Autodesk® AutoCAD® Utility Design: NV Energy's Agile Approach

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You decide to implement new software into your business process. You define requirements, design, and development, and then you unit test. You hand it over to Quality Assurance. In several months, you will be ready show the business and they can validate through user acceptance testing. Right? Not necessarily! Do it all up front with the agile methodology. NV Energy made the decision to leave the waterfall mindset behind. Listen to a proven success story of implementing a large design tool on time and on budget with the commitment of business, IT, and development.

Learning Objectives

At the end of this class, you will be able to:

- Identify why Autodesk AutoCAD Utility Design software provided the right tool to complement NV Energy's work management system
- Describe the fundamental methodology behind an agile approach
- List the key factors that made the agile approach successful for NV Energy's implementation
- Apply the lessons learned in this class to your own implementation

About the Speakers

Christer Hargrove is an IT Program Manager for NV Energy, an electric and gas utility located in Nevada. From his home office in Las Vegas, he has implemented a number of work and asset management implementations across the state with software including Maximo, Ventyx, Primavera, Microstrategy, and Autodesk Utility Design. Christer received his B.S. degree in Civil Engineering from Mississippi State University and has 23 years of experience in the utility industry. As a licensed professional engineer in the state of Nevada, he has had the opportunity to apply a variety of methods to lead successful teams in both IT and Operations. Christer last spoke at AU2012 by addressing the Infrastructure Symposium. *CHargrove@nvenergy.com*

Colleen Adams has been a Consulting Project Manager at Autodesk for almost two years. During this time, she has managed multiple projects for clients in the utilities and manufacturing industries. The majority of her projects involve the implementation and customization of one or more of the following products: AutoCAD, AUD, Vault, and Map3D products. Colleen has 15 years of project management experience within the IT industry. She received her BA degree from Northwood University in Midland, Michigan, majoring in Computer Science Management, and obtained her PMP certification in March 2005. Colleen was introduced to the Agile Methodology for project management in 2010, and while at Autodesk, successfully implemented a major AUD implementation with NV Energy, utilizing the Agile SCRUM framework. Since then, she has become an advocate for utilizing Agile best practices, as she has experienced first-hand its benefits by delivering “on-time” and “within budget”.
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Why Autodesk® AutoCAD® Utility Design?

While NV Energy has used AUD in its southern territory for over 10 years, an AUD implementation only became a priority for its northern territory in 2010 with the implementation of Maximo. The primary objective was to build efficiencies on the foundation of its enterprise work and asset management initiative. Working with Autodesk, a detailed assessment was completed and requirements specification produced. Based on the findings in the assessment, it was determined that:

- The probability of success was high.
- The benefits were clear for the New Business Design Department, Supply Chain, Operations, and Customers.

What is the Agile Methodology?

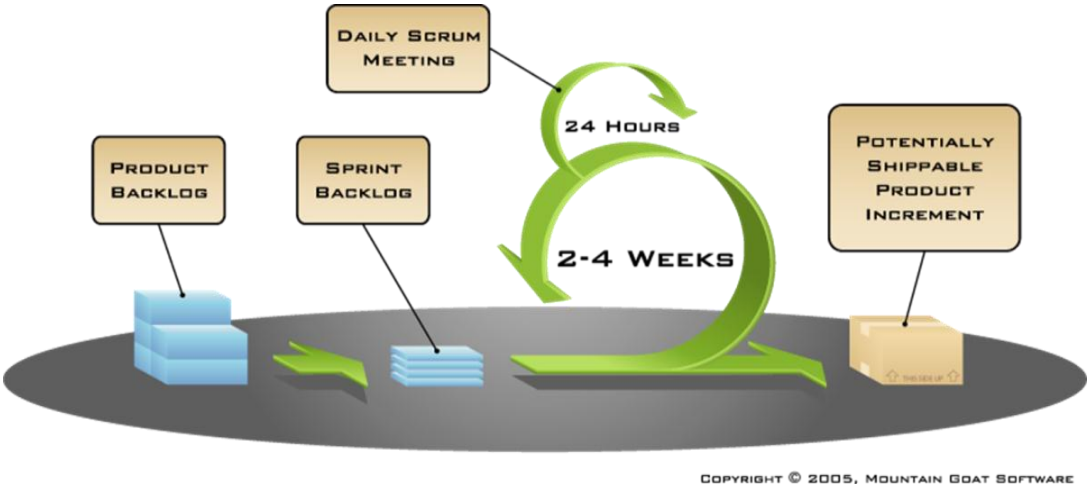
Agile is a software development methodology that values:

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

That is, while there is value in the items on the right, the team values the items on the left more. (1)

Agile isn't a mechanism for success. It is a mechanism of making failure transparent so that you can adapt quickly. Practically, an Agile project is characterized by:

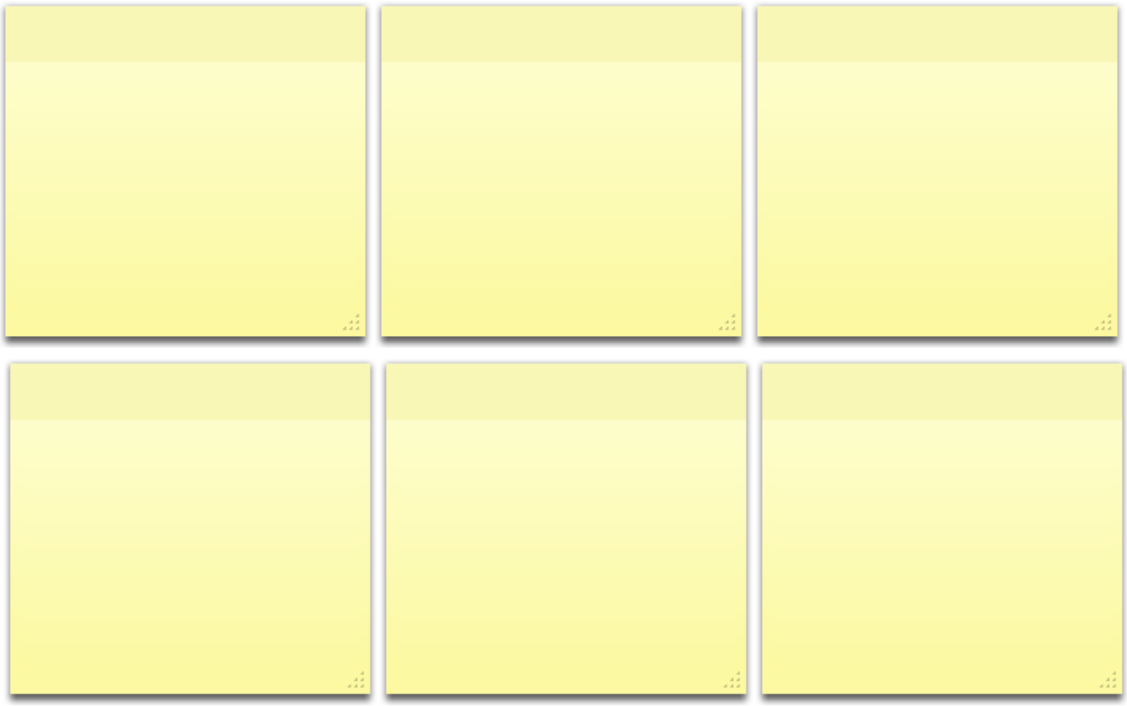
- Incremental product development
- Clearly defined roles
- Fast feedback loops
- Team empowerment



Getting Started with Agile Methodology in your Project

How would you identify a project to be successful?

Exercise 1 - (Enter your thoughts on the sticky notes below.)



If you answered on time, within budget, high quality, meeting scope, you are probably not alone.

What about constant collaboration, having commitment, all throughout the project cycle. Do you think that is important? These are things challenging to obtain following the traditional waterfall approach, correct?

Obtaining Commitment

Regardless of whether your project uses the Aglile approach or not, obtaining commitment is important within the everyday project team. It is also essential for extended stakeholders, which may include sponsors, business units, IT, and contractors. During Project Start, put key stakeholders into a room. Ask the question from above. "How would identify a project to be successful?" Put these up on a whiteboard or wall. There will be many responses: importance of scope, cost, schedule, and quality. You may be surprised how much of their answers tie back to "Collaboration" or "Commitment".

You can also switch the question. Ask "What have been the "misses" in previous project implementations?" Answers will probably include… "functionality missing or scope creep, large number of defects, users were in the dark during development, cost was more than expected, product was delivered later than expected, there was insufficient time to test, and/or train properly, no one listened to our feedback."

Explain what Agile can do to address their concerns and make their project successful. Bring in an Agile coach, if needed, for training and initial facilitation. Transform the overall thinking into an Agile mindset.

Engaging the Project Team

Identifying Team Members

Ensuring the right people are placed into their roles is another key to success.

1 – ScurmMaster: Who has the ability to manage the team and the Agile process?

This may or may not be the project manager. Responsibilities include:

- Ensures team is adhering to SCRUM process
- Ensures quality
- Ensures impediments are quickly removed
- Motivates team
- Facilitate team to improve productivity
- Represents team to management
- Facilitator
- Ensures team is aware of progress to project, sprints, release

2 – Product Owner: Who has the ability to make decisions?

In the case of NV Energy, this was a Business Lead. This person should be present and available on a daily bases to assist with:

- Gathering input from users and stakeholders

- Managing stakeholder expectations
- Clarifying priorities
- Answering product/requirement questions and giving feedback to work in progress

3 – Delivery Team: Who is needed to complete the work?

This entails but not limited to Analysts, Developers, QA, Testers. As part of the team, these individuals are responsible for:

- Committing to the Sprint
- Owning their estimates
- Plan their own work
- Do what it takes to complete what they are committed to
- Communicating progress and any impediments

SCRUM Teams are **self-organized** and **self-disciplined**. They make decisions collaboratively and share roles in development. Each member is accountable for the Team meeting the Sprint goal. There will be different levels of engagement within the team, and it should be clear who is committed (primary) versus who is involved (secondary) in the project.

Provide Agile Training and Coaching

The Agile methodology may be new to some or all of the team members. Providing Agile Training is critical if this approach is new. And having an experienced Coach to facilitate the initial creation, sizing, and prioritization of the product backlog is well worth the investment.

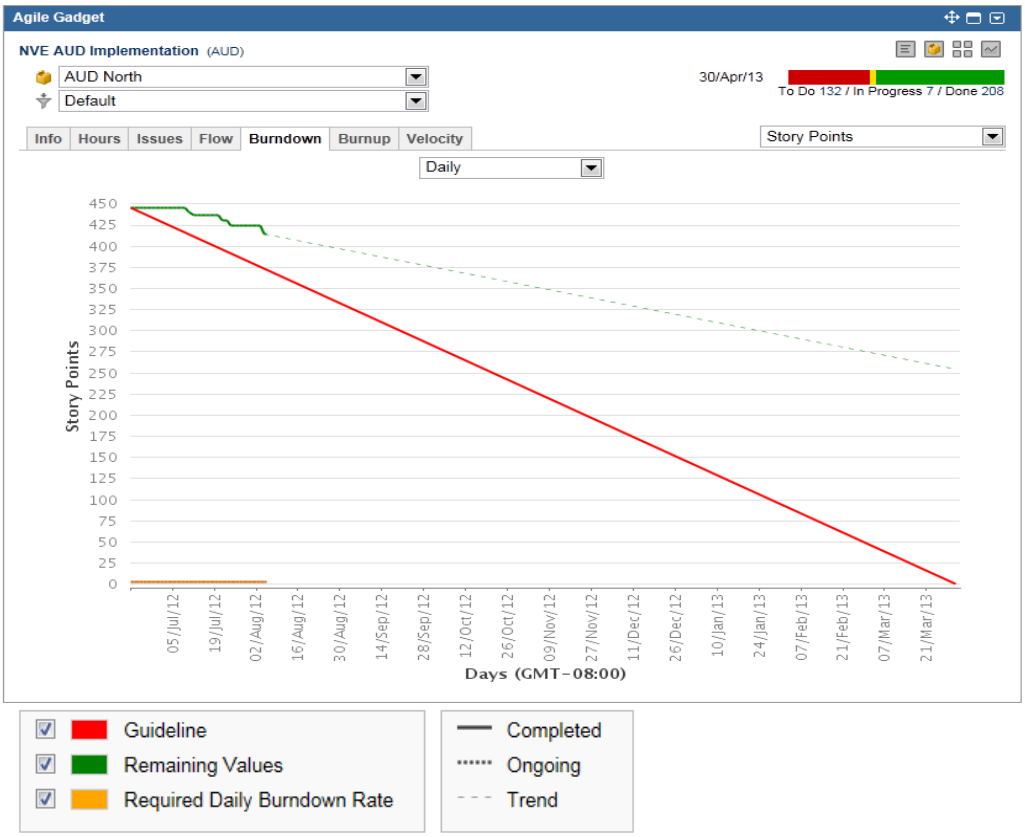
Steps to consider:

1. Research and select an Agile Coach
2. Ensure entire project team is available for Agile Training. One suggestion is to make this part of the Project Kickoff. This is a key for the start of collaboration.
3. During Project Kickoff, Agile Coach may assist team with creating user stories, estimating, Release Planning, and planning for first sprint.

4. Invite Agile Coach to the SCRUM ceremonies for at least for the first couple sprints. He/She may be able to provide some further guidance or suggestions to improving execution with the Agile process, if needed.

Selecting the Right Tool to Help with Agile Tracking and Reporting

There are different tools available to assist managing an Agile project. These tools assist with managing the Product Backlog, Release Planning, Sprint Planning, and Execution. In addition, they offer reporting capabilities, such as burn down charts, etc.



Selecting the right tool may vary based on your organization or project needs. They can range in licensing fees and offerings. A couple of products that were considered for this project were:

- JIRA, by Atlassian
- Rally ALM, by Rally Software

Project Setup

Creating User Stories

User Stories are basic requirement statements that contain the following content:

- As a <<who?>>
- I want to <<what?>>
- So that I can <<why?>>

We gather information from user stories, and they become placeholders to conduct conversations to gather more detail during the sprint iterations. User stories can be broken down into smaller user stories if needed. Ideally, acceptance criteria should be documented as the story is created. An example User Story is shown below:

AUD-178, Draw Pipe and Label Pipe

As a designer I want AUD to automatically label a line as a pipe to provide data for annotation and material capturing.

Acceptance Criteria:

- Insert pipes off palette with correct stylization and information
- Insert pipes via User Interface (UI)

In total, our project completed 148 user stories, including 36 that were not a part of the original requirements specification.

Creating the Product Backlog

Determine your ordered list of User Stories for all desired work on the project. These are to be prioritized by the Product Owner and may be reprioritized prior to each sprint as part of the Backlog Grooming. A portion of the product backlog is shown here in order of priority.

AUD-164	Edit Material Header
AUD-165	Project Explorer
AUD-166	Streamline menu
AUD-171	Insert Border
AUD-178	Draw Pipe and Label Pipe
AUD-170	Set Scale
AUD-687	Palette cleanup
AUD-185	Annotations
AUD-780	**NEW** Insert symbol and collect material - EFV (excess flow valve)
AUD-179	Label Overhead Wire

Estimating Story Points

Using Story Points provides an efficient means to estimate the relative size of any individual story. This estimation is done by the team collectively. "Poker Cards" may be used for voting and typically escalate in value (0, 1, 2, 3, 5, 8, 13, 20, 40, 100).

The value takes all aspects of the story into account such as effort, risk, and complexity. When done as a group, this method can be very effective. It may seem challenging initially, but as a history is built and estimation improves, it becomes an invaluable tool for tracking and communicating progress.. For this project:

- Smallest Story = 0 pts
- Largest Story = 20 pts
- Average Story = 4 pts

"Release" Planning

At the recommendation of our coach, we chose a two-week sprint iteration cycle. A couple of iterations over holiday periods were planned for three to four weeks. We found the two-week cycle enabled us to address any delayed work readily. Given the complexity of the project, we estimated the project to take approximately 26 Sprints.

Execution of Sprint Iterations

Capacity Planning

While Story Points are very useful, more detail is required to plan work in specific two-week sprint iteration. Capacity planning requires honest consideration of each team member's commitment in hours. By estimating both capacity and required effort, a reasonable number of stories can be selected for development during the sprint cycle.

Committed Stories for Sprint

AUD #	Desc	Story Points	Hours
872	Capture Material -electric -pole framing	8	64
1219	Insert symbol and capture material - electric-vault with switch	8	26.75
221	Insert symbol and capture material - electric -secondary box	5	30.5
TOTAL		**21**	**121.25**

NVE North Project - Capacity Planning			
Iteration	12		
Start Date	Wednesday, December 5, 2012		
End Date	Tuesday, December 18, 2012		
Non-Developer Days			
Iteration retrospective, demo and planning	Tuesday, December 18, 2012		
Holiday?			
Total days in Iteration	**9.0**		
Developer	Hours/Day (x-factor)	Days	Total
Bryde	8	7.0	56
Gabe	2	3.0	6
Chuck	6	9.0	54
John	3	9.5	28.5
Mike	2	5.0	10
Linda	6	9.0	54
Rebekah	2	3.5	7
Jim	3	9.0	27
Matt	?	7.0	
Capacity			242.5
Target			**145.5**
Remaining available hours			-24.25

Note: Before capacity planning can be done well, a consistent “definition of done” must be established for the stories. This will determine specific tasks and thus effort. Our definition of done included the following general tasks, and additional ones specific to the individual user story::

- Clarify Requirements
- Write Code
- Write Test Cases
- Execute Test Cases
- Review by Product Owner
- Create/Update Training Documentation
- Update the Requirements Specification

The average number of Story Points per Sprint for this project was 23.

Daily Calls

Progress was monitored daily through simple and straightforward question and answer of each team member.

- What did you accomplish yesterday?
- What do you plan to do today?
- Are there any blockers?

`The calls were held in parallel with an instance of "Live Meeting". As each team member discussed their work, the tasks were updated real-time in the Agile tool. This was especially helpful if a team member had unexpected availability and could pick up new tasks.

Backlog Grooming

At the mid-way point of any sprint we conducted a backlog grooming with the product owner. Here we adjusted priorities to make the upcoming sprint planning work go smoothly.

Sprint Retrospectives

At the conclusion of each Sprint, the team conducted a retrospective to evaluate what did and did not go well. This promoted continuous improvement and course corrections. Team members that had worked on previous Agile projects cautioned us that the first few Sprints would be difficult. They were correct. After the third Sprint, the team began to find its rhythm. Here are the notes from Sprint 4:

What went well?

- Capacity Planning – realizing few team members were out of the office we made these a low-pressurized sprint
- Good communication prior to people leaving for vacation. Were able to get questions we knew needed to be answered up front answered.
- Were able to go through the backlog to help get things done ahead of time while waiting for other planned sprint tasks to be completed.
- Use Live Meeting at end of daily standup to verify everyone is "on same page" and if any correction actions are needed. Catching things early on.

What did not go well?

- Reworked logic after receiving clarification from key resource who was out of the office during sprint. Made assumption maintenance tasks would not have major changes. This was a known risk during iteration planning, but caused developers to go back.
    - ACTION: Better planning of user stories within Sprint based on team availability.
    - ACTION: Consider pulling in other user stories (non- Gas related) and spreading Gas out into future sprints and pull in Overhead.

Sprint Reviews

Provided demos and solicited feedback. This provided a regular forum to keep stakeholders and sponsor engaged, while readily demonstrating the latest development work.

Lessons Learned

This project was considered very successful at NV Energy. It exceeded all of its cost, quality, and schedule goals. In addition, 36 user stories were included beyond the original scope that was documented in the Functional Requirements Specification.

Several key factors contributed to the success of this project. If you are considering an Agile approach to an upcoming project, we hope you are able to make use of our learning.

- Sought another utility to obtain feedback on experience with the Agile process
- Talked through process during the project kickoff
- Brought in Agile Coach during project kickoff which involved a 3-day onsite including training and coaching
- Included stakeholders in Agile Overview to further obtain commitment and understand their needs further
- Investigated different Agile tools and selected Jira Greenhopper to help manage the project
- Planned capacity at the beginning of each sprint to understand availability of team and plan sprint accordingly
- Quickly escalated any issues
- Used “stair stepping” to determine the target completion of a user story within each sprint cycle
- Any meetings needed to understand requirement further were planned for as part of the Sprint tasks
- Accepted the fact the first couple sprints will be a learning experience
- Ensured each team member was assigned a task. Eliminate any “waiting around”
- Started work on backlog items rather than “waiting for next sprint” to start
- When needed, used Live Meeting at end of daily standup to verify everyone is “on same
- Transformed leadership’s thinking into an Agile mindset where we were able to communicate in terms of Sprints and Story Points
- Leveraged historical data around Story Points and Sprints to clearly communicate the need for additional project resources when required.
- Softened the escalation of new scope items with the caveat that it would not extend the cost or schedule of the project, but rather be added to the backlog and prioritized by the team.

References

(1) Beck, Kent; et al. (2001). "Manifesto for Agile Software Development". Agile Alliance. Retrieved 14 June 2010.