

# Harp Technologies Ltd

Beyond Limits™



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# Company

- Provides expertise and contract R&D in RF and microwave technology since 2007
- Located in Espoo within Aalto University campus area
- Cooperates with leading European organisations in the space field
- Privately owned, entrepreneur-driven
- Turnover: 0.8 M€ (2017, 2018), ~1.8 M€ (2019)
- Profitable since 2009 (including)



#### Team

- The team incorporates 120+ years of R&D experience in RF, microwave & electronics
- 11 R&D engineers: 2 x D.Sc., 1 x Lic. Sc., 7 x M.Sc., one recruitment on-going
- Experience from leading R&D organisations
- Strong experience from S/C development



## **Core Competences**

- RF and microwave engineering
  - Active (radar) and passive microwave sensors
  - RF front-end design and development
  - Ferrite switches
  - Antenna design
- Methods and technology for Radio Frequency Interference (RFI) countermeasures
- Microwave remote sensing instrumentation
- System level specification and design
- Project management and PA according to ECSS



#### **Customer Segments**



Radio, RF-, Microwave and Millimetre Wave Engineering



### **Service Categories**





# Customers (1/2)

- Institutional market
  - European Space Agency
  - Large System Integrators (TAS, ADS, OHB)
  - Lower tier space companies
  - Research institutes
  - Finnish Defence Forces



# Customers (2/2)

- Commercial market (start-ups, SMEs, Plc's)
  - Space
  - Defence
  - Remote sensing
  - IoT
  - Customer products (wearable electronics etc.)



# **Public Project References**



#### **RFI Processor Breadboard**

- Customer: ESA
- For detection and filtering of Radio Frequency Interference
- Compatible with Metop-SG MWI requirements
- Applied for development and testing of various RFI detection algorithms







## **Telecom Switch for W-band**

- Customer: European
  Space Agency
- Ferrite switch (EM) for Wband (83.5 GHz)
- Internal latching architecture





#### Planetary Lander Altimeter: T/R Module etc.

- Customer: Efacec (Portugal)
- Harp (BB & EM):
  - T/R module
  - antennas
  - EGSE
- Range: 10 7000 m
- Accuracy: 0.33% H + 80 cm
- Weight: <1 kg</p>





## HUTRAD 2.0

- Customer: Finnish Meteorological Institute
- Refurbishment of an old airborne instrument
- Multiband radiometer: 6.8, 10.65, and 18.7 GHz
- Successfully applied in CIMRex campaign





#### HUTRAD 2.0





### **User Terminal Antennas**

- Customer: European
  Space Agency
- Terminal antennas for Land S-bands
- Realised using inkjet printing





## Summary

 Harp Technologies provides expertise and contract R&D services in RF and microwave technology

#### Services

- Studies and Analyses
- Component Design
- System Design



#### **Contact Information**

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