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1. RECEIVING AND RECORDING

INPE's Receiving Station at Cuiabá operates two independent tracking and receiving systems, both capable of receiving band-S Landsat transmissions. The old system, installed in 1973, is now kept mainly as a backup for the new one, installed in August, 1982, to handle Landsat-4 reception in both S and X bands. This new system is currently used to receive Landsat-4 MSS while TM transmissions to ground stations do not start. After the new system was installed, the old one was used to record RBV from Landsat-3, up to March 31, 1983, and also Landsat-4 MSS for almost 6 months, after the new antenna was struck by lightning in October, 1982, which caused severe damages in several equipments. The existence of the backup allowed continued operation while they were repaired.

The recording subsystem has undergone a modification in its telemetry data recorder to enable it to record 8 kbps (formerly only 1 kbps could be recorded) Landsat-4 telemetry. This modification was concluded in December 28, 1982.

In November, 1982 a new HDDR was added to the recording subsystem, to allow TM recording. This is a NASA-compatible Martin-Marietta 28-track serial-in-serial-out machine, that can also record MSS at reduced speed and can back up the 10-year-old Ampex FR-1928 in case of need. Test transmissions of PN code in band X, on February 5 and 6, 1983, were activated by NASA to check the system, which performed successfully.

In September, 1983, a moving-window display facility was added for monitoring TM recorded signal quality and estimating cloud cover on site. This completed the new receiving and recording system.

From October 01, 1982 to September 30, 1983 the station recorded:

- 3 MSS passes from Landsat-3
- 96 RBV passes from Landsat-3
- 618 MSS passes from Landsat-4.

At present, only Landsat-4 MSS and telemetry data are being recorded, but the station is ready for receiving and recording TM when the time comes. The RCA TR-70 RBV recorder will be sent to the Processing Station at Cachoeira Paulista to be used in playback, as a backup to the existing one.

The Receiving Station continues also to support the NASA "Back-up Plan" with the NASA-installed 14-track HDDR.

2. PROCESSING LABORATORIES

The Electronic and Photographic Laboratories operated normally in the period from October 1982 to September 1983. First generation film originals and CCTs were produced under user request only. MSS Quick-look images, on the other hand, were produced systematically from all acquired passes and constitute the basis of the Acquired Images data base, started in 1982.

This data base grows chronologically (quick-look production takes place normally 10 to 15 days after acquisition, which was not certain with the Processed Images), and this allows microfilming to follow closely the acquisition date, in contrast to the previous situation when a long delay could pass between acquisition and distribution of microfilmed imagery to the User Services Centers.

The Cartographic Applications Laboratory, created in 1982 to carry out cartography-related tasks, has achieved, in cooperation with the Army cartographic agency, during the mentioned period, the publication of two 1:250,000 controlled image charts (see one of them - the Campo Grande chart - in Annex A) and has already provided the precision-processed imagery necessary for the production of three additional charts. Besides that, 67 scenes were produced for the updating

of existing maps and charts by the official mapping agencies in Brazil.

From October 1982 to September 1983, the Processing Labs delivered:

- In 70 mm B & W originals:
 - 217 new MSS passes;
 - 124 regenerated MSS passes;
 - 1 new RBV pass;
 - 1 regenerated RBV pass.
- In Digital form:
 - 139 MSS Computer Compatible Tape (CCT) sets
- In Quick-look images:
 - 609 full MSS passes.

RBV processing has been suspended until new shading - correction tables are established. These tables are time-consuming to derive due to the fact that INPE does not have RBV in digital form, which prevents the use of computer help in the easiest form.

During the last months several civil and electrical works were carried in the Laboratories to prepare the building to receive the new TM processing system, expected to arrive in Brazil in mid-November.

This new processing system is built around a VAX-11/780 and has a 5-inch Electron Beam Recorder as the main image generation device. The original images are produced in 1:2,000,000 scale, in black-and-white (see a 1:1,000,000 enlargement of a sample image in Figure 1). Having a geometric fidelity comparable (0.01%) to that of considerably more expensive Laser Beam Recorders, the EBR allows a higher system throughput than otherwise achievable within the same price range, for not requiring resampling of any sort to generate corrected images.

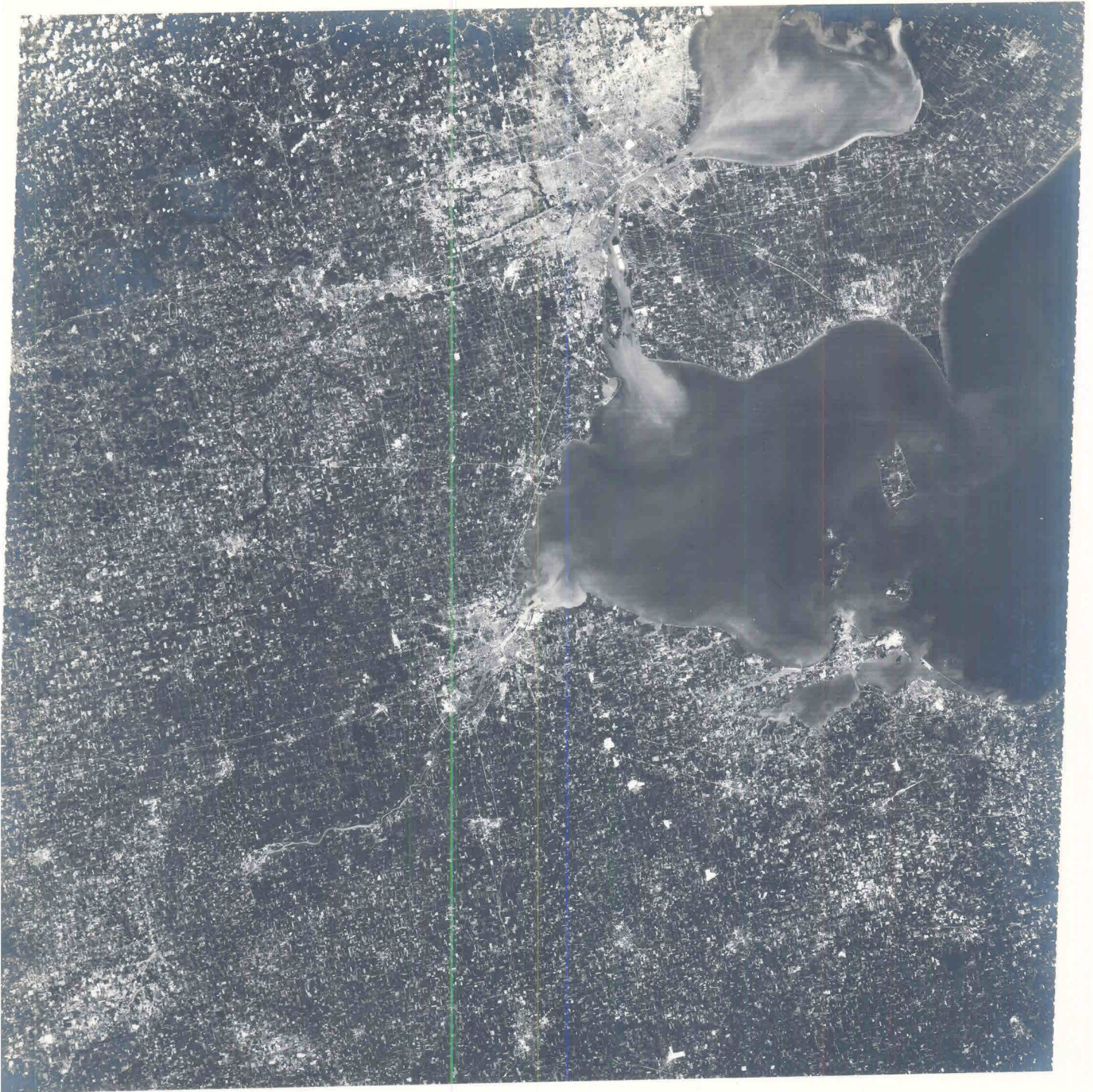
W 84 00

W 83 30

W 83 00

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W 82 00



W 84 30

W 84 00

W 83 30

W 83 00

W 82 30

BRASIL-CNPq/INPE

019D059

TM4-00130-T076

25JUL82 WRS: 019D059 HDE R P H 'C: N41:47/E000:00 TM - LANDSAT 4

SOL: EL56 AZ122 R191 T/C: 82206-154122.2
R=0 GAMA=0 QC=00 PROC 25MAR83 10:41

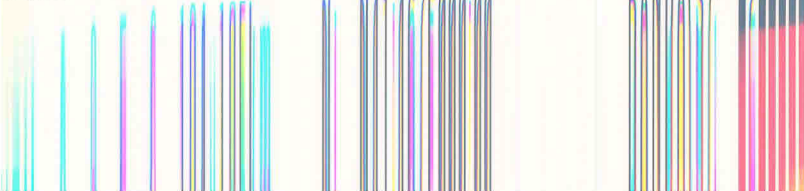


Figure 1 - TM image generated by the new CNPq/INPE processing
system
(Area: Detroit, USA; Date: July 25, 1982; HDDT provided by NASA)

CCTs will be initially produced containing video in geometrically raw form. After end of acceptance in Brazil studies will be started concerning geometric corrections for CCTs.

An update of the Station plans concerning TM processing is presented in Table 1.

3. DATA DISTRIBUTION

From October 1982 to September 1983 INPE distributed a total of 3895 images (see quarterly summaries in Annex B), 3756 being photographic frames and 139 digital products (CCTs). The last Price List update was on April 1983, consisting only of dropping the NOAA distribution fee from non-Landsat-4 products (see Annex C).

At this moment, we register 1402 Landsat data users, 227 of them from foreign countries.

The quarterly issues of the Acquired Images Catalog are being distributed to subscribers, with significant reduction of the time between data acquisition and the availability of information about them, with respect to the discontinued Processed Images Catalog.

A Landsat-4 WRS coverage map was prepared by the Cartographic Applications Lab and is distributed to all users (see Annex D).

A sixth User Services Center was established in Manaus in April, 1983, giving assistance to and receiving requests from users from the Northern Region of Brazil (see Figure 2). The former five Centers operated normally during the period of this report. Intention exists to install remote computer terminals in these centers, giving them access to the data bases in the Processing Labs at Cachoeira Paulista. The arrival of the VAX-11/780 Computer system is a key factor

in this idea, once the existing PDP-11/34 is already overloaded with the local use, mainly due to its minute disk capacity (5 MB). Several applications running on it will be transported to the VAX for enhanced performance and availability.

One of the first applications to be transported will be a recently implemented (August 1983) Order and Production Management system, developed in-house to integrate and supersede the manual procedures of order handling and production schedule + control in the processing labs. It is analogous, in essence, to the INORAC system of the EROS Data Center, although probably an order of magnitude less sophisticated. Nevertheless, it represented a milestone in the activities of INPE's Image Generation Department.

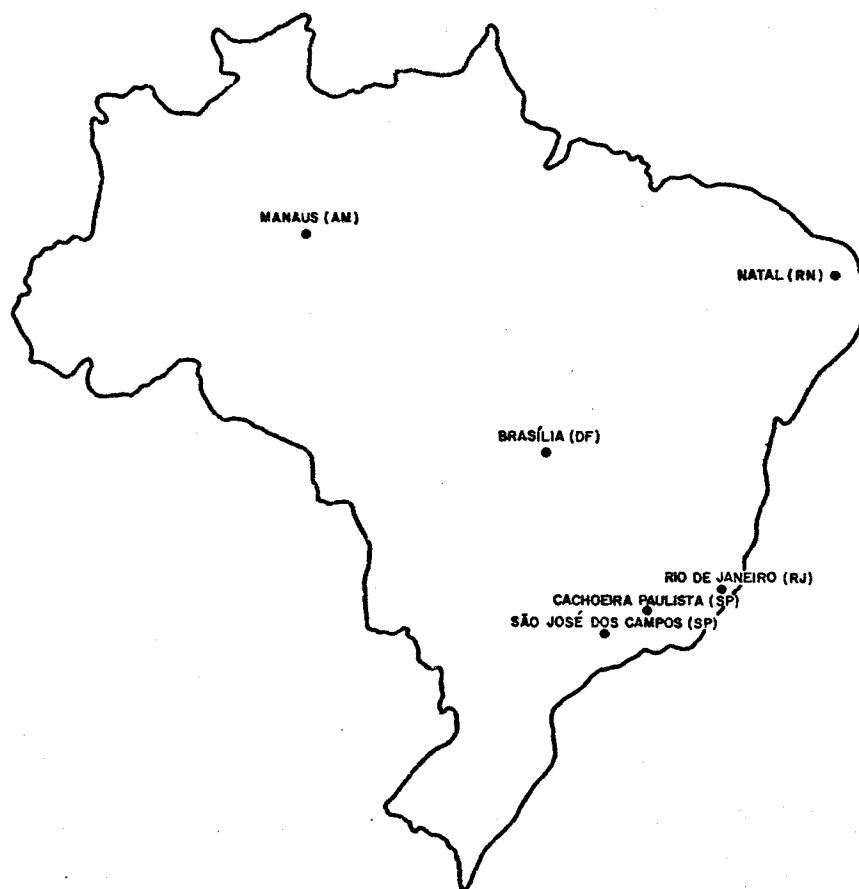


Fig. 2 - User Services Centers in Brazil

TABLE 1
BRAZIL STATION PLANS FOR TM PROCESSING CAPABILITY

OPERATIONAL PROCESSING DATE	PLANNED OUTPUT PRODUCTS		
	TYPE	VOLUME	FORMAT
3/84	Quick-look film (1 band)	Whole acquisition	Average Earth Rotation Corrected
	Bulk Film Product (4 bands)	5 scenes/day	System corrected
	CCT (7 bands)	2 scenes/week	Radiometrically corrected ; geometric model included
7/84	Bulk Film Product (4 bands)	20 scenes/day	System corrected
	CCT (7 bands)	3 scenes/week	Radiometrically corrected ; along-scan geometric correction is applied; geometric model included
12/84	Precision Film Product	3 scenes/week	System corrected + GCPs

ANNEX A

THE CAMPO GRANDE 1:250,000 SCALE

CONTROLLED IMAGE CHART

CNPq



Conselho Nacional de Desenvolvimento Científico e Tecnológico
Instituto de Pesquisas Espaciais
Departamento de Geração de Imagens de Satélite
Cachoeira Paulista - São Paulo
Brasil

MAPA ÍNDICE COBERTURA DO LANDSAT "4"

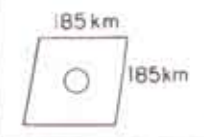


LEGENDA

- Limite norte da grade continental útil
- Limite sul da grade continental útil

ESCALA

1 / 15000.000



O centro da imagem pode variar / da coordenada nominal em torno ± 20 Km

ANNEX B

DATA ACQUISITION, PROCESSING AND

DISTRIBUTION SUMMARIES

B.1 Scenes Received and Recorded 1973-1983

B.2 Images Distributed to Users 1973-1983

B.3 CCTs Produced to Users 1973-1983

B.4 Images and CCTs - quantity and revenue 1973-1983

B.5 Quarterly Sales/Distribution Summaries

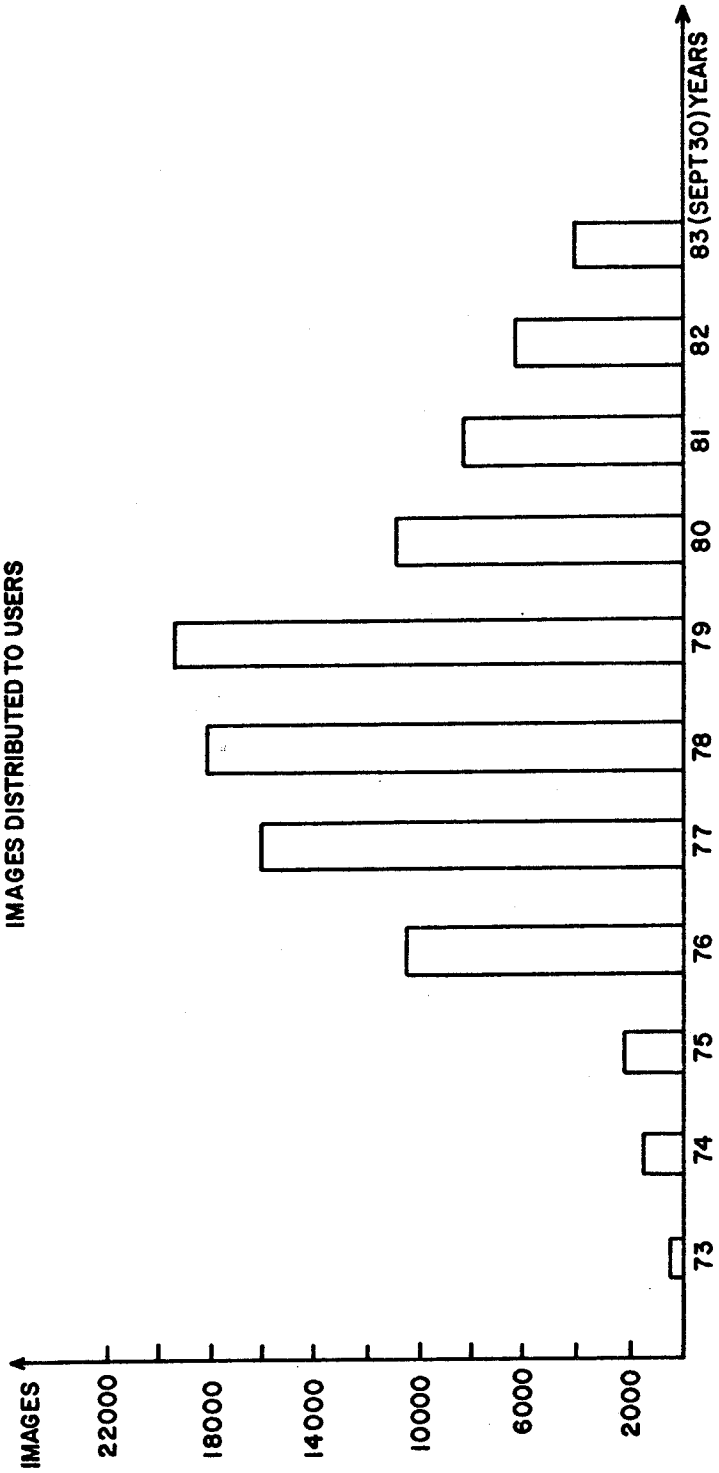
October, 1982 to September, 1983

BRAZIL
CNPq / INPE - LANDSAT SYSTEM
SCENES RECEIVED AND RECORDED
x
SCENES CONVERTED TO IMAGES

RECEIVED & RECORDED		1973 (may)	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983 (sept.30)
SATELLITES	YEARS											
LANDSAT 1	MSS	6114	14674	23112	32528	↑	↑	↑	↑	↑	↑	↑
	RBV	—	—	—	—	—	—	—	—	—	—	—
LANDSAT 2	MSS	—	—	1550	3370	19632	23952	32532	38626	51958	52948	↑
	RBV	—	—	—	—	288	↑	↑	↑	↑	↑	↑
LANDSAT 3	MSS	—	—	—	—	—	11487	17364	25768	↑	29869	↑
	RBV	—	—	—	—	—	1579	9477	23161	37329	43155	45201
LANDSAT 4	MSS	—	—	—	—	—	—	—	—	—	4383	14481
	TM	—	—	—	—	—	—	—	—	—	—	—
TOTAL	MSS	6114	14674	24662	35898	52160	67967	82424	96922	110254	119728	129826
	RBV	—	—	—	—	288	1867	9765	23449	37617	43443	45489
TOTAL	MSS	—	—	2232	5581	11162	19722	25281	27136	35364	40591	42187
	RBV	—	—	—	—	—	—	802	3470	9410	9497	9531

* CCT'S ARE CONVERTED BASED ON USER'S REQUEST

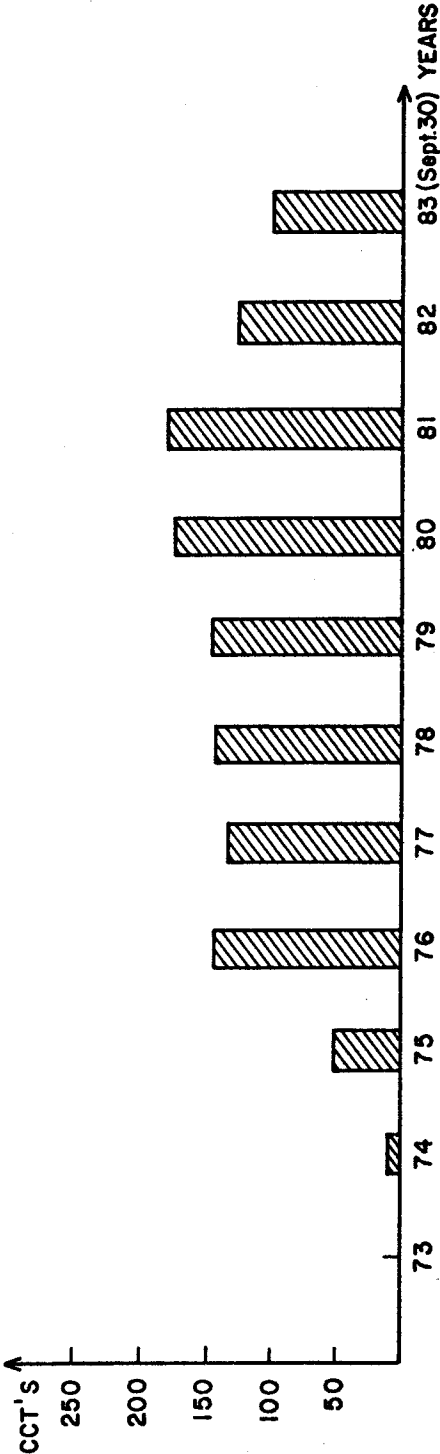
BRAZIL
CNPq / INPE - LANDSAT SYSTEM
IMAGES DISTRIBUTED TO USERS



	73	74	75	76	77	78	79	80	81	82	83 (SEPT 30)
BRAZ. USERS	323	1230	2094	10025	14971	17273	16269	10216	6986	5350	2313
NON-BRAZ. USERS	—	—	—	230	438	776	2782	1184	1305	748	504
TOTAL IMAGES	323	1230	2094	10255	15409	18049	19051	11400	8291	6098	2817

LGSOWG MEETING
NOV 1983

BRAZIL
CNPq/INPE-LANDSAT SYSTEM
CCT'S PRODUCED TO USERS



	73	74	75	76	77	78	79	80	81	82	83(Sept.30)
BRAZ. USERS	—	10	55	120	95	105	107	99	103	78	95
NON-BRAZ. USERS	—	—	—	21	37	36	39	77	81	47	24
TOTAL CCT'S	—	10	55	141	132	141	146	176	184	125	119

BRAZIL
 CNPq/ INPE - LANDSAT SYSTEM
 IMAGES AND CCT'S DISTRIBUTED

QUANTITY	PROD.	YEARS											83 (SEPT 80)
		73	74	75	76	77	78	79	80	81	82		
IMAGES	Images	323	1230	2094	10255	15409	18049	19051	11400	8 291	6098	2817	
	CCT's	—	10	55	141	132	141	146	176	184	125	119	
REVENUE	Images	—	4,808	26,020	57,695	118,457	232,661	251,367	338,556	291,492	484,508	192,743	
	CCT's	—	—	—	4,200	7,400	7,200	20,853	39,345	52,019	64,425	43,964	
TOTAL US \$		—	4,808	26,020	61,895	125,857	239,861	272,220	377,901	343,511	548,933	236,707	

CNPq/INPE

LANDSAT PRODUCT SALES/DISTRIBUTION SUMMARY

FOR THE FOURTH QUARTER (OCT-DEC) 1982

I.A - Total number of LANDSAT images by frames sold or distributed to users and monetary value US\$

	Black & White	Color	Total
Frames	813	126	939
US\$	95,598.00	10,420.00	106,018.00

B - Total number and total sales in US\$ of MSS scenes sold or distributed to users in CCT form

Number of MSS CCT's: 20 11,287.00

C - Total LANDSAT products sold or distributed for the quarter:

Photographs (B & W and Color Frames):	939	106,018.00
CCT's	: 20	<u>11,287.00</u>
	TOTAL	117,305.00

II. Classification of sales and distribution of photo products and CCT's by type of user

USER TYPE	PHOTO PRODUCTS		CCT's	
	% by money	% by frames	% by money	% by CCT's
A. National Government	86.62	86.44	82.04	84.21
B. State/Provincial Govt.	2.71	1.99	-	-
C. Academic	1.57	1.37	-	-
D. Industry	5.41	5.76	3.95	3.51
E. Individuals	0.21	0.15	-	-
F. Outside the country	3.48	4.29	14.01	12.28
TOTAL	100.00%	100.00%	100.00%	100.00%

CNPq/INPE

LANDSAT PRODUCT SALES / DISTRIBUTION SUMMARY

FOR THE FIRST QUARTER (JAN-MAR) 1983

I.A - Total number of LANDSAT images by frames sold of distributed to users and monetary value in US\$

	Black & White	Color	Total
Frames	293	38	331
US\$	18,471.00	2,054.00	20,525.00

B - Total number and total sales in US\$ of MSS scenes sold or distributed to users in CCT form

Number of MSS CCT's : 26 12,722.00

C - Total Landsat products sold or distributed for the quarter:

Photographs (Color and B & W frames):	331	20,525.00
CCT's	: 26	<u>12,722.00</u>
	TOTAL	33,247.00

II. Classification of sales and distribution of photo products and CCT's by type of user

USER TYPE	PHOTO PRODUCTS		CCT's	
	% by money	% by frames	% by money	% by CCT's
A. National Government	21.14	21.15	3.84	3.85
B. State/Provincial Govt.	9.97	9.97	23.09	23.08
C. Academic	28.39	28.40	49.98	50.00
D. Industry	9.06	9.06	-	-
E. Individuals	16.01	16.01	-	-
F. Outside the country	15.43	15.41	23.09	23.07
TOTAL	100.00%	100.00%	100.00%	100.00%

CNPq/INPE

LANDSAT PRODUCT SALES/DISTRIBUTION SUMMARY

FOR THE SECOND QUARTER (APR-JUN) 1983

I.A - Total number of LANDSAT images by frames sold or distributed to users and monetary value US\$

	FRAMES		SCENES ON CCT	TOTAL
	B & W	COLOR		
QUANTITY	818	491	19	
US\$	79,599.00	27,366.00	8,722.00	115,687.00

B - LANDSAT 4 MSS only:

	FRAMES		SCENES ON CCT	TOTAL
	B & W	COLOR		
QUANTITY	22	-	03	
US\$	1,851.00	-	893.00	2,744.00

II. Classification of sales and distribution of photo products and CCT's by type of user

USER TYPE	PHOTO PRODUCTS		CCT's	
	% by money	% by frames	% by money	% by CCT's
A. National Government	62.54	61.38	-	-
B. State/Provincial Govt.	4.02	3.98	-	-
C. Academic	2.67	2.68	42.62	42.62
D. Industry	9.66	10.60	33.34	33.34
E. Individuals	13.05	15.04	-	-
F. Outside the country	8.06	6.32	24.04	24.04
TOTAL	100.00%	100.00%	100.00%	100.00%

CNPq/INPE
LANDSAT PRODUCT SALES/DISTRIBUTION SUMMARY
FOR THE THIRD QUARTER (JUL-SEPT) 1983

I.A - Total number of LANDSAT images by frames sold or distributed to users and monetary value US\$

	FRAMES		SCENES ON CCT	TOTAL
	B & W	COLOR		
QUANTITY	1041	136	74	
US\$	57,733.00	7,520.00	22,520.00	87,773.00

B - LANDSAT 4 MSS only:

	FRAMES		SCENES ON CCT	TOTAL
	B & W	COLOR		
QUANTITY	97	07	03	
US\$	7,913.00	470.00	1,095.00	9,478.00

II. Classification of sales and distribution of photo products and CCT's by type of user

USER TYPE	PHOTO PRODUCTS		CCT's	
	% by money	% by frames	% by money	% by CCT's
A. National Government	44.68	44.72	5.58	5.58
B. State/Provincial Govt.	6.14	6.10	-	-
C. Academic	22.06	21.58	42.86	42.86
D. Industry	6.50	6.76	30.12	30.12
E. Individuals	5.40	5.67	7.02	7.02
F. Outside the country	15.22	15.17	14.42	14.42
TOTAL	100.00%	100.00%	100.00%	100.00%

ANNEX C

CURRENT LANDSAT PRODUCTS PRICE LIST



CNPq

CONSELHO NACIONAL
DE DESENVOLVIMENTO
CIENTÍFICO E TECNOLÓGICO

PRICE LIST

LANDSAT DATA

PHOTOGRAPHIC PRODUCTS

<u>IMAGE SIZE</u>		<u>SCALE</u>	<u>FORMAT</u>	<u>BLACK & WHITE</u>		<u>COLOR COMPOSITE</u>	
<u>MSS</u>	<u>CODE</u>			<u>UNIT PRICE</u>	<u>CODE</u>	<u>UNIT PRICE</u>	<u>CODE</u>
50 mm	1	1:3,704,000	Film Positive	US\$ 44.00	25	-	-
50 mm	1	1:3,704,000	Film Negative	53.00	26	-	-
185 mm	2	1:1,000,000	Film Positive	89.00	25	US\$ 113.00	28
185 mm	2	1:1,000,000	Paper	53.00	27	89.00	29
370 mm	3	1:500,000	Paper	116.00	27	149.00	29
740 mm	4	1:250,000	Paper	228.00	27	-	-
<u>RBV</u>							
50 mm	0	1:1,980,000	Film Positive	44.00	39	-	-
50 mm	0	1:1,980,000	Film Negative	53.00	40	-	-
198 mm	3	1:500,000	Film Positive	89.00	39	-	-
198 mm	3	1:500,000	Paper	53.00	41	-	-
396 mm	4	1:250,000	Paper	116.00	41	-	-
990 mm	5	1:100,000*	Paper	250.00	41	-	-

HIGH CONTRAST PHOTO PRODUCTS (MSS DATA)

A new electronic/photographic processing is available for photo products in all sizes, at three times the normal processing price. Recommended for the Amazonian Region.

COMPUTER COMPATIBLE TAPES (CCT)

<u>TYPE</u>	<u>CODE</u>	<u>TRACKS</u>	<u>BPI</u>	<u>FORMAT</u>	<u>PRICE</u>
Bulk	35	9	800	2 tapes (set)	US\$ 605.00
"Edge-Enhanced"	38	9	800	2 tapes (set)	1,075.00

CCT's are normally shipped air freight collect. Note that there is a delay of four weeks to obtain the export license.

NOTES:

- * RBV data in the scale 1:100,000 also available under special request and controlled by EMFA (Armed Forces Ministry) based on present law for aerial material distribution.
- The payment must be made in advance, through a nominal check to Instituto de Pesquisas Espaciais.
- The photo-product prices include air mail delivery.
- Minimum order: US\$ 88.00.
- Prices valid from April 1st, 1983 (subject to change).

Please add:
US\$ 5.00 for each photo
and
US\$ 65.00 for each CCT
requested from INPE.

April, 1983

Parada
Nelson de Jesus Parada
Director



INPE - INSTITUTO DE PESQUISAS ESPACIAIS

SEDE - SÃO JOSÉ DOS CAMPOS-SP - AV. DOS ASTRONAUTAS Nº 1758 - CX. POSTAL 515 - FONE (0123) 229977 - TELEX (011) 33530 - CEP 12.200
CACHOEIRA PAULISTA-SP - ROD. PRES. DUTRA, Km 40,0 - CX. POSTAL 01 - FONE (0126) 611377 - TELEX (0122) 1160 - CEP 12.630
CUIABÁ-MT - MORRO DA CONCEIÇÃO S/N - CX. POSTAL 714 - FONE (065) 321-9514 - TELEX (0652) 114 - CEP 78.000
NATAL-RN - AV. SALGADO FILHO Nº 3000 - CX. POSTAL 130 - FONE (084) 231-1284 - TELEX (0842) 1185 - CEP 59.000
FORTALEZA-CE - DISTRITO DE EUZÉBIO - CX. POSTAL 1281 - FONE (085) 224-4988 - CEP 60.000
SÃO PAULO-SP - RUA ITACOLMI Nº 615 - FONE (011) 257-9755 - TELEX (011) 34061 - CEP 01239

ANNEX D

INPE LANDSAT-4 COVERAGE MAP



SINAIS CONVENCIONAIS
Nesta folha consideram-se que uma via tenha a largura mínima de 2,5 metros.
A cor cinza representa áreas urbanizadas.

- VIAS DE CIRCULAÇÃO**
ESTRADAS DE RODAGEM
- Auto-estrada
 - Estrada pavimentada
 - Estrada sem pavimentação
 - Trilho permanente
 - Trilho temporário
 - Canal
 - Feição de estrada: federal, estadual
- ESTRADAS DE FERRO**
- Batida larga
 - Batida estreita
- LIMITES**
- Internacional
 - Estadual
- OUTROS ELEMENTOS PLANIMÉTRICOS**
- Linhas transmissoras de energia: alta, média, baixa
 - Ignis: Escala, Mina
 - Aeroporto, Campo de pouso
- ELEMENTOS ALTIMÉTRICOS**
- Ponto trigonométrico: Ponto astronômico
 - Ponto de nível
 - Cota comprovada
 - Cota não comprovada

- ELEMENTOS DE VEGETAÇÃO**
- Cerrado: Catinga
 - Floresta: mata, Plantação
 - Mangue: Salina
- ELEMENTOS DE HIDROGRAFIA**
- Curso d'água intermitente
 - Lago ou lagoa intermitente
 - Terreno sujeito a inundação
 - Brejo ou pântano
 - Poço (águas): Nascente
 - Rápido e cachoeira: grandes
 - Rápido e cachoeira: pequenas
 - Rocha submersa e a descoberto
 - Região de drenagem
 - Acendedor: Rio seco ou de alívio
 - Rio: riocho



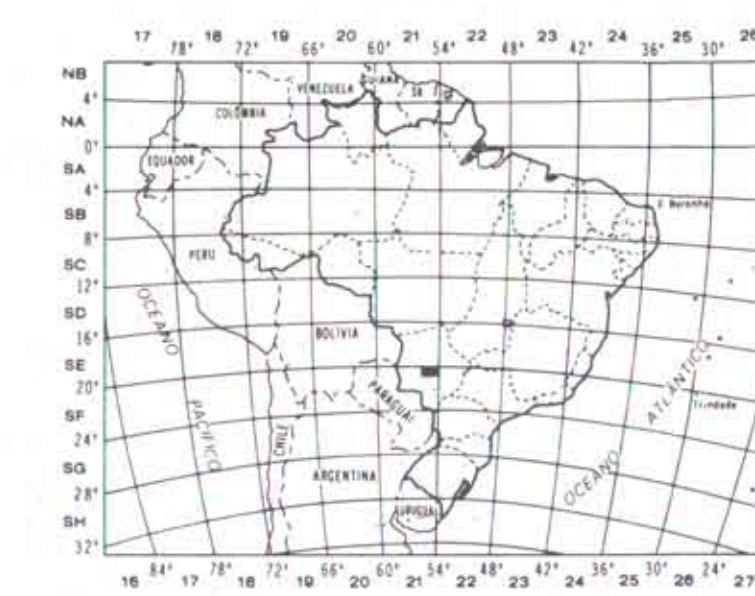
Escala 1:250.000
Escala de Declividade

CARTA IMAGEM SATELITE COMPLETA

Equidistância das curvas de nível: 80 metros
Projeção Universal Transversa de Mercator

DATUM VERTICAL: NABUUBA - SANTA CATARINA
DATUM HORIZONTAL: COORDENADAS ALGEBRA - MINAS GERAIS
ORIGEM: DA QUILOMETRAGEM UTM - EQUADOR E MERIDIANO 57° W. GR.
ACRESCIDOS AS CONSTANTES 10.000 KM E 500 KM, RESPECTIVAMENTE
DIREITOS DE REPRODUÇÃO RESERVADOS
A DSG (DIRETORIA DE SERVIÇOS GEOGRÁFICOS) - BRASILIA - DF
AGRADECE A GENTILEZA DA COMUNICAÇÃO DE FAIXAS
OU OMISSÕES VERIFICADAS NESTA FOLHA.
AS IMAGENS UTILIZADAS FORAM OBTIDAS DO SATELITE LANDSAT 2
NOS DIAS 4 E 5 DE ABRIL DE 1981 - NAS ORBITAS Nº 31567 E 31568
Primeira edição: DSG
Primeira impressão: 1981

LOCALIZAÇÃO DA FOLHA



FASES	EXECUTANTES	DATA
Processamento da imagem	Instituto de Pesquisas Espaciais (INPE)	Mar 82
Reatualização	Diretoria de Serviço Geográfico - DSG	1982
Interpretação da imagem	Diretoria de Serviço Geográfico - DSG	1982
Desenho	Diretoria de Serviço Geográfico - DSG	1982

* Esta folha foi confeccionada pela DSG através da utilização de imagens LANDSAT (satélites dos EUA) e 7 do Sensor Multiespectral (MSS), recebidas e processadas pelo Instituto de Pesquisas Espaciais (INPE) e do CNPq, mediante convênio entre os órgãos.

ARTICULAÇÃO DA FOLHA

SF.21-C	SF.21-D	SF.21-E
SF.21-A	SF.21-B	SF.21-F
SF.21-G	SF.21-H	SF.21-I