Question 1: Image Extraction at Best Quality

Qn.1A, if you used the supplied replay software:
please save and submit your results using the filename: Q1A_OtherMethod_ID05.bmp'

replay software DVR_Player.exe'.
Click 'Play' and extract the image by using the export tool of the player

Qn.1B, if you used the supplied replay software:
Please save and submit your results using the file name:
Q1B_ReplayDescribed_ID05.jpg

Please specify (i) the investigation method used to a) examine the video sequence and b) extract and examine the frame, and (ii) all steps executed. The information you provide should have sufficient detail so that anyone could independently reproduce your results.

Open the replay software DM NetVu
Import Video
extract image (right click on image and choose save)

Qn.1C

Frame Size of source file recording used in Qn.1A				**Frame Size of source file recording used in Qn.1B**			
1008	x	**767**	pixels	**720**	x	594	pixels

What are your conclusions about the raw, encoded quality of the provided video frame/sequence in Q1A and Q1B?

image Q1B = darker, less resolution, more compression, more artefacts

Question 2: Super-Resolution from supplied sequence of 249 .bmp files

Qn.2A

Please select your best result, i.e.: a single best quality super-resolution image:
Please save and submit your results using filename: "Q2A_SuperRes_ID05.tif"

1. How have you ingested the material into your enhancement system and super-resolution software tools?
Please detail all steps of any conversion performed including all software tools and settings used. The information you provide should have sufficient detail so that anyone could independently reproduce your results.

I used Amped Five

a. Sequence Loader	*Loads a list of images as video.*
b. Resize	*Resizes the image* **Details**: The *Resize* tool interpolates the input image by generating an output image of the desired size. The available interpolation algorithms are: - *Nearest*: simply copies the value of the closest pixel in the position to be interpolated; - *Bilinear*: uses a bilinear interpolation to resample pixel data; - *Bicubic*: uses a bicubic interpolation to resample pixel data. - *Area* resamples using pixel area relation. - *Lanczos* uses a Lanczos interpolation to resample pixel data. **Parameters**: • **Size**: 192, 160 *Size of output image.* • **Interpolation**: Bicubic *Interpolation algorithm.*

c. Local Stabilization: *Stabilizes a shaking video by keeping the current selection steady*	**Parameters**: • **Selection**: Static Tracking Reference Selection(s) 0: 43 58 92 28 *Selection where the filter is applied*
d. Frame Averaging	*Reduces the noise by creating an image which is the average of all the frames.*
e. Optical Deblurring	*Corrects the blur of objects that are out of focus (big blur).* **Parameters**: • **Size**: 5 *The size of the point spread function.* • **Noise**: 0.0242 *Estimate of the noise-to-signal power ratio.* • **Boundary conditions**: Symmetric *Reduce ringing artifacts near the boundaries of the image*

2. Please specify all software tools and all Enhancement Filters used (in order) and specific parameter settings; e.g. Super-Resolution Filter (Method? Zoom factor? Number of Iterations? Interpolation?.....)

1. resize
2. local stabilization
3. frame averaging
4. optical deblurring

3. Did you select a ”region of interest” for directing the super-resolution tool? If so please specify co-ordinates of the region (if used) in the format given by the tool.

   Yes = Selection: Static Tracking Reference Selection(s) 0: 43 58 92 28

4. Did you select any specific frames or image? If so, please provide details of range of frames or specific frames you used.

   NO - I choose them all

5. Please provide any other information that would be needed so that others would be able to repeat and reproduce your work.

Qn.2B

Please select your best result, i.e.: a single best quality super-resolution image:
Please save and submit your results using filename: “Q2B_SuperRes_ ID05.jpg”

1. How have you ingested the material into your enhancement system and super-resolution software tools?
   Please detail all steps of any conversion performed including all software tools and settings used. The information you provide should have sufficient detail so that anyone could independently reproduce your results.

   I used Amped Five

Crop:	*Crops a region of interest of the image.*
Resize:	*Resizes the image.*
Global Stabilization:	*Stabilizes the overall scene of a shaking video.*
Range Selector:	*Selects frames of the video within an interval with an optional step*
Super Resolution	*Merges all frames to improve the resolution of the image*

2. Which of the 5 number plates have you concentrated your efforts on (1=closest number plate, ..., 5=most distant) and how did you decide on selecting this number plate?

   Selected no. plate: 1

   Decision reached how: it has more pixels in the ROI

3. Please specify all software tools and all enhancement filters used (in order) and specific parameter settings; e.g. Super-Resolution Filter (Method? Zoom factor? Number of Iterations? Interpolation?.....)

   I used Amped Five

Video Loader	**Parameters**: • **File**: TestP_7mDistance_MidElevation.dav-converted.avi *Path of the video to load.* • **Video Engine**: FFMS
Crop:	*Crops a region of interest of the image.* **Parameters**: • **Selection**: Static Region Reference Selection(s) 0: 159 86 59 102
Resize:	*Resizes the image.* **Parameters**: • **Size**: 354, 612

	Size of output image. • **Interpolation**: Bicubic *Interpolation algorithm.*
Global Stabilization:	*Stabilizes the overall scene of a shaking video.* **Parameters**: • **Maximum Shift**: 50 *The maximum horizontal and vertical shifts (in pixels) to correct.* • **Frames**: 29 *The number of frames to be considered for the stabilization.*
Range Selector:	*Selects frames of the video within an interval with an optional step* • **First Frame**: 67 *First frame of the selection of interest.* • **Last Frame**: 281 *Last frame of the selection of interest.* • **Step**: 1 *Take only one frame every Step frames.*

Super Resolution	*Merges all frames to improve the resolution of the image* **Parameters**: • **Zoom**: 3 *Zoom factor for the output image.* • **Iterations**: 10 *Number of deblurring steps.* • **Selection**: 102 529 142 24

1. Did you select a “region of interest” for directing the super-resolution tool? If so please specify co-ordinates of the region (if used) in the format given by the tool.

   102 529 142 24

2. Did you select any specific frames or image? If so, please provide details of range of frames or specific frames you used.

   67 - 281

3. Please provide any other information that would be needed so that others would be able to repeat and reproduce your work.

   Use any space you need

Qn.2C (optional)

Please select your best result, i.e.: a single best quality super-resolution image: please save and submit your results using filename: “Q2C_SuperRes_ID05”

1. How have you ingested the material into your enhancement system and super-resolution software tools?
   Please detail all steps of any conversion performed including all software tools

and settings used. The information you provide should have sufficient detail so that anyone could independently reproduce your results.

I used Amped Five

Rotate:	*Rotates the image* **Parameters**: • **Angle**: 180 *Rotation angle.* • **Resize Image to Fit**: true
Crop:	*Crops a region of interest of the image.* **Parameters**: • **Selection**: Static Region Reference Selection(s) 0: 162 169 33 64
Resize	*Resizes the image.* **Parameters**: • **Size**: 198, 384 *Size of output image.* • **Interpolation**: Bicubic
Global Stabilization	*Stabilizes the overall scene of a shaking video* **Parameters**: • **Maximum Shift**: 50 *The maximum horizontal and vertical shifts (in pixels) to correct.*

	• **Frames**: 29 *The number of frames to be considered for the stabilization.*
Crop:	*Crops a region of interest of the image.* • **Selection**: Static Region Reference Selection(s) 0: 23 32 147 45
Sparse Selector:	*Selects a list of frames in random positions* **Parameters**: • **Frames**: 0, 8, 35, 50, 52, 56, 71, 107, 112, 114, 128, 216, 400, 451, 911, 916, 356
Super Resolution:	*Merges all frames to improve the resolution of the image. Writes the current image to a new file* **Parameters**: • **Zoom**: 3 *Zoom factor for the output image.* • **Iterations**: 10 *Number of deblurring steps.* • **Selection**: 34 38 130 270

2. Which of the 5 number plates have you concentrated your efforts on (1=closest number plate, ..., 5=most distant) and how did you decide on selecting this number plate?

Selected no. plate: 5

Decision reached how: it has more pixels in the ROI

3. Did you select a ”region of interest” for directing the super-resolution tool? If so please specify co-ordinates of the region (if used) in the format given by the tool.

   34 38 130 270

4. Did you select any specific frames or image? If so, please provide details of range of frames or specific frames you used.

   0, 8, 35, 50, 52, 56, 71, 107, 112, 114, 128, 216, 400, 451, 911, 916, 356

5. Please provide any other information that would be needed so that others would be able to repeat and reproduce your work.

Question 3: Focal deblur test

Please specify (i) all software tools or processing steps, (ii) all enhancement filters used (in order) and (iii) all specific parameter settings. The information you provide should have sufficient detail so that anyone could independently reproduce your results.

125 cm chart:
Please save and submit your results using filename: 'Q3_125cm_ID05' or 'Q3_125cm_LineNUMBER_YOURINITIALS'

I used Amped Five

Crop:	*Crops a region of interest of the image* **Parameters**: • **Selection**: Static Region Reference Selection(s) 0: 3736 198 774 1350

Motion Deblurring:	*Corrects the blur caused by moving objects* **Parameters**: • **Size**: 36 *Length of the blur, expressed in pixels.* • **Angle**: 137 *Angle of the blur direction, expressed in degrees with respect to the horizontal.* • **Noise**: 0.0049 *Estimate of the noise-to-signal power ratio.* • **Boundary conditions**: Symmetric *Reduce ringing artifacts near the boundaries of the image* • **Mode**: Linear *Selects if using a classical linear PSF or two isolated points to correct replica issues* • **Thickness**: 21 *Thickness of the blur, expressed in pixels. This allows to consider also an optical deblurring component.*
Unsharp Masking:	*Sharpens the image using an unsharp masking filter* **Parameters**: • **Strength**: 0.5000

	Intensity of the sharpening effect: larger values provide increasing amounts of sharpening. • **Size**: 99 *Size of the filter. High resolution images allow higher size. It is better to always sharpen an image at its highest resolution.* • **Threshold**: 0 *The minimum difference in pixel values that indicates an edge where sharpen must be applied. So you can protect areas of smooth tonal transition from sharpening, and avoid creation of blemishes in the facial, sky or water surface.* • **Mode**: Intensity *Type of adjustment to be done.* • **Selection**: Whole Image
Levels:	*Adjusts intensity and color levels.* **Parameters**: • **Value**: 235, 124, 0 *Highlights, Midtones and Shadows settings used to map the pixel values of the grayscale converted image.* • **Red**: 255, 127, 0 *Highlights, Midtones and Shadows settings used to map the pixel values of*

	the red channel of image. • **Green**: 255, 127, 0 *Highlights, Midtones and Shadows settings used to map the pixel values of the blue channel of image.* • **Blue**: 255, 127, 0 *Highlights, Midtones and Shadows settings used to map the pixel values of the green channel of image.* • **Selection**: Whole Image *Selection where the filter is applied. It may be the whole image, a static region, or a region containing a tracked object of interest.*

75 cm, 4th line:
Please save and submit your results using filename: 'Q3_75cm_Line4_ID05

I used smart deblur

BLUR PARAMETERS ----------
Defect Type: Auto-detect Blur
Blur Size: 100 px
Aggressive Detection: No
Analyzing Region: x: 104, y: 1118, width: 520, height: 201

---------- POST PROCESSING ----------
Smoothness: 60 % (Medium)

75 cm, 5th line:
Please save and submit your results using filename: Q3_75cm_Line5_YOURINITIALS'

Question 4: Motion deblur test

Qn.4A:

Please specify (i) all software tools or processing steps, (ii) all enhancement filters used (in order) and (iii) all specific parameter settings. The information you provide should have sufficient detail so that anyone could independently reproduce your results.
If you wish to provide results for different regions of interest in the image, please specify their coordinates and/or indicate the region in a small thumbnail, and use the filenames: "Q4A_RegionNUMBER_YOURINITIALS".

Region NUMBER: coordinates and/or thumbnail:

I used Amped Five

Q4A_Region 2_ID05.jpg and Q4A_Region 1_ID05.jpg (same filters and parameters)

Q4A_Region 1_ID05

Crop:	*Crops a region of interest of the image.* **Parameters**: • **Selection**: Static Region Reference Selection(s) 0: 231 1324 835 540
Motion Deblurring	*Corrects the blur caused by moving objects* **Parameters**: • **Size**: 33 *Length of the blur, expressed in pixels.* • **Angle**: 8 *Angle of the blur direction, expressed in degrees with respect to the horizontal.* • **Noise**: 0.0100 *Estimate of the noise-to-signal power ratio.* • **Boundary conditions**: Symmetric

	Reduce ringing artifacts near the boundaries of the image • **Mode**: Linear *Selects if using a classical linear PSF or two isolated points to correct replica issues* • **Thickness**: 1

Q4A_Region 2_ID05.jpg

Crop:	*Crops a region of interest of the image* **Parameters**: • **Selection**: Static Region Reference Selection(s) 0: 862 559 616 353
Motion Deblurring:	*Corrects the blur caused by moving objects.* **Parameters**: • **Size**: 30 *Length of the blur, expressed in pixels.* • **Angle**: 5 *Angle of the blur direction, expressed in degrees with respect to the horizontal.* • **Noise**: 0.0062 *Estimate of the noise-to-signal power ratio.* • **Boundary conditions**: Symmetric *Reduce ringing artifacts near the*

	boundaries of the image • **Mode**: Linear *Selects if using a classical linear PSF or two isolated points to correct replica issues* • **Thickness**: 1
Compare Original:	*Juxtaposes or overlays original and enhanced image for comparison* **Parameters**: • **Mode**: Side-by-Side Vertically

Qn.4B:

Please specify (i) all software tools or processing steps, (ii) all enhancement filters used (in order) and (iii) all specific parameter settings. The information you provide should have sufficient detail so that anyone could independently reproduce your results.
If you wish to provide results for different regions of interest in the image, please specify their coordinates and/or indicate the region in a small thumbnail, and use the filenames: "Q4A_RegionNUMBER_YOURINITIALS".

Region NUMBER: coordinates and/or thumbnail:

no result