

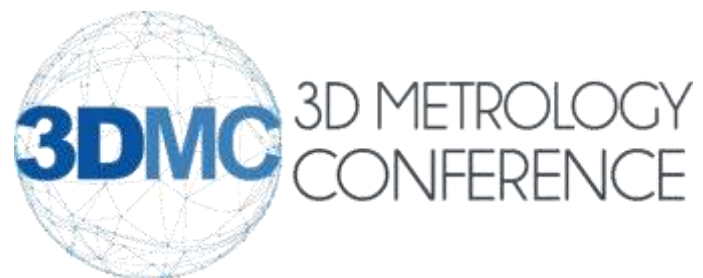


Large-Volume Metrology in Series Applications

Technical Overview of FFT-VisionVIEW

Alexander Schönberg, Aachen, 17. November 2022

Alexander.Schoenberg@fft.de



one step ahead in **INTELLIGENT** production systems

Company Introduction

Large-Volume Metrology in Series Applications – FFT-VisionVIEW



- Founded 1974
- Turnover 670 Mio.€
- Employees* 2811 (in 2021)
- Sectors Automotive, aerospace and other
- Features Turn-Key Partnership, System solutions/modules, Engineering, Future technologies, After-Sales-Service
- Role Global supplier of innovative, flexible and highly complex manufacturing systems

Technical Introduction

Large-Volume Metrology in Series Applications – FFT-VisionVIEW





Agenda

Large-Volume Metrology in Series Applications – FFT-VisionVIEW

1

FFT-VisionVIEW

Company introduction and Technical Overview

2

Large-Volume Metrology Integration

Software and Interfaces

3

Engineering / Setting-In Procedures

Messplan Simulation, Testing Programs, Parameter Adjustment, Acceptance Criteria

4

Series Applications / Sensor Lineup

Project Overview and Feasibility Studies

5

Conclusion and Outlook

Lessons-Learned and Development Topics



Agenda

Large-Volume Metrology in Series Applications – FFT-VisionVIEW

1

FFT-VisionVIEW

Company introduction and Technical Overview

2

Large-Volume Metrology Integration

Software and Interfaces

3

Engineering / Setting-In Procedures

Messplan Simulation, Testing Programs, Parameter Adjustment, Acceptance Criteria

4

Series Applications / Sensor Lineup

Project Overview and Feasibility Studies

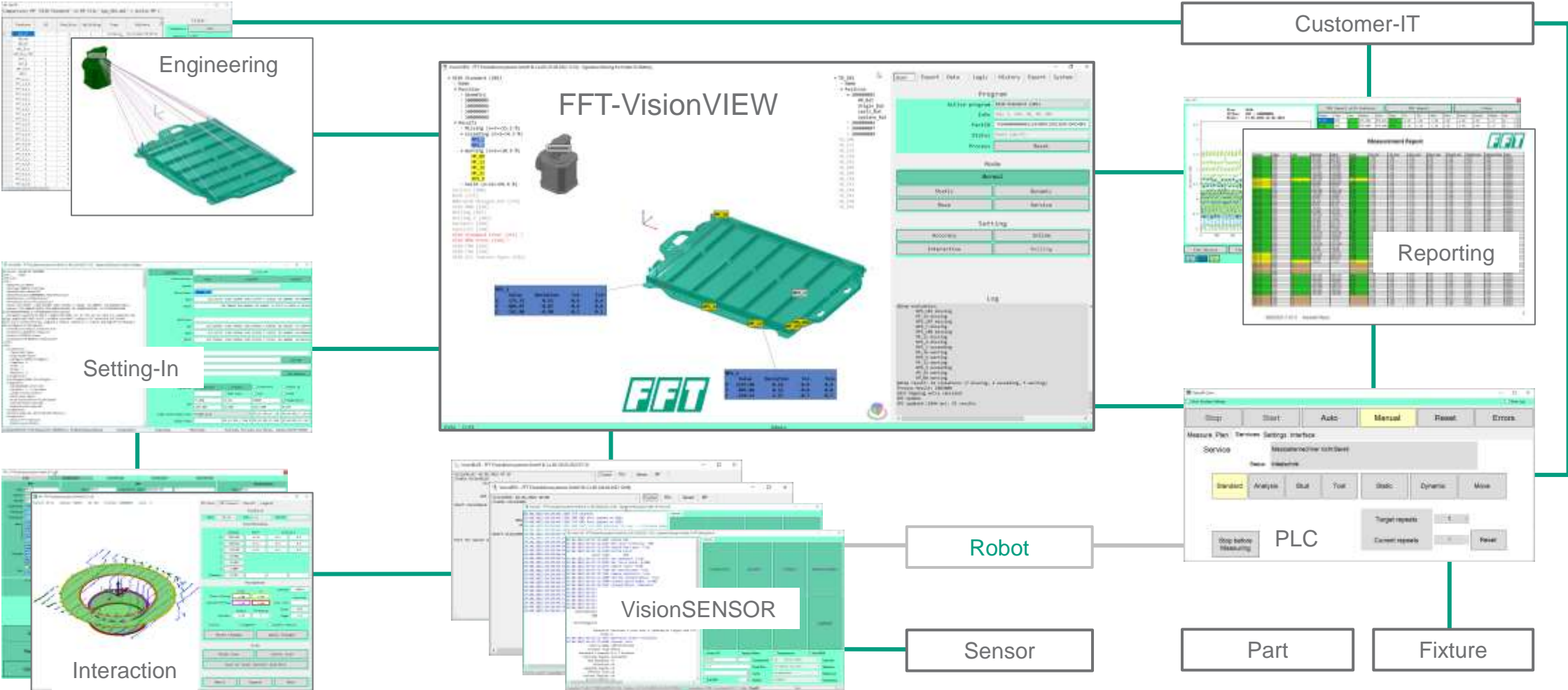
5

Conclusion and Outlook

Lessons-Learned and Development Topics

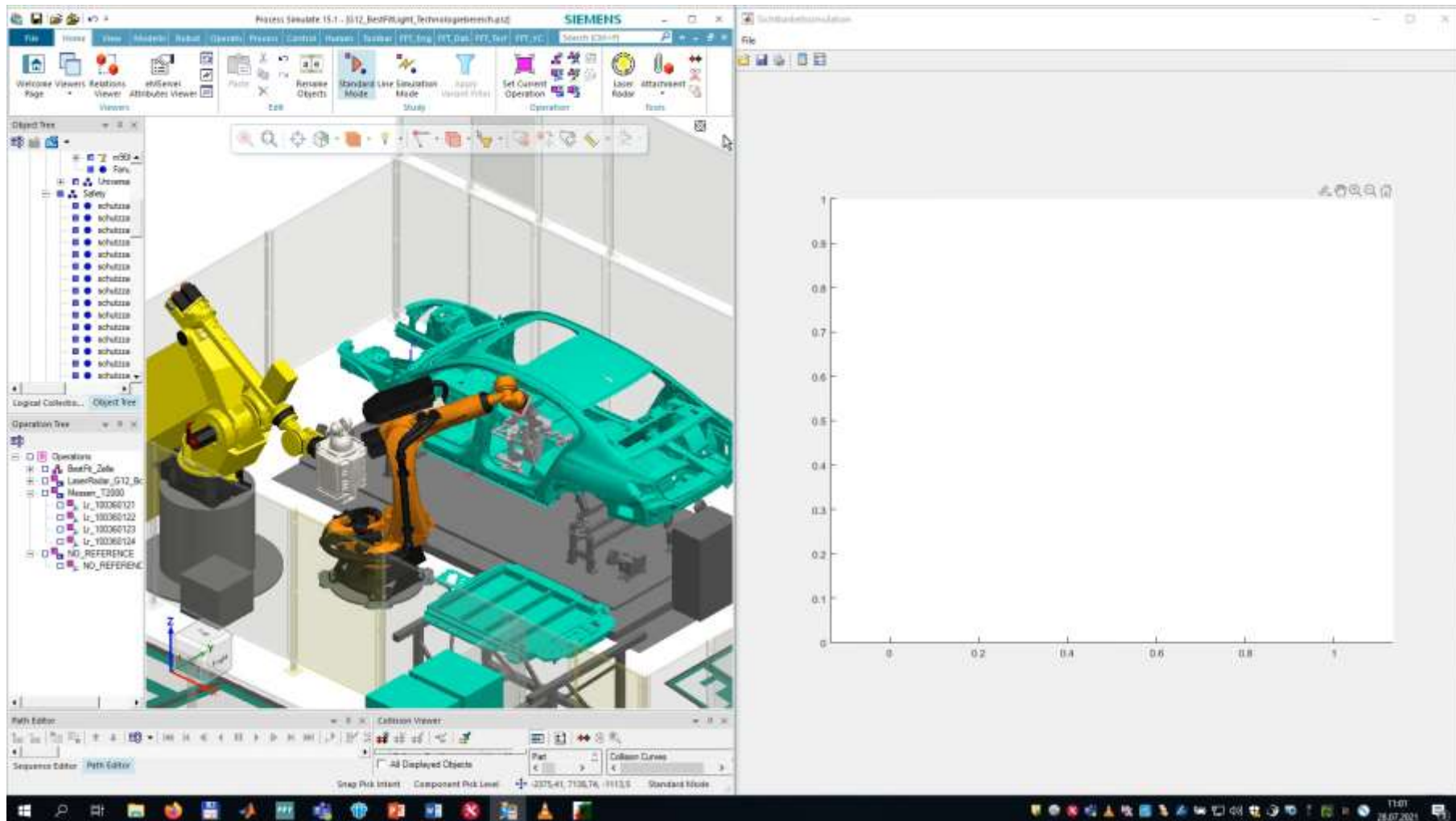
Software and Interfaces

Large-Volume Metrology in Series Applications – FFT-VisionVIEW



Engineering Procedures

Large-Volume Metrology in Series Applications – FFT-VisionVIEW



Setting-In Procedures

Large-Volume Metrology in Series Applications – FFT-VisionVIEW

The screenshot displays the VisionVIEW software interface. On the left, a 3D model of a green PCB is shown with various features labeled, including circles (Kreis), rectangles (Rechteck), and a long slot (Langloch). A blue arrow points to the 'Origin' of the coordinate system. On the right, a control panel is visible with the following sections:

- Program:** Active program: API Artefakt (200). Info: Typ: 1, Ich: 96, ID: 290. PartID: API Test. Status: Stopp (14:18). Process: Reset.
- Mode:** Normal (selected), Static, Dynamic, Move, Service.
- Setting:** Accuracy: Inline, Interactive (selected), Rolling.
- Log:**

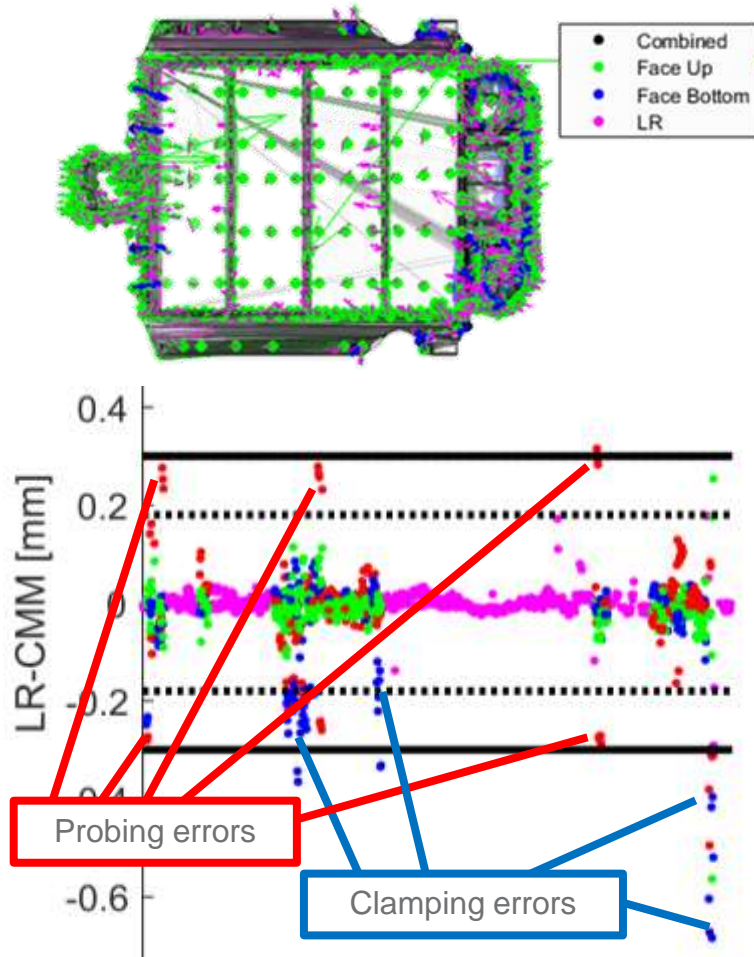
```

DFF folder missing: D:\API_VisionVIEW_Tester\DFF
Load Mapping
Level: user
Load Mapping: 2 entries
Load Mapping finished: 0.62s
Reset: active 'API Artefakt (Typ: 1, Ich: 96, ID: 290)'
Clear Result
Load PLY: D:\API_VisionVIEW_Tester\PLY\ply_2001.ply
Show PLY
Show PLY finished: 0.02s
Load Sensor: D:\API_VisionVIEW_Tester\PLY\PLM.ply
Load Sensor: D:\API_VisionVIEW_Tester\PLY\Generic.ply
Load Sensor: D:\API_VisionVIEW_Tester\PLY\VID.ply
Show Sensors
CLR reset valid
CLR Reset finished
CLR closed
Clear Result
No files to export
Manual reset: True

```


Setting-In Procedures

Large-Volume Metrology in Series Applications – FFT-VisionVIEW



- Optimization is performed Online / Offline
 - Interactive Parameterization with Presetting
 - Automated Report Generation for multiple cycles
- Acceptance Tests
 - Repeatability aim < 0.2 mm geo / 0.3 mm studs
 - Tolerance range TOL (Minimum Test TOL_{min} > ±0.4 mm due to shopfloor / MSA1)
 - Dynamic 50 cycles Alignment < 0.1 mm (Fixture stability)
95% of surfaces < 15% TOL+0.2 mm
 - Static 25 cycles 98% of features < 15% TOL
 - Move 5 x 8 shifts (2 mm) 98% of features < 15% TOL+0.4 mm
0,+X,-X,+Y,-Y,+Z,-Z,0
 - MSA3 6 types x 5 cycles 98% of features < 20% TOL
 - Correlation Shopfloor / CMM 98% of features < 20% TOL
93% of features < 30% TOL

→ Correlation example: Battery (902 features, discussion result)



Agenda

Large-Volume Metrology in Series Applications – FFT-VisionVIEW

1

FFT-VisionVIEW

Company introduction and Technical Overview

2

Large-Volume Metrology Integration

Software and Interfaces

3

Engineering / Setting-In Procedures

Messplan Simulation, Testing Programs, Parameter Adjustment, Acceptance Criteria

4

Series Applications / Sensor Lineup

Project Overview and Feasibility Studies

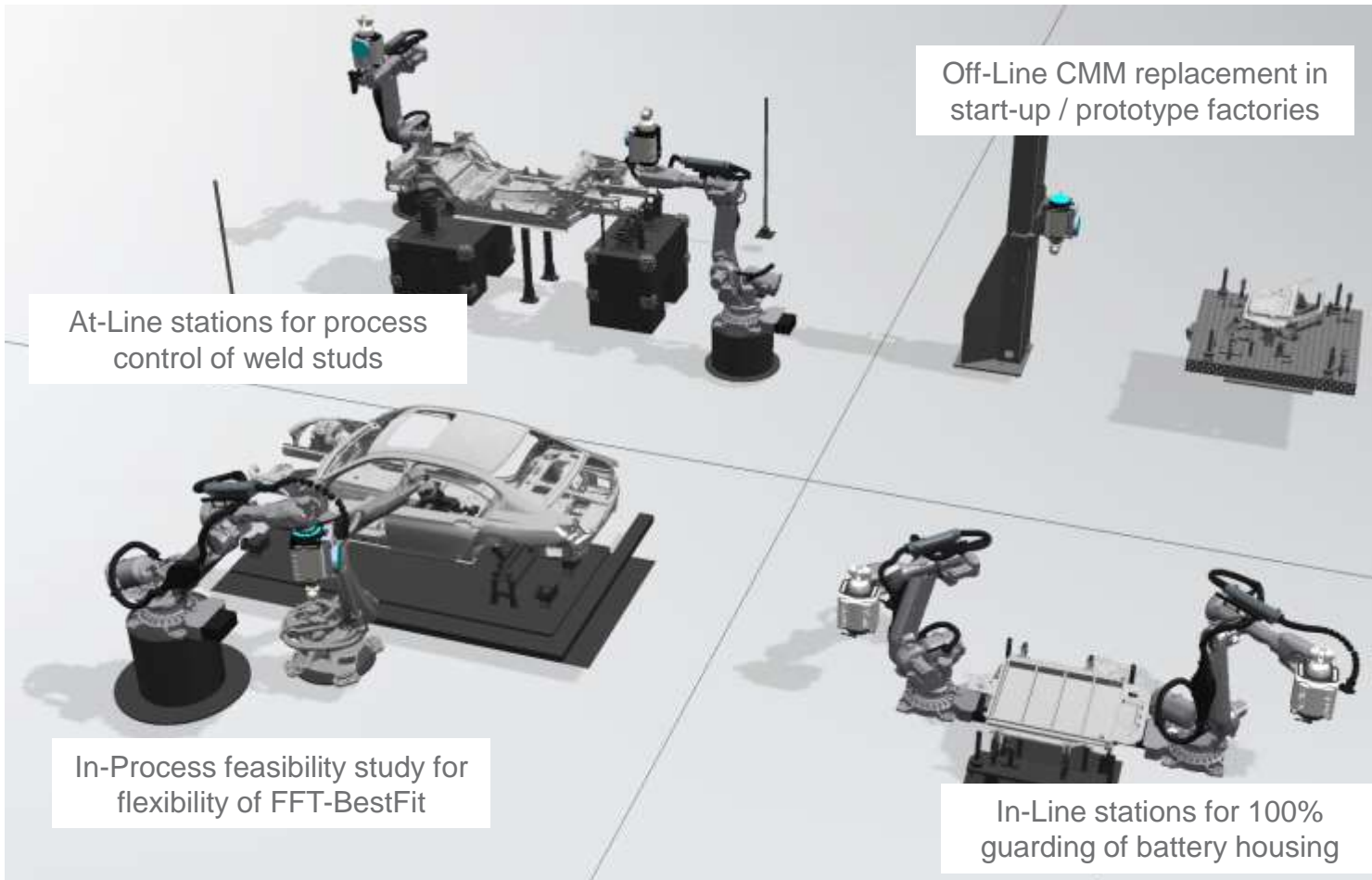
5

Conclusion and Outlook

Lessons-Learned and Development Topics

Series Applications and Sensor Lineup

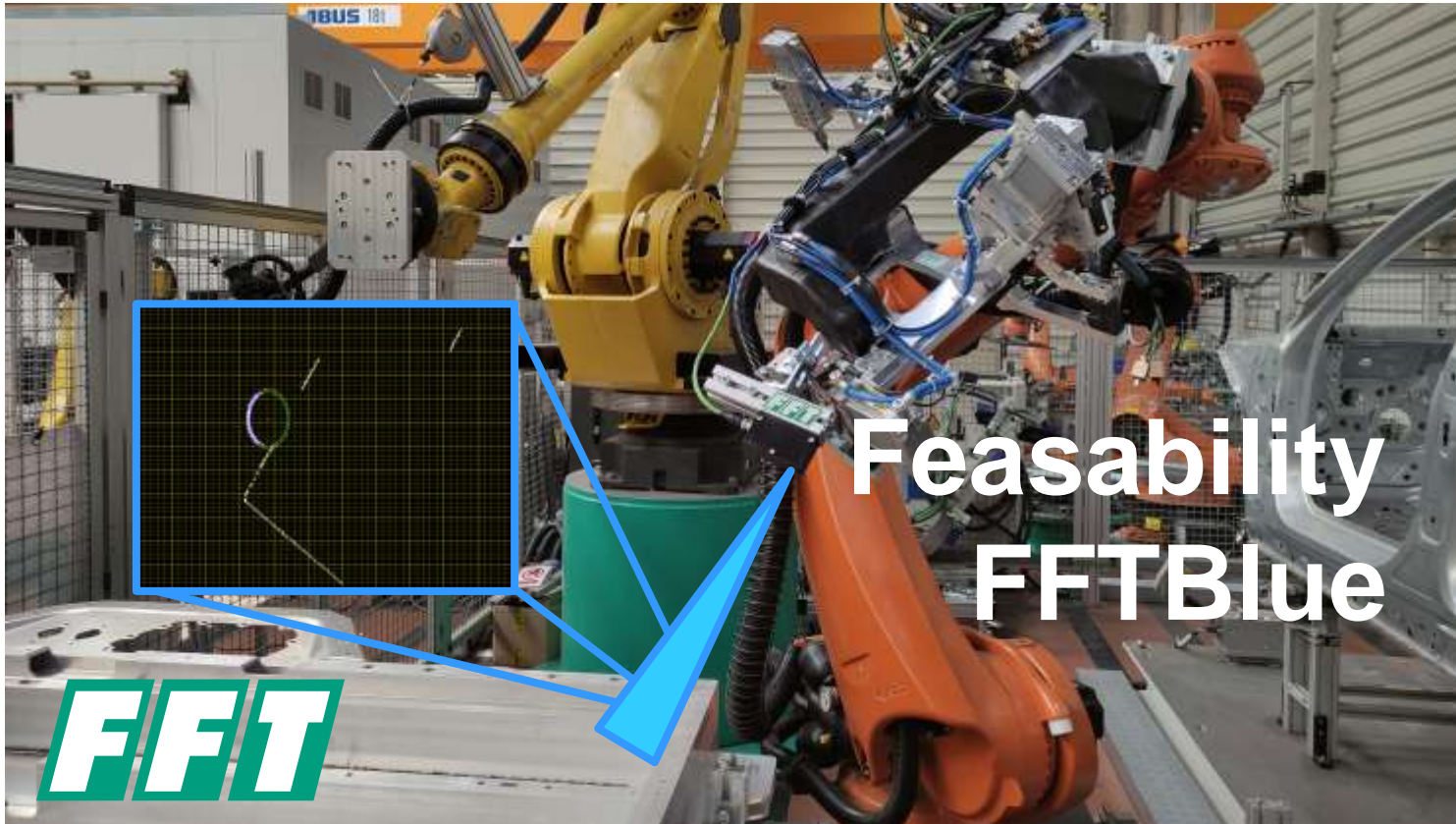
Large-Volume Metrology in Series Applications – FFT-VisionVIEW



- **Nikon Metrology MV33X-HS**
 - Overall, 27 systems implemented
 - 8 sensors with software gen.1
 - 7 sensors with FFT-VisionVIEW
- **Nikon Metrology APDIS**
 - 3 sensors in commissioning
- **Light Section Sensors**
 - Inhouse-sensor and robot interface to enable a cost-efficient non-traceable solution
- **Hexagon AS1 (with AT960)**
 - (Traceable,) high-density scanning capability / open parts
- **API DYNAMIC 9D LADAR**
 - Sensor with high data rate, new capabilities, integration benefits

Series Applications and Sensor Lineup

Large-Volume Metrology in Series Applications – FFT-VisionVIEW



- Nikon Metrology MV33X-HS
 - Overall, 27 systems implemented
 - 8 sensors with software gen.1
 - 7 sensors with FFT-VisionVIEW
- Nikon Metrology APDIS
 - 3 sensors in commissioning
- **Light Section Sensors**
 - **Inhouse-sensor and robot interface to enable a cost-efficient non-traceable solution**
- Hexagon AS1 (with AT960)
 - (Traceable,) high-density scanning capability / open parts
- API DYNAMIC 9D LADAR
 - Sensor with high data rate, new capabilities, integration benefits

Series Applications and Sensor Lineup

Large-Volume Metrology in Series Applications – FFT-VisionVIEW



- Nikon Metrology MV33X-HS
 - Overall, 27 systems implemented
 - 8 sensors with software gen.1
 - 7 sensors with FFT-VisionVIEW
- Nikon Metrology APDIS
 - 3 sensors in commissioning
- Light Section Sensors
 - Inhouse-sensor and robot interface to enable a cost-efficient non-traceable solution
- **Hexagon AS1 (with AT960)**
 - (Traceable,) high-density scanning capability / open parts
- API DYNAMIC 9D LADAR
 - Sensor with high data rate, new capabilities, integration benefits

Series Applications and Sensor Lineup

Large-Volume Metrology in Series Applications – FFT-VisionVIEW



- Nikon Metrology MV33X-HS
 - Overall, 27 systems implemented
 - 8 sensors with software gen.1
 - 7 sensors with FFT-VisionVIEW
- Nikon Metrology APDIS
 - 3 sensors in commissioning
- Light Section Sensors
 - Inhouse-sensor and robot interface to enable a cost-efficient non-traceable solution
- Hexagon AS1 (with AT960)
 - (Traceable,) high-density scanning capability for open parts
- **API DYNAMIC 9D LADAR**
 - **Sensor with high data rate, new capabilities, integration benefits**

Conclusion and Outlook

Large-Volume Metrology in Series Applications – FFT-VisionVIEW



- FFT successfully integrates large-volume metrology in series applications
- Feasibility studies open new sensor options
- Key aspects for developing FFT-VisionVIEW
 - Engineering and Setting-In largest cost-driver for external solutions
 - Universal approaches are less flexible to adopt to shopfloor requirements

More questions? → Alexander.Schoenberg@fft.de