

## ASC & InScript SYSTEM CONTROLLER SOLUTION

## Powerful synchronization performance for laser systems. Compatible with all ARGES' scan heads, lasers and sub-systems.



# **ASC & InScript** SYSTEM CONTROLLER SOLUTION

🖻 🗗 🗙 🌧 WFI BScan - [1] 🗗 🗙 🏂 WFI Measured Data - [4 Through our photonics brands— ARGES, Cambridge Technology, Laser Quantum and Synrad- Novanta engineers cutting-edge components and sub-systems 47840000 for laser-based diagnostic, analytical, micromachining and fine material processing applications. ARGES' next generation of controller and software solution features powerful synchronization tools to enhance laser system performance. Featuring real-time control signals, remote diagnostics and administration, and high accuracy and throughput for demanding applications, this laser controller solution empowers users with more control and × × flexibility to optimize their laser system.

#### Key Features

es - [9]



Autonomously functioning device that does not require a host to carry out its processing tasks.



Can be remotely diagnosed, administered and parameterized via Ethernet TCP/IP.



Combination of highly configurable interfaces and processing units responds in real-time to external signals.



ASC controller works seamlessly with our proprietary InScript software.



Enhanced features to optimize complex industrial machining processes.



InScript provides a userfriendly, object-oriented interface for integrating all external devices and defining complex processing steps.

## **ASC & InScript** V5.0 FEATURE OVERVIEW

This latest release of our ASC and InScript laser controller solution provides our Always-On On-The-Fly (AO-OTF) feature, which enables a very fast MOTF process for battery foil cutting for the e-mobility market. We also introduce our laser power ramping and new wobble shapes to improve welding applications. This release also includes: a major feature and usability update for our OCT solution, extended our EtherCAT automation interface to provide users with more flexibility and a greater amount of process data for better process handling and enhanced, user-friendly Controller Services for managing and monitoring the entire laser scan system. Lastly, you can find major usability & stabilization patches for the ARGNET Series.

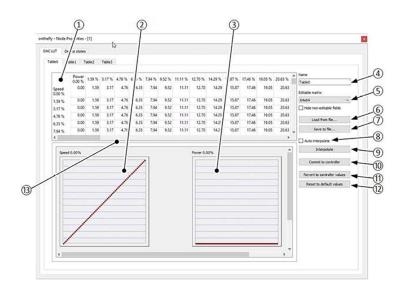


## DAC LUT UI – Laser User Interface

As part of our AO-OTF feature, we release the DAC LUT UI for the individual configuration of a specific laser source for an optimal process result.

#### Legend

- 1. Table view of the DAC LUT values
- 2/3. Graphical representation of the DAC LUT
- 4. Name your table; see section Table names.
- 5. Size your table
- 6/7. Load / Save DAC LUT table
- 8. Automatic interpolation mode
- 9. Perform manual interpolation
- 10. Save current DAC LUT table to the controller
- 11. Revert the current DAC LUT table to last stored on controller
- 12. Reset the current DAC LUT table to default
- 13. Splitter to increase or decrease the table size



# Fast switching between laser parameters during ongoing operation

It is possible to define four laser map settings in parallel and to switch between them in real time during the process, which enables particularly precise processing (see table 0 to table 3).

	bie1 T	ible2 T	able3				
	Power 0.00 %	25.40 %	50.79 %	76.19 %	100.00 %	^	Name
eed 00 %	0.00%	25.40	50.79	76.19	100.00		Table0 Editable matrix
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.19 %	0.00	25.40	50.79	76.19	100.00		9x9
0.00 %	0.00	25.40	50.79	76.19	100.00		3x3 2x2
						^	Auto interpolate
Speed 0.00	ñi			-1		Power 0.00%	Interpolate
			/	4			Commit to controller
							Revert to controller values
		-/					Reset to default values
		/					
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	1						
	¢						

## OCT Extension - Feature & Usability Update for the OCT.

We reworked our OCT device and our OCT job node to deliver improved features for better user experience. This release now includes better usability in terms of configuration and process interaction.

wfibase - Node Properties - [1]	
Control Configuration	Device states
Message port trigger	
Current state	listen
Corrent state	isten
Parameter	
Current state	idle
Error	
Current state	ok
	Reset
Power	
Current state	standby
Target state	standby
Lowest state	standby 🗸 🗸
	Attention
Ready to standby timeout	0.000 \$
Standby to down timeout	0.000 \$
Down to off timeout	0.000 \$
Remaining timeout	0.000 s
WFI Base States	
General state	Active
Video signal processing data	Ok
Calibration data	Ok
Distance to selected position	slot Ok
Reference arm init	Ok
Reference arm nominal posit	ion Configured
Illumination general state	Active
Illumination current	Ok
Illumination cooler	Active
Illumination temperature	24.532
Illumination temperature stat	Ok
Illumination driver	Ok

#### Auto Start/Stop

We provide a power state machine for easier interaction with the OCT. By means of a power-state machine, OCT measurement is automatically activated or deactivated during a complex job output.

#### Enhanced OCT Job Node

Reworked user interface with user-friendly overview to keep everything in view.

<ul> <li>Job Control</li> </ul>	×	without " Node Properties " [1]	× D' X	vribere - trapector - (4)				
-				Name	Value	Unit	3,pe	Flags
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				initialized	TRUE		VARBOOLEAN	
		Protunent		initialize	FALSE		VARBOOLEAN	-W
Controllers 172.29.227.228 (secv41)		S Signal processing		lavanActivity	Inactive		VARSTRING	
Selected jub: > No jub selected <				laserisActiv	FALSE		VARIBOOLEAN	*********
		E trane traper		interlockluketiv	FALSE		VARBOOLEAN	********
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💎 🕐 Devices 🛛 🔒 Job				interlockState	Inactive		VARSTRING	
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				moveToPositionSlot lastLocaMaximaAScan	0.000000	-	VARREALIZ	
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		Interfack Inactive Acknowledge		startFirmmareUpdate	FALSE		VARIBOOLEAN	-W-7
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v 💊 Jobs		Threshold monitor #active		generaWiState	Active		VARSTRING	
				vipState	Ok.		VARSTRING	*********
<ul> <li>DCT-lob_default</li> </ul>				calibrationData	Ok		VARSTRING	
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				referenceiumNominaPosition ceneralituminationState	Configured Active		VAR STRING VAR STRING	
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~ ? wfi				✓ <sup>™</sup> measurement			WARSET	-WCO
> E Hetch				power	50	N	VARINTS2	-wco
> S Pent				> 💋 CCDConfiguration			WARSET	-WCO
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) 🔝 Fants				> 💆 thresholdOptions			WASC	-WCO
V S Devices				> CCDScaling			VAR-SET VAR-SET	
A configurablelaser				<ul> <li>Reference/um reference/umStateDescription</li> </ul>	On position		VARSTRING	
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head				stepSee	6000		VARINT32	-W
💟 Enepar				increaseWedgePosition	FALSE		VARBOOLEAN	-W
S onthefly	= 2			decreaseWedgePosition	FALSE		VARBOOLEAN	-W
Sed-21				> 📁 videoSignaProcessing			WASET	
				reset	FALSE		VARBOOLEAN	-W
Sysmon				✓ <sup>™</sup> states			WARSET	
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S without				) perameter			WARSET	
							VAR SET VAR SET	
172.29.227.239 (ascitack)	-			> 📁 power			1,8,1997	

wfibase - Node Properties - [1]		
Measurement configuration		
Position slot	pos 0 V	
Power	50	%
Integration time	10.000	μs
Scaling value	0.000	
Image width	2048 ~	pixel
Image height*	512 V	pixel
Highpass cutoff index	50	pixel
Trigger frequency	64000.000	Hz
Trigger delay	0.000	μs
* Stop imaging to edit this setting		
Stop process at		
signal-to-noise ratio		
Threshold	0.000	
Interval	1	pixel
Sensitivity	0	pixel
absolute distance from Z =	0	
Threshold	0.000	
Interval	1	pixel
Sensitivity	0	pixel
Comparison select	greater than Threshold	$\sim$

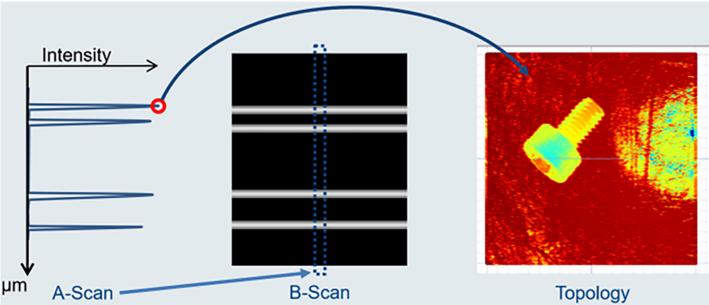
#### Increased Flexible OCT A-Scan Rate

Configurable OCT A-scan rate to achieve higher OCT resolution. With the newest implementation, A-Scan trigger frequencies of up to 64 KHz are possible.

#### Our A-Scan / B-Scan Principle

One sample point generates one complete A-Scan. Max. 64,000 A-Scans/s. One A-Scan is one line of pixels in the B-Scan. The A-Scan view in InScript is the middle line of the B-Scan view. The depth of the highest peak in each A-Scan is the depth of each point in the Topology view.

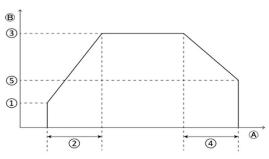
See below:



#### Laser Power Ramping

User-friendly capable by adjusting the laser power during process and making it easy to interact with the process parameters. This extension is part of our Linepar Device and is extending our line segments parameter functionality in terms of pulse duration and frequency control for line segments.

Laser power ramping is mainly used to prevent excessive material removal or scorching while cutting or welding and when the laser output overlaps.



Description: (A) Time in milliseconds or Length in millimeters, (B) Percentage of laser output power, (1) Start power factor, (2) Rise time or Rise length, (3) Power factor, (4) Fall time or Fall length, (5) End power factor

## Enhanced Controller Services

Suppor	t info				
If you	need support pla	ease generate a	a Support	Info and send it to our sup	port.
	Generate				
ASC					
	t or shutdown of	the ASC migh	t lead to lo	ss of data.	
Reboot		-		es of data. any of these operations.	
Reboot		nd configurati			
Reboot	save your jobs a	nd configurati	on before		
Reboot Please	save your jobs a Reboot	nd configurati	on before		
Please :	save your jobs a Reboot re	ind configuration	on before hutdown	any of these operations.	
Reboot Please Firmwa Restarti	save your jobs a Reboot re ing or stopping t	ind configuration	on before hutdown mware mig		

Extended Controller Monitoring and Health CareFunctionality.

onnect Co	ntrollerservices	Disconnect (	ontrollen	services		
General	Information	Settings	Jobs	Firmware Configuration	Update	
Current	temperatures		S	stem information		
Board	50 ° C		11	BUILDROOT VERSION INFO		-
CPU	45 ° C			Linux Kernel Version: 4.9.184	-09812-	
					SMP_Fri_Oct_6_13:42:06_CEST_2023	
					22101701_ascv4x_devrelease-67-	
Filesyste	m			g640b08c7e6 Buildroot Release: 2021.02.12		
Ou shall	king Cleanup the	Manual and		DUIDIOUT NEIEBSE: 2021.02.12		
	unnecessary dat			INSCRIPT FIRMWARE VERSI	ION INFO	
control						
Cleanin	a up the filesyste	m does not	3	InScript Firmware Version: fv	v-5.0.0+RL.20230918.0607	
leas to l	loss of data.			DETECTED BOARDS		
Curren	tly free: 1.3G					
Total:	3.5G			Board: LPCFEX		
131454576				Board: LPCHEX Serial: 760271920170000414		
	Cleanup			Revision: V10		
				Board: SPD		
				Serial:		
				Revision: 1.1.0		
				Board: LPCH		
				Serial: 2112000096		

System Health Monitoring

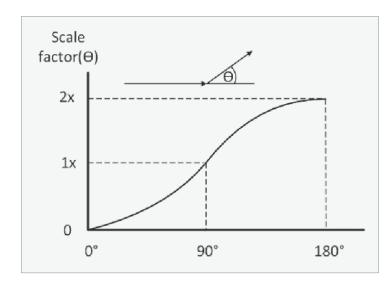
#### **One-Click Update Controller Solution**

Select a file and all system components of the controller, like the OS, the firmware and the FPGAs are updated fully automatically, and an update protocol is provided.

eneral	Information	Settings	Jobs	Firmware Configuration	Update	
Firmwa	re/FPGA S	ystem				
They u Please i If you	n Updates com pdate your syst make sure to sa use WFI-OCT p rk-settings for E	em, firmware a ve your work lease notice, th	before doing	so, you might lose data. to setup the		
Update	file					
						Update

## **Polyline Delay**

Our Polyline Delay enables higher accuracy with laser on in corners. Especially when outputting polygons, the galvos in the scan head can make abrupt turns that can create undesirable arcs. The poly delay function can be used to compensate for these arcs by introducing delays in the commanded scan head position stream at these curves. Typically, the time required to reach the target is proportional to the change in angle between successive vector segments. Smaller angles require less time, while larger angles require more time. This proportionality is automatically managed when delay scaling is enabled.



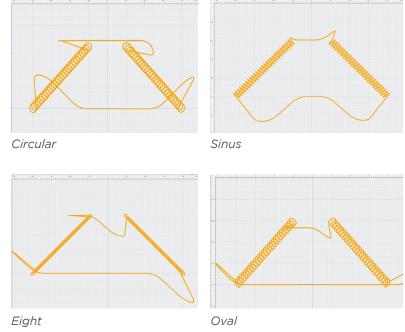
We use raised cosine function used for poly delay scaling. With enabled delay scaling the delay time will be automatically adjusted proportionally to the angular change of the vector segments. The scaling is done using a raised cosine function.

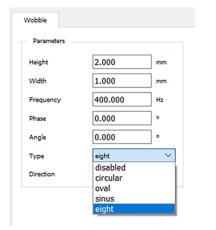
linepar - Node	Properties - [1]		
Common	Ramping	Times	Poly Delay
Poly Delay			
Delay	100	μs	
Enable -	delay scaling		

User interface in the Linepar device

## Wobble Extension

We extended our Wobble portfolio with new wobble shapes to improve welding applications. For some applications, the line width created directly by the laser beam is too narrow. For this reason, the laser beam trajectory can be superimposed with a circular, oval, sinusoidal, or eight-shaped movement, referred to as wobble – that way the resulting line width can be widened.





Implemented wobble shapes

## EtherCAT Extension

With this release, more process data is available via EtherCAT. The full GPIO Input/Output variables is now available via EtherCAT.

GPIC	Inputs G	PIO Outputs De	vice states			0	SPIO Inputs GPIO	Outputs	Device stat	-
- 6	eneral Purpose Ing	outs					- General Purpose Out	puts		
	Value	Value name	Signal name	State 0 name	State 1 name		0 not active	$\sim$	Value name	Ì
0	FALSE	Low	Input 0	Low	High		1 not active	~	not active	i
1	FALSE	Low	Input 1	Low	High		2 not active	$\sim$	not active	Ì
2	FALSE	Low	Input 2	Low	High		3 not active	$\sim$	not active	
з	FALSE	Low	Input 3	Low	High		4 not active	$\sim$	not active	[
4	FALSE	Low	Input 4	Low	High		5 not active	$\sim$	not active	
5	FALSE	Low	Input 5	Low	High		6 not active	$\sim$	not active	
6	FALSE	Low	Input 6	Low	High		7 not active	$\sim$	not active	
7	FALSE	Low	Input 7	Low	High		8 not active	$\sim$	not active	
8	FALSE	Low	Input 8	Low	High		9 not active	$\sim$	not active	
9	FALSE	Low	Input 9	Low	High		10 not active	~	not active	1
10	FALSE	Low	Input 10	Low	High		11 not active	~	not active	
11	FALSE	Low	Input 11	Low	High		13 not active	~	not active	Ì
12	FALSE	Low	Input 12	Low	High		14 not active	~	not active	Ì
13	FALSE	Low	Input 13	Low	High		15 not active	$\sim$	not active	İ
14	FALSE	Low	Input 14	Low	High					
15	TRUE	High	Input 15	Low	High					

O Inputs	GPIO Output	s Device sta	tes		
Seneral Purp	oose Outputs				
Value		Value name	Signal name	State 0 name	State 1 name
0 not act	ive	not active	Output 0	Low	High
1 not act	ve	not active	Output 1	Low	High
2 not act	ive	not active	Output 2	Low	High
3 not act	ive	not active	Output 3	Low	High
4 not act	ive .	not active	Output 4	Low	High
5 not act	ive	not active	Output 5	Low	High
6 not act	ive	not active	Output 6	Low	High
7 not act	ive .	not active	Output 7	Low	High
8 not act	ive	not active	Output 8	Low	High
9 not act	ive	not active	Output 9	Low	High
10 not act	ive .	not active	Output 10	Low	High
11 not act	ive .	v not active	Output 11	Low	High
12 not act	ve	- not active	Output 12	Low	High
13 not act	ive	not active	Output 13	Low	High
14 not act	ive	not active	Output 14	Low	High

#### Structure Your EtherCAT Data

Configure data either provided via EtherCAT or non-EtherCAT. This allows the data to be optimally adapted to the application desired.

ethercat - Nod	e Properties - [1]				⊕	8	>
Resource							
Interface	EthercatSlaveV2_0 $\lor$						
	Detect						
Settings							
PLC I/O contro	olled by EtherCAT Yes 🗸						
GPIO data	enable						
WFI B-Sca	in summary data enable						
WFI A-Sc	an data enable						
GPIO Outpu	t configuration						
Output 0	Not used $\checkmark$	Output 8	Not used	$\sim$			
Output 1	Not used $\checkmark$	Output 9	Not used	~			
Output 2		Output 10	Not used	~			
	Not used 🗸 🗸	00000110	Not used	~			
Output 3	Not used $\checkmark$	Output 11	Not used	~			
Output 3 Output 4							
	Not used V	Output 11	Not used	~			
Output 4	Not used V	Output 11 Output 12	Not used	~			

## Stability Patch - Critical Bug-Fixes & Usability Features

This release includes major usability patches for core components of the system such as the Vector Editor, the SFC Wizard, the Timed Signal Stream Views and various other components included. In addition, the release version includes major stability and performance patches that enable more efficient and user-friendly work experience.