

EXHIBIT A
EQUIPMENT DESCRIPTIONS AND SERVICE REQUIREMENTS
IFB 6100053298

A. LINE ITEM #1. CMS Rooftop Mounted Systems located at 333 Market Street, Harrisburg, PA

1. **Equipment.** TVRO systems (Prodelin 3.0M C/Ku and Prodelin 3.7M C\Ku); Vertex Ku Band earth station antenna (3.8M Vertex Ku band Uplink).
2. **Requirements.** The following are specific, additional required maintenance duties that are to be included as part of the routine monthly maintenance program to insure uninterrupted and efficient operation of the satellite communications system.
 - a. Visual Inspection of roof-mounted structure. Ensure steel frame is painted and protected from rust. (Mount is maintained by the Commonwealth.)
 - b. Inspection of antenna and support surfaces for any formation of rust on electrical box mounts structures. Remove rust and resurface if necessary.
 - c. Inspection of electrical cables and conduits to and from electrical junction boxes. Cables should be tight and secure.
 - d. Inspection of conduit and power cables from disconnect panels to equipment and jack screw motors. Cables should be secure, and power should be energized.
 - e. Inspection of all equipment mounting hardware. Hardware should be tight and free of rust. Repair or replace mounting hardware if necessary.
 - f. Inspection of all control and RF cables to and from the equipment room. Cables should be secure.
 - g. Inspection of waveguide and RG-11 coaxial cable from the LNB. Cables should be secure and connections weather sealed.
 - h. Inspection of the wave guide from the conduit exit to the feed system. Flex Wave Guide should not be cracked or brittle.
 - i. Inspection of jack screws and protection boots. Protection boots should be flexible, and tubes should be lubricated.
 - j. Inspection of limit switches for Azimuth, Elevation and Polarization. Switches should be free to move and clear of debris.
 - k. Inspection of the feed horn and protective cover. The feed horn protective cover should be free from cracks and the polarizer gear should be free from debris and lubricated.
 - l. Inspection of the polarizer sensor gears and control wires. Gear should be free of debris and wires secure.
 - m. Inspection of ground wire and connection. Wire should be securely connected to the antenna frame and securely connected to earth ground.
 - n. Inspection of the safety cables on each TVRO antenna to ensure antenna will remain on roof in the event of a mount failure due to high wind.

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B. LINE ITEM #2. CMS Operations Center Master Control located at 333 Market Street, Harrisburg, PA

1. Requirements. The following are specific, additional required maintenance duties that are to be included as part of the routine monthly maintenance program to insure uninterrupted and efficient operation of the satellite communications system.
 - a. Verify that the HD Video Encoders are free from alarms and output is set to correct level and frequency as displayed on the spectrum analyzer. Set transmit and receive frequencies to the same frequency.
 - b. Verify that the Digital Video Receivers are free from alarm and proper operation is desired with reception of a video signal.
 - c. Verify that the Anasat Control Software is operational, and the converters are free from alarms and set to the proper level and frequency. Measure output spectrum with spectrum analyzer to confirm proper operation.
 - d. Verify proper travel of the antenna using the antenna control system. Steer each dish to each limit in azimuth, elevation and polarity and verify that the location indicators change at a constant rate until each limit is reached.
 - e. Verify that the TVRO antenna controllers have the correct locations preprogrammed in for each satellite. If not, recalibrate the controller. Steer the satellite dish back to the most often used satellite.
 - f. Remove the output coaxial cable on the Digital Video Modulators and Verify that -20dBm output at L-Band is present and the signal is proper. Use the Spectrum Analyzer to verify correct frequency and power level.
 - g. Verify that HPA's are operating to manufacturer specs.
 - h. Enable the "B" transmit side uplink to the online position, which will position the "A" side into the dummy load.
 - i. Enable the "A" side HPA and verify that no alarms are present and drive power is displayed into the HPA. Power should be at +50dbm as displayed on the HPA. Using a microwave Spectrum Analyzer, verify that the signal is clean with harmonics at least 30db down from main carrier. Increase the gain to maximum and measure HPA output power to ensure proper performance. Mute the HPA.
 - j. Enable the "A" transmit side to the online position, which will position the "B" side into the dummy load.
 - k. Enable the "A" side HPA and verify that no alarms are present and drive power is displayed into the HPA. Power should be at +50dbma displayed on the HPA. Using a microwave Spectrum Analyzer, verify that the signal is clean with harmonics at least 30db down from main carrier. Increase the gain to maximum and measure HPA output power to ensure proper performance. Mute the HPA.

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- l.** Obtain satellite transponder space and set uplink system to the correct frequency and satellite. Bring the system online and verify good satellite loop back by monitoring downlink signal.

C. LINE ITEM #3. CMS Uplink Truck, Data/Video Trailers, and Data Uplink Trailers, various locations

- 1.** CMS Uplink Truck (1) – 2 Antennas - Ku Auto deploy Tx/Rx, Ka Auto deploy Tx/Rx
- 2. Requirements.** The following are specific, additional required maintenance duties that are to be included as part of the routine monthly maintenance program to insure uninterrupted and efficient operation of the satellite communications system.
 - a.** Visual Inspection of roof-mounted structure to ensure steel frame is painted and protected from rust.
 - b.** Inspection of antenna and support surfaces for any formation of rust on electrical box mounts structures. Remove rust and resurface if necessary.
 - c.** Inspection of electrical cables and conduits to and from electrical junction boxes. Cables should be tight and secure.
 - d.** Inspection of conduit and power cables from disconnects panels to equipment and jack screw motors. Cables should be secure, and power should be energized.
 - e.** Inspection of all equipment mounting hardware. Hardware should be tight and free of rust. Repair or replace mounting hardware if necessary.
 - f.** Inspection of all control and RF cables to and from the equipment control area. Cables should be secure.
 - g.** Inspection of waveguide and RG-11 coaxial cable from the LNB. Cables should be secure and connections weather sealed.
 - h.** Inspection of the wave guide from the conduit exit to the feed system. Flex Wave Guide should not be cracked or brittle.
 - i.** Inspection of jack screws and protection boots. Protection boots should be flexible, and tubes should be lubricated.
 - j.** Inspection of limit switches for Azimuth, Elevation and Polarization. Switches should be free to move and clear of debris.
 - k.** Inspection of the feed horn and protective cover. The feed horn protective cover should be free from cracks and the polarizer gear should be free from debris and lubricated.
 - l.** Inspection of the polarizer sensor gears and control wires. Gear should be free of debris and wires secure.
 - m.** Inspection of ground wire and connection. Wire should be securely connected to the antenna frame and securely connected to truck ground.

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D. LINE ITEM #4. PEMA Uplink Trucks, Data/Video Trailers, and Data Uplink Trailers, various locations

1. PEMA Uplink Trucks (2) – Ku Auto deploy Tx/Rx – Broadcast Video via cellular and satellite; PEMA Data/Video Trailers (2) – Ku Auto deploy Tx/Rx; and PEMA Data Uplink Trailers (3) – Ku Auto deploy Tx/Rx.
2. Requirements. The following are specific, additional required maintenance duties that are to be included as part of the routine monthly maintenance program to insure uninterrupted and efficient operation of the satellite communications system.
 - a. Visual Inspection of roof-mounted structure to ensure steel frame is painted and protected from rust.
 - b. Inspection of antenna and support surfaces for any formation of rust on electrical box mounts structures. Remove rust and resurface if necessary.
 - c. Inspection of electrical cables and conduits to and from electrical junction boxes. Cables should be tight and secure.
 - d. Inspection of conduit and power cables from disconnects panels to equipment and jack screw motors. Cables should be secure, and power should be energized.
 - e. Inspection of all equipment mounting hardware. Hardware should be tight and free of rust. Repair or replace mounting hardware if necessary.
 - f. Inspection of all control and RF cables to and from the equipment control area. Cables should be secure.
 - g. Inspection of waveguide and RG-11 coaxial cable from the LNB. Cables should be secure and connections weather sealed.
 - h. Inspection of the wave guide from the conduit exit to the feed system. Flex Wave Guide should not be cracked or brittle.
 - i. Inspection of jack screws and protection boots. Protection boots should be flexible, and tubes should be lubricated.
 - j. Inspection of limit switches for Azimuth, Elevation and Polarization. Switches should be free to move and clear of debris.
 - k. Inspection of the feed horn and protective cover. The feed horn protective cover should be free from cracks and the polarizer gear should be free from debris and lubricated.
 - l. Inspection of the polarizer sensor gears and control wires. Gear should be free of debris and wires secure.
 - m. Inspection of ground wire and connection. Wire should be securely connected to the antenna frame and securely connected to truck ground.

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- n. Verify that the HD Video Encoders and modems are free from alarms and output is set to correct level and frequency as displayed on the spectrum analyzer. Set transmit and receive frequencies to the same frequency.
- o. Verify that the Digital Video Receivers are free from alarm and proper operation is desired with reception of a video signal.
- p. Verify that block upconverters are free from alarms and set to the proper level and frequency. Measure output spectrum with spectrum analyzer to confirm proper operation.
- q. Verify proper travel of the antenna using the antenna control system. Steer each dish to each limit in azimuth, elevation and polarity and verify that the location indicators change at a constant rate until each limit is reached.
- r. Verify that the antenna controllers have the correct locations preprogrammed in for each satellite. If not, recalibrate the controller.
- s. Remove the output coaxial cable on the Digital Video Modulators and Verify that -20dBm output at proper frequency is present and the signal is proper. Use the Spectrum Analyzer to verify correct frequency and power level.
- t. Verify that HPA's/TWTA's are operating to manufacturer specs.
- u. Enable the "B" transmit side uplink to the online position, which will position the "A" side into the dummy load.
- v. Enable the "A" side HPA/TWTA and verify that no alarms are present and drive power is displayed into the HPA. Power should be at +50dbm as displayed on the HPA. Using a microwave Spectrum Analyzer, verify that the signal is clean with harmonics at least 30db down from main carrier. Increase the gain to maximum and measure HPA output power to ensure proper performance. Mute the HPA.
- w. Enable the "A" transmit side to the online position, which will position the "B" side into the dummy load.
- x. Enable the "A" side HPA and verify that no alarms are present and drive power is displayed into the HPA. Power should be at +50dbma displayed on the HPA. Using a microwave Spectrum Analyzer, verify that the signal is clean with harmonics at least 30db down from main carrier. Increase the gain to maximum and measure HPA output power to ensure proper performance. Mute the HPA.
- y. Obtain satellite transponder space and set uplink system to the correct frequency and satellite. Bring the system online and verify good satellite loop back by monitoring downlink signal.

E. LINE ITEM #5. CMS Earth Mounted Systems located at Fort Indiantown Gap, Annville, PA

1. Equipment. Vertex 9m Ku Band TX/RX Earth station antenna and C band TVRO antenna

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2. **Requirements.** The following are specific, additional required maintenance duties that are to be included as part of the routine monthly maintenance program to insure uninterrupted and efficient operation of the satellite communications system.
- a. Visual Inspection of earth-mounted structure. Ensure steel frame is painted and protected from rust.
 - b. Inspection of antenna and support surfaces for any formation of rust on electrical box mounts structures. Remove rust and resurface if necessary.
 - c. Inspection of electrical cables and conduits to and from electrical junction boxes. Cables should be tight and secure.
 - d. Inspection of conduit and power cables from disconnects panels to equipment and jack screw motors. Cables should be secure, and power should be energized.
 - e. Inspection of all equipment mounting hardware. Hardware should be tight and free of rust. Repair or replace mounting hardware if necessary.
 - f. Inspection of all control and RF cables to and from the equipment room. Cables should be secure.
 - g. Inspection of waveguide and RG-11 coaxial cable from the LNB. Cables should be secure and connections weather sealed.
 - h. Inspection of the wave guide from the conduit exit to the feed system. Flex Wave Guide should not be cracked or brittle.
 - i. Inspection of jack screws and protection boots. Protection boots should be flexible, and tubes should be lubricated.
 - j. Inspection of limit switches for Azimuth, Elevation and Polarization. Switches should be free to move and clear of debris.
 - k. Inspection of the feed horn and protective cover. The feed horn protective cover should be free from cracks and the polarizer gear should be free from debris and lubricated.
 - l. Inspection of the polarizer sensor gears and control wires. Gear should be free of debris and wires secure.
 - m. Inspection of ground wire and connection. Wire should be securely connected to the antenna frame and securely connected to earth ground.
 - n. Inspection of the safety cables on the TVRO antenna to ensure antenna will remain on roof in the event of a mount failure due to high wind.

F. LINE ITEM # 6. CMS Antenna Control located at Fort Indiantown Gap, Building 5-180, Annville, PA

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1. **Requirements.** The following are specific, additional required maintenance duties that are to be included as part of the routine monthly maintenance program to insure uninterrupted and efficient operation of the satellite communications system.
 - a. Verify that the HD Video Encoders are free from alarms and output is set to correct level and frequency as displayed on the spectrum analyzer. Set transmit and receive frequencies to the same frequency.
 - b. Verify that the Digital Video Receivers are free from alarm and proper operation is desired with reception of a video signal.
 - c. Verify that the Anasat Control Software is operational, and the converters are free from alarms and set to the proper level and frequency. Measure output spectrum with spectrum analyzer to confirm proper operation.
 - d. Verify proper travel of the antenna using the antenna control system. Steer each dish to each limit in azimuth, elevation and polarity and verify that the location indicators change at a constant rate until each limit is reached.
 - e. Verify that the TVRO antenna controllers have the correct locations preprogrammed in for each satellite. If not, recalibrate the controller. Steer the satellite dish back to the most often used satellite.
 - f. Remove the output coaxial cable on the Digital Video Modulators and Verify that -20dBm output at L-Band is present and the signal is proper. Use the Spectrum Analyzer to verify correct frequency and power level.
 - g. Verify that HPA's are operating to manufacturer specs.
 - h. Enable the "B" transmit side uplink to the online position, which will position the "A" side into the dummy load.
 - i. Enable the "A" side HPA and verify that no alarms are present and drive power is displayed into the HPA. Power should be at $+50\text{dbm}$ as displayed on the HPA. Using a microwave Spectrum Analyzer, verify that the signal is clean with harmonics at least 30db down from main carrier. Increase the gain to maximum and measure HPA output power to ensure proper performance. Mute the HPA.
 - j. Enable the "A" transmit side to the online position, which will position the "B" side into the dummy load.
 - k. Enable the "A" side HPA and verify that no alarms are present and drive power is displayed into the HPA. Power should be at $+50\text{dbma}$ displayed on the HPA. Using a microwave Spectrum Analyzer, verify that the signal is clean with harmonics at least 30db down from main carrier. Increase the gain to maximum and measure HPA output power to ensure proper performance. Mute the HPA.
 - l. Obtain satellite transponder space and set uplink system to the correct frequency and satellite. Bring the system online and verify good satellite loop back by monitoring downlink signal.