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UNIBAP
SPACE SOLUTIONS

Unibap LOOM
Hyperspectral Data Pre-Processing Pipeline
for Real-Time Intelligence from Space

Unibap LOOM

REAL-TIME DATA PROCESSING IN ORBIT

Unibap's LOOM enables satellites to autonomously process hyper-spectral data directly in orbit, delivering actionable insights in real time. This low-latency capability enhances situational awareness and supports time-critical decision-making processes.

CUSTOMIZABLE AND EFFICIENT DATA DELIVERY

Unibap LOOM can easily be adapted to handle different number of bands and image sizes. Its sensor-agnostic design ensures compatibility with different hyperspectral sensors, abstracting away hardware complexity while maintaining a uniform, high-quality output. This allows seamless integration into existing satellite constellations and AI workflows.

ENHANCED IMAGE QUALITY AND AI READINESS

Unibap LOOM abstracts away the sensor, creating the same quality imagery regardless which series, model or brand of sensor that is connected to its inlet. This consistency enables AI models trained on one spacecraft to be used with the same performance on another without costly re-training and optimization.

RAW-DATA ACQUISITION

- High-speed interface like Camera Link
- Raw data as lines of pixels
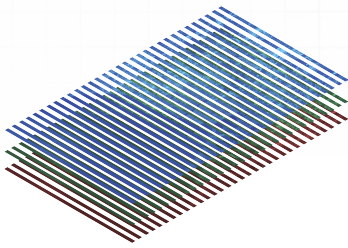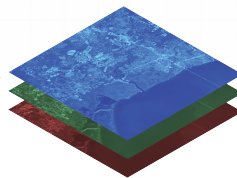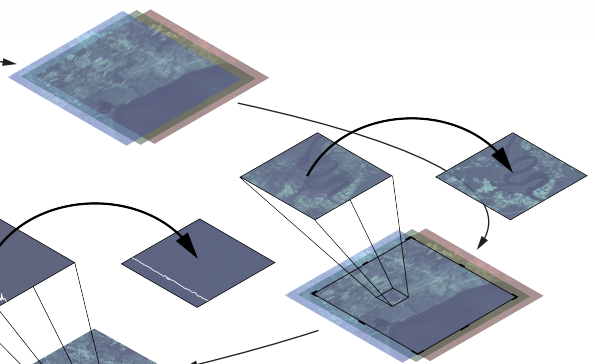- One line for each band

IMAGE PARSING

- Combine pixel lines to image
- One image for each band

BAND MERGING & CO-REGISTRATION

- Align bands acquired at different time/position
- Crop out areas without full band coverage

UNIBAP LOOM PERFORMANCE

- 12 megapixels/s on Unibap iX5
- 70 megapixels/s on Unibap iX10
- Real-time processing for most Multispectral imagers

CALLIBRATION & DE-NOISING

- Remove individual noise finger-print of sensor
- Create consistent information for general AI models

RADIANCE & REFLECTION CORRECTION

- Correct image for, e.g., different lighting conditions
- Improve temporal information consistency

GEOREFERENCING

- Perform orthorectification onto global coordinate system
- Give each pixel a time and coordinate for further analysis

Unibap LOOM
# Technical specifications

KEY TECHNICAL SPECIFICATIONS

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Input Methods	Directly from sensor or from disk
Input Data Format	Packetized RAW sensor data
Output Format	Corrected GEO-TIFF images
Max Number of Bands	Up to 32 bands (more bands optinoal)
Pixel Width	4096 pixels (wider arrays optional)
Processing Mode	Multi-threaded, runs as a single binary
Georeferencing	UTM coordinate-based affine transformation
Installation Methods	.deb packages for Linux-based systems

IMAGE CORRECTION CAPABILITIES

Correction type	
Band Co-Registration	Aligns spectral bands to remove distortions
De-Noising	Reduces sensor noise via statistical correction
Radiance to Reflectance	Converts raw radiance values for accurate data

DEPLOYMENT MODES

Standalone Binary	Direct processing on raw sensor data
As a Service	Integrates with Unibap SCOS (only for sensor input method)
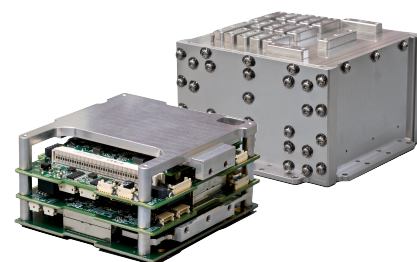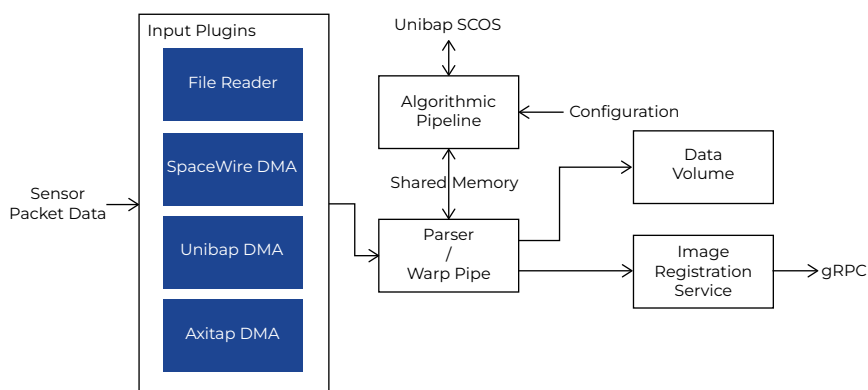
Unibap LOOM is compatibel with both
Unibap iX5 and Unibap iX10
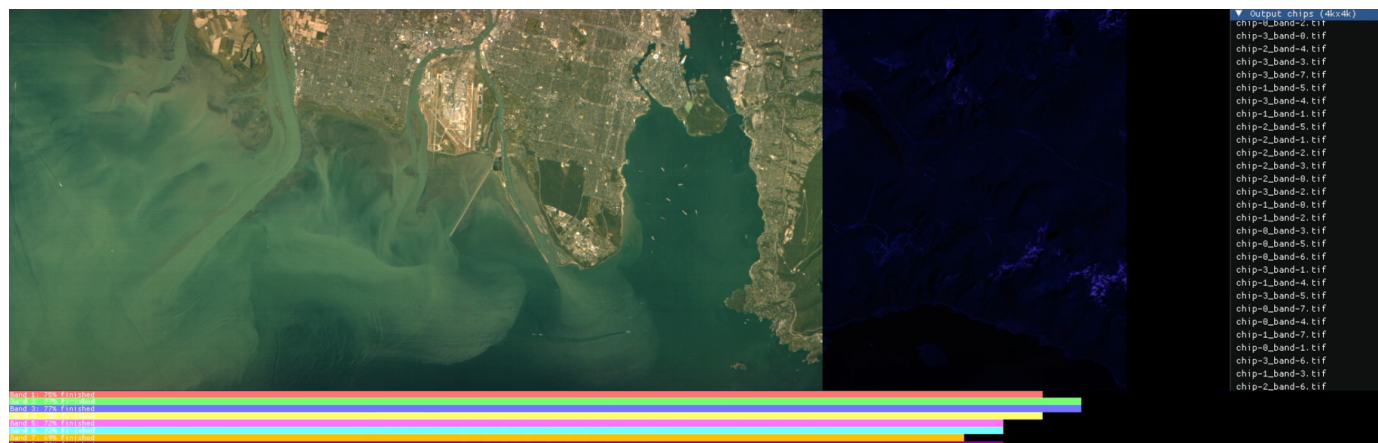
Unibap LOOM in action preprocessing 8 band 4096 pixel wide raw data from a Simera Sense MultiScape100 camera

Distribution in the US

Distribution in
South Korea and Japan