

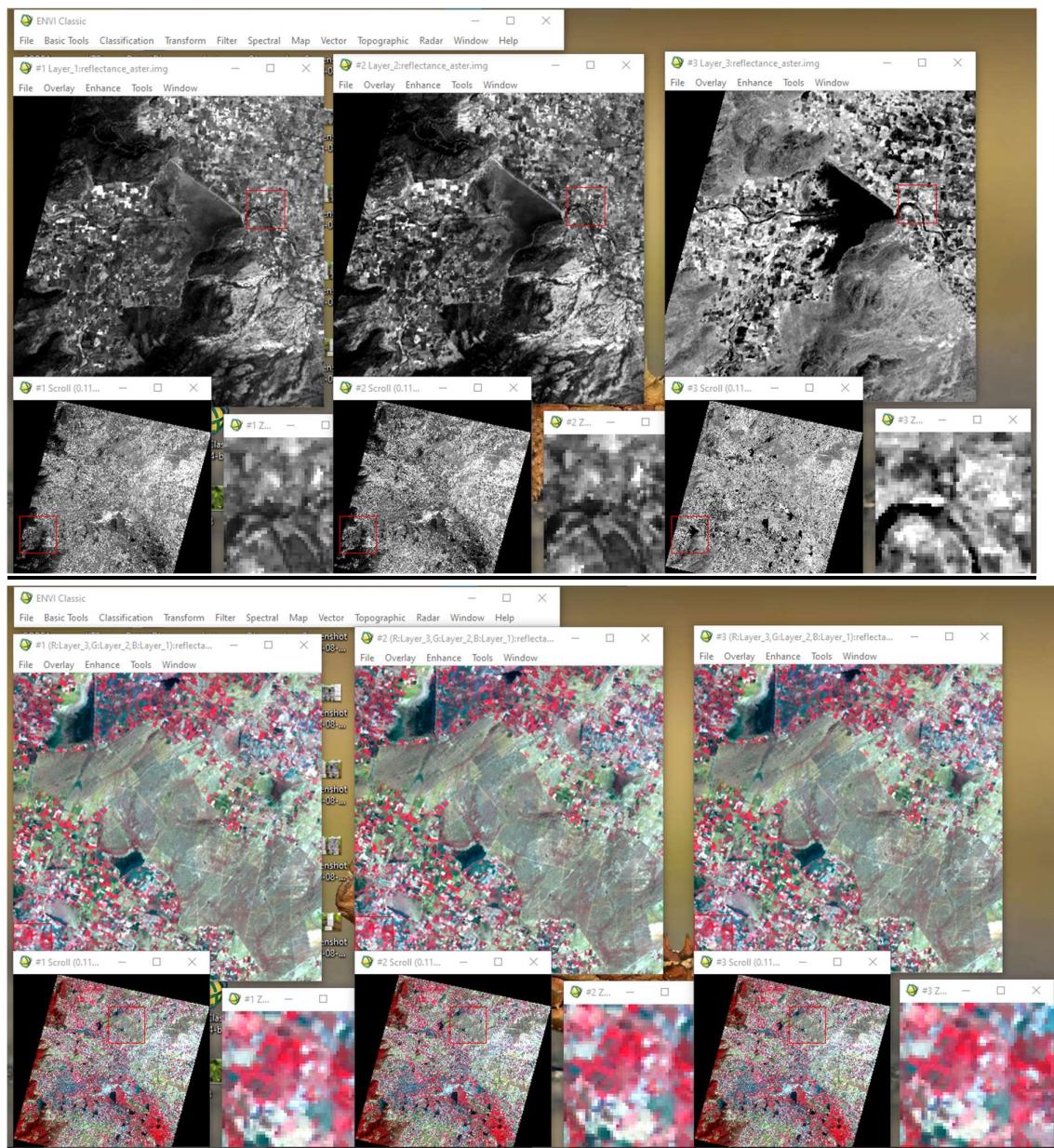
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244104010

CE-593 , ADVANCED REMOTE SENSING

Lab – 1 Exercise

1) Image – “reflectance_aster”



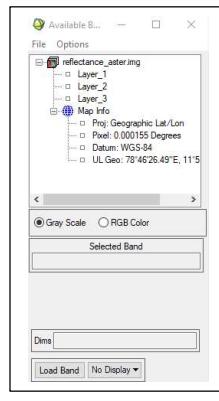
- **Number of Bands**

- As per Source – 14 Bands
- As per Given Data – 3 Bands

- **Number of Rows and Columns**

2138 x 2150

Dims 2138 x 2150 (Floating Point) [BSQ]



- **Minimum, maximum, standard deviation and mean for each band**

Basic Stats	Min	Max	Mean	Standard deviation
Band 1	0.000000	0.260068	0.081911	0.057548
Band 2	0.000000	0.284412	0.078222	0.057967
Band 3	0.000000	0.396463	0.145315	0.101934

Stats Min Max Mean Stdev
Band 1 0.000000 0.260068 0.081911 0.057548

Stats Min Max Mean Stdev
Band 2 0.000000 0.284412 0.078222 0.057967

Stats Min Max Mean Stdev
Band 3 0.000000 0.396463 0.145315 0.101934

- **Projection Information**

Proj: Geographic Lat/Lon

Pixel: 0.000155 Degrees

Datum : WGS-84

UL Geo : 78°46'26.49"E , 11° 59'54.39"N

Map Info
 Proj: Geographic Lat/Lon
 Pixel: 0.000155 Degrees
 Datum: WGS-84
 UL Geo: 78°46'26.49"E, 11°59'54.39"N

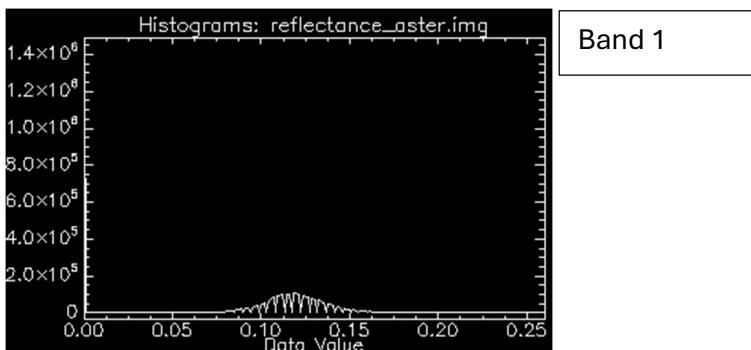
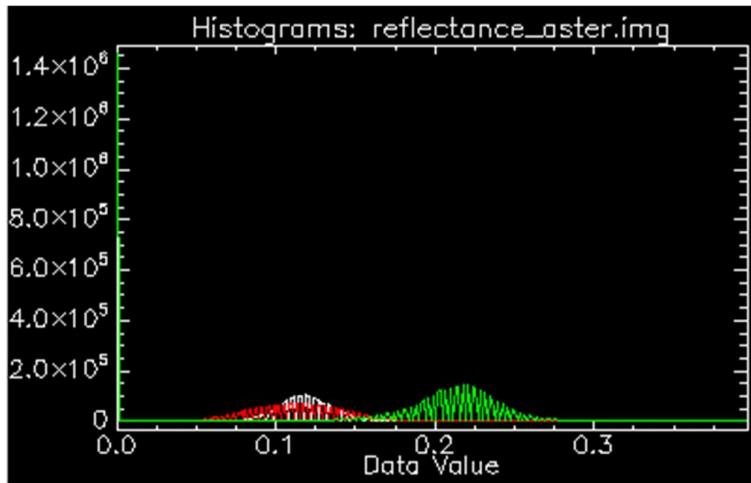
- **Spatial Resolution**

VNIR (bands 1-3): 15 meters

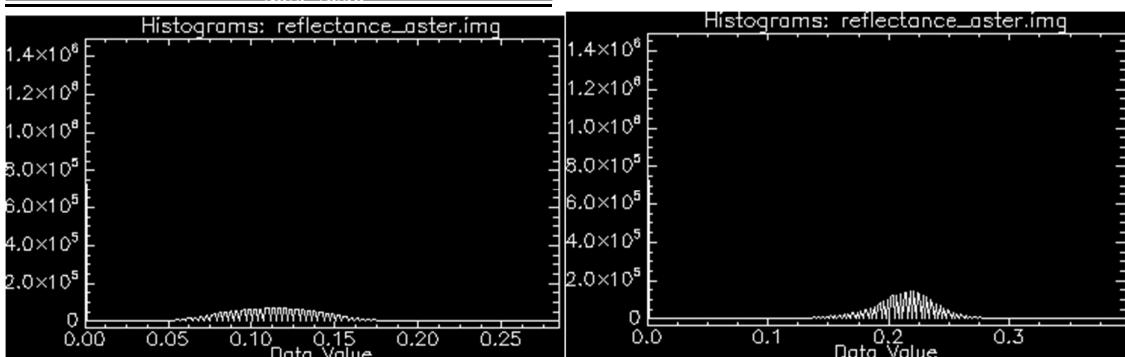
SWIR (bands 4-9): 30 meters

TIR (bands 10-14): 90 meters

- Histograms



Band 1

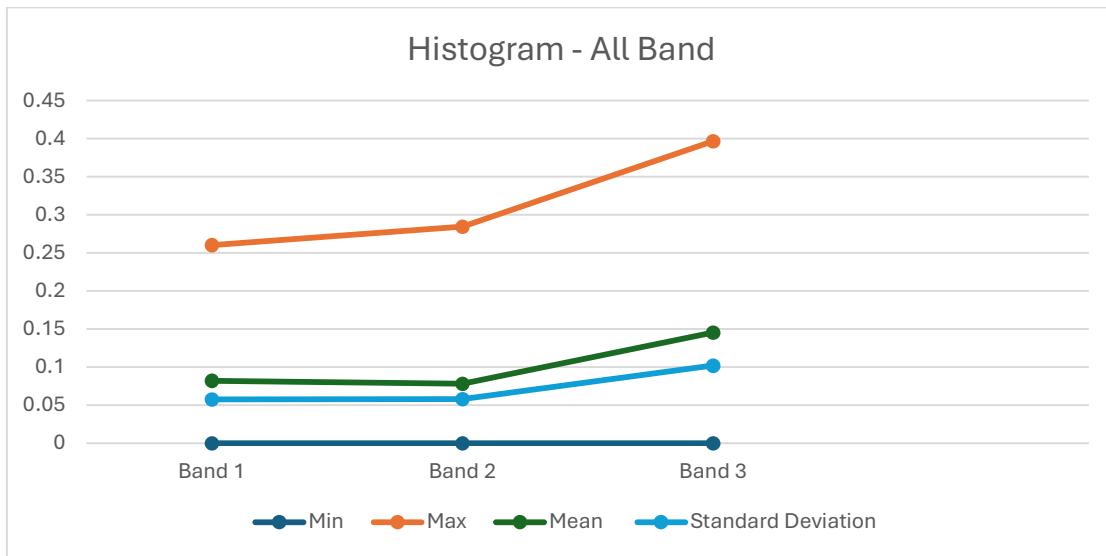


Band 3

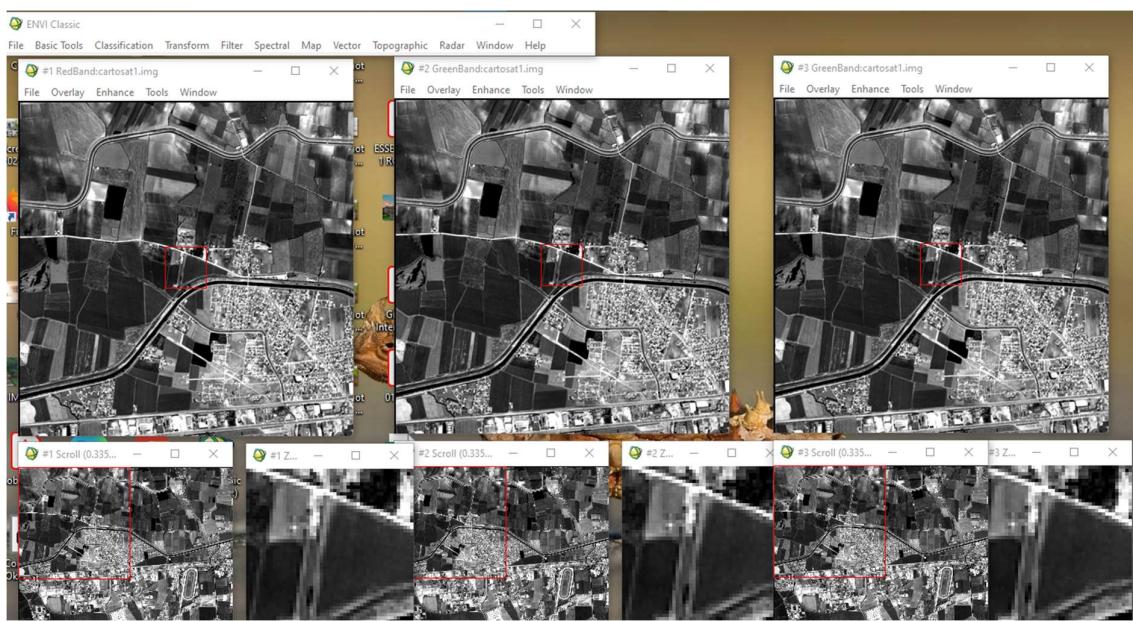
Band 2

- I. Band 1 has a skewed histogram with a long tail towards brighter values, indicating a few very bright pixels. Most pixels have low to medium brightness.

- II. Similar to Band 1, Band 2 has a skewed histogram with a long tail towards brighter values. However, the mean is slightly lower, indicating a slightly darker overall tone.
- III. Band 3 has a more symmetrical histogram with a wider range of values, indicating a greater variability in brightness. The higher mean and maximum values suggest a brighter overall tone compared to Bands 1 and 2.



2) Image – “cartosat1”



- **Number of Bands**
 - As per Source – 4 Multispectral Bands
 - As per Given Data – 1 Band

- **Number of Rows and Columns**

763 x 642

Dims 763 x 642 (Byte) [BSQ]

- **Radiometric resolution of the image**

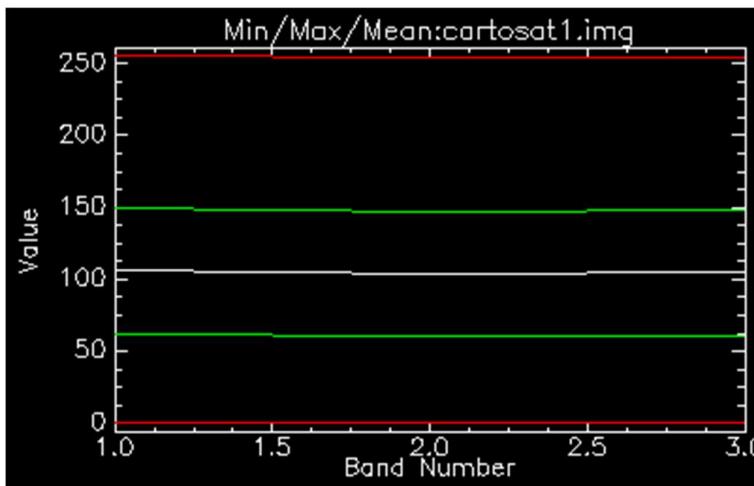
Min	Max
1	255

Radiometric resolution = 2^n , Max value 255, $2^8 = 256$, **8 bit**

Radiometric resolution – 8bit

- **Minimum, maximum, standard deviation and mean for each band**

Basic Stats	Min	Max	Mean	Standard deviation
Band 1	1	255	106.049797	43.463080
Band 2	0	254	104.060180	43.452155
Band 3	1	255	106.049797	43.463080

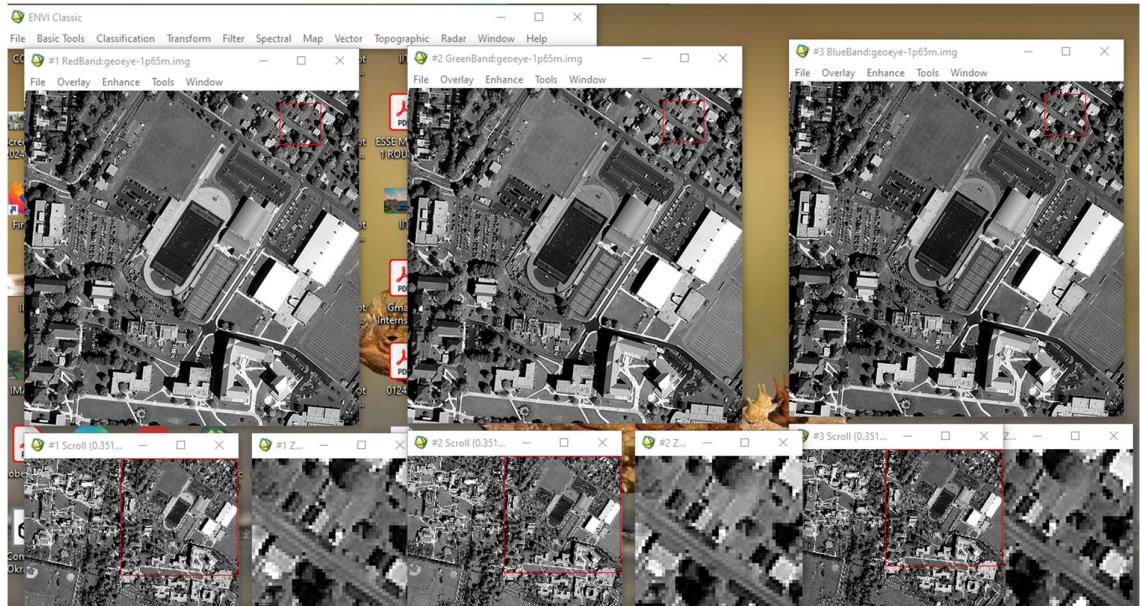


Select Stat ▼

Filename: D:\INDIAN INSTITUTE OF TECHNOLOGY , G
Dims: Full Scene (489,846 points)

Basic Stats	Min	Max	Mean	Stde
Band 1	1	255	106.049797	43.46308
Band 2	0	254	104.060180	43.45215
Band 3	1	255	106.049797	43.46308

3) Image – “geoeye-1p65m”



Number of Bands

- As per Source – 5 Bands
- As per Given Data – 3 Bands

- Number of Rows and Columns

729 x 533

Dims 729 x 533 (Byte) [BSQ]

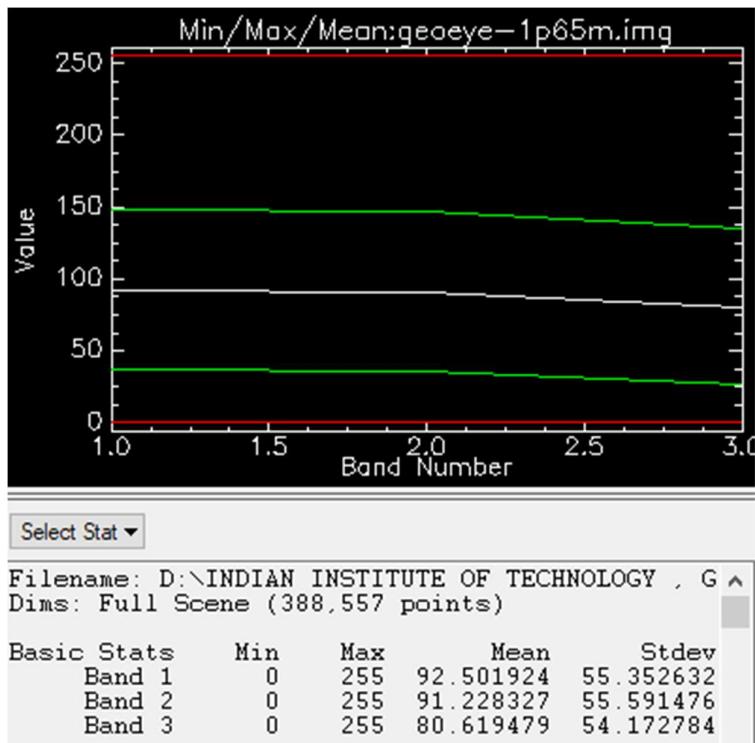
- Radiometric resolution of the image

Min	Max
1	255

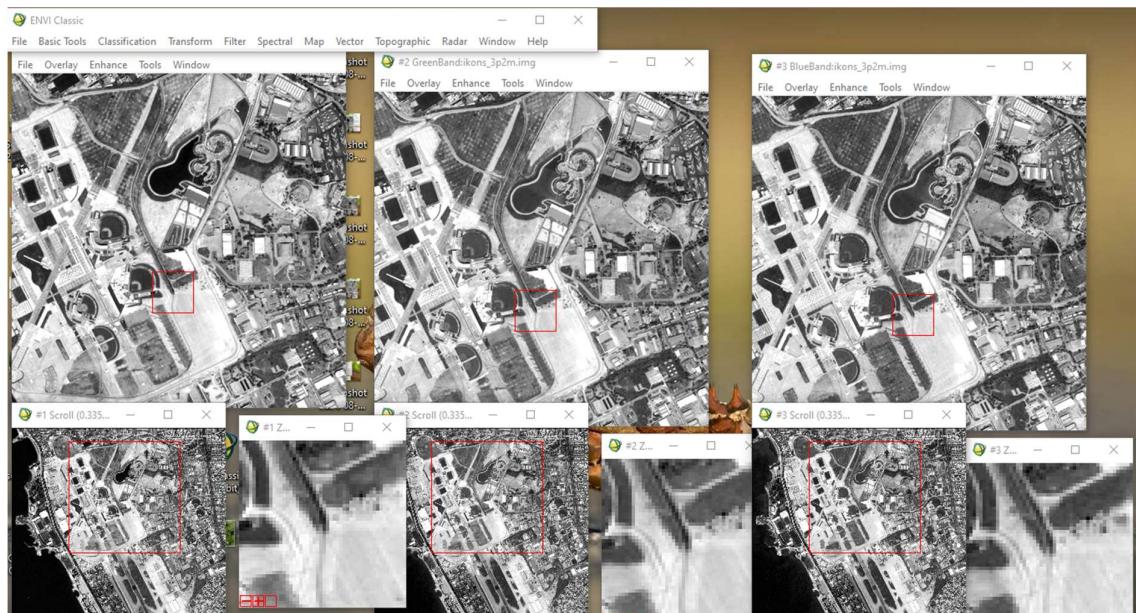
Radiometric resolution – 8bit

- Minimum, maximum, standard deviation and mean for each band

Basic Stats	Min	Max	Mean	Standard deviation
Band 1	0	255	92.501924	55.352632
Band 2	0	255	91.228327	55.591476
Band 3	0	255	80.619479	54.172784



4) Image – “ikons_3p2m”



Number of Bands

- As per Source – 4 Bands
- As per Given Data – 3 Bands

Number of Rows and Columns

729 x 763

Dims 763 x 763 (Byte) [BSQ]

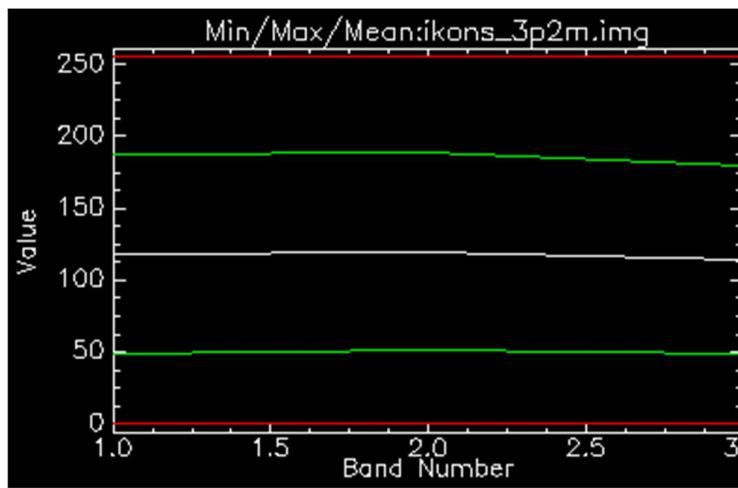
Radiometric resolution of the image

Min	Max
1	255

Radiometric resolution – 8bit

Minimum, maximum, standard deviation and mean for each band

Basic Stats	Min	Max	Mean	Standard deviation
Band 1	0	255	118.528659	69.41560
Band 2	0	255	120.072223	68.53939
Band 3	0	255	114.152688	65..11803



Select Stat ▾

Filename: D:\INDIAN INSTITUTE OF TECHNOLOGY , G
Dims: Full Scene (582,169 points)

Basic Stats	Min	Max	Mean	Stde
Band 1	0	255	118.528659	69.41560
Band 2	0	255	120.072223	68.53939
Band 3	0	255	114.152688	65.11803

5) Image – “lis3march99”



Number of Bands

- As per Source – 4 Bands
- As per Given Data – 4 Bands

- Number of Rows and Columns

793 x 598

Dims 793 x 598 (Byte) [BSQ]

- Radiometric resolution of the image

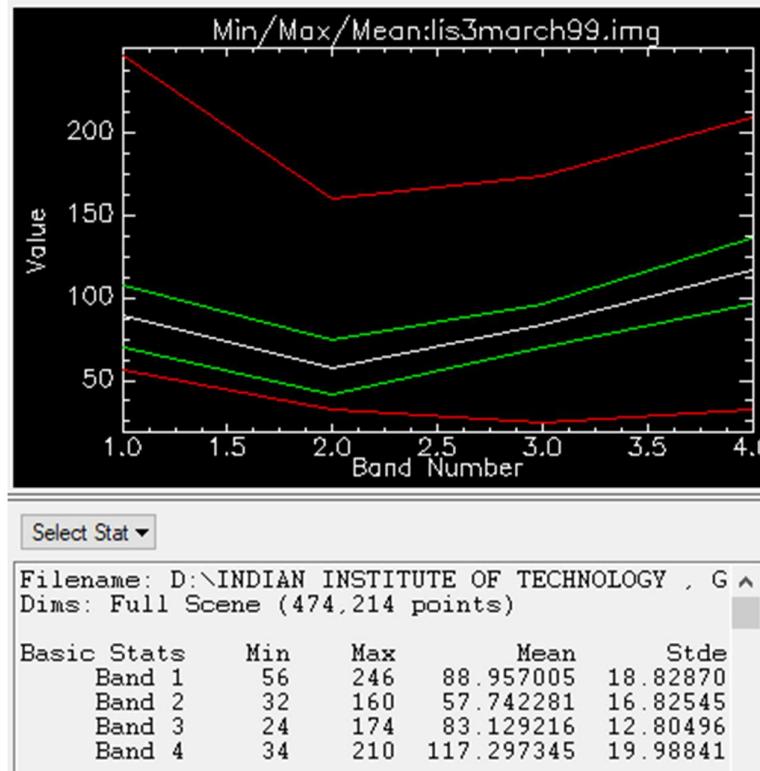
Min	Max
56	246

Radiometric resolution – 8bit

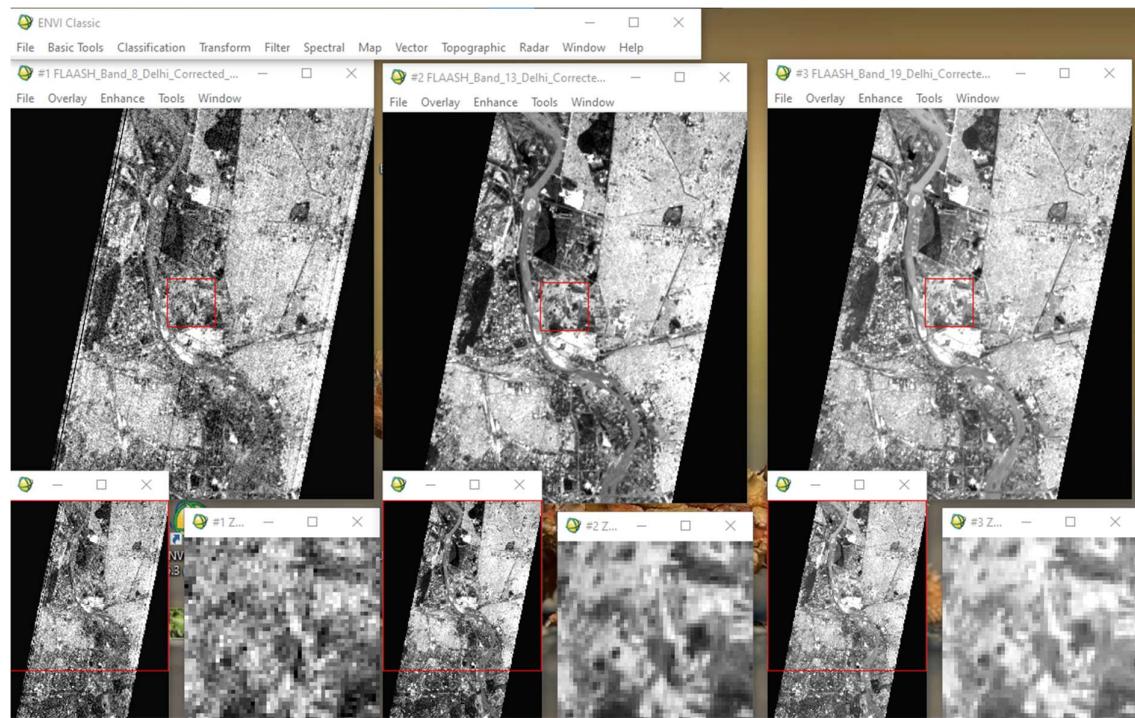
- Minimum, maximum, standard deviation and mean for each band

Basic Stats	Min	Max	Mean	Standard deviation
Band 1	56	246	88.957005	18.828707
Band 2	32	160	57.742281	16.825456
Band 3	24	174	83.129216	12.804965

Band 4	34	210	117.297345	19.988411
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6) Image – “hyperspectral image”



Number of Bands

- As per Source – 50-1200 Bands
- As per Given Data – 135 Bands

- **Number of Rows and Columns**

373 x 5858

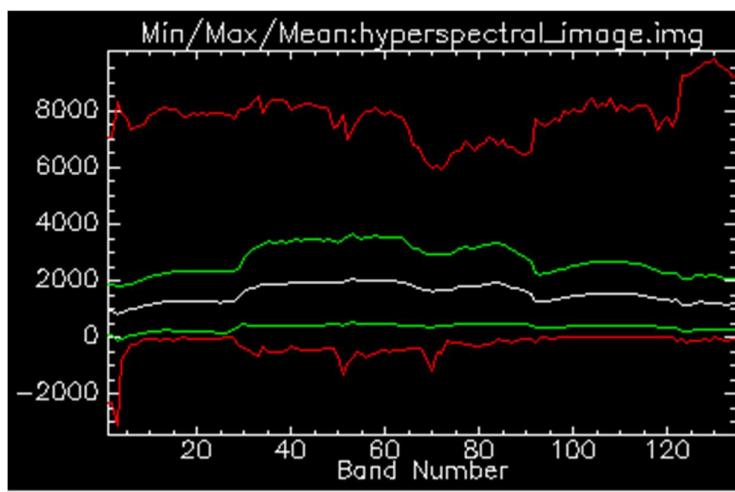
Dims 373 x 585 (Integer) [BSQ]

- **Radiometric resolution of the image**

Min	Max
-2305	7041

Radiometric resolution – 12bit

- **Minimum, maximum, standard deviation and mean for each band**



Select Stat ▾

Filename: D:\INDIAN INSTITUTE OF TECHNOLOGY , G
Dims: Full Scene (218,205 points)

Basic Stats	Min	Max	Mean	S
Band 1	-2305	7041	963.807575	885.74
Band 2	-2295	7041	949.575798	891.93
Band 3	-3143	8338	838.392645	953.29
Band 4	-798	7942	877.096341	937.46
Band 5	-556	7736	935.063605	923.29
Band 6	-271	7332	976.824046	896.74
Band 7	-246	7484	1001.210806	915.93

- **Projection Information**

Proj: UTM. Zone 43N

Pixel: 30 Meters

Datum : WGS-84

UL Geo : 77°11'24.74"E , 28° 44'7.70"N

Map Info

- Proj: UTM, Zone 43N
- Pixel: 30 Meters
- Datum: WGS-84
- UL Geo: 77°11'24.74"E, 28°44'7.70"N
- UL Map: 713895.000, 3180645.000

- **Spatial Resolution**

- **Airborne hyperspectral:**

- Low-altitude: 0.5-2 meters (e.g., AVIRIS, HyMap)
- Medium-altitude: 2-5 meters (e.g., CASI, SASI)
- High-altitude: 5-10 meters (e.g., Hyperion)

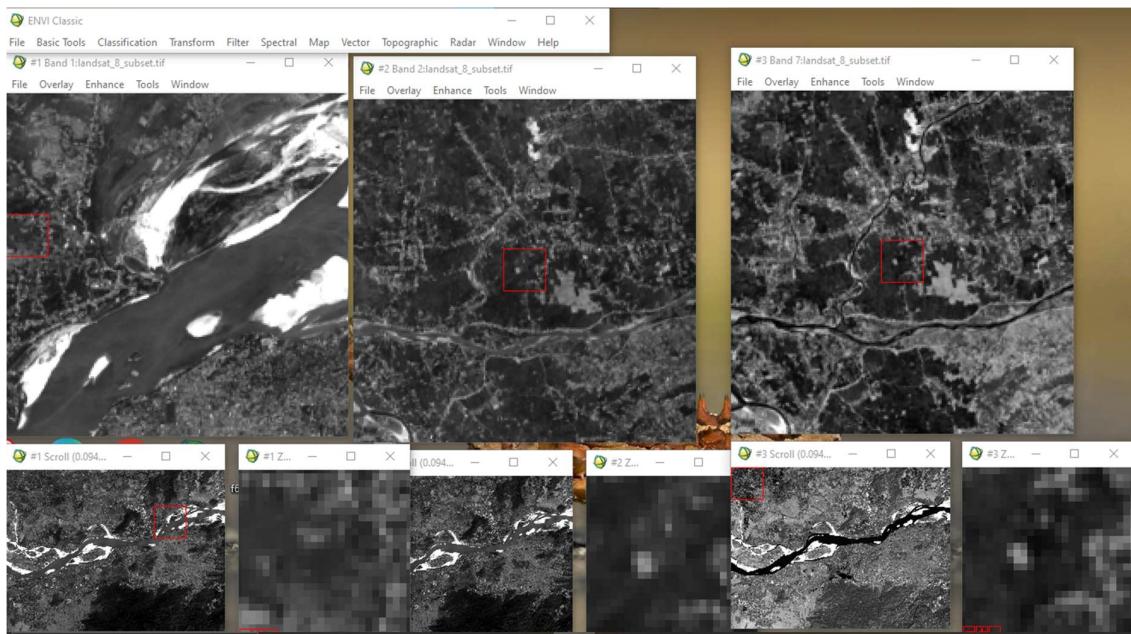
- **Satellite hyperspectral:**

- Low-resolution: 30-100 meters (e.g., MODIS, Landsat 8)
- Medium-resolution: 10-30 meters (e.g., Sentinel-2, Hyperspectral)
- High-resolution: 5-10 meters (e.g., WorldView-3, PRISMA)

- **Spaceborne hyperspectral:**

- Low-resolution: 100-300 meters (e.g., CRISM, M3)
- Medium-resolution: 30-100 meters (e.g., EnMAP, HISUI)

7) Image – “landsat 8 subset”



Number of Bands

- As per Source – 11 Bands
- As per Given Data – 11 Bands
-

- **Number of Rows and Columns**

2700 x 1988

Dims 2700 x 1988 (Unsigned Int) [BIP]

- **Radiometric resolution of the image**

Min	Max
9703	25726

Radiometric resolution – 16bit

- **Projection Information**

Proj: UTM. Zone 46N

Pixel: 15 Meters

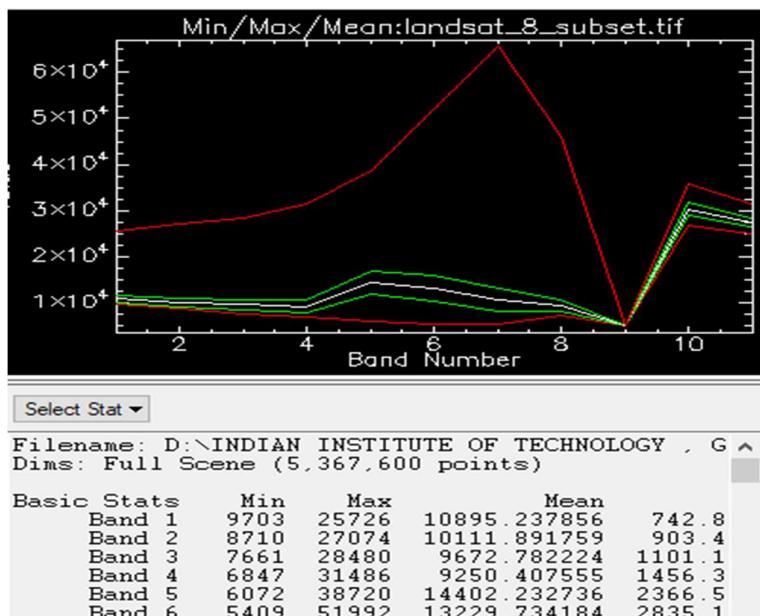
Datum : WGS-84

UL Geo : 91°26'48.79"E , 26° 17'17.44"N

Map Info

- Proj: UTM, Zone 46N
- Pixel: 15 Meters
- Datum: WGS-84
- UL Geo: 91°26'48.79"E, 26°17'44.52"
- UL Map: 344947.500, 2909362.500

- **Minimum, maximum, standard deviation and mean for each band**



- **Spatial Resolution**

- **Landsat 1-3 (1972-1983):**

- Multispectral Scanner (MSS): 79 meters (260 feet)

- **Landsat 4-5 (1982-2013):**

- Thematic Mapper (TM): 30 meters (100 feet)

- Multispectral Scanner (MSS): 79 meters (260 feet)

- **Landsat 6 (1993-1997):**

- Enhanced Thematic Mapper (ETM): 15 meters (50 feet) (panchromatic), 30 meters (100 feet) (multispectral)

- **Landsat 7 (1999-present):**

- Enhanced Thematic Mapper Plus (ETM+): 15 meters (50 feet) (panchromatic), 30 meters (100 feet) (multispectral)

- **Landsat 8 (2013-present):**

- Operational Land Imager (OLI): 15 meters (50 feet) (panchromatic), 30 meters (100 feet) (multispectral)

- Thermal Infrared Sensor (TIRS): 100 meters (330 feet)

- **Landsat 9 (2021-present):**

- Operational Land Imager 2 (OLI-2): 15 meters (50 feet) (panchromatic), 30 meters (100 feet) (multispectral)

- Thermal Infrared Sensor 2 (TIRS-2): 100 meters (330 feet)

- **Information of a particular point according to spectral signature.**

