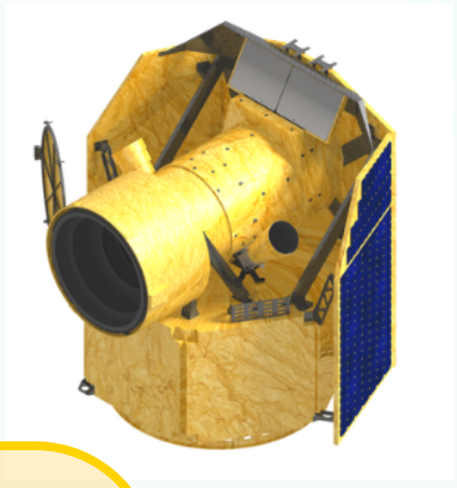

CHEOPS OBSERVATIONS OF TESS PLANETS

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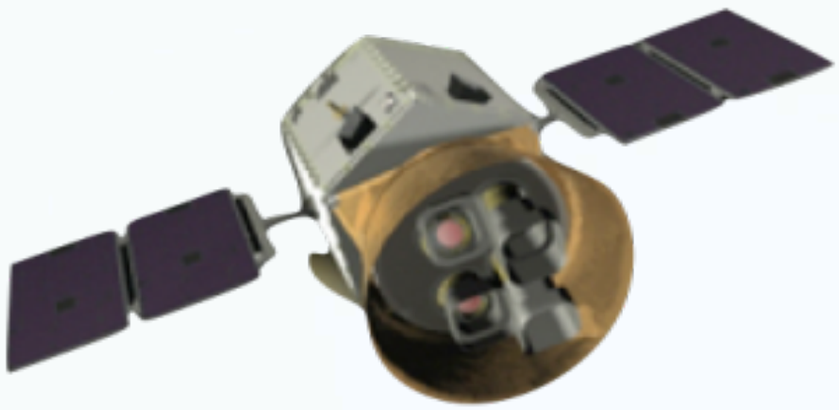
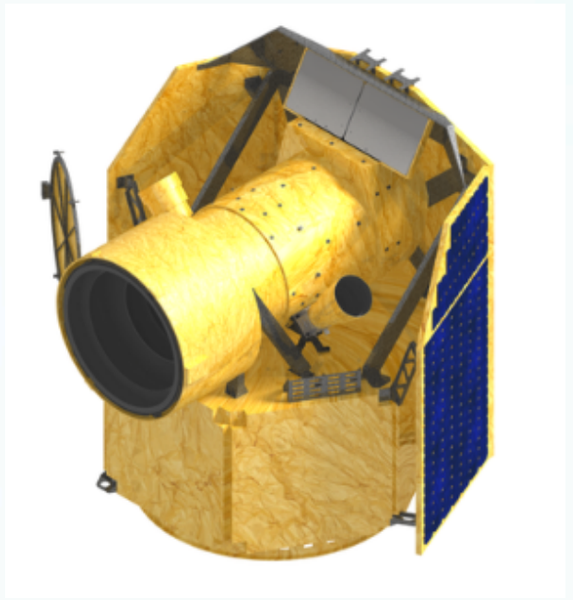
3rd CHEOPS Science Workshop, Madrid, June 2015

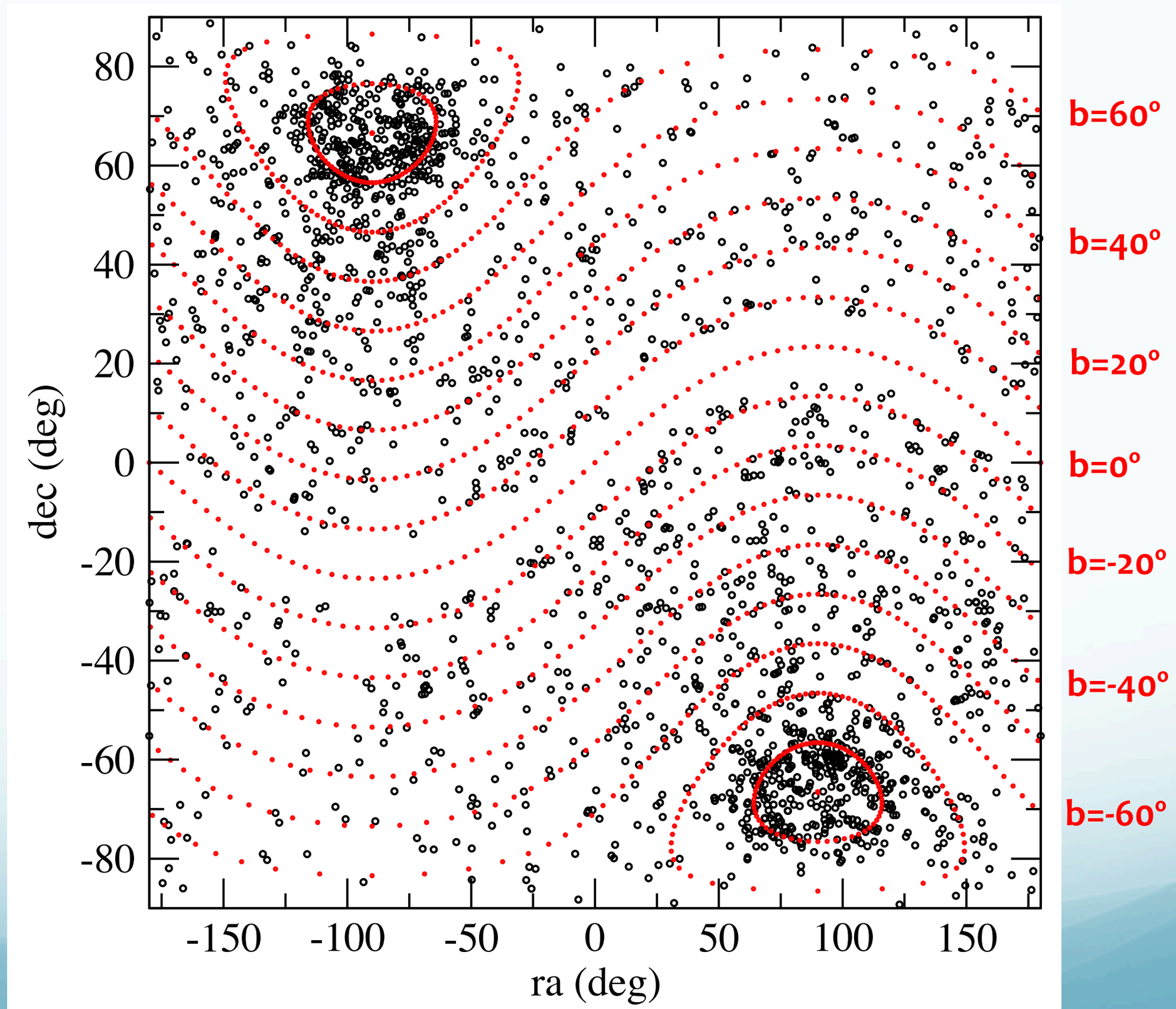


Introduction



- The TESS and CHEOPS missions are highly complementary survey vs. targeted
- TESS will discover a large number of planets around bright stars all over the sky but SNR will not always allow for very high precision in planetary radius.
- From CHEOPS perspective it is a mash-up of 2 requirements
- Simulations of TESS yields suggest 1984 planets may be found

TESS planets - Sky distribution



CHEOPS visibility

Observability (days in 1 yr)	Ecliptic latitude (deg)
70	20
60	35
50	43
40	52
30	57
20	60
10	62

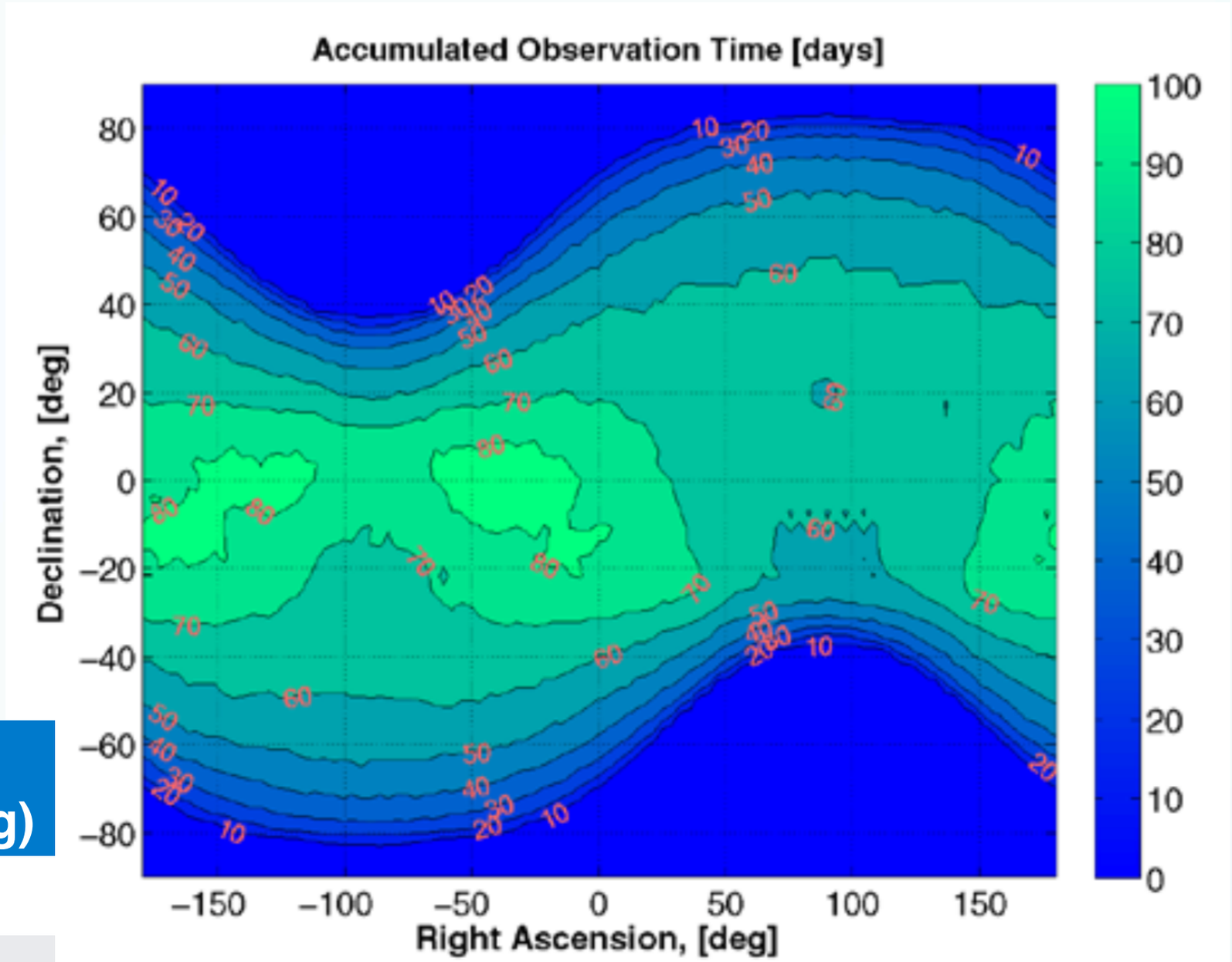
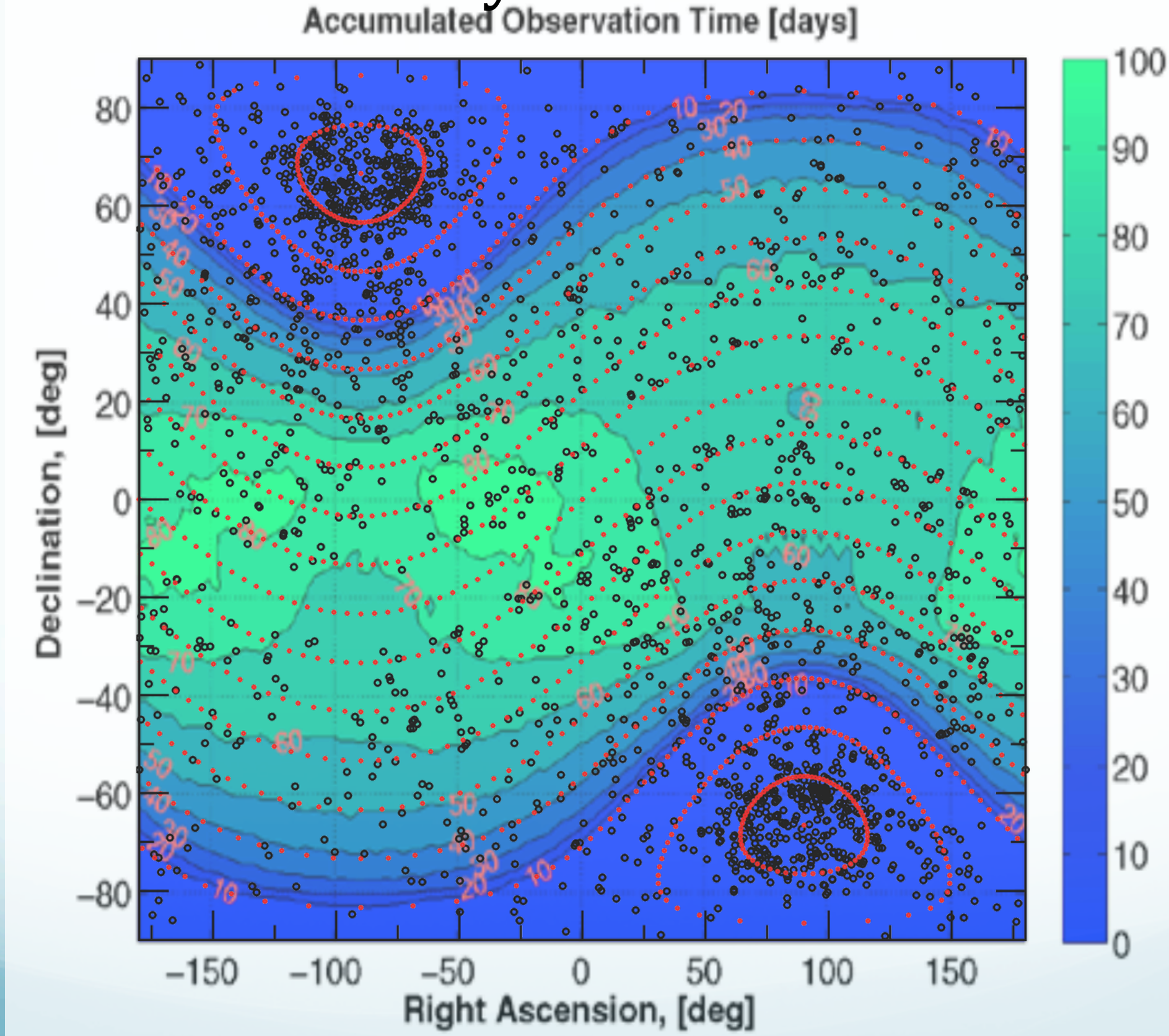


Fig.6 SSO650; CHEOPS-ESOC-TN-003

TESS and CHEOPS sky



CHEOPS access to TESS targets

- CHEOPS science requirement is to determine planet radii with $\sigma_R/R < 4\%$
- Considering a reasonable red noise model (5 ppm) it translates into SNR = 30

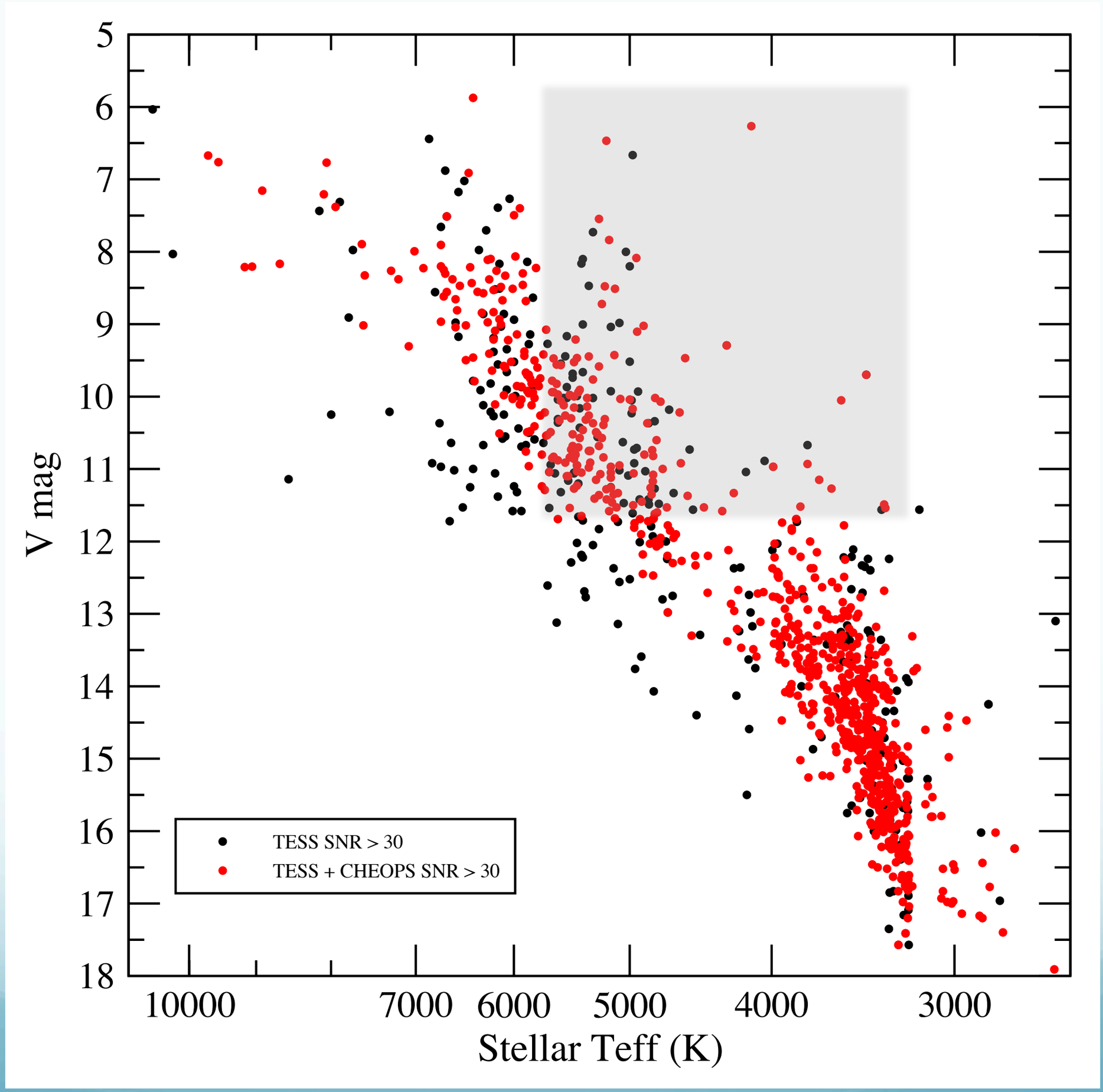
CHEOPS could double the number of TESS planets with SNR=30. Most interestingly it extends it to the whole sky !

N_{TESS}	N_{CHEOPS} & TESS SNR < 30	Visibility (days)
1001	0	<10
45	32	10-20
66	56	20-30
89	80	30-40
172	148	40-50
133	114	50-60
245	211	60-70
233	205	>70
1984	846	All

CHEOPS observations of TESS targets

- Interesting extension to longer period transiting planets

N_{CHEOPS} & TESS SNR < 30	N TESS transits
118	1
90	2
71	3
60	4
64	5
49	6
62	7
46	8
44	9
37	10
37	11
32	12
34	13
43	14
30	15
29	16


V mag
5
6
7
8
9
10
11
12
13
14
15
16
17
18
10000
7000
6000
5000
4000
3000
Stellar Teff (K)
TESS SNR > 30
TESS + CHEOPS SNR > 30

Conclusions

- High complementarity between TESS and CHEOPS (sky visibility)
- Selection is made to raise SNR
- Improvements ➔ increase in:
  - ➢ M star planets
  - ➢ Brighter hosts (~1.5 mag)
- Possible strategy:
  - ➢ Planets with key properties (bright, small, temperate)
  - ➢ Collect transits to increase SNR to 30
  - ➢ Apply this to 100-200 TESS planets

Work in progress...