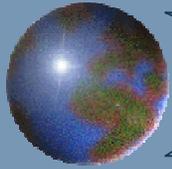


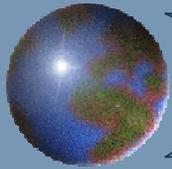


IKONOS Products - CARTERRA™ & NASA



Carterra Products

- Geo Images
 - Georectified, Map Oriented.
- Ortho Images
 - Accuracies from 2m CE90 to 25m CE90
- Stereo Images
 - Stereo Pair with RPC Image Geometry
- ITM - Ikonos Terrain Model



IKONOS Bands

Product options

- 1m Pan
- 4m MSI
- 1m Pan & 4m MSI, or
- 1m PSM (pan-sharpened).

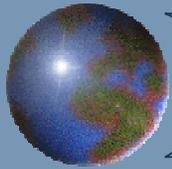
MSI & PSM

- Natural (Red/Green/Blue)
- CIR (NIR, Red, Green)
- 4-band (Blu, Grn, Red, NIR)

NASA products

- 1m Pan and
- 4-band, 4m MSI

Band	λ	GSD
Pan	450-900 nm	1m
Blue	445-516nm	4m
Green	506-595nm	4m
Red	632-698nm	4m
NIR	757-853nm	4m

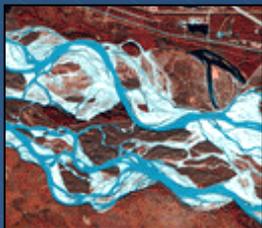


CARTERRA™ IKONOS Products

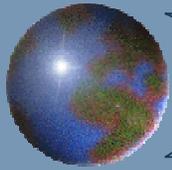


- 1-Meter Color (Pan-Sharpended)
 - Combines spatial content of 1-meter black-and-white imagery, with 4-meter multispectral content

- 1-Meter Black-and-White
 - Enables users to distinguish ground features as small as one-meter



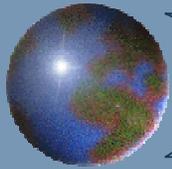
- 4-Meter Multispectral
 - Absolute radiometry in 4 spectral bands for automated classification algorithms.



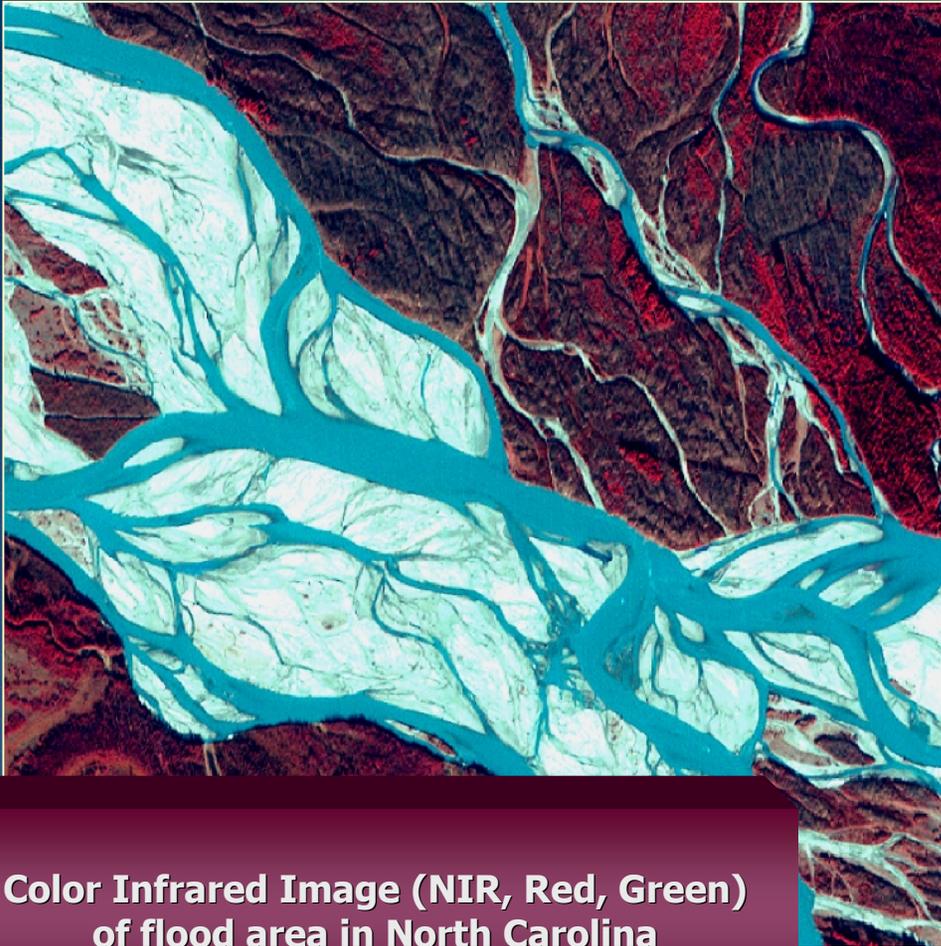
CARTERRA™ 1-Meter Black-and-White

**Beijing, China (Forbidden City)
Collected 22 October 1999**



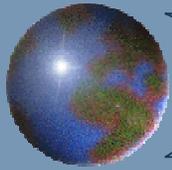


Multispectral Images



**Color Infrared Image (NIR, Red, Green)
of flood area in North Carolina**

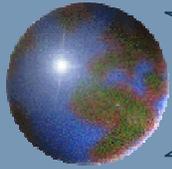
- 4m GSD
- Choice of RGB, CIR, or 4-band (Blue, Green, Red, NIR)
- Absolute radiometric accuracy for automatic classification and other multispectral applications.



CARTERRA™ 1-Meter Color



**Kyoto, Japan (Imperial Palace and Park)
Collected 20 October 1999**



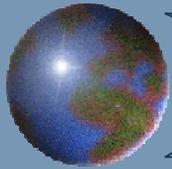
Georectified vs. Orthorectified

Georectified

- Image projected onto inflated ellipsoid.
- Map Oriented
- Terrain Displacement
- Produced from mono image.
- Low cost, fast delivery.

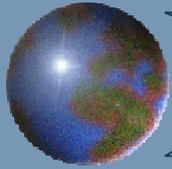
Orthorectified

- Image projected onto DEM.
- Terrain corrected
- Map Accuracy
- Produced from stereo or mono + DEM
- Higher cost.



Facts Pertaining to IKONOS Products

- Projections
 - UTM, State Plane, Albers Conic Equal Area, Lambert Conformal Conic, Transverse Mercator
- Datums (Ellipsoids)
 - NAD83(GRS80), NAD27(Clarke 1866), WGS84
- Format
 - GeoTIFF with map projection
 - NITF with Image Geometric Data in RPC data
- Support files - TFW world file, text metadata file, text license file
- Bits - 8 or 11
- Clouds < 20%
- Media - CD-ROM or DVD (coming soon).

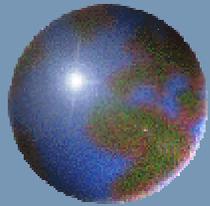


Value Added Products & Services

- Value-added production includes:
 - Special Map Projections (e.g., polar stereographic, equirectangular)
 - Special Datums (Ellipsoids)
 - Special Formats, Special Tiling Schemes
 - Special Products (CIB, TLM, FFD, DTED, DOQQ...)



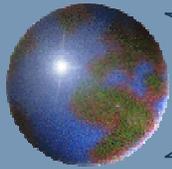
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CARTERRA™

Geometric Products

Map Oriented



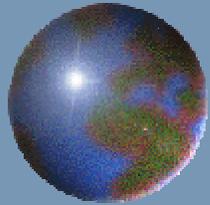
CARTERRA™ Geo

- Map-oriented
- Fast delivery of large areas
- Ideal for impact analysis, national and global security, emergency response and disaster management
- CE90 error of 50 meters (excluding effects of terrain displacement)
- Uniform ground sample distance
- Projects with limited budgets



Geometrically-Corrected

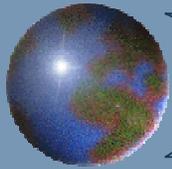
Available as 1-meter color and black-and-white, 4-meter multispectral



CARTERRA™

Orthorectified Products

Map Accurate



IKONOS Orthorectified Products

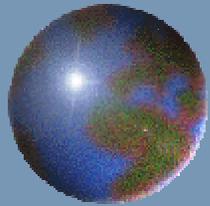
Product	CE90	RMS	NMAS	GCP	DEM
Reference	25.4 m	11.8 m	1:50,000	No	5c
Map	12.2 m	5.7 m	1:24,000	No	5c
Pro	10.2 m	4.8 m	1:12,000	No	5c
Precision	4.1 m	1.9 m	1:4,800	Yes	5c
Precision Plus	2.0 m	0.9 m	1:2,400	Yes	5e



1:50,000 (25 m)

1:24,000 (12m)

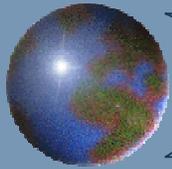
1:2400 (2m)



CARTERRA™

Stereo Products

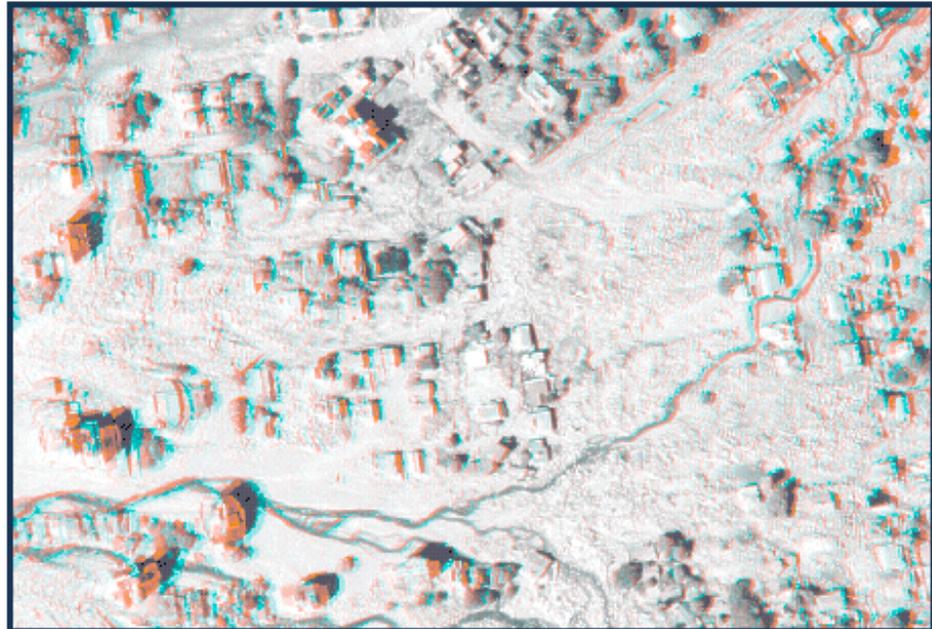
Epipolar Resampled



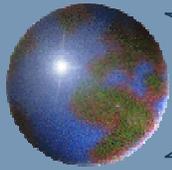
CARTERRA™ Stereo

- CARTERRA™ Stereo

- Stereo pairs with RPC Image Geometry Data.
- Standard Stereo
 - ❖ 25m CE90 (H)
 - ❖ 22m LE90 (V)
- Precision Stereo
 - ❖ 2-4m CE90 (H)
 - ❖ 3-6m LE90 (V)

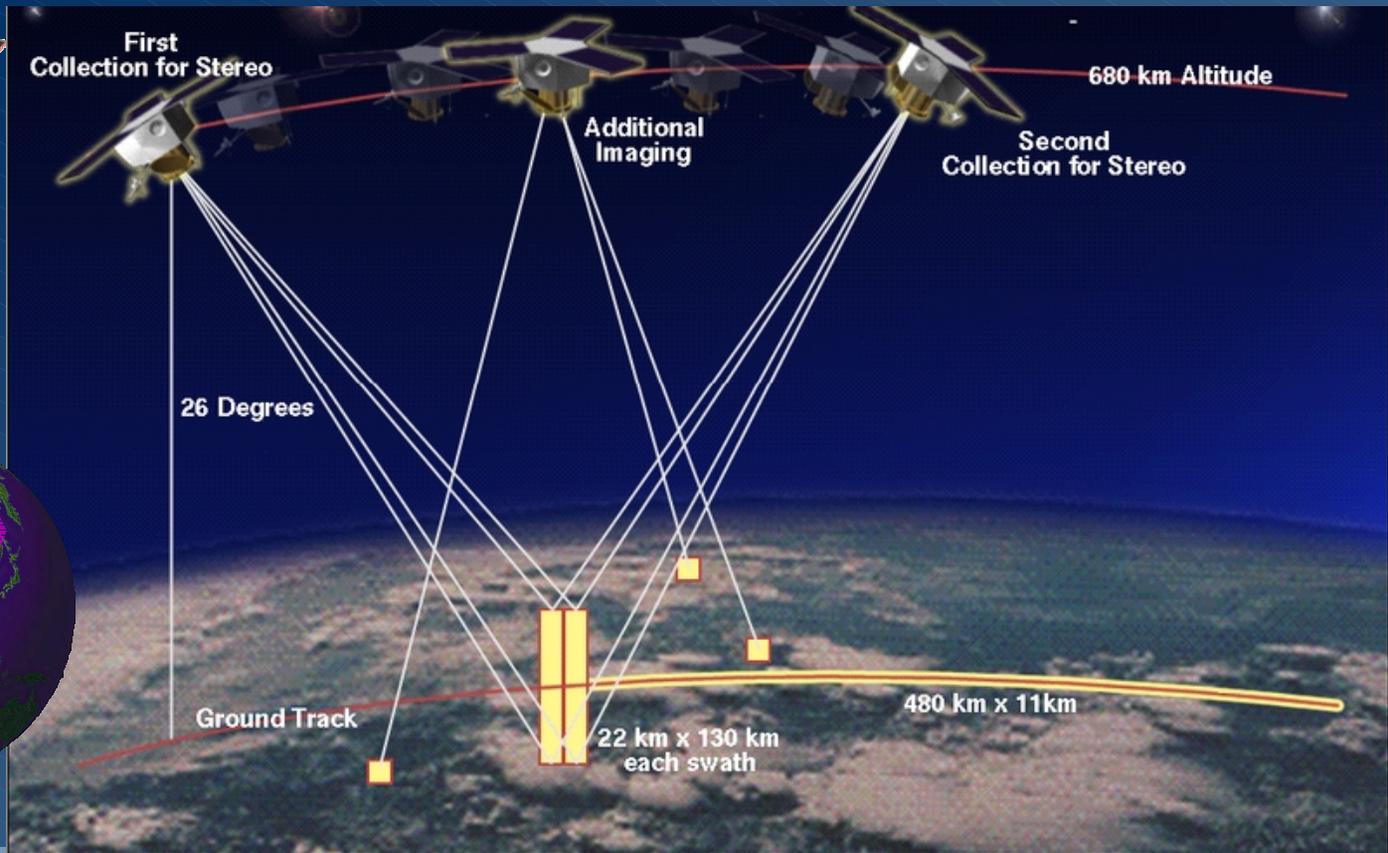
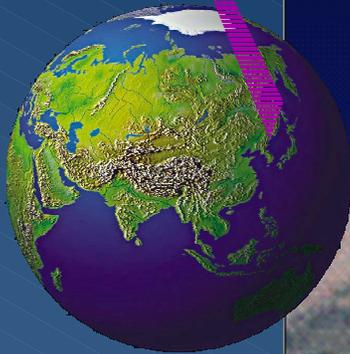
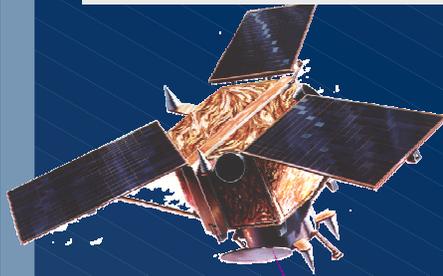


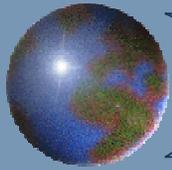
- Sold to US & foreign national governments only



Stereo Image Collection

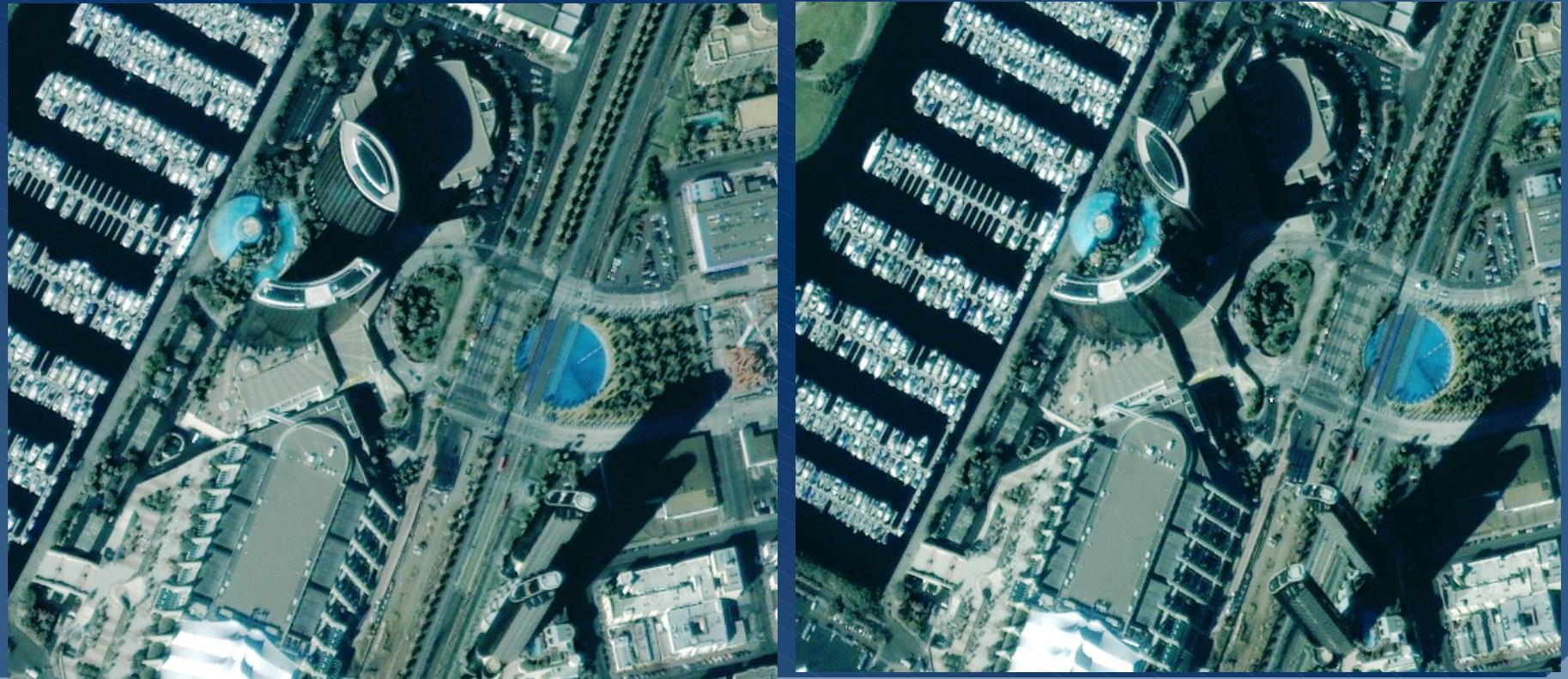
In Track Stereo - Same day, scene content, & lighting.

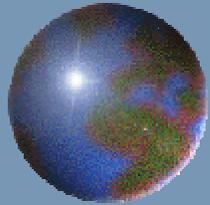




Pan Sharpened (Color) Stereo

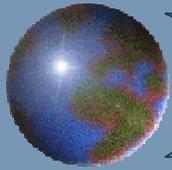
- Everything the eye can see
- High resolution, 3D, color imagery.





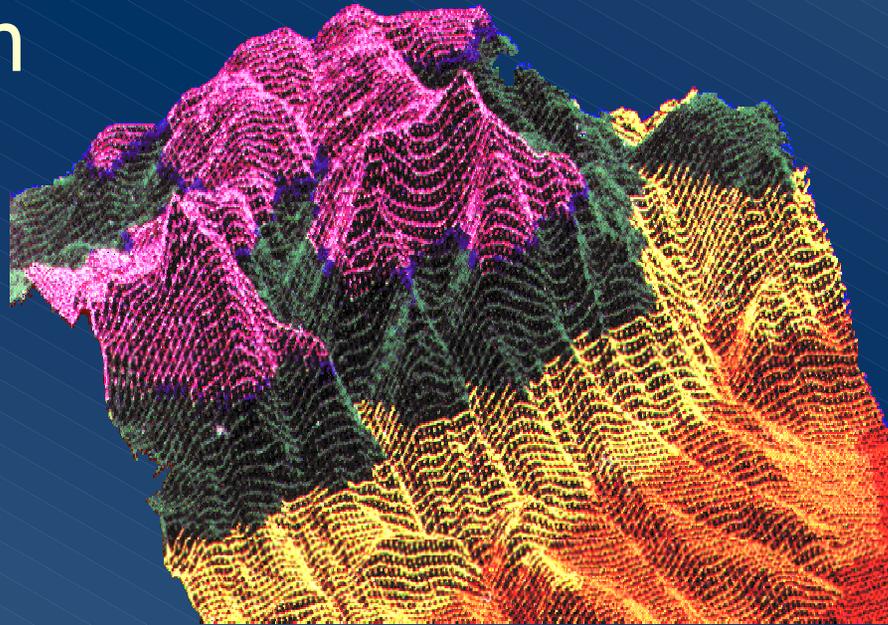
CARTERRA™ *DEM Products*

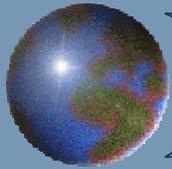
Digital Elevation Models



CARTERRA™ Digital Elevation Models

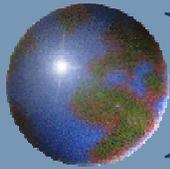
- Generated from IKONOS stereo pairs
- Edited to ground level to remove buildings and vegetation





IKONOS DEM Products

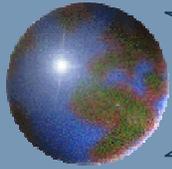
Level	Vertical Accuracy	Maximum AOI	GCP	Post Spacing
5a	30m LE90	1° × 1°	No	3 arc-sec (~90m)
5b	30m LE90	1° × 1°	No	1 arc-sec (~30m)
5c	12m LE90	7.5' × 7.5'	No	1 arc-sec (~30m)
5d	12m LE90	3.75' × 3.75'	No	0.5 arc-sec (~15m)
5e	3m LE90	3.75' × 3.75'	Yes	0.2 arc-sec (~6m)



NASA Products

Product Name	Process	Accuracy	GCP	DEM	Min. Elev.
Standard Original	Georectified	250m CE90*	No	No	60° mono
Precision Original	Georectified	3m CE90*	Yes	No	80° mono
Standard Master	Ortho-rectified	12m CE90	No	Yes	60° stereo
Precision Master	Ortho-rectified	2m CE90	Yes	Yes	75° mono
Model	Stereo + DEM	25m CE90 (H) 7m RMSE (V)	No	No	60° stereo

(*)Georectified accuracy is exclusive of terrain displacement.

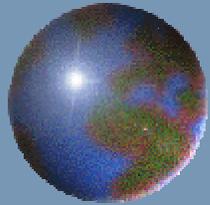


NASA Products

- Bands - 1m Pan + 4m MSI
- Bits - 11
- Datum - WGS84
- Projection - UTM
- Dynamic Range Adjust - Off
- Modulation Transfer Function Comp - On



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Questions and Answers