GEN22300

Design Tool Bag: Adding an iPad Pro to Your Toolset

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Learning Objectives

- Learn how to use SketchBook Mobile and the Apple Pencil to trace over existing images and PDFs
- Learn how to use AutoCAD 360 to view and edit DWG files wherever they are
- Learn how to use A360 to manage project files and access company assets
- Understand what types of accessories might help with an iPad in the field

Description

With the introduction of the Apple iPad Pro and Apple Pencil, an incredibly useful tool just got even better. Using Autodesk, Inc., apps like AutoCAD 360 software and SketchBook Mobile software, you can truly update the tracing paper and rolled-drawings workflows of the past. With the Apple iPad Pro, we can mark up prints, open and edit our design files natively, bring a new level of interactivity to our clients, and even trace and sketch over our designs like we do now. Whether you want to take field measurements, draw new or revised designs over existing ones, or enhance your construction management services, the Apple iPad should definitely find a place in your bag of tricks. This session features AutoCAD 360, A360, and SketchBook Pro.

Your AU Expert

Jim LaPier is the owner of IMPACT Designs, LLC, a consulting firm based in Maryland. Jim has worked with AutoCAD software for 17 years in varying disciplines, including commercial and residential architectural design, mechanical engineering, materials handling, and telecommunications. He is skilled in customization, efficiency, and speed, and he is adept in information technology. He also worked as a genius at an Apple Inc. Retail Store, becoming a certified Apple technician. Jim combines paper-and-pencil drafting knowledge with his love of advanced technology, both Mac and PC-based. Jim currently travels around the country giving workshops and classes on AutoCAD for Mac software and using Apple computers in today's design offices.

Overview

My goal is to approach this as a workflow; that is to say touch on all of the main milestones of a project from initial consultation to field verification / construction management. Obviously these milestones are general but the theory should be applicable whether you are a 500 person office building college campuses to a partner firm of 2 doing residential renovations. The milestones I intend to hit include:

• Initial Consultation
• As builts / Existing condition surveys
• Design / Concept drawings
• Field visits / find verifications / construction management

Again these milestones are generic and I will not be going into too much detail regarding specific apps for construction management itself. There are dozens of iPad apps for punch lists and timelines and so forth and I hope to focus on the general uses and helpful aspects of an iPad in the field.

Initial Meetings / Consultations

This should also be self explanatory at this point, but your iPad is a wonderful presentation tool. And I'm not just talking about Powerpoints. Current iPads can hold tens of thousands of photos and documents. Related / similar projects, sample plans and more should be loaded on your iPad before any meeting with a client. I can't tell you how many times a client has tried to describe an architectural detail or feature that doesn't quite come across, only for me to pull out my iPad and search through my photos for exactly what they wanted. It clarifies and makes sure everyone is on the same page. You can even tag the photo specifically for the client so when you return to the office the photo can be added to the project files.

There are a number of document and file management apps in the app store, but there are a few things to look for:

• File Types - Can the app not only hold but preview / display all of the file types you need to work with? Not just jpgs and PDF's, but DWF's and DWG files, or even RVT files.
• Compressed files - Can the app decompress zip files or compress them for easy sharing?
• Cloud / Server Access - Can the app access the cloud storage solution your company uses? Google Docs? Dropbox? Egnyte? What about your own server back in the office? Are you using a NAS that has webdav or ftp access? Can the app access the files easily? Does your NAS have its own access app?
• Local storage syncing - Can your app sync files locally for offline access in the field? Maybe you don't want to have to load project folders everytime you walk out of the office. Many apps will allow you to specify a folder that the app will sync with whenever you are online or on wifi. This way your files both on the iPad and the server are always up to date with each other. Keep in mind if you want to allow for 2 way syncing, meaning changes made on the iPad are loaded onto the server, or if you prefer the iPad to not be able to alter files on the server, only receive them.
• Search capabilities - Does the app have a robust search function, allowing you to search for specific files in a pinch? What about tags or keywords?

Initial Meetings / Consultations (cont)

One app I do want to mention here is Autodesk's own A360. A360 is a web based project management tool for not only keeping project files in order, but it allows for multiple users to work in collaboration on a project.

A360 supports a myriad of file types, including allowing you to view and markup 3D model files like Revit and Inventor models, as well as all of your dwf and pdf files. Access is controlled and monitored, so you can see who accessed a file when. A360 also has a design feed feature, which is a very powerful tool for keeping everyone on a project up to date. Think of it as a Facebook group for your project. Users can posts photos and comments regarding the project, and other users can respond. This is great for documenting all of those conversations that don't usually end up in the project files later. A360 also supports wiki pages for project specs and general information.

And the best part is you don't need to have CAD experience to work with the project files, so everyone from the client to the contractor can use the application. A360 has Android apps as well as iOS apps, and is accessible from the web from any desktop browser.

Another few apps to consider are GoodReader and PDFExpert. The reason I like these two apps is they offer a myriad of cloud connections to connect with and access your existing cloud solution of choice (Dropbox, Webdav, etc) and do very well with managing files themselves, as well as being able to mark up PDF files. Both applications also work with ZIP files, both creating them and extracting files from them, which can be quite handy in the field. Both apps began life focussed on marking up PDF files but have grown to work with other filetypes as well, and GoodReader will allow you to open image files, word documents and excel spreadsheets (to view only, not edit.)

So, the big thing here is access and organization. Can you access the files you need when you are away from the office? Once you access the server, can you FIND the files you need? I can tell you I've been in meetings for projects where my iPad saved the day:

At a town hearing for a renovation of an existing fast food chain restaurant, the historic society was very nervous the redesign would not reflect the aesthetic they wanted for the area. They asked about a specific architectural detail and wanted to see what the structure would look like with a cupola on top, to help tie it in. The original proposed design did not include a cupola, and we had no renderings with one for this project. So, I quickly grabbed my iPad and connected to the office server 50 miles away while my partner stalled for a little time. I was able to locate a completed project that had a design that was more in line with what the board wanted and we were granted approval on the spot. If not for the iPad and access, the project would have been delayed by two months, until the next historical board meeting.

So, when the client needs that clarifying visual, make sure you can get to the photo you need to seal the deal.

As Builts / Existing Conditions

You got the project! Now what? After all the contracts are signed and hands shaken, you need to get going. Depending on the project, you will most likely need to document the existing conditions.

If this is a new project from scratch or scorched earth, typically the existing conditions are pretty minimal. One small area the iPad may help with however is the GPS functionality. Using the GPS you can walk into the field (and I mean actual field, like a clearing or a forest) and mark off your exact position on apps like google maps or other surveying apps. If you already have an architectural or site plan, you can walk out to the location and see exactly where the structures will go and what the areas look like.

One type of project I've used this on is another chain restaurant. The client has a library of standard buildings that are essentially "dropped" onto a cleared site. Using AutoCAD 360's GPS functionality, I can open the DWG file for the project, mark my current location in the GPS, and see my location in the virtual "building" as I walk the site in the real world. Another example was for a custom in-ground pool company. I was able to insert the site plan of the client's property into AutoCAD 360, mark my location as I stepped out the back door, and then walk 100 yards into the backyard and show them the exact location and orientation of their future pool and matching pool house.

The other type of project would be more of a renovation. For this, as builts involve getting in the field and documenting the existing structure. Many of these tools and workflows are similarly useful for verifying field conditions during construction as well.

The way I learned basic residential as builts was to take a steel tape measure, a pad of grid paper and a pencil (eventually I migrated to colored pens, black for walls, green for dims, etc.) I'd sketch each room and all of the doors / windows, then pull out the tape measure and work my way around each room. I'd try to take pictures of the rooms and elevations, in case I missed something. Now, 15 years later, I use my iPad Pro, Apple Pencil and a laser tape measure. Each component has upgraded over the years, adding functionality and accuracy, while improving efficiency.

I still sketch the basic room by hand, but now I can place different components and features on different layers. One of the first projects I used my iPad to sketch, I drew the first room a little too close to the edge of the "paper" and left myself no room for an adjoining room I didn't see from the outside. In the past, I would have had to add another page, and split the dimensions to make sure I had all of the connecting dimensions and references between the two rooms. In the iPad however, I just did a clip and moved the sketch on the virtual page. I can place my dimensions on separate layers for clarity. I can place overall room dimensions on one layer, window dimensions on another, add notes for electrical outlets and switches on another layer. Using this method, I don't have to worry about my measurements overlapping or leaving enough space to read each number and line. I just turn layers on & off, meaning my dimensions on different layers can be right on top of each other if need be.

However, I mentioned every aspect of this process is upgraded from 15 years ago, and that isn't stopping anytime soon. There are a number of apps available that allow you to draw a rough shape with your finger or Apple Pencil that the app turns into straight walls and rooms. You can then pull out your laser tape measure and start taking measurements, applying each measurement from the laser to the corresponding wall in the app. These apps have "blocks" for windows and doors you drag & drop into the drawing as well. Some even allow you to export the sketch directly to a DXF file for importing directly into AutoCAD.

Using the camera on the iPad, you can take a picture of an interior wall, then draw dimension lines with your finger, on top of the image. Then take your laser tape and apply dimensions directly to your sketch. No more hand sketches complex bulkheads and weird ceiling transitions. Take a picture and place your dimensions directly on the image. You can't get any clearer than that.

Design / Concept Drawings

For "old school" architects, nothing beats pulling out a roll of bumwad and placing it over some ugly CAD print, taking out your markers and freehand sketching the next falling waters. For the more artistically inclined, there are hundreds of sketching apps for the iPad, all with their own plusses and minuses. However, did you know that many of these apps allow you to underlay an image to draw on? Here is another example of a scenario that you may have been in / could see yourself in:

Having dinner with a client, reviewing PDF drawings for his next mansion on your iPad. In a very out of the ordinary turn of events, he decides he doesn't like something he liked before and wants to revise the master suite. So, you take a screen cap on your iPad (by pressing the home and power buttons at the same time) of the floor plan. Next you open up Autodesk Sketchbook Mobile and insert the sceencap as a base layer. You adjust the transparency of the image so it looks a little lighter, then create a new layer for your first design. You set your "brush" to the pen tool and find a suitable color and start sketching, right on the image, right on the plan, right at the table. No rolls of drawings covering your steak dinners, no marker smudges on your hands that end up on the linen tablecloth. Using features like duplicating layers, you can even duplicate a sketch to take in a different direction while maintaining the previous sketch. Now the client is much happier now that her closet is bigger than her husbands and you can get on to your dessert to talk about your revised fees.

Even architects who prefer to sketch on paper and give their designs to their CAD draftsman or other architects can appreciate the ability to sketch with an infinite palette of colors and brushes, letting their designs take them wherever the design wants to go, without the hindrances of ink and paper. Now personally, as much as I love my iPad and have since I purchased my first one, I've had a love / hate relationship drawing on my iPad with styli. The biggest complaint was always accuracy and wrist suppression. I had to levitate my hand above the screen so it didn't register my palm or wrist and mess up my sketch. With all of the software based attempts to remedy the issue and previous bluetooth styluses, I could never find a combination that allowed me the experience I needed to give up my grid pad. Until the Apple Pencil and iPad Pro. The wrist suppression is nearly perfect and the accuracy / lag time are wonderful. No more awkward hand positions or 2 fingered gloves to cover my wrist so I can rest my hand on my screen.

Field Visits / Verifications

Well, up till now I haven't really talked too much about AutoCAD 360. Well, thats because this is the part of the project I really find it to be the most useful. As great as the iPad and Apple Pencil are, and with all of the great features like Smart draw, I still don't think I could sit down and draw a house plan from scratch in AutoCAD 360 mobile. Now editing an existing plan? Taking measurements in the field? AutoCAD 360 mobile is awesome. Can I create a plan from scratch in AutoCAD 360 mobile? Sure. I just don't think that is where it really shines as a design tool. AutoCAD 360 mobile does allow you to create DWG files from scratch, but before I would use that, I'd save a template. Just like the desktop version of AutoCAD, you have a template that has all of your layers, blocks and sheet layouts already there and ready to go, right? The same should be done for AutoCAD 360, more so because of the nature of the program.

Again, I personally find AutoCAD 360 mobile to really shine when in the field with CAD file loaded and ready to go. Using the app I can open my DWG file natively and interact with the geometry just like the desktop version. I can select lines and circles, copy them, scale them, trim and extend lines, even mirror and offset them. I can easily add dimensions to my file using object snaps.

Field Visits / Verifications (cont)

There are dozens of videos online that demonstrate the finer points of the app, but there are a handful I want to highlight:

Cloud Storage

You can add your Google Drive, Dropbox or Personal OneDrive account to the repository for AutoCAD 360 mobile so you can open the DWG files directly from your existing cloud servers. No need to email yourself files or upload every project your company ever worked on. Just go to your existing account and open your files.

Smart Draw

AutoCAD 360 mobile supports the Apple Pencil in what is called Smart Draw. This means when no commands are active, you can grab your Pencil and sketch a line, rectangle, circle or other shape and AutoCAD will turn your squiggles into real lines, rectangles, circles and so on. After drawing your shape, like a circle, you can tap on the measurement to enter a specific value, so you are as accurate as you expect to be in AutoCAD.

Quick Measure

Getting information out of your DWG files in the field is a huge benefit of AutoCAD 360 mobile, and Quick Measure is a tool I really wish the desktop version had access to. Simply start the command, and then tap anywhere in the drawing area. You will get a horizontal and vertical dimension from where you tapped to the nearest geometry. Tap in the middle of a room and get the overall dimensions at one time. That is 2 taps to get 2 or more measurements. I can't even do that on the desktop in 4 clicks.

Inset Image / Scale

You can insert a picture or image into AutoCAD 360 mobile and scale it visually. Using this, you could conceivably take a picture of the front of a structure, draw a rectangle at the dimensions of the known front door, insert the image, scale the image so the door image is aligned to the rectangle, and now you can measure the image to get real world dimensions. That means taking a picture and pulling real dimensions from it.

So using AutoCAD 360 mobile you can bring your DWG's into the field and interact with them. Make changes, like moving a door to reflect a field change, and having those edits show up back in the office. This is your direct link back to the office miles away.

Accessories

Pencil

The Apple Pencil is an essential tool for your iPad Pro if you do any design work. The pencil has a small removable cap that exposes a male lightning connector, allowing you to charge it from the female port on the bottom of your iPhone or iPad in a pinch. It also comes with a small adapter for charging from a normal lightning USB cable. The nibs or tips of the Pencil can also be replaced if they are damaged (Apple sells a small kit of replacement tips.)

The cap protecting the lightning connector is held on magnetically, but it can come off if knocked too hard. So, I recommend some sort of cap minder or lanyard to keep the cap accounted for.

Another accessory is a grip sleeve. The Apple Pencil is extremely slick and cab be a little slippery in the field. To combat this there are a number of rubber / silicone sleeves that you can place on the Pencil to give it some grip. Think the small pencil grips from grade school. The added benefit of some of these is that they can cover the length of the pencil

including keeping the cap connected. Be aware though these grip sleeves can prevent the Pencil from fitting into any sleeves or clips in a case (see Cases below.)

Cases

There are a number of factors to consider before you take your iPad out of it's nice clean box and throw it into a job site of grease, sawdust or water. Depending on who will be using your iPad, you most definitely want some sort of case. Protection is the foremost concern, but a case can also add functionality to your iPad as well. Consider looking for a case with a built in handle. I can tell you from experience trying to balance an iPad while measuring a window, about 15' in the air, leaning over the edge of a ladder can be a bit tricky. Handles make the iPad more secure and less prone to slips and falls, as well as being much easier to maneuver in the field.

Cases can also add storage. The Apple Pencil is a bit long and has no clips to make it easy to slip into a jeans pocket. Certain cases contain sleeves or holders just for the Apple Pencil, or you can purchase a small sleeve attached to a nylon band to slip over your existing case.

Like the add-on sleeves, there are add-on handles as well, typically rubber band like products that slip over opposing corners and provide a loop to hold the iPad from behind.

Another factor to consider is a lanyard or strap. There are times when you will need both hands in the field, whether to hold a measuring tape or a ladder rung, meaning you either must set your iPad down (a very dangerous proposition on most job sites) or try to hold it under your arm, also quite awkward. Below is a picture of a case that includes a rotating rear handle as well as hooks to attach a pouch and / or a strap you can sling over your should or neck.

Lastly, you need to consider how much typing you are going to be doing in the field. The on screen keyboard is actually rather large, but you may need a physical keyboard if you are going to be writing up reports or extensive emails. Aside from the official smart keyboard cover, a number of mechanical keyboards are available that essentially turn your iPad into a touchscreen laptop. Some have special keys to simulate pressing the home button or other special function keys and some are backlit for easier typing in dark situations. The iPad Pro has a set of small metal contacts along the left edge, called the Smart Connector. Using these contacts, the iPad can actually power the keyboard, so there is no need to worry about charging the keyboard separately. Only certain keyboards take advantage of this, so be sure to check.

Printer

If you are going to be generating reports or scanning plans in the field, you may want to look into a small, portable printer. Some units actually have scanning and copying capabilities, giving you a full office in the field. I haven't seen any personally that print larger than letter size paper, but for reports or sketches that need to be left or posted onsite, a portable printer might be something to look into.

Measuring Tools

There is no substitute for a good, quality tape measure in the field. I'm not going to go into ll of the features of a standard steel tape measure, but I will mention that when shopping for a new tape, I do look for a few features. Typically these include the width of the tape and the end or clip. I find wider tapes tend to make life a little easier, especially when working alone. The can reach much further without bending or breaking. In the end or blade I typically look for a wide blade attachment for hooking oddly shaped or rounder

corners, and I prefer there to be a magnet in the blade. This makes it easier to attach securely to a beam or metal stud.

Like all things in the field technology has crept into the measuring field and we now have laser tape measures. I find a laser tape almost essential in solo field measuring and incredibly useful in site visits. There are various manufacturers and numerous features, but there a few to look for / consider:

- Power source - I've seen rechargeable and standard AA / AAA battery powered units. I prefer the standard battery, as I can easily swap out a battery if I lose power, vs taking time to recharge. There is something to be said for the ability to plug in a laser in your truck on the way to the site, but make sure the device has some sort of "quick charge" for fast charge for at least a few minutes of use.
- Range - Laser tapes come in varying ranges, from just 50' to more than 1000' while maintaining an accuracy of 1/16". The longer the range, the higher the cost, typically. Just make sure your tape can handle more than the longest distance you think you may need.
- Math Functions - Many lasers can perform complex functions that allow you to add or subtract measurements, calculate areas, or, most important, work out pythagorean theorem calculations. Why is this important? The theorem is used to calculate the lengths of the sides of triangles. Using this, you can stand in front of a structure and take a measurement from yourself to the perpendicular face of the building, then a measurement to the top of the building (without moving) and have the tape give you the height of the building. This is incredibly helpful if there are shrubs at the base of the building or other obstructions that prevent you from getting a height measurement. Don't have an unobstructed line of sight from one end of the building to the other (pipes / bump outs in the way?) Stand away from the building and point the laser to one corner of the building, then the other, and let the laser calculate the theorem and give you the length of the building.
- Bluetooth - Many lasers now have bluetooth connectivity that will allow you to connect the laser to your iPad. This allows you to load all of the measurements directly into a CAD app. There are a number of apps in the app store and you will need to see what apps your laser supports, but for example: The Leica Disto app allows you to either freehand sketch a room, then take a measurement with the laser, which appears in the app. Then you just drag the measurement to the corresponding wall and the dimension is logged. You can also take a picture with the app, draw a dimension line, then take a measurement with the laser that will display on the photo. Great for specific dimensions requested by someone offsite.
- Internal Level - Some lasers have an internal sensor that tells you when they are perfectly level, ie horizontal. This is great for more accurate measurements, and helps with the math functions mentioned previously.
- Camera - Some lasers actually have a camera built in. This is very useful as it acts like a viewfinder or scope for your laser (imagine, a scope for your laser, lol.) It can assure you that you are indeed capturing the point you think you are.
- Clip - After all that, it seems a little anti-climactic, but how you are going to carry a laser level is important. How many steel tape measures do you have that don't have a belt clip? Surprisingly, very few lasers have a simple belt clip. Most utilize a small pouch with belt loops. This is fine if you are going to be doing a lot of measuring, but I personally prefer the ease of a small, built in clip I can clip to a pocket.

Laser Accessories
- Tripod - Some of the higher end lasers allow for tripod mounting. This assures a level motion and fixed position for more accurate measuring.
- Glasses - You can find red goggles or safety glasses that improve the visibility of the laser point in bright conditions. These look a little silly and can cause slight headaches if worn too long (not to mention after removing them, everything has a blue tinge for a while)
- Target - How do you measure an outside corner of a building? If you are not going to use the math functions mentioned earlier, a small target can come in handy. Some have adhesive or magnetic attachments, but the goal is to provide a flat surface, typically perpendicular to the feature being measured.

Other accessories include devices like 3D scanners or Drones. These vary wildly but have huge potential from a field and documenting perspective.