**GOES-R Semi-Static Data README**

**Reference:**

PTRSW 18981: WR 4274: “Develop latitude/longitude/timeoffset netCDF file-ADR 264”

**Contents:**

This delivery includes the following files: Three files containing the 2 km Full Disk (FD) fixed grid Latitude, Longitude, and satellite Local Zenith Angle (in degrees) computed for the GOES-East (-75 degrees longitude), GOES-Test (-89.5 degrees longitude), and GOES-West (-137 degrees longitude) satellite positions. Also included in this file is the GOES-R Land Mask resampled to the 2km fixed grid for each satellite.

* GOES\_Navigation\_2kmFD-GOES-East.nc
* GOES\_Navigation\_2kmFD-GOES-Test.nc
* GOES\_Navigation\_2kmFD-GOES-West.nc

NOTE:

The LATLON for CONUS can be extracted as a subset of pixels from the FD, ie:

GOES-East  x:902 to 3401 and y:422 to 1921

GOES-Test x:1372 to 3871 and y: 452 to 1951

GOES-West x: 1462 to 3961 and y: 422 to 1921

Local Azimuth angle not included in the data

1. Eight files containing the Scanline Time Offsets from the product image time for FD and CONUS scenes for each the Mode 3, 4, and 6.

* GOES\_Scanline\_Time\_Offset\_Mode3\_FD.nc
* GOES\_Scanline\_Time\_Offset\_Mode4\_FD.nc
* GOES\_Scanline\_Time\_Offset\_Mode6\_FD.nc
* GOES\_Scanline\_Time\_Offset\_Mode3\_CONUS.nc
* GOES\_Scanline\_Time\_Offset\_Mode4\_CONUS-East.nc
* GOES\_Scanline\_Time\_Offset\_Mode4\_CONUS-Test.nc
* GOES\_Scanline\_Time\_Offset\_Mode4\_CONUS-West.nc
* GOES\_Scanline\_Time\_Offset\_Mode6\_CONUS.nc

**Definitions:**

* **Latitude** is the earth coordinate specifying the angular position north or south of the equator. It is defined for -90 degrees (South) to +90 degrees (North).
* **Longitude** is the earth coordinate specifying the angular east-west location. It is defined for -180 degrees (West) to +180 degrees (East)
* **Local Zenith Angle** is the angle between the straight line from a point on the earth surface to the satellite and the line from the same point on the earth surface that is perpendicular to the earth’s horizontal surface at that point. It is defined for 0 to 90 degrees.
* **Land Mask:** The land/ocean mask is derived from the NASA EOS project supplied static dataset as well as World Vector Shoreline data and DTED DEM data provided by NIMA (then DMA) and bathymetric data provided by the oceanographic community. The native land/ocean mask is stored in a 1 km geographic (geodetic) projection.
* **Scanline Time Offset:** The scanline time offset is the time offset from the product start time (in seconds) at the western limit of the geolocated pixels in a scene associated with the scan pattern of the ABI instrument. It is reported for each row of the FD or CONUS image.
* **Scanline Duration:** The scanline duration is the time difference between the Eastern and Western limits of the geolocated pixels in a scene resulting from the scan pattern of the ABI instrument. It is reported for each row of the FD or CONUS image.

**Methodologies:**

* The Latitude and Longitude were computed using the equations for the GOES-R fixed grid projection from the Product User’ Guide (PUG).
* The Local Zenith Angle () was computed for every Latitude and Longitude (φ, λ) pixel on the fixed grid using parameters from the PUG description of the fixed grid projection as follows:



where H is the satellite height from the center of the Earth, req is the GRS80 semi-major axis of Earth, and  is the geocentric angle from the subsatellite location .

* The Land Mask for a given pixel (IABI, JABI) on the ABI fixed grid with latitude and longitude, φABI(IABI, JABI), λABI(IABI, JABI) was identified with pixel (INat, JNat) on the regular native grid (with 1-based indexing) with latitude and longitude, φNat(INat,JNat), λNat(INat,JNat) using the AWG Nearest Neighbor Interpolation scheme as follows:
  + INat = (λABI(IABI, JABI) – λNat(1,1) )/dλ + 2
  + JNat = (φABI (IABI, JABI) – φNat (1,1) )/dφ + 2

where dφ and dλ are the grid resolutions in latitude and longitude on the native grid.

* The Scanline Offset and Durations were derived from the ABI timeline information provided by the instrument vendor. These timelines describe the start and end time of Earth scene observations over a 5-minute (Mode 4), 10-minute (Mode 6), or 15-minute (Mode 3) cycle. For this the Scanline time offset was computed relative to the start time of the image. For FD scenes and for Mode 3 and 6 CONUS scenes, the start time of the image coincides with the start of the first scan so the offset for the first scan is zero. However, the GOES-R CONUS products in Mode 4 are extracted from the FD scene though the start time of a CONUS scene is recorded with the same information as the FD start time. Also, the extent of the Mode 4 CONUS scene does not necessarily align with the ABI swaths. In this case, the scanline time offsets and durations were computed based on the FD timeline and from the pixel offset between the CONUS region relative to the Western limit of the FD scene. Because the location of CONUS differs for East, Test, and West positions, the time offsets are reported separately for each position. A formulation of the scanline calculation is included in TIMELINESv3.xlsx.