PEFP status

Bird's eye View of the Site

Jihwa Kim
PAL, KOREA

EPICS Collaboration meeting

Dec 8-10, 2004 RICOTTI,Tokai, JAPAN

Pohang Accelerator Laboratory
POSTECH

Outline

I.PEFP

- Goal
- Plan, Schedule
- Status of Accelerator Development
- Project progress

II. 20Mev Control System

- History
- Development Status of Sub Control System

  .Vacuum,RF,Event,Beam Monitor, PS ,Utility

Proton Engineering Frontier Project

Collaboration with
KAERI , PAL,KAPRA,KIGAM,KAIST.

Under construction for 20Mev Com missioning in KAERI-Deajeon

Final Site will be selected by end of this year.

KAERI – Korea Atomic Energy Research Institute

KAPRA – Korea Accelerator & Plasma Research Association

KIGAM – Korea Institute of Geoscience & Mineral Resources

KAIST – Korea Advanced Institute Science and Technolgy

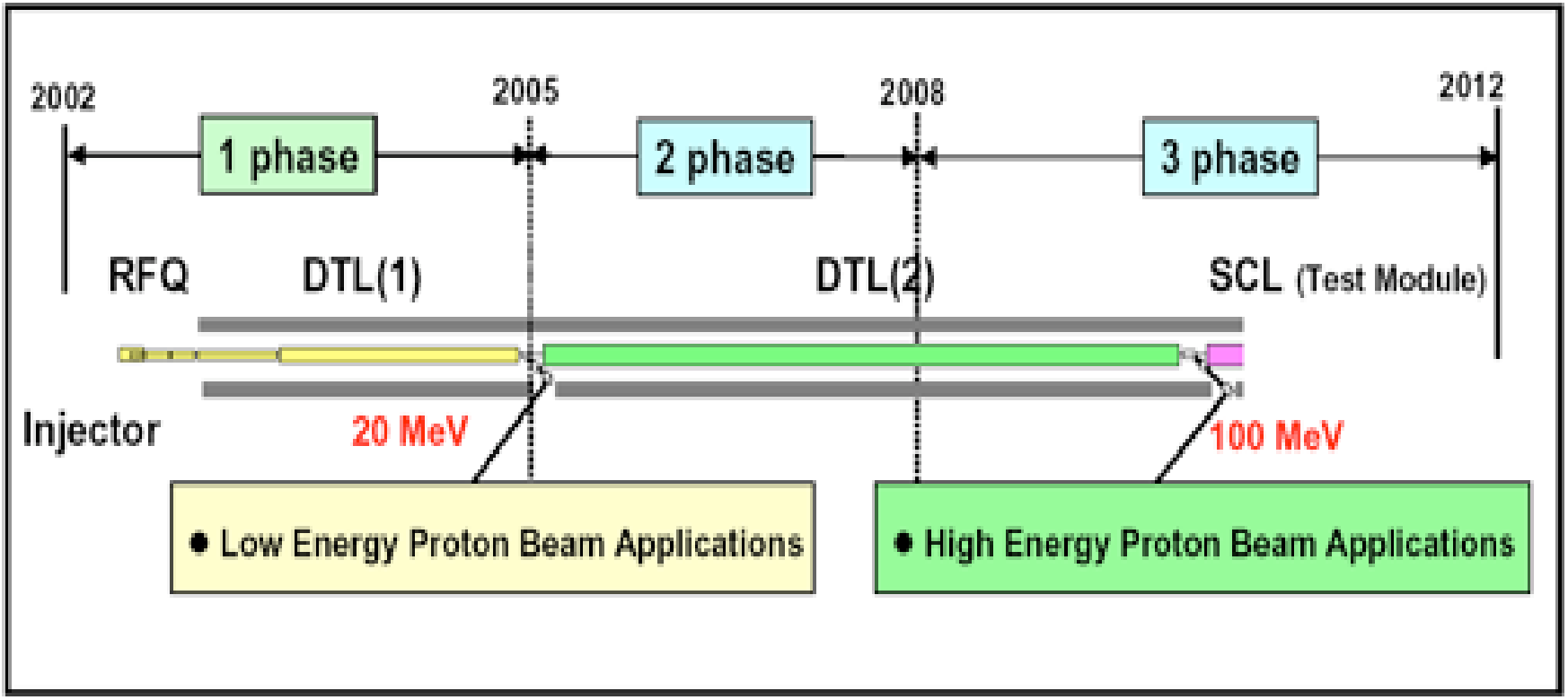
Pohang Accelerator Laboratory
POSTECH

Project Goal

- Project Name : Proton Engineering Frontier Project
- Project Goals :
  - 1st : Developing & constructing a proton linear accelerator (100MeV, 20mA)
  - 2nd : Developing technologies of proton beam utilizations & accelerator applications
  - 3rd : Promoting industrial applications of developed technologies
- Project Period : 2002.7 – 2012.7 (10 years)
- Project Cost : 128.6 B Won (107M$)
- Special Conditions : Land, site & supporting facilities will be provided by a host institution or a local government.

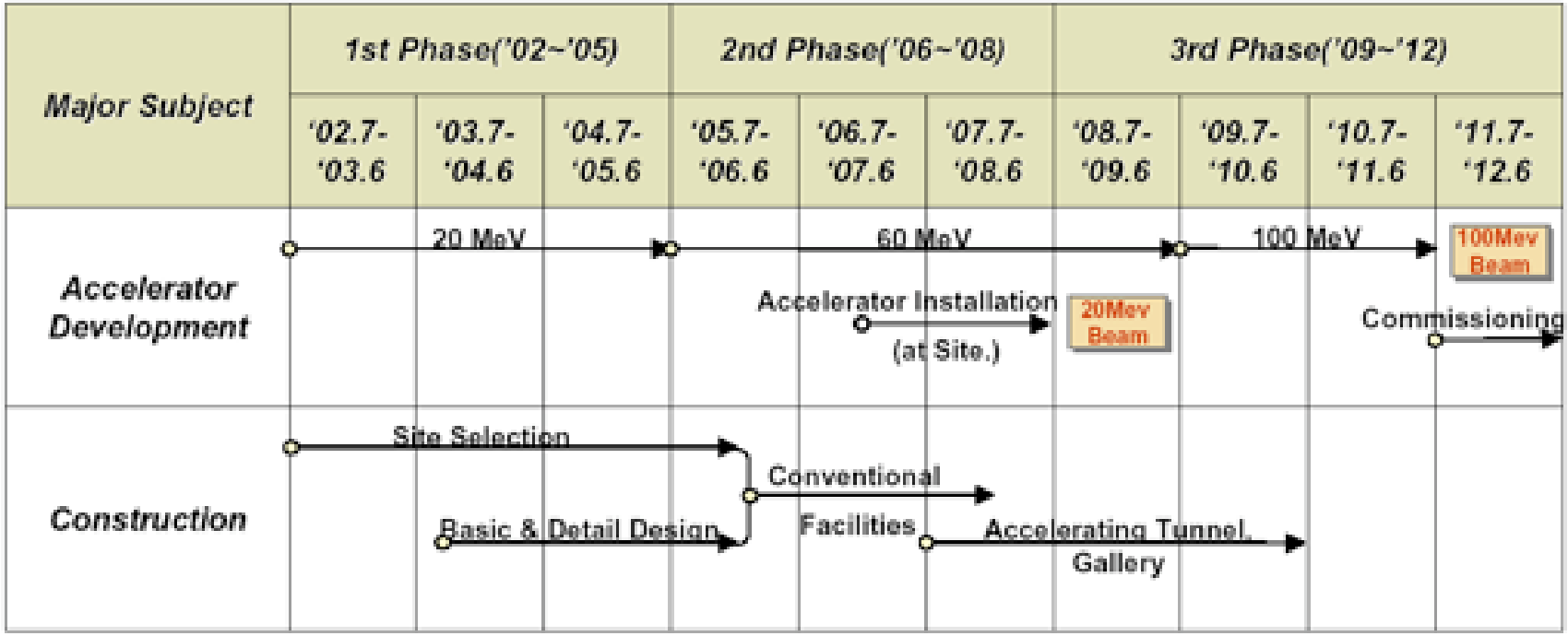
Refer to Slide materials(Page 3~8)presented at ICFA-HB 2004
October 20.2004 , Beansheim ,Germany
"Status and progress of the PEFP Project"
By Byung-Ho Choi & PEFP Team

Plan of PEFP(100MeV Linac & Utilization)



- PEFP is organized into 3 phases.
- Its accelerator composes of an Injector, RFQ, DTL(I), DTL(II) and a test module of SCL
- It has 2 beam extraction system ; a low energy proton beam extraction of 20MeV, a high energy beam of 100MeV
- Extracted proton beams will be used in various fields of beam utilizations & applications.
- We open a future extension plan over 100MeV

Project Schedule



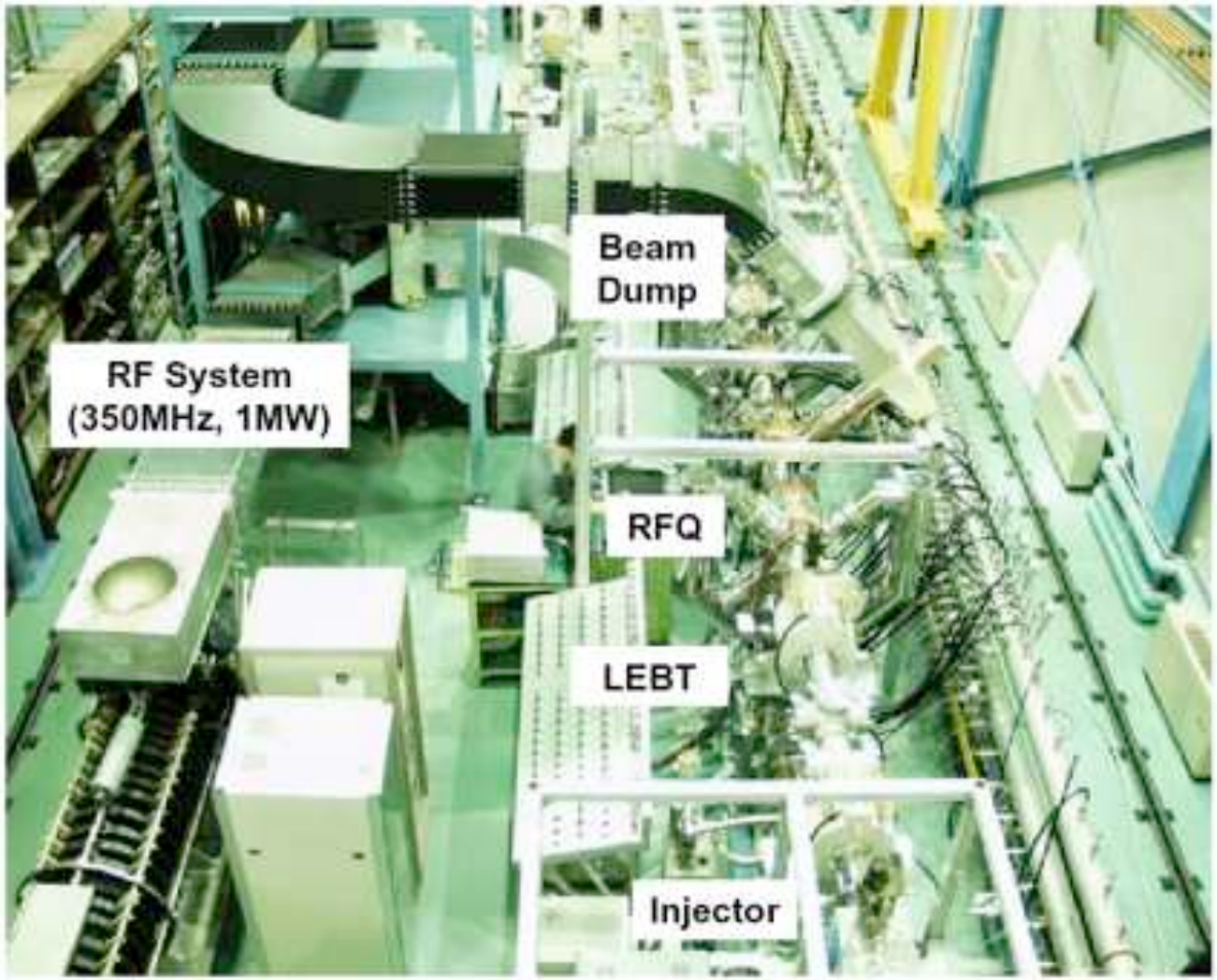
- Revised major milestones of the accelerator development & construction.
- In the 1st Phase, 20MeV accelerator will be constructed.
- After completion of the 20MeV accelerator in KAERI site in the 1st phase, it will be moved to new site and commissioned to supply 20MeV proton beam.
- 20MeV beam will be provided by Jun. 2008, 100MeV Beam by Jun. 2011

Basic Accelerator Parameters

- Particle : Proton
- Beam Energy : 100MeV
- Operational Mode : Pulsed
- Max. Peak Current : 20 mA
- Repetition Rate : 15 Hz for Commissioning to User
  (120Hz in Accelerator Design)
- Pulse Width : < 1 ms for Commissioning to User
  (< 2 ms in Accelerator Design)
- Max. Beam Duty : 1.5% for Commissioning to User
  (24% in Accelerator Design)
- Accelerator Structures : Linear Acc.

  1st Option : Injector - 3MeV RFQ - 100MeV DTL
  2nd Option : Injector - 3MeV RFQ - 60MeV DTL - 100MeV SCL (under study)

Status of Acceleraor Development(Nov. 2002)



- Injector, LEBT, RFQ & RF System have been developed.
- 50keV injector & LEBT were tested and operated
- RF system of RFQ was tested
- RFQ is under the beam test
- DTL is under fabrication

Project Progress

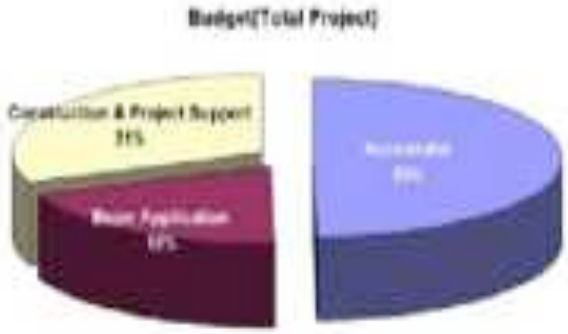
▶ Progress (by Aug 2004)

achieved : 14.8%

planned : 15.2%

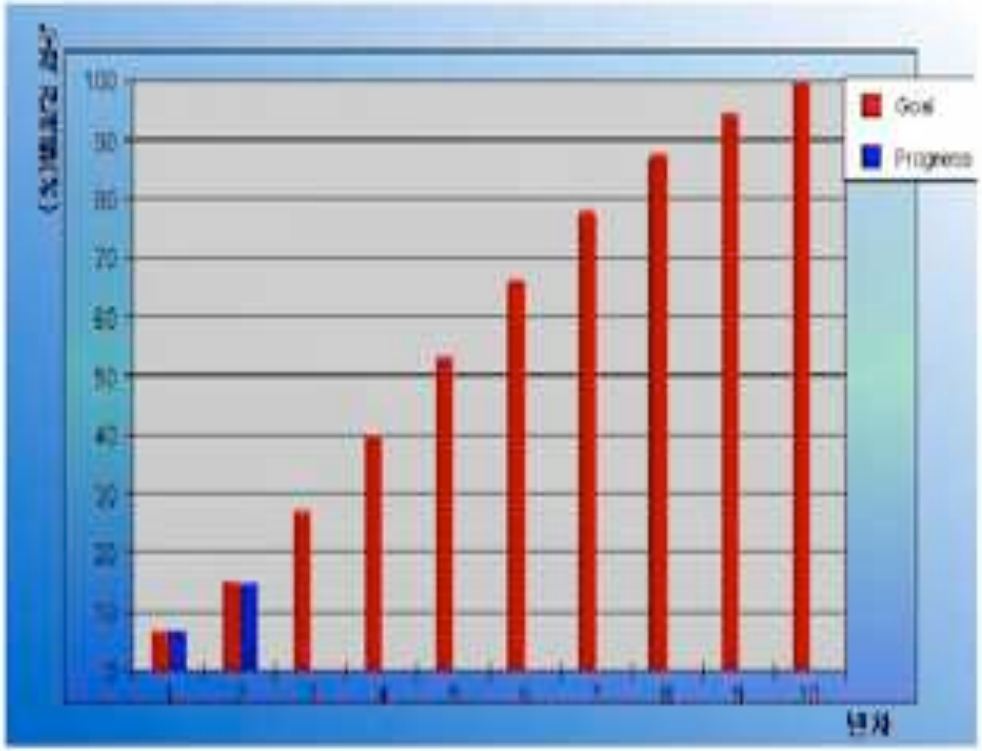
(0.4% delayed)

▶ Budget [128,567 M ₩]



Note) not include a budget of land, site & supporting facilities by a host

❑ Total progress chart of 10 years ('02.7-'12.7)



Year	1	2	3	4	5	6	7	8	9	10
Goal (sum)	6.9	15.2	27.1	40.2	53.2	66.2	77.9	87.6	94.6	100
Achieved (sum)	6.9	14.8								

Control System for 20MeV Commissioning

- Scheduled to 20 MeV commissioning in April 2005 at KAERI,Deajeon
- Development of Control System to satisfy this mission has been executed at PAL in 3Phases for last 3 years.

➢First Phase Development(2002.7~2003.6)
. Control System Architecture
. Control ToolKit Chioce(EPICS)
.Vacuum Control System
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➢\Second Phase Development(2003.7~2004.6)
. RF Control System
\\\\\. Event System for Timing Control
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➢Third Phase Development (2004.7~2005.6)

.Beam Monitor Control

.Power Supply Control

.Cooling Water Monitoring
.Intergration and Commissioning

EPICS Expert Invitation for Review

Bob Dalesio
LANL ,USA
May 27 ~31,2003
Seminar room at PAL

Ralph Langer
BESSY ,Berin,Germany
July 28~August 5,2004
EPICS Lab. At PAL

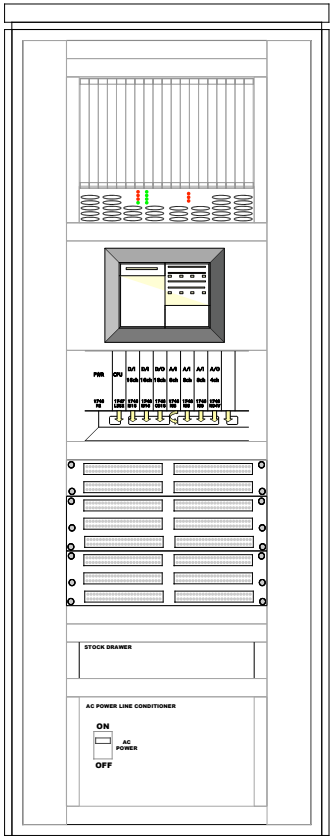
Vacuum Control System

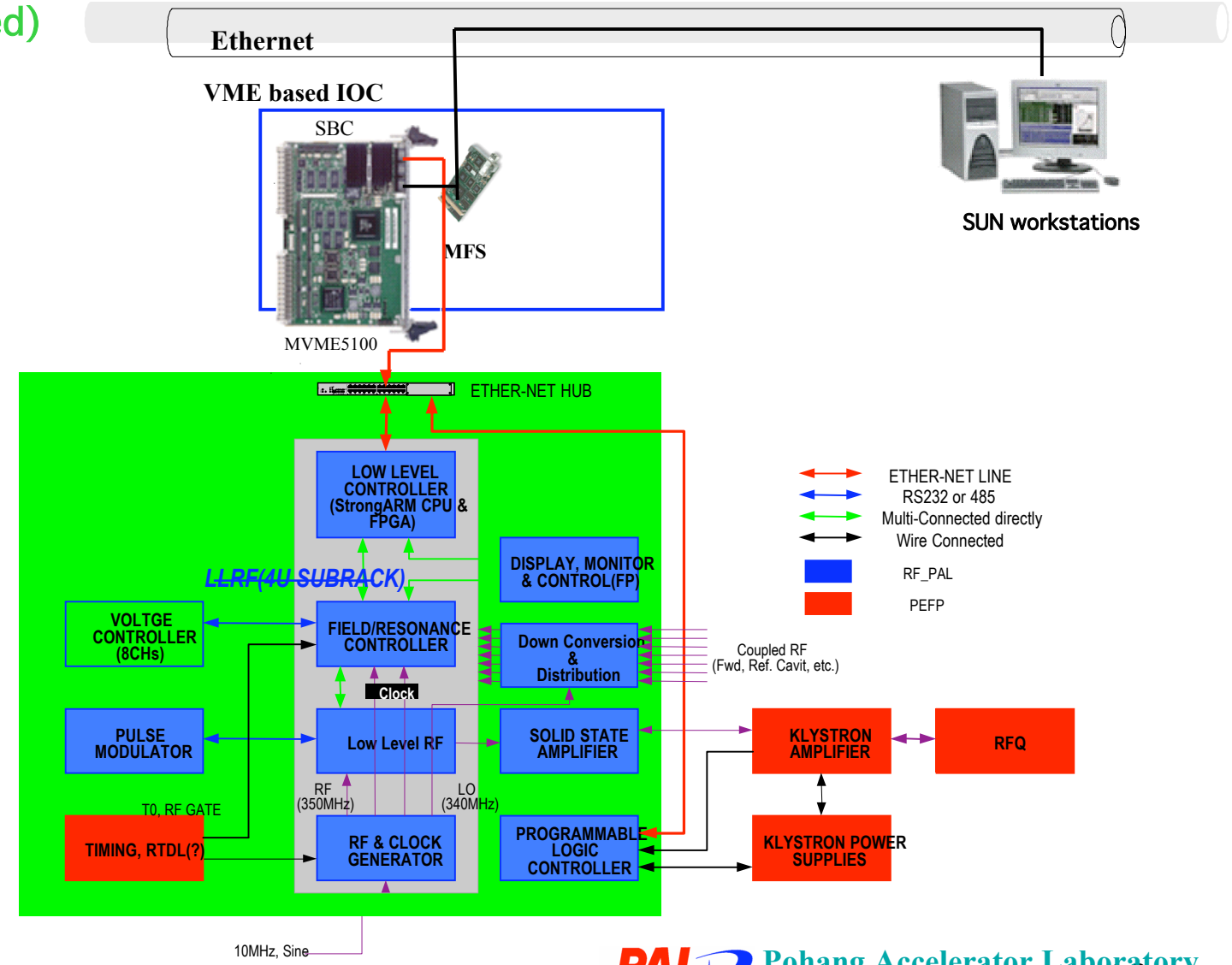
- Windows based PC
- RS422 Interface(63 Ports)
- EPICS base 3.14.1
- MEDM
- Installed and Working at KAERI site

RF Control System

EPICS IOC(Developed)

CPU : MVME5100
VME I/O: MFL32A
EPICS Base 3.13.8





Domestic Products

VMEbus MFL32A

- 16bits ADC,0~+10V :8Ch
- 16bits DAC,0~+10V:2Ch
- DIO:32Ch
- 10/100Base T Ethernet
- RS232C ,32bit CPU

Human CC,INC
http://www.humancc.co.kr

VME Bus Subrack

- 500W(+5V,-12V,+12V)
- .12 slots, VME64x with P0
- Remote Control(RS422,LAN)

VME Tech ,INC
http://www.vmetech.co.kr

Timing Control

- Event system for timing control has been selected.
- TIMO from SLS made contribution.

-Development Progress

. Detailed Specification
. System Configuration Layout
. Hardware Setup and Software module Test
. Lab Test

BPM/DCCT Control System(Third Phase)

EPICS IOC(Developing)
CPU : MVME5100
ADC#1 : VTR812/10
ADC#2 : AVME9325-5
EPICS Base 3.13.6

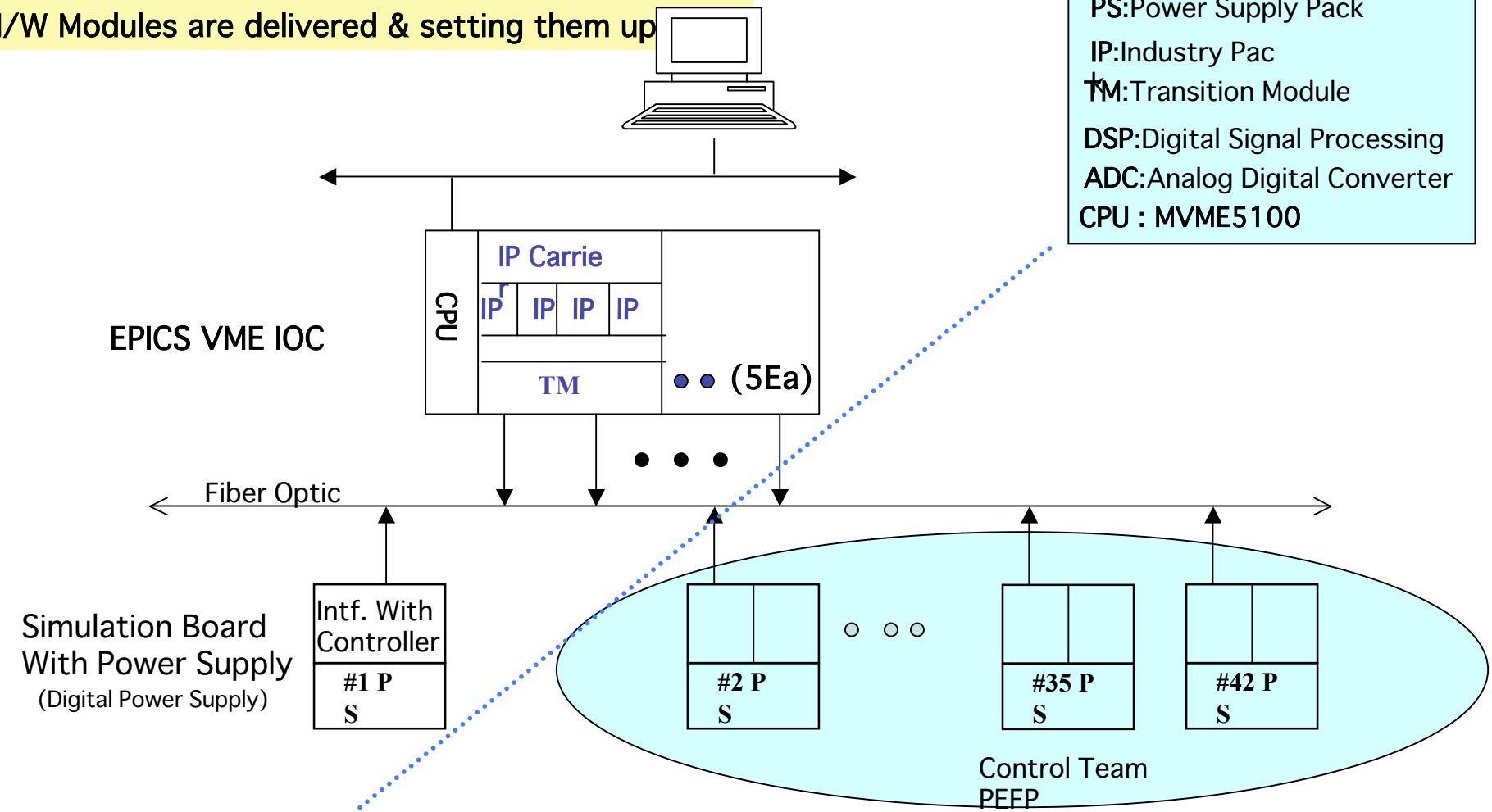
Low Level Electronics(Working)
-Bergoz Customized Hardware module

Power Supply Control System for DTL_Q

Selected the SLS Power Supply Type.

H/W Modules are delivered & setting them up

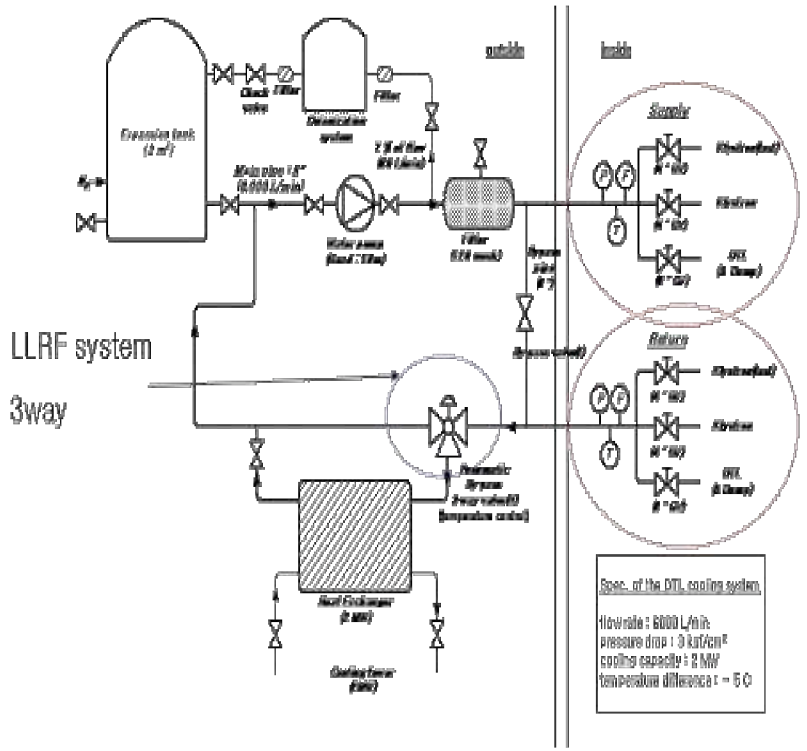
PS:Power Supply Pack
IP:Industry Pac
TM:Transition Module
DSP:Digital Signal Processing
ADC:Analog Digital Converter
CPU : MVME5100



Utility Control(Cooling Water)

Still gathering information for Utility

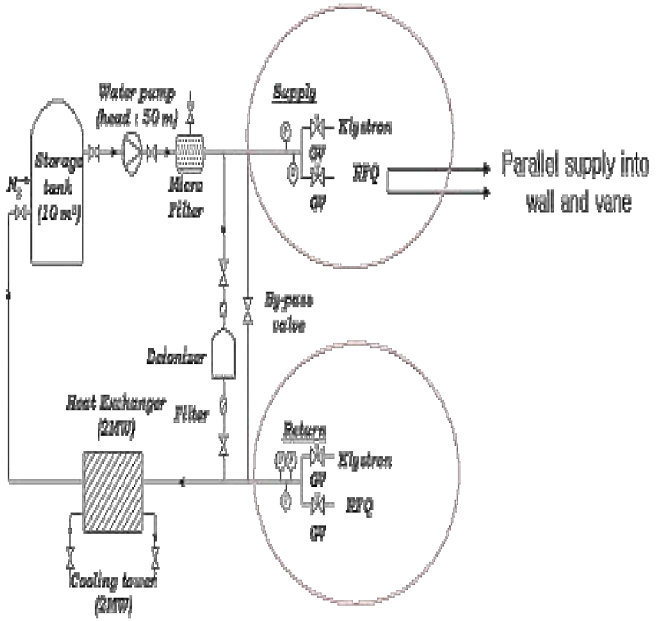
DTL Cooling System



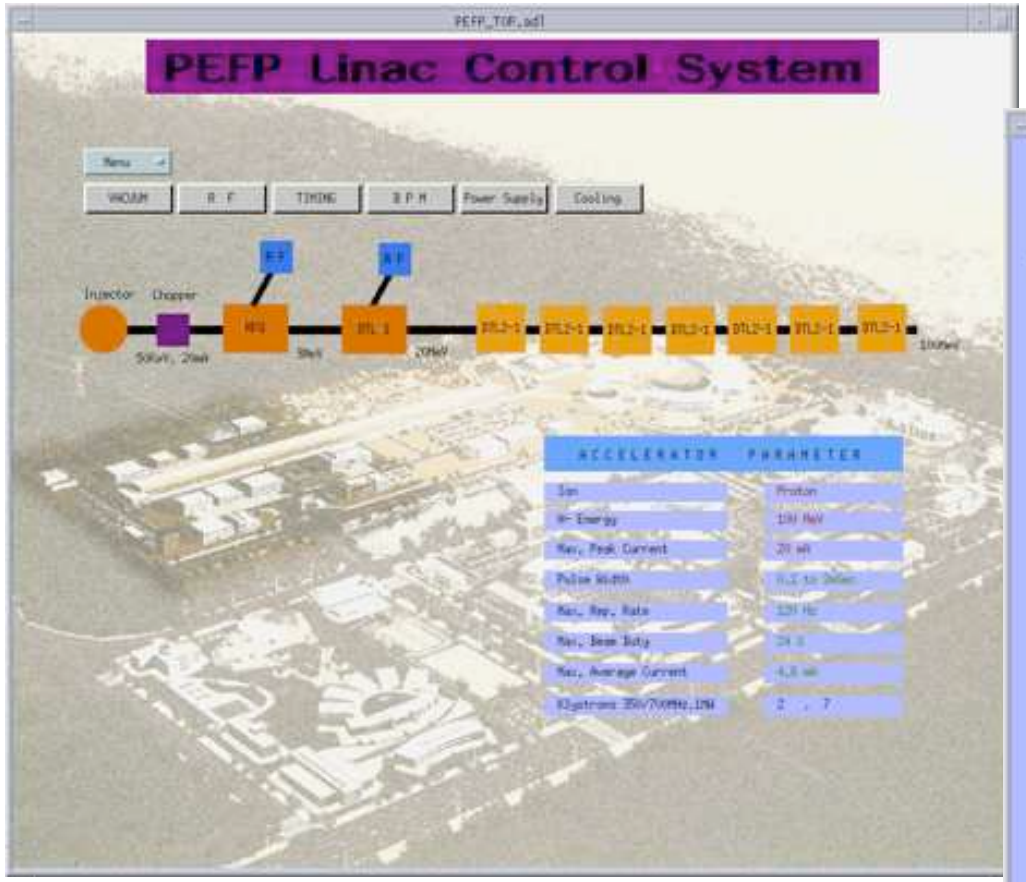
RFQ Cooling System

Specifications

- 3000 l/m, 3 kgf/cm^2, 2 MW



Main Control Screen for PEFP



Summary & Plan

➢PEFP

- Final Site will be selected by end of this year.

➢ 20Mev Control System for PEFP

IOC Level

- RF (Developed)
- Vacuum (Developed)
- Event System for Timing Control (Developed)
- Beam Monitor (Developing)
- Power Supply(Developing)
- Utility(Still gathering control requirement)

OPI

- MEDM Switch to EDM
- Channel Archiver(From Kay)
- More things..
- EPICS Training to PEFP Physicist, Engineer