

Simulating methodology

Simulating a DVB-T/T2 system

- Simulation environments
 - MATLAB
 - GNU Radio
 - C/C++ language
 - FPGA

- Simulation / Emulation / Real – time system

MATLAB

- Matlab very good on maths operations
 - Vectors
 - Matrices
 - Complex numbers
- Many functions already there
 - Noise
 - Communications toolbox
 - Modulation (Analog / Digital)
 - Source / Channel coding
 - Channel modelling
 - Equalization and synchronization
- Visualization easy
- Drawback – performance / bitwise operations

GNU Radio / Companion

- Presentation on GNU-radio
 - GNU Radio

C/C++ language

- Performance according to hardware used
- Flexibility: compilers available for most platforms
- Can use libraries of achieving performance
 - e.g. FFT using SIMD instructions
- Integration with GPU rather straight forward
 - However, challenges:
 - Data transfer GPU / main memory
 - Efficiently using parallelism of GPU

FPGA -

- Speed / parallelism fully achievable
- Challenge: Available number of
 - gates
 - memory

Mixed use of technologies

- CPU, GPU, FPGA, ASIC (e.g. FFT, LDPC, Turbo) on same project / platform
 - Application specific SoC?
- Functionality implemented in functional
- Challenge: How to efficiently implement?

Implementation issues

- Data format between blocks
 - Flexible for many formats
 - System independent?
- Timings - alternatives
 - Algorithm driven
 - Data driven
 - Common clock driven?

Simulator developed at ÅA

- Sim_Model