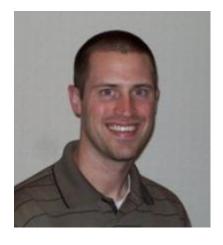


Project Planning

8 Oct 2019 Greg Hawley & Ben Jasperson



About Ben



Work History

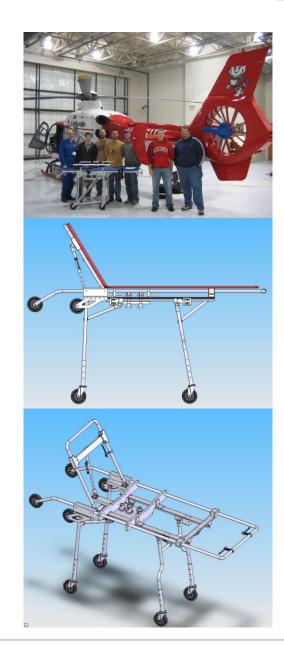
- Plexus, 2010 2017
- Phoenix, 2017 Present
- Co-Op, Briggs and Stratton Corp., 2006 2008
- Sod farmer, ??? 2006

Associations

- Professional Engineer, State of Wisconsin, since 2016
- Tau Beta Pi
- ASME

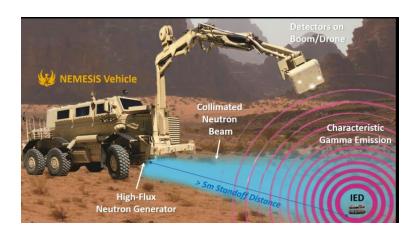
Education

- BSME UW-Madison, 2008
 Senior Design: Redesign of a Med-Flight
 Gurney For Improved Field and In-Flight Use
- MSME UW-Madison, 2010



Phoenix, LLC Background

- Founded in 2005, manufacturer of compact neutron generators
- Headquartered near Madison, WI
- Key markets served
 - Neutron Imaging
 - Nuclear Fuel Scanning
 - Explosives Detection
 - Medical Isotope Production











 NEMESIS: Army funded project to deliver Phase 1 Prototype

https://phoenixwi.com/

About Greg



Work History

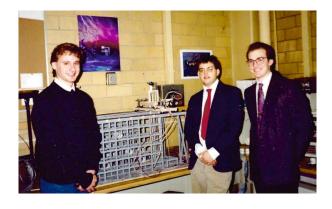
- Plexus, 1992 Present
- Intern, Fisher Controls Marshalltown, Iowa, 1991
- Consultant & Systems Administrator
 UW-Madison, College of Engineering, 1988-1991
- DJ. WBCR (Beloit College Radio), Summer 1988 (only).

Associations

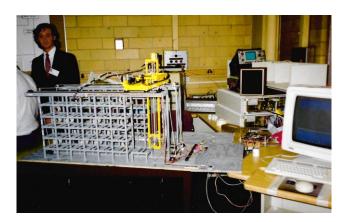
- IEEE TEMS Project Management Technical Activities Board, 2017-
- Member MSOE EE IAC, since 2004
- Professional Engineer, State of Wisconsin, since 1996
- Member of IEEE, since 1988
- Tau Beta Pi, Eta Kappa Nu

Education

- BSEE/CS UW-Madison, 1991
- Senior Design Project, Automated Storage and Retrieval
- Coursera, 2013-Present







Plexus Background/Introduction

- Global company headquartered in Neenah, WI
- Contract <u>design engineering</u> and <u>manufacturing</u>
- We help customers we don't have products ourselves.
- Design and manufacture products for other companies like:
 - Trek Bicycle, Honeywell Aerospace, GE Healthcare, Siemens, Micron Technology, Arris, Qiagen, Bombardier
- Market Sectors
 - Networking/Communications
 - Healthcare/Life Sciences
 - Industrial/Commercial
 - Defense/Security/Aerospace





http://www.plexus.com/

Humility

In 2013 there were 11,116 business books published[1], management clichés abound.



If one does not approach the topic of project management with some humility, there's a large threat of sounding like a know-it-all.

The PMBOK View of Project Management

The PMBOK view of project management is can be pretty hard-nosed.

Project Integration
Management Overview

4.1 Develop Project Charter

- .1 Inputs
- .1 Project statement of work
- .2 Business case
- .3 Agreements
- .4 Enterprise environmental factors
- .5 Organizational process assets
- .2 Tools & Techniques
- .1 Expert judgment
 .2 Facilitation techniques
- .3 Outputs
- .1 Project charter

4.4 Monitor and Control Project Work

- .1 Inputs
- .1 Project management plan
- .2 Schedule forecasts
- .3 Cost forecasts
- .4 Validated changes
- .5 Work performance information
- .6 Enterprise environmental factors
- .7 Organizational process assets
- .2 Tools & Techniques
- .1 Expert judament
- .2 Analytical techniques
- .3 Project management information system
- .4 Meetings
- .3 Outputs
- .1 Change requests
- .2 Work performance reports
- .3 Project management plan
- .4 Project documents updates

4.2 Develop Project Management Plan

- .1 Inputs
- .1 Project charter
- .2 Outputs from other processes
- .3 Enterprise environmental factors
- .4 Organizational process assets
- .2 Tools & Techniques
- .1 Expert judgment .2 Facilitation techniques
- .3 Outputs
- .1 Project management plan

4.5 Perform Integrated Change Control

- .1 Inputs
- .1 Project management plan
- .2 Work performance reports
- .3 Change requests
- .4 Enterprise environmental factors
- .5 Organizational process assets
- .2 Tools & Techniques
- .1 Expert judgment
- .2 Meetings .3 Change control tools
- .3 Outputs
- .1 Approved change requests
- .2 Change log
- .3 Project management plan
- .4 Project documents updates

4.3 Direct and Manage Project Work

- .1 Inputs
- .1 Project management plan
- .2 Approved change requests
- .3 Enterprise environmental factors
- .4 Organizational process assets
- .2 Tools & Techniques
- .1 Expert judgment
- 2 Project management information system
- .3 Meetings
- .3 Outputs
- .1 Deliverables
- .2 Work performance data
- .3 Change requests
- .4 Project management plan
- .5 Project documents updates

4.6 Close Project or Phase

- .1 Inputs
- .1 Project management plan
- .2 Accepted deliverables
- .3 Organizational process assets
- .2 Tools & Techniques
- .1 Expert judgment
- .2 Analytical techniques .3 Meetings
- .3 Meeting
- .3 Outputs
- .1 Final product, service, or result transition
- .2 Organizational process assets updates

It's a subset of what Plexus project managers do.

Source: A Guide to the Project Management Body of Knowledge (PMBOK Guide), Fifth Edition, Figure 4-1, Project Integration Management Overview

Project Management at Plexus



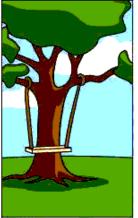
May the odds be ever in your favor.

Project Charter & Requirements

Before you get too far into your project, it's important that you know what done means.







How the Project Leader understood it



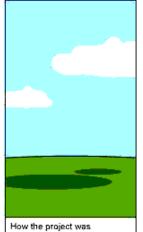
How the Analyst designed it

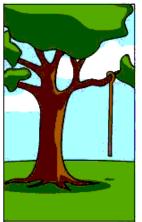


How the Programmer wrote it

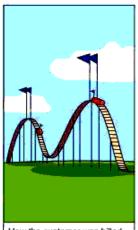


described it

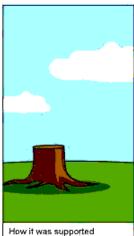




What operations installed



How the customer was billed





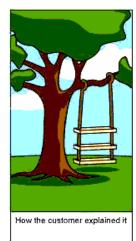
http://www.cvr-it.com/PM_Jokes.htm

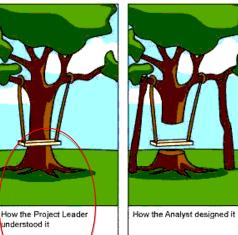
Project Charter & Requirements

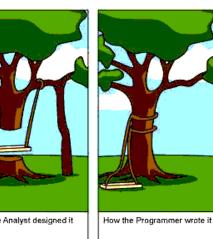
Before you get too far into your project, it's important that you know what done means.

Example: take entire team and document:

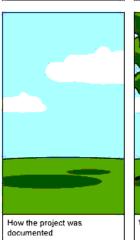
- Definition of done (Deliverables)
 - What physical things, documents, presentations, reports and/or tests are required. When do they need to be done?
- Inputs as needed (Requirements with owners and expected dates)
- Tasks (with time estimates) to get to each Definition of Done
 - Everyone gives estimate, then come to agreement
- Owners one owner per item.
 - Don't share ownership. Multiple people can "do" or "help" but to avoid confusion, there's only one "owner."

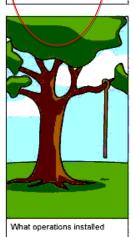


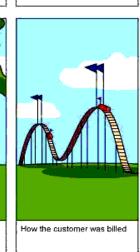


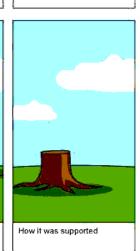


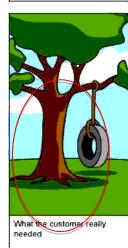












• Integration dates (non-negotiable items)

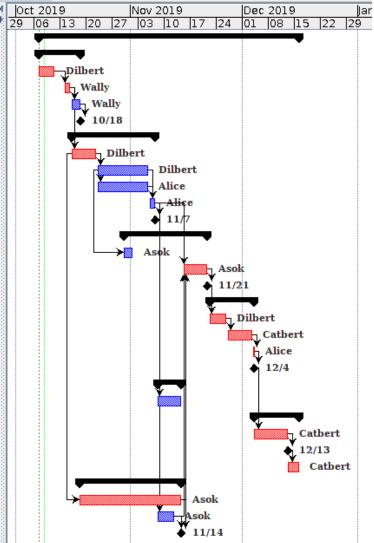
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What's the Plan? What's The Risk?

- Use a tool
 - ProjectLibre is one choice (https://sourceforge.net/projects/projectlibre/)
- "Stress-test" your project
 - What can go wrong?
 - What might be late?
 - What might take longer than you might expect?
- Reserve Buffer
 - Ideally, you want to plan to be done a bit before you need to be done.
 - That gap is the reserve buffer.
 - Real project rarely end with much (if any) of the reserve buffer left.
 - Stuff happens.

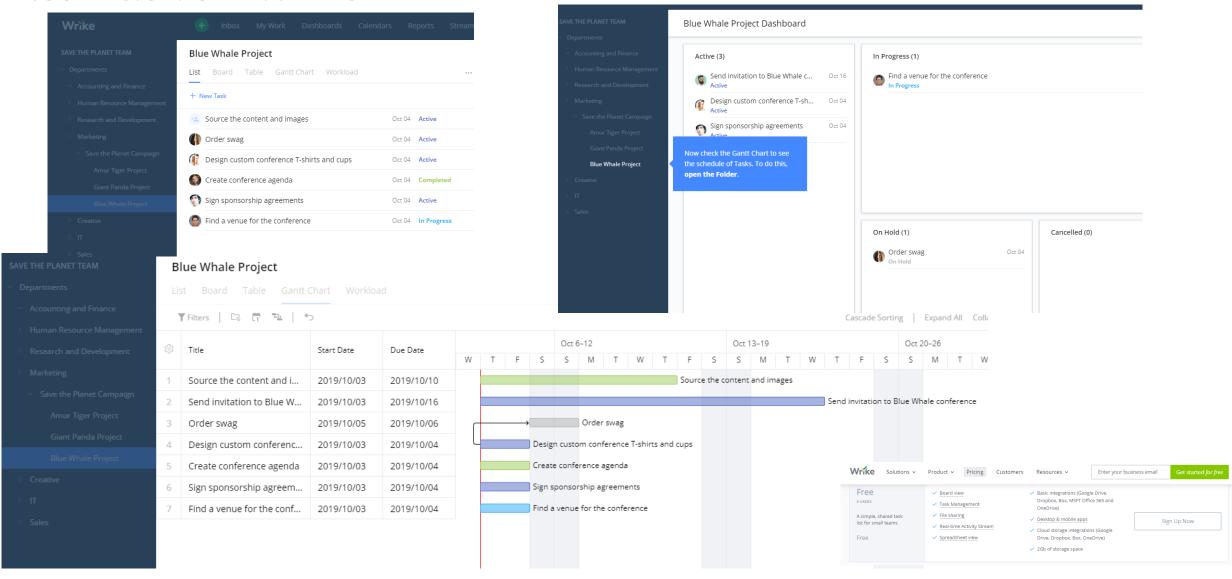
A ProjectLibre Sample

| | Name | Duration | Start | Finish | Resource Names | Predecessors |
|----|---------------------------------|------------|-------------------|-------------------|----------------|--------------|
| 1 | □Design Project | 50.125 | 10/7/19, 8:00 AM | 12/16/19, 9:00 AM | | |
| 2 | ⊟Specifications | 10 days | 10/7/19, 8:00 AM | 10/18/19, 5:00 PM | | |
| 3 | Write Draft Requirements | 5 days | 10/7/19, 8:00 AM | 10/11/19, 5:00 PM | Dilbert | |
| 4 | Review With Customer | 2 days | 10/14/19, 8:00 AM | 10/15/19, 5:00 PM | Wally | 3 |
| 5 | Update Following Review | 3 days | 10/16/19, 8:00 AM | 10/18/19, 5:00 PM | Wally | 4 |
| 6 | Approve Requirements | 0 days | 10/18/19, 5:00 PM | 10/18/19, 5:00 PM | | 5 |
| 7 | ⊡Design | 17 days | 10/16/19, 8:00 AM | 11/7/19, 5:00 PM | | |
| 8 | Initial Design and Architecture | 5 days | 10/16/19, 8:00 AM | 10/22/19, 5:00 PM | Dilbert | 4 |
| 9 | Detailed Mech Design | 10 days | 10/23/19, 8:00 AM | 11/5/19, 5:00 PM | Dilbert | 8 |
| 10 | Detailed Software Design | 10 days | 10/23/19, 8:00 AM | 11/5/19, 5:00 PM | Alice | 8 |
| 11 | Design Review | 2 days | 11/6/19, 8:00 AM | 11/7/19, 5:00 PM | Alice | 9;10 |
| 12 | Design Complete | 0 days | 11/7/19, 5:00 PM | 11/7/19, 5:00 PM | | 11 |
| 13 | ⊟Build | 17 days | 10/30/19, 8:00 AM | 11/21/19, 5:00 PM | | |
| 14 | Build Risky Subsystem | 3 days | 10/30/19, 8:00 AM | 11/1/19, 5:00 PM | Asok | 9SS+5 days |
| 15 | Build Prototype | 5 days | 11/15/19, 8:00 AM | 11/21/19, 5:00 PM | Asok | 11;29;30 |
| 16 | Build Complete | 0 days | 11/21/19, 5:00 PM | 11/21/19, 5:00 PM | | 15 |
| 17 | □Integration | 8.125 d | 11/22/19, 8:00 AM | 12/4/19, 9:00 AM | | |
| 18 | Test Things | 3 days | 11/22/19, 8:00 AM | 11/26/19, 5:00 PM | Dilbert | 16 |
| 19 | Find The Ugly Mistake | 5 days | 11/27/19, 8:00 AM | 12/3/19, 5:00 PM | Catbert | 18 |
| 20 | Fix it | 0.125 days | 12/4/19, 8:00 AM | 12/4/19, 9:00 AM | Alice | 19 |
| 21 | Ready | 0 days | 12/4/19, 9:00 AM | 12/4/19, 9:00 AM | | 20 |
| 22 | ☐Prepare Presentation | 5 days | 11/8/19, 8:00 AM | 11/14/19, 5:00 PM | | |
| 23 | Prepare Presentation | 5 days | 11/8/19, 8:00 AM | 11/14/19, 5:00 PM | | 12 |
| 24 | □Contingency | 8 days | 12/4/19, 9:00 AM | 12/16/19, 9:00 AM | | |
| 25 | Risk Reserve | 7 days | 12/4/19, 9:00 AM | 12/13/19, 9:00 AM | Catbert | 21 |
| 26 | Deadline | 0 days | 12/13/19, 9:00 AM | 12/13/19, 9:00 AM | | 25 |
| 27 | Demo Day | 1 day | 12/13/19, 9:00 AM | 12/16/19, 9:00 AM | Catbert | 26 |
| 28 | ⊡Order Things | 20 days | 10/18/19, 8:00 AM | 11/14/19, 5:00 PM | | |
| 29 | Order The Expensive Long-Lead T | 20 days | 10/18/19, 8:00 AM | 11/14/19, 5:00 PM | Asok | 8SS+2 days |
| 30 | Buy Easy to Get Stufff | 3 days | 11/8/19, 8:00 AM | 11/12/19, 5:00 PM | Asok | 11 |
| 31 | All Parts Available | 0 days | 11/14/19, 5:00 PM | 11/14/19, 5:00 PM | | 29;30 |



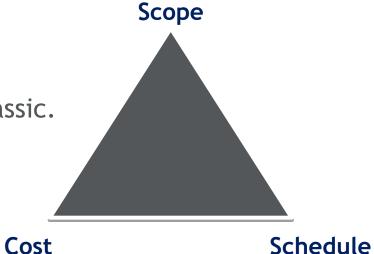
Alternative - Wrike

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Priorities & Trade-offs

- Every project has constraints.
- Senior design projects are no exception.
- The scope/cost/schedule constraint is classic.
- Others often exist.
 - Reliability versus cost or schedule?
 - Risk versus schedule?
 - Perfect versus good enough?



"Science discerns the laws of nature. Industry applies them to the needs of man."

Museum of Science and Industry rotunda, author unknown



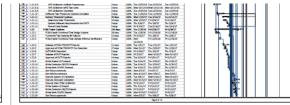
Scale the Process

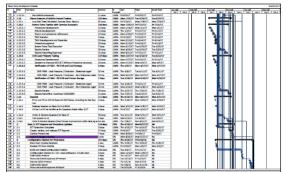
Not every project should have a 914-line Gantt chart, but some do.

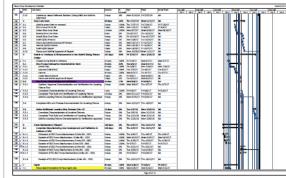
You need enough process to know the following things:

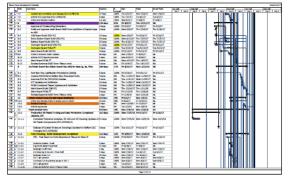
- Who's doing what?
- How long is it going to take?
- What comes before it, after it?
- Ability to update as the work evolves.
- In the real world, create tasks for every 40 to 100 hours of effort for a larger team.
- Individuals and small groups (like senior design project teams) break down those tasks.

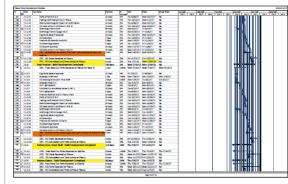




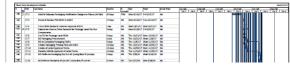








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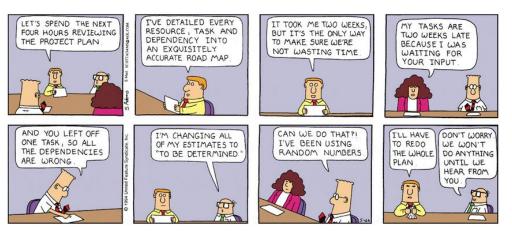
Plans Need to Be Flexible

Plans are worthless, but planning is everything. --- Dwight D. Eisenhower, 14 Nov 1957





Kein Plan überlebt die erste Feindberührung. (translated: No plan survives first contact with the enemy**.) --- Field Marshal Helmuth Karl Bernhard Graf von Moltke, 1871



**Out of respect for those in the audience from Lübeck, I will not (again) attempt to pronounce this and subject you to meine schlechte deutsche Aussprache.

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http://dilbert.com/strip/1994-05-22

Iterate, Where you can.

Agile development -

- Early and continuous delivery of product
 - Fail early, fail often
- Focused sprints, product backlog
 - Timeboxing
- Build the most important thing first
 - Reduce technical risk
- Prototype/proof-of-concept
 - 3D printing

Concept Assessment

"Continuous integration"

Can adopt "Agile" methods for other projects

Open Issues List, Budget, Teamwork and Conflict

- One open issues list (Google Doc, Shared file, etc) and budget
 - Your time vs. cost to purchase
- How do you deal with conflict?
 - Talk about this among your group.
 - It's important to know how you're going to deal with differences of opinion.



http://dilbert.com/strip/1995-08-10

The Cult of Done Manifesto

There are three states of being.

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Not knowing, action and completion Accept that everything is a draft. It helps to get it done There is no editing stage Pretending you know what you're doing is almost the same as knowing what you are doing, so just accept that you know

Pretending you know what you're doing is almost the same as knowing what you are doing, so just accept that you know what you're doing even if you don't and do it Banish procrastination

The point of being done is not to finish but to get other things done Once you're done you can throw it away

Laugh at perfection. It's boring and keeps you from being done People without dirty hands are wrong Doing something makes you right Failure counts as done. So do mistakes Destruction is a variant of done If you have an idea and publish it on the internet, that counts as a ghost of done

Done is the engine of more

Bre Pettis & Kio Stark http://www.manifestoproject.it/bre-pettis-and-kio-stark/

Thanks

Further questions:

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120 Main Street
PO Box 677
Neenah WI 54957-0677

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