Americas Region: T4CM Status and Plans

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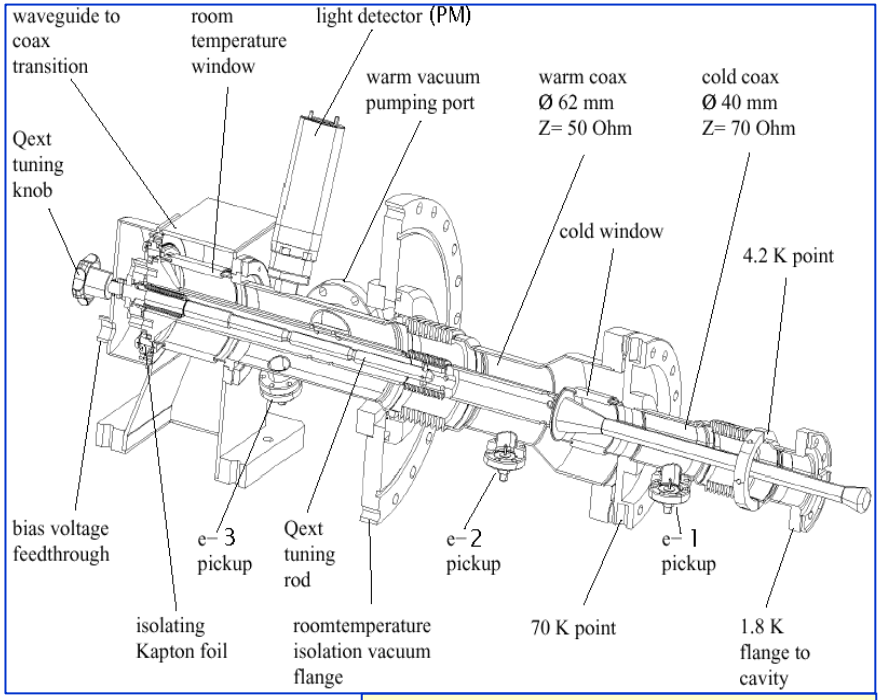
Americas Region: T4CM Status and Plans

- **T4CM Design Effort (discussed yesterday)**
- **SRF Infrastructure Development**
  - Coupler Processing
  - VTS
  - HTS
  - CAF
- **Cryomodule Assembly Plans**
- **RF Unit for ILCTA (NML)**

SLAC: Main Coupler Conditioning and Testing

- **Infrastructure Requirements**
  - Klystron for power (modulator, interlock systems)
  - Vacuum system
  - Class 10 cleanroom coupler assembly area
  - Baking system (150 C; 3 days)
  - X-ray shielding & control (less severe than VTS)
  - Data acquisition
- **100-120 hours per coupler pair conditioned**
- **Space for pre-testing, assembly, test stands, and storage of the conditioned couplers**
- **Approximate footprint 30 ft x 30 ft**



TTF 3 Power Coupler

Vertical Single Cavity Testing (Beta=0.81 to 1.0)

- **JLab, Cornell, FNAL (Spring '07)**
- **a.k.a. bare cavity testing**
- **Cavities are cold tested at low power for field emission, field flatness, and proper frequency prior to having their helium vessels welded on**
- **Initially, all vertical testing will be done at Cornell and possibly JLab**
- **Infrastructure:**
  - CW mode 0.3~1 kW power source
  - Cryogenics plant and vacuum pumps to achieve 1.8K
  - Vertical underground pits and dewars
  - Low power level RF & Data acquisition system
  - Different dewars for each frequency
- **Assume: 3 days to test a cavity**
- **Multiple cavities can be tested in a single dewar**
- **Concrete shielding above ground for radiation safety**
- **Approximate footprint: 15 ft x 30 ft for each pit area + control rooms + pre-testing assembly area (using portable clean room)**
- **Total area 80 ft x 45 ft (for three test stations)**

Horizontal Single Cavity Testing (Beta=0.81 to 1.0)

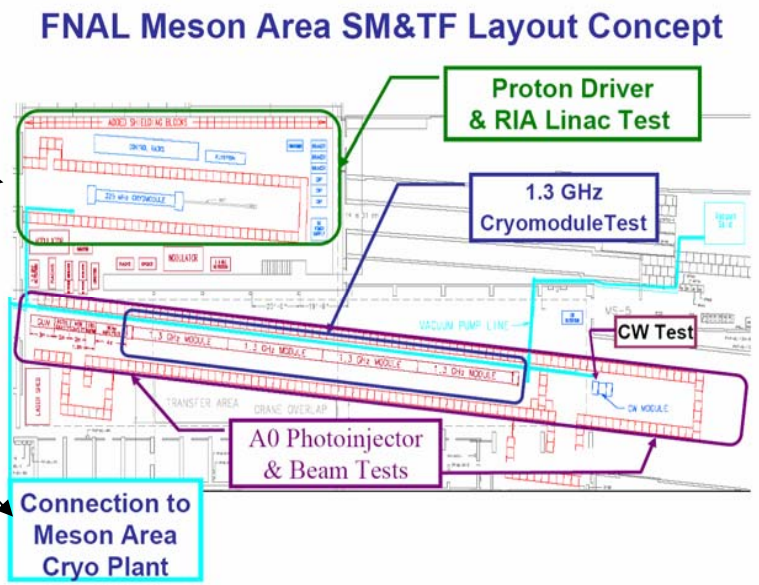
- **FNAL MDB (Operational in Fall '06)**
- **Single cavities are tested and conditioned at full power prior to installation in a cryomodule**
- **Assume: ~ 1 week to test a cavity**
- **Infrastructure:**
  - A cryostat to accommodate a single cavity with helium vessel and other components installed (CHECHIA)
  - A test cave to shield x-ray emission
  - RF power: 1.3 GHz for PD & ILC
  - Approximate footprint : 30 ft x 30 ft

SCRF Infrastructure Development

Cryomodule Assembly Facility

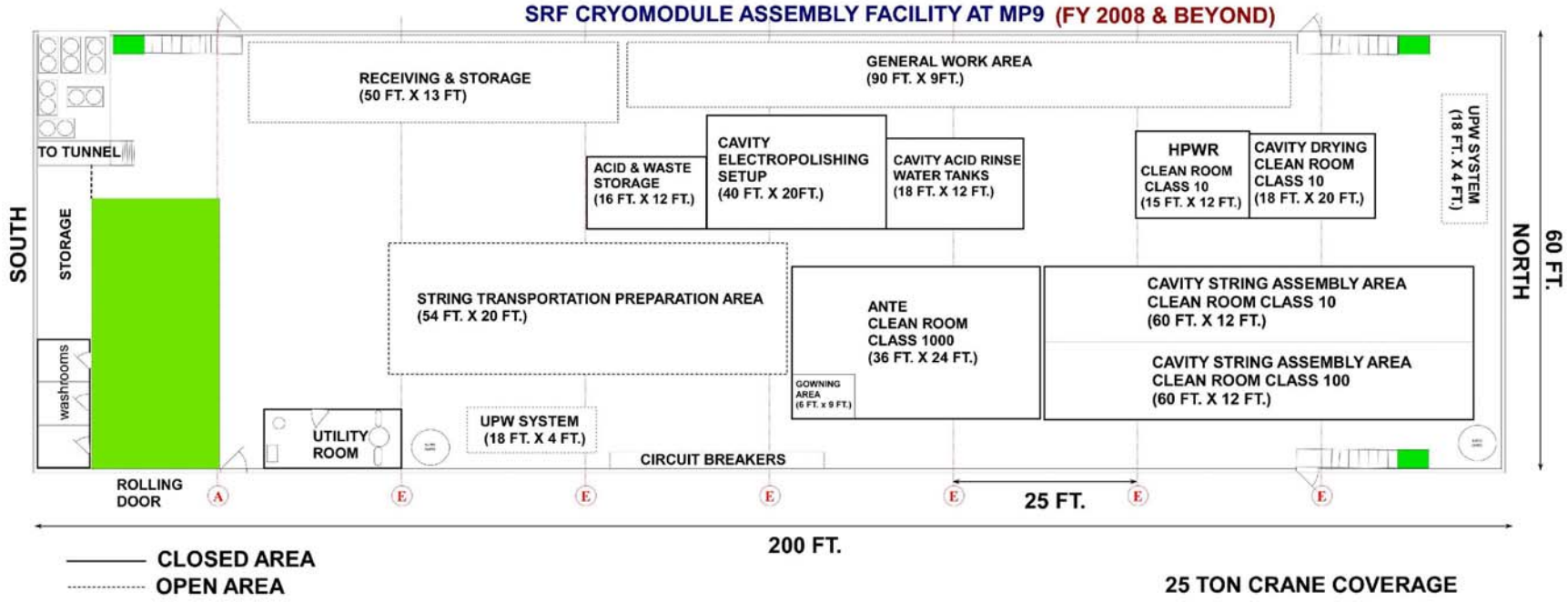
- **Clean rooms for cavity string assembly just completed**
- **Workspace for major tooling and fixturing**
  - Cavity String and Cold Mass Assembly
  - Final Cryomodule Assembly (ICB)
- **25 ton capacity crane coverage over entire area**
- **Sufficient storage area for component parts**

Meson Area at Fermilab



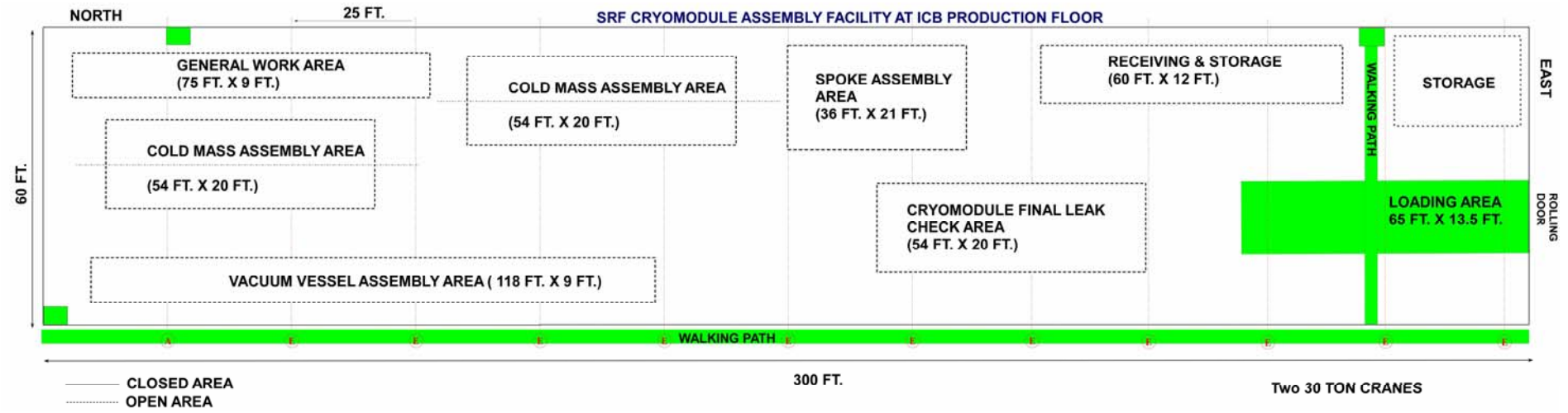
Cryomodule Assembly Infrastructure

- **MP9 Facility (CAF)**
  - cavity string assembly facility for ILC and possibly HINS
  - could also become a cavity processing facility (with EP and HPR) if necessary in order to maintain sufficient cavity inventory (more likely location is MAB for this work)



Cryomodule Assembly Infrastructure

- **Cryomodule final assembly: Proposed ICB Facility Layout**
  - two cold mass assembly areas for beta=1 and/or 0.81 cryomodules
  - one vacuum vessel assembly area for beta=1 and/or 0.81 cryomodules
  - production rate is two beta=1 (or 0.81) cryomodules/month
  - complete, sealed cavity string assemblies are delivered from MP9
  - sufficient area allocated for assembly of spoke cryomodules for HINS



Cryomodule Assembly Plans

- **CM1 is the first cryomodule to be assembled at Fermilab from a kit supplied by DESY**
  - Type III+ design using standard TESLA cavities and lever tuners
  - Kit expected in Fall ’06
  - Assembly expected to take ~4 months
- **CM2**
  - Type III+ design using standard TESLA cavities and blade tuners
  - Components to be procured by FNAL and expected by Summer ’07
  - Assembly expected to take ~2 months
- **CM3**
  - First Type IV design using cavities with equal length beam tubes (on each end) and blade tuners
  - T4CM design to be completed by ????
  - Components to be procured by FNAL and expected six months after design package is completed
  - Assembly expected to take ~2 months

RF Unit for ILCTA (NML)