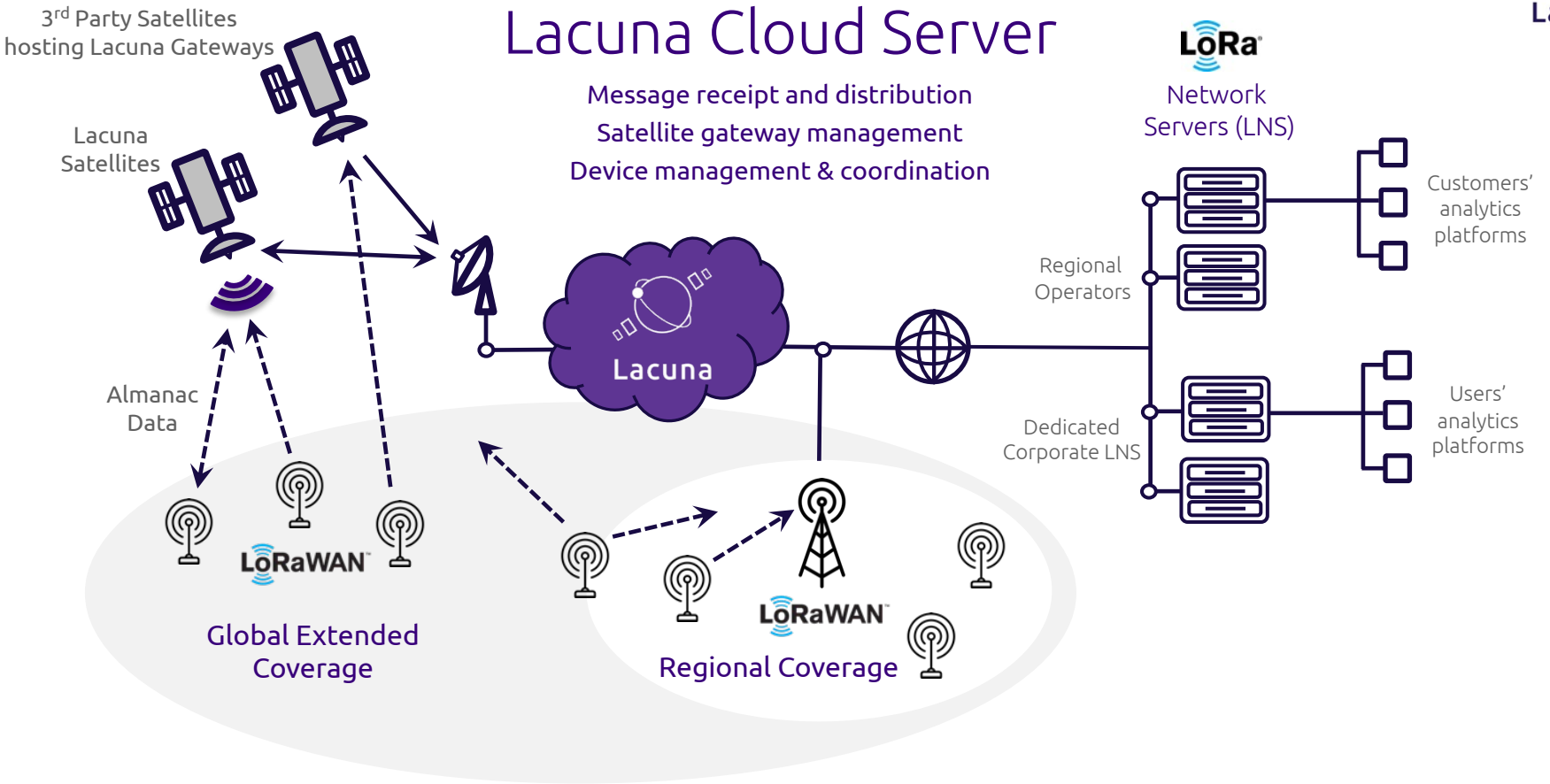
IoT4EO 2023 Workshop (IoT for Earth Observation)

Thomas Telkamp
CTO

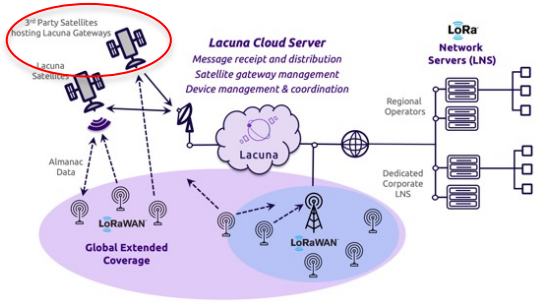
Lacuna Cloud Server

Message receipt and distribution
Satellite gateway management
Device management & coordination



Lacuna Network

- Announced at The Things Conference 2020

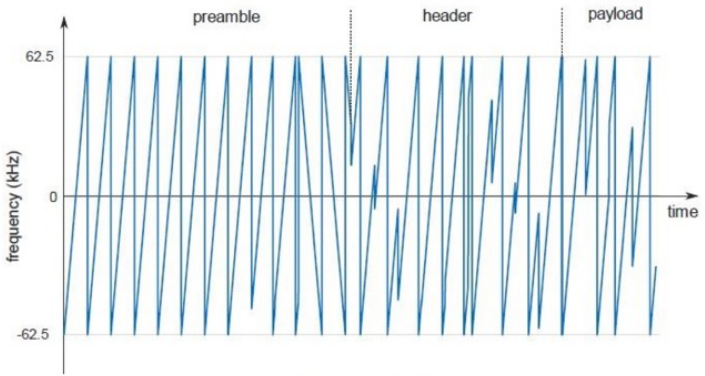


- Deploy Lacuna technology on third-party satellites
- Provide seamless network

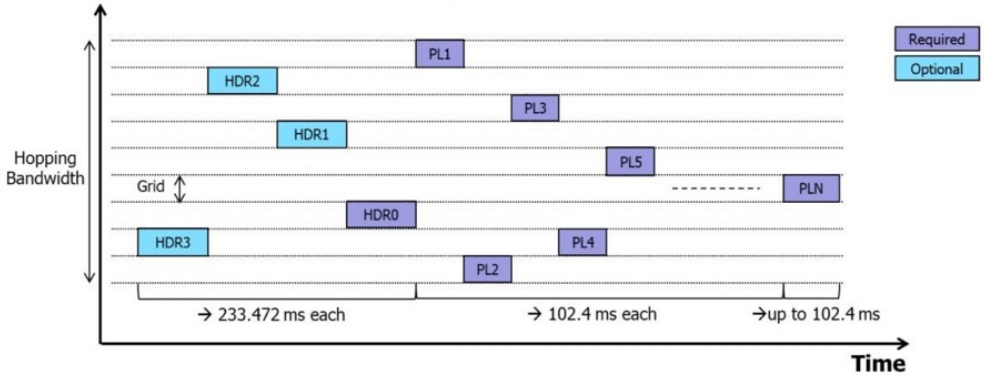
- Omnispace
  - Leveraging Omnispace's licensed, 2 GHz S-band spectrum
  - Semtech LR1120
  - Available in selected countries in Q1 2023
  - Real-time, bi-directional, and several hours of coverage per day

- More in the pipeline!

LoRa and LR-FHSS



LoRa® waveform spectrum
Source: LoRa Webinar "LoRa Modulation / Encoding" Harald Eigner (TU Wien



LR-FHSS spectrum usage
Source: Application Note: "LR-FHSS System Performance" Semtech Feb 2022

Open satellite access

Make your own devices talk to satellite

- Semtech SX126x or LR111x based
- Open-source *ls-soft-modem* stack (terrestrial & satellite LoRaWAN)
- Satellite antenna

Lacuna Cloud routing to preferred platform

- The Things Industries (via Packet Broker)
- Packet Broker
- LoRaWAN roaming interface
- Actility, ThingPark Exchange, etc.

Available components for development

Mass market chips and modules

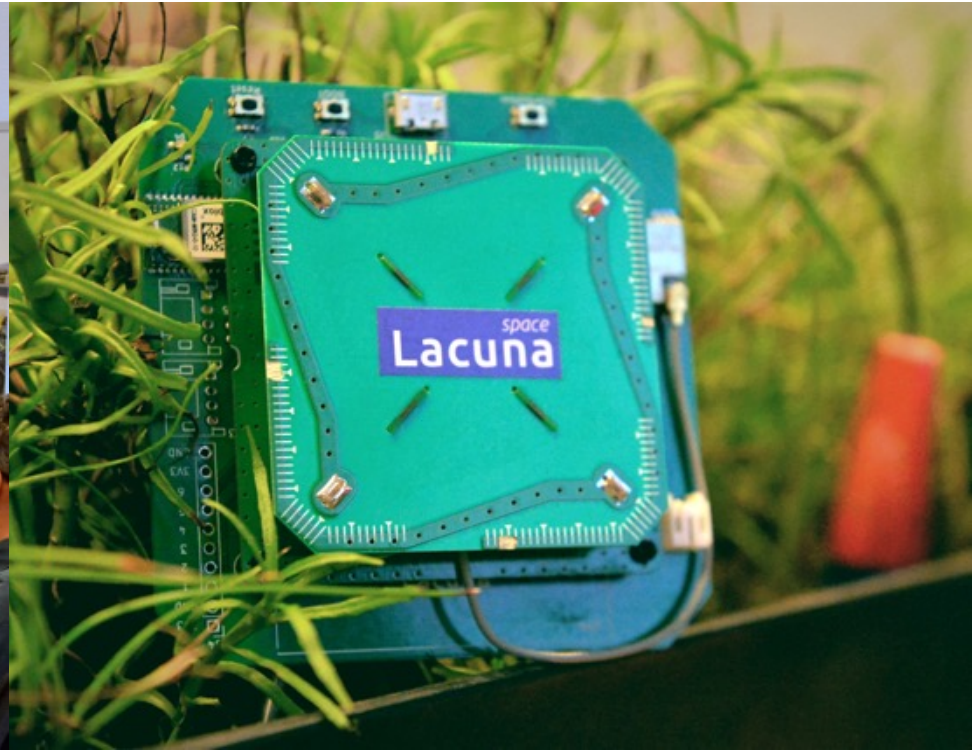
Development boards and modules

miromico

Development kits

Antennas

Plant powered satellite communications



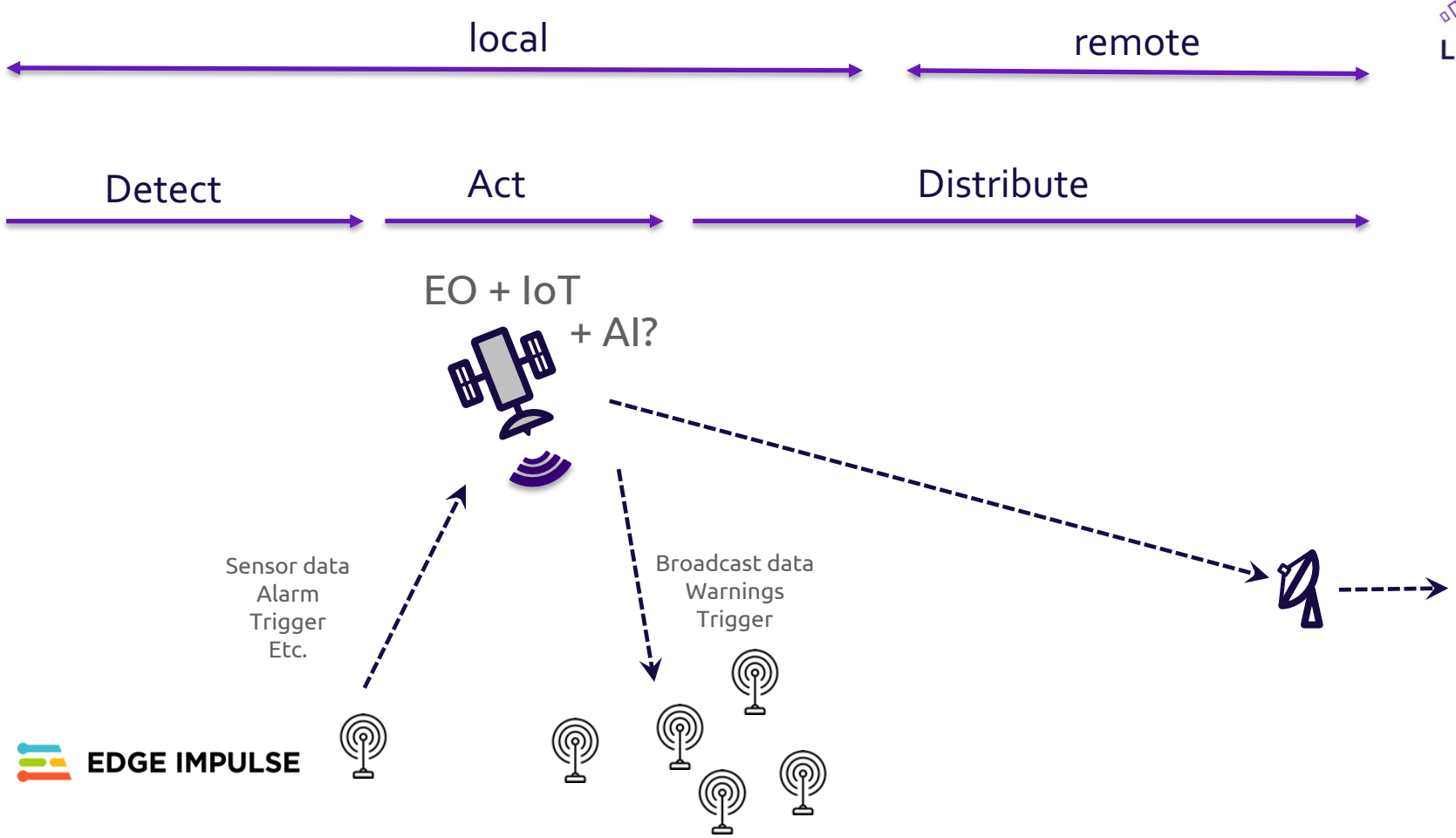
esa

Low-Power WAN at its extreme!

Plant-e
Spark of nature

IoT and Earth Observation

- IoT receiver on EO satellite
  - Economies of scale
  - Use cases of combined EO/IoT satellite:
    - Trigger and receive real-time synchronised sensor data from the ground
      LoRa efficient triggering
    - Real-time distribution of results and analysis
      AI in space driven, simple/cheap receivers (wireless thermometer like)
  - *Extra:* Reduce end-to-end latency by combining detection and action
- Or, formation flying with IoT and EO?


local
remote
Detect
Act
Distribute
EO + IoT
+ AI?
Sensor data
Alarm
Trigger
Etc.
Broadcast data
Warnings
Trigger
EDGE IMPULSE
Lacuna space

Lacuna