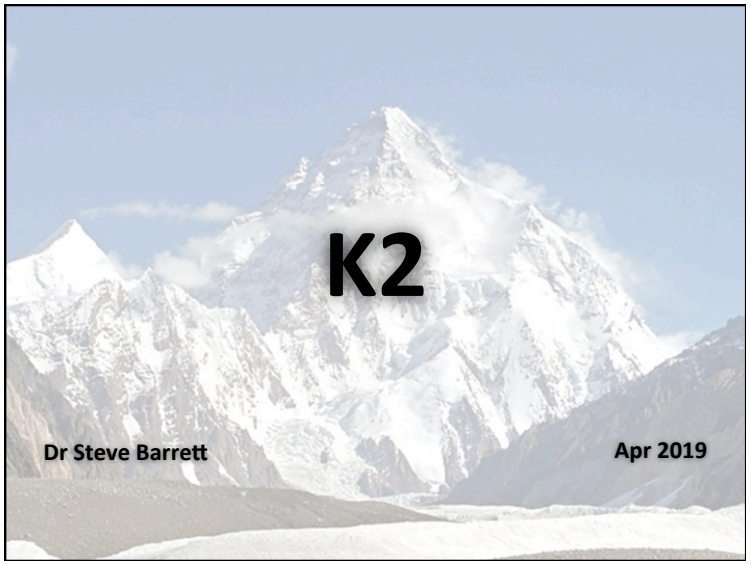

Introduction

Designing K2
- Basic Idea
- Design Criteria

Building K2
- Components
- Construction

Aligning K2
- Polaris
- Pegasus Arm

Testing K2
- Periodic Error
- Drive Speed

Using K2
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Star Trails

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Design Criteria

What criteria determine the design of a star tracker?

Ideally...	For K2 this means...
Compact	Footprint no larger than A4
Light	Less than 1 kg
Strong	Able to support a digital SLR
Accurate	Exposures of up to 15 minutes
Battery operated	AA batteries
Low power	Run for ~ 6 hours
Cheap	Cost < £50 for all components
Easy to construct	Manual tools (no workshop)

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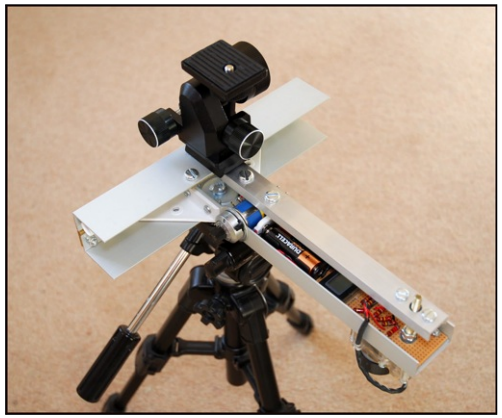
Construction



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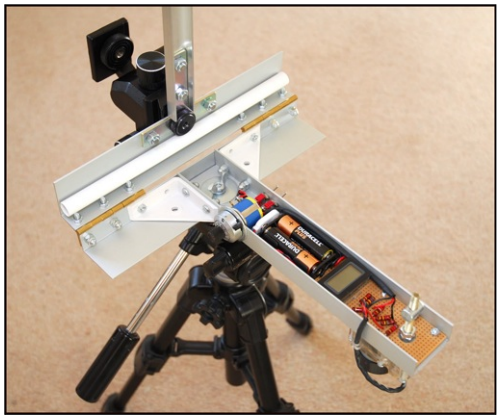
Construction



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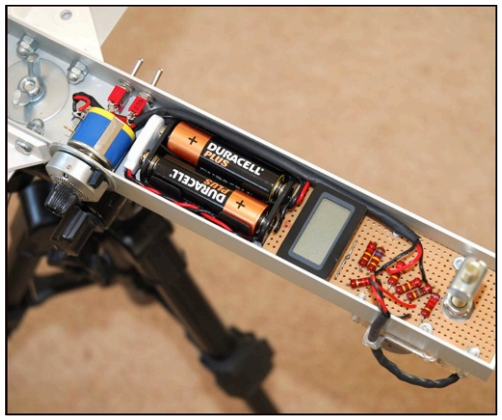
Construction



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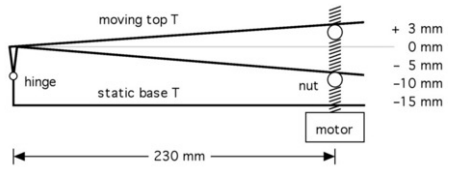
Construction



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Aligning Using Polaris

A simple sighting tube would work for Polaris, but...

When in Kenya, on the equator,
an alternative alignment is required.

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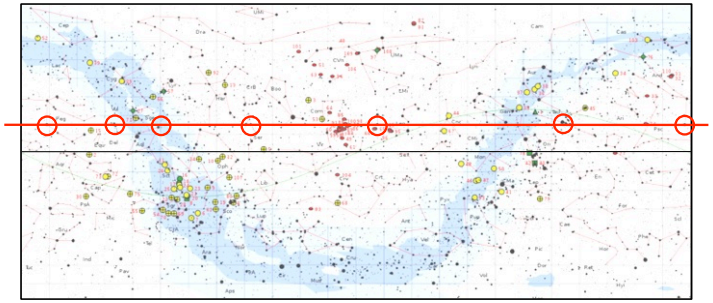
Aligning Using Pegasus Arm



Declination = 15.2°

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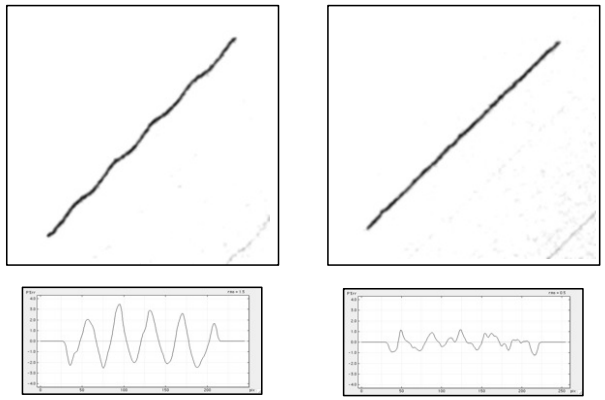
Periodic Error



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K2 – Off and On

With K2 switched off the stars trail after just a few seconds.

With K2 switched on the stars are imaged as pinpoints.

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Focal length = 100 mm, Exposure = 30 sec

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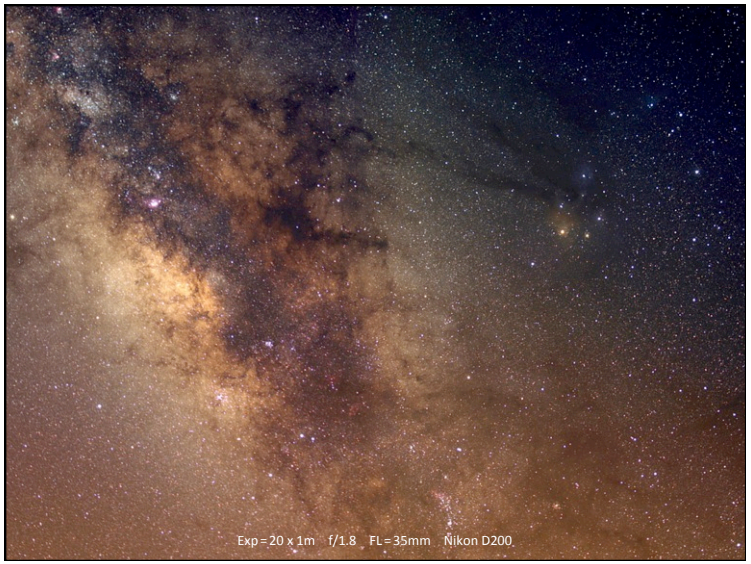

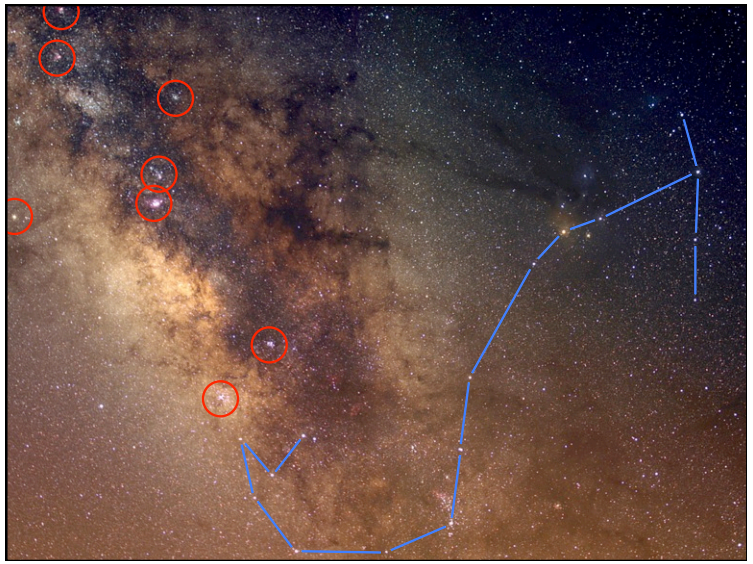

Overview

So how well did K2 work?

- Alignment using the Pegasus arm ☑
- Tracking accuracy ☑
- Size, weight, power ☑
- Rigidity ☒

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www.liverpool.ac.uk/~sdb/Astro/K2

K2

Dr Steve Barrett

Apr 2019