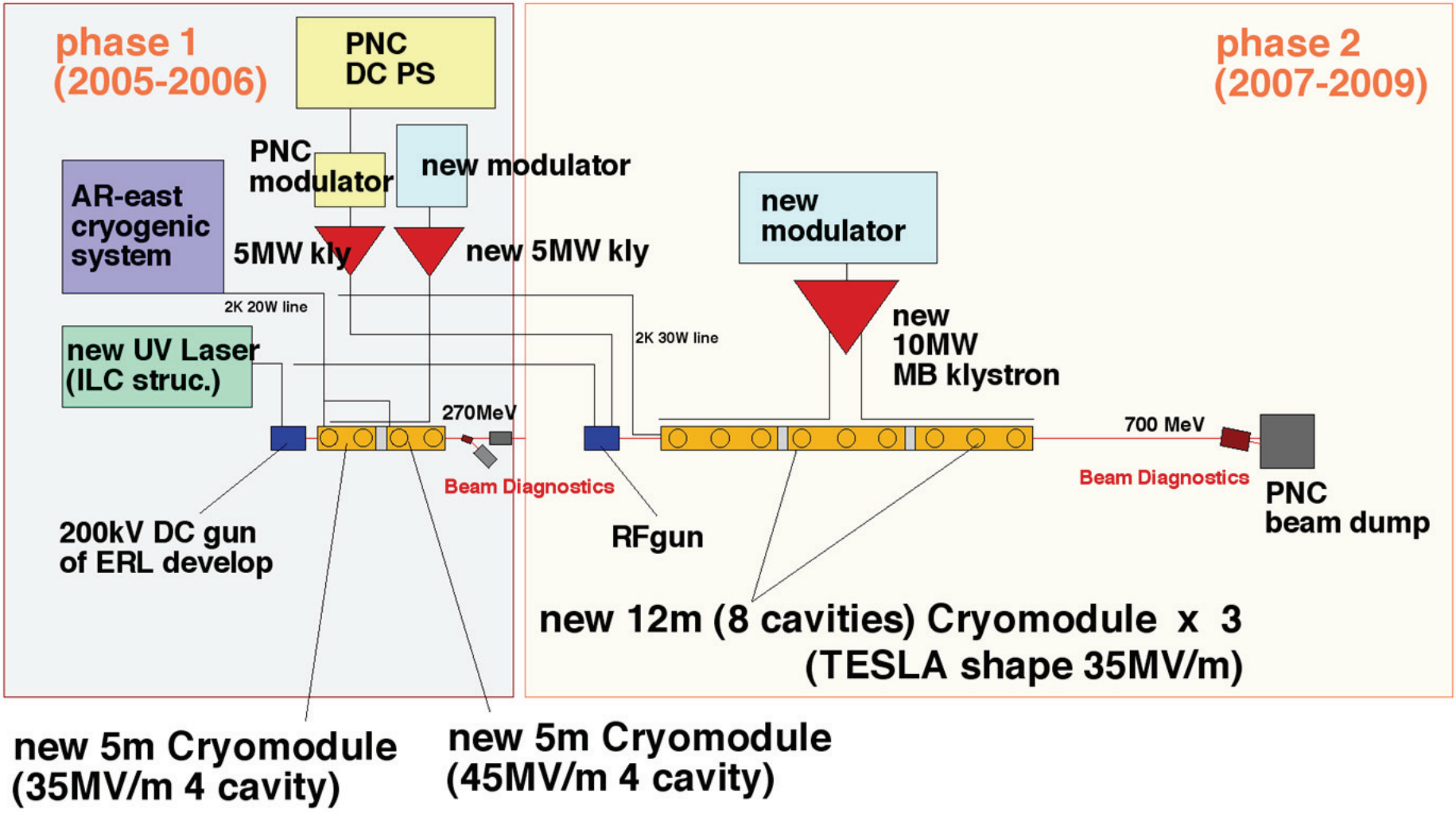
Controls & LLRF perspective at STF

Shin Michizono, Kazuro Furukawa

Plan of Superconducting RF Test Facility (STF)



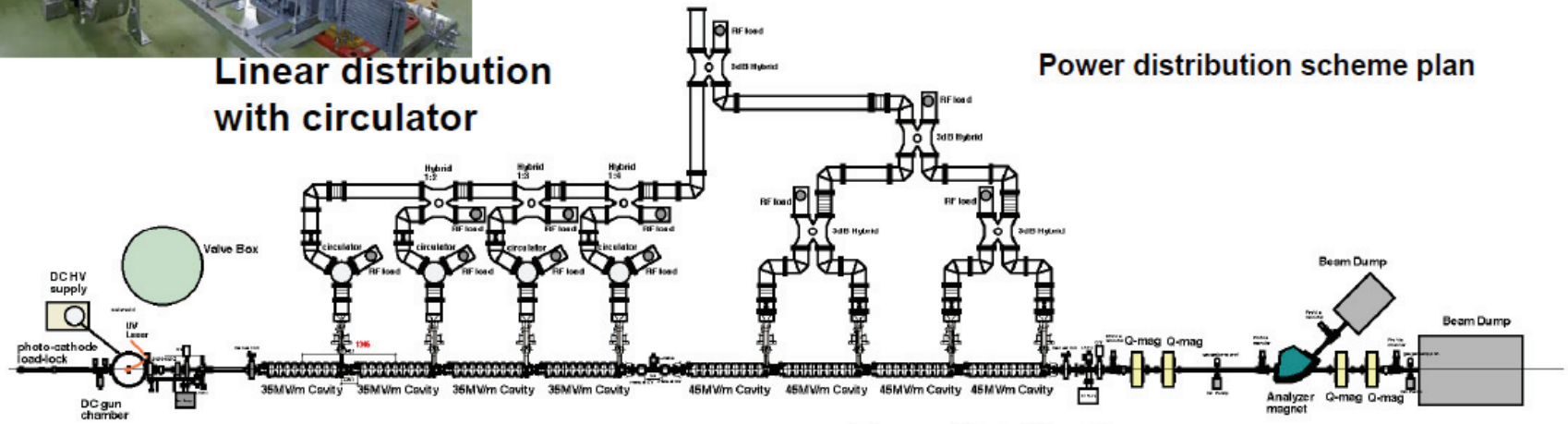
V3.0 Hitoshi Hayano, 12/02/2005

STF Phase 1 SC acc. Plan

STF Phase 1 Bean

Linear distribution
with circulator

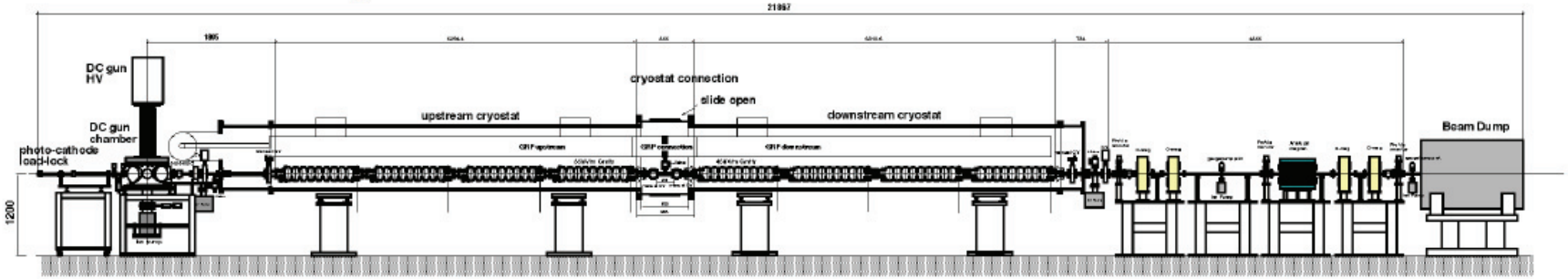
Power distribution scheme plan



Plain view

Tree distribution
without circulator

Photo-cathode DC-gun

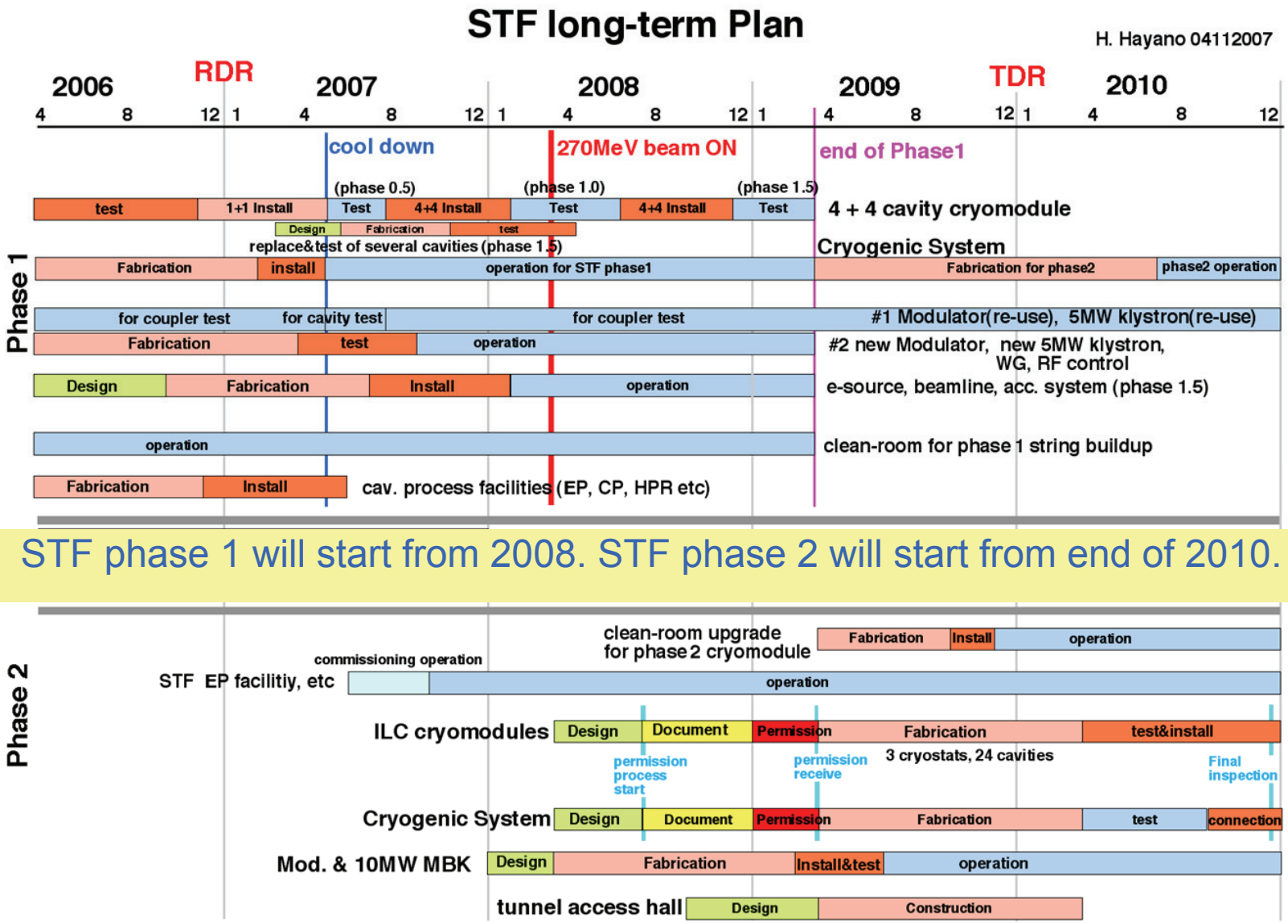


Side view

Aim of STF phase 1 / phase 2

- **Phase 1 (2005 -2008),**
  - ***Build up ILC SC-RF technology and experts,***
  - ***Establish 35MV/m cavity,***
  - ***Establish 45MV/m cavity,***
  - ***Build up SC-RF infra-structure.***

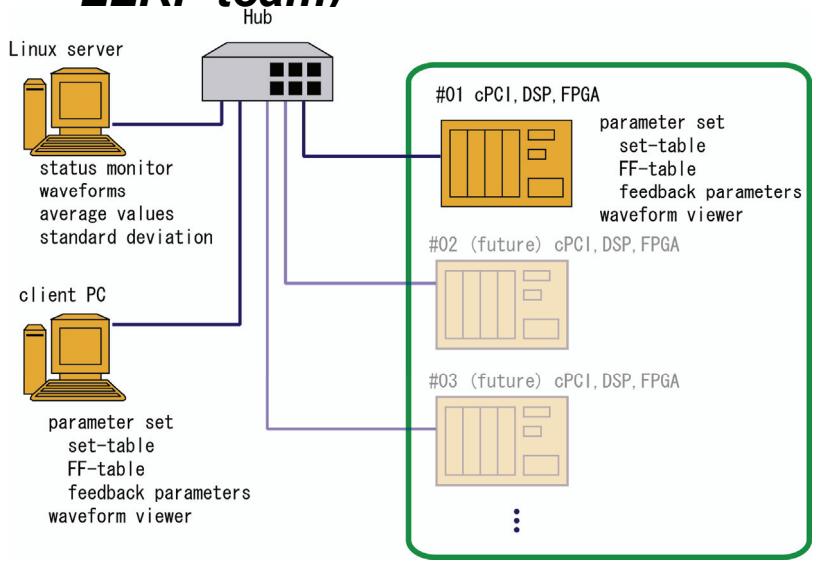
- **Phase 2**
  - ***Design work starts on 2008 and operation will start from end of 2010.***
  - ***Build ILC Main Linac RF unit,***
  - ***Achieve ILC BCD performance,***
  - ***Operate the unit for long time,***
  - ***Establish engineering design detail and basis of cost estimation.***


STF long-term Plan
H. Hayano 04112007
2006
RDR
2007
2008
2009
TDR
2010
4 8 12 1 4 8 12 1 4 8 12 1 4 8 12 1 4 8 12
cool down
270MeV beam ON
end of Phase1
(phase 0.5)
(phase 1.0)
(phase 1.5)
test
1+1 Install
Test
4+4 Install
Test
4+4 Install
Test
4 + 4 cavity cryomodule
Design
Fabrication
test
replace&test of several cavities (phase 1.5)
Cryogenic System
Phase 1
Fabrication
install
operation for STF phase1
Fabrication for phase2
phase2 operation
for coupler test
for cavity test
for coupler test
#1 Modulator(re-use), 5MW klystron(re-use)
Fabrication
test
operation
#2 new Modulator, new 5MW klystron,
WG, RF control
Design
Fabrication
Install
operation
e-source, beamline, acc. system (phase 1.5)
operation
clean-room for phase 1 string buildup
Fabrication
Install
cav. process facilities (EP, CP, HPR etc)
STF phase 1 will start from 2008. STF phase 2 will start from end of 2010.
Phase 2
clean-room upgrade
for phase 2 cryomodule
Fabrication
Install
operation
commissioning operation
STF EP facilitiy, etc
operation
ILC cryomodules
Design
Document
Permission
Fabrication
test&install
permission process start
permission receive
3 cryostats, 24 cavities
Final inspection
Cryogenic System
Design
Document
Permission
Fabrication
test
connection
Mod. & 10MW MBK
Design
Fabrication
Install&test
operation
tunnel access hall
Design
Construction

Phase 1 (2005 -2008)

- **Instrument and operation**
  - *Operate 8 cav. Vector sum with cPCI digital FB system*
  - *Stability requirements: 0.3% in amplitude and 0.3 deg. in phase*
  - *Install EPICS to the llrf and other systems and operate with EPICS*

- **R&D and collaboration**
  - *Data acquisition using EPICS*
  - *FB algorithm development*
  - *Survey of field stability and perturbation (shared with world-wide LLRF team)*



STF Phase 2 (2008 -2010)

- **Instrument and operation**
  - *Operate 26 cav. Vector sum with HA digital FB system*
  - *Stability requirements: 0.3% in amplitude and 0.3 deg. in phase*
  - *Install EPICS to the llrf and other systems and operate with EPICS*
- **R&D and collaboration**
  - *Develop 32ch reciever and FPGA board*
  - *Develop EPICS redundant IOC*
  - *ATCA/uTCA evaluation for control*
  - *Develop application of ATCA/uTCA (with Beijing and Shanghai) (example: watching power-line…)*
  - *Timing/Event system collaboration in ASIAN region (with Beijing and Shanghai)*
  - *Algorithm of beam based diagnostics (with FNAL and DESY)*
  - *Algorithm of automation (with FNAL and DESY)*