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Information technology — Process assessment — An integrated process capability assessment model for Enterprise processes

Technologies de l'information — Évaluation des processus — Modèle d'évaluation de la capacité des processus intégrés pour les processus d'entreprise

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

ISO/IEC 33071 was prepared by SPICE User Group and was adopted, under the PAS procedure, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

About Enterprise SPICE

The process community recognized the need for an integrated standards-based enterprise process assessment model and requested an international activity to develop such a model. The initiative was first proposed and discussed at SPICE 2006 conference in Luxembourg and formally launched at SPICE 2007 conference in Seoul, Korea.

A call for participation resulted in the community signing up to support the project in various roles (e.g. advisory board member, author, reviewer, and assessor). Over 120 project team members from 31 different countries participated in developing the Enterprise SPICE integrated process assessment model for enterprise processes (Enterprise SPICE process assessment model).

The Enterprise SPICE project is hosted by the SPICE User Group, and it is governed by a 15 member Advisory Board voted in by the project stakeholders every two years. The Advisory Board has reserved seats for representatives from various geographical regions, for the SPICE User Group, and for the SPICE Academy. The Enterprise SPICE project is guided by the Enterprise SPICE strategy, which identifies goals, objectives and activities, and is led by an International Project Leader who coordinates several authoring teams. A charter governs the working of the Advisory Board.

The Enterprise SPICE process assessment model was developed and released in review cycles. In 2008, the project team developed the draft process reference model, providing a description of the proposed architecture/high-level relationship of processes, the names, purposes, and outcomes for those processes, and a list of the sources and references integrated to develop each process. All process reference model review comments were adjudicated, and accepted comments were included in the next major review cycle which provided a draft process assessment model. This 2009 release of the process assessment model elaborated the process reference model with indicators (base practices and work products), a new section on relationship notes, plus a detailed mapping table for all processes indicating the sources and references integrated at the purpose, outcome, and base practice level. All comments were adjudicated by the project team and approved comments are reflected in *Enterprise SPICE® An Integrated Model for Enterprise-wide Assessment and Improvement, Technical Report – Issue 1*, The Enterprise SPICE Project Team, September 2010. This document which provides an integrated process capability assessment model for enterprise processes is based on that Technical Report.

The public website for information about the Enterprise SPICE project is: www.enterprisespice.com.

Introduction

This document provides an integrated process capability assessment model for enterprise processes (process assessment model) that integrates and harmonizes selected process models and standards into a single enterprise improvement model. By bringing together best practices from several disciplines and several models and standards into a comprehensive improvement model, this document provides an efficient effective mechanism for assessing and improving processes deployed across a typical, large or small, enterprise.

This document provides the following benefits to stakeholders:

- **Single Unified Model**: the model integrates practices from the widely recognized standards and sources of best practice; no need to use many separate standards and models concurrently - they are consolidated into a single unified model
- **Pick and Choose**: select from the model those areas relevant to your business needs
- **Authoritative**: provides best guidance available drawn from widely recognized standards and sources, with detailed mapping tables tracing each practice to sources if further information is desired/required
- **Comprehensive**: addresses a broad, and expanding, range of disciplines
- **Synergized:** the sources are integrated, harmonized, and synergized; each source contributes important perspectives
- **Reduced Costs:**
  - Training on one model, not several
  - Improvement using one model, not several, leading to simultaneous improvement vs. all sources; compliant processes address best practice from multiple standards concurrently
  - Avoids duplication of effort
  - Appraisals vs. one model, not several, leading to simultaneous multiple ratings/ certification if desired, assuming required assessment practices are followed
- **Enhanced Effectiveness via Integrated Guidance:**
  - For all levels from enterprise to team processes
  - For large or small business units
  - Across disciplines for multidisciplinary teams
  - Aligns business and technical processes
  - Across all product and service life cycle phases/activities
  - Improvement initiatives can be aligned across the enterprise
- **Conformity Assessment**: conformity assessment services from accredited bodies.

This document can be used by any enterprise or organization that seeks to improve its business performance in an integrated way. Both large and small enterprises can use the model and reap the benefits outlined above. Individuals can use the model to get an overview of best practices and to understand how various standards and models fit together.

Information technology — Process assessment — An integrated process capability assessment model for Enterprise processes

1 Scope

This document defines an integrated process assessment model for enterprise processes (process assessment model) for use in performing a conformant assessment of process capability in accordance with the requirements of ISO/IEC 33002.

The process assessment model integrates and harmonizes existing standards, as determined by stakeholders, and provides in a single document a process reference model and process assessment model that addresses broad enterprise processes and which provide an efficient and effective mechanism for assessing and improving processes deployed across an enterprise.

NOTE: **Copyright release:** Users of this document may reproduce subclauses 6.1 to 6.5 and 7.1 to 7.2 as part of any tool or other material to support the performance of process assessments, so that it can be used for its intended purpose.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 33001:2014, *Information technology — Process assessment — Concepts and terminology*

ISO/IEC 33004:2014, *Information technology — Process assessment — Requirements for process reference, process assessment and maturity models*

ISO/IEC 33020:2014*, Information technology — Process assessment — Process measurement framework for assessment of process capability*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 33001 and ISO/IEC 33020 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:
— IEC Electropedia: available at http://www.electropedia.org/
— ISO Online browsing platform: available at http://www.iso.org/obp

4 General

The Enterprise SPICE process assessment model which forms the basis for this integrated process capability assessment model for enterprise processes (process assessment model) was built on an existing baseline enterprise model, the Federal Aviation Administration (FAA) integrated Capability Maturity Model® (iCMM®)

v2.0, which integrated a set of disciplines and source standards/models. Additional disciplines and sources were identified via a formal survey of stakeholders. These were then vetted against a set of criteria and a smaller set chosen for integration into the Enterprise SPICE process assessment model.

Criteria for discipline selection

- **Priority** criticality, importance or urgency for inclusion (should this be in first release (high), next set of disciplines (medium), sometime in future (low)?)
- **Relevance** to enterprise operations and success (how relevant is this to your business?)
- **Perceived need, value or risk reduction** for including this discipline in enterprise assessments (does this discipline need to be assessed? will risks to enterprise success be reduced by including this discipline? how valuable to the enterprise will assessments be with respect to this discipline?)
- **Existence/maturity** of process standards and best practices in the discipline (does this discipline have mature best practices?)
- **Compliance** requirements regarding these disciplines in stakeholder enterprises (do you need to comply with requirements regarding this discipline?)

Criteria for source material selection

- Only major, essential, widely-recognized process standards/models/documents should be selected as source* documents (others may be useful reference** documents).
- The number of sources for a discipline should be limited to 3 to 5 for a given area.
- Process source documents should be generic rather than method specific improvement approaches (i.e. sources indicate what, not how).

* Source documents are documents from which the process descriptions are derived. Mapping of the processes to source practices is required, along with coverage of source documents, at an appropriate level of detail.

** Reference documents are documents identified as useful in developing best practice in certain areas, but full coverage and detailed mapping are not required.

The Enterprise SPICE process assessment model addresses the following disciplines by integrating the following sources.

Disciplines: enterprise management, investment management, general management, service management, human resource management, acquisition, quality management systems, full lifecycle engineering for products and services, knowledge management, environment, safety and security, and core supporting disciplines

Sources: FAA-iCMM (baseline model, integrating ISO 9001, ISO/IEC 12207, ISO/IEC 15288, ISO/IEC 15504, Malcolm Baldrige National Quality Award, CMMI®, EIA 731, previous CMMs, MIL-STD-882C, MIL-STD-882D, IEC 61508: DEF STAN 00-56, ISO 17799, ISO 15408, ISO/IEC 21827, NIST 800-30); plus: ITIL®; ISO/IEC 20000; CobIT®; People-CMM (P-CMM®); ITIM, ISO 14000. Additional references include ISO 31000, eSCM-CL, eSCM-SP, PMI Standard for Portfolio Management, PMBOK, and FEA Practice Guidance.

See Bibliography for a full description of all the above sources and references.

5 Process assessment model architecture

5.1 Two dimensional model

This process assessment model is structured as a two-dimensional model of process capability containing a process dimension and a capability dimension.

The process dimension includes the process descriptions, purpose and outcomes of the processes from a process reference model. This process assessment model provides the defined process reference model as an integral part the process dimension in the process assessment model.

The capability dimension includes a set of process capability levels and process attributes. A process attribute is a feature of a process that can be evaluated on a scale of achievement, providing a measure of the capability of any process. The capability dimension of this process assessment model incorporates the measurement framework for process capability as defined in ISO/IEC 33020 for process Capability Levels 0 and 1.

Note that this process assessment model is a process capability model, not an maturity model, and does not describe staging or ordering of processes or practices.

This process assessment model expands upon the process reference model and process measurement framework for assessing process by including a defined set of assessment indicators. Assessment indicators comprise indicators of process performance and process capability and are defined to support an assessor's judgment of the performance and capability of an implemented process.

ISO/IEC 33004 specifies requirements for conformance of process reference models and process assessment models. Statements of conformance of the process reference model and the process assessment model to ISO/IEC 33004 requirements are provided in Annex A: Conformity of the process reference model and process assessment model with ISO/IEC 33004 Requirements.

There are 29 processes in the model which are grouped into three Process Categories and one Special Applications Area. The process categories and special application area are described below.

Governance/Management Process Category	The governance/management category includes processes that govern the enterprise and manage the business. These processes set vision and direction and oversee execution of other processes. They can be used at the enterprise, project or team level. Included in this category are processes that establish and manage relationships and partnerships among business owners, acquirers, and suppliers.
Life Cycle Process Category	The life cycle category includes processes that develop, deploy, operate and maintain a product or service to meet customer needs. These processes cover the typical life cycle of a product or service, from inception to disposal.
Support Process Category	The support category includes processes that are used by other processes when needed, and contribute to the success and quality of all the processes.
Special Applications Area	The special "application areas" provide ways of applying the processes in a particular context. The practices, called "application practices", are implemented by using other processes in the context of the special application of the model. This new construct facilitates the re-use of the model without recreating processes that are already well established.

Each process is defined in terms of a process purpose statement and process outcomes. The process purpose statements contain the unique functional objectives of the process when performed in a particular environment. The process outcomes associated with each of the process purpose statements is a list of expected positive results of the performance of the processes.

5.2 Assessment indicators

The process assessment model is based on the principle that the capability of a performed process can be assessed by demonstrating the achievement of process attribute on the basis of evidence related to assessment indicators.

There are two types of assessment indicators: process capability indicators, and process performance indicators.

The process attribute in the capability dimension has a set of process capability indicators that provide an indication of the extent of achievement of the attribute in the instantiated process. These indicators concern significant activities, resources or results associated with the achievement of the attribute purpose by a process.

The process capability indicators are:

— Generic Practice (GP);

— Generic Resource (GR);

— Generic Work Product (GWP).

Each process in the process dimension has a set of process performance indicators which are used to support the measure of the degree of achievement of the process performance attribute for the process assessed.

The process performance indicators are:

— Base Practice (BP);

— Work Products (WP).

The performance of base practices provides an indication of the extent of achievement of the process purpose and process outcomes. Work products both input and output are either used or produced (or both), when performing the process.

The process performance and process capability indicators defined in the process assessment model represent types of objective evidence that might be found in an instantiation of a process and therefore could be used to judge achievement of capability.

6 The process dimension and process performance indicators

6.1 General

This clause defines the processes and the process performance indicators, also known as the process dimension, of the process assessment model.

The process dimension includes process reference model elements (purpose and outcomes) plus process assessment model elements related to process performance indicators (base practices and work products). Additionally, it includes for each process a set of relationship notes.

The individual processes are described in terms of process ID, process name, process purpose, and process outcomes:

Process ID: This is a process category identifier, followed by a sequential number assigned to process descriptions within that category.

Process name: This is the name given to the process.

Process purpose: This is a statement of the purpose of the process.

Process outcomes: These are the outcomes expected as a result of successful implementation of the process.

In addition, the process dimension provides information in the form of:

Base practices: A set of base practices are identified by appending sequential numbers to the Process ID, followed by the practice name, followed by the practice description. Each base practice description indicates the outcome(s) addressed by the practice.

Relationship notes: Relationship notes are used to describe how the processes are related. Relationships can be of various forms, such as providing input to another process, receiving output from another process, indicating general relationships for clarification purposes, or describing when another process might be used in relation to carrying out the process being described.

Work products: Work products are provided as both input work products and output work products, each are associated with related outcome(s). They are only examples and are not intended to be prescriptive. Nor do they necessarily list all possible input or output work products. The identification of example work products is intended to help the enterprise when defining their own processes, to provide clarification for interpretation of the outcomes and base practices in the model, and to help assessors regarding potential artifacts to look for when assessing a particular process.

Work products are further used to clarify relationships between processes. For example, an input work product may be provided by a producer outside the scope of the model (such as a customer, or an external legal requirement imposed on the enterprise), or it may be provided from another process within the model. In the latter case, this relationship is noted by Relationship notes and also in Annex C: Relationship Tables which captures all such relationships. Output work products similarly fall in different categories. Some are supplied to other processes in the model, and denoted as such in Relationship notes and Annex C: Relationship Tables. Other outputs are used as records indicating achievement of outcomes and purpose.

Informative notes are provided for any of the above elements, as appropriate.

Sources and mapping: Each process description has been mapped to the source and reference documents that were brought together to derive the purpose, outcomes, and base practices. The sources and references used in developing the process descriptions are described in the Bibliography, and the specific elements integrated to derive the process descriptions are included in Annex D: High Level Mapping Tables.

Note that Annex B: Application and use of the process assessment model provides information on its use in relation to its sources.

The processes are listed below with their process ID and process name grouped into the process categories and special application area.

Figure 1 —Processes Grouped by Process Categories and Special Application Area

Governance/Management Process Category
GVM.1 Enterprise Governance GVM.2 Investment Management GVM.3 Human Resource Management GVM.4 Enterprise Architecture GVM.5 Business Relationship Management GVM.6 Supplier Agreement Management GVM.7 Tendering GVM.8 Project Management GVM.9 Risk Management
Life Cycle Process Category
LFC.1 Needs LFC.2 Requirements LFC.3 Design

LFC.4 Design Implementation LFC.5 Integration LFC.6 Evaluation LFC.7 Operation and Support LFC.8 Deployment and Disposal
Support Process Category
SUP.1 Alternatives Analysis SUP.2 Measurement and Analysis SUP.3 Quality Assurance and Management SUP.4 Change and Configuration Management SUP.5 Information Management SUP.6 Knowledge Management SUP.7 Training SUP.8 Research and Innovation SUP.9 Work Environment SUP.10 Process Definition SUP.11 Process Improvement
Special Applications Area
SAP.1 Safety and Security

6.2 Governance/Management Category

6.2.1 Enterprise Governance

Process ID	GVM.1
Process name	Enterprise Governance
Process purpose	The purpose of the Enterprise Governance process is to establish strategic enterprise direction and ensure the enterprise achieves its goals and objectives. NOTE: This process provides enterprise and corporate governance.
Process outcomes	As a result of successful implementation of the Enterprise Governance process: 1) Vision, mission, values, performance goals, objectives, and targets are established, maintained, and communicated to all employees and stakeholders. 2) Enterprise policies and directives are established, maintained, and communicated to all employees and stakeholders. 3) The organization is structured and aligned to operate in order to achieve the vision, goals, and objectives. 4) Employees share a common vision, culture, and understanding of enterprise goals and objectives and their role in achieving them. 5) Strategies are developed, budgets are formulated and aligned to strategic goals, and actions to achieve goals and objectives are established and reviewed. 6) Societal impacts, regulatory and legal requirements, environmental impacts, and risks are recognized and addressed when operating the enterprise.

	7) Employees and stakeholders are informed about enterprise performance.
Base practices	**GVM.1.BP1: Establish and Maintain Strategic Vision.** Establish, maintain, and communicate a strategic vision that identifies long-term goals, values, performance expectations, and core activities. [Outcome: 1] **GVM.1.BP2: Establish and Maintain Policies.** Establish, maintain and communicate policies and directives. [Outcome: 2] **GVM.1.BP3: Align to Achieve the Vision.** Align the enterprise to operate in order to achieve the vision. Establish leadership systems, control systems and structures for decision making, empowerment, compliance and conflict resolution. Provide incentives for contributing to enterprise vision and strategy. Provide consequences for contravening enterprise directives and policies. [Outcome: 3] **GVM.1.BP4: Ensure sharing of common culture and vision.** Ensure that individuals in the enterprise share a common culture, understand the common vision, and are committed and empowered to perform their functions effectively. [Outcome: 4] **GVM.1.BP5: Establish and Maintain Strategy**. Establish and maintain the enterprise strategic plans that identify business objectives to be achieved, areas of business to be pursued and their interrelationships, and the significant goals to be accomplished. [Outcome: 5] **GVM.1.BP6: Formulate and Align Enterprise Budgets**. Formulate enterprise budgets to ensure alignment with strategic goals. Ensure congruency with action plans. [Outcome: 5] **GVM.1.BP7: Develop and Deploy Action Plans**. Establish, integrate, and deploy tactical action plans to accomplish enterprise business objectives. [Outcome: 5] **GVM.1.BP8: Review Performance**. Review performance relative to goals and changing needs across the enterprise. [Outcome: 5] NOTE: Performance review information is provided by related management levels, as appropriate. **GVM.1.BP9: Act on Results of Review**. Translate performance review findings into action plans. [Outcome: 5] **GVM.1.BP10: Fulfil Public Responsibility**. Address the impacts on society and the environment of planned activities, products, services, and operations, considering regulatory and legal requirements and risks associated with products, services, and operations. Ensure corporate social responsibility, and take specific actions to address relevant findings. [Outcome: 6] **GVM.1.BP11: Inform Employees Regarding Enterprise Performance.** Regularly inform employees and stakeholders regarding enterprise performance [Outcome: 7]
Relationship notes	NOTE 1: The Investment Management process manages the portfolio of enterprise investments to align with achievement of enterprise goals and objectives. NOTE 2: The Measurement and Analysis process supports the establishment

	and use of measures to evaluate performance. NOTE 3: Apply the Risk Management process for assessing risks associated with operating the enterprise. NOTE 4: The Process Definition process addresses alignment of processes to achieve enterprise business objectives. NOTE 5: The Process Improvement process addresses capability assessment, development, deployment, and evaluation of best practices for efficient effective management. NOTE 6: Products from the Enterprise Architecture process are useful in developing the enterprise strategy.

Work products	
Inputs	Outputs
Market analysis [Outcome: 1]	Strategic Vision [Outcome: 1]
Customer satisfaction reports [Outcome: 1]	Evaluations of the strategic vision [Outcome:1]
Past enterprise performance [Outcome: 1]	Long-term goals [Outcome: 1]
Technology forecasts [Outcome: 1]	Performance expectations [Outcomes: 1, 2]
Regulatory and legal requirements [Outcome: 6]	Business objectives [Outcome: 1]
Enterprise risk assessment reports [Outcome: 6]	Values [Outcome: 1]
Budget [Outcome: 5]	Core activities [Outcome: 1]
Measurements [Outcome: 5]	Product lines [Outcome: 1]
Performance information [Outcome: 5]	Targets [Outcome: 1]
Enterprise architecture [Outcome: 1, 5]	Communication plan [Outcomes: 1, 2, 4, 7]
	Policies [Outcome: 2]
	Directives [Outcome: 2]
	Leadership system [Outcome: 3]
	Unified goals [Outcome: 3]
	Conflict/issue resolution methods [Outcome: 3]

Work products	
Inputs	Outputs
	Organization charts [Outcome: 3]
	Guidelines for empowerment and decision making [Outcome: 3]
	Management structures [Outcome: 3]
	Monetary and non-monetary incentives [Outcome: 3]
	Performance plans aligned with enterprise goals and objectives [Outcome: 4]
	Strategy; Strategic plans [Outcome: 5]
	Aligned budgets; Allocated resources [Outcome: 5]
	Action Plans; Tactical Plans [Outcome: 5]
	Key performance measures/indicators [Outcome: 5]
	Performance results; Performance evaluations [Outcome: 5]
	Adjusted Plans [Outcome: 5]
	Results of regulatory or legal compliance reviews [Outcome: 6]
	Environmental improvements [Outcome: 6]
	Risk assessments [Outcome: 6]
	Enterprise performance reports [Outcome: 7]

6.2.2 Investment Management

Process ID	GVM.2
Process name	Investment Management
Process purpose	The purpose of the Investment Management process is to ensure that organizations realize optimal value from strategically aligned business investments at an affordable cost with a known and acceptable level of risk. NOTE 1: Investments may be internal or external to the enterprise. NOTE 2: Investment Management addresses management of a portfolio of investments, where a portfolio may include projects or programs or other related activities.
Process	As a result of successful implementation of the Investment Management

outcomes	process: 1) Criteria are established for categorizing, selecting and evaluating potential investment opportunities. 2) Business cases are prepared for potential investments. 3) Potential investments are prioritized for consideration in the investment portfolio. 4) An investment portfolio is established and maintained that collectively supports enterprise objectives. 5) Resources and budgets are identified and allocated. 6) The investment portfolio is reviewed based on agreed performance indicators, and is adjusted as needed to ensure alignment with enterprise objectives, acceptable risk levels, and resource constraints.
Base practices	**GVM.2.BP1: Establish Criteria.** Establish and maintain criteria for selecting and evaluating potential investments. [Outcome: 1] NOTE 1: For example, include alignment with business vision, enterprise strategy, enterprise architecture, cost, benefit, risk, performance, available resources, and business development opportunities. **GVM.2.BP2: Identify Investment Proposals.** Collect business cases, identifying and describing investment proposals. [Outcome: 2] **GVM.2.BP3: Categorize Proposals.** Define investment categories, categorization criteria, and categorize proposals. [Outcomes: 1, 3] **GVM.2.BP4: Prioritize and Evaluate Investment Proposals.** Evaluate and prioritize investment proposals. [Outcome: 3] **GVM.2.BP5: Establish and Maintain the Investment Portfolio.** Select proposals to be included in the investment portfolio. Establish and maintain the investment portfolio. [Outcome: 4] NOTE 2: The investment portfolio should provide a balanced mix with the greatest potential, to collectively support the organization's strategic initiatives and achieve strategic objectives in accordance with established criteria. **GVM.2.BP6: Identify and Allocate Resources.** Allocate resources to execute selected investments. Reallocate resources from deactivated and terminated investments. [Outcome: 5] **GVM.2.BP7: Review/evaluate Performance**. Review and evaluate ongoing investments versus stated criteria to determine whether to continue with, add to, or terminate specific investments. [Outcome: 6] **GVM.2.BP8: Adjust Investment Portfolio.** Adjust the investment portfolio in response to actual portfolio performance. [Outcome: 6] **GVM.2.BP9: Communicate Portfolio Adjustment.** Communicate results of portfolio adjustment to relevant stakeholders. [Outcome: 6] **GVM.2.BP10: Monitor Changes.** Monitor changes in strategy, risk levels, and resource constraints to assure appropriate alignment. [Outcome: 6]

Relationship notes	NOTE 1: Enterprise strategies and objectives are determined by means of the Enterprise Governance process. This process also reviews investment decisions to ensure alignment with changing enterprise needs. NOTE 2: Apply the Alternatives Analysis process for evaluating alternative investment choices. NOTE 3: Investment performance indicators can be developed by means of the Measurement and Analysis process. NOTE 4: Business cases may be prepared by means of the Project Management process. Performance indicators regarding funded investments are provided through the Project Management process. NOTE 5: Potential investments are represented in the to-be architecture developed by means of the Enterprise Architecture process. NOTE 6: Business cases for proposed innovations are from the Research and Innovation process.

Work products	
Inputs	Outputs
Enterprise strategy and objectives [Outcomes: 1, 4, 6]	Criteria for categorizing investments [Outcome: 1]
Enterprise architecture [Outcome: 1]	Criteria for selecting investments [Outcome: 1]
Portfolio risk assessments [Outcome: 6]	Criteria for evaluating investments [Outcome: 1]
Business cases [Outcome: 2]	Business cases [Outcome: 2]
	Prioritized investments [Outcome: 3]
	Investment portfolio [Outcome: 4]
	Resources and budgets [Outcome: 5]
Investment performance indicators [Outcome: 6]	Adjusted investment portfolio [Outcome: 6]

6.2.3 Human Resource Management

Process ID	GVM.3
Process name	Human Resource Management
Process purpose	The purpose of the Human Resource Management process is to provide the organization with individuals who possess skills and knowledge to perform their roles effectively and to work together as a cohesive group.

Process outcomes	As a result of successful implementation of the Human Resource Management process: 1) Committed work is matched to human resources, and qualified individuals are recruited, selected, and transitioned into assignments. 2) Objectives related to committed work are defined against which performance can be measured. 3) Individual and group workforce activities are efficiently and effectively coordinated. 4) Individuals are compensated and rewarded based on their contribution and value to the organization. 5) Skills and competencies are developed, maintained or enhanced. 6) Knowledge is shared for efficient and effective interaction. 7) Workforce performance is monitored against objectives.
Base practices	**GVM.3.BP1: Develop a Strategy for Human Resource Management.** Develop a strategy for human resource management, including how needed skills and competencies will be identified, developed or acquired, personnel performance evaluated, career development established, and personnel are motivated and matched to current and future business needs, at both the organizational and unit levels. [Outcomes: 1, 2, 5] **GVM.3.BP2: Identify Needed Skills and Competencies.** Identify and evaluate skills and competencies needed by the organization to achieve its goals. [Outcomes: 1, 2] **GVM.3.BP3: Define Evaluation Criteria.** Define objective criteria that can be used to evaluate candidates and assess staff performance. [Outcome: 2] **GVM.3.BP4: Recruit Qualified Staff.** Establish a systematic program for recruitment of staff competent to meet the needs of the organization**.** [Outcome: 1] **GVM.3.BP5: Develop Staff Skills and Competencies.** Define and provide opportunities for staff to develop skills and competencies. [Outcome: 5] **GVM.3.BP6: Support Staff Interaction and Collaboration.** Support staff interaction and collaboration to enable staff to work together as a cohesive group. [Outcomes: 3, 4, 6] **GVM.3.BP7: Empower Project Teams**. Empower teams to perform their job, by ensuring that they have: - an understanding of their job; - a shared vision or sense of common interest; - appropriate mechanisms or facilities for communication; and - support from management for what they are trying to accomplish. [Outcomes: 1, 3, 6, 7] **GVM.3.BP8: Evaluate Staff Performance.** Evaluate performance of the staff with respect to their contributions toward the goals of the organization as a whole. Ensure feedback is discussed with the staff.

	[Outcomes: 2, 4, 7] **GVM.3.BP9: Provide Feedback on Performance.** Ensure feedback is provided, at least annually, to the staff through formal personnel evaluations on results of their performance. [Outcomes: 2, 3, 4, 7] **GVM.3.BP10: Provide Adequate Recognition to Employees.** Provide adequate remuneration and benefits to employees in accordance with their individual contributions and value produced for the organization. [Outcome: 4] **GVM.3.BP11: Maintain Staff Records.** Maintain adequate records of staff, including personnel details, information on skills, training completed, and on performance evaluations. [Outcomes: 3, 4, 5, 7]
Relationship notes	NOTE 1: Enterprise Governance process provides the vision, mission, values, performance goals, objectives, targets, policies, directives and enterprise performance, and the Human Resource Management process supports sharing a common vision, culture, understanding of enterprise goals and objectives, and the role of employees in achieving them. NOTE 2: Project Management process determines the needed skills and competencies for the staff. NOTE 3: Needs and Requirements processes support the elaboration of identification of personnel needed skills and competencies. NOTE 4: Tendering and Supplier Agreement Management processes support the acquisition of services to address Human Resource Management process needs. NOTE 5: Human Resource Management process is applied to support Process Improvement process. NOTE 6: Knowledge Management process supports the Human Resource Management process to obtain the skills to share expertise of individuals and groups. NOTE 7: Human Resource Management process interacts with Training process.

Work products	
Inputs	Outputs
Personnel policy [Outcomes: 1, 2, 4, 5, 7]	
Human resource management plan [Outcome: 1]	Human resource management plan [Outcome: 1]
Human resource needs analysis [Outcome: 1]	Human resource needs analysis [Outcome: 1]
Project Management plan [Outcomes: 1, 2]	

Work products	
Inputs	Outputs
	Acquisition plan [Outcomes: 1, 2]
	Personnel performance criteria [Outcome: 2]
National Privacy laws [Outcome: 1]	
Personnel record [Outcomes: 1, 2]	Personnel record [Outcomes: 1, 2, 4, 5, 7]
	Organization, project, individual training needs [Outcomes: 1, 2, 5, 6]
Training record [Outcomes: 3, 5, 6]	Training record [Outcomes: 3, 5, 6, 7]
	Personnel performance evaluation [Outcomes: 2, 7]
	Personnel performance review record [Outcome: 7]

6.2.4 Enterprise Architecture

Process ID	GVM.4
Process name	Enterprise Architecture
Process purpose	The purpose of the Enterprise Architecture process is to establish and maintain an enterprise-wide architecture to facilitate mission success. NOTE: Enterprise Architecture is a means to describe an enterprise-wide structure that aligns its information flow, planning and operating processes, and infrastructure to achieve the organization's goals. The description should be comprehensive enough to include the enterprise's mission, strategy, business processes, and technological components and their relationships to the organization's environment and evolution.
Process outcomes	As a result of successful implementation of the Enterprise Architecture process: 1) Based upon adopted, recognized, and credible models and standards, an enterprise architectural framework is established and maintained. 2) A description of the current enterprise architecture is maintained in terms of the selected architecture framework. 3) A description of the target enterprise architecture is established and maintained that is based on analysis of mission needs. 4) Transition planning to achieve the target enterprise architecture is maintained and executed.
Base practices	**GVM.4.BP1: Adopt Standards.** Adopt standards to guide the enterprise architecture program. [Outcome: 1]

	GVM.4.BP2: Establish a Framework. Based upon adopted standards, establish dimensions, appropriate to each organizational segment, that constitute the state of the enterprise and that will be used to define its nature and performance. [Outcome: 2] **GVM.4.BP3: Maintain Architecture Description.** Document and maintain a description of the architecture and its components that will be used as a baseline to measure and improve performance. [Outcome: 3] **GVM.4.BP4: Identify Opportunities and Technologies.** Analyze mission needs and technologies to identify new products and technologies to support them. [Outcome: 3] **GVM.4.BP5: Determine Desired State.** Determine and maintain a description of the desired characteristics and performance of the architecture components based on mission needs and the current performance. [Outcome: 4] **GVM.4.BP6: Establish Benchmarks.** Establish measurable increments or phases in achieving the target architecture. [Outcome: 4] **GVM.4.BP7: Achieve the Target Architecture.** Plan and execute a program to achieve the targeted architecture increments. [Outcome: 4]
Relationship notes	NOTE 1: A number of processes are employed in support of Enterprise Architecture, especially Enterprise Governance to establish the desired architecture, Measurement and Analysis to measure progress, and Change and Configuration Management to manage changes. NOTE 2: Enterprise Architecture also helps define potential investments that are realized through Investment Management.

Work products	
Inputs	Outputs
Candidate standards and models: [Outcome: 1]	Selected standards and models [Outcome: 1]
Enterprise mission needs: [Outcome: 3]	Architectural framework and its components: [Outcome: 1]
Analysis of standards and models [Outcome: 1]	Enterprise architecture description [Outcomes: 2 & 3]
Enterprise architecture description: [Outcomes: 2 & 3]	Transition plan [Outcome: 4]

6.2.5 Business Relationship Management

Process ID	GVM.5
Process name	Business Relationship Management
Process purpose	The purpose of the Business Relationship Management process is to establish and maintain a mutually satisfying relationship between the product or service supplier and the business partner based on understanding the business partner and its business drivers. NOTE: This process is closely aligned with the Needs process, but focuses on business relationships. Business relationships pertain to relationships among internal and external stakeholders and partners.
Process outcomes	As a result of successful implementation of the Business Relationship Management process: 1) Business needs and drivers are understood and used as the basis for providing products and services. 2) Interactions and collaborative relationships are established and maintained. 3) Customer demand is influenced. 4) Complaints and compliments are collected, recorded and managed to resolution. 5) A focus on value creation is established. 6) Contacts and communication with stakeholders and the business are established and retained.
Base practices	**GVM.5.BP1: Develop Relationships**. Develop and document contacts and relationships with the business, customers and stakeholders. [Outcomes: 1, 2, 3, 6] **GVM.5BP2: Establish Interactive Communication Methodologies and Structures with Stakeholders and Partners.** Name an individual or individuals who are responsible for collaboratively managing customer satisfaction and the whole Business Relationship Management process. [Outcomes: 2, 6] **GVM.5BP3: Identify Relationship Attributes.** Identify and manage cultural, market, loyalty and beneficiaries attributes. [Outcomes: 3, 5] NOTE 1: Attributes are human characteristics in the business context, as needed and determined by the enterprise. They are used to develop relationships. **GVM.5.BP4: Identify Value Creation Opportunities.** Proactively identify value creation opportunities and communicate them to the customer. [Outcomes: 5, 6] **GVM.5.BP5: Manage Complaints and Compliments.** Log and manage all complaints and compliments by analyzing existing information, obtaining feedback from customers and performing service reviews. [Outcomes: 4, 6] **GVM.5.BP6: Create Service Level Agreements**. Create Service Level Agreements between the business owner and the product/service

	supplier. [Outcomes: 2, 4] **GVM.5.BP7: Establish a Service Catalog.** Establish and maintain a service catalog for communicating with the business. [Outcome: 6]
Relationship notes	NOTE 1: Relationship attributes and value creation opportunities should be refined based on the goals, objectives and strategies identified by the Needs process. NOTE 2: Communication methodologies and structures should be used in the Tendering process.

Work products	
Inputs	Outputs
Market Analysis [Outcomes: 1, 3, 5]	Customer Attributes [Outcomes: 1, 2, 3]
Customer Loyalty Analysis [Outcomes: 2, 4]	Contact List [Outcomes: 2, 6]
Customer Feedback [Outcomes: 3, 4, 6]	Value Creation Opportunities [Outcomes: 3, 5]
	Service Level Agreements [Outcomes: 2, 4]
	Storyboards [Outcomes: 1, 3, 5]
Communication Plan [Outcomes: 2, 6]	Communication Plan [Outcomes: 2, 6]
	Complaints and Compliment Register [Outcome: 4]
	Service Catalog [Outcome: 6]

6.2.6 Supplier Agreement Management

Process ID	GVM.6
Process name	Supplier Agreement Management
Process purpose	The purpose of the Supplier Agreement Management process is to identify, select, and manage suppliers of products and services according to documented criteria and formal agreements. NOTE: A supplier is an enterprise or an individual that enters into an agreement with the acquirer or customer for providing a product or service under the terms of the agreement. The supplier can be either external or internal to the acquirer organization.
Process outcomes	As a result of successful implementation of the Supplier Agreement Management process: 1) Needs and requirements for outsourcing to suppliers are

	determined. 2) A supplier selection strategy with selection criteria is documented and implemented to evaluate possible suppliers. 3) Qualified suppliers are selected according to documented criteria to provide product components and/or solution components. 4) Qualified suppliers are managed and their performance and risks are monitored according to documented objectives in formal agreements in order to encourage clear documentation of allocated objectives and associated requirements. 5) The established agreement is documented, maintained and kept consistent with the acquirer's requirements and relevant laws, policies, regulations, and other applicable guidance. 6) Acquired products and services are accepted based on suppliers meeting the terms and conditions described in the agreement. 7) Supplier invoices are approved and paid as defined in the supplier agreement. 8) A productive communications environment, including consideration of the impact of national language and cultural factors, is established and maintained with all suppliers.
Base practices	**GVM.6.BP1: Identify Needed Products or Services**. Identify needed products and/or solutions that may be provided by internal or external supplier organizations. [Outcome: 1] **GVM.6.BP2: Prepare for the Solicitation or Tasking**. Prepare for the solicitation/tasking and the selection of a supplier, including objective review of estimates of cost for the services/products to be outsourced, a clear description of tasking, development of a supplier selection strategy, and inclusion of evaluation criteria in the solicitation/tasking package. [Outcome: 2] NOTE: Align the supplier selection strategy with enterprise vision and goals. **GVM.6.BP3: Identify Competent Suppliers**. Identify suppliers that have shown expertise or capability in the identified areas. [Outcome: 3] **GVM.6.BP4: Select Supplier**. Choose suppliers in accordance with the selection strategy and criteria. [Outcome: 3] **GVM.6.BP5: Document Supplier Agreement.** Establish a documented supplier agreement with each supplier that complies with current laws, policies and regulations, and incorporates all necessary and mutually approved supplier requirements. [Outcome: 5] **GVM.6.BP6: Administer Supplier Agreement.** Ensure the agreement is being maintained and followed, and all changes and records are properly processed, controlled and maintained. [Outcomes: 4, 5] **GVM.6.BP7: Review and Monitor Agreement Performance.** Review and monitor supplier activities through periodic formal reviews and informal, technical issue interchanges with the supplier, and by quantitative means to continuously determine agreement outcomes versus plans and requirements. [Outcome: 4] **GVM.6.BP8: Monitor Supplier's Plans, Processes, Activities and Products**. Monitor supplier's quality assurance, configuration management, test, corrective action and risk management systems,

	plans and process activities, results, and products according to the specified contractual quality model. Analyze and direct the cost, quality, and schedule performance of supplier activities against work plans. [Outcome: 4] **GVM.6.BP9: Foster Cooperative and Collaborative Environment**. Perform activities to foster a partnership between the acquiring organization and the supplier that promotes collaborative discussion, collaborative peer review, and continual process improvement. [Outcome: 8] **GVM.6.BP10: Determine Product or Service Acceptance.** Determine whether to accept the supplier's product or service, based on acceptance conditions stipulated in the agreement. [Outcomes: 6, 7] **GVM.6.BP11: Pay Supplier.** Approve and pay invoices as defined in the supplier agreement. [Outcome: 7]
Relationship notes	NOTE 1: Product or service components to be outsourced may be based on inputs from the Design Implementation process. NOTE 2: Make-versus-buy decisions and supplier selection decisions should be made in accordance with the Alternatives Analysis process. NOTE 3: Measurement requirements relating to outsourced products and services are obtained from the Measurement and Analysis process. NOTE 4: Project Management activities determine needed skills, which may be made available by training resident staff or by obtaining those skills from sources external to the acquirer organization via Supplier Agreement Management. NOTE 5: Products and services developed by a supplier are transitioned after acceptance by means of the Deployment and Disposal process. NOTE 6: Risk Management practices are useful in identifying, assessing, and mitigating acquisition risks as well as risks related to supplier tasks once acquired. NOTE 7: All supplier requirements information is recorded and change controlled throughout the life cycle according to the Requirements process. NOTE 8: In preparation for supplier selection, needs and expectations are analyzed according to the Needs process in the context of the suppliers intended operational environment. NOTE 9: Enterprise vision and goals used for developing the supplier selection strategy are developed in the Enterprise Governance process.

Work products	
Inputs	Outputs
Make-versus-buy analysis [Outcome: 1]	Needed product or service components [Outcome: 1]

Project requirements [Outcome: 1]	
Enterprise vision and goals [Outcome: 2]	Acquisition or supplier selection strategy [Outcome: 2]
Supplier selection criteria [Outcome: 2]	Supplier evaluation results
Supplier evaluation [Outcome: 3]	Selected supplier [Outcome: 3]
Agreements are documented [Outcome: 4]	Formal agreements established [Outcomes: 4,5]
Supplier performance measures [Outcome: 4]	Supplier performance review records [Outcome: 4]
Risk analysis [Outcome: 4]	Identified, assessing, and mitigating acquisition risks [Outcome: 4]
Supplier meets terms of agreement [Outcome: 6]	Accepted products and services [Outcome: 6]
Supplier invoices approved [Outcome: 7]	Paid invoices [Outcome: 7]
Communications planning [Outcome: 8]	Technical exchange meeting minutes [Outcome: 8]

6.2.7 Tendering

Process ID	GVM.7
Process name	Tendering
Process purpose	The purpose of the Tendering Process is to identify, select and bid for acquirer requests for information, quotations and proposals based on decisions that appropriately consider customer needs, risks, organizational abilities and competitor capabilities.
Process outcomes	As a result of successful implementation of the Tendering process: 1) Knowledge of skills, services, and products to be offered is established and maintained. 2) An assessment of organizational goals and target customer markets to pursue is documented, including criteria for bid submission. 3) Targeted acquirers for products and services are proactively identified based on established criteria, and targeted acquirer requests for proposals are evaluated. 4) Research and development or trade studies, related to anticipated needs of customers, are established and maintained, to fulfil needs in requests for proposals. 5) A decision, based on established criteria and risk analysis, is made to prepare, or not pursue, a proposal from an acquirer. 6) A proposal team with required skills is identified and enlisted. 7) Communication between the supplier and the acquirer is established and maintained, including dialog on customer needs,

	additional requests for proposals, and research and development opportunities. 8) A targeted proposal, that meets the need of the acquirer, is prepared and submitted. 9) Upon acceptance of proposals, formal confirmation of agreement is obtained.
Base practices	**GVM.7.BP1: Evaluate Organizational Skills, Services and Products.** Examine and document the organizational goals, service catalog, resumes and existing products to determine what target markets to pursue or develop. [Outcome: 1] **GVM.7.BP2: Establish Criteria and Risk Analysis for Submission.** Document the basis for determining a bid or no bid decision for responding to requests for proposals. [Outcome: 2] NOTE: A Request for Proposal (RFP) is a common example of an acquirer request for information. **GVM.7.BP3: Evaluate Acquirer Requests for Proposals and Inquiries.** Determine that proposed effort is in accordance with potential targets identified in organizational goals. Determine if the requested task is in line with existing organizational skills and talents or if these skills will have to be acquired. Review overall requirements to determine if they are consistent, concise and clearly defined. Document any questions that need to be posed to the acquirer for clarification. Determine the probability that the organization can be successful in this bid according to established criteria. Identify the logical contenders for the proposal and their advantages. [Outcome: 3] **GVM.7.BP4: Perform any Preliminary Research and Development, Surveys or Trade Studies.** Determine if the request requires investigation of key product or service components that may prove to be high risk when providing the requested product or service. Investigate trade studies or surveys covering the expected work involved. [Outcomes: 3, 4] **GVM.7.BP5: Make a Go/No Go Decision.** Based on established criteria and risk analysis, including preliminary research, decide whether to pursue or not pursue a request for a proposal. [Outcome: 5] **GVM.7.BP6: Identify Resources to Perform Proposed Work and Form Proposal Team**. Identify needed skills and form a qualified team to develop the proposal, and to perform the proposed work. [Outcome: 6] **GVM.7.BP7: Establish and Maintain Supplier/acquirer Communications Interface.** Assign an individual or organizational entity to establish a communications interface with the potential acquirers. Review the acquirer's schedule of events and point of contact to assure adherence to proposal preparation and delivery schedule. [Outcome: 7] **GVM.7.BP8: Perform Estimation.** Estimate costs and resources needed to satisfy the request. [Outcome: 8] **GVM.7.BP9: Prepare and Submit Proposal in Response to**

	Acquirer Request. Prepare proposal in accordance with guidelines in the acquirer's request document or request. [Outcome: 8] **GVM.7.BP10: Negotiate and Confirm Agreement.** Negotiate relevant aspects of the agreement and formally confirm the agreement. [Outcome: 9]
Relationship notes	NOTE 1: Use the Supplier Agreement Management process if product or service components for proposals need to be outsourced. NOTE 2: In preparation for tendering, needs and expectations are analyzed according to the Needs process in the context of the organizational goals identified in Enterprise Governance. NOTE 3: Use the Evaluation process to review proposals. NOTE 4: Service catalog is developed using the Business Relationship Management process. NOTE 5: Proposal documentation can be retained using the Information Management process. NOTE 6: Successful or unsuccessful experiences can be recorded and retained using the Knowledge Management process. NOTE 7: If the bid developed during the Tendering process is accepted, the practices of Supplier Agreement Management would be used to manage the agreement reached

Work products	
Inputs	Outputs
Inventory of Organizational assets [Outcome: 1]	Inventory of products and services [Outcome: 1]
Personnel Resumes [Outcome: 1]	Personnel Resumes [Outcome: 1]
Service catalog [Outcome: 1]	
Goal Analysis Results [Outcome: 2]	Organizational Goals and Targets [Outcome: 2]
	Established criteria for Proposal Selections [Outcome: 2, 3]
	Targeted acquirers [Outcome: 3]
Research and Development capabilities [Outcome: 4]	Identified and improved capabilities for proposals [Outcome: 4]
Requests for proposals [Outcome: 5]	
Risk/Benefit analysis [Outcome: 5]	Identified, mitigated risk list and associated analysis for

	each proposal [Outcome: 5]
	Selection of target proposal [Outcome: 5]
Skill set and requirements for proposal [Outcome: 6]	Roster of proposal team members with required skills and experience [Outcome: 6]
	Proposal review team meeting minutes [Outcome: 6]
	Communication records [Outcome: 7]
	Final Proposal [Outcome: 8]
	Contract or agreement [Outcome: 9]

6.2.8 Project Management

Process ID	
Process name	Project Management
Process purpose	The purpose of the Project Management process is to ensure the project achieves its objectives within given resource constraints by initiating, planning, executing, monitoring, controlling and closing the project activities and resources NOTE 1: Project Management pertains to managing any undertaking that develops and/or maintains one or more products or provides a service. This includes managing operational projects (groups of operational activities). NOTE 2: Projects may be called by various names in different organizational contexts, such as product teams, service teams, business units, or programs for managing operational projects (groups of operational activities managed as projects) or managing business units.
Process outcomes	As a result of successful implementation of the Project Management process: 1) The project is initiated and authorized, moving from the feasibility study. 2) Project plan(s) are established and maintained in order to attain the objectives and scope that the project was undertaken to address. 3) Estimates of schedule and task resources are provided with supportable rationale. 4) People and other resources are managed to carry out the project plan. 5) Progress is regularly measured and monitored to identify deviations from the project plan. 6) Corrective actions are taken when necessary to meet project objectives and are managed to closure.

	7) Completion of the product, service or results is formalized and the project or project phase is brought to an orderly end.
Base practices	**GVM.8.BP1: Define Project Objectives, Scope, and Outputs.** Define project objectives, scope, and the work products and services that are to be provided by the project. [Outcome: 1] **GVM.8.BP2: Define the Life-Cycle Approach and Activities.** Define the life-cycle approach that will be used and define and sequence the activities needed to achieve project outputs. [Outcome: 2] **GVM.8.BP3: Define Stakeholders.** Identify stakeholders and interfaces between project elements and with other project and organizational units. [Outcomes: 1, 2] **GVM.8.BP4: Estimate Planning Parameters**. Estimate and document the work product and task planning parameters that provide a basis for resource estimates. [Outcomes: 2, 3] **GVM.8.BP5: Estimate Project Resource Requirements.** Estimate the project effort, cost, schedule and other resource requirements. [Outcome: 3] **GVM.8.BP6: Establish Schedules.** Develop schedules for the project. [Outcome: 2] **GVM.8.BP7: Establish Budget.** Develop a budget for the project. [Outcome: 2] **GVM.8.BP8: Plan the Quality.** Identify the quality requirements and/or standards for the project or product and document how the project will demonstrate compliance. [Outcome: 2] **GVM.8.BP9: Develop the Human Resource Plan.** Identify the experience, knowledge and skill requirements for the project and apply them to the selection of individuals and teams. Identify the specific individuals and groups contributing to, and impacted by, the project, allocate their specific responsibilities, and ensure that commitments are understood, accepted, funded and achievable. [Outcome: 2] **GVM.8.BP10: Plan Communications.** Determine project stakeholder information needs and define a communication approach. [Outcome: 2] **GVM.8.BP11: Plan Risks.** Identify and analyze risks which may affect the project. Develop alternatives and actions in order to enhance opportunities and to reduce threats to the project objectives. [Outcome: 2] **GVM.8.BP12: Plan Procurements.** Plan and document project purchasing decisions. [Outcome: 2] **GVM.8.BP13: Establish and Maintain Plans.** Establish and maintain a complete set of plans for providing the products and services throughout the project life cycle. Plans should be sufficient to commit and manage the next phase of the project while remaining consistent with the overall scope, objectives, outputs and planning framework of the project. [Outcome: 2] **GVM.8.BP14: Establish Commitment.** Establish and maintain

	commitment of affected groups and individuals to project objectives and plans and commitment of resources as identified in the plan. [Outcome: 2] **GVM.8.BP15: Acquire, Develop and Manage Project Team.** Identify individuals or teams that will be assigned the resources and responsibilities for meeting project objectives. Improve the competencies of the team. Track team member performance, provide feedback, resolve issues and manage changes to optimize project performance. [Outcome: 4] **GVM.8.BP16: Direct and Manage Project Execution.** Perform the work defined in the project plan to achieve the project's objectives. [Outcome: 4] **GVM.8.BP17: Distribute Information.** Make relevant or established information available to project stakeholders as planned. [Outcome: 4] **GVM.8.BP18: Manage Stakeholder Expectations.** Communicate and work with stakeholders to meet their needs and address issues as they occur. [Outcome: 4] **GVM.8.BP19: Monitor Project Performance.** Monitor and track project activities and results against plans and baseline. [Outcome: 5] **GVM.8.BP20: Review and Analyze Project Performance.** Conduct formal and informal reviews of project performance and analyze variances from the plans. [Outcome: 5] **GVM.8.BP21: Take Corrective Action.** Take corrective actions to address problems. [Outcome: 6] **GVM.8.BP22: Close Project.** Close the project formally using appropriate organizational mechanisms and update organizational process assets. [Outcome: 7]
Relationship notes	Project Management establishes and maintains the schedules, resources, and integration of the activities of all process areas. Project Management gathers information and provides information to the processes engaged in providing the products and services through all life cycle phases. NOTE 1: Projects are chartered and supported by Enterprise Governance and Investment Management processes. NOTE 2: The customers and stakeholders for the project, and their expectations, are identified in the Needs process. NOTE 3: Project plans and schedules depend upon critical project requirements from the Requirements process. Integrity of the requirements and ongoing consistency between requirements and project plans depends on close coordination of Project Management and the Requirements processes. NOTE 4: The activities of Project Management interface with Supplier Agreement Management to plan and monitor acquisition of products, services, skills, or other solution components from external sources. NOTE 5: The Change & Configuration Management process is essential

	to provide Project Management with configuration control and status of the evolving products or services. NOTE 6: Project Management coordinates with the Training process regarding project training needs and individual training plans. NOTE 7: The Quality Assurance and Management process feeds process and product quality information and non-conformance issues to Project Management. NOTE 8: The Measurement and Analysis process provides measurement data in support of project monitoring and tracking and Quality Assurance and Management. NOTE 9: Integrated teaming practices are included in Project Management for establishing and supporting teams to achieve coordination and communication among stakeholders and the integration of effort necessary for timely, effective execution of the project. NOTE 10: The Risk Management process is crucial in managing risk areas that could adversely affect planned performance. NOTE 11: The business cases are used by the Investment Management process to make decisions regarding whether to invest in the proposed project (also relates to Tendering process).

Work products	
Inputs	Outputs
Request for proposal [Outcome: 1]	
Contract [Outcome: 1, 2]	
Project charter [Outcome 2,3]	Project charter [Outcome 1]
	Business case [Outcome 1]
	Scope baseline [Outcome 1]
	Estimations [Outcome 2, 3]
Process performance data [Outcome: 4, 6]	
Project measure [Outcome: 5]	
Life cycle model [Outcome: 2]	
	Work Breakdown Structure [Outcome 2]
Project activity network [Outcome: 2]	Project activity network [Outcome: 2]
	Schedule baseline [Outcome 2]
	Cost baseline [Outcome 2]

	Budget [Outcome 2]
	Quality plan [Outcome 2]
Human resource management plan [Outcome: 2]	Human resource plan [Outcome: 1]
Project plan [Outcome: 2,3]	Project plan [Outcome: 2, 3]
Risk management plan [Outcome: 2]	Risk management plan [Outcome: 2]
	Procurements plan [Outcome 2]
	Communications plan [Outcome 2]
	Work performance information [Outcome 4]
	Project staff assignments [Outcome 4]
	Team performance assessments [Outcome 4]
	Communication record [Outcome: 5]
Problem record [Outcome: 6]	
	Work performance measurements [Outcome 5]
	Quality control measurements [Outcome 5]
	Performance reports [Outcome 5]
	Risk register [Outcome 5, 7]
	Corrective action [Outcome 6]
	Lessons learned [Outcome 7]

6.2.9 Risk Management

Process ID	GVM.9
Process name	Risk Management
Process purpose	The purpose of the Risk Management process is to aid decision making by taking account of uncertainty and the possibility of future events or circumstances (intended or unintended) and their effects on agreed objectives.
Process outcomes	As a result of successful implementation of the Risk Management process: 1) A risk management strategy is established and used that includes plans covering mitigation and contingency measures, methods, criteria, (including criteria for acceptance of residual risk after risk mitigation actions) and parameters for management of risk.

	2) Risks are identified and assessed for their risk attributes, such as likelihood and consequence. 3) Risk mitigation is performed when analysis indicates action. 4) Risk mitigation actions and risk status are monitored to determine their effectiveness and corrective action is taken as needed.
Base practices	**GVM.9.BP1: Define Risk Management Strategies.** Define appropriate strategies and risk measures to identify, analyze, treat and monitor each risk or set of risks, both at the project and organizational level. NOTE 1: The context of the Risk Management process will vary according to the needs of an organization. It can involve, but is not limited to: • defining responsibilities for the Risk Management process; • defining the scope, as well as the depth and breadth, of the risk management activities to be carried out; • including specific inclusions and exclusions; • defining the activity, process, function, project, product, service or asset in terms of time and location as well as its goal and objectives; • defining the relationships between a particular project or activity and other projects or activities of the organization; • defining the risk assessment methodologies; • defining the way performance is evaluated in the management of risk; • identifying and specifying the decisions that have to be made; and • identifying, scoping or framing studies needed, their extent and objectives, and the resources required for such studies. NOTE 2: According to the context of the Risk Management process the strategy might include such aspects as approach, methods, measures, risk action and acceptance criteria, risk attributes and parameters. [Outcome: 1] **GVM.9.BP2: Identify Risks.** Identify sources of risks, areas of impacts, events and their causes both initially and repeatedly as they may develop. [Outcome: 2] **GVM.9.BP3: Assess Risks.** Assess risks to determine their risk attributes, such as likelihood of occurrence and the consequences if they occur.[Outcome: 2] **GVM.9.BP4: Develop Risk Mitigation Plans.** Develop risk mitigation plans for risks that meet risk action criteria defined by the risk management approach.[Outcome: 1] **GVM.9.BP5: Perform Risk Mitigation Actions.** Implement risk mitigation activities in accordance with risk mitigation plans. [Outcomes: 3, 4] **GVM.9.BP6: Monitor and Review Risks and their Mitigation Actions.** Monitor the current state of each risk, determine changes in the status of risk and assess the effectiveness of risk treatment actions. [Outcome: 4]
Relationship notes	NOTE 1: Risk management is part of decision making. Risk management helps decision makers make informed choices. Risk management can help prioritize actions and distinguish among alternative courses of action. Ultimately, risk management can help with

	decisions on whether a risk is unacceptable and whether risk treatment will be adequate and effective. All decision making within the organization, whatever the level of importance and significance, involves the explicit consideration of risks and the application of risk management to some appropriate degree. NOTE 2: Risk management explicitly addresses uncertainty. Risk management deals with those aspects of decision making that are uncertain, the nature of that uncertainty, and how it can be addressed. NOTE 3: The risk management approach is incorporated into risk management plans by activities of the Project Management process. NOTE 4: Risks associated with incomplete, poorly stated, or ill-defined requirements should be identified during performance of the Requirements process activities. NOTE 5: The activities of Design Implementation process should be reviewed for risks associated with the development of product and service technical approaches and design solutions. NOTE 6: The level of risk should be a consideration in Alternatives Analysis process activities and selection criteria. NOTE 7: Risk should be considered when establishing strategies in Integration and Evaluation processes. NOTE 8: Supplier Agreement Management process activities should be reviewed for risks relating to acquisition of products and services from external sources. NOTE 9: Risk management practices should be applied to assess, analyze and mitigate risks to work environment continuity within Work Environment process. NOTE 10: Risk Management process provides the mechanism to identify issues to be measured by Measurement and Analysis process. NOTE 11: Risk Management process should be used to assess the risks related to insertion of innovation by Research and Innovation process.

Work products	
Inputs	Outputs
Business goals [Outcome: 1]	Risk management strategy [Outcome: 1]
Project plan [Outcome: 1]	Definition of method and parameters for assigning risk [Outcome: 1]
Risk management plan [Outcomes: 2, 3]	Risk management plan [Outcomes: 1, 2]
Risk mitigation plan [Outcomes: 2, 3]	Risk mitigation plan [Outcomes: 1, 2]
Communication record [Outcomes: 1, 2, 3, 4]	Communication record [Outcomes: 1, 2, 3, 4]

Risk action request [Outcomes: 2, 3]	Risk action request [Outcomes: 2, 4]
Tracking system [Outcomes: 2, 4]	Tracking system [Outcomes: 2, 4]
	Risk sources list [Outcome: 2]
	Categories of risk [Outcome: 2]
	Prioritized risk list, including likelihood and consequence [Outcomes: 2, 4]
	Criteria for initiating risk mitigation actions [Outcomes: 1, 2]
	Risk root cause [Outcomes: 2, 4]
	Risk analysis report [Outcome: 2]
	Risk status report [Outcomes: 2, 4]

6.3 Life Cycle Category

6.3.1 Needs

Process ID	LFC.1
Process name	Needs
Process purpose	The purpose of the Needs process is to elicit, analyze, clarify, and document evolving customer and other stakeholder needs and expectations.
Process outcomes	As a result of successful implementation of the Needs process: 1) A statement of customer and other stakeholder needs and expectations is established and maintained. 2) The rationale for the need is established. 3) The interaction and scenarios for use of products and services with users in the intended environment is described. 4) Communication with the customer and other stakeholders is established and maintained throughout the product/service life cycle. 5) Customer satisfaction with products and services is determined, monitored and measured against customer satisfaction targets, quality and environmental aspects, service level and previous surveys.
Base practices	**LFC.1.BP1: Identify Customers and Stakeholders.** Identify customers and stakeholders. [Outcomes: 1, 4] **LFC.1.BP2: Elicit Needs.** Elicit customer and other stakeholders' needs, expectations, and measures of effectiveness. [Outcomes: 1, 2] NOTE: Needs may pertain to business value, quality, environmental

	needs and needed service levels. **LFC.1.BP3: Analyze Needs.** Analyze needs and expectations in the context of the intended operational environment. [Outcome: 3] **LFC.1.BP4: Establish and Maintain a Statement of Need.** Establish and maintain a statement of customer and other stakeholder needs and expectations that is understood and agreed upon by the customer and other stakeholders. [Outcome: 1] **LFC.1.BP5: Communicate with Customers.** Communicate and interact with customers and other stakeholders throughout the life cycle to assure a common understanding of the status and disposition of needs, expectations, and measures of effectiveness. [Outcome: 4] **LFC.1.BP6: Determine Customer Satisfaction.** Determine customer satisfaction with products and services. [Outcome: 5]
Relationship notes	NOTE 1: Needs elicitation and analysis should be performed based on the relationship attributes identified by the Business Relationship Management process. NOTE 2: When the Needs process establishes an expression of a new potential problem to be solved, further efforts to meet these needs are initiated according to the practices of the Investment Management process, which assures alignment of stated needs with enterprise goals, objectives, priorities, and resource availability. Needs so "approved" become input to the Requirements process. NOTE 3: As the problem to be solved becomes more clearly understood, the Needs process is performed iteratively with the Requirements process. NOTE 4: The statement of needs and expectations is baselined and controlled using the practices of the Change and Configuration Management. It forms a basis for the development of requirements in the Requirements process. NOTE 5: The practices of the Alternatives Analysis process can be used to resolve conflicting needs and expectations. NOTE 6: Customer satisfaction can be measured using practices of the Measurement and Analysis process. NOTE 7: Customer satisfaction information is useful in measuring performance of a quality management system as described in Quality Assurance and Management. It can also be used as input for management review and action at the enterprise or project level by means of the Enterprise Governance or Project Management processes. NOTE 8: Products and services are validated in the operational environment to assure that customer needs and expectations are met using the practices of Evaluation. NOTE 9: Practices of Project Management are useful in coordinating and communicating with the customer and other stakeholders. NOTE 10: Demonstrations of potential new technologies as a result of

	the Research and Innovation process are ways of eliciting needs. NOTE 11: Practices of Operation and Support are useful in establishing mechanisms for receiving customer satisfaction information as well as feedback on changing needs. NOTE 12: The Needs process provides information used in the Supplier Agreement Management process. NOTE 13: The Needs process provides information on needed skills to the Human Resource Management process and the Training process. NOTE 14: Customer needs and expectations are used by the Tendering process. NOTE 15: Since the Needs process supports the dialogue between product and service suppliers and the customer, all other processes will use it to communicate with the customer throughout the life cycle. NOTE 16: The Alternative Analysis process can be useful for resolving issues related to concurrence on items to include in the statement of needs and expectations. NOTE 17: The Measurement and Analysis process can be useful when determining customer satisfaction. NOTE 18: Needs regarding the work environment are provided to the Work Environment process.

Work products	
Inputs	Outputs
List of interested parties [Outcome: 1]	Definition of customer and stakeholders [Outcome: 1]
Criteria for customer and stakeholder selection [Outcome: 1]	
Satisfaction criteria [Outcome: 2]	Justification and rationale for needs [Outcome: 2]
Customer attributes [Outcome: 1]	Statement of Needs and Expectations [Outcome: 1]
New technology demonstrations [Outcome: 1]	
Refined requirements [Outcome: 1]	
Questionnaires, interviews, operational scenarios obtained from users [Outcome: 3]	Storyboards [Outcome: 3]
Reverse engineering (for legacy products) [Outcome: 3]	Customer needs cases [Outcome: 3]

	Concept of enterprise operations [Outcome: 3]
Business case [Outcome: 3]	Business case analysis [Outcome: 3]
Customer communication process [Outcome: 4]	Problem reporting mechanism [Outcome: 4]
	Requirement traceability tables [Outcome: 4]
Customer feedback [Outcome: 5]	Customer survey results [Outcome: 5]
	Customer and stakeholder satisfaction measures and levels [Outcome: 5]

6.3.2 Requirements

Process ID	LFC.2
Process name	Requirements
Process purpose	The purpose of the Requirements process is to develop a detailed and precise set of requirements that meet customer needs and expectations and manage those requirements throughout the life cycle.
Process outcomes	As a result of successful implementation of the Requirements process: 1) Unambiguous, complete, traceable, feasible, consistent and verifiable requirements are derived from customer and other stakeholder needs and expectations. 2) All requirements information is recorded and change controlled to establish a baseline that is maintained throughout the life cycle. 3) Plans, products, activities, and agreements are traced for consistency with requirements, and any inconsistencies are identified for correction.
Base practices	**LFC.2.BP1: Identify Requirements.** Identify all types of requirements applicable to customer needs and expectations. [Outcome: 1] NOTE: Requirement types may be, but are not limited to, functional, non-functional, safety, security, human factors, interface, user, environmental, business, legal, regulatory and contractual. **LFC.2.BP2: Derive Requirements.** Derive requirements that may be identified as necessary implications of the identified requirements. [Outcome: 1] **LFC.2.BP3: Analyze Requirements.** Analyze requirements to ensure that they satisfy established quality criteria, including unambiguity, completeness, traceability, feasibility, and verifiability. [Outcome: 1] **LFC.2.BP4: Baseline Requirements.** Record, approve, baseline, and place under change control all requirements. [Outcome: 2] **LFC.2.BP5: Analyze Requirements Risks.** Document and analyze

	risks associated with the requirements. [Outcomes: 1, 2] **LFC.2.BP6: Manage Requirements Changes.** Analyze all requirements change requests for impact on the product or service and, upon approval, incorporate the approved changes into the requirements baseline. [Outcome: 2] **LFC.2.BP7: Ensure and Maintain Requirements Traceability across the Life Cycle.** Maintain traceability among requirements and between requirements and plans, work products, and activities initiating corrective action if inconsistencies are identified. [Outcome: 3] NOTE: Requirements may evolve throughout the lifecycle and are kept consistent with project plans.
Relationship notes	NOTE 1: Requirements identification is based on the results of the Needs process. NOTE 2: Requirements baseline and changes are controlled using the practices of the Change and Configuration Management process. NOTE 3: Requirements traceability has to be ensured to the work products of the Project Management process and the Life Cycle Category processes. NOTE 4: Requirements Risk Analysis is performed using the practices of the Risk Management Process. NOTE 5: Requirements form the basis of Service Level Agreements developed in the Business Relationship Management process. NOTE 6: Requirements documents are input to the Design process. NOTE 7: Products and services are verified to assure that requirements are met using the practices of Evaluation. NOTE 8: The Requirements process provides information used in the Supplier Agreement Management process. NOTE 9: Requirements change requests may come from the Operation and Support process. NOTE 10: Requirements for skills and competencies are provided to the Human Resource Management and Training process.

Work products	
Inputs	Outputs
Storyboards [Outcome: 1]	Requirements documents [Outcomes: 1, 2]
Requirements risk analysis [Outcome: 1]	Requirements risks [Outcome: 1]
Use cases [Outcome: 1]	Requirements traceability tables [Outcome: 3]
Business case analysis [Outcome: 1]	Requirements change log [Outcomes: 2, 3]

Statement of needs and expectations [Outcome: 1]	
Requirements traceability tables [Outcomes: 2, 3]	Requirements baseline [Outcome: 2]
Requirements change requests [Outcome: 2]	Risk register [Outcomes: 1, 2]

6.3.3 Design

Process ID	LFC.3
Process name	Design
Process purpose	The purpose of the Design process is to establish and maintain an architectural design and detailed design solution for the requirements of the customer and other stakeholders.
Process outcomes	As a result of successful implementation of the Design process: 1) A product or service architectural and detailed design solution that will meet the defined requirements and service level agreements is established and maintained. 2) The established product or service design is based on an analysis of alternatives against criteria that represent the requirements, including capacity, availability and risk considerations. 3) Allocations and traceability of requirements to the design elements are established and maintained.
Base practices	**LFC.3.BP1: Develop Design Structure.** Evaluate alternatives against established criteria, including capacity and availability considerations to select the architecture, structure, and elements for the product or service design. [Outcomes: 1, 2] **LFC.3.BP2: Develop Interface Specifications.** Develop interface specifications for the selected product and service elements. [Outcome: 1] **LFC.3.BP3: Allocate Requirements.** Allocate product and derived requirements to the design elements and interfaces and to personnel or processes where appropriate. [Outcomes: 2, 3] **LFC.3.BP4: Establish Component Specifications.** Establish design specifications for each element of the product or service. [Outcomes: 1, 2] **LFC.3.BP5: Establish and Use a Strategy for Non-Developmental Items.** Establish and use a strategy for managing issues relating to the use of non-developmental item (NDI) product and service elements. [Outcomes: 1, 3] NOTE: Non-developmental items may also be known as previously developed items of supply, components off-the-shelf, or commercial off-the-site items.

	LFC.3.BP6: Establish and Maintain Design Description. Establish and maintain a complete description of the product and service design. [Outcomes: 1, 2, 3]
Relationship notes	NOTE 1: Primary inputs to this process come from the Requirements process, including capacity and availability considerations. The Requirements process establishes the required functions of the product or service and how well the product or service is expected to perform the functions. NOTE 2: Traceability is maintained between requirements and work products throughout the life cycle by means of the Requirements process. NOTE 3: The Design process uses the Alternatives Analysis process to seek alternatives that meet established criteria for the product or service, and prioritize and/or recommend preferred alternatives. NOTE 4: Critical technical issues are considered in the Risk Management process. NOTE 5: Work products of the process are evaluated according to practices of Evaluation process and Quality Assurance and Management process. NOTE 6: Product or service elements defined in Design process are implemented by practices of the Design Implementation process or acquired through the practices of Supplier Agreement Management including outsourcing practices. NOTE 7: Baselines for the work products are established and maintained by the Change and Configuration Management process practices. NOTE 8: Formal and informal design information, whether placed under configuration management or not, is preserved for reference by the practices of Information Management process. NOTE 9: Architectural features and structures that support evolution of the product or service can be useful for Research and Innovation process. NOTE 10: Design constraints uncovered during Integration are input to the Design process.

Work products	
Inputs	Outputs
Implementation strategy [Outcomes: 1, 2, 3]	Physical architecture [Outcome: 1]
Customer requirements [Outcomes: 1, 2, 3]	Architectural design [Outcome: 1]

Interface requirements [Outcomes: 1, 2, 3]	Design alternatives [Outcome: 2]
System requirements [Outcomes: 1, 2, 3]	Interface specifications [Outcome: 1]
Maintenance requirements [Outcomes: 1, 2, 3]	Component specifications [Outcome: 1]
Detailed design [Outcomes: 1, 2]	Detailed design [Outcomes: 1, 2]
Analysis of design alternatives [Outcome: 2]	
Risk analysis of design issues [Outcome: 2]	Criteria for evaluating and selecting commercial off-the-shelf products [Outcome: 1]
Design constraints [Outcome: 1]	Function and performance requirements allocated to architecture and design components [Outcome: 3]
	Traceability record [Outcome: 3]

6.3.4 Design Implementation

Process ID	LFC.4
Process name	Design Implementation
Process purpose	The purpose of the Design Implementation process is to produce specified product or service solution components.
Process outcomes	As a result of successful implementation of the Design Implementation process: 1) An implementation strategy is defined. 2) Solution component(s) are developed. 3) Documentation to support solution component(s) installation, maintenance and use is established and maintained.
Base practices	**LFC.4.BP1: Establish the Implementation Strategy**. Establish the methods, standards, and tools to be used to implement the solution component(s), identifying any constraints associated with this strategy. [Outcome: 1] **LFC.4.BP2: Formulate Product or Service Components**. Formulate solution components according to the specifications and the implementation strategy. [Outcome: 2] **LFC.4.BP3: Develop Documentation**. Develop and maintain the documentation that will be used to install, operate and maintain the product or service components. [Outcome: 3]
Relationship notes	NOTE 1: Solution components have been previously specified by means of the Design process.

	NOTE 2: Solution components are validated and verified by means of the Evaluation process. NOTE 3: Traceability is maintained between requirements and work products throughout the life cycle by means of the Requirements process. NOTE 4: The enterprise infrastructure of facilities, tools and equipment is established and maintained by means of the Work Environment process. NOTE 5: Documentation developed in the Design Implementation process is used in the Deployment and Disposal process and in the Operation and Support process. NOTE 6: The Alternatives Analysis process may be useful in selection of tools for Design Implementation.

Work products	
Inputs	Outputs
Work environment standards [Outcome: 1]	Implementation strategy [Outcome: 1]
Current facilities, tools and equipment [Outcome: 1]	Product component [Outcome: 2]
Component specification [Outcome: 2]	Service component [Outcome: 2]
	Traceability record [Outcome: 2]
	User documentation [Outcome: 3]
	Installation instructions [Outcome: 3]
	Operator's manual [Outcome: 3]
	Maintenance manual [Outcome: 3]

6.3.5 Integration

Process ID	LFC.5
Process name	Integration
Process purpose	The purpose of the Integration process is to ensure that product and service components will function as a whole.
Process outcomes	As a result of successful implementation of the Integration process: 1) A strategy for integrating the product and service components is defined. 2) Readiness of the integration facilities and product and service

	components for integration is verified. NOTE1: This includes demonstrating compatibility of interfaces. 3) The product or service is integrated in accordance with the integration strategy.
Base practices	**LFC.5.BP1: Develop Integration Strategy.** Develop an integration strategy and supporting documentation that identify the sequence for receipt, assembly, and activation of the various components making up the product or service. [Outcome: 1] NOTE 1: The integration strategy should address items such as schedules for integration activities and component readiness, resource requirements, any special shipping and handling of components, procedures, and communication. **LFC.5.BP2: Obtain Integration Resources.** Obtain integration enabling systems, such as integration facilities, personnel, and specified materials, according to the integration procedures. [Outcome: 2] **LFC.5.BP3: Obtain and Confirm Readiness of Product and Service Components**. Obtain and confirm the readiness of each product and service component in accordance with the integration strategy schedule and quality standards. [Outcome: 2] NOTE2: Components that do not pass quality standards are identified as such and handled in accordance with defined procedures. NOTE3: Components are handled in accordance with relevant health, environmental, safety, security and privacy considerations. **LFC.5.BP4: Review and Coordinate Interface Definitions**. Review and coordinate product and service element interface definitions, designs, and changes with affected groups and individuals throughout the life cycle. [Outcome: 2] **LFC.5.BP5: Assemble Product and Service Components**. Assemble or integrate product and service elements in accordance with the integration strategy. [Outcome: 3] **LFC.5.BP6: Confirm Integrated Product or Service Operation**. Confirm that the integrated product or service functions to the extent required for evaluation. [Outcome: 3] **LFC.5.BP7: Record Integration Information.** Record integration information such as issues, problems, assembly errors, or any design constraints arising. [Outcome: 3]
Relationship notes	NOTE 1: The integration strategy and sequencing is coordinated with the planning and scheduling practices of Project Management. NOTE 2: Product and service components are received from Design Implementation or Supplier Agreement Management processes. NOTE 3: The product and service components are verified by means of the Evaluation process prior to integration. NOTE 4: Coordinating, reviewing and maintaining the integrity of

	interface definitions, developed in the Design process, relies on using the Change and Configuration Management process if interface integrity issues arise. NOTE 5: Problems or issues identified during integration are input to Project Management and Risk Management processes. NOTE 6: Integration risks are considered when developing the integration strategy. NOTE 7: The practices of the Evaluation process are performed on the integrated product and service. NOTE 8: Any design or solution constraints uncovered during Integration are provided to the Design process. NOTE 9: The Alternative Analysis process may be useful in determining the integration strategy.

Work products	
Inputs	Outputs
Project plan [Outcome: 1]	Integration strategy [Outcome: 1]
Risk analysis [Outcome: 1]	Integration procedures [Outcome: 1]
	Integration facilities and environment [Outcome: 2]
	Coordination records [Outcome: 2]
Quality standards [Outcome: 2]	
Component quality records [Outcome: 2]	Component evaluation report [Outcome: 2]
Product and service components [Outcome: 3]	Integrated product or service [Outcome: 3]
	Integration report [Outcome: 3]
	Integration record [Outcome:3]
	Integration constraints on solution [Outcome: 3]

6.3.6 Evaluation

Process ID	LFC.6
Process name	Evaluation
Process purpose	The purpose of the Evaluation process is to provide confidence that developed and acquired products and services satisfy specified

	requirements and operational needs. NOTE: The Evaluation process addresses both verification and validation.
Process outcomes	As a result of successful implementation of the Evaluation process: 1) The evaluation strategy, requirements, methods, and environment are established to provide an objective basis for determining whether the products and services meet requirements and expected outcomes and can be accepted. 2) Work products of all life cycle phases are evaluated against established needs and requirements. NOTE: This includes work products developed by any process. 3) Evaluations are performed as planned. 4) Analyses are conducted on results of evaluations, and reported to support acceptance or corrective actions and improvement.
Base practices	**LFC.6.BP1: Develop Evaluation Strategy.** Establish and maintain a comprehensive strategy and requirements for evaluating products and services throughout their life cycle. [Outcomes: 1, 2] NOTE 1: The strategy should include product or service acceptance criteria. **LFC.6.BP2: Develop Evaluation Procedures**. Develop the detailed procedures, methods, and processes to be used in evaluating products and services. [Outcome: 1] NOTE 2: There are many methods that can be used for product and service evaluation, such as inspections, analyses, simulations, peer reviews, walkthroughs, testing, prototyping, and operational demonstrations. **LFC.6.BP3: Establish and Maintain Evaluation Environment**. Establish and maintain the tools, facilities, personnel, documentation, and environment needed to perform planned evaluations. [Outcome: 1] **LFC.6.BP4: Evaluate Incremental Work products**. Evaluate incremental work products and services. [Outcomes: 2,3] **LFC.6.BP5: Verify End-products**. Evaluate end-products and services against specified requirements. [Outcomes: 2,3] **LFC.6.BP6: Validate End-products**. Evaluate the capability of end-products and services to fulfil their intended use in representative operational environments. [Outcomes: 2,3] **LFC.6.BP7: Analyze Evaluation Results**. Analyze results of evaluations and compare them to the needs and requirements to identify and quantify deficiencies, and recommend corrective and preventive actions. [Outcome: 4] **LFC.6.BP8: Report Results.** Record and report results of evaluation

	activities. [Outcome: 4]
Relationship notes	NOTE 1: The Evaluation process receives inputs of products and services to be evaluated from all processes. NOTE 2: Validation evaluations are based on needs determined in the Needs process. NOTE 3: Verification evaluations are based on requirements determined in the Requirements process, or the Supplier Agreement Management process. NOTE 4: Corrective and preventive actions resulting from evaluations are taken and monitored by means of the Project Management and Supplier Agreement Management processes. NOTE 5: The practices of Quality Assurance and Management should be coordinated with Evaluation practices to ensure they are complementary. NOTE 6: The Alternatives Analysis process may be useful in determining the evaluation strategy, methods, and tools. NOTE 7: The Measurement and Analysis process may be helpful in analyzing evaluation results.

Work products	
Inputs	Outputs
Established product and service needs [Outcomes: 1, 2]	Evaluation strategy [Outcome: 1]
Established product and service requirements [Outcomes: 1, 2]	
Products and services to be evaluated [Outcomes: 1, 2, 3]	Evaluation requirements [Outcome: 1]
	Evaluation methods [Outcome: 1]
	Evaluation environment [Outcome: 1]
	Evaluation criteria [Outcome: 1]
	Evaluation procedures [Outcome: 1]
	Evaluation results [Outcomes: 2, 3, 4]
	Evaluation records [Outcomes: 2, 3]
	Evaluation analysis results [Outcome: 4]
	Evaluation reports [Outcomes: 2, 3, 4]
	Evaluation communication [Outcome: 4]

	Evaluation recommendations [Outcome: 4]

6.3.7 Deployment and Disposal

Process ID	LFC.7
Process name	Deployment and Disposal
Process purpose	The purpose of the Deployment and Disposal process is to place a product or service into its intended environment so that it can be successfully used, operated and supported, and to deactivate and dispose of any replaced product or service. NOTE: *Deployment* of a product or service involves planning, preparation and the placement of a product or service into an operation and support environment. *Disposal* involves disassembly of the replaced item including the satisfaction of relevant health, safety and security regulations. If appropriate, it includes breaking down the replaced item into manageable elements to facilitate removal for reuse, recycling, reconditioning, overhaul or destruction.
Process outcomes	As a result of successful implementation of the Deployment and Disposal process: 1) A deployment and disposal strategy is developed. 2) Operation and support staff and facilities are prepared for the product or service to be deployed. 3) Readiness of the product or service for use in its intended environment is assured. 4) The product or service is deployed to the operation and support environments. 5) Continuity of operational performance is maintained. 6) The replaced product or service components are destroyed, stored, reclaimed or recycled. 7) Records allowing knowledge retention of disposal actions and analysis of long-term impacts are available.
Base practices	**LFC.7.BP1: Establish and Maintain a Deployment and Disposal Strategy.** Establish and maintain a strategy that addresses product or service deployment to the operation and support environment. The strategy should address roll-out method, resources needed, constraints, rollback and restoration of the environment to its previous stable state if required, training needed, readiness checks, and disposal of the product or service replaced. [Outcome: 1] **LFC.7.BP2: Prepare Staff for Product or Service Transition.** Establish and maintain a staff training plan, and train operation and support staff according to plan. [Outcome 2] **LFC.7.BP3**: **Plan Facility Upgrade**. Review current facilities and

	develop a plan for facility upgrade, as necessary. [Outcome: 2] **LFC.7.BP4: Ensure that Product or Service is Ready for Use**. Make sure that the product or services scheduled to be deployed are placed under change and configuration management. [Outcome: 3] **LFC.7.BP5: Deploy Product or Service.** Install the product or service into the operational environment and ensure minimum unpredicted impact on the production, operations and support services. [Outcome: 4] **LFC.7.BP6: Maintain Product or Service Continuity.** Identify essential functions and resources needed to ensure continuity during transition. Establish and maintain continuity plans. [Outcome: 5] **LFC.7.BP7: End the Existence of a Replaced Product or Service**. Destroy, store, reclaim or recycle the replaced product or service according to the plan. Confirm that there is no health, safety, security, and environmental impact following product or service disposal. [Outcome: 6] **LFC.7.BP8: Maintain Records**. Maintain records of disposal actions and analysis of long-term impacts to permit audits, reviews, and to form the basis for future disposal planning. [Outcome: 7]
Relationship notes	NOTE 1: The Change and Configuration Management process manages configurations during deployment and disposal and ensures the deployed product or service is baselined. NOTE 2: Products or services to be deployed are evaluated by means of the Evaluation process prior to Deployment. NOTE 3: Installation and user documentation is provided by the Design Implementation process. NOTE 4: Use the Training process to provide training during transition. NOTE 5: The Operation and Support process is used to operate and support the deployed system. NOTE 6: Use the Knowledge Management and Information Management processes for retaining records and knowledge of disposal actions. NOTE 7: The Alternatives Analysis process may be helpful in establishing the Deployment and Disposal Strategy.

Work products	
Inputs	Outputs
Evaluated and baselined product or service to be deployed [Outcome: 3]	Deployment and disposal strategy [Outcome 1]
Product or service for disposal [Outcome: 6]	
Transition training plan [Outcome: 2]	Training records [Outcome: 2]

Training materials [Outcome: 2]	Facility upgrade plan (as required) [Outcome: 2]
Installation instructions [Outcome: 2]	
User documentation [Outcome: 2]	Confirmed baseline for deployment [Outcome: 3]
	Deployed product or service [Outcome: 4]
	List of critical function needed for continuity of operation [Outcome: 5]
	Disposal strategy [Outcome: 1]
	Records of disposal [Outcome: 7]
	Statement of health, safety, security, and environmental impact [Outcome: 7]
	Continuity plan [Outcome: 5]

6.3.8 Operation and Support

Process ID	LFC.8
Process name	Operation and Support
Process purpose	The purpose of the Operation and Support process is to operate the product or service at agreed service levels and support its users.
Process outcomes	As a result of successful implementation of the Operation and Support process: 1) The product or service is operated and monitored. 2) Methods are established and used to sustain operational requirements, including required capacity and service levels. 3) If services are interrupted, they are restored to the business within time limits defined in the service level agreement. 4) Root causes of problems are investigated to determine need for corrective or preventive action. 5) Needed corrective and preventive actions are deployed. 6) Customer support, assistance, user request handling, and consultation are provided.
Base practices	**LFC.8.BP1: Operate the Product or Service**. Operate the product or service in its intended environment according to agreed service levels. [Outcome: 1] **LFC.8.BP2: Establish Methods.** Establish methods for monitoring and

	sustaining required product or service levels. [Outcome: 2] **LFC.8.BP3: Monitor and Evaluate Capacity, Service, and Performance**. Monitor and evaluate capacity, service, and performance of the product or service. [Outcome: 1] **LFC.8.BP4: Confirm Availability of Resources.** Confirm availability of required resources (e.g., personnel, parts) to ensure service levels can be sustained. [Outcomes: 1, 2] **LFC.8.BP5: Perform Corrective and/or Preventive Maintenance.** Perform corrective and/or preventive maintenance by replacing or servicing product or service elements prior to failure. [Outcomes: 2, 5] **LFC.8.BP6: Analyze Failures**. Perform failure identification and analysis activities when problems or interruptions occur in the product or delivered service. [Outcomes: 3, 4] **LFC.8.BP7: Take or Initiate Corrective Action**. Take corrective action when appropriate (e.g., defective part, human error), or initiate corrective action for product or service modification. [Outcomes: 3, 5] **LFC.8.BP8: Provide Customer Support.** Answer customer and user questions and help resolve problems they encounter. [Outcome: 6] NOTE: Customer support may be provided by means of a service request management system or something similar.
Relationship notes	NOTE 1: Customer support, assistance, and consultation are addressed in this process, as well as product or service monitoring. Product or service *modifications* are carried out using the other life cycle processes. NOTE 2: Customer feedback from operations provides input to the Needs process. NOTE 3: Customer problems may lead to requirements change requests submitted to the Requirements process. NOTE 4: The Design Implementation process provides documentation for Operation and Support. NOTE 5: Continuity of the work environment, including products, services, facilities, etc., is addressed within the Work Environment process. NOTE 6: The practices of Supplier Agreement Management are useful when assuring availability of parts and personnel. NOTE 7: Operational activities are managed using the Project Management process. NOTE 8: Service level agreements are developed in the Business Relationship Management process.

Work products

Inputs	Outputs
Service level agreements [Outcomes:1, 2, 3]	Operating product or services [Outcome: 1]
User documentation [Outcome: 1]	Regular operational monitoring reports [Outcome: 1]
Operations manual [Outcome: 1]	Operational problem reports [Outcome: 1]
Maintenance manual [Outcomes: 1, 2, 5]	Capacity and service level monitoring methods [Outcome: 2]
	Capacity plan [Outcome: 2]
	Availability plan [Outcome: 2]
	Preventive maintenance records [Outcomes: 2,5]
Parts or resources [Outcome: 2]	Requests for parts or resources [Outcome: 2]
	Problem analysis reports [Outcome: 4]
Problem analysis reports [Outcome:5]	Corrective action records [Outcomes: 3,5]
	Requests for and resolution of correction or problem prevention activities [Outcome: 6]
Service requests [Outcome: 6]	Responses to service requests [Outcome: 6]
	Customer feedback [Outcome: 6]
	Requirements change requests [Outcome: 6]

6.4 Support Category

6.4.1 Alternatives Analysis

Process ID	SUP.1
Process name	Alternatives Analysis
Process purpose	The purpose of the Alternatives Analysis process is to apply structured analysis and provide decision-making information to the issues to be analyzed and communicate the results to stakeholders.
Process outcomes	As a result of successful implementation of the Alternatives Analysis process: 1) Strategy is established and maintained that supports the structured analysis of alternatives and the provision of decision-making information. NOTE: Strategy includes the criteria to determine when to use the Alternatives Analysis process. 2) Evaluation criteria, alternatives analysis methods and alternative

	solutions for analyzed issues are defined. 3) Alternative solutions to the issues identified are analyzed and solutions are selected or recommended. 4) Results and rationale of alternatives analysis are documented and communicated.
Base practices	**SUP.1.BP1: Establish Analysis Strategy.** Establish and maintain an alternatives analysis strategy that provides guidelines for when and how to use structured analysis and decision-making methods. [Outcome: 1] NOTE 1: Strategy should include the criteria to determine when to use the Alternatives Analysis process and identification of the methods to be used. **SUP.1.BP2: Define Evaluation Criteria.** Establish criteria and their relative importance for evaluating alternative solutions. [Outcome: 2] NOTE 2: This practice includes clarification of the problem or issue for alternatives analysis. **SUP.1.BP3: Select Analysis Method.** Select alternatives analysis methods and document the rationale for their choice. [Outcome: 2] **SUP.1.BP4: Identify Alternative Solutions.** Identify and document alternative solutions to problems or issues. [Outcome: 2] **SUP.1.BP5: Analyze Alternative Solutions.** Analyze alternative solutions in accordance with the selected alternatives analysis method and evaluation criteria. [Outcome: 3] **SUP.1.BP6: Select Solution.** Select or recommend solution(s) that best meet the criteria of the analysis. [Outcome: 3] **SUP.1.BP7: Communicate Analysis Results.** Document and communicate alternatives analysis results to stakeholders. [Outcome: 4]
Relationship notes	NOTE 1: Structured alternatives analysis methods and decision-making information can be useful for many processes where a decision needs to be made. NOTE 2: Alternatives Analysis process can be useful for selection of strategy for Integration, and Deployment and Disposal processes. NOTE 3: Alternatives Analysis process can be useful for selection of design approach for Design process. NOTE 4: Alternatives Analysis process can be useful for selection of methods or tools for Design Implementation, Evaluation, Quality Assurance and Management, Change and Configuration Management, Risk Management processes. NOTE 5: Alternatives Analysis process can be useful for make-or-buy analysis, and for supplier selection for Supplier Agreement Management process. NOTE 6: Alternatives Analysis process can be useful for selection of

	measures for Measurement and Analysis process. NOTE 7: Alternatives Analysis process can be useful for selection of technologies to pursue or insert for Research and Innovation, and Design processes. NOTE 8: Alternatives Analysis process can be useful for selection of investments for Investment Management process. NOTE 9: Alternatives Analysis process can be useful for issues resolution for Project Management, Needs, and Investment Management processes. NOTE 10: Alternatives Analysis process can be useful for selection of goals for Enterprise Governance and Process Improvement processes.

Work products	
Inputs	Outputs
Alternatives Analysis Strategy [Outcome: 2]	Alternatives Analysis Strategy [Outcome: 1]
Problem Definition [Outcome: 2]	
Weighted Criteria [Outcome: 3]	Weighted Criteria [Outcome: 2]
Selected Evaluation Methods [Outcome: 3]	Selected Evaluation Methods [Outcome: 2]
Identified alternative solutions [Outcome: 3]	Identified alternative solutions [Outcome: 2]
	Documented analysis results [Outcome: 3, 4]
	Selected solution(s) [Outcome: 3, 4]

6.4.2 Measurement and Analysis

Process ID	SUP.2
Process name	Measurement and Analysis
Process purpose	The purpose of the Measurement and Analysis process is to define, collect and analyze data related to any measurement need to provide insight into performance relative to goals.
Process outcomes	As a result of successful implementation of the Measurement and Analysis process: 1) Measurement data needs related to the goals of enterprise processes are identified, prioritized and maintained. 2) Measures to address measurement data needs are established and maintained. 3) Data collection, verification and storage procedures are established

	and maintained. 4) Data analysis, interpretation and reporting procedures are established and maintained. 5) Measurement data are collected, verified, analyzed, interpreted and results are reported. 6) Measurement data and results are communicated and stored for use.
Base practices	**SUP.2.BP1: Develop a Measurement Strategy.** Define an appropriate measurement strategy to identify, perform and evaluate measurement activities and results, based on enterprise and project needs. [Outcome: 1] **SUP.2.BP2: Identify Measurement Data Needs.** Identify the measurement data needs of enterprise processes. [Outcome: 1] **SUP.2.BP3: Establish Measures Based on Performance Relative to Goals.** Establish measurable objectives to provide insight into performance relative to goals. [Outcome: 2] NOTE 1: A cause-effect relationship among objective could be established to identify the specific measures that will provide the basis for performance analysis. **SUP.2.BP4: Establish and Maintain Data Collection, Verification and Storage Procedures.** Establish and maintain data collection, verification and storage methods and procedures. [Outcome: 3] **SUP.2.BP5: Establish and Maintain Data Analysis, Interpretation and Reporting Procedures**. Establish and maintain data analysis, interpretation and reporting methods and procedures. [Outcome: 4] **SUP.2.BP6: Collect Relevant Measurement Data.** Collect, verify and validate measurement data and interpret results. [Outcome: 5] **SUP.2.BP7: Store Data and Results.** Store measurement data and results in a repository. [Outcome: 6] **SUP.2.BP8: Analyze Measurement Data.** Analyze data to determine performance against goals. [Outcome: 5] NOTE 2: To stress on trends and corrective/improvement actions, use statistical techniques whenever possible and valuable. **SUP.2.BP9: Communicate Results.** Report results of measurement and analysis to all affected stakeholders. [Outcome: 6]
Relationship notes	NOTE 1: The Measurement and Analysis process supports many other processes to help understand performance in relation to goals. Some specific examples include Enterprise Governance, Project Management, Investment Management, Evaluation, and Quality Assurance and Management processes, as well as some others noted below. NOTE 2: The measurement data repository is addressed by the Process Definition process and managed by the Information Management process.

	NOTE 3: The measurement of customer satisfaction on products and services provided is used by the Needs process. NOTE 4: In the case of solicitation of contractors/subcontractors, measurement data are used by the Supplier Agreement Management process. NOTE 5: The Risk Management process may identify issues to be measured. NOTE 6: Results from the Measurement and Analysis process represent the inputs for establishing an improvement plan managed by the Process Improvement process. NOTE 7: The Alternatives Analysis process can be used for selection of measures for Measurement and Analysis process. NOTE 8: The Measurement and Analysis process provides the measured results of innovations for the Research and Innovation process. NOTE 9: The Measurement and Analysis process is employed in support of understanding of Enterprise Architecture performance.

Work products	
Inputs	Outputs
Quality Policy [Outcomes: 1, 2]	
Organizational Goals by perspectives [Outcome: 2]	Measurement Strategy [Outcome: 1]
Selected solution(s) [Outcomes: 1, 2]	Information needs [Outcome: 1]
Documented analysis results [Outcomes: 1, 2]	Measurement goals [Outcome: 1]
Information Catalog [Outcomes: 3, 6]	Data collection, verification and storage procedures [Outcome: 3]
Service Catalog [Outcomes: 3, 6]	Data analysis, interpretation and reporting procedures [Outcome: 4]
Communication records [Outcome: 1]	Analysis report [Outcomes: 3, 4, 5]
Field measure [Outcome: 2]	Field measures [Outcomes: 2, 5]
Process measure [Outcome: 2]	Process measures [Outcomes: 2, 5]
Project measure [Outcome: 2]	Project measures [Outcomes: 2, 5]
Quality measure [Outcome: 2]	Quality measures [Outcomes: 2, 5]
Risk measure [Outcome: 2]	Risk measures [Outcomes: 2, 5]
Operational measure [Outcome: 2]	Operational measures [Outcomes: 2, 5]

Customer satisfaction survey [Outcomes: 4, 5]	Customer satisfaction survey [Outcome: 3]
Customer satisfaction data [Outcome: 4]	Customer satisfaction data [Outcome: 5]
Benchmarking data [Outcomes: 5, 6]	Benchmarking data [Outcome: 6]
Assessment data [Outcome: 6]	Problem record [Outcome: 5]
Customer request [Outcome: 3]	
Problem record [Outcomes: 1, 2]	Evaluation report [Outcomes: 5, 6]
Process description [Outcome: 6]	Process description [Outcome: 6]

6.4.3 Quality Assurance and Management

Process ID	SUP.3
Process name	Quality Assurance and Management
Process purpose	The purpose of the Quality Assurance and Management process is to assure the quality of the product or service and of the processes used, and provide management with appropriate visibility into all relevant quality aspects.
Process outcomes	As a result of successful implementation of the Quality Assurance and Management process: 1) A Quality Management System is established and maintained. 2) Adherence of work products, services, and activities to applicable standards, procedures, and requirements is verified objectively. 3) Noncompliance issues are tracked and those that cannot be resolved at the project level are addressed by senior management. 4) Affected groups and individuals are informed about quality assurance activities and results. 5) Causes of defects are sought out, identified, prioritized, corrected, and methods of elimination are evaluated. 6) Quality improvement opportunities are initiated with the appropriate stakeholders and managed at the appropriate level.
Base practices	**SUP.3.BP1: Establish a Quality Management System.** Establish, document, implement, and maintain a quality management system. [Outcomes: 1] NOTE 1: A quality management system typically includes quality policies, goals, objectives, criteria, methods, procedures, and quality plans. **SUP.3.BP2: Monitor Process Compliance.** Objectively monitor compliance of performed activities with the established processes. [Outcome: 2] **SUP.3.BP3: Monitor Product and Service Quality.** Objectively compare, measure and evaluate work products and services against the requirements

	and standards that define them. [Outcome: 2] **SUP.3.BP4: Monitor Noncompliance Issues.** Monitor and track noncompliance issues and support their resolution via escalation to senior management if necessary. [Outcome: 3] **SUP.3.BP5: Record and Report Results.** Record and report the results of quality assurance activities and customer satisfaction data to applicable stakeholders. [Outcome: 4] NOTE 2: An objective channel for reporting quality issues should be established. **SUP.3.BP6: Analyze Quality.** Analyze quality records and measurements to detect the need for corrective action and develop recommendations for quality improvement or corrective and preventive actions. [Outcome: 5] **SUP.3.BP7: Initiate Quality Improvement.** Initiate activities that address identified quality issues or quality improvement opportunities. [Outcome: 6] **SUP.3.BP8: Monitor and Evaluate the Effect of Changes.** Monitor the status of quality improvements on products and services and evaluate the effect of changes after they have been implemented. [Outcome: 6]
Relationship notes	NOTE 1: Quality Assurance and Management process provides an objective view that ensures planned processes are implemented and that products and services meet their applicable standards and requirements. NOTE 2: The Evaluation process supports Quality Assurance and Management process by providing quality measures and results. The Quality Assurance and Management process typically is accomplished by sampling products, services and processes throughout the life cycle. NOTE 3: The Quality Assurance and Management process is related to all the other processes and of specific relevance is the Project Management process. NOTE 4: As improvement opportunities are identified by the Quality Assurance and Management process, appropriate activities are initiated in the enterprise through Enterprise Governance process, in the project through Project Management process and, if applicable, Process Definition process and Process Improvement process are used to update the processes. NOTE 5: The Quality Assurance and Management process uses the Measurement and Analysis process for quality measurement. NOTE 6: Customer satisfaction information from the Needs process can be used improving and maintaining a quality management system and in analyzing quality. NOTE 7: In addition, these other processes provide quality information on products and processes: Evaluation, Project Management, Supplier Agreement Management, Risk Management, and Process Improvement. NOTE 8: Alternatives Analysis process can be used for selection of methods or tools for Quality Assurance and Management process. NOTE 9: The integrity, authenticity, reliability, and accuracy of selected work products under Information Management process control is ensured by

	Quality Assurance and Management process. NOTE 10: Work products of the Design process are evaluated according to practices Quality Assurance and Management process.

Work products	
Inputs	Outputs
Quality management requirements [Outcome: 1]	Documented quality management system [Outcome: 1]
Process descriptions [Outcome: 1]	Process compliance measures [Outcome: 2]
Process instantiation records [Outcome: 2]	Process measures [Outcome: 2]
Product/service requirements [Outcome: 2]	
Products and services [Outcome: 2]	Product/service quality measures [Outcome: 2]
Selected solution(s) [Outcome: 1]	Quality issue and defects reports [Outcomes: 2, 3, 4]
Documented analysis results [Outcome: 1]	Internal audit reports [Outcomes: 2, 3, 4]
Evaluation report [Outcomes: 2, 3]	Causal analysis and resolution records [Outcome: 5]
Benchmarking data [Outcomes: 2, 3]	Recommendations for improving process, product and service [Outcome: 6]
Evaluation report [Outcomes: 2, 3]	
Assessment report [Outcomes: 2, 3]	
Supplier performance review records [Outcome: 2, 3]	
Quality plan [Outcome: 2, 3]	
Quality control measurements [Outcome: 2, 3]	
Performance reports [Outcome: 2, 3]	
Risk root cause [Outcomes: 2, 3]	
Risk analysis report [Outcomes: 2, 3]	
Risk status report [Outcomes: 2, 3]	
Customer survey results [Outcomes: 2, 3]	
Customer and stakeholder satisfaction measures and levels [Outcomes: 2, 3]	
Architectural design [Outcomes: 2, 3]	

Detailed design [Outcomes: 2, 3]	
Evaluation analysis results [Outcomes: 2, 3]	
Evaluation reports [Outcomes: 2, 3]	

6.4.4 Change and Configuration Management

Process ID	SUP.4
Process name	Change and Configuration Management
Process purpose	The purpose of the Change and Configuration Management process is to ensure changes to selected items are controlled so as to enable the availability of accurate baseline and configuration information. NOTE: Items may be controlled at various levels of formality.
Process outcomes	As a result of successful implementation of the Change and Configuration Management process: 1) A change and configuration management strategy is defined. 2) Items to be managed are identified. NOTE: These items may be designated for formal configuration management or less formal version control. 3) Change requests with respect to identified items are managed, tracked and controlled. 4) Identified items are controlled and managed throughout the life cycle. 5) Status of identified items and of their changes is recorded and reported to all stakeholders. 6) The integrity of baselines and work products is assured.
Base practices	**SUP.4.BP1: Establish a Change and Configuration Management Strategy.** Establish roles, responsibilities, and methods for the application of Change and Configuration Management process activities. [Outcome: 1] **SUP.4.BP2: Identify and Baseline Configuration Items and Interim Work products.** Identify configuration items, interim work products, and work environment items that will be baselined or placed under version control, and baseline them. [Outcomes: 1, 2, 4, 6] **SUP.4.BP3: Establish and Maintain a Repository for Work Product Baselines.** Establish and maintain a repository to house work product baselines. [Outcome: 4] **SUP.4.BP4: Control Changes.** Control changes to baselined work products through tracking, recording, review, and approval processes throughout the life cycle. [Outcomes: 3, 4]

	SUP.4.BP5: Record and Report Configuration and Change Status. Record and report change information about the baselined configuration items. [Outcomes: 3, 4, 5] **SUP.4.BP6: Conduct Configuration Audits and Inspections.** Conduct configuration audits and inspections to verify integrity of the baselines and check the work products for compliance with the baselines. [Outcome: 6]
Relationship notes	NOTE 1: This process supports all other processes in controlling work products, and its practices are usually accomplished through collaborative activities, such as those provided by the practices of integrated teaming as part of Project Management process. NOTE 2: Traceability is established as part of the practices in the Requirements process. NOTE 3: The development of plans and work breakdown structures, as described in Project Management process, may be useful for determining configuration items. NOTE 4: Preliminary configuration management requirements are established in the Requirements process. NOTE 5: When the practices of this process are used to manage requirements, changes to these requirements need to be iterated through the Needs process to communicate the impact of changes to the customer or their surrogate. In this process, information is available about the method for analyzing the impact of proposed changes. NOTE 6: Information Management process and Change and Configuration Management process are interrelated, but differ in a number of ways. Change and Configuration Management process emphasizes informal and formal control of selected work products and environments. Information Management process is concerned with the identification, protection, and continued availability of all information that may be needed by or that is generated by project or enterprise elements. Items from information management repositories may be placed under configuration management, as the need arises. The practices of Information Management process apply to the storage and retrieval of Change and Configuration Management Items. Change and Configuration Management process and Information Management process may use the same or separate repositories. NOTE 7: Alternatives Analysis process can be used for selection of methods or tools for Change and Configuration Management process. NOTE 8: Change and Configuration Management process establishes and maintains the baselines for the work products, including designs. NOTE 9: The Change and Configuration Management process is interdependent with coordinating, reviewing and maintaining the integrity of interface definitions. NOTE 10: The Change and Configuration Management process ensures the deployed product or service is baselined managing configurations

	during deployment and disposal. NOTE 11: The Change and Configuration Management process is employed to manage changes in support of enterprise architecture.

Work products	
Inputs	Outputs
Selected solution(s) [Outcome: 1]	Configuration Control Board Charter [Outcome: 1]
Documented analysis results [Outcome: 1]	Change Control Board Charter [Outcome: 1]
Proposals on items to be managed [Outcomes: 1, 2]	Strategy for tool selection [Outcome: 1]
Work Breakdown Structure [Outcomes: 2, 3]	Identified items that are to be managed [Outcome: 2]
Project plan [Outcomes: 2, 3]	Baselined items/work products [Outcome: 2]
Change requests [Outcome: 3]	Repository for identified items [Outcome: 4]
Statement of needs and expectations [Outcomes: 2, 3]	Change requests and their status [Outcome: 3]
Customer needs cases [Outcomes: 2, 3]	Status reports on identified items [Outcomes: 3, 4, 5]
Requirements documents [Outcomes: 2, 3]	Audit results [Outcome: 6]
Requirements baseline [Outcomes: 2, 3]	
Requirements change log [Outcomes: 2, 3]	
Architectural design [Outcomes: 2, 3]	
Detailed design [Outcomes: 2, 3]	
Integrated product or service [Outcomes: 2, 3]	
Integration report [Outcomes: 2, 3]	
Integration record [Outcomes: 2, 3]	
Confirmed baseline for deployment [Outcomes: 2, 3]	
Deployed product or service [Outcomes: 2, 3]	

6.4.5 Information Management

Process ID	SUP.5
Process name	Information Management
Process purpose	The purpose of the Information Management process is to make relevant and timely information available to those who need it.
Process outcomes	As a result of successful implementation of the Information Management process: 1) Information management strategy and requirements are established. 2) An infrastructure is established and maintained to provide the mechanisms and media needed to support the information management at individual, project and organization levels. 3) Information is managed in accordance with established requirements and strategy. 4) Information is stored and protected from loss, damage, and unwarranted access. 5) Timely access to relevant information is available to those that need it.
Base practices	**SUP.5. BP1: Establish Information Management Strategy.** Establish and maintain a strategy and requirements for information management. [Outcome: 1] NOTE 1: Strategy can address such issues as identification of the information to be managed, origin, capture, retention, archiving, and disposal of information items, user access rights and privileges. NOTE 2: Requirements for information management can address integrity, security, privacy, record management, retention, intellectual property, regulatory requirements, etc. NOTE 3: Information, as used in this process, includes the various forms of hardcopy and softcopy documentation needed by the enterprise. Typical information management categories include customer communications, customer and other external documentation and reference material, requirement issues, metrics, status reports, architecture and design notes, design reference material, meeting minutes, etc. Information may take any form (e.g., reports, manuals, notebooks, charts, drawings, data bases, spreadsheets, specifications, files, e-mails, audio, video, or correspondence), and may exist in any medium (e.g., printed, drawings on various materials, photographs, electronic, or multi-media). Information may be deliverable (e.g., items identified by a project's data requirements), or non-deliverable (e.g., informal information, tacit knowledge, expertise, studies and analysis, internal meeting minutes, internal design review documentation, lessons learned, and action items). **SUP.5. BP2: Establish Information Management Capability.** Establish an infrastructure for information management including repository, tools, equipment, and procedures. [Outcome: 2] **SUP.5. BP3: Store Information.** Collect, receive, and store information

	according to established strategy and procedures. [Outcome: 4] **SUP.5. BP4: Share Information.** Disseminate or provide timely access to information to those that need it. [Outcome: 5] NOTE 4: User access rights and privileges are determined and maintained. **SUP.5. BP5: Protect Information.** Protect information from loss, damage, or unwarranted access. [Outcome: 4] **SUP.5. BP6: Establish Information Standards.** Establish requirements and standards for content and format of selected information items. [Outcome: 1]
Relationship notes	NOTE 1: Use high level input from Enterprise Governance process. NOTE 2: Project Management process uses Information Management process to identify information items and categories of information to be managed. NOTE 3: Information Management process supports Knowledge Management process with mechanisms to store, protect and access the knowledge gathered. NOTE 4: Information Management is applied to preserve and maintain access to work products that are created and used by named processes. NOTE 5: Quality Assurance and Management process ensures the integrity, authenticity, reliability, and accuracy of selected work products. NOTE 6: Information Management process supports the organization's process asset library defined in Process Definition process. NOTE 7: Information Management process and Change and Configuration Management process are interrelated. NOTE 8: Information Management process supports Measurement and Analysis process concerning the measurement data repository. NOTE 9: Information Management process supports Deployment and Disposal process concerning archiving information of disposal actions. NOTE 10: Information Management process manages design information, placed under configuration management or not. NOTE 11: Information Management process supports Tendering process to retains the proposal documentation. NOTE 12: Information Management process supports implementation of Safety and Security process with a focus on Security.

Work products	
Inputs	Outputs

Laws and regulations [Outcome: 1]	Categories of information required to be placed in the information repository [Outcome: 1]
Business goals [Outcomes: 1, 2]	
Communication record [Outcome: 3]	Communication record [Outcome:3]
Evaluation report [Outcomes: 4, 5]	Privacy and security requirements and controls [Outcome: 1]
Benchmarking data [Outcomes: 4, 5]	Access requirements by information category and user level [Outcome: 1]
Causal analysis and resolution records [Outcomes: 2, 3]	Security procedures [Outcome: 2]
Recommendations for improving process, product and service [Outcomes: 2, 3]	Backup storage locations and procedures [Outcome: 2]
Identified items that are to be managed [Outcomes: 1, 2]	Data development standards [Outcome: 3]
Baselined items/work products [Outcomes: 1, 2]	Data management plan [Outcome: 3]
Repository for identified items [Outcomes: 1, 2]	Information Catalog [Outcome: 3]
Knowledge item [Outcomes: 2, 4]	Service Catalog [Outcome: 3]
Knowledge repository [Outcomes: 2, 4]	Information repositories: information databases, electronic libraries, web-based repositories, raw data repositories, file systems [Outcome: 4]
Reusable knowledge work products [Outcomes: 2, 4]	Information capture, storage, protection, and access procedures [Outcome: 4]
Enterprise measurement repository and it's data [Outcomes: 4, 5]	Mechanism for information retrieval, reproduction, and distribution [Outcome: 5]
Enterprise process asset library [Outcomes: 4, 5]	
Performance plans aligned with enterprise goals and objectives [Outcomes: 1, 2]	
Strategy; Strategic plans [Outcomes: 1, 2]	
Key performance measures/indicators [Outcomes: 1, 2]	
Performance results; Performance evaluations [Outcomes: 1, 2]	
Enterprise performance reports [Outcomes: 1, 2]	
Architectural design [Outcomes: 3, 4, 5]	

Detailed design [Outcomes: 3, 4, 5]	
Disposal strategy [Outcomes: 3, 4, 5]	
Records of disposal [Outcomes: 3, 4, 5]	

6.4.6 Knowledge Management

Process ID	SUP.6
Process name	Knowledge Management
Process purpose	The purpose of the Knowledge Management process is to ensure that individual knowledge, information and skills are collected, shared, reused and improved throughout the organization.
Process outcomes	As a result of successful implementation of the Knowledge Management process: 1) The organization has an appropriate knowledge management strategy. 2) The knowledge required to perform the organization's business activities is defined, understood and updated. 3) The processes, infrastructure and opportunities for allowing knowledgeable individuals to share their expertise and for deploying, using and improving knowledge assets are established and maintained. 4) Knowledge is readily available and shared throughout the organization.
Base practices	**SUP.6.BP1: Develop a Knowledge Management Strategy.** Define an appropriate knowledge management strategy based on organizational, individual, domain and project knowledge needs. [Outcome: 1] **SUP.6.BP2: Establish a Knowledge Management System.** Establish and maintain a knowledge management infrastructure and mechanism to support the activities to identify, classify, exchange and use knowledge assets. [Outcomes: 2, 3, 4] **SUP.6.BP3: Create the Network of Knowledge Contributors.** Establish the network of experts and their mutual interaction. [Outcome: 3] **SUP.6.BP4: Capture Knowledge.** Identify and record each knowledge item according to the classification schema and asset criteria. [Outcome: 3] **SUP.6.BP5: Disseminate Knowledge Assets.** Share knowledge assets with experts, users and projects. [Outcomes: 3, 4] **SUP.6.BP6: Assess Knowledge Assets.** Assess knowledge assets according to their appropriateness and value to the organization. [Outcomes: 2, 3, 4]

	SUP.6.BP7: Improve Knowledge Assets. Validate and enrich knowledge assets to ensure their appropriateness and value to the organization. [Outcomes: 3, 4]
Relationship notes	NOTE 1: Use high level input from Enterprise Governance process regarding knowledge sharing policy or expectations. NOTE 2: Use the Information Management process mechanisms to store, protect and access the knowledge gathered. NOTE 3: Apply the Human Resource Management process to ensure knowledge background required to perform the organization's business activities. NOTE 4: Apply the Training process to ensure improvement of knowledge required to perform the organization's business activities. NOTE 5: The Research and Innovation process supports knowledge reuse and improvement. NOTE 6: Knowledge Management process provides inputs for Process Improvement process. NOTE 7: Knowledge Management process supports Deployment and Disposal process concerning knowledge retention of disposal actions and analysis of long-term impacts. NOTE 8: The Knowledge Management process records and retains tendering experiences.

Work products	
Inputs	Outputs
Business goals [Outcomes: 1, 2]	Knowledge management strategy [Outcome: 1]
Policy to share knowledge among stakeholders [Outcome: 1]	
Information repositories: information databases, electronic libraries, web-based repositories, raw data repositories, file systems [Outcomes: 2, 3]	Organizational, individual, domain and project knowledge needs [Outcome: 2]
Information capture, storage, protection, and access procedures [Outcomes: 2, 3]	Knowledge management system [Outcome: 2]
Mechanism for information retrieval, reproduction, and distribution [Outcomes: 2, 3]	Procedures to share knowledge among stakeholders [Outcome: 2]
Communication record [Outcome: 3]	Communication record [Outcome: 3]
Knowledge repository [Outcomes: 1, 2]	Knowledge item [Outcome: 3]
Information Catalog [Outcomes: 1, 2]	Knowledge repository [Outcome: 4]

Service Catalog [Outcomes: 1, 2]	Knowledge asset use data [Outcome: 4]
Training evaluation report [Outcome: 2]	Reusable knowledge work products [Outcome: 4]
Reviews of innovations applicable to products, services, processes, and the work environment [Outcomes: 2, 4]	
Perceived innovation and improvement needs and proposals [Outcomes: 2, 4]	
Strategy; Strategic plans [Outcomes: 1, 2]	
Performance plans aligned with enterprise goals and objectives [Outcomes: 1, 2]	
Human resource needs analysis [Outcomes: 1, 2]	
Personnel performance evaluation [Outcomes: 1, 2]	
Personnel performance review record [Outcomes: 1, 2]	
Roster of proposal team members with required skills and experience [Outcomes: 1, 2]	
Proposal review team meeting minutes [Outcomes: 1, 2]	
Records of disposal [Outcomes: 3, 4]	
Statement of health, safety, security, and environmental impact [Outcomes: 3, 4]	

6.4.7 Training

Process ID	SUP.7
Process name	Training
Process purpose	The purpose of the Training process is to develop and maintain the skills and knowledge of staff so they perform their roles effectively and efficiently.
Process outcomes	As a result of successful implementation of the Training process: 1) Organization, project and individual training needs are solicited and identified. 2) Training is developed or acquired to address the organization and project training needs. 3) Training is conducted to ensure that all individuals have the skills required to perform their assignments.

	4) Training effectiveness is assessed.
Base practices	**SUP.7.BP1: Develop a Strategy for Training.** Develop a strategy for training including how the training needs will be identified, how the needed training will be developed or acquired, and how the training will be performed. [Outcomes: 1, 2, 3, 4] NOTE: Training and learning experiences can be provided in various ways such as coaching and mentoring, on-the-job learning, or communities of practice. **SUP.7.BP2: Identify Needs for Training.** Identify and evaluate skills and competencies to be provided or improved through training. [Outcome: 1] **SUP.7.BP3: Establish Training Plan.** Establish and maintain a training plan. [Outcome: 1] **SUP.7.BP4: Establish Training Mechanism.** Establish and maintain training capability and delivery mechanisms to address identified training needs. [Outcome: 2] **SUP.7.BP5: Prepare for Training Execution.** Identify and prepare the execution of training sessions, including the availability of the training materials and the availability of personnel to be trained. [Outcome: 2] **SUP.7.BP6: Train Individuals.** Train individuals to have the skills and knowledge needed to perform their assigned roles. [Outcome: 3] **SUP.7.BP7: Establish and Maintain Records.** Establish and maintain records of training and experience. [Outcome: 3] **SUP.7.BP8: Assess Training Effectiveness.** Assess the effectiveness of training to meet identified training needs. [Outcome: 4] **SUP.7.BP9: Establish Learning Environment.** Establish and maintain an environment that encourages learning. [Outcomes: 1, 2]
Relationship notes	NOTE 1: Use high level input from Enterprise Governance process regarding learning policy or expectations. NOTE 2: Project Management process determines the needed skills through planning for training resident staff. NOTE 3: Needs and Requirements processes support the elaboration of training needs and requirements. NOTE 4: Tendering process and Supplier Agreement Management process support the acquisition of services to address Training process needs. NOTE 5: Training process uses Work Environment process to establish suitable learning environment. NOTE 6: Training process is applied to ensure the needs raised by Research and Innovation process. NOTE 7: Training process interacts with Human Resource Management process and Knowledge Management process to obtain knowledge to be

	provided and to ensure improvement of knowledge required to perform the organization's business activities. NOTE 8: The Training process provides the training needed for Deployment and Disposal process.

Work products	
Inputs	Outputs
Training material [Outcome: 3]	Organization, project, individual training needs [Outcome: 1]
Human resource management plan [Outcomes: 2, 3]	Organization, project, individual training plans [Outcomes: 1, 2]
Training plan [Outcomes: 2, 3]	Training material [Outcome: 2]
Personnel policy [Outcome: 1]	Acquisition plan [Outcome: 2]
Human resource needs analysis [Outcome: 1]	Trained personnel [Outcome: 3]
Organizational, individual, domain and project knowledge needs [Outcome: 1]	Certificates [Outcome: 3]
Reviews of innovations applicable to products, services, processes, and the work environment [Outcome: 1]	Training record [Outcome: 3]
Perceived innovation and improvement needs and proposals [Outcome: 1]	Training evaluation report [Outcome: 4]
Training strategy [Outcomes: 1, 2]	Training strategy [Outcomes: 1, 2, 3, 4]
Training in infused innovations [Outcome: 1]	
Work environment needs and requirements [Outcome: 1]	
Requirements for safety, security, health, environment, and human factors [Outcome: 1]	
Requirements for failure and disaster recovery [Outcome: 1]	
Personnel qualifications and certificates [Outcome: 1]	
Performance plans aligned with enterprise goals and objectives [Outcome: 1]	
Strategy; Strategic plans [Outcome: 1]	
Supplier performance review records [Outcome: 1]	
Accepted products and services [Outcome: 1]	

Roster of proposal team members with required skills and experience [Outcome: 1]	
Final proposal [Outcome: 1]	
Statement of needs and expectations [Outcome: 1]	
Customer needs cases [Outcome: 1]	
Requirements documents [Outcome: 1]	
Requirements baseline [Outcome: 1]	
Records of disposal [Outcome: 1]	

6.4.8 Research and Innovation

Process ID	SUP.8
Process name	Research and Innovation
Process purpose	The purpose of the Research and Innovation process is to identify, select, and introduce innovations into products, processes, services, and the work environment to improve the organization's business results. NOTE: Innovations may include technology, partnering, and conceptual and/or organizational changes. Enterprise research endeavors contribute to innovation.
Process outcomes	As a result of successful implementation of the Research and Innovation process: 1) Potential improvements and innovations are identified. 2) The organization's products, services, processes, and work environment are continually evaluated for suitability to use identified improvements and innovations. 3) Selected innovations are deployed to relevant parts of the organization in accordance with the organization's objectives and goals.
Base practices	**SUP.8.BP1: Maintain New Technology Awareness.** Maintain awareness of new technologies, concepts, or partnerships that support the organization's goals. [Outcomes: 1, 2] NOTE 1: This typically involves external investigation into research described in the literature, or into innovations deployed in other enterprises. **SUP.8.BP2: Collect Proposals.** Collect proposals for innovations from customers and stakeholders. [Outcomes: 1, 2] **SUP.8.BP3: Select Innovations.** Choose innovations to adopt based on established criteria. [Outcome: 3] NOTE 2: Selection may include pilot efforts, and their evaluation, to help

	select innovations to be considered for adoption **SUP.8.BP4: Prepare for Infusion.** Perform the necessary preliminary activities to ensure that innovation infusion will be successful and will advance the organization's goals. [Outcome: 3] NOTE 3: Preparation lays out the infusion strategy which may include additional pilot efforts to determine feasibility of untried innovations, and to measure results. **SUP.8.BP5. Infuse Innovations.** Insert innovations into the organization's products, processes, services and work environment. [Outcome: 3] **SUP.8.BP6. Manage Innovation.** Manage the innovation of products, processes, services, and the work environment to improve business results, and encourage adoption of further improvement initiatives. [Outcomes: 1, 2, 3]
Relationship notes	NOTE 1: Innovations in processes and practices are adopted in concert with the practices of the Process Improvement process. NOTE 2: Practices of the Deployment and Disposal process are applied when deploying innovations. NOTE 3: Enterprise/organizational goals, objectives and innovation criteria are determined from the Enterprise Governance process. NOTE 4: Research and Innovation process supports the Work Environment process when innovating the work environment. NOTE 5: The Alternatives Analysis process is useful for performing trade studies and for selecting innovations to adopt. NOTE 6: The Training process is used to provide training on infused technologies and innovations. NOTE 7: The Measurement and Analysis process is used to measure the results of innovations. NOTE 8: The Risk Management process is used to assess innovations insertion risks. NOTE 9: Business cases for proposed innovations are provided to the Investment Management process. NOTE 10: The Knowledge Management process interacts with Research and Innovation process to enable innovations and in support to knowledge reuse and improvement. NOTE 11: The Research and Innovation process may provide an input for the Process Definition process to introduce new process description. NOTE 12: The Research and Innovation process demonstrates a potential of new technologies as an input for eliciting needs and for Enterprise Governance process. NOTE 13: Design process provides architectural features and structures that support evolution of the product or service and can be useful for

	Research and Innovation process.

Work products	
Inputs	Outputs
Inventory of current products, services, technology, processes and work environment [Outcomes:1, 2]	Reviews of innovations applicable to products, services, processes, and the work environment [Outcomes: 1, 2]
Selected solution(s) [Outcomes: 1, 2]	Perceived innovation and improvement needs and proposals [Outcomes: 1, 2]
Documented analysis results [Outcomes: 1, 2]	
Enterprise or organizational goals, objectives, and criteria [Outcome: 3]	Methods for identifying innovations [Outcomes: 1, 2, 3]
Innovation trade study analyses [Outcome: 3]	Innovation trade study analyses [Outcomes: 2, 3]
Innovation insertion risk analysis [Outcomes: 2, 3]	Business cases describing selected innovations for insertion, with justification [Outcome: 3]
Evaluation report [Outcome: 2]	Innovation deployment strategy [Outcome: 3]
Benchmarking data [Outcome: 2]	Pilot project plans and results [Outcome: 3]
Knowledge repository [Outcome: 2]	Training in infused innovations [Outcome: 3]
Reusable knowledge work products [Outcome: 2]	Measures of innovation results [Outcomes: 2, 3]
Trained personnel [Outcomes: 2, 3]	Technology forecasts [Outcome: 1]
Training evaluation report [Outcomes: 2, 3]	
Improvement opportunity [Outcomes: 1, 2]	
Strategy; Strategic plans [Outcomes: 1, 2]	
Performance plans aligned with enterprise goals and objectives [Outcomes: 1, 2]	
Prioritized risk list, including likelihood and consequence [Outcomes: 1, 2]	
Criteria for initiating risk mitigation actions [Outcomes: 1, 2]	
Risk root cause [Outcomes: 1, 2]	
Risk analysis report [Outcomes: 1, 2]	
Risk status report [Outcomes: 1, 2]	

Design alternatives [Outcome: 2]	

6.4.9 Work Environment

Process ID	SUP.9
Process name	Work Environment
Process purpose	The purpose of the Work Environment process is to ensure that the workforce has an infrastructure of facilities, tools and equipment to perform their work effectively and safely. NOTE: The Work Environment includes facilities, tools, equipment, computing resources, transportation, utilities, communications systems, techniques, workspace, office equipment and supplies.
Process outcomes	As a result of successful implementation of the Work Environment process: 1) Work environment needs and requirements are determined. 2) A work environment that meets needs and requirements is established and maintained. 3) Distractions in the work environment are addressed. 4) Health, safety, security, and environmental factors are addressed in the work environment. 5) Continuity of the work environment is ensured.
Base practices	**SUP.9. BP1: Determine Work Environment Needs.** Establish and maintain the needs and requirements to implement, operate, and sustain work environments. [Outcomes: 1, 3, 4] NOTE 1: Work environment needs and requirements pertain to health, safety, security, environmental, and physical aspects of the workplace as well as facilities, tools and equipment. Relevant regulations, laws and policies are identified when establishing needs and requirements. **SUP.9. BP2: Establish Work Environment Standards.** Establish and maintain a description of work environment standards and tailoring guidelines that meet identified needs and requirements. [Outcomes: 1, 3, 4] NOTE 2: Consider potential cost savings from volume purchases or common training and maintenance. **SUP.9. BP3: Establish Work Environment.** Establish and maintain a work environment, tailored from the work environment standards, to meet the specific needs. [Outcomes: 2, 3, 4] **SUP.9. BP4: Maintain the Qualification of Components.** Maintain the required qualification of work environment components. [Outcome: 2]

	NOTE 3: This includes equipment calibration and configuration status. **SUP.9. BP5: Maintain the Qualification of Personnel.** Ensure that personnel have the required competencies and qualifications to access, use, and maintain the work environment. [Outcome: 2] **SUP.9. BP6: Maintain Technology Awareness.** Monitor, evaluate, and insert, as appropriate, new technology for improving the work environment. [Outcomes: 1, 2] **SUP.9. BP7: Ensure Work Environment Continuity.** Plan and provide for continuity of the work environment. [Outcome: 5] NOTE 4: This includes testing and training for continuity and recovery.
Relationship notes	NOTE 1: Further information on determining needs and requirements is available via the Needs and Requirements processes. NOTE 2: The Training process is applied to ensure work environment competencies. NOTE 3: The Research and Innovation process supports work environment improvement. NOTE 4: The Risk Management process is applied to assess, analyze and mitigate risks to work environment continuity. NOTE 5: The Work Environment process ensures continuity of the work environment, including products, services, and facilities according to Operation and Support process needs. NOTE 6: The enterprise infrastructure of facilities, including tools and equipment needed for the Design Implementation process, is established and maintained by means of the Work Environment process.

Work products	
Inputs	Outputs
Laws and regulations [Outcome: 1]	Identified work environment regulations and laws [Outcome: 1]
Stakeholder inputs on work environment needs and requirements [Outcome: 1]	Work environment needs and requirements [Outcome: 1]
Equipment calibration requirements [Outcome: 1]	Requirements for safety, security, health, environment, and human factors [Outcome: 1]
Training evaluation report [Outcome: 2]	Requirements for failure and disaster recovery [Outcome: 1]
Reviews of innovations applicable to products, services, processes, and the work environment [Outcomes: 1, 2, 3]	Standard workstation hardware and software [Outcome: 2]
Perceived innovation and improvement needs	Standard application software [Outcome: 2]

and proposals [Outcomes: 1, 2, 3]	
Business cases describing selected innovations for insertion, with justification [Outcome: 1, 2, 3]	Standard services and service levels [Outcome: 2]
Prioritized risk list, including likelihood and consequence [Outcomes: 1, 2]	Tailoring and waiver processes [Outcome: 2]
Criteria for initiating risk mitigation actions [Outcomes: 1, 2]	Workspace, equipment, workstations [Outcomes: 2, 3, 4]
Risk root cause [Outcomes: 1, 2]	Procedures for safety, security, operations [Outcomes: 2, 4]
Risk analysis report [Outcomes: 1, 2]	Calibration records and instrument accuracy certificates [Outcome: 2]
Risk status report [Outcomes: 1, 2]	Personnel qualifications and certificates [Outcomes: 2, 4]
Business continuity risks [Outcome: 5]	Technology insertion cost benefit analyses [Outcomes: 1,2]
Statement of needs and expectations [Outcomes: 1, 2]	Technology insertion plan [Outcome: 2]
Customer needs cases [Outcomes: 1, 2]	Disaster recovery plans, contingency plans, or continuity plans [Outcome: 5]
Requirements documents [Outcomes: 1, 2]	Plans and results of testing emergency response systems [Outcome: 5]
Requirements baseline [Outcomes: 1, 2]	Information sources for emergencies [Outcome: 5]
Preventive maintenance records [Outcomes: 3, 4, 5]	
Requests for parts or resources [Outcomes: 3, 4, 5]	
Problem analysis reports [Outcomes: 3, 4, 5]	
Corrective action records [Outcomes: 3, 4, 5]	
Requests for and resolution of correction or problem prevention activities [Outcomes: 3, 4, 5]	

6.4.10 Process Definition

Process ID	SUP.10
Process name	Process Definition
Process purpose	The purpose of Process Definition process is to identify, define and maintain a standard set of processes and description of allowed tailoring

	that can be used to establish the processes that are used across the enterprise. NOTE: Process Definition process provides a foundation for repeatable, effective and efficient work activities and support process improvement.
Process outcomes	As a result of successful implementation of the Process Definition process: 1) Standard processes, needed to accomplish business objectives, are established and maintained, including responsibilities, accountability and authority for its management. 2) Detailed tasks, activities, input/output work products of the standard processes are identified, together with expected performance characteristics. 3) Allowed modifications and approval mechanisms are established and maintained for the standard processes from which approved processes are tailored and established for projects, programs, services, organizations, or the enterprise. 4) Goals, performance data, and other assets that support the processes are collected, maintained and communicated. 5) Process assets (processes, allowed tailoring, approval mechanisms, process objectives, measures of process performance) are collected, maintained, and communicated. 6) The implemented processes are approved as well-defined derivatives of the standard processes, including support processes, whose purposes and interrelationships are coordinated.
Base practices	**SUP.10.BP1: Establish Standard Processes.** Establish and maintain the enterprise's set of standard processes that apply to its business activities. [Outcome: 1] **SUP.10.BP2: Establish Process Description.** Establish and maintain description of the standard processes approved for use in the enterprise, including detailed tasks, activities, input/output work products. [Outcome: 2] **SUP.10.BP3: Develop Tailoring Criteria and Guidelines.** Establish and maintain tailoring criteria and guidelines for the enterprise's set of standard processes and ensure their use. [Outcome: 3, 6] **SUP.10.BP4: Establish a Process Asset Library.** Establish and maintain the enterprise process asset library, including measurement repository, and make the library available for use by the projects and services. [Outcome: 4, 5] **SUP.10.BP5: Coordinate and Communicate Process Definition.** Coordinate and communicate process definition, ensuring implemented processes are approved as well-defined derivatives of the standard processes. [Outcome: 6]
Relationship notes	NOTE 1: This process covers the initial activities required to collect, to maintain, and standardize process assets for all processes. The activities of this process define the processes needed to achieve the enterprise

	vision and goals established by the activities of Enterprise Governance and Enterprise Architecture. NOTE 2: Established process improvement is covered in Process Improvement process. NOTE 3: The quantitative understanding of the processes and process assets is covered in Measurement and Analysis process. NOTE 4: The process asset library is maintained using the principles of Information Management process. NOTE 5: New processes may be the result of activities described in Research and Innovation process. NOTE 6: An input provided by the Quality Assurance and Management process is used to update the processes.

Work products	
Inputs	Outputs
Commitment / agreement [Outcome: 1]	
Improvement plan [Outcome: 1]	
Improvement opportunity [Outcome: 1]	Enterprise's set of standard process [Outcome: 1]
Process change request [Outcome: 3]	Description of lifecycle models approved [Outcomes: 2, 6]
Evaluation report [Outcomes: 4, 5]	Tailoring guidelines for the enterprise's set of standard processes [Outcome: 3]
Benchmarking data [Outcomes: 4, 5]	Enterprise measurement repository and it's data [Outcome: 4]
Enterprise process asset library [Outcome: 4]	Enterprise process asset library [Outcome: 4]
Processes goals and performance data [Outcome: 4]	Communication records [Outcome: 5]
Causal analysis and resolution records [Outcomes: 3, 5]	
Recommendations for improving process, product and service [Outcomes: 3, 5]	
Reviews of innovations applicable to products, services, processes, and the work environment [Outcomes: 3, 5]	
Perceived innovation and improvement needs and	

proposals [Outcomes: 3, 5]	
Innovation trade study analyses [Outcomes: 3, 5]	
Business cases describing selected innovations for insertion, with justification [Outcomes: 3, 5]	
Process description [Outcome: 3]	
Process repository [Outcome: 3]	
Strategy; Strategic plans [Outcome: 1]	
Performance plans aligned with enterprise goals and objectives [Outcome: 1]	
Enterprise architecture description [Outcome: 1]	

6.4.11 Process Improvement

Process ID	SUP.11
Process name	Process Improvement
Process purpose	The purpose of the Process Improvement process is to continuously and measurably improve processes capability so that business can be conducted more efficiently and effectively.
Process outcomes	As a result of successful implementation of the Process Improvement process: 1) Issues arising from the organization's internal / external environment are identified as improvement opportunities and justified as reasons for change. 2) Analysis of the current status of the existing processes is performed, focusing on those processes from which improvement stimuli arise and recorded as a baseline against which the actual improvement can be compared. 3) Improvement measures are identified, prioritized, and revised periodically and progress towards them is evaluated. 4) Process improvement activities are implemented. 5) Improvements are deployed, monitored, and sustained by the usage of the organization’s historical data. 6) Knowledge gained from the improvements is communicated within the enterprise. 7) Improvements made are evaluated and consideration given for using the solution elsewhere within the enterprise.
Base practices	**SUP.11.BP1: Identify Process Improvement Opportunities.** Proactively identify issues arising from the organization's

	internal/external environment or organization's appraisals as improvement opportunities and with justified reasons for change. [Outcome: 1] **SUP.11.BP2: Analyze Process Status.** Perform an analysis of the current status of the existing processes. [Outcome: 2] **SUP.11.BP3: Assess Process Improvement Objectives.** Assess processes focusing on those processes from which improvement stimuli arise and/or process based risk is reduced, resulting in improvement objectives for the process being established. [Outcome: 2] **SUP.11.BP4: Prioritize Improvements.** Prioritize improvement objectives considering relationships among the impacted processes. [Outcome: 3] **SUP.11.BP5: Plan Improvements.** Define and plan consequent changes to the process. [Outcome: 3] **SUP.11.BP6: Implement Improvements.** Implement improvements to the process and manage changes. [Outcome: 3] **SUP.11.BP7: Confirm Improvement.** Monitor, measure, and evaluate the effects of implemented improvements and confirm them against the defined improvement goals and desired results. [Outcome: 4] **SUP.11.BP8: Incorporate Process-Related Outcomes into Enterprise Process Assets.** Incorporate the outcomes resulting from the improvement activity into the enterprise process assets they refer to. [Outcome: 5] **SUP.11.BP9: Communicate Results of Improvement.** Communicate knowledge gained from the improvements across relevant parts of the enterprise. [Outcome: 6] **SUP.11.BP10: Evaluate the Results of the Improvement Project.** Evaluate the results of the improvement initiative to see if the solution can be applied elsewhere in the organization. [Outcome: 7] **SUP.11.BP11: Sustain and Deploy Improvement Gains.** Sustain and deploy improvement gains across all applicable parts of the organization/project. [Outcomes: 6, 7]
Relationship notes	NOTE 1: Possible new ideas can come from the Research and Innovation process and/or from satisfaction surveys and Alternatives Analysis process. NOTE 2: Outcomes from the Knowledge Management process are considered as inputs for improving the enterprise processes. NOTE 3: Results from the improvement project must be properly communicated and shared as part of the Enterprise Governance process. NOTE 4: The Enterprise Governance process establishes high level goals and objectives (including those pertaining to process improvement). NOTE 5: The initial collection of the organization's process assets and

	the definition of the organization's set of processes are covered in the Process Definition process, providing coordination of the actions for changing the process. NOTE 6: The Project Management process defines the actions for managing the process improvement. NOTE 7: Knowledge Management process defines the way to gather lessons learned from all projects as a knowledge base for Process Improvement process. NOTE 8: Process improvement may result from activities performed in the Quality Assurance and Management or Research and Innovation processes. The Research and Innovation process defines the actions for adopting and transforming new techniques and technologies into the organization. NOTE 9: The Process Improvement process provides quality information on products and processes for Quality Assurance and Management process. NOTE 10: The Process Improvement process uses the Human Resource Management process to support process improvement activities. NOTE 11: Research and Innovation process and practices can be used in concert with the practices of the Process Improvement process.

Work products	
Inputs	Outputs
Selected solution(s) [Outcomes: 1, 2]	Commitment / agreement [Outcome: 1]
Documented analysis results [Outcomes: 1, 2]	
Customer satisfaction data [Outcomes: 1, 2, 3]	
Benchmarking data [Outcomes: 1, 2, 3]	
Goals [Outcomes: 3, 4]	Goals [Outcome: 3]
Process performance data [Outcomes: 1, 2, 3, 4, 6]	Process measure [Outcome: 5]
Plan [Outcomes: 1, 2, 3, 4]	Plan [Outcomes: 1, 3, 6]
Causal analysis and resolution records [Outcomes: 1, 2]	
Recommendations for improving process, product and service [Outcomes: 1, 2]	Improvement plan [Outcome: 3]
Process description [Outcomes: 2, 4]	Process description [Outcome: 3]
Communication record [Outcome: 6]	Communication record [Outcome: 5]

Evaluation report [Outcomes: 1, 2]	Evaluation report [Outcomes: 1, 2, 3, 6]
Assessment report [Outcomes: 1, 2, 3, 4, 6]	Assessment report [Outcome: 2]
Improvement opportunity [Outcomes: 3, 5, 6]	Improvement opportunity [Outcomes: 1, 2, 3, 6, 7]
Process repository [Outcome: 2]	Process repository [Outcome: 3]
Knowledge repository [Outcomes: 1, 2, 3]	
Reusable knowledge work products [Outcomes: 1, 2, 3]	
Reviews of innovations applicable to products, services, processes, and the work environment [Outcomes: 1, 2, 3]	
Perceived innovation and improvement needs and proposals [Outcomes: 1, 2, 3]	
Business cases describing selected innovations for insertion, with justification [Outcomes: 1, 2, 3]	
Enterprise measurement repository and it's data [Outcomes: 1, 2, 3]	
Enterprise process asset library [Outcomes: 1, 2, 3]	
Strategy; Strategic plans [Outcome: 1]	
Performance plans aligned with enterprise goals and objectives [Outcome: 1]	
Human resource needs analysis [Outcome: 1]	
Personnel performance evaluation [Outcome: 1]	
Project plan [Outcome: 3, 4]	
Lessons learned [Outcome: 3, 4]	

6.5 Special Applications

6.5.1 Safety and Security

Process ID	SAP.1
Process name	Safety and Security
Process purpose	The purpose of the Safety and Security process is to ensure that the enterprise, its staff, and its products and services are safe and secure. NOTE1: The Safety and Security process is a special application of the process assessment model in the context of safety and security. Thus

	this process is denoted an “Application Area”. The practices, called “application practices”, are implemented using other processes in the context of this special application. This facilitates the re-use of the model without recreating processes that are already well established. NOTE2: Safety and security outcomes and practices are harmonized in this process description since so many activities are common to both safety and security. However, this process can be implemented in the context chosen by the enterprise, which may be security alone, or safety alone, or both safety and security.
Process outcomes	As a result of successful implementation of the Safety and Security process: 1) An infrastructure for safety and security is established and maintained. 2) Safety and security objectives are identified and met. 3) Safety and security risks are identified and managed. 4) Established safety and security requirements are satisfied. 5) Activities and products are managed to achieve safety and security requirements and objectives.
Application practices	**SAP.1.AP1: Ensure Safety and Security Competency.** Ensure safety and security awareness, guidance, and competency. [Outcome: 1] NOTE 1: This practice is implemented by performing practices in the Training process with a focus on Safety and Security. **SAP.1.AP2: Establish Qualified Work Environment.** Establish and maintain a qualified work environment that meets safety and security needs. [Outcome: 1] NOTE 2: This practice is implemented by performing practices in the Work Environment process with a focus on Safety and Security. **SAP.1.AP3: Ensure Integrity of Safety and Security Information.** Establish and maintain storage, protection and access and distribution control to ensure the integrity of safety and security information. [Outcome: 1] NOTE 3: This practice is implemented by performing practices in the Information Management process with a focus on Safety and Security. **SAP.1.AP4: Monitor Operations and Report Incidents.** Monitor operations and environmental changes, report and analyze safety and security incidents and anomalies, and initiate corrective actions. [Outcome: 1] NOTE 4: This practice is implemented by performing practices in the Operation and Support process with a focus on Safety and Security. **SAP.1.AP5: Ensure Business Continuity.** Establish and maintain plans to ensure continuity of business processes and protection of assets. [Outcome: 1] NOTE5: This practice is implemented by performing practices in the Risk

	Management and Work Environment processes in such a way as to ensure continuity of business processes and protection of assets. **SAP.1.AP6: Identify Safety and Security Risks.** Identify risks and sources of risks attributable to vulnerabilities, security threats, and safety hazards. Outcome: 3] NOTE 6: This practice is implemented by performing risk identification practice in the Risk Management process in such a way as to identify risks and sources of risks attributable to vulnerabilities, security threats, and safety hazards. **SAP.1.AP7: Analyze and Prioritize Risks.** For each risk associated with safety or security, determine the causal factors, estimate the consequence and likelihood of an occurrence, and determine relative priority. [Outcome: 3] NOTE 7: This practice is implemented by performing risk assessment practice in the Risk Management process in such a way as to analyze and prioritize risks associated with safety or security. **SAP.1.AP8: Determine, Implement, and Monitor Risk Mitigation Plan.** Determine, implement, and monitor the risk mitigation plan to achieve an acceptable level of risk. [Outcome: 3] NOTE 8: This practice is implemented by performing the risk mitigation planning and action implementation practices in the Risk Management process in such a way as to achieve an acceptable level of safety and security risk. **SAP.1.AP9: Determine Regulatory Requirements, Laws, and Standards.** Determine applicable regulatory requirements, laws, standards, and policies and define levels of safety and security. [Outcomes: 2, 4] NOTE 9: This practice is implemented by performing requirements identification practices in the Requirements process, and policy and public responsibility practices in the Enterprise Governance process in such a way as to determine regulatory requirements, laws, standards, and policies and define levels of safety and security. **SAP.1.AP10: Develop and Deploy Safe and Secure Products and Services.** Develop and deploy products and services that meet safety and security needs, and operate and dispose of them safely and securely. [Outcome: 2, 4] NOTE 10: This practice is implemented by performing all the Life Cycle processes of the process assessment model, but with a particular focus on safety and security. **SAP.1.AP11: Objectively Evaluate Products.** Objectively verify and validate the work products and delivered products and services to assure safety and security requirements have been achieved and services fulfil intended use. [Outcomes: 2, 4] NOTE 11: This practice is implemented by performing the practices in the Evaluation process is such a way as to objectively verify and validate the work products and delivered products and services to assure safety and security requirements have been achieved and services fulfil intended

	use. **SAP.1.AP12: Establish Safety and Security Assurance Arguments.** Establish and maintain safety and security assurance arguments and supporting evidence throughout the life cycle. [Outcomes: 2, 4] NOTE 12: The organization should perform this practice as stated, but practices of Information Management, Evaluation, and Quality Assurance and Management processes are useful in developing supporting evidence for safety and security arguments. NOTE 13: An assurance argument is a set of structured assurance claims, supported by evidence and reasoning, that demonstrates how assurance needs have been satisfied. The documentation shows compliance with assurance objectives and provides an argument for the safety and security of the product or service. **SAP.1.AP13: Establish Independent Safety and Security Reporting.** Establish and maintain independent reporting of safety and security status and issues. [Outcome: 5] NOTE 14: This practice is implemented by performing practices of Project Management in such a way as to establish and maintain independent reporting of safety and security status and issues. **SAP.1.AP14: Establish a Safety and Security Plan.** Establish and maintain a plan to achieve safety and security requirements and objectives. [Outcomes: 2,5] NOTE 15: This practice is implemented by performing the practices of Project Management in such a way as to establish and maintain a plan to achieve safety and security requirements and objectives. **SAP.1.AP15: Select and Manage Suppliers, Products, and Services.** Select and manage products and suppliers using safety and security criteria. [Outcome: 5] NOTE 16: This practice is implemented by performing the practices of Supplier Agreement Management process in such a way as to select and manage products and suppliers using safety and security criteria. **SAP.1.AP16: Monitor and Control Activities and Products.** Measure, monitor, and review safety and security activities against plans, control products, take corrective action, and improve processes. [Outcome: 5] NOTE 17: This practice is implemented by performing the practices of Measurement and Analysis, Change and Configuration Management processes, Project Management process practices related to monitoring and corrective action, Requirements process practices related to requirements changes, Quality Assurance and Management, and Process Improvement processes in such a way as to measure, monitor, and review safety and security activities against plans, control products, take corrective action, and improve processes.
Relationship notes	The relationships between the Safety and Security process and application practices, and other processes in process assessment model, have been noted for each practice above. This innovative concept of including “Application Areas” in a process assessment model instantiates the idea of using already established processes with respect to a

	particular application.

Work products	
Inputs	Outputs
Regulatory information [Outcomes: 1, 2, 4]	Training plans for safety and security skill improvement [Outcome: 1]
Risk assessments [Outcome: 3]	A safe and secure work environment [Outcome: 1]
Safety and security related reports (incident reports, operational problem reports) [Outcome: 5]	List of authorized users [Outcome: 1]
Safety Requirements [Outcomes: 1, 2, 4, 5]	Safety and security related reports (incident reports, operational problem reports) [Outcome: 3]
	Business continuity plan [Outcome: 1]
	Hazard or threat list [Outcome: 3]
	Risk assessment report [Outcome: 3]
	Risk mitigation plan [Outcome: 3]
	Organizational policies required for safety and security [Outcomes: 2, 4]
	Technical data package that addresses safety and security [Outcomes: 2, 4]
	Safety and security test and evaluation report [Outcome: 5]
	Safety or security peer review results [Outcome: 5]
	Supplier selection plan with safety and security criteria
	Supplier agreements including safety and security requirements Business continuity plan [Outcomes: 1, 5]
	Safety or security non-conformance report [Outcome: 5]

7 The capability dimension and process capability indicators

This process assessment model is intended to support the assessment of process capability, using the process measurement framework defined in ISO/IEC 33020. The scope of the Measurement Framework is limited to Process Capability Levels 0 and 1.

The process attributes in the capability dimension have a set of process capability indicators that provide an indication of the extent of achievement of the attribute in the instantiated process.

7.1 Process capability Level 0: Incomplete process

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

At this level there is little or no evidence of any systematic achievement of the process purpose.

7.2 Process capability Level 1: Performed process

The implemented process achieves its process purpose. The following process attribute demonstrates the achievement of this level.

PA.1.1 Process performance process attribute

The process performance process attribute is a measure of the extent to which the process purpose is achieved. As a result of full achievement of this process attribute:

a) The process achieves its defined process outcomes.

Generic practice for PA.1.1

PA.1.1.GP1 Achieve the process outcomes
Achieve the intent of the base practices.
Produce work products that evidence the process outcomes.

NOTE: The assessment of a performed process is based on process performance indicators, which are defined in Clause 5 of this document.

Generic resources for PA.1.1

— Resources are used to perform the intent of process specific base practices. [PA.1.1 outcome a]

Generic work products for PA.1.1

21-00 Product [PA.1.1 outcome a]

— Work products exist that provide evidence of the achievement of the process outcomes.

Annex A
(informative)

Conformity of the process reference model and process assessment model with ISO/IEC 33004 requirements

A.1 Introduction

ISO/IEC 33004 Information technology – Process assessment – Requirements for process reference, process assessment and maturity models [ISO/IEC 33004] provides requirements for the construction and verification of process reference models, process assessment models and maturity models. ISO/IEC 33004 requirements include:

- Conformance of process reference models, which verifies conformance with requirements in ISO/IEC 33004 clause 5
- Conformance of process assessment models, which verifies conformance with requirements in ISO/IEC 33004 clause 6
- Conformance of maturity models, which verifies conformance with requirements in ISO/IEC 33004 clause 7.

This process assessment model includes both the process reference model and the process assessment model. The process assessment model however does not include any maturity model; thus conformance with ISO/IEC 33004 clause 7 is not applicable.

This annex provides conformance statements of the process reference model and the process assessment model to ISO/IEC 33004 clauses 5 and 6.

A.2 Conformance of the process reference model with ISO/IEC 33004 Clause 5

Requirements in ISO/IEC 33004 Clause 5	**This document reference**
5.3 Requirements for process reference models	
5.3.1 A process reference model shall contain:	
a) a declaration of the domain of the process reference model;	The domain or scope of the process reference model includes: enterprise management, investment management, general management, service management, human resource management, acquisition, quality management systems, full lifecycle engineering for products and services, knowledge management, environment, safety and security, and core supporting disciplines. (See Introduction)
b) a description of the relationship between the process reference model and its	The context of use for the process reference model is any enterprise or organization that seeks to improve its business performance in an integrated way. The process reference

Requirements in ISO/IEC 33004 Clause 5	This document reference
intended context of use;	model is intended for use in multiple organizational contexts and to meet a full range of different business needs, application domains, and sizes. It is flexible with regard to type of product or service being acquired, developed, operated or provided. It is intended for organizations that focus on high-level issues, low-level issues or both. It is designed for selective use to meet business needs of the enterprise. (See Introduction and Annex B: Application and Use)
c) descriptions, meeting the requirements of 5,4 of this International Standard, of the processes within the scope of the process reference model;	There are 29 processes within the scope of the process reference model, organized as follows: Governance/Management Category: Enterprise Governance, Investment Management, Human resource Management, Enterprise Architecture, Business Relationship Management, Supplier Agreement Management, Tendering, Project Management, Risk Management Life Cycle Category: Needs, Requirements, Design, Design Implementation, Integration, Evaluation, Deployment and Disposal, Operation and Support Support Category: Alternatives Analysis, Measurement and Analysis, Quality Assurance and Management, Change and Configuration Management, Information Management, Knowledge Management, Training, Research and Innovation, Work Environment, Process Definition, Process Improvement Special Applications Safety and Security (See Section 5: Process Assessment Model Architecture)
d) a description of the relationship between the processes defined within the process reference model.	Related processes are grouped within the Governance/Management, Life Cycle, and Support categories. Each process description provides Relationship notes, explaining how processes are related. (See Section 5: Process Assessment Model Architecture and Section 6: Process Dimension and Process Performance Indicators)
5.3.2 The process reference model shall document the community of interest of the model and the actions taken to achieve consensus within that community of interest:	

Requirements in ISO/IEC 33004 Clause 5	This document reference
a) the relevant community of interest shall be characterized or specified;	The community of interest includes communities interested in pursuing process improvement using a model that integrates the disciplines listed in the scope, and the sources determined by this community. (See Introduction, Bibliography, and Project Participants)
b) the extent of achievement of consensus shall be documented;	Extensive community review was carried out, with comments adjudicated and addressed by the project team. Major decisions are made by the Enterprise SPICE Advisory Board, which operates by consensus-based procedures. (See Introduction, Advisory Board Charter, Advisory Board records, and project archives)
c) if no actions are taken to achieve consensus, a statement to this effect shall be documented.	Not applicable
5.3.3 The processes defined within a process reference model shall have unique process descriptions and identification.	Each process is identified uniquely and has a unique process description. (See Section 6 Process Dimension and Process Performance Indicators)
5.4 Process descriptions The fundamental elements of a process reference model are the descriptions of the processes within the scope of the model. The process descriptions in the process reference model incorporate a statement of the purpose of the process which describes at a high level the overall objectives of performing the process, together with the set of outcomes which demonstrate successful achievement of the process purpose. A process description shall meet the following requirements:	For ease of use, the process descriptions of the process reference model are replicated as the same and identical process descriptions in the process assessment model See 6.3.4 d)
a) a process shall be described in terms of its purpose and process outcomes;	Each process contains a purpose and outcomes. (See Section 6 Process Dimension
b) the set of process outcomes shall be necessary and sufficient to achieve the purpose of the process;	For each process, the set of outcomes summarizes expected positive results to be achieved if the purpose is met and the process is successfully implemented. (See Section 6 Process Dimension
c) process descriptions shall not contain or imply aspects of the process quality characteristic beyond the basic level of any relevant process measurement framework conformant with ISO/IEC 33003.	No aspects beyond capability level 1 are contained or implied in the process descriptions. (See Section 6: Process Dimension

Requirements in ISO/IEC 33004 Clause 5	This document reference
An process outcome describes one of the following: • production of an artefact; • a significant change of state; • meeting of specified constraints, e.g. requirements, goals etc.	Outcomes describe expected results of successful implementation of the process, which may include artifact production, state change, or meeting constraints. (See Section 6: Process Dimension

A.3 Conformance of the process assessment model with ISO/IEC 33004 Clause 6

Requirements in ISO/IEC 33004 Clause 6	This document reference
6.3 Requirements for process assessment models	
6.3.1 A process assessment model shall relate to a single process quality characteristic	This document relates to the process capability characteristic. (See Section 7: Capability Dimension
6.3.2 A process assessment model shall incorporate a single process measurement framework conformant with ISO/IEC 33003 based on the selected process quality characteristic.	This document incorporates a single process measurement framework based on process capability. (See Section 7: Capability Dimension
6.3.3 A process assessment model shall be based on one or more process reference models and a process measurement framework.	This document is based on the process reference model described in the document and the process measurement framework described above.
6.3.4 A process assessment model shall relate to at least one process from the selected process reference model(s).	The process assessment model relates to all 29 processes in the process reference model described in this document. (See Section 6: Process Dimension
6.3.4 A process assessment model shall declare its scope of coverage in the terms of:	
a) the selected process quality characteristic	The selected process quality characteristic is process capability
b) the selected process measurement framework	The selected process measurement framework is based on process capability. (See Section 7: Capability Dimension
c) the selected process reference models(s)	The selected process reference model is the process reference model described in this document.

d) the selected processes from the process reference model(s)	The process assessment model covers all 29 processes in the process reference model described in this document. The processes descriptions in the process assessment model are identical to and a replication of the process descriptions (purpose and outcomes) in the process reference model (See Section 6: Process Dimension
e) the process attributes and (if relevant) the process quality levels of the process quality characteristic selected from the measurement framework	The process assessment model addresses the process capability attribute up through capability level 1. (See Section 7: Capability Dimension
6.3.6 If the selected process measurement framework provides a nominal scale, then the process assessment model shall, for a given process, address all of the defined process attributes, including the process performance attribute.	The process assessment model addresses the process performance attribute. (See Section 7: Capability Dimension
6.3.7 If the process measurement framework provides an ordinal or interval scale, then the process assessment model shall address, for a given process, all, or a continuous subset, of the levels (starting at process quality level 1) of the process measurement framework for the process quality characteristic for each of the processes within its scope. Note: It would be permissible for a model, for example, to address solely process quality level 1, or to address process quality levels 1, 2 and 3, but it would not be permissible to address process quality levels 2 and 3 without process quality level 1.	The process assessment model addresses, for all processes, level 1 of the measurement framework for process capability. (See Section 6: Process Dimension)
6.3.8 Assessment Indicators A process assessment model shall be based on a set of indicators that:	
a) explicitly address the purpose and process outcomes, as defined in the selected process reference model, of each of the processes within the scope of the process assessment model:	For each process within the scope of the process assessment model, the process assessment model provides indicators (base practices and work products) that explicitly address the purpose and process outcomes. (See Section 6: Process Dimension
b) demonstrate the achievement of the process attributes within the scope of the process assessment model;	For each process, the process assessment model provides indicators (base practices and work products) that demonstrate achievement of the process attribute at capability level 1. (See Section 6: Process Dimension

c) demonstrate the achievement (where relevant) of the process quality levels within the scope of the process assessment model.	For each process, the process assessment model provides indicators (base practices and work products) that demonstrate achievement of the process attribute at capability level 1. (See Section 6: Process Dimension
6.3.9 Mapping process assessment models A process assessment model shall provide explicit mapping from the relevant elements of the process assessment model to the processes of the selected process reference model(s) and to the relevant process attributes of the selected process measurement framework. The mappings shall be complete, clear and unambiguous.	
6.3.9.1 Mapping to process reference models The mapping of the assessment indicators within the process assessment model shall be to the purpose and process outcomes of the processes in the selected process reference model.	The purposes and outcomes of the processes in the process reference model and the process assessment model are identical. (See Section 6: Process Dimension
6.3.9.2 Mapping to process measurement framework The mapping of the assessment indicators within the process assessment model shall be to the process attributes (including all the process attribute outcomes listed for each process attribute) in the process measurement framework.	For each process, the indicators (base practices and work products) in the process assessment model map to outcomes for that process, which in turn map to the following attribute in the measurement framework : “Level 1 Performed Process PA1.1 Process Performance attribute a) the process achieves its defined outcomes” (See Section 6: Process Dimension and Section 7: Capability Dimension)

6.3.10 Expression of assessment results A process assessment model shall provide a formal and verifiable mechanism for representing the results of an assessment as a set of process attribute ratings for each assessed process (the process profiles) selected from the specified process reference model(s). NOTE The expression of results may involve a direct translation of process assessment model ratings into a process profile as defined in this International Standard, or the conversion of the data collected during the assessment (with the possible inclusion of additional information) through further judgment on the part of the assessor.	Results of an assessment for each process using the capability level 1 indicators provided map directly to achievement of the process attribute at capability level 1. (See Section 6: Process Dimension and Section 7: Capability Dimension)

Annex B
(informative)

Application and use of the process assessment model

Enterprise SPICE has provided an innovative approach bringing together codified standards and the ISO/IEC 33002 assessment framework to serve the customer for whom the standards are intended --- the enterprise in its pursuit of performance excellence.

This Annex includes the following sections:

- Relationship to other standards and models
- Contexts of use
- Support for assessment and process improvement

B.1 Relationship to other standards and models

Single Integrated Model

Enterprise SPICE has integrated and harmonized stakeholder selected standards and models to provide a single model that addresses broad, essential enterprise processes. (See Annex D: References for a list of the source standards and models). This synergized model provides an efficient and effective mechanism for assessing and improving processes deployed across a typical large or small enterprise. Our challenge has been to serve the enterprise by clarifying and drawing together the most salient and useful aspects of the many sources models and standards-- and to provide guidance for essential enterprise activities. For example, there are many standards and models pertaining to service management, to engineering, to investment management, and to governance. The value results from these have been robustly harmonized so the enterprise can use a single model that captures the essentials of the sources.

Relation to Source Materials

Enterprise SPICE has captured its source material at an appropriate level of detail such that no significant source content is lost. The model provides essential practices addressing major points that can help the enterprise improve and lead to useful assessment results that can point out significant weaknesses or risks for the enterprise. Stakeholders can refer to source standards and models if desired or needed, but this should not be required for addressing major essential elements of enterprise processes. The Mapping Tables (Annex D) show the sources used for deriving each process and also indicate where users can find more detail and additional guidance if needed.

Use with Other Models or Standards

The enterprise can “mix and match” processes to include additional processes or seek coverage of areas that are not yet addressed in this initial release of the process assessment model. For processes that are part of process assessment model some enterprises might need more detail to guide their process improvement work. This could occur for processes that are deemed more critical to the business than others. In these cases it is recommended that this more granular level be sought in the sources.

Process Granularity

Several factors have led to the level of granularity of processes in the process assessment model. The domain of application is quite broad (a typical large or small enterprise that delivers products and/or services

to customers); the model is required not to be sector specific (so this excludes processes pertaining to specific disciplines such as software development); many disciplines are addressed in the model, (and there may be more in subsequent releases); some entire source models are devoted to what in the process assessment model has been brought into a single process. Different models and standards offer different levels of granularity depending on their focus and scope and authoring approaches. The process assessment model represents a consolidation of standards and models, currently depicted at what the authors consider an appropriate level to be useful for enterprise improvement and assessment purposes. Each process should be considered in such a way that it is possible to derive concrete improvement actions based on the practices of the relevant process. More detailed sources can be investigated if necessary, but this should not be required to address the major essential elements of enterprise processes.

Capability Dimension

The process assessment model provides a capability dimension which can be used to determine achievement of up to process capability level 1 for any of the processes. For flexibility in using the process assessment model, measurement frameworks from other models can be adopted and used to extend the measurement framework to higher capability levels. Examples of other models that provide 15504-2 conformant process assessment models addressing higher capability levels include [ISO/IEC 15504-5] and [iCMM]. Furthermore, as ISO/IEC 15504 evolves to the ISO/IEC 330xx series, different measurement frameworks will become available that can be used.

B.2 Contexts of Use

General Applicability

The process assessment model can be used by any enterprise or organization that seeks to improve its business performance in an integrated way. The process assessment model does not presume specific organizational structures, management philosophies, life cycle models, or methods. The concepts and principles are appropriate for a full range of different business needs, application domains, sizes and maturity of organizations; they may be used by all types of enterprises to guide improvement activities.

Products and Services

The process assessment model is designed to be flexible with regard to the type of product or service being acquired, developed, operated, or provided. Its guidance is not sector-specific. A service being provided may pertain to an area included in the model (e.g., evaluation or training services) or to any other service (e.g. restaurant or hotel services).

Level of Application

The process assessment model is intended for application in organizations wishing to address strategic and tactical issues (e.g., public responsibility, strategic direction, or enterprise architecture), operational issues (e.g., task management, or mechanism selection), and for organizations wishing to do both. A project can use the model to improve, as can a small organizational unit operating as a project, a large organizational unit comprising several units, or an overall enterprise.

Terminology

Every enterprise has its own particular culture, terminology, and communication style. Since the process assessment model uses generic terminology, it is expected that its concepts will be translated by all enterprises into their own language and culture.

Role Independence

The process assessment model defines processes which contain groups of practices which, when taken together, achieve a common purpose. However, the groupings do not imply that all base practices of a process are necessarily performed by a single individual or role. All base practices are written in verb-object

format (i.e., without a specific subject) to minimize the perception that a particular base practice "belongs to" a particular role. This is one way in which the syntax of the model supports its use across a wide spectrum of organizational contexts.

Selective Use

Since not all processes may be relevant or essential in a particular enterprise context, selected processes of the model may be used, as applicable. The expectation is that enterprises will improve those processes that are most critical to their business needs.

Once the applicable processes have been identified or selected, the chosen capability dimension (not provided in this document) provides guidance for improving the processes beyond capability level 1 and the selected assessment method measures the capability of a process in relation to the model.

B.3 Support for Assessment and Process Improvement

Major Usage

There are three major ways that the process assessment model can be used:

- Internal process improvement - performing internal assessments to understand the enterprise's or organization's or project's process capability for improvement purposes
- Independent capability evaluation - performing external evaluations/assessments to determine an enterprise's process capability for partnering or supplier qualification, or for general benchmarking purposes
- Process definition - using the process information in the model as a guide or roadmap when an enterprise/ organization/ project needs to define its own processes, whether these be new processes or documentation of existing processes

Assessment Purpose

Assessments are typically performed:

- To focus, motivate, direct, and/or launch improvement within the enterprise, organization or project
- As a diagnostic to determine status compared to a model or standard, or to track progress
- To form a baseline or benchmark of actual practice vs. best in practice represented in the process model

An assessment will compare the assessed entity to a standard or process assessment model, and identify strengths and weaknesses in the assessed entity's processes. Assessment findings are used by the assessed organizational unit to develop process improvement action plans.

Refer to ISO/IEC 33001 for further information on assessment concepts.

Assessment Method

It is not required that any particular assessment method be used with the process assessment model. However, it is highly recommended that the method used be conformant with ISO/IEC 33002 requirements. When combined with an ISO/IEC 33004 conformant process assessment model, these would form a basis for conducting reliable and consistent assessments of process capability and allow for reporting of results using a common rating scale. In this way, organizations can benchmark their assessment results against other organizations. Capability levels provide a path for increasing the capability of performed processes and institutionalizing improvements. The assessment method measures process capability.

Process Improvement Goals

Any process improvement effort should be constructed to support business objectives. The enterprise determines its needs and goals, determines process improvement directions and identifies improvement actions and priorities.

When using a process assessment model to guide improvement, several tools are provided.

- The processes provide good or best practice guidance for performing business processes.
- Several processes focus on process improvement itself.
- Establishing and achieving measurable objectives tied to business needs is emphasized throughout.
- Application guidance

The following processes within the process assessment model are particularly helpful in carrying out process improvement:

- Enterprise Governance – for establishing high level goals and objectives (including those pertaining to process improvement) and aligning them across the enterprise
- Project Management – for managing the overall process improvement effort, and the efforts of improvement teams
- Quality Assurance and Management – for checking compliance and identifying improvement opportunities
- Measurement and Analysis – for establishing, collecting, and analyzing measures relative to goals
- Process Definition – for establishing and communicating process assets
- Process Improvement – for more information on typical process improvement steps and activities
- The process assessment model Does Not Define the Process

A common misconception is that a process description in a process assessment model defines a specific process. The process assessment model provides guidance for organizations to define their own processes and then improve them over time. The base practices in the process assessment model describe fundamental activities that would be expected to be performed as part of a process to achieve the process purpose and outcomes. However, the practices are described at an abstract level, identifying “what” should be done without specifying “how” or by “whom” these activities must be performed. The basic philosophy is to provide guidance for enterprises to create, develop and improve processes that are most effective for them.

Mapping

The actual processes used in an enterprise depend on many factors such as its size and structure, application domain, and whether it is product or service oriented. The processes in the process assessment model may not map one-to-one with the processes used in the organization. Nor is it required or expected that this be the case. An organizational process description may span more than one process, or several organizational process descriptions may together address a single process in the process assessment model.

However, locating the parts of the organization process that map to processes in the process assessment model enables use of the model to guide improvement. If gaps are identified between the current organizational process and the practices in the model, then this indicates an area for potential improvement.

Adding Role and Structure

Role assignment, organizational structure, and organizational work products need to be added to the content of the processes in the process assessment model to come up with a performable and sustainable process design. It is an organization's context regarding these factors, combined with guidance from the practices defined in the process assessment model that produce sound organizational processes with the potential for improvement.

Annex C
(informative)

Relationship Tables

This annex summarizes relationships that are indicated in the Relationship notes between and among the processes in the process assessment model. Relationships are of several forms:

— Send O – this indicates that a process sends specific output to another process.

— Receive I – this indicates that a process receives specific input from another process.

— General – this indicates that the relationship between these processes is of a general nature, provides general information about the relationship, is a supporting process relationship, or is used as needed.

Relationships are portrayed in the following 3 tables:

— Table 1: Relationship notes – From Governance/Management processes view.

— Table 2: Relationship notes – From Life Cycle processes view.

— Table 3: Relationship notes – From Support and Special Application processes view.

Table C.1 — Relationship notes – From Governance/Management Processes view

Relationships – from view of top row of Governance/Management processes

— Send O – Sends specific output to another process

— Receive I – Receives specific input from another process

— General – General, informational, supporting, used as needed

	Enterprise Governance	**Investment Management**	**Human Resource Mgmt**	**Enterprise Architecture**	**Business Relship Mgmt**	**Supplier Agreement Management**	**Tendering**	**Project Management**	**Risk Management**
Enterprise Governance		Receive I; Send O	Receive I; Send O	Send O; Receive I	Receive I	Receive I	Receive I	Receive I; Send O	
Investment Management	Send O; Receive I			Send O				Send O; Receive I	
Human Resource Management	Send O; Receive I								
Enterprise Architecture	Receive I; Send O	Receive I							
Business Relationship Management	General						Receive I		

	Enterprise Governance	Investment Management	Human Resource Mgmt	Enterprise Architecture	Business Relship Mgmt	Supplier Agreement Management	Tendering	Project Management	Risk Management
Supplier Agreement Management			Receive I; Send O				Receive I; Send O	Send O; Receive I	Send O; Receive I
Tendering			Receive I; Send O		Send O				
Project Management	Send O; Receive I	Receive I; Send O	Receive I			Receive I; Send O			Send O; Receive I
Risk Management	Receive I; Send O	Receive I; Send O				Receive I		Receive I; Send O	
Needs	Receive I	Receive I			Send O	Receive I		Receive I; Send O	
Requirements					Receive I	Receive I		Receive I	Send O
Design						Receive I		General	Receive I; Send O
Design Implementation									
Integration						Send O		Receive I	Receive I; Send O

	Enterprise Governance	Investment Management	Human Resource Mgmt	Enterprise Architecture	Business Relship Mgmt	Supplier Agreement Management	Tendering	Project Management	Risk Management
Evaluation						Receive I; Send O		Receive I	Send O
Deployment and Disposal						Send O			
Operation and Support						Receive I; Send O			
Alternative Analysis	Receive I	Receive I				Receive I		Receive I	Receive I
Measurement and Analysis	Receive I	Receive I		Receive I		Receive I		Receive I	Send O; Receive I
Quality Assurance and Management	Receive I					Send O		Receive I; Send O	Send O
Change and Configuration Management				Receive I				Send O; Receive I	
Information Management	Send O						Receive I	Receive I	

	Enterprise Governance	Investment Management	Human Resource Mgmt	Enterprise Architecture	Business Relship Mgmt	Supplier Agreement Management	Tendering	Project Management	Risk Management
Knowledge Management	Send O		Send O; Receive I				Send O		
Training	Send O		Send O; Receive I			Receive I; Send O	Receive I; Send O	Send O	
Research and Innovation	Send O; Receive I	Receive I							Send O
Work Environment									Send O
Process Definition	Send O; Receive I			Send O					
Process Improvement	Send O; Receive I		Send O					General	
Safety and Security	General					General		General	General

Table C.2 — Relationship notes – From Life Cycle processes view

Relationships – from view of top row of Life Cycle processes

— Send O – sends specific output to

— Receive I – receives specific input from

— General – general, informational, supporting, used as needed

	Needs	**Requirements**	**Design**	**Design Implementation**	**Integration**	**Evaluation**	**Deployment and Disposal**	**Operation and Support**
Enterprise Governance	Send O							
Investment Management	Send O							
Human Resource Management	Send O	Send O						
Enterprise Architecture								
Business Relationship Management	Receive I	Send O						Receive I

	Needs	**Requirements**	**Design**	**Design Implementation**	**Integration**	**Evaluation**	**Deployment and Disposal**	**Operation and Support**
Supplier Agreement Management	Send O	Send O	Send O		Receive I	Send O; Receive I	Receive I	Send O; Receive I
Tendering	Send O							
Project Management	Send O, Receive I	Send O, Receive I	General		General, Send O	Send O		General
Risk Management		Send O, Receive I	Send O; Receive I		Send O, Receive I			
Needs		Receive I				Receive I		Send O
Requirements	Send O, Receive I		Receive I; Send O	Send O		Receive I		Send O
Design		Send O		Receive I	Send O			
Design Implementation			Send O		Receive I		Receive I	Receive I
Integration			Receive I					
Evaluation	Send O	Send O	Send O	Send O	Receive I; Send O		Receive I	
Deployment and Disposal				Send O				

	Needs	**Requirements**	**Design**	**Design Implementation**	**Integration**	**Evaluation**	**Deployment and Disposal**	**Operation and Support**
Operation and Support	Receive I	Receive I		Send O			Send O	
Alternatives Analysis	General; Send O;		Send O; Receive I	General; Send O; Receive I	General; Send O; Receive I	General; Send O; Receive I	General; Send O; Receive I	
Measurement and Analysis	General; Send O					General; Send O; Receive I		
Quality Assurance and Management	Send O		Send O			General		
Change and Configuration Management	Send O	Send O	Send O		General		General	
Information Management			Send O				Send O	
Knowledge Management							Send O	
Training	Send O						Receive I; Send O	

	Needs	**Requirements**	**Design**	**Design Implementation**	**Integration**	**Evaluation**	**Deployment and Disposal**	**Operation and Support**
Research and Innovation	Receive I		Send O					
Work Environment	Send O			Receive I				General
Process Definition								
Process Improvement								
Safety and Security	General	General	General	General	General	General	General	General

Table C.3 — Relationship notes – From Support and Special Application Processes view

Relationships – from view of top row of Support and Special Application processes

— Send O – sends specific output to

— Receive I – receives specific input from

— General – general, informational, supporting, used as needed

	AA	M&A	QA&M	CCM	InfMgmt	KM	Training	R&I	WE	PD	PI	S&S
Ent Gov	Send O	Send O	Send O		Receive I	Receive I	Receive I	Receive I; Send O		Receive I; Send O	Receive I; Send O	Gen
Inv Mgmt	Send O	Send O						Send O				
HRM						Receive I; Send O	Receive I; Send O				Receive I	
EA		Send O		Send O						Receive I		
BRM												
SAM	Send O	Send O	Receive I				Send O; Receive I					Gen

	AA	M&A	QA&M	CCM	InfMgmt	KM	Training	R&I	WE	PD	PI	S&S
Tender					Send O	Receive I	Send O; Receive I					
Proj Mgmt	Send O	Send O	Send O; Receive I	Receive I; Send O	Send O		Receive I				General	Gen
Risk Mgmt	Send O	Receive I Send O	Receive I					Receive I	Receive I			Gen
Needs	Send O	Send O	Receive I	Receive I			Receive I	Send O	Receive I			Gen
Req				Receive I			Receive I		Receive I			Gen
Des	Send O		Receive I	Receive I	Receive I			Receive I				Gen
DesImp	Send O								Send O			Gen
Integ	Send O			General				Send O				Gen
Eval	Send O	Send O	Receive I									Gen
D&D	Send O			General	Receive I	Receive I	Send O; Receive I	Send O				Gen
O&S									General			Gen

	AA	M&A	QA&M	CCM	InfMgmt	KM	Training	R&I	WE	PD	PI	S&S
AA		Receive I	Receive I	Receive I				Receive I			Receive I	
M&A	Send O		Receive I		Receive I; Send O			Receive I		Receive I; Send O	Receive I	Gen
QA&M	Send O	Send O			Receive I					Receive I	Receive I; Send O	Gen
CCM	Send O				Send O; Receive I							Gen
InfMgmt		Send O; Receive I	Send O	Receive I; Send O		Send O; Receive I				Receive I; Send O		Gen
KM					Receive I; Send O		Receive I; Send O	Send O; Receive I			Receive I	
Training						Send O; Receive I		Receive I; Send O	Send O; Receive I			Gen
R&I	Send O	Send O				Receive I; Send O	Send O; Receive I		Receive I	Receive I	Send O; Receive I	

	AA	M&A	QA&M	CCM	InfMgmt	KM	Training	R&I	WE	PD	PI	S&S
WE							Receive I; Send O	Send O				Gen
PD		Send O; Receive I	Send O		Send O; Receive I			Send O			Receive I; Send O	
PI	Send O	Send O	Send O; Receive I			Send O		Receive I; Send O		Send O Receive I		Gen
S&S		Gen	Gen	Gen	Gen		Gen		Gen		Gen	

Annex D
(informative)

High-level Mapping Tables

Introduction

The tables in this Informative Annex provide high-level mappings of the processes in the Enterprise SPICE process assessment model to their sources at the process (or equivalent) level undertaken by Enterprise SPICE resources. This indicates, at a high level, the source information that was integrated, synthesized, and harmonized in deriving the processes in the Enterprise SPICE process assessment model. In some cases, practices within these source processes are mapped to and integrated into several different processes; thus a source process may be listed as contributing to more than one process. Detailed-level mappings of process purpose, outcomes, and base practices to their respective sources at the detail level were also developed. Whereas this document only addresses the Process Dimension of the Enterprise SPICE process assessment model, source information that pertained to practices beyond process capability level 1 has not been included in these mappings.

Since the baseline model for the development of Enterprise SPICE process assessment model has been the Federal Aviation Administration integrated Capability Maturity Model [iCMM] and its extensions [iCMM-SS], this annex also provides high-level mappings of [iCMM] to its sources. Detailed practice-level mappings to sources for [iCMM] are provided in [iCMM-Map] and [iCMM-SS].

Organization

This Annex is organized into two sections, with several mapping tables in each section.

Section 1, Enterprise SPICE Mappings, provides high-level mappings of the processes in the Enterprise SPICE process assessment model to its major sources and references at the process level.

- Part 1 of this section maps the processes in the Enterprise SPICE process assessment model to [iCMM], [ITIL], [ISO/IEC 20000], [COBIT] and [P-CMM 2009].
- Part 2 of this section maps the processes in the Enterprise SPICE process assessment model to [ISO/IEC 12207 2008]*, [ISO/IEC 15288 2008]*, [ITIM], [PortfolioMgmt], and [ISO 14001].
- Part 3 of this section maps the processes in the Enterprise SPICE process assessment model to [CMMI-SVC], [eSCM-CL], [eSCM-SP], [FEA], and other sources and references.

* selected sections only, in relation to content already captured in [iCMM]

Section 2, FAA-iCMM Mappings, provides high-level mappings of [iCMM] and [FAA-iCMM 97] to their major sources and references at the process level.

(Detailed practice-level mappings to sources for [iCMM] and [FAA-iCMM 97] practices are included [iCMM Map].)

- Part 1 of this section provides high-level mappings of [iCMM] process areas to their major sources. This part is in two tables.
  - Table 1 maps the [iCMM] process areas to [FAA-iCMM 97] and [HFE], [ISO 9001], [EIA/IS 731], [CMMI-SE/SE/IPPD] and [CMMI-SE/SW/A] and [MBNQA] /[PQA].
  - Table 2 maps the [iCMM] process areas to [ISO/IEC TR 15504], [IEEE/EIA 12207], [ISO/IEC CD 15288], and other sources and references including [IPD-CMM], {EIA-632], [SA-CMM 99], [PSM], [P-CMM] and others.

- Part 2 of this section provides high-level mappings of [FAA-iCMM 97] process areas to their major sources. These sources are [SE-CMM], [SA-CMM 97] and [SW-CMM 93].

SECTION 1: Enterprise SPICE Mappings, PART 1 of 3

Enterprise SPICE	*[iCMM]*	*[ITIL]*	*[ISO/IEC 20000]*	*[COBIT]*	*[P-CMM 2009]*
GOVERNANCE and MANAGEMENT					
Enterprise Governance	PA 00 Integrated Enterprise Management	Strategy management for IT services	4.1 Management responsibility	PO1 Define a strategic IT plan PO3 Determine technology direction PO4 Define the IT processes, organization and relationships PO6 Communicate management aims and direction ME1 Monitor and evaluate IT performance ME3 Ensure compliance with external requirements ME4 Provide IT governance	Communication and coordination Participatory culture Organizational performance alignment
Investment Management		Service Portfolio Management	6.4 Budgeting and accounting for IT services	PO1 Define a strategic IT Plan PO4 Define the IT processes, organization and relationships PO5 Manage the IT investment DS6 Identify and allocate costs ME1 Monitor and evaluate IT performance ME4 Provide IT governance	
Business Relationship Management		Service Level Management Service Portfolio Management Service Catalog Management Business relationship management	6.1 Service level management 7.1 Business relationship management	DS1 Define and manage service levels PO4 Define the IT processes, organization and relationships DS8 Manage service desk and incidents ME3 Ensure compliance with external requirements	
Human Resource Management				PO7 Manage IT human resources	Staffing Performance management Compensation Workforce planning

SECTION 1: Enterprise SPICE Mappings, PART 1 of 3

Enterprise SPICE	***[iCMM]***	***[ITIL]***	***[ISO/IEC 20000]***	***[COBIT]***	***[P-CMM 2009]***
					Career development Competency-based practices
Enterprise Architecture				PO2 Define the information architecture PO3 Determine technology direction	
Project Management	PA 11 Project Management PA 14 Integrated Teaming	Project management (transition planning and support) Capacity Management IT operations control Application management Technical management Service review	4.1 Management responsibility 5.2 Plan new or changed services 5.3 Design and development of new or changed services 4.5 Establish and improve the service management system 6.2 Service reporting	PO4 Define the IT processes, organization and relationships PO9 Assess and manage IT risks PO10 Manage projects DS13 Manage operations ME1 Monitor and evaluate IT performance DS10 Manage problems AI2 Acquire and maintain application software	Workgroup development Competency integration Empowered workgroups
Supplier Agreement Management	PA 12 Supplier Agreement Management PA 05 Outsourcing	Supplier management	7.2 Supplier management 4.2 Governance of processes operated by other parties	AI5 Procure IT resources DS2 Manage third-party services	
Tendering		Financial Management			
Risk Management	PA 13 Risk Management	Risk management		PO9 Assess and manage IT risks	
LIFE CYCLE					
Needs	PA 01 Needs	Service Portfolio Management Request fulfillment Application development	7.1 Business relationship management	DS1 Define and manage service levels PO8 Manage quality	
Requirements	PA 02 Requirements	Demand Management Change Management Request fulfillment Application development		AI1 Identify automated solutions ME3 Ensure compliance with external requirements	

SECTION 1: Enterprise SPICE Mappings, PART 1 of 3

Enterprise SPICE	*[iCMM]*	*[ITIL]*	*[ISO/IEC 20000]*	*[COBIT]*	*[P-CMM 2009]*
Design	PA 03 Design	Service Level Management Availability management Capacity management Application development Design coordination Architecture management	6.5 Capacity management	AI2 Acquire and maintain application software DS3 Manage Performance and Capacity	
Design Implementation	PA 06 Design Implementation	Application development		AI2 Acquire and maintain application software	
Integration	PA 07 Integration	Application development Design coordination		AI2 Acquire and maintain application software	
Evaluation	PA 08 Evaluation	Service validation and testing management Change evaluation management Compliance management		AI2 Acquire and maintain application software ME3 Ensure compliance with external requirements AI7 Install and accredit solutions and changes	
Deployment and Disposal	PA 09 Deployment, Transition, and Disposal	Project management (transition planning and support) Release and deployment management	9.3 Release and deployment management 5.4 Transition of new or changed services	AI4 Enable operation and use AI7 Install and accredit solutions and changes	
Operation and Support	PA 10 Operation and Support	Event management Incident management Problem management Request fulfillment Access management Capacity management Service catalog management Availability management	8.1 Incident and service request management 8.2 Problem management 6.5 Capacity management 6.3 Service continuity and availability management	DS3 Manage Performance and Capacity DS8 Manage service desk and incidents DS10 Manage problems	
SUPPORT					
Alternatives Analysis	PA 04 Alternatives Analysis				
Quality Assurance	PA 15 Quality	Process evaluation		PO8 Manage quality	

SECTION 1: Enterprise SPICE Mappings, PART 1 of 3

Enterprise SPICE	*[iCMM]*	*[ITIL]*	*[ISO/IEC 20000]*	*[COBIT]*	*[P-CMM 2009]*
and Management	Assurance and Management			ME2 Monitor and evaluate internal control AI2 Acquire and maintain application software	
Change and Configuration Management	PA 16 Configuration Management	Change management Service asset and configuration management	4.3 Documentation management 9.1 Configuration management 9.2 Change management	AI6 Manage changes DS9 Manage the configuration DS11 Manage data AI2 Acquire and maintain application software	
Information Management	PA 17 Information Management	Service Catalog Management	4.3 Documentation management 6.6 Information Security Management	DS11 Manage data PO2 Define the information architecture DS5 Ensure systems security	
Knowledge Management		Knowledge management Service Catalog Management		DS7 Educate and Train Users AI4 Enable operation and use PO7 Manage IT human resources	- Competency Analysis - Competency Development - Competency-based assets
Measurement and Analysis	PA 18 Measurement and Analysis	Process evaluation	4.5 Establish and improve the service management system	ME1 Monitor and evaluate IT performance	Quantitative performance management
Work Environment	PA 19 Work Environment (from [iCMM-SS])	IT service continuity management Facilities management	6.3 Service continuity and availability management	AI3 Acquire and maintain technology infrastructure DS4 Ensure continuous services DS12 Manage the physical environment PO4 Define the IT processes, organization and relationships	Work environment
Process Definition	PA 20 Process Definition			PO4 Define the IT processes, organization and relationships PO8 Manage quality	
Process Improvement	PA 21 Process		4.5 Establish and	PO1.Define a strategic IT Plan	

SECTION 1: Enterprise SPICE Mappings, PART 1 of 3

Enterprise SPICE	***[iCMM]***	***[ITIL]***	***[ISO/IEC 20000]***	***[COBIT]***	***[P-CMM 2009]***
	Improvement	Service review Process evaluation Definition of CSI initiatives Monitoring of CSI initiatives	improve the service management system	PO8 Manage quality	
Training	PA 22 Training		4.4 Resource management	DS7 Educate and train users	Training and development Competency analysis Competency development Mentoring
Research and Innovation	PA 23 Innovation				Continuous workforce innovation
SPECIAL APPLICATIONS					
Safety and Security	AA 01 Safety and Security (from [iCMM-SS])	Information security management	6.6 Information security management	DS5 Ensure systems security DS12 Manage the physical environment PO4 Define the IT processes, organization and relationships	

SECTION 1: Enterprise SPICE Mappings, PART 2 of 3

Enterprise SPICE	***[ISO/IEC 12207 2008] (15504-5 selected additions)***	***[ISO/IEC 15288 2008] (selected processes)***	***[ITIM]***	***[PortfolioMgmt] (reference)***	***[ISO 14001]***
GOVERNANCE and MANAGEMENT					
Enterprise Governance	F.1 Organizational Alignment F.2 Organizational Management (MAN.1 and MAN.2 in 15504-5)			Strategic change	4.2 Environmental policy 4.3.3 Objectives, targets and programme(s) 4.4.1 Resources, roles, responsibility and authority 4.4.3 Communication 4.5.3 Nonconformity, corrective action and preventive action 4.6 Management review
Investment Management	6.2.3 Project Portfolio Management Process	6.2.3 Project Portfolio Management	Selecting an investment Providing investment oversight Capturing investment information Defining portfolio criteria Creating the portfolio Evaluating the portfolio Conducting post implementation review Improving the portfolio's performance Managing the succession of	Identification Categorization Evaluation Selection Prioritization Portfolio balancing Authorization Portfolio review Communicate portfolio adjustment	

SECTION 1: Enterprise SPICE Mappings, PART 2 of 3

Enterprise SPICE	***[ISO/IEC 12207 2008] (15504-5 selected additions)***	***[ISO/IEC 15288 2008] (selected processes)***	***[ITIM]***	***[PortfolioMgmt] (reference)***	***[ISO 14001]***
			information systems		
Business Relationship Management			Meeting business needs		
Human Resource Management	6.2.4 Human Resource Management Process B.3.4 Human Resource Management Process Lower-Level Processes B.3.4.1 Skill Development Process B.3.4.2 Skill Acquisition and Provision Process B.3.4.3 Knowledge Management Process (RIN.1 Human resource management – 15504-5)	6.2.4 Human Resource Management			
Enterprise Architecture			Managing the succession of information systems Using IT to drive strategic business change		
Project Management	6.3 Project Planning Process 6.4 Project Assessment and Control Process (MAN.3 Project Management in 15504-5)				4.3.3 Objectives, targets and programme(s) 4.4.1 Resources, roles, responsibility and authority (also GPs) 4.4.6 Operational Control 4.5.3 Nonconformity, corrective

SECTION 1: Enterprise SPICE Mappings, PART 2 of 3

Enterprise SPICE	***[ISO/IEC 12207 2008] (15504-5 selected additions)***	***[ISO/IEC 15288 2008] (selected processes)***	***[ITIM]***	***[PortfolioMgmt] (reference)***	***[ISO 14001]***
					action and preventive action
Supplier Agreement Management	6.1.1 Acquisition Process B.3.1.1 Acquisition Preparation Process B.3.1.2 Supplier Selection Process B.3.1.3 Agreement Monitoring Process B.3.1.4 Acquirer Acceptance Process B.3.2.2 Contract Agreement Process				4.4.6 Operational Control
Tendering	6.1.2 Supply Process B.3.2.1 Supplier tendering process	6.1.2 Supply Process			
Risk Management					4.4.6 Operational Control 4.4.7 Emergency preparedness and response 4.5.3 Nonconformity, corrective action and preventive action
LIFE CYCLE					
Needs	6.4.1 Stakeholder Requirements Definition Process 6.1.1 Acquisition Process	6.4.1 Stakeholder Requirements Process			4.3.1 Environmental aspects
Requirements	6.4.2 System Requirements Analysis Process	6.4.2 Requirements Analysis Process			4.3.2 Legal and other requirements

SECTION 1: Enterprise SPICE Mappings, PART 2 of 3

Enterprise SPICE	***[ISO/IEC 12207 2008] (15504-5 selected additions)***	***[ISO/IEC 15288 2008] (selected processes)***	***[ITIM]***	***[PortfolioMgmt] (reference)***	***[ISO 14001]***
Design	6.4.3 System Architectural Design Process 7.1.3 Software Architectural Design Process 7.1.4 Software Detailed Design Process	6.4.3 Architectural Design Process			
Design Implementation	6.4.4 Implementation Process 7.1.1 Software Implementation Process	6.4.4 Implementation Process			
Integration	6.4.5 System Integration	6.4.5 Integration			
Evaluation	7.2.4 Software Verification Process 7.2.5 Software Validation Process	6.4.6 Verification process 6.4.8 Validation Process			4.5.2 Evaluation of compliance 4.5.3 Nonconformity, corrective action and preventive action
Deployment and Disposal	6.4.7 Software Installation Process 6.4.11 Software Disposal Process	6.4.7 Transition process 6.4.11 Disposal Process			
Operation and Support	6.4.9 Software Operation Process B.3.5.1 Operational Use Process B.3.5.2 Customer Support Process	6.4.9 Operation Process 6.4.10 Maintenance Process			4.4.6 Operational Control 4.5.3 Nonconformity, corrective action and preventive action
SUPPORT					
Alternatives Analysis		6.3.3 Decision Management Process			
Quality Assurance and Management	6.2.5 Quality Management Process 7.2.3 Software Quality Assurance Process 7.2.7 Software Audit	6.2.5 Quality Management Process			4.4.6 Operational Control 4.5.1 Monitoring and measurement 4.5.2 Evaluation of compliance 4.5.3 Nonconformity, corrective

SECTION 1: Enterprise SPICE Mappings, PART 2 of 3

Enterprise SPICE	***[ISO/IEC 12207 2008] (15504-5 selected additions)***	***[ISO/IEC 15288 2008] (selected processes)***	***[ITIM]***	***[PortfolioMgmt] (reference)***	***[ISO 14001]***
	Process 7.2.8 Software Problem resolution Process				action and preventive action 4.5.5 Internal audit
Change and Configuration Management	6.3.5 Configuration Management Process F.3 Contract Change Management Process	6.3.5 Configuration Management Process			4.4.4 Documentation 4.4.5 Control of documents 4.5.3 Nonconformity, corrective action and preventive action 4.5.4 Control of records
Information Management	6.3.6 Information Management Process REU.1 Reuse Asset Management				4.4.3 Communication 4.4.4 Documentation 4.4.5 Control of documents 4.5.4 Control of records
Knowledge Management	RIN.3 Knowledge Management REU.1 Reuse Asset Management				
Measurement and Analysis	6.3.7 Measurement				4.5.1 Monitoring and measurement
Work Environment	6.6.2 Infrastructure		Managing the succession of information systems		4.4.1 Resources, roles, responsibility and authority 4.4.6 Operational Control 4.4.7 Emergency preparedness and response
Process Definition	6.2.1 Life Cycle Model Management Process B3.3.1 Process Establishment Process				4.1 General Requirements 4.4.4 Documentation
Process Improvement	6.2.1 Life Cycle Model Management B.3.3.2 Process Assessment B.3.3.3 Process Improvement	6.2.1 Life Cycle Model Management			4.1 General Requirements
Training	6.2.4 Human Resource	6.2.4 Human			4.4.2 Competence, training and

SECTION 1: Enterprise SPICE Mappings, PART 2 of 3

Enterprise SPICE	***[ISO/IEC 12207 2008] (15504-5 selected additions)***	***[ISO/IEC 15288 2008] (selected processes)***	***[ITIM]***	***[PortfolioMgmt] (reference)***	***[ISO 14001]***
	Management process	Resource Management Process			awareness
Research and Innovation					
SPECIAL APPLICATIONS					
Safety and Security					

SECTION 1: Enterprise SPICE Mappings, PART 3 of 3

Enterprise SPICE	***[CMMI-SVC] (service specific)***	***[eSCM-CL] (reference)***	***[eSCM-SP] (reference)***	***Other sources and references***
GOVERNANCE and MANAGEMENT				
Enterprise Governance		- Governance Management - Value Management - Organizational Change Management	- Performance Management	
Investment Management				[Val IT]
Business Relationship Management		- Relationship Management	- Relationship Management	[MBNQA] 3. Customer and Market Focus
Human Resource Management		People Management	People Management	[MBNQA] 5.1 Workforce focus, Workforce Engagement [CMMI-DEV] Organizational Training [CMMI-ACQ] Organizational Training [CMMI-SVC] Organizational Training
Enterprise Architecture				[FEA] FEA Practice Guidance Federal Enterprise Architecture A Comparison of the Top Four Enterprise-Architecture Methodologies from:http://msdn.microsoft.com/en-

SECTION 1: Enterprise SPICE Mappings, PART 3 of 3

Enterprise SPICE	***[CMMI-SVC] (service specific)***	***[eSCM-CL] (reference)***	***[eSCM-SP] (reference)***	***Other sources and references***
				us/library/bb466232.aspx
Project Management				[PMBOK]
Supplier Agreement Management		- Sourcing Agreements - Sourced Services Management - Sourcing Completion - Sourcing Strategy Management - Sourcing Opportunity Analysis - Sourcing Approach - Sourcing Planning - Service Provider Evaluation - Sourcing Agreements	Contracting	[CMMI-DEV] Supplier Agreement Management [CMMI-ACQ] Agreement Management Solicitation and Supplier Agreement Development Acquisition Requirements Development [ISO 9001:2008] 7.4.1 Purchasing Process 7.4.3 Verification of Purchased Product
Tendering			Contracting process	[MBNQA] 3. Customer and Market Focus
Risk Management		Threat Management	Threat Management	[ISO 31000]
LIFE CYCLE				
Needs				
Requirements			Service Design & Deployment	
Design	Service System Development		Service Design & Deployment	
Design Implementation				
Integration				
Evaluation			Service Design & Deployment	
Deployment and Disposal	Service System Transition	Service Transfer Sourcing Completion	Service Design & Deployment Service Transfer	
Operation and	Capacity and Availability		Service Delivery	[CMMI-DEV]

SECTION 1: Enterprise SPICE Mappings, PART 3 of 3

Enterprise SPICE	***[CMMI-SVC] (service specific)***	***[eSCM-CL] (reference)***	***[eSCM-SP] (reference)***	***Other sources and references***
Support	Management Incident Resolution and Prevention Service Delivery			Causal Analysis and Resolution
SUPPORT				
Alternatives Analysis				
Quality Assurance and Management				
Change and Configuration Management		- Technology Management		
Information Management		Threat Management	Threat Management	[ISO/IEC 27001]
Knowledge Management		- Knowledge Management	- Knowledge Management	
Measurement and Analysis		Value Management		
Work Environment	Service Continuity Strategic Service management	- Technology Management - Threat Management	-Technology Management -Threat Management	
Process Definition				
Process Improvement		- Value Management - Organizational Change Management		[ISO 9004:2009] 8.5 Continual Improvement
Training				[ISO/TS 16949] 6.2.2 Competence, awareness and training
Research and Innovation		Value Management	- Technology Management - Performance Management - Relationship Management	

SECTION 1: Enterprise SPICE Mappings, PART 3 of 3

Enterprise SPICE	***[CMMI-SVC] (service specific)***	***[eSCM-CL] (reference)***	***[eSCM-SP] (reference)***	***Other sources and references***
SPECIAL APPLICATIONS				
Safety and Security		Threat Management	Threat Management	[BS 25999] [ISO/IEC 2700]

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 1

FAA-iCMM v2.0 Process Area	***FAA-iCMM v1.0 Process Area***	***ISO 9001:2000 Subclause***	***EIA/IS 731 Focus Area***	***CMMI-SE/SW/IPPD*/A** Process Area***	***MBNQA/PQA Category/item***
PA 00 Integrated Enterprise Management	PA 10 Product Evolution	5.1 Management commitment 5.3 Quality policy 5.4.1 Quality objectives 5.5.3 Internal communication 5.6 Management review 6.1 Provision of resources	-	*Organizational Environment for Integration Organizational Process Performance	1.1 Organizational Leadership 1.2 Public/Organization Responsibility and Citizenship 2.1 Strategy Development 2.2 Strategy Deployment 7. Business Results
PA 01 Needs	PA 01 Needs PA 24 Human Factors Engineering	5.2 Customer Focus 7.2.1 Determination of requirements related to the product 7.2.3 Customer communication 8.2.1 Customer satisfaction	1.1 Define Stakeholder and System Level Requirements	Requirements Development	3.1 Customer and Market Knowledge 3.2 Customer Satisfaction and Relationships 6.1 Product and Service Processes

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 1

FAA-iCMM v2.0 Process Area	***FAA-iCMM v1.0 Process Area***	***ISO 9001:2000 Subclause***	***EIA/IS 731 Focus Area***	***CMMI-SE/SW/IPPD*/A** Process Area***	***MBNQA/PQA Category/item***
PA 02 Requirements	PA 02 Requirements PA 24 Human Factors Engineering	7.2.1 Determination of requirements related to the product 7.2.2 Review of requirements related to the product 7.3.2 Design and development inputs 5.2 Customer Focus	1.1 Define Stakeholder and System Level Requirements 1.2 Define Technical Problem	Requirements Development Requirements Management	3.1 Customer and Market Knowledge 6.1 Product and Service Processes
PA 03 Design	PA 03 Architecture	7.3.3 Design and development outputs	1.3 Define Solution	Technical Solution	6.1 Product and Service Processes
PA 04 Alternatives Analysis	PA 04 Alternatives	-	1.4 Assess and Select	Decision Analysis and Resolution	6.2 Support Processes 2. Strategic Planning
PA 05 Outsourcing	PA 05 Outsourcing	7.4.1 Purchasing process	2.4 Coordinate with Suppliers	Supplier Agreement Management **Supplier Selection and Monitoring **Integrated Supplier Management	6.3 Supplier and Partnering Processes

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 1

FAA-iCMM v2.0 Process Area	***FAA-iCMM v1.0 Process Area***	***ISO 9001:2000 Subclause***	***EIA/IS 731 Focus Area***	***CMMI-SE/SW/IPPD*/A*** Process Area***	***MBNQA/PQA Category/item***
PA 06 Design Implementation	PA 06 Software Development and Maintenance	7.3.3 Design and development outputs	-	Technical Solution	6.1 Product and Service Processes
PA 07 Integration	PA 07 Integration	-	1.5 Integrate System	Product Integration	6.1 Product and Service Processes
PA 08 Evaluation	PA 08 System Test and Evaluation PA 17 Peer Review	7.3.4 Design and development review 7.3.5 Design and development verification 7.3.6 Design and development validation 7.4.3 Verification of purchased product 8.2.4 Monitoring and measurement of product 8.3 Control of nonconforming product	1.6 Verify System 1.7 Validate System	Verification Validation	6.1 Product and Service Processes

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 1

FAA-iCMM v2.0 Process Area	***FAA-iCMM v1.0 Process Area***	***ISO 9001:2000 Subclause***	***EIA/IS 731 Focus Area***	***CMMI-SE/SW/IPPD*/A** Process Area***	***MBNQA/PQA Category/item***
PA 09 Deployment, Transition, and Disposal	PA 09 Transition	7.5 Production and service provision 7.5.1 Control of product and service provision 7.5.5 Preservation of product	-	Supplier Agreement Management Product Integration ** Supplier Selection and Monitoring	6.1 Product and Service Processes
PA 10 Operation and Support	-	7.5.1 Control of production and service provision 8.5.2 Corrective action 8.5.3 Preventive action	-	-	3.2 Customer Satisfaction and Relationships 6.1 Product and Service Processes
PA 11 Project Management	PA 11 Project Management	7.1 Planning of product realization 7.3.1 Design and development planning 8.5.2 Corrective action	2.1 Plan and Organize 2.2 Monitor and Control	Project Planning Project Monitoring and Control *Integrated Project Management Quantitative Project Management	6.1 Product and Service Processes

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 1

FAA-iCMM v2.0 Process Area	***FAA-iCMM v1.0 Process Area***	***ISO 9001:2000 Subclause***	***EIA/IS 731 Focus Area***	***CMMI-SE/SW/IPPD*/A*** Process Area***	***MBNQA/PQA Category/item***
PA 12 Supplier Agreement Management	PA 12 Contract Management	7.4.1 Purchasing process 7.4.3 Verification of purchased product	2.4 Coordinate with Suppliers	Supplier Agreement Management **Supplier Selection and Monitoring ** Integrated Supplier Management **Quantitative Supplier Management	6.3 Supplier and Partnering Processes 7. Business Results
PA 13 Risk Management	PA 13 Risk Management	8.5.3 Preventive action	2.5 Manage Risk	Risk Management	6.2 Support processes 1.2 Organization Responsibility and Citizenship
PA 14 Integrated Teaming	PA 14 Coordination	-	2.3 Integrate Disciplines	*Integrated Teaming *Organizational Environment for Integration * Integrated Project Management	5.1a Work Systems and Job Design

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 1

FAA-iCMM v2.0 Process Area	*FAA-iCMM v1.0 Process Area*	*ISO 9001:2000 Subclause*	*EIA/IS 731 Focus Area*	*CMMI-SE/SW/IPPD*/A** Process Area*	*MBNQA/PQA Category/item*
PA 15 Quality Assurance & Management	PA 15 Quality Assurance & Management PA 19 Prevention	4.1 General requirements 7.5.4 Customer property 7.5.2 Validation of processes for production and service provision 8.2.2 Internal audit 8.2.3 Monitoring and measurement of processes 8.2.4 Monitoring and measurement of product 8.4 Analysis of Data 8.5.2 Corrective Action 8.5.3 Preventive action	2.8 Ensure Quality	Process and Product Quality Assurance Causal Analysis and Resolution ** Quantitative Supplier Management	6.2 Support Processes
PA 16 Configuration Management	PA 16 Configuration Management	4.2.3 Control of documents 4.2.4 Control of records 7.5.3 Identification and traceability 7.5.4 Customer property	2.7 Manage Configurations	Configuration Management	6.2 Support Processes

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 1

FAA-iCMM v2.0 Process Area	*FAA-iCMM v1.0 Process Area*	*ISO 9001:2000 Subclause*	*EIA/IS 731 Focus Area*	*CMMI-SE/SW/IPPD*/A** Process Area*	*MBNQA/PQA Category/item*
PA 17 Information Management	-	4.2.3 Control of documents 4.2.4 Control of records 7.5.4 Customer property	2.6 Manage Data	-	6.2 Support Processes
PA 18 Measurement and Analysis	PA 18 Measurement	7.6 Control of monitoring and measuring devices 8.2.3 Monitoring and measurement of processes 8.2.4 Monitoring and measurement of product 8.4 Analysis of data	2.2 Monitor and Control	Measurement and Analysis Organizational Process Performance Quantitative Project Management Causal Analysis and Resolution	4.1 Measurement of Organizational Performance 4.2 Analysis of Organizational Performance 6.2 Support Processes 7. Business Results (all items)
PA 19 (reserved)					
PA 20 Process Definition	PA 20 Organization Process Definition	4.1 General requirements 4.2.1 General 4.2.2 Quality Manual 8.5.1 Continual improvement	3.1 Define and Improve the Systems Engineering Process	Organizational Process Focus Organizational Process Definition	6.Process Management (all items)

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 1

FAA-iCMM v2.0 Process Area	***FAA-iCMM v1.0 Process Area***	***ISO 9001:2000 Subclause***	***EIA/IS 731 Focus Area***	***CMMI-SE/SW/IPPD*/A*** Process Area***	***MBNQA/PQA Category/item***
PA 21 Process Improvement	PA 21 Organization Process Improvement	4.1 General requirements 4.2.1 General 8.5.1 Continual improvement	3.1 Define and Improve the Systems Engineering Process	Organizational Process Focus	6. Process Management (all items)
PA 22 Training	PA 22 Training	6.2.2 Competence, awareness, and training	3.2 Manage Competency	Organizational Training	5.2 Employee Education, Training, and Development 6.2 Support Processes
PA 23 Innovation	PA 23 Innovation PA 10 Product Evolution	6.3 Infrastructure 6.4 Work Environment	3.3 Manage Technology 3.4 Manage Systems Engineering Support Environment	Organizational Innovation and Deployment *Organizational Environment for Integration	6.1 Product and Service Processes 6.2 Support Processes 5.3a Work Environment
Areas not covered in FAA-iCMM v2.0	None	None	None	None	5.1a Work systems and Job Design – those aspects pertaining to organizational recruitment and employee performance management

* For CMMI, these process areas are specific to the Integrated Product and Process Development (IPPD) extensions to the CMMI-SE/SW model. Note that the IPPD version of Integrated Project Management was used in this mapping.

** For CMMI, these process areas are specific to the draft Acquisition (A) extensions to the CMMI-SE/SW model.

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 2

FAA-iCMM v2.0 Process Area	*ISO/IEC TR 15504 Processes (with process type*)*	*IEEE/EIA (ISO/IEC) 12207 Software life cycle processes*	*ISO/IEC CD 15288 System Life Cycle Processes*	*Other Sources*
PA 00 Integrated Enterprise Management	ORG.1 Organizational alignment (new) CUS.2 Supply	5.2 Supply	5.1.2 Supply 5.2.1 Enterprise Environment Management 5.2.2 Investment Management	IPD-CMM (v0.98) PA 18 Shared Vision PA 19 Organizational Leadership
PA 01 Needs	ENG.1 Development (basic) ENG.2 System and software maintenance (basic) CUS.3 Requirements elicitation (new) CUS.4.2 Customer support (ext component) ENG1.1 System requirements analysis and design (component)	5.1 Acquisition	5.4.1 Stakeholder Requirements Definition	

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 2

FAA-iCMM v2.0 Process Area	*ISO/IEC TR 15504 Processes (with process type*)*	*IEEE/EIA (ISO/IEC) 12207 Software life cycle processes*	*ISO/IEC CD 15288 System Life Cycle Processes*	*Other Sources*
PA 02 Requirements	ENG.1 Development (basic) ENG.2 System and software maintenance (basic) CUS.3 Requirements elicitation (new) ENG1.1 System requirements analysis and design (component) ENG.1.2 Software requiremts analysis (comp	5.1 Acquisition 5.2 Supply 5.3 Development 5.5 Maintenance	5.4.2 Requirements Analysis 5.4.10 Maintenance	
PA 03 Design	ENG.1 Development (basic) ENG.2 System and software maintenance (basic) ENG1.1 System requirements analysis and design (component) ENG.1.3 Software design (component)	5.3 Development 5.5 Maintenance	5.4.3 Architectural Design	ANSI/EIA-632-1999 4.3.2 Solution Definition IEEE Std 1220-1998 6.5 Synthesis
PA 04 Alternatives Analysis	-	-	5.3.4 Decision Making	ANSI/EIA-632-1999 4.5.1 Systems Analysis Process

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 2

FAA-iCMM v2.0 Process Area	*ISO/IEC TR 15504 Processes (with process type*)*	*IEEE/EIA (ISO/IEC) 12207 Software life cycle processes*	*ISO/IEC CD 15288 System Life Cycle Processes*	*Other Sources*
PA 05 Outsourcing	CUS.1 Acquisition (basic) CUS.1.1 Acquisition preparation (component) CUS.1.2 Supplier selection (component)	5.1 Acquisition	5.1.1 Acquisition	
PA 06 Design Implementation	ENG.1 Development (basic) ENG.2 System and software maintenance (basic) ENG.1.4 Software construction (component)	5.3 Development 5.5 Maintenance	5.4.4 Implementation	ANS/EIA-632-1999: Product Realization
PA 07 Integration	ENG.1 Development (basic) ENG.2 System and software maintenance (basic) ENG.1.7 System integration & testing (comp) ENG.1.5 Software integration (component)	5.3 Development	5.4.5 Integration	EIA-632 System Design, Product Realization, Application Key Concepts

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 2

FAA-iCMM v2.0 Process Area	*ISO/IEC TR 15504 Processes (with process type*)*	*IEEE/EIA (ISO/IEC) 12207 Software life cycle processes*	*ISO/IEC CD 15288 System Life Cycle Processes*	*Other Sources*
PA 08 Evaluation	ENG.1 Development (basic) ENG.2 System and software maintenance (basic) CUS.1.4 Customer acceptance (component) ENG.1.6 Software testing (component) ENG.1.7 System integration and testing (component) SUP.4 Verification (basic) SUP.5 Validation (basic) SUP.6 Joint review (basic)	5.1 Acquisition 5.2 Supply 5.3 Development 5.4 Operation 5.5 Maintenance 6.4 Verification 6.5 Validation 6.6 Joint review	5.4.6 Verification 5.4.8 Validation	
PA 09 Deployment, Transition, and Disposal	ENG.1 Development (basic) ENG.2 System and software maintenance (basic) CUS.2 Supply (basic) ENG.1 Development (basic)	5.2 Supply 5.3 Development 5.5 Maintenance	5.4.4 Implementation 5.4.7 Transition 5.4.11 Disposal	EIA/IS-632 Implementation; Transition to Use

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 2

FAA-iCMM v2.0 Process Area	*ISO/IEC TR 15504 Processes (with process type*)*	*IEEE/EIA (ISO/IEC) 12207 Software life cycle processes*	*ISO/IEC CD 15288 System Life Cycle Processes*	*Other Sources*
PA 10 Operation and Support	CUS.4 Operation (extended) CUS.4.1 Operational use (ext. component) CUS.4.2 Customer support (ext. component) SUP.8 Problem resolution (basic)	5.4 Operation	5.4.9 Operation 5.4.10 Maintenance	
PA 11 Project Management	CUS.2 Supply (basic) (+ all relevant PAs) MAN.1 Management (basic) MAN.2 Project management (new) SUP.6 Joint Review	5.2 Supply (+ all relevant PAs) 6.6 Joint review 7.1 Management	5.1.2 Supply 5.3.1 Project Planning 5.3.2 Project Assessment 5.3.3 Project Control	
PA 12 Supplier Agreement Management	CUS.1 Acquisition (basic) CUS.1.3 Supplier monitoring (component) CUS.1.4 Customer acceptance process	5.1 Acquisition 5.2 Supply 6.3 Quality Assurance	5.1.1 Acquisition Supply (to negotiate agreement)	SA-CMM v1.02 Contract Tracking and Oversight Contract Performance

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 2

FAA-iCMM v2.0 Process Area	*ISO/IEC TR 15504 Processes (with process type*)*	*IEEE/EIA (ISO/IEC) 12207 Software life cycle processes*	*ISO/IEC CD 15288 System Life Cycle Processes*	*Other Sources*
PA 13 Risk Management	MAN.4 Risk management (new)	-	5.3.5 Risk Management	
PA 14 Integrated Teaming	ORG.1 Organizational Alignment (new) ORG.3 Human resource management (ext)	-	5.2.4 Resource Management	
PA 15 Quality Assurance & Management	SUP.3 Quality assurance (basic) MAN.3 Quality management (new) SUP.7 Audit (basic) SUP.8 Problem resolution (basic)	6.3 Quality Assurance 6.7 Audit 6. 8 Problem resolution	-	
PA 16Configuration Management	SUP.2 Configuration management (basic)	6.2 Configuration Management	5.3.6 Configuration Management	
PA 17 Information Management	SUP.1 Documentation (extended) (documentation developed in relevant PA) ORG.6 Reuse (new)	5.5 Maintenance 6.1 Documentation (documentation produced in relevant PA)	5.3.7 Information Management 5.2.4 Resource Management	

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 2

FAA-iCMM v2.0 Process Area	*ISO/IEC TR 15504 Processes (with process type*)*	*IEEE/EIA (ISO/IEC) 12207 Software life cycle processes*	*ISO/IEC CD 15288 System Life Cycle Processes*	*Other Sources*
PA 18 Measurement and Analysis	ORG.5 Measurement (new)	7.3 Improvement	5.2.3 System Life Cycle Processes Management	[PSM] ISO/TR10017:1999(E) – Guidance on Statistical Techniques for ISO9001: 1994
PA 19 (reserved)				
PA 20 Process Definition	ORG.2 Improvement process (basic) ORG.2.1 Process establishment (component) ORG.6 Reuse (new)	7.3 Improvement	5.2.3 System Life Cycle Processes Management	

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 2

FAA-iCMM v2.0 Process Area	*ISO/IEC TR 15504 Processes* *(with process type*)*	*IEEE/EIA (ISO/IEC) 12207 Software life cycle processes*	*ISO/IEC CD 15288* *System Life Cycle Processes*	*Other Sources*
PA 21 Process Improvement	ORG.2 Improvement process (basic) ORG.2.1 Process establishment (component) ORG2.2 Process assessment (component) ORG2.3 Process improvement (component) 15504 Part 7: Guidelines for Process Improvement	7.3 Improvement	5.2.1 Enterprise Environment Management 5.2.3 System Life Cycle Processes Management	
PA 22 Training	ORG.3 Human resource management (extended)	7.4 Training	5.2.4 Resource Management	People CMM: Training Knowledge and Skills Analysis
PA 23 Innovation	ORG.4 Infrastructure (basic)	7.2 Infrastructure	-	

SECTION 2: FAA-iCMM v2.0 Process Areas and their Major Sources - Part 1, Table 2

FAA-iCMM v2.0 Process Area	***ISO/IEC TR 15504 Processes (with process type*)***	***IEEE/EIA (ISO/IEC) 12207 Software life cycle processes***	***ISO/IEC CD 15288 System Life Cycle Processes***	***Other Sources***
Areas not covered in FAA-iCMM v2.0	ORG.3 Human Resource management (extended) – practices regarding recruitment, staff evaluation, and staff records	None	Resource Management – activities regarding recruitment, retention, personnel pool, and staff review	N/a

*ISO/IEC 15504 process types are:
Basic – processes identical in intent to processes in ISO/IEC 12207

Extended – processes that are expansions of ISO/IEC 12207 processes

New – processes that are outside the scope of ISO/IEC 12207

Component – processes (group of one or more ISO/IEC 12207's activities from same process)

Extended Component – processes that are one or more of ISO/IEC 12207's activities from same process, with additional material.

SECTION 2: FAA-iCMM v1 Process Areas and their Major Sources - Part 2

FAA-iCMM v1.0	***[SE-CMM]***	***[SA-CMM 96]***	***[SW-CMM 93]***
PA 01 Needs	Understand Customer Needs and Expectations	-	-
PA 02 Requirements	Derive and Allocate Requirements	Requirements Development and Management	Requirements Management SW Product Engineering
PA 03 Architecture	Evolve System Architecture	-	SW Product Engineering

SECTION 2: FAA-iCMM v1 Process Areas and their Major Sources - Part 2

FAA-iCMM v1.0	*[SE-CMM]*	*[SA-CMM 96]*	*[SW-CMM 93]*
PA 04 Alternatives	Analyze Candidate Solutions	-	-
PA 05 Outsourcing	Coordinate with Suppliers	Solicitation	SW Subcontract Management
PA 06 Software Development and Maintenance	-	-	SW Product Engineering
PA 07 Integration	Integrate System	-	SW Product Engineering
PA 08 System Test and Evaluation	Verify &Validate System	Evaluation	SW Product Engineering
PA 09 Transition	-	Transition to Support	-
PA 10 Product Evolution	Manage Product Line Evolution	-	-
PA 11 Project Management	Plan Technical Effort Monitor and Control Technical Effort	SW Acquisition Planning Project Management Project Performance Management	SW Project Planning SW Project Tracking and Oversight Integrated SW Management
PA 12 Contract Management	Coordinate with Suppliers	Contract Tracking and Oversight Contract Performance Management	SW Subcontract Management
PA 13 Risk Management	Manage Risk	Acquisition Risk Management	Integrated SW Management
PA 14 Coordination	Integrate Disciplines	-	Intergroup Coordination

SECTION 2: FAA-iCMM v1 Process Areas and their Major Sources - Part 2

FAA-iCMM v1.0	***[SE-CMM]***	***[SA-CMM 96]***	***[SW-CMM 93]***
PA 15 Quality Assurance and Management	Ensure Quality	-	SW Quality Assurance
PA 16 Configuration Management	Manage Configurations		SW Configuration Management
PA 17 Peer Review	Level 3 Common Features		Peer Reviews
PA 18 Measurement	Level 4 Common Features	Quantitative Process Management Quantitative Acquisition Management	Quantitative Process Management SW Quality Management
PA 19 Prevention	Level 5 Common Features	-	Defect Prevention
PA 20 Organization Process Definition	Define Organization's Systems Engineering Process	Process Definition and Maintenance	Organization Process Focus Organization Process Definition
PA 21 Organization Process Improvement	Improve Organization's Systems Engineering Process	Continuous Process Improvement	Process Change Management
PA 22 Training	Provide Ongoing Skills and Knowledge	Training Program	Training Program
PA 23 Innovation	Manage Systems Engineering Support Environment	Acquisition Innovation Management	Technology Change Management

Annex E
(informative)

Project Participants

This Informative Annex provides information regarding Enterprise SPICE project participants engaged in the development of the *Enterprise SPICE® An Integrated Model for Enterprise-wide Assessment and Improvement, Technical Report – Issue 1*, in their various roles of participation.

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The SPICE User Group

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Winifred	Menezes	Co-Chair	Canada
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Bob	Vickroy	Communications	United States
William J.	Bradford	Member	United States
François	Coallier	Member	Canada
Wolfgang	Dashner	Member	Germany
Victoria	Hailey	Member	Canada
Werner	Henschelchen	Member	Germany
Antanas	Mitasiunas	Member	Lithuania
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Ernest	Wallmueller	Member	Switzerland

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First Name	Last Name	Country
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Cyril	Taylor	United States
Arthur	Valle	Brazil
Renato	Vasques	Brazil
Ernesto	Viale	Italy

First Name	Last Name	Country
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James	Zurn	United States

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This bibliography provides references that have been used in the development of the Enterprise SPICE process assessment model. Since source and reference material has evolved during the development of this work, annotations are additionally provided to indicate changes that have occurred, including version upgrades and their impact on content capture. Thus different versions of the same document may be indicated in this annex depending on when they were integrated into Enterprise SPICE process assessment model. This approach demonstrates the accuracy and robustness required to provide and document the precise capture of sources and references used for this project. See also Section 5 for further information on source changes.

This annex is organized into several sections.

- Section 1 describes the sources and other documents used in developing the Enterprise SPICE process assessment model.
- Section 2 describes additional reference material used in developing the Enterprise SPICE process assessment model.
- Section 3 describes sources and references used in developing the Federal Aviation Administration Integrated Capability Maturity Model, which is the baseline model used in developing the Enterprise SPICE process assessment model.
- Section 4 describes sources and references used in the development of Safety and Security Extensions for Integrated Capability Maturity Models, which extends the baseline model to address safety and security, as well as the work environment process.
- Section 5 provides annotations regarding changes to sources used in developing the baseline models.
- Section 6 provides a list of references describing application of the Enterprise SPICE process assessment model.

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4.3 Work Environment Sources and References

In addition to the Safety and Security source standards identified above, Work Environment sources include the following documents defined above: [EIS/IS 731], [FAA-iCMM 1997], [IEEE/EIA 12207], [ISO 9001:2000], [ISO/IEC TR 15504], and [MBNQA]. The documents listed below were also used in developing the Work Environment Process Area.

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5 [iCMM] Source Change Annotations

[iCMM] Source Document	Current status	Comment
[CMMI-SE/SW/A]	[CMMI-ACQ] released. The majority of the differences between [CMMI-ACQ] and [CMMI-DEV] are informative only.	Content of [CMMI-ACQ] covered in [iCMM]
[CMMI-SE/SW/IPPD]	[CMMI-DEV] released; materials were simplified and clarified. Main changes: • **2 work environment** practices added: 1 in Organizational Process Definition, 1 in Integrated Project Management PA • **Integrated Supplier Management** incorporated in Supplier Agreement management • **Organizational Environment for Integration** incorporated in Organizational Process Definition • **Integrated Teaming** incorporated in Integrated Project Management	Content of [CMMI-DEV] is covered in [iCMM] although some mappings would change since some CMMI process areas were consolidated. (see mapping table appendix) Work Environment is covered in [iCMM-SS]
[EIA/IS 731]	No change	
[FAA-iCMM 97]	Integrated into [iCMM]	
[HFE]	No change	

[iCMM] Source Document	Current status	Comment
[IEEE/EIA 12207]	Two amendments released: ISO/IEC 12207:1995/Amd.1:2002(E) ISO/IEC 12207:1995/Amd.2:2004(E) ISO/IEC 12207:2008 released: Revises: ISO/IEC 12207:1995 Information technology -- Software life cycle processes Revises: ISO/IEC 12207:1995/Amd 1:2002 Revises: ISO/IEC 12207:1995/Amd 2:2004	[ISO/IEC 15504-5] captures ISO/IEC 12207 including amendments 1 and 2
[ISO 9001:2000]	[ISO 9001:2008] released; “This fourth edition cancels and replaces the third edition (ISO 9001 2000), which has been amended to clarify points in the text and to enhance compatibility with ISO 14001 :2004.”	No changes required
[ISO/IEC CD 15288]	[ISO/IEC 15288 2008] Minor changes	
[ISO/IEC TR 15504]	- ISO/IEC TR 15504: Part 5 Assessment model included in ISO/IEC 12207 amendments - ISO/IEC 12207 and amendments are now [ISO/IEC 15504-5]	
[MBNQA]	Baldrige criteria reviewed/ adjusted every year.	Main content remains stable
[SA-CMM 96]	Integrated into [FAA-iCMM 97]	
[SA-CMM 99]	Changes from [SA-CMM 96] integrated into [iCMM] SA-CMM is a basis for [CMMI-ACQ]	
[SE-CMM]	Integrated into [FAA-iCMM 97]	
[SW-CMM 93]	Integrated into [FAA-iCMM 97]	
[SW-CMM 97]	Integrated into [CMMI-SE/SW/IPPD]	

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