

DATE: March 28, 2011

SUBJECT: NSG WSC VHF Minutes

LOCATION: JSC, Regents Park III

ATTENDANCE:

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INTRODUCTION

Mr. Kevin Riley convened the White Sands Complex (WSC) Very High Frequency (VHF) support meeting to discuss recent issues with VHF support from WSC.

MEETING

- A. The VHF-1/System 1 has had recent support issues. When bringing up the carrier, there is a lot of noise through the receive side. The noise levels are not the same when the carrier is down.
- B. Mr. Patrick Delong stated that the system components have been tested. The system was tested during the normal System Readiness Test (SRT) which included a Signal-to-noise and Distortion (Sinad) test and transmit test. The system tested within the Sinad specifications during the SRT. The value of 12 dB was used to check the system. The system tested good when the carrier was down. It was necessary to increase the levels at the receiver by 6 dB to get to 12 db Sinad. This is a 6 dB loss.
- C. Mr. Mike Yettaw stated that Dryden Flight Research Center (DFRC) has had the same issues and that is why DFRC uses two antennas. There were issues with the High Power Amplifiers (HPA) at Acquisition of Signal (AOS).
- D. Wallops has experienced approximately 2 dB loss with the new TLP HPAs.
- E. It was asked if the WSC HPAs have the power supply in the unit and the reply was that they do.
- F. Mr. Riley stated that it is thought that the problem may be caused by cable leakage. Mr. Larry Kindrick stated that WSC found two cables with shielding issues. WSC exchanged the cables and had no significant improvement. It could be an issue with the adaptors.
- G. Mr. William R. Jones stated that it would be good if an MP3 could be obtained for testing. Mr. Riley stated that this is being worked. He stated that a composite MP3 file would be good for testing. Mr. David Glasscock accepted an action item to provide a composite MP3 file for Goddard Space Flight Center (GSFC) testing; additionally look into providing a file using a 1k tone (action item 032811-WSC VHG-01).
- H. Mr. Jones stated that the issue could cable leakage due to parallel runs. Mr. Riley agreed stating that the equipment is contained in two racks that are side by side. Mr. Jones stated that an additional trap should be placed on the transmitter, as it may need more isolation. It was stated that a notch filter was left at WSC and its use provided no difference during testing. Mr. Delong stated that there are two PAs to be concerned about, system 1 and system 2. Mr. Ken Griffin stated that something must have changed. In the near term, a good cable/connector inspection is needed from the antenna back to the Modular Receiver/Transmitter (MRT).
- I. Mr. Riley asked if they are shooting out too far. A dummy load was installed at the input to the duplexer. That should have isolated the problem to the 'shack'.
- J. Mr. Kindrick stated that on the last pass, there was an antenna pointing issue. The antenna was calibrated to hard points on the tower and seemed ok. During the pass, the antenna did not seem to be point at the spot indicated by the Antenna Control Unit (ACU). Mode 6 seems to set the antenna to a default which is 90 degrees off. Both axes got set to default, which is wrong. It is not known how this occurred. Mr. Delong stated that the memory is retained without power. Mr. Kindrick stated that the mode 5 gear ratio setting is not touched. It went to default for the AZ motor. This is the first time this

has happened. When preparing for a pass, WSC looks at 0 and 270 degrees. The gear ratio is not checked. Mr. DeLong stated that the antenna would have to be moved 180 degrees to test for this and this is not done during an SRT. Mr. Riley asked if it should/can be placed in the SRT.

- K. Mr. Yettaw stated that DRFC does not use the M² rotators anymore as they are not reliable. DRFC used heavy duty, more robust rotators. Mr. Jones asked for a data package on the rotators. Mr. Mike Yettaw accepted an action item to provide Mr. Russ Jones with a data package on the antenna rotators that DRFC is using (action item 032811-WSV VHF-02).
- L. Mr. Riley asked if ISS SITE COORD was available in the shack. He stated that he had provided a mark which could have been used to check to determine if the antenna was pointed correctly. Mr. Kindrick stated that audio is available in the shack but was not being listened to during the pass.
- M. The question was raised as to whether the Ultra High Frequency (UHF) to type "N" adaptors could be the problem. There are adaptors on the preamp. It was recommended that the preamps be replaced with a type used for the VHF-2 system. These are used at Wallops and are working.
- N. Mr. Glasscock stated that the noise has been gradually getting worse. Each event with the ISS has noise. The last event it was the ACU problem. Mr. J. R. Hendrickson stated that this sounds like a ground or cable issue. Mr. Mark Harris stated that Wallops has a noise issue and found a bent pin. The noise was a problem for 6 months. Mr. Jones stated that the preamp could be degrading. There are many variables and it may be necessary to check cable by cable. A priority list should be developed and the effort needs to move forward. Mr. Jones stated that a Time-domain Reflectometer (TDR) might provide some indication.
- O. Mr. Harris stated that the system will have to be checked cable by cable. Mr. Bangerter stated that such a checkout has not been performed since the system was installed. Mr. David Glasscock accepted an action item to develop a cable priority list, as part of an overall cable test plan, to be used in testing the VHF system cabling (action item 032811-WSC VHF-03).
- P. Mr. Bangerter asked if Mr. Griffin could send personnel to assist. He stated that he has budget to support sending assistance. Mr. Griffin stated that this is a difficult time for travel. Mr. Bangerter stated that he will wait until after contract transition to discuss pursuing assistance. He stated that he has concerns regarding WSC resources.
- Q. The suggestion was made to swap preamps. Mr. Yettaw stated that the preamps are not that expensive. Mr. DeLong stated that ARR modules are being used. It was suggested to physically move them. Mr. Bangerter stated that an Engineering Change (EC) will be needed. Mr. Harris stated that an Engineering Test Notice (ETN) can be used for testing. It was stated that the EC process can be time consuming while the ETN process is quicker. A plan should be developed now to do the work after the contract transition.
- R. Ms. Karen Rogers asked if the WSC antenna is RED for VHF-1. It was stated that the system has been declared RED. Mr. Jones asked if the system is stable and Mr. Kindrick stated that it is.
- S. Mr. Jim Bangerter stated that the antenna pointing needs to be checked prior to each pass. A procedure should be developed to do whatever it takes to ensure that the pointing error is not introduced again (e.g., track ISS passes, do Two Line Elements [TLE] the day prior

to a pass). Mr. David Glasscock accepted an action item to develop a procedure to ensure that the VHF antenna is pointed correctly prior to each pass (action item 032811-WSC VHF-04). Mr. Bangerter stated that if the last pass error was strictly a pointing error, fix the issue and declare the system YELLOW. He stated that an engineering pass needs to be scheduled with the ISS when WSC is ready to determine if the new PA has helped. Ms. Rogers stated that the ISS planners need to be contacted to plan a pass. Ms. Karen Rogers accepted an action item to work with the ISS planners to schedule an ISS pass for VHF engineering testing (action item 032811-WSC VHF-05).

- T. Ms. Rogers asked the status of the VHF-2 system. Mr. Bangerter stated that the system should be in better shape as it is a quad system. Mr. Jones suggested that a dummy load be used to test the VHF-2 system. Mr. Bangerter stated that this should be added to the VHF-2 SRT. Mr. Glasscock stated that he has a current action item to update the SRTs.
- U. Mr. Delong stated that the settings are going to change on the controller default. Limit numbers need to be added to the settings and that personnel need to follow the procedure in the manual.
- V. The status of the MRT was asked. Mr. Delong has the MRT at GSFC. Mr. Patrick Delong accepted an action item to ship the MRT back to WSC (action item 032811-WSC VHF-06). (Editor's Note: Mr. Delong provided a response. An MRT Chassis was shipped to WSC and it was delivered to WSC April 4, 2011. Ed Ex tracing number 8756 9292 8932. This action item is **CLOSED**.)
- W. Mr. Hendrickson stated that Wallops has had some issues in the past and has resolved the issues. He stated that there may be some good approaches suggested by information pertaining to the previous problems. Mr. J. R. Hendrickson accepted an action item to review the WFF Maximo entries to determine if there are other problems that have occurred at WFF that could be factors in the WSC VHF issue (action item 032811-WSC VHF-07).

ACTION ITEM REVIEW

The following action items were assigned at the March 28, 2011, WSC VHF support splinter meeting.

AI No.	Assignee	Action	Status
032811-WSC VHG-01	David Glasscock/ WSC	Provide a composite MP3 file for GSFC testing; additionally look into providing a file using a 1k tone.	Open
032811-WSV VHF-02	Mike Yettaw/ DFRC	Provide Mr. Russ Jones with a data package on the antenna rotators that DFRC is using.	Open
032811-WSC VHF-03	David Glasscock/ WSC	Develop a cable priority list, as part of an overall cable test plan, to be used in testing the VHF system cabling.	Open

AI No.	Assignee	Action	Status
032811-WSC VHF-04	David Glasscock/ WSC	Develop a procedure to ensure that the VHF antenna is pointed correctly prior to each pass.	Open
032811-WSC VHF-05	Karen Rogers/ JSC	Work with the ISS planners to schedule an ISS pass for VHF engineering testing.	Open
032811-WSC VHF-06	Patrick DeLong/ GSFC	Ship the MRT back to WSC.	Closed
		Response: An MRT Chassis was shipped to WSC and it was delivered to WSC April 4, 2011. Ed Ex tracing number 8756 9292 8932.	
032811-WSC VHF-07	J. R. Hendrickson/ WFF	Review the WFF Maximo entries to determine if there are other problems that have occurred at WFF that could be factors in the WSC VHF issue.	Open

(Original Approved By)
Kevin Riley
GSFC/HSF