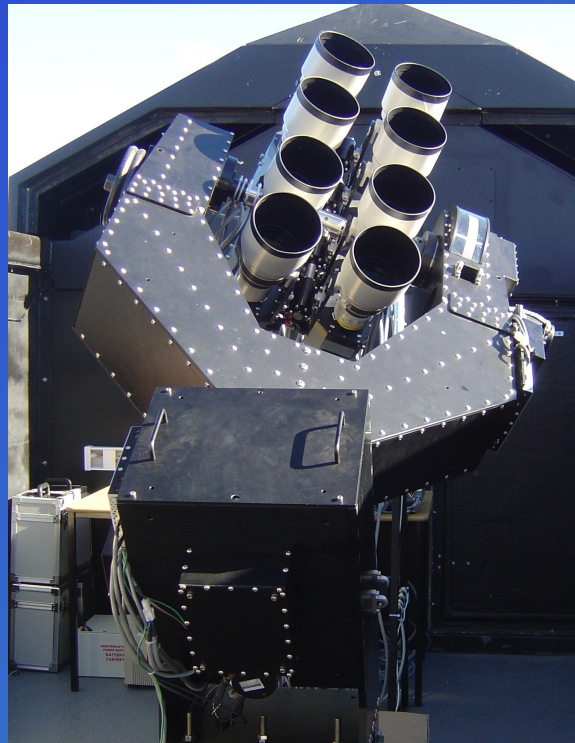


Planets Orbiting Bright Stars with WASP-South



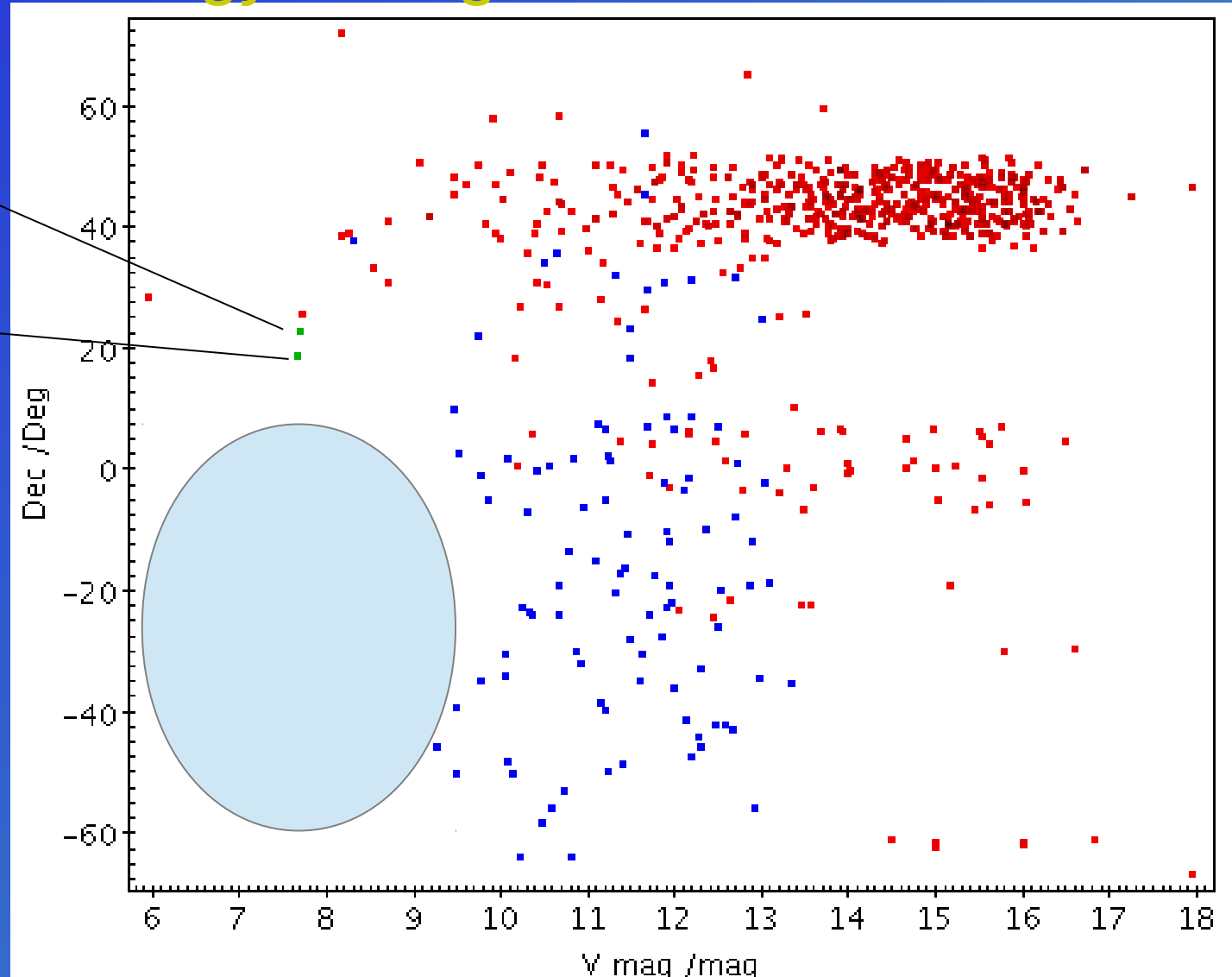
Exo-UK Warwick 2015
Oliver Turner

David Anderson, Coel
Hellier, Pierre Maxted

WASP-South strategy change: motivation

HD 189733

HD 209458



North of Dec +12 : 9 systems $V = 7.7 - 9.0$

South of Dec +12 : 5 systems $V = 9.3 - 9.6$ ($V_{\text{sat}} \sim 9.2$)

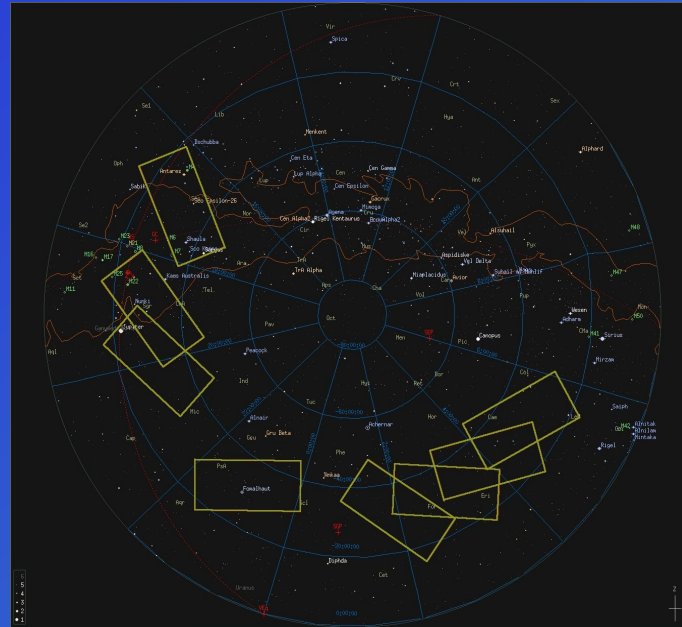
Predicted : 12 systems south of Dec +12

Key Differences

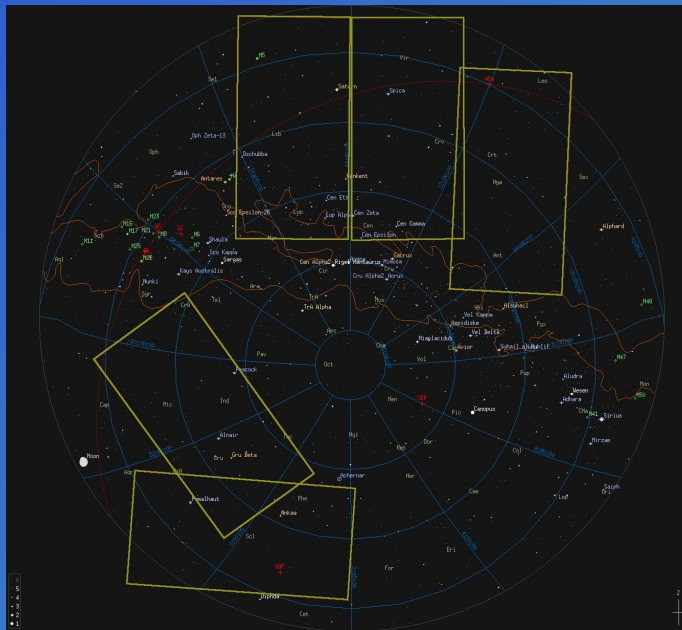
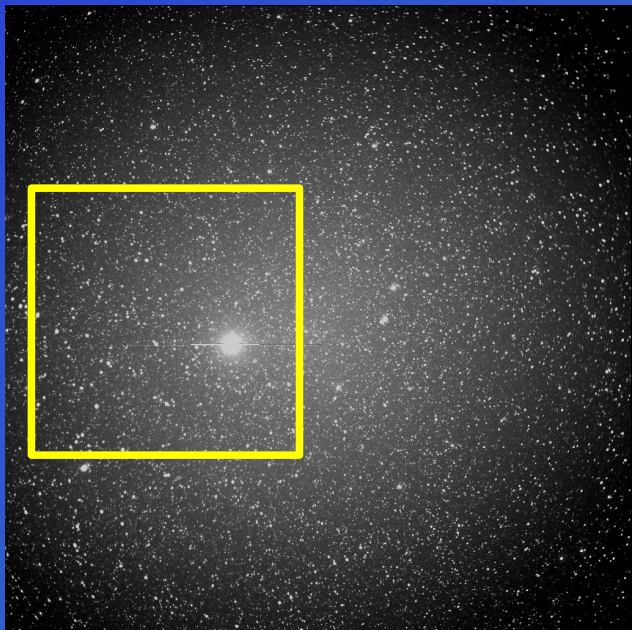
Lens	200mm	85mm
Field of View (degrees ²)	64	353
Plate Scale (arcsec/pixel)	13.7	33
Effective Magnitude Range	$9 \leq M_V \leq 13$	$6 \leq M_V \leq 11$ (Expected)
Filter	Broadband 400–700nm	SDSS r'
Exposure Time (s)	2 x 30	3 x 20



A brighter, wider WASP-South



200mm lenses:
8 pointings
median cadence = 7 minutes
80-140 images per pointing
5-8.5 hours coverage



85mm lenses:
5 pointings
median cadence = 4 minutes
150-350 images per pointing
3.5-8 hours coverage

Yield comparison

200 mm Lenses

Typical Field Total ~ 90000
 $V < 13$ ~ 22000

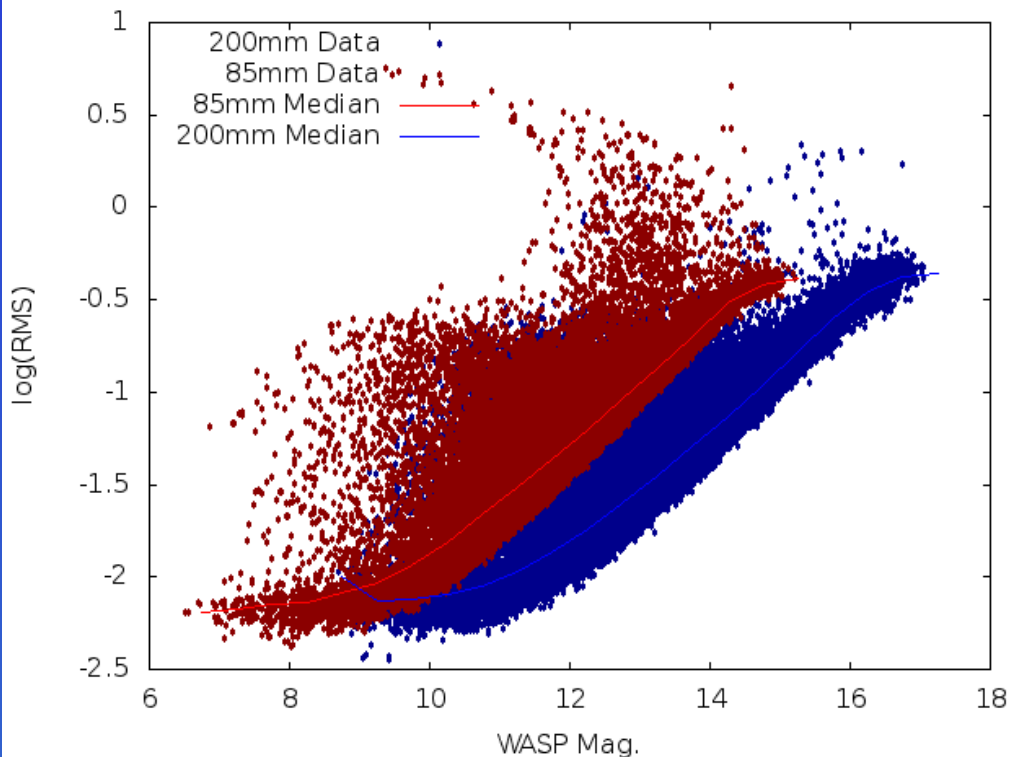
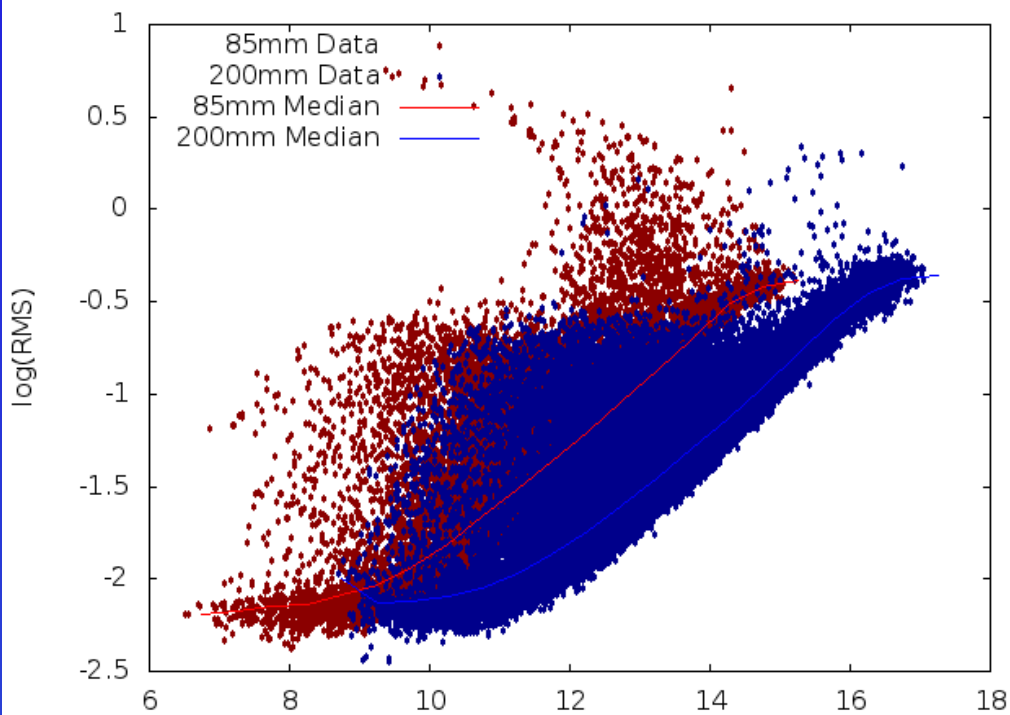
1% photometry ~ 1800

85 mm Lenses

Typical Field Total ~ 43000
 $V < 13$ ~ 30000

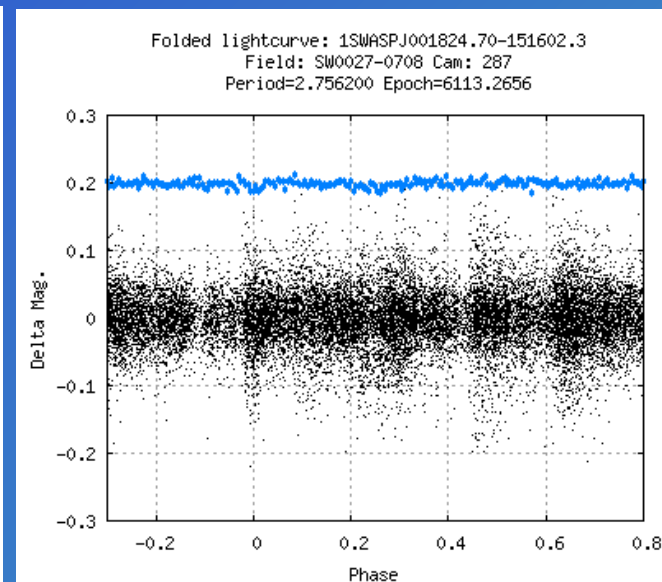
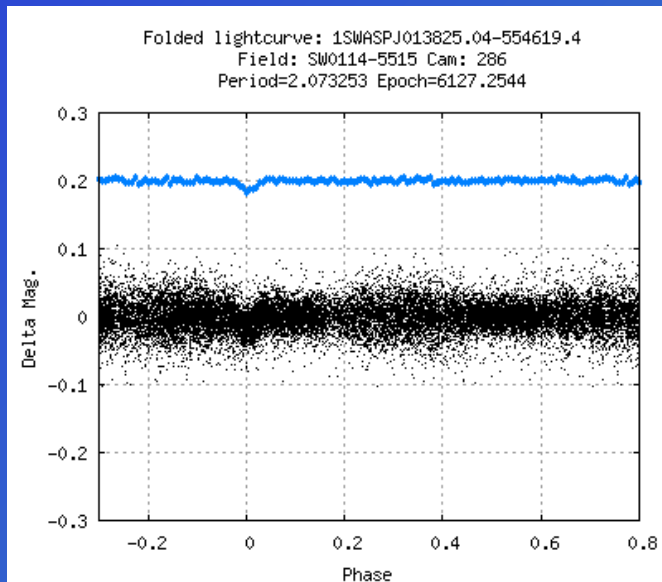
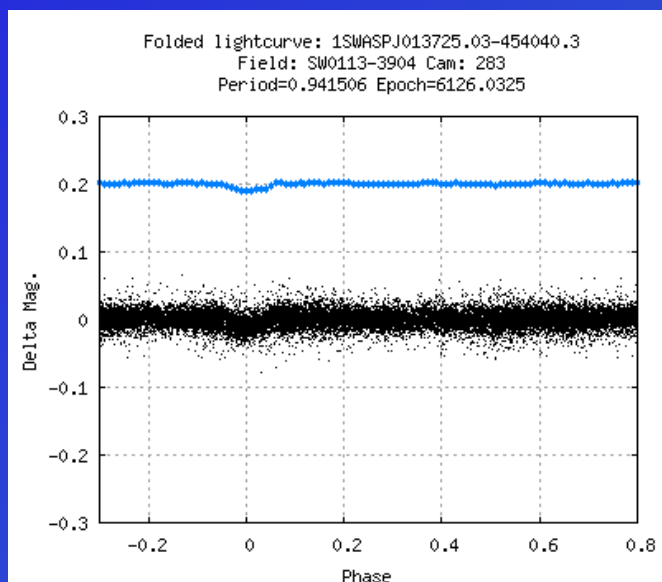
$V < 9$ ~ 700

1% photometry ~ 1600

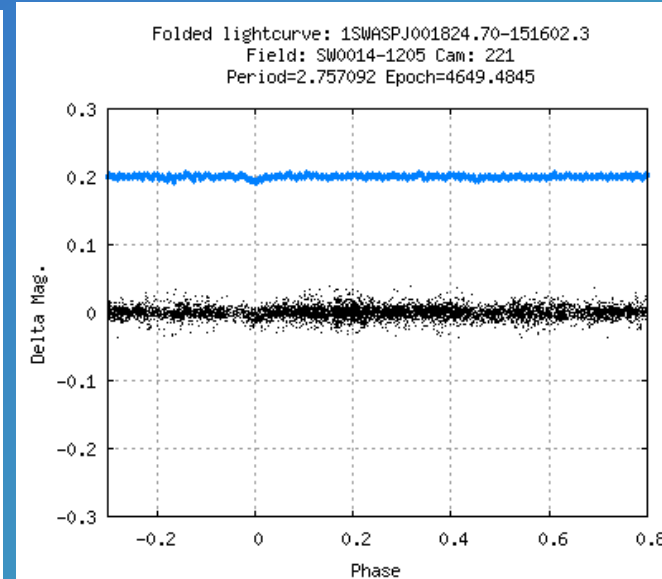
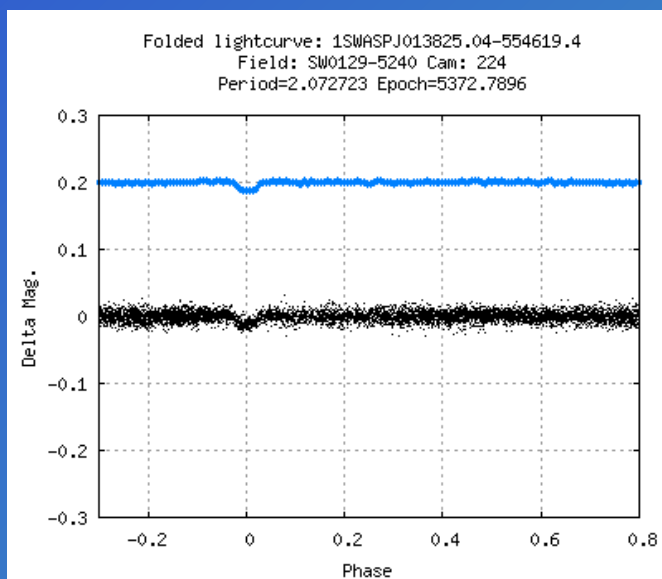
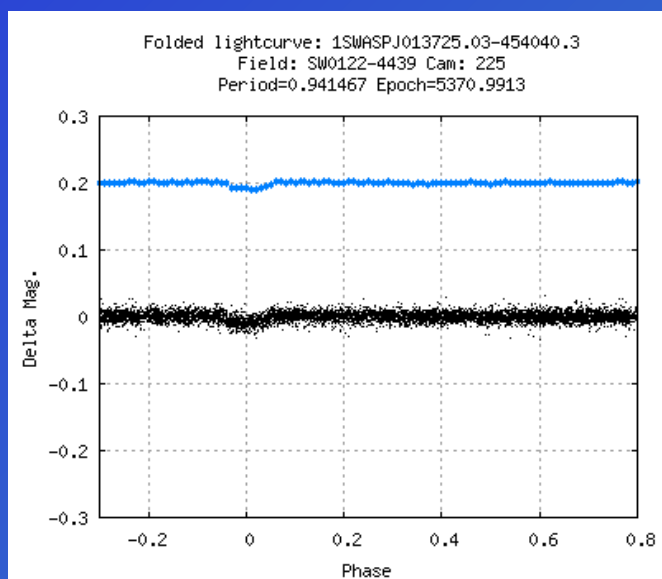


Still able to pick up planets around 'dimmer' stars.

85mm



200mm



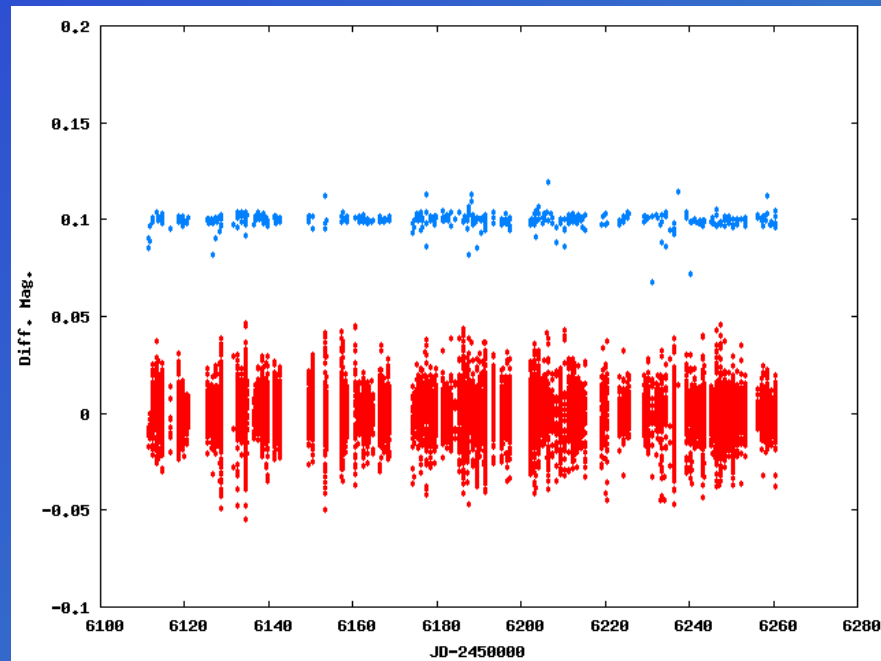
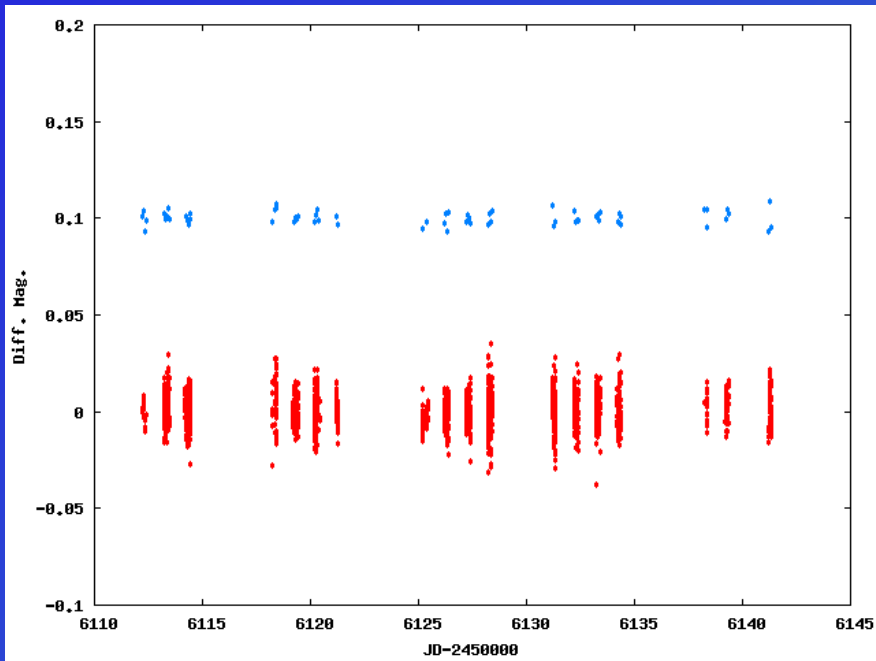
WASP-18
V=9.31

WASP-97
V=10.58

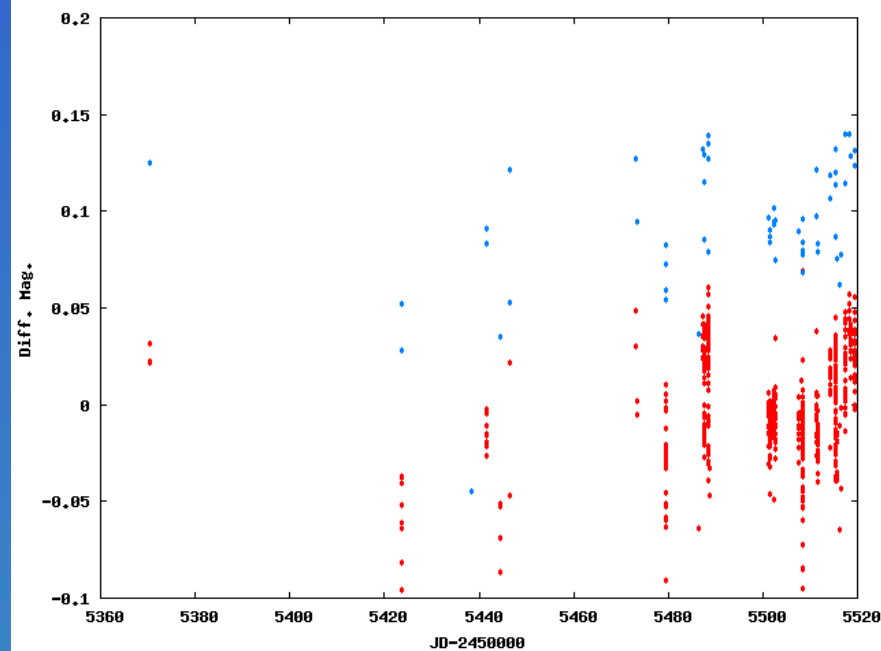
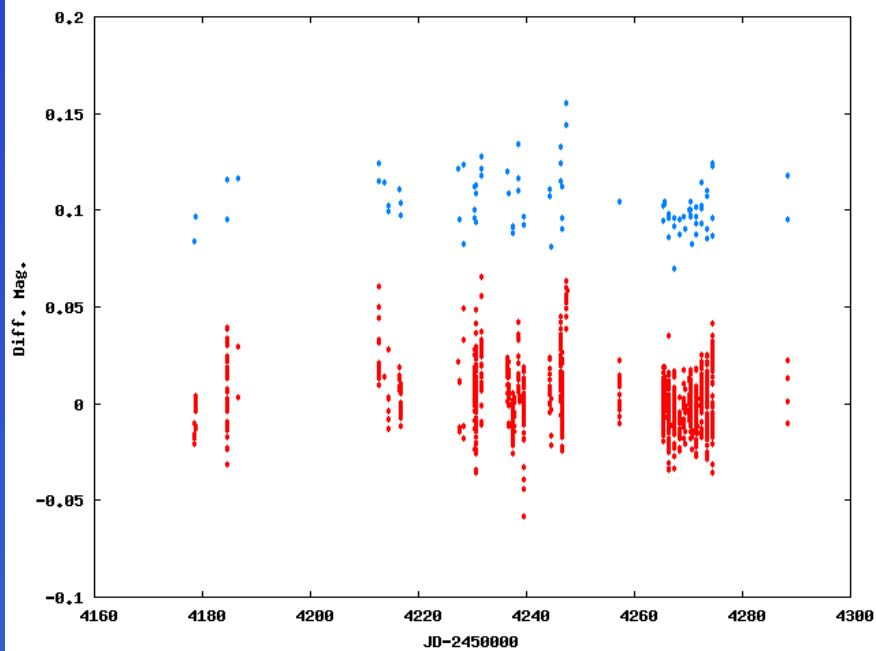
WASP-26
V= 11.30

85mm data ideal for intended targets $V < 9$

85mm



200mm



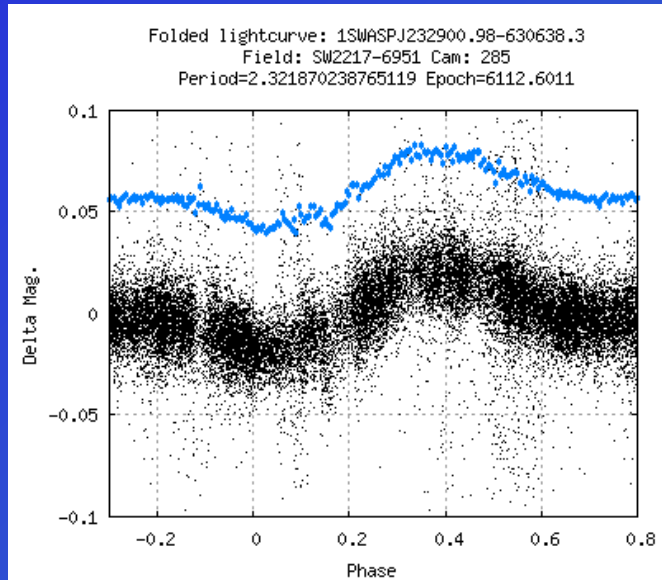
1.5 hr
bins

J155204: $V=7.24$

J005240: $V=7.88$

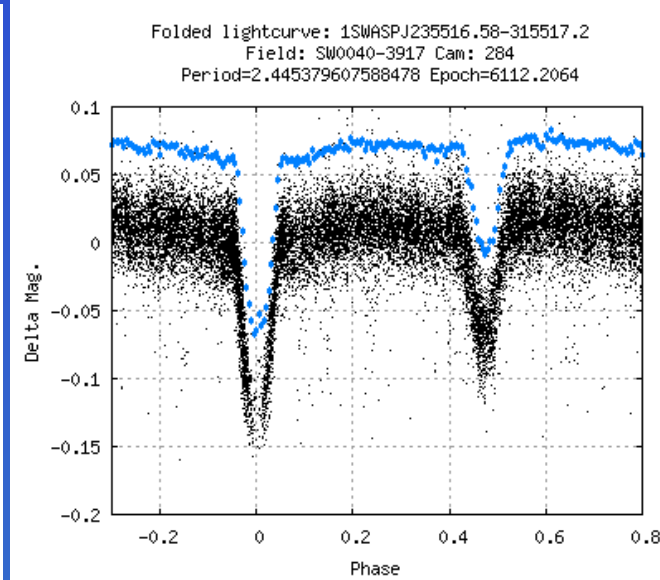
Known, very bright, southern objects.

85mm

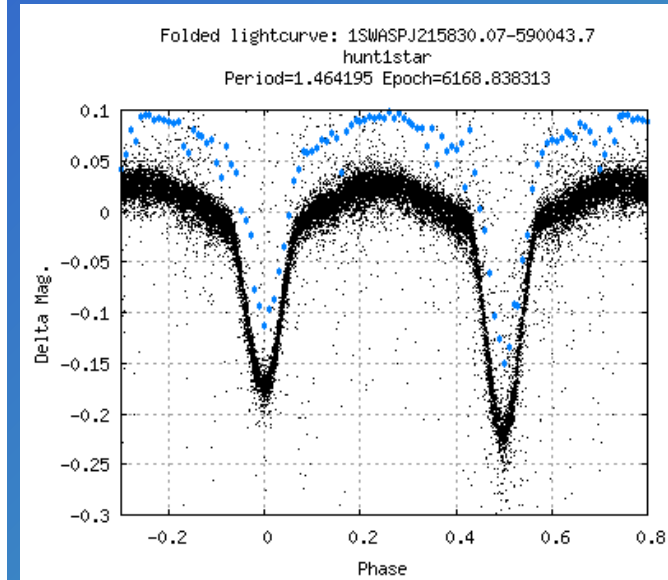


V* CG Tuc, $V = 5.68$
2.3148 Days (GCVS)

General Catalogue of Variable Stars (Samus+ 2007-2012)



V* AL Scl, $V \sim 6.09$
2.445088 Days (GCVS)



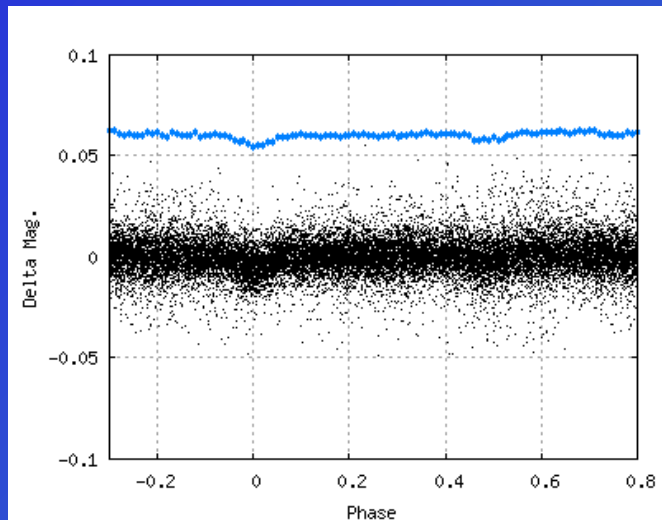
kap01 Ind, $V \sim 6.14$
1.4641 Days

Rozyczka, M., Kaluzny, J., Pych, W., et al. (2011)
MNRAS, 414, 2479

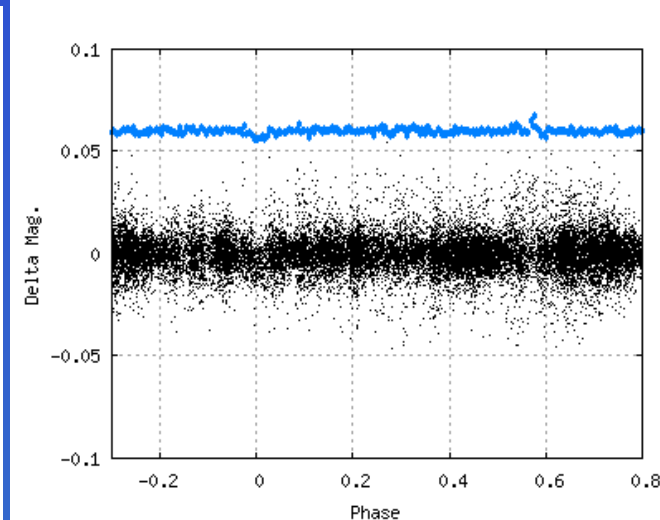
Up to naked eye brightness

New, very bright, southern objects / potential candidates.

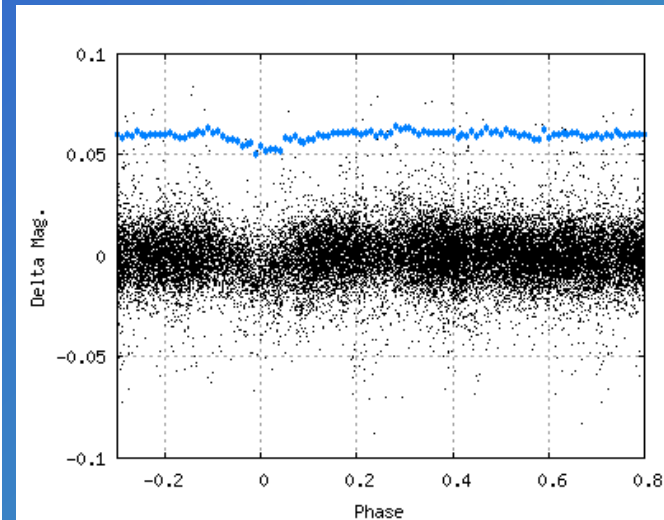
85mm



V ~ 7.8, EB
0.588 Days (WASP)
Depth ~ 4 mmag



V ~ 7.9, 'C' candidate
3.60 Days (WASP)
Depth ~ 4 mmag



V ~ 7.7, 'C' candidate
1.34 Days (WASP)
Depth ~ 6 mmag

4mmag ~ 0.6 R_j around a sun-like star.

Conclusions:

- WASP-South is poised to find planets transiting bright stars.
 - Detection of ~ 4 mmag events.
- Results suggest that WASP-South's effective range is $6 \lesssim V \lesssim 12$.
- Evaluation of WASP-South's photometric performance is under way.

85mm lenses are outperformed on fainter stars as expected.

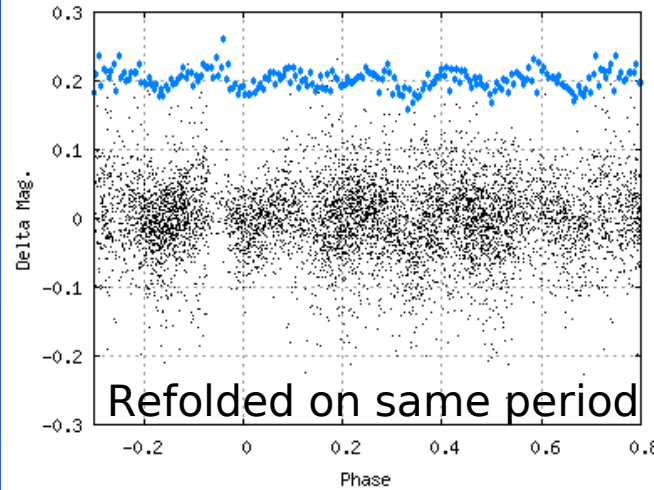
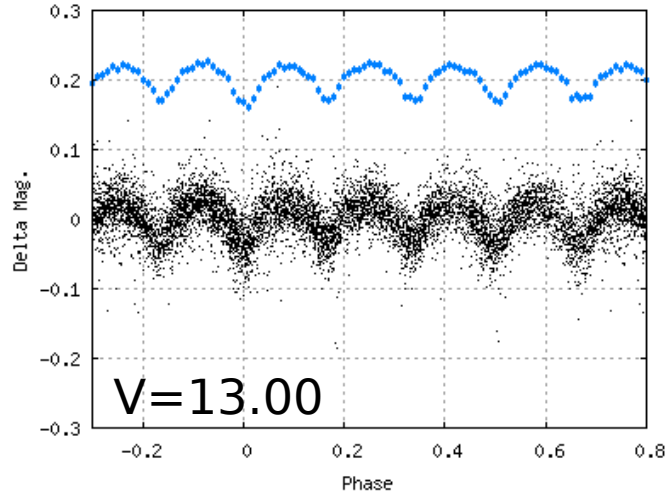
200mm data

85mm data

Brighter, wider WASP not intended for use on stars like these.

Folded lightcurve: 1SWASPJ154855.98-133646.4
Field: SW1544-1138 Cam: 222
Period=0.836479 Epoch=4909.3019

Folded lightcurve: 1SWASPJ154855.98-133646.4
Field: SW1530-1146 Cam: 281
Period=0.836479 Epoch=4909.3019



Folded lightcurve: 1SWASPJ000153.27-123430.7
Field: SW2356-1016 Cam: 147
Period=3.414006 Epoch=5051.9233

Folded lightcurve: 1SWASPJ000153.27-123430.7
Field: SW0027-0708 Cam: 287
Period=1.196822 Epoch=6112.4257

Folded lightcurve: 1SWASPJ000153.27-123430.7
Field: SW2325-0704 Cam: 288
Period=3.403817 Epoch=6112.5342

