

**Statement of Work for:
COMM 3 Controller Integration
SOW: AFRC-COM-001
April 3, 2014**

1.0 General Scope of Work

Arcata, Inc. prepared this Statement Of Work (SOW) on behalf of the National Aeronautics and Space Administration (NASA) at the Armstrong Flight Research Center (AFRC)

This document covers the SOW for the integration of Telemetry & Communications Systems, Inc. (TCS) ACU-M1 Antenna Control Unit (ACU) and TCS Pedestal Interface Unit (PIU) with Government Furnished Equipment (GFE) 20 foot reflector and pedestal components. Hereafter in this document these integrated systems will be referred to as the COMM 3 Controller Integration.

This system will be utilized by NASA AFRC Communications Facility for support of missions requiring high-gain communications such as Human Space Flight operations using Low Earth Orbiting Vehicles and long range aeronautical research missions.

The COMM 3 Controller Integration is operated in adverse environmental conditions and is used for mission critical applications and therefore it must be highly reliable.

2.0 Applicable Documents

The attached COMM 3 Controller Integration Requirements Document, AFRC-COM-01-001, contains detailed requirements for the Comm 3 Controller Integration and is the superseding compliance document.

3.0 Requirements

3.1 COMM 3 Controller Integration

The following GFE hardware shall be integrated at the vendor's facility for the COMM 3 Controller Integration:

- a. R.P.M. Pedestal T-Head (P/N PG2504A, S/N 003, and ECN 1976921), hereafter referred to as the T-Head.

- b. TCS ACU-M1 antenna controller (P/N 300110-J1151, S/N A1153, and ECN 3064891)

- c. TCS PIU (P/N 115110-01, S/N S1008)

- d. TCS azimuth servo drive system (P/N 304469-01)
- e. TCS elevation servo drive system (P/N 304469-01)

The vendor shall supply the following:

- a. Upgrade the GFE ACU-M1 Antenna Controller hardware, firmware and software to be the most current revision. The GUI shall be configured to meet NASA AFRC requirements.
- b. The GFE PIU assembly shall be upgraded and repackaged to bring the PIU up to the latest revision of hardware and firmware. The PIU / servo drive system shall be packaged in a vendor supplied enclosure which must be mounted inside of the equipment rack (W= 19", Depth= 24", Height= 36") inside the pedestal on Building 4870 at NASA AFRC.
- c. A 44 ring slip ring package capable of supporting the Comm 3 Controller Integration requirements.
- d. NTSC video 36X camera with a focal length of 3.3 millimeters to 119 millimeters with zoom and focus lens controllable from the TCS ACU-M1 GUI. The video signal shall be converted from copper to fiber and sent to the ACU-M1.
- e. Provide system integration, including cabling and hardware between the GFE T-Head, GFE servo drive system, GFE 3 channel rotary joint, camera, slip ring assembly and all the pedestal connections, data packs, limit switches, encoders/synchros, brake release switches, interlock switches, etc.
- f. System documentation including packing slip (list of delivered items), invoice, and certificate of compliance, drawings, system description, parts lists, recommended spares, Acceptance Test Procedure (ATP) and other information required to maintain the system.
- g. The vendor shall provide a means to remotely control the T-Head servo system using a control box connected to the PIU. The control box cable shall be a minimum of 50 feet in length.

If the vendor's facility is more than 200 miles from NASA AFRC the vendor shall provide shipping of the GFE to and from their location for the COMM 3 Controller Integration factory integration. The shipping cost shall be provided in the vendor's proposal. If the vendor's facility is less than 200 miles from NASA AFRC NASA will provide shipping back to and from NASA AFRC.

3.1.1 Acceptance Testing

The COMM 3 Controller Integration vendor shall successfully perform factory and on site (NASA AFRC) ATP of the GFE and vendor supplied components.

The vendor shall electronically deliver to NASA for review the factory ATP documentation for the Comm 3 Controller Integration a minimum of one week in advance of the planned factory ATP. The vendor shall provide a minimum of one week's notice to NASA prior to vendor's factory ATP. NASA personnel will review and provide feedback on the factory ATP documentation prior to the factory ATP being performed. NASA personnel will witness, verify, approve and sign off on the factory ATP. The onsite ATP shall be conducted at NASA AFRC Building 4870 once assembly and installation is complete. The vendor shall deliver to NASA for review detailed customer on-site ATP documentation a minimum of one week prior to the customer on-site ATP. The vendor shall perform an on-site ATP of all the GFE and vendor supplied associated hardware and software. NASA personnel will witness, verify, approve and sign off on the on-site ATP. The vendor's work shall result in an operational system that meets or exceeds NASA AFRC's requirements and specifications.

3.2 Quality Assurance

The vendor shall meet the technical and quality assurance requirements specified in the attached COMM 3 Controller Integration, AFRC-COM-01-001 Requirements Document and the NASA Quality Assurance Program Policy, NPD 8730.5B

3.3 Users Manuals

Vendor shall deliver two (2) copies of the user's manuals to include photographs, charts, drawings and diagrams which address operation and maintenance of the COMM 3 Controller Integration hardware at the time of product delivery.

4.0 Schedule

The vendor shall meet the delivery schedule specified in the key milestones specified below. Failure to meet a key milestone may result in contract cancellation at no additional cost to the purchaser.

4.1 Key Milestones

4.1.1 COMM 3 Controller Integration Completion - 50 days ARO

4.1.2 COMM 3 Controller Integration Partial ATP - 55 days ARO

4.1.3 AFRC on-site Integration and ATP - 65 days ARO

4.2 Deliverables

The vendor shall provide cost estimates for deliverables; 4.2.1 and 4.2.2 as specified below. The purchaser reserves the right to purchase any or all of these deliverables as specified in the cost estimate.

4.2.1 Completion of COMM 3 Controller Integration Partial ATP - 55 days ARO

4.2.2 Completion of AFRC on-site ATP - 65 days ARO

5.0 Warranty

The vendor shall provide a minimum of a one year warranty on parts, materials and workmanship.

6.0 Reference Documents

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