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# NASA Procedural Requirements

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## **Subject: NASA Enterprise Architecture Procedures**

**Responsible Office: Office of the Chief Information Officer**

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## **APPENDIX A: Enterprise Architecture Project Review (EAPR) Process**

### **A.1 Introduction**

a. Appendix A outlines the process to prepare a NASA project (DME or MLC) for an EAPR. The purpose of an EAPR is to ensure that project proposals do not create capabilities that already exist, have a solid business mapping to the program goals they support, and will create new capabilities for the Agency. Typically, the EA review is conducted in the formulation stage of a project. A review during this stage helps ensure that key sponsors, executives, and stakeholders have the appropriate information detail to make informed investment and funding prioritization decisions.

b. An EAPR is necessary prior to any investment consideration for a project that meets the funding thresholds established as listed in the NPR 2830.1. The review, prepared primarily from information already available in the project's documentation, is presented to the CEA for approval in order to move forward for funding consideration. The goal of any EAPR is to ensure projects have a fundamentally sound business foundation for successful funding and implementation. Additional EAPRs may be conducted during other phases of the project's life cycle.

### **A.2 Need and Benefits**

a. Executive management and stakeholders have a business requirement to use EA principles for analysis of investments in projects that develop, modify, or enhance (DME) Agency capabilities. The EAPR provides the deep-level analysis that is used to determine the following:

- (1) How the project investment provides benefits for the Agency, Centers, Directorates, or programs; essentially the qualitative and quantitative benefits of the investment.
- (2) Thorough analysis of the "As-Is" state to show how the project enhances current capabilities.
- (3) Analysis of customer densities and clear benefits to the customer community.

- (4) Project plan that shows clear development to the enhanced ?To-Be? state.
- b. The following are anticipated benefits to the executive sponsor, supervisors, and project managers in completing the EAPR:
- (1) A thorough understanding of the current state in order to transition toward the future state.
  - (2) Better data for product development life cycle (PDLC) management analysis in order for investment prioritization:
    - (i) Initiate new services.
    - (ii) Sunset Legacy services.
    - (iii) Evaluate services in the life cycle.
  - (3) Thoroughly understand the current state in order to respond quickly to external influences.
    - (i) Funding reductions.
    - (ii) Policy directives.
    - (iii) Unfunded mandates.
    - (iv) Executive resource redirection.
  - (4) A recommended list of potential projects for executive decision that create the next near-term ?To-Be? state from analysis of the data.
  - (5) Finished, approved reviews constitute our ?To-Be? Projects while documenting our transition plan. These are auditable EA artifacts.
  - (6) Creates good materials for funding requests and provides details for explanation to customers, executives, and other organizations such as NASA HQ, Office of Inspector General (OIG), GAO, OMB, and Congress.
  - (7) Clarity of information allows executive sponsors to better understand the high-level view, manage interfaces for the project, and to assess the extent and effectiveness against program goals.
  - (8) Results are helping people refocus. The focus EA reviews provide helps projects and sponsors gain insight that can be used for future state modeling and decisionmaking.
  - (9) Ensures investments are mapped to the organizational business goals, the 18 NASA Strategic Objectives, and the FEA BRM ?Services for Citizens? Line of Business (as described in section A.6).
  - (10) Allows the Agency to depend on standard tools and processes, thereby reducing complexity and redundancy.

### **A.3 Instructions**

- a. Prepare a concise PowerPoint briefing that answers the following categories of questions and include as much detail as possible. All required documents shall also be submitted. The content used to prepare the briefing should be derived from information already contained in existing documentation such as program plans, project plans, and formulation authorization documents (FAD?s). There is no need for redundancy in the submitted response. If a question or element is answered in any other part of the submitted response, it need not be repeated, but should be referenced for ease of evaluation. Samples of completed EAPR briefings are available from the CEA or designee.
- b. Successful reviews include the following actions:
- (1) Identify your team members early on.
  - (2) Identify a single point of contact to represent the service portfolio.

- (3) Prepare a schedule.
- (4) Plan a minimum of two meetings per week.
- (5) Have a PowerPoint specialist available.

## **A.4 EAPR Questions**

### A.4.1 Project Overview (NPR 7120.5 Compliant)

#### a. Project Description

- (1) What problems does this project solve?
- (2) What benefits, qualitative and quantitative, can NASA expect?
- (3) How was it determined that this project is necessary?
- (4) What is the overall context of the project?
- (5) What are the guiding principles, vision, and values for this project?

#### b. Requirements Document and Validation Strategy

- (1) How will you manage changing requirements?
- (2) How are the requirements gathered, and does the process allow for the voice of stakeholders?
- (3) How will you prevent ?scope creep??
- (4) What is the process or mechanism to add/delete/modify requirements?
- (5) What is the process for periodic validation of the requirements if the project is longer than six months?

### A.4.2 Results of the Mission Directorate, Mission Support Office, or Center Capital Planning and Investment Control Process

#### a. Who are the investors and executive sponsors?

- (1) What are their roles and expectations of the project?
- (2) How will the funding be procured or delivered?
- (3) How will they interact with the periodic reviews and project management?
- (4) How do they prioritize this project in their respective project investment portfolio?

#### b. What organization is the ?anchor? sponsor for the project (i.e., the sponsor with the most interest in completion)?

#### c. What program/Center/project will perform project management and periodic reviews?

#### d. What is the anticipated contract vehicle, and who will oversee the contract?

#### e. CPIC responses to selection criteria. (This must be answered verbatim.)

- (1) Does the initiative support core or priority mission and business functions that have to be performed by the Federal Government?
- (2) Is the initiative critical to the performance of these functions?
- (3) Does the initiative support work processes that have been simplified or otherwise redesigned?
- (4) Does the initiative support critical infrastructure?
- (5) Is the initiative being undertaken because no alternative is available in the private sector?

- (6) What are the expected benefits of the proposed initiative?
- (7) What are the expected costs of the proposed initiative?
- (8) Do the benefits justify the cost for the proposed initiative?
- (9) Is the initiative required by law?
- (10) Are there major risks involved that reduce the chances that the initiative will perform as expected?
- (11) Do performance measures exist, and do they adequately reflect the linkage to the appropriate mission and business functions and objectives?
- (12) Does the initiative comply with NASA EA, or has a waiver been granted and by whom?
- (13) Does the initiative provide OAIT or Multi-Program/Project Support?

## **A.5 Project Plan (NPR 7120.5 Compliant)**

a. Earned value (EV) management or operational analysis. The scope and level of detail depend on the size of the project. Follow NASA policy in Section 7 below.

- (1) EV is most appropriate for projects with clearly-defined schedules, milestones, and budget.
- (2) If EV is difficult to prepare, focus on cost/benefit or an overall operational analysis of full value.
- (3) It is appropriate to use estimates based on the best data available in trying to quantify impacts.
- (4) Qualitative impacts should be specifically described, even if they are not readily quantifiable.
- (5) Cost/Benefit Analysis and EV charts should be prepared to illustrate an estimated return.
- (6) Quantify and try to assign a reasonable value to everything. Lloyds of London is the world leader in assigning value to qualitative assets and future benefits based on available data and future projections. Try to assign quantifiable value to things like "One day of Flight Operations."
- (7) Resources:

(i) NASA SP 610S (1995) ? NASA Systems Engineering Handbook  
[http://ldcm.gsfc.nasa.gov/library/Systems\\_Engineering\\_Handbook.pdf](http://ldcm.gsfc.nasa.gov/library/Systems_Engineering_Handbook.pdf)

(ii) NPD 1000.0 (2005) ? NASA Strategic Management and Governance Handbook  
[http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal\\_ID=N\\_PD\\_1000\\_0000\\_&page\\_name=main](http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal_ID=N_PD_1000_0000_&page_name=main)

(iii) NPR 7120.5 (2005, in Draft) NASA Program and Project Management Processes and Requirements

b. Alternatives Analysis. (See Appendix E.) Options should include the following, as a minimum:

- (1) Do nothing. This is always an option.
- (2) COTS: Is there a commercial product to build this project?
- (3) MOTS: Is it possible to modify/customize (e.g., no more than 20% as a rule of thumb) a commercial product?
- (4) GOTS: Has another Government agency already solved this problem and can we use their solution?
- (5) Build the system. Why is this project so unique as to demand a one-off build? Check for previously developed modules available in NASA or other agencies for reuse.

c. Risk Assessment and Mitigation

- (1) Use the NASA-approved 5x5 Probability versus Impact/Expectations Risk matrix.
- (2) Articulate how the project will manage risk at a high level.
- (3) Identify the significant risks with associated mitigation strategies.
- (4) Resources:
  - (i) The primary instruction for an EA review risk assessment is the IEM Integration Project Risk Management Plan. This document outlines the 5x5 risk assessment process (see pages A-16 through A-22) and explains a problem versus a risk (page A-5).
  - (ii) For instruction on risk management for IT resources, see NPR 2810.1, Security of Information Technology, and NIST SP 800-30, Recommended Security Controls for Federal Information Systems.

#### d. Full Cost Budget

- (1) Articulate all associated project costs, direct or indirect, in the context of a full-cost analysis.
- (2) NASA will likely never get to a full "For Profit" cost business model, but we should strive toward that granularity.
- (3) Understand how involved missions/offices/executives/sponsors will view the project in their full-cost models.
- (4) Cost assumptions, projections, and estimates may be used as long as the rationale and supporting math are also provided. If the assumptions are disputed, it would only be a matter of changing the base assumption value and recalculating.
- (5) Quantify and try to assign a reasonable value to everything, if possible. For example, Lloyds of London is the world leader in assigning value to qualitative assets and future benefits based on available data and future projections. Try to assign quantifiable value to things like "One day of Flight Operations."

#### e. Cost Recovery Model (if a fee for service)

- (1) Build charts that snapshot the estimated rate and time for investment recovery.
- (2) Examine the project to see if there is a "per fee" or "per use" schedule potential.
- (3) Build charts that are easily understood.
- (4) Define the process for cost/benefit even if that is something as difficult as ?improved quality of life,? for example.

## A.6 Mapping to the NASA and FEA Models

- a. How does this project map to the goals and objectives of the Mission Directorate(s)?
- b. How does the project map to the NASA goals and objectives? (EA team will provide template for mapping to NASA goals.)
- c. How does the project map to the defined NASA EA reference models? (EA team will provide templates for mapping to FEA goals.)
- d. How does the project map to the FEA business reference model? Examples are available from previous projects. (EA team will provide templates for mapping to FEA goals.)
- e. If the project cannot map back to NASA and FEA business goals, then it may need a check for validity.
- e. Map to the NASA Centers for usage. Construct a matrix to illustrate the project usage and impact as it pertains to each of the NASA installations.
- f. Resources:

(1) e-Gov, FEA site <http://www.whitehouse.gov/omb/egov/a-1-fea.html>

(2) Federal Enterprise Architecture Management System (FEAMS) <https://www.feams.gov/>

## **A.7 Compliance with EA ?To-Be? State**

a. Define the ?As-Is? state that exists prior to project formulation. Diagrams and pictures can quickly demonstrate the ?As-Is? in the EA review. A thorough description should be maintained in the project documentation.

b. Define the ?To-Be? state that will exist when the project is completed. Diagrams and pictures are best used to easily describe the ?To-Be? in the EA review. A thorough description should be maintained in the project documentation.

c. How does the project design line up with the known mission, program, office, Center, or NASA ?To-Be? architecture and vision? The documentation must demonstrate that this project will be valid through its implementation and as far into the life cycle as the EA is defined.

d. How does the project line up with the overall EA vision, objectives, goals, and principles?

## **A.8 IT Security Plan (draft or approved)**

a. Ensure interaction with Program/Center/Mission IT Security Manager and appropriate IT Security support staff to ensure that:

(1) The IT System Security Plan Executive Summary represents a system that is based on realistic expectations. Requirements for a complete IT System Security Plan can be found in the Agency CIO SOP, System Security Plan Template.

(2) The IT Security Team is fully engaged through all phases of the project.

(3) The project plan is updated as IT Security regulations and direction change.

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