AUTOMOTIVE SPICE® PAM, VERSION 2.5

VDA OMC

AUTOMOTIVE SOFTWARE PROCESS IMPROVEMENT AND CAPABILITY DETERMINATION

ORGANIZATIONAL Life Cycle Processes

Management Process Group (MAN)

MAN.3 Project management

The purpose of the Project management process is to identify, establish, plan, coordinate, and monitor the activities, tasks, and resources necessary for a project to produce a product and/or service, in the context of the project's requirements and

- Define the work to be undertaken by the project, and confirm that the goals of the project are feasible with available resources and constraints.
- BP2 Define project life cycle Define the life cycle for the project, which is appropriate to the scope, context,
- magnitude and complexity of the project. BP3 Determine and maintain estimates for project attributes Define and maintain baselines for project attributes
- BP4 Define project activities Plan project activities according to defined project life cycle and estimations, define and monitor dependencies between activities.
- Identify required skills needed for the project and allocate them to individuals
- BP6 Define and maintain project schedule Allocate resources to activities and determine schedule for each activity and for
- BP7 Identify and monitor project interfaces Identify and agree interfaces of the project with other (sub-) projects, organizational units and other stakeholders and monitor agreed commitments.
- BP8 Establish project plan the project scope and goals, resources, infrastructure, interfaces and
- BP9 Implement the project plan BP10 Monitor project attributes
- Monitor the defined project attributes and document significant deviations of BP11 Review and report progress of the project Regularly report and review the status of the project against the project plans to all affected parties. This includes reports to the car producer. Regularly evaluate the performance of the project.
- BP12 Act to correct deviations Take action when project goals are not achieved, correct deviations from plan and prevent recurrence of problems identified in the project. Update project

MAN.5 Risk management

The purpose of the Risk management process is to identify, analyze, treat and monitor

- BP1 Establish risk management scope
- Determine the scope of risk management to be performed for the project, in accordance with organizational risk management policies. BP2 Define risk management strategies
- Define appropriate strategies to identify risks, mitigate risks and set acceptability levels for each risk or set of risks, both at the project and organizational level.
- Identify risks to the project both initially within the project strategy and as they develop during the conduct of the project, continuously looking for risk factors at any occurrence of technical or managerial decisions.
- Analyze risks to determine the priority in which to apply resources to mitigate BP5 Define risk treatment actions
- For each risk (or set of risks) define, perform and track the selected actions to keep/reduce the risks to acceptable level.
- For each risk (or set of risks) define measures (e.g. metrics) to determine changes in the status of a risk and to evaluate the progress of the of mitigation activities. Apply and assess these risk measures.
- When expected progress in risk mitigation is not achieved, take appropriate corrective action to reduce or avoid the impact of risk.

MAN.6 Measurement

The purpose of the Measurement process is to collect and analyze data relating to the products developed and processes implemented within the organization and its projects, to support effective management of the processes and to objectively demonstrate the

- BP1 Establish organizational commitment for measurement A commitment of management and staff to measurement is established and
- communicated to the organizational unit. BP2 Develop measurement strategy
- Define an appropriate measurement strategy to identify, perform and evaluate measurement activities and results, based on organizational and project needs. BP3 Identify measurement information needs

Identify the measurement information needs of organizational and management

- Identify and develop an appropriate set of measures based on measurement BP5 Perform measurement activities
- Identify and perform measurements activities. Collect and store data of both base and derived measures, including any context

information necessary to verify, understand, or evaluate the data.

Analyze and interpret measurement data and develop information products BP8 Use measurement information for decision-making Make accurate and current measurement information accessible for any

BP7 Analyze measures

Level 1: Performed process

PA 1.1 Process performance attribute

GP 1.1.1 Achieve the process outcomes

established, controlled and maintained.

Level 2: Managed process

PA 2.1 Performance management attribute

GP 2.1.3 Adjust the performance of the process

PA 2.2 Work product management attribute

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GP 2.1.6 Manage the interfaces between involved parties

GP 2.2.1 Define the requirements for the work products

GP 2.2.3 Identify, document and control the work products

The previously described Performed process is now implemented in a managed

GP 2.1.1 Identify the objectives for the performance of the process

fashion (planned, monitored and adjusted) and its work products are appropriately

GP 2.1.2 Plan and monitor the performance of the process to fulfil the identified

GP 2.1.5 Identify and make available resources to perform the process according to

GP 2.1.4 Define responsibilities and authorities for performing the process

GP 2.2.2 Define the requirements for documentation and control of the work

GP 2.2.4 Review and adjust work products to meet the defined requirements

The implemented process achieves its process purpose.

- decision-making processes for which it is relevant. BP9 Communicate measures Disseminate measurement information to all affected parties who will be using
- them and collect feedback to evaluate appropriateness for intended use. BP10 Evaluate information products and measurement activities Evaluate information products and measurement activities against the identified
- information needs and measurement strategy. Identify potential improvements. BP11 Communicate potential improvements Communicate to the affected people the identified potential improvements concerning the processes they are involved in.

Process Improvement Process Group (PIM)

PIM.3 Process improvement

The purpose of the Process improvement process is to continually improve the organization's effectiveness and efficiency through the processes used and aligned with the business need.

- Commitment is established to support the process group, to provide resources and further abilities (trainings, methods, infrastructure, etc.) to sustain
- improvement actions. BP2 Identify issues Processes and interfaces are continuously analyzed to identify issues arising
- from the organization's internal / external environment as improvement opportunities, and with justified reasons for change. This includes issues and
- improvement suggestions addressed by the customer. BP3 Establish process improvement goals
- Analysis of the current status of the existing process is performed, focusing on those processes from which improvement stimuli arise, resulting in
- mprovement objectives for the processes being established. BP4 Prioritize improvements
- BP5 Plan process changes **BP6** Implement process changes
- The improvements to the processes are implemented. Process documentation is updated and people are trained. BP7 Confirm process improvement The effects of process implementation are monitored, measured and confirmed
- BP8 Communicate results of improvement Knowledge gained from the improvements and progress of the improvement
- implementation is communicated outside of the improvement project across BP9 Evaluate the results of the improvement project Evaluate the results of the improvement project to check whether the solution was successful and can be used elsewhere in the organization.

Reuse Process Group (REU)

REU.2 Reuse program management

The purpose of the Reuse program management process is to plan, establish, manage, control, and monitor an organization's reuse program and to systematically exploit reuse

- BP1 Define organizational reuse strategy Define the reuse program and necessary supporting infrastructure for the
- BP2 Identify domains for potential reuse Identify set(s) of systems and their components in terms of common propertie that can be organized into a collection of reusable assets that may be used to
- BP3 Assess domains for potential reuse Assess each domain to identify potential use and applications of reusable components and products.
- BP4 Assess reuse maturity Gain an understanding of the reuse readiness and maturity of the organization, to provide a baseline and success criteria for reuse program management.
- Evaluate suitability of the provided reusable components and product(s) to

BP5 Evaluate reuse proposals

- BP6 Implement the reuse program Perform the defined activities identified in the reuse program. BP7 Get feedback from reuse
- Establish feedback, assessment, communication and notification mechanism to control the progress of reuse program. BP8 Monitor reuse

Monitor the implementation of the reuse program periodically and evaluate its suitability to actual needs.

The purpose of the System architectural design process is to identify which system

- BP1 Define system architectural design Establish the system architecture design that identifies the elements of the
- system with respect to the functional and non-functional system requirements. BP2 Allocate System Requirements Allocate all system requirements to the elements of the system architectural
- BP4 Develop verification criteria ef<mark>ine the verification criteria for each eleme</mark>nt of the system concerning
- Ensure that the system architecture meets all system requirements. architectural design Ensure consistency of system requirements including verification criteria to system architectural design including verification criteria. Consistency is supported by establishing and maintaining bilateral traceability between the

PRIMARY Life Cycle Processes

Engineering Process Group (ENG)

ENG.1 Requirements elicitation

The purpose of the Requirements elicitation process is to gather, process, and track evolving customer needs and requirements throughout the life of the product and/or service so as to establish a requirements baseline that serves as the basis for defining the

- needed work products. Obtain customer requirements and requests Obtain and define customer requirements and requests through direct solicitation of customer input and through review of customer business
- proposals (where relevant), target operating and hardware environment, and other documents bearing on customer requirements. Understand customer expectations
- Ensure that both supplier and customer understand each requirement in the
- BP3 Agree on requirements Obtain an explicit agreement from all relevant parties to work to these BP4 Establish customer requirements baseline

Formalize the customer's requirements and establish as a baseline for project

requirements baseline to ensure enhancements resulting from changing

- use and monitoring against customer needs. The supplier should determine the requirements not stated by the customer but necessary for specified and intended use and include them in the baseline. Manage customer requirements changes Manage all changes made to the customer requirements against the custome
- technology and customer needs are identified and that those who are affected by the changes are able to assess the impact and risks and initiate appropriate BP6 Establish customer-supplier query communication mechanism Provide a means by which the customer can be aware of the status and disposition of their requirements changes and the supplier can have the ability

to communicate necessary information, including data, in a customer-specified

The purpose of the System requirements analysis process is to transform the defined customer requirements into a set of desired system technical requirements that will

guide the design of the system.

BP1 Identify System Requirements Use the customer requirements as the basis for identifying the required in a system requirements specification.

ENG.2 System requirements analysis

- BP2 Analyze system requirements Analyze the identified system requirements in terms of technical feasibility, risks
- BP3 Determine the impact on the operating environment Determine the interfaces between the system requirements and other
- components of the operating environment, and the impact that the requirements Prioritize and categorize system requirements
- ioritize and categorize the identified and analyzed system requirements and map them to future releases of the system. BP5 Evaluate and update system requirements
- Evaluate system requirements and changes to the customer's requirements baseline in terms of cost, schedule and technical impact. Approve the system requirements and all changes to them and update the system requirements BP6 Ensure consistency and bilateral traceability of customer requirements to system
- Ensure consistency of customer requirements to system requirements including verification criteria. Consistency is supported by establishing and maintaining bilateral traceability between the customer's requirements and system requirements including verification criteria. Communicate system requirements Establish communication mechanisms for dissemination of system

requirements, and updates to requirements to all relevant parties.

ENG.3 System architectural design

requirements are to be allocated to which elements of the system.

- BP₃ Define Interfaces Identify, develop and document the internal and external interfaces of each
- the functional and non-functional system requirements based on the system BP5 Verify System Architectural Design BP6 Ensure consistency and bilateral traceability of system requirements to system
- design including verification criteria. BP7 Communicate system architectural design Establish communication mechanisms for dissemination of the system architectural design to all relevant parties.

ENG.4 Software requirements analysis

The purpose of the Software requirements analysis process is to establish the software requirements for the system.

- BP1 Identify software requirements Use the system requirements and the system architectural design as the basis fo identifying the functional and non-functional requirements of the software and document the software requirements in a software requirements specification. BP2 Analyze software requirements
- Analyze the identified software requirements in terms of technical feasibility risks and testability. BP3 Determine the impact on the operating environment Determine the interfaces between the software requirements, system
- requirements and/or other components of the operating environment, and the impact that the requirements will have. BP4 Prioritize and categorize software requirements Prioritize and categorize the identified and analyzed software requirements and BP5 Evaluate and update software requirements

Evaluate software requirements and changes to the system requirements and

- or system architectural design in terms of cost, schedule and technical impact. Approve the software requirements and update the software requirements BP6 Ensure consistency and bilateral traceability of system requirements to software requirements Ensure consistency of system requirements including verification criteria to software requirements including verification criteria. Consistency is supported
- verification criteria. BP7 Ensure consistency and bilateral traceability of system architectural design to software requirements Ensure consistency of system architectural design including verification criteria to software requirements including verification criteria. Consistency is supported by establishing and maintaining bilateral traceability between the system

by establishing and maintaining bilateral traceability between the system

requirements including verification criteria and software requirements including

architectural design including verification criteria and software requirements including verification criteria. Communicate software requirements Establish communication mechanisms for dissemination of software requirements, and updates to requirements to all relevant parties.

ENG.5 Software design

The purpose of the Software design process is to provide a design for the software that

- implements and can be verified against the software requirements. BP1 Develop software architectural design
- Use the functional and non-functional software requirements to develop a software architecture that describes the top-level structure and all the software components including software components available for reuse.
- BP2 Allocate software requirements Allocate all software requirements to the components of the software
- BP3 Define interfaces Identify, develop and document the internal interfaces between the software components and external interfaces of the software components.
- BP4 Describe dynamic behaviour Evaluate and document the dynamic behaviour of and interaction between
- BPs Define resource consumption objectives Determine and document the resource consumption objectives for all software BP6 Develop detailed design
- Dec<mark>ompo</mark>se the software architectural design into a detailed design for each software component describing all software units and their interfaces. BP7 Develop Verification Criteria Define the verification criteria for each component concerning their dynamic behaviour, interfaces and resource consumption based on the software
- BP8 Verify Software Design Ensure that the software design meets all software requirements. BP9 Ensure consistency and bilateral traceability of software requirements to software Ensure consistency of software requirements including verification criteria to software architectural design including verification criteria. Consistency is
- supported by establishing and maintaining bilateral traceability between the software requirements including verification criteria and software architectural design including verification criteria. BP10 Ensure consistency and bilateral traceability of software architectural design to software detailed design Ensure consistency of software architectural design including verification criteria to software detailed design including verification criteria. Consistency is supported by establishing and maintaining bilateral traceability between the

software architectural design including verification criteria and software detailed

ENG.6 Software construction

design including verification criteria.

- The purpose of the Software construction process is to produce verified software units
- BP1 Define a unit verification strategy Develop a strategy for verification and re-verifying the software units. The strategy should define how to achieve the desired quality with the available and suitable techniques over the complete range of allowed application parameter
- BP2 Analyze software units Analyze the defined software units in terms of interoperability, interaction, criticality, technical complexity, risks and testability.
- BP3 Prioritize and categorize software units Prioritize and categorize the identified and analyzed software units and map BP4 Develop software units Develop and document the executable representations of each software unit. BP5 Develop unit verification criteria
- Develop and document verification criteria to verify that each software unit satisfies its design, functional and non-functional requirements over the complete range of allowed application parameter combinations. BP6 Verify software units Verify software units against the detailed design according to the verification
- BP7 Record the results of unit verification Document the results of unit verification and communicate to all relevant BP8 Ensure consistency and bilateral traceability of software detailed design to Ensure consistency of software detailed design including verification criteria to software units including verification criteria. Consistency is supported by
- establishing and maintaining bilateral traceability between the software detailed design including verification criteria and software units including verification BP9 Ensure consistency and bilateral traceability of software requirements to software Ensure consistency of software requirements including verification criteria to software units including verification criteria. Consistency is supported by establishing and maintaining bilateral traceability between the software

requirements including verification criteria and software units including

verification criteria. BP10 Ensure consistency and bilateral traceability of software units to test specification for software units specification for software units including test cases for software units. Consistency is supported by establishing and maintaining bilateral traceability between the software units including verification criteria and test specification

ENG.7 Software integration test

and to test the interaction between the software items.

Integrate software units and software items

The purpose of the Software integration test process is to integrate the software units into larger assemblies, producing integrated software consistent with the software design

- Develop software integration strategy Develop the strategy for integrating software items consistent with the release strategy and an order for integrating them.
- BP2 Develop software integration test strategy Develop the strategy for testing the integrated software items. Identify test steps according to the order of integration defined in the integration strategy. BP3 Develop test specification for software integration test
- Develop the test specification for software integration test including test cases, to be executed on each integrated software item. The test cases should demonstrate compliance to the software architectural design and software detailed design allocated to each software item
- Integrate the software units to software items and software items to integrated software according to the software integration strategy. BP5 Verify the integrated software Verify each integrated software item against the test cases for software ntegration test according to the software integration test strategy. Record the results of software integration testing

Document the results of software integration testing and communicate to al

BP7 Ensure consistency and bilateral traceability of software architectural design and

software detailed design to software integration test specification

is supported by establishing and maintaining bilateral traceability between software architectural design and software detailed design to software ntegration test specification including test cases. Develop regression testing strategy and perform regression testing Develop the strategy for re-testing the software items if changed software items are integrated. Perform regression testing as defined in the regression test

to software integration test specification including test cases. Consistency

Ensure consistency of software architectural design and software detailed design

ENG.8 Software testing

strategy and document the results.

The purpose of the Software testing process is to confirm that the integrated software

- neets the defined software requirements. BP1 Develop software test strategy Develop the strategy for software testing consistent with the release strategy.
- BP2 Develop test specification for software test Develop the test specification for software test including test cases, to be executed on the integrated software. The test cases should demonstrate

Develop regression test strategy and perform regression testing

- BP3 Verify integrated software Verify the integrated software against the test cases for software testing and according to the software test strateg Record the results of software testing Document the results of software testing and communicate to all relevant
- BP5 Ensure consistency and bilateral traceability of software requirements to software test specification Ensure consistency of software requirements to software test specification including test cases. Consistency is supported by establishing and maintaining bilateral traceability between the software requirements and software test

Develop the strategy for retesting the integrated software should a software item

be changed. If changes are made to software items carry out regression testing

as defined in the software regression test strategy, and record the results.

ENG.9 System integration test

BP2 Develop system integration test strategy

specification including test cases.

The purpose of the System integration test process is to integrate the system elements to produce an integrated system that will satisfy the system architectural design and the customers' expectations expressed in the system requirements.

- BP1 Develop system integration strategy Develop the strategy for integrating the hardware, mechanics and software consistent with the release strategy and the order for integrating them.
- Develop the strategy for testing the integrated system. Identify test steps according to the order of integration defined in the integration strategy. Develop a test specification for system integration Develop the test specification system integration, including the test cases, to be executed on each integrated system element. The test cases should demonstrate
- compliance to the system architectural design. BP4 Integrate system elements Integrate the system elements to an integrated system according to the system Verify the integrated system
- Verify each integrated system element against the test cases for system integration according to the system integration test strategy. BP6 Record the results of system integration testing Document the results of system integration testing and communicate to all BP7 Ensure consistency and bilateral traceability of system architectural design to the system integration test specification
- Ensure consistency of system architectural design to the system integration test specification including test cases. Consistency is supported by establishing and maintaining bilateral traceability between the system architectural design and system integration test specification system including test cases. Develop regression testing strategy and perform regression testing Develop the strategy for re-testing the system elements if changed hardware, mechanics and software are integrated. Perform regression testing as defined in

ENG.10 System testing

systems test specification

The purpose of the Systems testing process is to ensure that the implementation of each

the regression test strategy and document the results.

system requirement is tested for compliance and that the system is ready for delivery. BP1 Develop system test strategy Develop the strategy for system testing consistent with the release strategy.

BP5 Ensure consistency and bilateral traceability of system requirements to the

Ensure consistency of system requirements to the systems test specification

- BP2 Develop test specification for system test Develop the test specification for system test, including the test cases, to be BP3 Verify integrated system Verify the integrated system against the test cases for system testing and according to the system test strategy Record the results of system testing
- including test cases. Consistency is supported by establishing and maintaining bilateral traceability between the system requirements and systems test specification including test cases. BP6 Develop system regression test strategy and perform testing Develop the strategy for re-testing the integrated system if a system element is changed. If changes are made to system elements, carry out regression testing as defined in the system regression test strategy, and record the results.

Acquisition Process Group (ACQ)

- **ACQ.4 Supplier monitoring**
- The purpose of the Supplier monitoring process is to monitor the performance of the BP1 Agree on joint processes and joint interfaces Establish an agreement on joint processes and joint interfaces, responsibilities type and frequency of joint activities, communications, meetings, status reports
- problem management, quality assurance and customer acceptance Establish and maintain communications between customer and supplier for all agreed information, processes and interfaces BP3 Review technical development with the supplier

and reviews. Agree on processes and interfaces at least for change management,

- Review development with the supplier on the agreed regular basis, covering BP4 Review progress of the supplier
- Review progress of the supplier regarding schedule, quality and cost on the agreed regular basis, also tracking problems to successful completion and performing risk mitigation activities. BP5 Tra<mark>ck open</mark> items Record open items found, pass them to the supplier and track them to closure

Take action when agreed targets are not achieved, to correct deviations from the

agreed project plans and to prevent reoccurrence of problems identified.

Changes on agreed activities proposed by either party are negotiated and the results are documented in the agreement.

BP6 Act to correct deviations

Supply Process Group (SPL)

ACQ.3, ACQ.11 - ACQ.15 are not shown in this poster

SPL.1 Supplier tendering

- The purpose of Supplier tendering process is to establish an interface to respond to customer inquiries and requests for proposal, prepare and submit proposals, and confirm assignments through the establishment of a relevant agreement / contract.
- BP1 Establish communication interface A communication interface is established and maintained in order to respond to customer inquiries or requests for proposal. BP2 Perform customer enquiry screening

Perform customer enquiry screening to ensure validity of contract, ensuring the

Identify and nominate staff with appropriate competency for the assignment.

Formally confirm the agreement to protect the interests of customer and

supplier proposal response is prepared in response to the customer request.

BP3 Establish customer proposal evaluation criteria Establish evaluation criteria to determine whether or not to submit a proposal based on appropriate criteria. BP4 Evaluate customer request for proposal

right person is quickly identified to process the lead.

Requests for proposal are evaluated according to appropriate criteria. Determine need for preliminary pre-studies Determine need for preliminary pre-studies to ensure that a firm quotation can be made based on available requirements. BP6 Identify and nominate staff

BP2 Define release products

BP5 Build the release from configured items

approved and available.

BP10 Ensure product release approval before delivery

BP7 Prepare supplier proposal response

BP8 Establish confirmation of agreement

- **SPL.2 Product release**
- The purpose of Product release process is to control the release of a product to the intended customer. BP1 Define the functional content of releases Establish a plan for releases that identify the functionality to be included in each
- The products associated with the release are defined. BP3 Establish a product release classification and numbering scheme A product release classification and numbering scheme is established based upon the intended purpose and expectations of the release(s). BP4 Define the build activities and build environment
- BP6 The type, service level and duration of support for a release are communicated. The type, service level and duration of support for a release is identified and BP7 Determine the delivery media type for the release
- The media type for product delivery is determined in accordance with the needs of the customer. BP8 Identify the packaging for the release media The packaging for different types of media is identified. BP9 Define and produce the product release documentation / release notes Ensure that all documentation to support the release is produced, reviewed,
- BP11 Ensure consistency Ensure consistency between software release number, paper label and EPROM-Label (where relevant). BP12 Provide a release note A release is supported by information detailing key characteristics of the release. BP13 Deliver the release to the intended customer

The product is delivered to the intended customer with positive confirmation of

SUPPORTING Life Cycle Processes

Supporting Process Group (SUP)

SUP.1 Quality assurance

- The purpose of the Quality assurance process is to provide independent assurance that work products and processes comply with predefined provisions and plans.
- BP1 Develop project quality assurance strategy A project level strategy for conducting quality assurance is developed. This strategy is consistent with the organisational quality management strateg BP2 Develop and maintain an organisation structure which ensures that quality

assurance is carried out and report independentely

work products meet the quality requirements.

BP7 Track and record quality assurance activities

BP8 Report quality assurance activities and results

BP9 Ensure resolution on non-conformances

or project properly reflects the specified requirements.

BP4 Determine and track actions for verification results

BP10 Implement an escalation mechanism

SUP.2 Verification

BP1 Develop a verification strategy

BP2 Develop criteria for verification

BP5 Report verification results

SUP.4 Joint review

Prepare joint review

BP4 Conduct joint reviews

BP5 Distribute the results

preparation for the review.

BP6 Determine actions for review results

BP7 Track actions for review results

SUP.7 Documentation

BP2 Establish standards for documentation

Specify documentation requirements

BP1 Develop a documentation management strategy

BP4 Identify the relevant documentation to be produced

appropriate before distribution or release.

information produced by a process.

BP5 Develop documentation

approved as appropriate.

BP7 Distribute documentation

BP8 Maintain documentation

BP8 Identify and record problems

BP3 Conduct verification

BP6 Assure quality of process activities

Quality assurance team members are not directly responsible to the project organisation – they work independently from it. BP3 Develop and implement a plan for project quality assurance based on a quality

is<mark>suran</mark>ce that the processes meet the defined requirements of the project

Regularly report performances, deviations, and trends of quality assurance

Develop and maintain the escalation mechanism that ensures that quality

The purpose of the Verification process is to confirm that each work product of a process

Develop and implement a verification strategy, including verification activities

with associated methods, techniques, and tools, work product or processes

under verification, degrees of independence for verification and schedule for

Develop the criteria for verification of all required technical work products.

Verify identified work products according to the specified strategy and to the

developed criteria to confirm that the work products meet their specified

Problems identified by the verification should be entered into the problem

The purpose of the loint review process is to maintain a common understanding with th

stakeholders of the progress against the objectives of the agreement and what should

be done to help ensure development of a product that satisfies the stakeholders. Joint

criteria for problem identification, resolution and agreement.

recorded, and that action items raised are recorded for action.

Collect, plan, prepare and distribute review material as appropriate in

Document and distribute the review results to all the affected parties.

Analyze the review results, propose actions for resolution and determine the

Track actions for resolution of identified problems in a review to closure.

The purpose of the Documentation process is to develop and maintain the recorded

Develop a documentation management strategy which addresses where, when

Establish standards for developing, modifying and maintaining documentation.

Specify requirements for documentation such as title, date, identifier, version

For any given development life cycle, identify the documentation to be produced.

history, author(s), reviewer, authorizer, outline of contents, purpose, and

Develop documentation at required process points according to established

Review documentation before distribution, and authorize documentation as

Distribute documentation according to determined modes of distribution via

Maintain documentation in accordance with the determined documentation

appropriate media to all affected parties, confirming delivery of documentation,

standards and policy, ensuring the content and purpose is reviewed and

and what should be documented during the life cycle of the product/service.

Identify and record the problems detected during the reviews according to the

BP2 Establish a mechanism to handle review outcomes

reviews are at both project management and technical levels and are held throughout the

the reviews (this includes personnel, location and facilities) and establish review

resolution management process (SUP.9) to describe, record, analyze, resolve,

requirements. The results of verification activities are recorded.

Verification results should be reported to all affected parties.

Deviations or non-conformance found in process and product quality assurance

assurance may escalate problems to appropriate levels of management to resolve

Records of quality assurance activities are produced and retained

actituities should be analyzed, corrected and further prevented.

activities to relevant parties for information and action.

- Establish a configuration management system, which provides an efficient means for handling the configuration items. BP4 Establish branch management strategy BP4 Maintain evidence of quality assurance
- Develop a branch management strategy where applicable for parallel Define and maintain the records that demonstrate that planned quali development efforts that use the same source base. BP5 Establish baselines Assure quality of work products Carry out the activities according to the quality assurance plan to ensure that the
- Establish the internal and external (delivery) baselines according to the configuration management strategy BP6 Maintain configuration item description Carry out the activities according to the quality assurance plan to ensure
 - Maintain an up-to-date description of each configuration item. BP7 Control modifications and releases

Report status of each configuration item.

and delivery of configuration items.

SUP.8 Configuration management

BP1 Develop a configuration management strategy

BP3 Establish a configuration management system

BP2 Identify configuration items

The purpose of the Configuration management process is to establish and maintain

the integrity of all the work products of a process or project and make them available to

Develop a configuration management strategy, including configuration

Identify configuration items according to the Configuration management

management activities and a life cycle model, responsibilities and resources for

strategy that need to be stored, tested, reviewed, used, changed, delivered and /

- Establish mechanisms in order to determine configuration items to change check in/out, configuration item access permissions, version identification and BP8 Maintain configuration item history
- Maintain a history of each configuration item in sufficient detail to recover a previously baselined version when required. BP9 Report configuration status
- BP10 Verify the information about configured items Verify that the information about configured items, their structures and baselines, supplied through status accounting reporting is complete and ensure the consistency of the items and baselines. BP11 Manage the backup, storage, archiving, handling and delivery of configuration Ensure the integrity and consistency of configuration items through appropriate scheduling and resourcing of backup, storage and archiving. Control the handling

- **SUP.9** Problem resolution management
- discovered problems are identified, analyzed, managed and controlled to resolution. BP1 Develop a problem resolution management strategy Develop a problem resolution management strategy, including problem
- resolution management activities and a life cycle model, responsibilities and resources for performing these activities. BP2 Establish a consistent problem resolution management proceeding A problem resolution management proceeding is established in order to ensure that problems are detected, described, recorded, analyzed, resolved and
- prevented in a consistent and traceable way based on the problem resolution management strategy. Interfaces to affected parties are defined and maintained BP3 Identify and record the problem ach problem is uniquely i<mark>dentified and recor</mark>ded.
- BP4 Investigate and diagnose the cause and the impact of the problem Investigate and diagnose the cause and the impact of the problem in order to determine appropriate actions and provide classification. BP5 Execute urgent resolution action, where necessary
- ne problem warrants immediate resolution pending an actual change then BP6 Raise alert notifications, where necessary
- If the problem is of high classification and impacts other systems or users an alert notification may need to be raised, pending a fix or change.

Before closure, a formal acceptance has to be authorized.

BP8 Track problems to closure. Track the status of all reported problems to closure

Develop a change request management strategy, including change request

management activities and a life cycle model, responsibilities and resources for

management strategy. Interfaces to affected parties are defined and maintained

- BP9 Analyze problem trends Collect and analyze data from the problem management system (occurrence, detection, affected range, etc.), identify trends and initiate actions, where Based on the needs of the project, identify the schedule, scope and participants of management and technical reviews, agree all resources required to conduct
- Establish mechanisms to ensure that review results are made available to all affected parties, that problems detected during the reviews are identified and **SUP.10 Change request management**
- The purpose of the Change request management process is to ensure that change requests are managed, tracked and controlled. Conduct joint management and technical reviews as planned. Record the review BP1 Develop a change request management strategy
 - BP2 Establish a consistent change request management proceeding A change request management proceeding is established and implemented in order to ensure that changes are detected, described, recorded, analyzed and managed in a consistent and traceable way based on the change request
 - BP3 Identify and record the change request Each change request is uniquely identified and recorded and the initiator of the change request is retained. BP4 Record the status of change requests Change Requests and changes are allocated a status indication to facilitate

BP5 Establish the dependencies and relationships to other change requests

Identify the relationship of a change request to other change requests to

issues, risks and benefits. For every change request a priority is specified that

Changes are reviewed after implementation, verification and validation and

before closure to ensure that they have the desired effect and meet their

- establish dependencies, e.g. for all changes to a specific software component or BP6 Assess the impact of the change BP7 Analyze and prioritize change requests Change requests are analyzed in terms of resource requirements, scheduling
- ndi<mark>cates t</mark>he urgency of the change request to be considered. BP8 Approve change requests before implementation Change requests are approved on the basis of priority and availability of BP9 Identify and plan the verification and validation activities to be performed for implemented changes
- Before implementing a change the required verification and validation activities to be undertaken are identified and planned. BP10 Schedule and allocate the change request Approved change requests are scheduled to a particular delivery and are allocated to the resources responsible for implementation, verification and

objectives and respective verification criteria.

BP12 Change requests are tracked until closure

Feedback to the initiator is provided.

BP11 Review the implemented change

Bilateral Traceability

GENERIC ELEMENTS

Level 3: Established process

- PA 3.1 Process definition attribute GP 3.1.1 Define the standard process that will support the deployment of the work as an integrated system of processes
- PA 3.2 Process deployment attribute GP 3.2.1 Deploy a defined process that satisfies the context specific requirements of the use of the standard process
- the standard process GP 3.1.5 Determine suitable methods to monitor the effectiveness and suitability of
- GP 3.2.2 Assign and communicate roles, responsibilities and authorities for performing the defined process **GP 3.2.3 Ensure necessary competencies** for performing the defined process GP 3.2.4 Provide resources and information to support the performance of the

GP 3.2.5 Provide adequate process infrastructure to support the performance of the

GP 3.2.6 Collect and analyse data about performance of the process to demonstrate

The previously described Established process now operates within defined limits to achieve its process outcomes.

PA 4.1 Process measurement attribute

quantitative objectives for process performance

Level 4: Predictable process

GP 4.1.1 Identify process information needs, in relation with business goals GP 4.1.2 Derive process measurement objectives from process information needs GP 4.1.3 Establish quantitative objectives for the performance of the defined process, according to the alignment of the process with the business goals GP 4.1.4 Identify product and process measures that support the achievement of the

GP 4.1.5 Collect product and process measurement results through performing the

GP 4.1.6 Use the results of the defined measurement to monitor and verify the

GP 4.2.2 Define parameters suitable to control the process performance

GP 4.2.5 Re-establish control limits following corrective action

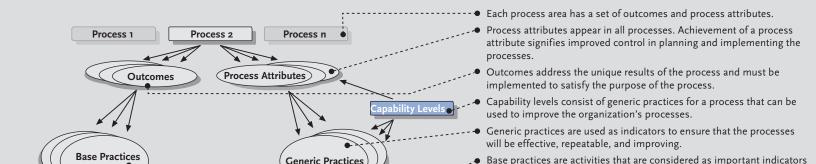
GP 4.2.3 Analyse process and product measurement results to identify variations in

GP 4.2.4 Identify and implement corrective actions to address assignable causes

The previously described Predictable process is continuously improved to meet relevant current and projected business goals. PA 5.1 Process innovation attribute

> GP 5.1.3 Identify improvement opportunities of the process based on innovation **GP 5.1.4 Derive improvement opportunities** of the process from new technologies and process concepts. Impact of new technologies on process performance is identified and evaluated.

Structure of Automotive SPICE



--● Each process area has a set of outcomes and process attributes. Process attributes appear in all processes. Achievement of a process attribute signifies improved control in planning and implementing the

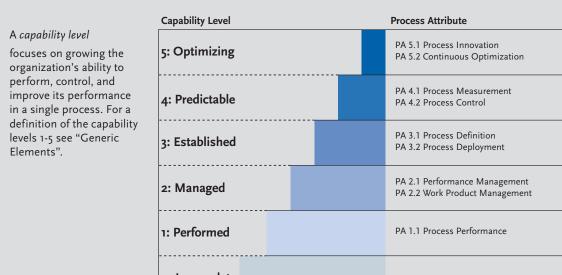
implemented to satisfy the purpose of the process.

used to improve the organization's processes.

will be effective, repeatable, and improving.

of successful outcome achievement.

HIS Scope (Hersteller Initiative Software) The German automobile manufacturers Audi, BMW, Daimler and VW agreed on a minimal subset of 15 processes, called HIS Scope, which will be assessed by each manufacturer. ACQ.4 is optional (HIS is shown in outlines).

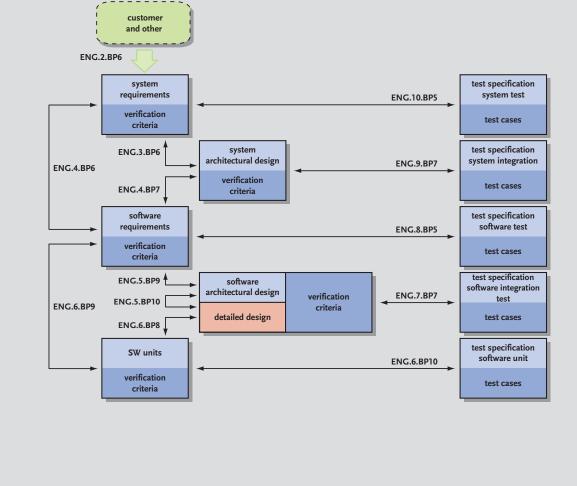


CL o: Incomplete CL 1: Performed CL 2: Managed CL 3: Established CL 4: Predictable CL 5: Optimizing

Example: Capability Levels of Software Requirements Analysis (ENG.4)

ENG.4		PA 2.x		PA 3.x	PA 4.x		PA 5.x
all base practices BP x		all generic practices of capability level 2 GP 2.x.y		all generic practice of capability level 3 GP 3.x.y	all generic practices of capability level 4 GP 4.x.y		all generic p of capability GP 5.x.y
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HOW TO USE



process capable of achieving its process outcomes.

its suitability and effectiveness

The previously described Managed process is now implemented using a defined

- GP 3.1.2 Determine the sequence and interaction between processes so that they GP 3.1.3 Identify the roles and competencies for performing the standard process GP 3.1.4 Identify the required infrastructure and work environment for performing
 - achievement of the process performance objectives PA 4.2 Process control attribute GP 4.2.1 Determine analysis and control techniques, appropriate to control the

process performance

Level 5: Optimizing process

GP 5.1.1 Define the process improvement objectives for the process that support the relevant business goals GP 5.1.2 Analyse measurement data of the process to identify real and potential variations in the process performance

GP 5.1.5 Define an implementation strategy based on long-term improvement PA 5.2 Process optimization attribute GP 5.2.1 Assess the impact of each proposed change against the objectives of the GP 5.2.2 Manage the implementation of agreed changes to selected areas of the

defined and standard process according to the implementation strategy

performance against process performance and capability objectives and

GP 5.2.3 Evaluate the effectiveness of process change on the basis of actual

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MORE INFORMATION

o: Incomplete

	all base practices	all generic practices of capability level 2 GP 2.x.y	all generic practices of capability level 3 GP 3.x.y	all generic practices of capability level 4 GP 4.x.y	all generic of capabil GP 5.x.y
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