

# IMPACT Team Meeting

14 December, 2001

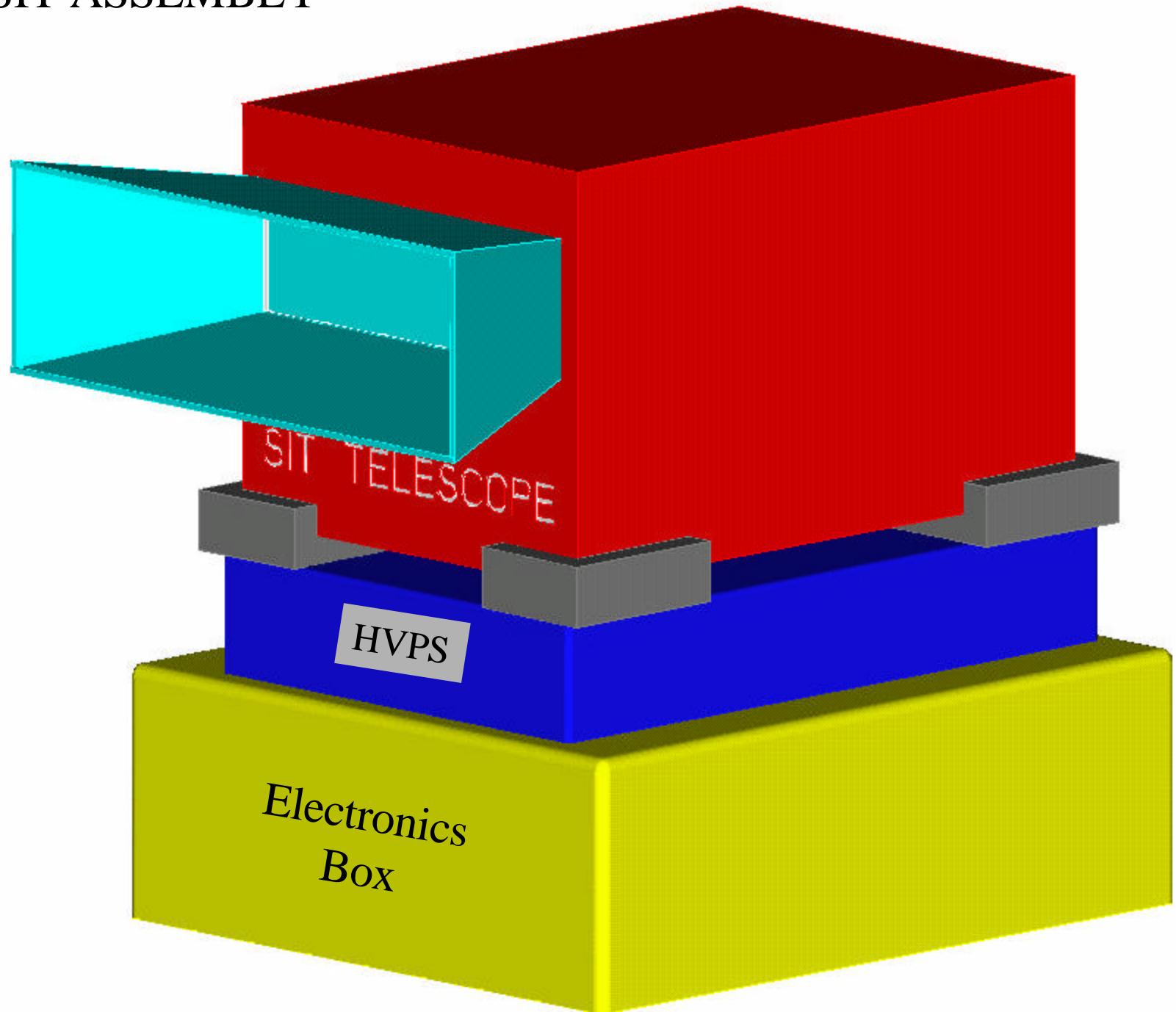
SIT NEWS & REPORT

UMd, GSFC, MPAe, UCB

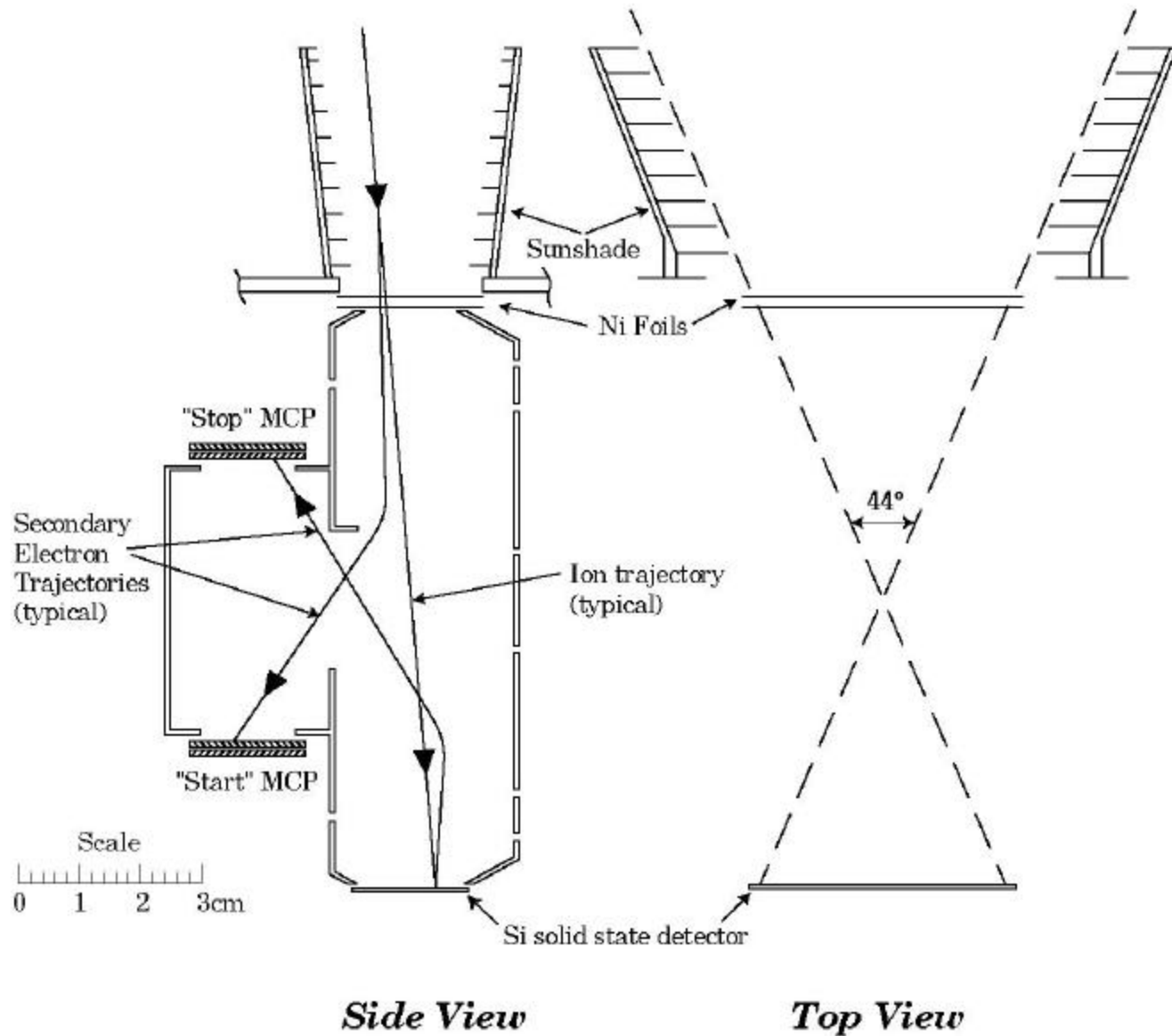
# SIT OVERVIEW

- TOF vs Total E
- He-Fe
- 30keV/Nuc - 2 MeV/Nuc
- Resolve He<sup>3</sup> from He<sup>4</sup>, C from O
- Single Telescope pointing near Parker spiral
  - 0.4 cm<sup>2</sup>ster
  - 17 x 44 degree FOV
- SSD, MCPs, thin foils, HV bias supply
- Non-reclosable acoustic cover
- Heritage
  - Telescope, analog TOF electronics designs were flown on WIND/STEP
  - Energy electronics ASIC is descendant of design flown on ACE/ULEIS
  - HVPS design flown by UCB
  - Digital TOF and logic electronics designs are new

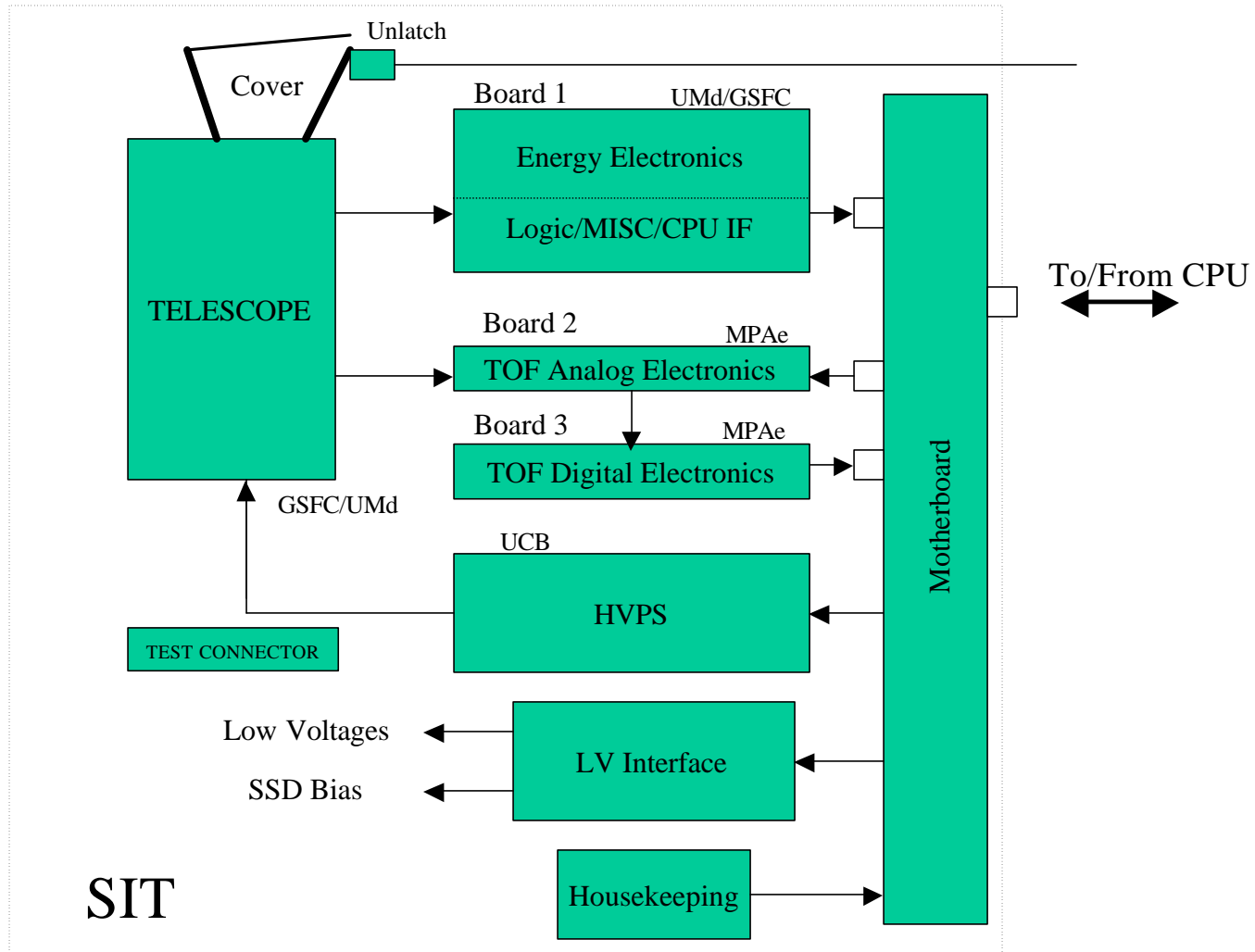
# SIT ASSEMBLY



# *Suprathermal Ion Telescope (SIT)*

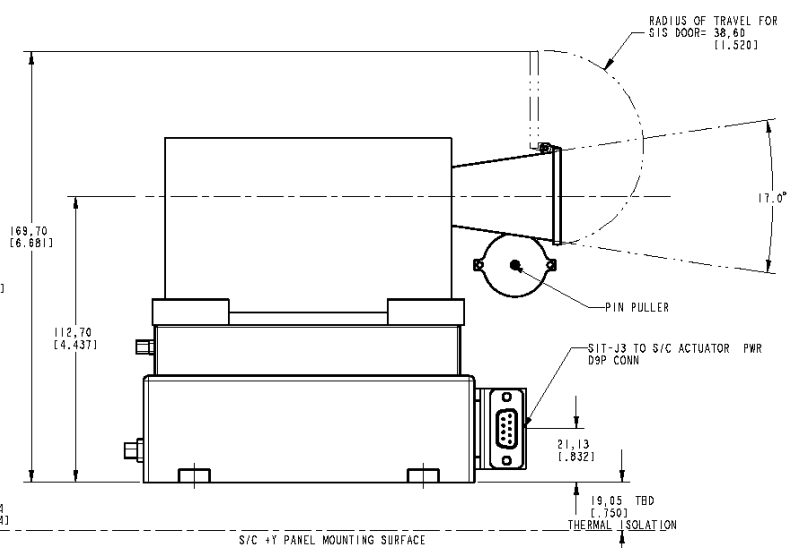
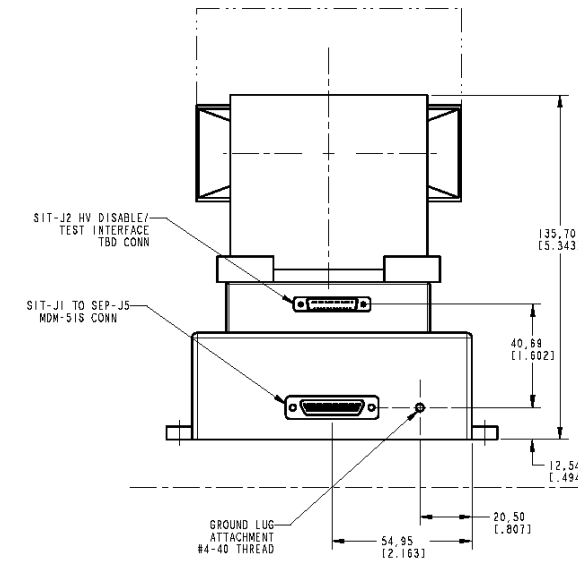
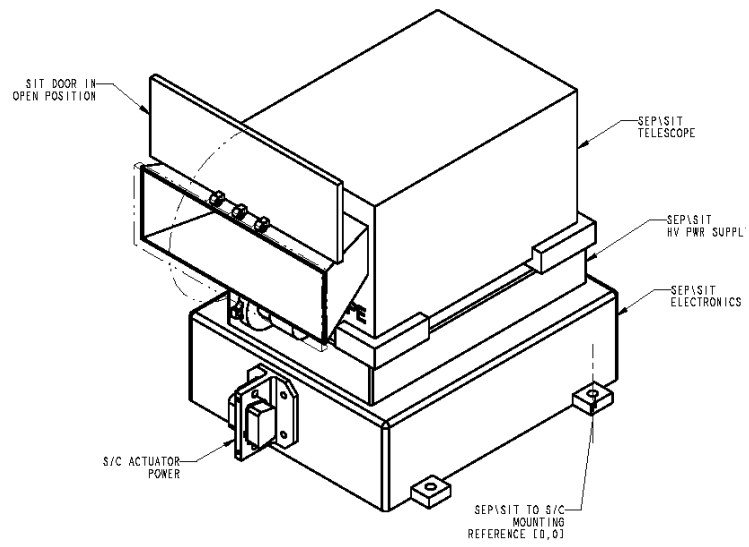
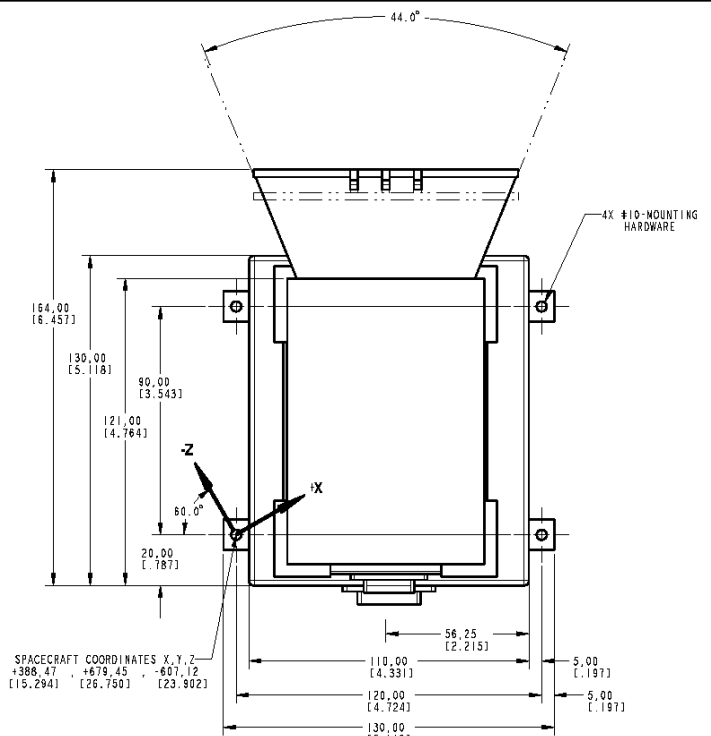


# SIT Board Level Block Diagram



# SIT STATUS

- Telescope
  - telescope mounting resolved
  - SIT mechanical concept and ICD drawing
  - ceramic parts ordered and received
  - some other parts ready for order
  - design work required on sunshade/door and on details of telescope mounting so the telescope sides can be finalized and ordered.
  - Sensor elements (SSDs, MCPs, foils) will be ordered in January or as soon as the contract between UMd and UCB is finalized.



**SIT INSTRUMENT ASSEMBLY**

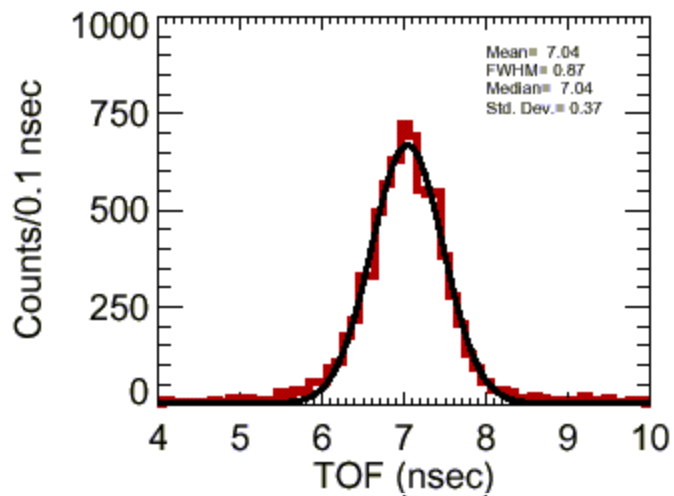
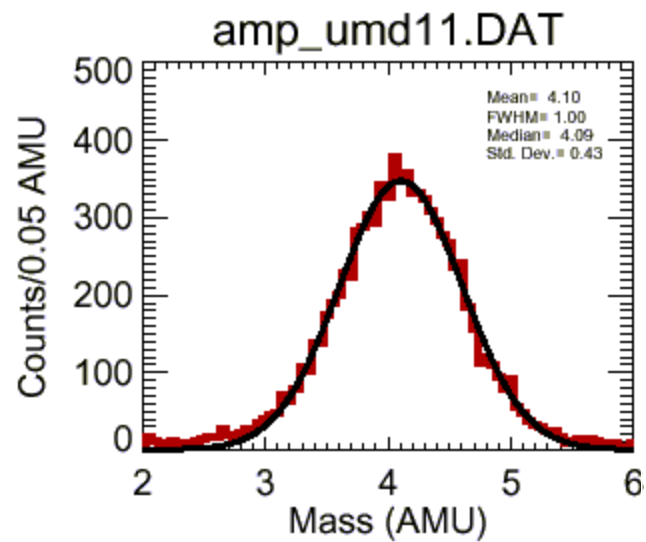
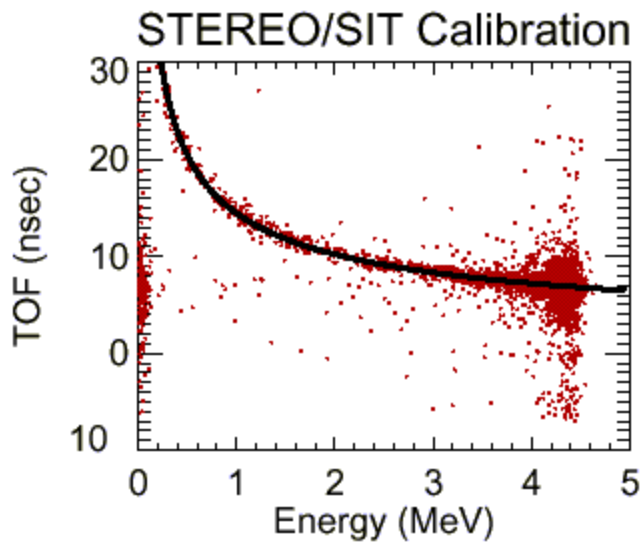
THIS DRAWING WAS PRODUCED USING  
 SOFTWARE: Pro/ENGINEER VERSION: 2001  
 FILE NAME: 2053440  
 PART: 0001 SIT-INSTRUMENT-ASSEMBLY

ITEM NO.	DESCRIPTION	QTY	UNIT
1	SEP/SIT TELESCOPE	1	EA
2	SEP/SIT HV PWR SUPPL	1	EA
3	SEP/SIT ELECTRONICS	1	EA
4	S/C ACTUATOR POWER	1	EA
5	SEP/SIT TO S/C MOUNTING REFERENCE (0,0)	1	EA

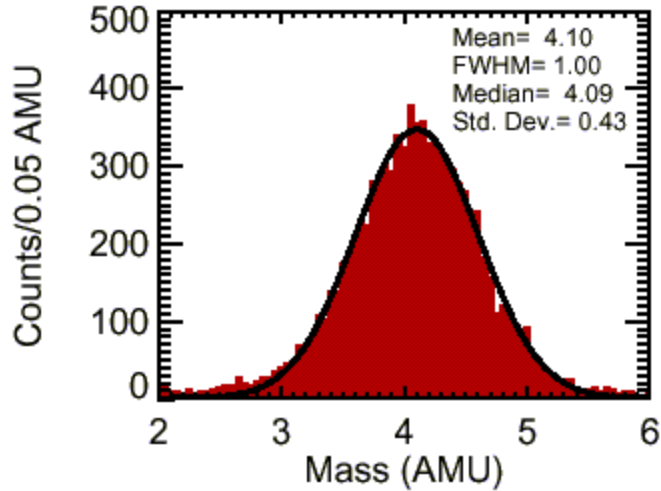
# SIT STATUS (cont.)

- TOF - Analog
  - prototype analog electronics tested at UMd with the prototype telescope and alpha source. Acceptable performance was observed and a potential improvement was identified.
  - Work on analog electronics has continued at MP Ae, including a test with the prototype digital electronics and a thermal vacuum test.
  - tested prototype analog electronics shipped to UMd for test with the digital electronics and telescope.

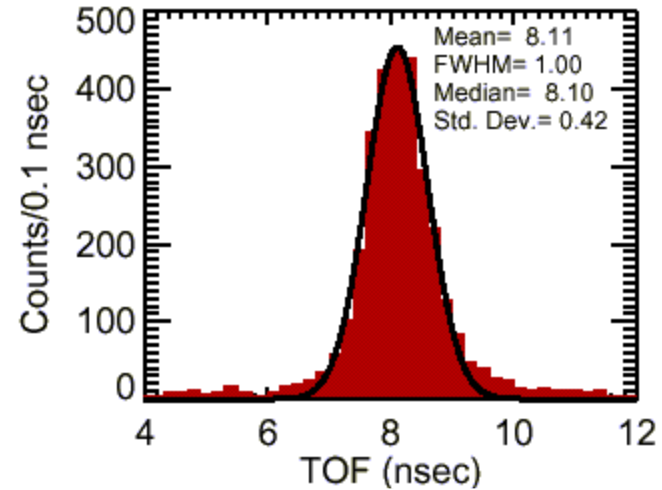
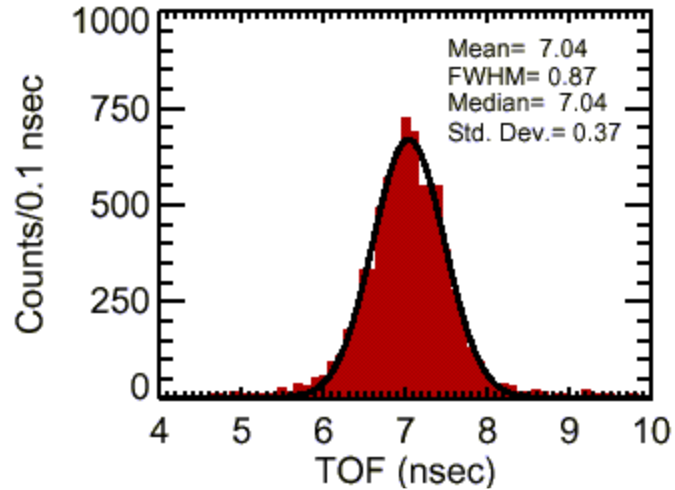
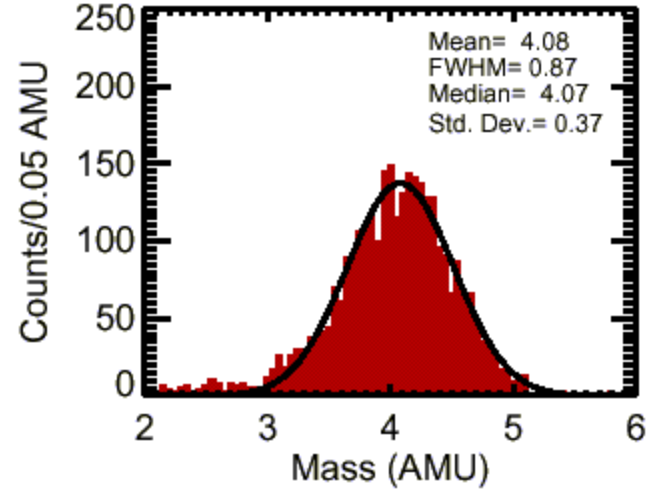




STEREO/IMPACT/SIT Prototype  
9/22/2001-UMD LAB.



WIND/STEP 1.5 $\mu$  Ni Absorber  
2/18/1992-BNL,



# SIT STATUS (cont.)

- TOF - Digital
  - prototype digital TOF electronics tested with analog electronics at MP Ae
  - digital electronics delivered to UMd with updated documentation.
  - TOF test GSE at UMd has been modified to accommodate the updated documentation
  - the digital electronics is in test on the bench and soon with prototype telescope
  - next the analog electronics will be added and the entire TOF system will be tested in December

# SIT STATUS (cont.)

- Energy Electronics
  - several versions of the data package for the Caltech PHA chip have been received. Design assistance from Caltech is still needed on interconnecting the Amptek CSA with the PHA chip. Rick Cook has promised this after the chips are in production.
- Logic
  - a preliminary front end logic requirements specification has been prepared and delivered to GSFC.
  - Work has begun on defining SW requirements

# SIT STATUS (cont.)

- HVPS
  - work has begun with Peter Berg and David Curtis at UCB and Sandy Shuman at GSFC on resolving the issue of interconnecting the HVPS and the telescope.

# SCHEDULE STATUS

ITEM	Behind	OK	Comment
Telescope		X	
Structure		X	
TOF	X		UMd is 2 weeks behind in testing
Energy	X	X	energy design waiting for VLSI release and Rick Cook availability
Logic		X	
HVPS		X	
Testing		NA	hasn't begun yet

# SIT Resources

	<b>Current</b>	<b>June Meeting</b>	<b>Delta</b>
<b>MASS (g)</b>	1215	1215	0
<b>POWER (mW)</b>	1346	1382	-36

Mass includes 200g of “SIT enclosure & hardware” from Tycho’s 4/19/01 breakdown, presented at the Peer Review

# SIT Issues

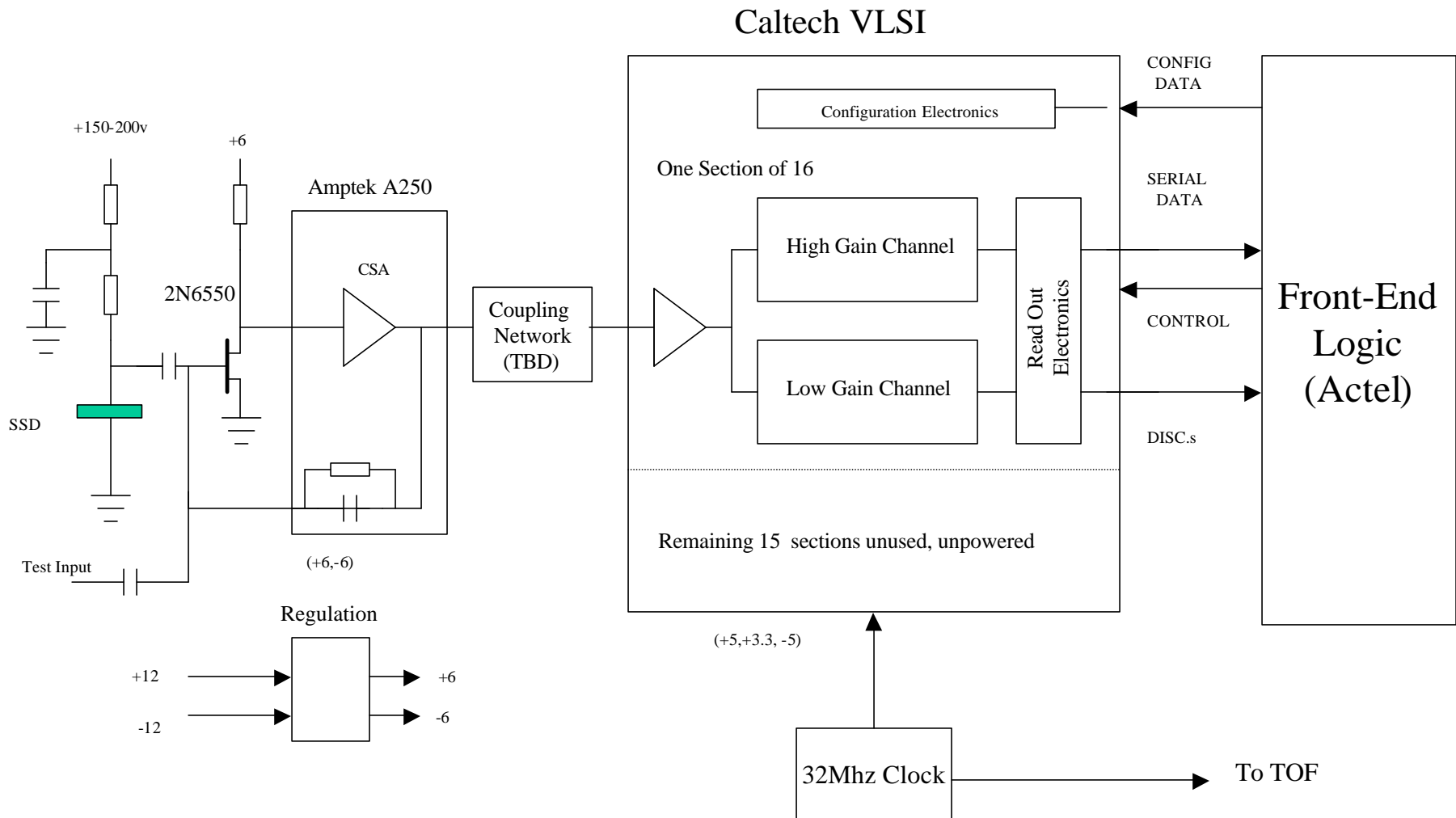
- UMd Contract Status
  - still in bridge phase
  - will need money early 2002 for SSDs/MCPs to meet schedule
- Manpower Tight
  - need to spend more time in lab, less in office
- Energy/Logic Board
  - no prototype board - design must work “first” time
  - continued close coordination between UMd and GSFC needed to stay on schedule
  - concern about when PHA chips and documentation available



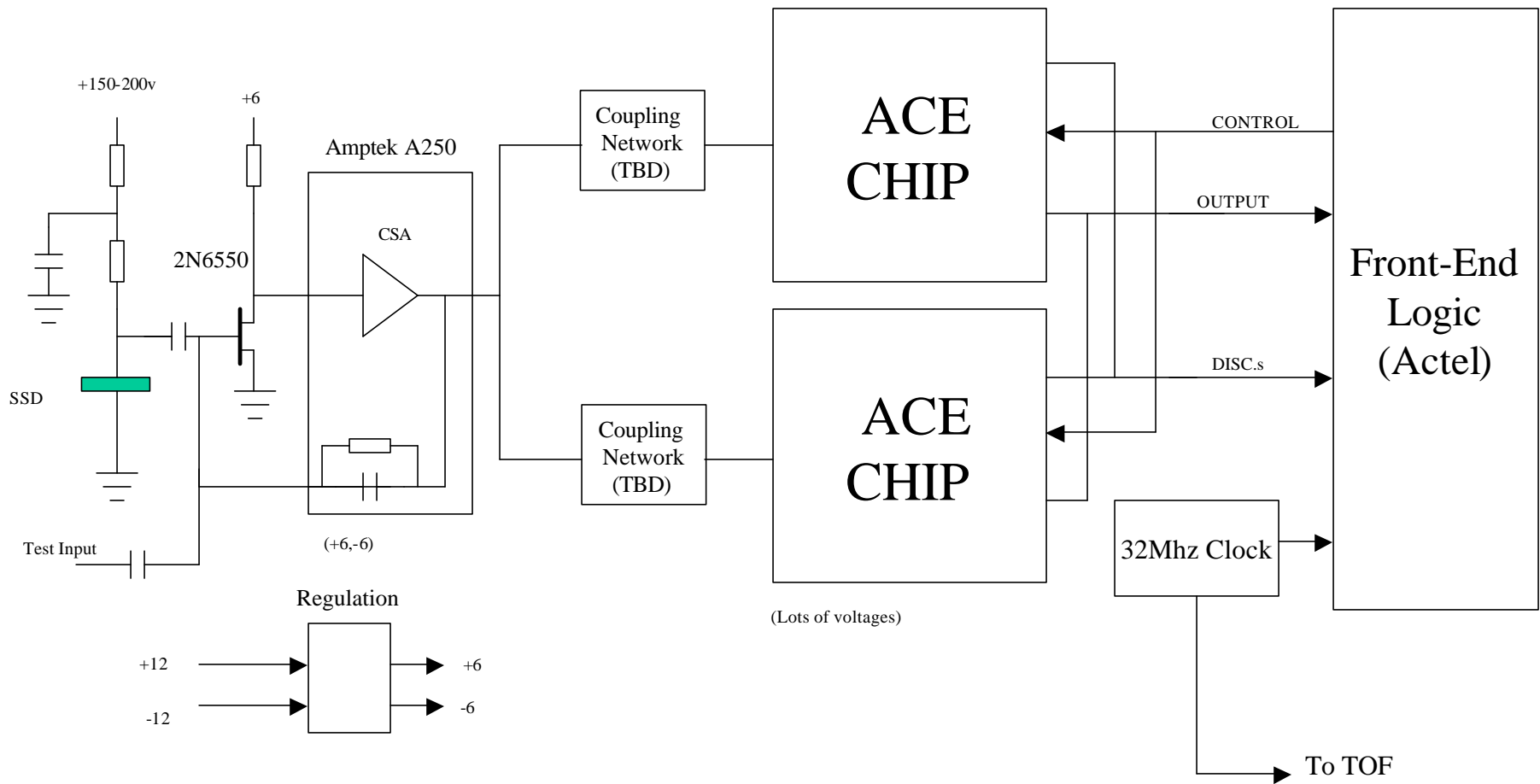
# Alternative Energy Schemes

- Concern about availability of PHA chips and design documentation
  - SIT energy design completely controlled by Caltech schedule
  - no manpower at UMd to use to recover from a late delivery
- Explore alternative energy schemes for SIT
  - single detector design means alternatives not completely infeasible
  - design can proceed in parallel with Caltech effort
- Project support needed if we choose an alternative
  - mass, power and cost impact

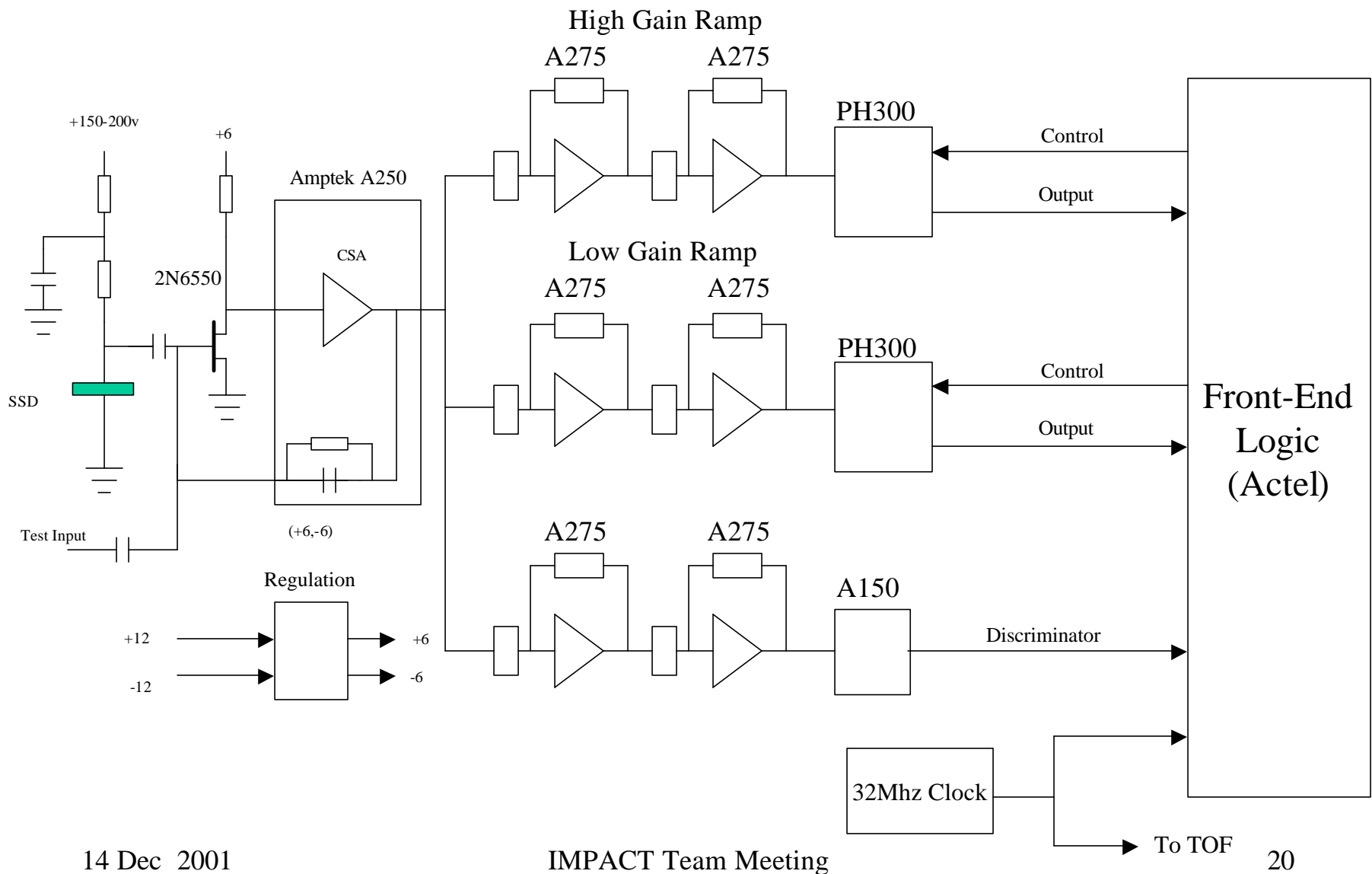
# SIT ENERGY SYSTEM BLOCK DIAGRAM



# Alternate SIT ENERGY SYSTEM - ACE Chips



# Alternate SIT ENERGY SYSTEM - Amptek Hybrids



# Pros and Cons

## Caltech PHA Chip

Baseline design but  
Uncertain Schedule

Most complicated I/F  
but same as rest of SEP

Lowest mass  
Lowest power

Least effort for UMD  
and GSFC

Uncertain start date

## ACE Chip

Existing chip design  
Parts available?

Interface complicated  
but a known quantity

Many voltages required  
Some mass penalty

Some design work at  
UMD, some at GSFC  
Need help from Caltech?

Can start now

## Amptek Hybrids

Off the shelf parts  
Use amplifier designs  
from earlier projects

Simple interface

Some mass and power  
penalty

Some design work at  
UMD, some at GSFC  
Independent of Caltech

Can start now

# UMd Recommends

- UMd recommends pursuing Amptek option
  - smallest impact on Caltech
  - can start immediately
- Additional resources required
  - based on back-of-envelope design:
    - Additional mass: 150g (one extra board + additional height of housing)
    - Additional Power: 300-500mW (depends on availability of +/-6v from LVPS)
    - Additional Dollars: \$35k-\$50k (\$25k parts and boards, \$10-25k for manpower) + 2-3 weeks of design and assembly time at GSFC
  - Note: more manpower than this involved, but we will save a lot of time by getting the work done now, not next year.