XSIGHT

OPTICAL EXTENSOMETER SOFTWARE
The software starting kit to build a custom system

FEATURES

- Simple software for axial measurement
- USB dongle and calibration grid 100&200 mm included
- Upgradable to transversal, axial, torsion, crack, 3D, post-process, and DIC.
- Operator mode for robust industrial measurements
- Many options for I/O and API communication
- Perpetual License
- One Year of TECS (Technical Enhancements & Customer Support)

SUPPORTED OPERATING SYSTEMS

- Win 11 64bit / Win 10 64bit
- Win Server 2019 / Win Server 2022

Latest Release on date of purchase

PACKAGE CONTENTS

Every optical extensometer software box includes: 100 mm and 200 mm calibration grids for setting up your device, a USB drive with installation and support files, a USB Dongle for software activation, and a lens cleaning cloth to keep your measurements accurate. It's all packed and ready for you to start measuring right out of the box.

OVERVIEW

The X-Sight DIC ALPHA is image processing software that can be used in a various of engineering applications to evaluate the deformation and deflection of a visible object captured by cameras, either online or ofﬁine. With ALPHA software, you can perform complex analyses of deformations and obtain precise measurements of various parameters. Our cutting-edge Digital Image Correlation (DIC) techniques, combined with a range of engineering tools, enable you to accurately measure changes in surface strains, lengths, point motions, deflections, and curvatures. The software is the perfect tool for engineers and professionals who need to perform advanced structural analysis.

OPERATION MODES

The X-Sight DIC ALPHA has two user modes, which differentiate skilled users performing advanced analyses from standard operators running repetitive measurements.

Administrator mode
All features, including calibrations and settings are allowed.

Operator mode
Largely limits the rights of the user. This mode restrains change of any change in setting or calibration. An operator can only select the measurement method preset and adjust the probe location, but not its settings, such as gauge length.

METHODS

Is the project structure defining the measurement pre-sets such as camera set-up, calibration selection, measured data, and measurement tools settings and layout. It also includes all recorded or imported data. The method, including custom scripts, can be exported and transferred to another ALPHA installation as a zip archive.

CALIBRATIONS

A mono or stereo calibration can be performed in three different ways. The full calibration can be done by using a calibration grid to create a camera model useful for other calibration types. ALPHA is equipped with a library of camera models for optical components supplied by X-Sight to ease the calibration process.
The simple calibration can use only the scale factor or perspective relations. It can be combined with a camera model to compensate for the lens distortions.
The composite stereo calibration simply defines the pose of cameras using visible surface features based on chose of the existing camera models.
The Calibration procedure supports single or stereo camera pair mode. More cameras or camera pairs can be calibrated in the joined mode, making the image stitching by certain overlap or independently as two or more mono cameras or multiple stereo pairs.

CAMERA SUPPORT

The X-Sight DIC ALPHA supports USB, GigE, FireWire, and PCIe cameras of the following brands: FLIR, BASLER, AVT, IDS, DAHENG, and XIMEA.
Resolution supported cameras ranges from 1 to 65 MPx at framerates up to 4.5kHz real-time data processing.
The system supports the connection of an Optris IR camera for applications requiring temperature monitoring. High-speed cameras and other cameras can be processed ofﬁine based on recorded data.

DATA TRANSFER

Multiple ways exist to OUTPUT the measured data to the machine control unit or the testing machine software.

• DIGITAL
DOLI Binary, MODBUS, HP VIDEO, TCP/IP, RS232

• API
Alpha API (JSON), MRT API

• ANALOG
Auxiliary AD/DA converters

• PULSE
quadrature encoder-like pulse communication with the use of a PULSEGEN device

INPUT of external data to X-Sight Alpha software (force, temperature, pressure) is also possible (requires Device Input software module – DIN).
The API communication allows the ONE to operate remotely. This feature includes commands like START/STOP, Method Switch, Set Gauge Length, and others. For more info, check out the Communication Options document.

I/O DEVICES

The output devices allow the sending of real-time data measurements to external DAQ and other measurement chain devices. Software supports the following brands and communication protocols:
• Advantech DAQ
• MCC DAQ
• HP Video
• DOLI Binary Protocol
• Digital Output TCP/IP
• Digital Output COM
• Mercury RT API
• Modbus
• LabView
• PulseGen (X-Sight)
The input devices allow recording of signal inputs of the following ways:
• Digital Input COM
• Digital Input TCP/IP
• Advantech DAQ
• MCC DAQ
• PIX Connect
• ZP-500N
• Modbus
• LabView

X-SIGHT DEVICES & ITEMS

There are specialized devices dedicated to DIC and optical extensometers, which help us use our systems with testing machines, in automatic lines, and on vibration testing applications.

USB Relay

It enables remote control of the light and other auxiliary devices and synchronizes their start with the measurement start.

PulseGen

PulseGen is an auxiliary device designed for X-Sight measuring systems interfacing testing machines. For a test rig, PulseGen acts as an incremental encoder working on a 5V logic. The signal type is a quadrature A/B. This device comes in dual or quad channel variant.
PulseGen supports external trigger to remotely start and stop the measurement in Alpha software. This trigger works on a 5V logic as well.

Wireless sync

Providing the synchronization of multiple cameras for long distances from 0-100 m with accuracy < 2 microseconds up to hundreds of meters or 1 km depending on direct view factor with accuracy < 5 microseconds.

Synchron

Synchron is a device that triggers cameras to capture images based on a predetermined scenario. This device allows the system to capture only the moments of highest or lowest load or record a complete cycle with more data points per cycle than a camera can provide.
Synchron is particularly useful for fatigue and crack-growth measurements.

Calibration grids

The X-Sight DIC Alpha software utilizes circular dots calibration grids to ensure proper calibration. These calibration grids can either be regular, with all dots of equal size, or contain fiducial points. The default grids that come with X-Sight systems are made of aluminum and are 3mm thick.

Speckle pattern kit

A set of stamps can be used to ease the application of a speckle pattern.
This kit includes black and white pigment-based stamp paint.

THE MODULARITY AND PROBES

The X-Sight DIC Alpha software is split into several modules. Modules group different measuring probes or advanced features.

POINT PROBE is a basic measuring probe for displacement determination.

ANCHOR POINT allows the isolation of displacements of other probes from displacements of the Anchor Point. It is intended for use with other probes.

LINE enables dual-position angular twist and strain measurement.

EXTREME LINE is the probe for axial neck detection. Provides improved E-modulus reading and eliminates invalid tests caused by failure outside the gauge length area.

TRANS LINE offers a multi-positional transversal measurement with averaged and max/min width functions.

TORSION LINE enables dual position angular twist and strain measurement.

BEND LINE is a probe designed for bending tests. Measures strain over a curved shape and enables the visualization of the real-time strain distribution.

LINE VALUE DISTRIBUTION provides a colorful strain visualization feature during real-time measurement.

CRACK PROBE measures crack length during static or dynamic tests.

DIC AREA is the full-field probe for strain and displacement distribution mapping.

ROD LINE is designed for rebar measurement, it compensates for the detachment of the oxide layer during testing. Includes the axial neck detection feature.

BRIDGE TOOL is a series of consecutive rectangles placed on repeating patterns of measured objects of known dimensions. Allows measuring deflection and sway.

X-SIGHT OPTICAL EXTENSOMETER MODULARITY APPROACH

The modularity approach is applied primarily for optical extensometer use cases.

The measurements are primarily performed in real-time using line-based measuring probes with online data transfer to the testing machine or DAQ.

However, to get the most out of an optical strain measuring device, there is an option to add a post-processing feature. In post-processing, the number of line-based probes can be multiplied or switched for an area strain or displacement mapping function.

This approach allows the building of a simple and cost-effective extensometer and easily expands it by modules. If users need many different functions, it is more effective to use a DIC license instead of many modules.

Software Module	Point	Line	Extreme Line	Trans Line	Bend Line	Torsion Line	Crack Probe	ROD Line	DIC Area
AX	•	•	•						
TR*				•	•				
TO*						•			
CR*							•		
ITT*								•	
DIC *									•
PP*	Post-processing of recorded measurements (different probes or layouts)								
DI*	Possibility to input auxiliary signals (digital and analog)								
LVD*	Color value distribution along Extreme, ROD, or Bend Line								
BM	Allows measuring deflection and sway and their side visualizations								
3DL*	Full stereoscopic functionality for line-based probes								

* Expansion software module requires the presence of AX.

LICENSING

The X-Sight DIC software ALPHA license is bonded to a HW USB dongle. This allows the user to install the software on unlimited computers and use only the one where the license key is plugged in. This way of licensing makes it easy to switch the computer in case of a PC breakdown.
The standard DIC ALPHA license is perpetual and includes one year of TECS.
The perpetual software license can be optionally extended by NET licenses for classes, schools, colleges, or universities in batches of 20 annual licenses for EDU (educational) purposes.
The EDU licenses can be used only by elementary, secondary, and higher education schools (universities), educational institutions, and training centers and will be installed only on equipment owned or used by such entities. The software will be used exclusively for educational and non-commercial purposes. This type of software license may not be used for grant-funded research purposes. The educational license may not be used for any profit-seeking activities.
The RESEARCH license is an annual subscription that can be used for non-commercial purposes only. The research license may only be used to conduct research up to and including TRL Technology Readiness Level 5. If you wish to conduct research beyond TRL 5, you must purchase a commercial license.

ERROR POLICY

For the optimal functioning of the software, the installation of necessary updates is recommended. In case of error reporting, the necessary updates are released.

TECS

Technical Enhancements refer to major and minor enhancements, changes, improvements, and non-critical bug fixes to the software product made available through online updates. They include new features, bug fixes, security updates, performance software improvements, modifications, customer-based feedback changes, design and user i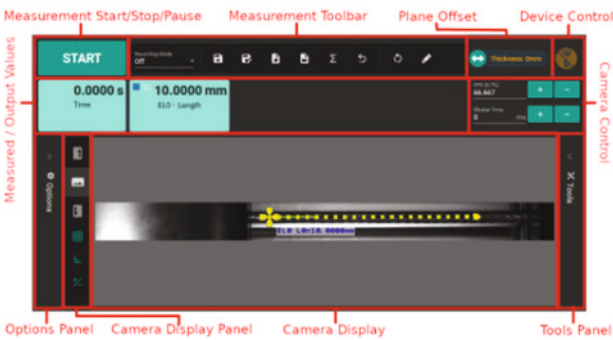nterface updates, and improved performance. Technical Enhancements are released twice a year, as minor and major releases, to allow users to take advantage of new features and improved performance.
Customer Support ensures that customers acquire the right

to guaranteed assistance in solving Their technical problems related to the operation of the software and hardware. This includes remote consultations and solutions via telecommunication service or email.

Customer support is included in the price of TECS based on the product type, with expiration at the end of the valid period.

The customer support service is available through the proposed teleconference service (TeamViewer, Windows Remote Assistance, Any Desk, Skype, MS Teams, Zoom, Google Meet, etc.). The teleconference request will be sent to tecs@xsight.eu with "teleconference request" in the email subject.
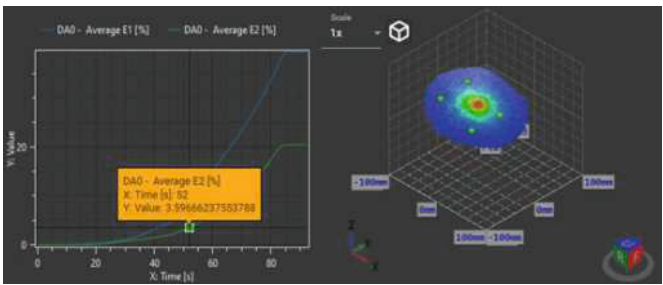
MEASUREMENT GUI

The GUI screen has multiple panels for real-time measurement control.

- Camera Display
- Camera Display Panel
- Camera Control
- Options Panel
- Tools Panel
- Measurement Start/Stop/Pause
- Measured/Output values
- Measurement toolbar
- Plane offset
- Device control
- 2D and 3D real-time chart

▲X-Sight DIC ALPHA SW measurement window

▲X-Sight DIC ALPHA SW 2D and 3D real-time charts

LANGUAGES

The X-Sight DIC software ALPHA is globally competent, o?ering full localization in a variety of languages to cater to our diverse user base. The SW platform is fully operational in English, German (Deutsch), Czech (Český), Polish (Polski), Spanish (Español), Russian (Русский), Chinese (中文), and Japanese (日本).

SYSTEM REQUIREMENTS

System Requirements	System Requirements	Recommended
CPU	Intel/AMD 2GHz 2-core (>3000 points - Average CPU Mark *) Intel/AMD 4GHz >8-core (>4000 points - Single Thread Rating **)
GPU	NVidia/AMD/Intel OpenGL 3.0 1024x768px (>300 points ***) NVidia/AMD/Intel OpenGL 3.0 1920x1200px (>5000 points ****)
Memory	4GB | 16GB DDR4
Disk	8GB HDD free | 1TB SSD / M.2
Ports	1xUSB (HW key), 1xUSB3.0 for each ONE device + 1xUSB2.0 (relay) (Optional) 1xUSB for peripheral data transfer device (Optional) 1xEthernet Port of MODBUS or TCP/IP communication
Operating System	Windows 11 64-bit ***** or Windows 10 64-bit ***** Windows Server 2019 ***** or Windows Server 2022 *****

* MID CPU BENCHMARK www.cpubenchmark.net
** HIGH-END CPU BENCHMARK www.cpubenchmark.net
*** MIDLOW GPU BENCHMARK www.videocardbenchmark.net

**** HIGH-END GPU BENCHMARK www.videocardbenchmark.net
***** Latest Release on date of purchase