Aerodays 2011
30th March - 1st April 2011, Madrid (Spain)
http://www.aerodays2011.org/

HISVESTA

HIgh Stability VErtical Separation Altimeter instrument

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Technical Coordinator HISVESTA project

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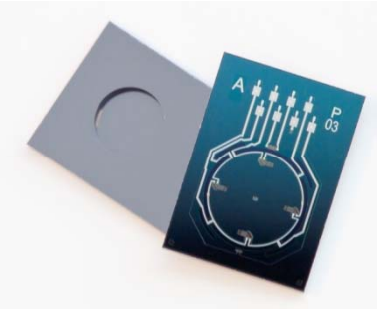
Project Coordinator
Aerodays 2011, Madrid, March 31, 2011

SEVENTH FRAMEWORK PROGRAMME
TRANSPORT /Aeronautics
FP7-AAT-2007-RTD-1
EC contract no. 213729-2008

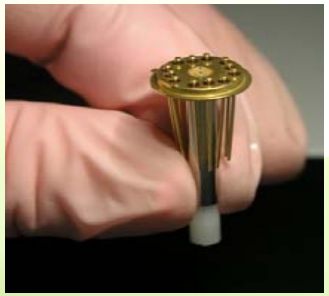
www.sintef.no/hisvesta

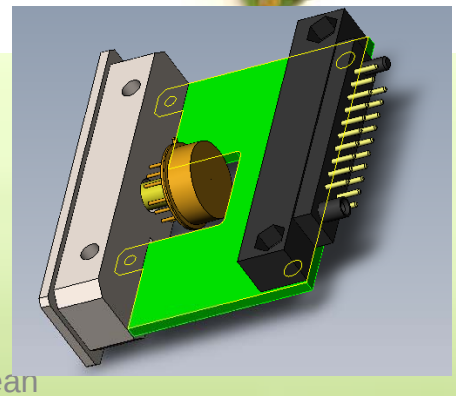
HISVESTA



MEMS technology reaches for the sky

Innovative sensor technology for altimetry and engine control applications





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European Commission

SEVENTH FRAMEWORK PROGRAMME

HISVESTA

HIgh Stability VErtical Separation Altimeter instrument

Project consortium

SINTEF, Research Institute, Oslo Norway

Memscap Sensor solutions, Horten, Norway

Penny&Giles Aerospace, Christchurch, UK

Ceramica, Ilfov, Romania

Micro Electronica, Bucarest, Romania

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The Power of a Small World™

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Motivation for HISVESTA

- **After introduction of RVSM (Reduced Vertical Separation Minimum) to 1000ft altitude separating aircrafts flight levels, a number of incidents are reported were passenger aircrafts are violating the tolerances of altitude accuracy.**

- **The specific Altimetry conference held in Brussels August 2010 by EuroControl, "Altimetry System Error, The invisible Risk" clearly showed that improved procedures and more accurate altitude equipment are needed to secure safe flight operation**

- **HISVESTA project concentrates on Research and Development of altimetry sensors with higher accuracy and better long term stability performance than what is currently available**

- **Additional Motivation: To utilize the R&D results from Altimetry sensor project to develop pressure sensing products suitable for Jet Engine FADECs (Full Authority Digital Engine Control) for high temperature operation, to reduce fuel consumption, reduce emission of CO_2 and NOx**

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Motivation

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Altitude System Error

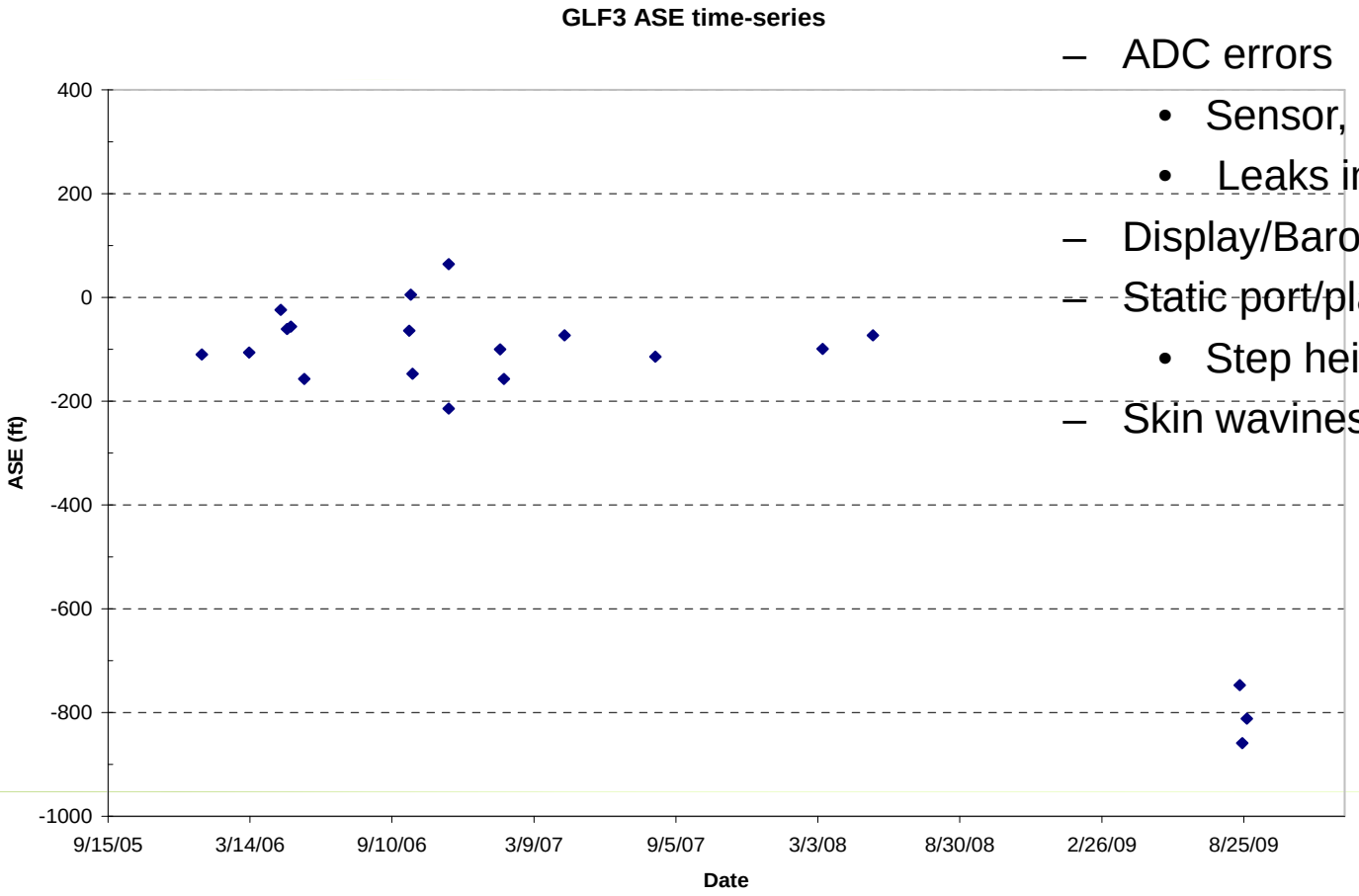
FL360 as measured by the Aircraft Altimetry System

ASE

Actual Pressure Altitude e.g. FL360

EUROCAE WG68, altimetry operating procedures

Observed ASE of GLF3: 2005-2009 (Time-line)



- ADC errors
  - Sensor, temp, drift,
  - Leaks in plumbing
- Display/Baro setting
- Static port/plate condition
  - Step height, smoothness, paint
- Skin waviness

Source FAA presentation, Brussels sept 2010

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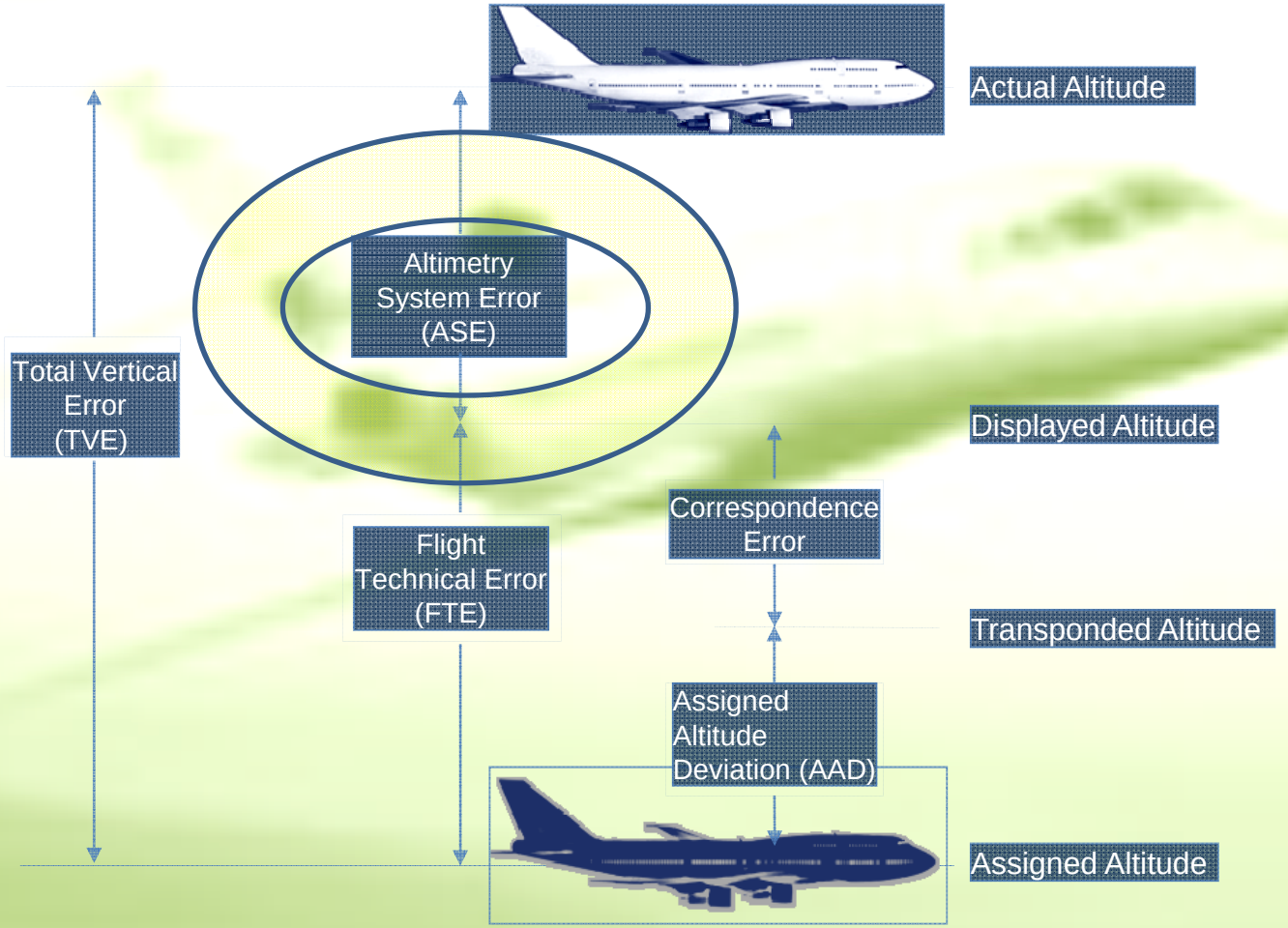
Complex elements of Total Vertical Error



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Where Industry is today

- Altimetry System Error
  - Crew will not see it
  - ATC will not see it
  - TCAS will be misinformed

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Research results for new altimetry sensors

The HISVESTA project was officially started in January 2009 and has 30 months duration.

HISVESTA is targeting better altimetry pressure sensors for altimeters, Air Data Computers and Auto Pilot systems

Sea level	1013,25 mbar A
18,000 ft	500mbar A
29,000 ft	315mbar A
41,000 ft	178mbar A

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Project overview

Success criteria's for the project:

- Demonstrate improved performance for a new Air Data Unit including new pressure transducers
- Demonstrate transducers with multi pressure range sensors, heated mode transducers and transducers with a frequency output
- Pushing the technology platform (sensor die, sensor package and pressure transducer) towards high temperature applications up to 200 °C.

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HISVESTA developments relevant for aircraft industry

MEMS activities:

- New SP83 sensor die
- 8 pressure ranges, from 0,25 bar to 60 bar
- Extreme long term stability performance

  (< 100ppm/year FS)

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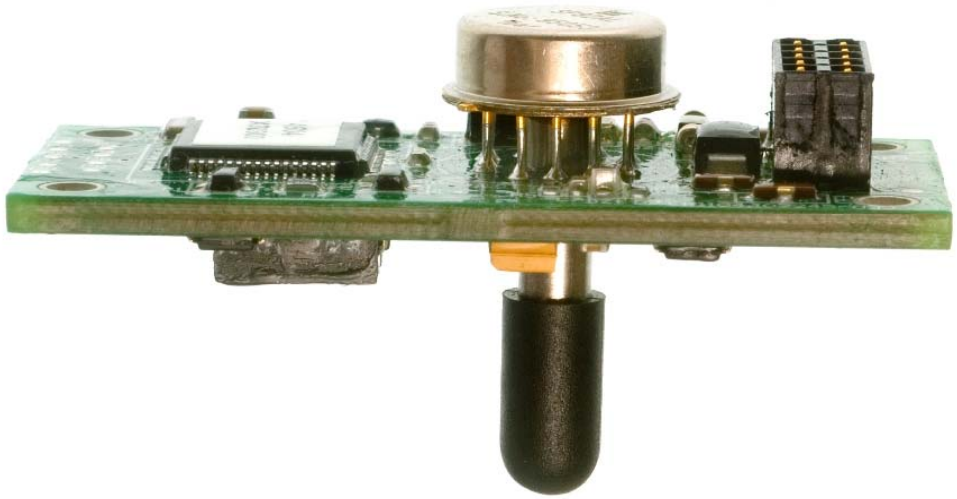
HISVESTA developments relevant for aircraft industry



- New altimetry barometric pressure sensor
- TP4000 altimetry pressure transducer

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TP4000 Evaluation kit

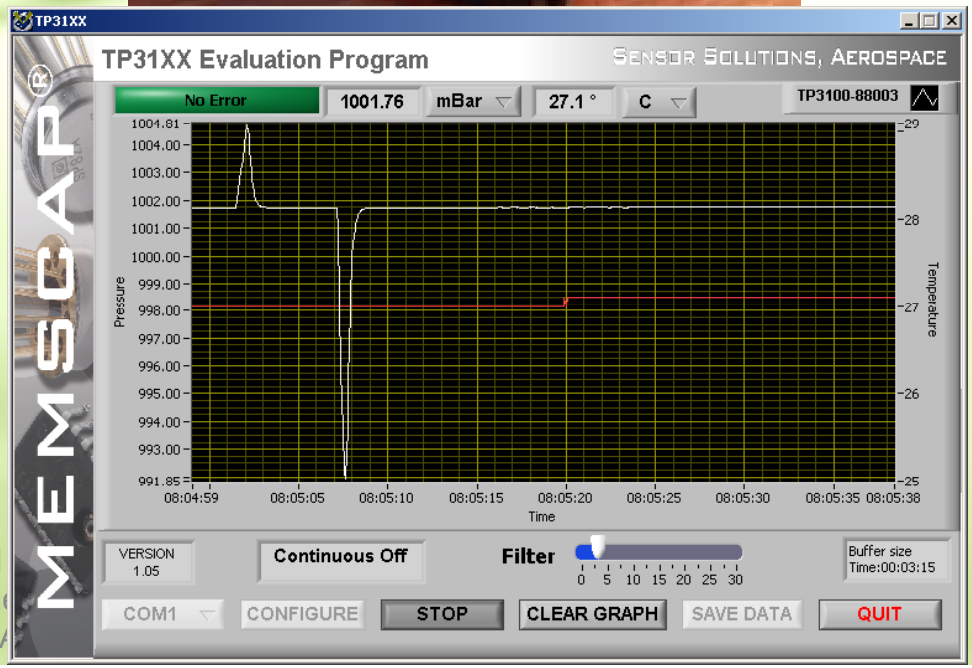
Test the transducer performance in our HISVESTA booth!

More info at:

www.sintef.no/hisvesta

or contact:

sensors@memscap.com



HISVESTA is carried
Commission Frame

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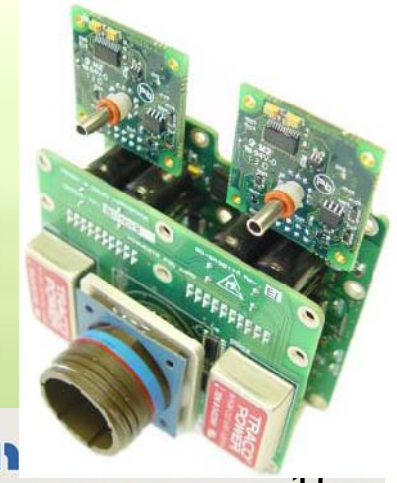
HISVESTA developments relevant for aircraft industry

- New RVSM compatible Digital Air Data Computer (prototype)
- Smaler, lighter and better performance than existing products to a reasonable cost.



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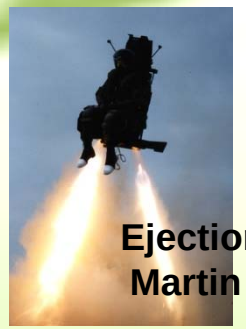
Sensor Products for Avionic applications

Eurofighter Typhoon/Pilot Mask oxy flow
Sequencer for ejection seat

Eurocopter/Sikorsky
Air Data/Airspeed indicators



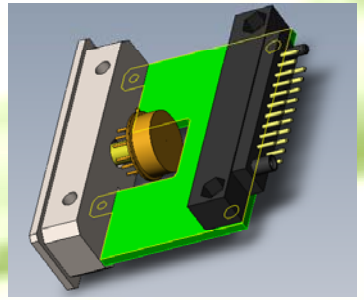
Ejection Seats
Martin Baker

Pressure transducers for Engine Control Modules

Cabin Pressure Control Transducers/switches

Air Data Computers, Pt and Ps sensors

FADEC Pressure Tranducer Solution



- Pressure ranges from P_0 static barometric up to 900Psia
- FADEC mounted or remote mounted hi temp

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Volcanic Ash-testing of sensors and transducers to be performed during spring 2011

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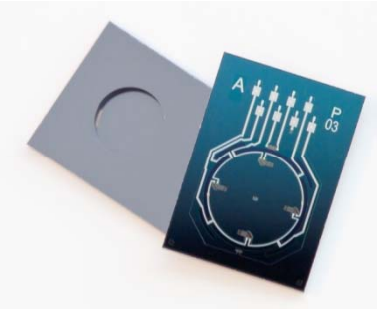

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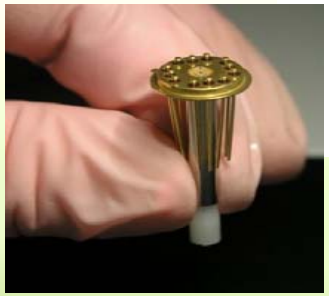

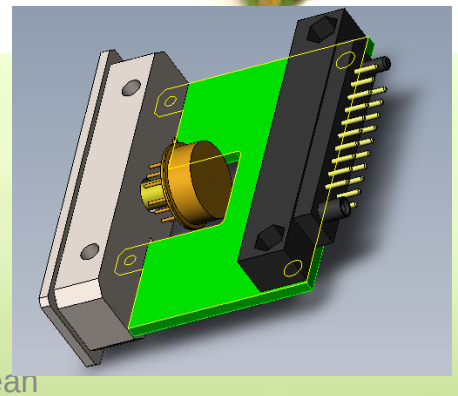

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Thank you for your attention

More info at
www.sintef.no/hisvesta
and
Sensors@memscap.com

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