EARNED VALUE
A Practical Approach

Stephan Vandevoorde, Ing.
Manager  LT BE
stephan.vandevoorde@fabricom-gti.com
+ 32 (0) 478 254761

Stephan Vandevoorde, Ing.
Director of Programs & Events
stephan.vandevoorde@pmi-belgium.be
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Introduction to Earned Value

Applying Earned Value Management

Experiences

Special topic: Earned Schedule
What about Time Forecasting?

**PMI Practice Standard for Earned Value Management, 2005**

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<th>Schedule Variance = SV = EV − PV</th>
<th>&lt; 0 = delay</th>
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<td>PD = Planned Duration</td>
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**PMBOK Guide, Fourth Edition**

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Schedule Variance

SV = EV − PV
- < 0: delay
- = 0: on time
- > 0: ahead

By definition at end of project:
EV = total PV (BAC)
Thus SV = PV − PV = 0
Shows perfect performance!!!
What if we are late?

SV is expressed in Euros
Difficult to understand

Schedule Performance Index

SPI = EV / PV
- < 1: delay
- = 1: on time
- > 1: ahead

By definition at end of project:
EV = total PV (BAC)
Thus SPI = PV / PV = 1
Shows perfect performance!!!
What if we are late?

SPI is dimensionless
Easier to understand
Real Life Late Project

Starting Mei/04:
- Positive trend for SV & SPI
- ... but we are slipping further

Something is wrong

23/06/2009 EV

0.70 0.75 0.80 0.85 0.90 0.95 1.00

0 100 200 300 400 500 600

Sep/03 Nov/03 Jan/04 Mar/04 May/04 Jul/04
Another Method

PMI Practice Standard for Earned Value Management

Box 3-1:

Time-Based Schedule Measures…
An Emerging EVM Practice

Describes basic principles of a new method called “Earned Schedule”

Provides foundation for further development of and research intended to result in Earned Schedule acceptance as a valid extension to EV
Earned Schedule

Earned Schedule (ES) = the time when the EV was to be achieved
## Earned Schedule

| VARIANCE ANALYSIS | Schedule Variance Time = SV(t) = ES – AD  
|                   | AD = actual duration  
|                   | < 0 = delay  
|                   | 0 > on time  
|                   | 0 = ahead  
|                   | Expressed in time units  
| FORECAST | Time Estimate at Completion = EACt = PD / SPI(t)  
| ASSESS REALISM | To Complete Performance Index Time  
|               | TSPI(t) = ( PD – ES ) / ( PD – AD ) if target = PD  
|               | TSPI(t) = ( PD – ES ) / ( LRD – AD ) if target is Latest Revised Duration |
Real Life Late Project

![Graph showing SPI(t) and SPI values over time]

23/06/2009
Real Life Late Project

The graph illustrates the progress of the project over time, with different lines representing various metrics such as AD, ES, PD, PD/SPI, and PD/SPI(t). The x-axis represents the months from Sep/03 to Aug/04, while the y-axis ranges from 0 to 14. The line AD shows a steady increase, while ES and PD/SPI(t) are represented by distinct colored lines with specific markers for each month. The PD line is marked with crosses, indicating key milestones or phases. The PD/SPI line is depicted with a dashed line, showing a slight deviation in the later months.
Real Life Late Project

![Graph showing SPI(t) and TCSPI(t) over time]
ES Research

Emperical evidence:

Vandevoorde St., Vanhoucke M.,
“A Comparison of different project duration forecasting methods using earned value metrics”

State of the Art Report on Forecasting Duration Methods

Earned Schedule provide schedule metrics which behave correctly during the whole project life

Earned Schedule forecasting is more reliable, and useful to sanity check schedule expectations
ES Research

Academical Research:

Funded by PMI Belgium & FWO, Vlaanderen

Vanhoucke M., Vandevoorde St.,
Journal of the Operational Research Society, October 2007
“A simulation and evaluation of earned value metrics to forecast the project duration”

IPMA Research Award 22nd World Congress Rome

Earned Schedule is the better performer for forecasting
ES Research

Accuracy along the completion stage (beginning, middle or late)

- All forecasting methods have a relatively low accuracy at the project start. So what?
- The earned schedule method outperforms the other methods from the beginning of the project.
- All other methods make the quirky mistake from the 50% to 60% percentage completed.
ES Research

The network structure has a clear influence on the forecast accuracy.

- Early project
- Late project

- SP low (parallel networks)
  - Low accuracy

- SP high (serial networks)
  - High accuracy

Graphs showing the transition from a parallel to a serial network for early and late projects.
Information

A Belgian Research Effort

Book coming out soon
EV/ES software package
www.protrack.be
ES Website Activity

Free Info, downloads, templates: www.earnedschedule.com
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