SKAISEN DATASHEET

Optimize downlink by minimizing unnecessary data transmission

SKAISEN is an on-board AI-based cloud detection solution designed for optical EO missions. SKAISEN offers multiple benefits, such as cost reduction by avoiding the download of unnecessary pixels, saving communication bandwidth for more valuable data, and faster access to critical data through prioritization.

Key benefits

REDUCTION OF DOWNLINK-RELATED COSTS

Save your costs by avoiding downloading data acquisitions polluted by clouds.

FASTER ACCESS TO CRITICAL DATA

Prioritise which data needs to be downloaded first.

HIGHLY REUSABLE FOR ANY OPTICAL EO MISSION

Seamlessly supports a range of commonly used sensors and data processing units, currently tested with Simera Sense cameras and boards equipped with Xilinx® Zynq™ SoC. More configurations and options will be added in the near future.

NO DATA IS CHANGED OR DISCARDED WITHOUT CONSENT

Your data from the sensor is safe, SKAISEN will generate only metadata for an operator.

ENHANCING MISSION AUTONOMY

Data-driven on-board decision-making is enabled..

UPDATE ANYTIME IN-ORBIT

In case a new/updated solution exists, we upload it anytime directly onboard the spacecraft/satellite.

SKAISEN is available in three variants, giving you the choice of a single component up to a comprehensive full mission Onboard Data Processing (OBDP) solution.

SKAISEN Edge

Standalone FPGA IP Core with AXI interface or a CPU-optimized binary to a specific embedded processor. This powerful solution offers on-board cloud filtering capabilities that effectively identify cloudy imagery and significantly reduce downlink costs.

PRODUCT AUDIENCE

Solution for customers developing their own software and data processing pipeline. Provides easy integration with existing software stack.

FLIGHT PROVEN

The SKAISEN Edge running on Xilinx® Zynq™ Ultrascale+™ will be deployed on the TROLL 6U mission, with a hyperspectral camera as the main mission payload. The mission launch is planned for Q4 of 2024. Additionally, there are more scheduled missions for 2024 that will utilize SKAISEN technology on-board.

FPGA IP Core	CPU-OPTIMIZED Binary
Cloudiness prediction from optical EO imagery	
Optimized AI model with over 90% accuracy for cloud predictions It can be further fine-tuned to your sensor	
Tested with Xilinx® Zynq™ 7020 and Xilinx® Zynq™ Ultrascale+™	Tested with 32/64-bit ARM CPUs
Operating frequency: 100MHz	Available as standalone binary for upload to existing satellite
SW counter-part with Python library for AXI DMA transfers	Protobuf interface for data input and output. Compatible with your favorite programming language
Delivered as an IP-XACT, making it possible to integrate into an existing design	Delivered both as a binary file and an ONNX model for evaluation purposes
Up to one image acquisition per second (full resolution image from SimeraSense xScape 100)	
Lossy and lossless compression using JPEG2000	
Support with integrations, commissioning, and operations	

ZAITRA

SKAISEN OS

Customized operating system designed to work seamlessly with SKAISEN Edge on Xilinx® Zynq™ 7000 and Xilinx® Zynq™ UltraScale+™ boards. SKAISEN OS offers flexibility and compatibility, allowing customers to easily update it with their own packages and software within the Linux environment.

FEATURES

- SKAISEN Edge
- Fault tolerant design
- Embedded Linux
- Bring your own package/software
- In orbit image pre-processing blocks (e.g. image registration)
- Drivers for most common interfaces (CAN, I2C, Ethernet etc.)
- Protocols:
  - REST API for transfers over Ethernet,
  - Cubesat Space Protocol (CSP) over CAN, UART, Ethernet
- Proprietary IP core for data readout over LVDS
- Support with integrations, commissioning and operations
- (Optional) Additional AI models for object detection and segmentation for your use-case

PRODUCT AUDIENCE

Solution for customers that want to procure/develop their own board and buy all the software necessary for smooth operations.

FLIGHT PROVEN

Compatibility currently extends to a satellite bus utilizing Cubesat Space protocol. Thorough testing and integration of drivers for the control and data readout of the SimeraSense xScape camera have been conducted. TRL 9 is expected to be reached on the mission in Q4 2024.

SKAISEN Payload

SKAISEN OS delivered together with one of the Data Processing Units (DPU) available on the market. Zaitra has connections with numerous suppliers throughout the global supply chain. We have the ability to procure and configure a DPU specifically tailored to meet your mission requirements.

FEATURES

- SKAISEN Edge
- SKAISEN OS
- DPU with Zynq™ 7000 or UltraScale+™
- Support with integrations, commissioning and operations
- Mechanical interface: PC-104 form factor CubeSat compatible
- Electrical interfaces: CAN, I2C, LVDS, Ethernet, RSxxx

PRODUCT AUDIENCE

Comprehensive solution for customers seeking a plug-and-play solution to their mission. We deliver flight hardware with all the necessary software ready for integration and in-orbit operations.

FLIGHT PROVEN

The SKAISEN payload, utilizing the board with Xiphos Q8S module, will be deployed on the TROLL 6U mission with hyperspectral camera as main mission payload. The mission launch is planned for the Q4 of 2024.

SKAISEN is available in multiple configurations. To ensure clear pricing, we have designed two types of licenses:

1. SKAISEN spacecraft licensing
2. SKAISEN instrument licensing

To make an inquiry, request a quotation, or learn more about Zaitra's products and services, please contact us at: sales@zaitra.io

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