Determining Tilt from a Metadata File for ATCOR2 or ATCOR3

PCI Geomatics

TUTORIAL

The calculations for atmospheric correction will depend on the sensor view angle. For sensors without tilt capability this parameter will not appear. There are two categories for sensors that do have tilt capability: 1) sensors with East/West tilt capability and 2) sensors with East/West and North/South tilt capabilities (also known as omni tilt sensors). The below table shows which sensors have East/West tilt capability and which satellites are omni tilt sensors.

East/West Tilting Sensors	Omni Tilt Sensors
Cartosat PAN	Ikonos
IRS-1C/D PAN	OrbView
MSU-E	QuickBird
SPOT	

For East/West tilting sensors, the user must choose one of 7 tilt options:

- Nadir
- 10 deg East
- 10 deg West
- 20 deg East
- 20 deg West
- 30 deg East
- 30 deg West

For omni tilt sensors, the user must choose one of 13 tilt options:

- Nadir
- 10 deg East
- 10 deg West
- 10 deg North
- 10 deg South
- 20 deg East
- 20 deg West
- 20 deg North
- 20 deg South
- 30 deg East
- 30 deg West
- 30 deg North
- 30 deg South

The satellite elevation, or the elevation above the horizon, is used to determine the magnitude of the tilt. The tilt magnitude will either be Nadir (no tilt), 10, 20 or 30 degrees. The sun azimuth and satellite azimuth are used to determine the tilt direction. The tilt direction is defined by ATCOR's discrete azimuth grid.

Discrete Azimuth Grid
30 deg = East
150 deg = West
120 deg = North
60 deg = South

You will need to look at the metadata ASCII file that accompanies your imagery to determine the correct tilt angle to specify for ATCOR2 or ATCOR3. The file extension containing the tilt metadata will be different for each sensor.

Below is the information needed to calculate the tilt angle for a QuickBird image. This information was taken from the IMD file accompanying the imagery.

```
sunAz = 163.694;
sunEl = 33.6918;
satAz = 55.439;
satEl = 72.5352;
```

Tilt Magnitude

A good approximation for tilt is:

Tilt = 90 deg – satEL

Tilt = 90 deg – 72.5352

Tilt = 17.5 deg

For ATCOR, the nearest available tilt angle is 20 deg.

Tilt Direction

The relative azimuth angle or the angle between the sensor line-of sight and the solar azimuth defines the tilt direction. The relative azimuth angle depends on the scene latitude and the season in which the image was acquired.

Relative Azimuth = sunAz – SatAz

Relative Azimuth = 163.694 deg – 55.439 deg

Relative Azimuth = 108.3 deg

So the nearest angle from ATCOR's discrete azimuth grid is 120 deg, or North.

For this particular scene, you would specify **20 deg North** as the tilt angle for ATCOR.

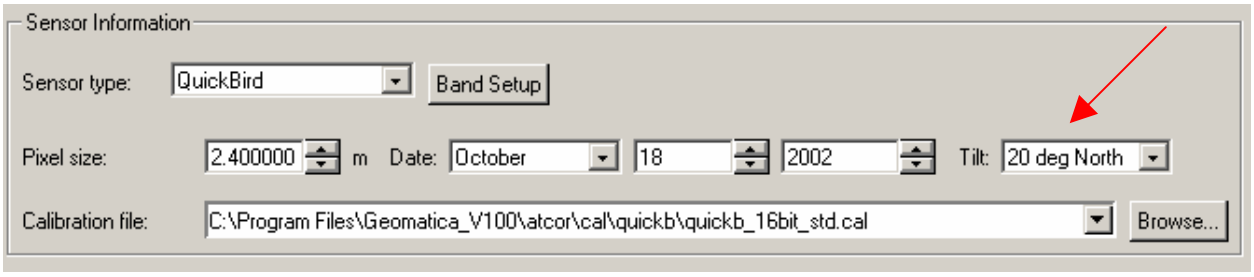

Fig. 1 – Sensor Information area in the Atmospheric Correction Configuration dialog box