Audio and video support in EXMARaLDA[1]

1. Introduction and general recommendations

EXMARaLDA supports the playback and display of digital audio or video files and their synchronisation with the transcriptions through:

- the timeline viewer in the Partitur-Editor,

- the Audio/Video panel in the Partitur-Editor (**View > Audio/Video panel**),

- the Praat panel in the Partitur-Editor (**View > Praat panel**),

- and through corresponding components in EXAKT, FOLKER and OrthoNormal.

Audio and/or video files are associated to a recording via **Transcription > Recordings...** in the Partitur-Editor.

If you work with video, you will still need to have an audio file in WAV format associated with your transcription for the timeline viewer to show you a real waveform. In that case, extract a WAV file from the video and associate both video and WAV file with your transcription, putting the video file on top of the list.
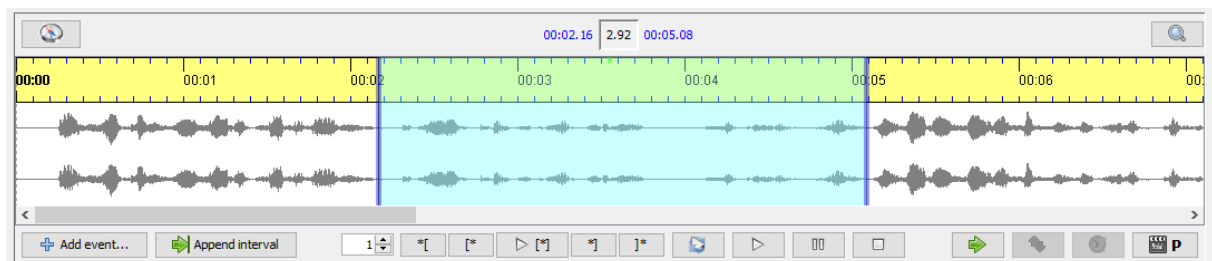
Likewise, the Praat Panel requires a WAV file to be associated with the transcription, as do the functions for running a silence detection (**File > New from silence detection**), for masking audio files (**Transcription > Mask audio file...**), and for calling the WebMaus web service (**CLARIN > WebMaus**).

Recommendation 1: WAV file

Always have a WAV file associated with the transcription. If you work with video, extract a WAV file and associate both files, putting the video first.

Not associating a WAV file will rob you of the possibility to visually detect pauses etc. in the timeline viewer and of the possibility to work with the Praat Panel and other important functions in the editor.

In a working setup, the individual components should look as follows in the Partitur-Editor:
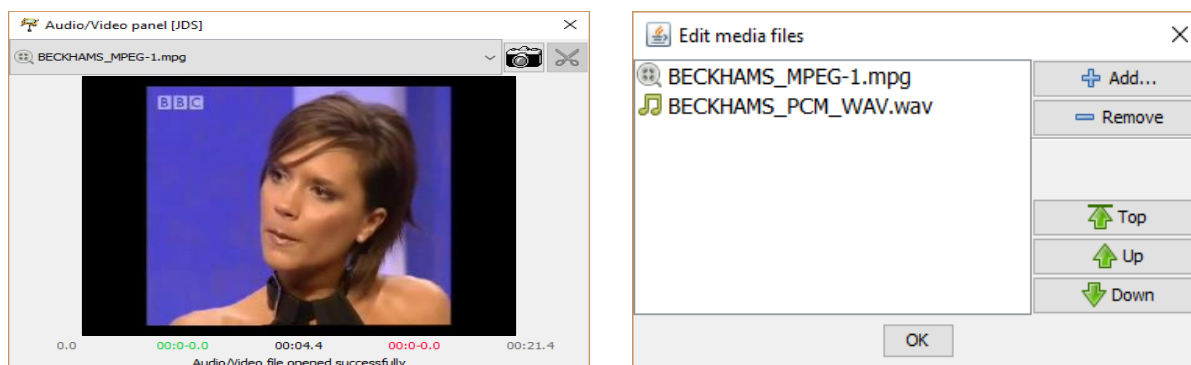

Figure 1: Timeline viewer displaying the waveform of the WAV audio file (top), audio/video panel displaying the image of the MPEG-1 video file (bottom left) and media files associated with the transcription (bottom right).

Whether and how audio or video support works for a given media file can be tricky to find out, because it can depend on many different parameters:

- your computer's hardware (audio and video card)

- your operating system (Windows, MAC OS or Linux)

- certain pieces of software which you may have or not have installed on your system (media frameworks like DirectShow or QuickTime and codecs for "reading" video data like H.264/MPEG-4)

- the file format of your audio or video file (e.g. ".wav" or ".mov")

- other parameters of your audio or video file (like sampling rate, frame rate, bit rate)

- the version of EXMARaLDA you work with (preview or official, 32bit or 64bit versions)

- the settings you choose in EXMARaLDA (in particular, the media player in the Partitur-Editor, via **Edit > Preferences**, **"Media"** tab)

Please be aware: The EXMARaLDA team has spent much time on trying to understand and improve audio and video support, and we have answered countless support requests regarding this topic. We have come to the conclusion that we will not be able to provide support for arbitrary kinds of media setup in the future any more. Starting with version 1.6 of the Partitur-Editor, audio and video support in EXMARaLDA is based on the following recommendation:

Recommendation 2: Standard formats

EXMARaLDA supports audio and video <u>only in one</u> of the three standard formats PCM-WAV (for audio), MPEG-1 (for video) and MPEG-4 (for video), as specified below.

EXMARaLDA may still work with media data in other formats (such as MP3 for video or WMV for video), but we <u>cannot guarantee</u> this, nor can we offer much support in cases where EXMARaLDA fails to work with these other formats. If you plan to seriously work with EXMARaLDA, we absolutely recommend that you establish a workflow where your audio and video data are converted to one of the standard formats before you use them in EXMARaLDA.

Please note that MPEG-1 video is generally not a good choice for archiving your data (since it is an outdated standard) or for delivering it over the web (since MPEG-4-based formats have

been established as a de facto standard in the WWW). We recommend it only as a "tool format". In your workflow, you could use MPEG-4 as the base format and simply derive an MPEG-1 version for the parts where EXMARaLDA is involved.

EXMARaLDA uses different players for audio/video playback. You can see which player is currently used in the lower right corner of the Partitur-Editor:
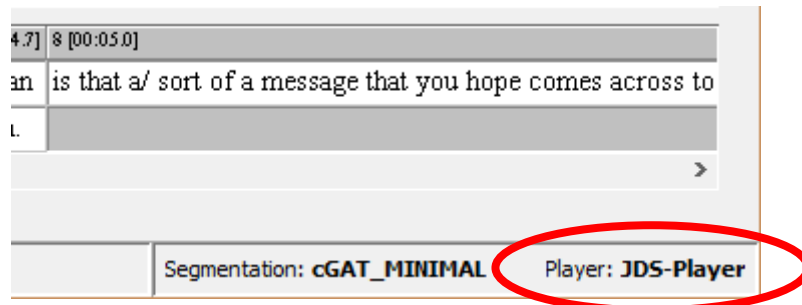

Figure 2: Currently used player

You can switch players via **Edit > Preferences…** (in the **"Media"** tab) in the Partitur-Editor. Please note that you'll have to restart the Partitur-Editor for a change of player to take effect.
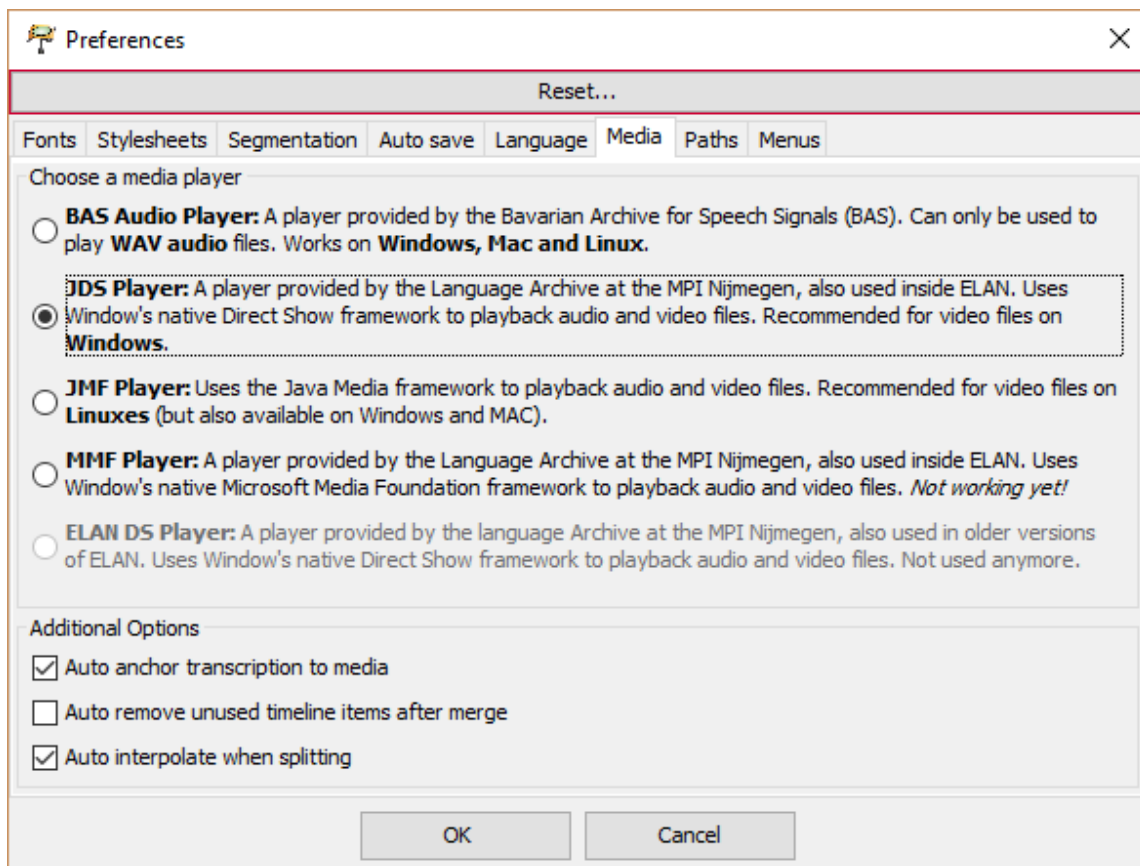

Figure 3: Switching players in the "Media" tab

Only the **"BAS Audio player"**, developed by the Bavarian Archive for Speech Signals, is written in "pure" JAVA and thus mostly independent of the operating system it runs on. The BAS audio player only supports WAV audio, i.e. you cannot use it to playback video.

For video, EXMARaLDA uses players developed at the Max-Planck Institute for Psycholinguistics in the context of the ELAN tool. The **"JDS player"** builds on Microsoft's DirectShow framework and is available under Windows only. It usually works fine with MPEG-1 videos as well as WAV audio files. The **"CocoaQT player"** builds on Apple's QuickTime framework and is available under MAC OS only. It usually works fine with MPEG-1 videos, MPEG-4 videos and WAV audio files. The **"MMF player"** builds on Microsoft's Media Foundation (MMF) framework. It is worth a try if you absolutely must work with MPEG-4 files under Windows, but we haven't managed so far to make it work 100% reliably. The **"JMF player"** builds on Sun's Java Media Framework, the development of which has, unfortunately, come to a standstill in 2003. It can still work okay for MPEG-1 video files on Windows, and it is the only video player we can currently offer on Linux.

The following table summarises the availability and properties of the different players on different platforms:

	Operating System			Audio	Video	
	Windows	MAC OS	Linux	WAV	MPEG-1	MPEG-4
BAS-Audio-Player	✓	✓	✓	✓	✗	✗
JDS-Player	✓	✗	✗	✓	✓	(✓)[2]
Cocoa-QT-Player	✗	(✓)[3]	✗	✓	✓	✓
JMF-Player	(✓)[4]	(✓)[4]	(✓)[4]	(✓)[4]	(✓)[4]	✗
MMF-Player	(✓)[5]	✗	✗	✗	✗	(✓)[5]

Figure 4: EXMARaLDA players for different platforms and formats

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Recommendation 3: EXMARaLDA players

If you work with audio only, the BAS audio player should work fine on all platforms. If you work with MPEG-1 video, choose the JDS player on Windows, the CocoaQT player on MAC OS.

Further options, which we do <u>not</u> recommend, but do not want to discourage altogether, are to work with MPEG-4 files on Windows using the MMF player, to work with MPEG-4 files on MAC OS using the CocoaQT player or to work with MPEG-1 files on Linux using the JMF player.

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2. Format specifications

2.1. WAV Audio

The following table summarises the properties of WAV audio files as we defined them as the "Archive Standard" at the Archive for Spoken Language. Audio files with these properties usually work fine in EXMARaLDA, both with the BAS audio player and the JDS, and CocoaQT players.

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[2] JDS will be able to playback MPEG-4 files if a suitable codec is installed on the system. One such codec is Ffdshow/mpeg-4: http://www.free-codecs.com/download/ffdshow.htm.

[3] The CocoaQT player will only work with Apple's Java 1.6. If you run EXMARaLDA on the MAC with Oracles Java (1.7 or higher), the player will be automatically switched to the BAS audio player. Video playback is thus not possible with Oracle Java on the Macintosh.

[4] The JMF player should be used as a last resort only. Since it is the only video player currently available on Linux, we cannot recommend to work with video under Linux. The JMF player under Linux requires the32bit distribution of EXMARaLDA.

[5] Support for MPEG-4 via the MMF player may improve in future versions of EXMARaLDA

	WAV
Format	PCM.WAV
Sampling rate	48kHz
Bit rate	1536Kbps
Bit depth	16bit
Channels	Stereo

Figure 5: Properties of WAV audio files

Lower sampling rates or bit depths, as well as mono recordings should also be fine. Higher sampling rates (e.g. 96kHz) or bit depths (e.g. 24bit) can cause problems for some of the players.

Some known problems in this area are:

▪ Some devices write compressed audio files with the suffix "WAV". Such compressed WAV files <u>must</u> be decompressed before they can be used in EXMARaLDA.

▪ The JDS player has sometimes trouble reading WAV from "external" (network or USB) drives (probably because of some issue with file permissions). If you experience such problems, try copying the WAV file in question to your local disk and read it from there.

▪ We do <u>not</u> recommend MP3 as a file format to work with in EXMARaLDA. However, the JDS and CocoaQT players should be able to play MP3. An MP3 version of the audio is needed when working with remote corpora in EXAKT.

2.2. MPEG-1 and MPEG-4 Video

The following table summarises the properties of MPEG-1 and MPEG-4 files as we defined them as the "Archive Standard" at the Archive for Spoken Language. Video files with the MPEG-1 (the "tool format") properties work fine in EXMARaLDA with both, the JDS and the CocoaQT player, and they can also be okay for the JMF player. The MPEG-4 parameters are those which we use as a "master format", i.e. for delivering high quality video wherever EXMARaLDA is not involved. We plan to improve EXMARaLDA's MPEG-4 support for this specification.

		MPEG-1	MPEG-4
Video Track (image)	Format/Container	MPEG 1	mp4/AVC
	Encoding	MPEG-PS	H.264/MPEG-4 Part 10 AVC
	Resolution	352 x 288	1980x1080
	Frame rate	25-FPS	25 FPS
	Bit rate	1000kbps	up to 5000Kbps
	Bit rate type	constant	constant
	Scan type	progressive	progressive
Audio track (sound)	Format	MPEG Audio	AAC
	Sampling rate	48kHz	48kHz
	Bit rate	224Kbps	384Kbps
	Channels	Stereo	Stereo

Figure 6: Summary of the properties for MPEG-1 and MPEG-4 files

2.3. Transcoding

To work with any of the three recommended formats you may have to convert data from your recording device (audio recorder or video camera) or from some other source (e.g. YouTube downloads) to one of the standard formats. As mentioned above, conversion can also be necessary between the standard formats, for instance when you need to extract a WAV audio

file from a video file or when you transform MPEG-4 "archive" videos into MPEG-1 "tool" videos.

Audio conversion: is usually straightforward. We can generally recommend Audacity (http://www.audacityteam.org/) for this task. Audacity is free, it has a great user community (also among linguists), and it works on all common platforms. Audacity can convert between WAV files with different parameters (e.g. turn a stereo into a mono file, or reduce sampling rate from 96kHz to 48kHz), it can convert compressed MP3 or OGG audio into uncompressed WAV, and it can even be used to extract audio from some types of video files, and save it as WAV. It does not, however, offer any support for converting between different video formats. Alternatively, Praat is also quite flexible in terms of the audio formats it understands, and it can be used to reliably produce WAV files with the parameters specified above.

Video conversion: there are many tools out there, some of them free, some of them with a commercial licence. Although many of them make a promise to be able to "convert any format into any other format", the quality of the conversions can differ greatly between any two such tools. As a rule, you get something for your money when you use a commercial tool – or, conversely, we found that most free converters produce unsatisfying results (besides, some of the more popular ones are categorised as AdWare). At the Archive for Spoken German, we use the following commercial products all of which, as a rule, produce MPEG-1 data that EXMARaLDA can handle well:

- EDIUS (Cannopus) - http://edius.de/

- Squeeze (Sorenson) - http://www.sorensonmedia.com/squeeze/squeeze-desktop/

- Magix Video Deluxe - http://www.magix.com/de/video-deluxe/


Recommendation 4: Converters

To convert between audio formats only, Audacity or Praat are both highly recommendable free tools. To convert video data, we strongly recommend to invest into a licence for a professional product.

If purchasing a licence is not an option, we recommend working with the FFMEG library or tools which are based on that technology. Currently, X-MediaRecode (http://www.xmedia-recode.de/) is one such tool for which we have found few drawbacks. We explicitly discourage the use of SUPER, Format Factory and Freemake Video Converter.

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3. Trouble shooting

You may run into one of the following problems when working with audio or video in the EXMARaLDA Partitur-Editor:

(1) The audio or video file is not loaded, the Partitur-Editor displays an error message.
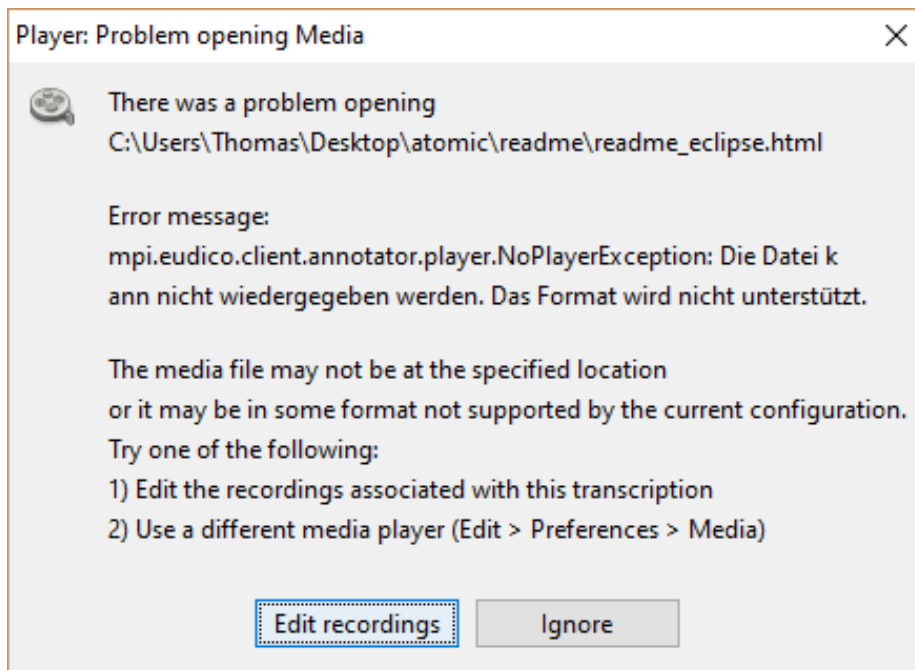
(2) The audio or video file is loaded, but playback is unreliable in one or more of the following ways:

a) Playback does not start or stop where it should

b) The video plays all right, but the last part of the sound can't be heard

c) The cursor jumps to the end of the file after an interval has been played

The first things you should do when your media file does not work as expected is to check…

- …if your media file is at the specified location – under **Transcription > Recordings…** files which cannot be found on the filesystem will be highlighted in red.

- …if your media file is in one of the recommended file formats (i.e. WAV, MPEG-1, MPEG-4, see above) – if they are not, convert them.

- …if you have selected a player suitable for that file format (see above) – if you just need audio playback, it is always worth trying to switch to the BAS Audio Player.

If this first check does not reveal any errors, you should then verify whether your EXMARaLDA setup works with the recommended tool formats at all. To make this easier for you, we have put together a zip archive with a few test files which you can download from http://exmaralda.org/en/utilities/ (see **"Test files for Audio and Video Support in EXMARaLDA"**).

Trouble shooting 1: Test your setup with the EXMARaLDA test files

→ Download and unpack the zip archive at http://www.exmaralda.org/files/MEDIA-TEST-BATTERY.zip.

→ Open the transcription BECKHAMS.exb with the Partitur-Editor.

→ Check if MPEG-1 video playback works, then check if WAV audio playback works by selecting the WAV file in the audio/video panel.

If your setup works with these test files, chances are that your own media file is not encoded according to the specifications given above.

If your setup does not work with the test files, your system may lack the appropriate codecs, or the codecs on your system may be misconfigured. This can happen especially on Windows when you have different types of media software installed. There is an easy way to clean up the codecs on your system, which also helps in many cases.

Trouble shooting 2a: Install the Combined Community Codec Pack (CCCP)

→ **On Windows:** Download the CCCP installer from http://www.cccp-project.net/ and run it. Restart your computer and try again if EXMARaLDA can open your media file.

A similar codec pack is available for MAC OS.

Trouble shooting 2b: Install the Perian Codec Pack (Mac OS)

→ **On the Macintosh:** Download the Perian Pack from http://perian.org/ and run it. Restart your computer and try again if EXMARaLDA can open your media file.

If none of these troubleshooting measures helps, feel free to contact the EXMARaLDA support at exmaralda-support@uni-hamburg.de. Make sure you give us all the necessary information (such as: Which media file are you using? With which player? On which OS? What is going wrong? Does it also go wrong with the EXMARaLDA test files?).