

Statement of Work

Surphaser Laser Scanning System

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National Aeronautics and Space Administration
Dryden Flight Research Center
Edwards, California
Background

The National Aeronautics and Space Administration (NASA) Dryden Flight Research Center (DFRC) regularly incorporates hardware and instrumentation into its varied aircraft fleet. Independently and/or in conjunction with outside entities, DFRC purposes to research and develop new and existing flight technologies. A deficiency, however, exists with regard to aircraft drawings and/or models. This lack of data significantly hinders the accuracy and efficiency with which hardware and instrumentation designs are performed. Reverse engineering often proves cumbersome, difficult, and tedious, sometimes requiring several attempts and iterations to accommodate a given environment.

Objectives

This statement of work aims to equip NASA DFRC with a new ability to quickly and independently obtain highly accurate and detailed dimensional data over very large areas (e.g., aircraft surface profiles, areas, clearances, curvatures, distances, hole patterns, interfaces, offsets, volumes, etc.). Moreover, this reverse engineering capability intends to drastically aid and improve the design of hardware, creation of computational fluid dynamics (CFD) models, and instrumentation installations, as well as increase the efficiency of the tasked engineer.

Scope

This statement of work applies to NASA DFRC, its branches, engineers, and any and all employees appointed to a design/CFD task requiring and benefiting from reverse engineering.

Requirements

NASA DFRC has identified and requires a system/solution comprised of (i) a phase-shift metrology scanner, (ii) support equipment for the scanner

(i) The phase-shift metrology scanner shall include:

- A working range of 1-35 m or greater
- Range noise (1σ), of 0.07mm @10m or better
- Range uncertainty of <0.5mm @5m
- 360° (H) x 270° (V) Working field of view
- Completely wireless operational capability
 - Minimum 1.5 hour duration on battery
 - Two batteries
 - Battery charger
- Wired operational capability
- Scan density control
 - Vertical: 24-90 points/degree or greater
 - Horizontal: 10-90 points/degree or greater
- Minimum 1 year warranty on parts and labor
- Minimum 2 days on-site training (DFRC)

(ii) The support equipment for the scanning system shall include:

- A ruggedized travel case for scanner
- Spherically mounted retroreflector (SMR) compatible black & white target set with case
- An assortment of black and white target stickers
- Jib-Arm
 - Must provide for 2-16ft vertical elevation of scanner
 - Weighs less than 75lbs without counterbalance weights

- Minimum 30lb payload capacity
 - Includes
 - Steel, aluminum, and/or carbon fiber construction
- Jib –Arm hard carrying case
- Compatible tripod with dolly or wheeled pedestal
 - Can support ground movement of jib arm when properly configured
 - Locking, swiveling castors
- Low profile scanner stand
 - Must support 30lbs minimum
 - Compatible with scanner attachment
 - Provides for between 0-8in vertical height, adjustable or non-adjustable
 - Steel, aluminum, and/or carbon fiber construction
- 3/8" Female thread to 5/8" male thread camera base adaptor
- 3.5x11 Female thread to 5/8" male thread tripod adaptor
- Point feet compatible with Brunson Tetralock 400S-D metrology stand
- Tripod tilt head
 - Must support 22lbs minimum
 - Provides +30° and -90° frontal tilt & ±7.5 lateral tilt
 - Integrated bubble level
 - 360° of panning adjustment
- Tripod
 - Must support 44Lbs minimum
 - Adjustable height from 17.3" to 105"
 - Less than 20lbs item weight
- Tripod dolly
 - Must support 125lbs minimum
 - Individually lockable wheels
 - Foldable
 - Compatible with Tripod
- Laptop Cart
 - All steel construction
 - Lockable cabinet
 - 200lb minimum weight capacity
 - Adjustable height (32"-42"H minimum)
- Top surface area of 24" W x 18" D minimum
- Jib-arm counterbalance weight set
 - Provides assortment of weights to allow for full adjustment range of jib-arm with mounted scanner and tilt head
 - Compatible with Jib-arm