CAP ST JACQUES	106º 28’ 49”.4 – 8 arcs Ra 8”.5
		THANH MINOR	00º 56 33”.2 – 4 arcs Ra 7”.0
AT CAP ST JACQUES	TO	NUI DAT	00º 00’ 00”.0 – 8 arcs
(reduced to Nui Dat as common RO)		AZ MK	02º 39’ 34”.4 – 8 arcs Ra 13”.0
		LIGHTHOUSE ECCE	288º 31’ 46”.4 – 8 arcs Ra 6”.5
		LIGHTHOUSE	288º 36’ 37”.5 – 8 arcs
		THANH MINOR	356º 31’ 53”.1 – 8 arcs Ra 6”.0
AT NUI DAT	TO	CAP ST JACQUES	00º 00’ 00”.0 – 8 arcs
		LIGHTHOUSE	02º 03’ 42”.9 – 8 arcs Ra 7”.5
AT THANH MINOR	TO	LIGHTHOUSE	00º 00’ 00”.0 – 4 arcs
		THANH	235º O4’ 43”.2 – 4 arcs Ra 5”.0
AT VUNG TAU AZ PT	TO	CAP ST JACQUES	00º 00’ 00”.0 – 8 arcs
		RADAR TR LIGHT	82º 18’ 31”.5 – 8 arcs Ra 4”.5

SUMMARY OF CLOSURES

POSITION		E	N
THANH –	LISTED COORDS	732,903.58	1150,334.82
	COMPUTED COORDS (From Lighthouse)	732,896.47	1150,341.36
	Difference	+7.11M	-6.54m
CAP ST JACQUES –	LISTED COORDS	728,683.83	1141,928.19
	COMPUTED COORDS (From lighthouse)	728,658.74	1141,933.86
	Difference	+25.09M	-5.67M

NOTE: LISTED VALUE OF NOUVEAU PHARE CAP ST JACQUES (VUNG TAU LIGHTHOUSE) 1ST ORDER STATION ADOPTED AS DATUM FOR THEATRE GRID. VALUES AS FOLLOWS:

	E	N
	727,928.5	1142,762.8
NUI DAT – ADOPTED VALUE	743,380.36	1167,418.42
	LONG 07º 13’ 27”.704E	LAT 10º 33’ 13”.724 N
GRID CONVERGENCE	00 º 24’ 27”.41	

TRIANGLE CLOSURES

THANH MINOR TRIANGLE: ANGLE AT –

LIGHTHOUSE	105º 34’ 31”.5	(Observed)
CAP ST JACQUES	67º 55’ 15”.6	(Observed)
THANH MINOR	06º 30’ 07”.8	(Calc from sides)
TOTAL	179º 59’ 54”.9	
MISCLOSE	- 05”.1	

NUI DAT TRIANGLE: ANGLE AT –

LIGHTHOUSE	106º 32’ 52”.7	
CAP ST JACQUES	71º 23’ 22”.5	
NUI DAT	02º 03’ 42”.9	
TOTAL	179º 59’ 58”.1	
MISCLOSE	- 01”.9	

Compiled RF Skitch Capt
Checked Cpl J Roberts

ANNEX C

REQUEST FOR STEREOTOPES

ANNEX C

From: Capt R.F. Skitch
Det 1 Topo Svy Tp
1st Aust Task Force
NUI DAT
VIETNAM

14 Jun 66

Maj W. Child
Directorate of Military Survey
Army Headquarters
CANBERRA ACT

(Scanned and transcribed from the original)

Dear Major Child

Today I have submitted an RVE through HQ 1 ATF for the following equipment:-

Stereotope Zeiss	Quantity 2 (for det)
Stereoscope OLD DELFT	Quantity 1 (for det)

I have included on the RVE a fairly comprehensive statement under the section marked 'reasons'. I have a real need for the Zeiss Stereotope and if supplied as requested they will tremendously increase the capability of the Troop in the theatre.

Gradually the pattern of our role is unfolding and as can be imagined, it is closely allied to intelligence, civil affairs and operations generally. There is a big demand for large scale plots of villages and close patrol areas at scales of 1:5000.

We have provided enlargements from the existing 1:50,000 maps but these leave something to be desired in the way of detail. New photography is easy to get, although it tends to be patchy, since it is basically flown for tactical reconnaissance purposes. I have considered the possibility of sending this sort of stuff back to AUSTRALIA for plotting and although this could be done it would be difficult to achieve the result required by HQ 1ATF. In the plotting stage information becomes available from Int sources which assists in photo interpretation. Furthermore it would be difficult to achieve a completed annotation before sending data back, since this has to be done a bit piece-meal when protection and linguists are available. Thus this can proceed whilst the plot is in progress.

Most work we do is done in a tremendous hurry and to make matters more difficult, night work is not possible for security reasons. Thus the requirement

exists for two of the instruments.

It would be simple enough to obtain height control on the overlap to be plotted, barometrically, and scale could, at the worst be obtained by direct measurement on the face of existing map sheets. Where security permits, ground control could be established.

If approved, it would be necessary to get the equipment here as soon as possible. I appreciate the difficulties of getting supply into the theatre, however if delay occurs in obtaining the equipment we will to some extent 'miss the boat' and have to resort to a compromise solution. All units are getting tremendous amounts of material into the theatre, and the presence of two steriotopes will certainly not create an embarrassment.

The OLD DELFT Stereoscope is intended to supplement the Zeiss in aiding photo-annotation.

Do hope you see your way clear to give me support in this matter,

Yours sincerely
Bob Skitch

ANNEX D

SILK SCREEN REPRODUCTION FACILITY FOR 1 ATF

Letter to HQ AFV

ANNEX D

Int/29/66

1 ATF
Nui Dat
30 Jun 66

HQ AFV

SILK SCREEN REPRODUCTION FACILITY FOR 1 ATF

(Scanned and transcribed from original)

Introduction

1. 1 ATF has a continual requirement for the reproduction of operational intelligence, particularly in the following forms:

a. Enlargements from existing 1:50,000 and 1:25,000pictomap coverage for battalion and TF operations.

b. Photo plots of towns and villages for battalion and TF clearing operations,

c. Overlays and. traces showing operational boundaries and free fire areas.

2. To supply an enlargement or photoplot to section level in a battalion operation requires 171 copies, and for a Task Force operation, 750 copies. If the operation is at all prolonged, a further 100 copies in the case of the battalion and 300 copies in the case of the Task Force may need distribution to make up for wastage; and in any case a reasonable number should be held in reserve.

Resources Available

3. Resources available within I ATF at present are:

a. Gestetner office duplicating machine capable of handling brief size paper operated by 1 ATF

b. Dyeline printing machine operated by Det 1 Topo Svy Tp.

4. Det 1 Topo Svy Tp currently has the facility for reproduction in the form of a dyeline printing machine. This machine produces a direct positive copy on sensitized paper from a trace. It suffers from the following limitations:

a. Dyelne paper is soft and absorbent. It therefore has no durability and quickly deteriorates, particularly when distributed at battalion level.

b. In this humid climate, the paper rapidly absorbs moisture and does not

easily take pencil or ink.

c. Partly because the process is wet and partly because of the humid conditions, the paper has no dimensional stability, that is, it is given to stretching, this has been found to be as much as 1/8th of an inch in a 2 inch grid square.

d. It is impossible to maintain adequate stocks of dyeline paper in the theatre due to the fact that the sensitized surface deteriorates. This means that the background colour of the paper progressively darkens from an initial creamy colour to a dirty brown. In the final instance, the paper will no longer produce an acceptable image.

Suggested Solution

5. Provision has been made in the organisation of 1 Topo Svy Tp for a Lithographic section with a capability of operating a silk screen printing press. This equipment has been acquired and is now held by the loaned-back element of the Troop at AHQ Survey Regiment in BENDIGO VICTORIA. OC 1 Topo Svy Tp reports that the user trials indicate that the equipment is functioning satisfactorily.

6 The silk screen printing press is capable of reproducing line drawings in unlimited numbers at the rate of about 100 per hour. In any four hour period, 200 copies could be produced allowing 1 hour to prepare the screen, and a further hour for drying. The latter factor may be variable in the climatic condition of VIETNAM. A further colour could be overprinted on the first colour if required to give two colour copy or to be registered to an existing map. The equipment is designed to be carried complete in a Landrover ¾ ton excluding expense stores, paper, inks, and film.

7. The establishment of the Survey Troop provides for a Lithographic section of 7 personnel to completely operate and maintain the silk screen printing press and its ancillary photographic equipment. OC Det 1 Topo Svy Tp suggests that this number could be reduced to two and the draughtsmen held on the Det establishment in VIETNAM could be trained to assist in the operation of the equipment. If the current theatre ceiling cannot be exceeded, OC Det 1 Topo Svy Tp suggests that the Lithographic personnel be introduced in lieu of the following:

Spr Storeman
Pte Cook

Recommendation

8. The following recommendations are made:
a. The establishment of Det 1 Topo Svy Tp be adjusted along the lines suggested.
b. The silk screen printing press be procured from AHQ Svy Regt BENDIGO VIC and sent to the theatre, (if possible by air).

(Signed)
(O.D. Jackson)
Brig
Commander 1 ATF

ANNEX E

MAPPING AND MAP DISTRIBUTION

1ATF Policy Statement

ANNEX E

RESTRICTED

AUSTRALIAN MILITARY FORCES
VIETNAM

HQ 1 ATF
NUI DAT

R7640-1-1 3 Jul 66

See Distribution list

MAPPING AND MAP DISTRIBUTION

(Scanned and transcribed from the original)

PART 1 MAP DISTRIBUTION

Responsibility

1. Det 1 Topo Svy Tp is responsible for the supply of all maps to 1 ATF Units and units of 1 ALSG.

Map Ordering Procedure

2. 1 ATF Units may request maps in the following:
   a. Written minute.
   b. Signal.
   c. Verbally 'over the counter'.

3. ALSG Units should place map orders with GS03 INT HQ ALSG who will then collate and place request with Det 1 Topo Svy Tp. Maps will be supplied directly to GS03 INT HQ ALSG.

4. Combinations of information as indicated below will allow a map order to be successfully satisfied.

SERIES NO	SCALE	SERIAL NO	NAME	BOUNDARY DESCRIPTION	NO OF COPIES REQUIRED
/		/			/
/			/		/
	/	/			/
	/		/		/
	/			/	/
/				/	/

NOTES

1. The series number is the number used to designate a particular series of maps in a particular country.
   eg 1:50,000 series in VIETNAM is the L701 series.
   1:50,000 series in THAILAND is the L708 series.
2. Decimal scales are used on all maps in SE ASIA.
   ie 1:25,000
   1:50,000
   1:250,000

Grids throughout are in metres and heights on all ground editions are given in metres also. Air charts give heights in

feet; this is always clearly stated on the map.

3. The serial number designates a particular map sheet and is found in the top right hand corner of the sheet, together with the series number.

4. The map sheet may have a name (usually only 1:50,000 sheets) and this appears in the top centre and lower right hand corner of the map sheet.

5. Boundary description: When a unit does not have access to a map index, the boundaries of the required coverage should be described.
eg: 1:50,000 coverage of 1 ATF TAOR
or
1;25,000 coverage between grid lines
30-46 EASTING
64-74 NORTHING

6. No of copies required of each map sheet may be calculated to effect distribution down to infantry section level or lower if required. When a particular map sheet is in limited supply, Det 1 Topo Svy Tp will provide as many as stocks allow and indicate to the unit on a proforma when further supplies can be anticipated.

PART II
NOTES ON MAP SERIES AVAILABLE IN VIETNAM

Series L8020 1:25,000 “Pictomap”

1. This map consists of a photomap base with intensified photo images overprinted with standard map details (roads, railways, water courses and some contours) The series is keyed to the standard 1:50,000 L7014 series - see Para 7 below. Each sheet measures 15’longitude by 7 ½’latitude.

2. As stated a "pictomap" is basically a photomap and consequently contains many of the disadvantages of a photomap eg:

a. The heavy background tends to obscure marked up detail.

b. The map user needs some photo interpretation experience to read the more subtle detail in the map eg cultivations, timber, village layout.

c. Positional accuracy is not necessarily precise. This means that a GR to a particular point of detail may disagree with the grid reference obtained from the standard 1:50,000. This is especially likely to be so in mountainous terrain where the differences in elevation of

the ground cause the photographic image to be displaced outwards from the centre of the photograph. For a feature 200 metres high above the surrounding country, the image of which is near the edge of the photograph, the displacement would be 0.2 inches or 150 metres on the pictomap series. In overprinting standard map detail, displacement due to height has been minimised by holding positional accuracy on the overprinted detail, regardless of the position of the photo image. This means that the overprinted detail may appear to 'miss' the feature.

d. Where photographs have been joined to produce the photomap base, 'steps' in detail can occur. Such a step might be at right angles to the join, in which case detail may be repeated twice, or be obscured by the overlap. If the step occurs along the join, detail will be displaced accordingly. Generally, however, on the pictomap series the joins between photographs are very good. Join displacements do occur in hilly or mountainous terrain, and this has been disguised to some extent by the colour intensification of the photo image and the overprinting of the standard map detail. This means that the pictomap contains minor misrepresentations of map detail which are not obvious to the user.

e. Pictomaps are printed out of the country and supplies are inclined to be erratic. It is intended that ultimately large bulk holdings will be held 'in country'. When this happens Det 1 Topo Svy Tp will carry 1000 copies of each sheet of interest.

3. Notice should be taken of the name describing the series that is – PICTOMAP SUPPLEMENT TO STANDARD 1:50,000 SCALE SERIES. This clearly indicates that the Pictomap is meant to supplement the 1:50,000 series and be used in conjunction with it.

Series L701 – VIETNAM 1:50,000

4. This is the standard large scale coverage of VIETNAM. The sheet is 10'lat by 15' long. Relief is shown by 20 metre contours. The series is generally reliable in detail with the follow exceptions:

a. Village detail is inaccurate and must be treated as being representative,
b. Creeks and contours tend to be generalised that is, creeks do not show small meanders and bends and contours may not show small re-entrants,
c. It should be kept in mind when using this series that the maps were compiled from air photos without field

inspection. Therefore man made detail may be in error as the result of misinterpretation. Also in many areas, the heavy jungle canopy precluded the plotting of many non-perennial creeks and small re-entrants.

Series L7014 VIETNAM 1:50,000

7. This series is a revised version of the L701 series with sheet size changed to 15′ X 15′. It is anticipated that the new series will be available for issue in about Aug – Sep 66. The map will be very similar to the L701 series in general appearance.

8. When available Det 1 Topo Svy Tp will replace bulk holdings of the L701 series with L7014 series.

Series 1501 Joint Operations Graphics Scale 1:250,000

9. The JOGs are the standard medium scale maps covering all of VIETNAM. All sheet are on UTM projection with 10,000 metre UTM grid. The JOGs are designated (G) for ground and (A) for air use. The ground version shows relief by 100 metre contours and relief is given a three dimensional effect by the combined use of elevation tints and shaded relief. The air version JOG is basically the same except that contours are labeled with the approximate value in feet and each 1 degree square is overprinted with its highest elevation. Additional air information is shown on the JOG (A).

10. Det 1 Topo Svy Tp carries bulk holdings of all relevant JOGs (G) and JOGs (A), the latter being held for distribution to army aviation.

USAF Pilotage Charts – 1:500,000

11. This is an air navigation chart covering an area 4 degrees Long and 6 degrees Lat. It is contoured with a contour interval of 500 feet. Relief is shaded to produce a three dimensional effect. The chart is suitable for a general purpose wall map. The sheets are easily obtainable and are held by Det 1 Topo Svy Tp in reasonable quantity.

RAF Topographical Tactical Chart 1:500,000

12. This sheet is compiled from the USAF Pilotage Chart. It contains similar information, however, it uses stronger colours in depiction of relief. It therefore makes a better wall map than the Pilotage Chart. The series is held in limited numbers by Det 1 Topo Svy Tp.

RAF Topographical Navigation Chart 1:1,000,000

13. This sheet is of similar type to the 1:500,000 sheets previously mentioned. Limited copies are held by Det 1 Topo Svy Tp.

Series 5303 South East Asia Road Map 1:1,250.000

14. This map covers all of S VIETNAM in one sheet. It shows topographical detail, road classifications and categorized population places by population. Reasonable quantities of this map sheet are held by Det 1 Topo Svy Tp.

Series 1206 Continental SE Asia 1:2,500,000

15. This map shows relief by colour tinting, railroads, principal roads, all weather and seasonal airfields. Populated places are categorized by population. Reasonable quantities of this map are held by Det 1 Topo Svy Tp.

(signed) J.S. Rowe Maj for
(O.D. Jackson)
Brig
Commander 1 ATF

Distribution
List A
HQ ALSG (25 copies)
HQ AFV (5 copies)

ANNEX F

PROVISION OF CONTACT/MIPOFOLIE FOR 1 ATF

Letter to HQ AFV

ANNEX F

R7640-1-2

1ATF
NUI DAT

3 Aug 66

HQ AFV

PROVISION OF CONTACT/MIPOFOLIE FOR 1 ATF

(scanned and transcribed from original)

1. 1 ATF has an urgent requirement to protect all maps, enlargements and photographs used in the field, with some form of plastic protecting film.

2. Experience has shown that the life of any map carried by the infantryman or any other soldier required to support the infantryman is from 1 to 2 days. Under very wet conditions the life may be less than this before th map becomes soggy and illegible. Other forms of map intelligence suffer as badly or worse.

3. The desirable qualities of such a protecting film are:

a. It must continue to adhere to the map when the map is folded without lifting or cracking.

b. It must be easy to apply and the map must be immediately useable after application.

c. It must be in continuous contact over the whole face of the map, that is, without crinkles or bubbles.

d. It must not add noticeably to the bulk of the map.

e. It must exclude all moisture.

4. To date the only material found to satisfy these requirements is 'Contact' or 'Mipofolie'.

ESTIMATED QUANTITIES

5. Table A shows the air photo and map requirements of all 1 ATF units, taking part in a Battalion Group on TF Operation with calculated amounts of contact required. The quantities fall into three categories:

a. Immediate requirement to allow ll maps in current use covering the TAOR to be covered immediately.

b. A continuing requirement to meet the needs of a particular operation. New battalion size operations have been

occurring about one per week.

c. Future requirement to allow maps covering any operation outside the TAOR to be covered.

6. The following criteria have been applied to the calculations of quantity, for the reasons listed.

	CRITERION	REASON
a.	Pictomap must be covered on both sides	Experience has shown that maps covered on one side only are not adequately protected. Moisture enters through the back of the map and along the edges. Pictomaps are very limited in supply and it is necessary that 75% of the pictomaps issued must remain in use for 6 months. Re-supply of pictos cannot be guaranteed in greater quantity than 25% of normal holdings over a 6 month period.
b.	Standard 1:50,000 maps to be covered on one side only	The current series 1:50,000 will be superceded within 3 months
c.	Photoplots and map enlargrments printed on dyeline photographic paper to be covered both sides	Dyeline paper is very soft and absorbent and will last only 2 to 3 hours in the field in moist conditions. Moisture must be completely excluded to allow the map to last the duration of the operation.
d.	Air photographs to be covered on emulsion side	The emulsion on air photographs issued by the US in Vietnam have been found to discolour and fade with continued exposure to air and light after developing. Covering the emulsion side with 'Contact'has been found to completely arrest this process as well as increasing the durability of the print.

SUMMARY OF QUANTITIES

7. The following table summarises the quanties of Contact/Mipofolie to cover 1 ATF requirements for an initial period of 6 months based on a roll measuring 25m x 1.2m containing 302 square feet.

Quantity required to cover:

a.	Map enlargements and photoplots.	180 rolls
b.	Pictomaps in AO	438 rolls
c.	Air photographs and mosaics	24 rolls
d.	1:50,000 maps	98 rolls
	TOTAL	740 rolls

CONCLUSION

8. It is requested that immediate action be taken to supply 1 ATF with 300 rolls of Contact/Mipofolie to meet the immediate operational requirement with delivery effected by courier aircraft.

9. It is further requested that the remaining 440 rolls to make up the estimated 6 month requirement be delivered to the theatre within 3 months.

O.D. Jackson
Brig
Commander 1 ATF

Attached: (i) Table A

ANNEX G

ROUTINE ORDERS PART 1

17 AUG 66

ANNEX G

The information given in this document is not to be communicated, either directly or indirectly, to the Press or to any person not authorised to receive it.

(Scanned and transcribed from the original)

Serial 5
Numbers 16 - 20

AUSTRALIAN MILITARY FORCES
ROUTINE ORDERS PART 1
BY
CAPT R.F. SKITCH
COMMANDING DET 1 TOPO SVY TP
NUI DAT
17 AUG 66

16. POSTAL

1. The following is a copy of HQ AFV signal Q9409 dated 5 Aug 66.

2. The following is a brief explanation of the postal system now in operation.

a. Letter Mail.

(1) Letter mail to AUSTRALIA is dispatched daily from 1 ATF to AFP03 VUNG TAU and daily from AFPO3 to SAIGON (except Sundays as US postal authorities do not accept mail on Sundays) and daily from SAIGON to HONOLULU by PANAM aircraft (except Sat and Mon when no civil aircraft are available). At HONOLULU mail is transferred to a PANAM or QANTAS aircraft flying daily to SYDNEY.

(2) Letter mail from AUST is dispatched daily to HONOLULU by PANAM or QANTAS and then on-forwarded daily by PANAM to SAIGON. From Saigon military aircraft fly the mail to VUNG TAU (including Sundays) and it is received the same day at 1 ATF

(3) Recent mail delays have not been the result of the mail system within VIETNAM. Delays have been experienced in HONOLULU and in delivery by GPO SYDNEY. Both of these places have been informed of all delays and detailed investigation is still in progress.

(4) It is thought some delays in mail from AUST may be due to insufficient postage ie 4 cents instead of 5 cents stamp on letters and this could result in the mail being forwarded by RAAF courier.

b. Parcel Mail.

(1) All parcel mail from AUST is dispatched weekly by RAAF courier from RICHMOND NSW.The system of dispatching parcels from AUST by RAAF courier is a recent development and for some weeks delayed parcels can be expected as they will be arriving by US military aircraft via HONOLULU which was the old system of parcel delivery.

c. Telegrams.

(1) Telegrams from AUST are sent by the PMG to 6 Sig Regt WATSONIA who dispatch the telegram direct to SAIGON, VUNG TAU, or 1 ATF through army signal channels. The telegram is delivered to the AFPO in each area, placed in an envelope and delivered to the unit.

(2) For telegrams to AUST the system works in reverse.

(3) Some delays have occurred recently in this system. Again the delay is not in VIETNAM. AUST has been asked to investigate the system in operation with the PMG and 6 Sig Regt.

d. It is stressed that many mail delays are a direct result of in-complete or inaccurate addressing of mail, parcels and telegrams. Particular care should be taken to inform NOK, friends and relatives of the correct method of addressing mail.

17. MORTAR ATTACK

1. During a mortar attack, the following procedure is to apply in Det 1 Topo Svy Tp:

a. At the first indication of a mortar attack:

(1) All members are to take immediate shelter in their weapon pits and remain in the pit until instructed to stand down.

(2) All members will wear helmets and take with them personal weapons and 1st line ammunition.

(3) 0C will man the telephone.

b. On cessation of the mortar attack, the following action will take place.

(1) W01 R.H. Rollston will determine the state in the WO & Sgts lines and report to the OC in the work area for further instructions.

(2) W02 D. Christie will proceed to the Cpls and Sprs lines to determine the state of casualty and or damage and report back to the OC.

(3) All other members will continue to stand to in the shelters.

(4) OC will report the unit state to the camp commandant.

c. Notification of stand down will come from the camp commandant to the OC who will then send runners to the Sgts lines and Cpls and Sprs lines instructing either a percentage stand down or a full stand down. No member will stand down until notification is received in this manner from the 0C of Det 1 Topo Svy Tp.

2. In the event of casualties occurring in any of the accommodation areas the following actions will take place as soon as the situation as determined by the senior member present, permits.

a. A runner will be dispatched to notify:

(1) 2 Fd Amb of the extent and nature of the casualties.

(2) 0C of the extent and nature of the casualties.

b. The injured member will be taken by the most expedient means to the Field Ambulance Post. Two members in addition to any stretcher bearers necessary will accompany the injured member.

3. The senior member present must make the assessment on when to send the runner and when to evacuate the casualty. The runner should be sent as soon as the immediate danger has apparently passed, ie mortars are no longer falling in the immediate area. Depending on the severity of the wounds, the casualty may be evacuated:

a. Immediately.

b. When the situation permits the evacuation with reasonable safety.

c. When stand down is ordered.

d. When ordered to do so by either Fd Ambulance or an officer, warrant officer or senior NCO.

4. A stretcher improvised with poles and capes

half shelter will be held in each accommodation area and in the work area at all times.

18 PARADES

1. The following timings will be adhered to by DEt 1 Topo Svy Tp.

a.	Reveille	0630
b.	Administration Parade	0800
c.	Morning tea	1000-1015
d.	Lunch	1200 -
e.	Administration parade	1330
f.	Afternoon tea	1500-1515
g.	Stand down	1630

19. DISCIPLINE

1. No person(s) will leave the unit area without first notifying W01 R.H. Rollston or WO2 D. Christie or in their absence the senior member present.

20. Q PARADES

1. Personal issues from the Q Store are only to be made between 1600 hrs and 1630 hrs.

Capt
OC Det 1 Topo Svy Tp

Distribution
Notice Board
Q Store
1 Topo Svy Tp
Adm Officer
File
HQ Coy 1 ATF

ANNEX H

PROVISION OF AIR PHOTOS, MOSAICS, MAPS, ENLARGEMENTS AND USE OF CONTACT IN 1 ATF

ANNEX H

RESTRICTED
AUSTRALIAN MILITARY FORCES

VIETNAM

HQ 1 ATF
NUI DAT

10 Aug 66

R-1-1
See Distribution List

PROVISION OF AIR PHOTOS, MOSAICS, MAPS, ENLARGEMENTS AND USE OF CONTACT IN 1 ATF

(Scanned and transcribed from the original)

1. The aim of this instruction is to clarify Task Force policy on the provision of:

   a. Air photographs

   b. Photo mosaics

   c. Maps

   d. Enlargements and photo plots

   e. Contact/Mipofolie plastic protecting film.

2. Air photographs are obtained primarily for photo intelligence. However, a limited distribution is proposed for operational planning purposes and unit intelligence uses to supplement the existing mapping. The intended distribution for air photographs is shown in Annex A.

3. Air photographs will normally be at scale of 1:25,000. This may be varied to suit the photo-intelligence requirement, or the requirement of a particular unit. The number of prints obtained may also have to be varied to allow printing priorities to be maintained.

4. A request for air photographs should be submitted 10 days before the date on which delivery is required. The actual date of delivery is dependent upon the priority allocated to the task and cloud conditions prevailing during the flying period.

5. Priorities are subject to review by higher HQ. Those in use are:

a. 1-X (Immediate) Restricted to major Field Commanders only.

b. Priority 1 – To exploit major targets of opportunity.

c. Priority 2 - In support of operations beginning within 48 hours of the requested time over target.

d. Priority 3 - In support of operational planning and surveillance of activities capable of posing a future threat.

e. Priority 4 – In support of routine planning, terrain studies, map supplements, surveillance of units or activities capable of limited interference with missions, basic cover.

6. The Photo Intelligence Section of Det 1 Div Int Unit is responsible for collating photo requests and placing orders on the US supply source. Normally 6 complete sets of prints will be obtained in order to effect the required scale of issue. For SAS operations 3 sets will be ordered, usually at a scale larger than 1:5,000.

Photo Mosaics

7. A large distribution of photo mosaics cannot be effected in 1 ATF for any operation. The 1:25,000 pictomap is basically a photomap with an intensified image and marked up cultural detail. As a supplement to the standard 1:50,000 map series the pictomap is intended to satisfy all normal photomap requirements.

8. A limited distribution of photo mosaics prepared from intelligence photography is intended (Annex A). The scale of these photo mosaics will normally be 1:5,000 but may be varied to suit photo intelligence requirements or the needs of a particular operation.

Maps

9. The scaling of 1:25,000 pictomaps and standard 1:50,000 maps for all 1ATF units is shown on Annex A. Every effort wil be made to meet the stated scaling, however, 'in country' bulk stocks of pictomaps are limited and the distribution rate for these may have to be scaled down. It is therefore essential that pictomaps are used judiciously and wasteage kept to a minimum. Cutting of pictomaps should be done carefully and the offcuts retained. Units are urged to cover, whenever possible pictomaps back and front with 'Contact' or other similar plastic films.

Map Enlargements – Photoplots

10. Det 1 Topo Svy Tp has the capability to produce map enlargements and photoplots. A photoplot is a map plotted directly from air photographs, using scaled map points for position and scale. The scale at which photoplots will normally be produced is as follows:

a. Areas including a village or hamlet – 1:5,000.

b. Areas not including a village or hamlet – 1:10,000.

11. The distribution of map enlargements and photoplots will normall be the same as that for maps. This may be limited by the amount of dyeline paper available for reproduction.

Use of Contact/Mipofolie Plastic Films

12. Contact/Mipofolie should be used in the following instances:

a. To cover both sides of all pictomaps issued.

b. To cover the detail side of 1:50,000 maps subject to arduous use.

c. To cover both sides of dyeline copied map enlargements and photoplots.

13. Pictomaps are in short supply, and must therefore be made to last as long as possible. Covered on both sides it should be possible to get 6 months life out of each map sheet.

14. Conversely the supply of standard 1:50,000 maps is plentiful. Contact should therefore only be used on 1:50,000 maps when these are going to be subject to arduous use over a protracted period without the opportunity for resupply.

15. Dyeline paper is soft and absorbent. It is therefore very vulnerable to the ravages of normal useage. Whenever possible, dyeline copies should be covered with Contact/Mipofolie on both sides.

16. Distribution of Contact/Mipofolie to all 1 ATF units will be controlled and effected by Det 1 Topo Svy Tp. It is intended that when an adequate supply of material becomes available, sufficient quantities in roll form will be issued to units to cover their scaled holdings of pictomaps, in accordance with Annex A, to give complete coverage of the TAOR. Dyeline copies for a particular operation will be supplied with adequate Contact to cover both sides of each sheet.

(signed)J S Rowe Maj for
(O.D. Jackson)
Brig
Commander 1 ATF

Annexes: A. Air photos, Mosaics, Maps and Enlargements Distribution Table.

Distribution:

List B
List C
List D

RESTRICTED

ANNEX H-1

PROVISION OF AIR PHOTOS, MOSAICS, MAPS, ENLARGEMENTS AND USE OF CONTACT IN 1 ATF

DISTRIBUTION TABLE

ANNEX H-1

DISTRIBUTION TABLE

Annex A to HQ 1ATF R-1-1

UNIT	PHOTO PLOTS & MAP ENLARGEMENTS		STANDARD MAPS		AIR PHOTOGRAPHS	
	1:5,000	1:10,000	1:25,000 PICTO	1:50,000	MOSAICS	STEREO PAIRS
	TIME				FRAME	
	14 DAYS	14 DAYS	2 HRS	2 HRS	7 – 10 DAYS	7 – 10 DAYS
HQ 1ATF	10	10	20	20	1	1
1 APC SQN	50	50	50	50		
1 FD REGT	90	90	90	90		
1 FD SQN RAE	15	15	15	15		
DET 1 TOPO SVY TP						1
103 SIG SQN	25	25		25		
5 RAR	160	160	160	160	1	3
6 RAR	160	160	160	160	1	3
3 SQN SAS	90	90	90	90		1
DET 1 DIV INT UNIT	15	15	5	15		
1 TPT PL RAASC	2	2		30		
131 RECCE FLT				15		
1ATF PRO SEC	5	5	5	10		

ANNEX I

OPERATION_ORDER 2/66 – OPERATION TRISIDER

ANNEX I

Det 1 Topo Svy Tp
1ATF
NUI DAT

21 Nov 66

See Distribution List

OPERATION ORDER 2/66 OPERATION TRISIDER

(Scanned and transcribed from original)

1. SITUATION

a. En: No part of the area of survey operations should be considered as completely secure. En interference with the operation is not likely, however north of northing 1148000 the possibility of sniper fire should be realised.

b. Own Forces: Det 1 Topo Svy Tp Survey Party will comprise of elements of Det 1 Topo Svy Tp, Det 131 Div Loc Bty and A Bty 2/35 Artillery Bn. Details of personnel are included as Annex A

2. MISSION

a. Det 1 Topo Svy Tp Survey Party is to provide 3rd order position and azimuth at batteries located at the following grid references; YS382618 YS468778 YS255740 YS648692.

3. EXECUTION

a. General: Position will be based on the Indian Datum 1960 as defined by the new listed values of the 3rd order point CAP ST JACQUES GR YS287419. Thus all points established will be connected to third order station CAP ST JACQUES. An attempt will be made to connect to any existing major or minor order station within the area of Survey Operation as defined below:

b. Area of Operation will be bounded by the following grid lines:

Easting	720000	770000
Northing	1140000	1180000

c. Phases: - The operation will be carried out in the following phases:

(1) Phase 1 VUNG TAU Area.

(a) Effect connexion from Point No 16 (3rd order) YS299450 to CAP ST JACQUES.

(b) Establish 3rd order position on NUI LON Hill in vicinity of GR YS 262473 from triangle

Point No 16 - THANH MINOR - NUI LON.

(c) The following lines will be measured to 3rd order specifications:

(d) The following directions will be observed to 3rd order specifications:

at CAP ST JACQUES
NUI DAT (AAS 001)
Point No 16
at Point No 16
CAP ST JACQUES
NUI LON
at AZIMUTH MARK
CAP ST JACQUES
RADAR LIGHT
Point No 16
at NUI LON
Point No 16
THANH MINOR
BARIA BATTERY
at THANH MINOR
Point No 16
NUI LON

(e) In the vicinity of the ALSG Back Beach area establish 4th order points to provide basic control for an Engineer Cantonment Survey.

(2) Phase 2 BARIA Area

(a) Establish 3rd order control station in vicintity of ARVN Bty at BARIA (AAS 005).

(b) Measure the following lines to 3rd order specifications.

BARIA – NUI LON (AAS 004)

BARIA - NUI DAT (AAS 001)

(c) Observe the following directions

NUI LON

NUI DAT

(3) Phase 3 - BINH GIA Area.

(a) Establishing 3rd order station on knoll to south of BINH GIA (AAS 006).

(b) Measure the following lines:

BINH GIA - NUI LON
BINH GIA – DUC THANH (AAS 007)

(c) Observe the following directions:

BINH GIA - NUI LON
BINH GIA - DUC THANH

(d) Establish 4th order photo point at eastern end of BINH GIA village by chain and theodolite traverse.

(e) Connect line from DUC THANH to Arty Station PENN by chain and theodolite traverse measured along LTL2.

(f) Dependent upon result of connection to PENN, carry out further connection from BINH BA water tower to NUI LON,

(4) Phase 4 - PHU MY Area.

(a) Establish 3rd order station in vicinity of PHU MY Battery (AS007).

(b) Measure line PHU MY - NUI LON.

(c) Observe AM - PM sun azimuth on line PHU MY - NUI LON, or an abitrary azimuth line.

(5) Phase 5- XUYEN MOC Area.

(a) Carry out map and air reconnaissance to determine best possible means of establishing 3rd order station in vicinity of XUYEN MOC.

d. Vertical observations will be carried out on all lines.

e. Technical Specification. All survey tasks will be carried out in accordance with RA Svy practice as specified in Corps manuals unless otherwise directed by OC Det 1 Topo Svy Tp. Specifications relevant to Operation TRISIDER are listed in Annex B.

f. Barometer calibrations. Calibration of Aneroid Barometers will be carried out at VUNG TU Air Base during Phase 1.

g. Recording will be carried out in duplicate. Original copies will be returned to Det HQ at intervals of not greater than 1 week.

h. Station Marking. Stations established by Det 1 Topo Svy Tp Svy Party will be marked with a RA Svy bronze mark set in concrete. Three recovery marks consisting of cartridge cases set in concrete will be positioned and in addition to these a further reference mark consisting of a permanent existing feature (eg building) will be connected to wherever possible.

i. Protection will be organised as required by OC Det 1

Topo Svy Tp.

j. Timings. Survey Party will depart 1 ATF base area for VUNG TAU on 21 Nov 66. The following schedule of timings will be adhered to as far as possible.

Phase 1	21 Nov 66	-	30 Nov 66
Phase 2	2 Dec 66	-	4 Dec 66
Phase 3	5 Dec 66	-	10 Dec 66
Phase 4	11 Dec 66	-	14 Dec 66
Phase 5	15 Dec 66	-	20 Dec 66

4. ADM AND LOG

a. Transport: Svy party will take the following vehicles:

Truck ¾ ton GS 113 130 - 1 Topo Svy Tp

Trailer ½ ton - 1 Topo Svy Tp

Truck ¾ ton FFR 111 434 - Det 131 Div Loc

Truck ¾ ton US & Trailer - A Bty

b. Accommodation.

(1) Phase 1: - Svy Party will be rationed and quartered at 1 ALSG Transit Depot during phase 1 of Op TRISIDER.

(2) Phase 2: - BARIA Party will operate from 1 ATF Base Area.

(3) Phase 3: - BINH GIA party will be accommodated at DUC THANH Compound during phase 3. Rationing will be from 24 hour packs.

(4) Phase 4: - To be notified.

c. Weapons and Ammunition

(1) Except in the proclaimed 'no weapons area' of VUNG TAU, personal weapons will be carried at all times. States of readiness will be as follows:

(a) In secured areas outside of VUNG TAU city area - no mag on, full mag in pouch.

(b) In unsecured areas full mag on, working parts forward.

(2) Ammo as follows will be carried:

SLR - 120 rounds per man
OMC - 180 rounds per man

d. Stores and Equipment

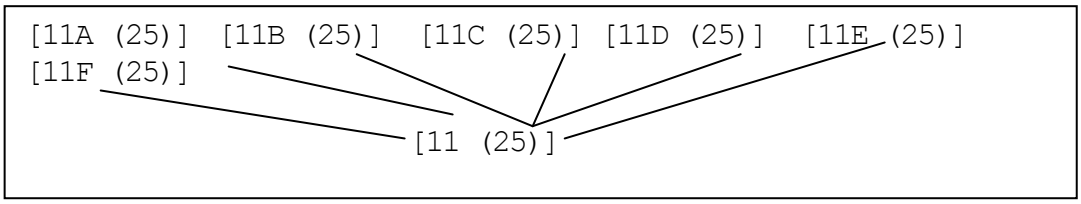
(1) All stores and equipment other than compasses prismatic and binoculars will be issued on AAF 1A. Compasses prismatic and binoculars will be issued on AAF F12 to members nominated by NCO I/C.

5. COMMAND AND SIGNALS

a. Sgt S.R. Campbell as NCO I/C of Det 1 Topo Svy Tp Survey Party as listed in Annex A. In the event of Sgt Campbell being withdrawn from the party for any reason, S/Sgt R.E. Glasgow will assume Comd, and thence in order of rank and seniority.

b. Communications: Survey Party will carry ANPRC 25 sets.

(1) Call signs



(2) Frequency 59.25

(3) Call words.

18 - 24 GOLF FOXTROT

24 - To be notified.-

(4) Nick names:

BASE AREA	HAPPY TOWN
CAP ST JACQUES	FOOT REST
LIGHT HOUSE	APPLE SAUCE
NUI LON	LONG ROPE
POINT NO 16	ROSE ROLL
AZIMUTH MK	DEAD DOG
THANH	JOLLY SPRING
BARIA	HOLLOW LOG
NUI DAT	WELCOME CITY
BINH GIA	CRAZY PLACE
PHU MI	NUT CAKE
XUYEN MOC	PEN GRIP

(5) Appointment Titles:

OC Det 1 Topo Svy Tp	STADIA MAJOR
NCO/IC Svy Party	STADIA
US Element	MICRO
Det 131 Div Loc Elm	ASTRO
Det 1 Topo Svy Tp Elm	GEOID

(6) Schedules: NCO/IC is responsible for maintaining internal schedules within the Survey Party. A rear link schedule will be held at 0730 hours daily.

Capt
OC Det 1 Topo Svy Tp

Annexes A. Det 1 Topo Svy Tp Survey Party Nominal Roll
B. Technical Specifications.

Distribution

HQ 1 ATF
Det 131 Div Loc Bty
1 Fd Regt
A Bty 2/35 Artillery Bn
8th Tgt Acq Bn, 25th Artillery 2 FFV Artillery
66 Eng Co(Topo)(Corps) - LONG BINH
File
1st Bn 83rd Artillery.

Annex A to Operation Order
2/66 OPERATION TRISIDER

DET 1 TOPO SVY TP SURVEY PARTY

NOMINAL ROLL

36616	Sgt	Campbell		Det	1	Topo	Svy	Tp
54467	Spr	Firns		Det	1	Topo	Svy	Tp
1731045	L/Bdr	Sellwood	(NS)	Det	131	Div	Loc	Bty
2781996	Gnr	Whittle	(NS)			do		
1200577	Gnr	Moreau				do		
2782434	Gnr	Lock	(NS)			do		
3787334	Gnr	Earwicker	(NS)			do		
2782129	Gnr	Killworth	(NS)			do		
RA27094307	S/Sgt	Glascow		A Bty		2/35		
US55834299	PFC	Bach			do			
US52622237	PFC	Renzo			do			

Annex B to Operation Order 2/66
OPERATION TRISIDER

TECHNICAL SPECIFICATIONS

1. TELLUROMETER MEASUREMENT.

a. The following procedure will constitute a 3rd order tellurometer determination between station A and Station B.

Mets - Both terminals

Course figure A to B
10 fine readings A to B
Course figures A to B
Mets – both terminals
10 fine readings B to A
Course figures B to A
Mets – both terminals

Fine readings to be spread over entire readable cavity range

2. THEODOLITE OBSERVATIONS

Horizontal observation: 4 arcs on following settings

00 00 30
270 05 45
180 10 15
90 15 00

Vertical observations - 4 face left and 4 face right pointings.

3. RECOVERY MARKS

a. Distances to be measured to 0.01 feet. Directions one round of angles on face left and face right.

ANNEX J

MAPS FOR OPERATIONAL HISTORY OF 1ST ATF IN VIETNAM

Letter to Directorate of Military Survey

ANNEX J

17-2-1(14)

Det 1 Topo Svy Tp
Aust Forces Vietnam
Aust FPO 4
c/o G.P.O. SYDNEY
7 Jan 67

Directorate of Military Survey

MAPS FOR OPERATIONAL HISTORY OF
1ST ATF IN VIETNAM

(Scanned and transcribed from original)

1. An operational history of the 1st ATF in Vietnam during 1966 has been prepared by HQ 1 ATF. The writing is tentatively called "NUI DAT – WITH THE FIRST AUSTRALIAN TASK FORCE IN VIETNAM – 1966" It is anticipated that the history will be published in the form of a book or army manual.

2. Det 1 Topo Svy Tp has prepared a series of 36 map drawings and 3 diagrams to support the written text. Six proof copies of the history have been prepared with dyeline copies of the maps and diagrams included. A detailed description of each map drawing is attached as Annex A.

3. Also enclosed is one dyelined set of the maps and diagrams. Forwarded by safe hand with Maj R.R. Hannigan is the complete set of reproducibles, consisting of original drawings, and, in some cases direct positive copies on cronaflex.

4. It is requested that two film positives be produced from each original drawing. In cases where a separate drawing showing a tactical situation overlaps a base map, eg SMITHFIELD maps, it is requested that a composite film positive be prepared, to include the base map and the overlay.

5. The final editing and preparation for publication is to be undertaken by Major R.R. Hannigan of E Comd Training Cell, formally GSO2 Operations on HQ 1st ATF. Major Hannigan would be able to answer any queries that might occur in relation to the task. It is requested that one set of film positives be supplied to Major Hannigan and the 2nd set forwarded to Det 1 Topo Svy Tp for record purposes.

6. Included with each proof copy of the operational history, and with the dyelined set of maps enclosed is a composite 1:50,000 map entitled "1ST ATF

AREA OF INTEREST – 1966". This map shows each "Area of Operation" of all the operations carried out by 1st ATF during 1966. Depending upon the nature of the publication in its final form, it in hoped to have a composite map overprinted with the detail shown on the proof copies included with each published copy of the history in the form of a map enclosure.

7. HQ 1 ATF has been made aware that problems, both in production and the possible infringement of mapping agreements might make the inclusion of the map enclosure impracticable. However, its inclusion would greatly enhance the value of the writing and it is recommended that the problem be looked at closely. Since the history could run into several thousand copies it would obviously be necessary to produce from the reproduction material held by RA Svy a special map sheet covering the area of interest. In doing this a reduction in the number of colours could perhaps be made to reduce the detail on the sheet to that which is essential to the history. Liaison with Major Hannigan would be needed both in this and also to determine the extent and nature of the marginal information.

R.F.Skitch Capt
OC Det 1 Topo Svy Tp

Annexes: A. Schedule of Maps and Diagrams

ANNEX J-1

Annex A to
MAPS FOR OPERATIONAL HISTORY OF
1ST ATF IN VIETNAM

ANNEX J-1

Annex A to SVY 117-2-1 (14)
of 7 Jan 67

MAPS FOR OPERATIONAL HISTORY OF
1ST ATF IN VIETNAM

(Transcribed from the original)

MAP NO	TITLE	DESCRIPTION
Frontispiece	1ST ATF BASE CAMP AND ENVIRONS	Single direct positive on cronaflex.
1	AREA OF OPERATION – OPERATION ENOGGERA	Single drawing on cronaflex
2	INTELLIGENCE – OPERATION ENOGGERA	Single drawing on cronaflex
3	INSTALLATIONS, CACHES AND EQUIPMENT – OPERATION ENOGGERA	Single drawing on cronaflex
4	AREA OF OPERATION – OPERATION SYDNEY 1	Single drawing on cronaflex
5	VC INSTALLATIONS OPERATION SYDNEY 1	Single drawing on cronaflex
6	EXTENDED AREA OF OPERATION – OPERATION SYDNEY 1	Single drawing on cronaflex
7	ASSEMBLY AREAS, ROUTES, CORDON AND HARBOUR POSITIONS – OPERATION SYDNEY 2	Single photo-positive on cronaflex
8	AREA OF SEARCH, AMBUSHES, ROUTES – OPERATION SYDNEY 2	Single photo-positive on cronaflex
9	AREA OF OPERATION – OPERATION HOBART 1	Single drawing on cronaflex
10	AREA OF OPERATION – OPERATION HOBART 2	Single drawing on cronaflex
11	AREA OF OPERATION – OPERATION HOLSWORTHY	Single drawing on cronaflex
12	ENEMY ARTILLERY ACTION NIGHT 16/17 AUG 66 – AREAS ENGAGED AND LOCATIONS	Single photo-positive on cronaflex
13	AREA OF OPERATION – OPERATION SMITHFIELD	Single drawing on cronaflex
14	OPERATION SMITHFIELD	Overlay on cronaflex marked map 14 over SMITHFIELD base map on cronaflex
15	OPERATION SMITHFIELD	Overlay on cronaflex marked map 15 over SMITHFIELD base map on cronaflex
16	OPERATION SMITHFIELD	Overlay on cronaflex marked map 16 over SMITHFIELD base map on cronaflex
17	OPERATION SMITHFIELD	Overlay on cronaflex marked map 17 over SMITHFIELD base map on cronaflex
18	OPERATION SMITHFIELD	Overlay on cronaflex marked map 18 over SMITHFIELD base map on cronaflex
19	OPERATION SMITHFIELD	Overlay on cronaflex marked

		map 19 over SMITHFIELD base map on cronaflex
20	OPERATION SMITHFIELD	Overlay on cronaflex marked map 20 over SMITHFIELD base map on cronaflex
21	AREA OF OPERATION – OPERATION TOLEDO 1	Single drawing on cronaflex
22	AREA OF OPERATION – OPERATION TOLEDO 2	Single drawing on cronaflex
23	AREA OF OPERATION – OPERATION VAUCLUSE	Single drawing on cronaflex
24	SAS INTELLIGENCE – OPERATION VAUCLUSE	Overlay on cronaflex marked MAP 24 over VAUCLUSE base map on cronaflex
25	VC CONTACTS AND INSTALLATIONS – OPERATION VAUCLUSE	Overlay on cronaflex marked MAP 25 over VAUCLUSE base map on cronaflex
26	AREA OF OPERATION – OPERATION CROWS NEST	Single photo positive on cronaflex
27	AREA OF OPERATION – OPERATION CANBERRA	Overlay on cronaflex over photo positive base map - CANBERRA
28	AREA OF OPERATION – OPERATION ROBIN	Photo positive overlay over photo positive base map as for CANBERRA
29	AREA OF OPERATION – OPERATION QUEANBEYAN	Photo positive overlay over photo positive base map as for CANBERRA
30	AREA OF OPERATION – OPERATION BUNDABERG	Overlay on cronaflex marked MAP 30 over Bundaberg Base Map on cronaflex
31	3SAS SQN AREA OF OPERATION (OPERATION HAYMAN PHASES 1 – 3)	Overlay on cronaflex showing zones 11 – 15 over HAYMAN base map showing zones 1 - 4
32	5RAR AREA OF OPERATION – OPERATION HAYMAN PHASE 1	Photo positive overlay over photo positive base map showing PHUOC HOA VILLAGE
33	5 RAR AREA OF OPERATION – HAYMAN PHASES 2 & 3	Overlay on cronaflex over base map on cronaflex showing LONG SON ISLAND
34	INTELLIGENCE OPERATION INGHAM	Cronaflex overlay marked MAP 34 over INGHAM base map on cronaflex
35	AREA OF OPERATION – OPERATION INGHAM	Direct positive overlay over INGHAM base map on cronaflex
36	VC INSTALLATIONS – OPERATION INGHAM	Overlay on cronaflex over INGHAM base map on cronaflex
APPENDIX D	MINOR TUNNEL SYSTEMS – OPERATION ENOGGERA	Single direct positive on cronaflex
APPENDIX E	XA LONG PHUOC TUNNEL COMPLEX LOCATION PLAN – OPERATION ENOGGERA	Single drawing on cronaflex
APPENDIX F	APPARENT VC ORGANISATION – BINH BA	Single drawing on tracing paper
MAP ENCLOSURE	1ST ATF AREA OF INTEREST 1966	Composite 1:50,000 sheets 6429-I, IV. 6430-I, II, III, IV.

ANNEX K

OP INSTR 1/67 - OP TRISIDER - PHASE 5

ANNEX K

RESTRICTED

Det 1 Topo Svy Tp
1ATF
NUI DAT

Apr 67

See Distribution List

OP INSTR 1/67 - OP TRISIDER - PHASE 5

(Scanned and transcribed from original)

1. SIT

a. En: Contact is unlikely in the area of operation. En presence may be felt in the form of:

(1) Sniper fire.

(2) Booby traps or land mines.

b. Own Forces: Det 1 Topo Svy Tp Survey Party will comprise of the following personnel:

210821	W02 D.	Christie
37696	Cpl D.C.	Duquemin
18457	Spr D.E.J.	Chambers
37657	Spr J.W.	Campbell

The party will be augmented by elm of Det 131 Div Loc Bty on day 2.

2. MSN

a. Det 1 Topo Svy Tp Survey Party will establish a 3rd order survey station on the highest point of the feature NUI DAT(3) GR YS646701 and connect to the ARVN Battery GR YS655685.

3. EXEC

a. General Outline: NUI DAT(3) here after called MOC will be connected by tellurometer distance and horizontal angle observation to:

(1) HORSESHOE HILL - AAS 013 GR YS 491621.

(2) XUYEN MOC (USAMSFE 59) GR YS 667677.

b. Tasks:

(1) At NUI DAT AAS 001:

(a) Erect temporary beacon as RO.

(b) Maintain helio aligned on HORSESHOE HILL if nec as required.

(2) At HORSESHOE HILL (AAS 013).

(a) Observe included angle at AAS 013 between AAS 001 and MOC.

(b) Measure 3rd order tellurometer distance AAS 013 - MOC.

(c) Observe vertical angles to MOC.

(3) At MOC (AAS 014)

(a) Observe the following horizontal directions:

i. HORSESHOE HILL AAS 013.

ii. XUYEN MOC (USAMSFE 59).

iii. Arbitrary Azimuth Mark in XUYEN MOC Village area.

iv. ARVN Bty Pos.

(b) Measure 4th order tellurometer distance to the following sta:

i. HORSESHOE HILL AAS 013.

ii. XUYEN MOC (USAMSFE 59).

(c) Measure 4th order tellurometer distance to fol sta:

i. ARVN Bty Pos.

(d) Measure vertical angles to:

i. HORSESHOE HILL.

ii. XUYEN MOC (USAMSFE 59).

iii. ARVN Bty Pos.

(e) Observe AM & PM sun observation on either of the following lines:

AAS 014 MOC – ARBITARY AZ MK
AAS 014 MOC - XUYEN MOC (USAMSFE 59)

(f) Establish surface mark, subsurface mark and three recovery marks.

(4) At XUYEN MOC (USAMSFE 59):

(a) Measure tellurometer distance to MOC AAS 014.

(b) Measure vertical angle to MOC AAS 014.

(c) Observe AM & PM sun observations as alternative to (3)(e) above.

(5) At ARVN Bty Pos:

(a) Measure 4th order tellurometer to MOC AAS 014.

(b) Measure vertical angle to MOC AAS 014.

(c) Establish ground marks and 3 recovery marks.

c. Technical Specifications: All observations and measurements carried out will be in accordance with RA SVY practice as specified in Corps Manuals. Annex 1 outlines specifications applicable to TRISIDER PHASE 5.

d. Recording will be carried out on RA SVY recording forms. Care must be taken to ensure that all detail, eg instr height is properly recorded.

e. Protection: Will be provided by 6 RAR.

f. Station Clearing: Assistance is to be provided for the clearing of MOC AAS 014 by 1 Fd Sqn RAE in the form of a bulldozer. Clearing priorities will be:

(1) Cleared lane to HORSESHOE HILL AAS 013 (MAG BRG 245 degrees).

(2) Cleared lane to XUYEN MOC - ARVN BTY (MAG BRG 135 – 155 degrees).

(3) Remaining clearing to North, West and South.

(4) Clearing to East.

g. Timings: Svy Party will depart KANGAROO PAD at 081100 by UH1B or UH1D for 6 RAR area GR YS 655671. Two lifts will be provided if necessary. The following schedule of timings will apply:

DAY 1 - 8 Apr 67

1100 Dep KANGAROO
1120 Arr 6 RAR
1300-1700 estb accommodation and recce XUYEN MOC USAMSFE 59 and ARVN Bty Pos.

DAY 2 - 9 Apr 67

Clearing of MOC AAS 014 and ground marking.

DAY 3 - 10 Apr 67

Carry out connexion to HORSESHOE HILL AAS 013 and commence connexion to XUYEN MOC USAMSFE ARVN Bty Pos.

DAY 4 - 11 Apr 67

Complete all tasks, and RTU 1 ATF Base Area.

4. ADMIN AND LOG

a. Rations: Survey party will take 2 days hard rations. Further rations can be taken fwd on DAY 3 if required.

b. Transport: Mov between 1ATF Base Area and XUYEN MOC to be by helicopter. Ground movement at XUYEN MOC to be by vehicle GS or track as provided by 6 RAR.

c. Accommodation: Members to carry Lt wt camping equipment; stretchers can be taken.

d. Wpns and Ammo:

(1) In the XUYEN MOC AREA the fol state of readiness will apply: Mag on - working parts forward.

(2) First line ammo will be carried.

e. Stores and Eqpt: All stores and eqpt other than compasses and binoculars will be issued on AAF 1A. Compasses and binoculars will be a personal issue to members nominated by WO I/C.

5. COMD & SIG

a. 210821 W02 D. Christie is in charge of Det 1 Topo Svy Tp Survey Party. 37696 Cpl D.C. Duquemin is second in charge.

b. Communications: Survey party to XUYEN MOC will carry two ANPRC 25 sets.

(1) Callsigns.

XUYEN MOC	81
XUYEN MOC SUBSTATION	81 ALPHA
HORSESHOE	81 BRAVO
NUI DAT (1)	81 CHARLIE
ARTY	81 DELTA

(2) Frequency 59.25

(3) Callword: GOLF ROMEO

(4) Q Hour 0800 daily

(5) POINT OF ORIGIN – 6366 CAR 6568 ANIMAL

(6) NICKNAMES

MOC AAS 014	PENGRIP
HORSESHOE	CIDER WINE
1 ATF BASE AREA	BRIGHT DAY
6 RAR LOC	HAPPY SITE
NUI DAT AAS OO1	WELCOME CITY
XUYEN MOC (USAMSFE)	DOGS TAIL

(7) Appointment titles

OC Det 1 Topo Svy Tp	TOPO SUNRAY
WO I/C	TOPO SUNRAY MINOR

(8) Schedules:

(a) WO I/C is responsible for maintaining internal schedules within survey party.

(b) Tellurometer call up time 0900 - cav 7 master at MOC AAS 014.

(c) SITREP - daily at 1850H on COMD NET.

R.F. Skitch (signed) Capt

OC Det 1 Topo Svy Tp

Annexes: 1. Technical Specifications.

Distribution

HQ 1 ATF
Det 131 Div Loc Bty
6 RAR
1 Fd Sqn
File

Annex 1 to Op Instr 1/67
OP TRISIDER PHASE 5

TECHNICAL SPECIFICATIONS

(Scanned and transcribed from original)

1. TELUROMETER MEASUREMENT

a. The following procedure will constitute a 3rd order tellurometer determination between station A & station B.

Mets - both terminals
Course figure - A to B
10 fine readings A to B
Course figure A to B
Mets – both terminals
10 fine readings B to A
Course figure B to A
Mets – both terminals

Fine readings to be spread over entire readable cavity range.

2. THEODOLITE OBSERVATIONS

a. Horizontal observations -

(1) Major traverse stations of unclosed figure - 8 Arcs. Half the number of arcs will be observed with the backsight as RO and the remaining half with the foresight as RO. The summation of the two angles observed must fall on either side of 360° within 8".O of arc.

b. Minor stations.

(1) Major lines - 4 face left and 4 face right pointings.
(2) Minor lines – 2 face left and 2 face right pointings.

ANNEX L

REPORT ON PRELIMINARY FIELD TESTING OF AIRBORNE SURVEY SYSTEM (ARTY CONCEPT) AT NUI DAT - SOUTH VIETNAM

ANNEX L

R723:1:3

A Sec 1 Topo Svy Tp
NUI DAT

May 67

HQ AFV SAIGON (3)

REPORT ON PRELIMINARY FIELD TESTING OF AIRBORNE SURVEY SYSTEM (ARTY CONCEPT) AT NUI DAT - SOUTH VIETNAM

(Scanned and transcribed from the original)

Refs A. DRA 542-I of I6 Feb 67.
B. Paper submitted by Lt Col D. Tier.

General

1. On receipt of reference A in February 1967 it was decided to carry out a field test of the principle expounded in reference B. The testing was intended to:-

a. Develop a field procedure which could be used in this and other observations of this nature.

b. Determine whether the inherent weaknesses of height measurement by altimetry would negate the resolution of such measurement into the horizontal plane.

c. Determine what modifications might be needed to develop the principle of simultaneous co-ordinated observations to an air station into a practical reality.

2. The testing carried out was limited in extent although sufficient to give some indication of the problems involved and the likely solutions. Observations were carried out on two separate days, the results of the first day being completely abortive and those of the second being sufficient to provide sensible computations.

Procedure

3. The procedure adopted is outlined in Annex A, and this was found to be very suitable and the only modifications necessary were:

a. After day one it became obvious that the helicopter would have to hover as steady as possible with no forward

movement.

b. The number of observations at each air station was reduced from 5 to 3 face left and face right pointings.

Modifications

4. In addition to the principle of fixing the unknown station from a single known station with observations to two air-stations, one on either side of the line between the known and the unknown station, a second known station was introduced into the observations of the first, air-station. This permitted the air-station position to be horizontally triangulated, requiring the altimetric vertical interval principle to be used only in carrying the position from the air-station to the unknown station.

Computations

5. All computations were carried out in plane trigonometrical figures. Separate computations were carried out for face left and face right readings and these meaned. Computations are attached as Annex B.*(omitted)*

Results

6. Co-ordinates of the assumed unknown station obtained, viz, the air-station fixed in the first instance by horizontal triangulation from the two known stations and in the second instance by vertical triangulation from the single known station, are shown in comparison with the known values of the assumed unknown station.

Results of Airborne System of Survey

7.	CO-ORDS	BEARING
Correct value	(E 749 052 (N 1162 131	100° 42′ 07″
Computed from 2 known stations and one air-station	(E 748 944 (N 1162 229	
Computed from one known station and two air-stations	(E 749 206 (N 1162 395	98° 31′ 43″

Analysis of Results

8. The large miscloses on the unknown station are due to:

a. To a greater extent, the imprecision of the principles of altimetry.

b. To a lesser extent the difficulties of intersecting the rotor mast of the helicopter from two or three directions simultaneously, over comparatively short distances.

c. The difficulty in holding the helicopter steady in both the horizontal and the vertical plane at the instant of intersection, without a point of reference on the ground. This aggravated the situation in (b.) above.

Altimetry Discussion

9. It is the opinion of the writer that the principle of altimetry does not offer sufficient precision to allow vertical intervals so measured to be resolved into a horizontal plane. The altimeters used were of WALLACE and TIERNAN (manufacturer) graduated to ten metres. It is possible to interpolate fairly precisely to two metres. The following factors, however, prevent vertical (interval) being measured to this degree of accuracy.

a. The vertical interval between the ground station and the air station is necessarily in the order of 300 - 500 metres, at the horizontal distance of 5000-6000 metres. The barometric datum plane is not likely to be truly horizontal over this range of altitude or distance.

b. Internal pressures within the helicopter make precise measurement of altitude by altimetry difficult. An attempt to calibrate the air station barometer against the ground station barometer was made, with the helicopter hovering with maximum power. This was not necessarily representative of the internal pressures at an altitude of 700 metres.

c. The combined effect of vapour pressure and an air temperature produces an altitude correction of 5% of the vertical interval. It was only possible to measure this with any degree of precision at the ground station, due to the internal influences of the helicopter.

d. Altimeters are affected by a condition known as 'lag' i.e., the altimeter requires time to ‘settle’ after movement, while the internal stresses in the mechanical components ‘take up’. This is especially true when large changes of altitude are effected. The error introduced by 'lag' could conceivably be 10 metres in the vertical interval of 700 metres.

e. The general assumptions applied to altimetry are acceptable only when the vertical interval is kept to a minimum. Generally, for accuracy to be within 5 metres, the maximum vertical interval should be no more than 100 metres.

Even if this interval was possible, error in resolution to horizontal distance would be magnified 50 times, so requiring a precision of better than one metre.

f. At an altitude of 700 metres, errors are magnified 8 times in resolving to the horizontal. To obtain an accuracy of 50 metres in horizontal position, an accuracy of +/-7 metres would be required in measuring the vertical interval. This is not likely to be achieved by altimetry under these conditions, regardless of the mechanical accuracy of the instruments.

Conclusion

10. Although the field testing carried out could not be considered to be exhaustive, when supported by the known facts of altimetry outlined above, it would indicate that sufficient precision to provide a horizontal fixation to an accuracy of +/-20 (metres) is unlikely to be attained. This would require a vertical interval to be measured to better than 2 ½ metres. Even under optimum conditions this accuracy would be difficult to achieve.

Recommendations

It is considered that further testing of the principle developed in reference B is not warranted.

RF Skitch (signed)
Capt· OC
A Sec 1 Topo Svy Tp

AIRBORNE SURVEY CONTROL SYSTEM
PROCEDURE

General

1. Simultaneous hor and vert observations are carried out from two known survey control stations to a hovering or slow moving helicopter (Air Station).

2. The vertical interval between the Air Station and all three ground stations (known and unknown) is measured at the instant of observation by altimetry.

3. At the known stations, the horizontal angle to the air station is read from a known azimuth line and at the unknown station, the horizontal angle to the air station is read from an unknown azimuth line.

4. Vertical observations from the known and unknown ground stations are carried out simultaneously with the horizontal observations to the air station.

5. Co-ordination is carried out by radio with control from the air station.

Procedure

6. All ground station personnel will be positioned and fully ready for observations 15 minutes before the helicopter moves to air station (1). RO lines will be proven during the setting up procedure.

7. Barometers/altimeters and psychrometers will be positioned in the shade.

8. A comparative altimeter reading between the air station altimeter and the unknown ground station altimeter will be carried out before the commencement of the 1st air station observations and after the completion of the 2nd air station observations. This will be effected by having the helicopter hover horizontal with the instrument position approx 100 metres out from the instrument position. The instrument observer will indicate whether the helicopter needs to rise or fall by:

   a. Extending left arm for fall.

   b. Extending right arm for rise.

   c. Extending both arms for 0K.

Altimeters will be read on the command READ given by the ground station.

9. Barometers/Altimeters on the ground stations will be read before and after each set of observations. Altimeter at the air station will be read on each observation. Barometers/Altimeters will be calibrated together at base before and after the task.

10. A set of observations will consist 5 face left and 5 face right observations with the horizontal being closed at the completion of each ½ set. Commands and responses will be as follows:

COMMAND	RESPONSE

a. To determine when station preparation is complete enroute to air station.

81. To all stations-	81A - READY OK OUT
STATION REPORT SIGNALS -	81B - READY OK OUT
OVER.	81C - READY OK OUT

COMMAND	RESPONSE

b. To determine whether helicopter can be sighted.

81. To all stations -	81A ROGER OUT
CAN YOU SEE ME OVER	81B ROGER OUT
	81C NEGATIVE OUT

c. Air station will then proceed towards 81C until 81C reports 'I CAN SEE YOU – OVER'. Other stations keep aligned during this process. Air station will then move back to 1st position.

81. To all stations-	81A ROGER OUT
CAN YOU SEE ME OVER	81B ROGER OUT
	81C ROGER OUT
81. To all stations -	All stations record hor and vert
RECORD HOR AND VERT	angle for recovery.

d. To commence observations. All stations align on RO.

81. To all stations -	81A READY OUT
PREPARE FOR OBSERVATIONS	81B READY OUT
OVER	81C READY OUT

e. 81. To all stations - READ BAROMETERS OVER
81A BAROMERER OUT
81B BAROMETER OUT
81C BAROMETER OUT

f. 81. To all Stations - FACE LEFT ON AIR STATION PREPARE TO READ
81A READY OUT
81B READY OUT
81C READY OUT

g. 81. To all stations – READING NO 1 – 'ONE TWO-THREE-FOUR-MARK' All stations read and record hor and vert readings. Remember to check alidade bubble. Air station will read altimeter and record. On completion of readings all stations will report.
81A OUT
81B OUT
81C OUT
If any one station finds that a mistake or an accident has occurred he will report: 81A ABORT OVER

h. 81. To all stations - ABORT READING NO 1 READING NO 1 ALPHA 'ONE-TWO-THREE-FOUR-MARK'
81A OUT
81B OUT
81C OUT

i. 81. To all stations - READING NO 2 etc etc to reading No 5
etc etc

j. 81. To all stations - READING NO 5 'ONE-TWO THREE-FOUR-MARK'
81A OUT
81B OUT
81C OUT

k. 81. To all stations - CLOSE HORIZONS AND REPORT All stations continue swing through 360^0 and re-read RO and report miscloses in seconds of arc

81 A 5 SECONDS OUT
81 B 2 SECONDS OUT
81 C 10 SECONDS OUT

l. If miscloses in excess of 20 seconds occur, set will be aborted and re-observed as follows:

To all stations - ABORT FIRST HALF SET - FACE LEFT ON AIR STATION PREPARE TO READ – OVER
81A READY OUT
81B READY OUT
81C READY OUT

m. Observation of 1st set will then continue. If misclose on 1st

set is satisfactory:

81.	To all stations -	81A OUT
	PLUNGE ON RO	81B OUT
		81C OUT

n. 2nd ½ set will continue in same manner.

81.	To all stations-	81A BAROMETER OUT
	READ BAROMETER OVER	81B BAROMETER OUT
		81C BAROMETER OUT

o.

81.	To all stations-	
	FACE RIGHT ON AIR	81A READY OUT
	STATION – PREPARE TO	81B READY OUT
	READ – OVER	81C READY OUT

p. Procedure will then continue as before. At completion of 2nd set, after miscloses have been verified and barometers read helicopter will proceed to 2nd air station and all observers will keep telescopes on the helicopter during movement. 2nd air station will proceed in same manner as first.

q. 81. To all stations -
PROCEEDING TO SECOND AIR STATION OUT

r. Should any ground station lose the helicopter in the movement the 2nd air station, this station should report immediately:

81B I CANNOT SEE YOU – OUT

s. At completion of 2nd air station comparative altimeter reading between air station and ground station 81C will be carried out as before. At completion of this:

81.	To all stations -	81A ROGER OUT
	END OF OBSERVATIONS	81B ROGER OUT
	RETURN TO BASE OUT	81C ROGER OUT

ANNEX M

DETACHMENT (A SECTION)
1ST TOPOGRAPHICAL SURVEY TROOP

STANDING OPERATING PROCEDURE (PROV)

ANNEX M

DETACHMENT (A SECTION)
1ST TOPOGRAPHICAL SURVEY TROOP

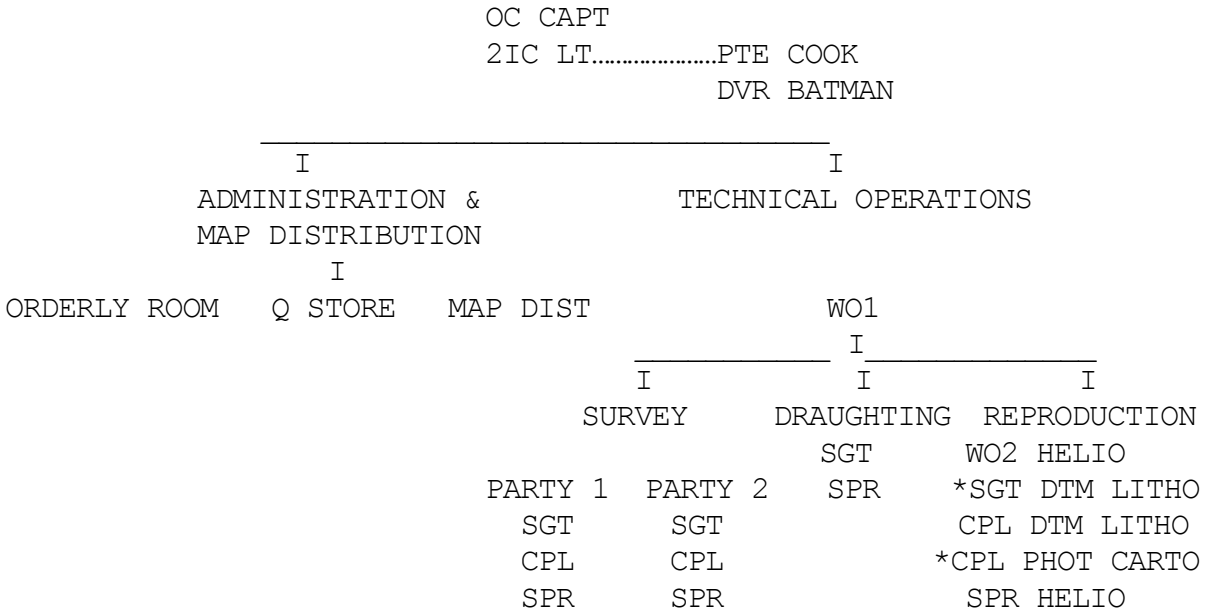
STANDING OPERATING PROCEDURE (PROV)
(Scanned and transcribed from original)

PART 1
ORGANISATION, ROLE & STAFF CONTROL

Internal Organisation

1. The following organisation is suggested as being workable and should normally be followed. It is based upon the proposed establishment amendment dated 5 Dec 66 from D Mil Svy to DSD.

STRENGTH
OFFICERS 2
ORS 19



*Restriction that would apply where total strength is held at 17 all ranks in accordance with TWE 11/14/1 (TW)

Role

2. To provide survey and limited mapping facilities to the Task Force.

Characteristics

3. Det (A Sect) of 1 Topo Svy Tp can undertake field surveys, produce large scale maps, overprint existing maps and distribute

maps.

Tasks

4. The following tasks are to be carried out:

a. Establish and extend survey control in the operational area as a basis for the theatre grid and the co-ordination of fire control.

b. Compile large scale maps to supplement existing maps.

c. Produce map enlargements and sketch maps.

d. Print limited numbers of maps and carry out overprints to existing maps.

c. Hold limited numbers of maps and distribute these to Task Force units.

e. The Officer Commanding the Det (Sect) advises the Task Force Commander and staff on all survey and mapping matters.

Duties

5. The duties of the Det (Sect) personnel are as follows:

a. Officer Commanding.

(1) To exercise full administrative, technical and productive control of the Det (Sect).

(2) To advise the Commander 1 ATF on all survey and mapping matters.

b. Second in Command.

(1) To assist the OC in carrying out his duties with particular reference to the administrative functions of the Det.

(2) To deputise for the OC in any period in which the OC is absent.

(3) To be responsible for the security of information and documentation.

c. W01 Surveyor Topographical.

(1) To assist in the planning of all technical tasks of a surveying, photogrammetric and draughting nature

with the OC or 2IC.

(2) To supervise the detailed planning of tasks with the NCOs and I/C of the survey and draughting elements the unit.

(3) To carry out limited administrative and regimental duties as Troop Sergeant Major.

NOTE. The WO1 Surveyor Topographical would carry out normal technical duties of a survey compilation nature in addition to the specific tasks outlined above.

d. WO2 Helioworker (Silk Screen)

(1) To be directly responsible to the OC for the operation and production control of the Silk Screen Printing equipment and Dyeline equipment.

(2) The control and maintenance of adequate reserves of all expendable stores required in silk screen printing. This will necessarily include the timely notification of depleting stock levels.

e. Sgts Surveyor Topographical.

(1) To plan and supervise the detailed operations of the survey parties in field survey operations.

(2) To carry out map compilation duties as directed by the WO1 Surveyor Topographical.

f. Sgt Draughtsman (Litho).

(1) To supervise and carryout re-touching of silk screen stencils and photo negatives.

g. Sgt Draughtsman (Carto).

(1) To supervise and carry out tasks of a purely drawing nature allocated to the draughting element by the WO1 Surveyor Topographical.

h. Cpl Surveyor (Topo).

(1) To assist the Sgt Svyr Topo in the detailed planning and supervision of field survey operations

(2) To carry out map compilation duties as directed by the WO1 Surveyor Topographical.

i. Sprs Surveyor Topographical.

(1) To carry out field survey, map compilation and photo inspection duties as directed by the WO1 Surveyor Topographical.

j. Cpl Photographer (Carto).

(1) To operate the camera and photographic equipment of the unit on tasks as directed by the WO1 Surveyor Topographical.

k. Cpl Draughtsman (Litho).

(1) To carry out re-touching of silk screen stencils and photo negatives as directed.

(2) To assist in general and topographic draughting as directed.

l. Sprs Surveyor Topo.

(1) To carry out field survey, map compilation and photo inspection duties as directed by the WO1 Surveyor Topographical.

m. Sprs Draughtsman Topo.

(1) To carry out draughting duties as directed by the Sgt Draughtsman.

n. Spr Helioworker.

(1) To assist in the operation of the silk screen printing equipment.

o. S/Sgt CQMS.

(1) The overall supervision of all Q functions in the unit, including:

(a) Receipt and issue of all stores and equipment.

(b) Receipt and issue of maps.

(c) Maintenance of map stock records.

p. Cpl Clerk (GD).

(1) To carry out all 'A' functions of the unit including the following:

(a) The compilation and submission of all periodic returns.

(b) The maintenance of the unit correspondence filing system.

p. Cpl/Spr Storeman Tech.

(1) To carry out Q duties as directed by the CQMS in relation to:

(a) The receipt and issue of stores and equipment.

(b) The maintenance of a neat and tidy Q Store.

(c) Receipt and issue of maps.

(d) The maintenance of an orderly and efficient map store.

(e) Collection and processing of unit laundry.

q. Spr Driver-Batman.

(1) To carry out driving duties as required.

(2) To carry out batman duties as required.

(3) To be responsible to the CQMS for the fuelling and maintenance of vehicles and the maintenance of vehicle records.

r. Pte Cook.

(1) To carry out cooking duties as directed.

Allocation within the Task Force

6. Det (A Sect) of 1 Topo Svy Tp is allocated to a Task Force. It is a sub-unit of HQ 1ATF and is under command of HQ 1ATF. Det (A Sect)1 Topo Svy Tp bears a relationship to HQ Coy 1ATF similar to that between and independent unit and an area command. Det (A Sect) 1 Topo Svy Tp retains responsibility for the following aspects of its administration:

a. Discipline. OC Det (A Sect)1 Topo Svy Tp is appointed by Comd 1ATF to exercise the power of a Commanding Officer in accordance with AMR 238 (8) in relation to all NCO's and private soldiers of Det (A Sect)1 Topo Svy Tp and can impose the punishments set

out as follows:

(1) In the case of an offence committed by a non-commissioned officer:

(a) Reprimand, or

(b) Admonition.

(2) In the case of an offence committed by a private soldier, one or more of the following sentences:

(a) A fine not exceeding $10.

(b) Confinement to barracks not exceeding seven days.

(c) Extra guards or picquets.

(d) Admonition.

b. Personal administration – Det (A Sect)1 Topo Svy Tp carries out all aspects of administration applied to its own members; in particular, that pertaining to:

(1) Promotion.

(2) Raising of PORs and Confidential Reports.

(3) Administration of Paludrin.

(4) Maintenance of Company Roll Book and routine administrative parades.

(5) Submissions or returns both periodic and occasional.

The following aspects of administration are specifically tied to HQ Coy HQ 1 ATF:

(6) Pay is drawn from a sub-sub imprest on HQ Coy.

(7) Orders and instructions from HQ 1ATF may be promulgated by HQ Coy to Det (A Sect) 1 Topo Svy Tp.

(8) All inwards correspondence from both HQ 1ATF registry and SDS is routed via HQ Coy.

(9) Personal mail inwards and outwards passes via the HQ Coy Postal Orderly.

(10) Amenities - allocation is via HQ Coy.

(11) R&R / R&C - allocation from HQ Coy.

(12) Weekly parade states are submitted to HQ Coy.

b. Det (A Sect) 1 Topo Svy Tp receives an ASCO rebate and operates a Unit Trust Account for handling this and other funds.

c. Defence - OC HQ Coy, HQ 1 ATF is responsible for the coordination of defence within the HQ 1 ATF area. Det (A Sect) 1 Topo Svy Tp is included in the overall defence plan.

d. Q Management and Administration.

(1) General – Det (A Sect) 1 Topo Svy Tp maintains its own Q Account. The account number allocated is 2593.

(2) The Det(A Sect) Q Account is used to:

(a) Maintain unit equipment.

(b) Obtain on block scales such stores as are required to maintain a unit base camp.

(c) Obtain all such expense stores as are necessary for the technical function of the unit.

(3) Clothing and ordinary expense stores are obtained from the HQ Coy HQ 1ATF store.

(4) Rationing – Det (A Sect) 1 Topo Svy Tp is rationed by HQ Coy and for this purpose a daily ration strength return is submitted before 0900. The Private cook on Det (A Sect)1 Topo Svy Tp strength will normally be employed on cooking duties in the HQ Coy kitchen.

(5) Accommodation – Det (A Sect) 1 Topo Svy Tp occupies an area of ground within the limits of HQ 1 ATF. In this sense, HQ Coy is the 'property holder' and exercises control over the external improvements of the area.

PART II

TECHNICAL PROCEDURES

Staff Direction

1. Det (A Sect) 1 Topo Svy Tp comes under GS02 Int (Int 1) for routine staff direction. The responsibilities of GSO2 Int to Det (A Sect) 1 Topo Svy Tp are:

a. Vetting of all requests for survey assistance from units.

b. Allocation of work priorities on operational tasks.

c. Representation on behalf of Det (A Sect) 1 Topo Svy Tp at Staff level on Task Force Headquarters.

d. Provision of sufficient advance information on forthcoming operations to allow the general planning and commencement of operational overprints, photoplots and large scale maps for the support of the operation.

e. To initiate the provision of infantry protection as required for field survey in insecure or disputed areas.

Control Surveys

2. The responsibility of Det (A Sect) 1 Topo Svy Tp in the provision of control survey is:

a. To provide 3rd order control points within and around the 1st ATF TAOR of sufficient density to allow simple connexions to be made from these points to the battery centres of fire support bases established in direct support of operations.

b. To assist the Task Force Artillery surveyors in extending this control to the near vicinity of the battery centres, where such assistance is requested, in the form of equipment or technical advice.

c. To provide photo control points for large scale mapping or map revision as determined by OC Det(A Sect) 1 Topo Svy Tp.

3. The following considerations apply:

a. For ease of establishment and ease of subsequent re-occupation, the basic 3rd order control points should be in either secure areas or areas easily secured.

b. Where possible each new basic control point should be fixed from two previously determined points by a combination of tellurometer and angle observations so that three additional quantities are measured independently on each triangle so formed.

c. All observations and measurements are to be carried out to normal RA Svy 3rd order specifications. These are summarized in Annex A to this instruction *(not included).*

d. Chain and theodolite traverses will conform to the RA Svy 3rd order specifications as stated in the RA Svy Manual of 3rd Order Traverse. Chain and theodolite traverses will be closed where possible either onto the start point or onto another station independently established. Where this is not possible, a Sun Azimuth will be observed on the closing line and all distances will be chained and check-chained independently.

e. When observing traverse angles whether on chain and theodolite traverses or tellurometer traverses, half the number of arcs will be observed using the backsight as RO and the remaining half with the foresight as RO. The summation of the two angles observed must fall on either side of 360 degrees within the allowable range of the set.

Cantonment Surveys

4. Det (A Sect)1 Topo Svy Tp carries responsibility for maintaining an up to date detailed Cantonment Survey of the 1 ATF Base Area or any sub base area. With the concurrence of HQ 1 ATF, Det (A Sect) 1 Topo Svy Tp will maintain a similar detailed survey plan of the 1 ALSG area at VUNG TAU, and this will be kept current when operational mapping tasks permit. The following considerations apply:

a. The scale should be sufficiently large to permit the p1otting of permanent buildings to scale and true to shape. A convenient scale has been found to be 1:2,000 or 1:2,500.

a. b. The contour interval should show the general shape of the ground sufficiently well to permit the planning of main scheme drainage. A contour interval of 2 metres has been found to be satisfactory in the Task Force Base Area.

b. c. Contours should be accurate to within one half a contour interval.

5. The essential ingredients of a Cantonment Survey are:

a. A general frame work of 4th order control stations at intervals of about 2000 metres throughout the area. At least 3 such stations should be established.

b. A closed 3rd order traverse, permanently marked, within the outer perimeter, and surrounding the inner perimeter, to carry both horizontal and vertical position.

c. Tacheometric traverses semi-permanently marked subdividing the 3rd order traverse into areas of about 500 metres square, starting and finishing on 3rd order traverse stations. Further tacheometric loop traverses should be extended from the 3rd order traverse to include the outer perimeter. These should carry both horizontal and vertical position.

d. Detail, both horizontal and vertical filled in from combined plane table and tacheometric survey, using the former to carry azimuth and maintain a continuous plot, and the latter for distance.

e. The availability of vertical air photography at a suitable scale to permit a photogrammetric solution will allow a reduction in the requirement for tacheometric control traverses and detailed field survey. A photo scale of 1:5,000 has been found adequate for the reproduction of a 1:2,500 plot.

6. A useful by-product of the cantonment survey is a further plot at 1:5000 published as a standard map showing all permanent buildings, road plan and physical detail. This can then become the base map for the overprinting of tactical areas and defences or any other information of a tactical or engineering nature.

Application of Photogrammetry

7. Photogrammetry is employed by Det(A Sect)1 Topo Svy Tp to:

a. Produce large scale maps of village areas or other areas of specific interest, to supplement the existing map.

b. Revise and up-date existing maps by:

(1) Increasing track information.

(2) Adding and where necessary eliminating buildings.

(3) Improving the drainage pattern and adding detail to the existing streams and rivers.

(4) Improving vegetation boundaries and classification.

c. Provide detail in the compilation of cantonment survey plans.

d. Extend artillery control by the block adjustment of consecutive runs of homogeneous photography and reading out the additional easily identifiable points for future battery positions or calibration points. This is a concept yet to be developed.

8. Det (A Sect) 1 Topo Svy Tp carries the following equipments for photogrammetric work:

a. Stereotopes Qty 2

b. Old Delft Scanning Stereoscopes Qty 2

c. Walch Sketchmaster Qty 1

Also Casella pocket stereoscopes and Universal Stereoscopes.

9. Limitations - The application of photogrammetry within the Det (A Sect) is limited by the following considerations:

a. Current equipment does not permit block adjustment of any form and only graphical strip adjustments.

b. Available photography is generally not flown to mapping specifications and may be entirely unsuitable for mapping purposes.

c. Tactical considerations usually prevent the establishment of ground control. In such cases control has to be scaled from the L7014 1:50,000 Series.

10. Large scale maps of village areas fall into the following categories:

a. Map enlargements extensively edited from direct photo inspection and proportional scaling from oblique photography.

b. Photo plots from split vertical (oblique) photography, plotted stereoscopically on the Stereotope, accepting the distortions inherent in the tilted photography. Maximum adjustment on the Stereotope rectiputers will minimise tilts up to 13 degrees obliquity. Approximate scale is obtained by comparison with the standard map and the Stereotope pantograph is adjusted to an even decimal scale.

c. Strip adjustment of consecutive runs of vertical air photography, using scaled points from the standard 1:50000

map as ground control. Plotting may be graphical or stereoscopic on the Stereotope. Detail may be field checked.

d. Strip adjustment of consecutive runs of vertical air photography using photo identified ground control. Plotting may be graphical or stereoscopic on the Stereotope. Detail may be field checked.

11. Plotting should normally be carried out stereoscopically on the Stereotope even when only planimetric detail is sought.

12. Map Revision - Additional track and building detail can be obtained from the various types of intelligence photography and transferred by direct inspection to the Pictomap (Photomap) series, In this way, any type of intelligence photography regardless of scale, format or tilt characteristics can be used. This detail can then be further transferred from the Picto Series to the 1:25,000 Enlargement Series correcting where possible for variations between Picto positions and standard map position. Overprint traces may be prepared for the 1:25,000 enlargement series. All photo inspection should be carried out stereoscopically using either Casella pocket stereoscopes or the Old Delft scanning stereoscope.

Reproduction

13. Det (A Sect) 1 Topo Svy Tp has the following reproduction facilities:

(1) Dyeline direct positive printing.

(2) Silk Screen Printing.

(3) Camera reproduction (reserved)

a. Reproduction facilities offered by Det (A Sect) 1 Topo Svy Tp is limited to the reproduction of maps, map overprints, map overlays and other drawings of a map like character. Expense stores associated with all forms of reproduction are scaled to meet the stated mapping and survey role of the Det (A Sect). The application of the reproductive capability to tasks of a GD nature not associated with maps and survey is a misuse of this capability.

14. 'Dyeline' direct positive printing produces a positive image on either an opaque or translucent light sensitive paper from a positive transparency.

15 The limitations of dyeline reproduction are:

a. The photo sensitive paper is dimensionally unstable and

may stretch 2½% of its overall dimensions.

b. Dyeline paper is not durable.

c. The dyeline process is strictly single colour - viz, a black lined image on a brown-white background.

d. For large numbers of copies (eg in excess of 50) the process is slow.

16. The dyeline process has the following advantages:

a. Simplicity of operation.

b. The sheet size is restricted in one direction only since the reproduction process is of a continuous nature on a roll of light sensitive paper.

c. The dyeline machine is available for immediate use without any special preparation.

17. Silk Screen printing is a stencil process where an image is produced on a sheet of paper or other material by applying ink to the stencil when in contact with the paper. An outline description of the process is given in Annex X *(not prepared at the time of this SOP)*.

18. Silk Screen Printing has the following limitations:

a. Requires highly trained and experienced tradesmen to obtain results.

b. Draughting for the production of silk screen stencils needs to be of good quality in opaque black drawing ink on a dimensionally stable drawing medium.

c. Upwards to 4 hours may be needed for stencil preparation before a single print is obtained. The process is therefore not economica1 in time when less than 20 copies are required.

19. The Silk Screen process has the following advantages:

a. Printing can be carried out in any colour desired.

b. Printing can be carried out in two or more colours, however, the time factor is a direct multiple of the number of colours used.

c. Printing can be carried out on any medium; paper, plastic, talc, tracing paper.

d. Once the stencil is made the printing rate is 150 impressions per hour. Therefore an optimum number of copies ranges from 100 to 400.

e. Overprinting of existing map series can be carried out.

20 - 21 Camera Reproduction - Reserved.

Draughting

22 Det (A Sect) 1 Topo Svy Tp has two topographical draughtsmen on establishment. In addition to those, two lithographic draughtsmen are provided for photographic re-touching and these may have some general draughting capability. The surveyors on establishment may also have some general draughting capability. This, however, is usually limited to the preparation of compilation work sheets, survey records and is not usually adequate for direct reproduction other than dyeline. In every cases the draughting capability of Det (A Sect) 1 Topo Svy Tp is limited to draughting associated with survey and mapping and is misused when applied on other tasks of a GD nature.

Registration

23. Registration is the most significant draughting problem and the following sub-paras are intended to provide an analysis of this problem.

a. Most draughting tasks carried out by the Det (A Sect) are required to register in detail against the detail of a standard map or some other map product. The registration may take the form of a direct overprint onto a standard map or an overlay keyed in to a standard map. Factors causing lack of registration are:-

(1) inaccurate draughting,

(2) expansion or contraction of the printing mediums,

(3) expansion or contraction of the draughting mediums.

b. Thus lack of registration may occur between the draughting process and the printing process due to:

(1) Movement of the draughting medium during or after draughting,

(2) Movement of the printing medium before printing or between successive colour overprints.

c. Overlays are usually reproduced as opaque dyeline

copies. Lack of registration in this case is usually caused by expansion of the dyeline paper after printing. It is impossible to prevent this from happening, however, its effect can be minimised by the construction of a standard grid on the original trace, so that errors in registration can be meaned out square by square, when transferring the overlay detail to the map in subsequent use.

d. Lack of registration in draughting applied to silkscreen printing can be minimized by constantly applying the following principles:

(1) Only dimensional stable draughting mediums should be used.

(2) The base map used for the production of an overprint drawing must be from the same stock as that to be used for the actual overprinting.

(3) Upon overlaying the base map with the draughting mediums, registration marks should be marked at approx 8" intervals (10,000 metre marks at 1:50,000), to cover the entire area of the overprint.

(4) Any line draughting required on the face of the base map should be carried out at this stage - after the marking of the registration marks. Then working between each set of four registration marks, the detail on the map traced onto the draughting medium.

ANNEX N

A SEA VOYAGE TO SOUTH VIETNAM
on the good ship *HMAS Sydney*

by Stan Campbell

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A SEA VOYAGE TO SOUTH VIETNAM
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A 'nice sea voyage' That was the proposal put to me by my Officer Commanding, Captain Bob Skitch, as we were preparing for the departure of our unit "Detachment 1 Topographical Survey Troop" for South Vietnam in early 1966.

We had recently finished our DP1 military training at Holsworthy and the prospect of Vietnam was very much on our minds. It wasn't until 8 March that the Prime Minister announced that the 1st Task Force of two battalions with supporting arms and services would be deployed to South Vietnam to replace the 1st Battalion Royal Australian Regiment. Our Troop was part of the Task Force – would we be going? It was some days later that Captain Skitch assembled all Troop members at Randwick and confirmed that Survey had a guernsey and read the names of the twelve members present who were to form the Detachment for Vietnam. It was a few days later that we were told that while the Detachment would be inserted by air, two members, a senior NCO and a Sapper, would be required to escort our vehicles and survey stores to Vietnam on the *HMAS Sydney*.

I wasn't sure whether this proposal of a sea voyage was subject to discussion or a polite order but in any case the idea appealed to me so I put my hand up. Sapper Brian Firns and I became the nominated escort personnel to escort two Landrovers with trailers all packed with an assortment of survey, drafting and basic reproduction equipment together with a small amount of consumable stores, on a voyage aboard *HMAS Sydney* to the South Vietnamese port of Vung Tau. But first we had to complete our three weeks battle efficiency training at the Jungle Warfare Centre at Canungra and that is another story. We returned to Randwick on 2 May to find preparation for our departure well under way.

The embarkation was relatively uneventful considering the apparent lack of trust between the Army and the Navy evident from time to time. Our Troop's preparation was fairly straightforward, all stores were securely packed, labeled with our unique colour code and loaded into the vehicles and trailers which were then driven to the wharf at Woolloomooloo and placed in the care of the army movement's staff. On the day of departure I said my farewells to my family at Randwick Barracks, as the situation down at the wharf would be somewhat chaotic and a bit traumatic for my wife and two small children. Brian and I were then driven to Woolloomooloo wharf where we boarded the *HMAS Sydney* and were placed in the hands of the ships army staff, processed through the administrative system and allocated our respective quarters. My living/sleeping area, called in navy terms a mess deck was a small bare room about l0 metres square which I was to share with 25 other senior NCOs. There were some lockers along one wall and several poles with hooks mounted at various heights going from floor to ceiling. Four bins were also fixed against the wall and contained rolled and tied objects which I later found out were hammocks. I was assigned a locker by a member of the crew and after depositing my few belongings went up to the flight deck to watch the procedure for the ship's departure. Several shore patrol vehicles were unloading reluctant and inebriated crew members who were escorted on board and impounded in the brig to await subsequent disciplinary action. Other fairly 'well oiled' but well behaved army personnel were shepherded up the gangway including some cheerful NZ gunners from the NZ Battery which formed part of our artillery regiment.

At last the lines were cast off and we slipped away from the wharf to the accompaniment

of cheers, whistles streamers and tears. We sailed down Sydney Harbour and through the Heads on our way to South Vietnam. As the land faded in the background we were summoned by loudspeakers to our mess decks for a briefing on the domestic arrangements for the voyage. By then our mess deck was filling up fast with sergeants from various corps mainly engineers, infantry and armoured who all seemed to know each other from past exercises. As there was one lone signals sergeant and I was the only survey sergeant we naturally gravitated together and compared job profiles. He was from a small "hush hush" signals unit and like myself was there to escort vehicles, trailers and equipment, assisted by a signaler who happened to be accommodated in the same mess deck as Brian Firns. Very early in the voyage it was established that the four of us played 500, so combating the tedium was not going to be a problem.

We gradually slipped into the shipboard routine which consisted of breakfast then a morning parade for all army personnel on the flight deck, where any administrative instructions were read out. Then sub-unit commanders and if required other key personnel in the sub-units were dismissed to attend to their own administration or equipment maintenance. This of course included Brian and I and the two RA Sigs so our first game of 500 for the day got away soon after. The other larger units were required to attend lectures (medical hygiene etc.) physical training and military skills revision which included live firing of weapons from the flight deck at targets thrown into the water. Our days then consisted of playing cards, reading, dodging work details and sleeping in the many nooks and crannies that can be found on a non-operative aircraft carrier. The highlight of the day was the afternoon beer issue where one large can of beer (opened) was given to each man. For the Senior NCOs one member of the mess deck would be rostered to collect the beer and bring the cans down to his thirsty colleagues to be drunk at leisure. The ORs and junior NCOs had to wait in a line while the duty NCO (usually a sergeant) would open a can and drink it to ascertain if it was cold enough. He would then open each can and distribute them individually to the troops, the theory being that they could not hoard the beer for a big splurge because it would go flat. It's the only time I have seen NCOs begging to be made duty NCO. Teetotalers naturally gained many friends during this time. The daily routine was interrupted from time to time for special events. When the ship reached the equator a canvas pool was set up for the crossing of the line ceremony where the first timers crossing the equator were initiated with red food dye and shaving cream by King Neptune. Several concerts were held featuring the ships band and a talent quest was conducted which drew out talent of various degrees of competence from the passengers. Movies were screened on deck and bingo, or tombola as the navy call it, was featured most nights in the eating area.

The days seemed to pass reasonably quickly although at the back of our minds was always the thought of where we were going and what we were likely to encounter, especially when the ship conducted an "action stations drill" of which there were several. These reminded us that this was not a leisure cruise. Finally after twelve days at sea we reached our destination. As we sailed into Vung Tau harbour the scene was of incredible activity. Numerous large ships were anchored all around the area where we moored, mainly merchant vessels and the water was teeming with small craft, barges, tugs, landing craft, ships tenders etc. Overhead, helicopters of various sizes were ferrying cargo in slings from ship to shore, an air strike was going on in the distance and the rumble of artillery and the sharp bark of small arms completed the impression of organised chaos. We packed our personal equipment and dressed in full battle gear but with empty magazines, proceeded to the flight deck where we were assigned to groups for disembarkation in small landing craft. The craft had fairly high sides and we were told to keep our heads down, so we couldn't see what we heading into. We were very apprehensive when the craft approached the shore and we felt the scrape of the keel on the sand. The ramp on the bow dropped and I am sure most of us expected to be greeted by a volley of withering gun-fire from the enemy. Instead we were faced by a row of small stalls with smiling locals offering to sell us coca -cola, Salem

cigarettes and fresh peeled pineapples. There were representatives waiting from the various units that were disembarking and I was pleased to see two of our survey troop WO2 Snow Rollston and WO2 Dave Christie who had flown in a few days earlier with the rest of the troop. After a few kind words of greeting we were told that our vehicles and stores would be off loaded later so they drove us to the back beach area of Vung Tau where our troop had set up camp in the sand dunes .And so began my 12 months tour of South Vietnam, a lot of which I have forgotten but some that will remain with me forever…….*Stan Campbell*