ROBOFEED

An introduction to Project Quality Assurance (PQA)
Foreword

PQA in an innovative management tool for co-ordinating individuals and/or external parties that have to cooperate to meet the goals of a project. The purpose of PQA is to ensure high quality of the project by focusing on the personnel resources involved.

PQA have been implemented as standard for some of our major projects in the OSL laboratory.

The co-ordination of a student projects with students from different parts of Europe with different cultural background and interests is a challenging task, but sometimes difficult when the co-ordinator has very limited legal tools or authority to control the behaviour of the participants. If there should be a non-performing partner in a consortium he can jeopardize the outcome of the project and lead to vast of time and money.

The introduction of PQA will aim to uncover the individual interests and different opinions, which is considered as a challenging experiment. The results of the process and the evaluation of the participants will be reported to the project coordinators (Neil, Jim and Yvan).

As this aspect is introduced late in the project, you are not expected to follow it but you should at least read it as its main purpose is to ensure that nothing critical has been omitted from your analysis of the project and that no critical task has been left unallocated. I hope you will find it useful to organise yourself and please give me feedback on it.
## Participants (This is an example from one of our current projects)

<table>
<thead>
<tr>
<th></th>
<th>P1</th>
<th>Maridan</th>
<th>Anders Bjerrum (co-ordinator)</th>
<th>Jens Pind (managing director)</th>
<th>Kristina Lund (head of development)</th>
<th>Anders Ishøy (software)</th>
<th>Mikael Larsen (navigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2</td>
<td>Heriot-Watt University</td>
<td>Yvan Petillot</td>
<td>Ioseba Tena Ruiz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>National Technical University of Athens</td>
<td>Kostas Kyriakopoulos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P4</td>
<td>University of the Balearic Islands</td>
<td>Oscar Calvo</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>P5</td>
<td>Innovatum International</td>
<td>Terry Slater (managing director)</td>
<td>Gavin</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>P6</td>
<td>SEAS Distribution</td>
<td>Peter Christiansen</td>
<td>Leif Flensted</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>P7</td>
<td>PB Exploration Co.</td>
<td>Roger Lott (BPX London)</td>
<td>Dave Bingham (BPX London)</td>
<td>Tony Blackburn (BPX Aberdeen)</td>
<td>Simon Allen (Stolt Offshore)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P8</td>
<td>Alcatel Submarine Networks</td>
<td>Mark Hudson</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
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1. Introduction to PQA

Project Quality Assurance (hereafter PQA) is an activity for a group of people who shall co-operating on solutions to complex problems. Even a speculative “strategy project” can become “practical” after a PQA. This is due to the activity plan generated by the experience and knowledge of the participants.

A PQA workshop focus on the participants motivation and their individual interest in the project which is the topic of the workshop. It defines the quality requirements for the product, the process, and the resources involved with the solution to the project tasks.

The PQA aim at uncovering:
- The key problem(s) for the project.
- The scope and complexity of the solution.
- How the solution can be carried out.
- How the responsibility is divided among the participants.

Briefly, the PQA uncover the product, the process, and the organisation involved in solving complex tasks in organisations with more than one person.
The term “uncover” in this context means define and document the requirements to key quality components of the solution (see figure above).

PQA is also a team building technique that ensures good co-operation between the participants and thereby strengthening the ability of the consortium to co-operate with external parties. PQA is useful for strategic planning at management level and for initiating projects or major phases of major projects.

PQA makes it possible to establish and visualise a common reference framework and to set up common objectives for people with different backgrounds and different personal goals.

1.1 What outcome can be expected from a PQA? (PRODUCT)

PQA is expected to generate an outline of an action plan including requirements to the deliverables. The action plan has to be shaped into one or more project plans with realistic resource estimates and time frames.

The PQA standard documentation assures a visible result which is essential as a basis for later evaluations of strategic milestones and completion of the project. It is also useful as an introduction to new participants and external parties. The PQA documentation will uncover the resource estimates and risks.

1.2 Who shall participate in a PQA? (ORGANISATION)

The PQA participants shall be selected based on their knowledge and experience of the subject, their management level, responsibility and authority in relation to the project.

It must be ensured that the participants as a group has the necessary competence in relation to the solution.

1.3 How will the PQA workshop be carried out? (PROCESS)

One of the prime characteristics of the PQA is that ALL participants are actively involved. No one can participate passively. The participants will listen actively to each other during the process and will be influenced and inspired by other participants. This results in a synergy effect where all participants understand each others priorities and wishes, and hereby, achieve a common understanding.

The process includes preparation of the documentation on site, which means it reflects exactly what the participants agreed on during the PQA. Activity descriptions that may require expert knowledge will be prepared after the PQA.

2. Problem description

2.1 Project background

Reference is made to the web pages where a full description of the project is available: http://www.cee.hw.ac.uk/3proj02
2.2 Purposes of the PQA

The purpose of the PQA is, in a structured way, to define and make visible the parameters for the design and realisation of a CD dispenser. The PQA will ensure that the project is managed by a well-organised project organisation and that the project will lead to the expected results within specified time and costs, so that all parties will consider the project as an success.

The scope of the project is development of a complete operational system. It is important that the scope of the development and the involvement in testing is visible and agreed on at an early point in the project.

In that respect all attendees have to consider:

- How will the consortium benefit in the accomplishment of the task?
- How can we ensure the necessary quality of the system satisfies all parties?

During the PQA workshop the participants should try to minimise detailed discussions of technical solutions. These solutions will be described in a later phase, taking into account the technological possibilities in connection with existing market standards.

2.3 How to prepare for the PQA

During the PQA the participants will have the opportunity to express and document how they think the success of the ROBOFEED project can be achieved. They will give and take inspiration to/from everybody.

On the basis of their experience and knowledge, they are asked to prepare a short description (or keywords) of their vision of ROBOFEED: Animal feed automation.

They should describe the factors that have their special interest with respect to their responsibilities in the project and in their own organisation. They should be prepared to discuss/defend their views.

2.4 Questions to be considered before the PQA

The questions below can be used as a basis for inspiration on the subjects that will be touched in the PQA workshop:

- What is the potential of ROBOFEED?
- Where will ROBOFEED make a difference?
- What information is to be passed between the different players?
- Are there different requirements for the different players?
- Who has the ultimate responsibility for the quality of the product?
3. How to proceed?

3.1 Verbal introduction to the PQA

The verbal introduction comprises the same information as this document, but allows for a discussion of the scope of the PQA workshop.

3.2 Definition of visions

Definition of visions is done by each participant individually. He/she presents personal views on the expected result and the expected benefits from the project. The views may be presented as a "pick" of the desired result, or as a list of its qualities. Each individual vision is written down with the name of the originator attached.

The personal visions are keys to the cooperation and mutual respect of the team members because they will understand what motivate other participants. *It is allowed to ask for explanations of vision statements, but their relevance or correctness can never be challenged.* People will always tackle problems in different ways. This is fine, but we should know the different ways of thinking represented in the group to benefit from the strength and creativity of each participants.

3.3 Suggestion of success factors

The success factors express what the participants believes should be the quality components of the project. The success factors should express the participants’ own opinions as well as what they think would be the opinion of external parties. The success factors have an important influence on the projects ability to reach its target because they are used for evaluation and quality control.

The success factors are created by asking participant in turn to suggest one success factor. This process is continued until nobody have more suggestions. All suggestions must be relevant and valid, but it is not required that everyone agrees to a suggestion as long as it cannot be rejected as wrong. Normally 40-60 success factors are suggested. All success factors shall be assigned to one or more of the key quality components:

- **PRODUCT** (technology)
- **PROCESS** (development, exploitation, dissemination)
- **ORGANISATION** (the consortium or team, external parties)

It must be considered that the key quality components are evenly addressed by the suggested success factors.

3.4 Consolidation of success factors

The suggested success factors are now consolidated into 5-9 groups called Critical Success Factors (CSFs). All participants must fully agree un the selected CSFs. Each success factor must support at least one CSF.

The CSFs will be evaluated to ensure the PRODUCT, the PROCESS, and the ORGANISATION is covered. If one of the key quality components is not fully covered by the CFSs the participants must re-evaluate the success factors and improve the CSFs.
3.5 Definition of activities

The next step is definition of (necessary and adequate) activities to fulfil the CSF. Daily routine activities should not be included, but activity about a major change of the routine tasks is adequate.

Participants can in turn suggest a number of activities. Each activity must supports at least one of the CSFs. When no further activities are suggested the group cross check the list of activities against the CSFs to check completeness of the activities. For CSF it is checked if it is sufficiently covered by adequate activities. Missing activities may be added and cross checked against other CSFs.

During this session it is important to ask the participants to define exactly what they mean by their suggested activity - unless it is absolutely self explanatory, which is rarely the case.

3.6 Assignment of responsibility

When the list of activities is complete one person is assigned as responsible for each activity. The assignment must be to a person, never a department or section where the responsibility is not visible.

All participants should take notes during the activity discussions. This will help describing the activities after the workshop.

4. After the PQA workshop

4.1 Activity descriptions

Each assigned person must, within a set time frame, describe the following for his activities:

- Title and definition
- List of tasks included in the activity
- Outcome (deliverables)
- Resource requirements and estimated time schedule
- Risks
- Dependency of other activities (predecessors and successors)

4.2 Structured activity plan

The activities are sorted by their natural sequence and grouped in accordance with an appropriate work structure (Work Breakdown Structure (WBS)) e.g. Analyse, Design, Construction,......, that also shows the essential milestones as (part)deliverables.

Most probably the activity descriptions are more detailed than what is already defined in the contract (Annex 1). A cross check of contractual deliverables against the deliverables defined in the activities will ensure the completeness of the activity list.
4.3 Risks assessment

During the preparation of the activity descriptions, the person responsible for the preparation assess and describes all possible risks concerning estimates. Availability of resources with the proper skill and experience, or the ability of subcontractors to deliver the required quality on time, are the most common risks in software development projects. If new technology is involved the ability of the organisation to acquire and to control it is a major risk area. The consequence of risks should be explicitly stated in the description of the activities involved.

4.4 Time schedule (project plans)

Based on the activity descriptions one or more project plans are created. The plans, together with the complete set of PQA documentation, must be approved on management level (managing directors of PCC members) for each partner.

4.5 Reporting procedures

Before the work starts appropriate reporting procedures must be agreed. This includes a distribution list, a list of documents and a list of persons responsible for preparation and distribution of documents.

4.6 Review of activity descriptions

The PQA participants and people to be directly involved in the work will review the activity descriptions 1-3 weeks after the PQA workshop.

All activity descriptions shall be distributed to the participants 2-3 days before the review.

5. PQA result

5.1 During the workshop

The results of the PQA workshop is a set of documents comprising:

- Vision/mission statements given by each participant (see 3.2)
- CSF definitions with their associated success factors (see 3.4)
- A cross reference matrix between CSFs and activities (see 3.5)
- Activities and assigned responsibility (see 3.6).

5.2 After the workshop

After the workshop the PQA result is specified in more details:

- Detailed activity descriptions (see 4.1)
- Structured activity plan (see 4.2)
- Risk assessment (see 4.3)
• Time schedule (see 4.4)
• Reporting procedures (see 4.5)

The PQA documentation shall be approved by the Project Coordination Committee. It will be used later for evaluation of progress and results.

6. PQA documentation

6.1 Vision statements and CFSs

The vision statements are listed with names e.g.:

<table>
<thead>
<tr>
<th>Visions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eric Pavier:</strong> We want to be outstanding with respect to usage and implementation of methods and techniques.</td>
</tr>
<tr>
<td><strong>John Doe:</strong> Our consultants are rated the best when it comes to project management and analytical skills.</td>
</tr>
</tbody>
</table>

The critical success factors (CSF) are anonymous because most of them are based on suggestions from several participants.

The CSF are documented like this:

<table>
<thead>
<tr>
<th>Critical Success Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. A Supply Service which can be measured and optimised.</strong></td>
</tr>
<tr>
<td>On time delivery to customers</td>
</tr>
<tr>
<td>Avoid or reduce the number of back-orders shipments</td>
</tr>
<tr>
<td>We understand what good delivery service is (it is defined)</td>
</tr>
<tr>
<td>Improved availability of goods due to better forecasting</td>
</tr>
<tr>
<td>Efficient support for the customer and the salesman in the order process.</td>
</tr>
<tr>
<td><strong>2. A competent Organisation</strong></td>
</tr>
<tr>
<td>Simultaneous adaptation of business, management, organisation, and system procedures.</td>
</tr>
<tr>
<td>We need to build an organisational match before installation of the system.</td>
</tr>
<tr>
<td>The users involved are the best we have.</td>
</tr>
<tr>
<td>Ability to handle big complex international projects.</td>
</tr>
</tbody>
</table>
### 6.2 PQA-matrix for XX A/S

<table>
<thead>
<tr>
<th>Critical Success Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>E</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Quality management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The system supports a dynamic business environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Accessible information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. A competent organisation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. A supply service which can be measured and optimised</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activities</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>E</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Define all aspects of a good supply service</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td>4</td>
<td>LH</td>
<td></td>
</tr>
<tr>
<td>2. Build a development support organisation</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>2</td>
<td>JD</td>
<td></td>
</tr>
<tr>
<td>3. Build the user competence necessary to utilise the new system</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>3</td>
<td>LH</td>
<td></td>
</tr>
<tr>
<td>4. Define the user competence necessary to define the new system</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Distribute the IRS report</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>1</td>
<td>PP</td>
<td></td>
</tr>
<tr>
<td>6. Inform involved sales companies about the process and the progress on-going</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td>1</td>
<td>PP</td>
<td></td>
</tr>
<tr>
<td>7. Define and build the complete system for communication, HW, SW and applications</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>0</td>
<td>CV</td>
<td></td>
</tr>
<tr>
<td>8. Do PQA with the users involved in the design</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td>CV</td>
<td></td>
</tr>
</tbody>
</table>
6.3 Activity Description Form

<table>
<thead>
<tr>
<th>Activity Description</th>
<th>Activity name/ID:</th>
</tr>
</thead>
<tbody>
<tr>
<td>By:</td>
<td>Date:</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>The framework of the activity tasks and the responsibility of involved resources (responsibility- and problem areas).</td>
</tr>
<tr>
<td><strong>Product</strong></td>
<td>The expected result of the activity, e.g. tender material, a decision or a Technical specification.</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>A Description of the <em>product</em> quality requirement or of the quality of the obtained.</td>
</tr>
<tr>
<td><strong>Responsible</strong></td>
<td>The person responsible for that the activity is done (maybe by others).</td>
</tr>
<tr>
<td><strong>Other resources</strong></td>
<td>The names of the involved resources and the requirements to there qualifications.</td>
</tr>
</tbody>
</table>
| **Tasks**            | **Task description**  
A list of all necessary tasks and their deliverable. Every description has to comprise a definition of each task deliverable. |
|                      | **Resource demand**  
The name of the persons expected to do the actual work, incl. estimates. |
| **Time frame**       | Duration in days or e.g. in case of a course a specific period/date. |
| **Risks**            | Describe any event which could jeopardise your estimated resource time consumption or the expected duration and timing of the activity. Consider the external factors that can not be controlled and internal factors that can. |
| **Dependent Activities** | Activities performed before and after this activity and an explanation of their relationship. |
### 6.4 Activityplan

![Activity plan chart](image)

### 6.5 Report definition and distribution

<table>
<thead>
<tr>
<th>Report Receiver</th>
<th>Project-Plan</th>
<th>Ressource actuals</th>
<th>Economy</th>
<th>Cost/Benefit</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource</td>
<td>W</td>
<td></td>
<td></td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Project-managers</td>
<td>W</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Steering committee</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Project Management group</td>
<td>W/M</td>
<td></td>
<td></td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Department managers</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
</tbody>
</table>

W=Weekly; M=Monthly