2. 3rd-year work

2-1 Outline of work

As for the aerial photography, the first-year secondary work and second-year work were conducted following the first-year work based on the S/W. Due to the severe natural conditions at the work area, however, its entire work could not be completed.

In the aerial photography of the second-year work, aerial photography and photo processing were performed for the area remained unfinished in the previous work. As the third-year work, pricking necessary for aerial triangulation as well as field identification for stereo plotting were carried out.

As for the domestic work, aerial triangulation for 425 models and stereo plotting for 64 sheets were completed.

2-2 Project area

The district for which a topographic map is to be prepared under this project is located at about the central area of Peru. The Andes Mountains, the altitude of which is over 4,000 m, run in the west of the project area. And also the area, northeast of the Andes, is changing its features gradually from high mountains into jungles in the basin of the Amazon river. As to a transportation network, the only one principal road is running from Lima through San Ramón up to Satipo. Though still partly unpaved, this road is passable throughout the year for its being relatively well-maintained. There is another national highway running from Satipo through southern mountainous area to Huancayo. This route is, however, a rather dangerous in the night time, for its narrow width and running in steep area.

There is also a road network connecting small villages, but it is difficult to rely on it during the rainy season for being relatively damaged by the transportation of heavily weighed things such as lumber and agricultural products. In the east jungle area only a few villages are dotted along the Ene River where there is no available transportation but light aeroplanes or boats.

2-3 Work period

Aerial photography and photo processing:

from March 29 to September 20, 1984.

Pricking and field identification

from June 24 to September 20, 1984.

Aerial triangulation

from September 25 to November 10, 1984.

Plotting

from November 15, 1984 to March 20, 1985.

2-4 Survey team members

Leader:	Masayoshi Takasaki
	July 4 - July 20 Sep. 7 - Sep. 20
Deputy leader:	Toshimasa Nagashima
	June 27 - Sep. 20
Coordinator:	Toshiyoshi So
	June 24 - Sep. 20
Mechanic:	Masahiro Kita
	June 24 - Sep. 20

Chief surveyor:	Toshiyuki Harada
	June 27 - Sep. 20
Surveyor (pricking):	Yasuo Ishiguro
	July 5 - Sep. 15
Surveyor ("):	Etsuo Yamanaka
	July 5 - Sep. 15
" ("):	Takeo Nagai
	July 5 - Sep. 15
Surveyor (pricking):	Toshiaki Kanada
	July 5 - Sep. 15
Surveyor (field identification):	Yoshihiro Azuma
	July 5 - Sep. 15
" ("):	Isao Morita
	July 5 - Sep. 15
" ("):	Toshiyuki Masui
	July 5 - Sep. 15
" ("):	Atsushi Okuizumi
	June 27 - Sep. 15
Supervisor (aerial photography):	Yoshiyuki Ohnuma
	March 29 - Sep. 20
" (photo processing):	Shinichi Kohno
	March 29 - Sep. 20

2-5 Work volume

(1) Aerial photography:	Area: 14,208 km^2
	Number of lines: 13 lines
	Line extension: 1,907.5 km
	Photo scale: 1/60,000

(2) Pricking: Number of NNSS points: 11 points
" of traverse points: 6 "
" of bench marks: 90 "

(3) Field identification: 12,070 km^2

(4) Aerial triangulation: 415 models

(5) Plotting: 12,070 km^2 (64 sheets)

2-6 Main instruments and equipment

(1) Aerial photography

Aircraft: LEAR JET 25B No. 522, No. 523
LEAR JET 36A No. 524, No. 525

Navigation device: COLLINS INS-61-B
SISTEMA DE NAVEGACION LITTON 72

Aerial camera: WILD RC-10 No. 2335
Lens: UNIVERSAL AVIOGON UAG II
No. 1101 f=151.39 mm
WILD RC-10A No. 5017, No. 5018
Lens: UNIVERSAL AVIOGON UAG A
No. 13035 f=152.83 mm
No. 13044 f=152.76 mm
No. 13052 f=152.78 mm

Film: Kodak PLUS-X Aerographic 2402

(2) Photo processing

Developer: Morse Co. Processing kit (rewind type)

Drier: Low Blower Co. A-10 Drum drier

Printer: Log Electronic Co. Electronic printer

Processing chemicals:

(Film developing)

Development solution:	Kodak Co.	DK-19, DK-50
Fixing solution	:	Kodak Co.	Fixer
Stabilizer	:	Kodak Co.	Hypocleaning Agent

Processing chemicals:

(Printing)

Development solution:	Kodak Co.	D-72
Stopping solution	:	2% acetic acid
Fixing solution	:	Kodak Co.	Fixer

Photographic paper:

For orientation for inspection:	Kodak Co.	Single weight AZO, No. 2 and No. 3
For delivery	:	Kodak Co.	Double weight AZO, No. 2 and No. 3

Drier: Pako Drier

(3) *Pricking and field identification*

Shortwave radio transmitter and receiver (8.612 KHZ) JRC, ICOM	6 unit
Theodolite WILD T2	2 unit
Laser distance meter HP 3800B	2 unit
Level Sokki-sha B-2	2 unit
Reflex mirror (HP Co.)	2 set
Signal lamp (Tamaya)	4 unit
Sun observation prism (WILD)	1 unit
FM radio transmitter (Shinwa)	3 unit

Generator	HONDA EM 2200	1 unit
"	HONDA EM 400	1 unit
Chain saw		1 unit
Oxygen respiratory device		1 unit
Plane table		2 set
Tent		3 set
Four-wheel-drive wagon	TOYOTA Landcruiser	6 unit
Four-wheel-drive truck	TOYOTA Landcruiser	2 unit
"	HINO (Middle type)	1 unit
Truck	HINO	1 unit
Motorboat		1 unit
Aeroplane (chartered)		

(4) Aerial triangulation

Point transfer device

Stereo comparator

Computer

(5) Plotting

Plotter : Autograph A-7

" : Stereo plotter A-8

" : Metrograph

2-7 Schedule

(1) Aerial photography

March 29, 1984 : Ohnuma and Kohno leave Japan.

" 30, " : Above two arrive in Lima.

April 2, " : Contract negotiations for aerial photography start.

April 5, " : Conclusion of the contract for aerial photography with Servicio Aerofotografico Nacional (SAN)

" 23, " : Kohno leaves Lima to inspect the allocation conditions of SAN's meteorological observation staff.

" 27, " : Kohno returns to Lima.

Sep. 10, " : Report to the Peru IGN Director on the progress of photographing work.

" 11, 1984 : Leader Takasaki and Ohnuma discuss with SAN Director.

" 17, " : Receives SAN's final results after quality inspection.

" 18, " : Takasaki and 7 others leave Lima.

" 20, " : Above 8 return to Japan.

(2) Pricking and field work

June 24, 1984 : So and Kita leave Japan.

" 26, " : Above two arrive in Lima.

" 27, " : Deputy leader, Nagashima and 2 others leave Japan and arrive in Lima.

" 28, " : Courtesy call at the Instituto Geografico Nacional (IGN) and the Lima office of JICA.

July 4, " : Leader Takasaki leaves Japan.

" 5, " : Ohtake, technical advisor (the Geographical Survey Institute of the Ministry of Construction), Murakami (JICA), and Takasaki arrive in Lima. Ishiguro and 6 others leave Japan.

July 20, "	:	Nagashima and other 1 leave Lima and arrive at Satipo.
		Takasaki returns to Japan.
August 1, 1984	:	4 pricking staffs leave Satipo and arrive at Comas.
" 2, "	:	Above 4 leave Comas and arrive at Andamarca.
August 3, 1984	:	They leave Andamarca and return to Satipo.
" 8, "	:	2 field identification staff leave Satipo and arrive at San Ramon.
" 11, "	:	Above two leave San Ramon and return to Satipo.
" 13, "	:	4 pricking staffs leave Satipo and arrive at San Ramon.
" 16, "	:	Above 4 leave San Ramon and return to Satipo.
" 20, "	:	2 field identification staff leave Satipo and arrive at Andamarca.
" 22, "	:	2 other field identification staffs leave Satipo and arrive Taruma.
" 23, "	:	The former party leaves Andamarca and returns to Satipo.
" 25, "	:	The latter leaves Taruma and returns to Satipo.
" 27, "	:	Completion of pricking at the survey area.
" 29, "	:	Completion of field identification at the survey area.

July 6, "	:	Courtesy call at the Japanese Embassy at Lima and briefing at JICA Lima office.
		Explanation and discussion at the Instituto Geografico Nacional (IGN) on the outline of the third-year field work.
July 7, 1984	:	Ishiguro and 6 others arrive in Lima.
		Ohtake, Murakami, Takasaki, and Nagashima inspect the survey area (by land).
" 9, "	:	Above 4 return to Lima (by land).
" 10, "	:	Discussion with IGN
" 11, "	:	Courtesy call at SAN
		Ohtake and Murakami leave Lima.
" 12, "	:	Ishiguro and 5 others leave Lima and arrive at Satipo.
		Discussion with IGN
" 13, "	:	Harada and 3 others leave Lima and arrive at Satipo.
		Discussion with IGN and briefing with SAN
" 14, "	:	Establishment of the Satipo office
" 16, "	:	Discussion with IGN
		Field work begins.
" 17, "	:	Signing of the Minutes with IGN
		Courtesy call at the Japanese Embassy.
		Report to JICA Lima office.
		Takasaki leaves Lima.

September	3, 1984	:	Closing of the Satipo office
"	5, "	:	Nagashima and 10 others return to Lima.
"	6, "	:	Report to IGN
"	7, "	:	Takasaki leaves Japan and arrive in Lima.
September	9, 1984	:	Nonomura, advisor, leaves Japan.
"	10, "	:	Courtesy call at the Japanese Embassy at Lima.
			Report to JICA Lima office and SAN
"	11, "	:	Nonomura arrives in Lima.
			Discussion with IGN
"	12, "	:	Discussion with IGN
			Ishiguro and 7 others leave Lima.
"	13, "	:	Discussion with IGN
"	14, "	:	Discussion with IGN
"	15, "	:	Ishiguro and 7 others return to Japan.
"	17, "	:	Signing of the Minutes with IGN
			Courtesy call at the Japanese Embassy in Lima
			Report to JICA Lima office and SAN
			Nonomura, Takasaki, and 6 others leave Lima.
"	20, "	:	Above 8 return to Japan.

2-8 Work supervision and inspection

During the field work period, the following staff visited

Peru to supervise and instruct on the work and discuss with the Peruvian Government.

Kazuhiko Ohtake : Director of Topographic Department, the Geographical Survey Institute, Ministry of Construction
From July 7 to July 11, 1984.

Kunio Nonomura : Head of Survey Guidance Division Planning Department, the Geographical Survey Institute, Ministry of Construction.

Hiroshi Murakami : Senior Staff, 1st Development Survey Division, the Social Development Cooperation Department, the Japan International Cooperation Agency
From July 7 to July 11, 1984.

3. Field work

3-1 Aerial photography of the second-year work

3-1-1 Outline of work

a) Photographing plan

(1) Aerial photography was done with a wide-angle camera (Focal length 15 cm) according to the line planned and practiced in the first-and-second-year aerial photography. (See the Fig. 1 and 2.) It was planned, in aerial photography, to specify two mean ground levels respectively for the plain area and the mountainous.

(2) Aerial photography was planned and practiced based on the JICA's regulations for overseas survey works.

b) Photographing contract

The International Engineering Consultants Association (IECA) began negotiations with Servicio Aerofotografico Nacional (SAN), the only one organization for aerial photography in Peru, on April 2. Since the main contents of the contract are the same as those of the previous work, the contract negotiations were proceeded without trouble and the contract was concluded smoothly on April 5, accepting all requests from the Japanese side.

c) Base of aerial photography

As 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, on an urgent occasion by fog and others, the Pucallpa, Tarapoto or Iquitos Airport were used.

d) Organization of aerial photography staff

Supervisor of aerial photography: Yoshiyuki Ohnuma (IECA)

Person in charge of the Project : Coronel FAP N. Peppe. B

Pilot	:	Mayor FAP	J. Cornejo. B
		" "	F. Villacorta. B
		" "	B. Power. G
		Capitan FAP	J. Urquizo. A
		" "	L. Guerra. A
Photographer:		Tecnico FAP	F. Lunga
		" "	H. Manrique
		" "	A. Vilcitez
		" "	R. Villar

Supervisor of photo processing and inspection:

Shinichi Kohno (IECA)

Person in charge of photo processing: Capitan FAP J. Arbe. D

e) Meteorological observation staff

IECA requested SAN to allocate necessary and sufficient number of meteorological observation staff in accordance with the contract, to grasp weather conditions in the area and not to miss any good opportunity for photography. Upon request, SAN placed the staff at Villa Rica, Oberteni, Yurinaki and Llaylla and begin meteorological observation from April 17.

The observation staff reported weather conditions to the base by radio every one hour from 07:00 a.m.

Since Yurinaki was not appropriate for meteorological observation, the observation point was moved to Puerto Bermudez. Meanwhile, another point was set up at Puerto Ocopa to fulfill the duty of meteorological observation perfectly.

f) Meteorological conditions

It was able to carry out almost completely the entire work volume with fine weather in September when it normally might be bad for aerial photography, in spite of a mass of raining through the first half of the work period, which caused by the delayed start of dry season in this year being influenced by the abnormal weather (el ninõ phenomennon) of the previous year.

3-1-2 Aerial photography

a) Photographing

Since there is no appropriate map of the survey area which can be used for photographing navigation, an inertial navigation

system of Litton 72 and Collins INS-61-B was used. Photographic flight was made by inputting the coordinates of starting and ending points of photographing. The navigation system was adjusted at the airport before start. The aircraft, however, sometimes deviated from scheduled lines due to the lag of flight path, since error increases as time passes.

Clouds tend to be born a lot over the survey area, which causes the rapid change of weather condition. Even though a photographic flight was made according to the 'Go ahead' cue of meteorological observation staff, many times the aircraft could not help returning due to the occurrence of clouds over the survey area.

Photos were processed and inspected immediately after photography, and re-photography was ordered as to the photos having scattered clouds beyond the rule in every line.

PEN automatic exposure was utilized for the photography. The flight altitude was as high as 12,000 m and it took 40 minutes on an average to reach the photographic area from the airport (average distance: 300 km). The actual description of aerial photography operated as follows:

Outline of the aerial photography work was as follows.

Number of days for aerial photography	:	159 days
Times of flight	:	34 times
Total flight time	:	82 hours 09 minutes
Time of photography achieved	:	12 times
Actual flight time on photography achieved	:	32 hours 48 minutes
Time of return	:	22 times
Flight time on return	:	49 hours 21 minutes

b) Daily photographing report

Number	Date	Work condition	Flight	Remarks
1	Apr.10	Preparation		
2	11	"		
3	12	"		
4	13	"		
5	14	"		
6	15	"		
7	16	"		
8	17	Stand-by		rainy, partially cloudy
9	18	"		cloudy
10	19	"		cloudy, partially fine
11	20	Return	09:25 - 10:45 (1 hour 20 min.)	fine, cumulus, cirrus, photographing impossible
12	21	Stand-by		cloudy, partially fine, partially rainy
13	22	"		rainy, partially cloudy
14	23	"		cloudy, partially fine
15	24	"		rainy, partially cloudy
16	25	"		"
17	26	"		cloudy, partially fine
18	27	"		"
19	28	"		cloudy, partially rainy
20	29	"		cloudy, partially fine
21	30	"		cloudy
22	May 1	"		cloudy, partially rainy
23	2	"		cloudy
24	3	"		cloudy, partially fine
25	4	"		cloudy
26	5	"		"
27	6	"		cloudy, partially fine
28	7	"		"
29	8	"		cloudy, fine
30	9	Return	08:00 - 09:12 (1 hour 12 min.)	fine, stratus, cumulo-stratus, photographing impossible

Number	Date	Work condition	Flight	Remarks
31	May 10	Stand-by		cloudy, partially fine
32	11	Photo-graphing	08:05 - 10:50 (2 hours 45 min.)	L-8,9 53 photos
33	12	Return	09:00 - 11:06 (2 hours 06 min.)	fine, stratus, high-stratus, photographing impossible
34	13	Stand-by		cloudy, partially rainy
35	14	"		"
36	15	Return	08:05 - 10:05 (2 hours)	fine, stratus, cumulo-stratus, photographing impossible
37	16	"	09:05 - 11:35 (2 hours 30 min.)	fine, stratus, low-cumulus photographing impossible
38	17	Stand-by		cloudy, partially fine
39	18	Return	10:15 - 13:30 (3 hours 15 min.)	fine, stratus, cumulus, photographing impossible
40	19	Stand-by		cloudy, partially fine
41	20	Return	10:20 - 11:25 (1 hour 0.5 min.)	fine, stratus, high-cumulus photographing impossible
42	21	"	13:10 - 15:10 (2 hours)	fine, stratus, cumulo-stratus, photographing impossible
43	22	Stand-by		cloudy, partially fine
44	23	Photo-graphing	08:30 - 11:10 (2 hours 40 min.)	L-20, 21, 23 49 photos
45	24	Return	09:20 - 11:50 (2 hours 30 min.)	fine, stratus, cumulo-stratus, photographing impossible
46	25	"	08:32 - 11:00 (2 hours 28 min.)	fine, low-cumulus, cumulo-stratus, photo-graphing impossible
47	26	Stand-by		cloudy, partially fine
48	27	"		cloudy, partially fine partially rainy
49	28	"		cloudy, partially fine
50	29	"		"
51	30	Return	07:50 - 08:55 (1 hour 0.5 min.)	fine, stratus, cumulus photographing impossible

Number	Date	Work condition	Flight	Remarks
52	31	Stand-by		cloudy, partially fine
53	Jun. 1	"		"
54	2	"		cloudy, partially fine partially rainy
55	3	"		cloudy, partially fine
56	4	"		"
57	5	"		cloudy, partially fine partially rainy
58	6	"		cloudy, partially fine
59	7	"		cloudy, partially rainy
60	8	"		cloudy, partially fine partially rainy
61	9	"		rainy, partially cloudy
62	10	"		cloudy, partially rainy
63	11	"		cloudy, partially fine
64	12	"		"
65	13	"		"
66	14	Photographing	10:00 - 14:05 (4 hours 0.5 min.)	L-7, 9, 12, 13, 15, 16 210 photos
67	15	Stand-by		cloudy, partially fine
68	16	"		cloudy, partially rainy, partially fine
69	17	"		"
70	18	"		cloudy, partially fine
71	19	"		cloudy
72	20	"		cloudy, partially fine, partially rainy
73	21	"		"
74	22	"		cloudy, partially fine
75	23	"		cloudy, partially rainy
76	24	"		cloudy, partially fine
77	25	"		"
78	26	"		cloudy, partially fine partially rainy
79	27	"		cloudy, partially rainy
80	28	"		"

Number	Date	Work condition	Flight	Remarks
81	Jun.29	Stand-by		cloudy
82	30	"		cloudy, partially fine, partially rainy
83	Jul. 1	"		cloudy, partially rainy
84	2	Photographing	09:00 - 12:00 (3 hours)	L - 19 36 photos
85	3	Return	08:15 - 11:35 (3 hours 20 min.)	fine, stratus, high cumulus photographing impossible
86	4	"	08:50 - 10:04 (1 hour 14 min.)	fine, cumulo-stratus, cumulus photographing impossible
87	5	Stand-by		cloudy, partially fine
88	6	"		cloudy
89	7	"		cloudy, partially rainy
90	8	"		cloudy, partially fine
91	9	Return	10:00 - 12:30 (2 hours 30 min.)	fine, stratus, cumulo-stratus photographing impossible
92	10	Stand-by		cloudy, partially rainy
93	11	"		cloudy, partially fine partially rainy
94	12	"		cloudy, partially rainy
95	13	"		cloudy, partially fine
96	14	"		cloudy, partially fine partially rainy
97	15	"		cloudy
98	16	"		cloudy
99	17	"		cloudy, partially fine
100	18	"		"
101	19	"		"
102	20	Return	09:20 - 11:40 (2 hours 20 min.)	fine, stratus, high-cumulus, photographing impossible
103	21	Stand-by		cloudy, partially fine, partially rainy
104	22	"		cloudy
105	23	"		"

Number	Date	Work condition	Flight	Remarks
106	Jul.24	Stand-by		cloudy
107	25	"	08:15 - 10:15 (2 hours)	fine, cumulo-stratus, cumulus,photographing impossible
108	26	Photograph-ing	08:00 - 10:15 (2 hours 15 min.)	L - 10, 11 26 photos
109	27	Return	07:50 - 11:20 (2 hours 30 min.)	fine, stratus, nimbo-stratus,photographing impossible
110	28	Stand-by		cloudy, partially fine partially rainy
111	29	"		cloudy, partially rainy
112	30	"		cloudy, partially fine
113	31	Return	08:30 - 10:30 (2 hours)	fine, cumulus, cirrus, photographing impossible
114	Aug. 1	"	07:30 - 10:30 (3 hours)	fine, stratus, cumulo-stratus, photographing impossible
115	2	"	07:35 - 11:00 (3 hours 25 min.)	fine, cumulo-stratus, high cumulus, photographing impossible
116	3	"	08:00 - 09:30 (1 hour 30 min.)	fine, stratus, cumulo-stratus, photographing impossible
117	4	Stand-by		cloudy, partially rainy
118	5	"		cloudy, partially fine, partially rainy
119	6	"		cloudy, partially fine, partially rainy
120	7	"		"
121	8	"		cloudy, partially rainy
122	9	"		"
123	10	"		cloudy, partially fine
124	11	Photograph-ing	09:25 - 12:00 (2 hours 35 min.)	L - 12, 14, 17, 18 42 photos
125	12	"	08:45 - 11:45 (3 hours)	L - 17, 18 54 photos
126	13	"	08:05 - 11:02 (2 hours 57 min.)	L - 12, 16, 19 32 photos
127	14	Stand-by		cloudy, partially fine
128	15	"		"

Number	Date	Work condition	Flight	Remarks
129	Aug.16	Stand-by		cloudy, partially rainy
130	17	"		cloudy
131	18	"		cloudy, partially rainy
132	19	"		rainy, partially cloudy
133	20	"		cloudy, partially rainy
134	21	"		cloudy, partially fine
135	22	"		cloudy, partially fine, partially rainy
136	23	"		"
137	24	"		"
138	25	"		cloudy, partially rainy
139	26	"		"
140	27	Photographing	11:00 - 13:42 (2 hours 42 min.)	L - 1, 8, 9 35 photos
141	28	Stand-by		cloudy, partially fine
142	29	"		cloudy, partially fine partially rainy
143	30	Photographing	08:00 - 10:15 (2 hours 15 min.)	L - 9 13 photos
144	31	Return	08:15 - 11:00 (2 hours 45 min.)	fine, cumulus, high cumulus, photographing impossible
145	Sep. 1	Photographing	07:55 - 11:15 (3 hours 20 min.)	L - 11, 12, 13, 14, 15, 18 126 photos
146	2	Return	08:00 - 10:30 (2 hours 30 min.)	fine, cumulus, high-cumulus, photographing impossible
147	3	Stand-by		cloudy, partially fine
148	4	"		cloudy, partially rainy
149	5	"		
150	6	"		cloudy
151	7	"		
152	8	"		cloudy, partially fine
153	9	"		cloudy, partially rainy
154	10	"		cloudy, partially fine
155	11	"		"
156	12	"		"
157	13	"		cloudy, partially rainy
158	14	"		cloudy, partially fine
159	15	"		cloudy

c) Weather conditions during the work period

Meteorological observation records (from April to September)

Observation point	Weather / Month	Very fine		Fine		Cloudy		Rainy		Total
		days	%	days	%	days	%	days	%	days
Villa Rica	April	0.0	0.0	0.5	3.6	11.5	82.1	2.0	14.3	14.0
	May	0.5	1.6	7.0	22.6	22.0	71.0	1.5	4.8	31.0
	June	0.0	0.0	3.0	10.0	22.5	75.0	4.5	15.0	30.0
	July	1.0	3.3	7.5	25.0	20.5	69.0	1.0	3.3	30.0
	August	1.0	3.2	8.0	25.8	18.0	58.1	4.0	12.9	31.0
	September	1.0	25.0	1.0	25.0	2.0	50.0	0.0	0.0	4.0
	Total	3.5	2.5	27.0	19.3	96.5	68.9	13.0	9.3	140.0
Benteni	April	0.0	0.0	0.0	0.0	11.5	82.1	2.5	17.9	14.0
	May	2.0	7.4	7.5	27.8	15.0	55.5	2.5	9.3	27.0
	Total	2.0	4.9	7.5	18.3	26.5	64.6	5.0	12.2	41.0
Yurinaki	April	0.0	0.0	0.0	0.0	11.0	78.6	3.0	21.4	14.0
	May	0.0	0.0	2.0	8.2	19.0	82.6	2.0	8.7	23.0
	Total	0.0	0.0	2.0	5.4	30.0	81.1	5.0	13.5	37.0
Llaylla	April	0.0	0.0	4.0	28.6	6.5	46.4	3.5	25.0	14.0
	May	0.0	0.0	3.0	9.7	25.5	82.2	2.5	8.1	31.0
	June	0.0	0.0	1.5	5.4	24.0	85.7	2.5	8.9	28.0
	July	0.0	1.6	6.5	21.0	22.5	72.6	1.5	4.8	31.0
	August	0.0	0.0	8.5	27.4	18.0	58.1	4.5	14.5	31.0
	September	1.0	33.3	2.0	66.7	0.0	0.0	0.0	0.0	3.0
	Total	1.5	1.1	25.5	18.5	96.5	69.9	14.5	10.5	138.0

Observation point	Weather Month	Very fine		Fine		Cloudy		Rainy		Total
		days	%	days	%	days	%	days	%	days
Puerto Bermudez	May	0.0	0.0	1.5	21.4	4.5	64.3	1.0	14.3	7.0
	June	0.5	1.7	4.0	13.3	21.0	70.0	4.5	15.0	30.0
	July	0.0	0.0	7.0	22.6	21.0	67.7	3.0	9.7	31.0
	August	0.5	1.7	9.5	31.7	16.0	53.3	4.0	13.0	30.0
	September	0.5	12.5	2.5	62.5	1.0	25.0	0.0	0.0	4.0
	Total	1.5	1.5	24.5	24.0	63.5	62.2	12.5	12.3	102.0
San Martin De Pangoa	May	0.0	0.0	0.0	0.0	1.0	100.0	0.0	0.0	1.0
	June	0.5	1.9	8.0	29.6	16.0	59.2	2.5	9.3	27.0
	July	0.5	1.7	3.5	12.1	23.0	79.3	2.0	6.9	29.0
	August	0.0	0.0	7.0	22.6	18.0	58.0	6.0	19.4	31.0
	September	0.0	0.0	4.5	34.6	7.5	57.7	1.0	7.7	13.0
	Total	1.0	1.0	23.0	22.8	65.5	64.8	11.5	11.4	101.0
Puerto Ocopa	June	0.0	0.0	5.5	19.6	21.5	76.8	1.0	3.6	28.0
	July	0.0	0.0	7.5	24.2	22.5	72.6	1.0	3.2	31.0
	August	1.5	4.8	8.5	27.4	16.0	51.7	5.0	16.1	31.0
	September	1.0	25.0	2.0	50.0	0.0	0.0	1.0	25.0	4.0
	Total	2.5	2.7	23.5	25.0	60.0	63.8	8.0	8.5	94.0
Satipo	September	0.0	0.0	2.5	31.2	4.5	56.3	1.0	12.5	8.0
TOTAL OBSERVATION POINT	Total	12.0	1.8	135.5	20.5	443.0	67.0	70.5	10.7	661.0

3-1-3 Outline of photo processing and inspection

a) Photo processing

Films were developed immediately after photography. Leader was taken enough to prevent developing marks, as the rewind processing was adopted.

b) Inspection

Uncontroled mosaic-photo was prepared per line for photo inspection with contact prints being fixed with tapes. It was checked if there were some clouds, sufficiency of lateral overlap and other abstacles on the photos or not, which may affect the subsequent works. If there were any photos which did not satisfy the rules, re-photography was ordered promptly. Mosaic-photo of LANDSAT image was used for confirming the range of photography and plotting the positions of principal points of photographs. As for the photograph inspected and approved as good, contact prints for precision check were prepared. The above check was done according to the specifications based on the JICA's regulations for overseas survey work (for basic map) to prepare an accuracy control sheet. This sheet was devised by translating Japanese version of the original sheet in the JICA's regulations into English with the form as same as the original.

No measurement of Tilt and Tip could be made, as both RC-10 and RC-10A cameras, that were used for this year's work, had no function to put leveling conditions on the image. The measurement, therefore, was to be made after returning home.

Check of flight altitude from the photographs was also difficult, since the map used for orientation was not precise and did not bear elevations.

The two main reasons for re-photography were as follows.

(1) The deviation of the flight path was large.

(2) There were many clouds and their shadows in the photos.

c) Film annotation and preparation of photo index map

① Film annotation

Film annotation was done according to the specifications that have been in use consistently since the first-year work. The specifications are as follows.

Date of photography	:	21-5-84
Project number	:	369-84-A
Project name	:	SATIPO
No. of line and photo	:	L-1, 1
Photo scale	:	1:60,000

② Preparation of photo index map

The same orientation map prepared in the first-year work was used. The national map in a scale of 1 to 1,000,000 was enlarged to develop a basic map in a scale of 1 to 500,000.

3-1-4 Result of photography

Preparations for photography work started from April 10 and the work was continued to September 15 with 122 km remained as the unphotographed area. The photo index map is shown in Fig. 3.

Number of film rolls : 2 rolls

Number of photographs taken : 712 pcs.

Number of the final photos adopted: 539 pcs.

Number of photos taken per line is shown in Table 1.

Table-1 Photographs taken per flight line

Line No.	Photo No.	Editing No.	Photos
L - 7C	734 - 707	1 - 29	29
L - 8B	559 - 548	1 - 12	12
L - 8C	27 - 48	1 - 22	22
L - 9B	76 - 72	1 - 5	5
L - 9C	683 - 705	1 - 23	23
L - 10A	353 - 371	1 - 19	19
L - 11A	401 - 373	1 - 29	29
L - 12C	679 - 647	1 - 33	33
L - 12D	692 - 678	1 - 15	15
L - 13C	643 - 610	1 - 34	34
L - 13D	676 - 666	1 - 11	11
L - 14B	430 - 438	1 - 9	9
L - 14C	641 - 665	1 - 25	25
L - 15C	566 - 607	1 - 42	42
L - 15D	582 - 593	1 - 12	12
L - 16C	560 - 522	1 - 39	39
L - 17A	404 - 416	1 - 13	13
L - 17B	445 - 478	1 - 34	34
L - 17C	517 - 531	1 - 15	15
L - 18A	636 - 595	1 - 42	42
L - 19A	281 - 314	1 - 34	34
L - 19B	503 - 499	1 - 5	5
L - 20C	332 - 315	1 - 18	18
L - 21C	333 - 338	1 - 6	6
L - 23C	234 - 239	1 - 6	6
L - 24C	352 - 346	1 - 7	7

3-2 Third-year work

Pricking and field identification

3-2-1 Outline of work

a) Preparation

So and kita left Japan on June 24, 1984 for preparation of the work. On arriving in Lima, So and Kita carried out to fix the vehicles after checking the maintenance condition, to receive the materials and instruments sent from Japan, to arrange hiring drivers, to purchase necessary materials and to make a proper bank transactions.

b) Establishment of the Satipo Office

The office was established at the following address in Satipo. Satipo is one of the important cities in the Department of Junin. It is not only the center of administration in this district but serves as a collecting place of agricultural products and as a base to enter into a jungle area expanding in the east.

Address: HOSTEL MAJESTIC

Plaza Principal, Satipo, Junin, Peru

c) Communications

The shortwave radio equipment brought in from Japan was utilized for mutual communications between the Satipo office, subcamp and photographing staff in Lima. Regular communications were made on weather, progress of works and other activities.

d) Issuance of ID card

IGN issued ID card to each member of the survey team to carry it with him all the time.

3-2-2 Pricking

Pricking was done as to the existing control stations and bench marks, and NNSS stations, traverse stations, and bench marks that were newly established in the second-year work. Details are as follows.

	Total	Existing	Newly established	Remarks
	point(s)	point(s)	point(s)	
NNSS stations	11	1	10	
Traverse stations	6	0	6	
Bench mark	90	70	20	Triangle bench mark

a) NNSS stations and traverse stations

Pricking of NNSS and traverse stations was made on the 5-time enlargement photos taking the subsequent aerial triangulation into consideration. Eccentric element was measured and transferred to the distinct spot on the photograph with the appropriate method for the survey area, using theodlite, laser distance meter, compass and alidade.

b) Bench marks

Bench marks were pricked at about every 4 km as a standard on the 3-time enlargement photos, taking subsequent aerial triangulation into account. Height difference was measured by using plane table. As for the unphotographed area and the route where the existing stations were lost and spares, eccentric element was measured with trigonometric leveling, using theodlite and distance meter, after being transferred from original point to the distinct point or object in the photograph.

3-2-3 Field identification

Necessary data was collected to prepare a topographic map on a scale of 1 to 25,000, while, in the field, geographical names were identified and confirmed.

a) Field identification standard

Symbols used in this topographic mapping project are subject to MTCT-321 (Manual Technico De Convenciones Topograficas No.321). Before starting of the field work, prior consultation was held with IGN of Peru to deal with questionable items. Whenever questions occurred in the actual field work, consultation was made with the Peruvian counterparts on the spot.

b) Photographs used in the field

Photographs taken in the first-year work and secondary aerial photography of the second-year work were reproduced as 3-time enlargement photos in Japan before departure. As for photographs taken in the tertiary photography of the second-year work, 3-time enlargement photos were reproduced only from the photos passed the check in good.

c) Preliminary photo-interpretation

After the arrival at the survey area, a joint reconnaissance was held by all staff of field identification party, dividing the area into four zones in accordance with the distinct features of vegetations, to confirm whether symbols correspond with objects in the photos and the actual situations in the field and to get the views among the staff united for subsequent photo-interpretation.

The results of photo-interpretation were entered in the photographs with color-inked separations according to the symbols. Questions and items, which might need to be confirmed in the field, were marked.

d) Field confirmation

Mainly the questionable spots arisen in prior photo-interpretation and geographical names were confirmed as far as vehicles could go in. Meanwhile the confirmation was made by airplane in the jungle. In case of the places where vehicles were not available, information were gathered from local people as much as possible.

e) Collection of necessary data

Apart from field confirmation, data on the geographical names were collected. These data were, however, very scarce and, if any, most of them were next to useless.

4. Domestic work

4-1 Aerial triangulation

a) Outline

Photo scale: 1:60,000

Number of lines : 31 lines

Number of models : 425 models

Number of control stations: Horizontal controls: 25 points

Vertical controls : 181 points

Aerial triangulation was carried out adjusting the whole models as one block.

b) Main instruments and equipment

Point transfer device: PUG III type, WILD

Stereo comparator : Stecometer, Zeiss

Computer : ACOS-350, NEC

c) Point selection and transfer

Control points were selected having stereoscopic vision of each model of photos with precision point transfer, pricked and marked on diapositives.

(1) Pass-point

In principle, except for rivers and lakes, one pass point was selected at near the principal point, another two were at both ends of the line almost perpendicular to the principal base passing near the principal point, and the other two were between above-mentioned places. The locations of pass-points were selected on the place as flat as possible and where it was possible to have stereoscopic vision on 3 consecutive photos. Then they were pricked and marked in red on the diapositives.

(2) Tie-point

More than 1 tie-point per model was selected on distinct spot enough for measurement in the overlapped area of the photos of 2 adjacent lines. Tie-points were indicated by adding "T" next to the names of points.

(3) Point transfer

Based on the description of pricked control stations and pricked 3-time enlargement photos of bench marks,

locations of control stations were transferred having stereoscopic vision on diapositives with precision point transfer equipment.

d) Measurement of photo-coordinates

(1) In the measurement of photo-coordinates, reference number was attached to control station's pass-points and tie-points, which is necessary for inputting data into the computer.

Reference number was attached with the following rule.

< example >

Control point

300010 : Original point of JMR 1

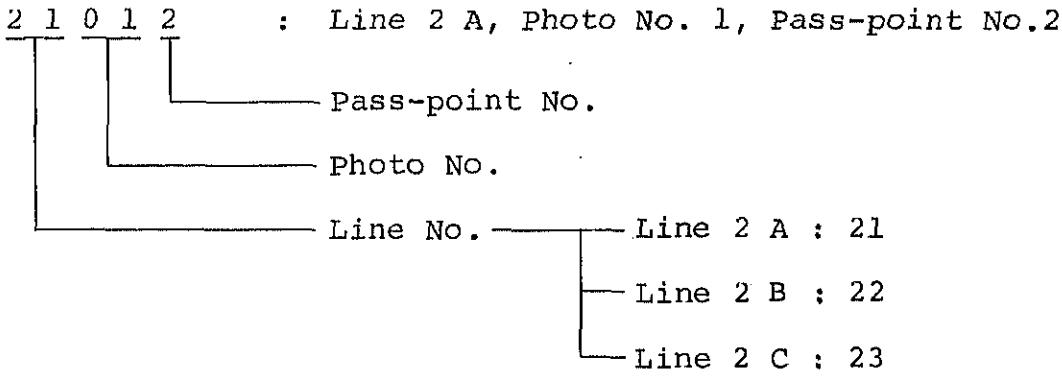
300011 : Eccentric point of JMR 1

400010 : Bench mark

500010 : Original point of traverse point 1

500011 : Eccentric point of traverse point 1

(Pass-point and tie-point)



(2) Measurement of fiducial marks, pass-points, tie-points, and bench marks of each model was made twice each separately with stereo comparator. If its discrepancy

was over 0.02 mm, another measurement was made to have mean value of all measurements.

Even after getting results of computation, the model was to be re-measured in the following three cases: (1) residuals of fiducial mark was over 0.03 mm, (2) residual vertical parallax of relative orientation was over 0.03 mm on diapositives, or (3) discrepancy of pass-point between two adjacent models was over 0.5% of photographing height in both planimetry and ground height.

e) Computation of block-adjustment and accuracy

As for the block-adjustment, simultaneous adjustment computation was made on planimetry and height in which the entire area was regarded as one block. Accuracy is as follows:

Lines	Models	Control points		Residuals of control points (Horizontal)		Residuals of control points (Vertical)	
		Horizontal	Vertical	Mean square error	Maximum value	Mean square error	Maximum value
31 lines	425 models	25 points	181 points	2.88 m	7.02 m	2.22 m	-7.65 m

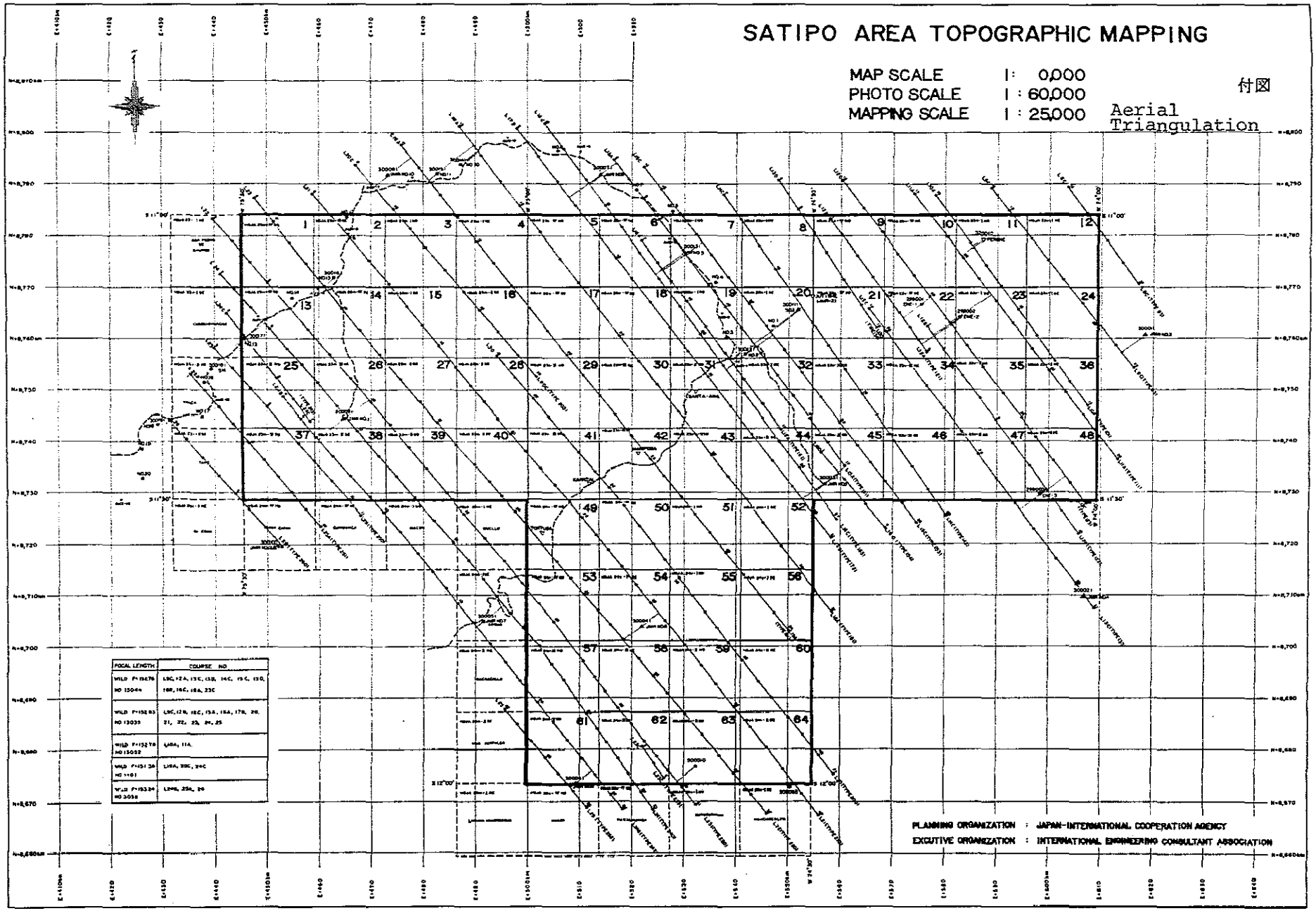
As there were existing 1 to 25,000 maps, which were produced as original manuscripts to compile 1 to 100,000 scale-deducted maps, covering the area adjoining the southern and western edge

of the mapping area, some points with obvious coordinates in those maps were chosen as given points for tying.

4-2 Plotting

a) Outline and specifications

Mapping scale	:	1 : 25,000
Coverage	:	12,070 km^2
Contour interval	:	Intermediate contour line : 25 m
		Index contour line : 100 m
		Supplementary contour line: 12.5 m
		(Supplementary contour line is to be indicated on a case by case basis.)
Plotter	:	Autograph A-7
		Stereo plotter A-8
		Metrograph
Projection	:	UTM projection
Neat line	:	East to west 7.5' x north to south 7.5'
Plotting paper	:	Polyester base film No. 500
Plotting	:	High-speed automatic plotter


SATIPO AREA TOPOGRAPHIC MAPPING
MAP SCALE 1: 0,000
PHOTO SCALE 1 : 60,000
MAPPING SCALE 1 : 25,000
付図
Aerial Triangulation
PLANNING ORGANIZATION : JAPAN-INTERNATIONAL COOPERATION AGENCY
EXCUTIVE ORGANIZATION : INTERNATIONAL ENGINEERING CONSULTANT ASSOCIATION

b) Plotting of control stations, etc.

Neat lines, grid lines, longitude and latitude lines, control stations, pass-points and tie-points were plotted on the plotting paper. Plotting paper was designed in a little wider than normal case with paying a consideration for orientations, as the line of the aerial photography was tilted about 45° against the bottom edge of the neat line. Plotting was done by high-speed automatic plotter. Plotting error was not to be over 0.2 mm on the completed topographic map.

c) Orientation

(1) Relative orientation was performed with 6 pass-points. Residual vertical parallax was not to be over 0.02 mm on the diapositives.

(2) Absolute orientation was practiced with results of pass-points and tie-points decided by aerial triangulation, and also with control stations, pricked horizontal and vertical points and others. Tolerance of absolute orientation was to be within 0.5 mm in planimetry and within 7 m in elevation. After completion of absolute orientation, the result was recorded in plotting orientation record.

d) Detail plotting

(1) Stereo plotting was performed in the order of running feature, buildings, vegetations and contour lines to leave out no single object.

(2) Symbols were used for stereo plotting as a rule according to the symbol specifications. However, simplified symbols were used for that purpose, since

symbols were so complicated to use in plotting and there were also symbols classified by colors.

(3) Field identification photographs were used for stereo plotting. In case operator's interpretation differed from field identification results, the spot in question was marked on the photographs and commented for reconfirmation in the stage of editing and supplementing.

(4) Color classification for stereo plotting was as follows.

Red : Roads

Blue : Lake lines, rivers

Black : Contour lines (index contour lines), works, symbols, buildings

Green : Vegetation boundaries, swamps and marshes boundaries

Orange: Contour lines (intermediate contour lines and supplementary contour lines)

(5) As to roads, the center of roads was plotted in one red line. Whenever the actual width of road, however, could be expressed on the 1 to 25,000 completed final topographic maps, it was plotted with two red lines tracing its edges.

(6) In this stage, on the expression of the concentrated buildings, they were plotted one by one, taking into account transfer of them and inspections on the expression of their shapes in the later course of editing.

(7) Vegetation, cultivated and uncultivated lands, swamps and marshes were plotted with not only making photo-interpretation by appearances, colors, patterns shades and shadows, but referring to field identification photographs.

(8) In drawing contour lines, special attention was paid to maintain original topographic characteristics. As for distorted surface area, its elevation was measured, aside from the specified spot height, to avoid omission of contour lines.

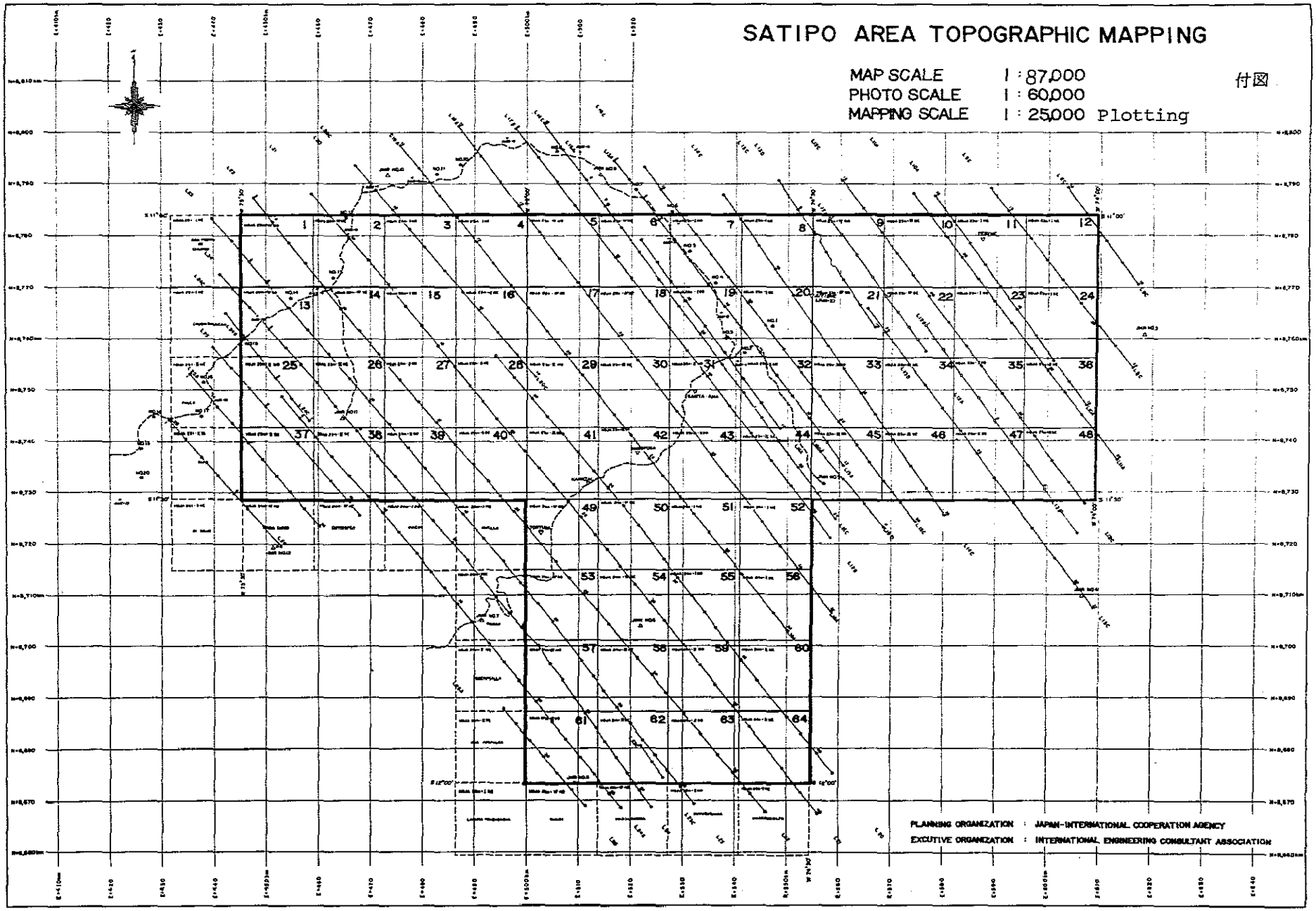
(9) Spot height was measured twice separately to adopt its mean value. The unit of measurement was 1 m. Measurement density of spot height, including horizontal control points, was to be more or less every 5 cm on the sheet.

Location of spot height were pricked on control station source maps and original manuscripts in plotting stage and measured value were recorded in control station source maps. Location of measurement of spot height was to be as follows:

i. Principal summit and large saddle of mountains
ii. Principal turning point of roads
iii. River meeting points, mouths of a valley
iv. Critical point of principal slopes
v. Representative points
vi. Bottom of depressions
vii. Other points necessary for defining topography

(10) In the sheet tying work, as there were existing map in a scale of 1 to 25,000 (intermediate contour line: 50 M) on west and south side of outside the mapping area to be used for developing 1 to 100,000 scale-deducted maps, they were tied with. Every sheets in the mapping area were tied with their surrounded sheets without fail.

(11) Areas, where clouds were in the photograph, were carefully supplemented with the photographs of its adjacent lines. The range of blanks left as a result was drawn in the control station source maps.


SATIPO AREA TOPOGRAPHIC MAPPING
MAP SCALE 1 : 87,000
PHOTO SCALE 1 : 60,000
MAPPING SCALE 1 : 25,000 Plotting
付図
PLANNING ORGANIZATION : JAPAN-INTERNATIONAL COOPERATION AGENCY
EXCUTIVE ORGANIZATION : INTERNATIONAL ENGINEERING CONSULTANT ASSOCIATION

5. Suggestions on the fourth-year work

Planned as the fourth-year work are field completion survey in the field work, and editing, drafting and printing in the domestic. In the supplementary survey, it is necessary to confirm questionable items arose and notations drawn in the plotting and editing stage and to investigate and confirm changing of topographic features due to some development projects. Above all, indispensable is a sufficient consultation with IGN of Peru on the geographical names to avoid any possible problem.

The third-year work was implemented with the relationship of mutual reliance, and proper and active cooperation of the Peruvian side, IGN as main counterpart. It is desirable, therefore, that the fourth-year work will also be performed under the same cooperation keeping further contact with each other.

6. Impressions

The survey area stretching from the Andes, located in the east part of the survey area, to the upriver district of the Amazon was in a severe natural environment where weathers suddenly changed and there were still no other means of transportation than walking and boats due to the yet incomplete transportation network. Nevertheless, the entire work of this year was able to be executed in safety, being helped by ING and other concerned Peruvian agencies and making the best use of the experience in the field work of the second-year stage.

As for the aerial photography, the disposition of the meteorological observation staff was rearranged according to circumstances not in order to miss good weather, coming often in the early morning, for shooting in the remaining area. The regular meetings with SAN, then, were held to keep prompt and accurate photography. And SAN was thorough to make assurance doubly sure on aircraft's stand-by for letting no opportunity slip.

By these measures, aerial photography of the entire planned area was able to be completed holding of the chance occurring in the second half of the work period. In the pricking, as to the area not yet covered by the photographs at that moment, eccentric observations of the control stations were done at the places, which were thought to be obviously interpreted in the photographs to be taken later, to bring no hindrance to the result. There was no problem in particular in the field identification work, but only it took a lot of time to put the photographs in order, which had been taken in lines crossing each other.

On the other hand, in the domestic work, the focus, the index-coordinates and etc. of the photographs to be used for computation in the aerial triangulation were corrected if necessary, as exceptionally five different aerial cameras were used due to changing the aircrafts utilized in the prolonged aerial photography over some years.

The symbols, which had been used in the field identification, were also applied in the course of detail plotting with a little modification to avoid confusing the classification of symbols.

During the work period, the director IGN visited the surveying field for the observation. It can be convinced that the technical cooperation for Peruvian side has been done sufficiently through the actual work in the field having proper communications with Peruvian counterparts and the duty as goodwill mission between Japan and Peru has been fulfilled without any trouble with local inhabitants.

General development, including for in jungle, is being steadily under way by the local organizations concerned. There is a great expectation toward the completion of these topographic maps which will be available for the area's detailed planning. We hope that a complete topographic map will be made based on the results of the second- and third-year work to contribute to the regional development.

We would like to express our deep gratitude to the officials concerned of the Instituto Geografico Nacional (IGN), Municipal Office of Satipo, San Ramón and Tarma, Mazamari Police Force,

Local Police, the Japanese Embassy in Peru and Geographical Survey Institute of the Ministry of Construction for their kind cooperation given in the actual work.

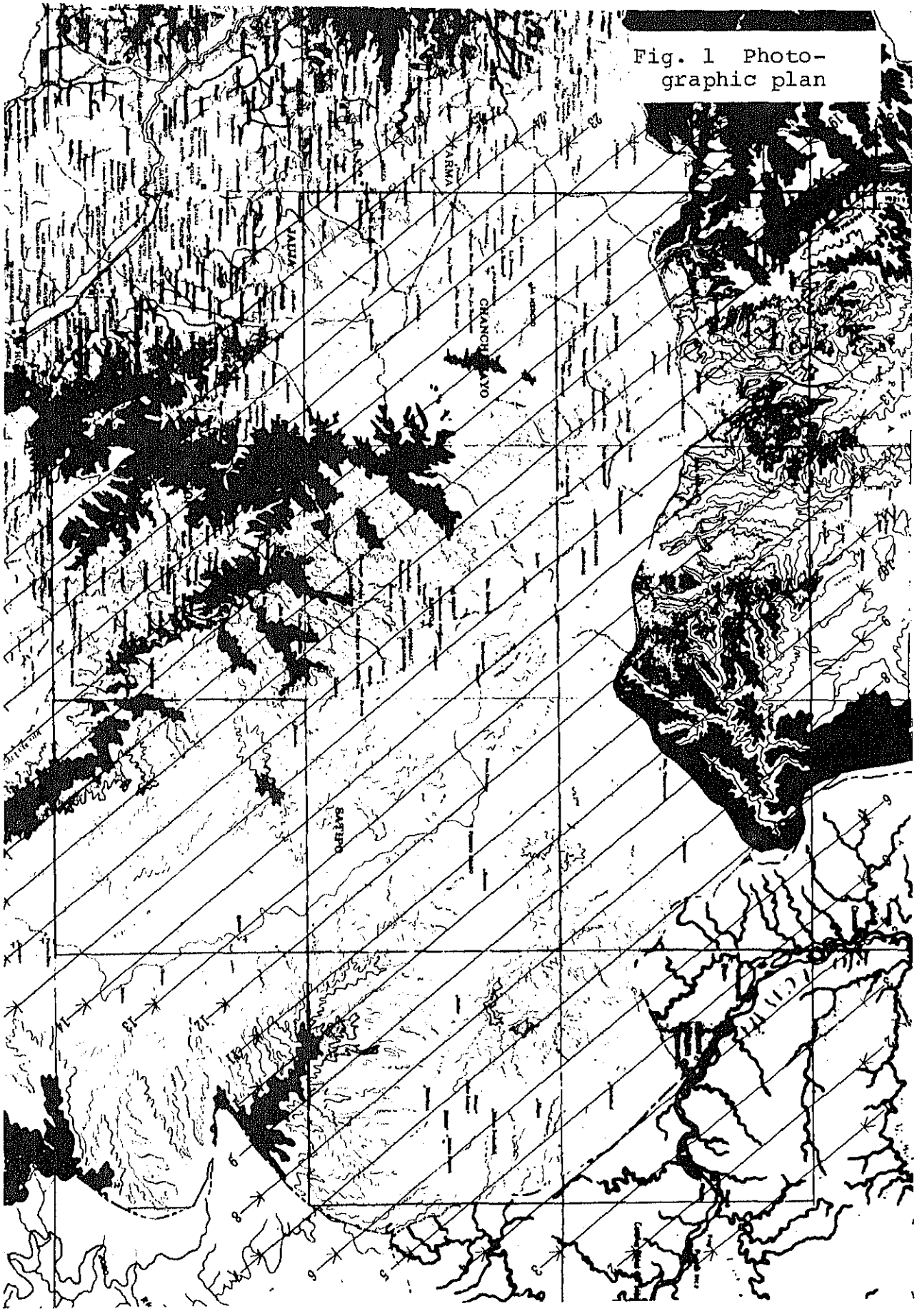


Fig. 1 Photo-graphic plan

Fig. 2 Photographic plan
for the second-year work

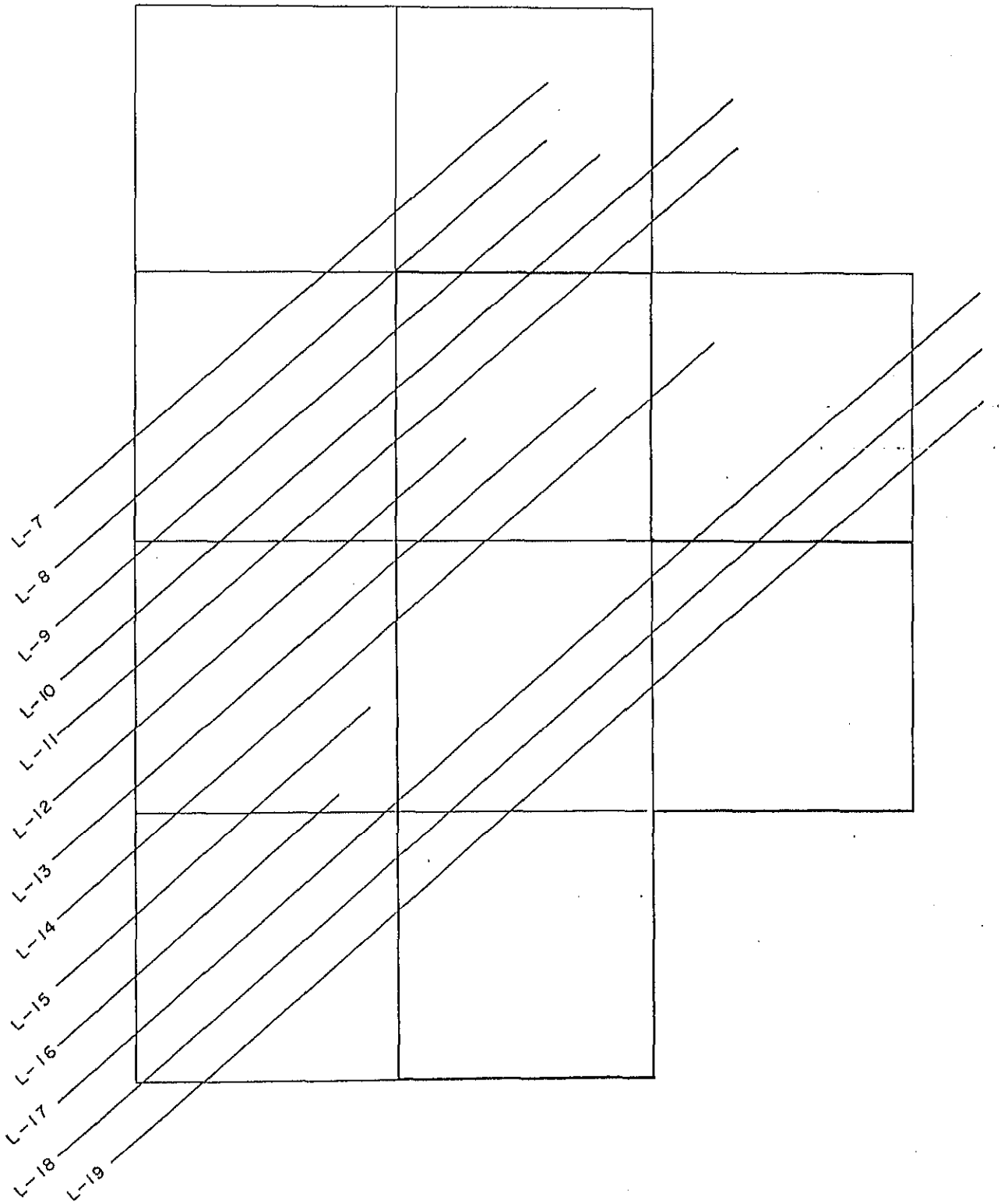
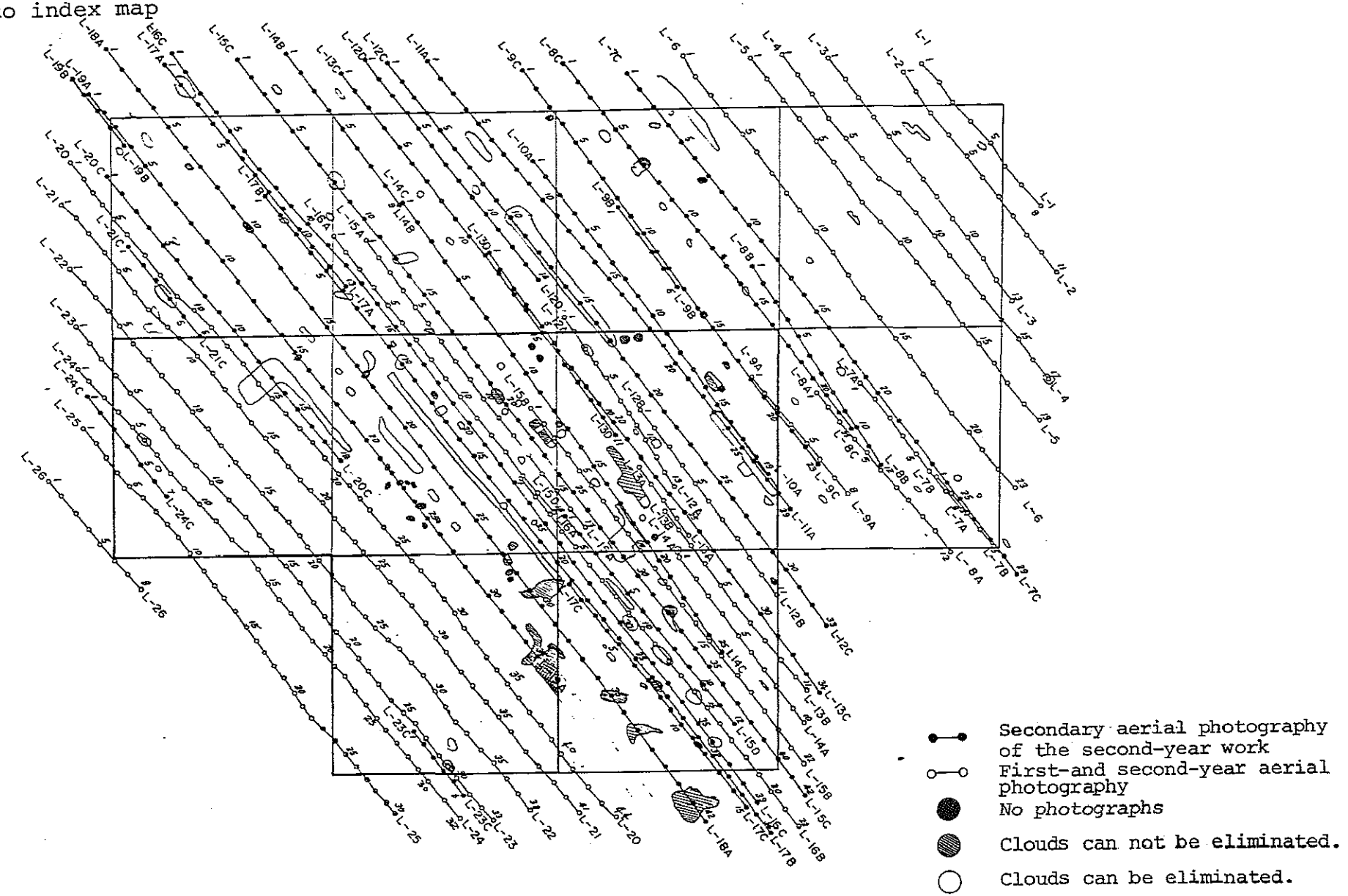


Fig. 3 Photo index map



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 7th to 17th July, 1984, 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 set up the guidelines for the 3rd year work.

Delegations were as follows:

Japanese Government:

Mr. Kazuhiko OHTAKE, Technical Advisor
Mr. Hiroshi MURAKAMI, Advisor

JICA Mission:

Mr. Masayoshi TAKASAKI, Leader
Mr. Toshimasa NAGASHIMA, Deputy Leader
Mr. Yoshiyuki OHNUMA, Member
Mr. Toshiyoshi SOH, Coordinator

IGN:

Brigadier General Jorge ROSALES VIERA, Director, IGN
Colonel José TASAICO DEL SOLAR, Deputy Director, IGN
LT. Colonel Víctor MONTOYA ASTULLE, Chief of the Photogrammetry 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 the following items:

1. Working Plan of 3rd year

   (1) Pricking: NNSS, 11 points
   Travers Point, 6 points
   Bench Mark, 90 points

   (2) Classification: 12,070 km2

   (3) Aerial Photography: 1,907.5 km2

   (4) Aerial Triangulation: aproximately 415 models

   (5) Stereo Plotting: 12,070 km2 (64 sheets)

2. Details of the Plotting Work

   (1) Simbols and style sheets for map shall be as prescribed by "Manual Técnico de Convenciones Topográficas" (MT-321).

   (2) Blank spots in plotting sheet caused by clouds on aerial photographs shall not be printed on the final printing sheets.

   (3) Contour intervals will be 25 M and the 100 M integral countour will be shown as index contour lines.

   (4) All traversing and, NNSS points which were established in 2nd year work and all of existing trianlation point shall be indicated on the map as simbol of the triangulation point.

   (5) Bench Marks shall not be indicated on the map.

   (6) Administrative boundaries shall not be indicated.

   (7) Discrepancies araising during the field classification shall be settled by mutual consent.

3. To ensure the safety in the Project area IGN will:

   (1) Issue identification cards.

   (2) Nominate the following members:
   Cap Guillermo QUINTANA, Chief of Party, one medical assistant, one radio operator and 10 drivers.

4. The Japanese Mapping Team will provide field quarters for the members of IGN.

5. Transfer of technology in Japan:
   The Trainning Course for one Officer of IGN in Japan, will be informed in detail to IGN, by JICA, shortly.

There were no other points for discussion, and the meeting was adjourned. The present proceedings were drafted, read an found in good order, and were signed by the heads of both delegations, on 17th July 1984.

M Takasaki

Mr. MASAYOSHI TAKASAKI
Leader, JICA Mission

JORGE ROSALES VIERA
General Brigadier
Director, IGN

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

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

In Lima, the capital of the Republic of Perú, meetings were held from the 10th to 17th September, 1984, in the office of the Instituto Geográfico Nacional (to be referred to as IGN), between the Survey Mission sent by the Japan International Cooperation Agency (to be referred to as JICA) and the IGN. Its purpose was to evaluate the result of the works carried out in the 3rd year and to discuss the guidelines for the remaining works of the 3rd and the 4th year.

Delegations were as follows:

Japanese Government:

Mr. Kunio NONOMURA, Technical Advisor

JICA Mission:

Mr. Masayoshi TAKASAKI, Leader
Mr. Toshimasa NAGASHIMA, Deputy Leader
Mr. Yoshiyuki OHNUMA, Member
Mr. Toshiyuki HARADA, Member
Mr. Toshiyoshi SOH, Coordinator

IGN:

Brigadier General Jorge ROSALES VIEPA,
Director, IGN
Colonel José TASAICO DEL SOLAR,
Deputy Director, IGN
LT. Colonel Víctor MONTOYA ASTULLE,
Chief of the Photogrammetry 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 the following items:

1. Work completed in the 3rd year

   (1) Pricking: NNSS, 11 points
   Travers Point, 6 points
   Bench Mark, 90 points

   (2) Classification: 12,070 km2

   (3) Aerial Photography: approximately 1,790 km.

2. Work to be carried out successively in the 3rd year

   (1) Aerial Triangulation: approximately 415 models

   (2) Stereo Plotting: 12,070 km2 (64 sheets)

3. Both parties agreed on the following items as to details of the Plotting Work besides those items agreed on the Proceedings of the Meeting dated 17th July 1984.

(1) Bridges less than 25 m long shall be indicated if necessary.

(2) Sabana and Hierba Tropical shall not be indicated unless they have clear boundaries such as those of Pastizal.

(3) Blank spots in plotting sheet where aerial photographs were not taken shall not be printed on the final printing sheets.

4. Aerial Photography shall not be carried out from now on in this project.

5. Working Plan of the 4th year

(1) Field Completion

(2) Color Separation Drafting

(3) Color Proof Printing

(4) Printing

6. IGN will arrange necessary procedure for JICA's training in Japan in close contact with JICA Lima Office as soon as possible.

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 17th September 1984.

M. Takasaki

Mr. MASAYOSHI TAKASAKI
Leader, JICA Mission

JORGE ROSALES VIERA
General Brigadier
Director, IGN