Risk Management Guide

MITP
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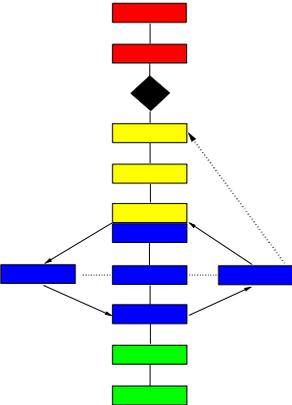
Edition Notice
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This edition applies to Version C5.0 of Managing the Implementation of the Total Project (MITP), and to all subsequent releases and modifications until otherwise indicated in new editions.

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Allturn Group International B.V.
Groenendal 7c
5405 AS Uden (NB) The Netherlands
Email: Info@AllturnGroup.com

Phone: 0031 (0) 6 20 35 67 51

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PREFACE About This Document

This document describes the MITP Risk Management technique.

For information about the MITP life cycle, the key techniques, and the support techniques, see the MITP Handbook. A glossary of terms may be found at the back of the MITP Handbook

Who Should Read This Document

The 'you' in is this document is the project manager, but other people can read it too and extract useful information from it.

How to Use This Document

The table of contents provides a clear roadmap to the main topics outlined in this document.

ISO9000 Control Information

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1. Risk Management

Note: The Procedures for Techniques are contained in the Project Control Book Guide.

This topic provides an overview of the Risk Management technique.

Subtopics
1.1   What is a Risk?
1.2   What Is Risk Management?
1.3   Why Do You Need Risk Management?
1.4   Who is Involved in Risk Management?
1.5   When Do You Need Risk Management?
1.6   How Are Risks Managed?
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1.1 What is a Risk?

A risk can be defined as a possible undesirable and unplanned event which could result in the project not meeting one or more of its objectives. Most projects have risks, and if these are ignored the project will usually fail in some way or another. It is different from an issue in that an issue represents a project impact which has already taken place. Consequently, a risk may become an issue, though not all issues emanate from risks.

Risks may be foreseen or unforeseen, but only foreseen risks can be managed and controlled. A risk, once recognized and documented, is classed as foreseen.

1.2 What Is Risk Management?

Your processes to manage project risks should contain the following activities:

- Identifying and recording, as early as possible, all potential risks to the project. Risks may be identified at all levels (from the Project Sponsor downwards), and you will need to consolidate the reports.
- Assessing the likelihood of each risk occurring and the cost to the project (in terms of lost benefits or of corrective action) should the risk occur.
- Agreeing an action plan to minimize the likelihood or cost of each risk. Actions should include avoiding, containing, and monitoring the risk, as appropriate.
- Regularly reviewing and verifying all risks with the associated assessment and actions, and incorporating new risks.

Risk management embraces a series of forward-looking linked activities and processes, comprising:

Risk assessment	The identification, evaluation, and initial prioritization of risk
Risk analysis	The qualitative and quantitative analysis of risk and second prioritization
Risk containment	The assignment of containment actions and (where necessary) contingency plans for dealing with risks assessed.
Risk control	The regular maintenance of risk action plans; risk reassessment; risk resolution; a process for the assessment of new risks; risk reporting and review

1.3 Why Do You Need Risk Management?

The management of risk is a vital undertaking for any project, yet it frequently has to be sold to company cultures which do not have a history of embracing risk. Certain cultures may be dismissive of the value of risk management, but time and time again an investment in process and resource for serious risk management has proved invaluable.

The value of risk management becomes obvious when it is compared to other key processes for managing project exceptions: issue management and change management. Most issues result from potentially foreseeable risks, which indicates that those project teams which only track and manage issues are losing the opportunity to prevent project impact, and, by the same token, are likely to incur greater costs in impact prevention and fire-fighting.
Just considering the cost of dealing with an impact demonstrates the value of early impact prevention and forecasting. See Figure 1.

```
┌─────────────┐      ┌─────────────┐      ┌─────────────┐
│    RISK     │ ───> │    ISSUE    │ ───> │   CHANGE    │
└─────────────┘      └─────────────┘      └─────────────┘

Containment          Fire-fighting        Costly replan
actions              Damage limitation    Delay to implement
                     Costly emergency
                     actions
```
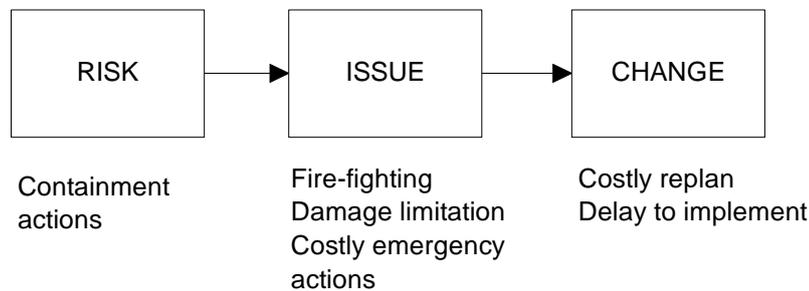
Figure 1. Comparative cost of dealing with a project risk, issue, and change

The cost of dealing with a risk is potentially much less than dealing with it when it becomes an issue. If a change then has to be made to resolve the issue then even greater cost may be incurred.

1.4 Who is Involved in Risk Management?

In a project, risks will originate from various sources, and it is the duty of you and your project team to recognize these sources and undertake regular risk assessments to identify risks and their potential impacts.
Risk is everyone's business in a project, be they suppliers, sponsors, steering group members, users, dependent functions, or those working within the core team.

The preferred approach is for you to encourage an open process for identifying and managing risk. This means that team members (including suppliers) are happy to share identified risks for the greater good of the project. The project manager, however, is ultimately accountable for project risk management.

1.5 When Do You Need Risk Management?

The opportunity for risk management presents itself right across a project's life cycle, from funding, resourcing, and start-up to contract negotiation with suppliers and business partners, and to testing and implementation. The following chart shows the MITP project life cycle with trigger points for risk activity.

Life cycle stage	Activity
Identifying the project	Risk assessment
Establishing the project	Establish risk control process
Managing project performance	Risk assessment Risk re-assessment Risk analysis Risk containment Risk tracking and reporting
Ending the project	Lessons learned

Although risks can occur throughout a project's life cycle, they generally attract the most attention during project identification, endorsement, and definition. It is a lamentable fact that, after these activities, risks are often given scant attention, even during important work stages. A reason for this is partly cultural (risk management has not been seen in the past to be as important as issue management) and partly process (a risk control process has not been established at project outset).
Projects often fail to carry forward the risks identified at feasibility and definition stages into an ongoing risk management plan.

Risk management is, after all, a continuing process, and not something which is undertaken just at the early stages of a project. As far as culture is concerned, if risks are managed on a par with other key project exceptions, such as issues and changes, then the habit of looking forward, which risk management provides, should reduce the chances of impact from major issues.

1.6 How Are Risks Managed?

For the management of risk, the master MITP control vehicle is the Risk Control Form (RCF), completed for each risk. See Figure 2. This form may be tailored for each project type, and may be held manually or as soft-copy. In order to compile the RCF certain data needs to be obtained from each of the risk management activities mentioned under "What Is Risk Management?" in topic 1.2. Initial data which will feed into the RCF will come from the Project Definition Report (PDR), and project identification, endorsement, and definition (feasibility and/or contracting activities), including any outputs from initial Risk Identification Workshops.

RISK CONTROL FORM				
Raised by : A.N. Other Date: 25 nov 1994 No.: R921101 Risk Owner:				
Risk Summary: Training rooms availability				
		Urgency: 1		Status: OPEN
RISK DESCRIPTION AND CONTAINMENT PLAN				
Risk: Risk of training rooms not being available for planned start of user training				
		Probability; VL		80%
Evaluation Criteria: Builder's schedule is behind, unlikely to catch up. Cannot move start of user training because of Xmas trading peak. Training schedule already published.				
Consequence: User morale (training sched. already published) Project schedule Ä delay (at least 1 month because of Xmas trading peak) estim. $10K cost of keeping				
team on		Impact: H		95%
Containment recommendations: Discuss improvement possibilities to builder's schedule. Arrange fallback accommodation for training.				
		Target date: 31 Nov 1995		
RISK ACTION LOG				
Status Date	Planned Actions and Costs / Progress and Comments	Actn. Ownr	Target Date	Compltn. Date
18 Nov	Liaise with Premises Dept. and understand constraints. Discuss impact & probability with sponsor at next review Secure option on training rooms with Sunnyview Hotel	DM AB DM	21Nov95 25Nov95 28Nov95	21Nov95 25Nov95
25 Nov	Premises Dept. to put pressure on builder following discovery of latedelivery clause	SJG	28Nov95	

Figure 2. Sample completed risk control form

Prior to establishing a risk management process, you need know who or what function will be controlling risk, according to the specified project management system (in the PDR). In a medium to large project, this would be the project office. In a very large project,you might establish a special risk function. In a small project the project manager might well assume the role for controlling risk. Whatever the preference, a process for controlling risk needs to be established. See "Risk Control" in topic 1.6.11.

1.6.1 Risk Identification and Assessment

A good initial approach is to run a group session, led by a risk management consultant or party conversant with the process of identifying risk through a Risk Identification Workshop (RIW). See the Risk Identification Workshop Foils and Notes. Running an initial group session will enable risk comparisons to be made amongst cross-functional attendees and will help to promote a concerted, common attitude towards risk.

Another approach is to target individuals for interview, though in a large project or where persons are remotely located this may be unproductive.

The most useful approach is one which gains early involvement by key parties to the risk management process.

In some projects, for cultural reasons, it may be necessary to embark on a prior selling phase of the value of undertaking risk management. See "Why Do You Need Risk Management?" in topic 1.3.

Practical suggestions for carrying out risk identification workshops are described separately in the MITP method.

1.6.1.1 Focus Areas

It is beneficial, at the start of risk identification, to identify focus areas, which break the project into manageable chunks. Typical focus areas might be Network, User Training, Installation Management, Data Migration. Often they neatly relate to the names of the project's subprojects.

Identification of the risks for a focus area will relate as much to the skill of the expert facilitator as to the ability of the attendees. MITP provides project risk assessment checklists (see "Risk Management Checklists" in topic 2.0) to facilitate the identification of focus areas and risks. There is, however, no real substitute for experience gained in risk on previous projects.

1.6.1.2 Risk Drivers

For any risk identification, it is useful to look for the risk drivers. These are the trigger points for potential risk. Each focus area will have them. The focus area, User Training, for example, will contain such drivers as type of audience, functional background, numbers to be trained, geographic location of participants, training sites, training materials and equipment, etc.

Risk drivers may vary according to scenario. For example, a diskette may not be readily thought of as a risk driver, but in a discussion on Security, it may well be the driver for risks regarding confidentiality of data, the introduction of viruses, etc.

1.6.2 Risk Evaluation

Once a risk has been identified, it can be evaluated, that is, why is it a risk, and how much of a risk is it. Relevant factors are:

- Precedence (has the risk occurred before?)
- Familiarity of operation (has the work been undertaken before?)
- Skills (the ability of staff to carry out the work)
- Resources (adequate materials to carry out the work)
- Time (adequate time to complete the work)
- Quality (confidence about the quality of work required)
- Cost (sufficient funding to carry out the work)
- Probability (the likelihood of the risk occurring)
- Impact (the affect on the project or business of the risk occurring, in terms of delay, cost, quality, specification, performance, etc.)

Some of these criteria are also risk drivers, and may be considered during risk identification. MITP recommends impact and probability as minimum evaluation criteria to employ. Probability is the percentage likelihood of occurrence, whereas impact is an expression of severity through, mainly, cost of damage or delay. The cost of impact may be calculated from time, quality, resources, benefit loss and cost of repair, for example. Evaluation is important since it records why a risk was assessed as it was. When a risk is revisited some time later the evaluation criteria of the original assessment may have changed in perspective causing a new assessment.

An example of a risk statement expanded to include some evaluation is:

R920401.   Risk of training rooms not being available for planned start of user training.

Builder's schedule behind, unlikely to catch up. Cannot move start of user training because of Christmas trading peak. Impacts complete project schedule and user morale (training schedule already published).

1.6.3 Initial Prioritization

True prioritization of identified risks can only take place after qualitative or quantitative analysis. In practice, however, it is often necessary to take an initial prioritization in order to cut down the number of risks identified and, therefore, the amount of work required in subsequent analysis.

In performing this initial prioritization the risk of losing a key risk will be very low since the facilitator and project team will have some idea of the importance of the identified risks without undertaking formal analysis. Analysis will confirm the importance of the risks and provide data for their ongoing management and control.

1.6.4 Risk Analysis

Following evaluation and initial prioritization, the identified risks should be qualified to the required degree using qualitative analysis. Qualitative analysis may or may not be extended to quantitative analysis, as required.

1.6.5 Qualitative Analysis

Each risk may be qualified according to the degree and complexity necessary for the project. MITP recommends the minimum qualitative rating should be impact and probability.

Even if a decision has been made for the project not to adopt a quantitative approach, it is recommended that a numerical basis be used as the foundation for rating. A three-category qualitative system is in current widespread use within the IT industry (HIGH, MEDIUM, LOW). This may well be sufficient for a very small and contained piece of development work, but for a MITP project it is recommended that at least a five-category percentage approach be used (1-20%, 21-40%, 41-60%, 61-80%, 81%-100%). Impact and probability can, therefore, be qualified for each risk according to these percentages.

The required level of granularity will vary according to project. For example, projects involving the movement of oil-platforms have used fine granularities of probability of 0.01%, 0.02%.

The project manager should provide the estimates of probability and impact, with support from team individuals, as appropriate.

For discussion purposes, each percentage category may be given a descriptive tag, but care should be taken not to become locked into words rather than more statistically useful numbers.

1.6.6 The Concept of Probability

It is not the intention of this topic to discuss at length the subject of probability, but it is important to be aware that the accuracy of a probability forecast is proportional to the number of probability statements and iterations of those statements: the more the better.

Consider the scenario of two people arriving to attend a meeting. What is the probability that the attendees would be present so that the meeting could start on time? At a simple level:
1.   Both attendees could be early
2.   Attendee A could be early and B late
3.   Attendee B could be early and A late
4.   Both attendees could be late

Only option 1 would allow the meeting to start on time, giving a percentage probability of 25%.

If the question were adjusted to simply What is the probability of the meeting starting on time?, additional considerations would come into play, such as likelihood of meeting materials being available. The percentage probability would change.

The more specific a risk statement is, therefore, the easier it is to rate. Using a spread of estimates to assess an outcome is preferable to using a single estimate.

1.6.7 Impact Analysis

In arriving at an evaluation percentage for impact, it will be necessary to consider the scale of impact or consequence. Impact is best expressed in terms of cost, that is, the cost to the project of the risk impacting.
This can be expressed as a percentage, but is only valid by comparison to other impacts. Thus, an impact costing $1,000 may be either high or low in relation to the overall cost of the project.

The RCF leaves space for a statement of the consequence of the impact. The consequence should support the impact percentage.

For some projects, particularly for reporting purposes, it is desirable to express risk severity as a combination of impact and probability.
Figure 3 in topic 1.6.8 shows two expressions of risk severity (alert and critical). Other terms may be coined to cover all squares on the grid, as required.

1.6.8 Severity

Following qualitative analysis, it is desirable to prioritize the risks identified for the assignment of actions. This will save unnecessary effort in assigning actions to non-urgent risks.

By comparing the ratings of impact and probability a balanced judgement needs to be made. For example, is High Impact but Likely Probability a higher priority risk than Very Likely Probability but Medium Impact? The answer rests largely with the nature of the risk, but, as a general rule, the impact to the project or business should bear the strongest weight.

Degrees of probability may be used to decide on the desired effect of the actions to be assigned. For example, should the action merely contain the risk, mitigate its impact or apply a contingency plan? (See "Risk Containment" in topic 1.6.10.)

Construction of a matrix will show a comparative spread of risks between impact and probability see Figure 3.

IMPACT

	Rating	LOW	MEDIUM	HIGH
P R O B A B I L I T Y	UNLIKELY	alert		
	LIKELY			
	V. LIKELY			critical
	CERTAIN			critical

This chart shows two expressions of severity: alert, at the lowest end of a scale of severity, and critical at the highest end. A separate chart may be constructed to show just severities.

Figure 3. Matrix diagram of evaluated risk quantities

Risk urgencies should be recorded on the RCF. The priority system to be used will depend upon particular project requirements, though a three-tier system, such as that shown below, may suffice for most projects:

Urgency	Condition
1	Urgent action Critical risks which must be effectively contained within a few days.
2	Normal action Key risks
3	Low priority Less damaging risks

Note: The above are suggested guidelines. A decision needs to be taken for each risk evaluated on its own merits.

1.6.9 Quantitative Analysis

Once a qualitative judgement has been made, a more sophisticated quantitative approach can be applied; and there are various methods which can be utilized.

Most methods employ probability evaluation as a quantitative means, but others use inference techniques and KBS (Knowledge Based System) statements. Several software tools exist currently to support these methods.

By far the most popular method is that known as Monte Carlo Simulation. It is a probability evaluation technique and is well supported by software tools. Monte Carlo is a recommended MITP quantitative approach, though its use is recommended via mechanical means, for speed and efficiency, as opposed to any manual calculations which can be laborious.

It is not the purpose of this guide to detail the Monte Carlo method here, but in summary, Monte Carlo uses up to 1000 iterations to apply multiple values to a given target. The target might be an end-date or a cost, for example. Monte Carlo, as a random number generator, applies input values (which might be based on experience) to give a spread of possibilities.

By comparison, a deterministic approach would yield only a single target value. Such a deterministic approach is provided by most of the project management scheduling software packages available today. Risk analysis software tends to be either available as a separate package or as an add-on to an existing scheduling package.

MITP also recommends the use of KBS statements for utilizing previous project experience. Again, various database packages exist, which provide for a question-and-answer approach to risk, and which analyse responses and give a view on acceptability, complexity, etc. The IBM Project Risk Checklist is a summary-level, manual version of this.

KBS risk software usually allows users to input their own statements, and so build a more tailored fund of project risk knowledge. This is the case with the IBM ProjecTools/2 Risk Assessor, which is available for use on IBM compatible PCs running OS/2 version 2.1 or higher and OS/2 Database Manager. For more information refer to the separate documentation on tools in the MITP library.

1.6.10 Risk Containment

Risk containment is the assignment of actions to contain or reduce the risks evaluated. Containment may be undertaken prior to detailed risk analysis, but once started, it becomes an important ongoing risk management activity. Containment should be undertaken as soon as possible after risk evaluation, and comprises, for each risk:

1.   An action statement
2   A person responsible for carrying out the action
3   An action-by date
4   An estimated cost of the action
5   An estimated cost/consequence of the impact (where appropriate)

Some risks will have several actions associated with them, and some of the actions may need to contain contingency plans. Contingency plans will be required for risks of significant impact or for risks deemed to have 100% impact and 100% probability (that is, certain to take place). Often, such risks require actions more appropriate to issues.

As an example of contingent actions being required, consider the prospect of new training rooms not being ready in time for user training. This risk may require a contingency action to take an option on external accommodation as well as specifying containment actions to speed up the building of the new training rooms.
The training room example may now look like this on the RCF:

R920401.   Risk of training rooms not being available for planned start of user training.

Builder's schedule is behind, unlikely to catch up.
Cannot move start of user training because of Christmas trading peak.
Impacts complete project schedule, user morale (training schedule already published).

Probability: 80%
Impact: 95%
  - Costs: Delay $10K (cost of keeping team on)
Urgency: 1
Actions
1. Liaise with Premises Dept. and understand readiness constraints. Training Mgr. by 21 July 1995.
2. Discuss impact and probability with sponsor. Proj. Mgr. at next sponsor review (25 July 1995)
3. Secure option on training rooms with the Sunnyview Hotel. Training Mgr. by 28 July 1995.

Cost if not taken up: $50 (loss of deposit).
Cost if taken up: $350 per week.

The last action in this example is a contingency. Note that actions 1 and 2 will not in themselves reduce the risk. They may lead to other actions which may do so.

It is feasible to allocate no actions to some risks which have been evaluated as very low percentages of impact or probability. These risks could be given warning status (that is, no actions assigned), but should still be monitored, since they could be influential in driving other risks.

The objective of risk containment is to minimize the occurrence of a risk, avoid it or to dispose of it altogether. The project manager must decide what actions are appropriate and what priority they should be given.

The allocation of actions, as with evaluation percentages, is judgmental. However, actions which prove to be effective should cause a re-evaluation of the impact and probability percentages at a later date. Note also that risks change over time, which is why regular re-evaluation is desirable.

1.6.11 Risk Control

Once risks have been evaluated and actions assigned they need to be regularly managed. In a small project, the project manager would assume this responsibility, but in a large project, this work is better undertaken by the project office or specialist risk manager.

Risks should be managed on a par with other project exceptions, such as issues and changes. There is a common misconception that risks only need to be examined once a month or every quarter. In a healthy project there should be at least as many risks as issues open at any one time.

A process for managing risks needs to be constructed, as part of the project management system, and this process should cover:
1. The raising of new risks by any team member
2. The recording of risks and their status (manual or mechanical)
3. The evaluation of risks
4. The allocation of actions, costs, impacts and persons responsible for progressing and carrying out the actions
5. Guaranteed turnaround times for notifying risks
6. The regular review of risks (recommended as part of regular project progress meetings) and notification to the team
7. The analysis of risks
8. The reporting of risks to senior management

The management approach needs to be tailored to the project, but a suggested format for all of the above is summarized below.

Since risks need to be regularly appraised, a means of searching by search parameters such as 'date raised', 'action-by date', etc., will need to be considered.

As a minimum, the person controlling risk will need to maintain a set of RCF sheets (one per risk), summarized in a log (one line per risk). The log needs only to be a register of risks, showing Risk Number, Short Description, Priority and Status. In practice, the RCF can be updated regularly during meetings, whereas the log needs only the Priority and Status fields to be updated, and new risks to be added.

1.6.12 Ownership

In risk management, there are two categories of owner:

- Risk owner
- Action owner

1.6.12.1 Risk Owner

Each risk needs to be owned by someone responsible for ensuring that the risk is suitably contained. The risk owner retains responsibility for the risk during its life cycle and is assigned by the project office (in consultation with the project manager) or during a Risk Identification Workshop. Often the risk owner is also the originator of the risk.

The risk owner is responsible for collecting and suggesting containment and contingency actions. It is primarily a coordinating role, but the person selected must have an affinity for the risks under his or her ownership.

For some risks the risk owner will also assume the role of action owner, since he or she will the person best placed for carrying out his or her own recommended actions.

It is important that the risk owner is closely connected to the project team. This ensures that control remains within the project. A risk owner outside the project may not share the same priority for producing actions as someone within the project.

In certain circumstances it may not be necessary to appoint a risk owner. An example is where the actions for a risk are self evident or well understood by the project team, and an action owner is obvious.

1.6.12.2 Action Owner

The action owner is the person suggested by the risk owner for carrying out specific actions to contain the risk. A single risk may have several action owners.

The project manager will approve suggested action owners, and the project office will chase action owners for progress on behalf of the risk owner.

In summary action owners are responsible for specific actions; risk owners are responsible for the life of the risk; the project office is responsible for administering the risk management process; and the project manager is accountable for the risks and process.

1.6.13 Risk Numbering

Whether a manual or mechanized approach is taken, each risk should be identified according to a unique number. A useful approach is to use a number composed of R/YY/MM/nn, where nn is a unique identifier. This enables each risk to be scrutinized according to when it was raised.

Thus, any risk going back to July, 1990 (R9007nn) will be significantly outstanding. There should not be more than 99 risks in any one month, but if there is likely to be, use nnn instead.

Use of the prefix R is beneficial for identifying a risk in a log of exceptions (as opposed to an issue or change). This may seem obvious, but in a review of risks, issues and changes, it is helpful to be able to recognize instantly which is which. Risks, issues and changes have at least two things in common. They all have statements and actions. Therefore, if a risk becomes an issue, the R number can be closed and an I number opened. Using a mechanized control system means that the same format for statements and actions may be shared between risks, issues and changes, with only the identifying number and prefix distinguishing them.

1.6.14 Process for Raising and Controlling Risks

As mentioned already, some team members will not be used to raising risks, and some initial work may need to be done to sell them the concept and encourage the team to "think risk". Occasional group risk assessment sessions can help to maintain the focus on risk.

Team members should be encouraged to use the RCF to raise risks (electronically or manually). The RCF encompasses three purposes:

- To enable a team member to formally raise a risk
- To record details of the risk
- To annotate progress in monitoring the risk

Each team member needs to be aware of how to raise a risk, and what the process is for dealing with it. The project office should construct a flow chart, which summarizes the steps of the process. This flow chart will be similar to that for issues and changes, but a unique for risks is the assignment of impact and probability.

A typical process for ad hoc risks (that is, outside of a formal risk assessment session) might be:

Responsibility	Task
Originator	1. Raise risk on RCF (E-mail or manual)
Originator	2. Send to project office (PO)
PO, with or without assistance from PM	3. PO receive and validate as a risk
PO	4. PO reject if invalid, or assign number and log
PO and PM	5. PO evaluate risk with originator and PM, and assign risk owner
PO	6. PO contact immediately affected parties (if urgent notification required), otherwise leave until step 8
PO and PM	7. PO discuss priority and containment actions with risk owner, originator and PM
PO	8. PO copy risk form with actions to action owners, risk owners and other affected parties
PO	9. PO progress chase action completions and re-evaluate risk, as necessary
PO and PM	10. PO close risk, as necessary

Note that the process flow must be matched to the project management system adopted, and may deviate from the above.

It may be helpful to assign status codes to show the position of a risk (and, indeed, an issue or change, likewise) in progress. OPEN and CLOSED are two logical states, but intermediary stages may be specified, if required.

It is difficult to guarantee a turnaround time for risks, since they can be open for long periods, but it is practical to guarantee to originators a turnaround time for logging and evaluating a new risk.

The maintenance of actions may be a significant load. "Action owners" will need to be chased and "action-by" dates will need to be monitored. Outstanding actions will need to be reviewed, as will their effectiveness in reducing or containing risk. Additional actions may need to be proposed. If a risk impacts, it will need to be converted to an issue, and appropriate action taken.

1.6.15 Risk Reporting

Risks should be regularly reviewed, and progress meetings are an ideal forum for reviewing new and outstanding risks (as well as issues and changes). The project manager will also want to review risks with the sponsor and/or steering group, both regularly and ad hoc. Many risk action decisions will need to be taken at a senior level, particularly regarding costly contingency actions.

The timely reporting of risk is a vital piece of risk management. The project stakeholders, particularly, need to have quick and simple understanding of the current risks.

1.6.15.1 Report Types

Different meetings will require different report types, with or without graphical representations. Some sample, manually-produced charts are included in the Project Control Book. These can also be managed on a PC system.

A sort on "action owner" within "action-by date" will be useful for checking progress during progress meetings. A sort on "status" may also be useful.

A matrix may be prepared to show visually the arrangement of the highest percentages of impact and probability in relation to the lowest percentages.

The sponsor and steering group need to be able to have a quick grasp of the current risk position. For them, a radar chart may be more useful. Figure 4 shows the number of risks identified in each focus area. The most severe are shown at the center, extending outwards (non-cumulatively) to the less severe. It is of particular benefit for giving a quick picture of the size of severe risk to someone such as a sponsor, and, when used comparatively, can show the progress made in reducing severity.
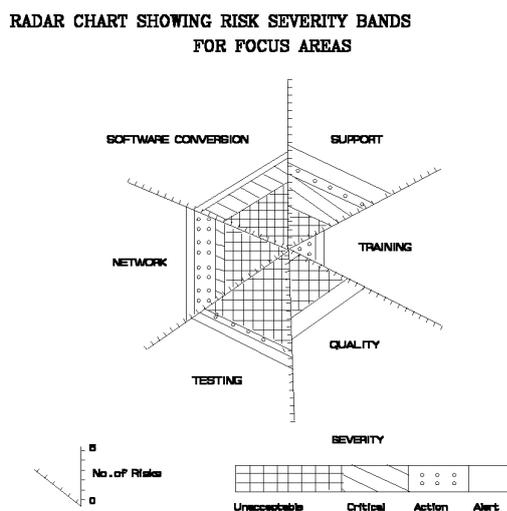
Figure 4. Radar chart of risk quantities by focus area

Scatter diagrams show the concentration of risk from low to high percentages of impact against probability, such as that shown below:
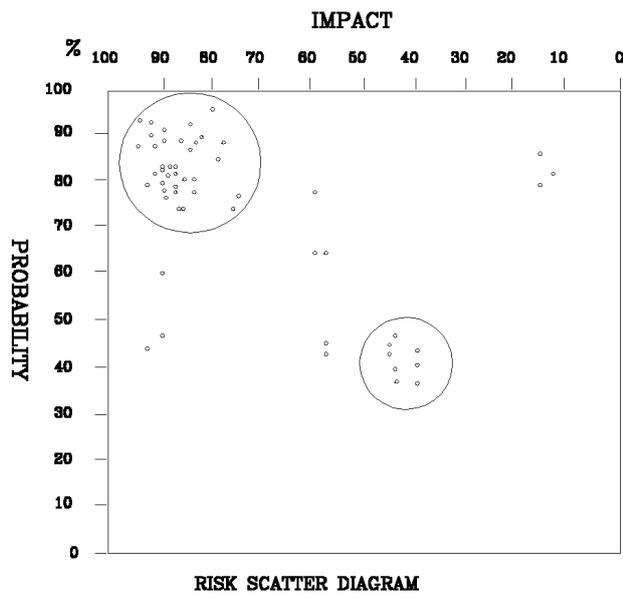
Figure 5. Scatter diagram of evaluated risk quantities

Monte Carlo diagrams can show a distribution curve against a bar chart of probabilities, such as that shown in Figure 6, whilst some software packages can produce a project network chart showing percentage probabilities of activities on a critical path.

MONTE CARLO SIMULATION EXAMPLE

Iterations = 100

Expected value

Probability

24%
20%
16%
8%
4%
0%

Values in Millions

− 2   −1.5   − 1   −.5   0   .5   1   1.5
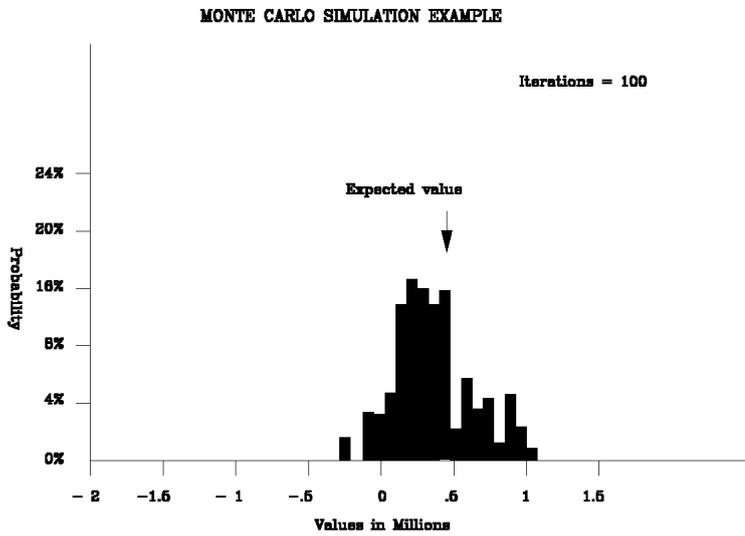
Figure 6. Monte Carlo simulation example

1.7 Risk Management Reading List

The following are suggestions for some useful books and papers on risk management.

1.7.1 Books
- Risk Analysis and its Application, D.B. Hertz and H. Thomas (John Wiley, 1983)
- The Business of Risk, P.G. Moore (Cambridge University Press, 1983)

1.7.2 Papers
The following are good papers on risk from various project management journals.
- For an excellent introduction to quantifiable approaches:
  Chapman, Chris, A Risk Engineering Approach to Project Risk Management, International Journal of Project Management, 8, No.1, February 1990.
- For a good basic introduction to risk analysis:
 *Clark, R.C. et al. of W.S. Atkins, Risk Analysis in the Evaluation of Non-Aerospace Projects, International Journal of Project Management, 8, No.1, February 1990.*
- For a specialized approach to quantification using inference analysis:
  Williams, T.M., Risk Analysis using an Embedded CPA Package, International Journal of Project Management, 8, No.2, May 1990.
- For an excellent paper on cultural issues:
  Mikkelsen, Hans, Risk Management in Product Development Projects, International Journal of Project Management, 8, No.3, August 1990.
- For a risk management paper, with some good coverage on the human factors of risk management:
  Dingle, John, Cultural Issues in the Planning and Development of Major Projects, International Journal of Project Management, 9, No.1, February 1991.
- For examples of potential project risks at the company, business, and market-place level:
  Bartlett, John, Business Risks in Major IT Projects, Journal of the Association of Project Managers, May 1992
- A short paper, with good diagrams:
  Berridge, Tony, Managing High Risk Projects,Project Management Today, April 1991.
- Selling the need for risk quantification:
  Gray, Stephen, Why Bother Modelling Risk?, Project Management Today, April 1991.
- For the case for developing risk management infrastructures in companies:
  Williams, T.M., Risk-management Infrastructures, International Journal of Project Management, 11, No.1, February 1993.
- For some useful new angles on identifying critical risks in relation to the total project, including cruciality:
  Williams. T.M., What is Critical?, International Journal of Project Management, 11, No.4, November 1993.
- For a useful survey of what tools and techniques people are actually using on projects:
  Simister, Steve J., Usage and Benefits of Project Risk Analysis and Management, International Journal of Project Management, 12, No.1, February 1995.

2   Risk Management Checklists

This topic contains three risk management checklists. The questions are designed to prompt you to think about risk in five focus areas, according to project status:

Focus areas	Subsections
Business considerations	Business case Company culture Consequences of failure External dependencies Suppliers Internal dependencies Project scope
User considerations	User expectations User impact
Technical considerations	Development environment System definition System design System testing
Project management considerations	Project organization Project objectives Project management processes Quality Health and safety
Implementation considerations	Skills and resources Training, documentation, and support Implementation plan

To start, answer the questions in Table 1 and follow the instructions.

Table 1. Project status

Questions	Comments
Current Position Which one of the following describes your position? • New project • Project in progress	
Life Cycle Status Which one of the following represents your current project status in life cycle terms? • Project Identification • Project Endorsement • Project Definition • Organization • Startup • Planning • Work 　　Requirements 　　Design 　　Build 　　Test	

If you chose New project in response to the Current Position question in this topic, proceed to "Risk Questions for New Projects" in topic 2.1; but first check the life cycle considerations in the next paragraph. If you chose Project in progress, proceed to "Risk Questions for Projects in Progress" in topic 2.2, having similarly checked the life cycle considerations.

Subtopics
2.1   Risk Questions for New Projects
2.2   Risk Questions for Projects in Progress

2.1 Risk Questions for New Projects

Each focus area is considered in a separate topic, and there is one table for each subsection, as given in topic 2.0. See "Risk Questions for Projects in Progress" in topic 2.2 for the equivalent questions for projects in progress.

2.1.1 Business Considerations

Table 2. Business Case

Questions	Comments
Is there a business case for this project ?	
Was it put together recently?	
Has the business case for this project been fully endorsed at board level, and has the approval to spend all the money required been confirmed	
Are any further board level decisions needed on any aspects of this project?	
Is the size of this investment (for instance in terms of effort, cost, amount of upheaval) significantly larger than the level which is normal for your organization?	
Does commitment to this project carry any implication of support to some future project?	
Is this a pilot project (that is, one requiring substantial up-front investment, but not in itself bringing substantial business benefits)?	
Does the business case allow for maintenance and on-going costs?	
If this project has been a long time going through the decision processes are there adequate plans for reviewing its implications with users and other senior management to ensure it is still viable?	

Table 3. Company culture

Questions	Comments
Is your organization's management style suitable for the level and spread of decision-making required for this project?	
Will people from different reporting lines be working together on this project?	
Does your decision-making rely on a number of independent companies (for example, a consortium, franchises, dealer network)?	
Are there factions (such as unions, clients, user groups, dealers) which might resent or resist the change brought about by this project?	

Table 4. Consequences of failure

Questions	Comments
Is this a project which your organization must undertake (for example, because failure to embark on it will put you at a serious competitive disadvantage, or because you simply cannot do business without it)?	
Is this a project in which your organization must succeed (for example, because once you have started implementing it there is no going back)?	

Table 5. External dependencies

Questions	Comments
Will any aspects of this project be a matter of public comment (for example, in the press)?	
Is any part of this project being undertaken to meet legislative requirements?	
Does any part of this project depend on government legislation not yet in force?	
Are there any deadlines to be met which have been imposed from outside of the company?	

Table 6. Suppliers

Questions	Comments
Are there any suppliers involved in this project?	
Is your estimate of the supplier involvement: • Less than 30% of the total project effort? • Between 30% and 50%? • Between 50% and 70%? • Greater than 70%?	
Have the suppliers previously worked successfully your company?	

Table 7. Internal dependencies

Questions	Comments
Are there any internally imposed end-date pressures or other critical deadlines to be met?	
Is the success of this project dependent on the success of some other project?	
Are there other major changes to your company or business which are planned or going on at the same time as this project, and which might jeopardize its success?	

Table 8. Project scope

Questions	Comments
Is this project different in nature from other projects which you have successfully undertaken in the recent past (for example, is it larger, more complex, more critical)?	
Has this type of project ever been successfully undertaken in your industry?	
Is this project • Wholly within your enterprise • Extending to wholly owned outlets (for example agents, franchises, dealers, suppliers)? • Extending to non-owned outlets (for example, agents, franchises, dealers, suppliers, clients)?	
Is this project being undertaken • On a single site or adjacent sites? • On geographically dispersed sites in one country? • On pan-European sites? • Worldwide?	

2.1.2 User Considerations

Table 9. User expectations

Questions	Comments
Is the part of your organization into which the system is to be installed one where IT is seen as useful and valuable?	

Table 10. User impact

Questions	Comments
Are you delivering to • A single user community (that is, department or function)? • Multiple user communities	
Are your users; • Naive end-users? • Already computer literate?	
Is your user population: • Less than 100? • 101-1000? • 1001-3000? • Greater than 3000?	
Will the system result in user departments having to learn a new way of life (for example, acquire new computing skills; undertake processes differently)?	
Do the users understand the impact the system will have on their working environment and day-to-day activities?	
Will the formal structure of your organization have to change significantly to use or take advantage of the system (for example, new departments, new lines of reporting or responsibility)?	
Will the user definitely agree any changes to his working practices required by the system?	
Do the users understand the extent of the end-user training needed for this type of system?	

2.1.3 Technical Considerations

Table 11. IT and development environment

Questions	Comments
Are you trying to do something which is considered leading edge technically in your part of the industry?	
Which of the following describe(s) the newness of the technology to be implemented? • Hardware exists on market and familiar to your people • Hardware exists on market but new to your people • Hardware brand new on market • Software exists on market and familiar to your people • Software exists on market but new to your people • Software brand new on market • Network exists on market and familiar to your people • Network exists on market but new to your people • Network brand new on market	
If there is software to be developed, is it of a size or complexity which is greater than your organization has tackled before?	

Which one of the following best describes the development of your key software applications?
• Off-shelf package(s), with no tailoring of code
• Tailored package(s) by:
  Package supplier
  Your people
  Supplier
• Custom-built package by:
  Your people
  A supplier	

Will the system result in your IT department having to learn a new way of working (for example, 24-hour working; reorganized activities)?	

Table 12. System definition

Questions	Comments
Is the proposed system solution the most effective solution available today?	
Does the system solution comprise any unannounced products?	

Table 13. System design

Questions	Comments
Will any of the critical components in the system be used for the first time in your organization?	
Will the system design involve combining components in a way which is non-standard or not sufficiently well proven?	
Are any of the requirements for the performance, capacity, reliability or availability of the system significantly more severe than you are used to achieving?	
Is there a source of expertise on any new components available in the U.K. (for example, supplier, other parts of your organization, other users)?	

Table 14. System testing

Questions	Comments
Will your test plans include provision for one or more of the following? • Ongoing regression testing during the development of the system • A formal post-development system test phase • A formal user acceptance test • A usability test prior to implementation • A prototype • A pilot • A "beta" test	

2.1.4 Project Management Considerations

Table 15. Project organization

Questions	Comments
Is there a project manager nominated for the project?	
Is the project manager the right person for the job (for example, has he/she handled a project of this size or complexity before)?	
Is a director or executive level manager clearly identified as "project sponsor"?	
Is the project sponsor the right person (the person who has most to gain in business terms when the project succeeds)?	
Will a project review board be set up?	
Is there a subproject structure and associated responsibilities which is sensible and workable?	
Will a project office be specified in the project organization?	

Table 16. Project objectives

Questions	Comments
Are clear project goals and objectives established?	

Table 17. Project management processes

Questions	Comments
Does your organization accept the importance of a formal project management system for this project?	
Will a planning tool being used?	

Table 18. Quality

Questions	Comments
Will quality be defined for this project?	
Will there be a quality plan for key deliverables?	

Table 19. Health and safety

Questions	Comments
Will health and safety considerations be reviewed and documented for this project?	
Is there a plan for everyone on the project, including any suppliers, to be made aware of their responsibilities regarding health and safety?	

2.1.5 Implementation Considerations

Table 20. Skills and resources

Questions	Comments
Does the project involve people in different locations working together as a team?	
Is any part of the project heavily dependent on the drive, energy and skills of one individual in your organization?	
Have you got all the necessary project management skills and resources to support this project?	
Are some of your people being spread too thinly (perhaps because there are too many projects going on at once)?	
Will you be self-sufficient technically once the system is completed?	
Are people with the necessary skills and experience [3] committed to this project for the time required?	
Are all estimates of required resources INDEPENDENTLY validated?	

Table 21. Training, documentation, and support

Questions	Comments
Is there someone in the project team responsible for ensuring that training happens (for example, manager of a Training Subproject)?	
Is there someone in the project team responsible for ensuring that documentation happens (for example, manager of a Documentation Subproject)?	
Is there someone in the project team responsible for ensuring that support happens (for example, manager of a Support or Help Desk Subproject)?	

Table 22. Implementation plan

Questions	Comments
Are you trying to implement the system in a shorter time than you would normally allow for this sort of project?	
If this is a pilot, do your senior management fully understand its purpose and the ways its success will be measured?	
If the pilot project is successful, will your management definitely proceed with the follow-on project?	
Is implementation the total responsibility of a supplier (for example, delivery, installation, commissioning)?	

2.2 Risk Questions for Projects in Progress

Each focus area is considered in a separate topic, and there is one table for each subsection, as given in topic 2.0. See "Risk Questions for New Projects" in topic 2.1 for the equivalent questions for new projects.

2.2.1 Business Considerations

Table 23. Business case

Questions	Comments
Is there a business case for this project ?	
Has the business case for this project been fully endorsed at board level, and has the approval to spend all the money required been confirmed?	
Does the business case allow for maintenance and on-going costs?	
Are any further board level decisions needed on any aspects of this project?	
If this project has been a long time going through the decision processes are there adequate plans for reviewing its implications with users and other senior management to ensure it is still viable?	

Table 24. Company culture

Questions	Comments
Are people from different reporting lines working together on this project?	
Does your decision-making rely on a number of independent companies (for example, a consortium, franchises, dealer network)?	
Are there factions (such as unions, clients, user groups, dealers) which might resent or resist the change brought about by this project?	

Table 25. Consequences of failure

Questions	Comments
Is this a project in which your organization must succeed (for example, because once you have started implementing it there is no going back)?	

Table 26. External factors

Questions	Comments
Will any aspects of this project be a matter of public comment (for example, in the press)?	
Is any part of this project being undertaken to meet legislative requirements?	
Does any part of this project depend on government legislation not yet in force?	
Are there any deadlines to be met which have been imposed	

from outside of the company?	

Table 27. Suppliers

Questions	Comments
Are there any suppliers involved in this project?	
Is your estimate of the supplier involvement: • Less than 30% of the total project effort? • Between 30% and 50%? • Between 50% and 70%? • Greater than 70%?	
Are the suppliers working successfully with your project team?	

Table 28. Internal dependencies

Questions	Comments
Are there any internally imposed end-date pressures or other critical deadlines to be met?	
Is the success of this project dependent on the success of some other project?	
Are there other major changes to your company or business which are planned or going on at the same time as this project, and which might jeopardize its success?	

Table 29. Project scope

Questions	Comments
Is this project different in nature from other projects which you have successfully undertaken in the recent past (for example, is it larger, more complex, more critical)?	
Has this type of project ever been successfully undertaken in your industry?	
Is this project: • Wholly within your enterprise? • Extending to wholly owned outlets (for example, agents, franchises, dealers, suppliers)? • Extending to non-owned outlets (for example, agents, franchises, dealers, suppliers, clients)?	
Is this project being undertaken: • On a single site or adjacent sites? • On geographically dispersed sites in one country? • On pan-European sites? • Worldwide?	

2.2.2 User Considerations

Table 30. User expectations

Questions	Comments
Is the part of your organization into which the system is to be installed one where IT is seen as useful and valuable?	
Are the system requirements clearly defined, well understood and endorsed by users and their management?	
Do the users know and agree the realistic dates by when they will really start to feel the benefits of the system?	
Do the users understand the real cost of the system (for example, in terms of extra work which they may have to do in order to provide data which will benefit someone else, not them; or work involved in collecting or cleaning data)?	
Has the application developer (your IT dept., supplier) worked with your users to understand and define the system requirements?	

Table 31. User impact

Questions	Comments
Are you delivering to: • A single user community (that is, department or function)? • Multiple user communities?	
Are your users: • Naive end-users? • Already computer literate?	
Is your user population • Less than 100? • 101-1000? • 1001-3000? • Greater than 3000?	
Will the system result in user departments having to learn a new way of life (for example, acquire new computing skills; undertake processes differently)?	
Do the users understand the impact the system will have on their working environment and day-to-day activities?	
Will the formal structure of your organization have to change significantly to use or take advantage of the system (for example, new departments, new lines of reporting or responsibility)?	
Have the users agreed to changes to their working practices, as required by the system?	
Do the users understand the extent of the end-user training needed for this type of system?	

2.2.3 Technical Considerations

Table 32. IT and development environment

Questions	Comments
Are you trying to do something which is considered leading edge technically in your part of the industry?	
Which of the following describe(s) the newness of the technology to be implemented • Hardware exists on market and familiar to your people • Hardware exists on market but new to your people • Hardware brand new on market • Software exists on market and familiar to your people • Software exists on market but new to your people • Software brand new on market • Network exists on market and familiar to your people • Network exists on market but new to your people • Network brand new on market	
If there is software to be developed, is it of a size or complexity which is greater than your organization has tackled before?	

Which one of the following best describes the development of your key software applications
• Off-shelf package(s), with no tailoring of code
• Tailored package(s) by
  - Package supplier
  - Your people
  - Supplier
• Custom-built package by
  - Your people
  - A supplier	

Will the system result in your IT department having to learn a new way of working (for example, 24-hour working; reorganized activities)?	
Have you planned adequate machine facilities for development and testing?	

Table 33. System definition

Questions	Comments
Is the proposed system solution still the most effective solution available today?	
Is the system solution documented and well understood by your people and by your suppliers?	
Does the system solution comprise any unannounced products?	

Table 34. System design

Questions	Comments
Are any of the critical components in the system being used for the first time in your organization?	
Does the system design involve combining components in a way which is non-standard or not sufficiently well proven?	
Are any of the requirements for the performance, capacity, reliability or availability of the system significantly more severe than you are used to achieving?	
Is there a source of expertise on any new components available in the U.K. (for example, supplier, other parts of your organization, other users)?	

Table 35. System testing

Questions	Comments
Do your test plans include provision for one or more of the following: • Ongoing regression testing during the development of the system • A formal post-development system test phase • A formal user acceptance test • A usability test prior to implementation • A prototype • A pilot • A "beta" test	
Have you planned adequate time for testing your system?	

2.2.4 Project Management Considerations

Table 36. Project organization

Questions	Comments
Is there a project manager in charge of the project?	
Is the project manager the right person for the job?	
Is a director or executive level manager clearly identified as "project sponsor"?	
Is the project sponsor the right person (the person who has most to gain in business terms when the project succeeds)?	
Is there a project review board in place?	
Is there a subproject structure and associated responsibilities which is sensible and workable?	
Is there a project office?	

Table 37. Project objectives

Questions	Comments
Are clear project goals and objectives established?	
Is there a full range of tasks to achieve the objectives?	

Table 38. Project management processes

Questions	Comments
Is there a formal project management system for this project?	
Is there a process in place for the management of changes and issues, and is it working?	
Is there a detailed project plan, showing activities and resources over time?	
Is a planning tool being used?	
Are there milestones which are being achieved?	
Is there a process for managing project risk, and is it working?	
Is there a structured review process in place?	
If there are suppliers involved, are they subscribing to the project management processes for the project?	

Table 39. Quality

Questions	Comments
Has quality been defined for this project?	
Is there a quality plan for key deliverables?	
Are quality reviews being carried out?	

Table 40. Health and safety

Questions	Comments
Have health and safety considerations been reviewed and documented for this project?	
Is everyone on the project, including any suppliers, aware of their responsibilities regarding health and safety?	

2.2.5 Implementation Considerations

Table 41. Skills and resources

Questions	Comments
Does the project involve people in different locations working together as a team?	
Is any part of the project heavily dependent on the drive, energy and skills of one individual in your organization?	
Have you got all the necessary project management skills and resources to support this project?	
Are some of your people being spread too thinly (perhaps because there are too many projects going on at once)?	
Will you be self-sufficient technically once the system is completed?	
Are people with the necessary skills and experience committed to this project for the time required?	
Have all estimates of required resources been INDEPENDENTLY validated?	

Table 42. Training, documentation, and support

Questions	Comments
Is there a viable training plan for end-users, service providers and support staff?	
Is there someone in the project team responsible for ensuring that training happens (for example, manager of a Training Subproject)?	
Is there a viable documentation plan for end-users, service providers and support staff?	
Is there someone in the project team responsible for ensuring that documentation happens (for example, manager of a Documentation Subproject)?	
Is there a viable support plan for end-users and service providers?	
Is there someone in the project team responsible for ensuring that support happens (for example, manager of a Support or Help Desk Subproject)?	

Table 43. Implementation plan

Questions	Comments
Is there an Implementation Plan?	
Are you trying to implement the system in a shorter time than you would normally allow for this sort of project?	
If this is a pilot, do your senior management fully understand its purpose and the ways its success will be measured?	
If the pilot project is successful, will your management definitely proceed with the follow-on project?	
Is implementation the total responsibility of a supplier (for example, delivery, installation, commissioning)?	

3. Disaster Recovery in Project Management

Subtopics
3.1   What is Disaster Recovery?
3.2   Why Do You Need Disaster Recovery?
3.3   How Do You Manage Disasters?

3.1 What is Disaster Recovery?

Disaster recovery is the ability to come to terms with the effects of a disaster, whether that disaster emanates from natural causes or human causes.

In project terms a disaster could be the sudden loss of key project personnel through illness, a major power outage, fire, flood, acts of war, bankruptcy of a key supplier, etc. The scale of disaster impact is usually varied, but is significantly catastrophic to affect the continued operation or validity of the project.

3.2 Why Do You Need Disaster Recovery?

Disaster recovery is closely associated with risk management. In risk terms, a disaster is often Low probability but High impact. For this reason contingency plans are often put in place to deal with disasters through normal risk management, but the low likelihood of a disaster causes many in the project team to believe the impacts will never occur.

The Data Center which was struck by lighting twice in one week was unlucky, but the failure to adequately test the backup network reflects carelessness. Disaster planning needs to be taken seriously, with real commitment to costs and implementation of contingencies.

3.3 How Do You Manage Disasters?

Planning for disaster is accomplished through the preparation of contingency plans and forward thinking, but is sufficiently important enough to warrant its own Disaster Recovery Plan. This plan outlinessteps to take in the event of particular disaster taking place.

Because each disaster will be so varied in its impact, from total loss to particular loss, each plan will be different in its scope and content. A common item on the plan, however, will be a contact list of all project personnel, such that notification can be made speedily in the event of a disaster.

INDEX

COMMENTS Readers' Comments

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Publication No. MICG1RSK

Overall, how satisfied are you with the information in this book?

Legend:
1   Very satisfied
2   Satisfied
3   Neutral
4   Dissatisfied
5   Very dissatisfied

	1	2	3	4	5
Overall satisfaction					

How satisfied are you about the information this book contains:

	1	2	3	4	5
Accurate					
Complete					
Easy to find					
Easy to understand					
Well organized					
Applicable to your task					

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Allturn Group International B.V.
Groenendal 7c
5405 AS Uden (NB) The Netherlands
Email: Info@AlturnGroup.com

Phone: 0031 (0) 6 20 35 67 51

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