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## Software Release Notes – Highlights of Key Changes VEST™ and I-Portal® Software

**NOTE:** Scroll towards the *end* for the most recent software versions, or click [here](#) to jump to VEST 8.2 and I-Portal 6.1 software sold with new I-Portal® Neurologic Testing Centers (NOTC), I-Portal® SVNG3 and I-PAS™, or click [here](#) to jump to VEST™ 8.1 and I-Portal® 6.1 software sold with the new I-PAS™.

### Software Release Notes: VEST™ 6.6.001 – Current

*\*Please note that bug fixes, although included in each software release, are omitted here to preserve the most relevant software release details.*

#### VEST 6.6.001

##### Key Changes:

- 1.1 Several improved user interface features (incorporate search function for Patient Setup, standardized buttons and screen colors on all screens, allow operator to enter “Referral,” etc.)
- 1.2 Added Binocular VOG compatibility
- 1.3 Allowed clinician to enter “Analysis Mode” without switching main motor off.
- 1.4 Automatically linked clinician who is logged in and running the test to the report.
- 1.5 UC with SVV in counter clockwise direction now performs analysis.
- 1.6 OKN, Visual Enhancement, Visual Suppression changed the data after the first analysis and corrected it in the report.

#### VEST 6.7

##### Key Changes:

- 1.1 Various Normative Data Plots are available for user supplied normative data on the analysis screen for the following tests: Chair Sinusoidal Rotation, Chair Trapezoidal (Step) Rotation, Optokinetic Nystagmus (Step), Saccade, Smooth Pursuit, Visual Enhancement, Visual Suppression
- 1.2 Analyses can now be saved when using the analysis manager
- 1.3 Filter settings can be reverted to default values during any analysis
- 1.4 Ability to set default filter settings
- 1.5 Saccades: Can set up and analyze up to 100 saccades in protocol, can detect and measure corrective saccades, results available with and without corrective saccade factoring
- 1.6 Caloric: Peak Slow Phase Velocity can be selected manually or automatically; pre-fixation calculations automatically exclude data collected within one second of the transition point to eliminate outliers.
- 1.7 Unilateral Centrifugation: percent ends and prime threshold filters are now available to the operator for this test.
- 1.8 Off Vertical Axis Rotation: both left and right eye torsional data can be analyzed.
- 1.9 Saccades: can define up to 100 Saccades
- 1.10 Positioning (BPPV Test): user has a greater control over the timing of the test (test can be defined without a fixation period)
- 1.11 Pedals (VNG and VOG systems only): pedal control updates for several tests including gaze, caloric, positional, positioning, and Spontaneous Nystagmus
- 1.12 Drop Down Menu for Test Name and Custom Test
- 1.13 Pupilometry: pupilometry tracings have been removed from the data screen to provide cleaner vertical and horizontal eye traces; data still available in the data files.
- 1.14 Improved Navigation: ability to navigate backwards one level through analysis screens without returning to main menu.

1.15 I-Portal is compatible with upgraded camera firmware, allowing for controllable maximum frame rate and more precise, patented “region of interest” control.

#### **VEST 6.7.001**

##### Key Changes:

- 1.1 Chair Trapezoidal Rotation Test peak eye velocity graph analysis is formatted to match the report.
- 1.2 Visual vestibular interaction analysis displays cumulative distribution graph independent of suppression test.
- 1.3 Upper and lower limit for saccade test, shows “no normative data” for regions beyond default setting.
- 1.4 Updated patient and test information displayed at the top of the caloric testing screen.
- 1.5 Ability to eliminate individual subjective visual tests from final results.
- 1.6 Left and right eye data displays are updated during caloric, positional, and positioning acquisition.
- 1.7 Dynamic unilateral centrifugation with and without subjective visual vertical tests may be run sequentially without interfering with testing state manager.

#### **VEST 6.7.002**

##### Key Changes:

- 1.1 Normative data displays now read from user-accessible files holding user’s normative data.
- 1.2 Caloric fixation average slow phase velocity now calculated using same window boundary inclusion criteria as used for analysis.
- 1.3 Conditions under which a blank patient can be tested when no patient has been tested have been removed and improved upon further in later versions.

#### **VEST 6.7.004**

##### Key Changes:

- 1.1 Data will fill in at least up to 500 missing frames (5 seconds of data) with null data points.\*\*
- 1.2 Corrected the display of left and right eye in vertical saccade analysis
- 1.3 Positioning table expanded to include both pre-fixation and fixation average slow phase velocity
- 1.4 Chair Trapezoidal Rotation Analysis calculation of Decay Time has been corrected and further improved in subsequent releases.
- 1.5 Caloric Report changed to be based on Peak Slow Phase Velocity

#### **VEST 6.8**

##### Key Changes:

- 1.1 Smooth Pursuit: eye tracings in both Position and Velocity modes; New “Percent Saccade” calculation
- 1.2 Subjective Visual Vertical and Horizontal: enhanced graphical representation
- 1.3 Chair Trapezoidal/ Step Rotation: drag and drop cursors added to simplify testing and define the beginning and end of eye data; Operator has manual option to define peak velocity beat.
- 1.4 Spontaneous Nystagmus and Gaze: vertical and torsional eye tracings may now be analyzed; each channel has independent results; for fixation-on and fixation-off, operator has manual option to define peak velocity beat.
- 1.5 Saccades: select or deselect which saccades to include in analysis calculations
- 1.6 More sensitive acceleration-based beat detection to define low-amplitude fast phase segments.
- 1.7 Simplified method for setting default filter settings for each test.
- 1.8 Numerous user interface improvements.

#### **VEST 6.9**

##### Key Changes:

- 1.1 Smooth Pursuit Analysis: implemented auto-adjust velocity filter settings
- 1.2 Updated New Patient screen prevents entry of nonstandard characters in First and Last Name fields

- 1.3 OKN Analysis separate segment velocity filters: allows clinician to pickup “wrong” direction Nystagmus
- 1.4 Spontaneous Nystagmus Analysis: manual identification of Beat Direction peak setting overrides automatic detection.

### **VEST 6.10**

#### Key Changes:

- 1.1 Existing Dynamic Unilateral Centrifugation with SVV Test modified to allow *multiple* SVV trials including: Separate calculations of mean and standard deviation; line offset changed from -30 degrees to -12 degrees; speed of SVV line rotation increased; ability to remove individual SVV results from the analysis
- 1.2 OKN analysis includes collective results table sorted by OKN velocity for easier viewing
- 1.3 Analysis simulation interface reorganized, relabeled and further modified in version 8.x

### **VEST 7.0 and I-Portal® 3.0**

Platform Changes: Single PC running windows® 7x64 bit operating system

#### VEST™ Key Changes:

- 1.1 Reports includes all clinical I-Portal® NOTC Tests; optional summary reports available
- 1.2 Ability to save and review most eye videos except SVV, SVH and Unilateral Centrifugation
- 1.3 Improved TCP communication between VEST™ and I-Portal®, increasing stability
- 1.4 Added auto-adjustment factor for Velocity Filter in SHA based on test peak velocity parameters
- 1.5 Operator/clinician can add Pre and Post Test comments
- 1.6 Expanded Custom Test Analysis to include Vertical and Torsional components

#### I-Portal® Key Changes:

- 2.1 Compressed video files by a tenth to reduce hard drive space.
- 2.2 Improved user interface including click and drag Region of Interest control
- 2.3 Eye selection in monocular mode and switching between monocular and binocular moved to VEST
- 2.4 Eye images can now be flipped without stopping acquisition or restarting the software.

### **VEST 7.1**

#### Key Changes:

- 1.1 Reports expanded to include all clinical NOTC and VNG tests
- 1.2 Redesigned VNG Pedal response algorithms
- 1.3 New curve fitting algorithm added to Caloric Test to visualize caloric velocity data
- 1.4 For SVV and UC-SVV tests, separate graphs and statistics were added for negative and positive preset angles and for the calculation of asymmetry between them
- 1.5 Beat detection algorithm is now based on acceleration.

### **VEST 7.5 & 7.5.1 and I-Portal® 3.2.1**

#### Key Changes:

- 1.1 Three new tools added to Analysis Graphs: full screen graph view, Quick Area Select Delete, Quick Area Select Undelete
- 1.2 Automatic Blink detection/removal in Smooth Pursuit Analysis and Saccades Analysis identifies eye blinks and automatically marks them for optional deletion
- 1.3 Displays the saccade clicked on in analysis and zooms graphs, allowing user to quickly find, evaluate and delete outliers
- 1.4 Chair Sine delete function no longer forces deletion of whole cycles
- 1.5 Save Video functionality no longer automatically defaults to “On”
- 1.6 Saccade markers can be highlighted by size and color.
- 1.7 Select specific channels for data export; apply calibration information to the exported data; unit conversion; create preview graphs of selected channels

1.8 Caloric Reports use the same scale for all of the Caloric Response (butterfly) graphs; displays cumulative caloric graphs

### **VEST 7.5.2 and I-Portal® 5.0**

#### Key Changes:

- 1.1 Patient Search function allows test reviewers to efficiently locate patients and preview test sessions; provides summary windows that provide a snap shot of patient analysis with pre and post-test comments
- 1.2 Option to mirror the view of facing the patient, where their left eye is on the right of the display and their right eye is on the left of the display or visa versa
- 1.3 Software no longer displays multiple “TCP error” messages when eye tracking goggles are unplugged, aborted, or otherwise stop functioning during patient testing.
- 1.4 VEST™ splash screen displays the version of VEST™ and reports progress of loading.
- 1.5 The ‘Tools’ menu has an option to configure reports, allowing selection of institution name and graphic.
- 1.6 Improvements to the crHIT acquisition and analysis, including randomize start time, display of number of cycles and reports.
- 1.7 Acquisition at a rate of 250 Hz is now available for the High Speed Falcon™ goggles.
- 1.8 The patient selection screen allows for the selection of a patient and test session for analysis on the same page.
- 1.9 Eye selection settings for analysis are saved and re-loaded for previously analyzed cases.

### **VEST 7.8 and I-Portal® 5.1**

#### Key Changes:

- 1.1 Code base is now operating on Labview 14
- 1.2 Tests automatically save into data files immediately after acquisition.
- 1.3 Tests automatically analyze immediately after acquisition in the background in order to assess the validity of the acquired data.
- 1.4 Calibration includes left and right horizontal and now separate left and right vertical calibration values.
- 1.5 Acquired data is stored in file format, \*.dat files. These files have column headers to indicate contents of each column.
- 1.6 Improved handling of I-Portal errors during acquisition enables operator the ability to reconnect to I-Portal after failure during acquisition.
- 1.7 Saccades test computes an “Area Under Fit,” which is a metric of the Saccadic Main Sequence, which is an area under a curve fit of velocity by displacement graph.

#### Research Changes:

- 2.1 Implementation and support for the new I-PAS™ type (I-Portal® Portable Assessment System) to be added to the family of NOTC and SVNG systems types.
- 2.2 Implementation of I-PAS™ Tests: Vergence pursuit, Vergence steps, memory-guided sequence, light reflex, self-paced saccades
- 2.3 Custom Free Run test added to allow acquisition and display of data from sensors, buttons and all channels of eye data. Stimulus displays are now configurable.
- 2.4 Added Tags Field to patient and test session records in the results database.
- 2.5 VEST system indicates when the system is in research-only investigational device configuration.
- 2.6 I-Portal performs automatic continual adjustments of pupil threshold.
- 2.7 I-Portal centers the region of interest (ROI) on the pupil when initiating testing.

**NOTE:** SVNG and NOTC devices are not supported by this software release. VEST 7.8 not sold for commercial use.

## VEST 7.9 and I-Portal 5.2

### Key Changes:

- 1.1 Implementation of screen off and on displays to control Gaze and Spontaneous Nystagmus timing for devices where screens have a lag in turning off and on.
- 1.2 Error handling during acquisition combines multiple acquisition warnings and errors
- 1.3 Previous analysis check boxes replaced with Cancel and Done buttons.
- 1.4 Redesigned the License Manager to allow more versatile licensing control.
- 1.5 Removal of Smooth Pursuit interpolation position from analysis.

### Research Changes:

- 2.1 Inclusion of signal quality estimation via the Raw Signal Validity feature to measure signal “noisiness” metrics of each data point during eye movement.
- 2.2 For both Vergence types (Pursuit and Step), the representation of depth is a known horizontal offset to the horizontal position.
- 2.3 New artifact detection based RSV for Smooth Pursuit, Vergence Pursuit, Vergence Step, Gaze Horizontal and Vertical, Spontaneous Nystagmus, Saccades, Predictive Saccades and Reaction Time.
- 2.4 Implementation of Vertical and Horizontal OKN tests.
- 2.5 Light Reflex analysis can calculate the AreaUnderFit up to 100% brightness.
- 2.6 Improvement of Sync Indicator malfunctions and production for the I-PAS screen stimulus.

**NOTE:** SVNG and NOTC devices are not supported by this software release. VEST 7.8 not sold for commercial use.

## VEST 8.0 and I-Portal® 5.3

### Key Changes:

<sup>†</sup> Pending FDA clearance, requires IRB

- 1.1 Reduction in workflow complexity and execution time (data is auto accepted)
- 1.2 <sup>†</sup>Reduction of data signal noise and artifacts, and identification of possible user errors, both to further improve clinical accuracy and consistency
- 1.3 I-PAS™ approved for clinical use as a nystagmograph for 14 tests. Some tests remain investigational.
- 1.4 <sup>†</sup>Added classic VNG tests to I-PAS™ (I-Portal Portable Assessment System): Caloric, Positional, Positioning, Custom Test, Calibration – Manual
- 1.5 <sup>†</sup>Data validation and optimizations implemented for the following tests:
  - a) Clinical (previously cleared tests): Calibration, Smooth Pursuit, OKN, Saccades, Gaze, Spontaneous Nystagmus, Chair Sine
  - b) Research (Investigational Device tests): Predictive Saccades\*, Anti-Saccades\*, Saccades and Reaction Time\*, Auditory and Visual Reaction Time\*
  - c) Research (Investigational Device tests): Vergence Step\* and Pursuit\*, Self-Paced Saccades\*
- 1.6 Caloric summary page shows unilateral weakness (RVR), directional preponderance, asymmetry, caloric response graphs (butterfly graphs), and results table for cumulative tests run in a session.
- 1.7 Indications to the operator at acquisition time of the need to re-run poor tests, based on the result of data quality evaluation
- 1.8 Detection and removal of artifacts (blinks) and regions of poorly recorded data with the stability for the clinician to undo removal
- 1.9 <sup>†</sup>Video Head Impulse Test (vHIT): provides functional analysis similar to previous VEST™ crHIT analysis
  - a) Detect and segment impulses
  - b) Calculate eye/stimulus gain and asymmetry
- 1.10 Improved Pulse Step Sine (PSS) acquisition and analysis.

**NOTE:** Only I-PAS™ and SVNG3 are supported by this release.

### **VEST 8.0.1 and I-Portal® 6.0**

#### Key Changes:

- 1.1 Prior versions have not supported National Instruments Data Acquisition (NI-DAQ) hardware based systems. This functionality was restored to NOTC, SVNG1 and SVNG2 systems, and is now merged into a more advanced and flexible code base for clinical use.
- 1.2 NOTC acquisition and analysis were improved such that the UC crash should no longer occur.
- 1.3 Full functional support of data acquisition at 250 Hz for NOTC, SVNG1 and SVNG2.
- 1.4 Abnormal system termination of VEST during Unilateral Centrifugation test is corrected.
- 1.5 NKI logo is changed throughout the software.

#### Research Changes:

- 2.1 The vHIT test has undergone further improvements and modifications.

### **VEST 8.0.2 and I-Portal 6.0**

#### Key Changes:

*Pending FDA clearance, anticipated in this release*

1. Analysis optimization, artifact detection, signal validation, and analysis validation features implemented previously are being made available.
2. The false positive detection rate of RSV is fixed.
3. Artifact detection and data validation is added for chair tests and Caloric/Positional type tests (Chair sine, step test, CustomTest, Positional, Positioning, Caloric).
4. Step test RSV is calculated using only the vertical eye position signal.
5. Added data validation, artifact detection, and auto eye selection as needed.
6. I-Portal automatic threshold is being made available for all systems.
7. The region of interest (ROI) defaults to centering on the pupil during test initiation. This feature is available for all systems.
8. Smooth Pursuit initiation latency is enabled for all systems.
9. Cybersecurity features are now documented in the Operations Manual. Users are advised to familiarize themselves with cybersecurity risks and mitigations for the I-Portal® systems.

### **VEST 8.0.3 and I-Portal 6.0.1**

#### Key Changes:

1. Vest 8.0.3 is intended for use only on I-PAS systems, it will analyze other systems' data with a warning message.
2. I-PAS now only supports resolutions of 1920x1080, and 1440x2560 (added with this release).
3. For SVV/SVH tests, in order to analyze only data where the head was near vertical (not tilted to one side or the other), SVV and SVH responses with deviations in the Roll axis will be filtered out based on a new Roll Angle Limits control.
4. The analysis fields for which substantial equivalence between NOTC and I-PAS was not established are not displayed in the analysis and are not saved into Results Database and reports. Fields affected:
  - a. Smooth pursuit velocity and position phase
  - b. OKN fast phase
5. Indication in I-PAS operations manual that separate norms are required for I-PAS for SVV/SVH relative to other devices.
6. Fixed reports, where manually analyzed tests showed auto analyzed data from other tests of same type.
7. New version of I-Portal:
  - a. Independent vertical ROI sizes
  - b. Splash screen with version and license manager

- c. Adjustments for camera exposure
- d. Full frame ROI independent for left and right
8. Other bug fixes and implementations to ensure system efficacy, safety, or regulatory compliance.

#### **VEST™ 8.1 and I-Portal® 6.1**

1. VEST™ 8.1.0 and I-Portal® 6.1 upgraded to LabView 2017.
2. I-PAS™ systems are now released with a quick start guide detailing important steps for initial set up and operation of the system.

#### Test Setup & Testing:

3. Audio instructions are available for testing and can be automatically played during the test session (also referred to as acquisition). This feature can be disabled or customized.
4. Deleting a patient from the Database Management interface in VEST™ will delete all test sessions and analysis records from the Results database that correspond to that patient.
5. During acquisition, VEST™ offers a tab for sensor alignment. This interface allows the user to accommodate any error or bias in the sensor at the start of acquisition.
6. Inter-pupillary distance (IPD) is entered in mm instead of cm. Millimeter values outside a reasonable range are prevented during patient entry.
7. Tests can be blocked to “auto-run”, meaning that the next test is executed immediately after the successful completion of the preceding test.
8. The appearance of the test selection list during a test session has been changed to be an open list, with visible indications of tests run as well as tests that auto start (run in blocks).
9. The RAM Drive that is used for temporarily storing video files during acquisition is no longer cleared by VEST™. Clearing of the RAM Drive is performed by I-Portal® at the start of a test where video is recorded. Specifically, at that time, files called “Video\_L.avi” and “Video.avi” are cleared from the drive specified by I-Portal’s configuration file.
10. The folder location for protocols can be specified in the VEST™ Settings.ini file.
11. Running a calibration with an up position of 0 degrees no longer causes an error during I-Portal® connection.

#### Analysis:

##### SVV/SVH:

12. In SVV/SVH tests, SVV and SVH responses with deviations in the Roll axis will be filtered out based on a new Roll Angle Limits control.
13. Previous versions of the SVV/SVH analysis wrote NaN (9999999) into the database segment tables for deleted segments. Now the analysis writes the actual angle error, and indicates deletion and Roll Limits filtering by a pair of flags written into the segment record.
14. Previous versions of SVV/SVH tests generated results of -0.0 when there were no valid cases. Now a value of "Not a Number" or NaN is produced instead.
15. Previous versions of SVV/SVH tests showed lines that appeared as normative data limits near -10 and 10 degrees, when there were no norms specified. These lines no longer appear on newly analyzed SVV/SVH tests.

##### Other:

16. Analysis has a new option to view results for the same patient across multiple sessions. This features uses previously analyzed results stored in the Results database.
17. Caloric analysis computes ASPVs (and Peak SPVs) by analyzing only nystagmus beats that are completely inside a Window region (not crossing the Window border). This region is initially marked deleted, but can be undeleted by the clinician.
18. Cancel buttons on analysis modules prevent analyzed data for the cancelled analysis from going into reports.
19. In Positional and Positioning tests, average slow phase velocity (ASPV) values on the Windows tabs of analysis screens are calculated identically to the ASPV results shown in the Results tab (upper

right). For Custom Test, the Horizontal, Vertical, and Torsional ASPVs will now match the Results tab values.

20. OKN Fast Phase analysis is now available on I-PAS systems.

#### Reports:

21. The Results database now contains database Views, which are virtual tables created by SQL queries. These views exist for multiple VEST™ test tables that are present in the Results database.
22. Mean latency, mean accuracy, and mean final accuracy now appear on Saccades reports.
23. Peak Velocity fit curves (for the Main Sequence graph) and area under the Main Sequence fit both appear on Saccades reports.
24. Report data for auto-analyzed tests (e.g. during acquisition) no longer appear in the compiled report data for manually analyzed tests of the same type (Smooth Pursuit, OKN, Caloric, Chair Sine, Step Test).

#### New Features:

25. Several features that were previously restricted to research-only systems are now available on all systems, including systems for clinical use.
  - a. **Artifact Detection:** The modified software performs initial automatic artifact detection on many test types, identifying and marking regions of poor quality data. This helps the clinician by removing noise and poorly recorded data from analysis, increasing the potential accuracy of the results. For more information, refer to the User Manual, Section 2- Operations, under the topic “Data Validation During Acquisition & Analysis”.
  - b. **Data and Analysis Validity Checking:** The modified software performs a preliminary analysis immediately following data acquisition (on I-PAS and SVNG3 systems), and alerts the operator regarding the validity of the analysis results. On these system types (and some tests), the modified software also informs the operator of signal quality at acquisition time, i.e. whether the acquired patient data are of sufficient quality to perform reliable analyses. This feature improves overall data acquisition and analysis, and saves time by allowing the clinician to re-run a test immediately without the need to schedule a new patient visit. For more information, refer to the User Manual, Section 2- Operations, under the topic “Data Validation During Acquisition & Analysis”.
  - c. **Automatic Eye Selection:** For most tests that use Left, Right, or Combined eye data, the modified software initially evaluates the raw eye trace data (during the first analysis of the data) to determine if one of the two eye traces is reliably better than the other. In those cases, the better of the two traces is selected as the default. For more information, refer to the User Manual, Section 2- Operations, under the topic “Default Parameter Setting(s)”.
  - d. **OKN Default Parameter Optimization:** Analysis of the Optokinetic Nystagmus tests has two improvements: First, the beat detection threshold (which determines how nystagmus beats are identified) is automatically selected to a value that better reflects the patient’s nystagmus features. Second, the starting value of the OKN velocity filter is set to a value appropriate for the stimulus velocity. These features also improve analysis quality and save time by reducing the amount of adjustment needed for these parameters, since they now start at values that are closer to optimal. For more information, refer to the User Manual, Section 2- Operations, under the topic “Default Parameter Setting(s)”.
  - e. **Automatic Pupil Detection:** The 6.0 version of the I-Portal® software will determine and continually update the brightness threshold for enhanced pupil edge location. Using this

information, the software generates recommended thresholds and displays them to the operator along with the resulting pupil edge locations. This feature improves analysis quality and saves time by removing the need [for most patients] to manually adjust the pupil detection threshold by trial and error. For more information, refer to the User Manual, Section 2- Operations, under the topic “VOG Setup”.

## **VEST™ 8.2 and I-Portal® 6.2**

### **For all I-Portal® Systems:**

- I-Portal® NOTC (Neurotologic Test Center)
  - I-Portal® SVNG, I-Portal® VNG (Video Nystagmograph)
  - I-PAS™ (I-Portal® Portable Assessment System)
1. The user can now select which voice prompts are played during testing. For example, prompts can now be disabled while still having test names or instructions played.
  2. NEW efficiency feature that allows one to group tests marked ‘auto-run,’ when marked this way, the tests so grouped execute immediately after the successful acquisition of the test preceding it, cutting test time.
    - **NOTE:** Tests that involve movement of the chair on the NOTC device will not have an auto run capability. Additional tests that will not have “auto-run” functionality are: Positional, Positioning, Caloric, Custom Test, Subjective Visual Vertical and Horizontal.
  3. Progress bar, displayed while each test is running and showing how much time is left for a given test, now functions for all tests.
  4. Smooth Pursuit:
    - Smooth Pursuit records in the Results database (in the tables ‘Results\_SmoothPursuitHorizontal’ and ‘Results\_SmoothPursuitVertical’) now write the original protocol’s amplitude and frequency into the record’s fields.
    - The Directional Average Cycle analysis now also displays time (X-axis) correctly for data acquired at rates other than 100 Hz.
  5. Caloric Test: the name now also displays the side and temperature, e.g., ‘Caloric Test – [Side] Ear [Temp]’.
  6. Gaze and Spontaneous Nystagmus tests: now filter beats based on the Beat Length. Default settings for the control are now a minimum of 0ms and a maximum of 5,000ms. User is free to edit default settings for this control.
  7. ‘Save Video Segment’:
    - Optimized to run approximately 10-20% faster.
    - Creates only one video showing both eyes as well as the data graph.
  8. Videos can now be recorded at different integer multiples of the original frame rate. For example, instead of 100 fps, frame rates of 50, 33, and 25 can be specified, potentially decreasing the demand for file storage.
  9. Errors: A simple sound replaces the voice feedback when errors occur during acquisition.
  10. Custom Test: Motion sensor feedback, both head position and velocity, are displayed against their complementary eye position or velocity data in the analysis.
  11. Patient Name or Patient ID: The user may now select which is displayed on the report summary page.
  12. Import Utility: A manual is available regarding procedures for transferring data from one I-Portal® system to another titled “Import Utility”, Please ask any NKI representative for a copy.

### **For Select I-Portal® NOTC Models:**

1. Maximum acceleration limits are enforced on the following tests in the ‘Protocol Editor’:
  - Step Test – 600 deg/sec<sup>2</sup>
  - Sinusoidal Test (SHA, Visual Enhancement, Suppression) – 800 deg/sec<sup>2</sup> crHIT – 1,200 deg/sec<sup>2</sup>.
2. Unilateral Centrifugation (UCF):

- UCF start time on a UC-SVV can be skipped with the UCF Start Button, similar to the standard UC test (once the Ramp Up phase has ended, a UCF Start button is shown, and when clicked this will skip the rest of the 'Wait for UCF' state).
- UCF test analyses acquired on older versions of VEST™ (pre VEST™ 7.5.2) will show a shift in the GIA waveform during analysis in this version relative to previous software versions.
- In UC Analysis: Overall Average Gain and Average Gain results will be calculated immediately upon opening the UC test in Analysis.
- Reports can now be generated for Custom Unilateral Centrifugation tests (similar to Unilateral Centrifugation-SVV tests in content and format).

### 3. Step Test:

- Users can filter beats by beat length in analysis.
- Eye Velocity Time Constant graph was previously mislabeled on the Report. It now reads "Acc.CCW/Dec.CW" on the left (this was previously correct) and "Acc.CW/Dec.CCW" on the right (this is a correction). This graph in analysis was correct and remains unchanged.
- Data analyzed in VEST 8.0.2, may not analyze the same as earlier VEST versions (segmentation and data alignment differ across versions). While data analysis for Step Test was consistent within 8.0.2, the same data, when re-analyzed or previously analyzed on earlier versions, may produce significantly different results from 8.0.2 analysis results. This problem has been corrected such that 8.2 analysis results will match those resulting from all versions other than 8.0.2.

### 4. Chair Sine Tests:

- Deleted areas in motion tests (including Sine (SHA) Enhancement, Suppression, and Visual Vestibular Interaction) now remain on the correct data segments when data are shifted with the "Acceleration Cycles Threshold" control.
- The results of Visual Vestibular Interaction analyses are now saved in the Results database (similar to other Chair Sine test types, including Suppression and Enhancement) in a table named 'Results\_VisualVestibularInteraction.'

### **For Customers with EOG Devices:**

1. An entirely new interface for EOG has been developed called 'I-Portal® EOG.' The VEST™ software will still connect to this new application via the same protocol and operation steps that it uses to connect to I-Portal® VOG.

### **For Customers with Research Only Tests:**

1. Anti-saccades Analysis: Grand Means now computes means without invalid values.
2. Predictive Saccades Analysis:
3. Average Accuracy (%) and Average Final Accuracy (%) for are no longer displayed as raw values, but instead as percentages.
4. "Initiation of Predictable Pattern at Saccade Number" is saved as part of the analysis settings for the test. Changing this control during analysis now correctly prompts a re-analysis of data.
5. Light Reflex analysis in previous versions did not save filter settings for the first analysis of a given test. Light Reflex analysis will now save settings and display data with the saved filter settings.
6. Vergence Step Analysis: Smoothing filter is now available and the values of the fields can be saved between analyses. To re-create analyses done in previous versions, reload any Vergence Step case and re-apply the smoothing filter as appropriate.

Revised 08/25/2019