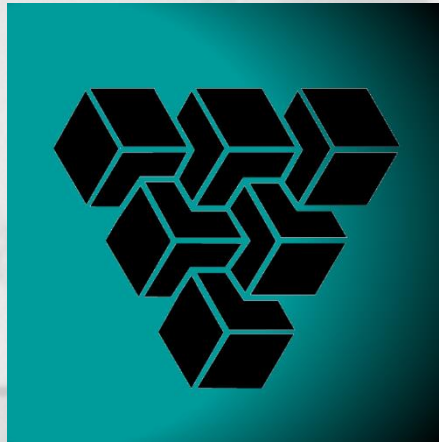


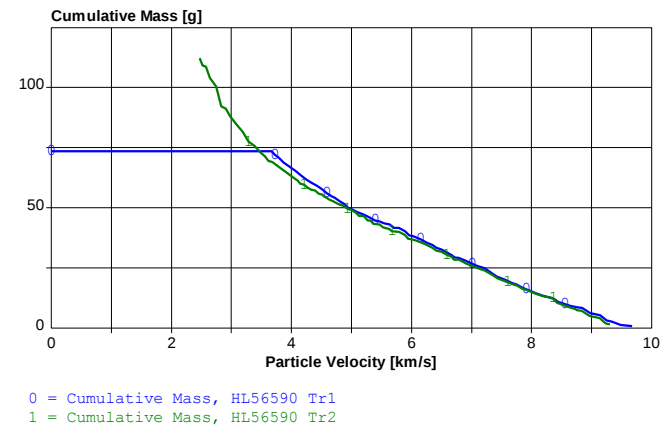
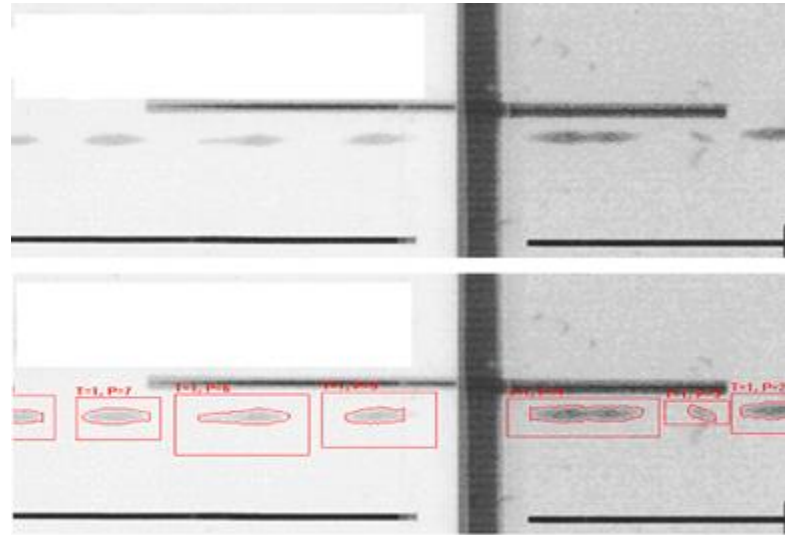


DIET

Digital Image Evaluation Tool

Overview

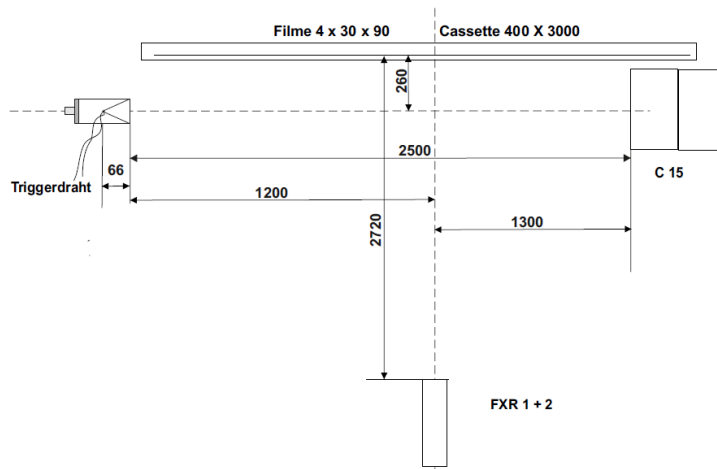
- Main purpose:
Processing of FXR-Records
and Optical Images
- Type:
Image Processing
- Operating System:
Windows 10, Windows 11
(64bit and 32bit)
- Interfaces
Export of Graphical and Text Data
Export of SC-Jet Data to MAP-SC
Export of SC-Jet Data to MAP-PET



Shaped Charge FXR Evaluation

Prerequisites:

1. High resolution scan of FXR negative or positive with marked FXR axis
2. Complete test setup documentation
3. Flash time(s)



t_0 = trigger wire at liner apex

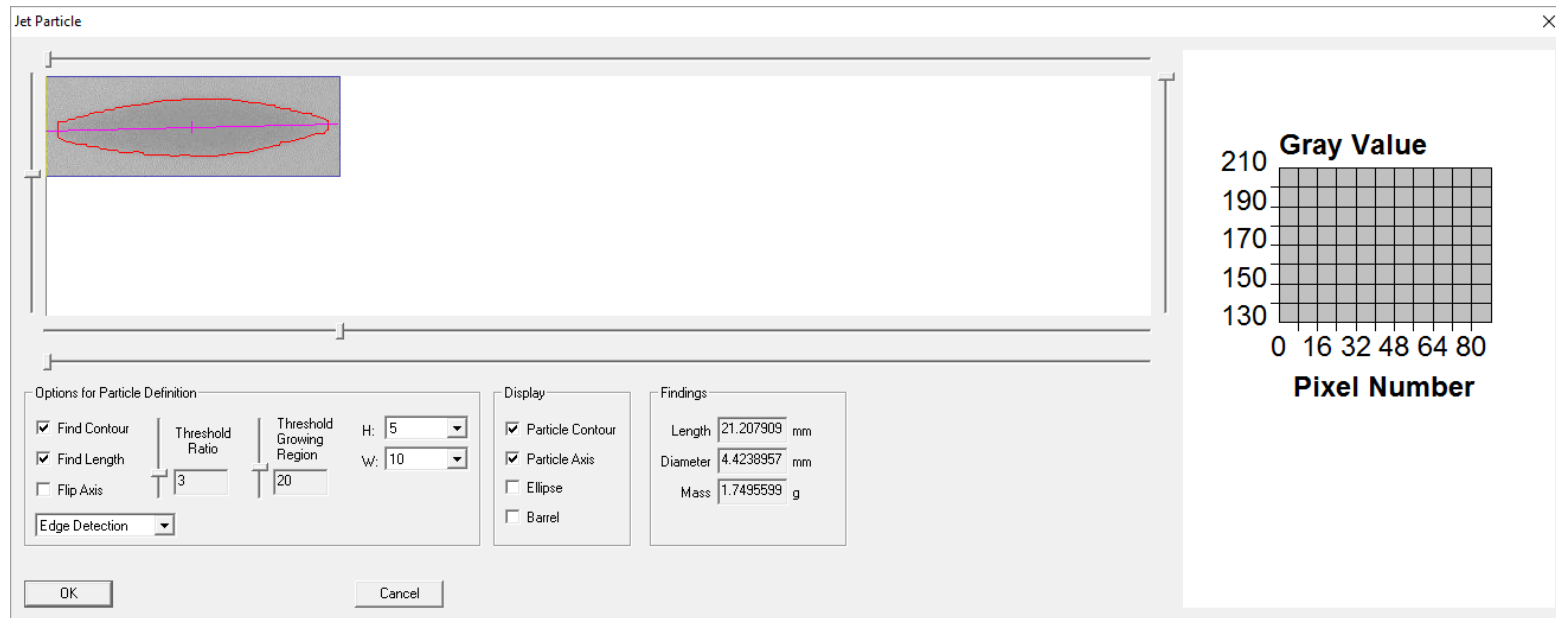
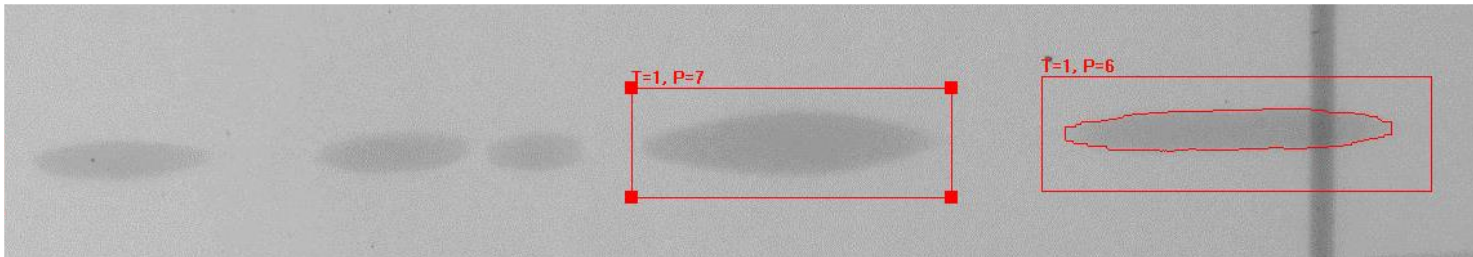
$t_0 - \text{FXR1} = 160.8 \mu\text{s}$

$t_0 - \text{FXR1} = 231.0 \mu\text{s}$

$\Delta t = 70.2 \mu\text{s}$

Shaped Charge FXR Evaluation

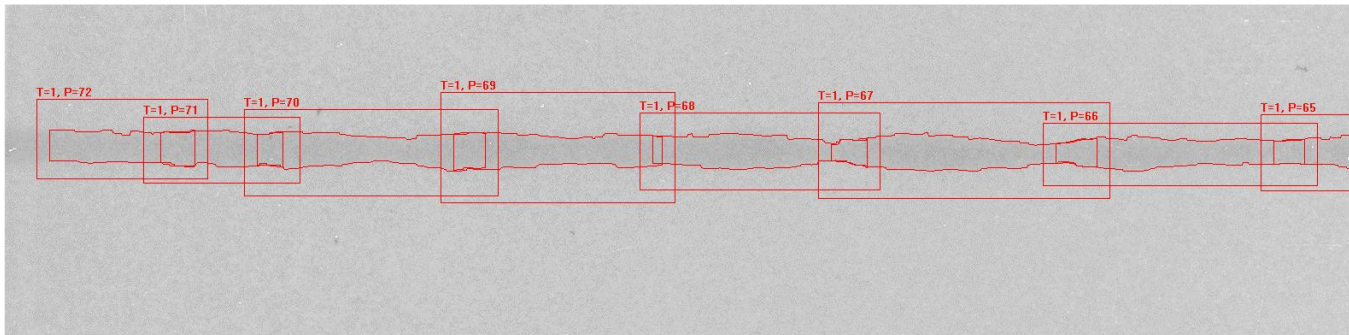
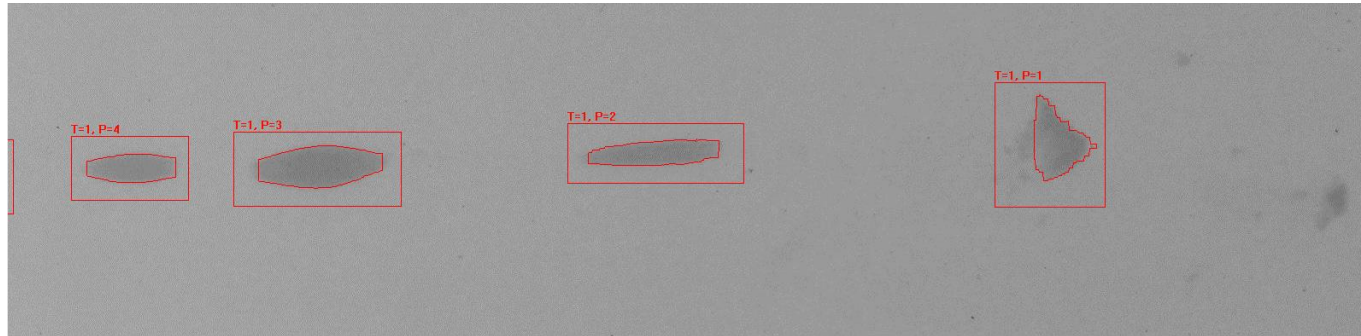
Step 1: Select particles and detect edges



Shaped Charge FXR Evaluation

Step 1: Select particles and detect edges

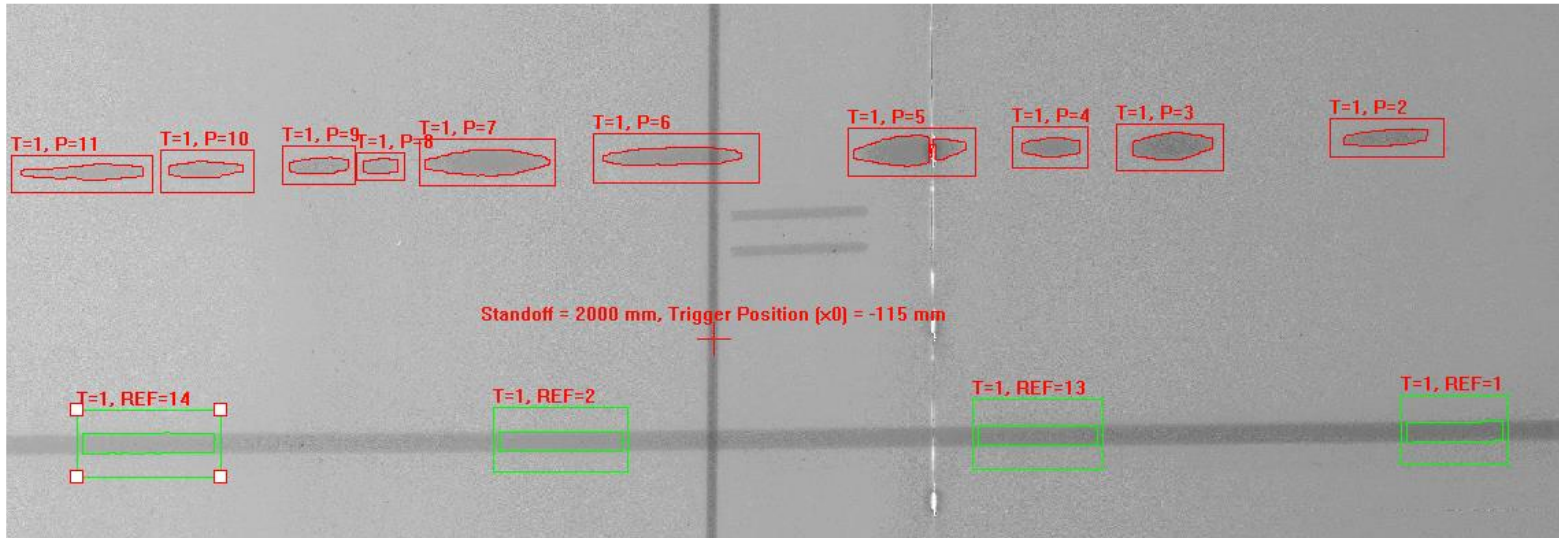
■ ■ ■



■ ■ ■

Shaped Charge FXR Evaluation

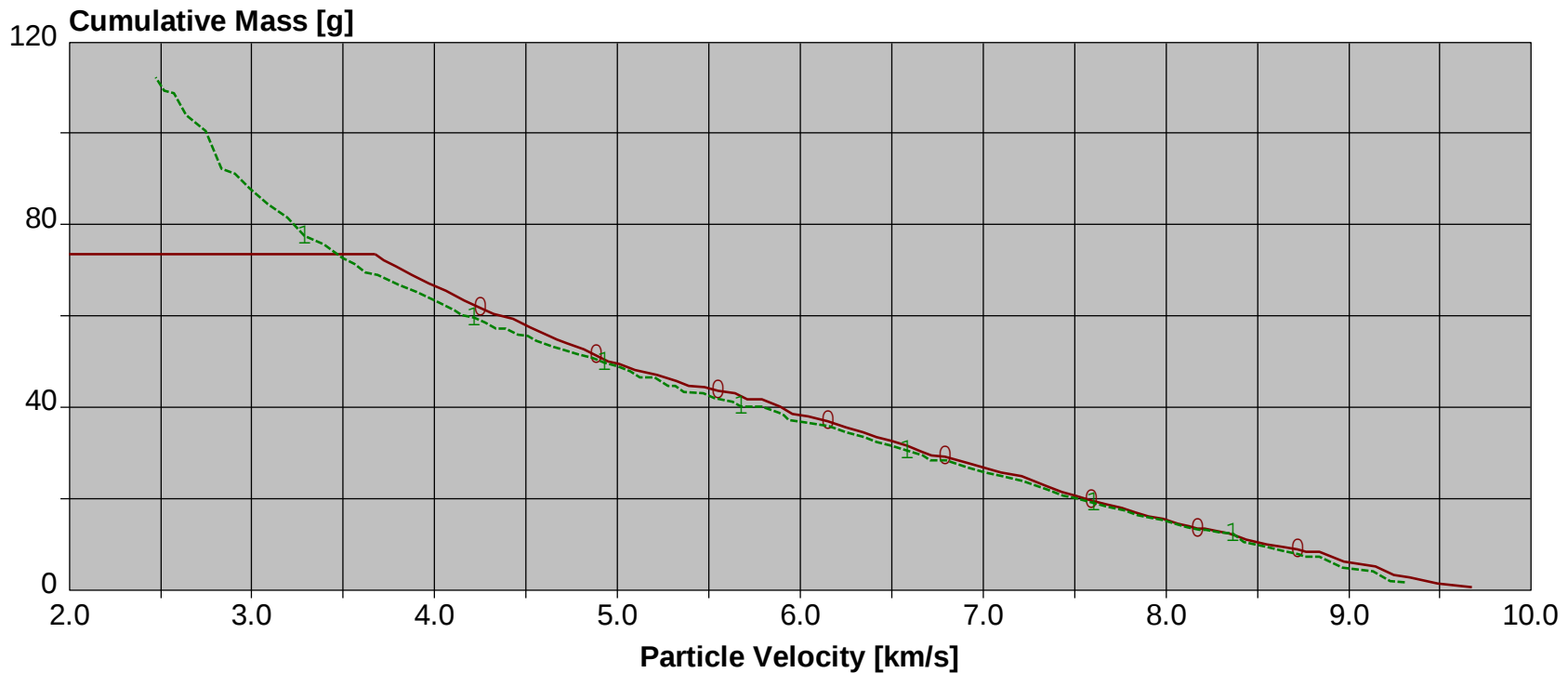
(Step 2: Detect reference wire)



A reference wire (wire of known diameter) can be used to additionally calibrate the particle diameter measures.

Shaped Charge FXR Evaluation

Step 3: Automatic characterization of SC jet

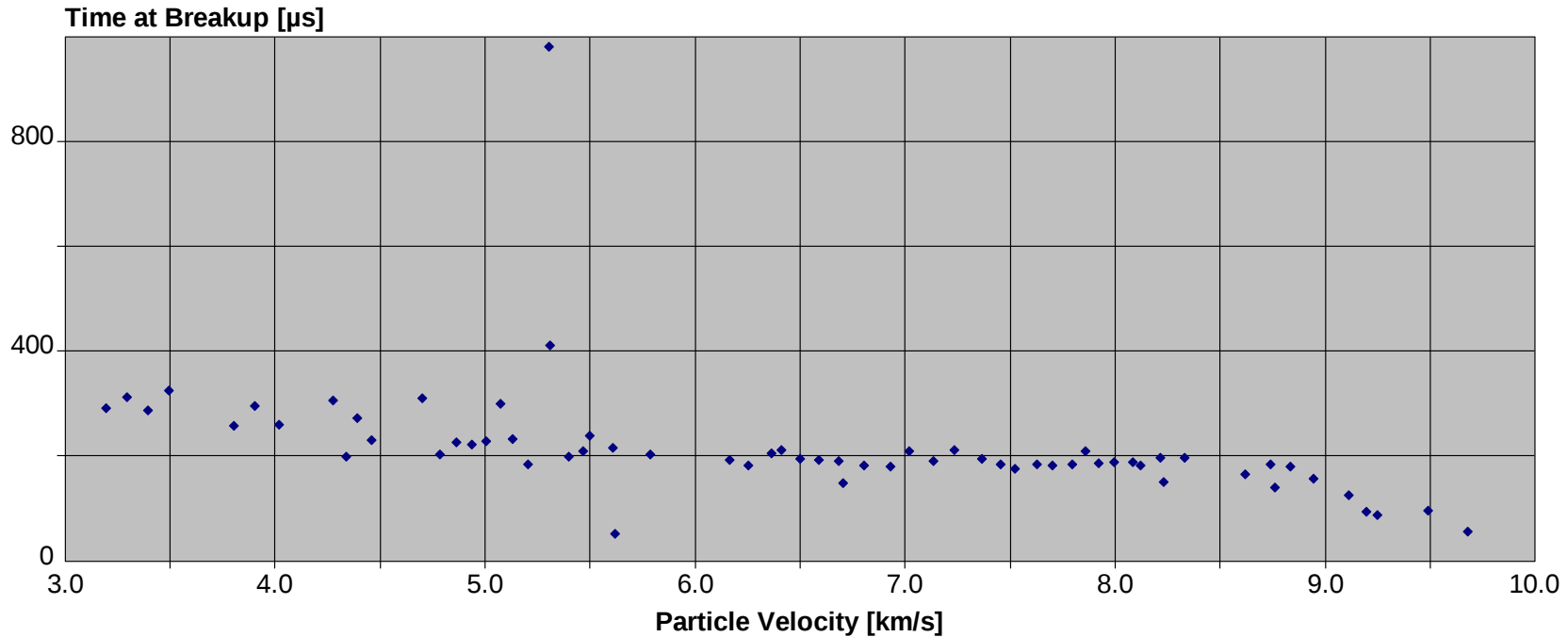


0 = Cumulative Mass, HL56590 Tr1

1 = Cumulative Mass, HL56590 Tr2

Shaped Charge FXR Evaluation

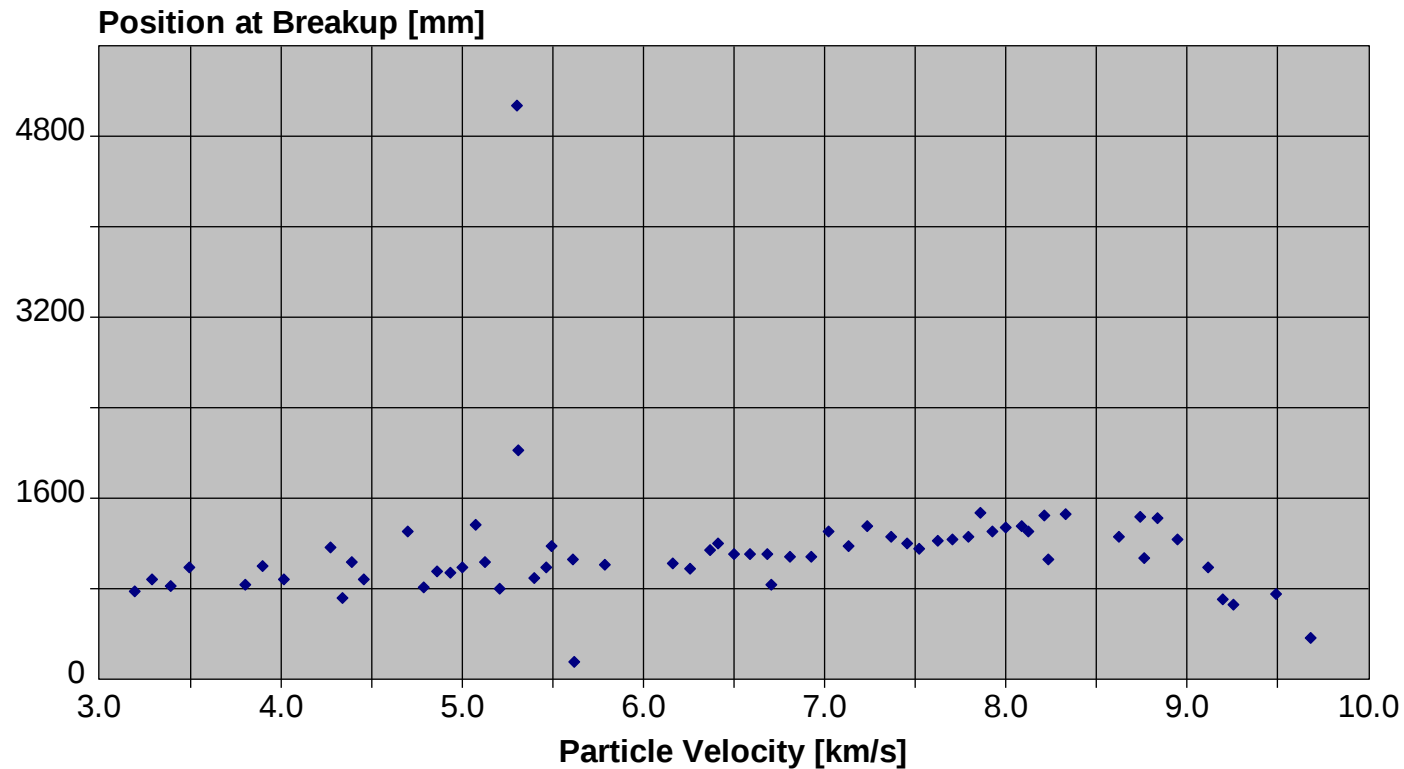
Step 3: Automatic characterization of SC jet



♦ = Time at Breakup, HL56590

Shaped Charge FXR Evaluation

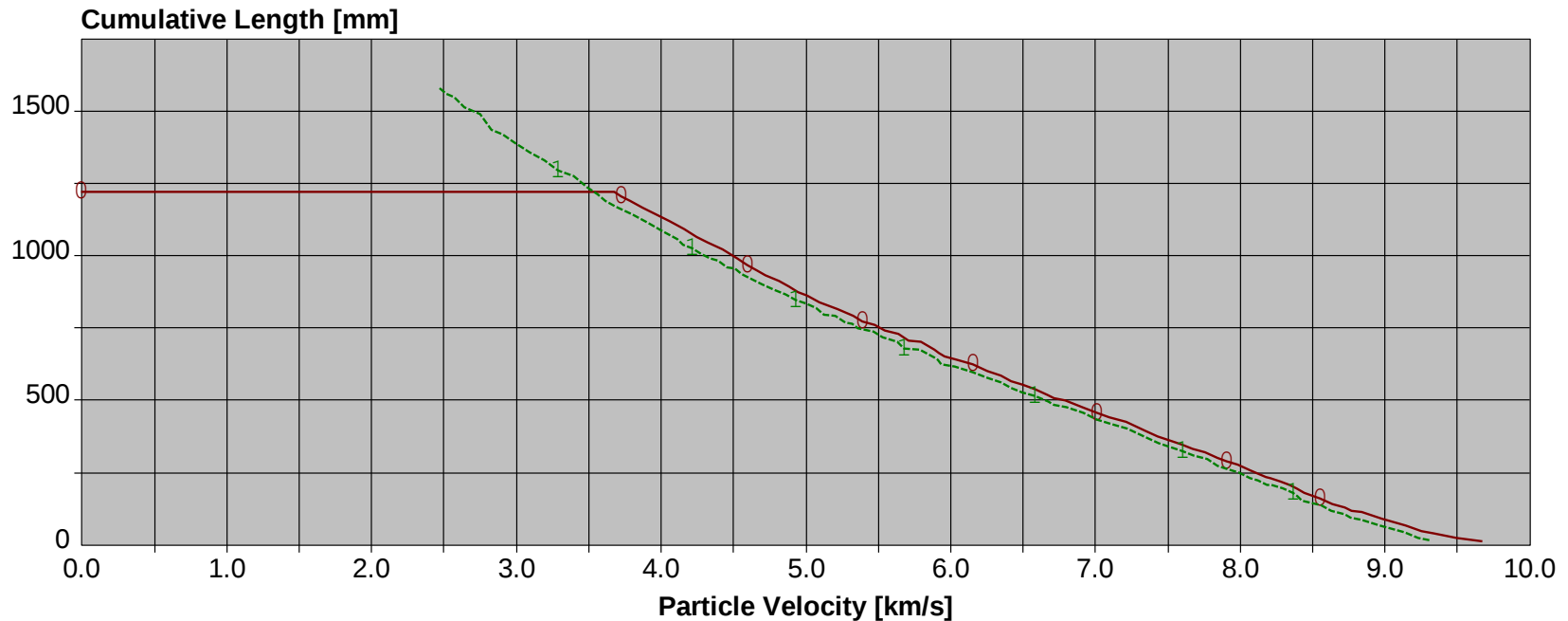
Step 3: Automatic characterization of SC jet



♦ = Position at Breakup, HL56590

Shaped Charge FXR Evaluation

Step 3: Automatic characterization of SC jet

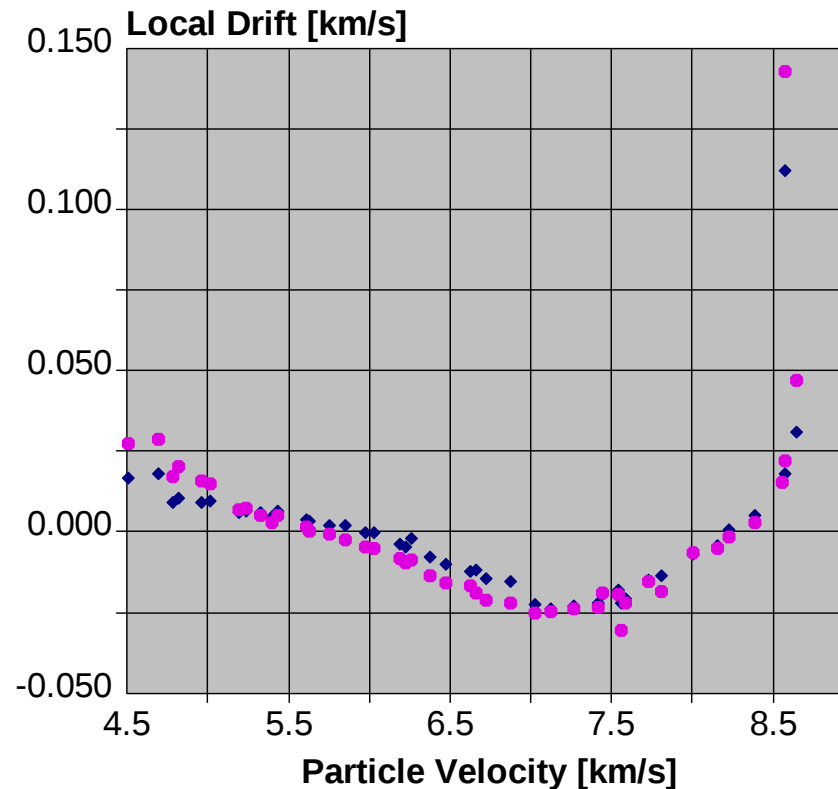


0 = Cumulative Length, HL56590 Tr1

1 = Cumulative Length, HL56590 Tr2

Shaped Charge FXR Evaluation

Step 3: Automatic characterization of SC jet

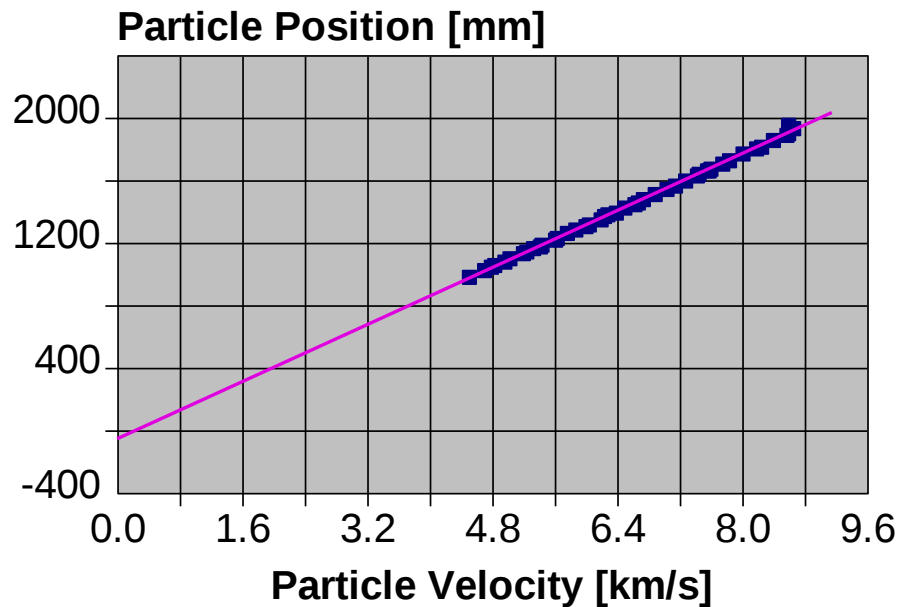


◆ = Local Drift, HL56591 - Track 1

● = Local Drift, HL56591 - Track 2

Shaped Charge FXR Evaluation

Step 3: Automatic characterization of SC jet



Virtual
Origin

VO: $X = -47\text{mm}$, $T = 3.6\mu\text{s}$, $V = 9136\text{m/s}$, $dV/dx = -330\text{ (m/s) / m}$

Shaped Charge FXR Evaluation

Step 4: Post-Processing

- Transformations (Sample, Integrate, Differentiate, Fourier Transformation, Response Spectrum, etc.)
- Filtering (High-Pass, Low-Pass and IR filters, Gauss-Weighting, etc.)
- Combination of Time-Histories (e.g. Sum or Average)
- Calculator (application of a large series of mathematical operations to abscissa and/or ordinate values)
- Editing (manual editing of single values)
- etc.

All post-processing functionalities are also applicable to external (experimental) data.

Manual Digitizing

Digitizing of (even distorted) diagrams from bitmaps

1. Load bitmap
2. Set scaling frame
3. Select data points

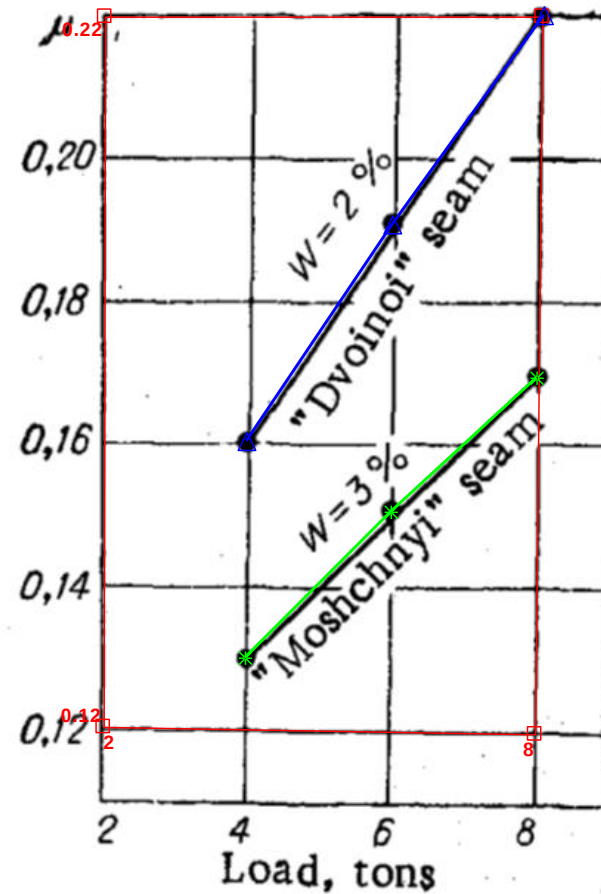


Fig. 3

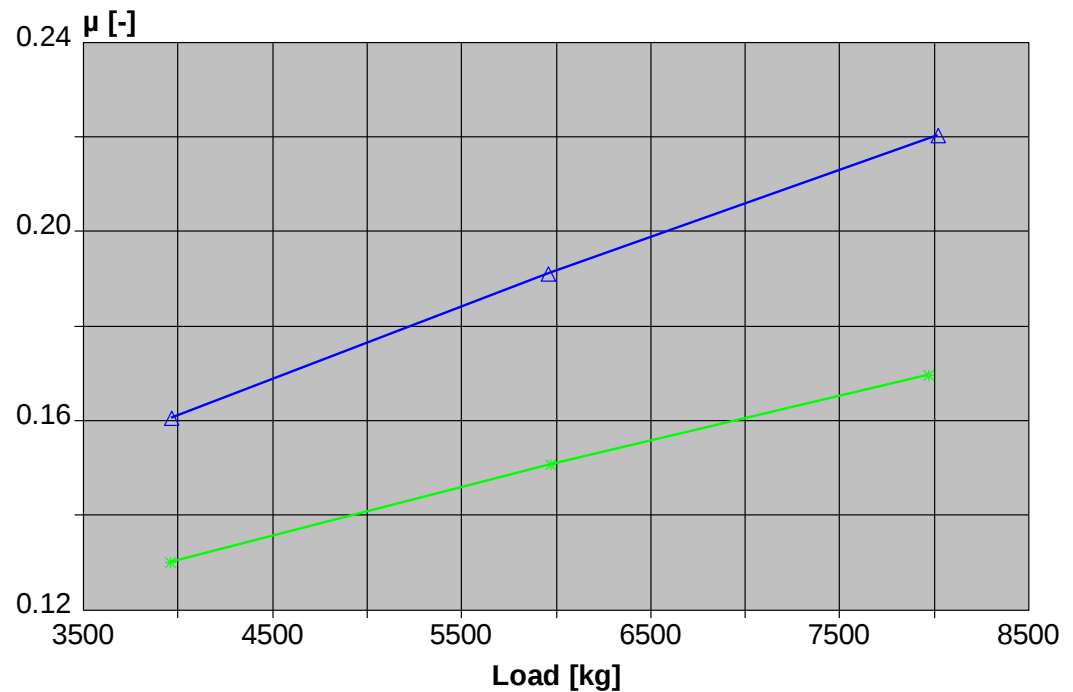
Manual Digitizing

Digitizing of (even distorted) diagrams
from bitmaps

4. Output data

name: Dvoynoi		
Mass	Number	
[kg]	[-]	
3961.1188	0.130056	
5970.1987	0.15076569	
7969.8061	0.16968939	

name: Moshchnyi		
Mass	Number	
[kg]	[-]	
3967.2009	0.16045149	
5960.762	0.19094584	
8019.9941	0.22020533	



* = Dvoynoi
 Δ = Moshchnyi

Conclusion

- DIET is a powerful tool specially designed for the evaluation of shaped charge jet FXR pictures.
- It permits fast and reliable data extraction and further processing of the extracted data.
- DIET exceeds conventional (manual) evaluations by far in accuracy while requiring significantly less effort.
- For shaped charge characterization from FXR there is practically no reasonable alternative.

Thank You for
Your Attention !