



United States Department of the Interior

GEOLOGICAL SURVEY  
EROS Data Center  
Sioux Falls, South Dakota 57198

*NOAA file*

OC 11-15

November 30, 1987

Mr. Henry Phillips  
Acting Chief, Landsat Operations Division  
NOAA/Goddard Space Flight Center  
Building 28, Code 435.7  
Greenbelt, Maryland 20771

Dear Mr. Phillips:

Enclosed is the EROS Data Center Landsat Data Handling and Processing Report for Fiscal Year 1987.

I would be happy to discuss any questions or concerns you may have.

Sincerely,

Allen H. Watkins  
Chief, EROS Data Center

Enclosure

cc: G. Landis  
R. Pohl  
R. Thompson  
D. Lauer  
W. Rohde  
D. Hood  
B. Bailey  
G. Thorley  
L. Pettinger  
J. Hussey, NOAA-Suitland  
H. Warriner, NOAA-EDC  
B. Youngren, NOAA-EDC

bcc: AHW Chron  
AHW Subj  
GGM Chron  
GGM Subj  
EDC Chron

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GGmetz/mle/x6125/11-27-87

EROS Data Center  
Landsat Data Handling and Processing  
Report for Fiscal Year 1987

The EROS Data Center (EDC) operates the final data processing, data archiving, product generation, and distribution portion of the Landsat ground segment on a cost-reimbursable basis for the National Oceanic and Atmospheric Administration (NOAA) and the Earth Observation Satellite Company (EOSAT), the Landsat commercial operator. This report summarizes the Landsat-related activities performed during FY 1987. Included in the attachment are Landsat data processing, production and distribution statistics, sales summaries, and customer profiles.

1. Data Receipt and Processing

Both the Domsat and DECNET links used for transmitting MSS high density image data and other related MSS and TM information between GSFC and EDC continued to perform satisfactorily. Domsat transmissions were rescheduled as necessary when other activities took priority over Landsat. EDC continued to consolidate incoming high density image data, which averages about 20 scenes per tape, to minimize the number of high density tapes required for archive storage. EDC currently stacks 40-50 MSS A (radiometrically corrected) scenes per tape.

During the year, EDC received and cataloged almost 42,000 scenes of Landsat MSS data. Approximately 3,100 hours of EROS Digital Image Processing System (EDIPS) pipeline process run time were required to create black-and-white archive film. Ninety-four percent of the MSS data processed was assessed good and fair; primary reasons for MSS downgrade were salt-and-pepper noise, and saturated data. MSS backlog at the end of the year was 905 scenes (about three to four days of pipeline processing) due to high volume of MSS data acquired each week.

Over 4,500 scenes of Landsat TIPS TM film were received, cataloged, and processed into the archive, bringing the total to approximately 19,230 film scenes. Ninety-three percent of the TM data was assessed good and fair; primary reasons for downgrade were radiometric sensor response, sensor striping, and pixel noise. EDC and GSFC personnel continued to work together on TM processing and inspection criteria and procedures to maximize TM film availability and quality. TM film backlog at the end of the year was 40 scenes. Approximately 1,210 scenes of TM digital data were also received, verified, and added to the archive, bringing the total TM digital CCT archive to 4,814 scenes.

Also during the year, EDC received almost 2,000 retrospective customer order and historical MSS CCT scenes. These scenes, which are stacked 3 scenes per 6250 BPI tape to conserve storage space, were added to the archive for future reproduction of user products, as needed. The majority of these 2,000 scenes were those selected from the 16,000 scene backlog as requested by NOAA to be processed during November 1986 - March 1987 (the five month period funded by NOAA) based on the following criteria: (1) at least one scene for each path/row, (2) equatorial regions that have had little or no ground station coverage or are in TDRSS zone of exclusion window, and (3) where limited coverage over Central America and southern Mexico exists. Because of funding problems, this process was stopped at GSFC the end of March, leaving a backlog of approximately 14,000 scenes from pre-1979 WBVT's to be processed. After much deliberation, it was decided by EDC, NASA, and NOAA to ship the historical MSS WBVT's and critical components of the processing system to EDC for storage and possibly low throughput processing. Representatives from NASA, NOAA, and EDC met at GSFC, September 29, to firm up plans and draft an agreement for this activity which should occur in early to mid-FY 1988.

## 2. Archive and Data Base Generation and Maintenance

Approximately 187,000 frames of Landsat MSS and TM archive film were generated and added to the Landsat archive, bringing the total number of frames to 2,589,793, which are referenced in the computerized data base (Main Image File) by 834,396 georeferenced accessions. Generation and maintenance of the International Landsat Data Base (references Landsat data available from certain other foreign stations) continued. Foreign Landsat station accessions reflected in the International data base, which almost doubled in FY 1989, totalled 1,538,144 at the end of the year and included: Brazil - 79,266; Italy - 357,727; Canada - 415,708; South Africa - 45,723; Sweden - 366,344; Australia - 136,712; Argentina - 10,790; Japan - 108,991; and Maspalomas - 16,893. As requested at the 9th LTWG, Japan, Italy, Sweden and Maspalomas provided a complete copy of their Landsat holdings, so that EDC could replace their old listings with a new complete update.

Also referenced in the EDC data base are about 106,750 TM scenes that exist in HDT format at GSFC.

At the end of the fiscal year, the EDC archive included: almost 568,000 scenes of Landsat 1-3 MSS and RBV data (almost all in film format, 187,000 scenes on HDT's, and a subset of about 43,000 historical scenes on CCT's); approximately 38,800 scenes of Landsat 4 and 121,300 scenes of Landsat 5 MSS data in HDTA and film format; 1,269 film,

300 corrected CCT, and 40 uncorrected CCT Landsat 4 TM scenes; and 17,962 film, 4,142 corrected CCT, and 232 uncorrected Landsat 5 TM scenes.

At current growth rates of the Landsat HDT and CCT archive, storage shelving and slot availability are sufficient for about two more years.

### 3. Customer Interface

Support continued to assure an orderly transition of the interface with data users from NOAA to EOSAT, the commercial Landsat operator.

EDC personnel worked closely with EOSAT in order to provide customer interpretation of EOSAT's agreement for purchase and protection of satellite data, and track which customers had signed agreements.

The monthly and quarterly micro catalog updates for Landsat MSS and TM coverage (approximately 3,650 sheets) were reproduced and issued. Approximately 46,000 frames of Landsat MSS and TM data coverage were microfiched, reproduced, and issued.

Landsat MSS data acquisition requirements for the Basic Data Set, the USDA, and other Federal and non-Federal users were consolidated at EDC and sent to GSFC for data acquisition scheduling. The Basic Data Set comprised the bulk of the data acquired, as special acquisitions did not increase significantly with the waived special acquisition charge.

EDC received 4,607 orders for Landsat data products during FY 1987, an increase of 778 over FY 1986. Turnaround time for orders averaged 7.3 days, a decrease of 1/2 day from FY 1986. Products distributed to users included 12,388 images at \$1,750,120 as compared with 19,061 images at \$2,015,788 in FY 1986, and 7,842 digital products at \$5,520,672 as compared with 7,100 digital products at \$4,876,300 in FY 1985. Special acquisition (no \$ in FY 1987) and cloud cover surcharges amounted to \$443,125 in FY 1987 and \$1,057,635 in FY 1986. Total Landsat revenue reached \$8,084,291, a one percent decrease from \$8,179,596 in FY 1986. Of the \$8,084,291 sales revenue in FY 1987, \$4,464,711 were from Landsat data purchases by the Federal government through the USGS blanket procurement authority with EOSAT. A detailed breakdown of FY 1987 and 1986 sales is reflected in the attachments.

#### 4. Product Generation and Distribution

Approximately 226,740 black-and-white (includes EDIPS MSS masters, TM masters, intermediates, and final user products) and 5,600 color (includes color intermediates and final user products) Landsat photographic products were processed by the EDC photographic laboratory. Of this number, 12,388 products were distributed to users as follows: Federal Government - 58%; Private Industry - 14%; non-U.S. - 19%; Academia - 4%; State/Local Government - 3%; and Individuals - 2%.

A total of 7,842 (MSS, RBV, and TM) Landsat digital products which included CCT's generated from EDIPS, CCT's reproduced from the EDC archive, and retrospective CCT's generated by GSFC and reproduced by EDC and MSS floppy disks were distributed to users. Distribution of digital products was as follows: Federal Government - 56%; Private Industry - 20%; non-U.S. - 18%; Academia - 4%; and State/Local Government - 2%.

Average turnaround for Landsat products was within the timelines agreed to between NOAA and EDC, except for black-and-white paper which exceeded the turnaround goal during the first and fourth quarters. Specific product turnaround times, by quarter, are reflected in the attachments.

#### 5. Miscellaneous

Software development modifications completed for Landsat data handling and processing and customer services included: change to AROT to allow data acquisitions to occur at sun angles as low as 0°; addition of 51 product codes for state sales tax; add additional priorities to AROT; product code for Landsat user notes subscription; changes to the Landsat International data base to reflect a single accession source code to save disk space on the B6900; expand AROT window by 5 days on front-end to allow for late data acquisition requests; change to determine age of Landsat data sold during any given year; change to EDIPS to eliminate minor agency data processing problem; one-time change to allow addition of Canadian data base tape that didn't conform to standard format; starting work on changes needed for TM floppy disks which include converting latitude/longitude coordinates to TM scene line/sample coordinates, extracting the user-requested window from the image, and formatting the header and image data for output to floppy disk; add product codes for EOSAT Lanham produced geocoded products; and other miscellaneous changes regarding sales information and AROT/ASIT interface with GSFC.

Engineering analysis support continued to improve color film recorder operations and products. MacDonald-Dettwiler and Associates installed a filter wheel and fiber light guide which significantly increased light throughput. Bulb life continued to be a problem during the early part of this reporting period. Engineering support was provided at GSFC to improve TM LBR film production operations.

Customer complaint handling procedures and interfaces between EDC and GSFC continued to work well. Seventeen PDA's were generated during FY 1987 and all closed by end of the fiscal year. These PDA's concerned problems with TM data and almost all were resolved by reprocessing HDTR data at GSFC. To preclude resending bad TM digital data to a customer, EDC continued doing a thorough evaluation of each TM CCT that is reprocessed by GSFC before it is shipped from EDC.

Effort continued to update all of the Interface Control Documents (ICD's) between EDC and GSFC. ICD 2801, which establishes TM film specifications and rejection criteria, and is the last ICD to be updated, has been signed off by GSFC and EDC.

Technical support was provided to bi-weekly Landsat telecons and interface meetings between EDC and GSFC, the Seventeenth Landsat Ground Station Operators Working Group meeting, the tenth and eleventh Landsat Technical Working Group meetings, and meetings with EOSAT regarding customer services related activities and billing and accounting for products distributed from GSFC and Lanham. EDC continued to work closely with GSFC to improve the automated cloud cover routines used at GSFC, so that EDC and GSFC cloud cover calls would be closer together.

Effort continued to increase the volume of and improve the timeliness of TM data products available to users. Because TM HDTA scenes are referenced in the EDC data base, CCT's can be entered immediately upon receipt at EDC and not have to wait for corresponding film.

Testing continued to better understand and determine optimum band combinations for color products using TM bands 5 and 7. EDC personnel conducted a poster session at Pecora XI to show users some of this testing and the differences that photo exposure and processing can make.

#### 6. NOAA Administrative Support

Office space was provided for the two NOAA and two EOSAT representatives located in the Customer Services area at EDC.

Miscellaneous office equipment was purchased by EDC and loaned to NOAA and supplies provided as needed. EDC responded to requests from NOAA and EOSAT regarding past, current, and projected Landsat data sales and for software and hardware impacts for changes to certain Landsat data handling and processing systems and procedures, etc.

7. Problems

- a. Domsat transmissions from GSFC to EDC were rescheduled, as needed, when other activities took priority over Landsat. Only minimal impact resulted from these occurrences.
- b. Both LBR's experienced periodic density, scale, modulator, and transport problems. The lasers and modulators were replaced in both LBR-1 and LBR-2. Even though both LBR's were down for long periods of time for these replacements, only minimal impact resulted because both LBR's were not down simultaneously.
- c. MSS ascending vs. descending node descriptor problem. Approximately 1,600 MSS Arctic and Antarctic area scenes were received at EDC with erroneous node descriptors. Software modifications made at GSFC in January fixed the problem. EDC modified all bad node descriptors in the main image file (MIF) however, HDTA data and film have not been changed.
- d. MSS noise problem noticed in about 2,600 scenes. Problem traced to AP180 array processor at GSFC and fixed. Affected scenes were put in the EDC MIF with no flag but quality indicators commensurate with severity of problem.
- e. Approximately 100 Agency MSS color film products were produced "too dark." Problem traced to bad parameter file in the color Fire recorder causing improper brightness value distribution. All dark scenes were reprocessed for the Agency during the first two weeks in May.
- f. Cloud cover assessment by GSFC and EDC differed intermittently (seasonally). EDC continued to work with GSFC to solve this problem.

## EROS Data Center

Landsat Processing, Production and Data Distribution Summary  
FY 1987Data Processing Performance

	<u>MSS</u>	<u>TM</u>
Scenes Received at EDC	41,807	4,526
Scenes Processed to MIF	40,136	3,922
Average Days-Rec'd. to MIF	3.7	N/A
Quality of Scenes to MIF		
Good (8)	87%	0%
Fair (5)	7%	93%
Poor (2)	5%	5%
End-of-Year Scene Backlog	905	40

Standard Data Production Performance

<u>Product Type</u>	<u>Items Produced</u>	<u>Average Days- Order to Product Ship (by Quarter)</u>				
		<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>Target</u>
B/W Film	3,847	10	8	8	9	7-10
B/W Paper Contact	999	9	7	7	12	5-7
B/W Paper Enlargement	1,217	10	7	6	10	7-10
FCC Generation	2,270	9	6	6	7	10-12
Color Paper Contact	276	4	3	2	4	5-7
Color Paper Enlargement	705	8	5	6	8	7-10
Color Film	2,055	7	6	4	7	10-12
Digital Products	7,842	2	2	2	2	2-3

Special Agency Data Production Performance

MSS Scenes Processed and Shipped	1,180
Average Days-Data Rec'd. to Product Ship	6.2

LANDSAT SALES SUMMARY

<u>Products/Services/Charges</u>	<u>FY 1987</u>		<u>FY 1986</u>	
	<u>Items</u>	<u>Dollars</u>	<u>Items</u>	<u>Dollars</u>
1. Imagery Products	12,388	\$1,750,120	19,061	\$2,015,788
a. MSS/RBV	(9,213)	(1,073,720)	(15,133)	(1,474,472)
b. TM TIPS	(3,168)	(674,980)	(3,873)	(533,546)
c. TM Scrounge	(7)	(1,420)	(55)	(7,770)
2. Digital Products	7,842	\$5,520,672	7,100	\$4,876,300
a. MSS/RBV Scenes	(3,966)	(2,445,900)	(3,617)	(2,239,215)
b. Add'l MSS Copies	(34)	(2,040)	(1)	(120)
c. MSS Sample CCT's	(7)	(350)	(5)	(250)
d. TM TIPS Quads	(3,446)	(3,048,302)	(3,182)	(2,582,725)
e. Add'l TM TIPS Copies	(103)	(7,740)	(42)	(7,920)
f. TM Scrounge Scenes	(1)	(3,300)	(27)	(32,700)
g. TM Sample CCT's	(5)	(1,000)	(5)	(1,000)
h. Floppy Disks	(280)	(12,040)	(221)	(12,370)
3. Miscellaneous	72	\$ 242,312	12	\$ 137,228
4. Accession Aids		\$ 41,772		\$ 59,072
5. Postage Charges (Non-US)		\$ 38,711		\$ 29,581
6. Sales Tax		\$ 47,579		\$ 3,992
7. Subtotal (#1-#6)	20,302	\$7,641,166	26,173	\$7,121,961
8. Acquisition Charges and Cloud-Cover Surcharges	6,325	\$ 443,125	6,387	\$1,057,635
9. TOTAL LANDSAT SHPD. SALES	26,627	\$8,084,291	32,560	\$8,179,596
10. Sales Returns/Allowances		\$ 320,908		\$ 288,687
11. Reimbursable Work-In- Process		\$ 332,989		\$ 213,390
12. Average Order Turnaround Time for Std. Photo. and Digital Products		7 days		8 days

# TOTAL LANDSAT ARCHIVES/DATA DEMAND FY 1987

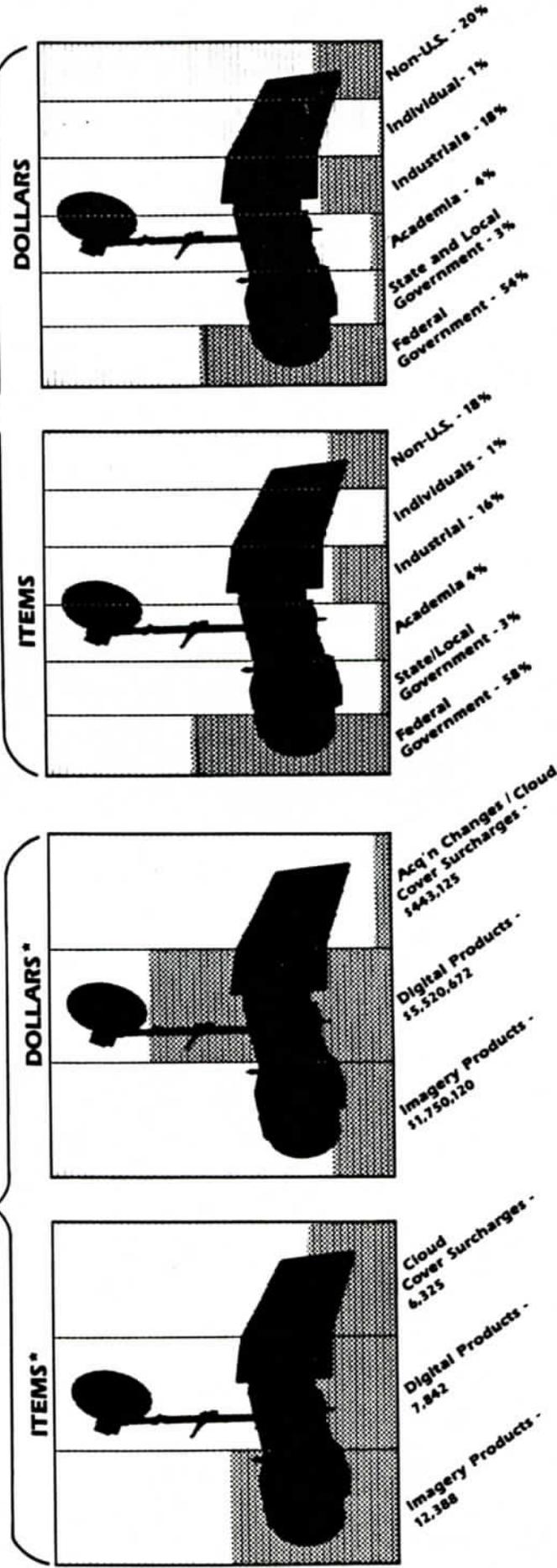
LANDSAT ARCHIVES:  
2,590,000 FRAMES

IMAGERY AND DIGITAL  
CUSTOMER PROFILE

12,388 FRAMES	\$1,750,120
7,842 ITEMS	5,520,672
20,230 TOTAL	\$7,270,792

LANDSAT DATA  
DELIVERIES AND REVENUE

TOTAL ITEMS: 26,627  
TOTAL DOLLARS: \$8,084,291



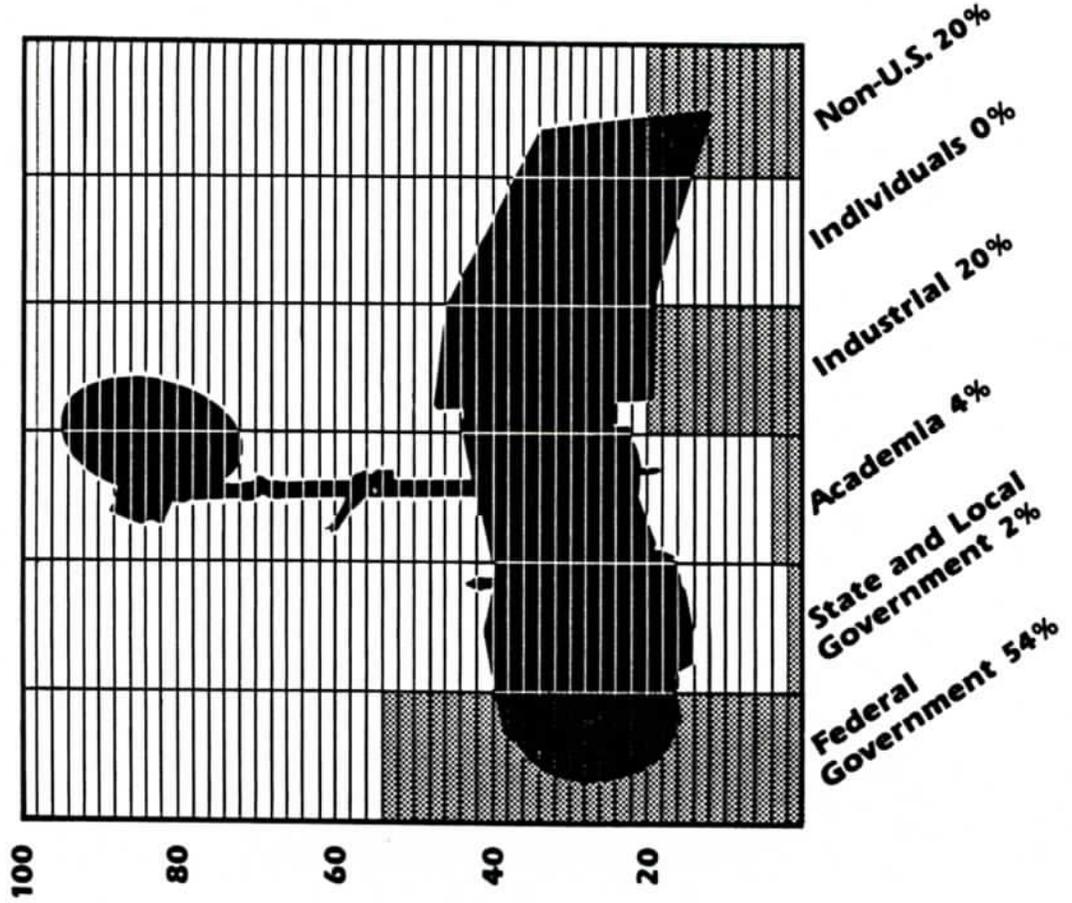
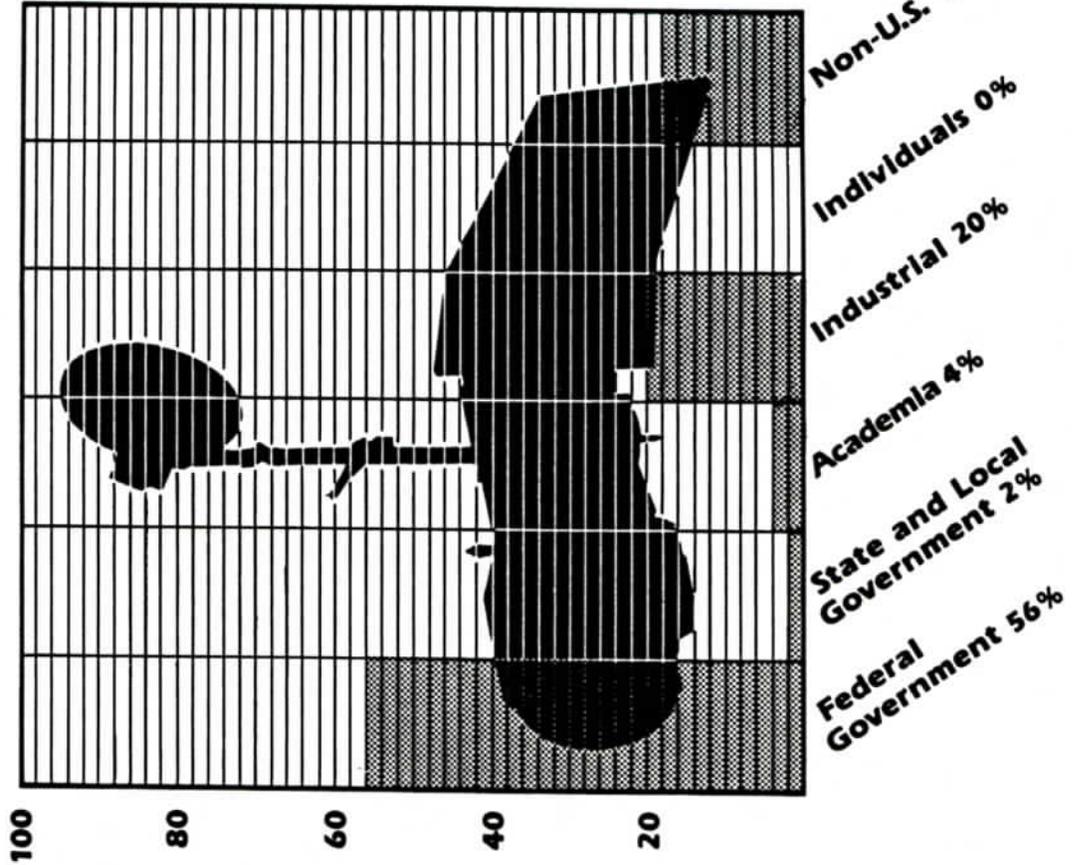
\*Accession Aids - Items, N/A; Dollars, \$41,772  
Other - Items, 72; Dollars, \$328,602  
Digital products includes 2,749 HDT-A's for \$1,649,400

# Customer Profile of Landsat Digital Products

FY 1987

7,842 Items

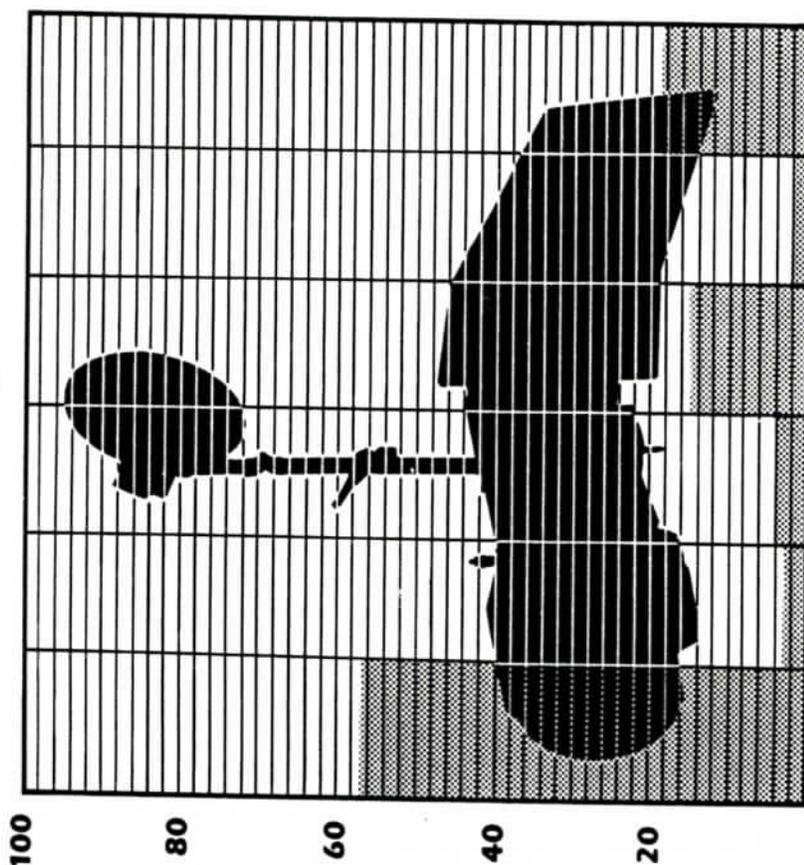
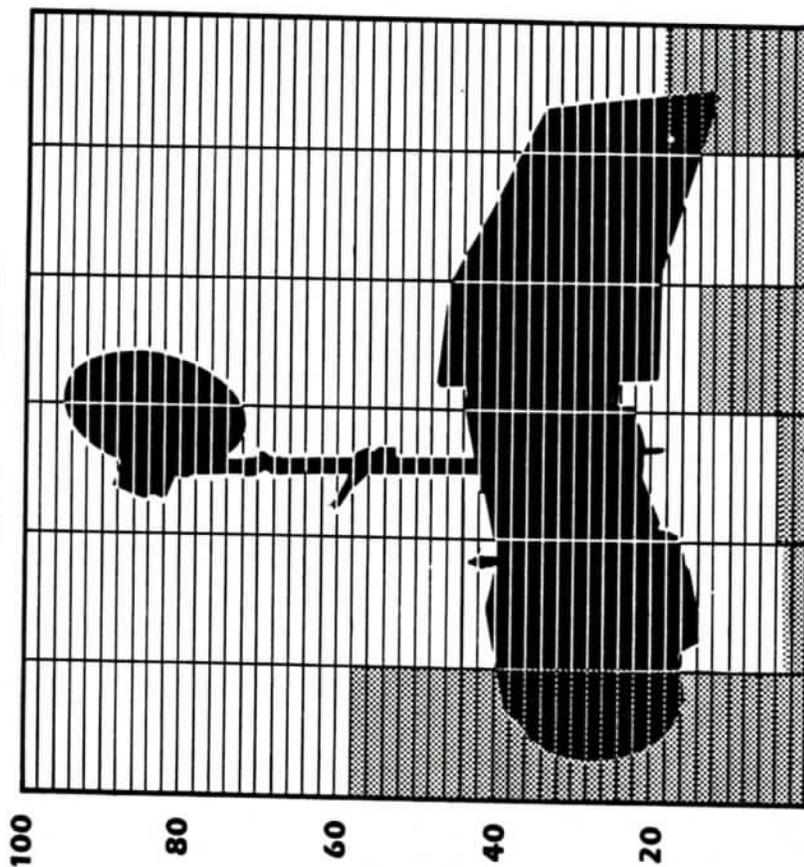
\$5,520,672



# Customer Profile of Landsat Imagery FY 1987

12,388 Frames

\$1,750,120



Federal Government 58%

State and Local Government 3%

Academia 4%

Industrial 14%

Individuals 2%

Non-U.S. 19%

Federal Government 57%

State and Local Government 3%

Academia 4%

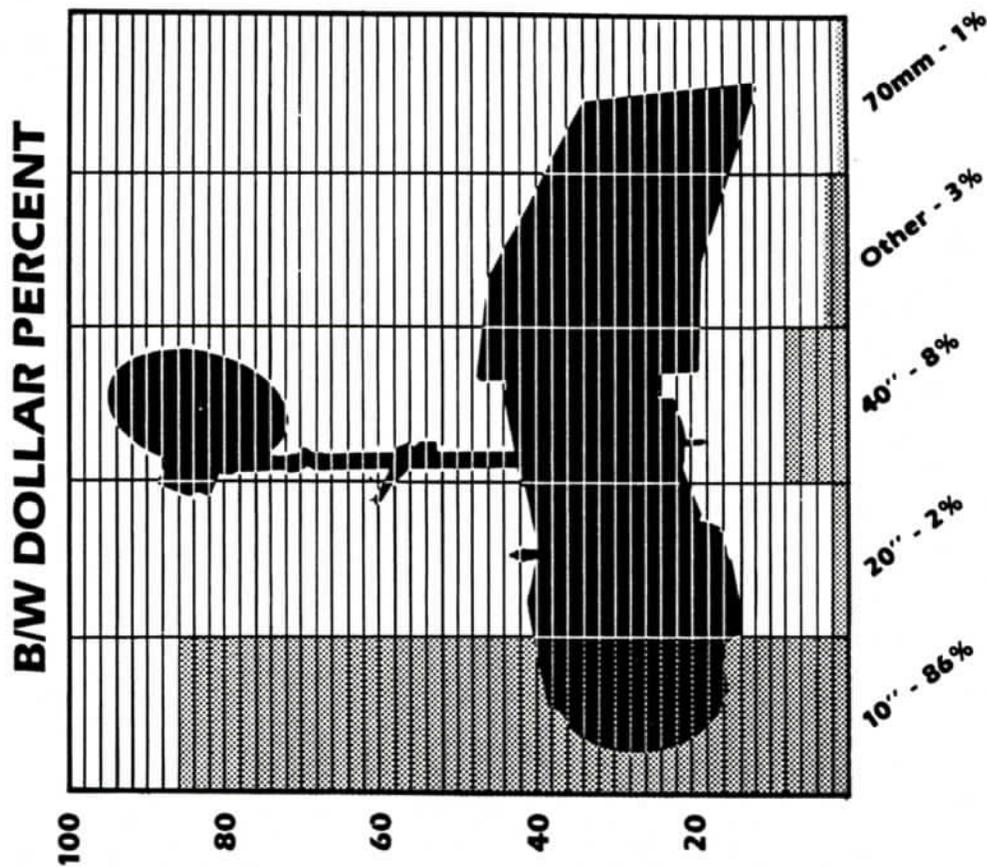
Industrial 15%

Individuals 2%

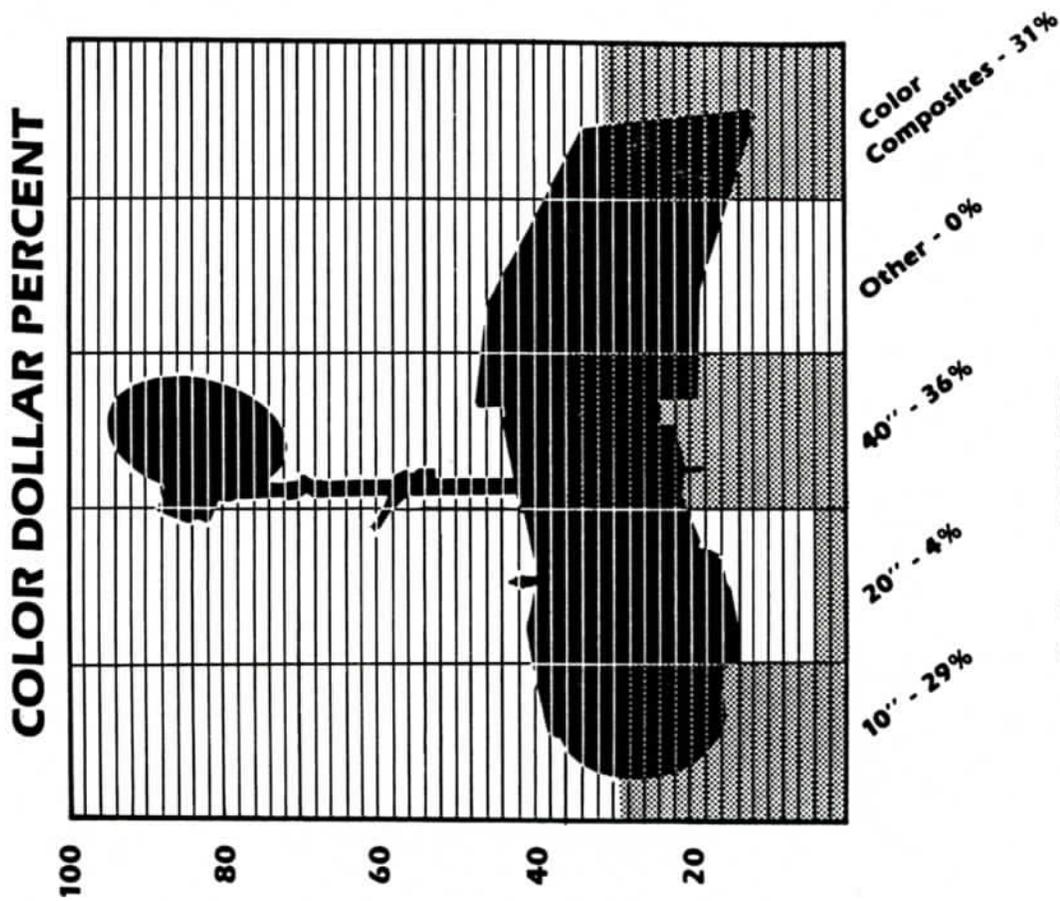
Non-U.S. 19%

# Product Size/Type Profile of Landsat Imagery Dollars\*

FY 1987



Dollars: \$1,076,450  
Total Dollars: \$1,748,700

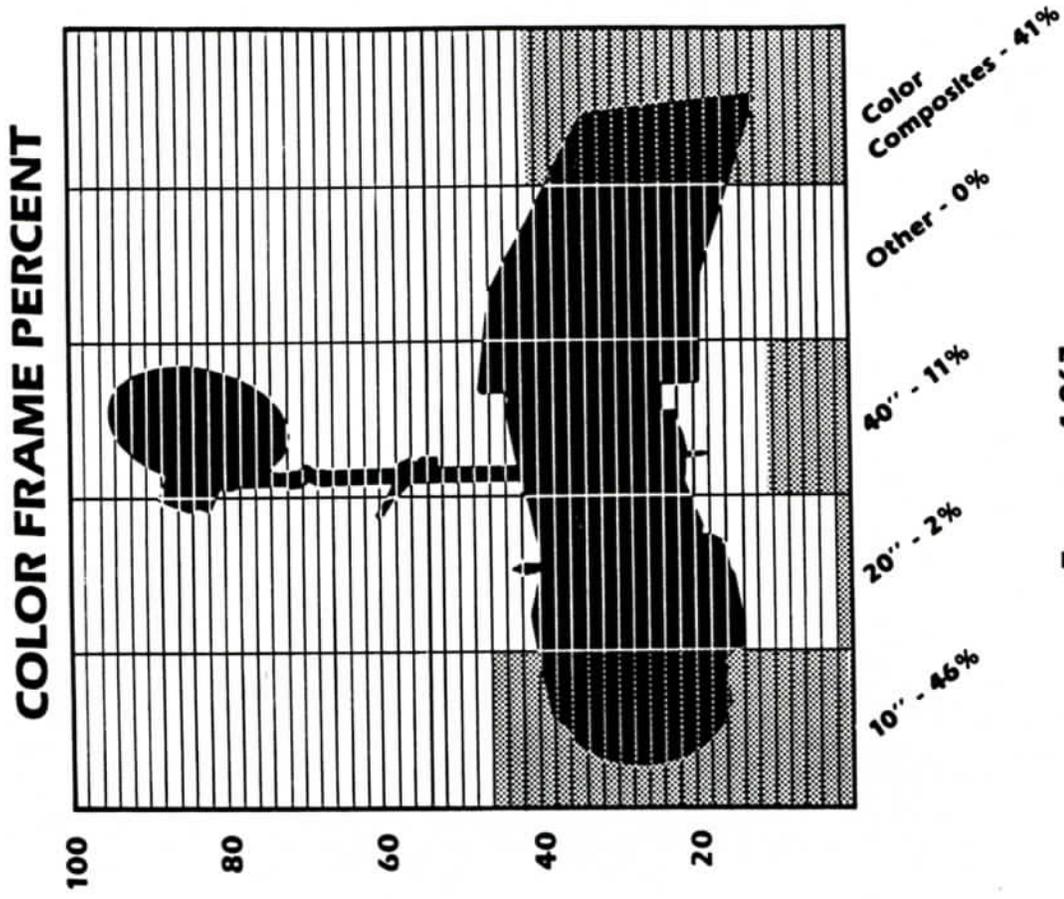


Dollars: \$672,250  
B/W: 62% Color: 38%

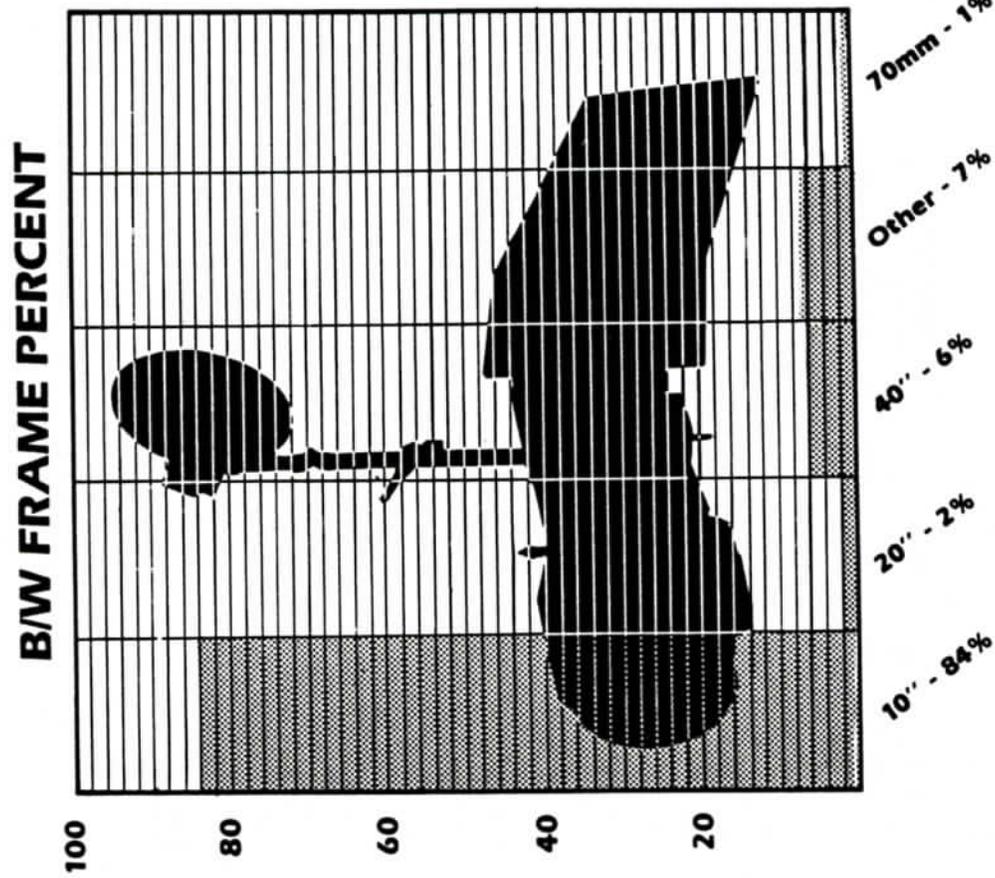
\*Excludes TM Scrounge Imagery

# Product Size/Type Profile of Landsat Imagery Frames\*

FY 1987



Frames: 4,967  
B/W: 60% Color: 40%



Frames: 7,414  
Total Frames: 12,381

\* Excludes TM Scrounge Imagery

EROS DATA CENTER  
LANDSAT CUSTOMER PROFILES  
FY 1987

IMAGERY PRODUCTS

Category	Items	Item Percent	Dollars	Dollar Percent
-----	-----	-----	-----	-----
Federal Government	7,215	58%	998,870	57%
U.S.G.S.	(386)	(3)%	(34,800)	(2)%
Other Federal	(6,829)	(55)%	(964,070)	(55)%
State/Local Government	389	3%	55,250	3%
Academia	507	4%	67,750	4%
Industrial	1,757	14%	252,060	15%
Individual	216	2%	35,560	2%
Non-U.S.	2,304	19%	340,630	19%
	-----	-----	-----	-----
TOTAL	12,388	100%	\$1,750,120	100%

DIGITAL PRODUCTS

Category	Items	Item Percent	Dollars	Dollar Percent
-----	-----	-----	-----	-----
Federal Government	4,398	56%	2,956,600	54%
U.S.G.S.	(182)	(2)%	(153,360)	(3)%
Other Federal	(4,216)	(54)%	(2,803,240)	(51)%
State/Local Government	162	2%	128,670	2%
Academia	340	4%	243,332	4%
Industrial	1,524	20%	1,082,350	20%
Individual	27	0%	24,140	0%
Non-U.S.	1,391	18%	1,085,580	20%
	-----	-----	-----	-----
TOTAL	7,842	100%	\$5,520,672	100%

Landsat Shipped Sales Profile - FY 85, FY 86, and FY 87

September 1987

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Total
<b>Total Landsat Shipped Products</b> (Imag., Dig., Acc. Aids & Misc.)													
FY 85 - (Monthly)	\$716,090	333,097	290,273	488,894	383,809	538,153	417,073	451,035	463,387	614,807	518,308	447,694	\$5,662,620
(Cumulative)	\$716,090	1,049,187	1,339,460	1,828,354	2,212,163	2,750,316	3,167,389	3,618,424	4,081,811	4,696,618	5,214,926	5,662,620	
FY 86 - (Monthly)	\$645,311	438,168	435,928	449,074	415,376	475,915	497,303	829,657	759,925	744,931	754,971	675,410	\$7,121,961
(Cumulative)	\$645,311	1,083,479	1,519,399	1,968,473	2,383,849	2,859,764	3,357,067	4,186,724	4,946,649	5,691,580	6,446,551	7,121,961	
FY 87 - (Monthly)	\$944,210	533,409	451,818	548,181	461,106	473,822	610,842	678,390	761,628	1,035,232	724,986	417,542	\$7,641,166
(Cumulative)	\$944,210	1,477,619	1,929,437	2,477,618	2,938,724	3,412,546	4,023,388	4,701,778	5,463,406	6,498,638	7,223,624	7,641,166	
<b>Acquisition Charges/Cloud Cover Surcharges</b>													
FY 85 - (Monthly)	\$1,061,170	427,225	400,700	261,510	48,395	69,910	90,995	602,885	769,525	730,355	746,830	104,405M	\$5,313,905
(Cumulative)	\$1,061,170	1,488,395	1,889,095	2,150,605	2,199,000	2,268,910	2,359,905	2,962,790	3,732,315	4,462,670	5,209,500	5,313,905	
FY 86 - (Monthly)	\$437,730	72,765	-91,970	33,315	33,850	24,260	62,600	105,175	142,915	107,370	80,925	49,500	\$1,057,635
(Cumulative)	\$437,730	510,495	418,525	451,840	484,890	509,150	571,750	676,925	819,840	927,210	1,008,135	1,057,635	
FY 87 - (Monthly)	\$31,625	3,625	2,800	3,025	18,700	22,825	23,925	62,150	80,850	97,900	70,400	25,300	\$443,125
(Cumulative)	\$31,625	35,250	38,050	41,075	59,775	82,600	106,525	168,675	249,525	347,425	417,825	443,125	
<b>Total Landsat Products &amp; Services</b>													
FY 85 - (Monthly)	\$1,777,260	760,322	690,973	750,404	432,204	608,063	508,068	1,053,920	1,232,912	1,345,162	1,265,138	552,099	\$10,976,525
(Cumulative)	\$1,777,260	2,537,582	3,228,555	3,978,959	4,411,163	5,019,226	5,527,294	6,581,214	7,814,126	9,159,288	10,424,426	10,976,525	
FY 86 - (Monthly)	\$1,083,041	510,933	343,950	482,389	448,426	500,175	559,903	934,832	902,840	852,301	835,896	724,910	\$8,179,596
(Cumulative)	\$1,083,041	1,593,974	1,937,924	2,420,313	2,868,739	3,368,914	3,928,817	4,863,649	5,766,489	6,618,790	7,454,686	8,179,596	
FY 87 - (Monthly)	\$975,835	537,034	454,618	551,206	479,806	496,647	634,767	740,540	842,478	1,133,132	795,386	442,842	\$8,084,291
(Cumulative)	\$975,835	1,512,869	1,967,487	2,518,693	2,998,499	3,495,146	4,129,913	4,870,453	5,712,931	6,846,063	7,641,449	8,084,291	

Low numbers due to sales returns/allowances processed for a number of months.

NOTE: December FY 1986 negative number due to adjustment for duplicate acquisitions.  
Total Landsat Shipped Products for FY 1986 includes HDT-R's for \$1,491,000 for February-September 1986. FY 1987 includes HDT-R's for \$1,649,400. The HDT-R's were previously included with Acquisition Charges/Cloud Cover Surcharges prior to February 1, 1986. The acquisition fee has dropped as of July 1, 1986.

Landsat Digital Shipped Sales Profile - FY 85, FY 86, and FY 87

September 1987

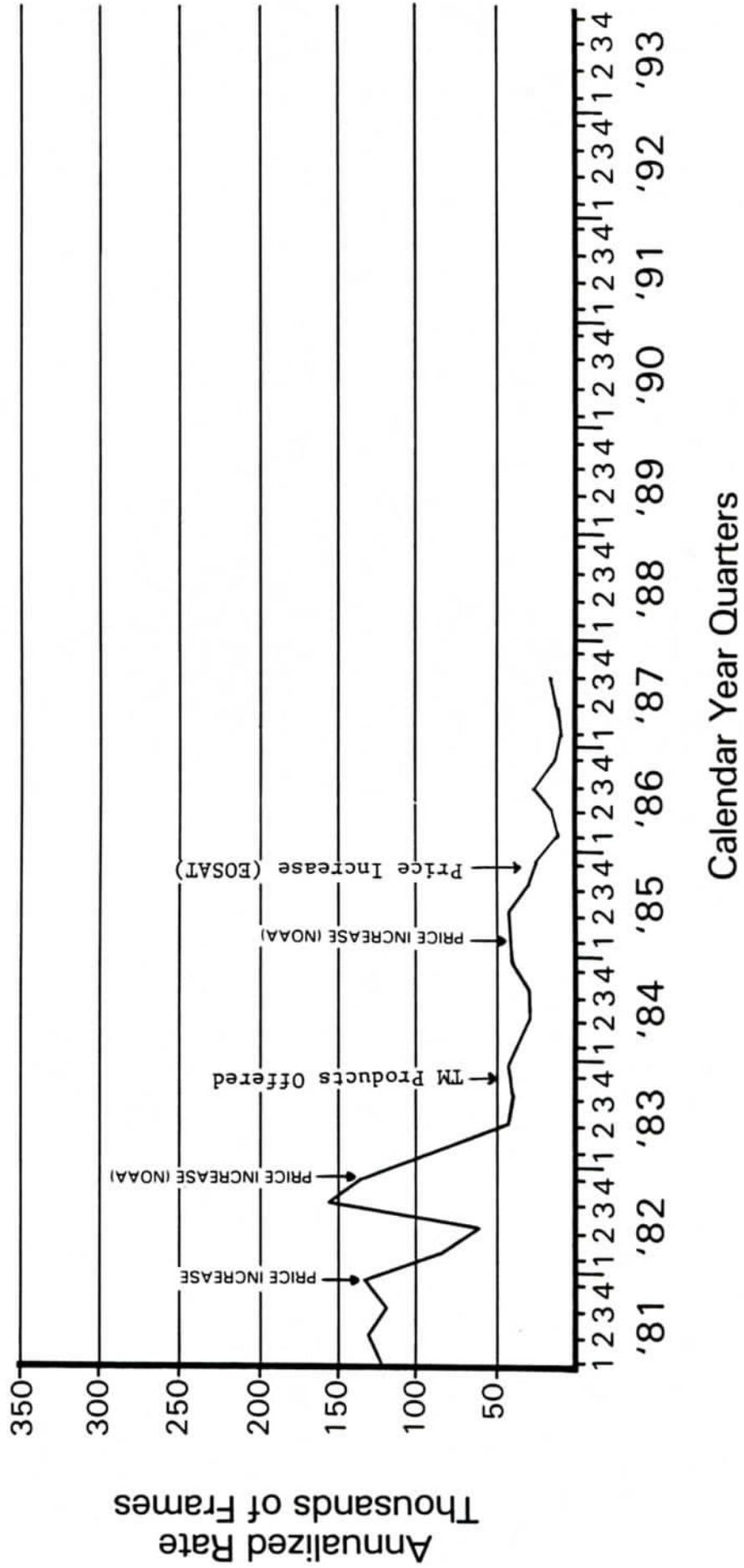
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Total
<b>Dollars</b>													
FY 85 - (Monthly)	\$485,535	177,685	178,860	305,315	270,955	276,195	209,585	244,885	253,985	428,790	290,835	329,890	\$3,372,435
(Cumulative)	\$485,535	583,220	762,080	1,067,395	1,338,350	1,614,545	1,824,130	2,069,015	2,322,920	2,751,710	3,042,545	3,372,435	-----
FY 86 - (Monthly)	\$439,710	336,245	291,490	314,750	304,500	365,960	370,330	628,615	543,400	501,170	490,810	289,320	\$4,876,300
(Cumulative)	\$439,710	775,955	1,067,445	1,382,195	1,686,695	2,052,655	2,422,985	3,051,600	3,595,000	4,096,170	4,586,980	4,876,300	-----
FY 87 - (Monthly)	\$661,250	426,920	327,850	426,370	356,685	274,755	486,240	498,957	584,370	668,795	516,890	291,590	\$5,520,672
(Cumulative)	\$661,250	1,088,170	1,416,020	1,842,390	2,199,075	2,473,830	2,960,070	3,459,027	4,043,397	4,712,192	5,229,082	5,520,672	-----
<b>Items (Scenes, Quads &amp; Floppy Disks)</b>													
FY 85 - (Monthly)	665	682	399	669	650	471	559	547	337	678	697	350	6,704
(Cumulative)	665	1,347	1,746	2,415	3,065	3,536	4,095	4,642	4,979	5,657	6,354	6,704	-----
FY 86 - (Monthly)	696	456	407	456	406	477	533	953	820	743	728	425	7,100
(Cumulative)	696	1,152	1,559	2,015	2,421	2,898	3,431	4,384	5,204	5,947	6,675	7,100	-----
FY 87 - (Monthly)	944	542	437	562	475	322	699	715	821	1,141	755	429	7,842
(Cumulative)	944	1,486	1,923	2,485	2,960	3,282	3,981	4,696	5,517	6,658	7,413	7,842	-----

NOTE: FY 1985 excludes HDT-R's. FY 1986 includes 2,485 HDT-R's for \$1,491,000 for February-September 1986. FY 1987 includes 2,749 HDT-R's for \$1,649,400.

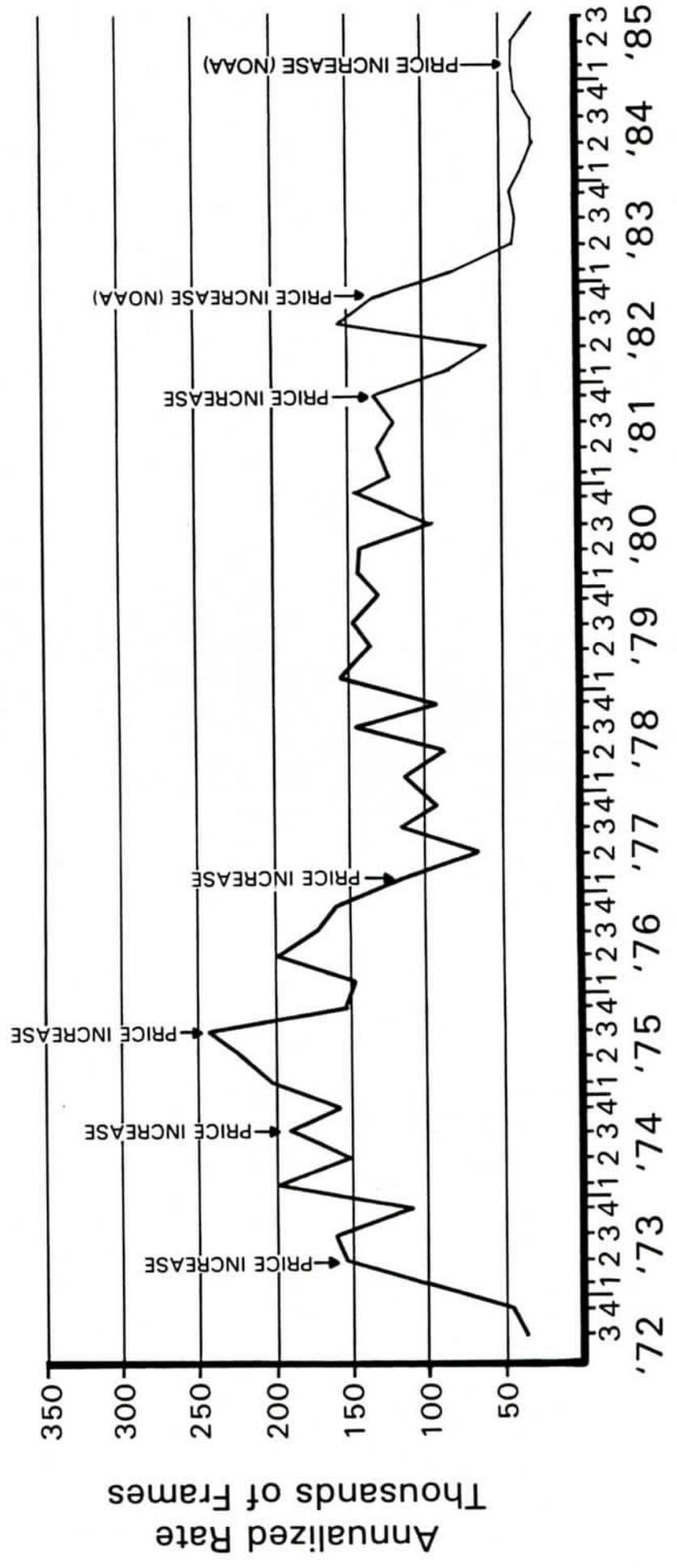
## September 1987

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Total
<b>Dollars</b>													
-----													
FY 85 - (Monthly)	\$307,866	153,931	109,170	183,142	111,446	250,280	206,331	205,917	207,681	184,489	227,124	113,348	\$2,260,725
(Cumulative)	\$307,866	461,797	570,967	754,109	865,555	1,115,835	1,322,166	1,528,083	1,735,764	1,920,253	2,147,377	2,260,725	-----
FY 86 - (Monthly)	\$205,042	99,436	124,956	97,794	106,356	104,324	120,880	173,140	195,190	171,150	248,130	369,390	\$2,015,788
(Cumulative)	\$205,042	304,478	429,434	527,228	633,584	737,908	858,788	1,031,928	1,227,118	1,398,268	1,646,398	2,015,788	-----
FY 87 - (Monthly)	\$243,810	97,070	111,630	93,280	92,800	140,300	100,390	143,280	167,920	290,030	174,570	95,040	\$1,750,120
(Cumulative)	\$243,810	340,880	452,510	545,790	638,590	778,890	879,280	1,022,560	1,190,480	1,480,510	1,655,080	1,750,120	-----
<b>Frames</b>													
-----													
FY 85 - (Monthly)	5,034	3,002	2,250	3,459	2,481	4,835	3,324	4,039	3,122	2,596	3,106	1,831	39,079
(Cumulative)	5,034	8,036	10,286	13,745	16,226	21,061	24,385	28,424	31,546	34,142	37,248	39,079	-----
FY 86 - (Monthly)	3,666	1,341	1,265	752	894	883	734	1,216	1,529	1,394	2,269	3,118	19,061
(Cumulative)	3,666	5,007	6,272	7,024	7,918	8,801	9,535	10,751	12,280	13,674	15,943	19,061	-----
FY 87 - (Monthly)	1,712	649	873	701	708	939	712	1,023	1,262	1,889	1,360	640	12,388
(Cumulative)	1,712	2,361	3,234	3,935	4,643	5,582	6,294	7,317	8,579	10,388	11,748	12,388	-----

# Sale of Landsat Imagery Frames

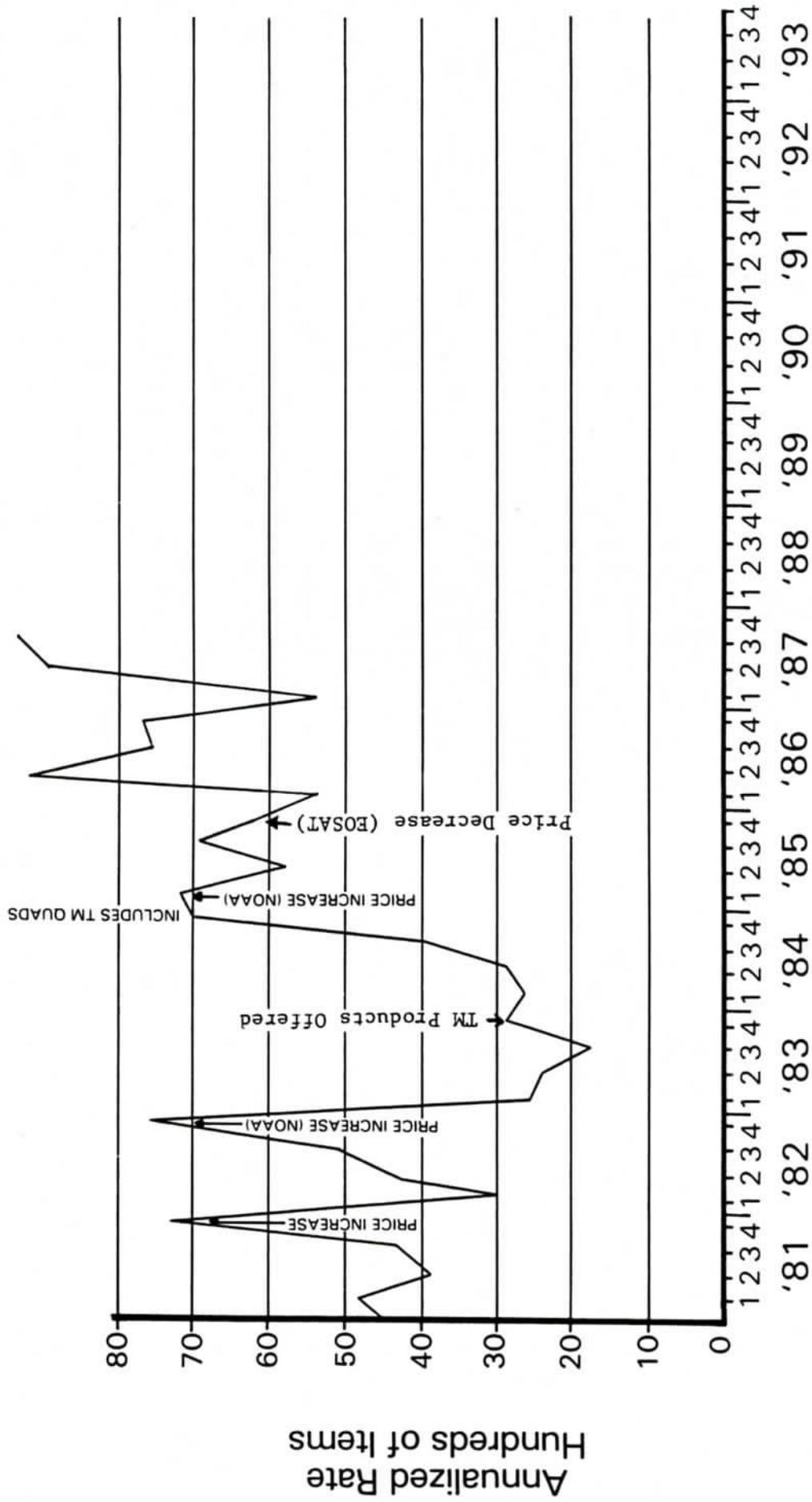


# Sale of Landsat Imagery Frames



Calendar Year Quarters

# Sale of Landsat Digital Products



Calendar Year Quarters

# Sale of Landsat Digital Products

