QWIP in space:
dual-band radiometry for Earth Observation

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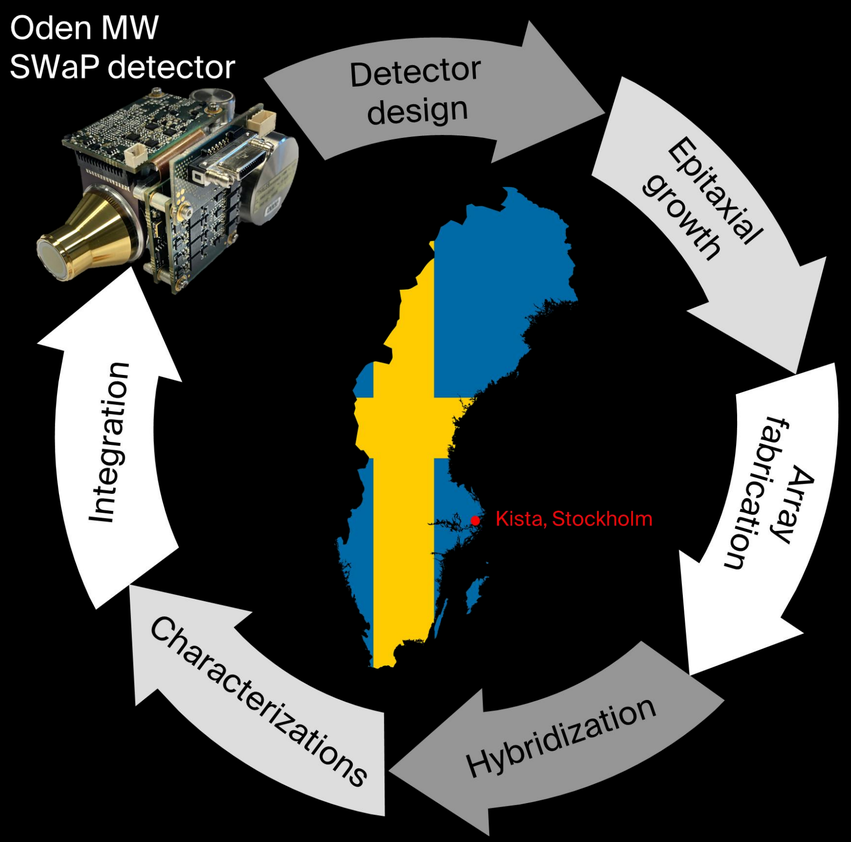
**Fraunhofer EMI / ConstellR AG*

Outline

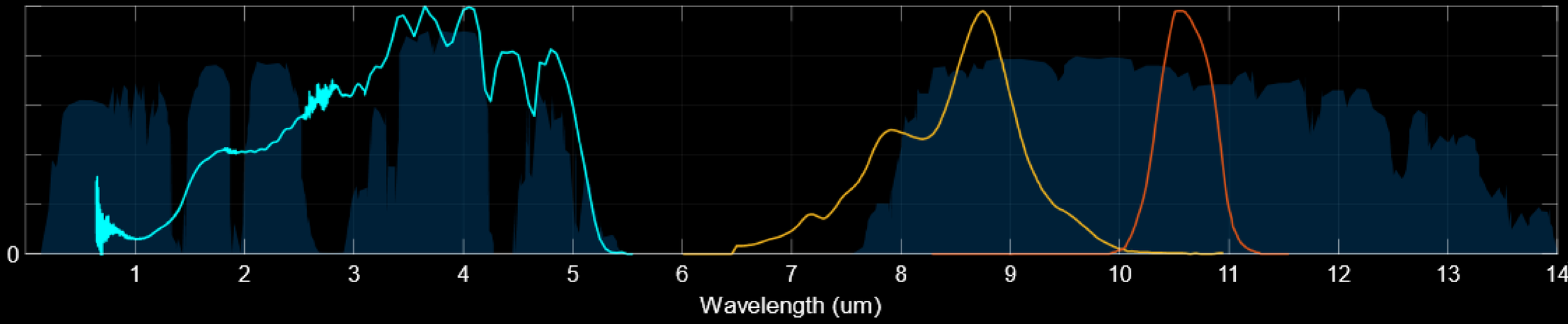
- Meet IRnova
  - About us
  - Product portfolio
- Dual-band QWIP FPA for E/O
- Conclusion

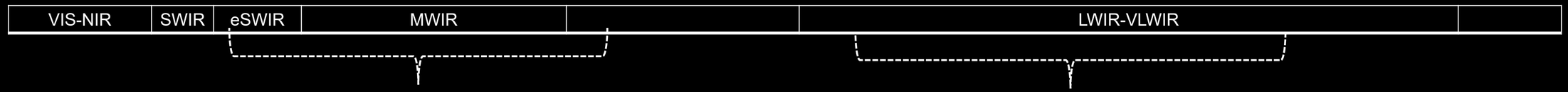
About IRnova



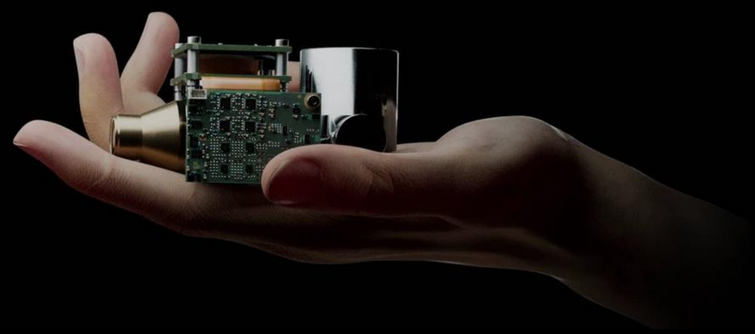
- **EU based IR detectors OEM Supplier**
  - Started in 1986 as a governmental research laboratory
  - Independent and Privately owned since 2007
- **30+ years of IR sensor R&D and Manufacturing**
  - Leading QWIP and T2SL detector manufacturing
  - Several 1000's of QWIP & T2SL detectors fielded
  - Contract manufacturing for III-V material and SWIR detectors
- **Pioneers in Optical Gas Imaging**
  - MWIR and LWIR solutions for all addressable gases
  - QVGA (320×256) and VGA (640×512) solutions available, HD in development
- **Strong Team and Excellent Facilities**
  - 70% staff share of PhD's and MSc's
  - 2500 m^2 manufacturing facilities including 1300 m^2 of clean room
  - ISO9001 : certified since 2015

Revolutionary technologies: T2SL and small pitch QWIP



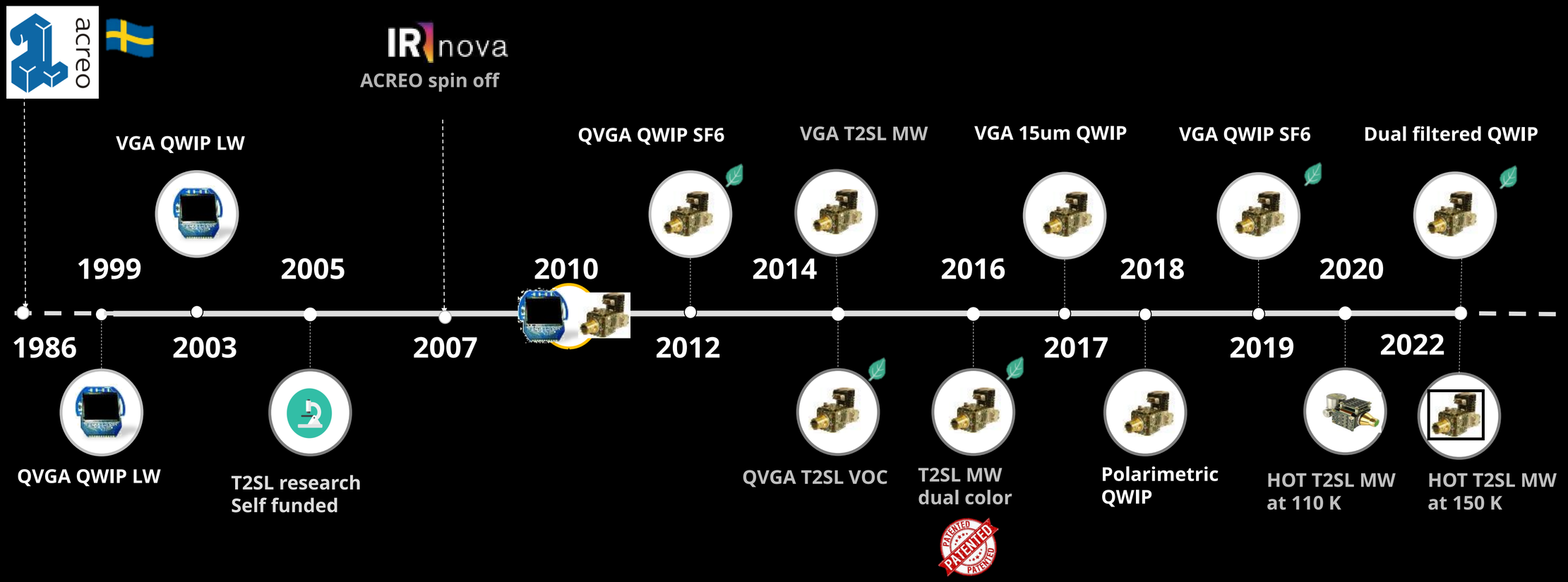


T2SL



Small pitch QWIP

Development history



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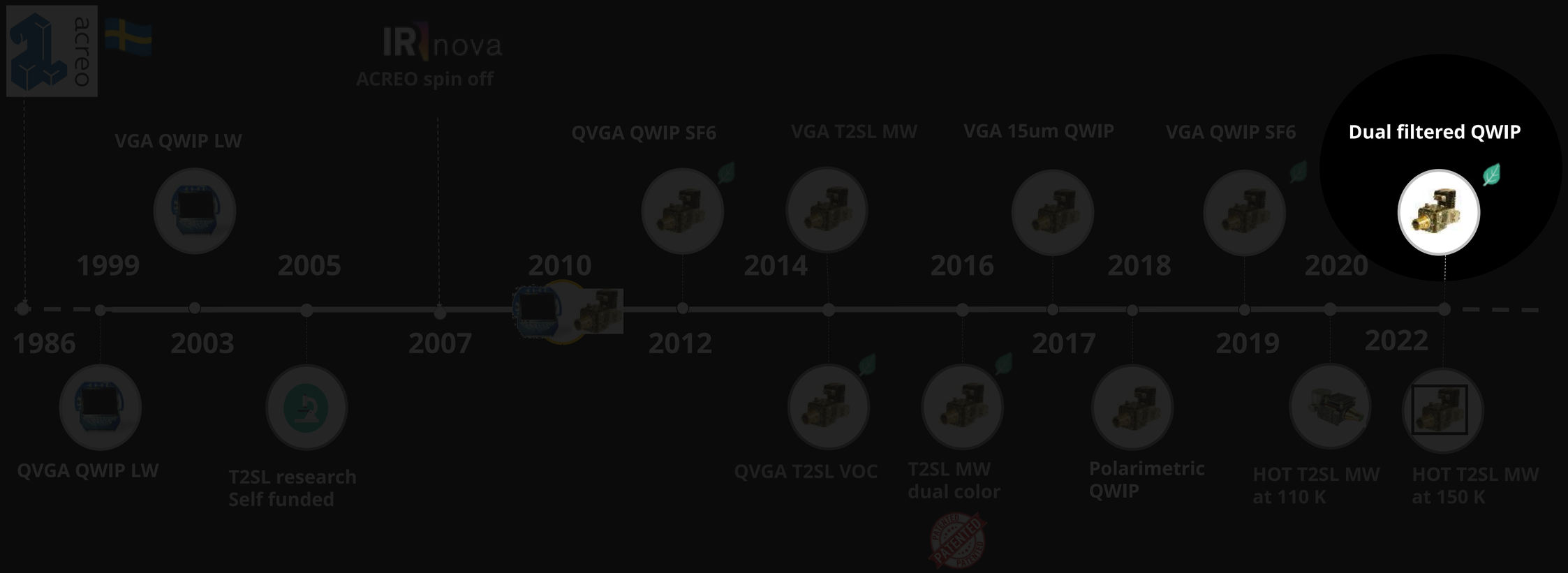
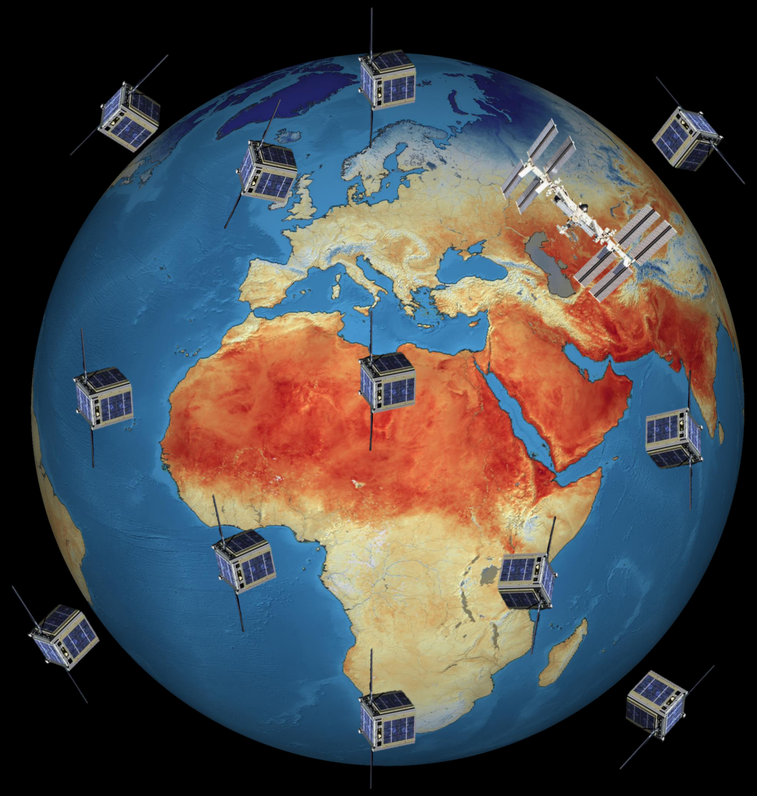


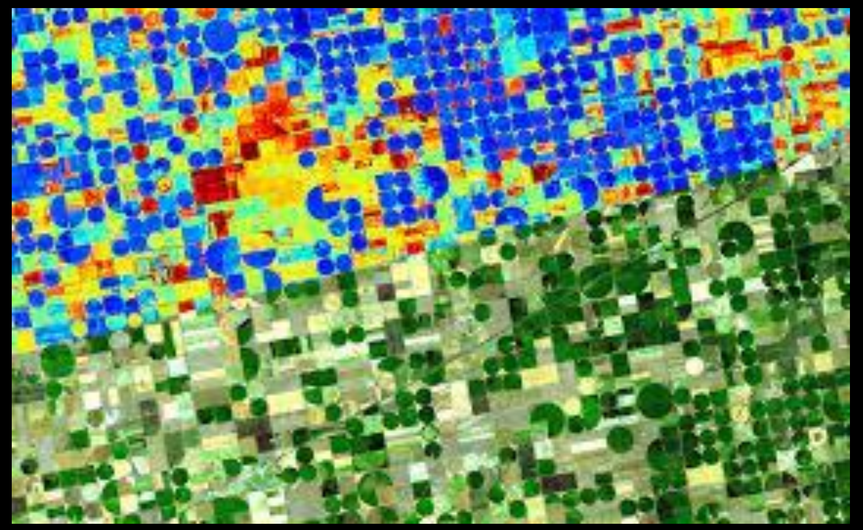
QWIP in space
dual-band radiometry for E/O

ConstellR



*the image credits: ESA

Goal: global water monitoring
- to mark water stress areas in agriculture
- Increase crop yield and optimize usage of fresh water



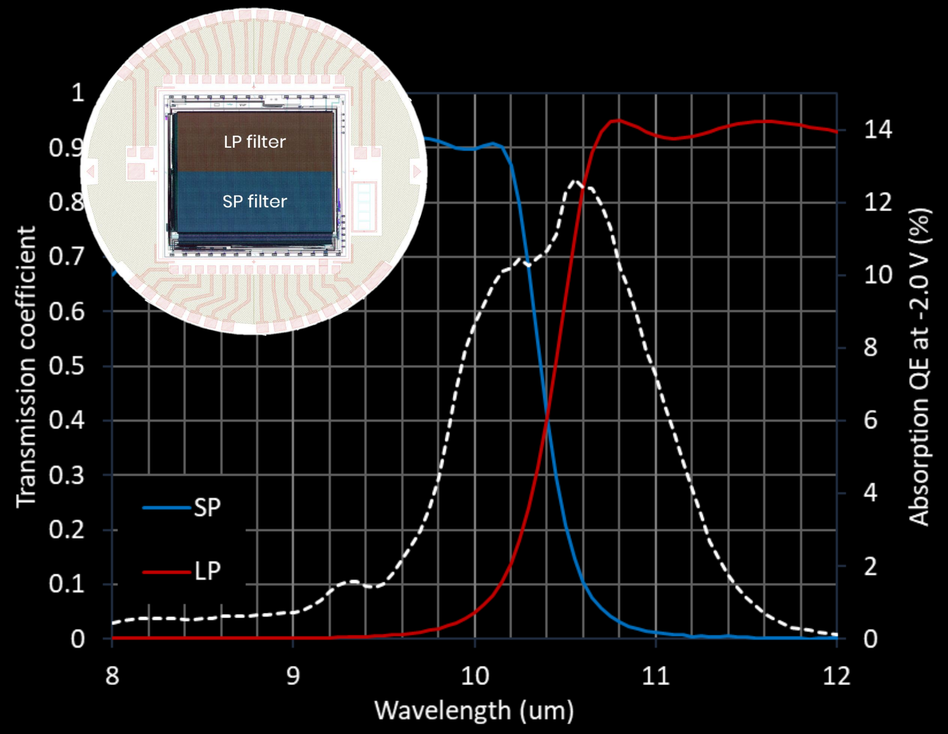
Challenge:
- Image in LWIR using dual-band mode
- Low-cost to keep affordable for constellation of CubeSats

AegIR: the detector solution for LiSR

In partnership with:

SPECTROGON

https://www.spectrogon.com/

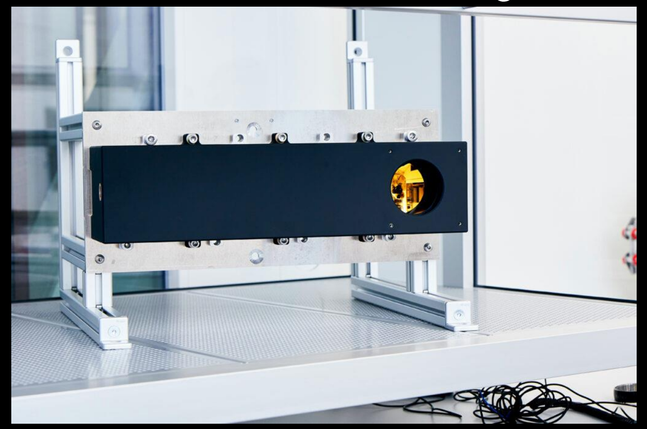


- Customized using an off-the-shelf FPA
- 18 months from conception to mission launch

- Monolithically integrated bandpass filters
- 320x256 @ 30μm pitch
- Spectral crosstalk = 10 %
- Operability: 99.79 % in LP band, and 99.65 % - in SP band
- NETD @ F/1.2 & 2 ms int. time: < 25 mK (for 18 °C BB)

LisR: compact telescope with AegIR

40×10×10 cm, 6 kg



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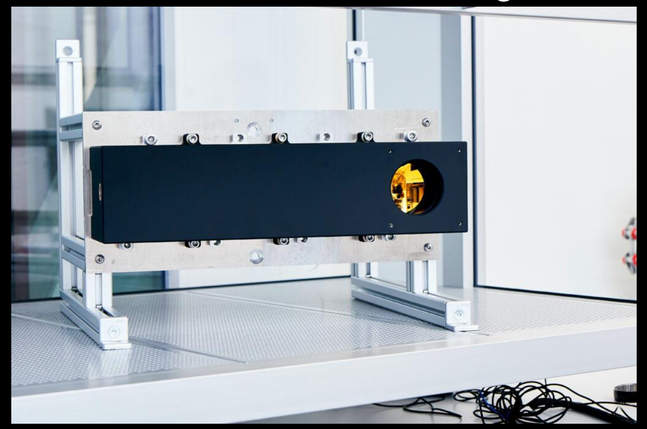
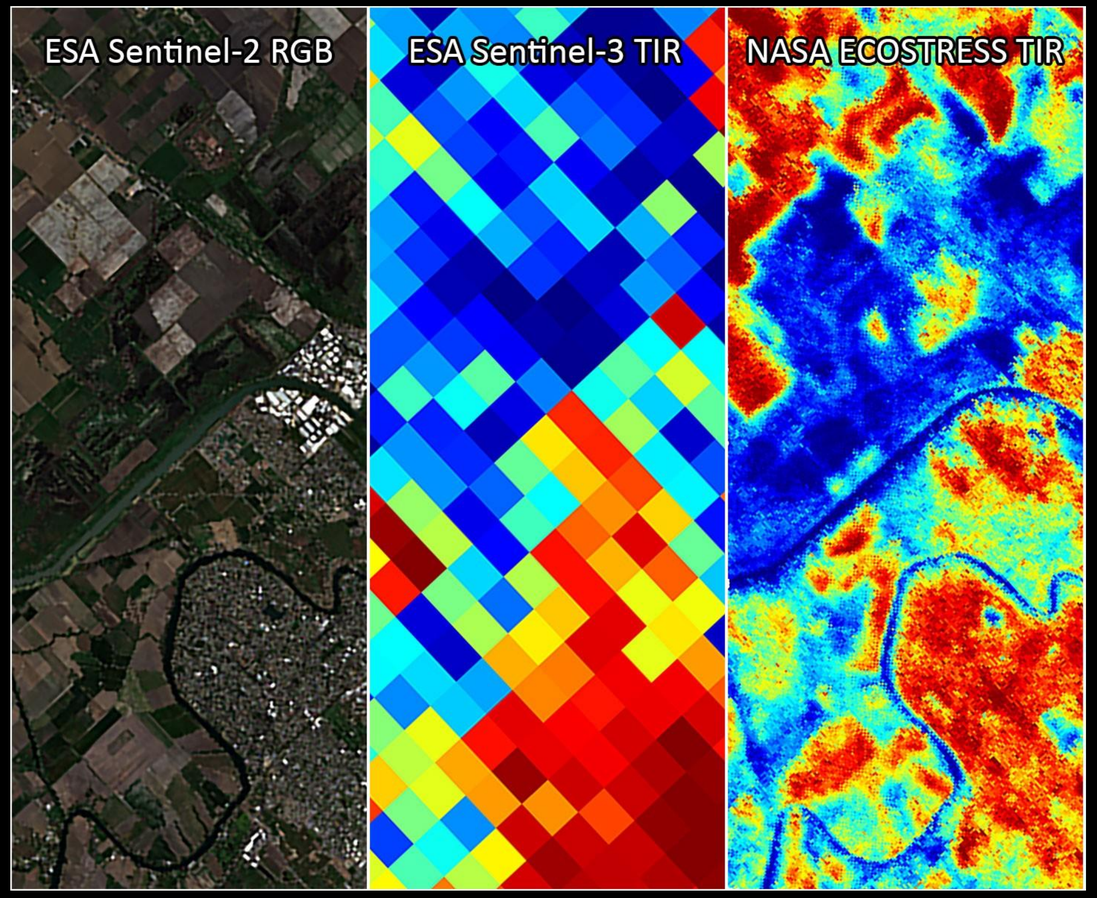


.. and just 18 months later – payload on the ISS

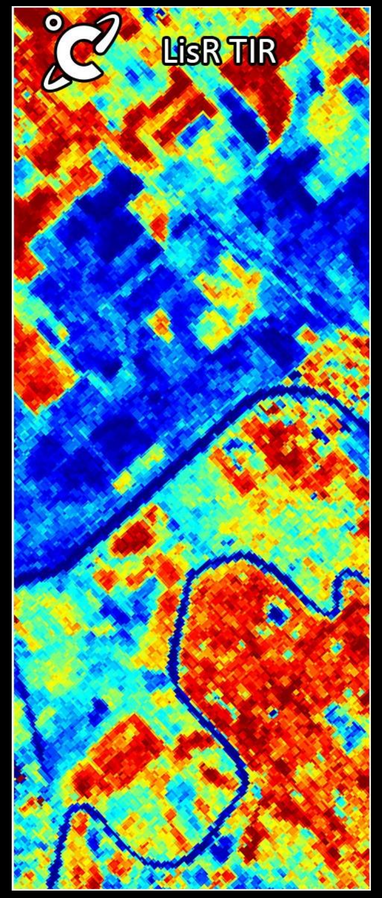
(Reached the ISS as part of Cygnus NG-17 resupply mission in March 2022)

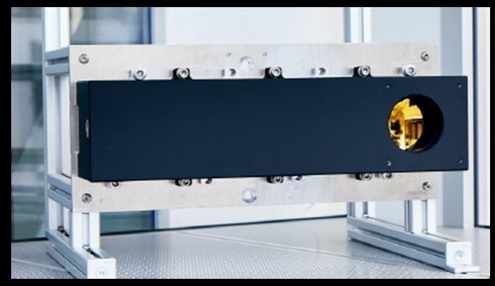
LisR (with AegIR): Imaging quality

*Reference: previous missions



LisR with AegIR core





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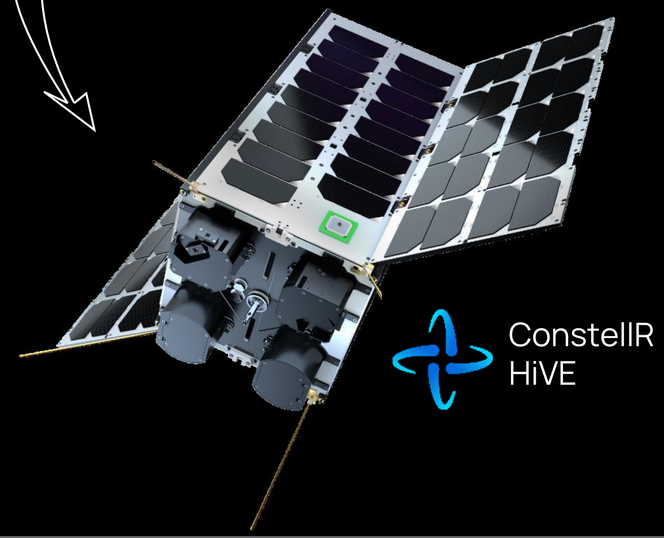


*the image credits: ConstellR

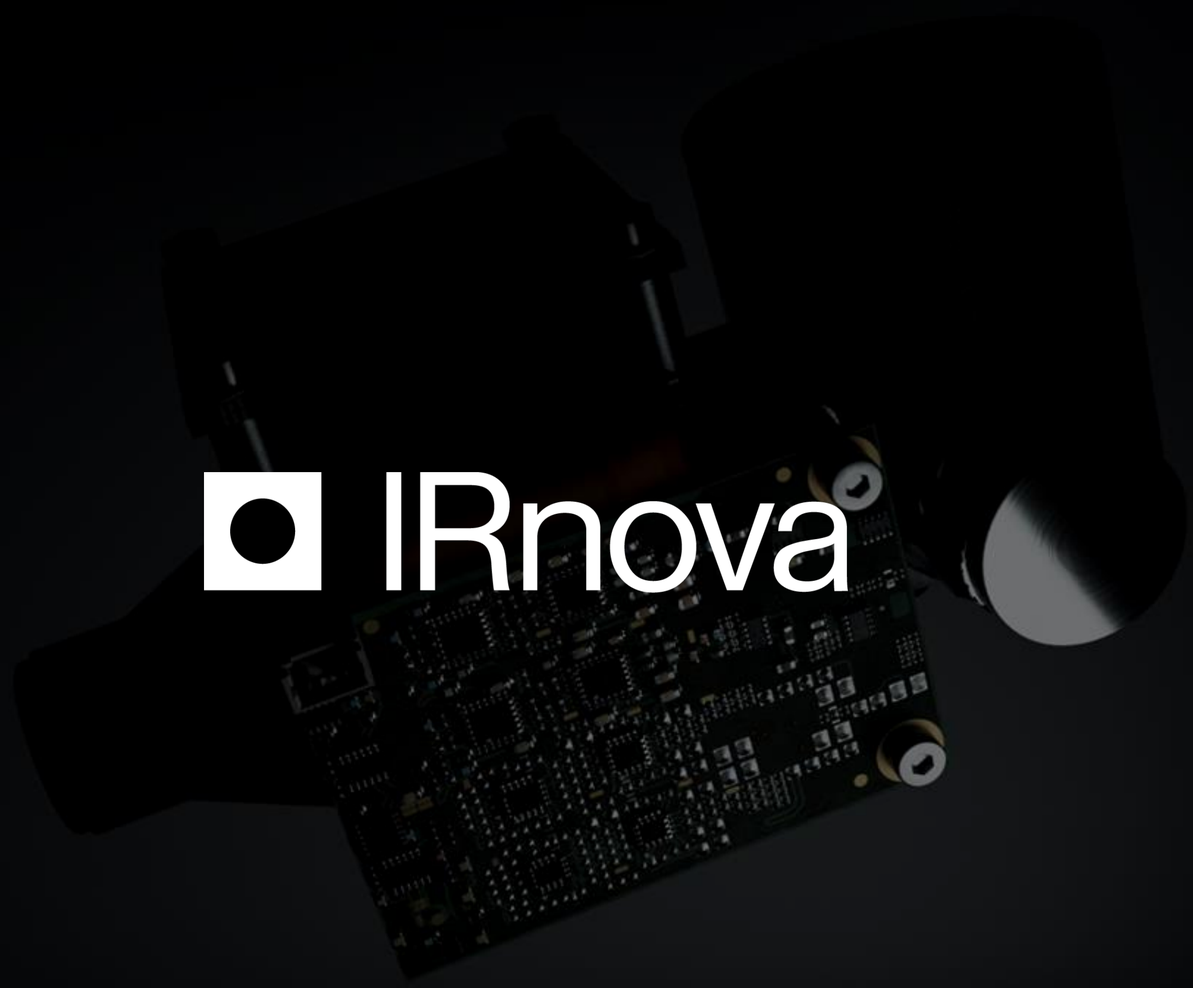
Conclusion

IRnova delivers high-end IR imagers covering entire IR range

We are agile, ready to customize off-the-shelf detectors for your needs

Dual-band QWIP for E/O

- State-of-the-art image quality
- Excellent long-term stability
- Core of LisR telescope, tested aboard the ISS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