3D Stereo
Mapping Solutions
Solutions for GIS, Photogrammetry and Engineering

AeroMap Technology Systems

www.aeromapss.com

DAT/EM® Systems International

www.**datem**.com

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World-Class Digital
Photogrammetric Workstation

SUMMIT EVOLUTION™

www.datem.com/summit

Summit Evolution provides a set of powerful tools for discovering and capturing 3D information from stereo data. The software includes CAD and GIS interfaces, 3D stereo vector superimposition, automated feature editing, contour generation and many more tools. Through the Capture™ interface for enabled Summit products, image features from a Summit Evolution project are digitized directly into AutoCAD®, MicroStation®, ArcGIS® or Global Mapper®. With DAT/EM SuperImposition™, those image features are overlaid on the Summit Evolution project for immediate feature verification.

Summit Evolution is available in five product levels. Professional includes orientation measurement, orthorectification, terrain visualization, contour generation, point translation and DTM collection. Feature Collection is for those whose project setup, orientation and ortho processing needs are met elsewhere. Lite is a visualization tool designed for resource specialists, GIS technicians and QA professionals. Mobile is a variety of Summit Evolution Lite optimized for the field, but also available for desktop. UAS is designed for UAS orthophoto-based 3D viewing and simple 3D digitizing.

Available Features

- Supports monochromatic, panchromatic, three- and multi-channel multispectral imagery.
- Supports scanned aerial film, matrix and push-broom digital airborne cameras, small- and medium-format metric cameras, close-range imagers, orthophotos, RPC satellites, LiDAR, UAS imagery and synthetic aperture radar.
- Imports third-party softcopy and pre-processed UAS projects, aerotriangulation results and other orientation files for quick setup.
- Full range of manual and automatic image orientation capabilities.
- Digitizes 3D vectors directly into AutoCAD, MicroStation, ArcGIS or Global Mapper using DAT/EM's Capture interface.
- Robust and easy-to-use interface for maximum productivity.
- Bird's-eye, close-up, project overview, 3D vector split window and multiple viewports offer a variety of visualization and feedback tools.
- Ability to apply coordinate transformation.
- Unlimited zoom levels, fast pan and automatic loading of adjacent stereo models with DAT/EM SuperImposition of CAD and GIS vectors over the image view.
- DAT/EM Ortho+Mosaic module for easy and precise creation of orthomosaics.
- Terrain Visualizer tool for dynamic, real-time preview of contours while DTM and breakline objects are created and edited.
- Contour Creator™ for creating and writing the finished contours to the CAD file.
- Interface to the DAT/EM-PCI ProPack to allow use of PCI Geomatica GDB data. (Requires PCI license)
- Airfield3D™ standards-compliant airspace obstruction mapping tool.
- Point Translator for importing, regridding and converting point data, including LiDAR and other DTM features.
- Several licensing levels from Professional to Mobile available.

Feature Comparison

PROFESSIONAL
Full-function, fully capable stereoplotter.

FEATURE COLLECTION
For those whose orientation requirements are met elsewhere, but who still require the world-class Capture interface to a CAD or GIS vector editor.

LITE
A low-cost system designed for viewing, terrain following, simple editing and measurement.

MOBILE
Light-weight Windows-based tablet tool for field data collection.

UAS
Collect 3D vectors from UAS-derived orthophotos or generated stereo.

	UAS	MOBILE	LITE	FEATURE COLLECTION	PROFESSIONAL
Vector Superimposition	■	■	■	■	■
Terrain following and Z digitizing based on DEM files	■	■	■	■	■
One-year system support included	■	■	■	■	■
3D Stereo Enabled*	■	■	■	■	■
Capture add-on for MicroStation, AutoCAD, ArcGIS or Global Mapper			■	■	■
LandScape integration available			■	■	■
Built-in drawing and editing tools	■	■		■	■
Dedicated 3D input device enabled				■	■
Advanced 2D and 3D editing, snapping, attribute handling				■	■
MapEditor automated editing software for AutoCAD or Microstation				■	■
Terrain Visualizer				■	■
Contour Creator				■	■
Point Translator				■	■
Project Status Tracker				■	■
Ortho+Mosaic					■
Airfield3D for ArcGIS					■

* Summit UAS is available in both stereo and non-stereo packages.

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Analyze 3D UAS Data

SUMMIT UAS™

www.datem.com/summituas

To meet the needs of the rapid deployment and data processing of UAS projects, DAT/EM Systems International brings the world-famous Summit Evolution technology to the world of UAS. Summit UAS contains simple and mobile tools to critically examine and compare UAS data by drawing, viewing, editing and defining features. Summit UAS requires no training in photogrammetry and is tailored to resource-grade data analysis. 3D feature collection may be done in either a stereo or non-stereo environment. With either viewing option, Summit UAS is the right choice to explore and analyze your UAS data and digitize accurately georeferenced 3D vectors.

Prospective industries and potential uses include:

- Farming: determine crop yields; conduct fertility time analyses; evaluate biomass and health assessments.
- Forestry: perform harvest time analysis, stand typing or revegetation planning.
- Surveying: inspect remote areas; validate data.
- Mineral Extraction: show stockpile inventory; monitor mine conditions and environment.
- Conservation: monitor and analyze hazardous, remote and/or inaccessible regions.
- Utilities: assess utility corridor infrastructure; monitor vegetation encroachment.
- Transportation: measure and evaluate signage; determine surface defects.
- Emergency Response: develop emergency preparedness schemes; display situational awareness; conduct hazards mapping.

Collect UAS Data

3rd-Party Orientation Software

- Use popular, third-party orientation software to process raw UAS imagery and create the orthophotos and DEM necessary for successful import to Summit UAS.
- Some third-party orientation software can create a Summit project file (.smtxml) for easy integration with Summit UAS.

Summit UAS™

- Requires pre-processed UAS orthophotos and DEM.
- Optionally, use a DAT/EM tool to create a stereo-mate offset from the orthophotos and DEM.
- Opens orthophotos and DEMs from several of the most popular pre-processing systems on the market.
- Activates option to view the orthophotos in mono with manual 2D movement and automatic Z movement based on the DEM. Or, use option to view the generated stereo pair in stereo with manual 3D movement.
- Utilizes built-in DAT/EM Drawing Tools to draw 3D vector objects.
- Exports 3D vector objects into Esri® shapefiles, Autodesk® .dwg and .dxf files, and Bentley® .dgn files.
- Upgrade path to the DAT/EM Photogrammetric Suite.
- Stereo equipment optional.

Summit UAS Bundles

For optimal use, Summit UAS requires a third-party UAS processing package to create an orthomosaic and point cloud or DEM from the UAS imagery.

Summit UAS offers two user options:

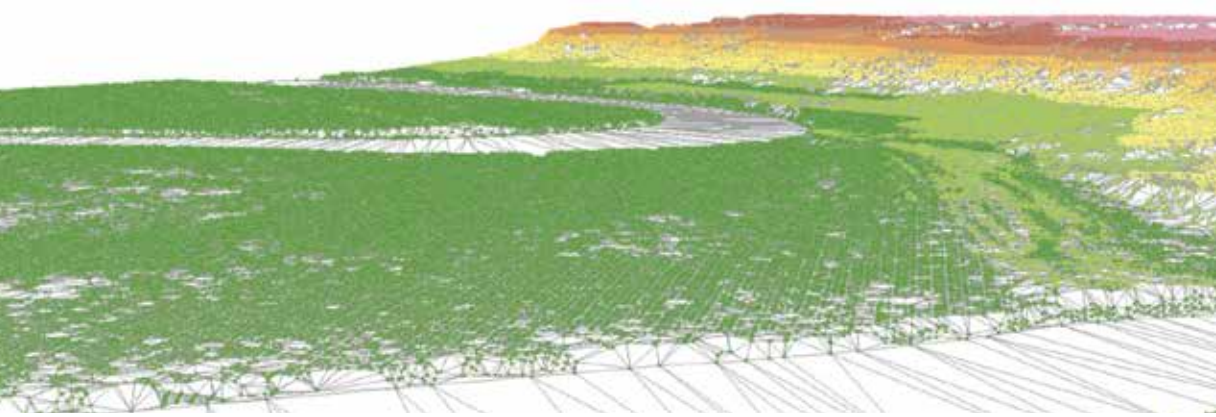
- View the orthomosaic in mono view and use the point cloud to determine the elevation value of the Summit UAS digitizer and digitized vectors.
- View stereo with the orthomosaic and its generated stereo-mate image, which Summit UAS generates from the mosaic and the point cloud.

Summit UAS has direct project and camera import tools for all major third-party UAS software packages, and maintains an open policy regarding support for others. Contact us for a current list.

3D Point Cloud Viewing
and Editing Software

LANDSCAPE™

www.datem.com/landscape



View and edit 3-dimensional point clouds using LandScape from DAT/EM Systems International to provide an advanced and efficient portal into one's terrain dataset. LandScape is capable of operating on very large terrain point clouds such as from LiDAR or SfM. The operator may choose options to view terrain datasets in stereo within LandScape in standalone mode, or interacting with and superimposed over a Summit Evolution imagery project. LandScape contains a wide variety of automatic and interactive tools to enhance understanding of one's data by creating, modifying and classifying points as well as drawing vectors based on those points. LandScape's tools can be configured by the user to further enhance understanding of the data view.

Editing tools in LandScape allow easy modification of point cloud data including a single point, all points in a project or a selection built using LandScape's filtering tools. LandScape includes the DAT/EM Drawing Tools, a simple built-in vector editor that collects, uses and saves vector features in a variety of formats. For more advanced digitizing tools, additional companion DAT/EM Capture™ modules may be added.

LandScape may optionally integrate with Summit Evolution™ to display the point cloud superimposed over stereo imagery. Use the Summit Evolution cursor to add, select and edit points, and to collect vector data.

Several tools for working with large point datasets are incorporated in LandScape and are also available with a Summit Evolution Professional installation:

- **Generate LiDAR Frame**
  Generates images and their stereo-mates from point data files, enabling 3D stereoscopic viewing.
- **Point Translator**
  Management tool to combine, extract and merge point files in a wide variety of formats, spacings and orientations.
- **SuperImposition Tool**
  Load vector and orthophoto files to view together with the points in LandScape.

Features

- Profile and perspective stereo view of points. Choice of preferences for coloring and viewing. Roam, zoom, pan and rotate from any angle or distance.
- Point cloud colorization by any attribute contained within the point dataset: elevation, return, flight line, intensity, embedded RGB color, orthophoto RGB color or class.
- No limit to the number of simultaneous input files. The operator has complete control over the amount of detail on display.
- Full 3D mouse and system mouse support for navigation, selection and digitizing.
- Support for mouse button programming and macro creation using DAT/EM Button Manager.
- Automatic point classification filters such as for bare earth, water, roads, buildings, vegetation, railroads, powerlines, color and high/low points. More filters are added with each release.
- Interactive tools: change or add points inside a polygon, filter points around breaklines, shift points onto a plane or surface, save selected points to a separate file and more.
- Brush Z Edit Tool to smooth points inside a brush-size circle using point elevations surrounding the cursor.
- Digitize new 3D vectors such as breaklines with the ability to snap to the surface.
- View existing .dxf, .dwg, .dgn or .shp vector files with the points.
- Draw and edit objects with the built-in vector editor, DAT/EM Drawing Tools.
- Digitize directly into AutoCAD®, MicroStation®, ArcGIS® or Global Mapper® using DAT/EM Capture (optional – sold separately or included with Summit Evolution).
- Use DAT/EM Capture to superimpose existing objects directly from AutoCAD, MicroStation, ArcGIS or Global Mapper.
- Integrate seamlessly with optional Summit Evolution, DAT/EM's world-class digital photogrammetric workstation. Superimpose LandScape's points on a Summit stereo model.

3D Vector Digitizing Interface for AutoCAD, MicroStation, ArcGIS and Global Mapper

CAPTURE™

www.datem.com/capture

DAT/EM Capture is the primary tool for collecting vector information from stereo images. Capture works in tandem with DAT/EM's flagship products, the Summit Evolution digital photogrammetric workstation and the LandScape point cloud editing toolkit. Capture is included with Summit Evolution Professional, Feature Collection and Lite and is an option for LandScape. Vectors are collected directly into one or more fully-functional companion CAD or GIS programs. Currently supported companion vector editors are AutoCAD®, MicroStation®, ArcGIS® and Global Mapper®. The Capture API (Application Programming Interface) is also available to enable development for other companion vector editing programs; third-party Capture versions that were built using the DAT/EM API are available.

Capture works in the background during collection to send 3D (x, y, z) ground coordinates to the companion application. Simultaneously, 2D or 3D features from the CAD or GIS software are rendered back in true relative 3D position in the stereo display using DAT/EM SuperImposition for immediate feedback and feature verification. The user's experience and productivity are enhanced through precise and instantaneous validation of work. The stereo capture capability is also useful to people trying to interpret imagery for their own specialties, such as urban planning, forestry, wetlands biology and geology.

Features

- DAT/EM Capture's drawing and editing tools make mapping-specific tasks easy to accomplish.
- Custom building-squaring modes
- Choice of 2D and 3D snapping modes.
- Spot elevations.
- A wide selection of multiple-line offsets.
- DTM point collection.
- Adds 3D and stereo tools to the companion application.
- CAD-specific attribute mapping.
- 3D digitizing, vertex dragging and field editing.
- Vector data superimposition onto stereo imagery in the stereo window.
- Full simultaneous functionality of the companion vector editor.

Automatic 3D Map Editing for AutoCAD and MicroStation

MAPEDITOR™

www.datem.com/mapeditor

DAT/EM MapEditor is a toolkit with automated editing shortcuts for AutoCAD® or MicroStation®. MapEditor for AutoCAD works completely within AutoCAD and AutoCAD-based applications such as Map3D and Civil3D; MapEditor for MicroStation works entirely within MicroStation and MicroStation-based applications such as Bentley Map. Both versions offer a collection of interactive, semi-interactive and automatic specialty mapping tools such as contour labeling and redundant feature detection. MapEditor is included with Summit Evolution Professional and Feature Collection and is also sold separately.

MapEditor for MicroStation Features (partial list)

- BREAK elements at selected vertices, near points or on an intersecting element or fence.
- BREAKLINE FILTER deletes/modifies points from the area in or near line string and shapes.
- BUILDING FRAME creates 3D faces inside closed 3D polylines and extends sides to the ground.
- CHANGE ATTRIBUTES standardizes or changes combinations of level, color, weight and line code.
- CHECK ATTRIBUTES reports unverified objects for interactive editing.
- CLOSE LINE STRING converts open line strings to closed line strings or shapes.
- CROSSCHECK verifies intersections and optionally adds vertex nodes or breaks.
- CURVE TO LINE STRING turns curves into line strings (also works in reverse order).
- DELETE removes objects based on attributes.
- FIX COMPLEX HEADER verifies, repairs and compresses complex line strings and shapes.
- JOIN combines line strings in the main file or end snaps to reference elements.
- TOUCH extends or trims lines to create intersections and optionally adds vertex nodes.
- VISIT moves to result coordinates.
- VOLUME calculates volumes based on input files and levels.

MapEditor for AutoCAD Features (partial list)

- 3D TO 2D removes Z from polylines.
- BREAK polylines along cutting edges.
- BREAKLINE FILTER changes the layer of DTM points that are located near linework.
- CLEANUP fixes polyline errors that AutoCAD AUDIT misses.
- CROSSCHECK verifies intersections and optionally adds vertex nodes or breaks.
- EDITLINE draws or combines existing polylines into a new polyline section.
- ELEVATE drapes objects based on a DEM.
- EXTEND trims or extends polylines to meet other polylines.
- FILTER reduces number of polyline vertices and maintains initial appearance.
- FIX Z values on 2D polylines so vertex shares elevation with starting segment.
- GRIDIT inserts a map sheet grid with northing and easting text.
- JOIN combines polylines.
- POLYLINE LENGTH finds polylines by length or by number of vertices and distance.
- REPLACE, RESIZE or CHANGE blocks and text.
- VISIT moves to result coordinates.
- VOLUME CALCULATION calculates volumes based on an upper surface and a base elevation.

Standards-Compliant Airspace Obstruction Identification Tool

AIRFIELD3D™

www.datem.com/airfield3d

A component of Summit Evolution™ Professional with Capture for ArcGIS®, Airfield3D collects precise 3D geospatial airport and aeronautical obstruction data for United States Federal Aviation Administration (FAA)-controlled airports. It uses the Summit Evolution Professional stereoplotter engine to enable viewing, identification and attribution of objects penetrating sensitive airspace. Airfield3D offers automatic obstruction surface identification, calculation and display based on survey data placed in ArcGIS, automatic field calculation and attribution (with manual override) and visual cueing of obstruction surface violations. Airfield3D collects all data directly into FAA-designed templates for ArcGIS so files are always in delivery format.

Features

- Enforces to FAA Advisory Circular 150/5300-18B (18B) standard at every step. When finished, data layers are already FAA 18B compliant.
- Includes Part 77 surface definitions and processing.
- Automatically and simultaneously fills in multiple attribute fields based on the obstacle measurement.
- Recalculation capability for all fields – automatic calculation for when input data change after digitizing has begun.
- Digitizes into FAA-designed ArcGIS templates.
- Changes cursor display and text to show the surface name and distance above or below it.
- Includes status tools to display how many points are measured for each surface and how many are required.
- Creates complete reports of obstruction data for each surface.

Automatic Digital Surface Modeling and Contour Creation

CONTOUR CREATOR™

www.datem.com/contourcreator

Contour Creator generates and stores permanent contours into CAD or GIS drawings or vector interchange files. Once terrain model editing is complete, Contour Creator generates elevation contours, smoothes the resulting lines, symbolizes and places them in their appropriate database category. Contour Creator is included with Summit Evolution Professional and Feature Collection.

Features

- Accepts input from many industry standard point file formats and accepts multiple input formats at one time.
- Allows user to select specific layers or levels from active AutoCAD®, MicroStation® or ArcGIS®.
- Allows selection of layers or levels from the reference files in AutoCAD and MicroStation.
- Provides essential tools such as automatic depression contour identification, TIN- or grid-based calculations and contour exclusion removal.

Easy-to-Use Orthophoto and Mosaic Generation

ORTHO+MOSAIC™

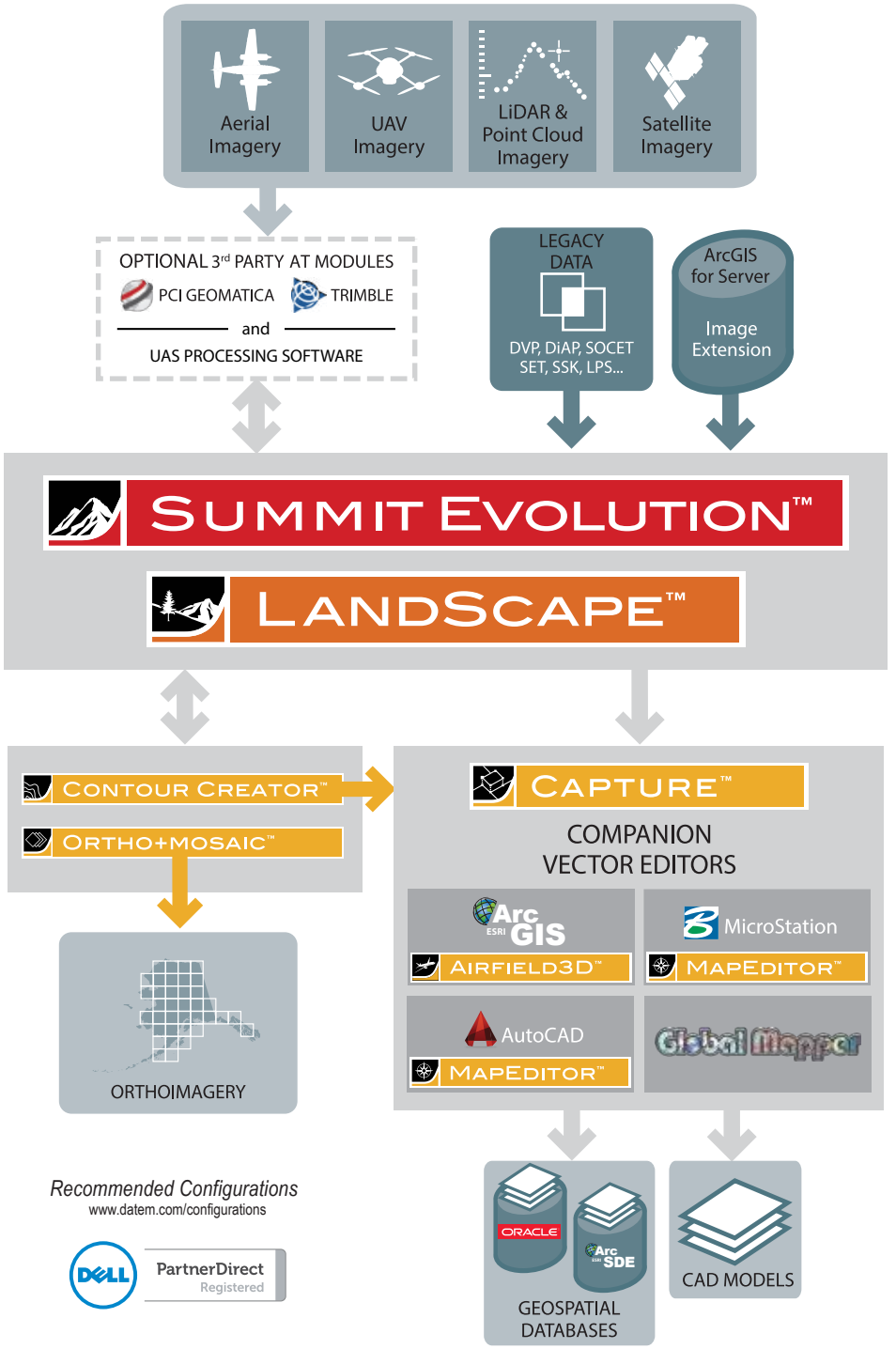
www.datem.com/orthomosaic

Straightforward tool to create orthophotos and orthophoto mosaics from Summit Evolution™ stereo projects. Ortho+Mosaic is included with Summit Evolution Professional.

Features

- Creates orthophotos and orthomosaics from Summit Evolution projects.
- Improves orthophoto results with a wide variety of point file and vector file input formats. Multiple input formats may be used at the same time.
- Offers orthophoto image adjustments such as histograms, brightness and channel mappings.
- For mosaics, offers hot spot removal, exclusion areas, image balancing, histogram matching and other image corrections.
- Provides advanced automatic mosaic seam line generation, manual editing and seam line import/export tools.
- Generates automatic and vector-based output tiles.
- Saves to optional “big” BigTiff and Jpeg2000 image output formats.
- User-controlled tiling options.

DAT/EM Systems International — Photogrammetric Suite Architecture



Recommended Configurations
www.datem.com/configurations

DELL PartnerDirect Registered

UAS Workflow

For our UAS solutions, check the Summit UAS page of this brochure or visit datem.com/uas.

Custom Workflows Available

The DAT/EM Photogrammetric Suite allows users to create workflows that best fit their needs. Our software integrates with many third-party software solutions to fulfill the additional requirements of our clients. If you are seeking a solution you do not see in our product portfolio, please contact us to discuss a custom workflow.

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Productivity at your Fingertips

HARDWARE

www.datem.com/hardware

KeyPad
Single-touch tactile command entry system

The original DAT/EM Keypad is a multipurpose programmable touch pad. Versatile and essential, it can be used either as an accessory to DAT/EM softcopy products or as a productivity enhancer for third-party products.

TouchScreen
On-the-fly configurable tactile interface

The DAT/EM 'TouchScreen' uses the KeyPad client on a stand-alone LCD monitor with an integrated tactile interface. With a single touch, operators can quickly change command sequences during map compilation.

KeyPad Advantage
Highly configurable wireless keypad

The DAT/EM KeyPad Advantage™ is part of the DAT/EM KeyPad product line. This option uses any tablet device with an Android® operating system and a Bluetooth® adapter for wireless communication to a desktop or laptop computer.

HandWheels
X, Y, Z precise and comfortable coordinate entry

The robust and precise HandWheels can be adjusted on three axes with a simple lever; there is no need for tools. The operator can easily set the height, depth and angle of the handwheels to provide an individual fit.

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