社会開発協力部報告書

No. 3

REPORT
ON
TOPOGRAPHIC MAPPING PROJECT
FOR
SATIPO AREA, DEPARTMENT OF JUNIN
THE REPUBLIC OF PERU
(Second Year Work)

Secondary Aerial Photography of the First Year
NNSS Observation
Traversing
Levelling

DECEMBER, 1983

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

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Letter of Transmittal

Mr. Keisuke Arita,
President
Japan International
Cooperation Agency

We are pleased to submit a report to you on the second-year work of the mapping project for Satipo area, Department of Junin, Peru which were entrusted by your Agency, conducted from April to December, 1983 and are now completed.

This report describes the contents of the field works (aerial photography, photoprocessing, control point survey by NNSS observation, traversing and levelling) performed under the project.

We believe that above works have been fully carried out as the basis for the subsequent works and made a great contribution to the development of the surveying technique in Peru.

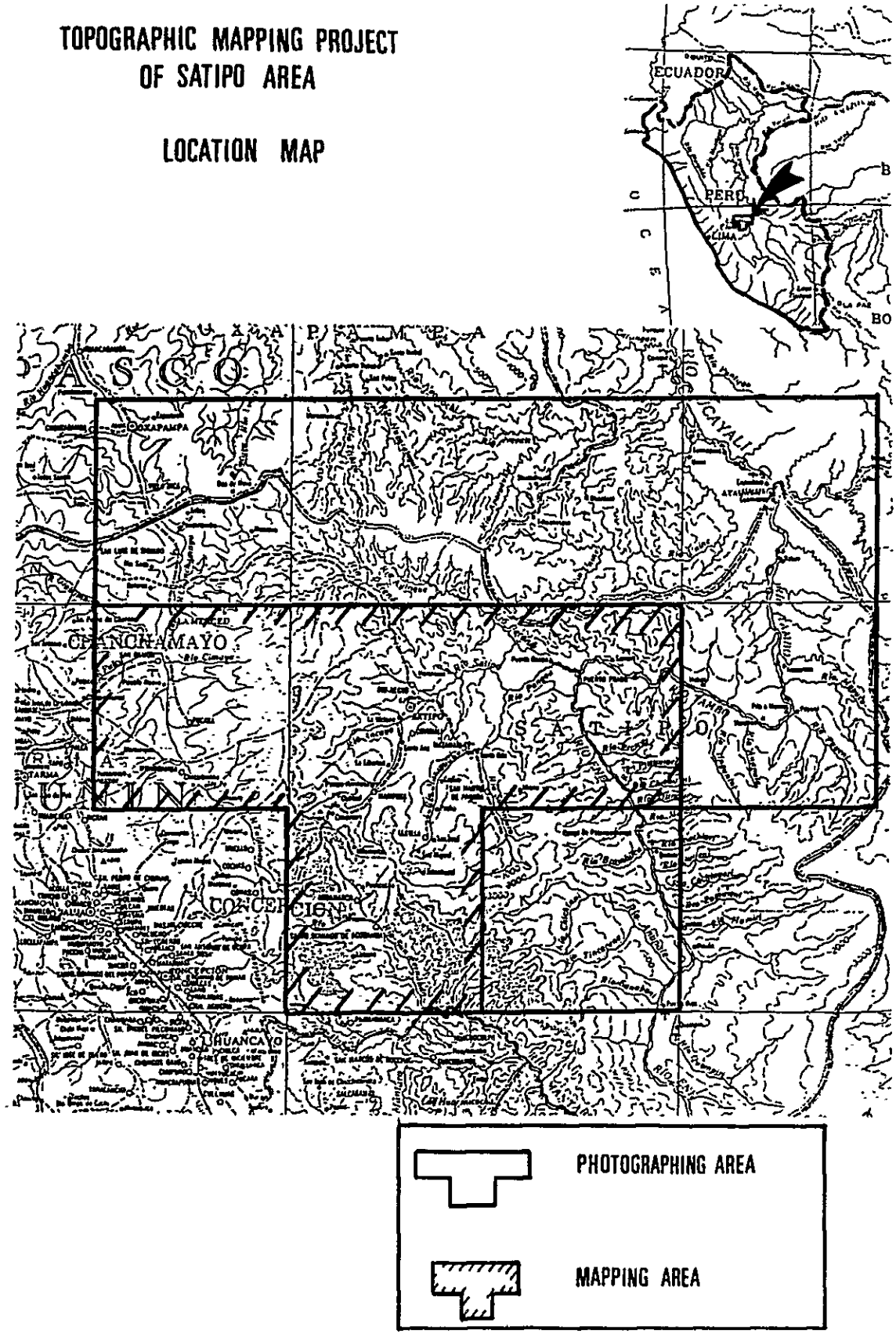
We would like to express our deep gratitude to the officials concerned of the Instituto Geografico Nacional (IGN) and other Peruvian authorities, the Japanese Embassy in Peru, the Japan International Cooperation Agency and other governmental organizations for their kind cooperations given in this survey. We hope that the third-year and subsequent surveys will be carried out smoothly.

M. Takasaki

Takasaki Masayoshi
Leader of Survey Team for
the topographic mapping project
of Satipo area, Department of
Junin, Peru
International Engineering
Consultants Association

TOPOGRAPHIC MAPPING PROJECT OF SATIPO AREA

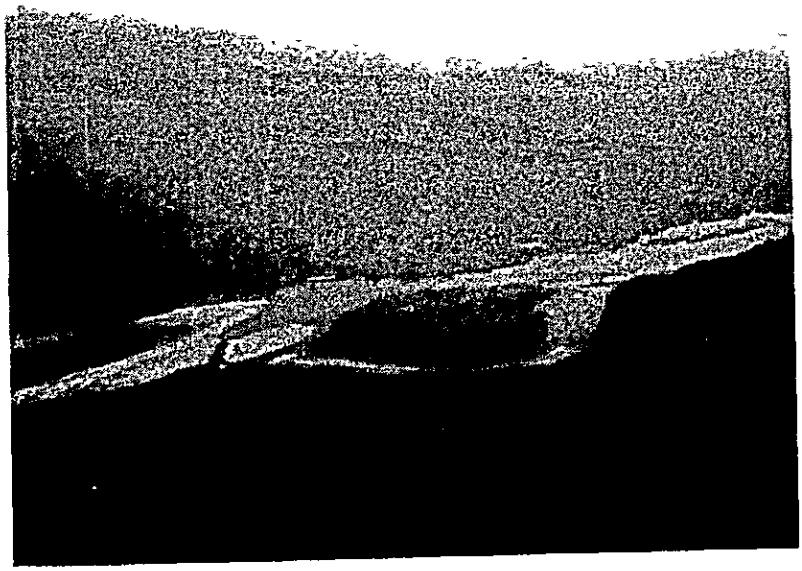
LOCATION MAP



General views of survey area.

High mountain area
4,000∿4,500 m high
(Chantimayo)

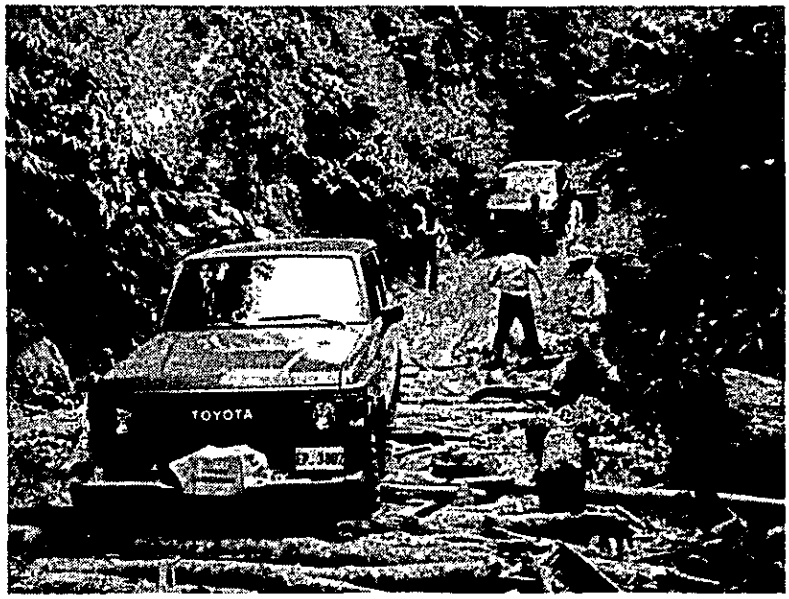
Mountainous area
adjacent to jungle
area at the upper
reach of Amazon River
(600∿1,000 m high)
(Satipo)



Jungle area untrodden
by men, 200∿400 m
high. (Ene River)

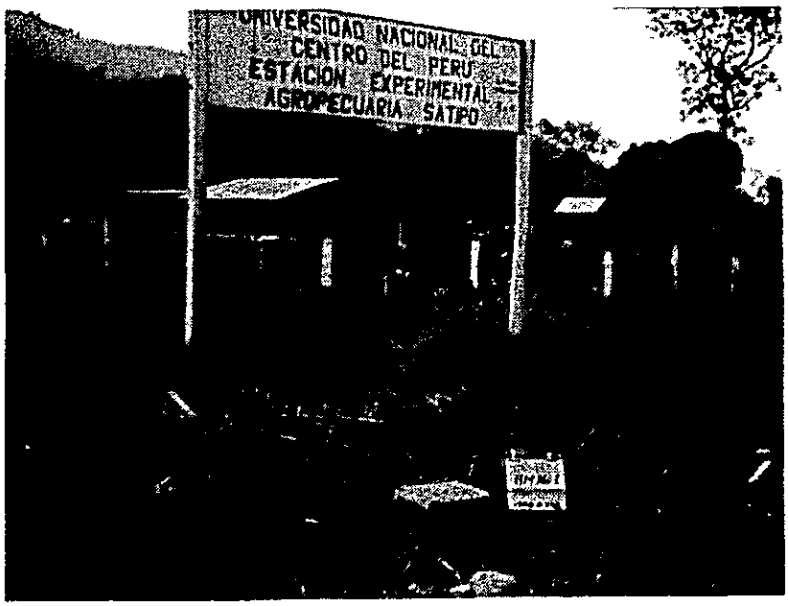
Making arrangements with the Peruvian counterpart prior to the field investigation.

A Cessana behind was used. (Satipo Airport)



Repair of a road destroyed by landslide. It was seen everywhere in the survey area.

(Near Yurinaki)



Monumenting point

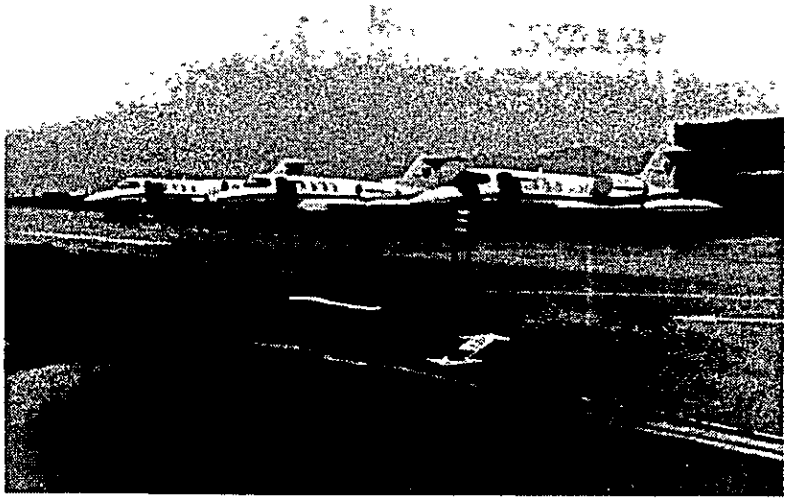
(10 NNSS points,
20 traversing points
20 bench marks

(Photo shows BM No. 1 near Satipo)

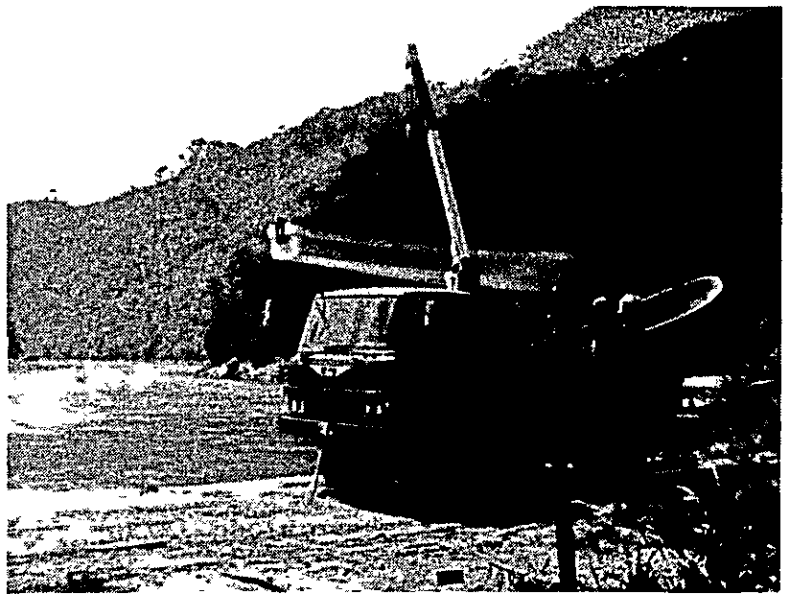
NNSS Observation at a place 4,500 m high above the sea level. (Tipe Cocha)

Felling in mountainous area. (Photo shows the existing point at Jutishe)

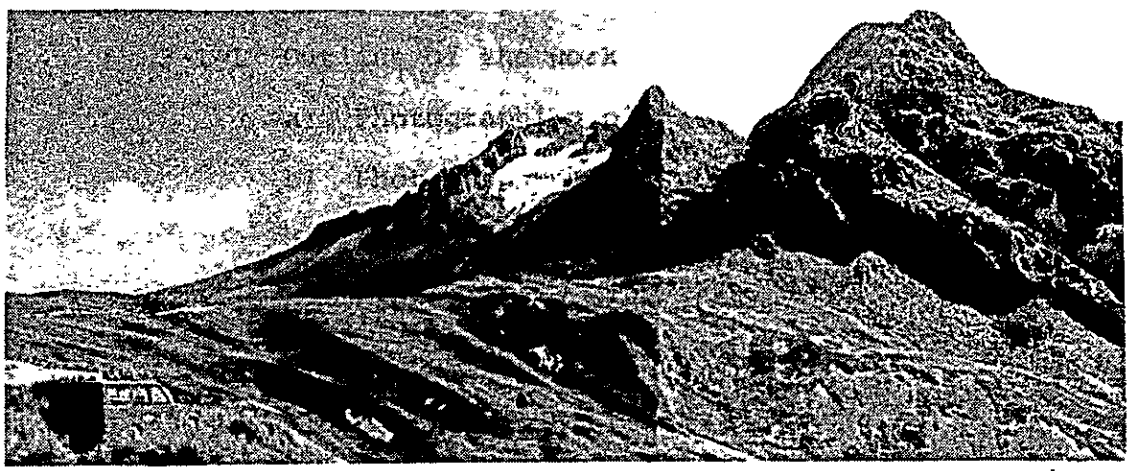
Investigation in Jungle area by artificial satellite observation group. (Puerto Ocopa)



Photographing planes.
Rear Jet 25B
Rear Jet 36A
(Las Parmas Airforce Base)



Loading boats by a crane car.
(Near Ipoki)



A land cruiser equipped with oxygen respirator running near the existing point at Juni. (4,500 m high above the sea level)

CONTENTS

1. Background

As regards the Topographic Mapping project for Satipo area, Department of Junin, Peru, conference was made by the contact mission in January, 1982, the preliminary survey was conducted from February to April, 1982 and S/W was signed between the Japanese and Peruvian governments.

In the first-year work, aerial photography was performed based on this S/W but it could not be completed due to extremely severe natural conditions at the work area.

In the secondary photographing of the first year work, aerial photography and photo processing of were made on the areas that had remained unfinished in the previous work. In the second-year work, the control point survey (NNSS observation, traversing and levelling) necessary for the map making was carried out.

2. Outline of the work

2-1 Purpose

The Satipo area, Department of Junin, Peru is rich in forestry. Some agricultural development projects are under way at this district. Further there are projects to develop electric power sources and construct power plants utilizing abundant water resources. But as the topographic map of this district necessary for these projects, there is only one series of maps on a scale of 1 to 450,000. Its contents are not enough as a map for these development plans. It was therefore decided to take aerial photographs on a scale of 1/60,000

over the area of 25,000 km^2, make a new map on a scale of 1 to 25,000, and complete the (national) basic map for the district.

2-2 Project area

The district for which a topographic map will be prepared under this project is located at about the central area of that country. The Andes Mountains are running in the west. Satipo is a remote and secluded area among the mountains near the jungles at the upper reaches of the Amazon River. The Perene River runs in the north of the survey area, and along this river, there is a national highway which leads to Lima from Satipo via San Ramon. Further another national highway runs from Satipo to Huancayo going over a 4,500m high mountain pass. These two routes are main roads at this area. Most villages are concentrating on these roads. The basins of the Tambo River and the Ene River that are tributary streams of the River Amazon are covered by thick forests, and there are available no other facilities of transportation than light aeroplanes and boats. Most of the region is jungle untrodden by men except for the villages scattering along this river.

2-3 Work period

Aerial photography and processing of photos: from April 8 to October 18, 1983.

Control point survey from June 19 to October 22, 1983.

2-4 Survey team members

Leader:	Masayoshi Takasaki
	June 21 - July 8 Oct. 9 - Oct. 22
Deputy Leader	Toshimasa Nagashima
	June 21 - Oct. 22
Coordinator:	Toshiyoshi Sou
	June 19 - Oct. 22
Mechanic:	Masahiro Kita
	June 19 - Oct. 22
Chief Surveyor	Daikichi Nakajima
	June 26 - Oct. 13
Surveyor (artificial satellite observation and levelling):	
	Kazunari Tanaka
	June 26 - Oct. 13
" (	"):
	Katsuyuki Hatakeyama
	June 26 - Oct. 13
Surveyor (artificial satellite observation and levelling):	
	Yoshihiro Toshima
	June 26 - Oct. 13
" (	"):
	Takeo Nagai
	June 26 - Oct. 13
" (	"):
	Nakao Shimizu
	June 26 - Oct. 13
" (	"):
	Toshiyuki Masui
	June 26 - Oct. 13

" (Traversing): Hideo Ishibashi
June 26 - Oct. 13

" ("): Shunji Onishi
June 26 - Oct. 13

" ("): Yoshinaga Oda
June 26 - Oct. 13

" ("): Shigeki Miyagijima
June 26 - Oct. 13

" ("): Etsuo Yamanaka
June 26 - Oct. 13

" ("): Takeshi Toyooka
June 26 - Oct. 13

Surveyor (Supervision of photographing):
Tadashi Muraki
April 8 - Oct. 18

" (Photo processing) : Shinichi Kono
April 8 - Oct. 18

2-5 Amount of the work

(1) Aerial photograpy
Area: 25,000km^2
Number of courses: 18
Number of photos: 720
Course extension: 3,357km
Scale: 1/60,000

(2) Control point survey

i) NNSS observation:

12 points (of which 2 points are the existing points)

(Translocation method) 10 newly established points.

ii) Third order traversing: 200km

Buried (at 10km intervals): 20 points

iii) Third order levelling: 80km

Buried (at 4km intervals): 20 points

2-6 Plan and enforcement

Work	Plan	Result	Ratio
Aerial photography	3,357km	1,449.5km	43.17%
NNSS Observation	12 points	12 points	100%
Traversing	200km	200km	100%
Levelling	80km	80km	100%

2-7 Main equipments

(1) Aerial photograpy

Camera: REAR JET 25B NO. 522, NO. 523

REAR JET 36A NO. 524, NO. 525

Navigation device: COLINS INS-61-B

LITTON 72

Aerial camera: WILD RC-10 NO. 2335

Lens: Universal Aviogon UAG II 1101

f=151.39mm

WILD RC-10A NO. 5017, NO. 5018

Lens: Universal Aviogon UAG A

NO. 13035 f=152.83mm

NO. 13044 f=152.76mm

NO. 13046 f=152.77mm

Film: Kodak PLUS-X Aerographic 2402

(2) Photo processing

Developer: Processing kit (rewind type) mfd. by Morse Co.

Printer : Log electronic printer

Drier : A-10 drum drier mfd. by Low Blower Co.

Processing chemicals:

Film developing:

Development solution: DK-50 by Kodak Co.

Fixing solution : Fixer by "

Stabilizer : Hypocleaning agent by Kodak Co.

Printing:

Development solution: D-72 by Kodak Co.

Stopping solution : 2% ice acetic acid

Fixing solution: : Fixer by Kodak Co.

Photographing paper:

Control point check : Single weight A20 No. 2 and No. 3 by Kodak Co.

For delivery : Double weight A20 No. 2 and No. 3 by Kodak Co.

(3) Control point survey

JMR-4AT Receiver	1 unit
JMR-4A Receiver	1 unit
Power supply	2 unit
Antenna set	2 set
Printer	2 unit
Cassette reader	1 unit
Signal simulator	1 unit
JMR-1 receiver set	2 set
Barometer Nekeretti & Sunbra Co. in England 1975/A	2 unit

Barometer (Aneroid)		3 unit
Ventilation psychrometer (SATO type)		4 unit
Shortwave radio transmitter and receiver (8,612 KHZ) JRC, ICOM		6 unit
Electronic computer	ACO2 system 350	1 unit
Theodolite WILD T2		2 unit
Light wave range finder	HP3808A	1 unit
"	HP3800B	1 unit
Levelling instrument	Sokki-sha B-2	3 unit
Steel tape		2 unit
Reflex mirror	mfd. by HP Co.	4 set
Heliotrope	mfd. by Tamaya	6 unit
Sun observation prism	WILD	1 unit
FM radio transmitter and receiver	mfd. by Shinwa	6 unit
Generator HONDA	EM2200	1 unit
" HONDA	EM 400	3 unit
Chain saw		3 unit
Oxygen respiratory device		3 unit
Life jacket		9 set
Tent		6 set
Four-wheel-drive wagon	(Toyota land cruiser) (from JICA)	6 unit
Four-wheel-drive truck	(Toyota land cruiser) (from JICA)	2 unit
"	(HINO middle type) (from JICA)	1 unit
Truck	(HINO middle type) (from JICA)	1 unit
Motor boat	(YAMAHA) (from JICA)	3 unit
Aeroplane (Cessna)	(Chartered)	1 plane

2-8 Schedule

Aerial photography

April 8, 1983 : Muraki and Kono leave Japan.

" 9, " : Arrival in Lima.

" 11, " : The contract negotiations starts.

" 15, " : Conclusion of the contract with Servico Aerofotografico Nacional (SAN).

June 7, 1983 : Kono leaves Lima to inspect the allocation conditions of SAN's meteorological observation staffs.

" 13, " : Kono returns to Lima.

September 2, 1983 : Report to the IGN director on the progress of photographing work.

October 14, 1983 : Inspection and reception of the products from SAN.

October 18, 1983 : Takasaki and Muraki sign the processings with SAN.
Muraki and Kono leave Lima.

" 19, " : Muraki and Kono returns to Japan.

Control point survey

June 19, 1983 : Sou and Kita leave Japan.

" 21, " : Arrival in Lima.
Suda, Technical Advisor, (The Geographical Survey Institute of the Ministry of Construction) and Ukiya, Advisor, (JICA),
Takasaki and Nagashima leave Japan.
Nagashima leave Japan.

" 22, " : They arrive in Lima.

" 23, " : A visit of courtesy to the Japanese Embassy at Lima. Making arrangements with the Lima Office of JICA. Explanation and discussion at Instituto Geografico Nacional (IGN) on the outline of the second-year control point survey work, etc.

" 26, " : Nakajima and 12 field investigation staffs leave Japan.

" 28, " : Arrival in Lima. Making arrangements with Lima Office of JICA.

" 29, " : Suda, Ukiya, Takasaki and Nagashima inspect the survey area (by land).

July 2, 1983 : Return to Lima (by air). Nakajima and 13 staffs leave Lima.

" 3, " : Arrival at Satipo.

" 4, " : Establishment of the Satipo Office. Discussions with IGN.

" 5, " : Signature of the proceedings with IGN.

" 6, " : Suda, Ukiya and Takasaki leave Lima. The field work begins.

" 7, " : Nagashima and Sou leave Lima and arrive at Satipo.

" 8, : Suda, Ukiya and Takasaki return to Japan.

" 12, " : Nagashima, Nakajima and counterparts investigate the survey area by a light aeroplane.

" 15, " : Observation starts by the artificial satellite observation group.

" 20, " : Monumentution starts by the traversing

group.

" 25, " : Observation starts by the traversing group.

August 12, 1983 : Point selection is completed by the traversing group.

September 6, 1983 : Observation starts by the levelling group.

" 7, " : Observation is complated by the artificial satellite observation group.

" 12, " : Monumentation is completed by the traversing group.

September 20, 1983 : Observation is completed by the traversing group.

" 23, " : Observation is completed by the levelling group.

October 1, 1983 : All members return to Lima (by land).

" 9, " : Masuda, technical advisor, Ukiya and Takasaki leave Japan.

" 10, " : They arrive in Lima.

" 11, " : A visit of courtesy to the Japanese Embassy at Lima, conference with the JICA Lima Office and discussion with IGN staffs on the results of the second-year survey and the contents of the third-year survey. Nakajima and 12 staffs leave Lima.

" 12, " : Discussions at IGN.

" 13, " : Discussions at IGN and SAN. Nakajima and 12 staffs return to Japan.

" 14, " : Masuda, Ukiya, Takasaki and Nagashima inspect the survey area (by land).

" 16, " : Return to Lima (by land).

" 17, " : Discussions at IGN and SAN.

" 18, " : Signature of the proceedings with IGN and presentation of automobiles and boats (at IGN).

" 19, " : Masuda, Ukiya, Takasaki and other 3 staffs leave Lima.

October 22, 1983 : Return to Japan.

2-9 Work supervision and inspection

During the field work period, the following persons visited Peru for supervision of the works and discussions with Peruvian Government.

Noriaki Suda: Chief of the Planning Section, Geodetic Department, the Geographical Survey Institute, Ministry of the Construction.
From June 21 to July 8, 1983.

Minoru Masuda: Assistant chief of the Planning Section, Geodetic Department, the Geographical Survey Institute, Ministry of the Construction.
From October 9 to October 22, 1983.

Akira Ukiya: Senior Staff, 1 st Development Survey Division, the Social Development Cooperation Department, the Japan International Cooperation Agency.
From June 21 to July 8, 1983, and from October 9 to October 22, 1983.

3. Field work

3-1 The secondary aerial photography of the first-year work

3-1-1 Outline of the work

a) Photographing plan

(1) The flight course was so set up as to be about parallel with the Andes Mountains with the meteorological conditions and topography of the survey area considered. Further the datum plane for flight for flat area was made different from that for mountainous area. (See the Fig. 1 and 2)

(2) The regulations for the photographing work was prepared based on the JICA's regulations for overseas survey works (for basic map).

b) Photographing contract

The International Engineering Consultants Association (IECA) began negotiations with Servico Aerofotografico Nacional (SAN) that was the only aerial photographing organization in Peru. Since the main contents of the contract are the same with those in the previous work, the contracting negotiations progressed without trouble and the contract was concluded smoothly on April 15, with all the requests from the Japanese side accepted.

c) Photographing base

Since the survey area has no airport where a jet plane can take off and land, the Las Palmas Air Force Base was used as the photographing base.

However taking off and landing are difficult due to fog, the Pucallpa Airport or the Tarapoto Airport was used.

d) Organization of staffs

The staffs of SAN engaged in this work are as follows.

Supervisor:

CORONEL.	M. SANCHEZ. M	
CAPITAN.	D. GAMMARRA. M	

Pilot:

CORONEL.	F. CHAVEZ. N	
COMANDANTE.	N. PEPPE. B	MAYOR. J. REYES. V

Photographer:

TECNICO	T. VILLEGAS
"	G. TIZON

Photo processing:

CORONEL	C. VINDROLA. F
CAPITAN	C. TASSARA. L

e) Weather observation staffs

IECA requested SAN to post a necessary and sufficient number of the weather observation staffs under the contract to grasp the weather conditions at the photographing area and not to miss any good opportunity of photographing. SAN, at request, placed weather observation staffs at Oxapanpa, Obenteni and Andamarca to set out the meteorological observation.

The observation staffs reported to the photographing base the weather conditions by radio at a one-hour interval starting from 07:00 a.m.

Photographing around Oxapanpa and Andamarca was completed on July 2nd, and the weather observation staffs were ordered to move to Villa Rica and Mariposa.

The weather observation staffs at Mariposa were moved

to Mazamari on August 12 to enhance the effects of weather observation taking the flight courses, the visual ranges due to topography, etc. into consideration.

Since the survey area has a largely different weather conditions according to topography, IECA requested SAN to increase the number of weather observation staffs and posted a staff along the Ene River on August 26.

f) Weather conditions

(1) The weather conditions over Peru are bad this year due to unusual, abnormal weather phenomenon (El niño phenomenon). The beginning of dry season got behind, and an unprecedentedly large flood occurred in the northern district.

(2) Under the influences of these abnormal phenomena, the survey area had bad weather conditions including unusual heavy rainfall.

3-1-2 Aerial Photography

a) Photographing

Since there is no appropriate map of this survey area available to the photographing navigation, an inertia navigation system of Litton 72 and Colins INS-61-B was used. The photographic flight was made by using the coordinates of the starting point and ending point of photographing as inputs into the inertia navigation system.

The navigation system was adjusted at the airport before taking off. But the error increased as time passed and the lag of the flight path was large making the aeroplane

sometimes advance into other paths.

Many clouds tend to occur over the survey area. Weather conditions changed rapidly and the photographic flights made based on the report by the weather observation staff that it was fine over the survey area often failed due to a rapid change of the weather. Immediately after photographing, the photos were processed and inspected, and re-photographing was ordered concerning the photos having scattered clouds on the principal point of photograph.

PEM automatic exposure meter was used for the exposure of the camera. The actual photographing time was about 2 hours 40 minutes per flight, because the flight altitude was as high as 12,120m and it took us 40 minutes in average to reach the photographing area from the airport (average distance: 300km).

Outline of the photographing work is as follows.

Number of days of photographing works:		175 days
The times of photographic flight:		24 times
Total flight time:		61 hours 01 minute
(Details)	Photographing:	9 times
	Flight time	25 hours 51 minutes
	Return:	15 times
	Flight time:	35 hours 10 minutes

b) Daily photographing report

Number	Date	Work condition	Flight	Remarks
1	Apr. 19	Preparation		cloudy
2	20	"		cloudy, partially rainy
3	21	"		"
4	22	"		"
5	23	"		"
6	24	"		cloudy
7	25	"		cloudy, partially rainy
8	26	Stand-by		cloudy
9	27	"		"
10	28	"		"
11	29	"		cloudy, partially rainy
12	30	"		"
13	May. 1			cloudy
14	2	"		"
15	3	"		"
16	4	"		cloudy, partially rainy
17	5	"		cloudy
18	6	"		cloudy, partially rainy
19	7	"		cloudy
20	8	"		cloudy, partially fine
21	9	"		cloudy, partially fine, partially rainy

Number	Date	Work condition	Flight	Remarks
22	May. 10	Stand-by		cloudy, partially fine
23	11	"		"
24	12	"		cloudy, partially rainy
25	13	"		"
26	14	"		"
27	15	"		cloudy, partially fine
28	16	"		cloudy, partially fine, partially rainy
29	17	"		cloudy
30	18	"		cloudy, partially fine
31	19	"		cloudy
32	20	"		cloudy, partially rainy
33	21	"		"
34	22	"		"
35	23	"		cloudy
36	24	"		cloudy, partially rainy
37	25	"		cloudy
38	26	"		cloudy, partially fine
39	27	Return	11:00 - 13:00 (2 hours)	fine, stratus, cumulus 4 (photographing impossible)
40	28	"	9:40 - 11:15 (1 hour 35 min.)	fine, cumulus 2, stratus 1, photographing impossible
41	29	Stand-by		fine, partially cloudy, partially rainy

Number	Date	Work condition	Flight	Remarks
42	May. 30	Stand-by		fine, partially cloudy, partially rainy
43	31	"		cloudy, partially rainy
44	June. 1	"		"
45	2	"		"
46	3	"		cloudy, partially fine
47	4	"		cloudy
48	5	"		"
49	6	"		cloudy, partially fine
50	7	"		"
51	8	"		"
52	9	"		cloudy, partially fine, partially rainy
53	10	"		"
54	11	"		cloudy,partially fine
55	12	"		cloudy, partially rainy
56	13	"		cloudy, partially fine
57	14	"		cloudy, partially fine, partially rainy
58	15	"		cloudy, partially rainy
59	16	"		cloudy, partially fine
60	17	"		"
61	18	"		fine, partially cloudy

Number	Date	Work condition	Flight	Remarks
62	June.19	Stand-by		fine, partially cloudy
63	20	"		"
64	21	Photograph-ing	8:50 - 11:35 (2 hours 45 min.)	L-23, 24, 25 106 photos
65	22	Stand-by		fine, partially cloudy
66	23	"		cloudy, partially fine
67	24	"		cloudy, partially fine, partially rainy
68	25	"		cloudy, partially fine
69	26	"		cloudy, partially fine, partially rainy
70	27	"		rainy
71	28	"		cloudy
72	29	"		"
73	30	Return	11:50 - 12:55 (1 hour 5 min.)	fine, cumulus 2 high cumulus photographing impossible
74	July. 1	Stand-by		fine, partially fine
75	2	Photograph-ing	7:15 - 11:05 (3 hours 50 min.)	L-20, 21, 22 150 photos
76	3	Return	11:10 - 12:25 (1 hour 15 min.)	fine, cumulus 2, photographing impossible
77	4	Stand-by		cloudy, partially fine
78	5	"		cloudy, partially fine, partially rainy

Number	Date	Work condition	Flight	Remarks
79	July. 6	Stand-by		cloudy, partially fine, partially rainy
80	7	Return	10:30 - 11:30 (1 hour 0 min.)	fine, stratus 4 photographing impossible
81	8	Stnad-by		cloudy, partially fine
82	9	"		"
83	10	"		"
84	11	"		cloudy partially rainy
85	12	"		"
86	13	Return	8:30 - 10:05 (1 hour 36 min.)	fine, high cumulus 2, photographing impossible
87	14	Stand-by		cloudy, partially fine
88	15	"		"
89	16	"		"
90	17	"		"
91	18	"		"
92	19	"		cloudy, partially rainy
93	20	"		cloudy, partially fine
94	21	Return	11:20 - 13:00 (1 hour 40 min.)	Fine, cumulus 2 photographing impossible
95	22	Stand-by		coludy, partially fine
96	23	"		"
97	24	"		"
98	25	"		"

Number	Date	Work condition	Flight	Remarks
99	July.26	Stand-by		cloudy, partially fine
100	27	"		cloudy, partially rainy
101	28	"		cloudy, partially rainy, partially fine
102	29	Photographing	7:55 - 10:07 (2 hours 12 min.)	L-12, 13 20 photos
103	30	Stand-by		cloudy
104	31	"		cloudy, partially fine
105	Aug. 1	"		cloudy, partially fine, partially rainy
106	2	"		cloudy partially rainy
107	3	"		cloudy, partially fine, partially rainy
108	4	"		cloudy, partially fine
109	5	"		"
110	6	"		"
111	7	Return	8:55 - 12:25 (3 hours 30 min.)	fine, cumulus 1 photographing impossible
112	8	Stand-by		cloudy, partially fine
113	9	"		"
114	10	"		cloudy
115	11	"		cloudy, partially rainy
116	12	"		clousy, partially fine

Number	Date	Work condition	Flight	Remarks
117	Aug. 13	Stand-by		cloudy, partially fine
118	14	"		cloudy, partially fine, partially rainy
119	15	"		cloudy
120	16	"		cloudy, partially rainy
121	17	Return	8:15 - 10:00 (1 hour 45 min.)	fine, cumulus 2 photographing impossible
122	18	Stand-by		cloudy, partially fine
123	19	"		cloudy, partially fine, partially rainy
124	20	"		cloudy
125	21	"		"
126	22	"		cloudy, partially fine
127	23	"		"
128	24	Photographing	9:50 - 12:40 (2 hours 50 min.) 8:00 - 10:15 (2 hours 15 min.)	L-12, 13, 15, 16 68 photos L-14 18 photos
129	25	Stand-by		cloudy, partially fine
130	26	"		"
131	27	"		cloudy, partially rainy
132	28	"		cloudy
133	29	"		cloudy, partially rainy
134	30	"		cloudy, partially fine

Number	Date	Work condition	Flight	Remarks
135	Aug. 31	Stand-by		cloudy, partially rainy
136	Sept. 1	"		rainy
137	2	"		cloudy
138	3	"		cloudy, partially rainy
139	4	"		cloudy, partially fine
140	5	Return	10:25 - 12:45 (2 hours 20 min.)	cloudy photographing impossible
141	6	Stand-by		cloudy, partially fine
142	7	"		"
143	8	"		cloudy, partially rainy
144	9	"		"
145	10	"		"
146	11	"		"
147	12	"		cloudy
148	13	Return	9:12 - 13:36 (4 hours 24 min.)	fine, cumulus 3 photographing impossible
149	14	"	8:58 - 11:12 (2 hours 14 min.)	fine, stratus, cumulus 2 photographing impossible
150	15	Photographing	8:53 - 10:37 (1 hour 44 min.)	L-7 9 photos
151	16	Stand-by		cloudy, partially rainy
152	17	"		cloudy, partially fine

Number	Date	Work condition	Flight	Remarks
153	Sept.18	Stand-by		coludy, partially fine
154	19	Return	9:00 - 12:30 (3 hours 30 min.)	cloudy photographing impossible
155	20	Stand-by		cloudy
156	21	Photograph-ing	9:40 - 13:15 (3 hours 35 min.)	L-11, 15 24 photos
157	22	Stand-by		cloudy, partially fine
158	23	"		"
159	24	Photograph-ing	8:20 - 11:30 (3 hours 10 min.)	L-13, 14, 15 59 photos
160	25	"	8:10 - 11:40 (3 hours 30 min.)	L-7, 8, 9 51 photos
161	26	Stand-by		cloudy, partially fine
162	27	Return	10:15 - 12:50 (2 hours 35 min.)	fine, cumulus 1 high cumulus 3 photographing impossible
163	28	Stand-by		cloudy, partially fine partially rainy
164	29	Return	8:34 - 13:15 (4 hours 41 min.)	fine high cumulus 1, photographing impossible
165	30	Stand-by		cloudy, partially fine, partially rainy
166	Oct. 1	"		cloudy, partially rainy
167	2	"		"
168	3	"		cloudy, partially fine
169	4	"		"

Number	Date	Work condition	Flight	Remarks
170	Oct. 5	Stand-by		cloudy, partially rainy, partially fine
171	6	"		cloudy, partially fine
172	7	"		cloudy, partially rainy
173	8	"		cloudy, partially fine
174	9	"		cloudy
175	10	"		

C) Meteorological observation records

Observation point	Weather / month	Very fine		Fine		Cloudy		Rainy		Total
Andamarca	May	2.0 days	6.7%	6.5 days	21.7%	21.0 days	70.0%	0.5 days	1.6%	30.0 days
	June	1.5	5.0	11.0	36.7	15.5	51.7	2.0	6.6	30.0
	July	2.0	66.7	1.0	33.3	0.0	0.0	0.0	0.0	3.0
	Total	5.5	8.7	18.5	29.4	36.5	57.9	2.5	4.0	63.0
Mariposa	July	0.5	2.1	7.0	29.2	14.0	58.3	2.5	10.4	24.0
	August	1.0	12.5	4.0	50.0	3.0	37.5	0	0.0	8.0
	Total	1.5	4.7	11.0	34.4	17.0	53.1	2.5	7.8	32.0
Mazamari	August	0.0	0.0	9.5	47.5	9.5	47.5	1.0	5.0	20.0
	September	0.5	1.7	10.0	33.3	17.5	58.3	2.0	6.7	30.0
	October	0.0	0.0	3.0	33.3	5.5	61.1	0.5	5.6	9.0
	Total	0.5	0.9	22.5	38.1	32.5	55.1	3.5	5.9	59.0
Oxapampa	May	0.0	0.0	9.5	31.7	18.5	61.7	2.0	6.6	30.0
	June	0.5	1.7	13.5	45.0	15.5	51.7	0.5	1.6	30.0
	July	0.5	1.6	14.5	46.8	15.5	50.0	0.5	1.6	31.0
	August	0.0	0.0	2.0	25.0	6.0	75.0	0.0	0.0	8.0
	Total	1.0	1.0	39.5	39.9	55.5	56.1	3.0	3.0	99.0
Villa Rica	August	0.0	0.0	1.5	6.5	20.5	89.1	1.0	4.4	23.0
	September	0.0	0.0	6.5	21.7	21.5	71.7	2.0	6.6	30.0
	October	0.0	0.0	1.0	11.1	7.5	83.3	0.5	5.6	9.0
	Total	0.0	0.0	9.0	14.5	49.5	79.8	3.5	5.7	62.0

Observation point	Weather / Month	Very fine		Fine		Cloudy		Rainy		Total
Obenteni	May	0.0 days	0.0 %	3.0 days	10.7 %	21.0 days	75.0 %	4.0 days	14.3 %	28.0 days
	June	0.0	0.0	6.0	20.0	20.0	66.7	4.0	13.3	30.0
	July	0.0	0.0	6.0	19.4	24.0	77.4	1.0	3.2	31.0
	August	0.0	0.0	6.5	21.0	23.5	75.8	1.0	3.2	31.0
	September	0.0	0.0	6.0	20.0	21.0	70.0	3.0	10.0	30.0
	October	0.0	0.0	0.5	5.6	8.5	94.4	0.0	0.0	9.0
	Total	0.0	0.0	28.0	17.6	118.0	74.2	13.0	8.2	159.0
Puerto ocopa	August	0.0	0.0	1.5	30.0	3.5	70.0	0.0	0.0	5.0
	September	0.0	0.0	2.5	20.8	9.0	75.0	0.5	4.2	12.0
	Total	0.0	0.0	4.0	23.5	12.5	73.5	0.5	3.0	17.0
Mision	September	0.0	0.0	0.5	8.3	5.5	91.7	0.0	0.0	6.0
Total observation point	Total	8.5	1.7	133.0	26.8	327.0	65.8	28.5	5.7	497.0

3-1-3 Photo processing

a) Photo processing

After photographing, the films were developed immediately.

As the rewind development method was adopted, enough leader was taken to prevent developing marks.

b) Temporary check

Contact prints for orientation were mosaicked per course and fixed by tape, and checked for clouds, side laps and other obstacles to the subsequent processes. If there were any photos against the rules, re-photographing was ordered promptly. The mosaic photo chart of LANDSAT image was used for confirming the range of photography and plotting the positions of principal points of photographs. Contact prints for precision check were prepared for the photograph parts which passed the temporary check, and precision check was made according to the specifications based on the JICA's regulations for overseas survey work (for basic map) and then a accuracy control sheet was prepared. For this accuracy control sheet, the above work regulations were translated into English and used.

No measurement of ψ and ω could be made as RC-10 and RC-10A cameras had no level on the picture. It was decided to be made after returning home.

Check of the flight altitude based on the photos was also difficult as the map used for orientation was not precise and does not bear elevations.

There were two main reasons for re-photographing as

follows.

(1) The lag of the flight path is large.

(2) There are many clouds and shadows of clouds in the photos, some of which had clouds on the principal points.

3-1-4 Results of photographing

Preparations for photographing started from April 19, and photographing was made up to October 9. But weather was bad and the team could not complete all the flight courses scheduled.

The photographing results in this year are as follows, and the index map is shown in the Fig. 3.

Number of film rolls used: 2 rolls

Number of photographs taken: 505 sheets

Number of the final photos adopted: 377 "

Number of photos taken according to flight courses is shown in Table 1.

Table-1 Number of photographs taken according to flight courses

Course No.	Photo No.	Editing No.	Number
L-7 A	513 - 520	1 - 8	8
L-7 B	380 - 376	1 - 5	5
L-8 A	479 - 487	1 - 11	11
L-9 A	474 - 481	1 - 8	8
L-12 A	362 - 350	1 - 13	13
L-12 B	272 - 262	1 - 11	11
L-13 A	275 - 279	1 - 5	5
L-13 B	280 - 290	1 - 11	11
L-14 A	459 - 468	1 - 10	10
L-15 A	325 - 309	1 - 17	17
L-15 B	411 - 432	1 - 22	22
L-16 A	327 - 342	1 - 16	16
L-16 B	457 - 436	1 - 22	22
L-20	213 - 256	1 - 44	44
L-21	205 - 165	1 - 41	41
L-22	112 - 149	1 - 38	38
L-23	3 - 35	1 - 33	33
L-24	68 - 37	1 - 32	32
L-25	74 - 103	1 - 30	30
		Total	377

3-2. The second year work (Control point survey)

3-2-1 Outline of the Work

a) Preparations for work

Sou and Kita left Japan on June 19, 1983 for making preparations for the work and maintenance of vehicles. Immediately after arrival in Lima, they confirmed the vehicles and began to service them. At the same time, they received the materials and equipment sent from Japan, made arrangements for employment of the drivers, purchase of some equipments and materials and the necessary transactions with banks.

b) Arrangement (the headquarters and base camp)

The headquarters office was set up at the following address in Satipo. Satipo is one of the important cities in the Department of Junin. It serves as a collecting place of agricultural products, and also as a base to enter into the jungle area expanding in the east.

Address: COLONOS FUNDADORES NO. 496,

SATIPO, PERU

The base camp was set up at a place within Satipo within 2 minutes' walk from the headquarters office. Further a subcamp was set up at Tarma, San Lamon.

c) Communications

Regular communications were made among the headquarters, the subcamp and JMR group using a short wave radio carried from Japan.

d) Issuance of ID cards

IGN issued an I.D. card to every member of the survey team. Every member always carried it.

3-2-2 NNSS observation

a) Point distrebutions

The observation points by the artificial satellite were set up mainly for the purpose of making them available as the control points for the subsequent aerial triangulation. A total of 12 points including 2 existing control points were set up for conversion of the coordinates values of the newly established control points into the geodetic coordinates system of Peru.

b) Point selection

Point selection of the newly established points was made taking into considerations preservation of the monumentations, easiness of access, topographical conditions, etc. The cooperations of IGN counterparts were always obtained in this work. (See theFig. 4)

c) Monumentation

The newly established points were monumented according to the specifications discussed and decided in advance with IGN. Over-all cooperation of the IGN counterparts was obtained in the monumentation work. A list of the monumented points was prepared. (See the Fig. 7)

d) Observation

The positions of the control points were observed by NNSS system, by using a total of 3 units of observation equipments of JMR-1, JMR-4A and JMR-4AT. (Except one spare unit)

The translocation system for observing 3 points at the same time was adopted to determine the relative positions to the existing points. But in the latter half of the work,

JMR-4A type got out of order and a spare JMR-1 type also did not operate normally. So the team made observation by switching over to the translocation system for observing 2 points at the same time.

The observation was made continuously for 24 hours, but it took 6 days in average for observation of 1 block as the topographical conditions were sometimes bad at the mountainous areas, and the team could sometimes observe only a small number of artificial satellites.

The signal reception conditions at each point are as follows.

	Jutishe	No.5	No.9	No.5	No.6	No.8
Observing instrument	type 1	type 4A	type 4AT	type 1	type 4AT	type 4A
Observed number	40	36	34	45	27	34
Effective number	25	25	25	22	22	22
	No.9	No.10	No.11	No.11	No.7	No.12
Observing instrument	type 4AT	type 1	type 4A	type 1	type 4AT	type 4A
Observed number	53	57	29	41	41	47
Effective number	27	27	27	24	24	24
	Astoro fix			Astro fix		
	Atalaya	No.3		Atalaya	No.4	
Observing instrument	type 1	type 4AT		type 1	type 4AT	
Observed number	54	47		48	45	
Effective number	35	35		44	44	

*Observed number: Number of signals received at good conditions.

Effective number: Number used for translocation.

3-2-3 Traversing

a) Point distribution plan

The traverse points were established mainly for the purpose of using them as the control points for the subsequent aerial triangulation. Connecting traverse was planned for an extension of about 200km from Satipo to Tarma where no existing control points were set up. It was decided that, in the traverse route, 20 regular traverse points be monumented and the third order traversing be made for 50 points including the traverse turning points. (See the Fig. 5)

b) Point selection

Starting from the existing point JUTISHE, the point selection was made as along the national highway as possible. Initially the closing point was planned to be established at Paclla Punta in the north of Tarma, but it was changed to Juni 20km south of Tarma because the existing control points were found unknown as a result of survey. Further point selection was made so as to pass through the 2 newly established JMR points.

Attention was paid to the following in newly setting up the regular traverse points.

(1) The positions must be easily utilized as the given points for various control point surveys.

(2) The positions of monumentation must be discovered easily, and must be the places suitable for preservation.

(3) The positions must be identified easily as the control points for aerial triangulation, and must

be the places where pricking is easy.

c) Monumentation

Monumentation of the regular traverse points was made according to the specifications discussed and decided in advance with IGN. Over-all cooperation of the IGN counterparts was obtained in the monumenting. Azimuth marks were monumented in order that these regular traverse points might be utilized effectively in future. The monumenting and engraving methods were decided by consulting with the IGN counterparts. A list of the monumented regular points and azimuth marks was prepared. (See the Fig. 7 and 8)

b) Observation

1) Distance measurement

A Huelette Packard distance meter was used. 2 sets were measured for each side. Difference between the 2 sets was within 1/40,000.

2) Horizontal angle observation

The observation points were decided to be 54 points including existing control points, newly established JMR points, regular traverse points, azimuth marks and nodal points. In order to check th horizontal angle, observation staffs were shifted at the whole points except for 2 existing control points, and 2 sets of angles (0° and 90°) in the onward direction and those (45° and 135°) in the backward direction were measured. The conditions at 360° were checked at each measured point. As for the limits of observation, a double angle difference of 12 seconds and observation difference of 7 seconds were adopted, and the limits of the second order

control point survey were applied. A signal lamp was used as the target mark.

3) Vertical angle observation

One set observation was made in both directions. The error of instrumental constant was 10 seconds. As in the case of horizontal angle, the observation staffs were shifted to improve the precision.

4) Astronomical observation

Since the existing control points that serve as a given point at the starting point and the closing point were lost or unknown, the direction observation by the sum was made. The same observation was also made at JMR No. 9 and No. 10 newly established in the traverse route. A solar prism was used in the observation. The observation was made by 3 sets (0°, 60°, 120°), (20°, 80°, 140°) and (40°, 100, 160,) at the existing control point, and by 2 sets (0°, 60°, 120°), and (30°, 90°, 150°) at JMR point.

5) Levelling

In order to determine the elevation of newly set-up traverse points, the differencial levelling was made at 8 points with the existing bench marks established in the trunk line used as the given data. The observed points were No. 1, No. 506, No. 8, AUX-6, AUX-9 AUX- 11 and No. 19. The discrepancy of levelling was $20^{mm}\sqrt{S}$ (S: one-way distance in km).

3-2-4 Levelling

a) Point distribution plan

In Satipo area 46 km levelling (11 bench marks) and in San

Ramon area 34 km levelling (9 bench marks) were planned for replenishing the control points for aerial triangulation and the levelling network. (See the Fig. 6)

b) Point selection

Cooperation of the IGN counterparts was always obtained in the point selection of newly established points. The places suitable for preservation of the monumentation and easy pricking were selected.

c) Monumentation

Bench marks were monumented according to the specifications decided in advance with IGN. (See the Fig. 8)
Description of point was prepared for the monumented points.

d) Observation

Observation was made by using an automatic level. The staff distance was within 70m. Fixed points were set up as far as possible to check the closure divergence. During the observation, some fixed points were broken by buldozers for repair or the roads. Fixed points could not sometimes be set up due to the frequent road expanding works. The closure divergence was $10^{mm}\sqrt{S}$.

3-2-5 Calculations

a) NNSS observation

The purpose of distributing new control points by NNSS observation is to supplement for shortage of the existing control points, and the results must be consolidated into the existing geodetic coordinates of the survey area. In this observation, the translocation method was executed using the

control point --- Astoro Fix Atalaya and Jutishe. Thus the geographical coordinates by the NNSS system determined on the WGS-72 spheroid was converted into the South American datum station system (the international spheroid was used.)

Translocation results

Block	Point	Lat			Lon			H	Note
	No. 9	°	'	"	°	'	"	m	
1	No. 10	- 10	55	47.046	- 75	14	39.899	893.20	
	No. 11	- 11	21	24.850	- 75	19	25.924	1477.77	
	No. 2	- 11	08	26.830	- 74	30	0.579	1444.00	Jutishe
2	No. 5	- 11	28	21.381	- 74	28	37.115	1008.23	
	No. 9	- 10	55	39.926	- 74	52	38.315	607.83	
	No. 5								
3	No. 6	- 11	43	30.478	- 74	47	56.823	2505.11	
	No. 8	- 12	00	03.706	- 74	54	51.228	3676.60	
	No. 11								
4	No. 12	- 11	35	05.305	- 75	26	46.669	4489.65	
	No. 7	- 11	42	57.431	- 75	04	44.594	3326.39	
5	No. 1	- 10	43	49.9153	- 73	45	02.2467	235.46	Astro Fix Atalaya
	No. 3	- 11	12	30.501	- 73	54	53.307	293.86	
6	No. 1								Astro Fix Atalaya
	No. 4	- 11	40	15.413	- 74	01	11.495	367.30	

- No. 1 (Astro Fix Atalaya)
- No. 2 (Jutishe)
- Calculation of No. 1 block was made after calculation of No. 2 block was completed.

b) Traversing

1) Rough calculations at the site

The coordinates calculations were made by using the horizontal angle observed and the distances which were corrected as to meteorology, inclination and projection. Further the azimuth by the sun was calculated to check the closure of angle.

The elevation was calculated by using the heights above the sea level as given data, which were determined by the

differential levelling from a bench mark to a triangulation station. The closure date are shown in the attached table.

2) Final calculations

i) The results of each point were calculated by the single route with the coordinates of Jutishe and Juni fixed. JMR No. 9 and No. 10 were not used as given point. The geodetic results calculated are all based on the existing control points. Therefore two different results were tabulated concerning these points.

ii) The elevation was calculated pursuant to the rough calculations made at the site with the 8 direct levelling points used as given point. By the way, the results of the existing control points (Jutishe and Juni) were renewed as the values in this calculation.

c) Levelling

The elevation of each point was calculated based on the table of the existing bench mark results.

Closing error of relative height

Division	Number of points	ΣS^2	Closing error	limits	Remarks
Jutishe - No.1	points 2	k 50.30	m - 1.03	± m 0.21	Results 1444.00 Measured 1442.97 (Calculation)
No.1 - No.3	3	58.10	- 0.04	± 0.22	
No.3 - 506	8	186.52	+ 0.02	± 0.40	
506 - No.8	2	77.90	+ 0.24	± 0.26	
No.8 - AUX-6	6	160.17	- 0.10	± 0.37	
AUX-6 - AUX-9	9	119.35	- 0.16	± 0.32	
AUX-9 - AUX-11	6	148.61	+ 0.15	± 0.36	
AUX-11 - No.19	4	103.81	- 0.09	± 0.30	
No.19 - JUNI	4	76.90	+ 1.37	± 0.26	Results 4470.10 Measured 4471.47 (Calculation)

Limits: $3^{cm}\sqrt{\Sigma S^2}$

4. Suggestions on the third-year work

As a result of consultation with Technical Advisor at the site, it is scheduled that the third-year work will carry out the aerial photography left incomplete in the second-year work, the field identification, pricking, aerial triangulation and plotting.

As a result of analysis of the survey results in the first-year and second-year works and the collected relevant materials, the suggestions on the third-year work are as follows.

1 Aerial photograpy

(1) A period from April to early October is the best for aerial photography including its preparations.

(2) Weather changes rapidly at this survey area. Clouds occurrence rate is high at the areas not photographed yet. So careful weather observation is essential. Stationing of Japanese weather observation staffs is necessary for rapider reports on the weather observation results and prompter photographic flights.

(3) Even in the case it seems difficult to take photographs over the entire course, photographic flights must be made if it is possible to take at least 8 photos.

(4) Photographing is possible when the sun altitude is more than 30° at the mountainous area, and more than 25° at the plane part. The volume of clouds is preferably less than 5% in case of photos having

no clouds on their principal points. In view of special weather conditions at the survey area, however, it is also considered necessary to ease the above photographing requirements within the scope of not hindering the stereo plotting.

2. The field identification and pricking.

(1) At this area, the weather becomes bad gradually from early September, and traffic is sometimes regulated at the mountainous area due to disasters by heavy rainfall. Therefore it is desirable to set out the work from the mountainous area.

(2) In the mapping area are distributed 7 existing control points, which must be utilized effectively to improve the accuracy of the subsequent aerial triangulation.

It is confirmed that one of these existing points is lost, but the other points are not yet surveyed and remain to be confirmed.

In the third-year work, confirmation and pricking of these existing control points are important. They will have large effects on the subsequent works.

(3) In the mapping area, road conditions are bad, and the field identification over the entire area is difficult. Therefore regarding the inaccessible forest areas, it is necessary to extract a typical vegetation area and prepare a photo-interpretation key using an aeroplane.

(4) The second-year work were faciliated by active

cooperation and support of IGN personnel. It is desirable that the third-year work will also be performed under a close cooperation system based on the relations of deep mutual understanding and reliance between Japan and Peru established through keeping close contact with each other.

FIGURES

Fig 1. Flight Plan Map

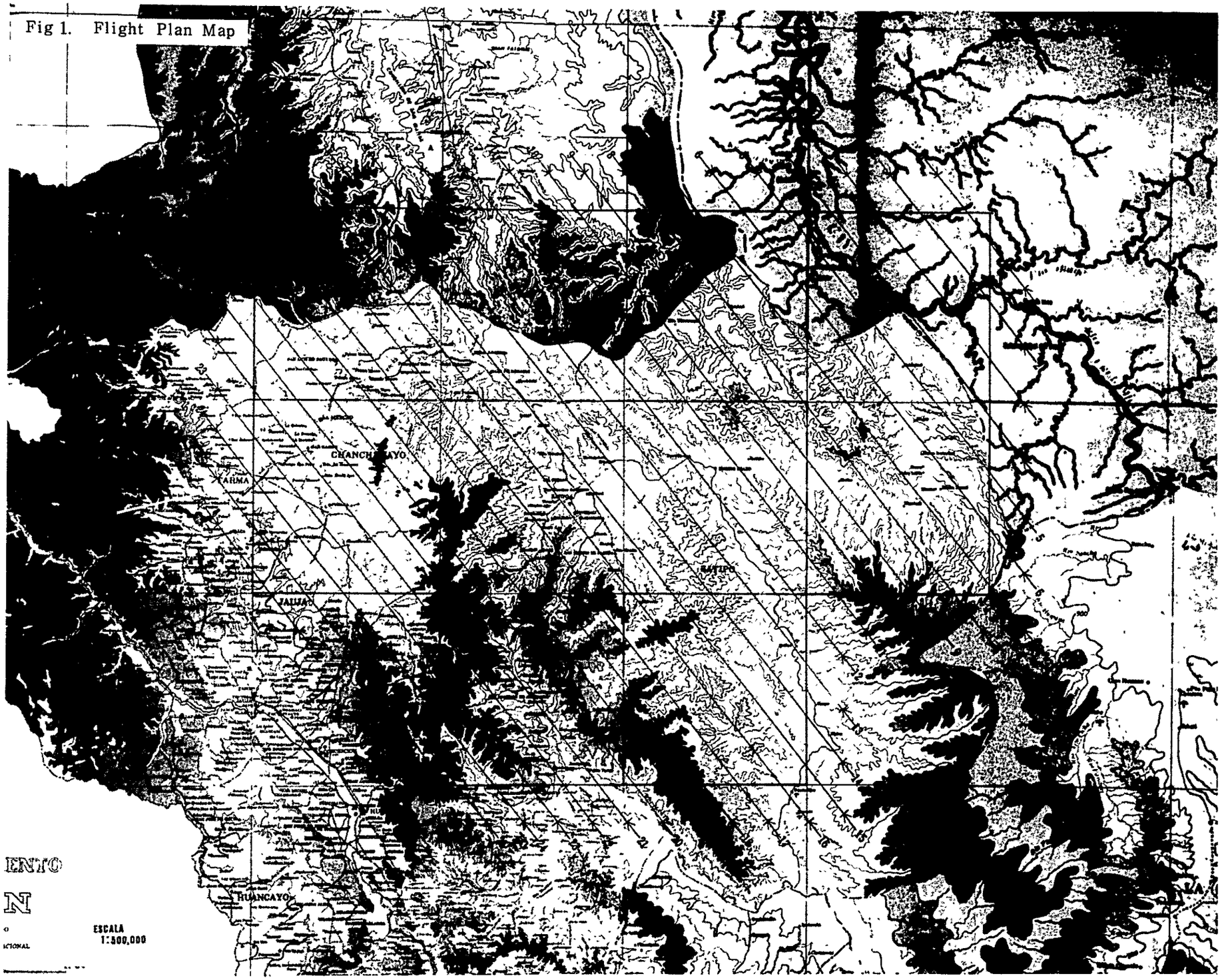


Fig 2. Flight Plan Map of Secondary Aerial Photography.

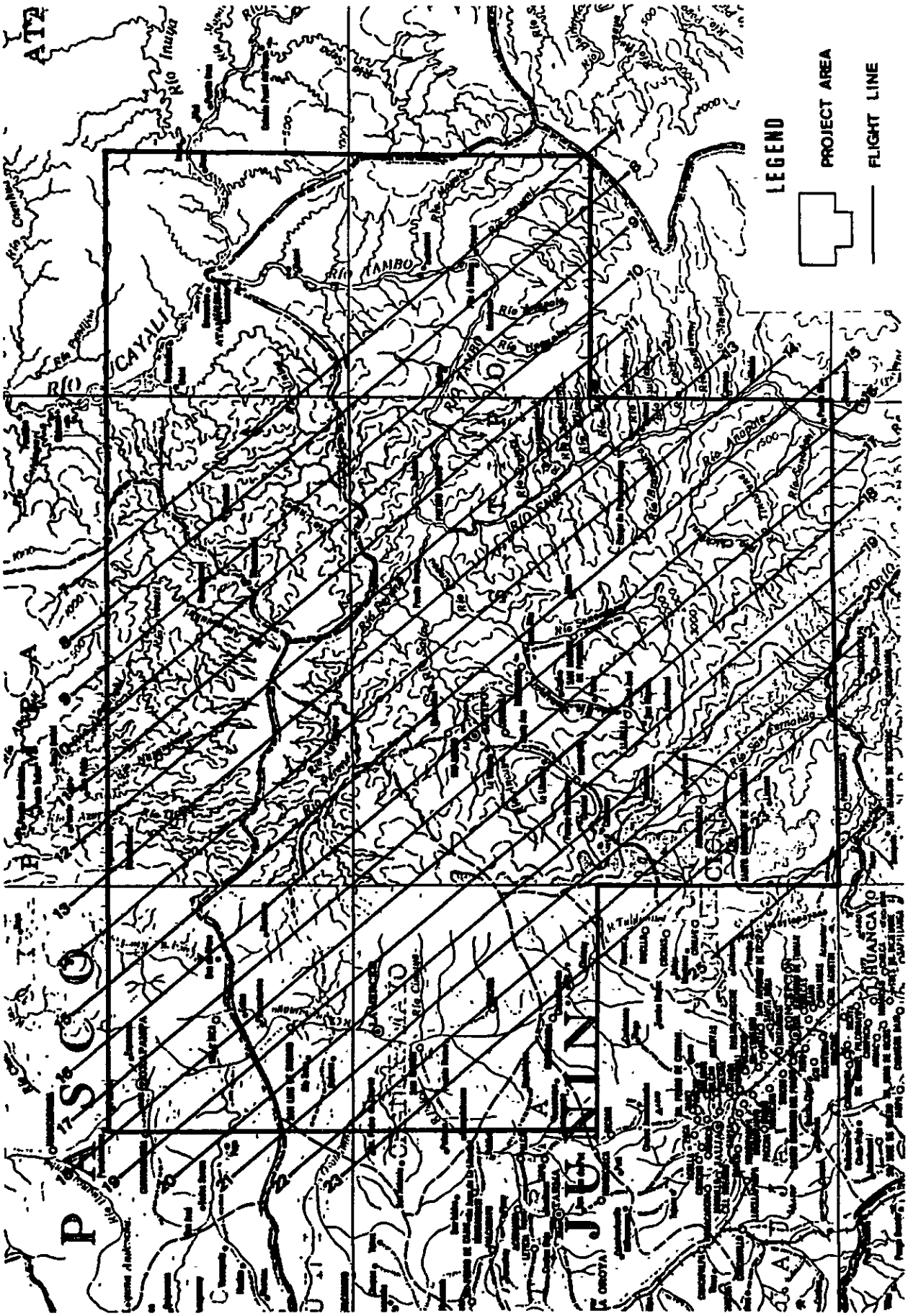


Fig 3. Index Map

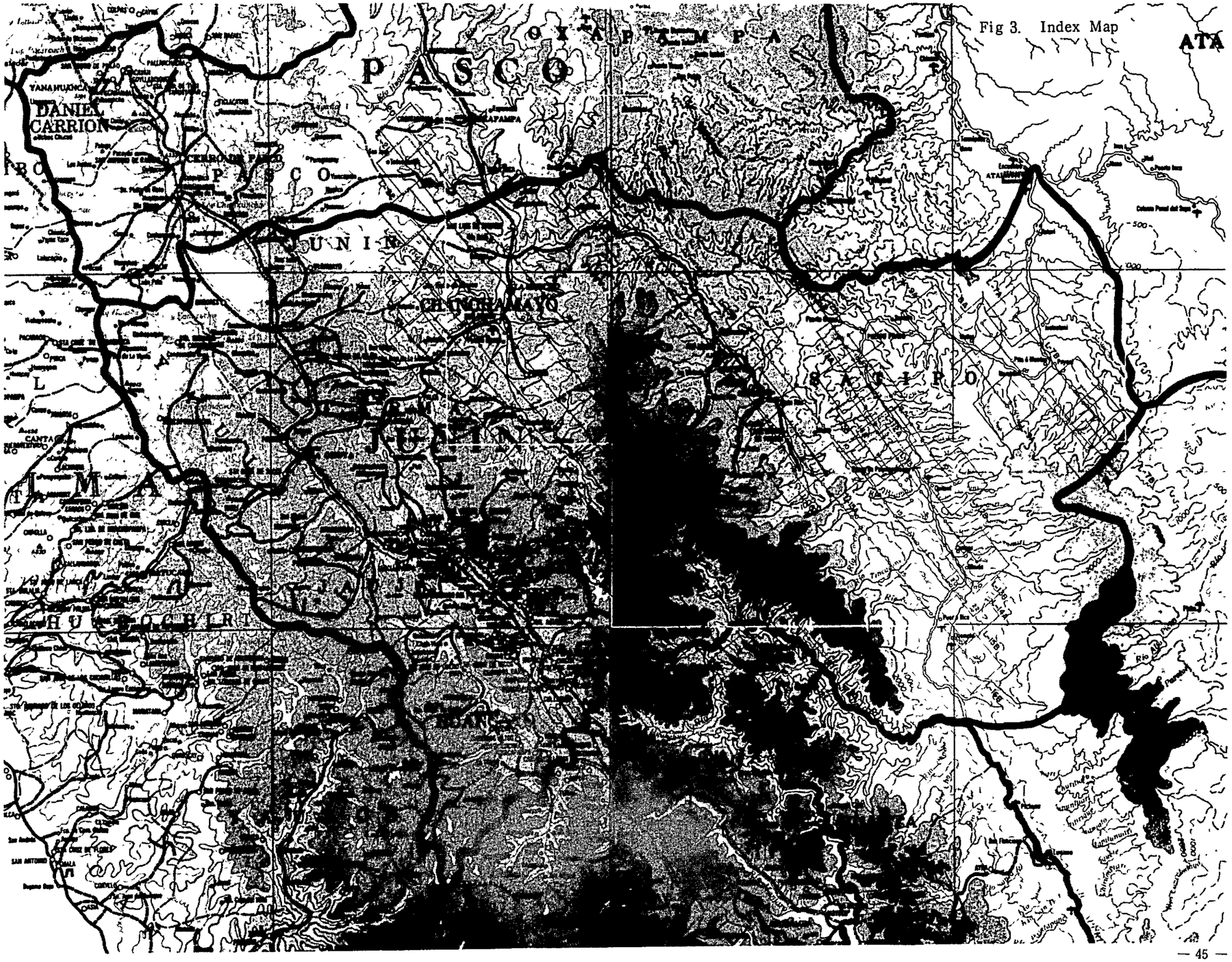
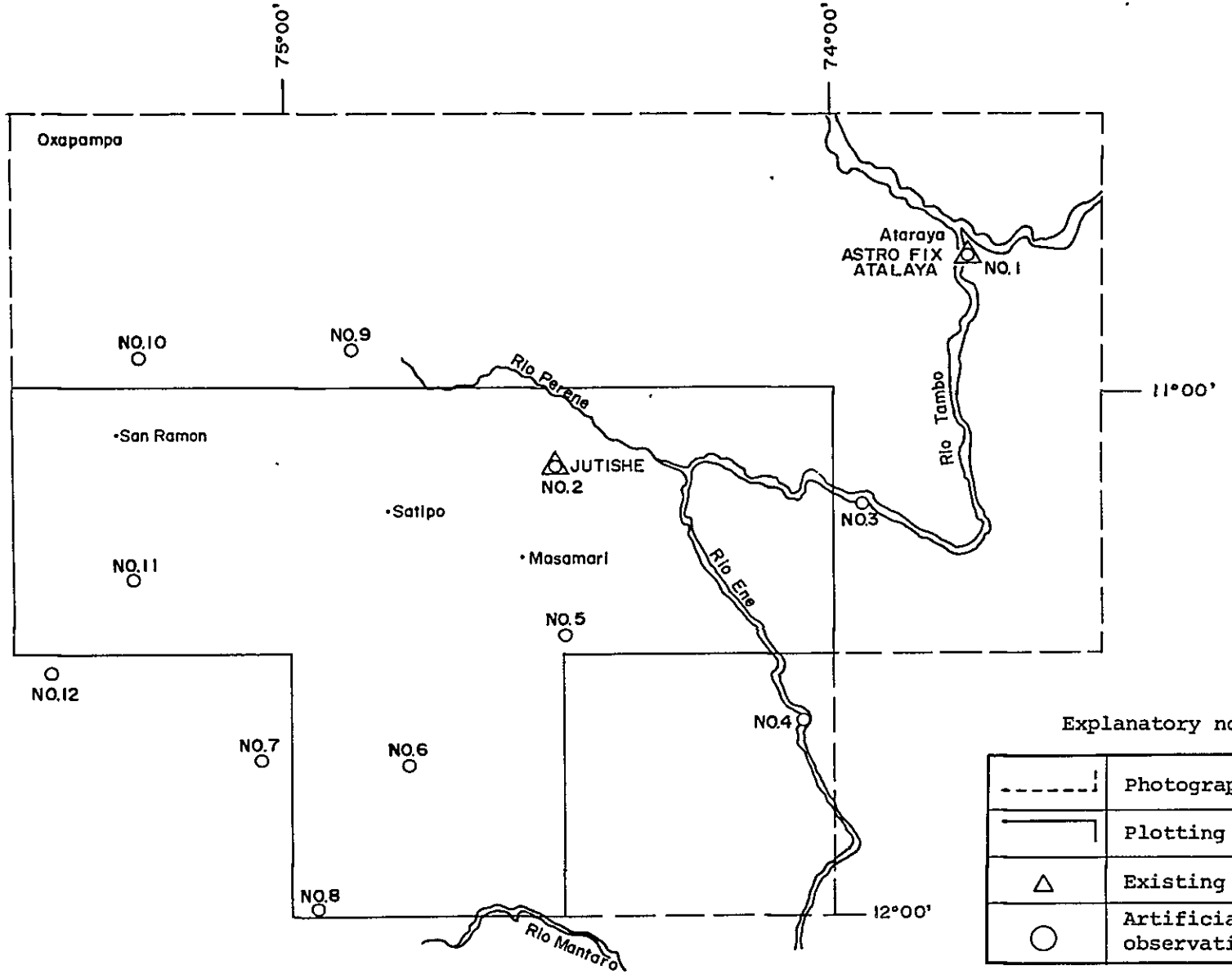


Fig 4.

Artificial satellite observation Point distribution

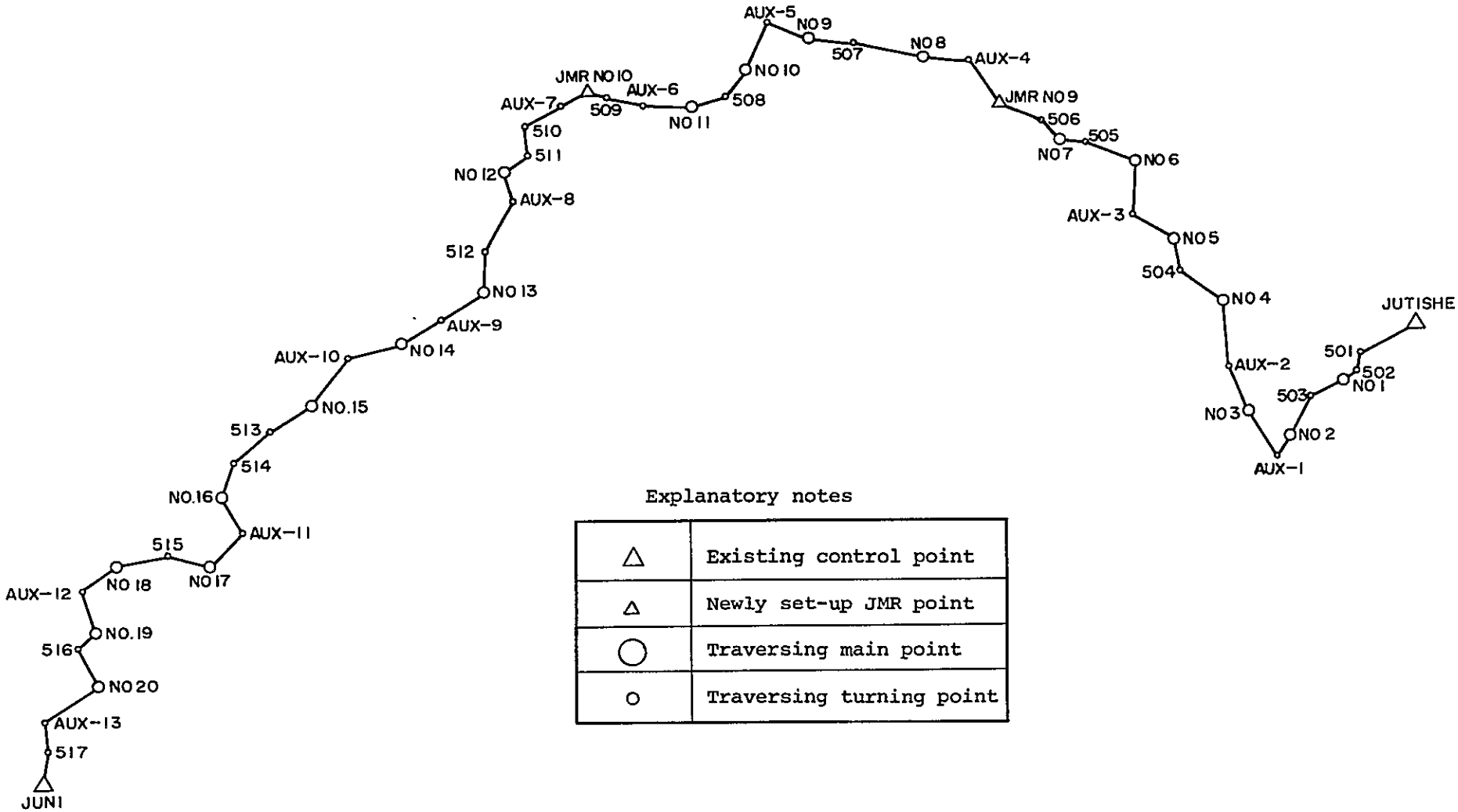


Explanatory notes

-------	Photographic area
———	Plotting area
△	Existing control point
○	Artificial satellite observation point

Fig 5.

Traversing route

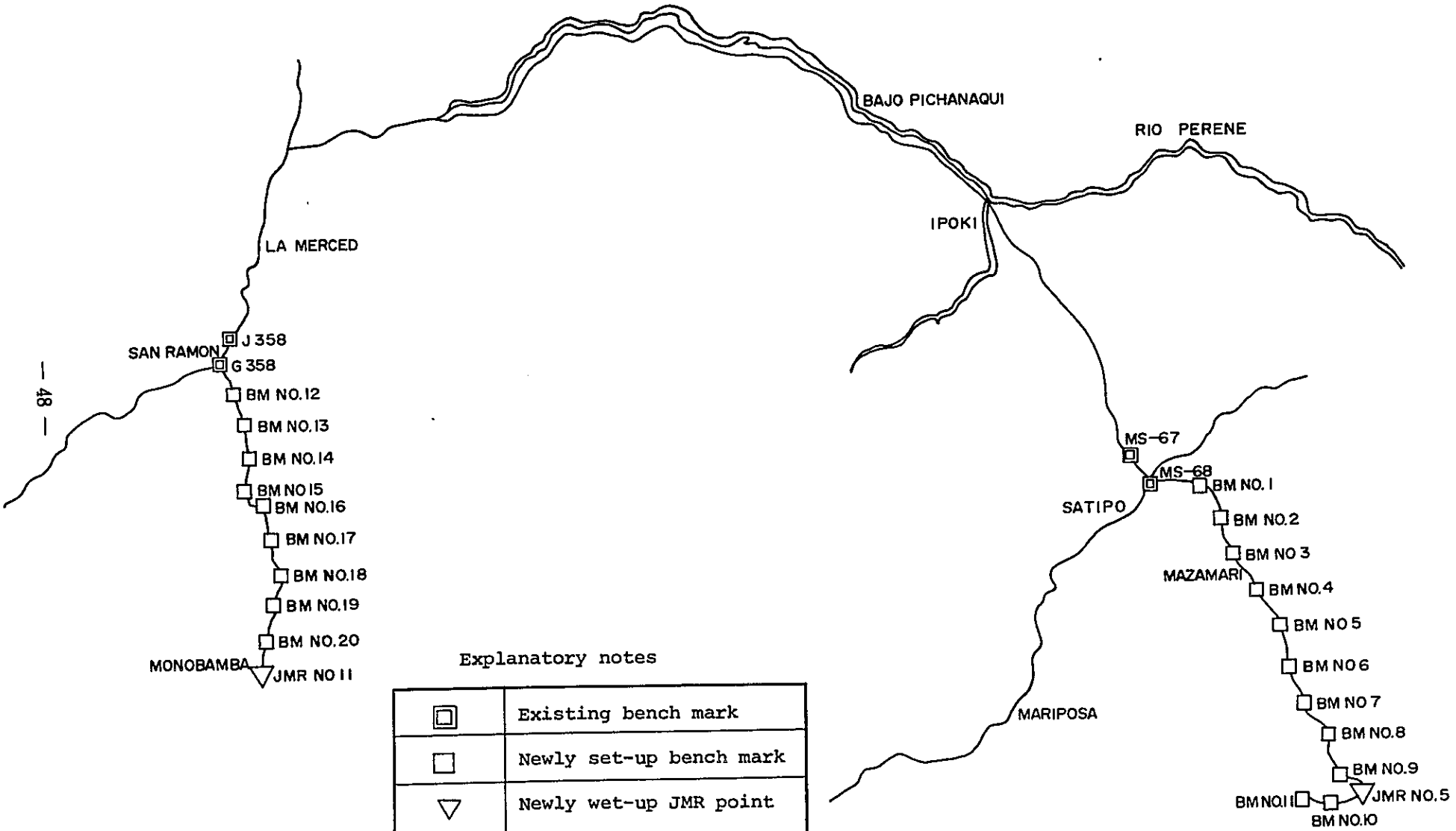


Explanatory notes

△	Existing control point
△	Newly set-up JMR point
◯	Traversing main point
○	Traversing turning point

Levelling route

Fig 6.



Explanatory notes

◻	Existing bench mark
□	Newly set-up bench mark
▽	Newly wet-up JMR point

Fig 7.

Observation by artificial satellite (NNSS system)

Traverse point

$S = \frac{1}{10}$

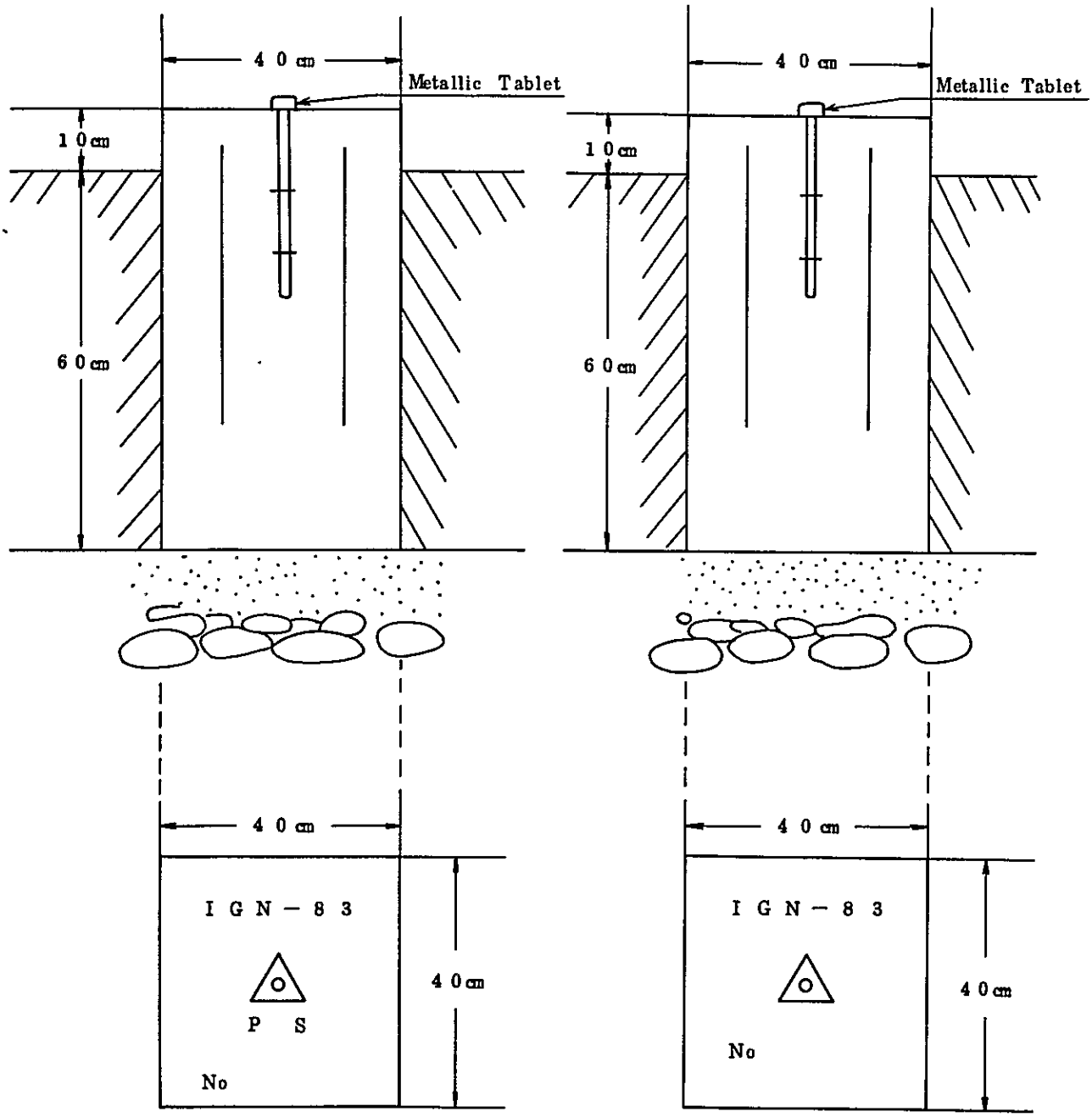


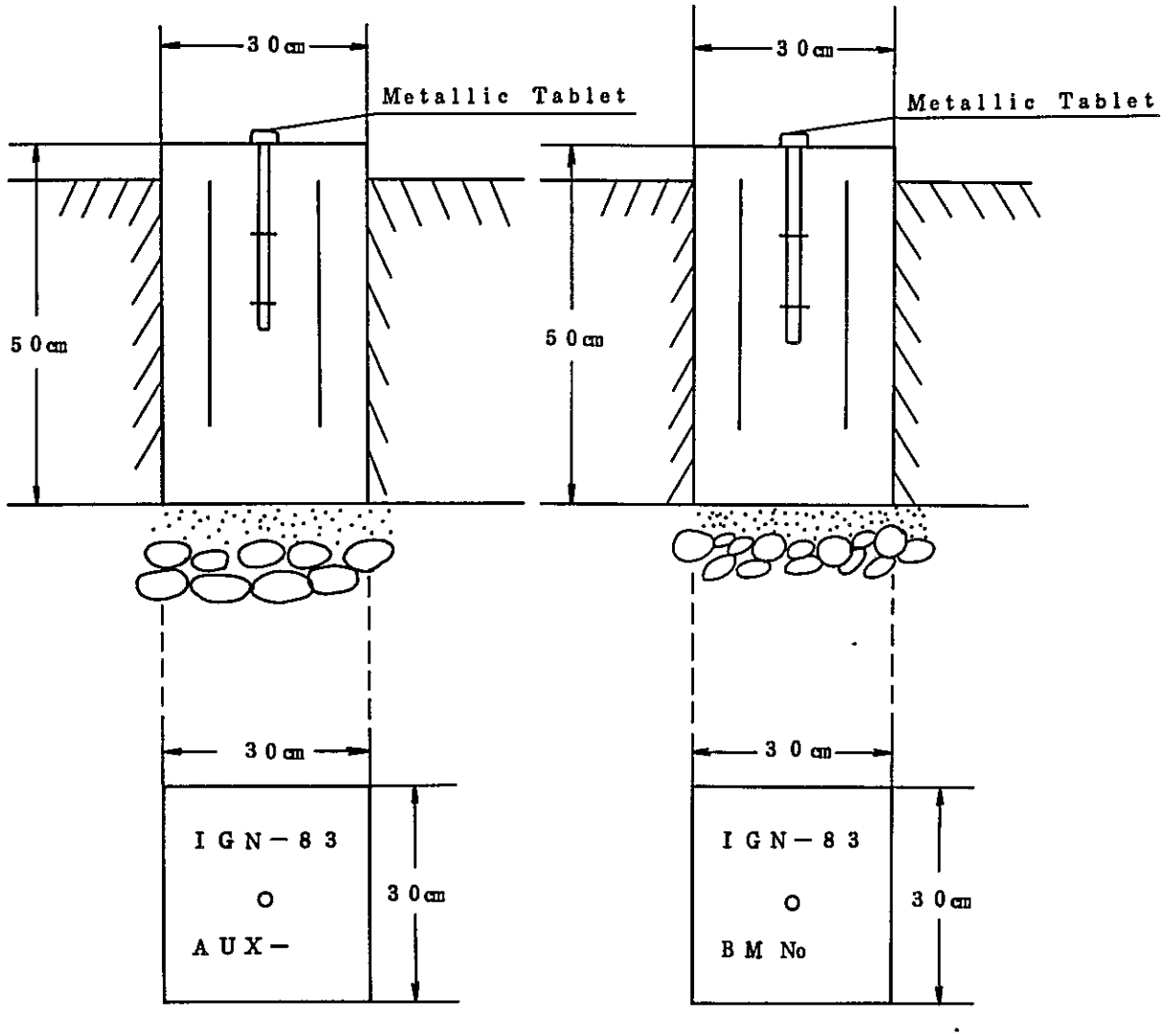
Fig 8.

Auxiliary

Bench mark

$S = \frac{1}{10}$

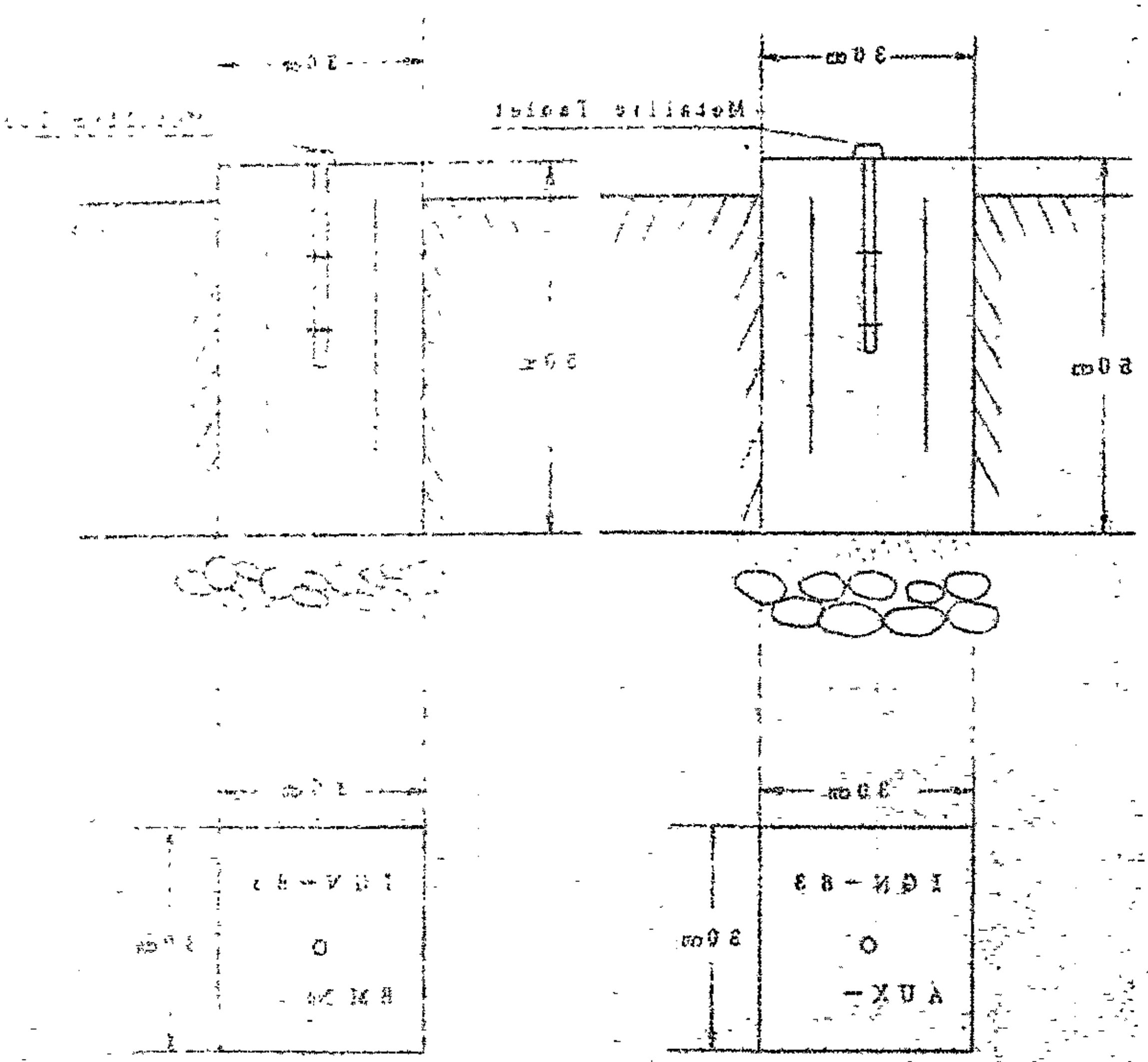
$S = \frac{1}{10}$



Bench Mark

Auxiliary

$S = \frac{1}{10}$



PROCEEDING OF THE MEETING

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ON

TOPOGRAPHIC MAPPING PROJECT OF SATIPO AREA

DEPARTMENT OF JUNIN, PERU

DATE : 24th, June '83

PLACE : Instituto Geográfico Nacional (IGN)

ATTENDANCE: Mr. NORIAKI SUDA, Technical Advisor
Mr. AKIRA UKIYA, Advisor
Mr. MASAYOSHI TAKASAKI, Leader
Mr. SHIGERU TAKAGI, Advisor
Mr. MASATOSHI NAGASHIMA, Deputy Leader
Mr. TOSHIYOSHI SO, Coordinator

Gral Brig ALBERTO DELGADO V, Director
Col. Eng. JOSE TASAICO DEL S, Deputy Director
Lt. Col. Eng. VICTOR MONTOYA ASTULLE, Head of Photogrammetry Div.

After exchanging the greeting the following matters were agreed and confirmed by the both parties on the second phase works of the Topographic Mapping Project of the Satipo Area, Department of Junin, Peru and were presented by Japanese party.

1. Japanese Mapping Team explained the schedule of the 2nd. year work and requested to the IGN cooperation with Japanese Mapping Team.

2. IGN accepted Mr. TAKASAKI's request on customs clearance. Regarding customs clearance:

   - IGN is going through the customs formalities and these action will be concluded in the forthcoming days.

- IGN also agreed that all surveying instruments and equipments will be stored IGN, Peru.

3. Mr. N. SUDA, Technical Advisor, explained in detail the specific work as follows:

   a. Aerial photography
   b. Establisment of Control Point
      (1) N.N.S.S. 12 points (2 points at existing points)
      (2) Traversing (200 km)
      (3) Levelling (80 km)

   Item (b) was explained through in the second phase of work and IGN agreed with the original plan (Annex N° 01).

4. Field identification will not be carried out this year, due to the fact of no advancing aerial photography.

5. Japanese Mapping Team requested cooperation to ensure the safety in the project area. This was agreed on.

   As IGN participants, the following members are nominated: Ing. Gerardo PEREZ DEL AGUILA as IGN representative, Medical Assistant, Assistance Radio Operator, boat mechanic and 10 drivers.

6. Bood Serums for snake biting are being procured by IGN. IGN will teach to the Japanese Team in emergency treatment before going to the Satipo Area.

7. Japanese Mapping Team will prepare the camping tent for the IGN participants during the JMR observation.

8. As the details of the work concerned following day are schedule to discusses between both parties.

IGN will arrange the training of one person for technical transfer of aerial photography or control survey which will be conducted in Japan from end of October '83.

As no other points for discussion were available, the meeting was adjourned, and the present proceeding was drafted, having read and found in good order, was signed by the heads of both delegations, on 5th July nineteen eighty three.

NORIAKI SUDA
Technical Advisor of
Geographic Survey Institute (GSI) Ministry of Construction

ALBERTO DELGADO V.
Director General del Instituto Geográfico Nacional

TOPOGRAPHIC MAPPING PROJECT BETWEEN THE JAPAN INTERNATIONAL COOPERATION AGENCY AND THE GOVERNMENT OF PERU

PROCEEDING OF THE MEETING BETWEEN THE JAPAN INTERNATIONAL COOPERATION AGENCY AND THE SERVICIO AEROFOTOGRAFICO NACIONAL

IN LIMA, CAPITAL CITY OF THE REPUBLIC OF PERU, A MEETING WAS HELD FROM 13TH THROUGH 17TH OCTOBER NINETEEN EIGHTY THREE, IN THE OFFICE OF SERVICIO AEROFOTOGRAFICO NACIONAL (TO BE REFERED TO AS SAN) BETWEEN THE SURVEY MISSION SENT BY THE JAPAN INTERNATIONAL COOPERATION AGENCY (TO BE REFERED TO AS JICA) AND THE SAN, TO SET UP THE REPORT OF THE AERO PHOTOGRAPHY TAKING IN 1983 AND THE GUIDELINES FOR THE AERO PHOTOGRAPHY THAT WILL BE TAKEN IN 1984.

DELEGATIONS WERE AS FOLLOWS:

FOR JAPAN: MR. MINORU MASUDA, TECHNICAL ADVISOR, GEOGRAPHICAL SURVEY INSTITUTE (GSI), MINISTRY OF CONSTRUCTION; MR. MASAYOSHI TAKASAKI, TEAM LEADER; MR. TOSHIMASA NAGASHIMA, DEPUTY TEAM LEADER; MR. TADASHI MURAKI, CHIEF SUPERVISOR OF AEROPHOTOGRAPHY; MR. SHINICHI KOHNO, SUPERVISOR; AND MR. AKIRA UKIYA, SENIOR STAFF, THE 1ST. DEVELOPMENT SURVEY DIV., SOCIAL DEVELOPMENT COOPERATION DEPT., JICA.

FOR PERU: MAJOR GENERAL FAP OSCAR CARRERA CANEPA, DIRECTOR GENERAL, SAN; AS CHAIRMAN; COLONEL FAP MARIO SANCHEZ MORENO JIMENEZ, HEAD OF PLANNING DIRECTION; CAPTAIN FAP WILAR GAMARRA MOLINA, MEMBER OF PLANNING DIRECTION; AND ING JUAN LUNA A., TECHNICAL ADVISOR.

THE CONSENTS WERE AS FOLLOWS:

1. DURING THE MEETING, SAN REPORTED THAT THE RESULTS OF THE TAKING AERO PHOTOGRAPHY OF THIS YEAR WAS AROUND THE 43% OF THE CONTRACT FOR THE PRESENT YEAR.
2. THE MISSION RECOGNIZED THE EFFORT DONE BY SAN, TAKING THE AERO PHOTOGRAPHIES, NEVERTHELESS THE BAD WEATHER CONDITIONS, CAUSED BY THE CLIMATE CHANGES DUE TO THE NIÑO CURRENT PHENOMENON.

3. NEVERTHELESS SOME STAFF MEMBERS OF THE JAPANESE GOVERNMENT CONSIDERED THAT THE PROJECT SHOULD BE STOPPED BECAUSE THE AERO PHOTOGRAPHY ADVANCE WAS SO SLOW, THE REQUEST OF ACCOMPLISHMENT OF THE PROJECT GIVEN BY THE GOVERNMENT OF PERU HAVE BEEN ATTENDED AND ACCEPTED BY THE JAPANESE GOVERNMENT, THE AEROPHOTOGRAPHY WILL CONTINUE IN 1984, AND SAN PROMISED TO GIVE THE FIRST PRIORITY TO THE CONTRACT.

4. THE FOLLOWING POINTS WERE DISCUSSED IN DETAIL:

a, THE SHORT ADVANCE IN THE TAKING OF AERO PHOTOGRAPHIES WAS IN PART FOR THE CHANGE OF WEATHER CAUSED BY THE NIÑO CURRENT PHENOMENON, JOINED WITH SOME TROUBLE IN USING THE NEW SOPHISTICATED INSTRUMENTS OBTAINED BY SAN.

b. INTERNATIONAL ENGINEERING CONSULTANTS ASSOCIATION (IECA) WILL TAKE IN CONSIDERATION, THE ACCEPTANCE OF AERO PHOTOGRAPHIES WITH MORE THAN 5% OF CLOUDS, THAT NOT DISTURBE THE MAPPING COMPILATION.

c. FOR THE NEXT YEAR WILL CONTINUE THE WEEKLY MEETINGS TO EVALUATE THE ADVANCE OF TAKING AERO PHOTOGRAPHIES.

d. JAPANESE MISSION ACCEPTED, THE OFFERING FROM SAN TO FLY WITH THE CREW DURING THE TAKING OF AERO PHOTOGRAPHIES.

e. SAN ACCEPTED TO INCREASE THE NUMBER OF WEATHER OBSERVERS FOR THE NEXT YEAR.

f. SAN WILL IMPROVE NEW TECHNIQUES AND METHODS TO TAKE AERO PHOTOGRAPHIES FOR THE NEXT YEAR, AS WELL AS THE USE OF THE SATELITE RADAR, TO OBTAIN THE METEOROLOGICAL INFORMATION MORE EXACTLY.

g. SAN REQUESTED TO JAPANESE MISSION TO SEND PERSONNEL FOR TRAINING IN AERO PHOTOGRAPHY IN JAPAN.

AS NO OTHER POINTS FOR DISCUSSION WERE AVAILABLE, THE MEETING WAS ADJOURNED, AND THE PRESENT PROCEEDING WAS DRAFTED, HAVING READ AND FOUND IN GOOD ORDER, WAS SIGNED BY THE HEADS OF BOTH DELEGATIONS, ON 17TH OCTOBER NINETEEN EIGHTY THREE.

MR. TADASHI MURAKI
CHIEF SUPERVISOR OF
AEROPHOTOGRAPHY (IECA)
INTERNATIONAL ENGINEERING
CONSULTATS ASSOCIATION

MARIO SANCHEZ MORENO J.
COLONEL FAP
HEAD OF PLANNING DIRECTOR, OF SAN
SERVICIO AEROFOTOGRAFICO NACIONAL

MR. MASAYOSHI TAKASAKI
TEAM LEADER
INTERNATIONAL ENGINEERING
CONSULTANTS ASSOCIATION

OSCAR CARRERA CANEPA
MAJOR GENERAL FAP
DIRECTOR GENERAL, SERVICIO
AEROFOTOGRAFICO NACIONAL

TOPOGRAPHIC MAPPING PROJECT BETWEEN THE JAPAN INTERNATIONAL COOPERATION AGENCY AND THE GOVERNMENT OF PERU

PROCEEDINGS OF THE MEETING BETWEEN THE JAPAN INTERNATIONAL COOPERATION AGENCY AND THE INSTITUTO GEOGRAFICO NACIONAL

In Lima, the capital of the Republic of Perú, meetings were held from 13 to 18 October, 1983, in the office of the Instituto Geográfico Nacional (to be refered to as IGN), between the Survey Mission sent by the Japan International Cooperation Agency (to be refered to as JICA) and the IGN. Its purpose was to report the work of the present year and to set up the guidelines for the work of next year.

Delegations were as follows:

JICA Mission : Mr. Minoru MASUDA, Technical Advisor
Mr. Akira UKIYA, Coordinator
Mr. Masayoshi TAKASAKI, Leader
Mr. Toshimasa NAGASHIMA, Deputy Leader
Mr. Tadashi MURAKI, Supervisor of Aerophotography

IGN : Brigadier General Alberto DELGADO VELAZCO, Director, Instituto Geográfico Nacional

Colonel Engineer José TASAICO DEL SOLAR, Deputy Director, IGN

Colonel Engineer Juan BAZAN VIVAR, Inspector, IGN

Lt. Colonel Víctor MONTOYA ASTULLE, Chief of the Photogrammetry Dept., IGN

Major Gerardo PEREZ DEL AGUILA, Assistant Chief of the Geodesy Dept., IGN

After the exchange of greetings, the meetings were held in an open and friendly atmosphere from beginning to end.

Both parties discussed and consented to following items:

1. Evaluation of the 2nd year's work

The second year's work, which was based on the proceedings established on 24 June 1983, has been executed by the JICA Mission, in close cooperation with the IGN and SAN. Aerophotography work resulted in completion of part of the projected area. Other 2nd year's work consisting of satellite geodesy, traversing and levelling was completed in close cooperation with many IGN participants and obtained excellent results.
The results of the work were as follows:

a. Aerophotography

Plan	25,000 km2
Result approx.	10,700 km2

b. Satellite Geodesy

Plan	12 stations (including 2 existing control station)
Result	12 stations (- do -)

c. Traversing

Plan	200 km
Result	200 km

d. Levelling

Plan	80 km
Result	80 km

2. Adoption of basic source for 2nd year's work

These indispensable factors for the 2nd year's work were decided by mutual consent:

Ellipsoid : International Ellipsoid PSAD 1956

DATUM : CANOAS Venezuela

Ellipsoid Constants:

Semi Major Axis	: 6'378,388.0 meters
Semi Minor Axis	: 6'356,911.9461 meters
Excentricity	: 0.006722670
Flattering	: 0.0033670034
Scale factor	: 0.99960207 for the central meridiam

Datum Shift constants:

Delta X	: -281 plus or minus 1 meter
Delta Y	: 104 plus or minus 3 meters
Delta Z	: -398 plus or minus 2 meters
Delta A	: -253 meters
Delta F	: -0.14223913 times 10 power 4

3. Basic plan of the 3rd year's work

a. Classification
b. Aerial triangulation
c. Stereo Plotting and Editing

Aerophotography: In response to a request by the Minister of Army, Division General Oscar BRUSH NOEL, and the Director of IGN, the continuation of aerophotography is under active consideration by the Government of Japan.

4. Transfer of cartographic technology in Japan

JICA is continuing to follow the necessary procedure for the transfer of cartographic technology in Japan.

Name of the applicants:

Eng. Col. José TASAICO DEL SOLAR,
Deputy Director

Eng. Lt. Col. Víctor MONTOYA ASTULLE,
Chief of Photogrammetry Div.

5. Contributions by the IGN necessary for the execution of the 3rd year's work

For the smooth and effective implementation of the 3rd year's work, the IGN will provide all the following necessary contributions:

a. To secure the use of all vehicles and boats which was contributed by JICA.

b. To collaborate in the field identification and surveying of geographical names.

c. Continue to follow and abide by the proceedings of the meeting of October 4, 1982.

At the closing of the meeting, the IGN expressed its sincere hope that close and continuous cooperation by the Japanese Government would aid in the completion of this project.

The JICA Mission has expressed its gratitude for the cooperation of the IGN and will exert its best effort for the accomplishment of the project.

There were no other points for discussion, and the meeting was adjourned. The present proceedings were drafted, read and found in good order, and were signed by the heads of both delegations, on 18 October 1983.

M. Masuda

Mr. MINORU MASUDA
Technical Advisor
JICA Mission

ALBERTO DELGADO VELAZCO
General Brigadier
Director, IGN

M. Takasaki

Mr. MASAYOSHI TAKASAKI
Leader, JICA Mission

JICA