NASA LANGLEY RESEARCH CENTER

HIGH-CONTROL PROJECT EXAMPLE

(NTF OPEN ARCHITECTURE DATA ACQUISITION SYSTEM SOFTWARE)

VERSION 1.0

Prepared By:
The Software Engineering Process Group

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High-Control Project Example Introduction

The following example is provided as a guide to assist the reader in applying the *Procedure for Applying High-Control to Software* and the *Procedure for Software Planning* to a high-control software project. Although the example makes reference to actual NASA Langley facilities/organizations where high control might be applicable, it is merely an example and not the actual documents used on any particular software project. The following are presented in the example:

A.1 Risk Rating Sheet (SEPG Document 50) for the Open Architecture Data Acquisition System for the National Transonic Facility

A.2 Response Package (SEPG Document 30) for the Open Architecture Data Acquisition System for the National Transonic Facility

A.3 Response Package Review Checklist (SEPG Document 20) for the Open Architecture Data Acquisition System for the National Transonic Facility

A.4 Software Project Management Plan (Software Project Management Plan Template [6]) for the Open Architecture Data Acquisition System for the National Transonic Facility.

A.1 Example: Risk Rating Sheet (SEPG Document 50)

Project Title: NTF Open Architecture Data Acquisition System						
Risk Area	**Risk Rating**					
	1	**2**	**4**	**8**	**16**	**Rating**
RESOURCES						
Total project cost	Less than $50K	Between $50K and $100K	Between $100K and $500K	Between $500K and $1M	More than $1M	16
Project staff size, including **local** contractors	Up to 2	Up to 5	Up to 10	Up to 15	More than 15	4
Contractors, **not local**	None	Suppliers with some development work	----------	Suppliers with major development work	Suppliers with development work critical to project success	8
ORGANIZATIONAL COMPLEXITY						
Intergroup coordination	One division	Two divisions	Three divisions	More than 3 divisions		2
Project location	One site	Up to three sites	More than three sites			1
Staff competence	All staff qualified and experienced	----------	Half the staff qualified and experienced	----------	Experienced staff not available	1
TECHNICAL COMPLEXITY						
Testing related risks	No product text risk	----------	Moderate test risk	----------	Major risk of test failure	4
Degree of innovation	Well proven, known to LaRC	----------	Proven, but new to LaRC	----------	Pioneering	4
Interdependencies of deliverables	Simple stand-alone	----------	----------	Highly integrated		8
CONFIDENCE IN STATEMENT OF REQUIREMENTS						
Stability and completeness of requirements	Stable requirements and no unknowns	Stable requirements and few unknowns	----------	Medium probability of change in requirements and/or many unknowns	High probability of change in requirements and/or many unknowns	8
BUSINESS IMPLICATIONS						
Impact of failure	Difficult to detect, minor loss in customer confidence	Maximum loss of $100K, loss in customer confidence	Maximum loss of $200K, damage to LaRC reputation	Loss exceeding $200K, severe damage to LaRC reputation	Very significant impact to NASA	4
Time pressure	No time pressure	Easy calendar deadlines	Difficult calendar deadlines	Time of the essence		4

---------- Intermediate option

Not applicable

A.2 Example: Response Package (SEPG Document 30)

Project Title	NTF Open Architecture Data Acquisition System		
File name and version:	NTF_RespPkg_Ver 01.doc	Software class:	High
Project/Job order number:	M1843	Software manager:	Michael N. Gineer, DSISB-ETTD
Customer: (include contact address/phone)	National Transonic Facility, Research Facilities Branch, AD George Tunnel, 864-0000, MS 267		
Schedule start date:	10-01-98	Schedule end date:	10-01-00

Use this section to describe the response in full and/or refer to other documents and plans

Background and objectives: (include any parent project or user requirements references)
Design, furnish, and install a new open architecture data acquisition system (OADAS) for the NTF. The 16 foot Jet Exit OADAS will be used as the baseline. The new NTF OADAS will replace existing proprietary DAS computers & software. New OADAS will be Unix-based, real-time, network distributed, and based on X-windows display technology. New OADAS will provide interfaces to NTF-unique facility instrumentation and meet the facility requirements specified in the user requirements document (TBD). The OADAS will meet the data acquisition, reduction, display, processing, and data management needs of the research model, plant/process system, and model preparation areas. The system will support pre-test setup, post-test data reduction operations of the current test concurrent with data reduction functions of previous test (perhaps a proprietary customer) on a separate host system(s). The new system will be tested in parallel with existing system prior to commissioning. The system will be developed under the High-Control Procedures.

Reference: System Engineering Request to Upgrade the NTF Data Systems, SER-12345.001, dated 7-1-98

Risks: (include risk identification, analysis, and planning information for identified risks)

(1) Open architecture DAS is new and relatively untested in a large, complex facility such as the NTF. If extensive in-situ testing is not performed at NTF to certify robustness of OADAS, the project may fail and NTF's test capability will suffer.
(2) The 16 foot Jet Exit system (the baseline DAS) does not have all of the software features required at the NTF. If experienced S/W development staff are not available for developing the NTF requirements document and coding, the system will not meet expectations and the scheduled installation date will have to be slipped.
(3) OADAS project team consists of 3 divisions (2 involved w/ S/W) and 2 competing support contractors. If Langley management does not create a supportive work environment and clearly define the roles/responsibilities, the project will fail.
(4) The proposed front-end DAU's are new and require different field wiring termination. If the proposed adapter connectors do not work, the cost for new field wiring will be tremendous, and the funds to cover it are not in the budget.
(5) ***A Risk Management Plan will be rolled-out as a separate document (covering the above risks, risks identified on the Risk Rating Sheet that are greater than "2," and other identified risks). Risks will be entered into the project risk tracking tool.

Products: (include project phase output deliverables)
Software requirements, architectural design, detailed design, code, validation test plan/procedures, installation plan, acceptance plan, maintenance plan, quality assurance plan, CM plan, and version management plan will be produced. A waterfall development approach will be used.

Resources: (include cost and resource estimates and name of approving manager(s))
ADPE H/W & S/W: $1.5M (R.B.Manager) Contractor #1 S/W & H/W: est. 10 work-years ($700K) (Approving Manager: I. Guessing)
Facility Wiring: TBD by Customer (T. Gauge) Contractor #2 S/W & H/W: est. 3 work-years ($210K) (Approving Manager: *M. Too)*

Change control: (specify how many changes to this document and the user requirements will be requested, dispositioned, implemented, and tracked) The version number embedded in the file name (see above) shall identify the electronic revision of this Response Package. Each successive revision becomes the official revision with the signature/date of all parties shown below. SEPG Document 70 (Document Revision Record) will document successive issues/changes to this document. Revisions may be requested by any signatory and routed accordingly. The signed documents (hardcopy) and revisions to be kept in the DSISB project files.			
Prepared by: (signature)	Michael N. Gineer	Date:	9-1-98
Line Manager: (signature)	Robert B. Manager	Date:	9-9-98
Customer: (signature)	George Tunnel	Date:	9-16-98

Response Package: NTF Open Architecture Data Acquisition System

SEPG Document 70: Document Revision Record

Issue Date	Description of Revision (Include reason for change if not self-evident.)	Section Affected	Prepared By	Authorized By
9/9/98	Initial Release		MNG	RBM

A.3 Example: Response Package Review Checklist (SEPG Document 20)

This document is to be completed by the Software manager.

Note: For all questions that are answered N, attach details of actions to be taken.

Project title: NTF Open Architecture Data Acquisition System		**Date of review** 9-1-98
File name/version of completed checklist	NTF_Response_Package_Checklist (Ver 1.0).doc	
Document(s) under review: Response Package: NTF-Response Package-Ver01.doc User Requirements for the New NTF DAS – NTF Document No. 4567.88, Version 6.0, dated 5-1-98 System Engineering Request to Upgrade the NTF Data Systems, SER-12345.001, dated 7-1-98		
A	**Technical issues**	
1	Are the customer requirements clear, documented/acceptable/viable?	Y
2	Did customer requirements remain unchanged during the writing of the response package?	N
3	Does the response package show how the requirements can be met?	Y
4	Are technical risks assessed to be acceptable?	Y
5	Has the technical content of the response been subject to independent technical review?	Y
6	Have 'lessons learned' from similar projects been reviewed?	Y
B	**Organizational issues**	
1	Are customer expectations realistic?	Y
2	Are staffing levels adequate for the tasks?	Y
3	Have experience levels required and available been assessed and no short comings or additional training is required?	N
4	Are special needs or dependencies identified (equipment, lab, support from other agencies) currently available?	Y
5	Can the requirements be realistically fulfilled within estimated funding?	N
6	Where resources are required outside the organization, has the appropriate management agreed to the resource commitment?	Y
7	Where external suppliers are involved, are external suppliers able and available to meet the project needs?	Y
8	Where external suppliers are involved, has adequate provision been made for their management, monitoring and progress reporting?	Y
9	Have adequate quality assurance resources been planned into the project?	Y
10	Overall, do we have the resources (time, staff) to undertake the work successfully?	Y
11	Overall, are the organizational risks considered acceptable?	Y
C	**General**	
1	Have all the identified user/customer requirements been documented?	N
2	If this effort involves a response to Headquarters for an Announcement of Opportunity etc., will we probably win the work?	NA
3	Have contracts issues been covered and specialist advice taken?	Y
4	Are the provisions for maintenance documented?	Y
5	If no provisions for maintenance are required for the project, is a clear justification for its waiver been documented and approved by the customer?	NA
D	**Decision (This section is completed by line manager)**	
1	Is it acceptable to proceed with the project? If N then state actions to be performed prior to authorization.	Y
Response package author: Michael N. Gineer	**Date:** 9-1-98	
Reviewer's signature: Robert B. Manager, DSISB-ETTD **(e.g., line manager)**	**Date** 9-1-98	

Actions to be Performed to Resolve Questions Answered "N":

A2, C1—We estimate that only 80–90% of the user requirements have been communicated at this time. A trade-off analysis has been initiated to answer specific technical questions regarding the choice of some instrumentation items proposed for the project. The results of this study *should* reduce the uncertainty of the instrumentation choices, and thus reduce the number of user requested options. A capability demonstration of the DAS laboratory has been scheduled for the customer. It is expected that the trade-off analysis and capabilities demonstrations will educate the customer and increase their confidence in our abilities as a DAS provider. As a result, changes and uncertainties in user requirements *should* ease.

B3—The customer's need for an advanced graphical display system will be met by using a commercial-off-the-shelf (COTS) software package. Although we have previously tested and verified the COTS package in a laboratory setting, our experience base is shallow in that only 2 persons have been trained on the product. Therefore, local training on the COTS package will be procured (see Acquisition Plan).

B5—To advance the schedule, only a preliminary funding request will be forwarded to ETTD and NTF Management. A project team has been formed to begin the analysis and development of the software requirements. A software requirements document will be prepared to enumerate all requirements prior to the start of major development efforts. After approval of the software requirements document, a revised funding request will be made.

A.4 Example Software Project Management Plan (SPMP) SEPG Document 40

Title:	Open Architecture Data Acquisition System for the National Transonic Facility
Filename and version number (if applicable):	NTF_OADAS_SPMP_Version_01.doc
Prepared by:	Michael N. Gineer
Signature:	Original signed by: Michael N. Gineer (original located in DSISB project files)
Date:	10-1-98
Reviewed by:	Robert B. Manager, Head DSISB
Signature:	Original signed by: Robert B. Manager
Date:	10-9-98
Authorized by:	Dr. N. Charge Chief, Experimental Testing Technology Division
Signature:	Original signed by: N. Charge
Issuing Organization:	Experimental Testing Technology Division Org. Code: GH

SEPG Document 70: Document Revision Record

Issue Date	Description of Revision (Include reason for change if not self-evident.)	Section Affected	Prepared By	Authorized By
10/9/98	Initial Release		MNG	RBM

1.0 Introduction

1.1 Project Overview

Open Architecture Data Acquisition System for the National Transonic Facility

The objective of this project is to design, develop, and install new open architecture data acquisition systems (OADAS) for the National Transonic facility. The majority of the work will be performed by the Data Systems and Instrument Support Branch (DSISB) of the Experimental Testing Technology Division (ETTD) and its PBC contractors. The NTF (customer) and their PBC contractor will also perform significant portions of the work. Other organizations are anticipated to minor roles (i.e., ISSD, FSSD, etc). The OADAS will meet the pre-test, in- test, and post-test requirements of the NTF and will be designed, developed, and installed at the NTF Wind Tunnel at B1236. The system will be capable of supporting test preparation as well as real-time data acquisition, reduction, display, and data management at the NTF wind tunnel. The delivered systems will be based on the 16' Transonic Tunnel baseline OADAS and …

The project schedule will be created and maintained electronically using Microsoft Project. The schedule will be kept under configuration control in the NTF OADAS Project files area under the file name …

The major products to be delivered under this SPMP are the pre-test, online, and post-test software and hardware systems to meet the setup, model preparation, data acquisition, data analysis, real-time display, and data reductions requirements of the NTF. Included in the deliverables are three (3) new DAS CPU systems and peripherals, two (2) host CPU systems, facility specific instrumentation interfaces, and new data acquisition units. Major work activities are …

The budget for the NTFOADAS is …

A separate Acquisition Plan will be developed to cover the procurement of software engineering products and services that are to be procured from outside suppliers. At this initial plan writing, the following products and services are anticipated to be procured: SAMMI Graphical User Environment (COTS) software, software and hardware engineering support via PBC contractor #1, software and hardware engineering support via PBC contractor #2, configuration management support via PBC #1, …

This project is not part of a larger system or project. The project and some of its requirements, however, are described in the following references:

- System Engineering Request to Upgrade the NTF Data Systems, SER-12345.001, 7-1-98
- User Requirements for the New NTF DAS—NTF Document No. 4567.88, Version 6.0, dated 5-1-98

1.2 Project Deliverables

Products (and their scheduled delivery dates) that will be provided under this SPMP will be shown and tracked as enumerated items in the project master schedule that will be located in the NTF OADAS project files residing at DSISB. The following life cycle phase products/documentation will be delivered: requirements, architectural design, detailed design, code, validation procedures, acceptance test procedures, and user's guide. User training will also be supplied. Upon transfer to the customer, the systems will be placed under maintenance via the RIMS contract.

1.3 Evolution of the SPMP

Plan to produce updates to SPMP: The SPMP will be reviewed during status reviews. The SPMP will be reissued after each update for the duration of the software project, up through transfer to the customer. Changes to the SPMP will be in accordance with a documentation management plan to be developed and rolled-out as a separate document.
Mechanism to place initial and subsequent SPMP version under change control: The NTF OADAS project file (in DSISB) will contain the SPMP and other project documentation. Document access will be recorded via check-in/check-out logs. Successive issues of the SPMP and other project documentation will be made under revision control as described in the rolled-out documentation management plan. Updates to the SPMP will be reflected on the LaRC document: *Development Schedule for Low, High, and Critical Class Software* for items such as schedule, software class, and staffing.

1.4 Reference Materials

User Requirements for the New NTF DAS - Version 6.0, 6-25-98, John Anderson, NTFD System Engineering Request to Upgrade the NTF Data Systems dated 7-1-98, George Tunnel, NTFD P200 Requirements of the 16 foot Jet Exit Facility Data Acquisition System P200, SD-123-456, 7-31-97, John Andrews, NTFD User's Guide for the NTF Research Data System, NASA Technical Memorandum 110242, 8-15-97, Kim Testbed, NTFD National Transonic Facility Users Guide, Version 3.2, 6-10-97, Nancy Code, NTFD Continuous Risk Management Guidebook, Software Engineering Institute at Carnegie Mellon University, 1996, NTIS#: AD-A319533KKG, DTIC#: AD-A319 533\6\XAB.

1.5 Definitions and Acronyms

DAU—Data Acquisition Unit	OADAS—Open Architecture Data Acquisition System
CPU—Central Processing Unit (e.g., computer system)	ESP—Electronically Scanned Pressure transducer system
COTS—Commercial-Off-The-Shelf	
RM—Risk Management	COTR—Contracting Officer's Technical Representative

2.0 Project Organization

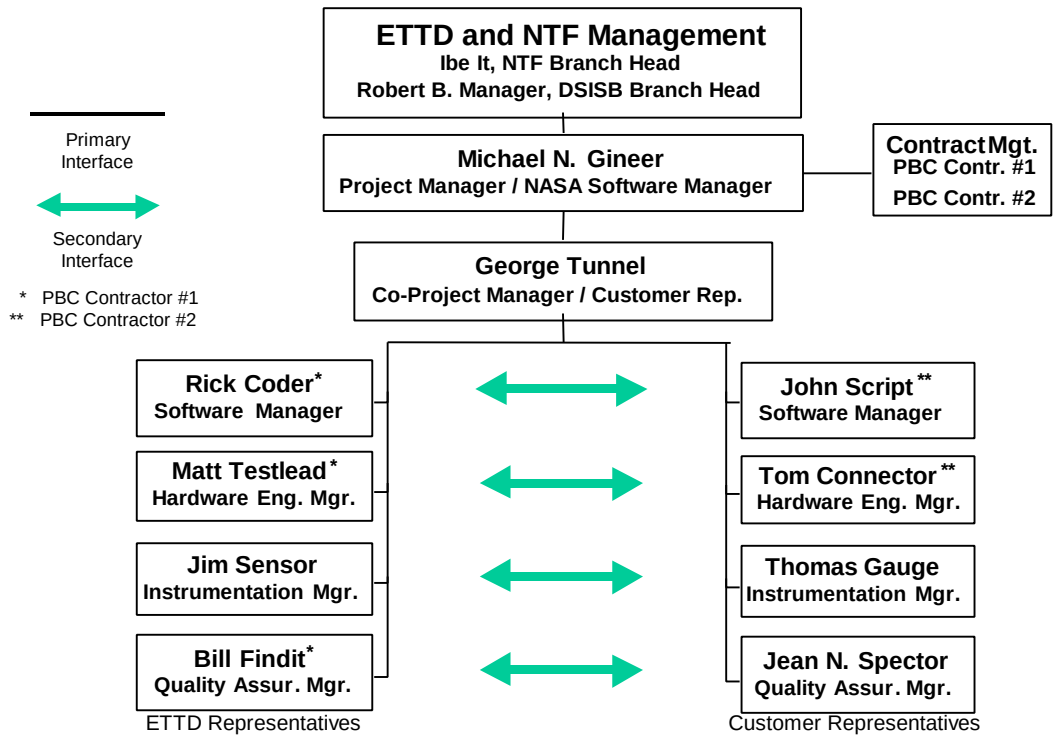
2.1 Process Model

Class:	*(low-control,high-control, or critical-control)*	High
Life cycle option used:	*(A, B, C, or D)*	A
Development approach:	*(waterfall, incremental, evolutionary, etc.)*	Waterfall

The timing of major milestones, baselines, reviews, work products, project deliverables, and sign-offs will be included in the Microsoft Project schedule…

2.2 Organizational Structure

Diagram of Organizational Structure



The project team consists of civil servants and contractor personnel. Michael N. Gineer is the overall project and software manager. The co-project manager and customer representative is George Tunnel. A rolled-out acquisition plan covers software and hardware engineering services to be delivered from two support contractors (each with their own software manager, as well as other area managers called for in their respective contractual agreements). Other area managers and project communications interfaces are listed in the organization chart shown above. Jean N. Spector is the quality assurance lead, which includes responsibility for managing the verification and validation efforts on the project. COTR's for each PBC contractor are shown in the Contract Management box.

2.3 Organizational Boundaries and Interfaces

Administrative and Managerial Interfaces	**POC**
Branch Management	NTF: Ibe It, NTF Branch Head ETTD: Robert B. Manager, DSISB Branch Head
Customer	George Tunnel, NTF Customer Representative
LaRC Organizations (Parent Project, Procurement, Safety, Legal)	Parent: none Legal: none Safety: none Procurement: Sally Quote, OD-OP
Contractors	PBC Contractor #1: Boss #1 via COTR #1 PBC Contractor #2: Boss #2 via COTR#2
Project Support Functions (Configuration Management, Quality Assurance, Verification and Validation)	Configuration Mgt.: PBC Contractor #1 via COTR #1 Validation and Verification: Boss #1 via COTR #1 Quality Assurance: Boss #1 via COTR #1

2.4 Project Responsibilities

Function	Name/Organization	Telephone/Fax/Email	Estimated Effort
NASA Software Mgr. PBC #1 Software Mgr. PBC #2 Software Mgr.	Michael N. Gineer, ETTD Rick Coder, PBC #1 John Script, PBC #2	x43333, x42222, m.n.gineer@LaRC 865-4444, 865-4443, j.c.coder@LaRC 865-5555, 865-5554, j.s.script@LaRC	Full time, 2 years Full time, 2 years Full time, 2 years
Software configuration manager:	Jane Configure, PBC #1	865-4444, 865-4443, j.c.configure@LaRC	Half time, 2 years
S/W engineering	John Doe, ETTD …	x48888, x48887, john.doe@LaRC …	Full time, 2 years …
H/W engineering	Tom Connector, PBC #2 Matt Testlead, PBC #1 …	x49999, x49997, t.connector@LaRC 865-4444, 865-4443, m.testlead@LaRC …	4 @ Full time, 2 years 4 @ Full time, 2 years …
Quality Assurance	Jean N. Spector, NTF Bill Findit, PBC #1 …	x44441, 44442, j.n.spector@LaRC 865-4444, 865-4443, b.findit@LaRC …	Half time, 2 years Half time, 2 years …
Verification and validation	…	…	…
…	…	…	…

3 Managerial Process

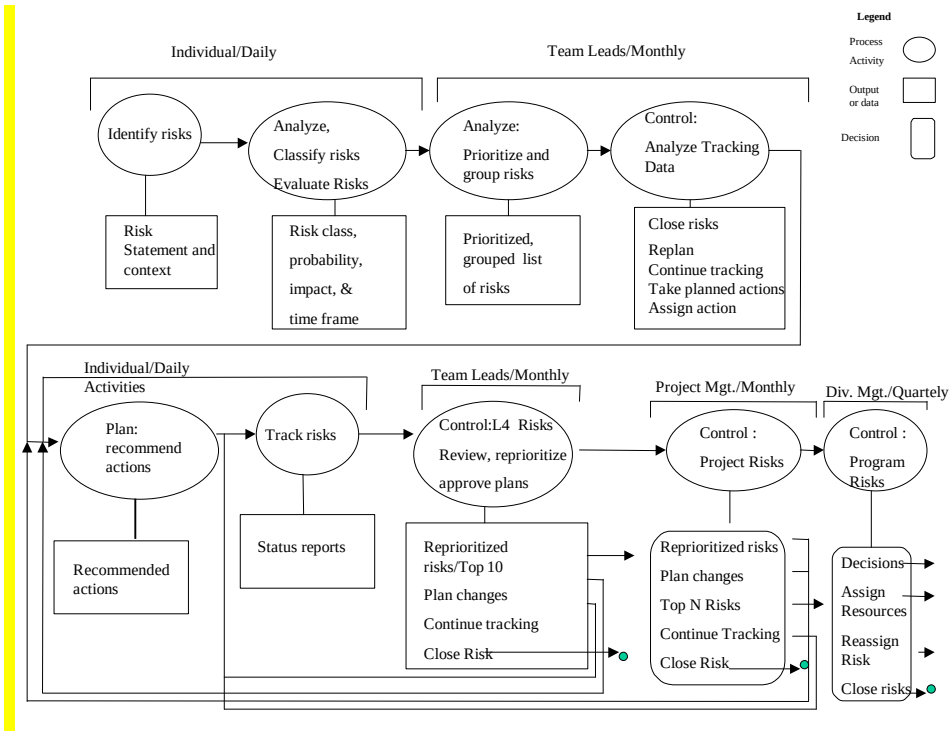
3.1 Management Objectives and Priorities

Objectives: To develop and install new, open systems-based DAS. DAS must have increased performance and capability over the existing DAS, and be installed and checked out by the scheduled delivery date, within budget. The management goals are to minimize the level of required rework after delivery; therefore, a high degree of emphasis will be placed on requirements definition and traceability. Formal inspections will be used for verifying documents and designs against their stated requirements …
Priorities: Relative order of importance is performance, schedule, and cost.

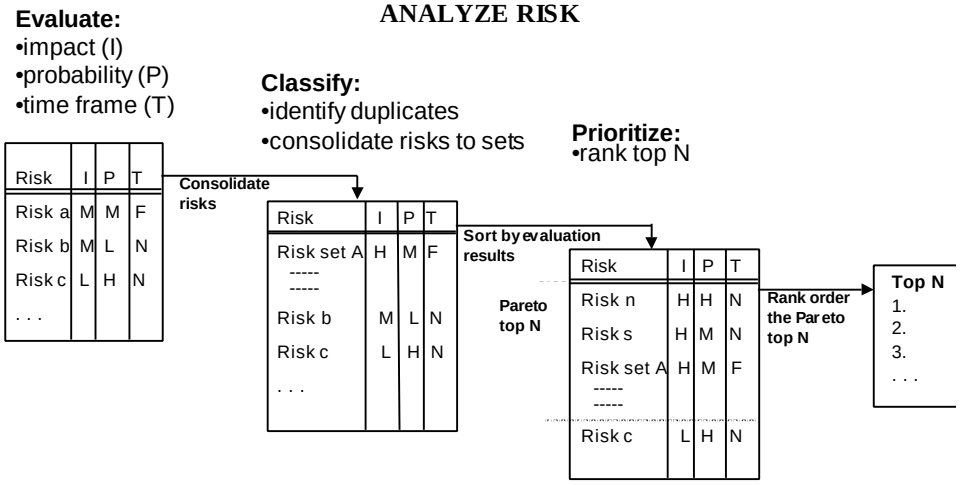
3.2 Assumptions, Dependencies, and Constraints

Assumptions: COTS package for networked real-time graphics will meet facility needs. The proposed CPU and architecture will meet the real-time data collection requirements. A general-purpose local area network will be sufficient for all intercomputer communications. The …
Dependencies: Funding request being met by management. Contractor availability to start the work when needed.
Constraints: New system must be qualified in parallel (to the extent possible) prior to removal of the existing DAS system. The …

3.3 Risk Management

Heading	Description
Introduction:	Continuous risk management (CRM) will be employed on this project. The NASA promoted Continuous Risk Management Guidebook process model will be used to the greatest extent practical to fulfill the risk management requirements specified in NPG 7120.5a.
Overview of process:	The following diagram depicts the overall process of continuously managing risk on the NTF OADAS project. The diagram illustrates functional relationships and data flow for the six primary activities (identify, analyze, plan, track, control, and communicate) that will be performed for the RM process. Specific process details can be found in the rolled-out RM plan. 
Organization:	The entire project team has responsibilities in carrying out continuous risk management activities for the project. Individual project team members will identify, analyze, plan, and track risks and their status. Team leads and project managers will analyze, plan, and control identified risks. They will also integrate risk management functions across the functional areas. The project manager will be the only person who can authorize resources to be spent on for risk management. Details of the organizational responsibilities can be found in the rolled-out RM plan.

3.3 Risk Management (Continued)

Heading	Description
Process details:	A detailed risk management process is explained in the rolled-out RM plan (only a brief summary is given here). Risks will be managed for the duration of the project based on the Continuous Risk Management (CRM) model. Critical to the RM process is the writing of risk statements (condition ⇒ consequence) by project team members. These risks will then be analyzed per illustration below:  In order to analyze risks, each risk will first be evaluated by Probability, Impact, and Time frame as defined below: • Probability classifications are based on the likelihood of a particular occurrence. • Impact classifications are based on the resources, requirements, and mission milestones as defined by the NTF OADAS project. • Time frame classifications establish overall urgency in which mitigation efforts need to be implemented. Risks will then be classified to identify duplicates and group those risks that … A plan will be chosen for top identified risks. Risks will be tracked/controlled and communicated at monthly/quarterly meetings. For more information, see the rolled-out risk management plan.
Resources and schedule:	Risks will be reviewed and managed monthly. Top N risks will be communicated to management on a quarterly basis. Continuous risk management activities will be budgeted at 5% of the project budget submittal. …
Documentation of risks:	The project will utilize the CRM guidebook templates to assist in documenting project risks. In addition, the following documentation are anticipated: Risk Information Sheets, Risk Analysis Reports, Risk Mitigation Status Reports, Stop Light Charts, Action Item Lists, and Task Plans. The recently purchased risk tracking tool will be used to …
Methodology:	The descope methodology is explained in the rolled-out RM plan.

3.4 Monitoring and Control Mechanisms

Procedures and control documents to be employed
Job Order (s) to which time is to be charged: R12345 for Software Engineering R67890 for Hardware and Instrumentation Engineering R56734 for Quality Assurance and Risk Management Monitoring and Control Mechanisms: Weekly status reviews will be held to assess project status and monitor progress, including acquisition and quality assurance. Status reviews will be every Monday, 8:30 AM in the facility main conference room. Format TBD. Reporting by WBS. Project managers and key personnel identified in the project organizational chart are required to attend (participation by others is optional). The last status review of the month will include continuous risk management status. Audits for compliance to metrics collection process are anticipated…
Problem resolution mechanism: The project managers will resolve all project technical issues, or elevate them to line management for action. Identified risks are to be resolved by the risk owners.

3.5 Staffing Plan

Skills and qualifications required (include start times and duration of need):	**Shortfall:**	**Plan to make up shortfall:**
PBC contractors #1: software engineering (5), hardware engineering (2), instrumentation engineering (1), documentation specialists (1), software and hardware management (1), electronic technicians (2), hardware maintenance technicians (2), quality assurance (1.5), configuration management (0.5), validation and verification (2) 2 year duration. Immediate start.	None	
PBC Contractor #2: software engineering (3), instrumentation engineering (1), documentation specialists (1), software and hardware management (1), electrical technicians (1), mechanical technician (1), quality assurance (1) 2 year duration. Immediate start.	None	
Civil servants: Project managers (2), quality assurance officer (1), software engineer (1), operator (1), quality assurance (1) 2 year duration, Immediate start. Facility representative (4) Support required until the end of requirements phase. Immediate start.	Facility representative (4) Quality assurance (1)	Requested line management to allocate 4 facility representatives to the project team from project start-up through the end of requirements analysis phase. Additional person requested for quality assurance.

4 Technical Process

4.1 Methods, Tools, and Techniques

Name	Version Information
Functional decomposition	Functional Decomposition Standard, FDS204, 1993
GNU Fortran 90	V7.0
GNU C Compiler	V3.2
C++	V4.3
Object Oriented programming	The OOP Guide V2.0, 1997
SCCS (source code control system)	V3.0
Acme Risk Tracking Tool	V2.a
C++ Programming Standard, STD-3H	V3
…	

4.2 Software Documentation

Document:	Reference:
Requirements for the NTF Open Architecture DAS*	NTF_OADAS_Req_Ver_0.doc
Architectural Design for the NTF Open Architecture DAS*	…
…	
* planned	

Note: The documents listed above will conform to the format specified in IEEE…

4.3 Project Support Functions

4.3.1 Configuration and Version Management

Document or comment:	Reference:
Process: PBC Contractor #1 responsible for carrying out CM functions for the project. Activities will be as described in the (NASA accepted) PBC #1 CM plan, a rolled-out document.	IEEE 12207.0, 12207.1, PBC #1 Config. Mgt. Procedures, xxx-yy
Project library, records and labeling: Per PBC #1 CM plan	NAS1-88888
Methods and tools: SCCS for software revision control and identification Document and Revision numbers on all documents …	…

4.3.2 Verification, Validation and Testing

Document or comment:	Reference:
Test schedule and process: To be determined and documented in published project schedule	
Acceptance criteria: To be determined and documented in acceptance test plan	

4.3.2 Verification, Validation and Testing (Continued)

Document or comment:	Reference:
Methods and tools: Software Formal Inspections; Peer reviews: Formal inspections on phase outputs up through architectural design. Formal reviews (PDR, CDR, etc.) per project schedule. …	Instructional Handbook for Formal Inspections, V1 IEEE 12207.1

4.3.3 Quality Assurance/Audit

Document or comment:	Reference:
Means of monitoring project: Quality assurance plan to be developed and carried out by quality assurance manager.	
Audit plans: See Quality Assurance plan to be developed.	

4.3.4 Metrics Collection and Analysis

Metric	Collection process	Person responsible for collection and analysis:
ETTD Metrics Form	All personnel email completed documents on a weekly basis (by COB on Fridays). Summaries of the associate data analysis are submitted and reviewed at the Monday morning status meeting	Frank Meter
Software Metrics Collection Sheet	Completed at end of the Project	Michael N. Gineer
…		

5 Work Packages, Schedule, and Budget

5.1 Work Packages

See rolled-out WBS for functional decomposition of major work elements.

5.2 Dependencies

See rolled-out WBS and rolled-out project schedule for discussion of known dependencies.

5.3 Resource Requirements

The NTF facility…

5.4 Budget and Resource Allocation

See rolled-out budget plan.

5.5 Schedule

See rolled-out schedule (MS Project)

6 Additional Components

Document or comment:	Reference:
Health, Safety, Systems Administration, and Security Plan: None	
Transition plan: To be developed as separate roll-out document	
Operational Support plan: N/A	
Maintenance plan: To be placed under LaRC's PBC contract for maintenance of wind tunnel DAS	
Training Plan: Training plans and materials to be produced by PBC #1 and PBC #2. Training to be provided by PBC #1 and PBC #2 as indicated on the project schedule	