Eye Tracking: Why, When, and How?

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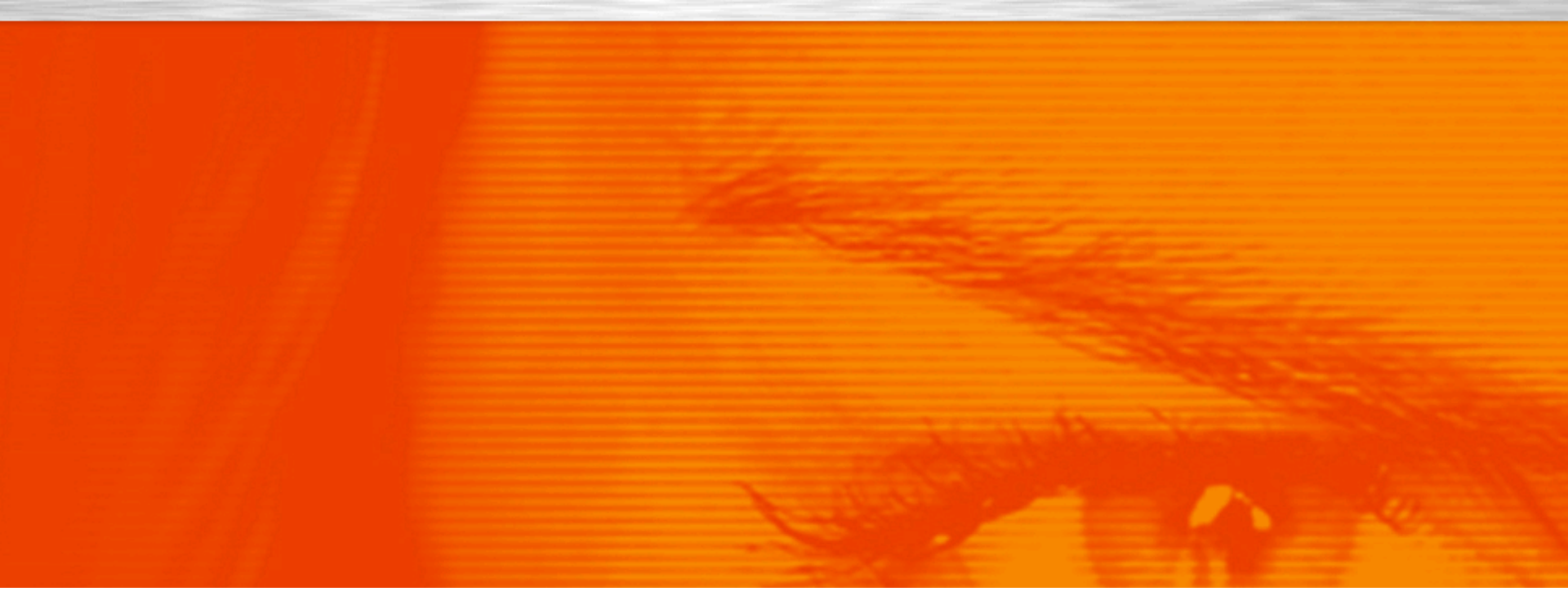


COLLECTING DATA

What are the spatial and temporal resolutions of the recording?

- highly depended on the setup
  - Look at our Metrics report
- resolution dependent on
  - light conditions
  - distance to the eye tracker
  - large gaze angles
- under ideal conditions
  - accuracy around 0.4°
- temporal resolution
  - 60/120Hz → 8,3-16,67ms
  - 300Hz → 3,3ms

How can one co-register other motion sensing or physiological sensors?

- best options with TX300
  - hardware interface StimTracker (analog trigger signal)
- other possibilities – usage of software like
  - E-Prime (Psychology Software Tools)
  - Presentation
  - Matlab (MathWorks)
  - Software Development Kit (SDK)

E-Prime

SDK

Can one access the raw data?

You will always get the raw data from our systems!

possible filter options in Tobii Studio:

- noise reduction filter
- fixation classification algorithms (Tobii Fixation Filters)
- export raw data and run own algorithms.

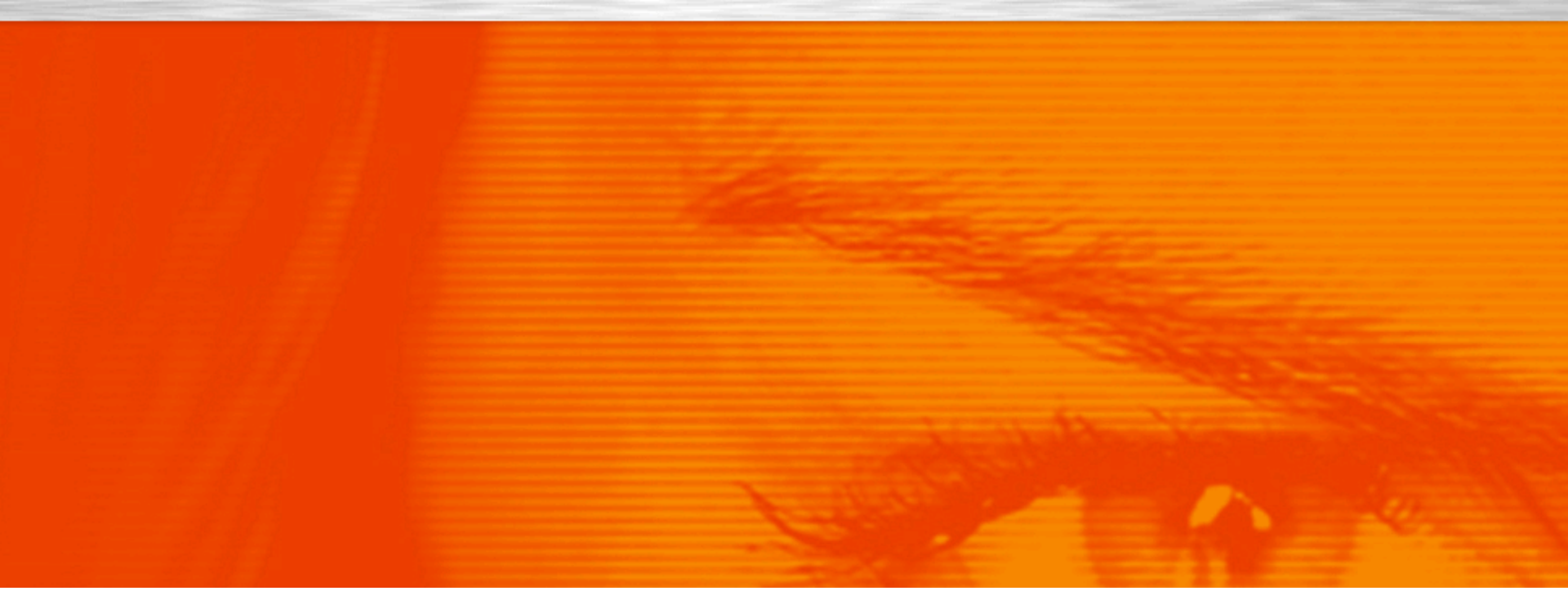
In what kinds of formats can data be exported or accessed?

- .xlsx (Microsoft Excel/OpenOffice etc.)

- .tsv file (programs like Excel or SPSS)

How can one move data between systems (i.e. merging data)?

- data always stored in software
- take care of:
  - screen resolution
  - sampling rate
  - setup itself



MOBILE EYE TRACKING SOLUTIONS

How long can an experiment be (battery life)?

- up to 70 min. of battery to conduct a Glasses recording
- plugging in always possible

What needs to be carried by the participant during the experiment?

- Glasses itself and the recording unit – in total 275g

Can one collect data in changing light conditions? What special considerations are there with this problem?

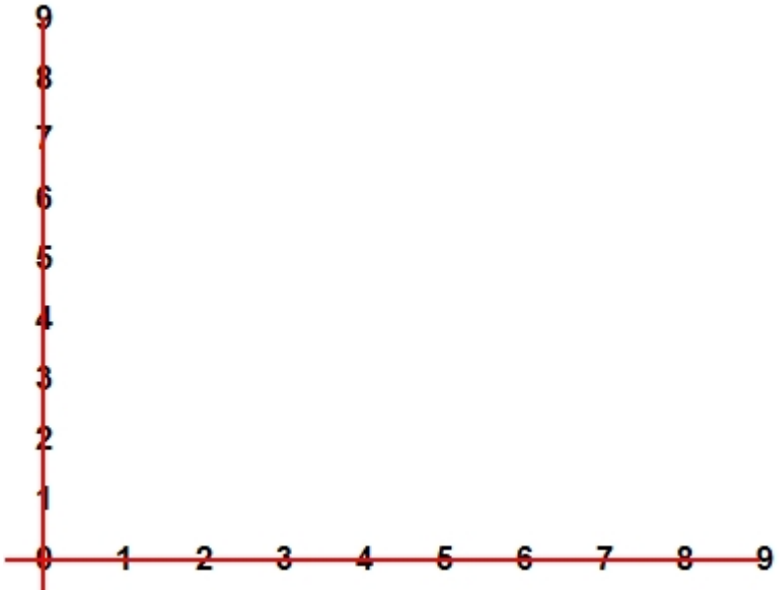
- take into account the possible changes:
  - accuracy
  - precission
  - trackability
  - pupil size

How does one register video to the real world?

camera in frame of Glasses

How are coordinate systems handled for analysis?

resolution of 640 to 480 pixels starting from left corner below



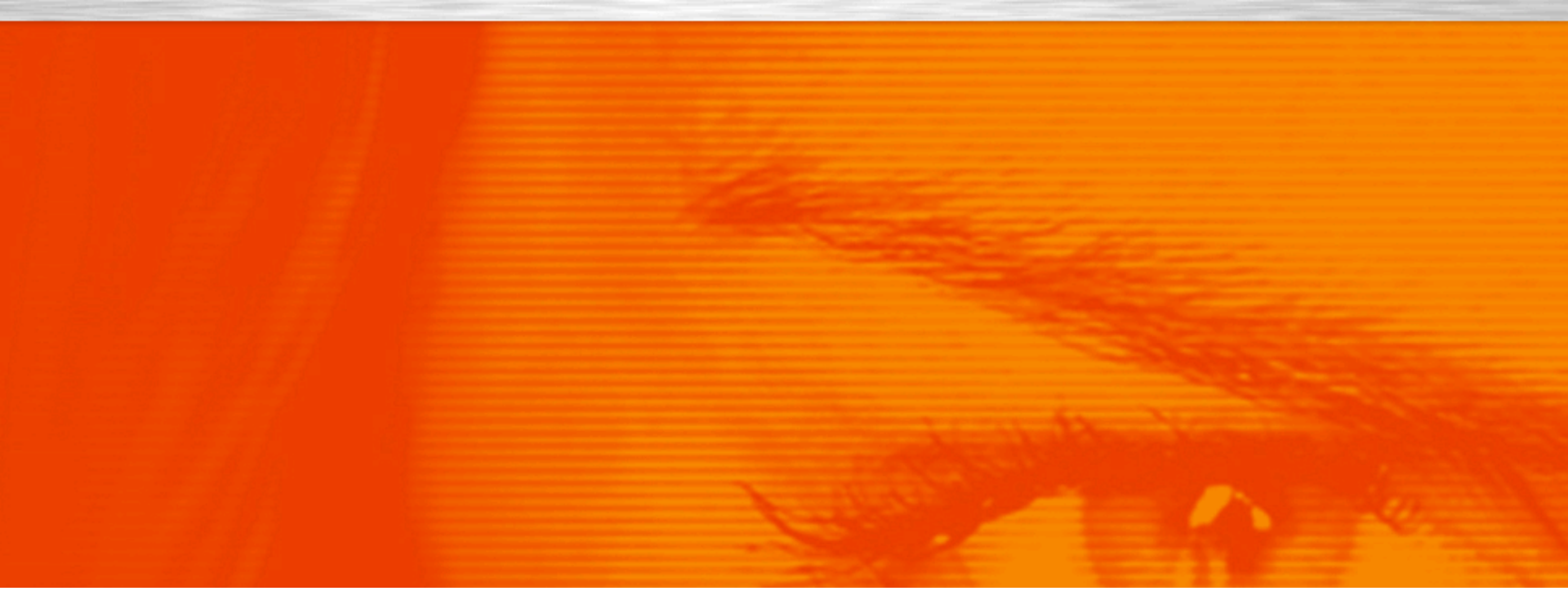
How does the system work with participants who already wear glasses?

It is not recommended to use Tobii Glasses with correction glasses – it works fine with contact lenses

How can one co-register other motion sensing or physiological sensors (i.e. sync devices)?

no automatic synch available in current version of Tobii Glasses

Source:http://imotionsglobal.com/hardware/eye-tracking-glasses/



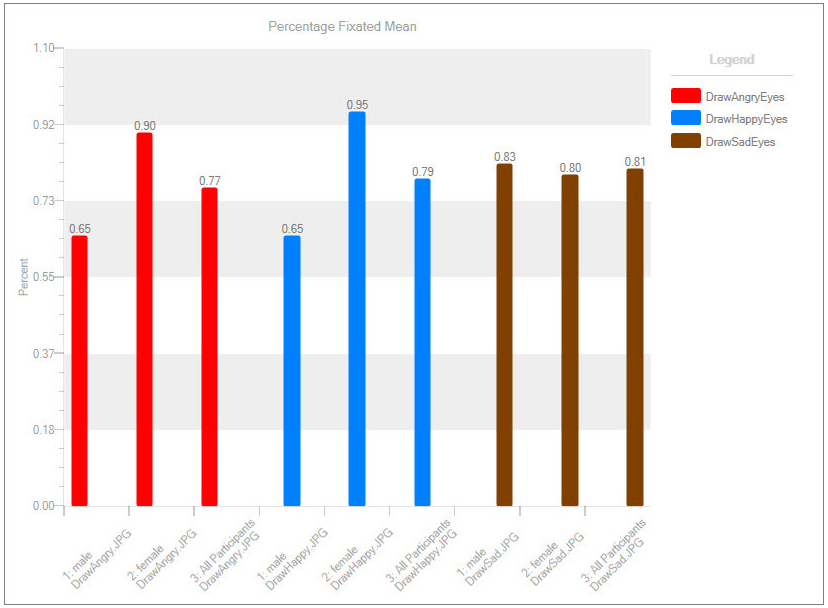
ANALYSING DATA

What are the system's out of the box capabilities for analysing dynamic stimuli (e.g. changing screen displays during an interactive session)?

- use two stationary eye tracking systems or the Tobii Glasses eye tracker
- dynamic areas of interest (dAOI) available in Tobii Studio

What types of eye-tracking metrics are implemented in the analysis software?

- AOI
  - time to first fixation
  - fixation duration
  - visit duration
  - visit count
  - fixations before

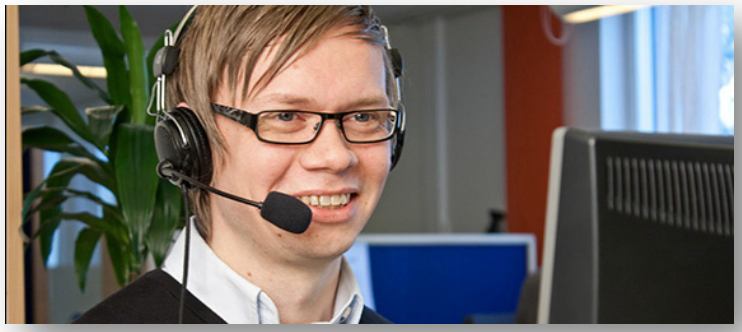


	Time to First Fixation								
	DrawAngry.JPG			DrawHappy.JPG			DrawSad.JPG		
	DrawAngryEyes			DrawHappyEyes			DrawSadEyes		
Participant Groups	N (Count)	Mean (Seconds)	Stdev (Seconds)	N (Count)	Mean (Seconds)	Stdev (Seconds)	N (Count)	Mean (Seconds)	Stdev (Seconds)
male	15	1.07	0.62	15	1.48	0.60	19	1.53	0.74
female	18	1.23	0.91	19	1.22	0.54	16	1.14	0.39
All Participants	33	1.16	0.78	34	1.34	0.58	35	1.35	0.63

	First Fixation Duration								
	DrawAngry.JPG			DrawHappy.JPG			DrawSad.JPG		
	DrawAngryEyes			DrawHappyEyes			DrawSadEyes		
	N (Count)	Mean (Seconds)	Stdev (Seconds)	N (Count)	Mean (Seconds)	Stdev (Seconds)	N (Count)	Mean (Seconds)	Stdev (Seconds)
	15	0.44	0.42	15	0.22	0.07	19	0.27	0.13
	18	0.36	0.30	19	0.38	0.20	16	0.37	0.24
	33	0.40	0.35	34	0.31	0.18	35	0.32	0.19

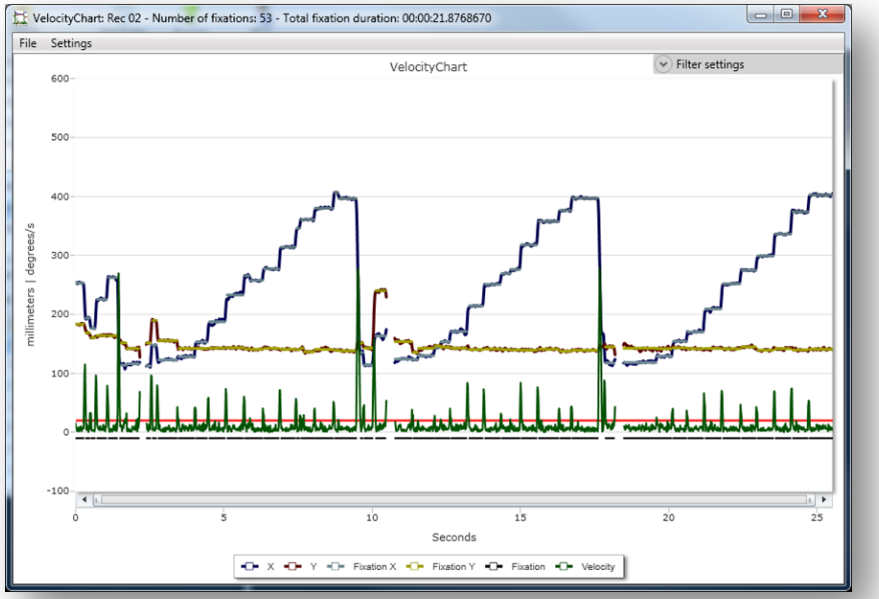
What types of support materials and training are available from the vendor?

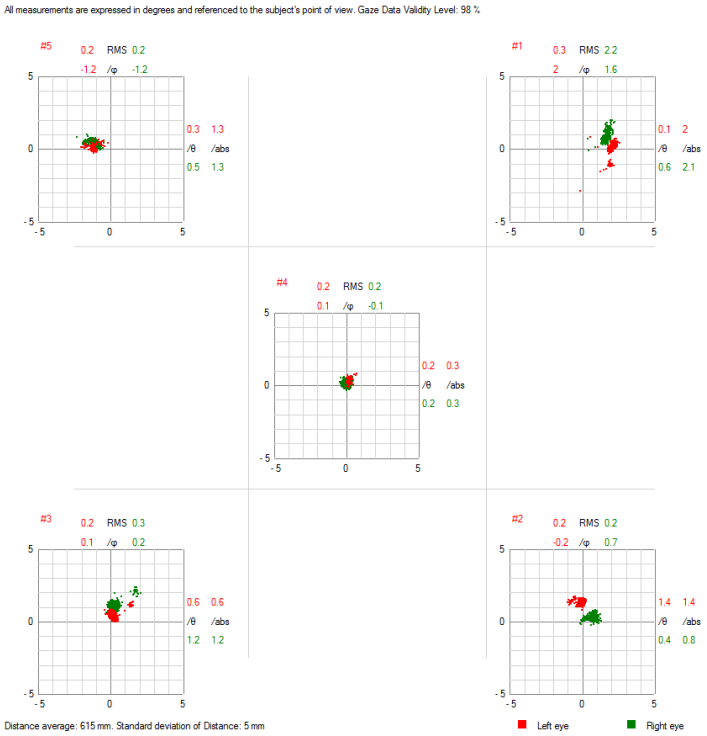
- Online support on global scale
- globally acting training team
- Consultancy
- special support for students
- manuals of Tobii Studio and our hardware products



How do you check the quality of the data & ensure their validity?

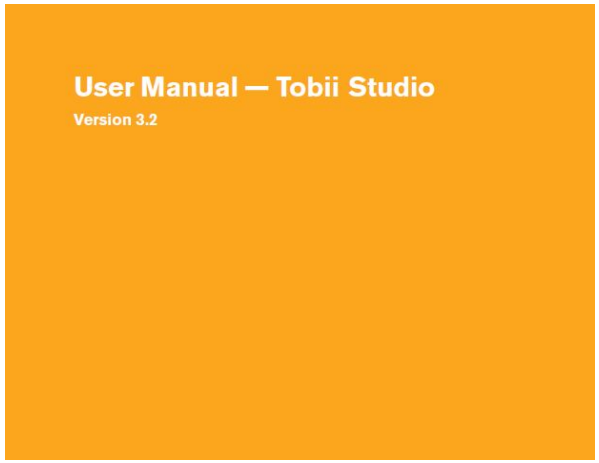
- verification tool (also used as one eye calibration tool)
- velocity chart to get impression of background noise and

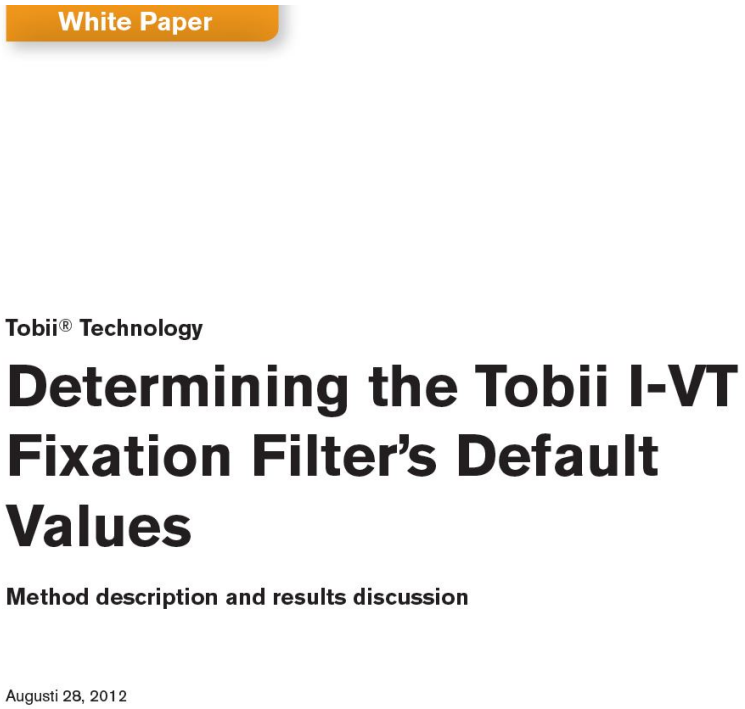


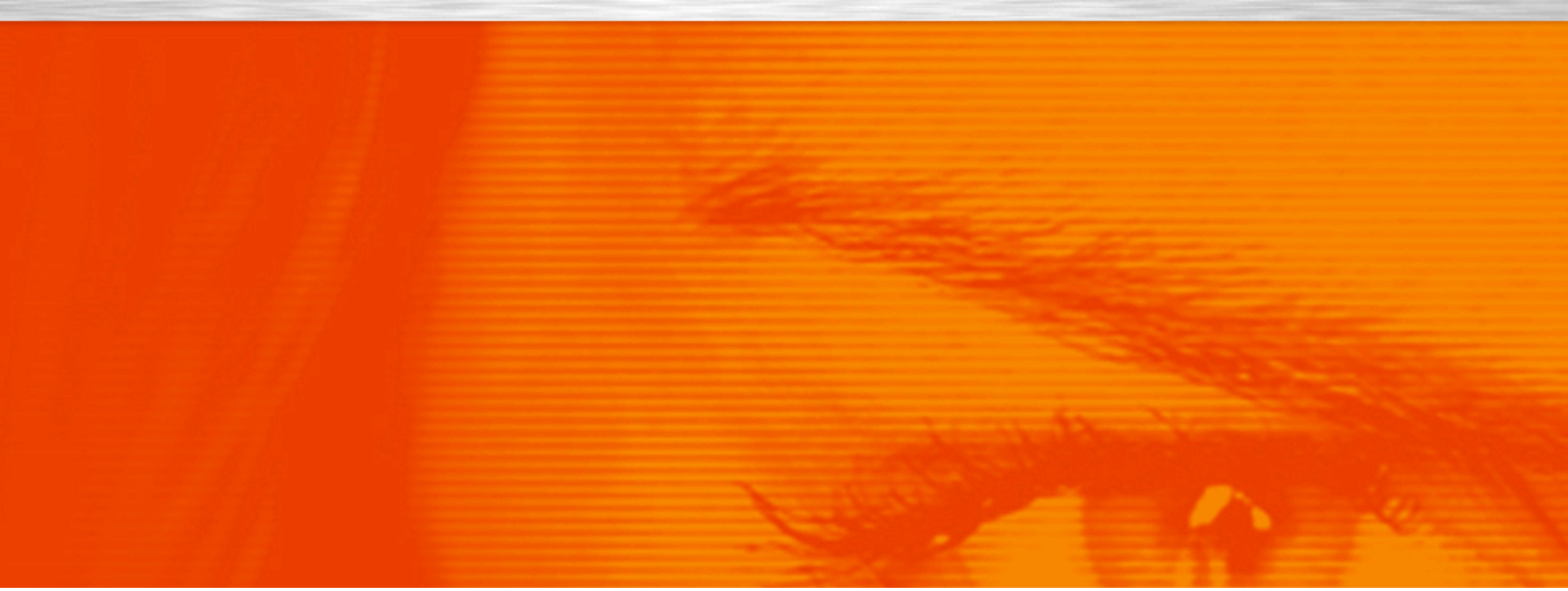


To what extent are the algorithms of the software exposed? Can one find out the details of what is under the hood?

- algorithms are published in user manual and Tobii Whitepapers
- download for free



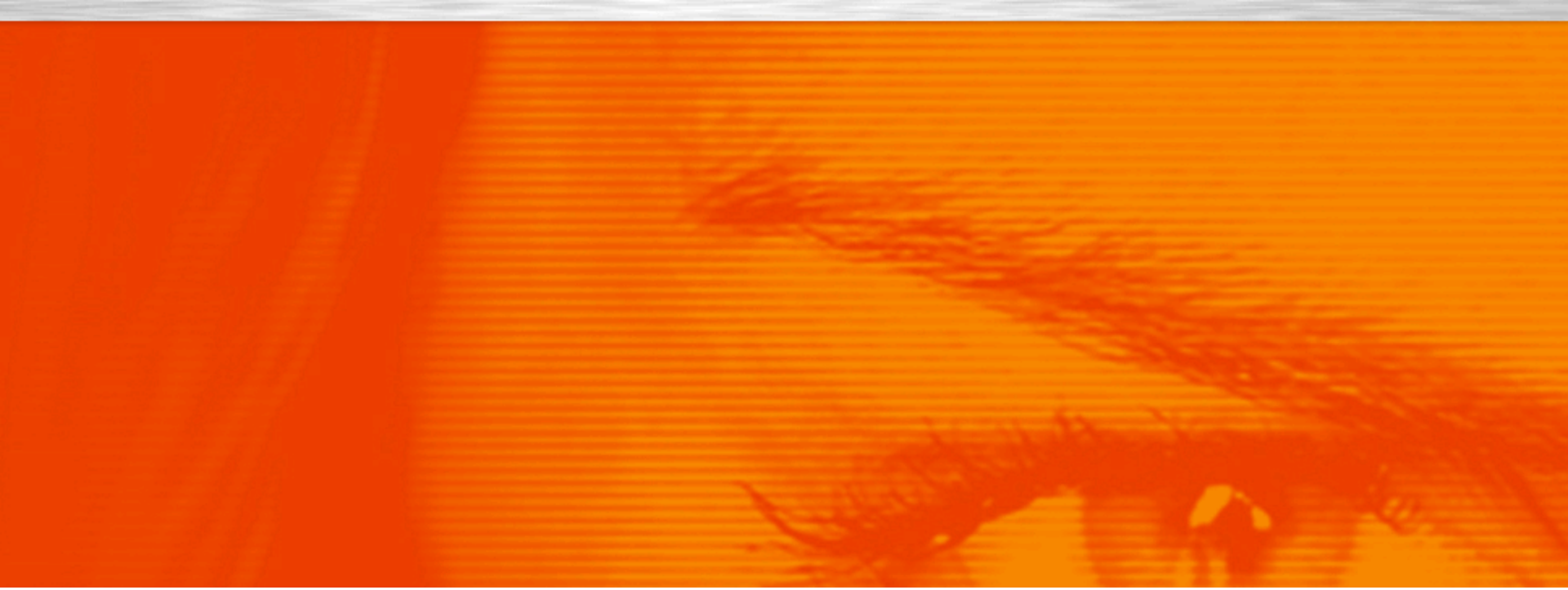




GENERAL

What is on the horizon in terms of the product, with respect to Research & Development?

- broad product - plan to develop further our full eye tracking portfolio
- investigate new ways to make hard- and software more user friendly and more robust in terms of usability



Thank you for your attention!