Company Introduction
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The Company

- Develops and manufactures miniaturized and robust multifunctional electronics systems for
  - Space applications
  - Industrial & Defence applications
- Spin-off company from Uppsala University, The Ångström Laboratory, Sweden

- Clients & partners such as:
  - In the US: NASA, ORS & AFRL
  - In Japan: JAXA, MELCO
  - In Europa: ESA, SNSB, DLR, CNES, FMV, OHB, RUAG, ADS & TAS-F

- Locations
  - Head Office: Uppsala Science Park, Sweden
  - Subsidiary: AAC North America, NASA Ames Research Park
  - Partners: OAI (US), HTL (JP), Soletop (Kr)

- Revenue: ~40 MSEK
- ~30 Employees
- Main owners
  - Fouriertransform AB, a state-funded venture capital company
  - RP Venutres AB, an early-stage venture capital company
  - Kalogi Holding
We have resilient solutions to space environmental issues

- Harsh environment
- Ionizing Radiation
- Large temperature cycles, CTE problems
- Vibrations
- Mass and size constrains
- Multi-way redundancy
- Vacuum
- All part must be evacuated
- No-single point failures

Miniaturized control computer
3 grams and 34 x 34 x 2 mm
Competitive strengths

- Ability to produce small, unique and purpose built satellites
- Complete offer to the market for small spacecraft
- ITAR-free products
- Unique cooperation with the US
- Established position in Europe
- Flight proven products
- Solid set of capabilities & competencies
- Industrial spin-off’s from space applications

TechEdSat after deployment from ISS on Oct 4th, 2012. Photo. NASA
Heritage

InnoSat
TechEdSat -3P
SPARC-1
RISESAT
Rising-1
TechEdSat-1
Rising-2
DX-1

Ariane 6
Space products

Satellite Systems

Sub-systems

Satellite Avionics

Ground Support Equipment (EGSE) and training products
Ongoing projects - InnoSat

Standard Configuration

- Mass: ~40 kg
- Size: 60x65x85 cm
- Payload mass: ~15 kg
- Payload power: ~40 W (orbit average)
- Design lifetime: ≥2 years
- Downlink bitrate: 3-5 Mbps
- Stabilization: 3-axis with reaction wheels
- Pointing performance:
  - 0.1 deg pointing knowledge error
  - 0.01 deg absolute pointing error
- Orbit determination: On-board GPS
- Optimized for Dawn/Dusk SSO
- Payload can be Earth- or Space-facing
InnoSat – A Swedish microsatellite platform

Payload examples
InnoSat – A Swedish microsatellite platform

Extended Configuration

• Mass: 40-50 kg
• Size: 60x65x85 cm
• Payload mass: >15 kg
• Payload power: ~100 W (orbit average)
• Suitable for 10:30 orbits for EO missions
• Payload can be Earth- or Space-facing
Spin-offs

Industry

• Development and manufacturing of systems and components to partners where the know-how in electronics and miniaturization bring customer value
• Products for specialized niche applications, such as high temperature motor driver electronics
Advanced packaging & sensor design
Hybrid electronics

- Hermetic sealing
- Bare die processing
- LTCC 3D-stacking
- Si-interposer platform
- Electrical integration
- Wire bonding & Flip-chip
- Mechanical integration

AAC Microtec
Benefits of miniaturization

- Decreased weight of electronics
- Decreased dimensions of electronics
- Place electronics in new locations you earlier only could dream about
- Improved environmental robustness
- Easier thermal management
- Short distances gives very good SNR
- Optimal life cycle performance

Sensor integrated in silicon with electronics on surface

MEMS sensors

Miniaturized control computer

Miniaturized control computer
3 grams and 34 x 34 x 2 mm
Interplanetary exploration
Contact info

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HQs

The Ångström Laboratory, Uppsala Univ.
Next Generation Product Summary

• **OBC-S**
  – On-board Computer board

• **TCM-S**
  – Tight Coupled Memory, a combined mass memory and CCSDS communication stack with Telemetry & Telecommand

• **RTU-S**
  – Remote terminal unit
  – Interface module for subsystems

• **SpW router**
  – SpaceWire router

• **PSU concept**
  – Power supply concept and a set of building blocks to form a mission tailored PSU.
Technical specification

- FPGA based design with Triple Modular Redundancy (TMR)
- RTOS RTEMS
- ~50 MHz CPU 32 bit OpenRISC Fault Tolerant™
- 64 MB RAM (with EDAC)
- 1GB Flash standard (with EDAC)
- 16GB Flash for TCM with SSR (with EDAC)
- 20 Mbit SpaceWire
- RS422/RS485 UARTs, I2C
- Debug, UART, JTAG and Ethernet
- Internal FDIR and housekeeping monitor
- 5-16V supply range
- Power consumption typically 1W
- 2 x Pulse command inputs. Can be read from for example the boot loader to select boot image. (for recovery modes)
- CCSDS compliance
- PUS-2 HW pulse command output (RS422 levels)
- LVDS or RS422 interface to radio transceiver
Mechanical envelope

- Aimed for Small Satellites and Cubesats
- The board is smaller than the Cubesat form factor
- A mechanical casing with Cubesat outline form factor
- Stack, top unit has a lid
Configuration example
DHS configuration example

- Debug connector side
- Thermal interface side
- X-band TX
- TCM-S (incl SSR)
- OBC-S
- SpW router
- Flight connector side