The Philips Vari*Lite VL6000 Beam

By: Mike Wood

Figure 1: As tested.

The release of the light under review this month couldn't be better timed. Just as one Dallas-based manufacturer of mirror-based searchlight fixtures changes dramatically and moves its base of operations, Philips Vari-Lite launches its own competitive product. I'm sure it was a coincidence, but it couldn't have done the product any harm!

It makes a nice change for me, as well. I don't think I've ever had the pleasure of examining an optical system of this type for review. There's something very satisfying, in a deeply nerdish way, about a light with a large reflector. Maybe it's because it reminds you of true military searchlights, with their 6' reflectors and those tight beams lancing into the sky, or maybe it's just because I like shiny things. Either way, I enjoyed powering it up, testing it out, and dismantling it to see how it all worked. The following review is based on those tests of a single VL6000 Beam supplied to me by Philips Vari-Lite, with the fixture operating on a nominal 230V 60Hz supply (Figure 1).

I should start off by saying that, as already mentioned, the VL6000 Beam is a mirror-based, searchlight-style product designed to produce a parallel, tightly collimated, beam of light. As such, some of the usual measurements I take of spot or wash lights would not be relevant. Although you could use the VL6000 Beam on stage to project gobos, that's not its primary intended use.

Lamp and lamp access

The VL6000 Beam uses Philips' MSR Gold 1500 FastFit lamp. As usual, this type of lamp is changed easily from the rear of the unit by removing a small access panel. Figure 2 shows the lamp and the twist lock socket. The lamp is rated at a nominal 120,000-lumen output at 6,000K. The temperature-controlled lamphouse is capped with the expected split and angled hot mirror, leading the light into the main optical train.

Dimmer and strobe shutters

The VL6000 Beam has separate mechanisms for dimmer and strobe. The highly collimated optical system makes it very difficult to get the smoothest dimming from a mechanical system, but the VL6000 Beam does quite well. The top end is even, but, as expected, the dim wheel pat-

Figure 2: Lamp change.

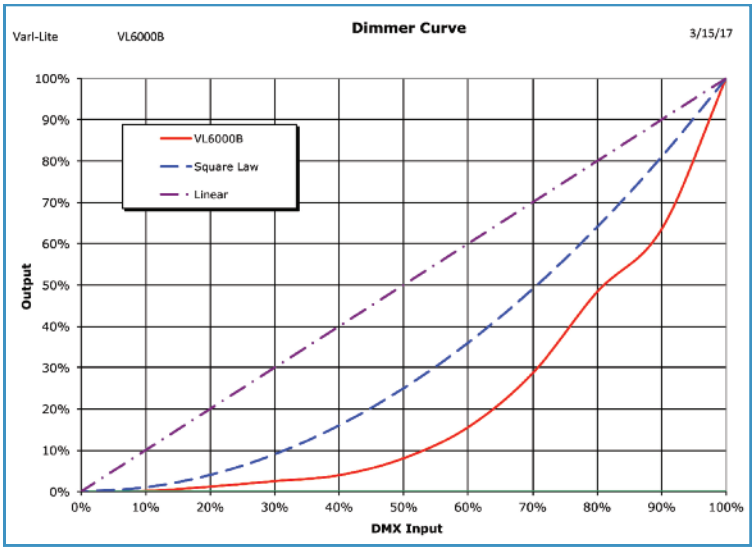

Figure 3: Dimmer curve.

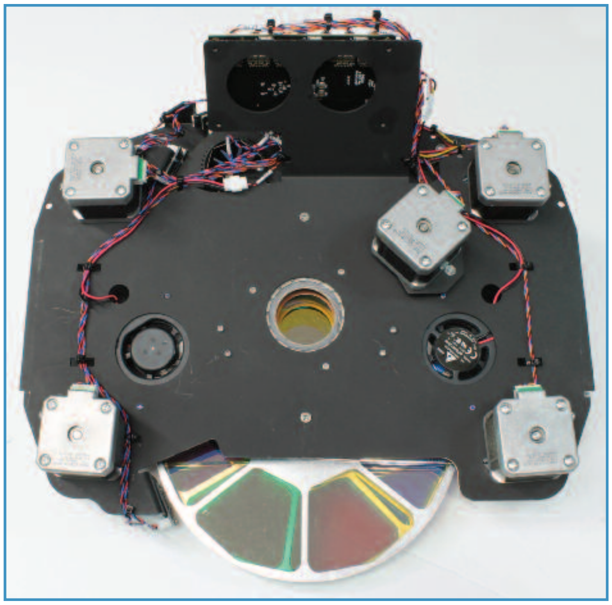

Figure 5: Color and gobo module.

terns come into view at lower dim settings. The dimmer curve is steeper than a square law, as shown in Figure 3.

The strobe function is provided by a pair of straight flags, shown in Figure 4. I measured these as providing strobe rates from 0.46 to 4.2Hz.

Figure 6: Color wheels.

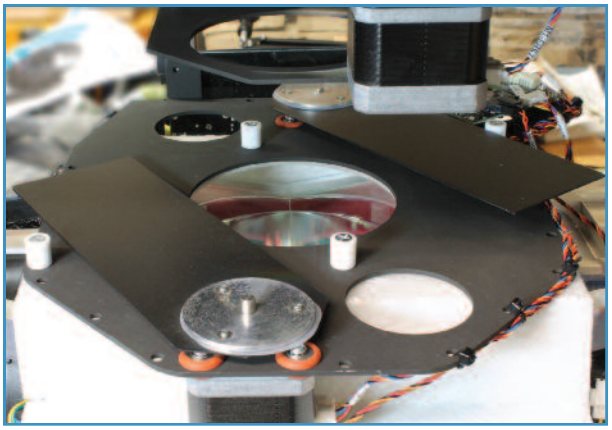

Figure 4: Strobe shutters.

Color systems

Next in line is the color system. The VL6000 Beam has an interesting design using three color wheels, each with six colors and an open hole. The removable module can be seen in Figure 5. These wheels are populated with an assortment of dichroic colors. Some are designed for use on their own, such as saturated reds and congo blues, while others are designed for mixing colors (Figure 6). In particular, one of the three wheels has three filters with differing saturations of magenta, while the second and third wheels have the same for cyan and yellow. This gives 36 options for CMY mixed colors plus nine discrete colors. This seems like a good compromise; more traditional graduated CMY wheels likely wouldn't have homogenized well with this optical system, and using discrete filters ensures that the colors are uniform across the beam. In addition to the three individual control channels (one for each wheel), a color macro channel offers quick, direct selection of a range of both individual and mixed colors. The table below gives outputs for a selection of the colors possible.

COLOR

Color	Red	Blue	Magenta	Yellow	Deep Blue	Green
Transmission	7.1%	30%	31%	91%	6.1%	20%

Color changes are snappy and the wheels offer a spin mode.

COLOR WHEEL SPEED

Color change speed – adjacent	0.1 sec
Color change speed – worst case	0.3 sec

Philips Vari-Lite also offers an operational mode for the VL6000 Beam's color wheels, called a "cloaked transition generator." With this engaged, the system will automatically fade to black, rotate the color wheel(s), then fade back up again when given a cue to change color. The fade times are adjustable from less than one second up to 10 seconds.

Gobo wheel

Very unusually for the fixture type, the VL6000 Beam has a rotating gobo wheel with seven replaceable glass gobos and an open slot. Don't think of these as conventional projected patterns, rather more as beam shaping for an aerial light beam. They add animation and movement to a beam rather than a sharply focused pattern on a wall. Figure 7 shows the wheel with the replaceable glass gobos.

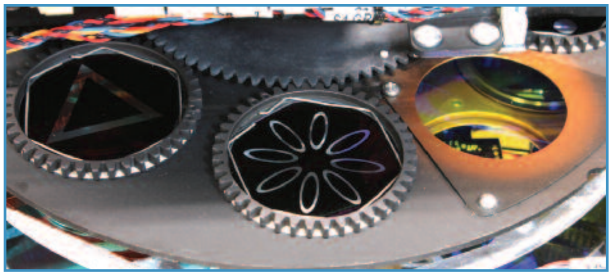

Figure 7: Gobo wheel.

ROTATING GOBO SPEEDS

Gobo change speed – adjacent	0.2 sec
Gobo change speed – worst case	0.8 sec
Maximum gobo spin speed	0.278 sec/rev = 216 rpm
Minimum gobo spin speed	33 sec/rev = 1.82 rpm
Maximum wheel spin speed	0.82 sec/rev = 73 rpm
Minimum wheel spin speed	37 sec/rev = 1.6 rpm

The mechanism looks similar to that used on the VL3000. Movement is good, with smooth rotation and indexing. The only issue was some jumpiness when reversing rotation direction, which results in some hysteresis. I measured the accuracy at a 0.3° of hysteresis error, which equates to 0.5" at a throw of 20' (23mm at 10m). The wheel uses a quick-path algorithm to minimize change times.

Iris

Last, but not least, just after the gobo is the iris. When fully closed, the iris reduces the aperture size to 48% of its full size. I measured the opening/closing time at around 0.2 seconds.

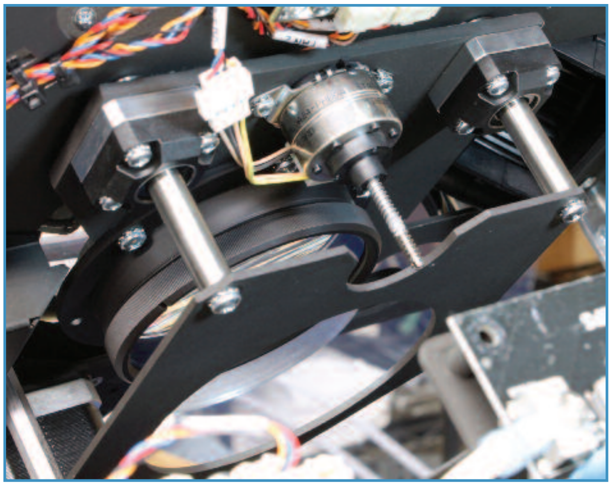

Figure 8: Lens.

Lens and frost

The VL6000 Beam has a single group lens that provides focus/edge control. A reflector system like this has a fixed beam angle, so no zoom/beam size control is offered other than through the iris or gobos. Figure 8 shows the lens and its associated linear actuator to provide the movement. End-to-end focus took around 0.7 seconds. Finally, there is a frost flag, as shown in Figure 9. This can be moved across in 1.1 seconds to significantly soften and widen the beam. In some focus positions, the lens has to move back out of the way before the frost can come across; this slightly lengthens the insertion time.

Figure 9: Frost.

Reflectors and output

We now reach the end of anything conventional about the VL6000 Beam. Instead of the normal sets of objective lenses, we have an ellipsoidal reflector system. This operates in a manner like a Cassegrain reflecting telescope in reverse. Some followspot designs use a similar optical system. The

Figure 10: Spider.

Figure 11: Conical reflector.

light beam exiting the focus lens is first directed onto a small, curved conical mirror mounted on a three-legged spider arm in the center of the field. Figure 10 shows the spider, while figure 11 shows a sideways view of the reflector. (Notice that the very center of the reflector is not coated, so as to avoid reflecting light back down the optical train). Light is bounced back off this conical reflector into the main large elliptical reflector, which forms the entire front of the luminaire, as clearly seen in Figure 11.

Figure 12 shows a view straight back down the barrel, which gives you a magnified view of the three adjusting springs on the central conical reflector.

Note: If you ever take a VL6000 Beam apart, put the spider back in place in the correct orientation when reassembling, to keep everything nicely aligned. The direction of the VL logo in the middle is the key to ensure you are the right way up. I may or may not have got this wrong…

The result of these reflections is a large light beam, the width of the main reflector, which is well-collimated with a narrow beam angle. I measured the total output at 41,000 lumens at one focus position with a field angle of 6.7°. However, it was a difficult fixture to measure and the focus position made quite a difference to the output and beam

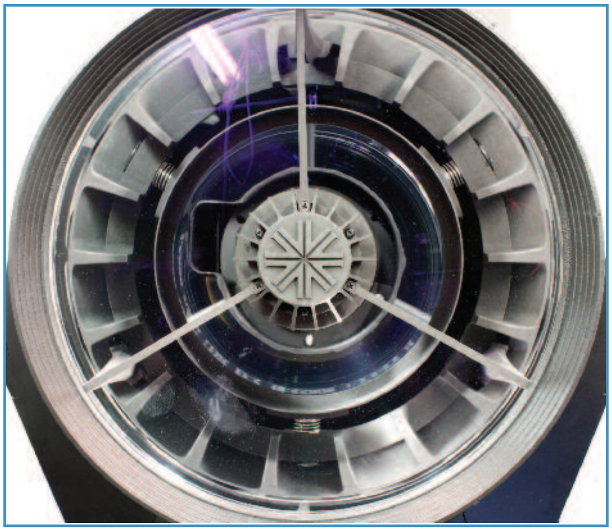

Figure 12: View into front.

Figure 13: Focus positions.

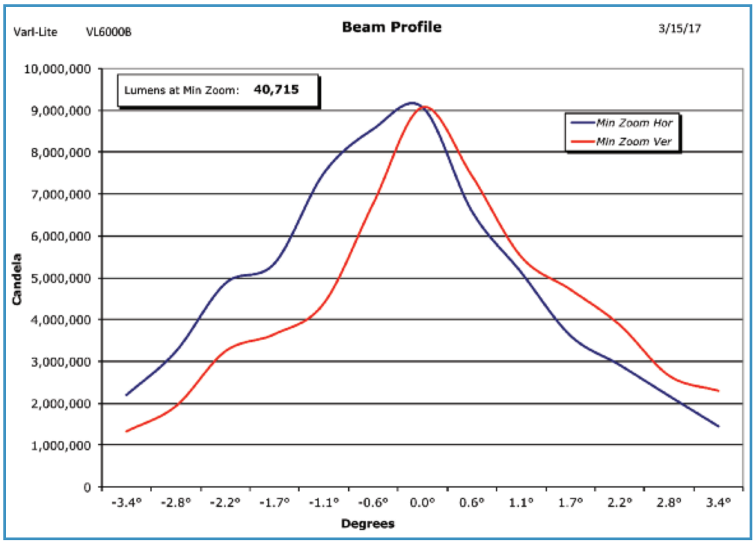

Figure 14: Beam profile.

sharpness and clarity. This is a fixture you have to try out in your space to see how it performs (Figure 14).

Color temperature, after going through all the optics, was measured at 6,710K with a spectrum, as shown in Figure 15. Not a spectrum for great color rendering, but you aren't likely to be using a VL6000 Beam to light people!

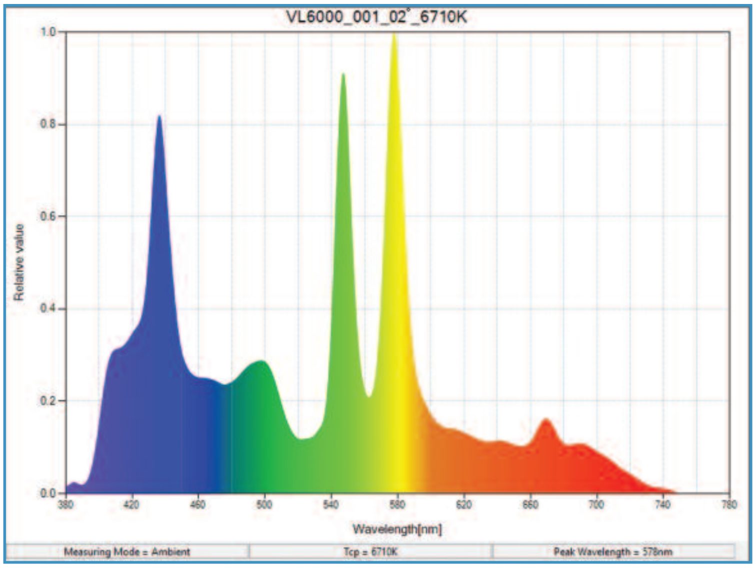

Figure 15: Spectral distribution.

Pan and tilt

I measured the pan and tilt range of the VL6000 Beam at 540° and 200°, respectively. A full-range 540° pan move took 4.75 seconds to complete, while a more typical 180° move finished in 3.75 seconds. Tilt took 2.6 seconds for a full 200° move and 2.5 seconds for 180°. All movements were very smooth, with very little bounce and no visible steppiness. Hysteresis, on the other hand, was quite high. I measured both pan and tilt at 0.87°, equivalent to 3.6" at 20' (151mm at 10m). It was also quite easy to make the unit misstep when reversing direction. The encoder system corrected for this immediately, but you could see and hear the slight jerk in the movement as it happened.

Noise

A 1,500W lamp means quite big fans. They provided by far the bulk of the noise from the unit. When moving, pan and tilt were the loudest functions.

SOUND LEVELS

	Normal Mode
Ambient	<35 dBA at 1m
Stationary	55.6 dBA at 1m
Homing/Initialization	63.3 dBA at 1m
Pan	66.7 dBA at 1m
Tilt	66.7 dBA at 1m
Color	55.8 dBA at 1m
Gobo	56.2 dBA at 1m
Gobo rotate	56.0 dBA at 1m
Focus	56.8 dBA at 1m
Strobe	56.0 dBA at 1m
Iris	55.6 dBA at 1m
Frost	55.6 dBA at 1m

Homing/initialization time

Full initialization took 21 seconds from either a cold start or a DMX512 reset command. Homing is well-behaved in that the fixture fades out smoothly, resets, and keeps its shutter closed before fading up again after all reset movement is finished. The lamp is cold-restrike but, with all the cooling available and with a new lamp installed, it cooled down sufficiently in one minute to be able to restrike.

Construction

The VL6000 Beam uses a distributed electronics system, with main boards in the head and yoke arm providing the motor drives. Figure 16 shows the inside of the head, with the main motor drive board in view. This board handles motors and sensors for the head.

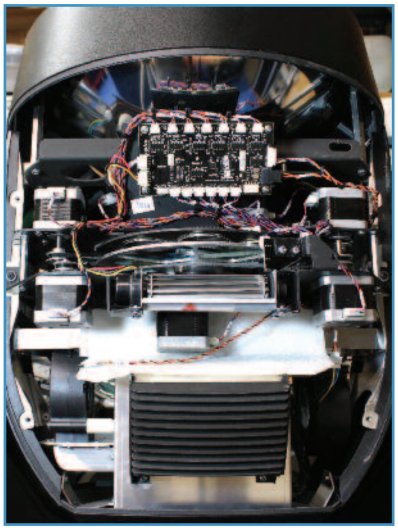

Figure 16: Head side 1.

Figure 17 shows the two yoke arms, one containing the tilt motor and belt, with the other side containing a circuit board for pan and tilt, along with data distribution.

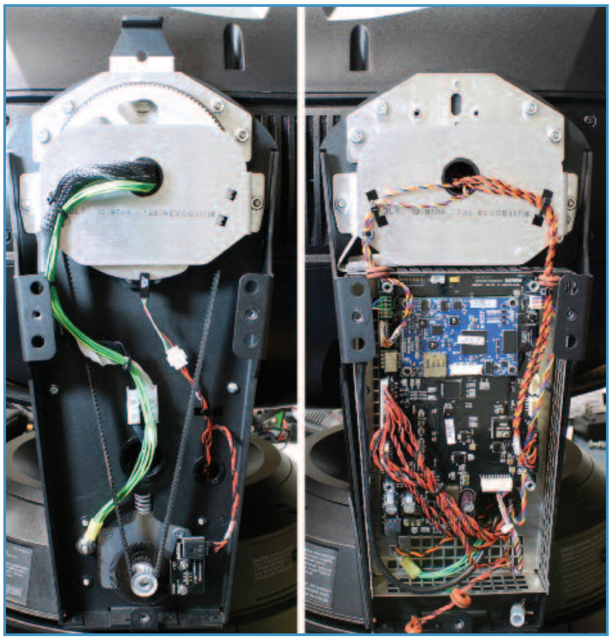

Figure 17: Yoke arms.

Figure 18: Display.

Figure 19: Connectors.

Electronics and control

The VL6000 Beam uses a now-familiar color display and button array to navigate the comprehensive menuing and control system (Figure 18). On the other side of the base, power and data connections are provided, including a Neutrik powerCON TRUE1 input and standard five-pin DMX512 connections as well as a service USB socket (Figure 19). The unit offers comprehensive RDM functionality. (See sidebar for testing method).

There you have it, the Philips Vari-Lite VL6000 Beam, somewhat of a departure for Vari-Lite, but a product that fills an important niche in the entertainment lighting industry. Narrow beam fixtures have been all the rage for a few years now, and the VL6000 Beam takes the beam diameter up a notch for larger venues. Does it seem right for you and your show? That's your decision.

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City Theatrical DMXcat

This was the first time I got to try out the new DMXcat, from City Theatrical. I first saw it at the trade shows last year, had been impressed with what I saw, and purchased one as soon as it started shipping. If you haven't seen the DMXcat, I encourage you to take a look. It's a small, dongle-sized device with a DMX socket that communicates with your smartphone (Apple or Android) via Bluetooth. Figure 20 shows it paired with my iPhone 6. City Theatrical has put together a nice range of apps to go with it. I won't go through them all, but, for me, the two most useful were the instant control it provides along with the RDM functionality.

Figure 20: DMXcat.

I was able to connect the DMXcat to the VL6000 Beam and, without having to tell it anything, it recognized the fixture from its RDM ID, and downloaded the correct library protocol so I was able to instantly control the unit from my phone. No addresses to set, no protocol to select: Very elegant! Figure 21 shows a small selection of the screens I used. It also provides a good set of both DMX and RDM test functions including checking timing and some low level parameters. It's definitely something for the tool box.

Figure 21: DMXcat screens.