Schedule-Driven Costs in Major Defense Programs

An exploratory Study

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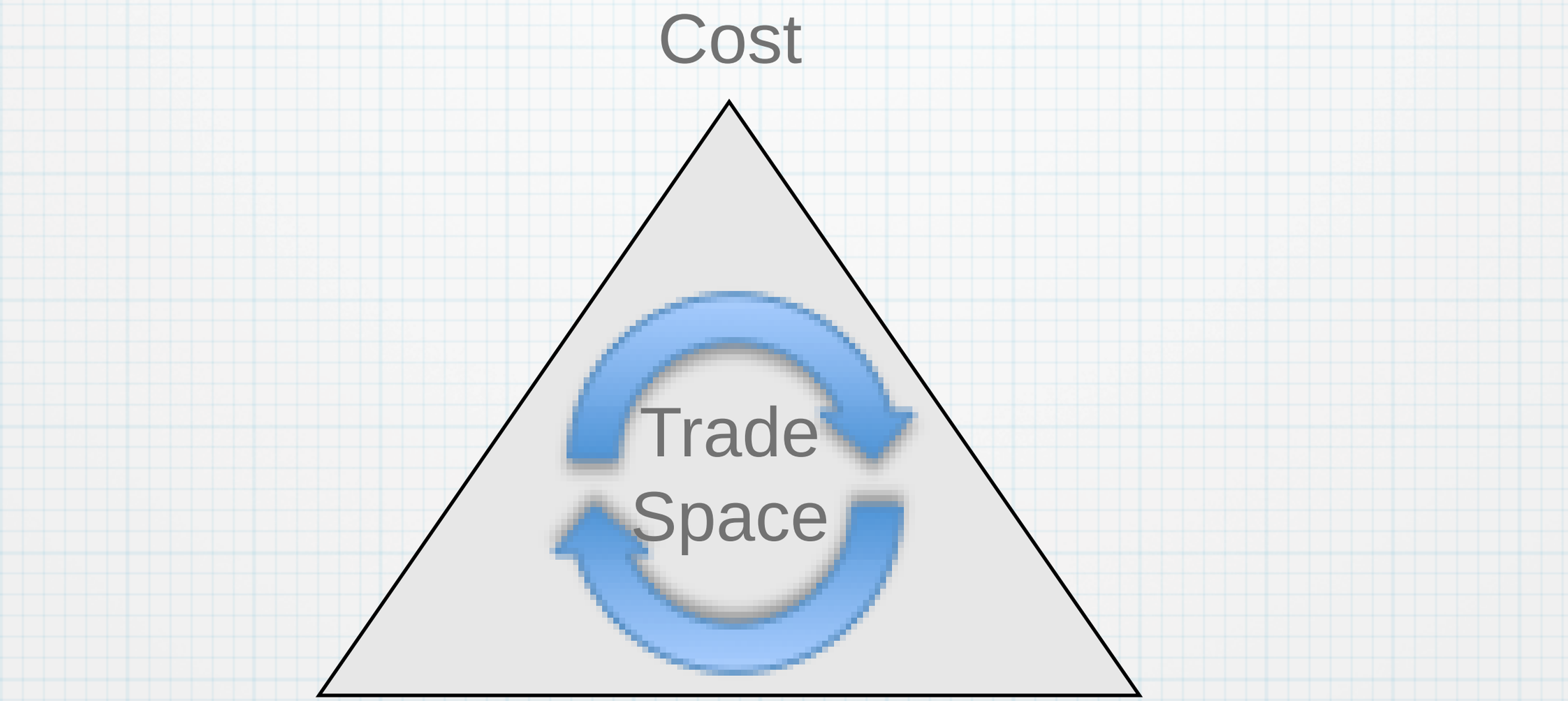
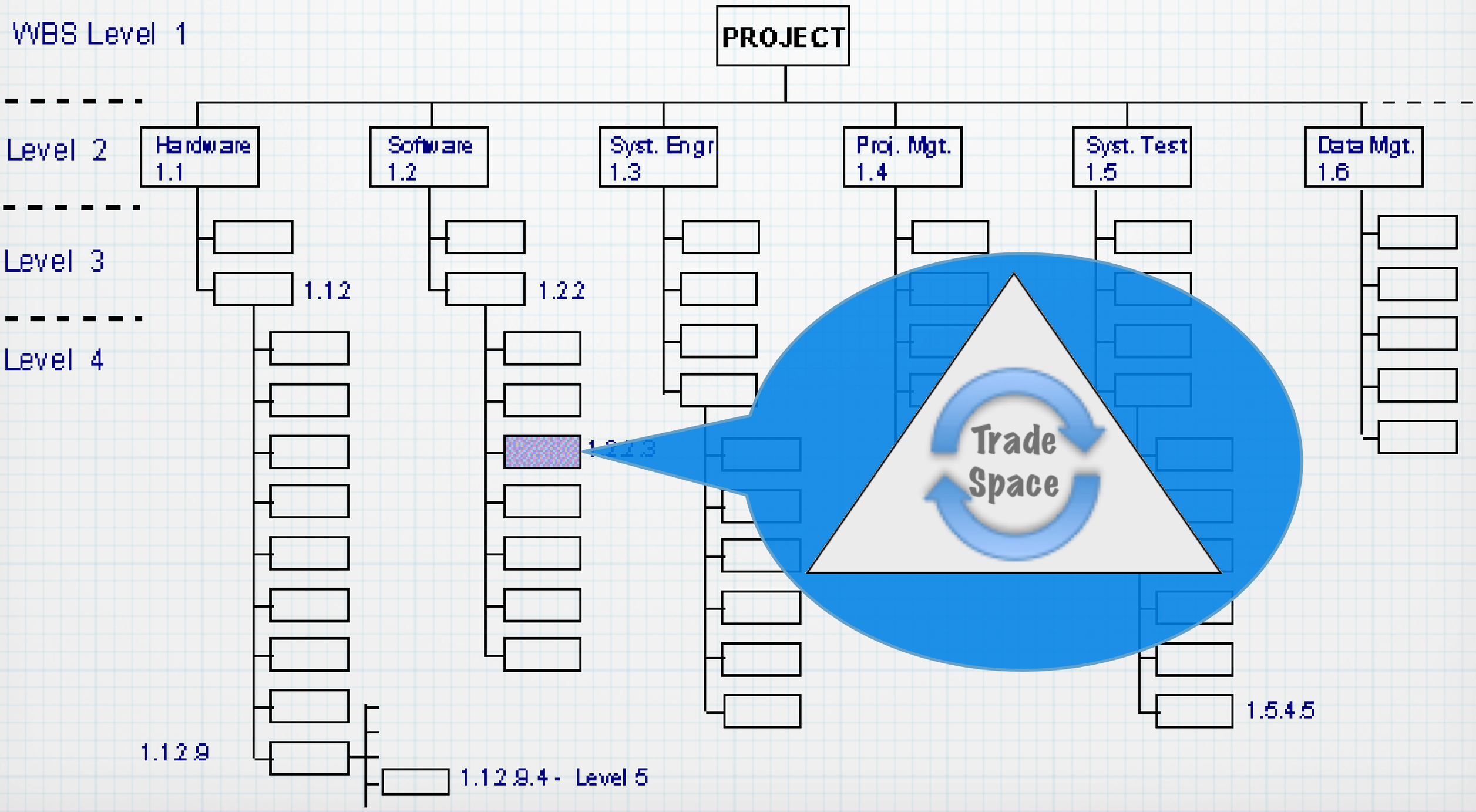
Program Management



Program Work Breakdown Structure



Program Schedule

Project WBS Tasks

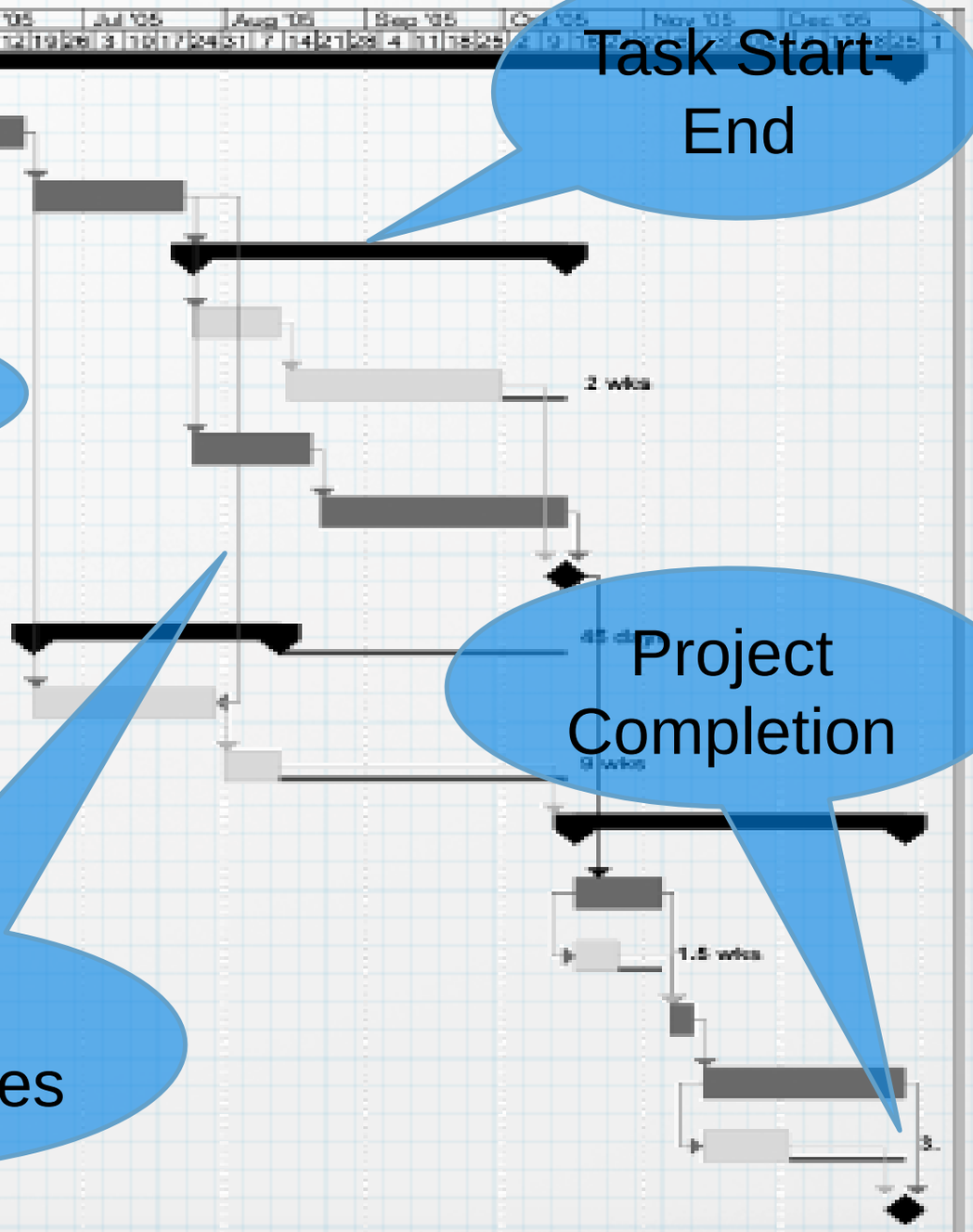
Project Start

Task Start-End

Links & Dependencies

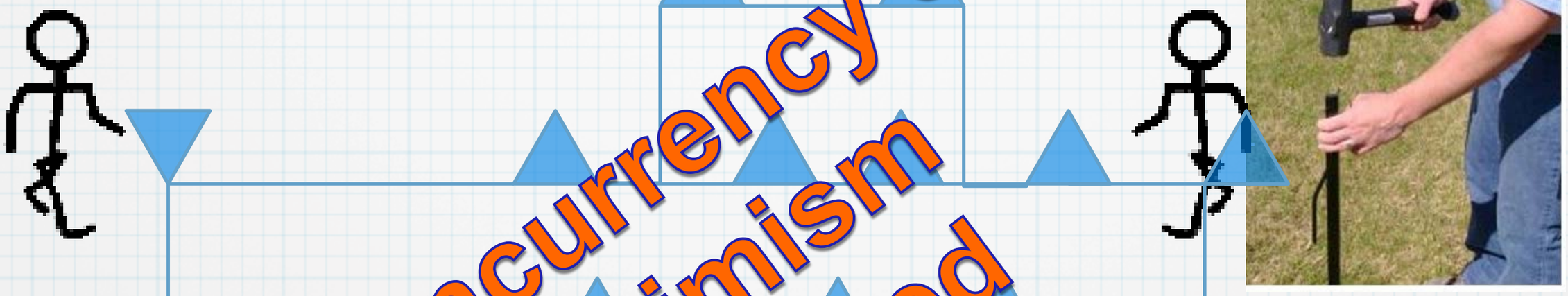
Project Completion

	Name	Duration	Predeces
1	**Software Project**	**172.5 days**	
2	Requirements	7 wks	
3	Design	5 wks	2
4	**Programming**	**60 days**	3
5	Unit Tests for Feature A	3 wks	3
6	Program Feature A	7 wks	5
7	Unit Tests for Feature B	4 wks	3
8	Program Feature B	8 wks	7
9	Feature-Complete Build	0 days	6,8
10	**Test Preparation**	**40 days**	
11	Build Test Plans	6 wks	2,3FF
12	Review, Correct Test Plans	2 wks	11
13	**Test Execution**	**52.5 days**	12
14	Execute Test Plan A	3 wks	9
15	Execute Test Plan B	1.5 wks	14SS
16	Fix Defects	1 wk	14,15
17	Regress Test Plan A	6.5 wks	15
18	Regress Test Plan B	3 wks	17SS
19	Deliver Beta Build	0 days	17,18



Need-Driven Schedule

Today



Users Drive a Stake in the Ground with Future Need Date

Schedule Compression

Today

Even More Concurrency & Optimism Required

Users Drive a Stake in the Ground with Future Need Date

Concurrency

+ 9 Months =

+ 1 Month =

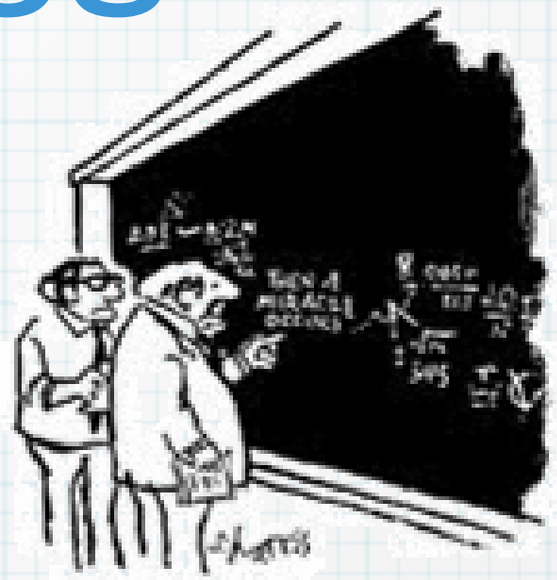
Overoptimism?

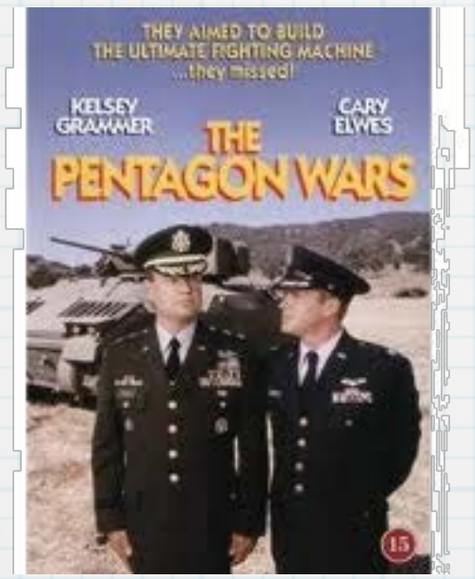
- Kahneman argues optimism bias leads to overestimation of utility, underestimation of difficulty
- How much impacts defense program schedules?
- Can the “outside view” of objective oversight counteract overoptimism?

Schedule-Cost Challenges

Technology Reach

- TRL, MRL, IRL

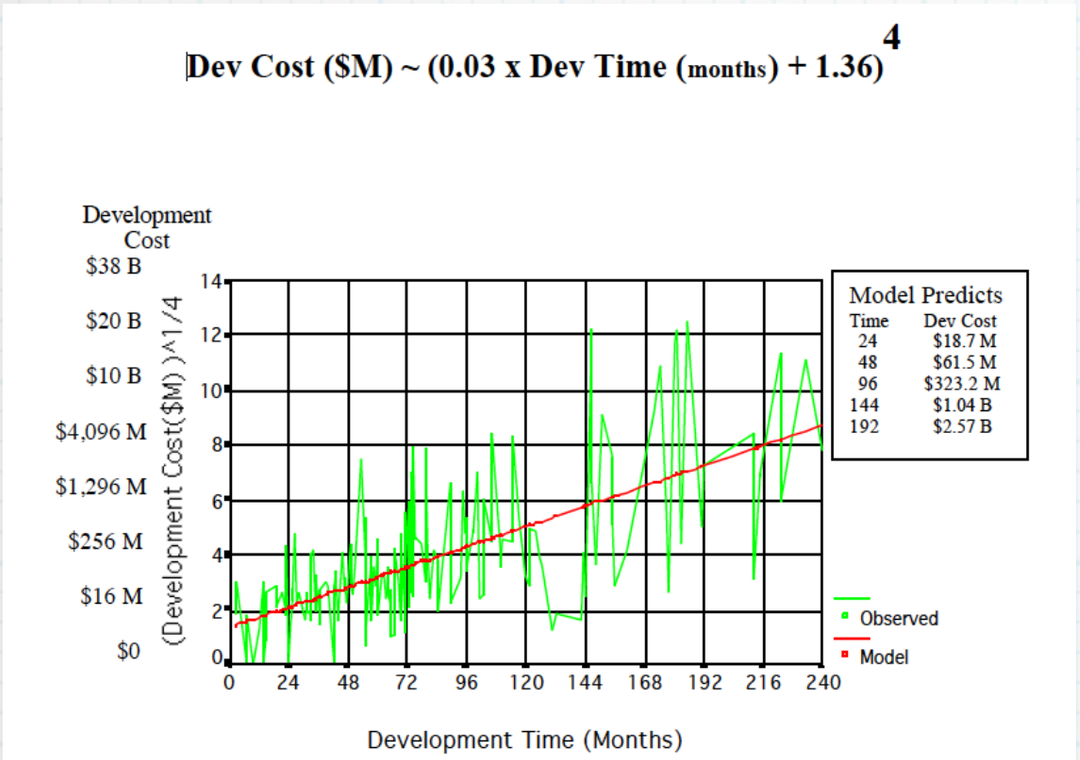




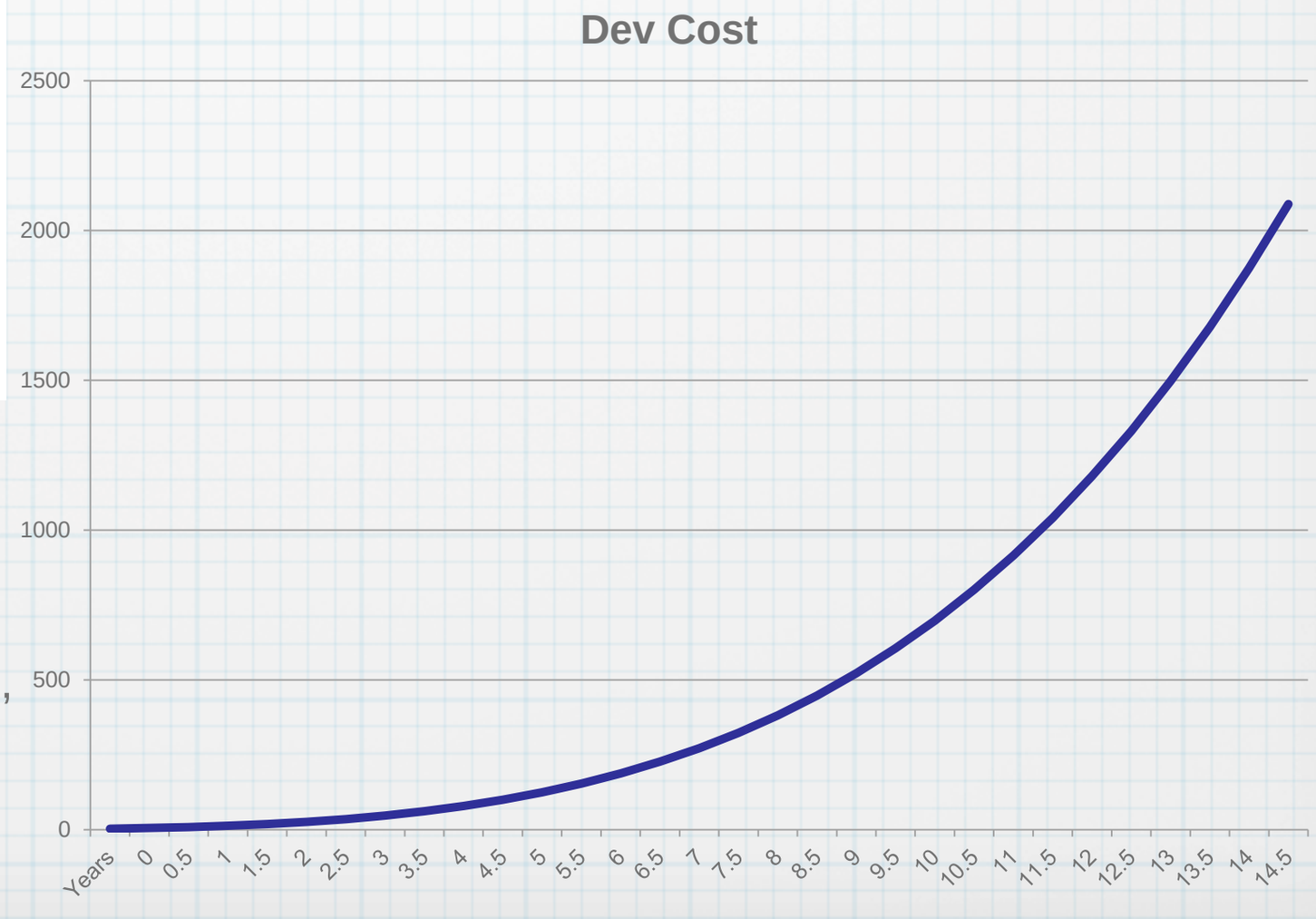
Unstable Budgets

Requirements Changes –
“It needs a turret…”

Longer Programs Cost More?



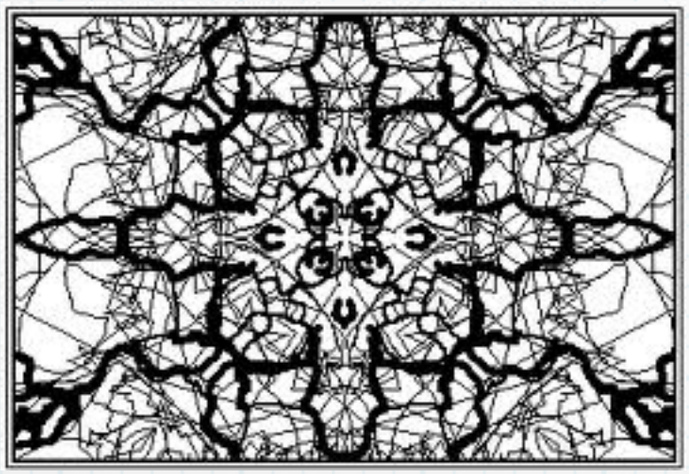
McNutt, R. (1998). *Reducing DoD product development time: The role of the schedule development process.* Doctor of Philosophy Dissertation, Massachussetts Institute of Technology, Boston.



Or maybe not…

Coleman, R. L., Summerville, J. R., & Dameron, M. E. (2003). The relationship between cost and schedule growth. Acquisition Review Quarterly, Spring 2003, 116-123.)

Why Longer Programs May Cost More



Long programs may be more complex

Requirements changes responding to threat or technology evolution

Funding Instability

Cost Impacts of Schedule Delays

“Marching Army” effect

Compound effects of Optimism

Attitudes toward Schedules

- Schedules can be “compressed” through “hard work” and “management attention”
- Immediate resource issues can be solved by “stretching” the schedule
- Increased concurrency or doing things in parallel helps keep the program “on schedule”

Inconsistent Attitudes toward Schedules - Survey

- 96% believed integrated, up-to-date schedule is critical
- 2/3 say they have confidence in the accuracy of their master schedules

Yet…

- < 50% believe schedules are resource-loaded
- Only 1/2 believe schedules are complete & accurate
- 56% believe schedules realistic and achievable, but 40% report programs behind schedule
- 20% would slip schedule to manage cost overruns, but PMs assign highest priority to ensuring quality and performance
- Only 10% agreed that maintaining detailed schedule is too labor intensive/costly for value, but PMs reported difficulty in synchronizing schedules among players

Future Research

- Linkage between schedule and cost
  - Validation of relationship
  - Study of the cost of schedule delays
- Examination of how schedules are built and used
  - Realism of schedules built around artificial end-dates
  - Contribution of concurrency and optimism to schedule-related cost