

# **AWIFS ORTHO RECTIFIED TILES**

National Remote Sensing Centre

## Introduction

This document briefly describes Resourcesat-1 & AWiFS sensor, Orthorectified tiles covering Indian region, generation methodology and its accuracies.

## Tiles Specification

### Tile related

- Tile Size : 1 deg x 1deg
- Collar : 20 pixels
- Naming Convention : As per SOI OSM

### Projection related

- Projection : Geographic Lat/Long
- Datum : WGS-84
- Resolution : 0.000450 (~50m).

### Image Related

- Image File Format : GeoTIFF
- Number of Bands : 4 (BAND 2, 3, 4, 5)
- Radiometric : 10 bits
- Resolution (Packed as 16bit)
- Correction level : Orthorectified

## Naming Convention

Image File naming convention contains the following information

- Sensor
- SOI OSM 1deg x 1deg area
- Path & Row
- Date of Acquisition
- Band Information

FileName: **SS-TTTTT-PPP-RRR-DDMMYY-BANDN.tif**

SS - AWiFS Sensor (AW / L3)  
TTTTT - SOI OSM 1deg x 1deg tile  
PPP - Path  
RRR - Row  
DDMMYY - Date of Acquisition  
N - Band number (2, 3, 4, 5)

Ex: AW-NC43E-099-063-06Feb10-BAND2.tif

### **ResourceSat-1**

The RESOURCESAT-1 (IRS-P6) is envisaged as the continuity mission to IRS-1C/1D, with enhanced capabilities both in the payload and the platform, to meet the increasing demands of the user community. The objectives of the mission are:

- \* To provide continued remote sensing data services on an operational basis for integrated land and water resources management at micro level, with enhanced spectral and spatial coverage and stereo imaging.
- \* To further carry out studies in advanced areas of user applications like improved crop discrimination, crop yield, crop stress, pest/disease surveillance, disaster management etc.,.

The life of the mission is planned to be five years. The satellite was launched by the indigenously built Polar Satellite Launch Vehicle on October 17, 2003. The orbit parameters of IRS-P6 are same as IRS-1C.

<b>Orbits/cycle</b>	341
<b>Semi major axis</b>	7195.11 km
<b>Altitude</b>	817 km

<b>Inclination</b>	98.69 deg
<b>Eccentricity</b>	0.001
<b>Number of orbits/day</b>	14
<b>Orbital period</b>	101.35 minutes
<b>Repetivity</b>	24 days
<b>Distance between adjacent paths</b>	117.5 km
<b>Distance between successive ground tracks</b>	2820 km
<b>Ground trace velocity</b>	6.65 km/sec
<b>Equatorial crossing time</b>	10.30 A.M (at descending node)

The payload system of IRS-P6 consists of three solid state cameras:

1. A high resolution multispectral sensor - **LISS-IV**
2. A medium resolution multispectral sensor - **LISS-III**
3. An Advanced Wide Field Sensor – **AWiFS**

### **AWiFS Sensor**

The AWiFS camera provides enhanced capabilities compared to the WiFS camera on-board IRS-1C/1D, in terms of spatial resolution (56 m Vs 188m), radiometric resolution (10 bits Vs 7 bits) and Spectral bands (4 Vs 2) with the additional feature of on-board detector calibration using LEDs. The spectral bands of AWiFS are same as LISS-III.

The AWiFS camera is realized in two electro-optic modules viz.,. AWiFS-A and AWiFS-B, each containing four band assemblies. A combined swath of 740 Km is realized by mounting the two modules on the Deck, with their optical axes tilted by 11.94 deg away from the + yaw axis in opposite direction. With this

mounting, a side lap of 128 pixels i.e., about 7.2kKm, is available in the combined swath.

### **Major specifications of AWiFS sensor.**

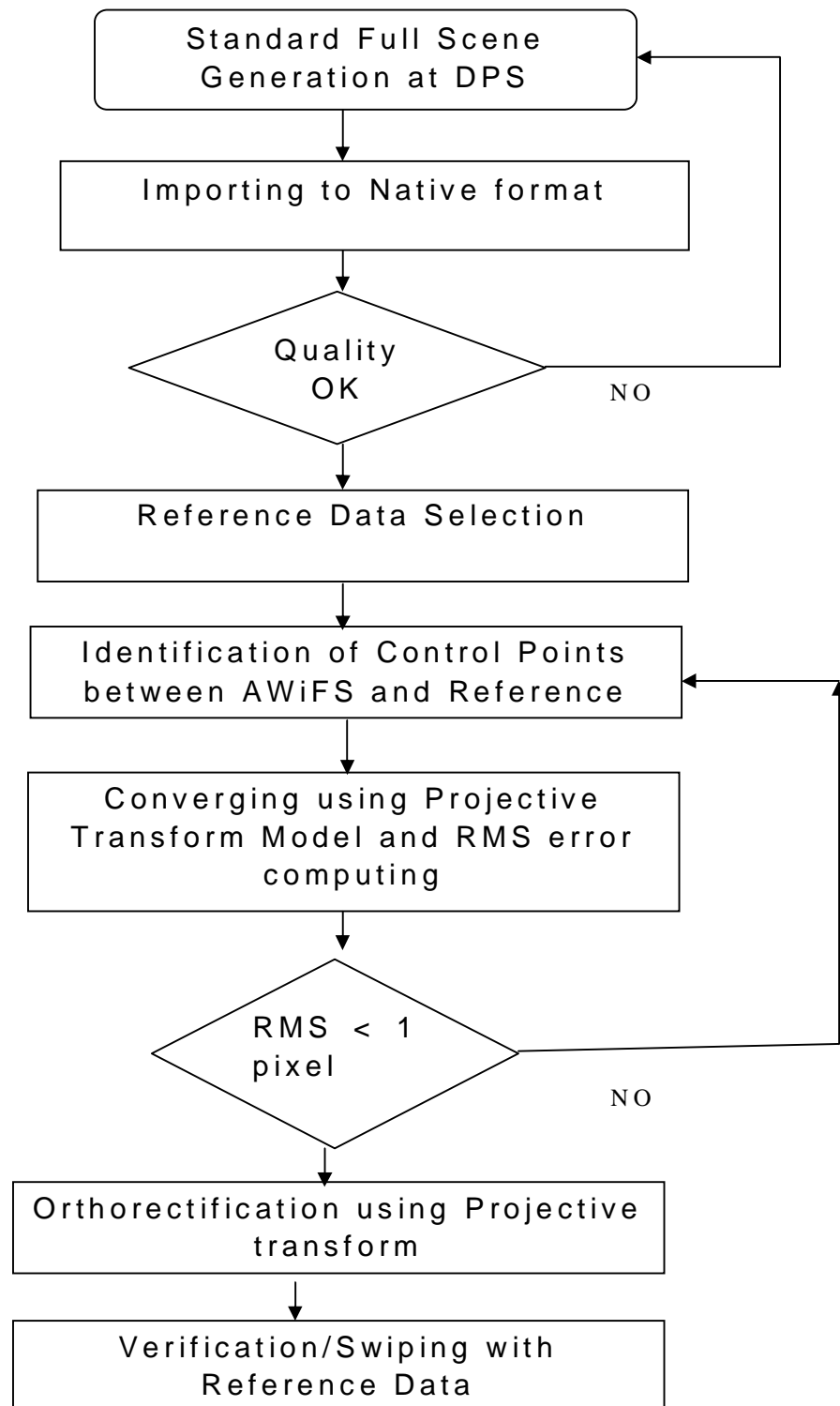
<b>IGFOV</b>	56 m (nadir) 70 m (at field edge)
<b>Spectral Bands</b>	B2, B3, B4 and B5
<b>Swath</b>	740 km (combined) 370 km each head
<b>Saturation radiance (mw/cm<sup>2</sup> /sr/micron)</b>	B2 - 53 B3 - 47 B4 - 31.5 B5 - 4.64
<b>Integration time</b>	9.96 msec
<b>Quantization</b>	10 bits
<b>No. of gains</b>	16

### **Ortho-rectification process**

The ortho-rectification process is carried out for correcting the following errors associated with satellite images

- Terrain relief error
- Scale variation
- Sensor attitude / orientation
- Internal errors.

## Flow Chart



The following steps were followed broadly to correct the image data

1. Control points were identified between Input AWiFS Full scenes and Reference data.
2. Height was obtained from Reference DEM.
3. Around 20-30 points were identified in such way that these are distributed across all corners of image.
4. Projective transform is used for correcting AWiFS image.

**Procedure:**

1. Importing to AWiFS full scenes
2. Image Analysis package is being used for ortho-rectification.
3. From Path/Row scheme identify the required reference data in which AWiFS scene is covered.
4. Projective transform is used as a registration model.
5. Carto DEM & other reference DEMs were given as a elevation source.
6. Around 20-30 GCPs are identified and distributed across the scene.
7. Repeat the process till reached RMS error is less than 1 pixel.
8. Ortho-rectification was carried out.
9. Registered image is verified with reference data using the swipe option.

<b>Accuracy</b>
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The planimetric accuracy of ortho-rectified data is 100m in CE90.