



Mission

The Indian Remote Sensing Satellite (IRS-1C) was successfully launched into polar orbit on December 28, 1995 by a Russian launch vehicle. Its payload was activated in the first week of January 1996. This satellite was followed by a similar one that was successfully launched into polar orbit on September 29, 1997 by a PSLV launch vehicle. Its payload was activated in mid-October 1997.

Orbit

The primary objective of IRS satellites is to provide systematic and repetitive acquisition of data of the Earth's surface under nearly constant illumination conditions. IRS-1C operates in a circular, sun-synchronous, near polar orbit with an inclination of 98.69°, at an altitude of 817 km in the descending node. The satellite takes 101.35 minutes to complete one revolution around the earth and completes about 14 orbits per day. The entire earth is covered by 341 orbits during a 24 day cycle. Successive orbits are shifted westward by 2820 km at the equator. IRS-1C and 1D have slightly different orbits (see below) and for this reason do not have the same reference system.

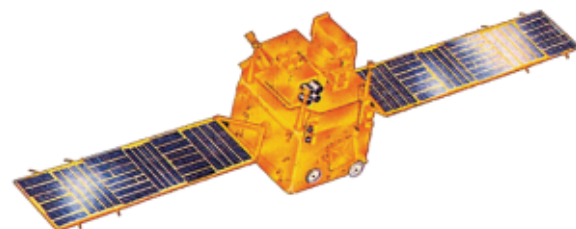
The mean equatorial crossing time in the descending node is 10.30 a.m. \pm 5 minutes. The orbit adjust system is used to attain the required orbit initially and it is maintained throughout the mission period. The ground trace pattern is controlled within \pm 5 km of the reference ground trace pattern.

Sensors

Details of the three sensors are given in the Technical Summary table, below.

During systematic operational data acquisition the tilt angle of the PAN sensor is set to either +2° or -2°, approximately. These settings guarantee full coverage of the entire area within 2 cycles (2*24/25 days).

The WiFS referencing scheme is based on LISS-III scene centres. Due to the large coverage of each WiFS scene there is an overlap of approximately 85% between adjacent WiFS passes.



Technical Summary

Satellite	Launch Date	Altitude	Inclination	Orbits/cycle	Revisit at equator	Sensors
IRS-1C	28-Dec-95	817 Km	98.69°	341	24 days	PAN, LISS-III, WiFS
IRS-1D	29-Sep-97	874 x 824 Km	98.653°	358	25 days	PAN, LISS-III, WiFS

Band	PAN		WiFS	
	1		3 (red)	4 (NIR)
μm	.5—.75		.62—.68	.77—.86
Pixel Size (m)	5.8 (resampled to 5)		188	
Quantisation (bits)	6		7	
Swath (km)	63—70		728—812	

Band	LISS-III			
	2	3	4	5
	(green)	(red)	(NIR)	(SWIR)
μm	.52—.59	.62—.68	.77—.86	1.55 – 1.70
Pixel Size (m)	23	23	23	70
Quantisation (bits)	7			
Swath (km)	127—141			

Coverage

Currently there are several receiving stations able to acquire IRS data over many parts of the world.

As the swath width of IRS-1D varies slightly, customers should provide the exact coordinates of their area of interest when ordering.

Eurimage, thanks to special agreements with Spacemaging, can distribute data acquired by all the stations whose receiving cone is marked in red in the map below. For the scenes acquired by Neustrelitz (Europe coverage, yellow cone), Eurimage has an agreement with Euromap to sell this data only to Italian customers.

Products

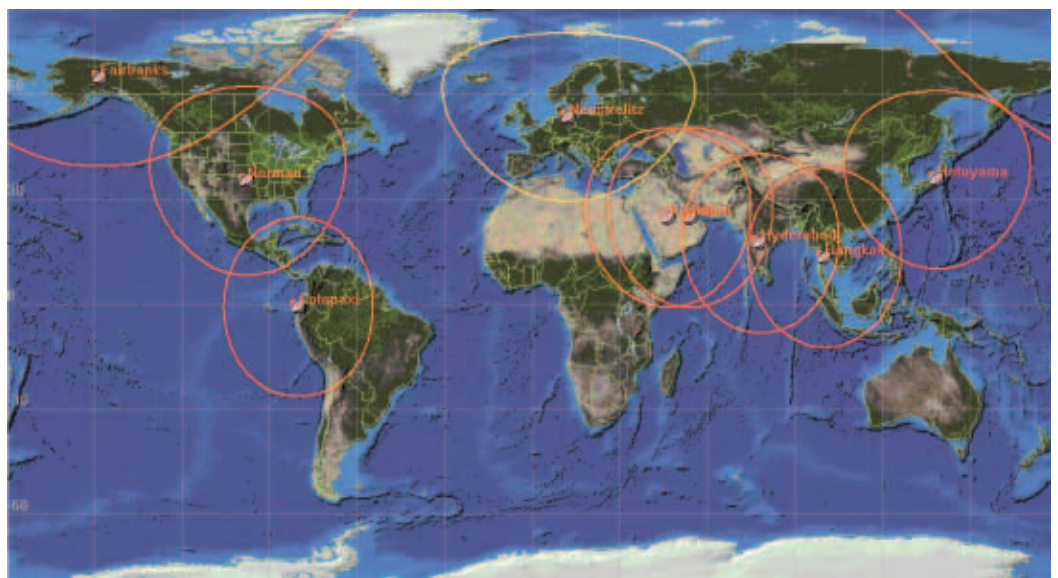
Processing Level

IRS data are typically available processed as System Corrected. This means that the products are radiometrically and geometrically corrected to the user-specified parameters including output map projection, image orientation, and resampling kernel (see after).

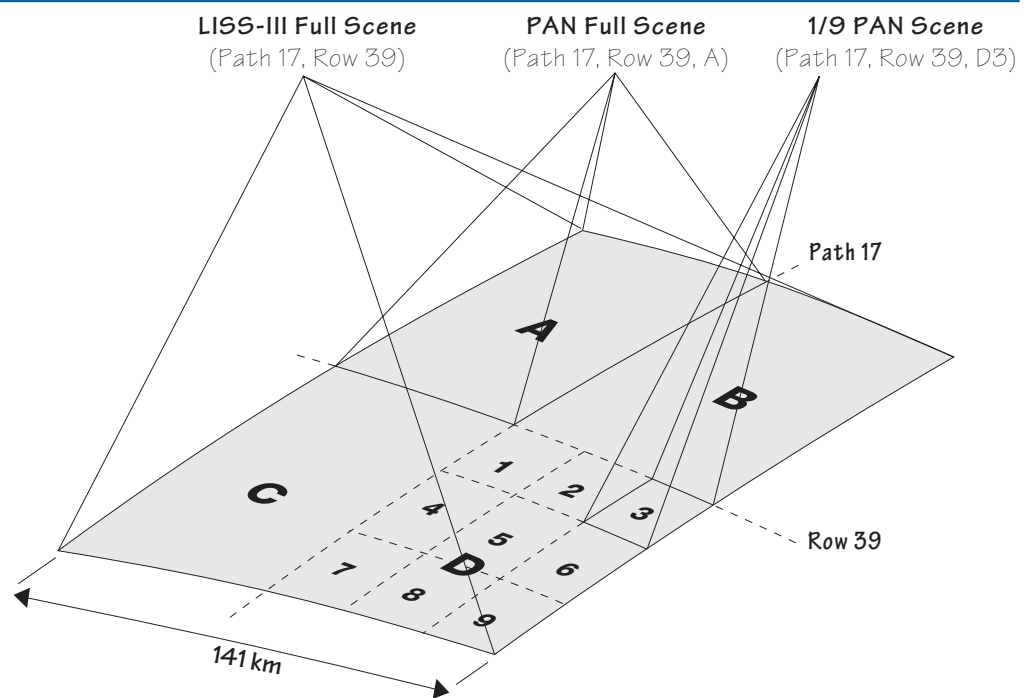
Geometric Corrections include Earth rotation, Earth ellipsoid and map projection, satellite attitude and internal sensor distortions.

From Euromap products are also available corrected only Radiometrically (not geometrically) for PAN and LISS-III.

IRS Ground Station Network



LISS-III and PAN scenes



System Corrected images can be produced with 2 different orientations: **path oriented**, displaying on the same rows the satellite acquisition scan lines, or **map oriented**, with north-up display.

From Euromap it is possible to have for LISS-III a synthetic blue band. Euromap has developed a model to derive a synthetic blue band on the basis of the 3 recorded LISS bands covering the green, red and near IR portion of the spectrum and a library of signatures. The resulting natural color renditions have proven to be of excellent quality and are particularly useful for the production of IRS PAN/LISS merged scenes. The blue band can be ordered as an option.

No atmospheric corrections are applied to the images.

Resampling algorithm

Level 1G images, during geometric correction, are resampled to a regular output grid. The

resampling kernel specifies how the input pixels are sampled: how many and how they are weighted. The available algorithms are:

Nearest Neighbour: in the transformed geometry the radiometric value of the output pixel is set equal to the value of the nearest input pixel in the original geometry. This algorithm preserves at its maximum the original radiance values.

Cubic Convolution: in the transformed geometry the radiometric value of the output pixel is interpolated using the values of its 16 nearest neighbours in the original geometry. This algorithm produces a better looking image, but changes the original satellite radiometry.

Map Projections and Ellipsoids

UTM/WGS84 are available from all ground stations. For other options please contact Eurimage Customer Service.

Available products and formats, by ground station

Products	Europe	USA	Ecuador	Dubai	India	Japan
PAN full (70*70 Km)	•	•	Only CC	Only CC	Only path oriented	Only CC and path oriented
PAN 1/9 (23*23 Km)	•	•	Only CC	Only CC	Only path oriented	Only CC and path oriented
LISS full (141*141 Km)	•				Only path oriented	Only CC
LISS quarter (70*70 Km)	•				Only path	Only CC oriented
WiFS full (774*774 Km)	•				Only path oriented	
Formats						
Fast Format	•		•	•	•	•
Super Structure	•			•		
TIFF	Extra charge	•	•			

Data Examples

IRS PAN (left) and LISS-III (right)

