

Astrophotography with Nikon DSLRs

























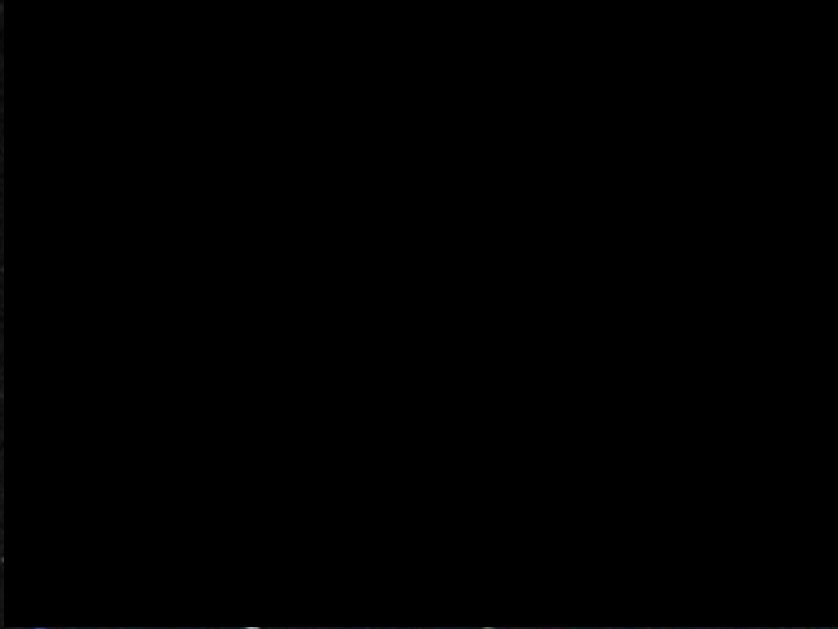




















Earlier Film Work



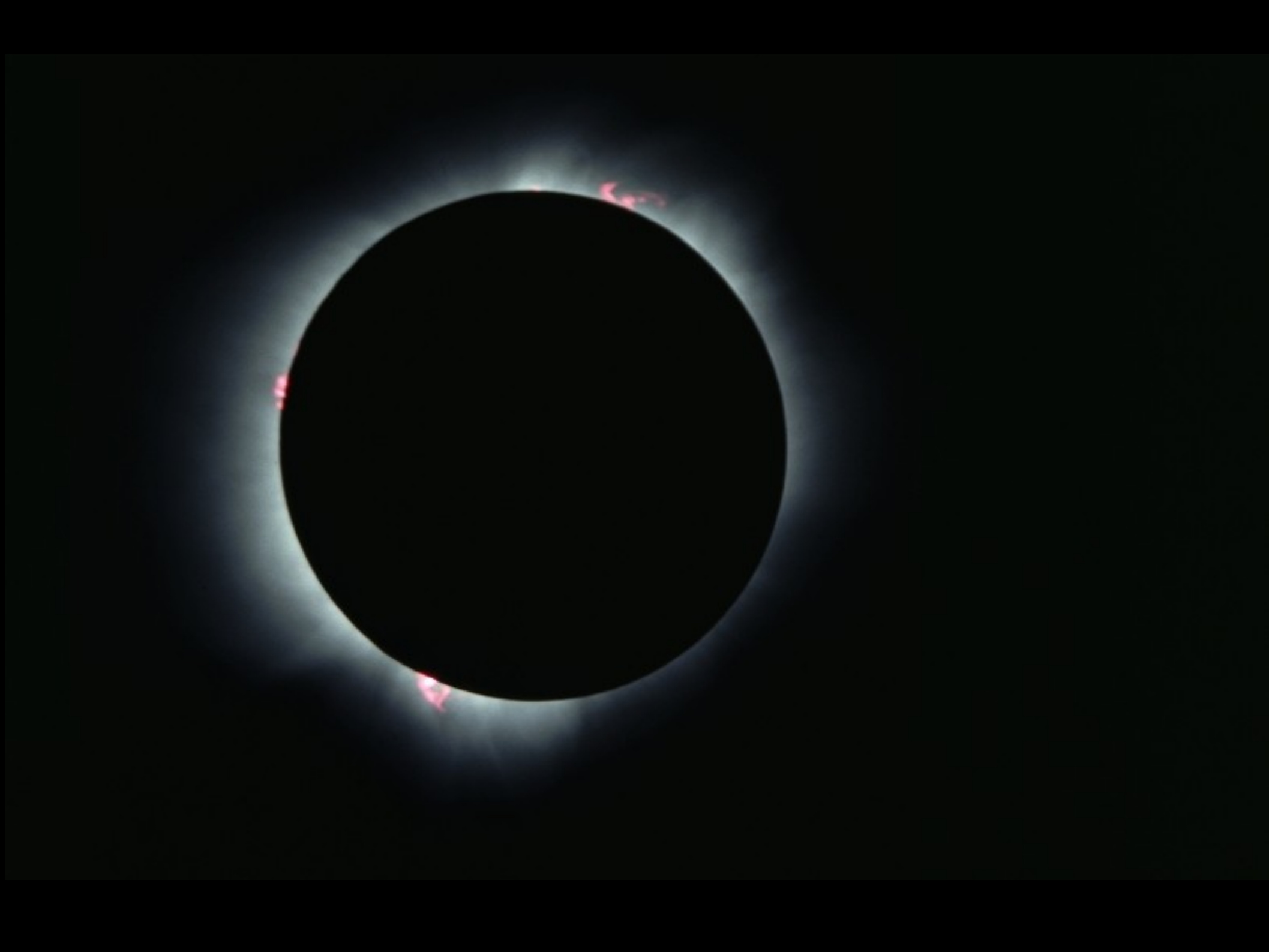














Presented to Heart of the Valley Astronomers – October 2, 2012
All images acquired in or near Corvallis, OR unless otherwise noted.

Nikon DSLRs purchased used.

D70: 6.1 MP – 2004 - likes AF lenses but will mount any Nikkor since 1977

D200: 10.2 MP – 2006 - mount and meter any Nikkor since 1977

Both DX sensors – 1.5x crop factor

Lightweight camera tripod - No tracking/guiding



Ursa Major
Model - NIKON D70
ExposureTime - 30 seconds
FNumber - 2.00
ExposureProgram - Manual control
DateTimeOriginal - 2011:03:03 23:22:12

FocalLength - 35.00 mm

ExposureMode - Manual
White Balance - Auto

FocalLengthIn35mmFilm - 52 mm

ISO Setting - 200

Lens type - AF-D or AF-S
Lens - 618

Alpha Ursae Majoris, Dubhe is the official star of the State of Utah

Spectral type K - orange



Ursa Major
Model - NIKON D70 – 35mm angle DX = 44 degrees

DateTimeOriginal - 2011:04:29 22:47:18
ExposureTime - 20 seconds
FNumber - 2.00
ExposureProgram - Manual control
DateTimeOriginal - 2011:04:29 22:47:18

FocalLength - 35.00 mm

ExposureMode - Manual
White Balance - Auto

FocalLengthIn35mmFilm - 52 mm

ISO Setting - 200



550mm Galileoscope f/11 – 2" 2 element achromatic objective

Combo is flimsy, wobbly and unbalanced – needs some work

Model - NIKON D70

DateTime - 2011:08:08 22:59:31

ExposureTime - 1/250 seconds

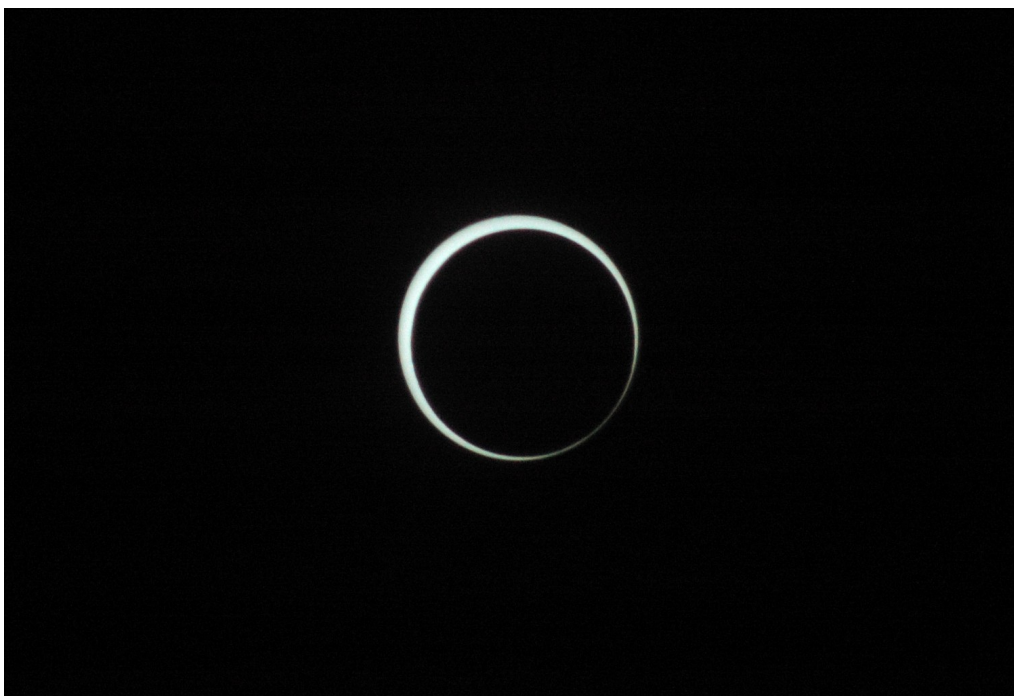
MeteringMode - Center weighted average

ISO Setting - 200

Image Quality - RAW



300mm f4.5 Nikkor-H
May 20 Annular Solar Eclipse
Baader Astrosolar Safety Film



Model - NIKON D70 – Round Mountain, CA

DateTimeOriginal - 2012:05:20 18:26:47

ExposureTime - 1/250 seconds - handheld

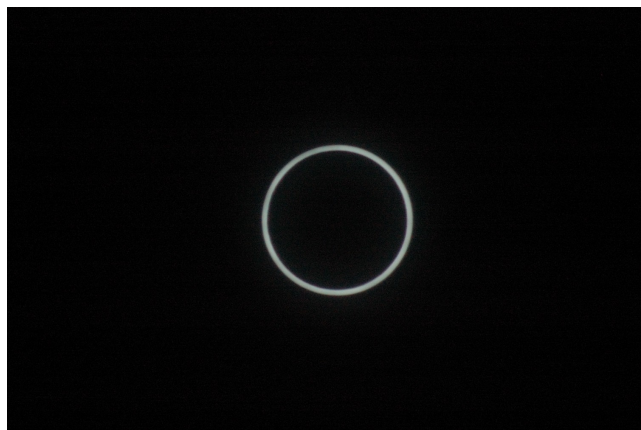
ISO Setting - 400

Image Quality - RAW

White Balance - AUTO

Focus Mode - MANUAL

Lens type – Manual – hard focus at infinity
300mm f4.5



Annular Solar Eclipse of May 20, 2012 – Round Mountain, CA

DateTimeOriginal - 2012:05:20 18:28:57

ExposureTime - 1/125 seconds – handheld

Doubled exposure to compensate for limb darkening.



Halo



“Supermoon” - Altitude:+03deg 23' 30"

Model - NIKON D70

DateTimeOriginal - 2012:05:05 20:51:07

ExposureTime - 1/250 seconds

FNumber - 5.60

ExposureProgram - Manual control

MeteringMode - Multi-segment

FocalLength - 300.00 mm

White Balance - Auto

ISO Setting - 400

Image Quality - RAW

White Balance - AUTO

Lens type - AF-D G

Lens – 70-300mm f/4-5.6G



Supermoon

Alt. 14Deg.

DateTimeOriginal - 2012:05:05 22:16:52

ExposureTime - 1/250 seconds

FNumber - 11.00

ExposureProgram - Manual control

FocalLength - 300.00 mm

ISO Setting - 400



Transit of Venus

Model - NIKON D70

DateTimeOriginal - 2012:06:05 17:38:24

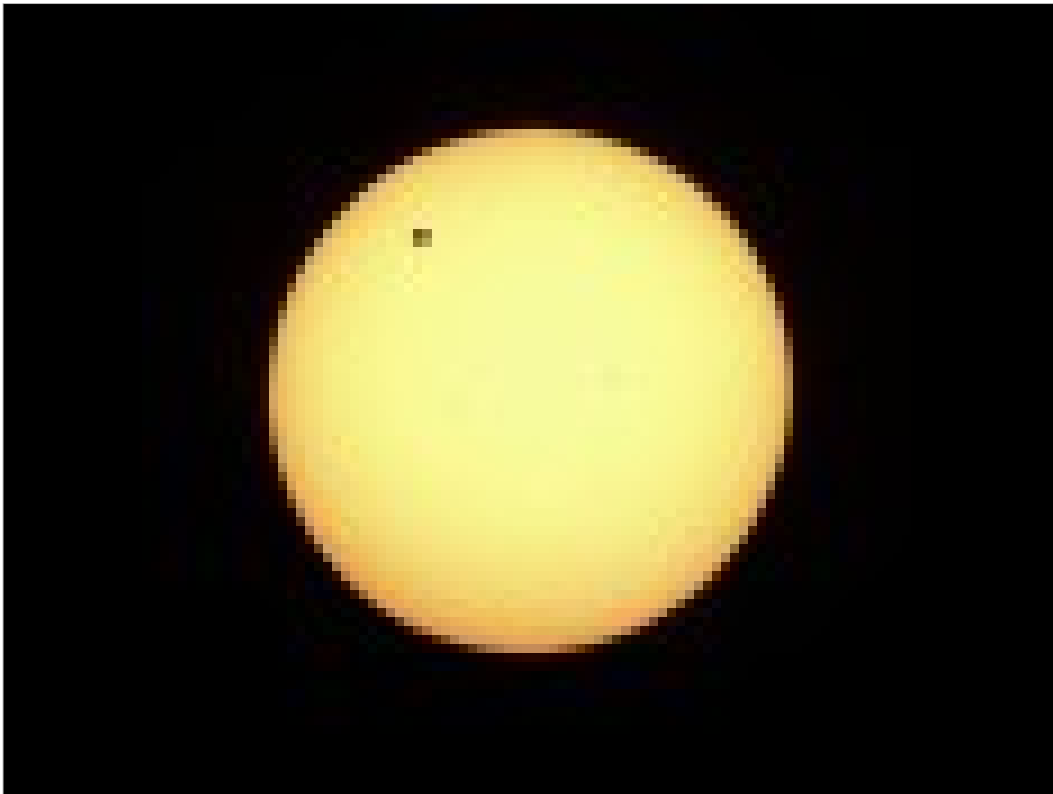
ExposureTime - 1/60 seconds

ISO Setting - 200

Image Quality - RAW

White Balance - AUTO

300mm f/4.5 H MF – same configuration as Annular Solar Eclipse of May 20, 2012



Transit of Venus

Galileoscope 17mm Orion Sirius Plössl 4-elements 32 X

Model - <KENOX S630 / Samsung S630> - handheld to Galileoscope eyepiece

ExposureTime - 1/180 seconds

FNumber - 2.80

ISOSpeedRatings - 80

DateTimeOriginal - 2012:06:05 14:14:19

FocalLength - 5.80 mm

FocalLengthIn35mmFilm - 35 mm



Daytime occultation of Venus Disappearance
300mm MF f/4.5

Model - NIKON D70

DateTimeOriginal - 2012:08:13 13:07:41
ExposureTime - 1/2000 seconds

ISO Setting – 200



Daytime occultation of Venus - reappearance
DateTimeOriginal - 2012:08:13 14:29:08
ExposureTime - 1/2000 seconds



Raw frame – D70 30seconds 28mm f/2.8 AF-D

6 frames stacked in Deep Sky Stacker



Cassiopeia, Andromeda Galaxy, Double Cluster in Perseus – Connors Camp
6 frames – 28mm angle DX = 53 degrees

Model - NIKON D70

DateTimeOriginal - 2012:08:18 22:34:11

ExposureTime - 30 seconds

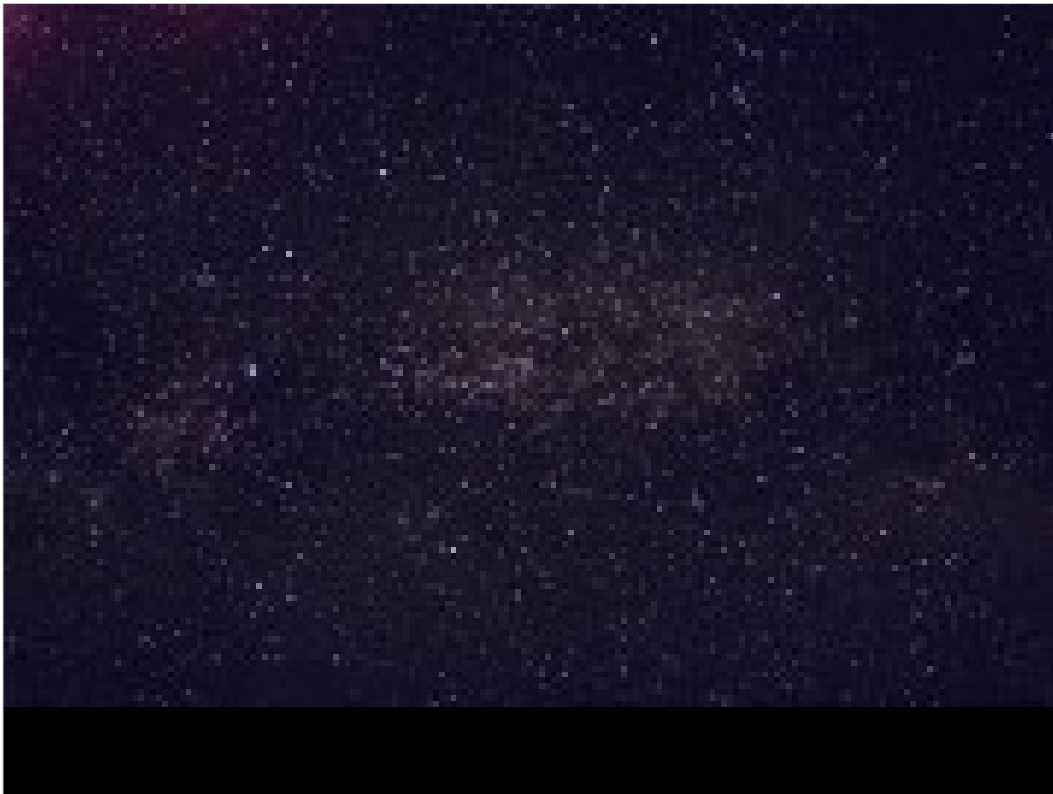
FNumber - 2.80

FocalLength - 28 mm

ISO Setting - 1600

Lens type - AF-D or AF-S

Lens - 570



Cygnus

Model - NIKON D70

Software - Camera Control Pro 2.9.0 W

DateTimeOriginal - 2012:08:18 22:19:43

ExposureTime - 30 seconds

FNumber - 2.80

FocalLength - 28 mm

ISO Setting - 1600



Center of the Milky Way Galaxy in Scutum/Sagittarius
Model - NIKON D70

Software - Camera Control Pro 2.9.0 W

DateTimeOriginal - 2012:08:18 22:07:18

ExposureTime - 30 seconds

FNumber - 2.80

ExposureProgram - Manual control

FocalLength - 28 mm

ISO Setting - 1600



Patriotic planetary alignment – end of 29th Ave.

Model - NIKON D70 – 70-300mm zoom @ 70mm – angle DX = 22.5 degrees

DateTimeOriginal - 2012:08:21 21:15:20

ExposureTime - 13 seconds

FNumber - 8.00

ExposureProgram - Normal program

ExposureBiasValue - 1.00

MaxApertureValue - F 4.00

MeteringMode - Multi-segment

FocalLength - 70.00 mm

FocalLengthIn35mmFilm - 105 mm

ISO Setting - 800

Focus Mode - MANUAL

Lens type - AF-D G

This lens has fantastic depth of field:

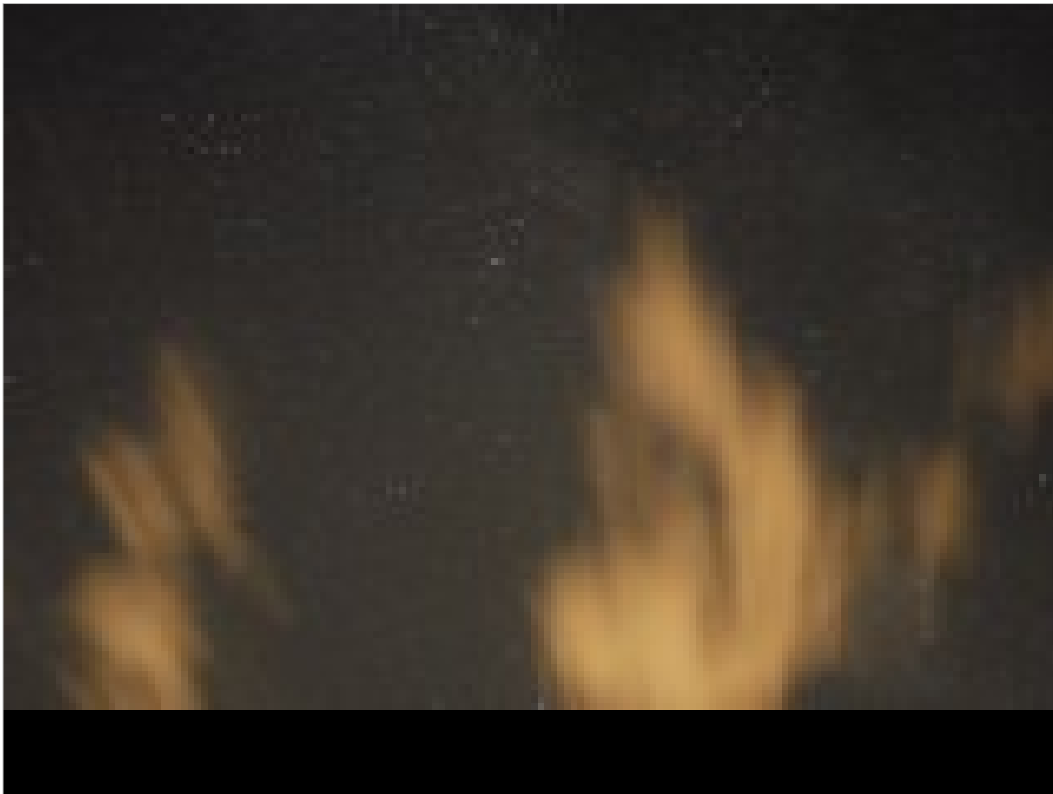
Marys Peak: 14 miles

The Moon: 230 thousand miles

Mars: 163 million miles

Saturn: 956 million miles

Spica: 249 light years (1.5 quadrillion miles)



Low pressure sodium vapor lighting up the clouds – Adair County Park
Model - NIKON D200

Software - Camera Control Pro 2.9.0 W

DateTimeOriginal - 2012:09:08 21:24:58

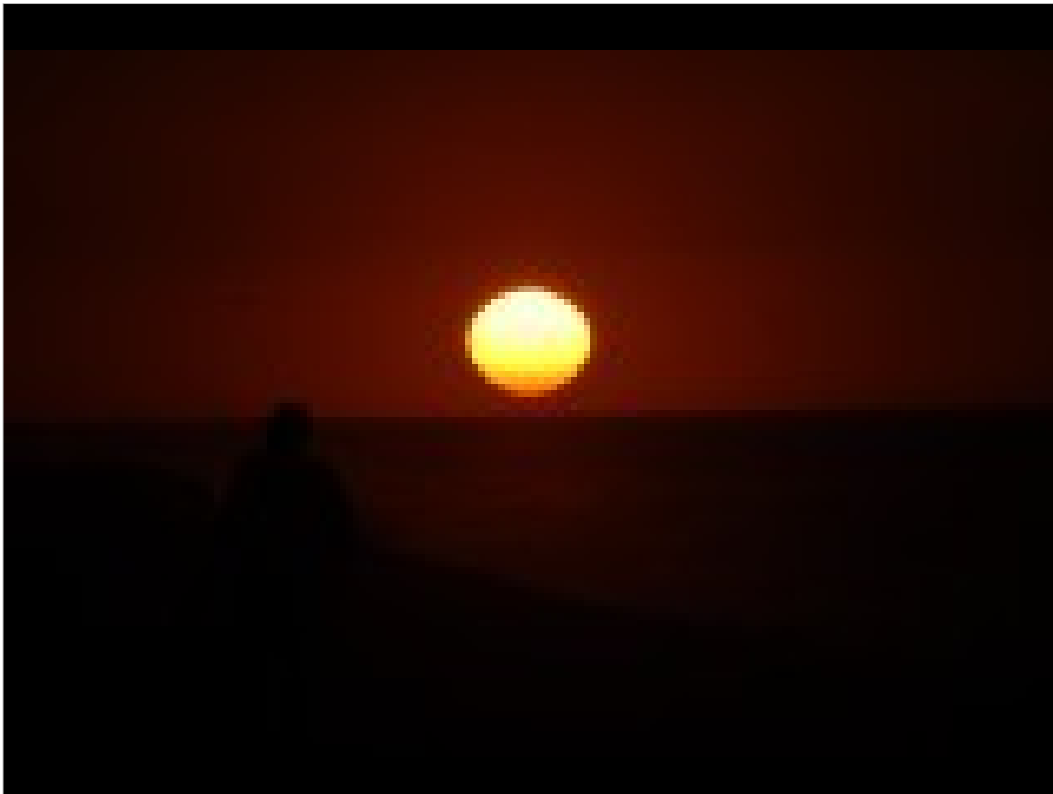
ExposureTime - 30 seconds

FNumber - 2.80

ExposureProgram - Manual control

ISO Speed Ratings - 1600

FocalLength - 28 mm



Seaside, OR – note inversion layer
Model - NIKON D200

DateTimeOriginal - 2012:09:11 19:30:25
ExposureTime - 1/2000 seconds
FNumber - 22.00
ExposureProgram - Normal program
ISOSpeedRatings - 100

FocalLength - 300.00 mm



The Green Flash

Model - NIKON D200 – 300mm – angle DX = 8 degrees

DateTimeOriginal - 2012:09:11 19:32:47

ExposureTime - 1/750 seconds

FNumber - 14.00

ExposureProgram - Normal program

ISOSpeedRatings - 100

ExposureBiasValue - -1.00

MaxApertureValue - F 5.66



Detachment and Green Flash
Model - NIKON D200

DateTimeOriginal - 2012:09:11 19:32:53
ExposureTime - 1/640 seconds
FNumber - 14.00
ExposureProgram - Normal program
ISOSpeedRatings - 100

ExposureBiasValue - -1.00

MeteringMode - Center weighted average

FocalLength - 300.00 mm

FocalLengthIn35mmFilm - 450 mm

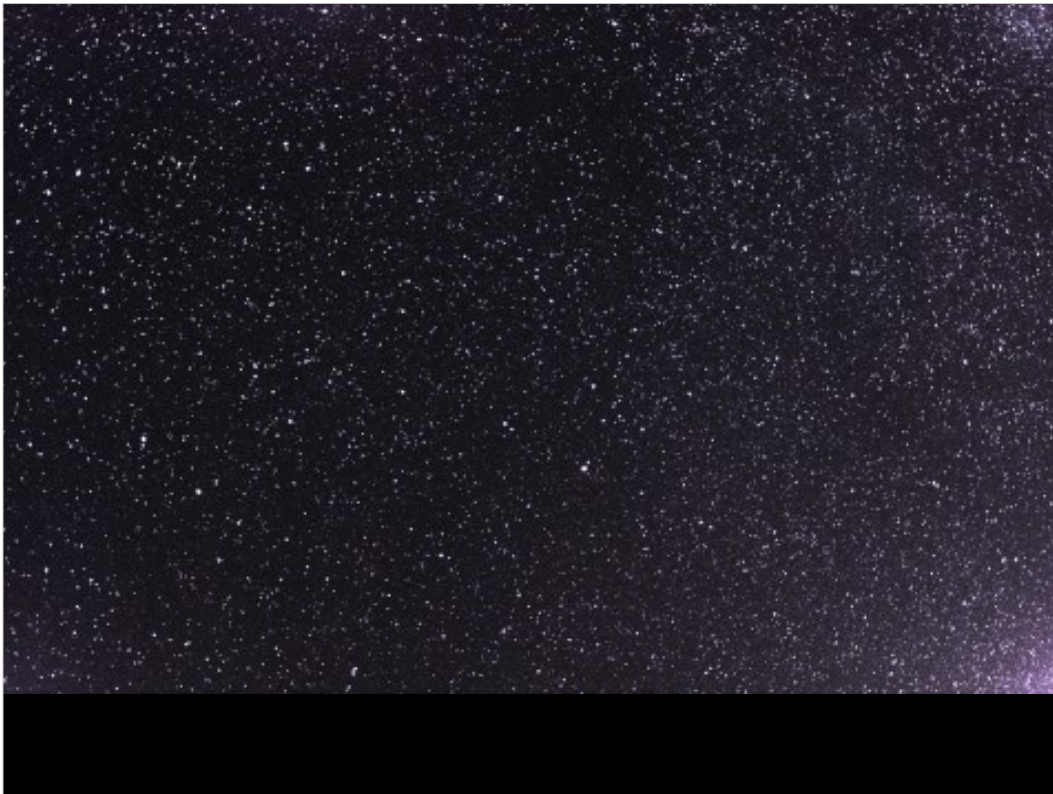
I

Lens type - AF-D G
Lens - 798

AF Focus Position - Center



Comparison of single frame and multiple stacked frames (Deep Sky Stacker) – Nikon D200
at Connors Camp



16 frames stacked in Deep Sky Stacker – North Celestial Pole – little trailing
Connors Camp, OR

Model - NIKON D200 w/28mm f2.8 Ais Nikkor manual focus lens

Software - Camera Control Pro 2.9.0 W

DateTimeOriginal - 2012:09:15 22:15:48

ExposureTime - 30 seconds

FNumber - 2.80

ExposureProgram - Manual control

ISO Speed Ratings - 1600

FocalLength - 28 mm

UserComment - (c)2012 Richard L. Watson

White Balance - Auto

FocalLengthIn35mmFilm - 42 mm



10 frames – Cassiopeia/Andromeda/M31 – near pole – little trailing.

Model - NIKON D200

Software - Camera Control Pro 2.9.0 W

ExposureTime - 30 seconds

FNumber - 2.80

ExposureProgram - Manual control

ISO Speed Ratings - 1600

DateTimeOriginal - 2012:09:15 21:54:12

FocalLength - 28 mm

Noise Reduction - OFF



Cygnus/Lyra

8 frames – colors start to look like artifacts. But notice North American Nebula to the left of Deneb.

started using D200s built-in intervalometer – automated process so I could spend my time looking at deep sky objects through Tim's 14" and Mark's 17"

Model - NIKON D200

Software - Camera Control Pro 2.9.0 W

DateTimeOriginal - 2012:09:15 21:43:00

ExposureTime - 30 seconds

FNumber - 2.80

ExposureProgram - Manual control

ISO Speed Ratings - 1600

FocalLength - 28 mm

UserComment - (c)2012 Richard L. Watson

FocalLengthIn35mmFilm - 42 mm



Aquila/Scutum

5 frames – Celestial Equator – star trails at 30 second exposure

Model - NIKON D200

Software - Camera Control Pro 2.9.0 W

DateTimeOriginal - 2012:09:15 21:20:28

ExposureTime - 30 seconds

FNumber - 2.80

ExposureProgram - Manual control

ISO Speed Ratings - 1600

FocalLength - 28 mm

UserComment - (c)2012 Richard L. Watson

Exposure Adjustment - 687934464

Thumbnail IFD offset - 6306

ISO 2 - 1600

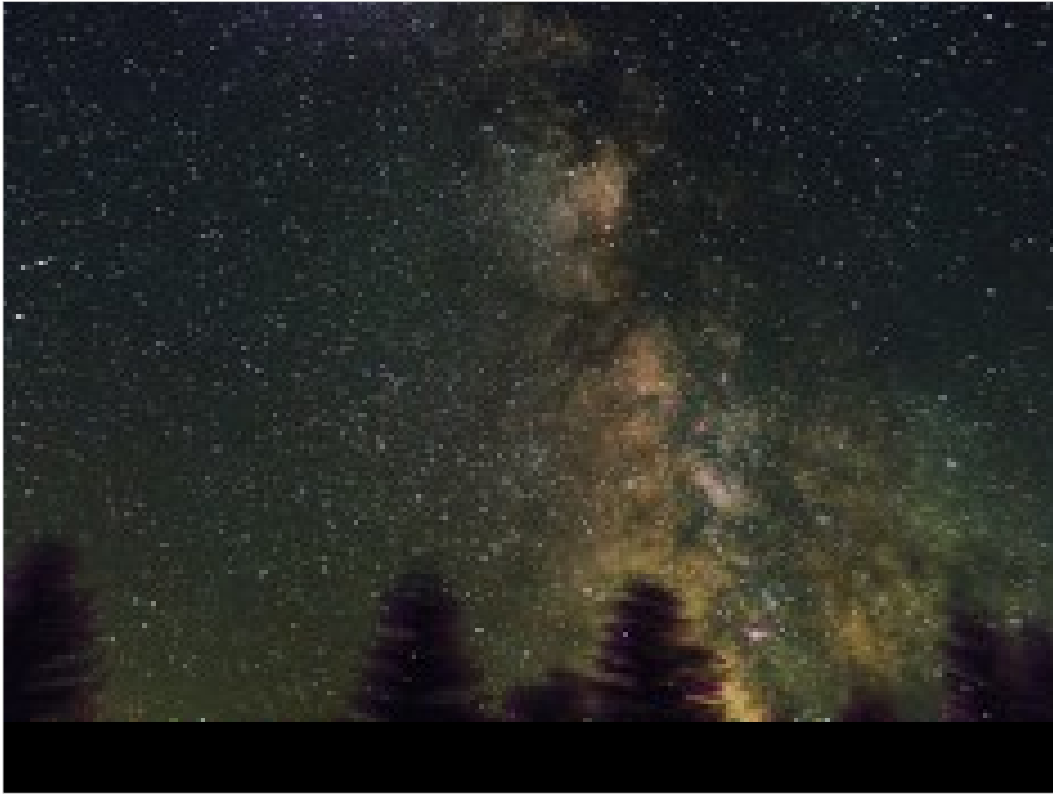
Tone Compensation - AUTO

Lens type - Manual

Flash Used - Not fired

Bracketing - 327680

Contrast Curve - I



Scutum/Sagittarius – Center of the Milky Way Galaxy
10 frames stacked in Deep Sky Stacker
Model - NIKON D200

Software - Camera Control Pro 2.9.0 W

DateTimeOriginal - 2012:09:15 21:03:52
ExposureTime - 30 seconds
FNumber - 2.80
ExposureProgram - Manual control
ISO Speed Ratings - 1600

FocalLength - 28 mm
UserComment - (c)2012 Richard L. Watson

Next steps: take UV filter off. Try a lower ISO (800?) to reduce noise. Experiment to find optimal ISO setting. Use 24mm f/2.8 Ai Nikkor for even wider angle views

Piggyback on a motor driven equatorial mount for longer exposures. Try sun/moon/planets through 10" Meade SCT.



Kowa SE – lens **not** interchangeable, but is of higher optical quality for star fields than the f/1.4 Hexanon lens to its right – even stopped down to f/2!



April 7, 1970

Comet Bennett, formally known as C/1969 Y1 (old style 1970 II and 1969i), was one of two brilliant comets to grace the 1970s, along with Comet West.

Discovered by John Caister Bennett (Pretoria, South Africa) on December 28, 1969 while still almost two AUs from the Sun, it reached perihelion on March 20, passing closest to Earth on March 26, 1970 as it receded, peaking at magnitude 0. — with Bruce Watson in Mississippi City, MS.

Tri-X ASA 400 B&W film – developed the negatives and printed it myself!



Venus, Mercury and a Boeing
Spotsylvania, VA

Make - OLYMPUS CORPORATION
Model - C765UZ

ExposureTime - 4 seconds
FNumber - 3.70

ISOSpeedRatings - 64

DateTimeOriginal - 2010:04:01 19:19:48

MeteringMode - Multi-segment

FocalLength - 63.00 mm

ExposureMode - Auto
White Balance - Auto

SceneCaptureType - Night scene



Golden Gate Canyon State Park – Colorado

Hyakutake C/1996 B2

“The Great Comet of 1996”

March 25, 1996

Magnitude estimates for the 25th were typically between +0.9 to -0.8, with the average near +0.1.

Couldn't see the wires until I got the pictures back!
Fujicolor 400



Iridium Flare in Virgo

Feb. 8, 2010 5:08 AM EST

Temperature 16° F

Spotsylvania, VA

Konica FT-1 Motor

Fujichrome Provia 100F transparency film



Leonid Meteor Storm of November 19, 2002

5 Leonid meteors. You can trace them back to the radiant in the Sickle of Leo. The bright planet is Jupiter. November 19, 2002.

Fujicolor 400 negative film



Olympus OM-1N 35mm SLR body T-mounted to a 2x Dakin Barlow inserted into the focusing tube of a 4-1/4" Newtonian telescope (Edmund Astroscan) for an effective focal length of about 1320mm (f/12.6). Shutter speed 1/60 second on Kodachrome 64 transparency film.

Total solar eclipse of July 11, 1991

Cabo San Lucas, Baja California Sur, MX