

## IMS PROGRAMME

### ABSTRACT

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<b>1. Ref. Number</b>		<b>2. Acronym</b>	VIPNET
<b>3. Full Title</b>	Virtual Production Enterprise Network		
<b>4. Theme(s)</b>	Virtual Enterprise Issues Architecture and Methodologies		
<b>5. Keywords</b>	Virtual Enterprise, Technology Information Infrastructure, Data Warehouse, Agent, Ontology, Data Mining, Knowledge Structuring, Knowledge Activation, Super Document, Semantic Web, Life Cycle Engineering, Knowledge-based Plant Engineering		
<b>6. Objective and industrial relevance</b>			
<p>Many production enterprises are currently operating their plants and offices in different countries and regions endeavoring to achieve optimal way to produce many kinds of different products. While being engaged in production activities, these enterprises have to keep the production cost as low as possible, the lead-time as short as possible and the quality of products at a reasonable level. In order to achieve these definite goals, technological information should be properly represented and shared among the enterprises at the time whenever it is needed.</p> <p>Production enterprises are using a large variety of information technologies to handle information generated through their activities. Information technologies, however, are evolving and changing so rapidly that it is very difficult for them to implement and maintain an information system stable enough over a reasonably long period to suit their respective purposes. It is therefore necessary to create a new information system that is neutral and independent of a specific hardware and/or software, that will enable production enterprises to handle a large amount of complicated information in a stable manner over a reasonably long period of time.</p> <p>The VIPNET (Virtual Production Enterprise Network) project herein proposed is aimed at developing a "technology information infrastructure", called "TECNOINFRA" capable of providing production industry with an environment in which information and knowledge can be structured, restructured, stored, distributed and activated, as required. The TECNOINFRA will be capable of improving the competitiveness of production enterprises by enabling them to combine their respective capabilities and expertise. The project VIPNET is essential for a group of heterogeneous enterprises located in different countries and regions to network together by sharing technological information and knowledge.</p>			
<b>7. Approach and overview of planned work</b>			
<p>Topics to be addressed and techniques to be developed through this project will include:</p> <p>(1) Architecture techniques</p> <ul style="list-style-type: none"><li>• An architecture will be developed for a practical TECNOINFRA capable of effectively supporting networking production enterprises to manage their life cycle activities. Life cycle activities include process design, engineering design, material procurement, construction, operation, maintenance, and disposal.</li></ul>			

- Tests will be conducted on a prototype TECNOINFRA incorporating the resulting architecture by first applying it to a nuclear power plant, and then to different industrial facilities to verify and assess its performance as implemented.

(2) Supporting techniques

- A data model, called GPM (Generic Product Model); a network model consisting of “object” and “associations” between two objects, will be developed to represent knowledge.
- Performance will be verified of the GPM methodology to represent knowledge for nuclear power plants.
- An agent function capable of searching and utilizing knowledge and information in an effective manner will be developed, along with a function capable of accelerating data registration into a data warehouse.

(3) Application techniques

- Knowledge management techniques for structuring, re-constructing and activating knowledge will be developed.
- Ontology representation technique using a super documentation and data mining methods based on GPM will be developed.
- A system capable of capturing design intent and representing the information onto GPM will also be developed with a view to creating a semantic web environment in the future.
- A visual knowledge-searching method will be developed, and its performance will be verified in practical applications.

<b>8. Cost Estimate</b> Total estimated cost in <b>person-years.</b>	40 person-years	<b>9. Duration (years)</b>	5 years
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**10. Partners**

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(Additional partners are expected to join the project shortly. Talk is at final stage for confirmation.)

**11. Value-added of the international cooperation**

The project VIPNET is designed to create a practical technology basis that will enable a group

of heterogeneous enterprises located in different countries and regions to network by sharing technological information and knowledge. International cooperation in this project is essential for heterogeneous production enterprises to achieve globally applicable solutions.

Development of a networking technology that will enable international partners to identify the best solution to production problems or the best way to produce a given product in collaboration not only in terms of such factors as its actual production cost, lead-time but its performance and reliability throughout its life-cycle including its disposal.

It is therefore imperative that this project be developed in collaboration among partners from different countries and regions differing in production culture and practices.

The value-added of international collaboration should further be stressed by the fact that need is on the rise for an international standard for such technology as this.