ESTEC Safety Instructions
AMICSA

International Workshop for
Analogue and Mixed Signal Integrated Circuits
for Space Applications

What is it about?
Integrated Circuits in Space

Mission Requirement → Spacecraft Design → ASIC Specification

Space Environment → Mitigation Techniques

Radiation Effects → Radiation Testing

In-flight Monitoring → Flight Part

Design → Manufacture Assembly

Prototype → Electrical Testing

Quality Assurance
Full Custom IC Design

• Analogue IC design domains are usually full-custom

• Full custom IC design does not allow for higher levels of abstraction

• Full custom IC designers need to be aware of the complete design flow, or work very closely with a team of experts:
  • Radiation effects
  • Mitigation techniques
  • System Design
  • Circuit Design
  • Layout
  • Design for Test
  • Design for Manufacture
  • Assembly
  • Qualification
  • User
And in Outer Space?

- Recurrent manufacturing costs are (mostly) irrelevant for Space ASICs. -> silicon real estate is not the prime cost driver.
- The costs for testing and quality assurance dominate the recurrent as well as the non-recurrent costs.
- There is no qualified vendor for qualified A/MS (full custom) ASICs.
- Is cell based analogue design a viable solution?
AMICSA Sessions

1. Space Applications for Analogue and Mixed-Signal ASIC
2. Methodologies for Radiation Hardening on Analogue Circuits
3. Advances in Mixed-Signal Technology
4. (continued)
5. Radiation Tests and Effects
6. Needs and Requirements for Analog and Mixed-Signal ICs for Space
Session 1
Chairman: Boris Glass

Space Applications for Analogue and Mixed-Signal ASIC

09:30  A CMOS Instrumentation Chain for Charged Particle Event Detection in the Space Environment
Olivier Bernal, Universite de Toulouse, France

10:00  The Essential Telemetry (ETM) ASIC: A Mixed Signal, Rad-Hard and Low-Power Component for Direct Telemetry Acquisition and Miniaturized RTU Applications
George Kottaras, Space-ASICs, Greece

10:30  Reconfigurable System-on-Chip for Multiple Instrumentation Applications
Daniel Gonzalez Gutierrez, Arquimea, Spain

11:00  Coffee break
Space Applications for Analogue and Mixed-Signal ASIC

11:30  OWLs: A Mixed-Signal ASIC for Optical Wire-Less Links in Space Instruments  
Juan Ramos-Martos, Instituto de Microelectrónica de Sevilla, Spain

12:00  Model accuracy for a smart power ASIC chip set for space  
Daniel Gonzalez Gutierrez, Arquimea, Spain

12:30  Integrated SAR Receiver/Converter for L, C and X-Bands  
Markku Åberg, VTT, Finland

13:00  Application of an Eight-Channel Comparator in a Cross-Correlator for Synthetic Aperture Radiometry  
Erik Ryman, Omnisys Instruments, Sweden

13:30 Lunch
Methodologies for Radiation Hardening on Analogue Circuits

14:30   Analysis of Single Event Transient Effects in analogue Topologies
         Fernando Márquez, University of Seville, Spain

15:00   Mixed-Signal Design Methodology Incorporating
         A Priori Single Event Transient (SET) Rate Estimates
         David Kerwin, Aeroflex, UK
Session 3
Chairman: Richard Jansen

Advances in Mixed-Signal Technology

15:30 Development of the ATMEL 150 nm CMOS Technology for Space
Bernard Bancelin, Atmel, France

16:00 Coffee break

16:30 Radiation Hardened Mixed-Signal IP with Dare Technology
Geert Thys, IMEC, Belgium

17:00 IHPs SiGe BiCMOS technologies for RF and mixed-signal space applications
René Scholz, IHP, Germany

17:30 Advanced features in RadSafe TM technology
Tuvia Liran, Ramon Chips, Israel
Dinner Cruise

Monday, August 27

18:15   Bus departure from ESTEC main building to Rederij Triton in Katwijk

Boat Tour
Buffet Dinner

21:30   Bus departure from Rederij Triton to hotels in Noordwijk
Session 4
Chairman: Richard Jansen

Advances in Mixed-Signal Technology

August 28

9:00  Advances in Radiation Hardened Mixed-Signal Technology
      David Kerwin, Aeroflex, UK

9:30  Technologies for Mixed-Signal Design
      Laurent Dugoujon, ST Microelectronics, France
Session 5
Chairman: Ali Mohammadzadeh

Radiation Tests and Effects

09:50  Radiation Testing Methodology and Techniques
TBD, ESA/ESTEC, The Netherlands

10:10  A new laser source for SEE tests
Isabel Lopez-Calle, ESA/ESTEC, The Netherlands

10:30  Electrical-Radiation Test Results of VASP and Flight Model Development Plan
Philippe Ayzac, Thales Alenia Space, France

11:00  The Road to Parts Approval and the Role of ESCC
Fernando Martinez-Martin, ESA/ESTEC, The Netherlands

11:10  Coffee Break
Session 5
Chairman: Ali Mohammadzadeh

Radiation Tests and Effects

11:30   Heavy-Ion and Proton Testing of Mixed-Signal ASSPs
        Rajan Bedi, EADS Astrium, UK

12:00   Radiation Test of TFSMART2 Technology using Extended Common Mode
        LVDS and DC-DC Converter Components
        Volodymyr Burkhay, Telefunken Semiconductors, Germany

12:30   Evaluation of the AMS 0.35 um CMOS Technology for Use in Space Applications
        Juan Ramos-Martos, Instituto de Microelectrónica de Sevilla, Spain

13:00   A Comparative Study of the MSI and Proba-V Linear Arrays
        under the Influence of Radiation
        Jan Vermeiren, Xenics, Belgium

13:30   Lunch
Session 6
Chairman: Agustín Fernández León

Needs and Requirements for Analog and Mixed-Signal ICs for Space

14:30  Analog and Mixed Signal ICs for use in future Space Missions
       Shri Agarwal, NASA/JPL, USA

15:00  “Smart Microsystems” - A Feasibility Study to investigate the Decentralisation of
       Space Systems with highly efficient Micronodes
       John Cornforth, SEA, UK

15:30  Challenges of Mixed Signal Space Grade ICs operating at Microwave Frequencies
       Nicolas Chantier, e2v, France

16:00  Coffee break
Session 6
Chairman: Agustín Fernández León

Needs and Requirements for Analog and Mixed-Signal ICs for Space

16:30   A Proven Development Flow for Designing Mixed Signal ASICs: Lessons Learnt from ASTRIUM Field Return
        Matthieu Dollon, Astrium, France

17:00   Barriers to Mixed-Signal Technology Growth in Space
        Richard Jansen, ESA/ESTEC, The Netherlands

17:30   Conclusion
Technical Committee

Rajan Bedi  
Constantin Papadas  
Nicolas Chantier  
Boris Glass  
Richard Jansen  
Alessandro Marchioro

EADS, United Kingdom  
ISD, Greece  
e2v, France  
ESA, The Netherlands  
ESA, The Netherlands  
CERN, Switzerland

Sponsor

e2V, France
AMICSA 2012 – Questionnaire

We would like to ask you spending a couple of minutes to answer the questions below. This will help us to improve and adapt AMICSA in the future to your expectations. Please use a rating from 1 (worst) to 5 (excellent), and the backside of the sheet for additional comments.

Please return this form to one of the organizers by the end of the day. Thank you!

Part A: AMICSA 2010

1) Presentations
   - Quality (20)
   - Duration (30 min.)
   - Scope of the workshop

   [ ] [too few] [just right] [too many]
   [ ] [too narrow] [just right] [too wide]

2) Venue
   - Location (ESTRACK Noordwijk, The Netherlands)
   - Hotels (accident, service)
   - Meeting facilities
   - Dates (5 - 7 September)
   - Duration (2 + 4 days)
   - Social Program

3) Organization
   - E-mail announcement
   - Information on conference website
   - Registration
   - Other:

4) What did you like and dislike in particular about AMICSA 2010? Please use the backside for your comments!

Part B: AMICSA 2012

What would you like AMICSA 2012 to take place?

[ ] Somewhere in Europe
[ ] Outside Europe
[ ] This city or country

Semiannual would you prefer the workshop to take place?

May [ ] June [ ] July [ ] August [ ] September [ ] October [ ] November [ ] December

Would you be interested to join the technical committee for AMICSA 2012?

Your name (this is optional, of course)
AMICSA 2012 - Proceedings

• On USB stick

• On the World wide web (soon):
  
  http://congrexprojects.com/12c21
  > Proceedings

  http://www.esa.int/TEC/Microelectronics
  > Workshops and Conferences
  > AMICSA 2012

Authors: Please fill and return your permission forms