Previous Section

5.0 -- Contracting Issues and Costs

This section contains information regarding contracting for the various types of TMs as well as cost information about each one.

5.1 -- Contract Requirements

Delivery of defense system data in digital form requires changes to Government solicitations and contracts including their attachments and enclosures. These changes should be made with full consideration of the ability of Government activities to make cost effective use of digital data deliverables or access. Each defense system program may include unique requirements for which additional program-specific tailoring will be needed. Most of the applicable CALS standards and specifications contain contract-negotiable options from which the technical data manager must choose to satisfy program-specific requirements including multiple classes or types of data formats.

The TM Contract Requirements (TMCR) will identify the types of TMs required and include language that specifies exactly how data will be delivered (including media, format, and content) under the contract. Typically, the Government fills out the TMCR, although the Air Force, for example, uses the Instructions to Offeror (ITO) language in the RFP to direct the contractor to complete the form. Regardless of who fills out the TMCR, CALS and industry standards should be invoked whenever appropriate for digital delivery of support products such as engineering drawings and TMs. The media for delivery (e.g., on-line, physical media) should be compatible with Government receiving system capabilities. On-line delivery of data is the preferred delivery method (per DoD 5000.2). Some digital deliverables, especially interim deliverables, may be efficiently acquired by agreeing on a common word processing package in the contract and specifying the appropriate and compatible delivery media/method.

5.2 -- IETM Deliverables

The IETM deliverable option, described in 2.1.3, is the most dynamic and comprehensive data deliverable option available to the technical data manager. It is of the utmost importance that the technical data manager know the specific digital and management infrastructure and end user requirements when specifying this deliverable option due to the vast network of data resources associated with an IETM. The GCO is designed to assist the technical data manager in gathering the necessary background information.

5.2.1 -- Cost

The cost of acquiring an IETM of any Class is assumed to be nearly the same cost as incurred in procuring a hard copy technical manual, after the producing activity becomes familiar with the IETM production process. The costs associated with procuring the basic engineering content of either a hard copy TM or an IETM are equal, because the content is the same. The costs of preparing and delivering data may differ significantly, due to the sunk costs in existing TM authoring systems versus investment and training costs for new IETM authoring and delivery systems and due to increased use of presentation enhancements, such as videos. Offsets such as the reduced costs of handling and grooming the data for use (e.g., camera-ready versus loading the data base) need to be evaluated. Contractor costs will also be driven by perceived risk.

New, unfamiliar, evolving or untested processes will be perceived as significant risk factors, particularly if the RFP is proposing ambitious schedules, fixed price awards, and/or award or incentive fees. The Government may mitigate or share some risk with the contractor to reduce cost and risk and enhance acceptability. Programs and contractors need to be aware of potential resources available to offset costs and perform services, and must eliminate or limit risks.

The cost to develop an IETM varies depending on whether the weapons system is new or simply a modification of an existing system. The first scenario involves creating a new TM, while the other likely involves modification, and possibly conversion, of an existing TM.

5.2.1.1 -- New Systems

Cost is not a major factor in developing an IETM for new systems; i.e., the cost to create at least a basic ETM is not substantially different from the cost to create the same TM in paper format. The material for the manual must be CALS compatible whether paper technical manuals or IETMs are developed. If properly planned up front, even the higher classes of IETM can be developed at similar cost to traditional paper TMs.

5.2.1.2 -- Existing Systems

Creating/modifying TMs for existing systems can involve modification and conversion of existing TMs in paper or digital format, or both. The cost of conversion can vary widely depending on the existing format and the Class of IETM desired. Table 9-3 shows some cost ranges for conversion of existing TMs.

Interactivity	Description	Class	Savings	Cost/Page[1]	Benefits
Low	Raster or neutral data file with indexing	1	Wt/Space	$2	Note 2
Moderate	Intelligent	2	Wt/Space	$2-10	Note 3
Good	Interactive to user (printable)	3	Wt/Space	$10-25	Note 4
High	Interactive to user (objects)	4	Wt/Space	$40-100+	Note 5
Full	Interactive to user and associated systems	5	Training and Data Maintenance	$200+	Note 6

Table taken from Navy IETM Process Plan

Note 1: Conversion costs do not apply when procuring IETMs as first time data.

Note 2: ***Raster or neutral data file (e.g., PDF) IETMs with indexing provide weight and space savings by storing typically 100 Class 1 IETMs on a CD-ROM. Some raster scanning efforts can also automatically collate page change packages. The user navigates through the IETM by selecting from the table of contents that is linked to the body of the TM or by arbitrary page or reference selection.***

Note 3: ***Intelligent IETMs (Class 2) give the user the added ability to search by key word(s) or as in Class 1, table of contents data that is linked to the body. Change packages are typically integrated into the previous version of the IETM and redistributed.***

Note 4: ***Class 3 IETMs have the same features as found in Class 2 with the added ability of providing the user with the ability to select view packages that present only selected data from the IETM to the user, thereby alleviating extraneous information as related to the emphasis of the view package. It should also be noted that an object oriented data base can be used here without having it integrated into the IETM itself.***

Note 5: ***Class 4 is a hierarchically structured data base managed by a data base management system that provides a very efficient method for maintaining the IETM content. Current costs for manual conversion are in the $100 per page range, although these costs can drop significantly if less granularity is desired. New prototype conversion processes are showing that costs of $25-40 per page will be achievable in the near future (i.e., 2 -- 3 years).***

Note 6: ***Class 5 IETMs (and functionality) provide the user with significant assistance from watching the system and alerting the user to specific conditions, to analyzing diagnostic data to provide recommendations, to presenting alternate maintenance solutions, to "learning" and recommending adjustments to processes.***

Table 9-3. -- IETM Conversion Costs.

5.2.2 -- CDRLs

To invoke this data deliverable option, specific TMCRs and CDRLs must be developed to identify the type of TM required and include language that specifies exactly how data will be delivered under the contract including media, format (in this case a processable text data file), and content. Note that it is **Not** sufficient to simply require the contractor to develop a "Class 3" IETM -- the format and capabilities of the IETM must still be specified. The TMCR addendum sample shown in Figure 9-8 is for a Class 3 IETM. The information contained in the following contract vehicles should be tailored to meet the requirements of the specific defense system program.

Note that if a CDRL is not used, the CALS requirements for data content, format, and delivery media should be specified in the Statement Of Work (SOW).

TMCR Attachment (1)

Addendum Sheet

The descriptions below identify any deviations/waivers or additions to the requirements defined in the referenced TMCR paragraphs.

TMCR Paragraph No.	Description
4.1.a	The text and tabular material for the review manuscript copy shall be delivered in (add mutually agreeable word processor application software). The text and tabular material for the final copy shall be delivered in ASCII with SGML content tags in accordance with MIL-PRF-28001. The final IETM shall have the following functionality: dialog-driven interaction, logical display of data in accordance with content, logical **Next** and **Back** functions, user-selectable cross-references and indices, and content specific help. Additional requirements are contained in Appendix A of the TMCR.
4.1.b	The illustrations and drawings shall be delivered in (add mutually agreeable graphics application software), and shall be compatible with the SGML tagged text.

Figure 9-8. -- Sample TMCR Addendum Sheet for IETM Deliverables. (Class 3 IETM example)

5.3 -- Illustrated Text Data Files

The illustrated text data file deliverable option, described in 3.2.2, includes the vast majority of data formats available to the technical data manager. Illustrated text data file deliverables provide the greatest flexibility and data manipulation capabilities. These types of files can be used to create Class 1, 2, and 3 IETMs using formats such as PDF, native word-processing or desktop publishing, and SGML. It is also the common format for TMs not being developed as ETM/IETMs. It is very important that the technical data manager know the specific digital and management infrastructure and end user requirements when specifying this deliverable option due to the number of digital formats and software applications available.

Note: ***In addition to the digital maintenance copies of the TM, change pages, or TM supplement, a rasterized version may also be required by the end user and/or the distribution infrastructures. If this is the case, convert and integrate the new change pages or TM supplement, as applicable, into the rasterized "basic" TM.***

5.3.1 -- CDRLs

To invoke the illustrated text data file data deliverable option, specific TMCRs and CDRLs must be developed to identify the type of TM required and include language that specifies exactly how data will be delivered under the contract including media, format (in this case a processable text data file), and content. To invoke this data deliverable option, a sample CDRL and a TMCR addendum sheet (see figures 9-9 and 9-10) have been developed. The sample CDRL may be used for any of the deliverable options by

specifying the required deliverable as indicated. The TMCR shown below is for a basic ETM. The information contained in the following contract vehicles should be tailored to meet the requirements of the specific defense system program.

Note that if a CDRL is not used, the CALS requirements for data content, format, and delivery media should be specified in the Statement Of Work (SOW).

TMCR Attachment (1)

Addendum Sheet

The descriptions below identify any deviations/waivers or additions to the requirements defined in the referenced TMCR paragraphs.

TMCR Paragraph No.	Description
4.1.a	The text and tabular material for the review manuscript copy shall be delivered in (add mutually agreeable word processor application software). The text and tabular material for the final manuscript copy shall be delivered in PDF format with hyperlinking and indexing. Additional requirements are contained in Appendix A of the TMCR.
4.1.b	The review illustrations and drawings shall be delivered in (add mutually agreeable graphics application software). The final illustrations and drawings shall be delivered in PDF format.

Figure 9-9. -- Sample TMCR Addendum Sheet for Illustrated Text Data File Deliverables (Basic ETM example).

5.4 -- Document Image Files (Raster, PDL)

The document image file delivery option, which consists of either raster (see 3.2.1) or PDL (see 3.2.2.3) files, allows the technical data manager to obtain TM data in a digital format. The data uses of the document image file deliverables are somewhat limited but do provide for view, archive, comment, and annotate capabilities. Keep in mind that these formats are only recommended for legacy data.

5.4.1 -- CDRLs

To invoke the document image file deliverable option, specific TMCRs and CDRLs must be developed to identify the types of TMs required and include language that specifies exactly how data will be delivered under the contract including media, format (in this case raster), and content. To invoke this data deliverable option, a sample CDRL and a TMCR addendum sheet (see figures 9-10 and 9-11) have been developed. The sample CDRL may be used for any of the deliverable options by specifying the required deliverable as

indicated. The information contained in the following contract vehicles should be tailored to meet the requirements of the specific defense system program. CALS standards should be invoked whenever possible.

Note that if a CDRL is not used, the CALS requirements for data content, format, and delivery media should be specified in the Statement Of Work (SOW).

Note: ***The sample in figure 9-10 addresses distribution of both hard copies and possible CITIS distribution. CITIS distribution is implemented by reference to the GCO, but as an alternative, the CITIS distribution could be itemized in BLK 14.***

CONTRACT DATA REQUIREMENTS LIST
(Data Item)

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 440 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503. Please DO NOT RETURN your form to either of these addresses. Send completed form to the Government Issuing Contracting Officer for the Contract/PR No. listed in Block E.

A. CONTRACT LINE ITEM NO.	B. EXHIBIT	C. CATEGORY: TDP_____ TM____X___ OTHER_____	
D. SYSTEM/ITEM		E. CONTRACT/PR NO.	F. CONTRACTOR

1. DATA ITEM NO.	2. TITLE OF DATA ITEM (Defense System)	3. SUBTITLE (Specify Deliverable)

4. AUTHORITY (Data Acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE
SEE BLK 16	SEE BLK 16 SOW PARA _____(Add No.)	

7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY	12. DATE OF FIRST SUBMISSION	14. DISTRIBUTION			
DD					b. COPIES		
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	Draft	Final	
A SEE BLK 16	D SEE BLK 16					Reg	Repro

16. REMARKS

BLK 4/5: (Add TMCR No./Statement of Work Paragraph No.)
Note: Requirements should be specified in TMCR/SOW.

BLK 7: Government to verify digital format and media. Allow _____(Add No.) days for Government to parse, verify, and accept/reject the manual. Government office responsible for inspection is _____(Add office.)

BLK 8: Approval shall be based on compliance with the requirement document(s) cited in BLK 4/5. The time required for Government approval will not exceed ____ days and turnaround time for the contractor to resubmit data to Government shall not exceed _____ days. (Add time required for Government approval and turnaround time for contractor to resubmit data to Government.) Government office responsible for approval is _____(Add office.).

BLK 9: Technical data shall be marked IAW MIL-STD-1806 and [Add "CDRL supplement attachment"/"TMCR No._____"(Add No.), as applicable.]

BLK 14: Hardcopy proofs are identified as "Reg" copies. Digital file copies are "Repro". If CITIS is required, distribution shall be compliant with GCO Program User Capabilities table and data item shall be delivered and accessible via CITIS except when the file size exceeds 30 Mb, in which case it shall be delivered on magnetic tape IAW MIL-STD-1840.

Note: See general DD Form 1423 glossary for instructions on completing this form.

a. ADDRESSEE	Draft	Final Reg	Final Repro
SEE BLK 16			
Addressee 1		2	1
Addressee 2		1	0
Addressee 3		2	1

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE

Figure 9-10. -- Sample CDRL for TM Deliverables.

TMCR Attachment (1)

Addendum Sheet

The descriptions below identify any deviations/waivers or additions to the requirements defined in the referenced TMCR paragraphs.

TMCR Paragraph No.	Description
4.1.a	The text and tabular material for both the review and final manuscript copies shall be delivered in a raster data file. [Insert Format Type] Format shall be used for the raster data contained in a MIL-PRF-28002 raster data file.
4.1.b	The illustrations and drawings shall be delivered in a raster data file. [Insert Format Type] Format shall be used for the raster data contained in a MIL-PRF-28002 raster data file.

Figure 9-11. -- Sample TMCR Addendum Sheet for Raster Deliverables.

5.5 -- Data Conversion Costs

The cost of data conversion from paper to digital formats can vary widely depending on the final format selected, and the condition and complexity of the original document. According to the Defense Automated Printing Service, which provides extensive conversion services, the following conversion costs apply:

Text to Raster:	$0.13/page
Text to PDF (no tagging):	$0.43/page
Text to SGML:	Depends on the work and requirements

The prices listed above do not include any clean up or Quality Assurance (QA) of the scanned in documents. Some clean up will typically be required for any scanned in documents, and the clean up effort will depend primarily on the condition of the original document. For example, a "clean" copy of a document (i.e., easy-to-read type, few extraneous page markings, simple graphics) can often be converted to raster or PDF with little or no clean up required.

5.6 -- Contractor Validation

The contractor should be required to validate that the delivered TM conforms to the contractual requirements. Specific validation agenda should be provided in the contractor's validation plan and associated documentation.

5.7 -- Government Verification

The acceptance of CALS digital data products, either delivered on physical media or by CITIS, is different in several ways from the acceptance of comparable paper data products. The following paragraphs provide details on the acceptance of digital data products.

5.7.1 -- Digital Data Acceptance

The unique aspect of CALS digital data deliverables is that they will be subject to inspection and acceptance on several levels.

1. Physical Media: The first level of acceptance is to the physical media. This acceptance will ensure that the delivery media was in accordance with delivery specifications. This level of inspection will not be used if data has been formally delivered via CITIS.

2. CALS Data Exchange Formats: The second level of acceptance is adherence to the specified CALS data exchange format(s). This level of acceptance is applied to the MIL-STD-1840 digital data format if specified by the contract. This level of acceptance may be aided by automated tools obtained, if available, from the CALS Test Network or each Service component CALS office.

3. Data Content and Format: The last level of acceptance is the data content and format. This acceptance will be performed either manually or through the use of computer-assisted tools. Pre-acceptance of any and all levels of acceptance may be performed at the contractor's facility and final acceptance shall always be performed at a Government facility.

Next Section