COTS Usage Risk Evaluation[SM] (CURE[SM])
Evaluation Record
Version 3.2

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Chapter 1: System Description

External operational context

- Other systems with which the system interacts; complexity of the interactions
  - Manner of dependency on other systems (e.g., accepts data; is controlled by, etc.)
  - COTS products (selected or candidate) known to be affected by this dependence
  - Current status of these systems (e.g., operational, in development)

Internal complexity

- Approximate size, major functional components, data and control flows, complexity of internal interfaces

Business/technical processes

- Business or technical processes supported by the system
  - Stated willingness of the user community to accept the processes
- Any reengineering of the processes:
  - Flexibility of the existing processes to be reengineered
  - Stakeholders that were consulted in planning the reengineering

Site-specific adaptation

- Need for multiple non-identical instances of the system
- Site-specific adaptation needed for the different instances of the system

1.1 External operational context

Questions

⇒ **Other systems with which the system interacts; complexity of the interactions**

Data:

- Identity & location of other system(s)
- Dependency? Or simple interaction (e.g., provides data to)?

⇒ **Degree of dependency on other systems (e.g., accepts data; is controlled by, etc.)**

Data:

- Type of dependency (e.g., is controlled by, needs data from)
- Degree of dependence (e.g., totally dependent; could partially function)

⇒ **COTS products (selected or candidate) known to be affected by this dependence**

Data:

- Name & version of product(s)
- Precise manner in which product is affected
- Role of product in system

⇒ **Current status of these systems (e.g., operational, in development)**

Data:

- If deployed, known to be effective / successful?
- If not deployed, known to be on schedule?

1.1 External operational context

Risk Factors **Notes**

⇒ **The operational context of the system is**

< not at all / moderately / very / massively >

complex (55)

⇒ **The system has**

< no / minimal / moderate / total >

dependence on

< external system x: -- > **(175)**

⇒ **The dependence on**

< external system x: -- >

affects the use of

< product x: -->

in

< some manner: -- > **(301)**

⇒ **The current status of**

< external system x: -->

is

< operational / in development / in testing / other:-- > **(176)**

1.2 Internal complexity

Questions

⇒ **Approximate size, major functional components, data and control flows, complexity of internal interfaces (5)**

Data:

- Size (e.g., LOC, number of modules or components)
- Major functional components
- Data flows
- Control flows
- Internal interfaces

⇒

Save specific details about the role of COTS products in the system's internal complexity until p.16 (2.2.1)

1.2 Internal complexity

Risk Factors **Notes**

⇒ **The interactions between components within the system are**

< not at all / moderately / very / massively >

complex (63)

This general risk factor is refined with a COTS focus in section 2.1, p.17

1.3 Business/Technical processes

Questions

⇒ **Business or technical processes supported by the system**

Data:

- Formally documented?
- Notation used? In what level of detail?
- *When* was process documented?

⇒ **Stated willingness of the user community to accept the processes**

Data:

- Types of users that were consulted
- Percentage of users consulted
- Spectrum of responses

1.3 Business / technical processes

Risk Factors **Notes:**

⇒ **N/A**

⇒ **The user community exhibits**

< no / limited / moderate / extensive >

flexibility to accept the reengineered processes (33)

1.3 Business / technical processes - 2

Questions

⇒ **Any reengineering of the processes:**

Data:

- Degree of change from old to new processes
- Percentage of persons in the enterprise that are affected
- Nature of changes, e.g., manual to computer-based; batch mode to real-time, etc.

⇒ **Flexibility of the existing processes to be reengineered**

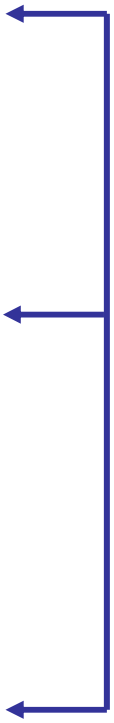
Data:

- How is flexibility manifested?
- What side effects are known to stem from the reengineered process?

⇒ **Stakeholders that were consulted in planning the reengineering**

Data:

- Types of users that were consulted
- Percentage of users consulted
- Spectrum of responses



1.3 Business / technical processes - 2

Risk Factors **Notes**

⇒ **There will be**

< *no / minimal / moderate / extensive* >

divergence between the current and the reengineered business processes (40)

⇒ **The business process to be reengineered have**

< *no / limited / moderate / extensive* >

flexibility based on

< *evidence:* --> (41)

⇒ **< *Stakeholder list :* -->**

were consulted on differences in business processes (302)

1.4 Site-specific adaptation

Questions

⇒ **Need for multiple non-identical instances of the system**

Data:

- Number of instances
- Nature of external differences (e.g., GUI, screens, menus, etc.)
- Nature of internal differences (e.g., different OS, different underlying database, etc.)

⇒ **Site-specific adaptation needed for the different instances of the system**

Data:

- Amount of adaptation data
- Source of adaptation data
- Volatility of adaptation data

1.4 Site-specific adaptation

Risk Factors **Notes**

⇒ **There will be**

< *some number of:* -->

non-identical instances of the system (304)

⇒ **The required site-specific adaptation will consist of**

< *details:* --> (305)

General use of COTS products

- Distribution of system functionality; overall role of COTS products
- Key COTS products and NDI components (anticipated or already chosen)
  - Centrality or importance of the product/component to the system
  - Complexity of interactions with other components of the system
- Factors that determined any choices already made
  - Whether a choice already made is conditional or absolute
- Past and future evolution (e.g., for COTS, known frequency of product update; for NDI, who will control future changes)
  - Expected future capabilities (i.e., of the product or component) that are critical

Evidence of use

- Factors that indicate COTS maturity (e.g., market share, estimated customer base, quality of documentation, other)
- Existing user groups
- Other operational systems using this software

Licensing issues

- Types of licenses needed for system's key COTS elements (e.g., standard commercial license, public domain, GNU Copyleft, other)
- Estimated cost for acquiring licenses; basis for this estimate
- Expected license owner (s)
- Estimated costs for future license renewal; basis for this estimate
  - Incorporation of these costs into program plans (28)

2.1 General use of COTS products

Questions

⇒ **Distribution of system functionality; overall role of COTS products**

Data:

- Allocation of system functionality to COTS
- Rough percentage of functionality done by COTS
- For all NDI, source of component?

(from p.7, Internal Complexity)

⇒ **Key COTS products and NDI components (anticipated or already chosen)**

Data:

- Name and specific version of all key products
- For each, indicator of whether candidate or chosen
- Other products?

⇒ **Centrality or importance of the product/component to the system**

Data:

- Nature of centrality or importance (e.g., performs some critical calculation)
- Degree of centrality (e.g., is the whole system; cannot function without it, etc.)

⇒ **Complexity of interactions with other components of the system**

Data:

- Is the nature of interaction a common use of the product?
- If so, is interface documented?
- If not, what is the nature of the interaction?

2.1 General use of COTS products

Risk Factors	Notes
⇒ N/A	

⇒ **Current system profile includes**

< *some number of:* -->

COTS products (1)

⇒ **The system depends**

< *not at all / partially / primarily / entirely* >

on

< *product x:* -- > **(2)**

⇒ **The interactions between**

< *product x: -- >*

and other components of the system are

< not at all / moderately / highly / massively >

complex (3)

(refinement of RF 63, p.8)

2.1 General Use of COTS Products - 2

Questions

⇒ **Factors that determined any choices already made**

Data:

- Name and specific version of product that was chosen
- Agency that made the choice
- Reason for the choice

⇒ **Whether a choice already made is conditional or absolute**

Data:

- If conditional, criteria for revisiting choice
- If absolute, whether any fallback strategy exists

⇒ **Past and future evolution (e.g., for COTS, known frequency of product update; for NDI, who will control future changes)**

Data:

- Frequency of releases to date
- Degree of change with each release
- And advance indication from vendor concerning future releases
- Other than vendor, sources of expectation regarding future evolution

⇒ **Expected future capabilities (i.e., of the product or component) that are critical**

Data:

- Source of knowledge about future capabilities
- Expected schedule for product releases
- Source of knowledge about future release schedule

Risk Factors **Notes**

⇒ **The selection of**

< ***product x:*** -->

was based on

< ***details:*** --> **(309)**

⇒ **The decision to use**

< ***product x:*** -->

has

< no / limited / moderate / extensive >

flexibility (310)

⇒ < ***product x:*** -- >

has been / is expected to exhibit

< limited / moderate / essential functional >

stability (308)

⇒ **The program depends**

< not at all / partially / entirely >

on future capabilities of

< ***product x:*** --> **(27)**

2.2 Evidence of Use

Questions

⇒ **Factors that indicate COTS maturity (e.g., market share, estimated customer base, quality of documentation, other)**

Data:

- Market share
- Size of customer base
- Quality of documentation

⇒ **Existing user groups**

Data:

- Number of user groups
- Location /geographical distribution of user groups
- Sponsored by vendor?
- Bboards, FAQ lists?

⇒ **Other operational systems using this software**

Data:

- Full identification of systems
- Location of systems
- Success of product in the system?
- Source of knowledge about product's success

2.2 Evidence of Use

Risk Factors **Notes**

⇒ **There exists**

<some evidence: -->

that

< product x: >

will be a mature product (13)

⇒ **User groups for**

< product x: -->

include

***< details: -->* (312)**

⇒ **There exists**

< some evidence: -->

that

< product x: -- >

has been successfully used in other systems (9)

2.3 Licensing Issues

Questions

⇒ **Types of licenses for system's key COTS elements (e.g., standard commercial license, public domain, GNU Copyleft, other)**

Data:

- Types of licenses
- Planned duration of license validity

⇒ **Estimated cost for acquiring licenses; basis for this estimate**

Data:

- Discussions with vendors?
- Use under existing licenses?
- If existing licenses, name & location of license owner

⇒ **Expected license owner (s)**

Data:

- Name & location of owning organization
- If other than project organization, name and role of person who provides primary Point of Contact

2.3 Licensing Issues

Risk Factors **Notes**

⇒ **The types of licenses include**

< *some types:* --> (124)

⇒ **There is**

< *some basis:* -->

for the estimates concerning licenses needed for

< *product x:* > (129)

⇒ **The owner(s) of these licenses is / are/ will be**

< *some organization:* --> (125)

2.3 Licensing Issues - 2

Questions

⇒ **Estimated costs for future license renewal; basis for this estimate**

Data:

- Discussions with vendors?
- Any anticipated change in license structure?
- Knowledge about cost increases?
- Source of that knowledge
- Formality of any existing agreements about these costs

⇒ **Incorporation of these costs into program plans**

Data:

- Visible line items in long-term budget?

2.3 Licensing Issues - 2

Risk Factors **Notes**

⇒ **There is**

< *some basis for:* -->

expectations with regard to future license costs for

< *product x:* --> (128)

⇒ **Project plans incorporate license renewal costs by means of**

< *some means:* --> (126)

Chapter 3: Management Readiness

Previous experience by Project Manager

- Experience on projects similar to the project; nature of similarity; Manager's role; relative success of these projects
  - Development projects
  - Reengineering projects
  - Long-term maintenance projects
  - Specific COTS products used

Anticipated management changes

- Known career changes (e.g., retirements, rotations, others) for any key management personnel
- Known alternate management personnel; nature of their experience (q.v.3.1)

Decision authority

- Name and location of each entity with decision-making authority (36)
- Types and degrees of authority exercised
  - Authority for resolving disputes concerning COTS product decisions
  - Authority for resolving "product vs. process" decisions
  - Authority to resolve inter-program conflicts

3.1 Previous Experience by Project Manager

Questions

⇒ **Experience on projects similar to the project; nature of similarity; Manager's role; relative success of these projects**

Data:

- {All in following subquestions}

⇒ **Development projects**

Data:

- Manager's role
- Size
- Domain
- Budget & schedule
- Successful? Still fielded?

⇒ **Reengineering projects**

Data:

- Manager's role
- Size
- Domain
- Budget & schedule
- Successful? Still fielded?
-

⇒ **Long-term maintenance projects**

Data:

- Manager's role
- Size
- Domain
- Budget & schedule
- Successful? Still fielded?

⇒ **Specific COTS products used**

Data:

- Names & specific version
- Vendor

This is a "global" question about experience with specific COTS products that is asked again in several lifecycle sections (Evaluation, Testing, Integration, Fielding.)

3.1 Previous Experience by Project Manager

Risk Factors	Notes
⇒ N/A	
⇒ < *Some person's:* --> experience on development projects similar to this project consists of < *details:* --> (361)	
⇒ < *Some person's:* --> experience on reengineering projects similar to this project consists of < *details:* --> (362)	
⇒ < *Some person's:* --> experience on long-term maintenance projects similar to this project consists of < *details:* --> (363)	
⇒ < *Some person's:* --> experience with < *product list:* --> consists of < *details:* --> (364)	

3.2 Anticipated Management Changes

Questions

⇒ **Known career changes (e.g., retirements, rotations, others) for any key management personnel**

Data:

- Persons and role affected
- Dates of event
- Centrality of person to the project

⇒ **Known alternate management personnel; nature of their experience (q.v.3.1)**

Data:

- Names and current status of replacements
- COTS-related experience
- Source of knowledge about their experience

3.2 Anticipated Management Changes

Risk Factors	Notes
⇒ **There are** *<some number of>* **anticipated personnel changes (111)**	

⇒ **Known replacement personnel have** *< unknown / no / limited / moderate / extensive >* **experience with COTS-related projects (112)**	

3.3 Decision Authority

Questions

⇒ **Name and location of each entity with decision-making authority (36)**

Data:

- Name
- Location
- Relationship to the program

⇒ **Types and degrees of authority exercised**

Data:

- High-level (e.g., Milestone) authority
- Low-level, immediate responsibility

⇒ **Authority for resolving disputes concerning COTS product decisions**

Data:

- Name
- Location
- Relationship to the program

⇒ **Authority for resolving "product vs. process" conflicts**

Data:

- Name
- Location
- Relationship to the program

⇒ **Authority to resolve inter-program conflicts**

Data:

- Name
- Location
- Relationship to the program

3.3 Decision Authority

Risk Factors	Notes
⇒ **N/A**	

⇒ **The source of decision-making authority resides in**
<some person/agency> **(113)**

⇒ **The authority for resolving disputes concerning COTS products resides in**
<some person/agency> **(115)**

⇒ **The authority to resolve conflicts between existing processes and candidate products resides in**
<some person/agency> **(114)**

⇒ **The authority to resolve inter-program conflicts resides in**
<some person/agency> **(116)**

Previous experience by Lead Engineer/Chief Architect

- Experience on projects similar to the project; nature of similarity; Engineer's role; relative success of these projects
  - Development projects
  - Reengineering projects
  - Long-term maintenance projects
  - Specific COTS products used

Experience with modification of COTS products

- Description of any modification that will be necessary; item that will be modified; agency that will perform the modification
- Experience of that agency with modifying any COTS or NDI
- Experience of that agency with modifying <item x>
- Experience with estimating the complexity of modification

Software development environment

- Software development environment to be used; resources and tools needed for implementing, debugging and integrating the COTS components of the system
- Basis of estimates for needed environment resources and configuration
- Present state of the development environment
- Extent of experience using the software development environment

4.1 Previous Experience by Lead Engineer/Chief Architect

Questions

⇒ **Experience on projects similar to the project; nature of similarity; Engineer's role; relative success of these projects (41)**

Data:

- {All in following subquestions}

⇒ **Development projects**

Data:

- Manager's role
- Size
- Domain
- Budget & schedule
- Successful? Still fielded?

⇒ **Reengineering projects**

Data:

- Manager's role
- Size
- Domain
- Budget & schedule
- Successful? Still fielded?
-

⇒ **Long-term maintenance projects**

Data:

- Manager's role
- Size
- Domain
- Budget & schedule
- Successful? Still fielded?

⇒ **Specific COTS products used**

Data:

- Names & specific version
- Vendor

This is a "global" question about experience with specific COTS products that is asked again in several lifecycle sections (Evaluation, Testing, Integration, Fielding.)

4.1 Previous Experience by Lead Engineer/Chief Architect

Risk Factors **Notes**

⇒ **N/A**

⇒ **< *Some person's:* -->**

experience on development projects similar to this project consists of

< *details:* --> (365)

⇒ **< *Some person's:* -->**

experience on reengineering projects similar to this project consists of

< *details:* --> (366)

⇒ **< *Some person's:* -->**

experience on long-term maintenance projects similar to this project consists of

< *details:* --> (367)

⇒ **< *Some person's:* -->**

experience with

< *product list:* -->

consists of

< *details:* --> (368)

4.2 Experience with Modification of COTS Products

Questions

⇒ **Description of any modification that will be necessary; item that will be modified; agency that will perform the modification**

Data:

- Name & location of organization that will perform modifications
- Nature of modifications
- Concurrence of vendor

⇒ **Experience of that agency with modifying any COTS or NDI**

Data:

- Names & version of other products modified by that organization
- Success of those modifications?
- Concurrence of vendor?

⇒ **Experience of that agency with modifying <item x>**

Data:

- Specific version that was modified
- Success of modification?
- Concurrence of vendor?

⇒ **Experience with estimating the complexity of modification**

Data:

- Source of estimate regarding complexity of modification
- That person's previous experience in making such an estimate
- Success of those previous estimates?

4.2 Experience with Modification of COTS Products

Risk Factors **Notes**

⇒ **The agency that will perform modifications to**

< ***product x:*** **-->**

is

< ***some organization*** **--> (314)**

⇒ **<*Some organization*>**

has

< no / limited / moderate / extensive >

experience in COTS modification [in general] (75)

⇒ **<** ***Some organization*** **-->**

has

< no / limited / moderate / extensive >

experience in modifying

< ***product x:*** **-- > (76)**

⇒ **<** ***Some person:*** **-->**

has

no / limited / moderate / extensive >

experience in successfully estimating the complexity of modifying COTS products (74)

4.3 Software Development Environment

Questions

⇒ **Software development environment to be used; resources and tools needed for implementing, debugging and integrating the COTS components of the system**

Data:

- Tools needed for project in general
- Tools needed for COTS-specific aspects of project

⇒ **Basis of estimates for needed environment resources and configuration**

Data:

- Person who defined specification of development environment
- That person's experience with defining a development environment
- Provision for replacement tools as products evolve

⇒ **Present state of the development environment**

Data:

- Currently in-house?
- All tools installed?
- Dedicated machines?

⇒ **Extent of experience using the software development environment**

Data:

- Environment currently in use on other projects?
- Manager of those projects? Competition for resources?
- Expressed satisfaction with environment?

Risk Factors **Notes**

⇒ **The development environment includes**

< *details:* -->

of tools for implementing, debugging, and integrating

< *product x:* --> **(156)**

⇒ **There is**

< *some basis:* -->

for the planned configuration and needed resources for the development environment (315)

⇒ **The development environment is in**

< *some condition of:* -->

readiness for use (158)

⇒ < *Some person:* -->

in

< *some organization:* -->

has

< *no / limited / moderate / extensive* >

experience with this environment (157)

Contractual relationships

- Contractual relationships with and between all entities that will contribute to the project
  - Contractual relationships between different organizations
  - Contractual relationships between different components of the same organizations
- Expected nature of any other contributions (i.e., non-contractual contributions) that are expected

Contract flexibility

- {For any contract that exists:} Provisions in the contract that provide flexibility (e.g., wrt changed costs, extensions of vendor services; increased requirements, etc.).
- Previous contracts with similar COTS-related provisions that served as a contract model

Contract renegotiation

- {For any that contract that exists:} Contract renegotiation that has occurred that was driven by COTS-related issues
- Effects of this renegotiation

Cost projections and budgeting

- Methods used for cost projections and budgeting for the system; impact of COTS products on these methods
- Resource allocations for specific COTS-related activities (e.g., standards group participation, technology watch)

Commercialization of modified products

- Contractual provisions concerning commercialization of modified products
- Expectations regarding other customers of the modified products

Project schedule

- Schedule for the project in terms of major milestones, IOC, interim deliverables, major decision points
- Provisions in overall project schedule for COTS products releases
- Any other COTS-related factors that contribute to or constrain the schedule

5.1 Contractual Relationships

Questions

⇒ **Contractual relationships with and between all entities that will contribute to the project**

Data:

- Name and location of entity
- Role in project

⇒ **Contractual relationships between different organizations**

Data:

- Name & location of organizations
- Type of contract
- When put in force?
- Duration of contract?

⇒ **Contractual relationships between different components of the same organizations**

Data:

- Name & location of organizational components
- Type of contract
- When put in force?
- Duration of contract?

⇒ **Expected nature of any other contributions (i.e., non-contractual contributions) that are expected**

Data:

- Name & location of organization
- Nature of contribution
- Source of expectation

5.1 Contractual Relationships

Risk Factors | **Notes**

⇒ **N/A**

⇒ **The contractual relationships involving**
< *organizations x & -y:* -->
consist of
< *details:* --> **(359)**

⇒ **The contractual relationships involving**
< *some different parts:* -->
of
< *organization x:* -->
consist of
< *details:* --> **(123)**

⇒ **The expected non-contractual contribution of**
< *organization x:* -->
toward the program's goals is
< *details:* --> **(122)**

5.2 Contract Flexibility

Questions

⇒ **{For any contract that exists:} Provisions in the contract that provide flexibility (e.g., wrt changed costs, extensions of vendor services; increased requirements, etc.)**

Data:

- Changed costs
- Extensions of Vendor services
- Increased requirements

⇒ **Previous contracts with similar COTS-related provisions that served as a contract model**

Data:

- Project that used the contract
- Dates of project
- Success of project

5.2 Contract Flexibility

Risk Factors	Notes
⇒ **The contract exhibits** < *no / limited / moderate / extensive* > **COTS-related flexibility {e.g., provisions for changed costs} (135)**	
⇒ **There is** < *no / limited / moderate / extensive* > **experience with COTS-related contractual flexibility available to the program (134)**	

5.3 Contract Renegotiation

Questions

⇒ **{For any contract that exists:} Contract renegotiation that has occurred that was driven by COTS-related issues**

Data:

- Parties to the renegotiated contract
- Nature of renegotiation
- License issues involved?

⇒ **Effects of this renegotiation**

Data:

- Schedule slip
- Increased costs
- Change in requirements
- Change in COTS product
- Additional process reengineering

5.3 Contract Renegotiation

Risk Factors	Notes
There have been **< *some instances of:* -->** **COTS-related contract renegotiation (136)**	
COTS-related contract renegotiation has caused **< *some quality of:* -->** **impact on the program (137)**	

5.4 Cost Projections and Budgeting

Questions

⇒ **Methods used for cost projections and budgeting for the system; impact of COTS products on these methods**

Data:

- Name of method
- Basic approach
- Overall impact of COTS on method (e.g., increase, decrease)

⇒ **Resource allocations for specific COTS-related activities (e.g., standards group participation, technology watch)**

Data:

- Cost & schedule figure (actual or proportional)
- Standards groups
- Ongoing technology watch
- This allocation comparable to other projects?

5.4 Cost Projections and Budgeting

Risk Factors **Notes**

⇒ **The impact of COTS-related cost projections on the system's budget consisted of**

< ***details:*** **--> (316)**

⇒ **The resources allocated to COTS-related activities consist of**

< ***details:*** **-->(317)**

5.5 Commercialization of Modified Products

Questions

⇒ **Contractual provisions concerning commercialization of modified products**

Data:

- What products will be commercialized?
- When will commercialization occur?
- What penalties exist for failure to commercialize?

⇒ **Expectations regarding other customers of the modified products**

Data:

- Identity of potential customers
- Similarity to present users of product

5.5 Commercialization of Modified Products

Risk Factors **Notes**

⇒ **The contractual provision for commercializing modified**

< *product x:* -->

consists of

< *details:* --> (78)

⇒ **< *Some person:* -->**

has

< *some expectation:* -->

concerning potential customers of modified

< *product x:* --> (79)

5.6 Project Schedule

Questions

⇒ **Schedule for the project in terms of major milestones, IOC, interim deliverables, major decision points**

Data:

- Major milestones
- IOC
- Interim deliverables
- Major decision points

⇒ **Provisions in overall project schedule for COTS product releases**

Data:

- What parts of the schedule? For which products?
- Degree of impact on overall schedule?

This is a "global" question on COTS release schedules that is asked again in several lifecycle sections (Evaluation, Testing, Integration, Fielding.)

⇒ **Any other COTS-related factors that contribute to or constrain the schedule**

Data:

- Third-party testing
- Any modifications of other system elements to work with a COTS product

5.6 Project Schedule

Risk Factors **Notes**

⇒ **N/A**

⇒ **The schedule accounts**

< not at all / partially / extensively >

for COTS product releases (318)

⇒ **COTS-related factors that constrain the schedule are**

< *details:* --> (319)

Vendor profile

- Size of the vendors of each key product (i.e., number of people employed)
- Products' relative market share
- Vendor's financial health
- Vendor's reputation in the software community
- Products of comparable quality from the same vendor

COTS product support *(also applies to NDI)*

- Organization with responsibility for product support
- Contractual status of product support agreements
- Expected product support process
  - Provisions for expected evolution, end-of-life, and normal upgrades
  - Provisions for emergency upgrades

Multiple vendor agreements

- Dependence on multiple vendors working jointly (e.g., product integration)
- Comparable joint work performed by these vendors in the past
- Status of any contractual statement about product interoperability

6.1 Vendor Profile

Questions

⇒ **Size of the vendors of each key product (i.e., number of people employed)**

Data:

- Number of employees
- Source of information concerning vendor
- Other indices of size (e.g., new worth)

⇒ **Products' relative market share**

Data:

- Size of market share
- Size of market
- Source of information

⇒ **Vendor's financial health**

Data:

- Estimate of vendor health
- Source of information

⇒ **Vendor's reputation in the software community**

Data:

- Quality of reputation
- Source of information

⇒ **Products of comparable quality from the same vendor**

Data:

- Name of product
- Kind of comparison (e.g., market share, word-of-mouth, other)

6.1 Vendor Profile

Risk Factors **Notes**

⇒ *< Vendor x: -->*
employs
< some number of: -->
people (180)

⇒ *< product x: -->*
has
< some amount of: -->
market share (183)

⇒ *< Vendor x: -->*
is in
< some state: -->
of financial health (181)

⇒ *< Vendor x: -->*
has
< some quality of: -->
reputation (182)

⇒ **There exists**
< no / limited / moderate / extensive >
evidence that
< vendor x: -->
has produced other products of
< lesser / comparable / higher >
quality (11)

6.2 COTS Product Support (*also applies to NDI*)

Questions

⇒ **Organization with responsibility for product support**

Data:

- Name & location of organization
- Relation ship to development organization
- Locus of joint authority

⇒ **Contractual status of product support agreements**

Data:

- Products & versions covered by contract(s)
- Duration of contract
- Expected maintenance organization covered?

⇒ **Expected product support process**

Data:

- 24/7 help desks
- Vendor onsite visits

⇒ **Provisions for expected evolution, end-of-life, and normal upgrades**

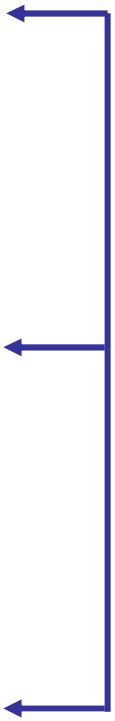
Data:

- Nature of provisions

⇒ **Provisions for emergency upgrades**

Data:

- Nature of provisions



6.2 COTS Product Support (*also applies to NDI*)

Risk Factors **Notes**

The entity with responsibility to support

< *product x:* -- >

is

< *name:* --> (22)

⇒ There exists

< *some form of:* -->

contractual provision for maintenance of

< *product x:* -- > (349)

⇒ The expected product support process is

< details: --> (370)

⇒ Maintenance plans have

< *no / limited /moderate / extensive* >

provision for future evolution of

< *product x:* --> (18)

⇒ The planning for emergency upgrade of

< *product x:* -->

consists of

< *details:* --> (350)

6.3 Multiple Vendor Agreements

Questions

⇒ **Dependence on multiple vendors working jointly (e.g., product integration)**

Data:

- Need for joint work
- Nature of joint work
- Level of effort involved

⇒ **Comparable joint work performed by these vendors in the past**

Data:

- Evidence of success of joint work
- Similarity to present project (e.g., technically, logistically, contractually)

⇒ **Status of any contractual statement about product interoperability**

Data:

- Details of the contractual statement
- Details about definition of "interoperability"
- Details about multiple vendors' expected roles and responsibilities

6.3 Multiple Vendor Agreements

Risk Factors **Notes**

There is

< *no / limited / moderate / extensive* >

dependence on

< *some level of* -->

cooperation between

< *vendors x & y:* --> (132)

⇒ **There is**

< *some evidence of:* -->

previous successful collaboration between

< *vendors x & y:* --> (131)

⇒ **There is**

< *some contractual basis for:* -->

joint work between

< *vendors x & y:* --> (130)

Required standards compliance

- Laws, stipulations, mandates, or requirements concerning standards compliance by any COTS components used in the system
  - For each applicable standard, whether the constraint has any flexibility
- Resources allocated for standards verification, participation in standards groups, committees, conferences, etc

Known standards compliance by COTS products

- COTS products (already selected or candidates) known to comply with standards identified above
- How standards compliance has been/will be verified
- Dependencies on vendor extensions to a standard
- Any other extension, subsetting, or modification of standards that will be needed

DII/COE (NB: Only required for programs expecting to use DII/COE)

- Overall project strategy wrt DII/COE; expected level of DII/COE compliance
- Version of DII/COE currently installed at development site; version of DII/COE expected in the system
- Previous projects by Contractor that made use of DII/COE; Lead Engineer's role in these projects
- Any known conflict between versions of products in DII/COE and planned versions of COTS products for the system

7.1 Required Standards Compliance

Questions

⇒ **Laws, stipulations, mandates, or requirements concerning standards compliance by any COTS components used in the system**

Data:

- Specific laws, etc. involved
- Products involved

⇒ **For each applicable standard, whether the constraint has any flexibility**

Data:

- Manner in which flexibility is indicated
- Waivers granted
- Waivers requested

⇒ **Resources allocated for standards verification, participation in standards groups, committees, conferences, etc.**

Data:

- Amount allocated
- Period of allocation compared with overall program schedule
- Resources targeted at particular activities?

7.1 Required Standards Compliance

Risk Factors **Notes**

⇒ **N/A**

⇒ **There exists**

< *no / limited / moderate / extensive* >

flexibility of the constraint concerning

< *standard x:* --> (161)

⇒ **There are**

< no / limited / moderate / extensive >

resources available to accommodate

< *standard x:* --> (159)

7.2 Known Standards Compliance by COTS Products

Questions

⇒ **COTS products (already selected or candidates) known to comply with standards identified above**

Data:

- Which products?
- Which standards?

⇒ **How standards compliance has been/will be verified**

Data:

- Organization responsible for verification
- Whether verification is "once-only" or to be repeated for future releases

---

⇒ **Dependencies on vendor extensions to a standard**

Data:

- Nature of extension
- Agreement of vendor to maintain extensions

⇒ **Any other extension, subsetting, or modification of standards that will be needed**

Data:

- Nature of extension, subsetting, or modification
- Organization that will maintain the modified standard

7.2 Known Standards Compliance by COTS Products

Risk Factors **Notes**

⇒ < *product x:* -->
is / is not known to comply with
< *standard x:* --> **(163)**

⇒ < *product x:* -->
can be verified by
< *some means:* -->
to comply with
< *standard x:* --> **(164)**

⇒ **Use of**
< *product x:* -->
will depend on vendor extensions to
< *standard x:* --> **(320)**

⇒ **Use of**
< *product x:* -->
will require
< no / limited / moderate / extensive >
subsetting, extension, or modification to
< *standard x:* --> **(160)**

7.3 DII/COE

Questions

⇒ **Overall project strategy wrt DII/COE; expected level of DII/COE compliance**

Data:

- Significance of DII/COE components to the system

⇒ **Version of DII/COE currently installed at development site; version of DII/COE expected in the system**

Data:

- Version installed at development site
- Version expected in system

⇒ **Previous projects by Contractor that made use of DII/COE; Lead Engineer's role in these projects**

Data:

- Domain of the previous projects
- Dates of projects
- Version of DII/COE used in project

⇒ **Any known conflict between versions of products in DII/COE and planned versions of COTS products for the system**

Data:

- DII/COE components involved
- Products involved

7.3 DII/COE

Risk Factors **Notes**

⇒ **N/A**

⇒ **There is**

< no / some / considerable >

conflict between different versions of DII/COE used in the project (321)

⇒ *< Some person: -->*

in the development organization has

< no / limited / moderate / extensive >

experience using DII/COE (165)

⇒ **There is**

< no / limited / moderate / extensive >

conflict between DII/COE and

< product x: --> **(166)**

Development process

- Planned development process to be used for the system; manner and detail in which it is recorded
  - Ways that the presence of COTS products will influence the planned development process
- Previous projects by Contractor that made use of any COTS-based development process; Lead Engineer's role in these projects
- Previous projects by Contractor that made use of the planned COTS-based development process; Lead Engineer's role in these projects
  - Relative success (e.g., technical goals, schedule, and budget) of these projects

Management process

- Planned management process to be used for the system; manner and detail in which it is recorded
  - Ways that the presence of COTS products will influence the planned management process
- Previous projects by organization that made use of any COTS-based management process; Program/Project Manager's role in these projects
- Previous projects by organization that made use of the planned COTS-based management process; Program/Project Manager's role in these projects
  - Relative success (e.g., technical goals, schedule, and budget) of these projects

Program risk management

- Resources allocated to risk management for the program
- Any ongoing continuous risk management strategies
- Extent to which the risk management plan has identified risks stemming from use of COTS products

Integrated product teams (IPTs)

- {If IPTs are to be used:}Other COTS-based projects on which management participated that made use of IPTs
- Organizational structure of IPTs; geographical distribution; expected composition; any divisions of authority
- Experience by personnel staffing the IPTs with COTS-based projects

8.1 Development Process

Questions

⇒ **Planned development process to be used for the system; manner and detail in which it is recorded**

Data:

- How formally is process documented?
- Notation used? At what level of detail?
- Means of access to the documented process? Who has this access?

⇒ **Ways that the presence of COTS products will influence the planned development process**

Data:

- What aspects of the process are affected? How?
- *Which* characteristics of *which* products?

⇒ **Previous projects by Contractor that made use of any COTS-based development process; Lead Engineer's role in these projects**

Data:

- Domain of the previous projects?
- Dates of experience?
- Formality of the COTS-based development process?
- Relative amount of COTS used?

⇒ **Previous projects by Contractor that made use of the planned COTS-based development process; Lead Engineer's role in these projects**

Data:

- Domain of previous projects
- Dates of experience?
- Formality of the planned development process

⇒ **Relative success (e.g., technical goals, schedule, and budget) of these projects**

Data:

- Fielding status of these project(s)
- Schedule of these project(s)
- Budget of these project(s)
- Aspects of the process that were successful
- Aspects of the process that were unsuccessful

8.1 Development Process

Risk Factors **Notes**

⇒ **N/A**

⇒ **The planned development process makes**

< *some details of:* -->

accommodation for COTS products (167)

⇒ **< *Some person:* -->**

has

< no / limited / extensive >

experience using a COTS-based development process (168)

⇒ **< *Some person:* -->**

has

< *no / limited / extensive* > experience using the planned development process (169)

<

⇒ **There is**

< *some evidence of:* -->

the quality of the planned development process (322)

8.2 Management Process

Questions

⇒ **Planned management process to be used for the system; manner and detail in which it is recorded**

Data:

- How formally is process documented?
- Notation used? At what level of detail?
- Means of access to the documented process? Who has this access?

⇒ **Ways that the presence of COTS products will influence the planned management process**

Data:

- Specific characteristics of the specific products?
- What aspects of the process are affected? How?

⇒ **Previous projects by organization that made use of any COTS-based management process; program/project manager's role in these projects**

Data:

- Domain of the previous projects?
- Dates of experience?
- Relative amount of COTS used?
- Formality of the COTS-based development process?

⇒ **Previous projects by organization that made use of the planned COTS-based management process; project/program manager's role in these projects**

Data:

- Domain of previous projects
- Dates of experience?
- Formality of the planned development process

⇒ **Relative success (e.g., technical goals, schedule, and budget) of these projects**

Data:

- Fielding status of previous project(s)
- Schedule of previous project(s)
- Budget of previous project(s)
- Aspects of the process that were successful
- Aspects of the process that were unsuccessful

8.2 Management Process

Risk Factors **Notes**

⇒ **N/A**

⇒ **The planned management process makes**

< *some details of:* -->

accommodation for COTS products (170)

⇒ **< *Some person:* -->**

has

< *no / limited / extensive* >

experience using a COTS-based management process (171)

⇒ **< *Some person:* -->**

has

< *no / limited / extensive* >

experience using the planned management process (172)

⇒ **There is**

< *some evidence of:* -->

the quality of the planned management process (323)

Questions

⇒ **Resources allocated to risk management for the program**

Data:

- Budget?
- Schedule?
- Number of persons assigned?
- Duration of the allocation?

⇒ **Any ongoing continuous risk management strategies**

Data:

- Length of time CRM has been in operation?
- Names of other programs that use risk management?
- Size of permanent risk management staff?

⇒ **Extent to which the risk management plan has identified risks stemming from use of COTS products**

Data:

- Nature of risks?
- Nature of mitigations?
- Whether mitigations have been put into place?
- Effect of mitigations?

8.3 Program Risk Management

Risk Factors **Notes**

⇒ **Current plans comprise**

< no / limited / moderate / extensive >

resources available for risk management (120)

⇒ **There is**

< no / limited / moderate / extensive >

planning for continuous risk management (324)

⇒ **The risk management plan manifests**

< no / limited / moderate / considerable >

awareness about COTS-specific risks and mitigations (121)

8.4 Integrated Project Teams (IPTs)

Questions

⇒ **{If IPTs are to be used:}Other COTS-based projects on which management participated that made use of IPTs**

Data:

- Which management personnel? Role in current project?
- Names of projects?
- Schedules, budgets, success rates?
- Size and number of IPTs used?

⇒ **Organizational structure of IPTs; geographical distribution; expected composition; any divisions of authority**

Data:

- Geographical distribution?
- Expected composition?
- Resources available?
- Authority structure?

⇒ **Experience by personnel staffing the IPTs with COTS-based projects**

Data:

- Nature of experience?
- Number of experiences persons?
- Proportion of experienced persons?

8.4 Integrated Project teams (IPTs)

Risk Factors **Notes**

⇒ < *Some person:* -->

has

< *no / limited / moderate / extensive* >

experience with IPTs (109)

⇒ **The planned IPT structure consists of**

< *some details:* -->

re geography, schedule, resources, authority (108)

⇒ **The experience base with COTS-based systems that is available to the IPTs is**

< *some quality:* --> **(110)**

Planning for evaluation

- Overall planning for evaluation (products as well as technologies)
  - Resources (budget, schedule, personnel) to perform evaluations
  - Basis of the resource allocation
- Specific COTS products to be evaluated

Evaluation methods and techniques

- COTS evaluation methods to be used
  - Rationale for these choices
- Supporting technologies (e.g., test harnesses) needed for these methods
  - Current availability of these supporting technologies

Experience with COTS product evaluation

- Previous projects by Contractor that required evaluation of COTS products; Lead Engineer's role in those projects
- Specific COTS products that were evaluated
- Methods and techniques used

Evaluation focus

- Support for the planned business process
- User interface; usability and tailorability
  - Anticipated learning curve for end users

Evaluation of interoperability

- Interactions of products to be evaluated
- Basis of the expectation that candidate or chosen products will successfully interoperate with other parts of the system.
- Verification of interoperability for heterogeneous groups of COTS products
- Experience with product interaction evaluation

9.1 Planning for Evaluation

Questions

⇒ **Overall planning for evaluation (products as well as technologies)**

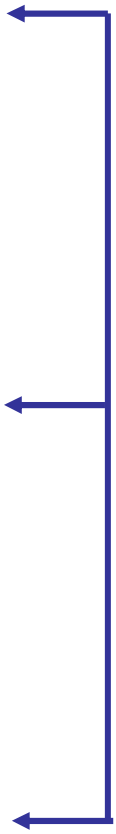
Data:

- Identity of planners
- Role of evaluation in the Work Breakdown Structure
- Other than WBS, formality of Evaluation Plan? How documented?

⇒ **Resources (budget, schedule, personnel) to perform evaluations**

Data:

- Actual budget figure
- Schedule
- Number of persons dedicated to evaluation



⇒ **Basis of the resource allocation**

Data:

- Other projects using a comparable plan
- Success of these projects

⇒ **Specific COTS products to be evaluated**

Data:

- Names & versions of products

Risk Factors **Notes**

⇒ **N/A**

⇒ **Current plans comprise**
< *some resources:* -->
for evaluation of
< *product x:* --> (4)

⇒ **The resource allocation for evaluation has**
< *some basis:* --> (5)

⇒ **There are**

< *some number of:* -->

COTS products to be evaluated (82)

9.2 Evaluation Methods and Techniques

Questions

⇒ **COTS evaluation methods to be used**

Data:

- Identity of specific evaluation methods
- Complexity of methods

⇒ **Rationale for these choices**

Data:

- Other projects that have used these methods
- Successes of these projects

⇒ **Supporting technologies (e.g., test harnesses) needed for these methods**

Data:

- Extent and complexity of supporting technologies?
- Time required to perform evaluations using them?

⇒ **Current availability of these supporting technologies**

Data:

- Currently in-house? Anything that still must be bought or built?
- Use of these technologies on other programs?

9.2 Evaluation Methods and Techniques

Risk Factors **Notes**

⇒ **Current planning assumes**

< *some technique/method/process:* -->

for COTS evaluation (6)

⇒ **There is**

< *some basis:* -->

for the planned use of

< *evaluation technique x:* --> (7)

⇒ **Use of**

< *evaluation technique x:* -->

requires

< *no / minimal / extensive* >

additional technical support (326)

⇒ **The supporting technology required to perform COTS evaluation**

< *is / is not* >

currently available (327)

9.3 Experience with COTS Product Evaluation

Questions

⇒ **Previous projects by Contractor that required evaluation of COTS products; Lead Engineer's role in those projects**

Data:

- Name
- Role
- Dates of evaluation experience

⇒ **Specific COTS products that were evaluated**

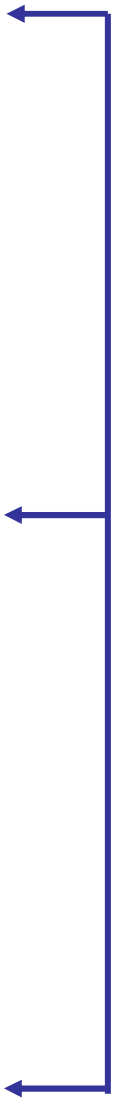
Data:

- {same person}
- Specific products & version
- Role of product in system

⇒ **Methods and techniques used**

Data:

- {same person}
- Formality of evaluation
- Formality of evaluation report
- Evaluation outcome(e.g., rejection, purchase)



9.3 Experience with COTS Product Evaluation

Risk Factors **Notes**

⇒ < *Some person: -->*

has

< *no / limited / moderate / extensive* >

COTS evaluation experience (173)

⇒ < *Some person: -->*

has

< *no / limited / moderate / extensive* >

familiarity with evaluating

< *product x: -->* **(325)**

⇒ < *Some person: -->*

has

< *no / limited / moderate / extensive* >

familiarity with

< *evaluation technique x: -->* **(8)**

9.4 Evaluation Focus

Questions

⇒ **Support for the planned business process**

Data:

- Whether business processes are common practice
- Names of products
- Tool coverage of business processes
- Number of products available

⇒ **User interface; usability and tailorability**

Data:

- Product names
- Concerns about usability
- Known capabilities for tailoring

⇒ **Anticipated learning curve for end users**

Data:

- Product names
- Complexity of products

9.4 Evaluation Focus

Risk Factors **Notes**

⇒ *There are*

< some number of -->

products that automate or support the new business processes **(303)**

⇒ *The user interface of*

< product x: -->

has

< no / limited / moderate / extensive >

tailorability **(188)**

⇒ *The end users' expected learning curve for*

< product x: -->

will be

< details --> **(311)**

Questions

⇒ **Interactions of products to be evaluated**

Data:

- Number of interoperating products
- Kind of interactions to be evaluated
- Kind and complexity of interactions in operational system

⇒ **Basis of the expectation that candidate or chosen products will successfully interoperate with other parts of the system**

Data:

- Name & role of person with expectation
- Type of knowledge (e.g., common standards, vendor assurance, expert opinion)

⇒ **Verification of interoperability for heterogeneous groups of COTS products**

Data:

- Specific products
- How was/will interoperability be verified?
-

⇒ **Experience with product interaction evaluation**

Data:

- Previous experience with evaluation of interoperability; identity of products
- Nature of evaluation
- Outcome of evaluation (e.g., success, other)

9.5 Evaluation of Interoperability

Risk Factors **Notes**

⇒ **N/A**

⇒ **The expectation that**

< *product x:* -->

will interoperate with other parts of the systems has

< *some basis:* --> (62)

⇒ **There exists**

< *some source of:* -->

evidence of interoperability between

< *products x & y:* --> (61)

⇒ **Experience includes**

< *no / limited / moderate / extensive* >

evaluation of interactions between

< *products x & y:* --> (341)

Requirements specification

- Characteristics of the requirements specification (e.g., status, detail, and stability); whether the specification describes "what" vs. "how" the system is to be built
- Whether familiarity with the overall COTS marketplace influenced the requirements specification
  - Whether knowledge of specific COTS products influenced the requirements specification

Prioritization and flexibility of requirements

- Any level of prioritization within the requirements specification (e.g., "must-have" vs. "like-to-have")
  - Person or agency that defined the prioritization of requirements
  - Participation and agreement from all stakeholder communities on prioritization
- Flexibility of requirements in the requirements specification

Specific COTS product requirements

- Requirements that mention COTS software, whether in general terms or by specific COTS products
- Any requirement that specifies a particular version of a COTS product

Functional requirements compliance

- Plans for verification of compliance with functional requirements by specific COTS products
- {For COTS products already selected:} Evidence that products comply with functional requirements
- Fallback plan if functional requirements are not met by any COTS product

Non-functional requirements compliance

- For any products, either candidate or already chosen, identify any non-functional requirements (e.g., reliability, security, scalability, availability, etc.) that affect it
- Plans for verification of compliance with non-functional requirements by specific COTS products
- {For COTS products already selected:} Evidence that products comply with non-functional requirements
  - If no such evidence is available, how predictions concerning these requirements have been made
- Fallback plan if non-functional requirements are not met by any COTS product

- **Questions**

⇒ **Characteristics of the requirements specification (e.g., status, detail, and stability); whether the specification describes "what" vs. "how" the system is to be built**

Data:

- Number of "requirements documents" (e.g., ORD, SRS,…)
- Approval status
- Length and granularity of detail?

⇒ **Whether familiarity with the overall COTS marketplace influenced the requirements specification**

Data:

- *Precise* nature of the "familiarity" ?
- Experience this knowledge is based on?
- Awareness of major players and technology trends in the domain in question?
- What was the chronology of: (1) market research, (2) requirements writing, and (3) product evaluation?

⇒ **Whether knowledge of specific COTS products influenced the requirements specification**

Data:

- *Precise* nature of the knowledge about product x?
- Which specific features of the product?
- Experience this knowledge is based on?
- Things omitted from the requirements because product x couldn't do them?

Risk Factors **Notes**

⇒ **N/A**

⇒ **Knowledge about the COTS marketplace provided**

< *no / minimal / moderate / extensive* >

basis for the requirements(30)

⇒ **Knowledge about**

< *specific features: -->*

of

< *product x: -->*

provided

< *no / minimal / moderate / extensive* >

basis for the requirements (31)

10.2 Prioritization & Flexibility of Requirements

Questions

⇒ **Any level of prioritization within the requirements specification (e.g., "must-have" vs. "like-to-have")**

Data:

- Precise nature of the prioritization buckets?
- How these buckets are interpreted?
- What does a *lack* of prioritization imply?

⇒ **Person or agency that defined the prioritization of requirements**

Data:

- Precise identity of the persons or agency that defined the prioritization.
- Relationship between the persons or agency and the program.

⇒ **Participation and agreement from all stakeholder communities on prioritization**

Data:

- *Precise* identity of individual stakeholder or stakeholder groups
- Relationship between the persons or agencies that defined the requirements prioritization (10.2.2) and stakeholder communities affected by it
- How stakeholders or stakeholder groups participated
- Conflicts or disagreements between various stakeholders or stakeholder groups; how agreement was reached; whether all conflicts are resolved.

⇒ **Flexibility of requirements in the requirements specification**

Data:

- Level of flexibility of requirements.
- How is flexibility expressed?
- Cognizance of distinction between *prioritization* and *flexibility* of requirements.

10.2 Prioritization & Flexibility of Requirements

Risk Factors **Notes**

⇒ **The requirements specification has**

< *no / limited / extensive* >

prioritization (328)

⇒ **The source of requirements prioritization is**

< *some source:* --> (29)

⇒ **There is**

< *no / minimal / moderate / extensive / full* >

agreement from

< *stakeholder x:* -->

on the requirements prioritization (174)

⇒ **The requirements have**

< *no / minimal / moderate / extensive* >

flexibility, e.g., for accommodation of COTS-related changes (32)

Questions

⇒ **Requirements that mention COTS software, whether in general terms or by specific COTS products**

Data:

- Number of requirements that reference COTS
- Whether flexibility or prioritization is operable for these requirements.

⇒ **Any requirement that specifies a particular version of a COTS product**

Data:

- Identity of specific requirement
- Product name and explicit version, release number, or patch level.
- Rationale for required version, release, etc.
- Currency of specified version
- Any indirect references to specific products (e.g., through DII/COE)

10.3 Specific COTS Products Requirements

Risk Factors **Notes**

⇒ **N/A**

⇒ < *Version x:* -->

of

< *product x:* -->

is required by the specification (28)

10.4 Functional Requirements Compliance

Questions

⇒ **Plans for verification of compliance with functional requirements by specific COTS products**

Data:

- Which requirements?
- Which specific products? Which versions?
- Method of verification (e.g., testing, hearsay)
- Formality of verification planning?

⇒ **{For COTS products already selected:} Evidence that products comply with functional requirements**

Data:

- Nature of evidence
- Currency of evidence
- Degree of compliance

⇒ **Fallback plan if functional requirements are not met by any COTS product**

Data:

- Amount of misfit that can be tolerated
- Formality of fallback plan
- Impact on schedule, cost, or requirements

10.4 Functional Requirements Compliance

Risk Factors **Notes**

⇒ **The mechanism for verifying**

< *functional requirement x:* -->

is

< *experimental evidence / anecdotal evidence / vendor claims / personal experience / expert opinion / other:* --> (178)

⇒ **There is**

< *no / limited / moderate / extensive* >

that

< *product x:* >

will satisfy functional requirements (179)

⇒ **The fallback plan if no COTS product is able to meet functional requirements is**

< *details:* --> (145)

10.5 Non-Functional Requirements Compliance

Questions

⇒ **For any products, either candidate or already chosen, identify any non-functional requirements (e.g., reliability, security, scalability, availability, etc.) that affect it**

Data:

- Most common non-functionals: security, safety, performance, reliability?
- Requirements affect specific products or classes of products?
- If specific products, then specific versions?

⇒ **Plans for verification of compliance with non-functional requirements by specific COTS products (138)**

Data:

- Which requirements?
- Which specific products? Which versions?
- Method of verification (e.g., testing, hearsay)
- Formality of verification planning?

10.5 Non-Functional Requirements Compliance

Risk Factors **Notes**

⇒ **N/A**

⇒ **The mechanism for verifying**

< *non-functional requirement x:* -->

for

< *product x:* -->

is

< *experimental evidence / anecdotal evidence / vendor claims / personal experience / expert opinion / other:* --> *(36)*

10.5 Non-Functional Requirements Compliance - 2

Questions

⇒ **{For COTS products already selected:} Evidence that products comply with non-functional requirements**

Data:

- Nature of evidence
- Currency of evidence
- Degree of compliance

⇒ **If no such evidence is available, how predictions concerning these requirements have been made**

Data:

-
-

⇒ **Fallback plan if non-functional requirements are not met by any COTS products**

Data:

- Amount of misfit that can be tolerated
- Formality of fallback plan
- Impact on schedule, cost, or requirements

10.5 Non-Functional Requirements Compliance - 2

Risk Factors **Notes**

⇒ **There is**

< *no / limited / moderate / extensive* >

evidence that

< *product x:* -->

can satisfy

< *non-functional requirement x:* --> (37)

⇒ **Lacking evidence, the predictions concerning**

< *non-functional requirement x:* -->

by

< *product x:* -->

are based on

< *details:* --> (38)

⇒ **The fallback plan if no product is able to meet non-functional requirements is**

< *details:* --> (329)

Design decisions concerning COTS products in general

- Design decisions that have been made that involve specific COTS products; relation of those decisions to specific requirements
  - Recorded rationale for these decisions
- Elements in the design that are absolute, elements that are conditional; flexibility to alter the design
- Backup plans if a product fails to meet design expectations

Specific COTS products and system design

- Familiarity with candidate or chosen products
- Aspects of the system design that are dependent on unique features or particular versions of specific COTS products
- Sustainment of unique features across future releases

COTS modification

- Degree to which modification, tailoring, extensions, or enhancements to COTS products is planned
  - Dependence of the system design on these modifications
  - Decision factors that indicate modification is necessary
- Agency that is performing the modifications; relationship to the project's decision authority
- Expected complexity of modifications
  - Basis for estimate on cost, schedule, and complexity of modifications
- Sustainment of modifications across future product releases

11.1 Design Decisions Concerning COTS Products in General

Questions

⇒ **Design decisions that have been made that involve specific COTS products; relation of those decisions to specific requirements**

Data:

- Which design decisions?
- Which products?
- Which requirements?
- Any adverse effects of these decisions?

⇒ **Recorded rationale for these decisions**

Data:

- Extent of the rationale for decisions
- How design decisions and rationales are recorded
- Whether all such design decisions have been documented

⇒ **Elements in the design that are absolute, elements that are conditional; flexibility to alter the design**

Data:

- How flexibility is expressed
- How conditional elements are documented
- Relative isolation of conditional design elements

⇒ **Backup plans if a product fails to meet design expectations**

Data:

- How “failure” is understood
- Extent of backup plans
- Inclusion of cost & schedule impact into backup plans?

11.1 Design Decisions Concerning COTS Products in General

Risk Factors **Notes**

⇒ **N/A**

⇒ **Information regarding design decisions concerning**

< *product x:* -- >

is / was captured through

< *some means:* --> (25)

⇒ **There exists**

< *no / limited / moderate / extensive* >

flexibility to accommodate alternate designs (142)

⇒ **There exists**

< *some details of:* -->

fallback positions for unavailable or inappropriate products (330)

Questions

⇒ **Familiarity with candidate or chosen products**

Data:

- Identity of products
- Persons familiar with products
- Basis & extent of familiarity

⇒ **Aspects of the system design that are dependent on unique features or particular versions of specific COTS products**

Data:

- Identity of products
- Which unique features?
- Extent & criticality of dependency?

⇒ **Sustainment of unique features across future releases**

Data:

- Expectations about feature's inclusion in future releases
- Fallback plans??

Risk Factors **Notes**

⇒ *< Some person: -->*

has

< no / limited / moderate / extensive >

familiarity with

< product x: --> **(54)**

⇒ **There is**

< no / some / significant >

design dependence on specific versions/unique features of

< product x: --> **(152)**

⇒ **There is**

< no / limited / moderate / extensive >

planning for the sustainment of

< unique feature x: -->

of

< product x: -->

across future releases of the product (331)

11.3 COTS Modification

Questions

⇒ **Degree to which modification, tailoring, extensions, or enhancements to COTS products is planned**

Data:

- Which products?
- What modifications?
- Formality of plans for modification

⇒ **Dependence of the system design on these modifications**

Data:

- Will design fail without modifications?
- Is there any alternative?

⇒ **Decision factors that indicate modification is necessary**

Data:

- Evaluation data?
- Input from vendor?
- Political factors? Programmatic factors?

⇒ **Agency that is performing the modifications; relationship to the project's decision authority**

Data:

- Person or agency that till do the modifications?
- Organization relationship/reporting structure?

11.3 COTS Modification

Risk Factors **Notes**

⇒ **Current planning assumes**

< *no / some / significant* >

modification to

< *product x: --* > (16)

⇒ **The system design depends**

< *not at all / slightly / significantly / entirely* >

on the modification to

< *product x: -->*(65)

⇒ **The rationale for the decision to modify**

< *product x: -->

was

< *some basis: -->* (332)

⇒ **The needed modifications to**

< *product x: --* >

are

< *not at all / partially / entirely* >

under the control of the program (73)

11.3 COTS Modification - 2

Questions

⇒ **Expected complexity of modifications**

Data:

- Which products?
- Cost & schedule for modifications?
- Nature of modifications? Degree of change to product?

⇒ **Basis for estimate on cost, schedule, and complexity of modifications**

Data:

- Basis for estimates of cost & schedule?
- That person's familiarity with product?
- That person's role in the product's evaluation
- Any input from vendor?

⇒ **Sustainment of modifications across future product releases**

Data:

- Knowledge of vendor's plans for releases?
- Vendor's awareness of modifications?
- Contract with vendor to include modifications in future releases?

11.3 COTS Modification - 2

Risk Factors **Notes**

⇒ **The needed modifications to**

< *product x:* -->

are of

< *no / some / considerable* >

complexity (70)

⇒ **The estimate for needed resources and complexity of modifying**

< *product x:* -->

has

< *some basis:* --> (333)

⇒ **Current planning assumes**

< *some provision for:* -->

sustainment of modifications of

< *product x:* -->

across future releases (81)

Chapter 12: System Integration

Planning for system integration

- Overall planning
  - Resources (budget, schedule, personnel) to perform integration
  - Basis of the resource allocation
- Plans for accommodating COTS product releases during integration
- Fallback plans (e.g., late product releases, integration difficulties; unanticipated impact on other system components, etc.)

Integration approach

- Integration techniques (e.g., scripts, common database), technologies (e.g., CORBA), and specific products (e.g., Orbix) to be used
- Rationale for using these techniques, technologies, or products

Experience with integrating COTS products

- Previous projects by Contractor in which integration of COTS products had comparable importance; Lead Engineer's role in these projects
- Specific COTS products that were integrated
  - Methods and technologies used

Integration with external systems

- Integration plans involving other systems (whether legacy or in development)
  - Quality of information about these systems (e.g., design documents)
  - Experience with interfaces to these systems
  - Authority over the interface to these systems
  - Extent to which external systems will be available (e.g., for inspection, analysis, trial integration, etc.)

Development or modification of external systems

- {If an external system with which the system must integrate is still under development:} Development organization and its relationships to the system's decision authority
  - Basis for expectation that this system will meet its schedule
- Modifications needed to external systems that interface (directly or indirectly) with the system
  - Organization responsible for modifications; its relationship to the project decision authority
  - Estimated amount of effort required for these modifications
  - Basis for this estimate

Legacy data conversion

- Conversion of legacy data
  - Organization responsible for the effort; relationship to the project decision authority
  - Expected complexity of the conversion effort
  - Resources (budget, schedule, personnel) allocated to perform data conversion
  - Basis of this resource allocation
- Automated support for data conversion

Questions

⇒ **Overall planning**

Data:

- Identity of planners
- Role of integration in the Work Breakdown Structure
- Other than WBS, formality of Integration Plan? How documented?

⇒ **Resources (budget, schedule, personnel) to perform integration**

Data:

- Actual budget figure
- Schedule
- Number of persons dedicated to system integration

⇒ **Basis of the resource allocation**

Data:

- Other projects using a comparable plan
- Success of these projects

⇒ **Plans for accommodating COTS product releases during integration**

Data:

- Advance knowledge about product releases
- Formality of plans

⇒ **Fallback plans (e.g., late product releases, integration difficulties; unanticipated impact on other system components, etc.)**

Data:

- Impact of skipping a product release
- Formality of plans

12.1 Planning for System Integration

Risk Factors **Notes**

⇒ **N/A**

⇒ **Current plans comprise**

< *some resources:* -->

for system integration (45)

⇒ **The estimates for integration resources have**

< *some basis:* --> (46)

⇒ **The planning for integration includes**

< *no / limited / moderate / extensive* >

planning for COTS product upgrade (47)

⇒ **There exists**

< *no / limited / moderate / extensive* >

integration flexibility to accommodate uncertain product release schedules (357)

12.2 Integration Approach

Questions

⇒ **Integration techniques (e.g., scripts, common database), technologies (e.g., CORBA), and specific products (e.g., Orbix) to be used**

Data:

- Identity of specific integration methods or techniques
- Complexity of these techniques

⇒ **Rationale for using these techniques, technologies, or products**

Data:

- Other projects that have used these techniques
- Success of those projects

12.2 Integration Approach

Risk Factors | **Notes**

⇒ **N/A**

⇒ **The choice of integration techniques has**

< ***some basis:*** **--> (60)**

12.3 Experience with Integrating COTS Products

Questions

⇒ **Previous projects by Contractor in which integration of COTS products had comparable importance; Lead Engineer's role in these projects**

Data:

- Name
- Role
- Dates of integration experience

⇒ **Specific COTS products that were integrated**

Data:

- {same person}
- Specific products & versions
- Role of product in system

⇒ **Methods and technologies used**

Data:

- {same person}
- Specific integration methods or technologies
- Complexity of these technologies
- Success of those systems

12.3 Experience with Integrating COTS Products

Risk Factors **Notes**

⇒ **Experience with integrating COTS products by**

< *some person:* -->

consists of

< *details:* --> (50)

⇒ **Experience with integrating**

< *product x:* -->

by

< *some person:* -->

consists of

< *details:* --> (51)

⇒ **Experience using**

< *integration technique x:* -->

by

< *some person:* -->

consists of

< *details:* --> (52)

12.4 Integration with External Systems

Questions

⇒ **Integration plans involving other systems (whether legacy or in development)**

Data:

- Name of external system
- Significance of the integration (absolutely necessary? optional?)

⇒ **Quality of information about these systems (e.g., design documents)**

Data:

- Existence of documentation? Availability?
- Quality of documentation? Real reflection of operational system?

⇒ **Experience with interfaces to these systems**

Data:

- Name & role of persons knowledgeable about the external system
- Nature of knowledge
- Dates of experience with external system

⇒ **Authority over the interface to these systems**

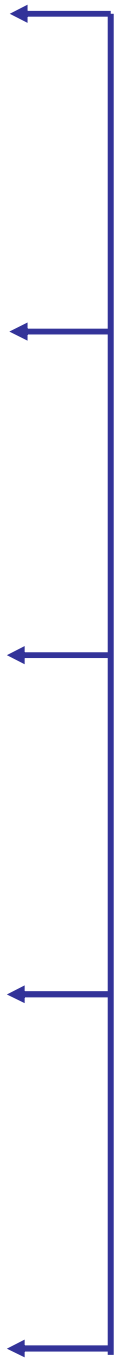
Data:

- Organization with responsibility over external system
- Relationship to project organization
- Locus of joint authority

⇒ **Extent to which external systems will be available (e.g., for inspection, analysis, trial integration, etc.) (170)**

Data:

- Current knowledge about access to external system
- Type of possible access
- Flexibility of the organization responsible for external system



12.4 Integration with External Systems

Risk Factors **Notes**

⇒ **N/A**

⇒ **There is**

< *no / limited / extensive* >

documentation about

< *external system x:* > (57)

⇒ **< *Some person:* -->**

has

< *no / limited / moderate / extensive* >

experience with interfaces to

< *external system x:* -- > (53)

⇒ **The program has**

< *no / limited / moderate / extensive* >

control over interfaces to

< *external system x:* --> (58)

⇒ **The project's available access to**

< *external system x:* -->

will consist of

< *details:* --> (335)

12.5 Development or Modification of External Systems

Questions

⇒ **{If an external system with which the system must integrate is still under development:} Development organization and its relationships to the system's decision authority**

Data:

- Identity of organization
- Relationship to project organization
- Locus of joint authority
- Extent of control over external system design decisions

⇒ **Basis for expectation that this system will meet its schedule**

Data:

- Current status of external system project
- Relationship to expected schedule
- Current expected date of fielding system
- Source of current expected date

12.5 Development or Modification of External Systems

Risk Factors **Notes**

⇒ **The program has**

< *no / partial / full* >

control over development of

< *external system x:* > (334)

⇒ **The expectation that**

< *external system x:* -->

will meet its schedule has

< *some basis:* --> (177)

12.5 Development or Modification of External Systems - 2

Questions

⇒ **Modifications needed to external systems that interface (directly or indirectly) with the system**

Data:

- Identity of system
- Operational status
- Nature of modifications
- Complexity of modifications

⇒ **Organization responsible for modifications; its relationship to the project decision authority**

Data:

- Identity of organization
- Relationship to project organization
- Locus of joint authority

⇒ **Estimated amount of effort required for these modifications**

Data:

- Expected cost & schedule
- Access to system to do modifications
- Availability and quality of documentation

⇒ **Basis for this estimate**

Data:

- Person making cost & schedule estimates
- That person's relationship to project organization

12.5 Development or Modification of External Systems - 2

Risk Factors **Notes**

⇒ **Current planning assumes**

< no / limited / moderate / extensive >

modification to

< *external system x:* --> (336)

⇒ **The program has**

< *no / partial / full* >

control over modifications to

< *external system x:* --> (59)

⇒ **The planned cost and schedule for modifications to**

<*external x*>

include

< *details:* --> (67)

⇒ **The estimates for external system modification have**

< *some basis:* --> (337)

12.6 Legacy Data Conversion

Questions

⇒ **Conversion of legacy data**

Data:

- Importance of data conversion to mission success
- Nature of planning; how documented?

⇒ **Organization responsible for the effort; relationship to the project decision authority**

Data:

- Identity of organization
- Relationship to project organization
- Locus of joint authority

⇒ **Expected complexity of the conversion effort**

Data:

- Nature of conversion effort
- Amount of data to be converted
- Quality of data before conversion

12.6 Legacy Data Conversion

Risk Factors **Notes**

⇒ **Current planning assumes**

< no / limited / moderate / extensive >

legacy data conversion (66)

⇒ **The program has**

< no / limited / full >

control over the data conversion effort (339)

⇒ **The task of legacy data conversion has**

< no / little / moderate / great >

complexity (71)

12.6 Legacy Data Conversion - 2

Questions

⇒ **Resources (budget, schedule, personnel) allocated to perform data conversion**

Data:

- Actual budget figure
- Schedule
- Number of persons dedicated to system integration

⇒ **Basis of this resource allocation**

Data:

- Other projects using a comparable plan
- Success of these projects

⇒ **Automated support for data conversion**

Data:

- Available tools for conversion
- Track record of these tools
- Experience base using these tools

12.6 Legacy Data Conversion - 2

Risk Factors **Notes**

⇒ **Current plans comprise**

< *no / limited / moderate / extensive* >

resources for legacy data conversion (338)

⇒ **The estimates for data conversion resources have**

< *some basis:* --> **69**

⇒ **There is**

< *no / limited / moderate / extensive* >

automated support for legacy data conversion (72)

Chapter 13: System Testing

Planning for system testing

- Overall planning (of all testing: unit, acceptance, other)
  - Resources (budget, schedule, personnel) to perform testing
  - Basis of this resource allocation
- Plans for accommodating COTS product release schedules
- Organization that will perform testing
- Organization(s) that will perform IV&V; its relationship to the test organization

Testing approach

- Testing strategy (e.g., exhaustive, selective) to be used
- Rationale for using this testing strategy
- Degree to which system testing will mimic actual system use (e.g., data size, long transactions, multiple instances, load factors, etc.)

Experience testing COTS-based systems

- Previous projects by Contractor in which testing of COTS-based systems had comparable importance; Lead Engineer's role in these projects
- Specific products used in those systems

Test environment

- Present state of the testing environment
- Basis for definition of test environment
- Differences between the test environment and the deployment environment e.g., hardware

13.1 Planning for System Testing

Questions

⇒ **Overall planning (of all testing: unit, acceptance, other)**

Data:

- Identity of planners
- Role of system testing in Work Breakdown Structure
- {Other than WBS} Formality of Test Plan

⇒ **Resources (budget, schedule, personnel) to perform testing**

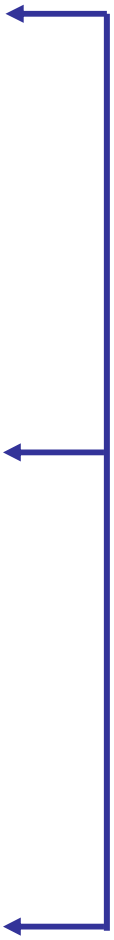
Data:

- Actual budget figure
- Schedule
- Number of persons dedicated to system testing

⇒ **Basis of this resource allocation**

Data:

- Other projects using a comparable system testing plan
- Success of those projects



Risk Factors **Notes**

⇒ **N/A**

⇒ **Current plans comprise**

<*some resources:* -->

for testing (83)

⇒ **The estimates for testing resources for**

< *system x:* >

have

< *some basis:* --> (85)

Questions

⇒ **Plans for accommodating COTS product releases during system testing**

Data:

- Advance knowledge about product releases
- Formality of plans

⇒ **Organization that will perform testing**

Data:

- Identity of organization
- Relationship to project organization
- Locus of joint authority

⇒ **Organization(s) that will perform IV&V; its relationship to the test organization**

Data:

- Identity of organization
- Relationship to project organization
- Degree of independence of IV&V organization

Risk Factors **Notes**

⇒ **There exists**

< *no / limited / moderate / extensive* >

testing flexibility to accommodate uncertain product release schedules (48)

⇒ **The organization that will perform system testing is**

< ***some organization:*** **--> (84)**

⇒ **The IV&V organization has**

< ***no / limited / complete*** >

independence from the program management and development organizations (87)

Questions

⇒ **Testing strategy (e.g., exhaustive, selective) to be used**

Data:

- Same strategy for all increments?

⇒ **Rationale for using this testing strategy**

Data:

- Influence of COTS products? Which ones?

⇒ **Degree to which system testing will mimic actual system use (e.g., data size, long transactions, multiple instances, load factors, etc.)**

Data:

- Data size
- Long transactions
- Multiple instances
- Load factors

⇒

13.2 Testing Approach

Risk Factors **Noted**

⇒ **The technical strategy for testing is**

< *some strategy:* --> (90)

⇒ **The planned approach for testing has**

< *some basis:* --> (91)

⇒ **The testing approach has**

< *no / limited / partial / full* >

fidelity to actual system use (342)

Questions

⇒ **Previous projects by Contractor in which testing of COTS-based systems had comparable importance; Lead Engineer's role in these projects**

Data:

- Name
- Role
- Dates of testing experience

⇒ **Specific products used in those systems**

Data:

- {same person}
- Specific products & versions
- Role of product in system

13.3 Experience Testing COTS-based Systems

Risk Factors **Notes**

⇒ **<Some person> has**

< *no / limited / moderate / extensive* >

experience in testing COTS-based systems (88)

⇒ **Previous products tested consist of**

< *product list:* --> (369)

Questions

⇒ **Present state of the testing environment**

Data:

- Location of test environment
- Dedicated machines?
- Tools installed?
- Test personnel trained?

⇒ **Basis for definition of test environment**

Data:

- COTS-specific features in test environment?
- Previous projects that used a comparable environment
- Dates of those projects
- Success of those projects

⇒ **Differences between the test environment and the deployment environment e.g., hardware**

Data:

- Nature of differences
- Degree of difference
- Cause of differences

13.4 Test Environment

Risk Factors **Notes**

⇒ **The test environment has**

< *no / limited / full* >

readiness for use (92)

⇒ **The makeup of the test environment was determined by**

< *some means:* --> (343)

⇒ **There is**

< *no / limited / complete* >

consistency between the test environment and the deployment environment (93)

Chapter 14: Fielding

Planning for fielding

- Overall planning
  - Resources allocated for fielding the system
  - Basis of the resource allocation
- Fielding schedule in terms of sequence, order, and priority
- Rationale for the fielding schedule decisions
- Organization with fielding responsibility (202)
- Planning for COTS product releases during fielding

Fielding approach

- Operational locations of distributed system components; organization(s) responsible for managing the deployed environment at these locations
- Basis for estimates on resources needed to install site-specific versions
- Anticipated variations in usage patterns for different instances of the system

Operational environment

- Environment into which the system will be fielded
  - Hardware needed
  - Communication bandwidth needed
  - Software consistency (e.g., versions of products, operating system, etc.)
  - Personnel available to staff the environment

Questions

⇒ **Overall planning**

Data:

- Identity of planners
- Role of fielding in the Work Breakdown Structure
- Other than WBS, formality of Fielding Plan? How documented?

⇒ **Resources allocated for fielding the system**

Data:

- Actual budget figure
- Schedule
- Number of persons dedicated to fielding

⇒ **Basis of the resource allocation**

Data:

- Other projects using a comparable plan
- Success of these projects

⇒ **Fielding schedule in terms of sequence, order, and priority**

Data:

- Actual budget figure
- Schedule
- Number of persons dedicated to fielding the system

⇒ **Rationale for the fielding schedule decisions**

Data:

- Other projects using a comparable system testing plan
- Success of those projects

14.1 Planning for Fielding

Risk Factors **Notes**

⇒ **N/A**

⇒ **Current plans comprise**

< *some resources:* -->

for fielding (94)

⇒ **The fielding resources were allocated based on**

< *some rationale:* --> (345)

⇒ **The sequence, order, and priority for fielding consist of**

< details: -->(371)

⇒ **The fielding schedule had**

< *some rationale:* -->

for sequence, order, and priority (95)

14.1 Planning for Fielding - 2

Questions

⇒ **Organization with fielding responsibility**

Data:

- Name and location of organization
- Relationship to development organization

⇒ **Planning for COTS product releases during fielding**

Data:

- Advance knowledge about product releases
- Which products?
- Chronological span of plans? (e.g., 1 year? 5 years?)
- Formality of plans

14.1 Planning for Fielding - 2

Risk Factors **Notes**

⇒ **The organization with responsibility for fielding the system is**

< ***some organization:*** **--> (20)**

⇒ **The planning for fielding includes**

< ***no / limited / moderate / extensive*** >

accommodation for product releases (96)

Questions

⇒ **Operational locations of distributed system components; organization(s) responsible for managing the deployed environment at these locations**

Data:

- Locations?
- Responsible organizations?

⇒ **Basis for estimates on resources needed to install site-specific versions**

Data:

- Other projects with comparable site-specific requirements
- Comparable resources for those projects?

⇒ **Anticipated variations in usage patterns for different instances of the system**

Data:

- Number of different instances
- Nature of variation
- Frequency / constancy of varied usage

Risk Factors **Notes**

⇒ **N/A**

⇒ **There is**

< *some basis:* -->

for the estimate of effort needed to install site-specific versions (100)

⇒ **There will be**

< *some number of:* -->

usage patterns for the system (196)

14.3 Operational Environment

Questions

⇒ **Environment into which the system will be fielded**

Data:

- Dedicated machines?
- Number of other operational systems running
- Dedicated personnel?
- Number of other systems for which they are responsible

⇒ **Hardware needed**

Data:

- Hardware specifications known?
- Currently in place?
- Schedule for hardware installation

⇒ **Communication bandwidth needed**

Data:

- Specifications known?
- Currently in place?
- Schedule for hardware installation

⇒ **Software consistency (e.g., versions of products, operating system, etc.)**

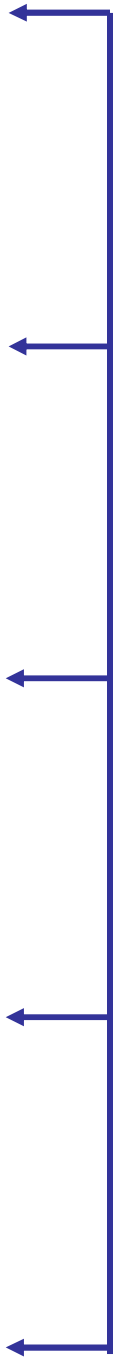
Data:

- Operating system
- Other software infrastructure

⇒ **Personnel available to staff the environment**

Data:

- Number of persons onsite
- Number needed to operate the system
- Training status?



14.3 Operational Environment

Risk Factors **Notes**

⇒ **N/A**

⇒ **The operational environment has**

< *no / limited / all necessary* >

hardware to support the system (190)

⇒ **The operational environment has**

< *no / limited / all necessary* >

communication bandwidth to support the system (192)

⇒ **The operational environment has**

< *no / limited / complete* >

software compatibility with the system (191)

⇒ **The deployment environment has**

< *no / minimal / all necessary* >

personnel (193)

Planning for system maintenance

- Overall planning
  - Resources (budget, schedule, personnel) for system maintenance
  - Basis of the resource allocation
- Plans for harmonizing COTS product release schedules with system upgrade schedule

System maintenance organization

- Organization that will perform maintenance
  - {If multiple maintenance organizations will exist} Breakdown of individual maintenance responsibilities (217)
- Contract status of the expected maintenance organization(s)
- Degree of organization's contribution to design or development activities
- Experience of that organization in maintaining COTS-based systems

Maintenance environment

- Infrastructure (e.g., middleware, engineering environment) expected to be needed to perform system maintenance
- Extent to which the maintenance environment will be able to model all deployed configurations
- Degree to which the maintenance environment will duplicate the operational environment of the system (e.g., data size, transactions, volume, loading factors, etc.)

Maintenance of multiple system configurations

- Number of different configurations to be maintained
- Different configurations involving different versions of COTS products
- Mechanisms available for tracking product releases, versions, updates, skews, etc.
- Basis of resource estimates for managing multiple product versions

Questions

⇒ **Overall planning**

Data:

- Identity of planners
- Role of fielding in the Work Breakdown Structure
- Other than WBS, formality of Fielding Plan? How documented?

⇒ **Resources (budget, schedule, personnel) for system maintenance**

Data:

- Actual budget figure
- Schedule
- Number of persons dedicated to fielding

⇒ **Basis of the resource allocation**

Data:

- Other projects using a comparable plan
- Success of these projects

⇒ **Plans for harmonizing COTS product release schedules with system upgrade schedule**

Data:

- Advance knowledge about product releases
- Formality of plans

Risk Factors **Notes**

⇒ **N/A**

⇒ **Current plans comprise**

< *some resources:* -->

for maintenance of the system (14)

⇒ **The maintenance resources were allocated based on**

< *some rationale:* --> (15)

⇒ **There exists**

< *no / limited / all necessary* >

system upgrade flexibility to accommodate uncertain product release schedules (358)

15.2 System Maintenance Organization

Questions

⇒ **Organization that will perform maintenance**

Data:

- Name and location of organization
- Relationship to development organization

⇒ **{If multiple maintenance organizations will exist} Breakdown of individual maintenance responsibilities**

Data:

- Name and each organization
- Essential responsibility of each

⇒ **Contract status of the expected maintenance organization(s)**

Data:

- Contractual status
- Period of contract

⇒ **Degree of organization's contribution to design or development activities**

Data:

- Actual participation in system design
- Roles and number of participants

⇒ **Experience of that organization in maintaining COTS-based systems**

Data:

- Specific systems maintained
- Specific COTS products in those systems

15.2 System Maintenance Organization

Risk Factors **Notes**

⇒ **The organization with responsibility for system maintenance is**

< *some organization:* --> (354)

⇒ **There is**

< no / moderate / massive >

complexity in the interactions of the maintenance organizations (185)

⇒ **There exists**

< *some form of:* -->

contractual provision for maintenance of the system (348)

⇒ **The maintenance organization is contributing**

< *no / limited / moderate / extensive* >

information to planning, design, or development (184)

⇒ **The maintenance organization has**

< *no / limited / moderate / extensive* >

experience with COTS-based system maintenance (21)

Questions

⇒ **Infrastructure (e.g., middleware, engineering environment) expected to be needed to perform system maintenance**

Data:

- COTS-specific elements
- Expected reliance on vendors for this infrastructure

⇒ **Extent to which the maintenance environment will be able to model all deployed configurations**

Data:

- Cause for omission of any deployed configuration
- Any partial modeling of a deployed configuration?
- If so, what is left out?

⇒ **Degree to which the maintenance environment will duplicate the operational environment of the system (e.g., data size, transactions, volume, loading factors, etc.)**

Data:

- Data size
- Transactions
- Volume
- Load factors

15.3 Maintenance Environment

Risk Factors **Notes**

⇒ **The expected infrastructure required for maintenances consists of**

< ***details:*** **--> (346)**

⇒ **The fidelity of the maintenance environment for all fielded configurations will consist of**

< ***details:*** **--> (347)**

⇒ **The maintenance environment has**

< ***no / partial / full*** >

fidelity to operational system conditions (352)

15.4 Maintenance of Multiple System Configurations

Questions

⇒ **Number of different configurations to be maintained**

Data:

-
-

⇒ **Different configurations involving different versions of COTS products**

Data:

-
-

⇒ **Mechanisms available for tracking product releases, versions, updates, skews, etc**

Data:

-
-

⇒ **Basis of resource estimates for managing multiple product versions**

Data:

-

15.4 Maintenance of Multiple System Configurations

Risk Factors **Notes**

⇒ **N/A**

⇒ **There will be**

< *some number of:* -->

different versions of

< *product x:* --> (306)

⇒ **The ability to track and manage product releases, updates, and patches consists of**

< *details:* --> (351)

⇒ **There is**

< *some basis:* -->

for the estimates about effort required to maintain multiple COTS configurations (155)