



Engineering for Industry

The New ISO/IEC 29110 Systems Engineering International Standard for Very Small Entities

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INCOSE Webinar, November 18th 2015



Topics

- Introduction
- Standards and Guides developed for Very Small Entities (VSEs)*
- ISO/IEC 29110 for Systems Engineering
- Two case studies
- Conclusion

* Very Small Entities are enterprises, organizations (e.g. government and not-for-profit), projects or departments having up to 25 people.

Development of Systems Engineering Standards and Guides

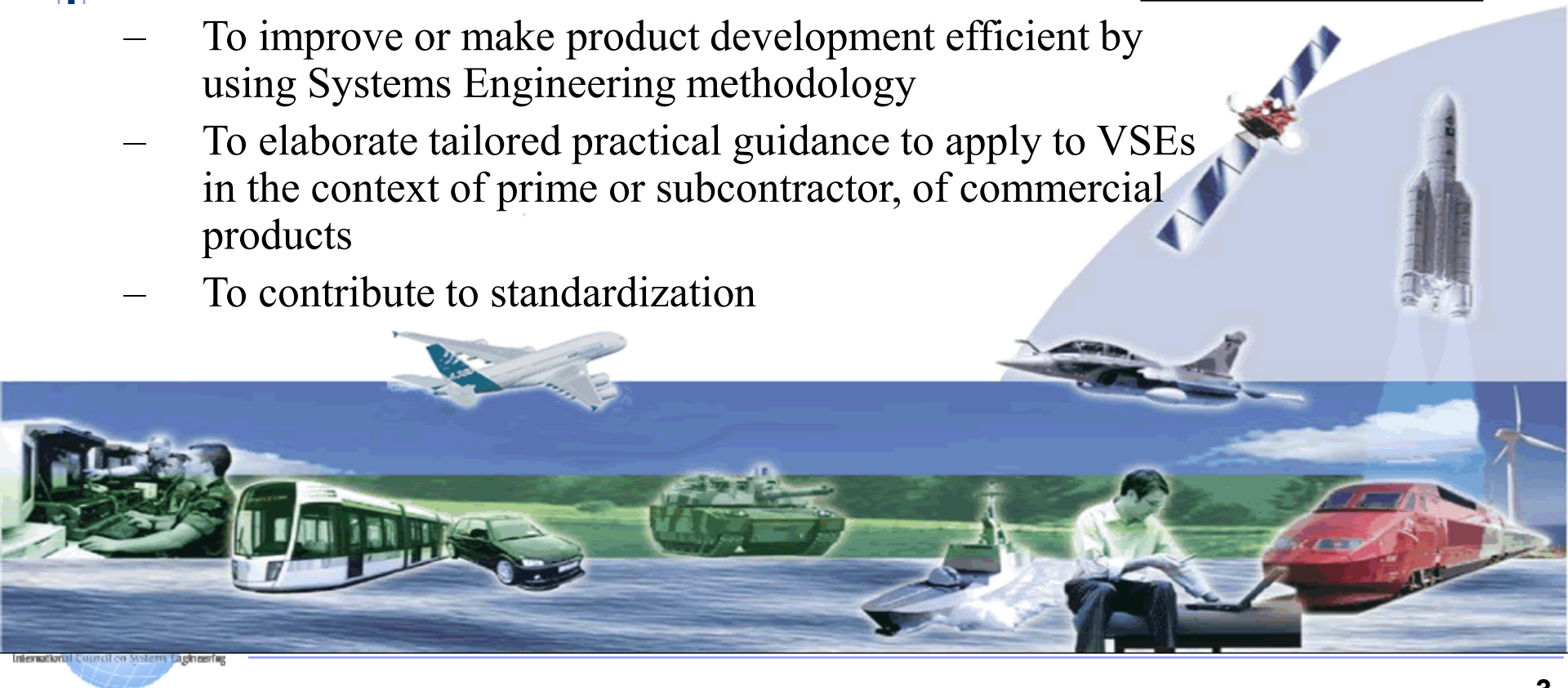
Project done under sponsorship of INCOSE/AFIS

- International Council on Systems Engineering (INCOSE)
- Association Française d'ingénierie système (AFIS)



Goals

- To improve or make product development efficient by using Systems Engineering methodology
- To elaborate tailored practical guidance to apply to VSEs in the context of prime or subcontractor, of commercial products
- To contribute to standardization



Background - Size of Enterprises

- European Union
 - 92.2 % are micro enterprises (between 1 and 9 employees)*
- Micro enterprises account for 70% to 90% of enterprises in OECD** countries (about 95% in USA)***

Type of enterprise	Number of employees	Annual turnover (EUR)	Number of enterprises (% of overall)	Number of enterprises
Micro-enterprises	1 - 9	≤ 2 million	92.2 %	19 968 000
Small enterprises	10 - 49	≤ 10 million	6.5 %	1 358 000
Medium enterprises	50 – 249	≤ 50 million	1.1 %	228 000
SMEs, total	87 100 000		99.8 %	21 544 000*
Large enterprises	> 250	> 50 million		
Large enterprises, total	42 900 000		0.2 %	43 000

* Independent companies only, excluding legally independent companies that are part of large enterprises.

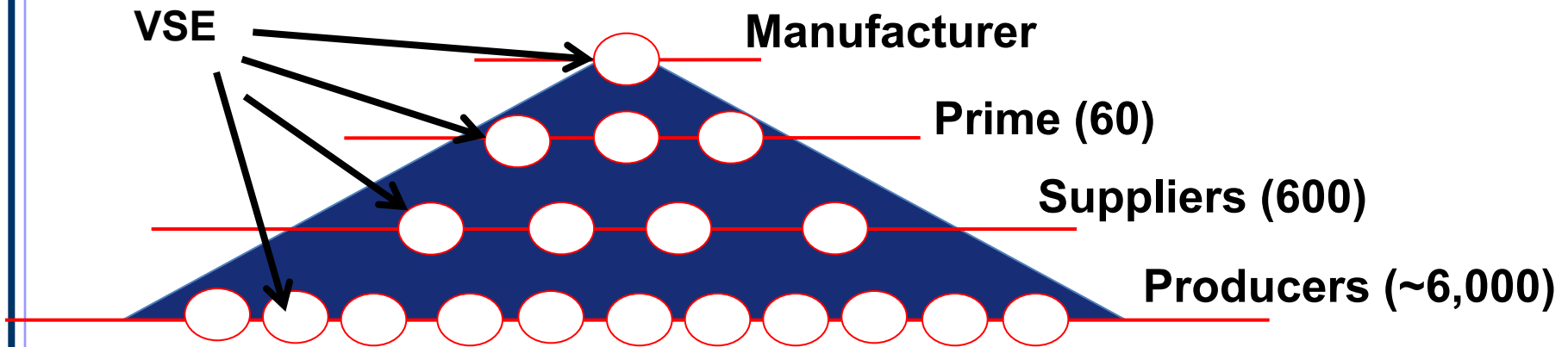
* Moll, R., Being prepared – A bird’s eye view of SMEs and risk management, ISO Focus +, February 2013

** OECD: Organisation for Economic Co-operation and Development

*** Statistics About Business Size (including Small Business).US Census Bureau (www.census.gov/econ/smallbus.html)

The Business of System Development

- The supply chain of an electronic manufacturer selling millions of products all over the world



There are VSEs in most large organizations

International Organization for Standardization (ISO)



Joint Committee for IT

Sub committee (SC) 7

Standardization of processes, supporting tools and supporting technologies for the engineering of software products and systems.

Working Group (WG) 24



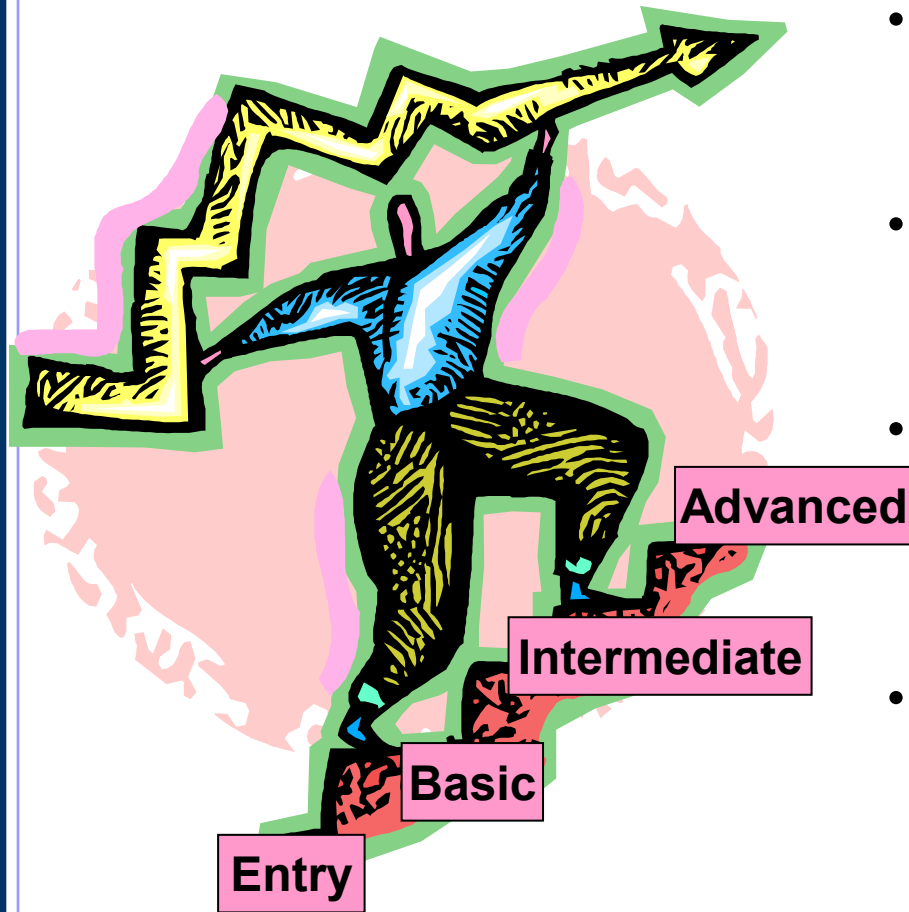
The Strategy of WG 24 – 1/2

- Use the notion of ‘Profile’ to develop a Roadmap and standards to meet the needs of VSEs.
 - A profile is an ‘assemblage’ from one or more base standards to accomplish a particular function.
 - A Profile Group (PG)
 - A collection of profiles which are related either by composition of processes (i.e. activities, tasks), or by capability level, or both.
- Focus first on VSEs developing Generic products (Generic Profile Group)
 - i.e. do not develop critical products.

The Strategy of WG 24 – 2/2

- Use two types of standards, as the input, for the development of standards and guides for VSEs:
 - **Process standards**, such as ISO/IEC 15288 and ISO/IEC/12207, that define the activities required to achieve identified objectives or outcomes;
 - **Product standards**, such as ISO/IEC 15289, that define the structure and content of artefacts produced by the processes;
- Develop a set of documents to describe and specify the profiles.

The Generic Profile Group *



- **Entry** - Targets VSEs typically developing 6 person-month projects or start-ups VSEs;
- **Basic** - Targets VSEs VSEs developing a single product by a single work team
- **Intermediate** – Targets VSEs involved in the development of more than one project in parallel with more than one work team
- **Advanced** – Targets VSEs which want to sustain and grow as an independent competitive system or software development business.

* Do not develop critical systems/software products

ISO 29110 Documents Targeted by Audience

29110 Overview (TR 29110-1)

For VSEs
and customers

29110 Profiles (IS)

Framework and Taxonomy (IS 29110-2)

Specifications of VSE Profiles (IS 29110-4)

Specification - VSE Profile Group
m
(IS 29110-4-m)

For Standard
producers, tool
vendors, methodology
vendors

List the Requirements
i.e. 'What to do'

29110 Guides (IS/TR)

Assessment Guide (IS/TR 29110-3)

Management and Engineering Guide (TR 29110-5)

Management and
Engineering Guide
VSE Profile m-n
(TR 29110-5-m-n)

For Assessors,
customers and VSEs

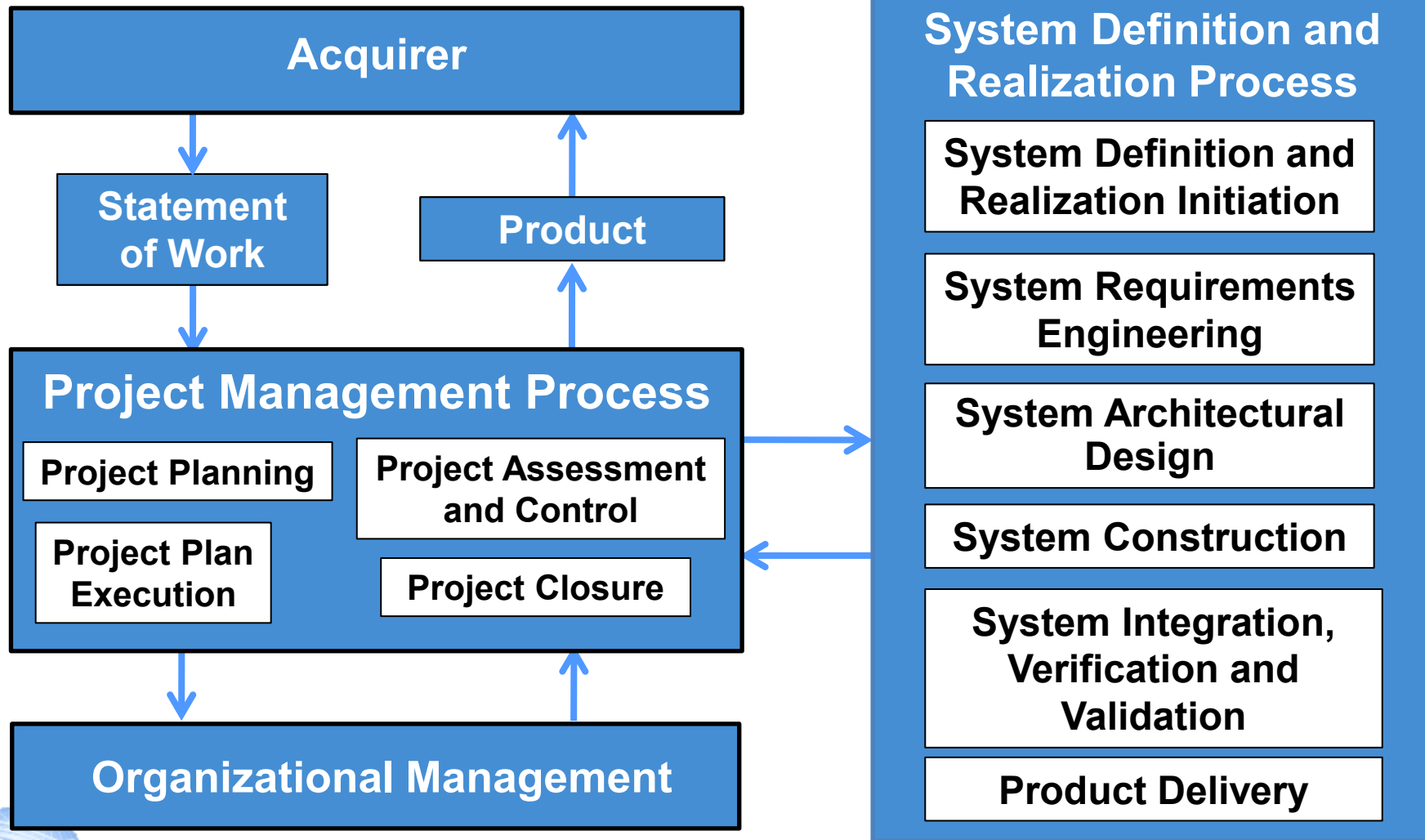
For VSEs
and customers

'How to do'

TRs are available from ISO at no cost

<http://standards.iso.org/ittf/PubliclyAvailableStandards/index.html>

Management and Engineering Guide for Systems Engineering



ISO/IEC 29110 is not intended to preclude the use of different lifecycles such as waterfall, iterative, incremental, evolutionary or agile

Management and Engineering Guides

Table of Contents

Foreword

Introduction

1. Scope

2. Normative references

3. Terms and definitions

4. Conventions and abbreviated terms

5. Overview

6. Project Management (PM) process

7. Software Implementation (SI) process

8. Roles (all roles)

9. Product description (all products)

10. Software tools requirements

Annex A (informative) – Deployment Package

Bibliography

One Task of the Requirement Engineering Activity

Role	Task	Input Product	Output Products
ACQ STK SYS	SR.2.7 Validate that System Requirements Specifications satisfies Stakeholders Requirements Specifications.	System Requirements Specifications [verified]	Validation Report • System Requirements Specifications [published]
	The results found are documented in a <i>Validation Report</i> and corrections are made until the document is approved by the SYS.	Stakeholders Requirements Specifications [validated]	System Requirements Specifications [validated]

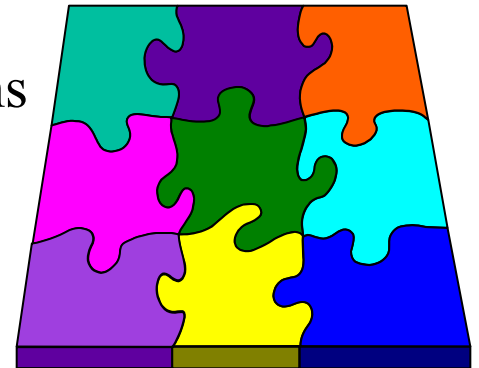
Example of the proposed Content of a Document

- **Change Request**

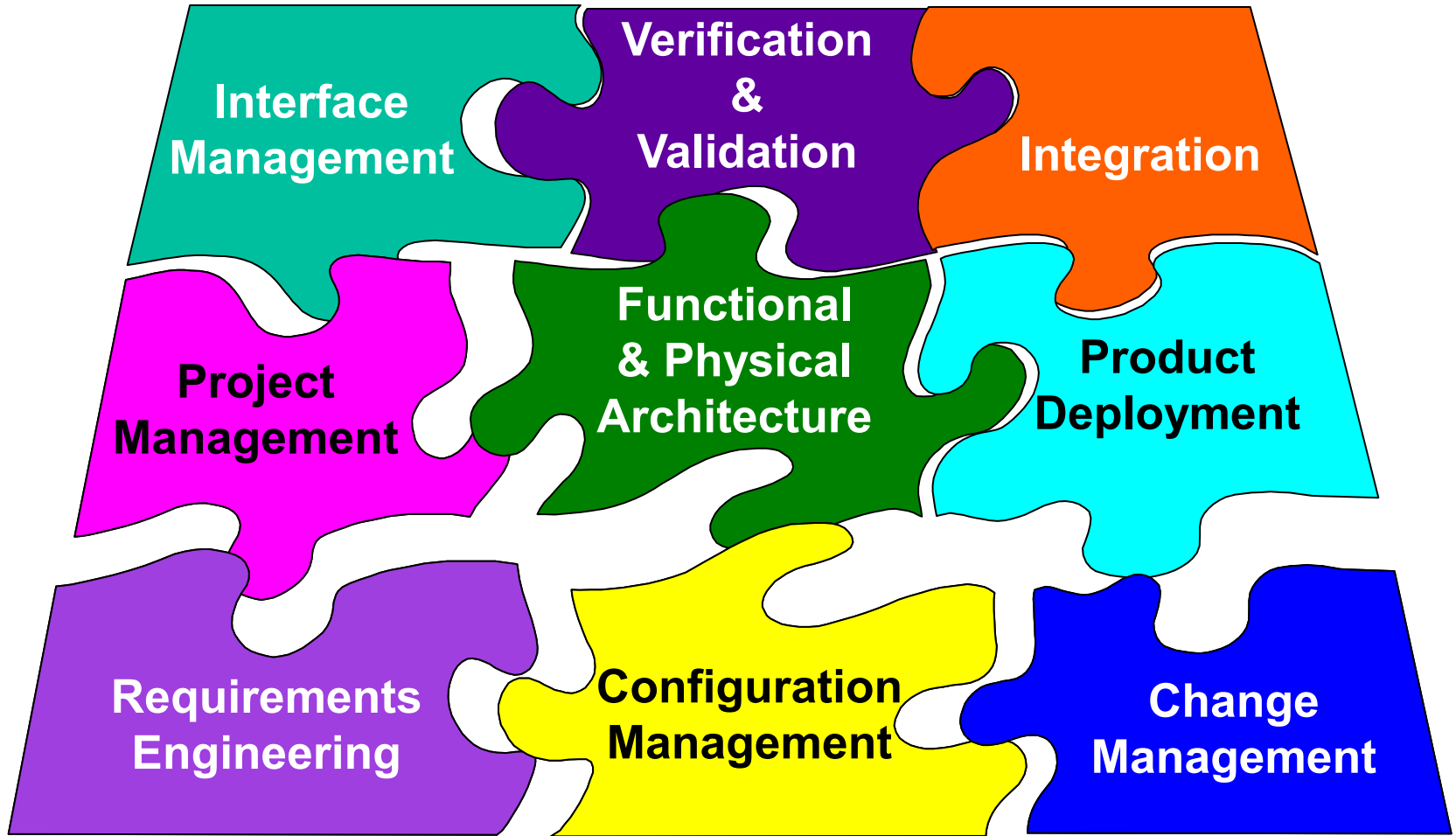
Name	Description	Source
Change Request	<p>Identifies a Software, or documentation problem or desired improvement, and requests modifications.</p> <p>It <i>may</i> have the following characteristics:</p> <ul style="list-style-type: none"> - Identifies purpose of change - Identifies request status - Identifies requester contact information - Impacted system(s) - Impact to operations of existing system(s) defined - Impact to associated documentation defined - Criticality of the request, date needed <p>The applicable statuses are: <i>initiated, evaluated, and accepted</i></p>	<p>Customer</p> <p>Project Management</p> <p>Software Implementation</p>

Deployment Packages (DPs)

- A Deployment Package (DP) is a set of artifacts developed to facilitate the implementation of a set of practices, of the selected framework, in a VSE.
 - Deployment packages are not intended to preclude or discourage the use of additional guidelines that VSEs find useful.
- By deploying and implementing a Deployment Package, a VSE can see its concrete step to achieve or demonstrate coverage to Part 5.
- Deployment Packages are designed such that a VSE can implement its content, without having to implement the complete framework at the same time.
- Each DP is reviewed and edited by at least 2 persons



Deployment Packages for the Systems Engineering Basic Profile



Available on SEBoK Wiki and INCOSE VSE WG

Polarsys Autonomous Rover

- Goal: Develop an Autonomous Rover capable to carry a sensor payload into a confined theatre to:
 - Map the zone
 - Collect sensor data
- Uses Dagu Electronics Rover 5 chassis
 - 2 DC Motors with encoders
- Multi-specialty development exposure
 - Electronics
 - Microcontrollers
 - Printed Circuit Board
 - Mechanical
 - Software
- Supports training activities for all Deployment Packages



Laporte, C.Y., Houde, R., [Open Source Systems Engineering Guides, Deployment Packages and Support Tools for Very Small Enterprises – A Case Study](#), 25th Annual International Symposium of INCOSE (International Council on Systems Engineering), Seattle, US, July 13-16, 2015.

Houde, R., Laporte, C., Blondelle, G., ISO/IEC 29110 Deployment Packages and Case Study for Systems Engineering: The "Not-So-Secret" Ingredients That Power the Standard, 26th Annual International Symposium of INCOSE ,July, 2016

Case Study 1

A Project in a Large Engineering Firm

Context

- A Canadian division of a large American engineering company,
- Offers a range of services in the production of hydro-electric, wind, geothermal, solar or biomass-related energy,
- Company was established 10 years ago,
- Over 500 employees spread over 10 offices in Canada,
- The company was already using a robust project management process for their large-scale projects.
- A project was launched to document small and medium scale project management processes.

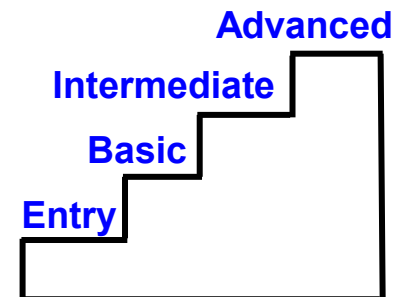
Business Objectives Targeted of the Improvement Project

Identification Number	Description
O-1	Facilitate the <u>integration</u> of new project managers.
O-2	Reach an overall <u>customer satisfaction</u> level <u>80%</u> .
O-3	On average projects should <u>reach cost and schedule targets</u> within 5%
O-4	Reduce <u>overload</u> of staff by <u>10%</u>
O-5	Reduce <u>schedule slippage</u> to less than one week and <u>5%</u> of initial cost for mismanaged risks of projects
O-6	Reduce <u>rework</u> by <u>10%</u>
O-7	Reduce <u>non billable hours</u> by <u>10%</u>

Frameworks for Small and Medium Scale Projects

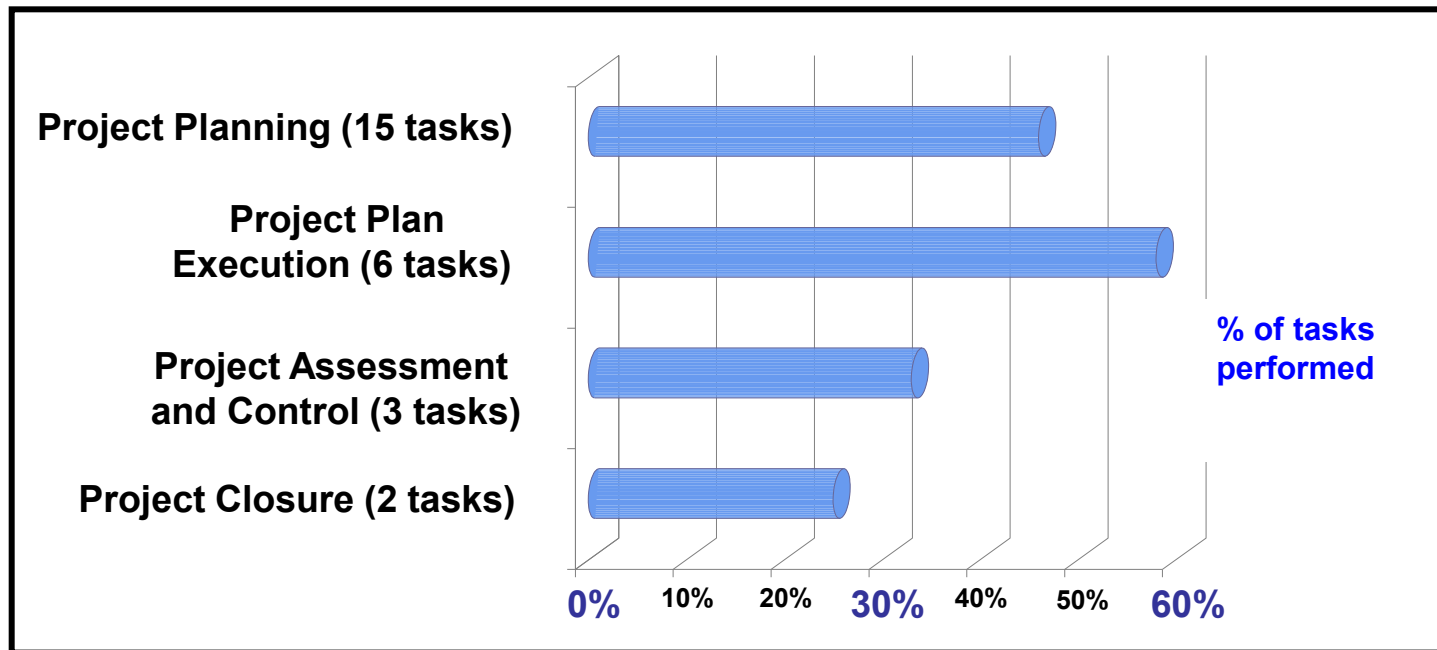
	Small Project	Medium project	Large project
Duration of project	Less than 2 months	Between 2 and 8 months	More than 8 months
Size of team	Equal or less than 4 people	Between 4 and 8 people	More than 8 people
Number of engineering specialties involved	One specialty	More than one specialty	Many specialties
Engineering fees	Between 5,000\$ and 70,000\$	Between 50,000\$ and 350,000\$	Over 350,000\$
Percentage of projects	70%	25%	5%

- Small projects used ISO/IEC 29110 Entry Profile
- Medium projects used ISO/IEC 29110 Basic Profile
- Large projects used the PMBOK® Guide of PMI



Initial Evaluation of Medium-Scale PM Process

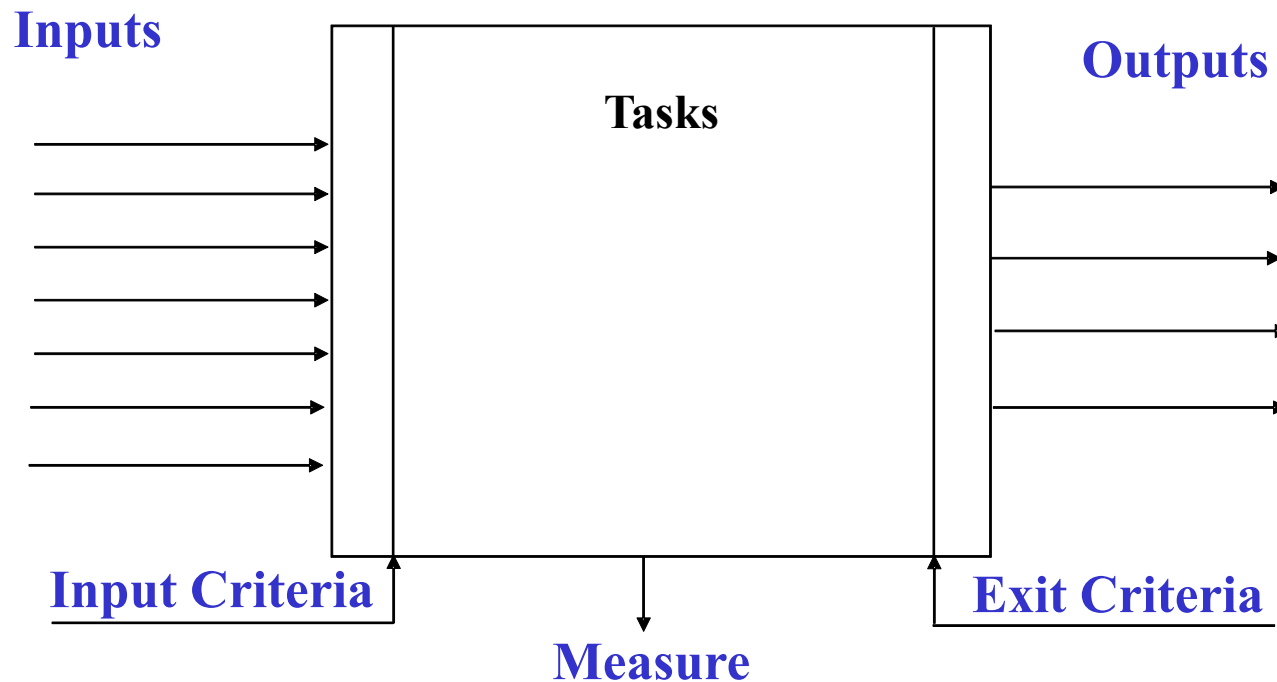
- Project Management process for medium projects was evaluated against [Basic Profile](#) of ISO 29110



- PM tasks were not performed systematically
- PM practices varied from project manager to project manager

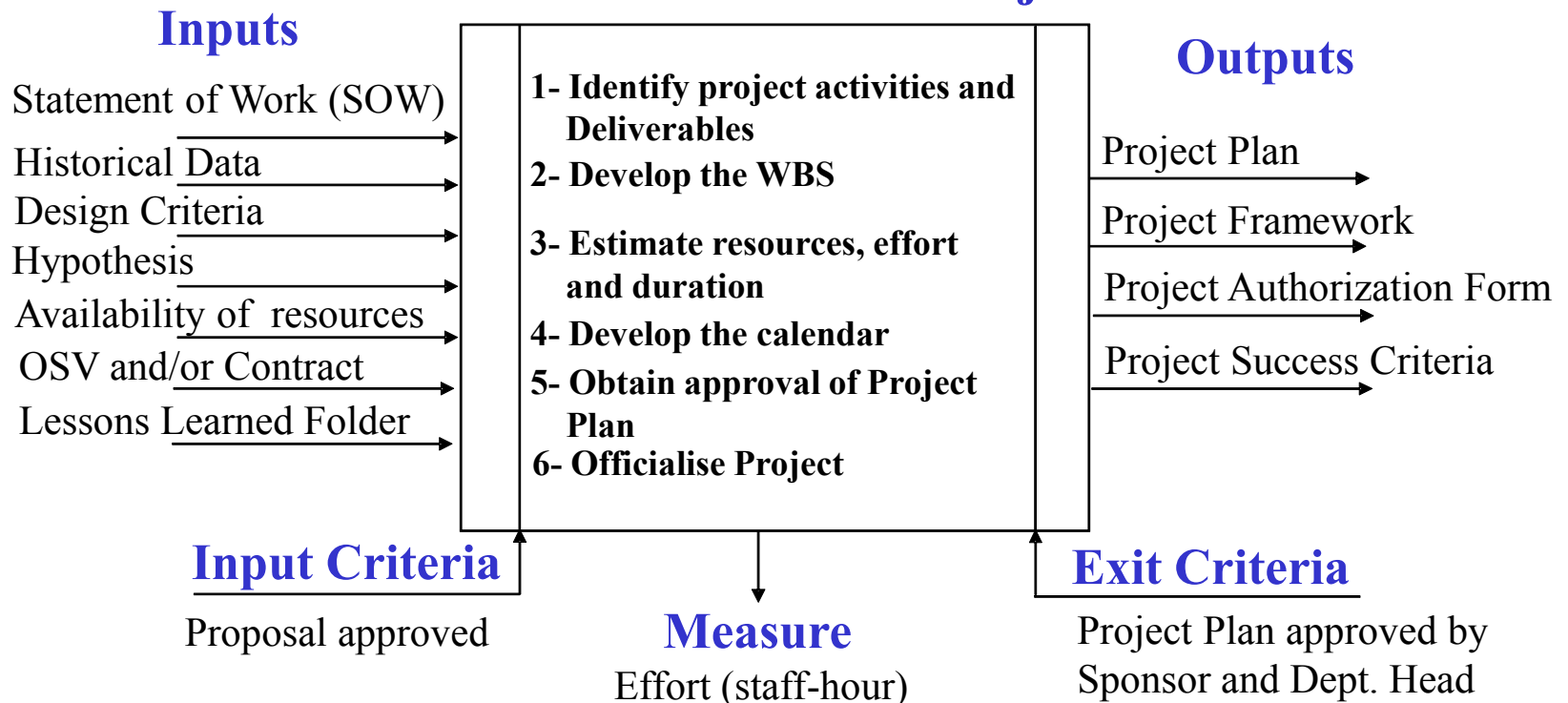
Documentation of Processes

XXX-YY – Title of Activity of a Process



Documentation of PM Processes - 1

SPP- 01 – Plan the Project



SPP = Small-scale Project Process

Documentation of PM Processes - 2

Procedure: <Name of Process or Procedure>	Phase: <Name of phase where the procedure is used>
Process/Procedure Owner: <Owner of this process/procedure>	
Description: a brief description, background and purpose of the process/procedure	
Entry Criteria: <ul style="list-style-type: none"> • <entry criteria> 	Exit Criteria: <ul style="list-style-type: none"> • <exit criteria>
Inputs: <ul style="list-style-type: none"> • <work products as input> 	Outputs: <ul style="list-style-type: none"> • <work products as output>
Roles: <ul style="list-style-type: none"> • <list of all the actors and their responsibilities> 	
Reference(s) <ul style="list-style-type: none"> • <Document required to use this procedure> 	
Assets: <ul style="list-style-type: none"> • <Tools; methodologies; references; guidelines; checklists; other procedures> 	
Tasks: <ul style="list-style-type: none"> • <Itemized list of tasks (summarized) which need to be accomplished to satisfy this process/procedure (using an active verb and a noun)> 	
Measures: <ul style="list-style-type: none"> • <Measures captured during execution of process/procedure> 	

Documentation of PM Processes - 3

- **Checklists Developed**
 - Project management process of small projects
 - Project management process of medium projects
 - Project management process of large projects
 - Preparation of service offerings
 - Preparation of detailed project planning
- **Project Management Forms and Templates**
 - To guide Project Managers in the execution of management tasks and enable a consistency of results.
 - To guide managers unfamiliar with some project management practices.

Testing the Solutions Developed

- Three pilot projects have been performed.
 - To validate that the proposed solutions were consistent, feasible, complete and acceptable to PMs
- Lessons learned have identified minor adjustments to the processes and tools.
- PMs evaluated the proposed processes, identified problems and potential improvements.
 - PMs also indicated that they would like to have examples of how to implement the tools.

Deployment Strategy - 1

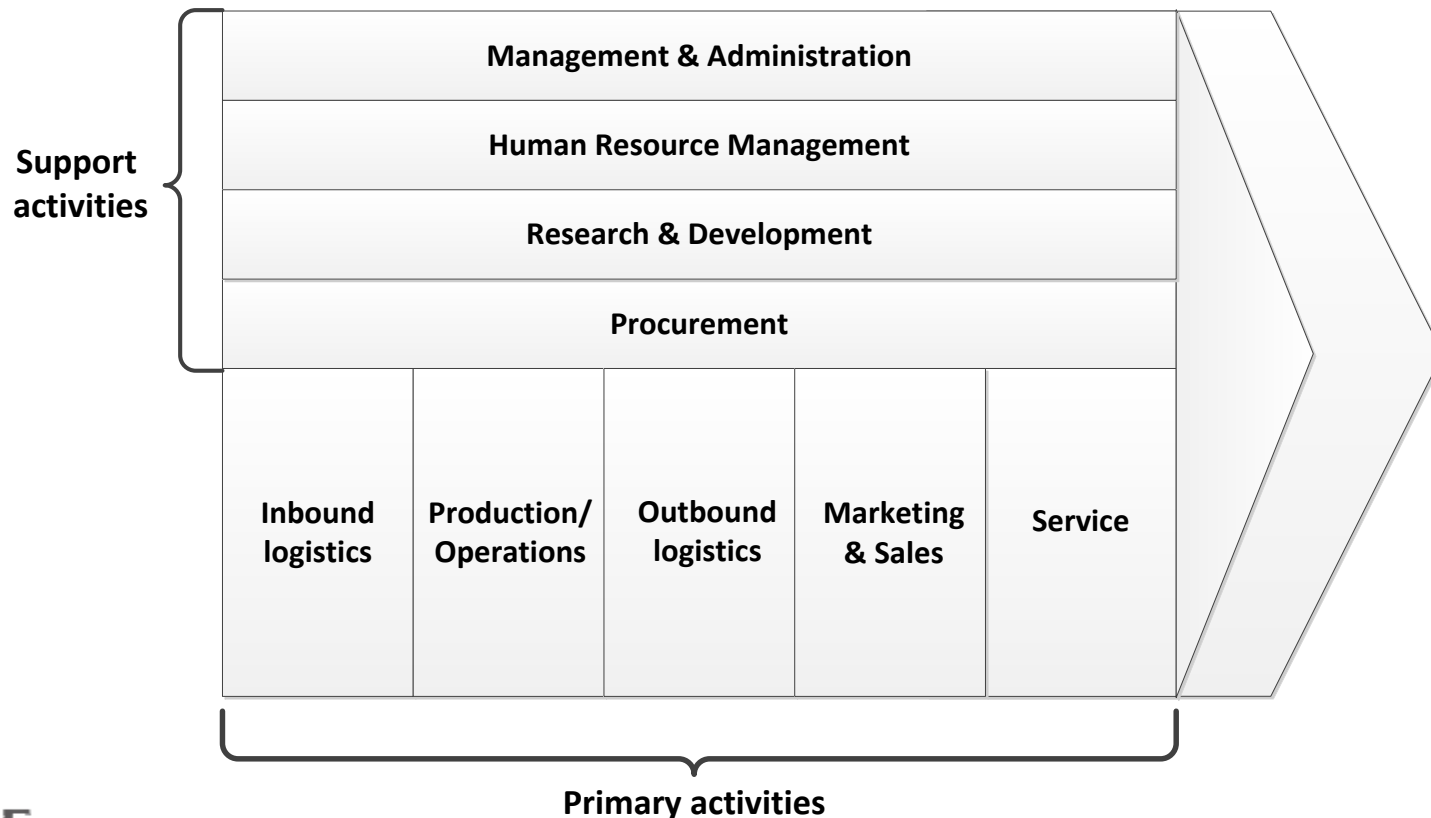
- A 2-phase strategy was developed for the deployment to all PMs in the division (i.e. about 30 PMs)
- Components of the deployment strategy
 - Communication
 - Training
 - Diffusion of the processes and their supporting documents

Deployment Strategy - 2

- **First phase – Inform PMs**
 - To reduce questioning and to mitigate the negative impacts of 'unknowns'
 - emails were sent;
 - Articles were published in the monthly Newsletter
 - Messages have been added to the intranet.
 - One-day training sessions have been prepared for PMs.
- **Second phase - Distribute process documents to all PMs**
 - A section of the intranet was created as a main access to project management documents
 - The intranet also contains information relevant to project management
 - Links to websites, the identification of project management standards and other information such as projects management books.

Cost/Benefit analysis

- Used the ISO method *Economic Benefits of Standards*
 - Value chain



Cost/Benefit analysis

- Anticipated costs and benefits
 - Over a period of three years
 - e.g. training, updating process documentation and intranet
 - Over 6 dimensions
 - Internal information transfer, staff training, cost of staff, quality of deliverables, management of quality and internal standardization

	Year 1	Year 2	Year 3	Total
Cost to Implement and Maintain	59 600\$	50 100\$	50 100\$	159 800\$

in a Large Engineering Firm

- INCOSE International Symposium,
- Seattle, July 2015
- A 20-page paper

An Innovative Approach to the Development of Project Management Processes for Small-scale Projects in a large Engineering Company

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Abstract. A Canadian division of a large American engineering company has developed and implemented project management processes for their small-scale and medium-scale projects. The company was already using a robust project management process for their large-scale projects. The objectives of this process improvement project were to reduce cost overruns and project delays, standardize practices to facilitate the integration of new managers, increase the level of customer satisfaction and to reduce risk-related planning deviations. For this improvement project, the engineering organization used the new ISO/IEC 29110 standard developed specifically for very small entities. An analysis of the cost and the benefits of the implementation of small and medium scale project management processes was performed using the ISO economic benefits of standard methodology. The engineering enterprise estimated that, over a three-year timeframe, savings of about 780,000\$ would be realized due to the implementation of project management processes using the ISO/IEC 29110 standard.

Introduction

A large majority of enterprises worldwide are very small entities (VSEs). In Europe, for instance, as illustrated in table 1, over 92% of enterprises, called micro-enterprises, have up to 9 employees and another 6.5% have between 10 and 49 employees. Micro enterprises account for 70% to 90% of enterprises in Organisation for Economic Co-operation and Development (OECD 2005) countries and about 57% in USA.

Available at (Publication or Pilot Project Tab: <http://profs.logti.etsmtl.ca/claporte/English/VSE/index.html>)

Project in a Large Engineering Firm

Book Chapter

- A 40-page chapter
- IGI Global, 2016



An Innovative Approach to the Development of Project Management Processes for Small-Scale Projects in a Large Engineering Company

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ABSTRACT

A 400-employee Canadian division of a large American engineering company has developed and implemented project management processes for their small-scale and medium-scale projects. The company was already using a robust project management process for their large-scale projects. The objectives of this project were to reduce cost overruns and project delays, standardize practices to facilitate the integration of new managers, increase the level of customer satisfaction and to reduce risk-related planning deviations. For this project, the engineering organization used the ISO/IEC 29110 standards developed specifically for very small entities, i.e. organizations, having up to 25 people. An analysis of the cost and the benefits of the implementation of small and medium scale project management processes was performed using the ISO economic benefits of standard methodology. The engineering enterprise estimated that, over a three-year timeframe, savings of about 780,000\$ would be realized due to the implementation of project management processes using the ISO/IEC 29110 standard.

Keywords: Project Management, Very Small Entity, Small-Scale Project, Medium-Scale Project, Process, ISO/IEC 29110, Standards, Economic Benefits.

INTRODUCTION

Standards are sources of codified knowledge and studies have demonstrated the benefits of standards, such as product interoperability, increased productivity, market share gains, and improved interaction with stakeholders such as enterprises, government organizations and the public. Standards and associated technical documents could be considered as a form of technology transfer and, if the right standards are selected and used correctly they should have an economical impact in an organization.

Many advantages or benefits as well as disadvantages or costs have been reported regarding the use of voluntary standards. Table 1 lists a few of the advantages and disadvantages reported.

Case Study 2

Young Transportation Enterprise

Overview

- Public transportation customers often require a CMMI[®] maturity level for system and sub-system suppliers.
- In 2012, **CSiT** was composed of 4 people (7 presently).
 - Implementing the CMMI[®] Level 2 Process Areas was too demanding at that time.
- **Strategy**
 - Implement the draft version of Systems Engineering ISO 29110 Basic profile as a foundation
 - Used other frameworks to complete process descriptions
 - e.g. INCOSE Handbook, PMBOK Guide of PMI and CMMI[®]
 - Perform a gap analysis between CMMI[®] level 2 and the SE Basic Profile
 - Implement the practices needed for a CMMI[®] level 2 assessment.



Classification of CSiT processes

	Light Process	Standard Process	Full Process
Type of Project	<p>Proof of Concept, Prototype</p> <p>Concept validation or Product Deployment at Customer Site</p> <p>Small Project</p>	<p>Typical Project</p> <p>Product intended to be installed at Customer Site</p> <p>Medium Project</p>	<p>Project when CMMI level 2 is required by a Customer</p> <p>Product Testing or Product Deployment at Customer Site</p> <p>Large Project</p>
Framework to be used	<p>ISO/IEC TR 29110-5-6-1 Entry Profile</p> <p>+ CMMI - Supplier Agreement Management</p>	<p>ISO/IEC TR 29110-5-6-2 Basic Profile</p> <p>+ CMMI - Supplier Agreement Management</p>	<p>CMMI (Level 2)</p>

Guidelines for the Project

- To avoid additional process and produce too many documents, stakeholders gave themselves the 2 sets of guidelines
 - **Process guideline**
 - Add tasks, not described in the Basic profile, only if they add value to the context and projects of the company or provided an alignment with CMMI® level 2
 - **Document template guidelines**
 - Group different documents into one where this is possible
 - Each section of a template must be relevant and applicable. If a section does not provide added value, it will not be included

Supplier Management Process

- CSiT, as a system integrator, has to purchase components from suppliers
- Basic profile has only a few tasks about the 'make or buy' decisions and follow-up actions (e.g. document, review and issue a purchase order)
- Basic profile does not describe a supplier management process
 - This process is covered in the Intermediate Profile
- The supplier process put in place contains a detailed description about planning and managing acquisitions from suppliers
- Additional templates were created
 - Request for proposal, supplier selection matrix, purchase order and purchase agreement (i.e. a contract)
- New sections have been added to the ISO 29110 project plan
 - A list of acquisitions and potential suppliers
 - An acquisition plan/strategy,
 - A supplier management plan.

Verification, Validation and Acceptance of Work Products

- Selection of types of peer review for each work product
 - For internal work products and deliverables

Deliverables and Internal Work Products	VERIFICATION					VALIDATION		ACCEPTANCE AND SIGNATURE		
	Peer Review			Tests		Tests		Acceptance		
	Peer Review ? (Y=Yes, N=No)	Type of Review (P=Personal, D=Desk-Check, W=Walkthrough, I=Inspection)	Output Documents ANN = Annotations RR = Review Report MoM = Minutes of Meeting CHKL = Checklist	Type of Test U = Unit I = Integration S = System	Output Document UTR = Unit Test Report ITR = Integration Test Report STR = System Test Report	Type of Test F = Factory S = On Site	Output Document FTR = Factory Test Report STR = Site Test Report	Internal Approval (signature) (Y=Yes, N=No)	Delivered to Customer? (Y=Yes, N=No)	Acceptance required form Customer? (Y=Yes, N=No)
Technical – System Requirement Specification	Y	D, W	RR then MoM	N/A	N/A	N/A	N/A	Y	Y	O
Technical – Software Requirement Specification	Y	D, W	RR then MoM	N/A	N/A	N/A	N/A	Y	Y	Y
Technical – System Architecture Design	Y	D, W	RR then MoM	N/A	N/A	N/A	N/A	Y	Y	Y
Technical – Software Architecture Design	Y	D, W	RR then MoM	N/A	N/A	N/A	N/A	Y	Y	Y
Technical – Interface Control Document	Y	D	RR	N/A	N/A	N/A	N/A	Y	Y	Y
Technical – Customer Requirements Specification	Y	D, W	RR then MoM	N/A	N/A	N/A	N/A	Y	Y	Y
Technical – Factory Acceptance Test	Y	D	RR	N/A	N/A	N/A	N/A	Y	Y	Y
Technical – Site Acceptance Test	Y	D	RR	N/A	N/A	N/A	N/A	Y	Y	Y
Technical – Drawing	Y	D	RR	N/A	N/A	N/A	N/A	N/Y	N/Y	N/N
...										
Project Management – Project Management Plan	Y	D	ANN and/or MoM	N/A	N/A	N/A	N/A	Y, First version	N/Y it depends	N
Project Management – Risk Register	Y	D	ANN and/or MoM	N/A	N/A	N/A	N/A	N	N	N
Project Management – Project Schedule	Y	W	MoM	N/A	N/A	N/A	N/A	N	N/Y	N/Y It depends
...										
User documentation – User Manual Installation	Y	D	RR	N/A	N/A	N/A	N/A	Y	Y	Y
User documentation – User Manual Operation	Y	D	RR	N/A	N/A	N/A	N/A	Y	Y	Y
User documentation – User Manual Maintenance	Y	D	RR	N/A	N/A	N/A	N/A	Y	Y	Y
...										
Product - Piece of software	Y	D	CHKL	U, I	UTR, ITR	N/A	N/A	N	N	N
Product - Piece of hardware	Y	D	CHKL	I	ITR	N/A	N/A	N	N	N
Product - System	Y	W, I	MoM	I, S	ITS, STR	F, S	FTR, STR	Y for UTR and STR	Y	Y

Young Transportation Enterprise

- Submitted to INCOSE International Symposium,
- Edinburgh, July 16-21, 2016

Developing and implementing systems engineering and project management processes at CSIT - A small Canadian company in public transportation

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Abstract. A project was created to define and implement project management and systems engineering processes at CSinTrans Inc. (CSIT), a Canadian company, founded in 2011¹. CSIT specializes in the integration of communication and security systems in transit industry such as trains, subways and buses as well as railway stations, subway stations and bus stops. ISO/IEC 29110 standard and guides for systems engineering have been used as the main reference for the development of these processes.

The project's history, purpose and rationale that prompted CSIT to adopt this recently published standard are presented. The implementation of the standard is described. The reflections and decisions made during the implementation are presented. The lessons learned are discussed. Recommendations and advice for organizations wanting to implement ISO/IEC 29110 are described.

ISO 29110 has helped raise the maturity of the organization by implementing proven practices and developing consistent work products from one project to another. ISO/IEC

¹ An extended version of this case study is available at: <http://csit.co/To be completed>

Translations of Systems Engineering ISO 29110 Guides

- **French**

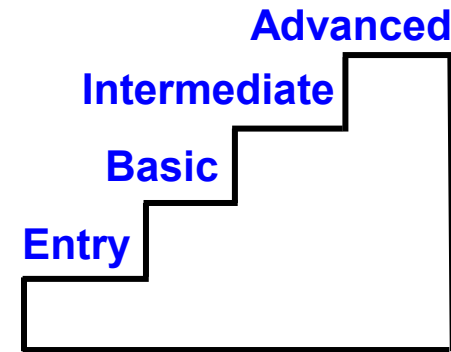
- Basic Profile translated by Michel Galinier of AFIS and approved by AFNOR
 - <https://www.afis.fr/>

- **German**

- Basic profile translated by Martin Geisreiter of the German INCOSE Chapter GfSE (Gesellschaft für Systems Engineering e.V.)
 - <http://www.gfse.de>
- Basic profile should be published in 2016
 - By DIN (Deutsches Institut für Normung)
 - <http://www.din.de/en>

Next Steps for ISO WG 24 and INCOSE VSE WG - 1

- **SE Entry Profile**
 - Should be published late 2015/early 2016
 - Develop Deployment Packages (~ 2)
- **SE Profile Specifications Document**
 - Should be published late 2016/early 2017
 - Once published, VSEs could be formally audited
- **SE Intermediate and Advanced Profiles**
 - Should start development early 2016
 - Develop Deployment Packages to support the 2 profiles
- **Mappings between ISO 29110 to ISO 9001 and CMMI-DEV**
- **Conduct more pilot projects and document case studies**



Next Steps for ISO WG 24 and INCOSE VSE WG - 2

- **ISO/IEC 29110 ‘Service Delivery’ Profile**
 - Project approved in May 2015
 - Objective
 - To guide VSEs in providing services after the delivery of a product
 - A set of ‘Service’ requirements have been imported from existing standards/frameworks
 - e.g. ISO/IEC 15288, ISO 9001
 - Two new ISO 29110 documents are developed
 - A Guide (TR)
 - A Profile Specification (IS)

Conclusion

- ISO 29110 has been specifically developed for VSEs (company, organization, project, department) developing systems and/or software,
- ISO 29110 is intended to help VSEs who have neither the expertise, nor the budget or the time to adapt existing standards (e.g. ISO 15288) to their needs,
- ISO and INCOSE WGs have worked together to develop a set of DPs to help VSEs in implementing and using ISO 29110,
- ISO 29110 brings many benefits to VSEs, their clients and their business partners,
- Other profiles (Intermediate and Advanced) and their DPs will start to be developed in 2015,
- A new 'Service Delivery' profile will help VSEs in delivering better 'after delivery' services to their customers.

A Public Web Site

- Members of WG
- Introduction
- Survey of VSEs
- Network of Centers
- Generic Profiles
- Deployment Packages
- Pilot Projects
- Education DPs
- Publications
- Certification
- Service Delivery

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ETS profs.etsmtl.ca/claporte/English/VSE/index.html

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Public Site of the ISO Working Group Mandated to Develop ISO/IEC 29110 Standards and Guides for Very Small Entities involved in the Development or Maintenance of Systems and/or Software

As systems and software quality increasingly become a subject of concern, and as process approaches are maturing and earning the confidence of organizations, the use of ISO/IEC JTC1/SC7 international standards is spreading in organizations of all sizes.

A Very Small Entity (VSE) is an entity (enterprise, organization, department or project) having up to 25 people. However, most standards were not written having in mind Very Small Entities (VSEs) and are consequently difficult to apply in such settings. Worldwide, the percentage of micro and small enterprises is quite high. The table below shows that 92.2% of European enterprises have up to 9 employees, another 6.5% have between 10 to 49 employees. Micro enterprises account for 70% to 90% of enterprises in OECD (Organisation for Economic Co-operation and Development) countries and about 57% in USA.

Type of enterprise	Number of employees	Annual turnover (EUR)	Number of enterprises (% of overall)	Number of enterprises
Micro-enterprises	1 - 9	≤ 2 million	92.2 %	19 968 000
Small enterprises	10 - 49	≤ 10 million	6.5 %	1 358 000
Medium enterprises	50 – 249	≤ 50 million	1.1 %	228 000
SMEs, total	87 100 000		99.8 %	21 544 000*
Large enterprises	> 250	> 50 million		
Large enterprises, total	42 900 000		0.2 %	43 000

* Independent companies only, excluding legally independent companies that are part of large enterprises.

Size of Enterprises in Europe (Moll, R., Being prepared – A bird's eye view of SMEs and risk management, ISO Focus +, February 2013)

Many Medium and Large enterprises, as illustrated below, need hardware and/or software components produced by VSEs. Finally, in large organisations, many projects have up to 25 people. Therefore, VSEs are found at all level of the pyramid below.

There is a wide spectrum of development approaches. The figure below illustrates the positioning of ISO/IEC 29110.

Waterfall

**“As innovation fuels economies,
standards smooth the ride”**

S. Joe Bhatia,
President and CEO
American National Standards Institute (ANSI)

ISO focus, May/June 2015

감사합니다 Natick
Grazie Danke Ευχαριστίες Dalu
Thank You Köszönöm
Спасибо Dank Gracias
谢谢 Merci Seé
ありがとう

Obrigado

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- **Public site of WG 24**

- Free access to Deployment Packages, presentation material and articles:

- <http://profs.logti.etsmtl.ca/claporte/English/VSE/index.html>