PERIODIC MAINTAINENCE LOG

350004-01 Rev A

GALACTIC HEADQUARTERS
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ANTENNA DIVISON
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PURPOSE

This form provides instructions necessary for monthly inspection, preventive and corrective maintenance, and alignment of the antenna system in accordance with meeting warranty criteria. This form/log is to be executed monthly and sent to Quasonix to maintain the warranty agreement. This form should be executed by personnel who are thoroughly familiar with safety processes required for the site and equipment. The personal shall be knowledgeable with the equipment, the installation, and operating procedures, as well as theory of operation contained within documentation provided with the antenna system. Refer to the documentation package provided for parts lists and schematic diagrams used to support maintenance procedures.

Preventive maintenance procedures contained herein are intended to be performed in the sequences and at the calendar intervals listed. However, the inspection schedules shown may be adjusted where necessary to coincide with inspection schedules for other electronic and electromechanical equipment used with the system, especially where unusual environmental conditions dictate more frequent inspections of areas subject.

TEST EQUIPMENT

TABLE 1 TEST EQUIPMENT	
EQUIPMENT/TOOL	**DESCRIPTION**
Digital Voltmeter (DVM)	Capable of 0-250 volts AC and DC ranges
General Hand Tools	Screw Drivers, Allen Wrench's (Hex Keys), Socket Set, Soft Jaw Pliers etc.
Torque Wrench(es)	Capable from 0-100 ft-lbs range

NOTE: all tools should meet calibration requirements and be of good working order.

SYSTEM INDENTIFICATION INFORMATION

TABLE 2 SYSTEM INDENTIFICATION INFORMATION	
System Part Number	
System Description	
System Serial Number	
System Manufacture Date	
Current System Software Revision	
System Location	
Owner/Customer	

TABLE 3 - PERIODIC MAINTAINENCE LOG						
Period of Performance	**Assembly/Function**	**Action**	**Result**	**Date**	**Performed By**	**Notes**
Safety						
Monthly	Run/Safe (R/S) Switch(s)	Verify that the Run-Safe Switch Disables AZ/EL Movement and Engages the Brakes: • Place both axes in MANUAL MODE, system is ready to run. • Pedestal RUN/SAFE Switch selected to SAFE. Switch functions and places system in SAFE (Brakes Click – ON are engaged). • Pedestal RUN/SAFE Light illuminates GREEN. • Mode Control Area on HTAC Controller is greyed out. • Status Triangle Blinks RED. Status Indicator shows Run Switch lit RED. • Return switch to RUN. Pedestal RUN/SAFE Switch functions and places system in RUN (Brakes Click – OFF are disengaged). • Pedestal Green Warning light blinks for approximately 30 seconds then turns off. • Mode Control Area is available to operator (no longer greyed out). • Status Monitor (Triangle Icon changes from Blinking RED to NO COLOR) and the Run Switch indicator in the Status Menu is lit GREEN. • System can again be controlled from the HTAC.				
Monthly	Man On Platform Switch (MOP) (Secondary Run-Safe)	Verify Secondary Run-Safe Operation: • Man on Platform Switch Assembly (Remote Run/Safe) places system in SAFE. • Mode Control Area buttons are greyed out. • Status monitor shows Man ON Platform indicator is RED. Status Triangle is Blinking RED. • Man On Platform Switch Assembly (Remote Run/Safe) places system in RUN. • Mode Control Area is available to operator (No longer Greyed out). • Status Monitor shows Man On Platform indicator is blank (NO COLOR). Status Triangle is NO COLOR and is not blinking. • System can be moved from the **HTAC** Controller (using handwheels, joystick or keyboard arrow keys).				

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Period of Performance	**Assembly/Function**	**Action**	**Result**	**Date**	**Performed By**	**Notes**
Monthly	AZ/EL Servos Operation	Verify AZ / EL Servos Safe Operation: • System Powers up correctly. RUN-SAFE switch can be placed in RUN position. • Status Panel AZ/EL Servo Indicators are GREEN (no servo faults). • Status Panel Servos show NO fault codes. • AZ/EL Mode Control buttons are NOT greyed out and can be used by operator. • AZ/EL axes can be moved by the operator and function correctly (using handwheels, joystick or keyboard arrow keys).				
Monthly	Hand-Held Controller	Verify the Safe Operation of the Hand-Held Controller (Pendant): • Remove the (JS3) Local Control Pendant Shorting Plug from the Servo Connector Panel. • Attach the Hand-Held Controller at the (JS3) Connector on the Servo Panel. • Check that the Mode Control Buttons on the **HTAC** Controller are GREYED OUT and system cannot be operated from the HTAC controller. • AZ/EL motion is now available and controllable from the Hand-Held Pendant. • Remove the Hand-Held Pendant from the (JS3) connector and re-attach the shorting plug. • Check that the **HTAC** Controller, Status Panel, displays all interlocks GREEN or NO COLOR. • The **HTAC** Controller has regained control of the system and AZ/EL motion is again possible and controllable, from the **HTAC** controller.				
Controls (Operations)						
Monthly	**Hypertrack™ (HTAC)** Antenna Control Unit	Verify the **HTAC Controller** Powers ON and Boots UP Correctly: • Select the power ON-OFF switch and power on the **HTAC,** check that the **HTAC** boots up correctly. Verify that the small, front panel display window shows five (5) icons. • The **HTAC** front panel will display a blinking, GREEN, LED light, at lower left corner of the face plate, after boot up is complete. A RED LED indicates a HTAC boot up fault (consult factory service).				

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Period of Performance	**Assembly/Function**	**Action**	**Result**	**Date**	**Performed By**	**Notes**
Monthly	Client Computer Operation	Verify the Windows Client Computer Boots up: • Select the computer ON-OFF switch, the computer powers ON and boots up to the Windows Desktop with **HTAC** Icon visible. • Selecting the **HTAC** icon, opens the Username and Password window and allows connection to the connected and displayed **HTAC** controller. • The STANDARD VIEW is displayed. • The Status Panel (Triangle Icon) shows NO critical faults present (indicators are blank or green) . The Status Triangle Button is white (not blinking). • AZ/EL Mode Control Buttons are present and usable (not greyed out). AZ/EL Manual buttons can be selected (GREEN). AZ/EL axes are operational and can be moved and controlled by the operator (using handwheels, keyboard arrow keys or joystick if installed)				
Monthly	Azimuth Soft Limits (Cable Wrap System Only)	Verify AZ Limits (Cable Wrap System ONLY): • In the mode control area, select the AZ manual button. Manually move the system AZ axis in both CW and CCW directions. • Move each direction until the CW and CCW soft limit displays and system stops at both (CW and CCW) soft limits. • Record the CW and CCW soft limit stop angles. **NOTE: A NON-Cable Wrap System (with slip ring), will have continuous AZ motion (only) with NO AZ limits present. Verification of AZ limits is not necessary.**				
Monthly	Elevation Soft Limits	Verify EL Soft limits (Applies to all systems; cable wrap and slip ring): • In the mode control area, select the EL manual button and move the EL axis in both the UP and DOWN directions, using the handwheel input controls or the keyboard UP and Down arrow keys. • Verify the axis stops at each soft limit (UP and DOWN) and a YELLOW limit light indicator is displayed. • When in a soft limit, the Status Panel Elevation Column shows a GREEN soft limit light, which turns OFF when the axis moves out of the limit. • Record the UP and DOWN Soft limit positions.				

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Period of Performance	**Assembly/Function**	**Action**	**Result**	**Date**	**Performed By**	**Notes**
Monthly	Feed Operation (SCM Feed only)	Verify SCM Feed Operation: • Power up system. Wait for the Client Computer and **HTAC** to fully boot up and begin Ethernet communication with the servo controller and any attached Ethernet switches (may take several minutes). The Standard View must be up and running and showing the Error Meter. • The SCM feed automatically powers up and displays a GREEN DOT in the Standard View Error Meter (Green Dot indicates the feed is powered on and working). • If the Green Dot does not appear in the Error Meter, the feed is not powered ON or the FEED SYNCH cable is not connected to the (DB9) FEED SYNCH connector, located on the **HTAC** back panel (consult factory service if the Error Meter's Green Dot will not display) .				
Monthly	Feed Operation (Conical Scanning Feed only)	Verify Con-Scan Feed Operation (only when supplied with system): • Power up system, wait for all Ethernet connections to complete. • From the Standard View, in the RSSI area select the Con-Scan Feed ON OFF button to ON (button will glow GREEN) • Check that the central DOT of the error meter turns GREEN (Con-Scan is spinning). Select the feed button again to OFF (RED) and the Con-Scan feed stops spinning, with the error meter's central DOT changes to RED.				
Monthly	Signal strength indicators - LNAs selection SCM FEED ONLY	Verify Feed Gain Control Operation (SCM feed only): • In the RSSI area (of the Standard View screen), each Signal Strength Ribbon Meter is active and the LNA LOW, MEDIUM and HIGH power control buttons are present and available to the operator. • The Noise floor changes with selected changes between the Low, Medium and High LNA control buttons (both L,S and C bands). • The connected receiver also shows signal strength changes in the receivers SL meter(s) with L/S and C bands, LNA gain control button selections.				

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Period of Performance	**Assembly/Function**	**Action**	**Result**	**Date**	**Performed By**	**Notes**
Monthly	Signal Strength Indicators LNA ON-OFF CON-SCAN FEED ONLY	Verify LNA ON-OFF button operation (Con-Scan feed only): • In the RSSI area of the Standard View select the LNA ON-OFF button to ON (GREEN). • Check that the noise floor changes (increases) with the LNA button ON (GREEN). With the LNA button in the OFF position (RED), the noise floor drops. • The connected receivers SL meter(s) should increase and decrease when the LNA button is selected.				
Monthly	IP Video Camera Operation with zoom and focus controls. COHU Live View can be displayed with the Fire Fox browser.	Verify Video Camera Operation from the Standard View Desktop: • The Standard View Display shows the small Camera Icon button in the Mode Control Area. • Selecting the Camera Icon button, opens the righthand side, CAMERA ON-OFF button. • Selecting the Camera ON-OFF button turns the button GREEN, (indicating that camera power is ON) and a picture is displayed in the connected video monitor (the camera may take a few minutes to power up and link, before displaying an image on the monitor). • The Fire Fox browser can now be opened from the Windows Desktop on the Client Computer. • The COHU Window can be opened in the Fire Fox browser by entering the cameras IP address in the browser's address bar and then entering the correct username and password in the COHU opening page. • COHU LIVE VIEW opens in the browser window. • Both focus and zoom are operational and useable from the Live View window, and can be used to control these functions of the system's IP camera.				

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Period of Performance	Assembly/Function	Action	Result	Date	Performed By	Notes
Monthly	Check System Stow Operation. MANUAL STOW ONLY	Verify System Manual Stow Operation (MANUAL STOW): • Power up system wait for all Ethernet communications to complete with Standard View displayed. Complete the Log In and select AZ/EL manual control. Move the system to 45º AZ and 45º EL using handwheels or the keyboard arrow keys. Select the GEAR ICON next to the manual buttons, to open the right-hand side DESIGNATES window. • In Designates, select STOW and then the GO button. The system will drive to the pre-set stow position (typically 0º AZ and 90º EL). Remove the (Manual) stow pin from the hatch holder and insert it into the yoke arm stow receptacle. Check that the stow pin can be easily inserted into the yoke arm receptacle and removed from the receptacle (if the stow pin cannot be inserted into the yoke arm, consult with factory service to reset the stow position). • The Standard View displays GREYED OUT mode control buttons (system cannot be moved). • The Status Triangle Button is blinking RED. The Status Panel displays a Stow Pin Fault indicator (RED) when the stow pin is in the yoke arm receptacle - locking the system in place. • Pull the stow pin from the yoke arm receptacle and place it back into the hatch holder. • Manual control is now available (no longer greyed out) and the system can freely move in both the AZ and EL axes. The Stow Pin Fault indicator is removed (OFF), in the Status Area and shows a BLANK (no color) indicator. The Status Triangle Button is no longer blinking and is BLANK (no color). • The system can now be moved and controlled from the HTAC again.				

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Period of Performance	Assembly/Function	Action	Result	Date	Performed By	Notes
Monthly	Check System Auto-Stow Operation AUTO-STOW ONLY	Verify System Auto-Stow Operation (optional - when supplied with a system): • Power up the system and wait for all Ethernet communication to complete with the Standard View displayed and complete all logins. • From the Standard View screen select the AZ/EL manual mode buttons and move the axes to around 45º EL and 45º AZ positions with the handwheels or keyboard arrow keys. • Select the ANCHOR (GREEN) button from the Standard View Mode Control area. This will begin the Auto-Stow routine. • The system will automatically drive back to the stow position (0º AZ and 90º EL). • Check that the Auto Stow PIN has moved up into the yoke arm receptacle and the axes mode control (AZ/EL) STANDBY buttons are RED. • In the STATUS area SYSTEM box, the Auto Stow Enabled LED will display RED indicating that the system is in the stow position with the pin inserted. The AZ and EL motor brakes are set. • In the Mode Control area selecting the AZ and EL Manual buttons (GREEN) automatically retracts the stow pin from the yoke arm receptacle and allows full, manual motion control of both axes. • If the auto stow pin fails to retract or fails to insert, check that the pin is not making contact with the yoke arm receptacle. It should insert cleanly into the yoke arm receptacle with no metal-to-metal contact (consult factory service if stow pin fails to insert or retract). • Note: the auto stow pin and the manual stow pin should both insert and remove from the yoke arm receptacles with ease. If one or the other fails to do so, consult factory service.				

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Period of Performance	**Assembly/Function**	**Action**	**Result**	**Date**	**Performed By**	**Notes**
Monthly	Sun Designate / Sun Track	Verify The Sun Designate and Sun Tracking Operation: • With the system powered ON and the Standard View Displayed, select both AZ and EL Manual buttons (GREEN). Select the GEAR ICON button next to the manual buttons and open the right side DESIGNATES Window. • Choose the SUN bar within the Designates Window and then the GO button. • Verify that the system points to the sky sun position. • With the camera ON the sun is visible near the middle of the camera view. • With the receiver ON and tuned to a frequency within the systems RF capability, the system signal level meters should show a small increase in signal strength when pointed at the sun. • The signal strength meter (SL) on the receiver will also show a small rise in signal strength (depending on dish size and frequency). • Check that the GREEN meatball dot is near the center of the Standard View's Error Meter. • Select the AZ and EL TRACK buttons (both buttons turn GREEN). • The system will move the Green Dot to the center of the Error Meter. • Allow the system to track the sun across the sky for a minute. The Green Dot should stay centered in the error meter during the track (Note: smaller reflectors (4ft and under) may not provide enough gain to track the sun in the L&S bands). ***Note: Do not point at the Sun more than 2 minutes as damage to the camera may occur.***				

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Period of Performance	**Assembly/Function**	**Action**	**Result**	**Date**	**Performed By**	**Notes**
Monthly	AZ / EL Velocity Check	Verify System AZ / EL Axes Velocities using the Logger to Record the System Motion: • With the system powered up and ready to run. Select the Designates (small GEAR ICON next to the Manual Buttons) and use the Immediate Designate (upper) entry box to move the system to AZ=0° and EL=0° (enter 0° in the AZ box and the EL box and touch the GO button). • Go to the Logger (CLIPBOARD ICON) and select settings. In the settings window choose the AZ and EL Actual Velocity, Actual Acceleration, and Actual Position buttons (all GREEN). The select the APPLY button to save these choices. • To move the AZ and EL axes, open the Designates Window again and enter 90° in the AZ immediate designate box and 90° in the EL immediate designates box. • Go back to the Logger Clipboard Icon and select ENABLE and the File Naming Menu will open. Name the file AZ / EL plus Velocity and Acceleration. Once the file is named select the START button to start the Logger recording. • With the Logger running (CLIPBOARD ICON is now GREEN), go back to the Designates menu and select GO. The system will drive at max rate to the designated positions of AZ=90° and EL=90° (both axes move in the plus + direction). Now, STOP the logger by unselecting the enable button (the CLIPBOARD ICON will turn WHITE). • The file for the + AZ and + EL velocities and accelerations has been created and saved. • Go back to the immediate designates menu and enter AZ=0° and EL=0°. • Repeat the process to record the negative direction velocity and acceleration. Select the logger again and choose the ENABLE button and name the file negative AZ / EL velocity and acceleration. Select the START button again to start the logger. • With logger running, select the Designates GO button to drive the system to AZ=0° and EL=0° (from 90°) at max rates. Stop the logger by selecting the Logger ENABLE button again (the CLIPBOARD ICON will now be white). • Both files are now saved and can be exported to the Client computer and opened in an Excel spread sheet to show the recorded parameters. The Max AZ and EL velocity and acceleration numbers saved in the file can be recorded in the result column. Choose the highest recorded values shown in the file. • The + and – velocity files can be saved on the Client Computer for future reference.				

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Period of Performance	Assembly/Function	Action	Result	Date	Performed By	Notes
Monthly	Dehydrator	Verify Dehydrator Operation: • Check that the dehydrator is powered ON. Verify that the dehydrator cycles ≥ 5 minutes for a nominal 15 seconds. Record time between cycles, the nominal time between compressor cycling should be between 5-20 minutes (depending on system configuration and possible system air leaks). Record cycle time intervals. • During compressor operation, the nominal charging pressure of the high-pressure tank should be approximately 50 PSI. • Output pressure (to the tracking system) should be approximately 0.4 PSI. • Adjust LOW PRESSURE regulator valve to 0.4-0.5 PSI. The low-pressure valve is located in the upper left-hand side of the dehydrator. It is secured with a lock nut which must be loosened to adjust the valve and then re-tightened (the system low pressure should always be kept, at an output of about 0.4 to 0.5 PSI). • If the dehydrator unit is connected to the system's Ethernet switch, select the STATUS TRIANGLE Button, from the **HTAC** controllers Standard View Window and check the dehydrator status column for the received, dehydrator, displayed parameters. • Check the Altec Dehydrator service manual for pressure valve locations and service suggestions. **Note: If the dehydrator's compressor is running continuously or the OFF times are very short between cycles (less than 5 minutes) then there is a pressure leak between the dehydrator and the system. Check all airlines for cracks or disconnections. Check system hatches and all gasketed areas for leaks. Spray areas with soapy water and look for bubbles which indicate air leaks. Repair as required. Contact factory service if compressor run time is excessive and air leaks cannot be found.**				
6 month	Dehydrator Install Altec P018301 Filter kit	Install the Altec Dehydrator 6-month Maintenance kit: • Install the Altec (PN P018301) Intake filter and compressor muffler kit. • See Altec P550W series air dryer Users Guide for the 6-month maintenance kit information and install instructions.				

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Period of Performance	**Assembly/Function**	**Action**	**Result**	**Date**	**Performed By**	**Notes**
Quarterly	RF System check using system noise temperature (G/T)	Verify RF Systems using the G/T testing: • Using the original acceptance test results, perform the G/T tests. Capture and attach the results here. • NOTE: G/T results will vary depending on the locations radio noise environment which may change over time. Save the test results, to track the system's RF performance and condition over time.				
System Mechanical and Electrical Inspections & Maintenance						
Quarterly	External Cabling	Verify External System Cables Condition: • Inspect all external cabling and connections to tracking system. • Check all exposed cables and connectors for deterioration (sun damage), cuts and cracks. Check that all connectors are in good condition and are secure **(DO NOT OVERTIGHTEN CONNECTIONS IF LOOSE, tighten connectors with SOFT JAW PLYERS ONLY).** • Check cable ties for damage and replace them as required.				
Quarterly	Positioner Connections and Cables	Verify Positioner Connections and Cabling: • Check Antenna / Feed cables and connectors for fitness, damage and corrosion. Check that all connections are tight. **(DO NOT OVERTIGHTEN CONNECTIONS IF LOOSE, tighten connectors with SOFT JAW PLYERS ONLY).** • Inspect AZ and EL positioner connector panels, check all connectors and connections for fitness, cleanliness and condition. Check that all connections are secure **(DO NOT OVERTIGHTEN CONNECTIONS IF LOOSE, tighten connectors with SOFT JAW PLYERS ONLY).** • Check all cable ties for damage and replace them as required. Check that system cables will not be damaged during axes motion. Be sure cables are secured away from axis motion, which may damage cables when system is moved.				

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Period of Performance	**Assembly/Function**	**Action**	**Result**	**Date**	**Performed By**	**Notes**
Quarterly	Feed Box and all Interface Connections	Verify Feed Box Assembly Cables and Connections: • Verify that the yoke arm mounted feed box is securely attached to the system's yoke arm. Check that all interface cables are secure and in good working order. Check cables for cracks near the box interface plate or where cables are flexing due to system motion. Check that the feed box lid is secure and all fasteners are hand tight. Check all cable ties and replace as needed. • Check input/output pressurized air lines for condition (no cracks) and air leakage. If an air leak is suspected, spray air lines and connection interfaces with soapy water and look for bubbles, which indicate air leakage. Replace air lines as required, if air leaks are found. Contact factory service if severe air leaks are found for repair advise.				
Quarterly	Client Windows Computer Connections	Verify the Client Computer Connections: • Check all back panel connections to the Client Computer for fitness and condition. Check that all connections are clean and secure. Look for damaged cables and replace them as required.				
Quarterly	HTAC Controller	Verify HTAC Controller Connections: • Check all **HTAC** back panel cables for secure connections. • Inspect cables for damage. Replace damaged cables as required. • Check that all cables are in their correct positions and have not been moved to a different position. Check that cable labels are matched to their correct HTAC back panel connectors.				

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Period of Performance	**Assembly/Function**	**Action**	**Result**	**Date**	**Performed By**	**Notes**
Quarterly	Servo Amplifier Chassis Condition (Including external cable connections)	Verify the External Condition of the Servo Amplifier Unit and Attached Cabling: • Inspect all cable connections to the servo chassis connector plate. Check that all connections are clean, tight and rust free (check for external water damage if unit is mounted outdoors). **(DO NOT OVERTIGHTEN CONNECTIONS IF LOOSE, tighten connectors with SOFT JAW PLYERS ONLY or by hand).** • Check servo chassis for paint damage, signs of rust or mechanical damage to the enclosure. • Check the door mounted HVAC unit for signs of damage and dirt accumulation. Clean HVAC surfaces as required. Check that the internal fan is continuously running. You should hear the internal fan running when the servo assembly is powered ON. The internal fan continuously runs when the servo assembly is powered on. • Check that all door latches are snug and secure to prevent water incursion and dry air leakage. • The servo amplifier's HVAC unit should keep the internal temperature between 10º C and 50º C (or between about 50º F and 95º F). The external fan should be operating most of the time. If the fan is OFF and the servo chassis is overly warm, power down servo amplifier and check internal temperature.				
Quarterly	Positioners Internal Heaters. Climate Control Systems:(PD300, PD450, PD500 and PD750).	Verify Operation of the pedestal internal Heater Units: • For a PD300 system: With the system powered ON check the lower AZ hatches for the sound of a running fan. The upper EL housing will have a strip heater ONLY with no fan sound. • For a PD450 system: With the system powered ON listen to the lower hatch area for the sound of a running heater fan (depending on the outside temperature – temp below 70ºF). The upper EL housing employs a strip heater and will have no fan sound present. • For a PD500 system: With the system powered ON listen to the upper Elevation housing for the sound of a running heater fan. Also, listen for the sound of a running fan on a lower AZ hatch (when temp below 70º F). • For PD750 system: Check the lower AZ hatch and the upper EL housing hatch for the sound of running fans. • With the outside temperature below 70º F an IR thermometer aimed at the lower AZ and Upper EL hatches, should indicate a warmer pedestal interior (the system heaters are set to come on when the system inside temperature falls below 70º F).				

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Period of Performance	**Assembly/Function**	**Action**	**Result**	**Date**	**Performed By**	**Notes**
Quarterly	System Positioner Mechanical Condition.	Verify the Positioner's External Mechanical Condition: • Inspect the Positioner's exterior for signs of rust, corrosion, paint chipping and/or flaking, and contaminants. Remove damaged paint if possible and apply touchup paint as needed. • Check positioner for mechanical damage and excessive grease/oil leakage around the exterior moving edges of both the AZ and EL turntables. Minor oil leakage is normal and can be wiped off with a towel. Oily dust may accumulate around the outside edges of the system axes turntables (consult factory service if a severe oil leak flowing down the pedestal side from the turntable area is detected).				
Quarterly	Positioner Hatch Panels.	Verify the External Condition of all Positioner Hatch Covers: • Do not remove panels. Light amounts of silicone O-ring grease, oil residue around each hatch are normal. Wipe residue from around each hatch with a rag. • Inspect all hatch covers for mechanical condition. Check for corrosion and/or paint damage. Touch up paint as required. • Check all hatch bolts for unusual corrosion or damage. Check that all bolts are secure and tight. **Note: DO NOT OVERTIGHTEN Hatch Bolts. IF LOOSE, tighten hatch fasteners with screwdriver by hand ONLY, do not use power tools.**				

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Annually	Servo Amplifier Assembly Internal inspection	Verify the Internal Condition of the Servo Amplifier Unit: • With the servo powered ON, loosen the cover latches and open the lid to expose the servo's internal components and cabling. • Inspect all internal cables and modules for signs of electrical or mechanical damage (check for signs of cable heat damage or burning electrical smells). Look for loose cable connections and/or loose module connectors. Check for water incursion if the servo is located outside. • Visually inspect all breakers and check that all breakers are in the fully ON position. • Check that the HVAC internal fan is continuously running. • If loose cables or connectors are found, POWER OFF the servo assembly before attempting to secure the loose cables, connectors or wires (if unsure, consult factory service before attempting repairs or service of the internal servo amp components and/or wiring). **CAUTION: HIGH AC VOLTGE IS PRESENT IN THE SERVO ASSEMBLY. DO NOT TOUCH ACTIVE CIRCUITS. IF LOOSE CABLES, WIRES OR CONNECTORS ARE FOUND, POWER OFF THE SERVO ASSEMBLY BEFORE RE-CONNECTING OR TIGHTENING ANY LOSE COMPONENTS (IF UNSURE, CONTACT FACTORY SERVICE BEFORE ATTEMPTING REPAIRS).**				
Annually	Dehydrator Mechanical Maintenance	Verify the Dehydrator Mechanical Condition: • Remove the dehydrator cover and inspect the dehydrator internal components for signs of corrosion, water incursion and/or misc. damage. • Perform dehydrator maintenance per manufacturer recommendations by installing the vendors service components.				
Annually or 8000 Hours	Install the Altec P013479 (8000 hour) maintenance kit	Install the Altec Dehydrator 8000 Hour Maintenance Kit: • Install the Altec (PN P013479) dehydrator (1 year) maintenance kit • See the Altec P550W Series Air Dryer User's guide for install information.				

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Annually	Airlines and Airline Connections	Verify System Airlines and Airline Connections: • Check airlines for visible cracking and other forms of damage. • Check that all air hose ends are securely connected and no visual or audible air leaks evident. If an airline leak is suspected, spray the area with soapy water and check for bubbles forming at the air leak point. • Note: Air leaks may also occur around hatches and the lid of the servo assembly. Large air leaks may cause the dehydrator's air compressor to run continuously. Repair as required (consult factory service if severe air leaks are found or unsure of repair requirements).				
Annually	Reflector Assembly Condition	Verify the Reflector Assembly and Associated Hardware Condition: • Check the painted surfaces for missing or peeling paint. Check that painted surfaces have not become flakey or chalky and is free of rust runs. Look for signs of damage (i.e., hail damage, excessive bird droppings). • Clean surfaces with soap and water, as required.				
Annually	Sub-reflector Condition	Verify the Condition of the Sub-reflector and its Associated Hardware: • Check painted surfaces for missing or damaged paint. Check that paint has not become flakey or chalky and is free of rust runs with no signs of damage (i.e., hail damage, excessive bird droppings etc.). • Clean surfaces with soap and water, as required.				
Annually	Camera	Verify the Condition of the External IP Camera: • Check that all interface cables are secure to their connectors and are properly secured to the system structure. Check that they show no signs of mechanical or sun exposure damage. • Check for surface corrosion which may be visible on the camera's housing and associated hardware. • Check that the camera lens is unobstructed, damaged free and the lens cover glass is clean. It may be necessary to clean the camera's external glass cover more often than once a year. • If possible, do not stow the system at 90º Elevation. Park the EL axis at 0º when not in use (as the camera's cover glass will accumulate pooling dirt and water which may be difficult to clean over time, if the system is constantly kept at 90º EL).				

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Annually	Feed Support Structure Prime Focus	Verify the Condition of all Feed Support Hardware: • Check that All hardware is in place and torqued properly. Check that the feed support structures (Feed, Spars, Backup Structure) are corrosion or rust free. Check for signs of mechanical damage (i.e., hail, birds etc.).				
Annually	Feed(s) Assembly (Both SCM and Con-Scan feeds)	Verify the Condition of the Feed Assembly: • Check the condition of the feeds painted surfaces, inspect the condition of the feed's fiberglass cover, check for obvious signs of mechanical damage (i.e., hail and excessive bird droppings). Clean cover with soap and water as required. • Applies to both an SCM or Con-Scan feed.				
Annually	Stow Pins (Both Manual and Auto Stow)	Verify the Condition of the System Stow Pin(s): • Check that the pin is clean and free from corrosion. Check that the pin's detent button (manual stow) is free moving and the stow pin easily is removed and able to be inserted into both its "SAFE" and "RUN" positions (in and out of the hatch receptacle). • Clean the pin assembly with a non-abrasive cleaning pad, such as "Scotch Brite Light" pads and lube with a light oil (i.e., Tri-Flow TF0021060). • For an Auto-Stow system (optional), check that the auto insertion pin is clean and free from damage. Check that the pin is not rubbing on the yoke arm receptacle by looking for scrape damage to the sides of the pin. Check that the auto stow assembly unit is secure to the pedestal. Check that the auto stow assembly's control cable is in good condition and the connector is secure to the pedestal's lower cable interface panel.				

TABLE 3 - PERIODIC MAINTAINENCE LOG						
Period of Performance	**Assembly/Function**	**Action**	**Result**	**Date**	**Performed By**	**Notes**
Annually	AZ Gearbox Areas AZ Gearbox Area (Upper Pedestal Hatches)	Verify the Condition of the AZ Gearbox, Motor and Data Pack: • Open the Azimuth hatches just below the AZ turntable and inspect the internal condition of the pedestal and AZ gearbox. Look for excessive oil flow around and on the gear box. Minor oil seepage on the AZ gearbox can be wiped off with a towel. • Check all cabling in this area for damage or unusual cable wear. • Check the AZ Data Pack for unusual wear. Check that all associated cabling is secure. • Remove and replace the hatch “O” rings before re-installing the upper AZ hatches. The O-rings should be lightly coated with O-ring lube before reinstalling them into the hatch grove. When re-installing the hatch, ensure that the O-ring is in the hatch groove and not outside of the groove as the hatch will pinch the O-ring and not seal correctly, causing a severe dry air leak. • Tighten all hatch bolts by hand. DO NOT USE POWER TOOLS to snug up hatch bolts, as they can strip out or damage the hatch bolt inserts.				

TABLE 3 - PERIODIC MAINTAINENCE LOG						
Period of Performance	**Assembly/Function**	**Action**	**Result**	**Date**	**Performed By**	**Notes**
Annually	EL Gearbox Area (Elevation Housing Hatches	Verify Condition of the EL Gearbox, Motor and Data Pack: • Open the Elevation housing hatches and inspect the EL gearbox for signs of excessive oil leakage on the gearbox and on the floor of the EL housing. Minor oil seepage is normal and can be wiped off with a clean towel. • Check all cabling in this area and look for damaged or unsecured cables. • Check that the motor fastening bolts are secure and not lose. • Inspect the EL Data Pack for lose hardware and unusual wear or damage. • Check the RF cabling in this area for possible twisting damage and lose connections to the external side connector plate. Reach into the area behind the side connector plate and feel that both LH and RH cable SMA connectors are tight. If the cable attachment feels lose, tighten the SMA connector with a standard open end SMA wrench- (typically a small 5/16" open end wrench). • Replace all hatch "O" rings before re-installing any removed hatches. Ensure O-rings are coated with O-ring lube and are secure in their groove. Check that the O-ring is in place when the hatch is re-installed. If the O-ring comes out of the groove when the hatch is re-installed, the hatch will not seal the opening correctly, causing a dry air leak. • Tighten all hatch bolts by hand. DO NOT USE POWER TOOLS to snug up hatch bolts, as they can strip out or damage the hatch bolt inserts. **Note: Each harmonic drive/gearbox is rated for 20,000 hours of full load operation. Typically, no further additional grease will be needed for the duration or this time period.**				
Annually	Reflector and Backup Structure Fasteners	Verify Condition of Reflector and Backup Structure Fasteners: • Check and tighten (as required) all reflector, spars, feed and feed ring fasteners. Check for corrosion and tighten all fasteners as required. • Check backup structure fasteners (between dish and yoke arms) for corrosion and secure all fasteners as required.				
Annually	Counterweights	Verify Condition of Counterweight Hardware and Fasteners: • Check the condition of counterweight hardware, including the threaded rods and nuts for physical condition and security. • Tighten all fasteners as required.				