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Software Engineering
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PARIS, FRANCE 11 - 15 NOVEMBER 1996

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ISO/IEC JTC1/SC7/WG7
N119
Life Cycle Management

Convener: USA (ANSI)

Space and Naval Warfare
Systems Command (052-3)
2451 Crystal Drive (CPK-5)
Arlington, VA 22245-5200
U.S.A.

5 August 1996

Members of WG7 and interested parties

Subject: Call for the WG7 meeting

1. WG7 will meet in Paris, France, from 11 through 15 November, 1996. Parties who are interested in the activities of WG7 are invited to attend the meeting.

2. Dr. Claude Vogel has kindly offered to host this meeting. Thank you, Dr. Vogel. The following details are provided for your information and action. I recommend that attendees stay at Hotel Astor.

Host:
Dr. Claude Vogel
Professor, Computer Science Department
Director, Computational Semiotics Laboratory

Place of Meetings:
University Leonardo da Vinci
92916 PARIS LA DEFENSE - Cedex-
FRANCE
(postal address)

Hotels:

Hotel "SOFITEL"
2 place de la Defense
CNIT BP 210
92053 LA DEFENSE
Phone: 46 92 10 10
Fax number: 46 92 10 50
Single room: 1200 FF (US $240)
Breakfast: 95 FF (US $19)

Hotel "MERCURE"
18 rue Baudin
92400 COURBEVOIE
FRANCE
Phone: 49 04 75 00
Single room: 870 FF (breakfast included)

Hotel "ASTOR"
36 rue Pierre Demours
75017 PARIS
FRANCE
Phone: 43 80 17 17
Fax number: 40 53 91 34
Single room: 780 FF (breakfast included)

Registration fee:
500 FF (US $100)

Point of contact for further information:
Irene Ludmann
E-mail address: iludmann@devinci.fr

3. WG7 will have a very busy agenda in Paris. The group will review and work on the standards and guidelines on software and system life cycles that are under its purview and in progress. The agenda is attached as WG7 Doc. # N120.

4. As you know, the JTC1 assigned WG7 the development of an International Standard on System Life Cycle Processes. The primary goal is a standard that would define, integrate, and harmonize the processes in the life cycle of a system containing hardware, software, and personnel. The group met in Prague on 27-31 May 1996 for the first time on this standard and developed a draft list of processes employable in the life cycle of a system. The system life cycle processes and the related architecture are attached as WG7 Doc. # N121, which was prepared by Richard Schmidt, Project Editor, based on the WG7 discussion in Prague. I request the heads of delegations to review this document (N121), preferably with their respective National Bodies, and come prepared to the Paris meeting to discuss their technical and National interests. As a first order of business under this agenda item, I will ask the members to establish a set of criteria for determining and deriving the life cycle processes (that is, design specifications for the processes).

5. With regard to the development of an International Standard on System Life Cycle Processes, it is my sincere desire and hope that WG7 is well-balanced among and across the areas of hardware, software, ergonomics, and quality management/assurance. Currently, the group is trying to achieve this balance. In that light, I request the WG7 members and interested parties to invite and recruit experts from those areas.

6. The following additional documents are attached for your information and action:

a. WG7 Doc. # N111 - Membership List;

b. WG7 Doc. # N117 - Minutes - WG7 Prague Meeting, 27-31 May 1996.

c. SC7 Doc # N1385 - Project Requirements: System Life Cycle Processes.

7. Please note that these documents may be circulated by the SC7 Secretary. In that case, the Secretary is expected to assign SC7 Doc. nos. to the documents.

8. See you all in Paris.

Sincerely,
Raghu Singh

ISO/IEC JTC1/SC7/WG7 N120
Life Cycle Management

Convener: USA (ANSI)

5 August 1996

AGENDA FOR WG7
PARIS, FRANCE
11 - 15 NOVEMBER 1996

1. Welcome, opening remarks, and roll call
2. Adoption of the agenda
3. Appointment of secretary
4. Approval of the Prague minutes
5. Summary of projects' status
6. Remarks from Heads of the Delegations
7. Review: Guidebook for ISO/IEC 12207 [Editor: Mr. Thiele]
8. Review: Guide on Mockup and Prototype [Editor: Dr. Vogel]
9. Review: Software Maintenance guide [Editor: Mr. Pigoski]
10. Review: Study Group on Software process measurements [Leader: Mr. McGarry]
11 Review: System Life Cycle Processes standard [Editors: Messrs. Schmidt and Arnold]
12. Interchange/Joint meetings with WG8
13. Planning: Next meeting(s)
14. Recap of the week
15. Adjournment

23 July 1996

INTERNATIONAL STANDARD
System Life Cycle Processes
P15288

[DRAFT OUTLINE]
July 23, 1996

1. Introduction

[DESCRIPTION: The Introduction Section provides general information on the content of the standard and its intended use.]

1.1 Scope

[DESCRIPTION: The Scope section provides an overview of the standard and its intended purpose in terms of area(s) of coverage, and relationships to other ISO standards.]

1.2 Application Guidance

[DESCRIPTION: The Application Guidance section provides general guidance on organizational implementation, and compliance with Shall, Must, Should clauses.]

1.3 How to Use This Standard

[DESCRIPTION: The How to Use This Standard section provides general tailoring suggestions for application of the standard to a project or Systems Engineering effort. It is supported by four subsections which address different perspectives: 1) The Project Context, 2) The Product Context, 3) the System Evolution Throughout the Life-cycle, and 4) Processes, Activities, and Tasks.]

1.3.1 The Project Context

[DESCRIPTION: The Project Context section provides an overview of the project implementation addressing the acquirer/supplier concepts. A discussion on applying the standard with subcontractors/vendors or within a single organization will be addressed (Agreement Process). The relationships between the Project and the Enterprise Processes, as well as, the role of The Technical and Management Processes will be discussed.]

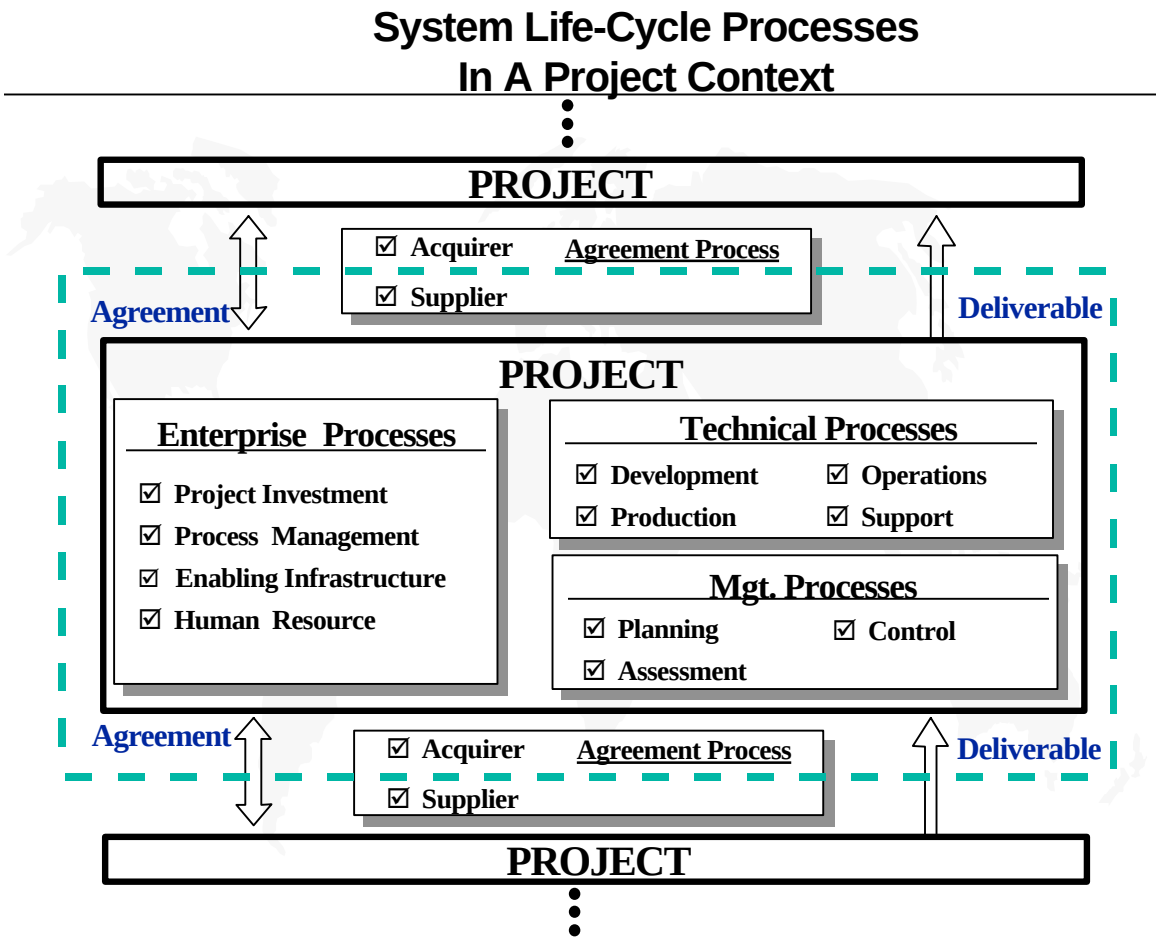

Figure 1: System Life-cycle Process in a Project Context

1.3.2 The Product Context

[DESCRIPTION: The Product Context Section introduces the concept of the System Breakdown Structure, and the application of the Systems Engineering Process to the definition of the Products and Processes used to develop, test, produce, distribute, support, train, operate, and dispose of products.]

1.3.3 Systems Evolution Throughout the Life-cycle

[DESCRIPTION: The Systems Evolution Throughout the Life-cycle section provides an overview of the generic system life-cycle, and how the system evolves from an initial concept into a realized product with the infrastructure necessary to support it throughout its life-cycle. The evolution of the system through development, production, and operation & support will be supported by a discussion of how the Systems Engineering Process is applied to support project objectives. The discussion will address how risks, quality factors, specification/baselines, and reviews are accomplished as the system is initially developed and undergoes enhancement or modification.]

(See Annex A for examples of applying System Life-cycle Processes to various Efforts)

1.3.4 Processes, Activities, Tasks

[DESCRIPTION: The Process, Activities, Tasks section discusses the generic use of this structure to describe the System Life-cycle Processes depicted in Figure 1 above.]

2. Normative References

3. Definitions

4. Application of this International Standard

[DESCRIPTION: The Application of this International Standard section specifies generic requirements which ensure compliance with this standard, and provides general guidance for organizational adoption.

Application to various types of "systems" will be discussed, and tailoring guidance included to address the application of the standard to hardware versus software -intensive systems.

A link between this standard, related standards (ISO - 9000 series, ISO -12207, etc.), and capability maturity models will be addressed.]

5. Technical Processes

[DESCRIPTION: The Technical Processes section (general) addresses the Integrated Product and Process Development philosophy, establishes the requirements for the Technical Processes and the relationships between the Technical Processes and the Management, Enterprise and Agreement Processes.]

5.1 Development Process

[DESCRIPTION: The Development section establishes the requirements for the activities and tasks associated with the Development Process. This addresses the establishment of technical plans and schedules and their relationship with Management plans/schedules; the establishment of a system breakdown structure and its relationship to the Work Breakdown Structure; and the evolution of the system from initial concepts into a defined system, its interfaces (both external and internal), its initial production items (mock-ups and prototypes), and its supporting life-cycle infrastructure.

The generic Systems Engineering Process is defined and its application to the development activities (System Definition, System Design, System Integration and System Evaluation) is specified. The SE Process is an iterative process involving Requirements Analysis, Functional Analysis, Design, Systems Analysis, and Verification/Validation which is iteratively applied throughout the system life-cycle.]

5.1.1 System Definition Activity

[DESCRIPTION: The System Definition Activity section specifies the requirements for tasks which address the initial effort to derive a system definition from competing concepts, addressing market/customer needs analysis, and results in a definition of the system, its external interfaces, the concepts for the supporting infrastructure (Production, Test, Distribution, Operations, Support, Training and Disposition) as applicable.

The results of this activity are the technical baselines for the system, preliminary baselines for subsystems, product interface specification (external) subsystem interface specifications, identified subsystem risks, and revised technical plans/schedules for conducting the Systems Design Activity. Appropriate reviews are specified to be conducted, including 1) Alternative Concept Review, and 2) System Definition review.]

5.1.2 System Design Activity

[DESCRIPTION: The System Design Activity section specifies the requirements for tasks which address the effort to derive a system design from commercially available (COTS - Commercial Off-the-Shelf) and newly developed items, results in a design of the system (both preliminary and detailed), its interfaces, and refines the architecture for the supporting infrastructure (Production, Test, Distribution, Operations, Support, Training and Disposition) as applicable.

The results of this activity are the "build-to" baselines for the product(s) and the items (Subsystems, Assemblies, Components, Subassemblies, etc.) which comprise its configuration, and revised technical plans/schedules for conducting the Systems Integration Activity. Appropriate reviews are specified to be conducted, including 1) Subsystem & System Preliminary Design Review, and 2) Component, Subsystem & System Detailed Design review.]

5.1.3 System Integration Activity

[DESCRIPTION: The System Integration Activity section specifies the requirements for tasks which address the effort to procure or fabricate parts or other elements of the system configuration, assemble, integrate, and test the components, subsystems and system, and establishes the supporting infrastructure (Production, Test, Distribution, Operations, Support, Training and Disposition) as applicable.

The results of this activity are updated baselines for the product(s) and the items (Subsystems, Assemblies, Components, Subassemblies, etc.) which comprise its configuration, initial production units for Test and Evaluation, and revised technical plans/schedules for conducting the Systems Evaluation Activity. Appropriate reviews are specified to be conducted, including 1) Component, Subsystem, and System Test Readiness Review, and 2) Component, Subsystem, and System Functional/Physical Configuration Audits.]

5.1.4 System Evaluation Activity

[DESCRIPTION: The System Evaluation Activity section specifies the requirements for tasks which address the effort test and evaluate the components, subsystems, system, and the supporting infrastructure (Production, Test, Distribution, Operations, Support, Training and Disposition) as applicable.

The results of this activity are updated baselines for the product(s) and the items (Subsystems, Assemblies, Components, Subassemblies, etc.) which comprise its configuration and a proven infrastructure (Production, Test, Distribution, Operations, Support, Training and Disposition) as applicable, and revised technical plans/schedules for conducting System Evolution/Enhancement. Appropriate reviews are specified to be conducted, including Component, Subsystem, and System Production Readiness Review.]

5.2 Production Process

[DESCRIPTION: The Production Process section specifies the requirements for tasks which address the definition, design, construction, integration, proofing, parts/raw material acquisition, and operation of the manufacturing process. Emphasis is placed on the tasks which directly support the development/enhancement processes to ensure that the resulting product design is producible and that ensure that the production process is established & proofed in a timely manner to support the production go-ahead decision.]

5.3 Operation Process

[DESCRIPTION: The Operation Process section specifies the requirements for tasks which address the definition of the Operations process and ensures that the operational concepts evolve for the system and are correctly perceived by the Development activities. The tasks include the definition of the Operational environment, the training of operational personnel (which may demand the development of specialized training systems), and operational feedback on product performance and effectiveness.]

5.4 Support Process

[DESCRIPTION: The Support Process section specifies the requirements for tasks which address the definition of the Support process and ensures that the Support concepts evolve for the system and are correctly perceived by the Development activities. The tasks include the definition of the Support environment, the training of Support personnel, conduct of Integrated Logistics Support Analyses, maintenance of product failure logs, and support feedback on product performance, reliability and maintainability.]

5.4.1 Transition Activity

[DESCRIPTION: The Transition Activity section specifies the requirements for tasks which address the transition of the product(s) from Development/Production to Operations and Support including, shipping, installation, inspection, and checkout.]

5.4.2 Maintenance Activity (H/W & S/W)

[DESCRIPTION: The Maintenance Activity section specifies the requirements for tasks which address the various levels of maintenance which will provide effective support for the product(s). Maintenance plans, logistical/spares requirements, and maintenance records shall be addressed, and the need for special tooling or equipment necessary to conduct affordable maintenance shall be investigated. In addition, the need for Built-in Test will be integrated into the Development activities to reduce the maintenance burden of fault detection and isolation.]

5.4.3 Training Activity

[DESCRIPTION: The Training Activity section specifies the requirements for tasks which address the training needs of operation and support personnel. The need for training facilities or equipment will be considered, and the development of training manuals and certification procedures shall be specified.]

5.4.4 Migration Activity

[DESCRIPTION: The Migration Activity section specifies the requirements for tasks which address planned and unplanned enhancements and the resolution of design deficiencies. This activity involves many of the Development tasks but recognizes the existence of a system architecture which shall be modified to enhance the system performance or functionality. This involves the necessary adjustments to the infrastructure (Production, Test, Distribution, Operations, Support, Training and Disposition) as applicable.]

5.4.5 Disposition

[DESCRIPTION: The Disposition Activity section specifies the requirements for tasks which address the disposal of product(s), produced by-products, or the reclamation of products to obtain spare parts for operational system once the spare parts are no longer being produced.]

6. Technical Management Process

[DESCRIPTION: The Technical Management Process section specifies the general requirements for integrating the Planning, Assessing and Control processes with the Technical Processes (Development, Production, Operations, and Support). It provides for Project-level input into the Technical Processes, and the feedback from these processes, to establish viable plans/schedules, the allocation of resources to activities and tasks, risk management, interface management, and continual product & process improvement.]

6.1 Planning Process

[DESCRIPTION: The Planning Process section specifies the requirements for the activities and tasks which govern project-level planning and the establishment of technical plans and schedules. It addresses the Work-Breakdown Structure which feeds and evolves along with the System Breakdown Structure, and the Specification Tree. Establishes the Technical Performance Measures which drive the Development process, and evolves into project-level metrics against which progress and design effectiveness can be assessed.]

6.2 Assessment Process

[DESCRIPTION: The Assessment Process section specifies the requirements for activities and tasks for Reviews and Audits, Performance-based metrics and data collection (process and progress measures), and Risk Assessment and Abatement efforts. The results of trade-off and cost-effectiveness analyses are considered and used to make balanced decisions which drive the Technical Processes towards the aim of achieving Enterprise and Project objectives.]

6.3 Control Process

[DESCRIPTION: The Control Process section specifies the requirements for activities and tasks for Risk Management, Data Management, Configuration Management, Interface Management and Quality Management [Note: Quality Management is not Quality Assurance. QA activities and tasks will be addressed in the Technical Management Process, as appropriate! The intent of the Technical Management Process is to ensure that Quality is designed into the product and enabling infrastructure processes.]

7. Enterprise Process

[DESCRIPTION: The Enterprise Process section specifies the requirements for activities and tasks for integrating project-related processes with those of the Enterprise.]

7.1 Investment Decision Process

[[DESCRIPTION: The Investment Decision Process section specifies the requirements for activities and tasks for interaction between the project and Enterprise Planning, Budgeting, and Reporting. Key Investment decision criteria involves Development Costs, Design-to-cost, Market price/Competition, Target market/audience, and Return-on-investment. These criteria are used to assess project progress at Decision Gates, as inputs into the Enterprise Strategic Plan, and for budgeting.]

7.2 Process Management Process

[DESCRIPTION: The Process Management Process section specifies the requirements for activities and tasks for establishing, conducting and continually improving Enterprise processes. Lessons Learned from projects are used to adjust policies and procedures, and metrics are used to provide insight into project performance against objectives.]

7.3 Enabling Infrastructure Process

[DESCRIPTION: The Enabling Infrastructure Process section specifies the requirements for activities and tasks for the enterprise to provide the enabling infrastructure (Facilities, Capital, Tools, Research & Development). Projects must interact with the Enterprise to gain access to elements of the enabling infrastructure, request the acquisition of additional resources(if required), and to relinquish resources when the project is finished with them.]

7.4 Human Resource Process

[DESCRIPTION: The Human Resource Process section specifies the requirements for activities and tasks for acquiring/providing and enhancing the skills of employees necessary to carry our project objectives. This involves assigning personnel to project, training programs to enhance the skill sets, and providing feedback to employees on their performance.]

8. Agreement Process

[DESCRIPTION: The Agreement Process section specifies the general requirements for the technical inputs to agreements between organizations (both internal and external to the Enterprise). This section involves requirements for establishing plans, milestones, acceptance criteria, technical interchange meetings, and participation in product teams.]

8.1 Acquisition Process

[DESCRIPTION: The Acquisition Process section specifies the requirements for the organization when it acts as an acquiring agent (obtaining products/services from another organization).]

8.2 Supply Process

[DESCRIPTION: The Supply Process section specifies the requirements for the organization when it acts as a supplying agent (providing products/services to another organization).]