



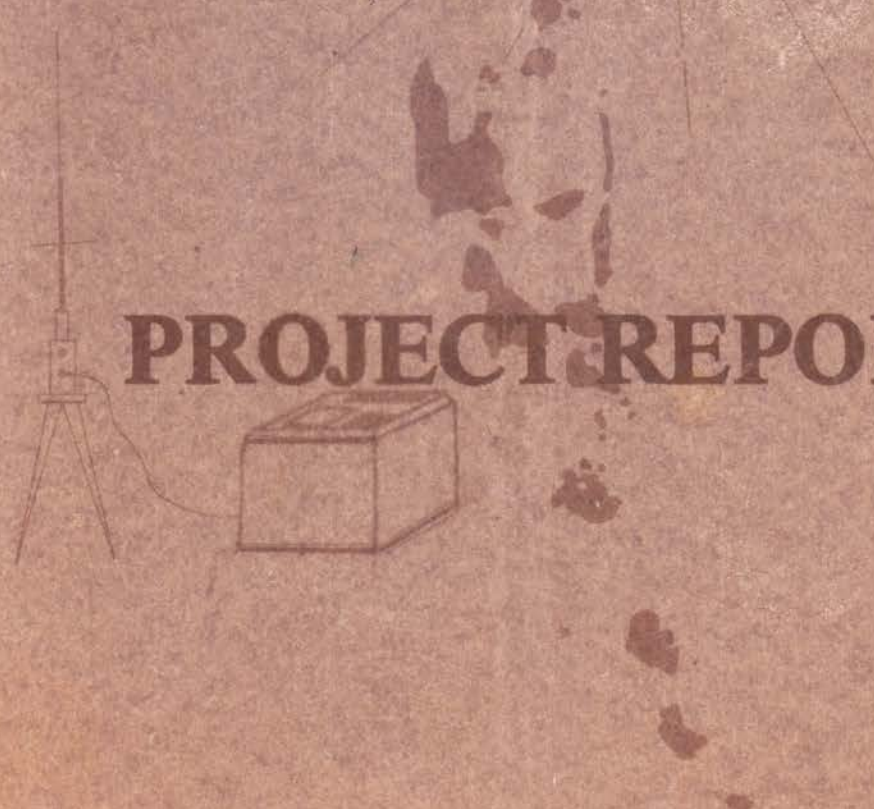
74

ROYAL AUSTRALIAN SURVEY CORPS

OPERATION ALGUM 85

VANUATU

PROJECT REPORT



4 FIELD SURVEY SQUADRON

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ROYAL AUSTRALIAN SURVEY CORPS

OPERATION ALGUM 85

VANUATU

PROJECT REPORT

4 FIELD SURVEY SQUADRON

ROYAL AUSTRALIAN SURVEY CORPS

DET 4 FIELD SURVEY SQUADRON

OPERATION ALGUM 85

AMENDMENTS

Amendment No	Date of Issue	Details	Signature/Date
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OPERATION ALGUM 85

PROJECT REPORT

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OPERATIONS	5	30
ADMINISTRATION AND LOGISTICS	7	46

OPERATION ALGUM 85  
PROJECT REPORT

- References:
- A. Headquarters Field Force Command Operation Order 1/85 dated 4 Apr 85
  - B. Unreferenced Financial Instruction dated 9 May 85
  - C. Dept of Defence SVY 103563 dated 31 May 85

INTRODUCTION

General

1. Vanuatu is a recently independent nation of the South West Pacific. It's government requested Australian assistance to acquire aerial photography and survey control to enable determination of its Exclusive Economic Zone. The request was accepted as a Defence Co-operation Programme project.
2. It was proposed that the operation be conducted in three phases over three years. Phase I was conducted during the period 30 Jun 84 to 22 Sep 84. This report covers Phase II of the operation and was conducted during the period 15 Jun 85 to 29 Sep 85.

Area of Operations

3. The Republic of Vanuatu occupies seven degrees of latitude between 13 deg S and 20 deg S and four degrees of longitude between 166 deg E and 170 deg E. A map of the AO is attached as Annex A.

Allocated Tasks

4. The following tasks were allocated for completion;
  - a. provide technical advice and assist the Vanuatu Survey Dept to obtain survey control by Doppler satellite techniques and conventional survey to determine maritime base point coordinates by occupation or photogrammetric surveys;
  - b. provide technical advice and assist the Vanuatu Survey Dept to obtain survey control by recovery of existing suitable stations. Doppler satellite techniques, and conventional survey to permit aerotriangulation of the proposed 1:80,000 (nominal scale photography);
  - c. provide technical advice and assist the Vanuatu Survey Dept to obtain survey control by Doppler satellite techniques at existing stations to enable a survey adjustment of existing UK DOS and French IGN observations to produce a high quality homogeneous network;
  - d. provide technical advice and assist the Vanuatu Survey Dept to prepare observation and station records of all stations visted and established;

- e. provide technical training to Vanuatu personnel;
- f. assist the Vanuatu Survey Dept to connect Doppler Satellite Stations to sea level where practicable;
- g. obtain available tide gauge data (observed and reduced) for stations in the AO for the period of Doppler observations and sea level connections;
- h. obtain from Vanuatu Survey Dept, survey intelligence from UK DOS and French IGN surveys, which has not previously been obtained, and which will enhance the network adjustment;
- i. obtain identification photography of stations in paragraphs 4a, 4b and 4c;
- j. obtain mapping quality photography at a nominal scale of 1:30,000, for all areas of Vanuatu;
- k. obtain large scale aerial photography as requested by the Government of Vanuatu and approved by Australia.

#### Background

5. A reconnaissance was carried out in Oct 83 to determine the feasibility, resource implications and the operational concept of an EEZ base point survey in Vanuatu. As a result of that reconnaissance, it was decided that the operation would take place in three phases, each of approximately three months, over a period of three years.

6. Phase One of the operation covered the southern portion of the archipelago (excluding Matthew and Hunter Islands) and was conducted during the period Jun to Sep 84. A further reconnaissance was conducted during the period 15 Sep 84 to 23 Sep 84. This formed the detailed plan for phase two, which covered the northern portion of the archipelago.

#### OPERATION SUPPORT

#### Air Support

7. Civil Aircraft. Movement to and from the AO was as follows:

- a. Movement of 4 Fd Svy Sqn personnel from ADELAIDE to SYDNEY on 11 Jun 85 and 12 Jun 85
- b. Movement of Det 4 Fd Svy Sqn from SYDNEY to PORT VILA on 15 Jun 85, and
- c. Return of Det 4 Fd Svy Sqn from VANUATU to AUSTRALIA on 14 Sep 85, 21 Sep 85 and 29 Sep 85.

8. Air Melanesia were used on numerous occasions during the operation to move personnel and stores within the AO.

9. Photographic Aircraft. One BEECHCRAFT QUEENAIR VH-MWO fitted with a WILD RC10 aerial camera was used to obtain all photography mentioned in para 4. The aircraft is on charter from Airsearch Aviation Pty Ltd of Melbourne.

### Sea Support

10. Two vessels were used during the operation for the transportation of survey control teams:

- a. The Coongoola was chartered from South Pacific Cruises Pty Ltd and used for the period 16 Jun 85 to 12 Sep 85, and
- b. The Rocinante was provided by the Vanuatu Government and used for the period 21 Jun 85 to 22 Jul 85.

11. Both vessels were equipped with 4.5 m flat bottom aluminium dingies with 40 H.P. outboard motors. These proved to be very effective for the movement of stores and personnel from ship to shore.

### Transport

12. Two vehicles were used in Port Vila for the duration of the operation;

- a. A Daihatsu Charade which was hired from Budget Rent a Car, and
- b. A Toyota Twin Cab 4 WD which was provided by the Vanuatu Survey Department.

13. A Toyota Twin Cab 4 WD was provided by the Vanuatu Survey Department in Luganville for use as required during the operation.

### Main Base

14. Port Vila was used as the main base with office and storage space being provided at the Vanuatu Survey Department.

### Forward Base

15. Luganville was used as a forward base for aerial photography operations during the period 4 Sep 85 to 7 Sep 85.

### Darkroom Facilities

16. The X-ray room of the Georges Pompidou Hospital was used for all film and bromide processing. The facility was available for use at any time as the hospital is no longer operational.

17. The Zeiss FE 120 Film Developer and TG 24 Film Dryer proved to be invaluable in the processing of photography.

### Vanuatu Survey Department

18. The Vanuatu Survey Department provided office and storage space as well as one vehicle for the duration of the operation.

19. In addition they committed surveyors Russell Fox, Moses Kalsale Williams, Ngpan Norbert and Marc Lusinchi together with 14 survey assistants for varying periods during the operation.

Australian High Commission

20. The Australian High Commission provided telex and postal services to Australia together with accounting for all financial matters.

Aviation Fuel

21. Bulk AVGAS was available in ground at Port Vila and Luganville with all accounts going to the Australian High Commission and being charged against OP ALGUM. All fuel was supplied by air BP.

Motor Spirit

22. Five by 200 litre drums of MT super were purchased for use by the field parties. Fuel for the hire car was purchased from local kerbside supplies.

23. Diesel was provided by the Public Works Department out of the Survey Department fuel allocation.

Communications

Internal

24. Radio equipment as follows was provided by the Communications Cell of the Vanuatu Police Dept

- a. Survey teams - CODAN 7924 HF Manpack Radios
- b. Rocinante - RACAL TRA 922 HF Radio
- c. Coongoola - CODAN 6B01 HF Radio and
- d. Main Base - CODAN 6B01 HF Radio

25. The frequency allocated was 5.267 MHZ. This was the same frequency as that used by the Vanuatu Police Department and minor problems were encountered with crowding on the network.

Rear Link

26. Communications with Australia were as follows:

- a. The Australian High Commission provided telex and mail facilities, and
- b. The Solaise Hotel provided telephone facilities

27. As occurred on OP ALGUM 84 the International Telephone Credit Card provided through Telecom Australia to the Detachment Commander was not accepted for use in Vanuatu. A statement certifying this is attached as Annex B.

28. A register of trunk calls C117 was maintained and the telephone account was paid at the Solaise Hotel out of petty cash at the end of each month.

### Local Assistance

29. The co-operation and assistance rendered by the local population was to be commended. Guides and labourers were hired as required and there were few cases of panels being stolen. The assistance received was largely due to regular publicity given on news reports over Radio Vanuatu. The text of a typical news report is included at Annex C.

### OPERATIONS

#### General

30. Survey teams were deployed in the field as follows:

- a. During the period 21 Jun 85 to 15 Jul 85 one survey control team and one panelling team onboard both the Coongoola and Rocinante;
- b. During the period 16 Jul 85 to 22 Jul 85 one panelling team onboard the Rocinante and;
- c. During the period 16 Jul 85 to 12 Sep 85 two survey control teams onboard the Coongoola.

31. One RASVY member was onboard the Coongoola at all times. Control survey teams often deployed without RASVY personnel however two surveyors from the Vanuatu Survey Department had attended a Survey Control Course at the School of Military Survey in preparation for the operation.

32. As occurred on OP ALGUM 84, the progress of the operation was hampered by poor weather conditions. Prevailing weather conditions from 15 Jun 85 to 31 Jul 85 were predominantly warm and humid with six to eight octals of cloud and rain. From 1 Aug 85 to 30 Sep 85 the weather improved with two to six octals of cloud and occasional showers. Annex D shows statistics for rainfall and sunshine at Port Vila for the duration of the operation.

33. It is recommended that OP ALGUM 86 not be commenced until mid to late Jul 86, due to the weather conditions.

#### Geociever Operations

34. Geociever operations commenced on 21 Jun 85 and ceased on 12 Sep 85. A total of 23 new stations were established with 6 existing stations being re-observed. Point positioning observations were made with a minimum of 20 balanced passes for new stations and 40 balanced passes for existing stations.

35. All new stations together with four of the existing stations observed were connected to sea level. Details of all observations are included in Annex H.

36. Four stations, MLY 18, D27, ESY 1 and D33 are required to be re-observed on OP ALGUM 86. This is due to no precise ephemeris being available for the present observations. The position of all stations observed is shown at Annex E.

### Panelling Operations

37. A total of 55 existing stations were visited and panelled. 16 stations were not found or had been destroyed with nearby stations being panelled as replacements. Locations of existing stations panelled and details of replacement stations are shown at Annex F and G respectively.

### Aerial Photography

38. Ident Photography. Photography was obtained for all 84 new and existing control stations visited using a WILD RC10 aerial camera with both a superwide angle (f=88mm) and wide angle (f=152mm) lens. Details of all ident photography acquired is shown at Annex H.

39. Line Photography. Monochrome photography was acquired at 1:30,000 nominal scale using a WILD RC10 aerial camera with a wide angle (f=152mm) lens. Due to the prevailing weather conditions only class Y photography could be acquired. A total of 194 line km of Class Y photography was acquired from a total requirement of 3918 line km. Details of line photography acquired is shown at Annex I.

40. Taking into consideration the poor weather conditions and hence the limited opportunities available to acquire photography, the requirement to use different lenses for both the ident and line photography was impractical and limited the overall acquisition of photography. Consideration should be given to using the 152mm lens for both the ident and line photography on OP ALGUM 86.

41. Urban Photography Colour photography at 1:10,000 nominal scale was acquired of Port Vila. The same requirement for Luganville remains outstanding. Details of colour urban photography obtained are shown at Annex J.

42. Film Processing All monochrome film was processed in Port Vila using the facilities mentioned in paras 17 and 18. All colour film was returned to Australia and processed by Air Photographics Pty Ltd of Melbourne.

### Tide Gauge Data

43. Only one permanent tide gauge exists in Vanuatu, this is maintained at Port Vila. Observational data at this tide gauge was obtained for the period 21 Jun 85 to 12 Sep 85.

### French (IGN) Survey Data

44. Approaches were made through the Australian High Commission to the French High Commission and through Mr Charlie Payne of the Vanuatu Survey Department to the Vanuatu Minister of Lands requesting the supply of outstanding French survey data. To date there has been a poor response from the French, with no data having been supplied.

### Aircraft Usage

45. Operations in country commenced on 17 Jun 85 and ceased on 28 Sep 85. Total flying time was 128 hr 34 min, including 24 hr 10 min ferry time to and from MELBOURNE plus 4 hr 45 min recon for OP ALGUM 86. Details are shown at Annex K.

ADMINISTRATION AND LOGISTICSManning

46. Manning was as follows:
- a. Det Comd; 231963 LT M. Hentschel,
  - b. Control Svy Adviser; 313931 WO2 R.J. Williams,
  - c. Camera Operator; 45650 SGT R. Garritty,
  - d. Radar Mech (Geoceiver); 3104368 CFN M.A. Lueders,
  - e. Civilian pilot from Airsearch Pty Ltd; Mr J.F. Ward, and
  - f. **Civilian** LAME from Airsearch Pty Ltd; Mr K. Reardon.

Visits

47. LTCOL K.J. Murphy SO1 (SVY) FF Comd and MAJ P.M. Bion OC 4 Fd Svy Sqn visited from 17 Sep 85 to 21 Sep 85 for the purposes of recon for OP ALGUM 86.

Passports/Visas

48. All members not in possession of an Australian Passport were issued with an official passport. No visas were required for entry into Vanuatu.

Finance

49. Support. OA1 No 15296-0 funded at \$50,000 and OA1 No 15144 funded at \$86,920 were forwarded to the Australian High Commission. Details of monies committed in Australia and Vanuatu are shown at Annex L.
50. Local Purchase. The procedure laid down in paras 7 to 11 of Ref B was followed with the exception that all paperwork was handled by the Australian High Commission.
51. Petty Cash. A petty cash advance of \$A700 in equivalent local currency was maintained by the Det Comd. This exceeded the amount of \$A200 as specified in para 12 of Ref B on advice from Mr G. Ramsey, 2nd Sec (CA) at the Australian High Commission. This was often used to obtain goods which would otherwise have required Local Purchase. Details of expenditure on petty cash is shown at Annex M.
52. Pay. All members received eight pays in advance prior to departure from Australia.
53. Outfit Allowance. All members except WO2 R. Williams were paid the basic and tropical element of Outfit **Allowance**. WO2 R. Williams received the allowance in 1984.
54. Overseas Allowances. Whilst in hotel accommodation members were in receipt of Short Term Duty Travelling Allowance at the rate of 4560 VT

per day for the first 28 days and at 3845 VT per day thereafter. In the field members were in receipt of Living Allowance at the rate of 2350 VT per day under tentage and 2265 VT per day on board ship. The allowances did not contain a component to cover accommodation expenses. Post Allowance was paid as applicable.

#### Accommodation

55. Hotel accommodation was maintained for the duration of the operation at the Hotel **Solaise** in Port Vila. For the period 4 Sep 85 to 7 Sep 85 while operations were based from Luganville, accommodation was obtained at the Hotel Santo.

56. As no accommodation element was included in the members allowances all payment for accommodation was made direct from the Australian High Commission.

#### Medical

57. No major health problems requiring medical treatment were encountered during the operation by Australian personnel. All members were **inoculated** against Hepatitis B prior to departure from Australia and **malarial** prophylaxis were taken each week by all members.

58. One labourer from the Vanuatu Survey Department was involved in a chainsaw accident and was evacuated to Port **Vila** using the chartered Queenair aircraft.

#### Morale

59. Morale remained high throughout the operation.

#### Rations

60. Tinned and fresh rations were purchased in bulk at Port Vila by field parties prior to leaving for the field. Prices in general are 30% to 40% higher than Australia.

#### Stores and Equipment

61. Power Generating Equipment. The two Yamaha EF 2000 generators which were purchased for OP ALGUM 84 were used again for this operation. Both generators became unserviceable midway through the operation and were unable to be repaired in Vanuatu. A Robin R600 generator was purchased and, along with a Honda generator from the Vanuatu Survey Department, were used as replacements.

62. Magnavox MX 1502. Two satellite surveying sets, Ser No 551 and 284, together with one set of spare parts and two tape duplicators were hired for the duration of the operation from Seatronics Pty Ltd of Perth. Both **magnavox** sets performed without trouble however the two tape duplicators became unserviceable and were replaced midway through the operation. The RAEME technicians report is attached as Annex N.

63. Other Equipment. The Short Range EDM and Pnuematic Telescopic Hilomast purchased for OP ALGUM 84 were used again without trouble for this operation.

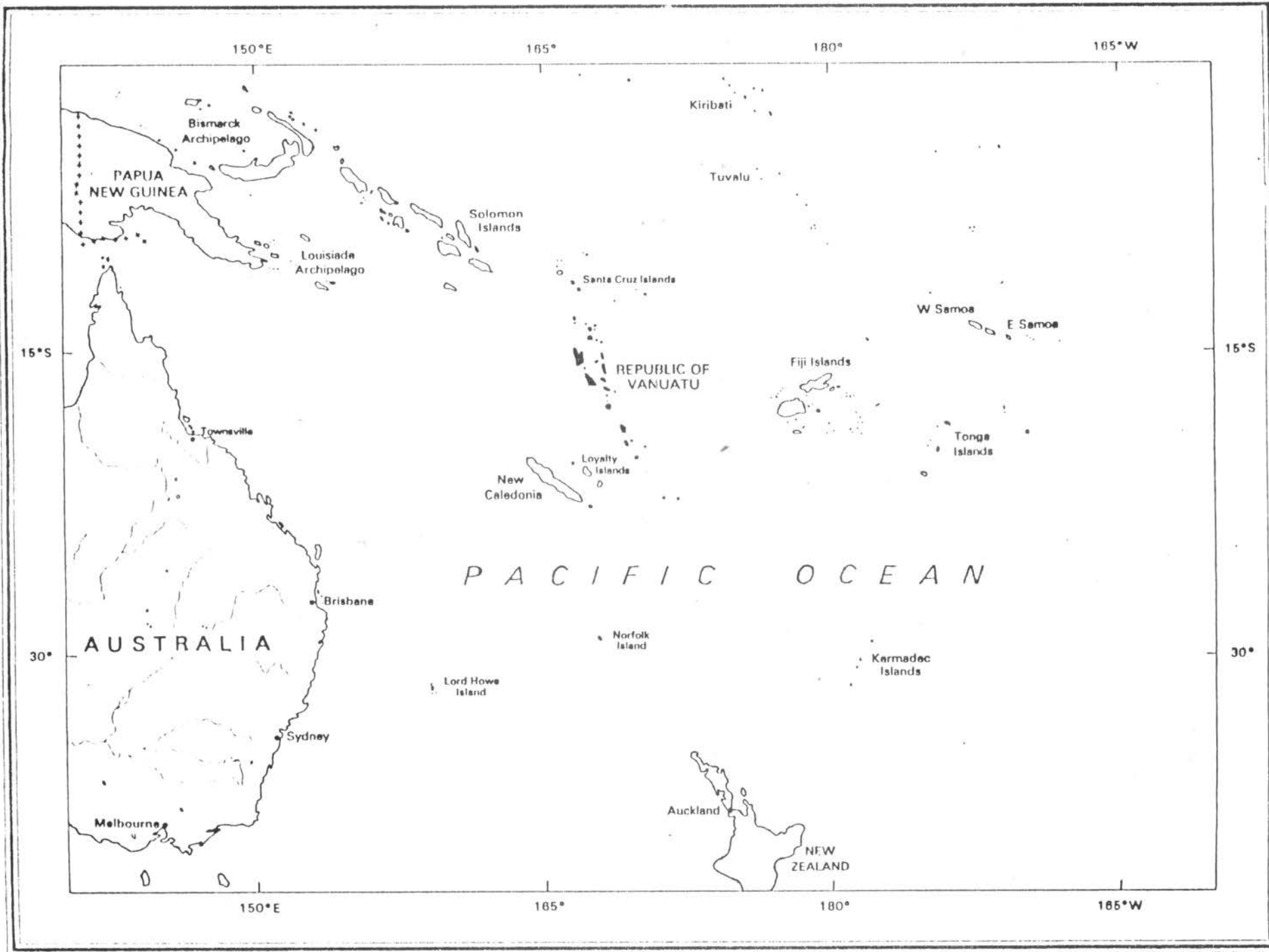
10 Dec 85

*M.J. Hentschel*

(M.J. HENTSCHEL)  
LT  
DET COMD

- ANNEXES:
- A. Area of Operations
  - B. Vanitel Statement
  - C. Radio Vanuatu News Report
  - D. Weather Statistics
  - E. Locations of Stations Observed
  - F. Locations of Stations Panelled
  - G. Details of Stations Panelled
  - H. Identification Photography
  - I. Line Photography
  - J. Urban Photography
  - K. Aircraft Usage
  - L. Finance
  - M. Petty Cash
  - N. RAEME Technicians Report

ENCLOSURES: 1. After Action Report OP ALGUM 85 dated 22 Oct 85.



AREA OF OPERATIONS

ANNEX A TO  
 OF ALGUM 85  
 PROJECT REPORT  
 DATED 10 DEC 85



SOCIÉTÉ DES TÉLÉCOMMUNICATIONS INTERNATIONALES DE VANUATU  
VANUATU INTERNATIONAL TELECOMMUNICATIONS COMPANY  
TELEPHONE 2185 TELEX NH 1050 — TELEFAX 2910

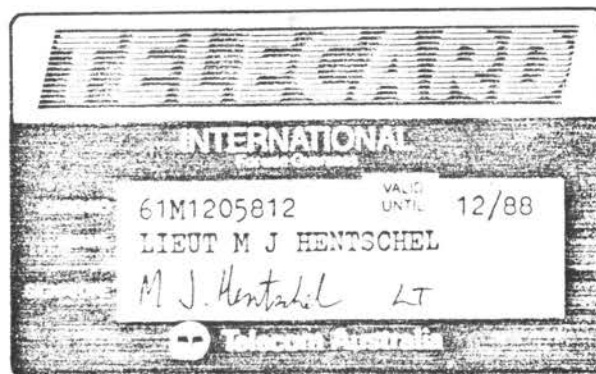
ANNEX B TO  
CF AIGUN 85  
PROJECT REPORT  
DATED 10 DEC 85

16th September, 1985

TO WHOM IT MAY CONCERN

This is to certify that "TELECARD" is not accepted as payment for international telecommunications.

H. Ramirez,  
General Manager



RADIO VANUATU NEWS REPORT

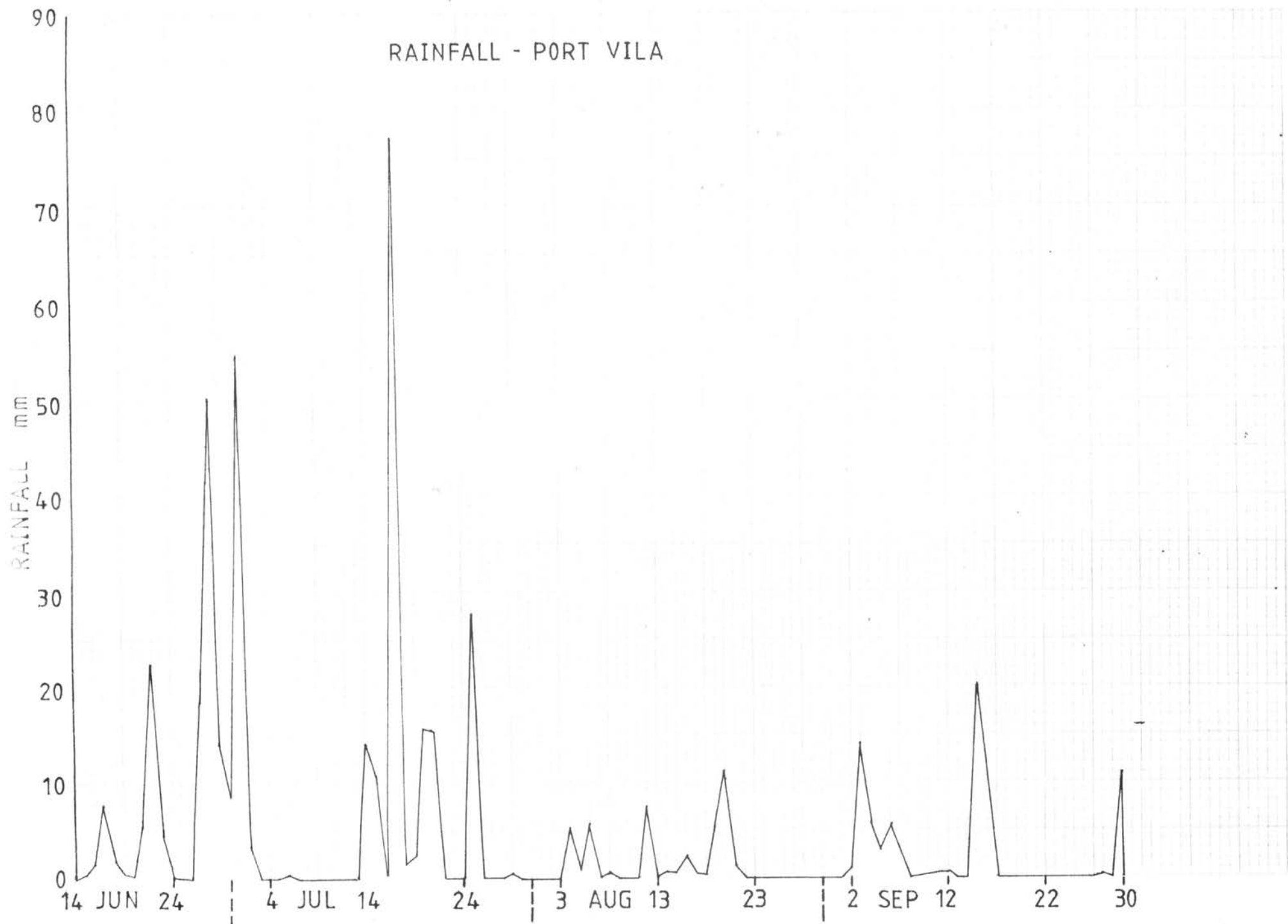
Dipatmen blong survey anda long ministri blong Lands, naoia hemi stap mekem wan fala wok blong produsim wan niu map blong Vanuatu...

Wan fala man blong dipatmen i bin talem aot long RV se fes phase blong wok ia oli bin mekem finis last year hemia blong mekem ol survey stat long Aneityum kasem saot long Epi. Sekon phase blong wok ia naoia i stap ko het hemia stat long saot Epi blong ko kasem Torres krup.

Spokesman i talem se naoia plande man blong olketa i stap long field. Long ol defren aelan we survey wok i stop long hem, bae ol pipol i faenem olketa waet plastik we tim i stap putum. Ol mark ia oli veri impoten mo oli askem ol pipol blong no tatsem sapos oli lukim. Last phase blong wok ia i save stat ino long taem.

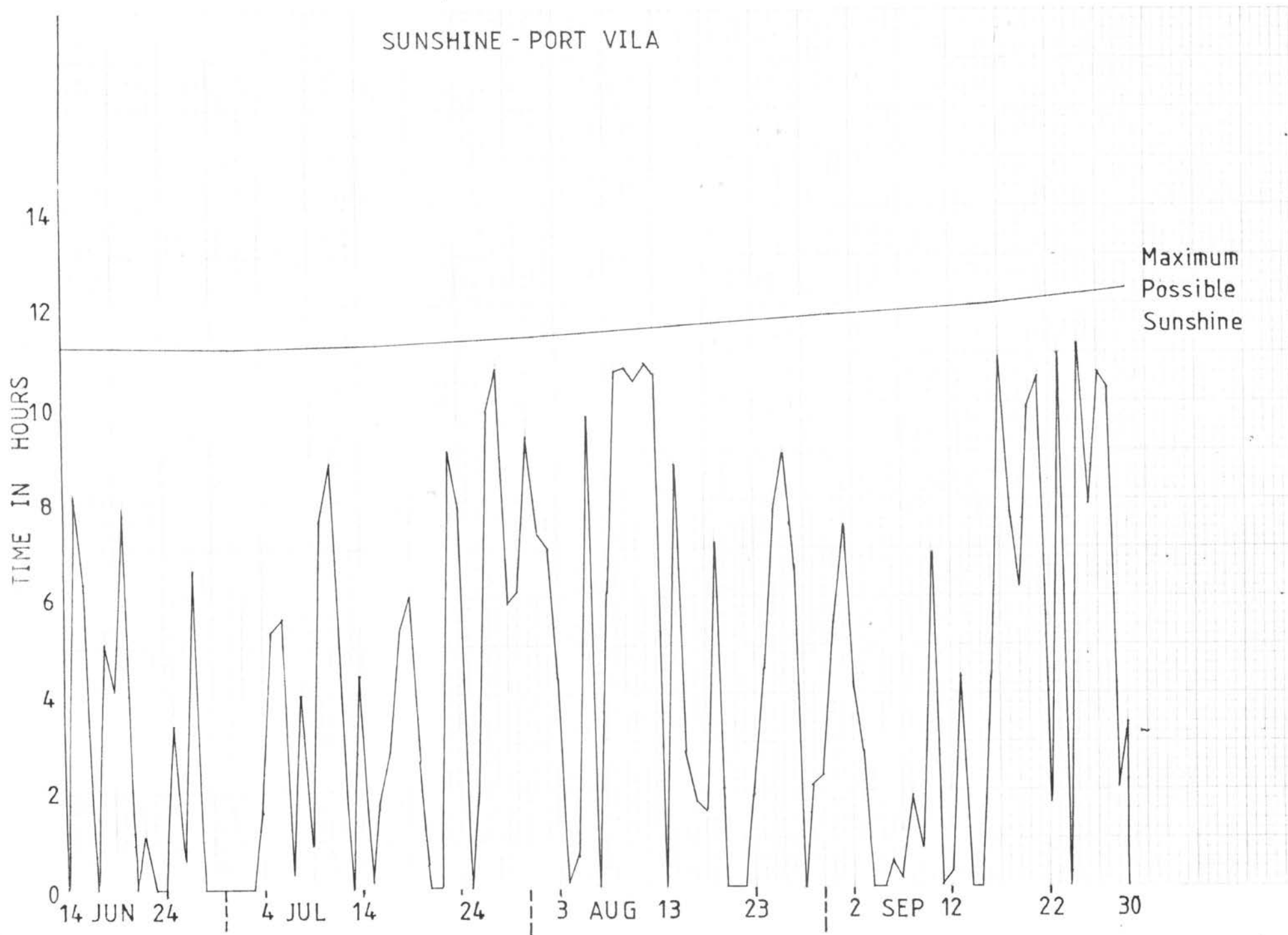
Wan fala smol plane bae i tek pat tu long wok ia, hemia blong kerem ol photo. Ensaed long plane ia, i kat sam army blong Australia we oli kat plande save blong tekem ol photo olsem ia.

Spokesman i talem tu se wetem map ia blong hol kaontri, bae oli produsim wan spesol wan bagegen blong tuketa taon wetem ol developmen blong tu fala.



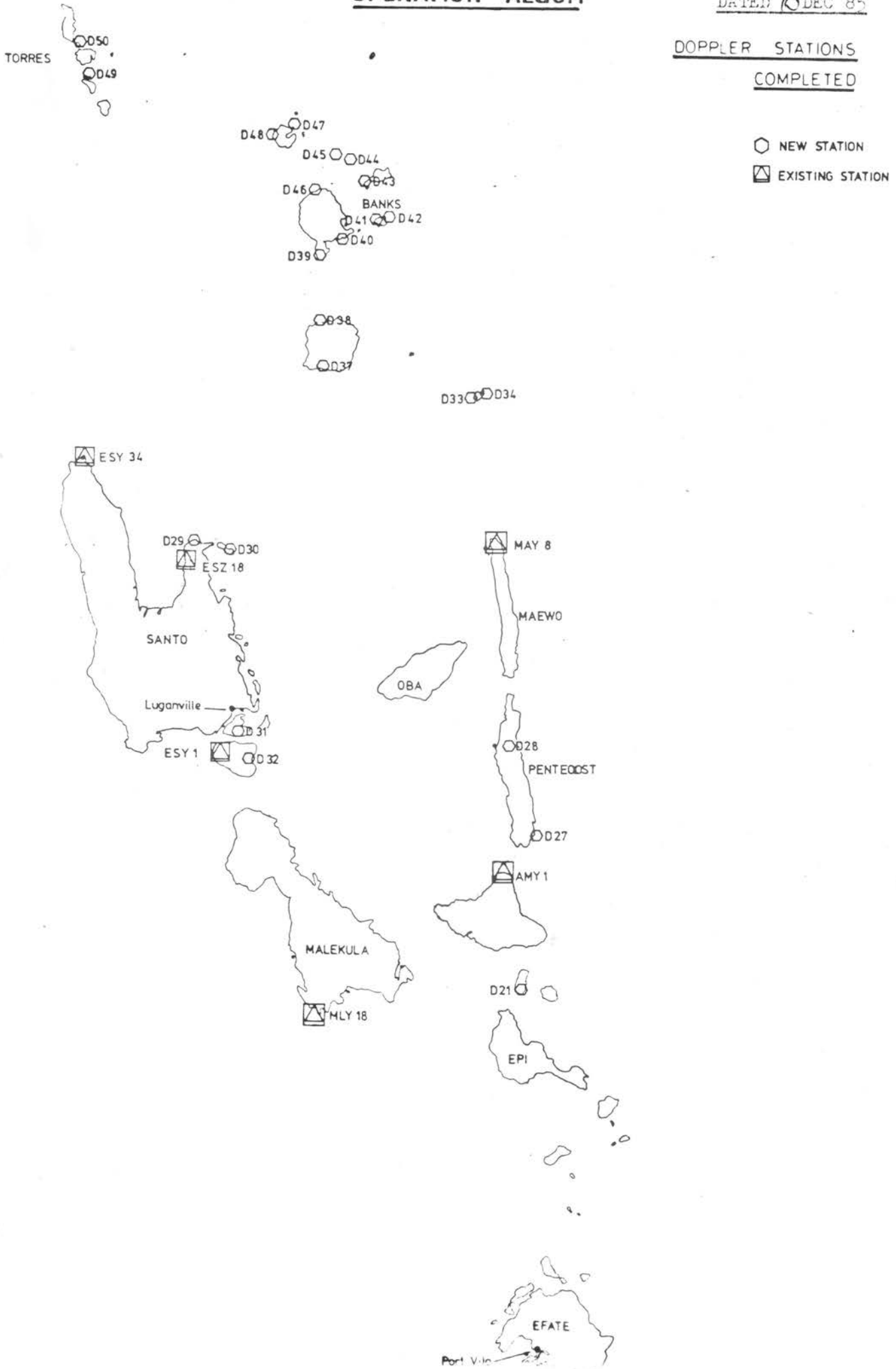
ANNEX D TO  
 OP AUGUST 85  
 PROJECT REPORT  
 DATED 10 DEC 85

# SUNSHINE - PORT VILA

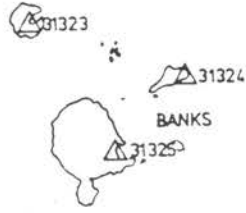


# OPERATION ALGUM

DOPPLER STATIONS  
COMPLETED



**OPERATION ALGUM**



△ EXISTING STATIONS  
 ▭ PANELLED



STATIONS PANELLED

Serial	Station Number	Island	Panelled	Replacement Station
1	31321	Torres	YES	
2	31322	Torres	YES	
3	31325	Vanua Lava	YES	
4	31324	Mota Lava	YES	
5	31323	Ureparapara	YES	
6	31326	Vanua Lava	YES	
7	31327	Santo	YES	
8	ESY 2	Santo	YES	
9	ESY 5	Santo	YES	
10	ESY 7	Santo	NO	ESZ 30
11	ESY 11	Santo	YES	
12	ESY 14	Santo	YES	
13	ESY 17	Santo	YES	
14	ESY 20	Santo	YES	
15	ESY 24	Santo	YES	
16	ESY 28	Santo	YES	
17	ESY 35	Santo	YES	
18	ESZ 17	Santo	NO	ESY 22
19	ESZ 43	Santo	NO	ESZ 41
20	ESZ 55	Santo	NO	ESZ 51
21	AOY 1	Ambae	YES	
22	AOY 3	Ambae	YES	
23	ST 11	Ambae	YES	
24	ST 17	Ambae	NO	ST 18
25	MAY 1	Maewo	YES	
26	MAY 3	Maewo	YES	
27	MAY 4	Maewo	YES	
28	MAY 6	Maewo	NO	MAY 5
29	MAY 6	Maewo	NO	MAZ 8 (Additional Station)
30	PEY 6	Pentecost	YES	
31	PEY 7	Pentecost	YES	
32	PEY 1	Pentecost	YES	
33	PEZ 3	Pentecost	NO	PEY 2
34	AMY 3	Ambrym	NO	AMZ 11
35	AMY 4	Ambrym	NO	AMZ 5
36	AMZ 4	Ambrym	YES	
37	AMZ 8	Ambrym	NO	AMZ 7
38	AMZ 9	Ambrym	NO	AMZ 10
39	31328	Malekula	YES	
40	MLY 1	Malekula	NO	MLY 5
41	MLY 2	Malekula	YES	
42	MLY 8	Malekula	NO	MLY 8 ECCE
43	MLY 10	Malekula	YES	
44	MLY 12	Malekula	YES	
45	MLY 13	Malekula	YES	

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Serial	Station Number	Island	Panelled	Replacement Station
46	MLY 14	Malekula	NO	MLY 15
47	MLY 16	Malekula	YES	
48	MLY 4	Malekula	YES	
49	MLZ 26	Malekula	NO	MLZ 25
50	MLZ 31	Malekula	YES	
51	MLZ 40	Malekula	YES	
52	MLZ 42	Malekula	YES	
53	MLZ 43	Malekula	YES	
54	LENOU	Malekula	NO	MLZ 33
55	PAY 1	Paama	YES	

---

4FFA

STATION NO (a)	PROCESS NO (b)	SOUTH LAT (c)	EAST LONG (d)	JULIAN DAYS FROM TO (e)	3D PASSES (f)	SEA LEVEL CONNECT (g)	PANEL DIAG (h)	MISSION NO (i)	PHOTO NO (j)	LENS MM (k)	FLYING HEIGHT (l)
AMY 1	11 961	16 06 19	168 07 53	175 178	44	LEVEL		16	59-63	152	11,000
D21	11 908	16 28 02	168 13 08	175 176	21	LEVEL		16	47-52	152	11,000
								16	53-58	152	11,000
D27	11 914	16 00 24	168 13 38	179 182	20	LEVEL		17	42-48	88	10,000
D28	11 915	15 40 25	168 10 38	184 186 & 253	24	BARO		19	112-116	152	10,000
								19	117-121	152	10,000
D29	11 916	14 56 00	167 00 43	199 200	21	LEVEL		19	155-159	152	10,000
D30	11 917	14 58 58	167 09 20	199 200	21	LEVEL		22	151-154	88	10,000
								22	155-161	88	10,000
								22	162-167	88	10,000
D31	11 938	15 36 28	167 10 44	194 196	23	LEVEL		18	171-172	152	10,000
								18	181-183	152	10,000
								21	06-09	88	10,000
								21	10-14	88	10,000
D32	11 939	15 41 31	167 13 46	191 192	21	TRIG		18	178-180	152	10,000
								20	01-05	152	10,000
D33	11 940	14 28 00	168 01 20	245 248	27	LEVEL		22	56-58	88	10,000
								22	64-68	88	10,000

IDENTIFICATION PHOTOGRAPHY  
DOPPLER STATIONS

ANNEX H TO  
OP AIGUM 85  
PROJECT REPORT  
DATED 10 DEC 85

4FSSA

STATION NO (a)	PROCESS NO (b)	SOUTH LAT (c)	EAST LONG (d)	JULIAN DAYS FROM TO (e)	3D PASSES (f)	SEA LEVEL CONNECT (g)	PANEL DIAG (h)	MISSION NO (i)	PHOTO NO (j)	LENS MM (k)	FLYING HEIGHT (l)
D34	11 941	14 26 40	168 03 59	245 246	25	LEVEL		20	25-29	152	10,000
								22	50-55	88	10,000
								22	59-63	88	10,000
D37	11 944	14 21 50	167 29 26	241 243	28	LEVEL		22	39-43	88	10,000
D38	11 945	14 12 38	167 28 01	241 242	22	LEVEL		22	24-28	88	10,000
D39	11 946	13 58 05	167 27 28	238 239	23	LEVEL		22	87-90	88	10,000
								22	91-96	88	10,000
D40	11 947	13 54 03	167 32 02	228 230	22	LEVEL		21	57-60	88	10,000
								21	61-65	88	10,000
								22	81-86	88	10,000
D41	11 948	13 51 04	167 40 42	231 233	21	LEVEL		22	69-74	88	10,000
D42	11 949	13 50 24	167 42 22	232 234	21	TRIG		22	75-80	88	10,000
D43	11 950	13 42 33	167 37 16	235 237	25	LEVEL		21	46-50	88	10,000
D44	11 951	13 37 13	167 32 11	224 225	20	LEVEL		22	34-45	88	10,000
								22	119-127	88	10,000
D45	11 952	13 35 59	167 30 21	223 224	22	LEVEL		21	34-45	88	10,000
								22	119-127	88	10,000
D46	11 953	13 43 03	167 27 06	235 238	25	LEVEL		21	18-22	88	10,000

IDENTIFICATION PHOTOGRAPHY  
DOPPLER STATIONS

4FSSA

STATION NO (a)	PROCESS NO (b)	SOUTH LAT (c)	EAST LONG (d)	JULIAN DAYS FROM TO (e)	3D PASSES (f)	SEA LEVEL CONNECT (g)	PANEL DIAG (h)	MISSION NO (i)	PHOTO NO (j)	LENS MM (k)	FLYING HEIGHT (l)
D47	11 54	13 30 57	167 21 20	220 222	20	TRIG		21	28-33	88	10,000
								22	29-32	88	10,000
								22	102-107	88	10,000
D48	11 55	13 32 20	167 17 28	220 222	21	LEVEL		21	23-27	88	10,000
								22	97-101	88	10,000
D49	11 56	13 19 11	166 37 46	215 218	23	LEVEL		22	13-17	88	10,000
D50	11 57	13 12 17	166 35 27	216 218	21	LEVEL		22	07-12	88	10,000
								22	33-35	88	10,000
								22	36-38	88	10,000
ESY 1 (ECCE)	11 92	15 39 27	167 06 52	187 190	38	TRIG		18	83-86	152	10,000
								18	87-91	152	10,000
ESY 34	11 94	14 38 46	166 37 18	204 208	40	LEVEL		19	133-136	152	10,000
ESZ 18	11 93	15 07 54	166 58 27	203 206	40	NIL		19	122-126	152	10,000
MAY 8	11 95	14 56 38	168 04 19	189 192	44	NIL		18	78-82	152	10,000
								18	147-150	152	10,000
								18	151-155	152	10,000
MLY 18	11 90	16 33 19	167 30 08	179 182	23	BARO		17	62-68	88	10,000

IDENTIFICATION PHOTOGRAPHY  
DATELIER STATIONS

4FSSA






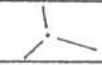


STATION NUMBER	SOUTH LAT	EAST LONG	PANEL DIAG	MISSION NUMBER	PHOTO NUMBER	LENS	FLYING HEIGHT	REMARKS
AMZ 4	16 09 29	168 05 35		17	98-105	88	10,000	
AMZ 5	16 15 26	167 55 11		16	80-83	152	11,000	
				16	84-89	152	11,000	
				17	01-06	88	10,000	
				17	30-35	88	10,000	
AMZ 7	16 15 38	168 00 40		16	64-68	152	11,000	
				16	69-74	152	11,000	
				16	75-79	152	11,000	
AMZ 10	16 21 45	168 11 18		17	49-54	88	10,000	
				17	81-86	88	10,000	
AMZ 11	16 21 28	168 13 57		17	87-89	88	10,000	
				17	92-97	88	10,000	
AOY 1	15 17 01	167 55 00		18	142-146	152	10,000	
AOY 3	15 27	167 40		18	161-165	152	10,000	
ESY 2	15 32 34	167 16 57		18	166-170	152	10,000	
ESY 5	15 28 31	167 15 23		16	06-10	88	10,000	
ESY 11	14 49 49	166 43 29		19	149-154	152	10,000	
				20	30-34	152	10,000	

IDENTIFICATION PHOTOGRAPHY  
PANEL STATIONS

4FSSA

STATION NUMBER	SOUTH LAT	EAST LONG	PANEL DIAG	MISSION NUMBER	PHOTO NUMBER	LENS	FLYING HEIGHT	REMARKS
ESY 14	15 37 26	166 57 12		18	173-177	152	10,000	
ESY 20	15 25 42	166 40 23		20	10-14	152	10,000	
ESY 22	15 37 52	166 46 00		20	06-09	152	10,000	
				22	140-144	88	10,000	
ESY 24	15 18 03	166 39 50		21	01-05	88	10,000	
ESY 28	14 53 47	166 32 30		19	137-142	152	10,000	
				20	20-24	152	10,000	
ESY 35	15 03 24	166 36 52		19	143-48	152	10,000	
				20	15-19	152	10,000	
ESZ 17	15 09 20	166 49 29		19	127-132	152	10,000	
ESZ 30	15 07 42	167 07 55		16	11-15	88	10,000	
				16	16-20	88	10,000	
ESZ 41	15 15 18	167 10 05		16	26-30	88	10,000	
				16	31-34	88	10,000	
ESZ 51	15 35 15	166 56 21		16	01-05	88	10,000	
MAY 1	15 22 47	168 07 30		18	06-08	152	10,000	
				18	27-31	152	10,000	

IDENTIFICATION PHOTOGRAPHY  
PANEL STATIONS

STATION NUMBER	SOUTH LAT	EAST LONG	PANEL DIAG	MISSION NUMBER	PHOTO NUMBER	LENS	FLYING HEIGHT	REMARKS
MAY 3	15 16 49	168 06 36		18	64-67	152	10,000	
MAY 4	15 07 19	168 05 17		18	09-14	152	10,000	
				18	22-26	152	10,000	
MAY 5	15 03 09	168 04 06		18	15-21	152	10,000	
				18	68-72	152	10,000	
MAY 8	14 56	168 02		18	73-77	152	10,000	
MLY 2	16 04 15	167 25 00		18	92-96	152	10,000	
				18	115-123	152	10,000	
				18	184-188	152	10,000	
MLY 5	16 14 03	167 35 11		19	88-92	152	10,000	
				20	41-46	152	10,000	
				20	72-76	152	10,000	
				20	77-81	152	10,000	
ECCE MLY 8	16 04 36	167 09 24		19	93-97	152	10,000	
MLY 10	16 10 04	167 22 17		18	42-44	152	10,000	
				18	97-100	152	10,000	

IDENTIFICATION PHOTOGRAPHY  
PANEL STATIONS

STATION NUMBER	SOUTH LAT	EAST LONG	PANEL DIAG	MISSION NUMBER	PHOTO NUMBER	LENS	FLYING HEIGHT	REMARKS
MLY 10				18	110-114	152	10,000	
MLY 12	16 08 03	167 17 34		18	101-104	152	10,000	
				18	105-109	152	10,000	
MLY 13	16 15 20	167 23 11		19	07-12	152	10,000	
MLY 15	16 25 23	167 24 03		19	01-06	152	10,000	
MLY 16	16 30 38	167 26 05		19	86-87	152	10,000	
				19	107-111	152	10,000	
MLZ 4	16 33 12	167 47 30		17	69-74	88	10,000	
MLZ 25	16 26 16	167 47 41		17	25-29	88	10,000	
				17	55-61	88	10,000	
				20	67-71	152	10,000	
MLZ 31	15 59 43	167 10 53		18	37-41	152	10,000	
MLZ 33	16 30	167 40		19	58-101	152	10,000	
				19	102-106	152	10,000	
				20	35-40	152	10,000	
MLZ 40	16 31 11	167 49 59		17	75-80	88	10,000	
MLZ 42	15 53 38	167 18 35		20	47-51	152	10,000	
				20	52-56	152	10,000	

IDENTIFICATION PHOTOGRAPHY  
PANEL STATIONS

STATION NUMBER	SOUTH LAT	EAST LONG	PANEL DIAG	MISSION NUMBER	PHOTO NUMBER	LENS	FLYING HEIGHT	REMARKS
MLZ 42				20	82-87	152	10,000	
MLZ 43	15 52 47	167 13 35		20	57-61	152	10,000	
				20	62-66	152	10,000	
PAY 1	16 26 06	168 13 53		16	35-41	152	11,000	
				16	42-46	152	11,000	
PEY 1	15 58 54	168 11 03		17	7-15	88	5,900	
				17	21-24	88	10,000	
				17	36-40	88	10,000	
PEY 2	15 44 17	168 07 54		17	16-20	88	10,000	
				18	137-141	152	10,000	
PEY 6	15 33 38	168 07 53		17	106-112	88	10,000	
				17	113-116	88	10,000	
PEY 7	15 27 27	168 08 26		17	117-120	88	10,000	
				18	01-05	152	10,000	
				18	32-36	152	10,000	
ST 11	15 27 34	167 51 04		22	145-150	88	10,000	
				22	168-174	88	10,000	

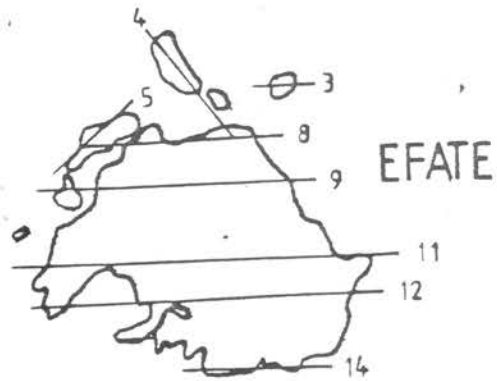
IDENTIFICATION PHOTOGRAPHY  
PANEL STATIONS

STATION NUMBER	SOUTH LAT	EAST LONG	PANEL DIAG	MISSION NUMBER	PHOTO NUMBER	LENS	FLYING HEIGHT	REMARKS
ST 18	15 22	167 45		18	156-160	152	10,000	
31321	13 06 01	166 33 22		22	01-06	88	10,000	
31322	13 23 49	166 41 06		22	18-23	88	10,000	
31323	13 32 40	167 20 25		22	108-112	88	10,000	
				22	113-118	88	10,000	
31324	13 40 09	167 42 46		21	51-56	88	10,000	
				22	128-133	88	10,000	
31325	13 51 04	167 32 17		21	015-017	88	10,000	
				22	134-139	88	10,000	
31326	14 13 05	167 34 47		22	44-49	88	10,000	
31327	15 24 14	167 11 54		16	21-25	88	10,000	
31328	16 07	167 25		18	115-123	152	10,000	

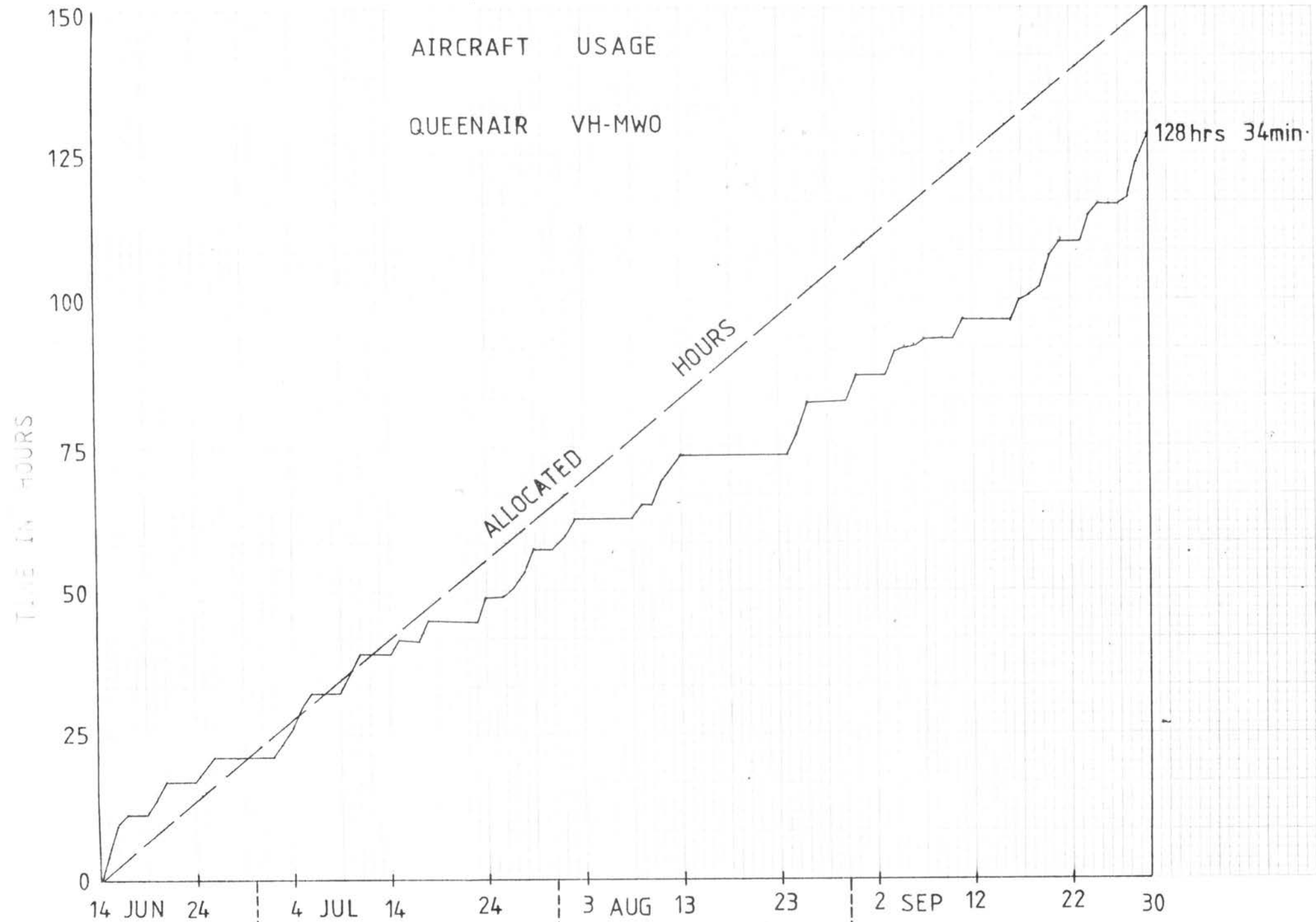
IDENTIFICATION PHOTOGRAPHY  
PANEL STATIONS



MAPPING PHOTOGRAPHY FLOWN







ATTEN K 10  
 OP ALGUM 85  
 PROJECT REPORT  
 DATED 10 DEC 85

FINANCIAL EXPENDITURE

1. Expenditure made by the Detachment Commander and paid through the Australian High Commission Port Vila.

	VATU	\$
Ship Charter	6,230,000	85,391.88
<b>Avgas</b>	1,210,812	16,647.56
Accommodation - Port Vila	699,600	9,459.21
<b>Allowances</b>	527,454	7,155.65
Sea Freight	221,045	3,109.81
Car Rental	190,400	2,562.95
Air Freight	142,318	1,932.08
Aircraft Charter	60,000	792.60
Accommodation - Luganville	40,500	563.99
Generator	34,255	452.51
Petrol	29,580	398.12
Oil (Aircraft)	17,100	240.57
Petty Cash	277,828	3,789.48
TOTAL VATU	9,680,892	\$132,496.41

2. Expenditure made through DDCM Canberra:

	\$
Magnavox Hire	67,008.17
Field Film Processer	22,399.00
Aluminium Boats	14,758.00
Consumables	2,197.74
Outboard Motor Spares	1,075.75
Ground Marks	766.00
Air Freight (For O.M. Spares)	51.28
TOTAL	\$108,255.94

3. Expenditure made through 4 Fd Svy Sqn, Keswick:

	\$
Allowances	14,224.30
Air Fares x 6	8,425.00
Air Freight	1,707.30
<b>Avgas</b>	1,189.10
Excess Baggage	836.00
Oil (Aircraft)	49.92
TOTAL	\$26,431.62

4. Expenditure made through 2 Fd Svy Sqn, Randwick:

	\$
Air Freight	1,597.44
TOTAL	\$1,597.44

5. Total expenditure at para 1 to 4 is \$268,781.41. Items that have not been accounted for include:

- a. Salaries
- b. Aircraft Charter (QUEENAIR)
- c. Accommodation )
- d. Allowances ) for QUEENAIR pilot & LAME
- e. Colour Film
- f. Black and white film, and
- g. Panel plastic.

PETTY CASH

Total Expenditure 277,828 VATU \$3789.48.

		VATU	\$A
1.	Air Fares/Freight	65,469	892.98
2.	Petrol	47,245	644.41
3.	Paint	24,000	327.35
4.	Telephone	23,239	316.97
5.	Oil/Lubricants	19,520	266.25
6.	Batteries	17,080	232.97
7.	Labour Hire/Compensation	12,500	170.50
8.	Misc Goods	36,839	502.47
9.	Misc Services	31,936	435.60
		<u>277,828</u>	<u>3789.48</u>

ANNEX N TO  
OP ALGUM 85  
PROJECT REPORT  
DATED 10 DEC 85

RAEME TECH A.A.R. - OP ALGUM 85

1. SERVICEABILITY OF MX 1502

- A. MX1502 S NO. 551 : PERFORMED WITHOUT PROBLEMS EXCEPT FOR FAULTY CABLES ON TWO OCCASIONS.
- B. MX1502 S No. 284 : PERFORMED WELL THOUGH HAD AN INTERNAL BATTERY BREAKDOWN DUE TO A FAULTY EXTERNAL BATTERY. THIS MACHINE ALSO EXPERIENCED FAULTY CABLES/CONNECTORS ON ONE OCCASION.
- C. MX1502 S NO. 284 : EXPERIENCED PROBLEMS WITH ACCEPTANCE OF PASSES ON MERE LAVA. THIS WAS CAUSED BY THE TERRAIN.

2. SERVICEABILITY OF MEMTEC 5000 AND MAL 5450 TAPE DUPLICATORS.

- A. TAPE DUPLICATORS SNO's 31555 and 0553 WERE RECEIVED AT SYD WKSP. COY. WITHOUT SUFFICIENT TIME TO ASSESS SERVICEABILITY. BOTH MACHINES PROVED TO BE IN AN UNSERVICEABLE CONDITION UPON FIRST USE IN THE FIELD.
- B. REPLACEMENT DUPLICATORS PERFORMED WITHOUT ANY PROBLEMS.

3. OTHER

- A. NUMEROUS PROBLEMS WERE ENCOUNTERED WITH THE GENERATORS. THE SALT CONDITIONS CAUSED CORROSION WITHIN THE MACHINERY CREATING SHORT CIRCUITS DAMAGING ELECTRICAL COMPONENTS.
- B. A SHORTAGE OF SPARE PARTS FOR THE TYPE OF GENERATOR IN USE NECESSITATED BUYING A NEWER ONE WITH BETTER SPARE PARTS AVAILABILITY.

4. RECOMMENDATIONS

- A. HIRED EQUIPMENT BE AT SYDNEY WORKSHOP COMPANY FOR A MINIMUM OF ONE WEEK BEFORE DEPLOYMENT TO A.O. TO ENABLE FULL TESTING OF EQUIPMENT.
- B. REPAIR MANUALS AND SPARE PARTS BE MADE AVAILABLE FOR TAPE DUPLICATORS TO ENABLE REPAIR IN SITU.
- C. SPARE PARTS/REPAIR MANUALS BE MADE AVAILABLE FOR GENERATORS TO ENABLE REPAIR IN SITU.

5. SUMMARY

- A. OVERALL OPERATION OF MX1502 WAS EXCELLENT ENABLING COMPLETION OF ALL STATIONS WITHIN THE ALLOTTED TIME SPACE.

(M.A. LUEDERS)  
CFN

4 Fd Svy Sqn  
 Keswick Barracks  
 KESWICK SA 5035

(08) 2939277

22 October 1985

788/2/C84

48

HQ FF COMD

For information

DSVY-A

OP ALGUM 85 AFTER ACTION REPORT

References: A. HQ FF Comd Op Order 1/85 dated 4 Apr 85

B. DOD (AO) A719-3-230 SVY 103563 dated 31 May 85

1. This after action report is submitted in accordance with Ref A. A more comprehensive report on both the administrative and technical aspects of the operation will be submitted when all details have been finalised.

Area of Operations

2. The Republic of Vanuatu lies in the South West Pacific region occupying seven degrees of latitude between 13 deg S and 20 deg S and four degrees of longitude from 166 deg E to 170 deg E. Matthew and Hunter Islands were specifically excluded from the AO. A map of the AO showing Vanuata's relationship to Australia is attached as Annex A.

Tasks

3. Details of specified tasks are given at para 7 to Ref B.

Operations

4. Achievements. Control surveys were carried out from Paama in the South, North to the Torres group. A total of 23 new control points were established and 6 existing stations were re-observed using Magnavox MX 1502 satellite surveying sets. All of the new control points and 4 of the existing stations were connected to sea level. 55 existing stations were visited and panelled. Positive identification photography was acquired for all 84 stations visited. Locations of all new stations established and existing stations visited are shown as Annexes B and C respectively. Due to poor weather a large portion of the mapping and large scale urban photography tasks remain outstanding. Diagrams showing mapping and urban photography flown are at Annexes D and E respectively.

5. Work Outstanding. Within the AO the following work remains outstanding:

a. Outstanding from Phase Two

- (1) Class X mapping photography of total area north of Efate;
- (2) Colour urban photography of Luganville;
- (3) Four stations may need reobserving due to satellite down time during observations. These are D27, MLY 18, ESY 1 and D33. This requirement is to be confirmed by DSVY-A.

b. Planned for Phase Three

- (1) Station D20 (Lopevi) inaccessible by boat;
- (2) Station D35 (Merig) inaccessible by boat;
- (3) Station D36 (Merig) inaccessible by boat;
- (4) Station D51 (Vot Tande) inaccessible by boat;
- (5) Station D52 (Vot Tande) inaccessible by boat;
- (6) Station D4 and D16 remain outstanding from OP ALGUM 84.

Composition of Force

6. The force comprised:

- a. Det Comd; 231963 LT M.J. Hentschel
- b. Control Svy Adviser; 313931 WO2 R.J. Williams
- c. Camera Operator; 45650 SGT R.P. Garritty
- d. Radar Mech (Geoceiver); 3104368 CFN M.A. Lueders
- e. Civilian pilot from Airsearch Pty Ltd; Mr J.F. Ward
- f. Civilian LAME fom Airsearch Pty Ltd; Mr K. Reardon.

All members met the eligibility criteria laid down in Annex A to Ref A.

Timings

7. The following timings applied:

- a. 27 Apr to 3 May 85 - recon conducted by S01 (SVY)  
HQ FF Comd - LTCOL K.J. Murphy and OC 4 Fd Svy Sqn -  
MAJ P.M. Bion.

- b. 12 Jun 85 - Force concentrates in Sydney, less civilian attachments.
- c. 15 Jun 85 - Force arrived Port Vila.  
- Operation commenced.
- d. 17 Jun 85 - FW aircraft arrived Port Vila.
- e. 12 Sep 85 - Control survey operations ceased.
- f. 25 Sep 85 - Aerial photography operations ceased.
- g. 29 Sep 85 - Rear party returned to Australia.

#### Administration and Logistics

8. Pay and Allowances. No problems were encountered with the arrangements which had been made for payment of pay and allowances.
9. Passports and Visas. Official Passports were obtained by members not already in possession of a passport. No visas are required to enter Vanuatu.
10. Accommodation. Suitable accommodation was obtained at the Solaise Hotel in Port Vila. Two single bedroom self contained flats were booked for the duration of the operation.
11. Local Purchase. The arrangements made with the Australian High Commission for local purchase of minor items of equipment proved successful.
12. Petty Cash. A petty cash advance of 50,000 VATU (\$A 700-00) was maintained by the Det OC.
13. Medical. No members required medical treatment during the operation. All members were inoculated against Hepatitis B prior to leaving Sydney and took malarial prophylaxis as prescribed in Annex B to Ref A.
14. Morale. Morale remained high throughout the operation.
15. Rations. Tinned and fresh rations were available in Port Vila and Luganville at prices in general 30% higher than in Australia. Limited amounts of fresh rations were available on all islands visited by the control survey teams.
16. Special Equipments. Special equipments used during OP ALGUM 85 were:
  - a. Yamaha EF 2000 generator set (2)
  - b. Robin R600 generator
  - c. AGA Geodimeter Model 16 EDM (2)

- d. Pneumatic Telescopic Hilomast NL 21 (2)
- e. Magnavox MX1502 Ser No 284 and 551
- f. 4.2 metre Aluminium Dinghy (2) and
- g. 40 hp Evinrude Outboard Motor (2)


All of these equipments worked well with the exception of the Yamaha generators. These became unserviceable mid way through the Op and were unable to be repaired in Vanuatu. The Robin generator was purchased and along with a Honda generator from the Vanuatu Survey Dept were used as replacements. The RAEME technicians report is attached as Annex F.

17. Sea Support. Two vessels were used for the transportation of survey teams. They were the "Coongoola" which was chartered locally and the "Rocinante" which was provided by the Vanuatu Government.

18. Transport. Two vehicles were used for the duration of the operation. They were a Daihatsu Charade which was hired from Budget Rent a Car and a Toyota Twin Cab 4WD which was provided by the Vanuatu Survey Dept.

Communications - Rear Link

20. Communications with Australia were provided by the Australian High Commission (telex) and the Solaise Hotel (telephone). These arrangements proved to be satisfactory. The International Telephone Credit Card provided through Telecom Australia was not accepted for use in Vanuatu.

  
P.M. BION  
Major  
Officer Commanding

- Annexes:
- A. Map of AO
  - B. Locations of New Stations
  - C. Locations of Existing Stations
  - D. Mapping Photography Flown
  - E. Urban Photography Flown
  - F. RAEME Technicians After Action Report