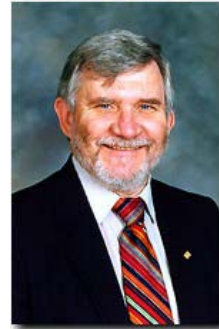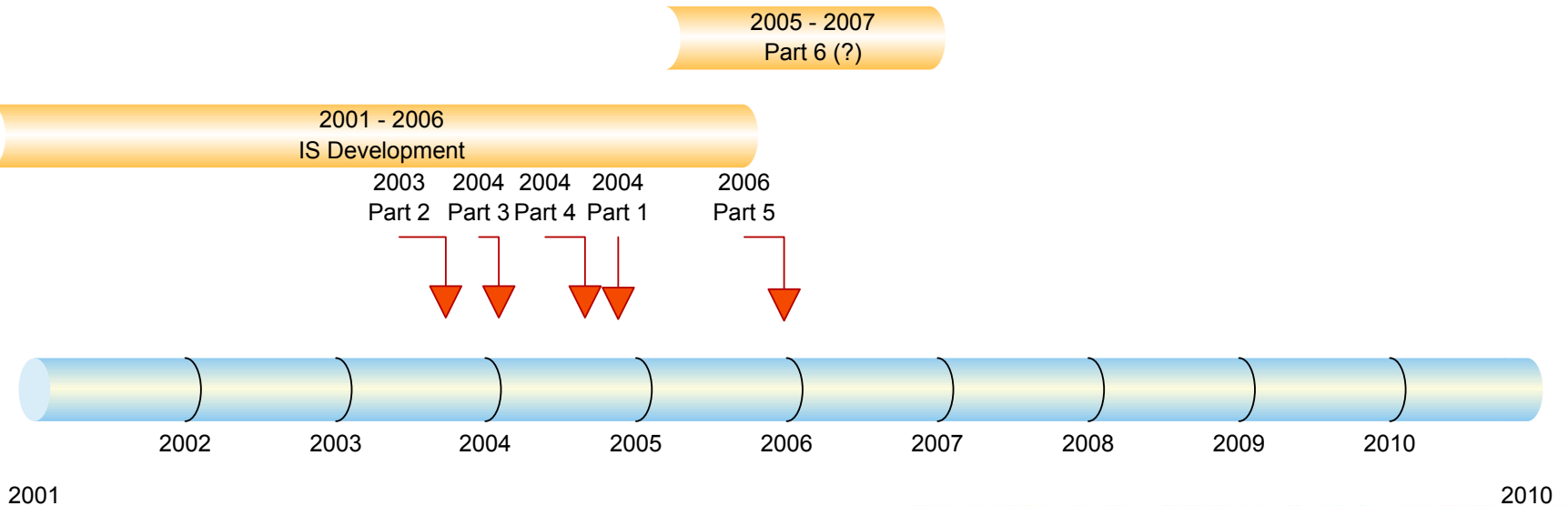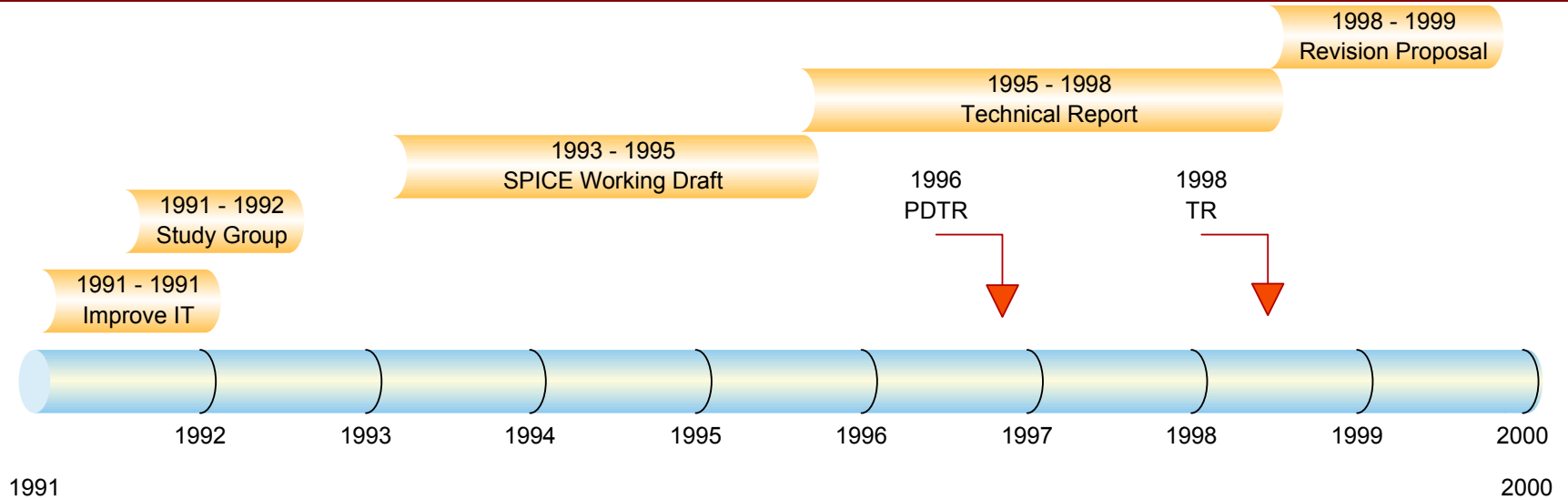# ISO/IEC 15504 (SPICE)

A Status Report

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The SPICE Timeline

1998 - 1999
Revision Proposal

1995 - 1998
Technical Report

1993 - 1995
SPICE Working Draft

1996
PDTR

1998
TR

1991 - 1992
Study Group

1991 - 1991
Improve IT

| 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |

1991

2000

2005 - 2007
Part 6 (?)

2001 - 2006
IS Development

| 2003 | 2004 | 2004 | 2004 | 2006 |
| Part 2 | Part 3 | Part 4 | Part 1 | Part 5 |

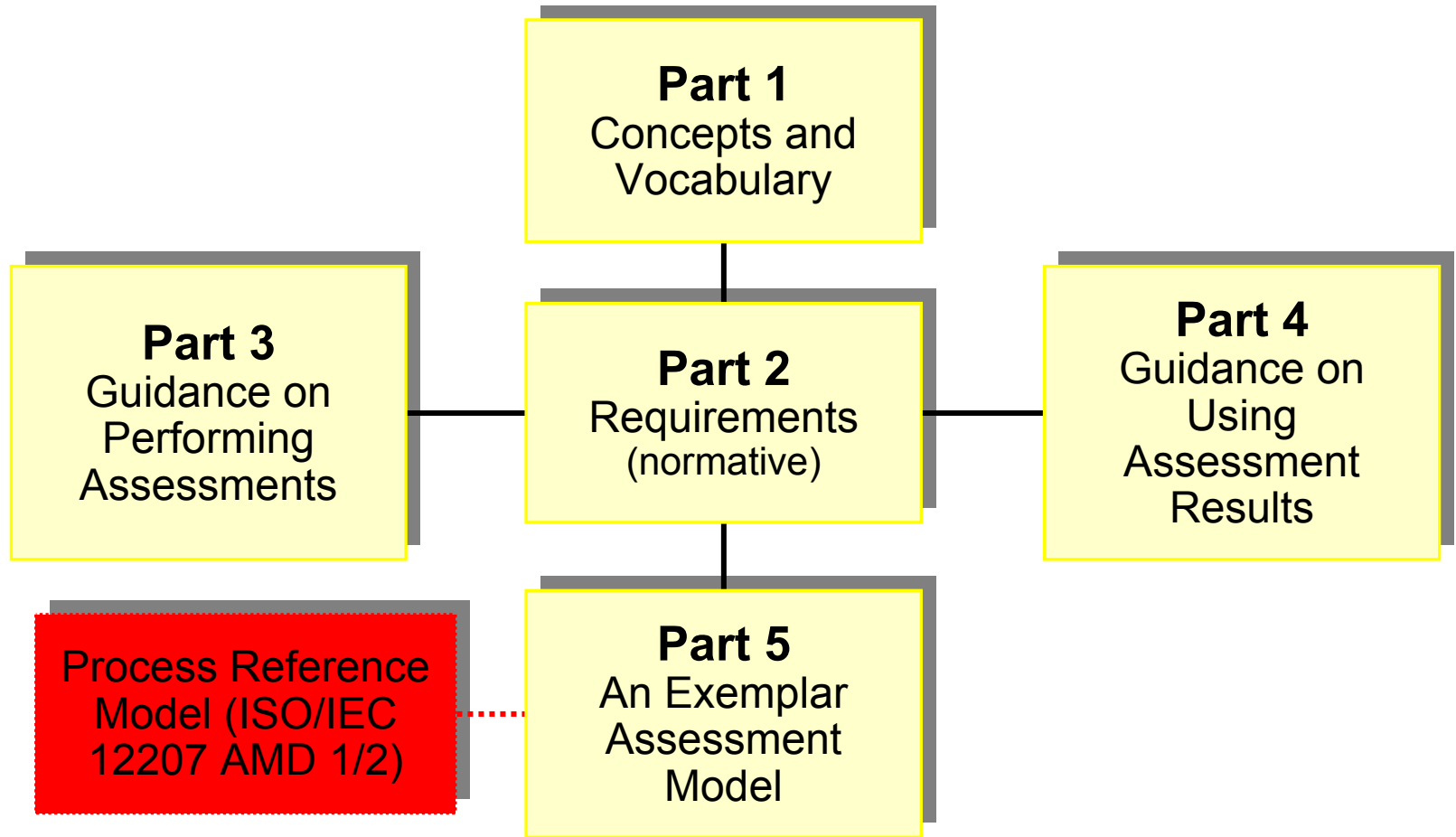| 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |

2001

2010

SPICE2005– Klagenfurt

Achievements

- **4000 assessments performed worldwide**
- **In 45 countries**
- **Major sectors setting the pace**
  - **Space, Automotive, Defence, Aerospace, Medical Devices**
- **Major country initiatives**
  - **Initiated in Europe**
  - **Japan, Korea, Australia, Brazil**
  - **SME initiatives e.g. SPIRE, RAPID**
- **Microsoft Readiness Framework**

The International Standard

Part 1
Concepts and Vocabulary

Part 3
Guidance on Performing Assessments

Part 2
Requirements (normative)

Part 4
Guidance on Using Assessment Results

Process Reference Model (ISO/IEC 12207 AMD 1/2)

Part 5
An Exemplar Assessment Model

Current Status

❖ **Part 1**
- ✧ **Published (Nov 2004)**

❖ **Part 2**
- ✧ **Published (Oct 2003)**

❖ **Part 3**
- ✧ **Published (Jan 2004)**

❖ **Part 4**
- ✧ **Published (Sep 2004)**

❖ **Part 5**
- ✧ **FCD ballot (closes 1 May 2005)**
- ✧ **FDIS ballot (starts June 2005 (?))**

Transition

- ❖ **All assessment approaches in conformance with the requirements of ISO/IEC TR 15504 should transition to conformance with the requirements of ISO/IEC 15504-2 (published October 2003). TR 15504 is no longer available.**

- ❖ **All assessment approaches currently using the ISO/IEC TR 15504-5 exemplar assessment model should transition to use the exemplar Process Assessment Model in ISO/IEC 15504-5 from FCD status (December 2004).**

- ❖ **All assessor training courses based on the exemplar assessment model should be based on ISO/IEC FCD 15504-5 or later.**

New Work items

- ❖ **ISO/IEC 15504 Part 6**
  - ✧ **Exemplar systems process assessment model**
  - ✧ **Based on Process Reference Model in ISO/IEC 15288**
- ❖ **Organisational maturity framework consistent with ISO/IEC 15504**
  - ✧ **Views have crystallized over time regarding continuous and staged representations and models of process capability.**
  - ✧ **It is generally acknowledged that levels of organisational maturity can be defined in terms of defined profiles of process capability.**
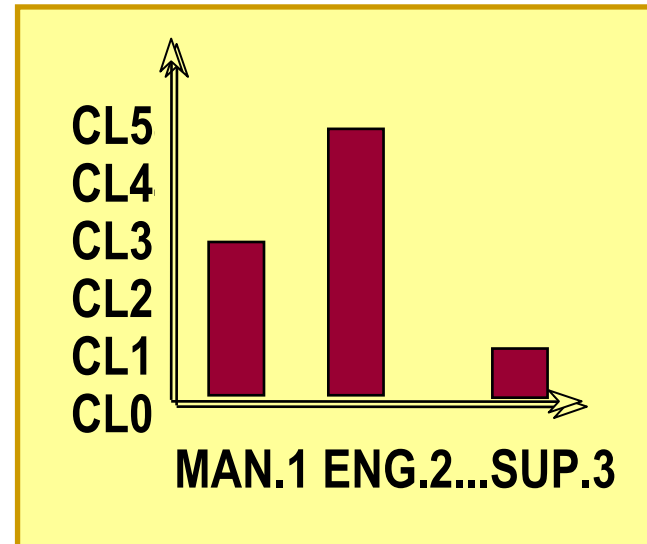
The Assessment Framework

Two-dimensional model for processes and process capability

✧ **Process Dimension**

  ● **Process Categories**

  ● **Processes (P1, …, Pn)**

✧ **Capability Dimension**

  ● **Capability Levels (CL1, …, CL5)**

  ● **Process Attributes (PA1.1, PA2.2 .. PA5.5)**

CL5
CL4
CL3
CL2
CL1
CL0

MAN.1 ENG.2...SUP.3

Each process receives a capability level rating

This is referred to as a Continuous Model

Measurement Framework

Optimising
The process is continuously improved to meet relevant current and projected business goals

Level 5   Optimizing
PA.5.1	**Process Innovation**
PA.5.2	**Continuous Improvement**

Predictable
The process is enacted consistently within defined limits

Level 4   Predictable
PA.4.1	**Process Measurement**
PA.4.2	**Process Control**

Established
A defined process is used based on a standard process.

Level 3   Established
PA.3.1	**Process Definition**
PA.3.2	**Process Deployment**

Level 2   Managed
PA.2.1	**Performance Management**
PA.2.2	**Work Product Management**

Managed
The process is managed and work products are established, controlled and maintained.

Level 1   Performed
PA.1.1	**Process Performance**

Performed
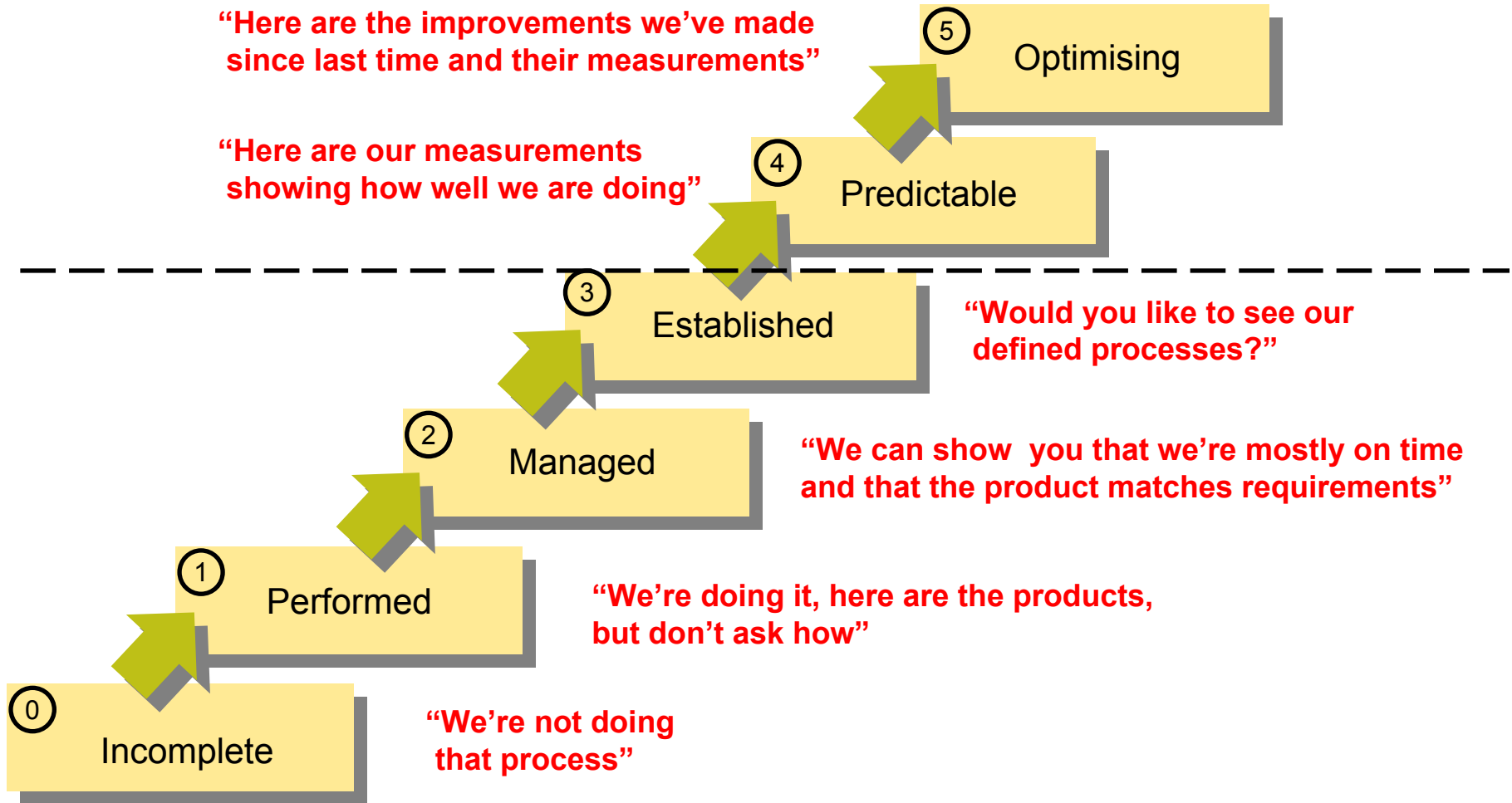The process is implemented and achieves its process purpose

Level 0   Incomplete

Incomplete
The process is not implemented or fails to achieve its purpose

Klagenfurt

ISO 15504 - Capability Levels "in practice"

"Here are the improvements we've made since last time and their measurements"

⑤ Optimising

"Here are our measurements showing how well we are doing"

④ Predictable

③ Established

"Would you like to see our defined processes?"

② Managed

"We can show you that we're mostly on time and that the product matches requirements"

① Performed

"We're doing it, here are the products, but don't ask how"

⓪ Incomplete

"We're not doing that process"

Capability Levels and Process Attributes

Optimizing
The process is continuously improved to meet relevant current and projected business goals.

Predictable
The process is enacted consistently within defined limits.

Established
A defined process is used based on a standard process.

Level 5 Optimising

PA.5.1	Process Innovation
PA.5.2	Process Optimization

Level 4 Predictable

PA.4.1	Process Measurement
PA.4.2	Process Control

Level 3 Established

PA.3.1	Process Definition
PA.3.2	Process Deployment

Covered by ISO 9001:2000

Level 2 Managed

PA.2.1	Performance Management
PA.2.2	Work Product Management

Managed
The process is managed and work products are established, controlled and maintained.

Level 1 Performed

PA.1.1	Process Performance

Performed
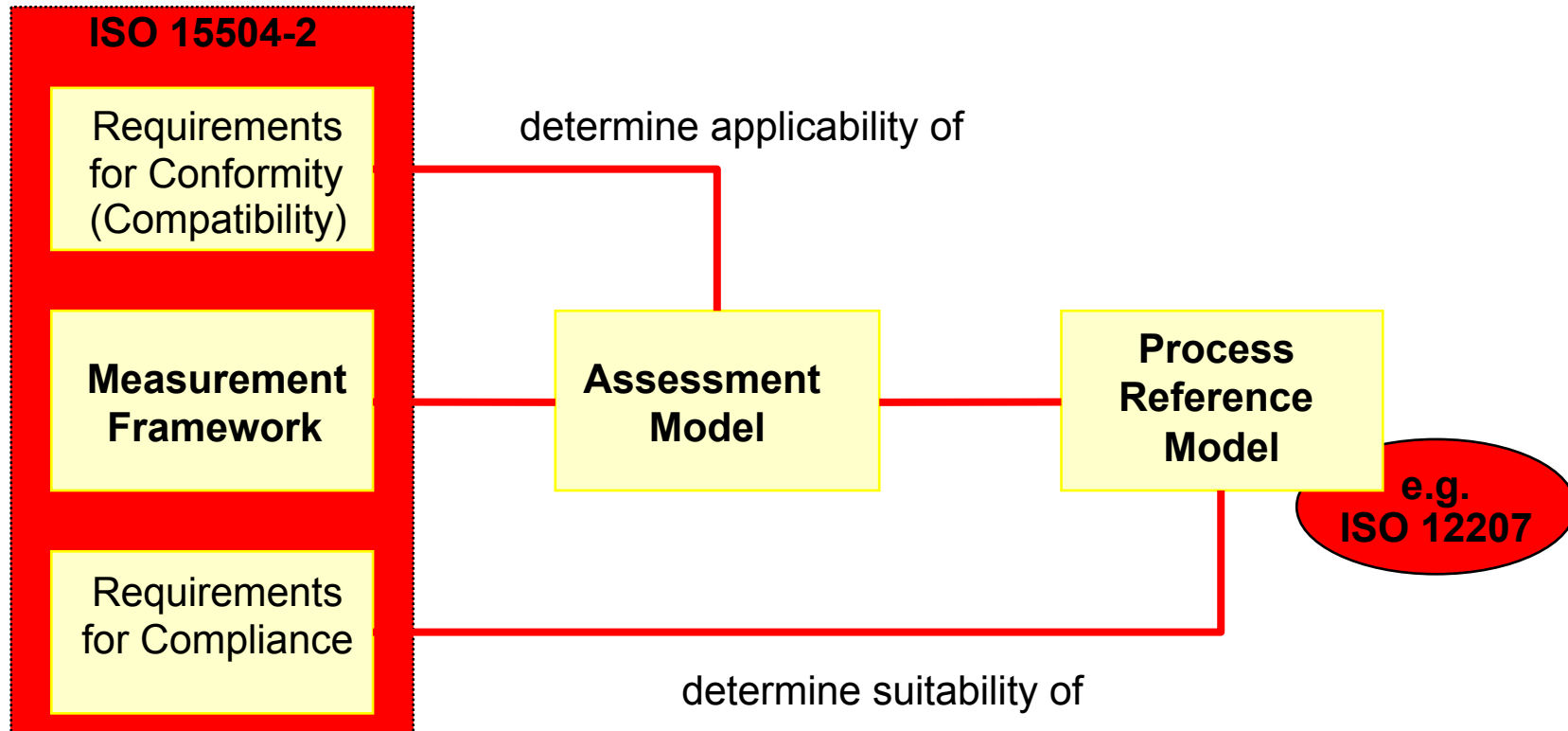The process is implemented and achieves its process purpose.
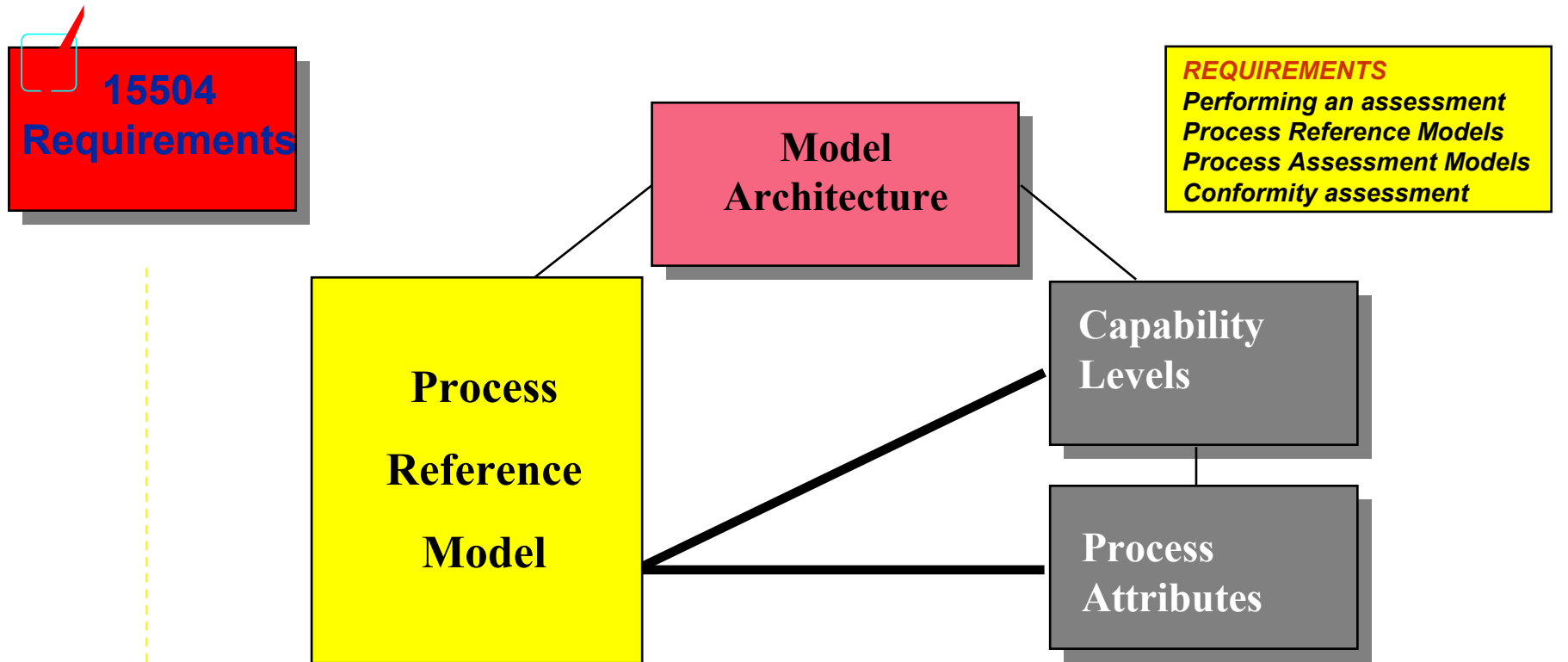
Level 0 Incomplete

Incomplete
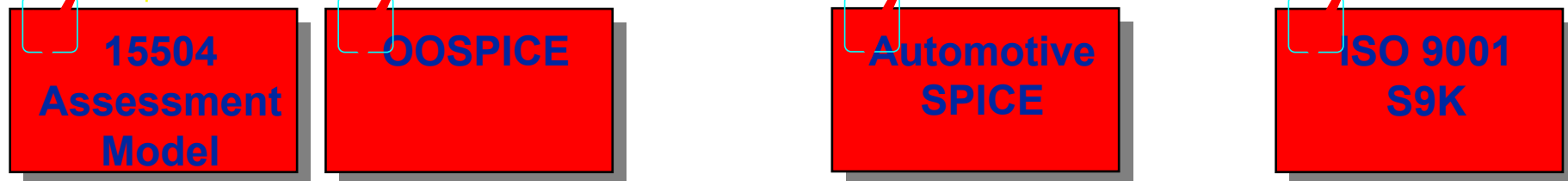The process is not implemented or fails to achieve its purpose.

Process Reference and Assessment Models

ISO 15504-2

- Requirements for Conformity (Compatibility)
- Measurement Framework
- Requirements for Compliance

determine applicability of

Assessment Model

Process Reference Model

e.g. ISO 12207

determine suitability of

Process Reference Models

15504 Requirements

Model Architecture

Process Reference Model

Capability Levels

Process Attributes

... and Assessment Models

15504 Assessment Model

OOSPICE

Automotive SPICE

ISO 9001 S9K

12207 based

(Software LCP)

SPICE2005– Klagenfurt

Standards-Based Process Reference Models

12207 Software Lifecycle Process	**ISO/IEC 12207 Amendment 1 and 2**
15288 System Lifecycle Process	**ISO/IEC 15288**
18529 Human Centered Lifecycle Process	**ISO/IEC 18529**
ISO 9001 Quality Management	**European Space Agency**

ISO/IEC 15504-5: Processes

Acquisition
Acquisition preparation
Supplier selection
Contract agreement
Supplier monitoring
Product acceptance

Supply
Supplier tendering
Product release
Product acceptance support

Engineering
Requirements elicitation
System requirements analysis
System architectural design
Software requirements analysis
Software design
Software construction
Software integration
Software testing
Software installation
System integration
System testing
System and software maintenance

Supporting
Quality assurance
Verification
Validation
Joint review
Audit
Product evaluation
Documentation
Configuration management
Problem resolution management
Change request management

SUPPORTING

Management
Organisational alignment
Organisational management
Project management
Quality management
Risk management
Measurement

Process Improvement
Process establishment
Process assessment
Process improvement

Resource and Infrastructure
Human resource management
Training
Knowledge management
Infrastructure

ORGANISATIONAL

Reuse
Asset management
Reuse program management
Domain engineering

PRIMARY
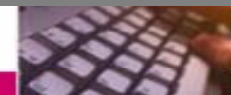
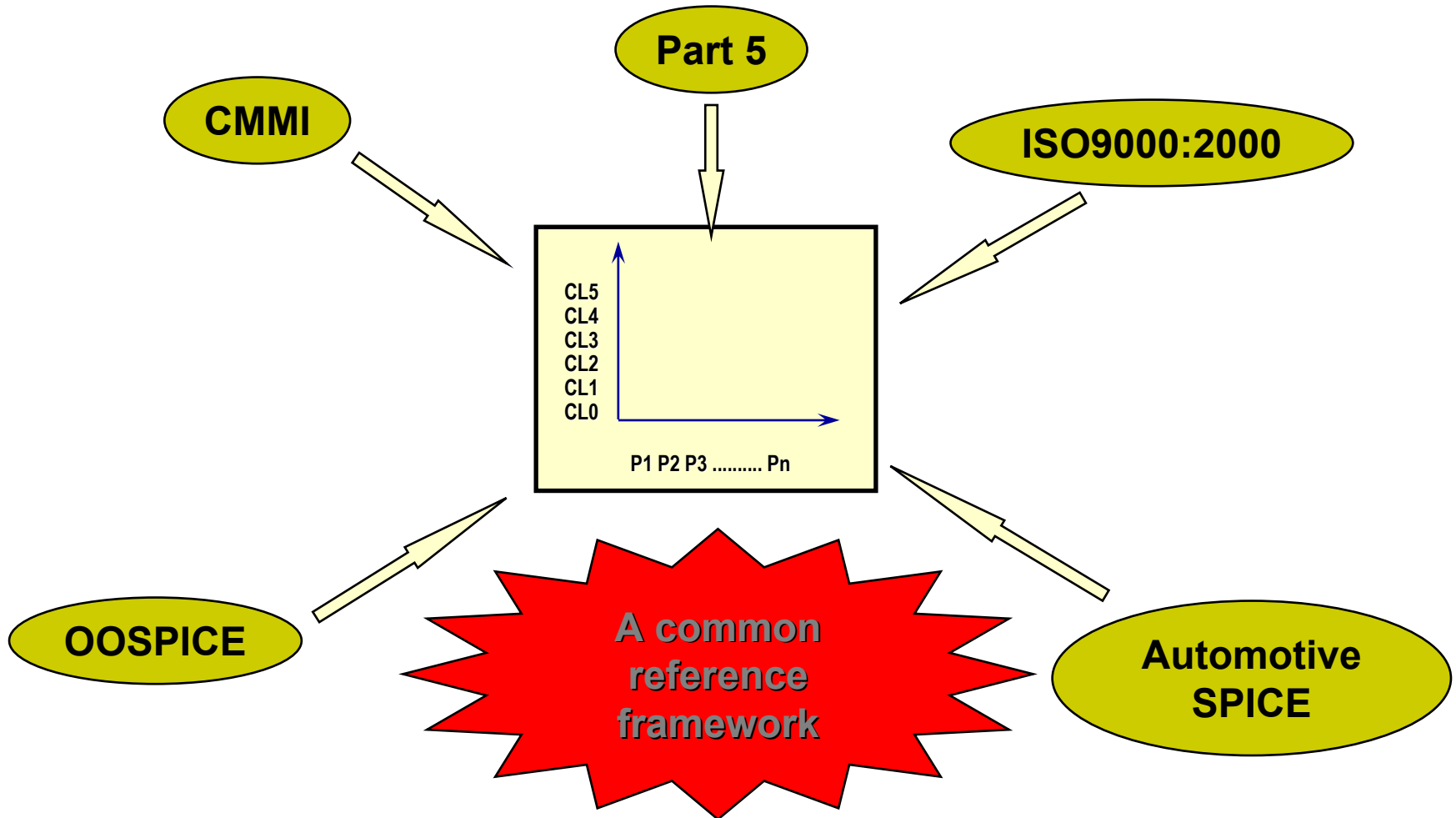|	
SPACE	**SPICE 4 SPACE** **European Space Agency**
AUTOMOTIVE	**AUTOMOTIVE SPICE** **Procurement Forum / SPICE UG**
Medical Device Software **(Software Life Cycle Processes IEC 62304)**	**MEDISPICE** **The SPICE User Group**
Component Based Development	**OOSPICE**
IT Infrastructure Management	**CRP Henri Tudor**

Compatibility is the Key

❖ **The process assessment standard must:**

◇ **be supportive of and consistent with other systems and software engineering standards;**

◇ **be supportive of and consistent with the ISO 9000 series of standards;**

◇ **provide a migration path for existing methods so as to discourage the establishment of other de-facto standards.**

Harmonising Different Approaches

CMMI

Part 5

ISO9000:2000

CL5
CL4
CL3
CL2
CL1
CL0

P1 P2 P3 .... Pn

OOSPICE

A common reference framework

Automotive SPICE

Automotive SPICE

Representative Organisations
VDA, MISRA, INCOSE

Goal

Common approach for assessing and evaluating suppliers based on ISO 15504 Automotive PRM
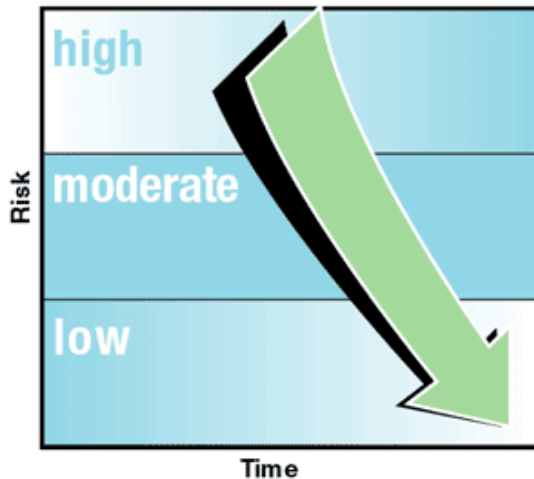
Automotive SPICE

- ❖ A **common model** for manufacturers specific to '**automotive**'

- ❖ Subset of **processes** with **application guidance** for automotive

- ❖ A common and **consistent way** to **use** ISO 15504 for automotive assessments

- ❖ **Builds on joint initiatives** in Manufacturer groupings (e.g. HIS and ´Pan-Brand')

- ❖ **Release date: May 2005**

Manufacturer's Approach

1. Establish **target capability levels** for requirements and/or suppliers

2. Determine the **software** development **capability** of the suppliers

3. **Evaluate** the **risk**

4. Exercise the necessary controls (contract and project) to **control the risk**

Automotive SPICE – Processes

Acquirer-Supplier

Technical Requirements
Legal and Administrative Requirements
Project Requirements
Request for Proposals
Supplier Tendering
Supplier Qualification
Contract Agreement
Supplier Monitoring

Support

Quality Assurance
Verification
Joint Review
Documentation
Configuration Management
Problem Resolution Management
Change Request Management

Engineering

Requirements elicitation
System Requirements Analysis
System Architectural Design
Software Requirements Analysis
Software Design
Software Construction
Software Integration Test
Software Testing
System Integration Test
System Testing
Product Release

Management

Project Manangement
Risk Management
Measurement

Process Improvement

Process Improvement

Reuse

Reuse Program Management

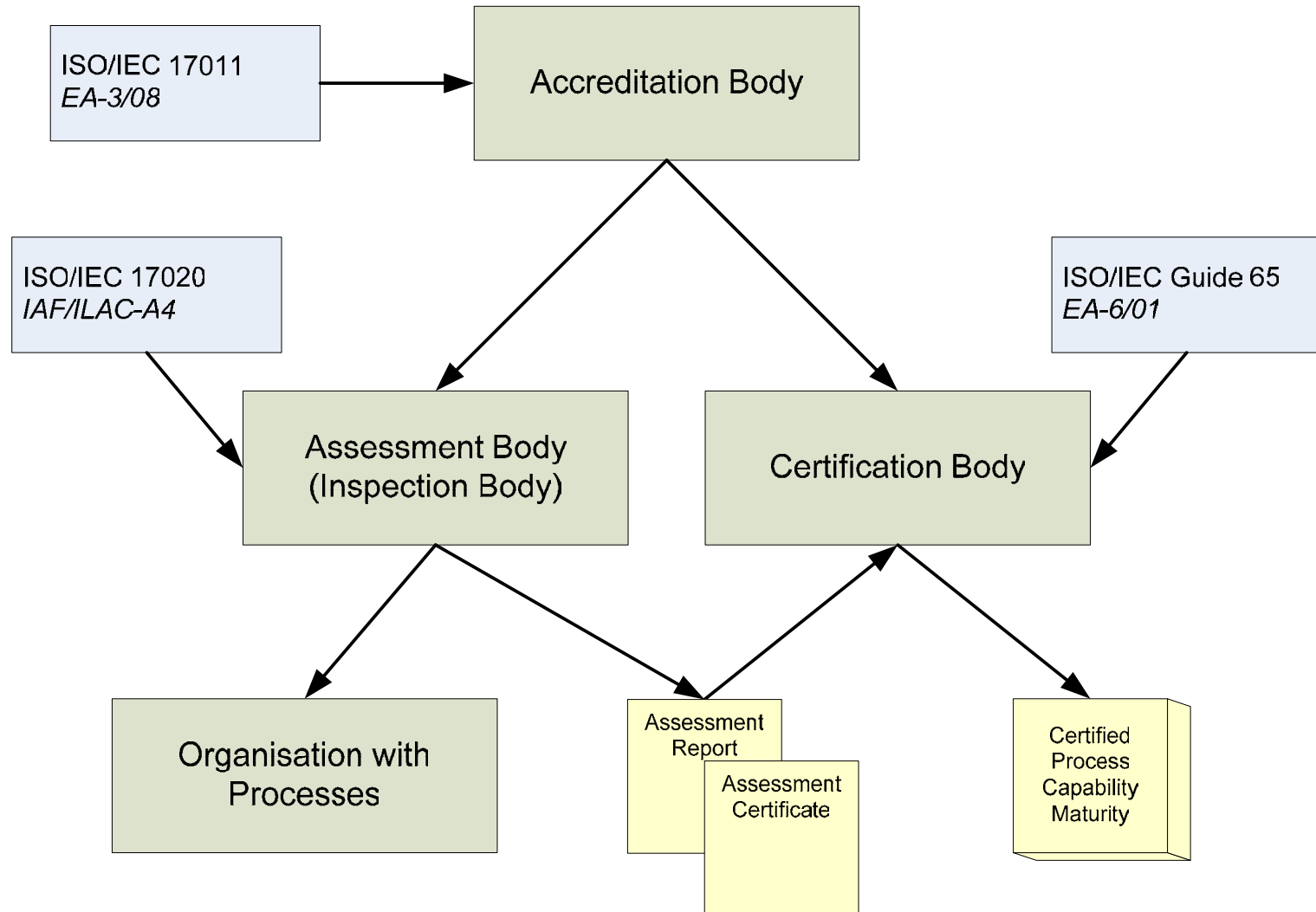## Supplemented by Guidance for Automotive Application

ISO/IEC 15504 Certification

Providing confidence in the Assessment Results

- ❖ **Certification Scheme under development**

- ❖ **Two levels of bodies – Assessment body and Certification body**

- ❖ **Underlying Target Maturity Model TMM©**

- ❖ **First certifications contracted 1st quarter 2006**

Process Measurement: Certification Scheme


```
ISO/IEC 17011          →          Accreditation Body
EA-3/08

ISO/IEC 17020                                              ISO/IEC Guide 65
IAF/ILAC-A4                                                EA-6/01

        Assessment Body                  Certification Body
        (Inspection Body)

Organisation with          Assessment         Certified
Processes                  Report             Process
                           Assessment         Capability
                           Certificate        Maturity
```

TYPE of Assessment

|	Type A	Type B	Type C
Independence	Shall be independent	Clear separation of responsibilities of inspection staff	Adequate segregation of responsibilities by organisation and documented procedures
Involvement in development	Not allowed	Not allowed	Allowed
Access to services	To all parties in a non-discriminatory manner	Only to own organisation	No requirements

CLASS of Assessment

	Class A	Class B	Class C	
Cost	High	Medium	Low	
Amount of objective evidence	High (three sources)	Medium (two sources)	Low (one source)	
Ratings generated	Yes	Yes	Yes	
Resource needs (order of magnitude)	200+ person hours	24 – 80 person hours	8 – 24 person hours	
Assessment team composition	A large team under a certified lead assessor	A team of two assessors lead by a certified lead assessor	A single assessor	
Typically	"Process assessment of an organisation with high safety critical aspects"	"Process assessment of a business unit, product line or project"	"Quick look process assessment to develop short term improvement priorities (or as a stepping stone for class B assessment)"	

Target Maturity Level (TMM)

TYPE A and CLASS 1/2 Assessments offered up for Certification
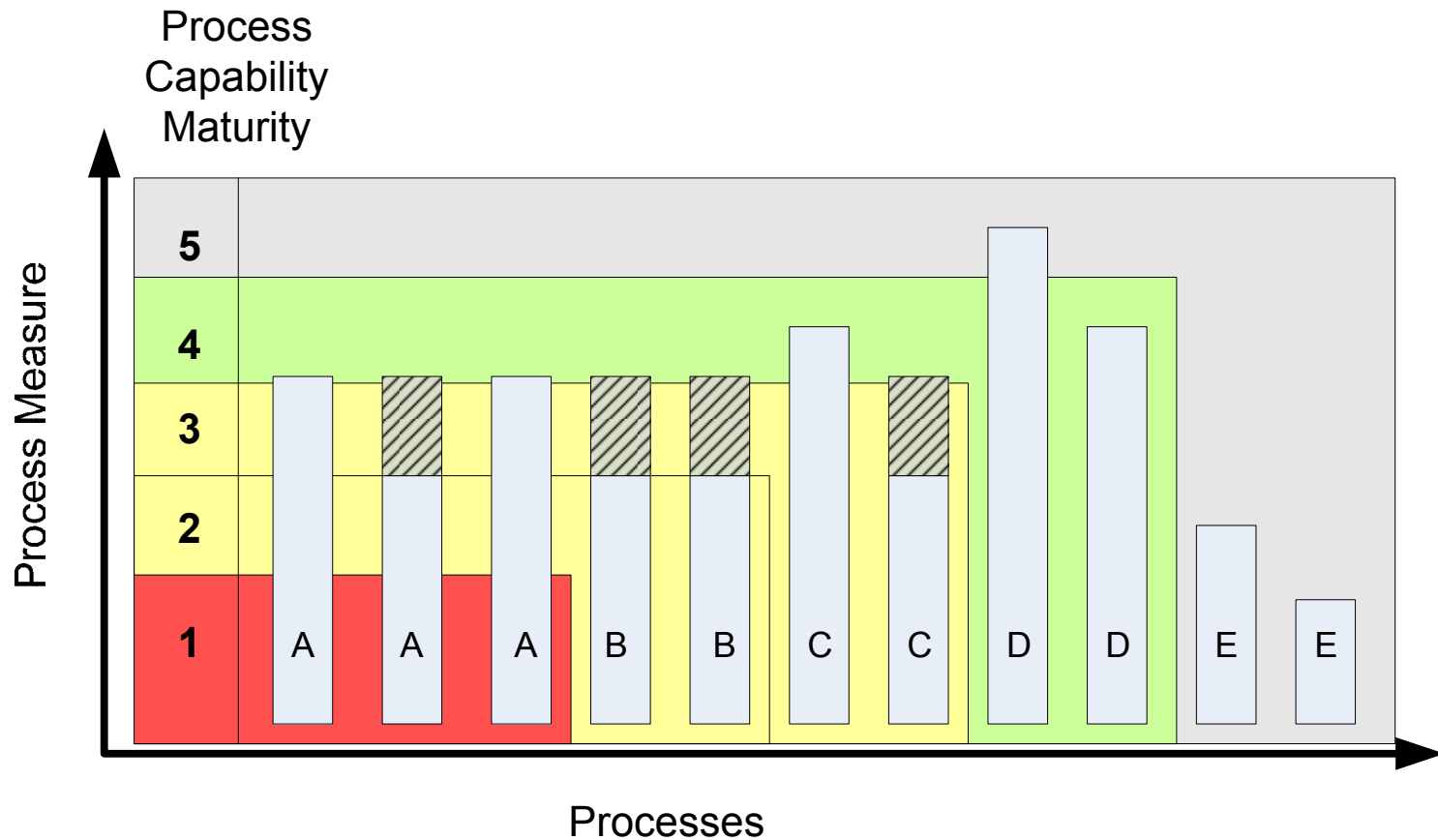
International Assessor Certification Scheme

Providing confidence in the assessors

❖ **www.int-acs.org**

❖ **Purpose**

  ✧ **To certify as competent, assessors trained and qualified in the principles and practices of assessing processes using ISO/IEC 15504.**

❖ **Intended for**

  ✧ **Internal process assessors**

  ✧ **External process assessors**

  ✧ **Process practitioners**

❖ **Three assessor grades**

  ✧ **Provisional assessor, Assessor, Principal assessor**

SPICE 2005

eXtra event

"Podcasting live from SPICE 2005"

www.isospice.com