Sample Requirements Process Macro

Quality in Daily Work System—Part 1

DEPT./ PERSON

PRC's Customers

Identify a Need

Process Customer:
PRC Customer and PRC Project Staff

Joint Customer/PRC Management and Technical Requirements Team

Customer Valid Requirements:
- An effective system
- Within budget
- On-time delivery
- Win-win partnership relationship throughout the system life cycle

Process Flowchart

PRC Req's Process
RWG 7/22/97

Dept./ Person

Step/ Time

PRC Process

Assess New/ Changed Requirements

Control Changes

Understand Customer Needs and Expectations

Derive and Allocate Requirements

Manage the Project!

Conduct Reviews

Jointly Work
Action Items

Finish

PDCA

Client Feedback

Assess effectiveness of the effort

Process Owners

Interaction with other Process Areas (PAs)

requirements

Process Description:
RE Macro/RE000
PRC Requirements Process

NOTES:
1. The PRC requirements (RE) process is characterized by partnership between the customer and PRC, by extensive communication and close and continuous coordination; and by use of methods and tools to gain an increasingly more robust understanding of customer needs and expectations throughout the system life cycle.
2. The project CCB consists of the project manager and the leads from all involved engineering groups. This is a mechanism to manage the project in a coordinated, effective manner. It could include a customer representative; be the “Joint Team,” and on a small project even be one or two people.
3. There are two entrance points to RE200: one from the initial assessment and another representing changes requested by the customer after the initial assessment.
4. The composition of the members of the Joint Team may change over the course of the system development effort as different levels are defined and addressed.
5. The requirements produced by the RE process will be impacted and changed by activities in the system architecture process.
Sample Requirements Processs Micro: Assess New/Changed Requirements and Control Changes

NOTES:
1. This is the first subprocess of the PRC requirements process. The objective is to perform an initial assessment of the project to establish its scope, to form an integrated "Joint Team," to analyze all new and changed requirements, and to control the changes.
2. The inputs to this effort include any available information provided by the customer plus feedback from all successor design, management, and verification processes. The outputs are an Operating Concept Definition (OCD), the selection of an automated tool to manage all other requirements processes, and the data needed to track, manage, and verify the system requirements.
3. The project scope sets customer expectations and includes needs, goals and objectives, mission definition, operational concept, customer requirements, constraints, schedules, budgets, and authority and responsibility.
4. The OCD describes why the capability or system is needed, how it fits into what is being done, and known information and requirements.
5. The concept of having a Joint Customer/PRC Team reflects that there is joint responsibility throughout the system life cycle for definition of requirements and for agreement on any changes to requirements.
6. For brevity, the selected requirements tool is referred to as the requirements traceability matrix (RTM). All outputs of the activities in the processes are input into the RTM, so that it continuously reflects the current status of the developing system.
Sample Requirements Process Micro: Understand Customer Needs and Expectations

Quality in Daily Work System—Part 1

Process Description;
RE200
Understand Customer Needs and Expectations

Process Customer;
PRC Customer and PRC Project

Customer Valid Requirements;
Partnership relationship between PRC’s Customer and the PRC Project to engage in ongoing dialog to translate customer needs and expectations into a verifiable set of requirements.

Process Flowchart

<table>
<thead>
<tr>
<th>Step/Time</th>
<th>PRC’s Customers</th>
<th>PRC PM</th>
<th>Systems Engineering</th>
<th>Development Team</th>
<th>Products</th>
<th>Process Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commit to the Approach</td>
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<tr>
<td></td>
<td>Utilizing the Joint Team created in RE100, undertake and commit to a partnership relationship to engage in ongoing dialog to translate customer needs and expectations into a verifiable set of requirements. This agreement recognizes that requirements change during the system development life cycle, therefore a mechanism is required to accommodate changes in requirements.</td>
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<tr>
<td>Understand Customer Needs</td>
<td>Customer and PRC technical representatives elicit, stimulate, analyze, and communicate customer needs, expectations, and Measures of Effectiveness (MOEs) to obtain a better understanding of what will satisfy the customer. The agreed upon needs, expectations, and MOEs form the basis for agreements between the customer and PRC’s engineering effort. Note: The techniques and methodologies that can be used are listed in the Process Descriptions for the micros of the RE processes.</td>
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<td>Document Requirements</td>
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<tr>
<td>Perform Requests Validation and Agree/Iterate</td>
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<tr>
<td>Mechanism to Accommodate and Manage Changes in Requirements During the System Life Cycle</td>
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<tr>
<td>POCAs</td>
<td>Client Feedback</td>
<td>Access Effectiveness of the effort</td>
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<td>Access Effectiveness of the effort</td>
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</tbody>
</table>

NOTES: 1. There can be multiples of these processes going on simultaneously and in parallel to define components of the planned system.
2. Applicable metrics to measure this process include time to complete RE200 and number of defects in requirements.
3. The RE200 process is characterized by partnership, extensive communication, and by use of methods and tools to gain an increasingly more robust understanding of customer needs.
Sample Requirements Processes Micro: Define and Allocate Requirements

**Process Description:** Derive and Allocate Requirements

**Process Customer:** PRC Customer and PRC Project Staff

**Customer Valid Requirements:** Analyze the system and other requirements and derive a more detailed and precise set of requirements.

### Process Flowchart

- **Inputs:**
  - Requirements from RE200 and RE300
  - Requirements from PA01 and PA02

- **Outputs:**
  - Derived and Allocated Requirements
  - Interface Requirements (May be considered "design independent" derived requirements)

**Key Steps:**

1. **Develop Detailed Concept**
   - BP02.01: Develop a detailed operational concept of the interaction of the system, the user, and the environment.

2. **Identify Key Requirements**
   - BP02.02: Identify key requirements that have a strong influence on cost, schedule, functionality, risk, or performance. Cost-benefit analysis is performed using PAs 01 and 03. Results are reviewed with customers using PA06.

3. **Partition Requirements**
   - BP02.03: Partition requirements into groups based on established criteria to facilitate and focus the requirements analysis.

4. **Derive Requirements and Identify Interface Requirements**
   - BP02.04: Derive from the system and other requirements, requirements that may be logically inferred and implied as essential to system effectiveness. (May be considered "design independent" derived requirements.)
   - BP02.05: Identify the requirements associated with external interfaces to the system and interfaces between functional partitions or objects. Interfaces are controlled according to the practices of the Integrate System Process Area (PA05).

5. **Allocate Requirements**
   - BP02.06: Allocate requirements to functional partitions, objects, people, or support elements to support synthesis of solutions.

6. **Analyze Requirements**
   - BP02.07: Analyze requirements to ensure that they are verifiable by the methods. Note: Asking users why we have a reqt. that often gives insight into how to test it!
   - BP02.08: Ensure that lower level (derived) requirements are necessary and sufficient to meet the objectives of higher level requirements.

7. **Capture Results**
   - BP02.09: Capture system and other requirements, derived requirements, derivation rationale, allocations, traceability, and requirements status.

8. **PDCA**
   - Client Feedback
   - Assess effectiveness of the effort
   - Capture ideas for improvement into Process

**NOTES:**
1. All activities of the RE300 Process are input into the RTM. Traceability from all activities must be maintained.
2. Applicable metrics to measure this process include time to complete RE300 and number of defects in requirements.
3. The RE300 Process is also characterized by partnership, extensive communication, and iterative joint effort often produces better results and understanding. Operational concepts, simulations, and prototypes are key to user-centered development and maintenance processes.
4. Joint Application Design is recommended method because the iterative joint effort often produces better results and understanding. Operational concepts, simulations, and prototypes are key to user-centered development and maintenance processes.
5. There can be multiples of these processes going on simultaneously and in parallel to define components of the planned system.
6. Recommend formal CCB approval of requirements outputs.
7. With regard to the "Allocate Requirements" step, note that we can't really allocate requirements until we know the pieces (components) of the system. This step requires iteration with the system architecture process.