

# TRIMBLE V10 IMAGING ROVER

## KEY FEATURES

12 calibrated cameras capture **60 MP panorama** for full site visualization

Generate **Survey, GIS or mapping accuracy positions** from images

Rapid data collection with **one-button capture of panoramas**

**Familiar, easy-to-use workflows** in Trimble Access field software

**Seamless integration** with the Trimble R10 GNSS receiver or Trimble robotic total stations

**Flexible, simple processing** in Trimble Business Center to generate deliverables

## POSITIONS FROM PICTURES

The Trimble V10 Imaging Rover with Trimble VISION™ technology is an integrated camera system that precisely captures 360 degree digital panoramas for efficient visual documentation and measurement of the surrounding environment. Either standalone or combined with a Trimble VX™ Spatial Station, S-Series Robotic Total Station or Trimble R10 GNSS receiver, the Trimble V10 Imaging Rover provides the means to quickly capture rich data and create comprehensive deliverables. Together with Trimble Access™ field software on the Trimble Tablet Rugged PC and Trimble Business Center office software, the Trimble V10 is the complete geospatial solution.

## RAPID DATA CAPTURE – TRIMBLE VISION AT THE ROD

The Trimble V10 featuring Trimble VISION technology allows you to capture a 60 MP panorama image with the simple push of a button. A total of 12 calibrated cameras – seven panorama and five downward-looking – provide complete site documentation that can be used to make photogrammetric measurements. This metric imaging functionality is ideal to perform work where there are many features to collect, or where features are complex or difficult to capture. Field work that has traditionally taken hours for data collection can now be completed in just minutes. An easy-to-use workflow in Trimble Access field software on the Trimble Tablet is simple and intuitive to capture panoramas, review images and store observations.

## CAPTURE EVERYTHING NOW, MEASURE LATER

Avoid site rework and benefit from increased quality control and data validation by capturing data now and measuring later. From the field, the Trimble V10 Imaging Rover allows you to visually observe and capture the entire job site now and process in the office later.

Back in the office, use the enhanced photo point measurement functionality in Trimble Business Center to measure and create points, lines, polygons and other imaging components which can be used to prepare rich deliverables for GIS, engineering and survey applications.

Both automated and manual processes are available for data processing resulting in greater user control while integrated quality control features that also speed up office processing times for increased efficiency. Multiple user options allow for a variety of data to be generated based on accuracy needs. This system allows for the use of existing familiar workflows to create both traditional and new deliverables for your clients.

## SEAMLESS INTEGRATION WITH GNSS AND TOTAL STATIONS

The Trimble V10 seamlessly integrates with the Trimble R10 GNSS receiver and Trimble robotic total stations, such as the Trimble VX spatial station. Easily associate your collected images with positions to generate a highly accurate geospatial dataset or capture GNSS and total station data. With the existing data capture workflow in Trimble Access, add 360 degree panoramas to your dataset as needed for a complete integrated geospatial surveying solution. One push of a button does it all.

## RUGGED DESIGN

Designed to withstand outdoor conditions that geospatial professionals face, the Trimble V10 is two-meter pole drop tested and has an IP54 rating. The integrated sensors are calibrated to perform in extreme environments. Like the people who use it, the V10 is built to work all day.

## A COMPREHENSIVE SYSTEM SOLUTION

The comprehensive Trimble V10 Imaging System offers unprecedented capabilities to the geospatial professional – never before has a picture been so powerful. By leveraging Trimble VISION technology, now available on the rod, along with other Trimble hardware and software offerings, the Trimble V10 enables you to capture more critical information that can be transformed into enhanced, rich geospatial deliverables. With the Trimble V10, a picture is worth a thousand points.



# TRIMBLE V10 IMAGING ROVER

## PANORAMA SPECIFICATIONS

Total Panorama Resolution	.60 MP
Exposure modes	.Auto
White balance modes	.Auto
Live view frame rate, normal light conditions	.15 Fps
Live view frame rate, low light conditions	.7.5 Fps
Resolution of each camera	.5 MP
File format of images	.Jpeg
File size of one panorama	10 MB–20 MB
Field of view angle captured by panorama cameras	360° x 43°
Field of view angle captured by down looking cameras	.210° x 57.5°
Vertical field of view	93.1°

## POSITIONING PERFORMANCE

Position Accuracy (RMSE) <sup>1,2</sup>	
Horizontal	10 mm RMS
Vertical	7 mm RMS

## HARDWARE

### Physical

Diameter of V10 housing	113 mm (4.45 in)
Height of V10 housing	124 mm (4.88 in)
Weight	
V10	.900 g (1.98 lb)
Battery	182 g (.40 lb)
Rod with battery compartment	1.15 kg (2.54 lb)
Trimble Tablet adaptor	300 g (.66 lb)
Trimble Tablet with large batteries	1.60 kg (3.53 lb)
Bipod	1.61 kg (3.55 lb)
R10 GNSS without battery	910 g (2.01 lb)

### Environmental

Temperature	
Operating	–20 °C to +50 °C (–4 °F to +122 °F)
Storage	–40 °C to +70 °C (–40 °F to +158 °F)
Operating humidity	100% condensing
Dust and water protection	IP54
Shock:	
Non-operating drop test	.Designed to survive a 2 m (6.6 ft) pole drop onto concrete.
Vertical drop onto tip of the pole	100,000 rep.@5 cm (15G) 100 rep.@30 cm (100G)
Vibration	.MIL-STD-810F, FIG.514.5C-1

### Electrical

Battery	
Voltage, nominal	7.4 V
Capacity	3.7 Ah
Smart Battery with capacity display	Yes
Camera Operating time	
with 1 Battery in normal operating mode <sup>3</sup>	.4 h
Number of panoramas with one battery	.350
Interfaces	USB Mini B, USB A

### Built-in Sensors

2 axis tilt sensor range	15°
Tilt sensor accuracy using bipod	0.03°
Magnetic sensor accuracy at undisturbed surrounding	1°

## CAMERAS

Panorama	
Orientation	.Landscape
Number of cameras	.7
Field of view	.57.5° (horizontal) x 43° (vertical)
Downlooking	
Orientation	.Portrait
Number of cameras	.5
Field of view	.43° (horizontal) x 57.5° (vertical)
Lens type	f-theta
Temperature compensated	Yes
Infrared blocking filter	Yes
Angle per pixel	0.39 mrad/Pix
Angle per pixel	1.33 arcmin/Pix
Focal length	3.63 mm (0.14 in)
Depth of field	0.1 to ∞ m
Calibration of	
Camera better than	1 Pix
Optical distortion, interior and exterior orientation	Yes
Stability of calibration	2 Pix
Calibration of Sensors with respect to the cameras	Yes

## POWER ROD

Hot swappable dual smart batteries	Yes
Shock absorbing tip. Shock load to user and camera reduced by factor of	4 x
Exchangeable tip	Yes
Compatible with 5/8 length extension	Yes

## ACCESSORIES

- 360-degree prism with quick release
- High-Accuracy Kit with power mount, prism base and two targets

1 The position accuracy expressed as Root Mean Square Error (RMSE) can be obtained with the following set-up conditions: Three panoramic images were taken from 3 photo stations on known locations with control point quality. Those locations had a triangular geometry with sides of 15 m, a base of 24 m, and an angle of 100°. The distance to the objects was up to 25 m resulting in intersection angles at the objects of close to 90deg. The object positions were determined with TBC photogrammetry software using manual tie points and full orientation option and then compared with the nominal object positions. Checker-board targets were used as objects. The use of the instrument is not limited to distances up to 25 m but the error increases with larger distance, smaller base length or worse geometry of the photo station locations.

2 The presence of control points visible in the panoramas and used in the photo point measurements will improve the orientation of the related photo stations both in horizontal and vertical direction, stabilize the whole bundle and result in even better horizontal and vertical accuracy.

3 Normal Operating mode is standard runtime capturing panoramas as needed, not continuously.



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