POSITION PAPER

MOTOROLA

Rugged and Connected:

ML910™ Rugged Notebook
MW810 Mobile Workstation

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Mission critical tasks demand the latest in mobile technology. Because the needs of today's mobile computing user are broad and the environmental operating conditions difficult, off-the-shelf computing devices fall short. The mobile workforce needs solutions to achieve their mission faster, safer, and more effectively while reducing the Total Cost of Ownership (TCO) of their equipment.

Motorola delivers on the promise of rugged power and connectivity with the ML910 Rugged Notebook and MW810 Mobile Workstation, which allow workers in the field to maintain constant connectivity while operating in almost any hazardous environment. Designed and tested to operate in extreme conditions, the ML910 notebook and MW810 workstation boost workforce productivity, improve operational efficiency, and minimize TCO.

Introduction

The Evolving Needs of Today's Mobile Computing

As the mobile workforce continues to grow, so does the demand for complex, secure information in real-time—anytime and anywhere. Saving lives, protecting property, and providing first response all require immediate information exchange and pre-emptive intelligence. However, the worst combination of environmental challenges imaginable—blazing heat, freezing cold, constant shock and vibration as well as water, dust, sand and humidity—hinder these efforts. Devices must rise to the demands of these hazards while providing fast, reliable connectivity in as many ways as possible.

Rugged Devices Reduce Total Cost of Ownership

Deploying a commercial grade device in a public safety or military environment is not only a risk but can also leave the user with poor productivity and deep frustration. Commercial grade devices have not only a higher failure rate but also a higher overall TCO than their fully rugged counterparts do. Device downtime, hardware failure, and lost operational efficiency all contribute to this cost disparity.

In many cases, the initial cost of a fully rugged device for a public safety or military application will be significantly more than a commercial grade competitor—but that does not tell the whole story. Studies show that the replacement cycle for field service workers utilizing rugged notebooks is roughly 4.5 years versus a 3-year replacement cycle for commercial grade, producing comparable per-year hardware costs. But once you take into account all the costs of device failure—including the cost of lost productivity due to hardware or connectivity loss—a rugged device from Motorola is the far more cost-effective alternative.

Figure 2: TCO Comparison (Five Year and Annual) for Notebook Computers: Government Environments

	FULLY RUGGED NOTEBOOK	CONSUMER GRADE NOTEBOOK
	FIVE YEAR COSTS	**FIVE YEAR COSTS**
Hard Costs – Deployment Costs		
Notebook*	$4,762.5	$2,388.8
Peripherals & Accessories	$543.8	$495.1
Software Costs**	$591.3	$735.1
Implementation Costs	$542.4	$561.8
Training Costs	$428.8	$283.4
Total Hard Costs	*$6,868.6*	*$4,464.2*
Soft Costs – Operational Costs		
Productivity Loss: HW Failure	$2,177.0	$6,188.0
Productivity Loss: Wireless Failure	$3,155.0	$7,990.1
IT Support: Troubleshooting / Maintenance Costs	$3,284.2	$8,190.0
IT Support: HW Replacement Costs	$212.1	$335.3
Total Soft Costs	*$8,828.3*	*$22,703.4*
Total Cost of Ownership	**$15,696.9**	**$27,167.6**

** Assuming a 4 year replacement for fully rugged notebooks and a 2.5 year replacement for consumer-grade notebooks*

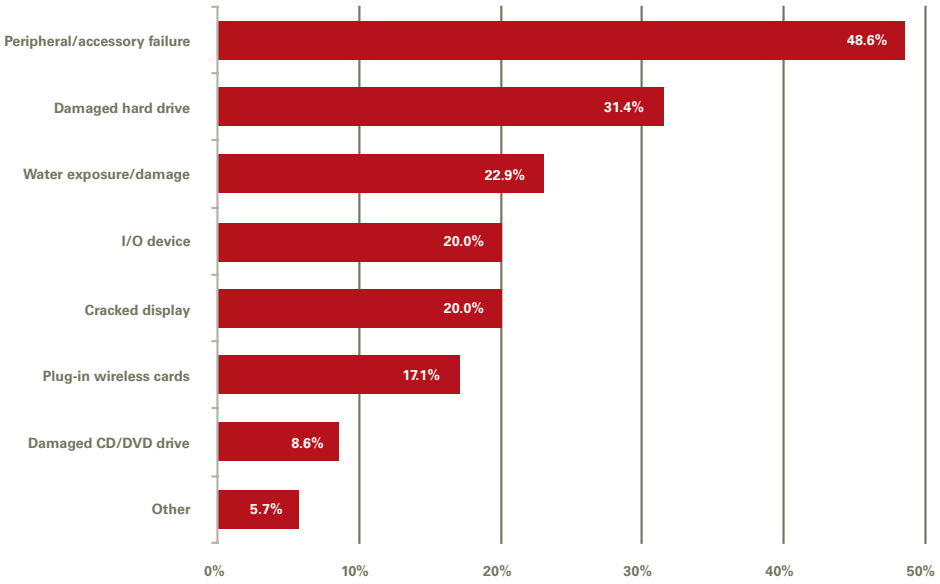
*** Normalized across all computer platforms*

SOURCE: Venture Development Corporation, *Total Cost of Ownership Models for Mobile Computing and Communications Platforms,* Second Edition, June 2007. "Government TCO Analysis," p. 274

Many factors contribute to a Motorola rugged computer's long-term cost-effectiveness. One of them is the lower failure rate: a recent study estimated that the average annual failure rate for rugged notebooks was only 9%, vs. 33% for non-rugged. (Even so-called "durable" laptops fail at more than twice the rate of fully rugged notebooks.) A notebook's failure deprives its user of productivity and connectivity, and repair and replacement cost money.

The most common sources of hardware failure in government applications are shown in the graph below. With shock-mounted hard drives, tempered-glass displays, and drop, shock, and water protection, the ML910 Rugged Notebook and MW810 Mobile Workstation are specially designed to prevent many such failures.

Figure 3: Primary Sources of Hardware Failure (Percent of Respondents)



SOURCE: Venture Development Corporation, *Total Cost of Ownership Models for Mobile Computing and Communications Platforms,* Second Edition, June 2007. "Government Mobile Deployment Trends," p. 109

Wireless connectivity is another factor driving up TCO for non-rugged hardware. Unlike rugged computers from Motorola, most consumer-grade devices do not come with built-in WWAN connectivity, and users compensate by plugging in PC cards. According to the study, however, "these plug-in solutions typically lag... in performance. Moreover, the plug-in card is a frequent source of failure/damage for notebook deployments."[2]

Unsurprisingly, "wireless transmission failure is almost three times as much for non-rugged notebooks when compared to rugged notebooks. Each failed transmission leads to 5-10 minutes in lost productivity (re-logging into network through VPN) and as a result can significantly add to TCO, not to mention employee frustration."[2] Built by the leader in wireless mission-critical communications, the ML910 notebook and MW810 workstation give you unmatched ruggedness and connectivity.

[2] SOURCE: *Venture Development Corporation, Total Cost of Ownership Models for Mobile Computing and Communications Platforms*, Second Edition, June 2007. "Government Mobile Deployment Trends," p. 277

It is not easy for a mobile device to achieve the status of "fully rugged." The device must meet strict specifications as outlined by the following organizations:

- **MIL-STD-810F**
  Department of Defense Test Method Standard for Environmental Engineering Considerations and Laboratory Tests. This is a set of standardized guidelines, tests, and procedures. The primary emphasis of MIL-STD-810F includes:
  - Tailoring the material's environmental design and test limits to the conditions that the specific material will experience throughout its service life
  - Establishing laboratory test methods that replicate the effects of environments on material rather than trying to reproduce the environments themselves.
- **NEMA/IP**
  International standard IEC 60529 classifies the level of protection a device provides against the intrusion of solid objects or dust. The Ingress Protection (IP) rating (written as IP*xy*), indicates the conformity level met by the device. The "X" denotes the conformity level met for the ingress of foreign solid objects, while "Y" denotes the conformity level met for the ingress of liquids.

Motorola's fully rugged ML910™ Rugged Notebook and MW810 Mobile Workstation meet MIL-STD-810F and IP54 requirements. For example, the ML910 notebook can withstand temperatures of –20°C to +60°C, survive a drop from three feet, and operate for several hours in a dust-laden environment. Instead of using plug-in PC wireless cards, Motorola's engineers embedded the wireless modems within the core system—sealing the chassis housing from water, dust, and sand.

Figure 1: Motorola Computers Meet Fully Rugged Requirements

Environmental	ML910 notebook	MW810 workstation
• Extreme Temperature	• –20°C to +60°C	• –30°C to +70°C
• Extreme Humidity	• 5-95% Rel. Humidity	• 5-95% Rel. Humidity
• Dust/Sand Exposure	• 5 hour exposure	• 5 hour exposure
• Shock/Vibration	• MIL-STD-810F	• MIL-STD-810F , TIA/EIA 603 par. 6.3.5
• Moisture	• MIL-STD-810F	• MIL-STD-810F
• Drop	• 26 times at 3ft	• N/A

With the ML910 Rugged Notebook and MW810 Mobile Workstation, Public Safety departments now have fully rugged computers that boost operational efficiency and help reduce operating expenses.

ML910™ Rugged Notebook and MW810 Mobile Workstation – Wireless Optimized for First Responders

Whether stationary or at highway speeds, Law Enforcement, EMS, and Fire teams must share information to coordinate activities. First responders require accurate, right now data to dispatch and manage the right resources at the right location. To enable these applications, mobile devices must support seamless roaming and multiple wireless communication standards.

Motorola's rugged computers provide the seamless mobility technology that Public Safety departments need to:

- Field deploy command units for improved efficiency and responsiveness
- Boost productivity by reducing trips to headquarters for data retrieval or report filing
- Use broadband connectivity to turn field time into productive time
- Execute mobile, paperless dispatching, work orders, and reports
- Support remote work site and vehicle video surveillance

As a trusted leader in communication technologies, Motorola designed wireless reliability into our rugged mobile computers. This approach provides users redundant wireless access across multiple networks, even when emergency vehicles are traveling at high rates of speed. Rugged computers from Motorola support multiple frequencies and standards, and contain up to four integrated wireless radios that operate simultaneously:

- WLAN – 802.11a/b/g (ML910) or 802.11a/g/n (MW810) with LEAP
- WWAN – EVDO Rev. A or UMTS
- Bluetooth®
- GPS Receiver

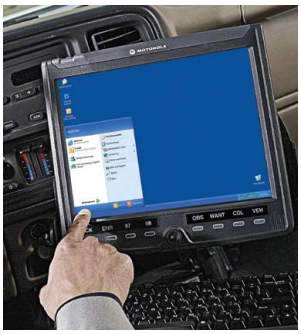
Which Device Is Right for Our Agency?

Being the only vendor of both vehicle-mounted and notebook computers, Motorola is uniquely positioned to put the choice between the two in perspective. The fact is, no form factor is ideal for all users; the right selection depends on your circumstances and needs.

A Desktop That Travels: ML910™ Rugged Notebook

While many public-safety agencies issue notebook computers to their vehicle-bound staff, in reality, the notebook evolved from a desktop computer. An entire industry has grown up around overcoming a notebook's design limitations for desktop use: docking stations, external monitors, second keyboards and mice all serve to make using a notebook comparable to using a full-sized workstation.

The ML910 Rugged Notebook is no exception. At the office, it is a powerful desktop PC, with support for multiple peripherals, a high-resolution external screen, and wired and wireless accessories, including Bluetooth®-based peripherals. Away from the office, the ML910 Rugged Notebook brings its full processing and communications power, combined with a notebook's portability. It is a superb solution for personnel who need to take their office-based work with them on the road, with available vehicle mounting stations that connect it to vehicle power and antennas for unmatched performance.



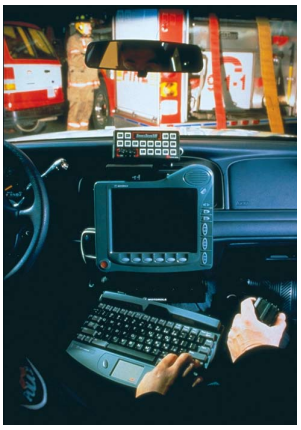
A Powerhouse On Wheels: MW810 Mobile Workstation

For staff who spend most of their work time in the vehicle, the MW810 Mobile Workstation is the preferred solution. Built without the weight, thermal management, and battery-life compromises inherent in notebook computer design, the MW810 is a flexible computer platform designed specifically for mission-critical vehicles. Features that make it an outstanding choice for vehicle deployment include a detachable keyboard that can be placed in the user's lap, support for two displays, a wider range of operating temperatures, and a choice of expansion boards that can be added or replaced without removing the unit. The CPU, display, and keyboard can be changed separately, protecting your investment without sacrificing performance. Without the wear and tear that notebooks have to endure, the MW810 can last years longer than those of a typical laptop, further reducing the Total Cost of Ownership (TCO).

In some cases, workers in the field need to take their computer out of the vehicle—to capture data, for example. While using a notebook computer may seem like the right solution, it's worth considering that a rugged notebook is not the most user-friendly way of bringing portability to vehicle-bound employees. Rather than requiring staff to undock a laptop computer, haul it to the fieldwork location, boot it up, and use it for an urgent task, organizations should consider fully portable rugged computers, such as Motorola's MC75 Enterprise Digital Assistant. Features like instant-on, a built-in camera, integrated bar code reader, WiFi, and cellular connectivity make Motorola handheld computers the logical choice for truly portable, on-the-spot computing. Together with the MW810 Mobile Workstation, a handheld like the MC75 can provide rugged, lightweight, on-the-spot computing power, backed by a full-powered, ergonomically designed vehicle computer.

For more information and to discuss your options, contact your Motorola representative.

Motorola – A Pioneer in Mobile Computing



Motorola MW520

When people think of Motorola, what typically comes to mind is over 75 years of cutting-edge wireless communication technologies, cell phones, and two-way radio systems. However, many people may not realize that Motorola has been designing and deploying mobile data systems and ruggedized mobile computers for over 35 years:

- 1970 – First rugged wireless Mobile Data Terminal and first wireless data system
- 1991 – Introduction of Private DataTAC wide area wireless data network
- 1999 – Motorola MW520 launches: our first 3-piece, vehicle-mounted, Intel® x86-based Mobile Workstation
- 2001 – First complete deployment of Internet Protocol-compliant Voice & Data System

Motorola's ruggedized mobile computing solutions have helped customers in Public Safety, Federal Government, and industry optimize processes, improve service, and reduce downtime. Motorola's design and quality assurance teams have decades of expertise in building rugged mobile computing solutions for the rigorous demands of a mission critical, mobile workforce.

MOTOA4™

Part of MOTOA4 Mission Critical Portfolio

The Motorola ML910™ Rugged Notebook and MW810 Mobile Workstation are part of the MOTOA4 Mission Critical portfolio of products—putting real-time information in the hands of public safety personnel, in virtually any environment. It's Technology That's Second Nature.™

MOTOROLA

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