Elation Platinum Beam 15R Pro

By: Mike Wood

Figure 1: Fixture as tested

After a slew of LED units, it's good to get my hands dirty with an HID-sourced luminaire again. LEDs may be the best thing since sliced bread, but you can't yet get a single small-point LED light source with output that compares to that of an arc. This still makes arc sources the best choice for units like the Elation Platinum Beam 15R Pro. It is one of the new breed of ultra-narrow beam projectors that give you that ACL look from an array of moving lights. Units of this type show up in every event at the moment, and the generic type must be one of the most popular small moving lights around. Elation enters this arena with the Platinum Beam 15R Pro, joining a family of products that use the Philips MSD Platinum lamps. How does the beam variant perform? As usual, I'll try to measure everything I can from lamp to output lens and give you the results so you can decide for yourself.

The Platinum Beam 15R Pro, like other beam lights we've measured, presents some problems to this objective approach. It's not a unit you would likely use to light surfaces or performers and is primarily used for aerial effects and "beamage." The perception of these beams is not an easy thing to measure objectively, as it depends as much as anything on the environment and haze in the air as it does on the luminaire. What we can measure with the luminaire is its brightness; we can also take a somewhat subjective view of how tight and parallel the beam is and how crisp is the edge. Because of this inevitable subjectivity, it's even more important that you test this kind of unit out in your own venue. What works for me may or may not work for you. All tests were carried out on a single unit supplied to me by Elation as typical of a production unit. I ran the unit on a nominal 115V, 60Hz supply for all measurements (Figure 1).

Lamp

You've heard me talk about etendue in this column before, and these beam luminaires are a perfect example of how it forces design decisions. In this case, you want to end up with a very narrow angled beam that's not too large in diameter. We know from the conservation of etendue that, as you make a light beam narrower, it must also inevitably get larger in diameter. To get the narrowest beam and not end up with a 6' diameter searchlight, we need to start out with the smallest light source we possibly can. The Elation Platinum Beam 15R Pro uses the Philips MSD Platinum 15 R lamp (Figure 2).

We've seen its smaller sibling, the 5R, in these reviews before. The Platinum 15R has a 1.3mm arc inside a simple arc tube that is mounted in a dichroic glass reflector and is accurately prealigned, by Philips, to the reflector to maximize light output. That tiny arc means that this alignment is critical; as the normal screw adjustment for lamp position on luminaires would be too coarse, better to have it done in the factory. I like prefocused lamps; they take the guesswork out of luminaire design and ensure that units in the field perform the same way as they did on the bench. The MSD Platinum 15R lamp is rated at 300W with 13,500 lumens output at 8,000K and a life-to-50% failure of 1,500 hours.

Figure 2: Lamp

Lamp change is pretty simple. Elation has made this much easier since I reviewed an early model of the Platinum Spot 5R. You remove three screws to drop off the rear panel and expose the lamp. Remove the connections and then push and slide the lamp downward against a spring-loaded plate to release it from its retaining clips (Figures 3 and 4). Replacement is the same, with the lamp flange slotting into a plate on the lamp bulkhead.

Figure 3: Lamp change panel

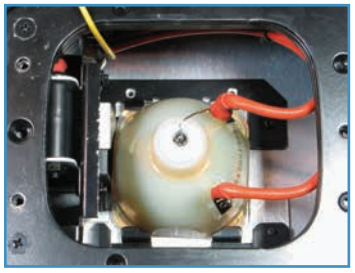

Figure 4: Lamp change

The lamp is enclosed within a sealed lamp house with temperature sensors and a dedicated blower to keep it comfortable. Temperature control is critical on these unjacketed lamps; a sealed lamp house is just about essential, particularly with a moving light where convection patterns are constantly changing with head movement.

Immediately after the lamp, and capping the lamp house, is a typical split-angled dichroic hot mirror. It reflects infrared energy back, keeping it out of the beam while the angles on the filter prevent that heat from reflecting directly back into the lamp.

Color wheel

You often see the dimmer/shutter flags next, but that isn't the case with the Platinum Beam 15R Pro. Instead, the color wheel is located immediately after the lamp-house. This has eight fixed dichroic colors plus an open aperture. Interestingly, like the hot mirror the dichroic colors are split and angled. Presumably, this is for the same reason as the angle on the hot mirror: to avoid sending reflected energy back into the lamp. Figure 5 shows the best shot I could get of one of the colors. Figure 6 shows the view from the lamp-house through both the hot mirror and a color. Each color is made of two pieces of dichroic glass that are glued to the wheel and to each other to form an angled assembly. Because of this method of attachment, colors are not changeable.

Figure 5: Angled filters

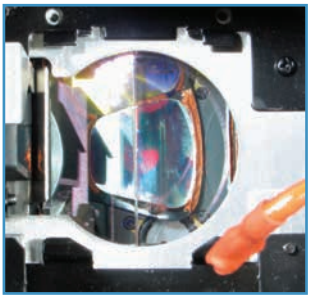

Figure 6: Hot mirror and colors

FIXED COLOR WHEEL

Color	Red	Blue	Green	Yellow	Magenta	Orange	Purple	CTO
Transmission	3.7%	14%	13%	77%	7.1%	16%	0.1%	43%

Color change speed was good; the filters are very small, but the angled construction makes them a little heavier than a flat filter. Wheel rotation was smooth.

COLOR WHEEL

Color change speed – adjacent	0.1 sec
Color change speed – worst case	0.4 sec
Maximum wheel spin speed	0.58 sec/rev = 108 rpm
Minimum wheel spin speed	138 sec/rev = 0.43 rpm

Gobos

The Platinum Beam 15R Pro has two gobo wheels. First in line is a rotating gobo wheel with eight changeable rotating/indexing patterns plus an open hole, followed by a fixed wheel with 13 unchangeable patterns plus open. The fixed wheel has all patterns cut into a single large wheel, as can be seen in Figure 7. It also shows the thicker rim on the fixed wheel; presumably, this is to avoid any buckling or warping with the heat. Both wheels contain an assortment of apertures and simple patterns. You can't really overlay the two wheels, as they are quite far apart in the optical train; the optics are so fast, with correspondingly small depth of field, that you can't focus on them both at the same time. However, it gives you a good selection of patterns. One thing I noted is that the small aperture on the rotating wheel is deliberately off-center. This allows you to get some interesting effects by rotating that single aperture off-axis.

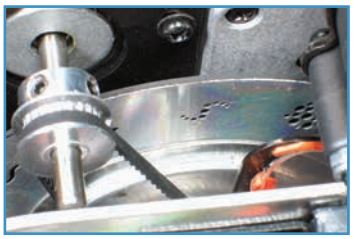

Figure 7: Fixed gobo wheel

ROTATING GOBO

Gobo change time, adjacent apertures	0.1 sec
Gobo change time, max (Gobo 0 to 4)	0.7 sec
Maximum gobo rotate speed	0.5 sec/rev = 120 rpm
Minimum gobo rotate speed	140 sec/rev =0.43 rpm
Maximum wheel spin speed	2.2 sec/rev = 27 rpm
Minimum wheel spin speed	82 sec/rev = 0.7 rpm

Both positioning accuracy and rotation smoothness of the gobos was excellent with no evidence of judder or jumping. I measured hysteresis at a very respectable 0.04° of error, which equates to about 0.2" at a 20' throw.

STATIC GOBO WHEEL	
Gobo change time – adjacent apertures	0.1 sec
Gobo change time – max (Gobo 0 - 7)	0.7 sec
Maximum wheel spin speed	3.3 sec/ rev = 18 rpm
Minimum wheel spin speed	93 sec/ rev = 0.6 rpm

Focus quality and aberration on the gobos was fine, given that this is a beam unit and not a spot. It is definition of the beams in the air that you want, not logos or patterns on a cyc. The gobos are chosen for this use—simple patterns, nothing too complex. The fixed gobo wheel has the smallest aperture; this is the one that you might use to get the very tightest beam you can. With that gobo in place, it reduces the beam size to 24% of the full size so that the beam angle is 1°.

Dimmer and strobe

The dimmer/strobe assembly is similar to other Elation units I've seen, with a pair of toothed flags that close in a scissor action across the beam. The peaky beam optics aren't kind to dimming, and, if you hard-focus on a cyc, you will see many artifacts and shadows. Again, however, this isn't what the Platinum Beam 15R Pro is for. With beams in the air, you don't notice any of this (Figure 8). The actual dimmer curve itself is close to a linear response. The same flags are used to provide the strobe, which I measured as providing rates from 1.7Hz – 9Hz (slightly faster when the unit was dimmed down slightly).

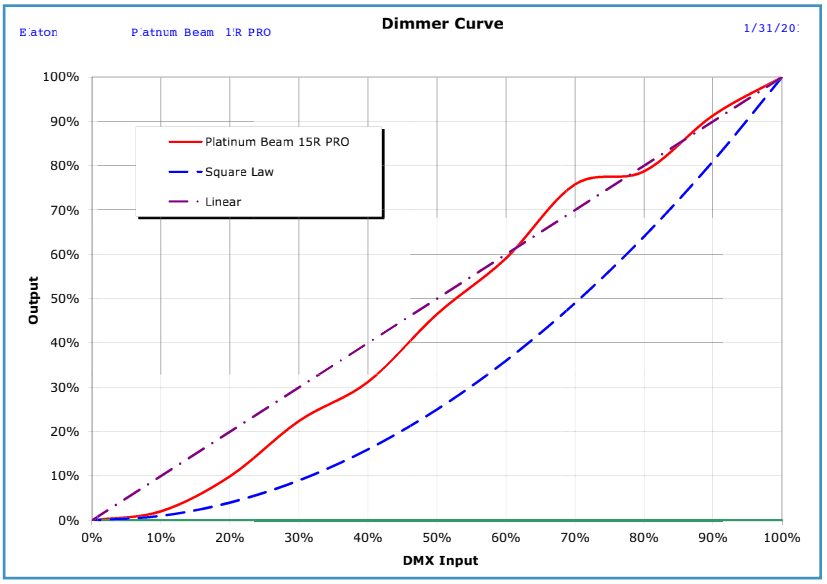

Figure 8: Dimmer curve

Prism and frost

The Platinum Beam 15R Pro has an eight-facet rotating prism mounted immediately after the dimmer. (The order of optical components is slightly unusual; the beam optics are very different from the more usual spot units.) This prism gives good image separation and some very interesting beam effects. Elation provides a range of preprogrammed prism and gobo macros on the prism control channel that give you quick access to many useful combinations. I measured 0.6 seconds to insert or remove the prism from the optical train, which can be rotated at speeds varying from 0.33 sec/rev (185 rpm) down to a very slow 976 sec/rev (0.06 rpm).

Figure 9: Frost flag

Finally, just before the lenses, we have the frost flag. This is a single large diffuser flag that can be dropped across the beam. It's not a variable frost; it's either in or out. This is quite a heavy effect and diffuses the beam into a broad wash. It's clearly designed for effect again, which is appropriate for a unit of this type. It took 0.7 seconds to insert or remove (Figure 9).

Lenses and output

The Platinum Beam 15R Pro has two large diameter lens groups. The first comes immediately after the frost flags, which moves to adjust the focal point of the assembly. The second forms the final output lens of the unit and is fixed. Figure 10 shows the output of the unit. This is very peaky and somewhat uneven, but that's okay for its use as a beam projector, where you want as much light as possible in the center of the beam through your small aperture. Because of this uneven distribution, I was unable to take a sensible reading for lumen output. (My algorithms require a smooth, symmetrical distribution.) However, I've provided candela readings on the chart, which will show you the beam brightness. The peak center beam was around 8,000,000 candela with a beam angle of 4.4° at full aperture.

Note: Because of the extreme narrow angle of this luminaire, I needed a longer throw than usual to take my measurements. To achieve this in my workshop, I used a mirror to bend the path and increase my normal 16' throw to around 30'. An unwanted side effect of adding a mirror is that it also introduces some loss in output due to reflection losses both at the glass surface of the mirror and at the reflective surface itself. To compensate for this, I measured the beam center illuminance at the mirror surface as

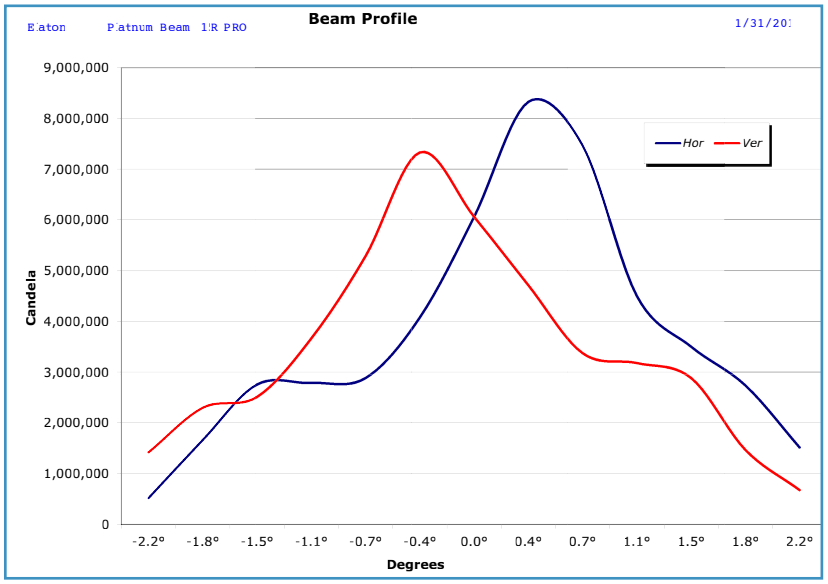

Figure 10: Output

well as at the screen. Then I used normal inverse square law math to calculate a correction factor to cancel out the effect of the mirror. This correction factor was then applied to all output measurements.

Pan and tilt

I measured the movement range of the Platinum Beam 15R Pro as 540° in pan and 221° in tilt. Pan time over that angle was measured at four seconds with four seconds for 180°. In tilt, the figures were 2.5 seconds for 221° and two seconds for 180°. Both pan and tilt have optical encoders to reposition the fixture if it is knocked out of place.

The unit seems to use the same algorithm as other Elation units I've tested, with quite strong movement profiling resulting in a slow deceleration into the final position. This algorithm reduces movement bounce on final positioning, but it inevitably slowed moves down slightly, particularly on pan.

I measured the repeatability accuracy for pan at 0.06°, which is about 0.3" at a 20' throw with tilt slightly better at 0.05° (0.2" at 20'). Both were excellent results. Slow moves had some visible stepping, particularly when moving diagonally.

Noise

By far the noisiest part of the unit is the cooling fans. The Platinum lamp needs a lot of cooling, which inevitably means noise from the fans. No motor movement, other than a small whine in tilt at one speed, was louder than the fans.

SOUND LEVELS

Ambient	<35 dBA at 1m
Stationary	50.7 dBA at 1m
Homing/Initialization	62.8 dBA at 1m
Pan	50.9 dBA at 1m
Tilt	51.0 dBA at 1m
Color	50.7 dBA at 1m
Prism	50.8 dBA at 1m
Gobo rotate	50.7 dBA at 1m
Gobo select	50.7 dBA at 1m
Focus	50.7 dBA at 1m
Strobe	50.8 dBA at 1m
Frost	50.7 dBA at 1m

Power and homing/initialization time

I measured power consumption at 3.93A, or 467W, with a power factor of 0.99 when running on a nominal 115V, 60Hz supply. The Platinum Beam 15R Pro is rated for use on 100V – 240V AC 50/ 60 Hz, and all supplies are auto voltage switching.

The unit took 55 seconds to complete a full initialization. Like many units, it is badly behaved on return from a reset, as it opens its shutter before reaching the final pan and tilt position.

Electronics and control

The electronics of the Platinum Beam 15R Pro are distributed throughout the unit with motor drives near to their associated motors. Figure 11 shows a view of one of the driver boards and associated cable management board.

Figure 11: Distributed electronics

Figure 12: Yoke arm and pan

Figure 12 shows one yoke arm, which contains the pan motor and associated electronics. You can also glimpse the encoder wheel for the position feedback at the bottom of the photo. The other yoke arm contains the tilt motor. Finally, the top box contains all power supplies, as well as the menu and main control electronics (Figure 14). The Platinum Beam 15R Pro head is fairly cramped and not

Figure 14: Top box

Figure 15: Display

modular, so this is a unit to repair on the bench, not in the rig.

As with other recent Elation products, a color LCD display is used for the menu and control functions. This offers all the normal DMX512 configuration functionality along with standalone, programming, and maintenance options; it has battery power so that you can set options while the unit is in the road case. The Platinum Beam 15R Pro also comes with wireless DMX built-in, in this case, to the W-DMX format.

The connection panel uses the almost ubiquitous Neutrik Powercon for power and offers both five-pin DMX512 XLRs and three-pin XLR connectors for data (Figure 16).

Well, that's about it for the Platinum Beam 15R Pro. As I said earlier, this type of beam unit has become very popular recently. It's interesting that Elation has chosen to go to the higher powered Philips MSD Platinum 15 R lamp. The real proof of that will have to be in your venue, as I discussed earlier. The effectiveness of aerial beam units is difficult to measure objectively, and a certain amount of subjectivity is bound to creep in. As always, I suggest that, if you think the Platinum Beam 15R Pro looks interesting, you try it out in your venue and make the final decision yourself.

Figure 16: Connections

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