Research

ClearVue Product Brief

Significant loss of image quality can arise in adverse atmospheric conditions such as rain, drizzle, smoke and fog. This is due to light scattering from particles between the camera and the subject, generating what is often called "airlight". Airlight degradation causes dark objects to appear brighter than they really are and is a persistent problem in outside broadcast operations.

The best current solution is manual intervention at the video editing desk using lift and gain controls. Lift allows manual setting of black level to compensate for airlight. In many cases reasonable image quality can be achieved by skilled manipulation of these controls. However the airlight may distort colour balance and may vary for different parts of the image, usually increasing with distance to subject. It is also quite a demanding task when the camera is tracking a moving subject as the airlight can change fairly quickly.

ClearVue is a *fully automatic* solution to this problem. A unique feature of ClearVue is that it only alters video when airlight degradation is present –this means that there is no need to turn the system off at any point. So ClearVue can be applied as a precautionary measure. ClearVue corrects the non-uniform image degradation that typically arises when shooting over longer distances or in unfavourable weather.

The ClearVue system is *easy to use*. It accepts standard-resolution video in composite or SDi formats and processes this in real-time with negligible latency. The system can be used to process a live camera feed or can be used in conjunction with an editing suite.

How it works

Clearvue uses a high-speed video pipeline to process full-resolution image data with minimal latency. Image data are converted to RGB format and processed using high speed digital arithmetic to subtract airlight noise and re-scale on a pixel-by-pixel basis. A key feature of the Clearvue system is that sample frames are continuously extracted to monitor image quality. Any airlight noise is detected using an advanced statistical algorithm (described in IEEE Transactions on Image Processing vol. 16 No. 2, 2007)

The output of this analysis is used to update the coefficients used for the high-speed processing chain. In this way an output stream is produced that is free from contrast loss, even in the case of non-uniform airlight.
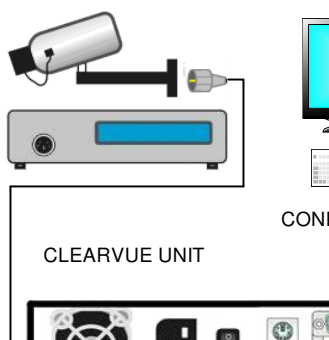
Example: The image below was captured under conditions of light rain.

The image was processed using conventional lift controls to give the result below.

The result from ClearVue is shown below. Notice that the bottom of the image is not dark as in the version using lift. As the process is fully automatic no adjustment is required should the conditions quickly improve (as is often the case in practice).

Some other examples of the output from ClearVue are shown below.

London Bridge: before   London Bridge: after

Sports event: left part processed

Horse race: left part processed

ClearVue II connectors

ClearVue II front panel