



An Introduction to Project Management

A workshop presentation to the University of Oxford Material Science Part II Induction Course

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Agenda

1 Introductions

- 2 Principles of Project Management
 - The Need for Project Management
 - What is a Project?
 - What is Project Management
 - The process of project management
- 3 Year 4 Research Project
 - Approach to Project Management
- 4 Departmental Project Management Forms
- 5 Project Exercise:
- 6 Other important things to focus on
 - Record keeping and traceability of records
 - Safeguarding Intellectual Property (IP)
 - Quality Assurance in Research
 - Health and Safety

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1 Introductions





1 Introductions

Keyna O'Reilly

- Part II Project Organiser
- Gerry Litchfield
- CIT business, QinetiQ Ltd.
- <u>http://www.QinetiQ.com/</u>
- Association for Project Management (APM)
- <u>http://www.apm.org.uk/</u>
- Part II Students

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 What are the key Objectives for your project; and why





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QinetiQ - "people who know how"

QinetiQ is a leading international science and engineering company, operating in Defence, Security, Aerospace and Training solutions.

Founded in 2001, from the UK's National Defence laboratories, QinetiQ has over 6 decades experience providing innovative technology solutions and services.

QinetiQ continue to expand our products and services into commercial applications, to the protection of personnel, critical infrastructure and facilities, and providing cyber security, using our specialised expertise to provide unique capabilities and solutions.

QinetiQ creates enduring relationships, operating in collaboration with partners and suppliers. Using our extensive technical knowledge and intellectual property to assist our customers to protect, advance and improve their vital interests

"Working Smarter, not harder; To do more, with less."

QinetiQ employs more than 6,000 people worldwide; operating in UK, Australia, and North America, plus a number of other international operations.





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Example use of technology – Optasense

OptaSense® has combined the technology of the "listening fibre" with advanced acoustic algorithm design to build "The Earth's Nervous System®"

OptaSense® solutions are being deployed in over 40 countries, working directly or through knowledge transfer, enabling local partners to install, maintain and operate the OptaSense systems.

Early 2011, QinetiQ's OptaSense® technology was chosen as the security system for the ~670km Mangala Development Pipeline ("MDP") in India.

OptaSense® technology protects thousands of miles of pipeline worldwide,

These technologies are being selected to protect borders, critical sites and assets and also assisting in military operations.





2 The Principles of Project Management





The Need for Project Management

Quote:

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"Planning is an unnatural process; it is much more fun to do something.

The nice thing about not planning is that failure comes as a complete surprise, rather than being preceded by a period of worry and depression."

Sir John Harvey-Jones

"Projects don't *go* wrong; they *start* wrong"





Project Management – What is a Project?



Project Management – What is a Project?

A project is any series of activities and tasks that together achieve pre-defined objectives, & deliverables, in accordance with:

- defined start and end dates
- Planned and scheduled activities
- funding limits
- a quality definition
- milestones

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• utilisation of resources such as equipment, materials, people





Project Management – What is Project Management?





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Project Management – The Process of Project Management

"I keep six honest serving-men

(They taught me all I knew);

Their names are What and Why and When

And How and Where and Who."

Rudyard Kipling





Project Management – The Process of Project Management

There are 5 basic Project Management processes:

- Initiation
- Planning
- Executing
- Monitoring & Control
- Closure





Project Initiation

Project initiation requires the following activities to be addressed and communicated:

- Confirm customers and stakeholders
- Confirm customers' needs
- State / Describe the question
 - List the project objectives
 - Identifying the project goals
- Preliminary determination of constraints
- Identification of assumptions and risks
- Inform stakeholders & Task all contributors

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A Statement of Requirements (SOR) is output from this activity and informs Project Planning





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Project Planning

Project Planning requires the following activities to be addressed:

- Identification of project activities
- Identification of the critical activities
- Determination of the sequence of activities & defined milestones
- Estimation of the time duration of each activity
- Schedule the activities to achieve the project objectives
- Estimation of the cost of each activity
- Allocation of the resources required to achieve the objectives

The output from this exercise is the Project Management Plan (PMP)



"A goal without a plan is just a wish." Antoine de Saint-Exupery, French writer (1900 - 1944)



The Project Management Plan (PMP)

The PMP should contain:

- Background. Covering the needs of the Customer and the SOR
- Objectives. Overview of scope, assumptions, constraints, time/cost/quality, deliverables and other success criteria
- Project Execution Strategy and Plans. How will we deliver the project; Work Breakdown Structure; and schedule, resource, product, quality, purchase, risk management and safety & environment plans
- Project Organisation. Structure; Roles, Responsibilities & Accountabilities; Control Groups/meetings (internal & external); and external contractor requirements. Motivational leadership, facilitation, & ownership
- Project Control System. The control cycle, progress reporting, change control, sign-off.
- Risk Management Risk Assessment. Identify risks to the successful completion of the project; Evaluate the Risks, including probability and impacts on project; including time, cost and performance, plus appropriate responses to control risk (mitigation planning)



Unclassified

Risk Assessment



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Unclassified

Risk Assessment, Evaluation and Control





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Project Execution & periodic review

Project execution is carried out in accordance with the Project Management Plan (PMP) and the agreed schedule

Project execution covers the period of doing the work to the achievement of all the project deliverables that satisfy the contract and are acceptable to the customer

During this stage of the project, careful project monitoring & control is required and regular project performance (progress) reviews should be carried out in accordance with the PMP.





Project Monitoring & Control

All projects of any reasonable size experience problems.

The Project Monitoring & Control Cycle of activities enables problems to be identified and solved at an early stage so that the project can be maintained on track.

"How does a project get to be a year behind schedule? One day at a time." <image>

Fred Brooks, author of "The Mythical Man-Month"





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The Monitoring & Control Cycle

The monitoring & control cycle consists of:

- Reviewing and measuring progress
- Comparing actual progress against the plans e.g. schedule, risk, resources, achieved performance
- Identifying any variances
- Taking action to correct variances
- Forecasting events that may cause deviation from the plan
- Re-planning if necessary

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Deliverables will be subjected to interim review during the project and extensive review against the relevant requirement before final delivery.

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Project Closure

The main objective of project closure is to confirm that all project objectives have been achieved, ensure that all elements of the project are completed, and to close down the project in a controlled manner.

Any lessons learned should be recorded and made available for the benefit of others.

'Lessons Learned' can be evaluated throughout the project. Use this approach to improve your current project.





3 Year 4 Research Project





Approach to Project Management

Establish the nature and scope of the project to enable the production of a Statement of Requirements (SOR).

Review and agree the SOR with your Supervisor (PM Form 1)

Establish an organisation structure for the project, and agree the resources you need, including:

- you the student as PM
- The Customer
 - Examiner
 - Supervisor

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- Industry sponsor
- members of the relevant research groups (to act as technical advisors, reviewers and auditors)
- laboratory technicians (for support in the laboratory)
- facility managers (to enable the scheduling of facilities required throughout the project etc.)



Approach to Project Management

Produce a work breakdown structure. The work should include tasks to:

- review what has to be achieved to determine what information/ facilities are required to enable the research;
- conduct literature searches;
- communicate with owners of facilities;
- develop ideas/methodologies and potential solution options to be researched;
- undertake experimental research and analysis;
- assess the results of the analysis for each option and determine the preferred solution to be recommended in the final report;
- write the final report;
- undertake reviews of the report within the research group, other peer groups and the Supervisor (Customer) prior to project summary (Thesis) and final delivery and acceptance.



Approach to Project Management

Produce a risk register and assess any risk contingency that may need to built into the project schedule plan

Produce a project schedule plan (Gantt Chart) including:

- the work activities including estimates of the amount of time to be spent on each activity in the plan and its start and finish time etc
- dependencies between activities;
- identified project review points (for assessing how well work is progressing against the plan and to resolve any issues/problems – (PM Forms 2-3));
- milestones;
- deliverables;
- risk contingency



Typical Project Schedule Plan – Gantt Chart





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4 Departmental Project Management (PM) Forms





Departmental Project Management (PM) Form 1

PM Form 1 – PART II Project Description Form (Agreed by when?)

- Title of Project
- What are the objectives of the project in order of priority?
- List the major milestones that must be accomplished in order to meet the objectives of the project
- What resources (equipment, materials, technician support etc) will you need?
- Complete the following plan for your entire project. List each major task down the left had column, and for each one draw a horizontal line to indicate the period you expect to allocate to it.

No.	Major Task	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1										
2										
3										
4										
5										
6										
7										
8										
9										
10	Write up							XXXX	XXXX	XXXX



Departmental Project Management (PM) Form 2 & 3

PM Form 2 – First PART II Project Analysis Form

This is used to conduct a project review (and self assessment) after about 2 months

Provides formal opportunity to update the Project Plan

PM Form 3 – Second PART II Project Analysis Form

This is used to conduct a 2nd project review (and self assessment) further into the project

Thesis

The Part II thesis should include a section on the project management aspects of the work



5 Project Exercise – 'workshop'





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Project Exercise – Describe your project; Draft PM Form 1

Identify your Customer(s)

Examiner; Supervisor; Industry sponsors': confirm their needs

Complete PM Form 1

- Project Objectives prioritised
- Produce a typical Work Breakdown Structure (WBS)
- Produce an outline Project Schedule Plan; Produce a schedule (Gantt Chart?)
- Produce a Risk Assessment evaluate the risks
- Resources required to execute the project
- Identify Milestones & Deliverables
 - Planning the tasks, 'key events' and outputs from tasks
 - Identify Milestones, Deliverables
 - Delivery of Thesis

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Risk Assessment Table

RISK ASSESSMENT

Risk No.	Identified Risk	Probability of occurrence (Low, Med, High)	Impact	Mitigation	Cost
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					



Typical Work Breakdown Structure – 2 levels





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5 Project Exercise example: To model and test material behaviour





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Project Exercise :

To model and test material behaviour Work Breakdown Structure (WBS)





Project Exercise :

To model and test material behaviour Gantt Chart







6 Other important things to focus on

- Record keeping and traceability of records
- Safeguarding Intellectual Property (IP)
- Quality Assurance in Research
- Health, Safety & Environment





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Record keeping and traceability of records

- Often you don't know exactly what you are going to do at the beginning of a research project.
- You need to be able to revise your approach, or even your objectives, if things don't go the way you expected.
- You need to allow enough time to be able to do this.
- Whatever course your project follows, you can be sure that you will need to write it up. You can therefore **plan to do so from the start.**
- It is important for you to keep sufficient records to provide an audit trail
 - from the initial baseline plan;
- through the key decision points that brought about any changes;
- to the final write up of what has been achieved.
- Records include:
 - Lab Books; baseline documents associated with the project (e.g. PM Form 1);
 - Scheduled review records (e.g. PM Forms 2-3) and technical reviews/meetings contributing to any changes to the project scope.



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Safeguarding intellectual property (IP) – Product of Research

- Intangible asset
- "Virtual" capital
- Can be exploited or traded





Safeguarding intellectual property (IP) - Types of IP

- Patents
- Copyright
- Design Rights
- Trade Marks
- Database Rights
- Secrets

The University Policy on IP Rights are set out in the University's Statutes 2000 and govern the ownership of certain forms of IP, which students may create.





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Safeguarding intellectual property (IP) - Patents

Purpose is to PREVENT unauthorised use

They must be:

- Novel
- Inventive
- Applicable / practical

Registered in 5 steps

- Filing
- Novelty search
- 'A' Publication

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- Substantive examination
- Granting and 'B' Publication





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Quality Assurance in Research

International standard

- e.g. ISO9000/9001
- Registration implies competence
- Quality management system
- Organisation
- Procedures
- Assurance
- Audit
- Problem identification & Corrective action
 Industry standards may also apply





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Quality Assurance in Research – Essential Issues in Research

Calibration of equipment

- Record keeping and traceability
- Consistency of method

Adherence to standards if appropriate





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Health, Safety & Environment (HSE)

It is essential that Health, Safety & Environmental (HSE) aspects are dealt with at the project planning stage.

Advice on specific HSE concerns will be provide by the Department as required and introduced during the induction and workshop practice courses.

You are advised to follow the 'do-s and don't-s'





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Summary – You & Project Management

Project Management applies common sense and forward thinking

As a minimum, make sure you have:

- PMP
- SOR What am I going to do; Why am I doing it
 - Project Description
 - Project Objectives
- WBS How am I going to do it (task activities and task 'breakdown')
- GANTT (schedule) Who and What do I need to achieve it, When do I need to do it (by)
- List of milestones / deliverables Project outputs; to Who
- Risks & appropriate mitigation plans What could 'go wrong' and how can I prevent it

Things happen! Don't be afraid to change the plan;

But record the change; and why









The Need for Project Planning





The Need for Project Planning





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