GOM Italia Srl
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Partita IVA IT07100640965

GOM Italia Srl Via della Resistenza 121/A IT-20090 Buccinasco (MI)

Spett. le

Politecnico di Milano
Att.ne Ing. Bernasconi Andrea
Milano (CT)

11.07.2018

**Offer 127/18 Aramis adjustable base 6M**

Thank you for your interest in our products.

Please find enclosed our offer on our ARAMIS Adjustable 6M system.

This system excels by high resolution. Thereby, measuring areas of approx. 15 x 12 mm² up to approx. 1,500 x 1,200 mm² can be realized.
In full resolution of 6 megapixels (2750 x 2200 pixels) up to 25 images per second can be recorded. Alternatively, with reduced resolution, a higher frame rate of up to 44 images per second can be realized.

In addition to the sensor with the specified measuring lenses and calibration objects, the complete system, as listed in Item 1, contains an image processing station.

The GOM Testing Controller allows controlling simple and complex image acquisition and can record up to 8 analog channels synchronously to recording the images.

In case you need further information or have any questions, please do not hesitate to contact us.

Yours sincerely

GOM Italia Srl

Gianluigi Burburan

**Offer ARAMIS adjustable 6M**

**ARAMIS Adjustable 6M system**

GOM Italia Srl
Via della Resistenza 121/A
20090 Buccinasco (MI)

C.F./ P.IVA e iscrizione al registro
imprese di Milano: 07100640965
Nr. R.E.A. 1935553, Cap. soc. 50.000 €

**Item 1: ARAMIS Professional Line consisting of:**

**ARAMIS Adjustable 6M sensor head**

- Stable camera frame, length 500 mm
- Two camera mounts to hold and adjust the cameras without additional tools
  - Fast adjustment of the camera distance
  - Height adjustment with supplementary fine adjustment
  - Stable interlock of the camera positions
- 2 x 6M pixel cameras
  - 2750 x 2200 pixels
  - Frame rate up to 25 Hz, with reduced resolution up to 44 Hz
- Extendable for measuring areas from 10 x 8 mm² to 1.500 x 1.200 mm²
- Cable guide with pull relief at the sensor head
- Prepared for the installation of the LED illumination system
- 10 m cable
- Transport case

**Adjustable Measuring Area**

- One pair of measuring lenses
  For rail length 500
  - Focal length 100mm for measuring areas from 10 x 8 mm² up to 95 x 75 mm²

- Two calibration object:
  For rail length 500 mm
  - CQ40/38 for measuring areas from 10 x 8 mm² up to 44 x 35 mm²
  - CP40/100 for measuring areas from 53 x 42 mm² up to 142 x 114 mm²

**GOM Testing Controller**


For complex stage acquisition, light management and integration in testing environments

- Analog data acquisition with 8 channels (AD values)
  - Digital resolution: 16 Bit
  - Adjustable voltage range from ±1 V up to ±10 V
  - Sample rate up to 200,000 values/s
- Controlling of image acquisition
- Triggering of image acquisition
  - Via analog inputs
  - 3 trigger inputs (BNC)
    - TTL (opto-decoupled)
    - Endurance: max. +30V
  - Light gate
  - Manual push button
- Triggering with measuring sequences at
  - Specific points in time
  - Required AD values
  - External trigger signals
- Triggering of external devices synchronously to image acquisition
  - With adjustable delay e.g. for pulsed light sources
- Accurate assignment between time, images and analog values (synchronous recording of analog values and images)
- Live data transfer with image processing computer during measurement
- Analog data output for live evaluations
  - 4 synchronized channels usable
  - 16 Bit
  - -10 V up to +10 V
  - Up to 500 Hz
- Laser diode control for adjustment and positioning of the sensor head
- Control of illumination
- Communication and data transfer via TCP/IP

**Image Processing Computer 7810.M – Rack Design**

- 64 Bit Intel 2x 2.3 GHz deca-core CPU
- 32 GB RAM
- NVIDIA Quadro OpenGL graphics card
- 24" TFT display with transport case
- Hard disks: 512 GB SSD + 2x 2000 GB RAID
- External USB system backup hard disk for incremental backups
- DVD+/-RW
- Image Interface
- I/O: LAN, USB 2.0/3.0
- Wheel mouse, keyboard
- Operating system: Windows 10 (64 Bit)
- Transport case on wheels with work plate, adjustable to sitting or standing working position
- 5 years of Dell ProSupport
  - Local Dell ProSupport with 24/7/365 availability by phone or via remote-access
  - On-site service on the next working day after the conclusion of remote diagnosis
  - Free spare parts

**2 x Dual LED illumination**

- Two high-power LED lamp heads (suitable for continuous operation)
  - 10° with integrated filter mount
- For measuring areas up to approx. 500 x 400 mm²
- Flexible ball-shaped head holder
- Pivot arms for free positioning of the lamps
- Directly mounted to the sensor head
- Control of the LED illumination directly from the software via the Sensor Controller

**ARAMIS Professional Live Software**

- Setup and Calibration
  - Administration of measuring fields and sensor configurations
  - Software-supported sensor adjustment
  - User-guided calibration
- Measuring data acquisition and project administration
  - reating the stereo image stage project

- Communication with GOM Testing Controller

- Comprehensive image acquisition functions
  - Image acquisition via ring buffer mode
    - Preadjustable number of images
    - Variable abort criteria: Start/Mid/Stop Trigger
  - Image acquisition via user-defined lists
    - Elements: fixed rate, fixed points in time, analog signals, external trigger, light sensor, manual push-button
    - All elements can be combined freely
    - Loop function
    - Abort function for each single element possible
- Live deformation tracking
  - Live computation of coordinates, result values and complete inspections
  - Result output:
    - Live data streaming with open SCPI protocol to external computers and software respectively (e.g. LabVIEW, MATLAB,…)
    - CSV protocol file
    - Analog data output via GOM Testing Controller
- Import of external images
  - (e.g. generated by microscopes, high-speed cameras etc.)
  - Creation of 2D stage projects
  - Creation of stage projects based on stereo images (only with Professional license)
- Use of generic USB cameras (GenICam) and creation of 2D stage projects with GOM Snap 2D
- Image processing and deformation analysis
  - Full-field image point assignment in accordance with the principle of gray value correlation with automatic start point identification
  - Computation of 3D coordinates based on point-based measuring markers
  - Definition of point components and surface components with automatic identification
  - Linking of components and CAD data, geometric elements and local coordinate systems
  - Creation of a surface topology
  - Determination of 3D coordinates and 3D displacements
  - Determination of strains and shears via surface strain tensor
    - Major strain, minor strain (including directions)
    - Thickness change
    - Equivalent total strains (mises, tresca)
    - Epsilon X, Epsilon Y and Epsilon XY as well as shear angle
  - Computation of local translations and rotations (6DoF)
  - Color representation of full-field 3D displacement and strain distribution

- Integrated evaluation options
  - Determination of forming limit curves based on Nakajima tests (according to ISO 12004)
  - Determination of the yield curve based on bulge test (according to ISO 16808)
  - Easy measurement and evaluation of tensile tests in the ARAMIS Kiosk Interface including the determination of:
    - Young's modulus, $R_{p02,}$ Ag, Poisson's ratio
    - True stress-strain curve
    - N-value and R-value
      incl. visualization of results
  - Display of forming limit curves (ARAMIS V6.3)
- FEM
  - FEM import of the following standard formats in the form of a surface component:
    - ASCII (GOM format)
    - XML (GOM Format)
    - LS-DYNA (DYNAIN)
    - ANSYS (A2G)
    - AutoForm (AF) (ARAMIS V6.3)
    - PAM-STAMP (M01) (ARAMIS V6.3)
    - NASTRAN (ARAMIS V6.3)
  - Export scripts for ARAMIS/ARGUS compatible export data for
    - ABAQUS
  - Alignment of the measuring data to a FEM data set (coordinate transformation)
  - Full evaluation functionality for FEA data sets equivalent to the measurement
  - Full-field comparative calculation between measurement and FEM or between two measurements
    - Surface (distance between the surfaces)
    - Displacement differences
    - Strain differences
- Editing of polygon meshes
  - Import of point clouds and polygon meshes (STL, ASCII, POL, PLY, PSL, etc.)
  - Import of CT volume data (VGI, VGL, PCR, EXV, REK) as a polygon mesh
  - Polygonization of random point clouds into polygon meshes
  - Filling of holes in the polygon mesh by interpolated freeform surfaces
  - Smoothing, thinning and refining of polygon meshes
  - Regularization and relaxation of polygon meshes
  - Repairing, combining and stitching of mesh areas
  - Inverting, offsetting and scaling of polygon meshes
  - Tracing and evaluation of curvatures and character lines
  - Export of 3D polygon meshes (ASCII, POL or STL)
  - Golden Mesh: Calculation of an average mesh based on series measurements
- Element construction
  - Creation of geometrical elements on CAD data, polygon meshes and components
  - Construction of equidistant multiple points on areas or along curves
  - Fitting elements (maximum inscribed and maximum circumscribed elements, Gaussian and Chebyshev methods)
  - Multisections (axis parallel, radial, along curves and in viewing direction)
  - Derivation of characteristic features for airfoils from profile sections
  - Distances, angles, virtual calipers
  - Intersection, projection (perpendicular or free defined), average

- Measurement plan import (ASCII, CSV, FTA, CATIA List, …)
- Alignment
  - Automatic prealignment via CAD or reference point clouds
  - Manual prealignment via 3D points
  - Alignment via 3-2-1, best-fit, RPS, local coordinate systems, hierarchically ordered elements
  - Hierarchical order of various alignments
  - Easy switching between the created alignments
  - Compensation of rigid body motions in stage projects
- Inspection
  - Import of CAD data in standard formats: IGES, VDA, STEP, JT Open, STL, PLY
  - Import of CAD data in special formats: CATIA v4/v5/v6, NX/UG, Pro/E, Parasolid, SAT (only with Professional license)
  - Automatic pre-alignment against CAD without 3D interaction
  - Alignment by 3-2-1, best-fit, RPS, local coordinate systems
  - Definition of tolerances for CAD data and geometric elements
  - Nominal/actual comparison of polygon meshes and point clouds with CAD data
  - Deviation representation with color plots using free defined legends
  - Colored inspection sections with needle plots
  - Full-surface computation of material thickness based on polygon meshes
  - Calculation of local surface defects based on polygon meshes
  - I-Inspect: Simple assignment of measuring principles and inspection instructions
  - Dimensioning based on local coordinate systems
  - Evaluation of GD&T according to ISO GPS and ASME Y14.5
  - Complete traceability of constructions and evaluations
- Stage management with timeline
  - Convenient stage management with adjustable reference stage
  - Transfer of evaluations from one stage to all stages
  - Global orientation and stage coupling
  - Definition of point components with automatic identification
  - Automatic computation of 3D displacement vectors
  - Statistical process control of full-field and point-based features
  - Diagram representation of characteristics via stage index or time
  - Determination of values derived by time, such as speed and acceleration
- Report module
  - Customized templates with logos and text boxes (with Professional license only)
  - Master page concept for uniform report styles
  - Customized measuring point visualization: Labels, needle plots...
  - Online tables and diagrams for sections and time-related values
  - Parametric integration of stages and alignments
  - Image mapping: Overlay of 2D and 3D data
  - Visualization of stage evaluations as video sequence or flip book
  - Presentation mode
  - Export as CSV table, PNG, PDF or video file
- Automation of workflows (with Professional license only)
  - "Teaching by Doing" concept for recurring construction and inspection workflows
  - Creation of templates for evaluations
  - Integrated macro recording

- Software module Live
  - Online display of sensor position and live image mapping
  - Live tracking of reference points for component positioning
  - Online touch probe and adapter measurement
    - Measurement of discrete points and regular geometries
    - Measurement against CAD

**Laser Pointer and Lighting Control**

- Laser pointer for adapting and positioning of sensor
- Control of lighting

**Stand**

- Height 1.8 m
- Extension 0.9 m
- Tilt and swivel head

**Calibration object holder**

- Calibration object holder with swivel head
- For all calibration panels

**12 Months free Software and Application Support including Software Updates (valid for new systems only, not for hardware upgrades)**

- Personal support for 12 months
  - Phone and email support for software and hardware relevant questions
  - Phone and email support for application-specific questions
  - Remote support via TeamViewer
- Free software updates for bug-fix releases for 12 months
- Online support
  - GOM Forum
  - Online knowledge base providing tips and tricks for software and hardware as well as application-relevant workflows
  - Video tutorials describing operation and workflows

**Installation amd training**

- 2 days ARAMIS Professional System Basic Training

**Marking material**

- One set of standard marking material for ARAMIS

**Price for Item 1: € 88,300.—**

**Price for Item 1 University: € 70,000.—**

**Condizioni di vendita:**

| | |
|---|---|
| Prezzi: | al netto di IVA di legge |
| Validità della presente offerta: | 30 giorni |
| Pagamento: | da definire |
| Consegna: | ca. 6 settimane data di ordine |
| Trasporto: | incluso |

***Condizioni generali di vendita.***

Si applicano le nostre condizioni generali di vendita. Possono essere consultate e scaricate al link seguente: http://www.gom.com/fileadmin/user_upload/secure/CGVFP_italiano.pdf.
La password e il nome utente sono "GOM".

Quest'offerta si avvale delle condizioni generali. Nel caso di domande o chiarimenti inerenti a quest'offerta, si prega di contattare il nostro ufficio.

Ci facciamo garante di un accurato processo del Vs. ordine, di una consegna nei tempi stabiliti come anche di un'assistenza professionale per l'introduzione delle nostre soluzioni tecnologiche presso i Vs. stabilimenti.

Data l'Acquirente

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