

## VIRS Cloud Imager Data (VIRS CID)

The VIRS Cloud Imager Data (CID\_VIRS) are Level-1B data from the five VIRS channels on the TRMM spacecraft. The data coverage is one orbit; however, the orbit files will be processed on an hourly basis. The sizes listed in the following data description reflect the estimated number of scan line records in 1 hour (11,817). The product is written in Hierarchical Data Format (HDF). It contains Vdata and Scientific Data Sets (SDS), which hold data for all of the scan line records. The VIRS HDF Structure Summary [Table 1](#) lists the type of HDF structure along with the name of the structure. A complete listing of parameters for this data product can be found in [Table 2](#) and [Table 3](#). The VIRS Level-1B product is described in more detail in the Level 1 File Specifications - Volume 3 ([Reference 5](#)). The five VIRS channels are

| Channels  | Micron | Resolution |
|-----------|--------|------------|
| Channel 1 | 0.63   | 2-km       |
| Channel 2 | 1.60   | 2-km       |
| Channel 3 | 3.75   | 2-km       |
| Channel 4 | 10.80  | 2-km       |
| Channel 5 | 12.00  | 2-km       |

**Level:** 1B  
**Type:** Ancillary  
**Frequency:** 1/Hour

**Portion of Globe Covered**  
**File:** Satellite Swath  
**Record:** 2-km by 2-km

**Time Interval Covered**  
**File:** 1 Hour  
**Record:** Instantaneous

**Portion of Atmosphere Covered**  
**File:** Satellite Altitude



Table 1. VIRS HDF Structure Summary

| HDFName                              | HDF Structure Type  | Num Records  | Table Number                | Size (bits)  |
|--------------------------------------|---------------------|--------------|-----------------------------|--------------|
| VIRS Core Metadata                   | HDF Annotations     | 1            | <a href="#">Reference 5</a> | 80 000       |
| VIRS Product Specific Metadata       | HDF Annotations     | 1            | <a href="#">Reference 5</a> | 80 000       |
| VIRS Swath Data for product decoding | HDF Vgroup          | 1            | None                        | 40 000       |
| Scan Time                            | Vdata Structures    | 1 .. 11, 817 | <a href="#">Table 2</a>     | 756 288      |
| Scan Status                          | Vdata Structures    | 1 .. 11, 817 | <a href="#">Table 3</a>     | 1 796 184    |
| Navigation                           | Vdata Structures    | 1 .. 11, 817 | <a href="#">Table 4</a>     | 8 319 168    |
| Geolocation                          | SDS Data Structures | 1 .. 11, 817 | <a href="#">Table 5</a>     | 197 391 168  |
| Calibration Counts                   | SDS Data Structures | 1 .. 11, 817 | <a href="#">Table 5</a>     | 5 672 160    |
| Local Direction                      | SDS Data Structures | 1 .. 11, 817 | <a href="#">Table 5</a>     | 20 419 776   |
| Channels                             | SDS Data Structures | 1 .. 11, 817 | <a href="#">Table 5</a>     | 246 738 960  |
| <b>Total VIRS Megabytes/File:</b>    |                     |              |                             | <b>57.37</b> |

Table 2. Scan Time VData

| Field Name | Description      | Field Num | Num Records  | Data Type    | Units | Range      |
|------------|------------------|-----------|--------------|--------------|-------|------------|
| scanTime   | Time of the scan | 1         | 1 .. 11, 817 | 64-bit float | sec   | 0 .. 86400 |

Table 3. Scan Status VData

| Field Name | Description                    | Field Num | Num Records  | Data Type     | Units | Range  |
|------------|--------------------------------|-----------|--------------|---------------|-------|--------|
| missing    | Missing Information Flag       | 1         | 1 .. 11, 817 | 8-bit integer | N/A   | 0 .. 2 |
| validity   | Status Mode Flag               | 2         | 1 .. 11, 817 | 8-bit integer | N/A   | N/A    |
| qac        | Quality and Accounting Capsule | 3         | 1 .. 11, 817 | 8-bit integer | N/A   | N/A    |
| geoQuality | Geolocation Quality            | 4         | 1 .. 11, 817 | 8-bit integer | N/A   | N/A    |
| ch1Quality | Quality of Channel Data        | 5         | 1 .. 11, 817 | 8-bit integer | N/A   | N/A    |
| ch2Quality | Quality of Channel Data        | 6         | 1 .. 11, 817 | 8-bit integer | N/A   | N/A    |
| ch3Quality | Quality of Channel Data        | 7         | 1 .. 11, 817 | 8-bit integer | N/A   | N/A    |
| ch4Quality | Quality of Channel Data        | 8         | 1 .. 11, 817 | 8-bit integer | N/A   | N/A    |
| ch5Quality | Quality of Channel Data        | 9         | 1 .. 11, 817 | 8-bit integer | N/A   | N/A    |
| scOrient   | Current Spacecraft Orientation | 10        | 1 .. 11, 817 | 8-bit integer | N/A   | 0 .. 4 |
| acsMode    | Current ACS Mode               | 11        | 1 .. 11, 817 | 8-bit integer | N/A   | 0 .. 8 |
| yawUpdateS | Yaw Update Status              | 12        | 1 .. 11, 817 | 8-bit integer | N/A   | 0 .. 2 |
| virsInstS  | VIRS Instrument Status         | 13        | 1 .. 11, 817 | 8-bit integer | N/A   | 0 .. 3 |
| virsMode   | VIRS Mode                      | 14        | 1 .. 11, 817 | 8-bit integer | N/A   | 0 .. 3 |

VIRS CID-2



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Table 3. Scan Status VData

| Field Name  | Description              | Field Num | Num Records  | Data Type     | Units | Range |
|-------------|--------------------------|-----------|--------------|---------------|-------|-------|
| virAbnCon   | VIRS Abnormal Conditions | 15        | 1 .. 11, 817 | 8-bit integer | N/A   | N/A   |
| fractOrbitN | Fractional Orbit Number  | 16        | 1 .. 11, 817 | 32-bit float  | N/A   | N/A   |

Table 4. VIRS Navigation VData

| Field Name       | Description                    | Field Num | Num Records  | Data Type    | Units               | Range |
|------------------|--------------------------------|-----------|--------------|--------------|---------------------|-------|
| scPosX           | Spacecraft Geocentric Position | 1         | 1 .. 11, 817 | 32-bit float | m                   | TBD   |
| scPosY           | Spacecraft Geocentric Position | 2         | 1 .. 11, 817 | 32-bit float | m                   | TBD   |
| scPosZ           | Spacecraft Geocentric Position | 3         | 1 .. 11, 817 | 32-bit float | m                   | TBD   |
| scVelX           | Spacecraft Geocentric Velocity | 4         | 1 .. 11, 817 | 32-bit float | m sec <sup>-1</sup> | TBD   |
| scVelY           | Spacecraft Geocentric Velocity | 5         | 1 .. 11, 817 | 32-bit float | m sec <sup>-1</sup> | TBD   |
| scVelZ           | Spacecraft Geocentric Velocity | 6         | 1 .. 11, 817 | 32-bit float | m sec <sup>-1</sup> | TBD   |
| scLat            | Spacecraft Geodetic Position   | 7         | 1 .. 11, 817 | 32-bit float | deg                 | TBD   |
| scLon            | Spacecraft Geodetic Position   | 8         | 1 .. 11, 817 | 32-bit float | deg                 | TBD   |
| scAlt            | Spacecraft Geodetic Position   | 9         | 1 .. 11, 817 | 32-bit float | m                   | TBD   |
| scAttRoll        | Spacecraft Geocentric Attitude | 10        | 1 .. 11, 817 | 32-bit float | deg                 | TBD   |
| scAttPitch       | Spacecraft Geocentric Attitude | 11        | 1 .. 11, 817 | 32-bit float | deg                 | TBD   |
| scAttYaw         | Spacecraft Geocentric Attitude | 12        | 1 .. 11, 817 | 32-bit float | deg                 | TBD   |
| att1             | Sensor Orientation Matrix      | 13        | 1 .. 11, 817 | 32-bit float | N/A                 | N/A   |
| att2             | Sensor Orientation Matrix      | 14        | 1 .. 11, 817 | 32-bit float | N/A                 | N/A   |
| att3             | Sensor Orientation Matrix      | 15        | 1 .. 11, 817 | 32-bit float | N/A                 | N/A   |
| att4             | Sensor Orientation Matrix      | 16        | 1 .. 11, 817 | 32-bit float | N/A                 | N/A   |
| att5             | Sensor Orientation Matrix      | 17        | 1 .. 11, 817 | 32-bit float | N/A                 | N/A   |
| att6             | Sensor Orientation Matrix      | 18        | 1 .. 11, 817 | 32-bit float | N/A                 | N/A   |
| att7             | Sensor Orientation Matrix      | 19        | 1 .. 11, 817 | 32-bit float | N/A                 | N/A   |
| att8             | Sensor Orientation Matrix      | 20        | 1 .. 11, 817 | 32-bit float | N/A                 | N/A   |
| att9             | Sensor Orientation Matrix      | 21        | 1 .. 11, 817 | 32-bit float | N/A                 | N/A   |
| green<br>HourAng | Greenwich Hour Angle           | 22        | 1 .. 11, 817 | 32-bit float | deg                 | TBD   |



Table 5. VIRS Science Data Sets

| SDS Name        | Description                                                          | Rank | Dimensions                                                                                 | Data Type      | Units                                                    | Range                    |
|-----------------|----------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------|----------------|----------------------------------------------------------|--------------------------|
| geolocation     | Earth location of the center of the field-of-view                    | 3    | (11817, 261, 2) scan line x pixel x (latitude, longitude)                                  | 32-bit float   | deg                                                      | -90 .. 90<br>-180 .. 180 |
| calCounts       | Raw calibration counts                                               | 4    | (11817, 3, 2, 5) scan line x {blackbody, space view, solar diffuser} x data word x channel | 16-bit integer | count                                                    | N/A                      |
| local Direction | Angles to the satellite and sun from the center of the field of view | 4    | (11817, 27, 2, 2)scan line x pixel x {satellite, sun} x {zenith angle, azimuth angle}.     | 16-bit integer | deg                                                      | TBD                      |
| channels        | Radiances                                                            | 3    | (11817, 261, 5) scan line x pixel x channel                                                | 16-bit integer | mW cm <sup>-2</sup> sr <sup>-1</sup><br>μm <sup>-1</sup> | TBD                      |



## VIRS CID Revision Record

The product Revision Record contains information pertaining to approved section changes. The table lists the date the Software Configuration Change Request (SCCR) was approved, the Release and Version Number, the SCCR number, a short description of the revision, and the revised sections. The authors are listed on the document cover.

VIRS CID Revision Record

| SCCR Approval Date | Release/Version Number | SCCR Number | Description of Revision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Section(s) Affected                                                                   |
|--------------------|------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| N/A                | R3V1                   | N/A         | <ul style="list-style-type: none"> <li>Updated format to comply with standards.</li> <li>The EOSDIS Product Code line was removed from the document. (6/17/2008)</li> <li>Some links were not working. They have now been modified. (12/10/2010)</li> <li>The ASDC footer was added to the bottom of the document. (06/07/2013)</li> <li>Eliminated section numbers from the Data Products Catalog. Specifically, in this document, section number 4.1 was removed. (12/18/2013)</li> <li>Updated some links to refer to the .pdf file instead of the .doc file. (06/20/2014)</li> <li>Updated document to change "mm" to "μm." (09/12/2019)</li> </ul> | <p>All</p> <p>Sec. 4.1</p> <p>All</p> <p>All</p> <p>All</p> <p>All</p> <p>Table 5</p> |

