1. Motivation

How to achieve:
- a low-power DSP application,
- a self energy-supporting software defined radio,
- an energy efficient EnergyBus and
- an energy autonomous nano-satellite.

2. Challenges

- Modern multimedia applications: high demands on system performance.
- Power consumption and resource usage must be minimal.
- Hence: trade-off between power consumption, resource usage and performance.

3. Synchronous Dataflow Graphs

- Popular dataflow computational models.
- Natural representation of DSP applications.
- Increasingly implemented on battery-constrained platforms.
- Novel power optimisation methods needed.

4. Power Optimisation Techniques

- Dynamic Power Management (DPM).
- Dynamic Voltage/Frequency Scaling (DVFS).
- Combination of DPM and DVFS: guarantees optimal power consumption.
- Voltage/Frequency Islands (VFIs).
- Combining DPM with any DVFS granularity.
- Better design choices.

5. Tool Support

- Application SDF Graph
- Platform
- PAM Model
- Conforms
- PAM Metamodel
- Epsilon Transformation Language
- Measures of Interest
- Priced Timed Automata Model
- Conforms
- UPPAAL Metamodel
- Energy Optimal Schedule

6. Experimental Performance Evaluation

- Results
  - Novel power reduction technique.
  - Heterogeneous platforms.
  - Quantitative model-checking.