

Software is key – new perspectives for product design and production in aerospace

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Exploring remote worlds with help of PLM Software: NASA JPL partners with Siemens to get to Mars



NX CAD



Complete
3D digital
product
design

- Design in context of full assembly
- Parts fit together first time
- Automate manual tasks

- Shortens development time
- Optimizes configuration
- Avoid costly rework

NX CAE & NX CAM

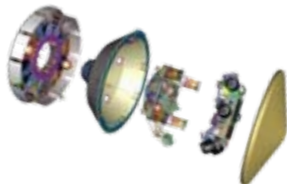


Integrated
simulation,
analysis &
manufac-
turing

- Concurrent engineering
- Detect / correct problems in digital model
- Re-use simulation models

- Dramatically reduces analysis time
- Reduce expensive physical prototypes
- Perform more analysis under tighter delivery schedule

Teamcenter

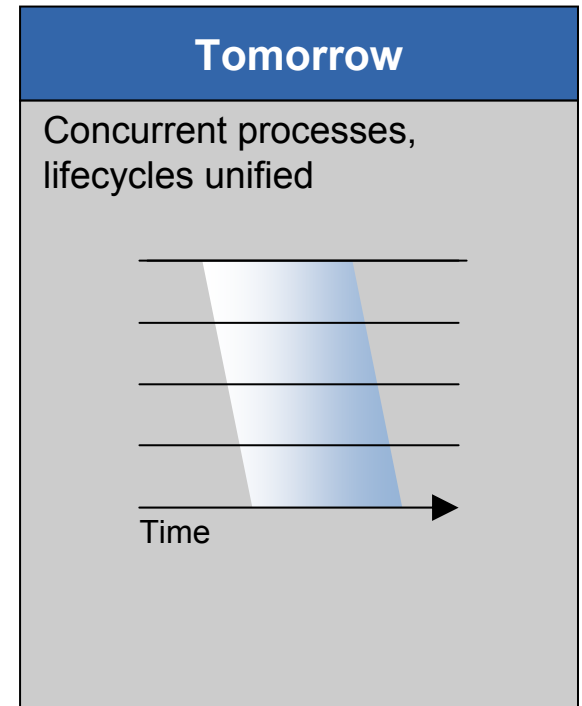
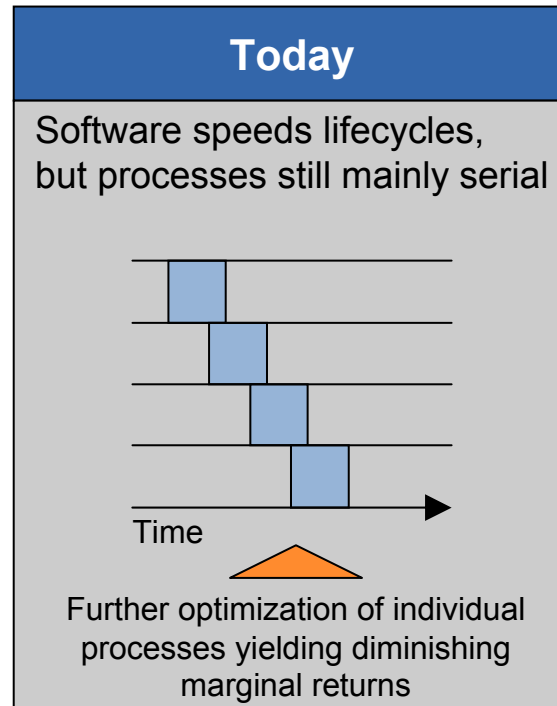
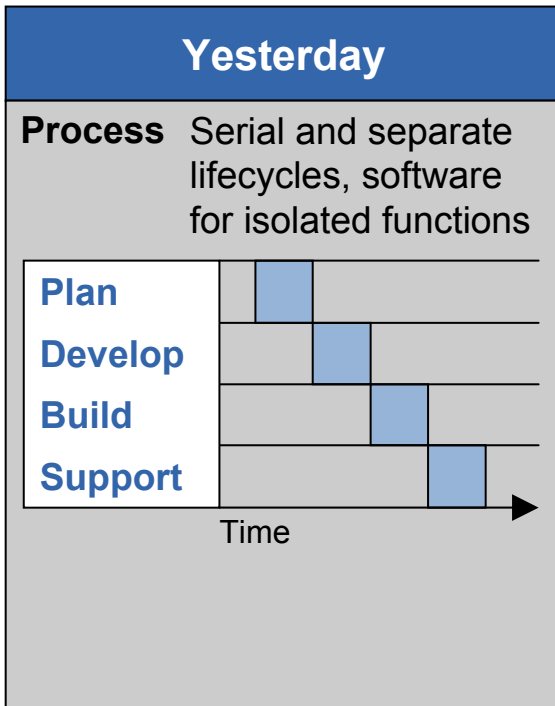
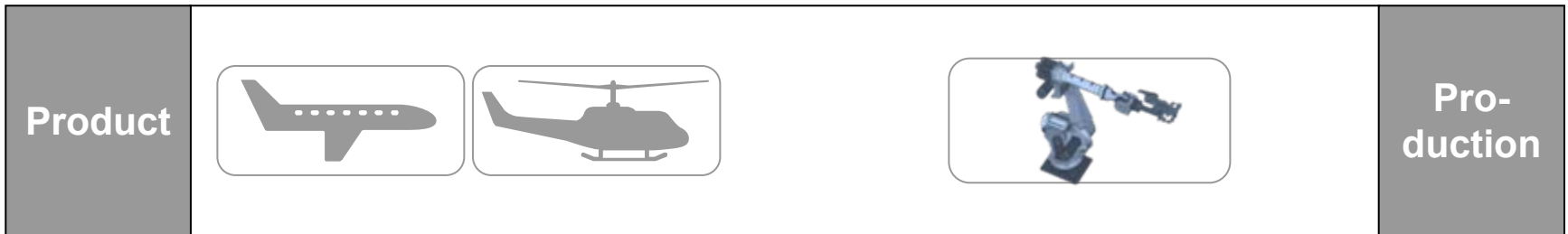


Full lifecycle
data ma-
nagement

- Always working with current accurate data
- Reduced development time
- Higher confidence in final results

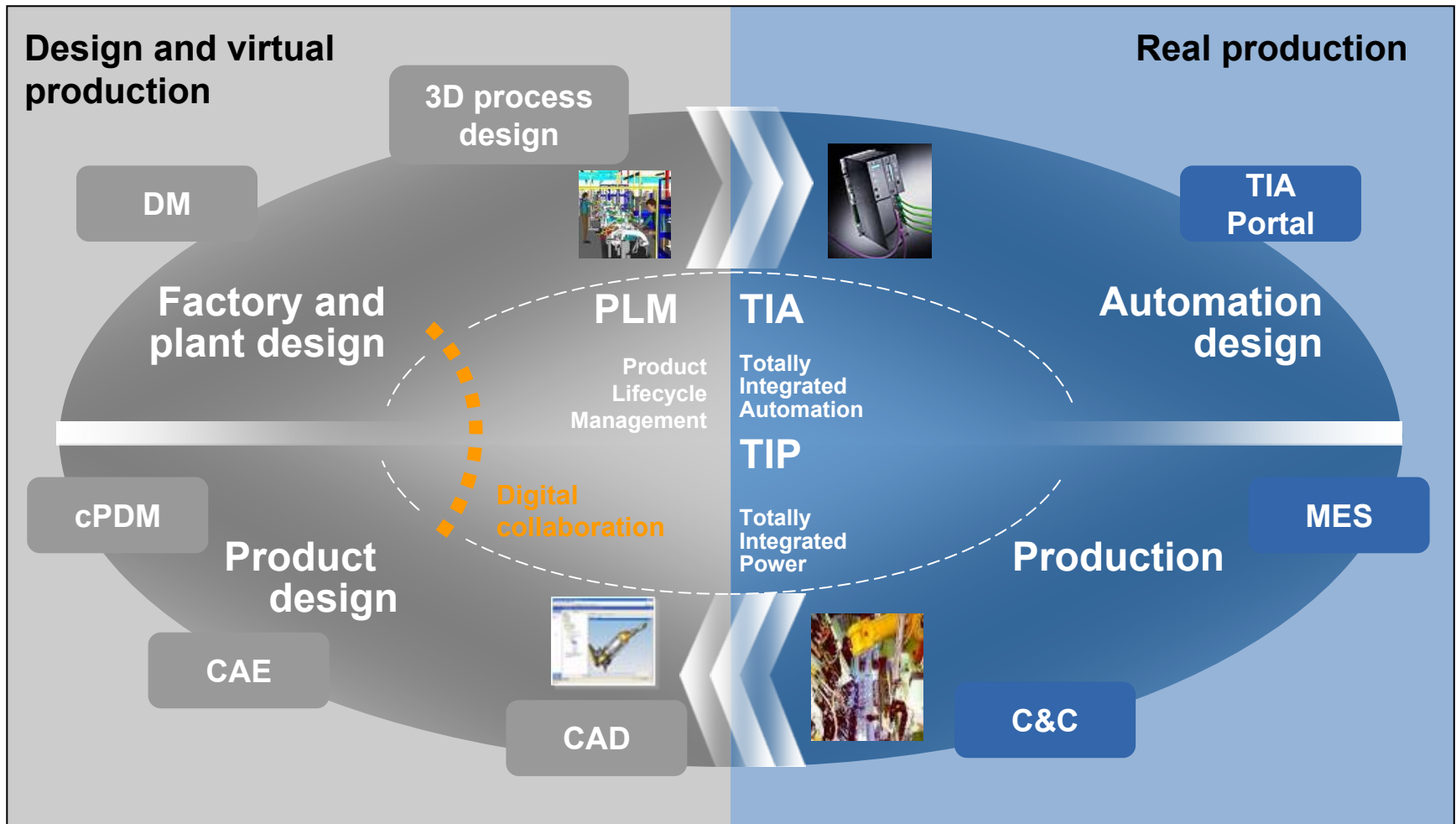
- Re-use of designs or design features: entire MSL model in managed database
- Improved efficiency, configuration mgt. and knowledge retention

Through the use of software, product and production planning will run in parallel in the future



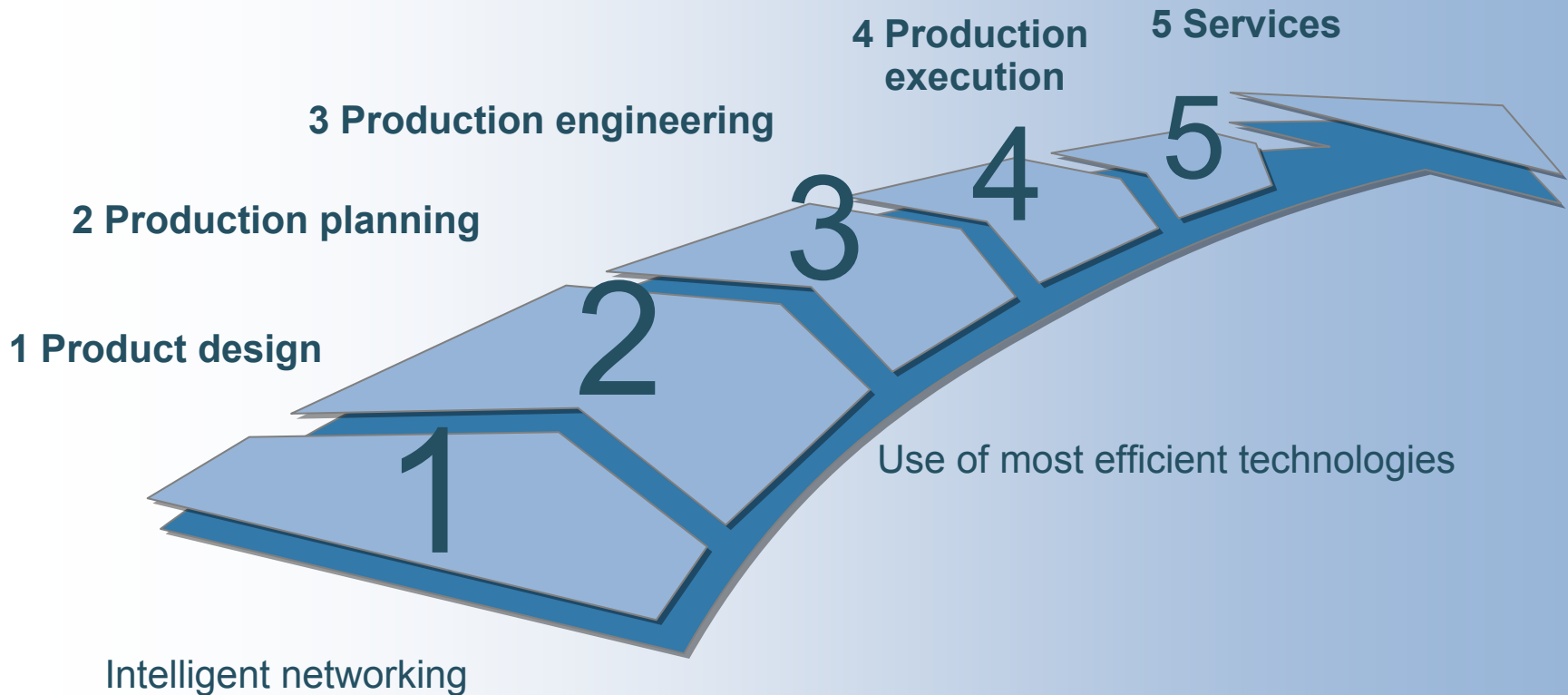
Paradigm shift through PLM software: Real and digital worlds of production are converging

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A holistic view of the entire production process all along the value chain ...

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... increases productivity and efficiency in the individual process steps

Siemens offers technologies for the entire production process in the aerospace industry

PLM solutions



- CAD / CAM / CAE
- PLM to shopfloor
- Digital manufact.

IT for manufacturing



- Downtime monitoring
- Energy mgmt.

Products & systems, sol.



- Factory automation
- Process control

Process applications



- Paint shops
- Surface- / heat treatment

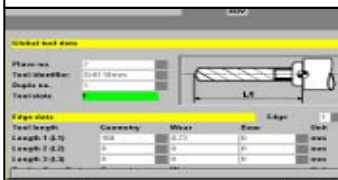
Assembly



- Fuselage shells
- Panels, wing

19 of the 20 leading aerospace companies work with Siemens

IT for shopfloor



- Motion control information
- Virtual production

Special technology



- Laser drilling
- Riveting

Machining



- Grinding
- Turn milling
- Water jet cutting

Handling jigs & tools



- Wing / wing panels, structures
- Stringers

Customer services



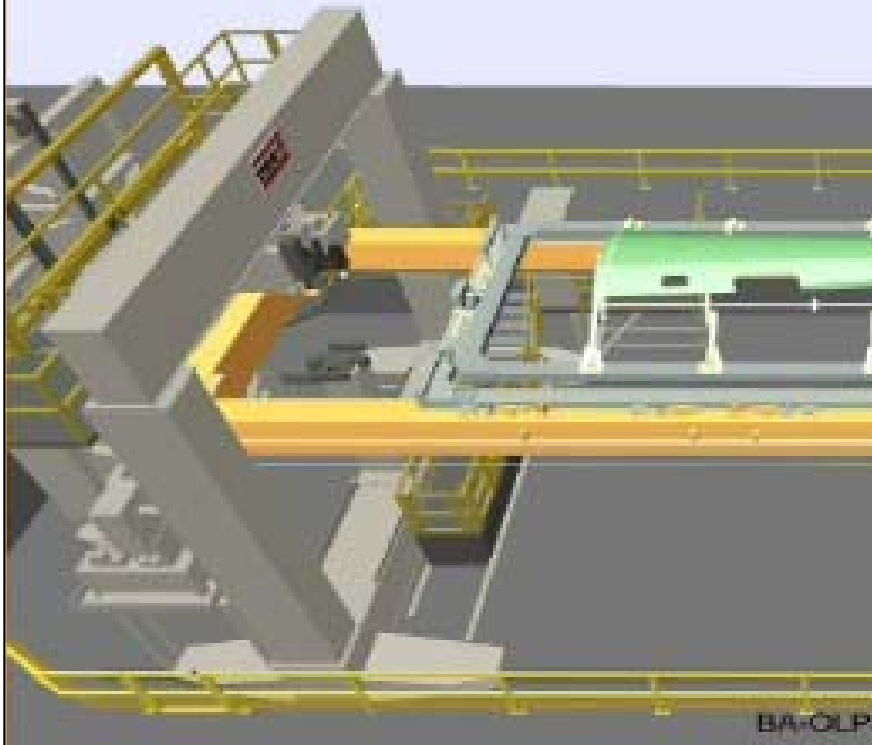
- Maintenance
- Plant modernization and extension

Broetje riveters with Siemens controls lower costs, increase quality and shorten schedules at Boeing

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Multi-axis riveters for automating process of building fuselage panes assemblies for C-17 airlifter

Each riveter with 4 Siemens Sinumerik controllers to manage a total of 77 servo axes

Combined efficiencies realized 50% time reduction to develop machine programs

On-site training at the Broetje riveters eased transition for Boeing technicians

BA-OLPS IPAC & SINUMERIK M5 © 2005 Brötje Automation GmbH

Latest drilling & fastening technology increases production flexibility and performance at Airbus

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Robot Assembly Cells with Sinumerik controls, PC panels and HMI software from Siemens

High accuracy drilling & fastening system based on standard 6 axes robot controlled by Sinumerik

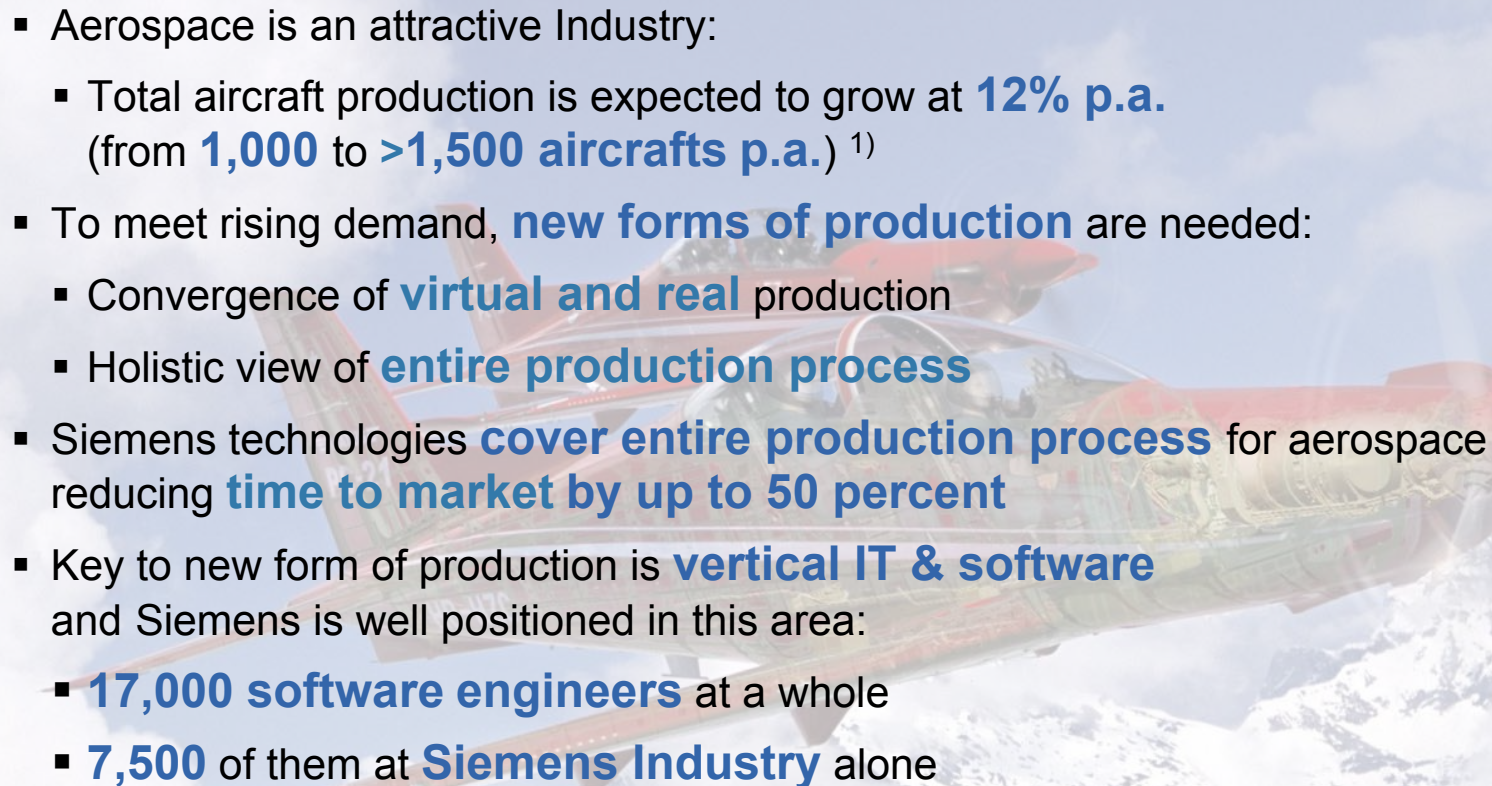
High flexibility and modularity due to expandable number of robots leads to an output of 52 shells/mth

Fully offline programmable solution using virtual machine to allow fast, safe and reliable machine set-up

Siemens is technology partner for primes, 1st and 2nd tier suppliers

Only Siemens has such a wide-ranging expertise in automation technology and industrial software

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- Aerospace is an attractive Industry:
 - Total aircraft production is expected to grow at **12% p.a.** (from **1,000** to **>1,500 aircrafts p.a.**) ¹⁾
 - To meet rising demand, **new forms of production** are needed:
 - Convergence of **virtual and real** production
 - Holistic view of **entire production process**
 - Siemens technologies **cover entire production process** for aerospace reducing **time to market by up to 50 percent**
 - Key to new form of production is **vertical IT & software** and Siemens is well positioned in this area:
 - **17,000 software engineers** at a whole
 - **7,500** of them at **Siemens Industry** alone

1) Source: Pricewaterhouse Coopers / Global Insight

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Thank you!



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