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WORKSHOP

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Implementation planning for AP236

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Foreword

This CWA is intended to be included in part in the AP document to become an International Standards Application Protocol by ISO/TC 184 Industrial automation systems and integration, SC4 Industrial Data.

If an International Standards Application Protocol, the document number would be ISO 10303-236. This explains why the document refers to itself as ISO AP 236, as well as why it contains expressions such as "this part of ISO 10303".

ISO AP 236 consist of the following parts under the title "ISO 10303-236 Product data representation and exchange: Application protocol: Furniture product data and project data":

· ISO 10303-1004: Elemental geometric shape
· ISO 10303-1006: Foundation representation
· ISO 10303-1010: Date time
· ISO 10303-1011: Person organization
· ISO 10303-1012: Approval
· ISO 10303-1013: Person organization assignment
· ISO 10303-1014: Date time assignment
· ISO 10303-1015: Security classification
· ISO 10303-1016: Product categorization
· ISO 10303-1017: Product identification
· ISO 10303-1018: Product version
· ISO 10303-1019: Product view definition
· ISO 10303-1020: Product version relationship
· ISO 10303-1021: Identification assignment
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· ISO 10303-1510: Geometrically bounded wireframe
· ISO 10303-1512: Faceted boundary representation
· ISO 10303-1514: Advanced boundary representation
· ISO 10303-436: AP236 furniture catalog and interior design

The production of this CEN Workshop Agreement was formally accepted as part of the CWAs to be developed by the CEN/ISSS Workshop funSTEP2 at the Workshop kick-off meeting in Valencia on 25 June 2002.

Workshop funSTEP2 gathers representatives of furniture industry, associations for furniture industry, software houses, universities, research centers, etc. The present CWA has received the support of representatives of these sectors. A list of companies who have supported the document's contents may be obtained from the CEN/ISSS Secretariat.

The CWA structure and provisional content was firstly agreed by the funStep AP-DIS consortium and presented to the funSTEP2 Workshop by e_mail on 17th November 2003. The final endorsement round for this CWA started on that very date and was successfully closed on 30th November 2003.

As funStep AP-DIS project objective is to produce a CEN Workshop Agreement (CWA) ready to be proposed to ISO as a Draft International Standard (DIS) of Part 236 of ISO 10303, i.e., Application Protocol: Furniture product and project data, it is needed not only to develop the AP but also to validate it through an implementation planning. This process of implementation and validation has been run in parallel with the Workshop.

1 Introduction

ISO 10303 is an International Standard for the computer-interpretable representation of product information and for the exchange of product data. The objective is to provide a neutral mechanism capable of describing products throughout their life cycle. This mechanism is suitable not only for neutral file exchange, but also as a basis for implementing and sharing product databases, and as a basis for archiving.

The International Standard ISO 10303 is organized as a series of parts, each published separately. The structure of this International Standard is described in ISO 10303-1.

A complete list of parts of ISO 10303 is available from the Internet:

<http://www.nist.gov/sc4/editing/step/titles/>

This document comprises deliverable D3.1 and it concerned with Implementation Planning for the Establishment of a roadmap to assist the implementers in the development of the translators to adopt AP236 in the FunSTEP AP-DIS project. It proposes a methodology for roadmapping and describes the required input from the WP1 and WP2 to conduct the roadmap process on the basis of the FunSTEP AP-DIS Framework. Our intention is that, during and after the course of the AP-DIS project, this framework will assist the implementers on adopting the AP236 Reference Model.

This document elaborates how to understand the scenario of the AP-236, as described by WP2 with the currently available Research, Technology, and Standards (RTS), (WP1). One of the prime goals of this deliverable is to support the analysis of the enterprise requirements, and more specifically, to represent and understand how the enterprise works, to capitalize acquired knowledge and know-how for adopting the AP236.

It describes the environment designed by the FunSTEP AP-DIS consortium to support a simple and convincible demonstration to manufacturers and software developers, giving the possibility to adopt and migrate the systems to the implementation related to AP236 using the software tools installed in computers.

The ISO10303 AP236 Application [1] Protocol already has a stable modular structure where several modules were developed to fulfil the user requirements. This modular approach will help the users to implement not all the application protocol but allowing selecting which parts intends to use.

Further related documentation can also be found in www.funstep.org/cofurn.

One of the major difficulties on the adoption of the AP-236 model is based on the existing gap between the STEP technologies and the emerging technologies used by a great part of software houses. For this reason, the main objective of the implementation planning is to decrease this gap, providing to the software houses and future users a set of functionalities that bring the STEP closer.

To provide the ability on adopting the AP-236 model in the area of STEP, it was necessary to deeply study the existing technologies (State of the Art in emerging technologies) understanding and planning the methodologies to easily encourage the users on adopting the model through facilitators that integrate the STEP technologies and user's technologies.

For that propose, the world of UML, understandable in the software houses environment, was choose to be the bridge between the two technologies. If the users starts to work in the model that may integrate their technologies with the STEP technologies that bring them the Standardization advances, the users interests will increase and will decrease the existing gap, bringing to the furniture world a big step on standardization.

2 Scope

This document specifies the use of the developed tools and tutorials to assist the implementers in the development of the translators to adopt AP236 in the FunSTEP AP-DIS project. It uses integrated resources necessary for the scope and information requirements for the exchange of data among manufacturers, suppliers, and the end-users (retailers, major retailers and private customers) in the furniture industry domain.

3 Overview around STEP - STandard for the Exchange of Product model data

STEP – Standard for Exchange Product model dara [ISO, 1994] [STEP, 1999] is an ISO (International Organisation for Standardisation) / TC 184 (Technical Committee: Industrial automation systems and integration) / SC4 (Subcommittee: Industrial data) international standard officially identified as ISO10303. STEP aims to provide a set of mechanisms capable of representing models and data related with the product during its life cycle [ISO 10303, Part11][ISO 10303, Part21].

It publishes a proposal for a methodology for development, implementation and validation of an open architecture for exchange and share of product data, together with a set of public data models as Application Protocols (APs).

During the last years this community has been working in several definitions of APs for some of the recognized main production system areas, as are the automotive, aircraft, electrical/electronics, shipbuilding, oil and gas and building and construction [Gonçalves, 2001].

The creation of a global model to support large-scale company requirements is at this moment one challenge to be address by the international scientific community. STEP has been presented as a viable alternative to the current state of multiple, incomplete, overlapped and proprietary data formats, seeking solid and reliable data exchange between partners using heterogeneous systems [Starzyk, 1999] [Hars, 1998].

STEP is mainly contributing for worldwide open systems networking communication of product data for neutral data exchange between heterogeneous systems, both in-house and with third parties, long-term archiving, system-independent architecture, flexible migration policies, and also contribution to paperless and life-cycle maintenance support.

The complete architecture of STEP can be found at STEP On A Page. STEP is organized in series of Parts, each one devoted to a specific function on the global STEP's architecture:

- Overview – Part1
- Description methods – Part11
- Data specification –Application Protocols (Parts 200s), Application Interpreted Constructs (Parts 500s), Integrated resources (Application resources-Parts 100s, Generic Resources-Parts 41-99), Modules (Parts 1000s)

- Implementation methods – Physical data file (Part21), Data access methods (Parts 22-29)

- Conformance testing – General concepts (Part31), Requirements for Test Labs and Clients Test Methods for File and data access methods (Parts 32-35), Abstract Test Suites (Parts 300s)

4 Roadmapping for implementation planning

The process of creating a roadmap is concerned with actions to close the gap while this identifies missing research, technology, and standards. Roadmapping is generally named as a process of creating a roadmap.

4.1 The roadmap process - Introduction and Background

To help organizations anticipate and clarify resource and performance requirements and to plan and systematically manage and integrate complex projects, the process roadmapping was developed [2], [3]. Currently roadmapping is used within organizations to facilitate technology planning and communication.

Several forms of roadmaps exists that can be distinguished. According to Schaller [4] the following roadmaps are best known:

- Science/research roadmaps (e.g. science mapping)
- Cross-industry roadmaps (e.g. Industry Canada initiative)
- Industry roadmaps (e.g. Semiconductor Industry Association (SIA))
- Technology roadmaps (e.g. aerospace, aluminum etc.)
- Product roadmaps (e.g. Motorola and others)
- Product-technology roadmaps (e.g Lucent Technologies, Philips Electronics)
- Project/issue roadmaps (i.e. for project administration)

From this variety of roadmaps Schaller [4] has established a taxonomy that classifies roadmaps according to their location in an applications-objectives space (Figure 1).

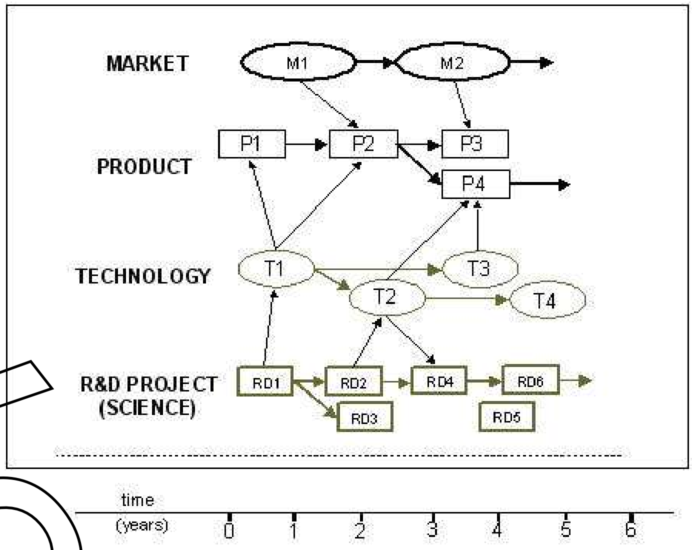

Figure 1 – Generic Technology Roadmap Nodes and Links

Technology roadmapping is a complex process which requires simultaneous consideration of markets, products and technologies and their interactions as shown in Figure 1. To determine the parameters of product, technology and time needed in the start-up phase, tools such as QFD (Quality Function Deployment) can be used based on the respective concepts of quality control from the manufacturing process into the new product development process. QFD helps define the customer needs (whats) and engineering characteristics (hows) for the system thus offers a reliable starting point for roadmapping and building the required cross-functional relationships [6].

The main features of QFD are a focus on meeting market needs by using actual customer statements (referred to as the "Voice of the Customer"), its effective application of multidisciplinary teamwork and the use of a comprehensive matrix (called the "House of Quality") for documenting information, perceptions and decisions.

Some of the benefits of adopting QFD:

- Reduced time to market
- Reduction in design changes
- Decreased design and manufacturing costs
- Improved quality
- Increased customer satisfaction

Furthermore with the use of Roadmapping, it can help the technology from different methods:

- Technology roadmapping provides a mechanism to help experts forecast technology development in targeted areas.
- Technology roadmapping can be used to develop a consensus about the technologies to satisfy a set of needs of achieving targets.

- Technology roadmaps provide a framework to help plan and coordinate developments within a company or an entire industry.

According to the taxonomy scheme the roadmaps can broadly be classified into the following four categories:

A. Science and Technology Roadmaps

B. Industry Technology Roadmaps

C. Corporate or Product-Technology Roadmaps

D. Product or Portfolio Management Roadmaps

Based on the four presented categories and the environment for the FunStep-IG, the best classification according to the taxonomy would be the "Corporate or Product-Technology Roadmaps" since the software understanding and development is the Meta for the implementation planning. The rest of this chapter will be referring to this category of roadmaps when talking about roadmaps and roadmapping.

4.2 Maestro - Roadmapping methodologies

The Maestro [7] methodology has been developed since 1995, and is based on the Porter model, SWOT analysis models and the concepts of Active Knowledge Modelling. The methodology was first conceived in a project with Ericsson Radio in 1995. The knowledge model built then was referred to as the "Demand-Offer Model". Its main purpose was to develop roadmaps and views that would bridge the knowledge gaps between marketing and sales people and product and systems development, engineering and product packaging people. Maestro distinguishes demand-trend-offer-analysis as expressed by customers, business consultants and visionaries. It describes trends as forecasted and sustained by technocrats, researchers and solutions consultants. It also describes what knowledge and solutions is and will be offered, and finally the gap analysis as a basis for deriving roadmaps and role-specific quality forecasts and predictions.

4.3 Roadmapper - Roadmapping methodologies

Roadmapper [8] is another available roadmapping methodology. Based on the gap-analysis it suggests to compare and contrast:

- Have vs. Want
- Have vs. NOT Want
- NOT Have vs. Want
- NOT Have vs. NOT Want

Have	Want	Interpretation
1	1	What can be done with existing RTS[1] to achieve a particular goal

[1] RTS = Research, Technology, Standards

1	0	What should be avoided to do with existing RTS
0	1	A particular goal should be achieved, but there is insufficient RTS
0	0	What should be avoided to do and there should be no activity to develop RTS

Table 1: Roadmapping Logic

This approach provides a generic methodology and tools for the creation of roadmaps. In order to achieve from the content of the area under investigation, only the process, context and structure of what is being "roadmapped" is of importance. The roadmap is not only based on the question "what", but also "how" and "why", providing all the required answers taking into account both the imagined and real risk. It is an iterative process that includes the following steps:

1. What is not happening at the moment? What challenges will we face in the future?
2. Creation of possible solutions: What are the future desired states to get to?
3. Compare and contrast the alternatives: What capabilities will we need to meet these challenges?
4. Select the best way forward: What are the positive and negative aspects of each possible route?
5. Design the steps to get there: How can we shape and speed the outcome?
6. Go back to step 1.

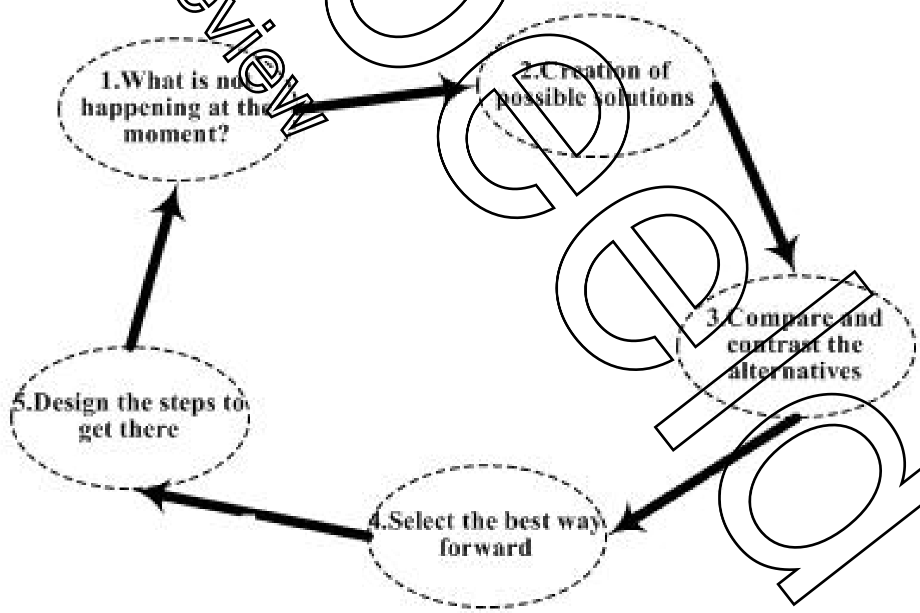

Figure 2 - Iterative process of Roadmapper

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