

# **S1Fermilab, S1-Global & Cooperation with Fermilab**

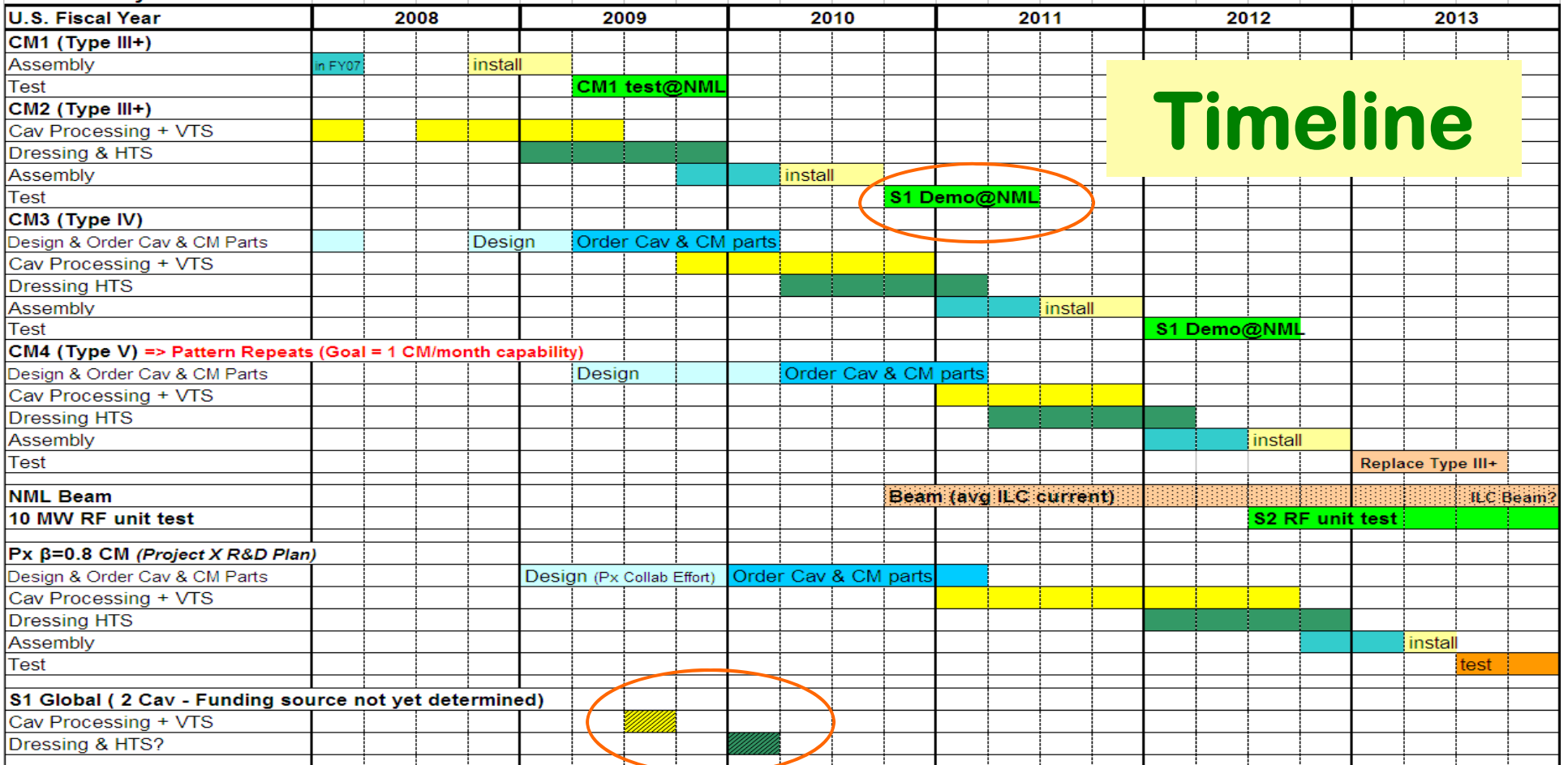
**Shekhar Mishra  
Fermilab**



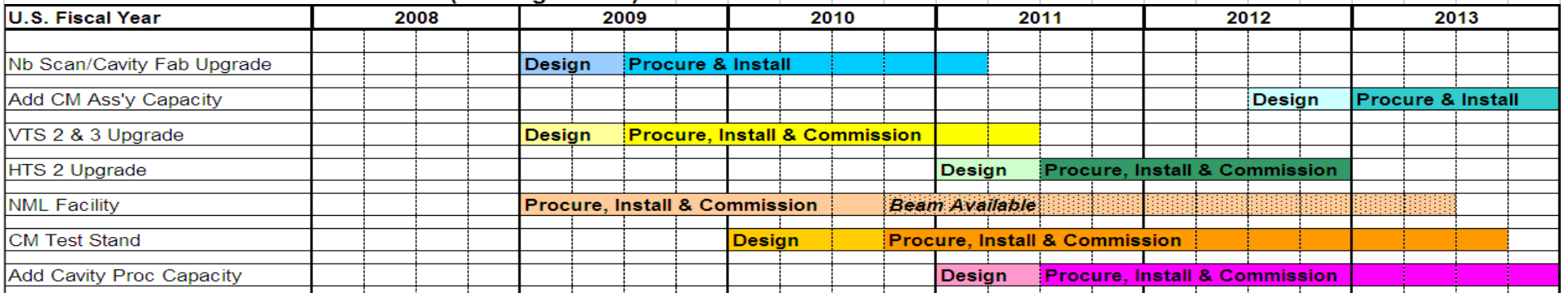
## Summary Slide From Sendai, S. Mishra

- **US plan for ILC Cavity and Cryomodule remains same as projected during the RDR phase with the following exception**
  - **We have considerably reduced the number of Cavities we will fabricate, process and test.**
  - **We have reduced the number of CM to ~1/yr.**
- **We would continue to develop infrastructure to test 1 RF Unit with electron beam (not ILC beam)**
- **We would continue to develop infrastructure for**
  - **Cavity processing and testing**
  - **Cryomodule fabrication and testing**
- **Our goal is to be ready for “a” project by 2012**

### 1.3 GHz Cryomodules



### New SRF Infrastructure Construction (funding limited)



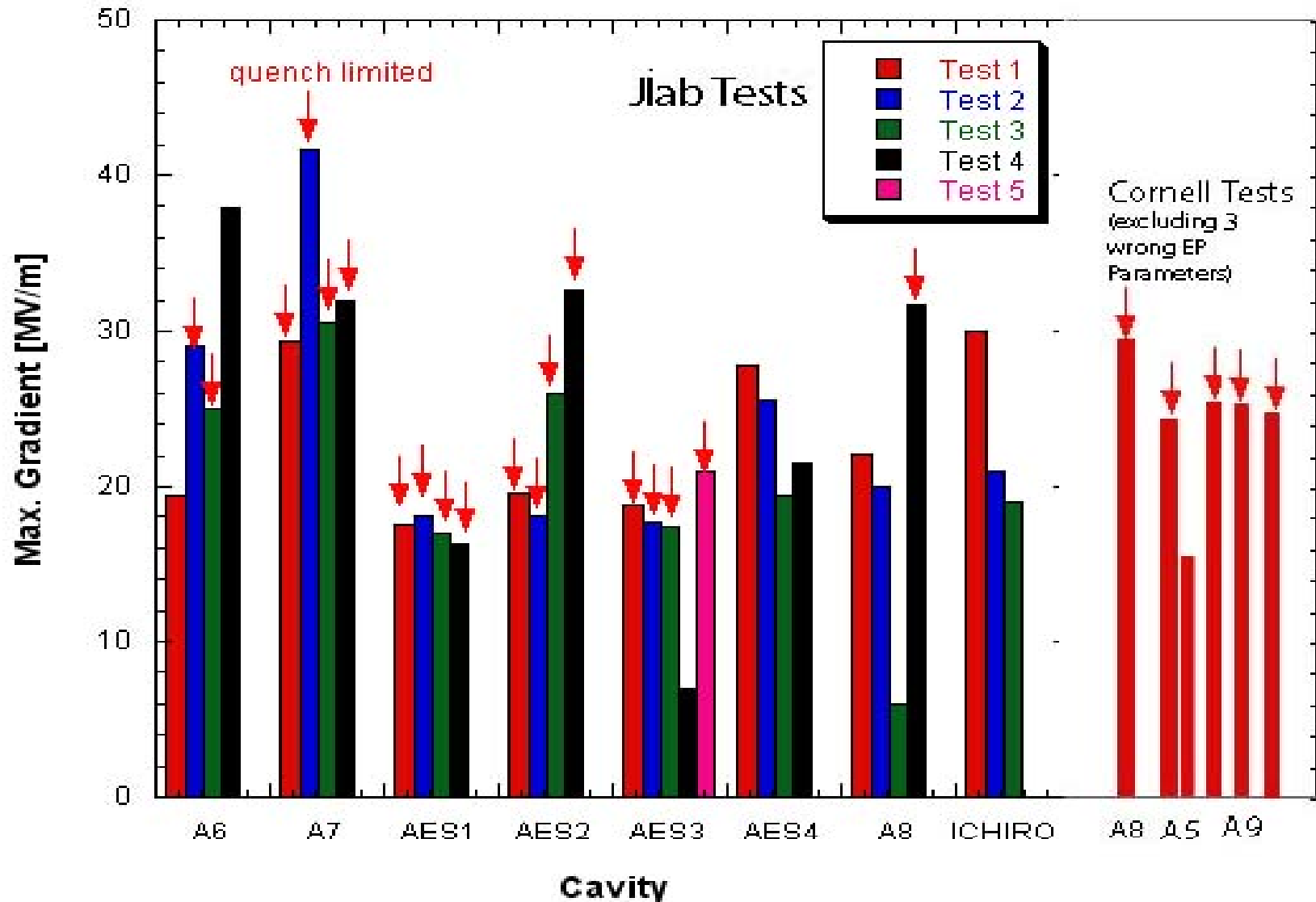


# High Gradient Cavity for CM

- **CM1 was assembled at Fermilab in FY07 using a kit supplied by DESY.**
  - It is waiting for infrastructure at ILCTA\_NML for installation and testing
- **CM2 Cavity inventory:**
  - Fermilab in collaboration with Jlab, Cornell and ANL has 5 high gradient cavities already processed.
  - Fermilab has 26 (ILC length, 9-cell) cavities on order. 20 from ACCEL and 6 from AES.
    - 8 cavities have arrived from ACCEL
    - Rest is expected later this year.
- **In FY08, with remaining US-ILC funds Fermilab has **restarted** the 1.3 GHz cavity processing.**
  - We are planning ~15 cycles using the cavities from ACCEL and **will be used to populate CM2.**
  - These processing will use S0 recipe but will not be “Tight Loop”
- **FY09 and Beyond: US proposes a plan of about ~50 processing and testing cycles to support of High Gradient R&D and CM fabrication.**
  - These cavities must be processes in a way that they are useful for CM



# Cavity for CM2: 9-cell Test Results



Average A6-8, AES2,4 = 32 MV/m

A9 reprocess at Jlab



# S1 Cryomodule (CM2) Plans

- **Cavity:** We are going to use
  - Already existing 5 high gradient cavities (AC6,AC7,AC8, AES2 and AES4)
  - 3 from the batch we 6 will process in 08 and early 09. (AC10,11,12,13,14,15)
  - This should give us 8 high gradient cavity with an average gradient of larger than  $>32$  Mv/m
- **Fermilab has ordered the CM2 cold mass parts from Zanon in collaboration with INFN**
  - This will be Type-III+ Cryomodule (same as CM1-DESY Kit).
  - Tuners are being fabricated under Fermilab-INFN MOU
  - All the major hardware except He vessels will be here by Fall 08.
- **Fermilab has “finalized” the design of He Vessel for this CM.**
  - 3 He vessel will be ordered in FY08
  - Plan is to dress and Horizontally test at least one 9-cell cavity in FY08.
- **In FY09 we will dress and HTS cavities for CM2**
- **Build CM2 in FY09.**

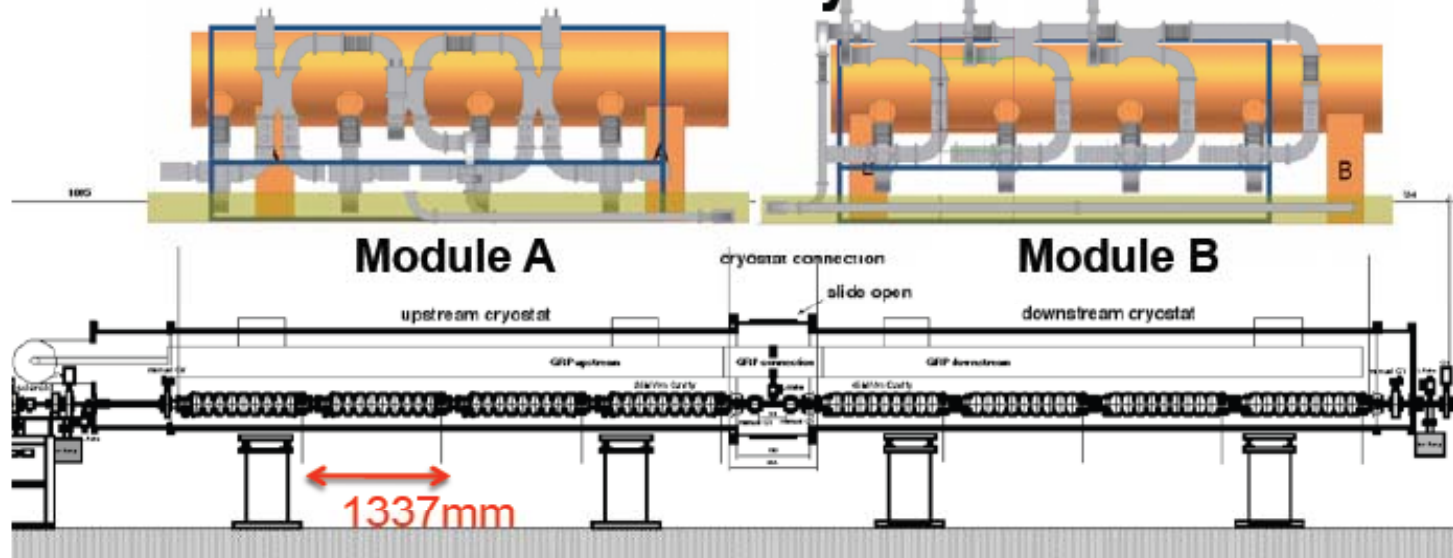
**Goal: Make a S1 Cryomodule in US by early CY10.**

- **ILC GDE Project Managers have proposed construction of a Cryomodule at KEK**
  - **With global cooperation and collaboration**
  - **To meet the S1 goal of 31.5 MV/m in a 8 cavities Cryomodule at an earliest possible date.**
- **It is a good idea to show that we can work together to achieve this highly technical goal.**
  - **A possible step towards plug compatible CM ???**
- **Issues that should be addressed**
  - **Technical/Engineering design of the S1G Cryomodule, Cavity interfaces, string assembly etc. etc.**
  - **Design variations in coupler, tuner etc.**
  - **Review of the technical design and schedule**
- **Detailed understanding of the International technical resources needed for successful fabrication and testing of S1G-CM**

# S1 Global at KEK

“S1 Global at STF” by H. Hayano

## S1 Global : cavity installation



TESLA-style

<b>STF1</b>	<b>#3</b>	<b>#4</b>	<b>#2</b>	<b>#1</b>
2008.4-10	20MV/m	20MV/m	29MV/m	21MV/m

Not yet decided for next

If we go S1 global for next

<b>S1 Global</b>	TESLA-style	<b>#2</b>	<b>#5</b>	<b>#6</b>
	(DESY or US)	29MV/m	??MV/m	??MV/m
	>32MV/m			
	( or TESLA-style#7?)			

TESLA

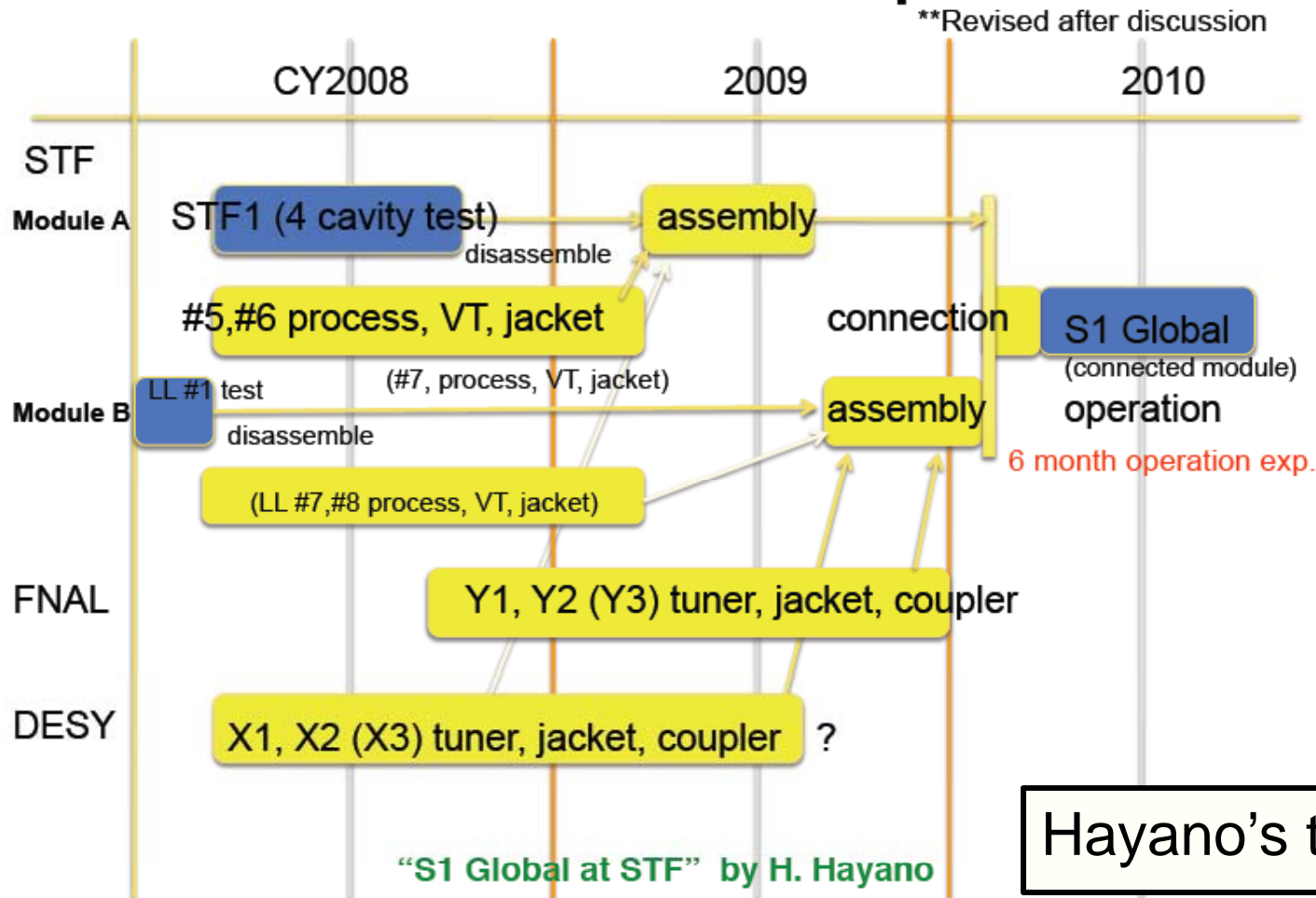
DESY1	DESY2	FNAL1	FNAL2
>32MV/m	>32MV/m	>32MV/m	>32MV/m
( or LL #7? #8?)			





# S1 Global Plan: Sendai Meeting

## Possible Schedule plans





# US Contribution: S1 Global

- **US has been asked to provide 2 Dressed Cavities for the S1 Global program.**
  - **These will be from the current batch of ILC cavities (AC16 and AC17).**
    - **Standard TESLA Shape cavity just the symmetric end tubes.**
    - **Based on our analysis of Fermilab and US schedule (without worrying about resources to support this activity) we can make these two cavities available **by the end of 1<sup>st</sup> quarter of 2010.****
- **Alternates:**
  - **Fermilab could make it available to KEK without processing late FY08.**
  - **US process and Vertical test these two cavities**
    - **They could be available by end of FY09 .**

- **US plan for ILC Cavity and Cryomodule remains same as projected during the RDR phase with the following exception**
  - **We have considerably reduced the number of Cavities we will fabricate, process and test.**
  - **We have reduced the number of CM to ~1/yr.**
- **Fermilab is getting ready to test DESY supplied and Fermilab assembled CM1.**
- **We are making progress towards construction of CM2 (Potential S1 candidate)**
- **Fermilab will participate in S1GCM, there are several issues that should be discussed.**