



SASIG

strategic automotive product
data standards industry group

PDQ Guideline V2.1

A global standard
for Product Data Quality

Lutz Völkerath
Chairman SASIG PDQ

Overview

- ▶ **Who and what is SASIG**
- ▶ **What does PDQ mean**
- ▶ **PDQ Business Case**
- ▶ **Goals of the PDQ initiative**
- ▶ **PDQ Strategy**
- ▶ **Content PDQ Guideline V2**
- ▶ **Experience Report**
- ▶ **Next Steps**

Who and what is SASIG



SASIG is a federation of national organisations to initiate, create, distribute and use global automotive engineering standards and promote their global implementation

Current Activities

- AP214 maintenance (edition 3)
- Product Data Quality (PDQ)
- Technical Data Package Exchange (XMTD)
- Digital Engineering Visualisation (DEV)
- PDM Data Exchange
- Engineering Change Management (ECM)
- Digital Manufacturing

➤ see <http://www.sasig.com> for details

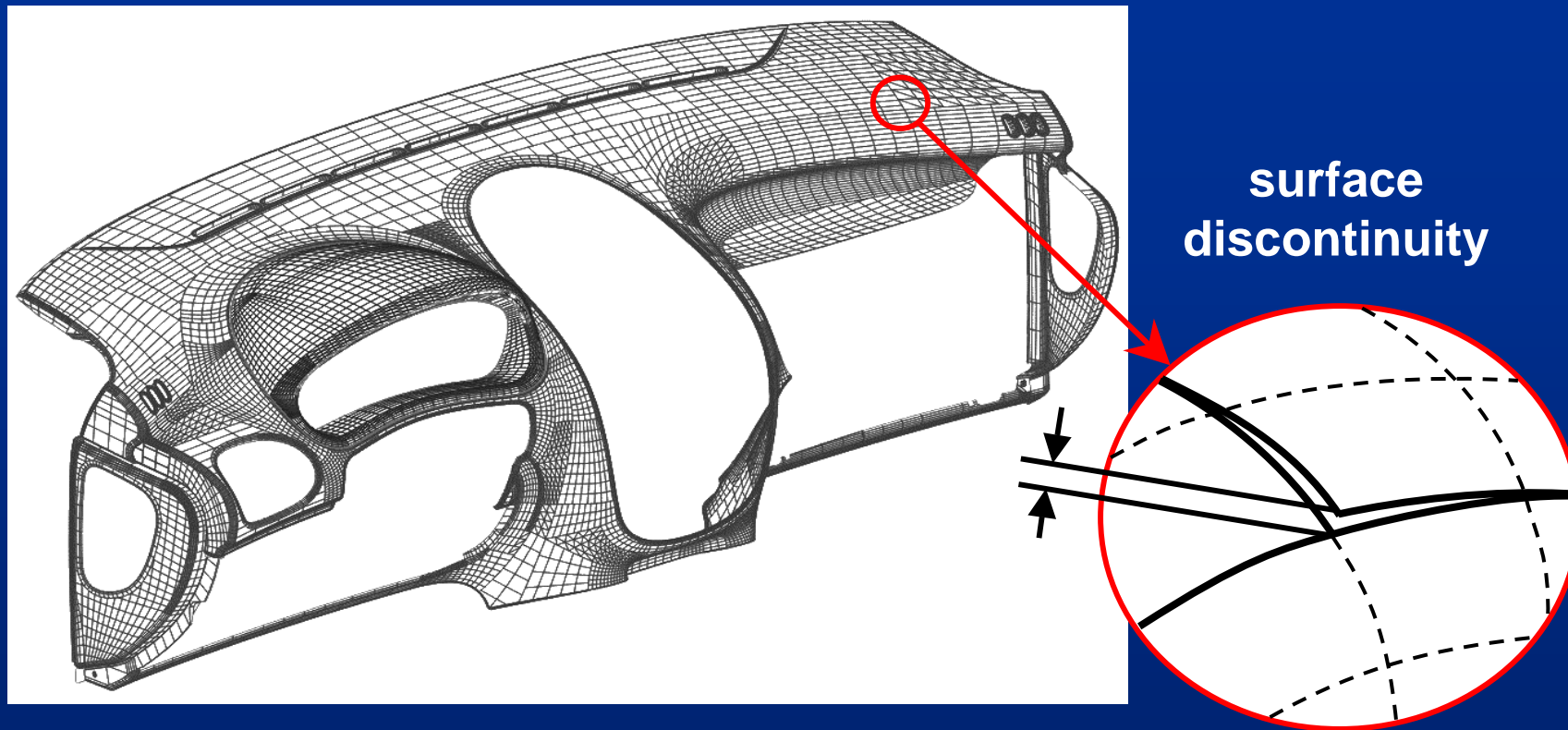
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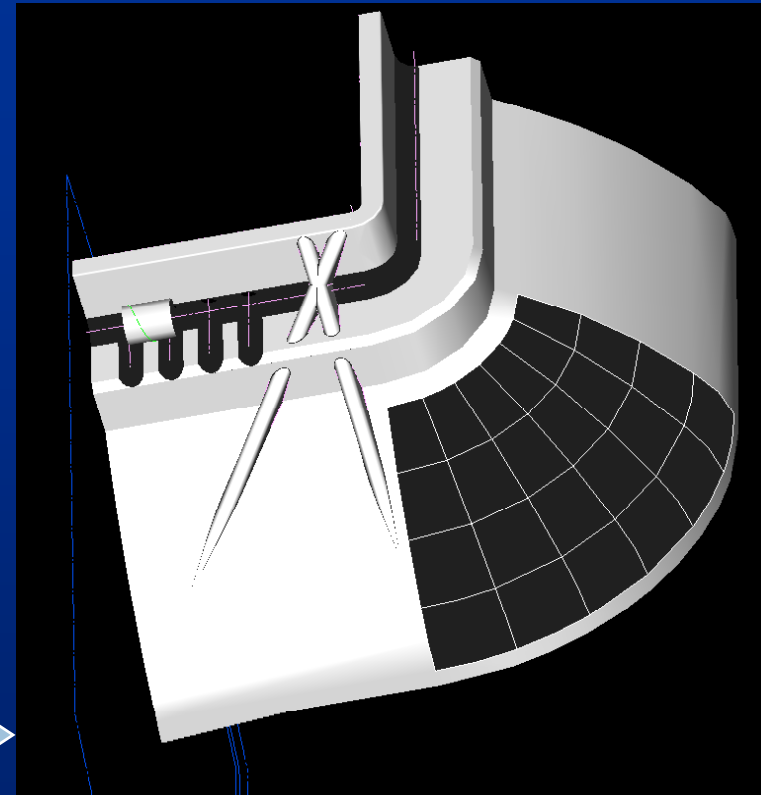
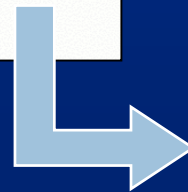
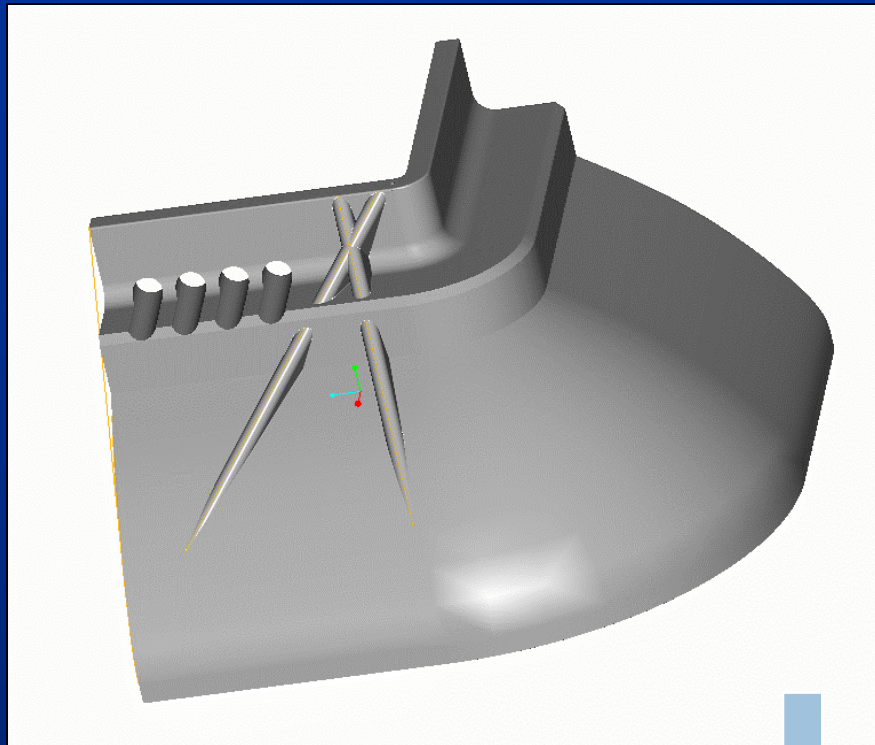
What does PDQ mean

- Good Product Data Quality means that a CAD model/part fulfills defined¹⁾ requirements regarding important²⁾ properties.
- 1) Without a definition of requirements and properties, PDQ can neither be created nor measured.
- 2) Important properties (e.g. accuracy of the description, completeness, structure, etc.) are such critical for users in subsequent processes to perform their job.
- Sender and Receiver of CAD models have to agree upon important properties and methods to ensure them.

Example of a CAD quality problem

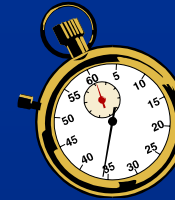


Example of a CAD transfer result



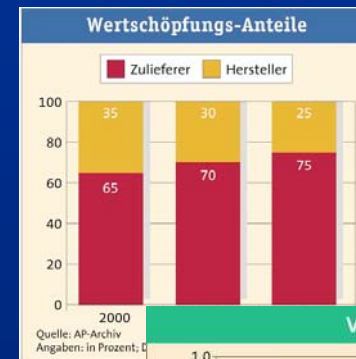
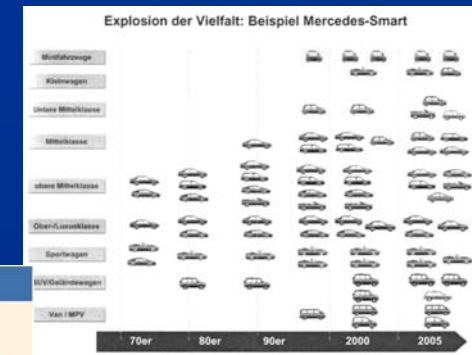
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Business Case Basics

- A significant share of automotive turnover is generated by new models/types with new features ...
- ... in a complex automotive network ...
- ... while development and manufacturing cycles have to break time reduction records from year to year!



Business Case (german automotive manufacturer)

- The calculation elements of this (simple) approach:
 - No. of types developed per year
 - No. of CAD models per type
 - percentage of CAD models with bad PDQ
 - No. of hours needed to correct a CAD model
 - € per hour
- Cost = $10 * 1.000 * 80\% * 2h * 60€/h$
= 960.000 € per year

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Goals of the PDQ initiative

- Mission: To describe (neutral) PDQ criteria to ...
 1. define PDQ
 2. visualise PDQ
 3. avoid bad PDQ
 4. remove bad PDQ
- Milestones:
 - create and use common PDQ terminology
 - support guideline transfer into company standards
 - initiate checktools and force their usage
 - unify checktool results (1 tool for n partners)

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PDQ strategy

- Agree on a useful subset of PDQ criteria and limit values
- Check PDQ regularly during creation
- Revise faulty methods and increase user skills
- Document PDQ when sending/archiving a CAD model

SASIG-Product Data Quality for the Global Automotive Industry

CAD/CAM Data Quality: Exchange Agreement (Example) Date: ___/___/___

De: _____
 To: _____
 From: _____
 Subject: _____

Company Name: _____
 Supplier: _____
 Classification: _____
 Creation: _____

Applicability: _____

Comments: _____

By the Agreement, the Controller agrees to use the SASIG Product Data Quality for the Global Automotive Industry (SASIG PDQ) as a basis for the development of the product data.

Applicable edition of CAD-Style: _____ (SASIG PDQ) Model: _____

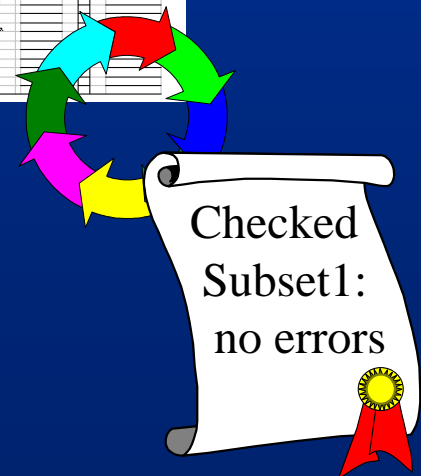
CAD Model type: Wireframe Surface Solid Space claim (Volume only)

Drawing: 2D 3D 2D only 3D only 2D/3D 3D model

Intended Model Use: Bill of Materials Production Background info. BOM Release

Max. Model Size: MB Spec. Coordinate: _____

Confirmation Result	Code	Criteria Identification	Example (CAD) Value (mark if...)	Results Value	Checked	Due Date or Milestone
<input type="checkbox"/>	01	Model Size	Less than 1 MB			
<input type="checkbox"/>	02	Model Size	Less than 1 MB			
<input type="checkbox"/>	03	Model Size	Less than 1 MB			
<input type="checkbox"/>	04	Model Size	Less than 1 MB			
<input type="checkbox"/>	05	Model Size	Less than 1 MB			
<input type="checkbox"/>	06	Model Size	Less than 1 MB			
<input type="checkbox"/>	07	Model Size	Less than 1 MB			
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<input type="checkbox"/>	10	Model Size	Less than 1 MB			
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<input type="checkbox"/>	47	Model Size	Less than 1 MB			
<input type="checkbox"/>	48	Model Size	Less than 1 MB			
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<input type="checkbox"/>	50	Model Size	Less than 1 MB			



Overview

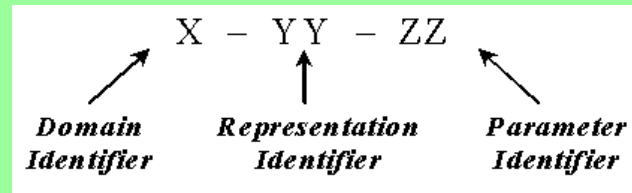
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Content

PDQ Guideline V 2.1

- Introduction and Background
- PDQ criteria
 - Encoding system
 - Geometric quality criteria (64)
 - Non-Geometric quality criteria (63)
 - Drawing quality criteria (19)
 - CAE quality criteria (13)
- Quality stamp
- Improving PDQ
 - Readiness for change
 - Product development process
 - Supplier roles
 - Skills and Motivation
 - Checking Tools
 - Healing
 - ...

Encoding system:



e.g. **G-CU-LG**
 O-GL-NL
 D-GE-TI

➤ Attachments

- Glossary
- Mapping between element types
- (Recommended values)
- Formsheet
- SASIG-Odette Cross-reference
- Business case
- Revision request

Criteria description

- Each criterion is described by
 - a Problem description, the measurement,
 - additional Supporting information,
 - a Recommendation (to avoid or remove the problem),
 - and a picture to illustrate the criterion.

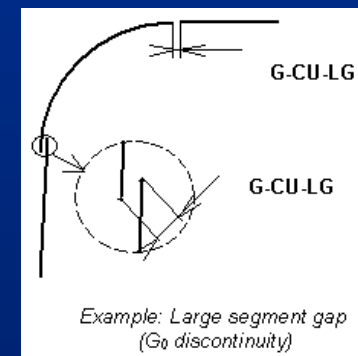
3.1.1.1 Large segment gap (G_0 discontinuity): G-CU-LG

Problem description: Large distance between or overlapping of adjacent curve segments - a G_0 discontinuity.

Measurement: Distance between segment endpoints at common bound.

Supporting information: The first and most important continuity issue is “position continuity,” i.e., the transition of curves and curve segments without gaps and/or overlapping end points. A position discontinuity endangers follow-up operations that build upon the unity of curve paths, especially after scaling, offsetting, or transfer.

Recommendation: Position discontinuities are to be rectified by limiting the affected curves to one another within the tolerances. A possible, necessary extension or trim of one or both elements is preferred.



Example of a Non-geometric quality criteria

3.2.2.7 Number of layers exceeded: O-GL-NL

Problem description: Layers are used to organise geometric elements describing a part. Usual operations (like visualise, hide, move, or copy) of elements on layers are much easier than with single elements.

If data organised with layers are loaded into an application (e.g., CAE pre-processor) that is not able to read layers, this might lead either to a loss of information or extra workload to create a new structure.

Measurement: Check the number of layers used.

Supporting information: Number of layers shall be limited to 254 layers or fewer. This is the recommendation based on the maximum number of layers specifications for major CAD systems.

Recommendation: Use a number of layers compliant to the company standard

- The Non-Geometric and Drawing criteria descriptions do not provide a picture

Overview

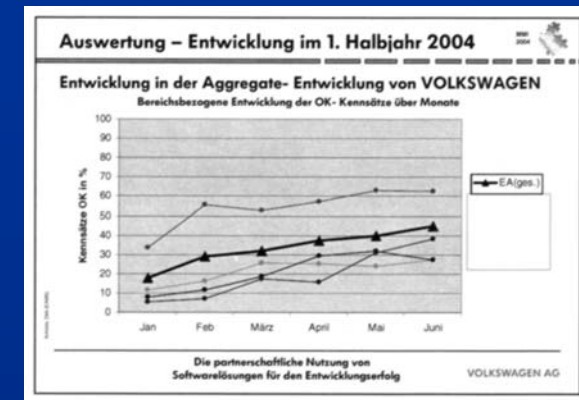
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Experience Report

- CAD users know PDQ and ask for it
- about 10 PDQ checkers are available
- CAD system vendors pay attention to PDQ
 - offer own PDQ checkfunctions
 - correct CAD concepts and functions
- Companies establish own PDQ guidelines, agreements and checks (with link to VDA and/or SASIG doc.)

Experience Report

- Companies establish PDQ statistics when receiving CAD models,
- CAD data exceeding a defined quality value or violating major quality criteria is rejected.
- Supplier's PDQ statistics are used as a criterion when placing orders.
- Companies with such procedures recognise significant increase of good PDQ and ...
- confirm to save time and money!



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Next Steps (for SASIG WG PDQ)

- Focus on “Roll-out“/Deployment
 - presentations, success stories,
 - perform ISO PAS procedure
- Establish a global checktool conformance procedure,
- intensify CAD developer dialogue,
- perform PDQ survey regularly to monitor success of the PDQ initiative,
- perform guideline maintenance.



Next Steps (for YOU!)

- Visit www.sasig.com or contact lutz.voelkerath@prostep.com to receive SASIG PDQ guideline V2.1,
- build the business case for your company (define starting point to show progress),
- perform PDQ improvement and statistics,
- and save time and money, too!

End

Thank you - Tack

**Please give me some
feedback!**



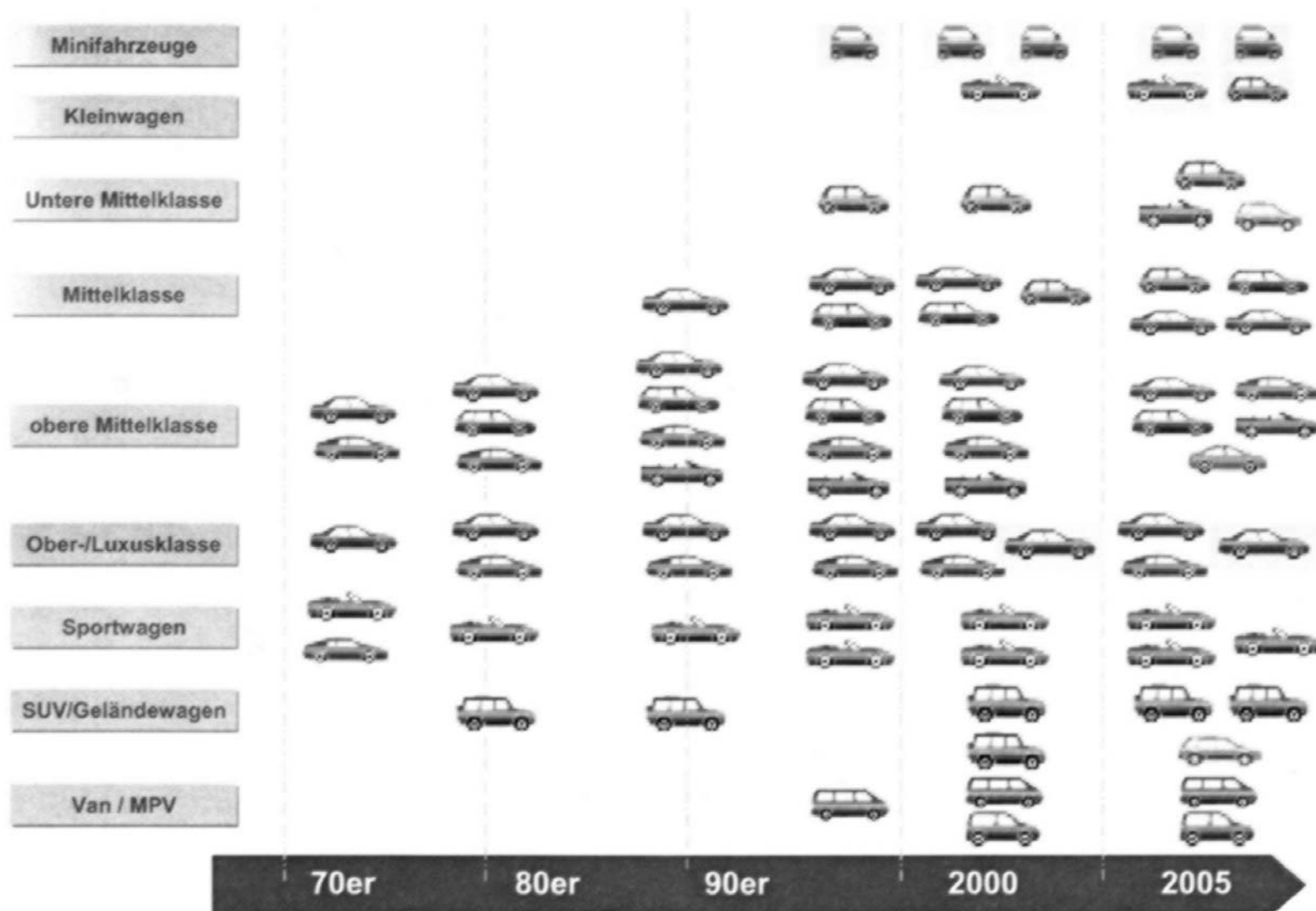
Lutz Völkerath

PROSTEP AG

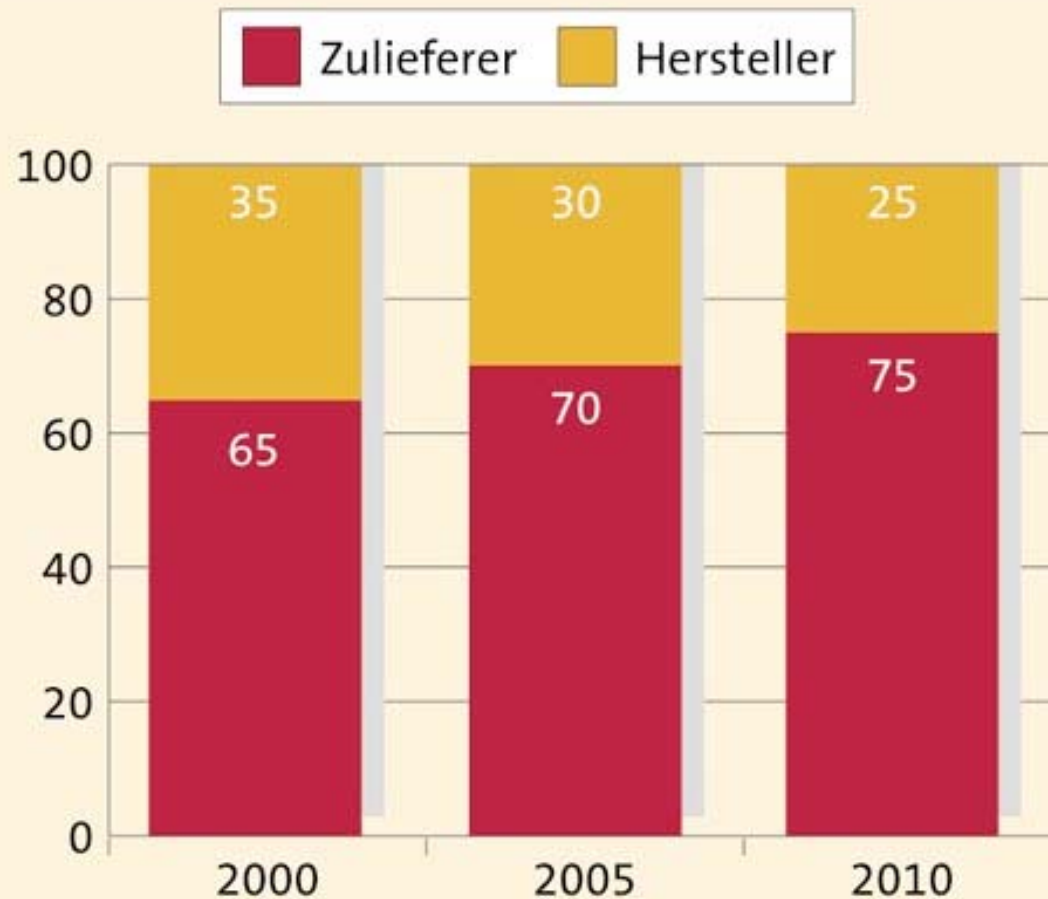
lutz.voelkerath@prostep.com

Backup

Explosion der Vielfalt: Beispiel Mercedes-Smart



Wertschöpfungs-Anteile

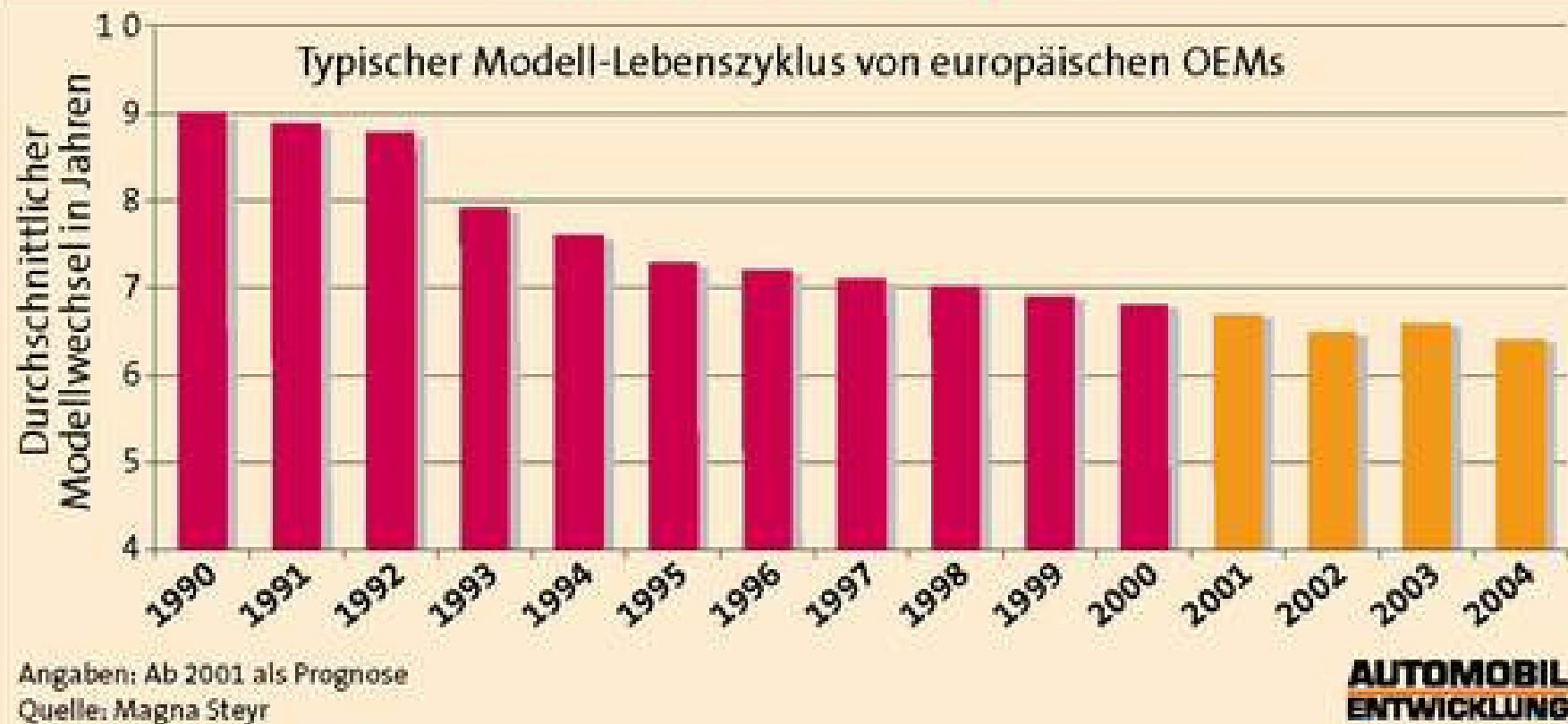


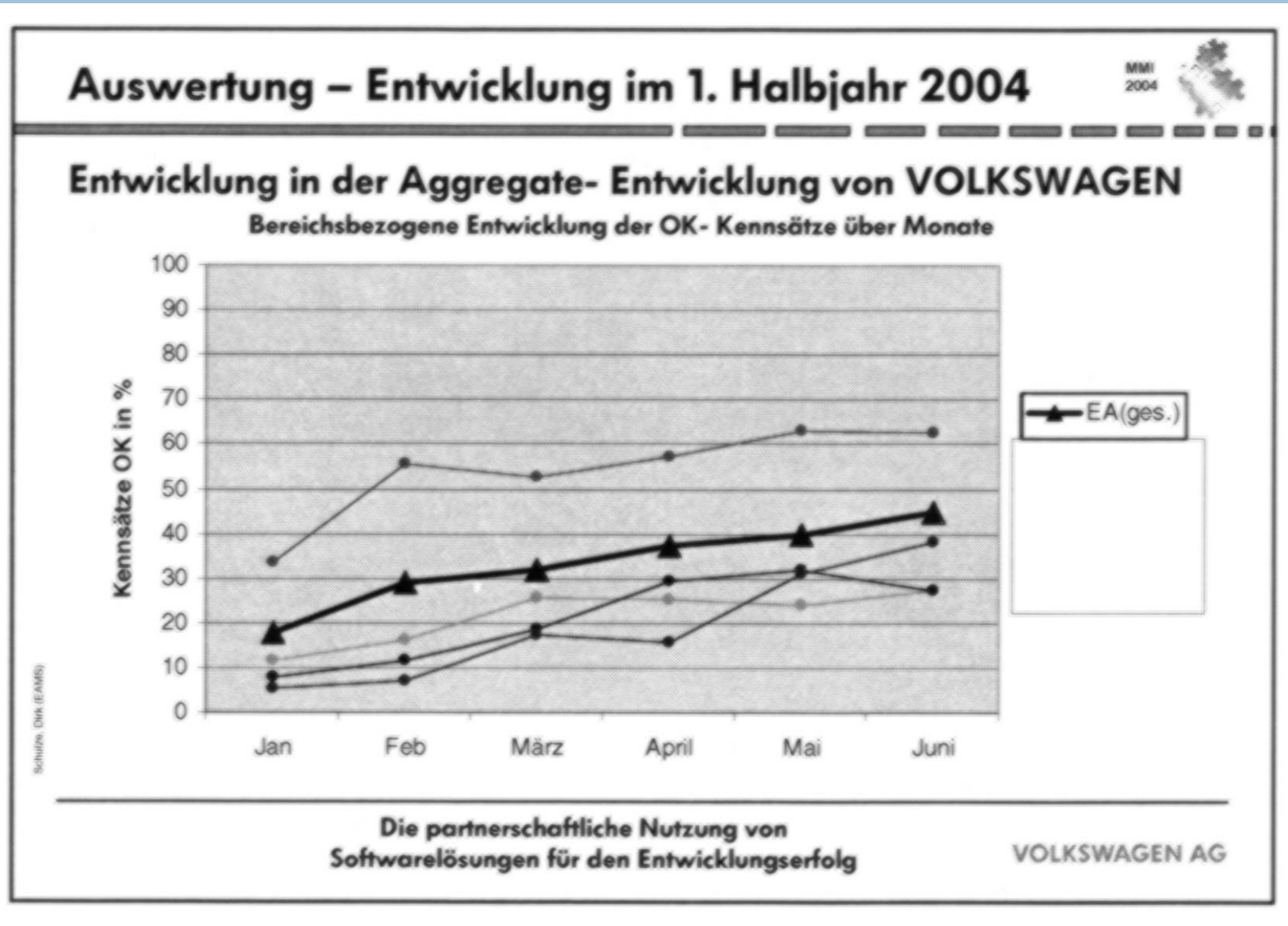
Quelle: AP-Archiv

Angaben: in Prozent; Durchschnittswerte

**AUTOMOBIL
PRODUKTION**

Verkürzte PKW-Lebenszyklen





SASIG Guideline migration path



international level

**SASIG
PDQ V2**

harmonised
Draft

Guideline
Version X

translate,
layout and
package

input

verify

OK

Initial
Input

final
Draft

Guideline
(package)
Version Y

national level

VDA 4955 V4

SASIG PDQ conformance procedure



- **Goals: Ensure ...**
 - completeness of checktools reg. SASIG criteria,
 - comparability (equality) of checktool results
 - to allow users to use 1 checktool for n partners.
- **Milestones: (C=Candidate, WG=work group)**
 - C perform checks with documented checkmodels
 - C fills result form (spreadsheet)
 - WG publishes result on SASIG Homepage