

INFORMATION PAPER

NGB-ART-S
19 March 2004

SUBJECT: Computer hardware and software requirements in support of Sustainable Range Program (SRP) Geographic Information Systems (GIS) capabilities.

1. **Purpose.** To provide documentation of hardware and software requirements and validate funding requirements for SRP GIS programs.

2. **Background.** GIS software provides new and powerful ways to evaluate information and make management decisions. For GIS applications on U.S. Army installations, large volumes of data are required in order to meet the goals of SRP GIS programs, including Integrated Training Area Management (ITAM), Range and Training Lands Program (RTLTP), and Training Facility Management Scheduling System (TFMSS). Access, retrieval, display, and printing of geo-spatial data puts large demands on computer hardware.

3. The creation of quality geographic data for the purpose of making informed management decisions requires the use of advanced GIS software, such as ESRI's ArcGIS software.

4. Compliance with Army geospatial standards, such as the Spatial Data Standard for Facilities, Infrastructure and Environment (SDSFIE) is critical for data compatibility with GIS systems at NGB, Army DA, and DoD, as well as with other ARNG training centers. Army geospatial compliance requires the use of a relational spatial database format such as the geodatabase. The implementation of an enterprise GIS program further requires the use of an advanced spatial database (geodatabase) such as ESRI's ArcSDE (Spatial Data Engine) coupled with a relational database such as Oracle or SQL Server. Creating and editing data in an enterprise geodatabase requires the use of ESRI's ArcInfo or ArcEditor levels of its ArcGIS software. When purchasing software keep in mind that ESRI's ArcView GIS (version 3.x) is not compliant with Army geospatial standards, as it will not allow editing of any type of geodatabase, and the ArcView level of the ArcGIS software will not allow editing of enterprise geodatabases.

5. In general, range and training offices on ARNG Major Training Centers (MTC) or ITAM category I and II installations should utilize ArcInfo level software. Range and training offices on ARNG Intermediate Training Centers (ITC), Collective Training Centers (CTC) or Local Training Centers (LTC) or ITAM category III or IV installations

should consider utilizing ArcView level software, unless they are participating in an enterprise GIS system, in which case ArcEditor should be purchased.

6. Annual vendor maintenance costs are critical for continued utilization and performance of GIS software. Annual maintenance costs provide for access to patches and fixes, periodic upgrades to new versions, and technical support. Allowing annual maintenance to lapse can jeopardize monetary investments in software and will eventually require the payment of back maintenance costs when support or upgrades are necessary.

7. NGB has a centralized Environmental Research Systems Institute (ESRI) account that is utilized by all NGB divisions that purchase ESRI GIS software. NGB receives significant quantity cost savings by centrally managing ESRI GIS software maintenance. States/Territory range and training offices that have existing ESRI GIS software licenses or are purchasing new ESRI GIS software may move their software licenses under the NGB account, 20910, and NGB-ART-S will pay the recurring maintenance bill. In order to accomplish this transfer, the annual maintenance must be synchronized to the following 1 April data for renewal. The POC for this type of action is Mr. Robert Barber-Delach, 703-607-7347, DSN 327-7347.

8. The hardware and software recommendations listed below should be considered to be flexible, recognizing that GIS software needs will vary by State/Territory or installation. Training Site Managers and State/Territory Offices should initiate a needs assessment when deciding what hardware and software to purchase. The NGB SRP Program will only support of the purchase of GIS hardware and software when a need has been established. NGB-ART-S will assist with needs assessments and implementation guidance when requested. All training center range and training offices should have personnel that are trained to utilize GIS for tasks such as data collection, creation, editing, and map making. In the event that the training center does not have a GIS program in any directorate, then it is recommended that SRP funds support a more robust GIS program in the range or training office to include managing a central GIS database, production of installation maps, and GIS analysis.

9. Several hardware items are considered essential, others optional. In all cases some basic research by the installation is expected. Hardware should be purchased from companies with good reliability and support records. GIS software must be covered by current Army National Guard software accreditations. Currently, only ESRI GIS software is accredited by ARNG for use on federal systems.

10. States with multiple LTC, ITC, and CTC's, or ITAM category III/IV training sites may qualify for MTC level or ITAM category I/II installation validated GIS requirements.

11. Expenditures on GIS hardware, software, training, and supplies will be supported by NGB-ART-S based on the following guidelines. See section 13 (table 1 below) for a summary of the following specifications.

a. MTC and ITAM CATEGORY I/II GIS PROGRAMS.

Note: Purchase of this suite of equipment with SRP funds is contingent upon having a full-time GIS operator on site. If this requirement is not met, the ITC/CTC/LTC or ITAM category III/IV validated requirements are recommended.

1) HARDWARE.

Computer: PC Workstation with Intel Pentium IV – 2.8 GHz processor* (or higher, dual processors are optional), 1 to 4 GB RAM, SCSI drive controller and SCSI hard drives with a speed of 10,000 rpm (15,000 RPM drive is optional), CD-RW drive, high end 128 or 256 bit memory interface video card, USB 2.0 ports, 10/100Mb Ethernet connection, and DVD-RW drive or similar for data backup.

Monitor: 21" (20"+ viewable width) with a pixel width (dot pitch) of 0.25 mm or less.

GPS: At a minimum the GPS should have 2 – 5 m accuracy (preferably sub-meter accuracy), data dictionary functionality, and the ability to store points, lines, and areas. Trimble ProXRS or GeoXT models are recommended, but other vendors' systems may meet the above specifications. Ensure that the system exports in shapefile format.

Plotter/printer: Large format color printer (accepts 36 - 42" wide roll paper) preferably made by HP. Suitable current HP models include, HP 1055CM, HP 800PS, or HP 5500 series.

Scanner: High quality flatbed scanner.

2) SOFTWARE.

GIS: ArcGIS (ArcInfo level), Spatial Analyst and 3D Analyst (ArcGIS extensions).

Other software: Adobe Acrobat (with Adobe distiller and PDFWriter), Adobe Photoshop.**

3) SUPPLIES.

Paper and ink cartridges to support the large format printer, and other basic computer related supplies.

4) GIS TRAINING.

5-10 days of GIS training annually per GIS operator.

* - or equivalent processor for non-Intel systems.

** - or similarly capable graphics editing software.

b. ITC, CTC, LTC and ITAM CATEGORY III/IV GIS PROGRAMS.

1) HARDWARE.

Computer: PC Workstation with Intel Pentium IV – 2.8 GHz processor* (or higher), 512 MB to 2 GB RAM, SCSI drive controller and SCSI hard drives with a speed of 10,000 rpm, CD-RW drive, high end 128 bit memory interface video card, USB 2.0 ports, 10/100Mb Ethernet connection, and DVD-RW drive or similar for data backup.

Monitor: 19" or 21" with a pixel width (dot pitch) of 0.25 mm or less.

Plotter/printer: Large format color printer (accepts 36" wide roll paper) preferably made by HP. Suitable current HP models include, HP 1055CM and HP 800PS.

2) SOFTWARE.

GIS: ArcGIS (ArcView level), Spatial Analyst (ArcGIS extension)

Other software: Adobe Acrobat (with Adobe distiller and PDFWriter), and Adobe Photoshop.**

3) SUPPLIES.

Paper and ink cartridges to support the large format printer, and other basic supplies

4) GIS TRAINING.

5 days of GIS training annually per GIS operator.

12. Validated GIS equipment expenditures.

a. MTC and ITAM CATEGORY I/II GIS PROGRAMS.

- 1) Start up hardware and software expenditures shall not exceed \$35,000.
- 2) Expenditures for equipment (as outlined in section 11.a.1 and 11.a.2 above) upgrades on a 3-year recurring basis shall not exceed \$21,000.
- 3) Expenditures from software annual maintenance in section 11.a.2 and other annual expenditures from sections 11.a.3 and 11.a.4 shall not exceed \$6,000.

b. ITC, CTC, LTC and ITAM CATEGORY III/IV GIS PROGRAMS.

- 1) Start up hardware and software expenditures shall not exceed \$21,000.

- 2) Expenditures for equipment (as outlined in section 11.b.1 and 11.b.2 above) upgrades on a 3-year recurring basis shall not exceed \$13,000.
- 3) Expenditures from software annual maintenance in section 11.b.2 and other annual expenditures from sections 11.b.3 and 11.b.4 shall not exceed \$4,000.

13. Table 1. Summary of validated hardware and software requirements for range and training GIS programs.

	MTC or ITAM Cat I/II Sites	ITC, CTC, LTC, or ITAM Cat III/IV Sites
Hardware	Computer: Intel Pentium IV – 2.8 GHz processor*, 1-4 GB RAM, SCSI controller and SCSI drives, CD-ROM or CD-RW drive. DVD-RW drive. 21” monitor. Accessories: GPS, Large format color printer, Flatbed scanner.	Computer: Intel Pentium IV – 2.8 GHz processor*, 512 MB – 2 GB RAM, SCSI controller and SCSI drives, CD-ROM or CD-RW drive. DVD-RW drive. 19 or 21” monitor. Accessories: Large format color printer.
Software	ArcGIS ArcInfo with Spatial Analyst and 3D Analyst, Adobe Acrobat, Adobe Photoshop.**	ArcGIS ArcView with Spatial Analyst, Adobe Acrobat, Adobe Photoshop.**
Supplies	Printer paper and cartridges, etc.	Printer paper and cartridges, etc.
Training	annually, 5-10 days of GIS training	annually, 5 days of GIS training

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* - or equivalent processor for non-Intel systems.

** - or similarly capable graphics editing software.