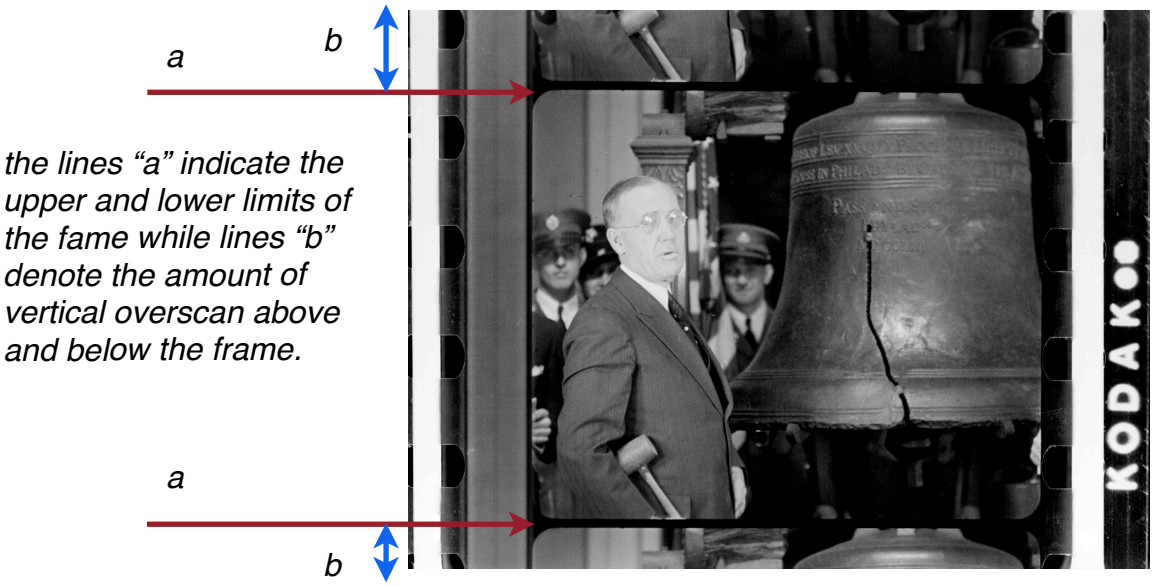
AEO-Light (beta)
[User Manual]

What is AEO-Light?

AEO-Light is an open-source software that extracts audio from optical sound tracks of motion picture film. AEO-Light is produced at the University of South Carolina by a team comprising faculty and staff from the University Libraries' Moving Image Research Collections (MIRC) and the College of Arts and Science's Interdisciplinary Mathematics Institute (IMI). Project funding comes from the Preservation and Access Division of the National Endowment for the Humanities. AEO-Light is available through an open-source licensing agreement. The complete terms are available in the AEO-Light "ReadMe" file and in the "About" menu.

Using AEO-Light: AEO-Light extracts audio from film scans that meet the following requirements:

- The scans must be made so that the film imaged includes the optical soundtrack in addition to the image-frame.
- The scans must also be configured so that some information above and below each image-frame is included. The minimum amount of vertical overscan required for AEO-Light has yet to be determined. Users are encouraged to start with a larger vertical overscan at first.



the lines "a" indicate the upper and lower limits of the fame while lines "b" denote the amount of vertical overscan above and below the frame.

- The scans must contain enough resolution to provide meaningful audio information. The minimum resolution required to produce acceptable audio is as yet undetermined, although audio has been produced from 1024 x 768 scans of 16mm film. Users are encouraged to scan at the highest resolutions possible for initial tests.
- AEO-Light is not designed to process optical-sound only tracks (aka double system tracks) but additional testing is being done to improve the software's ability to extract high quality audio from such tracks.

AEO-Light Requirements:

- 64-bit Widows, MAC, Linux
- AEO-Light application
- AEO-Light Unix executable file (MAC and Linux)
- Matlab Compiler Runtime (MCR) 2012b (v.8) for Mac or 2013a (v.8.1) for Windows
- FFmpeg v. 0.11 or later (required for video export functionality). See http://ffmpeg.org for documentation and downloads. AEO-Light beta has been tested against the static builds provided by Tessus (Mac) at http://www.evermeet.cx/ffmpeg/ and Zeranoe (Win) at http://ffmpeg.zeranoe.com/builds/ Users unfamiliar with FFmpeg are encouraged to install one of the Windows or Mac static builds.

INSTALLING AEO-LIGHT:

1) Unzip and install the Matlab Compiler Runtime (MCR).

2) Drag the aeolight.exe file into the Programs folder (Windows). Drag the aeolight.app and aeolight executable to the Applications folder (Mac).

3) Install FFmpeg. Note: a guide for installing FFmpeg from the Tessus static build is included in the zipped application package for the Mac.

BASIC INSTRUCTIONS:

1) Launch AEO-Light by clicking on the application (Windows) or by clicking on the 'aeolight' UNIX executable (Mac). *Note: this release of AEO-Light is known to have application launch times of up to 30 seconds.*

2) On first launch users must agree to the terms of use in order to use the software.

3) Select "New Project" from the dialog window.

4) Select the source file(s) for processing. AEO-Light can read a variety of formats: DPX, TIF (full color and grayscale), AVI and MOV.[1] By default the source selection menu displays all file types. Users may chose to restrict available files to a specific type (DPX, MOV, AVI, etc..).

a) When importing a folder of frame scans (DPX or TIF images), navigate to the desired directory and select one of the individual frame files. AEO-Light will scan the directory to find all of the similarly-named files.

- This directory must contain a single, contiguous sequence of DPX files whose names have a common prefix and differ only in a fixed-length index field occupying the positions immediately antecedent to the file extension. For example, f_00.dpx, f_01.dpx, … , f_87.dpx is a valid sequence.
- By comparison, f1_00.dpx, f2_00.dpx, … , f8_00.dpx does not satisfy the criterion for file naming, nor does f_00a.dpx, f_01a.dpx, etc… AEO-Light will automatically load all files in the sequence after the frame selected.

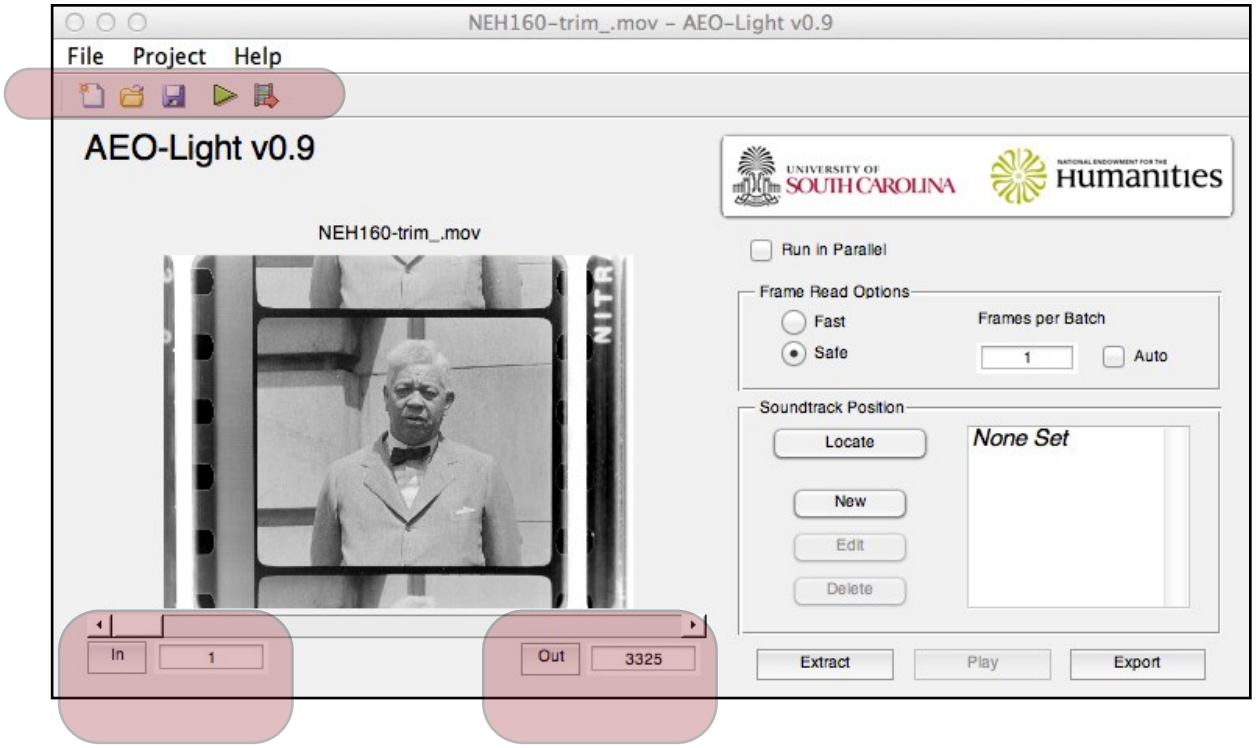
b) If importing a video file, select the AVI or MOV for processing.

c) NOTE: Although external drives are supported they are discouraged as the slow data transfer times will radically decrease the per-minute rate of extraction and may cause the program to fail.

[1] Video and still image formats come in many different varieties, not all of which have been tested.

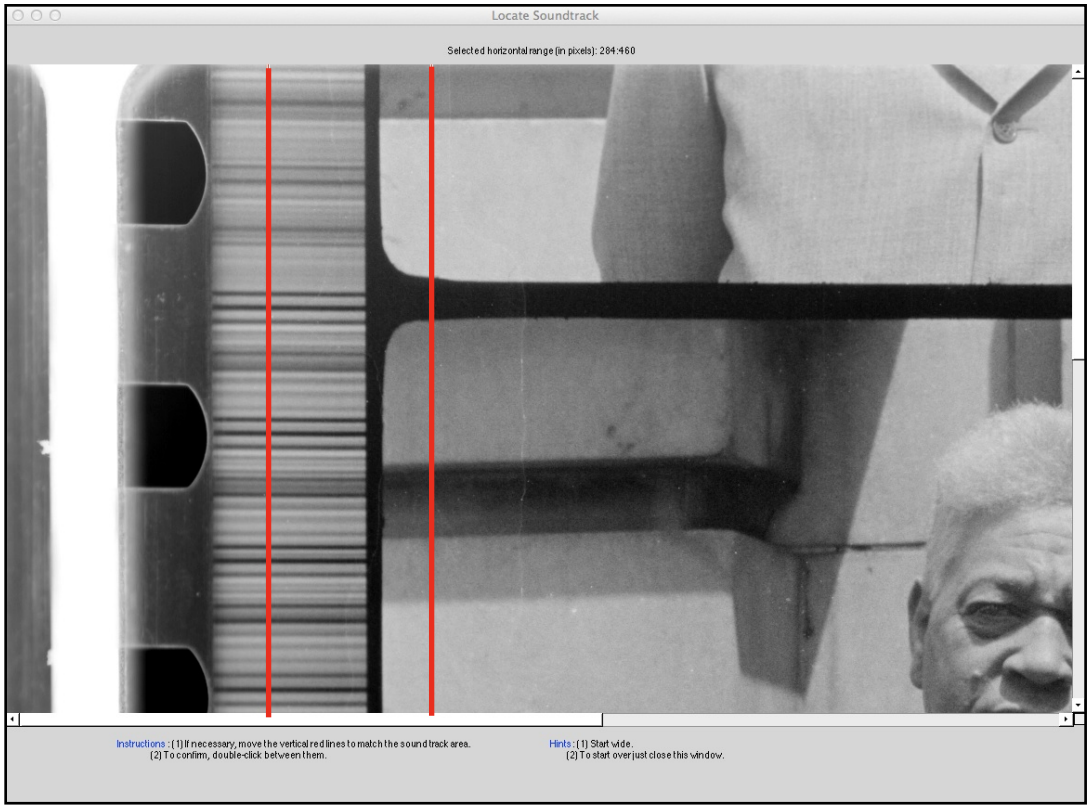
5) AEO-Light reads the information and then displays the main window showing the video.

6) Save the project by clicking on the "diskette" icon on the main window or selecting "save project" from the drop-down menu. AEO-Light project files are saved with the ".aeo" extension. The project file contains all of the setting about the project including the location of the source file. The source file is not copied into the project file.



7) By default AEO-Light will process the entire video sequence. However, users may select a portion of the video for processing by moving the slider to the desired locations and pressing the IN and OUT buttons. Users may also specify the frame number by directly typing a number into the display box and then pressing the IN and OUT button. Multiple IN and OUT points are not supported.

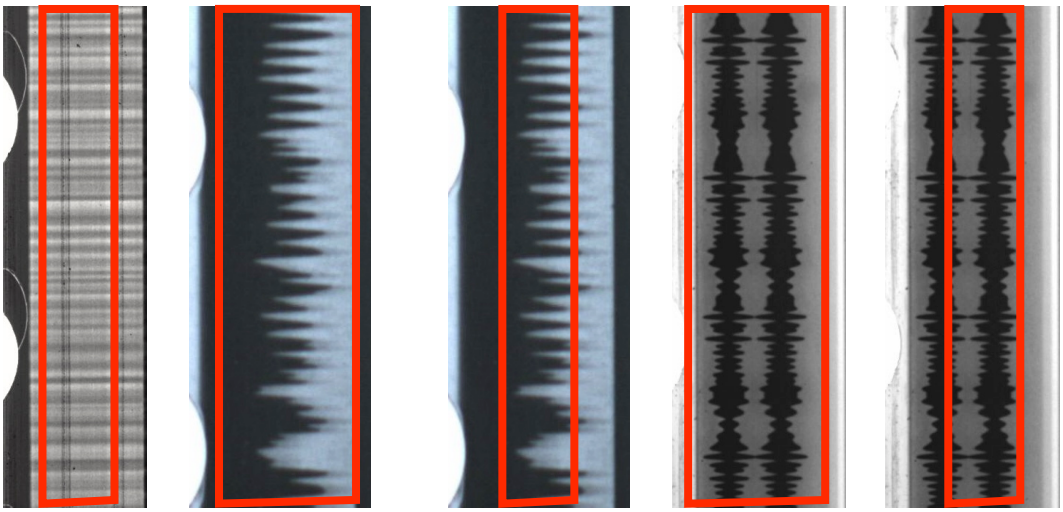
8) Define the region from which the optical sound will be extracted by selecting the "Locate" button.



a) Move the red bounding box over the optical sound track.

b) Adjust the width of the bounding box so that the left/right parameters fall on the edges of the track area. The software will use your selections to to set the parameters used on all frames during processing.

- Variable density tracks can be narrowed quite considerably; a narrow box may be used to avoid severe linear scratches in the track area.
- Variable area tracks require greater caution when setting the bounding box to ensure that the audio peaks are not cut off or "clipped" by the bounding box.



Note: variable density tracks can have narrow or wide boxes but variable area tracks must accommodate the complete wave signal in order to produce quality audio.

c) Double click with the pointer inside the bounding box. AEO-Light will randomly select a number of frames.

d) Repeat this process for each selected frame. From the second frame on, only making the box narrower will impact the audio extraction process. All other changes are ignored. When AEO-Light has sampled enough frames the window will close. *You may restart the "Locate Track" sequence at anytime during this process by closing the window and returning to the main GUI.*

e) More than one bounding box may be defined by repeating this process (the benefits of multiple bounding boxes are discussed in the "Advanced User" section).

9) Select the "Extract" button. This initiates the AEO-Light process. Depending on the configuration of the user's computer and type of input, extraction times will vary from 3 to 14 frames per second.

Once the extraction process is complete a dialog box will notify the user.

10) The default audio file may be sampled by selecting the "Play" button. AEO-Light saves the raw version automatically to the project's render folders.

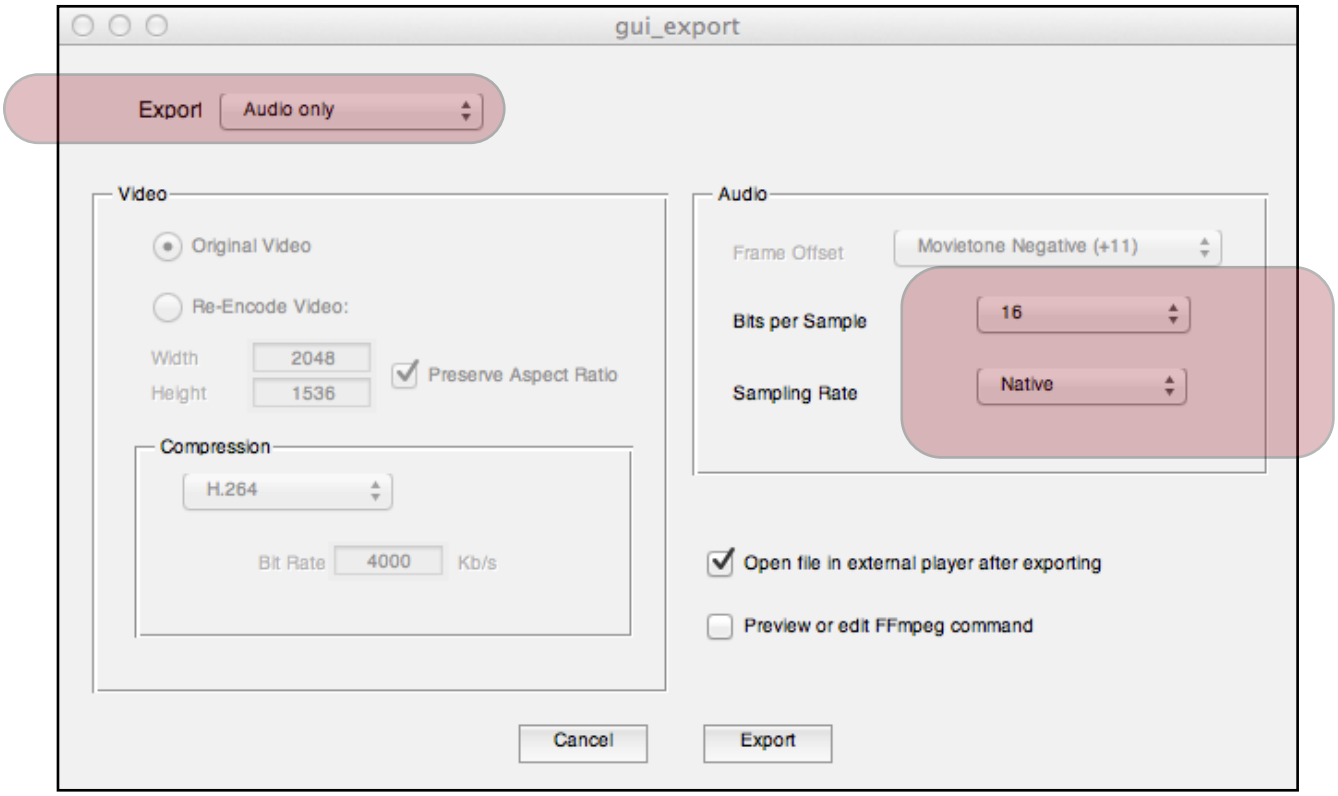
Saving the project at this stage will allow a user to close AEO-Light and reopen the project without having to redo the audio extraction process.

11) Select the “Export” button.

12) To extract audio only, select “audio only” from the drop-down window, select “export” and specify a file name and location.

a) By default AEO-Light exports 16 bit audio with a sampling rate derived from the resolution of the image input.

b) Users may specify a particular bit depth and sampling rate by choosing from the menu option on the right of the export window. Resampling is done by FFmpeg. If FFmpeg is not installed, only the default setting can be used.

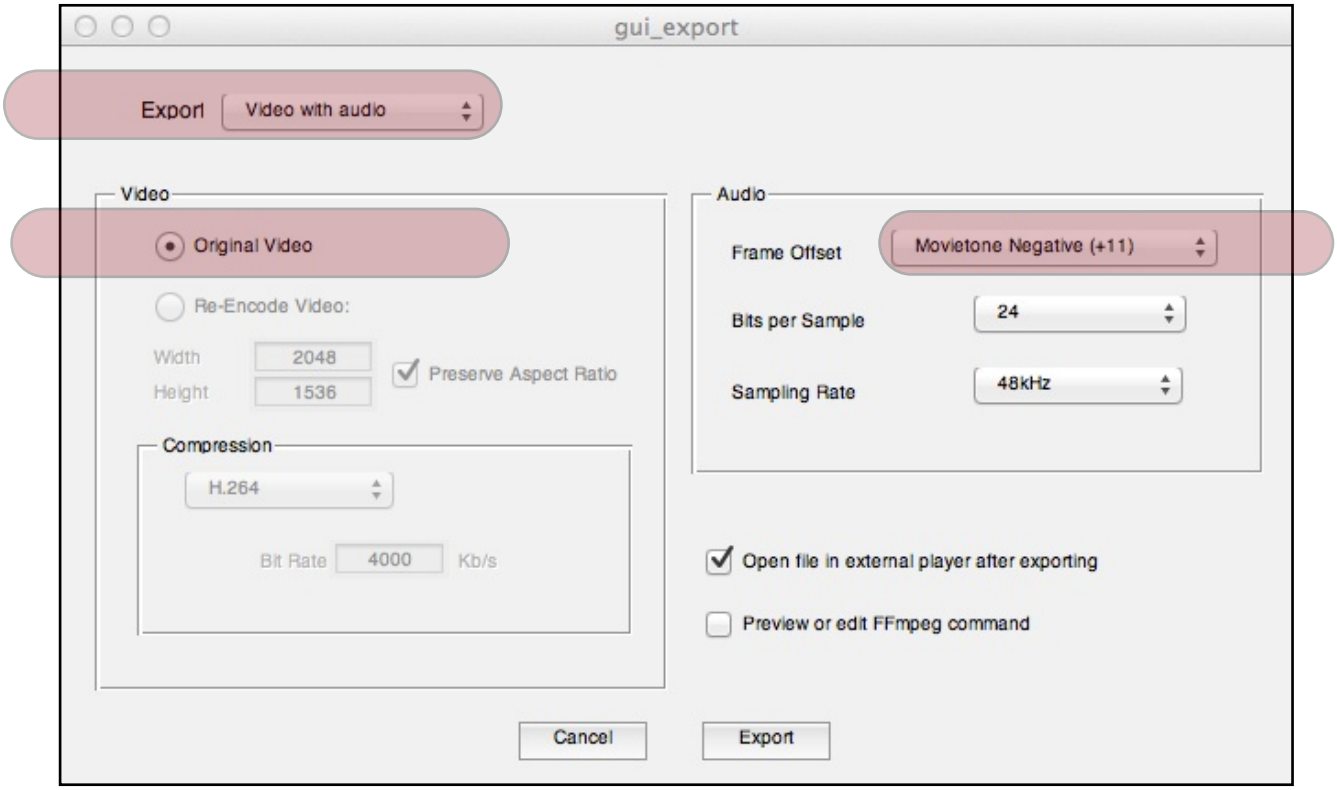


13) To extract synchronized audio and video, select “Video with audio” from the drop-down menu, define the video format and frame offset, select “export” and specify a file name and location. The export settings available depend upon the image input:

a) If the film source was a video format AEO-Light can synchronize the extracted audio with the original video file.[2]

b) If the film source was a frame format (e. g., DPX) then users must specify the encoding method for the video. AEO-Light defaults to H.264, but users may select ProRes (specifying a bit rate) or uncompressed video. If the “Preview or edit FFmpeg” option is selected users may modify the FFmpeg command as desired.

c) Specify the required frame offset, desired audio sampling rate, and bit depth.



14) AEO-Light will automatically launch the audio (.wav) or video file using the default application as set by the operating system. If users experience difficulty with playback a third-party player like VLC should be used to open the exported files.

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[2] Currently AEO-Light is able to extract audio from Cineform encoded video. However, synchronizing audio to video relies on the codec libraries utilized by FFmpeg. The Cineform codec is not at this time supported by FFmpeg.

ADVANCED INSTRUCTIONS: (to be completed)

AEO-Light offers a number of setting options for advanced users. These options are available under the "Settings" from the Project drop-down menu. Documentation for these settings will be forthcoming in a later version of the manual.

PROVIDING FEEDBACK:

AEO-Light Ver. 0.9 (beta) is provided to users for testing. All feedback is vital to the development of the software but we are keenly interested in reports on the following issues.

* Performance. Data about PC configuration combined with frames per minute processing rate--this information is displayed at the end of each audio extraction.

* Quality. Subjective and objective evaluation of the audio quality synchronization quality, etc..

* Scanner configuration. AEO-Light is designed to be scanner and sensor neutral provided the scans meet the basic criteria outlined above. The development team values feedback about the types of scanners and sensors used to produce the DPX, TIF or video input processed by AEO-Light. Whenever possible, the team would like sample input to help with our evaluation of the software's performance and to better contextualize the feedback provided on other issues. Unless permission for use is provided by the tester, any such scans will be used for internal evaluation only for the purposes of developing AEO-Light.

Send feedback to gregw@mailbox.sc.edu OR
submit feedback via the web, http://imi.cas.sc.edu/mirc-feedback/

AEO-Light, Ver. 0.9 (Beta)

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Additional programming by L. Scott Johnson. Testing and support by Brittany Braddock

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