

EDM/PDM in Japan

Satoshi Ezawa

In this article I would like to describe the current situation of the EDM/PDM market and users, and also address the historical background and expectations of EDM/PDM in Japan.

First, the name of PDM was really new in Japan when Mr Masanobu Hirata of Nikkei introduced PDM terminology in the monthly magazine called Nikkei CG (Computer Graphics) as "PDM that brings a revolution to the Design field" in the October 1992 issue. Most people were already working with several productivity tools, and saw how the power of PDM could resolve their problems with unlinked information in different Islands of Automation. Many of them started to evaluate PDM at that time, and there followed a year of launching PDM technology in Japan even among people who had been using a similar approach or technology with locally developed tools.

In the area of EDM (in the sense of Engineering Document Management), people had been using systems based on Document/Imaging approaches with closed architecture since the middle of the 1980's. There were many products in this area such as EDMICS (known as Docuplex in US and Europe) from Fuji Xerox at the middle level, and NSXPRES from Nippon Steel Corporation at the high-end. However, EDM systems had no program management, no configuration management, and no interface to other applications and information. This was because they were systems with proprietary architecture and were targeted at archiving and capturing drawings. These systems are now becoming more open and spanning a wider range of applications. Features such as workflow, product structure management, etc., are being added, so these systems will compete in the same arena as PDM systems.

In the Japanese manufacturing environment in the early 1990's one of the key issues was how to improve lead time from the design stage to the production stage for the next generation of world competition. A lot of discussion took place in study groups such as JEIDA's (Japanese Electronic Industry Development Association) NFS (New Factory System) group. Tools and technologies under discussion included rapid prototyping, CASE, Virtual Reality, Compound Document Processing, Groupware, Team Computing, 3D CAD, Distributed Databases, Concurrent Engineering, and so on. One of the key fundamental requirements in these is the integrated data and process management capability that is implemented in EDM/PDM technology.

At the same time there was a major economic crisis for Japanese manufacturers after the ending of the bubble-economics of the late 1980's and early 1990's. This led to the need to review the real state of manufacturing industry in Japan. For instance, the productivity of Japanese factories was top-class. However, improvement areas were identified, such as a more flexible approach for small-scale production and an increase in white collar productivity. Similar results came from re-engineering studies.

Another important issue for EDM/PDM is the changing computer environment. Many companies are switching to an open environment. Most are discussing groupware or workflow tools to share or route information at all levels - ranging from small groups to the enterprise level. The reasons for this are increased productivity and cost savings. There is some confusion between these tools and EDM/PDM tools concerning their role in sustaining and routing information.

As seen above, the situation of EDM/PDM in Japan has a slightly different history to that in other countries. One special characteristic is that many issues related to the computing system environment are affecting companies at the same time. They include:

- economic recession
- customer satisfaction
- industry hollowing
- downsizing/rightsizing/upsizing of computer systems
- Client/server computing
- End-user computing / workgroup computing
- Open Computing Environment
- Concurrent Engineering
- CALS
- EDM/PDM
- regulatory issues such as ISO 9000 and PL(Product Liability)

Since the launch of PDM technology in Japan, the above issues have been much in discussion either to improve the environment or to increase competitiveness, and it is very difficult to discuss EDM/PDM as a stand-alone issue separate from this overall context.

Another issue is that many Japanese manufacturers have implemented local standards concerning the process or data format using internal resources as much as possible. This can create a problem when they want their tool to be used more widely in industry. At the same time there is a desire to follow a worldwide standard in many aspects. The resulting situation becomes very complicated when these manufacturers compete or collaborate with manufacturers outside Japan. EDM/PDM tools are seen as being a way of increasing the use of industry standards by Japanese manufacturers with the objective of achieving cost savings and better exchange of information.

On the vendor side, there are now more than 10 companies in Japan offering EDM/PDM products and services. They can be grouped into the following classes:

- ECAD/MCAD vendors
- independent EDM/PDM vendors
- system integrators
- platform vendors
- imaging/document vendors

Many users are now about to, or are in the process of, implementing EDM/PDM tools for evaluation purposes. It is still too early to have examples of successful implementation of the latest generation of systems. The users are very much at the stage of understanding how to use EDM/PDM and the potential benefits it could offer relative to the needs they have to improve performance to meet the next level of competition. However, they have realized that this is a very important technology and it is a critical component for the new era of computing systems. Everything is coming together, and before long, major implementations are expected.

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EDM/PDM in Japan (Part 2)

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In the early 1990's, EDM/PDM related products were introduced by system integrators to provide sophisticated solutions for engineering data management for their customers, or for use as the data management engine of drawing management systems. In this article I would like to describe the current situation of the EDM/PDM market, where more than 10 tool vendors are now competing.

Vendors

The following are the major EDM/PDM tools grouped into five classes of vendor:

A. *ECAD/MCAD vendors*

- EDM / Nihon ComputerVision (EDM / ComputerVision)
- MATRIX / Marubeni Hytech Corporation (MATRIX / Adra)
- NOVA Manage / Mutoh Kogyo K.K. (NOVA Manage / NOVASOFT Systems)
- Metaphase Series 2 / SDRC Japan K.K. (Metaphase Series 2 / SDRC)
- PDM-5000 / Zuken Inc. (OEMed from CMS / Workgroup Technology)

B. *System integrators*

- InfoDesk / Hitachi Zosen Information Systems Co., Ltd. (Based on Metaphase by CDS)
- ENGINEERING:Express / SYSTEM CORE CO. LTD.
- DMS-PIMS / Toyo Information Systems Co., Ltd. (DMS-PIMS / Sherpa)

C. *Platform vendors*

- PDFFRAME / Fujitsu Limited (OEMed from Information Manager / EDS Unigraphics)
- PDMACE / Hitachi, Ltd. (OEMed from CMS / Workgroup Technology)
- PM6000 / IBM Japan, Ltd. (ProductManager / IBM)
- WorkManager / Yokogawa-Hewlett-Packard, Ltd. (WorkManager / Hewlett-Packard)

D. *Imaging/document vendors*

- FORMTEK-TDM / Mitsubishi Corporation (FORMTEK-TDM / FORMTEK)
- NSEXRESS-III / Nippon Steel Corporation

E. *Independent EDM/PDM vendor*

- Nothing

Current situation

The above are the names of typical vendors and products in Japan. The vendors are now promoting other activities and alliances with distributors and system integrators. As can be seen from the names in parentheses, many of the Japanese vendors are working with EDM/PDM suppliers from outside Japan. It can be seen that big names in this industry from the U.S.A are already active in the Japanese market. Early pioneers such as Hitachi Zosen Information Systems Co., Ltd. and SYSTEM CORE CO. LTD. have been making big efforts since the early 1990's. Some of their projects are now heading from the initial phase, such as document management with DRM (Design

Release Management) functions, to a second phase such as linking with an MRP system or towards implementation of process management with a commercial project management tool. Other articles in this series will describe examples of successful implementation.

The size of the EDM/PDM market in Japan can be estimated from the number of companies in manufacturing related industry. About 2,000 companies are listed in the Automotive, Electronics, Electrical, Utility (Gas & Electricity), Energy and Machinery sectors. These can be considered as 'large accounts' with over 1,000 employees. Many of them now recognize EDM/PDM technology as one of the enabling technologies for future worldwide competition. At this moment it is difficult to estimate the exact business size or sales volume, but it is a large enough number to encourage everybody who expects business through EDM/PDM related products. This is one of the reasons that many vendors are entering this market working with existing suppliers in the U.S.A.

However, it is still not a mature market. The reason for this is that there are still very few examples of implementation with commercially available tools. Many companies started to evaluate this technology around 1 - 3 years ago. Some of them have already evaluated EDM/PDM tools, or are now defining the requirements to improve the productivity to manage, share, and distribute information with this technology. Typical examples of issues arising at early stages include:

- Rescue of legacy information on paper, blueprints, or microfilm
- How to redefine the manual process as an automated process
- How to justify the gap between the white-collar engineers, such as the CAD/CAM/CAE group, and blue-collar engineers, such as the document management group
- Selection of the right tool for a good implementation
- How to link/access legacy information on existing systems to the EDM/PDM environment
- Estimation of disk space, network performance, conversion volumes
- How to link information in proprietary systems to the EDM/PDM environment
- Estimating the size and cost of customizing
- Estimating the size and cost of sustaining the EDM/PDM system
- How to get approval for the project from the management level

A typical issue in a small implementation for a design engineering group is how to access and sustain the right data in a sophisticated fashion without manual intervention and delay. Hopefully, solutions will be supplied by CAD/CAM vendors customizing existing tools as packaged solutions. New tools that don't require a lot of customization for small implementations may also be useful.

The customer may get the right solution for a small implementation from a CAD vendor or a CAD-related system integrator without too many big problems, but the customer will still need to work with a dedicated consultant at an early phase to get the right view on implementation, and with an independent system integrator during the implementation phase. EDM/PDM tool vendors are now willing to work with these third parties to provide the best solutions.

The next article in the series will look at some of the issues surrounding larger implementations, and at some CALS issues from a EDM/PDM viewpoint.

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EDM/PDM in Japan (Part 3)

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Last month we looked at some of the issues surrounding small implementations of EDM/PDM in Japan. This month we will look at the situation with larger implementations. In the case of large implementations, many of the issues described in the discussion of small implementations are also apparent. Some major companies are discussing these implementation issues with the vendors of the CAD/CAM systems they use. Others are discussing them with EDM/PDM vendors. A typical problem is that no-one and no single tool is able to satisfy all of the requirements at a large implementation site. It is just too difficult for a single vendor to provide the complete solution for the complicated requirements of a large user. As a result it becomes necessary, as a function of the particular customer requirements, to select not only an EDM/PDM system but also the appropriate supplemental tools such as drawing/document management systems, CAD/CAE/CAM tools, and documentation tools. In addition, the various tools must be integrated.

Necessity for a collaborative team

A collaborative team has to be built up to address all these needs. It should include users who understand the business processes and a third party organization such as a system integrator and/or a dedicated consultant understanding the user's problems, understanding tools such as EDM/PDM, having the skills to manage other vendors, and having skills in other core technologies such as networking and database tuning.

Customer expectation of the EDM/PDM tool - more than integration

Different customers have different expectations of EDM/PDM. Many are looking at it as an Integrated Information Management tool - a tool to integrate information - with metadata management spread in several locations and on several applications on various platforms. This is a very straightforward approach to applying PDM tools and can be used in clearly defined areas such as Design Review. The highly visible result of the approach should make it easy to evaluate the benefits of PDM. There will clearly be benefits such as improving the speed of finding information and improving the quality of information in use. However, this is still the same approach as is taken with traditional automation tools such as CAD. It does not take advantage of the full potential of PDM.

The real power of PDM technology, rather than PDM tools, will be apparent at the business level. It will be closely related to the business style of a manufacturing company for the coming years. If the people who are going to implement PDM can understand this, and address PDM from this point of view, then their PDM implementation will be much more effective than if it's implemented as an Integrated Information Management tool. Their implementation will be company-wide and, through its relationship with business processes, have a major effect on competitive performance.

This type of approach to PDM, in which the technology is directly used to support business performance, can often be achieved in the USA in organizations in which there is a Chief Information Officer (CIO) with an overview of all the company's information usage and systems. The CIO can act as the leader for the improvement of the company's business and processes through effective use of a technology such as PDM.

In Japan, it is very unusual to find a CIO position in a company, and it is correspondingly difficult to apply PDM technology to get results in business process improvement. However, some companies are beginning to understand the effect that PDM could have in this direction. They are now going to use PDM more as a tool to empower people than just to provide data management for CAD users or to reduce the walls that people have built to defend their know-how. If PDM can be used as an empowerment tool, it will have a great influence and will become a strategic technology and tool. So far, though, only a few companies are seeing it this way.

Top-down vs Bottom-up

Independent of the existence, or not, of a CIO, a strong driving force for successful implementation of PDM must come from employees in many areas in the company such as Design, Document Management and Quality Assurance. There must also be continuous support and a major commitment from top management in such a project. It's also necessary for everyone to have a common view of the future, namely a business mission and goal that is shared by top management and employees. The plans about the working style in the new environment need to be shared between the two, and this is the concept of "One Team and One Goal". A comparison can be made with the traditional IT (Information Technology) approach for IS people. The big difference lies in the metrics of implementation - where the measure will be the contribution to company-wide business success rather than divisional productivity.

Industry segments

The following are the industry segments in Japan where large-scale PDM projects are currently progressing or are expected to start:

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|-------------------------------------|--------------------------------|
| - nuclear energy | - construction and engineering |
| - electric utility | - plant engineering |
| - consumer electronics and electric | - automotive |

These are organizations managing hundreds of thousands of parts, and they often have millions of objects spread through the company and under not very good control by traditional means such as microfilm, blueprinting and electronic filing. Further problems can be that in addition to having a lot of non-electronic data, they organize on the basis of drawings rather than parts, and use proprietary systems. It will be a big challenge for them to break out of this environment into a globally competitive business environment with worldwide standards. PDM is a key technology to help them break the barriers.

Since last year, "CALS" has become a buzzword in Japan, even among IS people and in the banking industry. One of the recent topics has been to think about setting up a special project to address the area of CALS and CALS technology - and this could be a joint project of the Ministry of International Trade and Industry (MITI) and private enterprise. It could become a new national project following on after MITI's famous 5th Generation Computing project. In the next article we will describe PDM technology and CALS issues in Japan.

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EDM/PDM in Japan (Part 4)

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This month we would like to look at CALS from the viewpoint of EDM/PDM in Japan. As you know, the acronym of CALS is not so new, and already we see many CALS-compliant products in the EDM/PDM arena. Although CALS has been around in the industry as "Continuous Acquisition and Life-cycle Support" for some time, the CALS acronym is something of a buzzword in Japan this year. In this article, we'll look at the background of CALS in Japan and then show some opportunities for using EDM/PDM technology in the Japanese CALS context.

History of CALS in Japan

In the early 1990's, people in organizations such as JEIDA (Japan Electronic Industry Development Association) and SOLE (Society of Logistics Engineering) identified the activity of CALS (at that time Computer-aided Acquisition and Logistic Support). They formed working groups and study groups to gather information in the U.S.A. and to study the technology of CALS (rather than using the technology available at that time).

In the spring of 1994, the study group from JEIDA produced a report about CALS. It contains the following sections:- Brief Description of CALS, Economic Effectiveness with CALS Implementation, and Current Situation of Information Systems and their future with CALS. It is not too much to say that this report made the first major impact on most people.

JEIDA also promoted the CALS Japan event which was held in September 1994 with three objectives. These were: to publicize various Japanese industry groups, institutes and government organizations that decided to join global CALS initiatives; to answer the question "What is CALS?", and to use CALS Japan 94 as a proving ground/rehearsal for the upcoming CALS PACIFIC 95.

About the same time, MITI (The Ministry of International Trade and Industry) announced a project called "Standardization and Research & Development on Integrated Information Systems for Production, Supply and Operation" with some budget in 1995 to research CALS technology and to build a pilot and testing system. This emphasises the importance of CALS issues for MITI.

Why CALS now?

There are two answers to this question. On one hand, CALS is expected to be a remedy to help recover international competitiveness at a time of economic recession following the crisis of the bubble economy and in the situation of a strong yen. This answer can be categorised as seeing CALS as the solution tool of re-engineering - which is represented by sharing information or by the virtual corporation. On the other hand, CALS can be seen as a way to acquire technology/framework/infrastructure such as data translation, product model, integration of distributed databases, SGML, and so on. This answer is more a technological one, with the intention to have the technology and world-wide standards which are in use in the international community.

The project just started

Two kinds of organisation were formed, directly or indirectly, under the control of MITI. One of these is CIF-CALS Industry Forum, Japan. This is a non-governmental organisation that will look after everything concerning CALS and related issues in Japan. It's a forum that is aiming to address education and training, consultation, and information gathering, exchange and distribution. To become a member of this forum, an organisation has to pay a membership fee.

The other organisation is called "CALS research association". MITI has decided to invest over 2,000 million yen for the next three years. This association will validate the availability of CALS technology by building a pilot model on a real application in the electric power industry. To move this project forward, the following research groups will be formed:

1. Pilot Model Decision Group

- Business Model
- Validation Standard

2. EI (Enterprise Integration) Information Model Research & Development Group

- Pilot Model
- Generalization of Pilot Model and Industry Basis Application

3. Technical Document & Electronic Publishing Technology Development Group

- ITEM System
- Integrated Document Management System

4. Design & Production Data Sharing Technology Development Group

- PPDM System
- STEP

5. CALS Test Network Development & Operation Group

- Communication Platform
- Multimedia EDI
- Database Navigation
- Test Network

Many types of organisation ranging from manufacturing companies to System Integrators are interested in joining this project. Their main motivation seems to be to receive information about the results that will be produced by this project.

The above is a very brief overview concerning CALS in Japan. It seems that the "CALS research association" project is a national project. One concern is we don't see any involvement from a company or vendor from outside of Japan who has experience of CALS-related technology and standards such as SGML, EDM/PDM, and CITIS.

A few companies in Japan are already talking about implementing CALS-related tools (such as CITIS and EDM/PDM tools) to survive in the international business field regardless of the above project.

During the next couple of years, there will be parallel efforts:- (i) CALS-related implementation with commercially available tools by individual end users and (ii) technological acquisition by participating in associations under one government-led umbrella. During this time, commercial tools will be growing both in the number of users and in functionality (partly by getting feedback from end users). This will increase the opportunity for commercially available tools and for system integrators in CALS-related fields. In the near future, we will report progress in this area.