



**COS**  
*Monthly Status Review*



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**COS**  
**Monthly Status Review**  
**September 27, 2000**  
**UCB/SSL**

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*Cosmic Origins Spectrograph*  
*Hubble Space Telescope*

John Andrews  
September 27, 2000



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## *Monthly Status Review*



Center for  
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### Agenda

Progress Summary Since Last Monthly	J. Andrews
Optics Development Status	J. Andrews
Optics Test Status	J. Andrews
UCB FUV Detector Programmatic Status	J. Andrews
UCB FUV Detector Technical Status	O. Siegmund
CU Software Activities Status	K. Brownsberger
COS Descope Candidates	J. Andrews
Schedules	J. Andrews
Upcoming Events/Activities	J. Andrews
CU Issues & Resolution Plan	J. Andrews
STScI Presentation	M. McGrath
BATC Presentation	D. Hood
Financial Splinter	GSFC/Ball/CU



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### **Progress Summary Since Last Monthly**

- Took delivery of NCM1 and NCM2
- Received two G185M flight gratings from JY.
- Continued G140L testing.
- Continued AV-03 development.
- Burned DCE Actels, started DCE qualification.
- Started TDC qualification testing.
- Began DBA #1/electronics testing.
- Completed DVA #2 build-up.



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### Optics Development Status - NUV Mirrors

- Tinsley:
  - Current delivery Plan for flight optics (recent changes in red/bold):

Item	Previous Due Date	New Date	Slip	New Date for Spares
NCM1	<b>9/1/00</b>	<b>9/20/00</b>	<b>3 weeks</b>	<b>TBD</b>
NCM2	<b>8/25/00</b>	<b>8/25/00</b>	<b>0 weeks</b>	<b>TBD</b>
NCM3a,b,c	<b>9/8/00</b>	<b>9/27/00</b>	<b>2 weeks</b>	<b>TBD</b>

- The flight NCM1 and NCM2 mirrors are delivered. They meet all requirements and are now at GSFC for coating.
  - NCM 3a, b, c mirrors are supposed to be ready for delivery today.
  - Delivery dates for all spares are being assessed by Tinsley.
- TA-1 mirrors have been coated at GSFC and are delivered to Ball.



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### Optics Development Status - Gratings

- Present grating delivery plan (changes since last month in red/bold):

Item	Delivery Date	Coating Dates at GSFC	Test Dates	Planned Test Location
G140L	Done	<b>Done</b>	8/00-10/00	CU
G160M	11/00	12/00	12/00-3/01	CU
G140L-Blazed	11/00	11/00	10/01	CU
G185M	<b>Done</b>	9/00	10/00	GSFC
G225M	11/00	11/00	12/00	GSFC
G285M	12/00	12/00	1/01	GSFC
G230L	<b>2/01</b>	<b>2/01</b>	<b>2/01</b>	GSFC



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## COS FUV Grating Test Status

- Test reports for G130M gratings have been released ([cos-arl.colorado.edu/Documents/COS-03-0002.pdf](http://cos-arl.colorado.edu/Documents/COS-03-0002.pdf)).
- First G140L testing is underway and about 2 weeks ahead of schedule.
- Testing of 2nd G140L should start ~ 10/2/00.

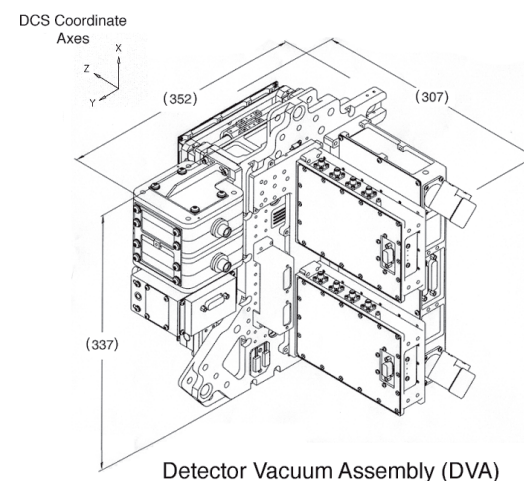
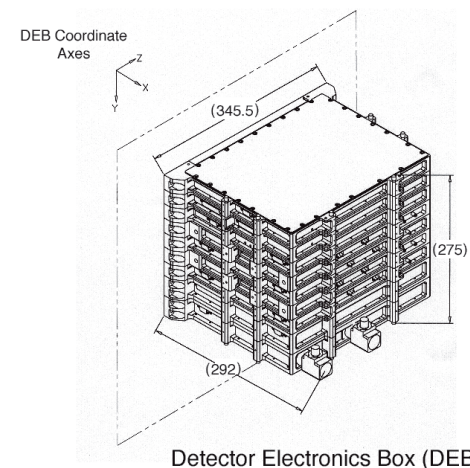


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## Overview of FUV Detector Assemblies

- **DEB - (Detector Electronics Box)**
  - DCE (Detector Control Electronics))
  - TDCs (Time-to-Digital Converters)
  - HVPS (High Voltage Power Supply)
  - LVPC (Low Voltage Power Converter)
- **DVA - (Detector Vacuum Assembly)**
  - VHA (Vacuum Housing Assembly)
    - Detector Door Mechanism
    - Ion Pump Assembly
  - DBA (Detector Backplate Assembly)
    - Amplifiers
    - HVFM (High Voltage Filter Module)





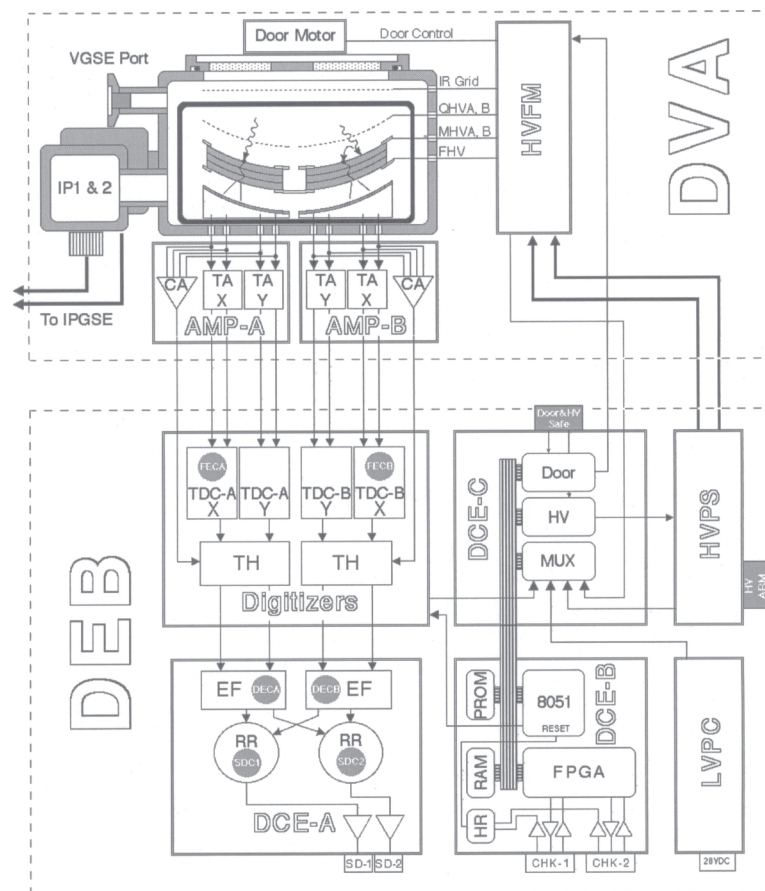
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## FUV Detector Subsystem Block Diagram

- UCB is under contract to deliver 1 flight FUV detector subsystem and 1 flight-spare detector subsystem.



TA - Timing Amplifier  
CA - Charge Amplifier  
TDC - Time-to-Digital Converter  
TH - Threshold Ckt  
EF - Event Formatter  
RR - Round Robin Arbitrator

FEC - Front End Counter  
PRC - Preamp Reset Counter  
DEC - Digitized Event Counter  
SDC - Science Data Counter  
HR - Hardware Reset Ckt

GG 11/99





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## **UCB FUV Detector Status - Personnel Issues**

- Raffanti still supporting UCB ~ 2 day/week plus consulting via daily phone conversations.
- Baja Technologies is still supporting electrical systems test and integration preparations at ~1 FTE level. This level of support is unchanged and consistent with our understanding of resource split with GALEX.
- MAG Systems will pick-up spare detector assembly and test in October.
- The UCB FSW development effort has recently been augmented by the HST program's assistance in making available W. Clement to assist in DCE boot code development.



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### UCB FUV Detector Status - Electronics Summary

ACTIVITY	Electronic Board								
	Amps	HVFM	HVPS	LVPC	DCE-A	DCE-B	DCE-C	TDC-X	TDC-Y
Parts List	C	C	C	C	C	C	C	C	C
Schematic	C	C	C	C	C	C	C	C	C
Parts Stress Analysis	NS	NA	NA	NA	NA	C	C	C	C
Worst Case Analysis	NA	NA	NA	NS	NA	C	C	C	C
Board Thermal Analysis	C	NS	NS	NS	C	C	C	<b>C</b>	<b>C</b>
Release Layout	C	C	C	C	C	C	C	C	C
Board Fabrication	C	C	C	C	C	C	C	C	C
Kit Parts	C	C	C	C	C	C	C	S	S
Board Coupon Testing	C	C	C	C	C	C	C	C	C
Stuff Boards	C	C	C	C	C	C	C	C	C
Board Workmanship Acceptance	C	C	C	C	C	C	C	S	S
Board Engineering Acceptance	C	C	C	C	C	C	C	<b>C</b>	<b>C</b>
Engineering Test & Acceptance	C	C	C	C	C	C	C	S	S
Temperature Cycle Test	C	C	C	C	<b>S</b>	<b>S</b>	<b>S</b>	NS	NS
Voltage Margin Test	C	NA	NA	NA	<b>C</b>	<b>C</b>	<b>C</b>	NS	NS
Final Acceptance Test	<b>C</b>	C	C	C	NS	NS	NS	NS	NS
<i>Legend</i>	<i>C = Complete</i>		<i>NA = Not Applicable</i>		<i>S = Started</i>		<i>NS= not started</i>		

Changes since last MSR in red/bold



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### UCB FUV Detector Status - Actels

ACTIVITY	DCE A		DCE-B	TDC-X	TDC-Y
	Counter	Round Robin	CPU	X	Y
Initial ACTEL Design	C	C	C	C	C
ACTEL Peer Review	C	C	C	C	C
End-to-end System Simulation	C	C	C	S	S
GSFC Review	C	<b>C</b>	C	<b>S</b>	<b>S</b>
FPGA tests with ETU electronics	C	C	C	C	C
Release ACTEL schematic/burn	<b>C</b>	<b>C</b>	<b>C</b>	NS	NS
<i>Legend</i>	<i>C = Complete</i>	<i>NA = Not Applicable</i>	<i>S = Started</i>	<i>NS = Not Started</i>	

Changes since last MSR in red/bold



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### UCB FUV Detector Status - Systems

- Documentation Update:
  - ICD Revision A - released 6/24/00.
  - Environmental Verification Plan - released 6/20/00.
  - ECO for Revision A QA Plan - in process.
- Mass and Power Updates (no change since last month):

	Mass (Kg)			Power (W)		
	Current Estimate	SoR Allocation (1)	Margin	Current Estimate	SoR Allocation (1)	Margin
DVA	19.43	21.5	9.6%	5.68	-	-
DEB	13.46	15.3	12%	46.46	-	-
Harness	2.7	3.4	20.5%	-	-	-
<b>Total</b>	<b>35.59</b>	<b>40.2</b>	<b>11.5%</b>	<b>52.14</b>	<b>53.0</b>	<b>1.6%</b>

Notes: (1) SoR Revision B allocations



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## UCB FUV Detector Status - Schedule Overview

<b>August Tracking Milestones</b>	<b>Status</b>
Fully assemble DVA #1	Complete
DCE Actel Reviews	Complete and flight Actels burned.
<b>September Tracking Milestones</b>	<b>Status</b>
Complete DVA No. 2 assembly	Complete (?)
Complete DCE qualification	DCE No. 1 by 10/2, DCE No. 2 by 10/16
Complete TDC No. 1 qualification	No. 1 delayed to 10/25, No. 2 delayed to 11/8
Complete BBA No. 2 to DBA No. 2 conversion	Complete
Commence DBA No. 1/electronics testing	Planned to start 9/25
<b>October Planned Milestones</b>	
DEB No. 1 operation verified	
DBA/DEB system characterization started	

Forecast flight system delivery to Ball:

This month = 3/7/01

Last month = 2/28/00

Surrogate detector delivery to Ball:

This month = 1/29/01



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### **UCB FUV Detector Status - Facilities**

- Due to possible construction conflicts, the UCB/SSL T-V chamber may not be available for FUV detector T-V testing.
- The UCB/CU/Ball team is exploring the possibility of doing FUV detector T-V at either CU or Ball.



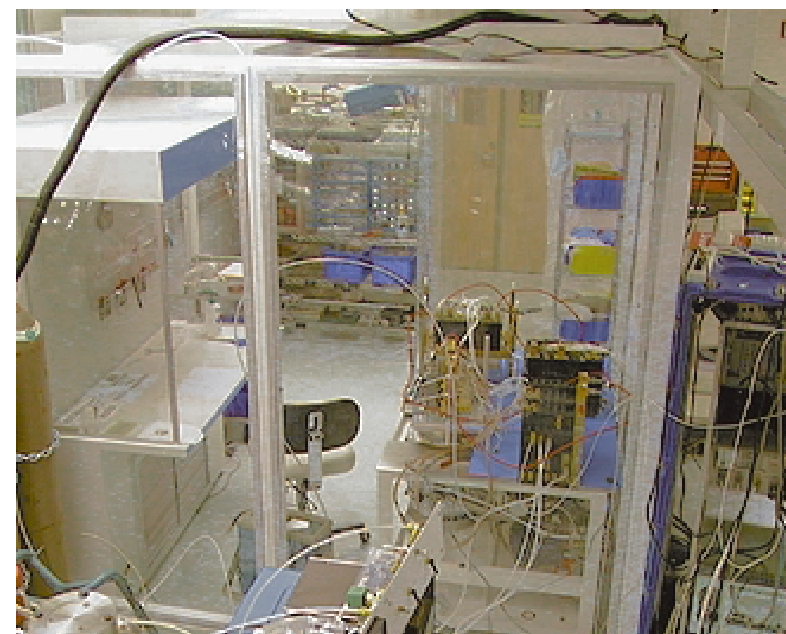
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### UCB FUV Detector Status - Facilities

- *Detector facilities in new building in full use*
- *Detector assembly clean room*



- *Detector system test cleanroom*
- *Detector test tank facility in clean tent accommodates two full COS detector systems*

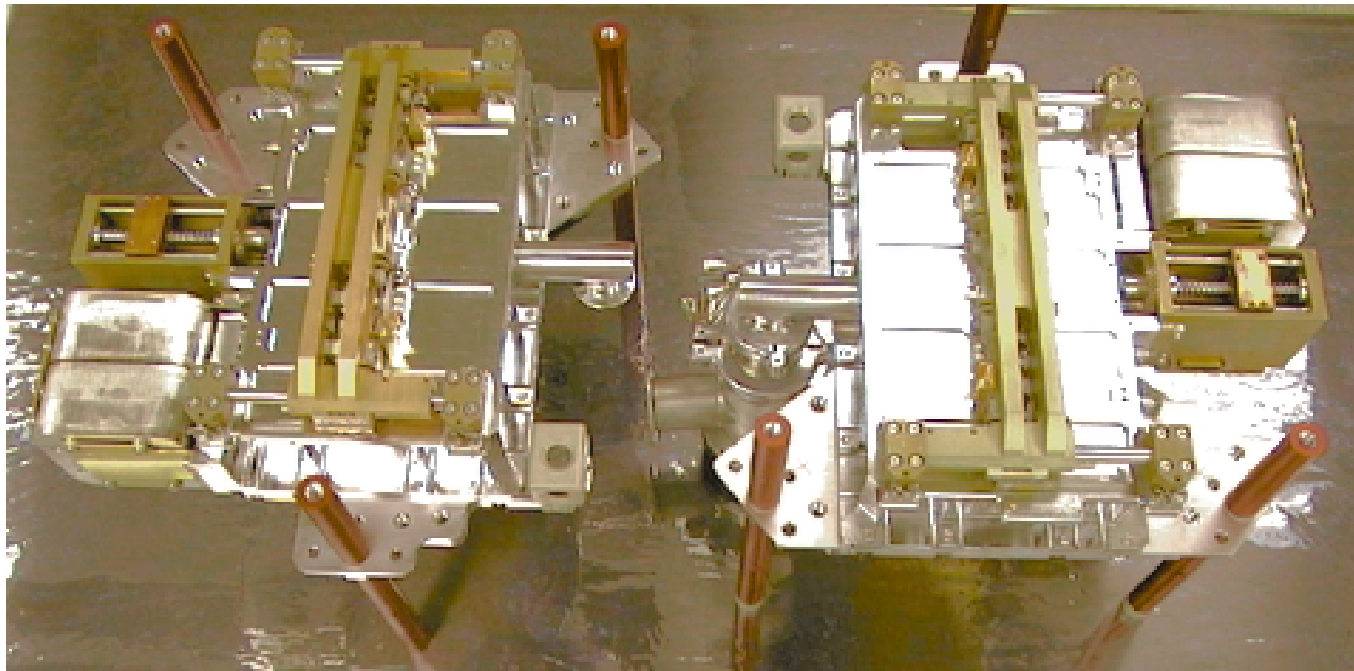


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### **UCB FUV Detector Status - Detector Vacuum Assembly**



- **Two VHA units assembled and attached to DBA's**
- **VHA #1 under vacuum and operated with ion pumps**
- **VHA #1 door operation verified**
- **VHA #2 door operation and ion pump operation tests underway**



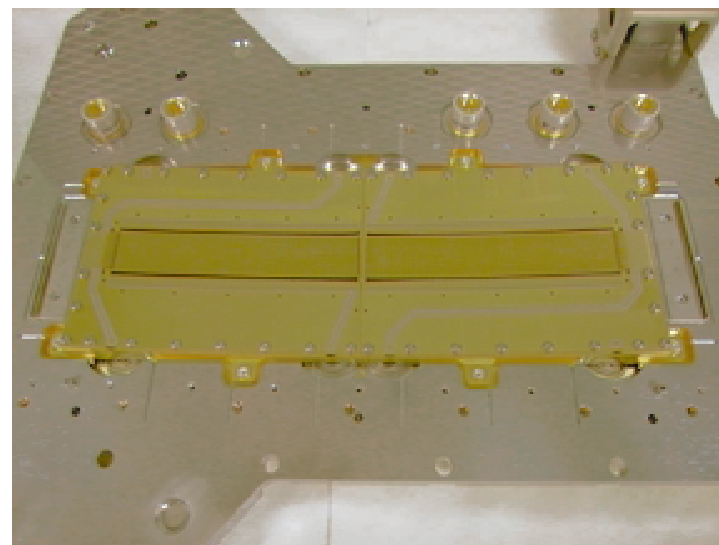
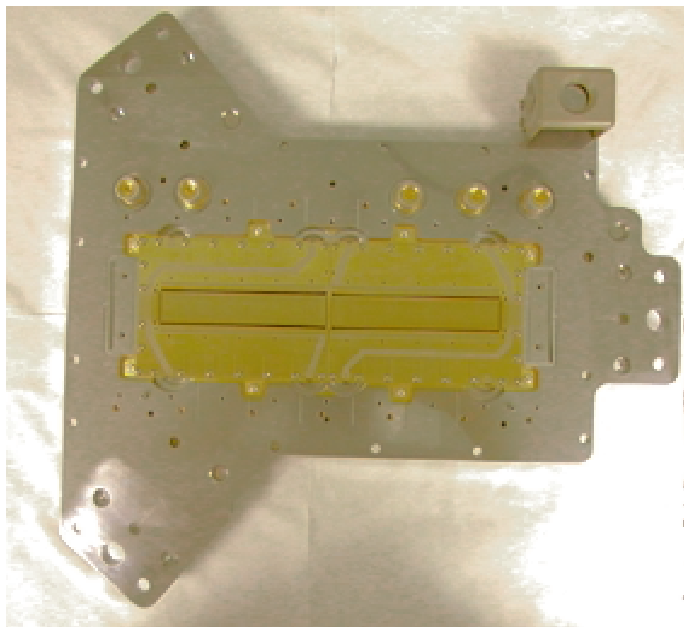


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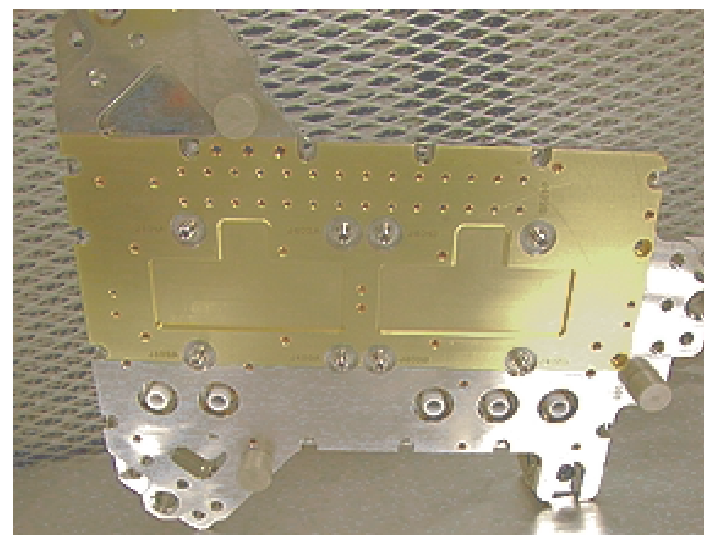
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### UCB FUV Detector Status - Detector Vacuum Assembly ctd



- DBA #1 integrated with 2 flight anodes and BBA#2
- DBA #2 integrated with 2 flight anodes
- DBA #3 in test on VHA#1





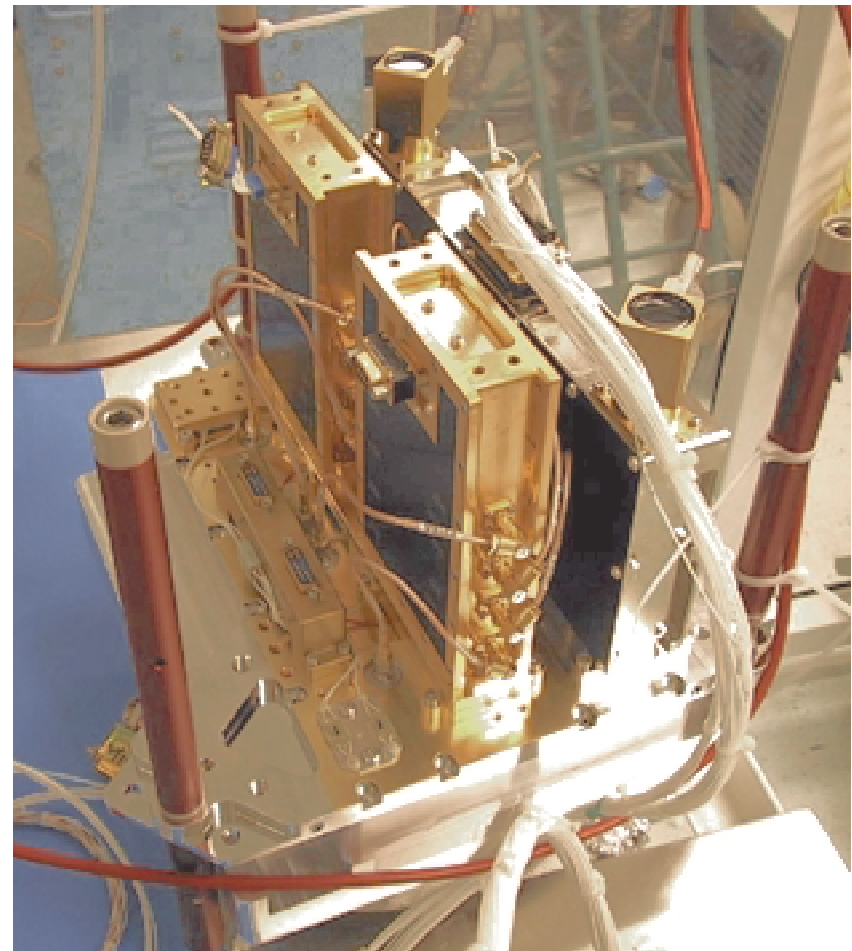
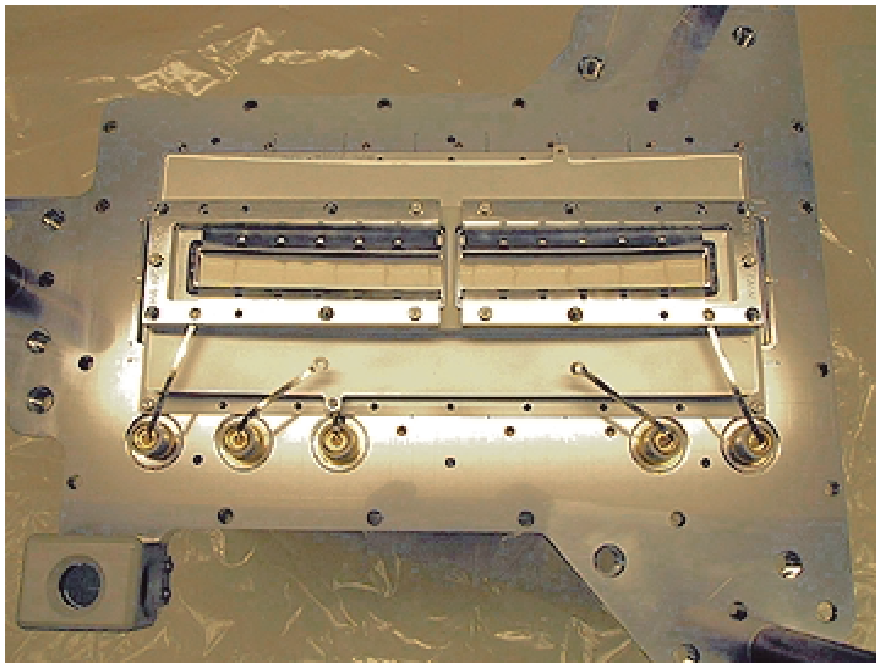
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### **UCB FUV Detector Status - Flight Detector**

**Flight detector DBA#1 & BBA#2 integrated and initial system test functional verification in process.**





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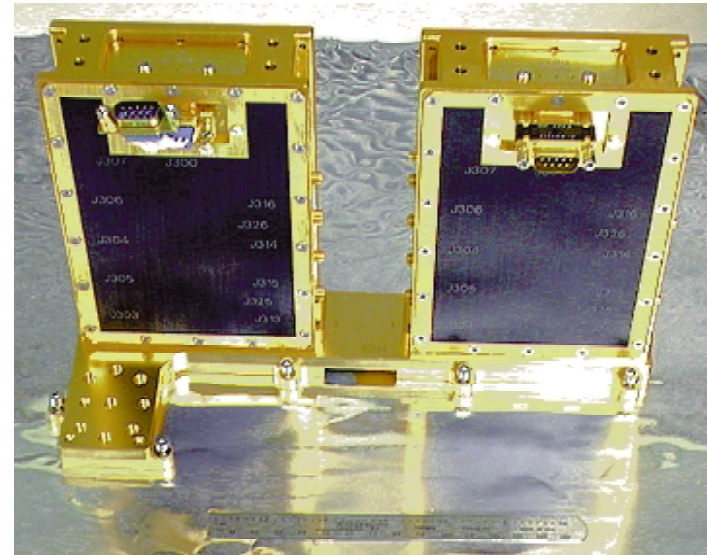
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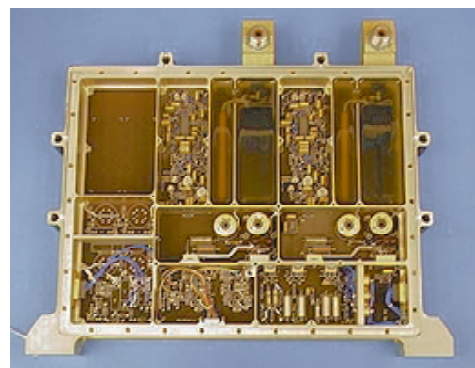
### UCB FUV Detector Status - Electronics

- Power systems (HVPS, LVPC, HVFM)
  - All ready
  - 1 HVFM on DBA#1
- Amplifiers
  - All amps ready
  - 2 amps on DBA#1
- Flight Harnesses
  - 2 sets complete

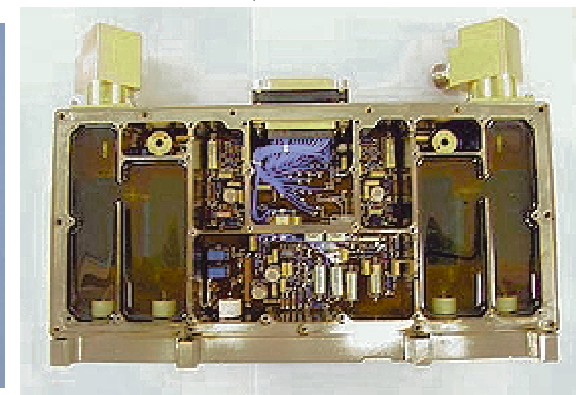
**Amplifiers**



**HVPS**



**HVFM**



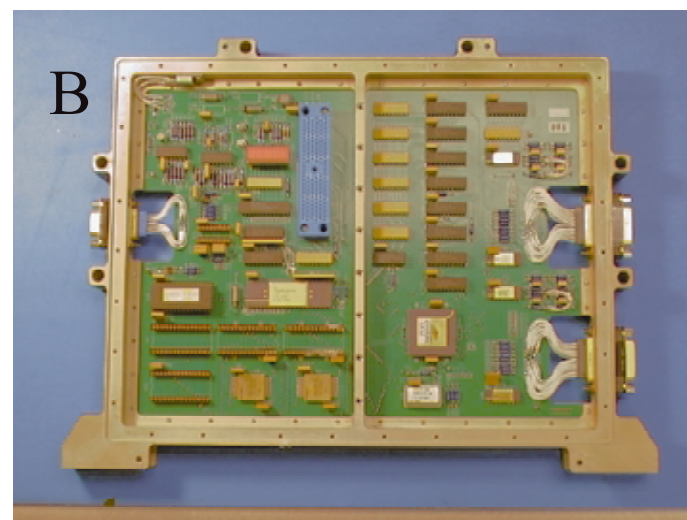
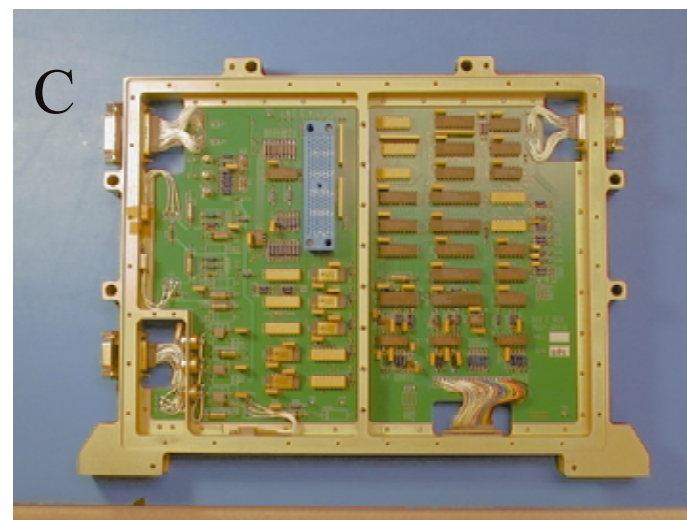
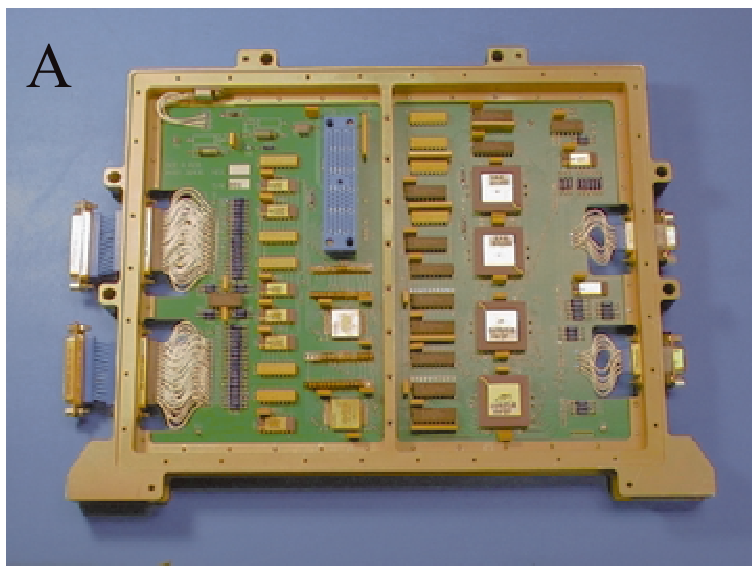


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### UCB FUV Detector Status - Electronics ctd

- DCE - A,B,C, 2 sets, in house
  - All 3 Actel designs reviewed with GSFC and revisions completed
  - 1 DCE set functionally verified, voltage & frequency margins done, thermal soak & thermal cycle tested
  - 2nd DCE set in burn-in (500+Hrs)





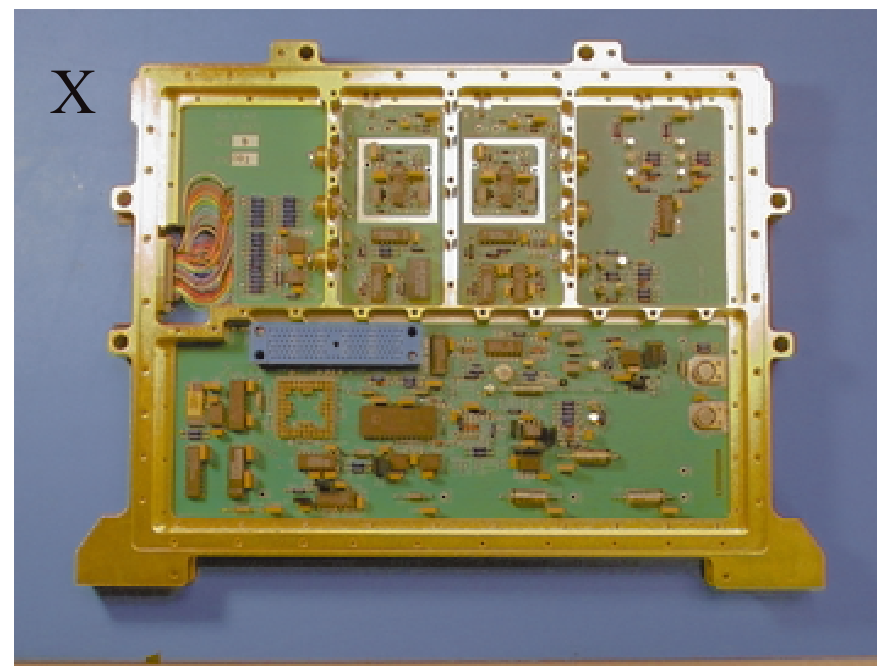
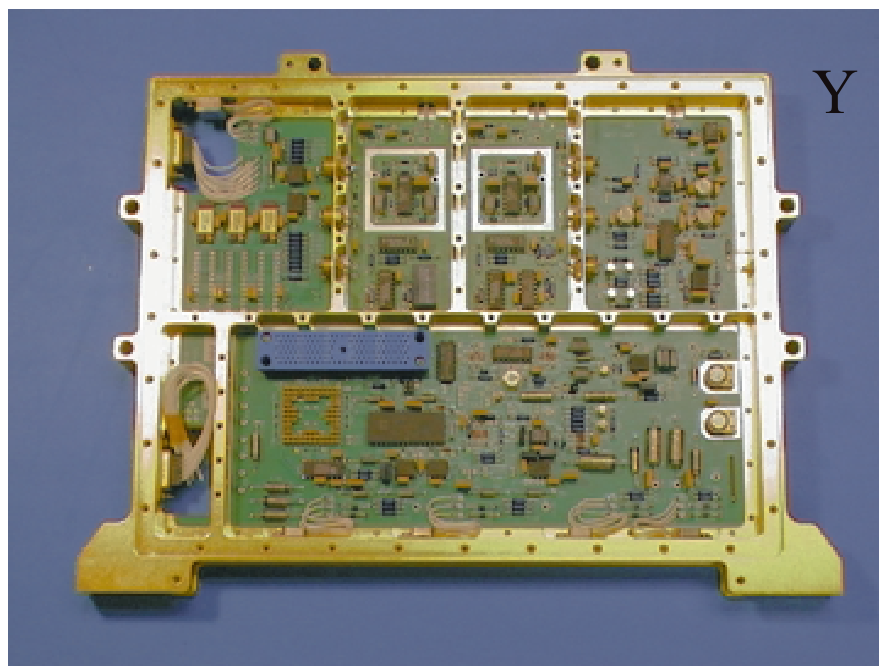
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### UCB FUV Detector Status - Electronics ctd

- 4 X and 4 Y flight TDC's at UCB
- 2 ETU flight board TDC's debugged with detectors,
  - Tested & set - delay cables, filters, walk, thresholds, Y Actel modified
- 2 X and 2 Y flight TDC's fully modified and in bench test
- ETU flight TDC's give outstanding performance with flight BBA's/anodes





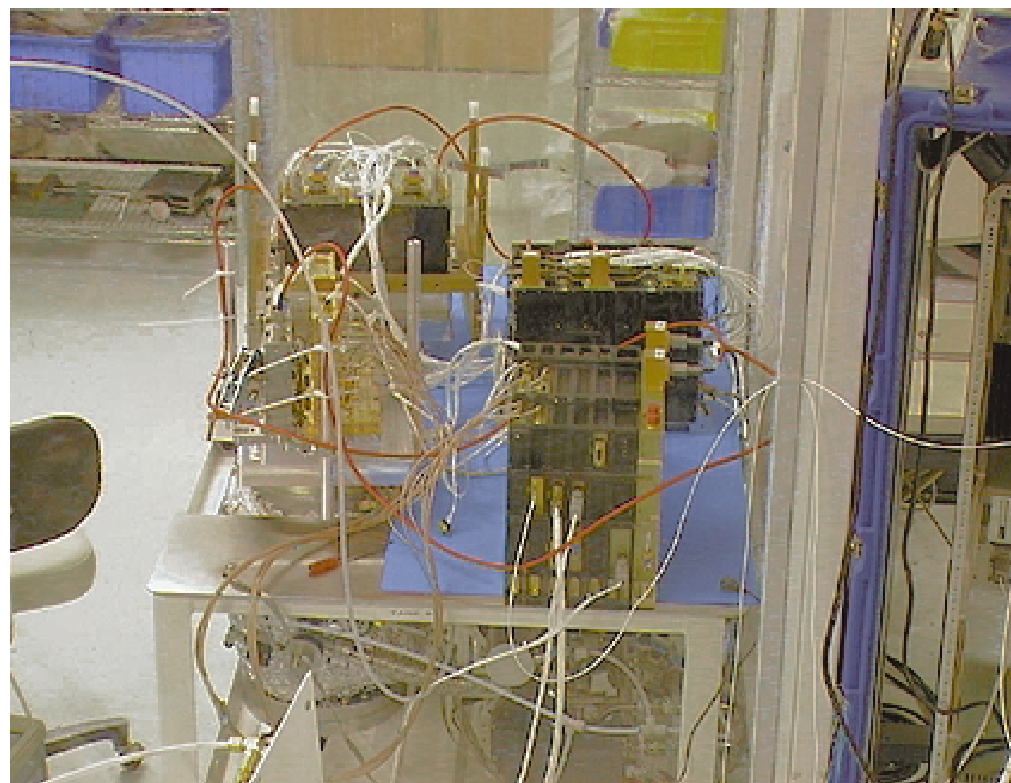
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### UCB FUV Detector Test Status

- Pair of flight board ETU TDC's have been used in full system electronics to test BBA#1 and BBA#2 resolution with 4 flight anodes.
- BBA#2 + ETU TDC's & the 4 flight anodes exceed specification for COS resolution performance.





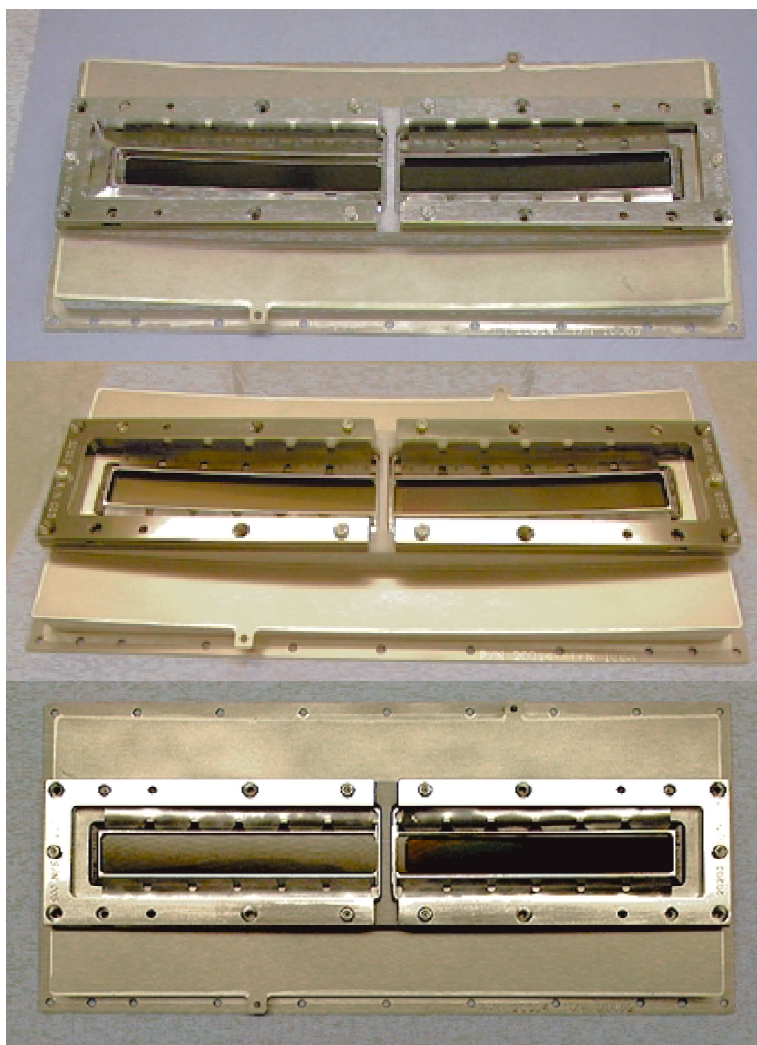
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### UCB FUV Detector Status - Flight BBA's

- BBA #1 completed scrub test, resolution, flat field & functional tests.
- BBA #2 gain matched & completed scrub test, resolution flat field & functional tests. Integrated onto flight detector DBA.
- BBA #3 assembled gain matching in progress



- BBA1

- BBA2

- BBA3



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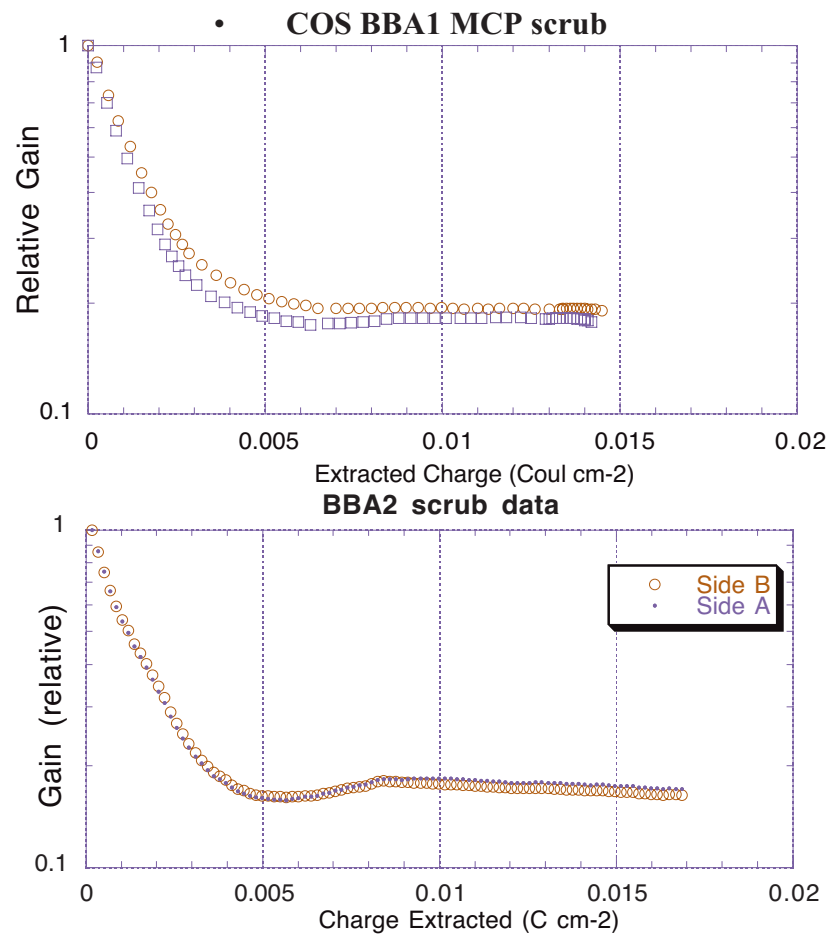
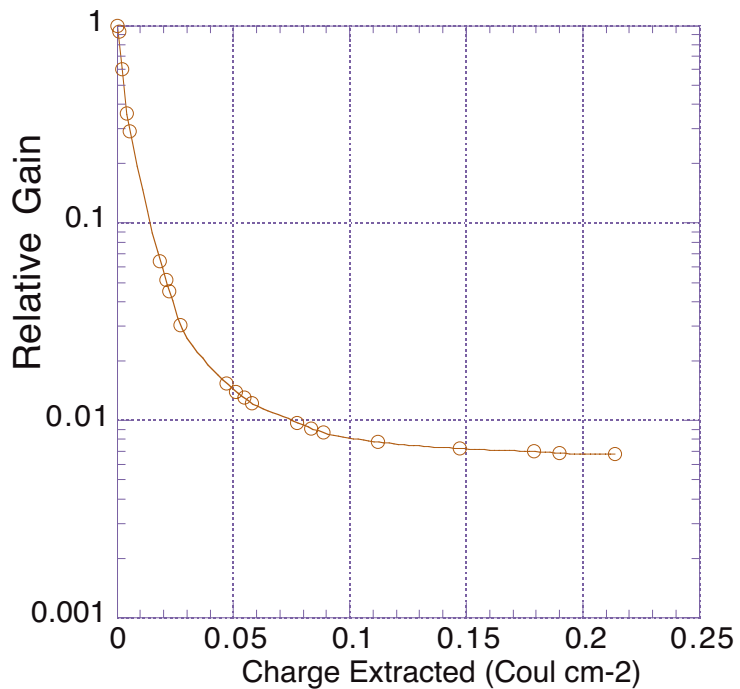
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### BBA Flight MCP Scrubbing

Both pre-scrubs on BBA's #1 and #2 show gain stabilization

- COS sample MCP scrub





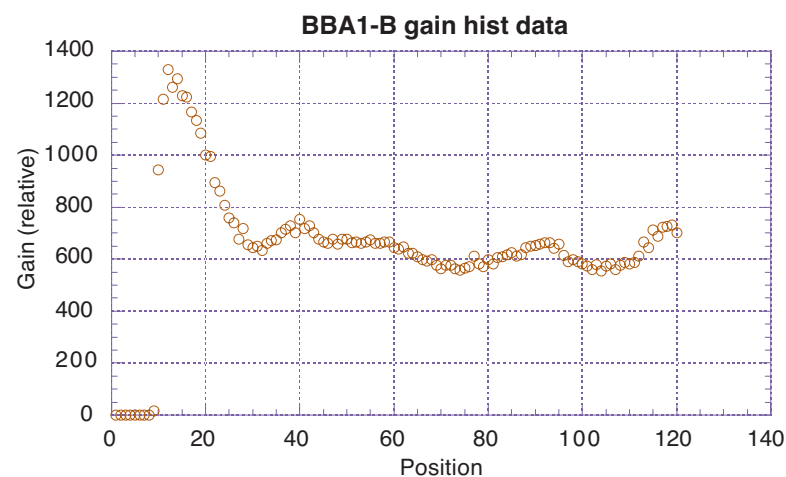
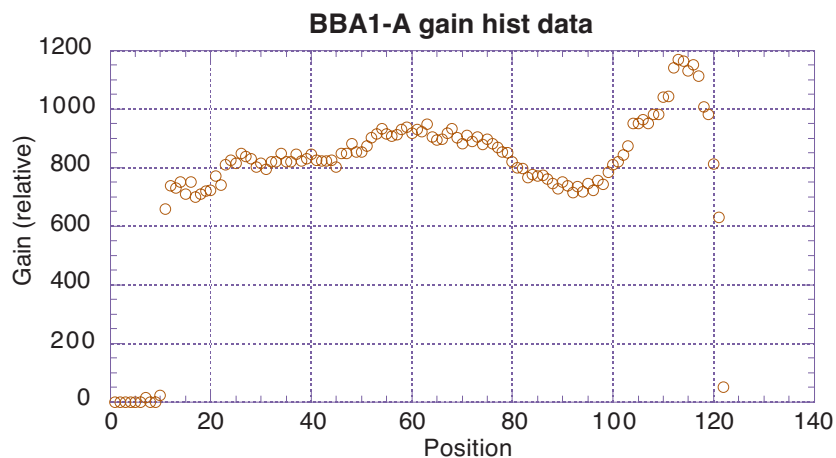


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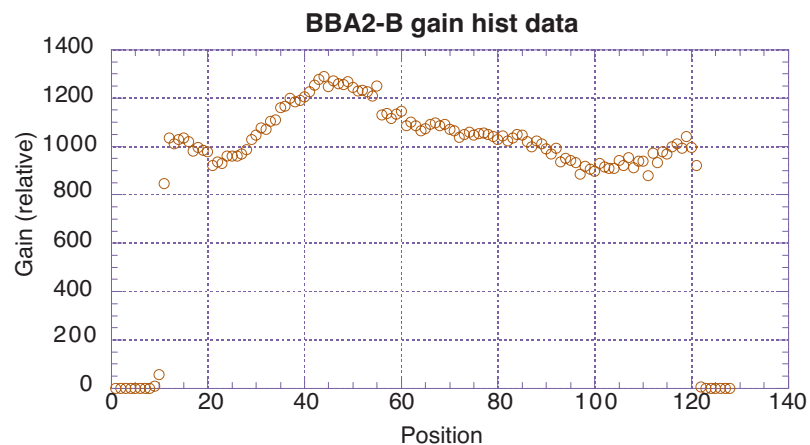
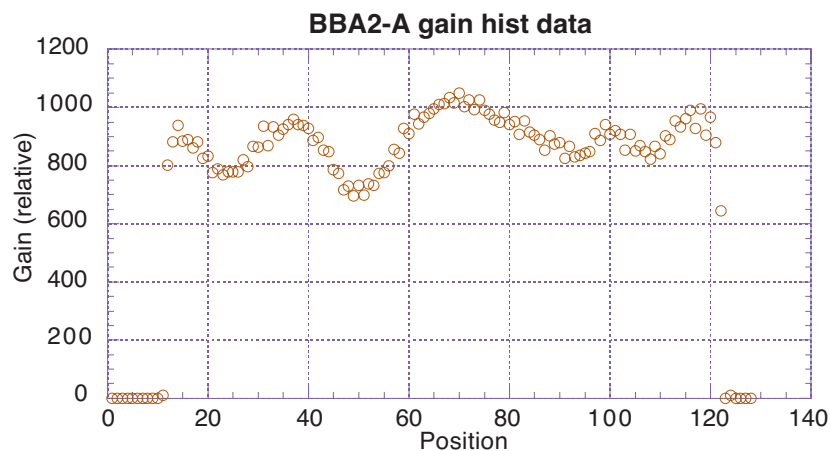
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### BBA gain uniformity measurements



**BBA#2 gain uniformity is much better than BBA#1**





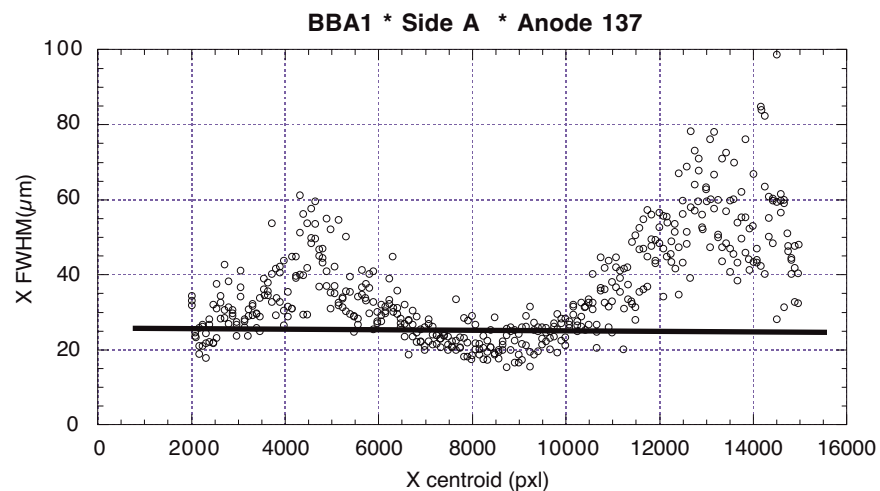
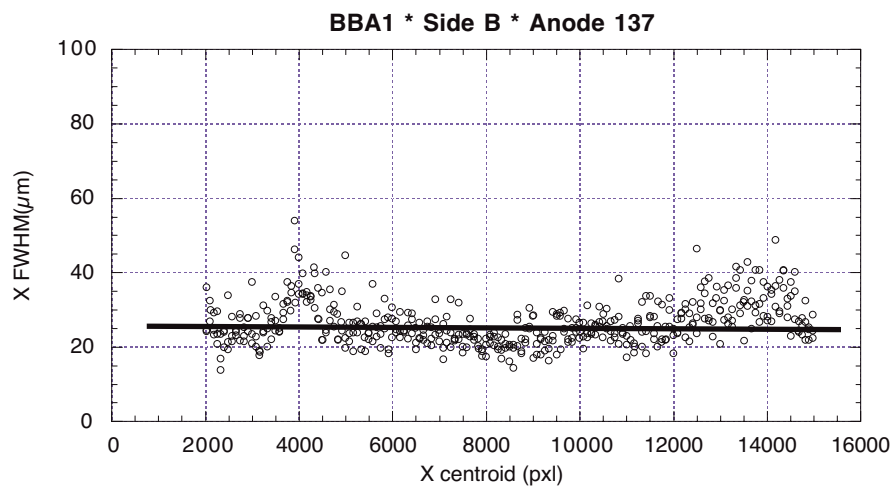
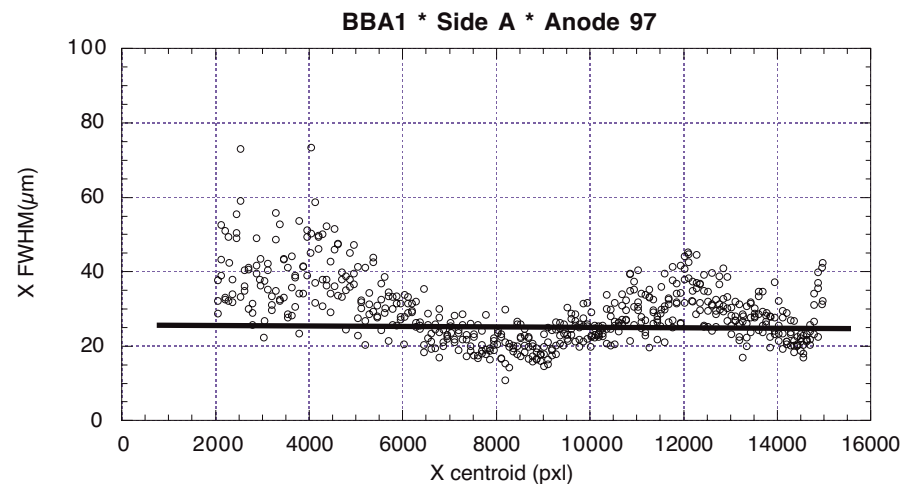
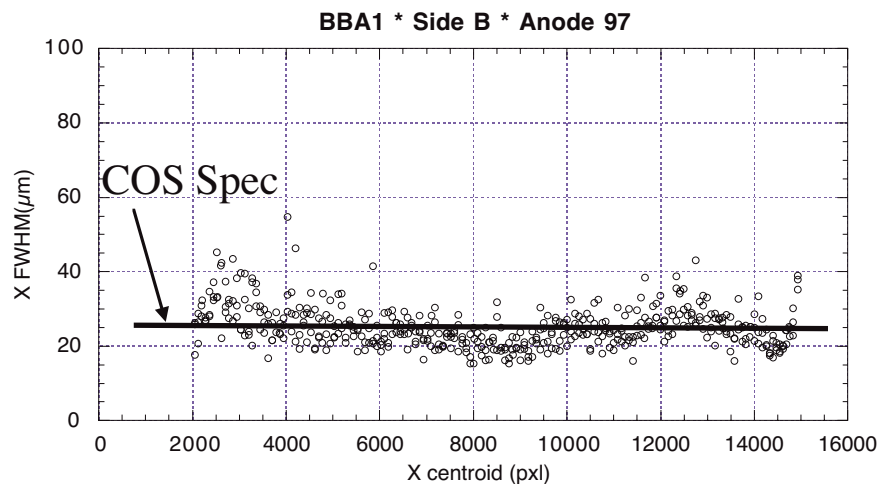
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### BBA#1 X resolution measurements with Flight anodes 97 & 137

- BBA#1, A side has poor resolution patches, B side is almost to COS spec





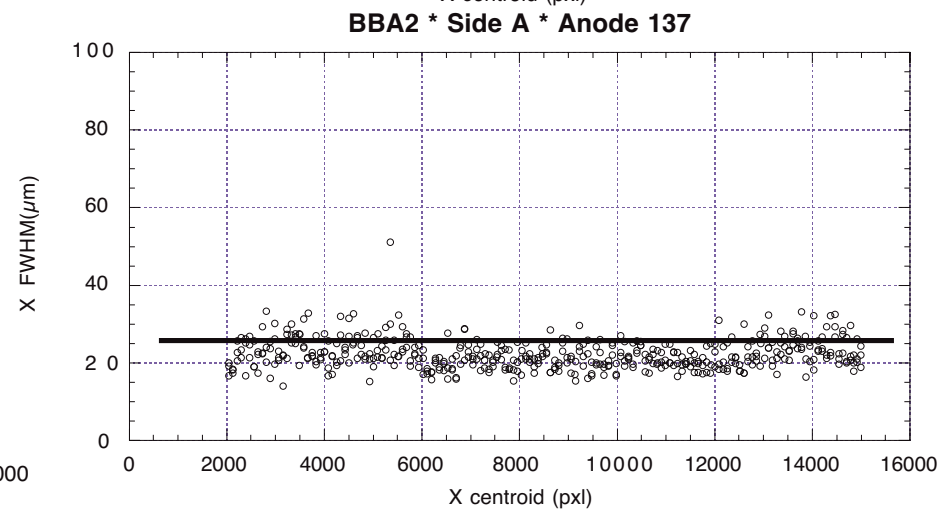
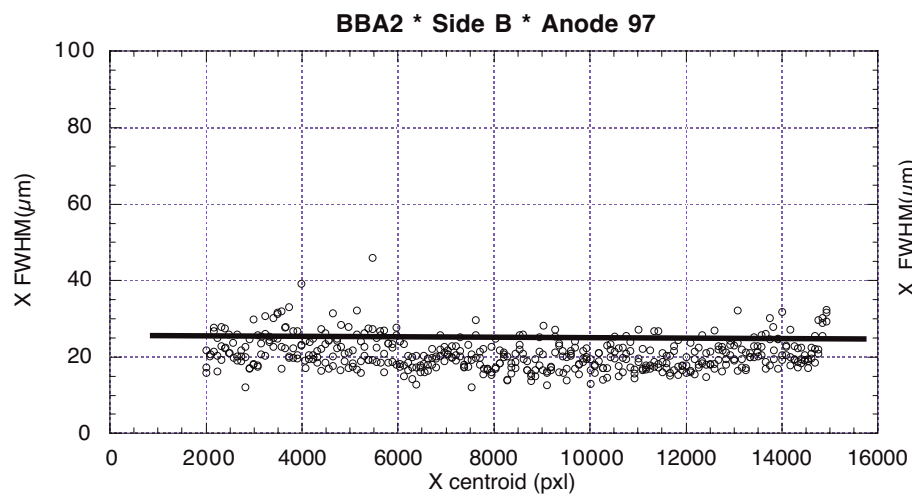
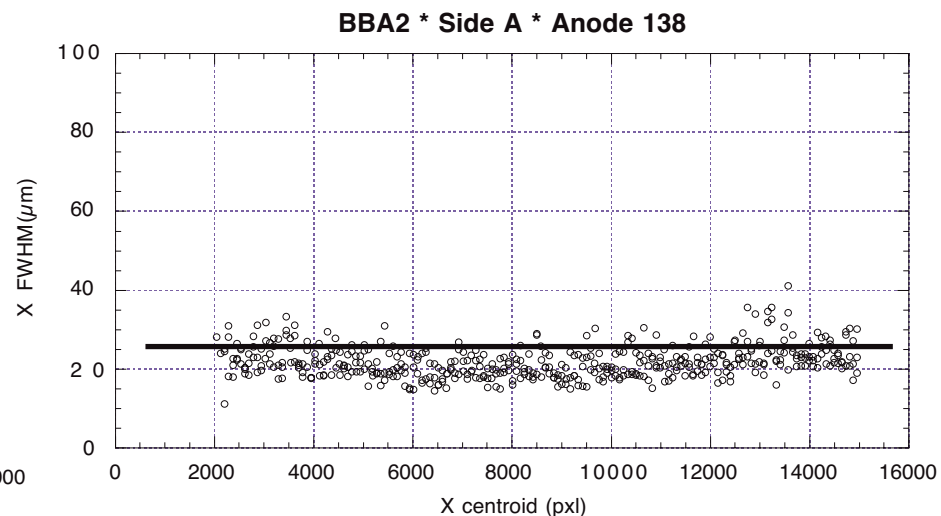
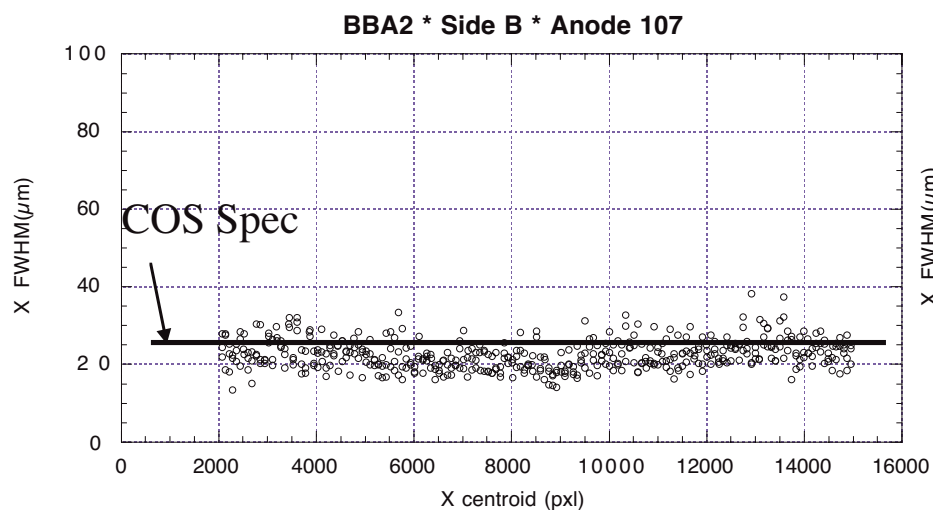
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### BBA#2 X resolution data with Flight anodes 97, 137, 138 & 107

- BBA#2, both sides better than COS specification with all 4 flight anodes

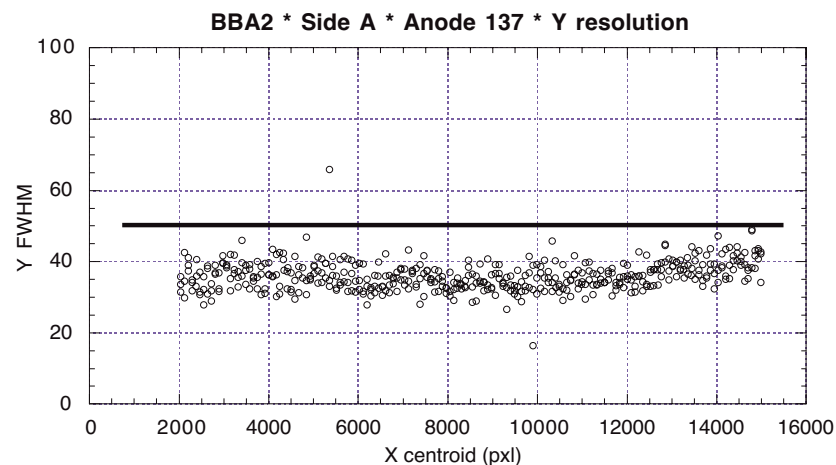
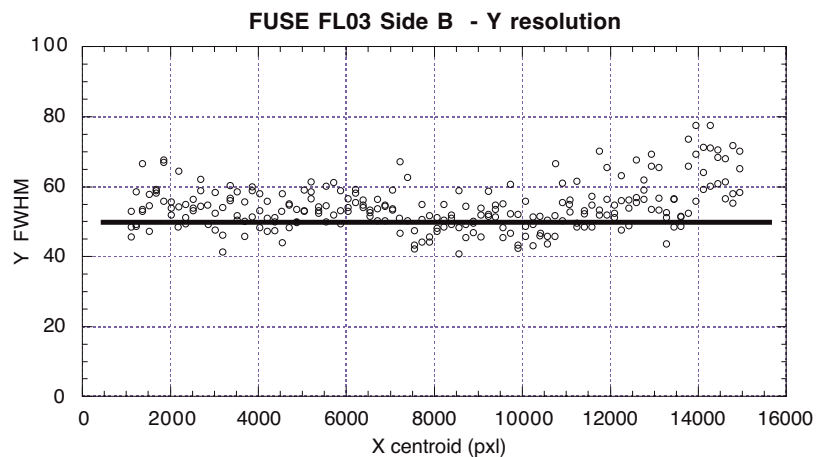
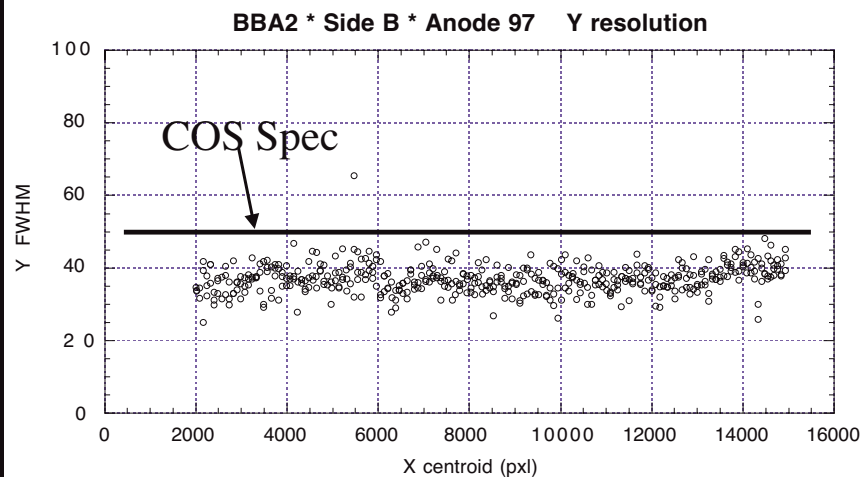
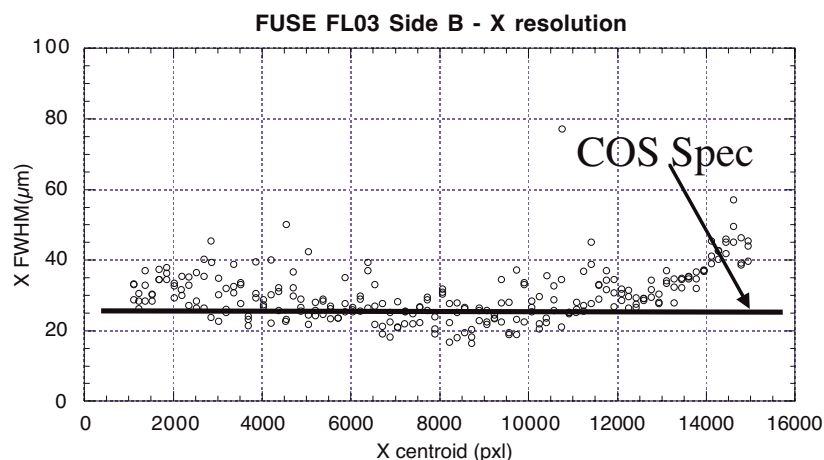




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## BBA#2 Y resolution, flight anodes 97 & 137, + FUSE comparison



- FUSE resolution performance X & Y

COS Y resolution



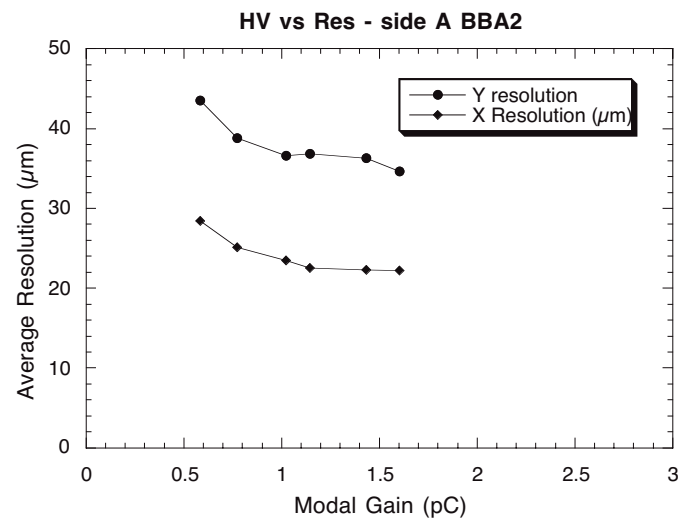
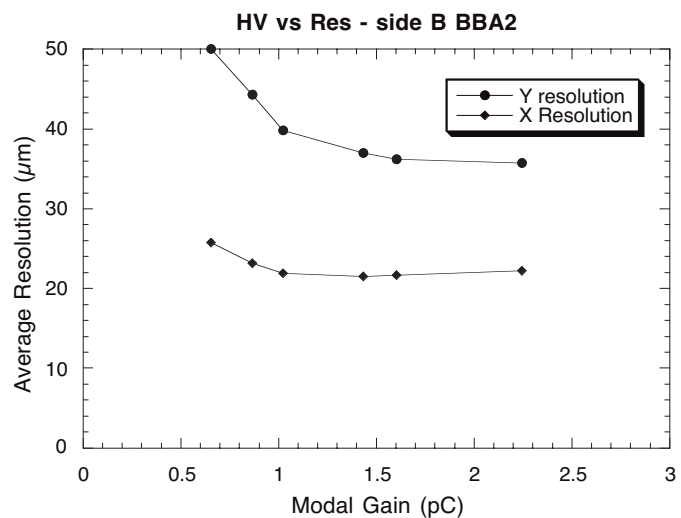
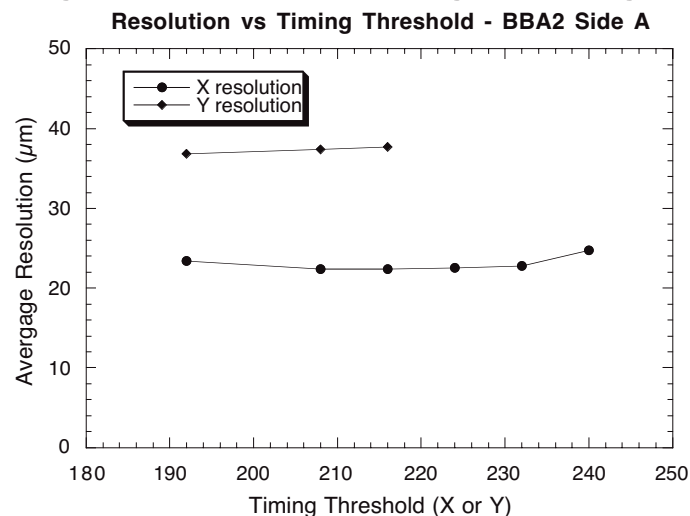
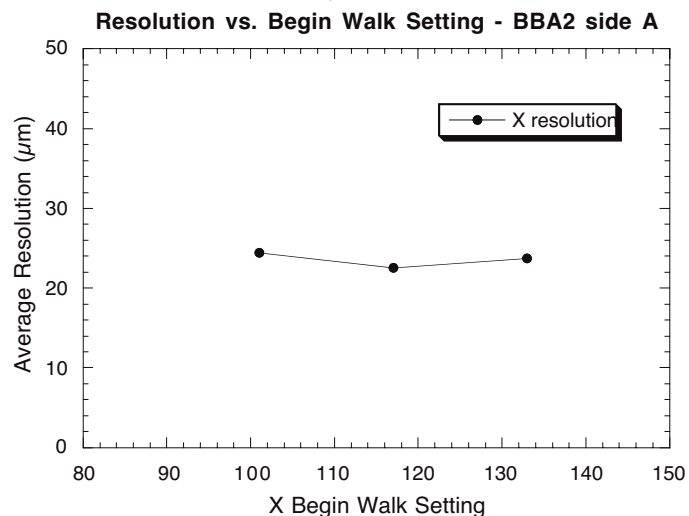
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### BBA#2 + flight anodes, resolution stability

- Resolution very stable to electronics settings, and over wide gain range





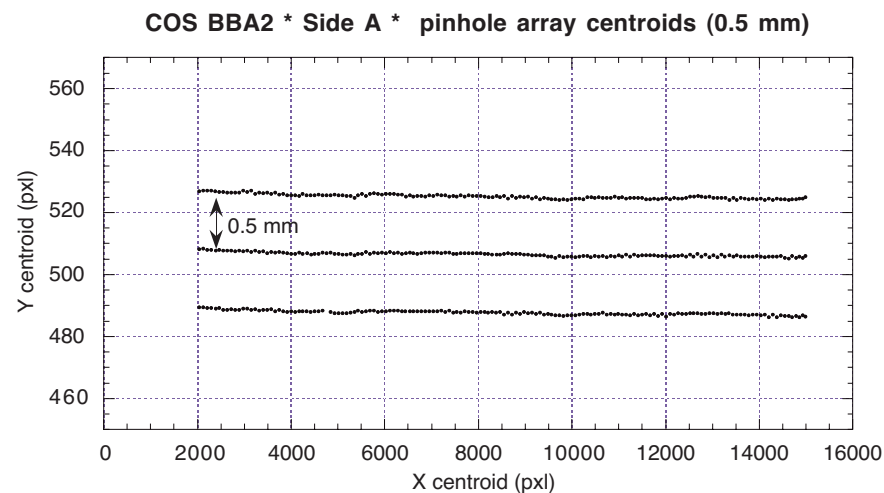
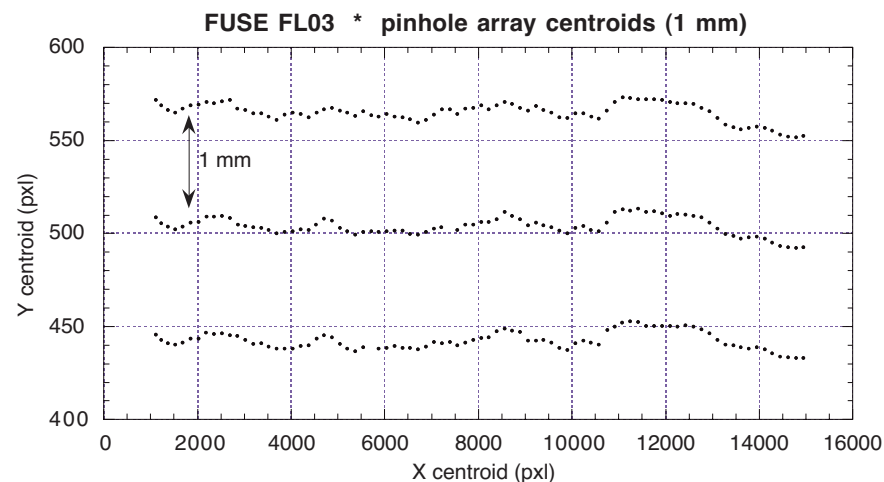
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### BBA#2 + flight anodes - Y linearity, FUSE comparison

- One of the problems with the FUSE DDL anodes was periodic distortions in the cross dispersion axis.
- The COS XDL has solved this problem and gives a very linear Y coordinate across the whole dispersion range.





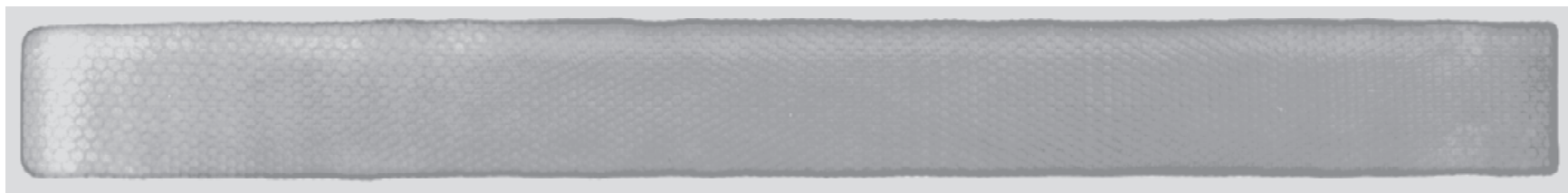
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## Monthly Status Review

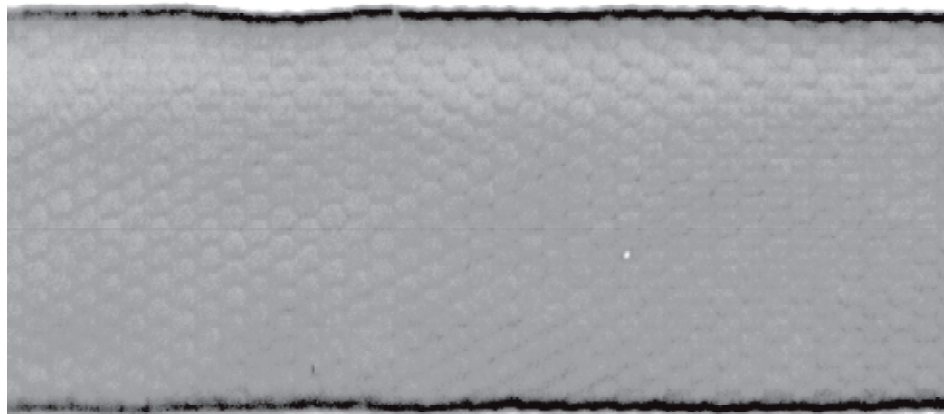


### BBA#2 MCP Stack Fixed Pattern Noise

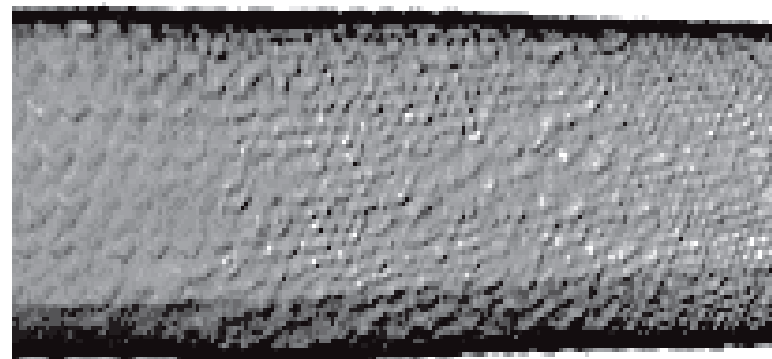
- COS UV full field illumination



- COS UV zoomed section



- FUSE UV zoomed section



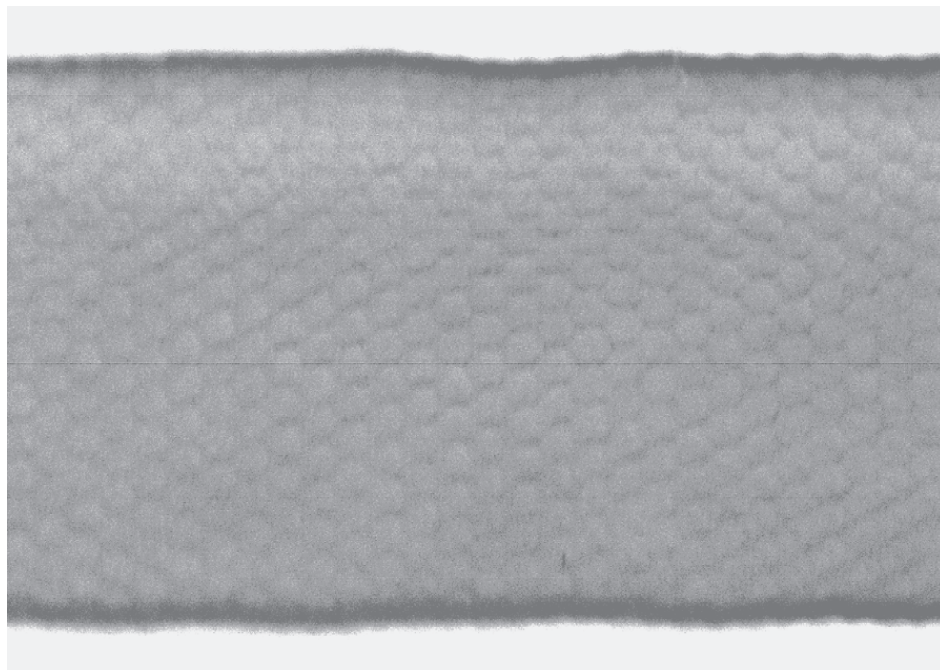
- FUSE showed areas where Moire caused high frequency fixed pattern modulation, the 30° rotation and MCP pore size mismatch (12/10μm) in COS improves the fixed pattern noise considerably.



COS  
*Monthly Status Review*



## Flight BBA#2 MCP Stack Fixed Pattern Noise



COS BBA#2-A MCP multifibers



FUSE Moire modulation

- Moire tests on BBA#2 show no visible Moire effects, clear multifiber MCP patterns are the major fixed pattern effect.
- Background rates are about  $0.5 \text{ events cm}^{-2} \text{ sec}^{-1}$  for BBA#2





# COS

## *Monthly Status Review*



### COS BBA Test Summary

- BBA #1 completed scrub test, resolution, flat field & functional tests.
  - Gain maps have high peaks at edges near detector center
  - Resolution is almost spec on side **B**, but **A** has poor areas, MCP's are cause!
  - Flat field on **B** is OK, but **A** has a poor areas
  - **A** MCP's probably not usable so replace them, but **B** are probably OK
- BBA #2 gain matched & completed scrub test, resolution flat field & functional tests.
  - Resolution and flat fields look very good, choose for flight detector
  - All flight anodes perform better than requirements
  - BBA#2 integrated onto flight DBA and electronics for verification tests.
- BBA #3 assembled with two more MCP sets
  - Gain optimization process underway.
  - Confirm resolution & flat field performance immediately.
  - Use for backup detector unit.



**COS**  
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**UCB FUV Detector Status -Risk Mitigation Planning**

- BBA#2 good performance test results have made detector system optimization tasks more straightforward
- Replace ETU TDC's with 1st flight TDC set immediately to verify flight system performance results - then qualify TDC's (thermal, frequency, margin tests)
- Achieve performance verification for BBA#3 and complete backup detector build with 2nd pair of good anodes on DBA#2
- Replace MCP's in BBA#1 A, optimize gain map & resolution
- Majority of tasks are performance verification & qualification
- Oct/Nov 00 fit check with flight design detector head & cables
- Deliver flight spare system to Ball in mid Jan 01 for tests with MEB simulator and UV focus/alignment test



**COS**  
*Monthly Status Review*



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**UCB FUV Detector Status -Milestones for next Month**

- DEB #1 operation verified with system electronics
- DBA/ DEB system characterization started



# COS

## *Monthly Status Review*



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### CU Software/Operations Efforts

- GSE Software Development at CASA-ARL
  - COS Science Data Index and Analysis Software - a.k.a. "CEDAR"
  - Website gives full details for CEDAR: <http://cos-arl.colorado.edu/CEDAR/>
    - Build II CEDAR implementation demonstrated to Hsiao Smith on 9/20/2000 at CASA-ARL.
    - During the past month, the CEDAR lead developer, Stéphane Béland, has primarily been working on other tasks. Currently, he is assisting with CS BOOT Code and Limits Checking FSW Testing at BATC. Beginning this week, he will transition over to start work on the CALCOS (GSE) software.
    - As was reported previously, CEDAR Build III development is on hold until specific TLM, Science Data Header and Science Data Format information are mature enough to allow further CEDAR development.
    - A specific list of exactly what TLM, Science Data Header, and Science Data Format information Stéphane needs to complete CEDAR Build III has been sent to BATC. It is expected that this information will be available very soon.
    - Build III completion will take approx. 1 month from the time these details become available.



# COS

## *Monthly Status Review*



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## CU Software/Operations Efforts

- COS Target Acquisition Simulation Software - a.k.a. "TAACOS"
- Website gives full details for TAACOS: <http://cos-arl.colorado.edu/TAACOS/>
  - Phase I simulations for NUV channel have been completed.
  - Phase I TAACOS Report for the NUV Channel completed and distributed in draft form on 9/25/2000.
  - A final, summary document - detailing all requested flight software and operational changes for Target Acquisition, based on Phase I TAACOS simulations for FUV and NUV channels - also released in draft form on 9/25/2000. The contents of this document, and the subsequent Software Change Requests (SCRs) issued by BATC will be discussed by the COWG during the first week of October.
  - Further TAACOS simulations, modifications and/or enhancements are on indefinite hold. The TAACOS lead developer, Dr. Steven Penton, will now transition over to begin work on the CALCOS (GSE) software.



# COS

## *Monthly Status Review*



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## Assistance with FSW Development Efforts at UCB

- DCE FSW Documentation Efforts
  - Website gives full details of DCE Documentation efforts:  
<http://cos-arl.colorado.edu/DCE/>
    - *Reminder*: Based on a series of meetings during the latter part of August 2000, a decision was made to bifurcate DCE FSW development - with Dr. William Clement taking over responsibility for the DCE BOOT Code, and Daniel Blackman continuing development of the DCE OPERATE Code.
    - To facilitate this "dual-development" approach, a "DCE BOOT/OPERATE Interface Specification" (COS-11-0023) was written and signed by DCE FSW Team members.
    - Because of the bifurcation, the usual biweekly DCE Code Telecon's were put on hold until the first, Revised Version of the DCE BOOT Code was released.
    - On September 15<sup>th</sup>, 2000 - Will Clement delivered the first version of the new DCE BOOT Code.



# COS

## *Monthly Status Review*



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## **Assistance with FSW Development Efforts at UCB (cont.)**

- Early testing of this code has been quite promising, and it is hoped that this "dual-development" approach will have only modest impact on the short-term DCE FSW development and test schedule. (Note: Part of the reasoning behind the "dual-development" approach was to mitigate risk to the long-term DCE FSW schedule, with the understanding that there would likely be a short-term schedule hit.)
- DCE Code Telecon's resumed on September 21<sup>st</sup> with an overview of the new DCE BOOT Code, and will continue until the BOOT Code has been fully reviewed.
- During the week of September 25-29, Will Clement, Tim Swanson, and Daniel Blackman will all be working together here at UCB to test and debug the new DCE BOOT Code.



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## **Assistance with FSW Development Efforts at UCB (cont.)**

– Unsolicited Commentary

- IMHO, UCB has responded extremely well to this "late" change to their FSW development effort - and have worked hard to accommodate this new, "dual-development" approach. Thanks are in order to Daniel Blackman, Geoff Gaines, and the entire UCB Team.
- Further, many thanks to both Will Clement and Tim Swanson for their continuing efforts - and to the DCE FSW Review Team: Allison Elliot, Chris Dorato, Steve Nissen, Michelle Troeltzsch, Daniel Blackman, Will Clement, and Art Rankin. Lastly, thanks to Grant Blue for graciously allocating time for members of his team to participate in the DCE FSW Review process.





# COS

## *Monthly Status Review*



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## COS Descope Issues

- The COS IDT has been asked to develop a de-scope plan which, if implemented, can be used to control future cost-growth and/or schedule difficulties.
- At the beginning of the COS development effort in late CY97 and early CY98 we prepared and presented several de-scope options.



# COS

## *Monthly Status Review*



### DESCOPE HISTORY

- The following list summarizes the items we proposed as de-scopes at the April 1998 MSR
  - Reduce SRAM buffer memory in MEB - **IMPLEMENTED**
  - Develop single type of NUV gratings - NOT IMPLEMENTED
  - Procure fewer optics spares on both FUV and NUV channel - **IMPLEMENTED**
  - Procure NO NUV optics spares - NOT IMPLEMENTED
  - Reduce NUV camera mirrors from 3 to 1 - NOT IMPLEMENTED
  - Convert the NUV channel to an Echelle - NOT IMPLEMENTED
  - Remove the NUV channel - NOT IMPLEMENTED
  - Reduce number of spare EEE parts - NOT IMPLEMENTED
  - Eliminate the redundant MEB - NOT IMPLEMENTED
  - Implement only 1 science aperture - NOT IMPLEMENTED
  - Eliminate the aperture mechanism - NOT IMPLEMENTED
  - Go with no external shutter - NOT IMPLEMENTED
  - Eliminate calibration subsystem - NOT IMPLEMENTED
  - Make calibration subsystem single string - NOT IMPLEMENTED
  - Reduce the I&T/calibration effort - **IMPLEMENTED**
  - Reduce the number of Ball and CU CDRL's - PARTIALLY IMPLEMENTED
  - Change MSR to QSR - NOT IMPLEMENTED
  - Eliminate a major review - NOT IMPLEMENTED
  - Move environmentals from Ball - **IMPLEMENTED**
  - Hold all status meetings and reviews in Boulder - NOT IMPLEMENTED



# COS

## Monthly Status Review



### Updated COS Descope Candidates

Candidate De-Scope	Trigger Date	Resource Saved*	Impacts
Eliminate FUV Detector detailed resolution tests	Implemented	2 weeks	Knowledge of detector
Eliminate FUV Detector detailed QE tests	Implemented	2 weeks	Knowledge of detector
Eliminate FUV Detector deep FF tests	Implemented	3 weeks	Knowledge of detector
Make DCE Op Code non-uploadable	TBD	\$.t	Higher risk, Ops
Early transition of FSW to Code 582	TBD	\$	Ops
Remove Redundant Cal/FF Elements	TBD	\$.t	Higher risk, Ops
Remove/reduce memory	TBD	\$.t	Ops
Remove NUV gratings from OSM2	TBD	\$.t	Degraded science
Drop NUV channel	TBD	\$.t	Degraded science
Remove NCM3 optics	TBD	\$.t	Degraded science, Ops
Eliminate Aperture Mechanism	TBD	\$.t	Ops, Obs. efficiency
Drop all Accum mode processing w/ Doppler	TBD	\$.t	Degraded science
Drop spare FUV detector	TBD	\$.t	Higher risk
Drop OSM1 capability (don't cover $\lambda$ gap)	TBD	\$.t	Degraded science
Reduce S/N requirement to 30 (no FF lamp)	TBD	\$.t	Degraded science
Relax NUV resolution requirements below 20k	TBD	\$.t	Degraded science
Remove on-orbit change-out capability	TBD	\$.t	Higher risk
Drop dispersed light TA	TBD	\$.t	Ops
No Ion Gauge	TBD	\$.t	Higher risk, Ops
No external shutter	TBD	\$.t	Ops
Change MSRs to QSRs	TBD	\$	Unknown
Drop G. Hartig support activities	TBD	\$	Unknown
Eliminate Mechanism Lifetime tests	TBD	\$	Higher risk
Reduce CDRLs	TBD	\$	Unknown
Drop G140L blazed effort	TBD	\$.t	Possibly degraded science
Reduce G160M image testing	TBD	\$.t	Higher risk

\*The IPT has not yet done a detailed analysis to quantify \$ or time saved.

*Cosmic Origins Spectrograph*  
*Hubble Space Telescope*

John Andrews  
September 27, 2000



# COS

## *Monthly Status Review*



### COS Schedule for CU

- The detailed CU schedule is available as a separate hand-out.

<b>Task</b>	<b>Status</b>
G160M/G140L – Blazed Grating Testing	Presented earlier
CEDAR Software Development	Ahead of schedule
TAACOS Software Development	On schedule
G140L Gratings & Testing	On schedule
JY Deliveries	Presented earlier
Tinsley	Presented earlier



# COS

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### **Upcoming Events/Activities**

- Complete G140L No. 1 testing, start G140L No. 2 testing.
- Complete internal review of AV-03.
- Commence CALCOS development.
- Deliver G185M gratings to GSFC for coating and testing.
- Complete TDC qualification.
- Complete DCE qualification.
- Complete systems electronics verification.
- Begin FUV detector PER preparations.
- Commence DBA/DEB system characterization.



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## Questions, Issues & Resolution Plan

- None