



VIP
2017

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Siemens Healthineers, CV Medical Electronics

Transfer from development to production of a PXI based Test System in the NPI process for medical electronics

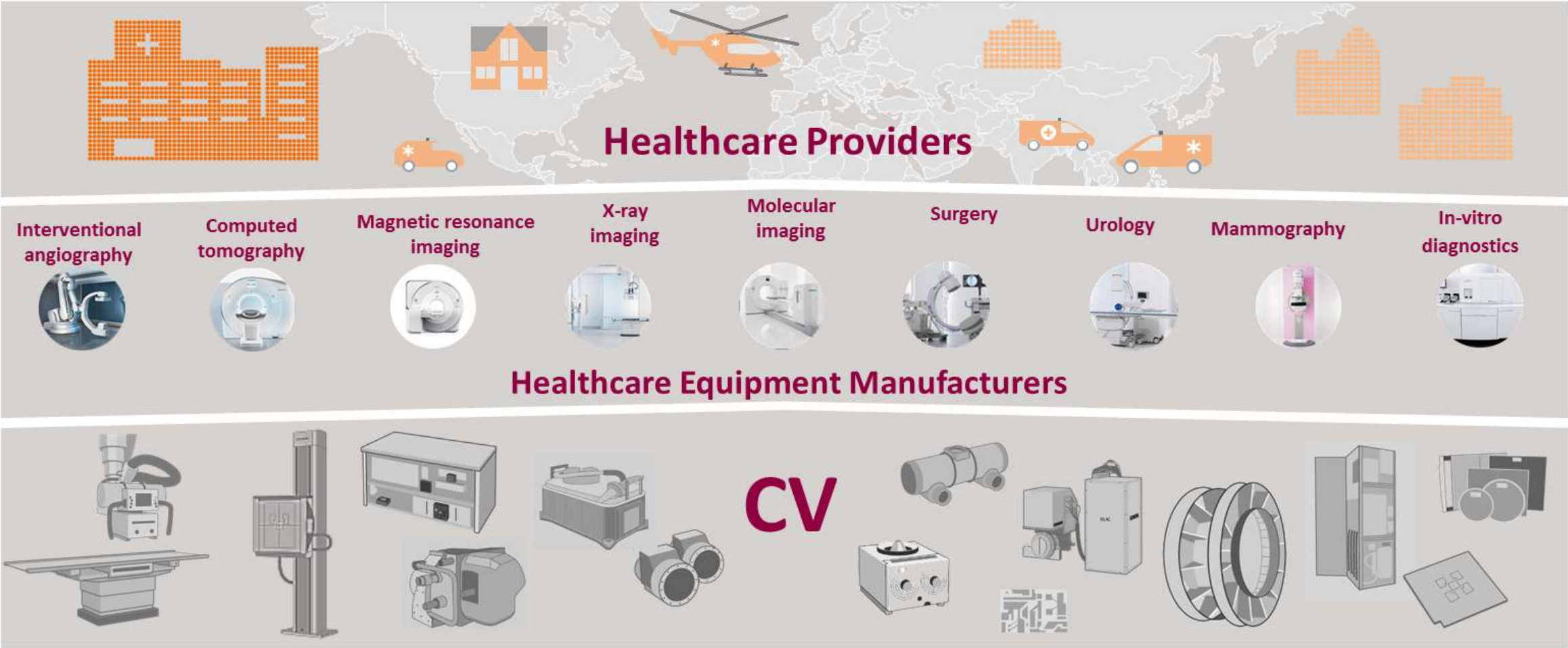
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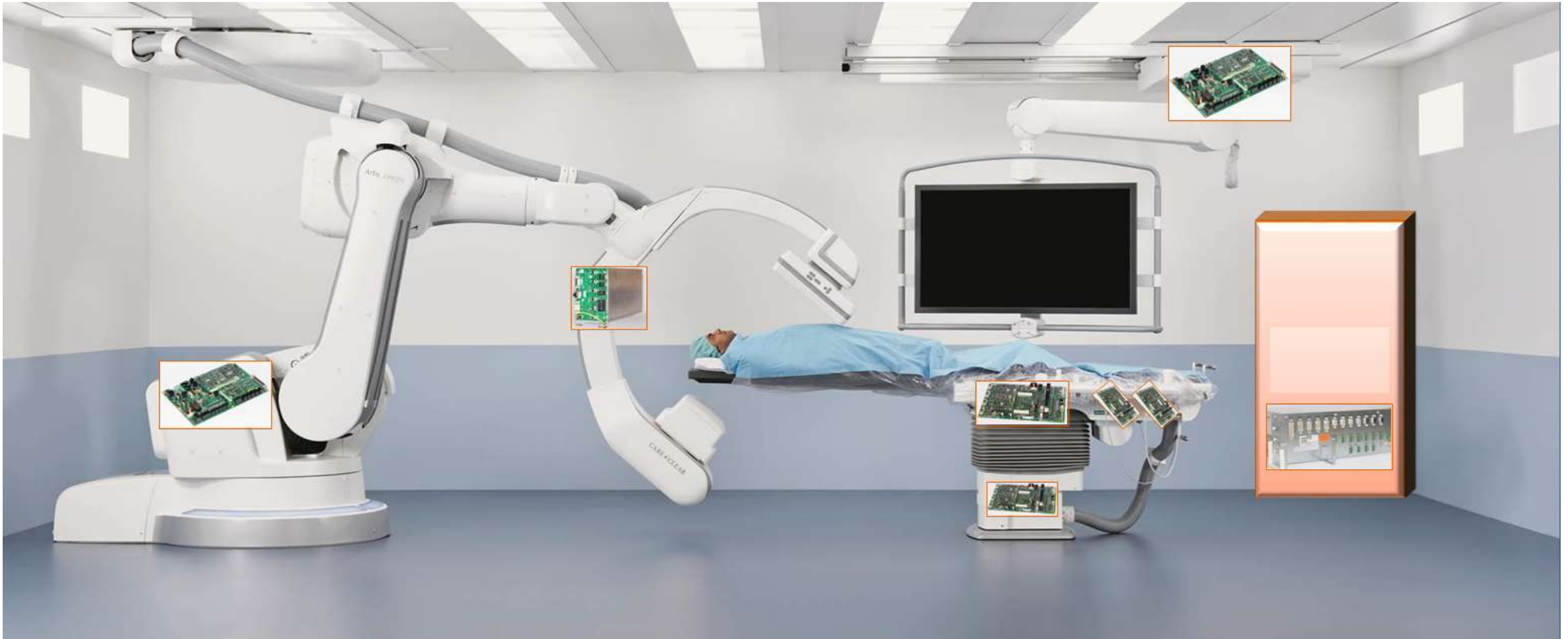


Siemens Healthineers – Components and Vacuum technologies



Challenge – Product Artis Pheno

Deliver eight components with high quality in a short time



Introduction of solution strategy

Hardware

Standard Components supplied by:

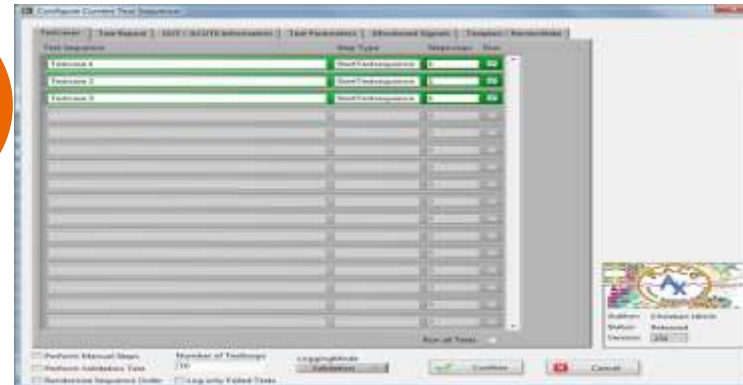
- National Instruments
- Siemens Industry PC
- PS Keysight
- IRS Systemlösungen
- VPC



Software

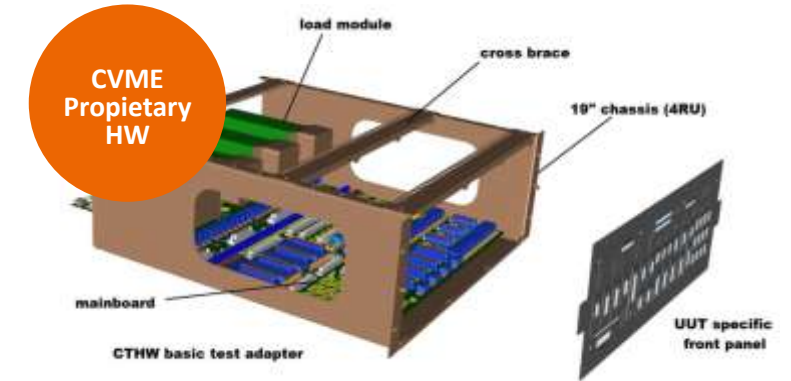
Standard Modules supplied by:

- Microsoft
- National Instruments: TS, LV



Additional non-standard Modules

- Additional hardware like CTHW_Mainboard is used to interconnect the signals and simplify the adapters
- Extra Software modules are always run by LabVIEW via dll or command line



Challenge II

Transfer four Test Systems from R&D to one merged system in production

In/Output Box



Controller Board



Sensor Interface



User Interface Board



Test System description

IPC

Siemens Industry PC

PXI-Chasis

Same HW as test system R&D
ACUTE CTHW

CTHW-Mainboard

Common Test Hardware

Simatic S7 + Ethernet Switch

ProfiNet Interface



UPS

PDU

Power Distribution Unit (IRS)

SwitchRack

Power supplies switches and
multiplexer for CTHW-Mainboard

VPC 9025-TR Interface

Dock the test fixture

2x Power Supply

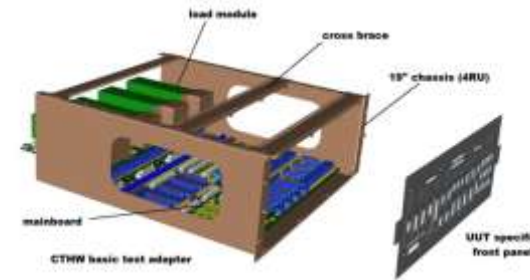
24V 8.5A

Test System comparison

Test System R&D
ACUTE



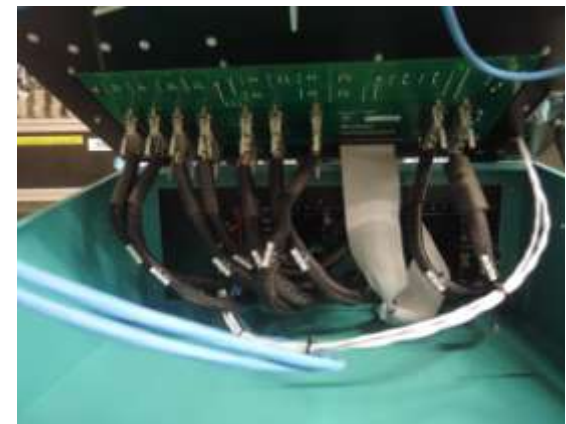
Test System Production
PXI-Subassembly



Product Adapter for
Control Board



Inside Adapter



Achievements – Reduce time from R&D to production

- **Approach: First R&D then production**

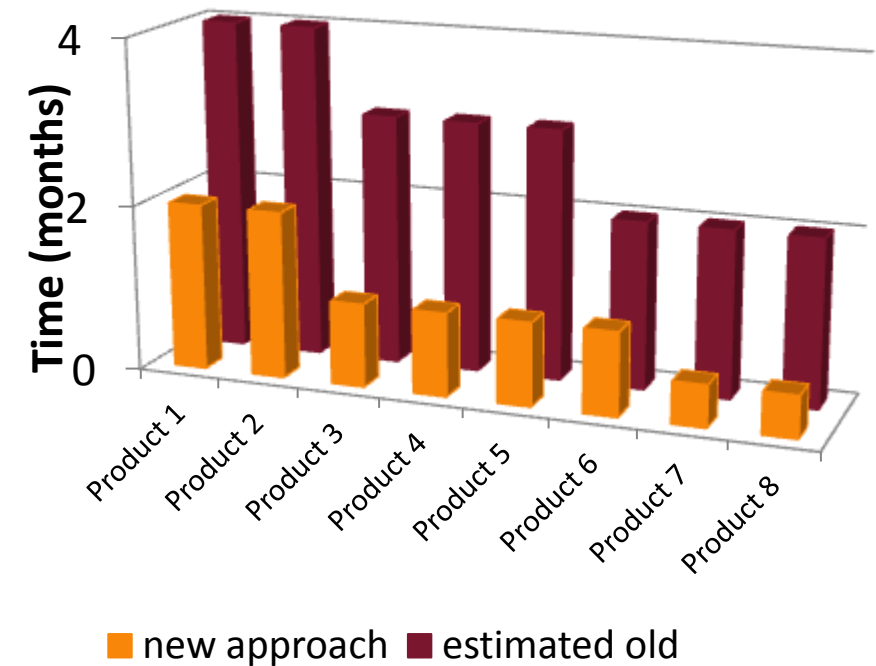
Duration: approx. 3 months for each product (8 products)

Total duration: 24 Months

- **New approach: R&D plan together with production (DevOps)**

Duration: approx. 5 months x 2 persons

Total duration: 10 Months



Achievements – Reduce cost reducing tests time

Lean production:

- Parallelize programming with test sequence
- Organize workers time more efficiently



Examples product test program execution time:

Product	Old Test program (min)	New Test program (min)
Control Board	17	10
Sensor Interface	27	6
In Out Box	60	20



Lessons learn and next steps



Early integration of all stakeholders in the project

Invite to kick off meetings test team



Standard HW shall be kept as standard



Common Sequences should be kept "common" and be re-used

Avoid to redesign again the same functionalities



SW modules need to integrate improvements for new releases



Improve the transfer of the test sequences

Added flags for different levels or types of tests



Generate efficient test reports

Less redundant information to reduce the storage space



Dedicated comments in test report to improve the reparability



Exchange

Present and communicate the experience to other client /areas to continue improving together

Factors for the success



Team work
Between same group and interdisciplinary



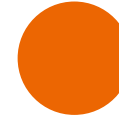
Expertise in team
HW-IRS, Test Stand and LabVIEW knowledge



Open culture for errors
Problems are reported quickly and solutions are proposed



Agile transfer of products
Regular feedback of steps achieved



Coding style guide for VIs and sequences



Stable test sequences
Reuse of sequences



Introduce version control



Common language – HW and SW
Same HW as ACUTE R&D Test System

Acknowledgments

Thanks to the team!

Thanks for your attention!

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Christian Ulrich

Engineering success.
Pioneering healthcare.

Together.



**VIP
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Test Standardization and Strategies

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