



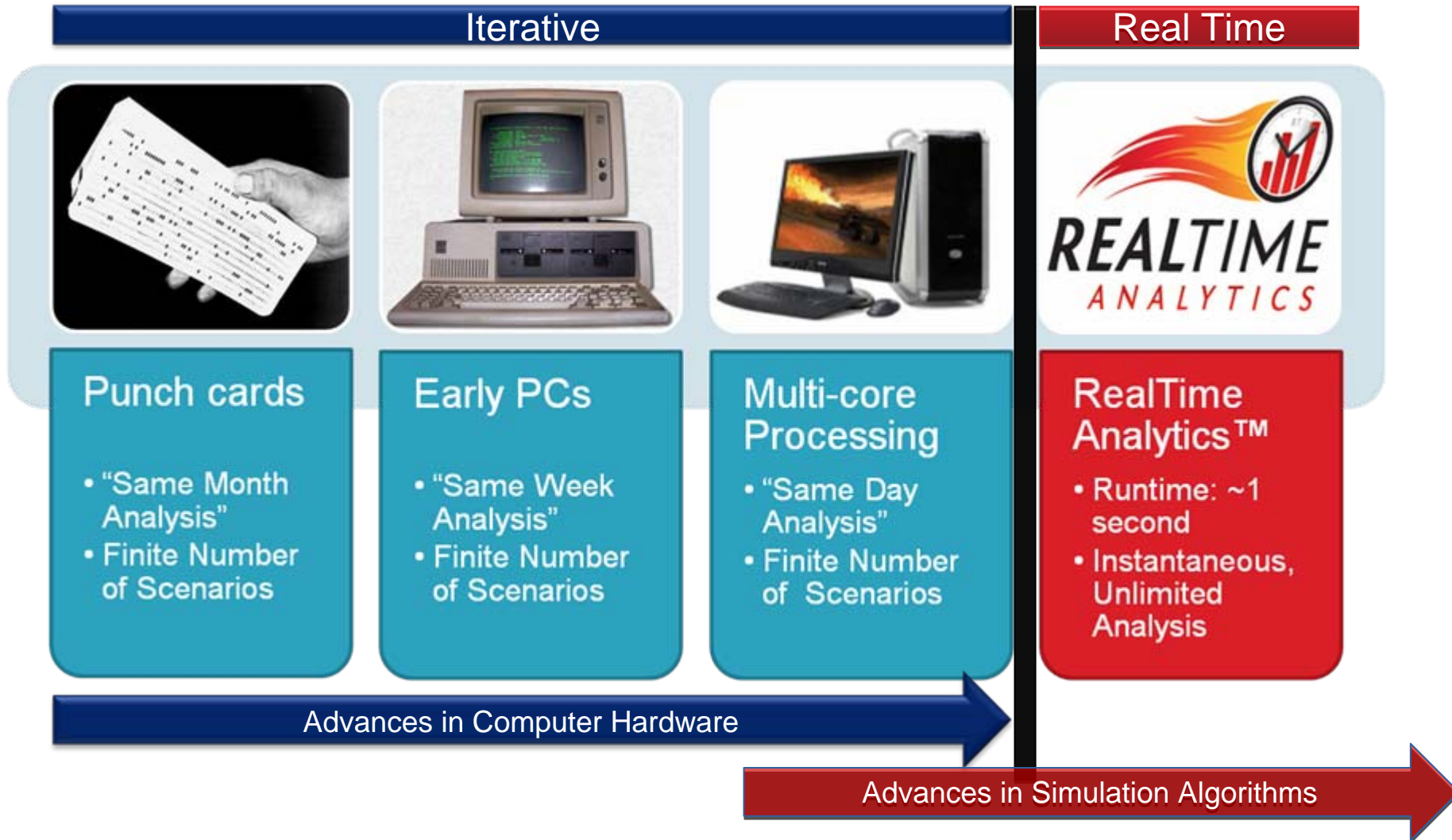
*Bringing Sophisticated Statistical Analysis to Real
Time Decision Making*

Eric Druker, Blake Boswell
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What is RealTime Analytics™

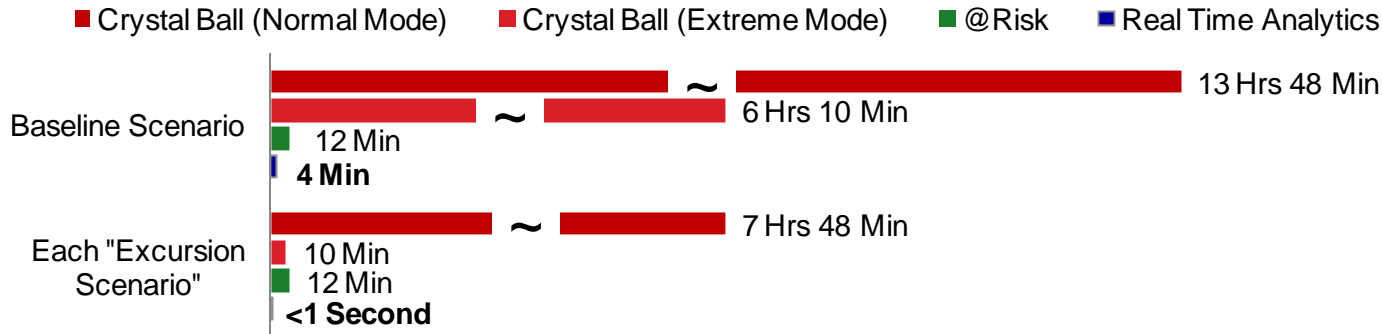
- ▶ One of the challenges in performing risk analysis is the time required to run simulations
 - Run-times of minutes or hours prohibit most risk analyses models from being decision making tools as they can not be re-run during meetings
- ▶ RealTime Analytics™ (RTA) is a collection of technologies, tools and methodologies allowing complex analytics to be performed far faster than using currently available methods
- ▶ This presentation will focus on two tools utilizing RTA technology for SCEA-centric applications
 - **RTA Excel Tool:** Cost Risk Analysis, Business Simulations
 - **Dynamic Integrated Cost Estimator:** Integrated Cost & Schedule Risk Analysis, Schedule Risk Analysis, Joint Confidence Level Analysis
- ▶ Both of these tools allow simulations to run up to 99.99% faster than comparable industry tools
- ▶ Simulations formerly taking minutes or hours to run now finish in under 1 second
 - Allows decision makers to run an unlimited number of excursion scenarios *without ever leaving the meeting room*
 - RTA is not a numerical approximation approach such as Method of Moments, it simply runs simulations faster than existing tools

RTA's Real-Time Capability is Enabled by Advances in Simulation Algorithms, Not Computer Hardware

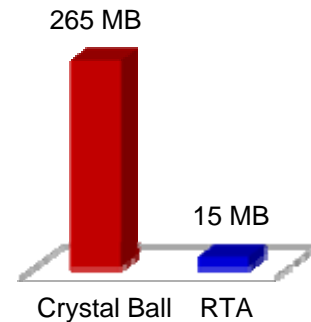


RealTime Analytics™ Excel Tool: Benchmarking against Crystal Ball & @Risk

Simulation Run Times



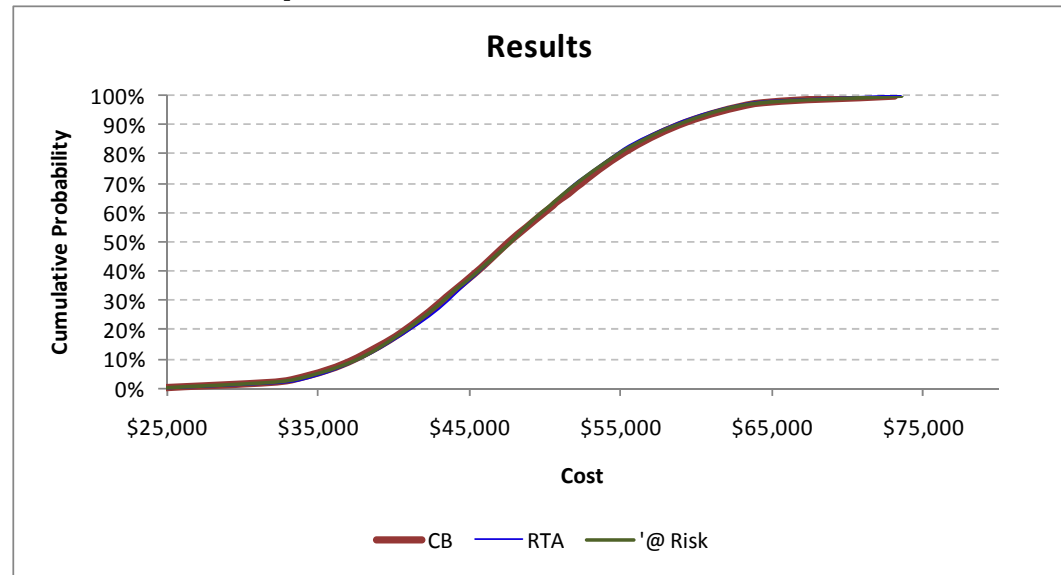
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Assumptions

- ▶ Simulations include mix of triangular, normal, beta, lognormal and uniform distributions with same parameters in each model
- ▶ 444 correlated distributions with 9,620 forecasted values
- ▶ Baseline scenario is the time to "prime" the models; includes adding in correlation
- ▶ Each additional scenario is time to re-run model when a single distribution parameter is changed
- ▶ Crystal Ball v11.1.1.0.00, @Risk Standard v5.7

Comparison of Simulation Results



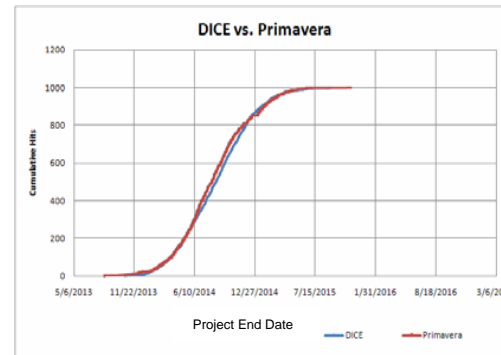
Dynamic Integrated Cost Estimator (DICE)

Benchmarking against Primavera Risk Analysis

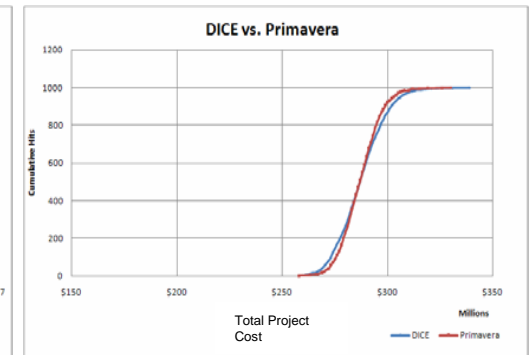
▶ Runtimes (3200-line schedule)

Task	Run Time	
	DICE	Primavera
Opening Tool	0:02	0:05
Import Schedule	0:03	2:05:27
Load Risk File	0:03	0:01
Initialize	0:02	0:05
Correlation	0:02	0:05
Run Simulation	0:09	2:27
Export Data	0:08	0:00

▶ S-Curves (at 0.4 correlation)



Schedule



Cost

▶ Key Points

- Identical input parameters to ensure consistency in benchmarking
- Importing risks from 3rd party template
- Outputs <1% variation from Primavera

Benefits of RealTime Analytics™

- ▶ Excursion scenarios requested by decision makers can be run without ever leaving the meeting room
 - Decisions are made quicker and more efficiently
 - Decision makers never lose focus on the task
- ▶ Engineers can immediately see the impact of design changes on cost, schedule and risk
 - Promotes synergy between engineers and cost/schedule/risk disciplines
 - Estimates are no longer “thrown over the fence” to be entered into “black box models”
- ▶ What-if analysis can be run in real-time
 - No longer a limit on number of excursion scenarios possible

The best way to demonstrate the benefits of RealTime Analytics™ is to see it in action!

RealTime Analytics™ Excel Tool Demo

Conclusion

- ▶ RealTime Analytics™ allows analysts to run business simulations instantaneously
 - Without using approximation methods
- ▶ The ability to run simulations in real time has several advantages:
 - Unlimited number of excursion scenarios can be run without ever leaving the room
 - Engineers and decision makers get immediate feedback as assumptions are changes
- ▶ RealTime Analytics™ not limited to simulations
 - Also applied to fraud/outlier detection algorithms and cloud computing applications



For further information...

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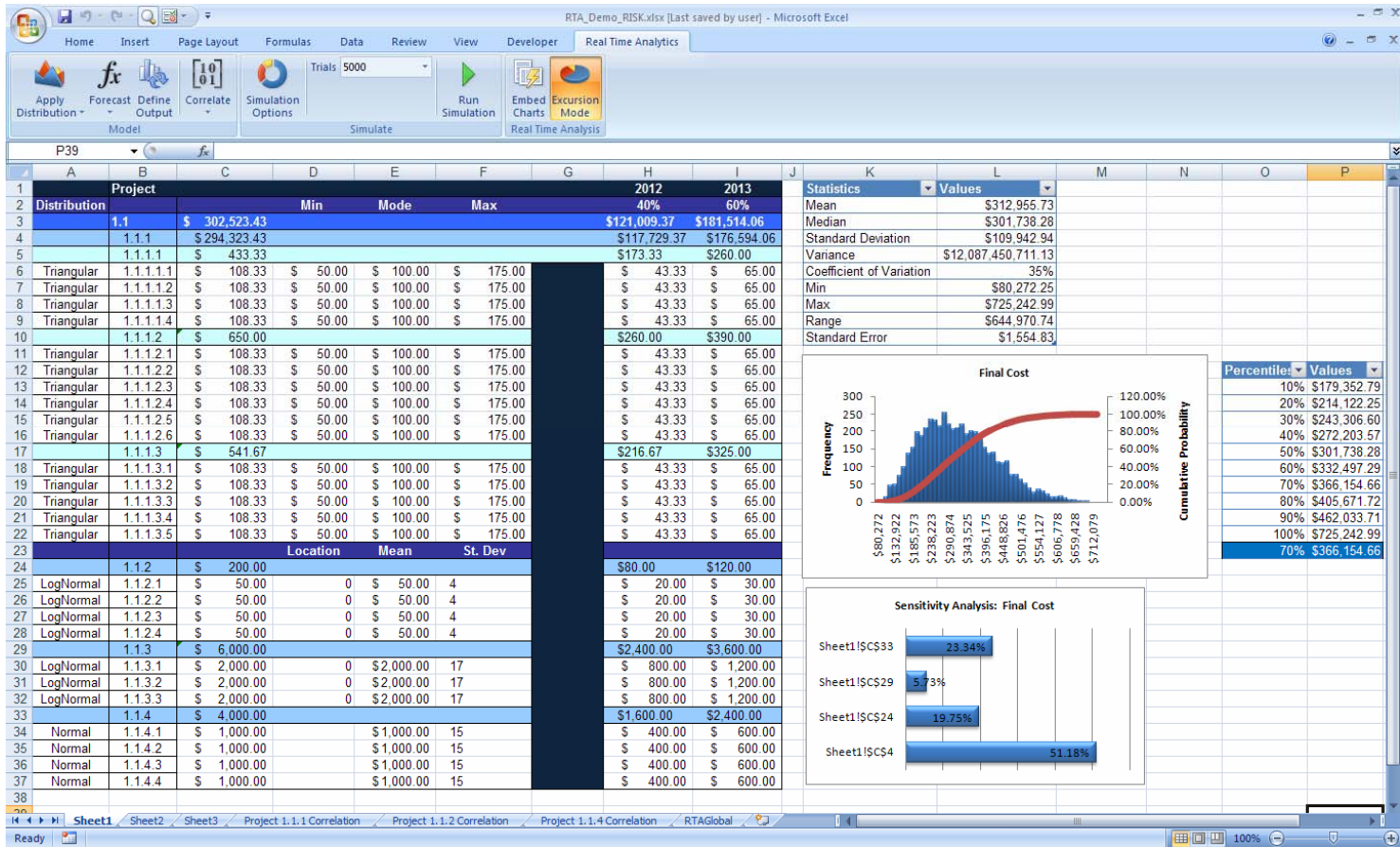
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Backup/Screenshots

Screenshots: RealTime Analytics Excel Tool

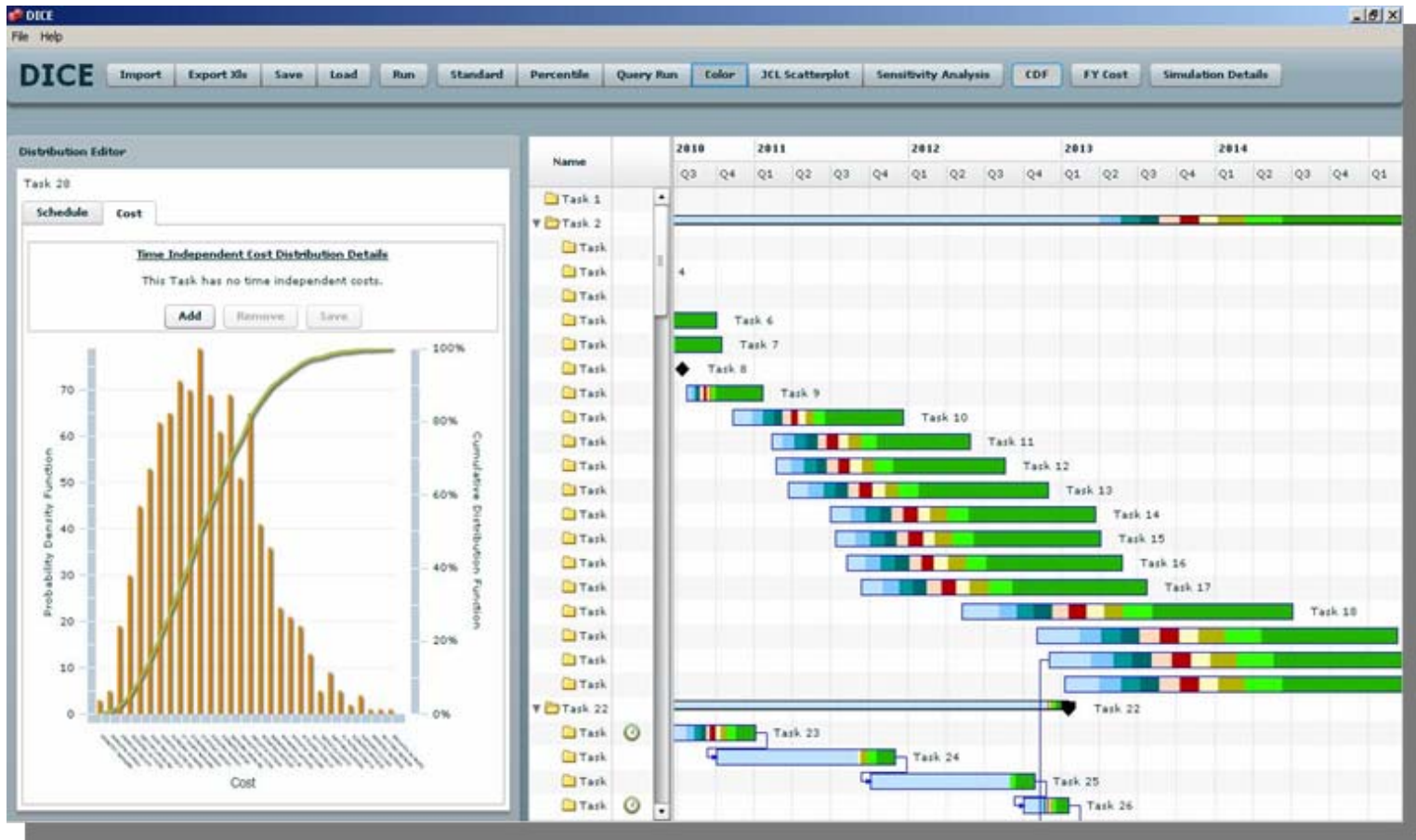


Screenshots: RealTime Analytics Excel Tool



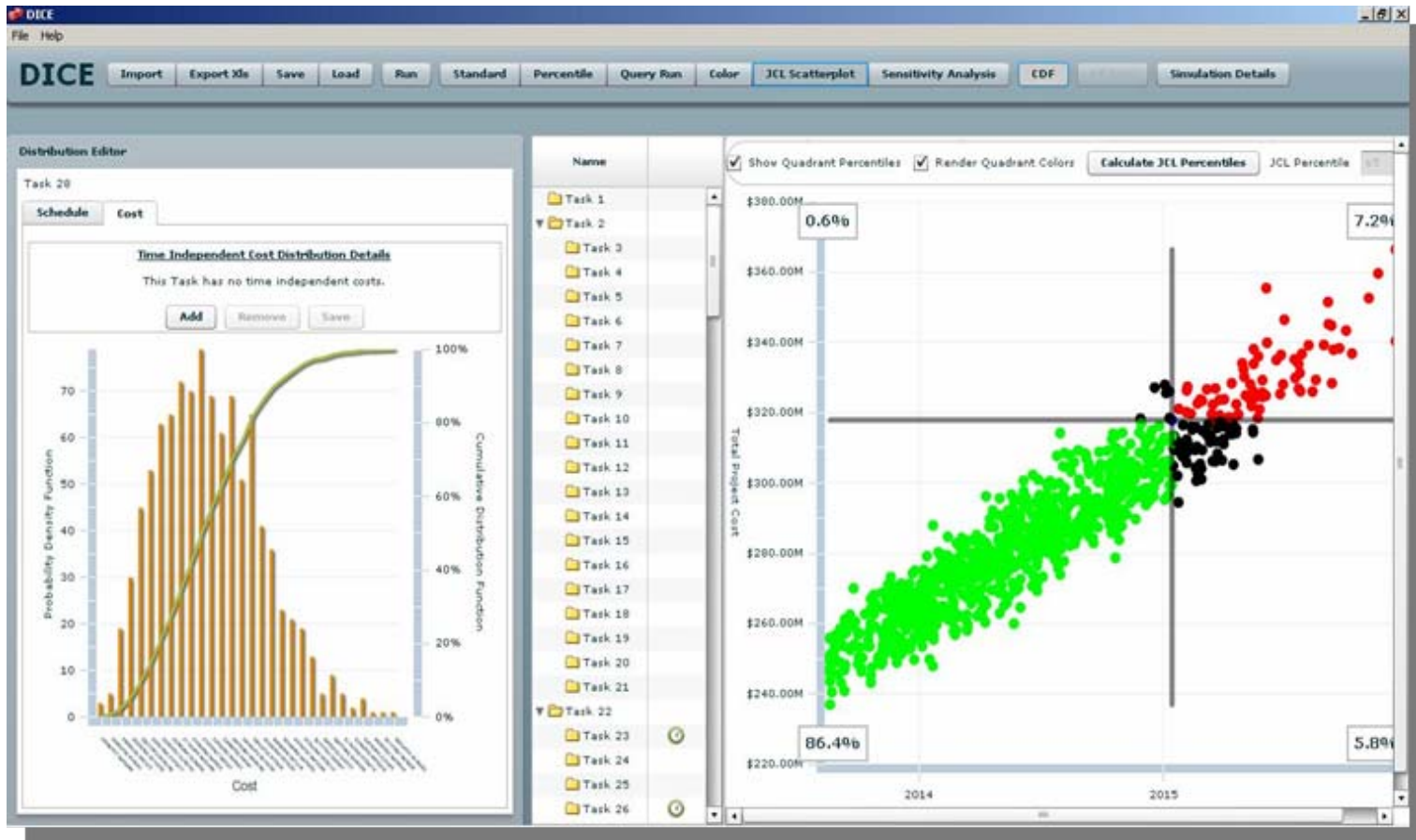
In this cost risk analysis example, that required Crystal Ball and @Risk up to 14 hours to run, RTA was able to reduce run-time to 4 minutes. Excursion scenarios using alternate assumptions took *under a second to run*

DICE Functionality – Gantt Chart and Cost/Schedule Uncertainty



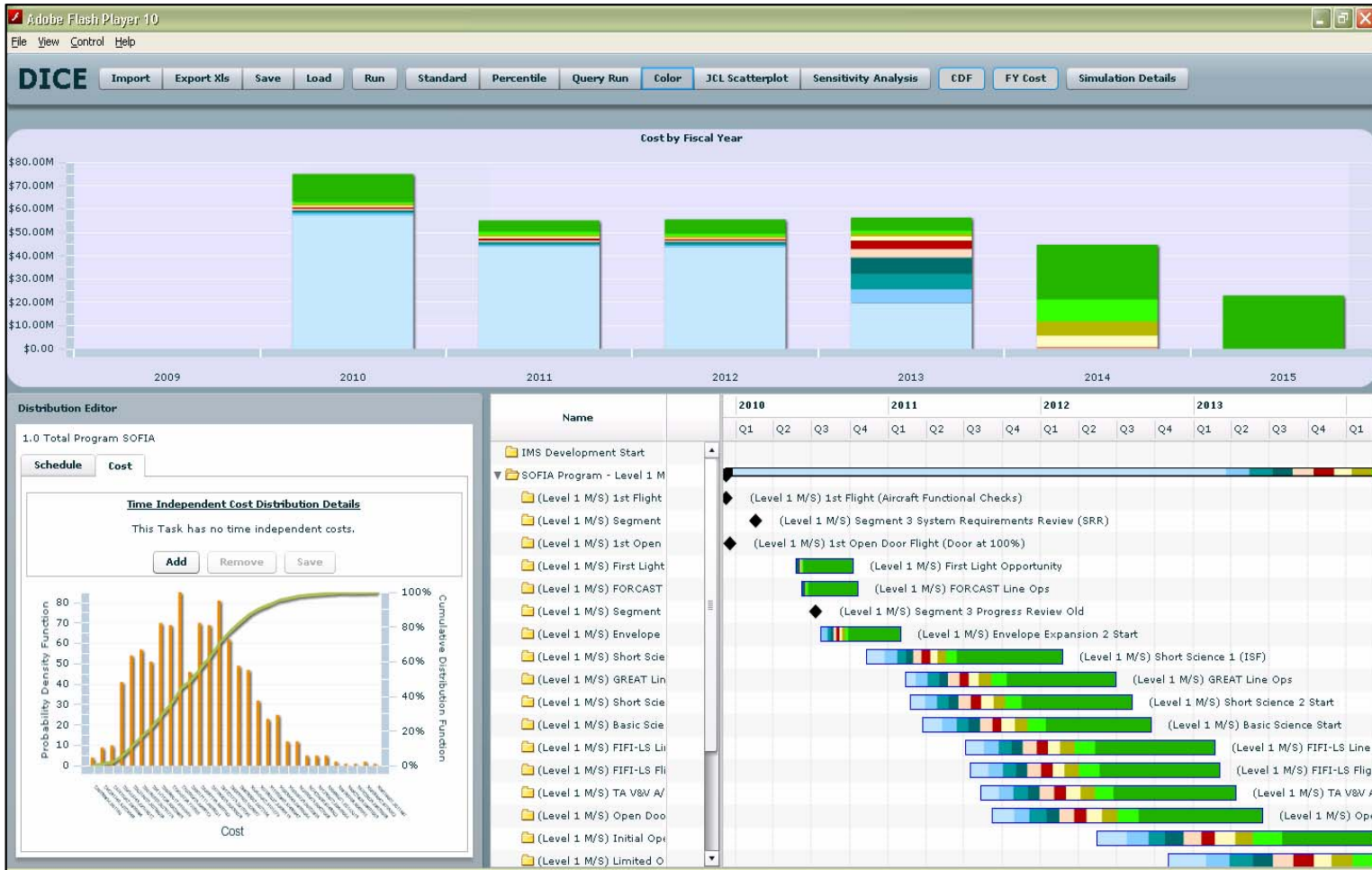
- ▶ Organizes project tasks, costs, constraints, schedule interrelationships, and adds uncertainty to individual cost and schedule items

DICE Functionality – Cost-Loading



- ▶ DICE can load schedules with time-dependent and time-independent costs, generating standard outputs such as JCL scatter plots and iso-curves

DICE Functionality – Fiscal Year Segmenting



► DICE accounts for costs (and uncertainty) by fiscal year – aids budget planning