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 INFORMATION BULLETIN ON VARIABLE STARS

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**NEW TIMES OF MINIMA OF SOME ECLIPSING VARIABLES**

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| <b>Observatory and telescope:</b>  |
| URSA Observatory at the University of Arkansas; 10" Schmidt-Cassegrain reflector. NFO WebScope near Silver City, NM, USA ( <a href="http://www.nfo.edu">www.nfo.edu</a> ); 24" classical Cassegrain. |

|                  |   |
|------------------|---|
| <b>Detector:</b> | URSA: 1020×1530 pixels SBIG ST8EN CCD cooled to (typ.) –20 °C; 1"15 square pixels; 20'(N-S)×30'(E-W) field of view.<br>NFO: 2102×2092 pixels Kodak KAF 4300E CCD cooled to (typ.) –20 °C; 0"78 square pixels; 27' square field of view. |
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| <b>Method of data reduction:</b>                               |
| Virtual measuring engine (Measure 2.0) written by C.H.S. Lacy. |

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| <b>Method of minimum determination:</b> |
| Kwee & van Woerden (1956)               |

| <b>Times of minima:</b> |                              |        |      |        |      |
|-------------------------|------------------------------|--------|------|--------|------|
| Star name               | Time of min.<br>HJD 2400000+ | Error  | Type | Filter | Rem. |
| AP And                  | 55121.6229                   | 0.0001 | 2    | V      | NFO  |
|                         | 55139.8769                   | 0.0005 | 1    | V      | NFO  |
|                         | 55144.6391                   | 0.0001 | 1    | V      | NFO  |
|                         | 55152.5755                   | 0.0001 | 1    | V      | NFO  |
|                         | 55159.7179                   | 0.0002 | 2    | V      | NFO  |
|                         | 55358.9230                   | 0.0002 | 1    | V      | NFO  |
|                         | 55412.8911                   | 0.0001 | 1    | V      | URSA |
|                         | 55432.7316                   | 0.0002 | 2    | V      | URSA |
|                         | 55451.7796                   | 0.0001 | 2    | V      | URSA |
|                         | 55466.8587                   | 0.0002 | 1    | V      | NFO  |
|                         | 55467.6531                   | 0.0002 | 2    | V      | URSA |
|                         | 55478.7642                   | 0.0003 | 2    | V      | NFO  |
|                         | 55486.7003                   | 0.0001 | 2    | V      | NFO  |
|                         | 55494.6360                   | 0.0002 | 2    | V      | NFO  |
|                         | 55497.8112                   | 0.0002 | 2    | V      | NFO  |
|                         | 55509.7156                   | 0.0002 | 1    | V      | NFO  |
|                         | 55528.7633                   | 0.0002 | 1    | V      | NFO  |
|                         | 55555.7470                   | 0.0002 | 1    | V      | NFO  |
|                         | 55563.6837                   | 0.0001 | 1    | V      | NFO  |
|                         | 55575.5884                   | 0.0002 | 2    | V      | NFO  |
|                         | 55575.5885                   | 0.0002 | 2    | V      | URSA |

| <b>Times of minima:</b> |                              |            |        |        |      |      |
|-------------------------|------------------------------|------------|--------|--------|------|------|
| Star name               | Time of min.<br>HJD 2400000+ | Error      | Type   | Filter | Rem. |      |
| CG Aur                  | 55116.9308                   | 0.0004     | 1      | V      | NFO  |      |
|                         | 55126.9113                   | 0.0004     | 2      | V      | NFO  |      |
|                         | 55137.7425                   | 0.0008     | 2      | V      | NFO  |      |
|                         | 55183.7123                   | 0.0004     | 1      | V      | NFO  |      |
|                         | 55193.6903                   | 0.0011     | 2      | V      | NFO  |      |
|                         | 55554.6634                   | 0.0005     | 2      | V      | NFO  |      |
| HP Aur                  | 55181.8290                   | 0.0002     | 1      | V      | URSA |      |
|                         | 55251.5488                   | 0.0007     | 1      | V      | URSA |      |
|                         | 55258.6627                   | 0.0002     | 1      | V      | URSA |      |
|                         | 55462.8389                   | 0.0003     | 2      | V      | URSA |      |
| V361 Cas                | 55435.9071                   | 0.0010     | 1      | V      | URSA |      |
|                         | 55445.7402                   | 0.0003     | 1      | V      | URSA |      |
|                         | 55478.9212                   | 0.0003     | 1      | V      | NFO  |      |
|                         | 55498.5865                   | 0.0004     | 1      | V      | URSA |      |
|                         | 55499.8127                   | 0.0004     | 1      | V      | NFO  |      |
|                         | 55509.6477                   | 0.0005     | 1      | V      | URSA |      |
|                         | 55514.5622                   | 0.0009     | 1      | V      | URSA |      |
|                         | 55515.7912                   | 0.0010     | 1      | V      | NFO  |      |
|                         | 55520.7069                   | 0.0007     | 1      | V      | URSA |      |
|                         | 55536.6835                   | 0.0006     | 2      | V      | NFO  |      |
|                         | 55568.6355                   | 0.0010     | 2      | V      | URSA |      |
|                         | 55568.6366                   | 0.0012     | 2      | V      | NFO  |      |
|                         | V381 Cas                     | 55435.7317 | 0.0002 | 1      | V    | URSA |
|                         |                              | 55468.9034 | 0.0002 | 1      | V    | NFO  |
| 55468.9044              |                              | 0.0002     | 1      | V      | URSA |      |
| 55470.6509              |                              | 0.0002     | 1      | V      | URSA |      |
| 55539.6137              |                              | 0.0002     | 2      | V      | URSA |      |
| 55566.6796              |                              | 0.0002     | 1      | V      | NFO  |      |
| 55574.5311              |                              | 0.0005     | 2      | V      | URSA |      |
| V651 Cas                |                              | 55458.9197 | 0.0003 | 2      | V    | URSA |
|                         | 55460.9133                   | 0.0002     | 2      | V      | URSA |      |
|                         | 55467.8926                   | 0.0003     | 2      | V      | URSA |      |
|                         | 55485.8329                   | 0.0002     | 2      | V      | URSA |      |
|                         | 55498.7920                   | 0.0002     | 2      | V      | URSA |      |
|                         | 55499.7889                   | 0.0001     | 2      | V      | URSA |      |
|                         | 55500.7856                   | 0.0002     | 2      | V      | URSA |      |
|                         | 55504.7729                   | 0.0002     | 2      | V      | URSA |      |
|                         | 55506.7666                   | 0.0001     | 2      | V      | URSA |      |
|                         | 55528.6964                   | 0.0002     | 2      | V      | URSA |      |
|                         | 55533.6805                   | 0.0003     | 2      | V      | URSA |      |
|                         | 55537.6673                   | 0.0002     | 2      | V      | URSA |      |
|                         | 55563.5838                   | 0.0002     | 2      | V      | URSA |      |
| 55564.5808              | 0.0002                       | 2          | V      | URSA   |      |      |
| WW Cep                  | 55176.5598                   | 0.0006     | 2      | V      | URSA |      |
|                         | 55431.9055                   | 0.0002     | 1      | V      | URSA |      |
|                         | 55468.7131                   | 0.0002     | 1      | V      | URSA |      |
|                         | 55469.8846                   | 0.0003     | 2      | V      | URSA |      |
|                         | 55528.5230                   | 0.0003     | 1      | V      | URSA |      |
| V456 Cyg                | 55283.9844                   | 0.0002     | 1      | V      | NFO  |      |
|                         | 55300.9172                   | 0.0002     | 1      | V      | URSA |      |
|                         | 55329.8805                   | 0.0002     | 2      | V      | NFO  |      |
|                         | 55337.9033                   | 0.0007     | 2      | V      | NFO  |      |
|                         | 55345.9214                   | 0.0002     | 2      | V      | NFO  |      |
|                         | 55354.8351                   | 0.0002     | 2      | V      | URSA |      |
|                         | 55366.8658                   | 0.0002     | 1      | V      | NFO  |      |

| <b>Times of minima:</b> |                              |        |      |        |      |
|-------------------------|------------------------------|--------|------|--------|------|
| Star name               | Time of min.<br>HJD 2400000+ | Error  | Type | Filter | Rem. |
|                         | 55366.8660                   | 0.0003 | 1    | V      | URSA |
|                         | 55378.8965                   | 0.0003 | 2    | V      | URSA |
|                         | 55379.7882                   | 0.0003 | 2    | V      | URSA |
|                         | 55392.7107                   | 0.0002 | 1    | V      | URSA |
|                         | 55395.8291                   | 0.0002 | 2    | V      | URSA |
|                         | 55396.7202                   | 0.0003 | 2    | V      | URSA |
|                         | 55399.8398                   | 0.0002 | 1    | V      | URSA |
|                         | 55400.7314                   | 0.0001 | 1    | V      | URSA |
|                         | 55411.8723                   | 0.0003 | 2    | V      | URSA |
|                         | 55421.6745                   | 0.0002 | 2    | V      | URSA |
|                         | 55425.6845                   | 0.0002 | 1    | V      | URSA |
|                         | 55434.5962                   | 0.0003 | 1    | V      | URSA |
| V974 Cyg                | 55296.9396                   | 0.0003 | 1    | V      | NFO  |
|                         | 55320.8793                   | 0.0005 | 2    | V      | URSA |
|                         | 55365.7471                   | 0.0007 | 2    | V      | URSA |
| V1136 Cyg               | 55301.8923                   | 0.0005 | 1    | V      | URSA |
|                         | 55301.8943                   | 0.0004 | 1    | V      | NFO  |
|                         | 55360.7606                   | 0.0004 | 1    | V      | NFO  |
|                         | 55362.7981                   | 0.0014 | 2    | V      | NFO  |
|                         | 55457.7170                   | 0.0007 | 1    | V      | NFO  |
|                         | 55466.6732                   | 0.0013 | 2    | V      | NFO  |
| BF Dra                  | 55370.7426                   | 0.0002 | 1    | V      | URSA |
|                         | 55370.7433                   | 0.0003 | 1    | V      | NFO  |
|                         | 55471.6415                   | 0.0002 | 1    | V      | URSA |
|                         | 55471.6422                   | 0.0002 | 1    | V      | NFO  |
| V501 Her                | 55278.8917                   | 0.0009 | 1    | V      | NFO  |
|                         | 55321.8833                   | 0.0005 | 1    | V      | URSA |
|                         | 55351.7943                   | 0.0007 | 2    | V      | NFO  |
|                         | 55364.8705                   | 0.0005 | 1    | V      | NFO  |
| WZ Leo                  | 55192.9954                   | 0.0004 | 1    | V      | NFO  |
|                         | 55209.8941                   | 0.0004 | 1    | V      | URSA |
| AL Leo                  | 55251.7365                   | 0.0002 | 1    | V      | NFO  |
|                         | 55259.7643                   | 0.0002 | 1    | V      | URSA |
|                         | 55259.7653                   | 0.0006 | 1    | V      | NFO  |
|                         | 55260.5666                   | 0.0004 | 2    | V      | URSA |
|                         | 55267.7921                   | 0.0003 | 1    | V      | NFO  |
|                         | 55280.6366                   | 0.0003 | 1    | V      | NFO  |
|                         | 55284.6497                   | 0.0002 | 2    | V      | NFO  |
|                         | 55296.6915                   | 0.0002 | 1    | V      | URSA |
|                         | 55300.7051                   | 0.0002 | 2    | V      | URSA |
|                         | 55300.7055                   | 0.0002 | 2    | V      | NFO  |
|                         | 55349.6723                   | 0.0004 | 1    | V      | NFO  |
|                         | 55490.9584                   | 0.0004 | 1    | V      | URSA |
|                         | 55519.8576                   | 0.0004 | 1    | V      | URSA |
|                         | 55531.9001                   | 0.0004 | 2    | V      | NFO  |
|                         | 55539.9273                   | 0.0001 | 2    | V      | NFO  |
|                         | 55543.9408                   | 0.0002 | 1    | V      | URSA |
|                         | 55543.9411                   | 0.0001 | 1    | V      | NFO  |
|                         | 55564.0097                   | 0.0002 | 2    | V      | NFO  |
|                         | 55564.0099                   | 0.0003 | 2    | V      | URSA |
|                         | 55564.8123                   | 0.0001 | 1    | V      | URSA |
|                         | 55568.8256                   | 0.0002 | 2    | V      | URSA |
|                         | 55568.8262                   | 0.0002 | 2    | V      | NFO  |
|                         | 55580.8670                   | 0.0002 | 1    | V      | NFO  |
|                         | 55588.8953                   | 0.0001 | 1    | V      | URSA |

| <b>Times of minima:</b> |                              |            |        |        |      |     |
|-------------------------|------------------------------|------------|--------|--------|------|-----|
| Star name               | Time of min.<br>HJD 2400000+ | Error      | Type   | Filter | Rem. |     |
| V501 Mon                | 55135.8866                   | 0.0019     | 1      | V      | NFO  |     |
|                         | 55170.9960                   | 0.0013     | 1      | V      | NFO  |     |
|                         | 55493.9715                   | 0.0009     | 1      | V      | NFO  |     |
|                         | 55500.9939                   | 0.0011     | 1      | V      | NFO  |     |
| V506 Oph                | 55293.9475                   | 0.0002     | 2      | V      | NFO  |     |
|                         | 55369.7682                   | 0.0002     | 1      | V      | URSA |     |
|                         | 55378.7803                   | 0.0003     | 2      | V      | URSA |     |
|                         | 55412.7157                   | 0.0002     | 2      | V      | URSA |     |
|                         | 55462.5558                   | 0.0002     | 2      | V      | URSA |     |
|                         | 55472.6288                   | 0.0002     | 1      | V      | NFO  |     |
|                         | 55170.8995                   | 0.0007     | 1      | V      | NFO  |     |
| FO Ori                  | 55505.9168                   | 0.0005     | 2      | V      | URSA |     |
|                         | 55152.9342                   | 0.0007     | 1      | V      | NFO  |     |
| V530 Ori                | 55482.9157                   | 0.0001     | 1      | V      | NFO  |     |
|                         | 55531.8024                   | 0.0001     | 1      | V      | URSA |     |
|                         | 55531.8024                   | 0.0002     | 1      | V      | NFO  |     |
|                         | 55537.9129                   | 0.0002     | 1      | V      | NFO  |     |
|                         | 55580.6883                   | 0.0002     | 1      | V      | NFO  |     |
|                         | 55484.9086                   | 0.0007     | 2      | V      | NFO  |     |
| NP Per                  | 55484.9116                   | 0.0014     | 2      | V      | URSA |     |
|                         | 55533.9424                   | 0.0006     | 2      | V      | NFO  |     |
|                         | 55241.6872                   | 0.0006     | 2      | V      | NFO  |     |
| IM Per                  | 55473.8723                   | 0.0003     | 2      | V      | URSA |     |
|                         | 55490.7857                   | 0.0003     | 1      | V      | NFO  |     |
|                         | 55490.7865                   | 0.0003     | 1      | V      | URSA |     |
|                         | 55500.9194                   | 0.0004     | 2      | V      | URSA |     |
|                         | 55507.6854                   | 0.0004     | 2      | V      | URSA |     |
|                         | 55507.6862                   | 0.0005     | 2      | V      | NFO  |     |
|                         | 55525.7190                   | 0.0007     | 2      | V      | NFO  |     |
|                         | 55533.6170                   | 0.0004     | 1      | V      | NFO  |     |
|                         | 55544.8885                   | 0.0004     | 1      | V      | NFO  |     |
|                         | 55568.5474                   | 0.0007     | 2      | V      | URSA |     |
|                         | 55569.6845                   | 0.0003     | 1      | V      | URSA |     |
|                         | 55587.7179                   | 0.0009     | 1      | V      | URSA |     |
|                         | V482 Per                     | 55158.8543 | 0.0011 | 1      | V    | NFO |
|                         |                              | 55169.8635 | 0.0006 | 2      | V    | NFO |
|                         |                              | 55185.7682 | 0.0004 | 1      | V    | NFO |
| 55201.6755              |                              | 0.0005     | 2      | V      | NFO  |     |
| 55245.7097              |                              | 0.0004     | 2      | V      | NFO  |     |
| 55432.8751              |                              | 0.0005     | 1      | V      | URSA |     |
| 55443.8859              |                              | 0.0004     | 2      | V      | URSA |     |
| 55459.7893              |                              | 0.0009     | 1      | V      | URSA |     |
| 55465.9052              |                              | 0.0005     | 2      | V      | NFO  |     |
| 55476.9162              |                              | 0.0004     | 1      | V      | NFO  |     |
| 55481.8093              |                              | 0.0004     | 1      | V      | NFO  |     |
| 55497.7146              |                              | 0.0006     | 2      | V      | URSA |     |
| 55498.9346              |                              | 0.0004     | 1      | V      | NFO  |     |
| 55498.9364              |                              | 0.0007     | 1      | V      | URSA |     |
| 55503.8308              |                              | 0.0003     | 1      | V      | NFO  |     |
| 55508.7236              |                              | 0.0002     | 1      | V      | NFO  |     |
| 55509.9476              |                              | 0.0010     | 2      | V      | URSA |     |
| 55514.8421              |                              | 0.0003     | 2      | V      | URSA |     |
| 55519.7355              | 0.0005                       | 2          | V      | URSA   |      |     |
| 55536.8653              | 0.0006                       | 2          | V      | NFO    |      |     |
| 55557.6609              | 0.0005                       | 1          | V      | NFO    |      |     |

| <b>Times of minima:</b> |                              |        |      |        |      |
|-------------------------|------------------------------|--------|------|--------|------|
| Star name               | Time of min.<br>HJD 2400000+ | Error  | Type | Filter | Rem. |
|                         | 55563.7761                   | 0.0006 | 2    | V      | NFO  |
|                         | 55563.7765                   | 0.0004 | 2    | V      | URSA |
|                         | 55573.5628                   | 0.0004 | 2    | V      | URSA |
|                         | 55590.6906                   | 0.0003 | 2    | V      | URSA |
| V514 Per                | 55144.9267                   | 0.0005 | 1    | V      | NFO  |
|                         | 55145.8344                   | 0.0006 | 2    | V      | NFO  |
|                         | 55154.9320                   | 0.0005 | 2    | V      | NFO  |
|                         | 55155.8410                   | 0.0006 | 1    | V      | NFO  |
|                         | 55156.7505                   | 0.0008 | 2    | V      | NFO  |
|                         | 55167.6673                   | 0.0010 | 2    | V      | NFO  |
| V335 Ser                | 55299.7795                   | 0.0003 | 1    | V      | URSA |
|                         | 55337.7290                   | 0.0002 | 1    | V      | NFO  |
|                         | 55368.7776                   | 0.0004 | 1    | V      | URSA |
|                         | 55401.6790                   | 0.0003 | 2    | V      | URSA |
|                         | 55451.5751                   | 0.0006 | 1    | V      | URSA |
| TY Tau                  | 55175.6721                   | 0.0003 | 1    | V      | URSA |
|                         | 55209.6089                   | 0.0004 | 2    | V      | URSA |
|                         | 55245.7000                   | 0.0005 | 1    | V      | URSA |
|                         | 55485.9534                   | 0.0003 | 1    | V      | URSA |
|                         | 55499.9587                   | 0.0002 | 1    | V      | URSA |
|                         | 55533.8951                   | 0.0004 | 2    | V      | URSA |
|                         | 55544.6664                   | 0.0003 | 2    | V      | URSA |
|                         | 55557.5960                   | 0.0008 | 2    | V      | URSA |
| CF Tau                  | 55153.7515                   | 0.0003 | 1    | V      | NFO  |
| V1094 Tau               | 55157.7494                   | 0.0003 | 1    | V      | NFO  |
|                         | 55175.7281                   | 0.0003 | 1    | V      | NFO  |
|                         | 55181.5904                   | 0.0003 | 2    | V      | URSA |
|                         | 55202.6903                   | 0.0006 | 1    | V      | NFO  |
|                         | 55208.5573                   | 0.0002 | 2    | V      | URSA |
|                         | 55247.6367                   | 0.0003 | 1    | V      | NFO  |
|                         | 55274.6011                   | 0.0003 | 1    | V      | URSA |
| HY Vir                  | 55280.8670                   | 0.0003 | 2    | V      | NFO  |
|                         | 55295.8986                   | 0.0006 | 1    | V      | NFO  |
|                         | 55306.8257                   | 0.0003 | 1    | V      | URSA |
|                         | 55317.7536                   | 0.0004 | 1    | V      | NFO  |
|                         | 55332.7877                   | 0.0005 | 2    | V      | NFO  |
|                         | 55369.6662                   | 0.0003 | 1    | V      | URSA |
|                         | 55590.9881                   | 0.0003 | 1    | V      | URSA |
| BP Vul                  | 55350.8269                   | 0.0004 | 2    | V      | NFO  |
| BT Vul                  | 55122.6912                   | 0.0002 | 2    | V      | NFO  |
|                         | 55134.6733                   | 0.0002 | 1    | V      | NFO  |
|                         | 55138.6677                   | 0.0004 | 2    | V      | NFO  |
|                         | 55154.6456                   | 0.0005 | 2    | V      | NFO  |
|                         | 55418.8327                   | 0.0002 | 1    | V      | URSA |
|                         | 55434.8089                   | 0.0002 | 1    | V      | URSA |
|                         | 55462.7666                   | 0.0008 | 2    | V      | URSA |
|                         | 55473.6084                   | 0.0002 | 1    | V      | URSA |
|                         | 55485.5918                   | 0.0005 | 2    | V      | URSA |
|                         | 55497.5738                   | 0.0002 | 1    | V      | URSA |

**Remarks:**

A sample of the observations has been published by Lacy, Hood & Straughn (2001). Mean deviations between independently timed eclipses by the two telescopes (URSA & NFO) are not significantly larger than expected based on the error estimates, implying that the estimated timing errors are realistic.

**Acknowledgements:**

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## References:

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