What the ILCTA@NML and STF will NOT Tell Us for the EDR by 2011

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EDR will include (M. Ross)

- Basic R&D to demonstrate that all components can be engineered.
- R&D into alternative solutions to mitigate remaining risk.
- An overall design to allow machine construction to start within 3 years following its completion.
- Selection between high tech options to allow industrialization efforts.
- A comprehensive value-engineering exercise.
- A complete value cost estimate for the machine, including a funding profile consistent with the project schedule.
- A project execution plan including a realistic schedule.
- Designs for facilities shared between different "area systems", and for site-specific infrastructure. The designs must include the level of detail needed for regions to estimate the cost to host.
- All necessary information must be provided to regions to evaluate project technical and financial risks in support of a bid to host.

- NML and STF will mostly contribute to items in red.

Rough S2 Schedule

Phase	Completion date	Description
0	2005	TTF/FLASH, not final cavity design, type 3 cryomodule, not full gradient, has beam
0.5	2008	Extra tests at TTF/FLASH with same type cryomodules as phase 0
1	2008	1 cryomodule, not final cavity design, type 3 cryomodule (and/or) STF type cryomodule, not full gradient, no beam
1.1	2009	1 RF unit, not all final cavity design, not all type 4 cryomodules, not full gradient, beam not needed for tests, but should be built so it and the LLRF are debugged for the next step
1.2	2010	1 RF unit (replacing cryomodules of phase 1.1), final cavity design, full gradient, type 4 cryomodules, with beam
1.3	2011	1 RF unit (replacing cryomodules of phase 1.1), final cavity design, full gradient, type DFM cryomodules, with beam
1.4	2011	Tunnel mockup above ground. 1 RF unit perhaps built with parts taken from earlier tests. Includes RTML and e+ transport, no beam
2	2013	N RF units at one site (of the final ILC?) as a system test of final designs from multiple manufacturers, no beam
3	2013	XFEL

Fermilab cryomodule plan

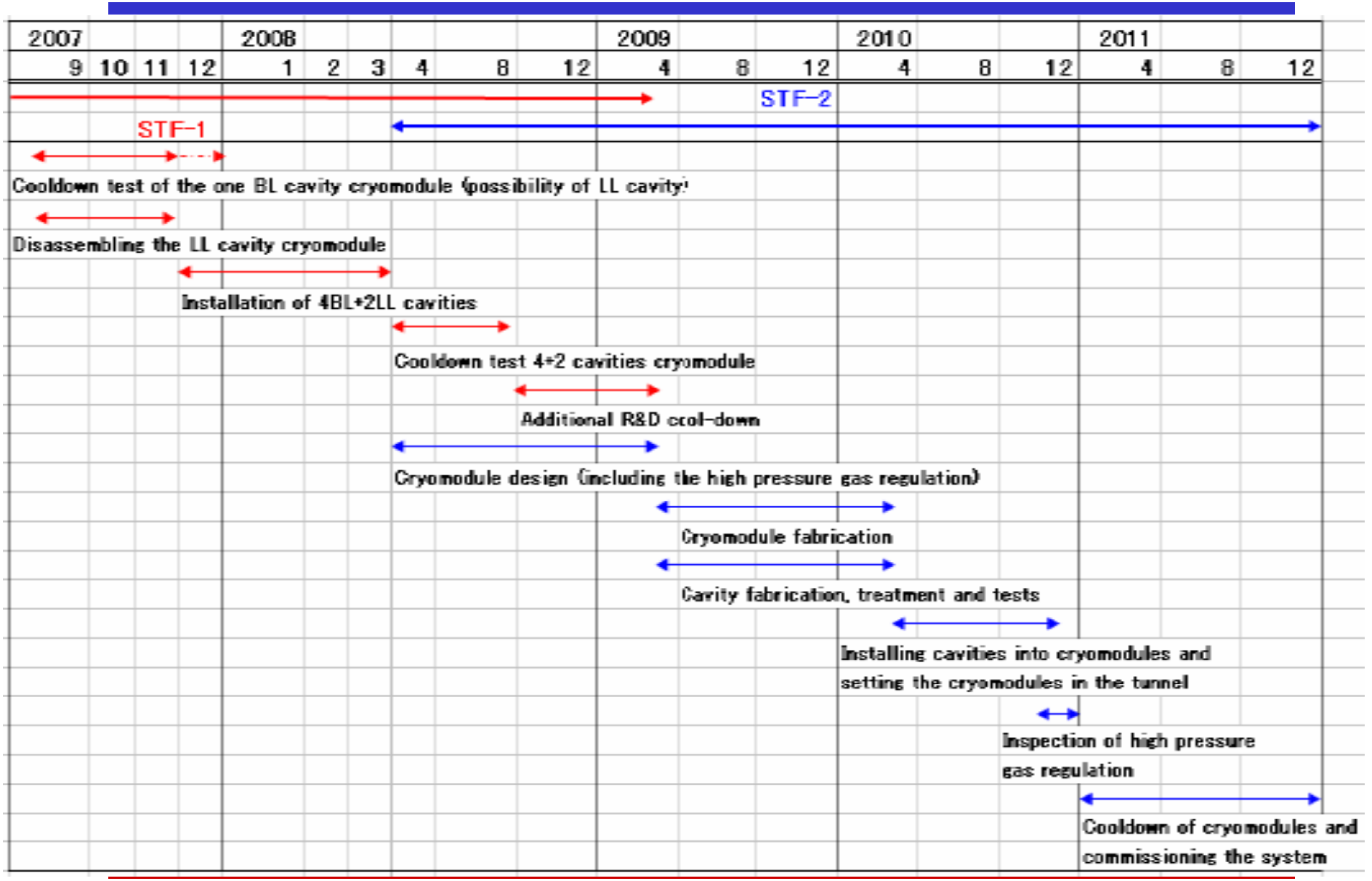
- 1st Cryomodule (2007)
  - Assemble a TESLA TTF type III CM from DESY "kit"
  - Cavities built and fully tested by DESY
- 2nd Cryomodule (2008)
  - Also TTF type III cryomodule
  - Cavities are processed and tested in the US
  - Electropolished and tested at JLAB, Cornell, and ANL/FNAL
  - Cryostat and cold mass from Zanon in Europe
- 3rd Cryomodule (2009)
  - 1st type IV ILC cryomodule built anywhere
  - Parts built in U.S. industry
- 4th-6th Cryomodules (2010-11)
  - Build ILC RF unit in U.S.
  - Transfer knowledge gained to Industry

NML plans

- Phase-1 (FY07 - FY08)
  - Prepare Facility for Testing of First Cryomodule (CM1) without Beam
    - Infrastructure, RF Power, controls
    - Cryogenics (Refrigerator #1) => reuse of existing TeV refrigerator
- Phase-2 & 3 (FY08 - FY10)
  - Install Gun, Injector, CM2 and CM3, Test with Beam
    - New RF Gun
    - Move A0 Photo-Injector to NML and Install Test Beamlines
    - Extend Building to fit Third Cryomodule
    - Cryogenics (Refrigerator #2)
    - Upgrade RF System to 10 MW
- FY11 and beyond run ILC RF unit with full ILC parameters

- Concern: to run at 5 Hz need a new cryoplant (300 W at 2K). Money for it is not in FY08 or in FY09??. Two year lead time.

STF plans


2007
2008
2009
2010
2011
9 10 11 12 1 2 3 4 8 12 4 8 12 4 8 12 4 8 12
STF-2
STF-1
Cooldown test of the one BL cavity cryomodule (possibility of LL cavity)
Disassembling the LL cavity cryomodule
Installation of 4BL+2LL cavities
Cooldown test 4+2 cavities cryomodule
Additional R&D cool-down
Cryomodule design (including the high pressure gas regulation)
Cryomodule fabrication
Cavity fabrication, treatment and tests
Installing cavities into cryomodules and setting the cryomodules in the tunnel
Inspection of high pressure gas regulation
Cooldown of cryomodules and commissioning the system

Some conclusions from looking at our plans

- It is likely that by end of 2010 neither facility will have an rf unit with Type 4 CM's
- NML will not operate at 5 Hz rep rate.
- We (NML or STF) may have at least one CM operating at 31.5 MV/m
  - need to verify gradient with beam – proof of ILC CM existence!
- Neither lab will have a separate CM test stand
  - Thus, no rapid CM tests with pulsed rf power

Phase 1.2 beam tests

- Quench rates & coupler breakdowns at high cavity gradient
- What gradient spread w/ and w/out beam can be handled by LLRF
- Heating from HOMs – principal reason for beam tests
- Beam phase and energy stability
- Demonstrate that we can build an ILC RF unit to specs

EDR

- Using Marc's definition of the EDR
  - most ML technical issues can be evaluated and validated by STF and NML
- We will have difficulties with:
  - long-term reliability tests of CM components, such as tuners, piezos, couplers
  - evaluating HOM absorption and propagation
    - need to do it with an ILC CM's
  - static and dynamic heat loads
    - NML temporary cryo system is not properly instrumented; wrong temperatures

EDR Main Linac Integration tasks

- NML and STF will not validate system optimization for the best "value engineering", such as
  - Beam dynamics and quadrupoles system design,
  - Cryomodule design with cryogenics system design
- Will not validate some interface parameters:
  - plug compatibility