When it comes to mobile computing, maximizing system uptime is absolutely critical for ensuring that officers on the streets have timely access to critical information — especially when performing traffic stops and responding to calls. Knowing about any outstanding warrants or criminal records before approaching a stopped vehicle or knocking on a door can mean the difference between a safe encounter and a potentially life-threatening situation.

On the productivity side, mobile computing allows officers to perform instant plate and license checks, issue and print traffic citations electronically, and write and file incident reports while seated behind the wheel. By completing routine tasks more quickly, they are able to spend more time on patrol. To put things into perspective, consider how much more efficient the modern office is thanks to computers, networks, and Internet connections — and then imagine what would happen if all of that business-critical technology was suddenly taken away. Productivity would plunge, frustration would soar, and general chaos would be just around the corner. Then, imagine how much more serious the situation would be if the public’s safety was dependent on that technology remaining functional.

The previous two articles in this series have explored the safety and ergonomic issues related to mobile computing. This final installment addresses the importance of system component reliability and the tests manufacturers can conduct to ensure it.
That is why an officer who has become dependent on the safety and productivity advantages of mobile computing will be the first to tell you that system failure is simply not an option when sworn duty is involved. But, is that a realistic expectation? It certainly can be if you make the right choices. One of the keys to making certain that the mobile computing system you implement provides long-term reliability is to carefully scrutinize each and every component to confirm its overall quality. Just as importantly, make sure each component is suitable for the intended application. Since it serves as the primary interface between the laptop and the officer, this is especially true for mounting systems. A mount that may perform perfectly well in light-duty civilian use could fail miserably under the rigors of law enforcement duty cycles.

Many people think of the obvious structural and manufacturing qualities when considering the potential reliability of a piece of equipment. Some obvious things to look for when examining a mobile computing mounting solution include the thickness of the material (thicker is better), the overall size of the components, and the quality of the welds and finish. While these cosmetic observations alone cannot confirm the quality of a product, they can at least help you determine whether or not it meets minimal quality standards. However, in the absence of first-hand experience, there is no better way to predict future performance than to look at the testing regimens that products have been put through.

**Toughest Testing in the Industry**

Prior to making a purchasing decision, it is critical to look into what kinds of testing, if any, are conducted by the equipment manufacturer. Testing that closely simulates the conditions that mobile computing equipment experiences in actual use helps manufacturers pinpoint potential trouble areas, optimize their designs, and maximize long-term reliability.

The following tests are applicable to mobile computing equipment and together represent a comprehensive regimen of performance benchmarks that manufacturers can rely on to ensure the quality and reliability of their products. If the manufacturer does not volunteer information about which testing protocols they follow, be sure to ask, because not all manufacturers conduct the full battery of tests described here.

**Crash Simulation** — Mobile computing equipment can be subjected to significant forces in the event of a crash. If improperly secured, laptops, keyboards, and other components can become potentially lethal projectiles. To ensure that the mounting solutions you are considering can withstand the physical stresses of a crash, ask the manufacturers if they have conducted crash simulation testing. These tests, conducted under carefully controlled laboratory conditions, allow manufacturers to determine how their equipment is likely to hold up in the event of a vehicle crash.

**Air Bag Deployment** — Simulating what happens when a mobile computer and its mounting system are struck by a deploying air bag, this test helps mounting system manufacturers determine if their equipment can withstand the force of impact. This test does not determine airbag compatibility, however. For more information on airbag compatibility, see the related article on mobile computing safety in the [2008] issue of Police Fleet Magazine.

**Vibration** — Equipment in patrol vehicles can be subjected to heavy vibration in the event of a high-speed pursuit over rough or uneven surfaces. A mount that vibrates can transmit damaging shock to a computer. Even during normal use, a mount that vibrates excessively can lead to eye strain, typing errors and undue wear and tear on the laptop’s chassis, electronics and hinges. Mounting solutions that pass stringent vibration testing in the laboratory are a fleet
manager’s assurance that they will perform satisfactorily under even extreme real-world conditions. Most companies refer to MIL-STD-810F for this test. Be sure to ask which components in the mobile computing system have been tested.

Pry-Force — This test determines the ability of a mounting solution to withstand attempts to forcefully remove a locked mobile computer. A mounting solution that fails this test — as well as any manufacturer that fails to perform this test — should be avoided if the security of the laptop is a concern. Although this testing is somewhat subjective, it is critically important for manufacturers to take theft resistance into consideration when designing their products.

Ingress Protection (IP) — The International Electrotechnical Commission (IEC) has established a worldwide standard for rating the ability of electronic devices to withstand exposure to dust particles and water. The ratings, called “Ingress Protection” or “IP” ratings, contain two digits. The first digit indicates the relative ability of a device to resist the ingress of dust and can have a value from 1 to 6. The second number indicates the ability of an enclosure to resist the ingress of moisture and has a value of 1 to 8. Higher numbers indicate greater protection. Devices with the highest ratings are typically more expensive than those with lower ratings.

Temperature — The range of climatic conditions in which mobile computing equipment is used spans extremes of temperature, from sub-zero to subtropical. Environmental testing subjects components to a range of temperature conditions in order to determine how well they perform and to identify any potential problems before they release the products to the marketplace.

EMI/RF — Almost everyone has experienced the annoyance of an electrically powered device interfering with a radio’s reception. A device that interferes with mission critical radios is not only annoying, but potentially dangerous. EMI/RF testing is conducted to ensure that docking stations do not emit or transmit electromagnetic interference or radio frequencies that could potentially disrupt the function of the patrol vehicle’s communications equipment and other electronic devices.

General Durability Testing — Even the most well-made products can eventually fail as a result of normal usage. The most quality-conscious manufacturers will likely perform a variety of other tests to ensure that their products will provide a reasonably long service life under typical operating conditions. Such tests may include repeated docking and undocking of laptops, tests of motion device position locking systems, and similar repetitive component durability analyses to simulate a lifetime of use.

ISO 9001 Certification
ISO 9001 is a series of internationally recognized standards and procedures developed by the International Organization for Standardization. These standards and procedures define requirements for the implementation of quality systems in operational procedures. They apply uniformly to companies of all sizes worldwide and to industries involved in the design, development, manufacture, installation, and servicing of products.

ISO 9001-certified companies must comply with stringent quality process standards and implement effective quality management systems. By requiring consistency in the manufacturing process and documentation of quality procedures, ISO-9001 registration is a customer’s assurance that a manufacturer is meeting standards that result in overall product quality.
Test Your Expectations

The more testing a manufacturer conducts, and the more information you can gather about the results of that testing, the better able you will be to assemble a mobile computing system that will meet your expectations for performance and reliability every minute you are on duty.

Do not assume that all manufacturers perform the same tests. If the product’s specs fail to specify the tests that have been performed, do not hesitate to ask. After all, your department is making a significant investment in mobile computing, and it is better to find out about a product’s quality shortcomings beforehand than to learn an unwelcome lesson the hard way.

The Changing Face of Mobile Computing Technology

The adoption of mobile computing technology by law enforcement agencies has given patrol officers powerful high-tech tools. These devices have enhanced their productivity, their personal safety, and their ability to protect and to serve the public. Given the enthusiasm with which departments across the country have welcomed mobile computing, the next generations of technology and software advances will undoubtedly find their way into fleets at an even faster pace.

Regardless of what those future advancements look like, three fundamental requirements must drive their development: they must be safe, they must be ergonomic, and, above all, they must be unfailingly reliable. As this series of articles has shown, the mounting systems that support them must be, too.

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Missouri State Highway Patrol Sticks With What Works

As an early adopter of mobile computing — they installed their first laptops in patrol vehicles back in 1999 — the Missouri State Highway Patrol understands the value of reliability.

Now on their fourth generation of laptops, the MSHP has approximately 825 units deployed in vehicles across the state. According to Captain Kim Hull, his troopers use the laptops for everything from sending and receiving email to performing license checks. Nine years of mobile computing has made his troopers dependent on the technology.

That dependence is why the MSHP purchases the most reliable equipment they can find. Hull claims that over the last nine years, the computers and docking stations have experienced only about a one-percent failure rate, most of which has been the result of user error.

The MSHP has looked at less expensive consumer-grade equipment, but because published failure rates of non-ruggedized systems are often in the range of 15 to 25 percent, the impact on operations would be too great. Investing in reliable equipment keeps troopers on the road, serving and protecting.

MSHP troopers are assigned take-home vehicles. “With some troopers located hours away from their regional headquarters, a system failure may require a drive of up to five hours one way just to access IT support. That could result in losing the trooper for 12 hours or more and put an additional 650 miles on the vehicle,” Hull says.

“We’re on our fourth generation and we’ve stuck with what works. With laptop and docking station failures almost nonexistent, our troopers know they can rely on the MCD (mobile computing device) to help them do their jobs.”