PURCHASE DESCRIPTION
FOR
Dual Axis Digital Autocollimator

1. **SCOPE:** The Dual Axis Digital Autocollimator (DADA) is an optical device used by the Air Force Precision Measurement Equipment Laboratories (PMELs) for calibrating fixtures, abnormal polygons, Heads Up Displays, and Guidance Systems.

2. **PERFORMANCE REQUIREMENTS:**

2.1. Range: Range for the DADA shall be at least +/- 500 arc-second in both axis.

2.2. Accuracy: The DADA Accuracy shall be +/- 0.5 arc-second or better in both axis. Accuracy shall be valid for measurements up to 8 feet away from the front face of the autocollimator.

2.3. Repeatability: Repeatability for the DADA shall be at least +/- 0.1 arc-second.

2.4. Aperture: Aperture for the DADA shall be 2.0 inches +/- 0.5 inches.

2.5. Units: The DADA shall be capable of displaying measurement units in Milliradians (mils), Decimal Degrees (°), Arc-Second ("), Micrometer/meter (μm/m), and Degrees (°)-Minutes (')-Arc-Second ").

2.6. Sign Convention: The autocollimator will have the following sign convention:

2.6.1. When the X-axis is horizontal: From the viewpoint of the autocollimator looking toward the mirror, a rotation of the mirror such that the right side moves toward the autocollimator and the left side moves away from the autocollimator will cause the measured angle indication to increase.

2.6.2. When the Y-axis is vertical: From the viewpoint of the autocollimator looking toward the mirror, a rotation of the mirror such that the top moves toward the autocollimator and the bottom moves away from the autocollimator will cause the measured angle indication to increase.

2.7. Minimum Reflective Surface: The DADA shall be capable of taking readings off of a highly reflective surface as small as 0.25 inches in diameter.

3. **FUNCTIONAL REQUIREMENTS:**

3.1. User Interface: The DADA shall have an LCD Display with PC user interface controls.

3.2. Ancillary Equipment:

3.2.1. The DADA shall be equipped with a supporting mounting fixture with leveling adjustments in both X and Y axis.

3.2.2. The DADA shall be equipped with all necessary cabling, and functional equipment needed for normal operation to meet all requirements of this Purchase Description.

3.2.3. The DADA shall come with an alignment aid.

3.2.4. The DADA Shall come with a Right Angle Target mirror in mount.

3.2.4.1. Mirror Flatness shall not exceed 3µin over center 85% of mirror face.

3.2.4.2. Mirror shall have back to back (dual sided) mirrors.
3.2.4.3. Mirror faces shall be parallel within 1 arc-sec.
3.2.4.4. Mirror faces shall be perpendicular to mirror mount base within 5 arc-sec
3.2.4.5. Mirror mount base shall have pads on the side that are square to the mirror within 10 arc-sec.
3.2.4.6. Mirror diameter shall be between 2 and 5 inches.
3.2.4.7. Center of mirrors shall be in line with the DADA when installed in its supporting mounting fixture within ±0.5 inches.

3.3. Warm-Up Time: The DADA shall meet all specifications contained in this purchase description after a warm-up time not to exceed 30 minutes.

3.4. Operation Time: The DADA shall meet the specifications of this purchase description and will not display any intermittent characteristics of overheating or "Erroring out" for an extended period of not less than 48 hours of continuous operation in the AFPSL operational environment.

3.5. Distance Input: The DADA shall not require user inputs of distance to target or environment conditions to produce measurements.

3.6. Roll: The DADA shall be able to roll about the body's central axis, which is defined as the axis perpendicular to the X-Y measurement plane; and remain at any roll position from 0 to 90 degrees. 90 degree roll shall allow for the X and Y axes to swap positions. The DADA shall have the capability to be secure at any position throughout the roll.

3.7. Network: The DADA shall be an isolated system (NO Internet Access).

3.8. Adjustment: The DADA shall be provided with adjustment/alignment capability that can be performed by the user.

4. MECHANICAL & PHYSICAL REQUIREMENTS:

4.1. Display:

4.1.1. The digital display shall be readable from 5 feet away. The display shall show both crosshair and numerical output.

4.1.2. If equipped with an external controller, controller must run on Windows 11 LTSC or higher. Controller must be capable of having a minimum of 5 additional non admin user logins. Any software must be able to run on a non admin user account.

4.1.3. The display shall be capable of communicating with a PC through common industry serial ports, such as a RS 232 or USB.

4.2. Dimensions and Weight: The DADA Length x Width x Height shall be no larger than 24 inches x 10 inches x 10 inches, and weigh no heavier than 30 lbs.

4.3. Leveling Base: The autocollimator will be supplied with a leveling base that will allow fine adjustment in azimuth and elevation with a range of at least ± 3°.

4.4. Model and Serial Number Identification: The DADA shall be identifiable by manufacturer, model or part number, and serial number for identification. Unique item identification shall follow the item Identification and Valuation clause as stated in the contract.

4.5. Shipping Case:

4.5.1. A reusable Shipping Case shall be rugged, waterproof, and fit the Dual Axis Autocollimator, display, remote, any cables needed for set up, and user's manual.

4.5.2. Shipping Case shall be capable of repeated opening and closings without degradation of the reusability of the case.

4.5.3. Shipping Case shall be labeled that identifies noun, model or part number, manufacturer, and serial number. Unique item identification shall follow the item Identification and Valuation clause as stated in the contract.

4.5.4. Shipping Case shall be secured using latches and have carrying handles capable of supporting the weight of DADA and all components.

4.5.5. Shipping Case will be inspected by the Air Force and shall be free from any defects (i.e. poor molding fabrication, loose materials, damaged or improperly assembled cases, peeling, or chipping of plating or finish, nicks or burrs of metal parts, and post molding warping) which affect durability, strength, safety, or serviceability. The finish of exposed edges/surfaces shall be smooth and free of sharp or jagged edges.

4.5.6. Shipping Case shall have cushioning and mounting provisions inside the case that provides protection to prevent damage from normal handling during transportation.

4.5.7. Shipping Case interior material shall be manufactured from a material that will not corrode any part of the Dual Axis Autocollimator; the material shall be oil resistant and not deteriorate.

4.6. Operating Environment/Storage: The DADA shall be capable of operating to the specifications listed above in paragraph 2.0 in temperatures of 67 to 79 °F with a Relative Humidity (RH) of 20% to 45%. The DADA shall be capable of being stored 0° F to 130 °F, with a RH less than 85%.

4.7. Grounding: The DADA shall be properly grounded through the power supply.

4.8. Warranty: The DADA shall have a minimum of a 3 year manufacturer warranty to cover both hardware and firmware.

5. DISPLAY REQUIREMENTS:

5.1. Firmware Identification: All firmware used in conjunction with the DADA shall be identified by Name, Version, and Date; to be displayed upon startup or located in an "About" menu in the firmware.

5.2. Operational Requirements: The DADA Display shall be capable of being zeroed in absolute, and relative.

6. OPERATOR'S MANUAL: The DADA shall come with a Commercial Off The Shelf (COTS) operator's manual describing features and functions, assembly and start up, operation, instructions and troubleshooting, technical data, alignment/adjustment process, maintenance and care, remote communication commands, and warranty.

7. ENVIRONMENT, SAFETY, AND OPERATIONAL HEALTH:

A combination of the system manual, other documentation, and/or the system itself shall identify potential environment, safety and operational health hazards and how they are mitigated when the design itself cannot mitigate them. This will be accomplished through stating the hazard and accompanying mitigation through the use of safety devices, use of warnings, or use of special operational procedures to counter such hazards.

8. **TESTING:** This item will be inspected and accepted at destination as stated in the contract. The item will be checked with test equipment with parameters equal to or better than those required to ensure that specified performance parameters are met. Test equipment has first echelon certification directly traceable to the International System of Units through the National Institute of Standards and Technology (NIST) or other AFMETCAL approved sources where required. Tests will be performed to ensure that the item meets the requirements of this purchase description. Such testing at destination does not relieve the contractor of performing all inspections and quality checks at the point of manufacture as necessary to assure performance as specified herein.

Attachment:
Data Requirements