01. **Close Range Photogrammetric Software**

Software capabilities:

- Create CAD-like models
- Perform accurate measurements
- Model man-made shapes
- Coded Targets
- Automate Projects
- Model organic and natural shapes
- Scanning and Dense Surface Modeling (DSM)
- Time Based Measurement
- Geographic Coordinate Systems
- Multi-spectral Images
- UAS / UAV photo-mapping and Camera Station Control

NOTE:

- A comprehensive training on software handing should be provided
- A User Guide should be provided
- Non renewable (lifetime) licenses are required

02. **Point Cloud Processing Software + Supportive Software**

Software capability for processing and manipulation;

- import and project structuring and defining tools for handling large amount of point clouds in various formats (including LAS, ASCII, binary)
- loading trajectories
- automatic classification/filtering routines that are combined in macros for batch processing
- tools for semi-automatic and manual classifications
- tools for creating 3D vector data based on the laser point
- opportunity to produce 3D vector models of buildings (at least up to LOD2) automatically over large areas
- toolsets for checking and modifying the building models manually
- ability to process point clouds representing power lines and tools for automatic vectorization of power line wires, manual placement of tower models as well as labeling, reporting and danger object analysis tools
- vectorize buildings, fit geometry components
- export options such as export lattice models or raster files
- tools for drawing 3D vector data based on laser points
- various commands for processing loaded points like transform points, cut overlap or color extraction from images in other external software
- adjusting laser points to geoid models
- convert geoid models
- view waveforms, extract echoes

Software capability for modelling 3D surfaces;

- creation of surface models from several sources, e.g. laser points, breakline elements, xyz text files
- visualization options including colored shaded surfaces, contour lines, grids, colored triangle nets, elevation texts, slope directions and textured surfaces
- production ability of contour lines and lattice models in batch processing,
- modification of the TIN, creation of profiles, calculation of volumes, calculation of elevation or volume differences between two surface models, different labeling options as well as other tools for design purposes including
- thinning, modifying elevations, inserting breaklines, inserting or removing elevation points, manipulating elevations inside specified areas
- creation of new surfaces by copying, subtracting or merging existing surface models
- visual analysis of surface models by displaying elevations, elevation differences between surfaces, slope gradients and directions
- drawing vector elements based on surface elevations
- drawing labels for slopes and areas
- manipulation of vector elements by changing their elevation, thinning or inserting vertices, copy elements, place elements relative to an alignment element
- creation of rule files for breakline handling in surface triangulation

- creation of setting files for contour lines and peaks/pits in preparation of batch contour line or lattice file production
- display of profiles based on surfaces, draw profiles in the dgn-file
- calculation of quantities and intersections between two surfaces

NOTE:

- If any supportive software is needed to run above point cloud processing and surface reconstruction software (or modules), all necessary software should be provided.
- A comprehensive training on software handing should be provided
- A User Guide is required
- Non renewable (lifetime) license is required

03. **Parallax Bars**

- Micrometer screw readings:
- Measurements 0 – 50mm
- Minimum reading 0.1mm
- Adjustable Length 31.5cm – 38cm

- Three color coded floating marks on the glass plates.
- Warranty three years

04. **Low cost UAV**

Drone Specification:
Minimum Flight time - above 35 minutes
Minimum Cruise speed - At least 6 m/s
Minimum Flying Distance - at least 10km
Flight modes - Fully Auto, Gyro Stabilize, Dynamic waypoints
Auto Takeoff/Landing - Yes
Failsafe - Auto return to launch on Battery low,RTL, failsafe functions
Propeller - Durable propellers
Battery - at least Rechargeable 6s 10000mah
Frame configuration - Full Carbon fiber frame
Wing Resistance - 35 km/h or more

Camera Capability:
Ground sample distance - down to 3cm (at 150m altitude)

Controling:
Flight planning & mission control software - should be provided and pre-installed in a tablet (besides, software should be provided seperately)
Telemetry link range - at least 2Km
Telemetry data - Location,cruise speed, Altitude, Modes, Battery level,error massages, etc
Mission features - Waypoint mission, Dynamic waypoint mission, RTL
Point of interest missions, etc.
Geofence missions planning capability - required

Display – at least 1280 x 800 pixels, 10.1 inches
OS - Android
RAM - At least 1GB
Memory - At least 16GB (internal), microSD (up to 128 GB)

Accessories: :
Battery charger, Two extra bateries, Extra propeller set (equal amount as of onboard), Anemometer, Drone Carrying case, GCS carrying case, Tool set

- Customisable ability to carry another sensor
- A comphreshensive training is required.

- **Warrenty** - Three year comprehensive warranty for electronic system

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05. **Specifications for Auto Level:-**

Sr. No.	Feature	Minimum Specification
	TELESCOPE	
1	Image	Upright/Erect
2	Magnification	24X or better
3	Objective aperture	32mm-36mm
4	Resolving power	3"-4"
5	Field of view	1° 25'
6	Minimum focus from instrument axis	<1.0m
7	Reticle pattern	Cross line
8	Stadia constant/additive constant	0
9	Stadia ratio/ multiplication factor	100
10	Sighting aid	Peep sight/ Gun sight
	ACCURACY	
11	Standard deviation for 1Km double levelling (ISO17173-2) without micrometer	2.0mm or better
12	With micrometer	0.5mm or better
	COMPENSATOR	
13	Type	Pendulum compensator with magnetic damping system
14	Setting accuracy	< 0.5"
15	Working range	+/-15'
16	Sensitivity (Circular level)	10'/2 mm or better
	HORIZONTAL CIRCLE	
17	Horizontal motion drive	Clampless
18	Graduation	360°
19	Graduation intervals	1°
	GENERAL	
20	Dust and Water Proof	IP 56 or better
21	Weight	1.5-1.7 Kg
22	Operating temperature range:	–20 °C to +50 °C
23	Storage temperature	–25 °C to +60° C
	Accessories to be supplied with Auto Level	
24	General accessories	Standard accessories like Lens cap, plumb bob, vinyl cover, lens hood, tool kit, operation manual, carrying case with straps
25	Standard Tripod	Standard Aluminium Tripod - 1 No.
26	Levelling Staff	5m dual face metric staff in Aluminium construction resists fading and weathering. Including circular bubble and transport bag -2 Nos
27	Warranty	Three years
28	Training of equipments	As in the Instructions to the Bidder
	PARALLEL PLATE MICROMETER	
29	Parallel plate micrometer attachment (compatible with the about optical auto level)	Measuring Range 10mm, Scale division 0.1mm [Should allows for staff readings in increments of 0.1mm (estimation to 0.01mm)].

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06. **Specifications for Digital Level:-**

Sr. No.	Feature	Minimum Specification
	TELESCOPE	
1	Magnification	24X or better
	ACCURACY	
2	**Height accuracies**	Standard deviation for 1Km double levelling (ISO17173-2)
3	Electronic measurement	2.0mm or better
4	Visual/Optical	about 2.5mm
5	**Distance accuracies**	about 10mm up to 10m
6	Measuring range	2-100m (electronic)
7	Measuring modes	Single and tracking
8	Measuring time	< 3 sec
	COMPENSATOR	
9	Type	Pendulum compensator with magnetic damping system
10	Working range	+/-15' or better
11	Sensitivity (Circular level)	10'/2 mm or better
12	Horizontal circle graduation intervals	1°
	POWER SUPPLY	
13	Power supply (Detachable)	Li-ion Rechargeable Batteries
14	Internal Battery	Standard Rechargeable Li-ion internal batteries(1 No + 1 No additional) with working time up to 12 hrs or better
15	Charger for above Batteries with cables	Dual slot battery charger Set
	INTERFACE, DATA MANAGEMENT	
16	Display	Dot matrix LCD/QVGA
17	Data storage	up to 2000 points (internal memory)
18	Interface	RS-232/ Mini USB/ Bluetooth
19	Onboard programs	Elevation/ Height difference/ Cut & Fill/ etc.
	GENERAL	
20	Dust and Water Proof	IP 56 or better
21	Weight	< 2.5 Kg
22	Operating temperature range:	–20 °C to +50 °C
23	Storage temperature	–25 °C to +60° C
	Accessories to be supplied with Digital Level	
24	General accessories	Standard accessories like power cable, Lens cap, dust cover, cleaning cloth, lens hood, tool kit, operation manual, carrying case with straps, etc.
25	Standard Tripod	Standard Aluminium Tripod - 1 No.
26	Levelling Staff	3m, 1 section Aluminium barcode staff or fibre grass barcode staff resists fading and weathering. Including circular bubble and transport bag -2 Nos
27	Warranty	Three years
28	Training of equipments	As in the Instructions to the Bidder

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08. Specifications for Total Station:-

Sr. No.	Feature	Minimum Specification
	ANGLE MEASUREMENT	
1	Angular Accuracy (ISO1712-3)	3" or better
2	Display resolution	0.5"/ 1"
3	Tilt Compensation type	Dual axis
4	Compensator with a working range	± 6' or better
	TELESCOPE	
5	Telescopic Magnification	30X or better
6	Resolving power	2.5"/ 3"
7	Field of view	1° 30'
8	Focusing range	1.3m-1.7m to infinity
9	Reticle illumination	Illuminated, 5-10 brightness levels
	DISTANCE MEASUREMENT	
10	Laser Output	Class 1 Laser (Prism mode) Class 3R Laser (Reflector less)
	Measuring Range (under average conditions)	
11	Reflector less	0.3 to 500m
12	With Single Prism	3000m or better
13	With three Prisms	5000m or better
14	Distance accuracy (With prism)	(2 mm + 2 ppm X D) mm or better
15	Measuring time	1 - 3 Sec or better
16	Without Prism Range (Kodak Grey 90 %)	500 Meters or better
	POWER SUPPLY	
17	Power supply (Detachable)	Li-ion Rechargeable Batteries
18	Internal Battery	Rechargeable Li-ion internal batteries(1 No + 1 No additional) with working time up to 12 hrs continuous distance / angle measurement (Total capacity 26 hours distance / angle measurement every 30 s for 1 sets of batteries).Instrument should have hot swappable battery function (1 set of 2 batteries)
19	Charger for above Batteries with cables	Dual slot battery charger Set
	OPERATING SYSTEM & DISPLAY	
20	OS	Windows CE 5.0/6.0 Operating system colour controller
21	Instrument Control Unit / Keyboard, Display	Face 1 & Face2: Full Alpha-numeric keyboard, with colour and Touch screen(QVGA) having front light illumination with passive touch screen works with stylus or finger. Display unit should be day light readable in bright outdoor atmospheric conditions Control Unit should have both Touch Screen and Key pad for manual operation - Colour graphical display.
	SOFTWARE & DATA MANAGEMENT	
22	Communication Port	RS 232C Port with minimum two of the below communication port should be available in the instrument Serial/ USB 2.0(Type A/Mini B)/ Ethernet/Memory Card Slot/ Bluetooth(operating range 150m or better)
23	Instrument Memory	Internal Memory – 500 MB RAM, External – Card Memory/USB drive with total memory storage capacity of 8GB or better

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Specifications for Total Station:-

Sr. No.	Feature	Minimum Specification
24	On-board Software	On Board Software with file import/export type: RAW, DXF,CSV,TXT,Land XML,XML,CR5.Software should be able to support data collection, feature coding, COGO functions, should have facility of customizable home page(s),should have Quick Pick list is a menu of specific functions. Should be able to generate plots, should be able to do sub-division of plots, should support active DXF maps as background files, should be able to link and import ASCII files with graphic display of measured points & points from the linked file. Generate many reports right in the field like Cut sheets, Survey reports, Stakeout reports etc. On board 3D view.
	GENERAL	
25	Instrument Tribrach	Detachable tribrach for traversing application
26	Plummet	Inbuilt optical/Laser plummet
27	Guide light	Green and Red (operating range upto 150m)
28	Operating Temperature	-20 deg. C to + 50 deg. C or better
29	Dust and Water Proof	IP 56 or better
30	Weight	5-6Kg with Tribrach and battery
31	Operating temperature range:	–20 °C to +50 °C
32	Storage temperature	–25 °C to +60° C
	Accessories to be supplied with total station	
33		Standard accessories like Lens cap, lens hood, tool pouch with tools, operation manual, carrying case with straps
34		Internal Rechargeable batteries - 2 Nos.
35		Charger and charger cable - 1 set
36		Single prism with Range Pole 2.0 mtrs high - 2 Nos.
37		Heavy wooden Tripod - 1 No.
38		Single prism Target Set with Aluminium Tripod and carry case -2 Nos.
39	Warranty	Three years
40	Training of equipments	As in the instructions to the Bidder

09. Laser Levelling Instrument Pocket type

TECHNICAL DATA

Specifications

Attributes	
Accuracy	Up to ±3/16" @ 33-ft.
Battery Voltage	1.5
Dimensions	6.0" x 1.1" x 0.9"
Laser Diode	Class II 630 - 670 nm
Leveling Type	Manual
Material	Plastic and metal
Mount Threading	1/4-20
Operating Temperature	41° F / 5° C ~ 104° F / 40° C
Range	Up to 16-ft.
Weight	0.2lb
Includes	(1) - GLL 1P, (1) - Versatile Mount, (2) - AAA Batteries

Benefits

- Single laser line for leveling and alignment
- Hand level with aluminum base for efficient alignment
- Compact design and one-button operation
- Versatile mounting accessory: mounts to walls or tripods with 1/4 in.-20 thread
- Two built-in bubble vials
- Easy grip handle with convenient access to battery compartment

10	Geodetic Invar Levelling Staves	Invar Staff - Length: 2m/3m For precise levelling. Body made of rigid aluminium profile with anodised surface. Yellow lacquered graduation side; print protected by 1mm polyester coating. Invar tape tensioned by soft spring to compensate extension coefficient of staff profile.

11. Distometer (Laser distance meter- pocket type)

Technical data

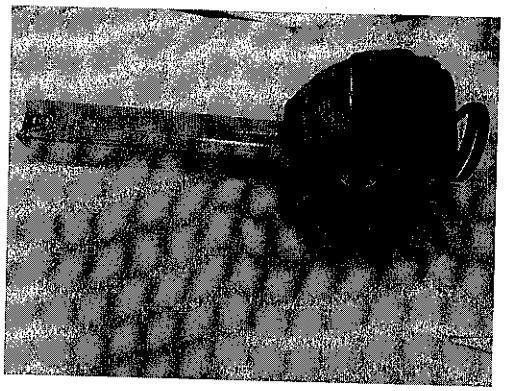
General	
Accuracy with favourable conditions *	2 mm / 0.08 in ***
Accuracy with unfavourable conditions **	3 mm / 1/8" ***
Range with favourable conditions *	0.2 - 40 m / 0.6 - 120 ft ***
Range with unfavourable conditions **	0.2 - 30 m / 0.6 - 100 ft ***
Smallest unit displayed	0.1 mm / 1/32 in
Laser class	2
Laser type	635 nm, <1 mW
ø laser point	at distances	6 / 30 / 60 mm	10 / 50 / 100 m
Protection class	IP54 (dust- and splash water protected)
Auto. laser switch off	after 90 s
Auto. power switch off	after 180 s
Bluetooth® Smart	Bluetooth® v4.0
Range of Bluetooth® Smart	<10m
Battery durability (2 x AAA)	up to 10000 measurements
Dimension (H x D x W)	115 x 43.5 x 23.5 mm | 4.53 x 1.71 x 0.93 in
Weight (with batteries)	87 g/ 3.07 oz
Temperature range Storage | Operation	-25 to 70°C/ -13 to 158°F | -0 to 40°C/ 32 to 104°F

12	Levelling Staves	Refer to Autolevel Specifications
13	Linen tape 20m	Plastic coated linen metric tape 20m/30m long, UV-Resistant, Corrosion-Resistant, Width 0.5inch
14	Steel tape	Plastic coated steel metric tape 50m long, UV-Resistant, Corrosion-Resistant, , Width 0.5inch

Pocket tape

Length - 5m

Material - Steel

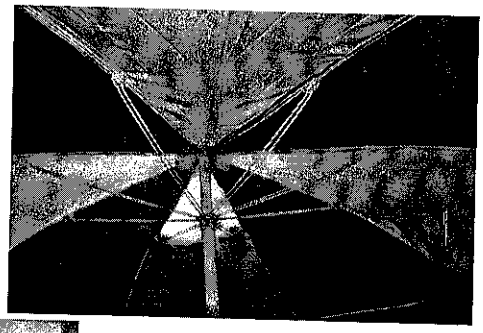


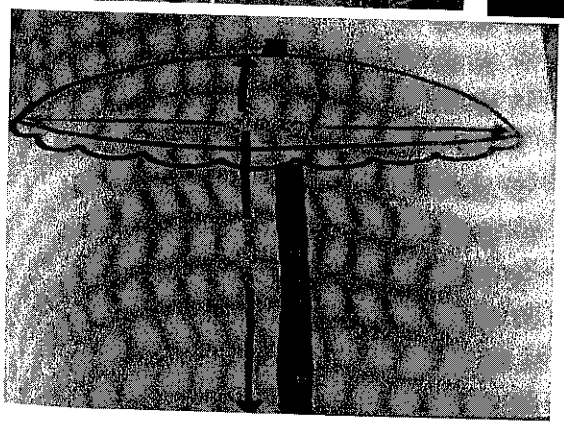
Gig Umbrella

Double Stretchers

Diameter – 210 cm

Length – 225 cm





17. Safety Jackets (Luminus vests)

Safety Jackets (Luminus vests)	100% Polyester Mesh Reflective & High-Vis Cool Material Rated: ANSI Class 2 Two Horizontal Stripes Zipper Closure Inside Pockets for Storage, Refer to sheet "Safety Vest"

18. **Plan Sheets**

Paper: Kent 160 g/m
Paper size: 76cm* 56cm
Printing Colour : Cream