

Hardware Requirements for Stereo Viewing

Introduction

NOTE: The Forest Service conducted a RFP for stereo viewing software. Several vendors submitted proposals, and their software was tested on FS hardware. As a result of this testing, Datem Summit Evolution was selected as the new Enterprise Stereo Viewing solution. This document has been updated to reflect the requirements of **Summit Evolution version 7.1 or later**.

Note: As with any technology, the availability, specifications, and costs of equipment changes rapidly. The details listed below are current as of the date shown in the footer of this document. Prices listed are typically "Manufacturer Retail Suggested Price", and some items may be found for less at retailers. Some locations also offer GSA pricing.

There are three main display systems for stereo imagery; anaglyph, active, and passive. It is critical to understand which one is most practical for your needs before investing in hardware. Table 1 outlines important attributes of each system.

	Anaglyph	Active	Passive
Use Frequency	rare	occasional	full-time production
Cost	\$1 – \$5	\$400 - \$800	\$2000 - \$8000
Quality	poor	good	excellent

Table 1: Comparison of stereo display system attributes

The following sections discuss the hardware required for the 3 types of stereo viewing systems.

Part 1: Anaglyph

Glasses

Anaglyph stereo allows a user to see in stereo by displaying the red and blue channels slightly offset on the computer screen. The glasses used to view these (usually) contain a red lens for the left eye, and either a blue or, more recently, a cyan lens for the right eye. These filter what information passes to each eye, and the visual cortex of the brain creates the perceived three dimensional scene.





Other than the red/blue or red/cyan option, there is one other basic decision to make when purchasing anaglyph glasses: paper or plastic. Paper glasses are similar to what they used to hand out in the theaters, and are a good option if you need to buy in bulk, but will be less durable. Plastic glasses will cost much more than their paper counterparts, but will be made with higher quality plastic lenses, and have usually been further treated to eliminate ghosting which is common in anaglyphs. Plastic glasses do not always fit over corrective glasses, however. Some sources for anaglyph glasses are listed below. These glasses can be purchased online from numerous companies at prices ranging from 0.25\$ to \$5.

Monitor

Viewing in anaglyph simply requires a standard LCD monitor that most FS computers have. Display resolution of at least 1024 X 768 X 32 or higher is recommended.

Graphics Card

The latest graphics card drivers are recommended

Part 2: Active



Glasses

Active shutter glasses are specially designed with a set of shutters in each lens, opening and closing alternately to trick the eyes into thinking they are seeing in 3D. The lens action is synchronized by an emitter in combination with the software. The screen rapidly alternates between the two images of a stereo pair as the shutters open and close, allowing the left eye to see only the left image, and the right eye to see only the right image. To accomplish this, there are two requirements. First, the monitor must be able to refresh rapidly enough. A 120 Hz refresh system is required so that each “side” of the image can be refreshed at 60 Hz. Second, it will require a graphics card of sufficient quality to push the graphics, which could add to the cost. These glasses can be purchased online from numerous companies at prices ranging from \$15 to \$150. We recommend the [NVIDIA Vision 2 Wireless Glasses Kit](#) which includes an emitter and retails for about \$130.

Monitor

The monitor must have a **LCD** (liquid crystal display) and have a refresh rate of at least **120 Hz** to be used as an active stereo display. It is good to have a second monitor for viewing ArcGIS. Ideally, the monitor port should match the port on the graphics card (see Active System Setup Checklist section below for more information). Please visit the NVIDIA website for a [list of recommended monitors](#).

3D Laptops

Laptops with 3D capability through active shutter glasses and an integrated IR emitter are becoming more commonplace. However, since the laptops will not include any type ruggedization, their suitability for field use will be extremely limited.

Since the list of available models changes rapidly, we list here several manufacturers of suitable laptops rather than listing specific models: ASUS (www.asus.com/us), Acer (www.acer.com), Sony (www.sony.com), Alienware (www.alienware.com).

Graphics Card

Upgrading the graphics drivers will typically solve most issues. These should be updated from the manufacture website and not the disk that comes with the graphics card, even for newly purchased cards.

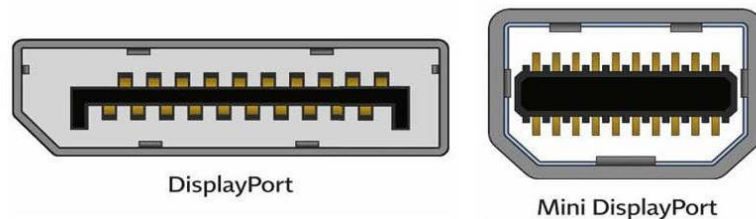
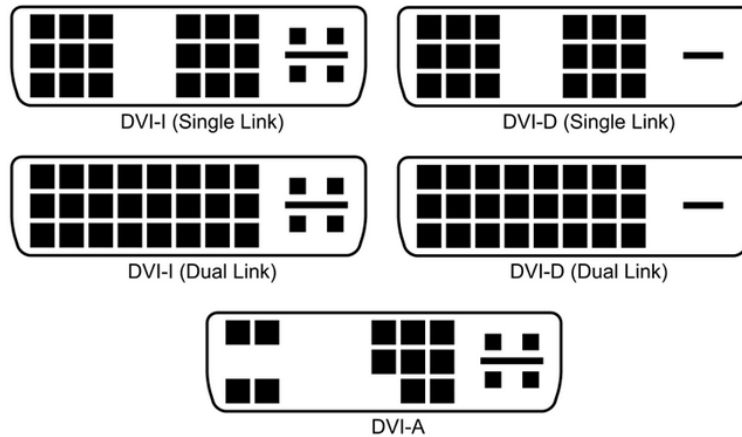
The current class 3A, 3B, and 4 systems commonly used in the agency come with NVIDIA Quadro cards which are compatible with NVIDIA active 3D vision systems and Summit Evolution. Performance can be improved by purchasing a card with higher speed and memory, but this always comes at a cost. You should look for a card with at least 512 MB memory, 25 GB per second speed, and a minimum on board video RAM of 2 GB.

Checking the compatibility of other cards may take some effort. It’s best to order a card that is known to be compatible with both the 3D Vision system and Summit Evolution when purchasing a computer system to be used for stereo viewing. As with most computer technology, graphic cards quickly become obsolete as processors and architecture are improved. Rather than try to maintain a list here, users are encouraged to review the webpages for the software to see the

currently recommended cards. [NVIDIA Quadro graphics cards](#) are ideal. However, **NVIDIA GeForce Graphics Cards are NOT supported by DAT/EM software!**

Active System Setup Checklist

- Computer Power supply of 1500w is best.
- Unplug any unnecessary USB devices and drives. Use only a powered USB hub.
- 16GB RAM is best
- Check what type of port is on the graphics card and monitor. They will most likely be DVI-D Dual link, DisplayPort, or Mini DisplayPort (see following graphics)



- If the monitor and graphics card ports don't match then [you will need an adapter for the cable](#).
- See **Appendix 1** for required NVIDIA settings
- For more setup information, refer to the [DAT/EM Configurations page](#)

Part 3: Passive



Glasses

A passive system uses polarized glasses. Each lens of the glasses is manufactured to allow either horizontally or vertically oriented light waves through. The light is oriented by use of a special screen which fits in front of a CRT monitor. This screen contains polarizing filters which projects superimposed images onto the screen. Since the glasses do not have active components like the active shutter glasses, they tend to be lighter, and are less straining on the eyes. The major drawback is that this method cannot be used with LCD monitors, since these monitors utilize polarization techniques in controlling the pixels on the screen. Glasses are included with purchase of the monitor system described below.

Monitor

Stereoscopic displays utilize polarized monitors to assist the user to see in stereo. The Planar system uses a “StereoMirror” between two monitors along with passive polarized glasses worn by the user to produce a stereo image. This system does not require the monitor to “flicker” like an active system and thus is less strenuous on the eyes. It works by allowing the left eye to see only the image displayed by one monitor (the “left” image), and the right eye seeing only the “right” image. We recommend the [3D PluraView system \(formerly the Planar system\)](#).

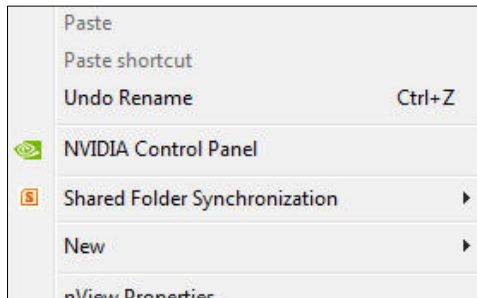
Graphics Card

Works with [NVIDIA Quadro](#) or [AMD FirePro](#) graphics cards.

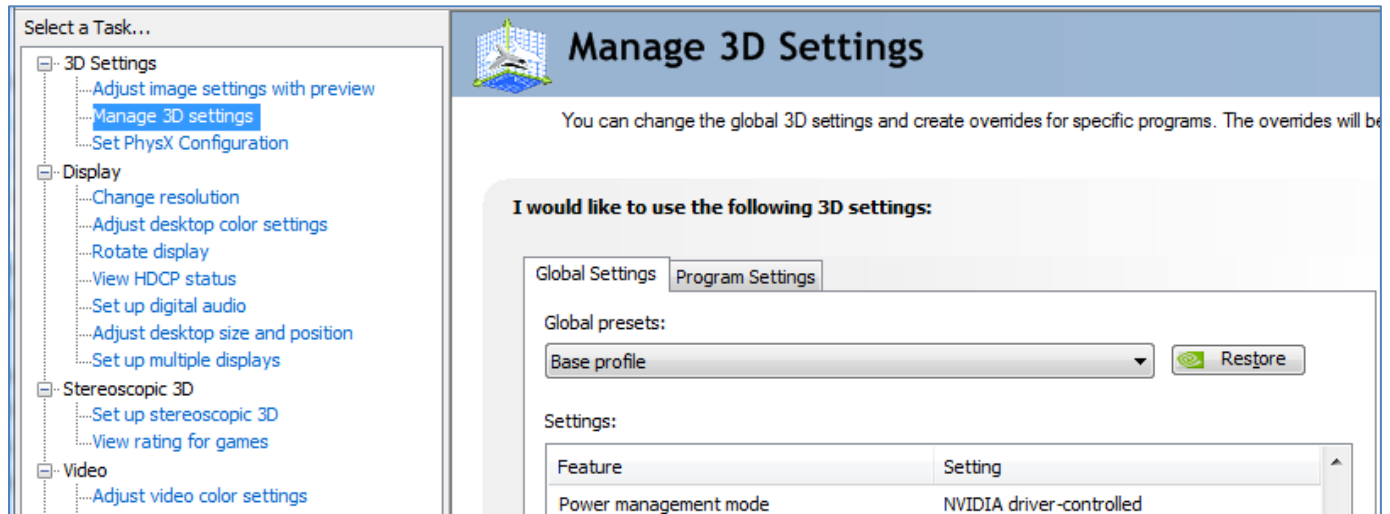
Appendix 1: NVIDIA Settings

We recommend the following NVIDIA settings for active stereo viewing.

1. On your desktop, right-click and select **NVIDIA Control Panel**.



2. In the Display panel on the table of contents, click on **Change Resolution**.
 - a. Select your 3D display and change the **Refresh Rate** to **120Hz**.
3. In the Select a task panel on the left side of the display, click **Manage 3D Settings**.
 - a. Click the **Global Settings** tab
 - b. Set **Global Presets** to **Base profile**



- c. Click **Restore** to make sure all settings are default
 - d. In **Settings** field, make the following changes:
 - i. Stereo – Display mode: **Generic active stereo (with NVIDIA 3D Vision)**
 - ii. Stereo – Enable: **On**
 - iii. If you are using a **projector** then turn on **Stereo – Swap eyes**
4. Click **Apply**