



**TECOLOTE
RESEARCH, INC.**
Bridging Engineering and Economics
Since 1973

Use of Joint Confidence Level (JCL) Data for Programmatic Success

ISPA/SCEA Conference – June 2011

Rey Carpio - Tecolote Research, Inc

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

BEIJING—China said inflation remained high last month, fueling further doubt about the government's ability...

The consumer-price index (CPI)... rose 4.9%, ... Last month's rise was in line with the 4.9% rise in January, and was just slightly higher than economists' expectations.

China's economic data are distorted by the timing of its Lunar New Year holiday, which fell earlier in the month this year than in 2010. ...

Despite the 4.9% ..., inflation pressure remains intense, ... The implication is that tightening pressure is still on, and before inflation is tamed, consumers will continue to be pressed.

... China's leaders have pledged to tame consumer prices, and expressed confidence in their ability to do so.

Beijing's success or failure ... could have global ramifications.

The government faces a delicate balance, wanting to cool prices without clamping down so hard that they strangle economic growth in China, which has driven global growth in recent years.

INDEX....Index....index....indeX....INDEX

NASA—Program Manager reported low **JCL index** which is fueling **further doubt** about the program's ability to tackle what Congress officials have called their main scientific priority this year...

The **JCL index** (JCLI) ... rose 4.9% ... Last month's rise was in line with the 4.9% rise in January, and was just **slightly higher** than NASA HQ's expectations.

Program's February confidence **data are distorted** by the timing of Continuing Resolution, which persisted this year than in 2010. ...

Despite the 4.9% ..., pressure to succeed remains **intense**, ... The implication is that tightening pressure is still on, and before technical risk is tamed, Program will continue to be **pressed**.

... Program management have pledged to manage technical risks, and expressed **confidence** in their ability to do so.

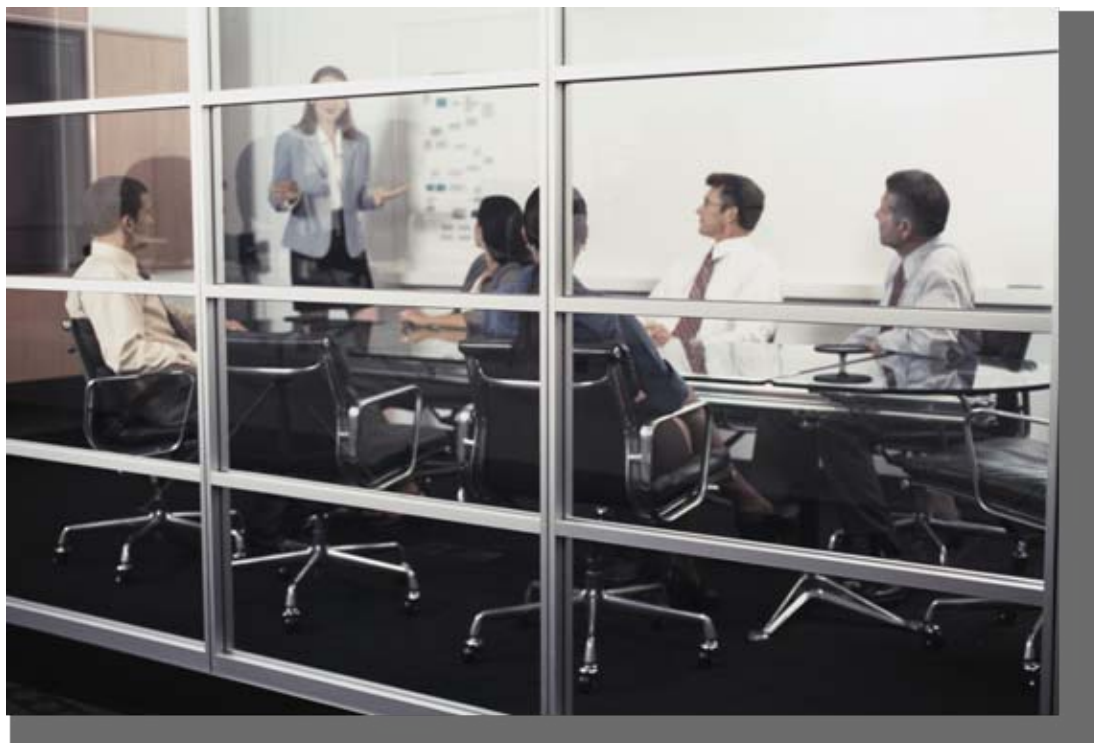
Program's success or failure ... could have NASA-wide **ramifications**.

The Program faces a **delicate balance**, wanting to control costs without clamping down so hard that they strangle technical growth, which has driven scientific growth in recent years.

JCL is an INDEX

- Viewed as an **INDEX** and used as an **INDEX**
- Index trend provides a measurement of change in the overall confidence level of the program's plan with respect to the cost, schedule, and threats managed by the Program
- Definition: statistical estimate constructed using information that captured uncertainty, risk, cost, and schedule of program representative elements whose data are collected periodically
- JCL can be one of the most closely watched program indices

Monthly PM's Status Mtg

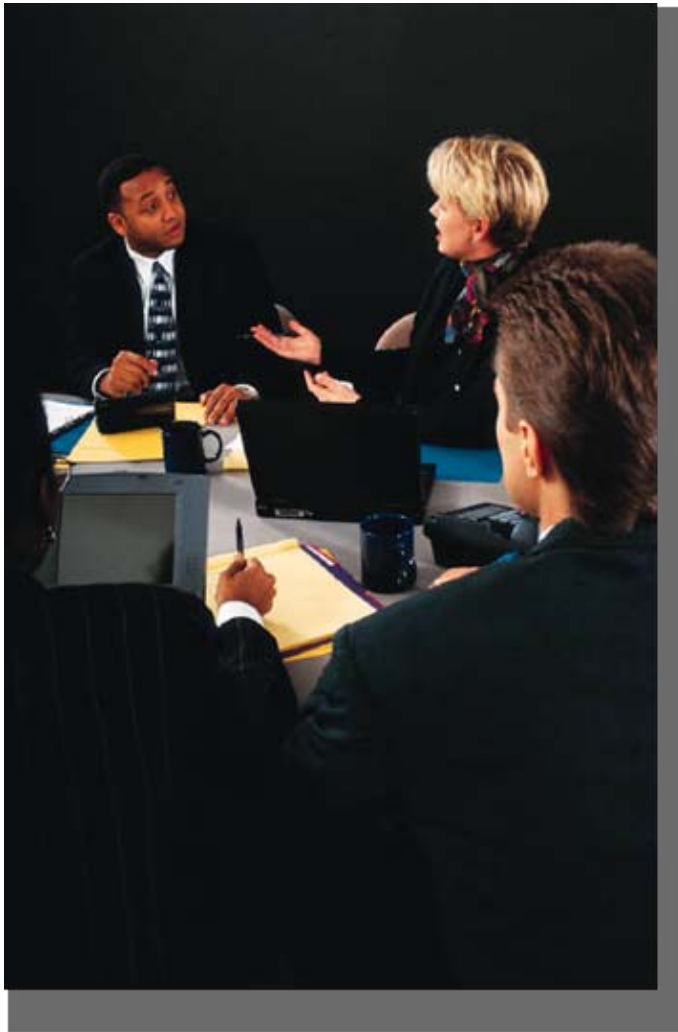


“Ok, let’s start with project schedule... then, the cost estimates, and have the risk people give us the state of project risk...”

**...the project
schedule doesn't
look that good... we
are couple months
behind schedule...
and recovery is not
in sight...**



Cost Estimates...



**... what do you mean,
we're over our budget?...
what about that S-curve
stuff you told me last
month...where are we
now?**

... Boss, can I just show you the risk list and we can discuss whichever one you feel like talking about... I can easily talk to you about this one... but not that one...





**Boss, you heard from
your staff ...
schedule, cost, and
risk.... and we are
ready to hear what
you have to say...
'cause we don't see
the picture...**

...schedule is behind,
cost estimate is ugly,
and risks are uglier...

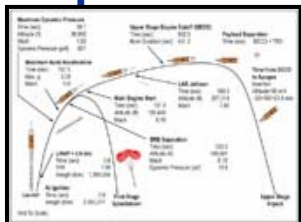
what's my trade space ...
and which risks are
driving me off the cliff ...

show me an integrated
metric (**index**) on where I
am...where I'm going...
“what's the net effect of
it all?”

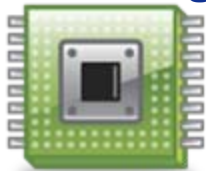


How JCL Index is put together...

Requirements



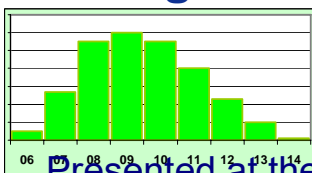
Technology



Resources



Budget



Productivity

Effort
Work to be done (i.e. estimated touch labor + material cost)

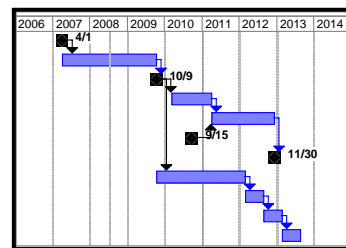
Availability
Capacity to do work

External Events

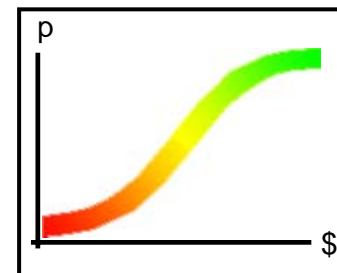


Schedule

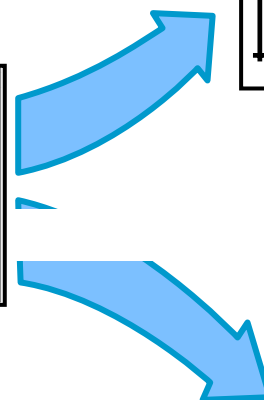
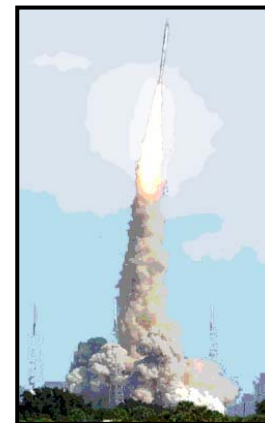
A plan to do work



Total Project Cost (w/ LOE)



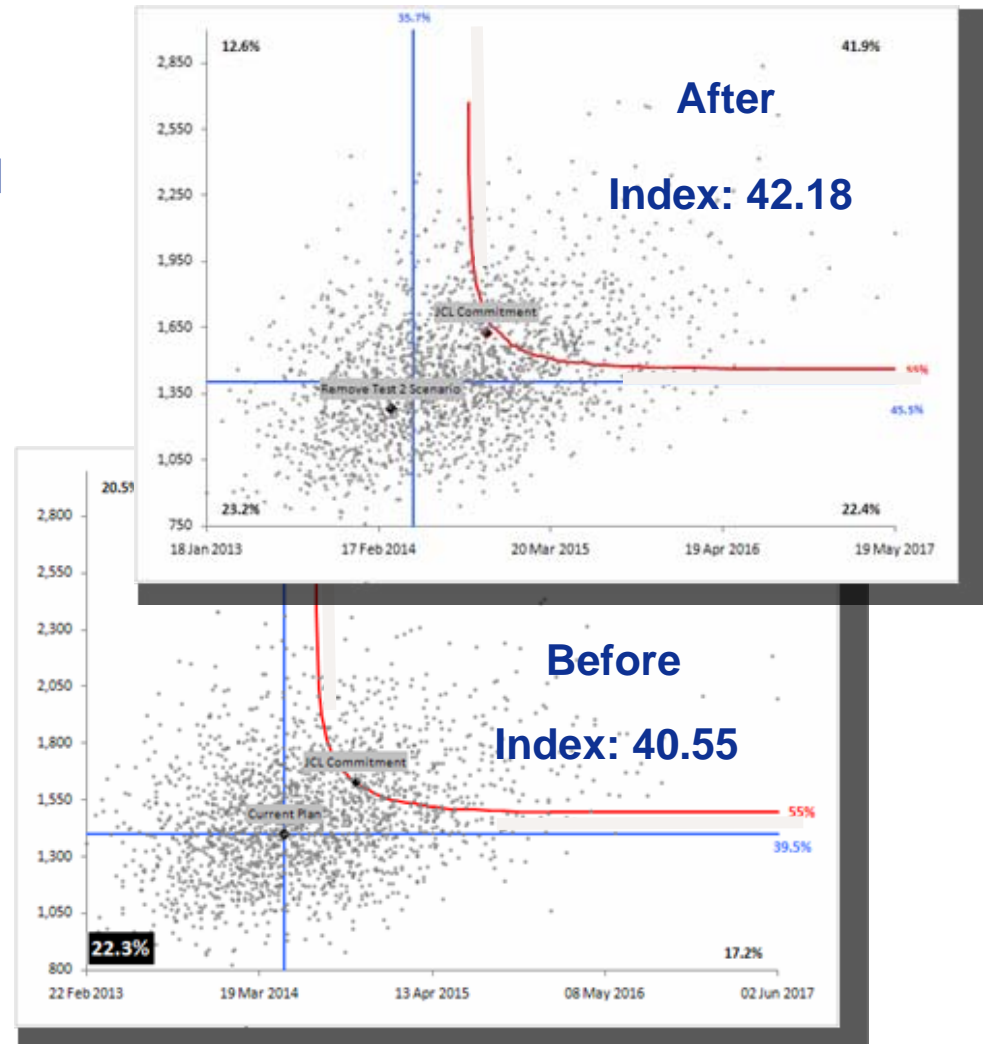
Project Completion Date



Source of Uncertainty

- **JCL index: 40.55 (100 means tracking to Target)**
 - Current JCL = 22.3%
 - Target JCL = 55%
 - Index = $100 * (\text{Current JCL} / \text{Target JCL})$
- **Analysis shows two test activities are scheduled and they are driving cost and schedule**
- **PM needs to decide whether to keep or eliminate Test #2**
- **Test #2 Specifics**
 - Schedule...Test #2 is about 3 months long
 - Cost...about \$150M
 - Risk...depends
 - Test #2 content is “shake & bake” of the satellite
 - If Test #2 is taken out, there will be impact to reliability, deployment mechanisms, and other aspects

- If Test #2 is deleted (\$150M and 3 months), do we improve confidence **index** for the plan and JCL frontier
- Compare previous JCL and the new JCL Curves
 - Point of marginal benefit
 - Trade space
- “Up/out” reporting data
 - Before and After JCL comparison
 - Manage stakeholder expectations
- “Down/in” management data
 - Capture/compare to historical norm
 - Trending over time

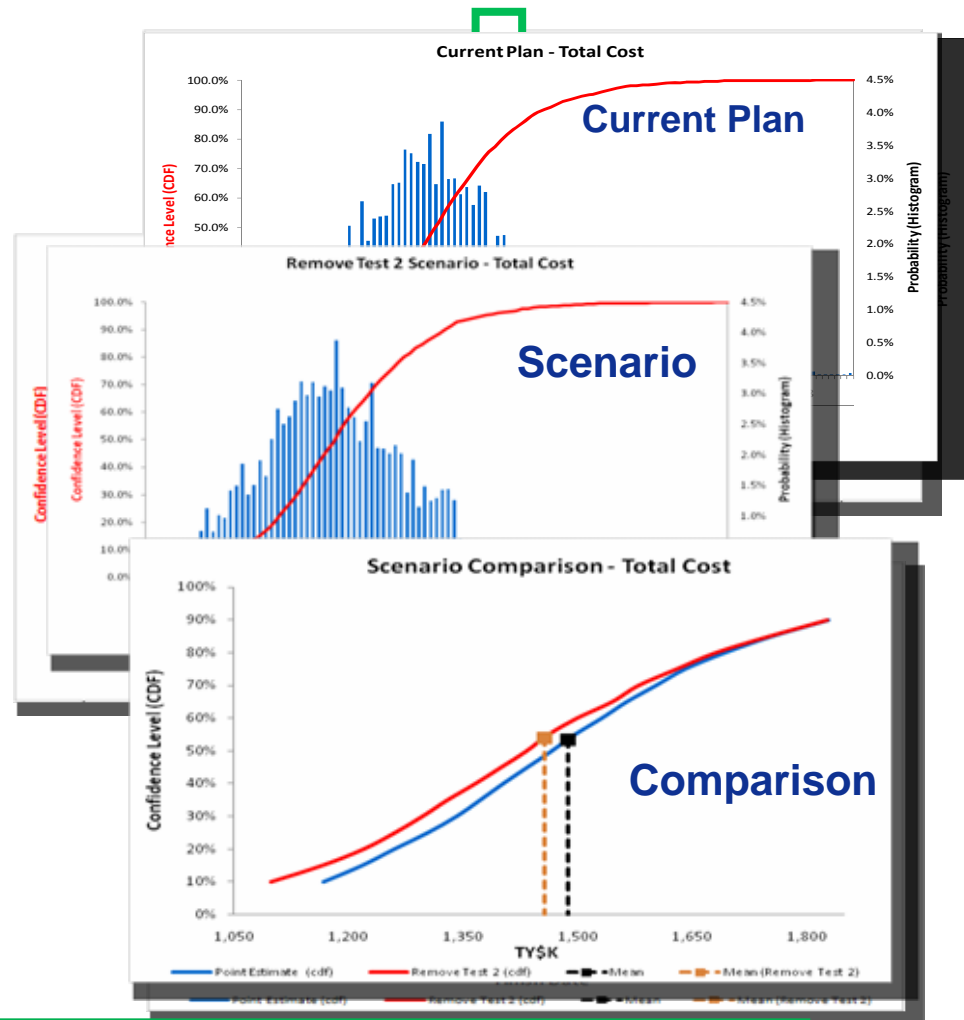


- If Test #2 is deleted, then what is the possible range of schedule on the curve at a given, or range of confidence level
 - Plan is shorter and planned costs for Test 2 (\$150M) are deleted
 - Increased uncertainty
 - Cost range shifting to the left, but...
 - Schedule range shifting to the right

- **“Net”** effects of increased technical risk, accelerated schedule, and cost reduction

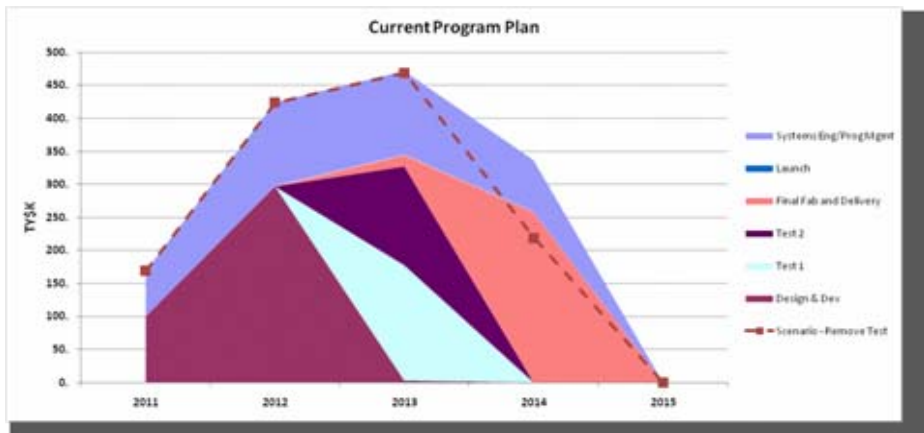
- May include additional risk mitigation cost/task/schedule to accommodate the deletion of Test #2

- Is the **Index** getting better?



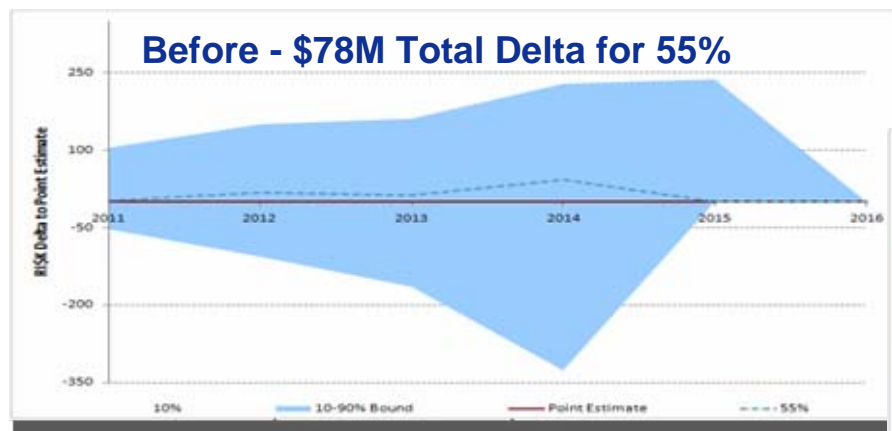
Cost CDF/PDF will undergo similar analysis...

Annual Risk (Fan) Charts

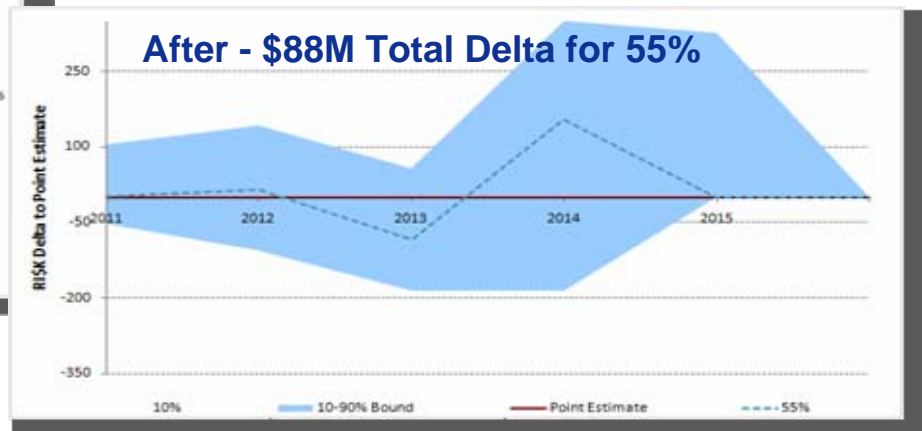


■ **Test #2 is deleted from year #3 (\$150M and 3 months)...**

- Annual comparison of plans doesn't provide enough information
- Compare previous river chart with new river chart
- Relative and absolute movement of the Bound and JCL target level



■ **Provides a perspective, with relation to time, on program uncertainty**



- **Just like Consumer Price Index... JCL is an INDEX**
- **Treat it like an index**
 - Develop the “before and after” pictures
 - Search for answers...for cost and schedules
 - Identify the risks trade space (risk-cost-schedule dimensions)
- **JCL is an INDEX**