

ARM

Atmospheric Radiation Measurement Program



AERI Status

Dave Turner, Ralph Dedecker



SPACE SCIENCE AND ENGINEERING CENTER
University of Wisconsin-Madison

Locations of the 8 ARM AERIs

- SGP central facility (-01 and E14)
- NSA (ER system)
 - 2nd ER system suffered a laser failure and is being repaired
- Darwin
- Nauru
- AMF
- Spare

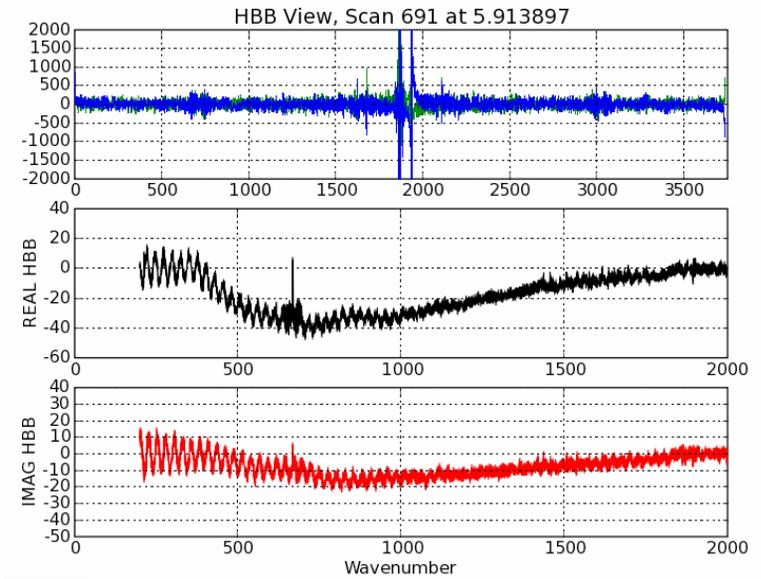
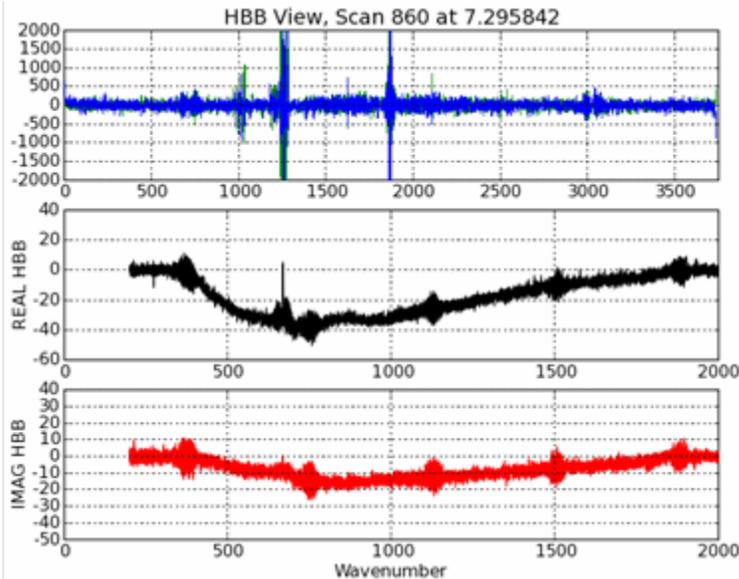
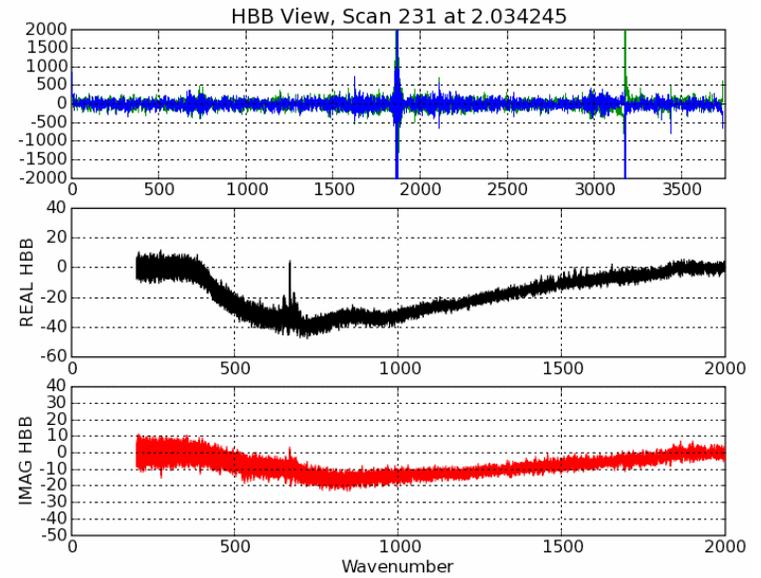
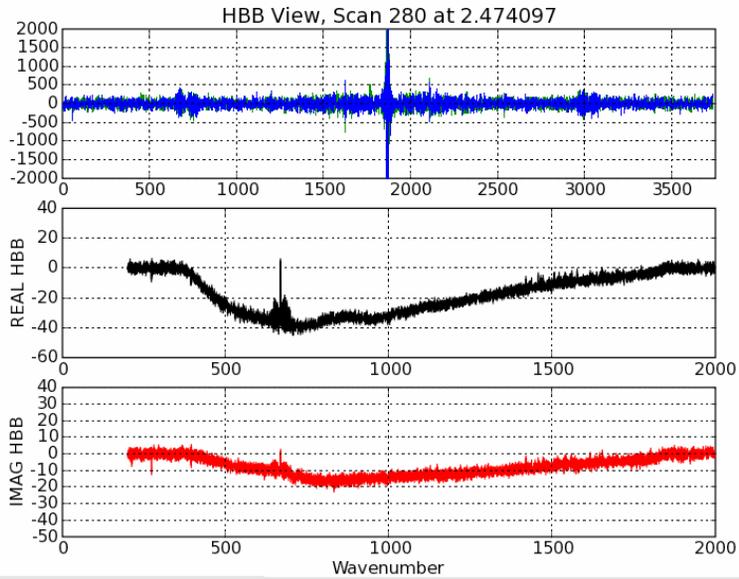
Upgrade Status

- Upgrading all AERI systems to modern operating system and transitioning to rapid-sample strategy
- Upgraded SGP-E14 and NSA-C1 in Sep 2005
 - Systems running ok; some “quirkiness” we are investigating (e.g., occasional bad spectra)
- Darwin system upgraded Sep 25th
 - Interferometer died Sep 28th
- Upgrade actions to occur by March 2007:
 - Spare electronics rack is being upgraded now for shipment to Nauru
 - Darwin electronics rack, when returned, will be upgraded and will be used to upgrade the AMF
- Still need to upgrade 2 other systems (spare system and 2nd ER system)
 - AERI-01 will not be upgraded

NSA Data Quality Issue

- AERI data from NSA is periodically noisy
- Characteristic of a noise burst in the interferogram
- Appears in sky views as well as blackbody views
- NSA-C1 and NSA-S01 systems both affected; however, the -C1 system was more susceptible for some reason
 - One hypothesis was that Great White (-C1 location) has more RFI than Connex (-S01 location)
 - -S01 laser died while swapping the two instruments to investigate this hypothesis
- Data from Sep 2004 to present at NSA are certainly affected; we feel that it is possible earlier data is affected also
- Do not see this issue at any other sites
- RHUBC in Feb-Mar 2007 makes this a high priority

Examples



NSA Noise Issue

- PCA noise filter significantly reduces the *uncorrelated* random error in radiance data (Turner et al. JTECH 2006)
- Applying noise filter to radiance data in netCDF file reduces random error dramatically; however, there is *still significant correlated error* in data due to the noise in blackbody (BB) views used to calibrate the sky views
- Working on a technique to apply noise filter to BB data first:
 - Apply noise filter to BB data in raw binary data files
 - After filter applied to BB data, need to run the calibration software, followed by the ingest to get ARM netCDF files
 - Apply the noise filter VAP to reduce sky view random error
 - Testing routine at SSEC now; if successful, will design code that can be run at ARM reprocessing center
- ***Need to identify RFI source and mitigate it!***

Instrument Specifics

Instrument	LASER Age	Last BB Cal.	OS
AERI-01 @ SGP	18 Mo. (Mar, 2005)	13 Mo. (Aug, 2005)	DOS/OS2
SGP-E14 @ SGP	24 Mo. (Sep, 2004)	31 Mo. (Feb, 2004)	Windows-XP
NSA-1 @ Barrow	52 Mo. (May, 2002)	13 Mo. (Aug, 2005)	Windows-XP
NSA- 2 @ UW	2 Mo. (Aug, 2006)	54 Mo. (Mar, 2002)	awaiting repair/upgrade
TWP 1 @ Nauru	14 Mo. (Jul, 2005)	69 Mo. (Dec, 2000)*	OS2*
TWP-2 @ Darwin	37 Mo. (Aug, 2003)	32 Mo. (Jan, 2004)	Windows-XP
AMF @ Niamey	55 Mo. (Feb, 2002)	33 Mo. (Dec, 2003)	OS2
Spare @ UW	94 Mo. (Nov, 1998)	94 Mo. (Nov, 1998)	OS2
AERIBago @ UW		2 Mo. (Aug., 2006)	Windows-XP

* Undergoing BB recalibration and OS upgrade in Oct., 2006

Typical interferometer lasers last approximately 60 months (continuous operation); otherwise ~36 months.