DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

WASHINGTON, D. C. AREA

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1988

Image © CNES 1987

SCALE 1:50 000

1 CENTIMETER ON THE MAP REPRESENTS 500 METERS ON THE GROUND

WASHINGTON, D. C. AREA

1:50 000 SCALE
SATELLITE IMAGE MAP

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The French Satellite pour l'Observation de la Terre (SPOT) satellite was launched on February 22, 1986 into an orbit with a nominal altitude of 832 km (517 statute miles). The high resolution imaging systems provide multispectral data at 20-meter ground resolution and panchromatic data at 10-meter ground resolution.

This image was prepared by merging and then mosaicking the multispectral and panchromatic data sets of four SPOT scenes acquired on March 19 and March 24, 1987. The merge of panchromatic and multispectral data was completed prior to mosaicking. To accomplish the merge, an image-to-image registration was first performed between each panchromatic/multispectral scene set. Approximately 60 control points were selected for each set using an autocorrelation technique. The multispectral data were geometrically rectified and spatially resampled to 10-meter pixels (ground resolution) during this procedure to match the panchromatic data, using a second-order polynomial and cubic convolution resampler. Once the panchromatic and multispectral data sets were geometrically identical, the merge was performed using a hue-intensity-saturation (HIS) method. The data merge was effected by transforming a contrast-enhanced spectral image into HIS color space. The panchromatic data were stretched to match the distribution histogram of the spectral intensity channel, then substituted for the intensity channel to create a hybrid HIS data set. The hybrid HIS data set was then transformed back into red, green, and blue components.

The four merged scenes were mosaicked together; each scene was registered to 1:24,000-scale maps by selecting approximately 10 control points per image. These control points were combined with tie points selected by Large Area Mosaicking Software (LAMS) along adjacent scene boundaries and a transformation grid was created. The grid was used to geometrically correct each image in relation to the Universal Transverse Mercator (UTM) projection and to each other. Once each scene was in proper geometric configuration, the radiometric matching between scenes was accomplished using LAMS.

Final processing of the data included a 3 × 3 edge enhancement and multipoint linear stretch to increase contrast. The digital data were then output on a recorder in the form of a color transparency. The transparency was scanned on a graphic arts scanner and color separates generated and used in the production of the map. This process creates an image that retains the spectral qualities of the multispectral data while adding the spatial quality of the 10-meter ground resolution of the panchromatic data. Further information on these procedures may be obtained from the U.S. Geological Survey, EROS Data Center, Sioux Falls, South Dakota 57198.

SPOT bands and wavelengths used:

Panchromatic (10 m)		0.51–0.73 μm
Multispectral (20 m)	Band 1	0.50–0.59 μm, printed in yellow
	Band 2	0.61–0.68 μm, printed in magenta
	Band 3	0.79–0.89 μm, printed in cyan

Colors generally relate to typical features as follows:

Black	Deep clear water
Dark to light blue	Turbid or shallow water; urban areas; industrial and commercial areas; asphalt roads, parking lots, and runways; railroads; quarries
Dark to light red	Grass areas, crops
Dark to light greenish brown	Coniferous and deciduous forests
Green to light green	Dry grass and crops
White to beige	Fallow land or bare soil; concrete roads and runways; light colored roofs

	Scene ID	Column(K)/ Row(J)	Date
1	16222718703241607052X 16222718703241607031P	622/271	3/24/87
2	16222728703241607132X 16222728703241607111P	622/272	3/24/87
3	16232718703191603152X 16232718703191603131P	623/271	3/19/87
4	16232728703191603232X 16232728703191603211P	623/271	3/19/87

FOR SALE BY U.S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092

Information on SPOT data may be obtained through
SPOT Image Corporation, 1897 Preston White Drive
Reston, Virginia 22091
Tel. (703) 620-2200

UTM GRID AND 1987 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

Produced by the United States Geological Survey
Images recorded by the Multispectral and Panchromatic sensors on Satellite pour l'Observation de la Terre (SPOT)
Images controlled to identified mapped features
The root-mean-square-error in position of well-identified features is less than 30 meters
Projection and 5,000-meter grid, zone 18: Universal Transverse Mercator
10,000-foot grid ticks based on the Maryland coordinate system and the Virginia coordinate system, north zone
1927 North American Datum
To place on the North American Datum 1983, move the graticule lines 12 meters south and 26 meters west

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38077-H1-SA-050

1987

EXPERIMENTAL EDITION