Developing Products Faster

and Preventing Project Disaster!

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The new product development world

- Faster
- Better
- Cheaper

Why is it difficult to achieve all three?

What causes project disasters?

Potential problem	Potential fixes
• Schedule overrun	Increase budget Decrease scope
• Not capable enough	Increase scope
• Budget overrun	Decrease scope

What causes project disasters (con't)?

- If projects are in schedule or budget trouble, we tend to reduce scope.
- Reduced scope is opposite of Better.
- Therefore, Faster, Better, and Cheaper is difficult to achieve at the same time.

Here are two ways to prevent project disasters.

Potential problem	Potential fixes
• Schedule overrun	Add a schedule contingency to the original schedule
• Budget overrun	Add a budget contingency to the original budget request

How long does it take to buy a loaf of bread?

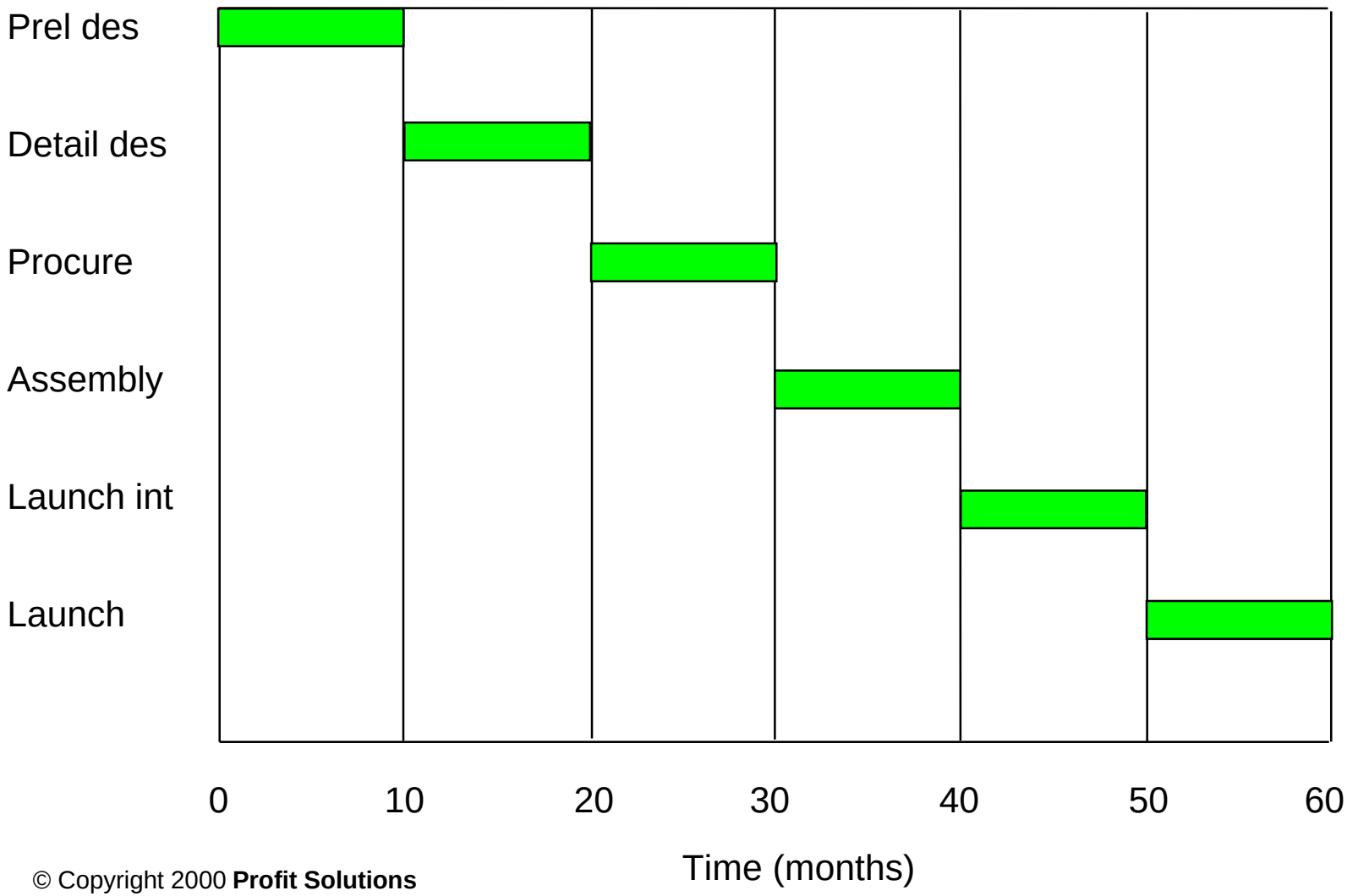
Optimistic Most Likely Pessimistic

Satellite schedule example

Phase	Opt	Most Likely (months)	Pess	Actual (months)
Prel design	3	5	10	
Detail design	3	5	10	
Procurement	3	5	10	
Assembly	3	5	10	
Launch integration	3	5	10	
Launch	3	5	10	

- How should we schedule this project?

Conventional schedule (using pessimistic values)



Critical Chain schedule contingency calculation

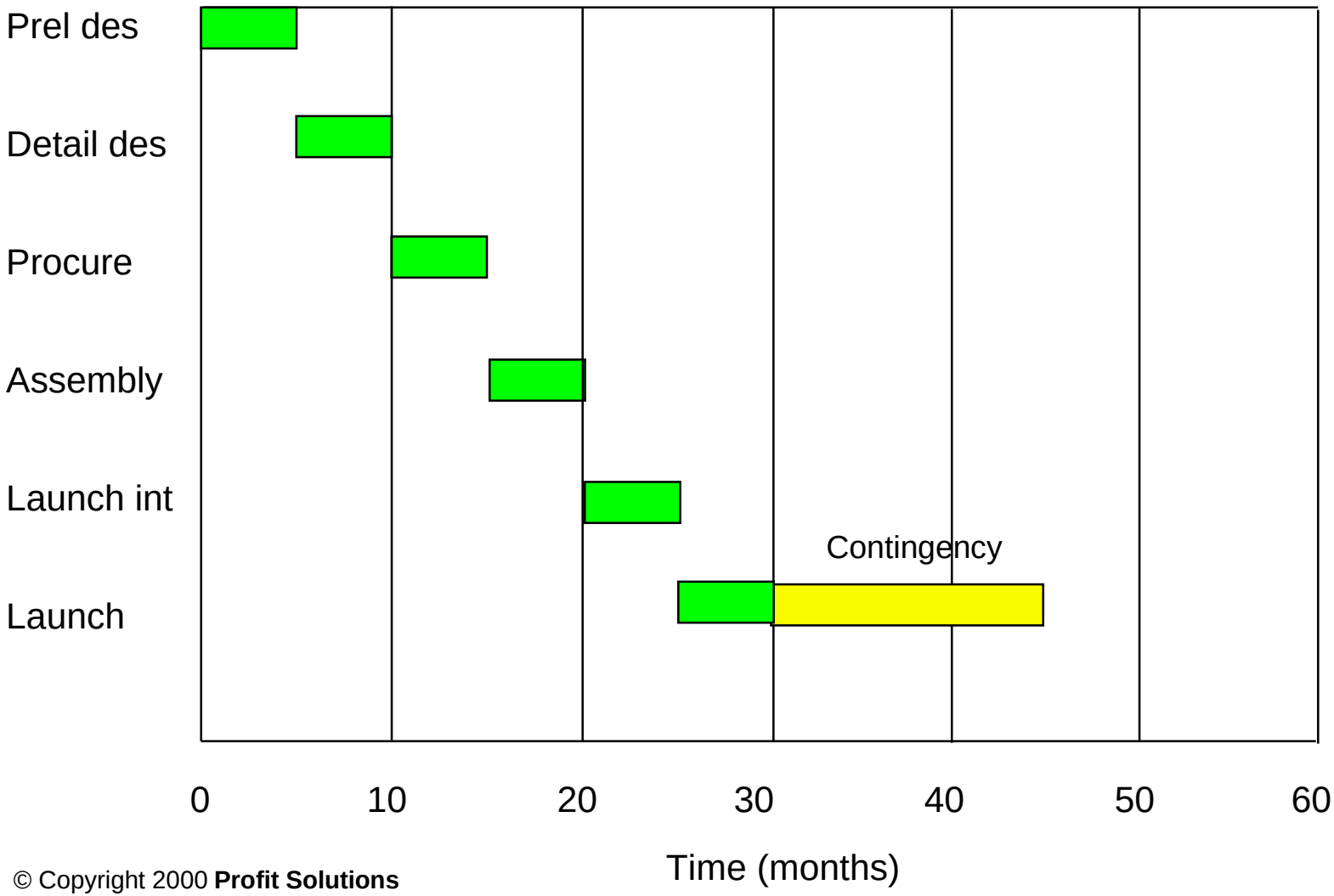
Statistical calculation

$$\text{Schedule contingency} = [\Sigma\,(\text{Pessimistic} - \text{Most Likely})^2\,]^{1/2}$$
$$= [\,(10 - 5)^2 + (10 - 5)^2 + (10 - 5)^2 + (10 - 5)^2 + (10 - 5)^2 + (10 - 5)^2\,]^{1/2}$$
$$= 12 \text{ months}$$

Goldratt approximation

$$\text{Schedule contingency} = \tfrac{1}{2}\,[\,\Sigma(\text{Pessimistic} - \text{Most Likely})\,]$$
$$= \tfrac{1}{2}\,[\,(10 - 5) + (10 - 5) + (10 - 5) + (10 - 5) + (10 - 5) + (10 - 5)\,]$$
$$= 15 \text{ months}$$

Most Likely / Critical Chain schedules



Results of satellite schedule experiment

Conventional Schedule (60 or under)	Slow but Sure!
(over 60)	
Most Likely Schedule (30 or under)	Fast but not Sure!
Critical Chain Schedule (31 to 45)	Fast ***and*** Sure!
(over 45)	

Satellite budget example

Phase	Opt ($M)	Most Likely ($M)	Pess ($M)
Prel design	10	20	40
Detail design	20	40	60
Procurement	20	40	60
Assembly	10	20	40
Launch integration	10	20	40
Launch	40	60	80

- What budget should we request?

Critical Chain budget contingency calculation

Statistical calculation

$$\text{Budget contingency} = [\Sigma\ (\text{Pessimistic} - \text{Most Likely})^2\ ]^{1/2}$$

$$= [\ (40 - 20)^2 + (60 - 40)^2 + (60 - 40)^2 + (40 - 20)^2 + (40 - 20)^2 + (80 - 60)^2\ ]^{1/2}$$

$$= \$\ 49\ M$$

Goldratt approximation

$$\text{Budget contingency} = \tfrac{1}{2}\ [\Sigma\ (\text{Pessimistic} - \text{Most Likely})\ ]$$

$$= \tfrac{1}{2}\ [\ (40 - 20) + (60 - 40) + (60 - 40) + (40 - 20) + (40 - 20) + (80 - 60)\ ]$$

$$= \$\ 60\ M$$

Satellite budget request calculation

Budget contingency = $ 60 M

Budget request = Σ Most Likely + Budget contingency

= $ 200 M + $ 60 M

= $ 260 M

Conclusions

- Using Critical Chain methodologies to calculate schedule and budget contingencies will enable you to achieve:
  - Faster
  - Better
  - Cheaper
  - and prevent Project Disasters!

Questions

The Presenter

Dohn Kissinger helps create project success and prevent project disasters. He has over 20 years experience in project management. He is:

- one of only 150 consultants in the world licensed by the Goldratt Institute to implement Critical Chain Project Management (CCPM)
- certified as a Project Management Professional (PMP) by the Project Management Institute
- a Member of the Institute of Management Consultants (IMC)
- a Senior Member of the American Institute of Aeronautics and Astronautics (AIAA)
- an Adjunct Professor in Business and Management at the University of Phoenix

With an MBA and a PhD in Engineering, he can relate to the unique needs of high-technology businesses.

References / Web Sites

References

1. Eliyahu M. Goldratt, *Critical Chain*, The North River Press, 1997.
2. Robert C. Newbold, *Project Management in the Fast Lane: Applying the Theory of Constraints*, St. Lucie Press, 1998.

Web Sites

1. Goldratt Institute (project management success stories)
   www.goldratt.com
2. ProChain Solutions, Inc. (project management software)
   www.prochain.com
3. Speed to Market Engines, Inc. (project management software)
   www.speedtomarket.com