

# VESTIBULAR

PRODUCTCATALOGUE

2024







# Content Overview

## SEMICIRCULAR CANALS

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Posterior Anterior Horizontal

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# COMBI MASK





# VNG/vHIT-COMBI MASK

for all measurements and additional functions

The combined video mask can be used either for examinations in darkness or with visual stimulation. The video image is focusable and can be individually adjusted both horizontally and vertically. The soft cushion guaranteed a pleasant and lightproof fitting to the face.

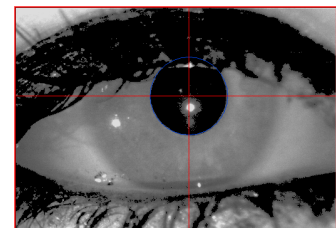
## eVNG / eHIT Mask

With 9 axes sensor fusion technology

Recording of both eyes with two cameras

Power supply via USB

Optional with foot switch for optimal freehand-usage



WITH THE ADDITIONAL MASCARA OPTION PATIENTS WITH EYE MAKE-UP ON CAN BE TESTED WITHOUT REMOVING IT AND STILL FEEL COMFORTABLE.







## eHIT<sup>USB</sup>

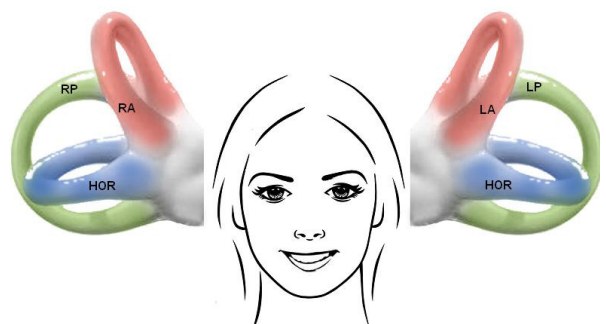
### Video - Head Impulse Test

The eHIT<sup>USB</sup> head impulse test has been developed to perform quantitative analysis of the six semicircular canals. The tested canal is always in the direction of the impulse. This means at a rotation of the head to the right, the right canal is excited and vice versa.

This also applies to the vertical semicircular canals. The test uses the vertical planes of the canals in the front and rear, which are located at an angle of approximately 45° to the sagittal plane.

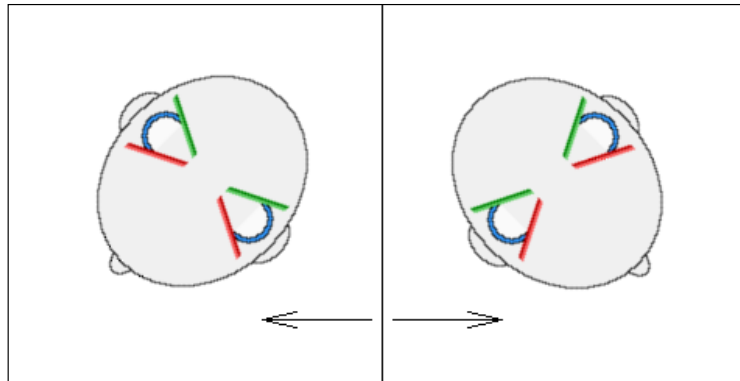
**With SHIMP\* test!**

Plane	Head Movement	Semicircular Canal
horizontal	leftward	left
	rightward	right
LARP	to the front	left anterior
	to the back	right posterior
RALP	to the front	rechts anterior
	to the back	left posterior

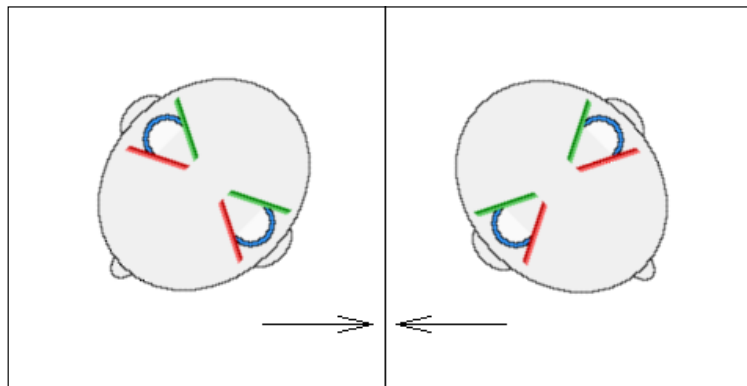


\* Optional - Suppression Head Impulse Paradigm

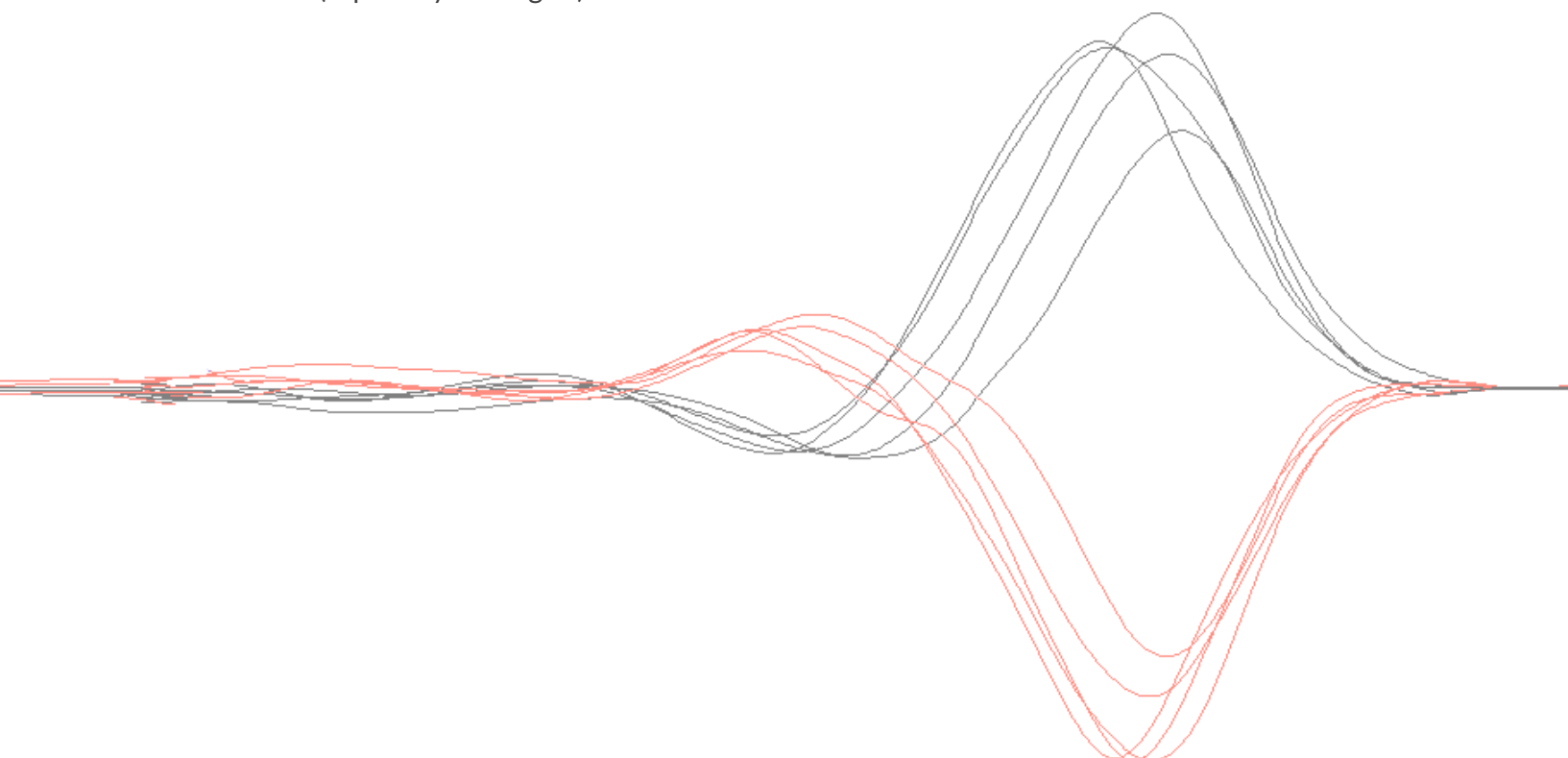
## Impulses



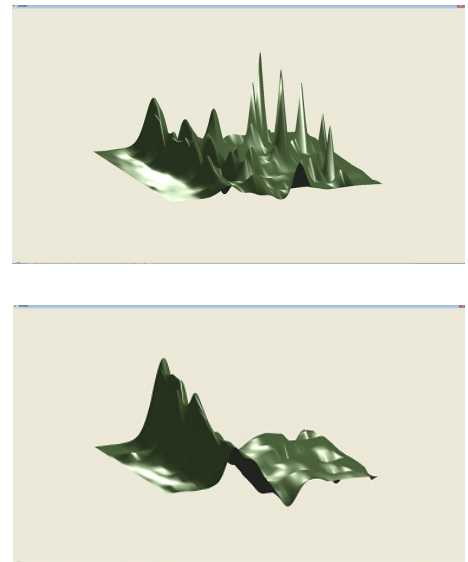
**Method 1:** The first method starts from the middle randomly to the left and to the right. After a stimulus the head is slowly moved to the start position. The benefit - the patient does not know the direction of the stimulus.



**Method 2:** The head is slowly moved to the left or right and then rotated to the central position. The benefit - it is easier for beginners, because there is more control over the stimulus (especially the angles).



The results are shown in realtime. The normal reaction to the stimulus is almost the complete opposite of the head movement with a smooth eye movement. The gain is calculated for each trial. The gain ratio between head and eye movement should nearly be 1. If there is an issue with a semicircular canal the patient loses the target and there will be compensation saccades. If the gain is in the grey area, there can be a disease. If only one side is affected there will be two separated point clouds. Additional to the gain and movement display, the **eHIT<sup>USB</sup>** software offers a 3D-representation of the eye response. A failure can be recognised very well by the refixation saccades that appear as peaks in the 3D representation.



If the VOR reacts normally, the eye makes a countermovement in order to continue to fixate the target. This countermovement is followed by a relative area without saccades. In the event of hypofunction or failure, distinct saccades are seen in this area.







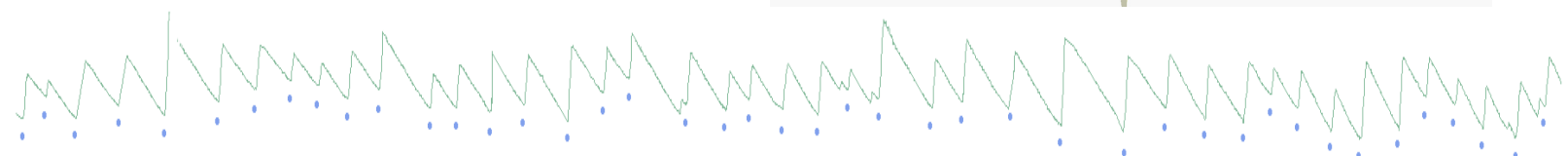
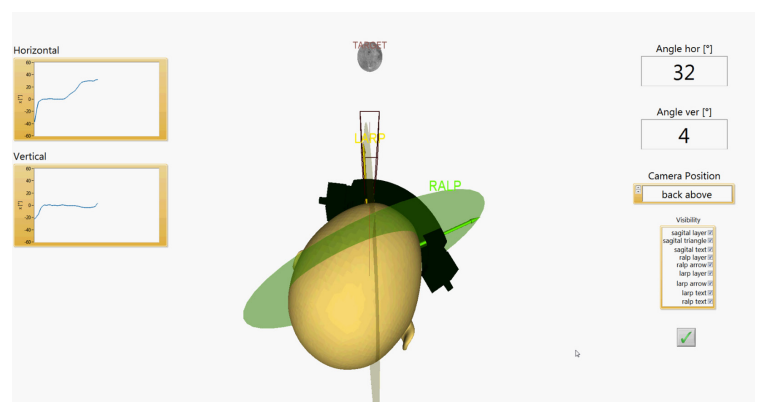
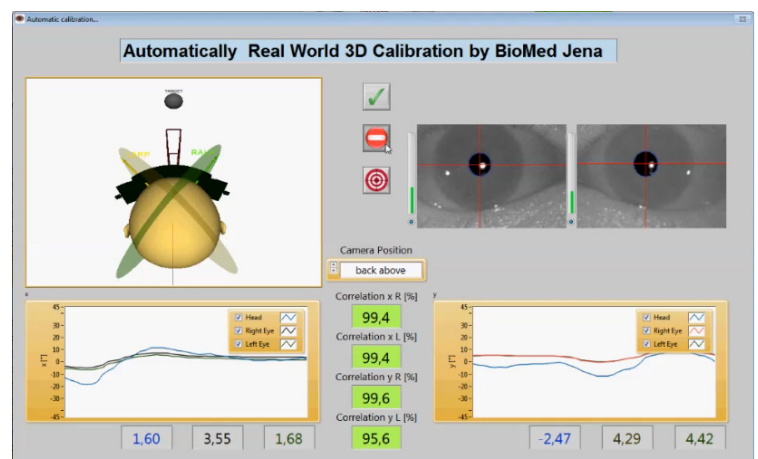
## Real world 3D Calibration

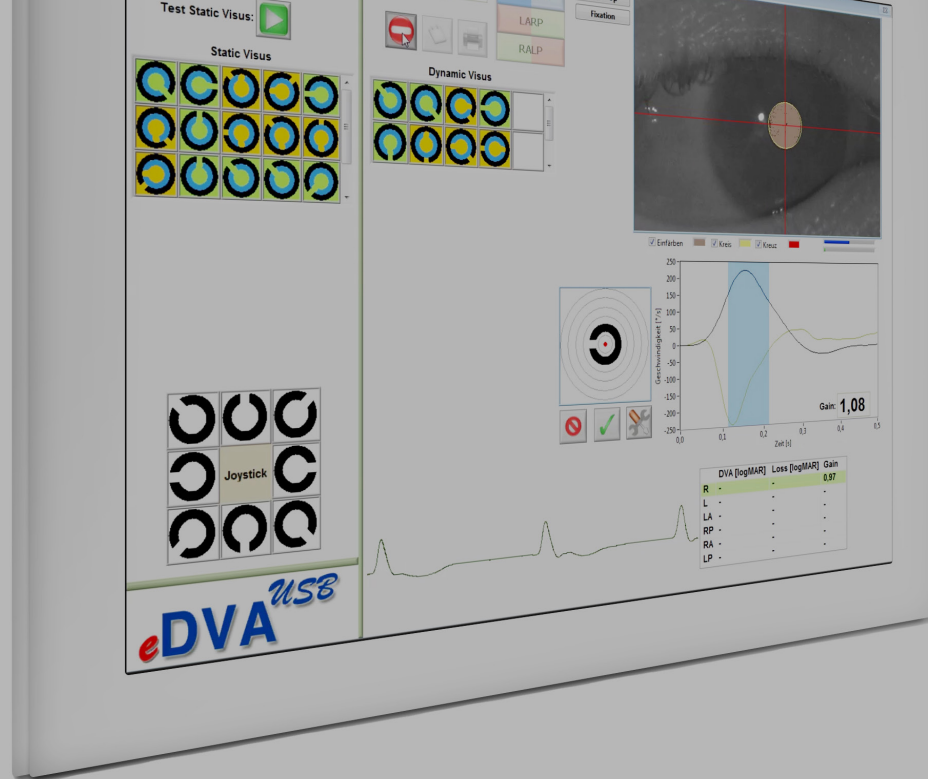
System requirements for eHIT<sup>USB</sup>:

- Min. Intel Core i5
- screen resolution of 1920x1080 Pixel (Full HD)
- Windows 10/11

Thanks to our new innovative sensor technology we are now able to offer you a simple real world calibration!

- Easy, fast and reliable!
- New opportunities in Training, Measurement and Diagnoses!
- Shows the movement of the head in space in all axes in real-time!





## eDVA<sup>USB</sup>

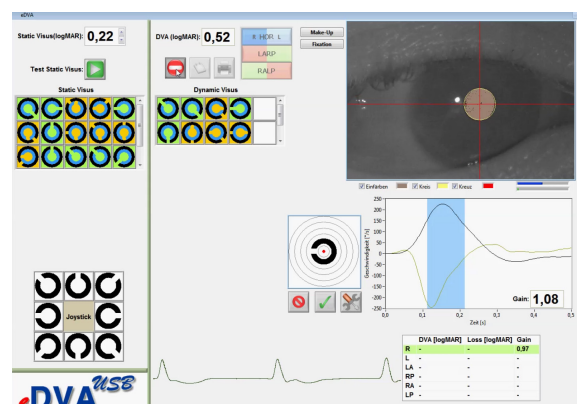
### Dynamic visual acuity during VOR

Dynamic Visual Acuity (DVA) describes visual image stability where the vestibular ocular reflex (VOR) counteracts head motion by moving the eyes in the opposite direction to maintain a clear view of the world.

The eDVA<sup>USB</sup> provides static and dynamic visus information in normal subjects such as pilots and athletes, as well as in patients with vestibular or neurological disorders.

Simpler versions of this test involve reading an eye chart while the patient is shaking their head. If the patient must move up two lines on the eye chart to see the characters clearly, then their VOR is considered abnormal.

One problem with the simple test is that the character can be read while the patient's head is stopped. The eDVA<sup>USB</sup> computerized version will only present the character to the patient when his head is moving at a high velocity where only the VOR is functional and not active tracking. The test is also direction sensitive, so **all the six semicircular canals** can be tested separately.









**eVNG<sup>USB</sup>**

Videonystagmography

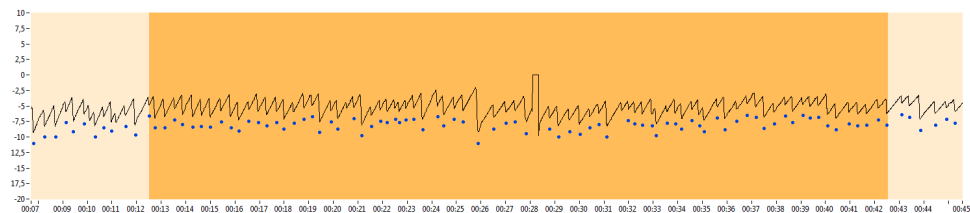
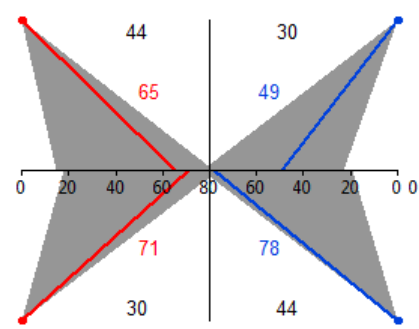
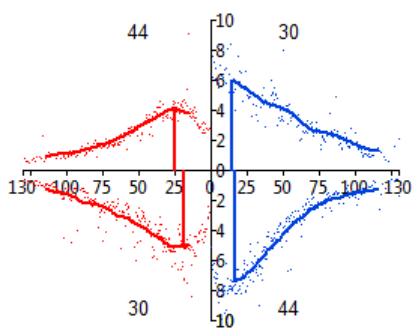
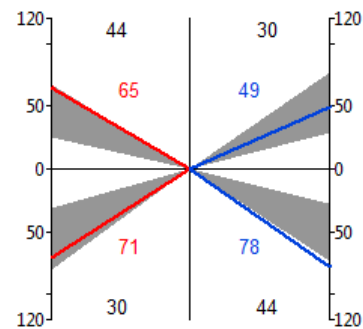
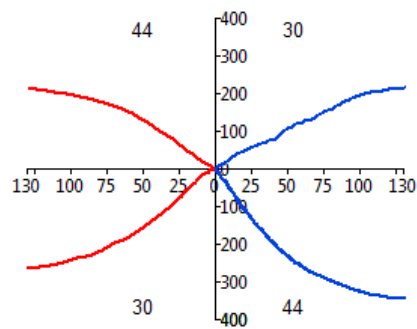
**User friendly routine check with the  
nystagmography system eVNG<sup>USB</sup>**

- test battery in standard nystagmography systems:
- spontaneous nystagmus, position/positioning test, bi-thermal caloric test, optomotoric tests
- real time image of the eyes improved image processing algorithm
- automatic nystagmus detection
- calculation of all relevant parameters
- improved automatic artefact rejection
- sharpness adjustment
- fully automatic test sequences
- stable binocularly video goggle with mask cover
- hot mirrors adjustable in 3 steps
- detailed results printout
- soft cushion for optimal and comfortable fit
- foot switch
- no other computer hardware needed



## User application

- network ready
- binocularly analysis at 100 Frames/s
- manual nystagmus marking
- findings sheets
- compatible with Windows 10/11



## Technical specifications

- Sample rate: binocularly 100 Hz (100 images/s)
- Resolution: 0,1 °
- Camera: 1280 (H) x 1024 (V)



# KALORistar

Air irrigator with active cooling technology

The **KALORistar Arctic** is a powerful caloric air irrigator used to stimulate the vestibular organ. Thanks to its innovative concept the cooling is guaranteed at all times. Thus it is not only useful in daily practice but also applicable in clinical research.

The default temperatures for air irrigation are **47°C (warm stimulus)** und **27°C (cold stimulus)**. You can change these values from 20°C to 50°C.



47°C  
(Warm stimulus)



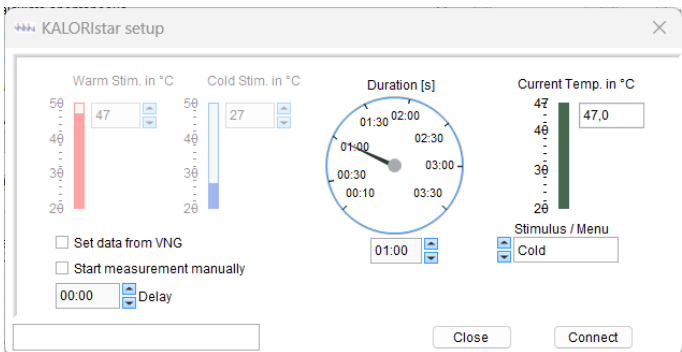
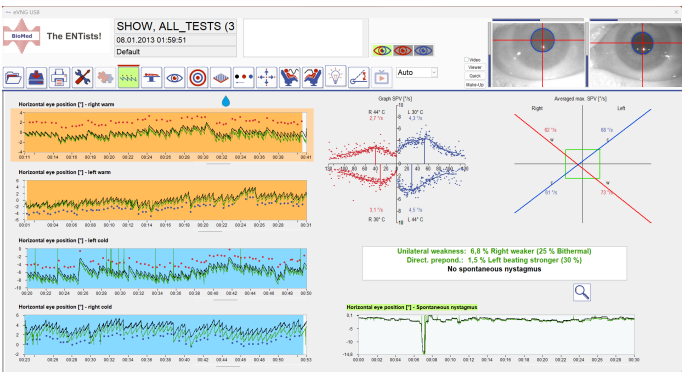
27°C  
(Cold stimulus)

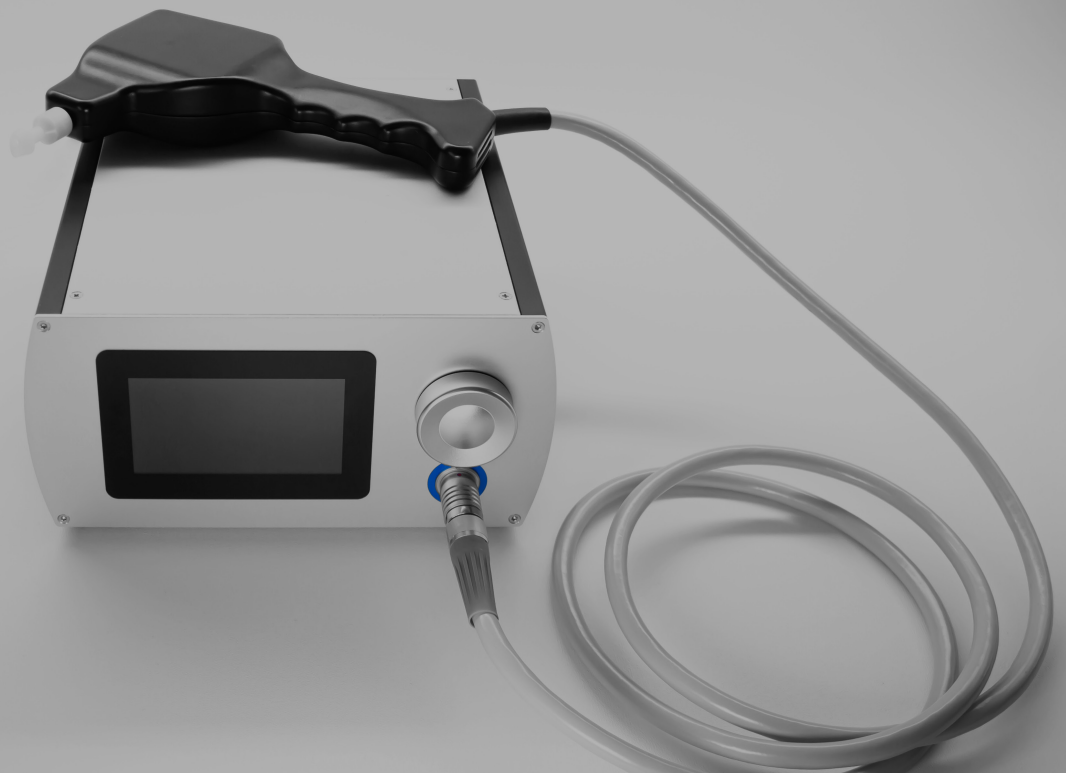


The examination with the **KALORistar** is part of the **eVNG<sup>USB</sup>** software using the **eVNG** mask. The stimulus is triggered with the handle. On the control panel you can change the temperature and the length and type of stimulus. Their values are shown on the display.

The caloric irrigation is a standard examination of the vestibular organ to investigate lower frequencies. Spontaneous nystagmus before the measurements can also be recorded and be included into the calculations.

The user interface is clearly structured and displays the eye movements of all irrigations. Additionally you get the calculated data as well as the diagrams.





# KALORistar<sup>CT</sup>

The new air irrigator with active cooling technology

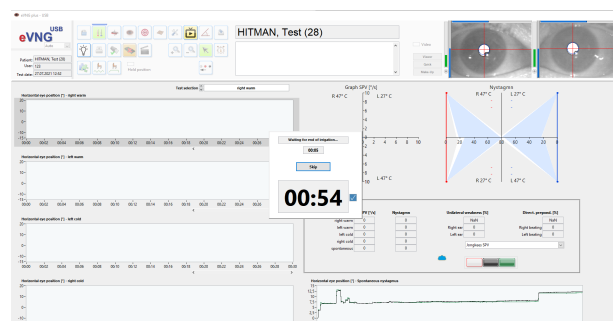
The **KALORistar<sup>CT</sup>** is the further development of the reliable air irrigator **KALORistar Arctic** the first air irrigator with active cooling technology (ACT).

We took the robust technology of the **KALORistar Arctic** and spent it an outstanding design. The round innovative push-pull connector fits in the high quality design and the intelligent handle allows us to change only the handle in case of service or maintenance. Last but not least, we are setting a new standard in low-noise operation. It is easy to use and comfortable for the patient.

**We were the first having active cooling technology and now we're the prettiest too.**

- Temperature 20...50 °C
- Improved active cooling (ACT)
- Very quick regulation
- Handle holder on device, wall mount available\*
- Intelligent handle for easy service/maintenance.
- Completely integrated into

eVNG<sup>USB</sup>



**SUPER QUIET PUMP! - EASY TO DISINFECT!**

\* Optional

## Systemeinstellung

System Töne

Erinnerung MTK

Datum & Uhrzeit

Sprache

Kalibriermenü



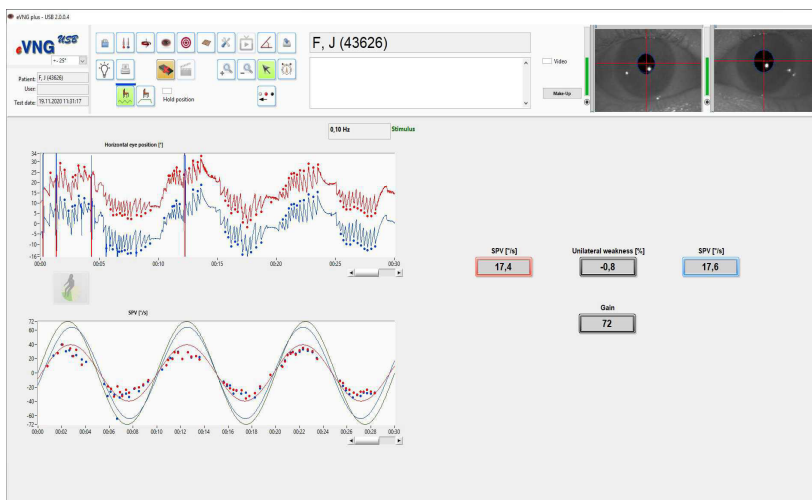
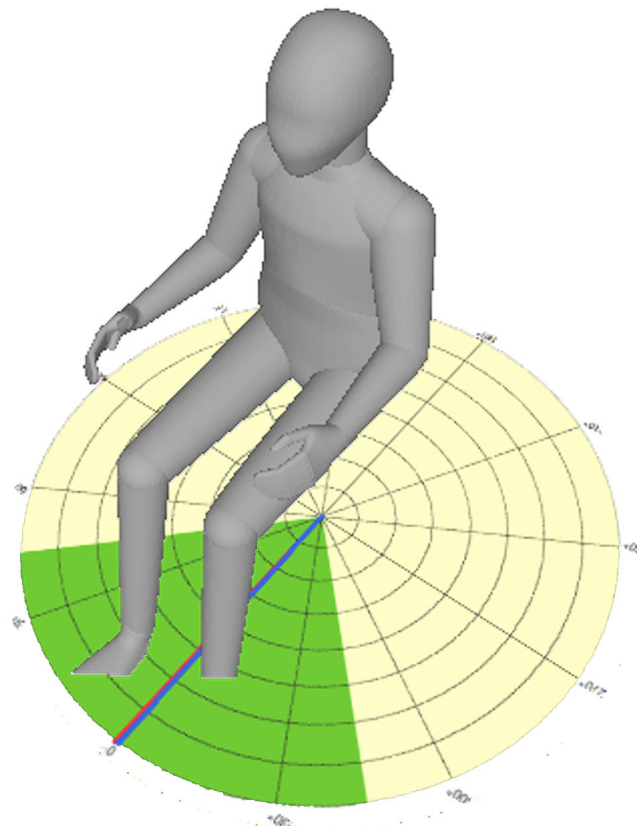
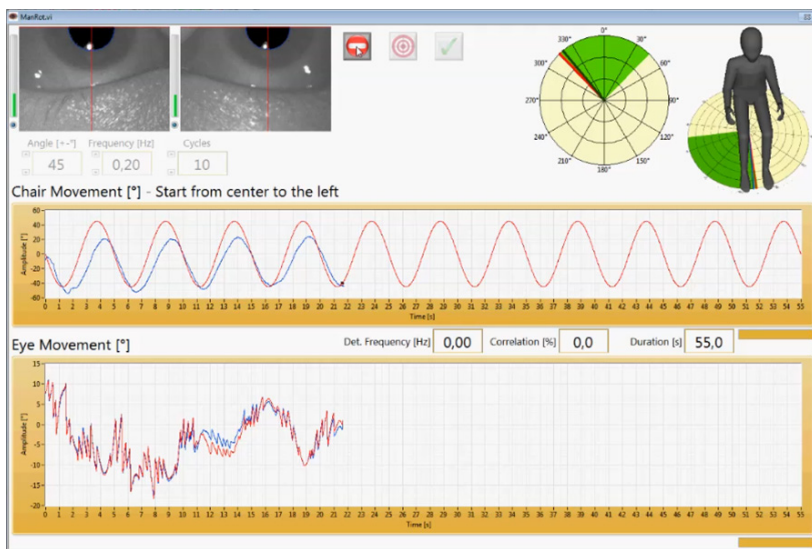
## Manual sinusoidal pendula test (MPT)\*

Integrated as an option in the **eVNG<sup>USB</sup>** software the manual sinusoidal pendula test (MPT) is used to check compensation after a vestibular loss. After the real life calibration the software guides the examiner with sound and 3D animation through the test. This test can be performed with a normal office chair.

As a result of a good cooperation the test is now compatible with the examination chair SIT 4 from **OTOPRONT** - Germany. The SIT 4 can perform standardized (5, 10 and 20 sec./ 45°, 90°, 180°) test programs, recorded by the **eVNG<sup>USB</sup>** system.







\* Available at mask version 3.0 or on request







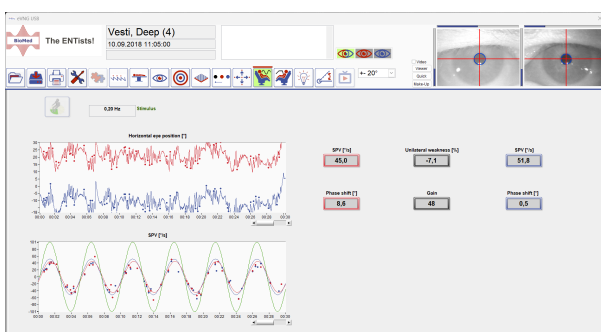
# RotaryChair

Sinusoidal testing and rotary-stop-test

The **RotaryChair** test is a mid frequency test in vestibular diagnosis. The VESTAR 100 USB rotary chair can be integrated into the **eVNG<sup>USB</sup>**. There are two methods:

## ① sinusoidal testing

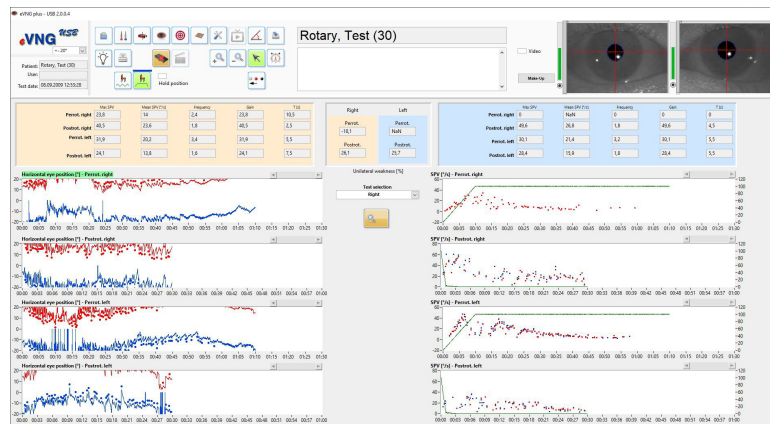
The chair is moving in a sinusoidal rotation. The velocity is measured in %s with a maximum of 200 %s.



On the user interface you see the diagrams which show the recorded eye movements. Identified nystagmus beats are tagged and plotted. The graphs regarding the eye movement are featured in different colours. The right eye is displayed in a black graph (with red nystagmus) and the left eye in a green graph (with blue nystagmus).

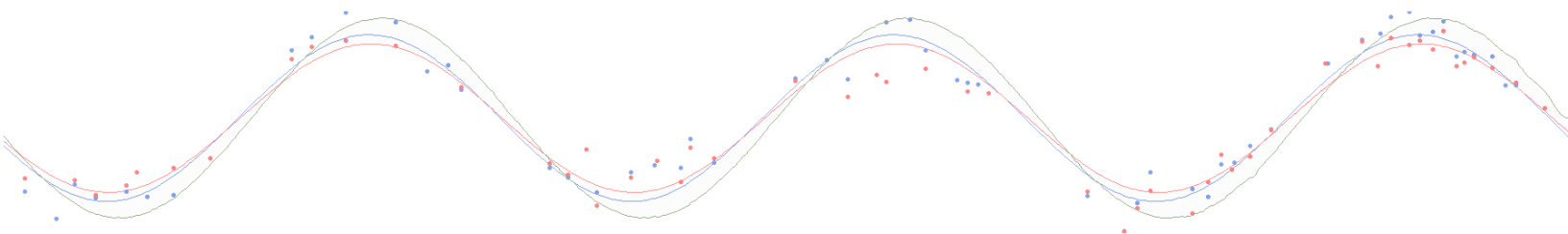
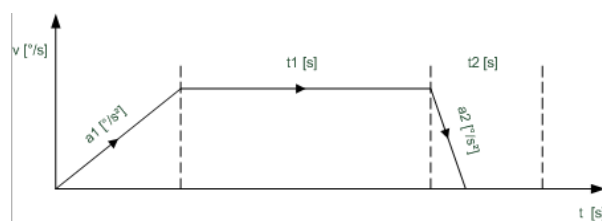
## ② rotary stop-test

The chair is slowly accelerated to a constant speed. After the excitation is gone, the chair is stopped abruptly. The analyses are separated according to the perrotary phase and after the postrotary phase.



### Specification

max. velocity:	200°/s
max. acceleration:	100°/s <sup>2</sup>
weight:	120 kg
power supply:	230V / 8A
required space:	1 m (1,8 m unfolded)
seat adjustable between	von 90° bis 0°





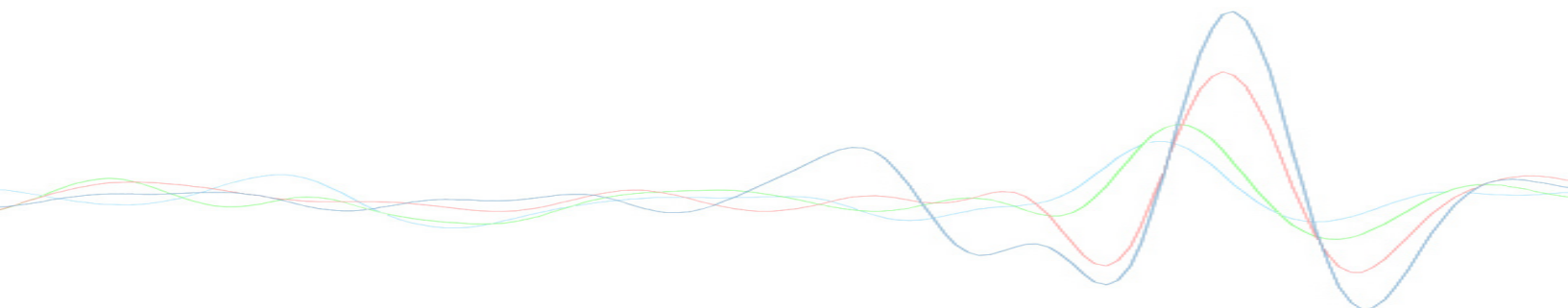
## eVEMP<sup>USB</sup>

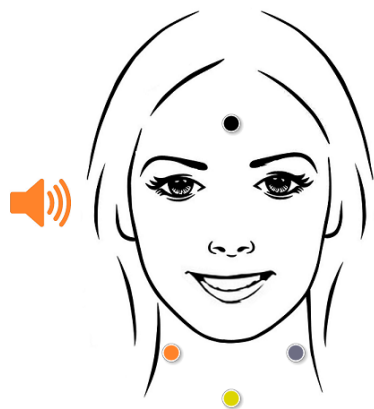
Vestibular Evoked Myogenic Potentials (c- and oVEMP)

The eVEMP<sup>USB</sup> as a part of eABR<sup>USB</sup> was designed for the examination of the otolithic organ, which consists of the saccule and utricle. These receptors are sensitive to gravity and linear acceleration. The saccule is sensitive for vertical movement, like lifting, and the utricle is sensitive to horizontal movement. The saccule can be examined with derivation of the cervical vestibular evoked myogenic potentials cVEMPs and the utricle with the derivation of the ocular vestibular evoked myogenic potentials oVEMPs. The stimulus is either an audio tone burst or a chirp (CW-VEMP-Chirp®).

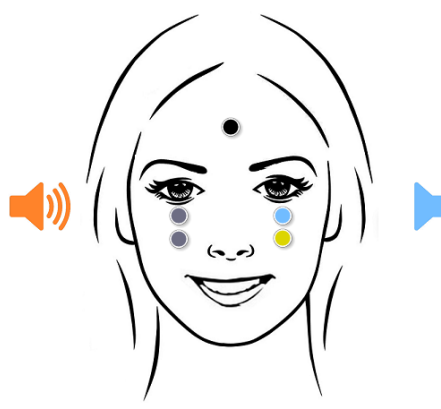
During examination the patient sits or lies. You put adhesive electrodes on the lead location. The EMG is recorded and averaged.

The indications are for example peripheral vestibular deficits, benign paroxysmal positional vertigo, M. Menière.





recording location of **cVEMPs**



recording location of **oVEMPs**

An **unique** feature in **eVEMP<sup>USB</sup>** is the MFA (Multi frequency analysis), the tone burst is presented with alternating frequencies (500, 750 and 1000 Hz). In Morbus Menière the frequency of max. response is shifted to higher frequency (1 kHz).

## Hardware



### **eABR<sup>USB</sup>-VEMP** device

- recording EMG-signals
- generation of stimulus tones
- USB data transfer

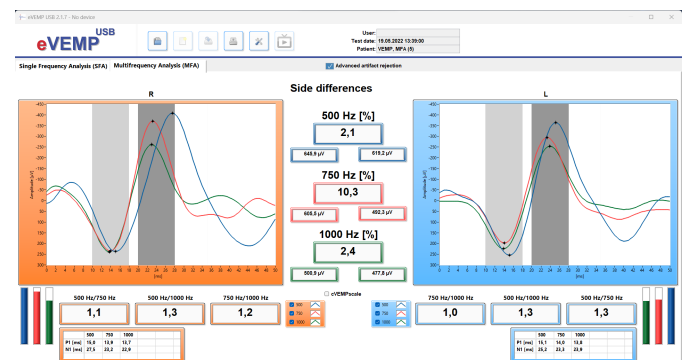


### **eVibration<sup>USB</sup>\***

biofeedback handle\* which generates vibrations depending on the muscle contraction.

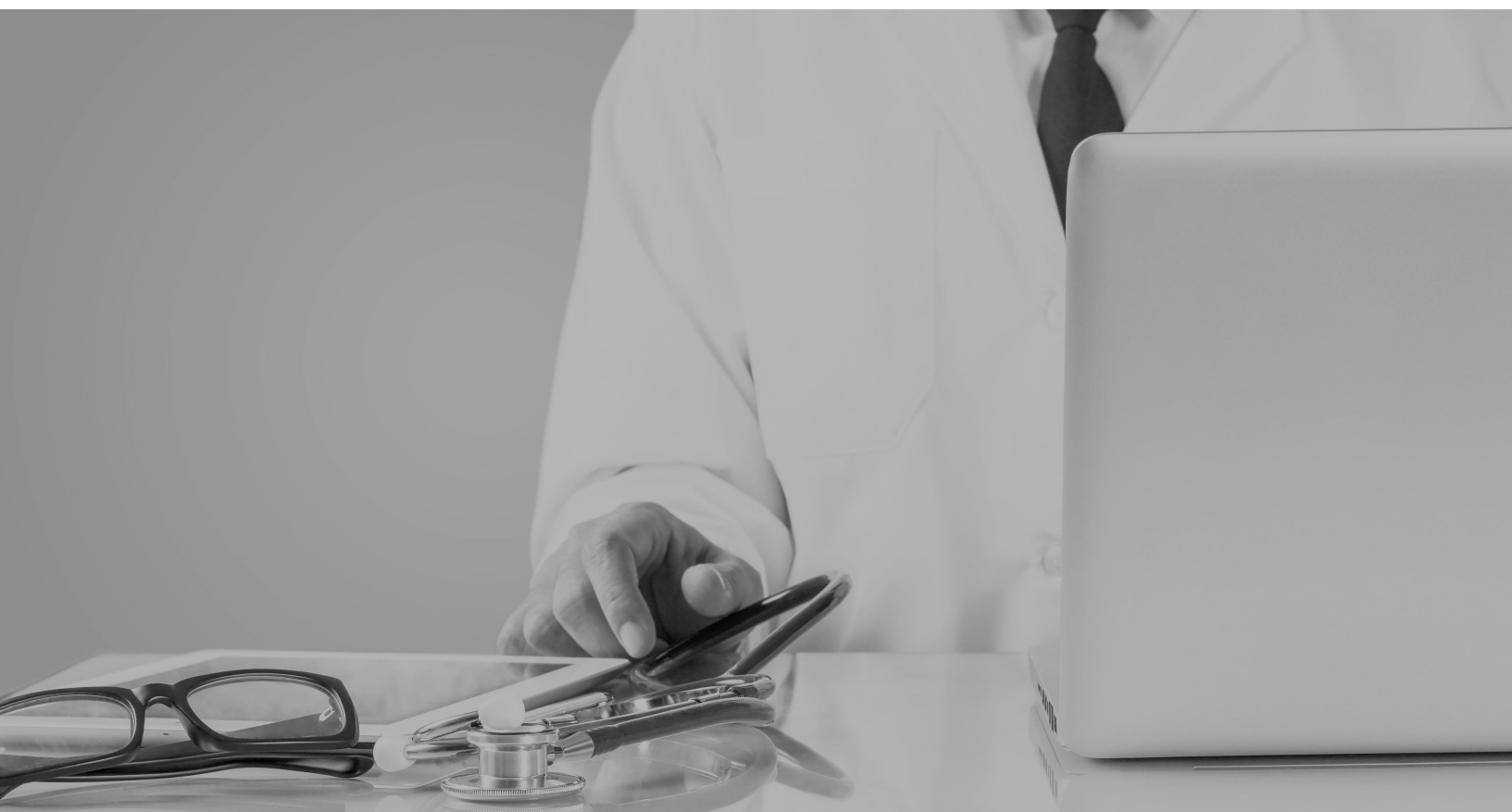
With the **eVibration<sup>USB</sup>** biofeedback handle\* the muscle tone can be controlled during cVEMP.

**\*optional**



The results are clearly presented. The SW marks automatically detected signals. The standard ranges with a grey background help with the analysis. You can see four diagrams with the recorded measurements (cVEMPs right/ left, oVEMPs right/ left). The examination of the otolith functions occurs with a 100% specificity. If VEMPs are recorded (diagrams), the function of sacculus and utricle is faultless.

The stimulus is provided by DD45 (shielded) headphones or IP 30 in ear phones. Colour-coded electrode cables are used in conjunction with wet electrodes for recording EMG signals.









# HINTS

## Head Impuls Nystagmus Test of Skew

- This test battery is for separating patients with central and peripheral diseases.
- It is very useful if you have to decide to send the patient immediately to the MRI.
- Sometimes it is hard to diagnose a stroke in the acute vestibular syndrome.

### Test of Skew

- Skew deviation means a vertical ocular misalignment that results from a right-left imbalance of vestibular tone (i.e., neural firing), particularly otolithic inputs, to the oculomotor system.  
(Brodsky MC, Donahue SP, Vaphiades M, Brandt T. Skew deviation revisited. Surv Ophthalmol. 2006;51:105-128.)
- Skew is generally detected by alternate cover testing

### HINTS - 3 step test

- 1. normal horizontal HIT
- 2. direction-changing nystagmus in eccentric gaze
- 3. skew deviation (vertical ocular misalignment)
- 100% sensitive and 96% specific for stroke



## O.C.S.B.

Optomotoric test

The **eVNG** offers the possibility to measure all significant tests with a projector or a big monitor in combination with the optokinetic stimulus box.

- Saccades – fast eye movements to re-fixate jumping targets (horizontal, vertical, combined)
- Smooth pursuit – following slow moving targets (horizontal, vertical, linear, sinusoid, accelerated)
- Optokinetic – presentation of moving stripes or chessboard pattern (horizontal, vertical)
- Fixation suppression – ability to suppress spontaneous nystagmus
- Gaze-evoked nystagmus
- Pro- and Antisaccades - Saccadometry





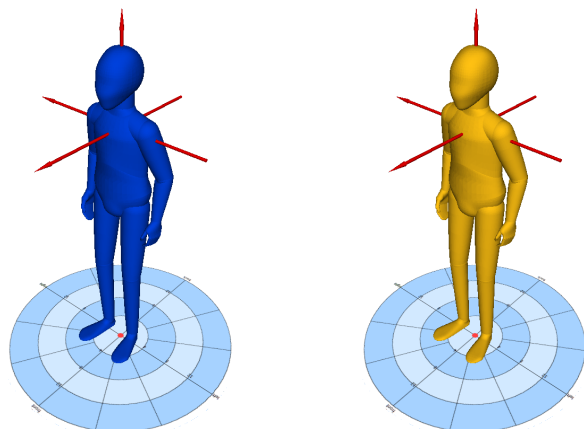
# ePOSTURO

mobile system for computer aided Posturography

Center of gravity (COG) is an important component of balance and should be assessed when evaluating someone's posture.

With **ePOSTURO** software and the **eVNG/eHIT** mask or the mobile sensor **Motion BLUE** static and dynamic Posturography can easily be done.

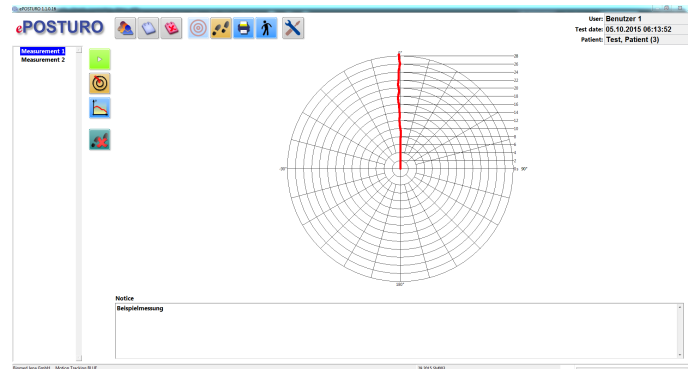
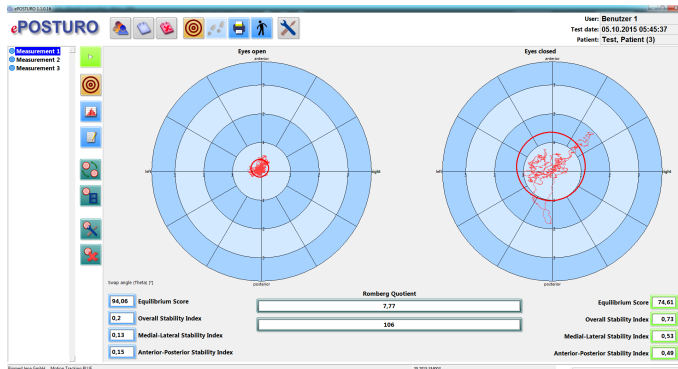
- animated 3D therapy control
- Fall questionnaire
- Determination of the personal risk of falling
- Creation of a training plan based on the results of the analysis
- Training games to improve balance
- Posturography
- Examination in the frequency range
- Corpo-granio-graphy:
- Measurement of torsion during the Unterberger kicking test





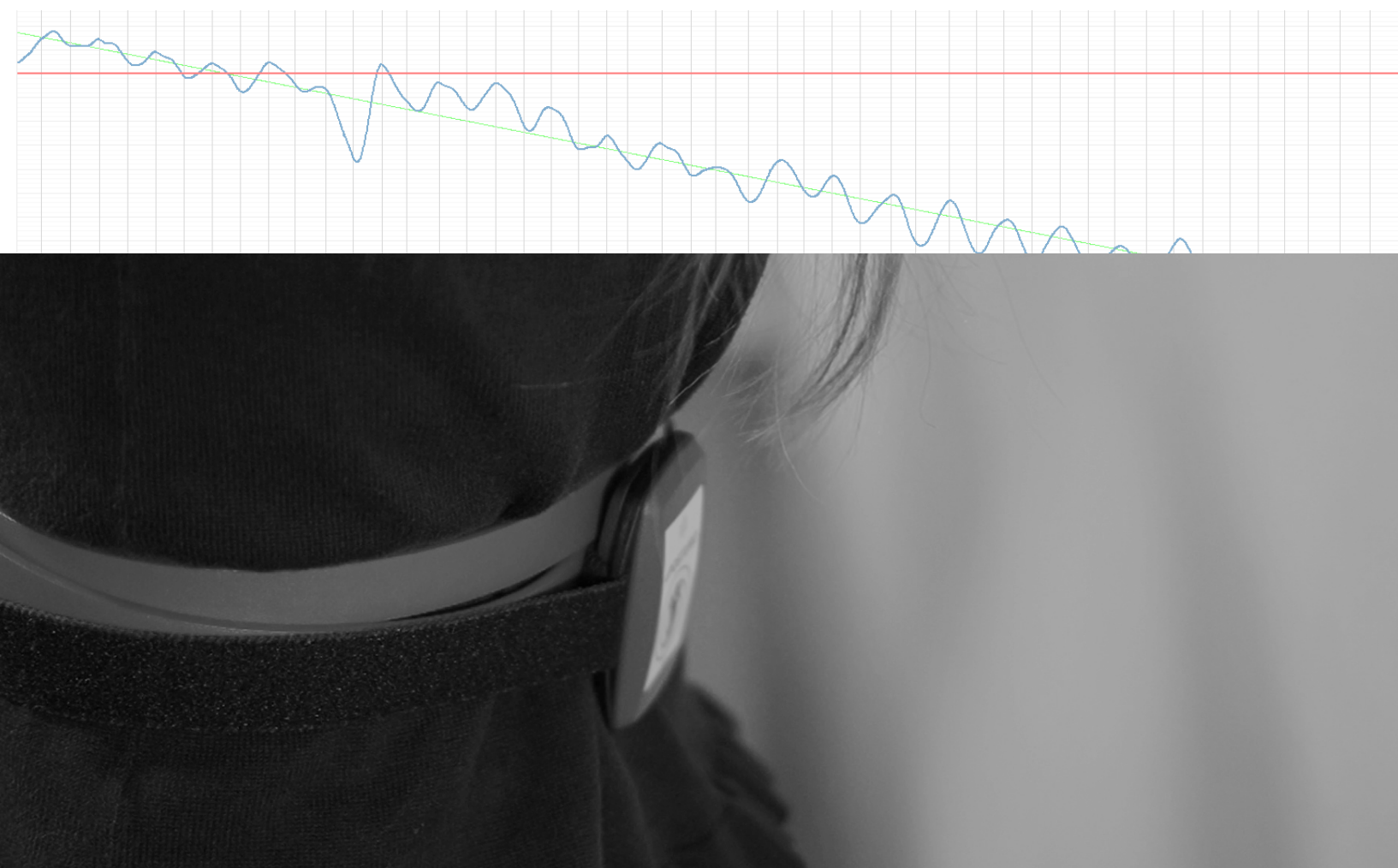
## Software

The software calculates all relevant parameters, like Romberg quotient, automatically and displays the actual risk of fall (RoF). Depending on the RoF an individual workout plan can be created.



## Features

- Wireless sensor Motion BLUE
- Balance testing without a platform !
- Wireless charging of mobile sensor Motion BLUE
- Up to 3 synchronously operating mobile devices
- +/- 0.5° vertical and 2° horizontal
- 100 Hz sampling rate
- Compatible with Win 10/11







## eFRENZEL<sup>USB</sup>

Binocular Video Frenzel Goggles

In some cases it is useful to do a visual observation of the eye movement due to a specific maneuver like Dix-Hallpike.

The eFRENZEL<sup>USB</sup> is the optimal solution for this. It combines the fixation-free observation and recording of the eye movements with a synchronized video of the examination itself.

Furthermore the test can be commented in the software as well as with the integrated microphone.

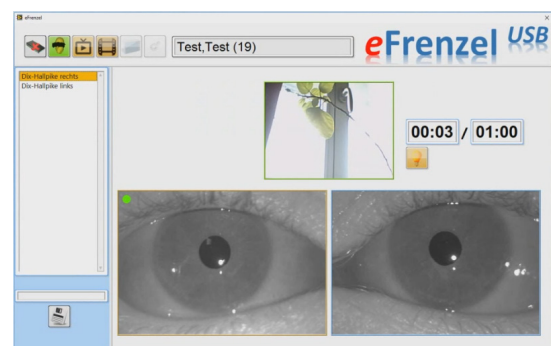
### Examination video

- Autofocus camera guaranties best image quality
- 30 Frames/s synchronized recording

### Recording / Playback

- Displays eye images in partial or full screen mode
- Start and Stop with the footswitch

Fixation light for nystagmus suppression









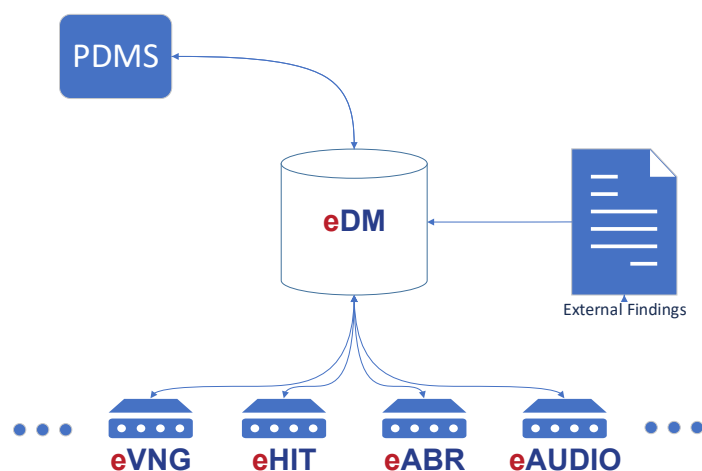
## eDM

### Diagnostic Manager

The **eDM** makes the daily work more efficient and easy at the same time.

The **eDM** is the optimal solution for measuring, visualizing, managing and storing ENT data, acquired by BioMed Jena devices.

All different tests can be easily accessed. To optimize the workflow a measurement schedule for each patient can be created. Also the **eDM** is able to import PDF documents from other sources.



Remote support as simple as possible - start the remote control software „Anydesk“ directly from **eDM**.

eHIT<sup>USB</sup> eDVA<sup>USB</sup> eABR<sup>USB</sup> eTYMP<sup>USB</sup> eVEMP<sup>USB</sup> eSUV<sup>USB</sup>  
 KALORISTar<sup>CT</sup> eAUDIO<sup>USB</sup> eOAE eVNG<sup>USB</sup> ePOSTURO<sup>USB</sup>



Feature highlight of eDM - Diagnostic Manager

## One software for all BioMed Jena devices

- Only one patient database
- Easy and quick data preview
- Configurable overview for all measurements
- Easy data administration (one for all)
- External PDF import / Automatic PDF export
- User profiles with independent settings for each user

MEASUREMENT SCHEDULE

EASY IMPORT OF EXTERNAL FILES

## Network support

- Create measurement schedule for every patient
- No storage limits - Firebird database
- No workplace licence
- GDT interface included, HL7 on request





1997	Founded by Prof. Dr.-Ing. Lutz Herrmann and Dipl. Ing. René Schüler
1998	Start of the vertigo diagnostic line as an OEM developer and manufactory
2004	Production start of the own brand: the „e“ line with the <b>eVNG</b>
2008	First VNG system with USB 2.0 and 100 Frames/s binocularly data acquisition <b>eVNG<sup>USB</sup></b>
from 2011	Full solution of vestibular diagnostics with all products: <b>eHIT<sup>USB</sup></b> , <b>eSUV<sup>USB</sup></b> , <b>KALORistar</b> , <b>eVEMP<sup>USB</sup></b> and <b>KALORistarlet</b>
2015	<b>ePOSTURO</b> , <b>eDVA<sup>USB</sup></b> and manual pendula test
2016	<b>eMANAGER</b> , <b>eFRENZEL<sup>USB</sup></b> , <b>eAUDIO<sup>USB</sup></b> and <b>eABR<sup>USB</sup></b>
2017	<b>eTYMP<sup>USB</sup></b> and move to new location „Am Egelsee 1“ in Jena
2018	Redesign of our famous Airirrigator KALORistar Arctic
2019	Development of the <b>eEMG</b> data logger and signal processor
2020	Further Development of the <b>KALORistar</b> to <b>KALORistar<sup>CT</sup></b>
2021	Release of the <b>eDM</b> and <b>eOAE</b>
2022	<b>25 years BioMed Jena GmbH - 25 years of development and progress.</b>
2023	Development of ABR/ABR module for <b>eOAE</b>





## Publishing Information

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