Geostationary SLR at Yarragadee

The ETS-VIII Experience

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Introduction

- ETS-VIII was launched into geostationary orbit by JAXA in December 2006.
- SLR stations in the ETS-VIII footprint were requested to try ranging from March 9th 2007
- First returns were obtained by Yarragadee on the 10th March

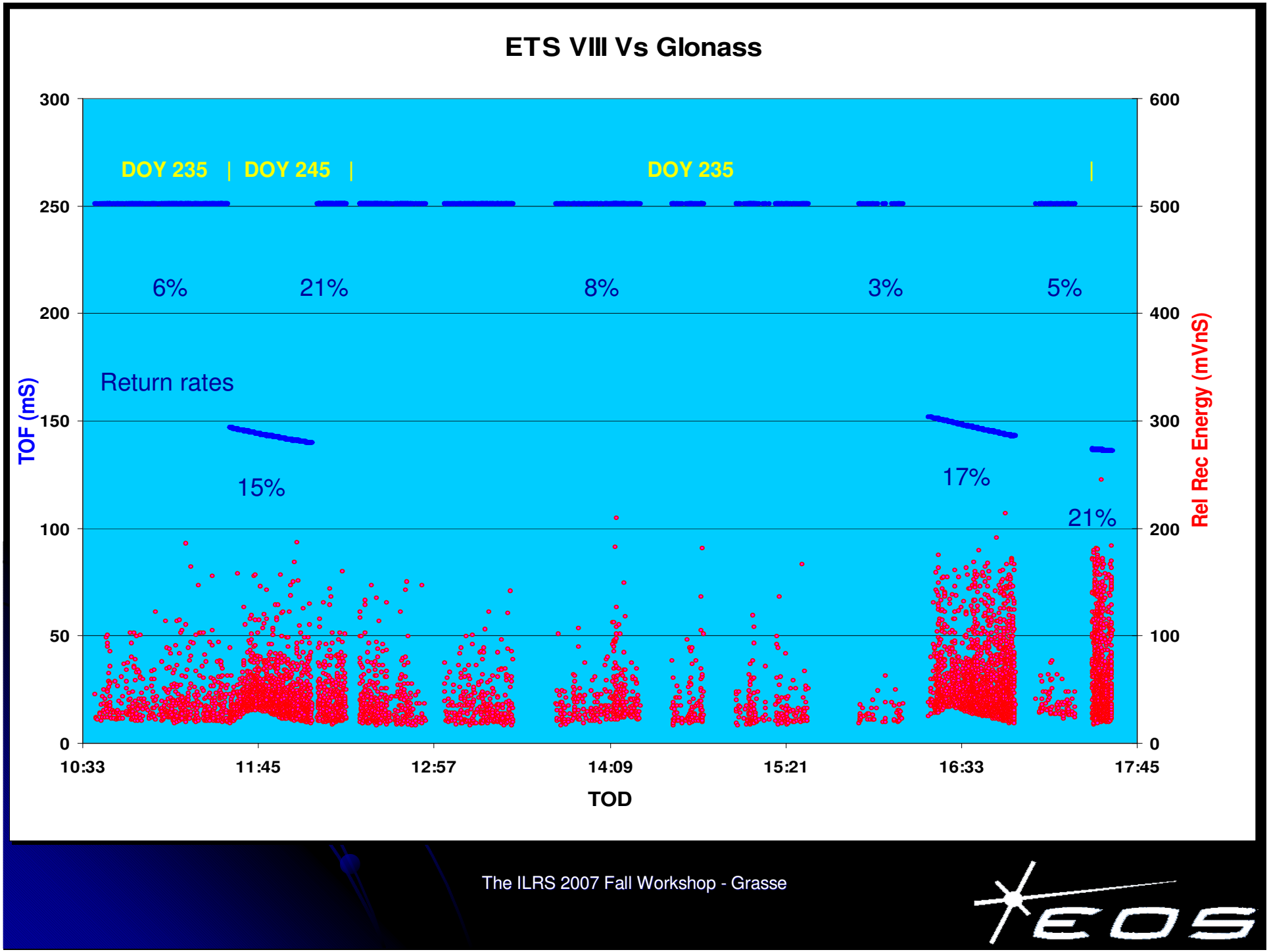
Yarragadee to ETS-VIII

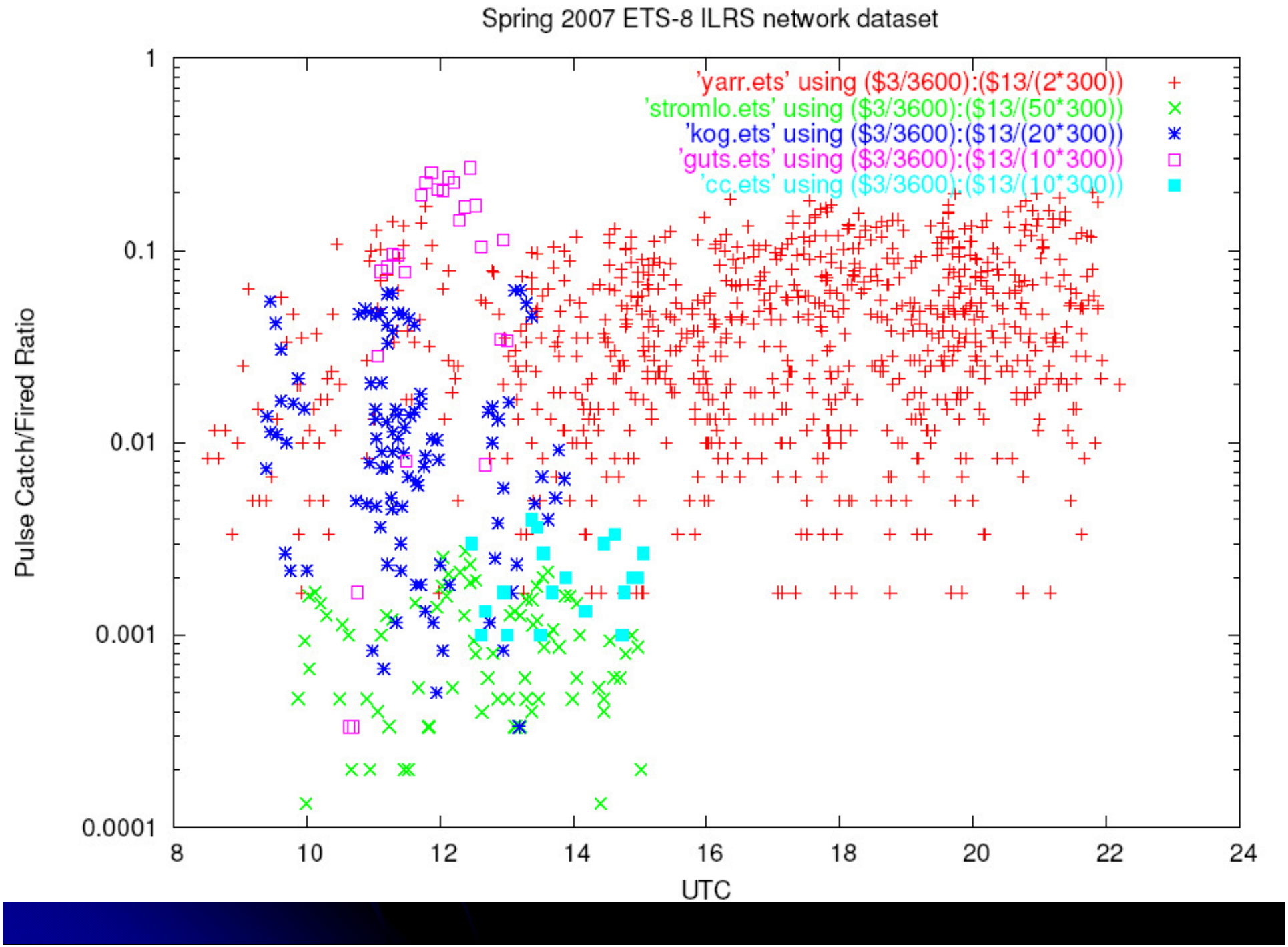
- TOF = 250.9 mS
- Range = 37,480 km
- Elevation = 42.5 degrees
- Optical Magnitude ~ 8-10

- Amplified receive path used (same as other HEO sats)
- 2 pps laser fire rate

Results

- Laser return to fire ratio averages 7% - this is > GPS (3%) < Glonass / Etalon (12-14%).
- Return rates vary from 3% to 21% between tracks under seemingly identical conditions.
- Several daytime (late afternoon) passes taken.
- SS RMS 9-15mm.


ETS VIII Vs Glonass
DOY 235
DOY 245
DOY 235
6%
21%
8%
3%
5%
Return rates
15%
17%
21%
TOF (mS)
Rel Rec Energy (mVnS)
TOD
300
250
200
150
100
50
0
600
500
400
300
200
100
0
10:33
11:45
12:57
14:09
15:21
16:33
17:45


Spring 2007 ETS-8 ILRS network dataset
'yarr.ets' using ($3/3600):($13/(2*300))
'stromlo.ets' using ($3/3600):($13/(50*300))
'kog.ets' using ($3/3600):($13/(20*300))
'guts.ets' using ($3/3600):($13/(10*300))
'cc.ets' using ($3/3600):($13/(10*300))
Pulse Catch/Fired Ratio
1
0.1
0.01
0.001
0.0001
8
10
12
14
16
18
20
22
24
UTC

Issues

- Except on HAC days (every 2nd Thursday), CPF quality is often poor – range biases +/- 3 uS.
- That along with low PRF makes acquisition sometimes difficult.
- Thankfully near permanent optical visibility makes it easier.
- Signal strength seems to vary more than other high sats – why??
- NP processor sometimes has trouble making a fit especially over more than 6 NP's.