PPPL

Product Requirements List
Photogrammetry Metrology Equipment

PPPL-PRL-18-001-00

December 6, 2007

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RECORD OF REVISIONS

Revision	Date	ECP	Description of Change
Rev. 0	12/6/2007		Initial Release

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1.0 SCOPE

This requirements list covers the procurement of Photogrammetry Equipment for the Princeton Plasma Physics Laboratory (PPPL) to support measurement and assembly operations.

2.0 REQUIREMENTS

This photogrammetry metrology package will be used to supplement existing mechanical measurement systems (FARO/Romer arms, Laser Trackers, and Verisurf and PowerINSPECT metrology software).

2.1 General Requirements of Photogrammetry System

The photogrammetry system shall be required to replace and/or extend the capabilities of Laser Trackers and pCMM arms for close distance (2-5 meters) and medium distance (3-20 meters) metrology. It shall include the following features and capabilities:

- Digital camera/capture system for taking the image data. Wireless transfer to computer is preferable to expedite preprocessing. Hardware shall include a protective carrying case.
- Laptop computer with software package for processing data.
- Length standard(s) - N.I.S.T. certified (or PPPL-approved equivalent). Appropriate for distances mentioned above and to be used with 5 cubic meter volume
- Capability to accept/import nominal coordinate data from existing CAD and Metrology software (versions current to this date), and work within the CAD part coordinate system.
- Characterize the fiducialized component (using standard Hubbs reflectorized targets)
- Perform best fit transformations.
- Provide distortion/deformation/translation analysis.
- Output/Export to a format that is compatible with existing CAD and Metrology software.
- Hardware/software manuals.
- Certificate of calibration for applicable components (N.I.S.T. traceable standards, camera system, etc)

2.2 Salient Characteristics

The proposed Photogrammetry systems shall be evaluated against the following criteria:

2.2.1 Performance - 40% of evaluation

- Accuracy
- Precision
- Resolution
- Speed, in regards to handling multiple projects, allowing use of system in as many as 3 parallel measurements
- Allow simultaneous use of multiple camera systems

2.2.2 Software - 30% of the evaluation

- User Interface
- Ability to handle multiple projects, allowing use of system in as many as 3 parallel measurements.
- Allow simultaneous post processing of multiple projects
- Learning Curve – expected time for someone with Laser tracker experience to gain proficiency
- Data output compatibility with existing PPPL metrology software (Verisurf 9.1-R28 and Delcam PowerINSPECT 4.315-SP1)
- Data output compatibility with existing PPPL CAD software (ProEngineer Wildfire 2.0)
- Availability of coded targets, sufficient in number to permanently apply to individual components as they are brought together into a larger assembly. Vendor to specify the maximum possible number of targets available.

2.2.3 Support/Service - 20 % of the evaluation

- **Hardware**:
  - Service agreements
  - Turn around time for replacement during warranty period
  - Turn around time for replacement out of warranty period
- **Software**:
  - Software Maintenance Agreement
  - Software updates
  - Software support, both by phone and/or on-site
  - Training availability at vendor location or on-site (PPPL)

2.2.4 System Upgradability - 10% of the evaluation

- Cost of incremental upgrade to 2 systems
- Trade-in program for hardware should substantially better hardware become available within the warranty period

2.3 Recommended Sources

- AICON (DPA-PRO system)
- GSI (VSTARS E4X or INCA3 systems)
- GOM (TRITOP system)