



release 0.9.x (Tergeste)

User's Guide

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A key issue to carry out massive digital lecture recordings (through capture, management and sharing), is to automate as much as possible all the needed processes of video production and post-production to pull down costs. OpenEyA satisfies these requirements in a simple way. The new release OpenEyA-for-YouTube produces synchronized .mp4 video files with one or two different scenes. It is easy-to-use and it is cost effective!

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1 About EyA

EyA stands for "*Enhance your Audience*". It is the name given to the automated system used to record continuously complete traditional Maths and Physics lectures and of international conferences (with parallel sessions), seminars, talks, *etc.*

EyA technologies can be used as educational content producer for e-Learning, mobile Learning, YouTube, *etc.*

This new release OpenEyA-for-YouTube produces synchronized .mp4 video files with one or two different viewpoints. It is easy-to-use and is cost effective!

Previous version of the automated EyA recording system was reviewed in the Physics World Magazine in 2007, won the Innovation Prize of Regione Friuli Venezia Giulia of Italy in the non-profit and public institutions category in 2008 and got a honorable mention in the Education category of the Stockholm Challenge Award 2010.

This **OpenEyA-for-YouTube** version is the Linux-based alternative to EyA developed earlier under Mac O.S. (For comments see Chapter 7 [Contacts], page 14).

1.1 OpenEyA-for-YouTube Features

OpenEyA integrates different technologies under Linux O.S. **Ubuntu 20.04** to synchronize:

- **video in .mp4 format** (to see whatever happens in front of, *e.g.*, a classroom podium), with
- **screen captures from OpenEyA's computer, or with frame pictures taken from the video or, alternatively, from a second view** (using a USB high resolution, Linux compatible webcam to focus specific areas of the classroom podium, blackboard and/or projected screen -if any), and with
- **classroom audio** (without the need to wear a microphone).

In this way, **OpenEyA** allows to archive and share traditional scientific lectures and talks carried out using, for instance, very large chalkboards found in classrooms and/or using digital presentations (PPT, PDF, animations, *etc.*).

It is innovative because of these main features:

- no dedicated human intervention during recording and processing; the synchronization of audio/video input and screen grab/video frames is done automatically;
- scalable architecture and portable (use from one classroom to many);
- no special requirements for the lecturer (no need to press buttons or to wear a microphone, *etc.*);
- low total cost of hardware implementation (see Chapter 2 [Requirements], page 2);
- low-bandwidth features (recordings are saved as **.mp4** compressed video files).

2 Requirements OpenEyA-for-YouTube

2.1 Hardware

As of this writing December 2020, the cheapest implementation cost of OpenEyA is the price of a

- **PC Laptop PC 64 bits with built in webcam and Mic running Ubuntu Linux O.S.** (or low-cost old NetBook with setup as in Fig.1).

optional:

- external **USB Webcam** Linux compatible, UVC Driver (*e.g.*, Logitech HD Webcam C510 8Mpx).
- external **USB microphone** (omni-directional, *e.g.* UB1 Samson Mic or Acousticmagic Array Mic
- Small tripod.



Fig.1: OpenEyA setup example using old PC hardware.

2.2 Software

The OpenEyA-for-YouTube software can be downloaded, in the form of a debian package 'openeya-yt-x.x.x-Linux.deb', under the License below from the website:

www.openeya.org

As of this writing December 2020, OpenEyA runs under Linux O.S. **Ubuntu 20.04** (see Chapter 3 [Install], page 4)

2.2.1 Copyright

Copyright © www.openeya.org

Permission to use, copy, and distribute the OpenEyA software and its documentation for educational purposes without fee is hereby granted, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation.

Permission to modify the software is granted, but not the right to distribute the complete modified source code. Modifications are to be distributed as patches to the released version. Permission to distribute binaries produced by compiling modified sources is granted, provided you

1. distribute the corresponding source modifications from the released version in the form of a patch file along with the binaries,
2. add special version identification to distinguish your version in addition to the base release version number,
3. provide your name and address as the primary contact for the support of your modified version, and
4. retain our contact information (www.openeya.org) in regard to use of the OpenEyA base software.

Permission to distribute the released version of any OpenEyA code along with corresponding source modifications in the form of a patch file is granted with same provisions 2 through 4 for binary distributions.

This software/application is provided "*as is*" without any express or implied warranty.

3 Install

As of this writing December 2020, **openEyA** runs under the free Linux-based operating system **Ubuntu 20.04** (download from www.ubuntu.com) and on **64 Bits PC Laptops**.

To install **openEyA** you can simply mouse click on the **openeya** '.deb' binary file, or by means of command line in which you need to install first some extra packages and their dependencies.

3.1 Manual Install

3.2 The simple way

In order to install the package you can use the following command:

```
sudo apt install ./openeya-yt-0.9.x-Linux.deb
```

The **apt** command will install **openEyA** and some necessary dependencies.

3.3 The hard way

If your **apt** system does not support your local file installing, you need to install first some extra packages and their dependencies.

You can check the list of needed packages by using the following command:

```
dpkg -I openeya-yt-0.9.x-Linux.deb
```

In 'Depends:' it is possible to find the list of the required packages.

To install the required packages (listed with the command above) issue the command: 'sudo apt-get install <pkg1> <pkg2>' and so on. For example,

```
sudo apt-get install libmp3lame0 libvpx6 ...
```

Then, to install the **openEyA** (.deb) package anew type the command:

```
sudo dpkg -i openeya-yt-0.9.x-Linux.deb
```

An **openEyA** launcher icon will appear in your **Show Applications** of Linux Ubuntu Desktop as shown in Fig.2. *RESTART YOUR COMPUTER (reboot) before using openEyA!*



Fig.2: *Launcher icon listed in Ubuntu Desktop's Show Applications.*

NOTE: The OpenEyA-for-YouTube configuration file can be found at:

```
~/config/ICTP/OpenEya-Yt.conf
```

the openEyA running shell script `openeya-yt.sh` can be found at

```
/opt/openeya-yt/bin
```

and this OpenEyA manual (in HTML and PDF formats) can be found at

```
/opt/openeya-yt/doc
```

3.4 Uninstall

In order to uninstall the openEyA (.deb) package type the following command (and check that the `/opt/openeya-yt` directory is now empty!):

```
sudo dpkg -r openeya-yt
```

3.5 Updates

Check for updates of the automated openEyA recording tool from www.openeya.org. A connection to the Internet is needed to download new releases.

4 Start Up

OpenEyA-for-YouTube supports two different Modalities for the automated capture and production of chalkboard and digital lectures. These are:

- **Screen grab:** to capture automatically your computer screen (*i.e.*, grab slides done with PPT, PDF or any other digital presentation) from the same computer in which **OpenEyA for YouTube** is installed and synchronize them with video; You can give and project a seminar/lecture while recording it! Alternatively, you can easily record self-seminars, *i.e.*, your own lectures, views, *etc.* which you can then share with your students and audience via YouTube.
- **Built in webcam or USB Webcam:** The use of an external USB Webcam (high resolution, Linux compatible UVC Driver) allows to take pictures/images over specific areas of a classroom podium, a blackboard, a Book/article presentation or a projected screen.

In any case, you need to select either **Screen grab** or **Webcam** after starting the small **OpenEyA** icon in your Desktop's **Show Applications** (of Fig.2).

You can also modify/select the **Webcam mode: photos from ...** modality from the option **Slides mode** at the top of **OpenEyA** GUI of Fig.3, or modify/select the **Webcam mode: photos from desktop** modality from one of the yellow button in the GUI of Fig.5.



Fig.3: OpenEyA-for-YouTube modalities.

4.1 Screen Grab

Select **Screen grab** from the option **Slides mode** at the top of **OpenEyA** GUI of Fig.3, or modify/select the **Webcam mode: photos from desktop** modality from one of the yellow button in the GUI of Fig.5.

This selection lets you to synchronize PPT/PDF slides or any other digital material being displayed on your computer screen with audio/video. **OpenEyA-for-YouTube** is useful to record your own talks/lectures in **.mp4** format using any computer with Linux **Ubuntu 20.04** and built in microphone and webcam (you can also use in this case an external USB webcam).

4.2 Using USB Webcam

Select Webcam from the option Slides mode in the OpenEyA GUI of Fig.5 or modify/select the Webcam mode: photos from webcam modality.

Plugin (connect) first the Webcam in a USB slot of your computer (and also the external Microphone if being used). OpenEyA-for-YouTube will recognize the device(s) automatically and these will appear as video0, video2, ... in the GUI of Fig.5.

4.3 Modalities Results

In either Modality Screen grab or Webcam shown in yellow in Fig.4, OpenEyA-for-YouTube automatically capture slides (every few seconds from the screen and from a built in webcam or from an external HD webcam) and synchronize them to the output .mp4 video *-ready for YouTube!*



Fig.4: OpenEyA-for-YouTube modalities.

5 How To use?

... It is very, very simple!

OpenEyA-for-YouTube do not need any extra hardware, by default you can use the built in webcam for the video and photo (or Screen grab) and the Mic of your PC Laptop. For the modality external 'Webcam', plug in the USB Webcam (Linux compatible, UVC Driver) and then launch the OpenEyA icon of Fig.2. Proceed further as indicated next.

5.1 Setup

The OpenEyA-for-YouTube Graphics User Interface (GUI) is shown in Fig.5. It allows to configure (and preview), to record and to view the synchronized audio-photo-video taken from your own computer through a built in webcam, the desktop or USB webcam (*e.g.*, HD).

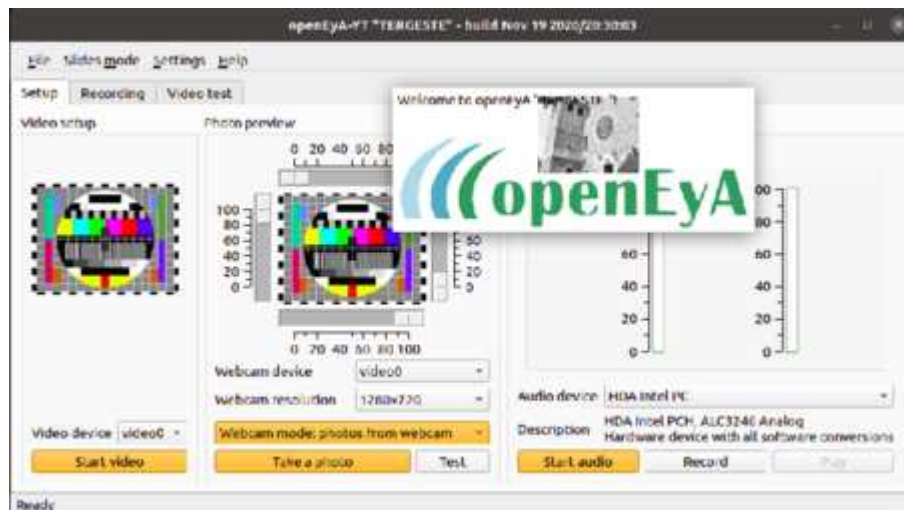


Fig.5: OpenEyA-for-YouTube Graphics User Interphase (GUI).

5.1.1 General Settings

By selecting 'Settings' from one of the upper links in the GUI (Fig.5), it is possible to select timing for the photos/slides as shown in Fig.6.



Fig.6: OpenEya-for-YouTube *general settings*.

NOTE Defaults are:

The default directory for the stored recordings is User's Desktop and a value of 6 sec is the default used for taking and saving photos/frames or grabbing the PC screen.

5.1.2 Video Test

Select 'Video device' (usually 'video0' or 'video2') depending if you are using your computer's built in webcam or an external USB webcam (with Linux UVC Driver).

Click 'Start video' to test and see the video image and positionate the webcam.

5.1.3 Slide Preview

Click 'Take a photo' to test, get a picture or capture! *Wait some seconds until every taken image appears in the Photo preview!*

When using an external (HD-)Webcam, with 'Take a photo' you can re-positionate the webcam if needed using the button 'Test'.

5.1.4 Audio gains

To test the audio quality, select first 'Audio device' to be used and then click 'Start audio' to check the correct audio level (see GUI in Fig.6).

From the menu 'Audio device' you can select your computer's Microphone or an external USB omni-directional Microphone.

It is possible to make a recording audio test of few secs (the small windows appears when pressing Record of Fig.7) and to Play it *to listen the audio quality*.

5.2 Recording

After all these parameters have been set: Video Test, Slide Preview and Audio gains, it is possible to start recording.

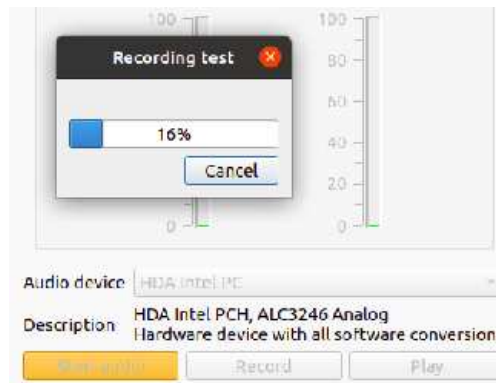


Fig.7: OpenEyA-for-YouTube *audio test*.

Within the Recording GUI shown in Fig.8, it is possible to start an Immediate recording 'Record now' (yellow button) or to program recording(s) by selecting the 'Alarms' options (see Fig.9).

'Record now'

Select the time lag in minutes to activate the recordings using the **Setup** of previous sections and press 'Record now'. OpenEyA allows to record slots of 15 min up to one hour continuously and automatically. A 'Beep' sound is issued on **Stop** or completion of an Immediate recording. If you need to record for longer periods then you can set the 'Alarms'.

'Pause'

You can **Pause** the recording and restart the recording at any time until the initial time lag given is completed (actual recording time). By pressing **Stop** you can fully stop the running recording before it ends.

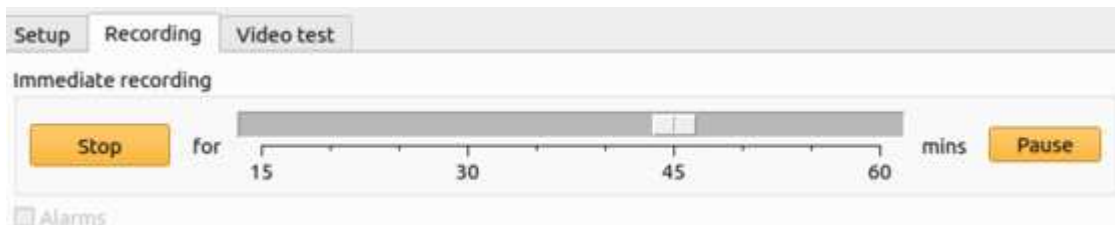


Fig.8: Pause *yellow button of the OpenEyA-for-YouTube GUI*.

'Record Title: Captioning'

Select this option to add a short text/captioning to your video output when recorded using Record now. At present, the text limit is 240 characters which will appear listed as lines (up to 12 lines) as in Fig.11. Note that some characters are not allowed. *This feature is useful to guide YouTube viewers about the contents of your video lecture.*

'Alarms'

Select this option, to program future automated recordings of up to one hour and half maximum each. You can **Add, Modify, Delete** alarms to build on a given schedule of recordings. you can **Stop** the current recording via Alarms at any time by pressing the **STOP current recording** button. Captioning does not work with the Alarms.

The 'Current time' level on the right of the OpenEyA-for-YouTube GUI indicates to time left (or, alternatively, can be seen as the time passed) to complete the recording.

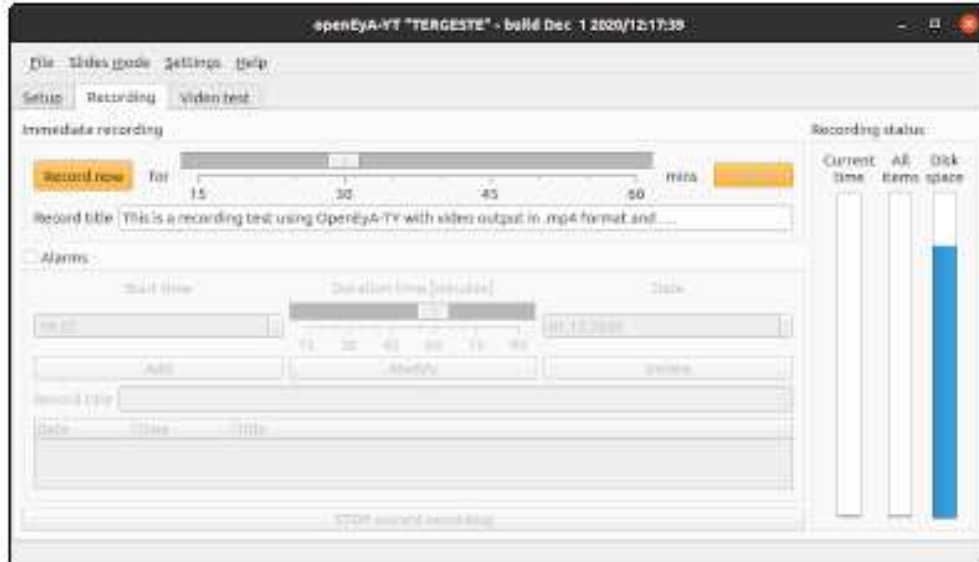


Fig.9: Example of immediate recording Record now (30 mins) (above the Alarms options).

6 Web Test

You can preview the recording results by pressing 'Web test' button as shown in Fig.10 below: If for some reason the duration of the final recording becomes smaller than the selected recording Time (*i.e.*, 'too short'), then an exclamation mark in red will appear to notify this shortage . . .



Fig.10: Example of Web test selection.

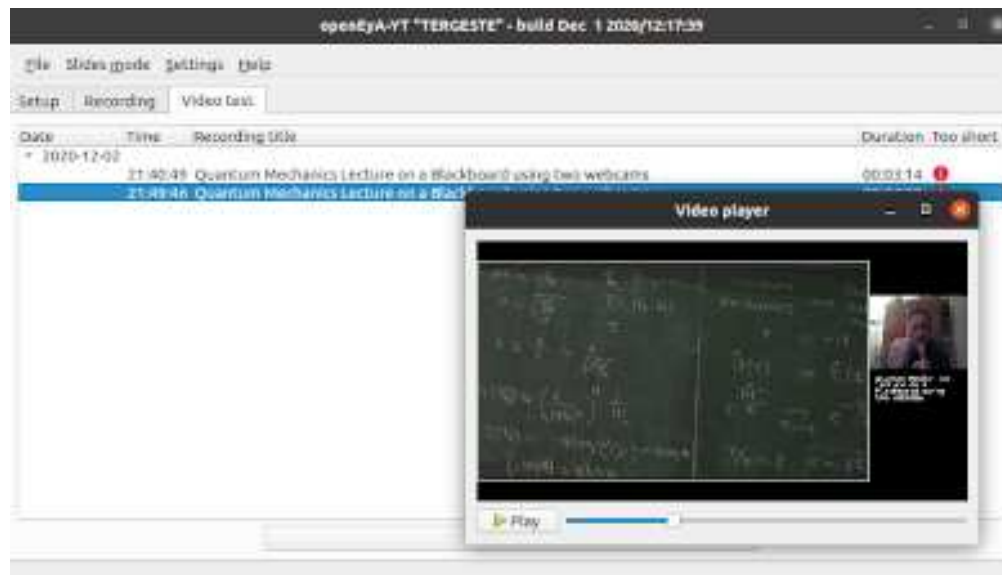
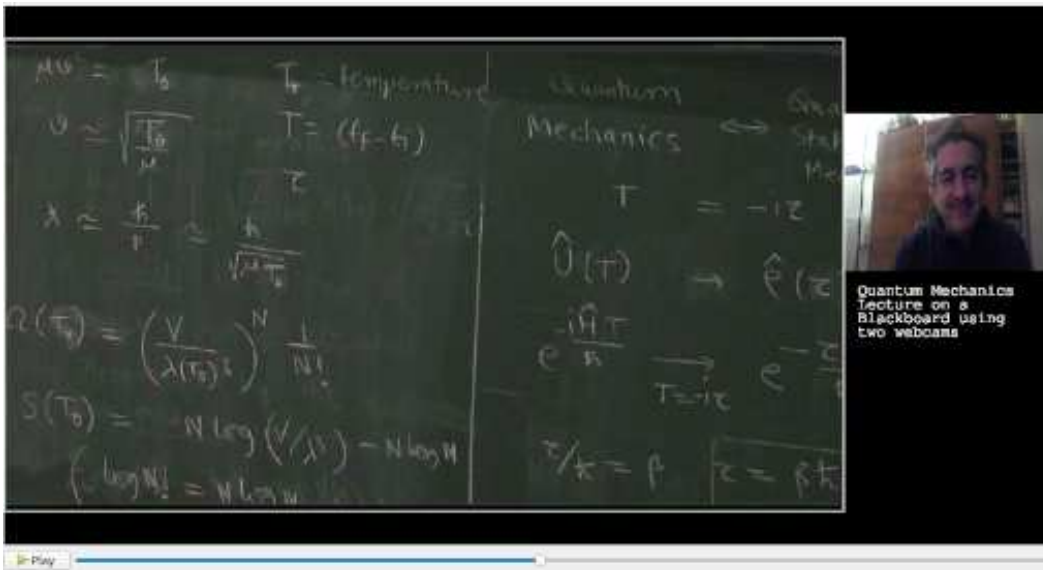


Fig.11: Example of selected OpenEyA-for-YouTube video recording with captions (using built in audio/webcam plus external webcam to record a chalkboard).

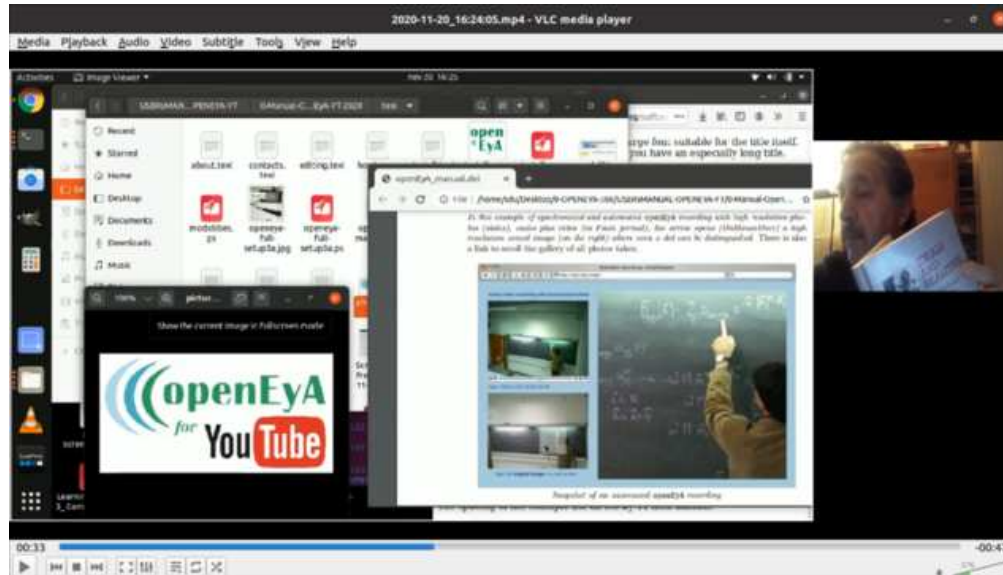
Wait a few seconds! and you will then be able to visualize the selected OpenEyA recording which will open on your screen as in Fig.11.

6.1 OpenEyA in Action

Examples of synchronized and automated OpenEyA-for-YouTube recordings:



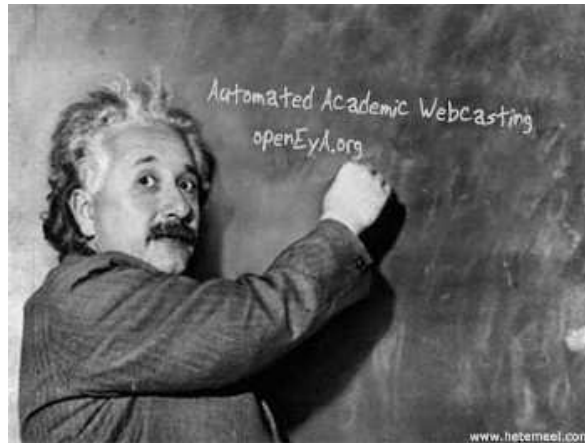
Automated OpenEyA-for-YouTube .mp4 recording output displaying two different scenes/viewpoints/webcams.



Automated OpenEyA-for-YouTube .mp4 recording output using Screen grab.

7 Contacts

For further information, or to report Bugs, please contact us at: 'sdu@ictp.it' or visit our project website: 'www.openeya.org' to see papers, presentations, conferences, *etc* on (open)EyA Technologies of previous versions.



... we hope you will "*Enhance your Audience*" using openEyA!

7.1 Credits

openEyA-for-YouTube for **Ubuntu 20.04** is developed and maintained by E. Canessa and L. Tenze at the ICTP Science Dissemination Unit (SDU), Trieste, Italy. Sincere thanks go to our colleagues C. Fonda and M. Zennaro for earlier insights on Mac O.S. EyA technologies.

... **Your feedback is most welcome and here acknowledged!**