MOTION COMPUTING R12 ON THE JOB, POWERED BY INTEL

There's no shortage of things to do in a workday, so every second counts. Field workers for utility companies spend time at various job sites, tackling a range of problems. The work may be difficult, and they need reliable, efficient technology to help them like the wrenches and pliers they use every day. Managers and supervisors want this, too—less time waiting on a tablet means more work orders completed at the end of the day.

What kind of tablet can best help field workers on the job? We put an Intel i7 processor-powered Motion Computing R12, an Apple iPad Air, and a Samsung Galaxy Tab Pro 12.2 through worker scenarios that included tasks such as launching and loading directions to a work site and loading a work order in ClickSoftware® ClickMobile®. We also looked for features that can help workers in the field and at how long the tablets could run on a single charge.

In our hands-on testing, we found that the Motion R12 got the job done with less hassle than the other two, offering features that the other tablets did not, such as pen functionality designed to make writing while wearing gloves easier. The Motion R12 provided greater functionality in many of the apps we tested, including Microsoft® Office, ESRI® ArcGIS® Online, and ClickSoftware ClickMobile, while moving through three worker scenarios with up to 36.2 less waiting than the iPad Air and up to 55.6 percent less waiting than the Galaxy Tab Pro 12.2. In addition, the Intel Core i7 processor-powered Motion R12 lasted over eight hours on a single charge.

LESS WAITING, MORE WORKING WITH THE RIGHT TABLET

The right tablet can make a workday easier instead of causing headaches and frustration. We tested three tablets running on different processors, putting them through a series of tasks that real field workers might perform regularly. We also looked for features that could help field workers and at how long each tablet could keep going on a single charge while lightly browsing the Internet. For more on how we tested, see Appendix B. For detailed results, see Appendix C.

Each of the three tablets had a different processor and ran a different operating system:

- **Motion Computing R12,** powered by an Intel Core™ i7 processor, ran Microsoft Windows® 8.1
- **Apple iPad Air,** powered by an Apple A7 processor, ran iOS 7.1.2
- **Samsung Galaxy Tab Pro 12.2,** powered by a Samsung Exynos® 5420 processor, ran Android™ 4.4.2

All three systems have a touch-focused user interface and similar display sizes. The designs of the Apple iPad Air and the Samsung Galaxy Tab Pro 12.2 minimize weight, while the Motion R12's design stresses durability. For detailed information on the tablets, see Appendix A.

TABLET FEATURES FOR ON THE JOB

> Motion Computing claims their View Anywhere® display produces a 225% increase in sunlight contrast ratio over the standard display.

While tablets may appear similar, they don't all carry the same features. For example, the Intel Core i7 processor-powered Motion Computing R12 features a hot-swappable battery, allowing continuous use in the field. In addition, the Motion R12 received an IP-54 dust and water resistance rating. An IP code, or International / Ingress Protection Marking, refers to protection provided against dust and water. The numbers in IP-54 describe the degree of protection. They signify that dust can't affect operation, and splashing water from any angle can't harm the device. The Motion R12 is also MIL-STD-801G impact resistant, which can come in handy with field service conditions. MIL-STD-810G is a United States Military standard that emphasizes the environmental design of a device or piece of equipment. The standard tests reproduce the effects of environments on the device rather than imitate actual environments. Motion Computing also touts the View Anywhere® display, which they claim performs better outdoors due to a proprietary optical enhancement process based on technology initially developed for high-end military aviation and marine applications.

Figure 1 presents the features each system offers.

	Motion Computing R12	Apple iPad Air	Samsung Galaxy Tab Pro 12.2
Rear camera (MP)	8.0	5.0	8.0
Rear flash	✔	✖	✔
Front camera (MP)	2.0	1.2	2.0
Display size (inches)	12.5	9.7	12.2
Resolution	1920 × 1080	2048 × 1536	2560 × 1600
Pen input	✔	✖	✖
Biometric scanner	✔	✖	✖
Water/dust resistance	✔ (IP-54)	✖	✖
Shock resistance	✔ (MIL-STD-810G)	✖	✖
USB port	✔ (USB3)	✖	✖
3.5mm audio	✔	✔	✔
HDMI	✔	✖	✖
SD™	✔	✖	✖
microSD™	✔ (with adapter)	✖	✔
Hot-swappable battery	✔	✖	✖
Battery capacity (Wh)	43	32.4	36.1
Storage (GB)	128	64	32
RAM (GB)	8	1	3
Vibrating alert	✔	✖	✔
Hardware security	✔ (Intel vPro™)	✖	✖

Figure 1: The tested tablets and their features.

WHAT WE FOUND

Collaborating on a problem

Jake arrives at work early Thursday morning. He grabs his tablet, turns it on, and signs on. Checking his corporate Web mail, he finds he's overdue for some corporate conduct and payroll portal training. He's supposed to view a video and a large PowerPoint® presentation. Jake loads the video from the link in the email, watches it, and then looks through the attached PowerPoint presentation.

Next, he checks ClickSoftware ClickMobile, his company's workforce management software, for new work orders. He finds one and opens it. He copies the address, pastes it into his tablet's navigation app, and loads directions to the site. He gets into the company truck with the tablet and sets off.

Arriving at the site, he loads a PDF manual describing normal maintenance requirements and common signs of pending failure for the piece of equipment he'll be working on. Jake sees a large squirrel nest on top of the equipment and needs to clear it. In doing so, he notices discoloration of the equipment and thinks it may be a sign of imminent failure. Making a quick Skype™ call, he connects to Jill, the lead equipment engineer in distribution. Jill asks Jake to take a couple of readings on the equipment with some handheld gear.

Jill also asks him to open Excel® Online so he can share a spreadsheet in the cloud. This will allow Jake to first input numbers so Jill can add formulas and then review the data as Jake runs more tests. Jill directs Jake to take specific readings and enter them into the spreadsheet. Jake finishes in about 10 minutes, and Jill has enough information to diagnose the equipment. Jill reports that the equipment is not near failure, but has lost some of its cooling fluid—a type of refined mineral oil—and Jake needs to add two liters. His tablet has made this a one-dispatch fix, instead of a multiple-engineer dispatch.

	Motion Computing R12	Apple iPad Air	Samsung Galaxy Tab Pro 12.2
Biometric sign on	✓	✗	✗
Pen input	✓	✗	✗
View Skype™ video call and Excel spreadsheet at the same time	✓	✗	✗

Figure 2: Availability of features that can help the worker in this scenario.

Figure 2 shows the availability of features for this scenario that could be helpful to Jake. For example, Jake would be able to see Jill in the Skype video call on the Motion R12 while also looking at the spreadsheet. We also found the Motion R12 running Windows 8.1 provided the greatest usability and a wide range of capabilities with Office, using both Office Online and the desktop versions of the Office applications.
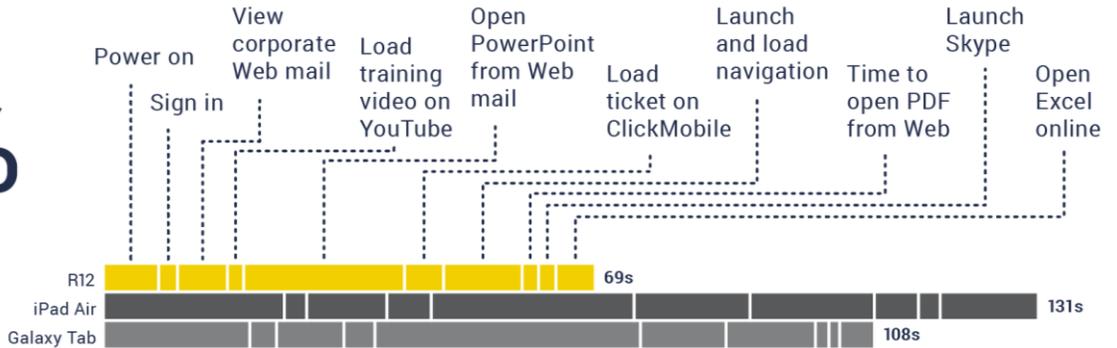

Figure 3: The time spent waiting when using the three tablets to start a workday.

Throughout the day, Jake would lose over 6 seconds every time he loads a ClickSoftware ClickMobile ticket on the iPad Air.

Figure 3 shows that the Intel Core i7 processor-based Motion R12 required 36.2 percent less waiting than the iPad Air and 47.4 percent less waiting than the Samsung Galaxy Tab Pro 12.2. Instead of waiting over 6 seconds longer for ClickSoftware ClickMobile to load a ticket on the iPad Air, Jake could be pulling up directions and heading out to the work site. He also wouldn't want to wait over 13 seconds for Microsoft Excel Online to open and fully load a spreadsheet on the ARM®-based Galaxy Tab Pro 12.2.

Figuring out a temporary fix

The phone wakes Jane at 3 AM. Someone at the office says a car slid into a pole and damaged the control system for a voltage regulator. As the on-call Instruments and Communications technician, Jane has to fix the problem. She quickly gets ready, grabbing and powering on her tablet along the way. After signing on, Jane pulls local weather information from the internet, and then loads ClickSoftware to look at her new work order. She sees the location of the voltage regulator, noting the pole number, and quickly logs into ArcGIS to view additional information. The model number of the voltage regulator is in ClickSoftware, but since the warehouse is closed, she will have to wait until morning to obtain a replacement and to apply a temporary fix to the wiring in the meantime. Using her corporate Web mail, she indicates to the Procurement team that a new box needs ordering, and heads to the truck. Jane launches the default mapping application, and the tablet provides her with spoken directions to the site.
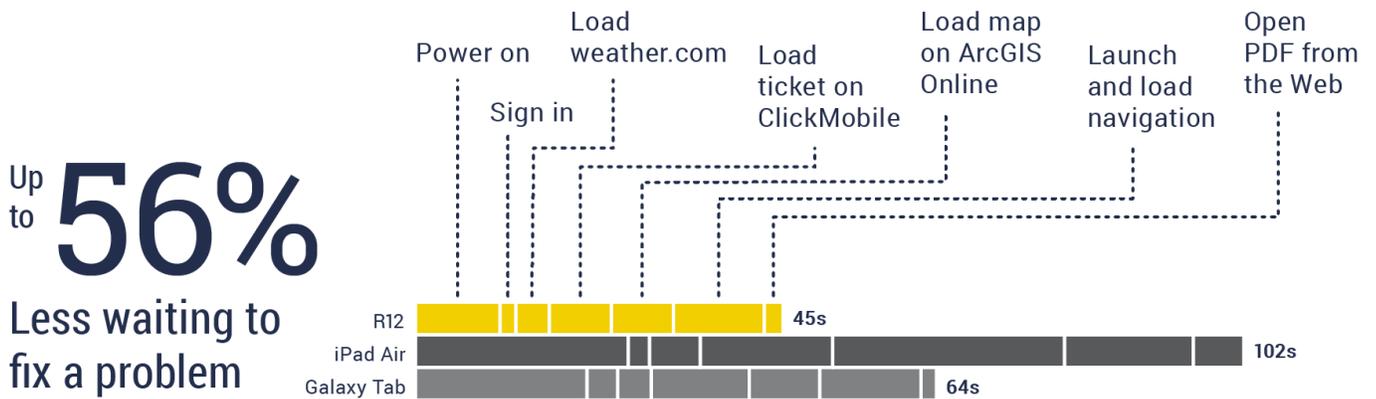
When she arrives, Jane notices burn marks on the box, indicating that the wiring cannot be re-used. She talks to the crew on site—they have to leave for another outage location. After opening the box, Jane sees that the accident melted and fused together the junction bar and connectors, which means a complete re-wiring. She does not have a clear idea of which is the hot wire in the box, so she searches for the wiring diagram of the device on her tablet. She finds it among her company's PDF manuals and pulls it up.

She returns to the control box with tools, equipment, and her tablet. Looking at the wiring diagram, she zooms in and figures out which wires may still be dangerous. She carefully pulls them loose and tapes them off. Then she re-wires the box for temporary use until the replacement shows up. She cleans the work area, logs into ClickSoftware, and closes out the work order online.

	Motion Computing R12	Apple iPad Air	Samsung Galaxy Tab Pro 12.2
Biometrics sign on	✓	✗	✗
Multiple ClickMobile schedule views	✓	✗	✗
Pen input	✓	✗	✗
Local storage for PDFs	✓	✗	✓
ClickMobile Resource Locator	✓	✗	✗

Figure 4: Availability of features that can help the worker in this scenario.

Figure 4 shows the availability of features for this scenario that could be helpful to Jane. We specifically found the ClickSoftware ClickMobile app showed significant functional differences between the three platforms. The iPad Air and Galaxy Tab Pro 12.2 apps contained exactly the same features, options, and datasets. However, the Motion R12 app had datasets, tools, and organization capabilities that created a better user experience including the Resource Locator tool, the ability to view schedules in three-day and week views, and access to more data fields and inventory capabilities for work orders.

Up to 56%
Less waiting to fix a problem

Power on · Sign in · Load weather.com · Load ticket on ClickMobile · Load map on ArcGIS Online · Launch and load navigation · Open PDF from the Web

R12 — 45s
iPad Air — 102s
Galaxy Tab — 64s

Figure 5: The time spent waiting when using the three tablets to figure out how to fix an urgent problem.

As Figure 5 shows, the Motion R12 required 29.5 percent less waiting than the iPad Air and 55.6 percent less waiting than the Samsung Galaxy Tab Pro 12.2. Rather than wait over 10 seconds longer for the iPad Air to power on, Jane could be out the door. She also wouldn't want to wait over 8 seconds longer in an urgent situation like this for ClickSoftware ClickMobile to load a ticket on the ARM processor-based Samsung Galaxy Tab Pro 12.2.

On the job, Jane would lose over 8 seconds every time she loads a ticket with ClickSoftware ClickMobile on the Galaxy Tab Pro 12.2.

Correcting field inventory data

Jeb has to do a patrol of a circuit to review the assets and their conditions. He arrives at the substation and then powers on and signs on to his tablet. He opens a form in Microsoft OneNote® to take notes. This circuit's data is several years old, so Jeb snaps a picture of the first pole and saves it to his tablet. He opens ArcGIS and reviews the data for the pole. Continuing, Jeb looks at the location of the third pole on his tablet and notices that the pole is nearly 50 feet from where ArcGIS shows it. He moves the inventory to its updated location using ArcGIS and opens ClickSoftware to double-check that the pole inventory matches information in the system's records. He notes a few maintenance items in Microsoft OneNote before moving on.

As he moves to the next pole, he notices there is a secondary lead from the transformer that does not match the data in ArcGIS. He also notes that the lead is of a different conductor than the utility normally uses. Jeb takes a picture of the secondary lead and opens his corporate Web mail. He attaches the picture and the asset tag information of the pole to the email and sends it to the fraud department for review.

	Motion Computing R12	Apple iPad Air	Samsung Galaxy Tab Pro 12.2
Biometrics sign on	✓	✗	✗
ArcGIS for Desktop support	✓	✗	✗
Pen input	✓	✗	✗
Manipulation of measuring tools in ArcGIS Online	✓	✗	✗
ArcGIS app	✓ (beta)	✓	✓

Figure 6: Availability of features that can help the worker in this scenario.

Figure 6 shows the availability of features for this scenario that could be helpful to Jeb. The Wacom® pen for the Motion R12 made annotating, measuring distance, and editing objects easier when using ESRI ArcGIS Online. In fact, the distance-measurement tool was impossible to use on the Apple iPad Air and the Samsung Galaxy Tab Pro 12.2, as the tablets lacked the ability to hover the cursor due to having only touchscreen capabilities.
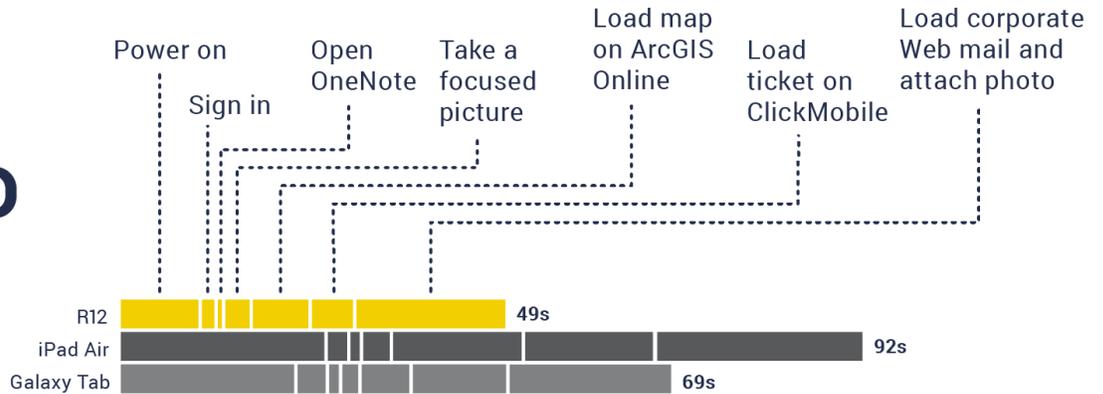
Up to 47% Less waiting to update field data

Figure 7: The time spent waiting when using the three tablets to correct field inventory data.

> Every time Jeb opens his Office 365 Outlook Web App on the Galaxy Tab Pro 12.2, he would lose over 6 seconds.

Figure 7 shows that the Motion R12 required 29.1 percent less waiting than the iPad Air and 47.3 percent less waiting that the Samsung Galaxy Tab Pro 12.2. Jeb doesn't have time to wait over 6 seconds longer for ClickSoftware ClickMobile to load a ticket on the iPad Air. Instead of waiting over 6 seconds longer to load his Office 365™ Outlook® Web App and attach a picture on the ARM processor-based Samsung Galaxy Tab Pro 12.2, Jeb could be moving on to the next item on the circuit.

BATTERY LIFE WHILE BROWSING

During a long day out on the job, battery life should be the least of your worries. Out in the field, a worker may not know when the next chance for available AC power may be. We found that all three systems lasted over 8 hours unplugged while browsing the Internet. In addition to the advantage of the hot-swappable battery feature, this means the Intel Core i7 processor-powered Motion R12 can deliver less waiting out on the job than the iPad Air or ARM processor-based Samsung Galaxy Tab Pro 12 without sacrificing all-day battery life. Additional hot-swappable batteries are available from Motion Computing. See Appendix C for detailed test results.

MOTION COMPUTING R12 OPTIONS AND ACCESSORIES

> Mobile Computing attempts to make the field worker's daily routine easier with a variety of special features.

Motion Computing offers a number of options and accessories for the R12 tablet that can make a utility worker's job easier and increase productivity.

- The SlateMate Data Acquisition Module adds three features: collecting and scanning barcodes, utilizing RFID tagging, and connecting to legacy devices that need a serial port.
- The R12 Companion Keyboard, according to Motion Computing, is a wireless keyboard with a foldable kickstand; it attaches magnetically to the back of the R12 for storage.
- To allow workers the freedom to work in various settings, Motion Computing offers two different Work Anywhere Kits—one with a shoulder strap and one with a handle—that they say allow the user to comfortably and conveniently use the tablet while standing and walking.

To learn more about Motion Computing accessories for the R12, see www.motioncomputing.com/us/products/rugged-tablets/r12#accessories

AT THE END OF THE DAY

The longer field workers out on the job must wait for apps or documents to open, the less time they have to complete work orders and troubleshoot problems. We put three tablets to work, and found that the Intel Core i7 processor-powered Motion Computing R12 offered features that the iPad Air and Galaxy Note 10.1 did not and provided greater functionality in many of the apps tested, including Microsoft Office, ESRI ArcGIS Online, and ClickSoftware ClickMobile. In addition, the Motion R12 moved through the worker scenarios with up to 36.2 percent less waiting than the Apple iPad Air and up to 55.6 percent less waiting than the Samsung Galaxy Tab Pro 12.2.

The Intel Core i7 processor-based Motion Computing R12 not only performed tasks conducted by utility workers faster, it could also let them get working sooner—it booted in half the time of the Apple iPad Air or Samsung Galaxy Tab Pro 12.2.

In terms of battery life, the Motion R12 lasted 8 hours and 55 minutes on a single charge while lightly browsing the Internet—more than a standard workday. In addition, the Motion R12 comes with IP-54 dust and water resistance, and MIL-STD-810G for impact resistance. This means durability and protection from the outdoor environment. With the Intel Core i7 processor-powered Motion R12, utility workers can do more, get working sooner, and waste less time waiting.

APPENDIX A – SYSTEM CONFIGURATION INFORMATION

Figure 8 provides detailed configuration information for the test systems.

System	Motion Computing R12	Apple iPad Air	Samsung Galaxy Tab Pro 12.2
Processor	Intel Core i7-4610Y	Apple A7	Samsung Exynos 5420
Processor (GHz)	1.7	1.4	1.9 + 1.3
Processor cores	2	2	4x4
Memory	8GB DDR3 RAM	1GB LPDDR3 RAM	3GB RAM
Storage	128GB SSD	64GB SSD	32GB SSD
Battery capacity	43 Wh	32.4 Wh	36.1 Wh
Display	12.5" (1920 × 1080)	9.7" (2048 × 1536)	12.2" (2560 × 1600)
Wireless	802.11 a/b/g/n	802.11 a/b/g/n	802.11 a/b/g/n
Bluetooth®	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0
USB ports	1 × USB 3.0	None	None
System weight	2.95 lbs.	1.05 lbs.	1.63 lbs.
Front Camera	2.0MP	1.2MP	2.0MP
Rear Camera	8.0MP	5.0MP	8.0MP
OS	Microsoft Windows 8.1	Apple iOS 7.1.2	Android 4.4.2

Figure 8: Detailed configuration information for the three tablets.

APPENDIX B – HOW WE TESTED

Battery life while browsing

Setting up the test

1. Make sure the display will not automatically turn off during the test.
   a. For the Samsung Galaxy Tab Pro 12.2, install the RedEye App from the Google Play™ store.
      i. Configure the app to force the display to remain on.
   b. For the iPad Air and Motion R12, set the display to sleep Never.
2. Open the devices' default browser, and bookmark the `www.msn.com` Web site.
3. Set the displays to as close as possible to 125 nits.
4. Plug the three tablet chargers into a power strip.
5. Make sure the batteries are all 100 percent charged.
6. Place the three tablets next to the clock.

Running the test

1. Start the video camera.
2. Open the default browser, and go to the bookmarked Web site.
3. Turn the power strip off, and note the time.
4. After the three tablets have fully discharged, review the video to determine when each tablet powered off.
5. Fully charge the three tablets.
6. Complete steps 1 through 5 two more times.

Collaborating on a problem

Before starting through this scenario, send a test email to a Microsoft Outlook 365 account, and include both an attached PowerPoint presentation and a link to a test YouTube video.

1. Start the timer and turn on the device.
2. When device fully powers on, stop the timer, and record the result.
3. Start the timer.
4. Sign into the device.
5. Stop the timer, and record the result.
6. Start the timer, and launch the default browser.
7. Use the Outlook 365 bookmark to navigate to www.outlook.office365.com.
8. Open the email Test Email 1 and stop the timer when the page finishes loading. Record the result.
9. Start the timer and select the link for the attached YouTube video.
10. Stop the timer when the video begins to play, and record the result.
11. Navigate back to the Outlook 365 Web App. This tab/browser should still be open.
12. Start the timer and select the PPT file from the test email.
13. When the PPT file completes loading, stop the timer and record the result.
14. Start the timer and launch ClickSoftware ClickMobile.
15. Select Action Items on iOS and Android, and Schedule on Windows.
16. Stop the timer when ClickSoftware ClickMobile has finished loading.

17. Select and copy a service address.

18. Start the timer and launch the default navigation app.

19. Search for directions using the service address.

20. Stop the timer when the directions are fully loaded, and record the result.

21. Load the test PDF from the Web.

22. Stop the timer when the PDF is fully loaded.

23. Exit the PDF viewer.

24. Start the timer and launch Skype.

25. When Skype is fully loaded, stop the timer.

26. Start the timer and select the bookmark for Office 365 Excel. This will launch in the default browser.

27. When the spreadsheet is fully loaded, stop the timer.

Figuring out a temporary fix

1. Start the timer and turn on the device.

2. Stop the timer when the device fully powers on and record the result.

3. Start the timer and sign into the device.

4. Stop the timer and record the result.

5. Start the timer and launch the tablet's default browser.

6. Select the bookmark for `www.weather.com`

7. When the browser and page are fully loaded, stop the timer and record the result.

8. Start the timer and launch ClickSoftware ClickMobile.

9. Select Schedule.

10. Select the first work ticket.

11. Stop the timer and record the result.

12. Select and copy the service address.

13. Start the timer and the launch the shortcut for ArcGIS Online.

14. Select the test map and zoom to the current location.

15. Stop the timer when the map is fully loaded and record the result.

16. Start the timer and launch the default navigation app.

17. Search for directions using the copied service address.

18. When the directions are fully loaded, record the result, and stop the timer.

19. Start the timer and open the test schematic PDF.

20. Stop the timer and record the result.

21. Start the timer and zoom in on the previously opened PDF.

22. Stop the timer when the PDF finishes rendering and record the result.

Correcting field inventory database

1. Start the timer and power on the device.

2. Stop the timer when the device fully boots and record the result.

3. Start the timer and sign onto the device.

4. Stop the timer and record the result.

5. Start the timer and launch Microsoft Word.

6. Stop the timer when Microsoft Word is fully loaded and record the result.

7. Start the timer, launch ArcGIS Online, and load the default test map.

8. Stop the timer when page is fully loaded.

9. Start timer and launch ClickSoftware ClickMobile.

10. Select Schedule.

11. Stop the timer when the schedule is fully loaded.

12. Navigate to the device's home screen.

13. Start the timer and select the default camera app.

14. When the camera loads and has finished focusing, take a picture.

15. When the picture completes saving, record the result, and stop the timer.

16. Switch to ArcGIS.

17. Start the timer and select the bookmark/shortcut for `www.outlook.office365.com`

18. Select the "+" to compose a new email.

19. Select the paperclip to attach a file. Attach the test picture.

20. Send the email to a test email address.

21. Stop the timer when the email finishes sending and record the result.

APPENDIX C – DETAILED TEST RESULTS

Figure 9 presents the detailed results, with battery life while browsing recorded in hours and the time to complete tasks in the scenarios recorded in seconds. We performed all tasks three times and used the median scores.

	Motion Computing R12	Apple iPad Air	Samsung Galaxy Tab Pro 12.2
Battery life while browsing			
Battery life while lightly browsing the Internet (higher is better)			
Run 1	8:55:00.00	10:28:00.00	09:44:00.00
Run 2	8:45:00.00	10:34:00.00	09:34:00.00
Run 3	8:55:00.00	10:32:00.00	09:34:00.00
Median	**8:55:00.00**	**10:32:00.00**	**09:34:00.00**
Collaborating on a problem			
Time to turn on tablet (lower is better)			
Run 1	00:07.95	00:20.60	00:25.46
Run 2	00:07.60	00:20.50	00:25.15
Run 3	00:07.75	00:20.53	00:25.34
Median	**00:07.75**	**00:20.53**	**00:25.34**
Time to sign on (lower is better)			
Run 1	00:02.66	00:03.75	00:03.16
Run 2	00:02.63	00:03.78	00:03.12
Run 3	00:02.64	00:03.62	00:03.28
Median	**00:02.64**	**00:03.75**	**00:03.16**
Time to view corporate Web mail (lower is better)			
Run 1	00:07.06	00:09.56	00:11.72
Run 2	00:07.00	00:09.38	00:11.22
Run 3	00:06.93	00:09.41	00:11.16
Median	**00:07.00**	**00:09.41**	**00:11.22**
Time to open training video (lower is better)			
Run 1	00:02.28	00:04.42	00:06.12
Run 2	00:02.40	00:04.35	00:06.22
Run 3	00:02.28	00:04.28	00:06.22
Median	**00:02.28**	**00:04.35**	**00:06.22**
Time to open Microsoft PowerPoint presentation (lower is better)			
Run 1	00:22.53	00:35.63	00:28.59
Run 2	00:22.78	00:37.53	00:28.41
Run 3	00:21.75	00:37.20	00:28.06
Median	**00:22.53**	**00:37.20**	**00:28.41**
Time to launch ClickSoftware ClickMobile (lower is better)			
Run 1	00:05.53	00:11.87	00:16.68
Run 2	00:05.41	00:12.11	00:16.25
Run 3	00:05.47	00:12.00	00:16.16
Median	**00:05.47**	**00:12.00**	**00:16.25**
Time to load navigation (lower is better)			
Run 1	00:10.90	00:12.30	00:17.40
Run 2	00:11.00	00:12.60	00:17.90
Run 3	00:11.10	00:12.50	00:17.10
Median	**00:11.00**	**00:12.50**	**00:17.40**

	Motion Computing R12	Apple iPad Air	Samsung Galaxy Tab Pro 12.2
Time to open PDF from web (2.5 MB) (lower is better)			
Run 1	00:02.30	00:01.80	00:06.50
Run 2	00:02.30	00:02.00	00:06.20
Run 3	00:02.30	00:01.90	00:06.00
Median	**00:02.30**	**00:01.90**	**00:06.20**
Time to launch Skype (lower is better)			
Run 1	00:02.40	00:01.50	00:03.09
Run 2	00:02.52	00:01.52	00:02.98
Run 3	00:02.45	00:01.53	00:03.02
Median	**00:02.45**	**00:01.52**	**00:03.02**
Time to load Excel Online spreadsheet (lower is better)			
Run 1	00:05.37	00:04.81	00:13.28
Run 2	00:05.63	00:05.07	00:13.75
Run 3	00:05.50	00:04.88	00:14.01
Median	**00:05.50**	**00:04.88**	**00:13.75**
Total time waiting	**01:08.92**	**01:48.04**	**02:10.97**
Figuring out a temporary fix			
Time to turn on tablet (lower is better)			
Run 1	00:10.22	00:20.94	00:26.12
Run 2	00:10.38	00:21.88	00:25.84
Run 3	00:10.40	00:21.06	00:26.29
Median	**00:10.38**	**00:21.06**	**00:26.12**
Time to sign onto tablet (lower is better)			
Run 1	00:01.94	00:03.81	00:02.53
Run 2	00:01.82	00:03.78	00:02.63
Run 3	00:01.94	00:03.65	00:02.69
Median	**00:01.94**	**00:03.78**	**00:02.63**
Time to view weather conditions (lower is better)			
Run 1	00:04.12	00:04.25	00:06.41
Run 2	00:04.56	00:04.12	00:06.21
Run 3	00:04.12	00:04.09	00:06.22
Median	**00:04.12**	**00:04.12**	**00:06.22**
Time to open ClickSoftware ClickMobile (lower is better)			
Run 1	00:07.83	00:12.03	00:16.68
Run 2	00:07.63	00:12.10	00:16.25
Run 3	00:07.55	00:12.00	00:16.16
Median	**00:07.63**	**00:12.03**	**00:16.25**
Time to view ArcGIS Online data (lower is better)			
Run 1	00:07.62	00:08.59	00:16.44
Run 2	00:07.30	00:08.66	00:15.81
Run 3	00:07.72	00:08.97	00:15.55
Median	**00:07.62**	**00:08.66**	**00:15.81**
Time to load navigation instructions (lower is better)			
Run 1	00:10.90	00:12.30	00:17.40
Run 2	00:11.00	00:12.60	00:17.90
Run 3	00:11.10	00:12.50	00:17.10
Median	**00:11.00**	**00:12.50**	**00:17.40**

	Motion Computing R12	Apple iPad Air	Samsung Galaxy Tab Pro 12.2
Time to open PDF from web (2.5MB) (lower is better)			
Run 1	00:02.30	00:01.80	00:06.50
Run 2	00:02.30	00:02.00	00:06.20
Run 3	00:02.30	00:01.90	00:06.00
Median	**00:02.30**	**00:01.90**	**00:06.20**
Total time waiting	**00:44.99**	**01:04.05**	**01:43.32**
Correcting field inventory database			
Time to turn on tablet (lower is better)			
Run 1	00:10.06	00:20.60	00:25.46
Run 2	00:10.19	00:20.50	00:25.15
Run 3	00:09.68	00:20.53	00:25.34
Median	**00:10.06**	**00:20.53**	**00:25.34**
Time to sign onto tablet (lower is better)			
Run 1	00:01.97	00:03.84	00:02.72
Run 2	00:01.94	00:03.93	00:02.82
Run 3	00:02.03	00:03.97	00:02.81
Median	**00:01.97**	**00:03.93**	**00:02.81**
Time to launch Microsoft OneNote (lower is better)			
Run 1	00:00.94	00:01.59	00:01.57
Run 2	00:00.93	00:01.62	00:01.62
Run 3	00:00.94	00:01.63	00:01.59
Median	**00:00.94**	**00:01.62**	**00:01.59**
Time to take a picture (lower is better)			
Run 1	00:03.40	00:02.50	00:03.80
Run 2	00:03.50	00:02.30	00:03.50
Run 3	00:03.20	00:02.40	00:03.70
Median	**00:03.40**	**00:02.40**	**00:03.70**
Time to open ArcGIS Online (lower is better)			
Run 1	00:07.33	00:06.33	00:16.28
Run 2	00:07.38	00:06.55	00:15.88
Run 3	00:07.25	00:06.25	00:16.57
Median	**00:07.33**	**00:06.33**	**00:16.28**
Time to load ticket in ClickSoftware ClickMobile (lower is better)			
Run 1	00:05.58	00:11.50	00:16.70
Run 2	00:05.51	00:12.03	00:16.33
Run 3	00:05.49	00:12.02	00:16.22
Median	**00:05.51**	**00:12.02**	**00:16.33**
Time to send email with attachment (lower is better)			
Run 1	00:18.88	00:19.75	00:26.55
Run 2	00:18.78	00:20.78	00:25.75
Run 3	00:19.02	00:20.41	00:25.85
Median	**00:18.88**	**00:20.41**	**00:25.85**
Total time waiting	**00:48.63**	**01:08.62**	**01:32.22**

Figure 9: Detailed results.

ABOUT PRINCIPLED TECHNOLOGIES

Principled Technologies®

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