Tough technology for the field

Contents

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How rugged is your tablet?

What you need to know about rugged tablet and laptop claims.

In today's mobile computing market, it can be difficult to understand what the term "rugged" really means.

It is reasonable for a buyer to expect that a device marketed as rugged is at least a little more durable than a standard off-the-shelf consumer product, but how durable and in what ways? How can buyers of laptops or tablets be assured the devices they are investing in will be reliable when it counts the most? This may seem like a matter of semantics, but questions about ruggedisation can have real consequences for end users.

Due to our growing dependence on mobile technology there are few instances where computer downtime does not have a major impact on productivity. IT hardware is now 'mission critical', not just for traditional users in our emergency service, utilities, telcos, defence forces, mining and manufacturing, but for a whole new generation of service, retail, technical, repair, logistics and transport users.

Rugged testing: MIL-STD-810G defined

In 1962, the U.S. Department of Defense (DoD) developed a series of tests, called MIL-STD-810G specifications (Mil-Spec), used to validate the level of ruggedisation in a piece of technology. Rather than a single test, these military standards include dozens of tests with strict parameters used to simulate how a mobile device will operate under a variety of stressors and environmental conditions. Once a device passes MIL-STD-810G specifications, they are approved for use by all departments and agencies of the U.S DoD.

The tests have been revised throughout the years to reflect the ever-changing needs of military personnel, and have become a benchmark across the industry in validating whether or not a device can be considered "rugged". MIL-STD-810G covers a variety of scenarios like drops and vibrations, extreme temperatures, high altitudes, water resistance and dust intake, and also includes criteria that limit the number of devices that can be used to pass a specific test. Successful completion of these tests helps identify truly durable devices that survive mission-critical jobs and weed out rugged claims that miss the mark.

You might be surprised to know that although enterprise mobility is entering more areas of businesses and is becoming increasingly critical to performance and profitability, there is no body that regulates the growing number of durability and MIL-STD-810G claims. Each manufacturer does its own testing. With that in mind, understanding each test and knowing what questions to ask is critical.

Below is a list of the critical tests that matter when evaluating a truly rugged device, along with the questions you should be asking.

Transit Drop Test: MIL-STD-810G Method 516.6 Procedure IV

What is it? A device is dropped from various heights at 26 different angles (every edge, corner and side) onto 10 cm thick plywood over steel plate on concrete. The height, at which the unit will still turn

on and operate, generally between 76 and 300 cm, is the rated drop specification.

Why does it matter? Drops are one of the most common causes of damage to business mobile devices. For example, 8 in 10[i] Australian fleets have regular remote staff, 8 in 10[ii] units encounter new stressors like drops, and monthly drops are reported for 7 in 10[iii] units.

Questions to ask: While MIL-STD-810G specifications allow for companies to use up to five devices to pass drop testing, does your manufacturer conduct all tests on the same unit to mirror a user's true working conditions? How many devices did it take to pass? At what height was the unit tested? While external cases may help with a single shock, 7 in 10 consumer tablets that fail in the field, fail in a protective case[iv].

Blowing Rain Test: MIL-STD-810G Method 506.5 Procedure I

What is it? A device is blasted with 14.7 cm-per-hour rain and 112 kph winds, for 30 minutes per surface while operational.

Why does it matter? Few mission-critical workers can put their work on hold due to rain. This test simulates using the device in inclement weather or on a job site around water.

Questions to ask: Many devices are marketed as "water resistant". What does this really mean? Is it just spill resistant? Did it merely pass the vertically falling rain/drip test (Procedure III)? Is the device only showing an Ingress Protection (IP) rating instead of submitting to this test? Does the manufacturer reveal to what extent they have tested their devices ie, can they be fully immersed in water and live to tell the tale?

Vibration Test: MIL-STD-810G Method 514.6 Procedure I

What is it? This test simulates the vibrations typically experienced in a vehicle-mounted environment.

Why does it matter? Personnel who use devices in vehicle or workers conducting business on the road need a reliable device to function in their everyday work environment. Mobile devices experience heavy vibration when mounted in utes, jeeps, tanks, trucks, patrol cars, fire engines, ambulances, forklifts, engineering equipment and even helicopters.

Questions to ask: Was the device operating during the test? Was it mounted during testing as it actually would be in use? Also ask about the specific conditions and duration of testing to ensure they mirror the types of environments your workers will face in the field. This could be anything from simulating gentle driving on paved surfaces to a rocket launch. For helicopter mounting, make sure the units are tested using Category 24 of this test.

Sand and Dust Resistance Test: MIL-STD-810G Method 510.5 Procedure I

What is it? Dust then sand is blown at a device over several hours in an environment of 60°C while operational.

Why does it matter? This test simulates situations like sandstorms or environments where unsealed devices, and those with fans, can have internal components exposed and damaged due to contaminants.

Question to ask: Ask for details about how the test was performed to ensure the test is reflective of the environment your workers may find themselves needing to operate in. Factories, mills and mines can have these types of conditions as much as outdoor environments can.

High Temperature Test: MIL-STD-810G Method 501.5 Procedure II

What is it? An operational test of the device is performed at 60°C for 30 minutes.

Why does it matter? This test simulates a device being exposed to high temperatures for an extended amount of time, like a device being left in a vehicle on a sunny day or in a hot factory environment. Most processors run well at room temperature, but when exposed to extreme hot or cold can experience catastrophic failure. This test simulates the ability of the unit to survive and operate at extreme temperatures ie, below freezing or above 50°C.

Question to ask: How long was the device tested in extreme heat?

Low Temperature Test: MIL-STD-810G Method 502.5 Procedure II

What is it? A device is placed in a -28°C environment for 30 minutes and powered on in the extreme cold.

Why does it matter? Successful completion means the device is able to boot in extreme temperatures without damaging the hard drive and losing valuable data. This test simulates the ability to start and operate at extreme winter conditions, without damaging the hard drive or experiencing data migration in an SSD. In many cases, a laptop will not start when the hard drive is frozen — in fact, trying to start a frozen hard drive may damage the device.

Questions to ask: If you ever work in a cold environment, ask if this test was performed and how data integrity was tested.

Temperature Shock Test: MIL-STD-810G Method 503.5 Procedure I

What is it? A device goes through three cycles of testing where it is placed in an environment of 93°C then 51°C to test reliability when moving between extreme temperatures.

Why does it matter? Typical, commercial-grade devices can experience severe usability issues at temperature extremes. This test simulates the environment a delivery driver might encounter when restocking foods from a freezer truck or moving from a cooler. Thermal shock can cause fogging/condensation inside a device which can impact the screen readability and the internal electronics.

Questions to ask: Was this test performed and do I want to risk damage from thermal shock if it was not?

Humidity Test: MIL-STD-810G Method 507.5 Procedure II

What is it? A device is tested in temperature cycles of 30°C then 60°C at 95% relative humidity.

Why does it matter? This test simulates how a unit might work outdoors in a tropical environment or in many plant locations. The main issue in these environments is the ability to transfer heat (reduced by the level of moisture in the air). If the device becomes overheated, units can become inoperable, temporarily or permanently.

Questions to ask: Has the device been tested for high humidity? Will it survive everywhere it may be needed?

Rugged device buyer's guide

Understanding Mil-Spec testing is the first step in selecting the highest quality, most reliable rugged device for your needs. Customers that are armed with the key questions they should be asking are best positioned to understand the product they are investing in. When evaluating products, look beyond the spec sheet. Were the products merely designed to meet Mil-Spec or were they actually tested? Ask for third-party testing results to be 100% confident in the results.

With no governing body conducting Mil-Spec testing, third-party validation is the only way to ensure rugged testing claims are true. It

is important to ask for independent lab testing results and details on each specific test, the number of products used and what parameters were given and any modifications made during testing. Consider how the device will fit into your total mobility solution. Investing in rugged means that your devices need to keep up with the demanding environments of your workers, and last for years to come. Here are the questions you should be asking:

Were the right tests passed?

Potential buyers shouldn't hear "Mil-Spec certified" and assume the device or case is rugged in all the potential testing categories. There are numerous types of tests, all done independently, so verify the device has passed the ones that best reflect the environment it will be deployed in. For example, customers that are purchasing a computer that will be mounted in a Northern Territory police car should put considerable priority on it successfully passing the extreme heat and vibration tests. A manufacturer may claim to have a Mil-Spec ruggedised device, but when you read the fine print, you may see it was only tested for altitude and not drops or spills, the most common causes of failure.

What is the fine print?

Currently, the armed services do not conduct actual tests or certify that rugged devices meet Mil-Spec standards. Each supplier of rugged computing equipment is expected to assure or guarantee adherence to the standards and can set their own parameters for the testing. Always ask for third-party validation of the tests that were passed. Also, remember to ask for details — for drop tests, for example, ask how many devices it took to pass and from what height.

What is the average annual failure rate?

In the end, reliability, as seen in low failure rates, is what counts. After all, Mil-Spec is just a test. Whether a computer continues to operate smoothly after several years of hard use in extreme environments is the best determinant of how rugged it really is. Ask the manufacturer to share verifiable data on how their computers have actually held up under real-world conditions.

What features are included?

Make sure you select a device that works the way your workers do. For example, first responders, service members and technicians spend a significant amount of time outdoors and need daylight-viewable screens, as well as devices that can function in rain, snow and other extreme weather conditions. Gloved touch capability and a sturdy handle, for minimising the potential for drops while carrying the device, are valuable features to consider.

What warranty and support is provided?

Beyond device warranty, consider the support available during and after deployment. Find a provider that will provide assistance should problems arise and work with you to resolve any issues. Investing in a device that is easily compatible with other systems can save headaches during future technology integrations. Some have local configuration and engineering support, other manufacturers may not.

What security measures are put in place?

Security is important to all business but especially critical for government workers. When valuable data is on the line, invest in a solution that will protect mission-critical information. Ask about features like a fingerprint reader or a SmartCard reader. Additional security features to ask for might include the Opal standard for hardware-based disk encryption necessary for DoD applications and mobile device management (MDM) capabilities that enable IT administrators to monitor and manage devices in real time, guard against unauthorised device access, remotely wipe or lock devices when lost or stolen, and perform other tasks such as updating applications or virus definitions.

Conclusion

The simple fact is any device can be labelled "rugged". Customers must be armed with the right information to ensure they get the ruggedised mobile computer or tablet that meets their needs and offers the lowest total cost of ownership (TCO).

Why rugged?

- 84% of Australian organisations now have workers outside their office environment.[v]
- 8 in 10 of their devices will be exposed to new stressors including drops and shocks, rain and weather, heat and cold, dust and vibration.[vi]
- Rugged IT failure rates are up to 91% lower than traditional IT.[vii]
- 70% of consumer tablets that fail in the field fail in a protective case.[viii]
- Panasonic rugged IT can deliver up to 45 minutes more productive field time per worker per day.[ix]

Important points to remember:

- Consumer-grade devices disguised as "rugged" do not offer the same level of durability or security as mobile computers that are built from the ground up for enterprise-grade applications and to perform reliably in the harshest environments.
- Customers evaluating rugged devices need information that helps them understand what MIL-STD-810G tests mean, which tests really matter, and what questions they should ask to ensure the device will be the right technology for their needs.
- Tight budgets require mobile computing technology to last longer than ever. Customers should evaluate TCO based on the cost of owning the technology over the full lifespan of the product, not just the initial investment.
- Whether you are looking for mobile computers or tablets, it is essential to understand how and where the devices may be used to ensure you get what you expect and select the right technology that can provide a durable and reliable solution for years to come.

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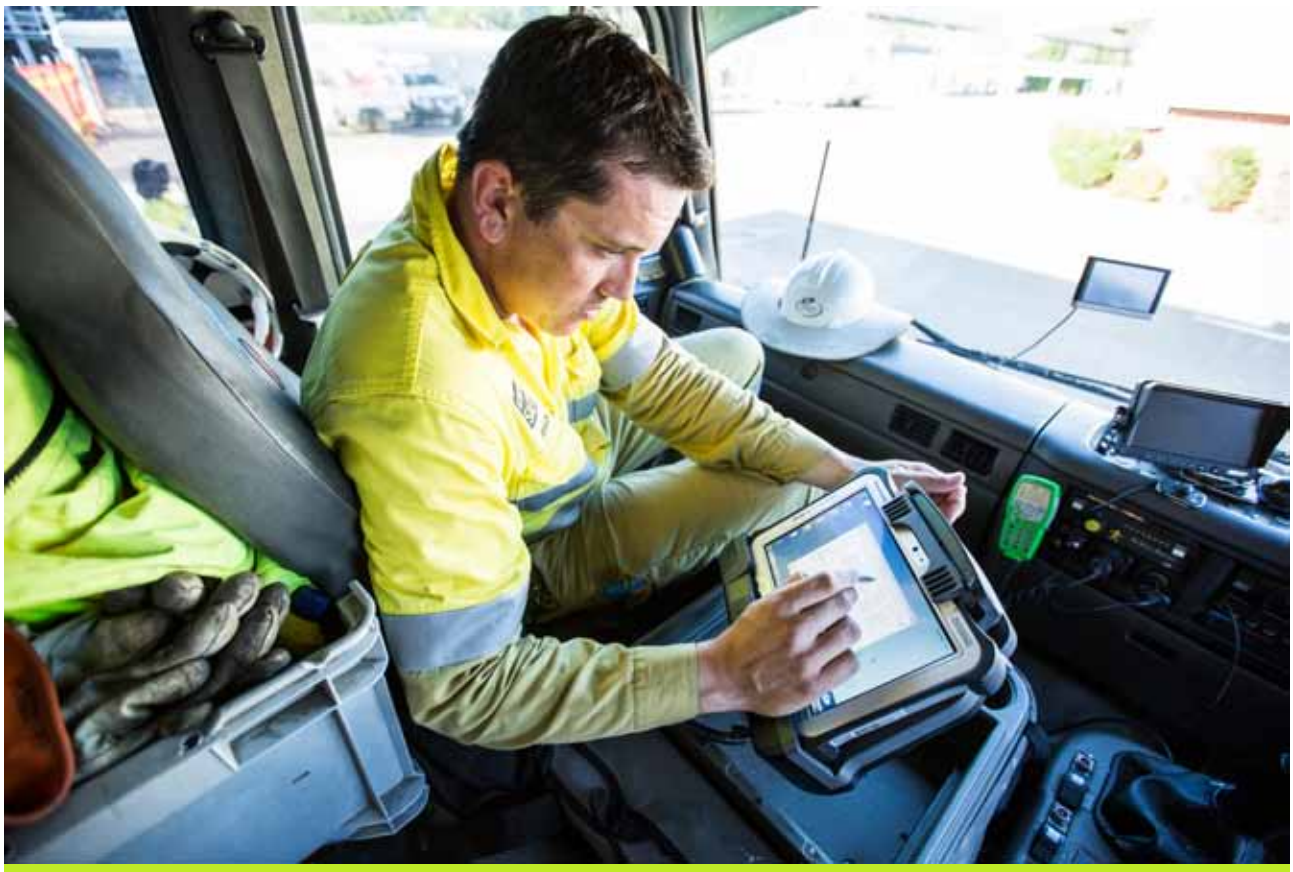

Mobilising the grid

Government-owned corporation Ergon Energy supplies electricity to around 700,000 homes and businesses across nearly 97% of Queensland. The electricity network comprises 150,000 km of power lines across diverse and harsh environments - from the coast to the outback. Field crews are responsible for establishing and maintaining the network, as well as restoring power after disasters, cyclones and floods.

For many years, Ergon Energy has conducted its field operations through manually intensive paper based methods. Work was distributed through a process involving many people and culminating in work dockets being printed out at depots around the state and then handed over to the field crews.

The field crews then travelled to grid locations to fix faults and captured new information from the site on paper. Once the work was completed, paper records were returned to the depot staff to be updated in the central system. The process was time-consuming, and because it was paper based with multiple people involved, it was easier for information to be lost or recorded incorrectly.

Jason Ledbury, Program Director for Field Force Automation, Ergon Energy, said, "As an energy provider we have a responsibility to provide the most efficient services to the community. We also realised there is going to be much more competition in the retail electricity market, driving more customer service work, and with our old processes it would have been difficult for us to scale up without requiring more resources. Therefore, we identified the need to revamp our processes by empowering our workforce with technology."

Ergon Energy opted to deploy over 500 Panasonic Toughpad FZ-G1 tablets mounted in vehicles and carried to sites. The Toughpads are already saving workers as much as 45 minutes per day, with the company expecting further efficiencies from the next project phase.

After an extensive field trial, the Toughpad was chosen for both form factor and functionality. The MIL-STD-810G and IP65 certified device, designed to endure high temperatures, drops and knocks, thick dust and heavy rain, is easily vehicle mounted and is light enough to be carried on the field. Its 10.1" screen with anti-glare and anti-reflective treatment means it can be read even in bright sunlight. In some remote areas, Ergon Energy has also adopted the Toughpad's extended battery which provides up to 20 hours of battery life.

A critical selection factor for Ergon was the ability to safely and securely mount devices in a wide array of vehicles. SPARQ Solutions worked with partners Data#3, Advanced Mobile IT (AMIT) and field crews to develop a mounting solution for each configuration that met strict government safety standards. AMIT delivered nine accredited vehicle configurations and subsequently fitted out around 400 vehicles.

Using 3G and 4G network capabilities, field crews access information from live data to manuals, with improved information flow to and from the field. The adoption has been smooth and the field crews have embraced the Toughpads.

"We have noticed a greater efficiency through optimised processes and are now in a position to cope with a greater volume of work," added Ledbury.

With the first phase now coming to an end, Ergon Energy will issue more work to the field in line with their Mobility Roadmap over the next five years, and plans to expand its Toughpad fleet accordingly.

4 steps to choosing the right mobile device

Rob Stummer, Managing Director ANZ, IFS Australia

Choosing the right mobile device is more than just product selection. Here are four simple steps to guide you to a better final outcome.

Laptops, ultrabooks, handhelds, smartphones and tablets; there is no one device appropriate for every type of service organisation, but each has specific features that might make it more suitable than other options.

Define the problem

It's critical to start the process with a clear definition.

A common mistake at this stage is to involve the wrong people. Include the team who will actually use the devices, which may seem like obvious advice, but not to everyone. Conversely, you'll never satisfy everybody so it's best to consider limiting participation only to areas where value can be provided.

Common requirements that impact on device choice:

- What conditions will the user be working under? Will they be working with gloves on, in the rain or up a pole with an electrical box? Wearing gloves requires a larger device and working at height requires a rugged device that can take a fall and must be attached to the user. Working on a pole means using the device one-handed, meaning smartphones may be preferable.
- What do your service level agreements look like? Do you guarantee a one-hour response time, regardless of technician availability? SLAs require devices that are always connected. Immediate notification of time-sensitive events helps prioritise projects and can affect whether you meet commitments.
- Who schedules the work? Do field service staff plan their own, are they scheduled automatically or controlled by a dispatch team, or is it a mix of the two? Do you want to take advantage of GPS in your schedule optimisation? When field staff are controlling their own schedule, they need a larger screen to view the totality of their workload. Companies relying on automated scheduling or a dispatch team may want the GPS capabilities of a smartphone so they can determine where each field service worker is and schedule them accordingly.
- Will your field service staff have to enter a lot of text or read large documents? If so, a smartphone may be less suitable than a tablet or laptop.
- Is it critical to take pictures, capture customer signatures or scan barcodes? Photos requirements generally mean a smartphone or tablet. Customer signatures and barcode scanning both require an external device for non-touch-enabled devices.
- How much access to data do you need to give your users? Is their customer list in the hundreds or the thousands? Do they need to access 100,000 spare parts? Consider wisely, as the total scale of the solution may push hardware capability.

Understand the costs

When conducting a cost/benefit analysis on various options, consider that some may include costs you're already incurring. For example, upgrading mobile phones to smartphones can be less expensive than acquiring additional hardware such as laptops or tablets. Many smartphones are subsidised by carriers in exchange for voice and data plans, so additional hardware costs may be negligible.

Regardless of whether you currently have mobile devices in the field, the biggest financial consideration should be choosing the device that makes the field force as efficient as possible, lowering costs and increasing revenue. For example, while rugged devices require a higher initial investment in hardware, if the field force is working under inclement conditions, the cost savings associated with device uptime might more than make up the difference.

Efficiency gains are subject to economies of scale based on the size of the workforce and costs scale in similar fashion. If choosing a particular device enables field service staff to complete more jobs with higher first-time fix rates and improved customer satisfaction, those gains will offset any additional hardware costs.

Consider non-tangibles

Perception matters and human beings don't always make decisions purely on reason. Service organisations must leave a good impression with customers, and field service staff arriving on time and behaving professionally, while treating clients with respect, will go a long way towards ensuring customer retention and referral.

Customers develop an emotional impression of a company based on that company's representatives, including the processes and tools that they utilise. The ability to quickly draw up account information and service history can assure the customer that you are able to provide the service they require.

Assess operational readiness

In the end, while customer perception, cost and hardware requirements are all very important in choosing a device, if your organisation isn't prepared or able to efficiently support a device, it might not be the right one for you.

The first thing to consider is the skill sets of employees and relevant third parties. If corporate IT is standardised on PC platforms, introducing an Apple-based solution may bring difficulties or increased costs. This is especially important if using internal resources to manage, develop or maintain software. Having 10 iOS programmers on staff won't provide a great benefit if you choose Android phones over iPads. If your IT department maintains Linux servers, the Java platform implemented by Android would be a much better fit for the corporate ecosystem.

It is equally important to take into account the offerings of your software vendors. If you have been using a Windows mobile VPN package for years to provide secure data transmission between field staff and the home office, choosing a non-Windows mobile device will mean finding a different vendor and absorbing the associated costs.

Additionally, the software vendor providing your field service software might not support all devices. Vendors, like end-user organisations, typically make the choice to optimise for certain devices or platforms. Even with web-based software, the reality is that there is a wide gap in the level of support for web technologies on mobile devices. While the browser on a cutting-edge smartphone might match most of the features supported by desktop browsers, it may lag far behind.

Choosing the right device isn't that straightforward. There are a lot of things to consider: how it will fit within your organisation's technology outlook, how customer perceptions might be affected and how it can increase efficiencies. Take yourself through these four steps and you'll probably have a better idea.

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