

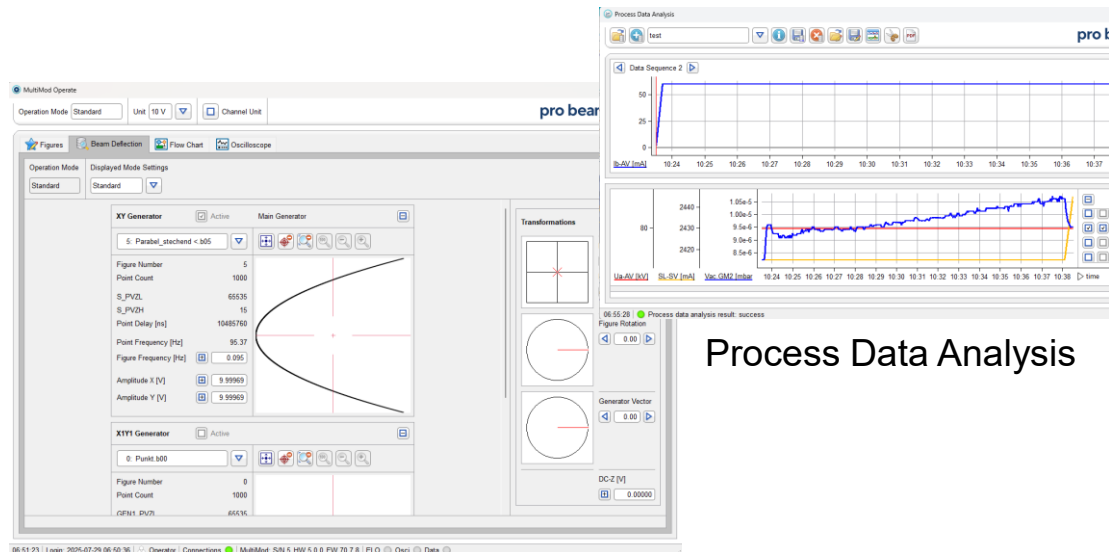
New pb-Application Features

Ole Schmidt, R&D

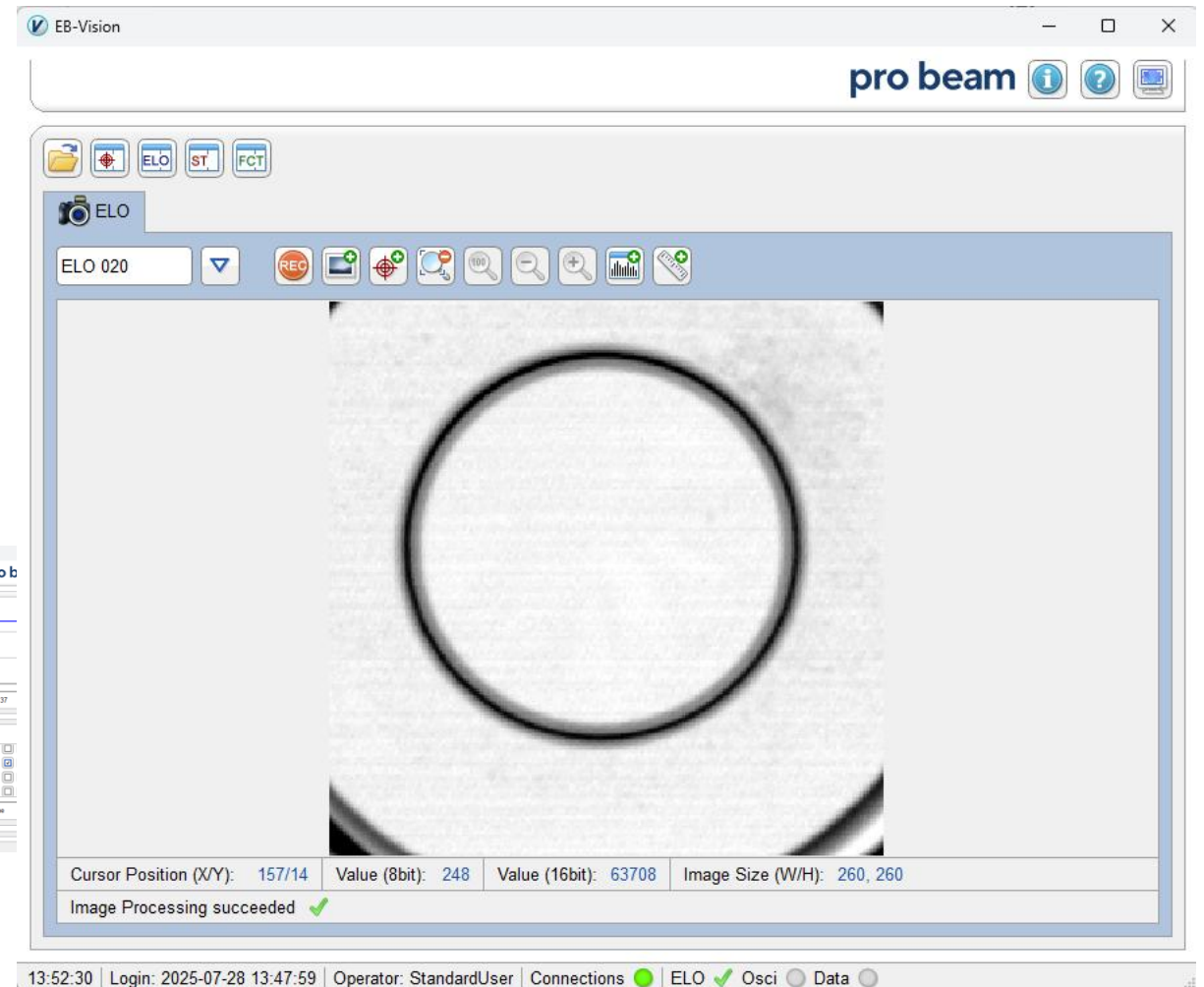
pro-beam GmbH & Co. KGaA
Innovation Club Welding, September 2025

www.pro-beam.com

- Software suite developed by pro-beam, installed on machine's industry computer (MSV-PC)
- Monitoring and control of the MultiMod
- Analysis of recorded process data
- Image processing and more



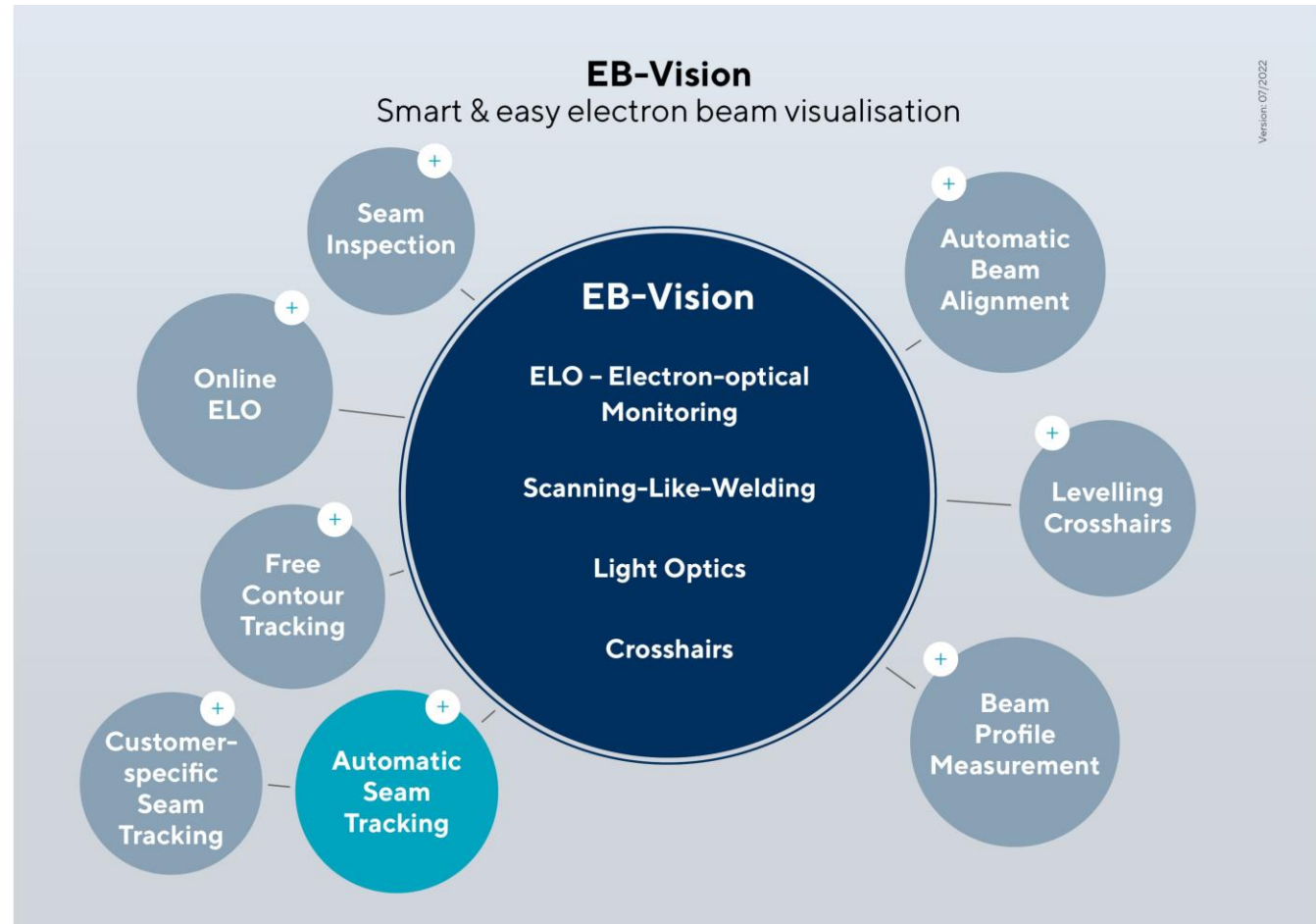
MultiMod Operate



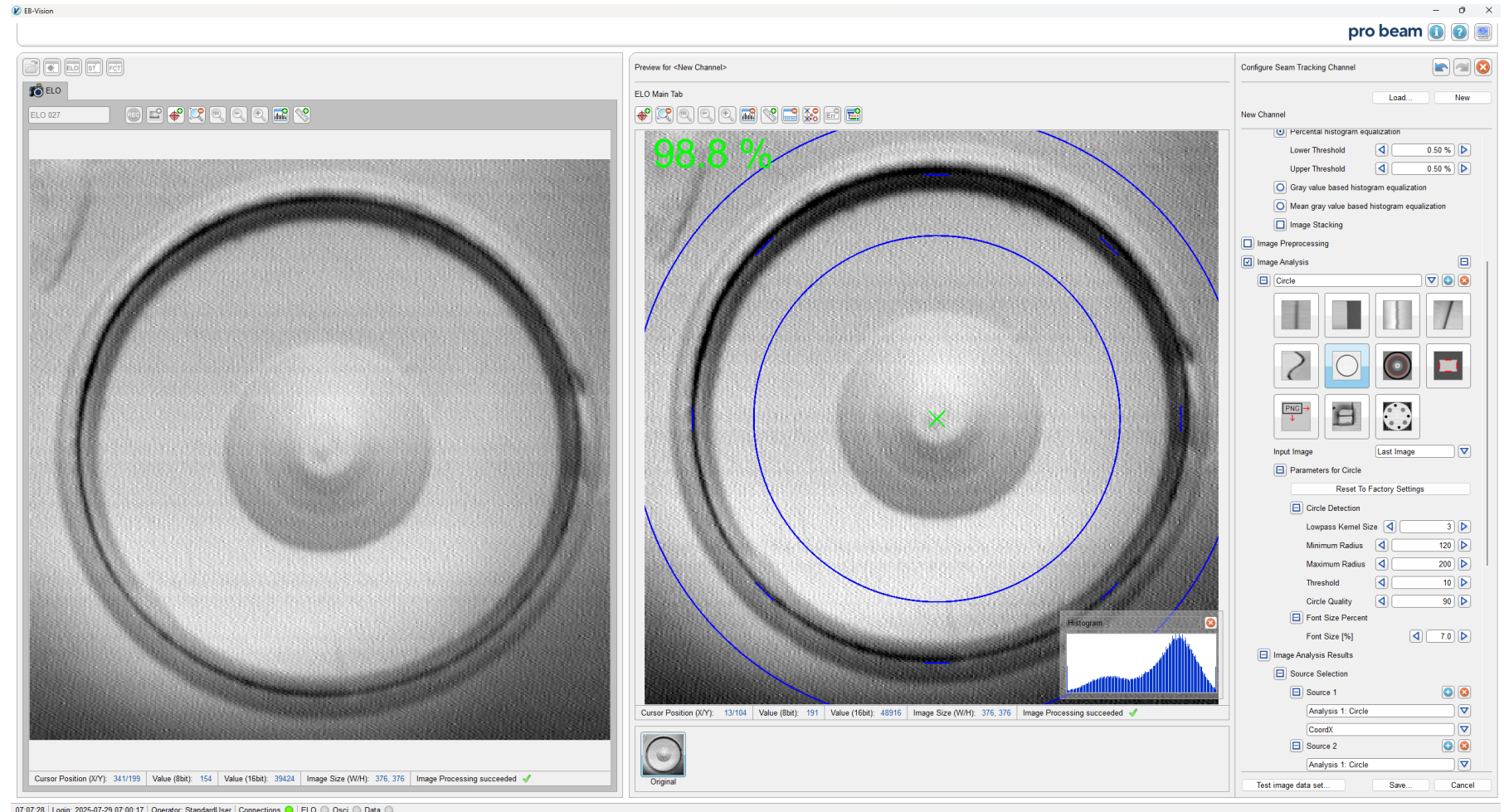
EB-Vision

Improvements for Automatic Seam Tracking

- Algorithms for identifying well-known shapes by mathematical functions
- Seam and Edge Averaging
- Linear Seam
- Radial and Axial Welds
- Circle
- Blob (for example for holes)
- Rectangle
- Pattern matching



- Typically a new seam tracking channel is created by an expert for a specific component
- During production this channel is used repeatedly without reconfiguration
- Configuring a seam tracking channel requires expertise and a thorough review of the user manual



- Live demo...

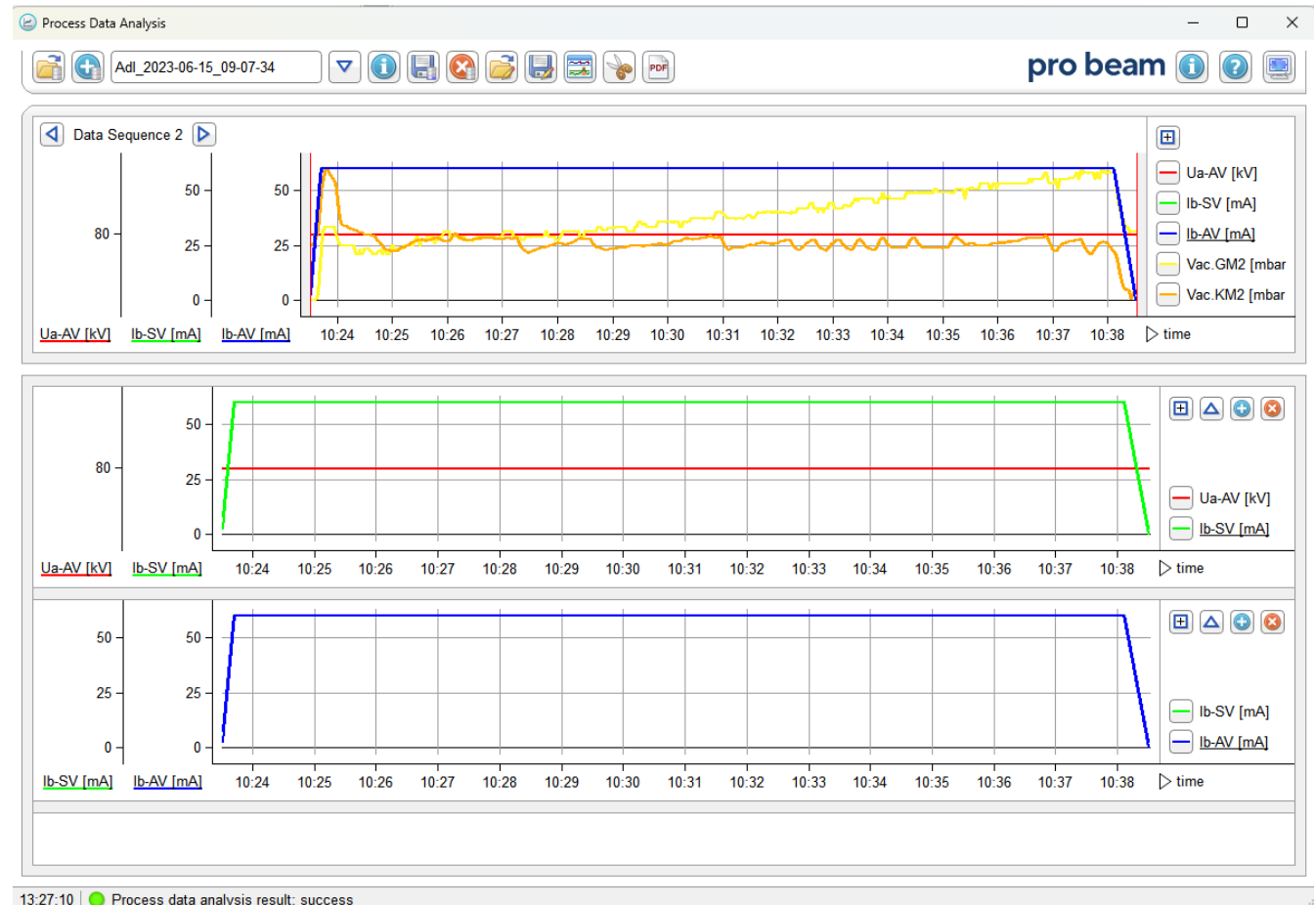
New automatic welding protocol

- The automatic data logger is writing the machine state (e.g. beam current, vacuum, X/Y position) to a log file in regular intervals (10 Hz)
 - Writing process data at 500 Hz is possible with second application “DA”
- For a single process there is one log file generated with multiple sections
- Header and footer store CNC program, part number, ...

Header

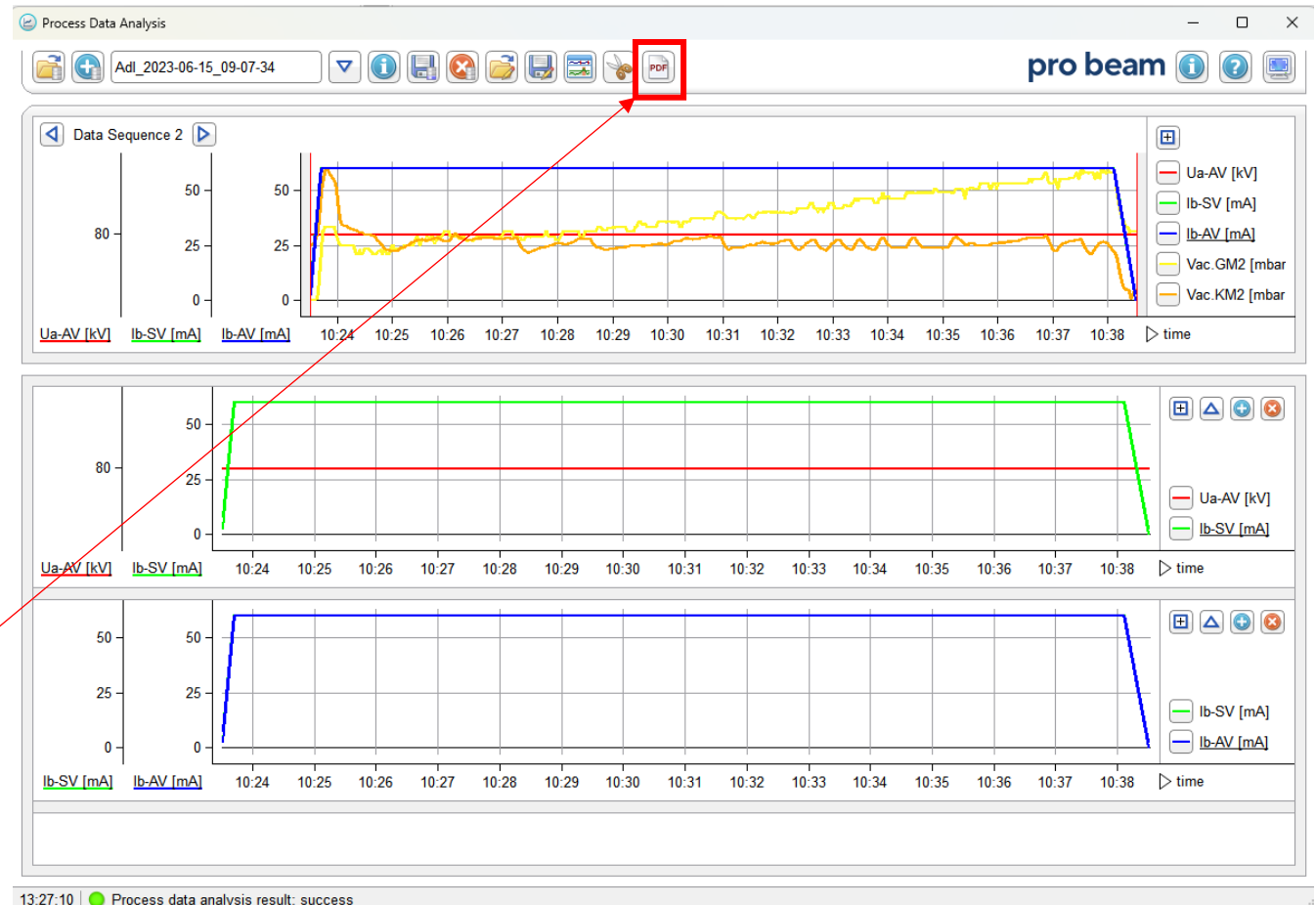
Data section 0

- PDA visualizes the process parameters and can perform basic analysis:
 - Set valid range for given parameter
 - Check deviation between set and actual value
 - Arc counter



- PDA visualizes the process parameters and can perform basic analysis:
 - Set valid range for given parameter
 - Check deviation between set and actual value
 - Arc counter

New functionality
“PDF Export”



- Based on ADL logs and PDA settings you can generate automatic welding reports
- Welding reports typically contain:
 - Information from the header put into a table at the top
 - Data protocols (per sequence)
 - Data diagrams (per sequence)

The screenshot shows a software window titled 'Process Data Analysis - Export to PDF'. It has a 'Configuration' tab on the left and a 'Preview' tab on the right. The 'Preview' tab displays a report titled 'EB-Welding Report' with the 'pro beam' logo. The report includes a header with the file name 'Adl_2023-06-15_09-07-34.csv' and a timestamp 'generated 2025-07-31 13:29:14'. Below the header is a table with the following data:

Source data file name	Adl_2023-06-15_09-07-34.csv
CNC Program Path/Name	/_N_WKS_DIR/_N_EXP_WPD/_N_LISSAGE_EXP_MPF
Machine-Name	<Machine-Name> - Not found in file!
Operator	<Operator> - Not found in file!
Department	EB Welding
Part-No	<Part-No> - Not found in file!
Part-Description	<Part-Description> - Not found in file!
Gun Sytem no.	0 (0=S80-40-1; 1=S150-30-1; 2=S150-15-1; ...)
Filament typ/no.	7 (0=3,5mm; 1=2,0mm; 2=1,5mm; 3 ...)

Below the table is a section titled 'Data Sequence 1 - Start Time: 10:23:27.440'. It contains a table with the following data:

Channel Name	Min Value	Mean Value	Max Value
Ua-AV[kV]	80	80	80

Automatic welding report

pro beam

- Format and content can be freely set by the user
- Settings can be saved for repeated use
- Typical workflow would be to set up the welding report for a given component and generate PDF exports automatically for all ADL logs in one go

The screenshot displays the 'Process Data Analysis - Export to PDF' application window. The interface is divided into a 'Configuration' pane on the left and a 'Preview' pane on the right.

Configuration Pane:

- Configuration Settings for PDF Export:**
 - Description: EB-Welding-Report_000_user
 - Folder: ..\..
 - (Base Folder) C:\Users\loschmidt\Documents\Process Data Ana
- Document Settings:** (Expanded)
- Document Content:**
 - ☒ Document Description (HTML format)
Content: <h2>EB-Welding Report</h2>
 - Wildcard Examples:** (Expanded)
 - ☒ Header Table Settings
 - ☒ Data Protocol Table Settings
Select Data Sequences - format: 1-3,6,8
Value: 2
 - ☒ Show Min Value
 - ☒ Show Mean Value
 - ☒ Show Max Value
 - ☐ Select Channels
 - ☒ Data Diagrams
Select Data Sequences - format: 1-3,6,8
Value: 2
 - Data Diagram Height: 60.0 mm
 - ☐ Data Diagram 1 Settings
- Channel Selection:**
 - ☐ Ua-AV [kV]
 - ☐ Ib-SV [mA]
 - ☐ Ib-AV [mA]
 - ☒ SL-SV [mA]
 - ☒ SL-AV

Preview Pane:

The preview shows a PDF report titled 'EB-Welding Report' with the 'pro beam' logo. The report includes a table of data for 'Data Sequence 2' and a corresponding data diagram.

Data Sequence 2 - Start Time: 10:23:30.518

Channel Name	Min Value	Mean Value	Max Value
Ua-AV [kV]	80	80	80
Ib-SV [mA]	0	58.7554	60.1
Ib-AV [mA]	0	58.7554	60.1
SL-SV [mA]	2415	2415.42	2445
SL-AV	2413.4	2414.81	2444.2
X-Av [mm]	1680.2	1680.2	1680.2
Ua-SV [V]	80	80	80
Vac.GM2 [mbar]	8.205e-06	9.8041e-06	1.071e-05
Vac.KM2 [mbar]	8.91e-05	0.000100516	0.0001153
IF-SV [A]	37.2	37.2	37.2
IF-AV [A]	37.16	37.1998	37.24
HFVArms	1	1	1
CentLYAV [mA]	-46.4	-46.4	-46.4
SlipX-AV [mA]	-22.7	-22.7	-22.7
SlipY-AV [mA]	-24.2	-24.2	-24.2
MSVST.Bits	0	0	0
MSVST.Bits	0	0	0

Diagram 1 - Data Sequence 2 - Start Time: 10:23:30.518

- Pb-Applications are continuously evolving
- For EB-Vision we focus on user interface and stability
 - New message box added in case of image processing failure
- New features for Process Data Analysis:
 - Automatic generation of welding reports