Construx®

Software Development Best Practices

Secrets of World Class Software Organizations

www.construx.com

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Software Development Best Practices

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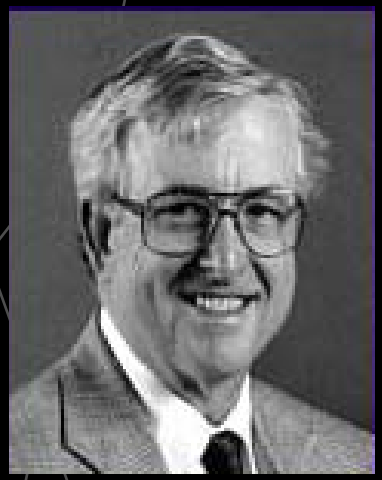
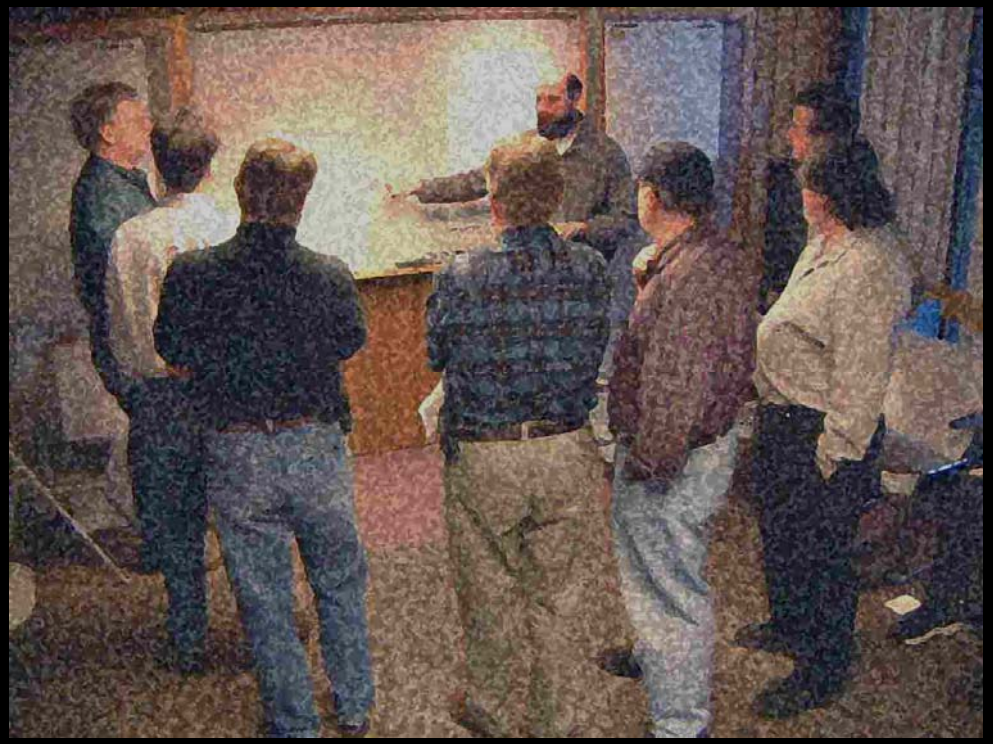
Views of World Class

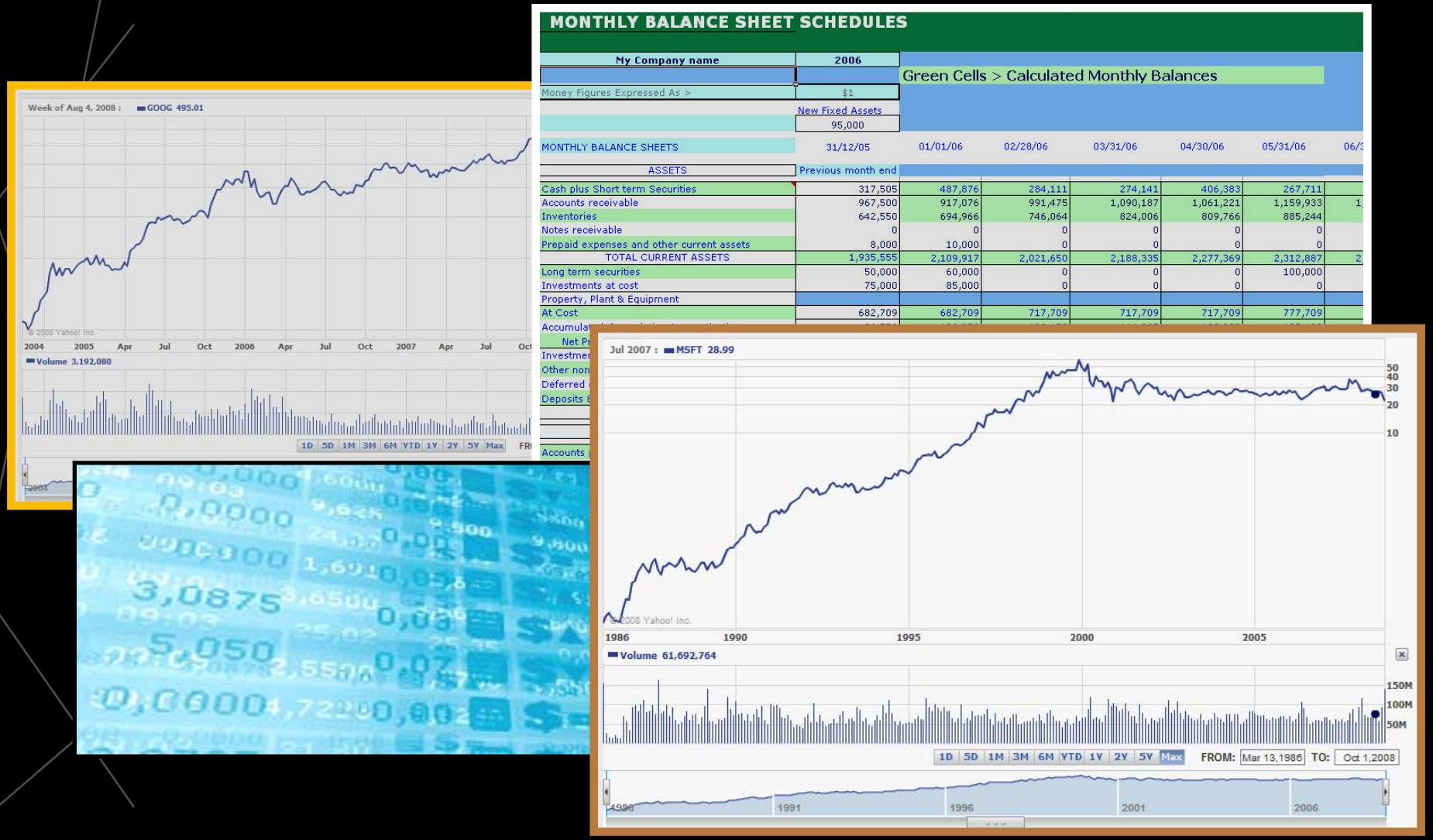




My View of World Class

- Can you have a *world-class* software organization inside a *mediocre* business?
- Can you have a *mediocre* software organization inside a *world-class* business?

My View of “World Class”



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Software Development Success

Providing software that is…

1. On time…
2. On budget…
3. With desired functionality…
4. At the defined quality level…
5. In a sustainable way…

Overlap with 10x …

Some of the most replicated research results in software engineering:

- 10x differences between different developers working on same/similar systems
- 10x differences between different organizations working on similar products

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Background on Selection of World-Class Software Organizations

Background: Construx Activities

- Consulting: Dozens of companies each year
- Training: Hundreds of companies each year
- Events: Executive Summit
- Industry participation
  - IEEE
  - OMG
  - SeaSPIN
  - ECSE
  - Etc.
- Other Research
  - Surveys
  - Discussion/focus groups
  - Forum discussions
  - Reading other people's and companies' research
  - Etc.

Construx Consulting and Training Clients

Aerospace
- Alaska Airlines
- Boeing Company
- FAA
- Northrop Grumman
- Rockwell
- United Space Alliance

Telecommunications
- Motorola
- Nokia
- QUALCOMM
- RIM
- Symbian
- Verizon

Computer Hardware and Manufacturing
- Apple
- ATi Technologies Inc.
- Cisco Systems
- Dell
- Hewlett-Packard
- Intel
- Texas Instruments

Retail
- Amazon
- Costco Wholesale
- Expedia
- Nordstrom
- Starbucks
- Walmart

Software Products and Systems
- Adobe
- EMC
- Intuit
- Microsoft
- RealNetworks
- Symantec

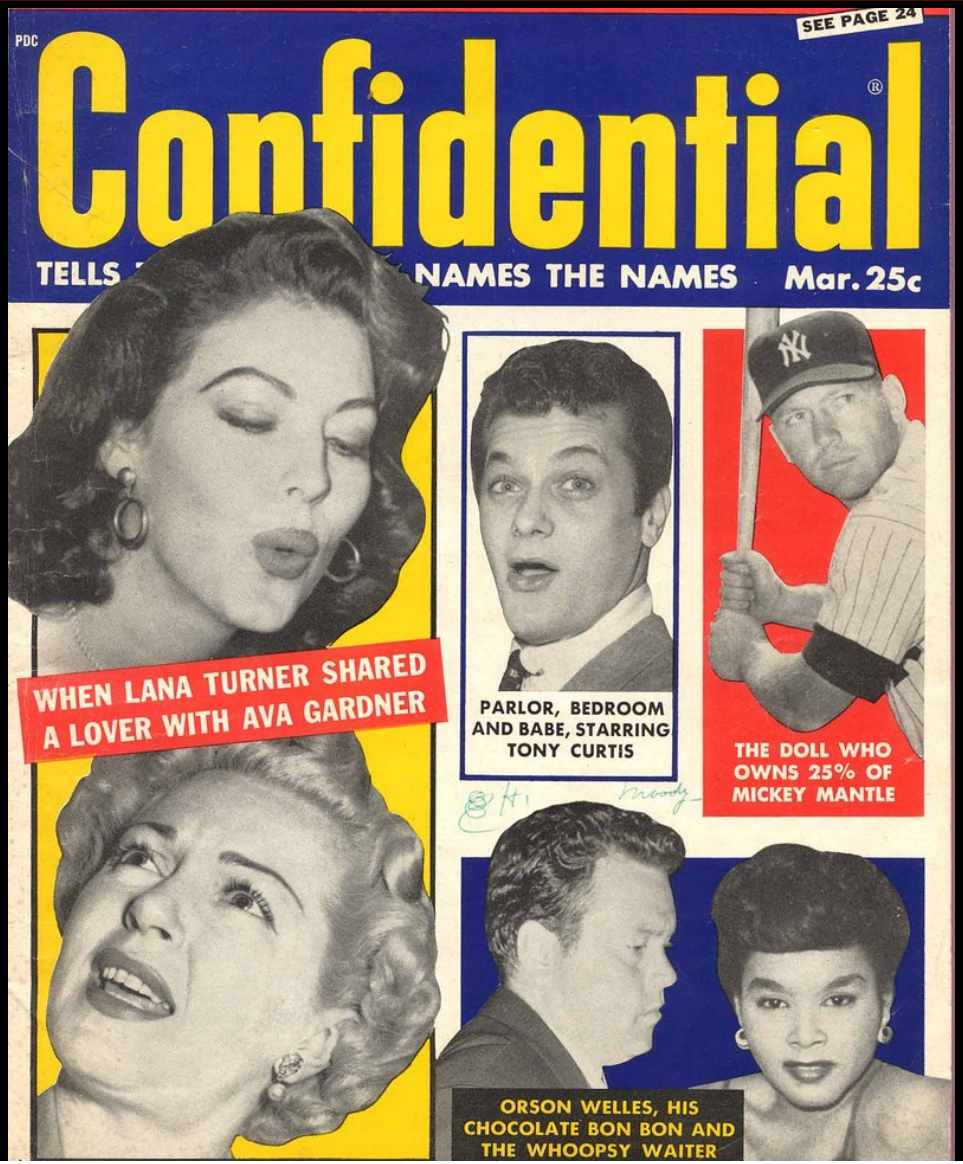
Government
- Lawrence Livermore National Lab
- Los Alamos National Lab
- National Security Agency
- Naval Sea Systems Command
- NOAA

Entertainment and Media
- AOL
- Electronic Arts
- Google
- MSNBC
- Walt Disney Company
- Yahoo

Financial
- Chubb
- Fidelity Investments
- Merrill Lynch
- TIAA-CREF
- Washington Mutual
- Wells Fargo

Healthcare
- Cardinal Health
- Eli Lilly
- IDX
- Philips Ultrasound
- Roche Diagnostics
- Spacelabs Medical

Which Companies Can We Talk About?



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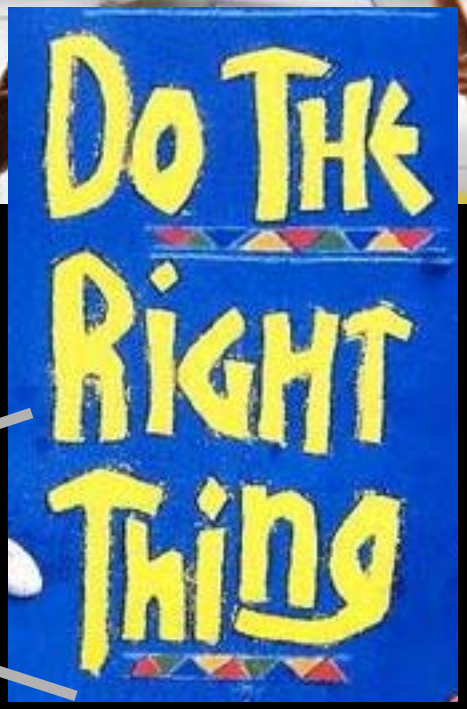
Sample of World-Class Software Organizations

Microsoft® (circa 1990)



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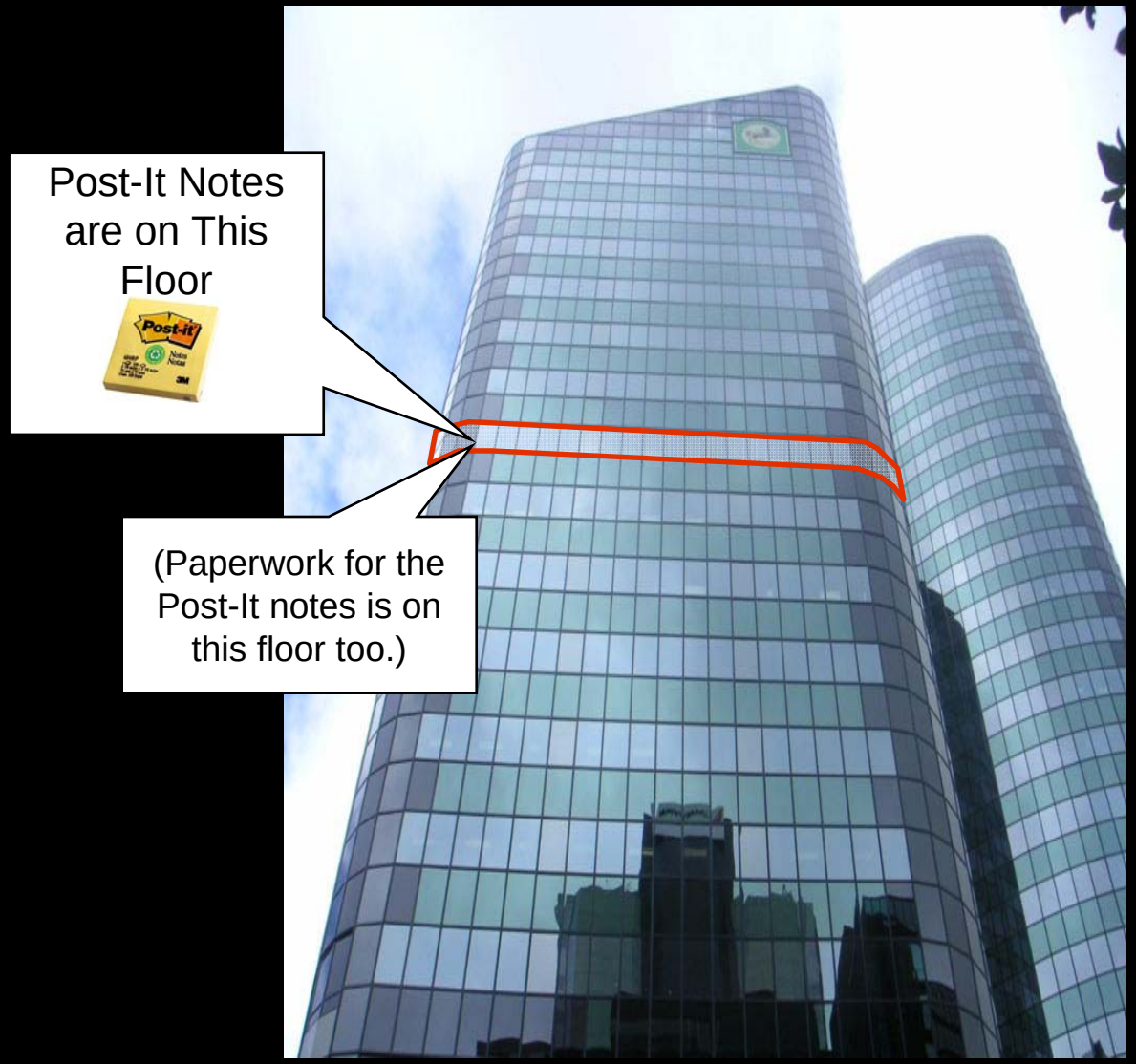
Microsoft® (circa 1990)

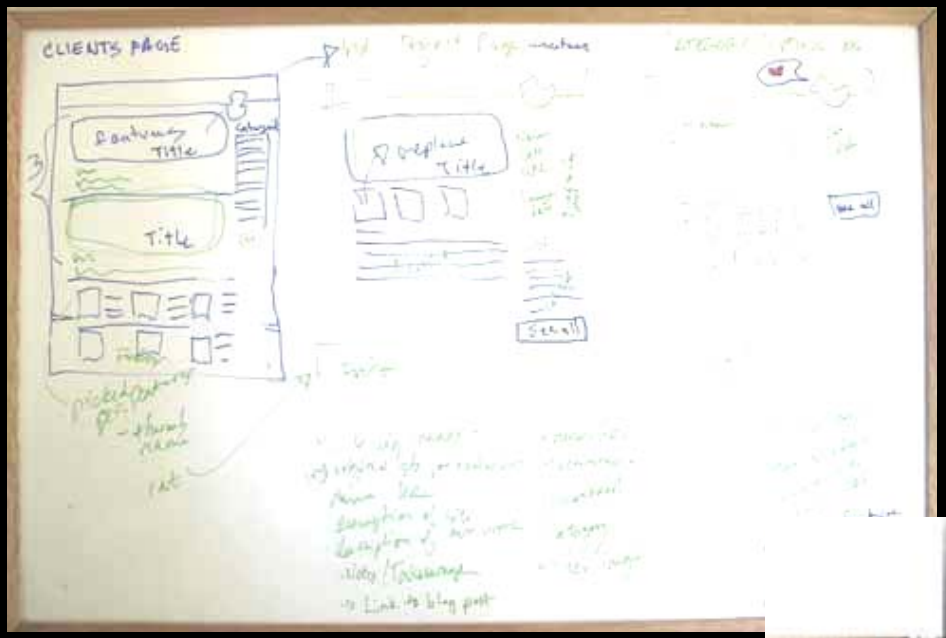
"The goal is NOT to write code. If we could ship products and make all this money without writing any code, we would. Your job is to *ship products EXACTLY on time*. It doesn't matter whether you're a developer, tester, program manager, product manager—whatever. Everybody's job is the same."

—Chris Peters, Excel 3.0

Microsoft (circa 1990), cont.



Microsoft® (circa 1990), cont.



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Microsoft® (circa 1990), cont.

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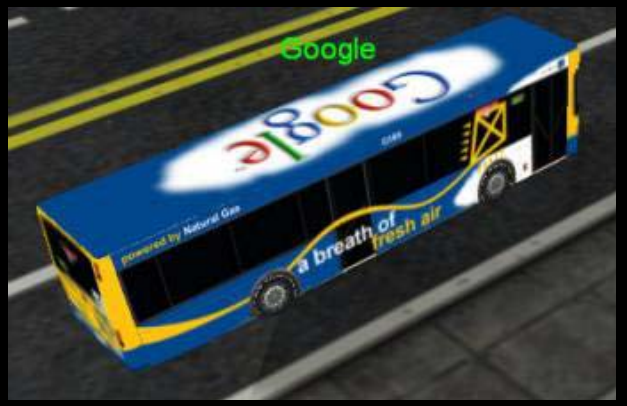
CLASSIC TOUCH CARWASH

ASE CERTIFIED



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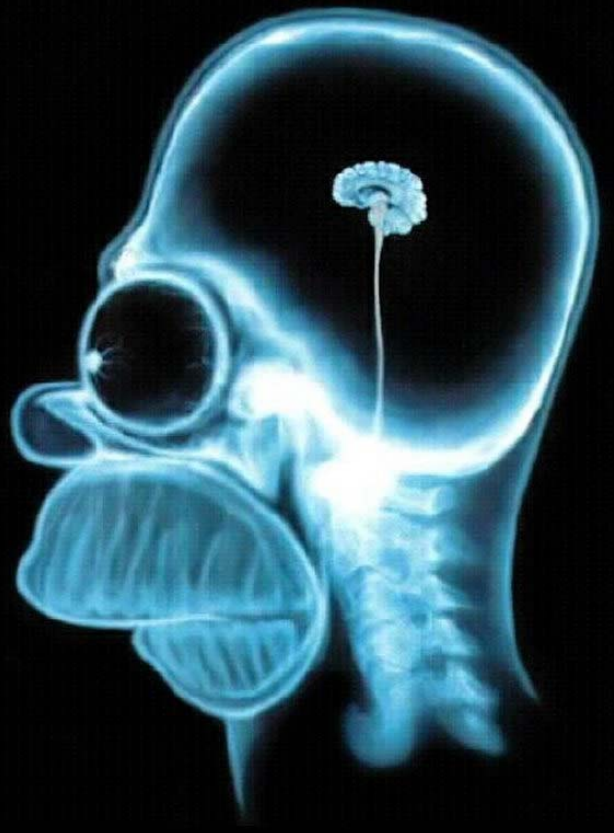
cont.



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cont.

"The goal is to strip away everything that gets in our employees' way. We provide a standard package of fringe benefits, but on top of that are first-class dining facilities, gyms, laundry rooms, massage rooms, haircuts, carwashes, dry cleaning, commuting buses—just about anything a hardworking employee might want. **Let's face it: programmers want to program, they don't want to do their laundry."**

– Eric Schmidt, CEO Google

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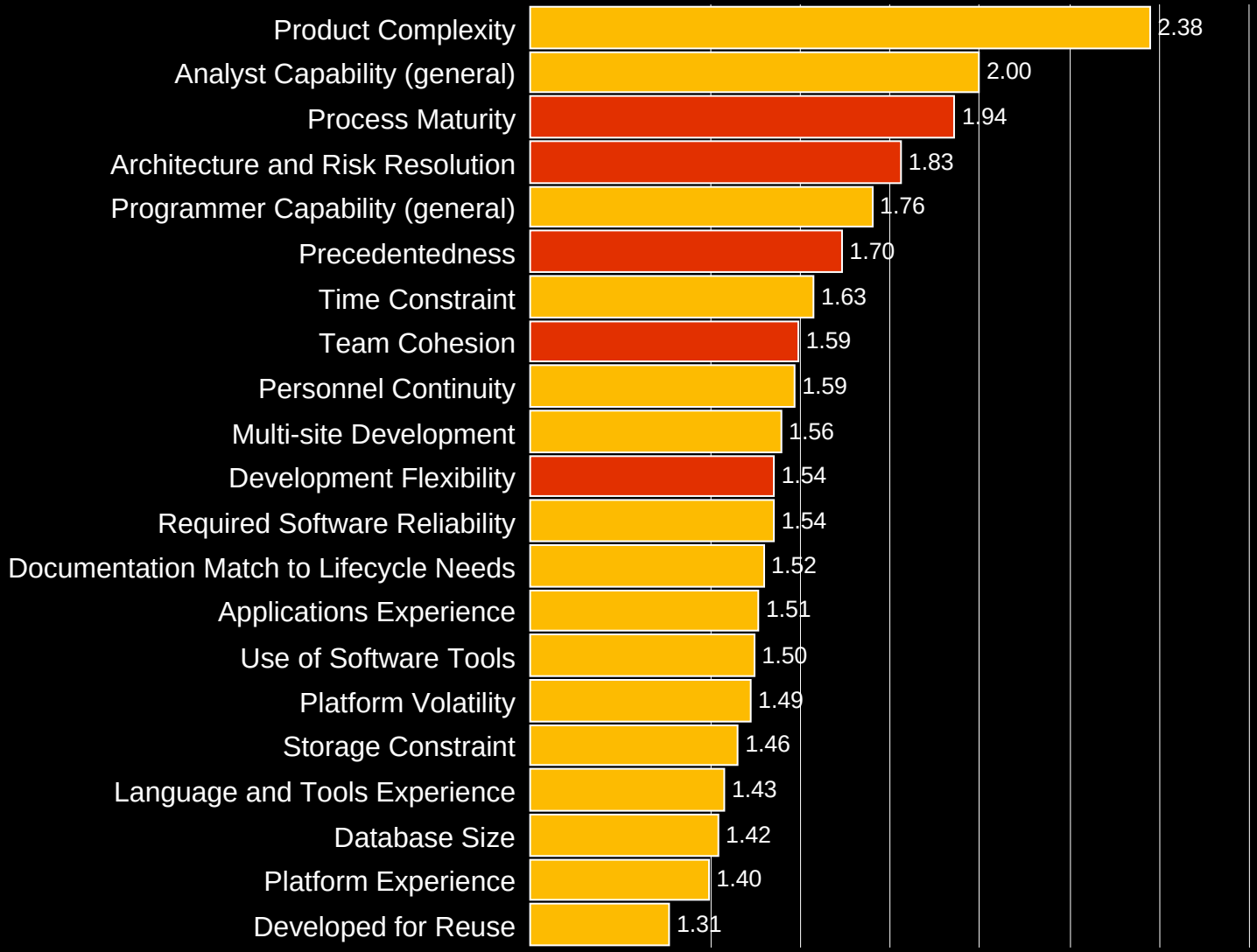
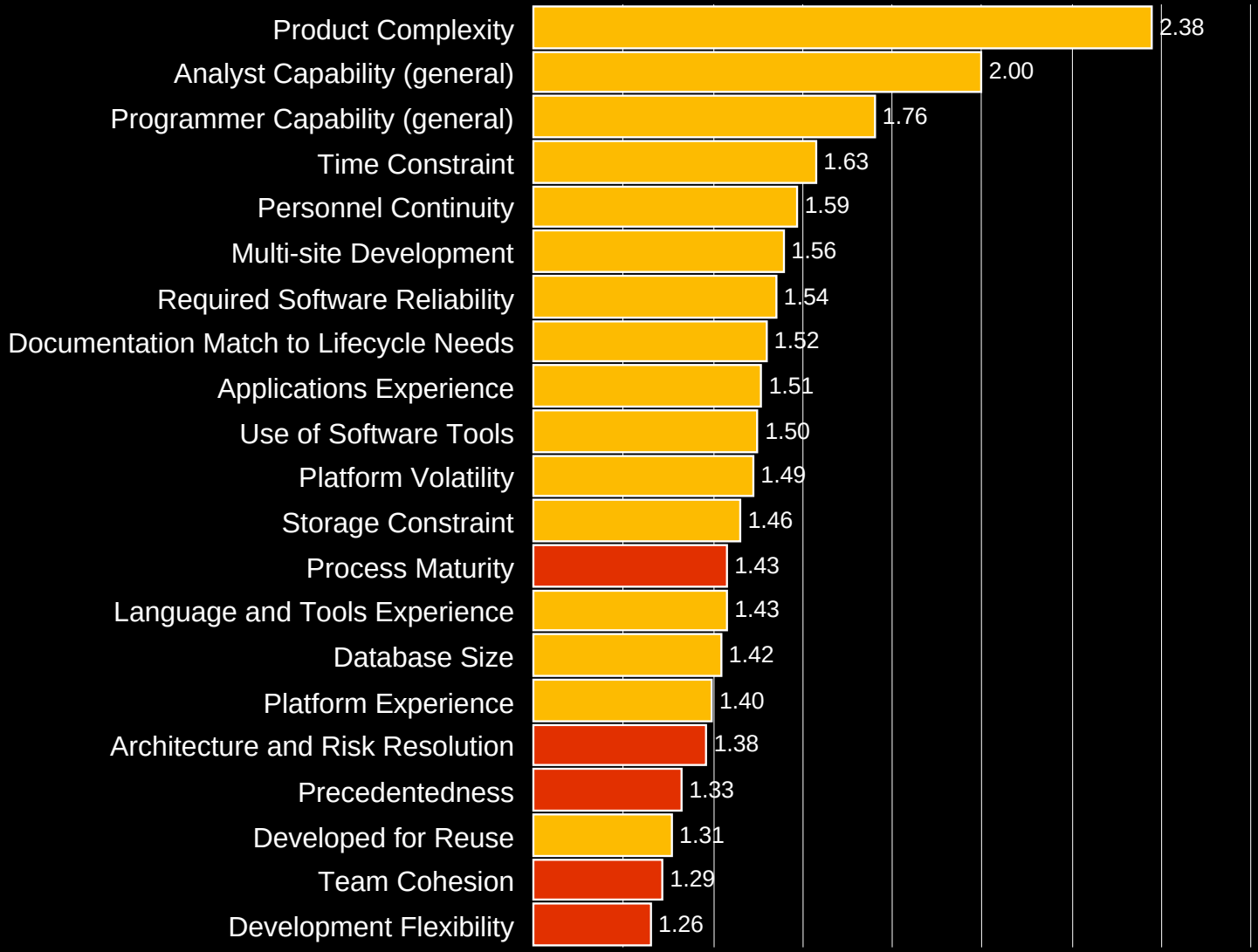
Interlude:
What Factors Really Matter?

Cocomo View

Effort Multipliers & Scaling Factors
(at 5M LOC)



Effort Multipliers & Scaling Factors
(at 100K LOC)



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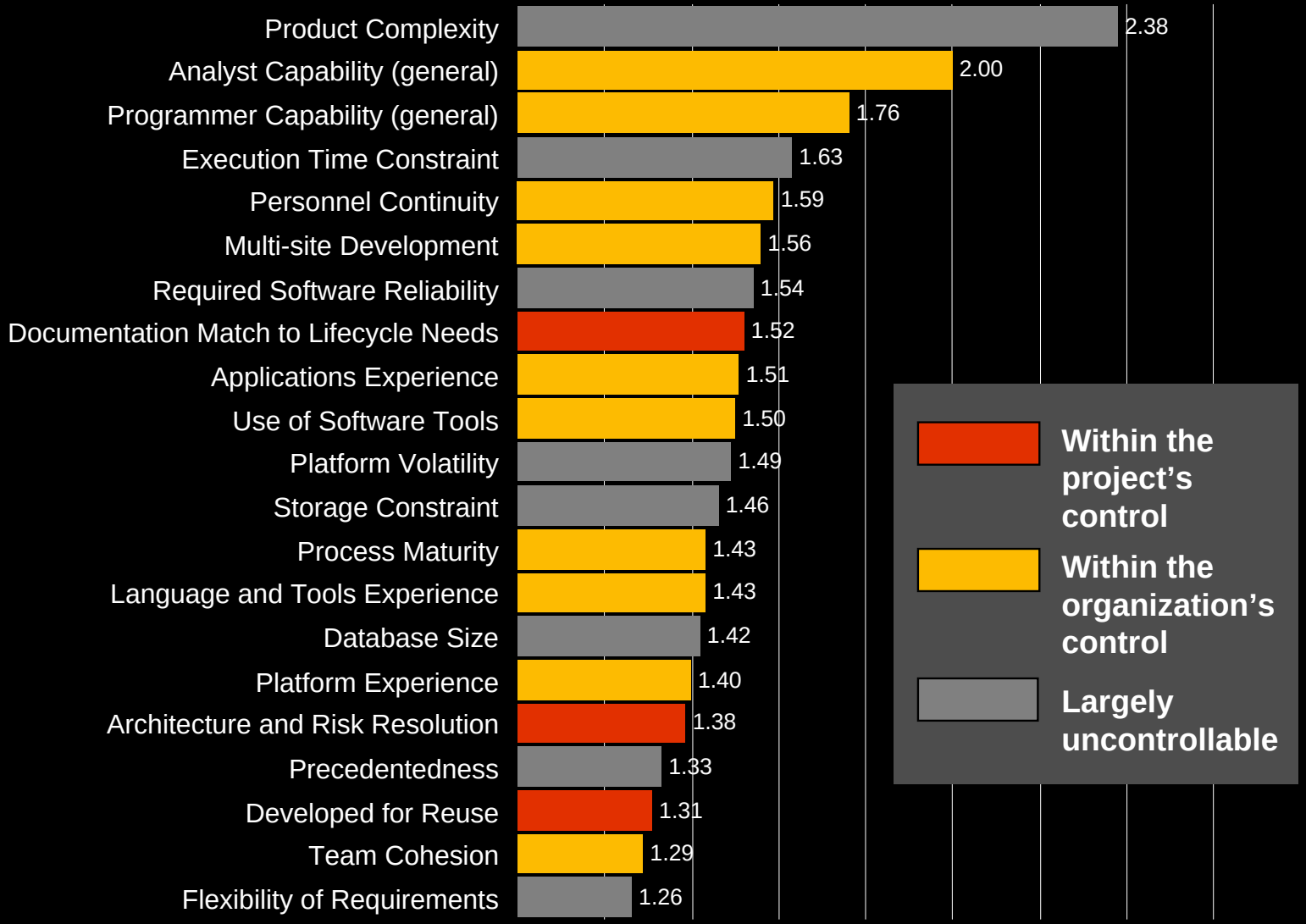
Where Can Organizations Improve?



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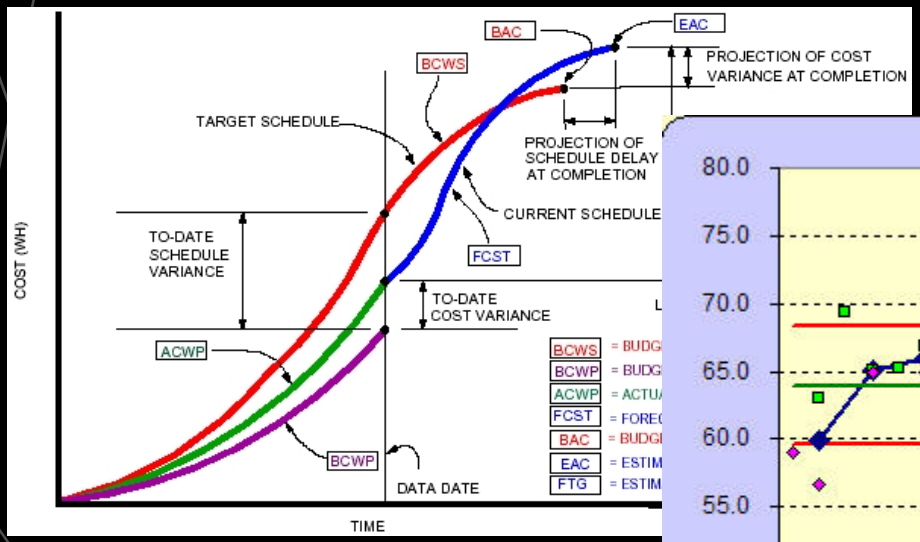
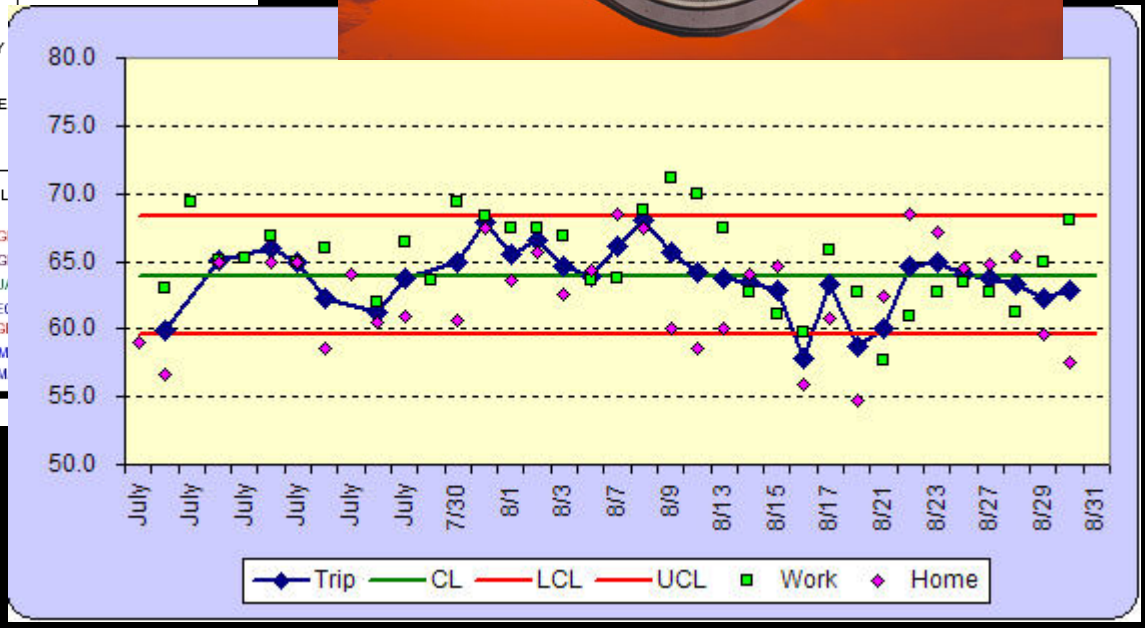
Sample of World-Class Software Organizations

Continued


BAC
EAC
BCWS
PROJECTION OF COST VARIANCE AT COMPLETION
TARGET SCHEDULE
PROJECTION OF SCHEDULE DELAY AT COMPLETION
CURRENT SCHEDULE
TO-DATE SCHEDULE VARIANCE
FCST
TO-DATE COST VARIANCE
ACWP
BCWP
DATA DATE
COST (WH)
TIME
BCWS = BUDG
BCWP = BUDG
ACWP = ACTU
FCST = FOREC
BAC = BUDGE
EAC = ESTIM
FTG = ESTIM


80.0
75.0
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60.0
55.0
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July
July
July
July
July
July
7/30
8/1
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8/7
8/9
8/13
8/15
8/17
8/21
8/23
8/27
8/29
8/31
Trip
CL
LCL
UCL
Work
Home

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Interlude:
What Factors Really Matter?

Discipline of Market Leaders

Discipline of Market Leaders

- Three value dimensions:
  - Operations
  - Product Leadership
  - Customer Intimacy
- Leading companies excel in one area and suffice in other areas

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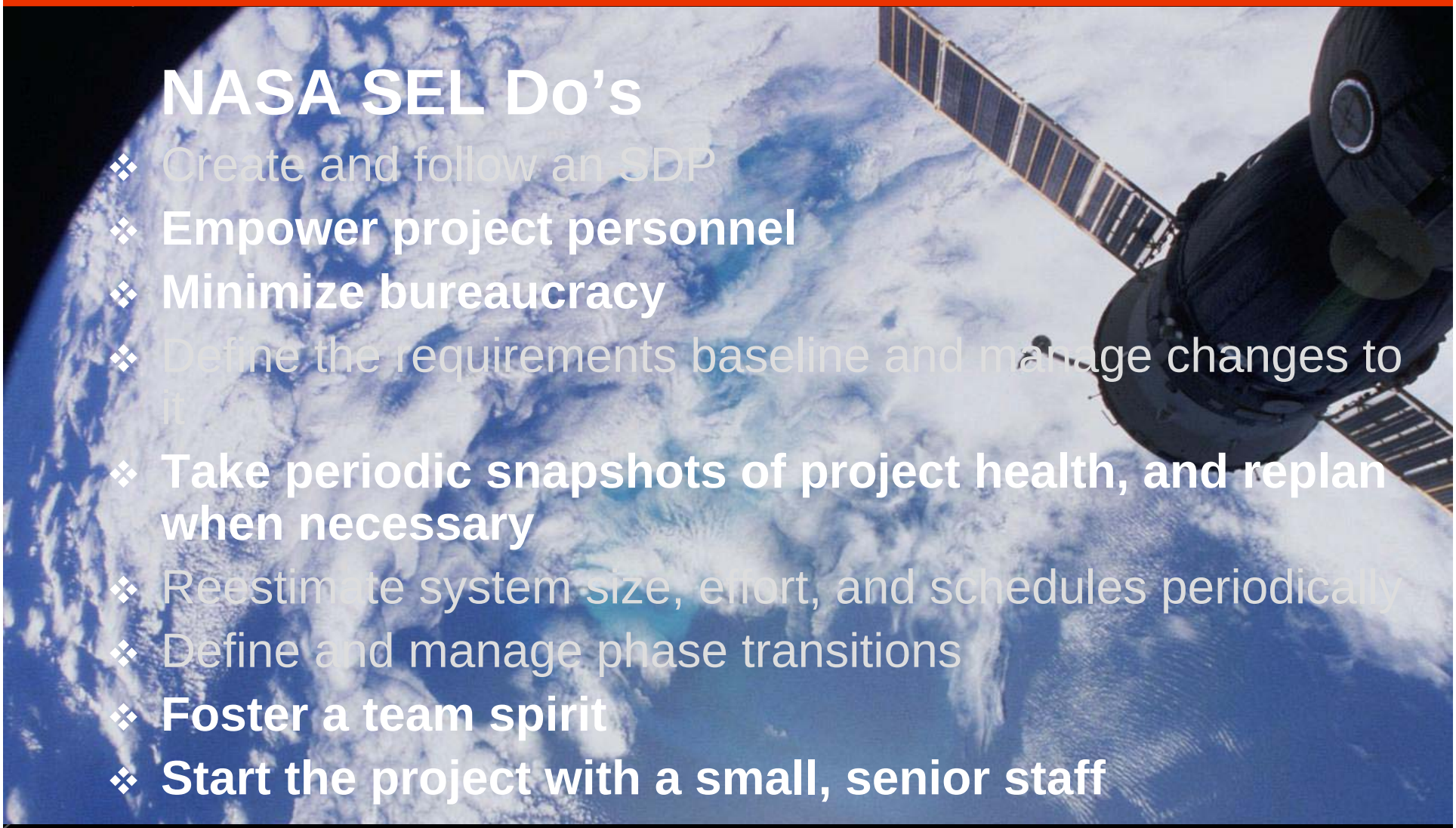
NASA SEL



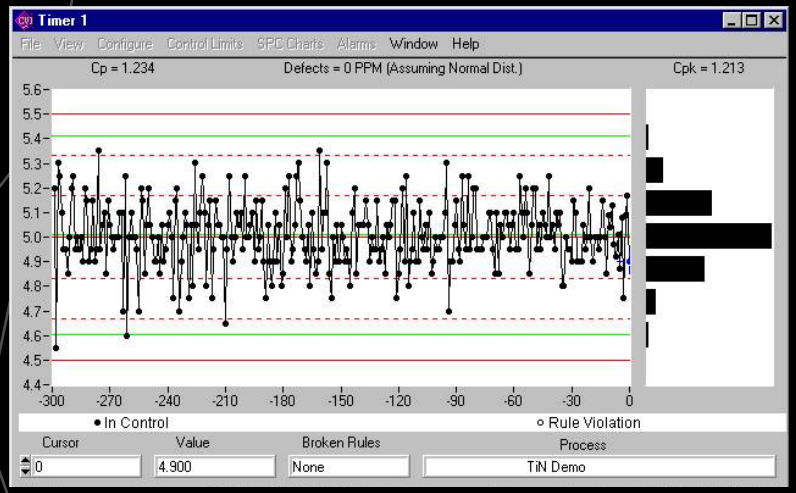
NASA SEL Do's

- Create and follow an SDP
- **Empower project personnel**
- **Minimize bureaucracy**
- Define the requirements baseline and manage changes to it
- **Take periodic snapshots of project health, and replan when necessary**
- Reestimate system size, effort, and schedules periodically
- Define and manage phase transitions
- **Foster a team spirit**
- **Start the project with a small, senior staff**

BOEING

BOEING

cont.



"If you can't find the time to do it right, where are you going to find the time to do it over?"

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Define Quotas

Study: QuickTry

Quota Total: 500 Save

Add Delete Checked

Delete	Cell Number	Description	Cell Limit
☐	1	Rarely	100
☐			
☐			

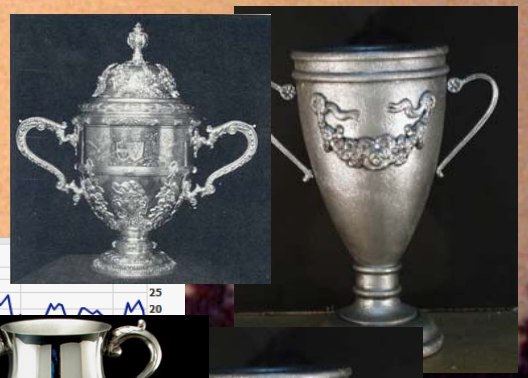
By Quota and Date

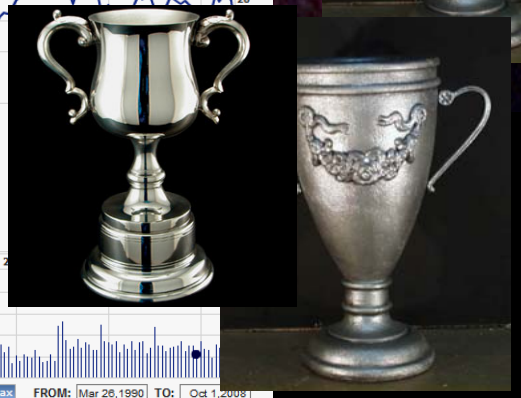
Study: QuickTry

Start Date (MM-DD-YYYY): 01-17-2002 End Date (MM-DD-YYYY): 01-19-2002

View

Cell	Name	Quota	Completed	To Go	1-17-2002	1-18-2002	1-19-2002
All Cells		500	365	135	180	120	65
1	Rarely	100	72	28	48	22	2
2	Sometimes	200	138	62	59	37	42
3	Often	200	155	45	73	81	21
TOTAL		500	365	135	180	120	65





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Conclusion

Attributes of World-Class Software Development Organizations

- Top talent
  - Support for top talent
- Strong sense of mission
  - High degree of alignment with the mission
- Real *business* accountability
- Commitment to quality (variously defined)
- Frequent introspection (learning from mistakes)
- "Standard" practices become highly adapted to local environment
- High degree of staff commitment, but as an effect of the other factors, not as a cause

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Construx Software is committed to helping individuals and organizations improve their software development practices. For information about our training and consulting services, contact stevemcc@construx.com.

Seminar Schedule: www.construx.com/calendar

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