NAG5-6649: Final Technical Report

The above-referenced award enabled the Lamont-Doherty Earth Observatory to establish a state-of-the-art remote sensing image analysis and data visualization facility to serve the research and educational needs of students and staff at Lamont and the Columbia Earth Institute.[1]

Rationale for the New Facility:

The synoptic and time-sequential views of the Earth offered by modern satellite and airborne remote sensing technology constitute the observational foundation for understanding the interaction of complex natural systems with human society and culture. This is a central research theme of Lamont and the CEI. Remote sensing data allow us to map Earth surface properties on global, regional, and local scales, and further, permit us to determine how these properties change on seasonal, annual, and decadal time scales under the action of natural processes and human activities.

Intended Clientele:

The new, dedicated remote sensing and visualization computing laboratory serves the research needs of not only the traditional Earth Science community but those in the Social Sciences who need to use remote sensing data to meet their research objectives. For example: An ecologist at Columbia's Center for Environmental Research & Conservation needs to use satellite images to study the forest cover in Madagascar to monitor chameleon populations on that island. A Columbia anthropology professor studying the ancient Incans wants to use satellite images to look at ancient road networks, irrigation systems and land modifications in Argentina. Until the establishment of the NASA-supported remote sensing and visualization laboratory, these researchers and others found it difficult to accomplish such research tasks.

Design Philosophy for a User-friendly Computing Environment:

The NASA award provided the foundation funds for the new remote sensing and visualization facility. The NASA award was augmented by matching funds from LDEO ($32,000) and the CEI ($32,000), and by an equipment grant from the Intel Corporation (valued at approximately $150,000). The computing laboratory was designed from the beginning to accommodate users from a wide variety of computing backgrounds, especially the novice unfamiliar with image processing and analysis methods, and therefore with how to use the wealth of remote sensing data available. Users have their choice of 21 top-of-the-line color graphics workstations from the three most popular hardware/operating configurations: PowerMac/MacOS; Pentium II PCs/Windows NT; and Sun Ultras/Solaris. To facilitate use further, we installed a state-of-the-art remote sensing and image processing software package

[1] The Columbia Earth Institute (CEI) is an integration of several established research and educational centers of Columbia University with new, complementary multidisciplinary units. The CEI mission is to develop the knowledge base and educational tools needed to solve important environmental problems facing global society in the twenty-first century.

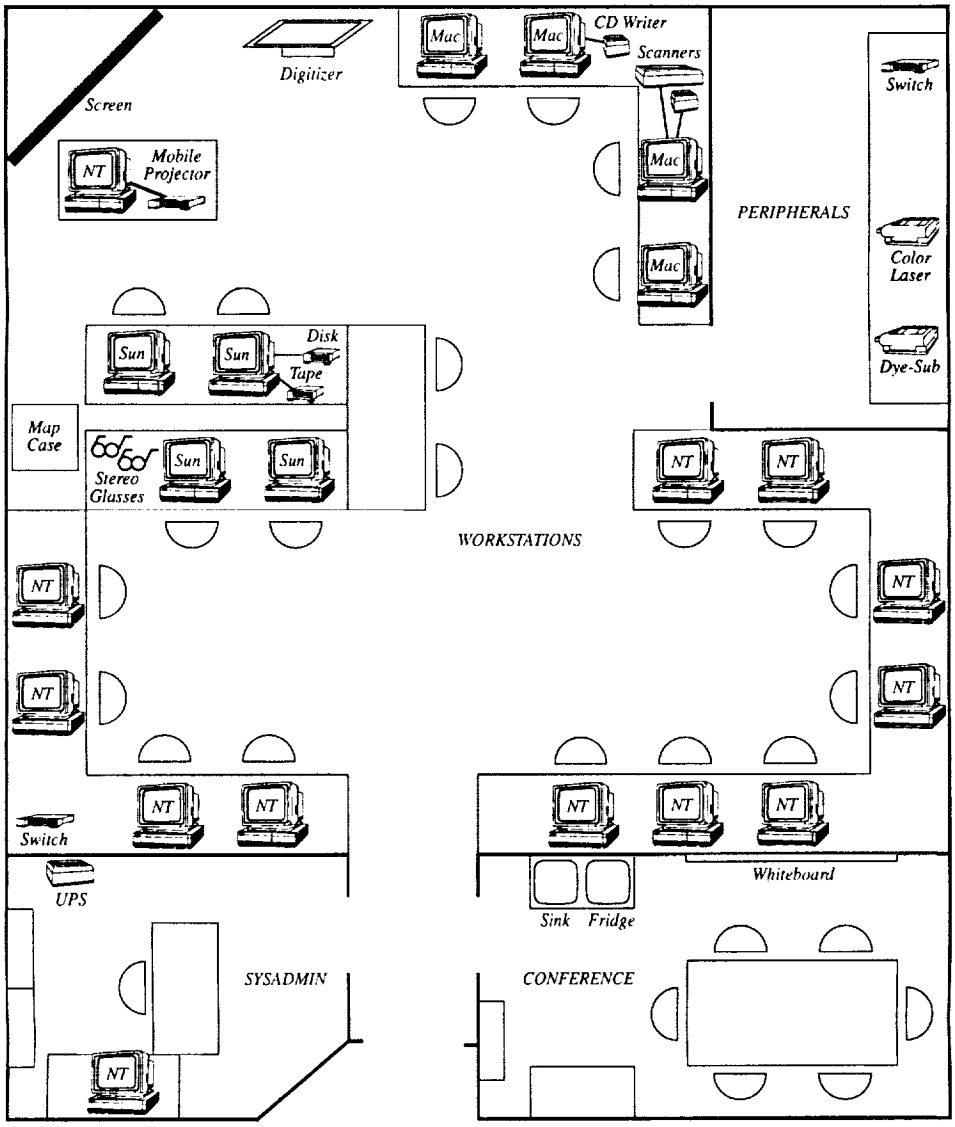
called ENVI that runs with the same look and feel on the three computer hardware systems. The equipment inventory is extensive, and a complete listing of hardware and software acquired under the terms of the NASA award is given in Tables 1 and 2. A large-format color scanner, slide scanner, digitizing table, a CD recorder, an A/V projection system, and two top of the line color printers make it easy for users to produce professional-looking finished products. The layout of the remote sensing and visualization facility is shown in Figure 1.

Educational and Training Activities:

The PIs on this award (Weissel and Small) have undertaken a number of educational and training activities as part of the establishment of the new remote sensing and visualization facility. The computer laboratory sections of the Columbia Department of Earth & Environmental Science courses on remote sensing[2] have been taught in the new computer laboratory in the Fall of 1998 and 1999. Course descriptions and information about the NASA-supported facility can be found on the Lamont Remote Sensing webpages http://www.ldeo.columbia.edu/rsvlab/.

In the summer of 1999, Weissel and Small, together with staff from the Center for International Earth Science Information Network (CIESIN) presented a training workshop in Geographical Information Systems, Remote Sensing and Image Processing using the facilities offered by the new remote sensing and visualization laboratory. The targeted audience was academic and technical staff members of Lamont and CIESIN who needed to upgrade their skills in GIS and remote sensing image processing.

[2] W4050 "Global Assessment and Monitoring Using Remote Sensing", and W4051 "Advanced applications of remote sensing and image processing", Weissel and Small, instructors.



Remote Sensing and Visualization Laboratory

Geoscience 204 - Facility Map (Page 1 of 2)

http://www.ldeo.columbia.edu/rsvlab/

TABLE 1. NAG5-6649: HARDWARE LIST

Number	Item Description	Cost
2	Sun Ultra 30 w/24" display	$ 18040
2	Sun Ultra 60 w/24" display	36398
9	256 MB RAM upgrade for Suns	6111
1	8mm 8705DX tape drive for Suns	1323
2	4.2 GB disk for Suns	1170
1	18.2 GB disk for Suns	1620
4	Power Macintosh G3 w/20" display	17212
8	256 MB RAM upgrade for Macs	4160
4	ix3D Pro Rez graphics card for Macs	1036
2	BayStack 350T Fast Ethernet switch	3918
1	Tektronix 480XC dye-sub printer (50% share)	6996
1	Tektronix supplies (50% share)	965
1	Tektronix 3-year warranty (50% share)	1875
1	QMS magicolor 2CX color laser printer	3019
1	QMS 1-year warranty	456
2	32 MB RAM upgrade for QMS	184
2	QMS fuser oil kit	140
1	QMS OPC belt	231
2	QMS black toner cartridge	174
3	QMS color toner cartridge	330
1	Lexmark Optra 45N color tabloid inkjet	1068
1	Lexmark 3-year warranty	140
1	Epson Expression 836XL tabloid scanner	2450
1	transparency adapter for Epson	480
1	MicroTek Scanmaker 35T + slide scanner	785
1	Proxima DP9210 projector	6525
2	Crystal Eyes stereo glasses	1695
1	Playwrite 4000RW+Toast cdwriter	599
1	Macintosh PowerBook G3	1950
1	Farallon 10T Ethernet PC Card	89
1	Exide Prestige 6000VA UPS (60% share)	4200
1	Exide SNMP Adapter for UPS (60% share)	399
1	CalComp DrawingBoard III digitizer	1495
1	electronic door lock	608
10	Belkin power strip	290
1	computer repair kit	130
1	computer cleaning kit	45
1	CD-R 100-pack	160

TABLE 2. NAG5-6649: SOFTWARE LIST

Number	Item Description	Cost
1	IDL license for Suns	$2353
12	ENVI license for Suns,PCs,Macs	7575
12	ENVI renewal	5280
4	Intragy Access (NFS client) for Macs	809
20	Omni-NFS (NFS/LPR client) for Windows	900
1	IDRISI (GIS software) for Windows	495
1	IDRISI tech support	150
1	ArcView GIS for Windows	250
1	Norton AntiVirus for Macs	40
1	Norton Utilities for Macs	55
1	Norton AntiVirus for Windows	30
1	Norton Utilities for Windows	50
1	FileGuard for Macs	140
1	Adaptec Toast	99
1	Adobe Acrobat for Macs	90
1	Adobe Illustrator for Macs	131
1	Adobe Photoshop for Macs	257
1	Adobe PageMill for Macs	50
	TOTAL HARDWARE & SOFTWARE	$147220