constellr

# constellr CEOS-ARD self-assessment report



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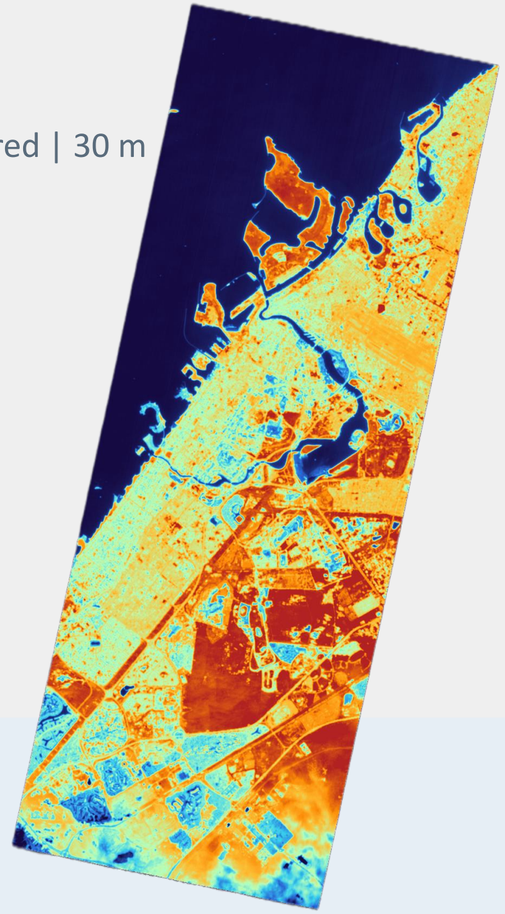
*CEOS LSI-VC 20th meeting (14-16 September 2026)*

# LSTprecision: TIR + VNIR in one product bundle

Core product: 30 m LST, day and night. Daytime acquisitions add surface reflectances in 8 VNIR Bands.

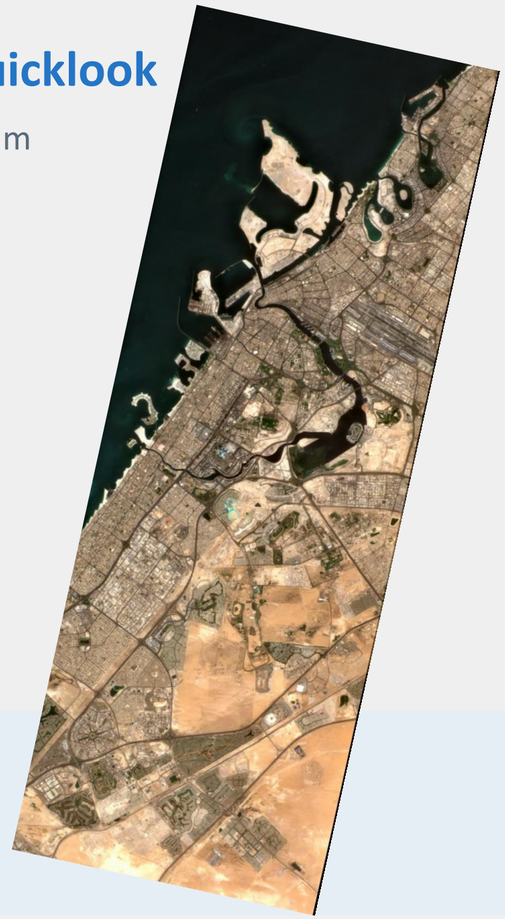
## LST layer

Thermal infrared | 30 m



## RGB quicklook

VNIR | 10 m



**Dubai, UAE | 22 August 2025 | LSTprecision**

## BUNDLE CONTENT

### Core bundle

Surface Temperature layer
Band quality layers
Metadata json file
Scene classification layers @10m, 20m and 30m
Surface reflectances in 8 VNIR bands (Day only)
Temperature & RGB quicklook

Optional:
emissivity and surface radiance layers
10 m sharpening

### Format

Cloud Optimized GeoTiff
json

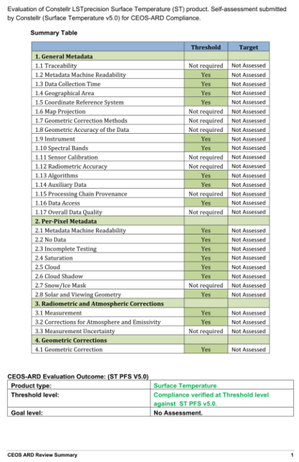
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# ST PFS v5.0: Threshold endorsement achieved

Endorsed 19 May 2026. The review verifies every applicable Threshold requirement; Goal was not assessed.

**19 / 19**

Applicable Threshold requirements verified



Evaluation of Constellr LSTprecision Surface Temperature (ST) product. Self-assessment submitted by Constellr (Surface Temperature v5.0) for CEOS-ARD Compliance.

**Summary Table**

| | Threshold | Target |
|---|---|---|
| **1. General Metadata** | | |
| 1.1 Traceability | Not required | Not Assessed |
| 1.2 Metadata Machine Readability | Yes | Not Assessed |
| 1.3 Data Collection Time | Yes | Not Assessed |
| 1.4 Geographical Area | Yes | Not Assessed |
| 1.5 Coordinate Reference System | Yes | Not Assessed |
| 1.6 Map Projection | Not required | Not Assessed |
| 1.7 Geometric Correction Methods | Not required | Not Assessed |
| 1.8 Geometric Accuracy of the Data | Not required | Not Assessed |
| 1.9 Instrument | Yes | Not Assessed |
| 1.10 Spectral Bands | Yes | Not Assessed |
| 1.11 Sensor Calibration | Not required | Not Assessed |
| 1.12 Radiometric Accuracy | Not required | Not Assessed |
| 1.13 Algorithms | Yes | Not Assessed |
| 1.14 Auxiliary Data | Yes | Not Assessed |
| 1.15 Processing Chain Provenance | Not required | Not Assessed |
| 1.16 Data Access | Yes | Not Assessed |
| 1.17 Overall Data Quality | Not required | Not Assessed |
| **2. Per-Pixel Metadata** | | |
| 2.1 Metadata Machine Readability | Yes | Not Assessed |
| 2.2 No Data | Yes | Not Assessed |
| 2.3 Incomplete Testing | Yes | Not Assessed |
| 2.4 Saturation | Yes | Not Assessed |
| 2.5 Cloud | Yes | Not Assessed |
| 2.6 Cloud Shadow | Yes | Not Assessed |
| 2.7 Snow/Ice Mask | Not required | Not Assessed |
| 2.8 Solar and Viewing Geometry | Yes | Not Assessed |
| **3. Radiometric and Atmospheric Corrections** | | |
| 3.1 Measurement | Yes | Not Assessed |
| 3.2 Corrections for Atmosphere and Emissivity | Yes | Not Assessed |
| 3.3 Measurement Uncertainty | Not required | Not Assessed |
| **4. Geometric Corrections** | | |
| 4.1 Geometric Correction | Yes | Not Assessed |

**CEOS-ARD Evaluation Outcome: (ST PFS V5.0)**

| | |
|---|---|
| **Product type:** | Surface Temperature |
| **Threshold level:** | Compliance verified at Threshold level against_ST PFS v5.0. |
| **Goal level:** | No Assessment. |

CEOS ARD Review Summary 1

Original peer-review summary

## COGs + explicit physical encoding

Cloud Optimized GeoTIFF rasters

**LST [K] = DN × 0.01**

Scale, offset and nodata recorded with the data

## REQUIRED METADATA

| | |
|---|---|
| **Time** | Acquisition start / end |
| **Location** | Footprint + coordinate system |
| **Sensor** | Platform + spectral bands |
| **Methods** | Algorithms + auxiliary data |
| **Access** | Documentation + retrieval links |

## MASKS + PIXEL QUALITY

### Scene classification (SCL)

Clear / thick cloud / thin cloud / shadow
Cast shadow and land / water context

### Quality assessment (QA)

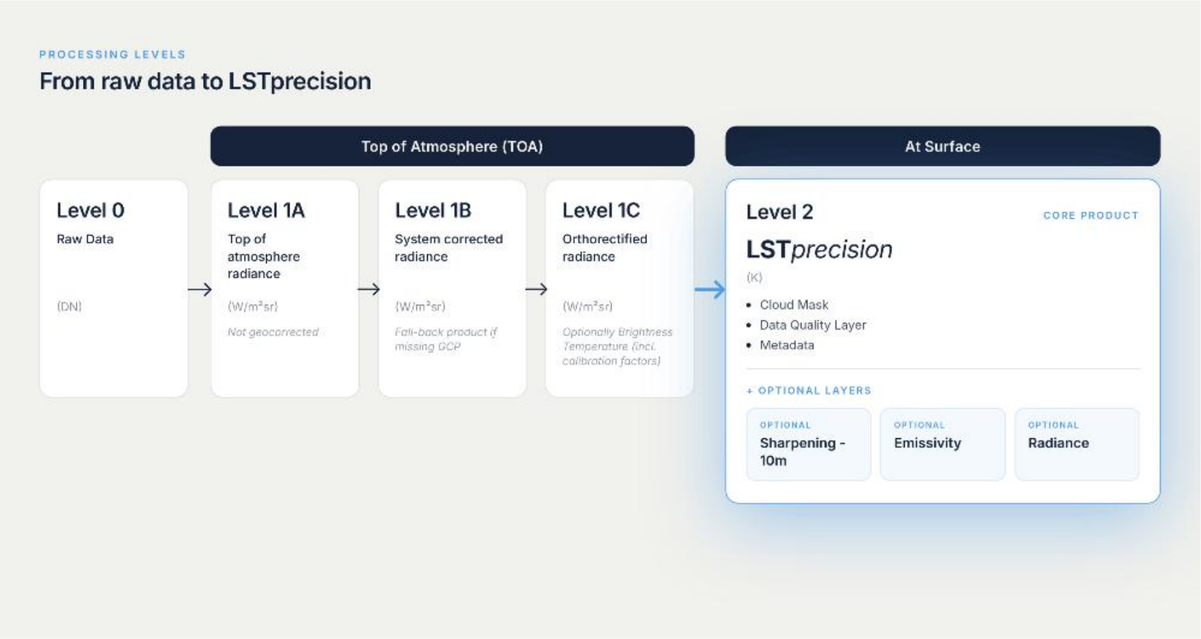
No data / saturation / incomplete testing

Average solar / viewing angles: in metadata

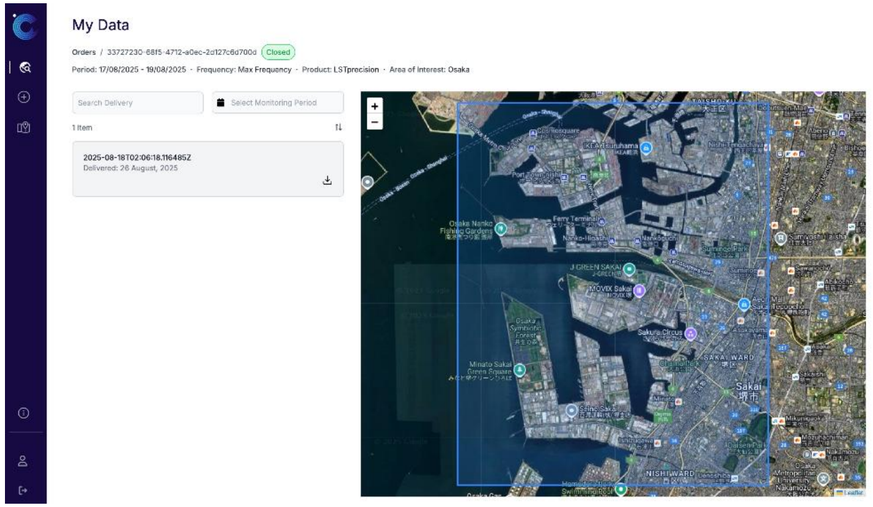
# Documentation connects the data to its methods

The Knowledge Center links product definitions, retrieval methods, calibration / validation and data access.

## METHODS + PROCESSING




## USER ACCESS




### UI delivery + STAC-compliant API

Download the image bundle, metadata and masks

Data bundle / algorithms

Metadata + mask definitions

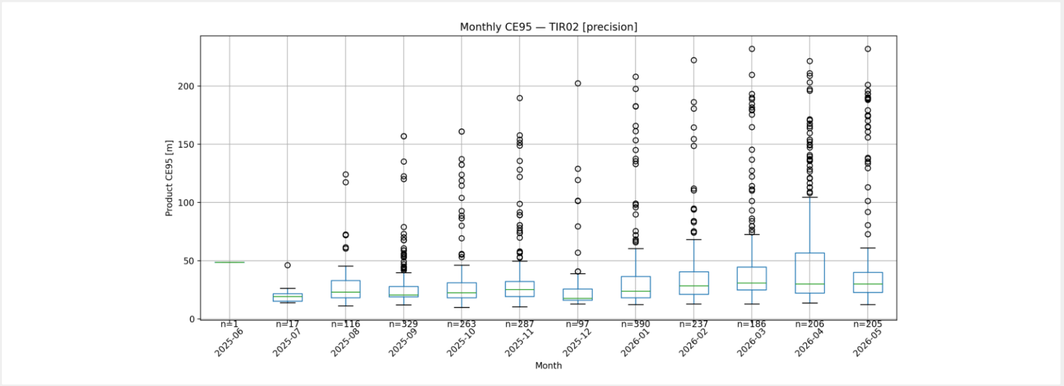
**constellr.github.io/product-lst/**

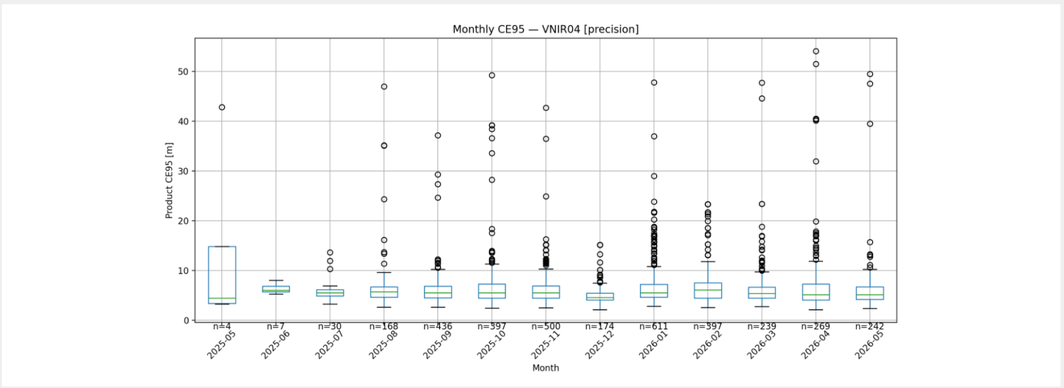
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# Accuracy: ground validation and geometric monitoring

Ground-based LST matchups and monthly CE95 monitoring of precision products.

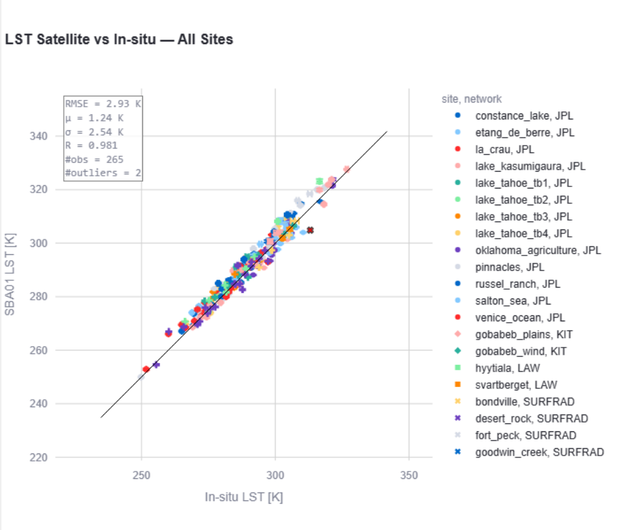
## GEOLOCATION | CE95 IN METRES



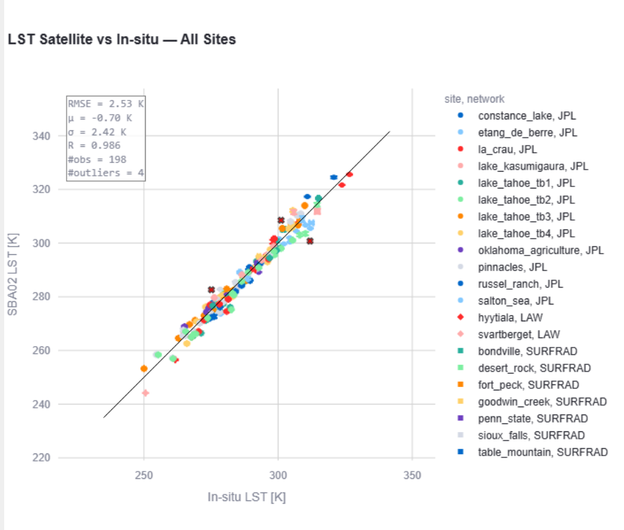




## LST VS. IN-SITU REFERENCES

### SBA01




### SBA02




| Satellite | RMSE [K] | μ [K] | R | #obs |
|---|---|---|---|---|
| **SBA01** | 2.93 | 1.24 | 0.981 | 265 |
| **SBA02** | 2.53 | −0.70 | 0.986 | 198 |

# Next steps: SR endorsement and preparation for ST PFS v6

Build on the existing product bundle, then formalise the additional evidence and uncertainty information.

## 01 Surface Reflectance

### Formalise endorsement of the VNIR / SR product

**VNIR02–09 surface reflectance**

- Scene classification + QA
- Metadata + processing documentation

Complete the SR-family self-assessment and submit the evidence for peer review.

## 02 Surface (Brightness) Temperature v6

### Priority: a proper per-pixel uncertainty layer

Define the uncertainty method and validate the estimates.

Document the method.

Also review emissivity, surface masks and processing provenance.

