Business Division Products

Microsemi FPGA's at Astrium

SEFUW Workshop – Noordwijk

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Ottmar Ried

All the space you need

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Heritage

- **Much flight heritage**
- **Microsemi FPGA's are used in almost all flight programms**
- **SX devices as well as RTAX devices**
  - › More and more RTAX devices are used
  - › Mainly RTAX2000 and RTAX4000
- **Used Packages**
  - › Most used CQ352 followed by CQ256
  - › CG624 only if not avoidable
- **Units with more then 20 RTAX devices**
- **The designer knows the devices and tools well**

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Applications

- **Telemetry and Control**
- **Data Processing**
- **Encryption**
- **Motor Control**
- **Standard Interfaces**
  - Milbus
  - SpaceWire
- **Customized Interfaces**
- **Integrated Processor**

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Achievements

- **High performance Designs**
  - Occupancy above 90%
  - with clock rates of 40MHz and 80MHz
  - Up to 138 MHz IO speed (parallel bus + clock)
  - Full usage of available clock resources
- **Usage of RTAX4000 devices**
- **Qualification of CG624 manufacturing**

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Problems/Lessons learned 1/2

Microsemi tool chain problems
- Several calculation failures identified in SmartTime tool over the last years
- Tool crash without failure information
- It seems that there is not enough attention from Microsemi

Limited tool support by 3rd party vendors
- Microsemi devices not supported as XILINX/ALTERA

We invest time and tools to get confidence in the Microsemi/3rd party tool chain
- Additional STA with 3rd party tool (PrimeTime)
- Equivalence check

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Problems/Lessons learned 2/2

- **Slow solving of problems**
  - E.g. Cascaded RAM Problem took ~ 1 year
- **Programming failures**
  - >5 % of SX devices fail
- **High power consumption of RTAX**
  - Customer has to pay extra to get a reasonable device (SL)
- **Business restricted by ITAR regulations**
- **PPBI is a schedule and cost driver**

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Needs/wishes for Devices

- **Increase internal RAM storage**
- **Possibility to have PLLs in flight**
- **Native DDR Flip-Flops**
- **Reduce power consumption**
- **More global clock networks**
  - Specific communication interfaces require different clocks.
- **Improve SET susceptibility of RTAX**
  - Equally to RTAX-DSP

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Needs/wishes

- **Improve the toolset**
  - › Microsemi as well as 3rd party
- **Accelerate support**
  - › Quicker bug fix releases
- **Improve clock tree segmentation**
  - › Better handling/management
  - › Better P&R algorithms (no more hold violations)

- **Reduce lead time**
- **Make them cheaper**

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