prostep ivip
VDA Recommendation

3D Measurement Data Management
with I++ DMS
Version 2.1
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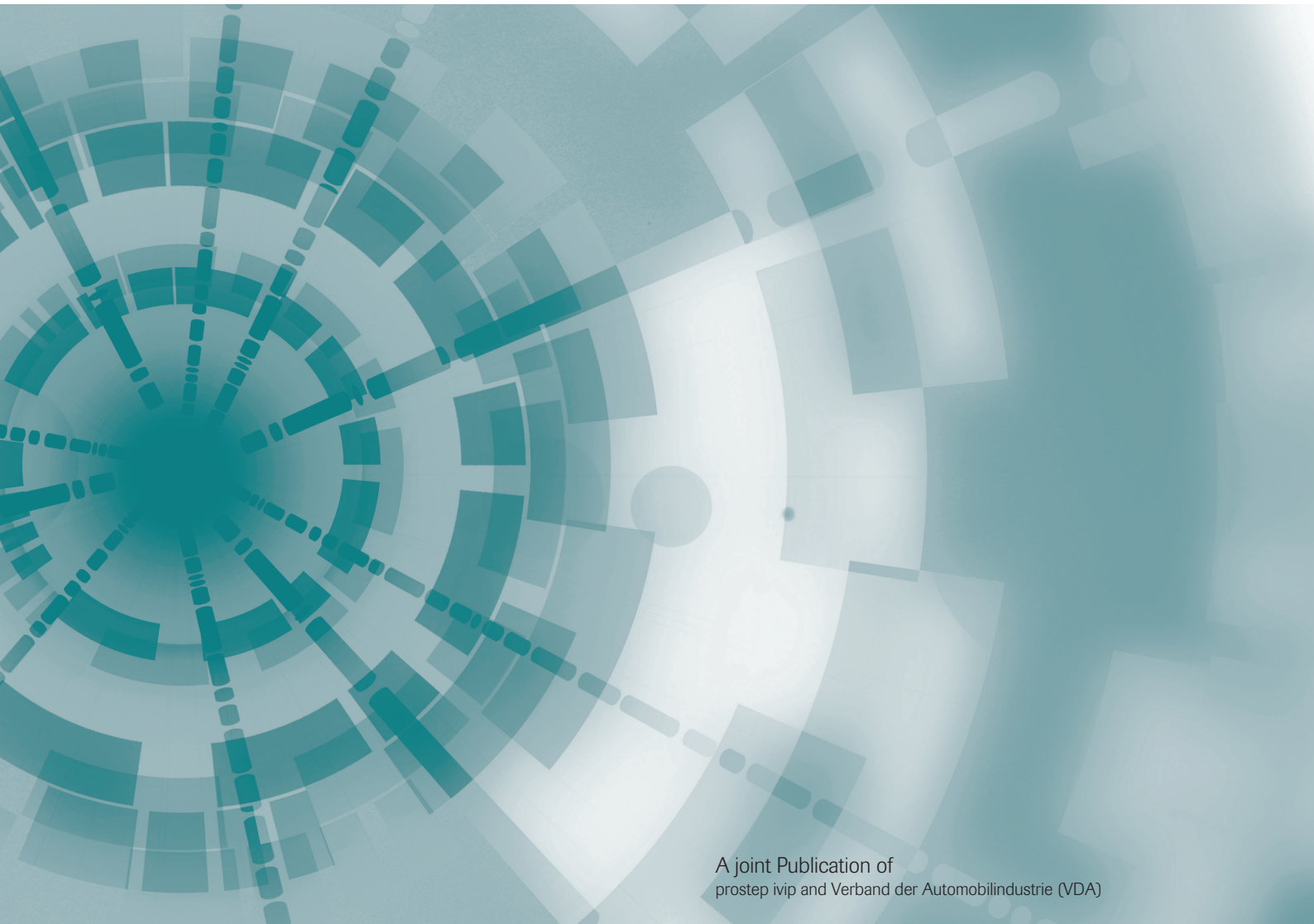

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Abbreviations and acronyms

ANSI	American National Standards Institute
CMM	coordinate measuring machine
FDC	functional dimension catalogue
I++ DME	Inspection PlusPlus Dimensional Measurement Equipment
I++ DMS	Inspection PlusPlus Data Management Services
I++	Inspection PlusPlus
ID	identifier
IP	inspection plan
IPE	inspection plan element
ISO	International Organization for Standardization
MBD	model-based definition
MDM	measurement data management
NIST	National Institute of Standards and Technology
OEM	original equipment manufacturer
PDM	product data management
PLM	product lifecycle management
PMI	product and manufacturing information
PS	product structure
QA	quality assurance
QA	quality assurance
QC	quality criteria
QIF	Quality Information Framework
QMS	quality management system
SOA	service-oriented architecture
UML	Unified Modeling Language
VDA	Verband der Automobilindustrie (German Association of the Automotive Industry)
WSDL	Web Services Description Language
XML	Extensible Markup Language
XSD	XML Schema Definition

1 Preamble

A variety of measurement methods and equipment are used in the manufacturing industry today to ensure a specified level of product quality. These differ in functional properties, such as the way in which data is collected (contact or non-contact), the way in which measurement data is processed, and in the level of integration with manufacturing equipment. In addition to typical properties such as precision and speed, their performance also differs in terms of the degree to which they can be integrated into cross-domain PLM processes. The multitude of devices and processes found in the manufacturing industry always presents a sizable challenge for the harmonization of processes and methods. The desire for a standardized interface for the flexible design of the measurement process, with its numerous participants and objects, is therefore a logical consequence. A complex object model is required that includes not just information on the product model but also the equipment and tools, as well as the relevant test and tolerance data (part of which is referred to as the product and manufacturing information), and its relation to the 3D geometry.

Given that the quality process is increasingly drawing-free, the digital representation of product data – the so-called digital master – has a key function in this context, too.

Cross-domain data management also gives rise to an additional need for powerful measurement data management. Here, factors such as data-related recording, digital master, control of the measurement process as well as IT systems and interfaces play a role. Companies are hoping that this will bring about an increase in the level of process automation, improvements to the change process, further stabilization in the process, consistent quality statements, enhanced performance in individual process steps, and the early identification of process risks before they become a problem. This challenge was addressed collaboratively and in a timely fashion through the Inspection PlusPlus (I++) initiative.

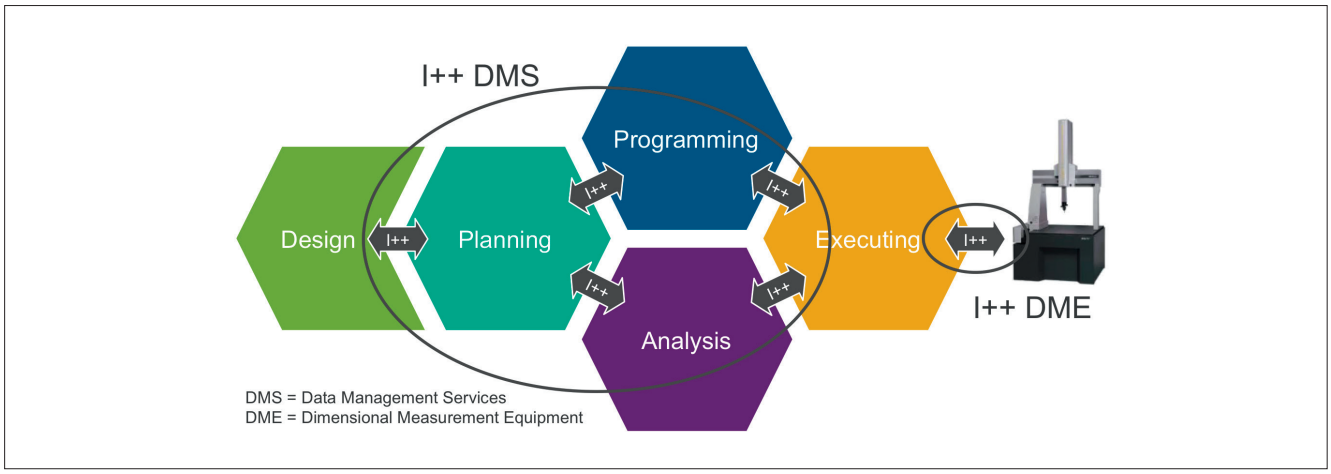

Figure 1: Measurement process covered by I++ DMS and I++ DME

I++ DMS is an interface definition that originated through the automotive sector's Inspection PlusPlus initiative and has since been evolved by automotive and aviation industry members of the 3D Measurement Data Management project group. The interface definition describes an interface for the exchange of information between software applications involved in dimensional quality assurance. The description covers design, planning, programming, analysis and execution in the quality process.

I++ DMS takes a service-based approach, and consists essentially of a UML information model, plus an XML schema that describes the UML model exactly. This extensive specification and its use in quality management systems are described here in this document.