



4th Field Survey Squadron

Operation NERVOSE 94

Operation Report

A field completion operation
conducted in the
Bathurst Island, Melville Island, Coburg Peninsula
and Alligator River regions of the
Northern Territory

July- August 1994



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CONTENTS

	<u>Page (s)</u>	<u>Para (s)</u>
COVER SHEET	i	
DISTRIBUTION LIST	ii	
CONTENTS	iii-iv	
ANNEXES	v	
EXECUTIVE SUMMARY	vi	
INTRODUCTION	1	1
MISSION	1-2	2-3
AREA OF OPERATIONS	2	4
CONDUCT OF OPERATIONS	2-	5-16
General Outline	2	5
Sequence of Events	2	6
Reconnaissance	2-3	7-8
Issue of Orders and Instructions	3	9
Phase 1 - Deployment to the AO	3	10-12
Phase 2 - Commencement of Field Checking and Other Tasks	3	13-15
Phase 3 - Extraction	3	16
OPERATION RESULTS	4	17-22
Field Completion	4	17
Hand-held GPS	4	18
Aerial Photography	4	19
VAP Photography	4	20
PIGs	4	21
Infrastructure Reports	4	22

ADMINISTRATION AND LOGISTICS	4-9	23-52
Operation Manning	4	23
AAAvn Support	5	24-25
LCM-8 Support	5	26
Vehicle Support	5	27-28
Land Clearances	5-6	29-32
POL	6	33-35
Accommodation	6	36-38
Messing	7	39
Medical	7	40
Morale and Discipline	7	41
Allowances	7	42
Finance	7-8	43-44
Banking	8	45
Mail	8	46
Remote Locality Leave	8	47
Rest	8	48
Visits	8	49
Contact Information	8	50
Public Relations	9	51-52
COMMAND AND SIGNAL	9	53-56
Command	9	53
Communications	9	54-56
CONCLUSION	9-10	57-61
RECOMMENDATIONS	10-11	62

ANNEXES

A. Op NERVOSE 94-Area of Operations

B. Sequence of Events

C. Technical Report

Appendix:

1. 1:50 000 Scale Map Sheets Field Completed on Op NERVOSE 94

D. Field Completion Report

E. Aerial Photography Report

Appendices:

1. Supplementary Photography Overlay - SC 52- 15 BATHURST ISLAND

2. Supplementary Photography Overlay - SC 52- 16 MELVILLE

3. Supplementary Photography Overlay - SC 53- 01 ALLIGATOR RIVER

4. Supplementary Photography Overlay - SC 53- 13 COBURG PENINSULA

5. Supplementary Photography Overlay - SC 53- 02 MILINGIMBI

6. Supplementary Photography Overlay - SC 53- 03 BAUHINIA DOWNS

7. Supplementary Photography Overlay - MT BUNDY TRAINING AREA

F. Operation Manning

G. AAAn Report - 161 Recce Sqn

H. AAAn Report - 173 Survl Sqn

I. Water Craft Report - 1 BASB

J. RAEME (VM) Technical Report

Appendix:

1. Specific Repairs

K. Resource Usage Report

L. Communications Report

EXECUTIVE SUMMARY

1. Op NERVOSE 94 was a field completion survey operation conducted by 4 Fd Svy Sqn in the North-Eastern region of the Northern Territory during the period 4 July to 8 Aug 93. 4 Fd Svy Sqn's mission was to field complete 66 x 1:50 000 scale line maps in the AO. Secondary tasks included the production of Photographic Interpretation Guides (PIGs), the acquisition of Vital Asset Protection (VAP) photography, the trial of GPS equipment, road and vegetation classification in the Borroloola region, and the compilation of infrastructure reports.
2. Deployment to, and extraction from, the AO was by road. Operations were conducted from a base camp at Jabiru, with detachments at Roper Bar, Bathurst Island, Melville Island, and Black Point. AAAvn elements and LCM-8s were deployed in direct support of 4 Fd Svy Sqn during on Operation.
3. The Operation successfully completed checking the 66 maps and additional tasks; four days ahead of schedule.

OPERATION REPORT

OPERATION NERVOSE 94

- References:
- A. HQ ADF MPO 86-26470, Tasking Directive 1/93 Survey Operations FY 93/94, dated 21 Apr 93
 - B. LHQ SIC IAE/Z2Y SVY0301 K93-00992, Op Order 37/94-Op NERVOSE 94, of 072330ZJUN94
 - C. LHQ K93-00992 SVY-0301, Op NERVOSE 94 Mounting Instruction, dated 8 Jun 94
 - D. DSVY-A A92-29003 DSVY-A00330/94, Op NERVOSE 94 -Technical Directive to OC 4 Fd Svy Sqn, dated 20 May 94
 - E. Our 851-94-2, Reconnaissance Report- Operation NERVOSE 94, dated 14 Apr 94
 - F. DTRIALS 328/94, Defence Trial No 8/617 Precision Lightweight GPS Receiver Trial Directive, dated 23 May 94

INTRODUCTION

1. Op NERVOSE 94 was a field completion survey operation conducted by 4 Fd Svy Sqn in the north-eastern region of the Northern Territory during the period 4 July to the 8 Aug 94. The Operation was mounted in accordance with References A and B.

MISSION

2. 4 Fd Svy Sqn's mission was to field complete 66 x 1:50 000 scale maps within the north-eastern region of the Northern Territory in accordance with References B, C and D.
3. In addition to the main task of field completion the following tasks, in order of priority, were undertaken:
 - a. road and vegetation classification of two 1:250 000 areas in the Borroloola region for subsequent use in JOG production,
 - b. upgrade and/or produce photo interpretation guides (PIGs),
 - c. acquire vital asset protection (VAP) photography for 1 Topo Svy Sqn,
 - d. the trial of GPS equipment, and

- e. the compilation of infrastructure reports for the townships of:
 - (1) Maningrida,
 - (2) Ngukurr, and
 - (3) Borroloola.

AREA OF OPERATIONS

4. The AO, which is illustrated at Annex A, was covered by the following 1:250 000 map areas:
 - a. SC 52-15 Bathurst Island,
 - b. SC 52-16 Melville Island,
 - c. SC 53-13 Cobourg Peninsula,
 - d. SC 53-01 Alligator River,
 - e. SD 53-14 Hodgson Downs, and
 - f. SD 53-03 Bauhinia Downs.

CONDUCT OF OPERATIONS

General Outline

5. To achieve the mission the Operation was planned and conducted in three phases as follows:
 - a. Phase 1 - Deployment to the AO,
 - b. Phase 2 - Commence field checking and other tasks.
 - c. Phase 3 - Extraction from the AO.

Sequence of Events

6. A detailed sequence of events for the Operation is given at Annex B. Significant events are detailed in the following paragraphs.

Reconnaissance

7. Reconnaissance was conducted from 21 Mar 94 to 25 Mar 94, with the Reconnaissance Report completed by 14 Apr 94 (Reference E). The Reconnaissance identified changes to the Concept of Ops that would result in a saving of time and resources. A new

Concept of Operations was drafted in accordance with recommendations given in the Reconnaissance Report.

8. The reconnaissance party produced a video of significant points in the AO. The video was able to accurately portray the township of Jabiru, the NORFORCE depot, and the vast areas to be field checked. The video provided a valuable tool for planning and mounting the Operation.

Issue of Orders and Instructions

9. The Operation Order (Reference B) and the Mounting Instruction (Reference C) were issued on 7 and 8 Jun 94 respectively.

Phase 1 - Deployment to The AO

10. Routine. A daily routine was established for the convoy to the AO. The convoy was able to travel approximately 650 to 700 km per day. An admin vehicle moved forward of the convoy to establish the night camp, prepare meals and purchase necessary provisions.

11. Darwin. Liaison visits were made to Darwin based units that were supporting the Operation. This allowed last minute details to be finalised and the progress of outstanding issues to be examined. The visits later proved to be useful in providing solutions to problems. They also allowed the OC Det, ADMINO and OPSWO to be briefed on the area and relevant issues. The OPSWO was able to access relevant source data and documentation that would assist in fulfilling the Operation's mission.

12. Establishment of the Base Camp. NORFORCE provided LT Bush to assist with the establishment of the Operation base camp. Liaison visits were made to local businesses to implement administrative arrangements. Various government departments and establishments were also approached notifying them, in person, of the Operation.

Phase 2 - Commencement of Field Checking and Other Tasks

13. Field Checking. Field checking commenced on 11 Jul 94 and was conducted as outlined in the Technical Report at Annex C. Field Parties deployed independently from base for periods of up to three days after which it was necessary to return and carry out map corrections and resupply.

14. Road and Vegetation Classification. Road and vegetation classification carried out in the Borroloola region commenced on 9 Jul 94, details of which are given at Annex C.

15. Infrastructure Reports. Parties were deployed to produce infrastructure reports at convenient times throughout the Op.

Phase 3 - Extraction

16. A NORFORCE representative visited the Jabiru compound to assist with the handing back of the base camp. Base camp was packed up on 2 Aug 94. All elements departed by road on 3 Aug 94 and arrived in Adelaide on 8 Aug 94.

OPERATION RESULTS

17. Field Completion. Technical details pertaining to the conduct of field checking are contained in Annex C. The main technical issues that arose were:

- a. The age and limited amount of source data was of concern.
- b. Some areas of drainage and vegetation were incorrectly classified.
- c. Cultural features which did not exist were digitised onto map sheets from old source data.
- d. Coloured enlargements proved to be extremely useful.

The field completion task was successfully completed. A comprehensive field completion report is at Annex D.

18. Hand-held GPS. Hand-held GPS were used to assist with field completion. The trial of a new GPS receiver, the Precision Lightweight GPS Receiver (PLGR), was also conducted during the initial weeks of the Operation in accordance with Reference F. The PLGR was required to be sent to the next trialing unit during the later part of the Operation. A separate report has been written commenting on the performance of the PLGR.

19. Aerial Photography. The Nomad was based at RAAF Base Darwin for the duration of the Operation. A report is included at Annex E. Some problems were unfortunately experienced with facilities and personnel at the Base. This was disappointing as a great deal of effort had been expended on ensuring that operations at RAAF Base Darwin would run smoothly and would not be of any hindrance to RAAF operations.

20. VAP Photography. The tasking for the VAP Photography was provided by 1 Topo Svy Sqn, and all tasking was completed as directed. The opportunity was also taken to acquire mapping photography of the Mount Bundy Training Area.

21. PIGs. PIGs were produced in accordance with current technical instructions. A video was produced to highlight plotting inaccuracies caused by incorrect interpretation and the assignment of incorrect SYMBAS definitions. The video was taken from an LOH and proved to be a good medium for providing additional information about the problems. The video will be distributed in the near future.

22. Infrastructure Reports. Infrastructure reports will be finalised as expediently as possible.

ADMINISTRATION AND LOGISTICS

Operation Manning

23. Personnel who participated in Op NERVOSE 94 are listed at Annex F. All supporting units are thanked for releasing their members.

AAAvn Support

24. The following AAAvn support was provided by 1 Avn Regt:
- a. Kiowa LOH. Responsibility for the provision of LOH support for the Operation was B Tp 161 Recce Sqn. 161 Recce Sqn operated in the AO from 14 Jul 94 to 2 Aug 94 with three LOH; their report is included as Annex G. The exchange of tp comds provided no inconvenience to the conduct of the Operation. A total of 150 task hours were flown on the Operation.
 - b. Nomad. Nomad support was provided by 173 Survl Sqn. The Nomad was based in Darwin which provided some communication difficulties, however, all photography was completed. Details are provided in the 173 Survl Sqn report at Annex H. A total of 45 task hours were flown on the Operation.
25. The professionalism of all AAAvn members and their willingness to help was appreciated.

LCM-8 Support

26. LCM-8 support was provided by 1 BASB in a competent and professional manner. A watercraft report is included at Annex I.

Vehicle Support

27. Vehicles used on the Operation were:
- a. 3 x Unimogs,
 - b. 8 x Land Rover FFR survey,
 - c. 1 x Land Rover 6x6, and
 - d. 1 x Land Rover GMV.
28. All vehicles performed well on the Operation. The inclusion of a FRT on the Operation manning ensures that repairs are carried out quickly and immediately. This gives the Det OC great flexibility in the use of vehicles and allows the progress of the Operation to proceed at an optimum pace. A report by the VM, including specific repairs, is given at Annex J.

Land Clearances

29. NORCOM was tasked by LHQ to obtain land clearances for the Operation. A guide was prepared by 4 Fd Svy Sqn to assist NORCOM in the approaches to the various authorities and land holders.
30. Private Property. Clearance to enter all private property had not been received upon arrival of the main body in Darwin. NORCOM informed the Det OC of the details of outstanding clearances allowing Det members to liaise directly with lease holders and land owners. Many of the applications for land clearance go to companies which own or lease the land. However this information is not always passed on by the companies to the managers of the

property. Consequently, on occasions, even though land clearances were given, managers were unaware of impending survey operations on their property.

31. Aboriginal Land. At the commencement of the Operation, the land clearances for Arnhem land had not been completed due to a dispute over the felling of trees at an Aboriginal scared site. A solution to the problem was achieved by the OC Det personally visiting the Northern Land Council (NLC) Office in Jabiru. Initially clearances were given for Operation vehicles to travel through Arnhem land, thus allowing the field check of Cobourg Peninsula. The clearances were put on a temporary hold under instructions from NORCOM due to the sensitivity of negotiations due to the scared sites. The land clearances for the field checking of Arnhem land took an additional week as a number of individuals needed to be contacted for their permission. To assist with this process, liaison visits were conducted by the ADMINO. The visits allowed the full explanation of what the land clearances were required for. Once the details of field checking were explained to the traditional land owners permission was forthcoming.

32. National Parks and Wildlife. There were no problems experienced in obtaining land clearances from National Parks and Wildlife. All restrictions imposed by National Parks and Wildlife were followed.

POL

33. Pre-Positioned Drummed Fuel. Pre-positioning of drummed fuel was carried out by ASU-D in accordance with Reference B. There were no significant problems with the pre-positioning of the fuel except for the drums placed at Murganella. These drums were placed at the beach instead of the airport.

34. Use of Drum Fuel. There were no significant problems with the use of drummed fuel except at Borrooloola. The positioning of drums at Borrooloola created confusion as the operator at Borrooloola placed the drums in his bulk fuel supply. Fuel was then taken from the bulk supply to refuel the LOH.

35. Fuel Drum Recovery. The recovery of drums was deemed uneconomical by ASU-D and LHQ. Consequently fuel drums were issued to civilian authorities at each drop point, with their approval, as directed by LHQ. Letters of Indemnity were signed by the civilian receivers, removing the Army's responsibility for the drums. The release forms are held by 4 Fd Svy Sqn.

Accommodation

36. Deployment/Extraction. Accommodation while driving to and from the AO was in caravan parks under personal shelters.

37. Jabiru. In the Jabiru AO the NORFORCE depot accommodation comprised:

- a. fully fenced large compound,
- b. toilets and shower block,
- c. large area for the tech work, and
- d. large undercover area for the kitchen and sleeping.

38. Those members that where on TA organised their own accommodation at Bathurst Island, Melville Island and the Borroloola region.

Messing

39. All food was purchased locally using Survey Party Ration Allowance (SPRA). Purchases were made from local business and wholesalers without problems. The amount of money dedicated to SPRA was sufficient. A small sum was returned due to the early end of the Operation.

Medical

40. Medical facilities were provided by the Jabiru Medical Centre. Bills where sent to the Director of Medical Services, DC-A. All medical cases were of a routine/minor nature.

Morale and Discipline

41. Morale throughout the Operation remained high with no discipline problems.

Allowances

42. The following allowances where paid to Operational members:

- a. Travelling Allowance (TA). TA was paid as follows:
 - (1) Full TA was paid in advance to all AAAvn elements for insertion and extraction.
 - (2) The meals and incidental element of TA were paid in advance to all members who deployed to Bathurst Island, Melville Island, Croker Island, Hodgson Downs and Bauhinia Downs.
- b. District Allowance. District allowance was paid in retrospect at the appropriate rates, depending on member categorisation.
- c. Field Allowance. Field allowance was paid in retrospect whilst members were not in receipt of TA.
- d. Separation Allowance. After a 14 day qualifying period, separation allowance was paid in retrospect to Cat M members, whilst not in receipt of TA.
- e. Flight Duties Allowance. Flight duties allowance was paid in retrospect to RASvy air camera operators.

Finance

43. Expenditure was as follows:

- a. Allowances- \$17 622.53.
- b. CLAE- \$10 843.25.
- c. DUF- \$1 054.80.

- d. Hire- \$1 051.00.
- e. Liquid fuels- \$15 466.33.

44. The total direct cost of Op NERVOSE 94 was \$46 037.91. The FAPES Resource Usage Report for the Operation is enclosed as Annex K.

Banking

45. Banking facilities in the AO were as follows:
- a. Jabiru Westpac bank and flexiteller.
 - b. Commonwealth bank agency.
 - c. EFTPOS at the Mobil service station.

Mail

46. Mail was picked up from the Jabiru Post Office daily. Before leaving the locality, instructions were left with the Post Office to forward mail.

Remote Locality Leave

47. All participants accrued remote locality leave at a rate of 7/12 days per completed month in the AO.

Rest

48. Members accrued rest days at a rate of one day for each weekend spent in the AO with a maximum of five days. These rest days were taken upon RTU.

Visits

49. The following personnel visited the Operation:
- a. COL D.G. Swiney MBE (Rtd); Col Comdt RASvy - 31 Jul to 1 Aug 94.
 - b. LTCOL D.H.O. Burns; CO, Army Survey Regt - 31 Jul to 1 Aug 94.
 - c. MAJ J.R. Rudd; SO1 Svy, LHQ - 29 Jul to 30 Jul 94.
 - d. MAJ P.C. Demaine; OC, 4 Fd Svy Sqn - 25 Jul to 29 Jul 94.
 - e. CAPT Sutimin; Malaysian Exchange Officer, Army Svy Regt- 4 Jul to 18 Jul 94.

Contact Information

50. Contacts made in the AO were as per Reference E.

Public Relations

51. Articles on the Operation were published in the Northern Territory News and the Jabiru community newspaper the "Jabiru Rag".
52. The reception given to Operation participants by civilians and government personnel alike, was always friendly and helpful. In the Northern Territory, however, there is a very small minority which has its own political agenda. This should be taken into account when deploying in the area.

COMMAND AND SIGNAL

Command

53. No problems were experienced with the command arrangements specified in Reference B.

Communications

54. Rear Link. Rear link communications were via telephone and fax.
55. Radio Net. 126 Sig Sqn provided one radio operator for communications support to the Operation who performed in a competent and professional manner. Communications between main base and field check parties were by RAVEN HF radio. The communications report is given in Annex L.
56. SITREPs. Weekly SITREPs were sent by fax.

CONCLUSION

57. The Operation was successful in achieving the mission and other assigned tasks. Many practices in place for the management of operations were proved during Op NERVOSE 94, such as the inclusion of an FRT, the use of hand-held GPS, and a support vehicle (cooks trailer) for the convoy moves. The conclusions that follow are drawn not only from the main body of this report but also from the Annexes.
58. With the future of field completion operations in question, this Operation vindicated the need for such operations. Errors were found in the Alligator River and Cobourg Peninsular blocks, with poor photographic interpretation and the incorrect assignment of SYMBAS definitions to hydrographic features. The significance of these mistakes, if portrayed in a product, would suggest that movement was not possible across these features; when quite the contrary situation exists. The implication of this misinformation is that map appreciations would use false information to make decisions. If substantial portions of the map are incorrect then the confidence of the user and the integrity of the map would be held in low regard resulting in poor customer satisfaction. There can also be no doubt as to the benefit that both plotters and supervisors gain from the opportunity to actually see and traverse the terrain upon which they are required to carry out photo interpretation. The benefit of having experienced personnel carrying

out and supervising photo interpretation will not become apparent until they no longer exist and the consequent degradation in product quality occurs.

59. The practice of digitising information from source data, or indeed importing data by any means onto the map sheet, without the feature showing up on current mapping photography is to say the least questionable. Annexes C and D elaborate on this issue.

60. Aboriginal land clearances once again were a cause of considerable concern. It was only through direct liaison between this Unit and the NLC that permission to operate in Arnhem Land was obtained and permits issued. A possible solution to this is for this Unit to deploy an LO into the AO approximately four weeks prior to the commencement of the Operation. The LO should be an Officer and should be mobile and self-sufficient. Prior to this the normal procedure for obtaining land clearances would be carried out. The LO's mission would then be to personally visit key personnel in the AO, brief them, facilitate the production of land clearances and generally add a face to the names and pieces of paper.

61. The incident at RAAF Base Darwin concerning the use of facilities there is an unfortunate one. This Unit had put a substantial amount of effort into ensuring that the facility would be available for use and that no hindrance would be caused to RAAF operations. Approval to use the facility had been secured yet a SSGT was berated, almost to the point of verbal abuse, by a GPCAPT over the matter. The most obvious point of contact over the matter at the time must have been the soldier's CO, which was the OC Det. It is a pity this more suitable path was not chosen.


RECOMMENDATIONS

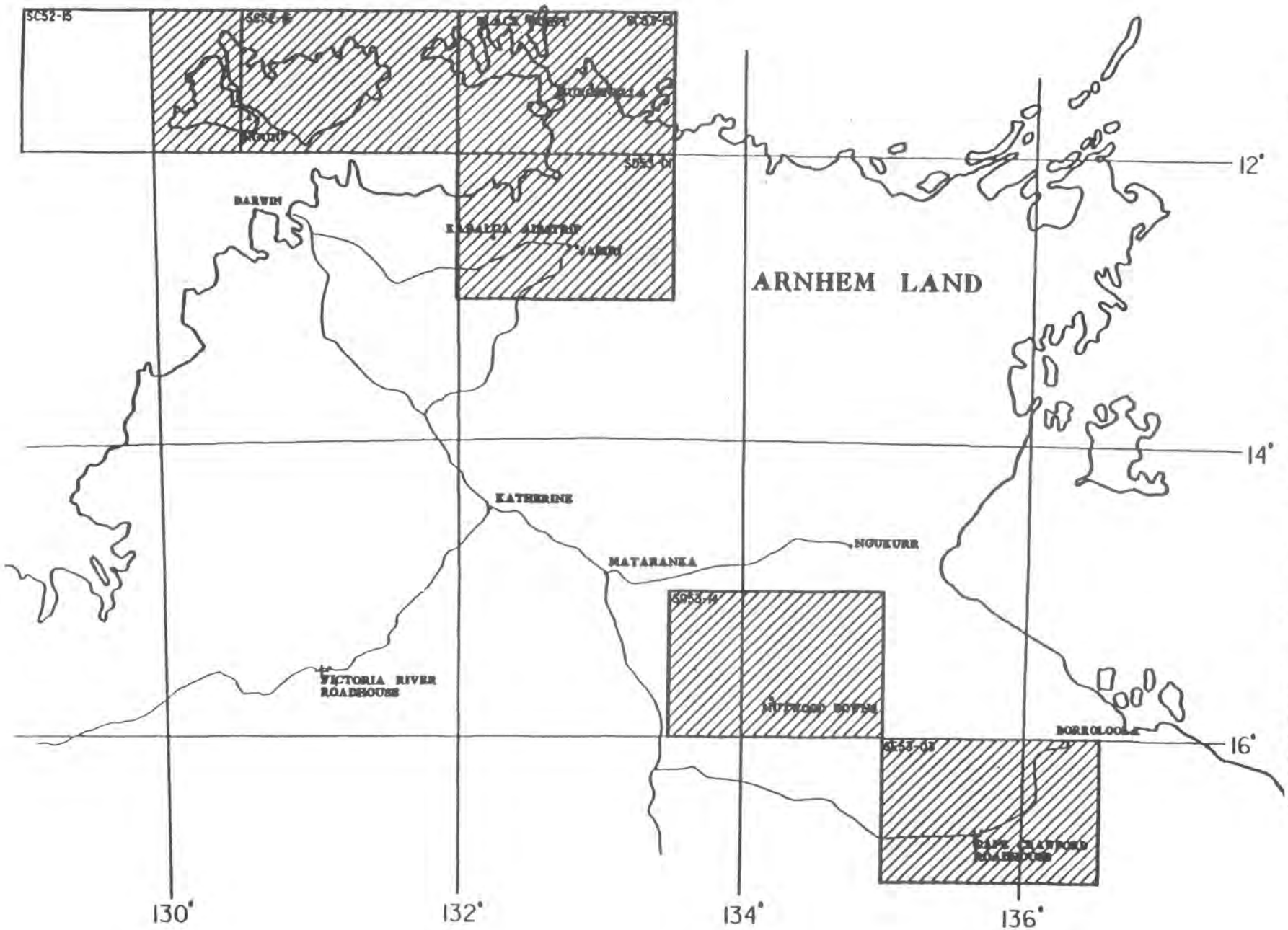
62. The following recommendations have resulted from Op NERVOSE 94 and are drawn from the body of the report and the Annexes:

<u>Recommendation</u>	<u>Recommended Action By:</u>
a. The cost/benefit of conducting field completion operations should be investigated.	LHQ & DSVY-A
b. The content of field check packages should be agreed upon between the producer and user before production actually starts.	Army Svy Regt & 4 Fd Svy Sqn
c. Only features that would not normally be visible on the mapping photography (eg bores, towers, submerged reefs, gates and grids) should be positioned from source data.	Army Svy Regt
d. An LO should be deployed to the AO prior to the commencement of operations to facilitate the acquisition of land clearances.	LHQ, NORCOM & 4 Fd Svy Sqn

- e. The acquisition of vehicle mounted antennas for hand held GPS should be pursued. LHQ, DSVY-A & 4 Fd Svy Sqn

15 December 1994


P.C. DEMAINE
Major
Officer Commanding



OP NERVEOSE 94 - AREA OF OPERATIONS

ANNEX A TO
 OP NERVEOSE 94
 OPERATION REPORT
 DATED 15 DEC 94

SEQUENCE OF EVENTS

<u>Serial</u>	<u>Date</u>	<u>Event</u>
1.	17 Jun	Attached Army Svy Regt personnel report to 4 Fd Svy Sqn for Pre-Op Training.
2.	20 Jun- 24 Jun	Pre-Op Training. Issued convey orders.
3.	27 Jun	Attached Sig Op Radio from 1 Sig Regt reports to 4 Fd Svy Sqn. Attached Vehicle Mechanic from 1 BASB Wksp reports to 4 Fd Svy Sqn.
4.	4 Jul	CAPT Sutimin reports to 4 Fd Svy Sqn Road Party departs Adelaide.
5.	7 Jul	2 x F/C parties detach from convoy to commence road and vegetation classification in the Borroloola region.
6.	8 Jul	Remainder of road party arrives Darwin. Det OC visits: HQ NORCOM, 2IC NORFORCE, SO1 PLANS NORCOM, and ASU-D. Road and vegetation classification commences for SE 53- 03 Bauhinia Downs and SE 53- 14 Hodgson Downs.
7.	9 Jul	2 x F/C Parties remain in Darwin, and prepare for sea transport. Remainder of the road party transit from Darwin to Jabiru and establish main base in NORFORCE Compound.
8.	10 Jul	2 x F/C parties depart Darwin by LCM-8 for Bathurst Island. LCM-8 remains in Bathurst island. 2 x F/C parties commence the field checking of Coburg Peninsula.
9.	11 Jul	2 x F/C parties commence field check of Bathurst Island.
10.	12 Jul	2 x F/C parties complete field checking Coburg Peninsula. 2 x F/C parties complete field checking Bathurst Is.
11.	13 Jul	LCM-8 transports F/C parties from Bathurst Is to Melville Is and returns to Darwin. Malaysian exchange officer (CAPT Sutimin) departs. MAJ Cordover arrives in Darwin.

<u>Serial</u>	<u>Date</u>	<u>Event (continued)</u>
12.	14 Jul	3 x LOH from 161 Recce Sqn arrive at Jabiru. Air Camera Personnel arrive in Darwin.
13.	15 Jul	Field check complete on Melville Island. 1 x Nomad arrives in Darwin via Jabiru.
14.	16 Jul	3 x LOH depart Jabiru for Melville Island with OC Det. Liaison visit to Murganella out-station.
15.	17 Jul	Air checks begin of Bathurst and Melville Island.
16.	18 Jul	Air checks complete of Bathurst and Melville Islands.
17.	19 Jul	LCM-8 deploys from Darwin to Melville Island. 3 x LOH transit to Borrooloola region via Jabiru. Liaison visit to Oenpelli and Nabarlek.
18.	20 Jul	Forward base established at Black Point. 2 x F/C parties depart Melville Island by LCM-8 for Black Point.
19.	21 Jul	LMC-8s arrives at Black Point. On LCM-8 goes on to Croker Is with one F/C party. LCM-8 remains on Croker Island. Field check of Croker Island commences. 1 x LCM-8 returns to Darwin with F/C Party to repair vehicle at 1 BASB. Air check of Borrooloola region complete.
20.	22 Jul	2 x F/C parties depart Borrooloola region to return to Jabiru. 3 x LOH depart Borrooloola region for Jabiru. Croker Is road check complete.
21.	23 Jul	2 x F/C parties from Borrooloola region arrive at Jabiru. AAAvn RAEME Spt arrive (FRT). 2 x LOH transit Jabiru to Black Point. Cobourg Peninsular air check commences. Alligator River air check commences.
22.	24 Jul	2 x F/C parties commence field checking Northern Arnhem Land. Air check of Croker Is commences and completed. 1 x F/C party transits Black Point to Jabiru.
23.	25 Jul	Coburg Peninsula air check complete. 2 x LOH transit Black Point to Jabiru. OC 4 Fd Svy Sqn arrives at Jabiru.
24.	26 Jul	Forward base extracts from Black Point and returns to Jabiru
25.	29 Jul	MAJ Rudd arrives. OC departs.

26. 30 Jul Alligator River air check complete.
27. 31 Jul COL Swiney and LTCOL Burns arrive.
28. 1 Aug Final edits.
29. 2 Aug Det 161 Recce Sqn depart the AO
Det 173 Survl Sqn depart the AO.
30. 3 Aug Road party departs for Adelaide.
31. 8 Aug Road party arrives in Adelaide.

TECHNICAL REPORT

- References:
- A. Army Svy Regt Stereo Compilation Report SD 53-1 dated 24 Jun 94
 - B. Army Svy Regt 851-17-33 dated 4 Feb 94

BACKGROUND

Package Construction

1. Army Svy Regt plotted and produced field completion packages for map sheets in the following 1:250 000 areas:
 - a. SC 52-16 Melville Island - 2 x 1:50 000;
 - b. SC 53-13 Cobourg Peninsula - 19 x 1:50 000 (plus 4 x 1:50 000 extensions), and
 - c. SC 53-1 Alligator River - 24 x 1:50 000.
2. 4 Fd Svy Sqn plotted and produced field completion packages (with the exception of master positives which were produced by the Army Svy Regt) for map sheets in the following 1:250 000 areas:
 - a. SC 52-16 Bathurst Island - 7 x 1:50 000; and
 - b. SC 52-16 Melville Island - 14 x 1:50 000.
3. A list of the 1:50 000 scale map sheets is included at Appendix 1.
4. The Army Svy Regt produced packages for the road and vegetation classification of the following 1:250 000 areas:
 - a. SD 53-14 Hodgson Downs, and
 - b. SE 53-03 Bauhinia Downs.

Source Data

5. Source data consisted of:
 - a. 1:50 000 field completion packages.

- b. 1:100 000 and 1:250 000 existing/published topographic mapping.
- c. Hydrographic charts at various scales.
- d. Service Land Availability Plans (SLAPs) for Aboriginal Communities.
- e. Telecom tower heights.
- f. Pastoral and Aboriginal boundary maps.
- g. Road overprints of 1:100 000 map sheets (Bathurst and Melville Islands only).

Field Completion Packages

6. Field completion packages were produced containing the following:
 - a. computer generated cultural, drainage, relief and vegetation (CDRV) composite colour paper plots;
 - b. various sheets in assorted colour combinations for use in the production of the guides and to assist in checking specific detail;
 - c. enlargements for areas of clutter; and
 - d. CDRV composite film positives for use as field completion masters.

Field Completion Colour Guides

7. 4 Fd Svy Sqn produced the various colour guides for all 1: 50 000 map sheets prior to departure to the AO.

Road and Vegetation Reclassification Packages

8. The road and vegetation reclassification package consisted of:
 - a. computer generated 1:50 000 orthophoto maps using LANDSAT satellite imagery with various remote sensing bands highlighted,
 - b. various 1:250 000 and 1:100 000 NTMS and RASvy mapping products, and
 - c. various enlargements and source data pertinent to the area.

EXECUTION

General Outline

9. The Operation was conducted by deploying seven field completion parties to the field. Two field completion parties were initially deployed to classify the roads and vegetation in the HODGSON DOWNS and BAUHINIA DOWNS areas and a further two parties were deployed from a forward base at Pularumpi (Melville Island) to field complete the BATHURST ISLAND and MELVILLE ISLAND areas. The remaining parties were initially based out of the main base

at Jabiru and deployed to field complete the ALLIGATOR RIVER area, later two parties were deployed from a forward base at Black Point to field complete the COBOURG PENINSULA area. Towards the completion of the Operation all seven parties congregated at the main base and deployed to conclude the field completion of the ALLIGATOR RIVER area.

Ground Verification

10. Ground verification was undertaken by two-man field parties who remained in the field for up to three days. On their return to base, corrections were applied to the master field check positives. Homestead owners/managers, park rangers and other officials within the AO were visited and provided valuable assistance on new development, positioning of detail and also the placement and verification of nomenclature.

Air Verification

11. At the completion of the ground verification, an aerial inspection was completed to resolve any outstanding queries and to verify any detail inaccessible by road. Where possible the air check was completed by the same personnel that carried out the ground verification.

Photography

12. The dates of plotting photography were as follows:

- a. BATHURST & MELVILLE ISLAND - 18 runs May/Jun 92;
- b. COBOURG PENINSULA - 4 runs Jun 89, 29 runs May/Jun 92; and
- c. ALLIGATOR RIVER - 16 runs Aug 93.

13. The recent date of the photography meant that very little new development occurred in these areas since compilation.

Photo Interpretation

14. The photo interpretation was generally good; the major problems being:

- a. Too many linear and area features were added from source data that were not visible on the photography. Most of these features had to be deleted, this often cost the field completion party a lot of wasted time trying to locate them. As the photography was more recent than any source data used these linear and area features should have been omitted. Any additions identified at field completion would be positioned as per field completion SOPs.
- b. A lot of island and coastal areas in the Cobourg Peninsula area were incorrectly classified as sand. These areas had sand in them but the sand did not dominate or hinder movement. They mostly consisted of areas of grass and scattered forest.
- c. Areas classified as STI (TI) should be reclassified as STI, where there is a tidal influence it is SCF (mainly in the Alligator River area).

- d. The large flood plain area on the south west coast of Cobourg Peninsula was incorrectly classified as marine swamp. It will be reclassified into areas of swamp within a larger STI area.
 - e. Flood plains along major rivers in the Alligator River block were wrongly classified, this Unit is currently re-classifying these areas from a combination of mapping photography and the original 3D data.
15. This Unit will produce a Photo Interpretation Guide (PIG) to clarify the problems highlighted above and forward it to the Army Svy Regt.
16. A detailed explanation of amendments and photo interpretation errors is included in the Field Completion Report attached at Annex D.

Enlargements

17. Coloured enlargements were used to clarify areas of clutter.
18. All enlargements that were utilised were compiled as per Compilation Specifications. The area covered by the enlargement was boxed on the composite positive with a notation indicating which enlargement was used. No changes were annotated within the boxed area on the composite positive.
19. All enlargements were included in their relevant Field Completion Package.

Source Data

20. Source data provided by the plotting agency was minimal and nowhere near the amount used by the compilation agency, as detailed in Reference A. The majority of source data made available to the completion agency was sourced originally by 4 Fd Svy Sqn for the plotting of the Bathurst/Melville Island block.
21. Source data originally collected for Cobourg Peninsula and Alligator River by 4 Fd Svy Sqn was never returned for use in field completion.
22. This lack of source data hindered the field completion operation as source data had to be collected by the completion agency in the field.

Administrative Boundaries

23. Aboriginal and other boundaries originally hand digitised from source mapping are now being positioned by gazetted coordinates.
24. To help future compilation agencies, the following is a guideline on the way to obtain this information in the Northern Territory:
- a. All land that is subject to an Aboriginal land claim has only rough boundaries marked up on small scale reprostat. This is kept by the Aboriginal Lands Branch. Once this land is granted it will then be gazetted giving either:
 - (1) the coords and/or bounds of the land (obtainable from the Aboriginal Lands Branch), or

- (2) the pastoral lease it refers to (obtainable from the Dept of Lands and Surveys (DOLAH)).
- b. Boundaries of Conservation Parks (eg. Gurig) are gazetted and can be obtained from the Conservation Commission.
- c. Boundaries of National Parks (eg. Kakadu) are gazetted and can be obtained from the Australian National Conservation Authority (ANCA).

Watercourse Classification

25. The overall watercourse classification for all areas checked during the Op was changed from mainly dry (the SYMBAS 88 classification) to intermittent. The reasoning behind this was that from local knowledge and observation it was determined that there are no creeks in these areas that 'seldom' contain water during an average 'wet' season.

Hand Held Global Positioning System (GPS) Receivers

26. Hand held GPS were used for checking information and positioning new data. Equipment used included Trimble Ensign, Trimble Trimpack, Magellan NAV 5000 PRO and Precision Lightweight GPS Receiver (PLGR), which was given to 4 Fd Svy Sqn to trial for the duration of the Op.

27. All linear features over 5 km in length were also positioned by supplementary photography on the Zoom Transfer Scope (ZTS).

28. Due to the fact that good survey principals were employed in positioning linear features by GPS, fidelity of shape was maintained. A report comparing the accuracy of positioning features captured by GPS with those captured using supplementary photography and ZTS will be produced separately.

29. A separate report detailing the results of the PLGR trials has been produced.

Joins

30. All internal joins were completed in the field. The only external joins with Alligator River were to the north with Cobourg Peninsula, to the south with Mount Evelyn and to the west with Darwin. External join problems were logged on the relevant PD sheet.

Field Check Concept Used

31. As requested in Reference B this Unit field checked solely for 1:50 000 line map content.

32. With regards to the road and vegetation reclassification, the primary role was to annotate the 1:250 000 NTMS products for the production of JOGs. No written direction was given as to the methodology to be used.

33. It was decided that the best technique would be to field check at 1:100 000 scale using RASvy products with JOG specifications in mind. The reformat produced and contents are as follows:

- a. All cultural and nomenclature changes were transcribed from the 1:100 000 field check reformat onto a master 1:250 000 cronoflex overlay.
- b. The road guide information was transcribed onto a 1:250 000 NTMS product.
- c. The annotation and generalisation of vegetation boundaries was produced on 1:100 000 cronoflex overlays, these corrections will be hand digitised or scanned into the JOG file.

Nomenclature

34. Nomenclature listings will be completed and forwarded to the appropriate authority. Included in the listings will be recommendations to change the names of 3 map sheets.

Stereo Compilation Reports

35. Stereo Compilation Reports compiled by the Army Svy Regt for Cobourg Peninsula and Alligator River proved extremely useful as a means of clearing up compilation queries.

36. This Unit received the report for Alligator River two days before the Op commenced and the report for Cobourg Peninsula two weeks into the Op, after a telephone request. As a result of the late arrival of these reports their usefulness was diminished, as field parties had to be briefed on their contents during the Op.

Field Completion Report

37. A single Field Completion Report was compiled for the entire AO and is at Annex D.

Supplementary Photography

38. Supplementary photography was acquired for detail that could not be positioned accurately during the field completion. A full report on the aerial photography is at Annex E.

39. Having the Air Camera support positioned in a different locality from the main base proved to be an administrative hindrance as communication between the Photo Section Darwin and the Main Base Jabiru was difficult. Messages left at the RAAF facility were often not passed on.

40. Also due to problems detailed in Annex E results of photography flown were not available in the usual time frame. This did not delay the Operation, but in other circumstances had the potential to become a major problem.

Vital Asset Protection (VAP)

41. VAP photography was acquired as an opportunity task from a prioritised request compiled by 1 Topo Svy Sqn. All priority tasks were completed, a full report on VAP photography is at Annex E.

Photo Interpretation Guides (PIGs)

42. Photographs for the production of PIGs were taken by all field completion parties whilst in the AO. A number of videos were also taken, these will be edited and forwarded with the PIGs to the Army Svy Regt when complete.

CONCLUSIONS

43. A thorough source data check was not completed prior to the field completion operation and not all of the data that was collected was forwarded to the completion agency prior to field completion.

44. Too many linear and area features were positioned from source data when they were not visible on the mapping photography, this caused wasted field completion time. This practice will cause confusion to the map user if in future mapping areas are not field completed.

45. A number of photo interpretation errors were found with the stereo compilation of the flood plain areas ('wetlands') in the south western Cobourg Peninsula and the Alligator River areas. These areas will be reclassified using a combination of the original 3D data and the mapping photography.

46. Having the air camera support in a different location from the main base resulted in some communication difficulties.

47. Using the RAAF Photographic Section to develop film resulted in an unacceptable time delay between flying and developing (proving) the film.

RECOMMENDATIONS

48. The following recommendations are made:

<u>Recommendation</u>	<u>Recommended Action By</u>
a. A thorough collection of source data should occur prior to compilation. This data should then be forwarded to the completion agency prior to field completion.	Army Svy Regt & 4 Fd Svy Sqn
b. Only features that would normally not be visible on the mapping photography (eg bores, towers, submerged reef, gates and grids) should be positioned from source data.	Army Svy Regt
c. On future field completion operations as many plotting supervisors as possible (who are not already familiar with the AO) should be detached to the field completion agency. By deploying with the field completion agency their photo interpretation skills in the types of areas being mapped will be enhanced and photo interpretation errors will be reduced.	Army Svy Regt

- d. On future operations the air camera team should be located in the main base if possible. 4 Fd Svy Sqn

Dec 94

S.C. CAPP
WO2
Det OPSWO

Appendix:

1. 1 : 50 000 Scale Map Sheets Field Completed on Op NERVOSE 94

APPENDIX 1 TO
ANNEX C TO
OP NERVOSE 94
OPERATION REPORT
DATED 15 DEC 94

1:50 000 SCALE MAP SHEETS FIELD COMPLETED ON OP NERVOSE 94

The following 1:50 000 scale maps were field completed during Op NERVOSE 94:

SC 52-15 BATHURST ISLAND 1:250 000:

4974 1	MANGUTAPI
4974 2	PIPIANAMILI
4974 3	CAPE FOURCROY
4974 4	GORDON BAY
4975 1	IMALU
4975 2	PULARUMPI
4975 3	CAUTION POINT

SC 52- 16 MELVILLE ISLAND 1:250 000:

5074 1	MARTARIMMI
5074 2	PICKERTARAMOOR
5074 3	NGUIU
5074 4	YARPALIKKA
5075 2	ANDRANANGOO CREEK
5075 3	MILIKAPITI
5174 1	CONDER
5174 3	MARANAPI POINT
5174 4	ALIU POINT
5175 1	JAHLEEL
5175 2	YIMPINARI
5175 3	BRENTON BAY
5175 4	TUWANAGGU
5275 1	TREPANG BAY
5275 2	SHAMROCK BAY
5275 3	TUKUNDAWU

SD 53-1	ALLIGATOR RIVER	1:250 000:
5372 1	KAPALGA	
5372 2	ALLIGATOR BILLABONG	
5372 3	HARDY	
5372 4	WILDMAN RIVER SOUTH	
5373 1	FIELD ISLAND	
5373 2	SOUTH ALLIGATOR RIVER	
5373 3	WILDMAN RIVER NORTH	
5373 4	FINKE BAY	
5472 1	MOUNT BROCKMAN	
5472 2	NOURLANGIE CREEK	
5472 3	MOUNT CAHILL	
5472 4	WOOLIWONGA	
5473 1	MOUNT BORRADAILE	
5473 2	CANNON HILL	
5473 3	MUNMARLARY	
5473 4	PORT FAREWELL	
5572 1	KAKADU *	(EAST ALLIGATOR RIVER)
5572 2	WATTA *	(NO NAME SUGGESTED)
5572 3	KUB-O-WER HILL	
5572 4	MOUNT HOWSHIP	
5573 1	NIMBUWAH	
5573 2	SPENCER RANGE	
5573 3	OENPELLI	
5573 4	COOPER CREEK	
SC 53-13	COBOURG PENINSULA	1:250 000:
5374 1	MORSE ISLAND	
5374 4	GREENHILL ISLAND	
5375 1	D'URVILLE POINT	
5375 2	RAFFLES	
5375 3	WANGEWANJA	
5375 4	GUNNERS QUOIN *	(BLACK POINT)

5474 1	WAUK LAGOON
5474 2	MOUNT PERMEIN
5474 3	MURGENELLA
5474 4	BAY HILL
5475 1	GRANT ISLAND + EXTENSION
5475 2	MALAY BAY
5475 3	DJMNGAN POINT
5475 4	MINJILANG + EXTENSION
5574 1	SOUTH GOULBURN + EXTENSION
5574 2	KING RIVER
5574 3	TOR ROCK
5574 4	LATERITE POINT
5575 3	GNINGARG

* recommendation for name change

FIELD COMPLETION REPORT

GENERAL

Report Areas

1. The field check phase of Operation NERVOSE 94 encompassed four 1:250 000 map areas, the coordinates for the entire area are:
 - a. NE cnr 11° 00'S, 133° 30'E.
 - b. NW cnr 11° 00'S, 130° 00'E.
 - c. SE cnr 13° 00'S, 133° 30'E .
 - d. SW cnr 13° 00'S, 132° 00'E.
2. The road classification phase for Operation Nervose 94 encompassed two 1:250 000 maps, they were:
 - a. SD 53-14 Hodgson Downs, and
 - b. SE 53-3 Bauhinia Downs.
3. A description for each area is given below:
 - a. SC 53-15 Bathurst Island & SC 53-16 Melville Island. The area is approximately 65 km off the coast of Darwin to the north and covers approximately 15 000 km². The area consists of two islands Bathurst and Melville. The topography of the islands is flat to undulating. The vegetation in the area is predominantly eucalyptus inland, and dominated by mangrove in the coastal areas, average height of the vegetation is around 10 metres. The main cultural centres are the townships of Nguiu on Bathurst Island and Pularumpi on Melville Island. Aboriginal communities are scattered throughout both islands and form the majority of the population.
 - b. SC 53-13 Cobourg Peninsula. The area is approximately 210 km NE of Darwin and covers over 8 000 km². The topography of the area is flat to undulating with the Wellington Range being the dominating relief feature. Vegetation in the area is mostly medium with an average height of 12 metres. The majority of the area is dedicated to the Gurig National Park and the Murgendela Wildlife Sanctuary. There are a number of islands in the area, Croker and South Goulburn Island being the biggest. The cultural development in the area consists of the Ranger Station at Black Point, the

Murgenella Settlement, and the Aboriginal Communities on Croker and South Goulburn Islands. Apart from pearling there is little industry in the area.

- c. SD 53-01 Alligator River. The area is located approximately 250 km east of Darwin and covers approximately 15 000 km² of land area. The entire area encompasses the Kakadu National Park, with Arnhem Land bordering on the east. The area is flat to undulating, being dominated by vast flood-plains over the majority of the block, rising to high escarpments and distorted surface on the eastern edge. The area contains numerous swamps with the main rivers being the South Alligator, East Alligator, Jim Jim Creek, Nourlangie Creek in the centre, and Magela Creek in the north-east. Vegetation in the area consists of medium vegetation with an average height of 10 m. The main cultural centres are the township of Jabiru which is also the headquarters of the National Park, the Ranger Mine in the north-east, and the tourist resort Cooida in the south-east. There are also numerous aboriginal communities in the area.
- d. SD 53-14 Hodgson Downs. The area lies approximately 400 km SE of Darwin and covers approximately 12 000 km². The topography of the area is undulating to flat. The Hodgson River is the main hydrographic feature in the area and bisects the map sheet centrally from North to South. Vegetation in the region consists mostly of medium eucalypt with the average canopy height of approximately 10m. The primary industry of the area is predominantly beef and the major cattle station in the region is Nutwood Downs. Hodgson Downs was once a cattle station but it is now presently under an aboriginal land claim. The new aboriginal name for Hodgson Downs is Miniyerri.
- e. SE 53-03 Bauhinia Downs. The area is approximately 700 km SE of Darwin and covers approximately 12 000 km². The region lies adjacent to the Gulf of Carpentaria and is serviced by the deep sea port of Bing Bong to the north-east. The topography of the area ranges from undulating in the west through to broken, escarpment type country dominating the central and south-east region of the map sheet. The primary industry of the area is predominantly beef serviced by a number of large freehold cattle stations. There has been some major development in the district with the introduction of the McArthur River Mine which is situated approximately 115 km to the south of Borroloola. The ores being extracted are silver, lead and zinc. Borroloola is the main township in the region and services a multicultural community.

Insertion

4. Parties working on Bathurst/Melville Islands were deployed into the AO using LCM-8 landing craft from 1 BASB Darwin (Larrakeyah Bks). The other parties were inserted into the AO by road.
5. The two parties working on the road and vegetation reclassification were inserted into their respective AOs by road.
6. The main base for the Operation was established at the NORFORCE Depot in

Jabiru. Two forward bases were also established, one at Pularumpi on Melville Island and the other at Black Point on the Cobourg Peninsula.

Task

7. The field check task involved the field completion of 66 1:50 000 map sheets as detailed in Appendix 1 to Annex C.
8. The road and vegetation reclassification task involved the confirmation and reclassification of data for the conversion of NTMS products to JOG specifications for the following sheets:
 - a. SD 53-14 Hodgson Downs, and
 - b. SE 53-3 Bauhinia Downs.

Method

9. The area was field checked by both ground and air methods.
10. Truck Panel Survey Series 110 Land Rover was used for the ground phase and LOH for the air check.
11. Hand held GPS (Magellan and Trimble) were used with the understanding that the solutions gained were to be used in conjunction with, traditional field check methods and Supplementary Photography. In addition to these GPS four parties were given the chance to evaluate a new GPS, the Precision Lightweight Gps Receiver (PLGR). The PLGR used vehicle power and had an externally mounted antenna.

Duration

12. Field checking commenced on the Phase One commenced on the 10 Jul 94 and was completed on the 12 Aug 94.
13. The time spent on the field check phase are as follows:
 - a. 269 hrs ground completion,
 - b. 99 hrs air check, and
 - c. 110 hrs spent in the office applying corrections onto the reformat.
14. The time spent on the road and vegetation reclassification phase are as follows:
 - a. 105 hrs ground completion for each 1:250 000 sheet,
 - b. 24 hrs air check (total), and
 - c. 51 hrs spent in the office applying correction onto the reformat.

AMENDMENTS/COMMENTSBathurst / Melville Islands

15. Cultural. Generally, plotted detail was portrayed well and the following amendments/comments apply:
- a. New roads were added using the PLGR GPS and sup-photography was flown.
 - b. Many vehicle tracks were deleted in the southern area of Melville Island as they had become overgrown or were cattle tracks.
 - c. Numerous Telecom towers were added.
 - d. The BUA boundary around the township of Nguiu was too large and quite a few roads were missed.
 - e. The small area of plotted buildings on map sheet 4975-1 Imalu turned out to be tents belonging to "Putjamirra", a seasonal resort, only four buildings were permanent.
 - f. Enlargements supplied for congested areas were invaluable.
 - g. FC parties had to wait four hours before starting because of no land clearances.
16. Drainage. Drainage portrayal was good with only minor changes.
17. Relief. Relief was portrayed well and no corrections were made.
18. Vegetation. Vegetation portrayal was good throughout the AO the only change being the Average Height of Vegetation, was adjusted on average to 10m over the entire block.
19. Nomenclature. The following amendments/comments apply:
- a. The township of "Garden Point" was Renamed "Pularumpi".
 - b. Aboriginal place names were added as per nomenclature list.
20. Joins. No problems occurred affecting joins.
21. Probable Obsolescence Rate (POR). The POR for Bathurst Island is 2, Moderately Developing/Medium Obsolescence area. This is due mainly to the on-going development of medium Aboriginal Communities throughout the area. The classification of Melville Island is 3, Slowly Developing/Low Obsolescence Areas around the developed areas, and 4, Undeveloped Areas due to its inaccessibility.

Cobourg Peninsula

22. Cultural. Generally plotted detail was portrayed well, and the following amendments/comments apply:

- a. Numerous roads plotted were in fact cleared lanes.
 - b. Roads were added to Sth Goulburn Island.
23. Drainage. Generally drainage detail was portrayed well; however, major changes to drainage detail occurred on the 1:100,000 areas 5474 and 5574. Large areas of STI were incorrectly plotted as swamp. These areas are being replotted by 4 Fd Svy Sqn using original mapping photography.
24. Relief. Relief was portrayed fairly well excepted for large areas of open ground being incorrectly plotted as sand.
25. Vegetation. Vegetation portrayal was generally good throughout the AO, and the following amendments/comments apply:
- a. Average height of vegetation was adjusted on average to 10m.
 - b. Dense vegetation on one model area had been incorrectly classified as TRF.
26. Nomenclature. Few changes were made to nomenclature.
27. Joins. No problems occurred affecting joins.
28. Probable Obsolescence Rate (POR). The POR for the Cobourg Peninsula area is 4, Undeveloped Area. Aside from one tourist resort in the area it is mostly national park.

Alligator River

29. Cultural. The following amendments / comments apply:
- a. Land clearances had not been done which slowed FC progress.
 - b. Numerous roads plotted were in fact cleared lanes.
 - c. Jabiru. The Jabiru township had been plotted using individual building symbols. These were replaced by a BUA boundary. Bike paths within the town were deleted.
 - d. Ranger Mine. Many vehicle tracks were deleted as they were overgrown. Ranger Lease boundary is to be added from coordinates converted from AMG to WGS. Some buildings were deleted as they were plotted over petrol bowsers and freight containers.
 - e. Jabiluka Mineral Lease on 54721 MOUNT BROCKMAN and Koongarra Mineral Lease on 54722 NOURLANGIE CREEK are currently not operating. This could also change depending on government uranium mining policies.
 - f. Currently the Kakadu National Park is undergoing a nomenclature renaming process. All English names within the area will in due time revert to its Aboriginal name.
 - g. Vehicle tracks labelled 'approximate position' were overgrown and

subsequently deleted.

- h. Fences. A majority of fences within the area were in a state of disrepair, and labelled as such with a descriptive note. The fence posts and strands of wire are still recognisable when on the ground, so can still be used as navigation features. All gates associated with these types of fence were deleted
- i. Locked Gates. Some national park maintenance tracks had locked gates on them to deter tourists from driving on them. The fences associated with gates were not significant enough as a feature ie., they were only upright for less than 50m before they became in a state of disrepair, and were therefore not added.

30. Drainage. The following amendments / comments apply:

- a. Major changes to drainage detail occurred on the 1:100 000 areas 5474 and 5574 in the low lying wetlands. Large areas of STI were incorrectly plotted as swamp, and swamp was incorrectly plotted perennial. These areas are being replotted in-house using original mapping photography.
- b. Jabiru. Swimming pools within the town were plotted as buildings. These pools are covered with either a solid or canvas roof structure, and were changed to the correct classification.

31. Relief. Comments on relief are as follows:

- a. Relief was portrayed well and no corrections were made.
- b. Ranger Mine. The main pit within the mine was plotted at minus 91m. It is now at minus 121m. Depression contours will need to be added.

32. Vegetation. Vegetation portrayal was generally good throughout the AO and the following amendments/comments apply:

- a. Average Height of Vegetation was adjusted on average to 10m.
- b. Dense vegetation on one model area had been incorrectly classified as TRF.
- c. Ranger Mine. All seismic lines were overgrown and therefore deleted from the map sheet.
- d. Scrapes. A majority of scrapes were changed from clear (CL) to scattered (S) as vegetation regrowth is well underway.

33. Nomenclature. The following amendments / comments apply:

- a. 'Mainoru Road' was renamed 'Kakadu Highway'
- b. 'Muriella Park' was renamed 'Muirella Park'.
- c. 'Jim Jim Waterhole' was renamed 'Jim Jim Billabong'.

34. Joins. No problems occurred affecting joins.
35. Supplementary Photography. As detailed in Annex E.
36. Probable Obsolescence Rate (POR). The POR for most of the Alligator River area is 3, due to it being national park. The exception is the area surrounding Jabiru and the Ranger Mine which has a POR of 1.

Hodgson Downs And Bauhinia Downs

37. Cultural. The following amendments/comments apply:
- a. The McArthur River Mine is a newly constructed mining lease which has change the surrounding infrastructure.
 - b. A new underground gas pipeline has been constructed from the McArthur River Mine to the Darwin / Alice Springs pipeline.
 - c. The highway from the McArthur River Mine to Bing Bong (a deep sea port) is now 2 lane sealed and by-passes the township of Borroloola.
 - d. Many of the tracks on both sheets were found to be overgrown and were deleted accordingly.
 - e. Some of the stations on the Hodgson Downs sheet were either disused or are now in a state of ruin and have been accordingly labelled.
 - f. All towers not previously displayed were added with available heights.
 - g. There has been a major realignment of the road between Hodgson Downs (Miniyerri) and Nutwood Downs station.
38. Drainage. No changes were made as the drainage system as it was not included as part of the reclassification requirements.
39. Relief. No changes were made to the relief as it was not included as part of the reclassification requirements.
40. Vegetation. The vegetation was generally well portrayed with only minimal changes made throughout both the areas. The vegetation boundaries were annotated from the air and then generalised for the production of JOGs.
41. Nomenclature. There were numerous deletions of nomenclature, especially yards as the feature often no longer existed. Some of the major nomenclature amendments included:
- a. the renaming of Hodgson Downs Homestead to Miniyerri,
 - b. the renaming of Cox River Homestead to Minamia,
 - c. the addition of Cape Crawford roadhouse, and
 - d. the addition of McArthur River Mine.

42. All other nomenclature changes are as per the nomenclature sheet.
43. Joins. No major problems were encountered in joining reformat though bleed edges were produced to facilitate JOG production.
44. Probable Obsolescence Rate (POR). The POR for Bauhinia Downs and Hodgson Downs is 3 except for the McArthur River Mine area which has a POR of 1.

CONCLUSIONS

45. The following conclusions are made:
- a. The Operation was held up due to land clearances not being done.
 - b. Vehicle mounted GPS were of immense value as they saved time, ie. you didn't have to stop in order to get a position fix.
 - c. Enlargements supplied for areas with large amounts of detail were extremely helpful.
 - d. Roads taken off outdated source material and annotated as approximate position were of little value, and waisted the time of Field Check Parties.
 - e. Hodgson Downs homestead is now known as Miniyerri.

RECOMMENDATIONS

46. The following recommendations are made:

<u>Recommendation</u>	<u>Recommended Action By</u>
a. Land clearances should be done well in advance of the Operation's commencement date.	NORCOM & 4 Fd Svy Sqn
b. The feasibility of using vehicle mounted GPS should be investigated for future operations as they were a valuable asset.	4 Fd Svy Sqn
c. The enlargements produced for areas of congested detail and townships should be incorporated in all future FC packages.	Army Svy Regt & 4 Fd Svy Sqn
d. The practice of using 10 year old source data as a supplement for cultural detail when current mapping photography is available should cease immediately.	Army Svy Regt & 4 Fd Svy Sqn

- e. The 1:250 000 Hodgson Downs sheet be renamed, as 4 Fd Svy Sqn
the Hodgson Downs homestead is now known as
Miniyerri.

Dec 94

F. L. DOWNIE
SGT

ANNEX E TO
OP NERVOSE 94
OPERATION REPORT
DATED 15 DEC 94

AERIAL PHOTOGRAPHY REPORT

General

1. Supplementary and Vital Asset Protection (VAP) photography was flown during the period 14 Jul to 2 Aug 94 in the East Arnhem region of the Northern Territory.
2. Photography was acquired using a WILD RC10 Camera, Serial No. 3294 with a SWA lens, Serial No. 2090. The camera was mounted in a military N22 Nomad aircraft, A18-314.
3. Missions utilised during the operation were 4 FD SVY 496 to 4 FD SVY 501 (incl).

Tasking

4. Supplementary Photography. Approximately 900 line kms of supplementary photography were taken during the operation using 47.5 task hours. The photography was generally flown at an altitude of 10 000 ft. In a few instances altitudes of 5 000 - 7 000 ft were flown due to cloud.
5. Vital Asset Protection (VAP) Photography. A request for VAP photography of various towns, airfields and other vital assets was received from 1 Topo Svy Sqn.
6. The requirement for oblique photography to be taken of coastal facilities was not attempted. This was due to the aircraft and camera used for the task not possessing a locking device which would prevent the camera from pivoting/moving about the PAV10 Universal Mount's hinge while the aircraft performed severe turns, which are necessary for oblique photography.
7. Photography was proved from the negative and paper prints processed in situ.
8. Appendixes 1 to 7 portray all supplementary and VAP photography flown.

Personnel

9. The following personnel were involved:
 - a. 223520 SSGT B.D. Hammond, Army Survey Regiment, Air Camera Operator;

- b. 454834 CPL R.P. Crawford, 4th Field Survey Squadron, Air Camera Operator;
- c. 329037 LT D.H. Kemp, 173 Surveillance Squadron, Pilot; and
- d. 328013 CFN P.H. Simpkin, 173 Surveillance Squadron, All Trades.

10. The provision of providing two camera operators for the operation not only ensures the continuous availability, irrespective of the work load of aerial photography tasking and subsequent processing, of the air camera crew, but also as an opportunity to conduct On the Job Training (OJT) of operators who have not completed and qualified as an Aerial Camera Operator.

11. This OJT is in no way to replace or make redundant the necessary requirement to successfully complete the Air Camera Operators Course as OJT generally only covers the basic operation of the aerial camera and fundamental photographic theory.

Processing

12. Film Processing. Film processing was carried out in Darwin utilising RAAF Base Darwin's Photographic Section dark room facilities and 6 Squadron RAAF KODAK Versamat film processor.

13. Paper Print Production. Paper prints were produced using the ZIESS KG30 Contact Printer and RAAF Base Darwin's Photographic Section facilities. Approx 900 paper prints were produced.

Administration Problems

14. Unfortunately due to an oversight by the RAAF Base Administration, the RAAF Commander Northern Area, GPCAPT M. Cottrell DFC, was ignorant of our presence and of our authority to utilise his facilities. The result of this administrative oversight was that the initial approval for unrestricted access to the Photographic Section was withdrawn. Access was only possible when the resident photo technician was present during normal working hours. This hindered the otherwise smooth running of the photographic aspect of the operation.

15. It was initially understood that 6 Sqn would be supplying a technician to operate the Versamat, for reasons unknown this only occurred on the very last day of the operation. Prior to this the operation of the Versamat was carried out by the resident photo technician who at best had only been given a quick "soldiers five" on its operation. This resulted in the films being under developed to a minor degree and one film being affected by processing and drying marks.

16. Enquires concerning the above two situations noted no administration deficiencies in the way the photographic side of the operation was organised. It was apparent that these two situations arose due to poor internal administration and "lip service" acknowledgments of support requests by the RAAF units involved.

GPS Navigation

17. As an aid to navigation, a 173 Surveillance Squadron supplied a TRIMBLE TRIMPACK GPS receiver. The use of GPS was invaluable as a navigational aid.

WILD RC10 Aerial Camera

18. The WILD RC10 aerial camera was fitted into the aircraft on its arrival to Darwin. As the particular aircraft to be supplied for the operation was unknown prior to the camera being dispatch to Darwin, three variations of the PAV10 Universal Mount were supplied. This overcame any problem associated with incompatibility of the aircraft and camera mount which has been a problem in the past. No problems were encountered with any of the camera equipment.

Army Aviation Support

19. The photographic aspect of this operation could not have successfully completed without the assistance of LT D. Kemp and CFN P. Simpkin. Their dedication to the task and willingness to help in anyway was greatly appreciated along with their patience and sense of humour.

Conclusions

20. All supplementary and VAP (except for obliques) photographic tasks were completed in the allocated time.

21. Administration problems encountered during the operation arose due to support units/establishments not comprehending their responsibilities detailed in the relevant tasking directives and not disseminating these responsibilities throughout their chain of command.

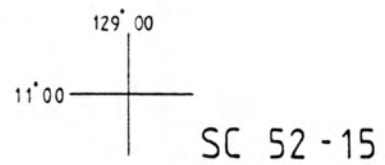
Aug 94

B.D HAMMOND
SSGT
Air Camera Operator

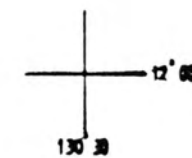
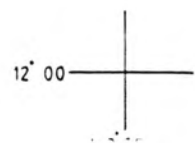
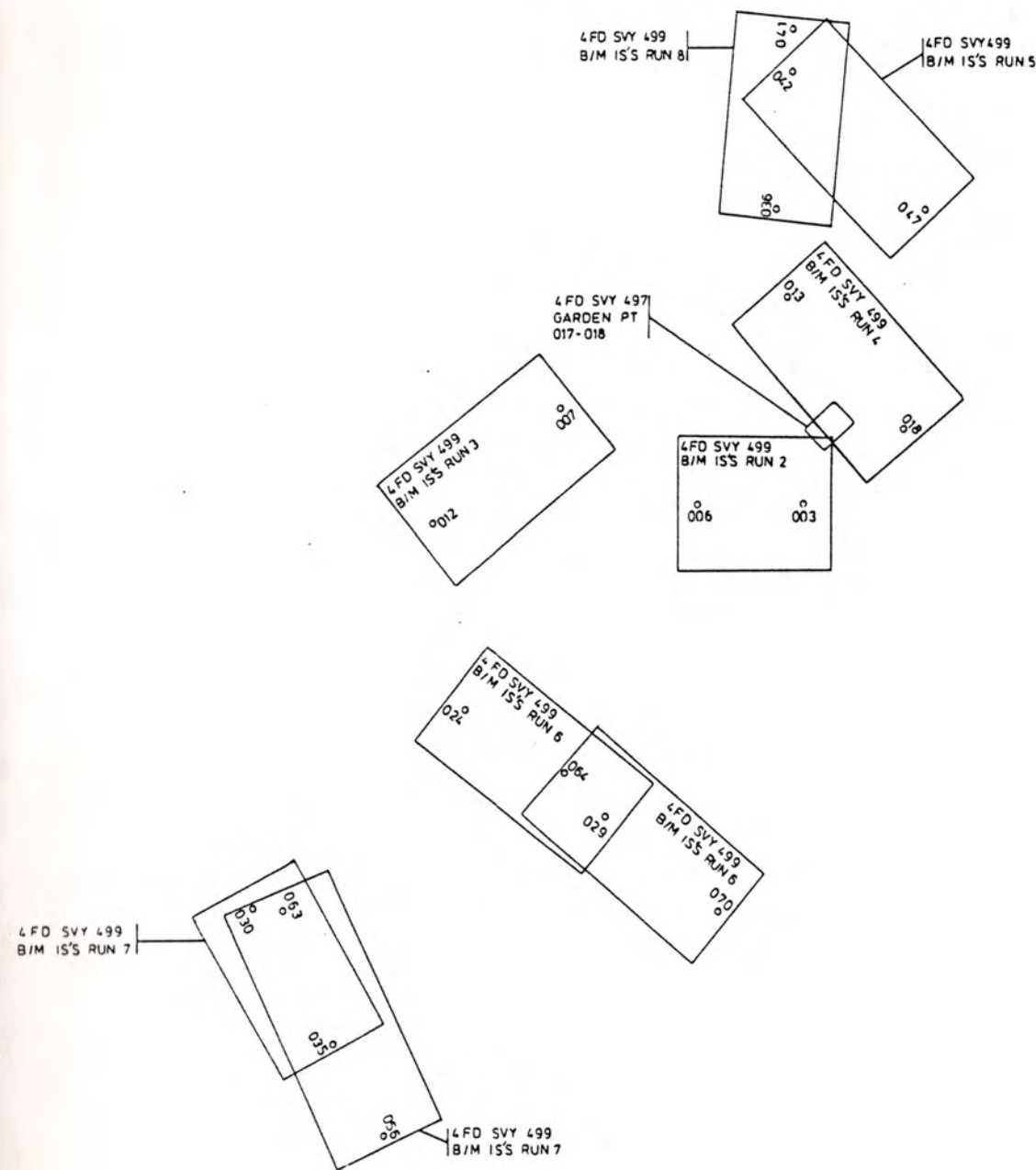
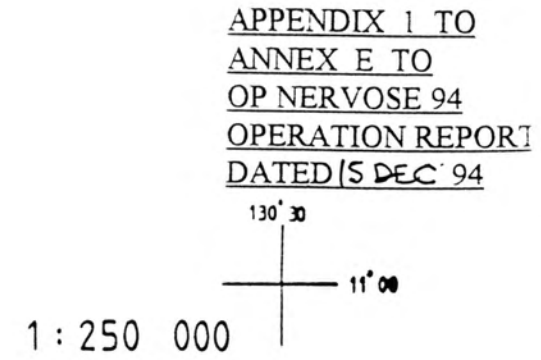
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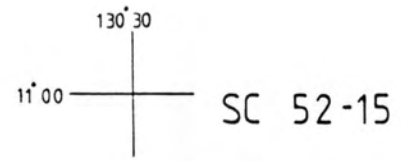
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2. Supplementary Photography Overlay SC 52-16 MELVILLE
3. Supplementary Photography Overlay SD 53-01 ALLIGATOR RIVER
4. Supplementary Photography Overlay SC 53-13 COBOURG PENINSULA

5. Supplementary Photography Overlay SD 53-02 MILINGIMBI
6. Supplementary Photography Overlay SE 53-03 BAUHINIA DOWNS
7. Supplementary Photography Overlay MT BUNDEY TRAINING AREA

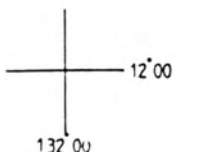
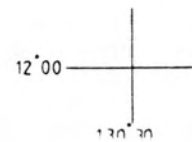
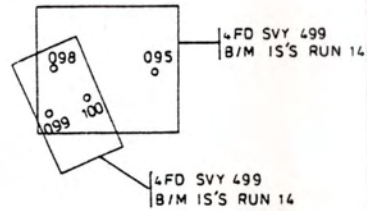
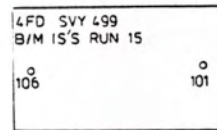
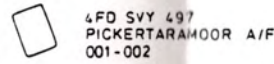
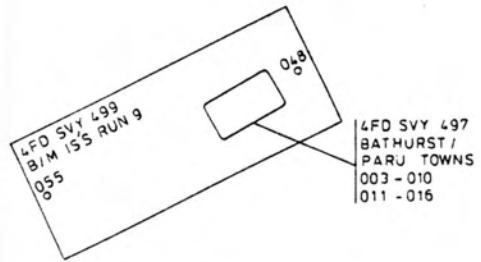
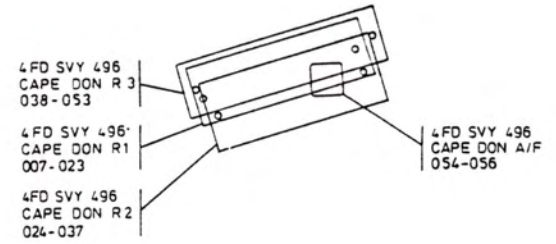
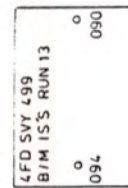
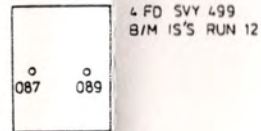
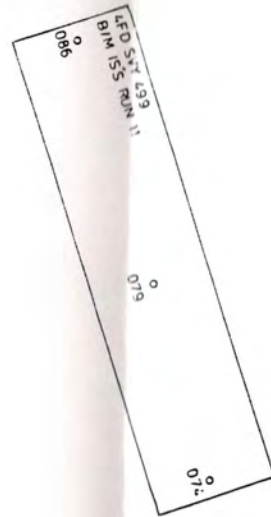
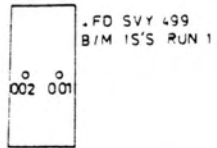
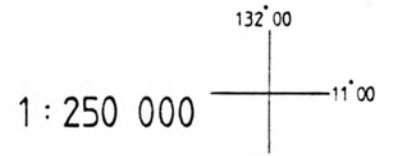


OP NERVESE 94 SUPPLEMENTARY PHOTOGRAPHY
BATHURST ISLAND





OP NERVOSE 94 SUPPLEMENTARY PHOTOGRAPHY
MELVILLE ISLAND

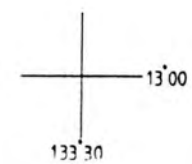
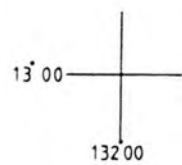
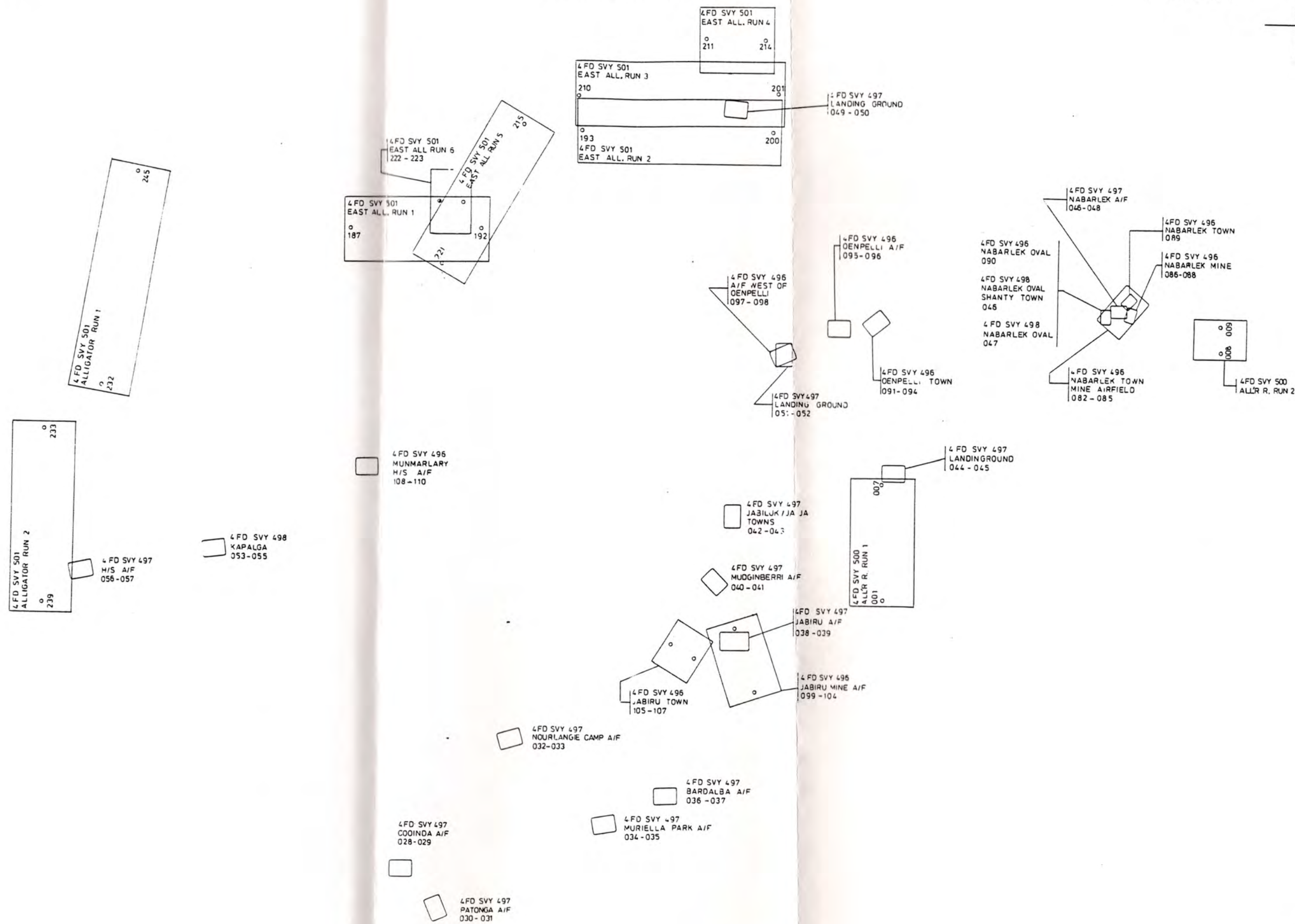
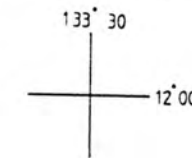
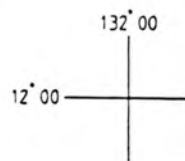


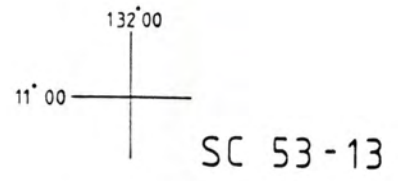
OP NERVOSE 94 SUPPLEMENTARY PHOTOGRAPHY

ALLIGATOR RIVER

1 : 250 000

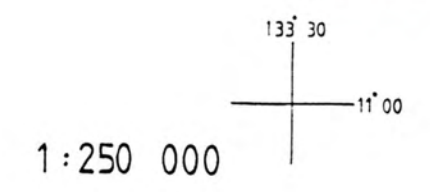
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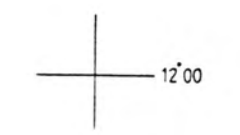
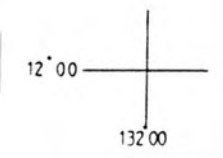
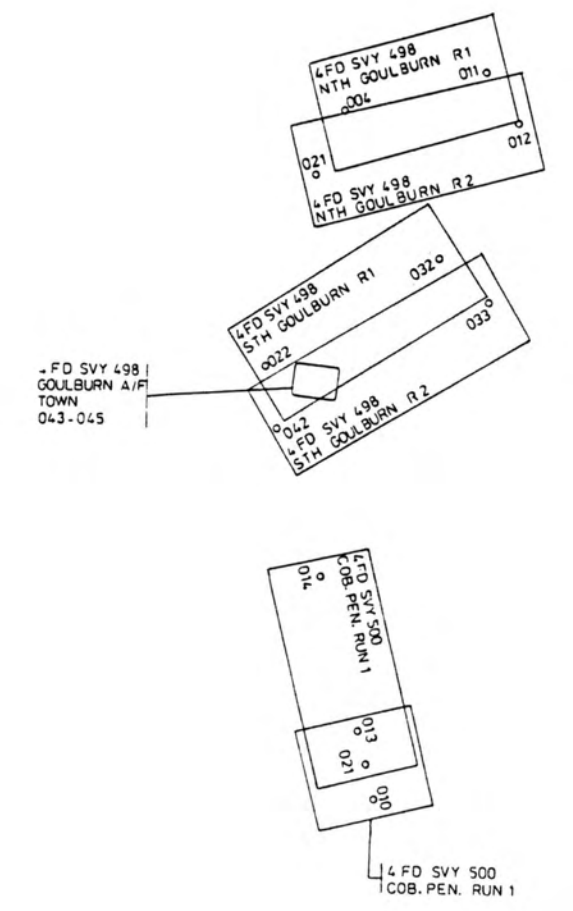
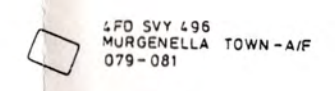
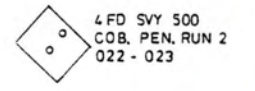
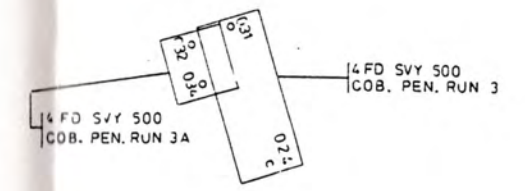
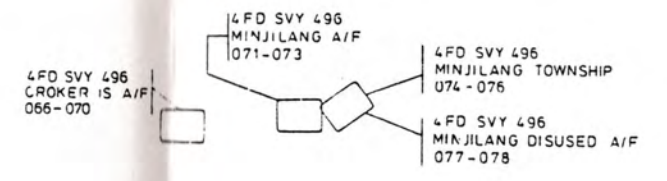
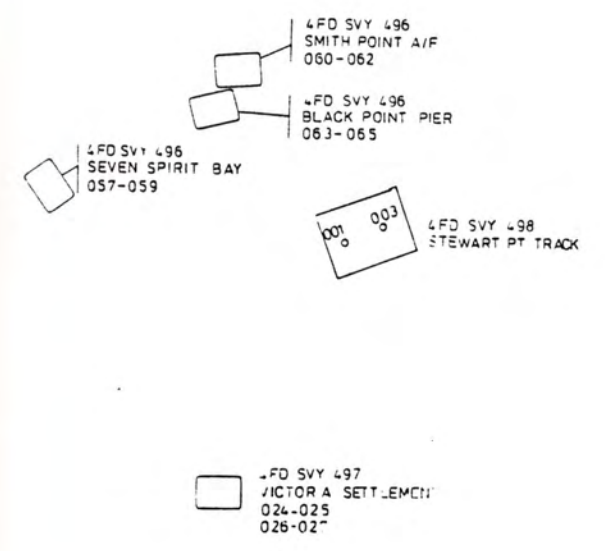


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OP NERVOSE 94 SUPPLEMENTARY PHOTOGRAPHY
COBOURG PENINSULA



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133° 30'
12° 00' SD 53-2

OP NERVOSE 94 SUPPLEMENTARY PHOTOGRAPHY
MILINGIMBI

4 FO SVY 501
MANINGRIDA TOWN
001

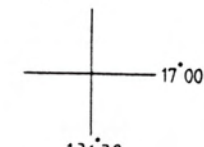
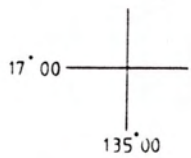
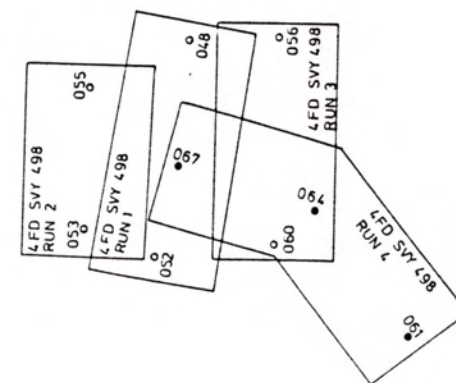
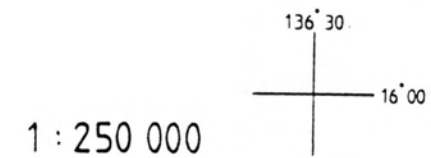
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135° 00'
12° 00'

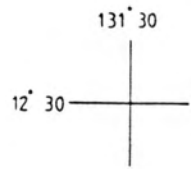
13° 00'
133° 30'

13° 00'
135° 00'

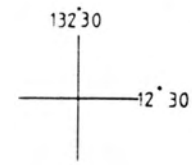


OP NERVOSE 94 SUPPLEMENTARY PHOTOGRAPHY
BAUHINIA DOWNS



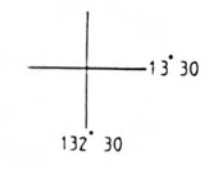
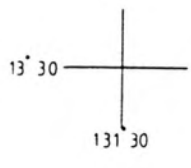
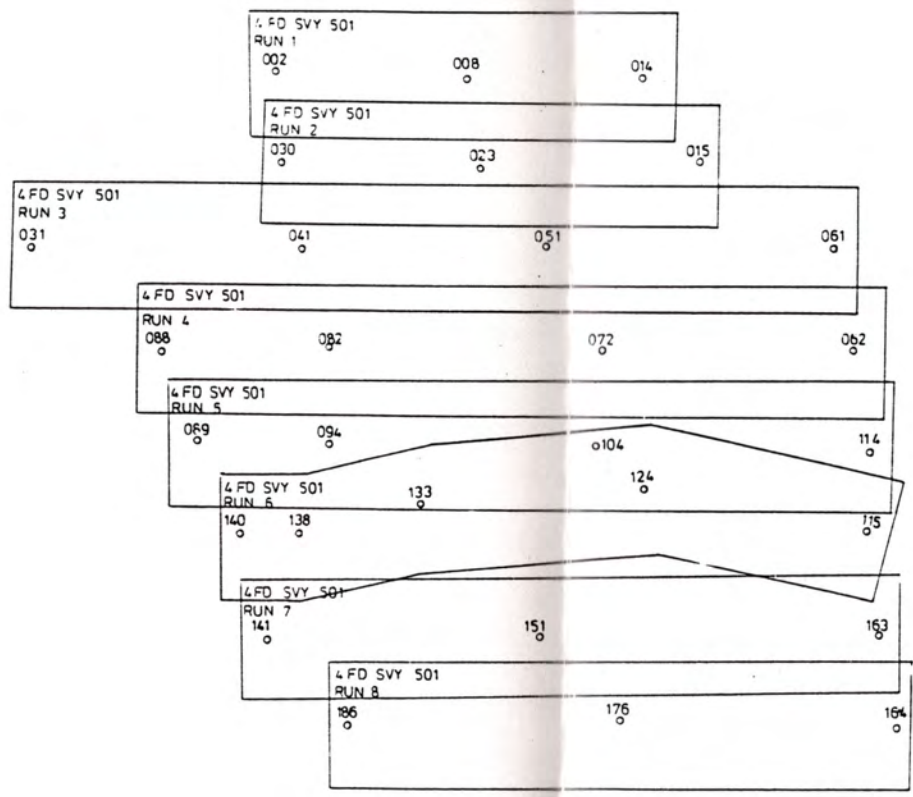


OP NERVESE 94 SUPPLEMENTARY PHOTOGRAPHY
 MT BUNDEY TRAINING AREA



1 : 250 000

APPENDIX 7 TO
ANNEX E TO
OP NERVESE 94
OPERATION REPORT
DATED 15 DEC 94



OPERATION MANNING

1. 4 Fd Svy Sqn:

182689	CAPT C. J. Topovsek	Det OC
454355	LT A. D. Caudle	ADMINO
45892	WO2 S. C. Capp	OPSWO
1204137	SSGT B. W. Collings	Editor
318818	SSGT P.A. Drover	FC Party IC
321968	SGT S.E. McGuiness	FC Party IC
1204137	SSGT A. B. Simcock	QMS
180179	SGT F. L. Downie	FC Party IC
455498	CPL J. P. Archer	FC Party IC
555441	CPL I. D. Baldwin	FC Party IC
325734	CPL P.J. Ball	FC Party
454834	CPL R. P. Crawford	Air Camera Op
3168177	CPL N.A. Smith	Cook
555964	CPL S. Wegener	FC Party IC
3804915	SPR M.J. Arnold	FC Party
454289	SPR G. Huxley	GD
184457	SPR M. Linwood	FC Party
5101262	SPR M.V. McInerney	FC Party
3804881	SPR C.V. Pearse	FC Party
32804932	SPR G. C. Richards	FC Party

2. Army Svy Regt:

421885099	MAJ W. Cordova	LO (US)
223520	SSGT B. D. Hammond	Air Camera Op
230158	SGT C. J. McInnes	FC Party IC
5103398	SPR A. S. Blake	FC Party

3. 126 Sig Sqn:

2311879	SIG R. W. Brown	Sig Rad Op
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4. 1 BASB MAINT COY:

185812	CPL R. J. Howe	Veh Mech
234461	CFN J. Chugg	Veh Mech

5. 161 Recce Sqn (LOH):

557116	CAPT A. J. Langley	Pilot
237194	CAPT M. Potts	Pilot
185796	LT J. A. Otter	Pilot
2803103	LT G. F. Quick	Pilot
239375	CPL P. C. Stuart	All Trades
236620	CFN K. Barends	All Trades
329198	CFN A. D. Roll	All Trades

6. 173 Survl Sqn (Nomad):

1204956	CAPT M. E. Sterling	Pilot
329037	LT D.H. Kemp	Pilot
328013	CFN P. H. Simpkin	All Trades

7. 1 BASB (LCM8s):

45931	WO2 M. Hill	Supervisor Marine
4401432	SGT D. Riddle	Supervisor Marine
185104	CPL K. Hayes	Coxswain
200285	CPL J. Giampino	Coxswain
64105	CPL K. Friberg	Engineer
326096	CPL J. Stewart	Engineer
327231	CFN I. Elliot	Engineer
2300092	PTE S. Davis	Deckhand
2305450	PTE D. Lankester	Deckhand

AAAVN REPORT- 161 RECCE SQN

Introduction

1. B Tp, 161 Recce Sqn supported 4 Fd Svy Sqn during Op NERVOSE 94 in the Bathurst Island, Melville Island, Coburg Peninsula, Alligator River and the Borroloola regions of the Northern Territory from 14 Jul 94 to 2 Aug 94. To maintain two aircraft on line at all times, three aircraft were provided with sufficient crews to enable the projected flying rate to be achieved.

Pre-Operation Administration

2. The pre-operation administration was sufficient to enable a smooth move into the AO. The air party arrived in Jabiru on the 14 Jul 94 and commenced tasking on the 16 Jul 94. The information received describing the type of operation and confirming task details was timely and in sufficient detail to allow a reasonable understanding of the field completion process. Pre-Op direct liaison was conducted, and this served to identify additional requirements.

Deployment

3. The air party consisting of 3 aircrew and three RAEME tradesmen self deployed on 11 Jul 94 with staging through Rockhampton, Georgetown, and RAAF Tindal. Two additional personnel arrived on the 20 Jul 94 via the scheduled C130 service to Darwin. A hand over of vehicles from A Tp on completion of Ex SABRE SLASH was carried out prior to their deployment to Jabiru.

Tasking

4. LOH were used primarily for air checking 1:50 000 map sheets of the designated area. All these sheets needed to be ground checked prior to the air checking and this led to some days of light activity for the detachment. Generally, the rate of activity was constant and there was at least two aircraft airborne on task every day of the Operation.

Maintenance

5. The detachment deployed with three RAEME tradesmen, with a fourth arriving on the 23 Jul 94. The requirement for the four personnel was established on the forecast of 240 task hours. As only 150 hours were flown, the following problems were encountered:

- a. there was an excess of RAEME personnel provided for the Op,
- b. a higher maintenance effort was required prior to departure from Holsworthy, and
- c. some disruption to the subsequent 2 Cav Regt exercise occurred as servicing that were to have taken place during the changeover occurred instead during the period of the exercise.

6. During the period of the Operation a number of un-serviceabilities and minor services were encountered. The third aircraft ensured two aircraft were on line for tasking at all times.

Fuel

7. Maximum use of the civilian infrastructure was achieved by using refuelling facilities at Jabiru airport and Borroloola airport. The Fuel drum stocks that were pre-positioned for the field checking stage were well located to make maximum use of the available aircraft hours.

Administration

8. Apart from minor difficulties with the accommodation and meals during the initial deployment to Roper Bar and Borroloola, all other aspects of administration were of a high standard. Meals at Jabiru were excellent, and the facilities provided were more than adequate.

Summary

9. For all but one of the 161 Det, Op NERVOSE 94 served as an introduction to field survey operations. The information and background regarding the map making process was valuable and educational. As in the past, 4 Fd personnel, displayed a good understanding of aviation operations, and Op NERVOSE 94 provided a further opportunity to enhance the cooperation between the two Units.

Sep 94

M. POTTS
CAPT
B Tp Comd

ANNEX H TO
OP NERVOSE 94
OPERATION REPORT
DATED 15 DEC 94

AAAVN REPORT - 173 SURVL SQN

Introduction

1. Op NERVOSE 94 was an aviation bid by 4 Fd Svy Sqn FY 94/95 for one Nomad to carry out supplementary aerial photography using an RC10 camera. The task was accepted for one Nomad with 60 task hours.

Execution

2. Nomad A18-314 departed Oakey on the 14 Jul 94 and arrived at Darwin on the 15 Jul 94. The camera was fitted and tested on the 16 Jul 94 and, tasking commenced from RAAF Darwin on the 17 Jul 94. No problems were experienced with the aircraft or camera.

3. The camera was removed on the 3 Aug 94 and the aircraft returned to Oakey that afternoon.

Flying Rate

4. Hours were flown as follows:
- a. task hrs- 44.7,
 - b. travel hrs- 22.0, and
 - c. continuous training hrs- 5.6.

Fuel

5. Fuel was purchased from civil sources throughout the Op.

Administration

6. Little administrative input was required from 4 Fd Svy Sqn with the Nomad based at RAAF Darwin. The only problems came from the RAAF at Darwin; however, a cease-fire agreement of sorts was worked out after a few days of operations.

Regt Details

7. The following regimental details are provided for the personnel that participated on the Op:

- a. 1204956 CAPT M. E. Sterling ARES 14-22 Jul,
- b. 329037 LT D. H. Kemp Det Comd 14 Jul - 03 Aug, and
- c. 328013 CFN P. H. Simpkin All trades 14 Jul- 03 Aug.

Aug 94

D. H. KEMP
LT
173 Survl Sqn

WATER CRAFT REPORT - 1 BASB

Introduction

1. Water craft LCM-8 support for Op NERVOSE 94 was provided by 1 BASB's Water craft section during the period 10-23 Jul 94. 1 BASB provided 2 x LCM-8s for the requested period.
2. The hours allocated for operation were as follows:
 - a. task hours x 145, and
 - b. travel hours x 145.

Pre-Operation Administration

3. The Pre operation administration was adequate to enable the 5 LCM-8's crews to arrange all aspects of the move prior the commencement of the task. Direct liaison was conducted, and served to iron out any misunderstandings. The information received for the Operation was in sufficient time and detail to allow the water craft personnel to understand the sea operation side.

Tasking

4. The LCM-8's were used for the transportation of personnel and vehicles from
 - a. Darwin to Melville Island,
 - b. Melville Island to Bathurst Island,
 - c. Bathurst Island to Black point,
 - d. Black point to Croker Island,
 - e. Croker Island to Black point, and
 - f. return to Darwin.

Generally, the activity went without any problems.

Maintenance

5. The water craft personnel completed all ongoing maintenance throughout the Operation, and there were no major breakdowns to upset the exercise commitments.

Fuel

6. The fuel required for the Operation was acquired through Fleet Base, Coonawarra within Larrakeyah Army Barracks. There were no problems experienced with the fuel.

Administration

7. The administration prepared and completed by 4 Fd Svy for the 1 BASB Water craft personnel was good, and more than adequate.

Conclusion

8. The Operation NERVOSE 94 was completed without any major problems and served as a learning introduction to the work with RASvy Corps. Overall, the operation went very well, and it was a pleasure to work the 4 Fd Svy Sqn people again.

29 Jul 94

M. I. HILL
WO2
Det Comd
1BASB

RAEME (VM) TECHNICAL REPORT

Deployment

1. The road party consisted of the following vehicles:
 - a. eight L/R 110 FFR,
 - b. one Truck Cargo MC2 Unimog ,
 - c. two Truck Cargo MC2 Unimogs with crane,
 - d. one L/R 6x6 FFR,
 - e. one 1/2 ton trl, and
 - f. one L/R 6x6 GMV.
2. All vehicles were inspected at 4 Fd Svy Sqn prior to leaving Adelaide. Also Servicing and repairs were done, this included the installation of the GPS modules to four vehicles. This brought all vehicles to a task-worthy condition for the road move.

Preventive Maintenance

3. All vehicles had first and last parade services completed daily. In addition Non-Technical inspections were carried out for the month of Jul as well as regular checks of gearbox, differentials, transfer case and CV hubs were done. Radiators and air filters were cleaned as required.

Parts Availability

4. Minimal parts were carried by RAEME support .Parts required in Adelaide were supplied by ALB. A Unimog generator was required at Port Augusta, this was air freighted to Port Augusta air port the same day and installed that night at Glendambo. All parts required in the Northern Territory region were supplied by 1 BASB (Forward) in Darwin.

Workshop Support

5. Field workshop support was required to conduct repairs on a L/R 110 FFR .The casualty vehicle was damaged whilst being transported by LCM-8. Tie downs chains worked loose in rough seas allowing the vehicle to move freely on the deck, this caused

excessive damage to both differentials, subsequently requiring replacement. 1 BASB provided timely support to repair the vehicle in Darwin. The workshop facilities were also used by CPL Howe to replace an unserviceable clutch in another vehicle.

Specific Repairs

6. Details of specific repairs are listed at Appendix 1.

Aug 94

R .HOWE
CPL VM
Maint Coy
1 BASB

Appendix:

- I. Specific Repairs

SPECIFIC REPAIRS

49-169 L/R 110 FFR

Remove 100 amp alt belts

49-170 L/R 110 FFR

Repair seized T/case filler plug
Replace rear diff pinion seal

49-171 L/R 110 FFR

Minor service
Install GPS
Adjust L/H rear wear bearing
Replace front and rear diff assemblies
Repair electrical faults { corrosion from salt water }

49-172 L/R 110 FFR

Install GPS
Replace starter solenoid
Wheel alignment and balance
Adjust steering box and tighten panhard rod

49-173 L/R 110 FFR

Replace fuel filter bracket mounting bolts { drill and tap }
Remount air-conditioning condenser
Wheel balance
Adjust throttle linkages
Replace clutch assembly and applicable modifications
Replace R/H gearbox mount and clutch slave cylinder
Tighten L/H ball joint
Repair charging system and replace battery

49-179 L/R 110 FFR

Install GPS

Repair air-conditioning compressor mounts { drill stud etc. }

49-180 L/R 110 FFR

Repair charging circuit and replace battery

Replace radiator

Release 4WD diff lock in gearbox { seizure }

49-181 L/R 110 FFR

Weld crack in front diff housing

Tighten rear axel cap

Replace throttle cable

Repair diff lock

Wheel alignment and balance

Repair fridge

Replace R/H mirror

38-898 UNIMOG CARGO

Repair fridge battery clamp and mounting brkts.

Repair air pump

46-571 UNIMOG WITH CRANE

Tighten generator mounting bolts

46-573 UNIMOG WITH CRANE

Replace brushguard mounting bolts L/H side

Repair R/H rear clearance light

Inspect and replace generator

Repair low beam L/H side

51-857 L/R 6X6 CARGO

Replace fan belts

Adjust wheel bearing L/H center axle

Adjust throttle linkages

50-782 L/R 6X6 GMV

Replace T/case output seal

Replace air compressor belt

Repair Handbrake cable

Adjust side door
Repair fuel gauge
Replace hub cap
Repair fuel switch

94/95 Resource Usage Report
4 FD SVY SQN
Unit/Fmn: 4 FD SVY SQN
TY 94/95

Activity Name: OP NERVOSE 94

ARA Allowances

Item	Unit					Total
Separation	manday	367				\$1,556.08
Flight Duties	manday	0				\$0.00
Field	manday	851				\$11,828.90

Group Total
 \$13,384.98

Civilian Salaries

Item	Unit					Total
Other Allowances	manday	4237.55				\$4,237.55

Group Total
 \$4,237.55

CLAE

Item	Unit					Total
GRES/ARA/Civil	\$	10843.25				\$10,843.25
Postage, Telephones	\$	0				\$0.00

Group Total
 \$10,843.25

Replacement, Hire, Repair and Overhaul of Equipment and Stores

Item	Unit					Total
DUF (AC's 61875, 621017, 62123, I	\$	1054.8				\$1,054.80

Group Total
 \$1,054.80

Replacement, Hire, Repair and Overhaul of Equipment and Stores - Other Sub-programs

Item	Unit					Total
Hire - showgrounds etc.	\$	1051				\$1,051.00

Group Total
 \$1,051.00

Liquid Fuels

Item	Unit					Total
Diesel - Bulk	ltr	14449				\$5,201.64
Diesel - Pack	ltr	800				\$288.00
ULP - Bulk	ltr	82.2				\$29.59
Avtur - Bulk	ltr	0				\$0.00
Avtur - Pack	ltr	16800				\$9,912.00
LPG - Non-domestic	kg	135				\$35.10

Group Total
 \$15,466.33

Total Cost for Resources Used: \$46,037.91

Major Activity Forecast vs Usage
4 FD SVY SQN
Unit/Fmn: 4 FD SVY SQN
TY 94/95

Activity Name: OP NERVOSE 94

ARA Allowances

Item	Unit			Total \$
Separation	manday	Forecast	480	\$2,035.20
		Usage	367	\$1,556.08
		Surp/Def		
Flight Duties	manday	Forecast	150	\$1,189.50
		Usage	0	\$0.00
		Surp/Def		
Field	manday	Forecast	980	\$13,622.00
		Usage	851	\$11,828.90
		Surp/Def		

Total Cost for Resource Group: Forecast - \$16,846.70

CLAE

Item	Unit			Total \$
GRES/ARA/Civil	\$	Forecast	61100	\$61,100.00
		Usage	10843.25	\$10,843.25
		Surp/Def		
Postage, Telephones	\$	Forecast	1500	\$1,500.00
		Usage	0	\$0.00
		Surp/Def		

Total Cost for Resource Group: Forecast - \$62,600.00

Civilian Salaries

Item	Unit			Total \$
Other Allowances	manday	Forecast		
		Usage	4237.55	\$4,237.55
		Surp/Def		

Liquid Fuels

Item	Unit			Total \$
Diesel - Pack	ltr	Forecast	800	\$288.00
		Usage	800	\$288.00
		Surp/Def		
Diesel - Civil Purchase	ltr	Forecast	34600	\$12,456.00
		Usage	14449	\$5,201.64
		Surp/Def		
ULP - Civil Purchase	ltr	Forecast	200	\$72.00
		Usage	82	\$29.52
		Surp/Def		

Major Activity Forecast vs Usage
4 FD SVY SQN
Unit/Fmn: 4 FD SVY SQN
TY 94/95

Activity Name: OP NERVOSE 94

Item	Unit			Total \$
LPG - Non-domestic	kg	Forecast	135	\$35.10
		Usage	135	\$35.10
		Surp/Def		

Total Cost for Resource Group: Forecast - \$12,851.10

Replacement, Hire, Repair and Overhaul of Equipment and Stores

Item	Unit			Total \$
DUF (AC's 61875, 62017, 62123, 62143)	\$	Forecast	6000	\$6,000.00
		Usage	1054.8	\$1,054.80
		Surp/Def		

Total Cost for Resource Group: Forecast - \$6,000.00

Replacement, Hire, Repair and Overhaul of Equipment and Stores - Other Sub-programs

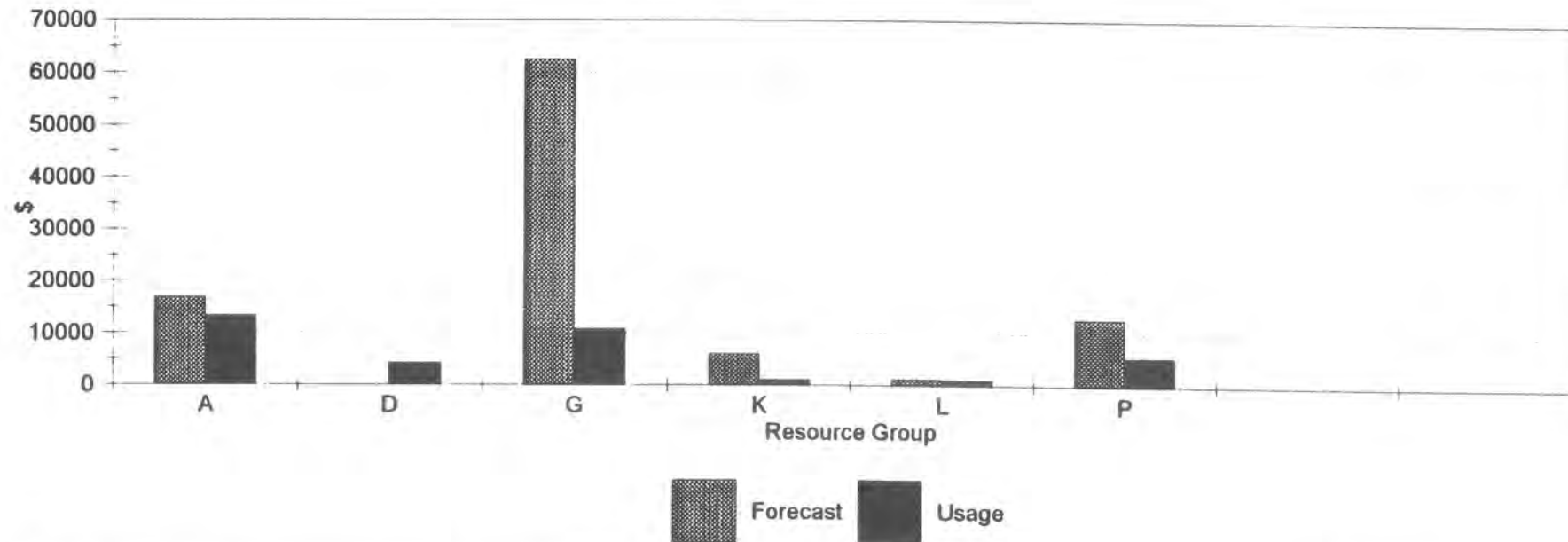
Item	Unit			Total \$
Hire - showgrounds etc.	\$	Forecast	1256	\$1,256.00
		Usage	1051	\$1,051.00
		Surp/Def		

Total Cost for Resource Group: Forecast - \$1,256.00

Total Costing for Activity: Forecast - \$99,553.80

Resource Forecast vs Usage Figures
4 FD SVY SQN
for 4 FD SVY SQN
TY 94/95

Activity: OP NERVOSE 94



A - ARA Allowances	B - RRES Allowances	C - GRES Allowances	D - Civilian Salaries
G - CLAE	K - Replacement, Hire, Repair and Overhaul of Equipment and Stores	L - Replacement, Hire, Repair and Overhaul of Equipment and Stores - Other Sub-programs	P - Liquid Fuels
S - Rations	T - Track Km	V - Training Salaries	X - Air Hours
Z - Ammunition			

COMMUNICATIONS REPORT

INTRODUCTION

1. 126 Sig Sqn was tasked to provide communications support to 4 Fd Svy Sqn in the Bathurst Island, Melville Island, Coburg Peninsula and Alligator River regions of the Northern Territory, for the period 9 July 94 to 4 Aug 94.
2. The main base was established at NORFORCE Depot, Jabiru. A forward base was then to be established at Black Point.

EXECUTION

General Outline

3. The HF radio net consisted of NCS, Alt NCS and seven Field Check (FC) parties. The FC parties were deployed throughout the Operation area.
4. Rear link with Adelaide was established via phone/fax facilities.

Manning

5. The Signals detachment consisted of SIG Brown. The manning proved more than adequate as 24 hr communications was not required.

Equipment

6. The following equipment was taken:
 - a. RT-F100 RAVEN HF Radio,
 - b. PP-F302 RAVEN High Current Power Supply,
 - c. AB-F300 RAVEN Antenna Mast,
 - d. AS-F105 RAVEN Broadband Antenna Kit,
 - e. AS-F104 RAVEN Antenna Dipole Kit, and

f. AS-F101 RAVEN Antenna Light Weight Kit.

Equipment Problems

7. A battery was found to be faulty, having little charge despite only just being opened.
8. Numerous Antenna Light Weight antenna wires were stripped of connector soldering.

Communications Problems

9. Location. Whilst Jabiru NORFORCE Depot met operational requirements well, it was not particularly suited to HF communications. The 360 degree coverage of power lines, made communications from within the compound, at best, improbable. Added to this was the fact that the depot consisted of large metallic structures, which also hamper effective and reliable HF communications. Antenna selection was also severely restricted due to safety concerns. An example of this is the fact that there was nowhere within the compound that an Antenna Mast could be erected without being over bitumen or very close to power lines. These problems were overcome however, by moving approximately 200 metres outside the compound area, before every scheduled nightly SITREP.

10. Frequency Allocation. Frequency allocation by FMP for the Operation was poor for the following reasons:

- a. The 6 MHz frequency (6.693 MHz) was shown by the IPSO charts (provided by 144 Sig Sqn) to be the optimum working frequency, out of those supplied by FMP. For this reason it was selected as the primary frequency for the Operation. Upon greater use however, it was discovered that there was large amounts of foreign language interference. This was not the biggest problem however, 3 days into the Operation, a sound that resembled a tuning signal, would come over the frequency at approximately 1915-1945 hrs daily and would not dissipate until 0800-0900 hrs the following morning. This made the 1900 hr SITREPs extremely difficult to conduct. Another problem encountered with this frequency was what appeared to be Australian Army morse. This problem however was overcome by changing the primary frequency from the 6 MHz to the 5 MHz frequency (5.1235 MHz).
- b. A lack of frequencies within the IPSO prediction parameters was also a concern. In fact the only frequencies within the parameters was the aforementioned 5 and 6 MHz frequencies.
- c. Frequency allocation for the particular distance was also a major concern before the Operation commenced. This was due to the fact that a signal was sent to 4 Fd Svy Sqn (by FMP) advising them, that if they required frequencies for use above 300 km, they were to contact their local Signals unit. This is despite the fact that 4 Fd Svy Sqn requested frequencies with a planning range in excess of 600 km.

11. Equipment. A few more RAVEN radio sets and Antenna light weight sets would also have been quite useful in coping with unforeseen eventualities.

ADMINISTRATION

12. No administration problems were encountered.

CONCLUSION

13. Once the 5 MHz frequency was selected as the primary and SITREPs were conducted outside of the base area, communications were maintained at an effective and reliable level.

14. 4 Fd Svy Sqn personnel performed well in both RATEL (Radio Telephony) procedures and in basic operation of all RAVEN equipment, despite frequency problems and location of base station at the beginning of the Operation.

RECOMMENDATIONS

15. It is recommended that:

- a. Any reconnaissance that is conducted pre-operation, should attempt to take into account communication needs as well as other operational requirements.
- b. More manpack raven equipment should be sought (on a permanent basis) to allow for breakages and unforeseen eventualities on Operation.

Aug 94

R.W. BROWN
SIG
Sig Op Rad