

Reference Manual

uLog

Version 3.5

Noldus
Information Technology

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1 Introduction

WHAT IS ULOG?

uLog is a tool for automatic recording of user-computer interaction. With uLog you can log basic computer events such as mouse clicks, scrolling, activating windows and typing words. It creates .odx log files that can be imported into The Observer XT, synchronized with manually scored events and other data, and analyzed in this program.

Logging computer events can be started and stopped manually, but you can also control uLog with commands from The Observer XT. This allows easy synchronization of logged events with manually scored events in The Observer XT.

The following computer events are logged with uLog.

- Key presses.
- Strings, which are a sequence of related characters, like words.
- Special keys like **Ctrl** and **Alt**.
- Combinations of keys with special keys like **Ctrl + S**.
- Mouse clicks and double-clicks.
- Mouse drags.
- Position of mouse clicks, double-clicks and drags.
- Mouse wheel turns.
- Starting and closing applications.
- Windows activated.
- Message boxes activated.



Please note that uLog logs all keyboard and mouse activity, so also typed passwords. Please make sure your test participants are aware of this before you start the test.

Special keys that require double key presses like ' or ~ may not be logged properly with some keyboard layouts. Change the keyboard layout if you notice this. To do so choose **Control Panel > Region and Language > Keyboards and Languages**. Click **Change keyboards** and choose another one from the list.

INFORMATION ABOUT THE OBSERVER XT

uLog 3.5 is supported with The Observer XT 12.5 or higher. We assume that you are familiar with the procedures of The Observer XT. The Observer XT Help can be accessed with the shortcut on the desktop of computer with The Observer XT. It is also available on The Observer XT installation USB stick. Copy the folder to your computer and open the file **Index.html**. You can download all documentation for The Observer XT and uLog on www.noldus.com/downloads.

2 Installation

REQUIREMENTS

uLog 3.5 was tested with The Observer XT 14 on computers with the 64-bit Professional editions of Windows 7 (Service Pack 1) and Windows 10. It was tested with the US English language pack. It is possible that certain local language versions of Windows may affect how well the program runs.

INSTALLATION

To install uLog:

1. Insert the uLog USB stick into a USB port of your computer on which you want to log the computer events.
2. Copy the file **uLogInstaller.exe** to a location on the PC where you want to start uLog from.
3. Double-click the file **uLogInstaller.exe** to install uLog. This creates a folder **uLog** with the program file **uLog.exe**. Note this location, because this is where you start the program from. Alternatively, right-click the file **uLog.exe** and choose **Send to > Desktop (create shortcut)**.

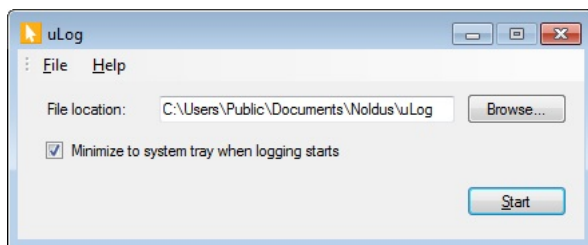
It also creates a folder uLog in the folder **C:\Users\Public\Public Documents\Noldus\uLog**. This is the default location where the log files are stored.

3 Logging

You can start and stop uLog manually on the test PC. Alternatively, you can start and stop uLog with commands from The Observer XT. If uLog runs on another computer than The Observer XT, you need the program PsExec (see page 12) to send commands from the computer with The Observer XT to the computer with uLog.

START AND STOP ULOG MANUALLY


1. Double-click the file **uLog.exe** in the folder **uLog** that was created during installation (see step 2 on page 6).
2. Optionally, change the folder where uLog saves its log files in the **File location** field.



3. Optionally, select the checkbox **Minimize to system tray when logging starts**. This removes the **uLog** window from the screen of the test computer when the test starts.
4. Click **Start**.
5. When the test ends, click the arrow in the bottom right corner of the screen, to open the system tray.
6. Double-click the **uLog** icon.
7. Click **Stop**.



Import the log files into The Observer XT


1. Copy the **.odx** file from the folder you set in step 2 on page 7 to the computer with The Observer XT.
2. On the computer with The Observer XT, open the project and then the observation into which you want to import the log file. If you do not have an observation yet, see the note below.
3. Click the **Import data** button on the tool bar and select **Import Observational data**. 
4. Locate the **.odx** file and click **Import**.
5. In the window that appears select **Yes import new coding scheme elements**. The log file is now imported as a new observation.



If you do not have an observation yet, choose **File > Import > Observational Data** and continue with step 4 above. The log file is imported as a new observation.

Synchronization

If you did not start logging at exactly the same time as you started the observation, you need to synchronize the log file with the observation. Do so in the following way:

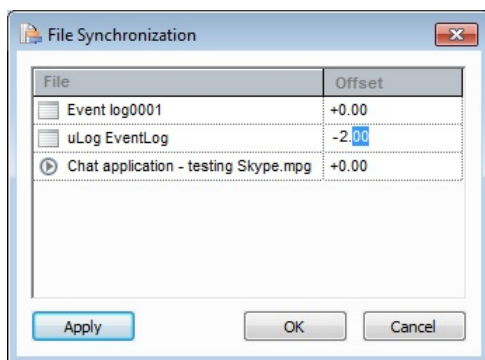
1. Click the **Offset** button on the Component tool bar, then choose **Numerical Offset**. 

Result – The **File Synchronization** window appears.

This window lists the event log currently open, the video files and the imported uLog data.

2. Locate the data set (event, video, uLog data) of which you want to change the synchronization point relative to others, and click the **Offset** cell.

3. Enter the offset value.



Example – If you started logging two seconds before the Event Log started, enter an offset of -2 for the uLog Event Log.

4. Click **Apply**.



For more information on synchronizing, see **Synchronize data sets** in **Carry out an Observation** in The Observer XT Help.

START AND STOP ULOG WITH THE OBSERVER XT

You can send commands from The Observer XT to start uLog when you create a new observation and to start and stop logging automatically when you start and stop an observation. To do so, select **uLog.exe** as external program and specify which command you want to use. This program is present in the folder **uLog** that was created during installation (see step 2 on page 6).

The following commands are available:

- **No parameter or /E** — Starts uLog.
- **/R** — Starts logging.
- **/S** — Stops logging.
- **/X** — Closes uLog.



Opening uLog requires time. When a command “Start logging” is sent before uLog is open, logging does not start. So make sure uLog is open when you start an observation.

Settings in The Observer XT

1. In The Observer XT, choose **Setup >Project Setup**.
2. Under **Observation Source**, select **Live Observation**. The **Devices** window opens. If not, click the **Devices** button.
3. Click the **Add External Program** button. In the **Add External Program** window that opens, under **Name**, type in a name for the commands (only for viewing purposes). For example, *Control uLog*.
4. Select the checkbox next to **New Observation**.
5. In the same row, click the ellipsis button and browse to the file **uLog.exe**.



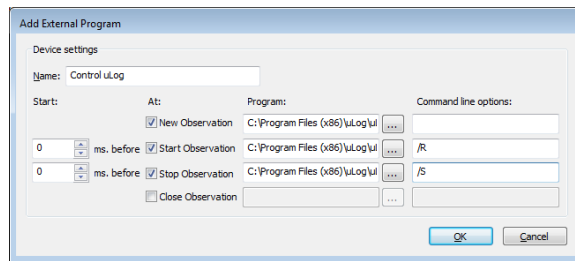
6. In the same row, leave the space under **Command line options** empty. You can also type the command **/E** in this field. This results in The Observer XT starting uLog when creating a new observation.
7. Select the checkbox next to **Start observation**.
8. In the same row, click the ellipsis button and browse to the file **uLog.exe**.
9. In the same row, under **Command line options**, type the command **/R**. This way recording starts when you start an observation in The Observer XT.

10. Select the checkbox next to **Stop observation**.
11. In the same row, click the ellipsis button and browse to the file **uLog.exe**.
12. In the same row, under **Command line options**, type the command **/S**. This way recording stops when you stop an observation in The Observer XT.



Enter the delay to start uLog in the **ms before** fields. This way the uLog log file will be synchronous with the observation in The Observer XT. See **Delay** on page 12 how to determine this delay.

The **Add External Program** window will look like this:



13. Click **OK**. A new row *Control uLog* appears in the **Devices** window. You can now start observing in The Observer XT. uLog opens when you create a new observation and logging starts and stops when you start and stop an observation.
14. Import the log file in the observation. See **Import the log files into The Observer XT** on page 8 for the procedure. If you set the delay correctly in the **ms. before** fields of the **Add External Program** window (see **Delay** below), the uLog events are synchronized with the manually scored events of The Observer XT.

Delay

To assess the delay between the start of the observation and the moment uLog starts logging, define a behavior with a keycode. Press this key during the observation in The Observer XT while simultaneously logging with uLog. When you press this key, this event is recorded in The Observer XT and also in the log file. Import the log file into The Observer XT and calculate the offset from the difference between time stamps in milliseconds for this event. Enter this value in the **ms, before** fields in the **Add External Programs** window (see **Settings in The Observer XT** on page 10).

If you of make a video recording of the observation with Media Recorder as well, make a recording where the camera points at your keyboard. When you press a key for an event, the event is recorded in The Observer XT event log, the video and in the log file. You can then visualize video and event data to estimate the time difference between the event recorded, the key logged and the corresponding video footage when the key was pressed. Synchronize the video with the logged events (see **Synchronization** on page 8).

START AND STOP ULOG WITH THE OBSERVER XT ON ANOTHER COMPUTER

Psexec

Psexec is a light-weight program that allows you to execute processes on a remote computer. The program allows you to access the command-prompt of the remote computer. With PsExec you can start uLog on one computer with The Observer XT on another computer.

Psexec is part of the PsTools suite from Microsoft Corporation. A full description of the PsExec commands does not belong to the scope of this document. For a complete overview go to <http://technet.microsoft.com/en-us/sysinternals/bb897553.aspx>

Installation

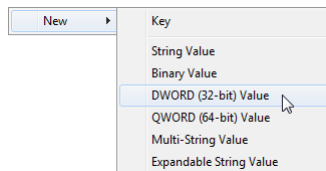
To install PsExec, go to the website <http://technet.microsoft.com/en-us/sysinternals/bb897553.aspx> and click **Download PsTools**. Locate the

downloaded zip-folder with Windows Explorer and open it. Double-click **PsExec** and choose **Extract all**. Browse to the location where you want to store the executable and click **Extract**. The program is copied to the specified location on your computer.

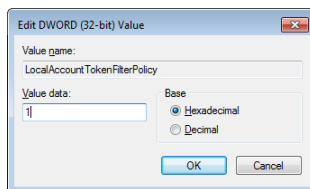
Registry entry

To ensure you connect to the remote computer as a full administrator, you must add a key to the registry of both computers. To do so:

- **Windows 7** — open the **Start** menu and type **regedit** in the **Search programs and files** field. Then click the program **regedit.exe**.
 - **Windows 10** — type **regedit** in the **Start** window with tiles and right-click the **regedit** app and run it as administrator.
1. Browse to
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System.
 2. Right-click in the right field and select **New** and then **DWORD Value**.



3. Name the registry entry **LocalAccountTokenFilterPolicy**.
4. Right-click the entry and select **Modify**. In the **Edit DWORD Value** window that appears enter **1** in the field under **Value data**:



5. Click **OK** and close all windows.



More information about this registry entry can be found on <http://support.microsoft.com/kb/951016>

Firewall

Some anti-virus scanners report that one or more of the tools are infected with a "remote admin" virus. None of the PsTools contain viruses, but they have been used by viruses, which is why they trigger virus notifications. You may need to create an exception for PsExec in the firewall or virus scanner of both computers. The procedure to create an exception in Windows Firewall is described below. If you have another firewall, consult its manual for the correct procedure.

1. Open the **Control Panel** and click **(System and Security/) Windows (Defender) Firewall**.
2. Click **Allow a program or feature through Windows (Defender) Firewall**.
3. Click **Change Settings** at the top of the page.

On the computer with PsExec:

4. Click **Allow another app**, browse to **PsExec.exe** and click **Add**.
5. Select all checkboxes next to **Execute processes remotely**. Then click **OK** and close the Control Panel.

Allow programs to communicate through Windows Firewall

To add, change, or remove allowed programs and ports, click Change settings.

What are the risks of allowing a program to communicate?

Change settings

For your security, some settings are managed by your system administrator.

Allowed programs and features:

Name	Domain	Home/Work (Pri...	Public	Group Policy
<input checked="" type="checkbox"/> Execute processes remotely	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	No

On the computer with The Observer XT:

6. Select all checkboxes next to **Remote Service Management**. Then close the Control panel.

If PsExec still does not work properly, you may disable the firewall or anti-virus scanner completely on the remote computer during the time PsExec is used. The procedure to disable Windows (Defender) Firewall is described below. If you have another firewall or virus scanning application, consult its manual for information on how to disable it.

1. Open the **Control Panel** and open **Windows FireWall**
2. Click **Turn Windows FireWall on or off**.
3. Select **Turn off Windows Firewall (not recommended)** for all networks.

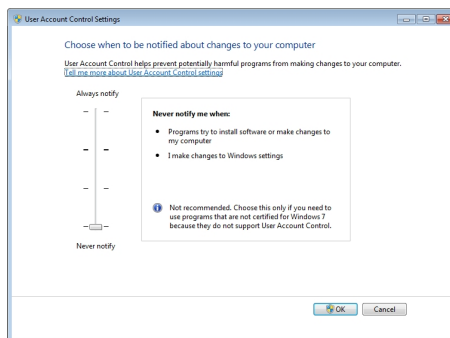


Remember to turn the FireWall on again after you finished working with PsExec.

User Account Control settings

If PsExec does not work, although you followed the procedure above and disabled the firewall as well (see page 14), adjust the **User Account Control Settings**. To do so:

1. Open the **Control Panel** and click **User Accounts**.
2. Click **Change User Account Control Settings**.
3. Move the slider completely towards **Never notify**.



4. Click **OK** and close the Control Panel. Now restart the computer.

User Account

If PsExec still does not work, although you followed all the steps above, let your system administrator create a new user account with administrator rights on the computer with uLog. Log on with this new user account.

Settings in The Observer XT

1. Open The Observer XT.
2. In The Observer XT, choose **Setup >Project Setup**.
3. Under **Observation Source**, select **Live Observation**. The **Devices** window opens. If not, click the **Devices** button.
4. Click the **Add External Program** button. In the **Add External Program** window that opens:
 - a In the field next to **Name**, type in a name for the commands (only for viewing purposes). For example, *Control uLog*.
 - b Select the checkbox next to **New Observation**. In the same row: browse to the program **PsExec.exe** and type the following command in the field under **Command line options**:
`-d -i -s \\remote-computer -u username -p password "location ulog.exe"`
 - c Select the checkbox next to **Start Observation**. In the same row: browse to the program **PsExec.exe** and type the following command in the field under **Command line options**:
`-d -i -s \\remote-computer -u username -p password "location ulog.exe" /R`
Enter the delay to start uLog in the field next to **ms, before** (See **Delay** on page 12).
 - d Select the checkbox next to **Stop Observation**. In the same row: browse to the program **PsExec.exe** and type the following command in the field under **Command line options**:
`-d -i -s \\remote-computer -u username -p password "location ulog.exe" /S`

Enter the delay to start uLog in the field next to **ms, before** (See **Delay** on page 12).



“location *uLog.exe*” is the path to the program file **uLog.exe**. This path depends on the folder in which you installed uLog (see step 2 on page 6) and can be, for example, “**C:\Program Files (x86)\uLog\uLog.exe**”.

The **Add External Program** window will look like this.

5. Click **OK**. A new row *Control uLog* appears in the **Devices** window. You can now start observing in The Observer XT. uLog opens when you create a new observation and logging starts and stops when you start and stop an observation.
6. Import the log file into the observation. See **Import the log files into The Observer XT** on page 8 for the procedure. If you set the delay correctly in the **ms, before** fields of the **Add External Program** window (see **Delay** on page 12), the uLog events are synchronized with the manually scored events of The Observer XT.

4 uLog data in The Observer XT

CODING SCHEME

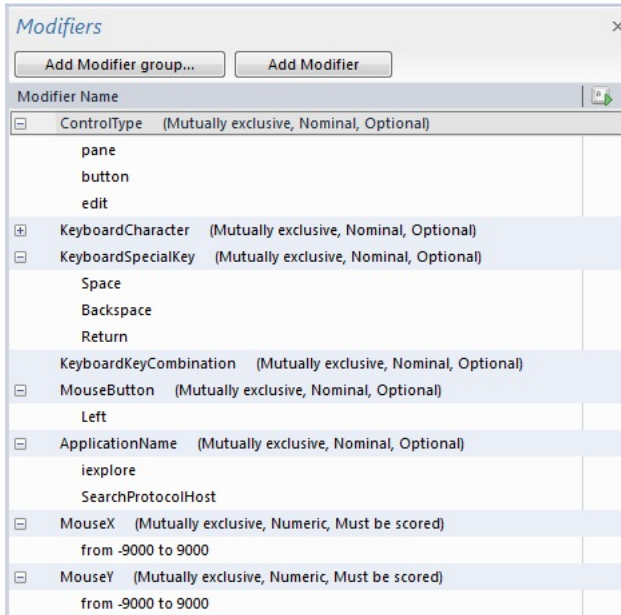
Only uLog events that have been logged are added to the coding scheme when a log file is imported in The Observer XT. Three different event types are added as mutually exclusive behavior groups:

- **Mouse events** – With the mouse clicks, double-clicks, hovering, mousewheel turns and mouse drags as point events.
- **Keyboard events** – With the characters and keys typed as point events. This group also contains the behavior **String**, which combines the key presses separated by a pressing a special key, like the space bar, enter key, or backspace key, to words.
- **Other events** – With events like starting and stopping applications, activation of windows and browsing behavior.

Behaviors			
Add Behavior group...		Add Behavior	
Behavior Name		Behavior Type	Modifiers
☐ Mouse events (Mutually exclusive)			
Mouse click		Point Event	MouseX, MouseY, ControlType, MouseButton
Mouse doubleclick		Point Event	MouseX, MouseY, ControlType, MouseButton
Mouse hover		Point Event	ControlType
Mousewheel turn		Point Event	ControlType
Mouse drag		Point Event	<Click here to add Modifier groups>
☐ Keyboard events (Mutually exclusive)			
Character		Point Event	KeyboardCharacter
Special key		Point Event	KeyboardSpecialKey
String		Point Event	<Click here to add Modifier groups>
Key combination		Point Event	KeyboardKeyCombination
☐ Other events (Mutually exclusive)			
Focus changed		Point Event	ControlType, TargetControlType
Window activated		Point Event	<Click here to add Modifier groups>
Browser URL chang...		Point Event	ApplicationName
MessageBox activat...		Point Event	<Click here to add Modifier groups>
Application started		Point Event	ApplicationName
Application exited		Point Event	ApplicationName

The Coding Scheme also contains a number of modifier groups:

- **ControlType** – Linked to the behaviors **Mouse click**, **Mouse doubleclick**, **Mouse hover**, **Mousewheel turn** and **Focus changed**. This modifier specifies, for example, where a mouse click took place. The individual modifiers are:
 - List
 - Edit
 - Tabitem
 - Combobox
 - Pane
 - Window
 - Button
- **KeyboardCharacters** – That contains the logged characters.
- **KeyboardSpecialKey** – That contains the special keys:
 - Backspace
 - Arrow
 - Return
 - Space
 - Alt key with Numpad keys
- **KeyboardKeyCombination** – That contains the key combinations like **Ctrl + S**, or **Ctrl + A**.
- **MouseButton** – Which button is used, left, right, or middle.
- **ApplicationName** – Which application is opened, or closed.
- **MouseX** – The X coordinate in pixels of the mouse event starting from the left side of your screen.
- **MouseY** – The Y coordinate in pixels of the mouse event starting from the upper side of your screen.



The name of applications and web pages in which events took place and typed text are imported as comments in the Event Log.

EVENTS IN EVENT LOG

The figure below shows an example how the events are shown in the Event Log.

- **0.00** – Activation of the uLog window.
- **1.60** – Another window is activated.
- **2.23** – The application Internet Explorer starts.
- **2.36** – The Internet Explorer window is activated.
- **3.04** – A tab is opened in Internet Explorer.

- **4.32** – Click of the left mouse button to edit the address field of Internet Explorer, that currently contains the address `www.noldus.com`. The coordinates of the mouse click are measured from the top-left corner of your screen. The coordinates are 430 pixels from the left and 38 pixels from the top.
- **5.66-8.59** – `www.google.com` is typed in the address field of Internet Explorer.
- **9.33** – The **Return** key is pressed and the string `www.google.com` is logged.

Time	Behavior	Modifier	Comment
0.00	Start		
0.00	Window activated		uLog
1.65	Window activated		
2.23	Application started	iexplore	
2.36	Window activated		Internet Explorer
3.04	Application started	iexplore	
4.32	Mouse click	430 38 edit Left	edit : http://www.noldus.com/ ;
5.66	Character	w	
5.83	Character	w	
6.09	Character	w	
6.38	Character	.	
6.84	Character	g	
7.06	Character	o	
7.24	Character	o	
7.44	Character	g	
7.73	Character	l	
7.93	Character	e	
8.03	Character	.	
8.24	Character	c	
8.38	Character	o	
8.59	Character	m	
9.33	String		www.google.com
9.33	Special key	Return	

A Technical Support

Noldus Help Desk

If you have any problems, questions, remarks or comments, please let us know. You can contact us on our website (www.noldus.com) and fill out a Support Request Form (preferred), or phone. We offer 24 hour support via help desks in different time zones. You can also contact us via the uLog program. From the **Help** menu choose **Noldus Online** and subsequently **Contact Help Desk**.

Before you contact the help desk, please have the following information available so our support staff can help you as quickly as possible. To find this information, go to the **Help** menu and select **About uLog**:

- The version number of your copy of uLog.
- The name of the registered user of The Observer XT (choose **Help** > **License Info** in The Observer XT).

Please refer to the **About Noldus - Contact** section on our website (www.noldus.com) for other contact information.

Error messages

All error messages are displayed in a **Critical Message** box. The error is displayed and, if possible, a solution. Whenever such an error occurs, a log file is created called uLog.log. The Technical Support Department may request this file when answering your support question. You can locate the file in:

C:\Users\Public\Public Documents\uLog\Log.

B End-User License Agreement

IMPORTANT – READ CAREFULLY. Please read this End-User License Agreement ("EULA") carefully before checking the "Accept" checkbox, downloading or using the Software (as defined below). By checking the "Accept" checkbox, downloading, installing or otherwise using the Software, End-User agrees to be bound by the terms and conditions of this EULA. If you do not agree to the terms and conditions of this EULA, do not check the "Accept" checkbox and do not download, install or use the Software.

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http://www.noldus.com/legal/noldus_corporate.pdf.

1.6. **Security System:** a system of software protection to limit installation and use of the Software to the authorized End-Users and computers.

1.7. **Security Device:** a device that forms part of or is attached to the computer, and is used as part of the Security System to control access to the Software.

1.8. **Software:** the software (including, but not limited to, any updates, upgrades and associated media, printed or electronic documentation and online services) provided to the End-User by Noldus or an Authorized Partner together with this EULA, that is not covered by third party terms and conditions and is included in the list under “Noldus software” in the Annex to the General Terms and Conditions (http://www.noldus.com/legal/noldus_gtc.pdf).

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3.3. End-User may, from time to time, provide Noldus with comments, suggestions, data, information or feedback ("**Feedback**") on the Software. End-User acknowledges and agrees that such Feedback may be freely used by Noldus, at its sole discretion, for the design, development, improvement, marketing and commercialization of its products and services, without any restrictions based on confidentiality or intellectual property rights.

4. TRANSFER

4.1. End-User is entitled to make a one-time, permanent transfer of this EULA and Software only directly to one other End-User. This transfer must include all of the Software (including all component parts, the media and printed materials, any upgrades and this EULA). Such transfer may not be by way of consignment or any other indirect transfer and shall be subject to the following provisions:

- a. End-User will provide to Noldus prior to any such transfer the full name and address details of the new End-User and the expected date of transfer in writing;
- b. The new End-User understands and agrees to all the terms and conditions of this EULA in the same way as if the new End-User had obtained the Software from Noldus or an Authorized Partner;
- c. End-User will destroy all (partial) copies of the Software and all accompanying materials, including but not limited to installed copies and any backup copies on data storage devices and guarantee to Noldus in writing that this has been done. If the Software is an upgrade, any transfer must include all prior versions of the Software;
- d. Noldus reserves the right to levy an administrative charge upon the End-User and/or the new End-User in relation to transfer of the Software to an End-User.

4.2. Any attempted transfer without prior written permission from Noldus shall constitute a material breach of this Agreement and shall be deemed null and void.

5. TERM; TERMINATION

5.1. This EULA shall enter into force on the date of acceptance by the End-User and shall continue until terminated in accordance with this article 5.

5.2. Noldus is entitled to terminate the EULA immediately upon prior written notice upon:

a. the breach of any material provision of this Agreement by the End-User if (i) such breach is not curable or (ii) if curable, the End-User has not cured such breach within 30 (thirty) day period following receipt of a written notice by Noldus substantiating such breach ("*ingebrekestelling*");

b. the filing or institution of bankruptcy, liquidation or receivership proceedings of the End-User or in the event a receiver or custodian is appointed for the End-User's business, or if its business is discontinued or if it has a petition presented by a creditor for its winding up or if the End-User enters into any liquidation (other than for purpose of reconstruction or amalgamation).

5.3. Upon termination of the EULA, the End-User shall immediately discontinue the use of the Software and remove the software of all computers, destroy all (partial) copies of the Software from all storage media and return the documentation and materials relating to the Software to Noldus or its Authorized Partner.

5.4. Termination of this Agreement does not remove or reduce End-User's obligation to pay any outstanding license fees or other monies, all of which shall be due for payment immediately on termination of the EULA.

5.5. The following provisions shall survive termination of this EULA: Article 3, 7, 9, 10 and this Section 5.5. In addition, any other provisions which are required to interpret and enforce the Parties' rights and obligations under the EULA shall also survive any termination or expiration of this EULA, but only to the extent required for the full observation and performance of the EULA.

6. WARRANTY

6.1. Noldus warrants that the Software as of the date of delivery to the End-User by Noldus or its Authorized Partner, the Software will, for a period of 90 days ("**Warranty Period**") materially conform to the specifications set out in the user documentation accompanying the Software ("**Specifications**"), provided that:

a. the Software is properly installed on a supported computer platform (as defined in documents that can be accessed on

<http://www.noldus.com/downloads>)

and used in accordance with the provisions of the accompanying user documentation and/or any Noldus-approved training course;

b. Noldus is notified in writing within 14 days after any non-conformity of the Software was known or should reasonably have been known to End-User and the End-User has made available all the information that might reasonably be required to allow Noldus to investigate, recreate and where possible remedy a non-conformity;

c. the Software has not been (a) altered, repaired or modified by any party other than Noldus or a third party provider approved by Noldus; or (b) used with software or a computer platform other than set out in the documents that can be accessed on

<http://www.noldus.com/downloads>

or have been subjected to negligence, or computer or electrical malfunction; or (c) were used, adjusted, or installed other than in accordance with instructions by Noldus.

6.2. Other than set out in Section 6.1, no warranties are expressed or implied with respect Software or any element thereof, including without limitation its quality, performance, accuracy, merchantability or suitability or fitness for any purpose, whether or not that purpose has been communicated by End-User to Noldus. The Software is a general product developed by Noldus for a wide range of solutions, requirements and situations and End-User is responsible for purchasing the Software required for his needs. Noldus explicitly does not warrant that the Software shall be entirely without error or fault nor that it will operate without interruption. End-User agrees that such errors, faults or interruptions shall not be deemed material and cause to terminate this EULA.

6.3. The warranty by Noldus set out in Section 6.1 applies only to the first installation of the Software and will not apply, resume or renew upon delivery or installation of any subsequent update or upgrade to the Software, alteration in the number of EULA's granted for use of the

Software, or any other extensions, upgrades or alterations to the Software where the Software has previously been delivered to or installed by the End-User.

6.4. The warranty by Noldus set out in Section 6.1 shall further not apply to Software that is licensed or otherwise made available at no cost, or Software that is designated as 'prototype', 'alpha' or 'beta' code, all of which are provided 'as is' and without warranty, representation or liability.

6.5. Upon receipt of an End-User's written notice of the Software not conforming to the Specifications during the Warranty Period, Noldus shall at its option and in its sole discretion (i) assist the Customer in correcting or replacing the non-conforming Software or, (ii) terminate the EULA immediately and refund the purchase price paid by the End-User. The remedies described above shall be End-User's sole and exclusive remedies. Upon expiration of the Warranty Period, Noldus shall have no obligation to provide such remedies.

6.6. Noldus and Authorized Partners, are not responsible for maintaining or supporting use of the Software or obligated to provide any updates, fixes or support to the Software unless otherwise expressly agreed in writing between End-User and Noldus or the Authorized Partners.

7. LIABILITY; INDEMNIFICATION

7.1. End-User acknowledges that the Software is intended for research purposes only and agrees not to use the Software for clinical applications, for the purpose of diagnosis or treatment of humans. The Software cannot be used in any application where the failure, malfunction or inaccuracy of the Product carries the risk of death or serious bodily injury.

7.2. In no event will Noldus or the Authorized Partners be liable to the End-User for any indirect loss, claim, damage, liability or expenses (including reasonable attorney's fees) ("**Losses**"), including lost profits, and damage due to the stagnation of business operations caused by the performance of Noldus, the Authorized Partners or the third parties engaged by Noldus in the performance of the EULA, unless for

and to the extent that such loss or damages are due to negligence or willful misconduct on the part of the Noldus or the third parties engaged by it. If, despite the provisions in this EULA, liability exists anyway, only direct damage will be eligible for reimbursement.

7.3. Noldus' and Authorized Partner's liability shall also be excluded in the event of:

- a. End-User's use of the Software other than in accordance with Section 7.1;
- b. direct and indirect consequences of the End-User's failing to adhere strictly to the user documentation provided or made available by Noldus or the Authorized Partner;
- c. for any loss of or damage to files howsoever caused.

7.4. Save for gross negligence or willful misconduct of Noldus or its officers, the Authorized Partner or the third parties engaged by Noldus in the execution of the Agreement, any and all liability of Noldus or the Authorized Partner is limited to an amount equal to the purchase price paid by the End-User to Noldus or the Authorized Partner for the specific Software from which the liability arises. In any event, a claim will be unenforceable and lapse unless Noldus or the Authorized Partner receives a written notice thereof no later than 6 months after the discovery of an event or circumstance that gives or may give rise to that claim.

7.5. End-User shall indemnify, and hold harmless Noldus, the Authorized Partners or the third parties engaged by Noldus from and against any and all Losses caused by (a) any failure in the performance of the obligations of the End-User under the law, this EULA or Noldus' General Terms and Conditions, and (b) all third party claims on any grounds whatsoever, directly or indirectly related to the End-User's use of the Software, the contents thereof or any results or materials generated by the Software.

8. MISCELLANEOUS

8.1. Parties may communicate with each other by electronic mail. Parties recognize the risks associated with electronic mail and declare

that they shall not hold each other liable for any damage incurred by either of them as a result of the use of electronic mail. If a Party is in doubt as to the content of an electronic message received, the content of the message originating with the sender shall be decisive.

8.2. The invalidity or unenforceability of any provision this EULA shall not affect or limit the validity or enforceability of any other provisions thereof. Any such invalid or unenforceable provision shall be deemed to be substituted by a provision that is considered to be valid and enforceable. The interpretation of the substituting provision shall be as close as possible to the economic, legal and commercial objectives of the severed provision.

8.3. Failure by Noldus or the Authorized Partner to enforce any of its rights under the EULA shall not constitute a waiver of such rights thereunder and shall not relieve End-User of its obligation to comply with such provisions. No waiver or amendment of any provisions therein shall be effective unless signed in writing by a Noldus representative. Any such written waiver shall only be applicable to the specific instance to which it relates and shall not be deemed to be a continuing or future waiver.

8.4. Amendments or changes to this EULA can only be agreed upon in writing between the Parties.

8.5. The EULA shall be binding upon the Parties thereto, their legal representatives, successors and assigns. End-User shall not assign any right or obligation arising out of this EULA without the prior written consent of Noldus. Any attempt by End-User to assign or delegate any obligation hereunder shall be deemed null and void.

9. GOVERNING LAW: END-USERS USA OR CANADA

9.1. This EULA is exclusively governed by the law of the Commonwealth of Virginia for End-Users having their principal place of business in the United States of America or Canada. The United National Convention for Contracts on the International Sale of Goods is expressly excluded.

9.2. Any disputes arising out or in connection with this EULA that cannot be solved amicably within a reasonable period of time will be

submitted to the competent court in Loudoun County, Virginia for End-Users having their principal place of business in the United States of America or Canada.

10. GOVERNING LAW: END-USERS OTHER COUNTRIES

10.1. This EULA is exclusively governed by the law of The Netherlands for End-Users having their principal place of business in any country other than the United States of America or Canada. The United National Convention for Contracts on the International Sale of Goods is expressly excluded.

10.2. Any disputes arising out or in connection with this EULA that cannot be solved amicably within a reasonable period of time will be submitted to the competent court in Arnhem, The Netherlands, for any dispute with End-Users having their principal place of business in the European Union. In the event that an End-User has its principal place of business outside the European Union, the United States of America or Canada, any dispute shall be finally settled in accordance with the Arbitration Rules of the Netherlands Arbitration Institute. Location shall be Arnhem, the Netherlands. The arbitration procedure shall be conducted by one (1) arbiter in the English language.

Revised 1 August 2017