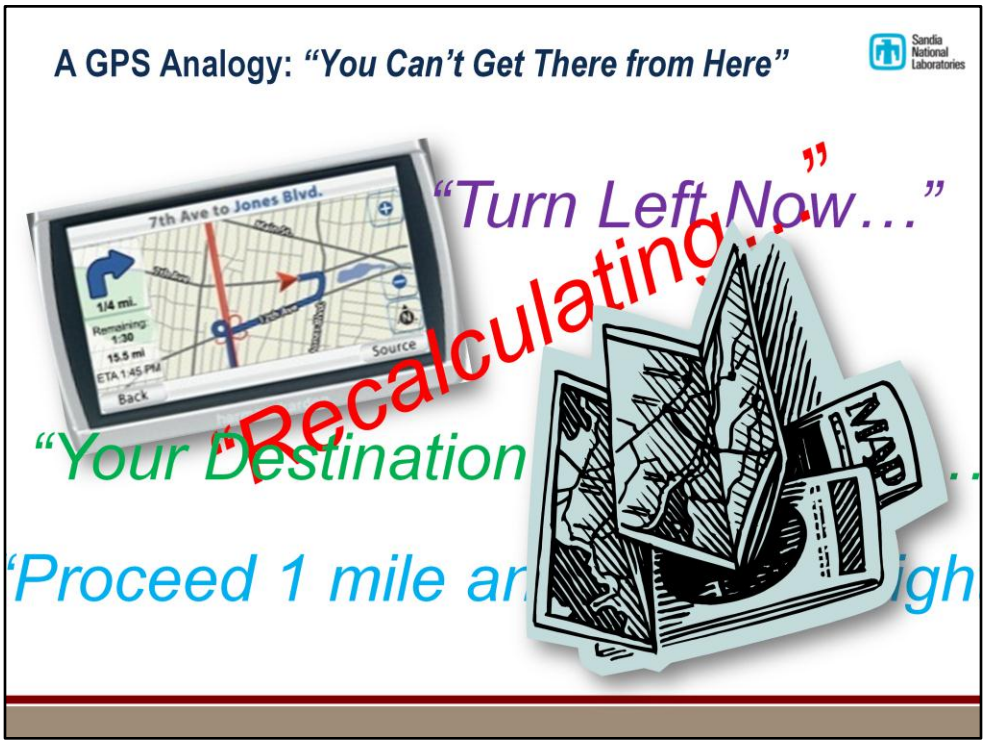
- I am Stephen LeTourneau from Sandia National Laboratories
- Sandia's National Security Missions include:
  - Nuclear Weapons
  - Defense Systems & Assessments
  - Energy, Climate & Infrastructure Security
  - International, Homeland & Nuclear Security
- This presentation describes a method that combines practices from other industry methods
- Originally conceived as a way to "jumpstart" projects that are struggling to "get started"
- Helpful for agile projects to "find" their bearings and to "keep" their bearings

Introductions

"We engineer, research, deploy, and support software and information solutions for the National Security missions of Sandia National Laboratories."

- Science and Engineering Information Systems
- Product Analysis Jumpstart Method Authors
  - Alan Armentrout
  - Elizabeth Parker
  - Stephen LeTourneau

- Organization is discipline-based, all software engineering disciplines
  - IT consulting group for the labs
- Teams are formed using resources from all disciplines
  - Many are multi-disciplined
- Use a variety of development methodologies, including BUFD, RUP, Agile, ad hoc



- Begin with an analogy
- Have you ever been so focused on the step-by-step directions of a GPS device that you actually get lost?
- Consider this scenario
  - You are in a new town and trying to find your way around with only a GPS device as your guide.
  - Only know how to get from point A to point B with GPS?
    - Can't recreate *return trip* (point B to point A) from memory?
  - Don't know where you are because of "recalculating hell"?
    - Worse… don't know how to get home?
  - You drive past your destination because the GPS device spoke too late
    - You were not paying attention to "outside the car"

- Sometimes you need just a *Plain Old Map (POM)?*
  - Map set the context to better understand the GPS-generated route
  - Can help you get you bearings

A GPS Analogy: *Blindly Following the Next Step*

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"Recalculating…"

Three women escape after GPS system on rented Mercedes SUV drives them into lake in Bellevue

- What can happen if we fail to consider the *Big Picture (i.e. Start, Destination, Route in between)* in favor of just the *next step?*
- Mainstream news has many stories that show what can happen if we blindly take the *next step*.

A GPS Analogy: *Blindly Following the Next Step*

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"Recalculating…"

'I was only following satnav orders' is no defence: Driver who ended up teetering on cliff edge convicted of careless driving

- What can happen if we fail to consider the *Destination (i.e. Big Picture)* in favor of just the *next step?*
- Mainstream news has many stories that show what can happen if we blindly take the *next step*.

- What can happen if we fail to consider the *Destination (i.e. Big Picture)* in favor of just the *next step?*
- Mainstream news has many stories that show what can happen if we blindly take the *next step*.

A GPS Analogy: *"You Can't Get There from Here"*

- Too often we are overly-focused on just the next step of *The Journey*
  - *"Turn Right Here"*
  - *"Turn Left in 1.2 miles"*
  - *"Make a legal U-Turn"*
- Doing this, we can loose sight of *The Destination*

- A Plain Old Map can help set the context of your trip (start, route, destination, etc.)
- Helps set expectation of the entire trip
- Sets your bearings at the start of the trip and can keep your bearing s during the trip

- I'm sure there are several reports of accidents caused by drivers trying to read a map while the vehicle is moving
  - Maps must be used wisely too

Similar Story, Project Context:
"Turn Right Here..."

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- Launched into a new project
- Going to be *agile*
- Given first set of user stories to implement
- Someone asked…
- The reply was: *"The architecture will emerge…"*

- With that analogy in mind, I want to tell you about a similar experience that I had on a project (before coming to Sandia)

- I was on an agile project and we were given our first user stories to implement
- During the launch, someone asked the project lead what the architecture looked like
    - They said something like "The architecture will emerge…".

Similar Story, Project Context:
"Turn Left in 1.2 Miles…"

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- Customer demo
- They loved what they saw
- Got next set of user stories to implement
- Someone asked…
- What we were told: *"The system is still evolving…"*

- We implemented the stories and proudly demonstrated the functionality to the customers
- The customers gave their approval, provided feedback, and the team picked the next set of user stories to implement.
- Again, someone asked the project lead what the architecture was supposed to look like and they said something like "The architecture is still evolving…".

Similar Story, Project Context:
"Make a Legal U-Turn…"

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- This pattern repeated several iterations
- The project was going well
- Then, without warning…
- We received new requirements!
- *"Its time for a 'Refactoring Iteration'…"*

- Repeat this pattern several iterations/sprints/cycles/etc.
- The project is well on its way when suddenly, it happened…

- We received new requirements that changed the fundamental design of the solution
  - E.g. Security, scalability, performance, etc.

- The project was forced to stop, and execute a couple "*Refactoring Iterations"*

- That's when we realized that we had been overly-focused on the next leg of the journey
  - We had forgotten about the overall trip (start, route, destination)
- Sound Familiar?

- We needed a *Map*, to get our bearings!

- NOTE:
  - Refactoring the architecture may be a very valid thing to do
  - But, in order to refactor, one has to "consider the architecture" that the solution is being "refactoring to"
  - So why not "consider the architecture" up-front, while there are more options available, less re-work, etc.?

What is a Reasonable "Map" for an Agile Project?

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- A map for an agile project provides a high-level perspective for one or more of the following:
  - Business Processes
  - Requirements
  - Architecture
  - Other

- In general, a map provides a high-level representation of some aspect of a celestial body
- Business processes tie together business roles, business activities, and various work products
  - Helps to describe the business domain
  - Shows how the product solution supports the business
- Requirements are high-level use cases (use case model survey)
  - Can also be an initial product backlog with high-level user stories and epics
  - Will focus on use cases for this presentation
- Candidate architecture(s) with tradeoffs that sets the context of how the product solution is to be developed

Product Analysis Jumpstart Method

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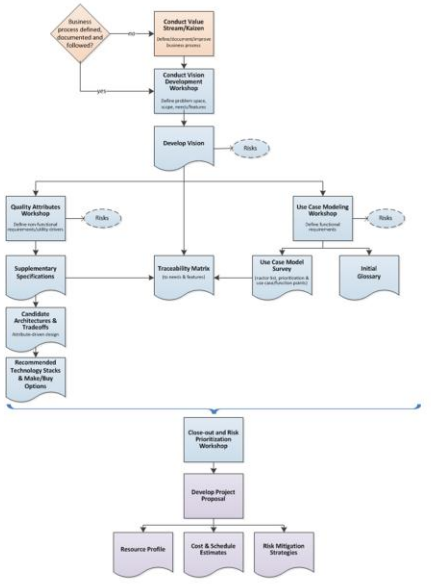
- Draws from proven industry practices
  - Rational Unified Process – Vision, Use Case Model Survey
  - QA/ADD Workshop – Architecture Drivers, Candidate Architecture
  - Lean Six Sigma/Kaizen – Key Process Description
- Collaboration of disciplines
  - Requirements Engineer
  - Software Architect
  - Business Process Analyst
- Focuses on "Breadth Work"
- Executed as quickly as possible

- Uses practices from several different methods
  - Provides the "Map" (i.e. High-level description) of the product solution
  - Sets the context for the development iterations (e.g. the steps along the route)
  - Lets team know if they have (potentially) "Fallen in a ditch" along the way
  - Reminds all stakeholders of the "Final destination"
- Uses several disciplines to ensure a variety of perspectives
- Focuses on the "Breadth" of the product solution, not the details
- Initially meant to "Jumpstart" product development efforts that were having difficulty getting started

Product Analysis Jumpstart Method Workflow

- Understand the Business Processes
- Develop a Vision
- Capture High-level Requirements
- Develop a Candidate Architecture
- Risk Mitigation Plan for Identified Risks
- Project Proposal/Plan



- Designed to be a series of working sessions (workshops) where all stakeholders participate
- Facilitated by practitioners in the various disciplines
  - Requirements Analyst
  - Business Process Analyst/Engineer
  - Software Architect
- A Product Analysis Jumpstart is a concentrated, workshop-focused effort:
  - Led by a team of experienced individuals
  - to produce project, requirements, and architecture breadth documentation
  - for the purpose of guiding and facilitating a project team in their efforts to develop an information system solution for a business problem or opportunity.

A Closer Look: *The Business Process*

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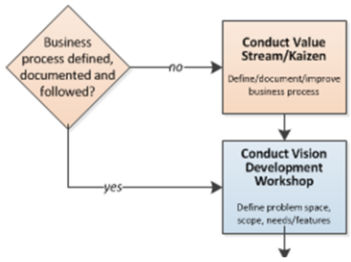
- Use a light-weight Value-Stream/Kaizen event to capture and document the existing business processes
- Use RUP workflows to:
  - Define the scope of the production solution
  - Identify the Needs and Features
    - Identify any Risks



- Is the Business Process well known?
  - No: Develop and document it
  - Yes: Is the business process documented?
    - Yes: Present it and get agreement among all stakeholders
    - No: Document it now
- Define the “problem space”
  - What are the Needs & Features of the product solution?
  - What is in-scope/out-of-scope?
- Capture this in a “Vision” of the production solution
- Optionally, capture any Risks that were identified

A Closer Look: *The Candidate Architecture*

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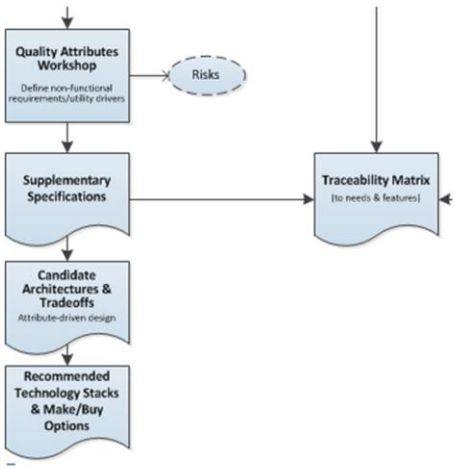
- Use a light-weight Quality Attribute Workshop to capture and document the *Architecture Drivers*
- Use light-weight ADD to develop one or more *Candidate Architectures*
- Identify any new Risks
- Map the QA's to Needs and Features



- Tailor your QAW so that it is "just enough" ceremony to identify the Architecture Drivers
- What are the stakeholder gripes/concerns/goals that you hear them articulate?
  - Can you turn that into a Quality Attribute Scenario?
- Prioritize the QA Scenarios
  - What are the primary drivers of the proposed product solution?
- Capture this in a (RUP) "Supplementary Specification" of the product solution
- Map the Architecture Drivers to the Needs and Features list
- Optionally, capture any Risks that were identified

A Closer Look: *The Requirements Workshop*

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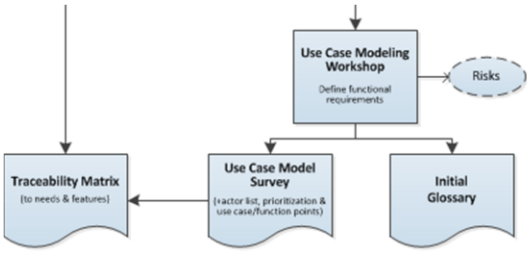
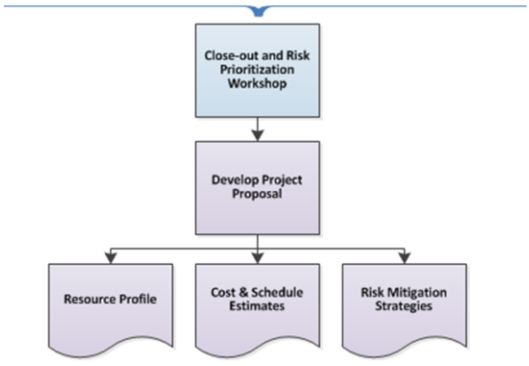
- A use case modeling workshop captures and document the *Functional Requirements*
- Collect Glossary terms
- Identify any new Risks
- Map the QA's to Needs and Features



- Tailor your Requirements Workshop so that it is focused on the "Breadth" of the requirements
  - Identify as many Use Cases as possible
- What are the stakeholder gripes/concerns/etc. that you hear?
  - Can you turn that into a Use Case Scenario?
- What are the stakeholder "goals"?
  - Can you turn that into a Use Case Scenario?
- Prioritize the Requirements
  - What are the "must have" requirements of the proposed product solution?
  - What are the "primary use cases"?
- Capture this all in a (RUP) "Use Case Model Survey" of the production solution
- Map the Requirements to the Needs and Features list in the traceability matrix
- Optionally, capture any Risks that were identified
- Optionally, capture any domain-specific terms in an initial Glossary

A Closer Look: *Close-Out*

- Prioritize Risks
- Communicate back everything that was captured and get validation from stakeholders
- Develop Project Proposal or Plan
  - Cost Estimates
  - Develop initial mitigation for top risks
  - Resource Profile



- Prioritize any risks that were identified
- Present what was captured/developed in the workshop
- Optionally, develop a project proposal or project plan based on breadth work
  - Resource profile needed
  - Cost & Schedule
  - Develop risk mitigations for top risks

What are Some Benefits of this Approach?

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- Agreement on *what* is being developed
- Common understanding on *why* it is being developed
- Identification of major components of the system

- Development teams need to know what is being developed and how it will be used in the context of the customer's workflows
- Customers need to know what is being developed and what it will look like
- Agreement on a Candidate Architecture
    - Major architecture components are identified
    - Sets "project bearings"
    - Reduces need for "Refactoring Sprints/Iterations"

What are Some Challenges?

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- Keeping the scope/scale of this effort to *just enough*
  - Don't revert back to *big up-front design*
- Staying focused on the outcomes
- Getting customer participation in each workshop

- BUFD Baggage
- Avoid "deep dives" into implementation details
- Losing focus on desired outcomes
  - Common Vision
  - Candidate Architecture(s)
  - How the product solution fits into the Business Processes
- Agile purists may reject these activities as unnecessary or to academic
  - Just keep telling yourself: *"Recalculating…"*

What does it Look like in Practice?

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- Depends on several factors
  - The size of the project
  - The diversity of the stakeholders
  - The availability of big-picture thinkers from the business domain
- Remember, this is an up-front activity conducted as fast as possible
  - Consider a "Sprint/Iteration 0"
  - Requires intense focus and fast pace to make best use of project resources

- Factors
  - The size of the project will impact the amount of time/effort is spent on creating the various maps
  - Each stakeholder will bring their "Need" to the table
    - All may have very different "Goals"
  - Customers must see themselves in the vision and agree on how the product solution helps them achieve their goals
- Remember, this is an up-front activity conducted as fast as possible
- Stay focused on the "breadth" of the product solution
- Collaboration!
  - Co-located
  - JAD-style
  - Team Room
- Sprint/Iteration 0
  - Iterations are typically short durations so it should not be a huge "hit" to the project
  - "Demo" the various "Maps" to the stakeholders as part of the Retrospective
- Really have to "lay some rubber"
  - Keep from diving into too much detail

A Similar Method

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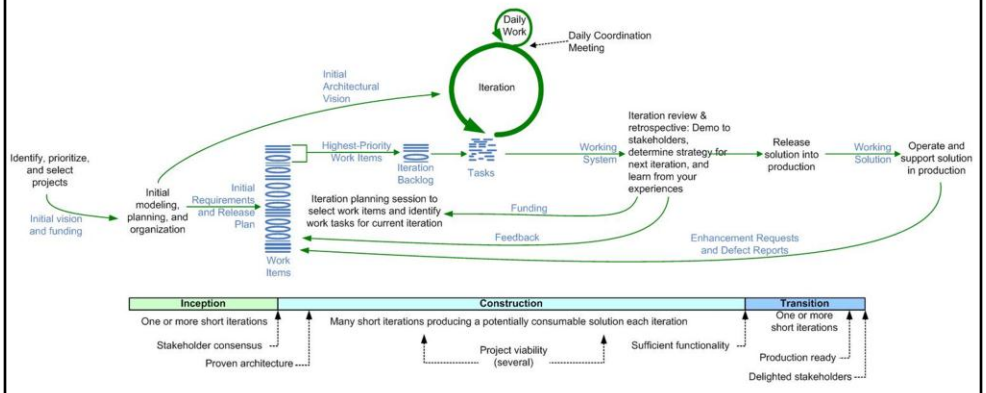
- Disciplined Agile Delivery*
  - Takes a similar approach



(*) *Disciplined Agile Delivery: A Practitioner's Guide to Agile Software Delivery in the Enterprise*, by Scott Ambler and Mark Lines, International Business Machines Corporation, 2012, p. 12.

- The Disciplined Agile Delivery method spends energy "up-front" ensuring all stakeholders are in agreement before launching into iterative development cycles
- Use "some" approach to consider the big picture before launching in

Conclusions

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- Agile development is great
  - Want to make sure we build the right system

- Want to be careful not to *throw out the baby with the bath water*

- Maps can keep you on-course or get you back on-course if you have gone off
- Still want to *sprint* right into development? Remember…

- I love agile projects
  - Need to make sure we know where we are headed and why
- *Still need to consider the Big Picture*
- Maps can help address the problems that cause the "Refactoring Iteration"
  - "What" you use may vary
- If you are thinking of just sprinting into development without considering the big picture, then remember one thing…
  - "Recalculating…"

Thank you!

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- Questions?

- Thank you for your participation

Stephen T. LeTourneau
Sandia National Laboratories
stletou@sandia.gov