British Astronomical Association

VARIABLE STAR SECTION CIRCULAR

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Contents

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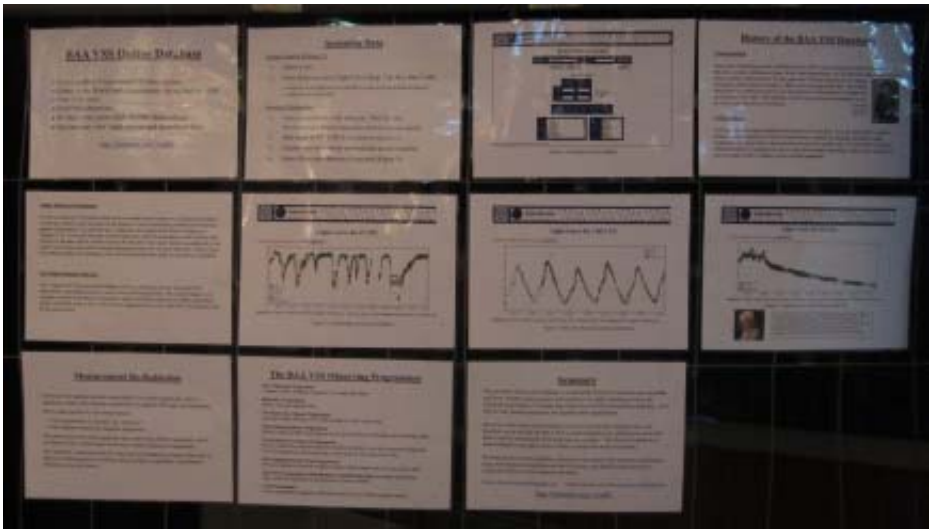


Photo - S. Waterman

BAA VSS ON-LINE DATA BASE POSTERS AT THE CAPAS MEETING, RODEZ

Bi-lingual Presentation of VSS On-line Data base by Helen Thomas.

Review data for a variable star
Rechercher données pour une étoile variable

- Select object
  Sélectionner l'objet
- Select either light curve or data table
  Sélectionner soit courbe de lumière soit table
- Options
  - method/ méthode
  - filter/ filtre
  - observer /observateur

The database today
La base de données aujourd'hui

- More than 900 observers since 1888
  Plus de 900 observateurs depuis 1888
- More than 2 million visual and CCD observations
  Plus de 2 millions d'observations visuelles et CCD
- More than 2000 stars
  Plus de 2000 étoiles
- More than 30 stars with more than 10k observations
  Plus de 10k observations d'une trentaine d'etoiles
- 8 members have made more than 200K observations each!
  8 membres de la section ont effectué plus de 200K observations chaqu'un!

FROM THE DIRECTOR

ROGER PICKARD

Joint TA/BAAVSS meeting St. Mary's Church Hall, Basingstoke, October 13th 2012
Guy Hurst kindly agreed that this year 'The Astronomer' magasine meeting should become a joint meeting with the Variable Star Section, in honour of the centenary (28th August) of the birth of George Alcock. This collaboration was a great success. Guy Hurst spoke of the "Lifetime achievements of George Alcock", and Denis Buczynski of "Some reminisces" and other themes were conducive with George Alcock's interests. For those of you unable to attend, the contributions from professional VS speakers, Professors Boris Gaensicke and Nye Evans have already been uploaded to the web page under "Past meetings" < *http://www.britastro.org/vss/tabaavss_meeting.htm* >. In addition, my own humble presentation, written in collaboration with Andy Wilson, has also been added.

Monitoring required of Young Stella Objects
This is another temporary programme which Darryl Sergison describes later in this Circular. These are reasonably bright objects for a change (well approximately in the range of 9.5-13.5 magnitude), and are therefore suitable for both viusal and CCD observers. I hope that some of you will undertake monitoring of these interesting objects. The Director managed to observe two of these stars on 5th November 2012 when DN Tauri was at magnitude 12.32 V and DR Tauri was at 12.2 V. Also note that in his article Darryl Sergison is offering the loan of a V filter for the duration of this programme. Please contact him if you would like to take advantage of this.

Most/least observed stars for 2011
If you are an observer of one or more of the most observed stars in the list then please consider observing it/them a little less frequently and instead take on one or more of the less well observed stars.

Light curves
I am sure most of you will be aware that we are now starting to produce more static light curves on the web page (just click on the side bar link "Light Curves"). So far, this has been the work of Tony Markham but Nigel Foster has also submitted a number of examples which have the added benefit of incuding the date as well as the JD. Hopefully, by the time you read this some of his light curves will also be on the website.

Missing Observations
As an example, I show the light curve for T Cas(p.28) from June 2003 to late 2007 where you will notice an obvious gap from 2453400 which equates to the whole of 2005! If you observed this star during this period could you please advise the Director. Furthermore, perhaps you could check to see if any more of your observations are also missing from 2005 (or any other period for that matter).
[Continued page 28]

EUROVS 2013 - THE 2ND EUROPEAN VARIABLE STAR OBSERVERS' MEETING

ARTO OKSANEN

Originally planned for 7 - 9 September 2012(VSSC No 153), EuroVS 2013 – the 2nd European Variable Star Observers' Meeting will now take place on 26 - 28 April 2013 in Helsinki,

[Continued page 2]

Finland. The meeting is a continuation from the first European meeting in Groningen, the Netherlands in October 2010. (The 2012 meeting was cancelled.)

The local organizer is the Variable Star Group 'Ursa Astronomical Association'. The meeting will be held in Helsinki Observatory. The old observatory has been renovated, and is now used as a public visitor center and museum of astronomy. It also houses the premises of Ursa Astronomical Association. It is in the city center area, about 1 km from the Helsinki Railway Station. The address is Kopernikuksentie 1.

The web-site '*http://www.ursa.fi/eurovs*' contains more information and registration form.

Talks and poster presentations are very welcome. Please contact me(see below) as soon as possible to reserve your place in the program, or if you need any help concerning the meeting.

Welcome to Helsinki! Arto Oksanen - *arto.oksanen@jklsirius.fi*

MONITORING REQUIRED OF YOUNG STELLA OBJECTS.

DARRYL SERGISON

Autumn 2013 will see the launch of an exciting new study into the nature of pre-main-sequence low mass stars, using time series optical spectroscopy and UV-Visual-IR photometry by Darryl Sergison and Tim Naylor of Exeter University. Professional telescopes will obtain data from six nearby T-Tauri stars (in the Taurus/Auriga star forming region) with unprecedented time and spectral resolution. The aim is to build the clearest picture yet of the environment around young solar-type stars and characterise their various disc, accretion and outflow structures.

This study offers a fantastic opportunity for professional-amateur collaboration as the objects (with V magnitudes of 10 - 13) are well within the reach of photometry by small telescopes. Amateur observations are uniquely capable in the study of chaotically variable young stars, offering crucial datapoints in the lightcurve between observations made by professional telescopes.

We would be very keen to recruit(!) observers who are interested in being part of this study and able to contribute visual or (V and R band) filtered CCD photometry. All contributing observers will be acknowledged in the published papers, significant contributors may also be co-authors. I do have one spare 1.25" V band filter that I could lend to any interested observer who may wish to borrow it for the duration of this programme.

In preparation for the main data collection next autumn, we would like to start monitoring targets immediately. The first 3 targets that we will be studying are RY Tau, DN Tau and DR Tau. Finder charts may be found at < *www.aavso.org/vsp* >. Data can be submitted either directly to "Darryl Sergison" < *darryl@astro.ex.ac.uk* >, or to the BAA VSS database in the usual way or to the AAVSO. CCD observers should ideally take a minimum of 3 images and also the occasional time-series could potentially be REALLY useful to characterise accretion infall.

If you would like more information or are interested in contributing to this study, please contact me by email at darryl@astro.ex.ac.uk. Many thanks, Darryl Sergison

darryl@astro.ex.ac.uk

DELTA ORIONIS (MINTAKA) CAMPAIGN

Laurent Corp

Following the recent pro-am conference on stellar astrophysics (CAPAS 2012) held at Onet le Château, Rodez, France on 28th September - 1st October this year, I was put in contact with Yaël Nazé (High Energy Astrophysics Group, University of Liège, Belgium) and Anthony Moffat (University of Montreal, Canada). With their help, I have put together a webpage detailing the circumstances of the eclipse campaign and guidance for participants, which can be found at:
http://www.astrosurf.com/lcorp/delta_ori.html

The campaign begins on 2012 December 17 and ends on 2013 January 7. The system will be observed by various satellites including; the CHANDRA X-ray observatory for which two periods of 6 days have been reserved during the second half of December by a professional team led by M. Corcoran, NASA; and the MOST satellite with its 0.15-m instrument which will be collecting continuous high-precision optical photometry from mid-December.

The contribution of amateurs

A call to the astronomical community has been made by Tony Moffat (Emeritus Professor, University of Montreal) for simultaneous complementary ground-based optical observations. Both multi-band photometry, and especially spectroscopy will be most welcome. N.B. You have to take into account the following constraints in planning your observations and submitting the results:

Photometry
Here the objective is to obtain 100 datapoints or more in each of B, V and Rc filters, preferably to a precision of 0.003 mag. The format for sending in the results is as follows:
Date, JD, Magnitude Delta Ori, Magnitude REF1, Magnitude REF2, ... Magnitude REFx

Spectroscopy
Frequently repeated high-resolution optical spectra are needed, especially including H-alpha (6562Å) and HeI (6678Å). Also, observations of a telluric standard (e.g. a broad line A-type star of similar magnitude) are needed for the H-alpha and HeI region. The spectra required are high signal-to-noise (S/N > ~200) with a spectral resolving power of R > ~10000, hopefully attainable in reasonably short times (< 30 min) and covering a large part of the optical spectrum from about 4000 - 7000A.

Sending the data
The data should be sent to Noel Richardson: *richardson@robaseastro.umontreal.ca*
Each observer will be cited if he or she provides useful data.

References:
Tomographic Separation of Composite Spectra. VIII. The Physical Properties of the Massive Compact Binary in the Triple Star System HD 36486 (delta Orionis A)
J.A. Harvin, D.R. Gies, and W.G. Bagnuolo, Jr.
http://iopscience.iop.org/0004-637X/565/2/1216/fulltext/54306.text.html

Where do X-rays come from in hot massive stars? The case of delta Orionis. Call for supplementary ground-based observations.
http://www.spektroskopieforum.vdsastro.de/download.php?id=4835&sid...

Good observations ... *laucorp@wanadoo.fr*

Thanks to Professor Tony Moffat and to Dr Ir Yaël Nazé for information provided.

THE TOP 100 "MOST OBSERVED" STARS IN 2011

ROGER PICKARD

Actually, there are 102 as the last 3 tied with 62 observations each. Note also, that not all these are necessarily Programme stars.

Star	Observations
Z Cam	370
SS Cyg	275
CH Cyg	266
Z UMi	227
SS Aur	223
Z UMa	216
AB Dra	204
AY Lyr	204
RU Peg	202
R CrB	183
SU UMa	179
rho Cas	176
V465 Cas	172
U Gem	171
RY UMa	168
R Sct	167
EM Cyg	161
RX And	159
T CrB	157
gamma Cas	148
CI Cyg	148
AF Cyg	147
AC Her	140
TZ Per	134
XX Cam	132
AB Aur	131
X Per	129
EG And	128
WZ Cas	127
CSV171 Cas	125
AH Her	124
X Leo	124
X Cam	122
SV Sge	120

Star	Observations
V393 Cas	119
GK Per	119
V391 Cas	118
P Cyg	115
RX Boo	113
chi Cyg	112
AG Peg	110
V CVn	108
V377 Cas	105
W Cyg	104
CH UMa	98
BU Gem	96
T Cep	93
U Mon	93
TV Gem	92
RS Oph	92
LS And	91
ER UMa	91
S10930 Lyr	90
V UMi	90
AG Dra	87
HP And	86
ST Cam	86
EY Cyg	86
V482 Cyg	85
DM Lyr	85
WY Gem	84
F128 Cg	82
SW UMa	81
U Ori	80
TX Dra	79
SU Tau	78
V1454 Cyg	74
V Vul	74

Star	Observations
V Cam	73
U Sco	72
USNO1425.0982 Cyg	71
V542 Cyg	70
RY Dra	70
ST UMa	70
mu Cep	69
Mark 421 UMa	69
TX CVn	68
T Cyg	68
DV Dra	68
F130 Her	68
X Oph	68
DX And	67
UV Boo	67
UW Per	67
eps Aur	66
beta Lyr	66
UU Aur	65
RV Boo	65
RW Boo	65
UV Cas	65
X Her	65
UV Per	65
RW Cep	64
EG Cnc	64
Y Lyn	64
Y CVn	63
TT Cyg	63
XY Lyr	63
CN Ori	63
V Boo	62
OP Her	62
BQ Ori	62

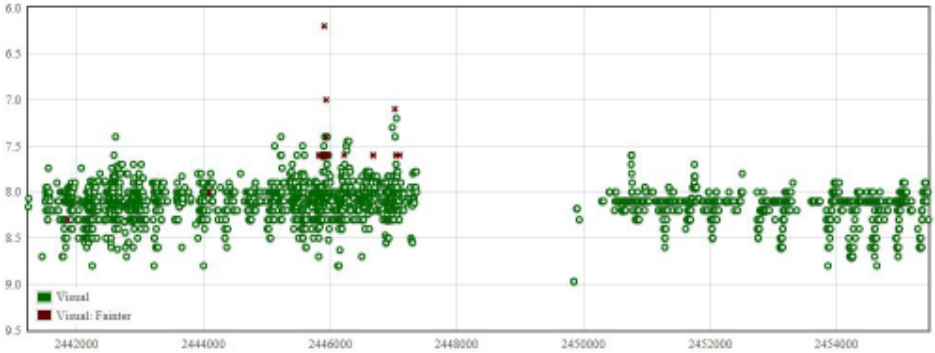
Notes on Non-Programme stars (in each case the number following the star is the number of observations submitted in 2011)

UV Boo 67

GCVS states that originally thought variable but later observations failed to show this. I am not so sure, but are there any missing observations?

(See also my note under "From the Director")

Figure 1: UV Bootes



Contributors: A Chapman, A Gardner, A Gibbon, A Hutchings, A J Shorten, A K Porter, B J Beesley, B Jobson, C Henshaw, C M Allen, C Pezzarossa, D A Rothery, D Churchill, D Gavine, D Hufton, D L Young, D M Swain, D Mcadam, D Storey, D Young, E Spooner, G B Chaplin, G J Privett, G M Hurst, I A Middlemist, I W Saunders, J Bingham, J E Isles, J R Higgs, J S Smith, J Toone, L R Matthews, M A Hapgood, M A Hather, M Currie, M D Taylor, N S Kiernan, P W Hornby, R A Kendall, R B I Fraser, R D Januszewski, R H McNaught, R J Asher, R J Geddes, R N Pennell, R Steer, R W Fleet, S R Dunlop, S W Albrighton, T G Saville, T Gough, T Markham, V G Mormyl, W J Worraker.

CSV171 (NSV 650) (in Cassiopeia) 125

Poorly-studied irregular variable of early spectral type. Is the reduction in scatter due to fewer observers nowadays?

V377 Cas 105

A Delta Scuti star according to the GCVS! I am not sure I agree.

T Cep 93

Officially dropped many years ago, before I became Director, but obviously a number of observers still enjoy observing it.

F128 Cyg 82

An SX Ari star with a variation of less than 0.1 magnitude!?

USNO1425.0982 (in Cygnus) 71

Very faint! I guess it was a "TOO" - Target of Opportunity.

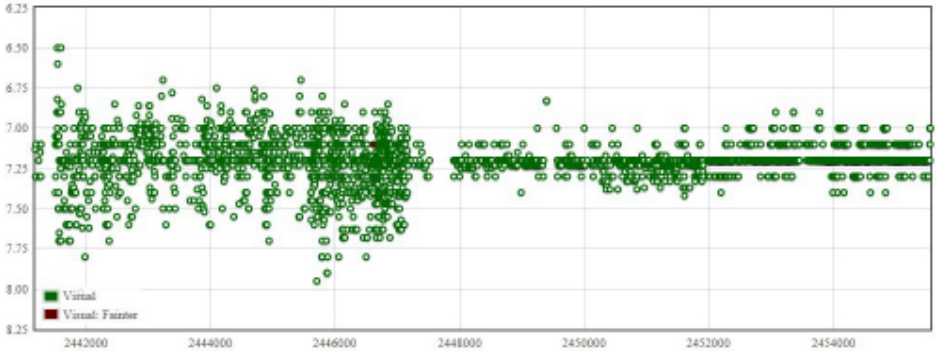
T Cyg 68

A slow irregular variable not showing much variation.

S10930 Lyr 90

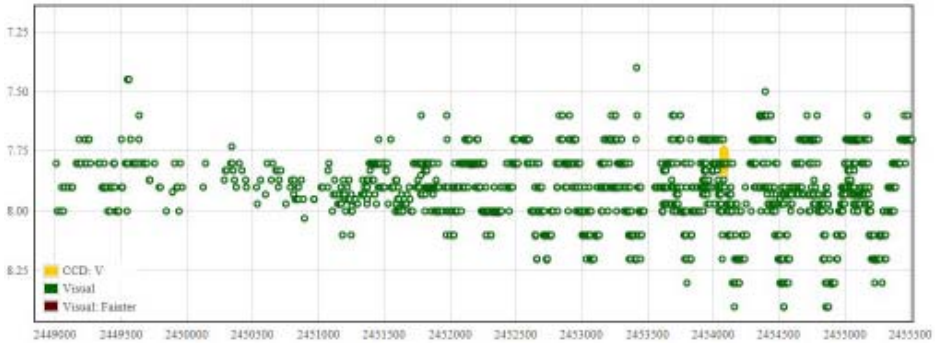
This has now been designated V493 Lyr and is a UGem type.

Figure 2: NSV 650



Contributors: A Gardner, A Hutchings, A K Porter, A R Pratt, B Jobson, C Henshaw, C J Fisher, C M Allen, C Pezzarossa, D A Pickup, D Hufton, E J W West, G M Hurst, G Poyner, G Ramsey, G Stefanopoulos, I A Middlemist, I D Howarth, I P Nartowicz, J E Agar, J E Isles, J S Bullivant, K Grundy, L R Matthews, M A Hather, M B Houchen, M Beveridge, M Currie, M D Taylor, M Poxon, N Reid, P Quadt, P R Clayton, P W Hornby, R A Kendall, R B I Fraser, R H McNaught, S W Albrighton, T Brelstaf, T Gough, T Markham.

Figure 3: V377 Cassiopeiae



Contributors: A Good, A J Shorten, B Jobson, B Morell, C Henshaw, C M Allen, D A Pickup, D K Lloyd, D M Swain, E J W West, E Spooner, G M Hurst, I H Kennedy, I P Nartowicz, J Bingham, J E Isles, J Simpson, M Clarke, M Currie, M D Taylor, M Poxon, N Britton, N R Baker, P Quadt, P R Clayton, P W Hornby, R B I Fraser, R C Dryden, R D Pickard, R J Livesey, R K Hunt, T G Saville, T Gough, T Markham.

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STARS NOT OBSERVED IN 2011

ROGER PICKARD

Unfortunately, neither this list nor the 'Most Observed Stars in 2011' list include any data that was submitted on paper, nor do they include CCD observations, and so they are not strictly accurate. However, I do think they give us a good idea as to what observers are interested in observing.

Firstly, unless we get some observations of the far southern stars in the next year or so, and if further research shows we have little data in our own database, we will seriously consider dropping them. This also applies to SRs on the Telescopic Programme. However, I wish to emphasise that observations are still very much required for the two ICCE Programme stars (for which it appears we had no observations last year), and all the Polars.

The 'Eclipsing Binary Programme' will be part of a separate review.

Stars on the main VSS Programmes not observed in 2011

Star	Const	Prog	Type
UU	Aql	Tele	UGSS
UW	Aql	Tele	Lc
V654 (SDSSp J0729+3658)	Aur	Tele	NL
CC	Cam	ICCE	Mira
CG	Dra	Tele	UG
RXJ1715+6856	Dra	Tele	UGSU
RXJ1831+6511	Dra	Tele	DN
DW	Gem	Tele	Lb
EX	Hya	Tel	far south
DP	Leo	Polar	
GG	Leo	Polar	
W	LMi	Tele	SRd
J0747+4248	Lyn	Tele	NL
FH (SDSSp J0813+4528)	Lyn	Tele	UG
SDSSp J0816+4530	Lyn	Tele	UGWZ
FR (EUVEJ0854+390)	Lyn	Polar	
V2110	Oph	Tele	NC
V2301	Oph	Polar	

V1309	Ori	Polar	
BU	Per	Tele	SRc
RS	Per	Tele	SRc
SDSSp J2303+0106	Psc	Tele	UG
V1017	Sgr	Tele	far south
V1172	Sgr	Tele	far south
V3645	Sgr	Tele	far south
V745	Sco	Tele	far south
FR	Sct	Tele	far south
1RXS J161008.0+035222	Ser	Polar	
MR	Ser	Polar	
SDSS J103533.03+055158.4	Sex	Tele	UGWZ:+E
NSV2249	Tau	ICCE	Mira?
AR	UMa	Polar	
EU	UMa	Polar	
QQ	Vul	Polar	

34 stars in all (22 x Telescopic, 10 x Polar, 2 x ICCE)

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CHART NEWS

JOHN TOONE

The following new charts are now posted to the VSS web site and are available in paper form from the Chart Secretary:

Telescopic Charts

079.02 VYAqr
New 5 degree and 30 minute field charts replace chart 079.01. Comparison stars A, B, E, G, K, M, S and U are dropped. Comparison stars Y and Z have been introduced. The new sequence consists of V measurements from Tycho, ASAS3, and Henden. The previous sequence was poorly calibrated (too faint) below magnitude 14.0.

037.02 V Boo
New 6 degree and 3 degree field charts replace chart 037.01. Comparison stars A, C, K, N, S and U are dropped. The new sequence consists of V measurements from Tycho and Pickard, and is now consistent with Skiff's measurements at Lowell Observatory in 1996.

044.02 W CrB

New 3 degree and 30 minute field charts replace chart 044.01. Comparison stars F and U are dropped. The new sequence consists of V measurements from Tycho, APASS and CMC14. The previous sequence was poorly calibrated (too bright) below magnitude 11.0.

060.02 RU Her

New 5 degree and 1 degree field charts replace chart 060.01. Comparison star B is dropped and comparison stars R, S and T have been added. The new sequence consists of V measurements from Tycho, BSM, and Pickard. The previous sequence had erroneous values for comparison stars F and P and the chart has been updated at the request of Mike Gainsford.

069.02 SU Lac

A new 30 minute field chart replace chart 069.01. Comparison star E has been dropped and comparison star T has been introduced. The new sequence consists of V measurements from Tycho, TASS, and Pickard. The previous sequence had erroneous values for comparison stars K, L, M and P, and the chart has been updated at the request of Philip Withers.

329.01 RR Tau

No previous BAA VSS chart existed for this star which has been selected as variable star of the year in the 2013 Handbook. A 30 minute field chart has been drawn and the sequence consists of V measurements from Wright.

056.02 RV Tau

New 3 degree and 1 degree field charts replace chart 056.01. Comparison stars C, E, J, M, N, P, Q, R, T, U and W are dropped. Comparison stars X and Y have been introduced. The new sequence consists of V measurements from Tycho, Hipparcos, ASAS3 and TASS, and has been culled at the faint end as RV Tau only rarely fades below magnitude 11.0.

066.02 TU Ma

New 6 degree and 1 degree field charts replace chart 066.01. Comparison stars B, D, H, Q, X and CC are dropped. The new sequence consists of V measurements from Hipparcos, TASS, and SRO, plus a Harvard Photometry measure for comparison star L to combat the colour difference with comparison star K. The previous sequence was poorly calibrated (too bright) below magnitude 12.5.

Binocular Charts

104.02 RV Boo and RW Boo

A new 9 degree field chart replaces chart 104.01. Comparison stars A and G are dropped and comparison stars N and P have been added. The new V sequence is taken from Tycho.

219.02 RX Boo

A new 9 degree field chart replaces chart 219.01. Comparison stars B and D are dropped and comparison star H has been added. The new V sequence is taken from Tycho and corrects a long standing anomaly with respect to comparison stars C, D and E.

215.02 Y and TU CVn
A new 9 degree field chart replaces chart 215.01. Comparison stars E, F and G are dropped, and comparison stars H, K and L have been added. The new V sequence is taken from Tycho and has a reduced colour range.

233.02 V465 Cas
A new 6 degree field chart replaces chart 233.01. There are no changes to the selection of comparison stars, but the sequence now consists of V measures from Tycho. The previous sequence was systematically too bright below magnitude 6.5.

112.02 Mu Cep
A new 18 degree field chart replaces chart 112.01. Comparison stars B, E, G, L and P are dropped. The new V sequence is taken from Tycho, and has a reduced colour range.

232.02 RU Cep and AR Cep
A new 6 degree field chart replaces chart MDT1985May06. The former chart included a sequence for RX Cep, which is now considered constant and has been dropped from the BAA VSS Binocular Programme. Comparison stars D, H, K and L are dropped and comparison star R has been added. The new V sequence is taken from Tycho and Hipparcos.

232.02 AF Cyg and V973 Cyg
A new 9 degree field chart replaces chart 232.01. Comparison stars A, K, L, N, P, S and T are dropped and comparison stars W and X have been added. The new V sequence is taken from Hipparcos and Tycho.

228.02 U Del and EU Del
A new 9 degree field chart replaces chart 228.01. Comparison stars B, C, H and K are dropped and comparison stars N and P have been added. Comparison star D, dropped in 1996, has been reinstated. The new sequence is a combination of V measurements taken from Tycho, plus a Harvard Photometry measure for comparison star D, to combat the colour difference with nearby comparison star F.

223.02 X Her and ST Her
A new 9 degree field chart replaces chart 223.01. Comparison stars C, 1 and 8 are dropped. The new V sequence is taken from Tycho. The previous ST Her sequence was systematically too bright below magnitude 8.0.

113.02 SX Her
A new 9 degree field chart replaces chart 113.01. Comparison star B is dropped, and comparison star H has been added. The new V sequence is taken from Tycho. The previous sequence was calibrated 0.2 magnitudes too bright.

107.02 UW Her
A new 6 degree field chart replaces chart 107.01. Comparison stars 1, C and D are dropped. The new V sequence is taken from Tycho and Hipparcos, and has a reduced colour range.

330.01 R Lyr
A new 20 degree field chart replaces chart MDT1972-11-11. Comparison stars a, c, e, g, k

and l are dropped and comparison star N is introduced. The sequence letters are now all capitals and the sequence colour range is much reduced. The new V sequence is taken from Hipparcos.

331.01 XY Lyr
A new 9 degree field chart replaces chart MDT 72-09-15. Comparison stars G and Z are dropped and comparison stars H, K and N have been added. All comparison stars are now aligned east/west to the north of Vega. The new V sequence is taken from Tycho.

114.02 W Tri
A new 6 degree field chart replaces chart 114.01. Comparison stars X and E are dropped and comparison stars G and H have been added to ensure the sequence covers the full range of W Tri. The new V sequence is taken from Tycho.

097.02 SS Vir
A new 6 degree field chart replaces chart 097.01. There are no changes to the selection of comparison stars, but the sequence now consists of V measures from Tycho.

098.02 SW Vir
A new 9 degree field chart replaces chart 098.01. Comparison stars C and E are dropped. The new V sequence is taken from Tycho and corrects an erroneous value previously given for comparison star F.

Note:

During the preparation of the above charts the following errors were noted in the Millennium Star Atlas:

1. V564 Per has an artificially large variable star symbol.
2. RV Tau is not labelled as a variable star.
3. W Tri has an artificially large variable star symbol.
4. AH Tri has an artificially large variable star symbol.
5. SS Vir is not labelled as a variable star.

EnootnhoJ@aol.com

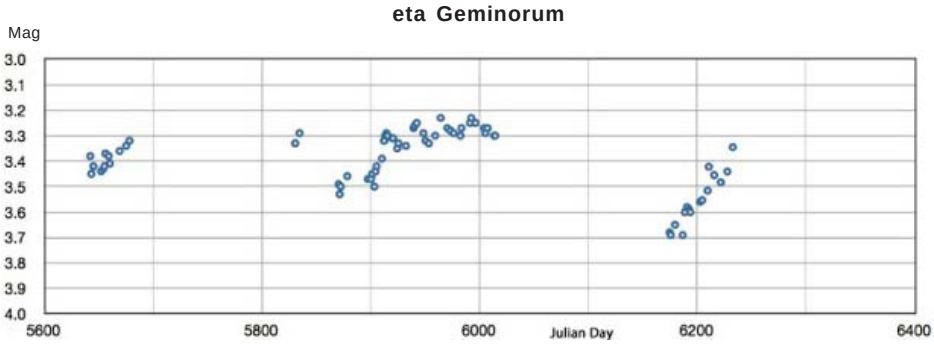
ECLIPSING BINARY NEWS

DES LOUGHNEY

Eta Geminorum

At the time of writing (early November 2012) observations seem to show that the eclipse minimum occurred around the end of August. Since that time the system has been slowly brightening with measurements perhaps illustrating the 20 day period (out of eclipse) pulsation of around 0.1 magnitude. Visual observations in August 2012 indicate fading during most of that month though observations were difficult as the system was low in the pre dawn sky in the east.

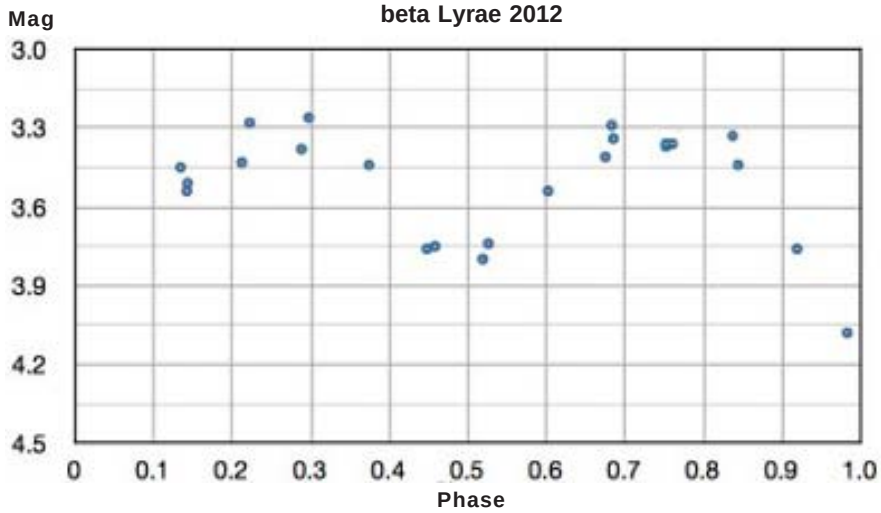
Below are the DSLR measurements from JD 2455600.



All observations seem to suggest that the eclipse has not taken place as predicted. Mid eclipse had been predicted for the start of October whereas it occurred at the end of August. It is too early to state when the eclipse will have ended. Observations should continue, until observing becomes impossible in the summer of 2013, so that we can be more certain of the out of eclipse variations.

Beta Lyrae

Following the article in VSSC 153, DSLR measurements of the Beta Lyrae system were started from 5 September 2012. The diagram below illustrates the measurements. There have been enough measurements to illustrate the light curve of a Class B Eclipsing Binary (a pair of stars that are semi-detached), but not enough measurements around either primary minimum or secondary minimum to make any determination of the period (and whether it has changed). This is because there have not been enough clear nights to obtain the necessary measurements.



CAPAS (Congres Amateurs Professionales Astrophysique Stellaire)

I attended this conference in Rodez, France, which was held between 28th September and 1st October 2012. I was interested in the GEOS RR Lyr Survey, but particularly the sessions on Eclipsing and Spectroscopic Binaries. The slides and abstracts of these sessions can be examined on: *http://rr-lyr.ast.obs-mip.fr/capas2012/article_0001.en.php*

There was a presentation by Oleg Malkov of the Institute of Astronomy, Moscow, on the 'Classification of eclipsing binaries: extreme and unusual systems'. The abstract for this presentation is:

"We have compiled a catalogue of eclipsing binaries, containing some 7200 systems. It is the largest catalogue, containing classified eclipsing binaries. We have also developed a procedure for the classification of eclipsing binaries. In this talk I present data on several eclipsing binaries, which can not be classified. Observational data for them are too contradictory. Additional observations are needed to attribute them to one or another class, or, perhaps, new classes should be introduced to find their places in the evolutionary scheme. Such observations can be made both by professional and by amateur astronomers."

Malkov listed the systems that are worth examining. The full list can be seen as part of his slides on the CAPAS website. What might be of interest to us in the UK are the systems RT Lac, AO Cas, OW Gem and CQ Cep. There will be more about these systems in future editions of the VSSC. It might well be worth, in the meantime, looking at CQ Cep which is circumpolar from the UK and is continously in eclipse. It has an out of eclipse magnitude of around 9, a period of about 1.64 days, and a primary minimum of 0.5 magnitude in depth and a secondary minimum of 0.4 magnitude in depth. It can just be tackled visually though it is a good target for DSLR photometry.

It is a strange system because both stars are of about 21 solar masses. The primary is a Wolf-Rayet star. Both stars produce strong stellar winds which result in an asymmetrical light curve. The primary star is now of less mass than the secondary star because it has ejected so much of its hydrogen outer layers via its stellar wind.

The brightest known star is a Wolf Rayet star (R136a1) of 265 solar masses with a luminosity of 8.7 million solar luminosities.

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OBSERVING BRIGHT RR LYRAE STARS

Des Loughney and Jean-François Le Borgne

At the CAPAS conference held in Rodez, France, from 28th September to 1st October 2012, a presentation was made on the 'GEOS RR Lyrae Survey' by Jean-François Le Borgne (Institute of Research in Astrophysics and Planetology, Toulouse, France; and GEOS – European Group for the Observation of Variable Stars).

It was hoped that BAA VSS observers would help in this survey. Below are some details of the observing campaign.

JEAN-FRANÇOIS LE BORGNE

http://rr-lyr.ast.obs-mip.fr/dokuwiki/doku.php?id=bright_rrlyr

Jean-François Le Borgne
(c) Association Andromède 4A - CAPAS 2012

Observing procedure

The aim of the proposed observations is to determine the time of maximum of RR Lyr stars to be included in the GEOS RR Lyr database, contributing to the study of the long term period variation of these stars.

RR Lyr stars are relatively short period pulsating stars. Their typical period is 12 hours, and the rise of the light curve before maximum is about 2 hours. To determine times of maximum we need to have enough magnitude measurements before and after the maximum. We recommend to start observing a couple of hours before the maximum and to end a couple of hours after. A good time sampling is a measurement every 5 minutes, at least, and no more than 10 minutes, at least in the fast rising branch of the light curve.

Observations may be done using CCD, DSLR, or be visual measurements. If possible, the use of filters (BVR, for example) is recommended, but not mandatory. Please send reports to Jean-François Le Borgne < *jean-francois.leborgne@irap.omp.eu* > or Jacqueline Vandenbroere < *j.vandenbroere@skynet.be* >. Visual measurement reports should be sent to Jacqueline. For CCD and DSLR observations, reports should contain the list of measurements with Julian day (**NOT** heliocentric JD), difference of magnitude with comparison star, uncertainty of measurement, and difference of magnitude of check star with comparison star. A list of suggested comparison and check stars are given on page 15. Reported JD times should be given with 5 decimal digits, and CCD or DSLR difference magnitudes with 3 decimal digits. Reports of visual observations should contain the list of measurements with Julian day and magnitude estimate. Reports may be excel files (or libre Office files) or plain text files.

ToMs are determined by Jean-François or Jacqueline and published in a GEOS circular (otherwise requested by observer) in addition to be included in the database. There is no exclusivity requested for these data on bright RR Lyr stars. Data may be archived in BAA or AAVSO databases.

Comparison stars

List of comparison stars suggested to use. They are chosen not too far from the variable stars, and with colours close to the one of the target stars, the spectral types of which are A-F. If comparison and check stars of the variable star you are observing are missing in the table, or if the stars in the table are not suitable for your instrument, please contact Jean-François (*jean-francois.leborgne@irap.omp.eu*). You may also choose the comparison and check stars your self, looking for A or F stars if possible.

				Comp. star coordinates					Check star coordinates	
Target	**Comp. star**	**Sp.**	**V**	**RA (J2000)**	**DEC (J2000)**	**Check star**	**Sp.**	**V**	**RA (J2000)**	**DEC (J2000)**
X Ari	TYC 651-258-1	G0	8.02	03 05 03.5181	+10 47 23.498	TYC 651-48-1	F8	9.75	03 05 17.4752	+10 18 30.420
RS Boo	TYC 2553-1142-1	G0	9.86	14 32 21.6088	+31 38 06.313	TYC 2553-607-1	G5	10.7	14 32 28.9220	+31 43 30.490
ST Boo	TYC 2567-1055-1	F0	9.14	15 29 50.9824	+34 44 10.892	TYC 2570-1483-1	F8	8.96	15 30 42.1421	+35 10 07.765
TW Boo	TYC 3046-611-1	F8	9.93	14 43 49.5734	+40 57 20.301	TYC 3046-598-1	F0	9.92	14 44 58.0068	+40 28 08.625
W CVn	TYC 2551-515-1	F8	8.88	14 06 39.8351	+37 15 41.953	TYC 2551-64-1	F5	9.46	14 05 41.2706	+37 27 12.348
S Com	TYC 1991-1733-1	F3V	9.04	12 32 20.5651	+26 46 49.772	TYC 1991-1710-1	F6	9.7	12 33 16.7622	+27 14 23.182
SU Dra	TYC 4392-1551-1	F0	8.23	11 40 31.569	+67 35 50.86	TYC 4159-1008-1	A3	8.95	11 35 13.3157	+67 11 04.430
SW Dra	TYC 4397-1341-1	F8	9.12	12 18 13.7845	+70 05 57.329	TYC 4393-1419-1	F5	9.73	12 13 41.9799	+69 09 27.421
RR Gem	TYC 2452-2070-1	A0	9.37	07 21 40.4199	+30 52 23.852	TYC 2452-1748-1	F5	8.66	07 22 17.3910	+30 52 02.994
RR Leo	TYC 1968-649-1	F0	9.7	10 07 36.8723	+23 44 07.786	TYC 1968-817-1	F8	10.05	10 04 49.9091	+23 30 13.236
TT Lyn	TYC 3424-161-1	A3	9.18	09 01 56.1948	+45 08 14.358	TYC 2989-1720-1	F8	9.75	09 04 01.1322	+44 49 12.259
RR Lyr	TYC 3142-00213-1	B9	7.57	19 27 24.4214	+42 13 45.464	TYC 3142-01187-1	A2	8	19 26 05.4968	+42 19 34.312
AR Per	TYC 3332-1582-1	A3	8.82	04 18 44.0875	+46 53 28.092	TYC 3333-29-1	A2	9.16	04 19 44.2635	+46 54 55.483
RV UMa	TYC 3850-1142-1	G5	9.38	13 35 34.8805	+54 20 52.396	TYC 3850-1262-1	G5	9.57	13 34 32.8318	+54 11 30.336
TU UMa	TYC 1984-495-1	F8V	8.9	11 30 24.5582	+29 53 03.391	TYC 1984-207-1	F2V	9.16	11 27 42.4926	+29 49 25.538

The suggested list of comparison stars are chosen for their proximity to the variable stars, with colours close to the target stars, the spectral types of which are A-F.

Short list of stars brighter than ~11.5 at minimum from the northern hemisphere.

This list contains a few RR Lyrae stars observable in January, February and March 2013.
Magnitudes at maximum and minimum are given in Johnson V filter. Periods are in days. Right ascensions are in Hms, declinations in °′″, for J2000.0 equinox and epoch. These data are extracted from GCVS, 2011 internet edition.

Star	RA (J2000)	DEC (J2000)	mag. Max.	mag. Min.	JD origin	Period
X Ari	03 08 30.88	+10 26 45.2	8.97	9.95	2453739.376	0.651169
RS Boo	14 33 33.21	+31 45 16.6	9.63	10.88	2448500.337	0.377339
ST Boo	15 30 39.23	+35 47 4.3	10.49	11.41	2419181.486	0.622290687
W CVn	14 06 27.98	+37 49 41.5	10.03	10.96	2421402.4238	0.551759337
SU Dra	11 37 56.60	+67 19 47.0	9.18	10.27	2454928.473	0.660425
SW Dra	12 17 46.63	+69 30 38.2	9.94	10.94	2455282.372	0.56967214
RR Leo	07 43.45	+23 59 30.3	9.94	11.27	2454913.410	0.4524025
TT Lyn	09 03 07.78	+44 35 08.1	9.42	10.21	2455203.446	0.5974305
AR Per	04 17 17.19	+47 24 00.6	9.92	10.83	2454743.605	0.4255505
TU UMa	11 29 48.49	+30 04 02.4	9.26	10.24	2442831.4947	0.5576587
RV UMa	13 33 18.09	+53 59 14.6	9.81	11.3	2445075.511	0.46806

There is more information on VTT Experiments on wiki page < *http://rr-lyr.ast.obs-mip.fr/dokuwiki/doku.php?id=vtt_experiments* > and in GEOS internal publications: GEOS Note Circulaire num. 1105 describing the VTT experiment (in French), note on observation of RR Lyr stars at magnitude 9 to 12 with a VTT (in English and French)

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RY CAMELOPARDALIS LIGHT CURVES

MELVYN TAYLOR

This star is well worth observing. It is a 'good' SRB object and circumpolar at:

RA 04h 31m Dec. +64° 26' (2000); 7.3-9.4 magnitude, SRB, 136d (GCVS).

The light curves give a favourable impression of a typical semi-regular variable, its spectrum is M3III with a B-V (TYC) of +1.91. The plots are visual magnitude against Julian Dates covering the interval from 1971 to 1994, the estimates are from the BAAVSS database. Varying from a mean maximum of 7.7 to 9.1 magnitude the overall average period is found to be 138d from this data. The mean magnitude was 8.5 (s.d. 0.30). The chart has hardly been found to need revision and has a date (no sequence number) of 1972 Jul 29. Other variables on the chart include programme objects ZZ Cam and UV Cam. The field is not an easy one to find initially.

Observers

A Good, A J Hollis, B H Granslo, B Jobson, C M Allen, C Pezzarossa, D A Pickup, D A Rothery, D Hufton, D M Swain, E J W West, E Spooner, G K Broadbent, G M Hurst, G Ramsey, I A Middlemist, J D Wise, J E Isles, J Toone, K West, L McCalman, L R Matthews, M A Hapgood, M A Hather, M Beveridge, M Currie, M D Taylor, M Poxon, N Reid, P Mcgenity, P Mettam, P Quadt, P R Clayton, P W Hornby, R B I Fraser, S Johnston, S W Albrighton, T Brelstaff, T Gough, T Hoare, T Markham, T Tanti, V J Freeman, W J Worraker.

Figure 1.

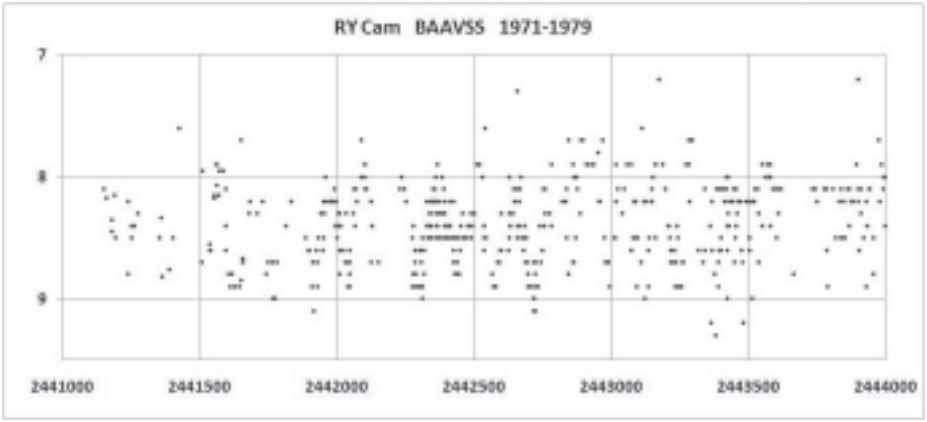


Figure 2

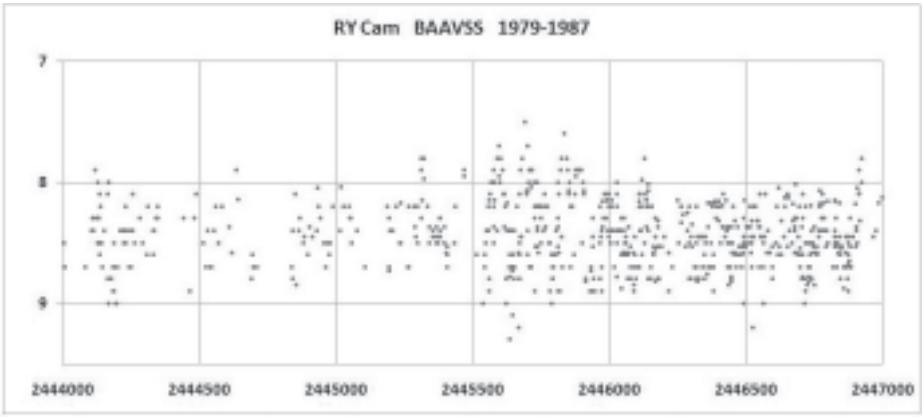
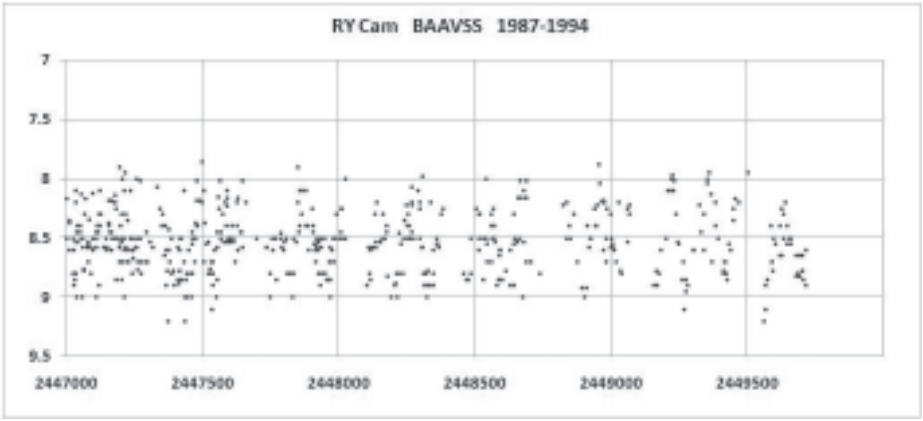


Figure 3



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THE TRANSFORMATION COEFFICIENT FOR THE CANON 550D DSLR.

DES LOUGHNEY

In a previous article on DSLR Transformation Coefficients, published in VSSC 140 (June, 2009), it was noted that the Transformation Coefficient of a Canon 450D DSLR was 0.15. Knowing this Coefficent, allowed the estimation of the Johnson V magnitude of a star from the green channel data obtained from that star, and analysed by AIP4WIN.

In the summer of 2012 I obtained a Canon 550D DSLR and decided to determine its

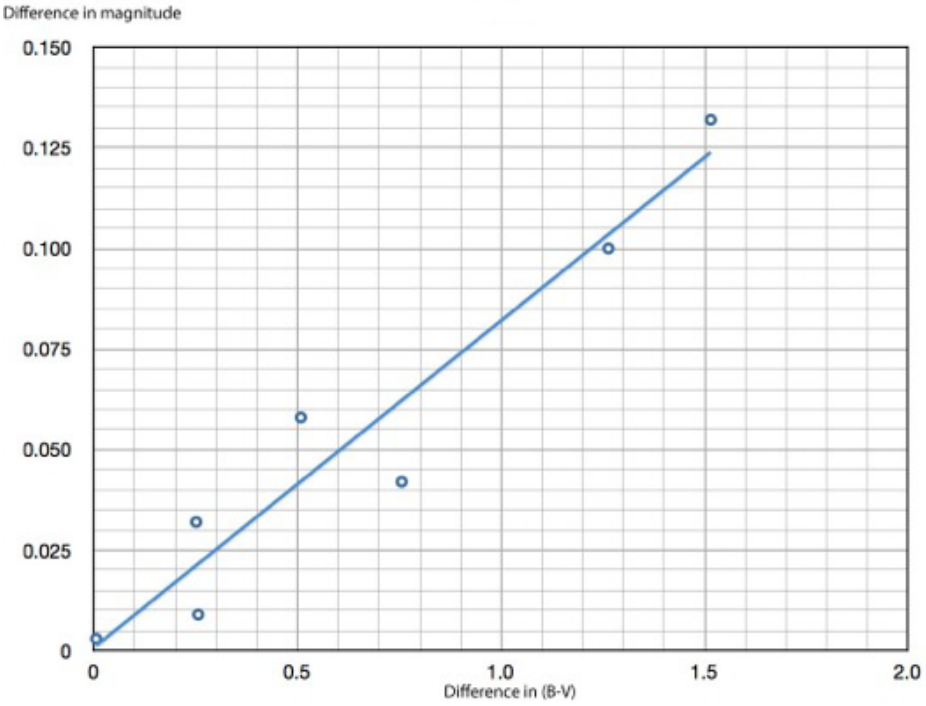
Transformation Coefficent (TC) using the green channel data obtained with the latest version of AIP4WIN (version 2.4.0).

The methodology of obtaining the TC is to compare a set of unvarying stars over a range of (B-V) colour indices. The predicted V magnitude differences between the stars is compared with the actual green channel magnitude differences. The difference between predicted and actual magnitudes is then plotted against the (B-V) colour indices of each set of compared stars. This allowed the estimation of the Transformation Coefficient of the Canon 550D camera which turned out to be 0.08.

The five stars compared were all close together in the constellation Auriga. They were:

HIP 25048 [ρAur]	5.22V and (B-V) of -0.129
HIP 24902	5.46V and (B-V) of +0.122
HIP 25143	5.54V and (B-V) of +0.127
HIP 24813	4.69V and (B-V) of +0.630
HIP 24771	6.22V and (B-V) of + 1.386

Fifty images of these stars were obtained using the Canon 550D with a Canon 100mm lens, and settings of exposure 5 seconds, ISO 800 and f4. The images were analysed with AIP4WIN in five stacks of ten. Relative magnitudes were measured using the green channel data. In the figure below the difference between the predicted magnitude difference and the measured magnitude difference forms the x axis. On the y axis forms the difference between the (B-V) colour indices of the compared stars. Within a spreadsheet the magnitude difference for a particular (B-V) difference was plotted on the chart illustrated below.



The line was calculated by a spreadsheet function. The points that were taken into account in plotting the straight line were not expected to fall exactly on the line. For this to happen the V magnitudes of the five stars and their (B-V) colour indices would have to be accurate, or to be unchanged since the time they were measured by Hipparcos. Another reason for departures from the straight line is that the five stars are not completely unvarying. Hipparcos states that all may vary by up to 0.02 magnitude, with the exception of HIP25143 which can vary by 0.03 magnitude.

In the previous 2009 article it was stated that the correction to the green channel magnitude of P Cygni was 0.05. Thus a green channel magnitude of 4.830 was corrected to 4.780. Using the Canon 550D and the newly determined TC the correction is 0.029 magnitude.

11th November 2012
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* * *

CAPAS 2012, RODEZ

(SCRAP BOOK)

JANET SIMPSON

Laurent Corp and the Andromèda 4A association are to be congratulated for the success of their first international congress of stellar astrophysics for amateurs and professionals. There were over 60 participants from eight countries: France, Belgium, Russia, Tunisia, Spain, Italy, USA, and UK.

With 'CAPAS Abstracts' already printed in VSSC 151, and VSSC 153 I feel we have already covered much of the content of this meeting. In addition, slides of many of the talks can now be downloaded from < *http://rr-lyr.ast.obs-mip.fr/capas2012/article_0001.en.php* > and photographs of the conference can be found on < *http://www.astrosurf.com/andromede/capas-suite/* >.

Laurent Corp,
Chairman of Andromeda 4A.
(c) Association Andromède 4A

The meeting was a chance for us to see what is going on outside the UK and to find opportunities for amateurs and professionals to work together. The general public were not forgotten with two lectures scheduled for them on Friday, and Saturday evenings, which we were also welcome to attend.

There were various exhibition booths and stands in the Conference hall. Andromedae 4A displayed their work results and telescope images. Shelyac had examples of spectrographs they have designed, with information and advice. It was also a good chance to purchase a copy of the EAS, EDP Sciences publication "Astronomical Spectroscopy for Amateurs" from Olivier Thizy. GEOS (European Group Stellar Observation), displayed their research results, and the BAA VSS put up a poster display of their new database.

Group Photograph CAPAS 2012

(c) Association Andromède 4A

CAPAS T -Shirt

On Sunday afternoon we had an outing to the Musée Fenaille, principally to see the collection of Neolithic/Copper Age statue Menhirs from Aveyron which are about 2500 - 3000 BC, and are representative of both male and female forms. The finest is Dame de Saint-Sernin. We had an excellent tour guide, who spoke French, which was beautifully translated into English by Danielle Feniou.

Dame de Saint-Sernin.
S. Waterman

(c) Association Andromède 4A

Olga Kiyaeva (Pulkovo observatory, St Petersbourg Russia) spoke of "Dynamic investigations of visual double and multiple stars based on 50 years of observations from the Pulkova observatories 26 inch refractor."

Des Loughney and the Lost Dog.

Photo - S. Waterman

We were intrigued to see several statues of dogs in Rodez which turned out to be 'Lost Dogs' by the artist Aurèle Ricard. These were part of an exhibit which was on from 25th June until 30th September! In the photo of Des and the Lost Dog, three of six small yellow lost dogs can be seen on the Musee Denys-Puech behind.

Sunday Afternoon

Photo - S. Waterman

Rémi Cabanac (Professional astronomer, IRAP, France, and Honorary President of Association Andromède 4A) spoke about 'Supernovae, the explosive death of the stars'. **Laurent Corp** (GEOS, AAVSO, BAAVSS) spoke of 'The state of eclipsing binary observations by amateurs' and **James Lequeux** (Astronomer Emeritus, Observatory of Paris) on the 'Life and death of stars, and the Evolution of binary massive stars'.

BINOCULAR PRIORITY LIST

MELVYN TAYLOR

(Includes *XX Cam*, *Mira*, *R CrB*, and *R Hya* which are also on the telescopic programme)

Variable		RA (2000) Dec	Range	Type	Period	Chart	Prog
AQ	***And***	00 28 +35 35	8.0-8.9	SR	346d	303.01	
EG	***And***	00 45 +40 41	7.1-7.8	ZAnd		072.02	
V	***Aql***	19 04 -05 41	6.6-8.4	SRb	353d	026.04	
UU	***Aur***	06 37 +38 27	5.1-6.8	SRb	234d	230.02	
AB	***Aur***	04 56 +30 33	6.7-8.4	Ina		301.01	
V	***Boo***	14 30 +38 52	7-12	Sra	258d	037.01	
RW	***Boo***	14 41 +31 34	7.4-8.9	SRb	209d	104.01	
RX	***Boo***	14 24 +25 42	6.9-9.1	SRb	160d	219.01	
ST	***Cam***	04 51 +68 10	6.0-8.0	SRb	300d?	111.02	
XX	***Cam***	04 09 +53 22	7.3-9.7	RCB		068.01	T/B
X	***Cnc***	08 55 +17 04	5.6-7.5	SRb	195d	231.01	
RS	***Cnc***	09 11 +30 58	5.1-7.0	SRc	120d?	269.01	
V	***CVn***	13 20 +45 32	6.5-8.6	SRa	192d	214.02	
WZ	***Cas***	00 01 +60 21	6.9-8.5	SRb	186d	1982Aug16	
V465	***Cas***	01 18 +57 48	6.2-7.8	SRb	60d	233.01	
γ	***Cas***	00 57 +60 43	1.6-3.0	GCAS		064.01	
Rho	***Cas***	23 54 +57 29	4.1-6.2	SRd	320d	064.01	
W	***Cep***	22 37 +58 26	7.0-9.2	SRc		312.01	
AR	***Cep***	22 52 +85 03	7.0-7.9	SRb		1985May06	
Mu	***Cep***	21 44 +58 47	3.4-5.1	SRc	730d	112.01	
O	***Cet***	02 19 -02 59	2.0-10.1	M	332d	039.02	T/B
R	***CrB***	15 48 +28 09	5.7-14.8	RCB		041.04	T/B
W	***Cyg***	21 36 +45 22	5.0-7.6	SRb	131d	062.03	
AF	***Cyg***	19 30 +46 09	6.4-8.4	SRb	92d	232.01	
CH	***Cyg***	19 25 +50 15	5.6-10.5	ZAnd+SR	97	089.03	
U	***Del***	20 46 +18 06	5.6-7.9	SRb	110d?	228.01	
EU	***Del***	20 38 +18 16	5.8-6.9	SRb	60d	228.01	
TX	***Dra***	16 35 +60 28	6.6-8.4	SRb	78d?	106.02	
AH	***Dra***	16 48 +57 49	7.0-8.7	SRb	158d	106.02	
NQ	***Gem***	07 32 +24 30	7.4-8.0	SR+ZAnd	70d?	077.01	
X	***Her***	16 03 +47 14	6.1-7.5	SRb	95d	223.01	
SX	***Her***	16 08 +24 55	8.0-9.2	SRd	103d	113.01	
UW	***Her***	17 14 +36 22	7.0-8.8	SRb	104d	107.01	
AC	***Her***	18 30 +21 52	6.8-9.0	RVA	75d	048.03	
IQ	***Her***	18 18 +17 59	7.0-7.5	SRb	75d	048.03	
OP	***Her***	17 57 +45 21	5.9-7.2	SRb	120d	1984Apr12	
R	***Hya***	13 30 -23 17	3.5-10.9	M	389d	049.02	T/B
RX	***Lep***	05 11 -11 51	5.0-7.4	SRb	60d?	110.01	
Y	***Lyn***	07 28 +45 59	6.5-8.4	SRc	110d	229.01	
SV	***Lyn***	08 84 +36 21	6.6-7.9	SRb	70d?	108.03	
U	***Mon***	07 31 -09 47	5.9-7.9	RVB	91d	029.03	
X	***Oph***	18 38 +08 50	5.9-9.2	M	328d	099.01	
BQ	***Ori***	05 57 +22 50	6.9-8.9	SR	110d	295.01	

Variable		RA (2000) Dec	Range	Type	Period	Chart	Prog
AG	***Peg***	21 51 +12 38	6.0-9.4	Nc		094.02	
X	***Per***	03 55 +31 03	6.0-7.0	GCas+Xp		277.01	
R	***Sct***	18 48 -05 42	4.2-8.6	RVA	146d	026.04	
Y	***Tau***	05 46 +20 42	6.5-9.2	SRb	242d	295.01	
W	***Tri***	02 42 +34 31	7.5-8.8	SRc	108d	114.01	
Z	***UMa***	11 57 +57 52	6.2-9.4	SRb	196d	217.02	
ST	***UMa***	11 28 +45 11	6.0-7.6	SRb	110d?	102.02	
VY	***UMa***	10 45 +67 25	5.9-7.0	Lb		226.01	
V	***UMi***	13 39 +74 19	7.2-9.1	SRb	72d	101.02	
SS	***Vir***	12 25 +00 48	6.9-9.6	SRa	364d	097.01	
SW	***Vir***	13 14 -02 48	6.4-8.5	SRb	150d?	098.01	

Updated 7th February 2010, M.T.

* * *

ECLIPSING BINARY PREDICTIONS

DES LOUGHNEY

The following predictions, based on the latest Krakow elements, should be usable for observers throughout the British Isles. The times of mid-eclipse appear in parentheses, with the start and end times of visibility on either side. The times are hours UT, with a value greater than '24' indicating a time after midnight. 'D' indicates that the eclipse starts/ends in daylight; 'L' indicates low altitude at the start/end of the visibility, and '<<' indicates that mid eclipse occurred on an earlier date/time.

Please contact the EB secretary if you require any further explanation of the format.

The variables covered by these predictions are :

RS CVn	7.9 - 9.1V	AI Dra	7.2 - 8.2	U Sge	6.45 - 9.28V
TV Cas	7.2 - 8.2V	Z Vul	7.25 - 8.90V	RW Tau	7.98 - 11.59V
U Cep	6.8 - 9.4	Z Dra	10.8 - 14.1p	HU Tau	5.92 - 6.70V
U CrB	7.7 - 8.8V	TW Dra	8.0 - 10.5v	X Tri	8.88 - 11.27V
SW Cyg	9.24 - 11.83V	S Equ	8.0 - 10.08V	TX Uma	7.06 - 8.80V
V367 Cyg	6.7 - 7.6V	Z Per	9.7 - 12.4p	Del Lib	4.9 - 5.9
Y Psc	10.1 - 13.1	SS Cet	9.4 - 13.0	RZ Cas	6.3 - 7.9

Note that predictions for Beta Per and Lambda Tau can be found in the BAA Handbook.

For information on other eclipsing binaries see the website:
http://www.as.ap.krakow.pl/o-c/index.php3

Again please contact the EB secretary if you have any queries about the information on this site and how it should be interpreted.

JANUARY

2013 Jan 1 Tue
TV Cas....00(04)07D
del Lib.....(05)07D
U Cep.....D17(13)18
RW Tau....D17(14)19
RZ Cas.....D17(19)22
HU Tau.....21(25)28L
X Tri.....23(26)27L

2013 Jan 2 Wed
Z Vul.....05(11)07D
U Sge.....L06(09)07D
SS Cet.....D17(16)21
AI Dra.....D17(17)18
TV Cas.....20(24)28
TW Dra....21(26)31D
RZ Cas.....21(24)26
TX UMa..22(26)31D
RS CVn.....L22(24)30
X Tri.....22(25)26L
SW Cyg.....24(30)24L

2013 Jan 3 Thu
SW Cyg..L02(06)07D
del Lib.....07(13)07D
Y Psc.....D17(15)20
Z Dra.....D17(18)20
AI Dra.....20(22)23
U Cep.....20(25)30
X Tri.....22(24)26L
HU Tau.....23(27)28L

2013 Jan 4 Fri
U CrB.....L00(00)06
RZ Cas.....02(04)07
RW Tau.....04(09)05L
TV Cas.....D17(19)24
Z Vul.....D17(22)20L
X Tri.....21(24)26

2013 Jan 5 Sat
Z Dra.....00(03)05
AI Dra.....01(02)04
RZ Cas.....07(09)07D
Z Per.....D17(13)18
SS Cet.....D17(16)21
U Sge.....D17(18)19L
TW Dra....D17(22)27
X Tri.....20(23)25
TX UMa..23(28)31D

2013 Jan 6 Sun
HU Tau.....00(04)04L
AI Dra.....06(07)07D
U Cep.....D17(13)18
TV Cas.....D17(15)19
X Tri.....20(22)25
RW Tau.....23(27)28L

2013 Jan 7 Mon
Z Vul.....L05(08)07D
U CrB.....05(11)07D
S Equ.....D17(12)18
RZ Cas.....D17(19)21
SW Cyg...D17(20)24L
Z Dra.....17(20)22
X Tri.....19(22)24
RS CVn.....L21(19)26

2013 Jan 8 Tue
HU Tau.....01(05)04L
del Lib.....L04(05)07D
TV Cas.....06(10)07D
Z Per.....D17(14)19
SS Cet.....D17(15)20
AI Dra.....D17(17)18
TW Dra.....D17(17)22
X Tri.....18(21)23
U Cep.....20(25)30
RZ Cas.....21(23)26

2013 Jan 9 Wed
TX UMa...01(05)07D
Z Dra.....02(04)07
U Sge.....L05(03)07D
Z Vul.....D17(19)19L
RW Tau.....D17(22)26
X Tri.....18(20)23
AI Dra.....20(21)23

2013 Jan 10 Thu
RZ Cas.....02(04)06
TV Cas.....02(06)07D
HU Tau.....03(07)04L
V367Cyg.L04(43)07D
del Lib.....06(13)07D
X Tri.....D17(19)22
V367Cyg.D17(43)22L
S Equ.....17(23)19L
U CrB.....L24(22)27

2013 Jan 11 Fri
AI Dra.....01(02)04
V367Cyg..L04(19)07D
RZ Cas.....06(09)07D
TW Dra.....D17(12)17
U Cep.....D17(13)17
SS Cet.....D17(15)19
Z Per.....D17(15)20
X Tri.....D17(19)21
V367Cyg..D17(19)22L
Z Dra.....19(22)24
TV Cas.....21(25)30

2013 Jan 12 Sat
TX UMa....02(07)07D
SW Cyg.....03(09)07D
V367Cyg.L04(<<)07D
Z Vul.....L05(06)07D
AI Dra.....06(07)07D
U Sge.....07(12)07D
V367Cyg.D17(<<)22L
U Sge.....D17(12)18
RW Tau.....D17(16)21
X Tri.....D17(18)21

2013 Jan 13 Sun
Z Dra.....04(06)07D
V367Cyg.L04(<<)07D
X Tri.....D17(17)20
RZ Cas.....D17(18)20
TV Cas.....D17(21)25
U Cep.....20(25)29

2013 Jan 14 Mon
U CrB.....03(08)07D
TW Dra.....03(08)07D
SS Cet.....D17(14)19
AI Dra.....D17(17)18
X Tri.....D17(17)19
Z Per.....D17(17)22
Z Vul.....D17(17)19L
Y Psc.....18(22)21L
RZ Cas.....20(23)25

2013 Jan 15 Tue
del Lib.....L03(04)07D
TX UMa....04(08)07D
X Tri.....D17(16)19
TV Cas.....D17(16)21
U Sge.....D17(22)18L
AI Dra.....20(21)23
Z Dra.....21(23)26

2013 Jan 16 Wed
RZ Cas.....01(03)06
X Tri.....D17(15)18
SW Cyg...D17(23)23L
TW Dra.....22(27)31D

2013 Jan 17 Thu
AI Dra.....01(02)03
SW Cyg.....L01(<<)05
RS CVn.....03(10)07D
Z Vul.....L04(04)07D
Z Dra.....05(08)07D
RZ Cas.....06(08)07D
del Lib.....06(12)07D
SS Cet.....D17(13)18
Z Per.....D17(18)23
S Equ.....D17(20)18L
U CrB.....L23(19)25

2013 Jan 18 Fri
RW Tau.....00(05)04L
TX UMa...05(10)07D
AI Dra.....06(07)07D
Z Dra.....D17(16)19
Y Psc.....D17(17)21
U Cep.....19(24)29

2013 Jan 19 Sat
TV Cas.....03(07)07D
U Sge.....L05(07)07D
Z Vul.....D17(15)19L
RZ Cas.....D17(17)20
TW Dra.....17(23)28
Z Dra.....23(25)27

2013 Jan 20 Sun
AI Dra.....D17(16)18
Z Per.....D17(20)24
RW Tau.....19(23)27L
RZ Cas.....20(22)24
TV Cas.....23(27)31D

2013 Jan 21 Mon
U CrB.....00(06)07D
TX UMa...07(11)07D
SW Cyg.....D17(13)19
AI Dra.....20(21)22
RS CVn.....22(29)31D

2013 Jan 22 Tue
RZ Cas.....00(03)05
del Lib.....L03(04)07D
Z Vul.....L04(02)07D
HU Tau.....D17(15)19
U Sge.....D17(16)18L
TW Dra.....D17(18)23
Z Dra.....D17(18)21
TV Cas.....18(22)27

2013 Jan 23 Wed
AI Dra.....01(02)03
RZ Cas.....05(07)07D
RW Tau.....D17(18)23
Z Per.....D17(21)26
U Cep.....19(24)29
2013 Jan 24 Thu
Z Dra.....00(03)05
AI Dra.....05(07)07D
del Lib.....06(12)07D
Z Vul.....D18(13)18
TX UMa...D18(13)18
HU Tau.....D18(16)20
S Equ.....D18(17)18L
TV Cas.....D18(18)22
2013 Jan 25 Fri
TW Dra.....D18(13)18
RZ Cas.....D18(17)19
SW Cyg.....21(27)23L
2013 Jan 26 Sat
SW Cyg...L01(03)07D
U Sge.....L04(01)07
TV Cas.....D18(14)18
HU Tau.....D18(17)21
Z Dra.....D18(20)22
Z Per.....D18(22)27
RZ Cas.....19(22)24
RS CVn.....L20(24)30
2013 Jan 27 Sun
Z Vul.....L04(00)05
TX UMa...D18(14)19
AI Dra.....20(21)22
U CrB.....L23(28)31D
RZ Cas.....24(26)29
2013 Jan 28 Mon
Z Dra.....02(04)07D
TW Dra.....04(09)07D
TV Cas.....05(09)07D
HU Tau.....D18(19)23
V367Cyg.D18(58)21L
U Cep.....19(24)28
2013 Jan 29 Tue
AI Dra.....00(02)03
RW Tau.....02(07)03L
del Lib.....L02(04)07D
V367Cyg.L03(34)07D
U Sge.....04(10)07D
RZ Cas.....04(07)07D
Z Vul.....05(11)07D
V367Cyg.D18(34)21L
Z Per.....19(24)28L
Y Psc.....19(24)20L

2013 Jan 30 Wed
TV Cas.....00(05)07D
V367Cyg..L03(10)07D
AI Dra.....05(07)07D
V367Cyg..D18(10)21L
TX UMa.....D18(16)21
SW Cyg....D18(16)22L
HU Tau.....D18(20)24
Z Dra.....19(22)24
TW Dra.....23(28)31D
2013 Jan 31 Thu
V367Cyg.L03(<<)07D
del Lib.....05(11)07D
U Cep.....07(11)07D
V367Cyg..D18(<<)21L
RZ Cas.....D18(16)19
Z Vul.....D18(22)18L
RS CVn.....L20(19)25
TV Cas.....20(24)28
RW Tau.....21(25)27L

February

2013 Feb 1 Fri
V367 Cyg....L03(<<)06
Z Dra.....04(06)07D
HU Tau.....D18(21)25
RZ Cas.....19(21)23
Z Per.....20(25)27L
2013 Feb 2 Sat
TX UMa.....D18(17)22
Y Psc.....D18(18)20L
TV Cas.....D18(20)24
TW Dra.....18(23)28
U Cep.....18(23)28
AI Dra.....20(21)22
RZ Cas.....23(26)28
2013 Feb 3 Sun
Z Vul.....03(09)07D
RW Tau.....D18(20)24
HU Tau.....19(23)26L
Z Dra.....21(23)26
U CrB.....L22(26)30D
X Tri.....24(26)24L
2013 Feb 4 Mon
SW Cyg.....00(06)06D
AI Dra.....00(02)03
RZ Cas.....04(06)06D
TV Cas.....D18(15)19
Z Per.....21(26)27L
X Tri.....23(26)24L

2013 Feb 5 Tue
del Lib...L02(03)06D
U Sge.....L04(04)06D
AI Dra.....05(06)06D
Z Dra.....06(08)06D
U Cep.....06(11)06D
TW Dra....D18(19)24
TX UMa..D18(19)24
RS CVn....L20(14)20
HU Tau.....20(24)26L
X Tri.....23(25)24L
2013 Feb 6 Wed
TV Cas.....06(11)06D
RW Tau....D18(14)19
RZ Cas.....D18(16)18
Z Dra.....D18(16)19
X Tri.....22(24)24L
2013 Feb 7 Thu
del Lib.....05(11)06D
S Equ.....L06(10)06D
RZ Cas.....18(20)23
U Cep.....18(23)28
X Tri.....21(24)24L
HU Tau....22(26)26L
Z Dra.....23(25)27
Z Per.....23(28)27L
2013 Feb 8 Fri
TV Cas....02(06)06D
Z Vul.....L03(06)06D
TW Dra...D18(14)19
SW Cyg.D18(20)22L
TX UMa..D18(20)25
AI Dra.....19(21)22
X Tri.....20(23)24L
RZ Cas.....23(25)27
SW Cyg....L24(20)26
2013 Feb 9 Sat
X Tri.....20(22)24L
TV Cas.....21(26)30
HU Tau.....23(27)26L
2013 Feb 10 Sun
AI Dra.....00(01)03
RS CVn....03(09)06D
RZ Cas.....03(06)06D
U Cep.....06(11)06D
Z Dra.....D18(18)21
X Tri.....19(22)24L
U CrB.....L22(23)29

2013 Feb 11 Mon
Z Per.....00(05)03L
TW Dra.....04(09)06D
AI Dra.....05(06)06D
TV Cas.....D18(21)25
TX UMa...D18(22)27
X Tri.....18(21)23
RW Tau.....22(27)26L
2013 Feb 12 Tue
Z Dra.....00(03)05
HU Tau.....00(04)02L
del Lib.....L01(03)06D
U Sge.....L03(<<)04
X Tri.....D18(20)23
U Cep.....D18(23)27
2013 Feb 13 Wed
Z Vul.....L02(04)06D
SW Cyg.....04(10)06D
TV Cas.....D18(17)21
X Tri.....D18(20)22
RZ Cas.....D18(20)22
TW Dra.....24(29)30D
2013 Feb 14 Thu
Z Per.....02(06)03L
del Lib.....04(11)06D
U CrB.....04(10)06D
S Equ.....L06(07)06D
X Tri.....D18(19)21
Z Dra.....D18(20)22
RW Tau...D18(22)26L
TX UMa.....19(24)28
AI Dra.....19(21)22
RZ Cas.....22(24)27
RS CVn.....22(28)30D
2013 Feb 15 Fri
U Sge.....L03(08)06D
U Cep.....06(10)06D
X Tri.....D18(18)21
2013 Feb 16 Sat
AI Dra.....00(01)03
Z Dra.....02(05)06D
RZ Cas.....03(05)06D
V367 Cyg..04(48)06D
X Tri.....D18(18)20
V367Cyg.D18(48)20L
TW Dra.....19(24)29

2013 Feb 17 Sun
V367Cyg..L02(24)06D
TV Cas.....03(08)06D
AI Dra.....05(06)06D
RW Tau.....D18(16)21
X Tri.....D18(17)19
Y Psc.....D18(20)19L
U Cep.....D18(22)27
SW Cyg....D18(23)21L
V367Cyg..D18(24)20L
TX UMa.....20(25)30
U CrB.....L21(21)27
SW Cyg.....L23(23)29

2013 Feb 18 Mon
V367Cyg..L02(00)06D
Z Vul.....L02(02)06D
V367Cyg..D18(00)20L
X Tri.....D18(16)19
Z Dra.....19(22)24
TV Cas.....23(27)30D

2013 Feb 19 Tue
del Lib.....L01(02)06D
V367Cyg.L02(<<)06D
V367Cyg.D18(<<)20L
RZ Cas.....D18(19)22
TW Dra.....D18(20)25
RS CVn.....L19(24)30

2013 Feb 20 Wed
Z Dra.....04(06)06D
U Cep.....05(10)06D
TV Cas.....18(23)27
AI Dra.....19(20)22
RZ Cas.....22(24)26
TX UMa....22(27)30D

2013 Feb 21 Thu
U CrB.....02(08)06D
del Lib.....04(10)06D
S Equ.....L05(04)06D
Y Psc.....D18(14)19
AI Dra.....24(25)26

2013 Feb 22 Fri
RZ Cas.....02(05)06D
U Sge.....L02(02)06D
SW Cyg.....D18(13)19
TW Dra.....D18(15)20
TV Cas.....D18(18)22
U Cep.....D18(22)27
Z Dra.....21(23)26

2013 Feb 23 Sat
RW Tau.....00(05)01L
Z Vul.....L02(00)05
AI Dra.....05(06)06D
TX UMa..23(28)30D
2013 Feb 24 Sun
Z Dra.....06(08)06D
RS CVn....D18(19)25
U CrB.....L21(19)24

2013 Feb 25 Mon
U Cep.....05(10)06D
TW Dra....05(10)06D
U Sge.....05(11)06D
Z Vul.....05(11)06D
Z Dra.....D18(17)19
RZ Cas.....D18(19)21
RW Tau.....19(23)25L

2013 Feb 26 Tue
del Lib....L00(02)06D
TV Cas.....05(09)06D
AI Dra.....19(20)22
RZ Cas.....21(23)26
SW Cyg.L22(27)30D
Z Dra.....23(25)28

2013 Feb 27 Wed
TX UMa..01(06)06D
U Cep.....D19(22)26
U CrB.....24(29)30D
AI Dra.....24(25)26

2013 Feb 28 Thu
TV Cas.....00(05)06D
TW Dra....01(06)06D
Z Vul.....L01(<<)03
RZ Cas.....02(04)06D
del Lib.....03(10)06D
S Equ.....L05(01)06D
HU Tau....D19(15)19
RW Tau....D19(18)22

March

2013 Mar 1 Fri
AI Dra.....05(06)06D
RS CVn....D19(14)20
Z Dra.....D19(18)21
TV Cas.....20(24)28

2013 Mar 2 Sat
TX UMa...02(07)06D
Z Vul.....03(09)06D
U Cep.....05(09)06D
HU Tau.....D19(16)20
TW Dra.....20(25)30D

2013 Mar 3 Sun
Z Dra 01(03)05
SW Cyg..D19(17)20L
RZ Cas.....D19(18)20
TV Cas.....D19(20)24
U CrB.....L21(16)22
SW Cyg.....L22(17)23

2013 Mar 4 Mon
U Sge.....L02(05)06D
Z Per.....D19(14)19
HU Tau.....D19(18)22
U Cep.....D19(21)26
AI Dra.....19(20)21
RZ Cas.....20(23)25

2013 Mar 5 Tue
del Lib.....L00(01)06D
TX UMa...04(09)06D
TV Cas.....D19(15)19
Z Dra.....19(20)22
TW Dra.....D19(20)25
AI Dra.....24(25)26

2013 Mar 6 Wed
RZ Cas.....01(03)05D
RS CVn.....03(09)05D
HU Tau.....D19(19)23
V367Cyg.D19(62)19L
U CrB.....21(27)29D

2013 Mar 7 Thu
V367Cyg.L01(38)05D
Z Vul.....01(06)05D
Z Dra.....02(05)05D
del Lib.....03(09)05D
U Cep.....04(09)05D
AI Dra.....04(06)05D
Z Per.....D19(16)21

2013 Mar 8 Fri
SW Cyg.....00(06)05D
V367Cyg.L01(14)05D
TW Dra.....D19(16)21
HU Tau...D19(20)24L
RW Tau.....20(25)24L

2013 Mar 9 Sat
V367Cyg..L01(<<)05D
TV Cas.....02(06)05D
RZ Cas.....D19(18)20
U Cep.....D19(21)26
Z Dra.....19(22)24

2013 Mar 10 Sun
V367Cyg..L00(<<)05D
S Equ.....L04(09)05D
Z Per.....D19(17)22
AI Dra.....D19(20)21
HU Tau....D19(22)24L
RZ Cas.....20(22)25
TV Cas.....21(26)29D
RS CVn.....22(28)29D

2013 Mar 11 Mon
U Sge.....L01(00)05D
Z Dra.....04(06)05D
RW Tau....D19(20)24L
AI Dra.....23(25)26
del Lib.....L24(25)29D

2013 Mar 12 Tue
RZ Cas.....01(03)05D
Z Vul.....L01(04)05D
U Cep.....04(09)05D
SW Cyg....D19(20)20L
TV Cas.....D19(21)25
HU Tau.....19(23)24L
SW Cyg.....L22(20)26
X Tri.....22(24)22L

2013 Mar 13 Wed
AI Dra.....04(06)05D
RZ Cas.....05(08)05D
Z Per.....D19(18)23
U CrB.....L20(25)29D
Z Dra.....21(24)26
X Tri.....21(24)22L

2013 Mar 14 Thu
TW Dra.....01(06)05D
del Lib.....03(09)05D
U Sge.....03(09)05D
TV Cas.....D19(17)21
U Cep.....D19(21)25
X Tri.....21(23)22L
HU Tau.....21(25)24L

2013 Mar 15 Fri
RZ Cas.....D19(17)19
RS CVn...D19(23)29D
X Tri.....20(22)22L

2013 Mar 16 Sat
Z Dra.....D19(17)19
Z Per.....D19(20)25L
AI Dra.....D19(20)21
X Tri.....19(22)22L
RZ Cas.....19(22)24
TW Dra.....21(26)29D
HU Tau.....22(26)24L

2013 Mar 17 Sun
Z Vul.....L00(02)05D
U Cep.....04(08)05D
S Equ.....L04(06)05D
SW Cyg.....04(10)05D
TX UMa...D19(15)19
X Tri.....D19(21)22L
Z Dra.....23(25)28
AI Dra.....23(25)26
RZ Cas.....24(26)29

2013 Mar 18 Mon
TV Cas.....03(08)05D
X Tri.....D19(20)22L
del Lib.....L23(25)29D
HU Tau.....23(27)23L

2013 Mar 19 Tue
AI Dra.....04(05)05D
RZ Cas.....05(07)05D
X Tri.....D19(20)22L
U Cep.....D19(20)25
TW Dra.....D19(21)26
Z Per.....D19(21)24L
RW Tau.....22(27)24L
TV Cas.....23(27)29D

2013 Mar 20 Wed
TX UMa...D19(16)21
Z Dra.....D19(18)21
RS CVn.....D19(18)25
X Tri.....D19(19)21L
U CrB.....L19(23)28
SS Cet.....20(24)20L

2013 Mar 21 Thu
U Sge.....L01(03)05D
del Lib.....02(08)05D
X Tri.....D19(18)21
TV Cas.....D19(23)27
SW Cyg..L21(24)29D

2013 Mar 22 Fri
Z Vul.....L00(00)05D
Z Dra.....01(03)05D
U Cep.....03(08)05D
TW Dra.....D19(17)22
X Tri.....D19(18)20
AI Dra.....D19(20)21
RZ Cas.....D19(21)23
RW Tau...D19(21)23L
Z Per.....D19(23)24L

2013 Mar 23 Sat
X Tri.....D19(17)19
TX UMa...D19(18)22
TV Cas.....D19(18)22
SS Cet.....D19(24)20L
AI Dra.....23(25)26
RZ Cas.....23(26)28

2013 Mar 24 Sun
S Equ.....L03(02)05D
U CrB.....04(09)05D
U Cep.....D19(20)25
Z Dra.....D19(20)23

2013 Mar 25 Mon
AI Dra.....04(05)05D
RZ Cas.....04(06)05D
RS CVn.....D19(14)20
RW Tau.....D19(16)21
Z Per.....D19(24)24L
del Lib.....L23(24)29D
V367Cyg..L23(53)29D

2013 Mar 26 Tue
Z Dra.....02(05)05D
TX UMa....D19(19)24
SS Cet.....D19(23)19L
V367Cyg..L23(29)29D
Z Vul.....L24(22)27

2013 Mar 27 Wed
U Cep.....03(08)05D
U CrB.....D19(20)26
V367Cyg..L23(05)29D

2013 Mar 28 Thu
U Sge.....L00(<<)03
del Lib.....02(08)05D
TW Dra.....02(07)05D
AI Dra.....D19(20)21
RZ Cas.....D19(20)23
Z Dra.....19(22)24
Z Per.....20(25)24L
V367 Cyg..L23(<<)25

2013 Mar 29 Fri
TV Cas.....00(05)05D
Z Vul.....03(09)05D
Z Per.....L04(01)05D
U Cep.....D19(20)24
TX UMa...D19(21)25
RZ Cas.....23(25)28
AI Dra.....23(24)26

2013 Mar 30 Sat
RS CVn.....02(09)05D
Z Dra.....04(06)05D
TV Cas.....20(24)28
SW Cyg.....21(27)28D
TW Dra.....22(27)28D

2013 Mar 31 Sun
U Sge.....01(06)04D
U CrB.....01(07)04D
S Equ.....L03(<<)04D
RZ Cas.....03(06)04D
AI Dra.....04(05)04D
Z Per.....22(27)24L
Z Vul.....L23(20)25

FROM THE DIRECTOR

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The **deadline for contributions** to the next issue of VSSC (number 155) will be 7th February, 2013. All articles should be sent to the editor (details are given on the back of this issue).

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Glyn Marsh 01624 880933, or
Martin Mobberley 01284 828431.

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