Earned Schedule in Action

Kym Henderson

Vice President
Research & Standards

College of Performance Management

Founding Member
Ambassador

EVM Europe Association

Copyright © Lipke & Henderson 2013

Agenda

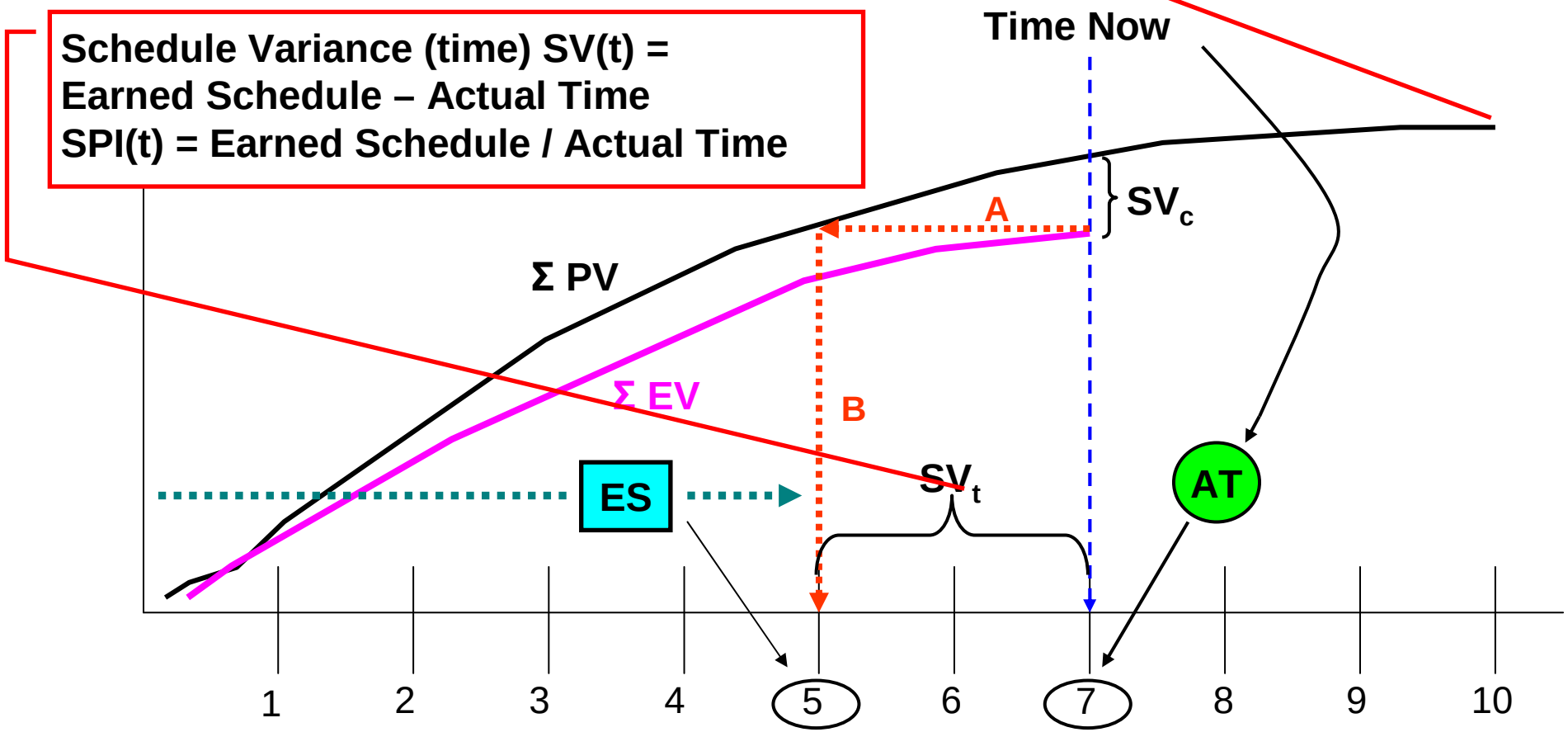
- What is Earned Schedule?
- History of the Methodology
- Some Independent Confirmation (USA)
- The “P” Factor Measure of Schedule Adherence (2 slides)
- Case Study Project #1
- Case Study Project #2
- Conclusions

Copyright © Lipke & Henderson 2013

Earned Schedule Concept

Statistically Predicted Project Duration = PD / SPI(t)

Schedule Variance (time) SV(t) = Earned Schedule – Actual Time
SPI(t) = Earned Schedule / Actual Time



For the above example, ES = 5 months …that is the time associated with the PMB at which PV equals the EV accrued at month 7.

Copyright © Lipke & Henderson 2013

"Recent" Developments

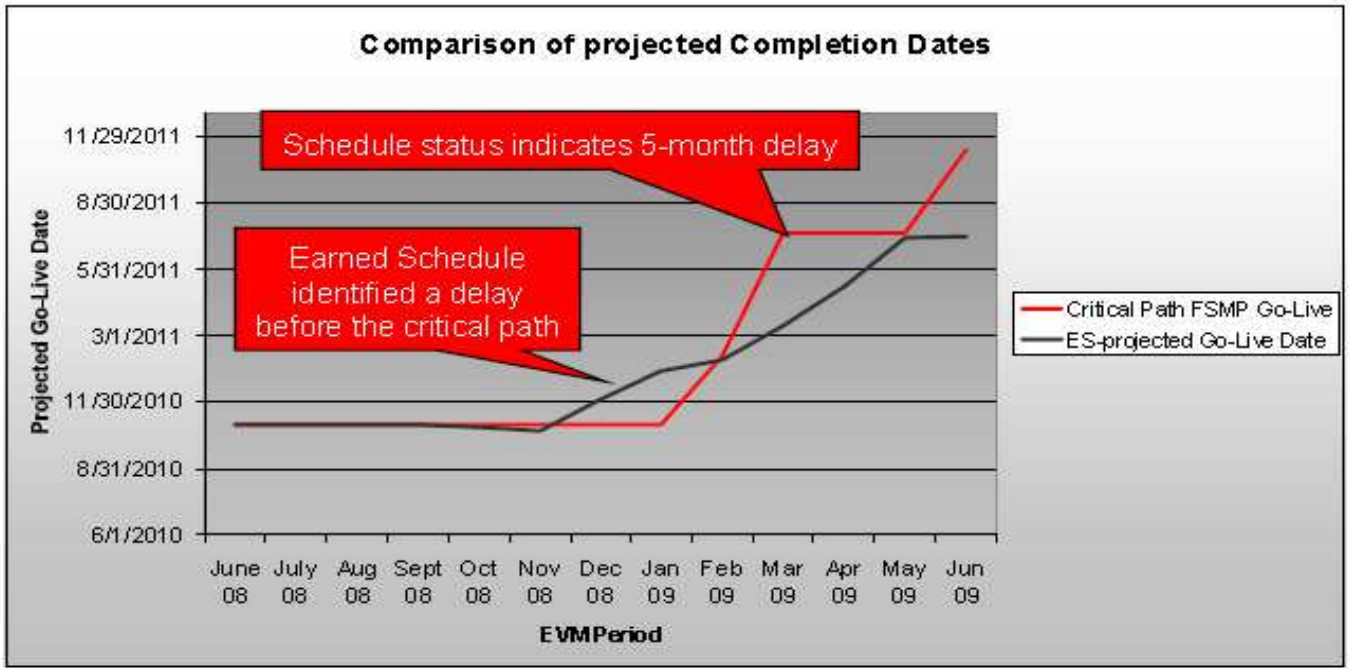
- **Invention of**
  1. Earned Schedule (ES) by Lipke in 2003 - ***USA***
  2. Earned Duration (ED) by Jacob also in 2003 - ***USA***
- **A global collaborative research effort**
  3. Initial validation (ES) ***Australia*** (practitioner)
  - Follow-on validation – ***Belgium***
    4. Practitioner initially
    5. Then academic at University of Ghent
  6. Leadership in adoption on large scale programs (ES)
     - ***United Kingdom***
  7. More validation and ES tools development (ES)
     - ***Canada***
  8. Higher end tools development (ES) – ***Belgium***
  9. Earned Schedule Guide ➔ Drafted in ***UK*** in 2009
10. **Global interest and uptake continues to accelerate**
    11. Including ***USA***
11. **PMI Global EVM Practice Standard Appendix D (2011)**

Copyright © Lipke & Henderson 2013

Booz Allen Hamilton Experience – USA
Un-named US Federal Govt Agency Program Data

Ready for what's next.

Looking Back: Earned Schedule view of The Project (project)



USA IPMC Conference 2009: Michelle Jones et. al.
http://www.evmlibrary.org/library/PS%2023%281%29.pdf

Booz | Allen | Hamilton

Booz Allen Hamilton Experience – USA National Reconnaissance Office Program Data

Summary of Program Case Studies

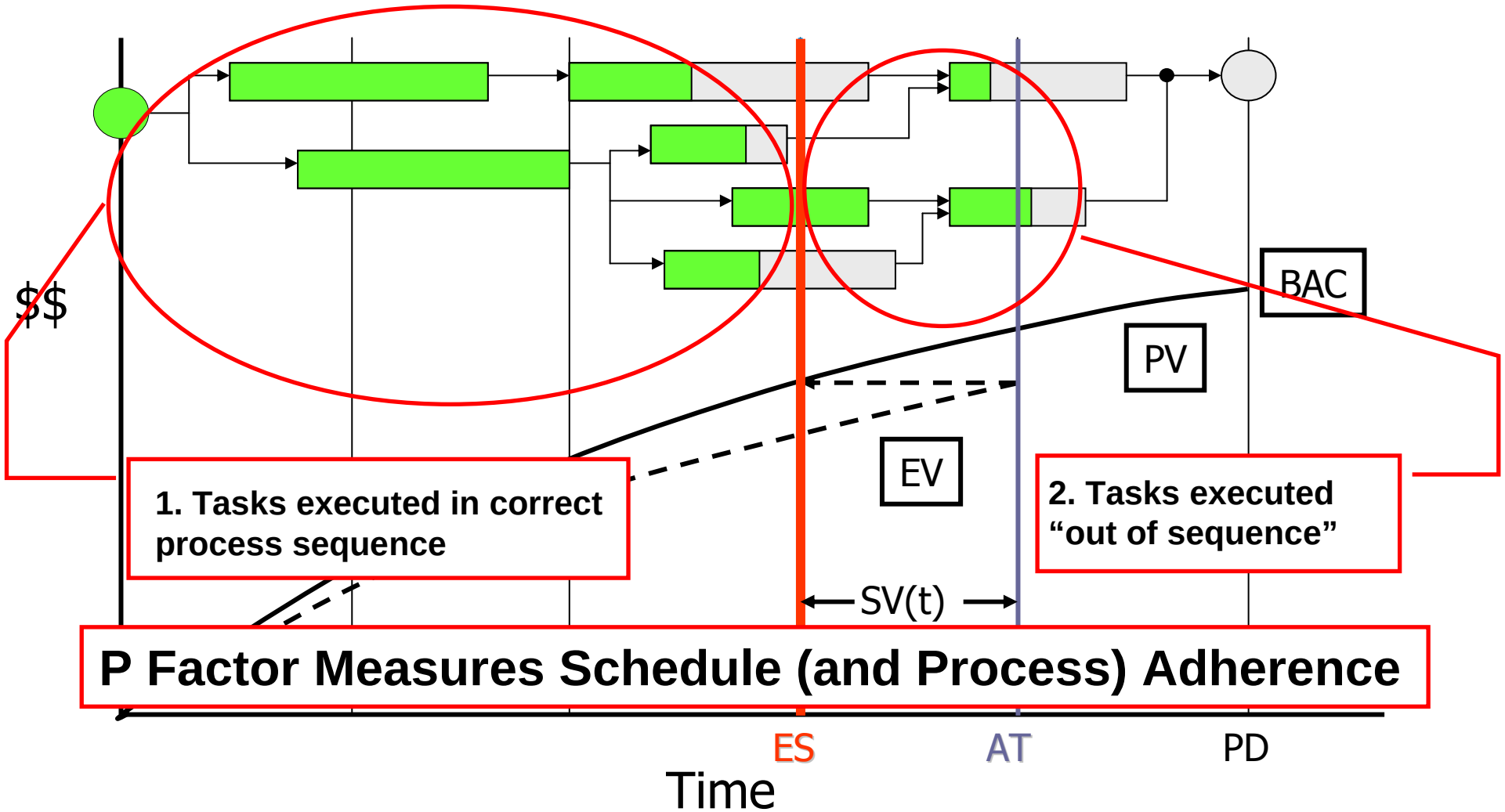
Program Case Studies	Insightful	Consistent	Misleading	
Program W - year 6	x			Quantitative measure, supporting controversial ICE
Program W - year 10		x		Consistent with other program metrics
Program X	x			Early warning of schedule problems
Program Y			x	Indicated slip, but extent of slip diluted by LOE in EVM baseline
Program Z	x			Early warning sign of major schedule delay
Additional Earned Schedule Data				
Program M		x		Earned schedule forecasts on-time performance for a program being managed to schedule
Program N		x		Earned schedule consistent with other metrics
Civil IT Project	x			Early warning of a schedule slip
Civil Shipbuilding Program	x			Accurate projection of a 6-month delay in delivery

- **Insightful**: Earned schedule metrics and forecast are a leading indicator of schedule performance or highlight something missed by other analytical techniques
- **Consistent**: Earned schedule metrics and forecast are consistent with the other program data
- **Misleading**: Earned schedule metrics and forecast are inconsistent with other program status indicators

USA IPMC Conference 2010: Lisa Wolf, Michelle Jones
http://www.evmlibrary.org/library/PS%2008v2.pdf

Earned Schedule - “P” Factor

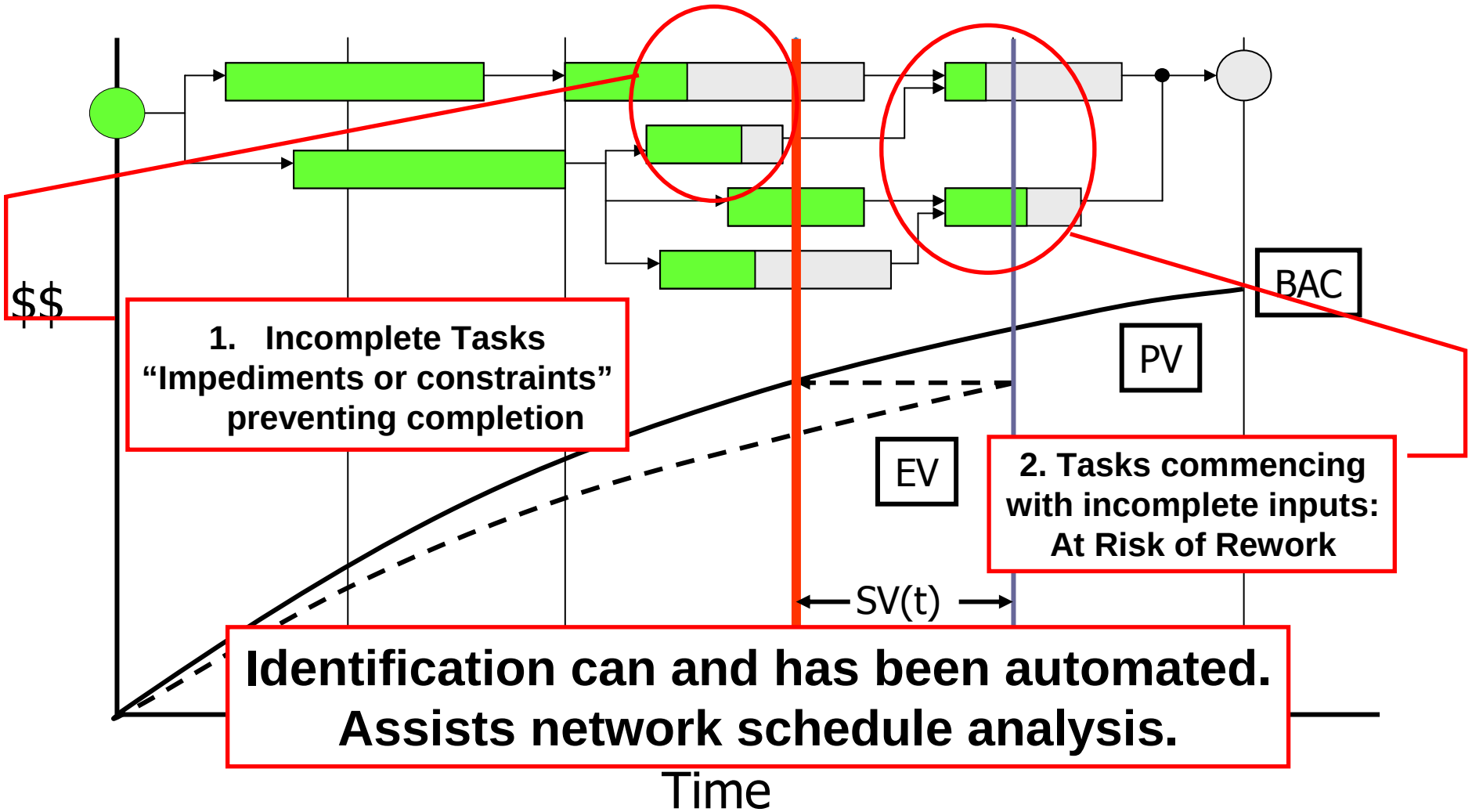
EV Earned “in sequence” / Total EV (Number >= 0 <= 1)



Copyright © Lipke & Henderson 2013

Earned Schedule - "P" Factor

Also Identifies "Impediments & Constraints" and Tasks at Risk of Rework



Copyright © Lipke & Henderson 2013

The Importance of Schedule ….

"We need to maintain our attention on schedule delivery. Data tells us that since July 2003, real cost increase in projects accounted for less than 3% of the total cost growth. **Therefore, our problem is not cost, it is SCHEDULE.**"

Dr Steve Gumley
***(then)* CEO DMO**
(Defence Materiel Organisation - Australia)

Prescription 1st year anniversary
DMO Bulletin, July 06, Issue 61, p3

Copyright © Lipke & Henderson 2013

Case Study Project #1

- **Commercial sector software development and enhancement project**
  - **Small scale**: 10 week Planned Duration
  - **Time critical**: Needed to support launch of revenue generating marketing campaign
  - **Cost budget:** 100% labour
- **Mixture of:**
  - 3 tier client server development
    - Mainframe, Middleware, Workstation
  - 2 tier client server development
    - Mainframe to Workstation direct

Copyright © Lipke & Henderson 2013

The EVM and ES Approach

- **Microsoft Project 2002 schedule**
  - Resource loaded for time phased effort and cost estimation
  - Control Account – Work Package views developed in the schedule
  - Actual Costs captured in SAP time recording system
    - Limited (actual) cost – schedule integration
  - Contingency (MR) managed outside the schedule
- **Top level Planned Values cum "copied and pasted" into Excel EVM and ES template**
  - High level of cost – schedule integration achieved

Copyright © Lipke & Henderson 2013

Schedule Management

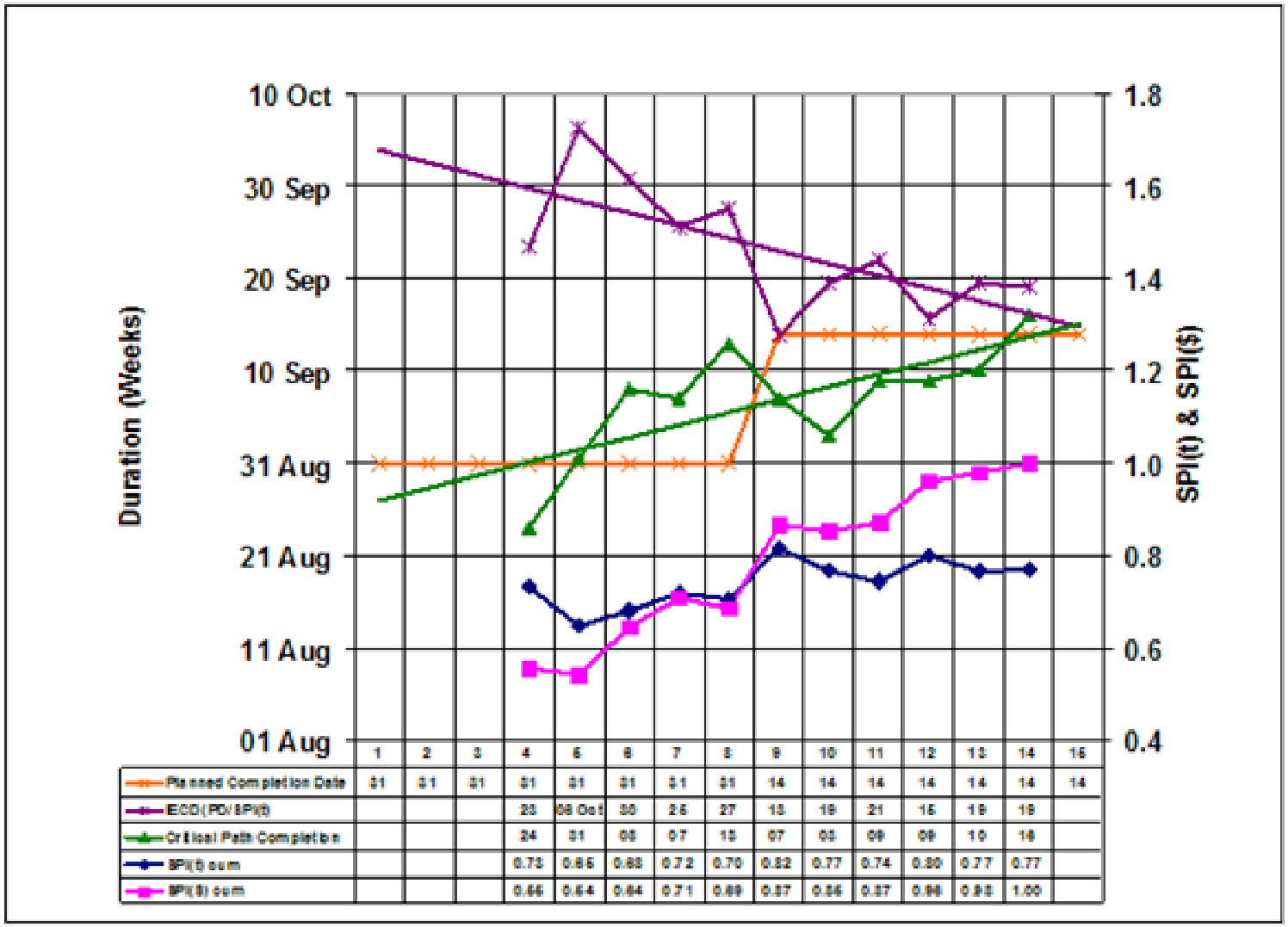
- **Weekly schedule updates from week 3 focusing on:**
  - Accurate task level percentage work completion updates
  - The project level percentage work completion (cumulative) calculated by Microsoft Project
    - Percentage work complete transferred to the EVM and ES template to derive the progressive Earned Value (cumulative) measure
- **Schedule review focusing on critical path analysis**
  - Schedule updates occurred as needed with
    - Revised estimates of task duration and
    - Changes to network schedule logic

  particularly when needed to facilitate schedule based corrective action
- **Actual costs**
  - Entered into the template as became available (weekly)

Copyright © Lipke & Henderson 2013

An Integrated Schedule Analysis Chart

Critical Path, IECD, SPI(t) and SPI($) on one page



Copyright © Lipke & Henderson 2013

Schedule Analysis

- **Initial expectation**
  - The critical path predicted completion date would be more pessimistic than the IECD
- **In fact**
  - The ES IECD trend line depicted a “late finish” project with improving schedule performance
  - The critical path predicted completion dates showed an “early finish project” with deteriorating schedule performance
- **Became the “critical question” in Week 8**
  - ES IECD improvement trend reversed
  - Continued deterioration in the critical path predicted completion dates

Copyright © Lipke & Henderson 2013

Schedule Analysis Result

- **IECD the more credible predictor in <u>this circumstance</u>**
  - Work was not being accomplished at the rate planned
  - No adverse contribution by critical path factors
    - e.g. Externally imposed delays caused by “dependent milestone”
- **Two weeks schedule delay communicated to management**
  - Very late delay of schedule slippage a very sensitive issue
- **Corrective action was immediately implemented**
  - Resulted in two weeks progress in one week based on IECD improvement in week 9
  - Project substantively delivered to the revised delivery date

Copyright © Lipke & Henderson 2013

The IECD vs Critical Path Predictors

- **Network schedule updates do not usually factor past (critical path) task performance into the future**
  - Generally concentrate on the current time window
    - Task updates
    - Corrective action to try and contain slippages
  - **Critical path predicted completion date is not usually calibrated by past actual schedule performance**
- **The ES IECD**
  - Cannot directly take into account critical path information
  - **BUT does calibrate the prediction based on historic schedule performance as reflected in the SPI(t)**

Copyright © Lipke & Henderson 2013

Further Observations

- **Much has been written about the consequences of not achieving work at the EVM rate planned**
  - At very least, incomplete work needs to be rescheduled …
  - Immediate critical vs non critical path implication requires detailed analysis of the network schedule
  - Sustained improvement in schedule performance is a difficult challenge
    - SPI(t) remained in the .7 to .8 band for the entire project!
    - In spite of the corrective action and recovery effort
  - **Any task delayed eventually becomes critical path if not completed**
- **SPI(t) a very useful indicator of schedule performance**
  - *Especially late in project when SPI($) resolving to 1.0*

Copyright © Lipke & Henderson 2013

Case Study Project #2

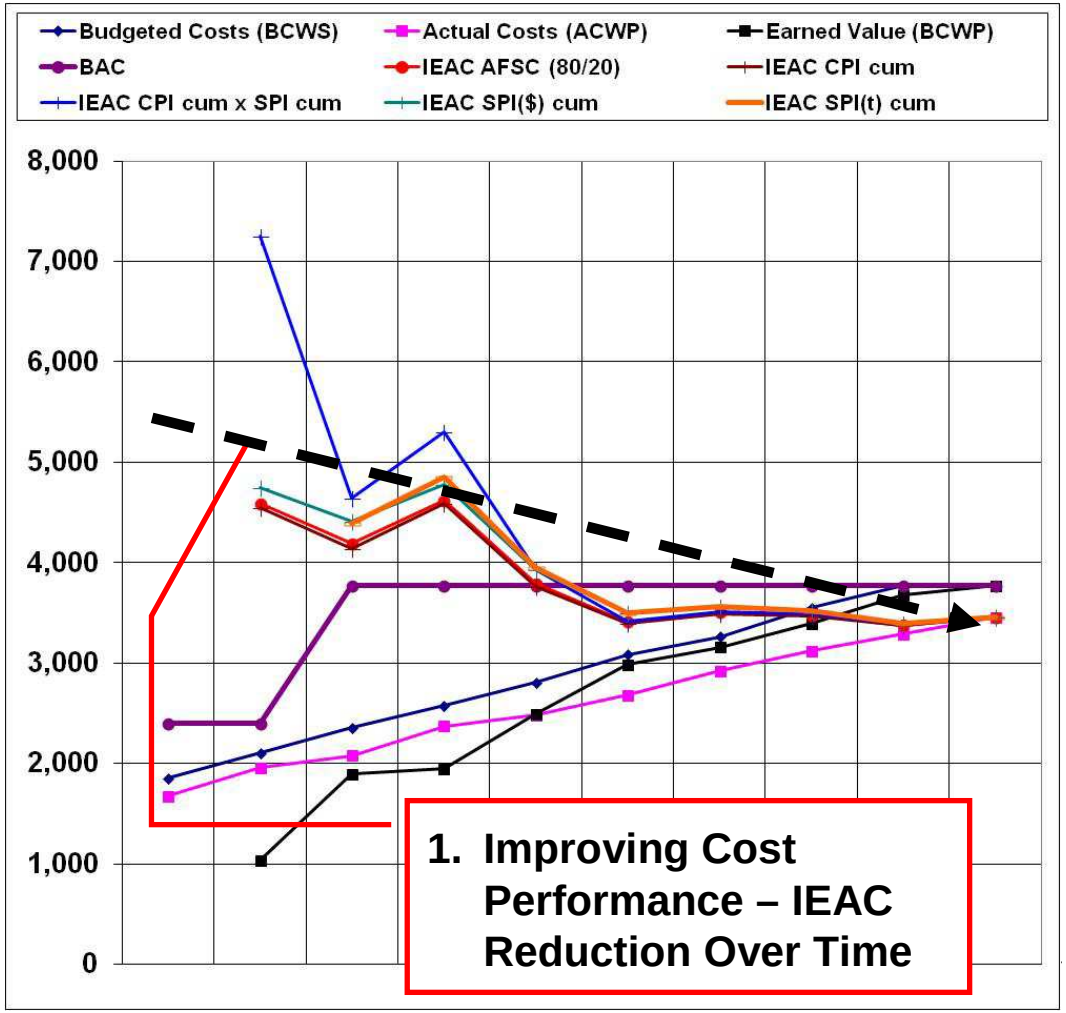
- Asset Management System for NSW Public Utility
  - Very poorly managed from inception
  - Appointed as 5th Project Manager
  - “Immediate (Phase) delivery required to “save” project
- Project re-baselined (in parallel to “save” Phase delivery)
  - Phased delivery strategy
  - Supplier Project Manager replaced
- Project delivered to revised commitment
  - Under budget (Risk budget not expended)
  - Final Phase delivered 4 weeks over schedule (approx 2% of scope)
  - Increase to baseline scope commitment
- Smaller follow on project defined and delivered to commitment
  - Addressed high priority backlog requirements

From impending failure to outstanding success

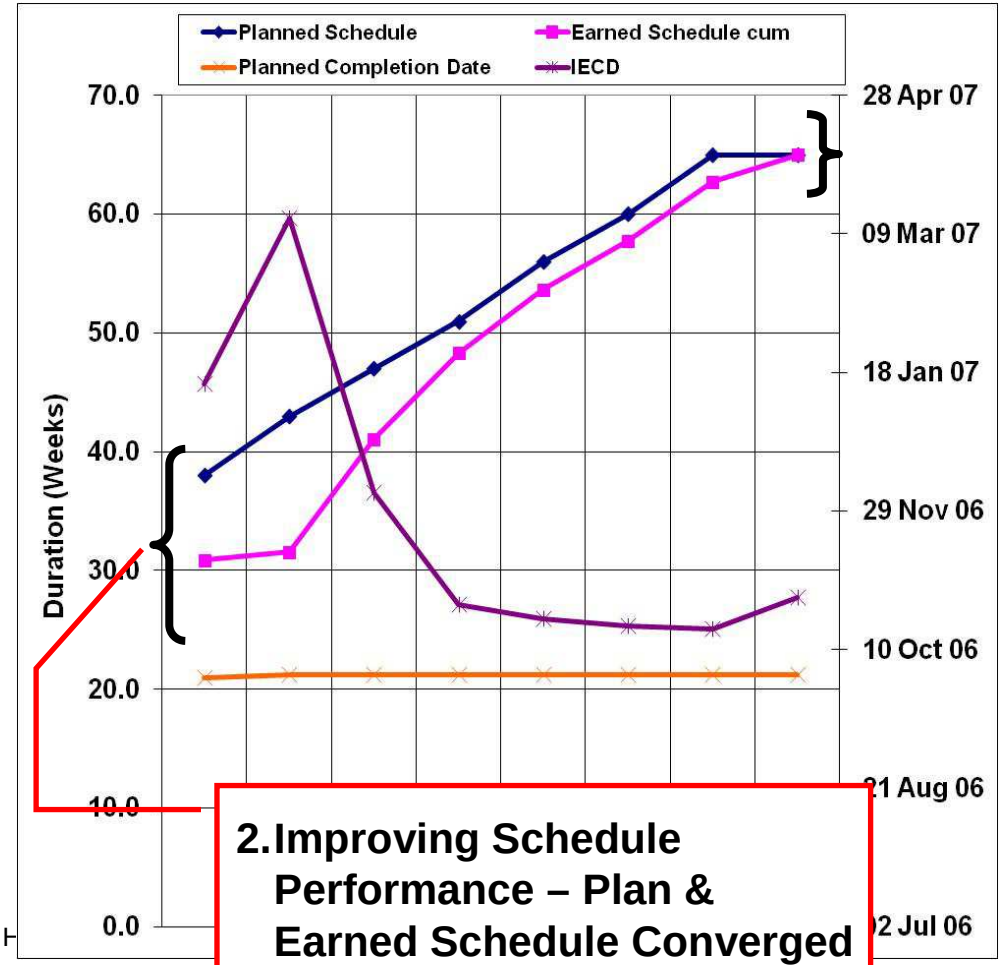
Copyright © Lipke & Henderson 2013

Overall Cost and Schedule Performance After Re-baselining

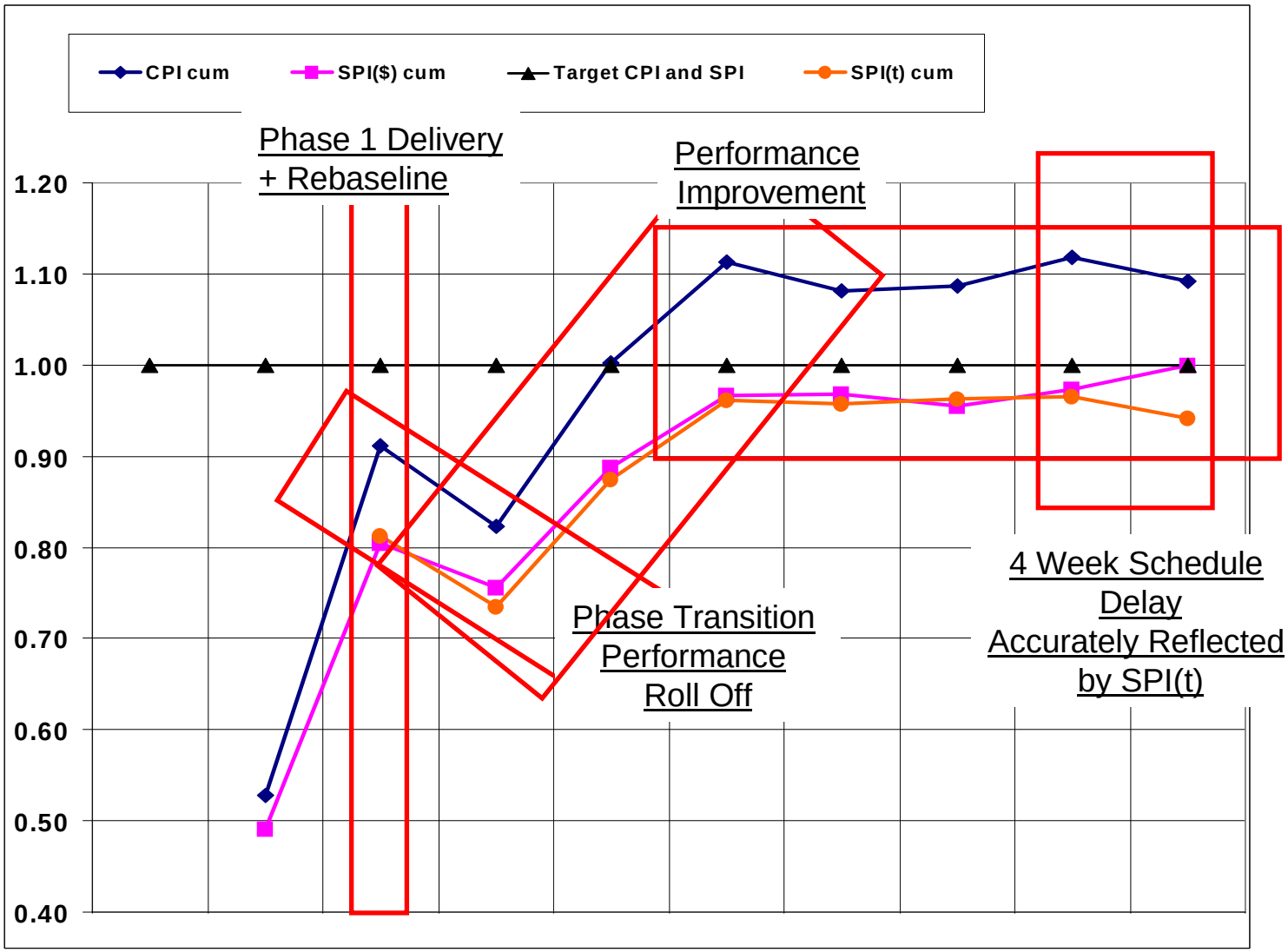
EVM Cost Performance



ES Schedule Performance



Improving CPI and SPI(t) ….



Conclusions

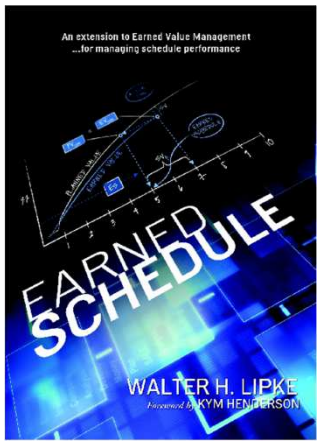
- Case Study Project #1
  - Developed into a paper “Earned Schedule in Action” (2005)
    http://www.earnedschedule.com/Docs/Earned%20Schedule%20in%20Action.pdf
  - First documented use of ES in managing a project
  - Assisted in generating interest and uptake in the method
- Both project are personal examples demonstrating
  - ES is very useful adjunct to EVM for managing and controlling projects
  - It is possible to analyse schedule performance using EVM data
    - In spite of small US based detractors claims to contrary
  - For the first time we have an ability to cross check the network schedule
    - ***But ES is no substitute for the network schedule***
- If already using EVM, no additional data collection is required

ES is a significant intellectual advance and advance to practice

Copyright © Lipke & Henderson 2013

Available Resources

- Earned Schedule Website (freely available)
  http://www.earnedschedule.com/
- PMI Global EVM Practice Standard 2nd Edition (Appendix D)
  http://marketplace.pmi.org/Pages/ProductDetail.aspx?GMProduct=00101262001
- Wikipedia references Earned Schedule
  http://en.wikipedia.org/wiki/Earned_Schedule
- *Earned Schedule* book (English, Japanese, Spanish)
  - Print
  - ePub (Nook & iPad)
  - Kindle
  - PDF



Copyright © Lipke & Henderson 2012

Contact Information

Walt Lipke		Kym Henderson
waltlipke@cox.net	Email	kym.henderson@gmail.com
+1 405 364 1594	Phone	+61 414 428 537

Copyright © Lipke & Henderson 2013