



4th Field Survey Squadron

# Operation BELAMA 93

## *Operation Report*

An aerial photography operation  
conducted in  
Solomon Islands and  
the Republic of Vanuatu

August - October 1993



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## EXECUTIVE SUMMARY

1. Op BELAMA 93 was an aerial photography operation conducted by 4 Fd Svy Sqn in Solomon Islands and Republic of Vanuatu during the period 28 Aug to 8 Oct 93. The base for the operation was Honiara, Solomon Islands and Port Vila, Vanuatu.
2. The aim of Op BELAMA 93 was to acquire mapping and identification photography for the plotting of topographic maps at a scale of 1:50 000.
3. Aerial photography acquisition was hampered by the normal weather conditions experienced in mountainous tropical areas. Despite this, a total of 1860 line km of mapping photography was obtained in Solomon Islands and 180 km in Republic of Vanuatu. When combined with photography achieved during Op BELAMA 92, it should enable the plotting of 26 1:50 000 map sheets in Solomon Islands and Block 4 of Republic of Vanuatu. Identification photography of 22 control points was achieved to enable the aerotriangulation of Russell and Florida Island groups in Solomon Islands.
4. Significant problems which affected the conduct and/or overall operation were:
  - a. Planning for the operation was made difficult with nine weeks notice.
  - b. A dependency upon RAAF transport now exists due to late notice for mounting of consecutive overseas operations and the unreliability of commercial means.

OPERATION REPORT  
OPERATION BELAMA 93  
AUGUST TO OCTOBER 1993

References:

- A. HQ ADF Tasking Directive 1/1993 dated 21 Apr 93
- B. LHQ OPORD 59/93 DTG 180455Z AUG 93
- C. LHQ Op BELAMA 93 Mounting Instruction dated 19 Aug 93
- D. DSvy-A Op BELAMA 93 Technical Directive dated 12 Aug 93
- E. International Aircraft Transport Association - Dangerous Goods Regulations, 34th edition, effective 1 Jan 93
- F. Standing Offer: PN8260 dated 1 Oct 91
- G. DSvy-A Specifications for vertical aerial mapping photography undated draft
- H. Operational Instruction 1/93 Responsibility of aerial camera operators dated 22 Mar 93
- I. Standing Operating Procedures for Assessment of Vertical Aerial Photography dated 24 Aug 93
- J. DSvy-A Technical Instruction No. 305: Acquisition and Classification of Identification Photography
- K. LHQ K91-00216 Minute I310/93 dated 26 Aug 93
- L. Army Svy Regt 851-17-39 Fax dated 7 Sep 93
- M. DSvy-A Technical Instruction 201: Acquisition and Classification of Aerial Photography
- N. Guide to Aerial Photography Assessment Procedures dated 30 Jan 90
- O. Army Svy Regt 851-196-01 Minute dated 13 Aug 93
- P. Defarm Campbell SIC Z2Y/JQJ DTG 080530Z SEP 93
- Q. Survey Adelaide SIC Z2Y DTG 202350 Z SEP 93

## INTRODUCTION

1. Operation BELAMA 93 was an aerial photography operation conducted in Solomon Islands and Republic of Vanuatu between 27 Aug 93 and 8 Oct 93. The Operation was conducted in response to References A, B and C.

## MISSION

2. 4 Fd Svy Sqn's mission was to acquire photography of Solomon Islands suitable for mapping at 1:50 000 scale. Additional tasking, and of equal priority was the acquisition of identification photography in the Florida and Russell Island groups within Solomon Islands.

3. Evaluation. All Technical Instructions (TI) and Standing Operating Procedures (SOP) used during the operation were to be evaluated as directed in Reference D.

4. Opportunity Tasking. As stated in Reference C, mapping photography of Republic of Vanuatu was an opportunity task. This was a continuation of photography that had been attempted during Op NASIKO 93 and Op BELAMA 92.

## AREA OF OPERATIONS

5. Solomon Islands. The AO for the mapping photography extended over the entire Solomon Islands from the South-eastern tip of Bougainville Island, 7° S, 155° 45'E, in a South-easterly direction to the Fatutaka Island at 11° S, 170° E. This is illustrated at Annex A.

6. Identification Photography. The identification photography for Solomon Islands was distributed throughout the Florida and Russell Island groups as shown at Annex B.

7. Vanuatu. The AO for mapping photography in Vanuatu is depicted at Annex C.

## CONDUCT OF OPERATION

### Outline of Technical Plan

8. To achieve the technical tasks it was necessary to obtain aerial photography from flying altitudes between 4 000 and 41 000 feet. With the different requirements for each of the tasks it was also necessary to alter the combination of lens filters and film types. Processing of the aerial film and assessment was conducted in the AO. Details are discussed in the Technical Report at Annex D.

9. Mapping photography as defined in Reference D was to be obtained to enable plotting of blocks or Island groups at a scale of 1:50 000. Due to the combination of climate

and terrain, some areas are virtually covered by cloud at all times. This can prevent an entire island group from being plotted due to a relatively small area not having been photographed. Alternative solutions were investigated during Op BELAMA 93 and these are discussed further in the Technical Report at Annex D.

### Conduct

10. The operation was conducted according to the Sequence of Events shown at Annex E. Significant events are discussed in the following paragraphs.

### Reconnaissance

11. A reconnaissance of the AO was not conducted prior to deployment. A similar operation, Op BELAMA 92, had taken place during the period Apr to May 92, and facilities utilised on that operation had proven satisfactory. Survey Adviser to Solomon Islands, CAPT B. Sloan is based in the capital, Honiara and this contact was fully utilised for any information or bookings required.

### Issue of Orders and Instructions

12. The Operation Order (Reference B) and Mounting Instruction (Reference C) were issued on 18 and 19 Aug 93 respectively. At least two months lead time would be more appropriate for an operation of this type.

13. The Technical Directive (Reference D) was not issued until 12 Aug 93. This left little time to thoroughly examine the document prior to deployment.

### Insertion of Force

14. Most of the equipment as well as the aircraft required for Op BELAMA 93 was deployed on Op KUMUL 93 in Papua New Guinea (PNG) until 27 Aug 93. The size and weight of the film processor (675kg) and the requirement for chemicals classified as dangerous cargo (DC) in accordance with Reference E, necessitated the utilisation of a C130 aircraft. It was also necessary to complete this changeover of crew and operational base with a minimum of delay due to the expense of chartering the Learjet in accordance with Reference F.

15. As a result of these circumstances, the only economical means of achieving a changeover of both personnel and equipment was:

- a. Op BELAMA personnel and stores including DC by civilian means to Townsville;
- b. C130 transport of Op BELAMA 93 personnel and stores to Madang, PNG, where Op KUMUL 93 was based;
- c. embarkation of Op KUMUL 93 personnel and equipment;

- d. deployment to Honiara, Solomon Islands; and
- e. extraction of Op KUMUL 93 personnel to Australia.

#### Establishment of Base

16. RAAF C130 with Operation personnel and equipment arrived in Honiara on the evening of 27 Aug 93. All equipment was unloaded directly onto a flatbed truck with lifting arm organised by the Survey Adviser, and transported to the Department of Lands and Surveys.

#### Aerial Photography

17. On 29 Aug 93 operational photographic sorties commenced.

18. Camera, film types, processing and assessment of photography are all covered within the Technical Report at Annex D. Most of the information within this Annex is applicable to aerial mapping photography in general and not peculiar to this Operation. All activities were carried out in accordance with References G, H and I.

#### Extraction of Force

19. Extraction of the operational force was not finalised until 4 Oct 93 due to the uncertainties that surrounded not only this operation, but previous and subsequent operations as well. Due to these uncertainties and the unavailability of C130, civil airlines were used for extraction of three operational members, chartered Learjet for two and civil freight for all equipment.

#### Problems Encountered

20. The following problems were encountered with the insertion and extraction phases of the operation.

21. Learjet. The Learjet was planned to arrive in Honiara on 27 Aug 93. Due to mechanical problems with the nose wheel support it was delayed in Port Moresby a further day and did not arrive in Honiara until 28 Aug 93.

22. Notification. Just two weeks before extraction from Op BELAMA 93, the possibility of deploying to Op EMU 93, Darwin, Northern Territory was raised. As with all aerial camera operations in 1993, this left very little time for planning and coordination. Final confirmation of Op EMU was not made until the Learjet landed in Brisbane on 8 Oct 93. This also effected arrangements for extraction of Op BELAMA 93 as some equipment would then need to be diverted directly to Darwin.

## OPERATIONAL RESULTS

### Mapping Photography

23. Solomon Islands. A summary of mapping photography achieved, classified in accordance with Reference G and I, during Op BELAMA 93 is:

- a. X 985 km, and
- b. Y 875 km.

24. By use of this and previously obtained photography, it is felt that 26 1:50 000 map sheets within the Solomon Islands may be plotted. These 26 map sheets are depicted at Annex F. The organisation and reasons for this are discussed in the Technical Report at Annex D.

25. Annex G depicts the individual lines and their classifications that were achieved during the operation.

26. Vanuatu. Mapping photography achieved in Vanuatu during the four days that the aircraft was redeployed there, consisted of:

- a. X 123 km, and
- b. Y 57 km.

27. A diagram showing photography achieved is at Annex H.

### Identification Photography

28. Of the identification photography tasked, photography classified as acceptable in accordance with Reference J was achieved of 22 control points (illustrated at Annex B).

### TI and SOP Evaluation

29. A separate report concerning the evaluation of Technical Instructions and Standing Operating Procedures was forwarded to DSvy-A on 29 Nov 93.

## ADMINISTRATION AND LOGISTICS

### Operation Manning

30. Personnel who participated in Op BELAMA 93 are listed at Annex I.

## Support

31. Army. Support by Army was as follows:

- a. Army Svy Regt:
  - (1) supplied three camera operators for the duration of operation,
  - (2) prepared flight lines for all mapping photography, and
  - (3) provided technical advice during the operation.
- b. 1 Topo Svy Sqn:
  - (1) received camera boxes sent for the removal of camera, and
  - (2) had all boxes at Brisbane airport for the extraction of the camera on 8 Oct 93.
- c. 15 GL Sect assisted in arrangements for C130 for insertion of operation.

32. Australian High Commission - Honiara. Assistance was sought from Australian High Commission, Honiara in the mounting of the Operation and the utmost co-operation was gained, particularly from Svy Tech Adviser, CAPT B. Sloan and Defence Cooperation Programme (DCP) staff at the High Commission. Assistance was provided in the form of:

- a. Reconnaissance matters and bookings were handled by CAPT Sloan.
- b. One dual cab utility was made available from the DCP pool for the duration of the Operation.
- c. Fuel for the DCP vehicle was charged directly to an account and paid for from DCP funds by High Commission.
- d. AVTUR for charter aircraft was organised with Shell Pacific and payment made with funds transferred by International Policy Division (IP Div).
- e. Telephone and facsimile facilities at Australian High Commission were made available for the duration of the Operation.
- f. Immigration and customs staff were organised to be available at arrival and departure.
- g. Extraction was assisted by ensuring that equipment returning to Australia by ship was loaded.

33. Australian High Commission - Port Vila. For the period of four days spent in the Republic of Vanuatu, the assistance of Australian High Commission, Port Vila, and in

particular the Svy Tech Adviser, CAPT P. Warwick was indispensable for organisation of all accommodation, hire car, diplomatic clearances and fuel purchases.

34. RAAF. Support by RAAF was as follows:

- a. 36 Sqn. RAAF support for the extraction phase of Op KUMUL 93 and insertion of Op BELAMA 93 was by 36 Sqn in the form of transport of personnel, stores and DC by C130 flight from Townsville to Madang and into Honiara.
- b. Central Photographic Establishment (CPE). CPE was responsible for post operation rewashing of films for archival storage.

35. Civilian. Reference F is a standing offer requiring Airscan Pty Ltd to supply a camera platform and pilots as requested by RA Svy. The company does not currently own a Learjet and one was subcontracted from Tipperary Aviation. This arrangement was the same as was used in 1992 and once again proved satisfactory despite RA Svy not giving the six month notification required in the contract.

36. Solomon Islands Government. Department of Lands and Surveys provided valuable work areas for the processing and assessing of photography.

## POL

37. AVTUR. The fuel for Learjet in both Solomon Islands and Republic of Vanuatu was purchased by the Commonwealth in accordance with Reference F. This was done by using an account with Shell Pacific organised by Australian High Commission, Honiara. Funds for the payment of these accounts were forwarded by IP Div.

38. Prist. Prist is a fuel additive for the Learjet to prevent freezing of the fuel at high altitudes and the incidence of bacterial growth in tropical climates. This is not generally available in Solomon Islands and all supplies required, had to be imported from Australia. It is classified in accordance with Reference E as DC and therefore there is some difficulty in transport arrangements. For this reason, requirements must be forecast well in advance.

39. Vehicle Fuel. Fuel for the loan vehicle was purchased through a local service station using an account established by Australian High Commission.

## Vehicles

40. For the duration of the operation in Solomon Islands one vehicle was loaned from DCP vehicles courtesy of Australian High Commission.

41. Whilst in Vanuatu an Avis hire vehicle was utilised. Payment for this was by Australian Government Credit Card (AGCC).

## Stores and Equipment

42. Stores and equipment deployed with the operational force were sufficient. Only a few minor items were purchased locally. Everything taken was in good working order and operated serviceably. The WAINCO film processor required some modifications to both the machine and operating techniques. These are discussed in the Technical Report at Annex D.

## Shipment of Stores

43. Shipment of stores, equipment and DC was by commercial shipping agent, TNT, to Townsville and by RAAF C130 to Honiara. As has been experienced with several commercial shipping agents during 1993, delivery of all items at a specified time is not assured. A Unit Emplaning Office (UEO) from 4 Fd Svy Sqn travelled to Townsville to pack the cargo in accordance with Reference E.

44. Freight to Honiara was achieved by using the diplomatic bag addressed to Australian High Commission Honiara. This proved satisfactory with delivery being within one week. Only two commercial flights arrive in Honiara each week from Australia, making urgent deliveries virtually impossible.

45. On extraction, a number of means were utilised:

- a. Safe Hand. Processed film, Data Transfer Devices (DTD's) and associated documentation were carried safe hand.
- b. Shipping. Larger items such as the WAINCO processor and Metoform processor that were not required immediately in Australia were returned to Australia by surface shipping, the first available ship departing Honiara on 13 Nov 93 and did not arrive until late December.
- c. Air freight. Items that were required in Australia immediately such as camera CES, flight line diagrams and records were air freighted by TNT.

## Accommodation

46. Accommodation for all operation personnel was at Kitano Mendana Hotel, Honiara. In Port Vila, the Le Lagon hotel was utilised. Each member had a single room paid for weekly using AGCC. The rooms were of a good standard.

## Messing

47. Meals were available from the hotel and several restaurants within the town. Payment for these was by individual members using Overseas Travelling Allowance issued prior to departure. Meals and selection were usually of a good standard.

## Medical

48. A main hospital is located in Honiara which includes operating and x-ray facilities. There are several medical practitioners within Honiara and one in particular, Dr Eric Pana was recommended. Medical standards are not equivalent to Australia and it was of the general opinion of Australians in the area that if any major medical treatment were required, medical evacuation to Australia would be recommended.

49. Prior to deployment, First Aid kits were prepared by Keswick Medical Centre. Some medications are not always available locally (Anti-biotics S3 and S4), and a letter stating the contents and purpose of the kits was obtained from the RMO.

50. The health of operational personnel was in general good, however, medical attention was required for:

- a. Pilot, Mr Harvey Morton, broke a bone in his foot after hours. Following consultation with Dr Pana and x-rays from the hospital, his foot was plastered and he returned to Australia. Payment for this treatment was made from petty cash in accordance with Reference F.
- b. SGT Longbottom injured his knee during a PT session. Consultation with Dr Pana revealed no serious damage. Medication was prescribed and physiotherapy given on return to Australia.

51. Honiara is in a malarial zone. In accordance with Reference C, the Keswick Medical Centre supplied 4 Fd Svy Sqn personnel with the prescribed anti-malarial treatment appropriate for the area and duration of deployment. Army Svy Regt personnel obtained anti-malarial treatment from the Army Svy Regt, RAP, however the supply was inadequate for the duration of deployment and further supplies were purchased locally. Anti-malarial precautions for the pilots were their own responsibility.

52. Army Svy Regt personnel were given blood tests for a variety of infectious diseases prior to deployment. 4 Fd Svy Sqn personnel were given no such tests or advised that they were necessary. Reference K specifies required medical precautions to be taken prior to, during and after a deployment to Solomon Islands.

## Finance

53. Australian Government Credit Cards (AGCC). Detachment OC and 2IC were each issued with AGCC prior to deployment with a limit of \$30 000.00. This limit was adequate but should be considered the minimum. Due to the deployment of some members from Australia and others from PNG it was necessary to have two cards with the detachment.

54. Petty Cash. A cash advance of \$1000.00 was issued to Det 2IC in Adelaide and converted to travellers cheques prior to deployment. These were converted to Solomon British Dollars (SBD) for use as necessary.

55. Cost Codes. The cost codes for Op BELAMA 93 were not issued until 18 Aug 93 due to the lateness of the Operation being approved. With an operation of this nature, stores must be ordered and allowances organised well in advance.

56. The Cost Codes used in accordance with Reference B were:

|              |            |
|--------------|------------|
| Req No       | 339006\2CP |
| Cost Centre  | 543216     |
| Account Code | 64732      |
| SLID/SLAC    | G999       |

57. Total costing. The total cost of Op BELAMA 93 was approximately \$ 395 000.<sup>1</sup>  
A break down of the costings is as follows:

|                               |            |
|-------------------------------|------------|
| Aircraft hire                 |            |
| Fuel                          | \$ 39 000  |
| Flying hrs                    | \$ 150 656 |
| Standing charges              | \$ 43 200  |
| Admin Charges                 | \$ 4 500   |
| Accommodation <sup>2</sup>    | \$ 21 056  |
| Allowances                    |            |
| Military pers                 | \$ 20 533  |
| Pilots <sup>3</sup>           | \$ 18 480  |
| Civil Airfares                | \$ 10 000  |
| Hire vehicles/taxis           | \$ 760     |
| Phone/Fax                     | \$ 720     |
| Freight and Cartage           | \$ 5 000   |
| Stores                        | \$ 9 600   |
| Petty Cash                    | \$ 520     |
| Svy Tech Adviser <sup>4</sup> | \$ 71 000  |

- Notes:
- 1 Some costs have been converted from Solomon British Dollars to Aust dollars, so they are only approximations due to the fluctuation of exchange rates.
  - 2 Accommodation element is for military personnel only.
  - 3 Pilots allowances contain both their meal and accommodation elements.
  - 4 These funds were used for panelling and in country costs.

### Total Expenditure

58. The cost estimate for Op BELAMA 93 in the Mounting Instruction (Reference C) was \$387 350.00. The reasons for this extra expenditure may be attributed to:

- a. added and hidden costs accounted against Op BELAMA 93 of which 4 Fd Svy Sqn was unaware, such as administration costs for aircraft contract;
- b. changes to the cost of aviation fuel;
- c. unavailability of RAAF C130 for extraction on the requested date, necessitated civil extraction of personnel and equipment;

- d. extra costs involved in deployment to Republic of Vanuatu; and
- e. decrease in value of Australian dollar.

### Allowances

59. Allowances for military operation personnel were:
- a. Overseas Travelling Allowance (Solomon Islands). Allowance was paid in accordance with INDMAN 1, Vol 4, Instr 3601 at the rate of:
    - (1) 143.30 SBD per day for the first 28 days; and
    - (2) 124.75 SBD per day after 29 days.
  - b. Overseas Travelling Allowance (Vanuatu). Allowance was paid in accordance with INDMAN 1, Vol 4, Instr 3601 at the rate of, 8047 Vatu per day.
  - c. Overseas Outfit Allowance. In accordance with INDMAN 1, Vol 4, Instr 3602 overseas outfit allowance was payable to members who had not received that allowance in the previous three financial years, at the rate of:
    - (1) Overseas - \$ 200.00; and
    - (2) Tropical - \$ 185.00.
  - d. Difficult Post Allowance. Following a continuous overseas detachment of 28 days, military members are entitled to a payment at a rate of \$ 205.23 per fortnight in accordance with INDMAN 1, Vol 3, Instr 3719.
  - e. Flight Duties Allowance. Flight duties allowance was paid in accordance with INDMAN 1, Instr 0107, calculated from the hours shown at Annex J.

60. The rate of Overseas Travelling Allowances was not considered sufficient to fully compensate members for the cost of living in Solomon Islands.

61. Pilots employed under Reference F were entitled to meal and accommodation allowance of \$A210.00 per day. An advance of \$ 19 320 was made to Airscan Pty Ltd prior to deployment and pilots individual payments were then the responsibility of Airscan Pty Ltd. This proved to be an acceptable method of operation and the level of allowance was of an acceptable standard to the pilots.

### Leave

62. Remote Locality Leave. As stated in INDMAN 1, Vol 3, Chap 26, Instr 2601, operation personnel are entitled to remote locality leave accumulated at the rate of 10/12 of a day per month whilst in the AO.

63. Flying Leave. Flying leave is accrued as stated in INDMAN 1, Vol 3, Instr 2601, and is to be calculated retrospectively according to the hours flown by individual members (shown in Annex J).

#### Passports and Visas

64. Official passports were issued to all military members of the detachment.

65. Visas for entry into Solomon Islands were arranged in advance by Australian High Commission.

66. Diplomatic clearances for those members who operated from Republic of Vanuatu were arranged by CAPT Warwick.

#### Banking

67. Banking facilities in Honiara are provided by:

- a. ANZ,
- b. Westpac (Solomon), and
- c. National Bank of Solomon Islands (NBSI).

68. Each of these banks has affiliations with their Australian counterparts, but, Australian passbooks or accounts are not able to be used. Personal credit cards can be used to obtain cash advances, however, this requires a telephone call to Australia each time an advance is made and the cost of that call is charged to the customer.

69. Travellers cheques proved to be the best form of converting currency. NBSI do not charge fees to Australian High Commission staff and offered the same to Op BELAMA personnel.

#### Mail

70. Mail rates to Australia were comparable to Australian overseas rates and delivery time to Australia varied between seven and ten days. All mail was addressed care of Australian High Commission which proved to be reliable.

#### Visits

71. A visit was made to the operation by MAJ A.B. McLeod (OC 4 Fd Svy Sqn) during the period 8-10 Sep 93.

### Public Relations

72. Information regarding the activities of RA Svy in general and Op BELAMA 93 in particular were well publicised throughout Solomon Islands by:

- a. Full page article in Solomon Star newspaper with photographs of Operation personnel and equipment;
- b. Solomon Islands radio interview;
- c. Radio item on Radio Australia; and
- d. Presentation of Op BELAMA 93 to Honiara Rotary meeting.

### Contact Information

73. Contacts made within the AO and that may be useful in the mounting of further operations in the area are contained at Annex K.

## COMMAND AND SIGNAL

### Command

74. Command arrangements specified in Reference C were both suitable and functional.

### Communications

75. Telephone/Facsimile. Telephone and facsimile facilities were available through Australian High Commission, Honiara during normal working hours. This was not always convenient and after hours both facilities were utilised through the hotel.

76. Due to the extremely high cost of phone calls through the hotel (approximately SBD 10.00 per minute) an International Telecom Telecard was requested and received from DC-A, through 4 Fd Svy Sqn which proved to be much more economical.

77. Personal telephone and facsimile facilities were available through the hotel however the most economical means was to arrange for calls from Australia on weekends.

### SITREPs

78. Weekly SITREPs were sent by facsimile to 4 Fd Svy Sqn. To decrease expenses, 4 Fd Svy Sqn then retransmitted the SITREP to Australian addressees.

## CONCLUSIONS

79. General. Op BELAMA 93 was a reasonably successful aerial photographic operation. The failure to achieve full photographic coverage can be attributed almost entirely to adverse weather conditions. On a task that requires perfect weather conditions, and in a country which is not conducive to such conditions, acquisition of acceptable aerial photography for mapping becomes more a fact of being in the right place at the right time and having both equipment and personnel ready to operate effectively.
80. Timings. The timing of this, and other operations were confirmed only months prior to deployment. This left little time for planning, reconnaissance, stores acquisition, issue of orders and instructions, and forecast of air hours for both RAAF and civilian charter.
81. Manning. Manning for the operation was satisfactory.
82. Vehicles. A loan vehicle was obtained whilst in Honiara from DCP. This saved a large expense but a spare vehicle cannot be relied upon for the planning of future operations in this area. The deployment of a unit vehicle should be considered if this is not the case.
83. Shipment of Stores. The commercial shipping of stores, particularly DC, proved to be totally unreliable and for insertion of such an operation RAAF support is necessary.
84. Dangerous Cargo. Due to the nature of chemicals used in all aerial photographic operations and restrictions placed upon their air movement a UEO in the AO would be an advantage.
85. Medical. Medical precautions should be standard throughout the Army and not different treatments issued to members from different units.
86. Cost Codes. With the operation due to commence on 27 Aug 93 and no cost codes issued until 19 Aug 93 it was difficult to order stores and make payments for allowances.

## RECOMMENDATIONS

87. As a result of the observations made throughout Op BELAMA 93 and the consequences and conclusions as detailed in this report the following recommendations are made with respect to both Solomon Island and future aerial photography operations. Further recommendations are contained at Annex D.

| <u>Recommendation:</u>   | <u>Recommended<br/>Action by:</u> |
|--|-----------------------------------|
| 88. <u>Timings.</u> An acceptable lead time be given to enable overseas operations to be properly coordinated. | IP Div, LHQ<br>DSvy-A             |

89. Dangerous Cargo.

- a. one member to be deployed on each operation operation should be a qualified UEO, 4 Fd Svy Sqn
- b. suitable boxes and packing material be obtained and held at 4 Fd Svy Sqn, and 4 Fd Svy Sqn
- c. all insertion and extractions be by C130 to and from RAAF Edinburgh. LHQ

90. Learjet fitting. Whenever the aircraft requires any RA Svy equipment fitted or extracted, it should be supervised by a competent RA Svy air camera operator. 4 Fd Svy Sqn

91. Vehicles. The possibility of deploying a unit vehicle with each overseas operation should be investigated. 4 Fd Svy Sqn

92. Shipment of Stores. At no time should commercial shipping be used for delivery of stores to the AO. This need not apply to extraction if there is no need for those stores immediately. 4 Fd Svy Sqn

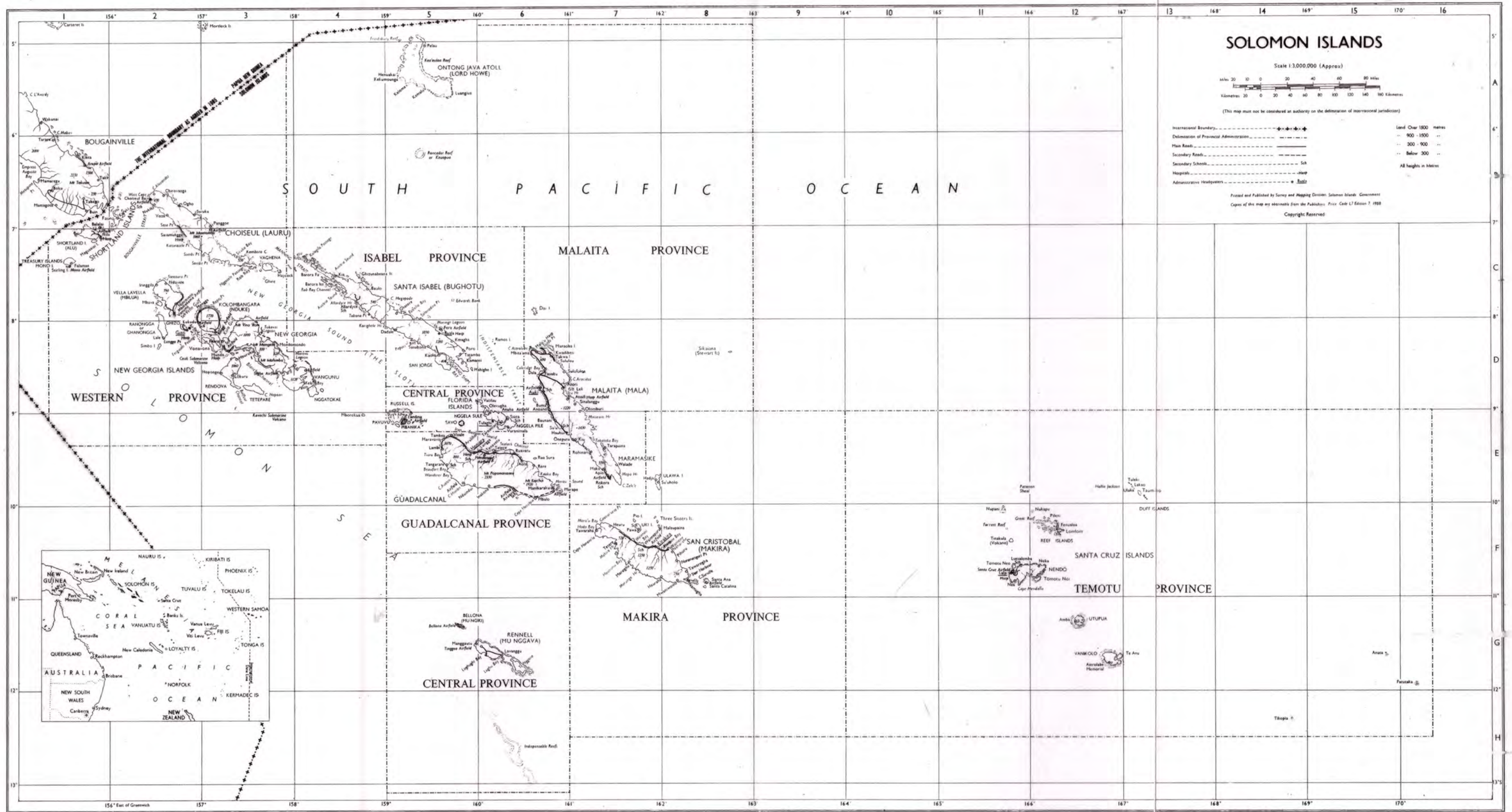


P.C. Demaine  
Major  
Officer Commanding

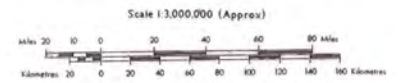
31 January 1993

# SOLOMON ISLANDS MAPPING PHOTOGRAPHY AO

ANNEX A TO  
OP BELAMA 93  
OPERATION REPORT  
DATED 31 JAN 94



## SOLOMON ISLANDS



(This map must not be considered an authority on the delineation of international jurisdiction)

|  |             |                       |
|--|-------------|-----------------------|
| International Boundary                   | -----+----- | Land Over 1000 metres |
| Delineation of Provincial Administration | -----       | 900 - 1500 "          |
| Main Roads                               | -----       | 300 - 900 "           |
| Secondary Roads                          | -----       | Below 300 "           |
| Secondary Schools                        | -----       | All heights in metres |
| Hospitals                                | -----       |                       |
| Administrative Headquarters              | -----       |                       |

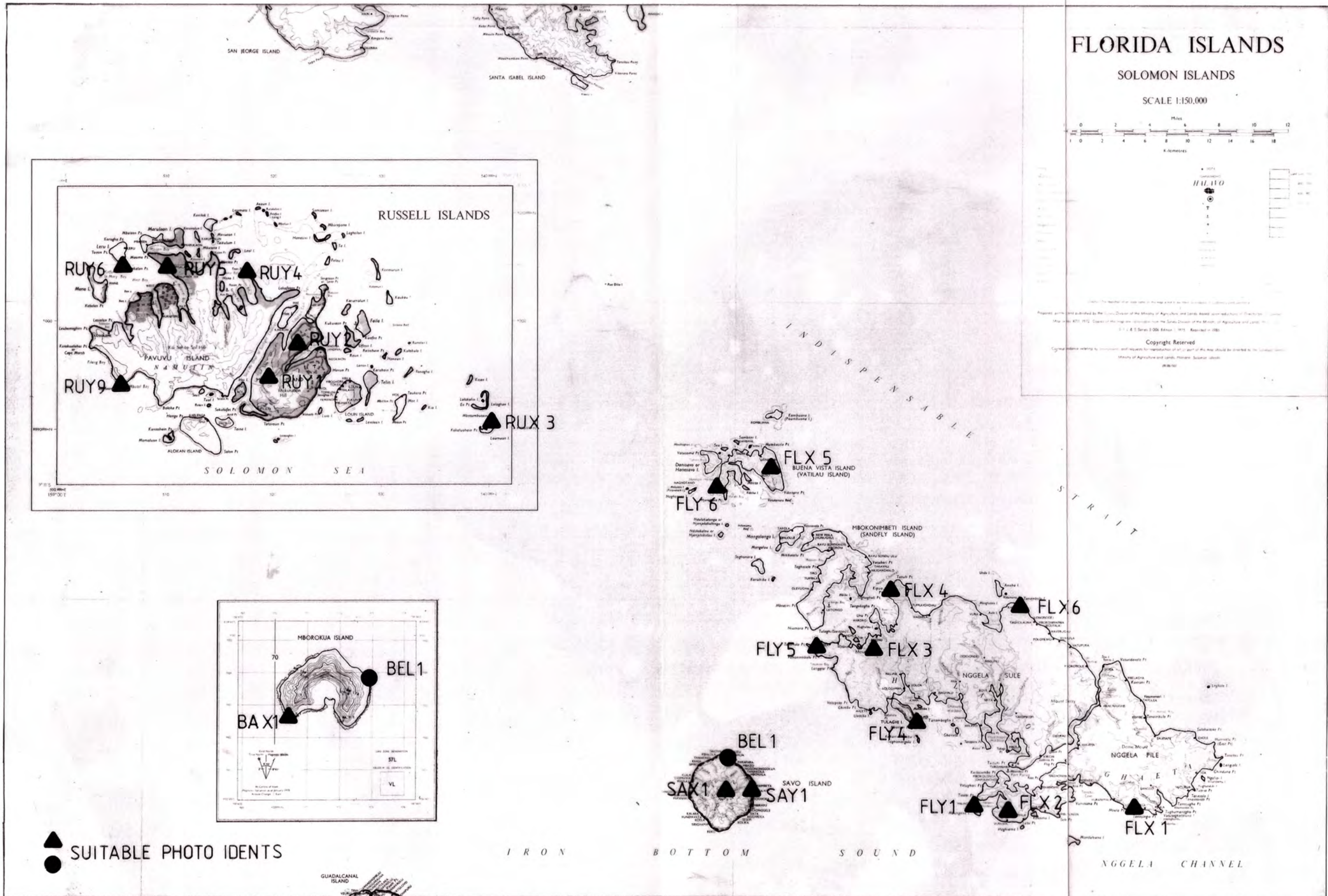
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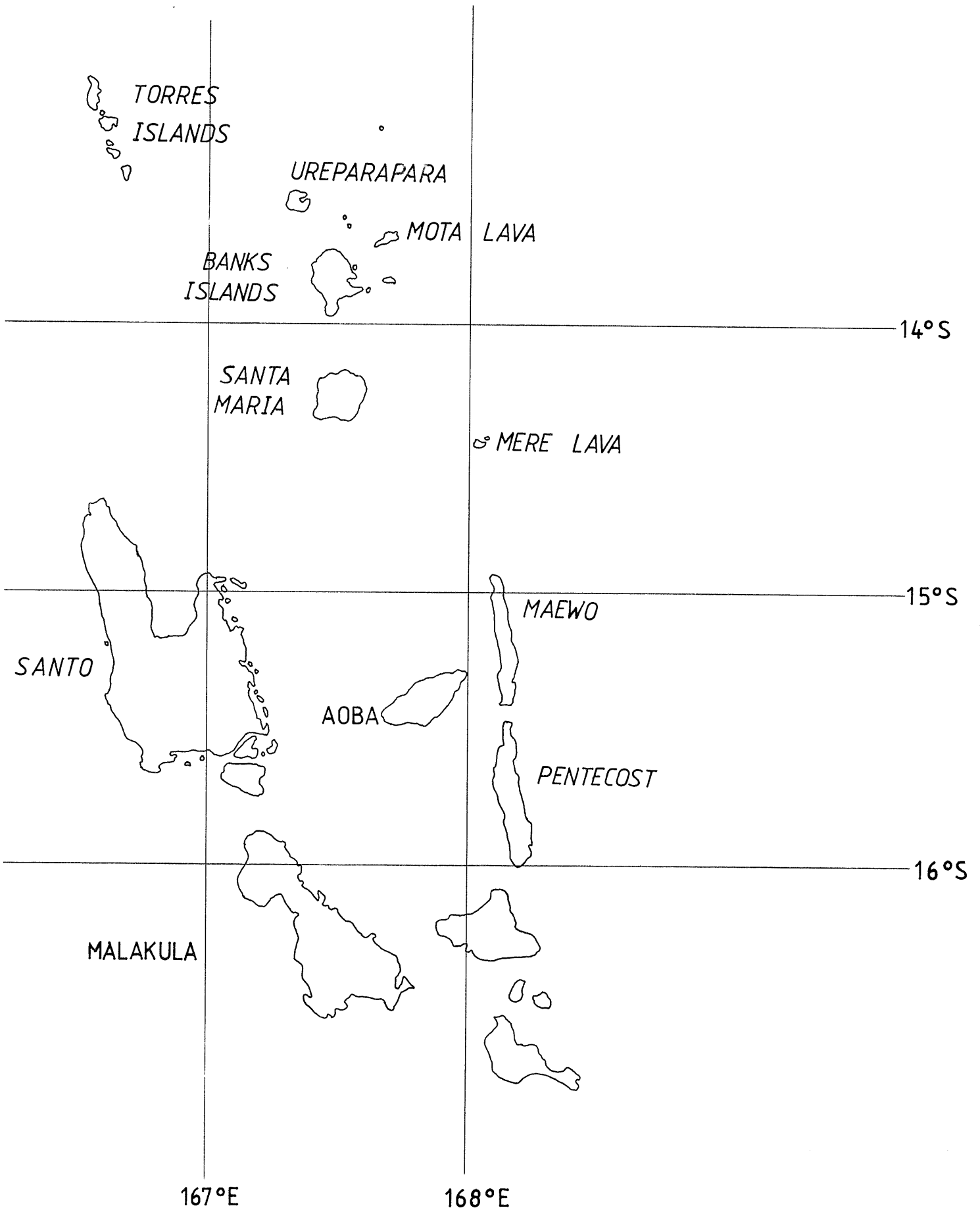
# SOLOMON ISLANDS IDENTIFICATION PHOTOGRAPHY

ANNEX B TO  
OP BELAMA 93  
OPERATION REPORT  
DATED 31 JAN 94



REPUBLIC OF VANUATU  
MAPPING PHOTOGRAPHY AO

ANNEX C TO  
OP BELAMA 93  
OPERATION REPORT  
DATED 31 JAN 94



ANNEX D TO  
OP BELAMA 93  
OPERATION REPORT  
DATED 31 JAN 94

TECHNICAL AND EQUIPMENT REPORT  
OPERATION BELAMA 93  
AUGUST TO OCTOBER 1993

INTRODUCTION

1. Operation BELAMA 93 was an aerial photography operation conducted by 4 Fd Svy Sqn in Solomon Islands and Republic of Vanuatu between 27 Aug 93 and 8 Oct 93.
2. The aim of the operation was to:
  - a. Complete the photographic coverage of Solomon Islands as described in References B and C.
  - b. Acquire Identification photography of the Florida and Russell Island Groups as stated in Reference C.
  - c. Complete outstanding mapping photography of Republic of Vanuatu as an opportunity task.
3. The Areas of Operations are shown at Annex A and C.

OPERATIONAL RESULTS

4. Mapping Photography. All mapping photography obtained was assessed and classified in accordance with References G and I. Suitable mapping photography that was achieved within Solomon Islands during Op BELAMA 93 is illustrated at Annex G. Annex H illustrates photography achieved within Republic of Vanuatu.
5. Details of line km of useable mapping photography achieved is:
  - a. Solomon Islands.

| Serial | MAPPING BLOCK     | X km | Y km | TOTAL km |
|--------|-------------------|------|------|----------|
| (a)    | (b)               | (c)  | (d)  | (e)      |
| (1)    | Shortland Islands | 28   | 25   | 53       |
| (2)    | Choiseul          | 151  | 106  | 257      |
| (3)    | Guadalcanal       | 29   | -    | 29       |

| Serial | MAPPING BLOCK         | X km | Y km | TOTAL km |
|--------|-----------------------|------|------|----------|
| (a)    | (b)                   | (c)  | (d)  | (e)      |
| (4)    | New Georgia           | 38   | 35   | 73       |
| (5)    | Santa Isabel          | 525  | 255  | 780      |
| (6)    | Malaita               | 96   | 166  | 262      |
| (7)    | San Cristobal         | -    | 78   | 78       |
| (8)    | Rennell               | -    | -    | nil      |
| (9)    | Indispensible Reefs   | 44   | 141  | 185      |
| (10)   | Ontong Java           | -    | -    | nil      |
| (11)   | Rancador Reef         | -    | -    | nil      |
| (12)   | Sikiana (Stewart Is.) | 17   | -    | 17       |
| (13)   | Santa Cruz Group      | 57   | 69   | 126      |
| (14)   | TOTAL                 | 985  | 875  | 1,860    |

b. Republic of Vanuatu.

| Serial | MAPPING BLOCK | X km | Y km | TOTAL km          |
|--------|---------------|------|------|-------------------|
| (a)    | (b)           | (c)  | (d)  | (e)               |
| (1)    | Santo         | 123  | 57   | 180               |
| (2)    | Aoba          | -    | -    | Z 64 <sup>1</sup> |
| (3)    | TOTAL         | 123  | 57   | 180               |

Note: 1            64 km of Z class photography on Aoba completes coverage.  
                          Assessment required to ascertain suitability for stereo compilation.

6.            Annex L depicts the photographic coverage required to complete tasking.

Identification Photography

7.            22 control points were tasked for identification photography and all were achieved. This is illustrated at Annex B and the Ident Register is at Annex M.

8.            Three of the points will be required to be coordinated by Svy Tech Adviser as:

a.        BEL 1 and BEL 2 are new points, and

b.        FLY 5 is eccentric.

9.            Photography of each of the points was attempted to conform with standards of Reference J. Due to prevailing weather conditions and time constraints RUY 1 was photographed below heavy cloud. The point is identifiable although not of good quality. BAX 1 and BEL 2 were photographed from a flying height of 4 000' rather than the planned 6 000' which would have yielded an absolute ident. This was also necessary due to cloud cover.

10. ISX 8 on Rua Dika Island could not be identified from ident photography due to minimum flying height for point transfer to mapping photography and panel size being limited by size of the feature. Current base mapping of Rua Dika Island is at 1:25 000 and in Reference L, Army Svy Regt agreed that there was no requirement for an ident photograph.

### PROCESSING AND PRINTING

11. All Panchromatic processing and printing was carried out in the AO by Det personnel utilising the WAINCO film processor and Metaform print processor.

12. Problems with processing equipment are discussed further under equipment in this report.

### ASSESSMENT

13. Photo assessing of photography was carried out by Det personnel in the AO in accordance with References G and I.

14. Photography that had been obtained in the AO during Op BELAMA 92 had been assessed and classified in accordance with References M and N. Photography classified as Y was suitable for aerotriangulation but not stereo compilation. 1993 Y class photography is suitable for most methods of producing a map at standard scales. As a result of this upgrading of standards, photography classified as Y in 1992 could be Z by the 1993 standards. To attempt to alleviate this discrepancy, any photography classified as Y in 1992 was attempted to be re flown in 1993 if possible, with the exception of Guadalcanal and Florida Island blocks. Guadalcanal was not attempted as Reference O had stated that this was not required and full coverage of Florida had been obtained in 1992.

### EQUIPMENT

#### Camera

15. WILD RC10 aerial camera number 2611 was used in conjunction with SAGII lens 2090 having a calibrated focal length of 88.04mm (calibration date 5 Apr 93).

16. NF2 Sight. The NF2 sight is hard mounted with a 1.5 degree rotation to the right of the aircraft axis. This can be compensated for by the operator, however it must be taken into account when setting drift, as a 1.5 degree drift correction to the right will read 0 degree on the drift graduation ring, where the same correction to the left will read 3 degree.

17. The pilots indicator lamp developed a sequence malfunction. Due to an altered lighting sequence one run of mapping photography was downgraded to Z. The new lighting sequence was noted and the problem did not recur.

18. The camera system was installed in VH-TPR for Op KUMUL 93 and remained in-situ for Op EMU 93 at the conclusion of Op BELAMA 93.

Differential Height Estimation and Logging System (DHELS)

19. DHELS airborne unit 1 had intermittent problems with being able to review information previously logged after a new mission number had been added. The operator then had no means of being able to confirm previous data. The solution used was to install a new DTD at the commencement of each mission.

Camera Platform

20. The camera platform used was contracted Gates 35A Learjet VH-TPR equipped with GARMIN GPS-100 Global Positioning System (GPS) for navigational purposes.

21. VH-TPR performed well with the speed, range and stability of the aircraft allowing tasking flexibility in difficult conditions. Good communication between pilots and camera crew was effected by head sets, hot wired for hands off operation.

22. The pilots proved to be experienced professionals who, having worked aerial survey missions previously, contributed significantly in weather liaison and interpretation as well as anticipating and reacting to changing weather conditions to maximise photo opportunities.

23. The GPS was used exclusively for initial navigation and proved valuable, particularly when forward viewing through NF2 sight was hindered by haze. Once the mapping run had been identified it was necessary to navigate manually as some existing maps in the AO do not show features in their correct positions.

24. The separation between glass port and 3" lens is minimal. If the aircraft is required to fly slower than normal a nose up attitude is adopted and consequently the PAV 11 mount must be adjusted. The lens cone then contacts the glass port and if any adjustments for drift are made, the glass port will become scratched. This was overcome by raising the PAV 11 mount with 5mm of spacers.

Film

25. Film types used for Op BELAMA 93 were:

- a. KODAK 2412 for SWA mapping photography, and
- b. KODAK 2402 for identification photography.

26. On two occasions due to time and weather constraints, 2402 was used for mapping photography. Results were acceptable in accordance with References G and I.

WAINCO Film Processor

27. The WAINCO 790 Aerial film processor was used for the processing of all aerial photography obtained during the Operation. Results obtained throughout the Operation could be classified as marginally acceptable. All films were processed emulsion down as recommended by user manual. Of the 25 films developed, only five were completely free of scratches or pinholes,

despite daily cleaning of rollers and wiper blades. All pinholes and scratches were of a minor order and should not effect the mapping process.

28. Two other films had sections creased by the processor. This appears to have been due to a broken catch on the dryer lid resulting in uneven tension.

29. Other minor difficulties were experienced throughout the Operation with the processor but all were overcome and did not effect the overall performance. Other technical difficulties and remedies that had been encountered during Op KUMUL 93 were taken note of and implemented.

30. Alternatives to the WAINCO processor are limited to:

- a. B5 Tanks. A manual method of processing producing consistent results that are within specifications. Both labour and time intensive;
- b. Kodak Versamat. Operated by RAAF at a number of bases around Australia the Versamat is able to consistently process films to a high standard; or
- c. Mobile Kodak Versamat. Operated by RAAF in air transportable cabins yielding results as good as those in-situ. Not available for overseas deployment at all times. Similar machines may be available through US Air Force.

### Metiform

31. The Metiform 5040 automatic paper processor performed well during the operation .

### Technical Difficulties

32. Technical Directive. The Op BELAMA 93 Technical Directive was not issued until 13 Aug 93. This left little time to confirm any queries with the document. Reference P was amendments to the Technical Directive clarifying some points but was not received until 10 Sep 93, 12 days after the Operation had commenced.

33. Ontong Java. This island group is on the extreme edge of the AO and consists mainly of reefs with a few small villages. Full 1:50 000 mapping coverage exists, printed in 1981 by RA Svy from 1980 photography. Although it was included in the tasking, after consultation with local authorities and discovering that little development had occurred, no further photography of the area was attempted.

34. Photography Under Cloud. Tropical climates and mountainous regions tend to continually develop large cloud banks. Several attempts were made to obtain photography with overhead cloudcover with mixed results. The ideal scenario appears to be a reasonably bright day with 100% overhead cloud evenly distributed. If the developing rate of the film is then slowed by approximately 2%, results will still be within standards defined in Reference G. The image is a little flat but still able to yield a stereo image.

Reassessment of Task

35. The primary aim of Op BELAMA 93, as with previous operations was to obtain aerial photography for 1:50 000 mapping. The ideal means to complete this is once total coverage of an aerotriangulation block is obtained, with suitable ident photography, it is aerotriangulated by Army Svy Regt.

36. Due to prevailing weather conditions and the nature of cloud formations over mountainous terrain, there is frequently a small percentage of an island that has no coverage and consequently delays the plotting of an island or group. These delays may be in the order of years.

37. During his visit to Op BELAMA 93, Major A. McLeod held discussions with both the Surveyor General, Mr Jackson Vaikota and Australian High Commissioner, Ms Ruth Pearce. During these meetings it was understood that the real priority for mapping within the Solomon Islands is for 1:50 000 maps of the coastal areas. It is these areas where the vast majority of development occurs and planning data is vital. Many of the more mountainous regions are completely inaccessible.

38. The decision was then taken to continue to attempt to capture imagery as detailed in Reference D which would yield the ideal aerotriangulation solution. When the optimum flight line was not clear for photography, extra tie runs were flown which would enable smaller block or strip adjustments to be completed. This is as discussed in Reference Q. While it is realised that this is not the optimum solution it will at least provide much needed mapping coverage of coastal areas.

39. A number of the smaller islands and reefs may be able to have imagery acquired by satellite means and this may be more economical than conventional aerial photography.

CONCLUSIONS

40. Op BELAMA 93 achieved much of the overall tasking, but was unable to complete it due to adverse weather conditions minimising photographic opportunities.

41. The equipment utilised on OP BELAMA 93 functioned serviceably with only minor problems.

42. The major area of concern is the RC10 cameras and WAINCO processor.

Camera

43. The serviceability of the equipment is a major concern as they surpassed their Life Of Type (LOT) in 1992 and each camera system is an accumulation of parts from various cameras.

44. Uncommon problems are appearing which can only be attributed to length of service and as WILD no longer provide replacement parts, cannibalism and patchup servicing can only provide support for a limited time.

45. High contrast, fine grain film such as KODAK 2412 requires a slow exposure and a large aperture. Use of 2412 in conjunction with a high speed aircraft should be a consideration for

future camera equipment updates, as Image Movement Compensation (IMC) would allow slower exposure times without the risk of image motion.

### WAINCO

46. The WAINCO film processor provided consistent results within specifications, however, scratching and pinholes no matter how minor are still unacceptable for A1 mapping photography.
47. The successes obtained with the processor are probably more a case of operators becoming familiar with the machines idiosyncrasies and a lot of trial and error.
48. The WAINCO processor is probably more suited for use in development of ident, supplementary or rapid response photography. For mapping photography a more reliable piece of equipment is required.

### RECOMMENDATIONS

| <u>Recommendation:</u>  | <u>Recommended<br/>Action by:</u>           |
|---|---|
| 49. Camera PAV11 mount in VH-TPR be spaced with washers 5mm above standard position to accommodate the 88mm lens.   | 4 Fd Svy                                    |
| 50. Specifications for Aerial Mapping Photography be amended to include KODAK 2402 as a substitute for 2412 when conditions require a faster film.  | DSvy-A                                      |
| 51. The aerotrig/plotting acceptability of different films being used on adjoining runs (2412 and 2402) be advised to 4 Fd Svy Sqn.   | Army Svy Regt                               |
| 52. All DHELs Data Transfer Devices be tested for battery life and serviceability.  | 4 Fd Svy Sqn                                |
| 53. Software be developed to allow the downloading of DTDs in the AO.   | 4 Fd Svy Sqn<br>Army Svy Regt               |
| 54. A replacement camera with Image Motion Compensation (IMC) be purchased to replace current cameras.  | DSvy-A                                      |
| 55. Ontong Java be deleted from any future tasking and updates gained either from satellite imagery or supplementary photography and local information channelled through Svy Tech Adviser. | DSvy-A<br>Army Svy Regt<br>Svy Tech Adviser |
| 56. Investigation be conducted as to the possibility of carrying out adjustment of strips or part blocks to New Georgia, Choiseul, Santa Isabel and Malaita.                                | DSvy-A<br>Army Svy Regt                     |

Recommendation:

Recommended  
Action by:

57. Investigation as to alternative methods of film processing be made a matter of priority.

4 Fd Svy Sqn



P.D. Longbottom  
SGT  
DET 2IC

31 Jan 94

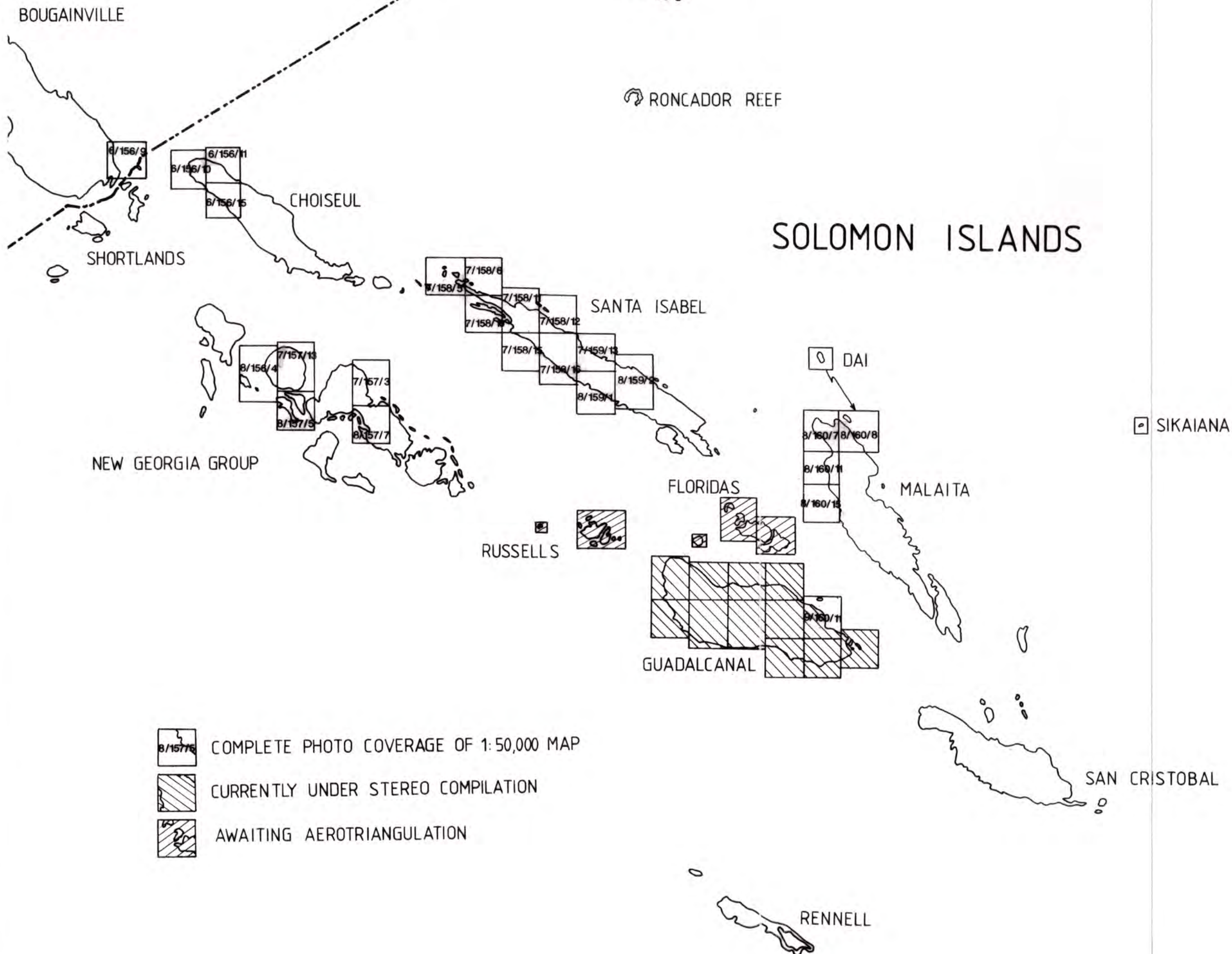
ANNEX E TO  
OP BELAMA 93  
OPERATION REPORT  
DATED 31 JAN 94




SEQUENCE OF EVENTS

| Serial<br>(a) | Date<br>(b) | Event<br>(c)  |
|---------------|-------------|---|
| 1             | 12 Aug 93   | Issue of Technical Directive  |
| 2             | 18 Aug 93   | Issue of Operation Order<br>Stores to Townsville  |
| 3             | 19 Aug 93   | Issue of Mounting Instruction   |
| 4             | 22 Aug 93   | WO2 Clark to Townsville   |
| 5             | 24 Aug 93   | SGT Longbottom to Melb  |
| 6             | 25 Aug 93   | SGTs Langeberg and Tuddenham and CPL Willis to<br>Melb<br>Op BELAMA 93 pers civ air Melbourne to<br>Townsville.<br>Assist WO2 Clark to pack freight.  |
| 7             | 26 Aug 93   | Assist WO2 Clark to pack freight.   |
| 8             | 27 Aug 93   | Op BELAMA 93 pers stores and DC transit by C130<br>Townsville - Port Moresby - Madang<br>Op KUMUL 93 pers, equipment, stores and DC<br>embark C130<br>C130 Transit Madang - Port Moresby - Honiara. |
| 9             | 28 Aug 93   | Op KUMUL 93 pers depart Honiara on C130<br>Op BELAMA 93 pers establish work areas<br>Learjet arrived Honiara  |
| 10            | 29 Aug 93   | Photographic sorties commence.<br>Completed establishment of work areas.  |
| 11            | 4 Sep 93    | Pilots rest day   |
| 12            | 5-6 Sep 93  | Photographic sorties flown  |
| 13            | 7-8 Sep 93  | No flying due to pilots broken foot.  |
| 14            | 8 Sep 93    | New pilot, Mr Bill Scott arrived  |
| 15            | 8-12 Sep 93 | OC 4 Fd Svy Sqn visit   |
| 16            | 9-17 Sep 93 | Photographic sorties continue throughout Solomon<br>Islands   |
| 17            | 18 Sep 93   | Pilots rest day   |
| 18            | 19 Sep 93   | Photographic sorties continue throughout Solomon<br>Islands   |

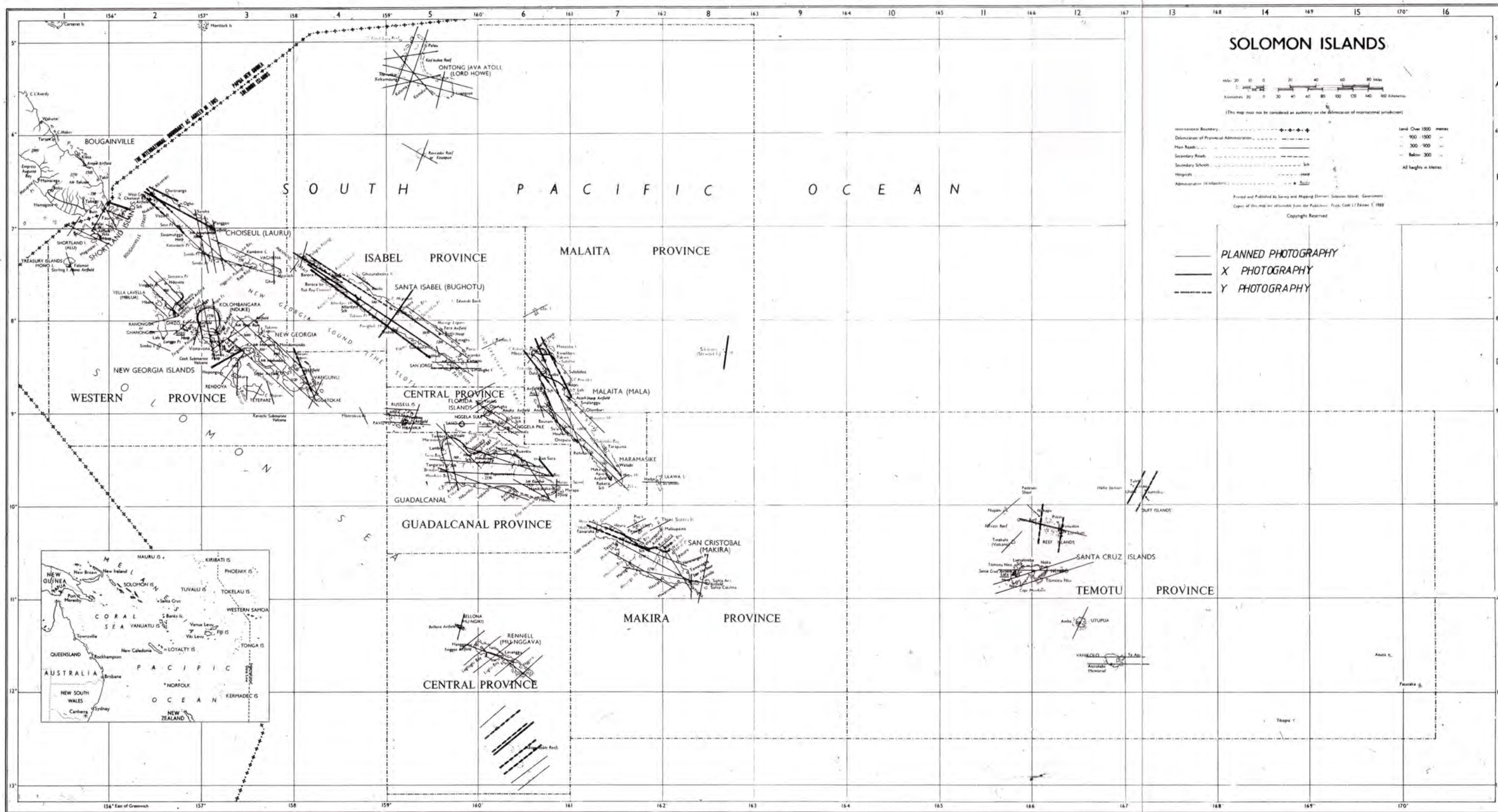
| Serial | Date            | Event  |
|--------|-----------------|--|
| 19     | 20-23 Sep 93    | Learjet deployed to Republic of Vanuatu with LT Gray and SGTs Langeberg and Longbottom   |
| 20     | 20-24 Sep 93    | CPL Willis panelling control points with Svy Tech Adviser  |
| 21     | 24 Sep 93       | Photographic sorties Solomon Islands<br>New pilot, Mr Trevor Frost   |
| 22     | 25 Sep 93       | Pilots rest day  |
| 23     | 26 Sep-1 Oct 93 | Photographic sorties Solomon Islands   |
| 24     | 2 Oct 93        | Pilots rest day  |
| 25     | 3-6 Oct 93      | Photographic sorties Solomon Islands   |
| 26     | 7 Oct 93        | Dismantle work areas   |
| 27     | 8 Oct 93        | Learjet transit Honiara-Brisbane with LT Gray and SGT Longbottom<br>Civil air Honiara-Melbourne SGTs Langeberg and Tuddenham and CPL Willis. RTU |

MAP SHEETS WITH FULL PHOTOGRAPHIC COVERAGE  
 ONTONG JAVA



-  COMPLETE PHOTO COVERAGE OF 1:50,000 MAP
-  CURRENTLY UNDER STEREO COMPILATION
-  AWAITING AEROTRIANGULATION

# SOLOMON ISLANDS PHOTOGRAPHY AQUIRED DURING OP BELAMA 93



**SOLOMON ISLANDS**

Scale: 1:50,000  
 0 20 40 60 80 100 Kilometers  
 0 20 40 60 80 100 Miles

(This map may not be considered an authority on the delineation of international boundaries)

|  |                               |                       |       |
|--|-------------------------------|-----------------------|-------|
| International Boundary                   | -----+-----+-----+-----+----- | Land Over 1000 metres | ----- |
| Delineation of Provincial Administration | -----                         | 900 - 1000            | ----- |
| Main Road                                | -----                         | 300 - 900             | ----- |
| Secondary Road                           | -----                         | Below 300             | ----- |
| Secondary School                         | -----                         |                       | ----- |
| Height                                   | -----                         |                       | ----- |
| Administration (UN/UNEP)                 | -----                         |                       | ----- |

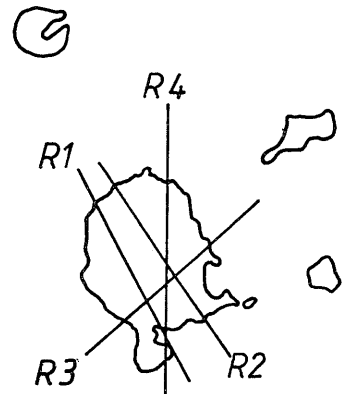
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\_\_\_\_\_ PLANNED PHOTOGRAPHY  
 \_\_\_\_\_ X PHOTOGRAPHY  
 \_\_\_\_\_ Y PHOTOGRAPHY

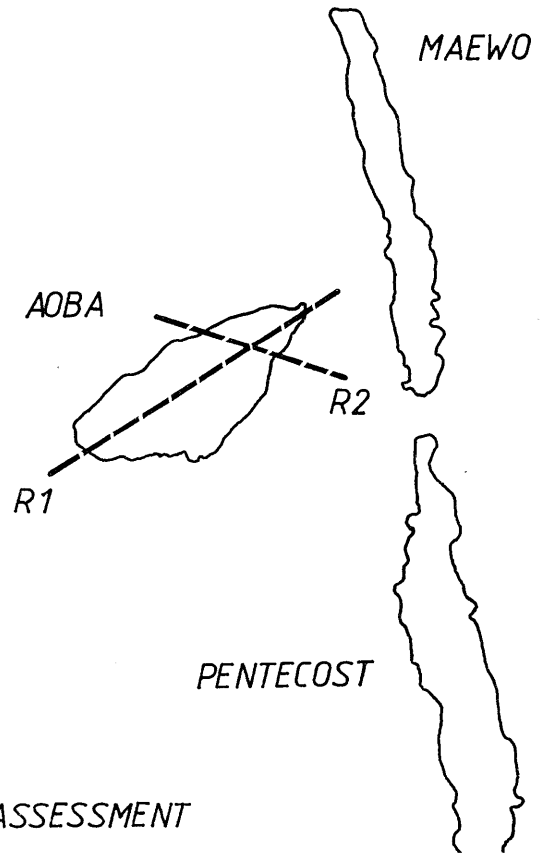
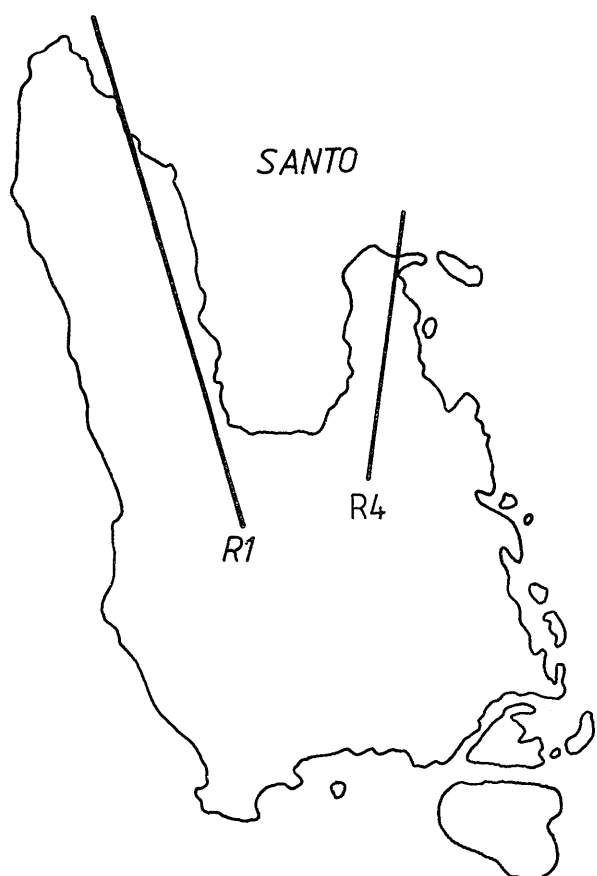
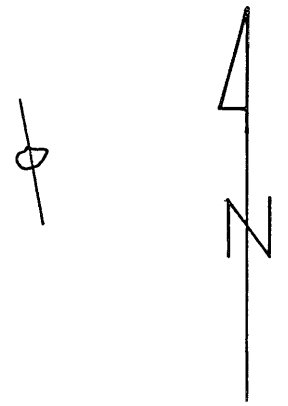
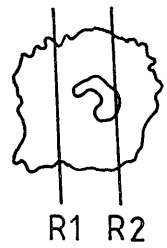
REPUBLIC OF VANUATU PHOTOGRAPHY ACHIEVED

ANNEX H TO  
OP BELAMA 93  
OPERATION REPORT  
DATED 31 JAN 94

NORTHERN  
REPUBLIC OF  
VANUATU



BANKS ISLAND GROUP



SCALE 1:1000000

- OUTSTANDING RUNS OF PHOTOGRAPHY
- USABLE PHOTOGRAPHY
- - - - - PHOTOGRAPHY REQUIRING FURTHER ASSESSMENT

ANNEX I TO  
OP BELAMA 93  
OPERATION REPORT  
DATED 3 JAN 94

OPERATIONAL MANNING

1. 4 Fd Svy Sqn.

|                           |         |                    |
|---------------------------|---------|--------------------|
| 226259 MAJ A.B. McLeod    | Visitor | 8 Sep -10 Sep 93   |
| 5104899 LT R.L. Gray      | OC Det  | 28 Aug - 11 Oct 93 |
| 49654 SGT P.D. Longbottom | Det 2IC | 25 Aug - 11 Oct 93 |

2. Army Svy Regt.

|                          |           |                    |
|--------------------------|-----------|--------------------|
| 4401491 SGT P. Langeberg | Camera Op | 25 Aug - 11 Oct 93 |
| 416476 SGT P. Tuddunham  | Camera Op | 25 Aug - 11 Oct 93 |
| 555573 CPL D. Willis     | Camera Op | 25 Aug - 11 Oct 93 |

5. Airscan Pty Ltd.

|             |       |                   |
|-------------|-------|-------------------|
| Mr M. Juelg | Pilot | 29 Aug - 8 Oct 93 |
|-------------|-------|-------------------|

6. Tipperary Aviation.

|              |       |                    |
|--------------|-------|--------------------|
| Mr H. Morton | Pilot | 29 Aug - 10 Sep 93 |
| Mr W Scott   | Pilot | 8 Sep - 24 Sep 93  |
| Mr T Frost   | Pilot | 22 Sep - 8 Oct 93  |

ANNEX J TO  
OP BELAMA 93  
OPERATION REPORT  
DATED 31 JAN 94

FLYING HOURS

| <b>Serial</b> | <b>Date</b> | <b>Pilots</b>               | <b>Crew</b>                           | <b>Hours</b> | <b>Comments</b>  |
|---------------|-------------|-----------------------------|---------------------------------------|--------------|--|
| (a)           | (b)         | (c)                         | (d)                                   | (e)          | (f)  |
| 1             | 29 AUG 93   | Mr H.Morton<br>Mr M.Juelg   | SGT D. Longbottom<br>SGT P. Langeberg | 2.3          | Honiara to New Georgia   |
| 2             | 30 AUG 93   | Mr H. Morton<br>Mr M. Juelg | SGT P. Tuddenham<br>CPL D. Willis     | 2.2          | Honiara to Santa Isabel  |
| 3             | 31 AUG 93   | Mr H. Morton<br>Mr M. Juelg | SGT D. Longbottom<br>SGT P. Langeberg | 2.7          | Honiara to New Georgia, Santa Isabel<br>& Russell Islands      |
| 4             | 1 SEP 93    | Mr H.Morton<br>Mr M.Juelg   | SGT P. Tuddenham<br>CPL D. Willis     | 2.5          | Honiara to Florida Islands, New Georgia<br>& Shortland Islands |
| 5             | 2 SEP 93    | Mr H.Morton<br>Mr M.Juelg   | SGT D. Longbottom<br>SGT P. Langeberg | 2.7          | Honiara to Santa Isabel & Rennell Island                       |
| 6             | 3 SEP 93    | Mr H.Morton<br>Mr M.Juelg   | SGT P. Tuddenham<br>CPL D. Willis     | 2.3          | Honiara to New Georgia & Rennell Island                        |
| 7             | 4 SEP 93    |                             |                                       |              | Pilot's Rest Day   |

|    |           |                             |  |     |  |
|----|-----------|-----------------------------|--|-----|--|
| 8  | 5 SEP 93  | Mr H.Morton<br>Mr M.Juelg   | SGT D. Longbottom<br>SGT P. Langeberg                  | 2.3 | Honiara to New Georgia & Rennell Island                          |
| 9  | 6 SEP 93  | Mr H. Morton<br>Mr M. Juelg | SGT P. Tuddenham<br>CPL D. Willis                      | 2.2 | Honiara to Shortland Islands & Rennell Island                    |
| 10 | 7 SEP 93  |                             |  |     | Day's lost due to injury to Mr H. Moreton, waiting for new pilot |
| 11 | 8 SEP 93  |                             |  |     |  |
| 12 | 9 SEP 93  | Mr B. Scott<br>Mr M. Juelg  | MAJ A. M'Leod<br>SGT D. Longbottom<br>SGT P. Langeberg | 3.2 | Honiara to New Georgia & Rennell Island                          |
| 13 | 9 SEP 93  | Mr B. Scott<br>Mr M. Juelg  | SGT D. Longbottom<br>SGT P. Langeberg                  | 0.9 | Honiara to Florida Islands                                       |
| 14 | 10 SEP 93 | Mr B. Scott<br>Mr M. Juelg  | SGT P. Tuddenham<br>CPL D. Willis                      | 2.8 | Honiara to Choiseul  |
| 15 | 11 SEP 93 | Mr B. Scott<br>Mr M. Juelg  | SGT D. Longbottom<br>SGT P. Langeberg                  | 2.8 | Honiara to Shortland Islands & Santa Cristobel                   |
| 16 | 12 SEP 93 | Mr B. Scott<br>Mr M. Juelg  | SGT P. Tuddenham<br>CPL D. Willis                      | 3.1 | Honiara to Malaita & San Cristobel                               |
| 17 | 13 SEP 93 | Mr B. Scott<br>Mr M. Juelg  | SGT D. Longbottom<br>SGT P. Langeberg                  | 3.4 | Honiara to Shortland Islands & Santa Isabel                      |
| 18 | 14 SEP 93 | Mr B. Scott<br>Mr M. Juelg  | SGT P. Tuddenham<br>CPL D. Willis                      | 2.7 | Honiara to Santa Isabel  |
| 19 | 15 SEP 93 | Mr B. Scott<br>Mr M. Juelg  | SGT D. Longbottom<br>SGT P. Langeberg                  | 2.5 | Honiara to Ontong Java   |
| 20 | 16 SEP 93 | Mr B. Scott<br>Mr M. Juelg  | SGT D. Longbottom<br>CPL D. Willis                     | 3   | Honiara to Duff Islands  |

|    |           |                            |                                       |     |  |
|----|-----------|----------------------------|---------------------------------------|-----|--|
| 21 | 17 SEP 93 | Mr B. Scott<br>Mr M. Juelg | SGT P. Tuddenham<br>SGT P. Langeberg  | 3.3 | Honiara to Santa Isabel & Malaita                    |
| 22 | 18 SEP 93 |                            |                                       |     | Pilot's Rest Day                                     |
| 23 | 19 SEP 93 | Mr B. Scott<br>Mr M. Juelg | SGT P. Tuddenham<br>CPL D. Willis     | 2.2 | Honiara to Choiseul                                  |
| 24 | 20 SEP 93 | Mr B. Scott<br>Mr M. Juelg | SGT D. Longbottom<br>SGT P. Langeberg | 3.7 | Honiara to Santo & Port Vila                         |
| 25 | 21 SEP 93 | Mr B. Scott<br>Mr M. Juelg | SGT D. Longbottom<br>SGT P. Langeberg | 3.5 | Port Vila to Reef Islands & Santo                    |
| 26 | 22 SEP 93 | Mr B. Scott<br>Mr M. Juelg | SGT D. Longbottom<br>SGT P. Langeberg | 1.8 | Port Vila to Banks Islands                           |
| 27 | 23 SEP 93 | Mr B. Scott<br>Mr M. Juelg | SGT D. Longbottom<br>SGT P. Langeberg | 2.7 | Port Vila to Utupua & Honiara                        |
| 28 | 24 SEP 93 | Mr T. Frost<br>Mr M. Juelg | SGT P. Tuddenham<br>SGT P. Langeberg  | 2.6 | Honiara to Stewart Islands                           |
| 29 | 25 SEP 93 |                            |                                       |     | Pilot's Rest Day                                     |
| 30 | 26 SEP 93 | Mr T. Frost<br>Mr M. Juelg | SGT P. Tuddenham<br>CPL D. Willis     | 3   | Honiara to Florida Islands & Santa Isabel            |
| 31 | 27 SEP 93 | Mr T. Frost<br>Mr M. Juelg | SGT P. Tuddenham<br>SGT P. Langeberg  | 2.2 | Honiara to Choiseul & Roncador Reef                  |
| 32 | 28 SEP 93 | Mr T. Frost<br>Mr M. Juelg | SGT D. Longbottom<br>CPL D. Willis    | 2.5 | Honiara to Choiseul                                  |
| 33 | 28 SEP 93 | Mr T. Frost<br>Mr M. Juelg | SGT D. Longbottom<br>CPL D. Willis    | 1   | Honiara to Russell Islands                           |
| 34 | 29 SEP 93 | Mr T. Frost<br>Mr M. Juelg | SGT P. Tuddenham<br>SGT P. Langeberg  | 1.9 | Honiara to Savo Island, Russell Islands & Santa Cruz |

|    |           |                            |                                       |     |  |
|----|-----------|----------------------------|---------------------------------------|-----|--|
| 36 | 30 SEP 93 | Mr T. Frost<br>Mr M. Juelg | SGT D. Longbottom<br>CPL D. Willis    | 3.2 | Honiara to Indispensable Reefs                       |
| 37 | 1 OCT 93  | Mr T. Frost<br>Mr M. Juelg | SGT P. Tuddenham<br>SGT P. Langeberg  | 3.7 | Honiara to Savo Island, Indispensable Reefs          |
| 38 | 2 OCT 93  |                            |                                       |     | Pilots rest day                                      |
| 39 | 3 OCT 93  | Mr T. Frost<br>Mr M. Juelg | SGT D. Longbottom<br>SGT P. Tuddenham | 2.9 | Honiara to Savo Island, Russell Islands & Santa Cruz |
| 40 | 4 OCT 93  | Mr T. Frost<br>Mr M. Juelg | SGT P. Langeberg<br>CPL D. Willis     | 2.7 | Honiara to Savo Island, Russell Islands & Santa Cruz |
| 41 | 5 OCT 93  | Mr T. Frost<br>Mr M. Juelg | SGT P. Tuddenham<br>SGT P. Langeberg  | 3.8 | Honiara to Savo Island, Malaita & Santa Cruz         |
| 42 | 6 OCT 93  | Mr T. Frost<br>Mr M. Juelg | SGT P. Langeberg<br>CPL D. Willis     | 2.9 | Honiara to Savo Island, Choiseul & Santa Cruz        |
| 43 | 7 OCT 93  |                            |                                       |     | Pilots rest day                                      |
| 44 | 8 OCT 93  | Mr T. Frost<br>Mr M. Juelg | LT R. Gray<br>SGT P. Longbottom       | 2.9 | Honiara to Brisbane                                  |

CONTACTS IN THE AO

International telephone and facsimile access is:

To Solomon Islands from Australia:

Tel: 0011 677 XX XXX

Fax: 0015 677 XX XXX

From Solomon Islands to Australia:

Tel: 00 61 X XXX XXXX

Fax: 00 61 X XXX XXXX.

ARMY

Survey Adviser - CAPT Brian Sloan

Tel: 21 511

A/H: 21 345

AUSTRALIAN GOVERNMENT

Australian High Commission

Tel: 21 561

Fax: 23 691

Defence Cooperation Desk

Tel: 20 386

Fax: 20 893

SOLOMON ISLAND GOVERNMENT

Dept of Lands and Surveys

Surveyor General - Mr Jackson Vaikota

Solomon Island Electricity Authority

Engineer - Mr Charles Temma

Tel: 30 236

Responsibility: Coordinating power cuts

Customs

Chief Boarding Officer - Mr Billy Lebewa  
Tel: 23 220

Immigration

IC Airport section - Mr Owen Rove  
Tel: 22 585

Civil Aviation

Director - Mr Kevin Turnball  
Tel: 30 563

Airport Manager - Mr Mike Anita  
Tel: 30 567

Meteorological Service Division

Manager - Mr Mike Ariki  
Tel: 21 718

Henderson Operations section  
Tel: 30 270

CIVILIANShell Petroleum

Manager Solomon Islands - Mr Stephen Subam  
Area Sales Manager - Mr Rex Inomae  
Tel: 21 838

Mendana Hotel

P.O. Box 384  
Mendana Ave  
Tel: 20 071  
Fax: 23 942

Solomon Airlines

Tel: 20 031  
Fax: 23 992  
Internal and International flights.

Honiara Diagnostic Laboratories

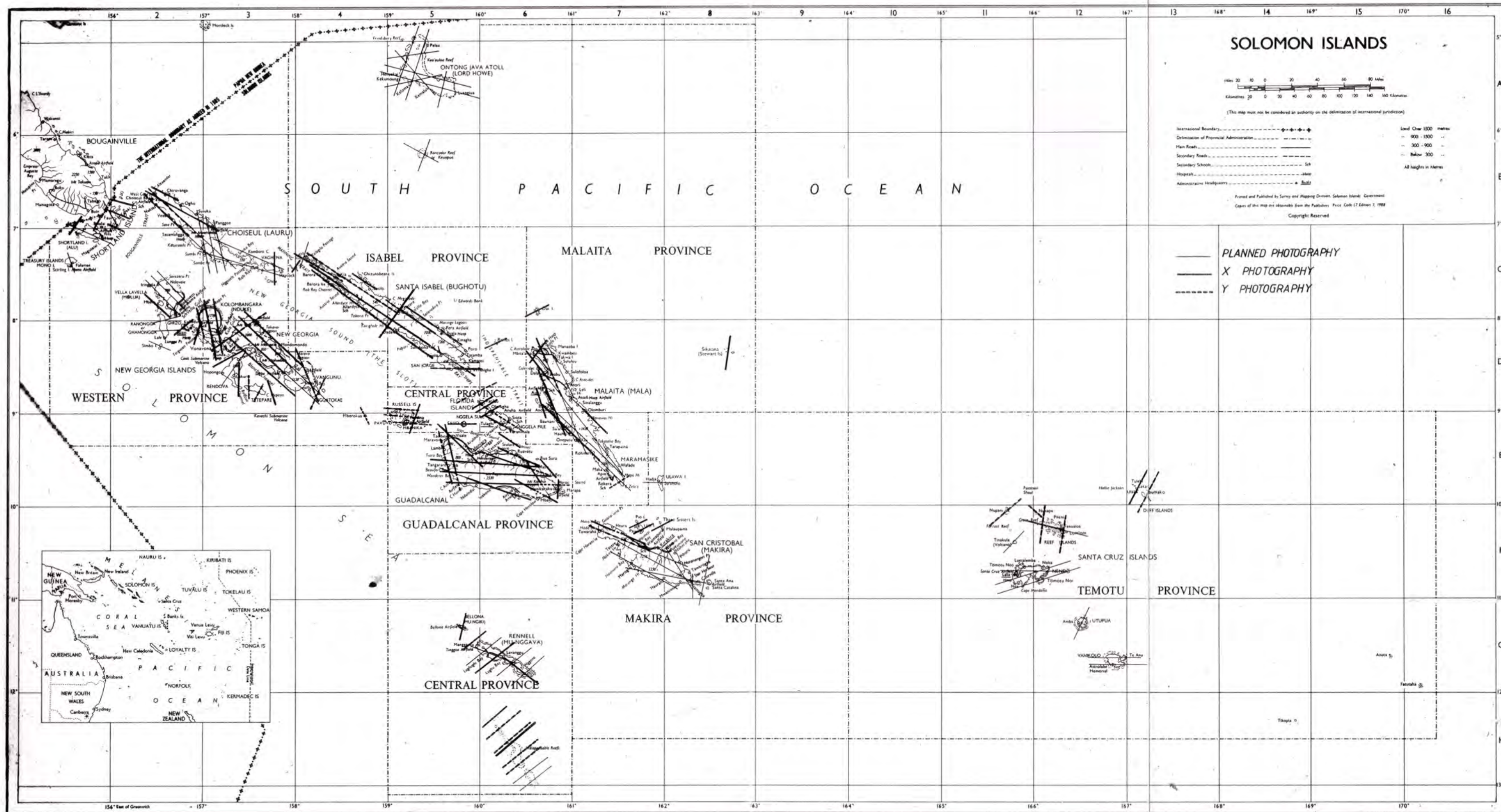
Tel: 22 376  
Conduct blood tests for malaria.

National Bank of Solomon Islands

International Division  
Manager - Mr Gary Sciberras  
Tel: 21 874

# SOLOMON ISLANDS OUTSTANDING PHOTOGRAPHY

**ANNEX L TO  
OP BELAMA 93  
OPERATION REPORT  
DATED 31 JAN 94**




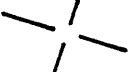

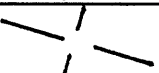
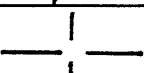
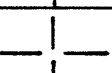
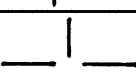

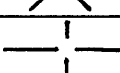
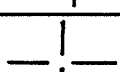
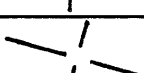



ANNEX M TO  
4 FD SVY SQN  
OPERATION REPORT  
OP BELAMA 93  
DATED 31 JAN 94

IDENT REGISTER

OPERATION BELAMA 93

| Station Name/No | Mission No | Frame No | Flying Height | Date      | Target Configuration |
|-----------------|------------|----------|---------------|-----------|----------------------|
| BAX 1           | 4 FD S 485 | 0012     | 4 000'        | 29 Sep 93 |                      |
| BEL 1           | 4 FD S 483 | 0044     | 10 000'       | 26 Sep 93 |                      |
| BEL 2           | 4 FD S 485 | 0015     | 4 000'        | 29 Sep 93 |                      |
| BEL 2           | 4 FD S 487 | 0022     | 6 000'        | 2 Oct 93  |                      |
| FLY 1           | 4 FD S 470 | 0001     | 10 000'       | 31 Aug 93 |                      |
| FLY 4           | 4 FD S 483 | 0017     | 10 000'       | 25 Sep 93 |                      |
| FLY 4           | 4 FD S 490 | 0008     | 10 000'       | 4 Oct 93  |                      |
| FLY 5           | 4 FD S 483 | 0008     | 10 000'       | 26 Sep 93 |                      |
| FLY 6           | 4 FD S 483 | 0005     | 10 000'       | 26 Sep 93 |                      |
| FLX 1           | 4 FD S 483 | 0014     | 10 000'       | 26 Sep 93 |                      |
| FLX 2           | 4 FD S 470 | 0006     | 10 000'       | 31 Aug 93 |                      |
| FLX 3           | 4 FD S 473 | 0006     | 10 000'       | 9 Sep 93  |                      |
| FLX 4           | 4 FD S 470 | 0012     | 10 000'       | 31 Aug 93 |                      |

| Station Name/No | Mission No | Frame No | Flying Height | Date      | Target Configuration  |
|-----------------|------------|----------|---------------|-----------|---|
| FLX 5           | 4 FD S 473 | 0015     | 10 000'       | 9 Sep 93  |    |
| FLX 6           | 4 FD S 483 | 0002     | 10 000'       | 26 Sep 93 |    |
| RUX 3           | 4 FD S 485 | 0007     | 10 000'       | 28 Sep 93 |    |
| RUX 3           | 4 FD S 485 | 0010     | 14 500'       | 28 Sep 93 |    |
| RUX 3           | 4 FD S 487 | 0012     | 10 000'       | 2 Oct 93  |    |
| RUX 3           | 4 FD S 487 | 0031     | 14 000'       | 2 Oct 93  |    |
| RUY 1           | 4 FD S 487 | 0005     | 9 000'        | 1 Oct 93  |    |
| RUY 2           | 4 FD S 469 | 0009     | 10 000'       | 30 Aug 93 |    |
| RUY 4           | 4 FD S 469 | 0006     | 10 000'       | 30 Aug 93 |   |
| RUY 5           | 4 FD S 469 | 0004     | 10 000'       | 30 Aug 93 |  |
| RUY 6           | 4 FD S 469 | 0001     | 10 000'       | 30 Aug 93 |  |
| RUY 9           | 4 FD S 469 | 0017     | 10 000'       | 30 Aug 93 |  |
| SAX 1           | 4 FD S 483 | 0043     | 10 000'       | 26 Sep 93 |  |
| SAY 1           | 4 FD S 490 | 0005     | 10 000'       | 4 Oct 93  |  |