

DEVELOPMENT of STF CRYOGENIC SYSTEM in KEK

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INTRODUCTION

In KEK, in order to develop
superconducting RF cavities for
ILC.....

Development of

Superconducting RF Test Facility (STF.)

* Accelerator (Cryomodule)

* Cryogenic System



PROJECT of STF CRYO.

Under the leadership of KEK,

Concept

Design Meeting & Procurement

Construction

KEK



KEK

Positive Japanese Cryo. Companies

Mayekawa

Vacuum System

Hitachi Plant
Technologies

Control System

Taiyo Nippon
Sanso group

Hardware

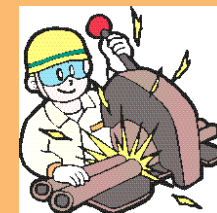
Hitachi TS.

Operation



KEK

venders



Project Management by KEK

DESIGN CONCEPT of STF CRYOGENIC SYSTEM

1) Fully Simple Design

30W at 2.0K for initial prototype

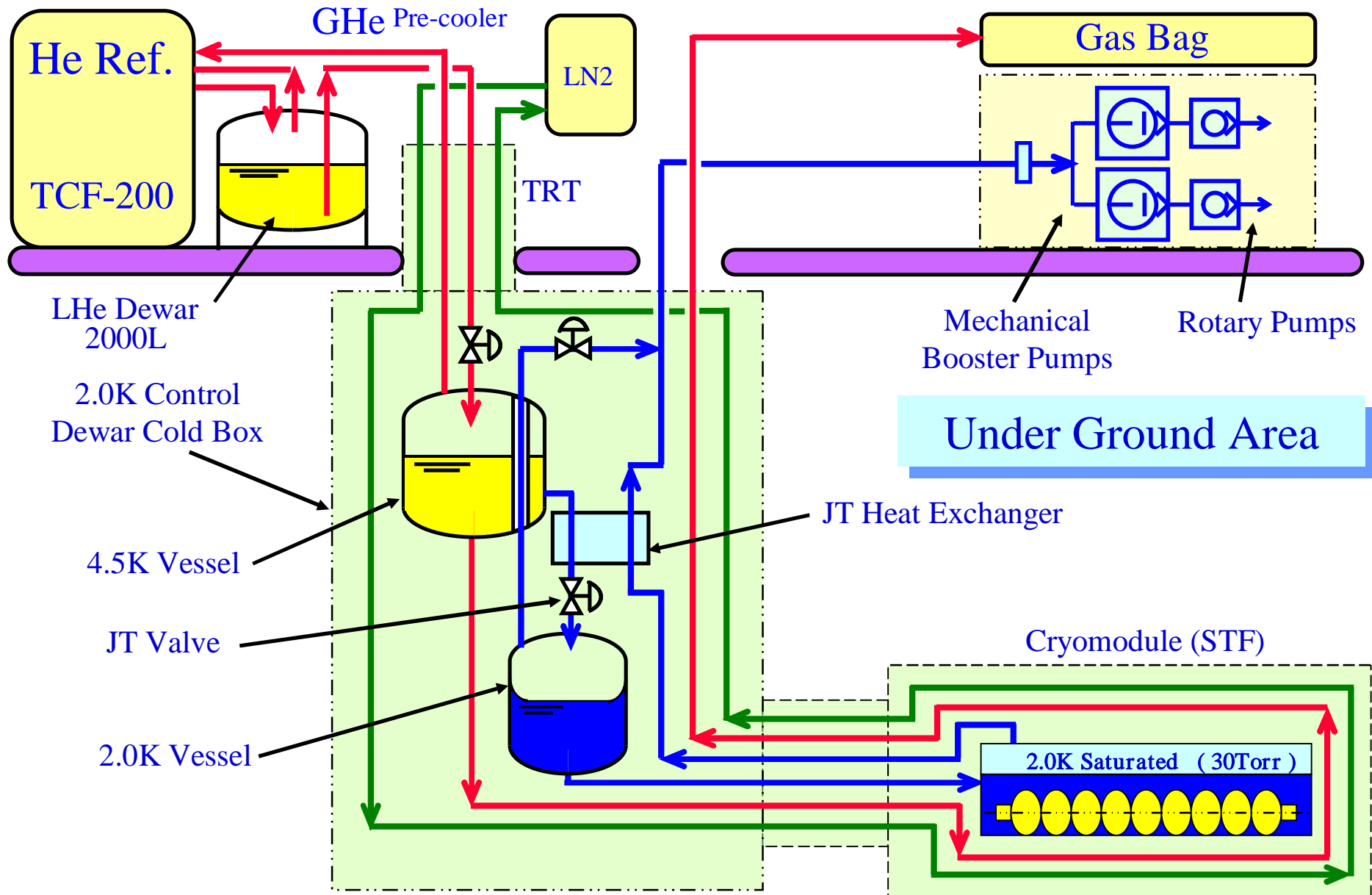
2) For several future usage

(experiment or development for testing other component)

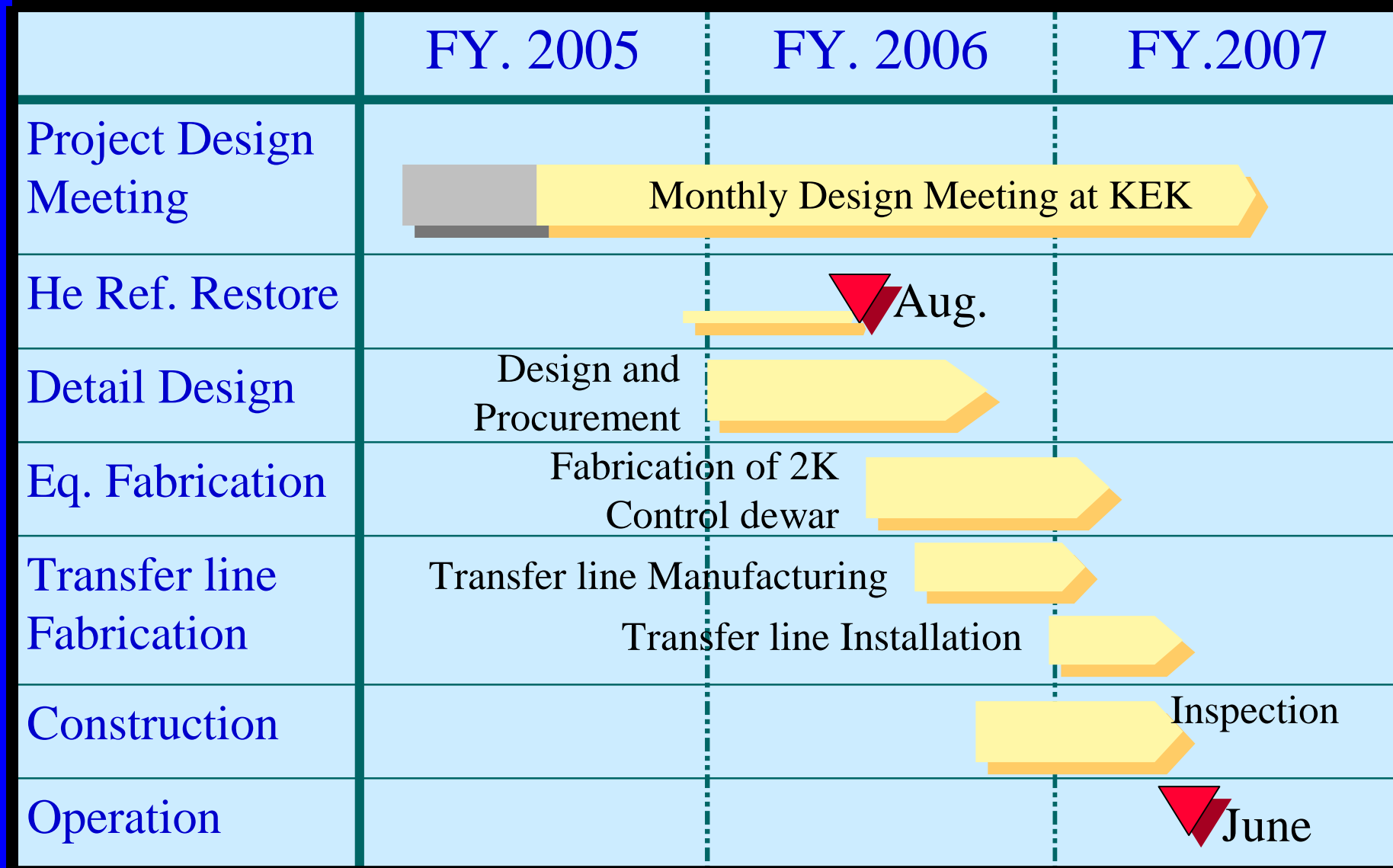
3) Adopting several components developed by KEK

(Transfer lines, GHe pre-cooler,
Cryogenic Heat Exchanger,
etc.)

STF CRYOGENIC SYSTEM



PROJECT SCHEDULE



▼ Aug.

▼ June

STF Cryogenic System (Building)



STF Building
in KEK

Compressor House
and LN2 Storage



Helium Refrigerator (Restored)

Former
SULZER
TCF-200

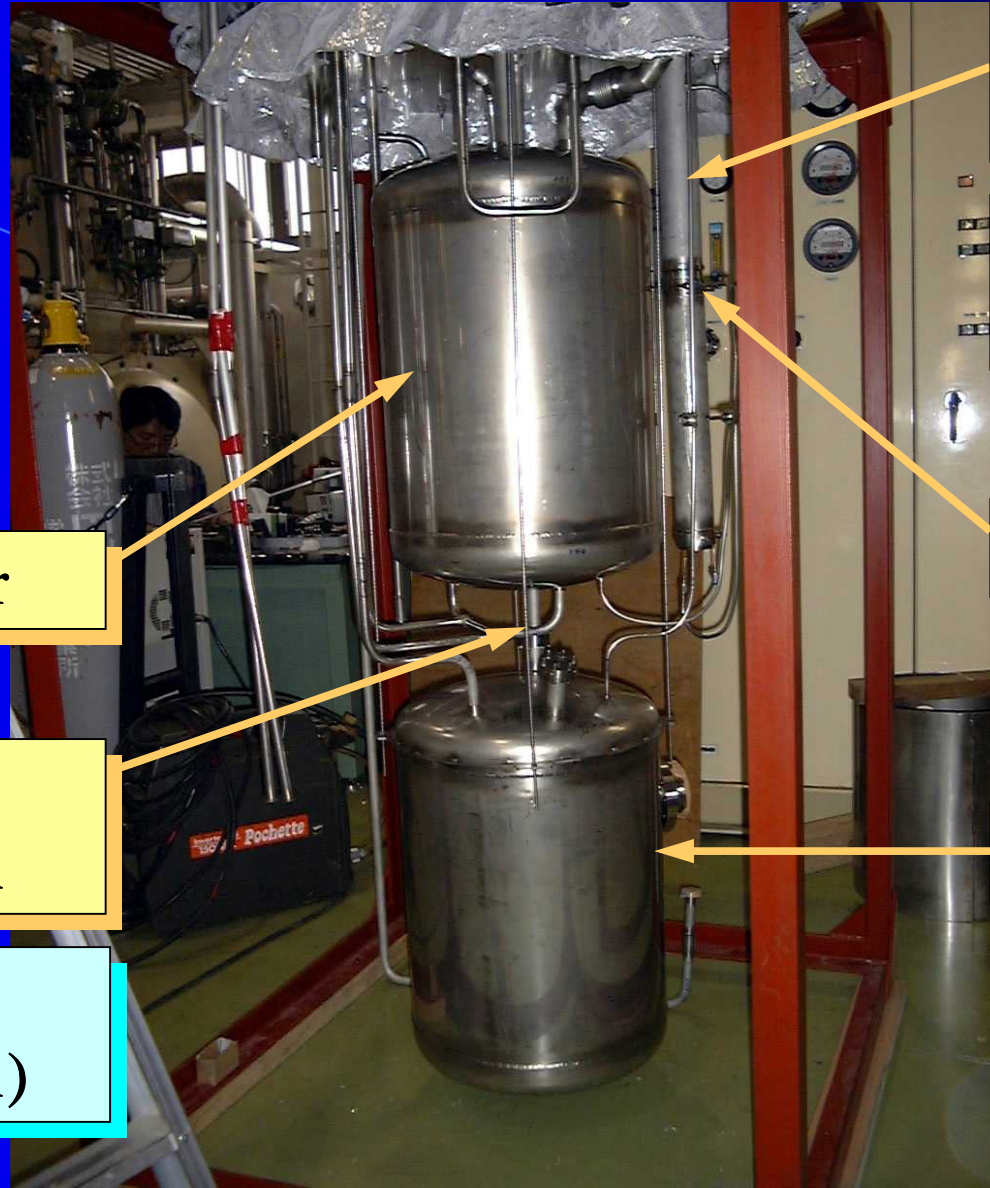
Helium Ref. was
restored

(used as KEKB,
more than ten years
ago)

Ref.: 600W at 4.4K
Liq.: 280L/h



2K CONTROL DEWAR



JT Heat
Exchanger

(vertical
counter
flow)

1st JT Valve

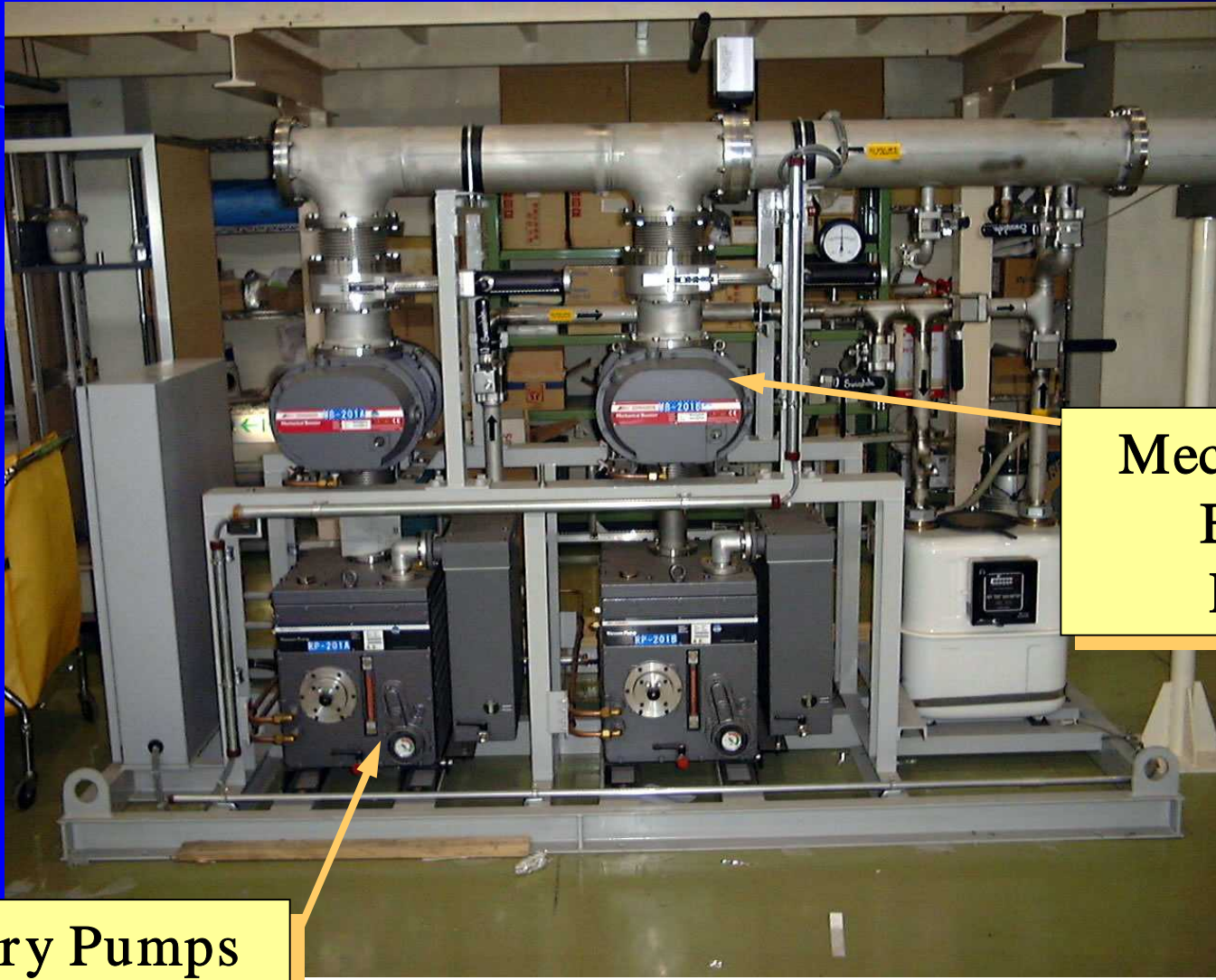
2.0K Dewar

4.5K Dewar

23 Torr
Evacuation

(vertical
penetration)

EVACUATION UNIT



Mechanical
Booster
Pumps

Rotary Pumps

GHe CIRCULATION SYSTEM

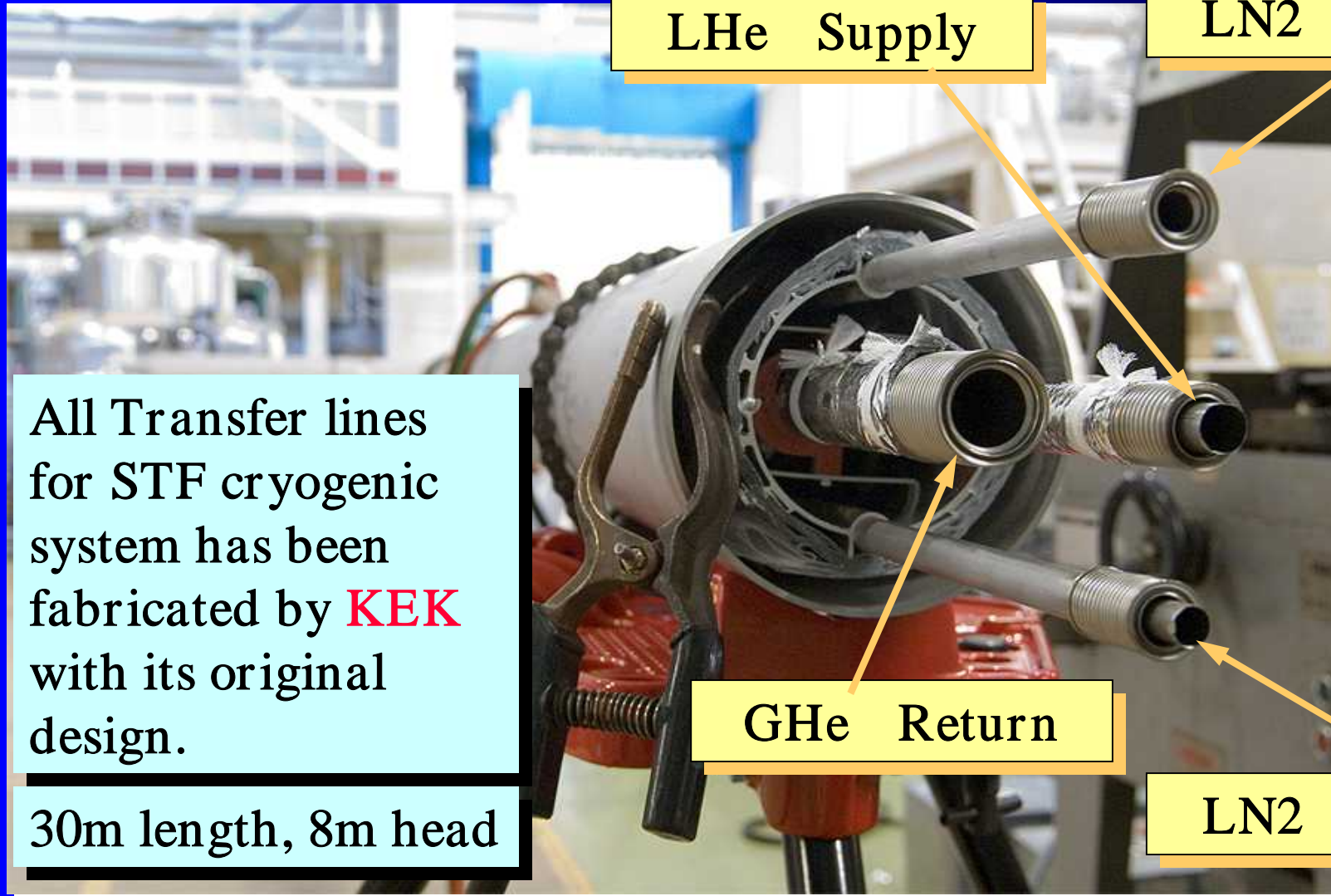
LN2 Vessel



LN2 Heat
Exchanger

KEK original design

MAIN TRANSFERLINE



LHe Supply

LN2 Return

All Transfer lines for STF cryogenic system has been fabricated by **KEK** with its original design.

30m length, 8m head

GHe Return

LN2 Supply

TRANSFERLINE (Ground Level)



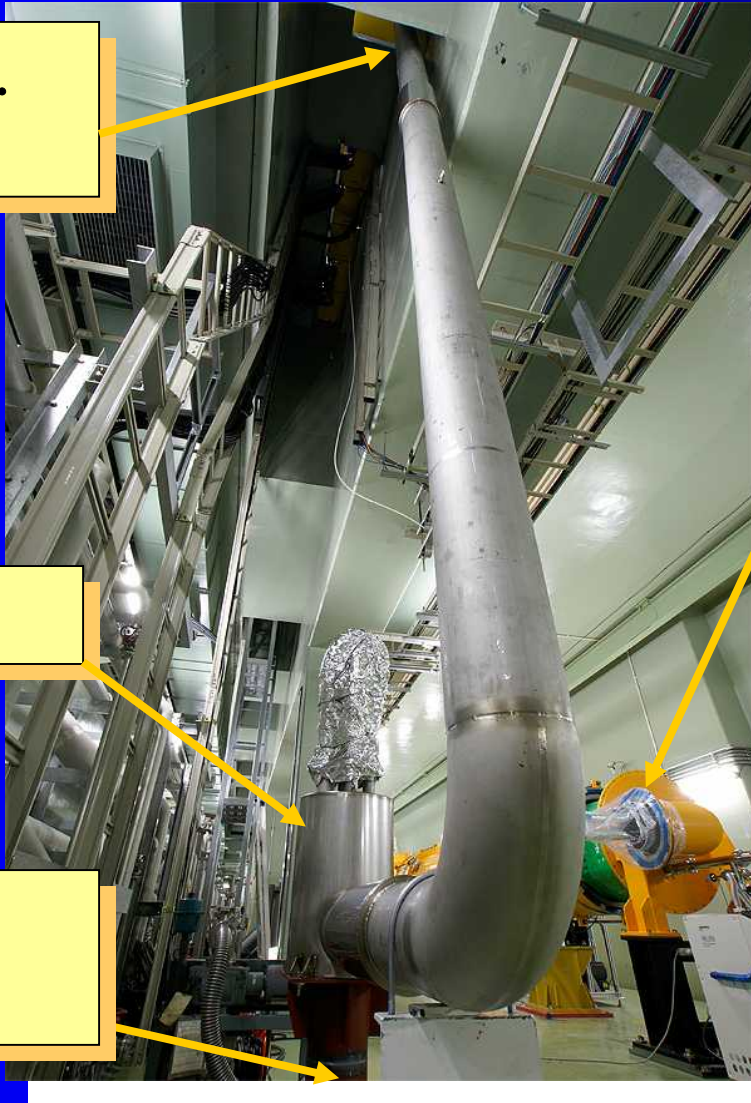
KEK original
Transfer lines

TRANSFERLINE (Underground)

He Ref.
Level

Endbox

B1F
Level



Cryomodule
West End

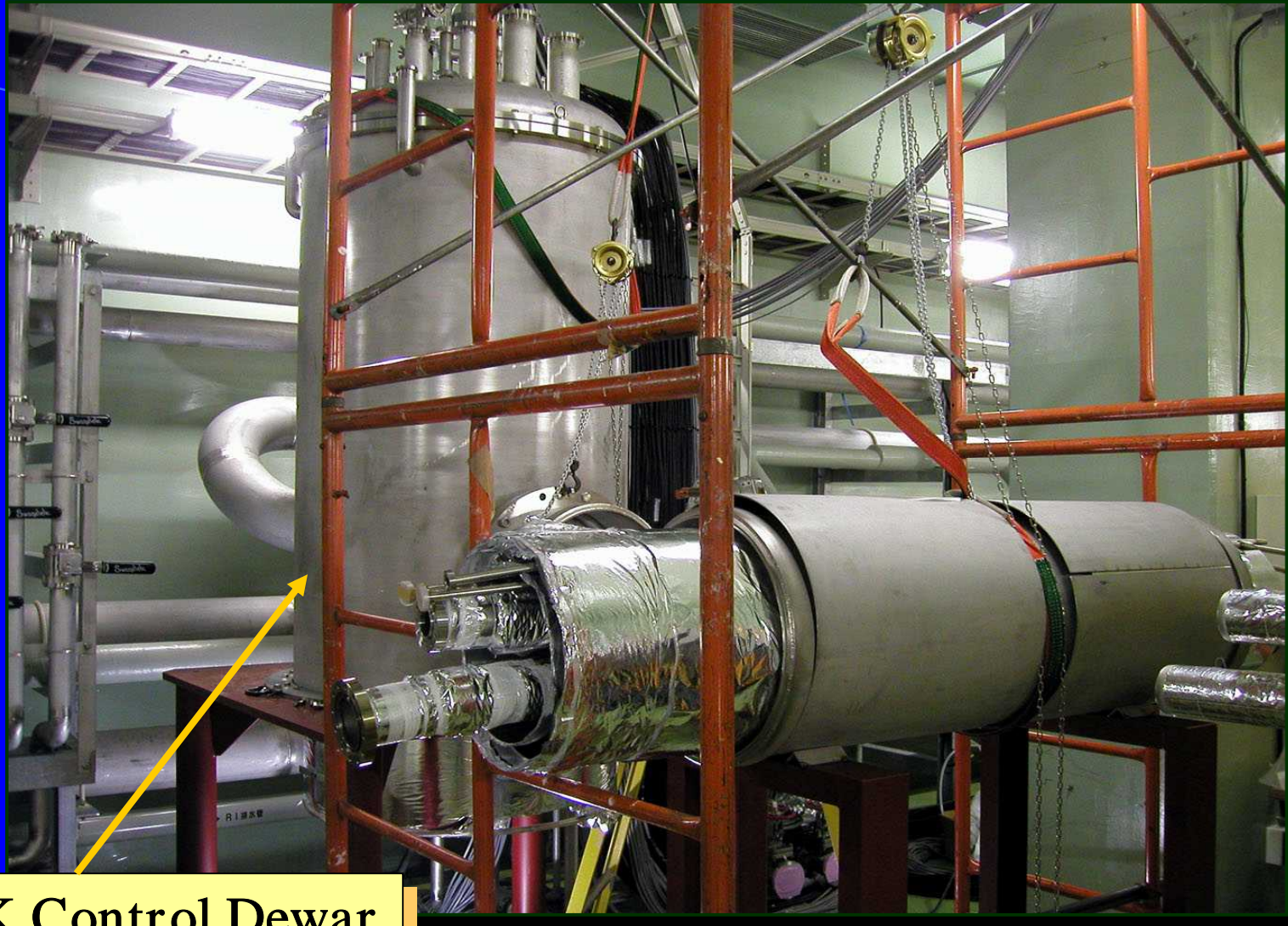


2K Control Dewar and Cryo-module



2.0K Control Dewar

CONNECTION with CRYOMODULE



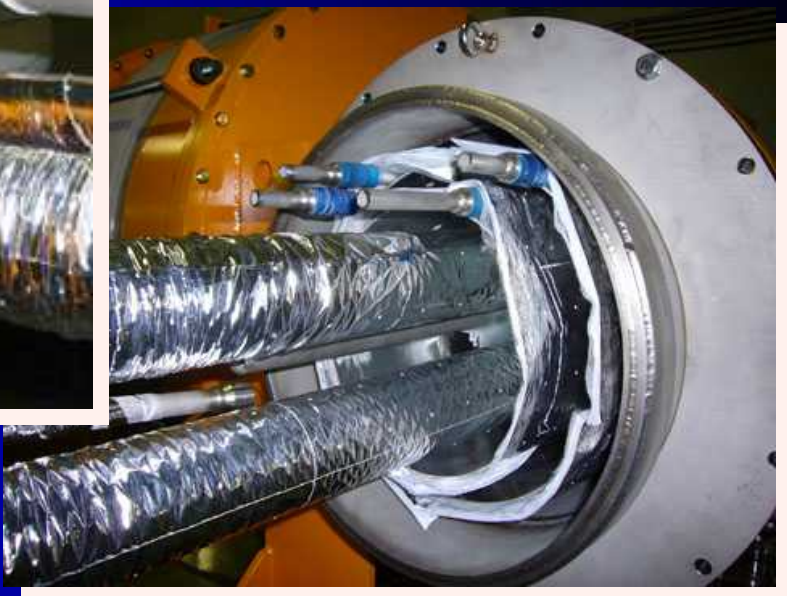
2.0K Control Dewar

CONNECTION with CRYOMODULE

2.0K Control Dewar side



Cryomodule side



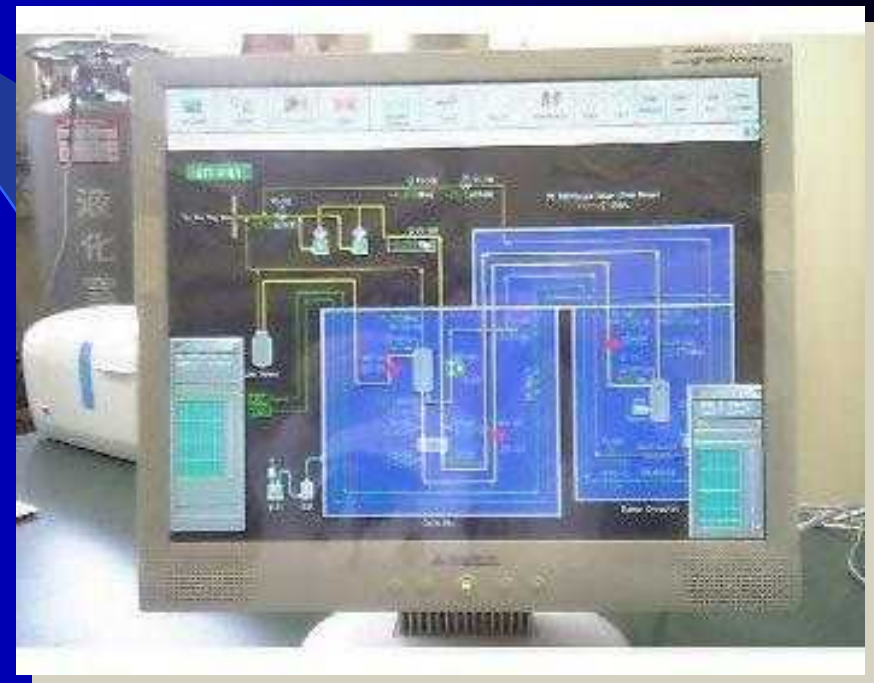
PC-DCS SYSTEM



PC-PLC System for
Control and Data
Acquisition

PID Controller

Start up and Shut down
Programming



CONCLUSION & SCHEDULE

- 1) Prototype 2.0K cryogenic system has been constructed by KEK in collaboration with industries.
- 2) 2.0K Cryogenic System for KEK Cryo-module has also been constructed.
- 3) Initial cooling-down of 2.0K cryogenic system will be operated in June 2007.

[Further Schedule]

- 1) Cooling down STF Cryo-module .
- 2) Modifying for long term operation.
- 3) Development of key component of 2.0K cryogenic system.

INITIAL COOLING DOWN

