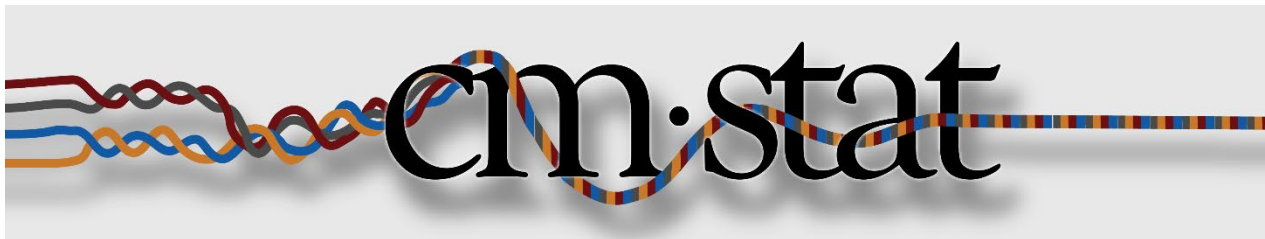


# Improving Program Profitability With Contract Deliverables Data Management Using CMstat's EPOCH DM Software

*A Best-in-Class Solution for Managing the  
Data Deliverables and Digital Threads of  
Performance-Based Contracts in the  
Aerospace & Defense Industry*



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## 1. Why the Management of Data Deliverables is Critical to Successful Contracts

It is rare to find a product or system that is designed, manufactured, delivered, and supported without an extensive set of legally binding contractual requirements, specifications, and agreements that must be met in order to obtain payment. The contract terms between the acquiring customer, whether it be a commercial entity or government agency, and the provider or contractor typically detail all the “deliverables.” These stipulations ensure the customer’s requirements at both the product and program levels will be satisfied.

For many manufacturing industries and their supply chains, the interim deliverables of documentation and supporting data developed during a program are just as important as the final product delivered or service work performed. It is not uncommon that the deliverable of data governs both progress payments and final payments to contractors, more so than the actual delivery of the physical product or system. The completeness, accuracy, efficiency, and timeliness in the management of these data deliverables can make or break the profitability of an OEM’s new product or an entire program for a prime contractor.

Contracts are increasingly performance-based, meaning that both financial incentives and penalties may be applied to delivery successes and failures, respectively. While contractors and subcontractors on government-funded programs have operated in this environment for decades, other industries and their supply chains are newly experiencing more performance-based contracting and costing. Examples include high-tech products in networked systems that are deployed, maintained, upgraded, and monitored in the field over many years of use, sometimes even without the delivery of physical products or hardware as evidence of contract milestones having been achieved.

In the U.S. aerospace and defense (A&D) industry, contract deliverables are typically spelled out as CDRLs and SDRLs—Contract Data Requirements Lists and Subcontract Data Requirements Lists respectively. CDRLs and SDRLs are the indispensable means of communication within the A&D contracting community. CDRLs and SDRLs span the lifecycles of products, projects, and programs from ideation onward through sustainment—often for decades—and are subject to many changes over time.

The sources of data for CDRL/SDRLs also span multiple organizations and typically originate in disparate, disconnected, systems of record that are inefficient and error prone. The failure to maintain tracking and visibility of CDRLs and SDRLs across all these organizations and their processes can result in delayed payment or even lead to the embarrassment of a litigated contract dispute for a missed delivery milestone.

### **Importance of Data Deliverables**

*Contract specified deliverables of data govern both progress payments and final payments to contractors—often more so than the actual delivery of the product.*

### **CDRLs and SDRLs**

CONTRACT DATA REQUIREMENTS LIST		DoD Form 1423 Contract Data Requirements List	
1. CONTRACT IDENTIFICATION		2. CONTRACT INFORMATION	
3. DATA REQUIREMENTS		4. DATA REQUIREMENTS	
5. DATA REQUIREMENTS		6. DATA REQUIREMENTS	
7. DATA REQUIREMENTS		8. DATA REQUIREMENTS	
9. DATA REQUIREMENTS		10. DATA REQUIREMENTS	
11. DATA REQUIREMENTS		12. DATA REQUIREMENTS	
13. DATA REQUIREMENTS		14. DATA REQUIREMENTS	
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93. DATA REQUIREMENTS		94. DATA REQUIREMENTS	
95. DATA REQUIREMENTS		96. DATA REQUIREMENTS	
97. DATA REQUIREMENTS		98. DATA REQUIREMENTS	
99. DATA REQUIREMENTS		100. DATA REQUIREMENTS	

Figure 1: CDRL DoD Form 1423

*CDRLs and SDRLs are comprised of detailed requirements specifying content, format, and means of transmittal to which data deliverables must conform in order to validate submissions of request for payments. There is little room for ambiguity, omissions, errors, or variances against the contract specifications.*

Many routine tasks are performed by program and contract managers using data prepared by others who may or may not reside within the project office. As example, CDRL and SDRL data may be produced from engineering services, procurement, quality assurance, and production units.

To manage the data deliverables process, many contractors rely on relatively low-tech approaches that use ad-hoc, manual processes. To produce documentation that ultimately validates their data submissions sometimes requires what can only be described as spreadsheet gymnastics.

The lack of standardization (let alone automation) in this function is ironic given that the contracts are often for high-tech programs that require millions of dollars of investment to win and then much more to deliver. This irony can be especially visible when the project and its data deliverables are sensitive, classified, or ITAR controlled.

Some contractors have attempted to solve their contract data deliverables problems with custom software “bolt-ons” to engineering-centric PLM or manufacturing-centric ERP solutions. More often than not these contractors found themselves enmeshed in long-term enterprise IT road maps—road maps intended to meet the technology needs of engineering and manufacturing users whose expectations often proved elusive, changing faster than IT deployment budgets could support.

When enterprise solutions fail to deliver, some contractors may try to develop “homegrown” software to manage their data deliverables. Rarely do these codes provide the functionality, usability, security, affordability, and elasticity over the long term to support the fluid lifecycles of multiple program contracts operating concurrently, each at a different stage of maturity.

For most contractors, a more nimble and cost-effective solution for deliverables data management is found in commercially available software—solutions that can be rapidly deployed and painlessly retired on a program-by-program basis as need arises and budgets are available. The application software solution market that provides these capabilities is called Contract Deliverables Data Management or “CDDM” for short.

The independent software provider CMstat is well known for its configuration management (CM) solution PDMPlus used across the A&D industry. PDMPlus is a best-of-class solution for performing nimble configuration management. In addition to standards-based automated maintenance of product data, PDMPlus manages the as-deployed and as-maintained configuration of long-life assets in the field, located and operated far downstream from the OEM’s original engineering CAD and PDM data vaults.

### **Data Deliverables**

*Unless otherwise noted, “deliverables” in this paper refers to data and documentation rather than physical products.*

### **Data Management Challenges**

*The challenges confronting program managers are real-time visibility and tracking of the status of all the data deliverables, schedules, and related workflow tasks, while maintaining an auditable history of all changes, notifications, correspondence, approvals, rejections, resubmissions, and final dispositions.*

### **CDDM vs. DM**

*CDDM is often referred to as just “DM” by data managers, especially in aerospace and defense, where it is understood that the term “data” relates to contract deliverables, and not product data, engineering data, or IT data.*

The first provider of a commercial-off-the-shelf (COTS) solution for CDDM was the U.S.-based firm CMstat. Founded in 1989, CMstat was started by engineers from the aviation industry to help A&D companies migrate their custom mainframe-based configuration management and data management codes to client-server architectures using rapidly deployable software based on industry standards and proven best practices.



*Figure 2: Abrams M1-A1 Battle Tank Manufactured by CMstat's Customer General Dynamics Land Systems*

EPOCH DM is CMstat's product offering for CDDM. EPOCH DM standardizes, automates, secures, and optimizes the data deliverables function by managing both data and processes in the context of their underlying programs, contracts, and projects. Key attributes of EPOCH DM include:

- EPOCH DM offers transparency and visibility to the complex relationships among all the many downstream data deliverables as well as to the original upstream information sources from which the deliverables are derived.
- Out-of-the-box, EPOCH DM provides templates, wizards, alerts, process automation guides, and other forms of built-in intelligence that make status reporting less onerous.
- EPOCH DM synchronizes workflow processes while providing physical and digital security for data deliverables, important in highly classified areas where failing to comply may constitute a breach of security.
- EPOCH DM has the extensibility and elasticity and to scale up or down to match a program's complexity, size, and maturity.

### **CMstat Customer Credentials**

*CMstat customers include aviation, marine, and aerospace contractors such as Northrop Grumman, U.S. Army, Boeing, L-3 Communications, Lockheed Martin, Fleetway, Irving Shipbuilding, Raytheon, and numerous other OEMs along with their subcontractors.*

*Programs where CMstat solutions are deployed include the Abrams Battle Tank (at left), B1-B Bomber, FAA STARS, and Target Missile Drone System, among others.*

### **EPOCH DM Benefits**

- *Increased accuracy, timeliness, traceability, and reliability of data deliverables*
- *Reduced labor costs from improved efficiency*
- *Adherence to industry standards and best practices*
- *Mitigate program execution risk from missed deliverables*

In this comprehensive whitepaper we will examine the as-is state of industry processes for managing contract data deliverables, identify opportunities for improvement, present the different strategy scenarios for realizing those improvements, and summarize the requirements for an effective CDDM solution.

Next we will overview the specific capabilities of CMstat's EPOCH DM product which make it a best-in-class solution for CDDM. Following this will be a customer use case documenting the business value the contractor derived from using EPOCH DM. These benefits include increasing the accuracy and reliability of deliverables, reducing manual labor costs, institutionalizing best practices, containing program execution risks, and improving final program profitability by winning bonus incentives and avoiding performance penalties.

Given these substantial benefits, the management of contract data deliverables is no longer a program administrative function and back-office expense to be endured. Instead, CDDM becomes a value-added organizational competency that can improve the bottom-line profitability from improved efficiencies that can amplify top-line revenues from the award of incentive performance bonuses.

### ***Value of CDDM Solutions***

*CDDM is a value-added organizational competency that improves bottom-line profitability and amplifies top-line revenues.*

## 2. Today's Challenging Environment for Contractors

In the aerospace & defense (A&D) business, there are fewer all-new big programs. This makes the efficient execution of a larger portfolio of smaller contracts more strategically important. Today's contract awards, large or small, now come with financial incentives as well as penalties for missed deliverables. It is not surprising that the performance risk of big and small contracts alike is being externalized and shared across the supply chain.

The pressures on contractors' program offices are also growing with ever-increasing complexity of requirements, products, processes, systems, and suppliers—all of which must be harmonized within compressed delivery cycles. In the A&D business environment, managing contract deliverables given all the inherent complexity can be just as challenging as producing the actual physical products or systems. These same challenges are now being experienced across industries other than A&D.

For contractors and suppliers in or outside of A&D, compliance with deliverables requirements has become the major hurdle to getting paid and ultimately ensuring a profit at the end of the program. To guarantee timely payments as a project progresses, tracking the status of every data deliverable and related tasks at each stage is a requirement. In turn, this means tracing each deliverable's history—its changes, reviews, approvals or rejections, and amendments. The challenge dramatically multiplies when deliverables from sub-contractors are rolled up as well.

### Challenges of the As-Is State

*Since compliance is mandatory, CDRLs and SDRLs are the indispensable elements of communication that enables contractors to effectively manage data deliverables.*

*Surprisingly, even in industries like A&D that produce such high-tech products, labor-intensive manual procedures are still used to gather, review, and reconcile the data reported by CDRLs and SDRLs.*

*Tracking any type of contract data-submittals and receipts for invoices—as an example—usually spans numerous disparate departments, disconnected databases, and ad-hoc workflows.*

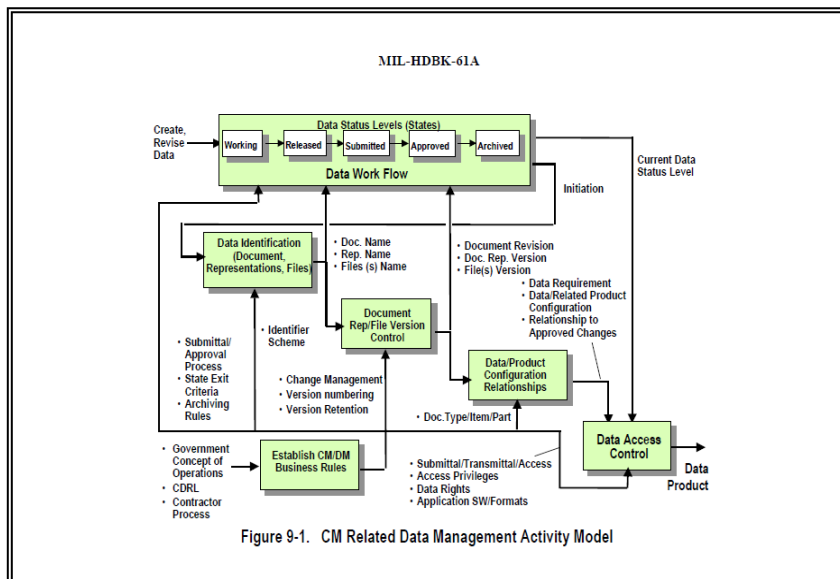


Figure 9-1. CM Related Data Management Activity Model

Figure 3: An example data management workflow from Mil-HDBK-61A

In A&D programs, Contract Data Requirements Lists and Subcontract Data Requirements Lists—CDRLs and SDRLs as previously noted—are defined then assigned by the customer to the contractor and its subcontractors. Large contracts may have hundreds of CDRLs or SDRLs

with each going into exhaustive detail on paper and in digital forms. Individual deliverables may run to dozens of pages with hundreds of boxes to be checked and fields to be completed.

Examining the contract data-handling processes in more depth reveals the nuances that can create great pain for data managers, program managers, contract managers, and eventually the chief financial officer. While the organizational tasks of producing and managing CDRLs and SDRLs may seem straightforward, they're anything but. Acquiring the data that is fed into CDRLs and SDRLs, and then managing the deliverables often for years afterward, is rarely easy. Among the reasons often cited:

- Not all departments have visibility into the intricate data requirements and predilections of each specific customer and contract.
- Impacts of changes to any of the contract data requirements, or their status, is difficult to track even if workflows have been standardized.
- Common datasets are usually poorly connected, non-relational, and not very intelligent; even though contract deliverables require that all the data's interwoven history be preserved.
- Inability to perform real-time forecasting when changes to schedules, scope of work, or subcontractor requirements are updated.

A contributing factor to the difficulty of these DM-related tasks is the sheer number of "interested parties" in the organizations of customers, contractors, and subcontractors who contribute to or use deliverables data, or have a stake in the final disposition. These interested parties include project, program, and contract managers as well as designers, manufacturing engineers, and quality assurance teams. Supporting them are a host of technical specialists responsible for change management, regulatory compliance, documentation, and customer delivery—plus the purchasing and finance teams of contractors, subcontractors, and customers.

As contract preparation begins, these interested parties become a fast growing community. Each group or function formulates its own data requirements which can expand almost daily. Unfortunately for managers of data deliverables, these parties usually meet their own needs for data management, often in extravagant spreadsheets running on insecure shared drives or off-premises in the cloud. For the data that eventually populates CDRLs and SDRLs, the many versions and revisions of these data records are rarely connected much less synchronized and may quickly become obsolete.

### **Data Deliverable Pains**

*In the many sources of information for contract data deliverables, key departments and their personnel, often have their own preferences and ad-hoc processes for saving, finding and sharing contract data items.*

*This data may be buried in reports, emails, meeting notes, engineering documentation, contract amendments, and invoice submissions.*

*It becomes a colossal, error-prone manual task for data managers to locate then review all the data to determine its timeliness, accuracy, and validity.*



CDRL submissions with contractor invoices, moreover, are just the starting point for getting paid. This is a highly iterative process with many feedback loops and multiple reviews that are, of course, largely manual. Every deliverable that falls victim to the any of the deficiencies at right will likely be late, incorrect, or missing required information.

Such errors can lead to submitting an incomplete CDRL or SDRL, which then results in an unpaid or disputed invoice. For example, the customer's procurement office may return the errant submission with comments or reject it outright. When that happens, all of the deliverables supporting data must then be researched, updated, annotated, and resubmitted.

There is a wealth of information in the details of these processes and communications—why the CDRL was returned and how the contractor handled the revisions, for example—that should be retained. This information includes:

- The date and time an object or item in a data deliverable was sent.
- Which version was sent, by whom, and to whom.
- How the data object or data item was sent and in what format.
- When it was received and by whom confirmed.
- Whether it was returned for updates and how those revisions were handled.

As reported in a previous CMstat paper “*Data Management Challenges of Aerospace & Defense*” as many as 80 percent of A&D industry suppliers lack a cohesive automated system to track, audit, and manage contract data deliverables. The business consequences often borne by these organizations include the following.

- Excess time spent in meetings and in e-mails to find, review and re-validate data.
- Frequent distractions to engineering staffs to check or verify questionable information in data deliverables.
- Increases in labor costs from manual, ad-hoc processes that are hard to repeat or scale.
- Slippage in schedules and a decline in internal confidence to satisfy customer requirements.
- Late payments or penalties that cut into the bottom line.

### ***Frequently Cited Data Deliverable Deficiencies***

*No linkage to a shared secure central repository of data.*

*Manual processes for updating schedules, tracking changes, and managing distribution.*

*Schedule changes require cascading updates of individual data deliveries.*

*Generating or refreshing delivery status reports takes days.*

*Poor visibility into data delivery workloads or resource requirements.*

*Notification reminders to authors and reviewers are a manual cut and paste e-mail task.*

*Histories of deliverables submissions is ambiguous.*

*Notifications have no linkage back to original data.*

*Inability to connect engineering and contract data.*

*Performance metrics reporting is an onerous, manual task.*

*Insufficient protection of required deliverable artifacts.*

*Inconsistent data visibility, marking, and control of ITAR or other sensitive data.*

*Limited metrics for reporting internal, sub-contractor and customer performance.*

*Scant information available to guide continuous process improvement.*

- Inability to identify inefficiencies and constraints to improve organizational performance
- A reputation for poor performance—or inability to defend good performance without supporting data—that can cause future competitive procurements to be lost.

According to the same CMstat paper, over 60 percent of the leading A&D organizations use a commercial software solution to gain control over their contract data and automate the deliverables management process. For these organizations, sound management of data deliverables does not just reduce risk and bottom-line cost. It can also become a competitive competency that increases top-line revenue and final profitability of a program contract.



### 3. Requirements of Contract Deliverables Data Management Solutions

When any new program commences, the data deliverables called for in CDRLs and SDRLs must first be defined, then acquired, and eventually archived and secured. Most government contracts have several hundred deliverables and large contracts may have thousands. They are scheduled throughout the life of the program and all of them are subject to ever-changing milestones.

To produce the relevant contract data items, project managers constantly sift through reports, internal and external correspondence, emails, meeting notes, contract requirements and amendments, supplier deliverables, drawings, invoices, engineering specifications, documentation, and even training manuals. In A&D, as in all contract-driven businesses, this is a great drain on management time and energy.

As work on a program contract progresses, data items are continuously generated and refreshed, then shared with many interested parties and job functions throughout the organization. As time passes, merely tracking down the ownership, status, and disposition of all these data items is increasingly difficult. Yet, a bigger challenge is that the lifecycle of perhaps thousands of data items is very dynamic if not at times disorderly. They are copied, revised, reviewed, and handed-off. Among dozens of job functions, data items are stored in redundant and not-always-obvious locations, in multiple formats, versions, and revisions.

This finally all converges upon the data manager's desk as a massive task: the collection and validation of every item of data for completeness, accuracy, and timeliness. The process is shown below.

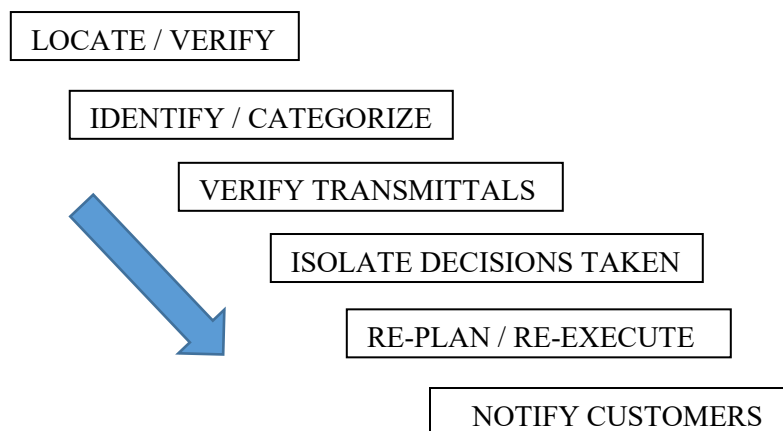


Figure 4: Example Data Management Workflow

#### **The Data Deliverables Process**

*Locate the correct deliverables data in its correct version with history attached.*

*Identify any incorrect data or outdated versions.*

*Verify transmittals between contractors and customer, and from sub-contractors to primes, with auditable history preserved.*

*Segregate decisions taken, or work underway, that is based on faulty data and assess impacts*

*Re-plan and re-execute any work needing to be repeated due to use of incorrect data.*

*Notify internal users or external customers of schedule changes, cost irregularities, or project delays.*

These high-level process requirements may at first appear to consist of a few simple steps, but they become difficult as projects and programs proceed. Each of the workflow steps grows more complex whenever data is stored in a new format, new method, new application or new system. Because each step increases the chances for miscommunication that can introduce errors or overlook changes, understanding transmittals and handoffs is an essential requirement of contract data management.

These challenges are felt by finance directors, too, not just project and program managers. The finance team will often have the following questions as they review or audit contract performance.

- How many attempts were made before a data deliverable was accepted by the customer?
- What were the reasons for the resubmissions: internal or external?
- Which subcontractors consistently deliver quality data on time, the first time, and which ones do not?
- What percentage of our deliveries satisfy internal quality assurance procedures but still did not meet the customer's stated contractual requirements?
- Did we ensure ITAR, controlled goods, IP and other sensitive data were protected during the deliverables process?
- Did we earn incentive bonuses or receive any penalties, and why or why not?
- What is the average cost of a late deliverable or re-submission, per customer or contract?
- In the past year, how much did late deliverables cost our program office?
- How can we continuously improve our processes and systems to do better while reducing cost?

At first appearance, it would seem reasonable that answering these questions should be possible with enterprise software solutions such as Project Management (PM), Enterprise Resource Planning (ERP), Supply Chain Management (SCM), or Product Lifecycle Management (PLM). Unfortunately, most contract data is neither native to nor centric to these solutions; deliverables data may merely pass through them at one time or the other. This means little explicit capability can be provided from these solution domains for contract deliverables data management. When data managers drill down to the exacting functionality needed to satisfy each requirement, the shortcomings and difficulties of enterprise solutions become more obvious.

### ***Enterprise PLM Solutions Support of CDDM***

*Many PLM solutions that claim to offer data deliverables management features only offer a bare-bones capability to capture data items, such as date due and date accepted, for populating a Department of Defense (DoD) Form 1423 Contract Data Requirements List.*

*The rest of the data management process is ignored or, worse yet, forces upon users a naive, hard-wired process that fails to support true data management, much less provide the flexibility to account for the unique needs of each contract.*

Project and program managers who are responsible for data deliverables seek improvements that include the following:

- Dashboards for real-time visibility into the deliverables process per contract.
- On-demand reporting customized to the organization's preferences.
- Easy to access and use web-based software accessible from anywhere that is intuitive for occasional users.
- A single application to manage incoming and outgoing deliverables which eliminates duplicate records and multiple repositories of contract data.
- The ability to capture each deliverable's entire data set, its status, and history including all submittals, receipts, and resubmittals.
- Milestone-based delivery scheduling.
- Performance metrics reporting that is customizable for each site or contract.
- Automatic cascading of updates and email notification of schedule changes.
- Minimizing extraneous communications, iterations, and corrections to isolate, verify, and release approved data to users, partners, customers, and other interested parties.
- Using intelligent relational data formats, vs. flat files, with a drill-down capability for history.
- Flexible workflows that can be user-defined and user-managed.
- Built-in support of industry best practices, standards, and regulatory compliance.
- Secure data repository and vaulting.

The best Contract Deliverables Data Management solutions address these desired improvements by first standardizing, then automating, next securing, and finally optimizing the data deliverables process to improve contractor financial performance. These fundamental requirements are summarized at right.

Each of these core requirements cascades into a set of functionalities that can be nearly impossible to satisfy without a solution focused on CDDM. A number of approaches have been used over the years to meet these requirements. They will be examined next in Section 4, "Strategy Scenarios for CDDM Solutions."

### **Core Requirements of any Effective CDDM Solution**

- ✓ *Collect, maintain, and secure all contract data deliverables along with their history so that they can be tracked, accessed, verified, audited, and shared upon demand.*
- ✓ *Provide real-time visibility to monitor the status of upcoming deliverables and document the transmittal of data deliverables presented to the customer in contract- specified formats.*
- ✓ *Capture performance trends and metrics of internal departments, external sub-contractors, and customer generated deliverables.*
- ✓ *Support the specific role-based needs of the Program Manager, Contract Manager, Data Manager, and Data Clerk.*

## 4. Strategy Scenarios for CDDM Solutions

It is not surprising that the automation of the contract data deliverables process has received little attention or investment over the years. Historically, some contractor executives often felt that deliverables data management was an inescapable cost center largely unrelated to producing products, profits, and happy customers.

These executives thought it reasonable to ask, given limited investment dollars, why spend on what was mistakenly appears to be a back-office function? They may have thought that compared to other IT investments, such as those which support product development or expand manufacturing capacity, the management of soft data deliverables likely offered a marginal return on investment.

The advent of performance-based contracting changed this mindset by adding a new dimension to contracting—the opportunity to earn incentive bonus revenue rewards based on meeting carefully specified deliverables requirements.

Once a decision is made that the status quo is no longer acceptable—and hoping for the best is deemed not to be a scalable business strategy—there are four basic software scenarios for improving the contract deliverables data management process. These are: extending enterprise solutions, customizing point solutions, developing homegrown applications, and acquiring best-in-class commercial-off-the-shelf (COTS) solutions.

At the enterprise-level, solutions for PLM, ERP, and SCM could conceivably provide the core CDDM functionality outlined in Section 3. The focus of PLM, ERP, and SCM implementations, however, is on the needs of their primary users. These users and their needs are in product development for PLM, bills of materials and financial management of manufacturing in ERP, and support of the supply chain in SCM.

Developers of these enterprise solutions have historically shown little interest for adding on CDDM modules to their existing solutions or developing new DM applications that can be integrated into their solutions. As a result, any functionality offered for contract data deliverables is typically limited to DoD Form 1423-type documents and generic workflow templates.

Adding site-customized CDDM functionality to these enterprise solutions also has fundamental difficulties. Customizations are generally pushed to the end of the deployment when all too often both budget and patience are exhausted. Even when resources are available, attempts to force-fit or extend a standard PLM or ERP solution almost always falter. The big reason is the arduous learning curves for IT departments and their consultants when they encounter CDDM requirements and processes for the first time.

### **Four Common Scenarios for Acquiring CDDM**

- *Extending existing enterprise solutions such as PLM or ERP.*
- *Customizing departmental point solutions such as Project Planning (PM) or Requirements Planning (RM).*
- *Developing homegrown software.*
- *Acquiring best-in-class commercial-off-the-shelf (COTS) solutions.*

### **Why Not Use Enterprise Solutions?**

*Attempts to force-fit or extend a standard enterprise solution to accommodate CDDM almost always falter. The big reason is the arduous learning curve for IT consultants when they encounter CDDM requirements and standards for the first time.*

Extending or customizing department point solutions like Project Management (PM) and Requirements Management (RM) may be the next option to evaluate. Often these lack the extensibility to capture best practices and implement industry standards for data management. Maintaining and enhancing these extensions is often held hostage to the release schedule of the underlying software solution. Then there is the question of who owns the solution and who has responsibility for maintenance and updates. The risk of premature obsolescence occurs frequently as providers force their customers onto an endless route of new licensing schemes or delivery platforms.

The consideration of developing a “homegrown” solution from scratch may often come next. Homegrown software entails costly development and frequent scope creep that may still fail to deliver what users require. Even worse, these homegrown tools can quickly become unsustainable “legacies” if their authors leave the organization or retire. Ongoing maintenance and support may become burdens borne by user departments. Most organizations now resist the temptation to distract the focus of their technical staffs on creating applications that are not mission critical to the actual product or system being developed and delivered by the contractor.

Sooner or later most contractors evaluate the use of a rapidly deployable commercial-off-the-shelf solution for CDDM. Sadly for some contractors, this step comes only after trying everything else with limited success. There are numerous benefits to the use of COTS solution as evidenced by the overwhelming preference in recent years of manufacturers to buy versus make.

In the following sections we will introduce the first COTS solution for CDDM, EPOCH DM, and explore its capabilities as employed by numerous A&D contractors.

### ***Benefits of a Best-in-Class COTS Approach***

- *Lower cost and faster deployment time.*
- *Fewer internal resources required to implement.*
- *Features, functionality, and performance built-in by experts.*
- *External support and maintenance avoids dilution of staff attention.*
- *Industry standards and best practices incorporated from a much large user community.*

## 5. Introducing CMstat and EPOCH DM

CMstat ([www.cmstat.com](http://www.cmstat.com)) is an independent software vendor (ISV) that has been successful because of its undivided attention to producing best-in-class industry-specific solutions for just two principal markets: Configuration Management (CM) and Contract Deliverables Data Management (CDDM). Thanks to this concentrated market focus, and even though it is a relatively small company, CMstat's footprint in the industries it serves is disproportionately large compared to its size.

CMstat was founded in 1989 to help the A&D industry migrate away from custom CM software to commercial-off-the-shelf solutions that are rapidly deployable. Prior to CMstat, CM software ran only on mainframe computers. CMstat began delivering CM tools based on client-server architectures. The company was the first provider of COTS solutions for both CM and CDDM.

CMstat is employee owned; management and employees acquired the company from a group of technology investors in 2002. CMstat's corporate parent is TPT Technologies, Inc., based in Nevada, USA. Employee ownership has allowed the company to remain focused on meeting the exacting needs of its targeted industries and customer base instead of chasing ever-broader markets to generate profits for outside investors.

The company has been rewarded by its focus on CM and CDDM solutions that can be used in aviation, aerospace, defense, marine, industrial equipment, and high-tech/electronics industries. All these industries perform work on big-dollar, performance-based contracts with demanding terms, bonuses, and penalties where the performance of their delivery processes is critical.

CMstat's solution for CDDM is EPOCH DM. A native web-based application, it was developed from the ground up to comply with A&D data-management standards and workflows. EPOCH DM was needed because CMstat customers—government agencies as well as private-sector prime contractors—desired much more information and automation than manually creating and tracking CDRLs and SRDLs could ever provide.

EPOCH DM's market-place acceptance has been fueled by the incessant demands for contractor-provided data by government agencies, private-sector OEMs, and prime contractors. In complying with these demands, the automation of the CDDM function has proven highly preferable to manually gathering, verifying, and tracking all the many sources of information and data specified in the typical contracts.

### **CMstat Focus on Standards**

*CMstat has been successful in the A&D industry because its software was originally developed by engineers from that same industry who possessed expert knowledge, not only in configuration management and data management, but also in the relevant military and industry standards. These standards include:*

- MIL-STD-973
- SAE/EIA-649
- EIA-836
- ANSI/EIA-859



As just one example, any given government contract may have several hundred deliverables scheduled throughout the life of the contract with all of them subject to ever-changing program milestones. Not only are these deliverables legal, contractual requirements that must be fulfilled prior to receiving payment, but this data is a hidden treasure trove of information about how well a contractor and its suppliers are performing.

Many of these deliverables are recurring deliveries that include: monthly status reports, quarterly financial reports, meeting minutes, technical documentation, performance data, product baselines, software releases, revisions of management project plans, and even updates to the deliverables schedule itself. Multiply this by the numerous iterations it often takes to achieve customer acceptance of these deliveries, coupled with maintaining relational history of transmittal for each distributed document or data set, the effort to track and audit becomes ungainly.

Out of the box, EPOCH DM has all the essential tools for effectively managing those data deliverables—every data item and object that feeds into these deliverables, regardless of the broadness or granularity of each item's and object's definition. These items and objects include contract fundamentals (program management plans, for example) and product-related information such as design files, specifications, bills of materials, production instructions, process information, service manuals, engineering notices, and much more.

EPOCH DM offers comprehensive rules-based, pre-programmed data relationships and process flows. Managers have the ability to define, schedule, track, review, and process data deliverables. EPOCH DM's integrated Business Process Management (BPM) module automates and supports the workflows in data management processes. Dashboards and reports provide real-time visibility into the status, performance, and history of data deliverables to ensure on-time and accurate submittals and receipts.

While program managers, data managers, and contract personnel have different roles and requirements, all can benefit from a standards-based and industry-focused COTS CDDM solution like EPOCH DM. Most importantly for users and managers in CDDM operations, EPOCH DM is implemented without site-dependent customizing or reconfiguring to provide all the basic CDDM functionality most users require.

In the next section we will examine the unique capabilities of EPOCH DM which make it a best-in-class if not only-in-class solution for CDDM.

### **CMstat EPOCH DM Users**

*Program managers, data managers, and contract personnel have different roles and user requirements, but all can benefit from a standards-based and industry-focused CDDM solution like EPOCH DM.*

## 6. EPOCH DM Capabilities

In EPOCH DM, CMstat offers the deep functionality, rapid usability, and data integrity required by routine users—who may be authors, reviewers, recipients, and auditors of contract data deliverables—along with other staff members who from time to time may touch or distribute these deliverables.

In the following segments we explore the top functions and features of EPOCH DM which undergo evaluation by prospective users to ensure the desired benefits from CDDM are attained.

### EPOCH DM is Standards Based

EPOCH DM complies with all the relevant A&D standards, most importantly the ANSI/EIA-859 Enterprise Data Management Standard. This compliance ensures full lifecycle support for every contract data deliverable and for the numerous cross-referenced relationships among these deliverables. All of the governing principles and best practices of ANSI/EIA-859 are addressed within EPOCH DM, as detailed at the right.

CMstat personnel participate in and support the organizations and committees responsible for developing standards and educating industry in their use. These organizations include the Association for Configuration and Data Management (ACDM), CMPIC, CMII, and SAE International, the association of aerospace and automotive engineers.

### Contract Data Types and Objects

EPOCH DM manages not only traditional CDRLs and SDRLs but also any type of data deliverable over the product or program lifecycle. The primary data objects are: DM Records, Contract Records, and Document Records. DM Records may include: tasks, CDRLs, SDRLs, and user-defined delivery types. Contract Records link to the appropriate DM record and maintain prime-sub relationships. Document Records house the deliverable data that are linked to DM records with revision tracking and auditable history preserved.

EPOCH DM also manages program-related data such as schedules, events, status, contract milestones, amendments, requirements, project plans, action items, data item descriptions (DIDs), submittals, distribution lists, data flags with their sensitivity, and contacts at the project, contract, or program level. User-defined attributes associated with these data types is also managed out-of-the-box and without customization.

### **EPOCH DM Support of Standards Includes:**

- *Planning for, acquiring, and providing data that is responsive to customer requirements.*
- *Developing data management processes to fit the context and business environment in which they will be performed.*
- *Identifying data products and views so that their requirements and attributes can be controlled.*
- *Controlling data, repositories, data products, data views, and metadata using approved change control processes.*
- *Establishing and maintaining an identification process for intellectual property, proprietary data, and competition-sensitive information.*
- *Retaining data commensurate with its value to the organization.*
- *Continuously improving data management processes.*

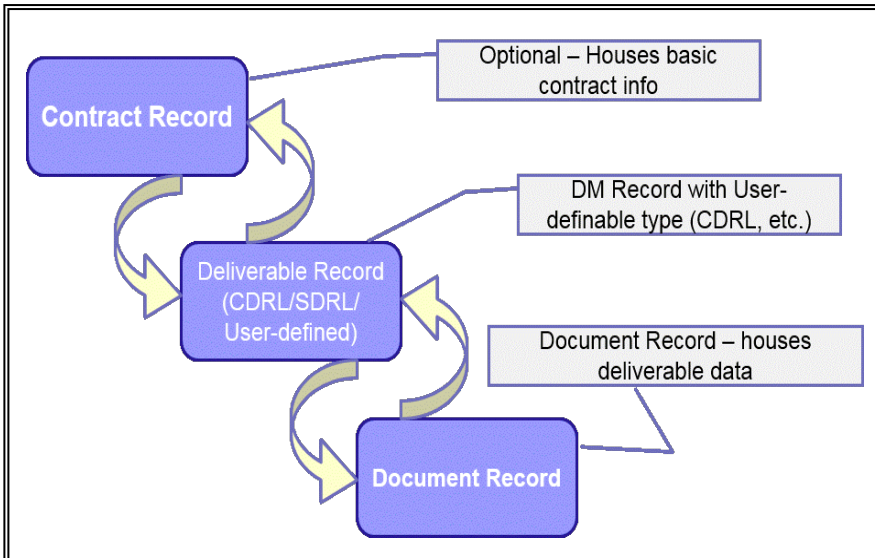


Figure 5: Object types managed in EPOCH DM

### Relationships Management

EPOCH DM offers a comprehensive rules base and pre-programmed data relationship model that provides data managers with the ability to define, schedule, assign, track, review, process, and approve deliverables. This ensures on-time submittals and accurate deliveries and receipts. EPOCH DM manages the interdependent relationships among all data deliverables. These connections include: relationships between prime- and sub-contracts; contracts and legal documentation; contracts and DM Records (CDRLs/SDRLs); DM Records and Data Item Descriptions (DIDs); data records that are dependent on a common contract, program, customer, or line of business; and milestones along with all dependent events on milestones.

The relationships between these objects can be managed at the contract level, subcontract level, project level, and user task levels. Managing relationships digitally with EPOCH DM spares users the need to scour files or disconnected databases for information. Users no longer have to manually correlate what they find and massage information into coherent data deliverables. With these error-prone manual tasks minimized, more accurate and complete work products can be submitted for payment sooner.

### **Any Type of Data Can Be Managed With EPOCH DM**

*EPOCH DM manages not only traditional CDRLs and SDRLs but any type of data deliverable over the product or program lifecycle.*

*Primary objects include DM Records, Contract Records, and Document Records. DM Records may include tasks, CDRLs, and SDRLs, as well as user-defined types of deliverables.*

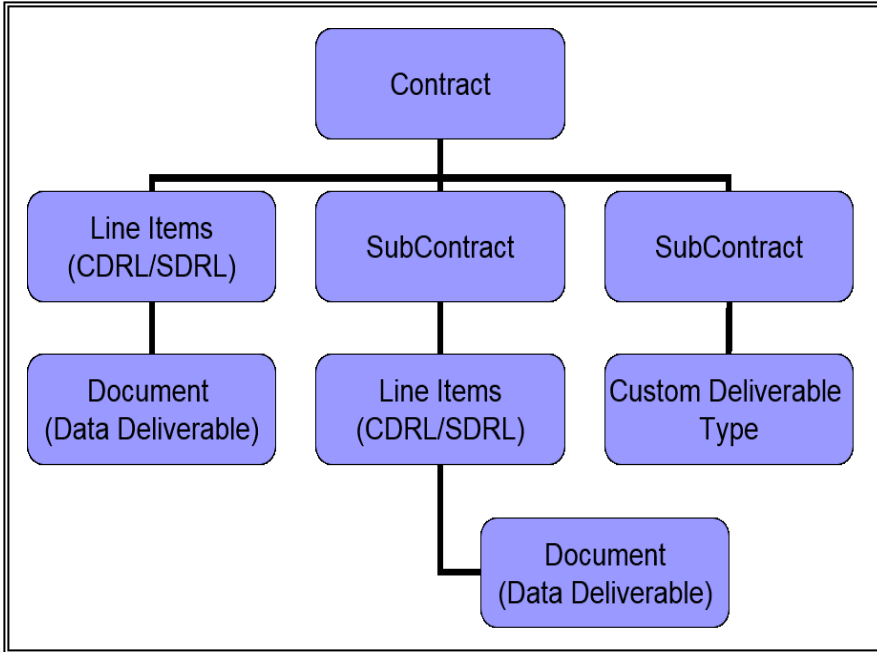


Figure 6: Relationships of contract artifacts

### **Managing Relationships in EPOCH DM**

*Managing relationships digitally with EPOCH DM spares users the need to scour files and separate databases for information. Users no longer have to manually correlate what they find and massage information into coherent data deliverables. More accurate and complete work products can be submitted for payment with history of relationships preserved should a resubmission be needed.*

### **Business Process Workflows**

The historic challenge with automating contract data processes has been to ensure real-time visibility into the status of deliverables with traceability preserved through the routing, submission and acceptance steps. While many companies use e-mail notifications for routing, e-mail offers little on-demand visibility into the actual status of a transmittal.

Creating an automated and reviewable process in EPOCH DM is straightforward for users and administrators alike: identify the roles and tasks (nodes), identify the order in which they are to be handled along with any conditional instances, and identify the timeframe for completion of each task and delivery.

EPOCH DM offers an embedded integrated Business Process Management (BPM) capability. This module supports any associated complex process, whether the intent is full or partial automation as may be most appropriate. BPM dashboards and reports provide real-time visibility into the status, performance, and history of data deliverables.

EPOCH DM's BPM automates and controls the site-specific workflow processes associated with CDDM including data reviews, routing, gathering, task automation, and more. Core capabilities include drag-and-drop creation of templates; ticklers, timers and priority escalation alerts with e-mail notifications; scheduling (both relative and absolute); and closed-loop process automation for all of these tasks.

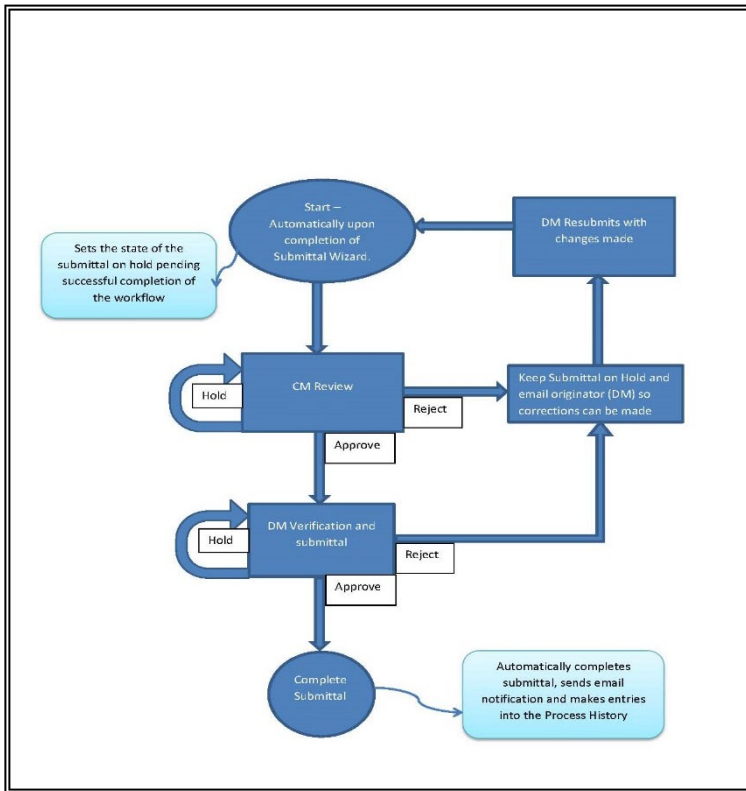


Figure 7: Example workflow in EPOCH DM

## Tracking of Deliverables

Tracking within EPOCH DM is far more than just accounting for CDRLs and SDRLs. The tracking task involves also knowing what's happening upstream within each data deliverable that populates a CDRL downstream. EPOCH DM keeps managers and users informed about each data deliverable due date, pending schedule adjustments, and revisions of contract milestones.

Streamlining and tracking can be fully or partially automated. Intelligent rules-based functionality streamlines the submittal-and-receipt tracking processes for data deliverables. Flexible search capabilities, custom reporting, and data export aid data managers in gaining quick access to information needed to perform their day-to-day tasks. Roles-based access to data and ease of navigation and export ensure that users can access process details needed to fully account for the status of data throughout the lifecycle.

## Reporting & Dashboards

An essential capability in any CDDM solution is its reporting functionality. CMstat believes that users should have full access to all of the data at any time. EPOCH DM offers pre-configured reporting tools that can access fields in any database, including data stored in legacy systems.

## EPOCH DM's BPM

*EPOCH DM's BPM not only ensures process flows are completed, but are done so in a timely manner with complete visibility.*

*For example, combined with EPOCH DM's multi-directional process management methodology, BPM also allows users to manage outgoing deliverables to customers, primes, or regulatory authorities and incoming deliverables from internal departments, sub-contractors, and regulatory receipts.*

## Tracking Is More Than CDRLs

*Tracking in a true CDDM solution is far more than just accounting for CDRLs. The test of tracking is knowing what's happening upstream within each data deliverable that populates a CDRL downstream.*

Standard reports are provided within EPOCH DM including 30/60/90-day forecasts, 3-month scorecards, and active contracts. Custom reports can be produced in the JRXML format (from Jasper Reports, an open-source Java reporting tool in the Extensible Markup Language) to include any field in the database. Example custom reports include those created to analyze metrics and produce recurring status updates. Data in all grids throughout the tool can be exported directly to MS-Excel spreadsheets.

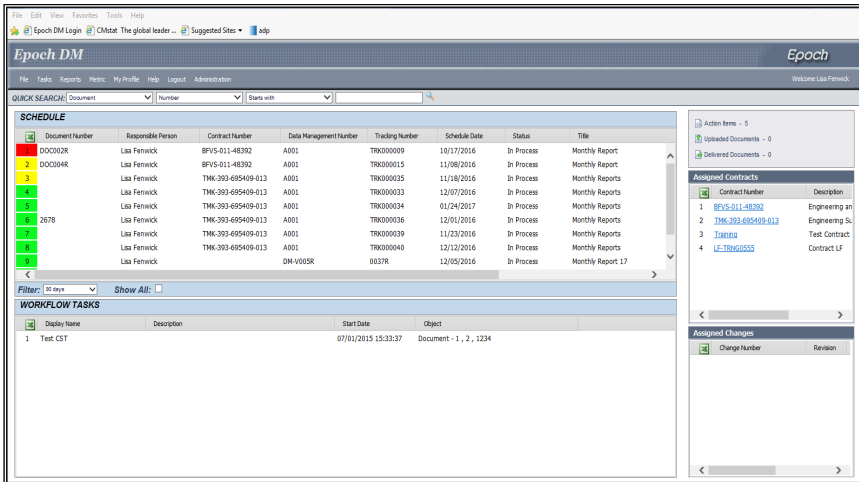


Figure 8: A user's dashboard view from EPOCH DM

## Rapid Usability

To facilitate ease of use, even among occasional users, EPOCH DM has built-in primers covering Data Management basics as well as the specifics of data currency and veracity. The many workflows, business processes, and feedback loops needed to build data relationships and deliverables are clearly defined.

Data wizards, data item descriptions, and contract-specific templates for versions and revisions guide users through the intricacies of deliverables. Users also benefit from data-entry aids such as look-up tables and drop-down menus. EPOCH DM offers easy searching of document records, file locations, file distributions, e-mail addresses, and more.

EPOCH DM's rapid usability is made possible by the close attention to process-oriented user interfaces (UIs) for desktops, notebooks, and mobile devices. EPOCH provides a secure web portal that streamlines submittal and receipt processes. The portal allows external users—customers, contractors, primes, subs, and others—to have their own simplified view with secure access for retrieving and uploading documents.

## EPOCH DM Dashboards

*EPOCH DM empowers managers and other users to stay on top of the deliverables process with role-based dashboards. The EPOCH DM Project Manager's dashboard provides a quick configurable view of deliverables status and custom reports that offer metrics and trend analysis of past or present deliverables processes. Capable of reconfigurable real-time views, these dashboards track the status, transmittal, and receipt of each data deliverable, and can quickly analyze emerging trends.*

To keep users productive even in the most rapidly changing programs and projects, EPOCH DM's UIs are tailorable and configurable. Language support for English, French, and Spanish is provided for out-of-the-box. With the help of CMstat, additional languages can be supported.

### **Secure Data Vaulting**

Throughout the A&D industry, as well as in many other competitive performance-based environments, physical and digital security is a paramount concern at both the proprietary commercial and national security levels.

EPOCH DM's architecture and its web browser-enabled implementation are significantly tighter and thus safer than most general-purpose data handlers. EPOCH DM provides secure data vaulting for all data and documents in any file format with built-in integrity protections. The vault supports references to physical documents, contract artifacts, faxed certifications, and more. Multiple distributed vaults can be set up, each with separate security specifications.

EPOCH DM highlights and controls access to restricted goods and classified information designated by DoD agencies, Homeland Security, and the U.S. International Traffic in Arms Regulations (ITAR). EPOCH DM goes a step further by allowing users to specify which countries are restricted from seeing any ITAR data and blocking access for users whose countries of origin are included in that list.

EPOCH DM also monitors and controls access to contractor intellectual property and competitively sensitive data by providing the ability to flag sensitive data so users are aware of the nature of the information they are handling.

### **Interoperability and Integration**

EPOCH DM can be deployed as an integrated system for all of the enterprise to access or as a standalone solution for a single program or contract. In EPOCH DM, data connectivity is provided by a digital backbone—a “data spine” that facilitates organizing, validating, securing, and sharing information. EPOCH DM's data sharing templates span numerous platforms and applications. The data spine is accessible from any of the templates and, with the BPM workflow module, from any physical location. As noted, the BPM module controls all processes in managing and approving CDRLs, SDRLs, and invoices.

In the absence of custom integrations, ease of connectivity is assured through EPOCH DM's architecture and BPM sub-routines. These sub-routines define how customers, prime contractors, subcontractors, and business partners relate to one another in a digital environment. Moreover, the data spine facilitates sub-routine workflow integration with enterprise solutions for PLM and ERP. For example, milestone schedules from

### **Controlling Data Access**

- *A tightly managed web browser-enabled architecture.*
- *Secure data vaulting for any data in any format.*
- *Highlighting alerts to users accessing data that comes under restrictions for national defense, Homeland Security policies, and ITAR.*
- *Controlled access to contractor IP and competitively sensitive goods and data.*

### **Over 250 2D/3D File Formats Supported in EPOCH DM**

*The EPOCH DM viewer supports over 250 different 2D/3D file formats so that users who must review technical documentation will have the tools and views they need to perform their jobs.*

Integrated Master Schedules (IMS) can be uploaded into EPOCH DM from project management tools such as MS Project or Primavera. Secure, browser-accessed user portals upload and retrieve any CDRL and SDRL data on contractor and customer intranets. Indispensable for collaborating and gaining consensus on documents and data presentations, these web interfaces can be configured to each user's processes and tasks.

For full EPOCH DM functionality a live connection to the Internet is not necessary. Software updates may be performed by the customers' IT department without the necessity of allowing remote access services work performed by external consultants. Customers use their hardware, their servers, and their networks, and their personnel resulting in secure control and distribution of their data.

### **Configurability and Maintainability**

EPOCH DM's configurability and extensibility make it easy to use, tailor, upgrade, and maintain without consuming internal or external IT resources. As an example, EPOCH DM administrators and super-users can tailor the application to the contract dependent roles and tasks of each user and manager class with no programming required.

Items that can be tailored in this way include:

- Setting up customized field titles.
- Editing e-mail notification templates.
- Defining dropdown values such as contract types and deliverable record types.
- Setting block numbering.
- Adding program or project headings.
- Adding user-defined attributes to standard record types.
- Creating and administering user accounts.
- Managing user access permissions by project and program, by record types, and by vaults.
- Importing milestones from MS Project, Primavera, etc.
- Custom report creation.

EPOCH DM's architecture ensures quick and easy software upgrades by users that typically take less than a day.

### **Ease of Deployment**

EPOCH DM as a best-in-class application is easy to deploy and easy to roll out to users. As a validation of this, CMstat is a rare software provider that is so sure of its products that it offers firm fixed-priced and fixed-schedule implementations.

### ***Ease of Configuration***

*Administrators and super-users can tailor the application to the contract dependent roles and tasks of each user and manager class with no programming required.*

### ***Guaranteed Implementations***

*CMstat is a rare software provider that is so sure of its products that it offers firm fixed-priced and fixed-schedule implementations.*



The deployment plan is defined by ten best-practice steps: site survey, requirements analysis, planning, implementation, training, data migration, integration, process optimization, user support, and continuous improvement.

CMstat personnel walk new users through the implementation processes including the site survey, training for non-technical administrators, basic user training, and (if desired) data migration training. CMstat deployment methodologies minimize the amount of time required by customer staff members. As an example, the initial installation is generally a half-day task. As EPOCH DM is a COTS program, the software update process is straightforward as a one- to two-hour task.

It is estimated that ninety percent of EPOCH DM system administration and tailoring tasks can be performed by a data manager without deep IT expertise. Neither support nor programming help from the IT/MIS organization is normally required.

### **Software Licensing and Support**

EPOCH DM and its modules are licensed in several convenient forms. Server Licenses (SL) are available as a one-time purchase that supplies all the basic modules necessary for out-of-the box operation. User Access Licenses (UAL) may either be concurrent or floating type licenses with vault capability. The BPM module is licensed per co-processor. Absent very large data loads, a single BPM license should suffice. The Collaborative Document Viewer (CDV) is also a concurrent access license. The CDV allows users to view documents stored in the EPOCH DM document vaults.

Annual Support & Maintenance (ASM) may be purchased annually by individual license or an entire site. ASM includes telephone support within North American business hours, web meeting technical support, and product documentation downloads in PDF format. Support outside of normal business hours and 24/7 support of critical programs are also available. New software releases through ASM are provided approximately every 12 months.

As an additional service, CMstat offers password-protected access to the EPOCH DM technical support site. The site allows users to post problem reports and check the status of pending resolutions.

### **System Requirements**

CMstat appreciates that many contractors, especially on DoD programs, must run a large range of current and older computing platforms to support product lines and sustainment contracts that may run many years. EPOCH DM uses the Oracle Standard Edition or Microsoft SQL Server database software. The database server can be hosted on any Windows and UNIX hardware platform that supports Oracle 9i and above or MS SQL Server 2012 and above.

### ***The Ten Steps of Deployment***

1. *Site Survey*
2. *Requirements Analysis*
3. *Planning*
4. *Implementation*
5. *User and Admin Training*
6. *Data Migration*
7. *Integration*
8. *Process Optimization*
9. *On-going User Support*
10. *Continuous Improvement*

Both Oracle and SQL Server support the use of triggers to further automate the data exchange between systems. The EPOCH DM server runs MS-Windows operating systems and the IIS 7 version is recommended. The server currently supports Windows 2003 and above.

Suggested minimum system requirements are a dual-core Intel CPU 2.0 Ghz+ MHz; RAM 3 gigabytes (GB) of available RAM and on the hard disk and 1 GB of free disk space. Clients require a MS Windows operating system 2003/2008 with all service packs and Microsoft IIS 6.

All other required software is supplied on the installation download. This includes Java SDK, Apache Tomcat, Apache Jakarta Connector (the ISAPI Redirector), and the EPOCH Application Server. The Advanced BPM workflow server and the eReview server are optional.

## 7. An EPOCH DM Customer Use Profile

Fleetway, Inc., a subsidiary of Irving Shipyards Canada, is a provider of a comprehensive array of engineering, technical, and management services to commercial and government customers in the shipbuilding, marine, and energy industries. Fleetway first implemented the CMstat Configuration Management solution—which eventually evolved into PDMPlus—to support the configuration management needs of its in-service contract for the Canadian Navy Frigate fleet.



Figure 9: A Canadian Navy Frigate

After evaluating various IT strategies and software solutions to meet their contract deliverables data management needs, Fleetway selected CMstat's EPOCH DM. The deep CDDM-focused functionality, flexibility, and low cost of deployment with EPOCH DM were cited as important issues. Additional criteria in Fleetway's selection process are itemized at right.

During the implementation, Fleetway quickly realized that the capabilities of EPOCH DM rendered unnecessary many of their existing disconnected processes and tools to track contract deliverables. By eliminating redundant applications and consolidating those functions into a single application, EPOCH DM, Fleetway optimized its processes, reduced costs, and pared back IT overhead.

EPOCH DM's flexibility provided extensive tailoring to fit the customers' business model hierarchy and process needs. Exploiting this flexibility, Fleetway expanded traditional CDRL/SDRL management to also support its "Task Management" requirements. That is, managing deliverables from both internal (e.g. engineering) and external (sub-contractors) sources as workflow tasks that are ultimately rolled up into their outgoing customer deliverable.

### **Criteria in Customer's Selection of CMstat and EPOCH DM**

- *CMstat instantly understood the language and requirements of A&D program contractors like Fleetway.*
- *EPOCH DM is a web-based solution developed from the ground up to support the ANSI/EIA-859 Data Management Standard.*
- *EPOCH DM offered a rules based, pre-programmed set of data relationships with a flexibility to enable data managers to define, schedule, track, review and process deliverables, thus helping to ensure on-time, accurate data deliverables and receipts.*
- *EPOCH DM's Business Process Management module automated and supported key workflow processes without custom programming.*
- *Satisfaction with other CMstat products, support services, and personalized attention received over the years.*

Utilizing the “User-Defined Deliverables” record type, Fleetway defined a deliverable record as a “Task”. During implementation, the Task Record was designated as the main vehicle for tracking and scheduling all contract deliverables along with any customer requests and engineering responses associated with a contract. All Fleetway task delivery due dates, requirements, milestones, responsible personnel, submittals, and receipt histories are now managed within EPOCH DM.

In three steps: here’s how Fleetway’s Task Management approach works in EPOCH DM:

First, when a request for estimate is received from the customer, a Task Record is created in EPOCH DM. An engineer is then assigned responsibility for the task. EPOCH DM sends out automatic notification e-mails and follow-up reminders to the “Responsible Person” when the task is coming due. The Admin Module allows the frequency of these emails to be selected by the Administrator.

Additionally, Action Items are assigned to track other functions that users need to perform to complete, or contribute to, the overall task. Again, automatic e-mail notifications and reminders are standard features of the Action Items module. Combining CMstat’s Task Management capabilities with EPOCH DM’s Action Items tracking system lets Fleetway ensure all tasks are completed and delivered on, or ahead of, schedule.

Upon completion of a given Task by the assigned engineer, the Task Record is returned to the data manager. EPOCH DM automatically “logs” the data manager’s “receipt” as a transaction. After the Task has been reviewed, a “submittal” is performed via the process wizard and the data is delivered to the customer. All transactions are automatically logged by the system and stored for metrics reporting, audit and traceability.

Through its EPOCH DM implementation, Fleetway was able to streamline its data management processes and reduce time for submitting, reviewing, and completing tasks. EPOCH DM allowed automatic notification of downloads via its data management portal. Additionally, the CMstat data models facilitated linkages to other needed information.

The EPOCH DM Program Management dashboard leveraged these new efficiencies with quick and accurate views of deliverables performance, metrics, and trend analysis. Reports and system outputs provide further process details and resource loading per Fleetway’s requirements.

As a result, EPOCH DM facilitated much improved communication of contract requirements, schedules, and data between managers, engineering personnel, and their customers. A significant result is an increase in performance-based contract bonuses, among other benefits listed at right.

Equally compelling, beyond the numerous technical and financial benefits to a program, the customer gained the confidence that for future contracts it had acquired the standards, best practices, and institutional knowledge to repeat and scale CDDM as a core organizational competency.

### ***EPOCH DM Benefits for CMstat’s Customer***

- *Eliminated a total of ten different repositories and databases with all information and processes now being consolidated into a single system of record.*
- *Streamlined the volume of task management procedures.*
- *Reduced the time needed to process and deliver a task by over 30%.*
- *Reduced the time needed to communicate customer requests and tasks to engineering by 50%.*
- *Reduced total late deliverables to one half of one percent (.05%).*
- *Reduced IT cost and resource load formerly required to manage permissions for access and storage of data.*

## **8. EPOCH DM Benefits and Value to Industry**

The use of EPOCH DM as a commercial-off-the-shelf solution for contract deliverables data management provides many benefits throughout the contractor's organization as well as to their customers.

As we have shown in this paper, the program office and its project managers will have access to a dashboard for real-time view of deliverables status with data all in one place. Visibility to past performance including metrics is also provided. Tangible efficiency gains with continuous improvement are not just possible but easily doable.

The work performed by data managers and clerical staffs will improve in efficiency from fewer errors, secure data vaulting, process automation, on-demand reports, and reliable tracking of submittals and receipt history.

Visibility into customer contract requirements as to what's needed and by when will greatly aid product engineering and engineering services groups. They will also gain the ability to track subcontractor requirements and performance while pinpointing resubmittal issues for continuous improvement.

For IT support teams and their budgets, EPOCH DM equates to lower overhead costs with no need to maintain legacy software or provide additional ad-hoc tools for CDDM. Merging disparate databases into EPOCH DM further reduces support hours and simplifies security compliance.

The finance and contract departments will have the tools, data, and metrics to maximize contract value, avoid penalties, earn contract bonuses, and optimize subcontractor performance. Their legal and compliance groups will be more proficient in demonstrating regulatory compliance with protection of data related to ITAR, controlled goods, and intellectual property.

Finally, and yet most important, the contractor's customers—such as Department of Defense agencies—will be ultimate beneficiaries of CDDM using EPOCH DM. Suppliers who have standardized, automated, secured, and optimized a more effectual system for managing data deliverables will most assuredly have a competitive advantage.

In summary, implementing a nimble, focused solution like EPOCH DM that institutionalizes best practices and incorporates industry standards for contract deliverables data management will help to contain program execution risks, reduce internal costs, maximize contract revenues, and enhance overall program profitability.

This last point is of growing importance for the 21st century. In aerospace and defense, today's business norm is fewer new large program awards or mega-contracts. What was once the risky art form of profitably delivering all of the deliverables from a higher volume of small to mid-size contracts must become a core organizational competency.



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