# 2021 Observing Notes

[2020 Observing Notes 1](#_Toc53134437)

[Year in Review 4](#_Toc53134438)

[January 5](#_Toc53134439)

[Winter 2020 Planning 5](#_Toc53134440)

[2020-Jan-04 (Jan-05 UT): M42 Narrowband including NB Continuum 7](#_Toc53134441)

[2020-Jan-13 (Jan-14 UT): M33 Narrowband including NB Continuum 9](#_Toc53134442)

[2020-Jan-14 (Jan-15 UT): M33 Narrowband including NB Continuum 10](#_Toc53134443)

[2020-Jan-15 (Jan-16 UT): M33 Narrowband including NB Continuum 11](#_Toc53134444)

[2020-Jan-18 (Jan-19 UT): M33 Narrowband including NB Continuum 12](#_Toc53134445)

[2020-Jan-19 (Jan-20 UT): M33 Narrowband including NB Continuum 13](#_Toc53134446)

[2020-Jan-23 (Jan-24 UT): Venus and Uranus Video 15](#_Toc53134447)

[February 17](#_Toc53134448)

[2020-Feb-02 (Feb-03 UT): Venus and Moon Video 17](#_Toc53134449)

[March 21](#_Toc53134450)

[2020-Mar-05 (Mar-06 UT): Venus Video 21](#_Toc53134451)

[2020-Mar-10 (Mar-11 UT): Venus Video 23](#_Toc53134452)

[2020-Mar-22 (Mar-23 UT): M42 – Narrow Band Reds 24](#_Toc53134453)

[2020-Mar-24 (Mar-25 UT): M42 – Narrow Band Reds 25](#_Toc53134454)

[2020-Mar-30 (Mar-31 UT): Venus and Sirius Video 28](#_Toc53134455)

[April 30](#_Toc53134456)

[2020-Mar-31 (Apr-01 UT): Venus and Moon Video 30](#_Toc53134457)

[2020-Apr-06 (Apr-07 UT): Venus Video 33](#_Toc53134458)

[2020-Apr-07 (Apr-08 UT): Venus Video 34](#_Toc53134459)

[2020-Apr-20 (Apr-21 UT): Venus Imaging (ST2000XM) 35](#_Toc53134460)

[2020-Apr-28 (Apr-29 UT): NGC2932 – Eskimo Nebula (ST2000XM) 36](#_Toc53134461)

[2020-Apr-29 (Apr-30 UT): M66 Galaxy in Leo (ST2000XM) 38](#_Toc53134462)

[May 39](#_Toc53134463)

[Spring 2020 Planning 39](#_Toc53134464)

[2020-May 07 (May-08 UT): M109 Galaxy in Ursa Major (ST2000XM) 41](#_Toc53134465)

[2020-May-19 (May-20 UT): M109 Galaxy in Ursa Major (ST2000XM) 42](#_Toc53134466)

[2020-May-25 (May-26 UT): M109 Galaxy in Ursa Major (ST2000XM) 43](#_Toc53134467)

[2020-May-26 (May-27 UT): M109 Galaxy in Ursa Major (ST2000XM) 45](#_Toc53134468)

[June 47](#_Toc53134469)

[2020-Jun-02 (Jun-03 UT): Lunar Mineralogy Imaging 47](#_Toc53134470)

[2020-Jun-09 (Jun-10 UT): M51 – 550OPN and 656HIA 48](#_Toc53134471)

[2020-Jun-10 (Jun-11 UT): M51 – 550OPN, 486HIB, and 501OIII 49](#_Toc53134472)

[2020-Jun-11 (Jun-12 UT): M51 – 550OPN, 685NIR, 656HIA 50](#_Toc53134473)

[2020-Jun-14 (Jun-15 UT): M51 – 550OPN, 685NIR, 656HIA 51](#_Toc53134474)

[2020-Jun-16 (Jun-17 UT): M51 – 467HeII, 540CNT, and 647CNT 52](#_Toc53134475)

[July 53](#_Toc53134476)

[2020-Jun-30 (Jul-01 UT): Configuration Change (no observations) 53](#_Toc53134477)

[Summer 2020 Planning 54](#_Toc53134478)

[2020-Jul-01 (Jul-02 UT): Moon and Jupiter Imaging 56](#_Toc53134479)

[2020-Jul-05 (Jul-06 UT): Jupiter and Saturn Video 59](#_Toc53134480)

[2020-Jul-09 (Jul-09 UT): Comet NEOWISE (C/2020 F3) 63](#_Toc53134481)

[2020-Jul-09 (Jul-10 UT): Jupiter and Moons Video 66](#_Toc53134482)

[2020-Jul-12 (Jul-12 UT): Mars, Venus, and Moon 69](#_Toc53134483)

[2020-Jul-17 (Jul-17 UT): Mars, Venus, and Moon 74](#_Toc53134484)

[2020-Jul-19 (Jul-20 UT): Jupiter & Saturn (visual on NEOWISE) 77](#_Toc53134485)

[2020-Jul-20 (Jul-21 UT): NEOWISE Imaging 81](#_Toc53134486)

[2020-Jul-28 (Jul-29 UT): Jupiter and Saturn Imaging 82](#_Toc53134487)

[2020-Jul-29 (Jul-29 UT): Mars Imaging 85](#_Toc53134488)

[2020-Jul-29 (Jul-30 UT): Jupiter Imaging 86](#_Toc53134489)

[2020-Jul-30 (Jul-31 UT): Jupiter and Saturn Imaging 89](#_Toc53134490)

[August 93](#_Toc53134491)

[2020-Aug-08 (Aug-09 UT): Jupiter Video 93](#_Toc53134492)

[2020-Aug-09 (Aug-09 UT): Mars & Moon Video 94](#_Toc53134493)

[2020-Aug-10 (Aug-11 UT): Jupiter 95](#_Toc53134494)

[September 97](#_Toc53134495)

[2020-Sep-01 (Sep-02 UT): Jupiter, Saturn, Moons, Vega, and Mars Photometric 97](#_Toc53134496)

[2020-Sep-02 (Sep-03 UT): Jupiter, Saturn, Moons Photometric 98](#_Toc53134497)

[2020-Sep-03 (Sep-04 UT): Jupiter, Saturn, Moons, Photometry and Jupiter Video 99](#_Toc53134498)

[2020-Sep-04 (Sep-04 UT): Mars and Venus Video 100](#_Toc53134499)

[2020-Sep-05 (Sep-06 UT): Jupiter, Saturn, and Mars Video 101](#_Toc53134500)

[2020-Sep-12 (Sep-13 UT): Jupiter, Saturn, and Mars Video 104](#_Toc53134501)

[2020-Sep-13 (Sep-14 UT): Jupiter, Saturn, and Mars Video 105](#_Toc53134502)

[2020-Sep-14 (Sep-15 UT): Jupiter, Saturn, and NGC7009 Imaging 106](#_Toc53134503)

[2020-Sep-15 (Sep-16 UT): Jupiter and Mars Video 110](#_Toc53134504)

[2020-Sep-16 (Sep-17 UT): Jupiter Video 112](#_Toc53134505)

[2020-Sep-23 (Sep-24 UT): Jupiter and Saturn Imaging 113](#_Toc53134506)

[2020-Sep-24 (Sep-25 UT): Jupiter and Saturn Imaging, Mars Video 114](#_Toc53134507)

[2020-Sep-29 (Sep-30 UT): Jupiter and Saturn Video 116](#_Toc53134508)

[October 118](#_Toc53134509)

[2020-Oct-04 (Oct-05 UT): Jupiter, Saturn, and Mars Video 118](#_Toc53134510)

[2020-Oct-06 (Oct-07 UT): Jupiter and Saturn Imaging 118](#_Toc53134511)

[2020-Oct-07 (Oct-08 UT): Jupiter and Saturn Imaging 118](#_Toc53134512)

[2020-Oct-08 (Oct-09 UT): Jupiter and Saturn Imaging 118](#_Toc53134513)

[References 119](#_Toc53134514)

## Highlights Year in Review

Main efforts so far

* Emission line data gathering for nebulae and galaxy analysis with continuum subtraction
  + M33
  + M42
  + M109
  + M51
* Planetary observations
  + Venus with some attempts at middle cloud NIR observations – unable to try surface emission imaging due to horizon blockage
  + NH3 detection and mapping on Jupiter. Key good key reference is <Texes>. At least with ST2000XM images, I believe I can detect the mid-latitude NH3 depletion. Possibly also with ASI120MM. While as of 9/2/2020 I’ve tried a few data analysis experiments, I probably need to work out the workflow and analytic details before proceeding to a formal analysis. I need to be clear on how to get at NH3 absorption, effective column length, and ultimately abundance and releative humidity. I may be able to convert DN to I/F as long as I have a reference star as proxy for solar illumination.
  + Titan photometry and surface detection. I need to get at good coverage at all CMs through at least on 16 day orbit. I can use 889CH4 as a fiducial for the surface albedo changes expected at 940NIR. 1000NIR may also show interesting variations. If 647CNT and 656HIA are available, they may also serve as fiducials.
  + Uranus bright polar cap
  + PLAN for Jupiter quantitative atmosphere absorption observations and weather observations
  + PLAN for Saturn observations
  + PLAN to for Mars observations

## January

### 2021-Jan-06 (Jan-075 UT): M42 Wide Angle, Narrowband Blue Regime

Last Updated 1/9/2021

Transparency was excellent (4/5) and seeing was good (3/5).

|  |  |
| --- | --- |
|  |  |
| M42-20210107UT-486HIB-sum29m45s-Flattened-Log.png | M42-20210107UT-501OIII-sum30m00s-Flattened-Log.png |
|  |  |
| M42-20210107UT-467HeII-sum29m45s-Flattened-Log.png | M42-20210107UT-540CNT-sum29m30s-Flattened-Log.png |
|  |  |
| M42-20210107UT-540CNT-sum5m30s-Saturated-Flattened-Log.png | M42-20210107UT-XXX-R(486)G(467)B(501).png |

**Data Disposition:**

* Raw data is zipped and archived on the 4TB drive.
* Processed data is in appropriate project directories on the Astronomy SD card.

### 2021-Jan-10 (Jan-11 UT): M42 Huygens Region Video – 730OIII

Last Updated 1/12/2021

Transparency was good (3/5) and seeing was very good (4/5).

~30% top images (300 per avi file)

Dark frame multiplied by 0.5 (50%) worked superbly to remove artifacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Video File** | **Exposure** | **Gain** | **Gamma** | **Binning** | **Capture Area** |
| 2021-01-11-0241\_9-M42\_730OIII.avi | 0.999 | 100 | 50 | 1 | 1280x960 |
| 2021-01-11-0354\_1-M42\_730OIII.avi | 0.999 | 100 | 50 | 1 | 1280x960 |
| 2021-01-11-0430\_4-M42\_Dark.avi | 0.999 | 100 | 50 | 1 | 1280x960 |

|  |  |
| --- | --- |
|  |  |
| 2021-01-11-0XXX\_X-M42-730OIII-Stack1800Dark50pct-Lin.png | 2021-01-11-0XXX\_X-M42-730OIII-Stack1800Dark50pct-Log.png |

**Data Disposition:**

* Raw data is zipped and archived on the 4TB drive.
* Processed data is in appropriate project directories on the Astronomy SD card.

### 2021-Jan-11 (Jan-12 UT): M42 Huygens Region Video – 550GRN, 380NUV, 1000NIR

Last Updated 1/12/2021

Transparency was good (3/5) and seeing was very good (4/5).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Video File** | **Exposure** | **Gain** | **Gamma** | **Binning** | **Capture Area** |
| 2021-01-12-0249\_0-M42\_550GRN.avi | 0.2 | 100 | 50 | 1 | 1280x960 |
| 2021-01-12-0251\_2-M42\_550GRN.avi | 0.2 | 100 | 50 | 1 | 1280x960 |
| 2021-01-12-0253\_3-M42\_550GRN.avi | 0.2 | 100 | 50 | 1 | 1280x960 |
| 2021-01-12-0255\_6-M42\_550GRN.avi | 0.2 | 100 | 50 | 1 | 1280x960 |
| 2021-01-12-0301\_8-M42\_550GRN.avi | 0.2 | 100 | 50 | 1 | 1280x960 |
| 2021-01-12-0315\_3-M42\_380NUV.avi | 0.999 | 100 | 50 | 1 | 1280x960 |
| 2021-01-12-0336\_1-M42\_380NUV.avi | 0.999 | 100 | 50 | 1 | 1280x960 |
| 2021-01-12-0356\_4-M42\_380NUV.avi | 0.999 | 100 | 50 | 1 | 1280x960 |
| 2021-01-12-0421\_0-M42\_380NUV.avi | 0.999 | 100 | 50 | 1 | 1280x960 |
| 2021-01-12-0450\_2-M42\_1000NIR.avi | 0.999 | 100 | 50 | 1 | 1280x960 |
| 2021-01-12-0513\_0-M42\_1000NIR.avi | 0.999 | 100 | 50 | 1 | 1280x960 |
| 2021-01-12-0534\_1-M42\_1000NIR.avi | 0.999 | 100 | 50 | 1 | 1280x960 |
| 2021-01-12-0643\_8-Dark\_999ms.avi | 0.999 | 100 | 50 | 1 | 1280x960 |
| 2021-01-12-0646\_2-Dark\_200ms.avi | 0.2 | 100 | 50 | 1 | 1280x960 |

|  |  |
| --- | --- |
|  |  |
| 2021-01-12-0XXX\_R(1000)G(550)B(380)-Lin.png | 2021-01-12-0XXX\_R(1000)G(550)B(380)-Log-ClrBal.png |

|  |  |
| --- | --- |
|  |  |
| 2021-01-12-0XXX\_0-M42\_1000NIR-Stack900Dark50%-Lin.png | 2021-01-12-0XXX\_0-M42\_1000NIR-Stack900Dark999ms50%-Log.png |
|  |  |
| 2021-01-12-0XXX\_X-M42\_550GRN-Stack1000Dark999ms50%-Lin.png | 2021-01-12-0XXX\_X-M42\_550GRN-Stack1000Dark999ms50%-Log.png |
|  |  |
| 2021-01-12-0XXX\_X-M42\_380NUV-Stack1200Dark50%-Lin.png | 2021-01-12-0XXX\_X-M42\_380NUV-Stack1200Dark50%-Log.png |

**Data Disposition:**

* Raw data is zipped and archived on the 4TB drive.
* Processed data is in appropriate project directories on the Astronomy SD card.

### 2021-Jan-19 (Jan-20 UT): M42

Last Updated 1/12/2021

Transparency was good (3/5) and seeing was very good (4/5).

|  |
| --- |
|  |
|  |
| M42-Spectrum-20210120UT-685NIR-sum1h55m30s-Cropped-HalfSize.jpg |

## References