



## The Straight Scoop on Agile for IT Executives

"If you want truly to understand something, try to change it."  
- Kurt Lewin

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## Nancy V's Background

- 15 years safety-critical systems experience
- 10 years agile team coaching
- 3 years agile enterprise coaching
- Industries: Aerospace, Medical Devices, Sonar Weaponry, Scientific Instruments, Financial Services
- Electrical Engineering and Software Engineering, embedded systems



## The Impossible Project

- New product based on new science
- New microprocessor - we're first customer
- First customer of OS port
- Low noise circuitry in farm equipment environment
- New NIR sensor hardware to exercise
- New science to calibrate grains 'envelope'
- Our product part of evolving suite of 'smart instruments' on vehicle
- Joint venture with another company - they have no engineers allocated at start



## Grain Monitor System

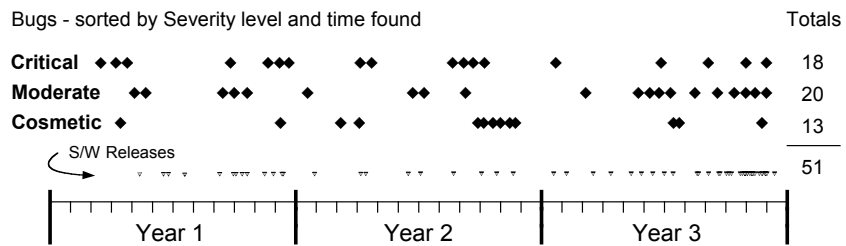


- Measures protein, oil in corn, wheat, etc. in seconds
- Based on new science, new CPU, new OS port, new NIR sensor, new algorithm...
- Agile team delivered 1st field units in 6 months



# Grain Monitor Teamwork

- Productivity 292% of comparable teams
- Quality 2000% above industry norm

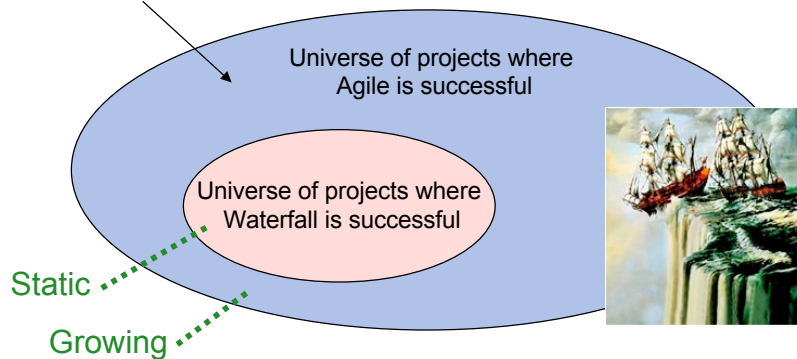


Source: "Embedded Agile Project by the Numbers with Newbies", available at <http://www.leanagilepartners.com/publications.html>

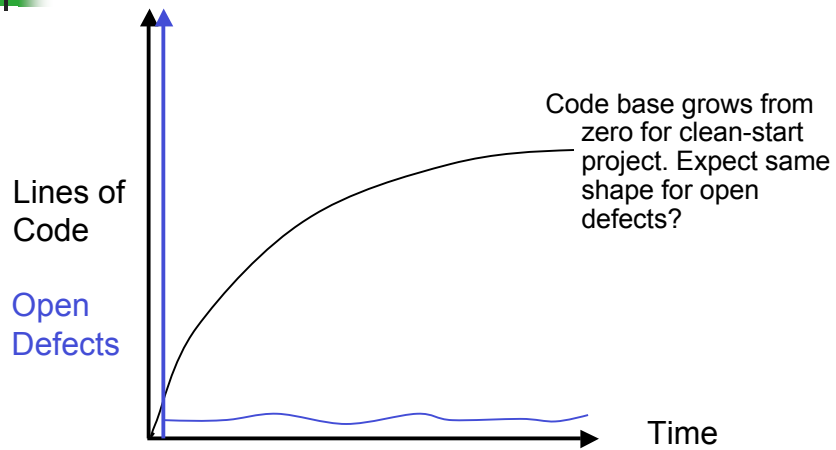


# Dynamic process needed...

These projects have high levels of uncertainty in the technology or business domain



## Break the complexity connection



## Agile and Productivity

Defect density as proxy for software team productivity





## LOC per Function Point

Language	Lines in 1 FP
Smalltalk	21
C++/Java	53
ADA83	71
PL/1	80
FORTRAN/COBOL	107
C	128
Macro Assembler	213
Basic Assembly Lang.	320




## The Score to Aim For

Team	Defects/Function Point	
Follett Software*	0.0128	agile
BMC Software*	0.048	agile
GMS	0.22	agile
Industry Best**	2.0	traditional
Industry average**	4.5	traditional

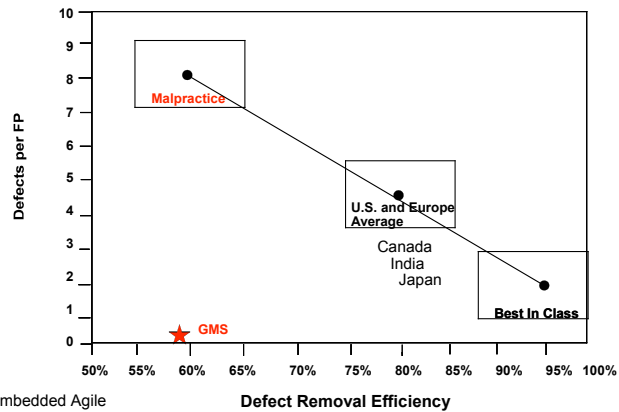
\* Computed from data reported in Cutter IT Journal, Vol. 9, No. 9 (Sept 2008), page 10

\*\* Capers Jones presentation for Boston SPIN, Oct., 2002



## Comparison with Industry Data

### MAJOR SOFTWARE QUALITY ZONES



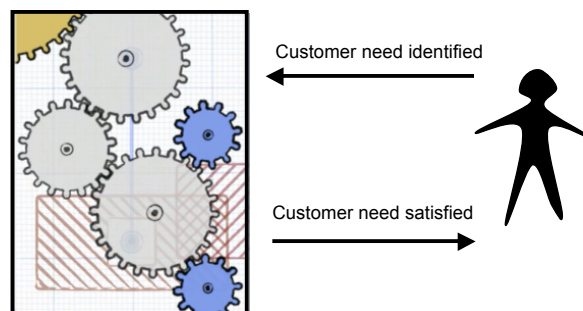
Details given in "Embedded Agile Project By the Numbers With Newbies". GMS data point added to Capers Jones' chart.

Source: Presentation to Boston SPIN by Capers Jones, Oct., 2002



## What's important - top level

- Company's process is not visible to customer
- They only sense cycle time and product quality





## Memes

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- Definition: Any unit of cultural information, such as a practice or idea, that is transmitted verbally or by repeated action from one mind to another.



## Agile Memes to Explore

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- ✓ 1. Agile and Productivity
- 2. Agile and safety-critical systems
- 3. Agile Adoption governance
- 4. Where Agile should not be applied
- 5. Agile and CMM compliance
- 6. Agile and team chemistry





## A note concerning these slides

- The remaining slides are props to support discussion of chosen memes
- These slides are not meant to give a complete treatment of the topics
- Articles going deeper into some of the topics can be found at <http://www.leanagilepartners.com/publications.html>



## Agile and safety-critical systems

Agile is best choice for safety-critical software development



## Top project risks - Standish

THE  
STANDISH  
GROUP

### Top Ten Reasons for Success

- ☑ 1. User Involvement
- ☑ 2. Executive Management Support
- ☑ 3. Clear Business Objectives
- ☑ 4. Optimizing Scope
- ☑ 5. Agile Process
- ☑ 6. Project Manager Expertise
- ☑ 7. Financial Management
- ☑ 8. Skilled Resources
- ☑ 9. Formal Methodology
- ☑ 10. Standard Tools and Infrastructure

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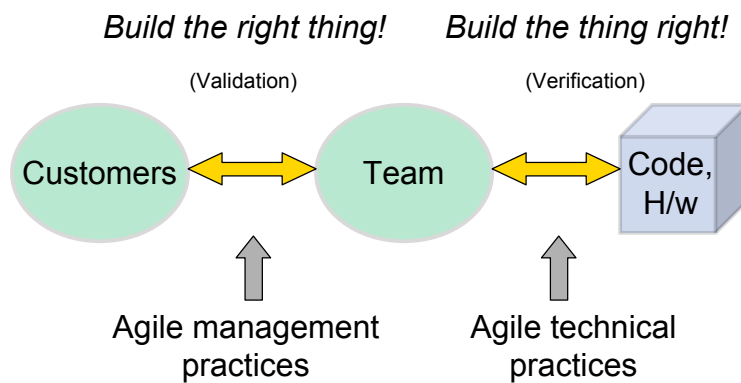


## Process risk

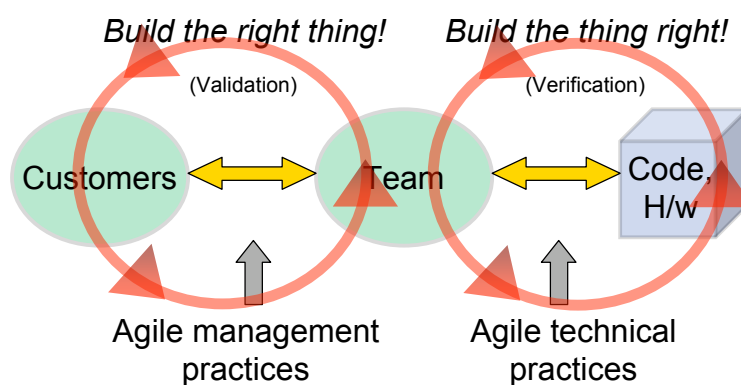
- Thought experiment: furnace with no thermostat ensures house always too cold or too hot
- Traditional sequential process gives us features no one uses, or omits those we need
  - Engineering solution for an unstable system is to add feedback (thermostat)
  - Agile process control has two primary feedback loops...



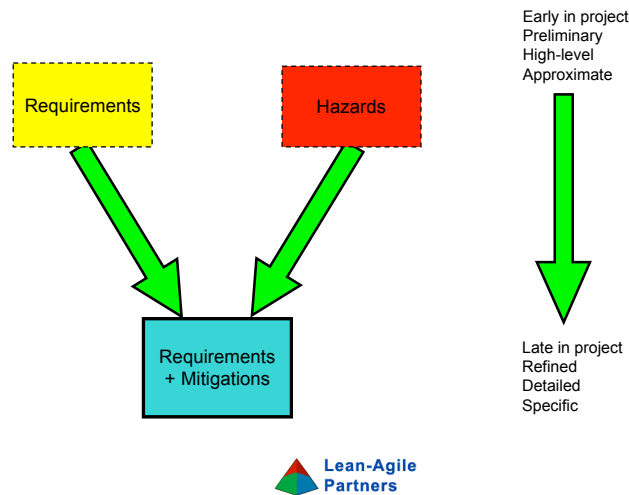
## Partnership: Business - Technical



## Control via Feedback loops



## Requirements / Hazards: Converging Analyses



## Classical Risk Ranking

Severity:	Probability:			
	High	Occasional	Low	Remote
Major	U	U	U	A
Moderate	U	A	A	N
Minor	A	A	N	N

Acceptability is ranked as follows:

U = unacceptable – mitigation required

A = ALARP (as low as reasonably practicable) – mitigate as reasonable; risk decision must be documented and reviewed

N = negligible – acceptable without review



## Let Agile tests enforce mitigations

- Agile test cases enforce stories (features) as positive content
- Agile test cases can also enforce the exclusion of undesired behavior (hazards)
- Automated enforcements that occur daily, hourly, etc. are safer



## Other safety benefits...

- Hazards and mitigations are revisited frequently, by many engaged minds
- Healthy Agile teams exhibit a “hyper accountability” - fewer things lost in the cracks
- Items tested “by analysis” in traditional projects can often be tested *for real* by Agile teams





## Agile Adoption governance

Govern agile adoption using a traditional project framework



## Agile Adoption as a *project*

- Mission: Incrementally change the organization to make it a fit habitat for agile projects
- Agile Adoption (AAP) is a project in its own right
  - It is actually a change management project
  - It is a customer of the Agile Development Projects (ADPs)
- It needs everything a project needs:
  - Sponsor, champion
  - Pan-organizational team members
  - Budget, schedule
  - Project plan: WBS, risk management, ADP selection criteria





## Typical milestones in the AAP

- AAP team members trained
- All necessary training is in place for the first Agile development project (ADP)
  - Sponsor, ADP team, their managers
  - People in any functions they touch
- Prior to selecting next ADP, we have reviewed ADP selection process
- First ADP completed
- First simultaneous ADPs completed
- First multi-team ADP completed



## Typical budget items in AAP

- Training
  - The AAP team
  - ADP teams
  - Functional elements that touch ADPs
- Coaching: AAP, ADPs, functional elements
- Equipment, software, facilities
- Collection and analysis of metrics
- Lessons Learned sessions and process
- Process and procedure changes in functional elements (HR, purchasing, ...)





## Selecting early Agile Dev Projects

- Early ADPs are *learning laboratories* for the AAP
  - Exercise the organization's ability to change
  - Learn how the new roles work *for us*
  - Find bottlenecks in workflow
  - Get customers used to interaction
  - Discover problems while they are small
- Impose new demands on only a few organizational functions
- Minimal external dependencies
- Stand-alone: no interaction with other projects



## Where Agile should not be used

There are situations where Agile should not be started





## Non-Starters

- Cannot assemble a willing, skilled team
  - Must contain the critical skills needed (though learning on the job *can* work)
  - OK to have skeptics
  - No draftees
  - Think of jury selection model...
- Team cannot test functionality within the iterations
  - Must be able to test at the story-acceptance level
  - Need testers as part of the team



## Adoption Project execution risks

- Examples:
  - AAP resources reduced for whatever reason
  - An ADP cannot succeed due to non-process reasons
  - Senior management support for AAP diminishes
  - AAP champion or sponsor leaves
  - Must use internal training resources but they're agile-naive





## Mitigating AAP execution risks

- Mitigating these risks requires overwhelming political clout
  - If you don't have the clout, enlist someone who does
  - If you can't enlist someone with clout, *game over*



## Agile and CMM compliance

Agile is CMM compliant when applied beyond team level





## CMM level 3 'Defined'

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### Level 3 - Defined

“It is characteristic of processes at this level that there are sets of defined and documented standard processes established and subject to some degree of improvement over time. These standard processes are in place (i.e., they are the AS-IS processes) and used to establish consistency of process performance across the organization.”



## Selected key process areas

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- L2 software subcontract management
- L3 Training program
- L3 Integrated software management
- Agile addresses software development at the team level, but lean ideas take its principles beyond that scope. The above KPAs are examples where broader scope applies





## Example of Agile + CMMI

- Systematic Software Engineering achieved CMMI level 5 using Scrum and CMMI practices: “Scrum and CMMI level 5: The Magic Potion for Code Warriors”
- Ref.  
<http://jeffsutherland.com/scrum/2006/11/scrum-supports-cmmi-level-5.html>



## Agile and team chemistry

It is possible to get agile team chemistry right MOST of the time (Discussion)

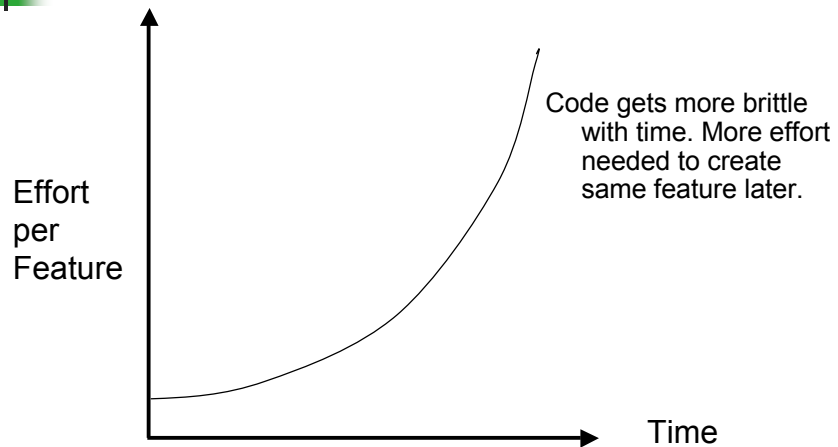


## Wrap-up

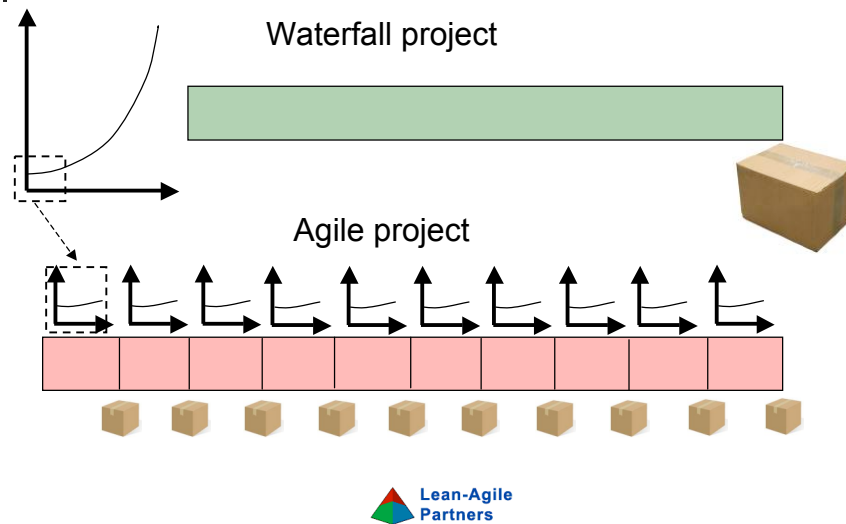
“Thought tools” for a very common Agile team mistake...



## Non-Linear Effort vs. Results



## Linear Effort vs. Results



## Recommended Reading

- Lean/ Management
  - “Measuring and Managing Performance in Organizations” - Robert D. Austin
  - “Lean Software Development” - Poppendieck\*
  - “The Goal” - Eliyahu Goldratt
  - “The Elegant Solution” - Matthew E. May
- Agile
  - “Agile Estimating and Planning” - Mike Cohn
  - “User Stories Applied” - Mike Cohn
- Paper referenced
  - “Embedded Agile Project By the Numbers With Newbies” available at <http://www.leanagilepartners.com/publications.html>

\* The newer book “Implementing Lean Software development” by Poppendieck is not a mere revision but addresses advanced topics.



## Quote for the Day

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“ In times of profound change, the learners inherit the earth, while the learned find themselves beautifully equipped to deal with a world that no longer exists.”

- Eric Hoffer

