JUST ENOUGH REQUIREMENTS MANAGEMENT

by

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PRESENTED TO:
IBM
SEOUL, SOUTH KOREA
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Outline

Definitions
- The Problem
- Some Solutions
  - Elicitation
  - Triage
  - Specification
- Summary

Within each:
- definition
- effects of over- and under-doing it
- list of “just enough” “tricks”
- expand a few
- show result of activity
Definitions

- **Requirement**: An Externally-Observable Characteristic of a Desired System
- **Requirements Management**:
  - Learning (elicitation),
  - Pruning (triage), and
  - Documentation (specification) of Requirements
Outline

- Definitions
- The Problem
- Some Solutions
  - Elicitation
  - Triage
  - Specification
- Summary
So, What Is the Problem? (1 of 4)

- CMMI proponents tend toward
  - Heavy process
  - More emphasis on measuring progress than making progress
  - Lots of control
  - “Heavy” documentation & strict standards adherence

- Good: Low risk of building poor quality system
- Bad: Very slow development
So, What Is the Problem? (2 of 4)

- Agile proponents tend toward
  - Light process
  - No emphasis on measuring progress
  - Little control
  - As little documentation as possible

- Good: Very fast development
- Bad: May work only for “simple” applications (e.g., one client; few changes)
So, What Is the Problem? (3 of 4)

- Actual RM Practices on Self-Declared “Agile” Developments
  - Face-to-Face Communication in Lieu of Written Specifications
  - No Predefined Requirements (They Emerge After Development Begins)
  - Prototyping (and Prototypes Evolve into Products)
  - Requirements Prioritized for Every Iteration
  - No Fixed Plans, so Changes Are Easy to Make
  - Tests Written Before Code (even part of classic waterfall!)

So, What Is the Problem?
(4 of 4)

Where Are You?
Where Should You Be?

Little Process Documentation
Heavy Process Documentation

Few Standards
Heavy Standards

No Reqt’s Documentation
Much Reqt’s Documentation

Very Small Iterations
Very Large Iterations

Drive Your Decisions Consciously

Where is Highest Risk?
What Risks Can You Tolerate?
What Is “Just Enough” Requirements Management?

- **What is “just enough” life insurance?**
  - Too Much: You Won’t Have Enough Money Left to Live
  - Too Little: You Will Worry About Your Family if You Die

- **What is “just enough” RM?**
  - Too Much: Your Project Will Be Late and Over-Budget
  - Too Little: You Will Build the Wrong Product; and Have Unhappy Customers or a Lukewarm Market
Iterative Development
(True Whether of Not You Intend To Do So!)

An Unsolved Problem

First Partial Solution

Second Partial Solution

Nth Partial Solution

Elicitation
Triage
Specification

Development
Test

Elicitation
Triage
Specification

Development
Test

Elicitation
Triage
Specification

Development
Test

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Just Enough Requirements Management
Why Three Kinds of Req’ts Management Activities?

- **Understand Needs (Elicitation)**
  - The customers’ needs are the requirements
  - Must be understood sufficiently up front or disaster (in large or small iterations)
  - And yet, continuous and perpetual

- **Select Appropriate Subset (Triage)**
  - Must balance requirements, schedules and expectations for first (next) release

- **Record Desired External Behavior (Specification) for Selected Subset**
  - To ensure that all developers have same goal
  - To ensure that developers and customers have same expectations (No surprises!)
A “Just Enough” Requirements Process

Customers & Competition

- Cust Rep or Marketing
- Cust Rep or Marketing: Prioritization
- Development: Estimation
- List of Candidate Requirements
- List of Annotated Candidate Requirements
- Cust Rep or Marketing Development
- Finance
- Available Resources
- 60% Baseline
- SRS & Estimation Refinement
- 100% Baseline
- Product Development

Technology

- Development
- Bug Reports Unsatisfied From Previous Release
- Cust Rep or Marketing
Key Attributes of this Requirements Process

- Gather *All* Candidate Requirements
- Prioritize and Estimate Requirements (but Ignore Selected Requirements)
- Do Triage Overtly
- Have All Three Groups Involved in Triage (as opposed to some agile communities that try to empower developers)
- (If Politically Possible), Commit a % of Available Resources
- Let Development Start ASAP
- Share *All* Candidate Requirements with Developers
- Expect Change

*Correct Message: Don’t Avoid Any Surfaced Candidates. I Don’t Mean You Need to Know Everything*
JERM with Small Iterations

Candidate Requirements → Selected Subset of Requirements → SRS → System

Note SRS Grows → Note System Grows

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Types of Requirements Errors

- **Elicitation**
  - Specifiers Do Not Know Something
  - Customers Do Not Know Something
  - Possible That There is NO Way to Know it!

- **Triage**
  - Build Something that Should Not Be Built
  - Not Build Something that Should Be Built
  - Being Late Due to Accepting Too Much Work

- **Specification**
  - We Know What We Want
  - We Err in Writing it Down
How Much Time for Requirements?

Outline

- Definitions
- The Problem
- Some Solutions
  - Elicitation
  - Triage
  - Specification
- Summary

Within each:
- definition
- effects of over- and under-doing it
- list of “just enough” “tricks”
- expand a few
- show result of activity
Elicitation

- The Art of **Listening** to Stakeholders
- The Art of **Sending Appropriate Stimuli** to Stakeholders So That the Responses are Worth Listening To
- The Art of **Establishing an Environment** in Which Stakeholders Are Willing and Able to Describe Their Problems and Needs
Elicitation in the Requirements Process

Customers & Competition

- Cust Rep or Marketing
- Bug Reports
- Unsatisfied From Previous Release
- Development
  - List of Candidate Requirements
  - Development: Estimation
  - Cust Rep or Marketing: Prioritization
- Cust Rep or Marketing

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- Cust Rep or Marketing
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- 100% Baseline
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Finance

- Cust Rep or Marketing
- Development
- List of Annotated Candidate Requirements
- SRS & Estimation Refinement
- 60% Baseline
- 100% Baseline
- Product Development
Effects of “Too Much” or “Too Little” Elicitation

Too much

- You would spend so much time understanding the problem that no time would be left to solve it

Too little

- You would build system before understanding problem, and would likely build the wrong system

- The Colorado telecom company’s use of CMM
  - Measurement for measurement’s sake

- The agile community’s approach to elicitation
  - Classic
    - Not performed up front
    - When questions arise, just ask the on-site customer
  - Modern
    - Stories
Secrets of “Just Enough” Elicitation

- Don’t lose sight of the goals
- Care
- Don’t ignore elicitation
- Recognize that 1 stakeholder cannot speak for all
- Prepare for change
- Who’s smart?
- Maintain glossary of terms
- Use appropriate elicitation techniques
- Prepare for triage
- Use sensible starting point(s)
Don’t Try to Convince Stakeholders the You Are Smart – Wrong Place to Do That!
Instead Take Every Opportunity to Show You Think the Stakeholder is Smart
Contrast These Two Cases

My Elevators Are Too Slow!
I See. Tell Me Why You Feel They Are Too Slow.
I Don’t Think So. I Think You Have an Elevator Throughput Problem, not a Speed Problem
Maintain Glossary

- Ellen Gottesdeiner Has Observed that a Many Requirements Miscommunications Are Caused by Word Meanings
- Useful for Customer-Developer and Marketing-Development Communications
- Appoint a Glossary Czar
  - Asks Questions Like: “What Do You Mean by $X$?”
  - Records All Agreements Concerning Definitions
Use Appropriate Elicitation Techniques

- One elicitation technique is not “good enough”
- Function of people involved
- Function of requirements not yet understood
- Function of application domain
- Function of kind of business (e.g., custom vs. existing market vs. new market)
Techniques for Elicitation

- **Interviews**
  - Same Place, Same Time
  - Few People, Analyst-Driven

- **Questionnaires**
  - Different Time, Different Place
  - Many People, Analyst-Observer

- **Group Sessions**
  - Same or Different Place, Same Time
  - <20 People, Analyst-Facilitated

- **Observation**
  - Same Time, Same Place
  - Analyst-Observer

All Expanded on Next Few Slides
Interviews

- Asking Questions; Listening to the Answers
- When Do You Interview?
  - When a “Few” People Each Know a “Lot”
  - Ability to Meet with Them
  - When True SME’s Exist
  - When the Stakeholders May Not Be Brought Together
  - When the Problem Does Not Require Interaction to Arrive at an Optimal Answer

Questionnaires

- Pre-defined Series of Questions
- Widely Used
- Appear Scientific Due to Statistical Analysis
- When Do You Use Questionnaires?
  - Large Base of Individuals
  - Need Answers to Well-Defined Specific Issues
  - To Verify Results of Limited Interviews
  - When You Want a Specific Outcome 😊

Group Sessions

- Gather (3 to 20) Stakeholders in One Room
- Team Answers Are Usually Better than Individual Answers
- When Conduct Group Session?
  - When Many People Each Knows a (Small) Part of the Whole
  - When Problem Needs Interaction to Optimize Solution
  - When You Can Get Them All Together
  - Anonymity Necessary? Use a Tool
  - Distributed? Use a Tool

Observation

- Analyst Observes Stakeholders Performing Their “Usual” Work
- Analyst Should Be As Passive As Possible
  - Heisenberg Uncertainty Principle: Observation Affects Outcome
  - Termed “Action Research” When Observer Participates
- When to Observe
  - When There Exists Someone/thing to Observe
  - When Knowledge is (Believed to Be) Tacit
- The Goguen/Jirotka Story
Prepare for Triage

- This is an “attitude”
- Elicitation’s purpose is to gather all candidate requirements
- Make sure everybody knows that triage will follow in order to select the requirements
Use Sensible Starting Point(s)

- Gause/Weinberg
- Using Any of the Aforementioned Techniques, Aim for
  - Goals
  - Needs
  - Users
  - Scenarios (Use Cases)
  - Outcomes
  - Reports

- Compatible with Any Technique
The Result of Elicitation

Here are the New Candidate Requirements

<table>
<thead>
<tr>
<th>ID</th>
<th>Requirement Text</th>
<th>Estim</th>
<th>Tech.</th>
<th>Risk</th>
<th>Priority</th>
<th>Rel.</th>
<th>Relates To</th>
<th>Comments</th>
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<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>51</td>
<td>No formal training shall be required to operate the FLM.</td>
<td>0.00</td>
<td>1</td>
<td>High</td>
<td>1.5</td>
<td></td>
<td>560</td>
<td>3</td>
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<tr>
<td>555</td>
<td>Any new releases or versions of the software shall be sold as new products. Users must p...</td>
<td>0.00</td>
<td>1</td>
<td>High</td>
<td>1.5</td>
<td></td>
<td>550</td>
<td>3</td>
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<tr>
<td>334</td>
<td>User software will not be free of charge.</td>
<td>0.00</td>
<td>1</td>
<td>High</td>
<td>1.5</td>
<td></td>
<td>550</td>
<td>3</td>
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<tr>
<td>512</td>
<td>The FLM shall return to the initial state.</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>472</td>
<td>Pressing the screen in an area without a command shall make no sound nor shall it be seen.</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>515</td>
<td>The screen shall be capable of displaying alphanumeric data in blocked, uppercase characters.</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>The FLM shall accept lawn and obstacle programming from the user. During programming, the FLM shall...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>321</td>
<td>The FLM shall initiate communications with the GPS through external interface EL-GPS.</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>The FLM shall interface with two different external systems, the GPS and the Electro...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>310</td>
<td>External interfaces include the receipt of location data from GPS and detection of obstacles...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>511</td>
<td>The FLM shall not overcut or undercut the border and user defined obstacles by more than 0.1...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>510</td>
<td>The FLM shall cut the lawn only within the area defined by the user during the programming...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>550</td>
<td>Border programming shall be required to be completed by the user prior to accepting the oh...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>411</td>
<td>The Screen shall be 10.25 mm (high) by 105 mm (wide) and capable of displaying two rows...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>446</td>
<td>Serious errors (e.g., blade fouling, Requirement 179) shall not have a button on the...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td>179</td>
<td>Unclear</td>
</tr>
<tr>
<td>553</td>
<td>Programming border data shall be terminated by a user request, or when the FLM returns to...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>554</td>
<td>After the termination, the FLM shall be ready to receive another command.</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>418</td>
<td>The screen shall be used to display information from the FLM to the user and accept data...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>561</td>
<td>User shall guide the FLM to the obstacle and indicated that the boundary of obstacle will...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>562</td>
<td>RLM shall record sufficient data (e.g., from GPS) to meet the accuracy requirements stated...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td>510, 51...</td>
<td>560</td>
<td>3</td>
</tr>
<tr>
<td>552</td>
<td>RLM shall record sufficient data (e.g., from GPS) to meet accuracy requirements stated...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td>510, 51...</td>
<td>550</td>
<td>3</td>
</tr>
<tr>
<td>551</td>
<td>User shall guide the FLM to the border of the lawn and indicate that the boundary will be...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>570</td>
<td>Programming refusal location shall be invoked by user during the initial state of programming...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>571</td>
<td>User shall guide the FLM to the refusal location and indicate that the location of FLM is th...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>572</td>
<td>RLM shall record sufficient data to meet the accuracy requirements 510, 511, 512, and 5...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>573</td>
<td>Programming refusal location shall be terminated after FLM records its location.</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>574</td>
<td>After the termination, the FLM shall be ready to receive another command.</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>440</td>
<td>In these cases, the FLM must be shut off and the error corrected by the user.</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>551</td>
<td>Terminate logic for FLM if the program ends and indicate the boundary of obstacle will...</td>
<td>0.00</td>
<td>1</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Appended to the Old Requirements
Outline

- Definitions
- The Problem
- Some Solutions
  - Elicitation
  - Triage
  - Specification
- Summary

Within each:
- definition
- effects of over- and under-doing it
- list of “just enough” “tricks”
- expand a few
- show result of activity
Triage

- The art of selecting the “right” features to include in your next release
Triage in the Requirements Process

Customers & Competition

- Cust Rep or Marketing
- Bug Reports
- Unsatisfied From Previous Release
- Development

List of Candidate Requirements

Development: Estimation

List of Annotated Candidate Requirements

Cust Rep or Marketing: Prioritization

Development:

60% Baseline

SRS & Estimation Refinement

100% Baseline

Product Development

Technology

- Cust Rep or Marketing
- Finance
- Product Development

Baseline

60%

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Just Enough Requirements Management
Effects of “Too Much” or “Too Little” Triage

Too much
- You would spend so much time prioritizing, establishing interrelationships, and selecting that no time would be left to build the system

- Most companies don’t do it at all
  - Consistently try to do too much
  - Intimidation, politics, threats, hallway pressure

Too little
- You would build the wrong system
- You would try to build more than you can build
Secrets of “Just Enough” Triage

- Maintain requirements in lists
- Establish practices that pit the team “against” the problem, rather than between team members
- Follow a sensible triage process
- Annotate requirements (by at least priority and cost-to-satisfy)
- Let schedule drive requirements inclusion
- Involve representatives from all key groups
- Often solution lies in out-of-box thinking

Expanded on Next Few Slides
Relative Importance to Stakeholders

- Don’t Just Ask a Stakeholder to Rate Them!
- $100 Test
  - How it Works
  - Game Playing (“prisoners dilemma” voting; collusion)
- Yes/No Vote
  - How it Works
  - Problems (what does “no” mean; what if really care)
- -2 to +2
  - How it Works
- Often important to record all votes independently
Annotate Requirements (2 of 3)

- Effort/Cost
- In Which Release?
- Duration (optional)
- Technical Risk (optional)
- Eased if Requirements Are in a Database
  - Microsoft Access
  - Microsoft Excel
  - IBM Rational RequisitePro
  - IBM Telelogic DOORS
  - Borland (Starbase/TBI) Caliber RM
  - Integrated Chipware RTM
  - ...

See: http://www.paper-review.com/tools/rms (from incose.org)
<table>
<thead>
<tr>
<th>ID</th>
<th>Requirement Text</th>
<th>Estim Level</th>
<th>Tech Level</th>
<th>Priority</th>
<th>Rel. To</th>
<th>Related To</th>
<th>Comments</th>
<th>Child of</th>
<th>Level</th>
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</thead>
<tbody>
<tr>
<td>561</td>
<td>No formal training shall be required to operate the FILM.</td>
<td>0.00</td>
<td>1</td>
<td>High</td>
<td>S</td>
<td></td>
<td></td>
<td>960</td>
<td>3</td>
</tr>
<tr>
<td>555</td>
<td>Any new releases or versions of the software shall be sold as new products. Users must be notified.</td>
<td>0.00</td>
<td>1</td>
<td>High</td>
<td>S</td>
<td></td>
<td></td>
<td>950</td>
<td>3</td>
</tr>
<tr>
<td>554</td>
<td>User software will not be modified or upgraded.</td>
<td>0.00</td>
<td>1</td>
<td>High</td>
<td>S</td>
<td></td>
<td></td>
<td>950</td>
<td>3</td>
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<tr>
<td>512</td>
<td>The FILM shall return to the default location or data area within 10 cm of the user data area.</td>
<td>10.00</td>
<td>6</td>
<td>Medium</td>
<td>TBD</td>
<td></td>
<td></td>
<td>510</td>
<td>3</td>
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<td>432</td>
<td>Pressing the screen in an area without a command shall make no sound nor shall it be inaudible.</td>
<td>12.00</td>
<td>4</td>
<td>Medium</td>
<td>TBD</td>
<td></td>
<td></td>
<td>430</td>
<td>3</td>
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<tr>
<td>415</td>
<td>The screen shall be capable of displaying alphanumeric data in block, uppercase characters, and numbers.</td>
<td>1.00</td>
<td>1</td>
<td>High</td>
<td>S</td>
<td></td>
<td></td>
<td>410</td>
<td>3</td>
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<tr>
<td>500</td>
<td>The FILM shall accept lawn and obstacle programming from the user. During programming, the FILM shall accept lawn and obstacle programming.</td>
<td>35.00</td>
<td>7</td>
<td>High</td>
<td>TBD</td>
<td></td>
<td></td>
<td>500</td>
<td>3</td>
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<tr>
<td>521</td>
<td>The FILM shall interface with two different external systems. The FILM and the Electronic display.</td>
<td>120.00</td>
<td>9</td>
<td>Medium</td>
<td>S</td>
<td></td>
<td></td>
<td>320</td>
<td>3</td>
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<tr>
<td>310</td>
<td>External interfaces include the receipt of location data from GPS and detection of obstacles.</td>
<td>22.00</td>
<td>5</td>
<td>High</td>
<td>TBD</td>
<td></td>
<td></td>
<td>310</td>
<td>3</td>
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<tr>
<td>511</td>
<td>The FILM shall not ever cut or uncut the border, and user defined obstacles by more than 0.5 mm.</td>
<td>13.00</td>
<td>4</td>
<td>High</td>
<td>TBD</td>
<td></td>
<td></td>
<td>510</td>
<td>3</td>
</tr>
<tr>
<td>510</td>
<td>The FILM shall cut the lawn only within the area defined by the user during the programming.</td>
<td>22.00</td>
<td>5</td>
<td>High</td>
<td>TBD</td>
<td></td>
<td></td>
<td>500</td>
<td>3</td>
</tr>
<tr>
<td>550</td>
<td>Border programming shall be required to be completed by the user prior to accepting the area.</td>
<td>4.00</td>
<td>3</td>
<td>High</td>
<td>TBD</td>
<td></td>
<td></td>
<td>500</td>
<td>3</td>
</tr>
<tr>
<td>411</td>
<td>The screen shall be 16.25 mm (height) by 105 mm (width) and capable of displaying two lines.</td>
<td>3.00</td>
<td>1</td>
<td>High</td>
<td>TBD</td>
<td></td>
<td></td>
<td>410</td>
<td>3</td>
</tr>
<tr>
<td>446</td>
<td>Serious errors (e.g., biofueling, Requirement 179) shall not have a button on the screen.</td>
<td>10.00</td>
<td>1</td>
<td>Medium</td>
<td>TBD</td>
<td>173</td>
<td>Unclear</td>
<td>440</td>
<td>3</td>
</tr>
<tr>
<td>553</td>
<td>Programming border data shall be terminated by a user request, or when the FILM returns to the default location.</td>
<td>4.00</td>
<td>3</td>
<td>Medium</td>
<td>TBD</td>
<td></td>
<td></td>
<td>550</td>
<td>3</td>
</tr>
<tr>
<td>554</td>
<td>After the termination, the FILM shall be ready to receive another command.</td>
<td>4.00</td>
<td>3</td>
<td>Medium</td>
<td>TBD</td>
<td></td>
<td></td>
<td>550</td>
<td>3</td>
</tr>
<tr>
<td>418</td>
<td>The screen shall be used to display information from the FILM to the user and accept data.</td>
<td>5.00</td>
<td>1</td>
<td>High</td>
<td>TBD</td>
<td></td>
<td></td>
<td>410</td>
<td>3</td>
</tr>
<tr>
<td>561</td>
<td>User shall guide the FILM to the obstacle and indicate that the boundary of obstacle will not be crossed.</td>
<td>11.00</td>
<td>6</td>
<td>High</td>
<td>TBD</td>
<td></td>
<td></td>
<td>560</td>
<td>3</td>
</tr>
<tr>
<td>562</td>
<td>RILM shall record sufficient data (e.g., from GPS) to meet the accuracy requirements stated in Requirement 510.</td>
<td>11.00</td>
<td>6</td>
<td>High</td>
<td>BD</td>
<td>510.5.</td>
<td></td>
<td>560</td>
<td>3</td>
</tr>
<tr>
<td>552</td>
<td>RILM shall record sufficient data (e.g., from GPS) to meet accuracy requirements stated in Requirement 510.</td>
<td>4.00</td>
<td>3</td>
<td>High</td>
<td>BD</td>
<td>510.5.</td>
<td></td>
<td>550</td>
<td>3</td>
</tr>
<tr>
<td>551</td>
<td>User shall guide the FILM to the border of the lawn and indicate that the boundary will not be crossed.</td>
<td>3.00</td>
<td>3</td>
<td>High</td>
<td>BD</td>
<td></td>
<td></td>
<td>550</td>
<td>3</td>
</tr>
<tr>
<td>570</td>
<td>Programming required location shall be invoked by user during the initial state of programming.</td>
<td>11.00</td>
<td>5</td>
<td>Medium</td>
<td>TBD</td>
<td></td>
<td></td>
<td>500</td>
<td>2</td>
</tr>
<tr>
<td>571</td>
<td>User shall guide the FILM to the required location and indicate that the location of FILM is the required location.</td>
<td>13.00</td>
<td>5</td>
<td>Medium</td>
<td>TBD</td>
<td></td>
<td></td>
<td>570</td>
<td>3</td>
</tr>
<tr>
<td>572</td>
<td>RILM shall record sufficient data to meet the accuracy requirements 510, 511, 512, and 513.</td>
<td>5.00</td>
<td>5</td>
<td>Medium</td>
<td>TBD</td>
<td></td>
<td></td>
<td>570</td>
<td>3</td>
</tr>
<tr>
<td>573</td>
<td>Programming required location shall be terminated after FILM records its location.</td>
<td>5.00</td>
<td>4</td>
<td>Medium</td>
<td>TBD</td>
<td></td>
<td></td>
<td>570</td>
<td>3</td>
</tr>
<tr>
<td>574</td>
<td>After the termination, the FILM shall be ready to receive another command.</td>
<td>5.00</td>
<td>5</td>
<td>Medium</td>
<td>TBD</td>
<td></td>
<td></td>
<td>570</td>
<td>3</td>
</tr>
<tr>
<td>447</td>
<td>In these cases, the FILM must be shut off and the error corrected by the user.</td>
<td>2.00</td>
<td>1</td>
<td>Medium</td>
<td>TBD</td>
<td></td>
<td></td>
<td>440</td>
<td>3</td>
</tr>
<tr>
<td>551</td>
<td>User shall guide the FILM to the required area and indicate that the boundary of the area will not be crossed.</td>
<td>3.00</td>
<td>5</td>
<td>Medium</td>
<td>TBD</td>
<td></td>
<td></td>
<td>550</td>
<td>3</td>
</tr>
</tbody>
</table>
Let Schedule Drive Req’ts (Not the Reverse) (1 of 3)

Typical Scenario

“It Will Take Us 9 Months”

“Oh, Here Are Our Requirements By When Can You Build Them?”

“Sorry, They Must Be Completed in 6 Months”

NOW WHAT?
Let Schedule Drive Req’ts (Not the Reverse) (2 of 3)

Better Scenario

“Okay, we’re going to build in a series of 3 month increments. Here are all the requirements.”

“But we really need reqt 17 in that first release.”

“Let’s see. If we build reqts 1 through 9 and 12, we’ll be able to do them in 3 months”

“Okay. How about if we add reqt 17 and drop reqt 12?”
Let Schedule Drive Req’ts (Not the Reverse) (3 of 3)

- Better Scenario

  “Hmmm. I really liked reqt 12. Can we drop reqt 3 instead?.”

  “Well if we drop requirements 3 and 4, we could do it.”

  “Okay”

  “Okay. How about if we add reqt 17 and drop reqt 12?”

NOW THIS IS TEAMWORK
Involve Representatives from All Important Groups

- Customer (or True Representative)
  - Could Be Marketing
- Development
- Source of Financing
  - Could Be Customer

This is a *Dynamic* Three-Sided Negotiation
“Solution” Often Lies Out-of-the-Box

- Tell story from my experience at disk-farm company
- New partial releases
- Innovative marketing
- Innovative pricing
- Market re-segmentation
The Result of Triage

- Annotated list of requirements
- Requirements selected for inclusion are flagged
- Flagged requirements balanced with schedule and budget
- All parties in agreement
Outline

- Definitions
- The Problem
- Some Solutions
  - Elicitation
  - Triage
- Specification
- Summary

Within each:
- definition
- effects of over- and under-doing it
- list of “just enough” “tricks”
- expand a few
- show result of activity

will some of your students be able to join us?
Requirements Specification

- The process of documenting the external characteristics of a desired system
What is a Requirements Specification?

The RS describes...

- Inputs
- Outputs
- Environments
- Functions
- Performance

The System
Roles of the RS

- Basis of communication between all parties
- Input to design team
- Input to (software) test and quality assurance
- Development manager’s reference
- Controls evolution of system
Effects of “Too Much” or “Too Little” Req’ts Specification

Too much
- You would spend so much time documenting requirements that no time would be left to build the system

Too little
- You would build the wrong system
- Customers would be surprised & disappointed by the system
Secrets of “Just Enough” Req’ts Specification

- Realize that the document will evolve during writing
- Include a glossary
- To increase understanding, refine when necessary (and then maintain requirements in a hierarchical list)
- Don’t go overboard checking for quality attributes
- Keep requirements in a list
- Don’t lose sight of goal
- Customers have the right to change their minds!
Keep Requirements in a List (1 of 2)

- Alternatives
  - Highly Polished Standards-Based Document
    - Will at Least Double Your Requirements Effort with Little Appreciable Gain
  - A Collection of Diagrams
    - is the Geek View of World: If You Are Not a Geek, We’ll Train You to Be One
  - No Requirements Documentation
    - High Risk of Building Wrong System
  - Formal Specification
    - Except Under Special Circumstances, Will Alienate Customer
Keep Requirements in a List (2 of 2)

- Much Better
  - A List of Annotated Requirements (in Natural Language) Organized Hierarchically
  - Augment as Needed with More Formal Models (and Cross-Reference)
Don’t Lose Sight of the Goal

- The Goal is *Not*
  - To Write the Perfect Requirements Specification
  - To Model the Entire System
- The Goal *is*
  - To Create the Best Possible Product at the Right Time
- So, Goal is to Record Product Behaviors Now to Minimize Risk, Especially Caused by Miscommunication
Customers Have a Right to Change Their Minds

- The More Features the Product Has, the *More* Customers Will Want
- The More Features Are Discussed, the *More* Customers Will Want

- The Real World Changes
- The Real Problem Changes
- Our Perceptions of the Real Problem Change
- And That’s Okay!

**Solutions:**
- Requirements Backlog
- 60% Baseline
- Small Iterations
The Result of Specification

- Expanded List of Selected Annotated Requirements
- Possibly Augmented Selectively with Models
- Probably Suppress Display of Rejected/Postponed Requirements
will some of your students be able to join us?

Outline

- Definitions
- The Problem
- Some Solutions
  - Elicitation
  - Triage
  - Specification

Summary
Secrets of “Just Enough” RM (1 of 3)

- In General
  - Involve the Customer
  - Manage Customer Expectations
  - Build Iteratively
  - Build in Small Increments
  - Don’t Get Suckered Into Believing Silver Bullets
  - KISS

- Elicitation
  - Don’t Lose Sight of the Goal: Understanding the Problem
  - Care
  - Who’s Smart?
  - Maintain a Glossary
  - Recognize that 1 Stakeholder is Never Sufficient
  - Don’t Ignore Elicitation
  - Use Appropriate Elicitation Techniques (continued)
Secrets of “Just Enough” RM (2 of 3)

- **Elicitation (continued)**
  - Prepare for change
  - Prepare for triage
  - Use sensible starting point(s)
  - Select appropriate notations

- **Triage**
  - Maintain requirements in lists
  - Annotate requirements
  - Establish practices that pit the team “against” the problem, rather than between team members
  - Let schedule drive requirements inclusion
  - Involve representatives from all key groups
  - Follow a sensible triage process
  - Often solution lies in out of box thinking
Secrets of “Just Enough” RM (3 of 3)

- **Specification**
  - Avoid notations foreign to your customers
  - Include a glossary
  - Don’t lose sight of goal
  - Realize that the document will evolve during writing
  - Keep requirements in a list
  - Customers have the right to change their minds!
  - Sign a baselining contract
  - To increase understanding, refine when necessary (and then maintain requirements in a hierarchical list)
  - Don’t go overboard checking for quality attributes
Recommended Books
(1 of 2)

- **Requirements in General**

- **Agile Development**

- **“Just Enough” Requirements**
Elicitation

Triage (No books, but . . .)

Specification