SEP workstation update

Rick Ottolini

ABSTRACT

Raster image drawing speeds for the Sun-4, Macintosh-2, and Microvax-3 are about 1.4 mega-pixels per second. There are new interactive graphics applications for volumetric browsing, figure drafting, picking, and interactive migration. The Macintosh-2 is powerful enough for interactive seismic graphics.

INTRODUCTION

Most SEP computer activities in the past year have been to develop the resources we already possess, particularly workstation software. Reasons for not buying new hardware include budget uncertainties and lack of deliverable products at both the large-scale and workstation levels.

New workstation raster speed measurements

The speed at which a raster image can be painted on a workstation screen is important criteria for SEP-type seismic graphics. New data points are listed in the table below. Many vendor's products seem to have reached the Sun-3 rate of a mega-pixel per second while the newest Sun models have advanced the frontier. This is above SEP's minimum requirements for useful graphics (.2M or several CMP gathers per second), but below our optimum desire (20M or twenty full screens per second). SEP-style graphics measure the speed of transferring an image from core memory to a graphics terminal monitor. This depends on the speed of the communications channel, image transfer software, and monitor hardware. This means for example, that an X-Windows Microvax must be compared to an X-Windows Sun rather than a raw Sun.

Raster Workstation Imaging Speeds (4/88)		
HARDWARE	*SOFTWARE*	*PIXELS/ SECOND*
Sun 386i	UNIX-DOS/pixrect	5.0M
Sun 4-110	UNIX/pixrect	3.0M
Sun 4-260	UNIX/pixrect	1.4M
Sun 3-160	UNIX/pixrect	1.4M
Sun 3-160	UNIX/X-Windows	.4M
Microvax 3200	Ultrix/X-Windows	.36M
Mac-II Apple Monitor	Apple-OS/direct memory	1.4M
Mac-II Apple Monitor	Apple-OS/CopyBits	.2M

A more complete list of workstation raster speed measurements is given on page 418 of SEP-51. Many of those measurements are for older generation workstations and are of less interest to us. We hope to test and perhaps purchase the next generation workstations such as the Sun-TAAC, Pixar-II, Microvax-8000 and Ardent-Titan. We don't have the manpower nor inclination to investigate everything on the market.

New interactive graphics applications

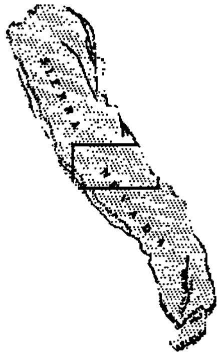
We write interactive applications for data browsing, interactive processing, and courseware. Recent data browsing applications include Rick's *Cubit* for looking at the interior of seismic data volumes and 3D cellular-automata simulations. Jon wrote *Balloon* for merging and annotating SEP-style image and vector files. Interactive processing includes 3-D raytracing and an event-picker by Jean Luc, residual seismic migration and radar imaging by Rick, and a processing shell by Clement. Courseware includes Jon's *FTedit*, a Fourier transform drawing program, and Joe's *Zplot* for displaying pole-zero plots.

Our seven Sun-III workstations continue to be the center of graphics development. We have not settled on a software development environment yet. SunView is favored for its maturity. X-Windows is used for portability and interactive processing on the Convex. The Macintosh is an upcoming dark-horse contender (see next section). Jean Luc and Jean Claude are investigating C++ and Objective-C for object-oriented interfaces, while Rick is sticking with his own methodology described in SEP-51.

Macintosh II

Portions of the seismic movie program run on a color Macintosh II. Animation speed is the same as a Sun workstation. The user interface is more robust and Apple monitor provide much better contrast. The program development environment we are using— Macintosh Programmer's Workshop (MPW)— is a little more difficult to use than UNIX, but adequate. Originally we considered buying Apple-UNIX (A/UX) but (1) it is not yet shipping to universities, (2) it is expensive, and (3) MPW emulates much of UNIX. Because we do not yet have a good connection to the Ethernet (only AppleTalk), transferring image files from the Convex is fifteen times slower than on a Sun.

The verdict is not yet in on the Macintosh II. Some things are better on the Mac, some better on the Sun. The Mac hardware and software can be incrementally configured by the user while a Sun comes in a whole package. This results in a lower price if you don't need all of Sun's features, but makes purchasing more complicated.



Prinicpal Igneous Formations of the Yosemite Region

Tuolumne Intrusive Series	Johnson Granite Porphory Cathedral Peak Granite Half Dome Quartz Monzonite Sentinel Granodiorite
Minor Intrusive Bodies	"Map of North America" Diorite Quartz-mica Diorite Bridaveil Granite
Western Intrusive Series	Leaning Tower Quartz Monzonite Taft Granite El Capitan Granite Granodiorite of the Gateway Granite of Arch Rock Diorite of the rockslides

About the field guide ...

The guide consists of maps and stop site descriptions. Click on a map stop location for more information about the stop. Click on a geologic map feature for more information about the geology. Click on a feature in a stop site photograph for more information about the feature.

Images and text excerpts in this field guide come from John W. Harbaugh's 'Geology Field Guide to Northern California', W.C. Brown Publishers, © 1974. Chapter 3 was translated into HyperCard by Richard Ottolini, ©1988. Both authors are at Stanford University.

About Yosemite & Mono-Craters ...

The Yosemite-Mono Craters field trip route is shown in the two road maps. The first segment of the trip follows Highway 140, beginning in the foothills west of Mariposa, and thence along the Merced River canyon in Yosemite valley. The second segment is along Tioga Road portion of Highway 120, initially traversing the upland area north of Yosemite Valley, then across Tuolemne Meadows, and over Tioga Pass to the junction with Highway 395. Following a stop at Mono Lake, the route is along 295 briefly, and then east along 120 again, concluding at Mono Craters.

Stop 1 — Western Metamorphic Belt Mariposa Slates

Metamorphic rocks lie along the western side of the Sierra Nevada batholith. The rocks include both sedimentary and rocks and volcanics that have been weakly to strongly metamorphosed. The sedimentary rocks include dark siltstones that have altered to slates, graywake sanstones, and conglomerates. THe volcanics include tuffs and breccias of andesetic composition, greenstones, and flows of basaltic lava. The sedimentary rocks are commonly interbedded with the volcanic rocks, and in places, intertongue with them.

At stop 1 dark siltstones and fine graywake of the Jurassic age have metamorphosed to slate. The metaphormism has not been extensive enough to obliterate the fine cross laminae

photo

Stop 2 — Western Metamorphic Belt Calaveras Assemblage

The Calavaras includes a variety of lithologies and is Paleozoic in age. At stop 2 resistant greenstone of altered volcanic rock occurs in steeply dipping beds. At little north of this stop you can observe the contact of greenstone with metasedimentary siltstones, also of the Calaveras.

Stop 3 — Merced River Canyon Glacial Outwash

At stop 3 gravel deposits rest upon bedrock in road cuts. The gravels are glacial outwash consisting of well rounded boulders of granite and granodiorite. Since the bedrock in the vicinity consists of slate and chert, the boulders must have been transported a numer of miles by the river. It is unlikely that the boulders were transported to this location by glacial ice, because the pebbles are quite well rounded and the deposit is stratified. Moreover, the V-shaped profile of this part of the Merced River canyon strongly suggests that the glaciers did not extend this far down the canyon. Glaciers upstream supplied the abundant rock rock derbis which the river transported as glacial outwash.

photo

Stop 4 — Merced River Canyon Folded Calaveras

Here the Calaveras has been tightly and complexly folded with steeply plunging fold axes. Probably the rock layers were folded gradually at a time when they were several miles deep in the earth and were subjected to high confining pressure and elevated temperatures.