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Establishing a CAD Proving Ground

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Learning Objectives

- Learn how to identify new software methods and tools to pursue
- Learn how to test and improve software using a proving ground methodology
- Learn how to pass proving ground results on to all users throughout the company
- Learn how to constantly improve software via repetitive proving-ground sessions

Description

As a CAD manager you are responsible for implementing new software tools and motivating users, but how do you do that when you have to train, implement standards, and deal with everything else? By establishing a CAD proving ground, you can treat your super users like test pilots and build a strong software development environment that benefits your users and your company. The proving-ground concept starts identifying new tools and customization through testing, training, standardization, constant improvement, and broad user adoption. In this class we will challenge you to think about software implementation in a totally different way than you have in the past, but the change will be worth it when you build a powerful proving ground. If you have to develop and/or deploy new software tools, you can't afford to miss this class.

Your AU Expert

Since 1991 Robert Green has provided CAD management consulting, programming, training, and technical writing services for clients throughout the United States, Canada, and Europe. A mechanical engineer by training, Robert has used many popular CAD tools in a variety of engineering environments since 1985. Robert has acquired his expertise in CAD management via real-world experience as the "alpha CAD user" everywhere he has worked. Over time he has come to enjoy the technological and training challenges associated with CAD management, and he now trains CAD managers via public speaking. Robert is well known for his insightful articles in Cadalyst magazine and for his book, Expert CAD Management: The Complete Guide (published by Sybex). When he's not writing, Robert heads his own consulting practice, Robert Green Consulting, based in Atlanta, Georgia.

Foreword

I don't have to tell you that managing CAD tools isn't easy because you already know that. I also don't have to tell you that CAD tools are always changing and that managing that change and standardizing the tools over time is a key element in being a successful CAD manager. The hard part is doing the research and implementing new tools while also managing a production environment.

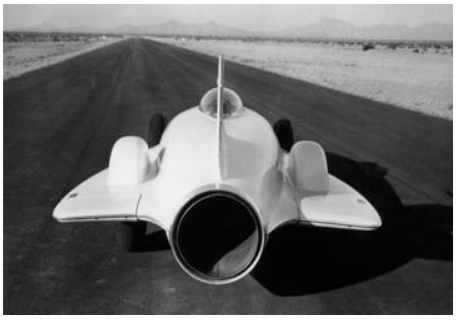
Wernher von Braun

I've always loved the quote from Wernher von Braun on the topic of managing technical change*: "Research is what I am doing when I don't know what I am doing."*

In this course I'll share an approach to managing new CAD tools that has served me well at a number of client companies. I like to call this approach "The Proving Ground" as it helps me prove new CAD tools will actually work.

What is a Proving Ground?

Military installations often having proving grounds where new technical systems like weapons, aircraft or electronics can be tested under conditions where data can be gathered and designs can be improved. Auto companies also have proving grounds to test new vehicle innovations and bring cars to market.



Or, put another way, a proving ground is simply a place where you can test out new products by putting them into real world usage to find out what is good/bad with the design and improve the design before putting the product into service. When put into that context is deploying a CAD system really any different?

The CAD Proving Ground

In a CAD context I view the proving ground as a collection of test machines and users who can take new software and put it through a controlled barrage of testing to find out what works and what doesn't. The mental image that emerges for me is that of a test pilot because test pilots understand the following:

- The craft they're flying may have problems
- They may have to use the ejection seat
- They can convey information to flight engineers

SR-71 test pilot Lt Col Tom Smith

And in addition these test pilots will help me verify other important aspects of software implementation and standardization like:

- Training materials
- Standards configurations
- Best practices

The CAD proving ground therefore becomes the ideal place for the CAD manager to get new software releases battle tested and ready to implement.

Find Your Test Pilots

The proving ground will only be as good as the test pilots you recruit. Software test pilots are a special breed of user that knows they'll be trying out new tools that will almost certainly crash for some while before being production ready and are excited to be a part of the process. These test pilot candidates must exhibit the following traits to be successful:

- Strong desire to learn new software
- Calm when confronted with problems
- Ability to communicate problems clearly
- The desire to follow through until finished

Give me a few test pilots with these attributes and I can promise that I'll be able to evaluate new CAD software and make it work. Without these test pilots new software will be released to the general user population who will panic when confronted with anything that doesn't work perfectly the first time. Does that latter scenario sound familiar to you?

Admit it. You already know who your test pilots are don't you?

The Proving Ground Environment

Your test pilots should receive any special hardware, software and customized setups on their machines configured just as you propose to use in a full production environment. This way they'll evaluate the new software but they can always go back to using standard CAD tools if project demands dictate. (Think of this as the ejector seat that allows them to escape the new CAD tool if a project crash is imminent.)

Proving ground machines live in the standard network ecosystem.

Further, isolate the proving grounds so you only have a select number of projects that are using experimental software to mitigate risk. The goal is to prove new software on a working project but to keep the risk profile low in case data corruption, version conflicts, or other unforeseen difficulties arise.

Finally, I feel very strongly that the proving grounds is setup so that I'm delivering the new software exactly as I would in a production environment so I can debug my setup, deployment and network topologies and permission settings as I go.

Setting Up the Infrastructure

One of the things I always recommend in a proving ground topology is to test and verify the software using the same network systems, directories, licensing, etc. that you will use in production mode. My logic in recommending this is that you'll not only debug the software functions you'll debug the network technology at the same time. Might as well get it all done the first time, right?

So to setup the proving ground installation you'll need to do, at minimum, the following:

- Acquire software licenses and make sure network licensing works.
- Create required network folders and set correct permissions.
- Organize standards type files (templates, families, content libraries, etc.)
- Outline filing procedures or install EDM/PDM control software
- Create basic instruction documents for test pilot users

Remember that your proving ground users understand that there will be glitches and problems, but the goal is to get the software/network infrastructure as close to working as possible. Here are your checklist items for establishing infrastructure:

When should you perform these tasks?
Prior to software testing.

Why?
You wouldn't test fly an airplane without a runway or a hanger to park it in so don't test software before you have the infrastructure it needs ready!

Assign Your Test Pilots

Now you must assign the most appropriate test pilot(s) for the task at hand. If you're debugging civil software assign your best Civil Engineer test pilot, for mechanical analysis your best Mechanical Engineer, for productivity and speed enhancement assign your most detail focused production operators, etc.

The key is to assign your test pilots to the right software so their piloting skills can be put to the best use.

Capt. Caroline Jensen

When should you assign your pilots?
Just prior to testing but far enough in advance to clear the assignment with their day to day manager.

Why?
Without the right pilot testing the software you won't learn as much and your proving ground won't deliver its highest value.

Who?
The person with the right discipline skills is assigned to software that requires their specific expertise.

Support and Interview Your Pilots

As your test pilots evaluate your new software in the proving ground be ready to work with them and support them so that you can learn from their experiences. To do so always do the following:

- Note any problems your pilots have
- Ask what symptoms they noticed
- Ask them what confused them
- Ask them what would make things easier
- Ask them how they would teach users

Neil Armstrong helped debug aircraft and pressure suits long before flying in space.

Note that everything I recommended helps you learn from the test pilot's experience in a way that will not only help you debug the software but to create training materials for the users who will use the software in production later.

This interviewing process is called debriefing in test pilot environments and is key to getting the greatest value from your proving ground. So don't just let your test pilot say "this is great" or "this software stinks" make them explain what they experienced.

When should you interview your pilots?
As often as possible!

Why?
To create better configured software that can be taught to new users most easily.

Iterate and Improve the Proving Ground

Now that your test pilots have given you're their feedback it is time for you to adjust your software, document (for training purposes later), develop and otherwise tweak the proving ground so that the next test pilot flight will be smoother and more successful.

After you've done everything you can to improve the software you'll be ready for another test pilot mission and interviewing session. And so the iterative process of testing and fixing will go until your test pilots report that the software is ready to go.

When should you do this?
As soon after the test pilot testing as possible – ideally immediately after.

Why?
To work through the problems while all the information is fresh in yours and the test pilot's minds. The sooner you tackle the problems the greater the chance of solution.

How often should you iterate?
As much as you can.

Why?
Because the more you test the better the software will be when production implementation goes forward.

Training, Standards and Savings Benefits

As new CAD tools are run through the proving grounds approach think about the knowledge you can build that will help you during mass implementation later. If you pay attention and take good notes you should learn the following:

- What concepts were hard to learn?
- How did you best explain hard concepts?
- What problems happened most often?
- What hardware and configuration problems came up?
- What work methods worked best?

When you consider these pieces of information you can start to draw some conclusions on how you'll train new users, how you'll administer the software and what sorts of standards and best practices you'll need to make the new software run best. So it turns out the proving grounds isn't just a place to get software running, it is also a usability lab that assists you in optimizing the software for future users.

Peer Envy Creeps In

As the proving ground takes shape and your test pilots start using the experimental new software a curious thing will start to happen – the test pilots will form a sort of camaraderie. And as they do so other users will start to ask questions like "Why do these guys/gals get the new software?" or "What are they doing and when can I see it?"

When users start to get curious about what your test pilots are doing you know you've been successful in getting people to think about new CAD tools and what might be coming in the future. This is good news because those who are curious are those that want to show you they're smart enough to be a test pilot and they might be test pilots in your next proving ground project.

Make your test pilots role models for your CAD users and watch things change!

What I've observed over and over is that when you call attention to the test pilots as being hard working, sharp, talented users who are helping the company get ahead with new technology you establish a culture where being a test pilot is a goal. Wouldn't you rather have all your CAD users strive to be as good as your test pilots already are? How much easier would it be for you to train and implement new CAD tools if everybody had a test pilot mindset? Think about it.

Advertise the Results

As the proving ground starts working don't forget to advertise your results with your senior management team and users. After all, how will anyone know what a great job you're doing if you don't tell them?

When should you advertise?
Whenever you achieve a milestone or unexpectedly great result.

Why?
So management and users see that change is on the way and prepare for it!

Positive Peer Pressure Cements Change

In the case of creating new standards or best practices you may sometimes experience users who don't want to follow the new procedures right? Here is where peer pressure can be used to extend the proving ground environment into your general user base. It works something like this:

> ***Q.*** *Why should I follow the new standards?*
> ***A.*** *Because they have been proven to work!*
>
> ***Q.*** *Who else is using the new standards?*
> ***A.*** *All the test pilot/proving ground users!*
>
> ***Q.*** *Will the new standards really work on projects?*
> ***A.*** *They certainly have so far!*
>
> ***Q.*** *I guess I can't really avoid using the new standards can I?*
> ***A.*** *Not really!*

If you leverage the experience of your test pilots and power users from the proving ground you'll be able to exert a level of credibility and influence over even those users who typically don't follow standards or best practices.

Once you have more people following the proving ground results than not, you'll hit the tipping point and users will not be able to argue anymore. When you reach this tipping point you've successfully transitioned your new CAD tools from the proving ground to standard usage.

Now Get on It!

I hope my "proving grounds" series has given you some ideas for how you can utilize the human resources inside your company to make software innovation and implementation go more smoothly. This approach works in all manner of technology development so there's no reason we CAD managers can't use the concept of a proving ground in our offices as well.

Updated Materials and PowerPoints

You can download updated materials (with any additional notes, corrections or supporting files) for this presentation at the AU web site using your AU user name and password. I will also post course summaries at my web site at this URL: www.CAD-Manager.com

I will send you a PDF copy of the session PowerPoint presentation if you request it. Just send an email to me at **rgreen@CAD-Manager.com** and I'll get back to you as soon as I get back from AU.