COMPUTING FACILITIES

The Centre offers a wide variety of computing systems and software libraries to scientists of CSIR laboratories and other institutions. They are used extensively not only for inhouse, sponsored and collaborative projects but for specific tasks of scientists of other institutions (see *Tables 1,2,3*).

Most of the computer systems run on UNIX and some of the micros based on 80386 and 80486 run on both DOS and UNIX.

SOFTWARE ADDITIONS

- *SDRC I-DEAS*

I-DEAS solid modelling application package (GEOMOD) is a design tool for conceptual and detailed design of mechanical parts and assemblies, which is eminently suitable for applications in high technology areas such as aerospace engineering. Modelling of complicated 3-D mechanical component using GEOMOD and machining on an NC machine saves considerable time and effort. Calculation of mass and interior properties and identification of fit and interference problems can be carried out easily.

I-DEAS finite element modelling package (SUPERTAB) is a complementary package, which includes mesh generation. Direct mesh generation from a solid model significantly shortens the most labour intensive part of finite element analysis.

- *MAPINFO (Desktop Mapping Software)*

This desktop mapping system is used to display and analyse data geo-graphically. It can be used to create, manipulate, and analyse colour maps of geographical areas of a wide range of distances. Data distributions and trends can also be analysed.

- *CSS STATISTICA*

CSS is a high-performance, integrated system for statistical data processing, database management, and graphics. It includes nonparametric statistics, multiple regression methods, unconstrained nonlinear estimation methods, general ANOVA/ MANOVA with contrast analysis, time series techniques with modelling, and ARIMA and forecasting. CSS GRAPHICS offers a comprehensive selection of graphs, including multi-graphs, categorised graphs and a large selection of fully customisable and interactively rotatable 3D graphs with animated stratification.

- *DADiSP*

This package is a graphics-based worksheet and is a comprehensive package for data analysis which can be used for signal processing, graphic data analysis, statistical analysis, and noise and vibration analysis. It can display and manipulate up to 100 data series of any length at once using a variety of different data formats. It has more than 200 functions for data transformation. Its features include complete Fourier analysis including mixed radix FFT and power spectral density.

HARDWARE ADDITIONS

The COSMOS-486/860 was upgraded by installing two i860 satellite processors. It has improved the computing speed by a factor of five

Table 1
Graphics libraries at C-MMACS

Library	Platform
GINO-F, GINOSURF, GINOGRAF	PS/386
GKS2B+	COSMOS
SGGL	IRIS 3120, 3130, 4D/20GT
SUN PHIGS	SUN SPARC 1

Table 2
Mathematical libraries at C-MMACS

Library	Area	Platform
EISPACK	Eigen System Analysis	COSMOS
ELLPACK	Solvers for Elliptic Partial Differential Equations	COSMOS
IMSL	Comprehensive Library for Numerical and Statistical Analysis	COSMOS & PS/486
ITPACK	Iterative Solvers for Linear Systems	COSMOS
LINPACK	Linear System Solvers	COSMOS
NUMERICAL RECEIPES	Extensive Programmes of Numerical & Statistical Analysis	COSMOS & PS/386
ODEPACK	Ordinary Differential Equation Solvers	COSMOS
SPARSEPACK	Sparse Linear System Solvers	COSMOS

Table 3
Application packages at C-MMACS

Package	Area	Platform
ACRPLOT	General Purpose Plotting Package	PS/486
CAMAND	Computer Aided Modelling, Analysis, Numerical Control, Design & Documentation	IRIS 3130
CHEMKIN	Chemical Kinetics	COSMOS
CSS STATISTICA	Integrated Statistical and Graphical Analysis	PS/386
DADISP	Digital Signal Processing	PS/386
DT-IRIS	Image Processing Software	PS/386
FASCOD 2	Line-by-line Atmospheric Radiative Transfer	COSMOS
LOWTRAN 7	Atmospheric Radiative Transfer	
MAPINFO	Desktop Mapping Sotware	PS/386
NASASEC	Chemical Equilibrium (Combustion)	COSMOS
NEXPERT	Expert System Shell	PS/386
NISA 90	Finite Element Analysis	PS/486
PORFLOW	Simulation of Fluid Flow, Heat and Mass Transfer in Porous Media	PS/486
SDRC I-DEAS GEOMOD	Solids Modelling	IRIS 4D/20GT
SUPERTAB	Finite Element Modelling	IRIS 4D/20GT
TIDAL	Shallow Water Simulation & Pollutant Transport	PS/486

for applications which require a lot of number crunching. Each of the two i860 processors deliver a sustained speed of about 5 MFLOPS (LIN-PACK 100x100 double precision).

An ethernet based local area network (LAN) consisting of the COS-MOS-486/860, workstations, and micros has been established to facilitate remote login, remote job execution, file transfer and electronic mail.

80386-based micros have been upgraded by increasing the coprocessor speed, expanding the disk capacity, and installing VGA display cards and monitors for high resolution graphics.

The DoE has, in principle, cleared the raising a global tender for of a large compute-server for C-MMACS. Procurement is in progress. Extensive civil, electrical and site preparation work is under way.

E-mail

The e-mail connection to C-MMACS on ERNET is now fully operational. A user can now be accessed through the e-mail address:

user@ cmmacs. ernet.in

where user is the login ID. A UUCP connection to SIRNET is undergoing tests.