CAPABILITIES, FACILITIES AND EQUIPMENT OF THE GIS TRAINING AND RESEARCH CENTER AT IDAHO STATE UNIVERSITY

CAPABILITIES

The GIS Training and Research Center (GIS TReC) at Idaho State University maintains a staff of personnel with knowledge, skills, and abilities across a wide spectrum of Geographic Information Science. The University's GIS Director and leader of the GIS TReC, Keith T. Weber is a Certified GIS Professional (GISP) with over 25 peer-reviewed professional publications to his credit. Together with other staff scientists there exists over 30 years of experience in applied GIS research and multispectral remote sensing analysis.

Staff at the GIS TReC are experienced with producing cartography for a wide variety of audiences and purposes and can advise on layout, flow, and print media. In addition, staff members have experience in effective geodatabase design following an end user driven paradigm, along with the production, configuration, and maintenance of geodatabases.

As the recognized regional leader in GIS continuing education, the GIS TReC offers numerous workshops annually which are designed to help GIS professionals maintain and enhance their skills in the field. Each of the workshops offered by GIS TReC personnel carry continuing education units to further benefit the profession.

We offer a range of GIS courses to undergraduate and graduate students and GIS workshops to agencies, institutions, corporations, faculty, and staff. These courses address topics, such as, core GIS (e.g., Principles of GIS and Advanced GIS), spatial data analysis (e.g., Spatial Analysis and Geostatistical Spatial Data Analysis), programming (e.g., Programming for GIS and Advanced GIS Programming), and other closely related geotechnologies (e.g., IT for GIS, Remote Sensing, and GPS Applications in Research).

The GIS TReC also completes GIS research projects with faculty, agencies, institutions, and corporations that do not have the facilities or expertise to do so.

The GIS TReC has been awarded the prestigious ESRI Special Achievements in GIS award. This honor was bestowed upon only 150 sites (chosen from among over 300,000 user sites worldwide) in 2000.

FACILITIES AND EQUIPMENT

HARDWARE

1. **<u>Enterprise GIS Server constellation</u>:**
   ArcIMS Server: Dell PowerEdge 2650 server running Windows Server 2003 Enterprise edition with hardware RAID-5 546GB hot-swappable SCSI hard drives and 2 Xeon 3.2GHz CPUs with 12 GB RAM and hot-swappable redundant power supplies

   ArcSDE & IBM DB2 Server: Dell PowerEdge 6650 server running Windows 2000 server with hardware RAID-5 694GB hot-swappable SCSI hard drives and 4 Xeon 1.4GHz CPUs with 8GB RAM and hot-swappable redundant power supplies

GIS Web Server: Dell PowerEdge 2550 server running Windows Server2003 Enterprise edition with hardware RAID-5 120GB hot-swappable SCSI hard drives and 2 Pentium III 1.0GHz CPU's with 2.1GB RAM and hot-swappable redundant power supplies

Spatial Library Server: Dell PowerEdge 2950 running Windows Server 2003 64-bit Enterprise edition with hardware RAID-5 1.8 TB hot-swappable SCSI hard drives and 2 Intel Quad Core XCL 2.66 GHz CPUs with 16 GB SDRAM and hot-swappable redundant power supplies

GIS Web Mirror Server: Dell PowerEdge 2650 server running Windows Server 2003 Enterprise edition with hardware RAID-5 153 GB hot-swappable SCSI hard drives and 1 Xeon 1.76GHz CPU with 1GB SDRAM

Research Back-up Server: Dell PowerVault 735N running Windows 2000 server with hardware RAID-5 613GB hot-swappable SCSI hard drives and 1 Pentium III 833Mhz CPU with 512MB SDRAM and hot-swappable redundant power supplies

Research Back-up & GPS Server: Dell PowerEdge 2950 III running Windows Server 2008 Enterprise Edition with hardware RAID -5 1.8 TB hot-swappable SCSI hard drives and 2 Dual Core Intel Xeon 3.33 GHz CPUs with 8 GB SDRAM and hot-swappable redundant power supplies.

On-site server constellation is backed up by two APC 3000 SmartUPS devices, powered through separate circuits and electrical feeds.

Archive Server (Off-Site): Dell PowerEdge 2800 server running Windows Server 2003 Enterprise Edition with hardware RAID-5 2.2TB hot-swappable SCSI hard drives and 1 Xeon 3.0GHz CPU with 2GB SDRAM

GPS Server (Off-Site): Dell Precision 530 workstation running Windows Server 2003 Enterprise edition with 36GB hard drive and 1 Intel Xeon 2.4 GHz CPU with 2 GB RAM

2. **Dedicated Instructional Workstation**: Dell Optiplex GX755 workstation running Windows Vista Business with 460GB of hard drive space and 1 Intel Core2 Duo 3.16 GHz CPU with 4GB RAM. Also part of this system: Intuos2 9x12 tablet, lens cursor, and inking pen.

3. **Student Workstations**: Fifteen(15) : Dell Optiplex GX755 workstation running Windows Vista Business with 460GB of hard drive space and 1 Intel Core2 Duo 3.16 GHz CPU with 4GB RAM. Also part of this system: Xerox Phaser 3350 black and white printer

4. **Research and Development Server**: Dell PowerEdge 850 server running Windows Server 200364-bit Enterprise edition with 1 TB hard drive and 1 Pentium D 3.2 GHz CPU with 2GB RAM

5. **Teaching Assistant Workstation**: : Dell Optiplex GX755 workstation running Windows Vista Business with 460GB of hard drive space and 1 Intel Core2 Duo 3.16 GHz CPU with 4GB RAM.

6. **Research Workstations**

   Two (2) Dell Precision T3400 workstations running Windows Vista Business x64 with 660 GB hard drive and 1 Intel Core2 Quad 2.39 GHz CPU with 4 GB RAM

   One (1) Dell XPS 600 workstation running Windows Vista Business with 465 GB hard drive and 1 Pentium D 3.46 GHz Dual Core CPU with 4GB RAM
   Two (2) Dell Precision T3400 workstations running Windows Vista Business with 640GB hard drive and 1 Core 2 Duo 3.16 GHZ CPU with 4GB RAM

   One (1) Dell XPS 730 running Windows Vista Business with 500GB hard drive and 1 Pentium Core2 Duo 3.0GHz CPU with 4GB SDDR3 RAM.

   One (1) Dell Precision T3400 workstation running Windows Vista Business x64 with 1TB hard drive and 1 Intel Core 2 Xtreme 3.0 GHZ CPU with 8GB RAM

   One (1) Dell XPS Generation 3 workstation running Windows XP Professional with 400GB hard drive and 1 Pentium IV 3.2GHz CPU with 2GB RAM

   One (1) Dell XPS Generation 4 workstation running Windows XP Profession with 400GB hard drive and 1 Pentium IV 3.4GHz CPU with 3GB RAM

7. **Cartographic Workstation**

   One (1) Dell Precision T3400 workstation running Windows Vista Business with 900 GB of hard drive space and 1 Intel Core2 Quad 2.39 GHz CPU with 4GB RAM. Also part of this system: Two (2) 20.1" flat panel monitors and a Canon Image PROGRAF iPF8000s 42" wide printer with 1200 dpi printing capabilities and an 80GB hard drive

8. **Other**

   One (1) Alienware ALC workstation running Windows Vista Ultimate with 500GB solid state hard drive, an Intel Core i7 3.2 GHz CPU with 12GB RAM

   One (1) Dell Dimension 8400 workstation running Windows XP Professional with 400GB hard drive and 1 Pentium IV 3.4GHz CPU with 2GB RAM.

   One (1) Dell Optiplex GX270 running Windows XP Professional with 40GB hard drive and 1Pentium IV 2.8GHz CPU with 2GB RAM.

   One (1) Dell Optiplex GX755 running Windows Vista Business with 160GB hard drive and 1 Pentium Core2 Duo 3.0GHz with 4GB RAM.

   One (1) Dell Optiplex GX400 workstation running Windows 2000 with 40GB hard drive and 1 Pentium IV 2.2GHz CPU and 1GB RAM. Also part of this system: 36" color drum scanner (800dpi)

   One (1) Dell XPS Generation 4 workstation running Windows XP Professional with 1.2TB hard drive and 1 Pentium IV 3.4GHz CPU with 4GB RAM. Also part of this system: Hewlett Packard Photo Smart printer.

   One (1) Motorola ML900 field laptop computer running Windows XP Professional with 37.25GB hard drive and 1 Pentium IV 1.7GHz CPU with 1GB RAM. Integrated GPS receiver included.

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One (1) Dell Latitude X300 Ultralight laptop computer running Windows XP Professional with 60 GB hard drive and 1 Pentium IV 1.4GHz Centrino CPU with 1GB RAM.

One (1) Dell Latitude D630 laptop computer running Windows XP Professional with a 120 GB hard drive and 1 Intel Duo 2.00 GHz CPU with 2 GB RAM.

One (1) Panasonic Toughbook field laptop computer running Windows XP Profession with 75 GB hard drive and 1 Intel Duo 1.66 GHz CPU with 512 MB RAM.

One (1) HP Pavillion dv2 laptop computer running Windows Vista Home Premium with 320GB hard drive and 1 AMD Neo 1.6GHz CPU with 4GB RAM

One (1) Xerox Phaser 7750DN color laser printer.

One (1) Dell Laser 3100cn color laser printer.

One (1) Hewlett Packard 8300 ScanJet flatbed scanner.

One (1) Hewlett Packard Office Jet 720 capable of scanning, faxing, color copying and printing.

Gigabit Ethernet deployed for all workstations and servers. Dark fiber network from the GIS Center to the ISU backbone. ISU is an Internet2 University.

8 ft. prismatic projection screen and Mitsubishi 1080i LCD projector.

One (1) BenQ LCD projector.

One (1) Portable BoxLight LCD projector.

Seven (7) Trimble GeoXT hand held GPS receivers.

One (1) Trimble ProXR mapping grade GPS receivers

Three (3) Trimble GeoXH hand held GPS receivers

One (1) Trimble ProXR Pathfinder Community Base Station phase corrected GPS receiver. This receiver has been permanently mounted and is continuously running as the GIS Center's Community Base Station.

One (1) Davis Vantage Pro2 Weather Station with soil moisture and temperature probes and solar radiation sensors.

SOFTWARE

1. ESRI's ArcGIS 9.3.1 (including Spatial Analyst, 3D Analyst, Network Analyst, Geostatistical Analyst extensions, and MapObjects 1.2)
2. ESRI's ArcGIS Server 9.3.1
3. ENVI remote sensing software
4. ESRI's ArcPad and ArcPad Application Builder
5. Clark University Lab's Idrisi Taiga GIS for Windows
6. Pacific Meridian's LUCCAS (Land Use Cover Change Analysis Software)
7. Able Software's R2V (Raster to Vector conversion software)

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8. Virtual Nature Studio 5 Landscape Simulation GIS software
9. Jasc Paint Shop Pro ver. X2
10. Onyx Poster Shop Pro
11. Trimble Pathfinder Office software 4.0
12. Trimble Pathfinder Community Base Station software (ver. 2.68)
13. Stat-Box statistical tools for MS Excel
14. Frag-Stats landscape fragmentation software
15. MS Office 2007 Professional
16. EndNote 6.0
17. Adobe Acrobat 9.0
18. MS Visual Studio .Net Professional edition.
19. Proctor! digital testing software
20. Metadata Profile Builder version 1.01
21. ESRI Spatial Database Engine (SDE) for DB2
22. IBM DB2 with Spatial Extender
23. ESRI State wide site license
24. Feature Analyst
25. SigmaPlot

DATA

1. ESRI SDE implementation on IBM DB2 RDBMS populated with detailed data sets to support research at ISU.
2. Full DEM and DRG coverage for our Area of Concern (AOC, cf. http://giscenter.isu.edu/data)
3. Over 2,000 DOQQ's
4. Lightning strike data for southeastern Idaho (1998-2000)
5. Land cover change analysis data for AOC.
6. Historic wildfire data for southeastern Idaho.
7. NAIP digital ortho imagery for southeastern Idaho counties (2004 and 2006)
8. Landsat 7 ETM+ imagery for 2000, 2001, and 2003 for the study area.
9. Landsat 5 TM imagery for 1987, 1997, 1998 and 2000 for our AOC
10. Landsat TM imagery for 1985, 1992, and 1998 for the Palcazu River valley, Peru
11. Imagery for Focused Study Areas (FSA's) within the AOC:
    a) Digital Globe Quickbird high spatial resolution multispectral imagery (0.6mpp and 2.5mpp)
    b) Space Imaging IKONOS high spatial resolution multispectral imagery (4mpp)
    c) Positive Systems ADAR high spatial resolution multispectral imagery (0.7mpp)
    d) 3Di AISA hyperspectral imagery (1mpp)
    e) HyVista Hymap hyperspectral imagery (3mpp)
    f) RADARSAT LIDAR imagery
12. Idaho State University GIS data sets
13. Lower Portneuf River Valley aquifer GIS data sets
14. Digital Chart of the World GIS data sets
15. 1:1 million, 2 million, and 3 million world data sets
16. ESRI street data sets for the entire US
17. STATSGO soils coverage for most of the western US
18. SSURGO soils coverage for parts of Bannock, Power, and Oneida counties, Idaho.

REMOTE SENSING CAPABILITIES

The remote sensing capabilities at ISU include the GIS TReC and facilities in the Department of Geosciences (including the Digital Mapping Lab and the Boise Center Aerospace Laboratory). The GIS TReC has ENVI, Idrisi, ERDAS, and LUCCAS software. Currently, the Department of

Geosciences has ENVI, Idrisi, ERDAS and ER Mapper software. Investigators have experience processing remote sensing data acquired by the following platforms: AVHRR, Landsat, SPOT, IKONOS, Quickbird, AISA, ADAR, HyMAP, PROBE 1, CASI, RADARSAT, ERS, AIRSAR, and airborne LiDAR data. The following are research topics that the GIS TReC and Department of Geosciences are currently involved with:

1. Use remotely sensed imagery for rangeland health assessment.
2. Use hyperspectral imagery for invasive weed detection and mapping
3. Use high-spatial resolution multispectral imagery for invasive weed detection and mapping.
4. Use SAR data for geomorphic and topographic mapping of the SRP
5. Use high-spatial resolution multispectral imagery and airborne LiDAR for landslide evaluation
6. Use airborne LiDAR data for low-height vegetation studies
7. Use SAR data for evaluating fluvial processes and volcanic evolution on the SRP