DATA ITEM DESCRIPTION

Form Approved
OMB No 0704-0188

1. TITLE	2. IDENTIFICATION NUMBER
SOFTWARE DEVELOPMENT SUMMARY REPORT	DI-MCCR- 80902

3. DESCRIPTION/PURPOSE

3.1 This report collects data pertaining to effort and schedule, computer program size, function by functional element, programming language, characteristics, and complexity.

4. APPROVAL DATE (YYMMDD)	5. OFFICE OF PRIMARY RESPONSIBILITY (OPR)	6a. DTIC APPLICABLE	6b. GIDEP APPLLICABLE
890926	G/Y231		

7. APPLICATION/INTERRELATIONSHIP

7.1 This data item descriptionn (DID) contains the format and content preparation instructions for the data product generated by the specific and discrete task requiremnt as delineated in the contract.

7.2 This report is designed to collect data at several stages during the software review development.

7.3 This DID supersedes DI-F-5612.

8. APPROVAL LIMITATION	9a. APPLICABLE FORMS	9b. AMSC NUMBER
		G4833

10. PREPARATION INSTRUCTIONS

10.1 General Information. The report is required for each task consisting of 5000 or more Source Lines of Code (SLOC) within the project. SLOC consists of all executable statements, inputs/outputs, format statements, data declaration statements, deliverable job control language statements, and procedure oriented language. It does not include program comments. These reports are submitted at several major milestones as specified in the CDRL and at major contract modifications. Therefore a number of questions request project size, schedule and level of effort data in the form of "estimated actual". This implies that at the time of preparation of the report, if the data hasn't become available in certainty, then estimated data is to be provided: once the actual data is available, then such data is to be provided. For example, for the question which addresses the date of achievement or the level of effort at a certain milestone, the estimated data should be reported for reports prior to the milestone, and actual data should be reported thereafter.

10.2 Format. The report may be in the contractor's format.

10.3 Content.

10.3.1 Title Page. The title page shall contain the following information:

(continued on Page 2)

11. DISTRIBUTION STATEMENT

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

Block 10, PREPARATION INSTRUCTIONS (Cont'd)

10.3.2 Project Title. The highest level of the development contract. It includes the compilation of all software systems being developed.

10.3.3 Contractor/Subcontractor Name. The contractor or subcontractor name as appropriate.

10.3.4 Subsystem Information.

10.3.4.1 Subsystem Title and Description. The software subsystem is the compilation of all computer programs which must interrelate to support a specific operation. A project may consist of multiple software subsystems (e.g. one supporting the prime mission equipment; another supporting the training package, a third supporting test and evaluation, etc.). However, each subsystem would run on a separate processor.

10.3.4.2 Development Computer Name and Model Number. Shall be included at the subsystem level except in the case when the subsystem crosses machine bounds. In that case, this information should be included at the program level. Reference to the section in the document is appropriate when the description is lengthy.

10.3.4.3 Development Computer CPU Size. Shall be included at the subsystem level except in the case when the subsystem crosses machine bounds. In that case this information should be included at the program level.
*NOTE: The size of the CPU refers to the size of the data bus used in the computer.

10.3.4.4 Host Computer Name and Model Number. Shall be included at the subsystem level except in the case when the subsystem crosses machine bounds. In that case this information should be included at the program level.

10.3.4.5 Host Computer CPU Size. Shall be included at the subsystem level except in the case when the subsystem crosses machine bounds. In that case this information should be included at the program level.

*NOTE: The size of the CPU refers to the size of the data bus used in the computer.

10.3.5 Subsystem Schedule and level of Effort. Create a matrix and enter the estimated/actual DATE OF ACHIEVEMENT and the estimated/actual LEVEL OF EFFORT in man-hours expended for each ACTIVITY/MILESTONE as specified in the contract. Also enter the estimated/actual DATE OF ACHIEVEMENT and the estimated/actual LEVEL OF EFFORT in man-hours expended while preparing each required DOCUMENT. Provide the estimated or actual data as appropriate in accordance with the instructions at the beginning of this document. (Item 10.1)

10.3.5.1 Comments. Proved an explanation for any gaps or unusual circumstances which may affect the schedule.

10.4 Computer Program Information.

10.4.1 Computer Program Name and Description. Reference to the section in the document is appropriate when the description is lengthy.

10.4.2 Computer Program Language(s). Enter each programming language which is utilized in the computer program and its percent of the SLOC. These percentages should sum to 100 percent. Expand the list as necessary to accommodate each programming language that is utilized. This data may be included in the SLOC Matrix. (See 10.3.3)

Block 10 Preparation Instructions (Cont'd)

10.4.3 Maximum Intricacy of Code in Computer Program. Create a matrix and enter, in percentages, the applicable code that identifies the intricacy characteristics of the code within the type of operations that most closely resembles the computer program. Use the tables provided to generate the matrix. After the information has been derived it should be delivered in the earliest submission of this report. (i.e., If this information is available at Preliminary Design Review (PDR), it will be submitted during PDR.)

10.4.3.1 Control Operations (see Table II).

10.4.3.2 Computational Operations (see Table III).

10.4.3.3 Device-Dependent Operations (see Table IV).

10.4.3.4 Data Management Operations (see Table V).

10.4.4 Schedule and Level of Effort. Enter the estimated/actual date of achievement for each activity/milestone and the estimated/actual level of effort in man-months for each activity as specified in the report. Enter the estimated/actual date of achievement for each required document and the estimated/actual level of effort in man-months expended for preparing (preparation time and thought required to prepare the document) the required document. Provide the estimated or actual data as appropriate in accordance with the instructions at the beginning of this document (Item 10.1).

10.4.4.1 Comments. Shall include an explanation for any gaps or unusual circumstances which may affect the schedule.

10.5 Component Information.

10.5.1 Component Name and Description. Reference to section in the document is appropriate when description is lengthy.

10.5.2 Maximum Intricacy of Code in Component. Create a matrix and enter, in percentages, the amount of applicable code which identifies the intricacy characteristics of the code within the type of operations that most closely resembles the computer program component. Use the tables provided to generate the matrix. This information should be delivered in the earliest submission of this report, after the information has been derived. (i.e., If this information is available at PDR, it will be submitted during PDR.)

10.5.2.1 Control Operations (see Table II).

10.5.2.2 Computational Operations (see Table III).

10.5.2.3 Device-Dependent Operations (see Table IV).

10.5.2.4 Data Management Operations (see Table V).

10.6 Unit Information.

10.6.1 Unit Name and Description. Reference to section in the document is appropriate when description is lengthy.

Block 10, PREPARATION INSTRUCTIONS (Cont'd)

10.6.2 Maximum Intricacy of Code in Unit. Create a matrix and enter, in percentages, the amount of applicable code that identifies the intricacy characteristics of the code within the type of operations that most closely resembles the unit of code. Use the tables provided to generate the matrix. After the information has been derived it should be delivered in the earliest submission of this report. (i.e., If this information is available at PDR, it will be submitted during PDR.)

10.6.2.1 Control Operations (see Table II).

10.6.2.2 Computational Operations (see Table III).

10.6.2.3 Device-Dependent Operations (see Table IV).

10.6.2.4 Data Management Operations (see Table V).

10.7 Source Lines of Code Down to the Unit Level. Consists of all executable statements, inputs/outputs, format statements, data declaration statements, deliverable job control language statements, and procedure oriented language statements, but does not include program comments. Enter, at the unit level, the SLOC used in this subsystem. See Figure 1 for matrix example. This information could also include other items as necessary (i.e., Routine name, etc...). Items in this matrix should be entered as they become available (PDR, Critical Design Review (CDR), CCUT, etc..), otherwise TBSs will be entered.
(*NOTE: SLOC numbers will include rebuilt lines of code)

Block 10, Preparation Instructions (Cont'd)

WAS

Source Lines of Code (SLOC) Down to the Unit Level

prog_ name.	comp_ name.	unit_ name.	min (SLOC)	Likely (SLOC)	max (SLOC)	actual (SLOC)
CONTROL			1100	1700	2300	TBSL
	CONTROLLER		TBSL	TBSL	TBSL	TBSL
		LOGIN	TBSL	TBSL	TBSL	TBSL
		INIT/TERM	TBSL	TBSL	TBSL	TBSL
		TOP	TBSL	TBSL	TBSL	TBSL
		USER/AUTH	TBSL	TBSL	TBSL	TBSL
COMMS			1100	1700	2300	TBSL
	CONNECT		TBSL	TBSL	TBSL	TBSL
		CONN	TBSL	TBSL	TBSL	TBSL
		APPL	TBSL	TBSL	TBSL	TBSL
ORDER			1625	2500	3375	TBSL
	ENTRY		TBSL	TBSL	TBSL	TBSL
		INITIATE	TBSL	TBSL	TBSL	TBSL
		BUILD	TBSL	TBSL	TBSL	TBSL
	SUBMIT		TBSL	TBSL	TBSL	TBSL
		PAPER	TBSL	TBSL	TBSL	TBSL
		ELEC	TBSL	TBSL	TBSL	TBSL
		LIST	TBSL	TBSL	TBSL	TBSL
		ON_LINE	TBSL	TBSL	TBSL	TBSL
		OFF_LINE	TBSL	TBSL	TBSL	TBSL
	MNGMT		TBSL	TBSL	TBSL	TBSL
		UR_CC	TBSL	TBSL	TBSL	TBSL
		QUERY	TBSL	TBSL	TBSL	TBSL
		BCK_RECV	TBSL	TBSL	TBSL	TBSL
		ARCHIVE	TBSL	TBSL	TBSL	TBSL
		PRT_ORD	TBSL	TBSL	TBSL	TBSL

etc.....

Figure 1. Example of SLOC Matrix

Block 10, PREPARATION INSTRUCTIONS (Cont'd)

10.8 New versus Rebuilt Lines of Code: If code for this subsystem is rebuilt from previously existing programs, rather than newly designed, than a matrix (see Figure 2) should be created. Enter on a unit level, the minimum most likely, and maximum amount of Lines of Code that came from: original, essentially unmodified, and significantly modified SLOC on a unit level. *NOTE - (See Table I for supporting definitions).

Prg_ name	Cmp_ name	Unt_ name	Minimum orig	unmod	mod	Likely orig	unmod	mod	Maximum orig	unmod	mod

Figure 2. New vs Rebuilt Source Lines of Code

10.9 Readjustment Level of Effort. Enter, on a program level, the actual level of effort expended in the High Level Design (HLD) and Detailed Design (DD) Phases, Implementation Phase, and the Detailed Test & Evaluation (DT&E) Phase, due to readjusting the existing code to accommodate the rebuilt code. The level of adjustment effort which is necessary to accommodate rebuilt code depends on the configuration of the modification within the existing code. If the modification is embedded throughout the existing code then the level of effort due to adjustments is likely to be more extensive than if the modification affects only one part of the code with few outside interfaces. See Figure 3 for an example matrix of this data.

Readjusted Level of effort by program.				
Program name	Development Phase			
	HLD	DD	SI&T	DT&E

Figure 3. Sample Readjustment Level of Effort Matrix

Table I Supporting Definitions
New vs Rebuilt Source Lines of Code

Original Source Lines of Code:	New lines of code designed and implemented completely from scratch specifically for SDNS.
Unmodified Source Lines of Code:	Lines of code originally designed and written for FSVS, which will be transferred with little or no modifications to SDNS.
Modified Source Lines of Code:	Lines of code, originally designed and written for FSVS, which will be significantly modified and transferred to SDNS.

Block 10, PREPARATION INSTRUCTIONS (Cont'd)

Table II. Control Operations Codes

Code	Characteristics
A	Straight-line code with a few non-tested structured programming operators: DOs, CASEs, IF-THEN-ELSE, Simple Predicates.
B	Straight forward nesting of structured programming operators. Mostly simple predicates.
C	Mostly simple nesting. Some inter-module control. Decision tables.
D	Highly nested structured programming operators. Mostly simple predicates.
E	Re-entrant and recursive coding. Fixed-priority interrupt handling.
F	Multiple resources scheduling with dynamically changing priorities. Microcode level control.

Table III. Computational Operations Codes

Code	Characteristics
A	Evaluation of simple expressions. For example, A=B+(D-E)
B	Evaluation of moderate level expressions. For example, D=SQRT(B**2-4.*A*C)
C	Use of standard math and statistical routines. Basic matrix and vector operations.
D	Basic numerical analysis: multivariate interpolation, ordinary differential equations. Basic truncation, round-off concerns.
E	Difficult but structured numerical analysis: near-singular matrix equations, partial differential equations.
F	Difficult and structured numerical analysis: highly accurate analysis of noisy, stochastic data.

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Block 10, PREPARATION INSTRUCTIONS (Cont'd)

Table IV. Device-Dependent Operations Codes

Code	Characteristics
A	Simple read, write statements with simple formats.
B	No cognizance needed of particular processor or Input/Output (I/O) device characteristics. I/O done at GET/PUT level. No cognizance of overlap.
C	I/O processing, includes device selection.
D	Operations at physical I/O level (physical storage translations; seeks, reads, etc.). Optimize I/O overlap.
E	Routings for interrupt diagnosis, servicing, masking. Communication line handling.
F	Device timing-dependent coding, mirco-programmed operations.

Table V. Data Management Operations Codes

Code	Characteristics
A	Simple arrays in main memory.
B	Single file subsetting with no data structure changes, no edits, no intermediate files.
C	Multifile input and single file output. Simple structural changes, simple edits.
D	Special purpose subroutines activated by data stream contents. Complex data restructuring at record level.
E	A generalized, parameter-drive file structuring routine. File building, command processing search optimization.
F	Highly coupled, dynamic relational structures. Natural language data management.