



Pilot Use Case inside Change2Twin Activity

Dr. Benjamin Braun Summit Industrie 4.0, 10.12.2020



P Products Low CME LOW CTE lightweight Reliability ECSS Requirement ace System Engineering Specification Launcher Interface Fracture Control Engineering Services Space equipment modelling Shock Sine Vibration Thermo-elastic NASTRAN Transient Analysis Random Vibration FEM Modal Analysis Fatigue Structure Analysis Stability Optimisation Global spacecraft modelling Finite Element Method Model Correlation Composite Materials Acoustic Noise Pressure Spectrum VA One® BEM Acoustic Analysis Power Spectral Density Boundary Element Method RMS Thermal-vacuum HERMICA Thermal Analys Steady state ESATAN-TMS® Transient sert VDI 2230 ECSS-E-HB-32-23A Analysis Software SpaceBolt M NASA-STD-5020 Threaded Fasteners Space Products Transport Container Panel Support Lifting Devic Cosine effect Integration Stand Sensor Systems Coarse Sun Sensor lightweight Electrical conductivity Custom designs Harness Brackets **CFRP** Products LOW CME DoubleZero™ ISO 9001



SpaceStrut

All CFRP solution



Company





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Products





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Change2Twin – Pilot Use Case



Bringing Digital Twins to Manufacturing SMEs





Change2Twin – Assessment Workshop

Outcome

Compass tool summary

("Kompas")

ARE DIGITAL TWINS THE INNOVATION YOU NEED?

- Yes, Change2Twin 7-steps tool
- No, focus on business needs and broad digitalization topics







The WHY – Process Identification



NOTE For SPS manufacturing is only one step of many product realization steps AND batch size is typically <10

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The WHY – Digital Twin Related Purpose



PURPOSE

Increase the interaction of and enhance the data associated with digital twins to support e.g. virtual testing and root cause analysis in case of anomalies

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The WHY – Application Topics and Solution Providers

- Data Exchange
- Data Storage and Archiving
- Enrichment of the Digital Twin with Test Data (wrt standardization)



 Product Manufacturing Information & LPBF Metal Production



- Enrichment of the Digital Twin with Test Data: Photogrammetry / Digital Image Correlation
- TNO

 Data interoperability of 3D models with complex geometries



- Computing power on demand
- Cloud solutions







Asset selection – PLM and openSimDM software



MAIN IMPACT

- Availability and exchange of data regardless of hardware and software system used
- Accessible and secure storage during product life and beyond

Test preparation - Gage & Test Definition









Infrastructure/Twin Building – Enrichment of the digital twin with test data

Example workflow for 3D image acquisition and camera & robot calibration-to-standards © TNO



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PLANNED STEPS

- Feasibility study
- Identification of ٠ resolution needs versus sensor capability





Initialise full software tools and cloud-computing environment

Execute product development loop (",pilot")

Validate

🗢 Test

Monitor KPIs

Act upon information provided

Maintain the digital twin environment

• Evaluate pilot experience, solution provider offerings and marketplace





Thank you & the whole Change2Twin team!

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