

# EARTH IMAGES CATALOGUE - 13

## LEDA

### **SUBJECT COVERAGE**

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- Remote Sensing
- Earth Observation
- Remotely - Sensed Satellite Imagery
- LANDSAT Images
- NOAA/TIROS Images
- MOS Images
- NIMBUS - 7 Images

### **FILE CATEGORY**

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Numeric file (Source file)

### **FILE PRODUCER**

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European Space Agency  
Via Galileo Galilei  
I-00044 Frascati, Italy  
Tel.: (6) 94180 1  
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### **FILE DESCRIPTION**

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The Earth Images Catalogue (LEDA - on-Line Earthnet Data Availability) is a catalogue of remotely-sensed satellite imagery. It consists of four general series of images:

- LANDSAT series acquired using:
  - Multi-Spectral Scanner
  - Thematic Mapper
- NOAA/TIROS series acquired using:
  - Advanced Very-High-Resolution Radiometer (AVHRR)
- Marine Observation Satellites series (MOS) acquired using:
  - Multispectral Electronic Self-Scanning Radiometer (MESSRs)
  - Visible and Thermal Infrared Radiometer (VTIR)
  - Microwave Scanning Radiometer (MSR)
- Nimbus-7 series acquired using:
  - Coastal Zone Color Scanner (CZCS)

## LANDSAT IMAGES

The database contains catalogued information of imagery remotely sensed by the LANDSAT series of satellites (LANDSAT 1 to 5) and acquired by ESA/Earthnet at Fucino (Italy), Kiruna (Sweden) and Maspalomas (Canary Islands, Spain). The database also includes the EROS Data Center Catalogue with information on image data received by the LANDSAT stations in the US, Canada, Brazil, Argentina, South Africa, Australia and Japan, and through the relay satellite system TDRSS.

The data contains geographical location information pertaining to the centre of each frame covering 185 square kilometers on the earth, either using the conventional World Reference Systems (path/row or track/frame numbers) or latitude/longitude coordinates. It also gives information on the sensing satellite, sensors used, the date of acquisition, image quality, cloud coverage per quadrant, and sun azimuth and elevation.

### Geographical Coverage

Each ESA/Earthnet station covers an areas with a radius of 2500 km. The data-acquisition zone therefore extends from the polar zones (Greenland, Iceland, Svalbard), Scandinavia and Western Russia, to the Middle East and part of Saudi Arabia, and to north and west African countries. The EROS Data Center catalogue has a worldwide coverage.

### Sources

Images are acquired from

- The Multispectral Scanner (MSS) working on four channels in the visible and near-infrared spectral bands, having a picture element spacing of about 80m with respect to the ground.
- The Thematic Mapper (TM) acquiring data on 7 channels in the visible, near, shortwave and thermal infrared, with a picture element spacing of about 30m with respect to the ground. The swath covered on ground by the Landsat sensors is 185km.

### Availability on ESA-IRS

Time Span	EROS Data Center (worldwide): 1972 to present Fucino: 1975 to present Kiruna: 1978 to present Maspalomas: 1984 to present
File size	Approximately 1 800 000 records
File Update	Daily for ESA stations Approximately 300 records; Quarterly for most other stations
Search Language	Approximately 13 000 records Menu

## NOAA/TIROS IMAGES

The database contains catalogued information of imagery from the NOAA/TIROS series of satellites, acquired at Maspalomas (Canary Islands, Spain), Tromsø (Norway), Dundee (UK), Oberpfaffenhofen (Germany), Rome (Italy), Nairobi (Kenya), Niamey (Niger) and by the ground station in the Antarctic. In the database, each entry represents a single acquisition from one station. The acquisition is defined by date, satellite ID and orbit number, station ID, ascending or descending pass, day or night, equator crossing longitude, and start and end times of acquisition (GMT). Additional parameters are output to indicate the extent to which each pass covers the user-defined geographic area.

To complement the archived data, the catalogue includes an Acquisition Planning facility, whereby you define a geographic area and future time period of interest (e.g. the following week), and you are given the details of all appropriate passes including the likelihood of acquisition by a particular station.

## Geographical Coverage

Geographical coverage extends from the North Pole, Greenland and northern Canada, to Europe, northern and western Russia, the Middle East and parts of Saudi Arabia, Africa with exception of the southern part, and the Brazilian coast. The Antarctic is also covered.

## Sources

The database consists of AVHRR imagery from the NOAA-5 to NOAA-12 satellites. The AVHRR acquires data on four or five channels in the visible, near, shortwave and thermal infrared spectral bands, with a picture element spacing of about 1km with respect to the ground. It scans a 3000 km-wide swath, and one acquisition from a single station can be up to 6000 km long. Each retrievable record in the database represents either a full acquisition or a processed 4-minute-of-orbit scene (SHARP). A SHARP product processed from an AVHRR swath covers about 1500km, and in the catalogue more information is provided such as scene corner geographical coordinates, extent of cloud cover etc.

## Availability on ESA-IRS

Time Span	Maspalomas: July 1986 to present Tromsø: December 1986 to present DLR: November 1986 to present Rome: November 1988 to present Niamey: April 1989 to present Antarctica (seasonal): January 1990 Nairobi: January 1991 to present
File Size	AVHRR and SHARP 60 000 records
File Update	Approximately 50 records daily
Search Language	Menu

## **MOS IMAGES**

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The MOS (Marine Observation Satellites) database contains information regarding images of the MOS satellite acquired at Fucino (Italy), Kiruna (Sweden), Maspalomas (Canary Islands, Spain) and Tromsø (Norway). The data contains the geographical location of the acquired area expressed in the MOS World Reference System (track and frame numbers) and in latitude/longitude coordinates. Further information is given regarding the sensor used, acquisition date, image quality, sun azimuth and sun elevation.

### **Geographical Coverage**

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Each ESA/Earthnet station covers an area of radius 2500 km. The data acquisition zone therefore extends from the polar zones (Greenland, Iceland, Svalbard), Scandinavia and western Russia, to the Middle East and part of Saudi Arabia, and to north and west African countries.

### **Sources**

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Images are acquired from

- Two Multispectral Electronic Self-scanning Radiometers (MESSRs) working with four channels in the visible and near-infrared spectral bands, with a picture element spacing of 50m with respect to the ground. System 1 looks left in respect to the flight direction and system 2 looks right. The scene size is 100 km by 90 km for both systems with an overlap of 15 km around the subsatellite track.
- The Visible and Thermal Infrared Radiometer (VTIR), which, with 900m ground resolution, has one channel in the visible spectral band, and, with 2700m ground resolution, has one channel in the water-vapour absorption range (shortwave infrared) and two channels in the thermal infrared spectral band. The swath width is about 1500km.
- The passive Microwave Scanning Radiometer (MSR) working in the 31 and 24 GHz bands with a footprint of 23 and 32 km respectively, and covering a swath of about 317km on the ground.

### **Availability on ESA-IRS**

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Time Span	Fucino: November 1987 to present Kiruna: November 1987 to present Tromsø: April 1988 to present Maspalomas: June 1988 to present
File Size	Approximately 400 000 records
File Update	Approximately 350 records daily
Search Language	Menu

## **NIMBUS-7 IMAGES**

This catalogue contains details of CZCS (Coastal Zone Color Scanner) imagery from the NIMBUS-7 satellite, acquired at Maspalomas, Lannion, Dundee and NASA stations. In the database, each entry represents either a single CRT (corrected radiance and temperature scene), or a higher-level product. Each scene is defined by date, orbit number, station ID, equator-crossing longitude, start and end times of acquisition (GMT), proportions of water, and saturated band-4 pixels. You are also given the latitude/longitude coordinates of the four scene corners (at a 40-degree view angle). Additional parameters are output after a search to indicate the extent to which each pass covers the user-defined geographic area.

### **Geographical Coverage**

Geographical coverage from the European stations (including Maspalomas in the Canary Islands) extends from the Gulf of Guinea and over the North Pole. The NASA data covers the geographic area delimited by the latitude range (10S, 80N) and the longitude range (60W, 75E).

### **Source**

The CZCS instrument scans a 2000km-wide (approx) swath, and one acquisition from a single station can be up to 2 minutes long and contain data on six channels in the visible, near and thermal infrared spectral bands, with a picture element spacing of about 800m with respect to the ground

### **Availability on ESA-IRS**

Time span	NASA acquisitions: November 1978 to June 1986 Maspalomas/European stations: January 1982 to December 1985
File size	Approximately 29 000 records
Search language	Menu

## **SEARCH SUPPORT**

### **From ESA-IRS**

Online Help:	?FILE13	?COMMANDS.13	?OUTPUT.13
	?NPOC.13	?GENERAL.13	?FURTHER.INFO.13
	?AVAILABILITY.13	?ADDRESSES.13	

### **From the file producer**

See "How to use the database" below. For any additional help, call  
European Space Agency  
ESRIN  
Frascati  
Italy  
Tel.: (6) 941801

## HOW TO USE THE DATABASE

When you access the LEDA database, you must choose the satellite series that you want to search (LA, TI, MO or NI). The appropriate TOP-LEVEL MENU is then displayed.

Later, to search another satellite series, exit from the TOP-LEVEL MENU by entering the command EX

To exit from the LEDA database, enter the command EN

The following information can also be retrieved from the on-line catalogue by typing OD at the Top-Level Menu. The example given is from the LANDSAT section of the database. Similar but adapted information is found for the NOAA/TIROS, MOS and NIMBUS-7 sections within the appropriate catalogues.

## SAMPLE RECORDS (each record 75 characters)

MIS	TRK	FRM	STZ	SENS	DATE	CLOUD-COV	ACQ.	VIS	LAT-LON	ELEV.	AZIM.	NO.
4	200	25	FO	M	- 820814	0 4 0 2	0	3	5028 144	4818/13962	1	
4	200	25	FO	M	- 830222	0 0 0 0	0	0	5028 140	2463/14939	2	
4	200	25	FO	M	- 830716	0 0 0 0	0	3	5028 130	5460/13502	3	

## LEGEND

MIS:	Mission N	Landsat satellite used for acquisition
FRM:	Frame N	Expressed in the World Reference System of relevance to the particular satellite
TRK:	Track N	Expressed in the World Reference System of relevance to the satellite considered
STZ:	Station	FO for Fucino, KI for Kiruna, MP for Maspalomas, US for EOSAT/USA, BR for Brazil, CA for Canada, SA for South Africa, AU for Australia, JA for Japan, AR for Argentina, PA for Pakistan
SENS:	Sensor	M - for Multispectral Scanner, T.M. for Thematic Mapper
DATE:	Acquisition date	Expressed in year month day (YYMMDD)
CLOUD-COV:	Cloud cover	Per quadrant in 10% increments. 9 is fully clouded
ACQ:	Acquisition vote	Data loss; 0 means no data loss, 9 means 3 or more lines lost
VIS:	Visibility vote	Image contrast; 0 is very good, 9 very poor
LAT-CF:	Latitude	Frame centre in hundredths of a degree
LON-CF:	Longitude	Frame centre in hundredths of a degree
ELEV.:	Sun elevation	In hundredths of a degree
AZIM.:	Sun azimuth l	n hundredths of a degree
NO.:	Number	Sequential number used as counter in the printout

## NOTES

- (1) The order in which the quadrants for cloud cover are given is: upper left, upper right, lower left, lower right
- (2) Tracks are numbered from east to west. There are 251 orbital tracks for Landsat 1-3, starting with track 001, which crosses the equator at 65.29 degrees west. For Landsat 4-5 there are only 233 tracks. The definition of track 001 is the same.
- (3) Frames are numbered in ascending sequence from north to south (day passes) and from south to north (night passes) along a given track. Each frame number represents the geographical coordinates for the nominal centre of a square area of sides 185 km (MSS).
- (4) The maximum range for sun azimuth is 10 000 to 30 000 (100 to 300 degrees). The maximum range for sun elevation is 0 to 9000 (0 to 90 degrees).

## ACCESS POINTS

LEDA is a menu-driven searchable database. The menus are evoked in their logical order i.e. top-level menu, geographic coverage selection, image-parameter selection, output display. For each menu, a series of specific commands are proposed. For proper input, some require you to specify parameters. The tables below indicate the command mnemonic, its function, the nature of the parameters to input (in parentheses) and examples, which, wherever possible, indicate the practical range of permissible values. Note that the standard separator between commands is CR or "+ " and between parameters is the comma. See the role of the CARRIAGE RETURN key (CR) under GENERAL COMMANDS.

While it is mandatory to perform a geographical selection through one of the proposed functions in Level 2, within Level 3 most of the functions need not to be defined (with the exception of perhaps DD); undefined functions are defaulted to "no limitations". However setting additional functions (e.g. SN,CC,MS and ST) will speed up the search.

### TOP-LEVEL MENU (Level 1)

COMMAND	FUNCTION (PARAMETERS)	EXAMPLE
SI	Single image retrieval (WRS, track, frame + date)	SI+ 2,255,50+ 841224
GS	Geographic coverage selection - go to Level 2	GS
OD	On-line documentation (8 pages: 1H 2H 3H 4H 5H 6H 7H 8H)	OD+ 7H
NW	Catalogue information	NW
H	General commands	H

### GEOGRAPHIC COVERAGE SELECTION MENU (Level 2)

COMMAND	FUNCTION (PARAMETERS)	EXAMPLE
RT	Geographic coordinate range (low lat, high lat, left long, right long)	RT+ 4600,4800,0,1000
TF	Segment of frames on track (WRS, track, north frame, south frame)	TF+ 2,191,29,31
PN	Geographic point (latitude, longitude)	PN+ 4700,1000
RF	Range of frames and tracks (WRS, min track, max track, min frame, max frame)	RF+ 2,194,197,27,28
PO	Polygon (lat, long - clockwise, in hundredths of degrees, south and west are negative numbers)	PO+ 4700,-400+ 4900 200+ 4800,0
SH	Show defined tracks/frames	SH
LI	List of existing special commands	LI
SC	Special command execution (name assigned to area, e.g. WRS2 France)	SC+ 2FRANCE
SE	End geographic coverage selection - go to Level 3 SE	
H	General commands	H

## IMAGE PARAMETER SELECTION MENU (Level 3)

COMMAND	FUNCTION (PARAMETERS)	EXAMPLE
DD	Acquisition period (start date, end date)	DD+ 750421,830630+
SN	Sensors (1 = MSS, 5 = TM)	SN+ 5+
CC	Cloud coverage (by quadrant) (min values per quadrant, max values)	CC+ 0,0,0,0,2,2,2,2
MA	Acquisition vote (min, max)	MA+ 0,3+
MS	Mission code (Landsat 1 to 5)	MS+ 5+
MV	Visibility vote (min, max)	MV+ 0,3
ST	Station code (1= Fucino, 2= Kiruna, 3= Maspalomas, 8= EROS Data, etc.)	ST+ 2+
EL	Sun elevation (min,max hundr deg)	EL+ 2000,9000
AZ	Sun azimuth (min, max hundr deg)	AZ+ 10000,30000
SH	Show current set of parameters retained	SH
OU	Exit to output menu - do search and go to Level 4	OU
H	General commands	H

## OUTPUT MENU (Level 4)

COMMAND	FUNCTION (PARAMETERS)	EXAMPLE
TT	List of first 16 lines of output - go to display options (Level 5)	TT
SR	Sort instructions (Track= TK, Frame= FM, Date= DD, Cloud Cover= CC, Acq.vote= MA, visib.vote= MV), default: sorted by Track-Frame	SR
LP	Off-line print service,	LP+ my text+
SE	Return to image parameter selection menu - go back to Level 3	SE
PS	Off-line print service, sorted	PS+ my comments+
H	General commands	H

## DISPLAY OPTIONS AND ORDER HANDLING MENU (Level 5)

COMMAND	FUNCTION (PARAMETERS)	EXAMPLE
RW	Display first page of data output	RW
BS	Display previous page of data output	BS
SQ	Display next 16 lines of data output	SQ
OD	On-line documentation (8 pages: 1H 2H 3H 4H 5H 6H 7H 8H)	OD

## GENERAL COMMANDS (valid at all Levels)

COMMAND	FUNCTION (PARAMETERS)
H	General commands help-messages
?	On context help-message (provides an explanation of current commands)
#	Required parameter range
<	Set short form of dialogue
>	Set long form of dialogue
EX	Return to top level menu
DF	Assign the current default value
< CR>	Enter key/Carriage return key - assign the current default value or return to menu (input performed)
*	Return to previous menu or return back to current main menu
+	Command separator on string (sequence of commands)
EN	End of session

## ORDERING OF DATA

For ordering satellite image data (on computer compatible support or as photographic product) please contact the appropriate institutions. For all addresses return to QUEST (command is EN) and enter ?ADDRESSES.14 and/or ?NPOC.14

## EXAMPLE OF A LEDA (LANDSAT) SEARCH ON ESA-IRS

INPUT: BEGIN LEDA

Connection with LEDA in progress  
 Welcome to the  
 Earth Images Catalogue LEDA  
 The ESA/Earthnet Database of Space Borne Earth  
 Observation Imagery

.....  
 Enter Option:  
 AVAILABLE OPTIONS : LA TT MO NI H  
 DEFAULT : LA

INPUT: LA

LEVEL 1 : TOP LEVEL MENU

YOU ARE IN THE LANDSAT CATALOGUE  
 ENTER ACTIVITY MODE :  
 AVAILABLE OPTIONS : SI GS OD NW H  
 DEFAULT : GS

INPUT: GS

LEVEL 2 : GEOGRAPHIC SELECTION

ENTER GEOGRAPHIC SELECTION MODE. THE RESULTING GEOGRAPHIC  
 AREA IS THE SUM OF SUCCESSIVE SELECTIONS. YOU MAY LOOP ON  
 THE FOLLOWING CHOICES:  
 AVAILABLE OPTIONS: RT TF PN RF PO SH LI SC SE H  
 DEFAULT: SE

GEOGRAPHIC POLYGON AREA DEFINITION

INPUT: PO

GEOGRAPHIC POLYGON. ENTER FIRST OR NEXT CLOCKWISE POINT OF POLYGON COORDINATES LAT, LON (HUNDRETHS OF DEGREE). AFTER THE LAST POINT ENTER <CR>:

INPUT: 4000,800+ 4100,900+ 4000,1000+

I NEED 4-8 SECONDS FOR GEOGRAPHIC COVERAGE COMPUTATION.

NUMBER OF LAST SELECTED FRAMES : 13

NUMBER OF TOTAL SELECTED FRAMES : 13

ENTER GEOGRAPHIC SELECTION MODE. THE RESULTING GEOGRAPHIC AREA IS THE SUM OF SUCCESSIVE SELECTIONS. YOU MAY LOOP ON THE FOLLOWING CHOICES:

AVAILABLE OPTIONS: RT TF PN RF PO SH LI SC SE H

DEFAULT: SE

SHOW LIST OF TRACK/FRAMES

INPUT: SH

SELECTED GEOGRAPHIC AREA EXPRESSED IN TRACK-FRAME

WRS : 1 TRACK = 206 FRAMES FROM 32 TO 32

WRS : 1 TRACK = 207 FRAMES FROM 31 TO 32

WRS : 1 TRACK = 208 FRAMES FROM 31 TO 32

WRS : 1 TRACK = 209 FRAMES FROM 31 TO 32

WRS : 2 TRACK = 192 FRAMES FROM 31 TO 32

WRS : 2 TRACK = 193 FRAMES FROM 31 TO 32

WRS : 2 TRACK = 194 FRAMES FROM 31 TO 32

INPUT: SE

LEVEL 3 IMAGE PARAMETER SELECTION

ENTER IMAGE PARAMETER SELECTION:

THE IMAGE SELECTION IS MADE ON THE "AND" OF ALL POSSIBLE PARAMETER; DEFAULTS ARE ALREADY SET. YOU MAY LOOP ON THE FOLLOWING CHOICES :

AVAILABLE OPTIONS : DD SN CC MA MS MV ST EL AZ SH OU H

DEFAULT : OU

SET DATE LIMITS

INPUT: DD

ENTER STARTING, ENDING DATE (YYMMDD.)

TO RETURN TO MAIN MENU ENTER <CR> :

INPUT: 810501,810701+ 820301,820501+

.....  
 .....  
 SET CLOUD COVER LIMITS

INPUT: CC  
 ENTER 4 MSS QUADRANTS CLOUD COVER RANGE (4 MINIMA, 4 MAXIMA):

INPUT: 0,0,0,0,0,0,0,0+ DF

I NEED (ABOUT) 11 SECONDS FOR IMAGE SELECTION  
 NUMBER OF RETRIEVED IMAGES = 9

ENTER FURTHER SELECTION MODE :  
 AVAILABLE OPTIONS : YE NO  
 DEFAULT : NO

INPUT: NO

LEVEL 4: OUTPUT PRESENTATION ON TERMINAL

ENTER OUTPUT PRESENTATION MODE :  
 AVAILABLE OPTIONS : TT SR LP SE PS H  
 DEFAULT : TT

INPUT: < CR>

MIS	TRK	FRM	STZ	SENS	DATE	CLOUD-COV	ACQ-VIS	LAT.	LCN.	ELEV.	AZIM.	NO.
2	206	32	FO	M	- 810616	0 0 0 0	0 3	4020	1111	5937	11412	1
2	206	32	KI	M	- 810616	0 0 0 0	0 1	4020	1110	5890	11328	2
3	206	32	FO	M	- 820409	0 0 0 0	0 3	4020	1117	4814	13336	3

EXIT

INPUT: EN (twice if necessary)

LEDA session terminated

ENTER LOGOFF

-----4Jan92 10:39:55 User00000-----  
 0.70 AU 2.11 Minutes in File 13  
 1.05 AU approx Total

ESA-QUEST session terminated at 10:40:01

