

The Lifecycle of Product Testing

October 8, 2013

Tero Leppänen

Business Unit Director, Espotel Oy



Espotel as a company



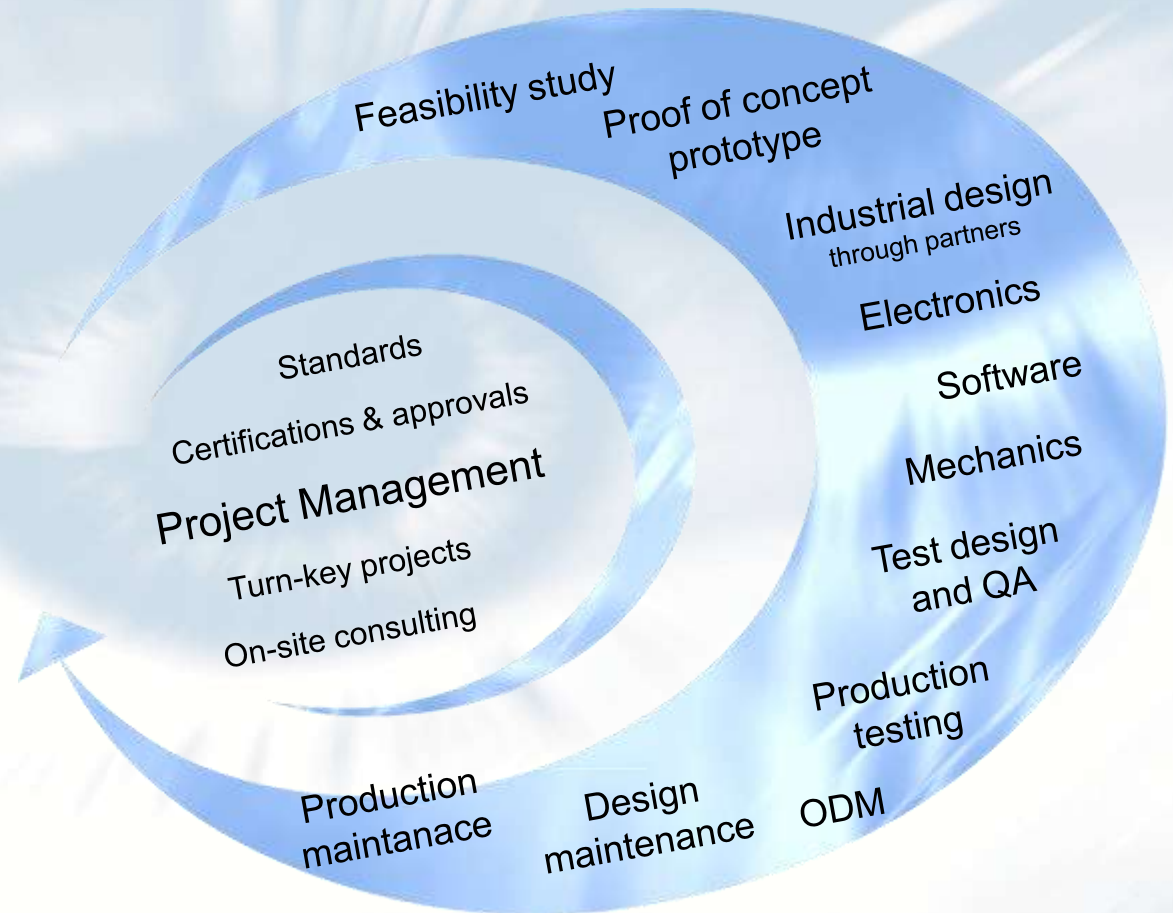
The leading engineering services company in the field of embedded systems.

- More than 25 years in operation, founded in 1986.
- ISO9001 and ISO13485 certified.
- Gold Alliance partner of National Instruments
- Operations in Finland, Sweden and Poland. Approximately 300 employees.
- Espotel values are honesty and openness in professional, customer oriented activity that leads to profitability.
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Services - From Ideas to Products



Industrial applications
Automation & control
Measurement systems
Medical devices
Telecom
Building automation
Wireless solutions



PROCKET

BY ESPOTEL

Testing Platform

- Turnkey solution for functional testing
- Fast and low risk production ramp-up
- EMS independent testing solution
- Efficient test system development process
- Uses commercial off-the-shelf instrumentation and industry standard SW tools
- Minimized costs over the product life cycle
- The Procket family provides cost effective production testing solution for a large production volume range



Technology Partners



PROCKET

More than 500 Procket test applications
in over 40 locations around the world.



The Lifecycle of Product Testing



Design phase

- Unit testing, module testing, SW testing, HW testing, ...
- In order to support upcoming phases, apply DFT here!

Verification and Validation

- System testing, Hardware-In-Loop (HIL)

Manufacturing

- Production testing, SPC

Design Maintenance

- Re-verification and re-validation
- Production testing maintenance

Repair and field return analysis

Lifecycle of Product Testing: DFT Targets

Easing testability in R&D and Production

- Optimum blend of test methods, with best quality, best possible cost, largest amount passed and in shortest possible time

Detecting defects as early as possible, keeping the “rule of tens” in mind

- Improving reliability of testing and diagnosis

Utilizing known solutions; avoiding reinventing the wheel

- Test concepts, re-use of existing test cases, “test libraries” etc.
- Standardizing existing testing solutions, paying close attention to product features to get everything needed tested

Speeding up the time to market

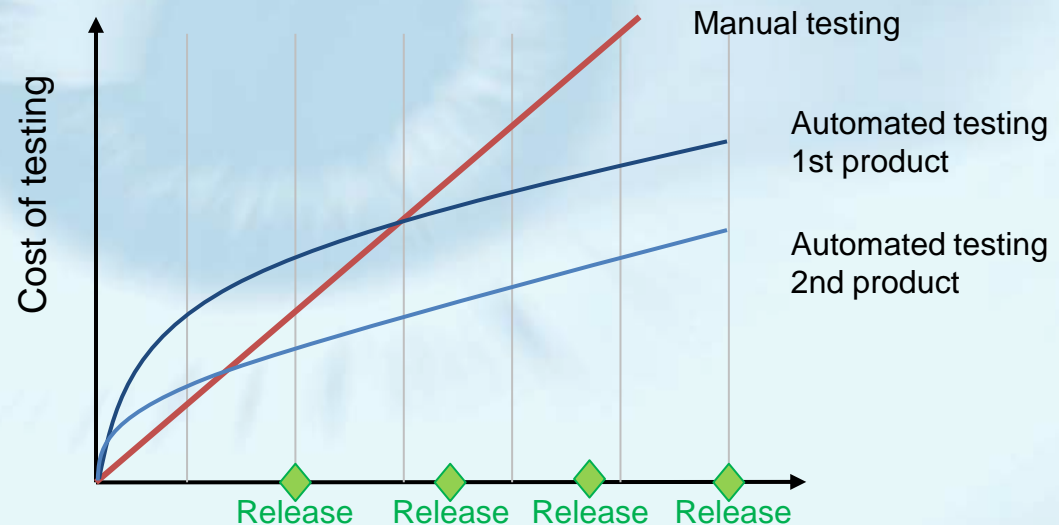
- Standardize test processes and automated test systems also in R&D

Why to automate R&D testing?



Key drivers for automation of R&D testing:

- Increased complexity of products:
 - Incremental design process needed.
 - Regression testing needed.
- Larger prototype series and need for statistical data already in R&D phase.
- Verification of 2nd source components.
- Synergy to production testing and re-usability of test routines.

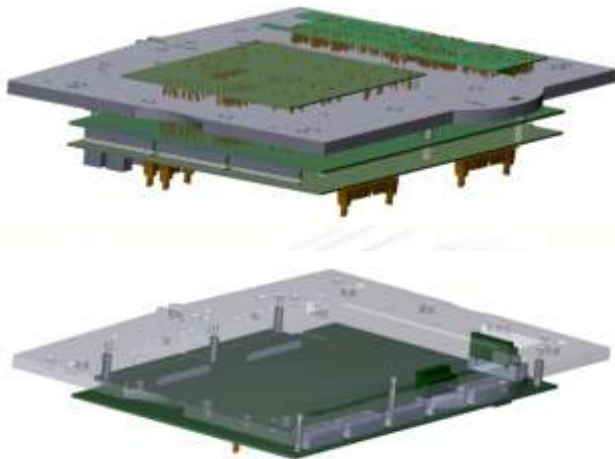


Benefits of using automated R&D test environment and testers



- R&D people can focus on R&D activities – increased effectiveness
- Increased R&D test coverage
- Faster time to market – More testing in less time
- Cost savings – Testing is fast and easy to repeat
- Faster NPI
- Painless verification of 2nd source components
- Increased statistical coverage of tests due to increased number of DUTs
- Possibility to use statistical analysis during R&D to have more information about product behaviour and estimate yield in production
- Re-using tests in production tester and next R&D project

Automated R&D testing: Case Example



- Procket test station was used for automated product verification & validation of industrial control product, which consists of several PCBAs
 - Enables automated regression tests for HW and SW also in temperature chamber
 - Allows over night automated test routines
-
- Reduces test resources in project
 - More tests, in less time
 - Speeds up the testing and product development
 - Enables the use of statistical analysis already in R&D phase
 - Enables efficient testing for 2nd source components
-
- 30...50% of tests was re-used in production tester development
 - Speeds up the production tester development and saves costs
-
- The same test setup can be utilized during the product maintenance phase for verification and validation of possible changes in a product

The Ultimate Production testing system

Standardized

- Overall testing cost optimization
- NRE optimization for a new product
- Enables fast production ramp-up with minimum risks

EMS independent

- Enables competitive bidding for between EMS companies
- Similar and known testing methods in all factories, regardless of EMS → Equal quality

Easy to maintain, minimized costs over the life-cycle

- Cost-of-the-self instrumentation
- Robust
- Comprehensive documentation including maintenance instructions
- Spare parts and calibration services available

Flexible & Scalable

- Supports different product types (PCBA and box-built end products)
- Supports different intrusion / accessing methods (connectors, test probes, etc.)
- Supports additional testing methods to increase test coverage: AOI, RF, Boundary Scan, LED testing etc.)

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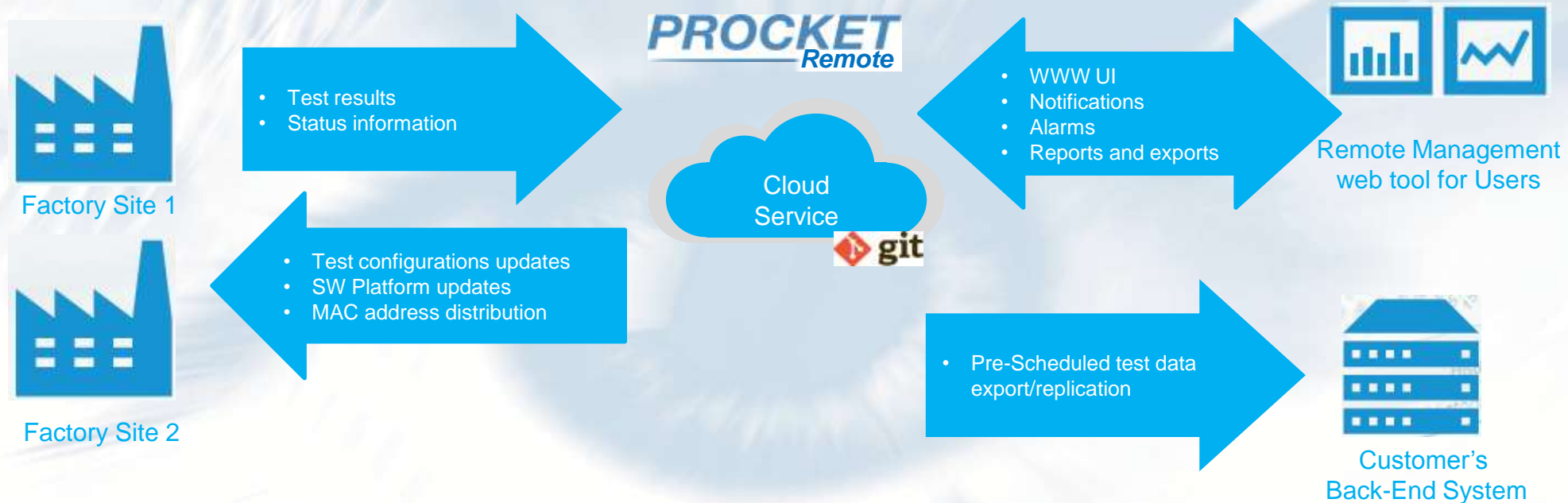
COST SAVINGS

Motivation for test system remote management



- **shortening the reaction time of problems** raised during production testing
- **reducing costs of production sites visits** due to easier remote access to test stations via Internet
- **reducing manual work** of analyzing, refinement and reporting of test results
- **simpler setup of network access** to remote production sites (factories)
- **reduce impact of network connection outages** and problems in remote production sites

Procket Remote Management System



Main benefits of Procket Remote:

- Enables **version control** for tester configuration files (test sequences, test limits and other configuration files) in a field
- Provides remote **access to test results**
- Gives executive summary of the **test systems status**

Espotel - Solutions for testing

Services and Processes

- Design for Testing (DfT) consultancy
- Automated R&D testing
- Production Test Specifications
- Test System Design
- Test System Manufacturing
- New product Introduction (NPI)
- Training and Certification of Operators
- Statistical Process Control (SPC)
- Test System Remote Maintenance

PROCKET
Automated Test Solutions

Technology Partners



Resources

- 60+ Testing Professionals
- From staffing to turn-key projects
- HW Designers, SW Designers, MECH Designers
- Test Engineers and Project Managers
- Certified developers for NI LabVIEW and TestStand
- Boundary Scan know-how and tools
- Six Sigma know-how
- Wide partner network



Thank You!

Tero Leppänen

tero.leppanen@espotel.com