



TRACKEYE ARENA

The obvious solution to image analysis when motion counts

ARENA is a combination of dedicated statistics modules in TrackEye to optimize the usability and the repeatability of arena testing. During an arena test, the ARENA tracking session collects inputs from one or several cameras monitoring a single or multiple screens which are pierced by shrapnel and particles. The location and timing of each piercing is recorded.

Key benefits

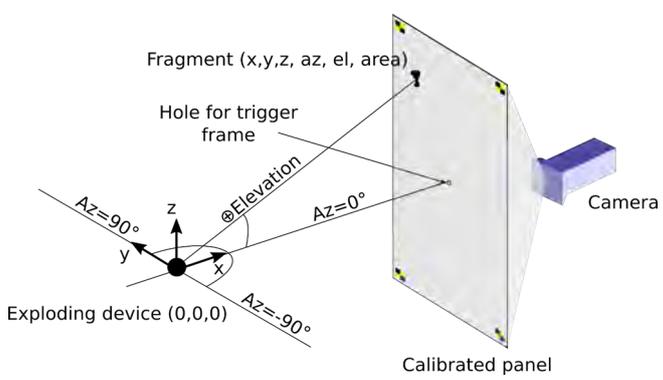
- Easy to use, modular
- Unlimited number of trackable points
- Automated analysis process
- Various table & image export formats
- Compatible with all major HS cameras

From images to results

From loading an image sequence, executing the tracking algorithms, applying the chosen analytics and logic to presenting the derived data - TrackEye offers a straightforward workflow. The user interface is fully synchronized: any change of parameters or set-up will directly effect all parts of the tracking session, updating results, graphs and tables.

Concept of ARENA

1. Shrapnel and particles ejected from an explosion in the center of the testing grounds penetrate target calibrated screens mounted at a known distance from the explosion.
2. Cameras monitor the screens and record images of the event. The position of each screen has been entered into ARENA with surveyed coordinates acting like reference points.
3. ARENA identify the shrapnel and particules the moment they hit the target screens and then proceeds to quantify and visualize the passage through the screen.



Data Ouputs

- Time of impact
- Area of impact
- Azimuth & Elevation angles of hit
- Panel hit (in multi-screen scenario)
- Average speed to screen for fragments
- Max, min, mean of these averages for fragments
- Fragments speed versus angle
- Number of fragments versus angle
- Total number of fragments versus time
- Statistics on shape of fragments



APPLICATION EXAMPLES

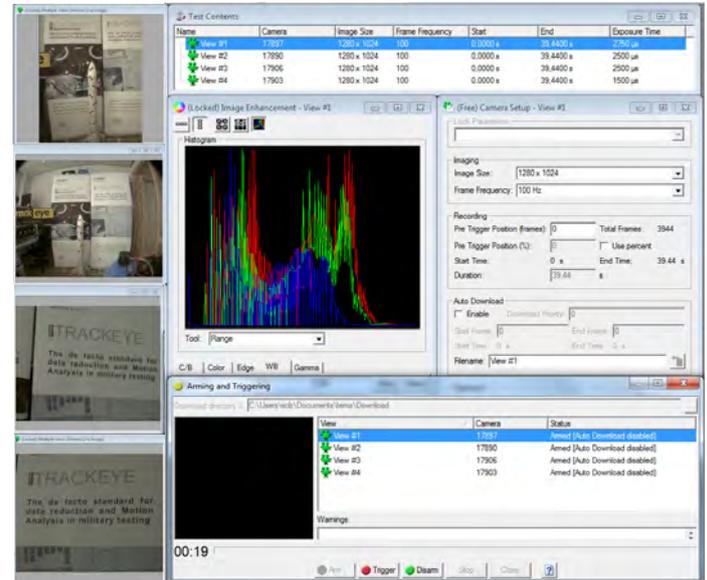
Calibration of the panels

STATIC3D module is used to survey static objects in order to build target models from images of the object. Markers are used to increase the accuracy of the calculations. The set-up procedure involves assigning tracking algorithms to markers in the images.



Camera control

TrackEye Camera Control can control all the major HS cameras on the market, all at the same time, with no limitation of number and from one single interface. Its user-friendly interface allows the user to record and view live images, set up parameters, snapshots, image enhancement as well as automatic downloading of the sequences.



Calibration of the cameras/lenses

A calibration board can be used to quantify and correct the distortion of a couple Camera/Lens in a certain configuration for more accurate tracking results.



The collage displays several software windows from the TRACKEYE system:

- Flowchart:** A process diagram showing steps like 'Load images', 'Tracking', 'ARENA Statistics', and 'Fragments vs. Angle'.
- Number of fragments vs. Time:** A line graph showing an increasing trend of fragments over time.
- Tracking View:** A 2D image with yellow bounding boxes around objects, labeled with coordinates like ULL, URL, ULC, URC, ULR, URR, LLL, LRL, LLC, LRC, LLR, LRR.
- Reference points (box) & hit positions:** A scatter plot of hit positions in pixel coordinates.
- 3D Model:** A 3D perspective view of a tracked object with multiple colored lines representing its structure.
- Output data table:** A table with columns for Panel name, Impact #, Exit time, Hit position, and Area.

Panel name	Impact #	Exit time [s]	Hit position x [m]	Hit position y [m]	Hit position z [m]	pointing angles azimuth [degrees]	pointing angles elevation [degrees]	speed [m/s]	Area pixel area [pixels]
CS1:1									
CS2:1									
CS3:1									
SAV2_Left	Impact#1	2.1	4.482	0.523	-6.446	6.403	-6.051	2220.7	8.000
SAV2_Left	Impact#2	2.1	4.483	0.521	-6.442	6.629	-5.588	2109.0	193.000
SAV2_Left	Impact#3	2.2	4.456	0.713	-6.586	9.090	-7.388	2068.3	20.000
SAV2_Left	Impact#4	2.6	4.466	0.031	-6.532	0.395	-6.792	1697.1	24.000
SAV2_Left	Impact#5	3.0	4.532	0.199	-6.175	2.517	-2.204	1513.3	2.000
SAV2_Left	Impact#6	3.6	4.341	0.449	-6.202	5.900	-15.400	1240.2	20.000
SAV2_Left	Impact#7	3.6	4.338	0.511	-6.219	6.721	-15.589	1242.4	19.000

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