THE FUTURE IS TRK

Leica Cyclone Pegasus OFFICE

Data Sheet

Autonomous. Intelligent. Simplified.

PART OF HEXAGON

leica-geosystems.com

Leica Geosystems

Leica Cyclone Pegasus OFFICE - Key Features

Validated User Experience

One licence: access to all required processing tools without requiring survey or mobile mapping expertise
Seamless: connected workflows from field-planning through acquisition to processing in a connected Leica Geosystems reality capture software landscape
Local language support: ask your local authorised distribution partner for details
Base map: background map to superimpose collected data (service may not be available in all countries)

Organised Project Management & Data Flow

Smooth data flow: data exchange between all Leica Cyclone software components with full support of MMS-relevant information and workflows with an aligned project hierarchy (project-job-scan)
Continuous project status information: progress monitoring at any time for full control over project delivery time-lines
Big-data readiness: corridors > 200km
Geo-tags: location-based hardware acquisition-notifications (errors, warnings…) carried through the complete workflow
Follow-up workflow:

- Works in perfect combination with Leica Cyclone MMS DELIVER for object recognition / information extraction
- Prepared for sharing and publishing on online platforms such as HxDR or Leica Cyclone ENTERPRISE

Simplicity for Autonomous Processing

Unattended batch execution: time-consuming tasks processed in batch for multiple jobs over night/weekend (trajectory calculation, reference target detection, image enhancement, cloud-to-cloud multi-pass refinement, anonymisation, point cloud colourisation, classification)

Repeatable high-quality: autonomous processing with confidence and free from human bias

Deliverables: precisely refined trajectories, perfectly co-registered immersive panoramas and detailed side-camera imagery compliant to strict privacy regulations (GDPR), RGB colour-balanced and classified homogeneous point clouds

Point cloud density-optimisation: highest processing efficiency

Rigorous geo-referencing: reference data plus all TRK positioning information (RTK, multi-antenna GNSS, IMU, SLAM, DMI)

Road/Rail-specific pre-classification: segmentation for higher success in later feature extraction with Cyclone MMS DELIVER

Automatic data clean-up: dedicated classification options to detect moving objects and artifacts to be leveraged for later removal from the point cloud

Validated Quality & Optimisation

No hidden weaknesses in the data: find highlighted areas to optimise quickly and easily, understand and analyse data at a glance
Efficient data refinement: effective automated and interactive refinement tools to optimise quality and precision
Quality indexing: graphical and statistical quality information with traffic-light index for trajectory segments, cloud-to-cloud links, control point observations to focus on areas to optimise
Context-aware quality analysis: location-based auto-notification tags from acquisitions in a map context

Navigation & Visualisation

Slice and clip views: limit-boxes, automatic time-clipping according to context, classification, sensor-ID
Adaptive point density: GPU-based rendering optimisation depending on zoom level
Display modes: render by RGB-colour, intensity, class, colour by scan
Smooth transition zoom: seamlessly switch from panoramas into detailed side camera imagery
Navigation options:

- Rotatable 3D views
- Navigate to rotatable image spheres
- Site view / top view / side view

3D measurements:

- Measure in images and point clouds
- Various snapping and selection tools

Finalise & Publish

Industry-standard formats: SHP, DXF, LAS, DOC, Cyclone / LGS, Legacy Pegasus:Manager
Splitting and decimation:

- Split point clouds according to data volumes and file sizes or by class or sensor-ID
- Separate point clouds by scan
- Clip to scanner range
- Thin-out point density by point spacing

Image enhancement: change saturation and brightness for selected groups of panoramas and side-camera imagery

Customisable reports and logs: create personalised reports from processing logs with statistics and graphics

Finalise point cloud:

- Colourise from imagery with masking of acquisition vehicle
- Rail-specific or road-specific segmentation / classification

Finalise imagery:

- Create radiometrically optimised compressed JPEG
- Anonymisation if not done in real time

Exports:

- Export into undistorted imagery
- Export point clouds to LAS 1.2 or 1.4
- Export to LGS – combining colourised and classified point cloud, tags, positioning/trajectory, time stamps and all immersive imagery in one format, optionally protected with credentials
- Export all data into legacy Pegasus:Manager format – consumable by Cyclone MMS DELIVER

Processing Hardware & Licencing

Recommended Hardware

Operating system: Windows® 10
Graphics card: NVidia RTX A-Series / Quadro RTX with 8GB RAM (minimum 4GB)
Memory: 32GB RAM (minimum 16GB) DDR4
Storage: min. 1TB SSD for project data

Licencing options scaled to project requirements and budget

Perpetual: floating licence
Time-limited: extendable on a weekly basis
Subscription: on a yearly basis
Edge computing: any licence model above additionally allows for edge computing on the Pegasus TRK mobile mapping system

Related Products

Customer Care Packages (CCPs)

Customer Care Packages for support and constant updates to keep the complete mobile mapping workflow in optimal condition.

Related Software

Leica Cyclone family of products:

- Cyclone MMS DELIVER: object recognition / information extraction for rail/road/cities
- Cyclone 3DR: point cloud operations, analysis and modelling
- Cyclone ENTERPRISE: Enterprise reality capture solution
- TruView: visualisation, sharing and publishing

NovAtel Inertial Explorer: mandatory! Trajectory computation
HxDR: digital reality online sharing and service platform

A Leica Cyclone Pegasus OFFICE licence gives access to general processing tools in the standard desktop environment as well as on the TRK hardware in a simplified version with reduced functionality and black-box processing mode.

Leica Cyclone MMS DELIVER - Key Features

Object Recognition, Asset Collection & Information Extraction

Mobile mapping extraction deliverables create actionable information for planners, monitoring and maintenance officers and asset managers. They help to drive a future for autonomous infrastructure, detailed smart HD-maps and photorealistic digital twins for simulations.

Cyclone MMS DELIVER takes as input the trajectory information, point clouds with all meta information and imagery previously processed with Cyclone Pegasus OFFICE to transform Pegasus mobile mapping data into actionable information. All detected objects and extracted information are delivered from unattended batch processing routines into industry-standard formats that can seamlessly be shared among multiple offices and collaborators.
In combination with Pegasus mobile mapping systems and Cyclone Pegasus OFFICE, Cyclone MMS DELIVER completes an end-to-end solution for any rail-related, road-related or smart city-related application relying on precision and reliable information.

	Rail application	Road application	SMART City
Autonomous Extraction Capability			
ASPRS-compliant point cloud classification	•	•	•
Application-related point cloud segmentation	Rail-tracks, trackbed, high-mid-low vegetation, hardscape, platforms, catenary	Road, road-marking, road-signs, high-mid-low vegetation, hardscape, power lines	Derived from road or rail segmentation
Object recognition	Main track, side track, poles/signals, platform edges, catenary, walls, overpasses, underpasses/tunnels	Road centre line, edge of pavement, edge of travel lane, lane lines, power lines, curbs, guard rails, poles, road signs	Derived from road or rail segmentation
Autonomous information extraction / data analysis	Clearance (2D train sections, 3D train models / complex loads), as-built geometry plots and superelevation/cant, cross sections, union profiles, longitudinal profiles, digital surface model of trackbed	Clearance, as-built geometry and superelevation, cross-profiles, longitudinal profiles, road condition analysis (cracks, holes, ruts) with indexing	
Rasterisation	Tunnel ortho, trackbed ortho (with pavement cameras), LiDAR-to-TIFF (RGB, DEM, relative elevation colourisation, intensity)		LiDAR-to-TIFF (RGB, DEM, relative elevation colourisation, intensity)
DTM and Contours	•	•	•
Unattended processing	•	•	•
Scheduled processing	•	•	•
Interactive refinement	•	•	•
Big-data ready	•	•	•
Location-based Geo-Tagging	•	•	•
Take 3D measurements from point clouds / immersive imagery	Area, volume, cut/fill volumes, distance, point-to-plane		
CAD Editing tools	Selection, snapping, deleting, merging, splitting, digitising…		
Navigation in captured data, different rendering styles			
Transition zooms from panoramas into higher detail side-camera imagery	•	•	•
Dynamic navigation along trajectory with mouse-wheel	•	•	•
Dynamic data density depending on zoom level	•	•	•
Clipping	By time, by quality, by class, by track, limit box		
Render by	Height, time, quality, intensity, RGB, density (transparency), class		
Exports & Data Formats	SHP, DXF, LAS 1.2/1.4	SHP, DXF, LAS 1.2/1.4, OpenDRIVE® / OpenGRG (compatible to VIRES VTD), Proval	SHP, DXF, LAS 1.2/1.4
Analysis reports	DXF, PDF, XLS	DXF, PDF, XLS	DXF, PDF, XLS
Layer reports	Map view plus objects including meta information		
Project hierarchy "Project-Job-Scan"	Tracks		
Connectivity to Leica Geosystems reality capture software	Pegasus:Manager Format (export from Cyclone Pegasus OFFICE), Cyclone 3DR (PUBLISHER Pro), TruView (PUBLISHER Pro)		
Local language support	•	•	•

Leica Cyclone Pegasus OFFICE

	Desktop	TRK - Edge Computing
Licence	Shared licence (desktop+TRK) through Cyclone Cloud	Shared licence (desktop+TRK) through Cyclone Cloud
Local language support (ask your local authorised distribution partner for availability of specific languages)	•	•
Connectivity into the Leica Cyclone Ecosystem	•	(Cyclone Pegasus OFFICE)
Project hierarchy “Project-Job-Scan”	•	•
Processing status information	•	Limited monitoring capability
Big-data ready	•	Limited on TRK capacity
Visualise acquisition notification tags	•	Limited visualisation capability
Unattended processing	•	•
Interactive refinement	•	
Quality analysis (graphical / reports)	•	Limited visualisation capability
Navigation in captured data, different rendering styles	•	Limited (low resolution LiDAR) visualisation / navigation capability
Take 3D measurements from point clouds / imagery	•	
Generation of point clouds	•	RTK based projects, only
Generation of panoramas	•	RTK based projects, only
Trajectory computation	•	
Absolute geo-referencing	•	
Relative multi-pass adjustment	•	
SLAM post-processing	•	
Rail/road-specific classification, classification for data clean-up	•	•
RGB colourised point clouds, time-stamped, quality-tagged	•	•
Stitched panoramas	•	•
Anonymised imagery	•	•
Radiometric enhancements for immersive imagery (saturation and brightness)	•	
Exports	•	•
Splitting / Decimation	•	

Swiss Technology by Leica Geosystems

1. According to Leica Geosystems AG standardised test methodology. Based on open sky, GPS+GLONASS processing, and phase differential or online with RTK. Points were measured manually from within the point cloud. A ring with 23 check points was collected 4 times, for a total of 92 observations at different times. Check points were measured with TPS and levelling. Results corresponds to a standard deviation of 1 sigma. Measurement accuracy and reliability are dependent on various factors including satellite geometry, obstructions, observation time, ionospheric conditions, multipath, etc. Figures quoted assume normal to favourable conditions.
2. Not available in all geographical regions.

Leica Geosystems AG
Heinrich-Wild-Strasse
9435 Heerbrugg, Switzerland
+41 71 727 31 31

Leica Geosystems