MOSCOW FORENSICS DAY ’26

DMITRY BOROSHCHUK

MEDIA FORENSICS:
ENHANCING PHOTOS, VIDEO AND AUDIO

BEHOLDERISHERE



- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS



"ANY OBJECT CAN BE ENLARGED AS MUCH AS NEEDED, EVEN IF IT IS VERY FAR AWAY!"

A 10 x 10-pixel face cannot be turned into an image suitable for identification. Upscaling only interpolates (fills in) pixels; it adds no new information. We enhance visibility rather than recover information that is absent.

"THE SOFTWARE WILL DO EVERYTHING, INCLUDING THE CONCLUSIONS!"

A tool is only a brush. A forensic examiner must understand the physics, color theory and optics. Automatic filters often destroy evidential value by making irreversible changes to the original frame.

"AI CAN ACCURATELY IDENTIFY A CRIMINAL IN A VIDEO!"

Modern neural networks are useful for verification (similar or not), but criminal proceedings require forensic facial comparison. AI acts as a filter to find similar faces; the final assessment remains with an expert comparing anatomical landmarks, ears and other features.

"METADATA ALWAYS TELLS THE TRUTH!"

EXIF metadata is easy to forge. First examine the content: house numbers, signs, shadows and weather, and compare it with the claimed time. Metadata is a hypothesis and a direction for verification, not the truth.

"ANY EDIT CAN BE DETECTED BY PIXEL-BY-PIXEL COMPARISON!"

We look for statistical anomalies rather than frame joins: changes in noise between frames, double-compression artifacts (when a video was saved twice), and mismatches between frame numbers and timecode.

DMITRY BOROSHCHUK

BEHOLDERISHERE.CONSULTING

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS

PROBLEM:

"We received a video file, but the standard player cannot open it..."

INSTALL CODECS AND UNIVERSAL MEDIA PLAYERS FIRST:



TOOLS:

K-Lite Codec Pack

https://codecguide.com/download_kl.htm

A codec pack for playing various video formats on Windows.



VLC Media Player

https://www.videolan.org/

A universal, cross-platform video player.

DMITRY BOROSHCHUK

BEHOLDERISHERE.CONSULTING

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION

PROBLEM:

"Installed them! It still will not play, and the extensions look strange: .dav, .dat, .h264..."

METHODOLOGY:

- **Identify the codec.**
  Determine which codec was used to compress the video. Media-information analysis tools provide this information.
- **Containerization / remastering.**
  If the codec is known but unsupported, repackage the video into a recognized container (such as .mkv or .mp4) without recompression (losslessly), preserving quality and the original metadata and evidential value.

TOOLS:

MediaInfo

https://mediaarea.net/en/MediaInfo

Analyzes metadata and the codecs used.

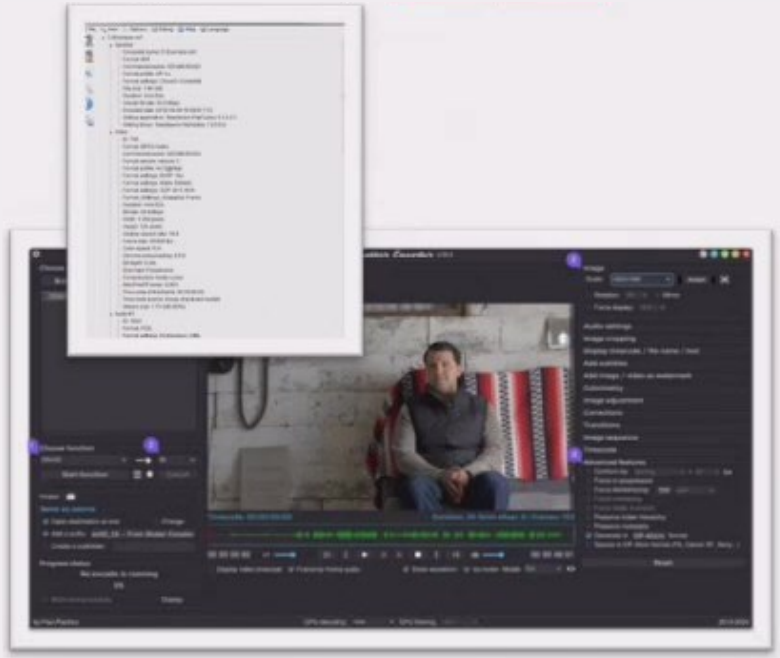
Shutter Encoder

https://www.shutterencoder.com/

Media analysis and conversion software.

WORKFLOW:

- Install **MediaInfo**. A MediaInfo item will appear in the file context menu.
- Select **View > Tree**. The program displays Format, Codec ID and Format profile, identifying the exact codec (H.264, H.265, MJPEG, etc.).
- Then use **Shutter Encoder**.



DMITRY BOROSHCHUK
BEHOLDERISHERE.CONSULTING

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION

DMITRY BOROSHCHUK
BEHOLDERISHERE.CONSULTING

PROBLEM:

"We need to make the video playable without lossy compression destroying fine details, such as license plates or facial expressions."

METHODOLOGY:

Use a container that supports the original codec, or re-encode with a mathematically lossless codec.

TOOLS:

Shutter Encoder

https://www.shutterencoder.com/

Media analysis and conversion software.



WORKFLOW:

- Drag the file into the program window.
- Under **Choose Function**, select **Copy**. This remuxes the video into another container rather than converting it. If the player is the only problem, choose .mp4 or .mov as the output format.
- For an unusual codec, select **Apple ProRes** or **FFV1**. These use lossless (or visually lossless) intraframe compression. They create large files while retaining the source pixels. Set the bitrate to **Automatically** or the maximum value.

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA

PROBLEM:

"The defense has supplied a phone video. We need to establish which device it came from."

METHODOLOGY:

- Check whether the video bitrate is consistent with the claimed device.
- Analyze metadata.
- Compare the amount of metadata with what is expected from the claimed device.

TOOLS:

Metadata++

https://www.logipole.com/

Extracts the complete metadata.

MediaInfo

https://mediaarea.net/en/MediaInfo

Analyzes metadata and the codecs used.

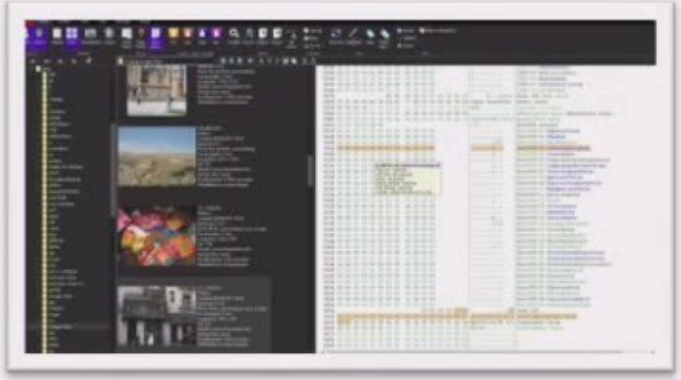
VideoCleaner

https://www.videocleaner.com/

A forensic suite for examining video and photos.

WORKFLOW:

- Load the file in **MediaInfo** or **Metadata++**. Examine the codec, profile and bitrate. A suspiciously low bitrate for the claimed phone may indicate recompression.
- Open the file in **Metadata++**. Examine the EXIF and XMP tabs for the camera **Make** and **Model**, the original recording date (**CreateDate**), and the file modification date (**FileModifyDate**).
- In **VideoCleaner > Forensic**, use **DCT Test** (discrete cosine transform analysis) to reveal compression artifacts. Double compression produces a characteristic grid pattern.



DMITRY BOROSHCHUK
BEHOLDERISHERE.CONSULTING

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING

DMITRY BOROSHCHUK
BEHOLDERISHERE.CONSULTING

PROBLEM:

"The dashcam recorded at night. The image is so dark that almost nothing is visible. How can we brighten it without losing detail?"

METHODOLOGY:

Simply increasing brightness makes the image gray and amplifies noise. Work with Curves and Levels in a professional color-grading tool. Expand the dynamic range to bring information out of the shadows without overexposing already visible areas.

TOOLS:

DaVinci Resolve

https://www.blackmagicdesign.com/products/davinciresolve

A software suite for working with video.



WORKFLOW:

- Import the video and drag it onto the timeline on the **Edit** page.
- Open the **Color** page and use the **Lift / Gamma / Gain** controls.
- Lower **Lift** (black points) to remove the gray veil and deepen shadows.
- Raise **Gain** (white points) to brighten headlights, streetlights and other light sources.
- Adjust **Gamma** (midtones) to balance the overall scene brightness.
- For finer adjustment, use **Curves**. Add a point in the lower part of the curve (shadows) and lift it slightly to brighten shadows without affecting highlights.
- To suppress noise revealed by brightening, use **Noise Reduction** (the three-dot icon in the settings palette).

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING

DMITRY BOROSHCHUK

BEHOLDERISHERE.CONSULTING

PROBLEM:

"Motion blur makes the vehicle license plate unreadable. How can we read it?"

METHODOLOGY:

Combine several methods:

- Stabilization to reduce camera shake.
- Deblocking to remove block-shaped compression artifacts.
- Sharpening using deconvolution when the blur type is known.

The key task is to isolate character outlines from the blurred patch.

TOOLS:

VideoCleaner

https://www.videocleaner.com/

A forensic suite for examining video and photos.



WORKFLOW:

- Open the video in **VideoCleaner**.
- Select the segment where the plate is most visible, usually a few frames before and after the point of closest approach.
- Apply **STABILIZE** to minimize shake and make the plate movement more predictable.
- Go to **TOOLS > Focus** (or **FORENSIC > Edge**). Use **Deblock** to reduce pixelation. The **Sharpen** slider increases edge sharpness.
- Use **FORENSIC > Edge** filters (Sobel, Canny). They emphasize object outlines, often revealing letter and digit shapes even when overexposed or blurred.
- Review the result frame by frame and select the best frame.

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION

DMITRY BOROSHCHUK

BEHOLDERISHERE.CONSULTING

PROBLEM:

"The suspect's face in CCTV footage is a pixelated patch. Can it be made recognizable for identification?"

METHODOLOGY:

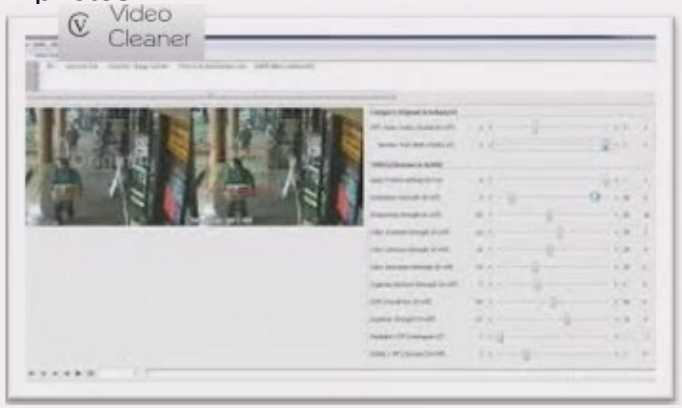
The key method is **Super Resolution**. Unlike ordinary scaling (interpolation), which only stretches pixels, it combines information from several adjacent frames to synthesize a higher-quality frame with reconstructed detail. The software analyzes movement relative to the camera and fills in texture.

TOOLS:

VideoCleaner

https://www.videocleaner.com/

A forensic suite for examining video and photos.



WORKFLOW:

- Load the video in **VideoCleaner** using **File > Open** or drag and drop.
- Select at least 2-3 seconds on the timeline with the most favorable view of the face.
- Under **RESIZE**, locate **SUPER RESOLUTION**.
- Click **Super Resolution**. The selected segment is processed into an enhanced still frame or video clip.
- You can experiment with the **Quality** sliders, although the default settings are usually sufficient.

IMPORTANT: The resulting image is a derivative reconstruction. This must be stated in your report.

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS

DMITRY BOROSHCHUK

BEHOLDERISHERE.CONSULTING

PROBLEM:

"Glare on glass may contain a reflection of the suspect's face. How can we enhance the reflection?"

METHODOLOGY:

Reflection analysis is particularly difficult. We cannot remove the glass, but can try to isolate the reflection by adjusting contrast and color channels and suppressing the main image behind the glass.

TOOLS:

DaVinci Resolve

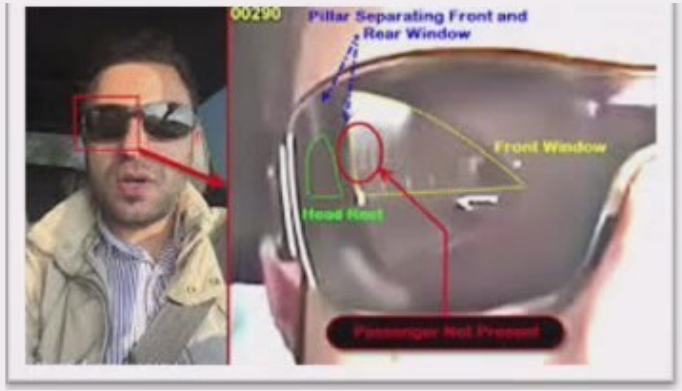
https://www.blackmagicdesign.com/products/davinciresolve

A software suite for working with video.

GIMP

https://www.gimp.org/

A raster graphics editor and free alternative to Photoshop.



WORKFLOW:

- Export the frame in which the reflection is most visible.
- Open the frame in **GIMP**. Duplicate the layer (**Ctrl+Shift+D**).
- Desaturate the upper layer (**Colors > Desaturate**) and experiment with layer blending modes. **Screen** or **Dodge** may brighten the reflection.
- Apply **Colors > Levels** separately to the red, green and blue channels. Sometimes the reflection is clearer in just one channel.
- Try the **Edge** filter to highlight the reflected object's boundaries.

IMPORTANT: Draw conclusions with particular care. Noise or an artifact can easily be mistaken for a meaningful detail.

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS
- EVENT RECONSTRUCTION

DMITRY BOROSHCHUK
BEHOLDERISHERE.CONSULTING

PROBLEM:

"Several witnesses filmed a fight from different positions. We need a timeline showing who struck blows and who tried to intervene."

METHODOLOGY:

- **Compositing and synchronization.** Audio provides a key synchronization reference. Even in poor-quality video, the sound of an impact, a shout or music is shared across recordings.
- After synchronization, edit the videos into a single sequence that allows switching between camera angles.

TOOLS:

DaVinci Resolve

https://www.blackmagicdesign.com/products/davinciresolve

A software suite for working with video.



WORKFLOW:

- Load all videos into **DaVinci Resolve** on separate tracks.
- Display the audio waveforms for all clips.
- Find a distinctive audio peak, such as breaking glass or an impact, on one track.
- Locate the same peak on the other tracks. Move the clips along the timeline until the peaks align.
- After synchronization, mute individual tracks to retain one shared soundtrack. Switch between videos to build a sequence showing the most useful view of the events at each moment.

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS
- EVENT RECONSTRUCTION
- AUDIO ENHANCEMENT

DMITRY BOROSHCHUK
BEHOLDERISHERE.CONSULTING



TOOLS:

AUDACITY

https://www.audacityteam.org/

A powerful free audio editor with a wide selection of extensions.

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS
- EVENT RECONSTRUCTION
- AUDIO ENHANCEMENT

DMITRY BOROSHCHUK
BEHOLDERISHERE.CONSULTING

PROCESSING CAN:

- Reduce masking noise.
- Improve the intelligibility of speech that remains in the recording.
- Even out volume.
- Make listening easier.

PROCESSING CANNOT:

- Recover completely masked sound.
- Reliably fill in missing words.
- Restore information lost through clipping.
- Turn a guess into an established fact.



- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS
- EVENT RECONSTRUCTION
- AUDIO ENHANCEMENT
  - TYPES OF NOISE

DMITRY BOROSHCHUK
BEHOLDERISHERE.CONSULTING



Steady background

100 Hz-15 kHz; ventilation often 50-500 Hz



Electrical hum

50/60 Hz and harmonics at 100/120 and 150/180 Hz



Low-frequency rumble

20-200 Hz; often strongest at 30-120 Hz



Wind

Mainly below 200-300 Hz; gusts are broadband



Hiss / rain

Usually 2-16 kHz, especially 4-10 kHz



Urban noise

Broadband: approximately 30 Hz-10 kHz and above



Clicks

Short broadband impulses



Clipping

No fixed frequency band; adds harmonics across the spectrum

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS
- EVENT RECONSTRUCTION
- AUDIO ENHANCEMENT
  - TYPES OF NOISE
  - CHOOSING TOOLS



Steady background > Noise Reduction

Electrical hum > Notch Filter

Low-frequency rumble > High-Pass Filter

High-frequency hiss > Low-Pass Filter or EQ

Wind > High-Pass and local level reduction

Urban noise > Spectrogram and selective processing

Clicks > Repair or Click Removal

Clipping > Diagnose and document the limitation

DMITRY BOROSHCHUK
BEHOLDERISHERE.CONSULTING

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS
- EVENT RECONSTRUCTION
- AUDIO ENHANCEMENT
  - TYPES OF NOISE
  - CHOOSING TOOLS
  - IDENTIFYING NOISE



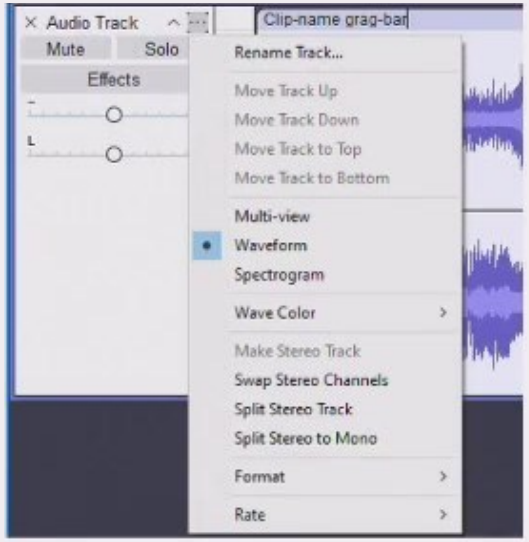
ANSWER FOUR QUESTIONS:

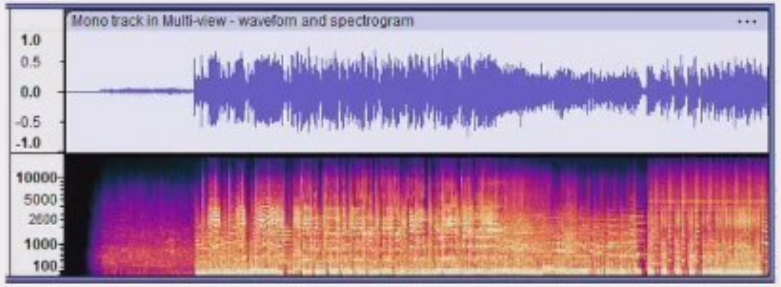
1. Is the noise steady or does it change over time?
2. Is it hum, hiss, pops or clicks?
3. Where in the spectrum is the interference concentrated?
4. Does it completely mask the speech?

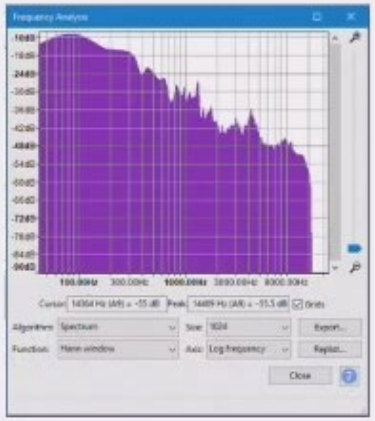
TOOLS:

- Track menu > Multi-view
- Analyze > Plot Spectrum

A spectrogram shows how frequencies change over time.
Plot Spectrum shows the average spectrum of a selection.







DMITRY BOROSHCHUK
BEHOLDERISHERE.CONSULTING

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS
- EVENT RECONSTRUCTION
- AUDIO ENHANCEMENT
  - TYPES OF NOISE
  - CHOOSING TOOLS
  - IDENTIFYING NOISE
  - STEADY BACKGROUND NOISE



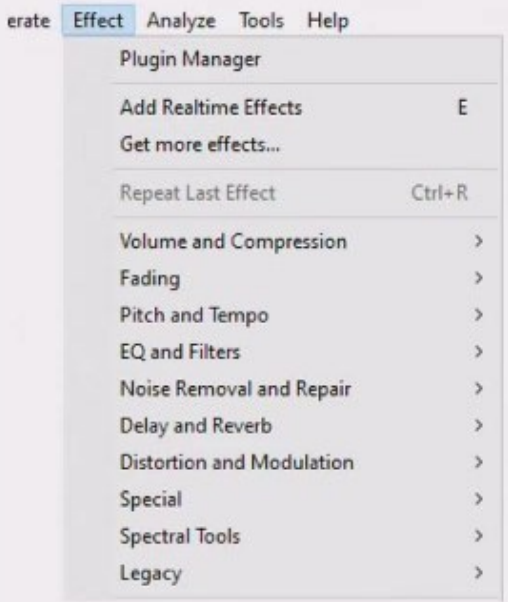
Usually 100 Hz-15 kHz; mechanical ventilation noise often 50-500 Hz

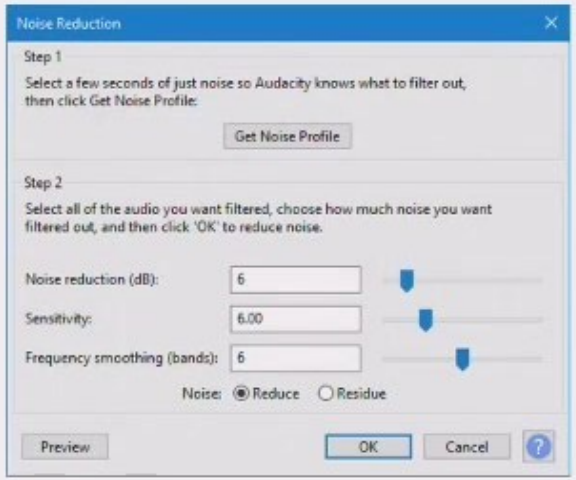
HOW TO RECOGNIZE IT:

- The noise changes very little.
- It is clearly audible during pauses.
- The spectral pattern remains stable.
- It sounds like a fan, refrigerator or amplifier hiss.

TOOLS:

Effect > Noise Removal and Repair > Noise Reduction





WORKFLOW:

1. Find a few seconds without speech.
2. Select only the background noise.
3. Click **Get Noise Profile**.
4. Select the working track.
5. Open Noise Reduction again.
6. Check the result in **Residue** mode.
7. Switch back to **Reduce** and apply.

A cautious starting point:
Noise Reduction: about 6 dB
Sensitivity: about 6
Frequency Smoothing: 0-6 bands

DMITRY BOROSHCHUK
BEHOLDERISHERE.CONSULTING

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS
- EVENT RECONSTRUCTION
- AUDIO ENHANCEMENT
  - TYPES OF NOISE
  - CHOOSING TOOLS
  - IDENTIFYING NOISE
  - STEADY BACKGROUND NOISE
  - LOW-FREQUENCY RUMBLE

DMITRY BOROSHCHUK

BEHOLDERISHERE.CONSULTING

Mainly 20-200 Hz; often strongest at 30-120 Hz

HOW TO RECOGNIZE IT:

- It sounds like rumbling or vibration.
- Most energy lies at the bottom of the spectrogram.
- Sources may include traffic, machinery or touching the microphone.
- The interference sometimes overloads the recording.

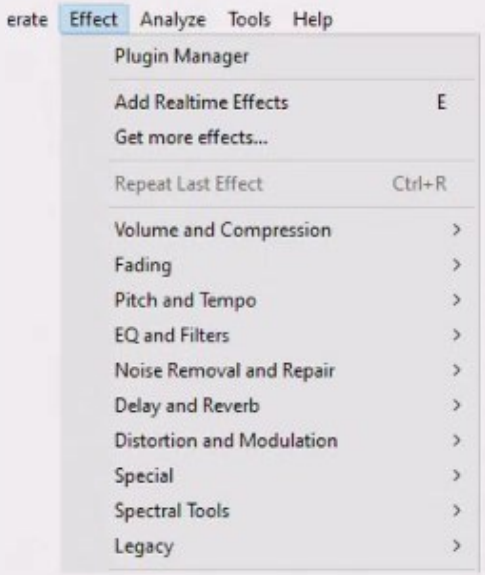
TOOLS:

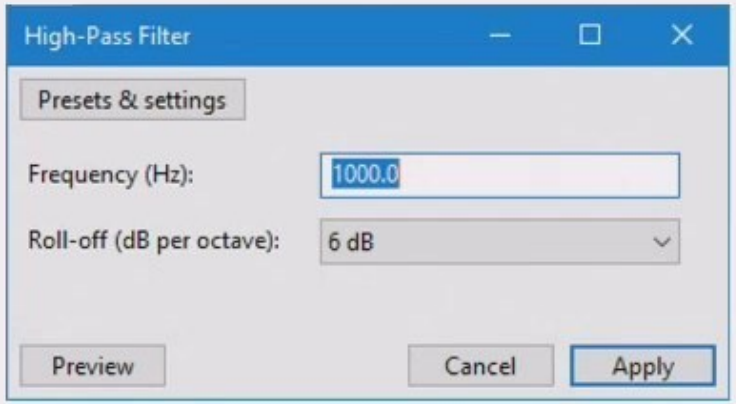
Effect > EQ and Filters > High-Pass Filter

WORKFLOW:

1. Select a segment with noise and speech.
2. Start at 60-80 Hz.
3. Try a roll-off of 12 dB per octave.
4. Preview the result.
5. Raise the cutoff in small steps.
6. Check the voice timbre after every change.

Take care: a 120-250 Hz cutoff can remove the fundamental of a low male voice.





The 1000 Hz shown is a demonstration value. For the first test, replace it with 60-80 Hz.

- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS
- EVENT RECONSTRUCTION
- AUDIO ENHANCEMENT
  - TYPES OF NOISE
  - CHOOSING TOOLS
  - IDENTIFYING NOISE
  - STEADY BACKGROUND NOISE
  - LOW-FREQUENCY RUMBLE
  - WIND NOISE

DMITRY BOROSHCHUK

BEHOLDERISHERE.CONSULTING



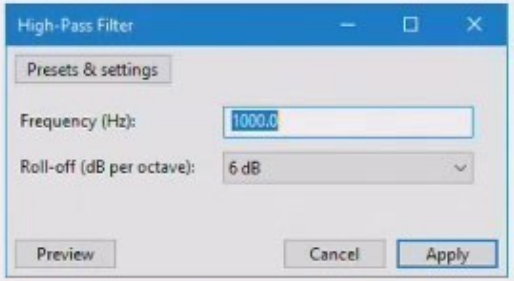
Most energy is below 200-300 Hz; strong impulses may extend above 1 kHz

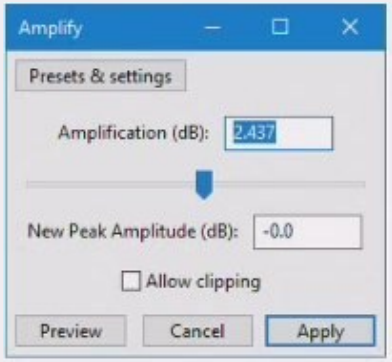
HOW TO RECOGNIZE IT:

- Low-frequency rumble.
- Large, irregular peaks.
- Individual pops.
- Abrupt changes in level.
- Possible microphone overload.

TOOLS:

Effect > EQ and Filters > High-Pass Filter

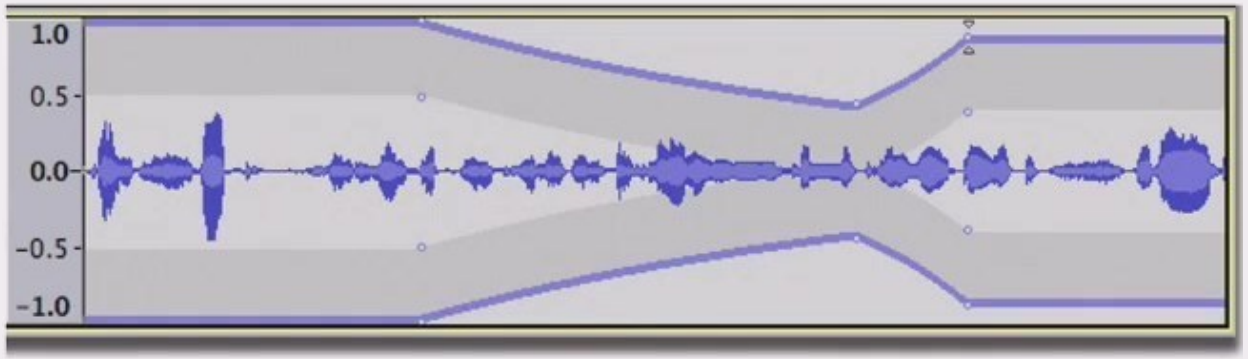




WORKFLOW:

Goals:
1. Reduce the overall low-frequency rumble.
2. Locally reduce individual pops.

1. Apply High-Pass Filter, starting at 80-100 Hz.
2. Zoom in on an individual pop.
3. Select the smallest possible region.
4. Open Amplify.
5. Enter a negative value from -3 to -9 dB.
6. Use the Envelope Tool for a smooth transition.



- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS
- EVENT RECONSTRUCTION
- AUDIO ENHANCEMENT
  - TYPES OF NOISE
  - CHOOSING TOOLS
  - IDENTIFYING NOISE
  - STEADY BACKGROUND NOISE
  - LOW-FREQUENCY RUMBLE
  - WIND NOISE

DMITRY BOROSHCHUK

BEHOLDERISHERE.CONSULTING



Usually 2-16 kHz; often most noticeable around 4-10 kHz

HOW TO RECOGNIZE IT:

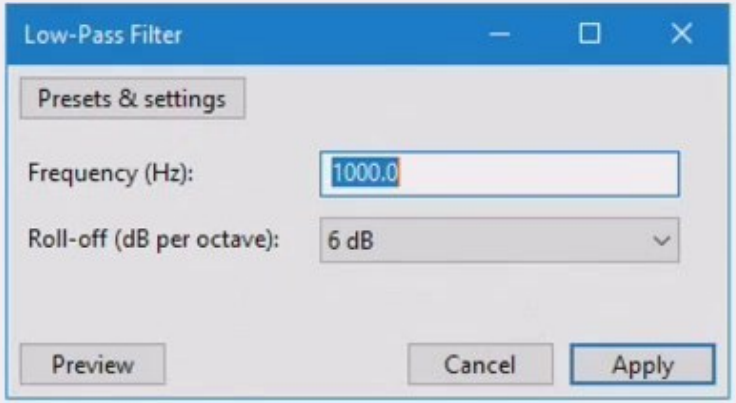
- The noise sounds like hiss.
- Energy is concentrated at the top of the spectrogram.
- It is especially noticeable during pauses.
- Consonants can blend into the interference.

TOOLS:

- Effect > EQ and Filters > Low-Pass Filter
- Effect > EQ and Filters > Filter Curve EQ

WORKFLOW:

1. Start with a cutoff of 10-12 kHz.
2. Listen to the consonants "s", "sh", "f" and "t".
3. Lower the frequency in small steps.
4. Use Filter Curve EQ for a narrow frequency region.
5. Start with a local reduction of 2-3 dB.





- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS
- EVENT RECONSTRUCTION
- AUDIO ENHANCEMENT
  - TYPES OF NOISE
  - CHOOSING TOOLS
  - IDENTIFYING NOISE
  - STEADY BACKGROUND NOISE
  - LOW-FREQUENCY RUMBLE
  - WIND NOISE
  - URBAN NOISE

DMITRY BOROSHCHUK

BEHOLDERISHERE.CONSULTING



Broadband: approximately 30 Hz-10 kHz and above

HOW TO RECOGNIZE IT:

- The noise changes constantly.
- Sources appear and disappear.
- The spectral pattern varies between regions.
- A single noise profile does not describe the whole recording.

ADDITIONAL CLUES:

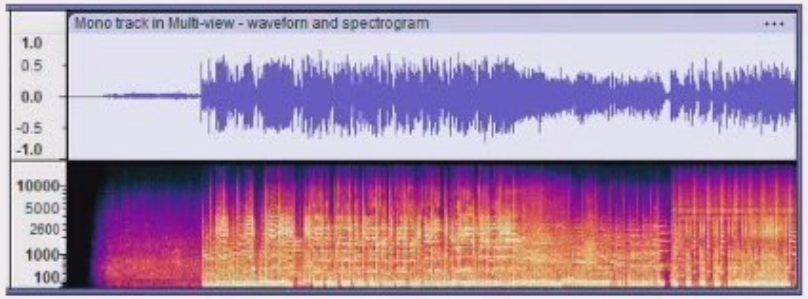
- Engines: about 50-500 Hz.
- Tire noise: about 1-8 kHz.
- Impacts and construction: almost the full spectrum.

TOOLS:

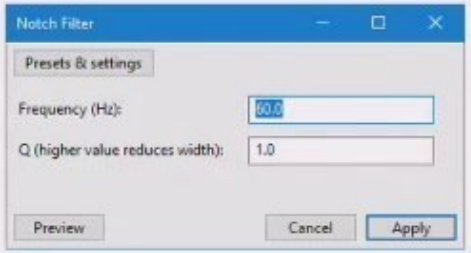
- Effect > EQ and Filters > Low-Pass Filter
- Effect > EQ and Filters > Filter Curve EQ

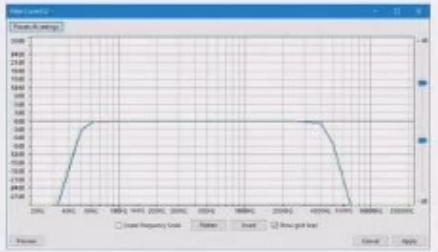
WORKFLOW:

1. Switch to Multi-view.
2. Find the most intrusive sections.
3. Identify the frequencies of each interference source.
4. Use High-Pass Filter for low hum.
5. Use Notch Filter for a narrow tone.
6. Apply a small EQ reduction to the upper band.
7. Reduce individual impacts locally.
8. Do not process the entire recording uniformly.









- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS
- EVENT RECONSTRUCTION
- AUDIO ENHANCEMENT
  - TYPES OF NOISE
  - CHOOSING TOOLS
  - IDENTIFYING NOISE
  - STEADY BACKGROUND NOISE
  - LOW-FREQUENCY RUMBLE
  - WIND NOISE
  - URBAN NOISE
  - COMPRESSION

DMITRY BOROSHCHUK

BEHOLDERISHERE.CONSULTING

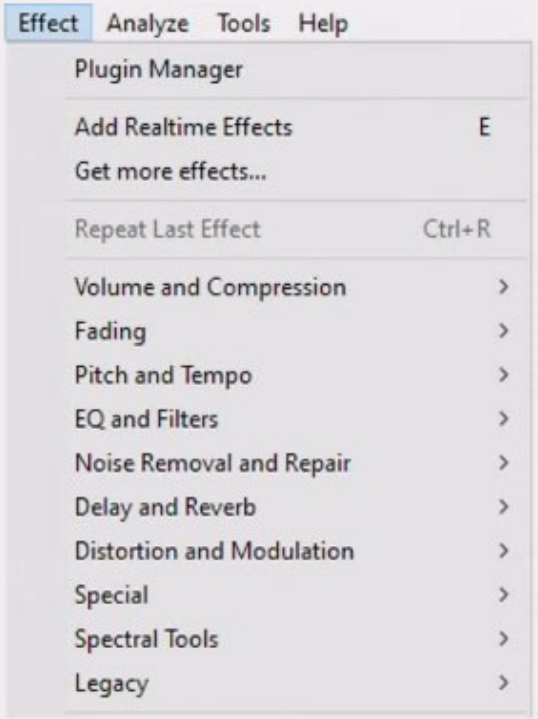
Evening out volume differences

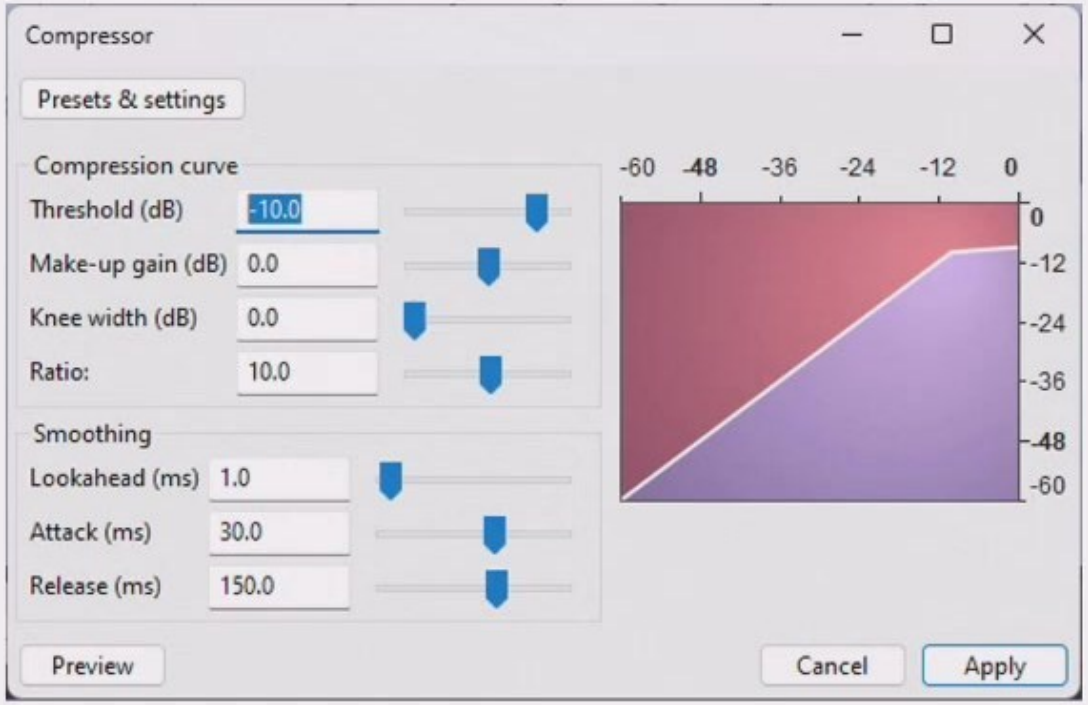
TOOLS:

Effect > Volume and Compression > Compressor

WORKFLOW:

1. Apply the compressor after noise reduction.
2. Start with a Ratio of about 2:1.
3. Adjust Threshold to match the recording level.
4. Use make-up gain carefully.
5. Check that residual noise has not been amplified.





- AREAS OF EXAMINATION
- MYTHS AND MISCONCEPTIONS
- TECHNICAL ASPECTS
  - CODECS
  - CONVERSION
- METADATA
- IMAGE ENHANCEMENT
  - BRIGHTENING AND DENOISING
  - DEBLURRING
  - INCREASING RESOLUTION
  - REFLECTION ANALYSIS
- EVENT RECONSTRUCTION
- AUDIO ENHANCEMENT
  - TYPES OF NOISE
  - CHOOSING TOOLS
  - IDENTIFYING NOISE
  - STEADY BACKGROUND NOISE
  - LOW-FREQUENCY RUMBLE
  - WIND NOISE
  - URBAN NOISE
  - COMPRESSION
  - NORMALIZATION

DMITRY BOROSHCHUK

BEHOLDERISHERE.CONSULTING

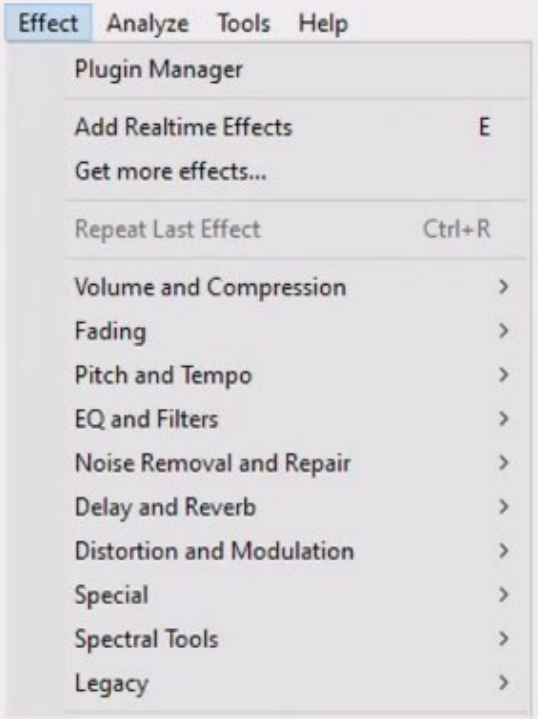
Evening out volume differences

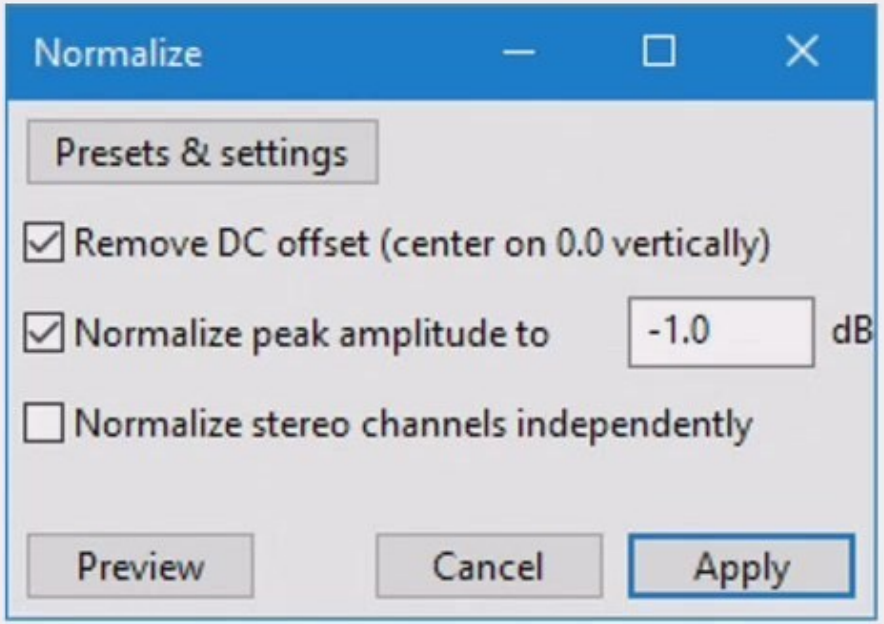
TOOLS:

Effect > Volume and Compression > Normalize

WORKFLOW:

1. Apply the compressor after noise reduction.
2. Start with a Ratio of about 2:1.
3. Adjust Threshold to match the recording level.
4. Use make-up gain carefully.
5. Check that residual noise has not been amplified.





@BIHCONSULTING



@FORENSICTOOLS

DMITRY BOROSHCHUK
BEHOLDERISHERE.CONSULTING