4. OTHERS

4-1. Technology transfer

In addition to the technical co-operation mentioned in 3-2-6, technology transfer to Fiji counterpart personnel will be performed during the field work in the Study Area F53 as well as the data processing and preparation of the smooth sheet of survey during the post- work in Japan on the on-job training basis.

4-2. Cooperation by FHS

(1) FHS will provide appropriate number of officers/ surveyors as counterpart personnel.

(2) FHS will assist the Study Team in:

1) facilitating customs clearance of instruments and materials and other official procedures,
2) hiring local assistants to work in the field,
3) obtaining and purchasing necessary materials for the Study,
4) proceeding local formalities for the entry and work of the Study Team, and
5) other matters deemed necessary for smooth progress of the Study.

4-3. Operation of survey vessel

(1) In principle, the survey work on board the survey vessel will be during the daytime only, and there will be no work on Sundays.

(2) Every 30 days the survey vessel will return to Port of Suva from the survey site for rest and replenishment for four days.

4-4. Working schedule

The working schedule will be discussed and agreed by the Study Team and FHS, and then informed to JICA Fiji Office prior to commencement of the field work. Any changes necessitated in the schedule during the course of work will be communicated to JICA Fiji Office without delay.

4-5. Concluding meeting

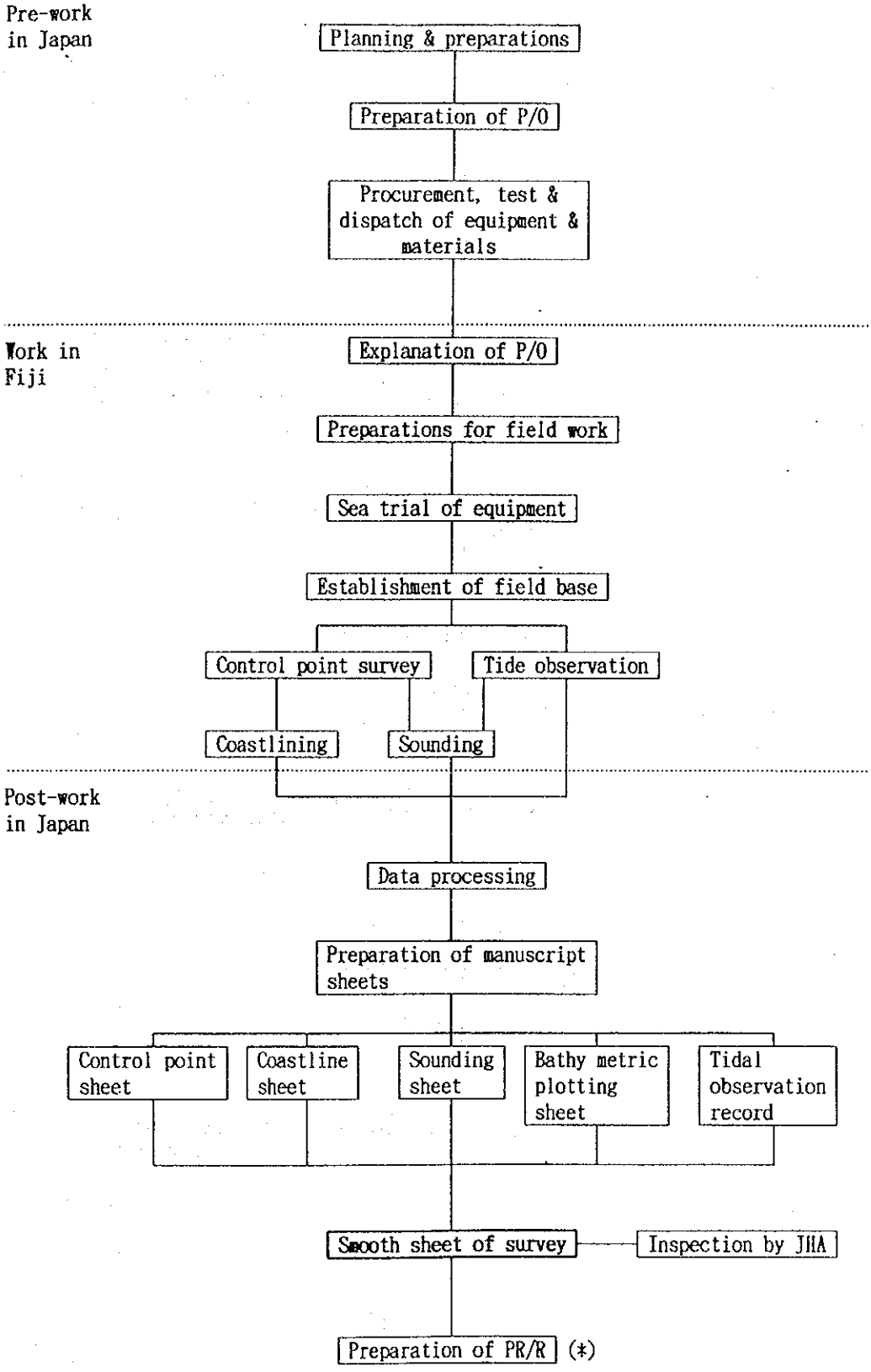
As soon as the field work of Phase III is completed, a meeting will be held between FHS and the Study Team to review and discuss the work done, problems encountered and solved, etc. and to make suggestions to the work in the next phase.

4-6. Emergency communication network

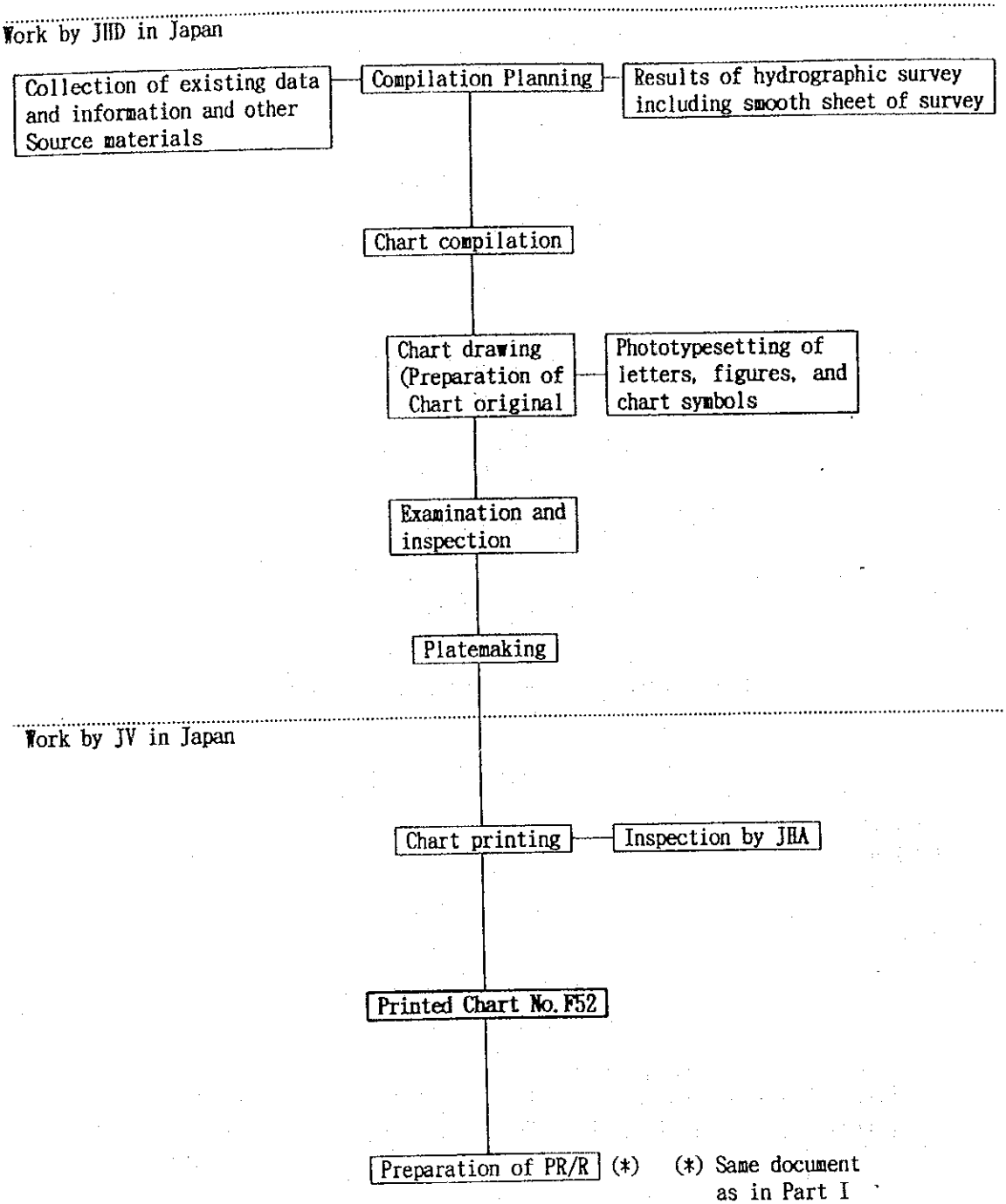
An emergency communication network is shown as in Appendix 5.

Appendix 1

FLOW OF WORK FOR PHASE III (FISCAL 1996)
(Part I - Preparation of Smooth Sheet of Survey)

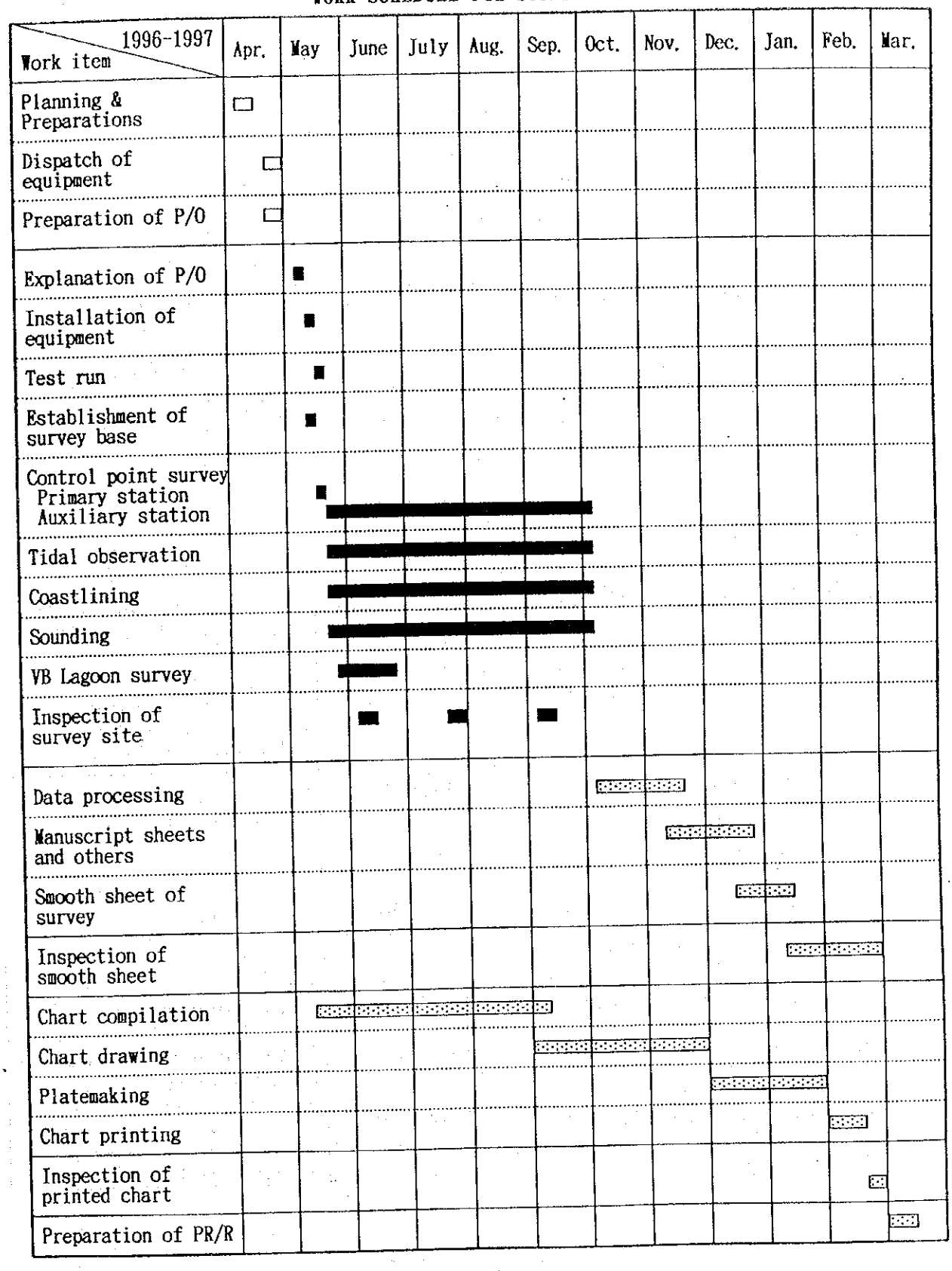


FLOW OF WORK FOR PHASE III (FISCAL 1996)
(Part II - Preparation of Nautical Chart No. F52)



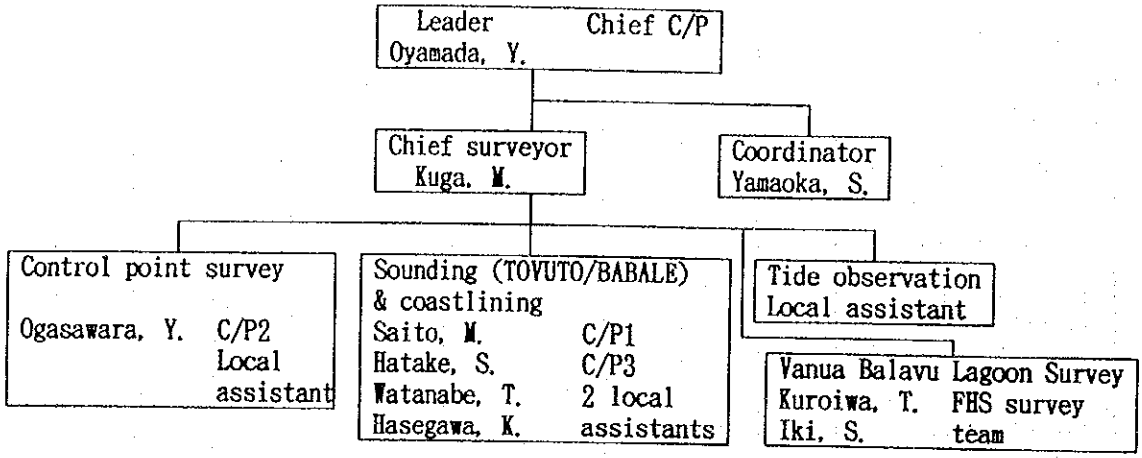
Appendix 2

WORK SCHEDULE FOR STUDY IN PHASE III



Appendix 3

COMPOSITION OF STUDY TEAM



TASK ASSIGNMENT

Name	Position	Post of duty	Task
1. OYAMADA, Yasuhiro	Team Leader	Survey Team Office in Suva	General managing of overall work; consultation with Fiji side
2. KUGA, Masao	Chief Surveyor	R/V TOVUTO	Supervision of control point survey, sounding and coastlining
3. SAITO, Masashi	Surveyor	R/V TOVUTO SMB BABALE	Control point survey, sounding and coastlining
4. KUROIWA, Tosiki	Surveyor	VBL survey	do.
5. HATAKE, Shuhei	Surveyor	R/V TOVUTO	do.
6. WATANABE, Toshiaki	Surveyor	do.	do.
7. OGASAWARA, Yoshikazu	Surveyor	Field base	Control point survey
8. IKI, Shinji	Surveyor	VBL Survey	Control point survey, sounding and coastlining
9. HASEGAWA, Kazuhiro	Surveyor	R/V TOVUTO	do.
10. YAMAOKA, Shinichi	Coordinator	Suva	Business coordination

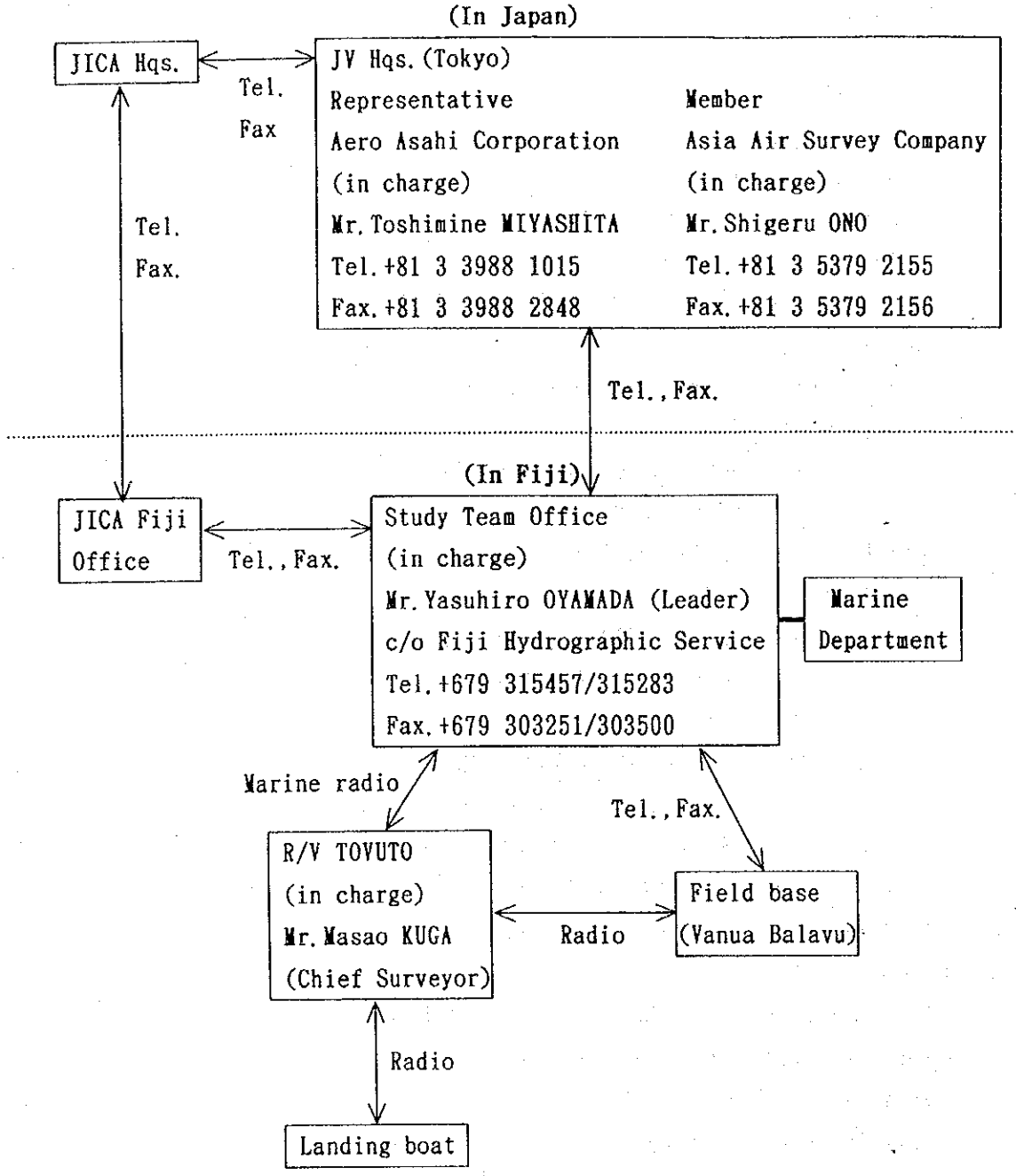
PRINCIPAL SURVEY EQUIPMENT AND INSTRUMENTS TO BE USED

1. Survey vessel
   R/V TOYUTO
   SMB BABALE
2. Survey instruments

2-1. Control point survey	
GPS receiver : Trimble 4000SSE	3 sets
Total Station : Nikon Model DTM-1	1 set
Distance meter : Atlas Model LARA 90/205	1 set
2-2. Coastlining	
GPS receiver : Same as in 2-1 above.	
2-3. Tidal observation	
Tide gauge : Kyowa Shoko Model PFT-II	1 set
YEO-KAL 610	1 set
Level : Sokkia Model B-2	1 set
2-4. Sounding	
GPS receiver : Sercel NDS200/NR103	1 set
Del Norte 1009/4012	1 set
Navigation	1 set
Echo sounder : Ocean Data BATHY-2000P	1 set
Ocean Data BATHY-1000	1 set
Senbon Denki Model PDR 601	3 sets
Side-scan Sonar : EG&G Model 260	3 sets
Plotter : Graphtec Model FP9100	2 set
3. Others	
Personal computer : NEC Versa V50 Notebook	1 set
Laser printer : HP Laser Jet IVL	1 set
Radio set : Barrett 550	3 sets
Battery charger : Dengen	2 sets
Power generator : Robin Model RGD3300	3 sets
Copying machine : Sharp SF7800	1 set
AC power conditioner : Sola 210-26-650-00	2 sets
Facsimile machine : Codan 9001	1 set
Autopilot/Gyrocompass : Tokimec RESCO PR-2000/TG-5000	1 set
Outboard engine : Yamaha E60HML	1 set

Appendix 5

EMERGENCY COMMUNICATION NETWORK



MINUTES OF MEETING

ON

THE PLAN OF OPERATION

FOR

THE STUDY ON THE PREPARATION OF NAUTICAL CHARTS

IN

THE NORTHERN LAU ISLANDS REGION

IN

THE REPUBLIC OF FIJI

PHASE III

(THE THIRD YEAR - F.Y. 1996)

SUVA, 13 MAY 1996

MR YASUHIRO OYAMADA
LEADER
STUDY TEAM
JAPAN INTERNATIONAL
CO-OPERATION AGENCY

.....

MR. F. R. MAHARAJ
CHIEF HYDROGRAPHER
FIJI HYDROGRAPHIC SERVICE
MARINE DEPARTMENT
MINISTRY OF INFRASTRUCTURE,
PUBLIC WORKS & TRANSPORT

The Study Team of Japan International Cooperation Agency (JICA) headed by Mr Yasuhiro Oyamada visited the Republic of Fiji on 9th May 1996, to conduct the third year (Phase III) work for the Study on the Preparation of Nautical Charts in the Northern Lau Islands Region of the Republic of Fiji.

Meetings were held at the Fiji Hydrographic Office, Marine Department, Ministry of Infrastructure, Public Works and Transport on 9th and 10th May 1996, to discuss the Third Year's Plan of Operation and various arrangements for starting survey operations.

As a result, the following items have been confirmed and agreed by FHS and JICA Study Team.

1. The Third Year's Plan of Operation (P/O) proposed by JICA Study Team was discussed and in principle agreed by both sides, with the following note:

   (i) Paragraph 3.2.5.2 Control Point Survey, the figures 179° 45' 00" E be amended to read 178° 45' 00" E.

   (ii) Paragraph 3.2.5.5.2 sub para 7 (ii), due to the great deal of time taken to carry out bar checks Fiji representatives have requested that the STD be used to calculate velocity of sound, and the Study Team agreed to use it.

   (iii) It was agreed that due to the different sheet thickness and dimensions used by FHS, JICA Study Team would supply these for use in Vanua Balavu Lagoon survey.

   (iv) Paragraph 3.3.4.1 sub para 12, the FHS would provide a negative of its seal to JICA Study Team before their departure on completion of Phase III survey work.

   (v) Paragraph 3.3.4.3, the word "plasting film" to be amended to read "plastic film".

   (vi) Paragraph 4.2, FHS would formally approach the owner's representative of Mago Island for permission of JICA Study Team members to work on the island for an estimated period of 5 days.

   (vii) Paragraph 4.3, it was agreed that in principle TOVUTO would arrive in Suva on Thursdays for replenishment.

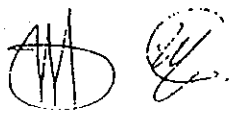
LIST OF ATTENDANTS

FIJI SIDE
(Fiji Hydrographic Service)

1. Mr F.R. MAHARAJ	Chief Hydrographer
2. Mr. A. SILATOLU	Senior Hydrographer
3. Mr. P.R. HILL	Hydrographer
4. Mr P. VAKALOLOMA	Master - RV TOVUTO

JAPANESE SIDE
(JICA Study Team)

1. Mr Yasuhiro OYAMADA	Leader
2. Mr Masao KUGA	Chief Surveyor



MINUTES OF MEETING

FOR

CONCLUSION OF THE FIELD WORK

FOR

THE STUDY ON THE PREPARATION OF NAUTICAL CHARTS

IN

THE NORTHERN LAU ISLANDS REGION

IN

THE REPUBLIC OF FIJI

PHASE III

(THE THIRD YEAR - F.Y. 1996)

SUVA, 9th OCTOBER 1996

.....
MR YASUHIRO OYAMADA
LEADER
STUDY TEAM
JAPAN INTERNATIONAL
CO-OPERATION AGENCY

.....
MR F. R. MAHARAJ
CHIEF HYDROGRAPHER
FIJI HYDROGRAPHIC SERVICE
MARINE DEPARTMENT
MINISTRY OF
INFRASTRUCTURE, PUBLIC
WORKS & TRANSPORT

In concluding the field work for the Phase III of the Study on the Preparation of Nautical Charts in the Northern Lau Region, a meeting was held at the Fiji Hydrographic Service (FHS) Office between the JICA Study Team headed by Mr Yasuhiro Oyamada, Team Leader, and Staff of FHS, headed by Mr Felix R. Maharaj, Chief Hydrographer, on the 9th October 1996.

In opening the meeting, the chairman Mr Oyamada thanked all involved in the survey for their whole hearted support and hospitality with which the field work was completed successfully.

Discussions and exchange of opinions were mainly concentrated on the problems encountered during the field work, and agreements were reached on the following matters to enable smoother and more effective implementation of the field work to be carried out in Phase IV of the Study next year:

1. The survey next year for Phase IV will preferably commence early May 1997.

2. The rate of allowance for adverse in Phase IV survey will be the same as for Phase III survey.

3. TOVUTO will be well maintained so that the survey schedule may not be disrupted.

4. TOVUTO will be exclusively used for the Study next year except for any case of force majeure.

5. The newly discovered shoal in Lat.16° 52.1" S Long. 170° 42.7" W (approx.) will be named as "Cakau-i-Qalitu" and will be charted as such.

6. It is suggested that a plotter will be provided by JICA next year for enhancing the data processing of survey at FHS.

7. In Phase IV survey, the tide station will be established at Lakeba instead of Vanua Balavu as originally planned, in order to obtain more accurate and timely tidal data for the Study Area F54.

8. On page 20 of P/O-III, the parallel of meridian to be graduated on Nautical Chart F52, 16° 20' , will be amended to read 16° 15'.

9. The periods of work in Fiji and post-work in Japan on page 3 of P/O-III, "from 8 May to 5 October 1996" and "from 8 October 1996 to 31 March 1997" will be amended to read "from 8 May to 12 October 1996" and "from 14 October 1996 to 21 March 1997", respectively.

10. The equipment provided by JICA will be kept by FHS safely. It is necessary to obtain by FHS permission from JICA for its use while the Study Team is absent. Auto Pilot/Gyrocompass will need JICA's approval for general purpose use.

11. FHS will make every effort to ensure that Echo-sounder Bathy-2000P will be available for use in the Phase IV survey properly.

12. FHS will make every effort to ensure that the smooth sheets of Vanua Balavu Lagoon will be made available to JICA Study Team by May 1997.

LIST OF ATTENDANTS

FIJI SIDE
(Fiji Hydrographic Service)

1. Mr Felix Ranchor MAHARAJ	Chief Hydrographer
2. Mr Aca SILATOLU	Senior Hydrographer

(Marine Department)

1. Capt. Dave ROBINSON	Fleet Superintendent
2. Mr Pauliasi VAKALOLOMA	Master, R/V TOVUTO.

JAPANESE SIDE
(JICA Study Team)

1. Mr Yasuhiro OYAMADA	Leader
2. Mr Masao KUGA	Chief Surveyor
3. Mr Masashi SAITO	Surveyor

LIST OF FINAL PRODUCTS OF SURVEY

1. Control point survey

- Control point sheets (3 sheets)
- Field records of control point survey
- Final results of control point survey
- Geodetic station records
- Magneto optical disk of control observation data
- List of geographical coordinates and index sheets of geographical positions

2. Coastlininig

- Coastline sheets (2 sheets)
- Data file of height observation
- Sheet of geographical names

3. Tidal observation

- Tide table
- Tidal curve at Vanua Balavu
- Reference level determination book

4. Sounding

- Bathymetric plotting sheet, northern portion
- Bathymetric plotting sheet, southern portion
- Sounding sheet, northern portion
- Sounding sheet, southern portion
- Enlarged bathymetric plotting sheets (18 sheets)
- Enlarged sounding sheets (18 sheets)
- Sounding book
- Echo sounding records (52 volumes)
- Records of side-scan sonar (12 volumes)
- Bar-check table
- Magneto optical disk of sounding data
- Check tables of sounding at line crossing
- STD table

5. Preparation of smooth sheet of survey

- Smooth sheet of survey
- Survey report
- Certificate of inspection

APPENDIX 3-6-1

PROGRAMME FOR COUNTERPART TRAINING ON PREPARATION OF NAUTICAL CHART

(Study on the Preparation of Nautical Charts in the Northern Lau Islands Region, Phase III)

Name of counterpart : Mr. Filimoni W. TIRIKULA, Senior Technical Assistant (Cartography) Fiji Hydrographic Service

Training period : 17 June to 16 December 1996

Note : HDMSA = Hydrographic Department of Maritime Safety Agency
ICO = International Cooperation Office of HDMSA
CCO = Chart Compilation Office of HDMSA

Date	Itinerary/Subject	Attendant	Venue
17 Jun.(Mon)	Leave Fiji and arrive in Japan		
18 " (Tue)	Briefing at JICA	Coordinator	JICA
19 " (Wed)	Observation visit and orientation at HDMSA	ICO, CCO,	HDMSA
~	Chart compilation planning (10 days)	Mr Imai,	
2 Jul.(Tue)		Coordinator	
3 " (Wed)			
~	Chart compilation (49 days)	Mr Chiba,	do.
24 " (Wed)		Coordinator	
25 " (Thu)	Visit to Geographical Survey Institute	ICO	Tsukuba
26 " (Fri)	Visit to Geological Survey of Japan	do.	do.
29 " (Mon)			
~	Chart compilation	Mr Chiba,	HDMSA
29 Aug.(Thu)		Coordinator	
30 Aug.(Fri)	Visit to Buyodo (printing factory)	CCO,	Meguro
		Coordinator	
2 Sep.(Mon)			
~	Chart compilation	Mr Chiba,	HDMSA
9 " (Mon)		Coordinator	
10 " (Tue)			
~	Chart drawing(38 days)	Mr Shiga,	do.
24 Oct.(Thu)		Coordinator	

25 Oct.(Fri)	Visit to AAC Technical Center	Coordinator	Kawagoe
28 " (Mon) ~ 29 " (Tue)	Chart drawing	Mr Shiga, Coordinator	HDMSA
30 " (Wed) ~ 1 Nov.(Fri)	Observation tour	ICO	Hokkaido
5 " (Mon) ~ 18 " (Mon)	Chart drawing	Mr Shiga, Coordinator	
19 " (Tue) ~ 25 " (Mon)	Chart editing (4 days)	Mr Usui, Coordinator	do.
26 " (Tue) ~ 2 Dec. (Mon)	Block correction of chart (6 days)	Mr Yamashita, Coordinator	do.
3 " (Tue) ~ 11 " (Wed)	Chart printing (7 days)	Mr Saito, Coordinator	do.
12 " (Thu)	Preparation of report	ICO, Coordinator	do.
13 " (Fri)	Evaluation meeting, closing ceremony	ICO, Coordinator	HDMSA
16 " (Mon)	Leaves Japan for Fiji		

APPENDIX 3-6-2

PROGRAMME FOR COUNTERPART TRAINING ON PREPARATION OF SMOOTH SHEET OF SURVEY

(Study on the Preparation of Nautical Charts in the Northern Lau Islands Region, Phase III)

Name of counterpart : Mr. Pio NABOSEYAWA, Senior Technical Assistant (Hydrography), Fiji Hydrographic Service

Training period : 11 November to 19 December 1996

Date	Itinerary/Subject	Attendant	Venue
11 Nov.(Mon)	Leaves Fiji and arrive in Japan		
12 " (Tue)	Briefing at JICA	Coordinator	JICA
13 " (Wed)	Courtesy visit to the Head Office of Aero Asahi Corporation (AAC)	Mr Oyamada	Ikebukuro
14 " (Thu)	Courtesy visit to Head Office of Asia Air Survey Co.(AAS)	Coordinator	Shinjuku
15 " (Fri)	Visit to AAC Technical Center and Orientation	Mr Saito	Sayama
16 " (Sat)	Rest		
17 " (Sun)	do.		
18 " (Mon)	On-job training (OJT) on processing and plotting of control points	Mr Saito	Sayama
19 " (Tue)	OJT on computer processing of sounding data	do..	do.
20 " (Wed)	OJT on processing of tidal data	do.	do.
21 " (Thu)	OJT on processing of coastlining data	do.	do.
22 " (Fri)	OJT on preparation of coastline sheet	do.	do.
23 " (Sat)	Rest		
24 " (Sun)	do.		
25 " (Mon)	OJT on preparation of control point sheet	Mr Kuga	Atsugi
26 " (Tue)	OJT on preparation of sounding sheet	do.	do.
27 " (Wed)	OJT on tidal analysis and datum level determination	do.	do.
28 " (Thu)	OJT on preparation of smooth sheet of survey	do.	do.
29 " (Fri)	do.	do.	do.
30 " (Sat)	Rest		
1 Dec.(Sun)	do.		
2 " (Mon)	Visit to Survey Ship KAIYO and Hydrographic Department, Maritime Safety Agency	Mr Oyamada	Tokyo Bay, Tsukiji

3	Dec.(Tue)	Visit to Japan Marine Science and Technology Center	Mr Hatake	Yokosuka
4	" (Wed)	Visit to Geochemistry Research Center	do.	Chiba
5	" (Thu)	Visit to Yamaha Motors Co. factory	do.	Hamamatsu
6	" (Fri)	Moves to Tokyo	do.	
7	" (Sat)	Rest		
8	" (Sun)	do.		
9	" (Mon)	Moves to Hiroshima	Coordinator	Hiroshima
10	" (Tue)	Observation of hydrographic survey (6th RMSHq.); move to Okayama	do.	Okayama
11	" (Wed)	Visit to Bisan Seto Traffic Advisory Service Center; moves to Hiro, Kure	do.	Hiro
12	" (Thu)	Visit to Chugoku National Industrial Research Institute; moves to Hiroshima	do.	Hiroshima
13	" (Fri)	Returns to Tokyo		
14	" (Sat)	Rest		
15	" (Sun)	do.		
16	" (Mon)	Review of overall training, questions and answers, preparation of report	Mr Oyamada Mr Saito	Sayama
17	" (Tue)	Report on the training, evaluation meeting	Coordinator	JICA
18	" (Wed)	Preparation for returning to Fiji		
19	" (Thu)	Leaves for Fiji		

DIARY OF SURVEY WORK

No. of day	Date	Location	Work carried out
1	30/4 (Wed)	Lv. Narita	Study Team leader and senior surveyor left Japan.
2	1/5 (Thu)	Ar. Suva	Visits to JICA Fiji Office, Embassy of Japan and Director of Marine; P/O submitted to FHS.
3	2 (Fri)	Suva	Meeting at FHS to explain and discuss P/O.
4	3 (Sat)	"	Preparation of draft survey schedule at hotel.
5	4 (Sun)	"	Part of crates of instruments and materials opened.
6	5 (Mon)	"	At FHS, M/M prepared and signed; discussions on details of survey schedule.
7	6 (Tue)	"	Two members arrived from Japan. Procurement of materials.
8	7 (Wed)	"	Crates of instruments and materials opened.
9	8 (Thu)	"	Procurement of materials.
10	9 (Fri)	"	Three members arrived from Japan. Meeting at FHS by Study Team, FHS counterparts, the Master of TOVUTO and officers from Marine Department. Preparations for survey; procurement of materials.
11	10 (Sat)	"	Rest.
12	11 (Sun)	"	Preparations for survey.
13	12 (Mon)	"	Installation of survey instruments aboard TOVUTO and test.
14	13 (Tue)	"	TOVUTO left Port of Suva for survey site.
15	14 (Wed)	Lakeba	TOVUTO arrived at Lakeba. Survey base established.
16	15 (Thu)	"	Tide station established. Control survey.
17	16 (Fri)	"	Test run by TOVUTO; control survey.
18	17 (Sat)	Survey site	Sounding by TOVUTO; control survey.
19	18 (Sun)	"	Rest.
20	19 (Mon)	"	Sounding.
21	20 (Tue)	"	Sounding.
22	21 (Wed)	"	Sounding; control survey.
23	22 (Thu)	"	Sounding: control survey.

24	23	(Fri)	Survey site	Sounding; control survey.
25	24	(Sat)	"	Sounding; control survey.
26	25	(Sun)	"	Rest.
27	26	(Mon)	"	Sounding.
28	27	(Tue)	Lakeba	JHA inspector embarked TOVUTO.
29	28	(Wed)	Survey site	Sounding; control survey.
30	29	(Thu)	"	Sounding; control survey.
31	30	(Fri)	Lakeba	JHA inspector disembarked. Control survey.
32	31	(Sat)	Survey site	Sounding; control survey.
33	1/6	(Sun)	"	Rest.
34	2	(Mon)	"	Sounding; control survey.
35	3	(Tue)	"	Sounding; control survey
36	4	(Wed)	"	Sounding; control survey.
37	5	(Thu)	"	Sounding; control survey.
38	6	(Fri)	"	Sounding; control survey.
39	7	(Sat)	"	Sounding; control survey.
40	8	(Sun)	"	Rest.
41	9	(Mon)	"	No sounding due to rough sea; checking of data.
42	10	(Tue)	"	Sounding; control survey.
43	11	(Wed)	"	Sounding; control survey.
44	12	(Thu)	"	Control survey. TOVUTO left Survey site for Port of Suva.
45	13	(Fri)	Suva	TOVUTO returned to Port of Suva.
46	14	(Sat)	"	Replenishment.
47	15	(Sun)	"	Rest.
48	16	(Mon)	"	Replenishment.
49	17	(Tue)	"	Preparations for survey; TOVUTO left Port of Suva for survey site.
50	18	(Wed)	Survey site	TOVUTO arrived at survey site.
51	19	(Thu)	"	Sounding; control survey.
52	20	(Fri)	"	Sounding.
53	21	(Sat)	"	Sounding.
54	22	(Sun)	"	Rest.
55	23	(Mon)	"	Sounding; control survey.
56	24	(Tue)	"	Sounding; control survey.
57	25	(Wed)	"	Sounding; control survey.
58	26	(Thu)	"	Sounding; control survey.

59	27	(Fri)	"	Sounding; control survey.
60	28	(Sat)	"	Sounding; control survey.
61	29	(Sun)	"	Rest.
62	30	(Mon)	"	Sounding.
63	1/7	(Tue)	"	Sounding; control survey.
64	2	(Wed)	"	Sounding; control survey.
65	3	(Thu)	"	Sounding; control survey.
66	4	(Fri)	"	Sounding.
67	5	(Sat)	"	Sounding; control survey.
68	6	(Sun)	"	Rest.
69	7	(Mon)	"	Sounding; control survey.
70	8	(Tue)	"	JHA inspector embarked TOVUTO.
71	9	(Wed)	"	Sounding; control survey.
72	10	(Thu)	"	Sounding; control survey.
73	11	(Fri)	Lakeba	JHA inspector disembarked.
74	12	(Sat)	"	Checking of data.
75	13	(Sun)	"	Rest.
76	14	(Mon)	Survey site	Sounding; control survey.
77	15	(Tue)	"	Sounding; control survey.
78	16	(Wed)	"	TOVUTO left Survey site forPort of Suva.
79	17	(Thu)	Suva	TOVUTO returned to Port of Suva; replenishment.
80	18	(Fri)	"	Replenishment.
81	19	(Sat)	"	Replenishment.
82	20	(Sun)	"	Rest.
83	21	(Mon)	"	Preparations for survey.
84	22	(Tue)	"	TOVUTO left Port of Suva for survey site.
85	23	(Wed)	Survey site	TOVUTO arrived in survey site.
86	24	(Thu)	"	Sounding.
87	25	(Fri)	"	Sounding.
88	26	(Sat)	"	Sounding.
89	27	(Sun)	"	Rest.
90	28	(Mon)	"	No sounding due to rough sea.
91	29	(Tue)	"	No sounding due to rough sea.
92	30	(Wed)	"	No sounding due to rough sea.
93	31	(Thu)	"	No sounding due to rough sea.
94	1/8	(Fri)	"	No sounding due to rough sea.
95	2	(Sat)	"	Control survey.

96	3	(Sun)	Survey site	Rest.
97	4	(Mon)	"	Control survey.
98	5	(Tue)	"	Sounding; control survey.
99	6	(Wed)	"	Sounding.
100	7	(Thu)	"	Sounding.
101	8	(Fri)	"	Sounding.
102	9	(Sat)	"	Sounding.
103	10	(Sun)	"	Rest.
104	11	(Mon)	"	Sounding.
105	12	(Tue)	"	JHA inspector embarked TOVUTO.
106	13	(Wed)	"	Inspection by JHA inspector.
107	14	(Thu)	"	Inspection by JHA inspector.
108	15	(Fri)	"	Inspection by JHA inspector. Inspector disembarked TOVUTO.
109	16	(Sat)	"	TOVUTO left survey site for Port of Suva.
110	17	(Sun)	Suva	TOVUTO came back to Port of Suva.Rest.
111	18	(Mon)	"	Rest and replenishment. Training on plotter at FHS.
112	19	(Tue)	"	Rest and replenishment. Training on plotter at FHS.
113	20	(Wed)	"	Training on plotter at FHS. TOVUTO left Port of Suva for survey site.
114	21	(Thu)	Suva	Training on plotter at FHS.
			Survey site	Sounding.
115	22	(Fri)	Suva	Training on plotter at FHS.
			Survey site	Sounding.
116	23	(Sat)	Suva	Rest
			Survey site	Sounding.
117	24	(Sun)	Lakeba	Dismantling of survey base. TOVUTO left Lakeba for Port of Suva.
118	25	(Mon)	Suva	Training on plotter at FHS. TOVUTO arrived in Port of Suva.
119	26	(Tue)	"	Dismantling Tovuto of survey instruments. Training on plotter on board Babale in approaches to Port of Suva. Meeting by Study Team at FHS.
120	27	(Wed)	"	Training on plotter in approaches to Port of Suva. Sorting and packing instruments and survey data.
121	28	(Thu)	"	Training on plotter at FHS. Sorting and packing instruments and survey data.

122	29	(Fri)	Suva	Training on plotter at FHS. Packing instruments and survey data.
123	30	(Sat)	"	Rest.
124	31	(Sun)	"	Rest.
125	1/9	(Mon)	"	Concluding meeting by Study Team, FHS and Marine Department at FHS.
126	2	(Tue)	"	M/M prepared and signed by Study Team Leader and Fiji Chief Hydrographer. Sorting and packing of instruments and data.
127	3	(Wed)	"	Packing of instruments and data.
128	4	(Thu)	"	Report to JICA FijiOffice and Embassy of Japan. Dispatching of instruments.
129	5	(Fri)	"	Courtesy call on Director of Marine and Chief Hydrographer.
130	6	(Sat)	"	Rest.
131	7	(Sun)	"	Rest.
132	8	(Mon)	"	Preparations for returning to Japan.
133	9	(Tue)	Auckland	Study Team left Suva and arrived in Auckland.
134	10	(Wed)	Lv. Auckland Ar. Narita	Study Team left Auckland and returned to Japan.

APPENDIX 4-2

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
MINISTRY OF INFRASTRUCTURE, PUBLIC WORKS AND TRANSPORT, FIJI

PLAN OF OPERATION
FOR
THE STUDY ON THE PREPARATION OF NAUTICAL CHARTS
IN
THE NORTHERN LAU ISLANDS REGION
IN
THE REPUBLIC OF FIJI

PHASE IV

(THE FOURTH YEAR – F.Y. 1997)

APRIL 1997

AERO ASAHI CORPORATION
ASIA AIR SURVEY CO., LTD.

CONTENTS

STUDY AREA AND CHART COVERAGE

1. INTRODUCTION

The Government of the Republic of Fiji requested the Government of Japan for technical cooperation in the Study on the Preparation of Nautical Charts in the Northern Lau Islands Region in the Republic of Fiji.

In response to the request, the Japan International Cooperation Agency (JICA), the official agency responsible for implementation of the technical cooperation programmes of the Government of Japan, dispatched a Preparatory Study Team to Fiji from 15 February to 15 March 1994, and the Scope of Work (S/W) was agreed between JICA and the Ministry of Infrastructure, Public Works and Transport on 15 March 1994.

According to S/W, the objectives of the Study are:

(1) To prepare three Fiji nautical charts, Nos.F52, F53 and F54, each on the scale of 1/150,000, covering the Northern Lau Islands region;

(2) To report the recommendation for improvement of operation and management system of hydrographic surveying and nautical charting in Fiji; and

(3) To promote technology transfer through the implementation of the Study with a view to enabling the Fiji counterpart personnel to improve their technique in hydrographic surveying and nautical charting.

The work in the First Year (Phase I) of the Study was conducted from 13 January to 30 March 1995, during which a Study Team was dispatched to Fiji for consultation of the Plan of Operations for Phase I (P/O-I) with the Fiji Hydrographic Service (FHS), Marine Department, Ministry of Infrastructure, Public Works and Transport, and for making preparations for hydrographic surveys in the forthcoming phases. P/O-I containing an overall plan for the five-year Study and a detailed plan of the Phase I work was agreed upon by JICA and the Ministry of Infrastructure, Public

Works and Transport on 27 January 1995.

In the Phase I work, (1) selection of survey equipment to be used, (2) acquisition of aerial photographs and other source materials for the ensuing work, (3) reconnaissance of survey sites for Phase II work, and (4) confirmation of survey implementation and support systems, were conducted in Fiji, while tentative drawing of coastlines of islands and atolls of the whole Study area were performed in Japan..

To conclude the Phase I work, the Progress Report of Phase I (PR/R-I) was submitted to the Government of Fiji from JICA, in which problems encountered and overcome and suggestions to the work in Phase II were included.

Pursuant to Phase I, the work in the Second Year (Phase II) of the Study was conducted from 13 June 1995 to 29 March 1996. During this period, a Study Team was dispatched to Fiji to conduct the work on: (1) consultation and agreement on the Plan of Operation for Phase II (P/O-II), (2) hydrographic survey in the Study Area F52 to prepare a smooth sheet of survey, and (3) technology transfer to Fiji counterpart personnel. The data obtained by the survey were then processed in Japan and the smooth sheet of survey for Area F52 was prepared. The progress of work in Phase II including suggestions to the Phase III work, was compiled into Progress Report (PR/R-II), which was then submitted to the Government of Fiji from JICA.

The work in the Third Year (Phase III) of the Study was conducted from 23 April 1996 to 21 March 1997. During this period, the Study Team was dispatched to Fiji to conduct the work on: (1) consultation and agreement on the Plan of Operation for Phase III (P/O-III), (2) hydrographic survey in the Study Area F53 to prepare a smooth sheet of survey, and (3) technology transfer to Fiji counterpart personnel during the survey and data processing for Study Area F53 as well as during the large-scale survey in Vanua Balavu Lagoon by FHS. The data obtained by the survey were then

processed in Japan and the smooth sheet of survey for Area F53 was prepared. The progress of work in Phase III including suggestions to the Phase IV work, was compiled into the Progress Report for Phase III Study (PR/R-III), which was then submitted to the Government of Fiji from JICA. The Nautical Chart No.F52 was prepared at the Hydrographic Department of Japan (JHD) with participation of a Fiji counterpart as on-job training. The printed copies of Chart No.F52 were submitted to the Fiji Government through JICA.

Based on P/O-I and PR/R-III above, this Plan of Operation for Phase IV (P/O-IV) is worked out to give a detailed plan of hydrographic survey for preparation of a smooth sheet of survey for Study Area F54 as well as of the pre-work and post-work in Japan, including the work for preparation of the Nautical Chart No.F53.

Other than those matters described in this P/O-IV, all the contents of P/O-I agreed in January 1995 remain effective and are to be applied to the Study in Phase IV.

2. GENERAL

2-1. Objectives

The objectives of the Study in Phase IV are as follows:

(1) To conduct hydrographic survey in Study Area F54 to prepare a smooth sheet of survey.

(2) To produce Fiji Nautical Chart No.F53.

(3) To render technology transfer to Fiji counterpart personnel during the survey and data processing for Study Area F54.

2-2. Study period

(1) Pre-work in Japan

From 15 to 30 April 1997.

(2) Work in Fiji

From 1 May to 9 September 1997.

(3) Post-work in Japan

From 10 September 1997 to 20 March 1998.

2-3. Study area

(1) Hydrographic survey will be conducted in the Study Area F54 bounded by the following parallels and meridians:

Lat. 19° 04' 40" S and 17° 45' 00" S

Long.179° 06' 30" W and 178° 11' 16" W

(As shown in Fig.1.)

(2) Continuous tidal observation will be conducted at Lakeba (Lat. 18° 14.5' S, Long. 178° 48.6' W approx.).

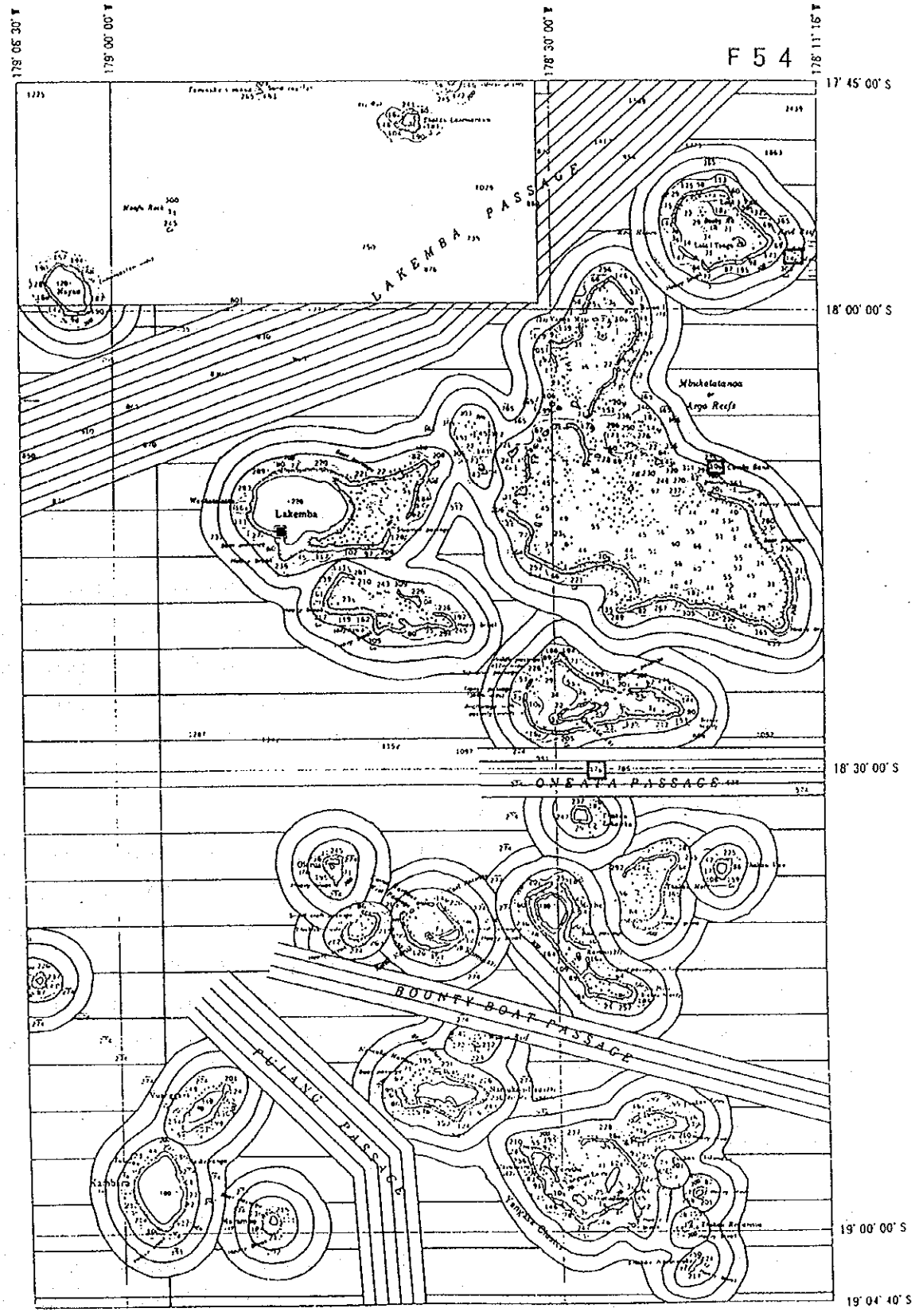
2-4. Flow of work

The flow of work to be carried out is as shown in Appendix 1.

2-5. Schedule of work

The schedule of work is as shown in Appendix 2.

Fig. 1


F54
179° 05' 30" E
179° 00' 00" E
178° 30' 00" E
178° 11' 15" E
17° 45' 00" S
18° 00' 00" S
18° 30' 00" S
19° 00' 00" S
19° 04' 40" S
LAKEMBA PASSAGE
ONEATA PASSAGE
BOUNTY BOAT PASSAGE
PUANG PASSAGE
Lakemba
Mbelelatanoa or Argo Reefs
Legend —— Sounding line
Field base, Tide gauge
Shoal/Reported depth
0 10 20 30 40 50 km

3. IMPLEMENTATION PLAN OF THE STUDY IN PHASE IV

3-1. Pre-work in Japan

3-1-1. Planning

Based on the information, data and materials collected by the JICA Preparatory Study Team as well as by the Study Team during Phases I and III, a detailed plan for implementation of the Study in Phase IV will be worked out, in which the suggestions made in the Progress Report of Phase III work (PR/R-III) will be taken into account.

3-1-2. Preparation of Plan of Operation (P/O-IV)

P/O-IV for Phase IV Study will be prepared on the basis of S/W, P/O-I and PR/R-III as well as the detailed plan in 3-1-1 above.

P/O-IV will describe details of the hydrographic survey as to methods, amount of work, accuracies, etc., pre-work and post-work in Japan and the survey products from Phase IV work, as well as the items for which co-operation from the Fiji side is requested and others matters.

3-1-3. Preparations for survey

Preparations for the survey work in Phase IV will thoroughly be made. For example, preliminary photo-interpretation of topography will be made on the islands and atolls in the Study area, various boat sheets prepared, computer software supplemented, and instruments and materials necessary for the survey procured, tested, adjusted and dispatched by air to Fiji.

3-2. Work in Fiji

3-2-1. General

(1) Composition of Study Team is as shown in Appendix 3.

(2) Survey equipment and instruments to be used in the field work are as listed in Appendix 4.

(3) As for hydrographic survey standards, the International Hydrographic Organization (IHO) Standards for Hydrographic Surveys (S-44) shall in principle be applied unless otherwise stated.

3-2-2. Explanation of P/O-IV and consultation

P/O-IV thus prepared will be submitted to FHS for explanation by the Study Team, and consultation will be held to reach agreements on the content.

3-2-3. Preparations for field work

The Study Team will proceed to implementation of the Study without delay after arrival in Fiji, such as customs clearance and checking of survey instruments and materials.

3-2-4. Installation and test of survey instruments aboard the survey vessel

All the necessary survey instruments will be installed on board R/V TOVUTO at Port of Suva, and then tested and adjusted before leaving for the survey area.

3-2-5. Field work

3-2-5-1. Establishment of a field base

For starting the field work, a field base will be established at Tubou, Lakeba, which will be used for accommodation of the Study Team members and Fiji counterparts as well as for storage and maintenance of survey instruments and materials.

3-2-5-2. Control point survey

(1) The standard of survey will be as follows:

Ellipsoid of reference : WGS-72
Grid system : FMG (Fiji Map Grid)
Origin of coordinates : 17° 00' 00" S, 179° 45' 00" E
Values of coordinates : 2,000,000mE and 4,000,000mN
Scale factor : 0.999850
Projection : Transverse Mercator (TM) projection

(2) A primary shore control point for fixing positions of auxiliary shore control points and the survey vessel will be established by DGPS observation with two or more existing control points.

(3) Auxiliary shore control points to be used for coastlining and fixing positions of conspicuous objects will be established by open DGPS observations with an existing control point or the primary shore control point.

(4) Auxiliary shore control points for coastlining will be selected one to three per an island or an atoll where landing is feasible, where open DGPS observations will be conducted. In case of an extensive island or atoll selection of auxiliary control points will be made at a rate one in every 10cm at the scale of survey, in principle.

(5) Transformation parameters from WGS-84 to FMG will be as follows:

Parameter	Value
Shift dX	79.027m
Shift dY	-70.749m
Shift dZ	-102.333m
Rotation about X	-0.852520"
Rotation about Y	-3.876562"
Rotation about Z	2.648162"
Scale	7.420964ppm

(7) Specifications for GPS observation will be as follows:

1) Performance of GPS receiver

Model : Trimble 4000SSE (3 sets)

Receivable frequency : 1,575.42MHz (L1) and 1,227.6MHz (L2)

Capability : $\pm(5mm + 1 \times 10^{-6} \times D)$ or more, where D is distance (km)

2) Observation will be made to more than four satellites of good health status at elevation angles of more than 15 degrees.

3) Duration of observation will be as follows:
Primary control point : 90 minutes or more.
Auxiliary control point : 20 minutes or more.

4) The accuracy of the primary control point shall be no more than 1/10,000. The relative positioning error shall be no more than 0.25mm at the scale of survey in case where the survey may cover an extensive area.
The accuracy of an auxiliary control point shall be no more than 0.5mm at the scale of survey.

3-2-5-3. Coastlining

(1) For delineation of coastlines, pricking will be made at selected points on the contact print aerial photographs (scale : 1/50,000) after confirming the conformity between picture and actual topography.

(2) Coastlining will be carried out at such coastlines where considerable changes have been found between the aerial photography and actual topography. It will also be carried out in such places where tentative drawing of coastline was found difficult during the work in Phase I due to clouds, halation or other reasons.

(3) For a conspicuous object useful to navigation with unknown height, measurement of the height will be carried out as far as possible.

3-2-5-4. Tidal observation

3-2-5-4-1. Tide station at Lakeba

(1) A self-recording tide gauge will be set on a jetty at Tubou, Lakeba.

(2) Continuous observation of tide will be conducted throughout the period of sounding operation.

(3) The type and specifications of the tide gauge to be used will be as follows:
Type : Pressure type tide gauge YEO-KAL Model 610
Recording mode : Digital
Accuracy : 0.0025m at 0-10m range
Resolution : 0.001m at 0-10m range

Data logging rate : Every 5 minutes

(4) In parallel with the tide gauge above, the following tide gauge will be set as a backup:

Type : Floating type tide gauge model PFT-II

Recording mode : Analog

Reduction ratio : 1/20

Paper speed : 20mm/h

Recording interval : Continuous recording

Minimum graduation : 1cm

(5) In order to determine the zero of tide gauge, a bench mark (BM) will firmly be established nearby on land, and levelling will be carried out between the tide gauge and BM.

(6) The time kept on the recording paper of PFT-II will be checked with the correct local time at least once a day.

(7) Mean Sea Level (MSL) and Datum Level (DL) of sounding be determined as follows:

- Suva being the standard port, the necessary tidal data recorded at Suva tide station will be retrieved by connecting a personal computer to it.
- The MSL at Lakeba tide station will be computed by using the following equation:

$$A = A' + (A_0 - A'_0)$$

where A_0 : MSL at Suva tide station

A'_0 : Short term MSL at Suva tide station

A : MSL at Lakeba tide station

A' : short term MSL at Lakeba tide station

- For computation of short term MSL, tidal data from more than one-month observation will be used.
- The DL at Lakeba tide station will be obtained by harmonic analysis of the tidal data and compared to the existing value.

3-2-5-5. Sounding operation

3-2-5-5-1. Position fixing

(1) Ship s positions will be fixed by DGPS observation with the primary shore control point. Real time processing will be made for the observation.

(2) The following DGPS receivers will be used:

(a) Main : Sercel NDS200/NR103

(b) Backup : Del Norte 1009/4012

(3) The interval between the position fixes at the scale of survey shall be 2cm or less in case of a linear sounding line, and in case of a curved one, shall be such that maintains the plotting error of any cut-in sounding to be within a circle with a 1.5mm radius on the sheet.

3-2-5-5-2. Sounding

(1) The sounding lines planned in the area F54 are as shown in Fig.1.

(2) The vessel to be used for sounding will be R/V TOVUTO, and in such shallow waters where R/V TOVUTO is unable to navigate, SMB BABALE will be used for sounding.

(3) The planned sounding distances are as follows:

Deep water areas : 1,179km

Shipping routes : 1,718km

Around islands and atolls : 2,659km

Reported shoals, shoals and banks : 50km

Total distance : 5,606km

(4) The sounding line intervals will be as follows:

Deep water areas : 3M

Shipping routes : 1.5km

Around islands and atolls : 1M

Reported shoals, shoals and banks : 200m or less (with Side Scan Sonar)

(5) The ship's speed during sounding operations will, in principle, be as follows:

Deep water areas and shipping routes: 8-10 knots

Other areas : 4-6 knots.

However, the speed will be reduced to ensure accurate sounding owing to circumstances.

(6) The echo-sounder Model Bathy-2000P installed on board R/V TOVUTO will principally be used.

For confirmation of the least depth of a shoal, a four-beam echo sounder for shallow water use, Model PDR 601, will be used. Specifications of these echo-sounders are as follows:

	Bathy-2000P	PDR 601
Depth range	0.5 - 6,000m	0 - 140m
Frequency	12/200kHz	90 - 230kHz
Sound velocity	1,400 - 1,540m/sec	1,500m/sec
Accuracy	±10cm to 100m depth, ±0.3% to 6,000m depth	±(0.3+DX1/500)
Resolution	180 DPI	--
Minimum reading	--	0.1m

As a backup of Bathy-2000P, the following echo-sounder will also be installed aboard R/V TOVUTO, and will be used when Bathy-2000P is not operational.

Model	Specifications	
Bathy-1000	Depth range	0.5 - 6,000m
	Frequency	12/200kHz
	Accuracy	±10cm to 100m depth, ±0.3% to 6,000m depth
	Resolution	1/2400 over paper width

(7) Correction to soundings

i) Tidal reduction to soundings will be made to the depths of 200m or less.

ii) Correction to soundings for underwater sound velocity will be made by bar-check method down to depths of 50m, and by the echo-sounding correction tables to deeper depths.

(8) The accuracy of sounding shall be as follows:

Depths 30m and shallower : Less than 0.3m

Depths deeper than 30m : Less than 1% of the depth

(9) For confirmation of the least depth of a shoal, recordings of echo-sounder and Side Scan Sonar will be compared, and if any shallower water is likely to exist, interlines will be sounded.

The following Side Scan Sonar will be used:

EG&G Model 260 Image Correcting Side Scan Sonar

Range (m) : 25 50 75 100 150 200 300 400 600 (each side)

Scale : 1/(10 X range)

Resolution: 1/400 of range

Another same type Side Scan Sonar will be used as a backup.

(10) Supplementary sounding or resounding will be conducted as follows:

1) In case where sounding line intervals have become more than 20% wider than the planned interval, interline sounding will supplementarily be conducted.

2) In case where a depth of less than 30m considered to be dangerous to navigation is likely to exist in between the sounding lines, supplementary sounding will be conducted to confirm its least depth.

3) Resounding will be conducted in such waters where the sounding record on the echogram is extraordinary, illegible or lacking.

4) In case where the difference between soundings at the crossing point of a principal sounding line and a cross-check sounding line exceeds twice the value of the accuracy of sounding, resounding will be carried out when the previous sounding data are considered to have exceeded an allowable error.

3-2-6. Field inspection

Inspection of the field work will be conducted three times by a qualified hydrographer of JHA.

3-3. Post-work in Japan

3-3-1. Data processing

3-3-1-1. Control point survey

(1) Computation of control points will be performed by a computer with an approved programme.

(2) Results of control point survey for preparation of manuscript sheets for F54 will be shown on rectangular coordinates with the following standards:

Ellipsoid : WGS-72
Origin of coordinates : 18° 30' 00" S 178° 40' 00" W
Coordinate values of origin : X = 0.00m, Y = 0.00m
Scale factor : 1.000000
Projection : Transverse Mercator projection

(3) Latitudes and longitudes of the primary shore control point and auxiliary control points will be computed.
Such computation will also be made to graticule points at every 10cm from the origin of coordinates.

(4) The results of control point survey will be stored in floppy disks and compiled into final results of control point survey, list of geographical coordinates and index sheet of geographical positions, data list of control point survey and geodetic station records.

3-3-1-2. Coastlining

Coastlines will be drawn by adopting those on the existing nautical charts and topographic maps as far as possible. The rest will be drawn according to the coastline drawings prepared during Phase I, which will be based on the results of coastlining conducted in the field.

3-3-1-3. Tidal observation

(1) The mutual relationship between the zero of tide gauge, MSL, DL and BM at the Lakeba tide station will be compiled into the results of reference measurement of the tide station and data of measurements.

(2) As for MSL and DL, the method of computation and the data of measurement will be compiled into a book of determination of reference levels of tide station.

3-3-1-4. Sounding

(1) Soundings will be read out to 0.1m order for those shallower than 31m, and to 1m order for deeper ones, disregarding fractions.

(2) Soundings of shallower than 200m will be reduced for tidal heights.

(3) In reading out the soundings shallower than 50m for which bar-check was carried out, the reading-scale prepared from the results of bar-check will be used for correction of underwater sound velocity. For the correction to deeper soundings, the correction tables will be used.

(4) Positions of soundings will be selected on the echogram with priorities given to summits and bottoms of seabed undulations and transition points of slopes.

(5) Intervals of cut-in soundings to be read out will be so selected that they may be less than 10mm on the flat bottom and less than 5mm elsewhere on the sheet.

3-3-2. Preparation of manuscript sheets

3-3-2-1. Control point sheet

Projection : Transverse Mercator (TM) projection

Scale : 1/150,000

Material : Plastic sheet with a thickness of 0.125mm or more

Items to be shown :

1) Existing and new control points and auxiliary control points with symbols and names

2) Origin of coordinates, coordinate points at intervals of 10cm based on the origin

3) Graticule points of every 15 minutes of latitude and longitude
4) Positions and symbols for the four corners of the neatline.
5) Metric scale.

Plotting error : Less than 0.2mm on the sheet.

3-3-2-2. Coastline sheet

Projection, scale and material : Same as 3-3-2-1 above.

Items to be shown :

1) Existing control points and those auxiliary control points necessary for delineation of coastlines
2) Coordinate points at 10cm intervals
3) Every 15-minute graticule points
4) Coastlines taken from aerial photographs and existing source materials, for which any correction to scale and distortion in topography has been rectified by using common points on the coastline sheet.

Symbols and abbreviations : In accordance with those adopted by the Hydrographic Department of Japan Maritime Safety Agency (JHD) for the smooth sheet of survey.

Elevation : Elevation of an object measured in the field will be shown to 0.1m order for less than 10m and to 1m order for 10m or higher.

3-3-2-3. Sounding sheet

Projection, scale and material : Same as 3-3-2-1 above.

Items to be shown :

1) Existing control points and those control points and auxiliary control points necessary for sounding operation
2) Coordinate points spaced at 10cm
3) Graticule points spaced at every 15 minutes

4) All of the positions fixed shall be shown. However, in such an area where a dense survey for searching a shoal was conducted so that plotting all of the fixed positions may not be possible, they will be shown on a separate larger-scale sheet.

5) Sounding positions will be connected with a firm line according to a chronological order, and the position fix number will be marked against every fifth sounding position.

6) The position of a cut-in sounding will be marked on the sounding line.

7) The plotting error of sounding positions shall be less than 0.5mm on the sheet.

8) Navigational aids such as buoys and beacons existed within the survey area will be shown with their positions and shapes.

3-3-2-4. Bathymetric plotting sheet

Projection and scale : Same as 3-3-2-1 above.

Material : Plastic sheet with a thickness of 0.075mm or more.

Items to be shown :

1) Control points, coordinate points, graticule points spaced at every 15 minutes and four corners of the neatline.

2) Positions of soundings will be transferred from 3-3-2-3 above, each of which is shown with a red point, and the corresponding sounding value will be marked against it.

3) All of those soundings selected in 3-3-1-4 above shall be shown.

As to such a protruded echo of an object not constituting the sea bottom, it will be marked with an identification note if it is identified, or if not, with an abbreviation "eO".

4) Should there be charted on existing source materials any sounding, wreck or fishing reef which is shallower than the sounding in 3) above and considered dangerous to surface navigation, the one to be adopted will be determined after careful examination of the previous report concerned and the results of survey conducted in this Study.

5) The depth contours to be shown on the bathymetric plotting sheet shall be those of 2m, 5m, 10m, 20m, 200m, 1000m and every 1000m for deeper waters.

3-3-3. Preparation of smooth sheet of survey

3-3-3-1. Smooth sheet of survey

Projection : Transverse Mercator projection

Scale : 1/150,000

Material : Plastic sheet with a thickness of 0.125mm or more

Title : FIJI ISLANDS
LAU GROUP — SOUTHERN PORTION
LAKEBA PASSAGE TO KABARA

Items to be shown:

1) Control points, graticule points and neatline corner points.

2) The neatlines of the smooth sheet, drawn in parallel with the lines joining the coordinate points in S-N and E-W directions.

3) Coastlines to be transferred from the coastline sheet.

4) Soundings in slant figures based on the bathymetric plotting sheet. Standard intervals for soundings to be shown will be 10-20mm on the sheet.

Priorities will be given to the soundings in shallow waters.

Soundings will be so selected that they may well represent the sea bottom configurations.

5) The depth contours to be shown are 2m, 5m, 10m, 20m, 200m, 1000m and every 1000m for deeper waters.

Checking : The contents shown on the smooth sheet should be thoroughly checked with manuscript sheets and source materials used for any erroneous or lacking indication.

Colouring : Colouring of symbols to be shown on the smooth sheet shall be in accordance with those prescribed in the Regulations of the Law for Hydrographic Surveys and Detailed Regulations for the Application of the Law for Hydrographic Surveys specified by JHD.

3-3-3-2. Inspection

The smooth sheet of survey thus prepared shall undergo due inspection by JHA.

3-3-4. Preparation of Nautical Chart No.F53

The preparation of Chart No.F53 will be undertaken by JHD upon receipt of the results of the hydrographic surveys and other relevant materials and data from JICA.

3-3-4-1. Chart specifications, basic factors and principles

(1) Projection: Mercator Projection

(2) Geodetic system: Fiji Geodetic Datum (FGD), which is equivalent to WGS 72

(3) Corner coordinates: 17° 59' 33" S, 16° 40' 00" S
179° 25' 00" W, 178° 30' 55" W

(4) Title: FIJI ISLANDS
LAU GROUP-NORTHERN PORTION
NANUKU PASSAGE TO LAKEBA PASSAGE

(5) Scale: 1:150,000 (at Lat.17° 20' S)

(6) Graticules: Every 15 minutes of latitude and longitude

(7) Graticules graduated: Parallels of 17° S and 17° 30' S
Meridian of 179° W

(8) Graduation on the borders: Every 0.2 minute of latitude and longitude

(9) Chart paper: The same paper as currently used by JHD; size 1,085 X 765mm, weight 140g/m^2

(10) Unit of measure for depths: In metres and reduced to Chart Datum, which is approximately the level of Lowest Astronomical Tide (LAT)

(11) Unit of measure for heights: In metres and above Mean High Water Springs

(12) Title block including:
- Title of the chart
- FHS seal
- General geographical area and specific geographical reference

- Chart scale
- Unit of measure for depths and heights
- Name and date of the horizontal datum used
- Name of the projection used

(13) Source diagram : Showing source material data

(14) Conversion table: For metres/fathoms/feet

(15) Compass roses: Three compass roses on the chart

(16) Existing source materials to be adopted: Depths in lagoon areas will be adopted from the existing BA Charts Nos.440, 441 and 416, as well as from the smooth sheet of survey in Vanua Balavu lagoon prepared by FHS in 1996.

3-3-4-2. Compilation planning

Based on the results of hydrographic surveys as well as the existing data and information collected, the planning sheet and the planning note will be prepared for the chart.

(1) Preparation of planning sheet

The following items will be indicated on the planning sheet:

1) Borders and neatlines of the chart
2) Graticules
3) Graduation
4) Information on and the coverage of the existing data to be adopted on the chart
5) Chart title
6) Notes to be given in the title block
7) Chart number
8) Tidal notes
9) Cautionary notes
10) Submarine cables
11) Source diagram
12) Geographical names
13) Other data and information to be adopted on the chart

(2) Preparation of planning note

The planning note will be prepared, listing or indicating the following items:

1) Type of the chart (new chart) to be produced
2) Ellipsoid of reference
3) Chart scale and projection
4) Coverage and neatline dimensions, as well as the corner coordinates
5) Units of measures
6) List of source materials to be adopted
7) Use of colours
8) Positions of compass roses, as well as magnetic variations and their annual change
9) Other data and information as well as directions and instructions necessary for compilation of the chart

3-3-4-3. Preparation of drawing guide

Based on the planning sheet and the planning note prepared, a drawing guide will be prepared on the plastic film exactly on the same scale as that of the chart to be produced.

3-3-4-4. Preparation of chart original

(1) Chart drawing

The chart original (original drawing) of the chart which is a manuscript for platemaking will be prepared based on the drawing guide prepared, in conformity with the IHO Chart Specifications. The chart original will be prepared on the plastic sheets by the scribing method, and sounding figures, chart symbols, compass roses, and geographical names and various type faces to be given on the chart will be prepared by phototypesetting and stuck up on the plastic sheets.

(2) Two sheets of the chart original will be prepared, one for black colour and the other for magenta colour.

3-3-4-5. Verification and examination of chart original

The chart original will be checked for consistency, accuracy and adequacy according to the contents of the drawing guide. The chart representation will also be examined. Items to be checked and examined will include the following:

(1) The format as a nautical chart.
(2) The original drawing is examined to ensure that it does not exceed the maximum possible printing size.
(3) Whether the original drawing is drafted in accordance with the Chart Specifications of the IHO.
(4) Whether the contents are adequately checked to suit the purpose of the chart
(5) Whether the representation of the chart is comprehensive to users.
(6) To ensure that it is checked up to the latest Notices to Mariners affecting the chart to be printed. The charted information has to be updated according to additional data and/or Notices to Mariners. Such additions or corrections will be made on the original drawing up to the time of the platemaking process.

3-3-4-6. Platemaking

(1) Preparation of original plates

By using the chart original completed, the following original plates (negative films) will be prepared:

1) Original plate for black colour (for chart borders and neatlines, coastlines, geographical names, etc.)
2) Original plate for magenta colour (for distinguishing information superimposed)
3) Original plate for buff colour (for land tint)
4) Original plate for blue colour (for shallow water areas)

(2) Preparation of machine plates

By using each of the four original plates (negative films) prepared, the machine plates will be prepared by printing negative images on the PS plates, for which the final checking and inspection will be made.

3-3-4-7. Chart printing

(1) Using the printing plates made from the chart original prepared by JHD, 200 copies of the nautical chart F53 will be printed.

(2) Printing specifications

1) Type of printing : Offset printing

2) Colour : Black, magenta, blue and buff

3-3-5. Inspection of printed chart

The printed chart No.F53 shall undergo due inspection by JHA.

3-3-6. Preparation of Progress Report (PR/R-IV)

The PR/R-IV describing the progress of work up to Phase III Study, problems encountered and countermeasures taken, suggestions to the work in the future, etc. will be prepared and submitted to the Fiji government.

4. OTHERS

4-1. Technology transfer

Technology transfer to Fiji counterpart personnel on the on-job training basis will be performed during the field work in the Study Area F54 as well as in the data processing and preparation of the smooth sheet of survey and in the preparation of Fiji Nautical Chart F53 in Japan.

4-2. Cooperation by FHS

(1) FHS will provide appropriate number of officers/ surveyors as counterpart personnel.

(2) FHS will assist the Study Team in:

1) facilitating customs clearance of instruments and materials and other official procedures,
2) hiring local assistants to work in the field,
3) obtaining and purchasing necessary materials for the Study,
4) proceeding local formalities for the entry and work of the Study Team, and
5) other matters deemed necessary for smooth progress of the Study.

4-3. Operation of survey vessel

(1) In principle, the survey work on board the survey vessel will be during the daytime only, and there will be no work on Sundays.

(2) Every 30 days the survey vessel will return to Port of Suva from the survey site for rest and replenishment for four days.

4-4. Working schedule

The working schedule will be discussed and agreed by the Study Team and FHS, and then informed to JICA Fiji Office prior to commencement of the field work. Any changes necessitated in the schedule during the course of work will be communicated to JICA Fiji Office without delay.

4-5. Concluding meeting

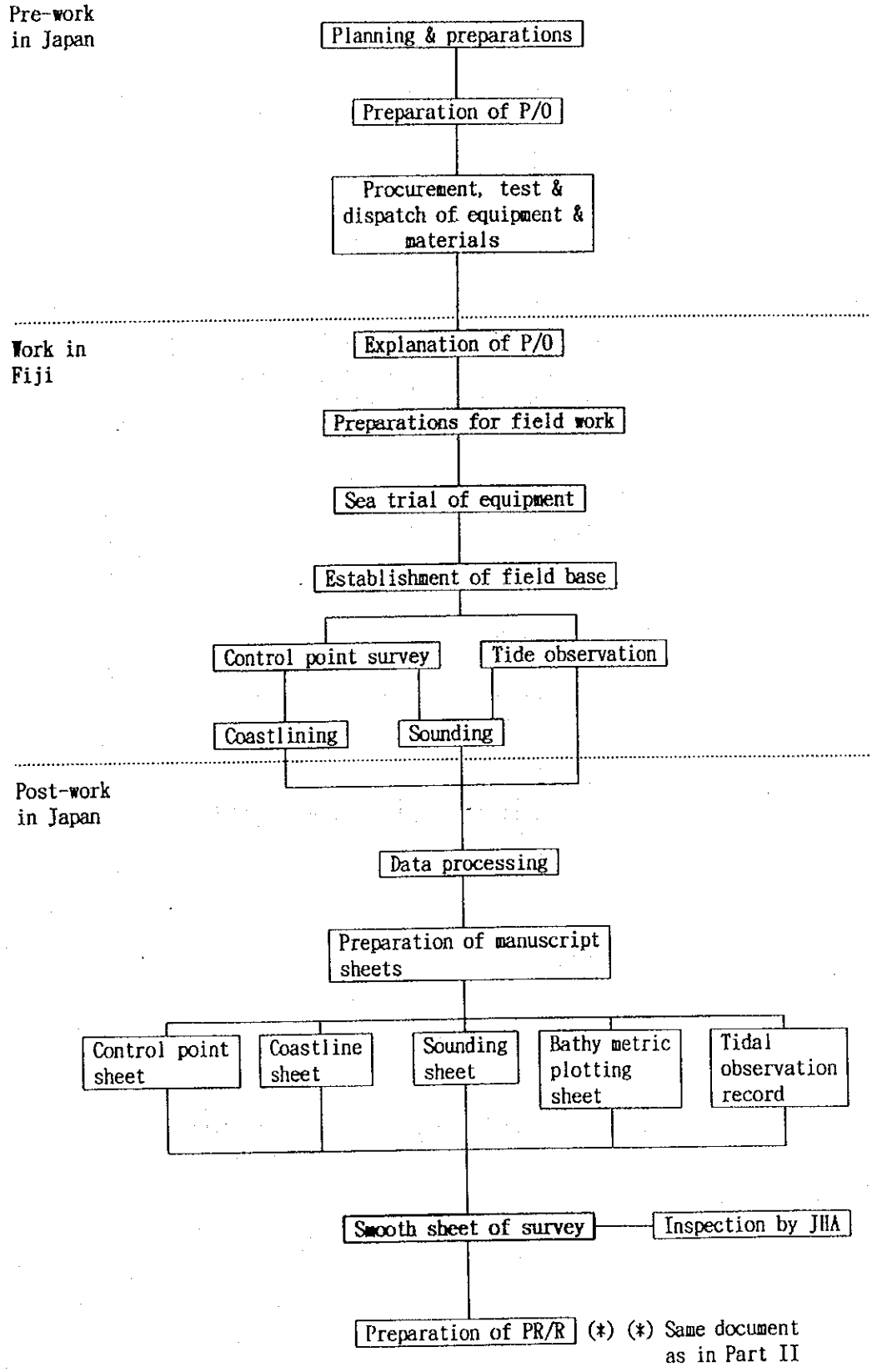
As soon as the field work of Phase IV is completed, a meeting will be held between FHS and the Study Team to review and discuss the work done, problems encountered and solved, etc. and to make suggestions to the work in the next phase.

4-6. Emergency communication network

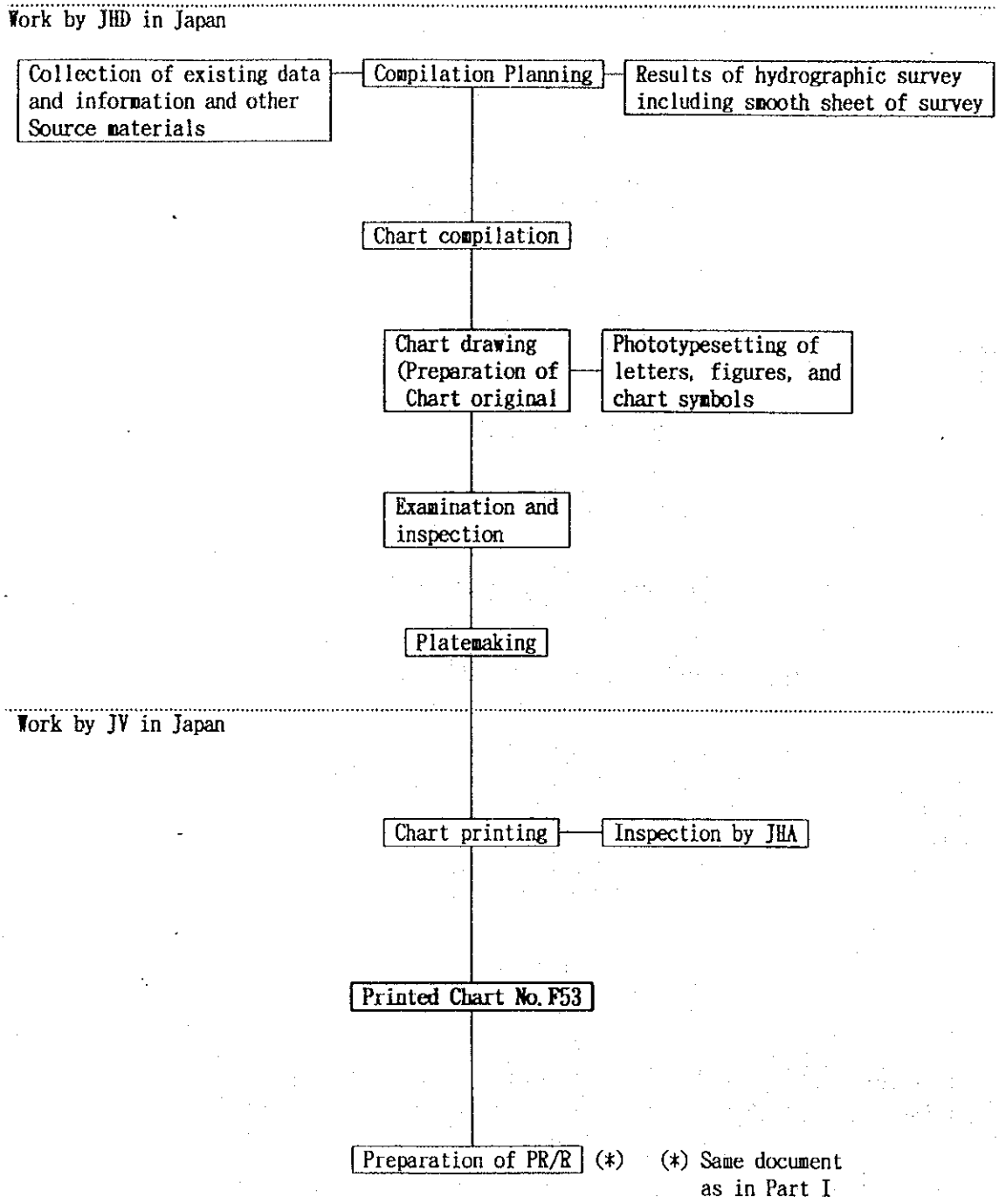
An emergency communication network is shown as in Appendix 5.

FLOW OF WORK FOR PHASE IV (FISCAL 1997)

(Part I - Preparation of Smooth Sheet of Survey)

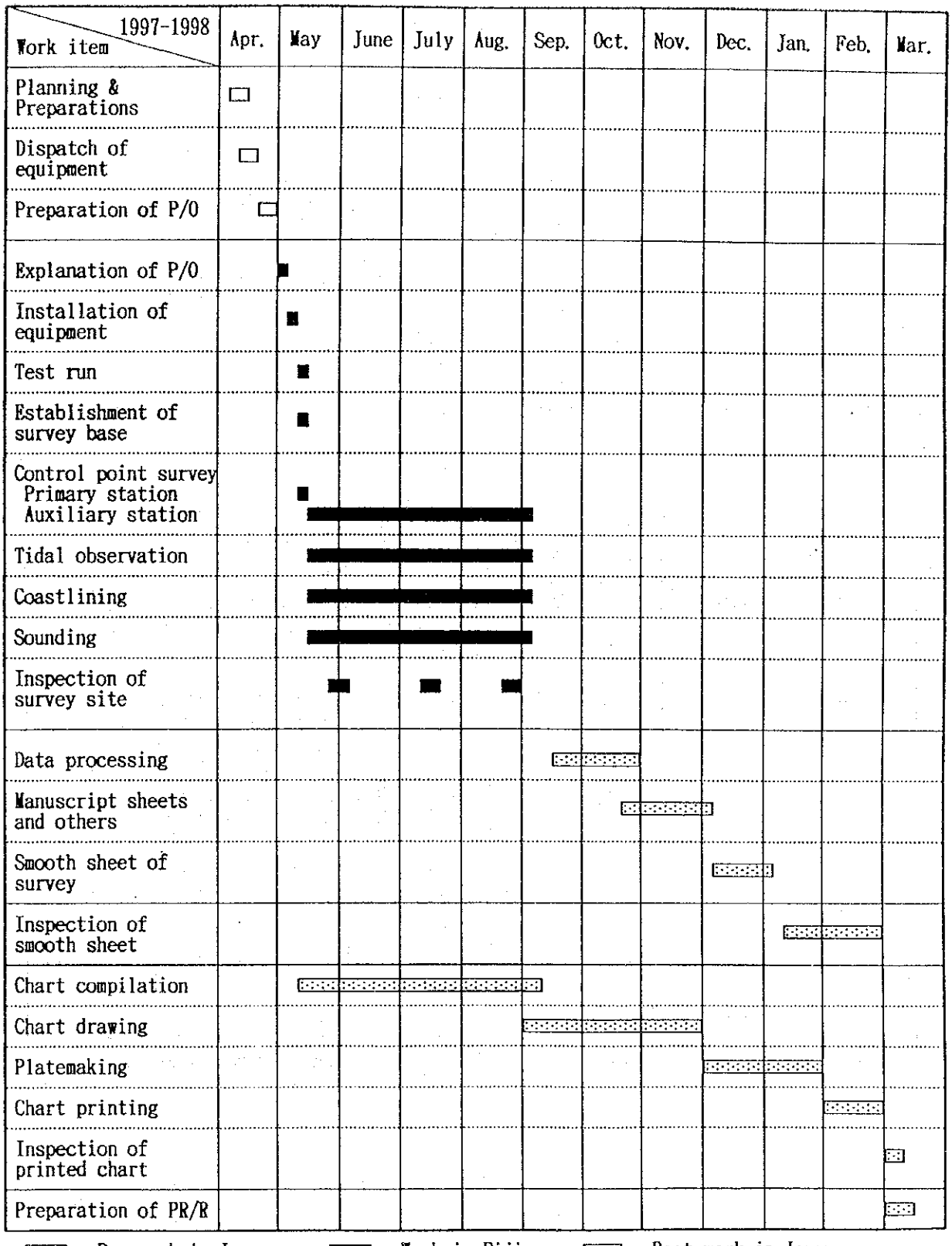


FLOW OF WORK FOR PHASE IV (FISCAL 1997)
(Part II - Preparation of Nautical Chart No. F53)

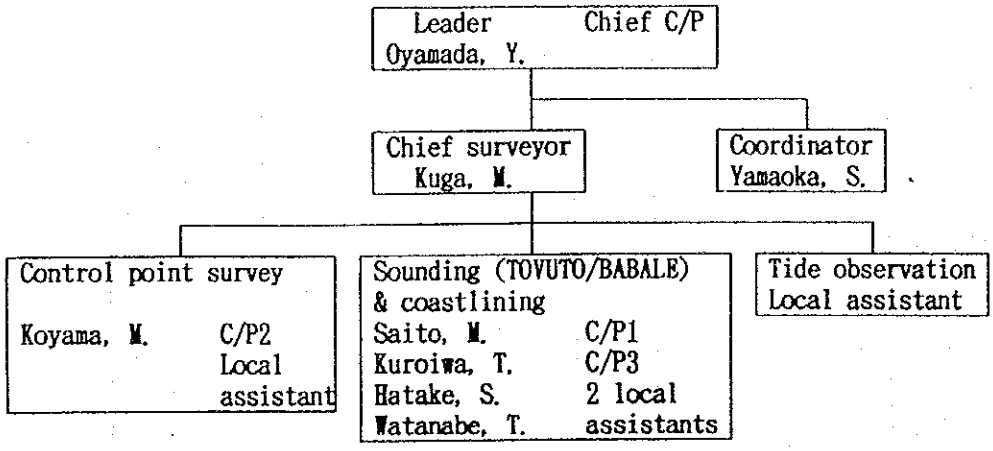


Appendix 2

WORK SCHEDULE FOR STUDY IN PHASE IV



COMPOSITION OF STUDY TEAM



TASK ASSIGNMENT

Name	Position	Post of duty	Task
1. OYAMADA, Yasuhiro	Team Leader	Survey Team Office in Suva	General managing of overall work; consultation with Fiji side
2. KUGA, Masao	Chief Surveyor	R/V TOVUTO	Supervision of control point survey, sounding and coastlining
3. SAITO, Masashi	Surveyor	R/V TOVUTO SMB BABALE	Control point survey, sounding and coastlining
4. KOYAMA, Masashi	Surveyor	Field base	Control point survey
5. KUROIWA, Toshiki	Surveyor	R/V TOVUTO	do.
6. HATAKE, Shuhei	Surveyor	do.	do.
7. WATANABE, Toshiaki	Surveyor	do.	do.
8. YAMAOKA, Shinichi	Coordinator	Suva	Business coordination

PRINCIPAL SURVEY EQUIPMENT AND INSTRUMENTS TO BE USED

1. Survey vessel

   R/V TOYUTO

   SMB BABALE

   WB SALALA

2. Survey instruments

2-1. Control point survey

GPS receiver : Trimble 4000SSE	3 sets
Total Station : Nikon Model DTM-1	1 set
Distance meter : Atlas Model LARA 90/205	1 set

2-2. Coastlining

GPS receiver : Same as in 2-1 above.

2-3. Tidal observation

Tide gauge : Kyowa Shoko Model PFT-II	1 set
YEO-KAL 610	1 set
Level : Sokkia Model B-2	1 set

2-4. Sounding

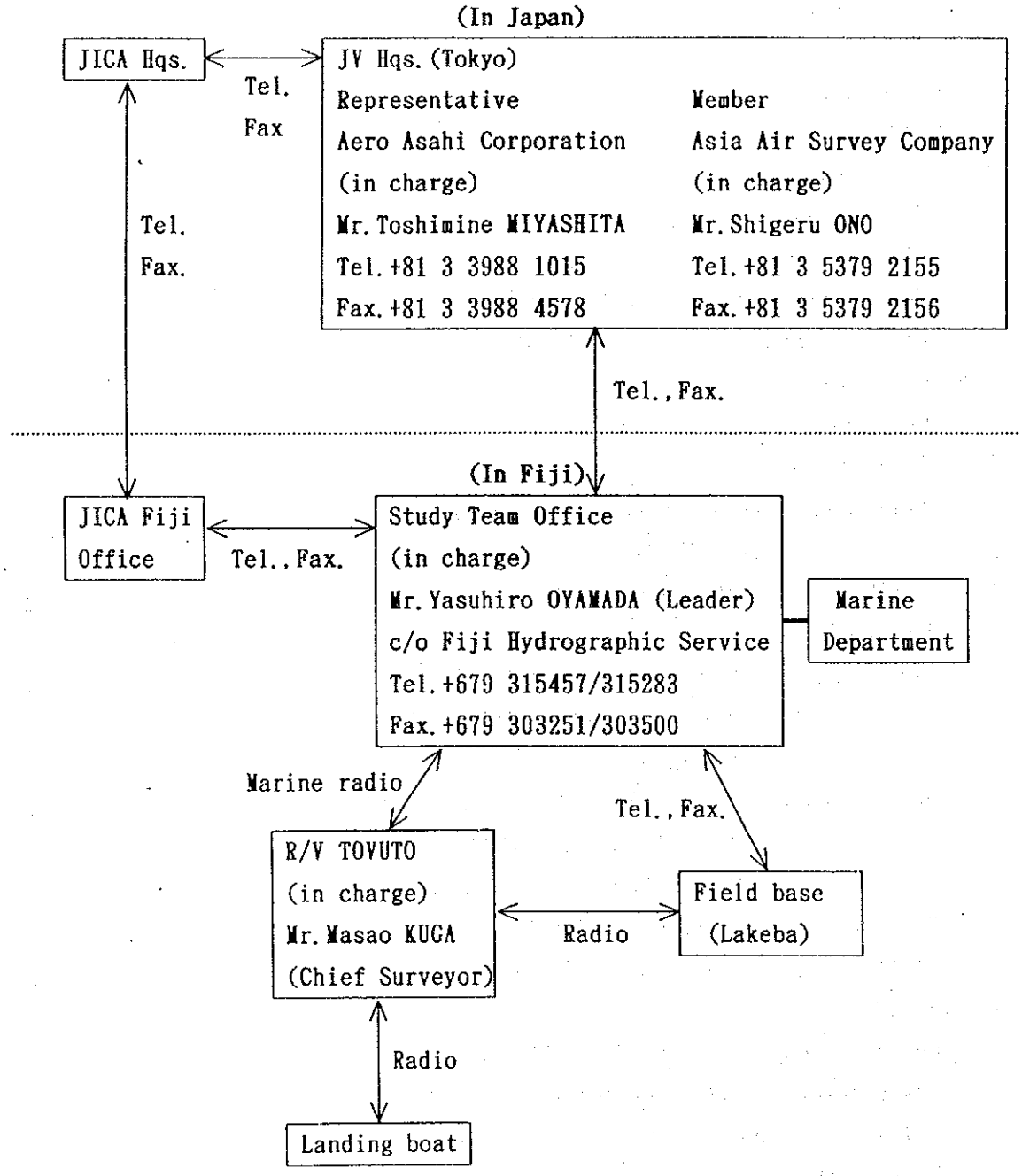
GPS receiver : Sercel NDS200/NR103	1 set
Del Norte 1009/4012	1 set
Navigation	1 set
Echo sounder : Ocean Data BATHY-2000P	1 set
Ocean Data BATHY-1000	1 set
Senbon Denki Model PDR 601	2 sets
Side-scan Sonar : EG&G Model 260	2 sets
Plotter : Graphtec Model FP9100	1 set

3. Others

Personal computer : NEC Versa V50 Notebook	1 set
Laser printer : HP Laser Jet IVL	1 set
Radio set : Barrett 550	3 sets
Battery charger : Dengen	2 sets
Power generator : Robin Model RGD3300	3 sets
Copying machine : Sharp SF7800	1 set
AC power conditioner : Sola 210-26-650-00	2 sets
Facsimile machine : Codan 9001	1 set
Autopilot/Gyrocompass : Tokimec RESCO PR-2000/TG-5000	1 set
Outboard engine : Yamaha E60HML	1 set

Appendix 5

EMERGENCY COMMUNICATION NETWORK



APPENDIX 4-3

MINUTES OF MEETING

ON

THE PLAN OF OPERATION

FOR

THE STUDY ON THE PREPARATION OF NAUTICAL CHARTS

IN

THE NORTHERN LAU ISLANDS REGION

IN

THE REPUBLIC OF FIJI

PHASE IV

(THE FOURTH YEAR - F.Y. 1997)

SUVA, 02 MAY 1997

.....

MR YASUHIRO OYAMADA
LEADER
STUDY TEAM
JAPAN INTERNATIONAL
CO-OPERATION AGENCY

.....

MR F. R. MAHARAJ
CHIEF HYDROGRAPHER
FIJI HYDROGRAPHIC SERVICE
MARINE DEPARTMENT
MINISTRY OF
INFRASTRUCTURE, PUBLIC
WORKS & TRANSPORT

The Study Team of Japan International Cooperation Agency (JICA) headed by Mr Yasuhiro Oyamada visited the Republic of Fiji on 01 May 1997, to conduct the fourth year (Phase IV) work for the Study on the Preparation of Nautical Charts in the Northern Lau Islands Region of the Republic of Fiji.

Meetings were held at the Fiji Hydrographic Office, Marine Department, Ministry of Infrastructure, Public Works and Transport on 02 May 1997, to discuss the Fourth Year's Plan of Operation and various arrangements prior to commencement of the survey.

The meeting resulted in the following points being agreed and confirmed between the JICA Study Team and Fiji Hydrographic Office.

1. The Fourth Year's Plan of Operation (P/O) proposed by JICA Study Team was discussed and agreed in principle by both sides, with the following notes :

   (i) Paragraph 3-2-5-2 Control point survey, the figures 179° 45' 00" E be amended to read 178° 45' 00" E.

   (ii) A third tide gauge (simple pressure type gauge) will also be used as backup at Lakemba.

   (iii) Paragraph 4-1, names of counterpart personnel to be submitted to the JICA team before TOVUTO's departure for the survey area.

   (iv) Appendix 3 - the name in line 4 to read KOYAMA, Masaji.

   (v) Paragraph 4-3, it was agreed in principle that TOVUTO would arrive in Suva on Thursdays for replenishment.

   (vi) Paragraph 3-3-4-6 sub paragraph 1, the items listed here were handed over to the Fiji Hydrographic Office by the JICA study team at this meeting.

2. The Fiji Hydrographic Office received from JICA Study Team 200 copies of Nautical Chart No. F52 together with 1 sheet each of F52 Chart original (negative film) of black-line, magenta-line, water tint and land tint plates and 1 sheet each of their positive films.

LIST OF ATTENDANTS

FIJI SIDE
(Fiji Hydrographic Service)

1.	Mr F.R. MAHARAJ	Chief Hydrographer
2.	Mr A. SILATOLU	Senior Hydrographer
3.	Mr P. HILL	Hydrographer

JAPANESE SIDE
(JICA Study Team)

1.	Mr Yasuhiro OYAMADA	Leader
2.	Mr Masao KUGA	Chief Surveyor

APPENDIX 4-4

MINUTES OF MEETING

FOR

CONCLUSION OF THE FIELD WORK

FOR

THE STUDY ON THE PREPARATION OF NAUTICAL CHARTS

IN

THE NORTHERN LAU ISLANDS REGION

IN

THE REPUBLIC OF FIJI

PHASE IV

(THE FOURTH YEAR - F.Y. 1997)

SUVA, 1st September 1997

.....

MR YASUHIRO OYAMADA
LEADER
STUDY TEAM
JAPAN INTERNATIONAL
CO-OPERATION AGENCY

.....

MR F. R. MAHARAJ
CHIEF HYDROGRAPHER
FIJI HYDROGRAPHIC SERVICE
MARINE DEPARTMENT
MINISTRY OF
INFRASTRUCTURE, PUBLIC
WORKS & TRANSPORT

In concluding the field work for Phase IV of the Study on the Preparation of Nautical Charts in the Northern Lau Region, a meeting was held at the Fiji Hydrographic Service (FHS) Office between the JICA Study Team headed by Mr Yasuhiro Oyamada, Team Leader, and Staff of FHS, headed by Mr Felix R. Maharaj, Chief Hydrographer, on the 1st September 1997.

In opening the meeting, the chairman Mr Oyamada, thanked all those involved in the survey for their whole hearted support leading to the successful conclusion of survey work this year. The meeting carried on with discussions on the following points:

1. Good weather and the good mechanical state of R.V. TOVUTO contributed to the overall timely completion of the survey.

2. The echo sounder Bathy 2000P still has operational problems and this is now the responsibility of FHS, which will liase with ODEC (USA) for improving its performance.

3. The GRAPHTEC plotter is fully operational and all persons from FHS that will operate this machine have been given the necessary training. Further assistance will be given by the Study Team through correspondence on operation of the plotter should operational problems be encountered.

4. It was requested by the Chairman that comments on the compilation of F53 be submitted to Japan Hydrographic Department as early as possible in order that timely execution of printing this chart can be accomplished by March 1998. It was noted that due to the lack of topographical data on a majority of islands, contours will not be shown in those cases where data are not available.

5. The Chairman asked Fiji Hydrographic Service that FHS would render full support to him in collecting necessary information and data for his work in Phase IV of the Study.

6. On returning to Japan the Study Team will plot geodetic control stations onto the Vanua Balavu Lagoon smooth sheet of survey including sunken dangers and shoals.

LIST OF ATTENDANTS

FIJI SIDE
(Fiji Hydrographic Service)

1. Mr Felix Ranchor MAHARAJ	Chief Hydrographer
2. Mr Aca SILATOLU	Senior Hydrographer
3. Mr Philip Ronald HILL	Hydrographer
4. Mr Seci LAGIVOLA	Hydrographer

(Marine Department)

1. Mr Pauliasi VAKALOLOMA	Master, R/V TOVUTO.

JAPANESE SIDE
(JICA Study Team)

1. Mr Yasuhiro OYAMADA	Leader
2. Mr Masao KUGA	Chief Surveyor
3. Mr Masashi SAITO	Surveyor

LIST OF FINAL PRODUCTS OF SURVEY

1. Control point survey
   - Control point sheets (3 sheets)
   - Field records of control point survey(1 volume)
   - Final results of control point survey (1 volume)
   - Geodetic station records (1 volume)
   - Magneto optical disk of control observation data (1 sheet)
   - List of geographical coordinates and index sheets of geographical positions (2 copies)

2. Coastlininig
   - Coastline sheets (2 sheets)
   - Data file of height observation (1 volume)
   - Drawing of coastlines (1 volume)
   - Aerial photographs (3 volumes)

3. Tidal observation
   - Tide table (1 volume)
   - Tidal curve at Lakeba(1 volume)
   - Reference level determination book (3 copies; 1 in English, 2 in Japanese)

4. Sounding
   - Bathymetric plotting sheet, northern portion (1 sheet)
   - Bathymetric plotting sheet, southern portion (1 sheet)
   - Sounding sheet, northern portion (1 sheet)
   - Sounding sheet, southern portion (1 sheet)
   - Enlarged bathymetric plotting sheets (4 sheets)
   - Enlarged sounding line sheets (4 sheets)
   - Sounding book (1 volume)
   - Echo sounding records (38 volumes)
   - Records of side-scan sonar (4 volumes)
   - Data for corrections to soundings(1 volume)
   - Magneto optical disk of sounding data(1 copy)
   - Check table of soundings at line crossing (1 volume)

5. Preparation of smooth sheet of survey
   - Smooth sheet of survey(1 sheet)

- Survey report(3 copies; 1 English, 2 Japanaese)
- Certificate of inspection(1 sheet)
- Sheet of geographical names (1 sheet)

APPENDIX 4-6-1

PROGRAMME FOR COUNTERPART TRAINING ON PREPARATION OF NAUTICAL CHART

(Study on the Preparation of Nautical Charts in the Northern Lau Islands Region, Phase IV)

Name of counterpart : Mr. Sunil KUMAR, Senior Technical Assistant (Cartography), Fiji Hydrographic Service

Training period : 23 June to 22 December 1997

Note : HDMSA = Hydrographic Department of Maritime Safety Agency
ICO = International Cooperation Office of HDMSA
CCO = Chart Compilation Office of HDMSA

Date	Itinerary/Subject	Attendant	Venue
23 Jun.(Mon)	Leave Fiji and arrive in Japan		
24 " (Tue)	Briefing at JICA	Coordinator	JICA
25 " (Wed)	Observation visit and orientation at HDMSA	ICO, CCO, Coordinator	Tsukiji
26 " (Thu)	Medical examination		JICA
27 " (Fri)	Observation visit to CCO	CCO	Tsukiji
30 " (Mon) ~ 8 Jul. (Tue)	Chart compilation planning (7 days)	Mr Imai, Coordinator	do
9 " (Wed) ~ 25 " (Wed)	Chart compilation (42days)	Mr Chiba, Coordinator	do.
28 " (Thu)	Visit to Geographical Survey Institute	ICO	Tsukuba
29 " (Fri)	Visit to Geological Survey of Japan	do.	do.
30 " (Mon) ~ 8 Aug.(Thu)	Chart compilation	Mr Chiba, Coordinator	Tsukiji
11 " (Mon) ~ 13 " (Wed)	Observation tour	ICO	Hokkaido
14 " (Mon) ~ 12 Sep.(Fri)	Chart compilation	Mr Chiba, Coordinator	Tsukiji

16 Sep.(Tue)			
〃	Chart drawing (40 days)	Mr Kurosaki	Tsukiji
21 Oct.(Thu)		Coordinator	
22 〃 (Fri)	Visit to Buyodo (printing factory)	CCO, Coordinator	Meguro
23 Oct.(Thu)			
〃	Chart drawing	Mr Kurosaki	Tsukiji
28 〃 (Tue)		Coordinator	
29 〃 (Wed)			
〃	Observation tour	ICO	Osaka
31 〃 (Fri)			
4 Nov.(Tue)			
〃	Chart drawing	Mr Kurosaki	Tsukiji
19 〃 (Wed)		Coordinator	
20 〃 (Thu)	Visit to AAC Technical Center	Coordinator	Kawagoe
21 〃 (Fri)			
〃	Chart editing (5 days)	Mr Usui,	Tsukiji
28 〃 (Fri)		Coordinator	
1 Dec.(Mon)			
〃	Block correction of chart (5 days)	Mr Yamashita,	do.
5 〃 (Fri)		Coordinator	
8 〃 (Mon)			
〃	Plate making (8 days)	Mr Saito,	do.
17 〃 (Wed)		Coordinator	
18 〃 (Thu)	Preparation of report	ICO, Coordinator	do.
19 〃 (Fri)	Evaluation meeting, closing ceremony	ICO, Coordinator	do.
22 〃 (Mon)	Leave for Fiji		

APPENDIX 4-6-2

PROGRAMME FOR COUNTERPART TRAINING ON PREPARATION OF SMOOTH SHEET OF SURVEY

(Study on the Preparation of Nautical Charts in the Northern Lau Islands Region, Phase IV)

Name of counterpart : Mr. Gerard D. ROKOUA, Technical Officer I, Hydrography, Fiji Hydrographic Service

Training period : 17 November to 18 December 1997

Date	Itinerary/Subject	Attendant	Venue
17 Nov.(Mon)	Leaves Fiji and arrives in Japan		
18 " (Tue)	Briefing and programme orientation at JICA	Coordinator	JICA
19 " (Wed)	Courtesy visit to the Head Office of Aero Asahi Corporation (AAC)	Mr Oyamada	Ikebukuro
20 " (Thu)	Courtesy visit to Head Office of Asia Air Survey Co. (AAS)	Coordinator	Shinjuku
21 " (Fri)	Visit to Hydrographic Department, MSA; and Survey Ship SHOYO	Mr Oyamada	Tsukiji, Tokyo Bay
22 " (Sat)	Rest		TIC
23 " (Sun)	do.		do.
24 " (Mon)	do. (National holiday)		do.
25 " (Tue)	On-job training (OJT) on processing and plotting of control points	Mr Saito	Sayama
26 " (Wed)	OJT on computer processing of sounding data	do.	do.
27 " (Thu)	OJT on processing of tidal data	do.	do.
28 " (Fri)	OJT on processing of coastlining data	do.	do.
29 " (Sat)	Rest		TIC
30 " (Sun)	do.		do.
1 Dec.(Mon)	.Moves to Hiroshima	Coordinator	Hiroshima
2 " (Tue)	Observation of hydrographic survey (6th RMSHq.); moves to Okayama	do.	Okayama
3 " (Wed)	Visit to Bisan Seto Traffic Advisory Service Center; moves to Hiro, Kure	do.	Hiro
4 " (Thu)	Visit to Chugoku National Industrial Research Institute; moves to Hiroshima	do.	Hiroshima
5 " (Fri)	Returns to Tokyo	do.	TIC

6 Dec.	(Sat)	Rest		TIC
7 "	(Sun)	Rest		do.
8 "	(Mon)	OJT on preparation of control point sheet	Mr Kuga	Atsugi
9 "	(Tue)	OJT on preparation of sounding sheet	do.	do.
10 "	(Wed)	OJT on tidal analysis and datum level determination	do.	do.
11 "	(Thu)	OJT on preparation of smooth sheet of survey	do.	do.
12 "	(Fri)	do.	do.	do.
13 "	(Sat)	Rest		TIC
14 "	(Sun)	do.		do.
15 "	(Mon)	Review of overall training, questions and answers, preparation of report	Mr Oyamada Mr Saito	Sayama
16 "	(Tue)	Preparation of report		TIC
17 "	(Wed)	Evaluation meeting	Coordinator	JICA
18 "	(Thu)	Leaves Japan for Fiji		

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
MINISTRY OF COMMUNICATION, WORKS AND ENERGY, FIJI

PLAN OF OPERATION
FOR
THE STUDY ON THE PREPARATION OF NAUTICAL CHARTS
IN
THE NORTHERN LAU ISLANDS REGION
IN
THE REPUBLIC OF FIJI

PHASE V

(THE FIFTH YEAR – F.Y. 1998)

MAY 1998

AERO ASAHI CORPORATION
ASIA AIR SURVEY CO., LTD.

CONTENTS

STUDY AREA AND CHART COVERAGE

1. INTRODUCTION

The Government of the Republic of Fiji requested the Government of Japan for technical cooperation in the Study on the Preparation of Nautical Charts in the Northern Lau Islands Region in the Republic of Fiji.

In response to the request, the Japan International Cooperation Agency (JICA), the official agency responsible for implementation of the technical cooperation programmes of the Government of Japan, dispatched a Preparatory Study Team to Fiji from 15 February to 15 March 1994, and the Scope of Work (S/W) was agreed between JICA and the Ministry of Infrastructure, Public Works and Transport (now Ministry of Communication, Works and Energy) on 15 March 1994.

According to the S/W, the objectives of the Study are:

(1) To prepare three Fiji nautical charts, Nos.F52, F53 and F54, each on the scale of 1/150,000, covering the Northern Lau Islands region;

(2) To report the recommendation for improvement of operation and management system of hydrographic surveying and nautical charting in Fiji; and

(3) To promote technology transfer through the implementation of the Study with a view to enabling the Fiji counterpart personnel to improve their technique in hydrographic surveying and nautical charting.

Pursuant to the S/W, the Study has been implemented as follows:

First Year (Phase I)(From 13 January to 30 March 1995)

- Work in Fiji : Consultation of the Plan of Operation for Phase I (P/O-I) with the Fiji Hydrographic Service (FHS), Marine Department, Ministry of Infrastructure, Public Works and Transport, and agreement thereof (27 January 1995).

Preparations for hydrographic surveys in the forthcoming phases:

(1) Selection of survey equipment to be used;

(2) Acquisition of aerial photographs and other source materials;

(3) Reconnaissance of survey sites for Phase II work; and

(4) Confirmation of survey implementation and support systems

- Work in Japan: (1) Tentative drawing of coastlines of islands and atolls of the whole Study area.

(2) Preparation of the Progress Report of Phase I(PR/R-I), which was then submitted to the Government of Fiji from JICA.

Second Year (Phase II)(From 13 June 1995 to 29 March 1996)

- Work in Fiji : (1) Consultation and agreement on the Plan of Operation for Phase II (P/O-II);

(2) Hydrographic survey in the Study Area F52; and

(3) Technology transfer to FHS counterpart personnel.

- Work in Japan: (1) Processing of survey data and preparation of the smooth sheet of survey for Area F52.

(2) Preparation of the Progress Report of Phase II (PR/R-II), which was then submitted to the Government of Fiji from JICA.

Third Year (Phase III)(From 23 April 1996 to 21 March 1997)

- Work in Fiji : (1) Consultation and agreement on the Plan of Operation for Phase III (P/O-III);

(2) Hydrographic survey in the Study Area F53; and

(3) Technology transfer to FHS counterpart personnel during the survey, in

particular, the large-scale survey in Vanua Balavu lagoon to be conducted by FHS.

- Work in Japan: (1) Processing of survey data and preparation of the smooth sheet of survey for Study Area F53.
  (2) Preparation of the Nautical Chart No. F52 by the Japan Hydrographic Department (JHD) with participation of a Fiji counterpart personnel as on-job training.
  (3) Preparation of the Progress Report of Phase III (PR/R-III), which was then submitted to the Government of Fiji from JICA, together with the printed copies of Chart No.F52.

Fourth Year (Phase IV)(From 15 April 1997 to 31 March 1998)

- Work in Fiji : (1) Consultation and agreement on the Plan of Operation for Phase IV (P/O-IV);
  (2) Hydrographic survey in the Study Area F54; and
  (3) Technology transfer to FHS counterpart personnel.
- Work in Japan: (1) Processing of survey data and preparation of the smooth sheet of survey for Study Area F54.
  (2) Preparation of the Nautical Chart No. F53 by JHD with participation of a Fiji counterpart personnel as on-job training.
  (3) Preparation of the Progress Report of Phase IV (PR/R-IV), which was then submitted to the Government of Fiji from JICA, together with the printed copies of Chart No.F53.

Based on P/O-I and PR/R-IV above, this Plan of Operation for Phase V (P/O-V) is prepared to give a substantial guideline of the work to conclude the whole programme of the Study.

2. GENERAL

2-1. Objectives

The objectives of the Study in Phase V are as follows:

(1) To survey and analyze the existing status of the organization, facilities and activities of FHS.

(2) To make an analytical study of the results and findings of the survey and analysis in (1) above.

(3) Based on the relevant data and information obtained by the survey and analytical study thereof on the current conditions and problems in operation and management system of hydrographic surveying and nautical charting in FHS, to make any recommendation for possible improvement of such system.

(4) To prepare a Draft Final Report (DF/R) including the results of (2) and (3) above, and to discuss and finalize DF/R between the Government of Fiji and JICA.

(5) To prepare Fiji Nautical Chart No.F54, where technology transfer will be made to Fiji counterpart personnel.

(6) To prepare Final Report (F/R) containing the results of (2) and (3) with its Summary and the report covering the whole work and products of the Study, and to submit F/R to the Fiji Government by JICA together with the printed copies of Fiji Nautical Chart No.F54.

2-2. Study period

(1) Pre-work in Japan
From 15 to 24 May 1998.

(2) Work in Fiji
From 25 May to 1 July and from 2 to 8 November 1998.

(3) Post-work in Japan
From 2 July to 1 November 1998 and from 9 November 1998 to 31 March 1999.

(4) Preparation of Nautical Chart No.F54.
From June 1998 to March 1999.

2-3. Flow and schedule of work

The flow and schedule of work are as shown in Appendices 1 and 2, respectively.

3. IMPLEMENTATION PLAN OF THE STUDY IN PHASE V

3-1. Pre-work in Japan

3-1-1. Planning

Based on the materials, data and information collected by the JICA Preparatory Study Team as well as by the Study Team during Phases I and IV, a detailed plan for implementation of the Study in Phase V is worked out.

3-1-2. Preparation of Plan of Operation (P/O-V)

P/O-V for Phase V work for the Study is prepared on the basis of S/W as well as the detailed plan in 3-1-1 above. P/O-V describes a substantial guideline of the work as to methods, types and amount of work, etc., in Japan and in Fiji, as well as the items for which co-operation from the Fiji side is requested and others matters.

3-2. Work in Fiji

3-2-1. General

(1) Composition of Study Team is as follows:

Leader : Mr. Yasuhiro OYAMADA, from 25 May to 1 July and from 2 to 8 November 1998.

Member : Mr. Katsuji Chiba (JHD), from 15 June to 1 July 1998.

Mr. Shinobu Inazumi (JHD), from 15 June to 1 July 1998.

Mr. Kunio Yashima (JHD), from 2 to 8 November 1998.

3-2-2. Explanation of P/O-V and consultation

P/O-V thus prepared will be submitted to FHS for explanation by the Study Team Leader, and consultation will be held to reach agreements on the content.

3-2-3. Survey and analysis of the existing status of the operation and management system for hydrographic surveying and nautical charting in Fiji

(1) A survey will be made to the existing status of the organization, human resources, facilities and equipment, recent work results, financial status, maintenance, arrangements and storage of nautical charts and relevant data and information, chart publication plan, etc. of FHS that is responsible for the planning, maintenance, production and management of nautical charts.

(2) The items of materials, data and information to be collected for the survey will be as follows:

a. Organization of FHS and Marine Department.

b. No., academic and professional background and job descriptions of the staff and employees of FHS.

c. No., type and make of the equipment and instruments:
   - survey vessel
   - control point survey
   - hydrographic survey
   - oceanographic observation
   - cartographic work including printing

d. Results of work of FHS in the recent years:
   - Hydrographic surveys carried out
   - Charts issued and/or sold
   - Publications issued and/or sold, including Notices to Mariners and Navigational Warnings

e. Amount of budgetary allotments and expenditures with breakdowns according to items

f. Maintenance, servicing and storage of charts and relevant materials and data

g. Chart publication planning (domestic and international)

h. Other relevant information.

(3) Those materials, data and information thus collected will be analyzed to clarify the existing status of the all aspects of FHS.

3-2-4. Appraisal of survey results and preparation of suggestion

The results of the survey and analysis thereof will be appraised by the Study Team which will make a pertinent suggestion for publication of nautical charts to be required for the Fijian waters, and in particular, those for short-term requirements.

3-2-5. Analysis of vital points

Any vital point for possible publication of charts according to the suggestion in 3-2-5 above will be brought out and analyzed by the Study Team.

3-2-6. Preparation of Draft Final Report

For improving the current situation thus analyzed, a recommendation that is practicable and adaptable in Fiji will be prepared by the Study Team, and a Draft Final Report (DF/R) including the results of (2), (3) and (4) above.

3-2-7. Discussion for finalization of DF/R

After editing work of DF/R is completed, discussion will be held between the FHS and the Study Team for comments, which will be furnished to the Study Team within one month after the discussion.

3-3. Post-work in Japan

3-3-1. Preparation of Final Report

Upon receipt of the comments on the DF/R from the Fiji side, the Final Report (F/R) will be prepared with incorporating any amendments as necessary.

The F/R will consist of:

(a) Results of analysis of the existing status of management system of hydrographic surveying and nautical charting in Fiji.

(b) Appraisal of the results in (a) and a recommendation for improvement of the system.

(c) Summary of (a) and (b) above.

(d) Report on the whole work and products of the Study from Phase I to Phase V.

3-3-2. Submission of F/R

The F/R thus finalized will be submitted to the Government of Fiji from JICA by the end of fiscal 1998.

3-4. Preparation of Nautical Chart No.F54

The preparation of Chart No.F54 will be undertaken by JHD upon receipt of the results of the hydrographic surveys and other relevant materials and data from JICA.

3-4-1. Chart specifications, basic factors and principles

(1) Projection: Mercator Projection

(2) Geodetic system: Fiji Geodetic Datum (FGD), which is equivalent to WGS 72

(3) Corner coordinates: 19° 04' 40" S, 17° 47' 00" S
179° 06' 00" W, 178° 12' 00" W

(4) Title: FIJI ISLANDS
LAU GROUP-SOUTHERN PORTION
LAKEBA PASSAGE TO KABARA

(5) Scale: 1:150,000 (at Lat.18° 25' S)

(6) Graticules: Every 15 minutes of latitude and longitude

(7) Graticules graduated: Two parallels of 18 15'S and 18° 45' S
One meridian of 178° 45'W

(8) Graduation on the borders: Every 0.2 minute of latitude and longitude

(9) Chart paper: Size 1,052 × 730mm, weight 140g/m^2

(10) Unit of measure for depths: In metres and reduced to Chart Datum, which is approximately the level of Lowest Astronomical Tide (LAT)

(11) Unit of measure for heights: In metres and above Mean High Water Springs

(12) Title block including:
- Title of the chart
- FHS seal
- General geographical area and specific geographical reference
- Chart scale
- Unit of measure for depths and heights
- Name and date of the horizontal datum used
- Name of the projection used

(13) Source diagram : Showing source material data

(14) Conversion table: For metres/fathoms/feet

(15) Compass roses: Three compass roses on the chart

(16) Existing source materials to be adopted: Depths in lagoon areas will be adopted from the existing BA Charts Nos. 416 and 441.

3-4-2. Compilation planning

Based on the results of hydrographic surveys as well as the existing data and information collected, the planning sheet and the planning note will be prepared for the chart.

(1) Preparation of planning sheet

The following items will be indicated on the planning sheet:

1) Borders and neatlines of the chart
2) Graticules
3) Graduation
4) Information on and the coverage of the existing data to be adopted on the chart
5) Chart title
6) Notes to be given in the title block
7) Chart number
8) Tidal notes
9) Cautionary notes
10) Submarine cables
11) Source diagram

12) Geographical names

13) Other data and information to be adopted on the chart

(2) Preparation of planning note

The planning note will be prepared, listing or indicating the following items:

1) Type of the chart (new chart) to be produced

2) Ellipsoid of reference

3) Chart scale and projection

4) Coverage and neatline dimensions, as well as the corner coordinates

5) Units of measures

6) List of source materials to be adopted

7) Use of colours

8) Positions of compass roses, as well as magnetic variations and their annual change

9) Other data and information as well as directions and instructions necessary for compilation of the chart

3-4-3. Preparation of drawing guide

Based on the planning sheet and the planning note prepared, a drawing guide will be prepared on the plastic film exactly on the same scale as that of the chart to be produced.

3-4-4. Preparation of chart original

(1) Chart drawing

The chart original (original drawing) of the chart which is a manuscript for platemaking will be prepared based on the drawing guide prepared, in conformity with the IHO Chart Specifications. The chart original will be prepared on the plastic sheets by the scribing method, and sounding figures, chart symbols, compass roses, and geographical names and various type faces to be given on the chart will be prepared by phototypesetting and stuck up on the plastic sheets.

(2) Two sheets of the chart original will be prepared, one for black colour and the other for magenta colour.

3-4-5. Verification and examination of chart original

The chart original will be checked for consistency, accuracy and adequacy according to the contents of the drawing guide. The chart representation will also be examined. Items to be checked and examined will include the following:

(1) The format as a nautical chart.

(2) The original drawing is examined to ensure that it does not exceed the maximum possible printing size.

(3) Whether the original drawing is drafted in accordance with the Chart Specifications of the IHO.

(4) Whether the contents are adequately checked to suit the purpose of the chart

(5) Whether the representation of the chart is comprehensive to users.

(6) To ensure that it is checked up to the latest Notices to Mariners affecting the chart to be printed. The charted information has to be updated according to additional data and/or Notices to Mariners. Such additions or corrections will be made on the original drawing up to the time of the platemaking process.

3-4-6. Platemaking

(1) Preparation of original plates

By using the chart original completed, the following original plates (negative films) will be prepared:

1) Original plate for black colour (for chart borders and neatlines, coastlines, geographical names, etc.)

2) Original plate for magenta colour (for distinguishing information superimposed)

3) Original plate for buff colour (for land tint)

4) Original plate for blue colour (for shallow water areas)

(2) Preparation of machine plates

By using each of the four original plates (negative films) prepared, the machine plates will be prepared by printing negative images on the PS plates, for which the final checking and inspection will be made.

3-4-7. Chart printing

(1) Using the printing plates made from the chart original prepared by JHD, 200 copies of the nautical chart F54 will be printed.

(2) Printing specifications

1) Type of printing : Offset printing

2) Colour : Black, magenta, blue and buff

3-4-8. Inspection of printed chart

The printed chart No.F54 shall undergo due inspection by JHA.

4. OTHERS

4-1. Technology transfer

Technology transfer to Fiji counterpart personnel will be performed in Japan as follows:

(a) Study and observation basis for management and operation of hydrographic activities.

(b) On-job training basis for preparation of Fiji Nautical Chart No.F54.

4-2. Cooperation by FHS

The FHS will render good offices in all respects for facilitating the Study Team to obtain necessary materials, data and information as described in 3-2-3 above.

The FHS will also provide appropriate personnel for counterpart training as described in 4-1 above.

4-3. Working schedule

The working schedule will be discussed and agreed by the Study Team and FHS, and then informed to JICA Fiji Office in due course. Any changes necessitated in the schedule will be communicated to JICA Fiji Office without delay.

4-4. Concluding meeting

A concluding meeting will be held between the FHS and the Study Team at the end of preparation of DF/R.

4-5. Finalization meeting

A finalization meeting will be held between the FHS and the Study Team at the end of discussions for finalization of DF/R.

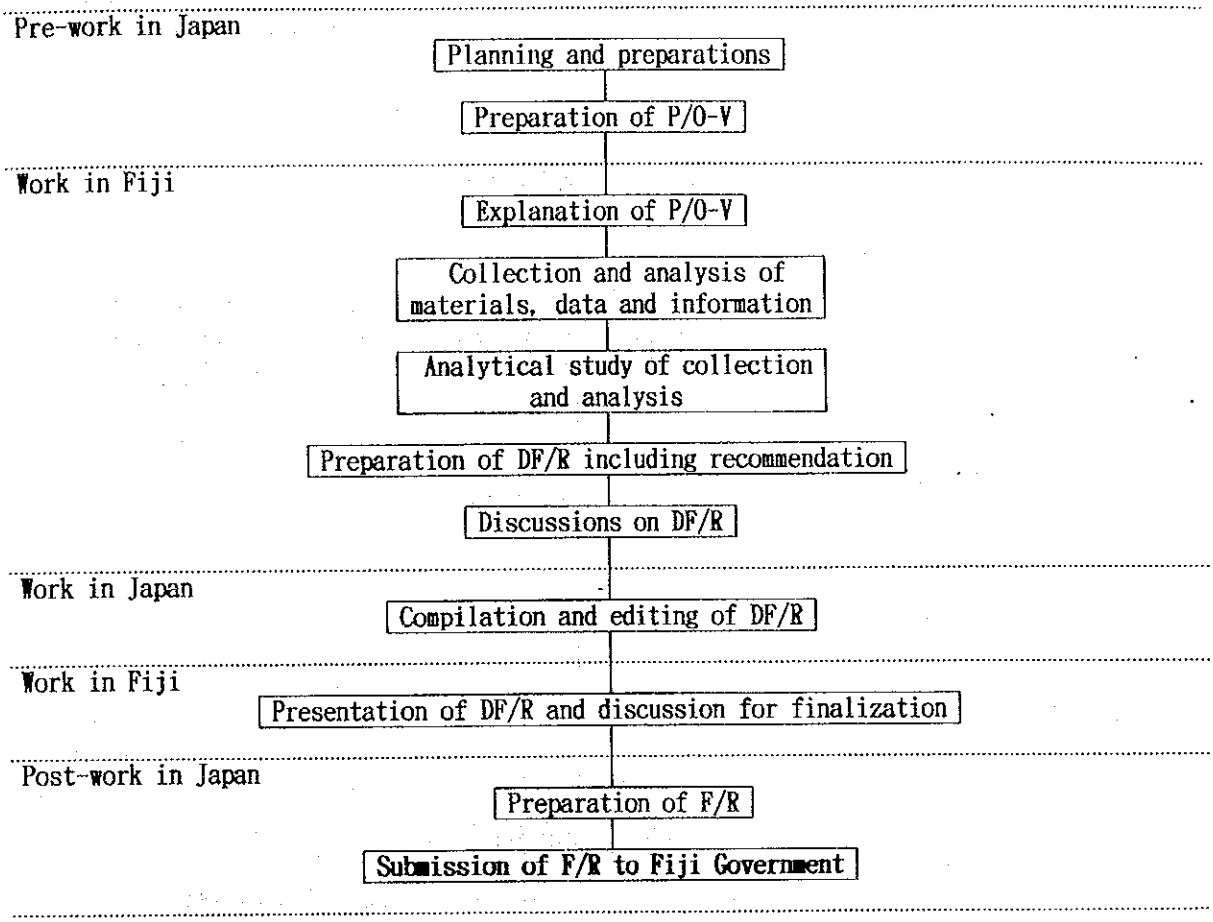
4-6. Emergency communication network

An emergency communication network is shown as in Appendix 3.

Appendix 1

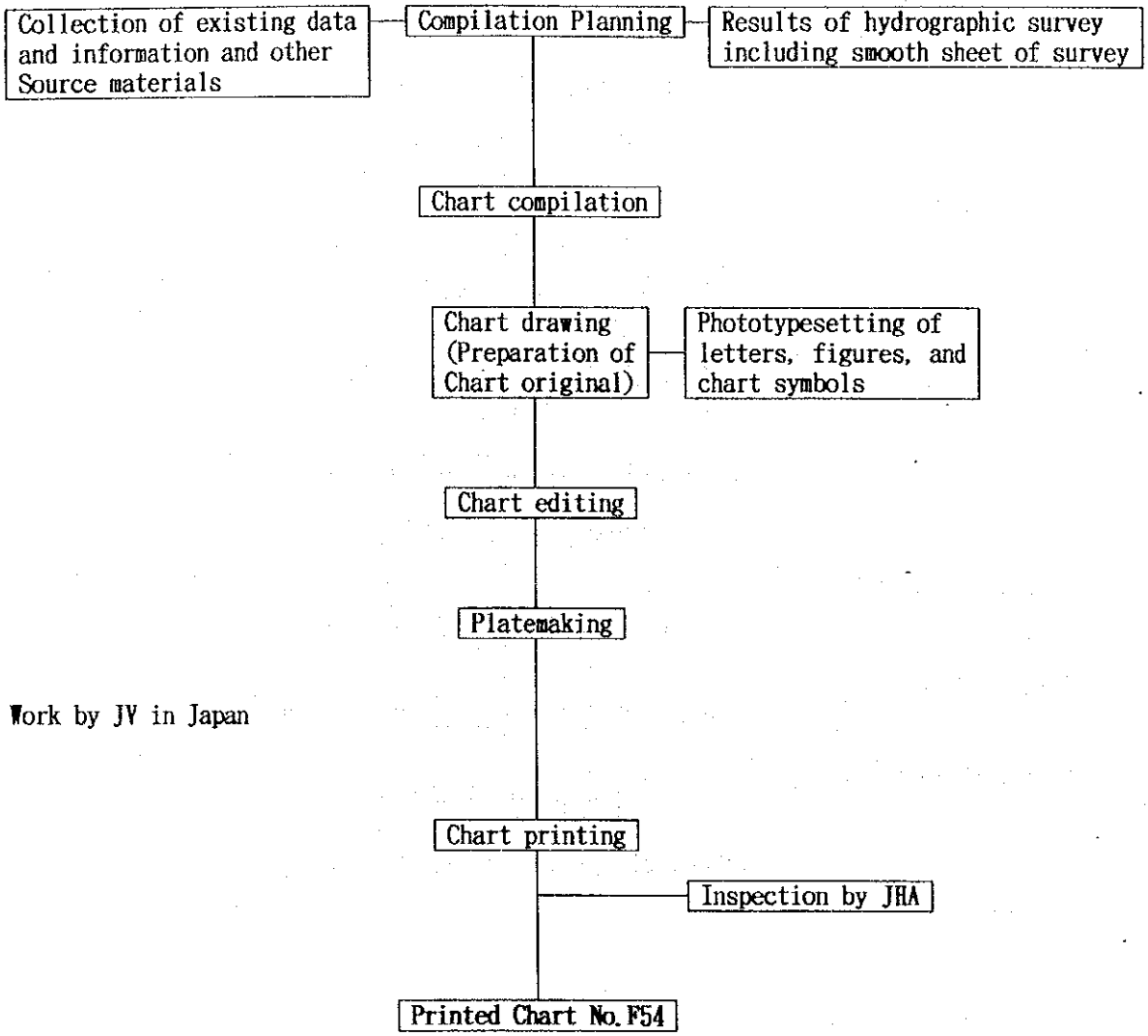
FLOW OF WORK FOR PHASE V (FISCAL 1998)

Part I - Preparation of Final Report



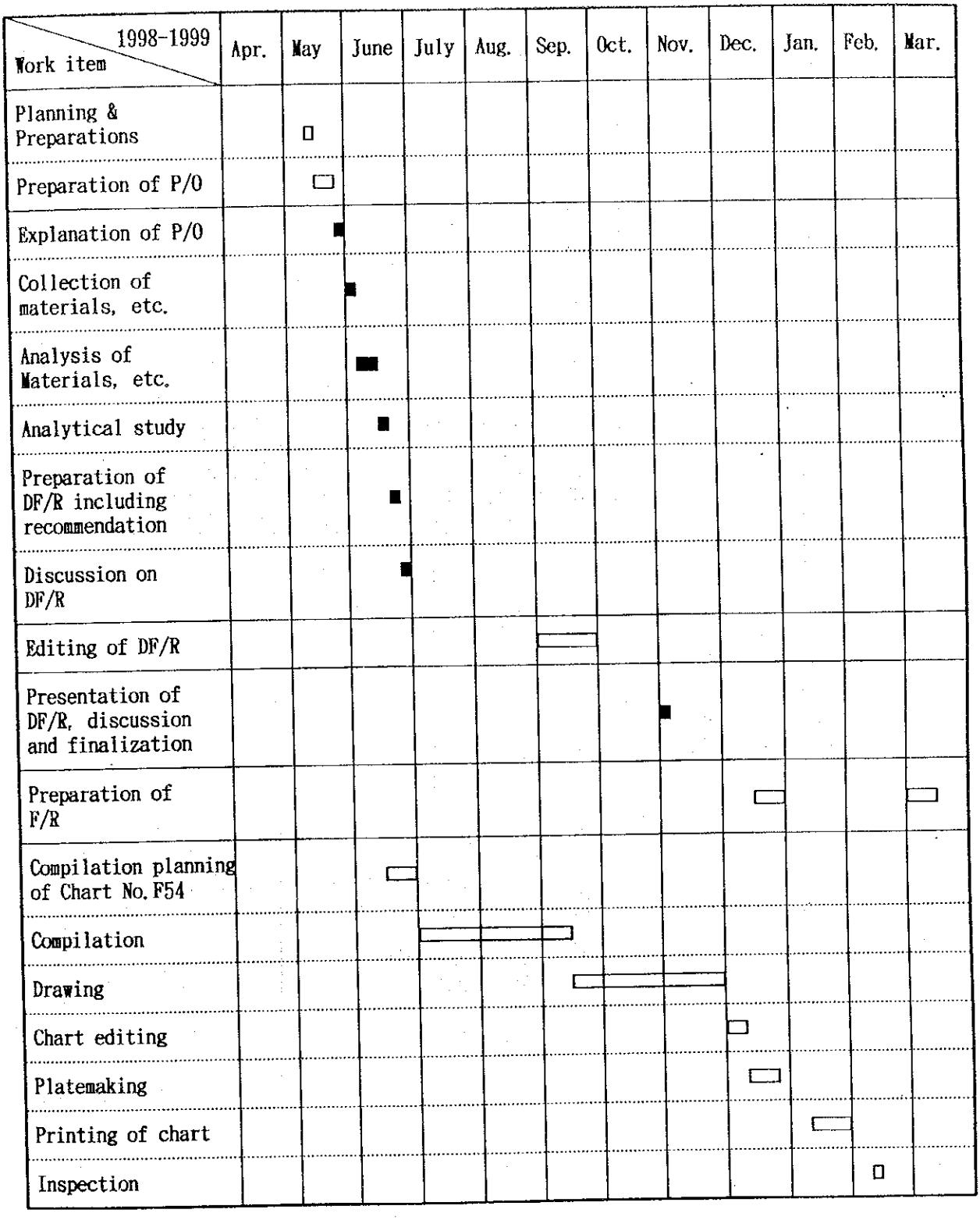
Part II - Preparation of Nautical Chart No. F54

Work by JHD in Japan (with participation of Fiji counterpart personnel)

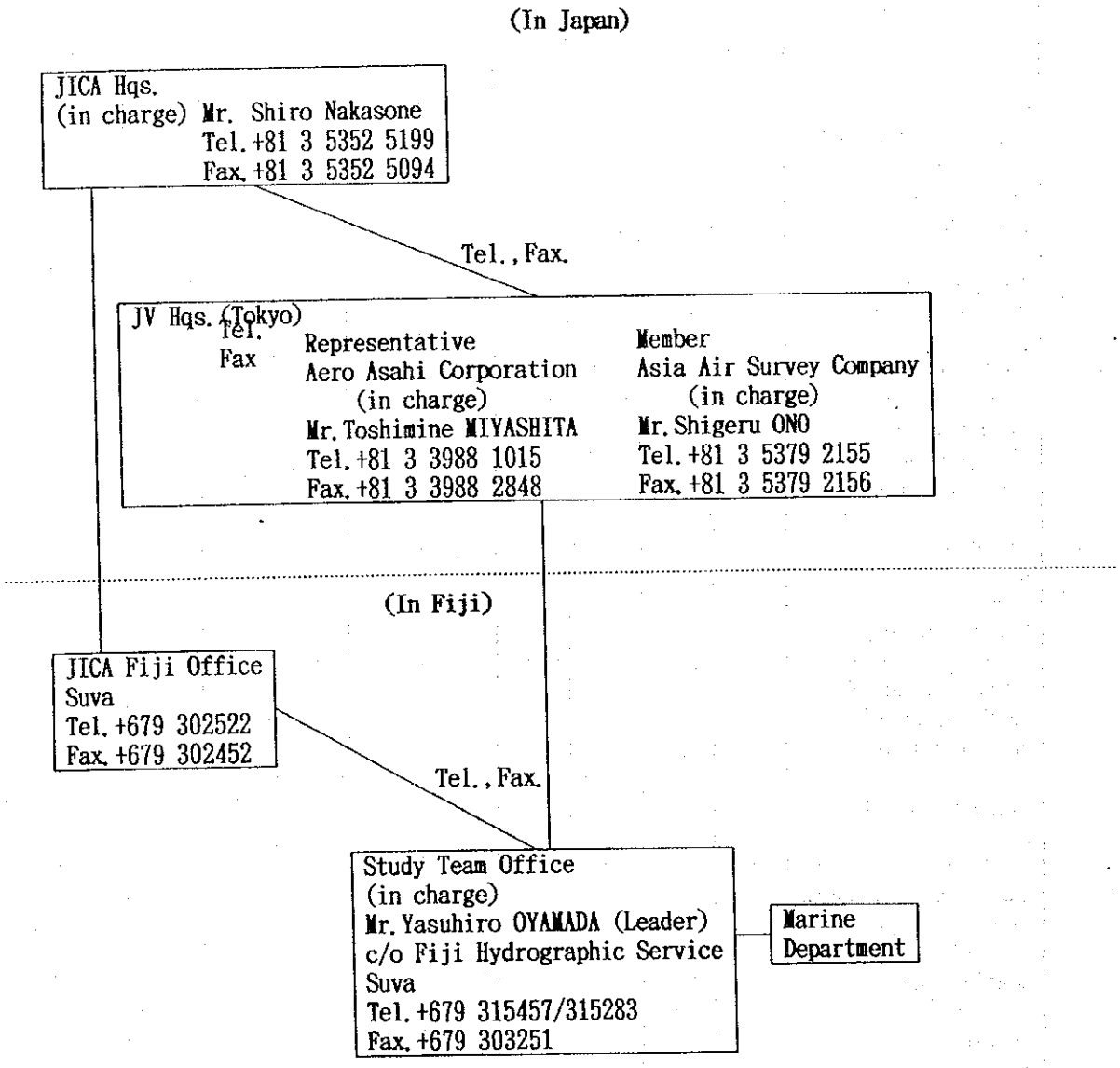


Appendix 2

WORK SCHEDULE FOR STUDY IN PHASE V



EMERGENCY COMMUNICATION NETWORK



APPENDIX 5-2-1

DIARY OF WORK (FIRST STAGE)

No. of Day	Date	Location	Work carried out
1	25/5 (Mon)	Lv. Narita	Oyamada left Narita for Suva.
2	26 (Tue)	Ar. Suva	Arrived in Suva via Nadi.
		Suva	Courtesy visit to Embassy of Japan and JICA Fiji Office. Visited FHS to deliver P/O-V, PR/R-IV and 200 copies of Chart No.F53.
3	27 (Wed)	"	Explanation and consultation of P/O-V at FHS. M/M prepared and signed. Discussion on work schedule.
4	28 (Thu)	"	Collected related materials, data and information at FHS.
5	29 (Fri)	"	Collected related materials, data and information at FHS.
6	30 (Sat)	"	Sorting of collected materials at hotel .
7	31 (Sun)	"	Rest.
8	1/6 (Mon)	"	Courtesy visit to Director of Marine. Collected related materials , data and information at FHS.
9	2 (Tue)	"	Collected related materials, data and information at FHS.
10	3 (Wed)	"	Collected related materials, data and information at FHS.
11	4 (Thu)	"	Collected related materials, data and information at FHS.
12	5 (Fri)	"	Collected related materials, data and information at FHS.
13	6 (Sat)	"	Sorting of collected materials at hotel.
14	7 (Sun)	"	Rest.
15	8 (Mon)	"	Collected necessary materials, data and information at the Bureau of Statistics, Government Printing Office and Marine Department. Analysis of data and information at FHS.

16	9/6	(Tue)	Suva	Collected necessary materials at the Marine Department. Analysis of data and information at FHS.
17	10	(Wed)	"	Attended a ceremony on arrival of a new government vessel. Analysis of data and information at FHS.
18	11	(Thu)	"	Analysis of data and information at FHS.
19	12	(Fri)	"	Started drafting of the Draft Final Report (DF/R) at FHS.
20	13	(Sat)	"	Continued drafting of DF/R at hotel.
21	14	(Sun)	"	Rest.
22	15	(Mon)	Nadi	Oyamada moved to Nadi. Chiba and Inazumi left Narita for Fiji
23	16	(Tue)	Suva	Chiba and Inaumi arrived at Nadi and moved to Suva with Oyamada. Courtesy call on Embassy of Japan and JICA Fiji Office. Visited FHS and consulted schedule of work.
24	17	(Wed)	"	Study Team examined DF/R at FHS.
25	18.	(Thu)	"	Study Team examined DF/R at FHS.
26	19	(Fri)	"	Study team prepare draft recommendations at FHS and examined.
27	20	(Sat)	"	Revised DFR at hotel.
28	21	(Sun)	"	Revised DF/R at hotel.
29	22	(Mon)	"	Draft recommendations were examined and discussed by FHS and Study Team at FHS.
30	23	(Tue)	"	DF/R was examined and discussed by FHS and Study Team at FHS. Transfer of technology to C/P on chart compilation at FHS.
31	24	(Wed)	"	Examined DF/R by FHS and Study Team at FHS. Transfer of technology to C/P on chart compilation at FHS.
32	25	(Thu)	"	Meeting held at FHS to conclude the 1st stage work. Transfer of technology to C/P on chart compilation at FHS.
33	26	(Fri)	"	M/M prepared and signed by the Chief Hydrographer of FHS and the Study Team Leader. Study Team edited DFR Transfer of technology to C/P on chart compilation at FHS.

34	27/6	(Sat)	Suva	Preparation for returning to Japan.
35	28	(Sun)	"	Rest.
36	29	(Mon)	Nadi	Moved to Nadi.
37	30	(Tue)	Brisbane	Oyamada left Nadi and arrived in Brisbane.
			Auckland	Chiba and Inazumi left Nadi and arrived in Auckland.
38	1/7	(Wed)		Oyamada left Brisbane and arrived at Narita.
				Chiba and Inazumi left Auckland and arrived at Narita.

APPENDIX 5-2-2

DIARY OF WORK (SECOND STAGE)

No. of Day	Date	Location	Work carried out
1	2/11 (Mon)	Lv. Narita	Left Narita for Suva.
2	3 (Tue)	Ar. Suva	Arrived in Suva via Nadi.
		Suva	Courtesy visit to Embassy of Japan and JICA Fiji Office.
			Visited FHS to deliver DF/R.
3	4 (Wed)	"	Examination and discussion on DF/R at FHS.
4	5 (Thu)	"	
5	6 (Fri)	"	
6	7 (Sat)	Brisbane	Moved to Brisbane via Nadi.
7	8 (Sun)		Left Brisbase and arrive at Nadi.

APPENDIX 5-5

MINUTES OF MEETING

ON

FINALIZATION OF DRAFT MAIN REPORT

VOLUME I AND ITS SUMMARY

FOR

THE STUDY ON THE PREPARATION OF NAUTICAL CHARTS

IN

THE NORTHERN LAU ISLANDS REGION

IN

THE REPUBLIC OF FIJI

SUVA, 05 NOVEMBER 1998

MR YASUHIRO OYAMADA
LEADER
STUDY TEAM
JAPAN INTERNATIONAL
CO-OPERATION AGENCY

MR F. R. MAHARAJ
CHIEF HYDROGRAPHER
FIJI HYDROGRAPHIC SERVICE
MARINE DEPARTMENT
MINISTRY OF
COMMUNICATION, WORKS
AND ENERGY

WITNESSED BY:

DR KUNIO YASHIMA
LEADER
ADVISORY TEAM
JAPAN INTERNATIONAL COOPERATION AGENCY

The Leader of the Study Team, Mr Yasuhiro OYAMADA, and the Leader of the Advisory Team, Dr Kunio YASHIMA, of the Japan International Cooperation Agency (JICA), visited the Republic of the Fiji Islands on 03 November 1998, to present and discuss the draft Main Report Volume I and its Summary on the Study on the Preparation of Nautical Charts in the Northern Lau Islands Region of the Republic of the Fiji Islands.

Meetings were held at the Fiji Hydrographic Service, Marine Department, Ministry of Communication, Works and Energy on 04 and 05 November 1998, to discuss the Main Report Volume I and its Summary.

The meeting resulted in the following points being agreed and confirmed between the JICA Study Team and Fiji Hydrographic Service.

1. The Main Report Volume I and its Summary were reviewed and discussed, resulting in the final draft being agreed upon. Corrections are noted in the attachment to these minutes.
2. It was also agreed that the Main Report Vol. I and its Summary will be utilised by the Republic of the Fiji Islands Government and not distributed to the general public until such a time that the Republic of the Fiji Islands Government sees it as fit to do so.

LIST OF ATTENDANTS

FIJI SIDE
(Fiji Hydrographic Service)

1.	Mr .F.R. MAHARAJ	Chief Hydrographer
2.	Mr. A. SILATOLU	Senior Hydrographer

JAPANESE SIDE

1.	Mr Yasuhiro OYAMADA	Leader of the Study Team, JICA
2.	Dr Kunio YASHIMA	Leader of the Advisory Team, JICA Director, Coastal Surveys and Cartography Division, Hydrographic Department, Japan Maritime Safety Agency

K. Y

CORRIGENDA TO MAIN REPORT VOLUME I

1. Page 1; line 10 from the bottom; for " Transport" to read: " Transport (renamed as the Ministry of Communication, Works and Energy as of August 1997)" .

2. Page 2; line 3: for " the Sovereign ... Fiji" to read " the Republic of the Fiji Islands"

3. Page 8; to replace by the separate sheet.

4. Page 10; line 5–6: for " Hydrographic matters, formulation" to read: " hydrographic matters. Formulation"

5. Page 10; line 11: for " International Hydrogrphic Bureau" to read " International Hydrographic Bureau (IHB)" .

6. Page 15; after line 8, insert : " FIG : Federation International de Geometres" .

7. Page 20; after line 3 from the bottom: insert the following line:
" The income from the sale of charts and others in 1997 amounted to about F$15,880" .

8. Page 24; after line 1: insert the following sentence:
" Major marine industries, i.e. maritime traffic, fisheries and tourism, which include movement of vessels at sea, were studied from the viewpoint of needs for nautical charts and other hydrographic services."

9. Page 30; lines 5–8 : to replace by the following lines:
" A survey has been made on the operation and management system of FHS which is responsible for planning, producing and maintaining nautical charts in Fiji. It focused on FHS's organisation, human resources (number of personnel, speciality, capability), facilities (survey ship, instruments for control point survey, hydrographic survey, oceanographic observation and cartographic work),"

10. Page 30; lines 12–16: to replace by the following lines:
" It is considered most probable that the maritime traffic, fisheries and tourism in Fiji will be more intensive in the future. This will create a greater need for modern nautical charts covering critical areas in passages, coastal waters, lagoons, ports and harbours for safer and more economical navigation. From this point of view, an analysis has been made on the existing status thus studied, and, in particular, on certain vital points in FHS's charting capabilities for such demands."

11. Page 30, lines 18–22; to replace by the following lines:
" In the analysis of the existing status of requirements for hydrographic products in Fiji, the following points have been taken into accout; demands from domestic and international shipping and other maritime activities, budgetary constraints, and limited availability of qualified personnel. It is noted that qualified personnel and suitable facilities are most important for FHS's more effective service.

12. Page 30, line 14 from the bottom: for " no staff doing his task" to read " no alternate"

13. Page 30, line 7 from the bottom: to replace by the following:
" It is also considered advisable that the number of Senior Technical/Technical Assistants will be" .

14. Page 31, line 4: to replace by the following:
" It is considered desirable that a survey vessel of medium type built for the specific purpose be provided."

15. Page 31, line 19: for " desirable" to read " also desirable" .

16. Page 31, lines 5–8 from the bottom: to replace the whole sentence by the following:
" It is considered essential that all the technical staff of FHS will be trained at appropriate training facilities abroad, or experts will be invited to carry out training programmes on the following subjects to maintain their technique and knowledge up–to–date:
(a) Basic hydrographic survey and nautical charting.
(b) Tide and tidal current observation and prediction.
(c) Swath survey technique and data processing.
(d) Position fixing by DGPS.
(e) Computer–aided programming of hydrogrphic survey operation and data processing.
(f) Computer–aided marine cartography.
(g) Basic knowledge on electronic navigation charts.

17. Page 31, bottom line: for " be" to read " will be" .

18. Page 32, top line: for " prediction be published" to read " prediction published" .

19. Page 32, line 11: for " noticed" to read " noted" .

20. Page 32, line 13: for " should" to read " will" .

21. Page 32, line 15: for " noticed that,the Senior Technical Assistant should ..." to read " advisable that the post of Senior Technical Assistant ..." .

22. Page 32, line 22: for " are better ...for this work." to read " will be better ... for these tasks." .

23. Page 32, line 13 from the bottom: for " If basic plan" to read " If a basic plan" .

24. Page 32, line 8 from the bottom: for " it is necessary" to read " it is considered necessary" .

25. Page 32, line 6 from the bottom: for " considered" to read " observed" .

26. Page 33, lines 8–9 from the botom: to replace by the following lines:
" It is advised that, as a follow–up scheme of the present JICA Study, the Fiji Government request the Government of Japan for the following technical cooperation matters:

K. Y.

Separate sheet

4-1-2. Functions of the Marine Department

To operate safely and efficiently, the maritime community required a uniform set of minimum standards that apply equally to all participants.

The role of the Marine Department is to provide those standards, monitor and promote compliance within them and, where necessary, take action against those that fail to meet the standards.

The Department is also responsible for ensuring that the maritime community has access to marine safety support services in the form of navigational aids, distress and safety radio system and maritime search and rescue, and is provided with an effective oil spill response capability.

In summary, the Marine Department's functions are as follows:

(1) to establish safety standards relating to entry into the maritime transport system, which promote safe shipping.

(2) to monitor adherence to the safety standards within the maritime transport system.

(3) ensure regular reviews of the maritime transport system to promote the improvement and development of its safety;

(4) to promote compliance with safety and marine pollution prevention standards in the maritime transport system;

(5) to ensure the provision of appropriate distress and safety radio communication systems, marine navigational aids and hydrographic services;

(6) to ensure Fiji's preparedness for, and ability to respond to marine oil pollution spills;

(7) to license vessels, their operation, and their crews;

(8) to ensure the occupational health and safety of seafarers;

(9) to promote safety in the maritime transport system by providing marine safety information and advice;

(10) to investigate and review maritime accidents and incidents;

(11) to maintain the Fiji Register of ships;

(12) to maintain and preserve records and documents relating to the department's functions;

(13) to advise the Minister on technical maritime safety policy;

(14) to perform such other functions as are conferred on it by the Marine Act or any other Act;

(15) providing technical advice and expertise.

The total number of officers and employees working in the Marine Department in 1997 was 557. The annual budget for 1997 was about F$8,064,000.

CORRIGENDA TO MAIN REPORT VOLUME I – SUMMARY

EXECUTIVE SUMMARY

Column : Existing status

I. 2.; for " and Technical" to read " and 5 Technical" .

III. 1.; to replace by the following line : " A limited number of modern instruments are available."

IV.; for " staff" to read " officers" .

V.; for " not exclusive use for" to read " is not exclusively used for" .

Column : Analysis and Assessment

I. 1.; for " should be assigned." to read " is desirable."

I. 2.; for " should be reduced to one or nil." to read " can be reduced to one."

I. 3.; for " should be equivalent to Senior Hydrographer. Also, the posts of cartographers of lower posts should be upgraded to harmony with the Hydrographic Survey Section." to read " can be justifiably upgraded to NS02 level. Also, the posts of cartographers of lower posts can be upgraded in harmony with the other posts within the Hydrographic Section."

I. 4.; for " should be handled exclusively by a staff" to read " can be handled exclusively by an officer" .

I. 5.; for " technical/technical assistants in the Hydrographic Survey Section should be" to read " senior technical/technical assistants in the Hydrographic Section can be"

II. 1.; for " should be worked out." to read " is desirable."

II. 2.; for " should be published for timely providing up-to-date" to read " be published for timely provision of up-to-date" .

II. 3.; for " should be" to read " will ideally be" .

II. 4.; for " should be" to read " will be" .

III.; for " SWATH survey in shallow water and a co-ordinategraph should be provided at" to read " swath survey in shallow water and a co-ordinategraph be provided to" .

IV.; for " staff" to read " officers" .

V.; for " should be replaced by a second-handed 200-500-ton survey vessel capable of carrying asurvey" to read " will preferably be replaced by a more affordable 200-500-ton survey vessel capable of carrying a survey" .

Column : DRAFT RECOMMENDATIONS

I. 1.; for " senior hydrographer" to read " senior hydrographer's post" .

II. 3.; for " Reference charts of the areas where surveys" to read " Publication of reference charts of the areas where survey" .

IV.; for " staff" to read " officers" .

K. Y

V.; for " used hydrographic" to read " hydrographic", and for " serviceable to support hydrographic survey activities by" to read " capable of supporting hydrographic survey activities of".

K.Y.

APPENDIX 5-6-1

PROGRAMME FOR COUNTERPART TRAINING ON PREPARATION OF NAUTICAL CHART

(Study on the Preparation of Nautical Charts in the Northern Lau Islands Region, Phase V)

Name of counterpart : Mr. Yauka Daveta Soro, Technical Officer I (Cartography), Fiji Hydrographic Service

Training period : 20 July to 19 December 1998

Note : HDMSA = Hydrographic Department of Maritime Safety Agency
ICO = International Cooperation Office of HDMSA
CCO = Chart Compilation Office of HDMSA

Date	Itinerary/Subject	Attendant	Venue
20 Jul. (Mon)	Leaves Fiji and arrives in Japan		
21 " (Tue)	Briefing at JICA	Coordinator	JICA
22 " (Wed)	Observation visit and orientation at HDMSA	ICO, CCO, Coordinator	Tsukiji
23 " (Thu) ~ 29 " (Wed)	Chart compilation planning (5 days)	Mr Shiga, Coordinator	do.
30 " (Thu) ~ 17 Aug.(Mon)	Chart compilation(37 days)	Mr Chiba, Coordinator	do
18 " (Tue) ~ 20 " (Thu)	Visit to Nicon Co. Ltd.	ICO	Zao-cho
21 " (Fri) ~ 22 Sep.(Tue)	Chart compilation	Mr Chiba, Coordinator	Tsukiji
23 " (Wed) ~ 25 " (Fri)	Observation tour	ICO	Himeji
28 " (Mon) ~ 29 " (Tue)	Chart compilation	Mr Chiba, Coordinator	Tsukiji

30 " (Wed) 〜 15 Oct.(Thu)	Chart drawing(34 days)	Mr Kurosaki, do. Coordinator
16 " (Fri)	Visit to Buyodo (printing factory)	CCO, Meguro Coordinator
19 Oct. (Mon) 〜 27 " (Tue)	Chart drawing	Mr.Kurosaki, Tsukiji Coordinator
28 " (Wed) 〜 30 " (Fri)	Observation tour	ICO Kashiwazaki
2 Nov.(Mon) 〜 24 " (Tue)	Chart drawing	Mr Kurosaki, Tsukiji Coordinator
26 " (Thu)	Visit to AAC Technical Center	ICO Kawagoe
25 " (Wed) 〜 1 Dec.(Tue)	Chart editing (4 days)	Mr Usui, do. Coordinator
2 " (Wed) 〜 8 " (Tue)	Block correction of chart (5 daysC)	Mr Hashikawa, do. Coordinator
9 " (Wed) 〜 16 " (Wed)	Plate making (6 days)	Mr Kuroda, do. Coordinator
17 " (Thu)	Preparation of report	ICO, do. Coordinator
18 " (Fri)	Evaluation meeting, closing ceremony	ICO, do. Coordinator
19 " (Sat)	Leaves for Fiji	

APPENDIX 5-6-2

PROGRAMME FOR COUNTERPART TRAINING ON HYDROGRAPHIC SURVEYING AND NAUTICAL CHARTING

(Study on the Preparation of Nautical Charts in the Northern Lau Islands Region, Phase V)

Name of counterpart : Mr. Felix Ranchor Maharaj, Chief Hydrographer, Fiji Hydrographic Service

Training period : 5 to 21 September 1998

Note : AAC-Aero Asahi Corporation AAS-Asia Air Survey Co.

Date	Itinerary/Subject	Attendant	Venue
5 Sep.(Sat)	Leaves Fiji		
6 " (Sun)	Arrives in Japan		
7 " (Mon)	Briefing and programme orientation at JICA Courtesy visit to Head Office of AAC and Head Office of AAS	Coordinator Mr Oyamada, Mr Ono	JICA Ikebukuro, Shinjuku
8 " (Tue)	Visit to Hydrographic Department, MSA, Curtesy call on Chief Hydrographer of Japan	Mr Oyamada, Coordinator	Tsukiji
9 " (Wed)	Visit to AAC Technical Center	Mr Oyamada, Mr Saito Coordinator	Kawagoe
10 " (Thu)	Moves to Maizuru by train Visit to Maritime Safety Training School	Mr Kato, Coordinator	Maizuru
11 " (Fri)	Moves to Kobe by train Visit to 5th Regional Maritime Safety Hqs. Moves to Kyoto by train	Mr Kato, Coordinator	Kobe, Kyoto
12 " (Sat)	Observation tour in Kyoto Moves to Tokyo by train	Coordinator	Tokyo
13 " (Sun)	Rest		do.
14 " (Mon)	Visit to AAC Technical Center	Mr Oyamada, Coordinator	Kawagoe
15 " (Tue)	Rest (National holiday)		Tokyo
16 " (Wed)	Visit to AAS Technical Center	Mr Ono, Mr Kuga, Coordinator	Atsugi

17 " (Thu)	Visit to Japan Marine Science and Technology Center	Mr Kuga, Coordinator	Yokosuka
18 Sep.(Fri)	Evaluation meeting; preparation of report	Coordinator	JICA
19 " (Sat)	Preparations for returning to Fiji		Tokyo
20 " (Sun)	Leaves Japan for Fiji		
21 " (Mon)	Arrivesin Fiji		

JICA