

Agile Hardware and Co-Design

Agile Conference 2011, Salt Lake City
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Timo?



Agenda for today:

What is happening in R&D

Benefits of agile co-design

What enables agile co-design?

Advice to Agile/Scrum ceremonies

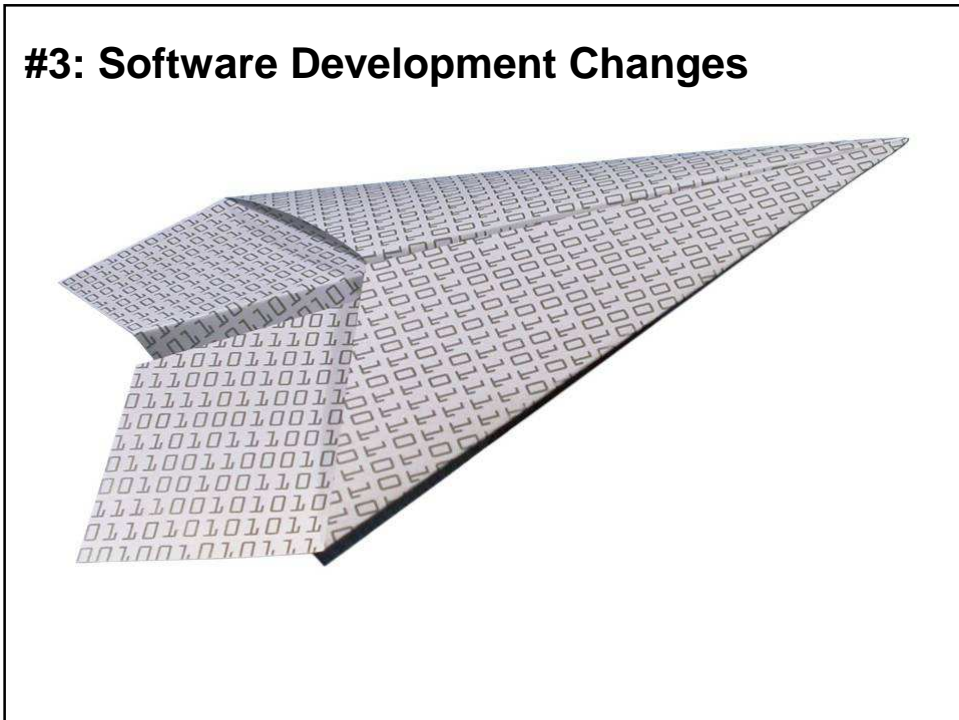
#1: Speed of Change



#2: Innovation accelerated by 360

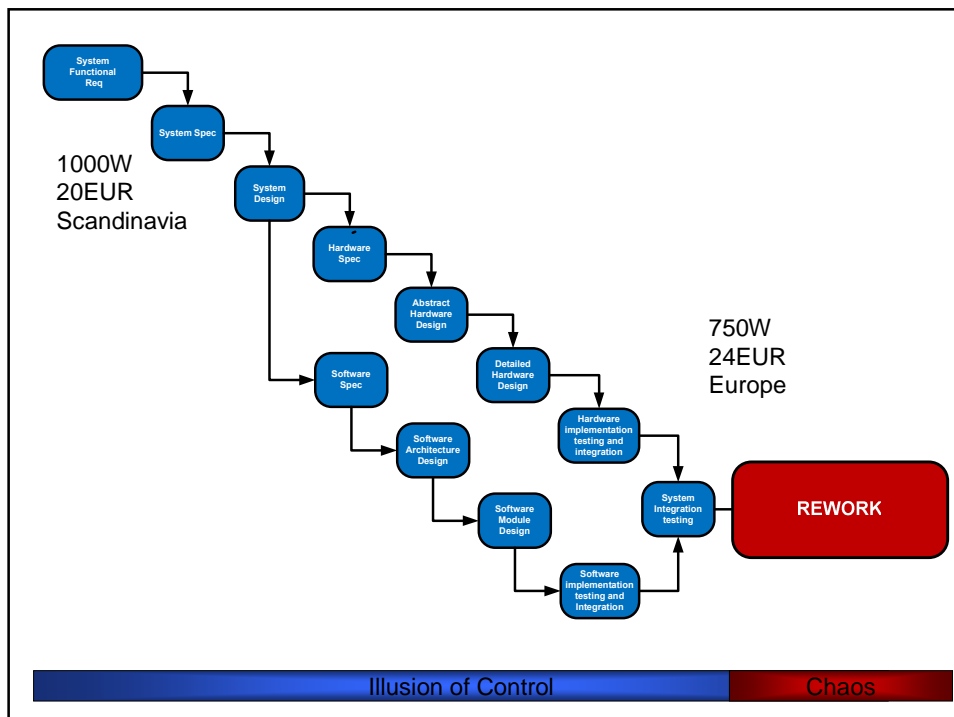


#3: Software Development Changes



Benefits of Agile Hardware and Co-Design

- Avoiding the big surprises using Up-front Prototyping



Alternative: Cross-Disciplined Up-front prototyping:



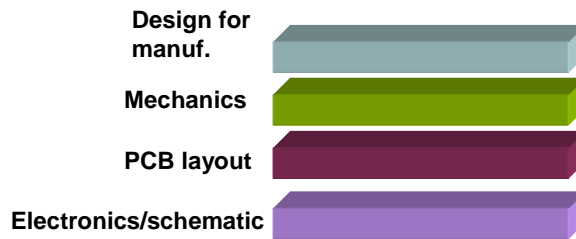
“Experimenting, not validating”

What enables agile hw and co-design?

- **Vertical slicing**
- **Cross disciplined Whole Team**
- **Customer team**
- **Economics of prototyping**
- **HW Unit Tests**

Vertical Slicing

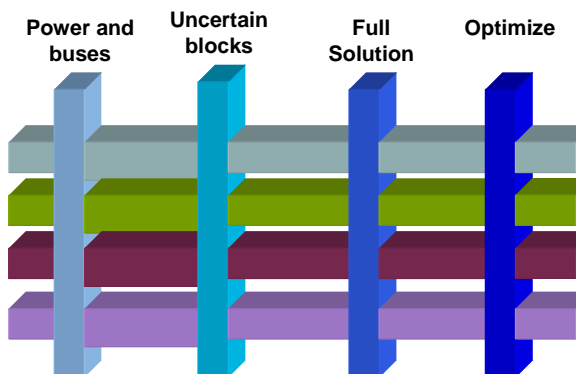
**Think Big,
Think Horizontal**



Adapted from
Doing Hard Time, Bruce Douglas

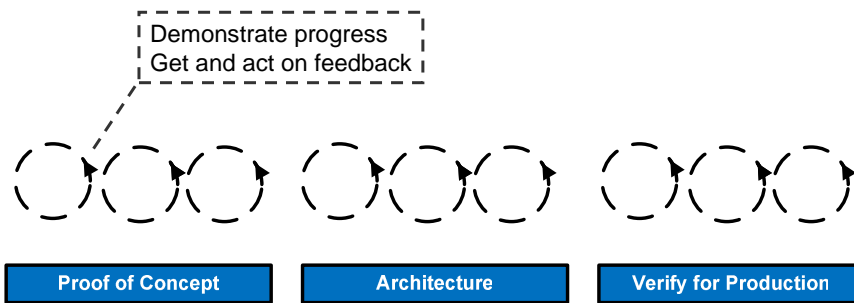
Vertical Slicing

**Implement Small,
Implement Vertical**



Adapted from
Doing Hard Time, Bruce Douglas

Serial in large, incremental in small



Schematics

3d models

Simulation

Bread board prototypes

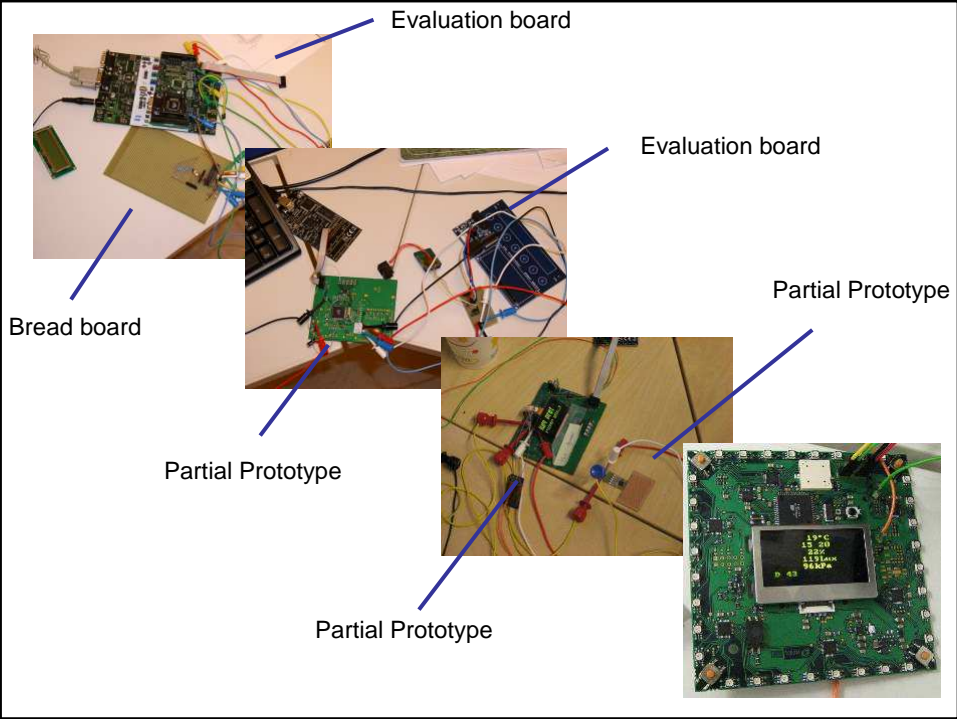
Re-usable generic prototypes

Evaluation boards

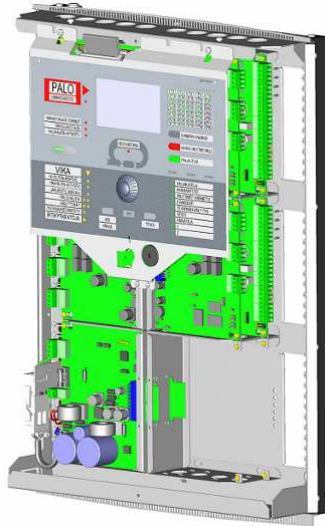
Partial prototypes

FPGA

3d printers



Flexible Architecture



- 1. Identify and prioritize uncertainties**
- 2. Deal with it:**
 - 1. Use focused prototypes to buy uncertainty down**
 - 2. Keep options and defer decisions**
 - 3. Isolate uncertainty**

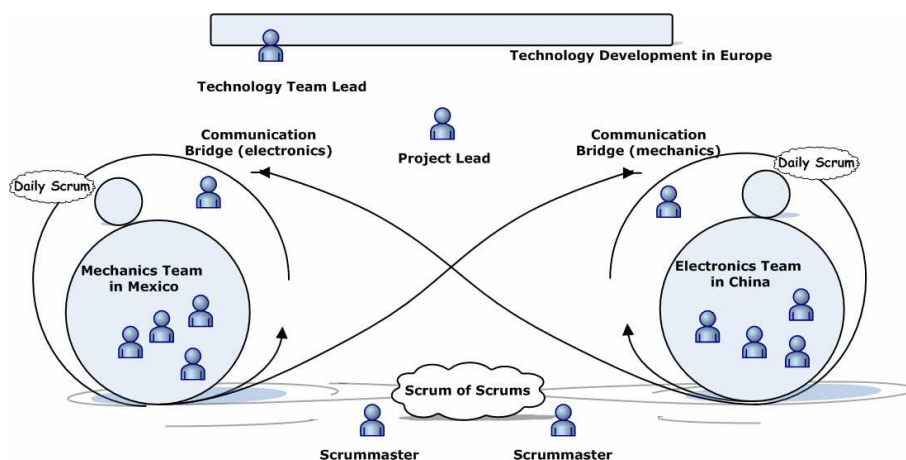
Remember to learn from prototypes!

Cross-Disciplined Whole Team approach

Schematics
PCB layout
Mechanics
Industrial design
Supply chain
Industrialization
Launch

Software

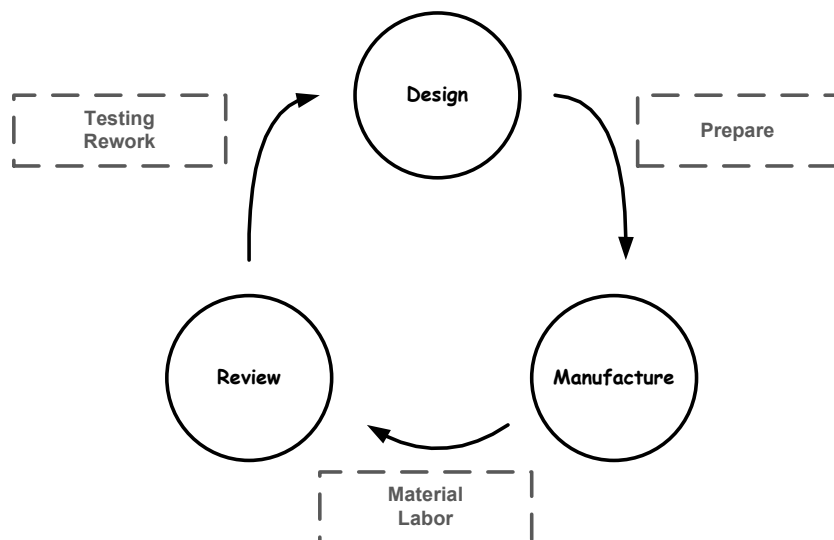
Cross-Disciplined



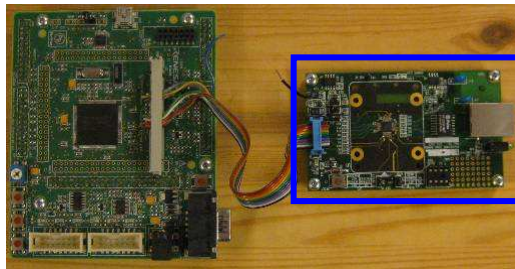
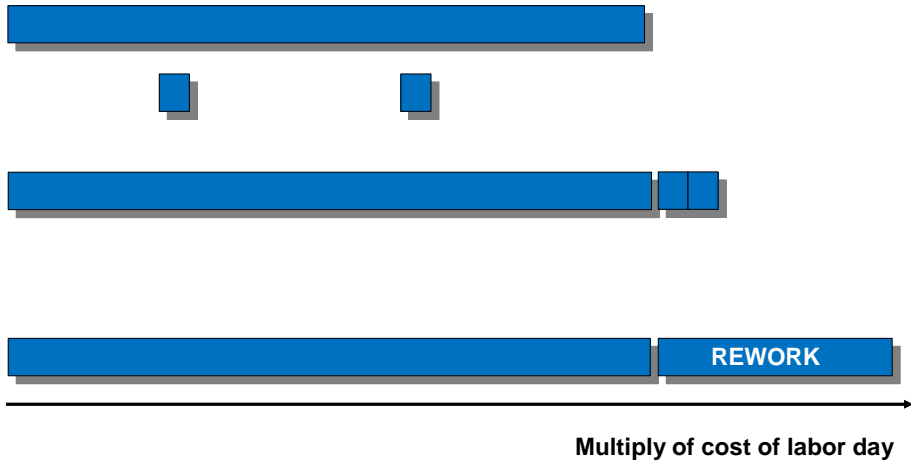
Customer Team

Domain experts:
Other disciplines
Technical lead
Novel technology provider
EMC test lab
Industrialization

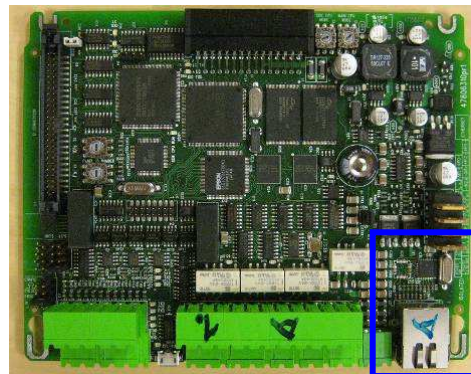
No Free Prototypes?



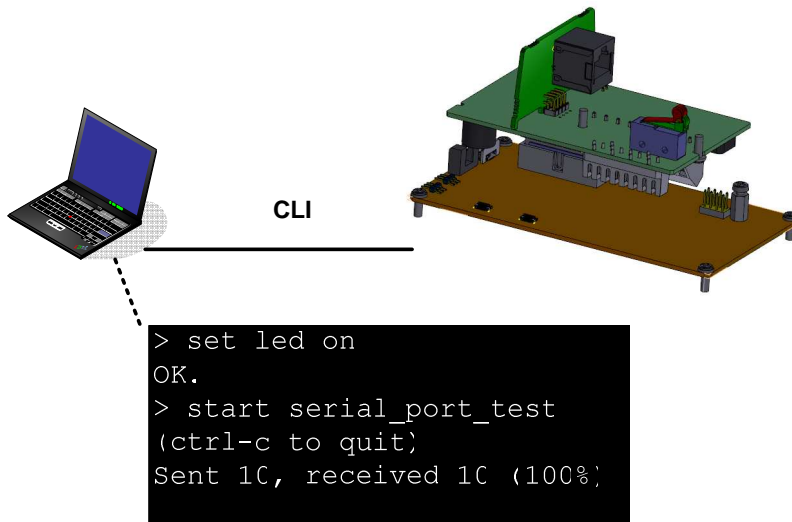
(Imaginary) True Cost of Prototyping



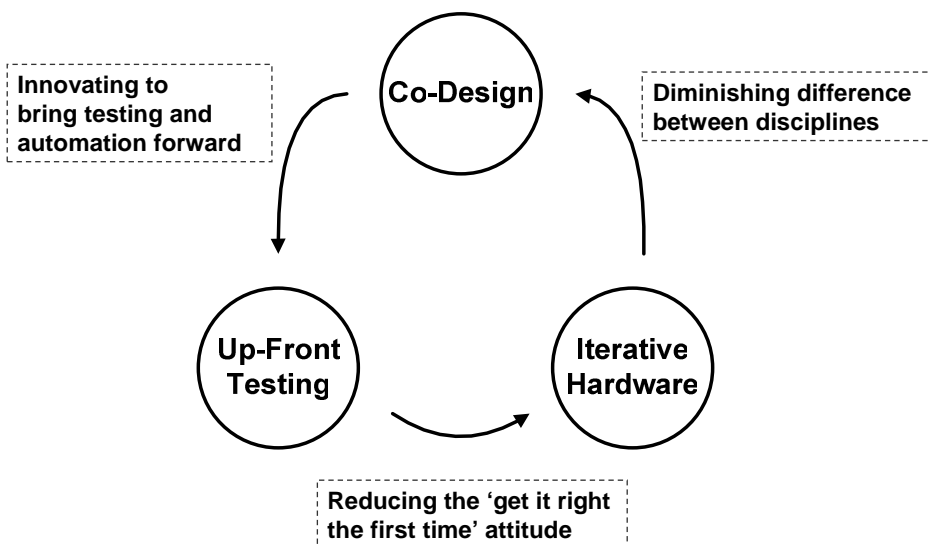
Hardware Unit Tests



Hardware unit tests



Positive reinforcing loop of agile co-design



Tips for ceremonies

- Planning
- Daily Scrum
- Review

Planning

Release Goal Proof of Concept [technology]

* [technology] Prototyped with ceiling mounted relay

Acc Criteria Be able to start performance testing

Block diagram for ceiling mounted relay

5

Acc.Criteria: Draft (block diagram) to identify the job to be done.

Schematics of [technology]

3

Acc.Criteria: Schematic enabling PCB work



Daily Scrum

- 3 pieces of information create agenda for latter part
- Find appropriate level of detail
- Creates shared sense of direction

Review



IKIWITI

Books

