Annexure: Technical Specifications for (Black & White) handheld 3D Scanner

Sl#	Specification	Description	Justification
		Hardware	
1	Light Source	Handheld White Light 3D Scanner	Handheld scanners provide a great degree of freedom and speed for scanning complex geometries. Less maintenance, completely safe for human compared to laser scanner. White light technology produces very less noise compared to laser scanner.
2	Color Information	24 bits per pixel (bpp)	With 24 bpp most of the colors can be captured, which a naked human eye can differentiate. This is the maximum available specification among the commercially available 3D Scanners.
3	Scanner Weight	Less than 1Kg.	Reduces operator fatigue in case of longer duration scanning. Can be easily carried to the site by an individual.
4	Integration with Hardware	Integration with Tablet and laptop for outdoor / onsite scanning applications.	Comfortable and easy to scan during outdoor scanning.
5	Scanning Operation	Scanning under ambient condition with consistent reliability and accuracy.	Special lighting conditions will demand additional investments. Additionally, it is helpful for onsite scanning requirements without compromising on the accuracy.
6	Battery Backup	Minimum one-hour backup	Less dependency on AC power supply during onsite/outdoor scanning requirement.
7	Data Acquisition Speed	20,00,000 points per second	More the data acquired per unit time, better is the resolution. Specified parameter is the moderate specification in the commercial 3D scanners available in the market.
8	3D point accuracy	0.1 mm	Minimum required accuracy
9	Motion Capture	Capability to scan moving object like a video camera with frame rate of 15 frames per second or better	Helpful in capturing the moving rigid object. More the frame rate of scanning, higher is the scanning speed.
10	Scanning Flat Geometries	Ability to capture flat parts	Saves time required to prepare the part for scanning.
11	Light Source Safety	Scanner to have safe light source for scanning human body	White light is safe to human body unlike lasers.
12	Easy to use	Marker free scanning with no object preparation essential	Saves time required to prepare the part for scanning.
13	Scanner Calibration	Scanner does not have to be calibrated	Saves time required for calibration and produce consistent results.
14	Tracking System	Usage of electromagnetic tracking is not preferred	With trackers, the system becomes bulky and not portable. Special skills are required to handles trackers.

15	Linear Field of View, H x W	Closet Range: 215 mm x 150 mm Furthest Range: 500mm x 350mm	Suitable for scanning small to large objects.
16	Angular Field of view, H x W	30 x 21 degree	
17	Interface	USB 2.0 and USB 3.0	Industry standards
18	Working Distance	Less than a meter	Standard specification for Handheld scanners.
19	Power Consumption	12V, 48W	

Support Software			
20	Output format	0BJ, PLY, WRL, STL, AOP, ASCII, E57, XYZRGB. Software must support a raw data export as .scan format	Industry accepted standard formats. Provides flexibility to save selected frames from current project and use it in any other similar projects if required.
21	Output format for measurement	CSV, DXF, XML	Industry accepted standard formats.
22	OS Support	Windows 10, 64 bit with Multi core processing	Multi core processing helps in reducing the processing time and to achieve maximum speed of scanning.
23	Scan Alignment	a. Software to support both manual and automatic align of surfaces, including flat surfaces. b. software should automatically align with geometry as well as texture of part to be scanned.	a. Useful to align data with minimal effort. b. Advanced method to align surfaces in real time scanning without using target stickers.
24	One click processing	a. Software to support defeature tool to automatically erase imperfections and fill holes with one click operation. b. software should be able to guide through the steps and analyses data to build the best possible scanned data.	a. Helpful for post processing the polygon data and to get watertight polygon model. b. To get best possible data out of scan using automatic process.
25	File Compression Tools	Software should automatically compress the data reducing the disc space required to save multiple projects.	Helps to reduce the disk space required to store the projects. Sharing and transferring of data is easy.
26	Measurement Tools	Software to have measurement tools for Linear, geodesic, sections, distance maps, Volume measurements, annotations, DXF export.	Helpful to extract dimensions from the polygon model. And to compare two different polygon files to check deviations.
27	Noise Filter Features	a. Software to have customizable 3D noise filters.	a. Useful to get noise free data with minimal effort.

		b. It should automatically delete the flat background on the scanned objects (i.e. base / noise), to minimize manual erasing process.	b. Helpful to reduce manual erasing process time.
28	Software User Settings	Software to store different types of user settings and switch between them freely.	Useful to easily switch between different user settings.
29	Polygon conversion Tool	Software should support polygon conversion with different resolution from the scanned data and option to fill holes automatically to get water tight polygon.	Helpful to get different resolution output from the scan data depending on the application.
30	Polygon Simplification Tool	Software should have tools to reduce the polygon count in the mesh as per user's requirement.	Useful to create different polygon count in the mesh to reduce the file size for different application.
31	Process Monitor Bar	Software should have progress bar in the windows taskbar to monitor the process without opening the software window which helps for multitasking.	It gives the time calculation about the ongoing process on the software which helps in multitasking.
32	Full screen Feature	Software should have full screen option while scanning for better viewing experience.	Full screen view helps for better viewing the current scanning portion and to focus on portion which need extra attention to scan without missing any detail.
33	X-Ray Vision	Software should have X-Ray vision mode to highlight areas with high point density and makes data semi-transparent.	X-Ray vision helps to check for possible holes or misalignments in the scan.
34	3D Radar Mode	Software should have 3D Radar mode which helps user to maintain the optimal working distance without the help of working distance map.	Useful for new and experienced user
35	Texture Settings	Software should have optimized color settings like brightness, saturation and contrast set automatically after applying Texture Mapping option.	It is required to automatically and manually changed the texture setting as per the lighting condition during scanning for the better color information.
36	3D Mouse Connectivity	Software should support 3D mouse to navigate in the software's interface in 3D.	Helpful to navigate software's interface in 3D environment.
37	Auto Save Option	Software should have option to Automatically save the project before starting each post processing work.	Useful to start the post processing work from the point where you left if any sudden breakdown in OS or PC

38	Real-Time Polygon feature	Software should have option to scan the object with Real-Time polygon conversion feature	It gives the sample view of how the final output will look like in very early stage.
39	Automatic Base Removal Feature	Before scanning the part, Software should have feature to identify and remove the base on which the part is placed for scanning.	Helpful to reduce manual erasing process time after scanning is done.
40	Customizable Texture Scanning Feature	Software should have option to Automatically capture textured frame and option to capture texture frame after every specific number of frames defined by the user.	It is useful to get more textured frames as per user requirement.
41	Multi Scanner Connectivity	Software should have option to connect with more than one scanner simultaneously	Helpful to scan larger objects in less time.
42	Software Licensing Type	The Software License should be perpetual in nature.	