

# EDDISON USER MANUAL

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# REVISION HISTORY

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# 1. INTRODUCTION

Edison is a VR slide show presentation tool that allows the teacher to lecture from a virtual environment while interacting with 3D objects in real-time. Edison provides quick and easy control over the cameras and the virtual scene making VR friendly and easy to setup to any user.

Edison features a built in chroma key as well as an automatic keyer (if an Intel realsense camera is detected), which both allows us to place the teacher in the virtual environment in real-time. While the chroma key gives better quality results the automatic keyer needs no setup.

As a presentation tool, Edison is capable of displaying predesigned slides, such as Adobe .pdf's, Power Point .ppt's, image files(.png, .jpg, .tga), movies (.mp4, .mov, .avi), interactive Brainstorm presentations and 3D objects (.obj, .3ds, .fbx), which can be controlled either by hand gestures (with a real sense camera), a mouse or a power point presenter.

## 2. QUICK START

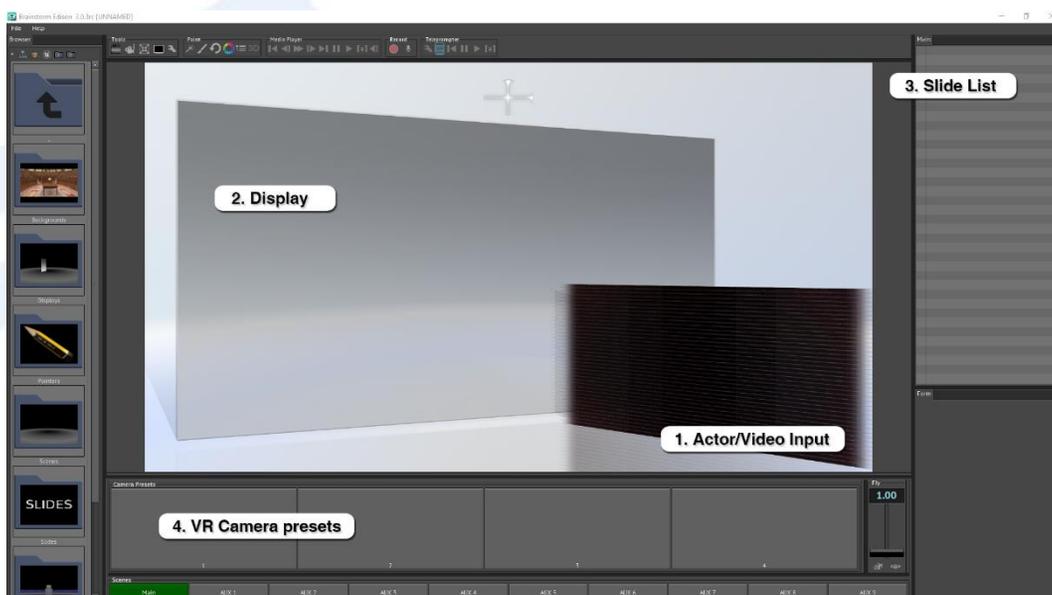
### 2.1 Making a presentation using the Default Template

When you start Edison for the first time the Project window is empty. There are three buttons on the top left corner, Back, Import and Load.

To start making a presentation in Edison click on the Back button to load the Default template.



Edison will load the Default Template which we'll use to setup a live presentation. On the viewport there are two 3D objects, the Actor/VideoInput and the Display. The Actor is a 3D Surface that will show your webcam input and the Display will be the virtual support for your presentation.

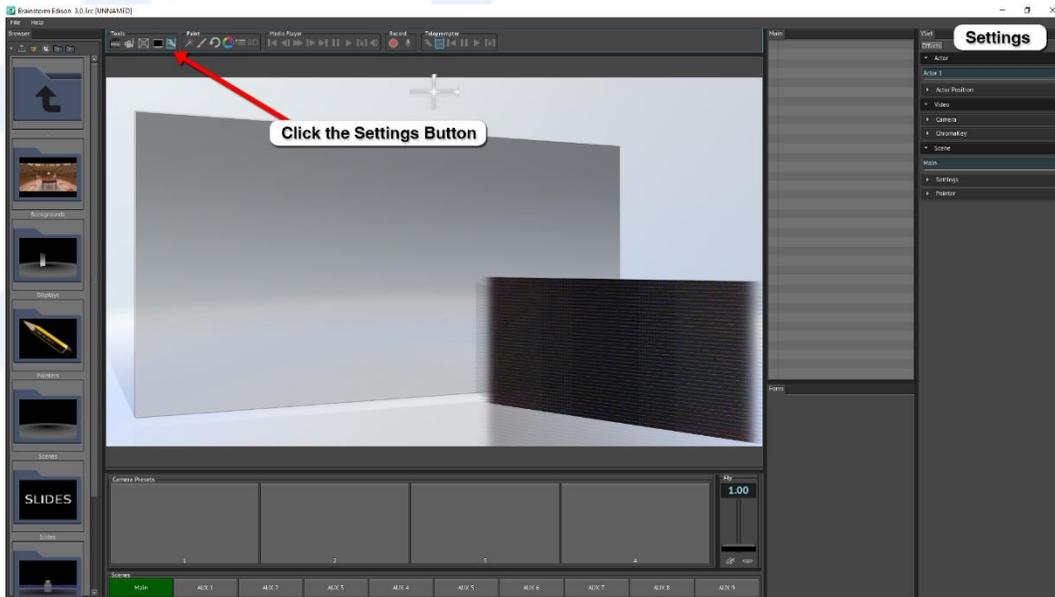


To setup a presentation you have to follow 5 steps:

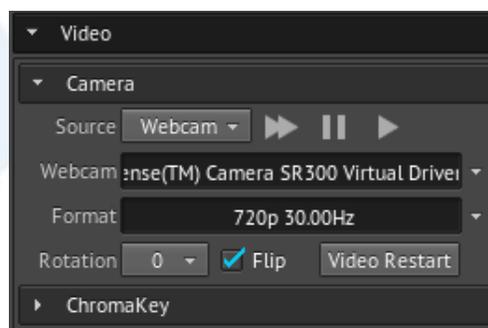
1. Actor Setup
2. Display Setup
3. Import content to the Slide List
4. Capture VR Camera presets
5. Play the Presentation

## 2.2 STEP ONE: Actor Setup

Click on the settings button on the Toolbar or the letter e in your keyboard to display the VSet settings tab.



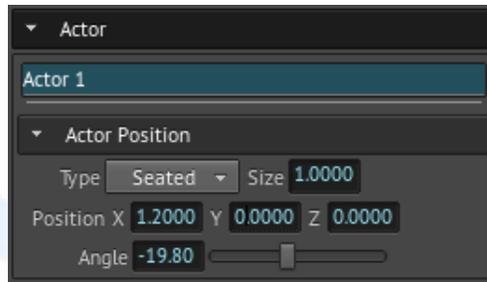
Go to the VSet tab and click on the Camera section rollout in the Video Settings. This section shows a camera selector which will list the hardware currently connected to your computer.



Click on source to select a webcam and then select the resolution and frequency of your webcam in the Format options.

Hint: If you have selected a camera and video is not showing on the viewport click the Video Restart button to refresh it.

You can change the position of the actor on the Actor position settings in the VSet tab.



Edison is based on 3D space coordinates, this means 3 axis (X, Y and Z). X and Y axis define a plane on the ground and the Z axis corresponds to the height.

Move your actor by using Position editor to place your 3D Video Input any place on the scene. You can click and drag on any editor to increase/decrease a value (click and drag right to increase/drag to left to decrease).

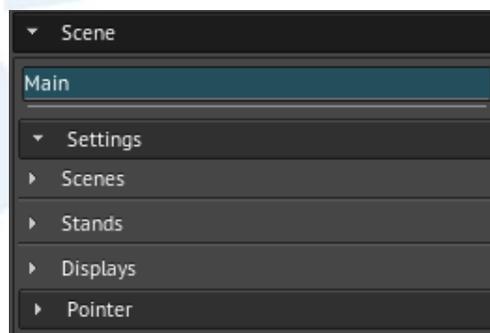
Hint: The speed of the editor increase/decrease depends on the position of the mouse in the decimals position of a value. If you click on the integer it will increase faster than if you clicked on a decimal value.

## 2.3 STEP TWO: Display Setup

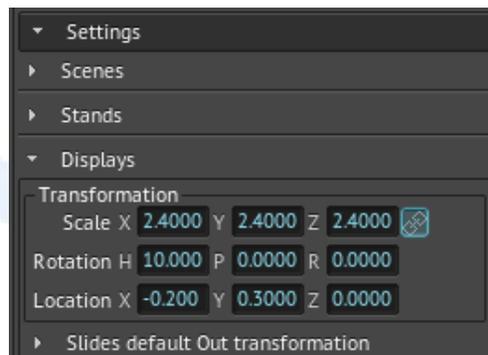
Displays are 3D objects that act as a mounting for the content of our presentation such as an Easel, a notebook, or a virtual screen, that will show the slides of the current Stage.

For this getting started quickguide you'll use the default one to learn the basics.

To see the Display Settings click on the settings button on the toolbar if the VSet tab is not already on the right side of your interface. Go to the Scene section and click on the Settings rollout.



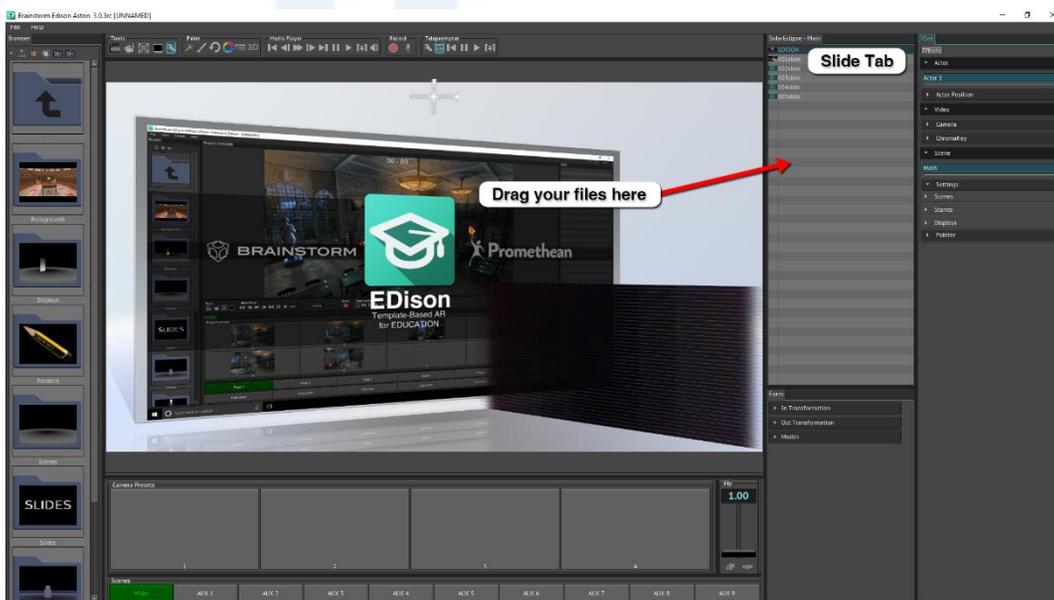
Just as the Actor, the Display has editors to setup size/scale, rotation and position. Change those values to place the object in the desired position on the screen.



Now you are ready to start importing your content to the presentation.

## 2.4 STEP THREE: Import your content to the slide list

A presentation can be made out of any combination of the supported files. In order to create a new slide just click and drag from a Windows browser to the Slides Tab. Every time an item/file is dragged from Windows a new Slide of the presentation is created for the selected Stage.



Supported Files:

- Adobe PFD (see Adobe PDF Importer)
- Image Files> .jpg, .png, .tga, .bmp, psd
- Video Files> .mov, .avi, .mp4
- Photoshop Editable Slides (see PHOTOSHOP EXPORTER)
- Pre-exported .ppt files (see POWER POINT EXPORTER)

Hint: An Edison project can hold up to 9 presentations composed by slides contained in the Main presentation and de Auxiliars ones.

## 2.5 STEP FOUR: Capture VR Camera presets

Edison camera is LIVE, you can move it around to any place at anytime by using the mouse on the viewport or by clicking on any of the camera prestes.

Hint: To learn how to move the camera check the [Camera Control](#) section.



The camera presets section controller has 4 buttons which can store camera positions to be called whenever you click on any of them in a live presentation

To save a camera shot just click on an empty program preset slot and it will record the current camera position. A thumbnail of the current camera shot will be generated once the slot is created as shown in the last picture.

To delete a camera preset click on it while holding Ctrl key on the keyboard.

The transition time between camera presets will be controlled using the Fly control which sets the fly time in seconds (by default is set to 1second). By clicking on an existing camera preset, the virtual camera will transition smoothly to the selected camera position preset.

## 2.6 STEP FIVE: Play the Presentation

To go LIVE make shure you have connected your projector/screen to the HDMI port and that it is configured as the second monitor of your computer. Then click the DISPLAY OUTPUT button located in the toolbar to share your video Output to the second monitor.



There are 3 different ways of controlling a Presentation:

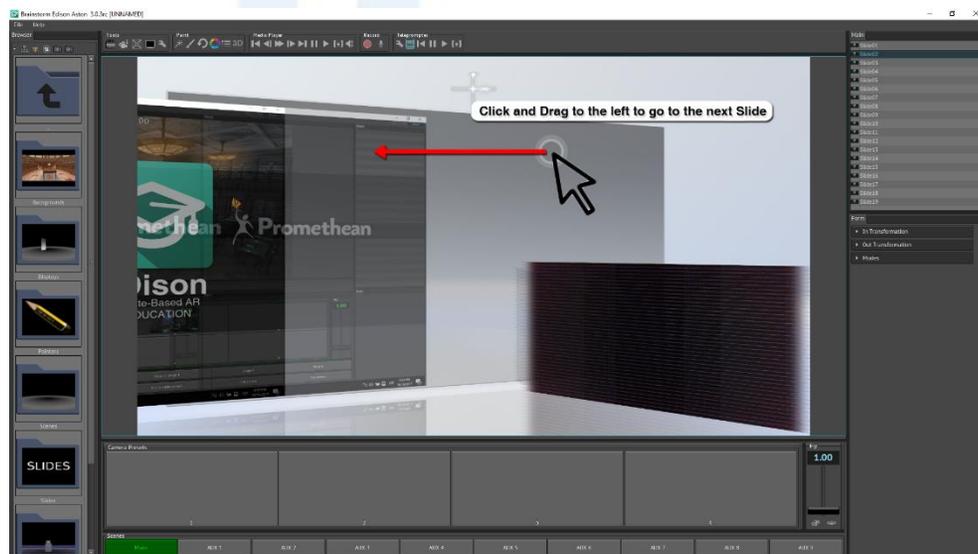
1. With Keyboard
2. With a Mouse
3. With a Clicker

With keyboard:

- Press down arrow to go to the NEXT slide.
- Press up arrow to go to the PREVIOUS slide.

With a Mouse:

- Click and drag left on the viewport to pass to the NEXT slide.
- Click and drag right on the viewport to pass to the PREVIOUS slide.



With a presentation Clicker:

Use the NEXT/PREVIOUS buttons to pass the slides.



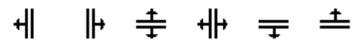
### 3. USER INTERFACE

This section is a brief summary of the main Edison interface.

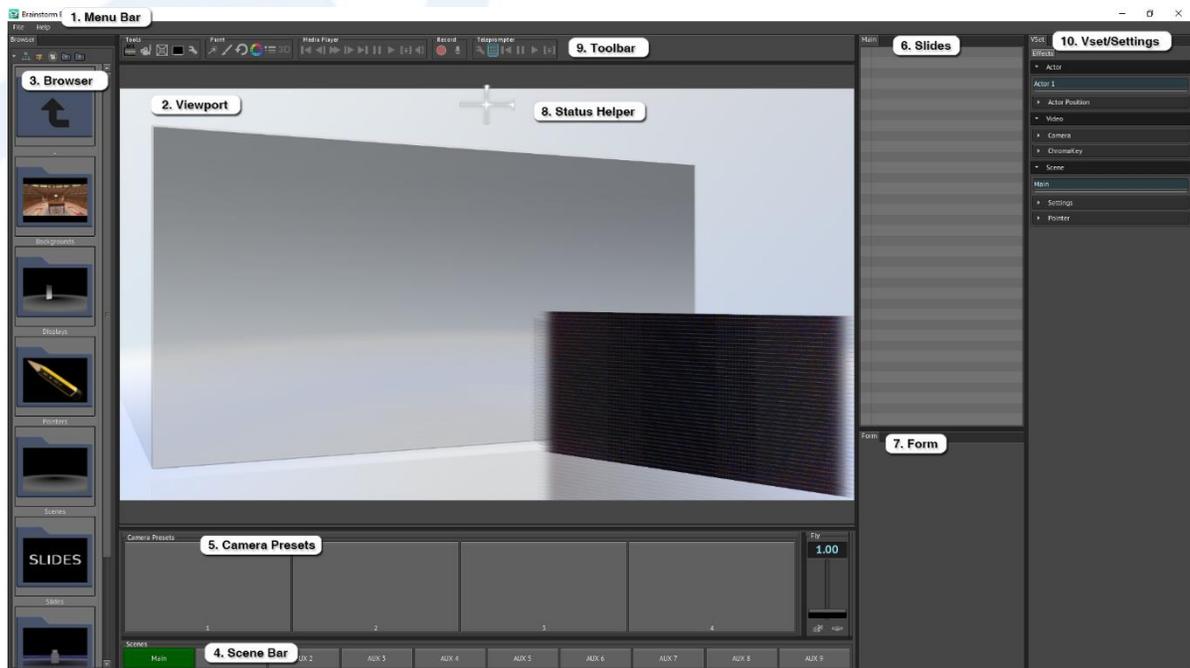
As you read, keep in mind that the default interface has some hidden/collapsed tabs. This collapsed areas can be recognized by a grey thick line that highlights in green as we pass the mouse over.

To uncollapse an area just click on the light grey line while highlighted in green.

To collapse an area move the mouse over a dark grey line until the cursor changes to one of the next pointers and then just double click with the left mouse button.



The interface areas can be resized by click and drag when any of the previous cursors are visible.



Edison Interface is composed by 10 different areas. Numbered headings above refer to each of these areas which will be reviewed on the following pages.

## 1. Menu Bar

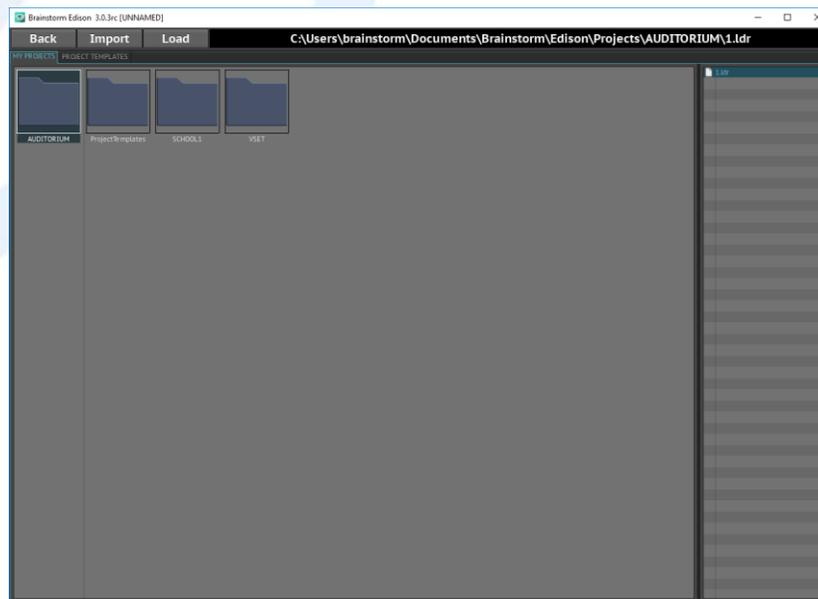
There are two menus available in Edison: File, Help.

### 1.1 File Menu

This menu contains all of the actions you can perform with respect to projects within the window.

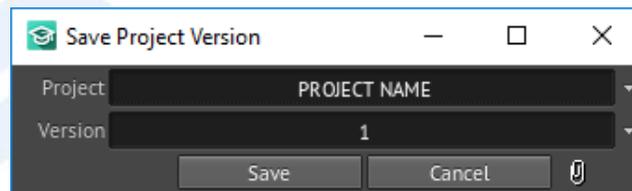
#### 1.1.1 Project Menu

- New: Creates a new empty project
- Load: Opens the Projects Browser. Double click on a project folder to load it.



Each project can have many versions, as many as you need to save, the column on the right shows the list of versions that you have for a selected project. Select the version you want to load before loading the project.

- Save: Saves the current project



As mentioned in the previous point a project can have many versions, so when you save a project you'll have to fill two text fields, the project name and the project version. The project version can be either a number or a text.

- Save as: Saves the current project with a new name
- Save as Project Template
- Import: Imports a pre-exported project
- Export: Exports the current project in a ldr.zip file
- Import Presentation

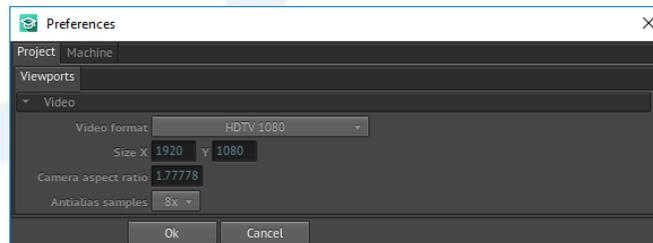
## 1.1.2 Preferences Menu

The Preferences menu has two tabs, one for the Project preferences and one for the Machine preferences. Project preferences refer apply only to the current project, they are project exclusive, being saved within the project files and will be loaded even if the project is moved from one machine to another, while machine preferences apply to Edison at loading and are saved in the %AppData%/Brainstorm/Edison directory.

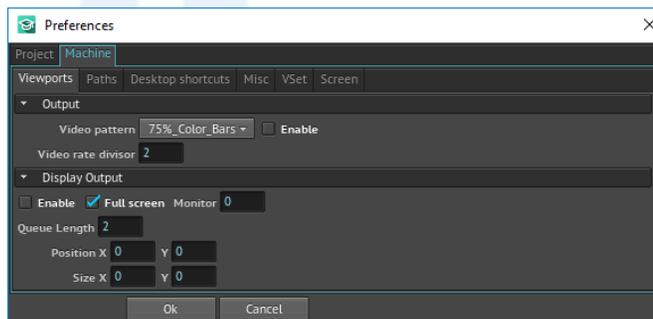
### 1.1.2.1 Project Preferences

Viewport video configuration:

Sets the viewport render resolution as well as the Antialias samples. By default it is set to Full-HD 1080.



### 1.1.2.2 Machine Preferences



**Video Pattern:** This dropdown provides several video patterns, which are used for calibrating or troubleshooting the downstream signal path.

**Enable:** Shows in the viewport the test pattern selected.

**Video rate divisor:** Improves performance by reducing the frequency by the given factor. By default dives by 2.

**Display Output:** Send the video output signal to the selected monitor. Usual Edison workflow is to send the output through the HDMI video output of the computer.

**Queue length:** Sets the number of extra frames to be rendered in order to avoid peaks in performance.

Paths / User projects: Defines the path where Edison projects are going to be saved in the hard drive. The default path is C:\Users\user\Documents\Brainstorm\Edison\Projects

Each project is contained within a folder with the projects name, so it can be easily managed.

Desktop Shortcuts / create: Creates a desktop shortcut that launches Edison automatically and loads the project at the same time.

Misc / Layout: Defines the default position and loading mode for Edison's layout when launching the engine.

Vset:

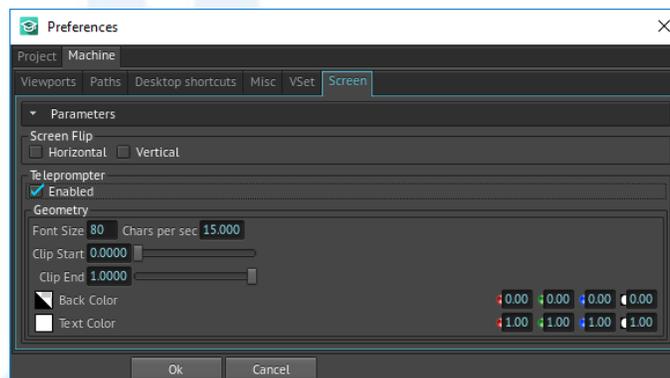
Mouse Sensibility: sets the mouse speed sensibility when moving the virtual camera.

Touch Sensibility: sets the touch screen sensibility.

LeapMotion: enables the use of a leap motion device if one is connected to the computer on a usb port.

Screen / Flip: Flips the viewport horizontally or vertically to visually help the user working as a virtual mirror.

Teleprompter: Activates the teleprompter tool.



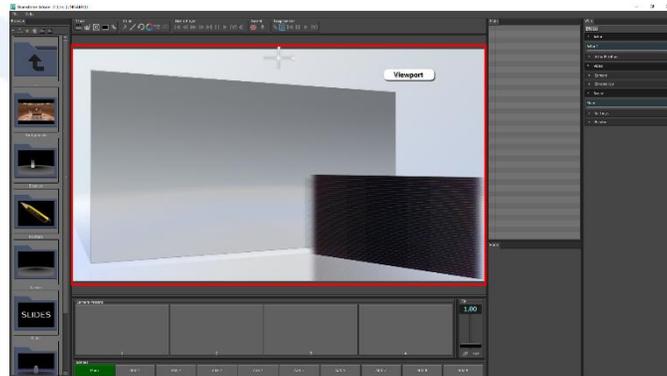
If enabled the teleprompter preferences section will appear. You can set the font size, the speed and the text color for the teleprompter.

## 1.2 Help Menu

- Brainstorm web page: Opens a web browser and takes you to the Official Brainstorm webpage
- User Help: Opens the .pdf Edison manual
- About Edison: Displays the current version information

## 2. Program Viewport

The viewport area shows the content that will be displayed live through the HDMI output for the audience. What you see in this window is what the actual video output shows (except for the teleprompter and the status helper).



Edison has two modes of operation:

- Virtual Scene mode. Shows the presenter integrated in a virtual reality environment displaying the presentation in a virtual support which is as well inserted in the 3D world.
- Full Screen mode. Displays the presentation in Full Screen just like a traditional power point presentation.

We can switch between this modes live just by clicking on the Scene buttons. One click will set the current presentation to FullScreen and a second one will bring it back to Virtual Scene mode.

## 3. Scenes Bar

Edison has a Main scene and 9 auxiliary scenes. Every scene in Edison has its own presentation/slide list as well as camera presets.



When you select an Auxiliary Scene it will create a new slide in the Main Scene slide list that will display whatever you have on the Auxiliary presentation (video, virtual scene or a slide show).

To select/view a Scene just click on any of the buttons of the Scenes Bar.

The buttons Located on the Stages Bar allow to switch between scenes/presentations as well as toggle between VR Mode and Full Screen Mode.

To change the current presentation mode from VR to Full Screen just click on the selected Scene button. To go back to VR Mode click again on the same button.

## 4. Camera Presets

This area contains all the camera control related editors.



This controller has 4 buttons which store camera positions to be called whenever you click on any of them in a live presentation. Each Stage has its own 4 buttons to store the camera positions so when a Stage is selected the Shotbox presets will show the camera presets stores in that Stage.

To record a camera shot just click on an empty program preset slot and it will record the current camera position as well as the defocus settings. A thumbnail of the current camera shot will be generated once the slot is created as shown in the last picture.

To delete a camera preset click on it while holding Ctrl key on the keyboard.

The transitions between camera shots will be controlled using the Fly control. When Fly is enabled, a smooth transition between camera shots will be applied, simulating that the camera is changing position. If the Fly control is disabled, the changes between presets will be immediate, thus making the effect of video cuts.

The transition time is set by the Fly slider in seconds.

### 4.1 Camera Control

The camera position can be controlled either with mouse and keyboard over the viewport or by using the slider for each individual movement in the control panel.

#### **Go Zero**

This feature resets the camera to the tracking position, which is represented with a square-shape funnel.

#### **Pan (alt+left mouse button click and drag left and right)**

This slider moves the orientation of the camera in the left-right direction rotating on its own axis.

#### **Tilt (alt+left mouse button click and drag up and down)**

This slider moves the orientation of the camera in the up-down direction rotating on its own axis.

#### **Zoom (alt+right mouse button click and drag up and down)**

This slider simulates the zoom in/out of the lens of the camera.

#### **Roll**

This slider moves the orientation of the camera in clockwise or anti-clockwise direction.

#### **Head (alt+shift+left mouse button click and drag left and right)**

This slider moves the camera around the virtual set orbiting around the aim.

**Pitch (alt+shift+left mouse button click and drag up and down)**

This slider moves the camera to a top a down shot view orbiting around te aim.

**Rad (alt+shift+right mouse button click and drag up and down)**

This slider moves the camera forward or backwards.

**Truck (alt+ middle mouse button click and drag left or right)**

Moves the camera left or right on an axis parallel to the camera orientation.

**Pedestal (alt+ middle mouse button click and drag up or down)**

Move s the camera up or down in an axis parallel to the camera orientation

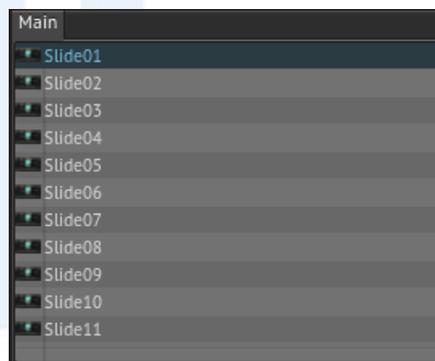
**Sens**

This control sets the sensitivity of the above sliders and the camera mouse movements.

## 5. Slides Tab

The Slides Tab contains a list of slides which are created when a file is dragged to a Stage. Edison has 10 individual Stages so this means that we can create up to 10 different lists of Slides, each list for each Scene. The Slides Tab Name will display always the name of the currently selected Scene.

### 5.1 Selecting a Slide



To show a slide on the Stage's Display or on Full Screen mode click on it so its highlighted blue on the Slides Tab.

There are 3 different ways of controlling your slide show Presentation:

1. With keyboard:
  - Press down arrow to go to the NEXT slide.
  - Press up arrow to go to the PREVIOUS slide.
2. With a Mouse:
  - Click and drag left on the viewport to pass to the NEXT slide.
  - Click and drag right on the viewport to pass to the PREVIOUS slide.
3. With a presentation Clicker:

Use the NEXT/PREVIOUS buttons to pass the slides.

## 5.2 Re-arranging Slides

Slides can be re-arranged on the Slides Tab just by click and dragging one slide to the desired position in the list.

## 5.3 Renaming Slides

A Slide can be renamed by selecting it on the Slides Tab and double clicking on it.

## 6. Status Helper



Shows the status of the current slide.

When a slide is passing to the next one by left mouse click and drag the status bar will show a glowing point crossing the line and the right radar on.



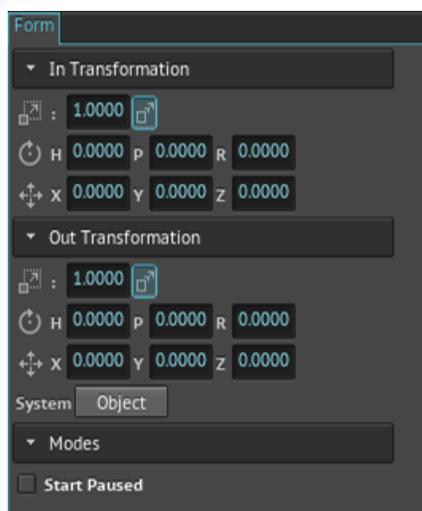
When a slide is brought to screen (3D mode) by dragging down while holding click with the mouse) a glowing point will move down and the status helper and the two radars will turn green.



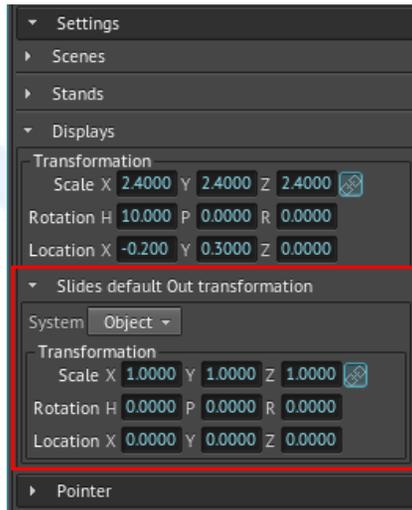
## 7. Form Tab

The Form tab displays the properties of the selected slide, such as the 3D transformations of the slide as well as the configuration editors for interactive slides.

When an Image/3D Object/video is selected on the Slides List, the Form tab will show the IN and Out Transformations for this object (Scale, Rotation and Position). This editors can be used to change the Scale, Rotation and Position which the selected object will display when the Slide in the Display or brought out of the Display.



By default both In and Out transformations are set to scale the objects to 1 and no rotations. The default settings can be changed in the VSET tab Settings/Displays/ Slides default Out Transformation menu.

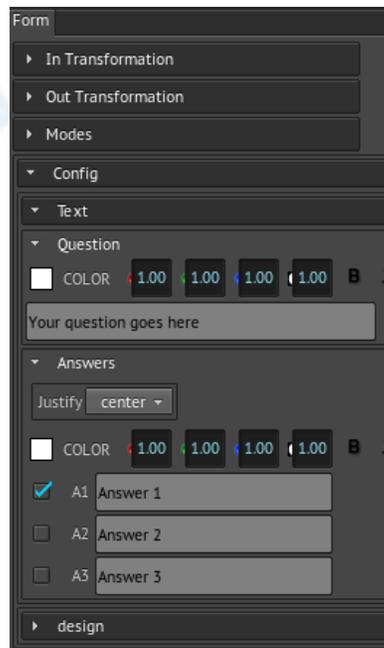


The Modes section has a single toggle which enable the playout mode if the current slide is a video/audio. If the toggle is checked when you reach this slide the video won't click until you click again on the screen. If the toggle is not checked the slide will start playing the content automatically.

3D objects might show another editor "Model Axis Y UP", which forces the right vertical coordinate for the object. This toggle should be activated if the 3D object is not rotated when imported.

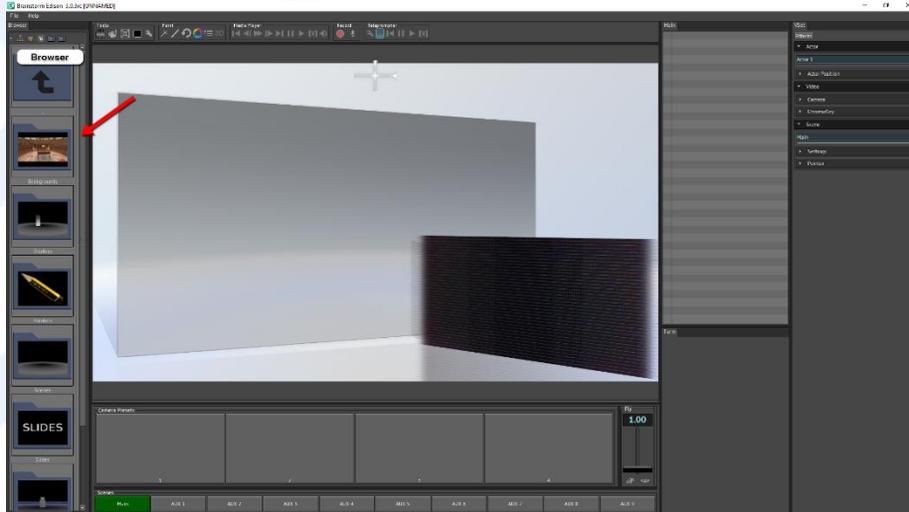


Edison can show interactive graphics and editable slide templates which have their own settings. If you add an interactive slide to your presentation, this settings will appear below the Modes Section in the Form Tab.



## 8. Browser Tab

The Browser tab, located on the left side of the interface, shows the Edison Library. It has 7 folders which contain all the parts of a scene that you can customize or replace as well as interactive content for your presentation.



On the top of the Browser tab there are 4 buttons.



**Library:** Shows the library section folder on the Browser tab.



**Desktop:** Shows the PC Desktop on the Browser Tab



**Unreal Engine:** Shows the Unreal Engine 4 projects path to load a project as a background.



**Windows Browser:** Opens a windows browser window.

The library is comprised by seven folders, each with different content:

1. **Background:** Contains pre-Trackted video files which can be used to immerse the actor on a real environment.
2. **Displays:** Contains special 3D objects which will act as a "canvas" to display the slides in a presentation.
3. **Scenes:** Contains a library of 3D Virtual Environments to use as backgrounds.
4. **Pointers:** Contains a library of 3D pointers that visually enhance the look of the drawing tool.
5. **Slides:** Contains a library of editable and interactive slides such as quick quizzes, and image slides which you can modify within Edison.
6. **Stands:** Contains a library of 3D objects such as podiums, desks and tables to act as supports for the teacher.
7. **Waistdowns:** Contains a library of half bodies that you replace your own when you are using a webcam input that just captures a short shot and you want to look as if you're standing behind a podium.

To assign a Background/Display/Scene/Stand to the current Scene just drag the selected object to the Stage Button on the Stages Bar.



To replace any of the scene objects (scene/display/stand) just drag a different one to the same Scene.

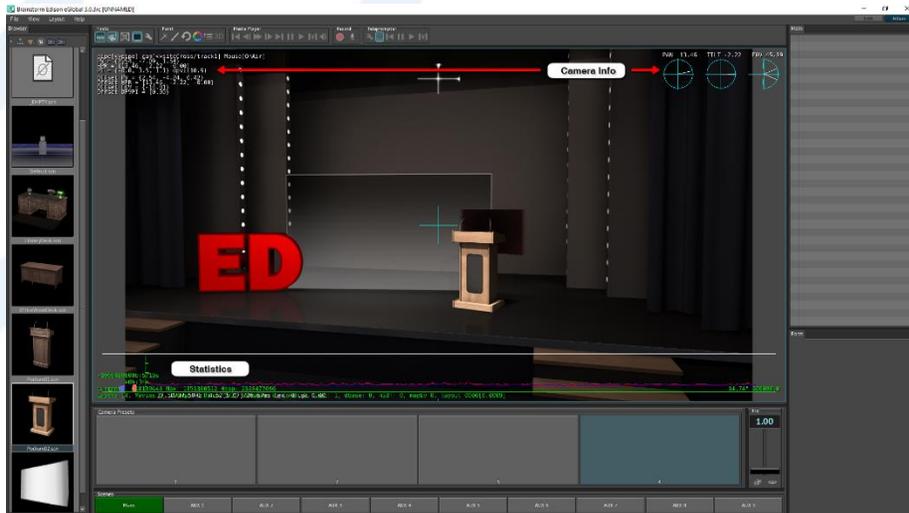
Download the Library Assets at the Edison Asset Store:  
[www.education.brainstorm3d.com/edison-free-downloads/free-edison-assets/](http://www.education.brainstorm3d.com/edison-free-downloads/free-edison-assets/)

## 9. Toolbar



Located below the viewport, provides buttons to control viewport Drawing, Video/audio playback, Recording session, and Teleprompter.

### 9.1 Viewport Tools



**DFT** Statistics: Displays different statistics to check the performance of the project.

Hint: If you're having glitches or things are moving to slow you probably have performance issues. Enable the Statistics in order to see how your processor and graphics card are doing with your current project.



**Camera Info**: Displays data related to camera position, orientation and lens angle on top of the viewport. This is only visible on edit interface, it won't show on the video output.



**Camera Reset**: Moves camera to the default position.



**Display Output**: Shows the video output on an independent viewport.



**Settings**: Collapses/Uncollapses the VSET settings tab on the right side of Edison's interface.

## 9.2 Paint Tools

In order to make a presentation more dynamic Edison has a drawing tool that allows the speaker to make live notes on top of the presentation.



Pointer: Shows/Hides the 3D pointer on the viewport



Paint: Activate to draw on top of the current slide.



When the drawing mode is on this Icon  will replace the viewport helper to indicate you're on drawing mode. To draw just click and drag on the viewport.



Undo All: Deletes all lines on the current Slide.



Palette: Shows a Color Palette to select the color of the Stroke for the current Slide.



Size: Changes the size of the Stroke.



3D: Allows to paint in perspective mode.

There are two ways to use the drawing tool:

1. If 3D is OFF you'll be drawing on a flat plane corresponding to the camera view.
2. If 3D mode is ON you'll be drawing on a plane over the current slide.

Hint: Every drawing is saved per slide, so if you go back to the previous slide and you had a drawing it will still be there if it hasn't been deleted manually.

### 9.3 Media Player Tools

Edison is able to use media as slides, such as videos, and audio files. In order to make a video slide just drag your file from windows to the Slides Tab.

The media player buttons are located on the toolbar.



### 9.4 Record Tools

Edison as presentation tool can be used for live presentation as well as prerecorded ones. To start recording your current session just click on the Record button located on the toolbar. Edison will make a temporary RAW video and when you click stop it will compress it to an mp4 video and save it to the default Output path C:\Users\user\Documents\Brainstorm\Edison\Output



Starts recording of the current session.



Mutes/unmutes the microphone on the recording session.

You can change the path where the videos are being saved in Preferences/Machine/Paths

## 9.5 Teleprompter

Edison has a built in Teleprompter tool to help the speaker with the spec. The Teleprompter plays automatically when a Slide that has Notes is selected if the teleprompter tool is ON. The teleprompter text will not show on the recordings or video output.



To use the teleprompter you have to add some text to the Notes of the current slide. To show the Text Editor click on the Settings icon in the Teleprompter section of the toolbar.



Shows the teleprompter text editor below the scenes bar. The text shown in the Text Editor corresponds to the currently selected slide.



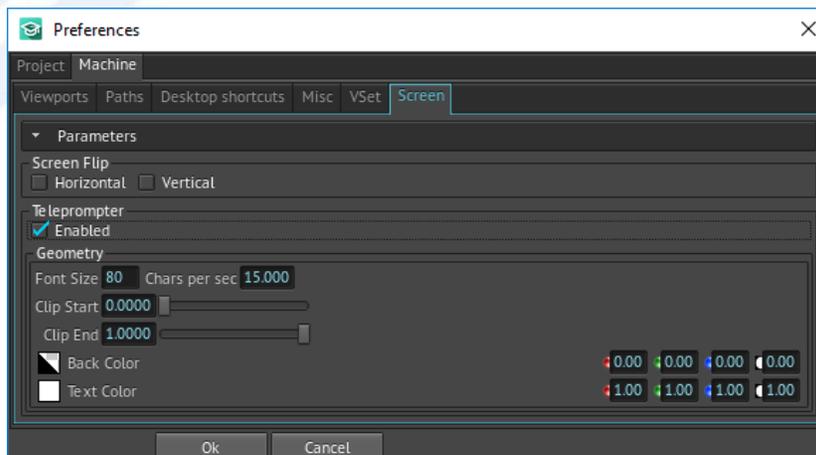
Hides/Shows the teleprompter tool in the viewport.

Each Slide has its own Teleprompter Notes. These notes help the presenter to keep looking directly at the camera and be able to read his notes at the same time.



Controls for the Teleprompter queue playback.

All teleprompter settings, such as Font Size, Text Color, and playback speed can be changed on Edison preferences by going to File/Preferences/Machine/Screen.



## 10. Vset Tab

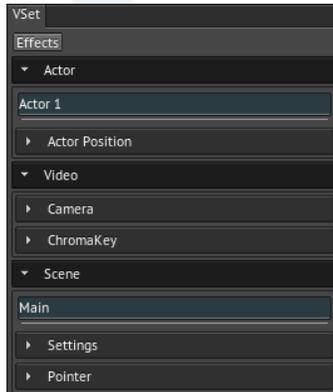
The Vset Tab contains all the editors to customize the looks of current project. By default it is collapsed on the right side of the screen. There are three ways to access it:

1. By clicking on the Edit Column button on the toolbar



2. By clicking on e on your keyboard
3. By clicking on the grey line on the border of the screen when it is highlighted in blue

The VSet tab is divided in three main sections: Actor, Video and Scene.



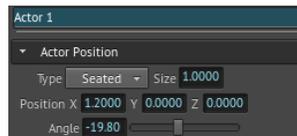
These three sections contain the basic editors to configure a project though you can apply extra attributes to each one via Effects. These effects are accessible by clicking on the Effects button located at the top of the Vset tab. We'll review each individual effect in each of the three Vset sections (Actor, Video, Scene).

### 10.1 Actor

Edison by default is displaying Actor1 on scene though it can display up to two actors at the same time in the same virtual environment. In this section we'll review the main properties of the Actor Object as well as all the additional Effects that can be applied to get more advanced behaviours.

#### 10.1.1 Actor Position

Editors in this effect allow the user to configure the Actor's position as well as the relative size of the actor object on the virtual environment.



Type: Edison has two different ways to display an Actor, Standing or Seated. The standing configuration is to be used when a Podium is loaded as a Stand and the seated configuration is meant to be used when a Desk is loaded as a Stand.

Position: Editors to setup the Actor position on the scene

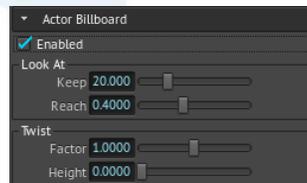
Angle: Sets the Actor's object orientation on object coordinates.

### 10.1.1.1 Actor Effects

The Actor section has additional properties that can be applied by selecting the corresponding effect from the effects list which appears by clicking on the Effects button. To apply an effect just double click on it and it will be added to the VSet list.

### 10.1.1.2 Actor Billboard

The actor billboard effect allows the actor geometry orientate looking at the camera at all times.



Enabled- Enables/Disables Billboard function

Look At

Keep: Defines the angle the geometry will try to keep as the camera changes its position

Reach: Defines how fast the billboard readjusts the angle to the camera.

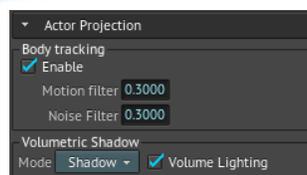
Twist

Twists the actor geometry top vertices and tries to kee them looking at the camera while the bottom vertices keep the last orientation angle

Factor: The twist effect Factor multiplier defines how much it affects the actor geometry. If it is set to 0 there will be no twist applied to te actor.

Height: Sets the height for the Twist effect to take effect on the actor geometry surface.

### 10.1.1.3 Actor Projection



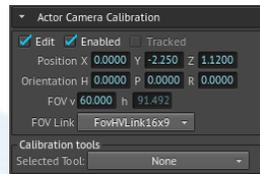
Volumetric Shadow: allows to use a balloon shaped geometry to cast the shadow from a volumetric shape instead of a flat billboard.

Volume lighting: Makes the actor surface receive color information from the virtual lights.

In order to properly use the Projected Actor feature you need to calibrate the virtual camera to match your real camera settings. Apply the Actor Camera Calibration effecto to calibrate the camera.

#### 10.1.1.4 Actor Camera Calibration

To properly setup Edison Actor Camera for a standing actor you have to make some measurements on the real webcam or camera that you're using. Edison uses meters as unit so all measurements must be done in meters.

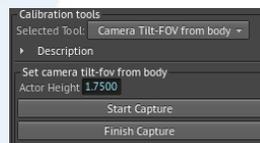


Steps:

1. Measure the distance from the tip of the actor feet to the center of the base of the tripod and set it on Y.
2. Measure the height of the center of the camera and type the value on Z.
3. Set the tilt angle (P) and the FOV angle by using the Camera Calibration tool.

##### 10.1.1.4.1 Camera Calibration Tool (Camera Tilt-FOV from body)

To save the user some time and effort Edison incorporates a built-in camera calibration tool to automatically calculate the right values for camera tilt angle and the camera Field of View. This tool avoids the user from having to make the measurements and calculations to get the proper values.



Steps:

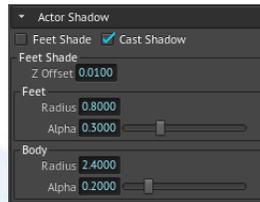
1. Click on Selected Tool and select 'Camera Tilt-FOV from body'.
2. Measure the real actor height and type the value in meters.
3. Click Start Capture
4. Two manipulators will appear on the viewport which you'll need to drag to the top of the head of the actor and to the ankle.



5. Once the manipulators are in positions click on Finish Capture. Edison will apply the new values for Tilt and FOV.

### 10.1.1.5 Actor Shadow

The Actor Shadow effect gives additional control over the projected Actor Shadow which is on by default.



**Feet Shade:** Displays two soft shadow circles, each on each foot of the actor when the Actor Projection is enabled. This feature only works if the actor is on 'standing' mode and projection effect is applied.

**Cast Shadows:** enables/disables the actor capability to project real time shadows on the virtual environment.

**Z Offset:** sets the height of the feetshade. By default is 0.01 to avoid clipping on the ground plane.

**Feet Radius:** Sets the size of the feet shade shadows.

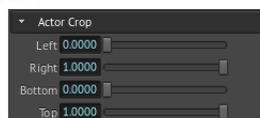
**Feet Alpha:** Sets the opacity of the feet shade shadows.

**Body Radius:** Sets the size of the soft shadow below the center of the body when Feetshade is on.

**Body Alpha:** Sets the opacity for the Body shadow

### 10.1.1.6 Actor Crop

Set of editors that control the clipping planes of the actor plane.



### 10.1.1.7 Actor WaistDown

The WaistDown feature allows to put fake legs below the body of an actor when using a webcam that sees a mid shot instead of the whole actor standing.

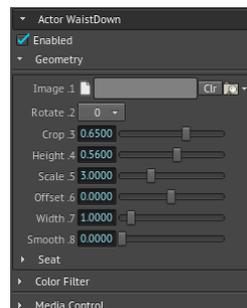
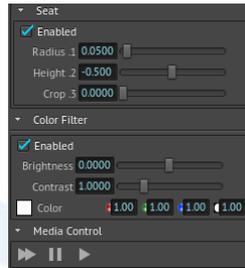


Image: File selector for the fake legs. You can find some examples in Edison browser tab, section WaistDowns. The file selector also accepts videos to show legs with a subtle movement.



Seat: bends the image around the knees area to emulate the legs of a seating person.

Color Filter: Allows to do some color corrections like, brightness, contrast and tint on the WaistDown image.

Media Control: Playback editors for the WaistDown if a video is set instead of an image file.

### 10.1.1.8 Actor Incremental Position

These editors allow to trim the actor walking distance when using Projection mode and Body Tracking.



Reset: Resets the walking distance.

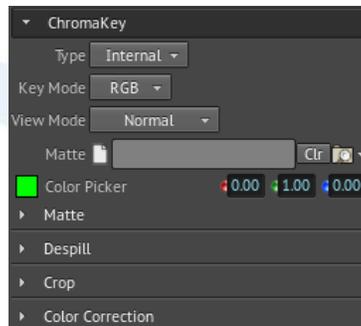
Transition: defines the transition time for the incremental displacement when an Incremental Positioning button is clicked.

Move X, Y: Sets the displacement length for the incremental displacement when an Incremental Positioning button is clicked.

## 10.2 Video

### 10.2.1 Chroma Key

Edison has a built-in Chroma keyer to allow the user to integrate the actor with the virtual environment without the need of second party software/hardware.



#### 10.2.1.1 Type

Turns On/Off Edison's Chroma keyer.

#### 10.2.1.2 Key Mode

Allows to select the color space which will be used to key the actor. There are four different modes: RGB, HSV and SUB.

#### 10.2.1.3 View Mode

Here there are the available display modes of the plugin. Understanding and using them properly is the best way to get the most of the chroma.

- **Normal** – Is the default that produces a composite image.



- **Foreground** – Shows the foreground keyed over a light and dark grey check-board to help you see the keying against a neutral background.



- **Despilled** – Shows the foreground with the effects of despilling (see below).
- **Matte** – Shows the greyscale matte that will be used and the alpha channel in the final composite.



- **Matte Colour** – Is designed to highlight details that are hard to detect in a grayscale image. The colours are blue (for 0) and yellow (for 1) with the values between displayed as a fade from red to green. The important aspect of these colours is that you can see when a value is exactly zero instead of almost zero.



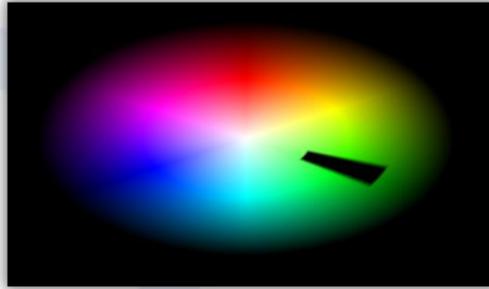
- **Split** – Shows an image split diagonally between the original foreground and the final composite image to help you check the integrity of the unkeyed foreground.



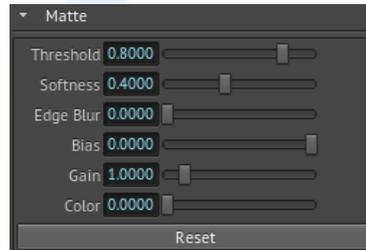
- **Channels** – Shows the RGB levels of the selected line of an image. The `Row` editor allows you to move the line selector (the blank line) to match the desired line whose RGB levels you want to adjust.



- **Pattern** – Shows a colour wheel and the colour to which the chroma is being applied. It can be used as a helper when adjusting settings. The example image shows how the chroma is being applied to the green area with some specific values for Hue, Clip Black, Clip White and Slope.



### 10.2.1.4 Matte



The internal keyer is based on colour differences. The way it works is by comparing the differences between the green channel and a functions of the other two. Based on the difference value, pixels are classified as belonging to foreground or background.

The algorithm supports intermediate values, which are in fact semi-transparent pixels. Those will appear for semi-transparent objects (thin clothes, glass, plastic...), but also on the edges of the matte.

Those are the parameters affecting the matte extraction process:

- **Threshold [0, 1]** – Shapes the boundary region of pixels belonging to foreground or background.

Given the colour difference value of a pixel, it decides with the threshold how it should be classified.

A value of 0 means that there are no background pixels.

A value of 1 means that all green pixels (pixels with the green channel as the dominant one) and just those belong to the background.

- **Softness [0, 1]** – Used to soften the transition between foreground and background.

Modifying this value will not modify the shape of the boundary area. As it increases, more areas of the matte become transparent. So this control is used to add transparency on the matte, which on the edges is perceived as smoothness.

- **Edge blur [0, 1]** – This control blurs the transparent areas of the image, not just the edges.

However, it is more noticeable on the edges. This control can add extra softness, in case the edges still look jaggy.

It works by blurring the matte channel, not the colour mask. However, if the value is 0 the effect is not applied, and it does not affect performance.

Applying this control requires some more processing power.

- **Bias [-1, 0] / Gain [1, 8]** – Those controls are usually used together.

There are times when foreground and background cannot be completely isolated, but the background parts are the ones with lowest transparency. The `Bias` will cut this low values; the lower the value, more it cuts.

However, the whole matte transparency is affected, and the foreground areas need to be restored.

To restore them, `Gain` can be increased until the solid areas of the matte have the correct appearance.

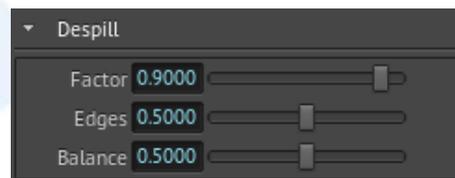
- **Color [0, 1]** – The keyer is based on the colour difference between the green channel and a combination the other two.

There are several possibilities on how to calculate this difference: comparing with the maximum value in red or blue channel, compare just with red, with blue, with the average of both, etc.

The `Balance` changes the comparison strategy, going from the maximum value of the other two channels (for a value of 0), to the average value of these two channels (for a value of 1).

The default value works fine, but different images might work better with another strategy. If the matte is hard to extract, then you can use this control to get a slightly different matte.

### 10.2.1.5 Despill



Despill is a process that tries to remove the unwanted light that has spilled onto the object from the screen. This will improve the edges and remove the colour wash over the whole object.

This is done by adjusting the component (blue or green) of the screen in relation to the other two.

It's important to realize that it is not theoretically possible to get a truly accurate solution to the spill problem, just acceptable approximations.

- **Factor [0, 1]** – Control how much of the despill effect is to be applied on the final image. A value of 0 does not remove any spill at all; a value of 1 tries to remove it completely.
- **Edges [0, 1]** – The edges are the areas where despill effect is more noticeable.

However, after despill it is still possible that those are not matching the background scene, and the composition is strange.

With the `Restore` control it is possible to darken or lighten the edges. Values down of 0.5 will darken them, while values higher will lighten them.

Please note that not just the edges will change its lightness, but also any other transparent area in the image.

- **Balance [0, 1]** – As in the matte colour balance, the strategy for retrieving a difference value can be changed for the despill process.

### 10.2.1.6 Crop

The crop section editors are used to crop the chroma-keyed video feed image.

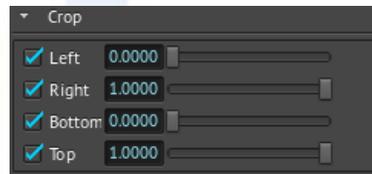


Figure 2 is the raw video recorded with the camera used in the virtual studio. The actor has moved too much to the right and there are parts of the video that cannot be keyed out (they are elements outside the green screen) and are not interesting for the program, so they will need to be removed from the video feed received by Edison. Edison Crop editors allow to cut out the edges of footage to be keyed. There is a slider for each boundary of the crop: left, right, top and bottom.



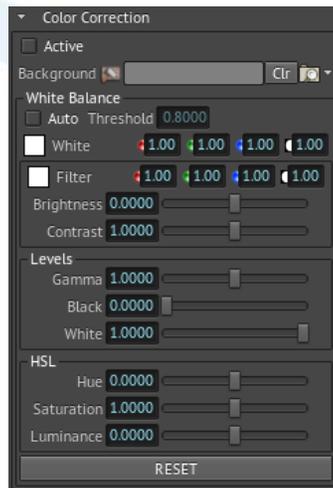
Figure 2. Original source



Figure 1. Cropped video feed

## 10.2.1.7 Color Correction

This tab allows the creation of colour effects and colour adjustments such as sepia, vintage, color balance [+info], etc. that can be saved as presets using the `Create`, `Delete` and `Rename` buttons available at the bottom of the tab.



`White` and `Filter` colour selectors are used for white balance adjustments. White balance is the process of removing unrealistic color casts, so that objects which appear white in person are rendered white in your scenario just as shown in the images below.



`Brightness` makes the image brighter or darker by a specified amount.

`Contrast` is defined as the separation between the darkest and brightest areas of the image. [+info]

- Increase contrast and you increase the separation between dark and bright, making shadows darker and highlights brighter.
- Decrease contrast and you bring the shadows up and the highlights down to make them closer to one another

Gamma, Black and White are equivalent to the typical level-adjustments tools used in other applications such as Photoshop/Gimp [+info] [+info].

- Gamma determines the mid point.
  - Going to the left, to the black, makes the image lighter (more colored/more opaque).
  - Going to the right, to the white, makes the image darker (less colored/more transparent).
- Black determines the black point. All pixels with this value or less will be black.
- White determines the white point. All pixels with this value or higher, will be white.

Hue is the actual colour.

Saturation is the intensity of a hue from gray tone (no saturation) to pure, vivid color (high saturation).

Luminance (also known as Luminosity or Brightness) is the relative lightness or darkness of a particular color, from black (no brightness) to white (full brightness)

We might use hue to tell the difference between ripe bananas and ones that aren't so ripe.

Or, we might use saturation to help us tell the difference between your glass of chocolate milk and the chocolate milk for your friend.

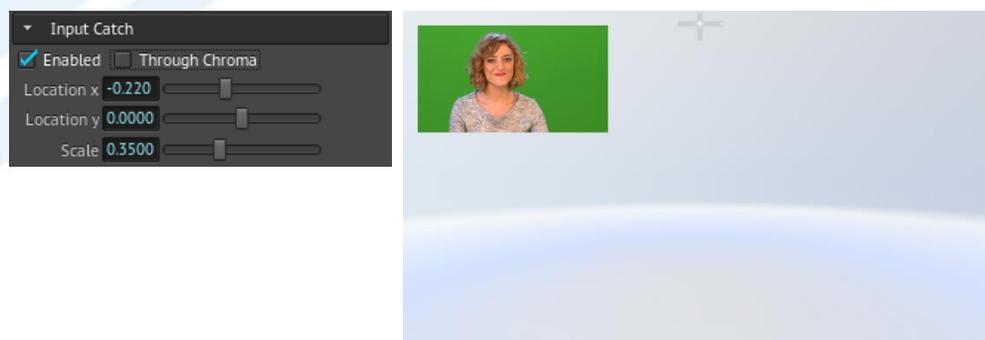
Brightness can help us tell the difference between bread and toast, especially burnt toast.

All these values and combinations can be stored as presets to be used when needed in the future instead of readjusting all the editors every time.

To create a preset simply press Create button. A preset with a default name will be added to the list. This preset can be then renamed and/or deleted with the Rename/Delete buttons respectively.

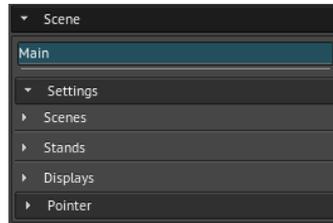
## 10.2.2 Input Catch Effect

Input Catch Effect displays the camera Input as a frame on top of the viewport when enabled.



Location and scale sliders allow to position and set the frame on the viewport. Trough Chroma: When enabled the fame displays the keyed image.

## 10.3 Scene

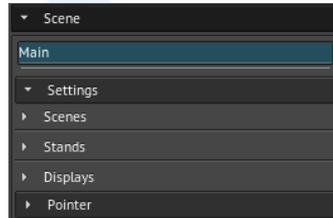


An Edison Scene is mainly composed of three basic parts:

1. Scene: It is the virtual environment/background theme of the presentation.
2. Stand: Is the virtual desk or podium in front of the actor/teacher.
3. Displays: Is the virtual support of the presentation, the screen that will display the slides of the Slide List.

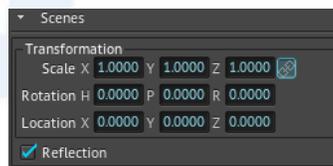
### 10.3.1 Settings

The Settings section contains all the editors to customize the attributes of the main three objects that compose an Edison Scene: the Scene, the Stand and the Display.



#### 10.3.1.1 Scene

Transformation editors for the Virtual Scene.



#### 10.3.1.2 Stand

Transformation editors for the Stand.



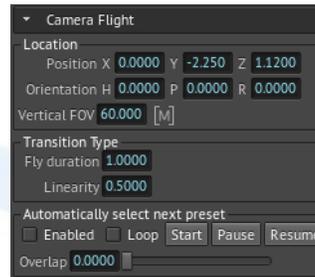
#### 10.3.1.3 Display

Transformation editors for the Display.



## 10.3.2 Camera Flight

Camera flight editors allow the user to tweak how the camera moves from one position to another when clicking on the camera presets buttons located below the viewport.



Location: current camera position

### Transition Type

Fly Duration: time it takes to go from one camera position preset to another.

Linearity: Controls the smoothness of the flight.

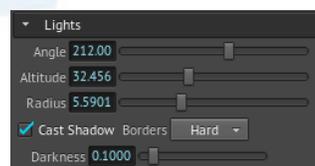
### Automatically select the next preset

Allows to automatically fly between camera positions as if they were on a playlist.

Overlap: If overlap value is higher than 0 the camera flight will interpolate between camera presets avoiding the time stops.

## 10.3.3 Lights

Edison allows the user to control the main light of the project to be able to control the direction and length of the projected shadows.



Angle: Sets the light direction

Altitude: sets the light height in meters

Radius: set the light distance to the center of the scene in meters.

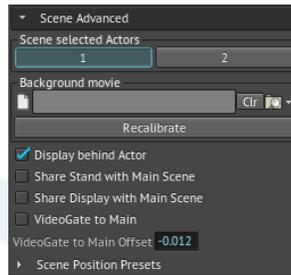
Cast Shadows: enables/disables the real time shadows on Edison

Borders: defines if the projected have hard or soft edges.

Darkness: sets the opacity of the projected shadows.

## 10.3.4 Scene Advanced

Additional Scene settings for advanced users.



**Selected Actors:** Highlights the visible actors on the current scene. Edison supports up to two actors on a scene at the same time.

**Background movie:** file selector for a video background with embedded tracking

**Recalibrate:** Restarts the video embedded tracking.

**Display behind Actor:** Switches the drawing order of the display and actor objects.

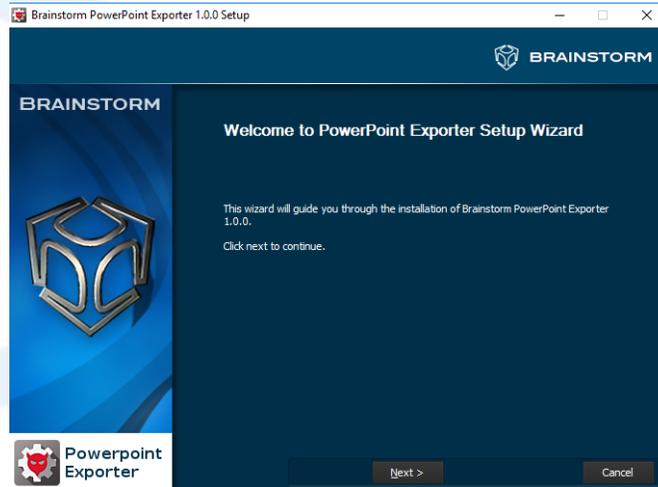
**Share Stand with Main Scene:** Shares the current stand in all scenes if the editor is enabled.

**Share Display with Main Scene:** Shares the current stand in all scenes if the editor is enabled.

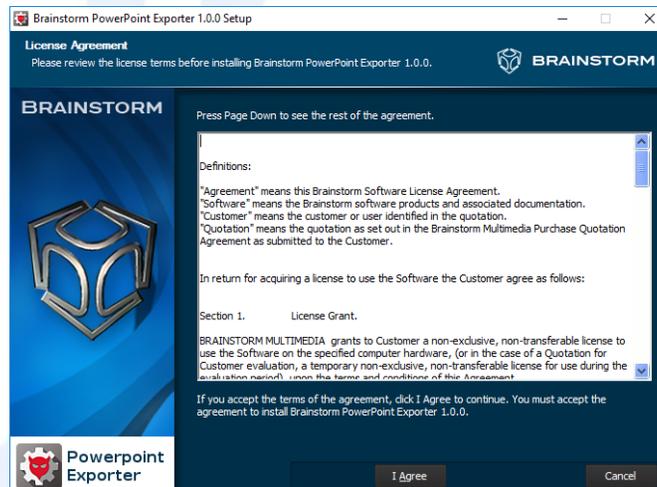
## 4. APPENDIX 1: POWER POINT EXPORTER

### Installing Brainstorm's Power Point Exporter

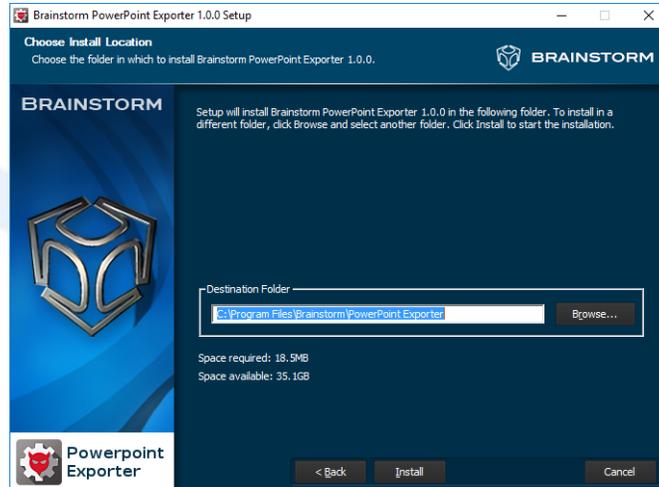
To Install the PPT exporter make sure that you've installed Microsoft's Power Point 2013 or higher. Execute PowerPoint Exporter-1.0.0rc-37.exe on windows and follow the instructions.



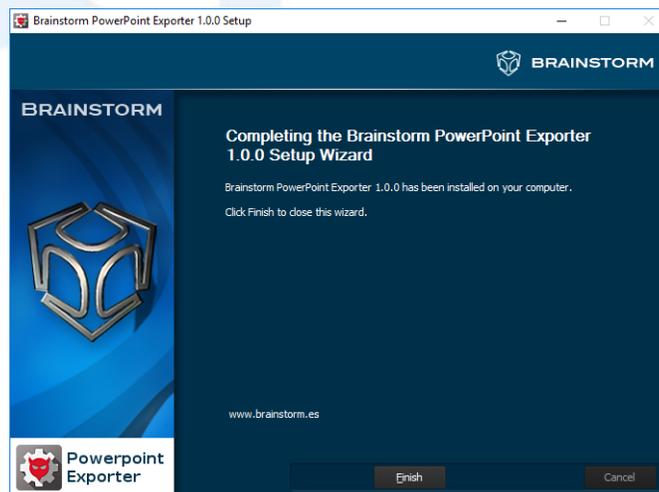
Read the license agreement and click on the "I Agree" button.



Select the Install path and click on "Install"



When the progress bar is done click on "Finish"

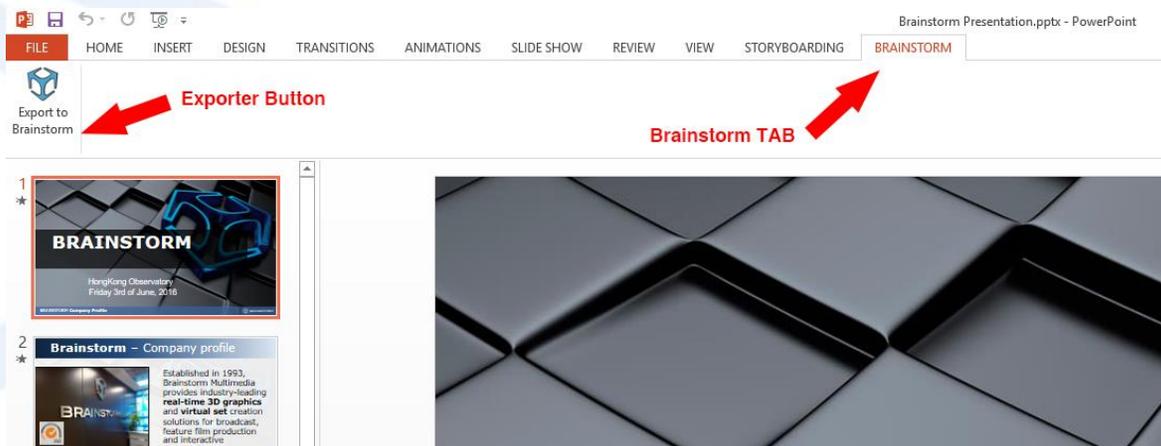


Now you're ready to export Power Point Presentations to EDISON!

## Exporting a Power Point Presentation to Movies for Edison

On Microsoft Power Point go to File Open and load a .ppt project.

Go to the Brainstorm Tab on the menu bar and click on "Export to Brainstorm"



When the progress bar is done exporting all the slides, a pop up will show "Conversion Complete!" and a new folder with the same name as the PowerPoint will be created in the same path as your presentation. This folder holds an .mp4 movie for each slide.

To import it into Edison just drag and drop the new folder in the desired Stage, EDISON will convert every .mp4 movie into a slide for the current Stage presentation.

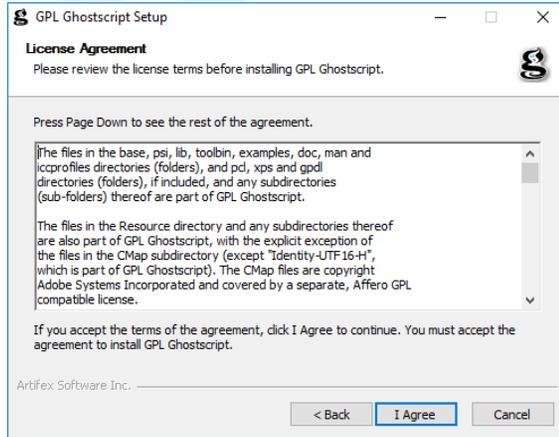
## 5. APPENDIX 2: PDF IMPORTER

### Installing GPL Ghostscript

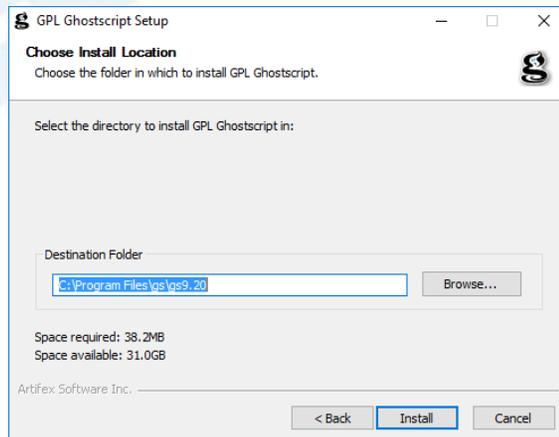
To Install the PDF Importer we have to Instal the GPL Ghostscript on windows. Execute gs920w64.exe and follow the instructions.



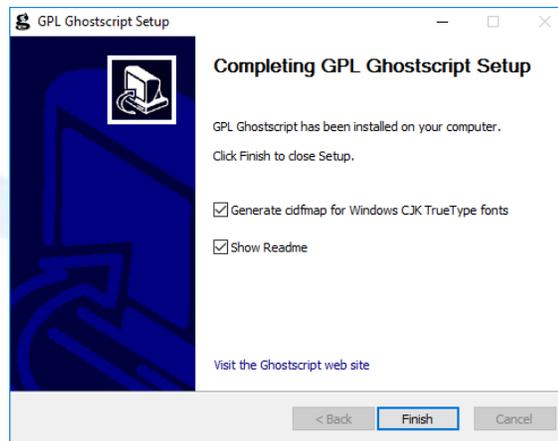
Read the license agreement and click on the "I Agree" button.



Select the Install path and click on "Install"

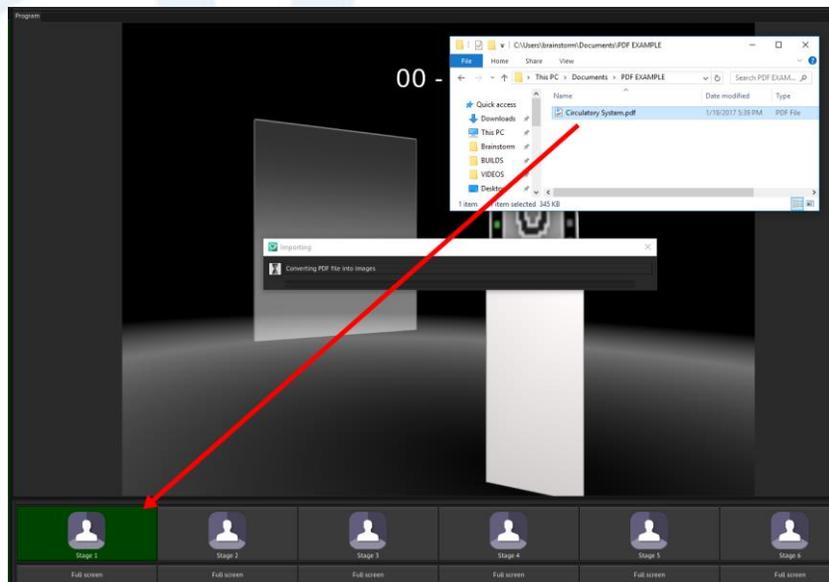


When the progress bar is done click on "Finish"



Now you're ready to Import PDF's into EDISON!

## Importing a PDF into Edison



To import a PDF into Edison as Slides for a presentation just drag and drop the PDF file to the desired Stage. When the progress bar is done you'll have a new folder in the same path as the .pdf with every page converted to a .jpg file. Now every page of the PDF is a slide of the presentation for the selected STAGE.

## 6. APPENDIX 3 ADVANCED CHROMAKEY

### 6.1 How to light the green screen

Green screening allows even the smallest video producers to create amazing content with impressive effects. But, green screening can be challenging.

Proper lighting is absolutely crucial when it comes to achieving a professional look. The most important thing about green screening is the lighting. Green screening can be nice and smooth if proper lighting is used. First, the screen has to have only one color, so that a single chroma key is required. By picking up one spot on the area to be removed the whole background disappears.

People might think an expensive camera or the right software is just as important, but even the best camera and editing program will not fix bad lighting. The lighting must be even so that the background is all the same color. If the lighting is soft and even, any software would remove the background and make it become transparent.

Hence, the most crucial thing to care about when lighting a green screen is to make sure any area of the backdrop in the frame is lit perfectly even and is exposed correctly. The backdrop cannot be underexposed or overexposed on some spots, or it will be a hard task to pull a clean key during the composition/edition phase.

The basic principals of lighting a green screen are:

1. Set up the green screen so it is as smooth as possible. Stretch it out to get rid of wrinkles and hang it up as high as possible so that the weight of the cloth pulls out wrinkles. There are several types of surfaces that can be used for green screening. In order of preference a painted wall, paper, fabric or cloth, or foam. However, they must have a smooth appearance look. A wrinkled cloth or reflective paper will be useless.
2. If you are in a green screen studio, look out for any big scuffs or marks on the floor or walls. Most studios will have paint or green tape to patch up little problems.



*Figure 3. Possible configuration of a Green screen*

3. Create a soft even light over the green screen (no hot spots, no shadows). Use big, soft light sources. Experienced professionals use five to six lights. Do not point a hard

light source at your green screen. If the light has hot spots there will be a gradient surrounding it, ultimately giving an uneven light to work with.

4. Light the background first and make sure the light is evenly distributed. Once the background is right, begin lighting the actor.
5. Light the green screen a couple of stops below the actor. Blasting the green screen with loads of light is not a good idea, as it can bounce green light off the screen onto the actor. Lighting the screen too dark will mean that it is easier to cast shadows on the screen. The best situation is a green screen just slightly darker than the light on your subject.
6. Treat the green screen and the actor separately. Once the green screen seems to be evenly lit, light the actor in the same way it would normally be made. The actor should be lit using different lights from those used to light the screen.
7. Avoid all shadows. The easiest way to do this is to create some distance between the green screen and the actor. In some cases this may be difficult, for example if the room or the green screen are small and the Director needs a full body shot, the actor will be forced to be near to the screen. In this case, the shadows can be cut down by raising the lights and moving them out to the sides, therefore throwing the shadows down at the ground and away to the edges. Just ensure that there is enough distance around the actor to cut him, her or it out from the background.

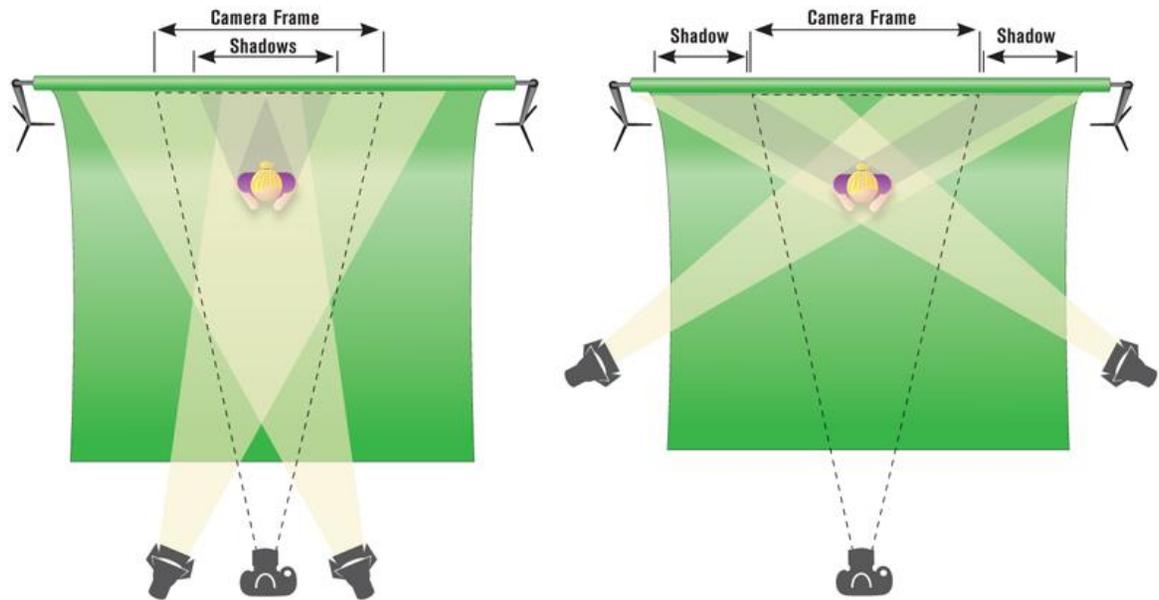
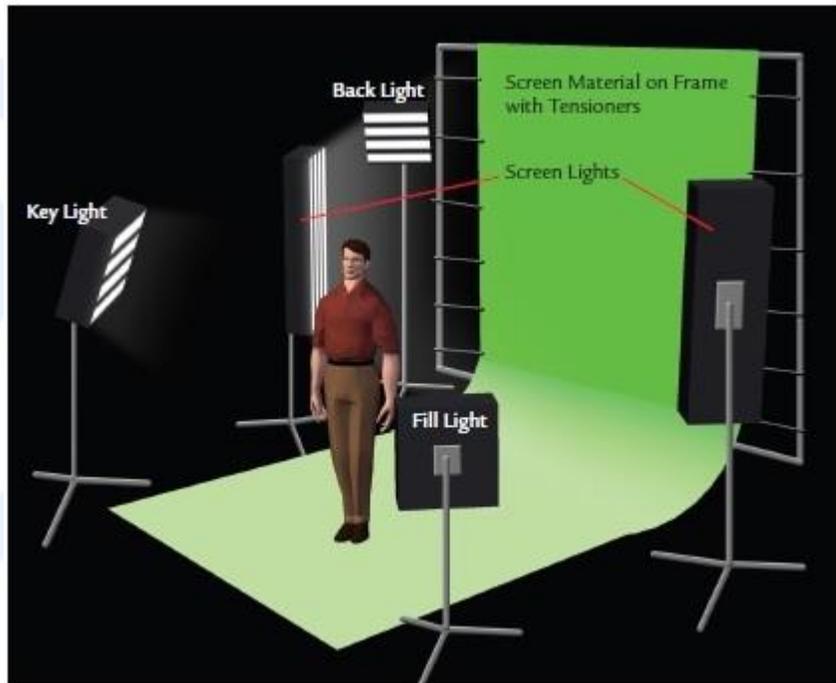


Figure 4. Lighting a green screen to avoid the actor's shadows

8. Shoot at a wide aperture when possible. Having the screen out of focus helps even out any inconsistencies, e.g. wrinkles.
9. Use a backlight to sharpen the edges between the subject and the green screen. The backlight is used to light the actor from behind. This should be a relatively soft light. This light is placed overhead shining down on the actor's shoulders and hair. It is also called a hair light. The backlight is there to separate the actor from the background. Be sure to diffuse the backlight so that it does not look like a white halo around the actor. Minus green gels (magenta), if available, can be used for this purpose. They will cut down any green light which may have bounced onto the actor.
10. The next step is setting up a key light (main light), which is focused on the actor's face and body. The key light should be diffused giving a soft and even look. The next

light also goes on the actor, and is called a fill light. It fills in on the opposite side of the actor. The key and fill together create a small amount of contrast on the face, designed to show more interest than even light across the face.



*Figure 5. Types of lights to light the green screen and the actor*

11. Anything that sparkles or reflects will be challenging to key. Ensure the actor is not wearing any green, including reflective material, e.g. a watch, a piece of jewellery or glasses. These items could reflect a small amount of green from the floor or walls, which will give the editor a long and boring job fixing up this issue. It is important to watch for and remove those objects before you start shooting, as the recording cannot be changed afterwards.

There are another really important consideration with green screen: to think about the finished product when lighting the scene. Normally, what we see through the lens is the finished product, but with green screen this is not the case. There is no point in creating perfect three point lighting, if the green screen setting is outside, or a night scene or a cartoon sequence. It will just look odd. In a real life outdoor situation where would that perfect hair light be coming from? The best way to approach this is to get as much information about the finished scene as possible. It is worth having for a photo or video of the plate, if not, ask questions whether it is indoor, outdoor, sunset, night time, etc. Other big challenge with green screening is to make sure the actor does not move any body part outside of the green background. One hand gesture reaching just outside the green area can ruin the entire shoot. There really is no way to fix a missing hand. The only thing that can be done is to cover up that shot. A good advice is to have the actor move around before starting shooting, making sure there are not going to be gestures outside the green screen background.

Even if the lighting and background are great, blonde hair and thin fly away hair can be challenging, as the yellow color is close to green. Hence, keying it can be difficult. Professionals suggest that if the actor has blonde hair, a magenta gel on the backlight can counteract the green.



Figure 6. How to properly light and handle blonde and thin fly away hair

## 6.1.1 Steps to properly set up the chroma key

To get a proper chroma key configuration, it is advisable to follow the following stages.

### 6.1.1.1 Stage 1 – Hard Matte Extraction

The first step is to get a matte separating foreground and background. It is advisable to switch to `Matte Colour` mode to see the matte values. The key point in here is to get the most adjusted matte that retains all foreground pixels.

The easiest way to do it is by using the colour picker to sample a point in the chroma. That will set automatically the threshold value. For sampling a base color, you will need to see the original colour or the source image.

Use the `Split` or `Channels` diagnose mode for sampling, and then switch back to `Matte Colour`. Remember that you need to sample the darkest pixel that you want to exclude from the background.

You might need to sample different time a base colour, until you find a suitable value. Or you can sample one colour for reference, and then then adjust the `Threshold` value a little more, until the results are satisfactory.

**Tip 1.** If you want to see the matte as two colours, bring to 0 the `Softness` value.

**Tip 2.** If you cannot get a good matte approximation at this stage, try changing the `Balance` value.

**Tip 3.** There are times where you cannot remove all background pixels, but still they are the most transparent ones. You can keep them in the matte, and remove them in a later stage by using `Bias` and `Gain`.



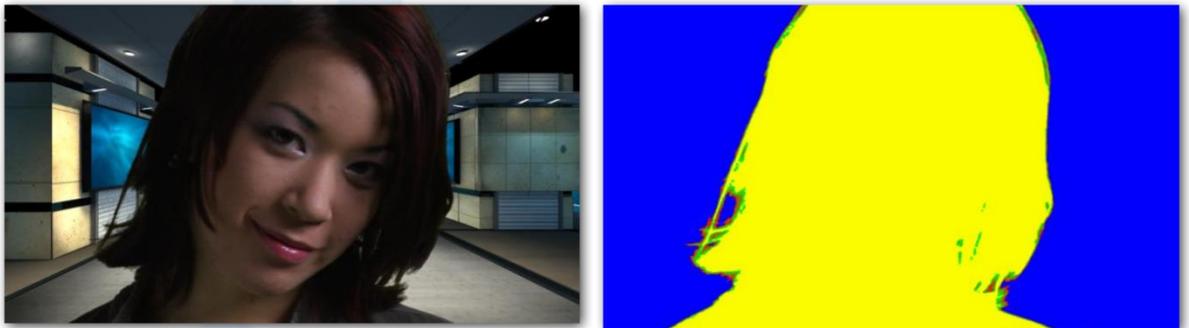
With threshold raised and zero softness, we get a hard cut matte.

### 6.1.1.2 Stage 2 – Matte Edges and Transparency

The next step is to add transparency to our matte. That will affect semi-transparent objects and edges, getting rid of the blocky look of the matte.

To do that you can play with the `Softness` value until the results are satisfactory. If the matte still looks blocky (that could be the case for poor illuminated environments), you can use the `Edges blur` value to further blur the matte.

**Tip 1.** `Edges blur` is an effect that affects performance, so don't use it if there is no need for it.



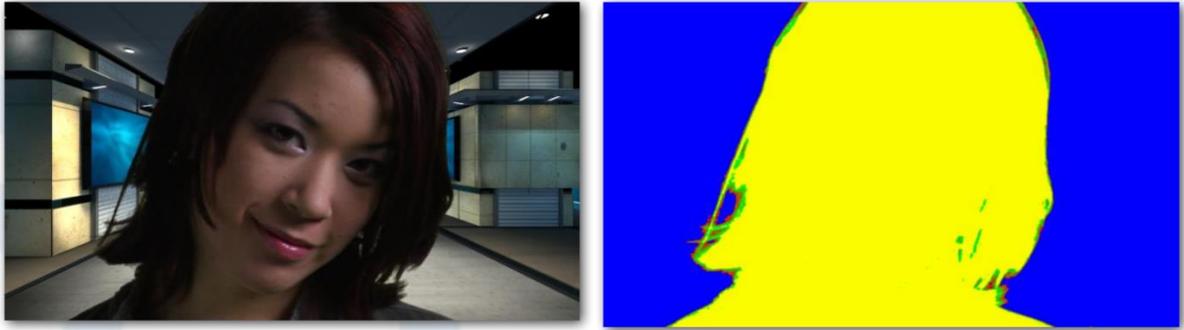
Increasing softness will introduce transparent areas, including edges.

### 6.1.1.3 Stage 3 – Correcting the Matte (Optional)

There are times when the matte will show as foreground some background areas. Those areas can be removed, as long as they represent the most transparent parts of the images.

To do that we can decrease the `Bias` value, until all those unwanted parts are removed. On the process, the whole matte gets transparent, so we need to restore it by increasing the `Gain`.

**Tip 1.** Use the `Matte Colour` to adjust this easily.



Adjust colour balance, bias or gain if needed.  
For this image, changing colour balance had a small effect on the edges.

#### 6.1.1.4 Stage 4 – Despill

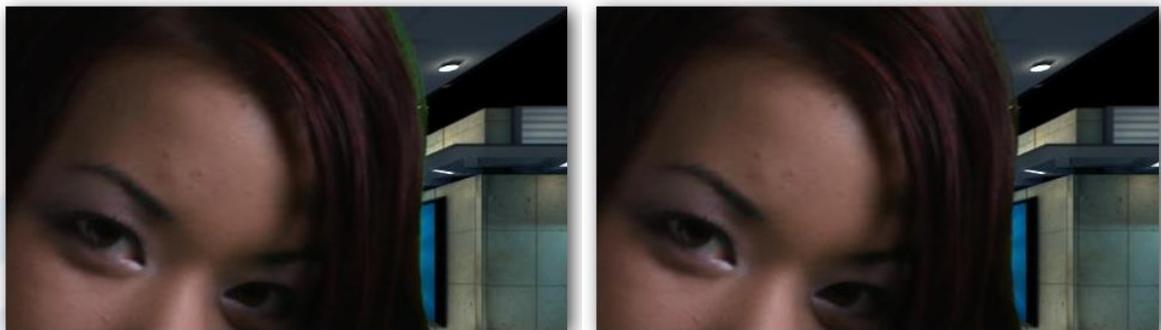
The next task is to remove the unwanted light that has spilled onto the object from the screen.

The best way to proceed is to follow those steps:

1. Set the `Factor` to 1, to see the effect fully applied.
2. Play with the `Balance` to see which value gives you a more natural feel.
3. You can lighten or darken edges, if that helps with the final composition.
4. You can attenuate the effect by decreasing again the `Factor`, if needed.

**Tip 1.** Darkening or lightening the edges might be useful for very dark or bright backgrounds.

**Tip 2.** To better match the colour of the matte with the background, you can use the controls in the `Color` tab. Those controls take performance, so it is advisable to disable it if you don't need them.



Despill removed. Notice how the green colour on the hair is gone.



Different Restore settings: darkening on the left (restore is 0.0) and lightening on the right (restore is 1.0).



Different Balance settings: 0.0 on the left and 1.0 on the right. The effect will be more or less noticeable, depending on the image.