

KEKB Control System Status

presented by N. Yamamoto

System Overview

System Performance

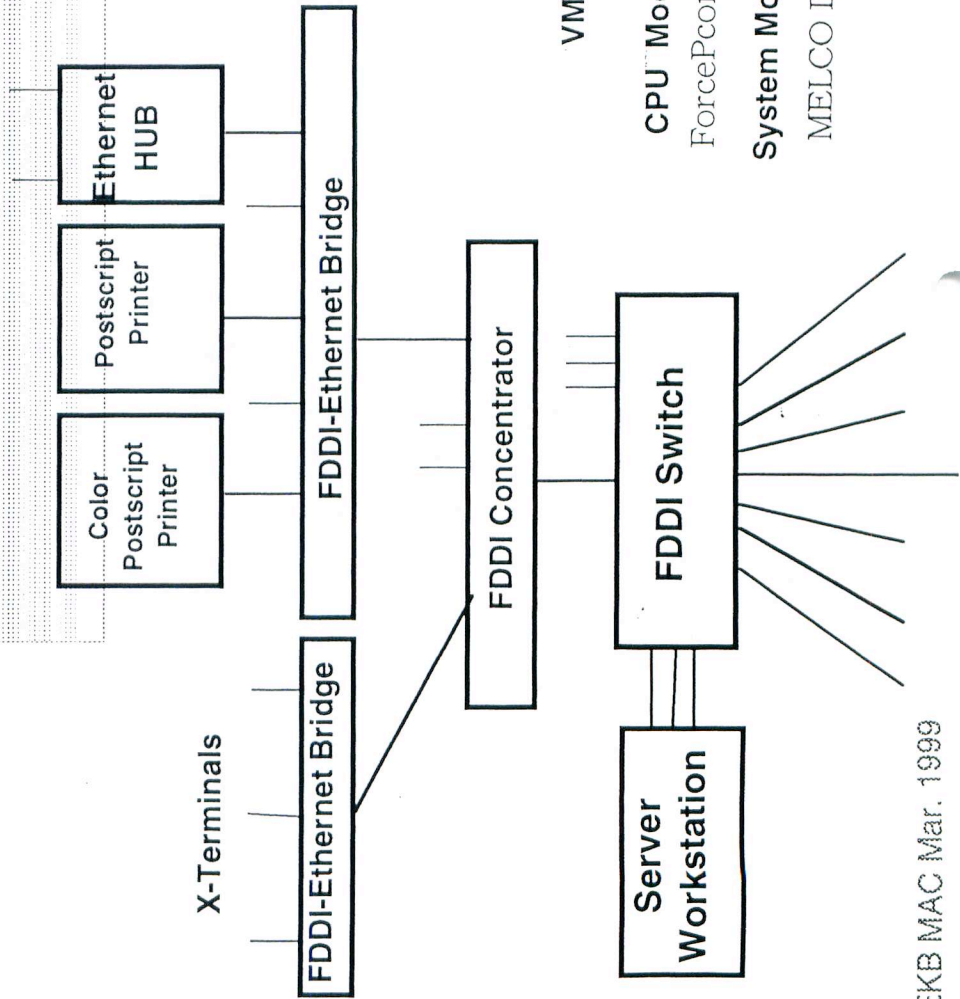
Problems

Future Improvements

System Overview

Central Control Room

26 Local Control Rooms and Central Terminal Room



From the Central Control Room

X-Terminal

FDDI-Ethernet Bridge

Ethernet HUB

Terminal Server

VME Computer (IOC)

CPU Module
ForcePcore750

System Monitor Module

Power Supply Module

MELCO DRSJ-01

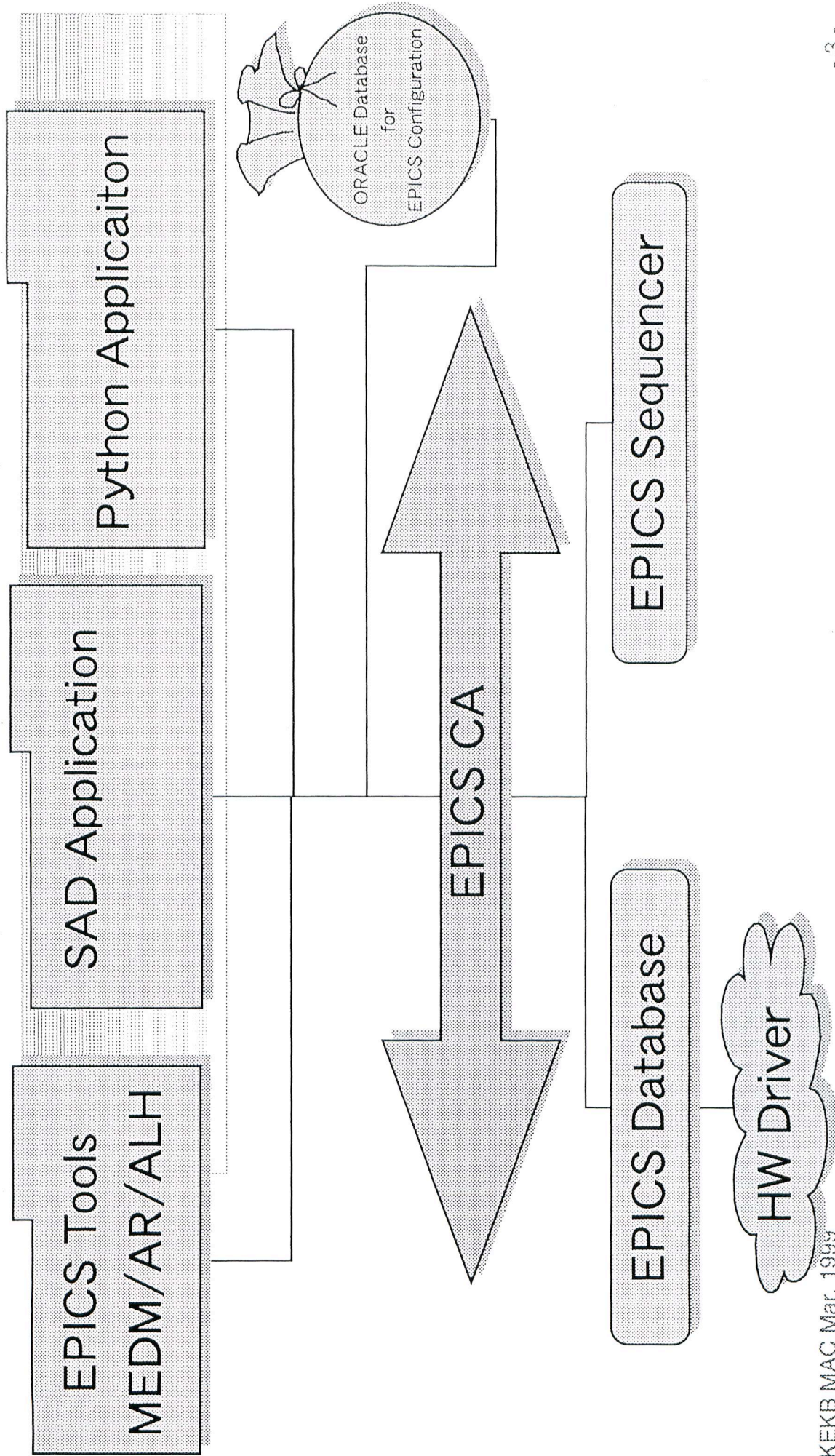
GP-IB

CAMAC Serial Highway Driver

Hytec 2992

NI 1014

System Overview (cont'd)



IOC Hardware-1

CPU Module

- Force PowerCore6750

▶ Add-in board: PPC/IOBP-6750 for Serial interface (RS-232)

- Force PowerCore6603e
- Force CPU64/CPU40
- 93 IOCs in KEKB control system

System Monitor Module

- MELCO DRSJ-01

▶ VME reset from a remote terminal

IOC Hardware-2

MXI-VME Modules

- National Instruments VME-MXI-2
- National Instruments VME MXI

GP-IB Interface

- National Instruments GP-IB 1014

CAMAC Serial Highway Driver

- HYTEC 2992 Serial Link Driver Module

Arcnet Driver

- Advanet ARCNET-4

Modbus+ Interface

- Modicon SV 85

Arcnet

Arcnet Interface Boards

- Magnet Power Supplies (2517 PS in total)
- Video Switchers
- Abort Signal Status Monitors

Arcnet Network

- 176 Arcnet Networks for Magnet Power Supplies
- Upto 20 Power Supplies in an Arcnet Network

Network & Host Computer

Network

- Switched FDDI Backbone : DEC Gigaswitch
- FDDI-10Mbits Ethernet Switch : Cisco Catalyst 1200
- Terminal Servers : Cisco 2500 Access Server
- Ethernet Hubs
 - ◆ Baynetworks Model 810M
 - ◆ HP AdvanceStack 10BT
- FDDI Concentrator: Cisco Workgroup Stack CDDI/FDDI
- Extended Ethernet segment using optical fibre cable in Tsukuba and Fuji experimental halls.

Host Computer

Mitsubishi ME/RK 460

- 2 CPUs(upgraded to 4-CPU on March 6, 1999)
- 2GB memory
- 20GB disk space
- FDDI Interface
- OS: HP-UX 10.2

Terminals

X-terminals

- Placed in remote control rooms.
- HP-ENViZEX model C3253A
- IBM Network Station

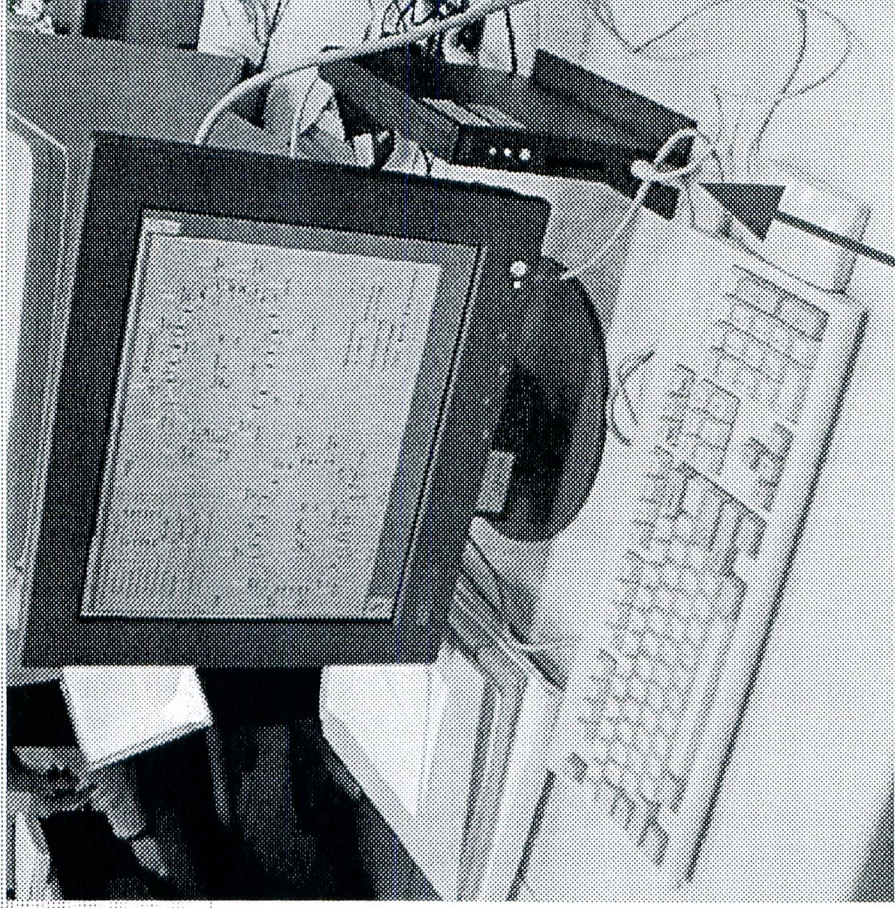
PCs

- Used as operator consoles with multiple screens.
- Macintosh + eXodus X server program
- Windows-NT + X server program

IBM Network Station

Network Station Type 8361

- PowerPC 403/66MHz
- 48MB memory
- up to 1600 x 1200 resolution
- 10 Base-T
- PCMCIA card interface
- W:1.25' x D: 10.5' x H: 7.5'



IBM Network Station

Software-1

EPICS

- ORACLE database generates parameter files for EPICS

database configuration files.

■ Drivers

- ◆ Arcnet

- ◆ Modbus+

MEDM

- FAST, Easy to use

- No programming capability

Software-2

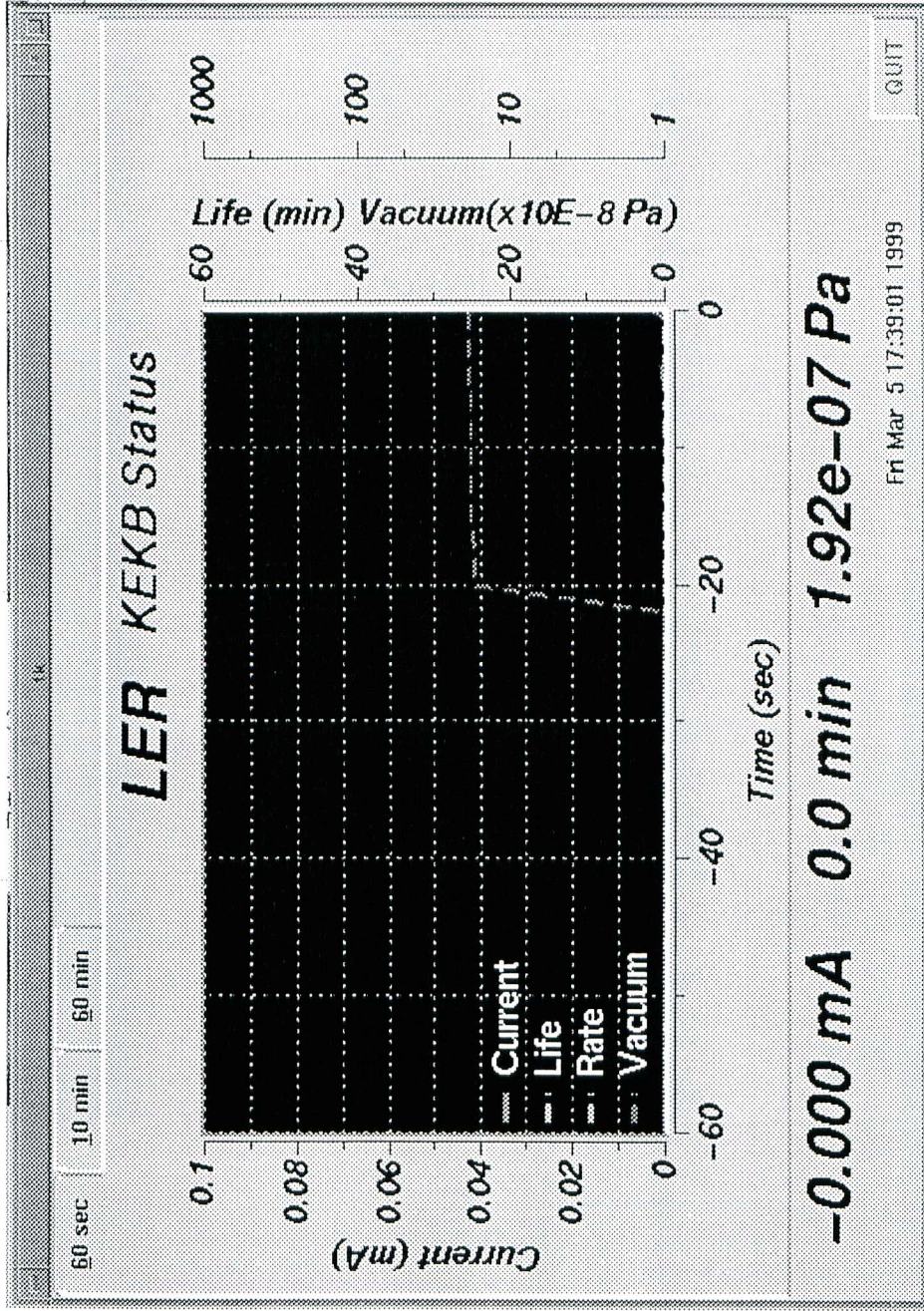
SAD

- Accelerator modeling program
- Mathematica like programming language
- GUI using Tkinter/KEKFrame*

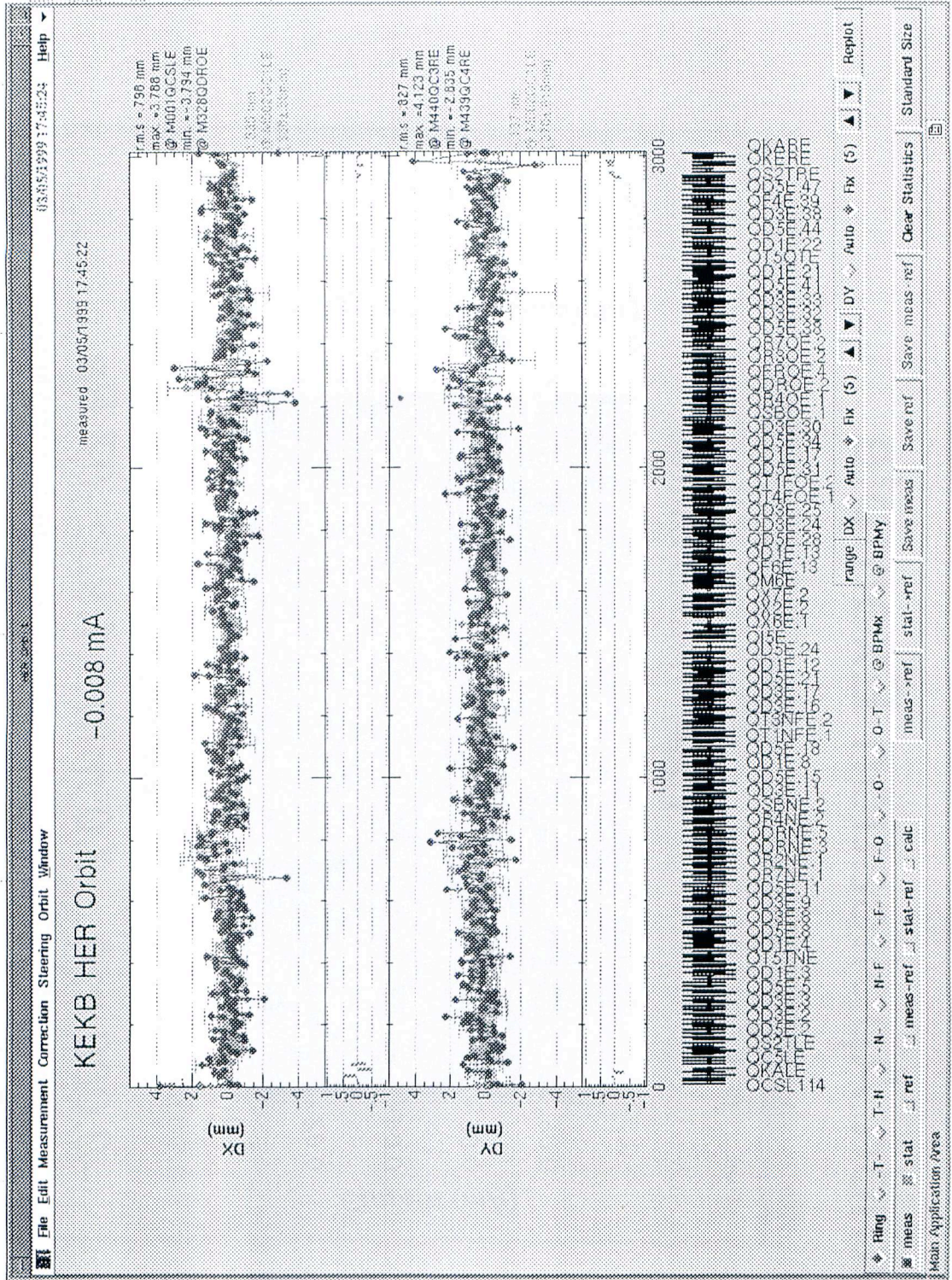
Python

- Object oriented scripting language
- EPICS interface + GUI (Tkinter)
- Runs anywhere, well almost.

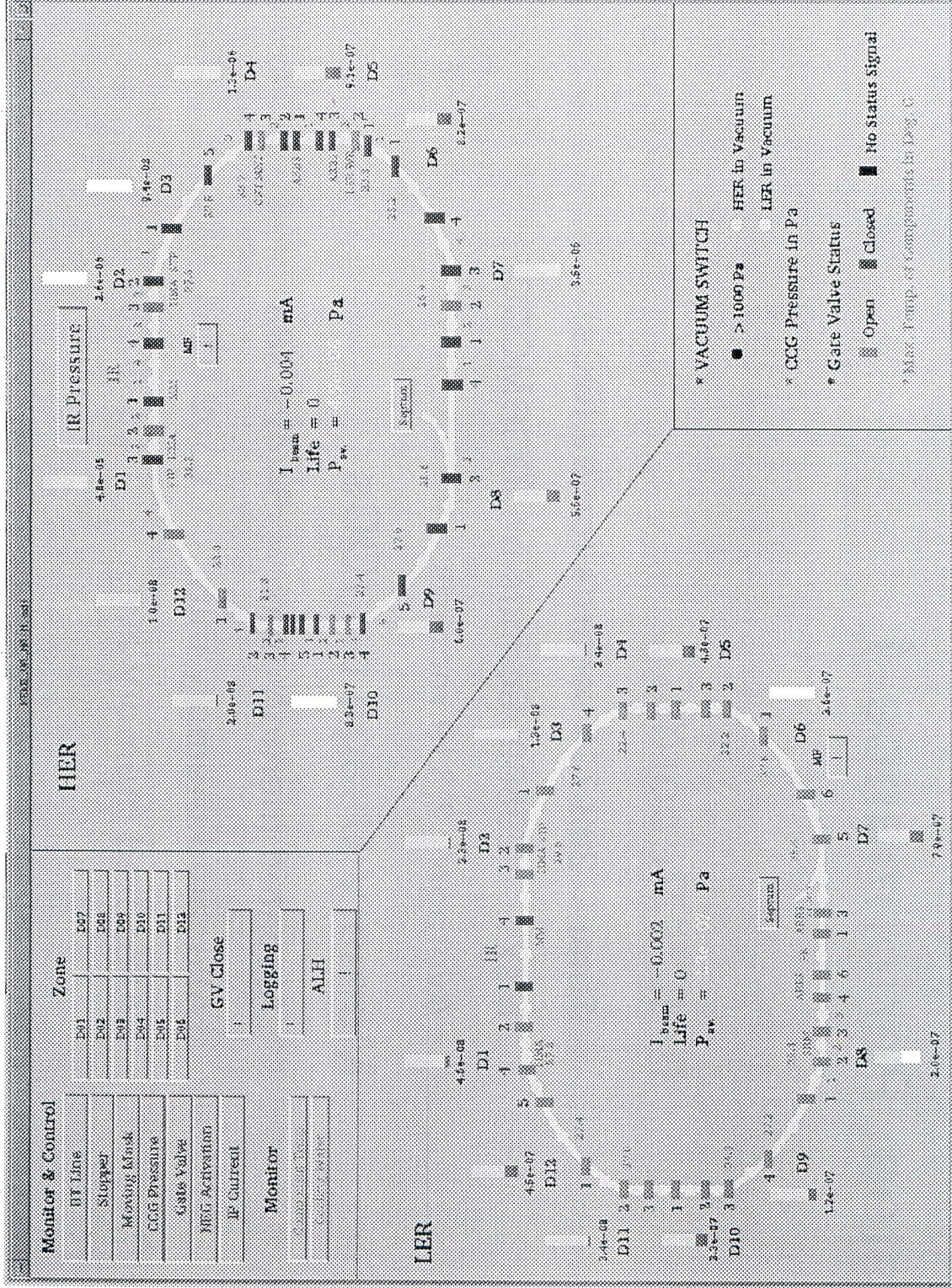
Python Application Example



SAD Application Example



MEDM Display Example



System Performance-1

EPICS Records

- Total 208,716 records (on 90 IOCs)
- Max. 29669 records on IOCBMCCC
- Average 2,319 records

Memory Usage on IOCs

- Allocated memory max. 54,429,368
- Allocated memory min. 1,309,016
- Allocated memory ave. 4,593,781

System Performance-2

Host Computers

■ CPU load (before March 6)

▶ Load average 15-20

▶ Users 150

▶ Processes 900

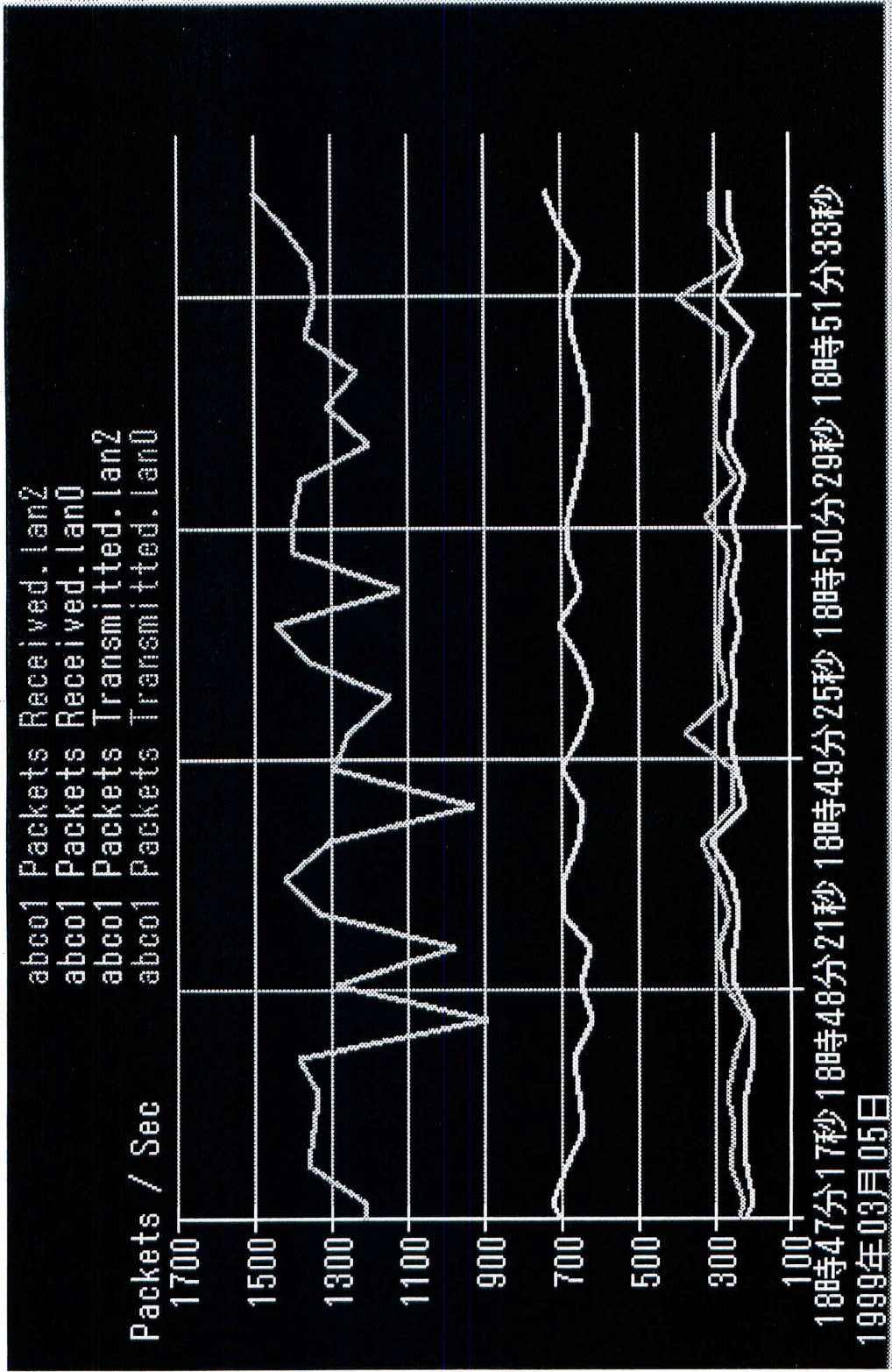
▶ Memory Usage

	AVAIL	USED	FREE	USED
..				
.. Memory(KB)	1,635,272	275,920	1,359,352	17%

■ Network Load

▶ around 2000 Packets/sec

Typical Network Traffic



Problems

Device Support Interference

- Arcnet-Modbus+ drivers interference

IOC crashes

- Floating Point Exception

VxWorks task was suspended because of Floating point exception even though there is NO floating point operation in the program . Adding VX_FP_TASK flag to spawn these tasks eliminates the problem [This solution is suggested by M. Clausen of DESY]

Problems (cont'd)

■ BM IOC

Some IOCs used for Beam Position Monitor system crashes frequently. Other IOCs which run similar Database run OK. Checking various possibility but we cannot find the reason yet.

- Crash caused by network trouble
- Once network system lost connection due to a malfunctioning network device, tasks on an IOC may crash.
- Loosing CA link between IOCs is a candidate of the cause.

Problems (cont'd)

Arcnet Network

- Arcnet network condition depends on the ambient air temperature. Network reconfiguration occurs frequently at low temperature. At operating temperature, we observed less network reconfigurations and No problem.

Network congestion in TsukubaB3/B4

- Ethernet HUB in Tsukuba-B3 should be replaced by Ethernet Switch

LINAC CA-Server

- Cannot control "monitor" condition.
- Slow response