

# Thoughts on FMI Application Programming, CHEP95 And The Main Injector

C. S. Mishra

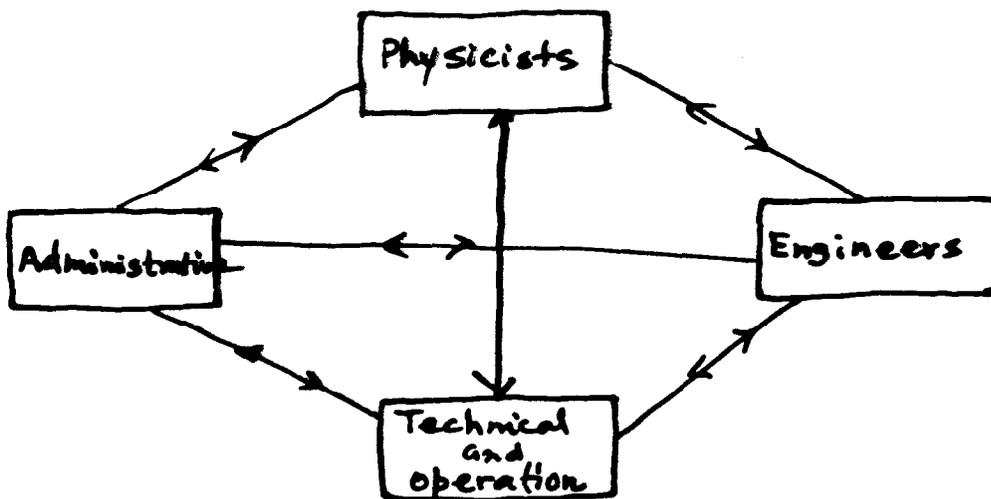
MIAP (10/5/95)

- \* Introduction
- \* AIM's Committee (Where we should be heading)
- \* CHEP95 (Where the world is heading)
- \* Thoughts for Main Injector
- \* Can we / should we ....

# Introduction

The main goal of AD is to provide highest Luminosity to HEP experiment.

- \* Smooth operation
- \* Early and Correct ~~Diagnosis~~ Diagnosis of problem
- \* Better understanding of Accelerator
- \* Automated information and operation



- \* RUN 1a - 1b experience

# AIM'S Committee

There is really only one basic image I want you to focus on: When people are working for Fermilab five or ten years from now, how will they be presented with information about the accelerators and how will they handle it? Some of these people are physicists, operators, engineers, technicians, experimenters, and even lab management. They all can influence the performance of the accelerators.

The charge to the AIM committee is:

1. To analyze the way we are currently running the complex, and collecting and handling information about it. (People in general are not satisfied but there is a big inertia to change.)
2. To suggest new approaches, -organizational changes, technology, hardware and/or software improvements that in its view would:
  - a. Help us better understand and manage the complexity of the accelerators.
  - b. Improve our ability to understand and fix problems in a timely fashion.
  - c. Improve the reliability of the complex.
  - d. Improve the way in which accelerator training is done.
  - e. Improve the manner in which information about the accelerators is handled by physicists, operators, engineers, technicians, experimenters, and lab management.
  - f. Technical feasibility, personnel requirements, and costs should be secondary concerns at this point. (But don't go off the deep end.)
3. To submit to me a first draft report by October 13, 1995. The final draft shall be submitted by November 17, 1995.

Committee Co-chaired by S. Mishra  
F. Ostiguy

1 Member from each department

\* During several Meetings of AIM's Committee, and talking to AD and Fermi staff outside AD it is the opinion of the Committee that we need serious work.

1. Current state of Affairs
2. View of the future
3. Management
4. Accelerator Modelling (online)
5. Application Environment
  - \* Programming Methodology
  - \* object oriented Approach
  - \* operating system
  - \* Graphics
  - \* GUI
  - \* Commercial Software
  - \* Data Base
  - \* Code Management

## 6. Data Acquisition, analysis and Instrumentation

- \* Support & Need
- \* DAQ rate and Method
- \* Future BPM ideas
- \* Front end
- ⋮

## 7. Data Communications

- \* Protocols
- \* Physical Network Connection
- \* Clock

## 8. Data storage

## 9. Integration of the above and operation

# CHEP95

## Computing for the next Millennium

- \* We are at a time in the development of High Energy Physics, when some major changes in the way we think through our data acquisition and computing problems and apply technology to solve them, will be called for in the HEP programs of the year 2000 and beyond.

## Look to the future

- \* Analysis
- \* Data Access and Storage
- \* DAQ and Trigger
- \* Worldwide Collaboration
- \* Tools, Languages, and software development Environment.

	1970	1980	1990	2000
Readout	CAMAC	FB-VME	VME	VME
Language	Assembler	F Assembler	C F	Object oriented C++
OS	Custom	Real Time	UNIX	UNIX, POSIX PC, ...
Event Builder	Sequential	Parallel Sequential	Parallel Sequential	Parallel Parallel

- \* Operating system Independent software
- \* Integration of Technology
- \* UNIX/PC, C++ /F90, GL, GUI, CVS, ...
- \* Use of Industrial Products
- \* Getting over the inertia
  - \* Education and Training

# Main Injector

## \* UNIX / PC

- \* VMS is dead or getting old
- \* Very cost Effective
- \* Commercial Software

## \* Application Programming

- \* C++ / object oriented Approach
- \* GUI
- \* Better Graphics
- \* Tcl/Tk, Script, GL
- \* Window (No more hidden interrupts)
- \* User Friendly, intelligent program.
- \* Better use of Data

## \* Data Collection

- \* Data Acquisition and Analysis  
(example BPM data, time stamped  
with Bus currents)
- \* Few Mb/sec. (1 GB/sec @ LHC)

## \* Instrumentation's

- \* VME as much as possible
- \* Do we need 46.5 Canal ? (Some one asked)  
Can we do this in VME ?
- \* BPM (Uniform Technology)
- \* other monitors

## Can We / Should we

Yes / Yes

- \* This is a big job but not impossible.
- \* 20-30 man years
- \* Computing and Engg Graduate Students from Local Universities.

## If we do not

- \* We will lack in technological front
- \* Hard to find people
- \* Dead end Road for current Young staff.
- \* operation will get difficult & difficult.