

C-ALS[®] HD



The Carlson C-ALS HD is a Cavity Auto-Scanning Laser System equipped with a high-definition camera and a 874-lumen spot light. The new system is capable of 360° scans in underground cavities and rugged environments for observation, mapping, risk assessment, and more. The C-ALS HD is deployable through a 76 mm borehole and offers versatile deployment options. The C-ALS HD features an extended deployment range of up to 205 m.

Carlson Scan is the included operational Windows-based software that provides a live, full-color video feed of the deployment path as it is being deployed. Within Carlson Scan, operators can utilize the free-moving joystick controls to look at geologic faults, observe existing conditions, or initiate a complete scan of the cavity.

Cavity Auto-Scanning Laser System Equipped with a High-definition Camera and 874-Lumen Spot Light

Scan and map what you can't see, explore, or investigate. Visualize geologic faults or workings that you can't reach, observe existing conditions, monitor changes over time, map old workings, assess dangerous rock falls and observe obstacles with the universal scanner — the C-ALS HD

Advantages

- Full 360-degree scanning capability
- Deploy at any angle with internal gyro
- Scanning range up to 150 m
- High-definition camera and lighting payload with 5mm visibility at 25 m
- Free-moving joystick controls for camera head
- Automatic gravity-based camera orientation
- Fully integrated surface controller
- Slip ring drum for quicker cable deployment



**CLASS 1
LASER PRODUCT**
IEC / EN 60825-1: 2014



BREAK NEW GROUND

View the Void in High-definition

Visualize what you couldn't before with the C-ALS HD nosecone camera equipped with a 874-lumen LED spot light. Operators can view the pathway to the void through Carlson Scan in real-time to see any possible obstructions or obstacles as the probe enters the void. Once deployed into the void, the C-ALS HD maintains visibility of 5 mm at up to a 25 m distance. The operator can freely move the head of the system to visually examine before or after a scan. Always know what is up and what is down with automatic camera orientation.

Map What You Cannot Reach

- With a diameter of just 50 mm, the Carlson C-ALS HD system is easily deployed through boreholes, downhole or uphole, in order to survey the inaccessible
- Survey the collar location on your mine coordinate system to give a starting point for the survey
- Use the supplied calibration jig to initialize the gyro to a known heading
- Connect to the C-ALS HD using the included Carlson Scan software and a ruggedized tablet or laptop
- Control the C-ALS system from the integrated control box
- As the C-ALS HD is deployed, take regular readings at fixed intervals
- The IMU establishes the heading and inclination of the probe as it is deployed and as it scans in the void
- The high-definition nosecone camera provides onscreen video and a real-time view of the borehole as the probe is deployed — allowing operators to see any obstructions and to judge the point at which the probe breaks through into the void
- Once in the void, operators can visually examine the void by using the on-screen joystick control or begin a scan to measure the 3D shape of the void with full 360° coverage, up to a range up to 150 m
- Using Carlson Scan, the operator can view live data, with the option to import existing data as a backdrop to the ongoing survey



Spot Light Visibility

Spot light visibility brings powerful 874-lumen LED illumination to voids and inaccessible sections for expansive camera visualization of up to 25 m.



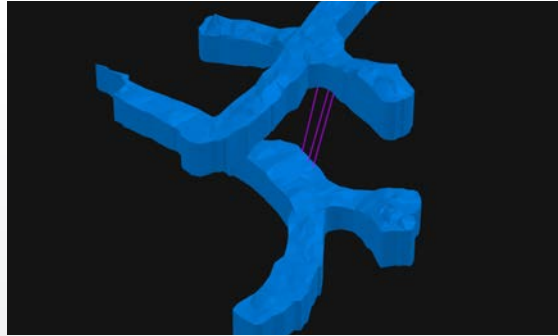
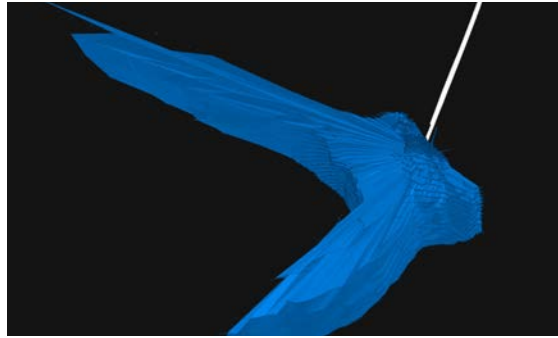
Slip Ring Drum Deployment

The all-new slip ring drum offers a simple and quick method for deployment. This means a seamless process from deployment, to scan, to recovery.

Value

Value comes from insight. By using C-ALS HD to determine the size, extent, and status of inaccessible voids, sites gain valuable insight. The C-ALS Gyro provides a full understanding of the layout of underground workings. Their relation to operations is essential for safe underground and open-pit operations using heavy machinery, explosives, and personnel. The C-ALS HD can provide an accurate view of:

- Excavation and infill of stopes
- Location of voids
- Geometry and condition of mine workings
- Inaccessible historic workings
- Collapsed areas, sinkholes, and troughs
- Erosion of ore passes
- Volumes of voids
- Position of cavities in relation to other underground workings and structures
- Size and location of remaining pillars
- Location of the voids/workings relative to surface features



Carlson Scan

Carlson Scan software for the C-ALS HD makes it easier and quicker for operators to use the system, to analyze collected data and to produce sharable and integratable industry-standard deliverables.

- Simplistic and easy-to-recognize design
- Smooth and efficient animation and point cloud rendering
- Optimised for ruggedized, touchscreen tablets for easy in-field use
- Desktop mode for reviewing and editing data in the office
- See the live heading, inclination and activity of the animated C-ALS probe at all times
- Real-time surfacing and volume calculation from raw scan data for the production of closed 3D models and volumes
- Import existing point clouds and surfaces to see real-time comparisons with design data or previous surveys
- Quickstart mode with single-click project setup up and instrument auto-detection
- View and save live footage from the C-ALS HD camera
- Easy integration with third-party packages with the ability to import and export formats, such as LAS and DXF



Dimensions given in mm

C-ALS

Laser Module

Laser classification (IEC / EN 60825-1: 2014) (Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.)		Class 1
Type	InGaAs laser diode	
Wavelength (typical)	905 nm	
Resolution	1 cm	
Maximum range to a passive target ¹	Up to 150 m	
Minimum range	0.5 m	
Range accuracy ²	± 5 cm (Under Carlson test conditions)	
Divergence	< 2 milliradians	
Maximum average power	20.5 µW	

Angle Measurement

Accuracy	0.2°	
Resolution	0.1°	
Range	Vertical	-90° to 90°
	Horizontal	0° to 360°
Motion	Servo-driven gear systems with manual clutch override	

IMU Sensors

Type	IMU comprising triaxial gyro and accelerometers	
Pitch-and-roll accuracy	±0.2°	
Pitch-and-roll range	360°	
Gyro heading drift	Typically, <1° during a 20 minutes deployment	

Physical data

Construction	Machined aluminium and stainless steel	
Water and dust resistant	IP67	
Operating temperature range	Probe	-10° C to +60° C
	Surface unit	0° C to +50° C
Dimensions	Probe	1110 mm x 50 mm
	Probe with extension piece	2189 mm x 50 mm
	Surface unit	270 mm x 245 mm x 170 mm
Weight	Stainless steel probe	6 kg
	Single-section steel extension piece	3 kg
	Main C-ALS cable	0.18 kg/m
	1 m Boretrak rod	0.4 kg
	Surface unit	4.1 kg

Power

External power input	11.5 Vdc to 15 Vdc
Mains power adapter input	110 Vac to 240 Vac
Max current draw during scan	4.5 A

Camera

Lighting	874 lumens
Lens	10 mm fixed
Video signal	AHD
Resolution	Full HD (1920 x 1080) @25fps

For further information and the best possible application and performance support please contact Carlson at lasermeasurement@carlsonsw.com