

THE STAND

Rugged IT

Q&A with an Industry Leader

There are situations where commercial, off-the-shelf computers and other devices can't cut it because of the physical and operational constraints of the environment they are used in. Some form of ruggedization is then essential.

THE STAND: Rugged IT explains how agencies can decide how and when to use rugged devices, and what the trade-offs are in moving at least some of their requirements to the rugged side. See, through the eyes of one industry veteran, why low cost isn't always the best and most effective IT strategy.

How would you gauge the state of the rugged IT market in the federal government today?



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A: In general, we're seeing very good demand for our traditional, fully-rugged notebooks as well as increased interest for small form-factor devices, which will bring new technologies and easier to use computing capabilities to users such as dismounted soldiers. Durability, usability and mobility all continue to be big drivers.

On the military side, where we have the strongest presence, we are seeing good growth, particularly in areas where advanced computing and communications solutions are required. The edge of the network is where our rugged, mobile computers live. Small form-factor devices are a big push right now, because of the weight and other constraints on warfighters.

On the civilian side, the approach to rugged computing is more cautious. We're starting to see more deployments, particularly for such things as vehicle rugged solutions, but generally agencies are still feeling their way when it comes to the total cost of ownership of rugged versus off-the-shelf computing.

What in your view are the more significant issues driving rugged IT deployment?



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A: The number one issue continues to be that the solution has to work from the time the box is opened and configured by the IT staff, to when it's in the field and being used. That's critical, because the people who have invested in this technology have identified requirements that go well beyond that of a regular computer. The expectations are that it will be able to survive and work seamlessly with the software and communications network, and we offer a number of different services to ensure this.

Mission support is also important. The IT solutions need to be selected according to the unique requirements of the mission. Agencies need to understand those requirements in order to identify the right solution for their needs. These environments also tend to have support requirements that involve specialized integration and assessment support.

Is rugged IT the right choice for every agency and department? Why or why not?



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A: The short answer is yes, but again it gets back to the environment the computer will be used in, and what applications it needs to run. We also look at ruggedness in a broader sense than many others do, to include the security that's needed to assure secure communications, and the robustness of the networking. When these computers are deployed they have to maintain connectivity, because they tend to use real-time data applications.

Overall, however, ruggedness is mission specific rather than agency specific. Even within the Department of Homeland Security and the border patrol, you'll have some users working on the border in Arizona and others in Washington, DC who work in a conventional office environment 90 percent of the time. That will dictate the type of system that's deployed and the investment that needs to be made.

How can an agency or department objectively determine it needs to spend the extra money to go rugged?



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A: That again goes to total cost of ownership, which equates to return on investment. But you can't look just at the hard dollar costs of deploying the computer, such as the software, systems design and integration. You also have to look at soft costs like training, systems maintenance, third party technical support and upgrades.

The biggest factor in determining ROI, however, is the difference in downtime. It seems a simple matter, when you look at a rugged computer that is more expensive than that of a regular computer, to choose the cheaper solution and say you'll just swap them out when you have to replace one. But that doesn't take into account the system reimaging that needs to happen and the transference of data, not to mention the possibility of damage to or loss of data. The longevity of the rugged product cycles are also important to consider.

All of that often gets lost in the equation. Studies by VDC Research have shown that the average annual total cost of ownership of a rugged notebook is some 59 percent lower than that of a non-rugged computer. Evaluating the lifetime cost of the system is the key here.

Are there metrics available to help agencies analyze the complete project lifecycle of rugged IT?



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A: There are certain ROI calculators that can be used with the hard and soft dollar costs, but one of the key things to consider is the number of ‘touches’ that the IT support organizations needs to make with any computer, for everything from phone calls asking for support to driving out to replace a notebook to having a device sent back to be swapped out. Each one of those is a cost and a burden to the entire organization. There’s no specific tools or methodology to help with that, but it’s something that has to be measured. It’s critical that agencies understand that.

What unique issues does mobility bring into play?



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A: Weight is the foremost consideration. It's very easy to ruggedize a notebook by adding rubber bumpers and more metal to it, but then the weight balloons. Warfighters carry 80 lb rucksacks when they go out in the field and don't want to shoulder another 10 lb of computer. We designed our GD8000 fully-rugged notebook to weigh 8 lb, for example. Over a full day in the field those two pounds add up.

Another issue is daylight viewability. Not being able to see diagrams or maps on the computer can make the user's job impossible. Our DynaVue™ technology addresses that problem, providing optimized outdoor viewability without impacting battery run time or processor performance.

What unique core competencies does your company bring to the table in this space?



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A: Experience and expertise are key. We've been in the business for over 20 years, and we've brought over 30 rugged platforms to market in various form factors. Our ruggedization techniques also set us apart, in that we design from the inside out rather than just putting some rubber over moulds and I/O doors and calling that rugged.

We also take a solutions approach to rugged IT, providing the systems integration, custom products and value-added services that are needed and partnering with customers to make sure we bring the best solutions to market that will actually exceed customer requirements.

And then, of course, we have General Dynamics as a parent company, so we can leverage the corporation's expertise in all of its government programs of record, along with the R&D and engineering expertise within the company.

What are the key power management challenges agencies and departments need to keep in mind?



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A: The display technology and effect it has on the performance of the battery and the computer overall is key. As the display size goes up the power consumption increases, and also the brighter the display is then the lower the battery life. The kind of graphics performance that's needed is also important. That all relates to the type of processor that's used in the computer. An ultra low voltage processor, for example, has lower power consumption than a full voltage processor and is typically deployed in environments where mobility is needed and there's no external power source available.

How do those power management issues affect product selection?



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A: This goes back to the use case and the mission, which means you have to take into consideration the types of application that will be used. If you are running applications that are computing power and performance intensive, you're going to need a computer with more processing power. Although the balance between the computing power and the battery life is critical, in those types of situations it's probably more important that you have the system performance and you sacrifice a little bit of the battery life.

In the case of our vehicle rugged notebook, we expect that device will be in a vehicle upwards of 80 percent of the time. There, you have multiple power sources available, either through the cigarette lighter adapter or hard wired directly into the vehicle battery. As a result, we use a full voltage processor in the GD6000 vehicle rugged notebook.

How important are enhancements such as GPS positioning data?



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A: They're critical. On the battlefield it boils down to situational awareness and knowing where your enemies and friendlies are. With the new technology that's being integrated into devices today and will be in the future, we're looking at using GPS coordinates to track specific images with geotagging. So, say you're on a mission and you're tracking GPS coordinates with your handheld computer and you come upon an unknown building or person. You take a picture and capture geographical and other data about that building or person, input it into a device, and then upload it to a larger database so that everyone else has access to it. GPS is a critical part of that.

We spend a lot of time and attention within engineering to ensure the highest performance GPS components and antenna structures within our devices.

How much of a challenge is it to ruggedize controls?



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A: Displays are obviously a big part of that. All of our displays have touchscreen capability, with a touch panel that sits on top of the glass panel itself. Especially if you are using just one or two applications, you're constantly hitting one area of the panel because that is where the button is that says "enter" or "go to" or "connect my radio now". You can understand how that could deteriorate if you weren't using an industrial strength touch panel or display.

Keyboards are another point of failure due to constant use so designing industrial strength, rubberized keyboards rather than loose keys is a way to combat failure. They also prevent foreign object debris or FOD, one of the main requirements for computers used on Air Force flight lines.

Other than that, the I/O ports are critical in a fully-rugged platform. We do far more than just place rubber doors and seals on the outside of the ports. With our fully rugged GD8000 computer, for example, we've designed it rugged from the inside out using special materials and gaskets on the inside of the device. This way a user need only replace a wet port rather than having to replace a ruined system board.

There are different specs for Rugged IT (most notably mil-spec and IP). Practically speaking, how do they differ?



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A: The fundamental guideline in rugged computing is the US Military Standard, referred to as MIL-STD-810G. This series of tests has been developed to determine the impact that various environmental factors have on a computer during its life based on its anticipated usage and where it will be deployed. Drop is the big one, but there are over 20 different test categories within the 810G mil spec.

The important thing to understand about the MIL-STD is that it allows the device manufacturer to tailor the tests based on the environment that they intend it to be used in. That is why the customer has to be aware and to ask questions about the intention of any test. Also, about what specific tests have been run.

Other important standards are those for ingress protection. The standard for this is the Ingress Protection Rating or IP rating system. IP54 provides sufficient levels of water and dust ingress protection for mobile computers that will operate in environments where those elements exist. IP65 is a higher level of ingress protection that is determined by increasing the volume of water and dust the device is exposed to over an extended period of time during testing. Our GD8000, fully-rugged notebook is tested to an IP65 rating so it can operate in the harshest of environments.

Another type of test we do to ensure our vehicle rugged product will survive in the vehicle are the ASTM procedures. These tests were developed to simulate the extremes associated with heavy equipment and truck transportation, particularly vibration. This is critical when you think about rugged notebooks that are used in border patrol activities given the conditions and likelihood of high speed pursuits. If the notebook cannot survey in this rough terrain it is going to fail.

What are the three most significant threats to the survivability of rugged IT systems?



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A: There is security, maintaining and encrypting the data, and then the physical threat of the device being lost or stolen.

Cyber threats and the need for secure data are obviously key for any computer system. Ruggedized computers may use various levels of encryption, together with biometric safeguards such as fingerprint readers; along with smart cards to enforce multiple forms of authentication in order to access the device.

If the computer is stolen and the person who stole it has enough time and incentive to find out what's on the device, they will certainly find a way regardless of the encryption. So we install services within the BIOS that allow devices that are lost or stolen to be completely wiped and the computer disabled entirely. We also have recovery services that enable a third part to go out and track the device from its last known location and network access.

What are the three key products/services you're offering to agencies today?



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A: In the services area we offer the full gamut of consultative and system support, integration and analysis to make sure that the right systems are being deployed in their environments, and once they're deployed they're installed correctly and maintained. Of course, break fix and technical support are key parts of that, and we offer those services under our GDAssure brand.

In terms of products, one of the things we are providing in partnership with Cisco System Inc. is a mobile unified communications system, which is basically an on-demand mobile communications hub that can be deployed easily and rapidly in the field. It leverages our GD8000 fully rugged notebook combined with Cisco's call manager hardware and software.

One of the things we've done with our MR-1 small form-factor device is create a flexible architecture that allows for various types of input and output modules to be added to the MR-1 through what we call a slice architecture. Today we offer a PC card slice that supports legacy I/O like PCMCIA cards and a serial connection, as well as a Communication slice that offers USB, ethernet and serial inputs. We are also developing custom slices that allow for multiple USB, RJ45 and Ethernet ports based on specific customer needs.

Looking ahead to the next year-18 months, what do you believe will be the biggest challenges for federal agencies and how can you help mitigate those challenges?



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A: One of the biggest challenges is technology adoption, given that the technology is changing so quickly. You don't want to be on the bleeding edge because you have to be conscious of your budgets but you still want to push the boundary as far as you can. To help mitigate those pressures we do the research and analysis to understand what technologies are going to be viable for the long term. With rugged computers, you are looking at a product cycle of anywhere from 5 to 10 years, so you really have to go where the puck is going from a technology standpoint.

That can certainly be done through our slice architecture, which allows us to adopt new technologies over the lifecycle of the product. We also work collaboratively with a number of research laboratories in the various branches of the military and federal government to vet some of these technologies to see what's going to be necessary for the long-term.