



Australian Government
Department of Defence
Capability Acquisition and
Sustainment Group

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Joint Confidence Levels

Combining Project Control Artefacts to Inform Decision Making



Andrew Butt Ships Divisional Controls CASG

Defending Australia and its National Interests
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Thank you to Tecolote Research Inc. for
their graphical contribution to this
presentation.

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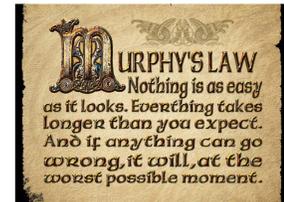
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Are you sure? – Uncertainty what is it? Why is it important?

- There is uncertainty in everything we do.
- Uncertainty is the indefiniteness of the outcome of a situation¹ (of which both opportunities and risks make up a part)
- Sources of uncertainty
 - Cost estimates
 - Labour Rates
 - Cost Estimation Relationships
 - Inflation
 - Duration estimates
 - Schedule logic
 - Known/Unknown unknowns
 - Risks
 - Opportunities
 - Technical solutions
- To maximise the chances of project success we need to make allowances for all of this uncertainty

**THERE IS NOTHING
CERTAIN, BUT THE
UNCERTAIN**

Proverb



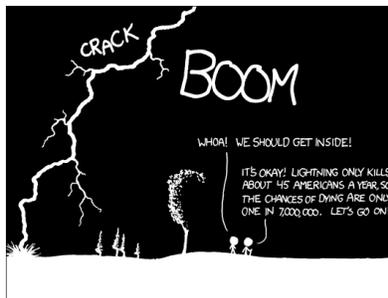
¹ NCCA, Joint Agency Cost Schedule Risk and Uncertainty Handbook (JA CSRUH), 2014, para. 1.2.2 "The Difference Between Risk, Opportunity, and Uncertainty", pg. 2

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Probability – You wanna bet?

- FACT²: It is impossible to estimate precisely how much something will cost or how long it will take.
 - Decision-makers, cost and schedule analysts should always think of an estimate as a probability distribution, NOT as a deterministic number or date
 - The best we can provide to decision-makers is the cost and/or Schedule probability distribution
 - It is up to the decision-maker to decide where (i.e., at which confidence level) they want to set the budget and completion date
 - The probability distribution provides a quantitative basis for making this determination



THE ANNUAL DEATH RATE AMONG PEOPLE WHO KNOW THAT STATISTIC IS ONE IN SIX.

² Whole slide paraphrased from slide 11 [2011-MT16 – International Cost Estimating and Analysis Association \(iceaaonline.com\)](https://www.iceaaonline.com) presented at the 2011 ISPA/SCEA Joint Annual Conference and Training Workshop

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Let's start at the beginning – It's a very good place to start!

- The Artefacts
 - Mature Schedule
 - Aligned with CASG WBS
 - Built with the help of Subject Matter Experts
 - Included anticipated activities and milestones from proposed Contract Master Schedule(s)
 - All work packages included until project closure
 - Detailed Cost Model
 - Bottom up cost model
 - Acquisition elements aligned with tenderer price schedule
 - Contracted support elements aligned with tender documentation
 - As many out of contract costs as possible anticipated and costed in the model
 - Known CCPs
 - Government Furnished Stuff (GFx)
 - Sparing and ammunition costs
 - Etc.,
 - Phased in alignment with schedule
 - Comprehensive Risk Register
 - Parsed correctly
 - Loaded into Predict
 - Reviewed on a regular basis



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The Analysis Schedule – the art of simplifying an integrated master schedule

- An Integrated Master Schedule (IMS) often provides too much detail for a simulation
- At the early stages of the project, notional summary level schedules provide insufficient detail for a simulation
- An analysis schedule lies between an Integrated Master Schedule (IMS) and a summary schedule
- *The objective of an analysis schedule is to capture enough content and interdependencies to support a simulation*
 - Displays major work-flows of a project
 - Identifies work required to support major deliverable/tracking items
 - Structured around management/budget responsibility
 - Allows linkage of budgeted work effort to schedule scope
 - Enables alignment with EVM generated data
- Creates a solid framework and the backbone for incorporating cost/schedule uncertainties and risk events
- Analysis schedules are designed for linking cost / schedule, providing budget insight, supporting what-if analysis, assessing risk posture, and identifying reserve management strategies

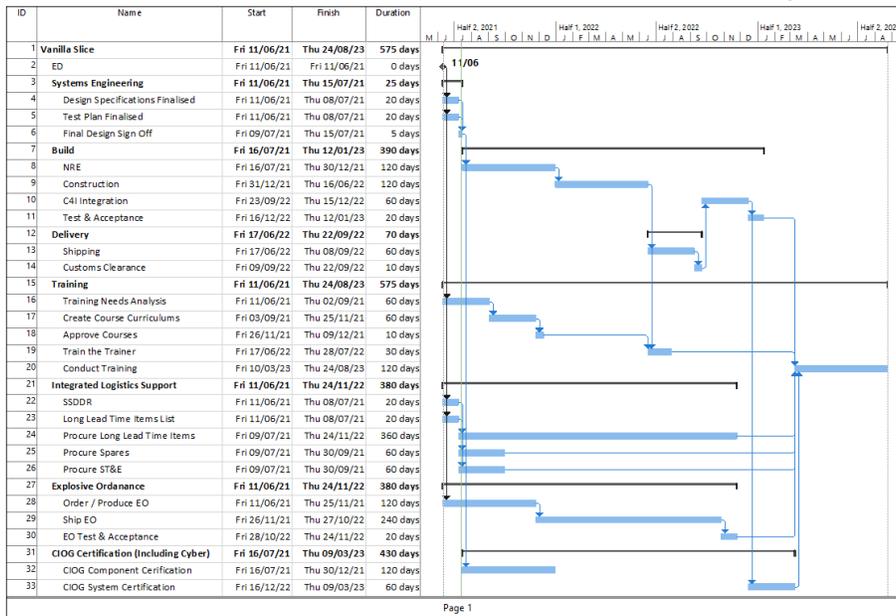
This is Art holding a Mirror up to Life. That's why everything is exactly the wrong way around.

Terry Pratchett (2008). "Wyrd Sisters: (Discworld Novel 6)", p.312, Random House

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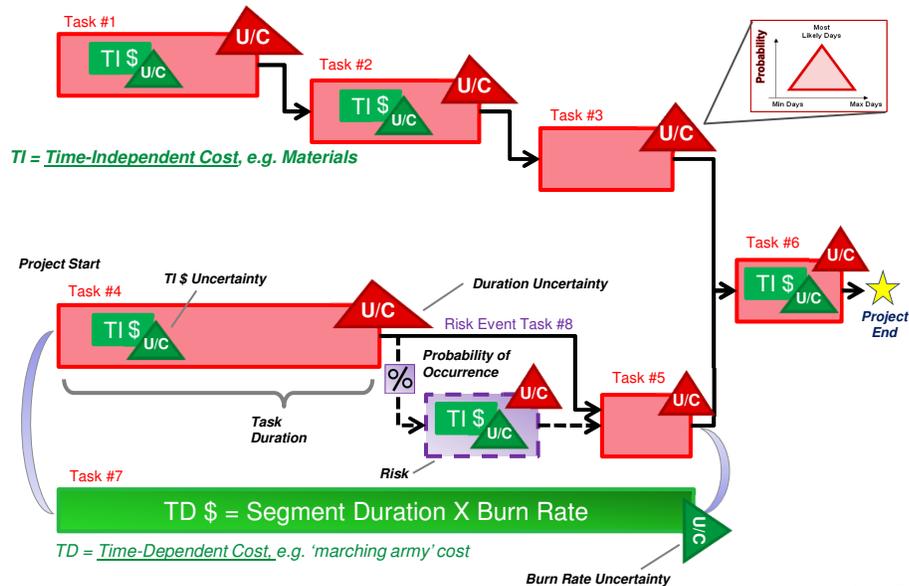
What an analysis schedule could look like



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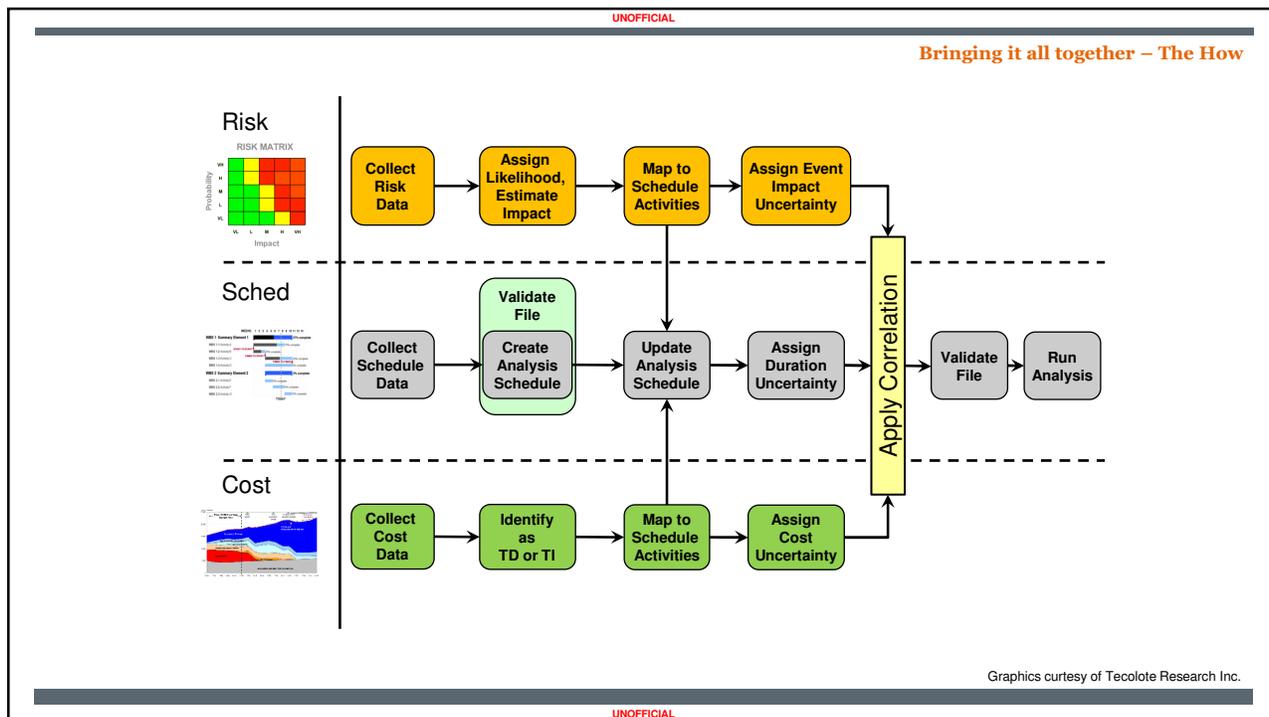
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Bringing it all together – The What



Graphics courtesy of Tecolote Research Inc.

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Bringing it all together – The Benefits to Schedule

- Just by following the process...
 - More rigour around schedule activity durations
 - Three point estimates (where SMEs available) caused stream leads to think about:
 - Work to be done
 - Differing abilities of teams to complete
 - Schedule logic was contested and improved
 - Risks were able to be built into schedule logic
 - Schedule moved from being deterministic to probabilistic
 - The schedule was used as a planning tool (rather than a reporting tool)
 - Schedules & schedule logic informed decision making
 - There was less – “just make it fit between those dates”
 - Less ‘optimistic’ schedules

Finish to Start

Task B cannot start until Task A finishes
A is the Driver of B

“If you trust in yourself. . .and believe in your dreams. . .and follow your star. . . you'll still get beaten by people who spent their time working hard and learning things and weren't so lazy.”

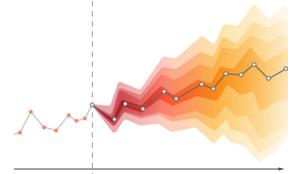
Terry Pratchett, The Wee Free Men

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Bringing it all together – The Benefits to Cost

- Just by following the process...
 - Focus moves towards individual lines of the model as opposed the totals
 - Documentation of the estimate to inform uncertainty becomes paramount
 - All uncertainty on each line must be justified
 - Estimates moved from being deterministic to probabilistic
 - No longer “can we do it for this amount or less” to “what is the chance we can achieve this for this amount or less”
 - Less ‘optimistic’ models
 - Can generally justify requesting more achievable levels of funding when compared to using the point estimate
 - Using probabilistic language empowers decision makers to understand the magnitude of the impact each decision they make has on an estimate

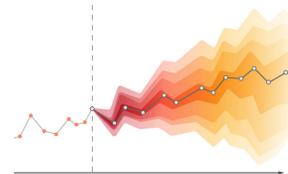


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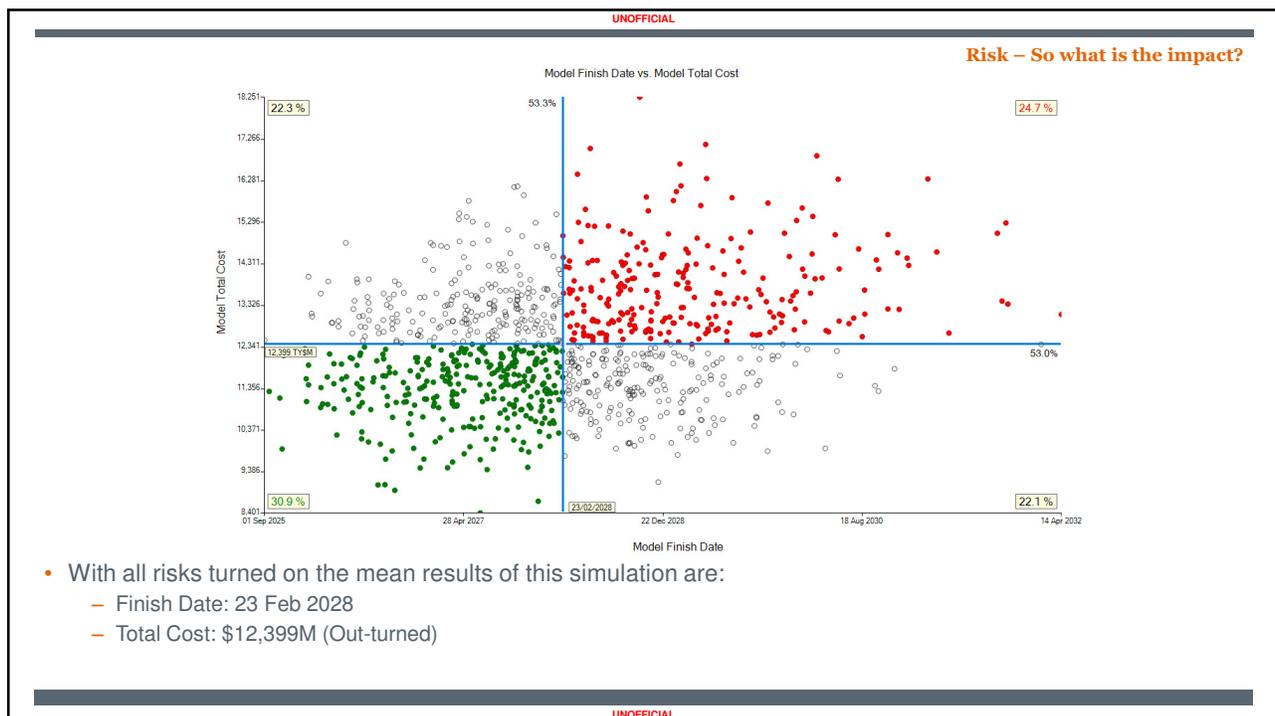
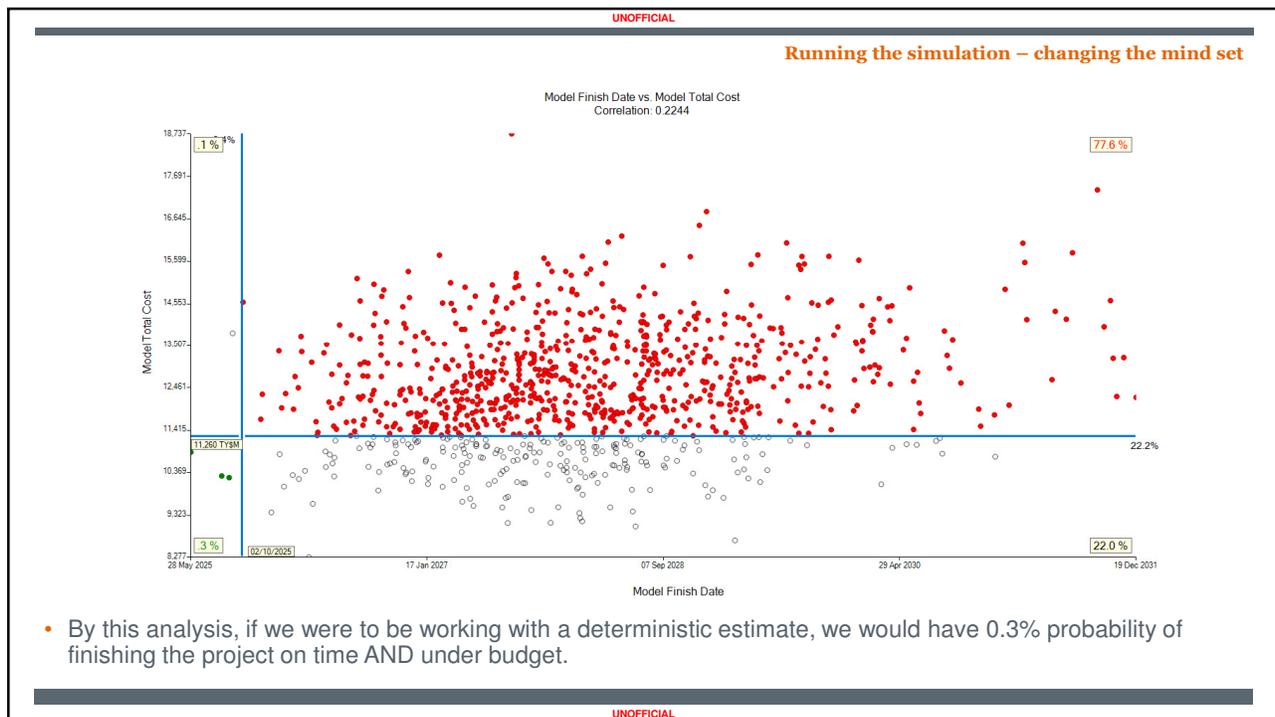
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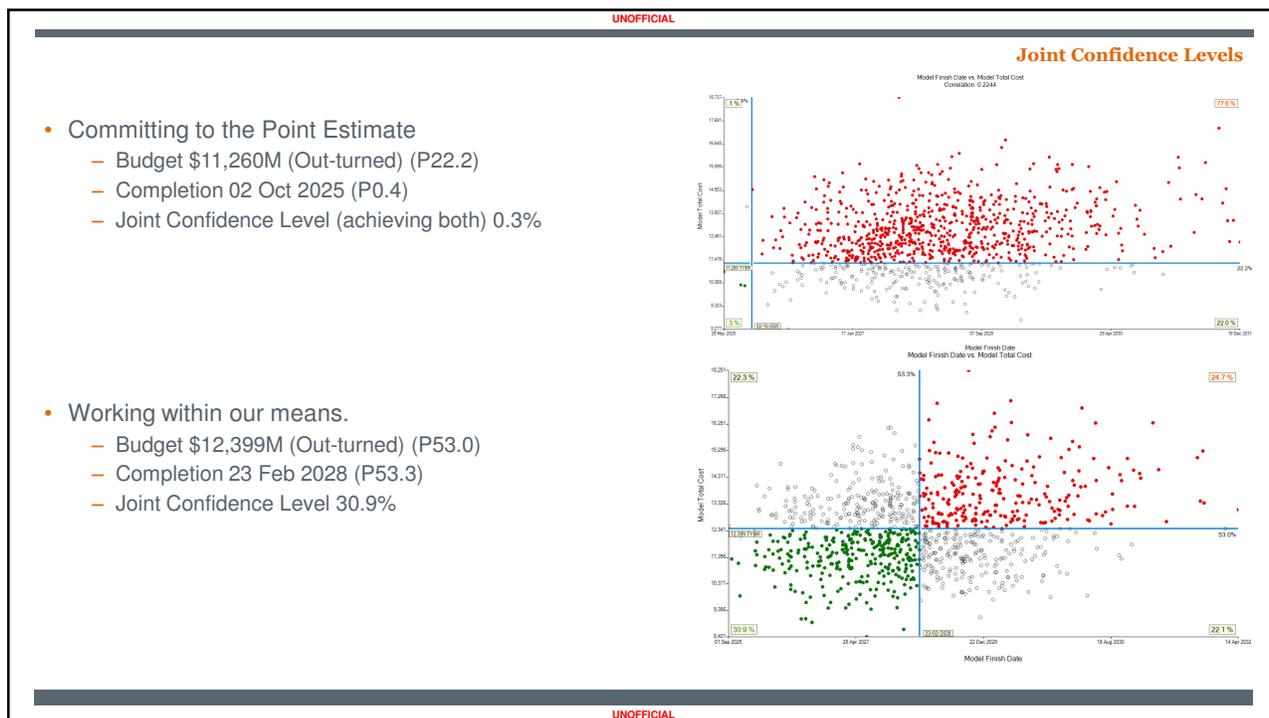
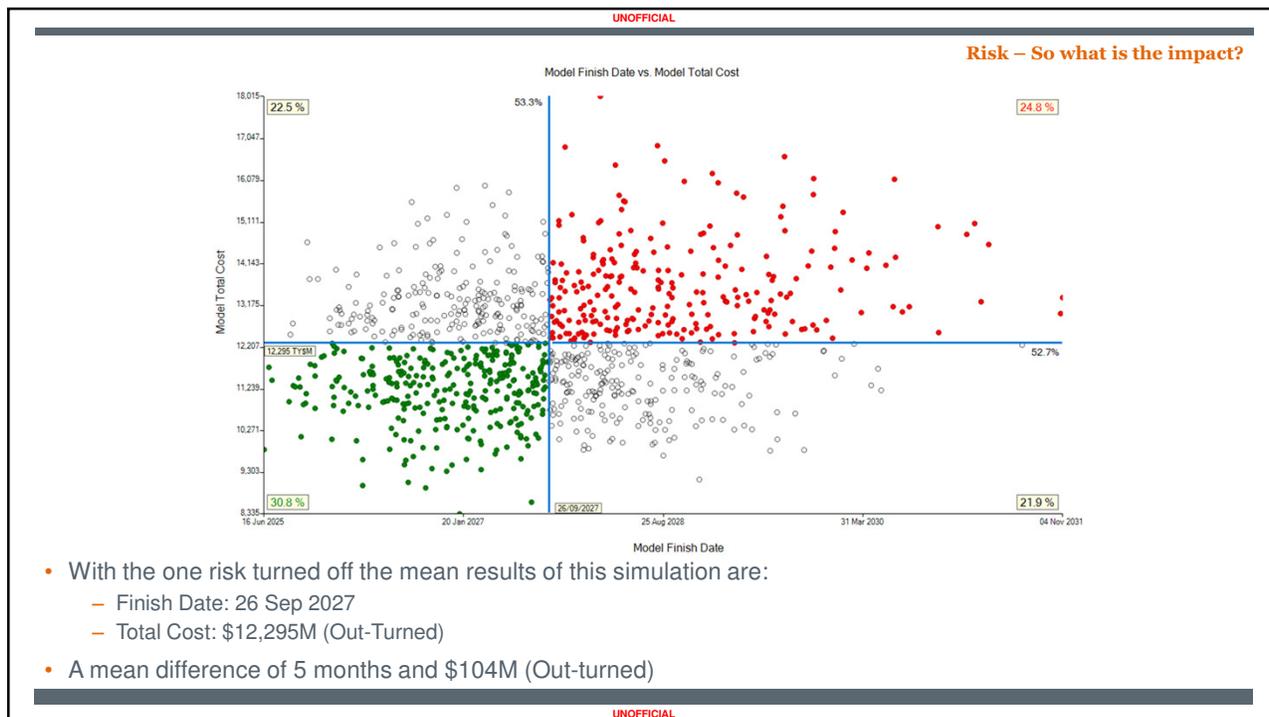
Bringing it all together – The Benefits to Risk

- Just by following the process...
 - Risk events were placed in time (within schedule)
 - Durations of impact were considered (3 point estimates rather than selecting from a grid)
 - Cost impacts were considered through the lens of time & materials
 - Some risks in the register were identified as not being risks (100% likelihood, not impacting schedule, treated via business as usual)
 - In general people thought through their risks more as opposed to than the quick tick and flick exercise it often becomes
 - Decision makers could more easily use predicted cost and schedule impacts to scope acceptable mitigation activities
 - Risk register informed decision making
 - Risk impacts moved from being considered deterministically to probabilistically



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A thought to leave you with...



Presented at the 2011 ISPA/SCEA Joint Annual Conference and Training Workshop - www.iceaonline.com

Administrator Griffin Confidence Level Policy

*Confidence-level budgeting is an attempt to use statistical methods together with cost-modeling techniques (and yes, Doc, I know...) to produce, for a given level of program content, a budget and associated schedule that carries with it some statistical level of confidence – “belief” if you will – that the project will achieve its goals. **The confidence level is selectable by managers; we’ve chosen 70% for agency projects in general, and I personally adjusted that to 65% for Cx.** I can discuss reasons for that on another occasion if you like.*

*Now, what that means is this: **I won’t ask you to deliver on a date sooner than, or for a budget less than, the date and the budget associated with a 65% confidence estimate that you can achieve the goal. I won’t promise the WH or the Congress that we can do better than such a date/budget.** If they move the money, I will move the date to recover the 65% confidence. If they want it sooner, I will not agree until and unless a sufficient amount of money is supplied to recover the stipulated confidence level.*

But that is my contract with you. It is not to be confused with the level of goal-setting that you do for those who report to you, within reason.

**Email sent 17 Feb 2007 by Administrator Dr. Michael Griffin to Cx & ESMD management

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