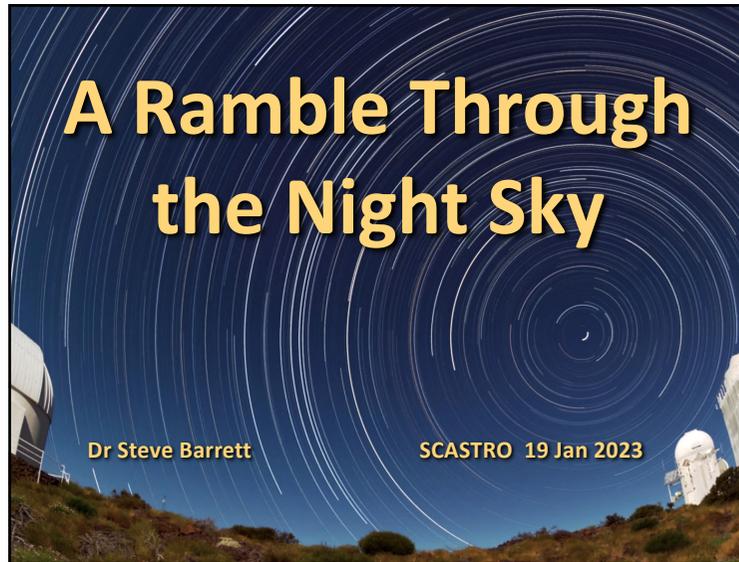


# A Ramble Through the Night Sky



## Contents

What's up there?	planets and comets stars and galaxies
How can I find my way around?	maps apps
What if I want to see more?	binoculars telescopes
How can I take photos?	star trails tracking the sky

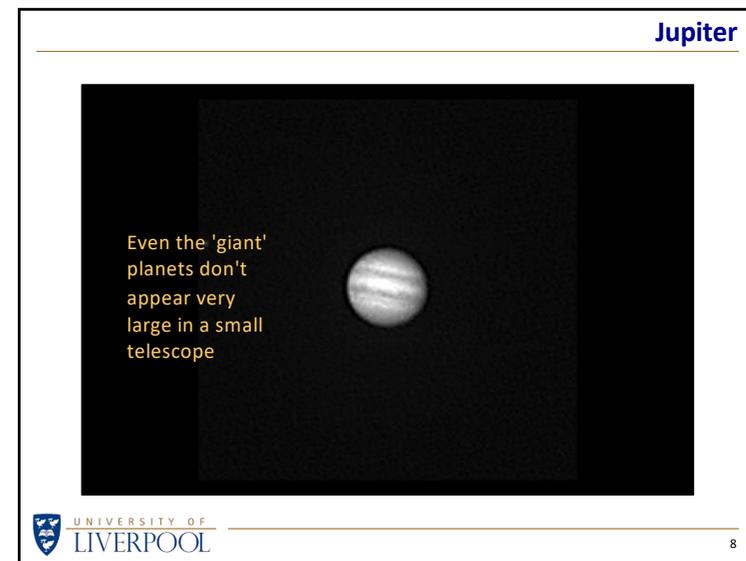
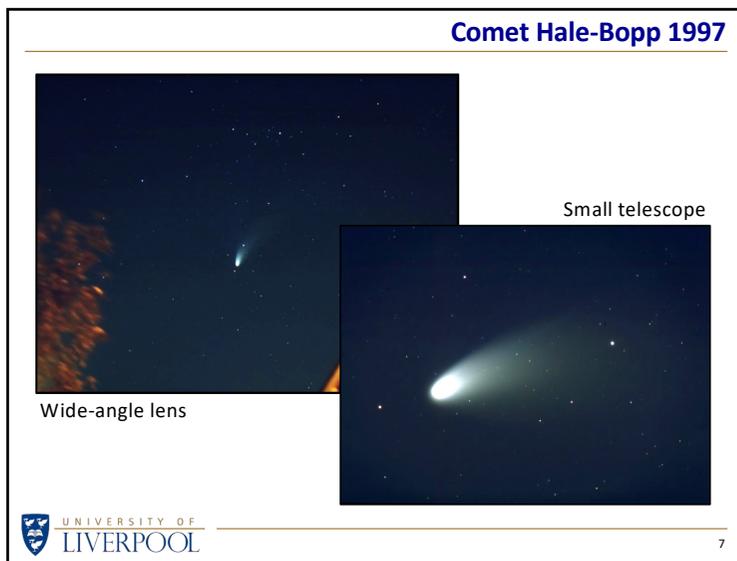
## Contents

Note that ...

- I'm not attempting to describe everything 'up there'
- This is a random walk through the Universe
- Along the way, I will show photographs that I have taken (with and without a telescope)

# What's up there?

# A Ramble Through the Night Sky



# A Ramble Through the Night Sky

Saturn



Even the 'giant'  
planets don't  
appear very  
large in a small  
telescope

What's up there?

( beyond our solar system )

Stars and Stuff



Rosette Nebula

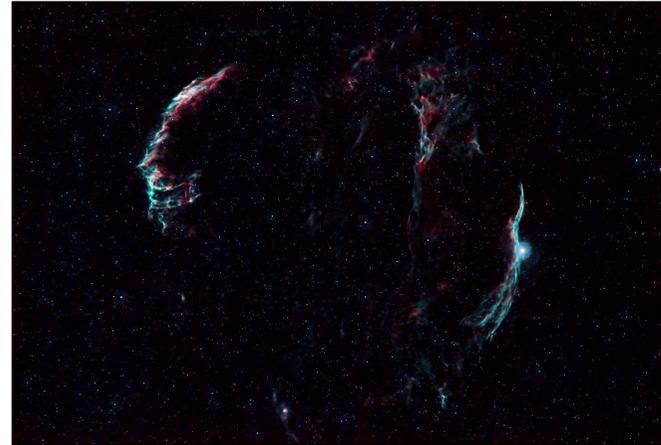


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Helix Nebula



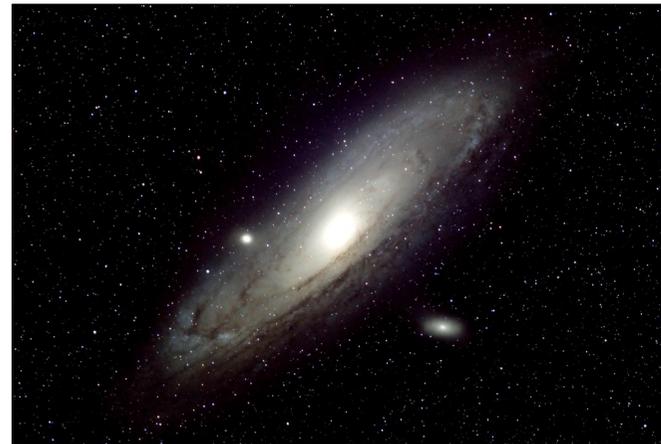
Veil Nebula



Milky Way

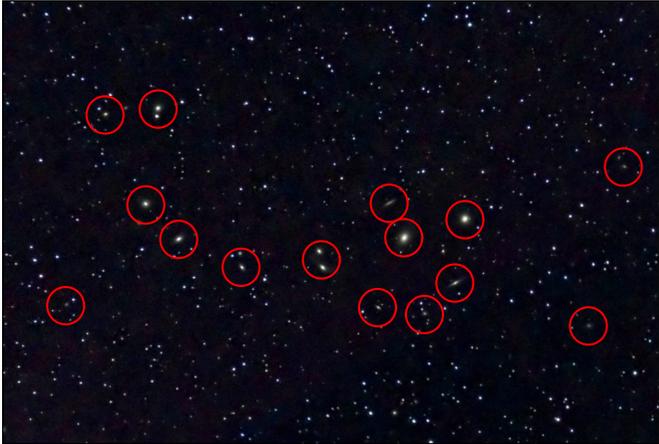


Andromeda Galaxy



# A Ramble Through the Night Sky

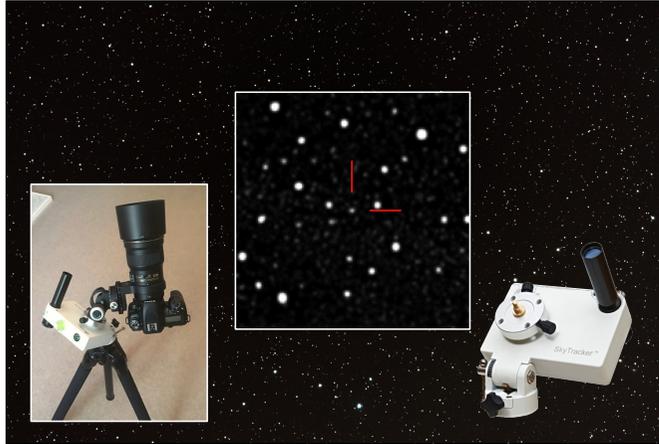
**Millions of Light-Years**



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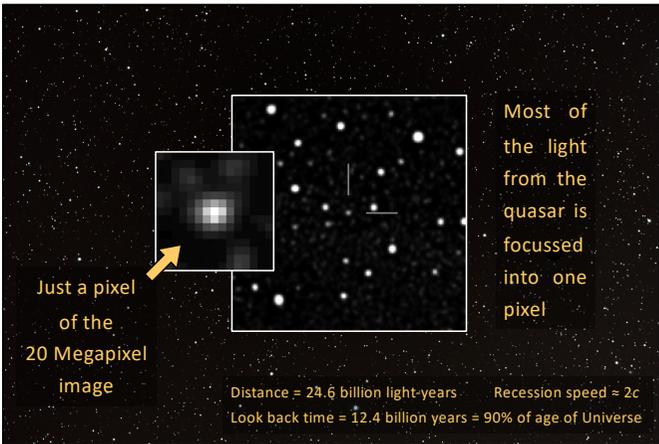
**Lockdown Challenge**



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**Billions of Light-Years**



Just a pixel of the 20 Megapixel image

Most of the light from the quasar is focussed into one pixel

Distance = 24.6 billion light-years    Recession speed  $\approx 2c$   
Look back time = 12.4 billion years = 90% of age of Universe

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How can I find my way around?

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# A Ramble Through the Night Sky

Maps and Apps



Starry Night ENTHUSIAST  
© 2005 Imaginea Canada Ltd.  
Steve Barrett y0f-23bc-7bac-fae1-f9a3

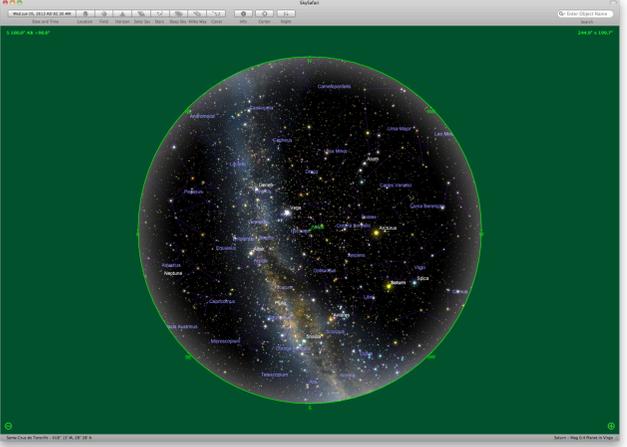
SkySafari  
release 1.8  
SOUTHERN STARS

stellarium SVN r4215  
www.stellarium.org

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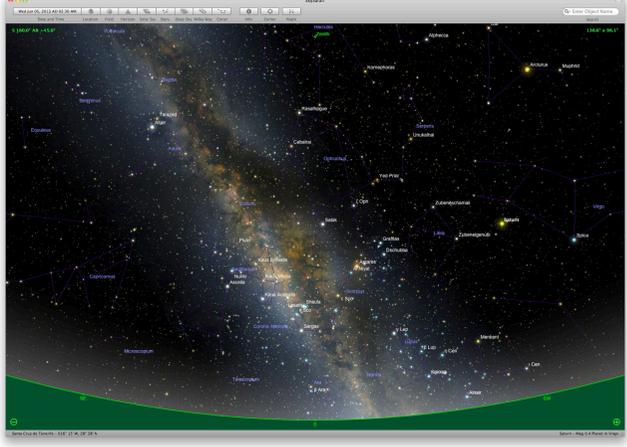
Maps and Apps



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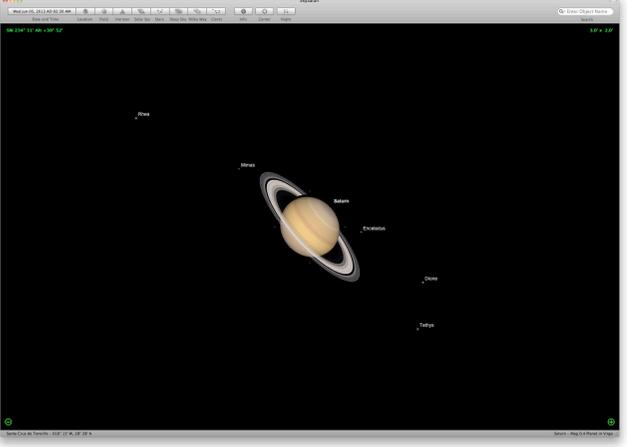
Maps and Apps



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Maps and Apps



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# A Ramble Through the Night Sky

What if I want to see more?

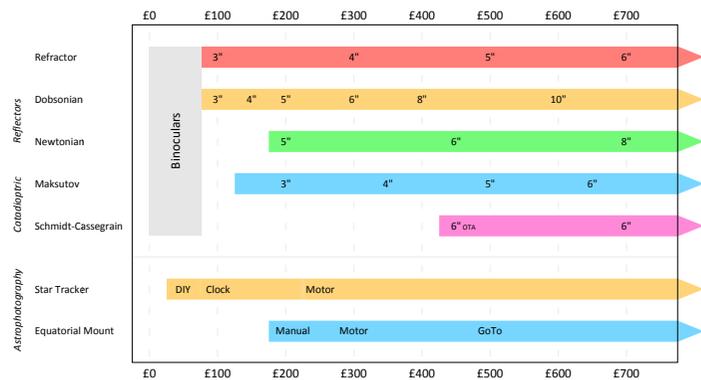
## What Do You Need?

If you have  
~£250 – £25,000  
to spare ...



## Telescope Prices

Prices collated in 2021



## Telescopes

### First Eye on the Sky

A Rough Guide  
to buying your first astronomical telescope

Dr Steve Barrett  
BASoc 1 Nov 2021



# A Ramble Through the Night Sky

## Where To Put the Telescope?



Palomar Mountain, California



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## Back Garden Observatory



1982

1998



30

## Teide Observatory



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## Mons Telescope at Teide Observatory



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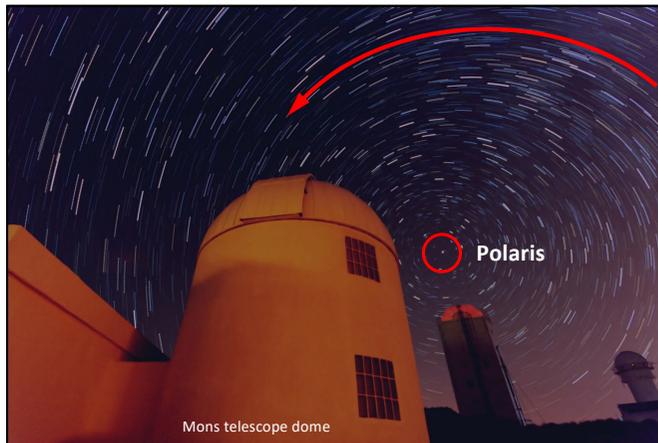
# A Ramble Through the Night Sky

How can I take photos?

## Astrophotography



## Star Trails



## Star Trails



# A Ramble Through the Night Sky

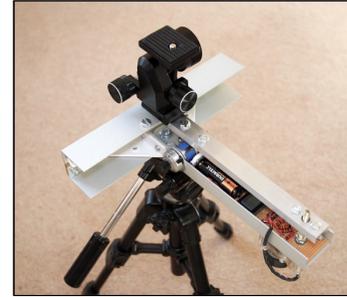
## Astrophotography

Aside: Remember that astrophotography doesn't *need* a telescope, as you can use a camera on a star tracker:



Astrophotography using a telescope can be very rewarding, but to get the most out of it will take quite a bit of time, effort and cash.

## Star Trackers

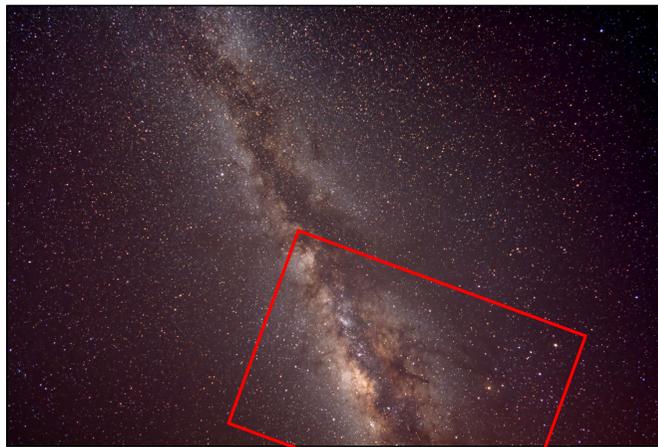


DIY star tracker 'K2' that I designed and built  
Used 2007 – 2013

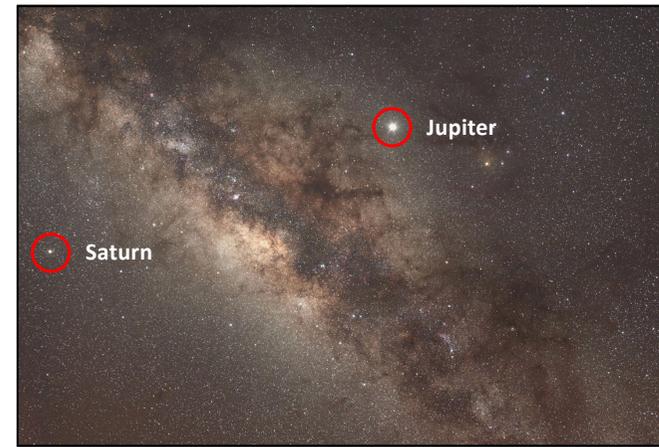
iOptron SkyTracker™  
Used since 2015



## Astrophotography With a Star Tracker

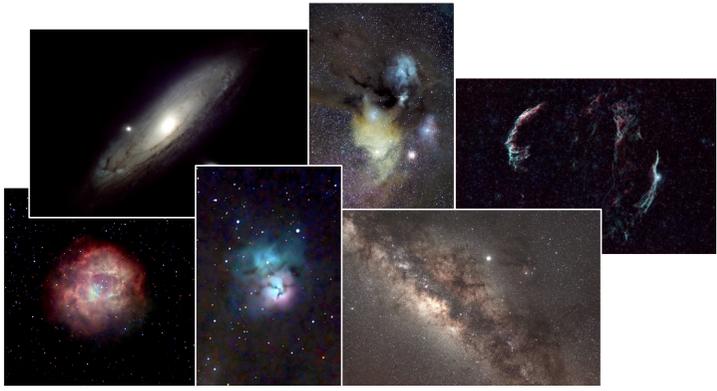


## Astrophotography With a Star Tracker



# A Ramble Through the Night Sky

**Astrophotography With a Star Tracker**



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**What About Light Pollution?**



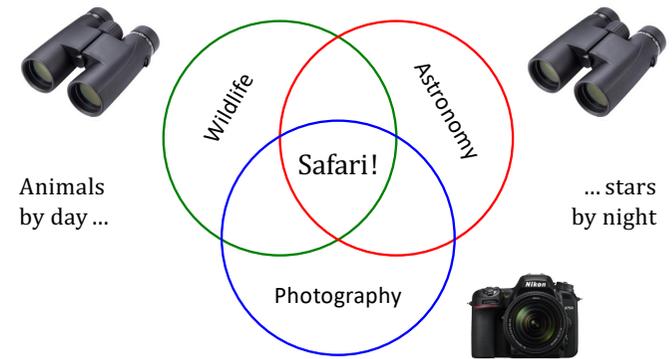
Dr Steve Barrett

BASoc 20 Mar 2023

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**Wild Astronomy**



Animals by day ...

... stars by night

( Sleep when you get home )

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**A Ramble Through the Night Sky**

[www.liverpool.ac.uk/~sdb/Talks](http://www.liverpool.ac.uk/~sdb/Talks)

Dr Steve Barrett

SCASTRO 19 Jan 2023