DATA REQUIREMENT DESCRIPTION

Cost Analysis Data Requirement (CADRe) Number: XX-XXX

(Contractor Version)

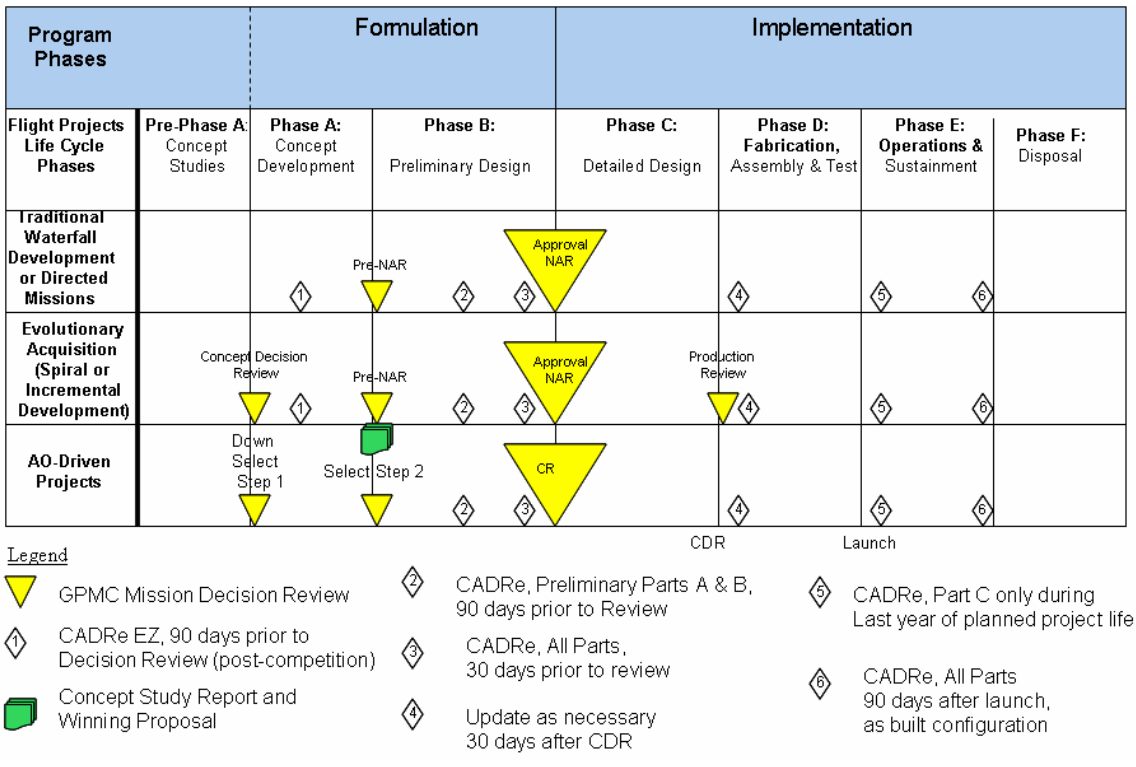
USE: The Cost Analysis Data Requirement (CADRe) documents the programmatic, technical, and life cycle cost information into a single, internally consistent document that evolves throughout the project life cycle. It is required for Category I and Category II Flight Systems and Ground Support Projects. It is the NASA version of the Department of Defense (DoD) Cost Analysis Requirements Document (CARD). NASA's CADRe combines and streamlines the contents of formerly separate DoD DRDs - the CARD and the Life Cycle Cost Estimate (LCCE), as well as cost reporting. The CADRe is for both internal project use and for independent cost estimating. CADRe is part of an overall Agency focus on performing best practices in cost estimating called Continuous Cost Risk Management (CCRM).

Typical projects will make five CADRe submissions across the project life cycle (see *Submissions* below). The NASA Project Manager is responsible for the CADRe and may develop the CADRe within the Project Office or use the CADRe as a DRD on contract(s). This document has been tailored to provide specific language for the contractor. Because the CADRe collects Full Cost information, the project will integrate contractor-prepared CADRe to include all Full Cost information.

OTHER DRD INTERRELATIONSHIP: Work Breakdown Structure; Earned Value Management Report; Integrated Master Schedule; Risk Management Plan & Reports; Phase Implementation Plans; PRA Plans and Reports, 533 Reports.

REFERENCES: NASA Cost Estimating Handbook (www.ceh.nasa.gov); DoD 5000.4M (CARD); DI-MGMT-81466, CPR DID; DD Forms 2734/1-5 (CPR Formats) (www.dior.whs.mil)

Figure E-1. Flight Systems and Ground Support Projects CADRe Submissions Timeline



FIRST SUBMISSION: The first CADRe submission shall occur 45 days prior to the dates depicted in Figure E-1. The first submission is known as the CADRe-EZ and shall contain a higher level of program and technical information than contained in the full CADRe. It typically contains the same programmatic and descriptive information as the full CADRe, but the technical data will be at the system or subsystem level of detail. The Work breakdown structure may also be at a higher level of detail. For AO (Announcement of Opportunity)-driven projects, in lieu of this initial CADRe-EZ, copies of the selected winning proposal and Concept Study Report may be submitted at the end of Step 2 down selection.

SUBSEQUENT SUBMISSIONS: The contractor shall submit the full CADRe 45 prior to the dates shown in Appendix E-1.

DOCUMENT FORMATS: The contractor may submit the CADRe in a contractor-developed format; however, the government prefers the information be delivered within Microsoft Word and Excel. Contractors are encouraged to provide supporting and supplemental documentation[1] to aid in understanding project cost. [The use of Microsoft Office™ products (Word, Excel, PowerPoint, and Project) is preferred. At www.ceh.gov, there are three downloadable Microsoft Excel CADRe Report formats (the Hardware Metrics Report, the Software Metrics Report and the WBS Cost Report). However, project formats are acceptable. Most, if not all, CADRe information can be extracted from other project documents and included in the CADRe. Projects are encouraged to provide other supporting and supplemental documentation[2] to the CADRe as these documents are helpful in understanding project cost.]

DELIVERY METHODS: The contractor shall submit the CADRe and supporting documents directly to the government on CDs or by other electronically accessible means, for example, from a web page.

DISTRIBUTION: The contractor shall deliver the CADRe and supporting documents to the project office, and the Office of Program Analysis and Evaluation at CADRe@NASA.gov. Further distribution is at the discretion of the project. The contractor shall notify the government COTR via email or in writing when the documents are distributed electronically. [As a minimum, the CADRe and supporting documents shall be delivered to the Office of Program Analysis and Evaluation. Further distribution is at the discretion of the project.]

PREPARATION INSTRUCTIONS: The guidance contained in this document describes the contents of the CADRe. It is a guide for content rather than format.

The body of the CADRe consists of three parts. Part A contains general descriptive information. Part B contains hardware and software technical parameters necessary to estimate the project's life cycle cost. [. The Hardware Metrics Report and Software Metrics Report formats at www.ceh.gov are available to use directly or as a content guide for Part B. Part C contains the project's life cycle cost estimate (LCCE). The WBS Cost Report available at www.ceh.gov is available to use directly or as a content guide for Part C. The Project Manager is responsible for collecting the inputs from the various participants including Full Cost elements and submitting an integrated CADRe.]

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[1] Examples include: Project Plan, Systems Engineering Plan, Work Breakdown Structure and Dictionary, Integrated Master Schedule, requirements documents, parts program, and major review documentation/briefings

[2] Examples include: Project Plan, Systems Engineering Plan, Work Breakdown Structure and Dictionary, Integrated Master Schedule, requirements documents, parts program, and major review documentation/briefings

Part C contains the project's life cycle cost estimate (LCCE) within an agreed WBS. The required Hardware and Software technical parameter information and the project WBS are contained in the attached Microsoft Excel Workbook. The contractor shall provide cost estimates, as noted in the spreadsheet tab within the Workbook, for those WBS elements for which he is responsible. The government project manager will use this information to develop and deliver a complete LCCE in the government-submitted CADRe.

The Freedom of Information Act (FOIA) law defines confidential business information as data that provides visibility into elements of cost (labor rates, overhead rates, G&A rates, profit rates and similar rates and factors). The CADRe reports costs rolled into the project WBS *without* visibility into rates and factors. Likewise, the CADRe does not collect proprietary technical information such as insight into production processes, etc. Rather, the CADRe only collects performance specifications as technical cost drivers. Therefore, NASA intends that no proprietary, confidential or sensitive business information be included in the CADRe and that CADRe submissions need not be marked as "proprietary", "sensitive" or display other confidential business information markings.

The subsequent paragraphs describe the information that shall be contained in each part of the CADRe.

Part A – General Descriptive Information (in narrative form supplemented by tables, figures and graphics as appropriate)

- **Description –** Provide a top-level description of the system, including functions to be performed, measurements to be obtained and key performance parameters. A functional block diagram and/or photograph or drawing of the system (with major elements identified) shall be provided. For CADRe purposes, document the baseline project description that is being used as the basis for budget forecasts (i.e. excluding other options that might still be in the trade space at any given point in the project evolution).

    - **Mission/Objective -** Describe the overall mission(s) of the system, including interfaces and functional relationships to other systems. Include a description of the concept of operations (CONOPS) for the system.
    - **Configuration –** Provide a WBS Dictionary for each WBS element identified within the attached Excel Workbook. Note that the WBS within this Workbook is the project's WBS along with a map to NASA's cost community's WBS down to level 4 and 5, if applicable. The contractor shall ensure that this map is updated if the project WBS should change. Mapping should be in accordance with NASA WBS dictionary (www.ceh.nasa.gov).

- **Government-Furnished Equipment and/or Property –** Identify and describe any hardware and/or software elements that will be furnished by the Government. For items such as joint-use of facilites, availability and schedule constraints must be identified along with any cost-sharing provisions.

- **Project Management and Systems Engineering -** Describe the responsibilities and functions of the project office. Include current and anticipated funding levels (by Government Fiscal Year) for all project elements and funding lines/sources.

- **Acquisition Plan -** Provide a description of the acquisition plan to include make versus buy decisions for each of the WBS elements. Describe sub-contract type(s), fee structure(s) and any unusual acquisition strategies assumed or corporate investments such as New Ways of Doing Business (NWODB), or CAIV, etc. Identify any government or foreign partners and the hardware and/or software elements that will be furnished by the partners. Include a project schedule that shows key development and/or production dates including delivery dates of major suppliers.

- **Heritage –** In Part A, provide at a summary level, any heritage or analogous systems that are being used to reduce development/production costs. Describe any ECP/ECO (Engineering Change Proposal/Engineering Change Order) activity that modified original system performance requirements from the previous CADRe submission (in order to understand requirements creep/evolution). Lower-level WBS heritage is documented in Part B on the Hardware Metrics Report and Software Metrics Report.

- **Test Plan –** If available within the current phase of the program, describe all testing to be conducted by the developing organization(s) and/or other agencies to include equipment, subsystem and system-level testing. Testing includes assessment of functionality, reliability, utility, operational effectiveness, supportability, etc.

- **Project Risks** - Identify programmatic and technological aspects of the project that present potential or demonstrable risks to the schedule and/or budget of the project and their effects on specific WBS elements. Include an identification of cost-correlated WBS elements. Describe risk mitigation philosophy and processes. As the project proceeds through its life cycle, this information must be updated to document the interim results of risk mitigation and to include any risks identified since the last CADRe submission.

- **Track to Prior Release -** Summarize changes made since submission of the previous CADRe. If no changes occurred since the last submission, the Contractor is not required to resubmit, but to notify the Distribution list provided earlier. The CADRe will document evolution in the project, specifically addressing changes in cost drivers and cost.

Part B – Technical Data

The contractor shall provide hardware and software metrics data as described in the attached Excel Workbook.

Part C – Life Cycle Cost Estimate

This part of the CADRe contains the LCCE.

Life Cycle Cost Estimate Documentation

The CADRe WBS Cost Report Tab within the Workbook should be used to report those WBS elements for which the contractor is responsible. The LCCE consists of design, development, test and evaluation (DDT&E) and production through the end of operations and disposal. The LCCE for those elements for which the contractor is responsible should be consistent with the descriptive information provided in Parts A and B of the CADRe.

NPR 7120.5C requires projects to take cost risk into account when performing cost estimates. The costs reported in Part C shall be risk-adjusted costs consistent with the Continuous Cost Risk Management (CCRM) process as described in the NASA Cost Estimating Handbook.

The LCCE documentation shall also include:

a. Sufficient information to allow an independent estimator/analyst to understand how the estimate was constructed, understand the impacts of key assumptions and inputs, and determine a level of confidence in successfully completing the system(s) within the estimated cost.

b. LCCE team memberships, including basic functional organizational memberships and names of cost experts.

c. LCCE methodologies and models used, by phase of project: System design cost analysis methodology and parametric or other cost models, analogy, or "grass roots/WBS-based"(or combinations). Provide information on cost and economic models (especially, information concerning model validation, history of successful use, configuration version), backup and supporting data, ground rules and assumptions.

d. The WBS Cost Report format provides for a separation of non-recurring and recurring cost assumptions. The NASA Cost Estimating Handbook provides guidance on defining non-recurring and recurring costs. However, if the contractor believes it cannot reasonably separate non-recurring and recurring cost, total cost may be reported without such a separation.

e. A WBS display of total cost in tabular form to the agreed upon WBS Level. A fiscal year time-phased display of life cycle cost shall be provided at least to WBS Level 2. At any given milestone (Preliminary NAR, NAR, etc.), past years' costs are "actuals", while future years' costs are estimates. The final CADRe at the end of Phase E/F contains all actual costs.

f. Narrative identification and explanation for cost growth occurring since the last CADRe submission stemming from all technical, programmatic, and project configuration sources delineated in accordance with the following two general categories:

- **Risk-Driven** cost and schedule growth is cost and schedule growth, overruns or funded changes, linked to technical risk drivers (e.g., technology maturity, design/engineering, complexity, integration, etc.) and key engineering performance parameters.

- **Externally-Driven** cost and schedule growth is cost and schedule growth, overruns or funded changes, linked to external factors (e.g., requirements changes, technical enhancements not driven by risk, perturbations to budgets by external agents causing schedule changes, labor strikes, business base changes, etc.).

(NOTE: Sources for both categories of this cost and schedule growth can be specifically identified in the Earned Value Management Cost/Schedule Performance Report variance analysis reporting – Cost Performance Report Format 5).