# Nano - User Reference

Version 1.0

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greyscalelabs.com

**Nano combines the concept of light scattering with monocular depth-estimation to administer haze in your scene-referred footage.**

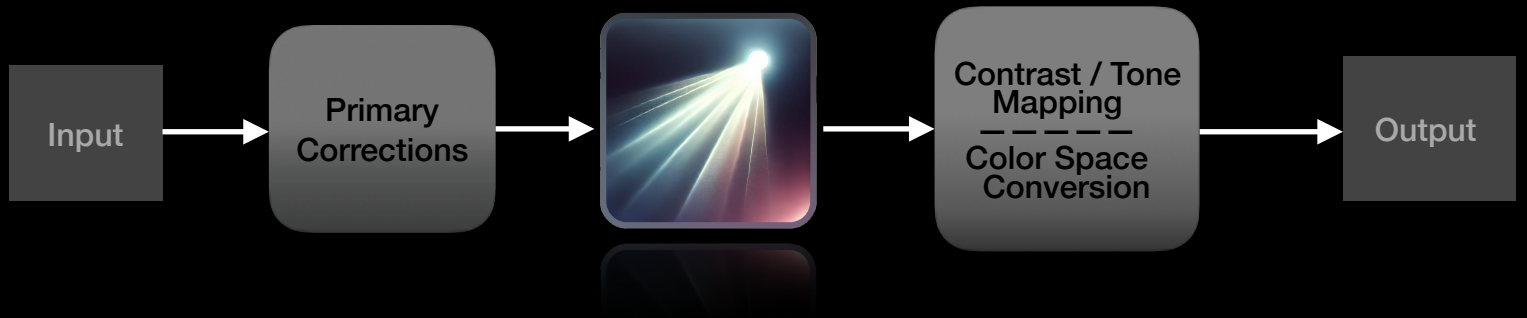
The depth map is generated by native machine-learning models or can be inherited by a prior node. It is used to define and shape haze levels, or exported directly to the alpha channel for other practical uses.

The look of the generated haze is defined by:

- Airlight - The result of particles in the atmosphere intercepting light and re-emitting it in various directions
- Halation - The effect that appears as a bright glow or halo around intensely lit areas

This is expanded on by creating depth-aware light rays which amplify and adopt the color of the generated haze.

## Node Structure

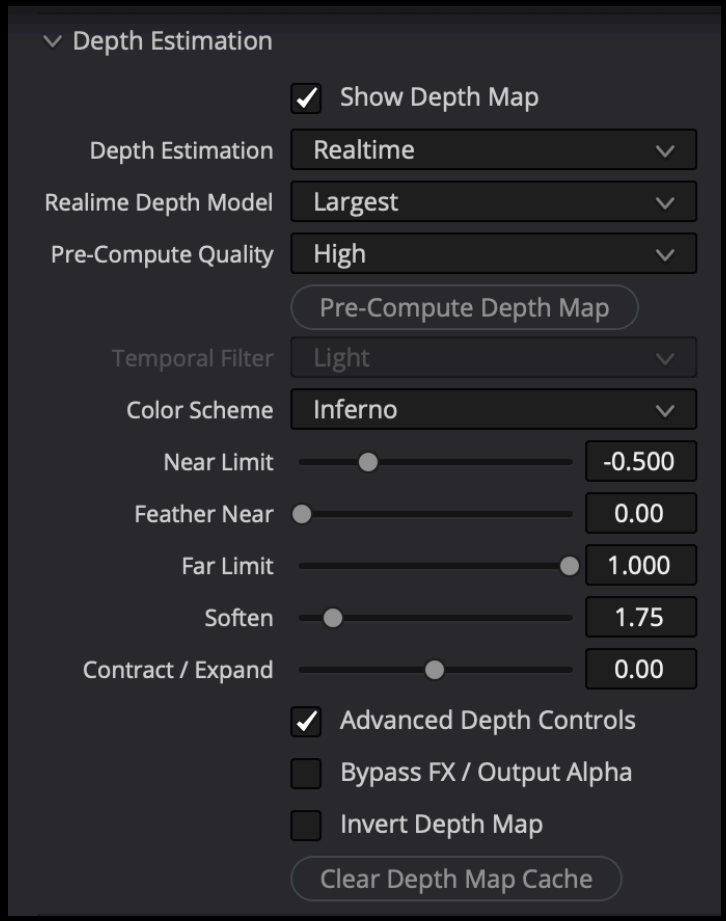



Nano responds to the scene-referred highlights of your scene. Applying it **after** your primary corrections ensures that the light that it scatters is consistent with your scene. Applying Nano **before** converting color space allows it to judge highlight intensities as accurately as possible. There is a Rec.709 colorspace override for footage not shot in log, but this is less accurate and tuned differently than the others. The depth-estimation suite also benefits from the extended highlight and shadow information of log footage.

# Depth Estimation Suite

Nano performs machine-learning to perform monocular depth estimation, shipping with controls intended to shape the scattered light.

DaVinci Resolve 20 includes a native Depth Map tool which is **excellent**, getting the same level of detail while being much faster and consistent but with occasional temporal artifacts. Use either suite with the rest of the plugin to your judgement.



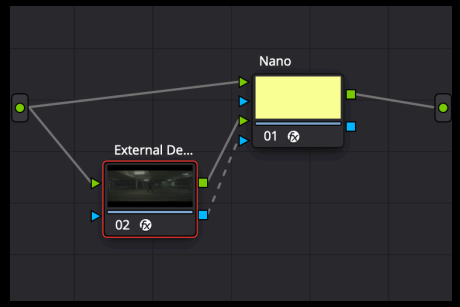
## Depth Estimation

**Realtime:** Renders depth-map frame-by-frame with playback. The result may be inconsistent.

**Pre-Rendered:** Loads a pre-computed depth-map form the hard drive for real-time playback. This will have no data until the ‘Pre-Compute Depth Map’ button is run.

**Bypass:** Bypasses all depth estimation.

**External:** Uses information from the 2nd input as the depth map. A node structure as shown to the right will properly feed the source and depth map input into the node.




## Realtime Model

**Small:** Fastest model yet not detailed and inconsistent. Not recommended for delivery.

**Base (coarse):** More accurate than small yet just as pixelated.

**Base (fine):** Faster than coarse with the same accuracy as course but less pixelated.

**Largest:** Same accuracy as course but less pixelated. Slowest render speed but most detailed and temporally consistent.

## Pre-Compute Quality

Determines which model is used when pre-rendering depth map.
**Low** uses ‘Small’, **Medium** uses ‘Base (course)’, **High** uses ‘Largest’ model

**Pre-Compute Depth Map** ***(button)***
Triggers the plugin to pre-compute the depth map for the entire clip as exposed in the 'Edit' page. Extending the clip after pre-rendering will result in video frames unaccounted for.

The now-computed the depth map is stored in your computer's filesystem. Each node's depth map will persist across sessions, but is unrecoverable and needs to be re-computed if the node is deleted or reset. The locations on computer are as follows:

macOS: /Users/Shared/Greyscale Labs/depthCache/
Windows: C:/Users/Public/Documents/Greyscale Labs/depthCache/

**Temporal Filter**
The 'de-flicker' strength of the pre-computed depth map. A higher value means that more frames are filtered between.

**Temporal Filter Threshold**
Determines the tolerance of filterable pixel values. A value of 0 means that all values are rejected and no 'de-flickering' will occur. A value too large can allow too many and cause artifacts in fast-moving images.

**Near / Far Limit**
Controls the levels of the depth map

**Feather Near**
Smooths the transition around near limit

**Soften**
Blurs depth map

**Clear Depth Cache**
Deletes all pre-computed depth maps for all clips. Don't click this by accident.

**Contract / Expand**
Offsets the size or nearer regions

**Bypass FX / Output Alpha**
For when you only want to use it for the depth map. Bypasses all effects not related to depth-estimation and outputs to the alpha channel

# Haze Parameters

## Motivation

**Highlights:** Nano was designed to work on scenes with practical lights in the shot. If there are light sources within the frame, this should always be selected.

**Ambient:** For use when there are no visible highlights in the shot. If ‘Highlights’ is selected on this sort of scene, things will start to glow that shouldn’t.


**Light Source Threshold / Show Light Sources**
Filters out what values are considered a light source

**Density**
General amount of haze present

**Attenuation**
Controls how density responds to depth. Very similar effect to *Density* but more nuanced.

**Airlight Luminance**
Controls the brightness of the ‘veil’ of scattered light

**Airlight Falloff**
Controls how spread or localized the spread of airtight is

**Halation Luminance**
Controls the brightness of the immediate glow around highlights

**Halation Falloff**
Controls how spread or localized the halation is

**Thickness**
Controls how obscured farther objects are. Usually leave this at its maximum value.

**Airlight Color**
Overrides color of haze using CCT or RGB values.

**Highlight Near Limit**
Limits highlight sampling to farther regions of the image. Use this when the foreground is as bright as the regions you'd like to scatter.

# Volumetric Light

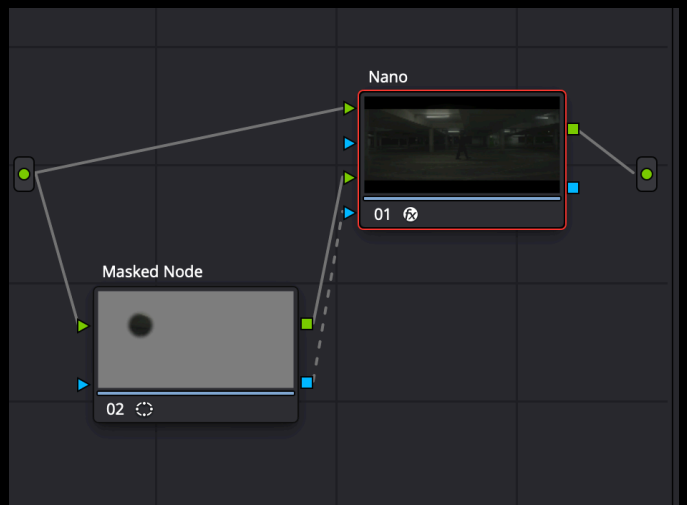
## Mode

**Point Source:** Projects light as if it comes from a single point

**Point Source - Input 2 Mask:** Projects in the same manner as Point Source but defines the point by the centroid of ‘Input 2”s alpha channel + an offset.

A user can define a mask in this Input 2 node and track it in order to keep its position consistent with camera movement. A node structure that feeds this into the node is as shown below.

**Angular:** Projects light in a user-defined direction.




**Source Threshold**
Filters out what light values will be projected.

**Proximity Limit**
Limits projected highlights to this radius of the point source.

**Decay**
Controls falloff of the light ray with distance.

**Spread**
Dilates projected light with distance.

**Obstruction**
Controls the extent to which foreground objects obstruct projected light.