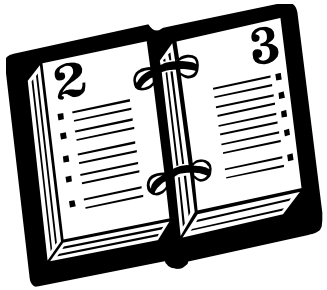
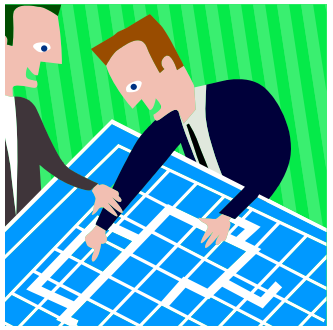
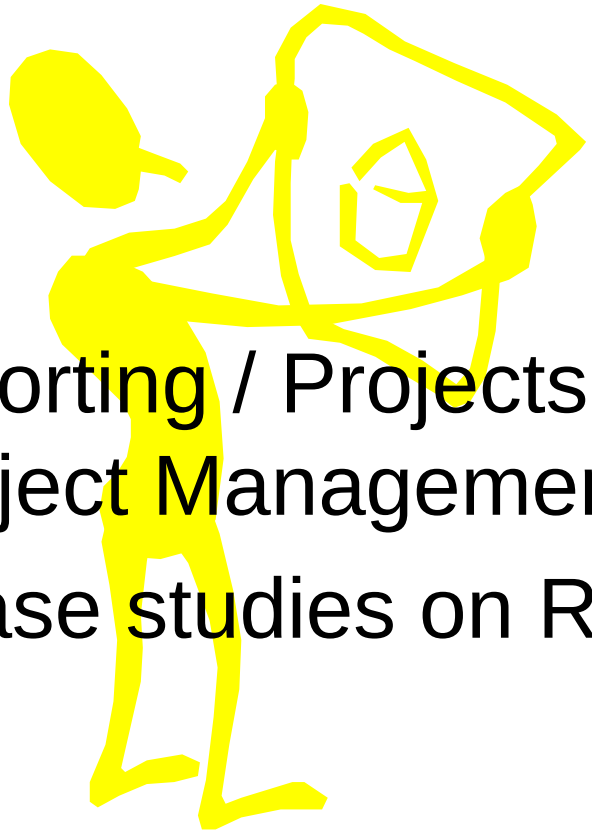
The University of Sydney

# INFO5990 Professional Practice in IT

Lecture 07A/B







## Risk & Reporting / Projects Tools for Project Management

## 2 Case studies on Risk

# By the end of this lecture you will be able to:

- Describe some tools and techniques used for project management
- Understand how a network diagram can be used to establish projects
- Case studies on PM
- Project reporting
- Project risk

# Case Study
# Ariane 5

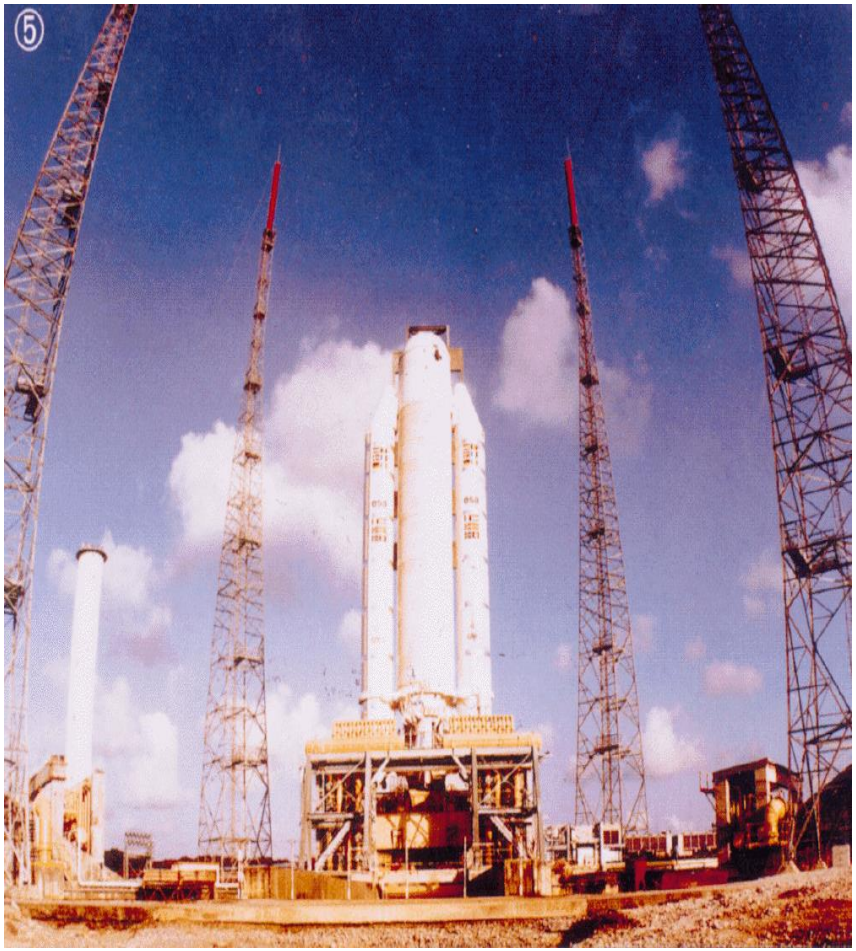
# Video of the failure

*Show this !*

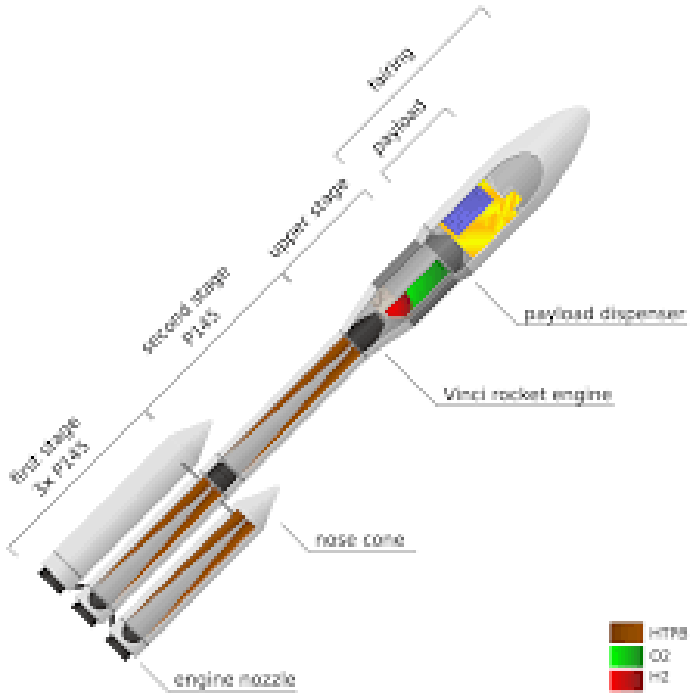
https://www.youtube.com/watch?v=PK_yguLapgA

# Project

- *On June 4, 1996, the first European test flight of Ariane 5 took place.*
- *They were sending $500M of satellites into space.*



# What Failed




- 40 seconds after launching, at an altitude of about 3700 m, the launcher veered off its flight path, broke up and exploded.
- ***A 16 bit integer was executed which caused the computers to shut down and the aerodynamics destroyed Ariane 5***.
- The same code used in Ariane 5 worked fine in Ariane 4. So why did the mission fail? Scientists believed it would work as well in Ariane 5.

# What did they do ?

- Set up an independent Inquiry Board.
- The software bug was misleading, because the failure was due to dynamics of ariane 5, different than ariane 4.
- Due to the failure they decided to run test and re-examine the test flights .
- After analyzing the data, they found out that the launcher correctly was triggered by the rupture of the electrical links between the solid boosters and the core stage which caused the self-destruction.

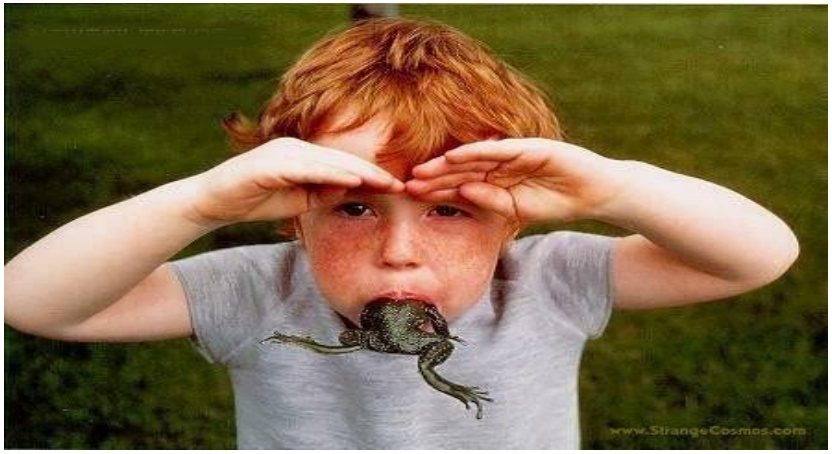
# Summary

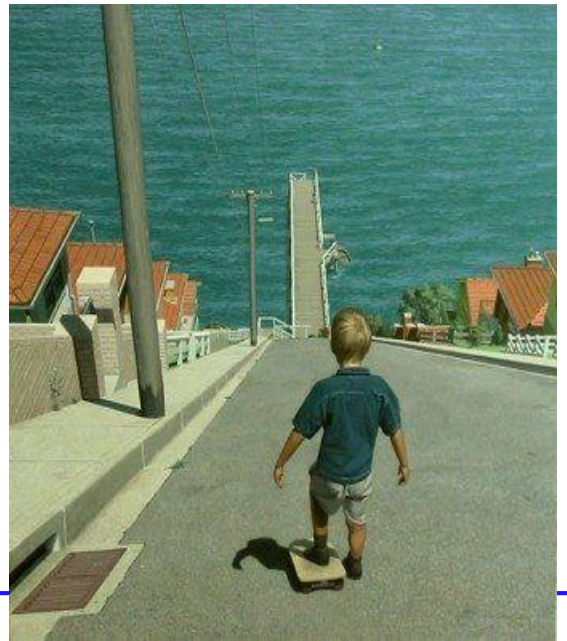
- This engineering failure, was due to specification and design errors in the software of the internal reference system and the loss of information.
- This failure was a good way to show that you can’t always rely on previous work even if it has worked on the passed.
- The code that worked on Ariane 4 was also used in Ariane 5.

# What Project Risk's where there ?

# Risk Management

# Analysing risks



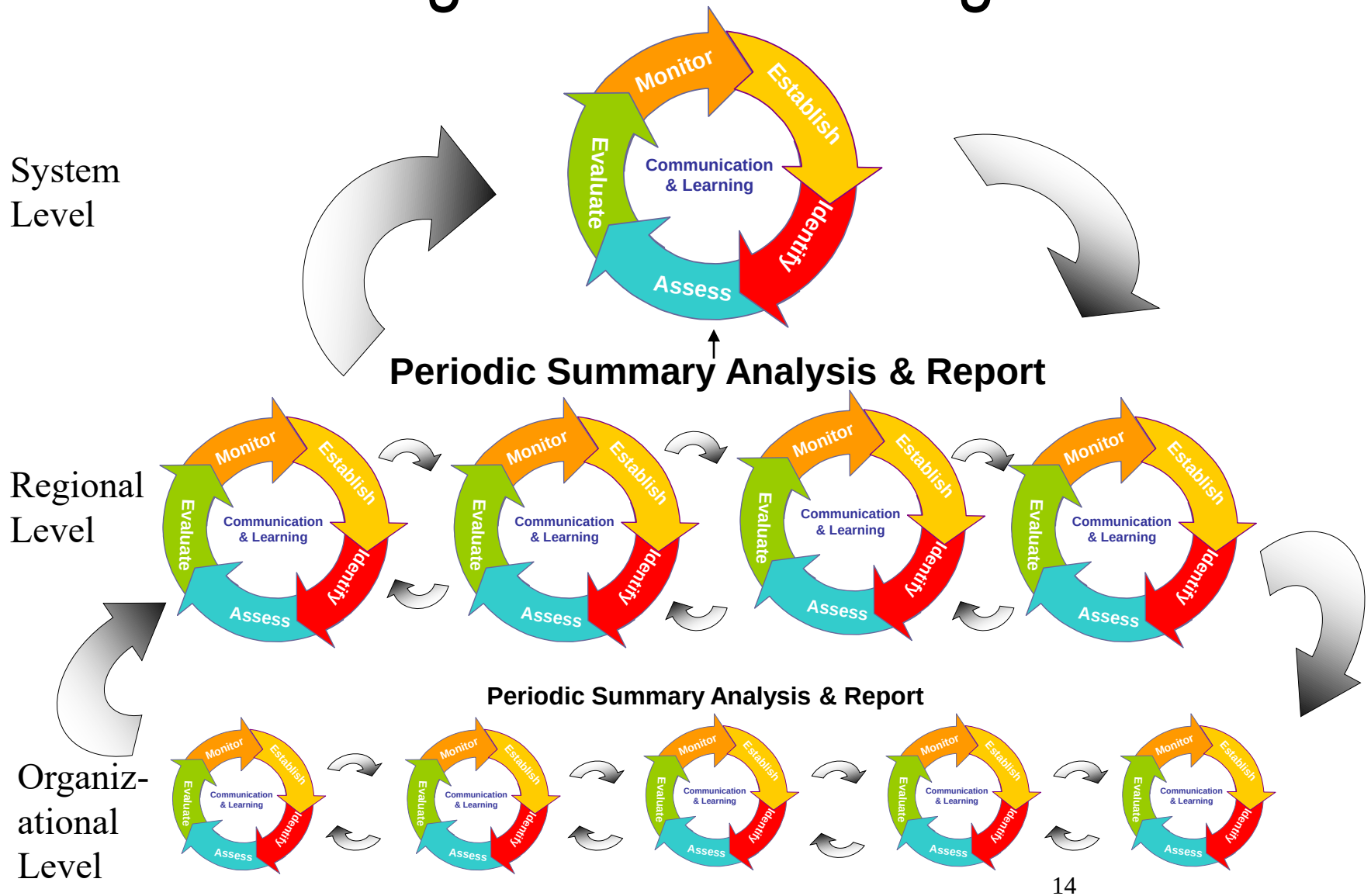
# Identify small bits of the project

# What to do if the project is ‘slipping’

## Take action

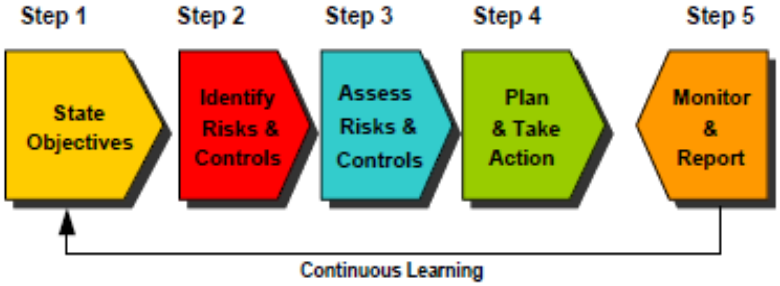
- Identify cause
- Notify management
- Plan remedial strategy
- Revise budget
- Revise project schedule
- Communicate the state of affairs

# Integrated Risk Management



# Integrated Risk Management Quick Reference Guide

## The OPS risk management process




## Step 1: State (or establish) objectives

- Define context and confirm objectives
- Risks must be assessed and prioritized in relation to the objective
- The more specific the objectives (specific goals, key milestones, deliverables and commitments) the easier it is to assess potential risks
- Risks can be assessed at any level; operational, program, initiative, unit, branch, health system

**Risk (uncertainty)**
The chance that a future event will impact the achievement of established objectives. Risks can be positive or negative.

**Control / Mitigation Strategy**
Controls/ mitigation strategies put in place by management to minimize negative risks or maximize opportunities.

**Consequences**

- Identify the specific consequences of each risk, if the risk in fact occurred
- Consider and quantify consequences in relation to cost, quality, time, etc.

**Cause/Source of Risk**

- Understand the cause/source of each risk
- Use a cause/effect diagram

## Step 2: Identify risks & controls

**Identify risks - What could go wrong?**

- Always use the 13 categories of risk
- Examine trends and consider past risk events
- Obtain information from similar organizations or projects
- Brainstorm with colleagues and/or stakeholders
- Increase awareness of new initiatives/ agendas and regulations, consider interdependencies
- Document short-term and long-term consequences for each risk (consider interdependencies)

**Identify existing controls – What do you already have in place?**

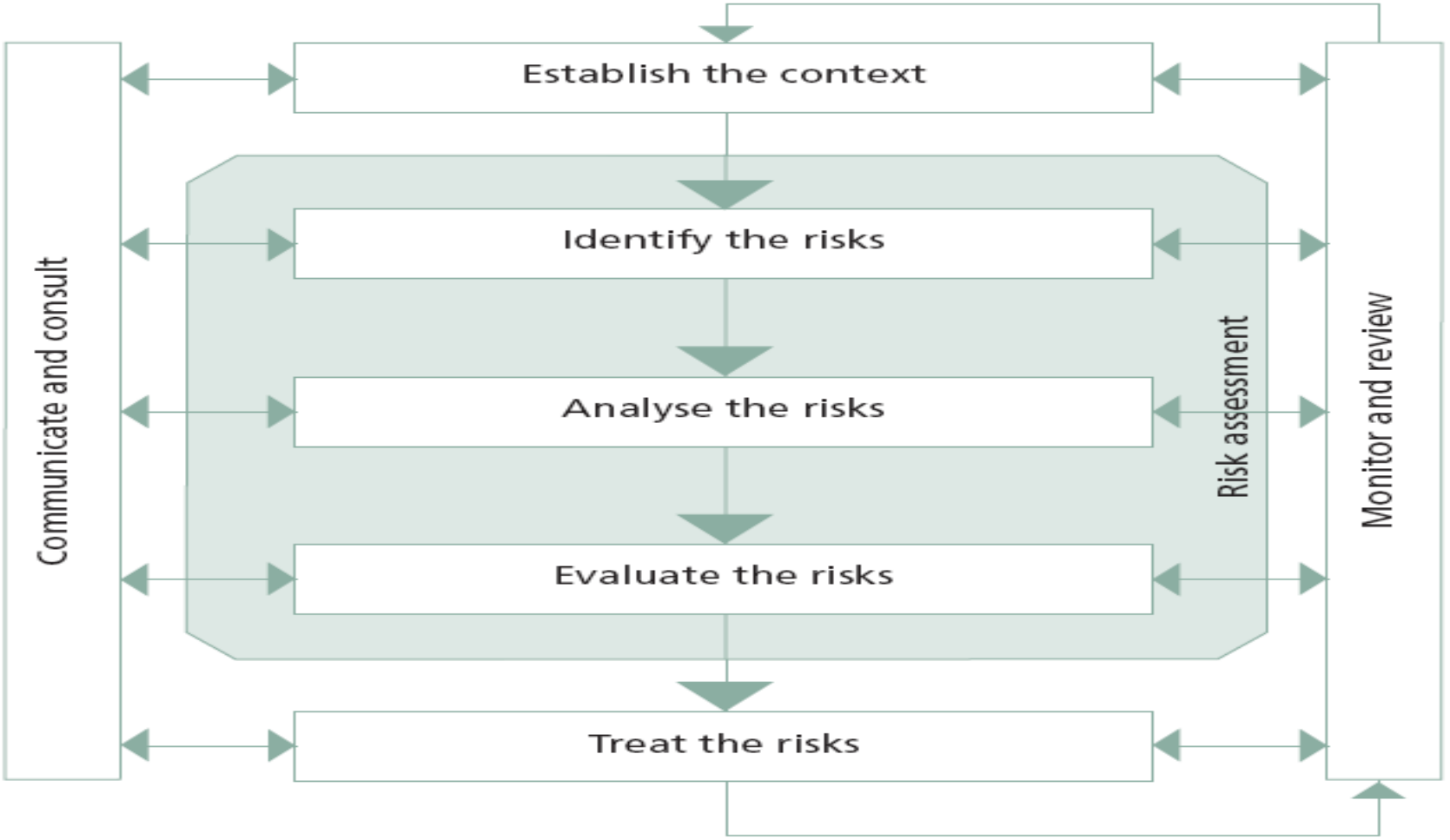
- Preventative controls (address causes and source of risk)
- Corrective / Recovery controls (focuses on reducing impact after risk has occurs)

## 13 categories of risk

| RISK | DESCRIPTION |
|---|---|
| Compliance/ Legal | Uncertainty regarding compliance with laws, regulations, standards, policies, directives, contracts; may expose the ministry to the risk of fines, penalties, litigation. |
| Equity | Uncertainty that policies, programs, services will have an equitable impact on the population. |
| Financial | Uncertainty of obtaining, using, maintaining economic resources; meeting overall financial budgets/commitments; preventing, detecting or recovering fraud. |
| Governance / Organizational | Uncertainty of having appropriate accountability and control mechanisms such as organizational structures and systems processes; systemic issues, culture and values, organizational capacity, commitment, and learning and management systems, etc. |
| Information / Knowledge | Uncertainty regarding the access to or use of accurate, complete, relevant and timely information. Uncertainty regarding the reliability of information systems. |
| Operational or Service Delivery | Uncertainty regarding the performance of activities designed to carry out any of the functions of the ministry/unit, including design and implementation. |
| People / Human Resources | Uncertainty as to the ministry's/ business unit's ability to attract, develop and retain the talent needed to meet its objectives. |
| Political | Uncertainty of the events may arise from or impact any level of the government including the Offices of the Premier or Minister, e.g. a change in government political priorities or policy direction. |
| Privacy | Uncertainty with regards to the safeguarding of personal information or data, including identity theft or unauthorized access. |
| Security | Uncertainty relating to physical or logical access to data and locations (offices, warehouses, labs, etc). |
| Stakeholder / Public Perception | Uncertainty around the expectations of the public, other governments, media or other stakeholders; maintaining positive public image; ensuring satisfaction and support of partners. |
| Strategic / Policy | Uncertainty that strategies and policies will achieve required results or that policies, directives, guidelines, legislation will not be able to adjust as necessary. |
| Technology | Uncertainty regarding alignment of IT infrastructure with technology and business requirements. Uncertainty of the availability and reliability of technology. |

V 2

# Risk Process



# What NOT to do if the project is ‘slipping’

- Ignore it
- Try to hide it
- Keep on keeping on
- Rob Peter to pay Paul
- Try to play ‘catch up’

# Dealing with uncertainty


Risk management – one of the most important aspects of a project !

But mostly ignored !

# Managing risk

- ‘Risk’ is the probability that an uncertain event or condition will negatively impact project performance or success
- Risk management involves
  - Identifying risks
  - Assessing risks
  - Planning risk response
  - Tracking and controlling risks

# Risk Management

- Making informed decisions under conditions of uncertainty.
- The manager must balance the opportunity offered by each action against possible negative consequence of associated risks.
- Making decisions now, about future possibilities, rather than having to make them in the future.
- Being active rather than passive.

# What can go wrong?

- Time overrun on particular task, e.g. INCIS(NZ Police)
- Staff illness
- Staff leaving
- Technical ‘hitch’ – need for invention
- Technology failure
- Late delivery
- Failure to meet specifications
- Budget overrun

# Ways of dealing with risk (1)

- Avoiding Risk
  - Change the project plan to eliminate the risk or condition.
  - Examples:
    - Use older well-tried software or technology, rather than ‘bleeding’ edge
    - Locate power station away from fault line and the coast

# Ways of dealing with risk (2)

- Mitigating Risk
  - Reduce the likelihood an adverse event will occur
  - Reducing impact of adverse event.
  - Examples:
    - Ensure good staff conditions
    - Employ multiple employees who can cover for each other
    - Build some slack into the project schedule
    - Have several projects on the go concurrently
    - Have disaster recovery plan in place

# Ways of dealing with risk (3)

- Transferring Risk
  - Pay a premium to pass the risk to another party
  - Examples:
    - Take out insurance
    - Impose penalties on contractors for late delivery
    - Outsource critical elements of the project

# Ways of dealing with risk (4)

- Sharing Risk
  - Allocating risk to different parties
  - Examples:
    - Joint ventures
    - Distributed tasks
- Accepting Risk
  - Making a conscious decision to accept the risk and deal with the event if it happens

# Risk reporting and communications

| Risk Level | Action and Level of Involvement Required |
|---|---|
| **Critical Risk** | • Inform Chief Executive Officer and Board of Directors<br>• Immediate action required |
| **High Risk** | • Inform Chief Executive Officer<br>• Strategy Team involvement/attention is essential to manage risks – provide report to Board as appropriate |
| **Moderate Risk** | • Management mitigation and ongoing monitoring required<br>• Inform relevant Strategy Team members |
| **Low Risk** | • Accept, but monitor risks<br>• Manage by routine procedures within the program and site |

# Scrum - an agile process

- SCRUM is an agile, lightweight process for managing and controlling software and product development in rapidly changing environments.
  - A way to maximize productivity of all staff
  - Team-based approach
  - Iterative, incremental process
  - Improve communication and maximize cooperation
- Benefits
  - Develop’s products with rapidly changing requirements
  - Controls the chaos of conflicting interest and needs
  - Outcome driven

# Network diagrams can help:
## **Project Evaluation and Review Technique** (PERT)

Developed by US Navy for the POLARIS (mobile submarine launched ballistic missile) project (1958).

The project involved 250 contractors and 9000 subcontractors and was competed on time, thanks to good project management.

PERT CAN HELP REDUCE RISKS

# Rationale for PERT

- Projects often finished behind schedule, even though everything seemed to be going all right
- The under-estimation of the project completion time was due to alternate paths becoming critical
- Some account had to be taken of random effects on the time estimates

# Reminder:
# Computer aids for project management

Creating a Project Plan
using Microsoft “Project”

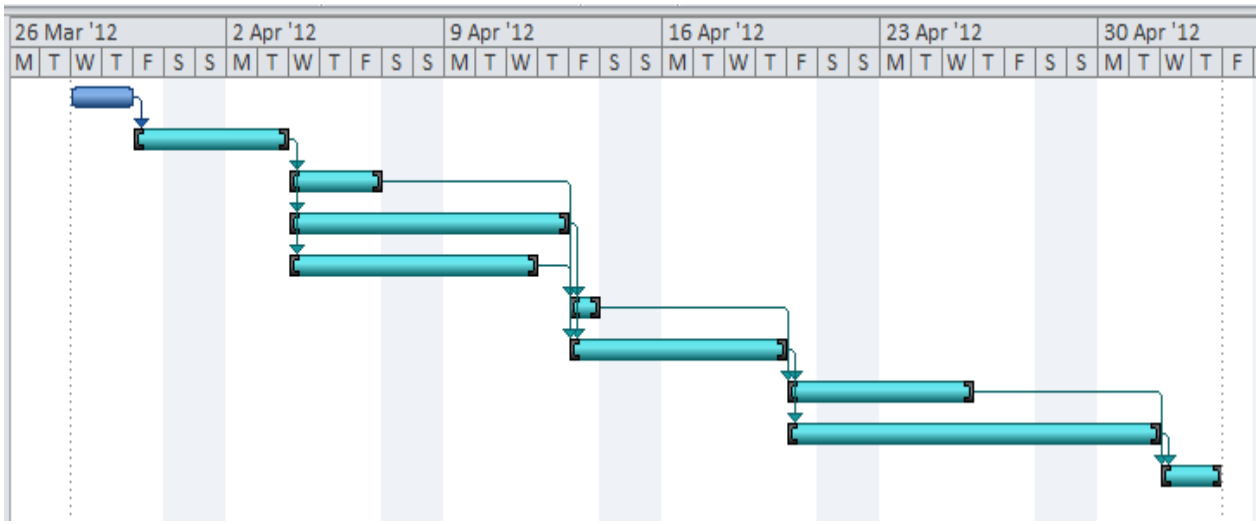
There are other software – but MS is by far the most popular

# Enter data into MS Project

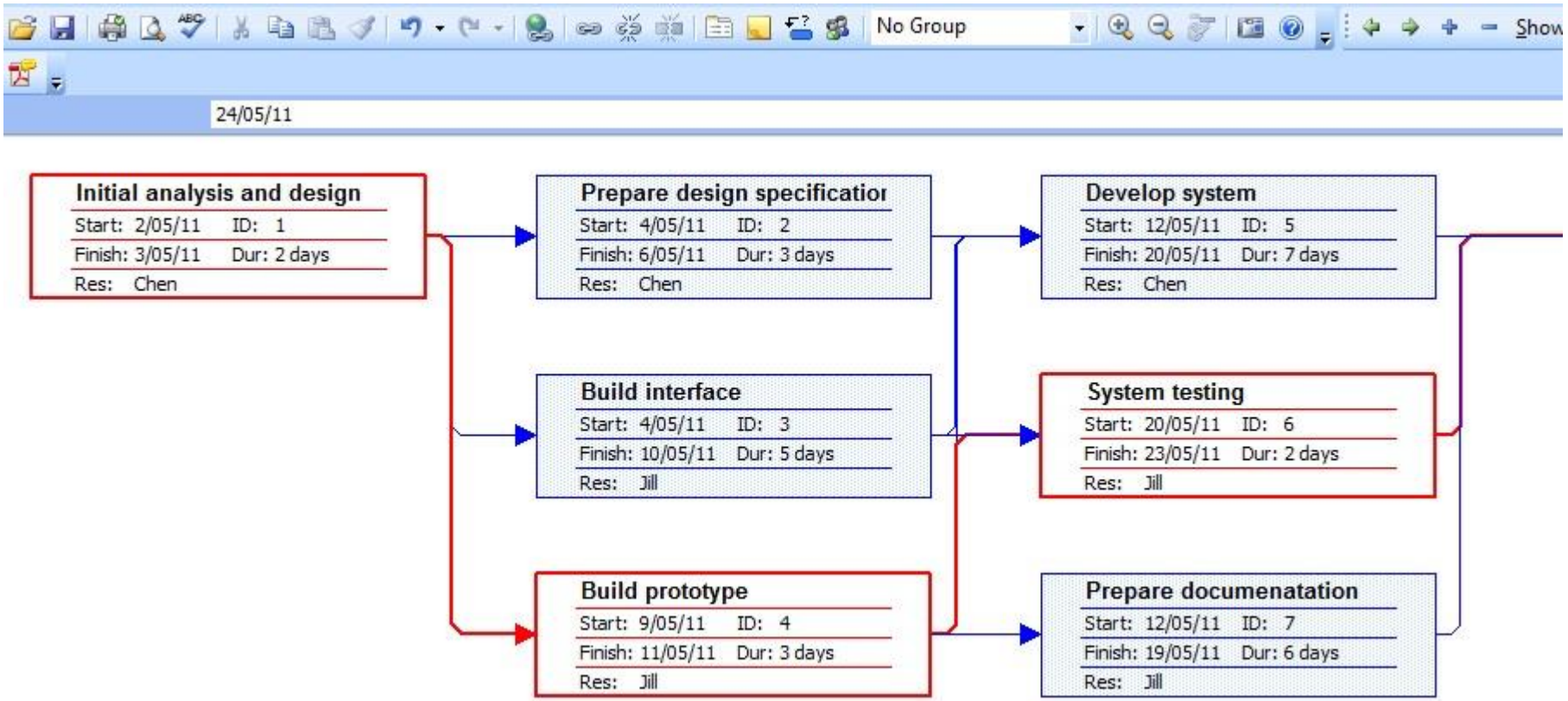
| | Task Name | Duration | Start | Finish | Predecessc |
|---|---|---|---|---|---|
| 1 | Collect requirements | 2 days | **Wed 28/03/12** | **Thu 29/03/12** | |
| 2 | Analyse processes | 3 days | Fri 30/03/12 | Tue 3/04/12 | 1 |
| 3 | Analyse data | 3 days | Wed 4/04/12 | Fri 6/04/12 | 2 |
| 4 | Design processes | 7 days | Wed 4/04/12 | Thu 12/04/12 | 2 |
| 5 | Design data | 6 days | Wed 4/04/12 | Wed 11/04/12 | 2 |
| 6 | Design screens | 1 day | Fri 13/04/12 | Fri 13/04/12 | 3,4 |
| 7 | Design reports | 5 days | Fri 13/04/12 | Thu 19/04/12 | 4,5 |
| 8 | Program | 4 days | Fri 20/04/12 | Wed 25/04/12 | 6,7 |
| 9 | Test and Document | 8 days | Fri 20/04/12 | Tue 1/05/12 | 7 |
| 10 | Install | 2 days | Wed 2/05/12 | Thu 3/05/12 | 8,9 |

You do this …

MS Project produces …



# The PERT Diagram



# How does PERT help to Monitor the project

# What happens when the project gets behind?

How much can you catch up?

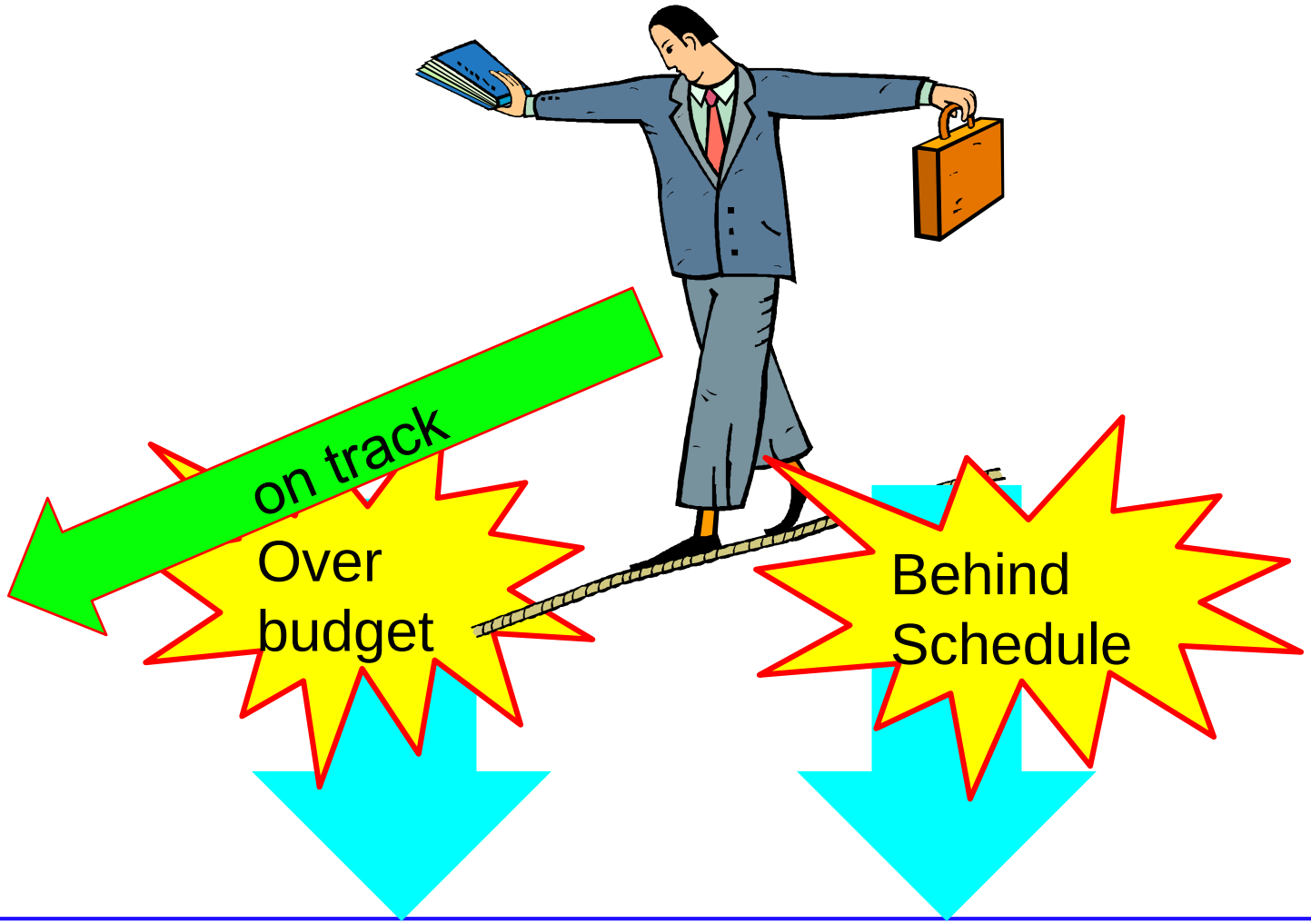
# Monitoring Project Progress:

# Earned Value Management

A key Role of the Project Manager is monitoring and controlling.

How is this accomplished?

# Managing a project is like walking a tight rope



# Key performance indicator's

- Quantifiable measure that reflects some critical success factor of an organization
- Provide a high-level snapshot of the organization.
- Examples
  - retail business: annual sales volume
  - IT project:  % of task completed
  - social service organization: number of clients seen
  - university department: number of graduates

# A dash board to Make decisions !

# A dashboard to report progress



# Three useful values for project management

"Planned value", PV

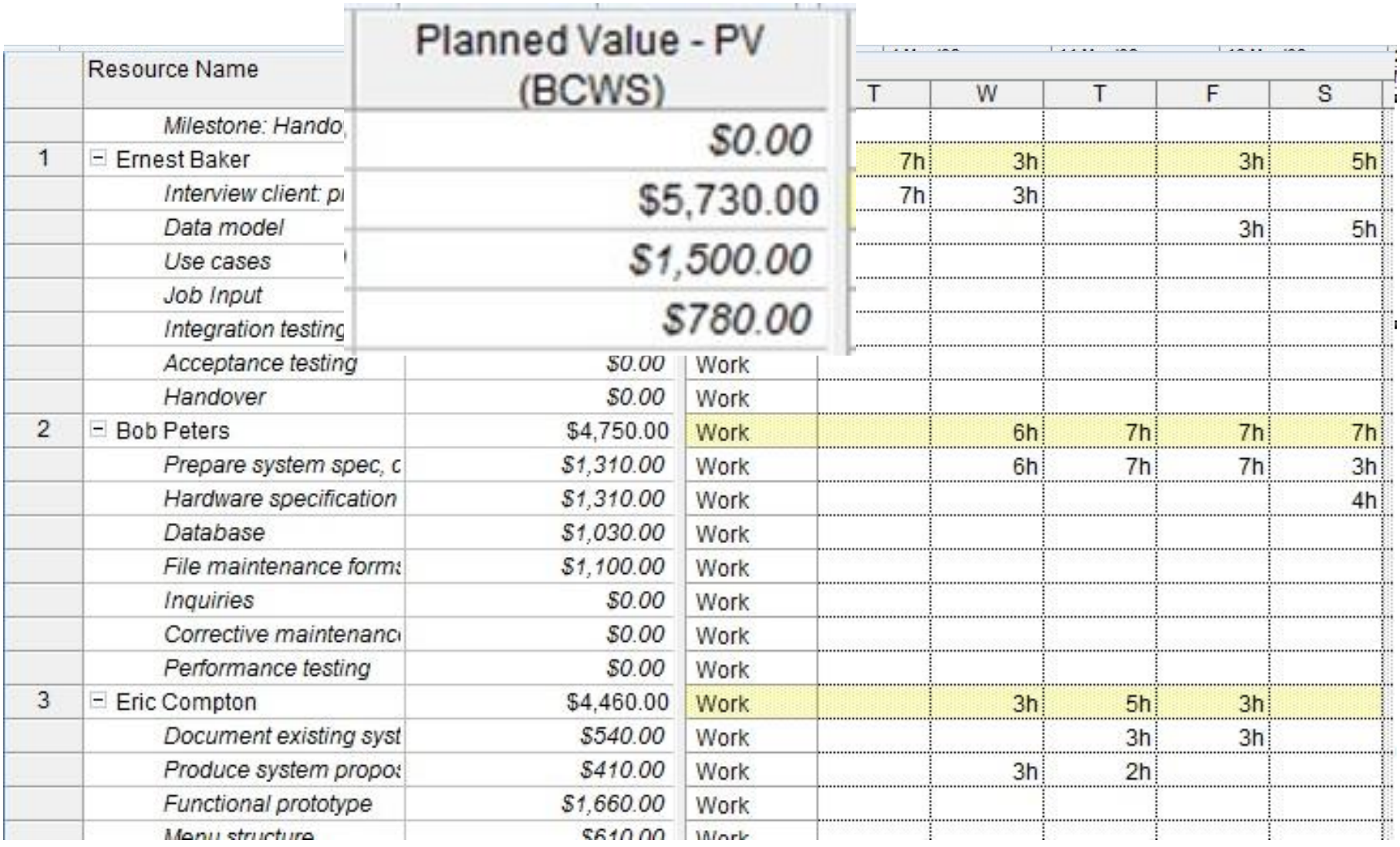
- **That portion of the approved cost estimate planned to be spent on the activity during a given period**
- At each check point need to look at the schedule to determine as a $ amount what proportion of the budget it was planned to have spent since last check point
- Used to be called "**budgeted cost of work scheduled**" (BCWS)

# If I have time

PRIORITY:

CASE STUDY ON DATA CENTRE

# Monitoring progress and cost



| | Resource Name | Planned Value - PV (BCWS) | | T | W | T | F | S |
|---|---|---|---|---|---|---|---|---|
| | *Milestone: Hando* | *$0.00* | | | | | | |
| 1 | Ernest Baker | $5,730.00 | | 7h | 3h | | 3h | 5h |
| | *Interview client: pı* | *$1,500.00* | | 7h | 3h | | | |
| | *Data model* | *$780.00* | | | | | 3h | 5h |
| | *Use cases* | | | | | | | |
| | *Job Input* | | | | | | | |
| | *Integration testing* | | | | | | | |
| | *Acceptance testing* | *$0.00* | Work | | | | | |
| | *Handover* | *$0.00* | Work | | | | | |
| 2 | Bob Peters | $4,750.00 | Work | | 6h | 7h | 7h | 7h |
| | *Prepare system spec, c* | *$1,310.00* | Work | | 6h | 7h | 7h | 3h |
| | *Hardware specification* | *$1,310.00* | Work | | | | | 4h |
| | *Database* | *$1,030.00* | Work | | | | | |
| | *File maintenance forms* | *$1,100.00* | Work | | | | | |
| | *Inquiries* | *$0.00* | Work | | | | | |
| | *Corrective maintenanc* | *$0.00* | Work | | | | | |
| | *Performance testing* | *$0.00* | Work | | | | | |
| 3 | Eric Compton | $4,460.00 | Work | | 3h | 5h | 3h | |
| | *Document existing syst* | *$540.00* | Work | | | 3h | 3h | |
| | *Produce system propos* | *$410.00* | Work | | 3h | 2h | | |
| | *Functional prototype* | *$1,660.00* | Work | | | | | |
| | *Menu structure* | *$610.00* | Work | | | | | |

# Useful values to measure

## Actual cost (AC)

- Is the total of direct and indirect costs actually incurred in accomplishing work on the activity during a given period
- At each check point collect together all the bills, receipts and timesheets, to determine a $ amount for what has actually been spent since the last check point
- Used to be called "actual cost of work performed" (ACWP)

# Useful values

## Earned value (EV)

- the proportion of the total budget represented by the work actually completed
- At each check point need to look at the schedule to determine as a $ amount what proportion of the budget has actually been completed since last check point, i.e. to assess what fraction of each deliverable has been delivered
- Some managers use only 0 % or 100 % (done or not done) in determining earned value performance, but can determine fractions
- Used to be called “budgeted cost of work performed” (BCWP)

# Earned Value Calculations

(See Supplementary material)

Initial Cost Estimate ($) 100,000

Initial Duration Estimate (months) 12

| Activity | Jan | Feb | Mar | Apr | May |
|---|---|---|---|---|---|
| 1. Plan and staff project | 4,000 | 4,000 | | | |
| 2. Analyse requirements | | 6,000 | 6,000 | | |
| 3. Develop ERDs | | | 4,000 | 4,000 | |
| 4. Design forms, reports | | | | 6,000 | 4,000 |
| 5. Design database tables | | | | | 8,000 |
| 6. Design forms, reports and queries | | | | | |
| … etc. etc … | | | | | |
| Monthly Planned Value (PV) | 4,000 | 10,000 | 10,000 | 10,000 | 12,000 |
| Cumulative Planned Value | 4,000 | 14,000 | 24,000 | 34,000 | 46,000 |
| **Monthly Actual Cost (AC)** | **4,000** | **11,000** | **11,000** | **12,000** | **15,000** |

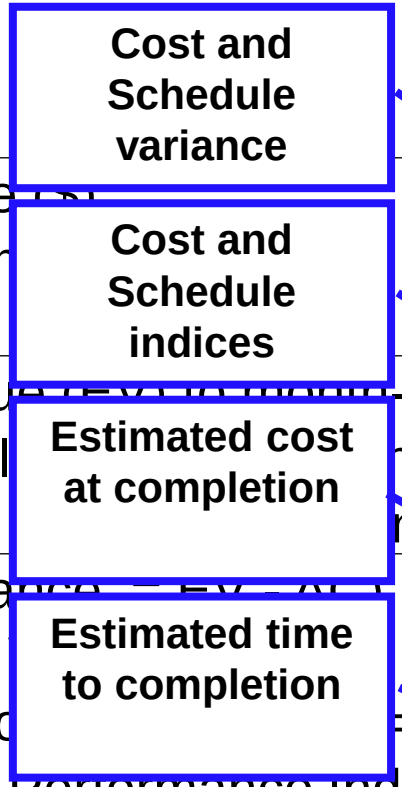
# Key performance indicators for a project

- **Cost variance**
  - CV = EV - AC
  - 0 or positive is good (on track)
  - Negative is ‘bad’ (budget over spent)
- **Schedule variance**
  - SV = EV - PV
  - 0 or positive is good (on track)
  - Negative is ‘bad’ (behind schedule)

# Useful forecasts

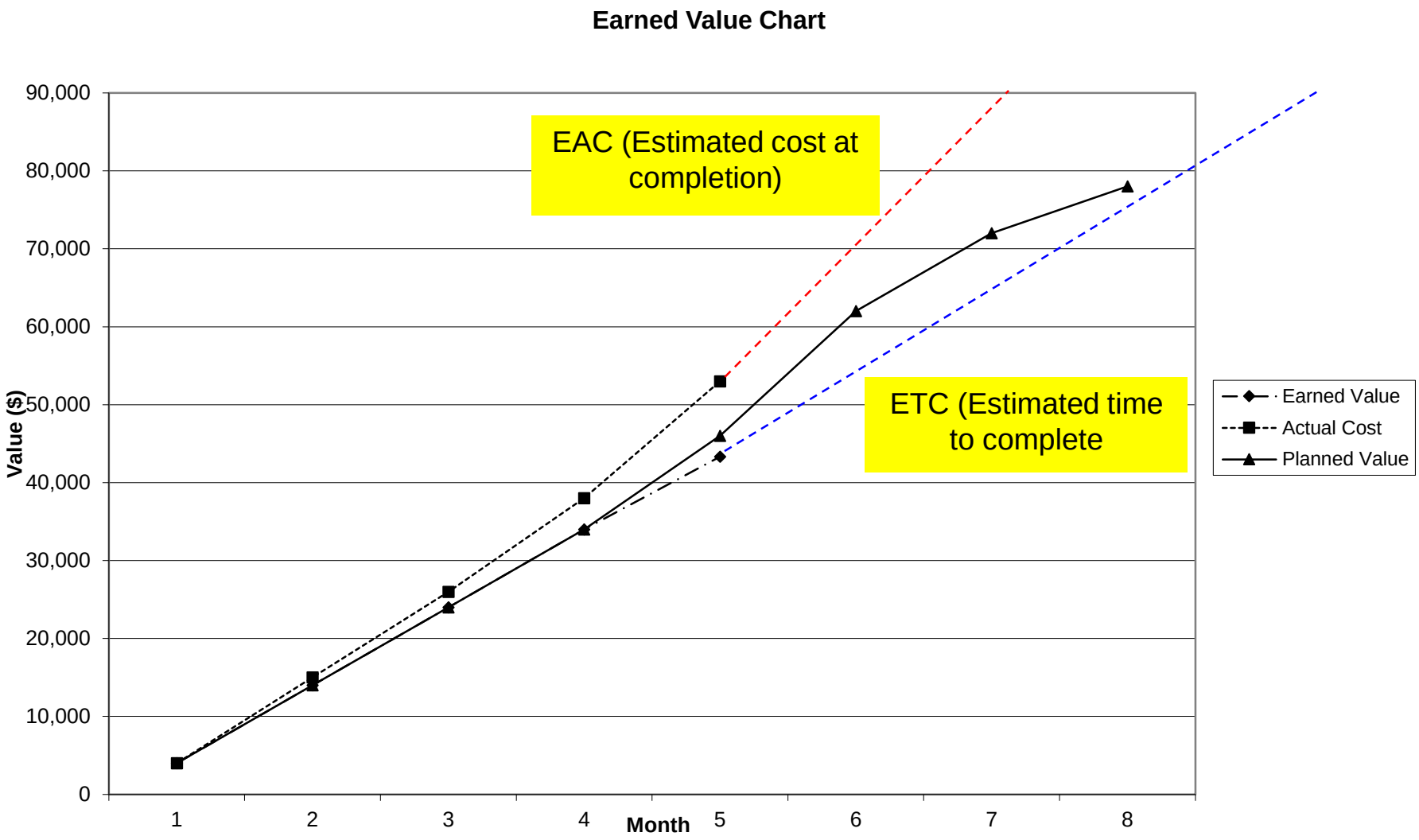
- Estimated cost at completion (EAC)
  - EAC = Original budget estimate / CPI
  - Estimate of eventual cost of project at the present rate of spending.
- Estimated time to complete (ETC)
  - ETC = Original time estimate / SPI
  - Estimate of when the project will finally be completed if current rate of progress is maintained.

# Key Performance indicators




| | |
|---|---|
| Initial Cost Estimate | 100,000 |
| Initial Duration Estimate | 12 |
| Project Earned Value (EV) to month-end | 38,333 |
| Project Planned Value (PV) to month-end | 46,000 |
| Project Actual Cost to month-end | 53,000 |
| CV (Cost Variance = EV - AC) | -14,667 |
| SV (Schedule Variance = EV - PV) | -7,667 |
| CPI (Cost Performance Index = EV / AC) | 72.33% |
| SPI (Schedule Performance Index = EV / PV) | 83.33% |
| Estimated Cost at Completion = Planned Cost / CPI | 138,262 |
| Estimated Time to Completion = Planned Time / SPI | 14.4 |

# Predicting the future



# A case study

# A case study

Fire fighting an IT project delivery

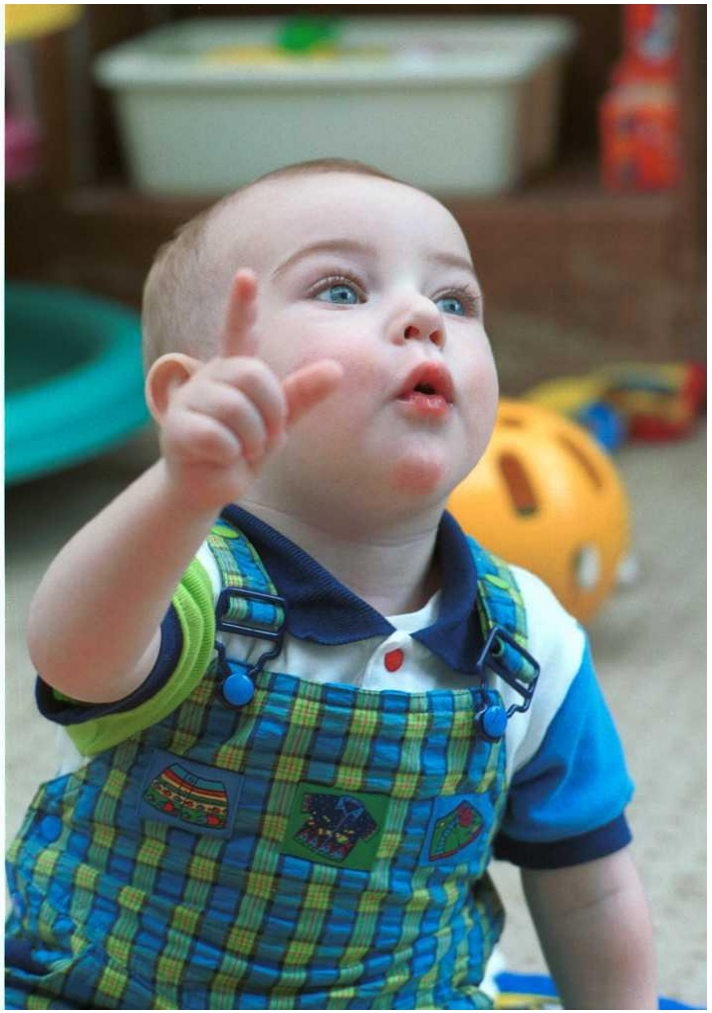
Your designing a new $100m data centre in Ryde (Real Project ! )

Your late and over budget ! – what do you do ?

Do you blame someone or do something about it?

What steps do you take to get the project back on track ?

# Any Questions?



Thanks
see you next week
Remember those who are presenting