

COSIMA - an update (June 2014)

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6 years have passed, since COSIMA was first presented in this magazine and the time is ripe for an update. Apart from that, lots of new features have been included in the software.

I will do this in 2 parts, with part 1 oriented towards beginners, explaining the basic operating concept. As an example, a simple workflow shows how to process MPO images (such as those from a Fuji W3) for playback on a 3D-TV. In the second part, I will discuss some features of COSIMA, which in my opinion are particularly worth mentioning.

What is the purpose of COSIMA?

COSIMA is a universal assembly program for stereo images and stereo videos. It corrects erroneous pictures/videos and automatically sets a correct stereo window. Image cropping is either automatic (symmetrical) or manual. In manual mode, cropping and stereo window setting are incorporated in one single operational step, which also covers adjustment. I assume that all the readers of this magazine are convinced, that for a relaxing stereo experience, it is absolutely necessary, that all errors of height, size, rotation and so on should be meticulously corrected - which is only possible with the appropriate software support.

How is the COSIMA workflow organized?

If you want to process stereo images, many decisions have to be made beforehand, for example: which layout should the resulting images have (separate left-right, side-by-side, MPO, ...), what resolution should they have, are there any black edges at the input images from scanning the slides, which have to be cut off, etc. etc.? All these decisions are communicated to the COSIMA program by means of *COSIMA parameters*, which are defined in a graphical user interface. A complete set of parameters build a *processing task* and can be stored in a *COSIMA project file* (sometimes also called *inifile*). If a certain task - for example the preparation of MPO images for 3D-TV - is to be performed repeatedly, the project file for this task only needs to be created once and can then be used over and over again.

The purpose of the COSIMA project files.

You can share Cosima project files with your friends. The files can also be created centrally and then distributed. For certain tasks (and to help beginners skip the first hurdles) there are some ready-made project files on the COSIMA homepage. One example is http://www.cosima-3d.de/releases/mpo_to_3dtv.ini, which prepares MPOs for display on 3D-TV. After working with COSIMA for a while, you will accumulate suitable project files for all your major processing scenarios, ideally with meaningful file names that enable you to see their purpose at a glance.

Where shall I store the project files?

For example, you can keep your project files centrally located in the dropbox (or somewhere similar) so that they are always available on all your computers. I recommend, however, cloning a working copy of it into the folder containing the images you are working on.

The COSIMA workflow.

Now we are ready to prepare our MPO images for 3D-TV in 6 steps:

1st step: Download the COSIMA setup program from the COSIMA homepage http://www.cosima-3d.de/releases/setup_cosima_gui_0.9h5.exe and run it. All preferences should be accepted, e.g. install Cosima to *C:\Cosima* and **not** to *C:\program files* or similar, because COSIMA creates and uses temporary files in the installation directory: if you use Windows 7 or Windows 8, you would need administrator rights to work on that directory, which not everyone has or would like to have.

2nd step: Copy all MPO images, which you want to process, from your Fuji-W3 (or from any other camera) into a new directory and call it *D:\CosimaTest* or any other name you like.

3rd step: Download the project file http://www.cosima-3d.de/releases/mpo_to_3dtv.ini and copy it to the newly-created directory containing your images (*D:\CosimaTest*).

4th step: Open a file manager (e.g. Windows Explorer), click with the **right** mouse button on the project file and then **send it** (with the left mouse button) to the *COSIMA Gui*. It opens. With this method, the COSIMA Gui knows the directory in which the files are stored automatically and the tedious configuration of the image path is omitted. (Of course, also first starting the Cosima Gui and then loading the project file is possible.)

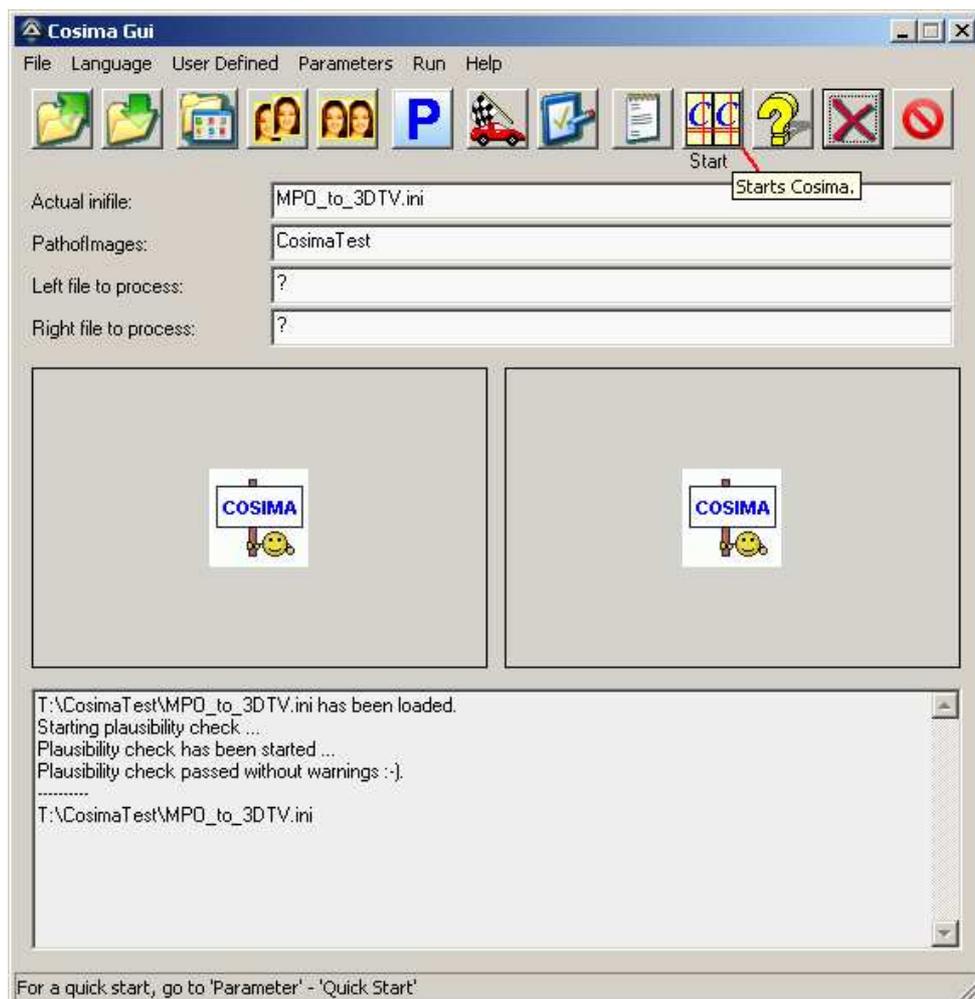


Figure 1: The Cosima Gui after loading MPO_to_3DTV.ini

5th step: For the moment, don't change any parameters but start the COSIMA run directly by pressing the yellow start button: COSIMA now starts working. We can watch which image is currently being processed in the two small thumbnail windows. We see the original image with a red border during the calculations and the corrected image with a green border during the storing on the hard disk.



Figure 2: Original image with red edges during the calculation process.



Figure 3: Corrected image with green edges during the storage process.

6th step: Because we expect the original images of the W3 to have a 4:3 aspect ratio and the 3D-TV has a 16:9 display, it makes sense to choose the *manual cropping method*. Using this method, after the calculations are finished, the *COSIMA Viewer* opens, shows an anaglyph preview of the image (interlaced also provided) and proposes a default frame for symmetrical cropping. The shown cutout can be moved with the right mouse button (click with the *right* mouse button into the frame and move). With the left mouse button the edges of the frame can be moved individually, and with the middle mouse button, the stereo window can be changed. If you are satisfied with the image, just click *Enter* to apply the changes and after that the final image will be created in accordance to all the user specifications. After finishing, the images can be found in a **ce**-subfolder below the original folder (**ce** stands for **COSIMA Extra**), where they may be copied to a USB stick and displayed on any 3D TV in full perfection.

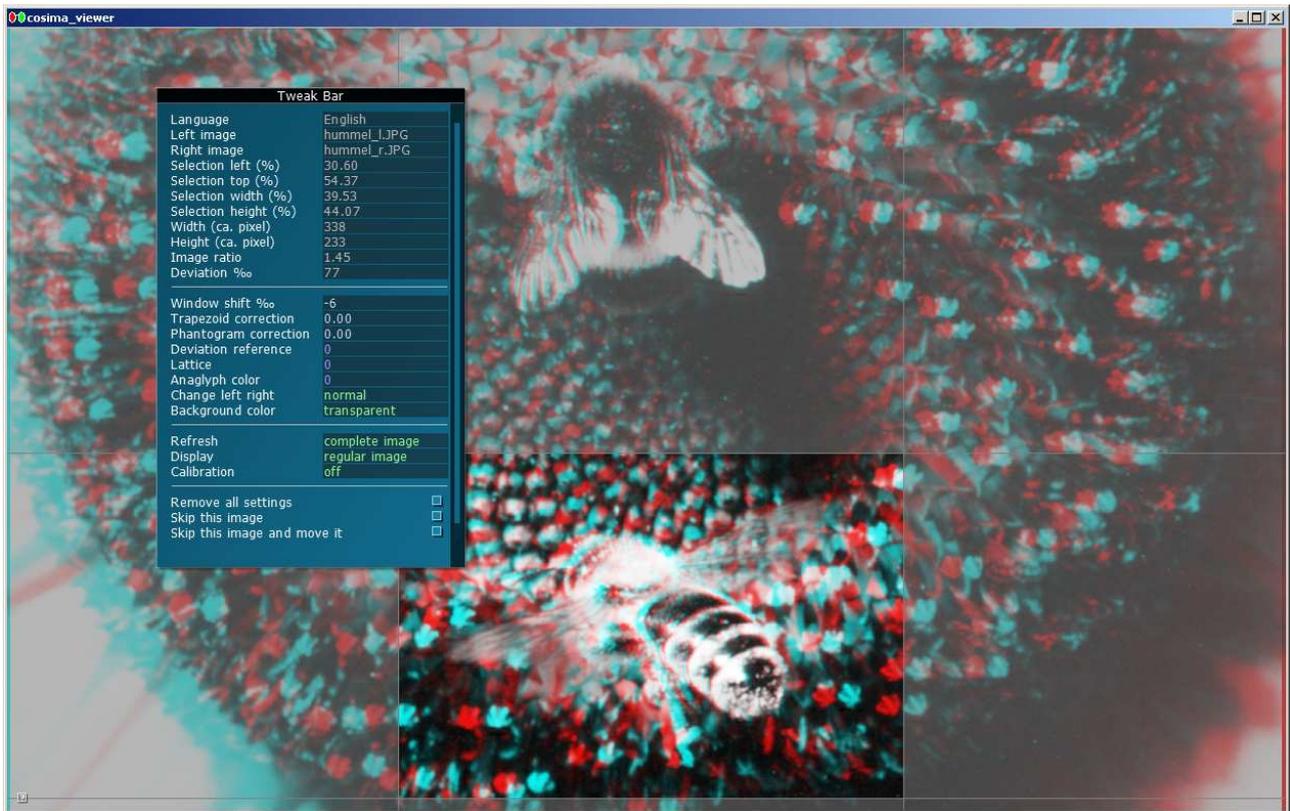


Figure 4: Cosima Viewer for cropping and stereo window setting.

What settings (COSIMA parameters) can I usefully change?

Most default settings are meaningful and only need to be changed very occasionally. Others will need to be changed more frequently. For that, click on the blue P and find all *COSIMA Parameters* properly sorted in grouped tabs. Common tweakings are:



The layout of the resulting images can be changed in the *Output-1* tab, where you can set left-right separated images, side-by-side images, anaglyph images or one of all the other formats (such as interlaced, top-and-bottom, MPO etc.). The fundamental layout variants can be enabled or disabled independently. The parameters for that are called *LeftRightOutput*, *StereoOutput*, *AnaglyphOutput* and *ExtraOutput*.

The resolution of the images is set with the parameters *OutputHeight* and *OutputWidth* at the *Output-2* tab. If you want to process a large number of images in **batch mode**, the *COSIMA Viewer* is of course disturbing. Then it is disabled with the parameter *PostViewerActive* in the *External* tab. If cropping is required (eg, 4:3 to 16:9) it is done symmetrically.

Images from a **camera pair** exist as separate left and right frames. In this case, create two subfolders, *\l* for the left images and *\r* for the right images, where you copy your images. For that type of image organization, set *InputMode* = 9 in the *Input-1* tab. COSIMA must also know that there are individual pictures and you have to set the parameter *StereoImageInput* = 2 on the same tab. The usual practice is to rotate the left camera, if so, set also *RotMirInputLeft* = 2 on tab *Input-2*. Don't move the project file into one of the subfolders, so you should have for example: the project file in *PathofImages* = D:\CosimaTest, the left images in D:\CosimaTest\l and the right images in D:\CosimaTest\r.

Automatic image pairing. It is annoying when a camera doesn't trigger reliably or there are different numbers of images in the left and right subfolders for some reason. Then you can instruct COSIMA with the parameter *Input-1/ExifTimeTolerance* = 3 (e.g. for 3 seconds tolerance time) to pair the images automatically with the help of their embedded Exif times. If, in addition, *Input-1/RenameOrphans* = 1,  the orphaned images are moved into new subfolders and after one crawling run ( - button), the directories are properly paired. The cameras must **not** be  synchronized for that run, because COSIMA operates relative to the Exif times of the alphanumerically first image in each directory.

Scanning slides. When you scan slides, usually black edges appear which must be removed prior to the calculation of the correction parameters. This is done automatically, if you set *Passepartout* = 4 in the *Input-2* tab.

Help. Next to each *COSIMA Parameter* is a button with a question mark. This button leads to a detailed explanation of this parameter. Special help for the *COSIMA Viewer* is achieved by a click on the ? in the left lower corner of the Viewer window. More help pages can be found in the Help menu - COSIMA help.

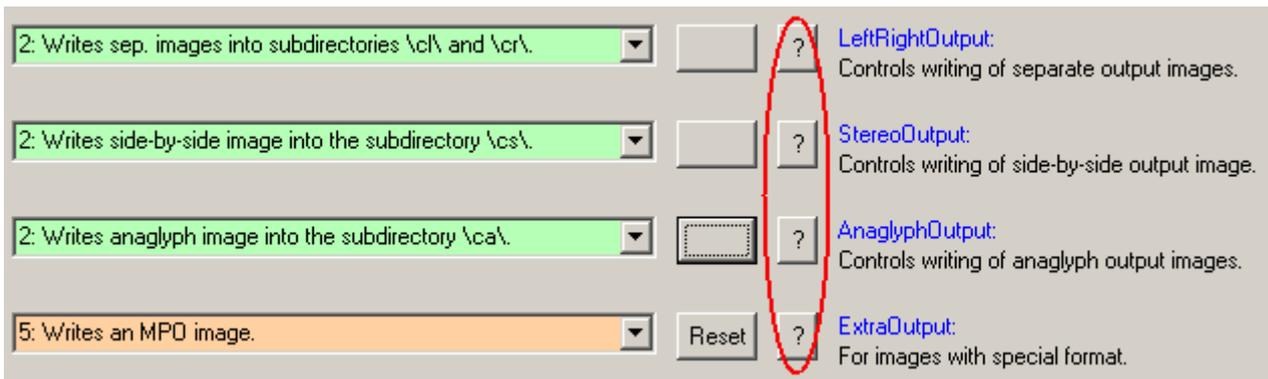


Figure 5: The help buttons for each COSIMA parameter.

Note: So far, one of the most important parameters was not even mentioned: *PathofImages*. With this parameter, the user normally tells COSIMA the path, in which the images are located. However, with the chosen workflow (the project file is copied into the image path, then it is sent from there to the *COSIMA Gui*), this parameter is automatically adopted and need not be explicitly set. On the other hand, if you have the images and the project file (the inifile) stored separately, you must notify COSIMA, where your images are located and you do this with the parameter *PathofImages*.

COSIMA is a comprehensive analysis tool: COSIMA creates for each image a report file with txt- and html-format. The html file is opened in your browser, when you double-click it. You can also use the *COSIMA Gui* (File menu - Last report file) to start the browser with the last report. (If your browser refuses to display the file for security reasons, the browser security settings for local websites (intranet) should be reduced.) In the report file, for each processed image, the geometric errors, and if necessary, the apparent stereo window correction is given. For higher *VerboseMode* (in *General* tab), more information about the image, for instance a depth-matrix is produced. An example of a simple report file can be found on the COSIMA homepage: http://www.cosima-3d.de/cosima_report_en.html.

COSIMA licence. All functionalities can be tested without a licence (including auto-pairing subfolders), but there will be a logo stamped in the corrected images: *Mounted with COSIMA*. A licence for two computers costs 99 € and can be ordered at the COSIMA homepage: <http://www.cosima-3d.de/ordering.html>. Users can ask questions on the open *COSIMA User Forum*: <http://de.groups.yahoo.com/group/cosima-3d> or directly to me cosima@herbig-3d.de.