How to Collect and Manage Requirements for Successful GIS Projects

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Craig Venker
Requirements
Provide direction for program success
Why Requirements are Important?

**Top Ten factors found in “Failed” projects**
1. Incomplete Requirements
2. Lack of user involvement
3. Lack of Resources
4. Unrealistic Expectations
5. Lack of Executive Support
6. Changing Requirements & Specifications
7. Lack of Planning
8. Didn’t Need it Any Longer
9. Lack of IT management
10. Technical Illiteracy
Why Requirements are Important?

“As many as 71% of software projects that fail do so because of poor requirements management, making it the single biggest reason for project failure.”

Christopher Lindquist states in CIO Magazine, “Fixing the Requirements Mess,”
Why Requirements are Important?
Early mistakes lead to costly fixes

Figure 3: Origin of Software Defects (Source: Crosstalk, the Journal of Defense Software Engineering)
Why Requirements are Important?

COST OF A SOFTWARE BUG

$100 If found in Gathering Requirements phase
$1,500 If found in QA testing phase
$10,000 If found in Production

Systems Sciences Institute
Defect prevention reducing costs and enhancing quality
Graphic by Celerity
Why Requirements are Important?
Requirements evolve over time

- Never: 45%
- Rarely: 19%
- Sometimes: 16%
- Often: 13%
- Always: 7%
- 64% - Rarely or Never
- 20% - Often or Always

Standish Group Study Reported at XP2002 by Jim Johnson, Chairman
A User Story is a requirement expressed from the perspective of an end-user goal.

- We always start with the card...
- That drives the conversation...
- The user story becomes the requirement...or really, the understanding
Collect Requirements
User Story

- Simple, brief descriptions of functionality
- Primarily from a user (role) perspective
- Sized for planning
- Testable
- Why?

![Comic strip](https://www.dilbert.com/comics/2002/01/11/)
As a [role], I can [feature] so that [benefit]
AGILE FAMILIES

AS YOUR FATHER I WANT YOU TO CLEAN UP YOUR ROOM

SO THAT.....?

MAKE SURE YOUR USER STORY IS CORRECTLY PHRASED
Understanding The Four C's

A
Fun
Teacher

F
Always
Drinks

T
Coffee

D

ROY G BIV

HOMES

Kings Play Chess On Fine Glass Sets
Let me give you a couple devices to help

• Three C’s – a gimmick pattern to remind us of the process

• INVEST – a mnemonic to helps us develop good stories
The 3 C’s of User Stories

Card

Conversation

Confirmation
The Card
A good user story uses the “INVEST” model:

**Independent.** Reduced dependencies = easier to plan

**Negotiable.** Details added via collaboration

**Valuable.** Provides value to the customer

**Estimate-able.** Too big or too vague = not estimate-able

**Small.** Can be done in less than a week

**Testable.** Good acceptance criteria
As a field representative, I want to collect information offline so that data can be collected in remote locations.
As a Farmer, I need to be able to overlay existing data on top of my basemap in order to see different data while working in the field.

Browser Back Warning
As a Groove user, I want to be warned if I hit the 'Back' button in my browser so that I don't lose my data in the application.

Acceptance:
- User receives pop-up with "Cancel" or "Continue" options
- User can "cancel" and stay on the same page
- User can "continue" and be directed to previous page
- User will be logged out of application if the choose "continue"
- Functionality in IE, Chrome, Firefox browsers

Use **paper cards**

Write out **concise** user stories

Define **acceptance criteria** for each user story
Keep your stories visible
Some things are **not about a [user]**

As a user interface, I need to look like the following image so that I can be intuitive to use
The Conversation
User stories facilitate a **conversation** with the team and with the users…

**Hey! Something to look at, talk about, comment on, react to…**
Progressively decompose your stories…

As a real estate manager, I need to interact with a map to explore new locations.

As an analyst, I need the ability to create a map with pop-ups to build easy-use-maps for management.

As a real estate manager, I need to be able to see a pie chart of surrounding demographics so that I can match consumer demand with product.

As a real estate manager, I need interactive map capability on my iPad so that I can travel minimalistic during site visits.
Consider grouping user stories into themes
The Confirmation
How do we know when we are done?

Confirmation…the acceptance test

• Given [some context]
• When [some action is carried out]
• Then [something happens]
How do we know when we are done?
Confirmation…the acceptance test

- **Given** I have enabled offline access on my map
- **When** I click on the map to create a feature
- **Then** the feature will be stored locally until I sync with connectivity.
How do we know when we are done?

Couple of things to note...

• Define acceptance just in time…don’t waste too much time
• Part of the conversation process
• Acceptance consistency (given…when…expect) is helpful, but not necessary
Definition of Done
I don’t do strict...

Examples of practices that might be included in the definition of “done:”

• Acceptance criteria met
• Code is reviewed by another development team member
• Test cases are written
• Unit tests and UI automation tasks are written
• Feature is tested for accessibility
• Feature is tagged for analytics

http://blog.teamtreehouse.com/when-is-a-user-story-done-acceptance-criteria-definition-done
How will I know I’ve done that?

Bob Hartman – Agile for All

As the author of this presentation, I want to put together a slide deck communicating the Esri way of dealing with requirements so that the audience will take away something meaningful.

How will I know I’ve done that?

- Presentation created
- Audience in attendance
- Someone learns something
Watch out for the ‘Gotchas’

Things to avoid

- Avoid long lists of acceptance criteria on a single user story
- Prepare for conflicting requirements
- Avoid requirements that are ambiguous
- Avoid requirements that describe HOW
- Requirements must have a “reason”
- Avoid moving forward on development until after the customer has reviewed the design
- Don’t forget to prioritize
Manage Requirements
Using TFS
## Making a Decision

<table>
<thead>
<tr>
<th>Project Considerations</th>
<th>Trello</th>
<th>GitHub</th>
<th>TFS</th>
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</thead>
<tbody>
<tr>
<td>Requirements are Proprietary</td>
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<td>Mobile App</td>
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<td>Easy to setup</td>
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<td>Estimation tools</td>
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<td>Automated Burndown chart</td>
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<td>Easily integrated with Visual Studio for Code Repository</td>
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<td>Capacity Planning</td>
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<td>Exports to MPP and Excel</td>
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There is a lot of info out there to help
A few years ago, Accompa put together a list, with pros and cons, of free requirements management tools.

http://rmblog.accompa.com/2012/04/free-open-source-requirements-management-tool/
Requirements

THE most important part of a project

- Solid requirements gathering leads to successful projects
- Consider solution, COTS capabilities before collecting additional requirements
- Involve the right people in the process
- Pick a methodology that fits your project
- Focus on the level of detail that is appropriate
- Important to prioritize and allocate
- Invest plenty of time to secure customer approval
References

• *Agile & Iterative Development: A Manager’s Guide* by Craig Larman, Addison-Wesley, 2003
• *Use Case Driven Object Modeling with UML* by Doug Rosenberg and Matt Stephens, Apress, 2008
• *Writing Effective User Cases, A Cockburn*, Addison-Wesley, 2001
• *Agile Development with ICONIX Process* by Doug Rosenberg, Matt Stephens, and Mark Collins, Apress, 2005
References

www.agilemanifesto.org

http://alistair.cockburn.us/

http://www.iconixsw.com/

http://www.pmi.org/default.aspx
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