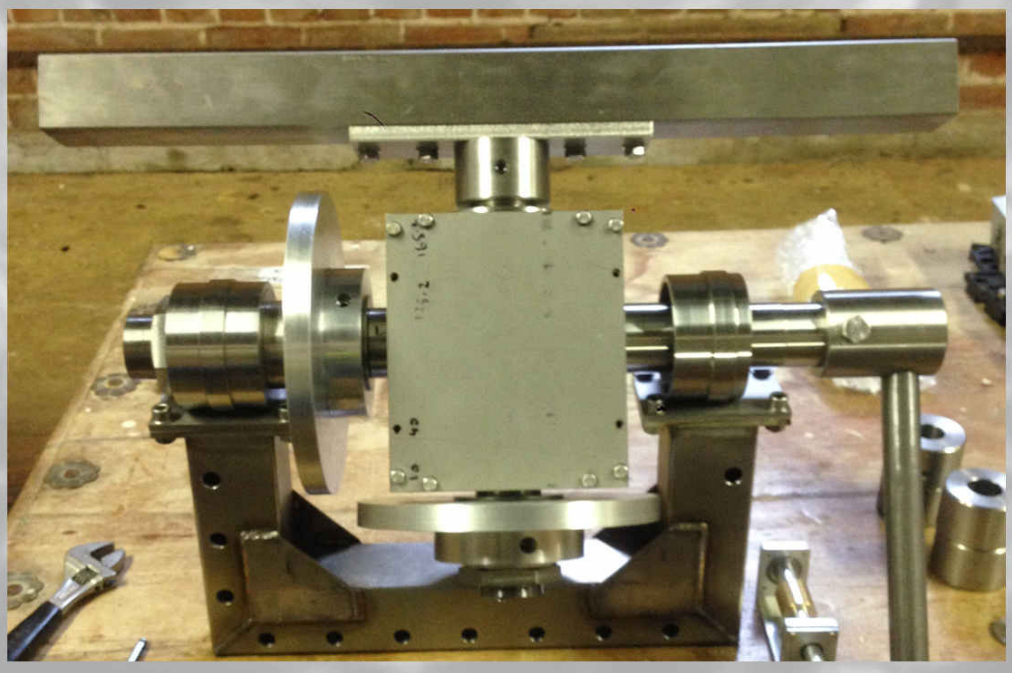
PEM – Portable English Mount

Looking at different telescope mounts, there are problems with all the different designs and to understand this fully you need to fully understand the stresses and forces involved.

Two UK Astronomy based manufacturing companies, AWR Technology and Astromount, both known for their design and innovation, have come together to tackle this problem.

Knowing the inherent design problems they have taken the concept of the mount back to the drawing board. They have stripped it back to its core components, worked out the forces and stresses involved and calculated the best design.

They have taken the mechanics of an English Mount design and modified it into a 'C' shape and made it portable.



www.astromount.co.uk

Specifications

* Very stable, accurate and strong construction.
Large bore tubes and pipes of stainless steel make it extremely rigid without the weight. Accuracy covers a whole host of parameters - the drive system, the worm wheels and no wobble in the shafts. The worm wheel sets are from Beacon Hill Telescopes, well known for providing rugged items of low periodic error. Very stable - careful design to make sure that overhanging weights are reduced as much as possible. The design itself is inherently stable by putting all the load between bearings on the RA shaft. This is the only axis that rotates to follow the stars.

* Designed to be used with all types of telescopes up to 50kg.
The design of the telescope support bar means it is suitable for holding very long telescope tube assemblies. The angled support structure is designed so the centre of gravity of the telescope plus mount will be within the pier, so there is no loss of stability when a long pier is used for long tube refractors in visual use. Long Newtonian tubes can also be held effectively without wobble. Short tube 16 inch SCT's can also be held. These are notoriously difficult to balance - there needs to be mass in the DEC components which we have. The mount weight is around 35kg with the counterweight bar and telescope bar in place, so a payload of 50kg OTA is easily achieved. It will be tested with more. It is still portable, the telescope bar and counterweight bar are removable bringing the weight down to about 27kg for putting in situ.

*Complete with the AWR Intelligent Drive System.This is the most precise piece of kit that covers an almost universal number of applications. It has been fitted in various configurations on telescopes up to 36 inch diameter on mounts all round the world, including upgrades for commercial mounts. It is continually being upgraded with new features, reprogrammable by the user.

* 8.5 inch worm wheel sets.
Easier to get a high accuracy drive with larger diameters. By restricting the teeth to 250 keeps the ruggedness, has a large tooth profile making it easier to control backlash. Correct tooling is used to get an engineering tooth

* Large 48mm diameter shafts, thrust and roller bearings.
Thick walled tube makes it equivalent to a 42.6mm dia solid rod, without the weight. The 45mm inside diameter bearings are used in trucks. Two opposing thrust bearings work with a large nut against a step on the shaft to keep it in position. The third bearing on each axis is able to slide but provides a reference to keep the shaft rotating in the same axis without wobble.

*DEC Load supported between bearings 0.35m apart on the RA shaft.
By using the 'C' section support structure it is possible to provide the benefits of the English Mount design and with 8.5 inch wheels we get 0.35m between the arms. With smaller worm wheel sets it is possible to shrink the size of the 'C'. Nothing else is affected. This is what can be done when all the drawings are under your control.

*Reduced centre of gravity reduces counter weight required.
The overhang of the telescope to the RA axle defines a torque which must be balanced by the counter weight. Reducing this distance as much as possible reduces the torque and hence the counter weight.

*Will not bind or go out of alignment when the temperature changes.
The secret is in the placement of the bearings. Opposing thrust bearings keep that part of the axle stable against the housing. The bearing at the other end can slide on the shaft which copes with minor position changes due to temperature differentials.

Portable English Mount

*Excellent for Astrophotography.
Low periodic error by the precision worm wheel sets.
Only one axis turning as it is an equatorial and no wobbles, with an accurate drive. Just what you need. Autoguiding corrections are taken in the standard drivebox.

*State of the art modelling CAD design software.
Engineering drawings have been produced with 'Design Cad' by an engineer with knowledge of technical drawing and engineering workshop practise. Up to date tools allow transfer of files for laser cutting parts, or producing on CNC lathes etc.

* Good old fashioned stress and bending calculations.
Even with good computer tools it is necessary to work out cross sections, beam bending moments and stress analysis so that the mechanism can be designed without over-engineering or with weak links.

* CNC engineering techniques. Used for accurately producing the myriad of parts used in the mount.

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SHOWING YOU THE WAY
ASTROMOUNT

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