Laser Alignment – Questions and answers

How does laser alignment work?
Simply put a laser is a device that emits a beam of light, which has very little spread, hence the 'dot'. This is because the light it emits consists of a very narrow frequency range, which also determines its colour. It travels in a perfectly straight line toward what ever it is pointed at. If you point it at say the other side of a kart and there is a target of some description attached to the other side the laser will produce a dot on that target. When you move one side with the laser independently you will see that the dot moves on the target.
Now if you produce a target that takes into account the distance between the 2 points you can use a measurement grid and so take actual measurements when moving the dot around.
By moving the tie rods on a kart you will alter the toe setting, move the eccentric nut around the king pin and you alter the camber. You can confirm your current castor angle; set your steering central, check for stub axle bend all within a few minutes, accurately and quickly.

How much more accurate is a laser system over a standard disc set up?
Not only is a laser system more accurate (The Eagle Eye will achieve settings easily within 0.5mm) it is repeatable, meaning that whoever checks the settings can achieve the same results. Eye line, tape inaccuracies, experience do not come into it.

Pro? Clubman? What's the difference?
Both units share the same internal components and go through the same rigorous set up procedure to ensure accuracy and reliability. The only differences between the two units are the material they are made from and the method of mounting on the stub axle. The Pro has an anodized aluminium body whereas the Clubman is an engineering plastic. The Pro locates by way of a precision steel bush whereas the Clubman utilizes an engineers 'V' block fitting which will accommodate all axle sizes up to and including 25mm (1").
All other features are the same.

Can I use your units on my gearbox kart?
Yes. You will need the extender set which allows the laser beam to be lifted clear of the disc brakes. These units will accommodate axle sizes up to 40mm and fit both Pro and Clubman versions.

I already own an Eagle Eye Pro/Clubman; can I buy the rear unit separately?
Yes. We understand that budgets may not allow for a complete system to be purchased from the outset and with a new chassis we'd like to think that twist etc in the frame would be non-existent. As the Eagle Eye is a complete system and designed as such from the word go, all components of it can be purchased separately at any time and will work together regardless.

I now own a laser alignment system how do I start off?
The first thing you will need to do is to read the instructions carefully. If you do not have them they can be downloaded from our web site. Assuming you have read them lets begin.
We feel that the best, in fact the only way to truly check and set your karts front end is dynamically, meaning with the driver in the kart with the kart on the ground. The closer you can get to actual race weight the better. Now I know we feel a bit self-consciences in our helmet, suit, gloves and boots on the front drive way but we want to get this right yes?
OK first we need to center our steering and lock it in place. We make a simple steering wheel lock to enable you to do this.
Mount the units as described in the instructions, switch on and take a reading. Most first time users are surprised at just how far out their karts are.
If you have no prior knowledge as to what works well for you then as a starting point I would suggest setting your toe to zero and your camber to zero, with the driver in the kart. You will find that when he or she gets out of the kart the camber and possibly the toe, will have changed. This is the effect of driver weight and hence the reason for getting all dressed up in the first place.
On most karts you cannot adjust castor without affecting camber so for now take a reading as described in the instructions and go do a few laps. You will more than likely find that the kart feels a bit strange at first especially if you had to do a fair degree of adjustment to equal up both sides but you can take comfort from knowing that your steering is now set up to be identical both sides.
From here on in it is a matter of test, drive, test and drive. There are no perfect settings. Track, kart, driver weight, driver style, weather, will all have an effect on the handling. I cannot emphasis enough the importance of keeping records. All the top teams we know have detailed readings appertaining to track, driver, kart, weather. The one bit of advice I would offer is to not get into the habit of change for changes sake. Stick with a good dry setting that works for you and only change one thing at a time. Learn what effect increasing the toe or camber has on your kart. Try different castor angles. The great thing about laser alignment is that once measurements have been established in a matter of minutes you can tune your kart to suit any track you race on. You can find more information on kart set up at www.karting.co.uk and click on karts and karting.

What effect do the different methods of mounting have on accuracy?
Our Pro version has a steel bush that locates over the stub axle diameter our Clubman has an engineers 'V' block fitting. You could argue that a precision fit onto the stub axle would be the best but in our experience the diameter and finish on some kart stub axles leaves a lot to be desired when trying to achieve a one size fits all.

The question isn't what effect does mounting have on the accuracy but rather how much more accurate is one from the other?
We've tested both our units extensively and to be truthful the difference is negligible (if it exists at all). Meaning you cannot see any difference with your eye so what difference will it make on the track?

Is the bubble accuracy important?

Yes to a point but lets not get carried away. We give a tolerance of + or – 30 arc minutes which is half a degree. Given that this is a + or – tolerance means that at the **absolute worse** case the bubble will be ½ degree out when set by eye.
As a test set your front end to zero toe and zero camber with the bubble as centrally positioned as possible within the vial i.e. equally spaced between the two lines. Now move one of the units until the bubble is lined up with the line and move the other in the opposite direction to the same mark. Look at the target. We found that the laser dot hadn't even moved outside of the center circle in fact its movement was hardly noticeable. We feel ½ degree is more than acceptable when setting up a kart, brain surgeons may require more!!
With the rear axle kit the bubble accuracy is more important. We use the same bubble and because of the unique and simple way in which we use the rear system we are able to set the laser to the bubble. Therefore the bubbles repeatability is important and not it's accuracy. The repeatability is very, very good!

Is it necessary to have the kart dead level when setting up?

For toe and camber it is not necessary to have your kart on a level table. Small slopes will not materially offset your readings or settings…….try it!!
However, castor angle will be affected if the kart is not level in the front to back plane. Every one-degree of angle will give a degree error on the castor scale; however, you can still compare one side to the other.

When looking for chassis twist, squareness and crabbing should you set the front geometry to zero toe and zero camber?

In a word yes, zero toe is absolutely essential. Remember what you are doing is checking your front axle against your rear axle and to your frame so the front units at zero toe and camber will give you a flat and true face to point the rear units at. Knowing that the front is correct immediately shows up discrepancies with the rear.

Caster angle, what is it and how does the Eagle eye work in this respect?

On a Kart the castor angle allows for the inside rear wheel to lift during cornering to avoid excessive scrubbing of the tyre. If you look at your kingpin from above you will notice that it is inclined towards the centre of the kart and also towards the rear. These are 2 separate angles. The first is the camber and the second is the castor. When you move the steering the stub axle sweeps down as it moves backwards. This is the result of the castor angle and you can see this clearly on the Eagle Eye targets. Note that this is measured only at and around the straight ahead steering position and not over large swings, which are also affected by other factors too deep for this article.

All the visitors to our stand at the shows had various opinions over why one setting (toe, camber or caster) is more important than the other. The simple answer is it is up to you. What feels good, what makes a difference to you? We can tell you what the castor angle is using the front laser systems and as a rule of thumb most karts run between 15 and 20 degrees of castor.

Measuring or comparing, what's the difference?

With the front laser alignment system you are measuring the toe, camber and castor using millimeters and degrees of angle.
With the rear system you are comparing one side of your kart against the other using the position of the laser dot on targets attached to the front units as a comparison.

If I don't check my chassis alignment how reliable is the front-end geometry?

This is a very good question we receive often. The front end is separate from the rear in that you need not make any adjustments to the rear to achieve good front- end settings. But what is the value in an accurate front-end if your chassis is out of line? You may still have control problems around corners if your chassis is bent and twisted.

How often do I need to check my karts alignment?

Good question. How often do you race? Is it always the same track? Have you taken a knock recently? Have you gained 2 stone in weight?
OK seriously we check for each different track we race on and also whether it's wet or dry. Also if our driver takes a knock we will check it out for peace of mind.
When you've changed your tyres can also be a good time in case something got moved when tightening or un-doing.
The beauty about using a laser alignment system is that ANYONE can achieve all of the above quickly and accurately.