

# Using the Magellan MobileMapper 6 With ArcPad 10 in the Field

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## Introduction

The West Virginia Geological and Economic Survey (WVGES) is attempting to transition from traditional field mapping methods to the use of digital geographic information system (GIS) devices in the field in order to increase efficiency and productivity. WVGES currently uses various global position system (GPS) devices as well as the more powerful MobileMapper™ 6 unit. This paper presents a review of the MobileMapper 6 running Esri's ArcPad version 10. Two MobileMapper 6 devices were available for hands-on demonstration at the Digital Mapping Techniques '11 Workshop held in Williamsburg, Virginia, in May 2011, where this evaluation was presented in poster format (see poster at <http://ngmdb.usgs.gov/Info/dmt/DMT11presentations.html>).

## Hardware

### Specifics of the MobileMapper 6 Unit

The MobileMapper 6 (sold by Ashtech Products) used by the WVGES is a handheld personal data assistant (fig. 1). Ashtech, formerly Magellan Pro, started marketing a newer unit, the MobileMapper 10, in May 2011. The MobileMapper 10 was not tested by WVGES, but some details of the newer unit are provided here as it will likely replace the older MobileMapper 6 in the near future. The MobileMapper 6 was still available as of June 2011, but its continued availability is unknown.

Both units use the Microsoft Windows Mobile operating system with Office Mobile (Word, Excel, and PowerPoint) included. The MobileMapper 6 runs on two AA batteries, and

two rechargeable batteries last 2 to 8 hours, depending on the number and type of layers open in ArcPad. The MobileMapper 6 has an integrated 2 megapixel camera and 128 megabytes (MB) of Flash memory with 64 MB of Random Access Memory (RAM). The MobileMapper 6 has a stated accuracy of 2 to 5 meters without post processing and less than 1 meter with post processing.



Figure 1. Magellan MobileMapper 6 in hand.

The newer MobileMapper 10 uses a lithium-ion battery pack, which reportedly has a 20-hour life with the device turned on. The MobileMapper 10 has a 3 megapixel camera, 256 MB of Flash memory, and 128 MB of RAM. The MobileMapper 10 has a stated accuracy of 1 to 2 meters without post processing and less than 0.5 meter with post processing.

As of June 2011, online prices for a MobileMapper 6 unit without mapping or differential correction software were \$900 to \$1,100 (Stakemill Measuring Systems). Differential correction software is available for an additional cost of approximately \$500 (Stakemill Measuring Systems). The optional MobileMapper Field software is an additional \$300 and was not tested by WVGES. The base cost of a MobileMapper 10 unit is approximately \$1,200 and can be bundled with ArcPad 10 for a total of \$1,640 (online prices as of June 2011 without taxes or shipping).

## Hardware Pros

One of the major reasons WVGES chose the MobileMapper for field work was its capability to run ArcPad so that shapefiles created in the office can be used in the field, and those created in the field can be used in the office. Another reason this device was chosen over other field systems was its use of easily replaceable AA batteries. The MobileMapper 6 has several other useful features. The unit is ruggedized, relatively small, and relatively lightweight. It measures 2.5 inches (6 centimeters [cm]) wide by 6 inches (15 cm) long by 1 inch (2.5 cm) deep (fig. 1) and weighs 7.9 ounces (224 grams), making it relatively easy to carry in the field. However, the compact size of the overall device results in a screen that is relatively small (1.75 by 2.2 inches (4.5 by 5.6 cm). The MobileMapper can access satellites while kept in

its case and will stay locked on satellites if the case is worn relatively high—on a shoulder strap, for example—as opposed to lower on a belt. An optional external antenna is available for approximately \$30 (June 2011). The unit is capable of utilizing an optional secure digital (SD) memory card. WVGES uses 8 gigabytes (GB) SD cards in the units with generally good results.

## Hardware Cons

As with any hardware, the MobileMapper 6 is not perfect. The unit's GPS is initially slow to lock onto satellites, but stays locked if the device is kept up or out. The 2 megapixel camera in the MobileMapper 6 is relatively slow and cumbersome. The camera may be adequate for scenery, but it has a relatively slow shutter speed and does not provide enough resolution for closeup detail, as shown in figures 2, 3, and 4. The device is not always recognized by a desktop or laptop computer when connected. If the MobileMapper is not initially recognized, the computer may have to be rebooted, the unit may have to be restarted, or both, before the two will communicate with each other. The unit does not hold the time and date in memory for very long after it is switched off and must be reset when turned back on. The unit will synchronize with the desktop computer's Microsoft Outlook program, updating all contacts and calendar items during every desktop connection unless the "Sync" settings are changed. The on-board memory could be larger, and the stylus provided with the unit is relatively small and easy to lose. The device reportedly does not work well with Windows 7, but this was not tested by the authors, who use Windows XP and Vista with the WVGES unit. Some of these drawbacks may have been improved in the newer MobileMapper 10, but that model was not tested by WVGES.



**Figure 2.** Photo taken with Magellan MobileMapper 6 in brighter light (Babcock State Park, WV).



**Figure 3.** Closeup photo taken with Magellan MobileMapper 6 (*Technocrinus* crinoids).



**Figure 4.** Scenery photograph taken with the Magellan MobileMapper 6 in low light (Babcock State Park, WV).

## Software

### Specifics of ArcPad 10

The WVGES MobileMapper units were running Esri's ArcPad 10, Version 10.0 SP1, Build 26 for this evaluation.

### Software Pros

ArcPad 10 appears to be more stable than ArcPad 8, which initially was used by WVGES, but software errors still arise. Field data collected in ArcPad can be used in ArcMap by directly copying and pasting files from the device to the computer if all projection and other associated files are included. ArcPad 10 is capable of creating quick-fill forms; however, this feature was not tested by the authors as of June 2011.

### Software Cons

A “Low Memory Error” occurs relatively often, which necessitates closing and re-opening ArcPad and re-acquiring satellites. Data check-in and check-out in ArcPad is error prone and cumbersome, but fortunately is unnecessary. Geotagged photographs are not easily placed in ArcMap. A memory card error sometimes occurs for no obvious reason, and occasionally a projection error occurs. The unit sometimes freezes while in edit mode and must be restarted. Turning on the track log may cause frequent low-memory errors and decreases battery life. Automatic sequential numbering of station numbers and a more automatic GPS track log using less memory would be useful features, if available. ArcPad is not ArcMap, and while the basic principles used in both programs are the same, the menus and toolbars are very different. Therefore the ArcPad learning curve may be relatively steep for some users.

## Tips, Tricks, and Final Thoughts

A screen protector is recommended and used by WVGES, even though it decreases screen brightness. Unless versioning is important, checking ArcPad data in and out through ArcMap is not necessary and can be unwieldy. Shapefiles can be created on the unit in the field with ArcPad or in the office with ArcMap and can be transferred back and forth if all files associated with the shapefile (projection, database, etc.) are present. As usual, it is recommended to always test that shapefiles and other files transferred correctly and are usable *before* going into the field. Turning on the GPS before opening ArcPad generates an error, but using the GPS to set the time and date before starting ArcPad does not cause the same error. The device will maintain contact with satellites, in or out of its case, if it is worn on the shoulder or held away from the body. Frequent saves appear to cause low memory errors and may not be necessary because shapefile edits appear to be saved automatically. If a track log is desired, decreasing track log size before using the device in the field results in fewer memory errors. Even with its drawbacks, the MobileMapper is a viable and useful option for digital mapping in the field and will continue to be used by WVGES for its field-mapping projects.

## References

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