UK observations of 2018:
Successes, new CCD users, and a lunar graze project.

70 Tau 2016 Jan 19  0.2 sec

Faint comes 2018  5.5 sec >>

(130) Elektra 2018 April >>

Tim Haymes
BAA Assistant Director, Asteroids/Lunar Occultations

ESOP XXXVII  Rokycany, CZ
This is the very successful Elektra observation
Prediction was highlighted by Oliver at ESOP XXXVI Freiberg, 2017

The observation from my Home observatory was made with 30cm F4 Newtonian, WAT-910HX and GPSBOXSPRITE2-U. (Time checked with radio)

Recording was to digital tape (Sony TRV33E camcorder) and transferred to laptop by fire-wire.

Analysis with TANGRA

Exposure 0.04s (25fps)     Duration 16.48 s

An audio recording with DCF 77 pips was also obtained as a backup.

FR 7    CH 9    CZ 3
BE 2    UK 9
IT 12    AT 1    Total 48
(EURASTER.NET)
VID v CCD
are compared

11 Tickner  CCD (UK)  16.66
12 Talbot  VID (UK)  16.72
13 Haymes  VID (UK)  16.48s
14 Mutti  VID (CH)  16.42s
26 Kidd  CCD (UK)  14.88
27 Schenker  VID (CH)  14.76
Occultation by (130) Elektra on 2018 April 21 well-observed in western Europe and U.K.

Good fit to DAMIT Shape Model 1856

http://iota.jhuapl.edu/2018June_occultations.ppt
Another occultation by (130) Elektra in North Carolina Mon. pm, April 30 (2018 May 1 UT)

Altitude only 15° in the east, with a 99% sunlit nearly full Moon 33° away, but it was beautifully clear the nights of both Apr. 29 & 30. We had only 2.5h of dark time before the event on Apr. 30, so we pre-pointed 4 stations the night of Apr. 29 on paver stones, as shown on some of the next slides.

Full details here:
http://iota.jhuapl.edu/2018June_occultations.ppt
Observers with CCDs

- We have three (or 4) new observers in England using CCDs:

- These are USB planetary cameras deployed for asteroid occultations.

- Two observers (P Tickner and S Kidd) have established *through experiment* that GPS disciplined NTP time servers are reliable to 1 to 10ms, but quote accuracy of 10 to 100ms due to potential variations in their recording systems.

- P Tickner is moving to Windows 10 due to its *improved* time handling.
  (or so it is said...)
## Timing and cameras:

<table>
<thead>
<tr>
<th>Observer</th>
<th>Camera</th>
<th>Software</th>
<th>UT source</th>
<th>Recording</th>
</tr>
</thead>
<tbody>
<tr>
<td>P Tickner</td>
<td>USB3 ZWO ASI 174mm</td>
<td>Genika</td>
<td>GPS “TimeBox” Stratum-1</td>
<td>W7 i7 SSD</td>
</tr>
<tr>
<td>S Kidd</td>
<td>ZWO ASI 224 colour</td>
<td>Fire Capture</td>
<td>GPS 1pps-disciplined (RasPi) / Dimension-4</td>
<td></td>
</tr>
</tbody>
</table>

![Image of camera setup]

S.Kidd RasPi NTP time server
UT/USB testing

• S Kidd: Established the UT was at the start of the frame. He recorded the LED on the RasPi GPS time server at 100 and 500 sub-frames / sec.

• Time stamp variation was in the 1 to 10ms error range.

• P Tickner: Used an MSF receiver with LED (made by T Haymes) to establish the start of the frame. The time stamp accuracy was also good, and he purchased the “Time Box” USB GPS add-on to Genica software. He does not use NTP.

  On Windows 7 he says there is a 15ms write delay onto a SSD.

There is a written description from Mr P Tickner available from me – please ask
Double star lunar occultations

Team APT: Alex Pratt, Phil Denyer and Tim Haymes (assisted by Brian Loader)

SAO 95446 on 2018 Apr 20
dT +5.8s - T Haymes

SAO 95446 magnitude differential 9.0 and 11.5 – A Pratt (Partial recording)
“Unreported” Lunar Graze Project:


• Originally reported in *The Astronomer Magazine*  (6411) Tamaga
  [ founded in 1964 for rapid reporting: Editor is Guy Hurst.]

  - Rapidly reported Lunar Obs didn’t all reach RGO or ILOC.
    ( detailed reporting to the recognised astronomical body was not always followed up. )

• Mr J. A. Burger was contacted and he confirmed his location and visual timings.

• The observations were not in Dave Herald’s Occult Database.
Y3S was the call sign for East German Radio Time Signal at Nauen – no longer transmitted. Is the oldest continuously operating radio transmitting installation in the world. It was founded on 1 April 1906.
Location of J Burger at Heathfield, W. Sussex

- His OSGB coordinates placed him in the circle, but his location on GE (WGS84) was at the road side X
Corrected to WGS 84 Datum

Mr Burger’s timings plotted on the Occult4 display
### UK observation summary...

(2017-2018) with **Positive chords**

<table>
<thead>
<tr>
<th>Name</th>
<th>Observation Chords</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haymes T</td>
<td>npnnnpnnnnnpnnpppnnnnnnnnnnnnnnnnn</td>
<td>5/37 vid</td>
</tr>
<tr>
<td>Kidd S</td>
<td>npnppnpnnnpn</td>
<td>5/12 ccd</td>
</tr>
<tr>
<td>Ward D</td>
<td>pnnnp permit</td>
<td>0/4 ccd</td>
</tr>
<tr>
<td>Talbot J</td>
<td>npnnnpnnpnnpnnnnnppnnnnpnnn</td>
<td>4/27 vid</td>
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<tr>
<td>Denyer P</td>
<td>pnnnpnnnpn</td>
<td>2/8 vid</td>
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<tr>
<td>Tickner P</td>
<td>npnnnpnppnp</td>
<td>6/8 ccd</td>
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<tr>
<td>Sargant R</td>
<td>n</td>
<td>0/1 vid</td>
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<tr>
<td>Stuart</td>
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<td>0/1 vid</td>
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<td>Pratt A</td>
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<td>4/21 vid</td>
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<td>Hubbard</td>
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<td>2/2 drift</td>
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<td>Briggs D</td>
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<tr>
<td>Jones A</td>
<td>pp</td>
<td>2/2 vid</td>
</tr>
<tr>
<td>Collins M</td>
<td>p</td>
<td>1/1 eye</td>
</tr>
</tbody>
</table>

**THANK YOU**
PAVER mount: Attach the side rail with two thumb screws. The bottom is held with a screw through a single hole, the top is in one of two ranges. This is the coarse altitude adjustment. Fine adjustment is made by turning the knob on the back end.

Designed by
John Broughton (AU)