

WORK HARD & SMART

The Rugged Smartphone

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Rugged Handheld or Smartphone: Why Not Both?

When it comes to business, smart phones are more than just “smart” machines for sending and receiving messages. Today’s professionals are taking advantage of the full range of capabilities to use them as small computers in their own right: collecting, manipulating and storing data; documenting activities and managing workflow; accessing the internet for information and file sharing.

Business professionals are also private consumers and recent trends show that more of them force the hand of Enterprise IT policies by bringing their own devices into the workplace, including smart phones and tablets, because they insist on having the functionality they embrace in their personal lives. Of course, this often means that the Enterprise is expensed when those products break while

on the job. This is something that can’t be stopped or even slowed down, as according to Forrester research, by 2016, smartphones and tablets will be standard equipment “in the pockets of a billion global consumers...350 million employees will use smartphones.” (*“Mobile is the New Face of Engagement”* by Ted Schadler and John C. McCarthy, Forrester Research, Feb. 23, 2012)

When field professionals take consumer-grade smartphones out on the job, the enterprise finds itself spending considerably more dollars than if an upfront investment in rugged equipment had been made. Because the reality of field conditions will shorten the average lifespan of mobile devices to just a few months, budgets are quickly busting on equipment expenses, lost productivity and lost data. However, today’s rugged smartphone contains functionality that meets or exceeds what consumer-grade devices can offer, and they will last for years

in the tough environments encountered by today's mobile workforce.

The ease of use of the smartphone brought the devices to the enterprise, but they are staying due to functionality that the mobile workforce now expects. Ten years ago, a field worker took pen and paper to a job site and filled in pre-printed forms that came back to the office. Today, forms are filled out on site, photographs are taken, and all of it is emailed on the spot to managers at the office, or elsewhere in the field. This kind of real-time workflow capability has become a standard across many industries, from healthcare to heavy construction, and can be crucial to having the productivity gains and cost-cutting efficiency to survive in today's competitive markets.

However, when a device fails, the average handheld device user (including smartphone or tablet users) will lose an average of 50 to 80 minutes of productivity, not counting the time required by IT to repair the device to productive standards or to put a replacement device into service. (*"Total Cost of Ownership Models for Mobile Computing and Communications Platforms"* VDC Research, 2010.)

When Total Cost of Ownership is figured in to an equipment purchase, it makes sense to require rugged specifications for any field deployment. A single drop onto a sidewalk can destroy a consumer-grade device; working in sunlight or rain is impossible; worker productivity is compromised quickly when the equipment is delicate. When efficiency and reliability are necessary, rugged is the only way to go. And of course – efficiency and reliability are always necessary!

For most enterprise smartphone purchases, cost and functionality (and to a lesser degree size and weight) have been the primary criteria for choosing the equipment. However, to truly maximize value, the type of deployment where the equipment will

be used should be a primary concern when making a purchasing decision. Will the smartphone be subjected to drops, vibration, temperature extremes, rain, dirt/dust, long run-times without battery charge? Also, integrated functionality such as camera/video capability, advanced sensors such as GPS receivers and accelerometers, software compatibility with the operating system, and ease of use for the field worker all come in to play.

Several years ago, rugged handheld computers were considerably behind consumer devices in terms of processing power, memory, storage, connectivity and other features, limiting the enterprise in what they could do with a rugged handheld. However, recent new technology advancements and more aggressive product development by rugged computer manufacturers are enabling business to have cutting-edge speed, communications and integrated features with all the protection that a rugged handheld offers.

Today's field workers, regardless of industry, enjoy the capabilities of consumer-grade products and expect the same functionality in the equipment they use at work. When they encounter ineffective devices in the workplace, they often will find a way to smuggle their own smartphones in to the job – creating a nightmare for security along with expense bills for replacements. When enterprise provides equipment that meets or exceeds the expectations of the end user, while still meeting ruggedness standards, the Return on Investment is assured.

The Handheld in Enterprise: Needs-based Decision making

Purchasing decisions are made based on the ability of a product to solve a problem: either for the mobile worker or for mobile workforce management and productivity. Saving workers time and

effort in data collection in the field, or increasing the efficiency of workflows for an entire workforce, is a primary driver behind widespread adoption of rugged smartphones for the field.

Let's consider some core needs for enterprise in considering the purchase of smartphones for their mobile workforce:

Need: Ease of Use

Requirements:

- Familiar user interface with Gorilla® Glass capacitive touchscreen
- Larger, high resolution display that is readable outdoors in sunlight
- Ergonomic form factor
- Attractive industrial design

Benefit/Value:

A rugged smartphone still needs to feel like a cell phone to the user. It needs to be able to fit into a pocket or easily carried all day long in small hands without taxing the user. A high screen resolution and larger 4.3" display, paired with multi-touch gesture support, can allow the user to easily view maps or consume other types of information on the screen.

A drop protected device with a rugged display and touchscreen is another factor to consider: in a professional capacity a touchscreen must survive all day use, much more so than in a consumer-grade product. In fact, touchscreen and display damage is one of the leading causes of device failure in the consumer smartphone category.

Need: Reliability in the field

Features:

- Ingress Protection (IP) ratings of IP65 or better
- Certified to survive a four-foot drop, and MIL-STD-810G ratings
- Long battery life (3300 mAh)
- Availability of extended run-time accessories
- Sunlight-readable display

Benefit/Value:

Mobile workers need a device that works in all outdoor conditions. The IP65 (or higher, up to IP68) rating indicates protection against water damage and is unique in comparison to most consumer devices. A sunlight readable display with vibrant colors both indoors and outdoors is a competitive advantage to any consumer grade cell phone; it should be just as easy to view in the mid-day sun as it is indoors. Drop specifications and testing to military standards ensure the smartphone will survive under the toughest wear and tear.

Battery capacity 2.5 times larger than leading consumer smart phones¹ and optional accessories to double the battery life of the device when necessary, ensure the mobile worker remains productive in the field. With this combination of environmental and operating features, the enterprise worker is not restricted in performing their work, no matter the types of weather they encounter or the remote locations they go to. In exchange for the investment in rugged devices, companies benefit from greater productivity through continuous workflow and continuous worker productivity.

¹ Compared to iPhone 4S 1432mAh battery

Need: Cost-Effective Purchases & Quick Return on Investment

Cost Options:

- \$1500-MSRP for an entry-level rugged handheld with Bluetooth, Wi-Fi, GPS & 8 MP Camera.
- \$1900-MSRP for a full-featured rugged handheld and smartphone with cellular data and voice call capability, plus more processing speed, RAM and storage.

Benefits/Value:

In the face of budget constraints and pressures to reduce costs, sound project management requires that companies perform a Return on Investment analysis on any hardware deployment. Competitive pricing combined with the durability of a rugged device compared to a consumer-grade smartphone, the ability to reduce extra hardware costs by having an all-in-one device and the longevity of a stable application platform all contribute to a quick ROI, make a rugged smartphone the intelligent choice for large workforce deployments.

The Juno T41 is available in three models with varied feature sets, IP ratings (IP65 or IP68) and operating systems (Microsoft® Windows Embedded Handheld (WEHH) 6.5 or Android 2.3.4 “Gingerbread”) to enable each enterprise project to buy the optimum device for their hardware specification and price requirements.

Need: Data Transfer & Communications in the Field

Features:

- 3.75G Data & Voice Penta-band GSM Module
- Wi-Fi (802.11b, 802.11g and 802.11n)

Benefits/Value:

By purchasing a rugged smartphone such as the Juno T41, enterprise will have a more cost-effective solution by not having to provide a separate voice and data plans to each mobile worker, in addition to a separate cell phone and data collection device. Workers using an all-in-one device with a cellular and Wi-Fi data connections will benefit from having most current data and being able to easily communicate with office. Managers benefit by being able to contact their workers no matter where they are, check on work progress and reassign work as necessary. Companies also benefit from increased productivity as users are using up to date information and can be allocated as needed. Integrated Wi-Fi enables easy connectivity when workers are at a company office facility. Depending on the enterprise IT policy, mobile workers would have the option of using Wi-Fi hotspots, where available, to reduce the volume of data transferred on a cellular data plan.

Need: Reliable Connections to bring the field to the office

Features:

- USB client and PC synchronization cable
- USB host connector
- RS-232 9-pin Serial connector

Benefits/Value:

A smartphone can rarely work directly with office equipment such as printers or other office devices. Cables and connectors are either not available or are delicate and prone to damage. In the enterprise, with many users, a cable connection that can withstand multiple uses is a factor in Total Cost of Ownership.

The Juno T41's custom cables are a flexible solution designed for ease of integration and reliability in

the field. The custom connection is robust, sealed and designed to handle three times more connections than a standard USB host port². The USB client cable ships with the unit and allows the user to charge the battery and sync to a PC. The USB host connector provides a connection to USB peripheral accessories such as a Flash memory drive, and the DB-9 connector allows connection to the legacy hardware with a 9-pin Serial port. This simple, fully sealed product design with custom connectors allows users to modify connections to fit their unique field requirements and without compromising the rugged protection, even momentarily.

Need: Imaging and Location information

Features:

- 8 megapixel camera
- Integrated geo-tagging capability
- Camera application with intuitive graphical user interface (GUI)

Benefit/Value:

Mobile workers often need to capture high quality photographs that include GPS time and location data directly on the image or in the image EXIF data. Workers in the field benefit from the easy-to-use GUI with integrated geo-tagging functionality and not having to carry an additional camera. Managers benefit from being able to evaluate field conditions and assign follow-up work as necessary. Companies benefit from increased productivity and less rework with highly detailed images of assets and events.

Need: Reliable & accurate location information in a variety of GPS conditions

Features:

- High-sensitivity GPS Receiver
- 2 - 4 meter real-time accuracy with SBAS corrections (consumer-grade smartphones do not have this functionality)

Benefits/Value:

Mobile workers need to get accurate positions and be able to reliably navigate in a variety of conditions: near tall buildings, under trees and on the go.

Need: Operating System Choice

Microsoft® Windows Embedded Handheld (WEHH) 6.5: designed to work in tandem with the Microsoft® Office Mobile suite of products, WEHH units are ideal for enterprise that requires their field data to be inserted seamlessly into their office workflow.

Android: Military and federal workflow applications are increasingly moving towards Open Source Environments. Application developers and software partners are also demanding operating system choices that allow them to create their own IT solutions, compatible across multiple platforms.

Need: Integrated components

Features:

- Integrated antennae, radio and GPS receiver components

Benefits/Value:

When components such as antennae and GPS receivers are built inside a rugged unit, they will provide optimal performance no matter the conditions and provide better ease of use for the mobile

² Based on USB On-the-Go Standard 5,000 insertion/removal specification

worker, they will last. While ports to attach antennae and other peripherals should be included and sealed, having most of the functionality internal to the device enhances reliability.

What Qualifies as Rugged: the Facts

As enterprise buyers become more aware of the cost benefit to purchasing rugged handhelds such as smartphones and tablets for longevity, security and functionality, some manufacturers are advertising their consumer-grade products as “ruggedized” even if all they have is a plastic shell around their standard device. The harsh reality is that devices that are not specifically engineered from the inside out for real-world field conditions will continue to have a high failure rates due to rain, dirt, temperature extremes, drop shock and high battery use. Long-term rugged reliability is not something that can be accomplished with just an add-on shell. To ensure that field workers have the most cost effective equipment, it’s best to start with products that are designed rugged from the inside out.

IP Ratings and MIL-STD-810G

Two basic standards—Ingress Protection (IP) ratings and MIL-STD-810G—are used to determine the ruggedness of handheld computers. The IP rating uses two numbers to describe how well the unit is protected against incursion by dust and water. The first number (1 to 6) measures dust protection; the second number (1 to 8) describes water protection.

The second major standard—MIL-STD-810G—is a series of U.S. military testing standards that have gained acceptance in industries beyond the military for their methods of objectively determining whether a device is able to withstand potentially destructive elements such as drops, dust, water, vibration, altitude and extreme temperatures. The MIL-STD testing procedures determine the effect of

natural and artificial impact on equipment. Started in 1961, MIL-STD-810 has seen seven revisions over the past 51 years.

Some manufacturers’ product specifications make claims like “designed using MIL-STD-810 test procedures.” Since MIL-STD-810 includes hundreds of testing procedures, each of which tests different levels of protection, the mere reference to MIL-STD-810 testing is insufficient. It is important to know which tests were performed, and this should be available on any data sheet associated with a rugged product.

Semi-Rugged Handhelds

Semi-rugged handhelds can handle rougher treatment than a consumer-grade handheld, but they are not fully waterproof or dustproof, generally have a narrower temperature range, and do not meet all MIL-STD-810G specs. Most semi-rugged handhelds come with an IP rating of IP54. That means the unit is protected, though not sealed, against dust. It is resistant only to light splashing, but it’s not able to withstand jet sprays or immersion.

Rugged Handhelds

Trimble’s Juno T41 is rugged. A rugged handheld computer comes with a minimum rating of IP65, which means it is sealed against dust and can survive temporary immersion, such as being dropped in a puddle; the IP68 rated unit can be fully immersed for a length of time and still work. A fully rugged handheld like the Juno T41 has also passed MIL-STD-810G tests, including drops, shock, vibration, altitude, humidity and temperature extremes.

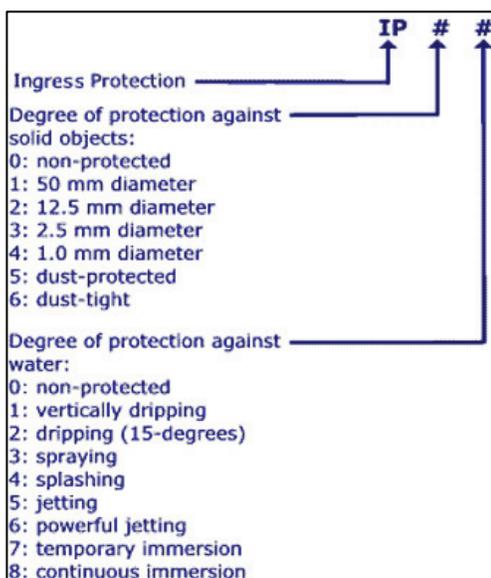


Figure 1—Ingress Protection (IP) Code definitions

Trimble MCS: Providing the Juno T41

Whatever your data collection or field service requirements, Trimble provides the rugged handheld computer and smartphone designed to fit your enterprise needs.

Smartphones and tablets designed for the mobile worker will continue to appear in the marketplace because the demand continues to grow. Now that enterprise is presented with this fact and is budgeting for the reality, the ruggedness and functionality of any integrated smartphone purchase should be priorities in making purchasing decisions. The average annual Total Cost of Ownership for a ruggedized handheld device used for enterprise operations is \$2,355, which is 34 percent less than the average annual TCO for commercial grade models used in the same environments. (“Total Cost of Ownership Models for Mobile Computing and Communications Platforms” VDC Research, 2010.) This includes lower costs for replacement and repair, and thus higher productivity and efficiency that cannot be fully measured.

The Juno T41 is designed to be a mobile enterprise solution for the mobile workforce. Standard features of the Juno T41 include a rugged design that withstand multiple four-foot drops to concrete, and integrated features including accelerometer, electronic compass, 8 MP camera, GPS receiver with 2 - 4 meter accuracy, a strengthened touchscreen and a durable keypad. Options include wireless connectivity with Bluetooth, Wi-Fi and GSM cellular data, two processor speeds and two capacities of data storage.

The Juno T41 is available in three models with varied feature sets, IP ratings (IP65 or IP68) and operating systems (Microsoft® Windows Embedded Handheld (WEHH) 6.5 or Android 2.3.4 “Gingerbread”) to enable each enterprise project to buy the optimum device for their requirements.



For more information about Trimble Mobile Computing Solution rugged handheld computers, visit www.trimble.com/rugged, www.trimblemcs.com, e-mail handhelds@trimble.com or call 541-750-9200.