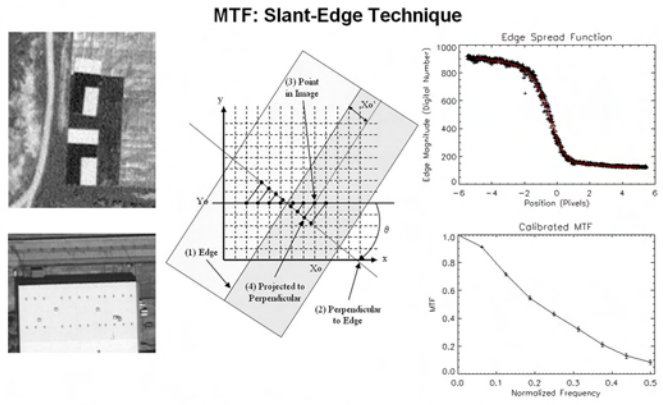
OrbView-3 Technical Performance Evaluation 2005

Modulation Transfer Function (MTF)

Fundamental measure of imaging system quality (sharpness)

MTF Methodology



Classical Slant-edge measurement is employed

Fixed high contrast targets are used to obtain the MTF measurements in the center of the array

Measurements from specialized targets are used to confirm the measurements from the operational imagery

MTF Results

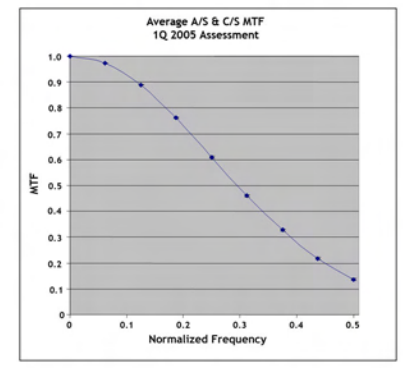
MTF = .14 +/- .01 (1σ)

There was no statistical difference between the OV-3 initial on orbit measurement of .15 +/- 0.01 (1σ) and the MTF measured in 2005 (MTF = .14 +/- .01 (1σ))

The current result is within the measurement error of the previous result, therefore no change in MTF was detected.

MTF measurements were taken from high contrast edges in the stereo T&E images.

In an effort to minimize atmospheric refraction the collection strategy will be adjusted in future collections to acquire near nadir imagery for MTF analysis.



Radiometric Calibration Methodology

Relative Radiometric Calibration

Reduces pixel to pixel variation (streaking and banding)

Absolute Radiometric Calibration

Defines the relationship between the focal plane digital numbers to the physical units of spectral radiance (mW/cm²/str/μm)

Radiometric Correction

Second-order fit to detector response for calibration coefficients

- Absolute component based upon laboratory measurements
- Relative component based upon on-orbit measurements
- Second-order fit improves relative performance

Verification

- Absolute: Vicarious calibration
- Relative: Streaking / Banding metrics

Streaking and Banding

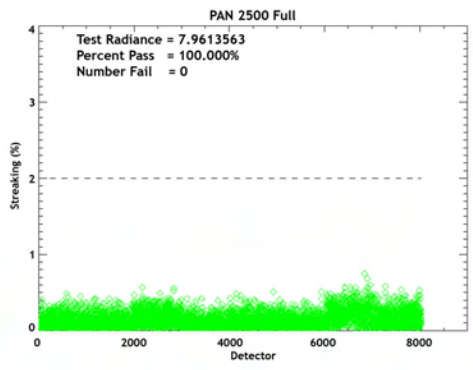
Relative radiometric assessment

Streaking
- % diff. between a pixel response and the average response of adjacent pixels

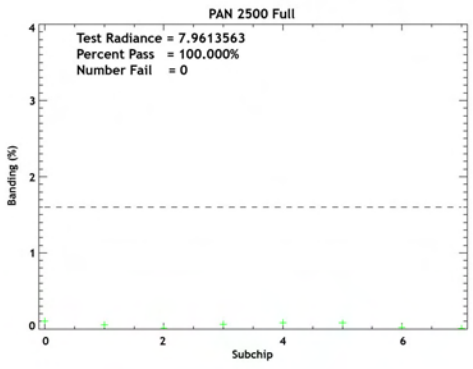
Banding
- % diff. between a group of pixels and the average response of adjacent groups

Relative Radiometric Assessment Results

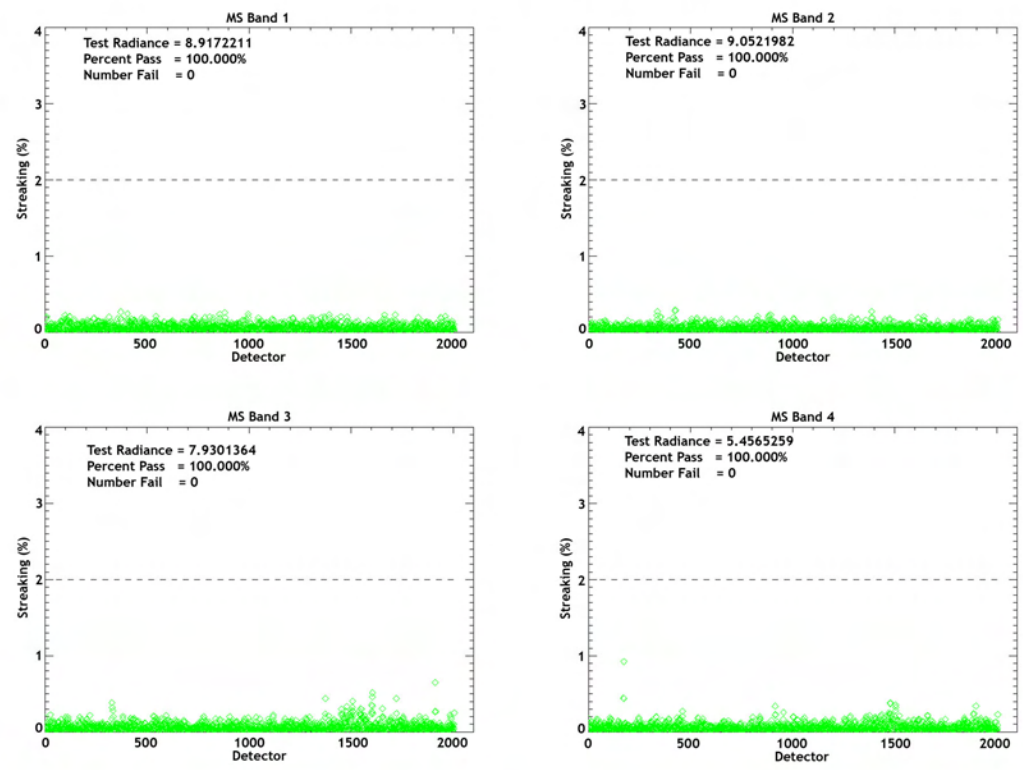
PAN Streaking



PAN Banding



MSI Streaking



GeoEye