Strong, Well-Designed Mounting Systems are the Key to Efficiency and Safety

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"Safety in Mobile Computing" is part one of a three-part series that presents vital information for the proper selection of mobile computer mounts in police vehicles. Look for future installments addressing mobile computing ergonomics and mounting system reliability in upcoming issues.

Mobility and connectivity have become the lynchpins for increases in operational efficiency in the past decade. Technology that provides instantaneous access to computing power and communications has changed the way people, processes, and organizations function and interact across the business spectrum. Like businesses, police departments have adopted technology to increase efficiency, allowing today’s patrol officers to do even more to mitigate risk, combat crime, and save lives — all from behind the wheels of their patrol cars. As computing migrates further and further from dispatch locations, departments must consider the unique set of needs and risks that officers working in technology-enabled patrol vehicles encounter. This article addresses the importance of proper mounting solutions in meeting those needs and in minimizing the potential risks associated with mobile computing.
Looking Out for Officer Safety

Unfortunately, there are currently no governing bodies charged with overseeing the testing and standardization of mobile computing equipment to ensure that it is actually safe for use. And, just as local, state, and federal governments are currently struggling to develop and implement policies related to cell phone use, policies regarding mobile computing are practically nonexistent. A quick web search shows that even OSHA has yet to establish uniform workplace safety regulations that apply to mobile workers such as patrol officers.

It is the department’s responsibility to ensure that the mobile computer improves the patrol officer’s ability to function efficiently and safely. This responsibility begins with the proper mounting and positioning of the unit, especially in relation to airbag deployment zones.

Without a governing body to verify the compatibility of a mounting solution with the airbags in a vehicle, there is no such thing as an “airbag safe” or “airbag certified” mounting solution.

An improperly installed or inadequately secured mobile computer can become a dangerous projectile in the event of a crash. And, if the computer is mounted in an airbag deployment zone, it can also render the airbag incapable of providing sufficient protection in a collision.

Here’s how airbag safety is currently handled in the mobile computing industry. No governing body currently provides verification of airbag compatibility, but the National Highway Traffic Safety Administration (NHTSA) has said that no installations are allowed in airbag deployment zones. At the same time, NHTSA places the task of defining what an airbag deployment zone is with the vehicle manufacturer. Not surprisingly, vehicle manufacturers generally adopt a conservative approach when creating their definitions—a situation that tends to create ambiguity when it comes to finding acceptable areas for the placement of mobile computing equipment. Finally, the vehicle manufacturers state that the responsibility of mounting these systems safely ultimately rests with both the mobile computing equipment supplier and the installer.

Clearly, the responsibility of completely understanding airbag-associated safety risks in order to ensure that the solution is designed and implemented correctly, falls on everyone—the fleet manager, the installer, and the mount manufacturer.

Selecting the proper mounting equipment is essential for optimizing ergonomics, usability, safety, and security in mobile environments. Mounting solutions are comprised of several components that must work together flawlessly and be installed properly to ensure user safety and comfort. Following is an introduction to the different parts of a successful mobile computing mounting system and its key attributes:

**Vehicle Base Plate:** A properly fitted base plate is the foundation of a secure mounting system. Vehicle-specific base plates are typically installed using a vehicle’s seat mounting bolts and require no drilling. When choosing this option, the selected vendor should test possible negative affects on airbag sensors. Some manufacturers offer universal bases that require the installer to drill additional mounting holes in the floor of the vehicle. Should this be the case, ensure that the bolt is properly backed. Never use self-tapping screws. Regardless of attachment methodology, the thicker the base, the better the overall solution stability.

**Motion Device:** The motion device fits between the dock and the tube, allowing the computer to swivel, rotate, or swing horizontally to achieve the best ergonomic position. A critical part of an in-car mobile computing solution, this device allows a user to properly interact with the laptop. Although there are a number of devices available, it’s important to choose one that provides the desired range of motion, locks into position firmly and easily, and is ruggedized to protect occupants and equipment during quick maneuvers and in crash situations.

Motion devices represent the greatest risk to occupants. Since motion is critical for ergonomics, a safe solution would be a combination of the device’s range of motion and the security of its locking system. If the computer can potentially swing into contact with an occupant, the user MUST have the ability to lock the motion device in place with a pin or lever. A tension mechanism (like a bike-seat quick-release) could easily fail to hold the computer and its dock during an accident.

Despite the violent force of the crash, the patrol car’s mobile computer and mounting system sustained only cosmetic damage.
Consider Key Design Features

Docking Station/Port Replicator/Cradle:
Docking solutions attach to motion devices and hold mobile computers securely in place. Docks can be configured to provide power and connectivity, or mounting only. Docks should be free of sharp edges that could rupture or snag a deploying airbag. Additionally, docks should pass severe shock testing (simulation of a crash) to ensure that the computer would remain intact during a crash. At a minimum, mounting and docking solution manufacturers should provide information about their products’ compliance with applicable Mil-Std 810F standards, and should be prepared to discuss other tests they perform to mitigate ejection risk.

Accessories: A variety of dock accessories is available for adding functionality and customization to a fleet’s mounting systems. Adapter plates, lights for night viewing, and screen stiffeners are among the most commonly utilized options. When choosing accessories, make sure that they don’t have sharp edges or awkward profiles that could be dangerous in the event of a collision, or those that could snag an airbag or impede airbag deployment.

Installation: Regardless of the design specifics of the mounting solution components, the installer is as integral to the success of the overall mounting solution as the equipment itself. A properly designed and sturdily constructed mount can be just as hazardous as a poorly designed mount if installed improperly. If the installer mounts the base with sheet metal screws instead of nuts, bolts, and washers, for example, the entire unit could be ripped loose in a violent crash. Likewise, sloppy or improper wiring can result in electrical malfunction. As is the case with quality manufacturers, the best installers will have extensive experience with mobile mounting systems and should be able to provide a long list of satisfied clients. If you decide to install the products yourself, check to see if the manufacturer has an expert to assist with any questions you might have.

Securing and positioning a mobile computer properly requires a specialized mounting system. When selecting a mounting system, keep in mind the four most important features crucial to the optimum safety of the patrol officer:

Positioning
Proper positioning deals with both of the operating modes of a mobile computing solution — when the computer is in use, and when the unit is stowed while the vehicle is in motion. When in use, this includes careful positioning of both the monitor and keyboard components (if detached) at proper height, and free from interference with emergency controls. When stowed during travel, solutions should be as close to the centerline of the vehicle as possible, and away from the airbag deployment zones.

Motion Locking System
If the solution’s motion will allow it to cross paths with an occupant, then locking is required to prevent possible impact. The motion system mounting component must lock solidly and securely to prevent potentially dangerous interference with the steering wheel and damage to the computer and surrounding equipment. It’s equally crucial that the locking mechanism has the ability to be activated quickly and easily.

Computer Security
The mounting system must be capable of preventing the unauthorized removal of the computer from the dock, while also allowing officers to easily remove the computer when desired. Keep in mind that if a laptop can easily be pried from the dock with a screwdriver, it is probably going to struggle to hold the projectile during a crash.

Adjustability
Adjustable mounts allow an officer to position a mobile computer at the most effective height and angle for his or her size and personal needs. This flexibility not only increases comfort and ease-of-use, but helps to prevent chronic pain caused by awkward postures, as well.
To ensure that mobile computing truly enhances, rather than compromises, officer safety and productivity, departments must look beyond the computer hardware itself, and devote equal diligence to selecting the best mounting system. For guidance in selecting the optimal mounting system for your fleet, it’s imperative to turn to qualified sources. Before you commit to a specific brand of mount, put the manufacturers through their paces to ensure that their products meet the required standards of quality and performance. Can/will the manufacturer provide a list of references? If so, contact as many of the references as required to get an idea of the real-world performance of a given manufacturer’s products and after-sales service. Ask the manufacturer about its testing protocols. What kind of tests do they perform on their mounts? To which specs? Do they test to failure? Have they run collision simulations?

Once your line of questioning has helped you narrow your choice of mount options, the next step is to get your hands on a sample mount from each of the manufacturers. Examine them side by side. Inspect the welds. Are the beads smooth and uniform? Is there any weld spatter present? What about the paint? Is it applied uniformly and thoroughly? Do the arms swivel smoothly? Do they lock securely? Check for differences in the thickness of the materials used — as a general rule, a thicker component is a stronger, more rugged component.

Once you look closely, you will begin to notice many differences in both the design and construction of the mounts under consideration. While some of these differences may be merely cosmetic, others are indicative of overall product quality. With so much riding on the mounting solution decision, it’s important to take even subtle quality differences into account.

Ask how many of their units are currently in service. Ask about any documented accidents involving vehicles fitted with their mounts. Did the mounts perform as promised? The more answers you get at this stage of the decision-making process, the easier it will be to make a satisfactory choice when it’s time to place your order.

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