

# **PBS CAD/CIFM Program Program Development Area Business Process Integration**

## **Introduction**

Recognizing the ongoing need for program expansion and refinement, the PBS CAD Center established three Program Development Areas (PDA) for the CAD/CIFM Program in November 1997. The three areas are Library Development Guidelines, Facility Assignment Procedures, and Business Process Integration.

The purposes of the Business Process Integration PDA are to identify regional PBS processes where CAD/CIFM technology may be most beneficial and to recommend actions that may be taken to implement the technology. The CAD/CIFM Program has taken hold in all of the regions to varying degrees from barely existing to well established. Therefore, the analyses and recommendations presented must be considered within the context of the state of CAD/CIFM in a given region.

## **CIFM**

CIFM (Computer Integrated Facilities Management) is a system that integrates various facility management software packages to provide accurate information to users. CIFM has several components including Electronic Document Management Systems (EDMS), Computer Aided Facilities Management (CAFM), Geographic Information Systems (GIS), Computer Aided Design (CAD), Computer Managed Maintenance Systems (CMMS), and enterprise level databases. Other tools include graphics viewers, multimedia applications and web-based project management.

In the case of PBS, EDMS is the software upon which the regional CAD/CIFM libraries have been developed. As with the CAD/CIFM Program itself, the libraries have been established to varying degrees. In general, a regional library will house drawings and related documents, providing desktop access to this information. CAFM is a type of software that enables management of facility attributes such as assignments. CAFM products can track assignments, assist in move designs, manage leases, etc. GIS products allow users to gain a spatial understanding of properties from individual buildings to an entire region. These products are useful in analyzing property attributes over large areas such a vacancy rates, historic properties, occupant identification. Enterprise level databases are systems such as STAR and IRIS that have been developed to serve specific purposes in PBS.

Several factors must be considered when integrating CIFM technology into PBS business line processes. The first, and foremost, factor is that implementation must be performed at the regional level. While Central Office can provide support through the PBS CAD Center, the effort behind the CAD/CIFM Program must be put forth in the region. Within a region, successful integration will depend on support from staff and management, accurate analysis of needs and realistic setting of goals.

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**Methods**

Some regions conform to a business line strategy while others tend to group a range of functions into geographically organized teams. Regardless of specific structure, base line business processes remain the same from Region to Region. For purposes of this Business Process Integration PDA, one Region was selected as the 'test' region.

Criteria used to select the appropriate Region were as follows:

1. Upper management support for CAD/CIFM.
2. CAD/CIFM Program Manager participation on the PDA Team.
3. CAD/CIFM technology applied to limited extent.

Region 8 stepped forward and met all three criteria. Once Region 8 was selected as the 'test' Region, a specific plan was developed through which the goals of the Team could be accomplished. The first step toward meeting the goals was to set a framework for the PDA that included general concepts, current PBS technology, PBS work processes, and available technologies. Using this framework, analyses could be performed and recommendations made. Finally, Region 8 would be used as a case study for the PDA.

The combination of the Team members' experience and interviews with staff involved in daily processes would give the desired background information for the Team. Thus, interviews were conducted in Region 8 with follow-up interviews in the respective Team members' Regions. From these interviews and from the Team's knowledge base, criteria were developed for identification of successful target processes where CAD/CIFM technology may be applied. In general, areas were identified where implementation could be performed quickly and returns gained immediately. To understand the impact of applying CAD/CIFM technology, the Team would perform and evaluate actual implementations. In addition, processes that would entail long term implementation were also identified.

Three concepts contributed greatly to development of the methods. First, the definition of the methods and of the overall product was a team effort. Any attempt to integrate CAD/CIFM technology should begin with a team of experts. Secondly, the product generated by the Team was based on interviews with PBS staff who actually do the work. Lastly, a general master plan was used as the basis for team's efforts.

**Where to start**

Regardless of the technological advances that CIFM represents, the CAD/CIFM Program must be shown to have tangible benefits to the staff and management in the region.

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Tangible benefits include saving time, saving money, enhancing work effectiveness and enhancing the image of PBS. Some regions have developed the program beyond the starting point, having proven to management and staff that CIFM technology will benefit business line processes. These regions should consider expanding the program where possible. Other regions are just getting started with CAD/CIFM and will need to obtain support to implement the program. Support will be achieved once management and staff are convinced of the benefits of integrating CIFM technology into business line processes. A network of CAD/CIFM advocates is in place throughout the regions, spearheaded by the national CAD Center and the regional CAD/CIFM Managers. This network may be used for support and information as the program is developed in a region.

The CAD Center's mission is to integrate the CAD/CIFM process in PBS business operations by the year 2001. The role of the CAD Center is to act as the catalyst in the integration process. Among its many activities, the Center performs evaluations of software products and is involved in integration of CAD/CIFM technology with national programs.

The following steps serve as a roadmap to successful integration of CIFM technology into business line processes.

- 1) Establish a CAD/CIFM team across business line processes
- 2) Define the work processes
- 3) Define CIFM Tools and components and define existing infrastructure
- 4) Develop scenarios based on items 2 and 3 and show benefits of integration
- 5) Implement a small-scale integration to show success
- 6) Integrate other processes

**Establishing a CAD/CIFM Team**

The importance of this first step cannot be underestimated. The task of integrating CAD/CIFM technology requires a PBS wide network of individuals who are committed to the success of the program. Ideally, the team would consist of representatives from different program areas who are interested in enhancing their respective processes. Prospective team members might include a project manager interested in gaining access to drawings more easily; a building manager interested in computerized maintenance management; a portfolio manager interested analyzing properties spatially; a systems

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manager interested in technological advances; and so on. The team will establish goals and phases for integration and promote CAD/CIFM in the region.

## **Work Processes**

Regional work processes vary greatly from region to region as to organizational placement, management, and resource allocations and in many other ways. However, rudimentary execution level work processes utilizing graphical information are really not regionally unique. One region may have a need for mapping more than another region because of a unique property. Another region may have better access to project history files and, therefore, use that information more. A Project Manager (PM) in any given region may have a preference for electronic format along with hardcopy. However, across the nation, our research indicates that there is much more uniformity in graphical information utilization and need than originally thought. All regions have a campus type facilities or federal centers that require maps. People need to see floor plans to complete various tasks. They want to know what kind of work has been done to the building over the course of time. They want to show a client the exterior view and so on.

1. **Customer Service Contact**

Single point of contact for agencies for general customer service contacts. In some region this work process is assigned to the Regional Account Manager in other region there might be a single manager in the organization with this assignment.

2. **Strategic Marketing**

Strategic marketing plans and general marketing.

3. **Business Planning**

Developing materials for IOS, managing groundbreaking and opening ceremonies, sales.

4. **Liaison Officer**

Single point of contact provided to a specific client for focused needs. Courts Liaison Officer is common to most regions providing close coordination between PBS, the Judiciary and the Administrative Office of the Courts relating to new construction, alteration and expansion of court space. Some regions have other specialty liaison officers such as Marshall's Service and SSA

5. **Procurement**

Commits Government to contracts for acquisition of materials, equipment, construction, professional services, cleaning services and maintenance services.

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- Construction Contract
  - Services:
    - Professional
    - Cleaning/Maintenance
  - Materials/Equipment
6. Develop Space Requirements  
Evaluation of Agency functions to be housed in a specific location (building, facility or campus) and documentation of types, adjacencies and quantities of spaces required to accomplish the Agency's mission at that location.
7. Space Acquisition  
Solicitations for offers of leased spaces and facilities.
8. Administer/Manage Lease Contracts  
The monitoring of leased spaces and enforcement of lease provisions including cure requests and corrective actions. Execution of reimbursable work in leased spaces.
9. Market Vacant Space  
Identify vacant spaces and match potential tenants whose needs can be satisfied by those spaces thus reducing vacancy rates in federally controlled space.
10. Asset Planning/Management  
Evaluation and monitoring of asset financial performance, planning and overall coordination of business decisions.
11. Project Management:  
Management of all aspects of design and construction projects above prospectus level.
12. Technical Support Services  
In-house Architectural and Engineering support of design and construction projects. Provides technical assistance for procurement, design, design review, construction management, and conflict resolution.
13. Buildings Management and Operation  
Planning, ongoing administration, inspection, administration, and service assessment provided in support of facility management activities in the areas of building testing and safety, cleaning and equipment maintenance, energy conservation, environmental, fire protection, food service, industrial hygiene, occupational health and safety, recycling, repairs and alterations, and contracting.

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- 14. Repair and Alterations  
Maintain continuity of government operation and extend the life of government buildings through building engineering inspections, work item tracking and program planning, project accomplishment and prospectus planning.
- 15. Conduct Technical Surveys  
Everything from Building Assessment to Construction Document Review
- 16. Disposal/Sale of Excess Real Property  
Disposes of excess property to remove it from the inventory
- 17. Technical Security Services  
Design, installation and testing of security systems in Federally controlled space.
- 18. Mega Control Center  
Federal police patrols, guards staff, and security system monitoring in federally controlled space.

**CIFM Tools and Existing Infrastructure**

<b>Category</b>	<b>General Function</b>	<b>Sample Products</b>
CAD	Drawing manipulation, Space definition	AutoCAD, AutoCAD LT
Viewer	Vector and Raster file viewing	Myriad, AutoDesk View,
EDMS	Engineering Document Management System	WorkCenter, AutoManager WorkFlow
GIS	Geographic Information System	ArcView, MapInfo, GeoMedia, Autodesk World
CAFM	Computer Aided Facilities Management (space management, move management, lease management)	FIS, SPAN, Aperture, Archibus
CMMS	Computerized Maintenance Management System	Maximo, TMA
Data Gateway	PBS database access	STAR, IRIS, NEAR
Project Websites	Project Management using WWW	Aspects Site Builder
Virtual Modeling & Photography Multimedia	3D Modeling & animation, Interactive Photography  Audio/Video presentations	3D Studio, ConceptCAD, IPIX Viewer RayDream, SmoothMove
Desktop Publishing	create brochures, formal documents	MS Publisher, Quark Xpress
Collaborative Computing Image Editors	Simultaneous document review by multiple users at remote sites	NetMeeting, Netscape Collabra, Lotus Domino Corel DRAW!, Adobe Photoshop, PaintShop Pro

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*Table 1. CIFM Tools and Components*

The usefulness of any given CIFM tool will depend on the infrastructure of the region's computer system. The team must evaluate desktop capabilities, server capabilities, and network capabilities to determine which tools will operate under existing conditions and which may require system upgrades.

### **Integration Scenarios**

To be successful, integration must begin with the process/technology combination that provides the greatest benefit to the most people at reasonable cost. Therefore, integration may be considered in two broad classes. The first would be to integrate technologies that involve more than one business processes. 90% of the business processes could use EDMS and Viewing Packages (Table 2.). EDMS is the basis for regional library development, the backbone of the CAD/CIFM Program. The library will enable desktop access to drawings and related files. Though establishing a library is a long-term process, library development must be undertaken to meet business process needs. Providing viewing packages to users is a simple, inexpensive proposition. A viewing package can be installed on the desktop and will enable a user to look at drawings, images and other documents.

GIS and digital photography are also technologies that cross many business processes (Table 2). The ease with which a GIS can be implemented will depend on the extent and availability of the desired mapping information. Purchasing software and 'retail' mapping data is simple and fairly inexpensive. For example, a user could purchase streets, demographics, jurisdictional boundaries, and environmental features for an area from a variety of vendors. It will be more difficult to obtain GIS maps, such as building locations, specifically related to PBS. This information would be developed by the region. Digital photography is simple to implement. Essentially, a camera would be purchased and software installed locally. Digital photographs would be entered into a library so that users involved in any business process would have access.

Table 2 shows the CAD/CIFM tools that integrate with PBS work processes. The table represents integration in a general context such that the CAD/CIFM team could respond to the business process needs with a good idea of the applicable technology.

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	Data Gateway	Multimedia	Desktop Publishing	Collaborative Computing	Project Website	Virtual Modeling	Digital Photography	Viewers	CAD	GIS	EDMS	CAFM	CMMS
Customer Service Contact:													
Strategic Marketing:													
Business Planning:													
Liaison Officer													
Procurement													
Develop Space Requirements													
Space Acquisition													
Administer/Manage Lease Contracts													
Market Vacant Space													
Asset Planning/Management													
Project Management													
Technical Support Services													
Buildings Management and Operation													
Repair and Alterations													
Conduct Technical Surveys													
Disposal/Sale Of Excess Real Property													
Technical Security Services													
Mega Control Center													

Key:	
Moderate use	
Heavy use	

Table 2. PBS Work Processes/Tools Matrix

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**Quick and Easily Implementable Technologies and Strategies**

Below are technologies and strategies that have been found which can be quickly and simply executed to greatly help integration of electronic graphical data into any region.

<b>Technologies &amp; Applications</b>	<b>Estimated Cost</b>
<p><b><i>Whip!™ (DWF) Technology</i></b></p> <p>DWF is as little as 1/10<sup>th</sup> the size of .DWG files and thus easier and quicker to transmit over the Internet. "Save As" option in AutoCAD / AutoCAD LT.</p> <p>One can view &amp; red line drawings via a web browser from remote locations.</p>	<p>\$0 (free plug-in)</p>
<p><b><i>Document Viewers</i></b></p> <p>Very simple software for viewing and redlining drawings over a local-area network. Easy to learn, and more powerful than remote viewers.</p>	<p>\$50-300</p>
<p><b><i>Collaborative Meeting Software</i></b></p> <p>Allows for geographically dispersed groups to interactively review and edit documents and drawings over the Internet or local-area network.</p>	<p>\$0 (free or GSA Site License)</p>
<p><b><i>Electronic Distribution of Bid Documents</i></b></p> <p>One can substantially reduce or eliminate distribution and/or printing costs for bid documents by distributing them electronically:</p> <p style="padding-left: 40px;">Via local Printing Service Bureaus (contractors <u>pick-up and pay for</u> documents at their local Kinko's)</p> <p style="padding-left: 40px;">Posting of Bid Drawings to agency Web Site</p>	<p>\$0</p> <p>\$0</p>

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Document Distribution via CD-ROM (substantial reduction in production and mailing costs)	< \$2 per CD-ROM <\$0.30 per mailing
<b><i>Interactive Photography (IPIX):</i></b>  Inexpensive service and technology to create interactive photographs that simulate the experience of being in an actual place.	\$300-500 each (including photo session)
<b><i>Maps (GIS)</i></b>  A myriad of digital maps is available for inexpensive desktop applications. These maps can include demographics, topography and physical infrastructure (roads, utilities etc). They are available from retail outlets as well as from local municipalities and government agencies (i.e.: USGS)	\$800 (for application)  \$0-1500 (for maps)
<b><i>Image Editors</i></b>  Software for creating artwork and for manipulating digital photographs.	\$50-1000
<b><i>Multimedia</i></b>  Software for creating dynamic presentations that include videotape and audiotape as well as digital media such as 3D animation.	\$500-1500
<b><i>Desktop Publishing</i></b>  Software for creating static presentations and printed media such as newsletters, manuals, flyers and other publications.	\$200-500

**Strategies**

Dispatch Drawings: This is a simple idea to assist FPS. Security folks need drawings and maps for directing officers to locations once an alarm is received. Provide a layer in floor plan drawings to include location of alarms.

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Roof Drawings for Antenna Stuff: One region has been able to rent antenna sites on rooftops and discovered a real need for roof drawings.

All Photographs Digital: One region discovered that they could, for a relatively low cost, have all photographs scanned. This provides a rich resource for researching, working with historic elements, adding photos to reports, sales brochures and many other areas.

Net Working and Promotion: As has been indicated previously in this document one of the best tools in getting electronic graphic data going in your region is network promotion and teaming. Taking the initiative to coordinate, promote, encourage and just generally selling folks on the fact that it is not that complex or expensive. Once started it will build on itself.

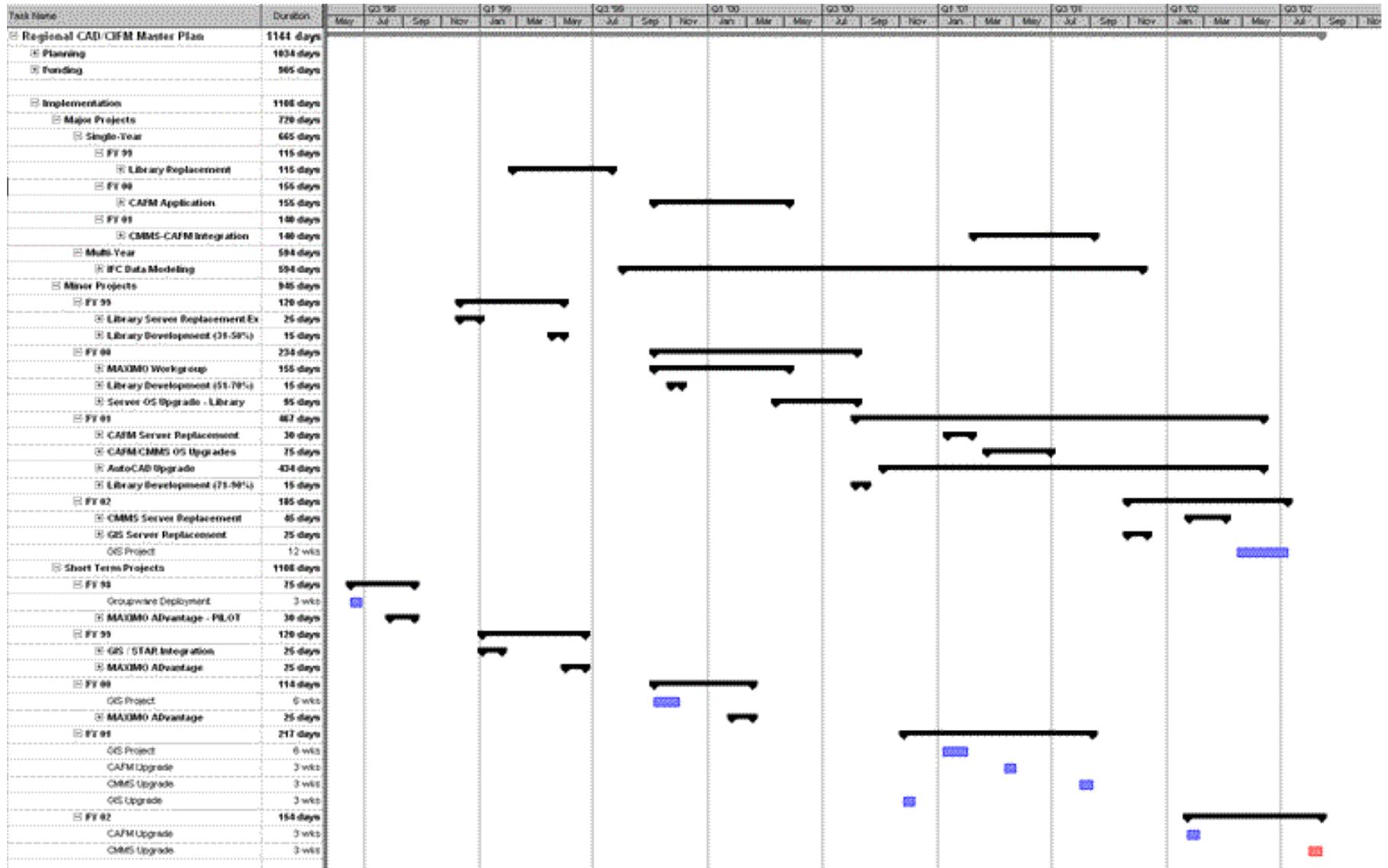
### **Recommendations**

The complete integration of CIFM technologies into various business processes is a complex task that will take several years. In order to accomplish this, one should start small and grow the program in a logical and ever expanding direction.

In order to insure that the processes ultimately interrelate, one must develop a comprehensive master plan for these technologies that includes not simply the costs for applications, but a schedule for their rollout and maintenance. By managing the CIFM integration as a single ongoing program implemented through discreet tasks, one can insure that various aspects of the program do not conflict with one another or with other Regional and National initiatives. Furthermore, by developing and managing a master plan, one can track progress, make intelligent programmatic changes, and more effectively manage annual budgets.

Figure 3 is a roll-up of a prototypical Regional Master Plan for CAD/CIFM integration. A more comprehensive view of this plan can be found in the appendices --and an electronic version is available for use as a Program Template.

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All program elements are linked to annual budgets and are arranged as short, medium and long-term projects as their complexity and cost dictate.

Based on a “generic” region, the master plan outlines the steps required to introduce and manage virtually every available CIFM technology into a Regional infrastructure. Given the status of our current budget, only low cost and easily Implementable technologies are slated for implementation this fiscal year, with an increasing number of more complex and costly tasks taking place in subsequent fiscal years.

Delaying implementation of more difficult and expensive projects until later fiscal years was not only scheduled because of the need to establish financial commitments, but also to allow for the smaller projects to “set the stage” of the larger ones, since tangible benefits will have been already seen. It is believed that by implementing short-term projects early on in the program, regional staff and management will better comprehend and more readily support the implementation of the more comprehensive systems.

Every year, *at least* 3 or 4 CIFM applications should be completely integrated into **specific** regional business processes. These integrations need not be uniformly distributed across business lines, nor within a given business line. In particular, short-range projects should be targeted towards users and groups that have indicated their need and support for these technologies as a means of improving their workflow. By targeting specific groups and producing results in relatively short time frames, the Regional CAD/CIFM program gains an ever-increasing foundation of successes that can be used to bolster support and financing for future initiatives. As a bonus, a successful implementation for one group opens previously closed eyes in other groups as they begin to see how these technologies might benefit their work processes and provide ever-important guidance to the Program Manager as to program direction.

While short-term applications are being implemented, larger “enterprise” level applications and integrations should be taking place **simultaneously**. Supported (and funded) by more executive level management, these integrations form the backbone of the CIFM program. While short term applications may be seen as the “front-line” of the program, less visible projects such as these enable information sharing between the various business processes, further improving the benefits of what become “existing” applications.

Between the rollouts of Program infrastructure and the applications is perhaps the most critical component of all: data.

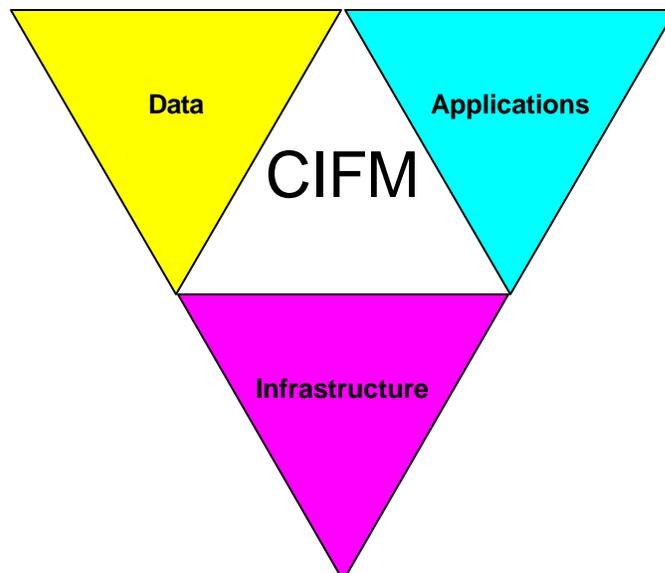
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Individual and simple installations of non-integrated applications will have limited benefits in the overall framework of regional business processes, would be the implementation of a robust framework without useful tools. Neither component is of any use unless comprehensive information is present.

Managing the conversion of drawings from paper and microfilm to digital form is only one of the many data-management tasks that must be performed every fiscal year to allow for staff to continually and effectively use these CIFM applications and infrastructure as part of their business processes.

These multi-faceted approaches are critical to a successfully run CAD/CIFM program. Not only is it important to simultaneously deploy various CIFM archetypes, it is equally important to have different approaches to application and data deployments. Only by constantly proving the worth of the program *time-after-time* through quickly achievable goals, will one foster the regional buy-in necessary for more comprehensive projects that form the backbone of true CIFM integration.

Only through successful management of all aspects of the CIFM integration process –data, applications and deployment-- year-in-and-year out can one develop the momentum of technology adoption necessary to sustain and expand the program. By strategically implementing component of the CAD/CIFM program incrementally, one will find that the impetus for program adoption and expansion will eventually come from the business lines themselves, as these technologies become a preferred and eventually **ordinary** means of doing business.



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## **Appendix A – Region 8 Interview Notes, Feb 1998**

### **REALTY SERVICE GROUP:**

They believe that accurate CAD assignment plans would be very useful in reconciling the assignments with the total floor and building areas.

Realty specialists are receiving CAD data from their clients and building owners. Need to be able to view & plot these files. They currently go to space planners to plot.

They receive electronic responses to solicitations and need to be able to view and plot these as well.

Want to be able to locate receptacles and doors to determine if there were enough

It would be nice if the system was able to count receptacles in submissions.

Having a shared CAD plan may be useful in telephone conversations w/ clients and field offices to be able to locate a room on a plan.

All realty specialists are located in the Regional Office Building, but work out of the Service Centers.

Specialists need a tool to help them locate and reconcile space areas. Sometimes different plans have different labels for space area. Need to be able to determine what the correct area is.

People may say “I need a space 350sf” and need a tool to help them find a room.

They reiterated a need for adequate training in all CAD/CIFM tools to use them effectively.

Specialists need to be able to review electrical and mechanical plans to see if outlets or mechanical is suitable for a potential client.

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Specialists have access to technical expertise in the service centers.

Centralization of assignment data alteration is preferable to current distributed responsibilities.

There should be only one resource for making changes. There are concerns over many people making changes at the same time to drawings.

Digital photographs would be useful to sell space to those outside of the area and for “outleasing” space to the private sector.

They have plans to market outlease space on the Internet and photos and drawings would be helpful.

Maps/GIS are useful in locating a facility’s proximity to the city.

They need heights of building as well as map coordinates for antenna outleasing

Nice to get digital maps of floodplains (FEMA), seismic zones (USGS), Central Business Districts (city), historic districts, empowerment zones, and areas slated for urban renewal.

They need to have assignments listed for both BOMA rentable and BOMA usable. They must advertise both classifications. They also need to be able to convert to and from different standards of their clients.

They need “as-built” drawings from designer or field offices when the projects are completed.

Most of their clients are good about calling the Realty Specialists for even minor assignments changes.

Occasionally people in a field office ask the Realty Specialists who is the tenant in a specific space.

The specialists felt that it would be useful to interactively discuss space alterations with lessors and tenants from remote locations.

Digital photography would be useful to evaluate leases by tenant agency managers in remote locations.

Realty specialists need to have access to Asset reports that indicate profit/losses. They say that this was needed to justify rent increases for client agencies.

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They need plans that show the number, assignment and location of federal and leased parking spaces and lots.

They need to identify the security level of a building<sup>A</sup>.

## FIRE PROTECTION & ENVIRONMENTAL

She wanted all of the available data organized by building.

She wanted to be able to locate data created between a range of dates.

She wanted HAZMAT studies available online.

She wanted fire protection plans, fire alarm plans and shop drawings of sprinklers.

She wanted to be able to track the inclusion of fire protection comments in the development of the specifications. She would also like to make those comments electronically.

She would like maps that indicated, among other things, the location of monitored wells, underground tanks and pipelines.

She wanted online versions of environmental masterplans.

She wanted Environmental Impact Reports available online.

She wanted abatement reports online as well as abatement photos.

She wanted online access to safety and environmental management (SEM<sup>B</sup>) reports.

She prepares Building Profile reports, narratives of a building's Safety and Environmental deficiencies. She would like to be able to attach photos and plans (such as an evacuation plan) to these reports and store them electronically.

She only inputs the highest priority deficiencies into the SAFE system. All others are submitted to the buildings' manager/lessor for correction and are not tracked.

She needs to be able to log the submission of drawings as well as their approval status.

She needs to maintain copies of pre-lease certifications<sup>C</sup>.

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## SPACE PLANNING

They use CAD with CAD Plus to create layouts.

They maintain hard copy and CAD assignment plans.

Some use CAD Plus<sup>D</sup> as a symbol library and drafting tool. Others create custom symbol libraries.

CAD Plus is used for all but the simplest layouts. AutoCAD is used for simple layouts. Paper is use for sketches.

They expressed an interest in using 3D models and interactive photos.

They receive CAD drawings on disk but expressed that a hard copy is necessary for aiding in their review.

They visit sites prior to developing layouts. Photographs would not eliminate the need for these visits.

They expressed no interest in mapping.

They need to make extensive notes on drawings in conjunction with client interaction.

## SYSTEMS STAFF

Interest in the CAD program is cyclical. It usually peaks when Hal Piper asks for information.

Base drawings of owned buildings are being scanned with a proposed completion date of 3/98. They are being scanned in DXB format<sup>E</sup>. Scanning of drawings related to leased buildings is planned but is a lower priority.

56k lines are to be replaced by T1 lines. The downtown field office should have a T1 by 2/15/98.

Using current lines, a user may wait up to 45 minutes to open a drawing.

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Some remote users are not active in CAD and need viewing only.

Where high-speed access will not be available, Systems staff is considering sharing drawing files over the Intranet using the DWF format.

Most users need only view and plot capabilities.

Training needs include Drafting, WorkCenter, and AutoCAD.

Region 8 has NT 4.0 on all workstations and an NT 4.0 server with 8GB.

Region 8 is responsible for 600 buildings (owned and leased).

Region 8 has 5 licenses for WorkCenter 1.2 and plans to purchase 5 more<sup>F</sup>. WorkCenter will be installed for Space Planners, Planner/Estimators, and a few A/E's first.

All AutoCAD versions will be upgraded to version 14.

Region 8 does not have AutoDesk View or any other viewing software.

## PROPERTY DEVELOPMENT

Just as a description, they explained that Property Development is located in the regional office building and is solely a regional function.

They receive CAD deliverables from A/E contractors.

Some major projects have their own website. The websites contain construction photos and schedules. The sites have both a public section and a private section.

Central Office has suggested that VR models of courtrooms be generated in lieu of physical mock-ups. Judges currently prefer physical mock-ups.

Physical mock-ups cost approximately \$50,000 each, which is relatively insignificant compared to the over all project cost.

A/E's show videotaped samples of VR walkthroughs during the interview process.

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Project managers are interested in using a project web site for document review and comment distribution. They explained that distribution of hard copies was a time consuming task<sup>g</sup>.

They suggested combining the use of paper documents with electronic documents during the transition phase between paper and electronic media.

Project managers are not currently incorporating the national CAD deliverable standards. Solicitations only currently require the latest version of AutoCAD.

In the past, training was conducted months before the installation of the software on which it is based, rendering the training ineffective.

A comprehensive project management software package would be useful to manage all related documents<sup>h</sup> and construction photographs to ensure fast access to information critical to the project<sup>i</sup>.

Original construction photographs have value beyond the initial construction stage.

Projects can contain up to 60 boxes that must be archived; three times that number are collected throughout the project. A typical project will contain 20 boxes of material to be archived, most of which is correspondence.

They expressed interest in sharing documents on-line.

They expressed interest in video-streaming to dynamically convey on-site problems to individuals at remote locations.

Currently, the building manager may or may not have drawings for his/her building, for use by the GSA and contract A/E's.

For large projects, the A/E copies all historical data for use at the A/E's office.

Tenant agencies perform work on our buildings that GSA has no documentation of. A/E's must therefore always visit project sites and generally alter our documentation to match existing conditions. No "as-builts" exist for any building.

They suggested that mapping data is needed to relate a project to a city as well as for identifying probable locations for a project identified in a prospectus.

DENVER MEGACENTER

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Each alarm panel has over 100 alarm points that annunciate individually, however; the alarm monitoring software can only associate 12 graphics per alarm panel.

They are mostly interested in graphics that display the building exterior and access doors, and vicinity maps that show the route to the facility.

The MegaCenter is a multi-regional, consolidated control center tasked with monitoring entry, fire, and duress alarms. This is the first of four planned centers in the nation and will ultimately cover regions 7 through 10.

## PORTFOLIO MANAGEMENT

Lisa developed a GIS Masterplan application in ArcView<sup>l</sup> that contained planning studies, master plans, and environmental impact and preservation plan of the Denver Federal Center (DFC). They developed the application to serve as a day to-day tool.

GIS Application was designed to support the DFC Master Plan and contains building footprints, roads, natural features and photographs.

The GIS application was developed before STAR, and she developed a custom database with property information that is linked to ArcView. She has hopes that the application will ultimately be linked to STAR instead.

The GIS application has been used a little bit, primarily because the implementation of the master plan was delayed.

She feels that the GIS application has the most benefits for people in Field Offices and in the Service centers.

She had visions of this application tied to an F/M application<sup>k</sup>.

Currently, the system is installed on only one standalone computer.

She believes that the application may be useful to other Regions, but not to the same degree as one designed for a particular Federal Center or campus of federal building.

Portfolio managers and planners are always using various maps.

Currently, because of previous land usage, the DFC is on the verge of becoming a federal Superfund site. The master plan is used to indicate the location of monitoring sites and test borings.

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The application has potential to aid in resolving real estate and asset-management issues.

She expressed an interest in using ArcView to import facilities data and automatically generate asset business plans.

It seemed that this application would be perfect for use in a CAD/STAR interface pilot.

## BUSINESS DEVELOPMENT

Business development is involved in a myriad of different activities such as developing materials for IOS, managing groundbreaking and opening ceremonies, project management, sales and the MegaCenter broadcast.

The primary graphic technology used is Desktop publishing. They have Quark/X-Press (PC based), but contract out most of the work to service bureaus that use Macs. They are often involved in converting the deliverables from Mac to PC formats in house.

She has a great interest in collecting a **current** inventory of building photographs. Currently many of the photos are on paper and must be scanned; many are also out of date and she has to contract for pictures to be taken.

She wants digital photographs so that she can easily manipulate them.

Only one multimedia presentation has been created and that was for an IOS presentation. Most of this work was contracted out because of the lack of in house expertise.

Business development has an MOU with FTS for website development. The partnership with FTS was done to insure that the pages have a consistent look.

They would like to have digital versions of simplified<sup>l</sup> drawings for use in marketing vacant space. Interactive photographs would also be useful for this purpose.

Business development shares the responsibility of marketing space with the realty services group.

They have an interest in many forms of mapping data, however said that anything graphical would be utilized.

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## CONTRACTS

Contract division is not directly responsible for managing graphic material; most graphic uses come before them.

They want to put new solicitations on the Internet.

They expressed an interest in using a service bureau to distribute bid comments. They wanted to distribute electronic document and not have to deal with printing and shipping.

They will need a paper copy of all contract documents, but they also will need to inspect the digital versions as well.

They will need to sometimes insert the contract number on documents (paper and digital) prior to distribution.

They need to reference accurate drawings for managing service contracts. For example, they need to compute areas and count windows for cleaning services.

## FIELD OFFICES

They said they need to manage office “churn” with an F/M system.

They wanted an F/M system to be able to track areas of where carpet and asbestos was removed.

They are currently using TMA, but are looking at other packages such as Maximo and a Microsoft package.

In discussing enterprise level systems, they stressed how much of a success the ETAMS software was, and how complicated and unsuccessful STAR was. They felt that this was because that ETAMS was a highly focused application used for a single purpose, while STAR tried to be more general and all encompassing.

The Colorado Property Management Center (CPMC) consists of 6-7 people.

There is a T 1 line between the CPMC and the Regional Office, but it is not working yet<sup>M</sup>

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The expressed concerns over the compatibility of AutoCAD LT and AutoCAD 13 or 14.

They expressed an interest in using digital photography for construction progress, noting deficiencies and for maintenance management.

One of the planner/estimators stated that he had no need for "Planner/Estimator"<sup>TM</sup> software and that the new IDIQ contracts may make it obsolete.

They also were not interested in CAD material takeoffs that required extensive data entry.

They didn't know whiteboarding was possible, and that it would be useful for remote field offices. They did not see a great need for GIS applications.

## REPAIRS AND ALTERATIONS

The R&A function is distributed to the Service Centers.

R&A Reps from each service center meet and hash out priorities and recommend them to the directors who change and/or sign off on the projects.

They reference line items and descriptions in their meetings; they do not need drawings. Only the people in the service center need access to the drawings.

Almost no in-house design is done other than short sketch type of projects and change orders. All complex designs are contracted to an A/E.

The region has not done BER's recently because of lack of funds; however, there are enough projects in the pipeline for this not to be a problem. Expansion of BER development is uncertain, pending the justification needed by Central Office. In addition, limited funds prevent one from doing large-scale projects. Therefore, projects need to be managed over many fiscal years.

Everyone in the region can use quick access to accurate drawings. The region has accessible copies of drawings on Microfilm, but it often of poor quality. The original drawings are in storage at their local Records Center. It can take days or even weeks to retrieve documents from the Records Center.

He felt that digital photographs would be useful.

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He has seen many projects over the years, and has seen them fall into disuse primarily because people fail to keep the data/system up-to-date.

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<sup>A</sup> DOJ Assigns security levels to buildings. Ratings are from 1-5

<sup>B</sup> SEM reports are done every 5 years. They include Industrial hygiene related to a building.

<sup>C</sup> Used for facilities < 10Ksf. Most of R8's leased facilities are < 10ksf. Life Safety only reviews leases over 10Ksf.

<sup>D</sup> CAD Plus includes manufacturer specific symbols and data. CAD Plus may be used for quantity take-offs.

<sup>E</sup> Discussion with Joe Todd suggested that native raster formats be retained in addition to DXB and other vector formats.

<sup>F</sup> Discussion with Joe Todd suggested that version 1.3 be installed as soon as possible and, because of Motiva's take-over of WorkCenter, no new licenses be purchased. Rather, funds should be used to scan more drawings.

<sup>G</sup> Currently, A/E's send up to 25 sets of construction documents to project managers for distribution.

<sup>H</sup> Documents include requests for information, correspondence, change orders, invoices, and other non-graphic information.

<sup>I</sup> Thousands of issues come up during projects. Some become changes, others become claims. Being able to search and categorize documents electronically based on issues is superior to paper searches.

<sup>J</sup> The GIS application was developed inside of ArcView 2.0 using the ArcView programming language.

<sup>K</sup> While she stated "FM", the usage scenarios described were more akin to those found in a CMMS application.

<sup>L</sup> While simplified, the drawings need to be visually appealing.

<sup>M</sup> Regional Systems Staff indicated that the T1 line was not scheduled to be operational until mid Feb.

<sup>N</sup> Planner/Estimator is a GSA developed application that is founded on contract line items.