NAVAIR TSP[SM] Experiences Using the Excel Workbook and Team Dashboard

Prepared For:
Systems Software Technology Conference (SSTC)
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Prepared By:
Bradley Hodgins
NAVAIR Systems Software Support Center (NSSC)

Presentation Objectives

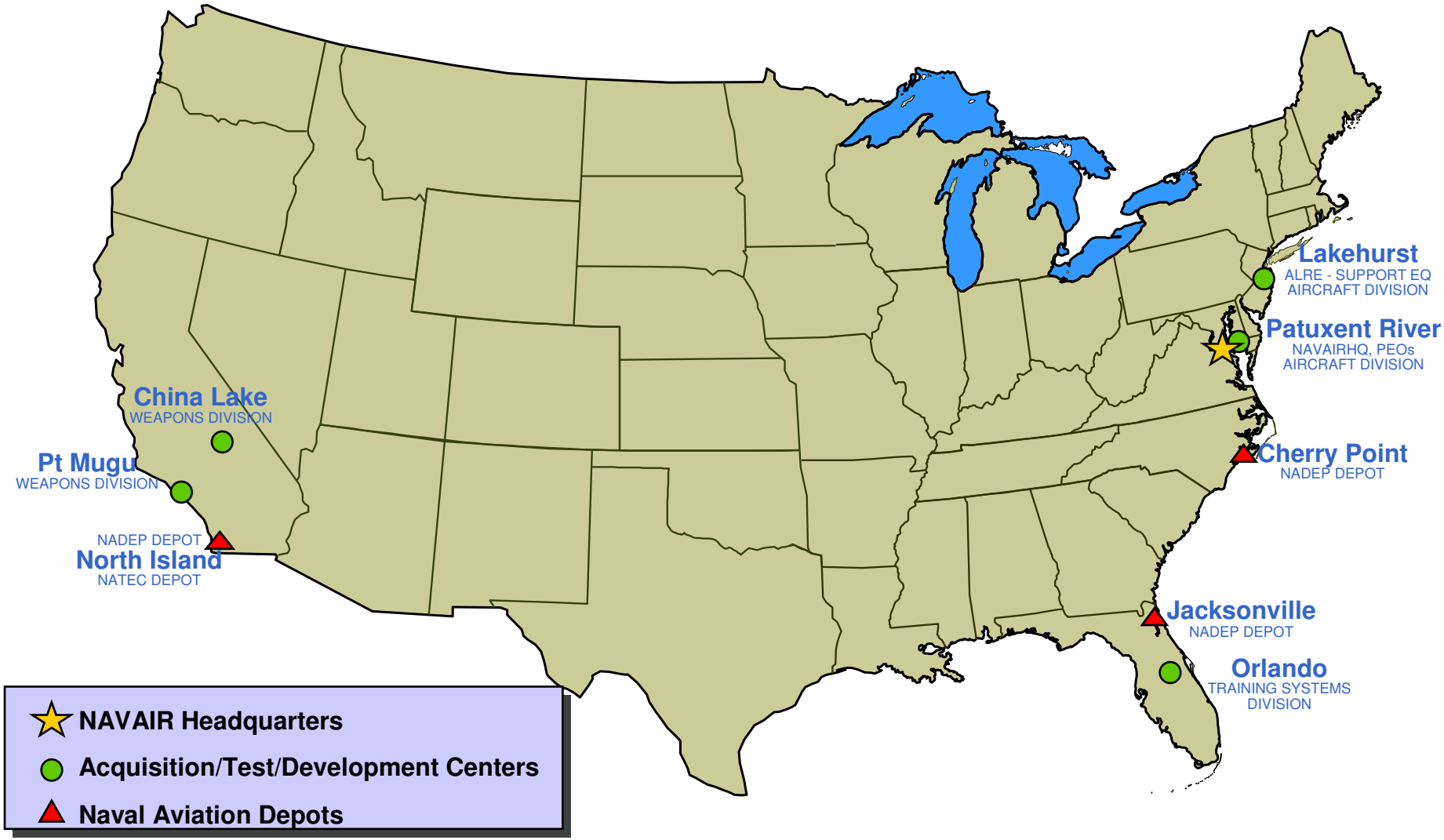
- Background
  - NAVAIR
  - Personal Software Process (PSP) and Team Software Process (TSP)[1]
  - TSP Workbook and Process Dashboard tools
- Strengths and Weaknesses of Tools
  - Planning Phase (TSP Launches)
  - Plan Execution Phase (Daily Use)
  - Analysis of Plan Execution (Postmortems)

[1]Personal Software Process, PSP, Team Software Process, and TSP are service marks of Carnegie Mellon University

Who is NAVAIR?

- NAVAIR is the Naval Air Systems Command.
- We develop, acquire, and support the aircraft and related weapons systems used by the U. S. Navy and Marine Corps.
- We translate the needs of the Navy and Marine Corps into the technical and financial requirements needed by industry to actually produce an aircraft or other weapon system.
- Our goal is to provide the fleet with quality products that are both affordable and available when they are most needed.
- Our support extends across the entire life span of a product, including all upgrades and modifications to that product.

Who is NAVAIR?



What is PSP/TSP?

- PSP shows software professionals how to
  - plan and track their personal work
  - define processes that best suit them
  - measure and manage cost, schedule, and quality
- TSP shows teams of PSP-trained professionals how to
  - establish realistic commitments
  - keep management informed
  - deliver quality products
  - minimize project cost and schedule

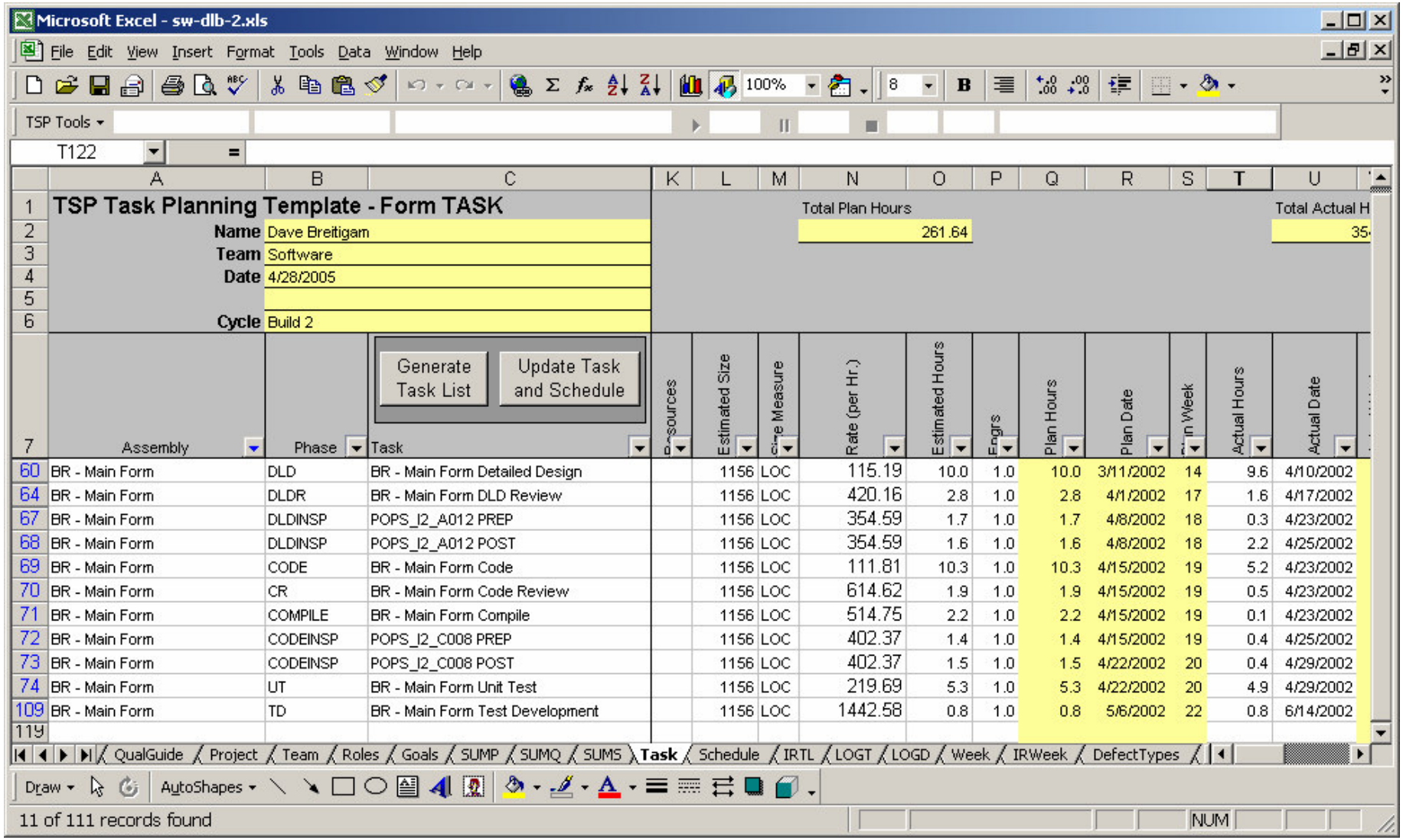
PSP/TSP Benefits

- PSP/TSP quickly improves the performance of software groups.
- Planning and tracking is accurate, timely, and precise.
- Product quality is managed and measured from the beginning of the job.
- By finding and fixing problems before test, project cycle time is substantially reduced.

What is TSP Workbook?

- Created by Software Engineering Institute (SEI) at Carnegie Mellon University
  - Automates implementation of TSP/PSP concepts
  - Enables software engineers to focus on work
  - Uses Microsoft Excel and Visual Basic macros

TSP Workbook – S/W Task List



Microsoft Excel - sw-dlb-2.xls

File Edit View Insert Format Tools Data Window Help

TSP Tools

T122 =

TSP Task Planning Template - Form TASK

Name: Dave Breitigam
Team: Software
Date: 4/28/2005
Cycle: Build 2

Total Plan Hours: 261.64
Total Actual H: 35

Generate Task List | Update Task and Schedule

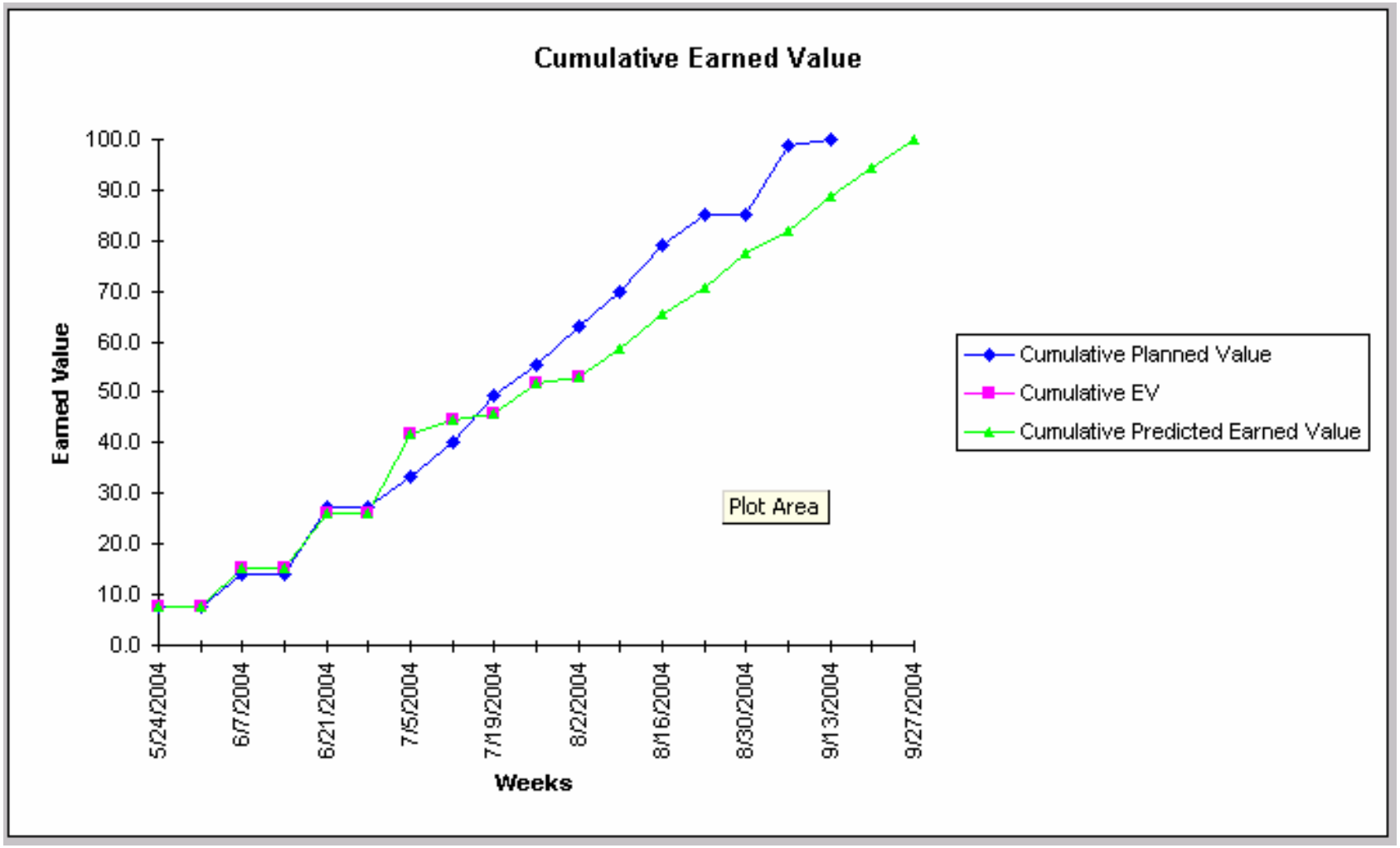
	Assembly	Phase	Task	Resources	Estimated Size	Size Measure	Rate (per Hr.)	Estimated Hours	Engrs	Plan Hours	Plan Date	Plan Week	Actual Hours	Actual Date
60	BR - Main Form	DLD	BR - Main Form Detailed Design		1156	LOC	115.19	10.0	1.0	10.0	3/11/2002	14	9.6	4/10/2002
64	BR - Main Form	DLDR	BR - Main Form DLD Review		1156	LOC	420.16	2.8	1.0	2.8	4/1/2002	17	1.6	4/17/2002
67	BR - Main Form	DLDINSP	POPS_I2_A012 PREP		1156	LOC	354.59	1.7	1.0	1.7	4/8/2002	18	0.3	4/23/2002
68	BR - Main Form	DLDINSP	POPS_I2_A012 POST		1156	LOC	354.59	1.6	1.0	1.6	4/8/2002	18	2.2	4/25/2002
69	BR - Main Form	CODE	BR - Main Form Code		1156	LOC	111.81	10.3	1.0	10.3	4/15/2002	19	5.2	4/23/2002
70	BR - Main Form	CR	BR - Main Form Code Review		1156	LOC	614.62	1.9	1.0	1.9	4/15/2002	19	0.5	4/23/2002
71	BR - Main Form	COMPILE	BR - Main Form Compile		1156	LOC	514.75	2.2	1.0	2.2	4/15/2002	19	0.1	4/23/2002
72	BR - Main Form	CODEINSP	POPS_I2_C008 PREP		1156	LOC	402.37	1.4	1.0	1.4	4/15/2002	19	0.4	4/25/2002
73	BR - Main Form	CODEINSP	POPS_I2_C008 POST		1156	LOC	402.37	1.5	1.0	1.5	4/22/2002	20	0.4	4/29/2002
74	BR - Main Form	UT	BR - Main Form Unit Test		1156	LOC	219.69	5.3	1.0	5.3	4/22/2002	20	4.9	4/29/2002
109	BR - Main Form	TD	BR - Main Form Test Development		1156	LOC	1442.58	0.8	1.0	0.8	5/6/2002	22	0.8	6/14/2002

QualGuide | Project | Team | Roles | Goals | SUMP | SUMQ | SUMS | Task | Schedule | IRTL | LOGT | LOGD | Week | IRWeek | DefectTypes

Draw AutoShapes

11 of 111 records found NUM

TSP Workbook – EV Chart



What is Team Dashboard?

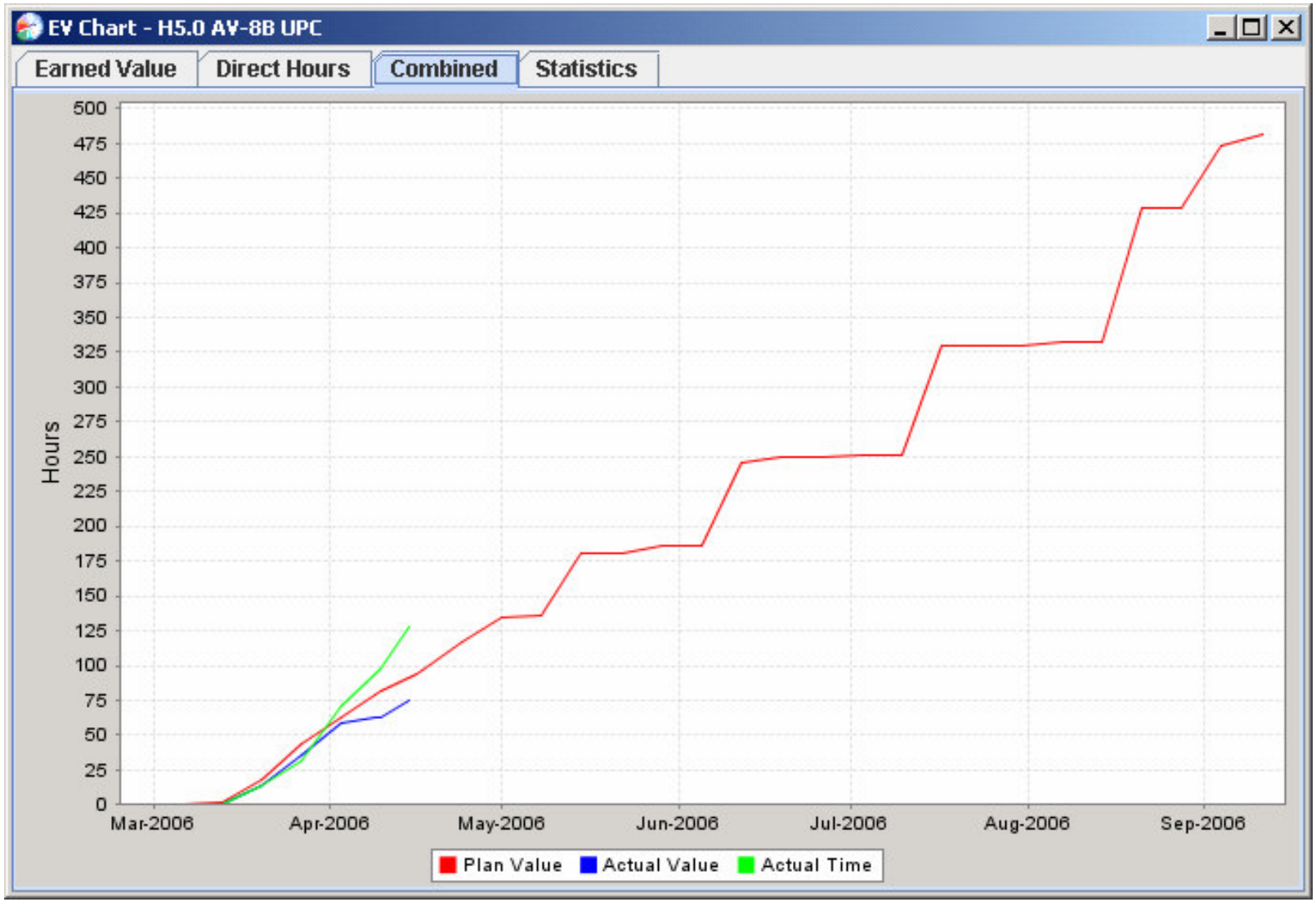
- Created by the Air Force Software Technology Support Center (STSC)
  - Automates implementation of TSP/PSP concepts
  - Enables software engineers to focus on work
  - Uses Java scripts
  - Filled need for a PSP/TSP tool for use on Unix-based computers (tool also works on Windows-based computers)

Team Dashboard – S/W Task List

Task and Schedule Rollup

Project/Task	PT	Time	PV	Plan Date	Date	%C	%S	EV
Move-Add Buttons	23:10	19:39	4.8%	Apr 9, 2006		94%	85%	4.5%
HLD Task	0:22	0:32	0.1%	Mar 19, 2006	Mar 17, 2006	100%	143%	0.1%
HLD Inspect Task	0:07	0:15	0%	Mar 26, 2006	Mar 22, 2006	100%	208%	0%
PSP	18:00	14:45	3.7%	Apr 9, 2006	Apr 5, 2006	100%	82%	3.7%
Planning	0:47	1:14	0.2%	Mar 19, 2006	Mar 17, 2006	100%	156%	0.2%
Design	5:00	2:18	1%	Mar 26, 2006	Mar 20, 2006	100%	46%	1%
Design Review	1:23	0:13	0.3%	Mar 26, 2006	Mar 20, 2006	100%	16%	0.3%
Code	4:16	2:39	0.9%	Mar 26, 2006	Mar 21, 2006	100%	62%	0.9%
Code Review	1:31	0:03	0.3%	Mar 26, 2006	Mar 21, 2006	100%	3%	0.3%
Compile	0:17	1:29	0.1%	Mar 26, 2006	Mar 22, 2006	100%	516%	0.1%
Test	3:58	5:15	0.8%	Mar 26, 2006	Mar 23, 2006	100%	132%	0.8%
Postmortem	0:47	1:34	0.2%	Apr 9, 2006	Apr 5, 2006	100%	198%	0.2%
Test Plan	0:06	0:01	0%	Mar 26, 2006	Mar 20, 2006	100%	15%	0%
Design Inspect Task	0:56	0:21	0.2%	Mar 26, 2006	Mar 22, 2006	100%	37%	0.2%
Test Devel Task	0:19	0:05	0.1%	Mar 26, 2006	Mar 20, 2006	100%	27%	0.1%
Code Inspect Task	1:52	3:40	0.4%	Apr 9, 2006	Apr 4, 2006	100%	197%	0.4%
Int Test Task	1:28	0:00	0.3%	Apr 9, 2006				

Team Dashboard – EV Chart



What is a TSP Launch?

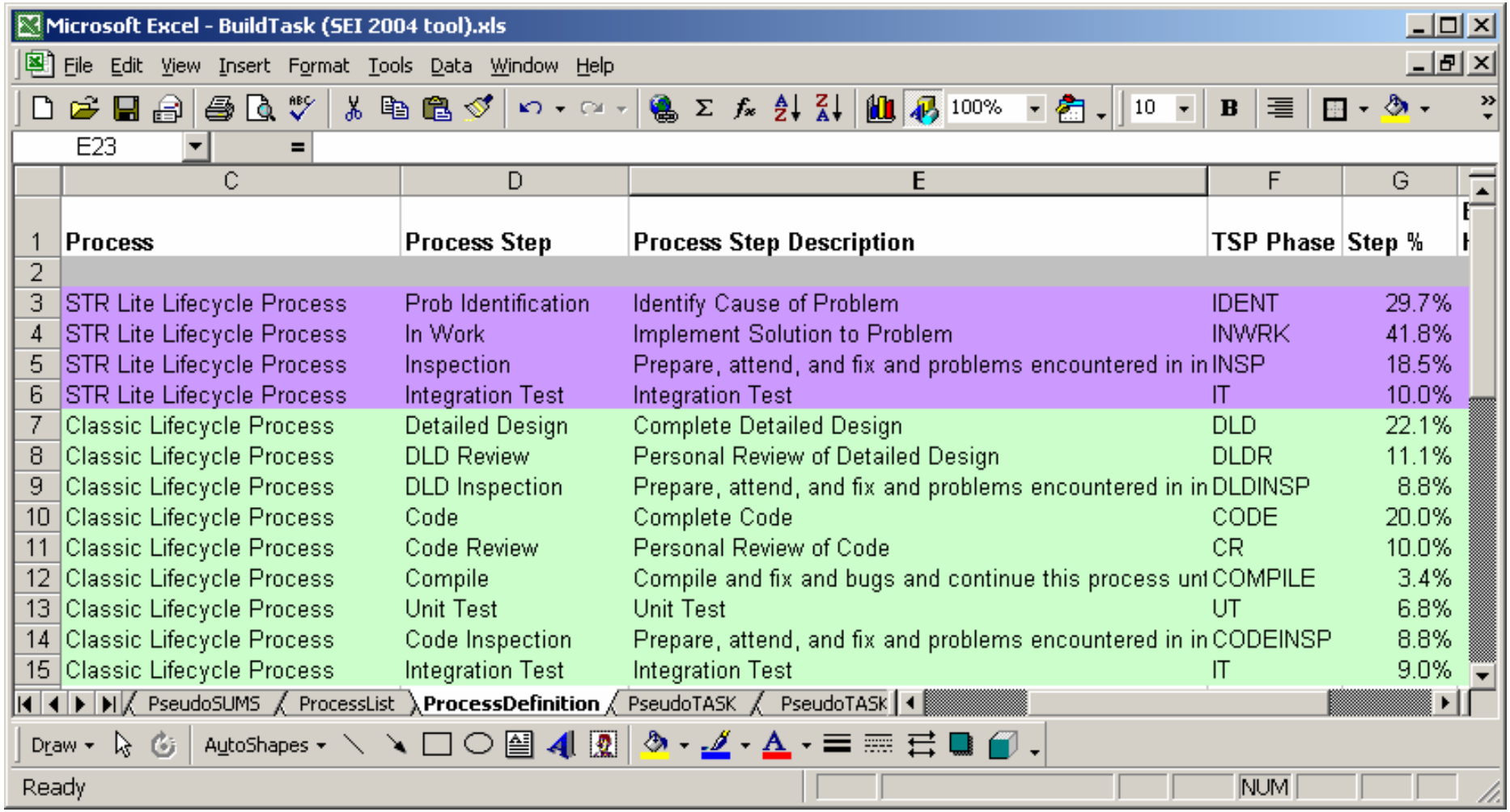
Tools used for these steps

Meeting 1	Review Management goals.
Meeting 2	Set S/W Team goals.
Meeting 3	Produce development strategy and process.
Meeting 4	Produce top-down plan.
Meeting 5	Review quality plan.
Meeting 6	Produce bottom-up plan (detailed individual plans).
Meeting 7	Perform risk assessment.

TSP Launches – TSP Workbook

- Strengths
  - Top-down plan is easy to enter real-time
  - Quality Plan is generated automatically
  - Non-software development efforts are supported
  - User tool training is reduced (COTS-based)
- Weaknesses
  - Balancing workloads is time-consuming (at times)
  - Implementing personal rates is error-prone
  - Producing bottom-up plan requires all team members to use tool

TSP Workbook – Lifecycle Processes[1]



Microsoft Excel - BuildTask (SEI 2004 tool).xls

File Edit View Insert Format Tools Data Window Help

E23 =

	C	D	E	F	G
1	**Process**	**Process Step**	**Process Step Description**	**TSP Phase**	**Step %**
2					
3	STR Lite Lifecycle Process	Prob Identification	Identify Cause of Problem	IDENT	29.7%
4	STR Lite Lifecycle Process	In Work	Implement Solution to Problem	INWRK	41.8%
5	STR Lite Lifecycle Process	Inspection	Prepare, attend, and fix and problems encountered in in	INSP	18.5%
6	STR Lite Lifecycle Process	Integration Test	Integration Test	IT	10.0%
7	Classic Lifecycle Process	Detailed Design	Complete Detailed Design	DLD	22.1%
8	Classic Lifecycle Process	DLD Review	Personal Review of Detailed Design	DLDR	11.1%
9	Classic Lifecycle Process	DLD Inspection	Prepare, attend, and fix and problems encountered in in	DLDINSP	8.8%
10	Classic Lifecycle Process	Code	Complete Code	CODE	20.0%
11	Classic Lifecycle Process	Code Review	Personal Review of Code	CR	10.0%
12	Classic Lifecycle Process	Compile	Compile and fix and bugs and continue this process unt	COMPILE	3.4%
13	Classic Lifecycle Process	Unit Test	Unit Test	UT	6.8%
14	Classic Lifecycle Process	Code Inspection	Prepare, attend, and fix and problems encountered in in	CODEINSP	8.8%
15	Classic Lifecycle Process	Integration Test	Integration Test	IT	9.0%

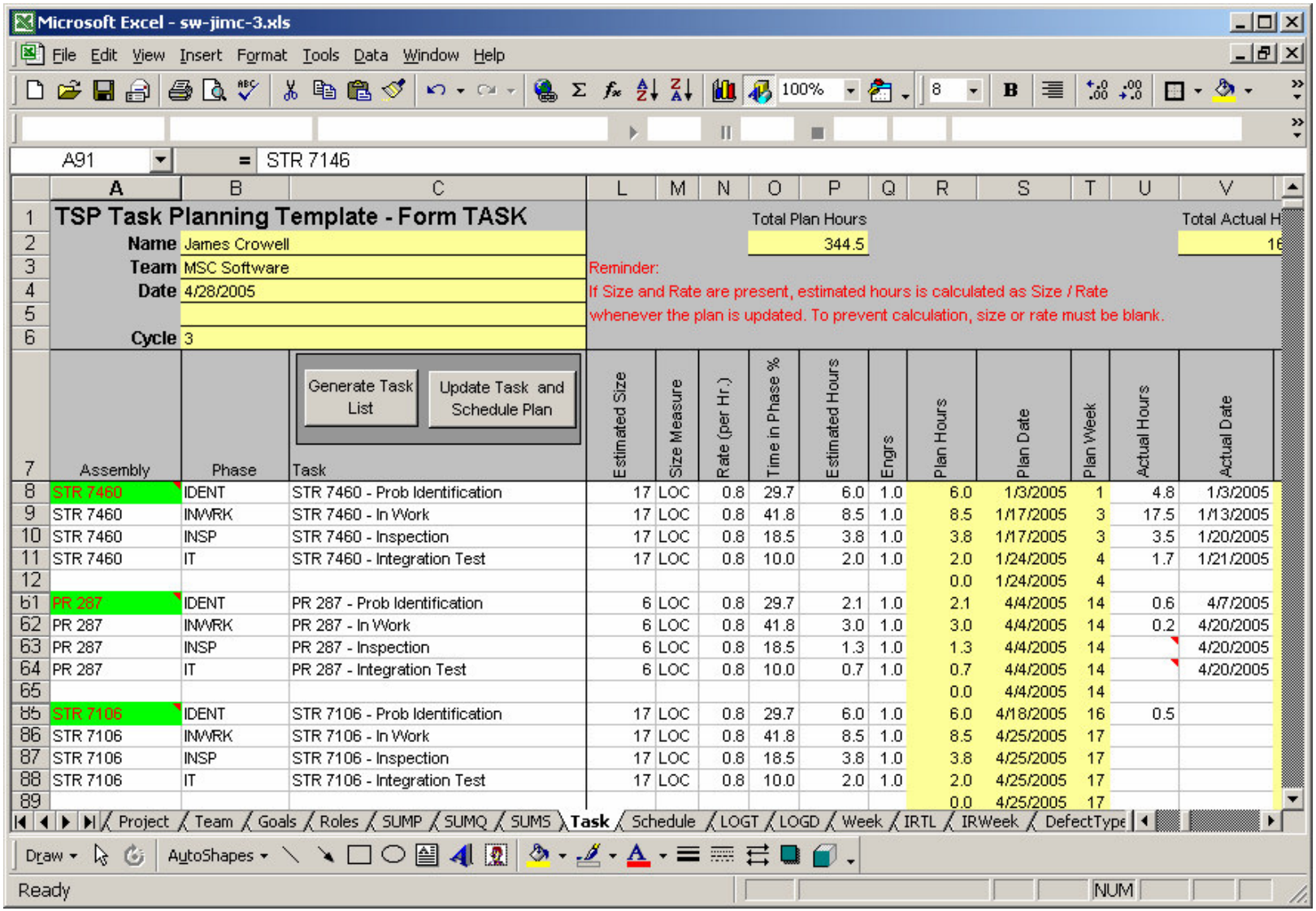
PseudoSUMS | ProcessList | **ProcessDefinition** | PseudoTASK | PseudoTASK

Draw AutoShapes

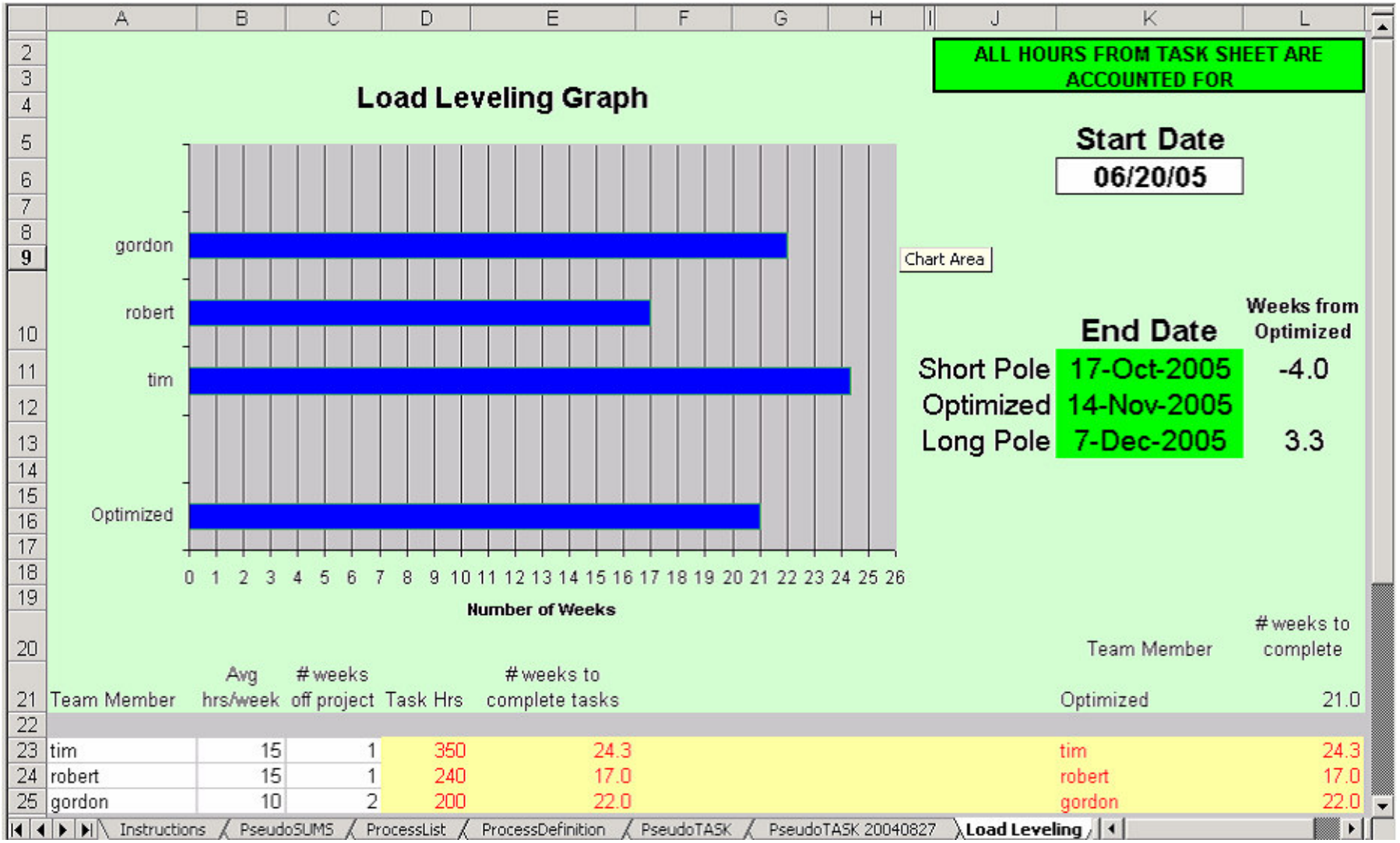
Ready NUM

1 - **Launch Assistant** tool provided by **Advanced information Services** (**AIS**)

TSP Workbook – Non-S/W Task List



TSP Workbook – Load Leveling



Team Member	Avg hrs/week	# weeks off project	Task Hrs	# weeks to complete tasks
tim	15	1	350	24.3
robert	15	1	240	17.0
gordon	10	2	200	22.0

TSP Workbook – Load Leveling

C	K	L	M	N	O	P	Q	R	S	T
emplate - Form TASK					Tota	an Hou				
Draft a Design Standard for the team	aa					5.0	1.0	5.0	[illegible]3/2004	2
Team Review and comment on standard	team					2.0	3.0	6.0	8/[illegible]	[illegible]
Improve standard based on comments	aa					2.0	1.0	2.0	8/23/200[illegible]	
Issue the standard to the team	aa					0.5	1.0	0.5	8/[illegible]	
Core Requirements REQINSP - inspection	aa, cc	55	pgs	2.0		27.5	3.0	82.5	9/[illegible]	
Core Requirements REQINSP - meeting	bb, aa, cc					1.0		0.0	9/[illegible]	
"A" Requirements REQ - write requirements	aa	45	pgs	0.5		90.0	1.0	90.0	9/[illegible]	
"A" Requirements REQINSP - meeting	aa, bb, dd					1.0		0.0	10[illegible]	
"A" Requirements REQINSP - resolve issues	aa					5.0	1.0	5.0	10[illegible]	
Core SW DLDINSP - Inspection	aa, bb	500	LOC	200.0		2.5	3.0	7.5	11/8/2004	13
Core SW DLDINSP - Inspection Meeting	cc, aa, bb					1.0	3.0	3.0	11/8/2004	13
Core SW CODEINSP - Inspection	aa, bb	500	LOC	200.0		2.5	3.0	7.5	11/[illegible]	
Core SW CODEINSP- Inspection Meeting	cc, aa, bb					1.0	3.0	3.0	11[illegible]	
"A" SW DLD	aa	1000	LOC	15.0	30.0	20.0	1.0	20.0	11/[illegible]	
"A" SW DLDR	aa	1000	LOC	15.0	15.0	10.0	1.0	10.0	11/[illegible]	
"A" SW DLDINSP - Inspection Meeting	aa, bb, cc					1.0	3.0	3.0	11/[illegible]	
"A" SW DLDINSP - Resolve Issues	aa					2.0	1.0	2.0	11/[illegible]	
"A" SW CODE	aa	1000	LOC	15.0	30.0	20.0	1.0	20.0	11/15/2[illegible]	
"A" SW CR	aa	1000	LOC	15.0	10.0	6.7	1.0	6.7	11/15/2004	
"A" SW CODEINSP- Inspection Meeting	aa, bb, cc					1.0	3.0	3.0	12/6/2004	
"A" SW CODEINSP - Resolve Issues	aa					2.0	1.0	2.0	12/6/2004	
"A" SW COMPILE	aa	1000	LOC	15.0	3.0	2.0	1.0	2.0	12/6/2004	
"A" SW UT	aa	1000	LOC	15.0	12.0	8.0	1.0	8.0	12/6/2004	

QualGuide | Project | Team | Goals | Roles | SUMP | SUMQ | SUMS | Task | Schedule | LOGT | LOGD | Week | IRTL | IRWeek | DefectTypes | QPr[illegible]am

Sum=213.7

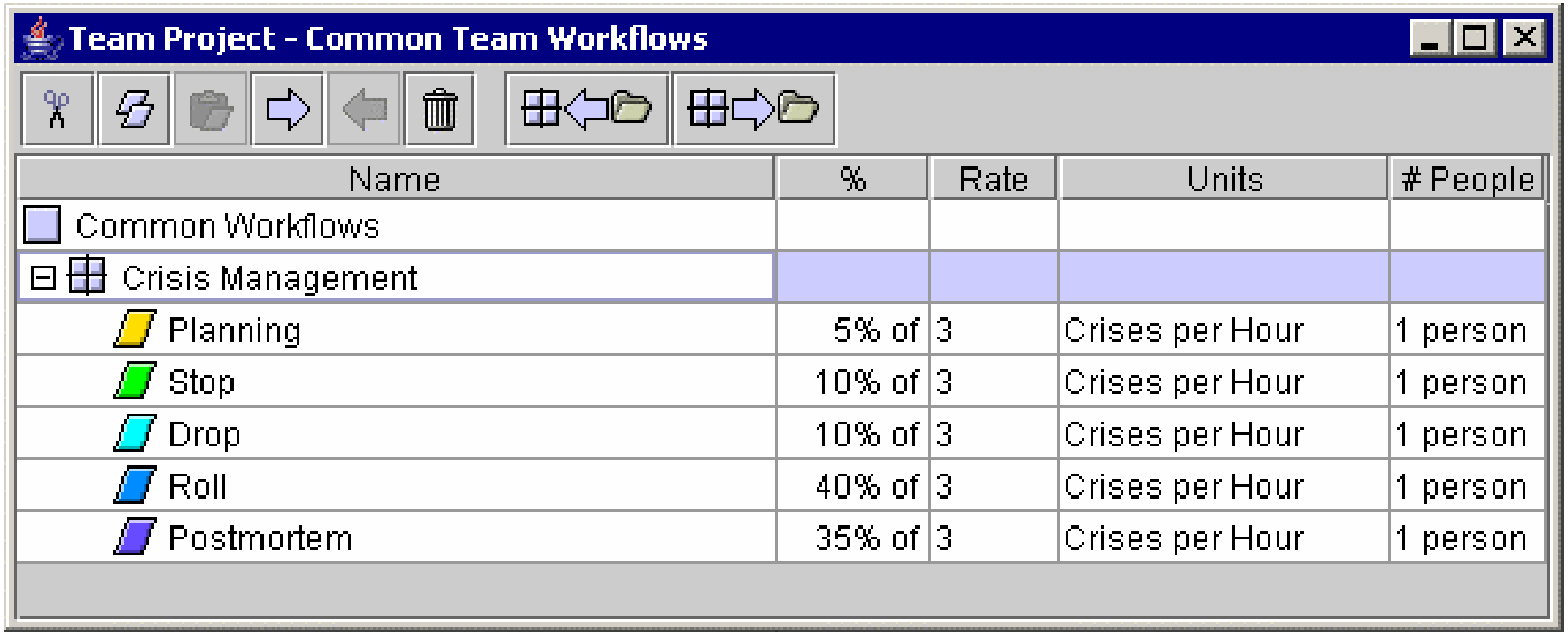
Click on the "P" (Plan Hours) Column, and the entire column will be selected.

EXCEL will display the "SUM", the total effort hours, planned for aa.

TSP Launches – Team Dashboard

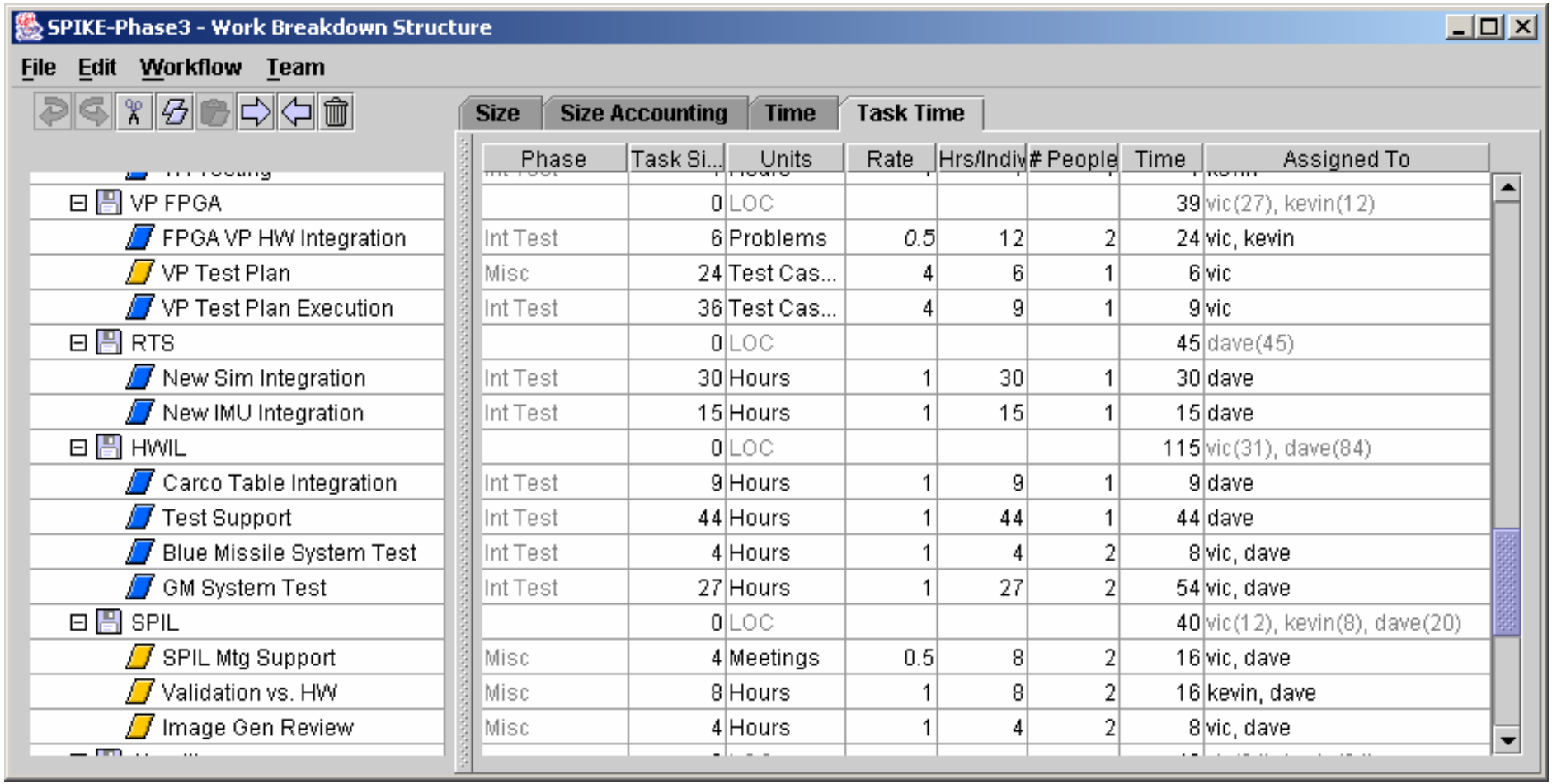
- Strengths
  - Top-down plan is easy to enter real-time
  - Quality Plan is generated automatically
  - Non-software development efforts are supported
  - Balancing team workloads is quick & easy
  - Tool familiarity is not required
- Weaknesses
  - Some tool workarounds require explanation

Team Dashboard – Non-S/W Workflow



Name	%	Rate	Units	# People
Common Workflows				
Crisis Management				
Planning	5% of	3	Crises per Hour	1 person
Stop	10% of	3	Crises per Hour	1 person
Drop	10% of	3	Crises per Hour	1 person
Roll	40% of	3	Crises per Hour	1 person
Postmortem	35% of	3	Crises per Hour	1 person

Team Dashboard – Non-S/W Task List



Phase	Task Si...	Units	Rate	Hrs/Indiv	# People	Time	Assigned To
	0	LOC				39	vic(27), kevin(12)
Int Test	6	Problems	0.5	12	2	24	vic, kevin
Misc	24	Test Cas...	4	6	1	6	vic
Int Test	36	Test Cas...	4	9	1	9	vic
	0	LOC				45	dave(45)
Int Test	30	Hours	1	30	1	30	dave
Int Test	15	Hours	1	15	1	15	dave
	0	LOC				115	vic(31), dave(84)
Int Test	9	Hours	1	9	1	9	dave
Int Test	44	Hours	1	44	1	44	dave
Int Test	4	Hours	1	4	2	8	vic, dave
Int Test	27	Hours	1	27	2	54	vic, dave
	0	LOC				40	vic(12), kevin(8), dave(20)
Misc	4	Meetings	0.5	8	2	16	vic, dave
Misc	8	Hours	1	8	2	16	kevin, dave
Misc	4	Hours	1	4	2	8	vic, dave

Daily Use – TSP Workbook

- Strengths
  - Logging time and defects is easy
  - Changing order of tasks is easy
  - User ramp-up time is short (COTS-based)
- Weaknesses
  - Additional steps required to build team status
  - No support for PROBE analysis

TSP Workbook – Time and Defect Logs

TSP Time Recording Log - Form LOGT

Name Robert N Lindeman **Date** 5/3/2006
Team MSS Team **Cycle**
Hours 91.6

Assembly	Phase	Task	Date	Start	Int.	Stop	Delta	Comments
UPC AMU RS A	CODE	UPC AMU RS Access DB Create - Data Entry	8/6/2004	11:40:24	0.0	11:40:26	0.0	PB done
UPC AMU RS A	CODE	UPC AMU RS Access DB Create - Data Entry	8/6/2004	11:40:36	0.0	12:00:40	20.1	Net done
UPC AMU RS A	CODE	UPC AMU RS Access DB Create - Data Entry	8/6/2004	12:03:04	0.0	12:06:18	3.2	delete all traces of pilot data file
UPC AMU RS A	CODE	UPC AMU RS Access DB Create - Data Entry	8/6/2004	12:06:32	0.0	12:34:11	27.7	corrected and remove inapplicable personalitie
UPC AMU RS A	CR	UPC AMU RS Access DB Createe - Data Entry	8/6/2004	12:36:11	0.0	12:39:21	3.2	done reveiw of the OC1.2 changes
UPC AMU RS A	CR	UPC AMU RS Access DB Createe - Data Entry	8/6/2004	12:39:38	0.0	12:45:38	6.0	done
UPC AMU RS A	CODEINSP	UPC AMU RS Access DB Create - Data Entry Ir	8/6/2004	12:46:57	0.0	13:09:46	22.8	sent out request to review
UPC AMU RS A	DLDINSP	UPC AMU RS Access DB Create - DLD Inspecti	8/11/2004	10:52:47	0.0	10:52:55	0.1	
UPC AMU RS A	DLDR	UPC AMU RS Access DB Create - DLD Review	8/11/2004	10:53:40	0.0	11:17:56	24.3	will have review sessions for construction an
UPC AMU RS A	DLD							
UPC AMU RS A	COI							
UPC AMU RS A	COI							
UPC AMU RS D	DLD							
UPC AMU RS D	COI							
UPC AMU RS D	COI							

TSP Defect Recording Log - Form LOGD

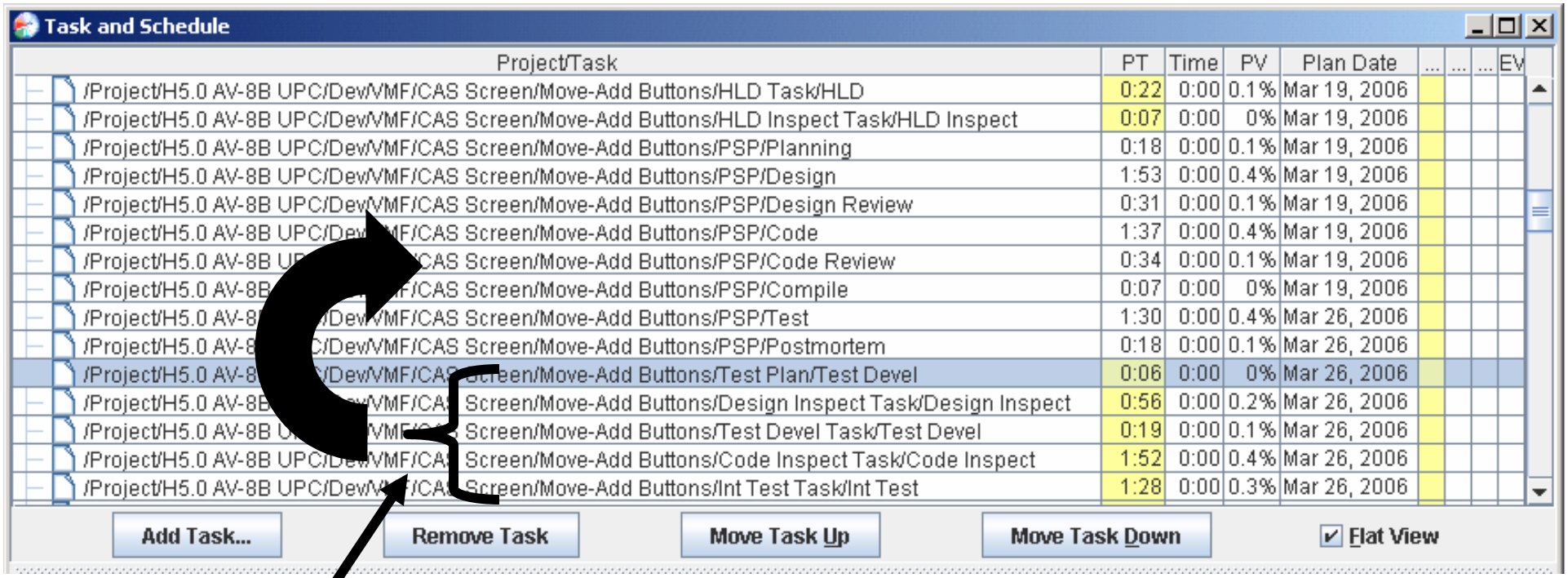
Name Robert N Lindeman **Date** 5/3/2006
Team MSS Team **Cycle**

Date	Num	Type	Assembly	Injected	Removed	Fix Time	Fix Ref.	Description
8/2/2004	9	10	UPC AMU RS DSUUAPI In PVCS	DLD	DLDINSP	10.0		move interp layer to same level as rule server
8/2/2004	10	10	UPC AMU RS DSUUAPI In PVCS	DLD	DLDINSP	10.0		move interface stack and scsi1553 to its own folder
8/2/2004	11	10	UPC AMU RS DSUUAPI In PVCS	DLD	DLDINSP	0.5		clarify words for whats in "the rest"
8/2/2004	12	10	UPC AMU RS DSUUAPI In PVCS	DLD	DLDINSP	0.5		name of doc in review incorrect in review form
8/4/2004	13	40	UPC AMU RS DSUUAPI New Records	DLD	DLD	20.0		wrong msb in access data base for wypt file checksum
8/5/2004	14	10	UPC AMU RS Access DB Create	DLD	CODE	2.0		clarify that OC1.2 db will be modded for H4.0 DSU
8/6/2004	15	70	UPC AMU RS Access DB Create	DLD	CODE	10.0		must remove the 16, 17 and 18 personaliies from AMU DB
8/6/2004	16	70	UPC AMU RS Access DB Create	CODE	CR	0.5		wrong number of words for MX
8/12/2004	17	10	UPC AMU RS DSUUAPI New Records	DLD	DLDINSP	15.0		mod so OC1.2 does not contain any H4.0 items
8/12/2004	18	70	UPC AMU RS Access DB Create	CODE	CODEINSP	60.0		remove references to AMU in H4.0 access data base
8/12/2004	19	70	UPC AMU RS Access DB Create	DLD	DLDR	60.0		pilot data belongs in addition to new files in H4.0 access data bas

Daily Use – Team Dashboard

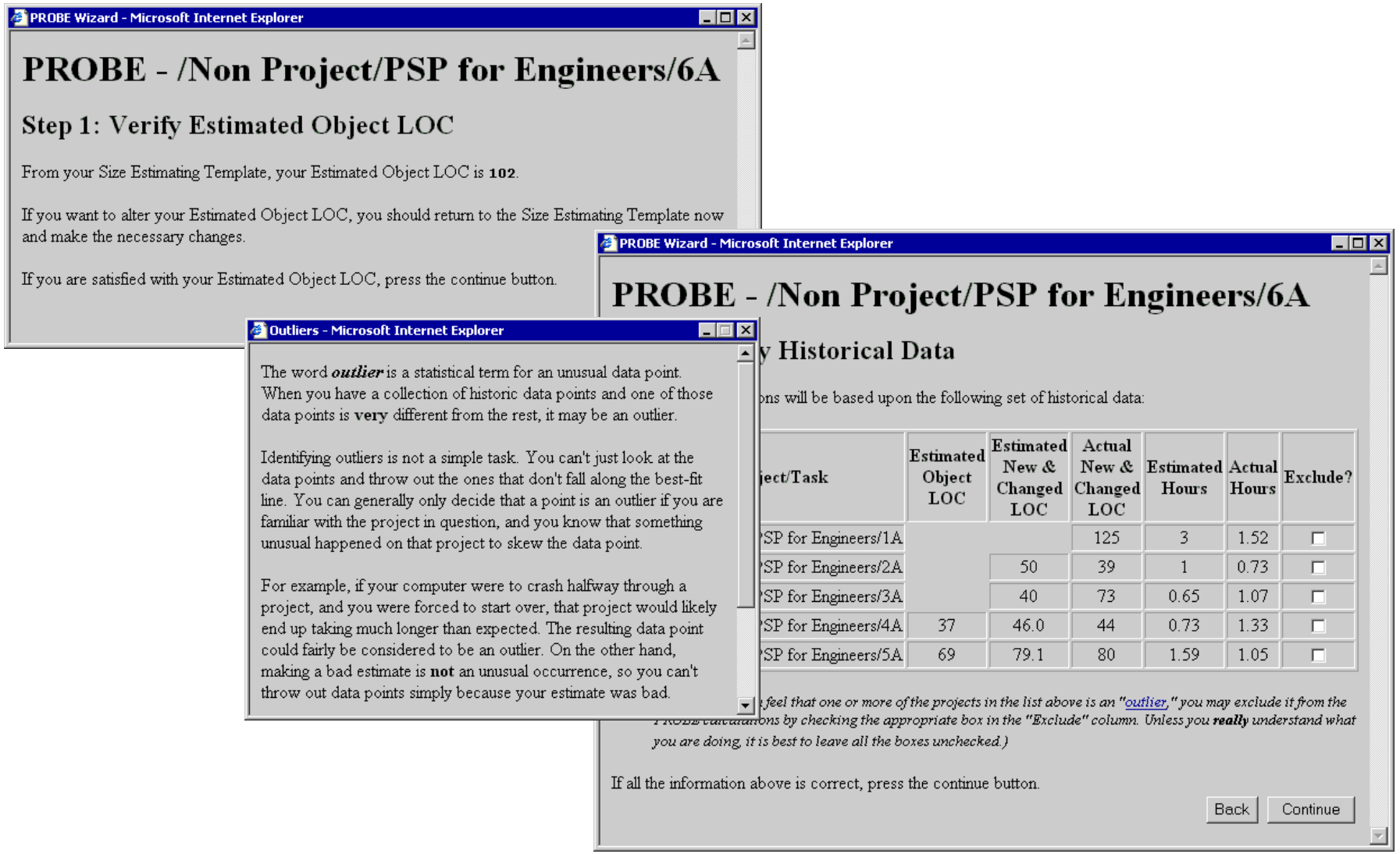
- Strengths
  - Logging time and defects is easy
  - Team status is built automatically
  - PROBE analysis is fully supported
- Weaknesses
  - Tasks must be manually reordered to support TSP
  - Changing order of tasks is awkward (at times)
  - Full training of tool requires time
  - Training materials are still in development

Team Dashboard – Task List

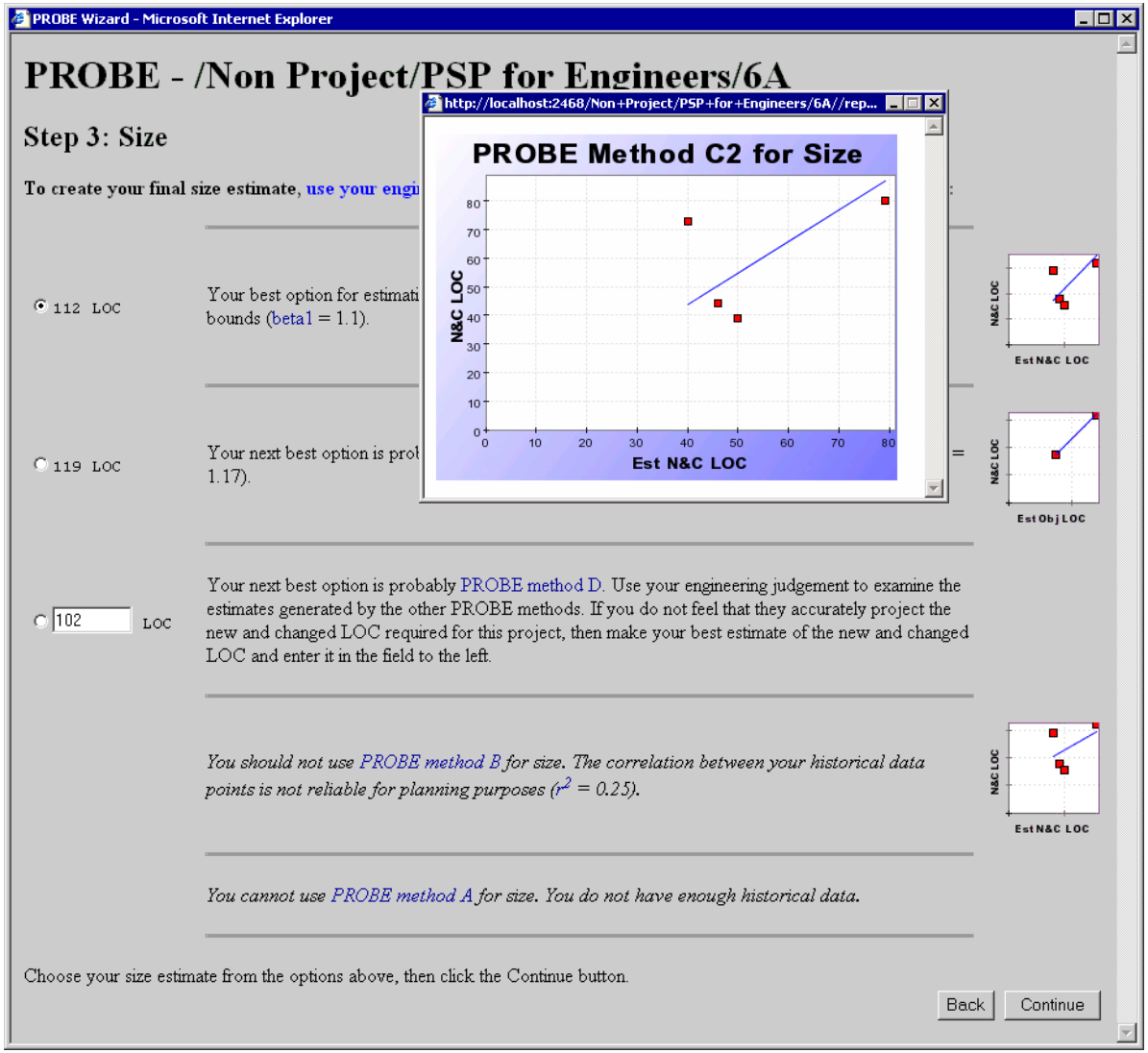


Note that bottom tasks are not in the proper sequential order for TSP development

Team Dashboard – PROBE Support



Team Dashboard – PROBE Support



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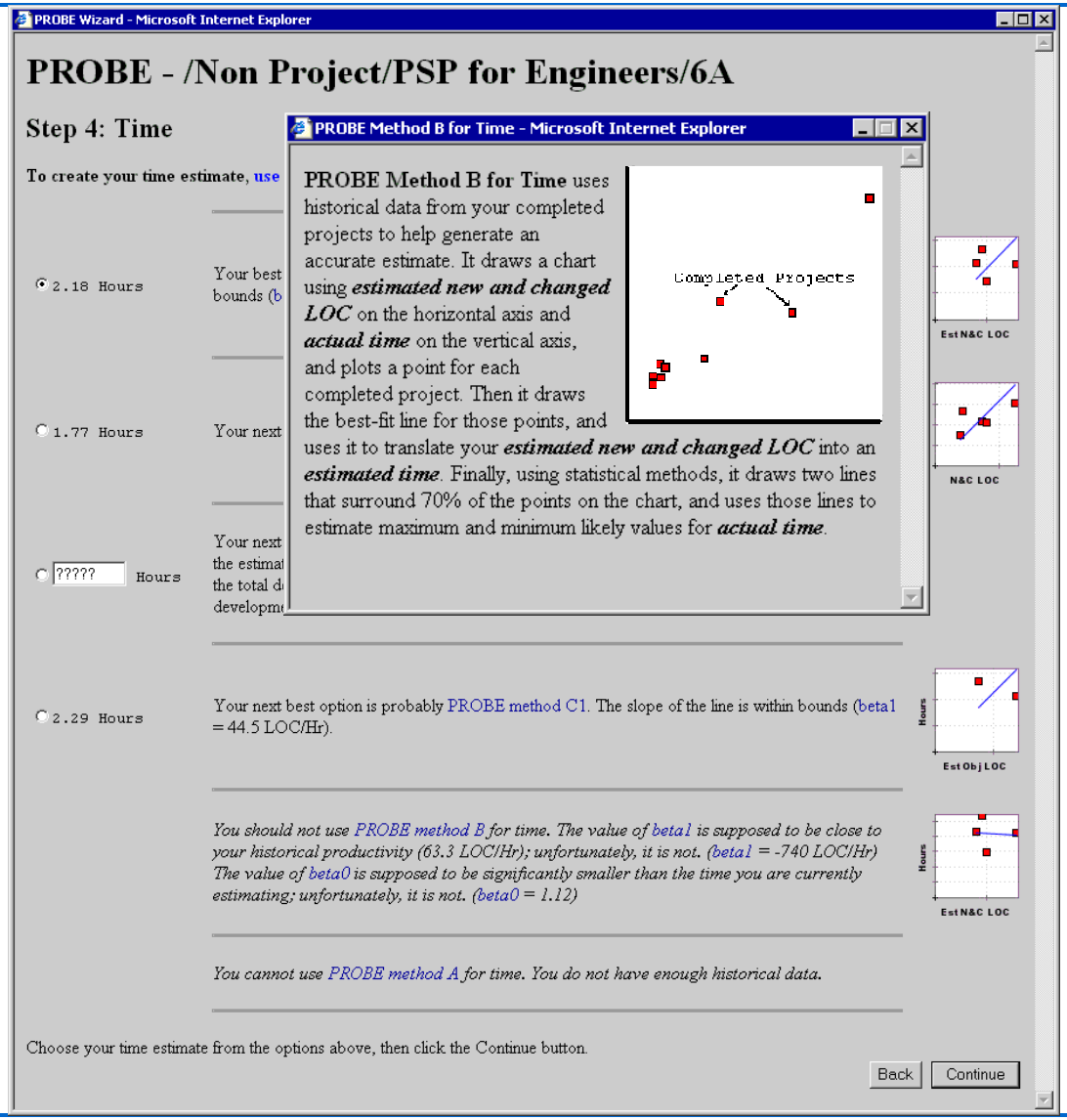
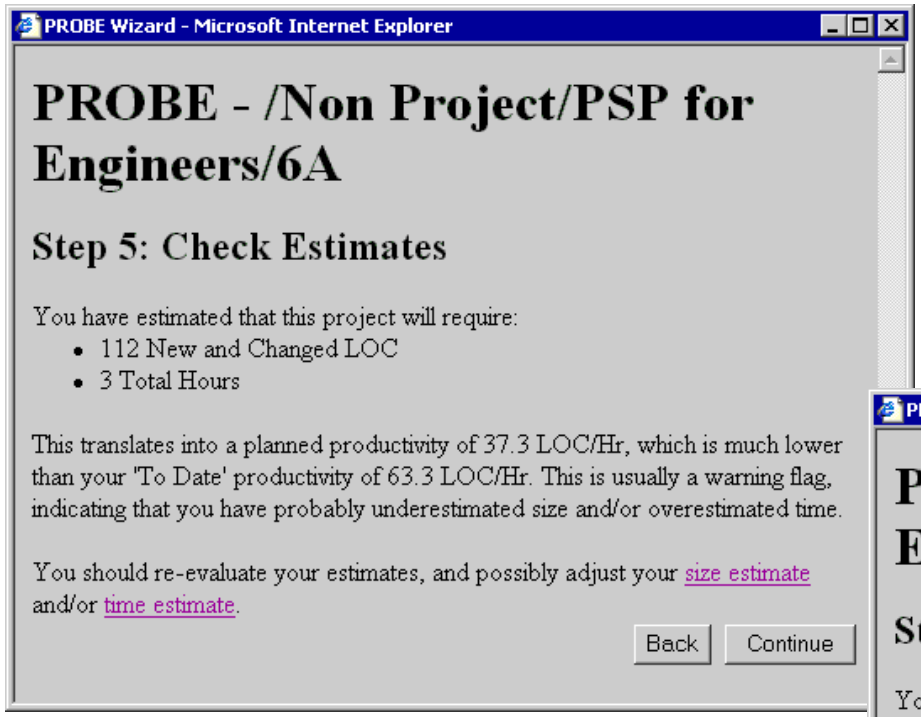
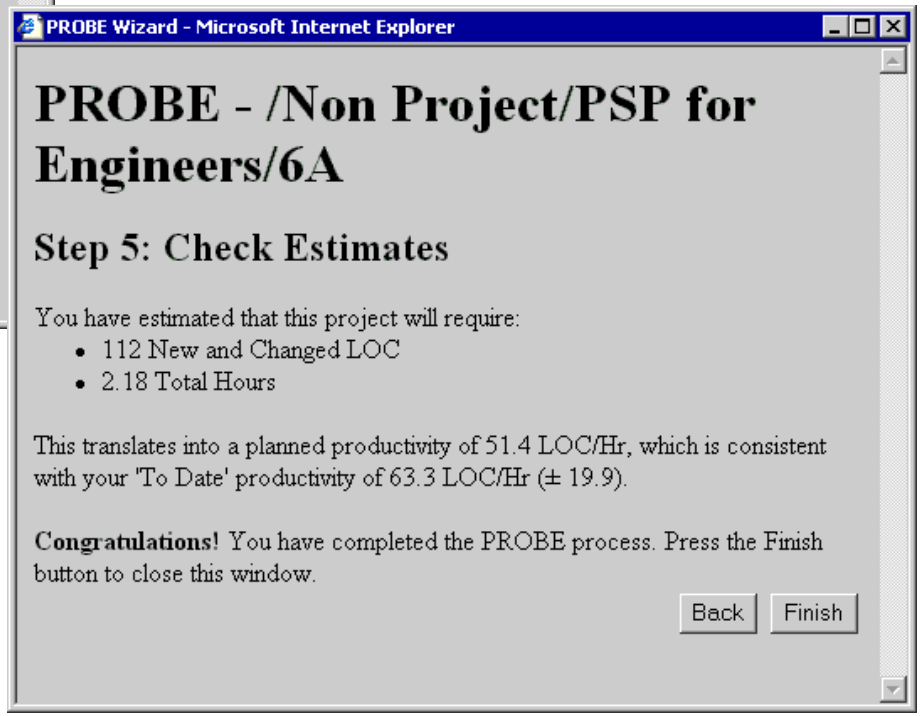


Team Dashboard – PROBE Support



– OR –



Postmortems – TSP Workbook

- Strengths
  - Compiles team defect log automatically
  - Easy to generate charts from data
- Weaknesses
  - None

Postmortems – Team Dashboard

- Strengths
  - Compiles team defect log automatically
  - Data analysis charts provided within tool
  - Easy to export data to Excel (easy to generate charts from data)
- Weaknesses
  - None

Summary Conclusions

- TSP Workbook and Team Dashboard
  - are successful implementations of fundamental PSP/TSP concepts
  - are neither "Silver Bullets" nor perfect implementations of all PSP/TSP concepts
  - can be used to execute a TSP project
- Expect to work with your PSP/TSP tool to determine how your team will use it

Contact Information

- Brad Hodgins
  - phone: (760) 939-0666/4446
  - e-mail: bradley.hodgins@navy.mil

Note: These slides are not on the SSTC 2006 CD. Please email me if you wish additional information.

Abbreviations

- COTS – Commercial Off The Shelf
- NAVAIR – Naval Air Systems Command
- NSSC – NAVAIR Systems Software Support Center
- PROBE – PROxy Based Estimating
- PSP – Personal Software Process
- SEI – Software Engineering Institute
- STSC – Software Technology Support Center (Air Force)
- TSP – Team Software Process