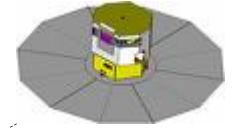


Gaia validation tasks

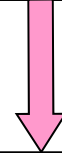
Institut d'Estudis Espacials de Catalunya
&
Institut de Ciències del Cosmos – Universitat de Barcelona

C. Fabricius

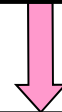
Gaia data flow



ESAC



DPAC

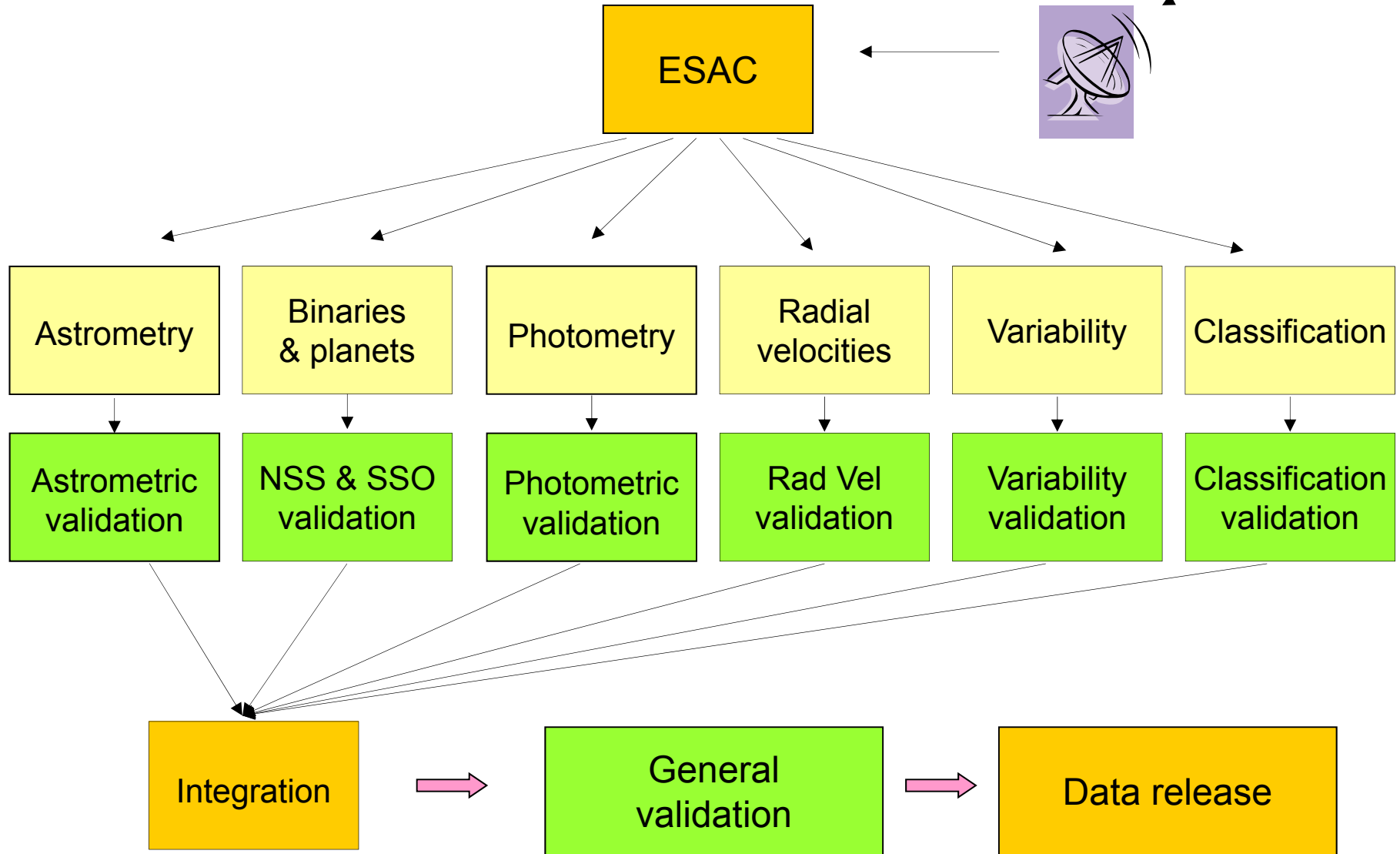
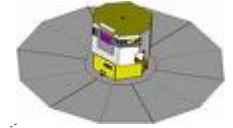


General validation

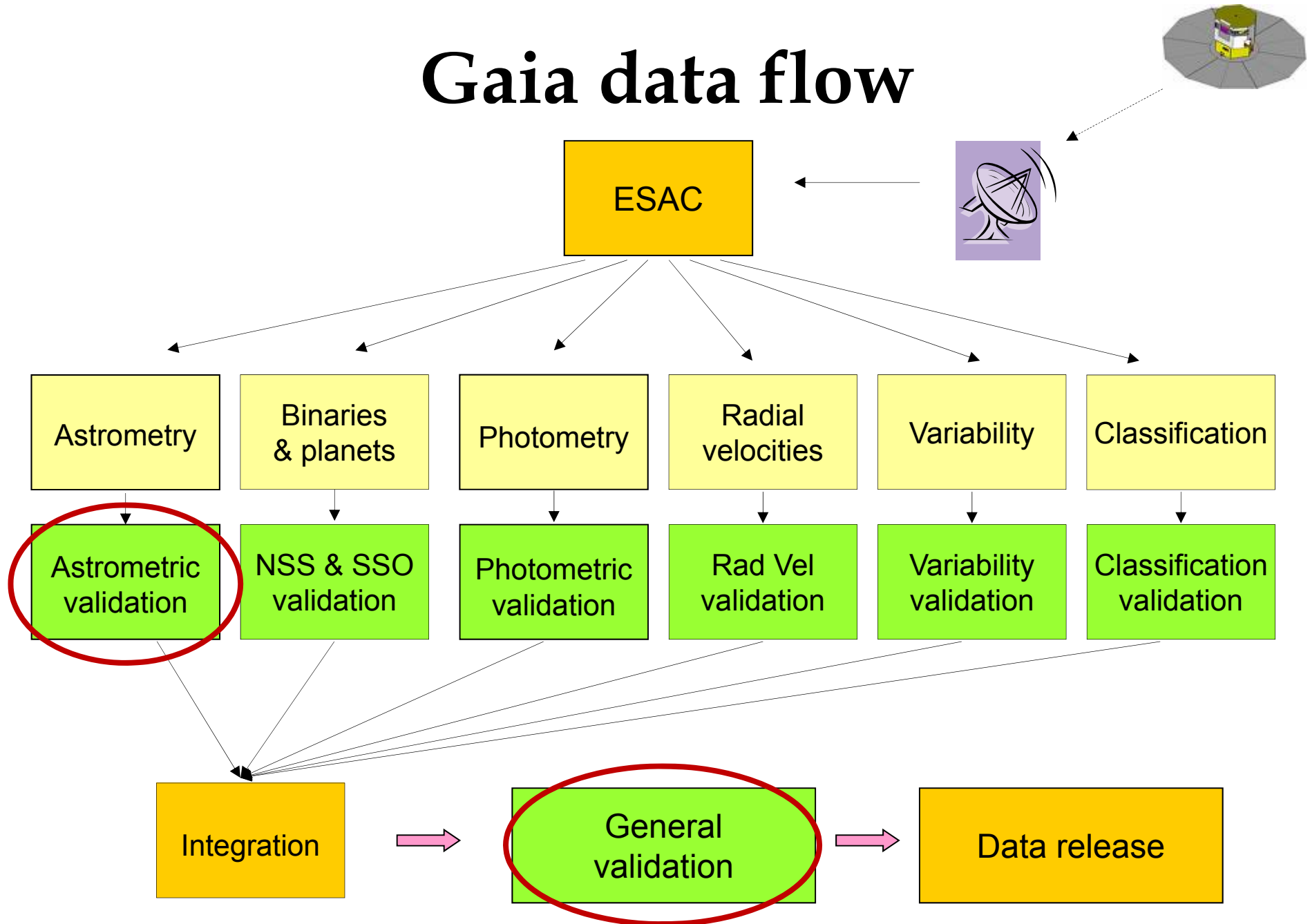


Data release

Gaia data flow

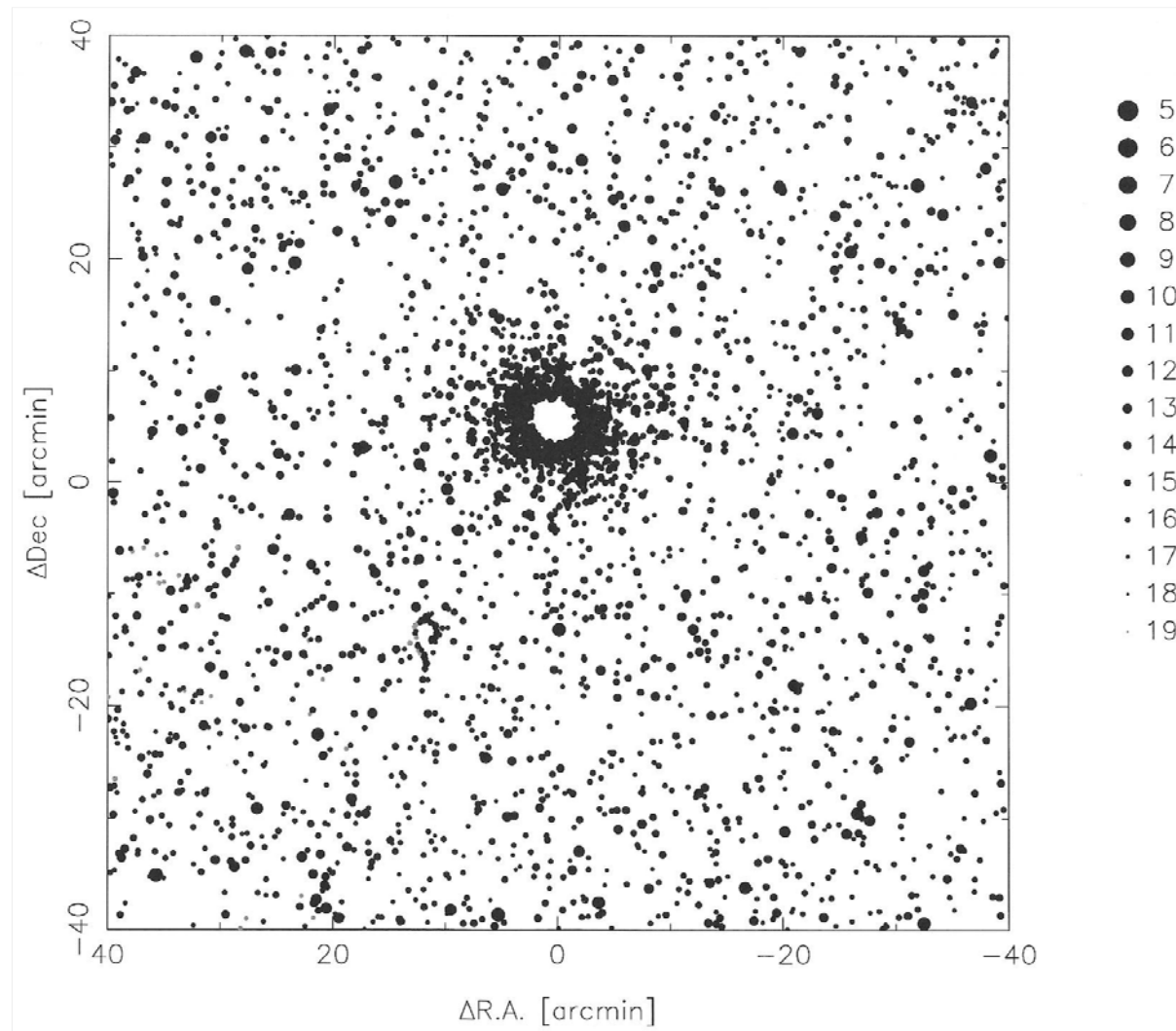


Gaia data flow

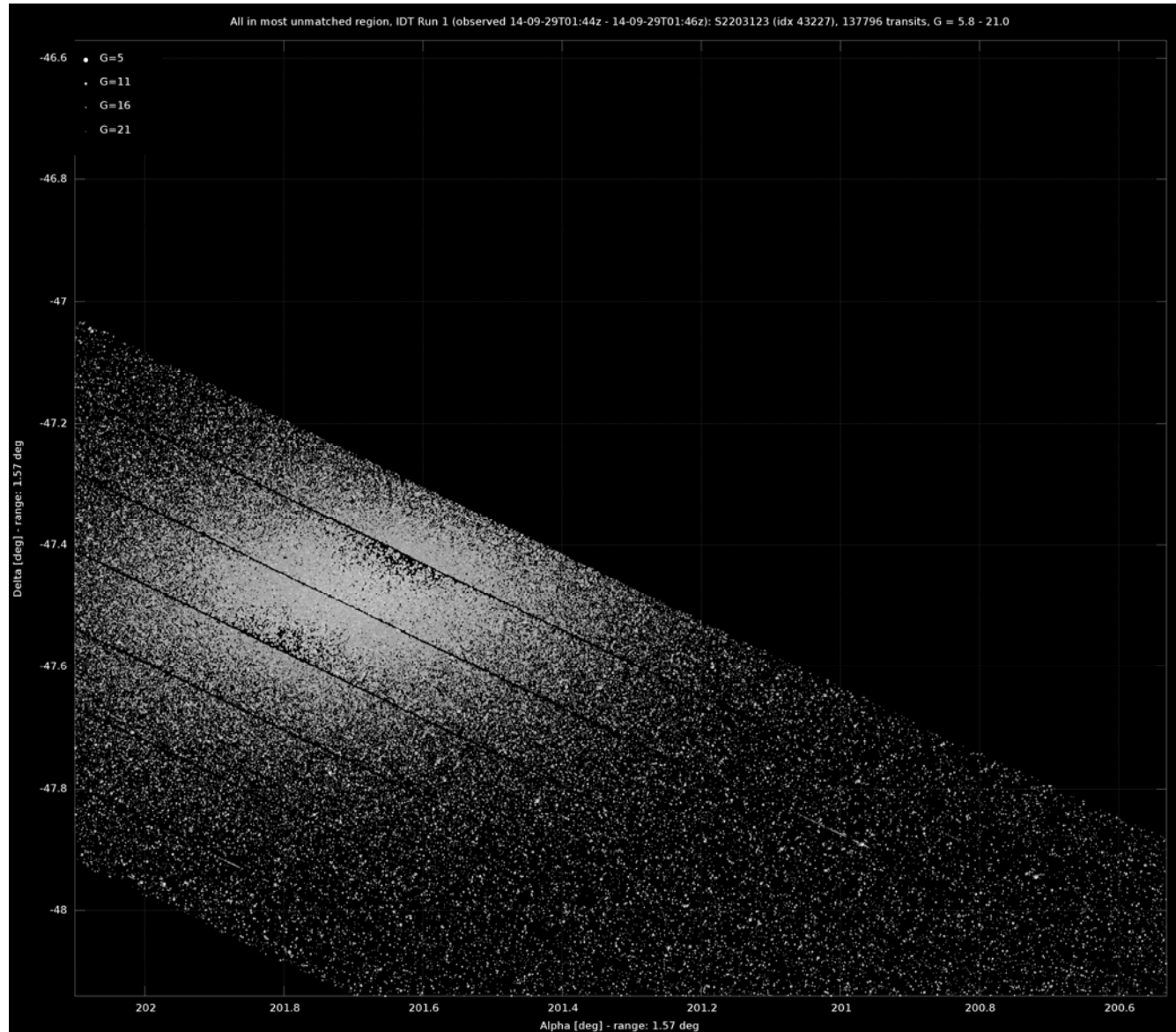


Dense areas

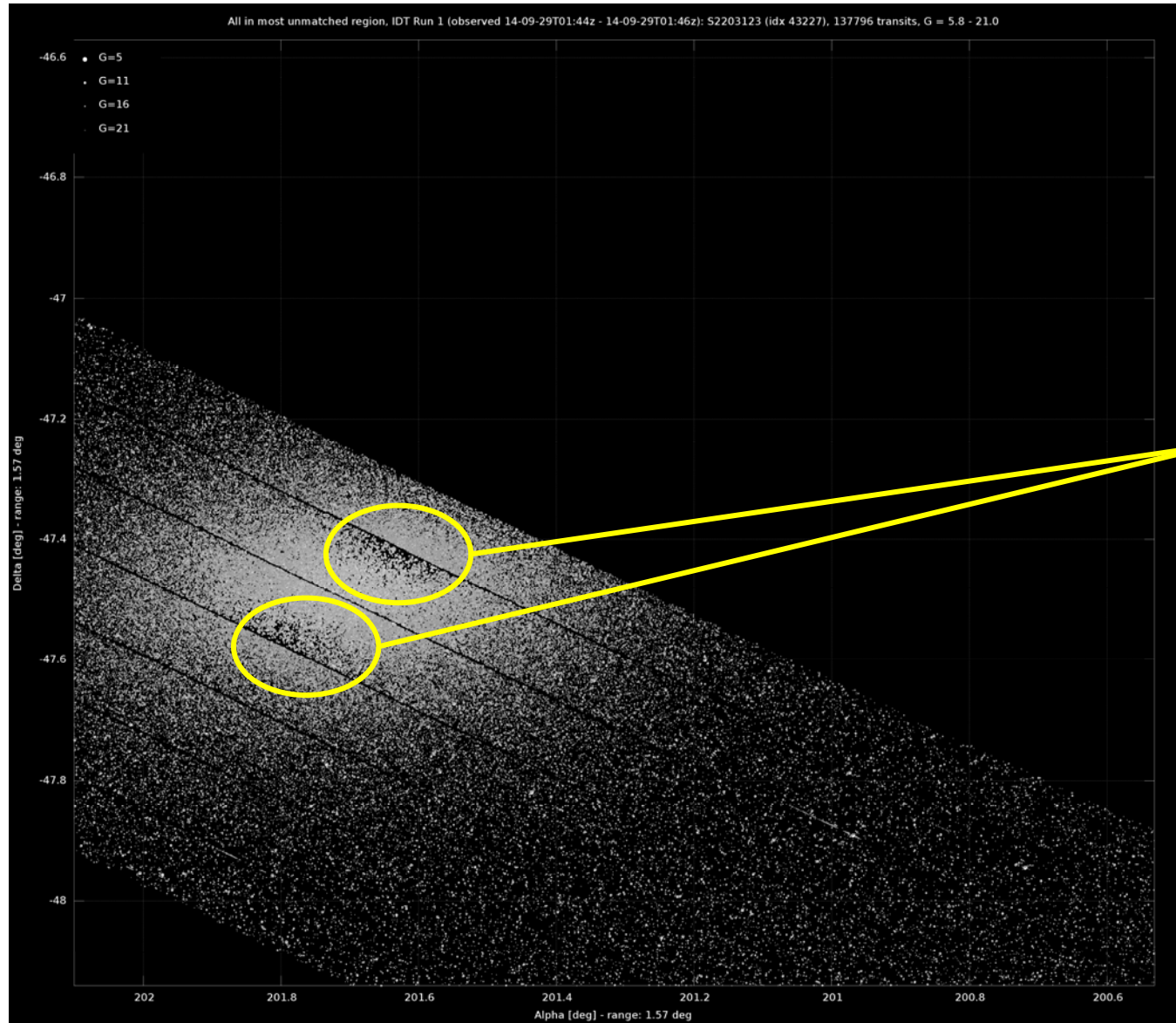
Carlsberg Catalogue, M5



ω Cen seen in one pass of Gaia



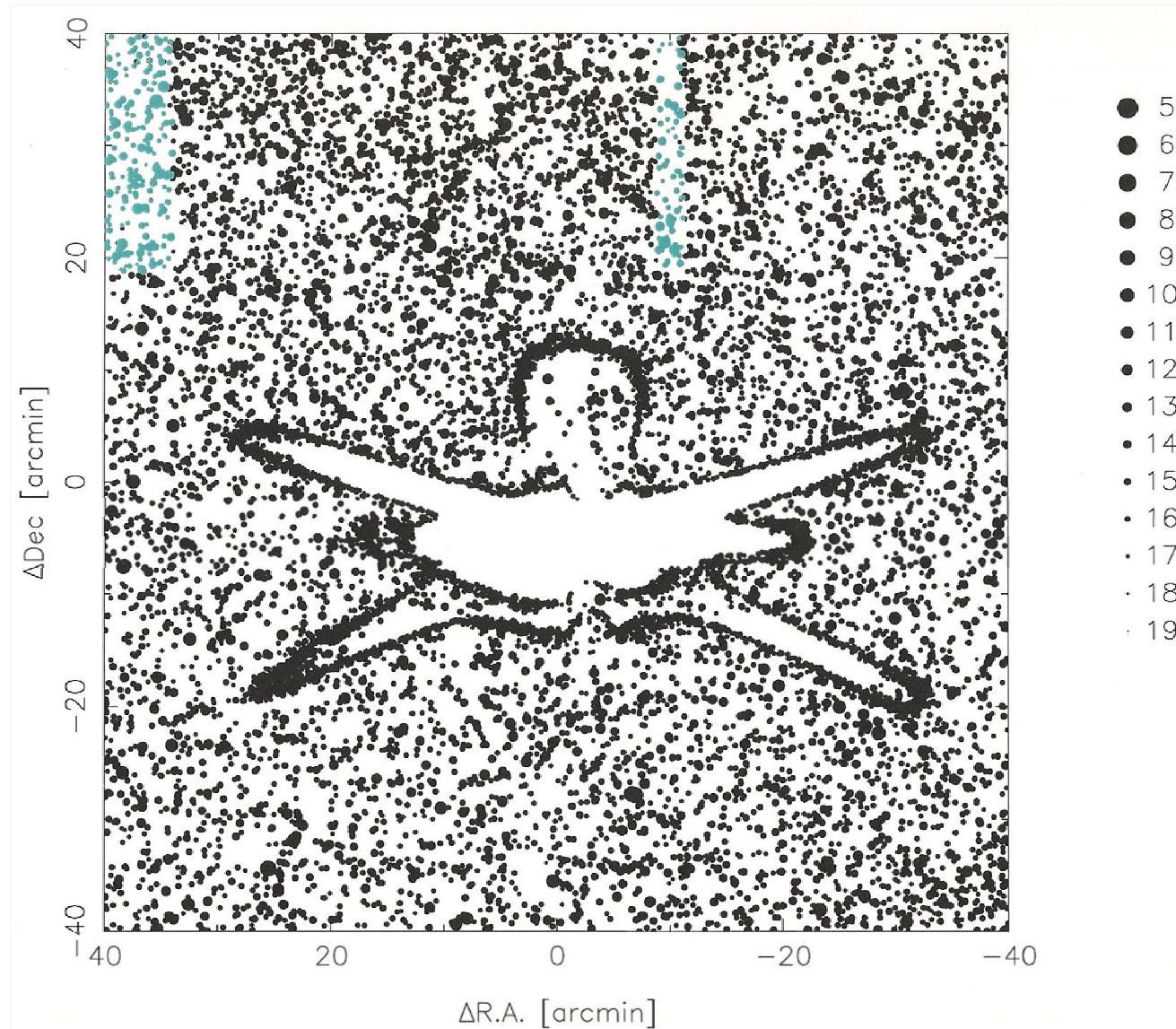
ω Cen seen in one pass of Gaia



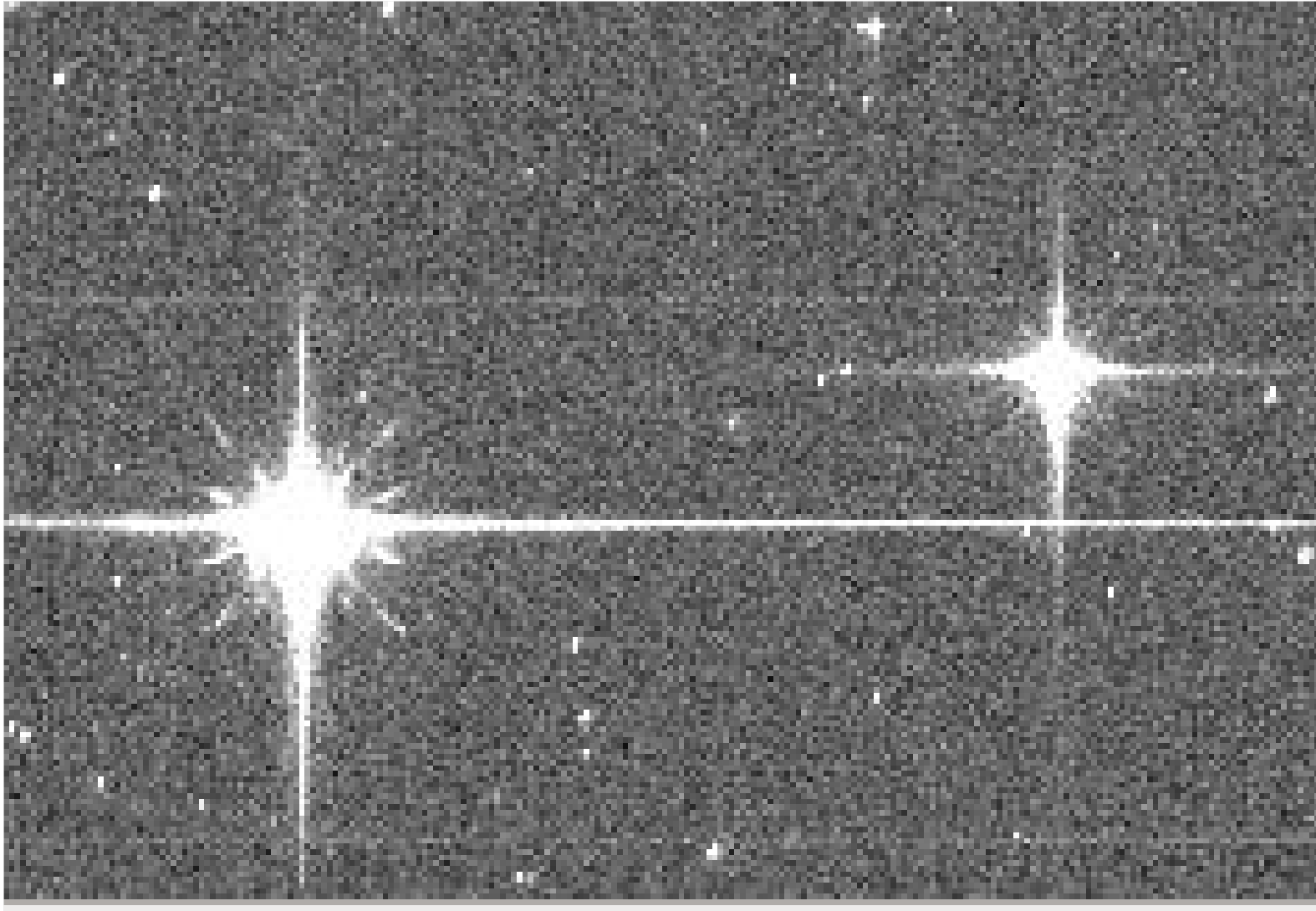
Exhaustion of resources for two sky mappers

Bright stars

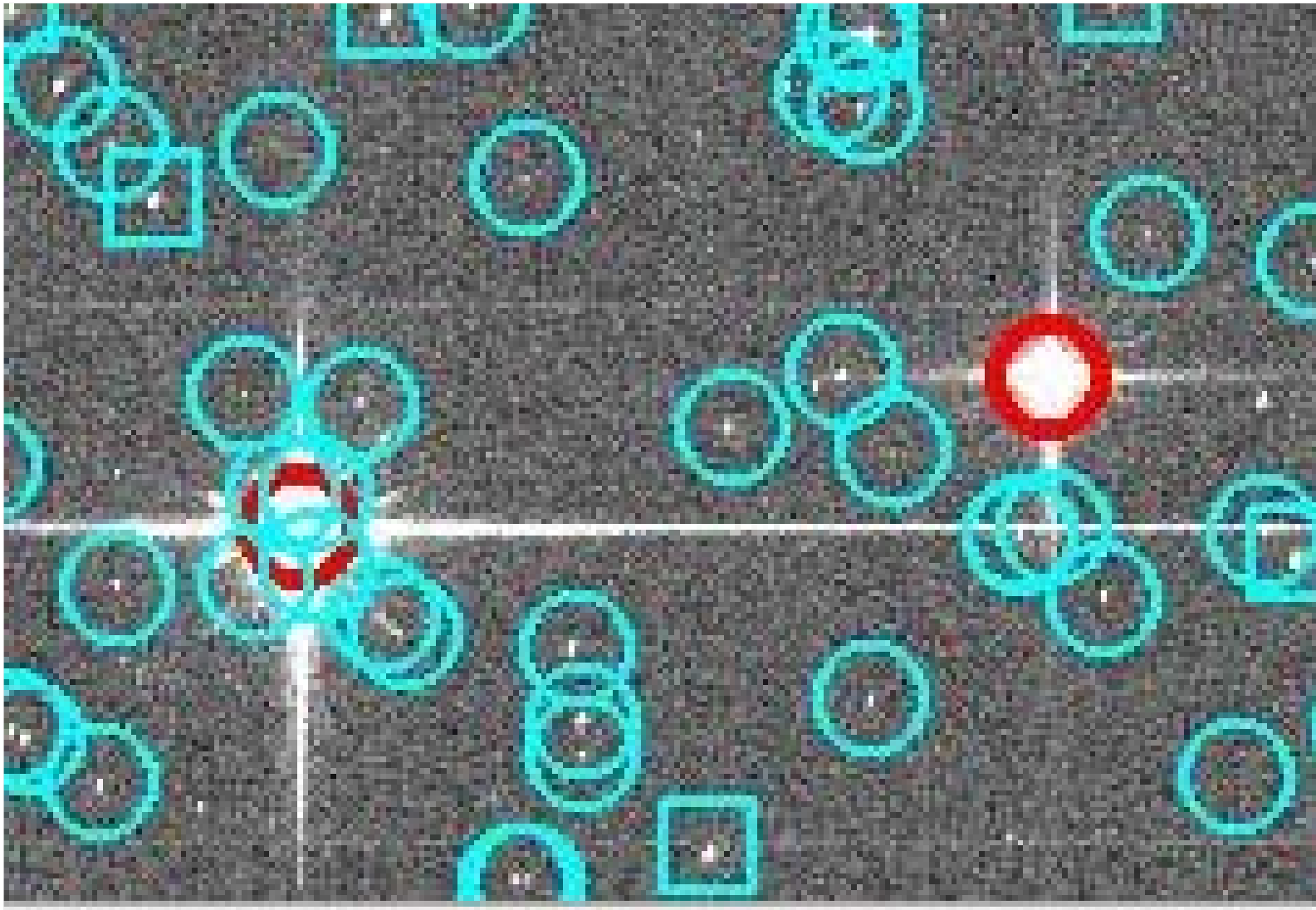
prelimCarlsberg Catalogue, Betelgeuse



Gaia sky mapper, Image

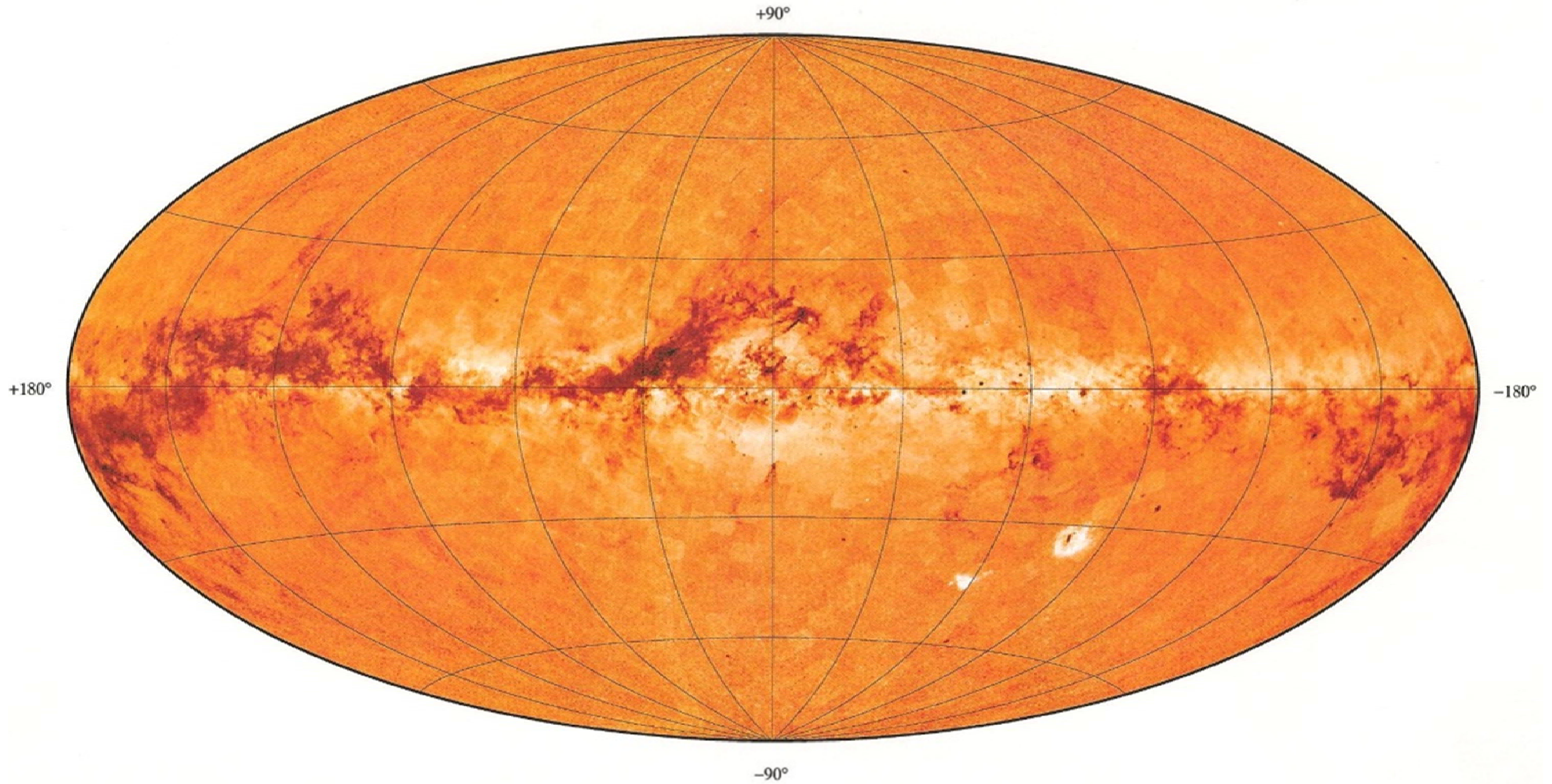


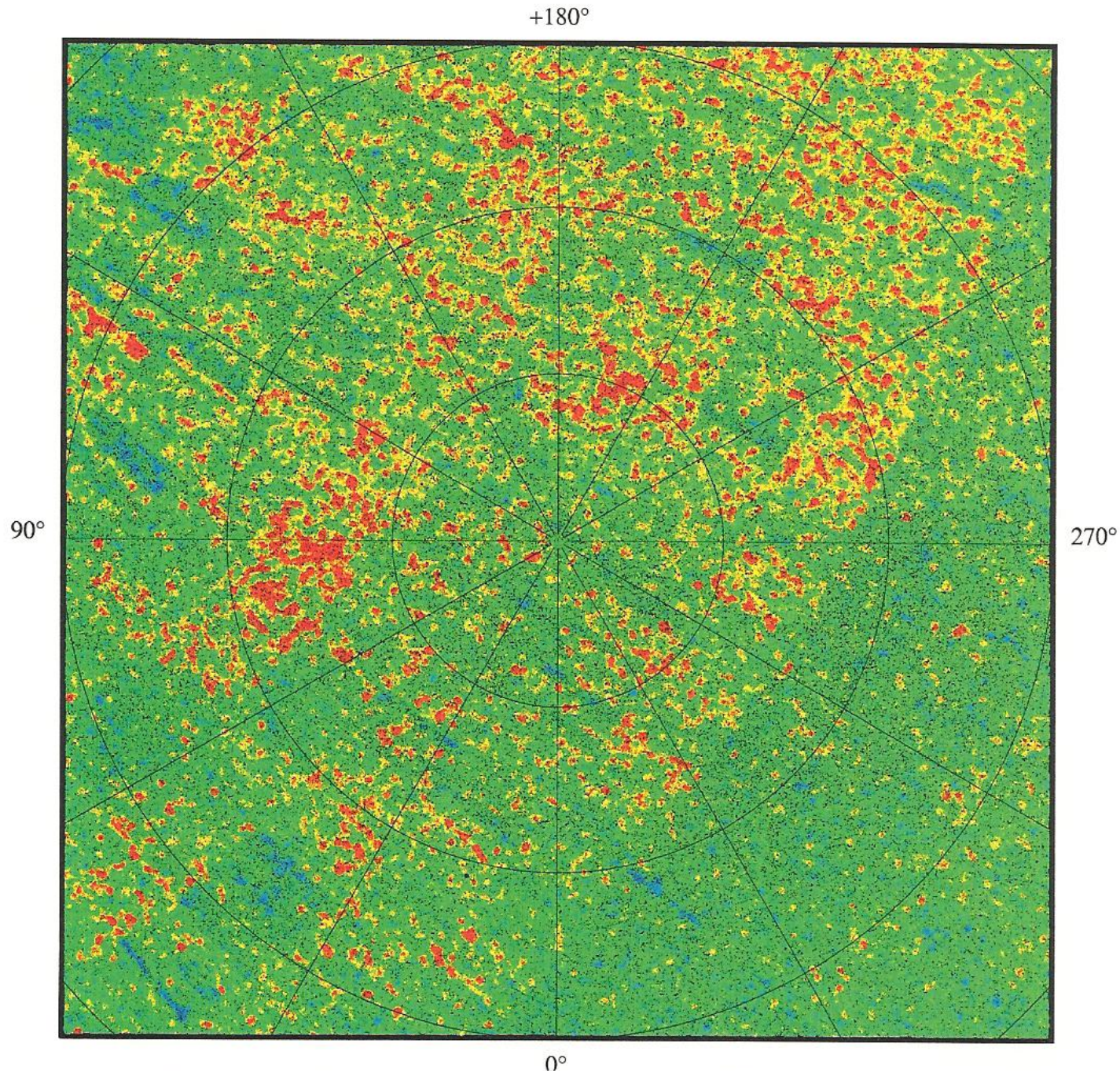
Gaia sky mapper, Detections



Scanning law

Starcounets, USNO A2, $B < 17$





2MASS H-K

North Galactic Pole

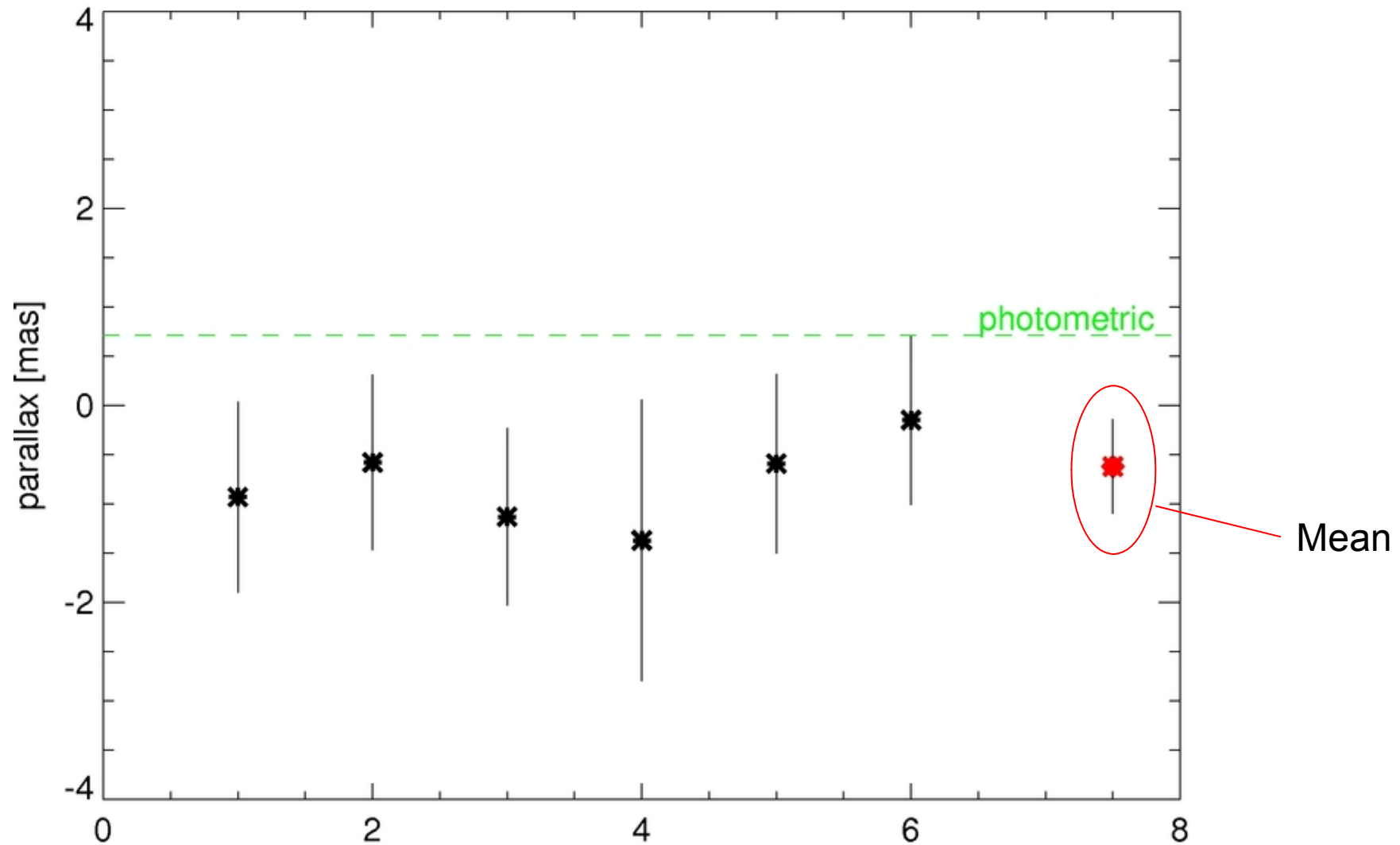
What happens
when we try to
squeeze the
standard error?

Scanning law

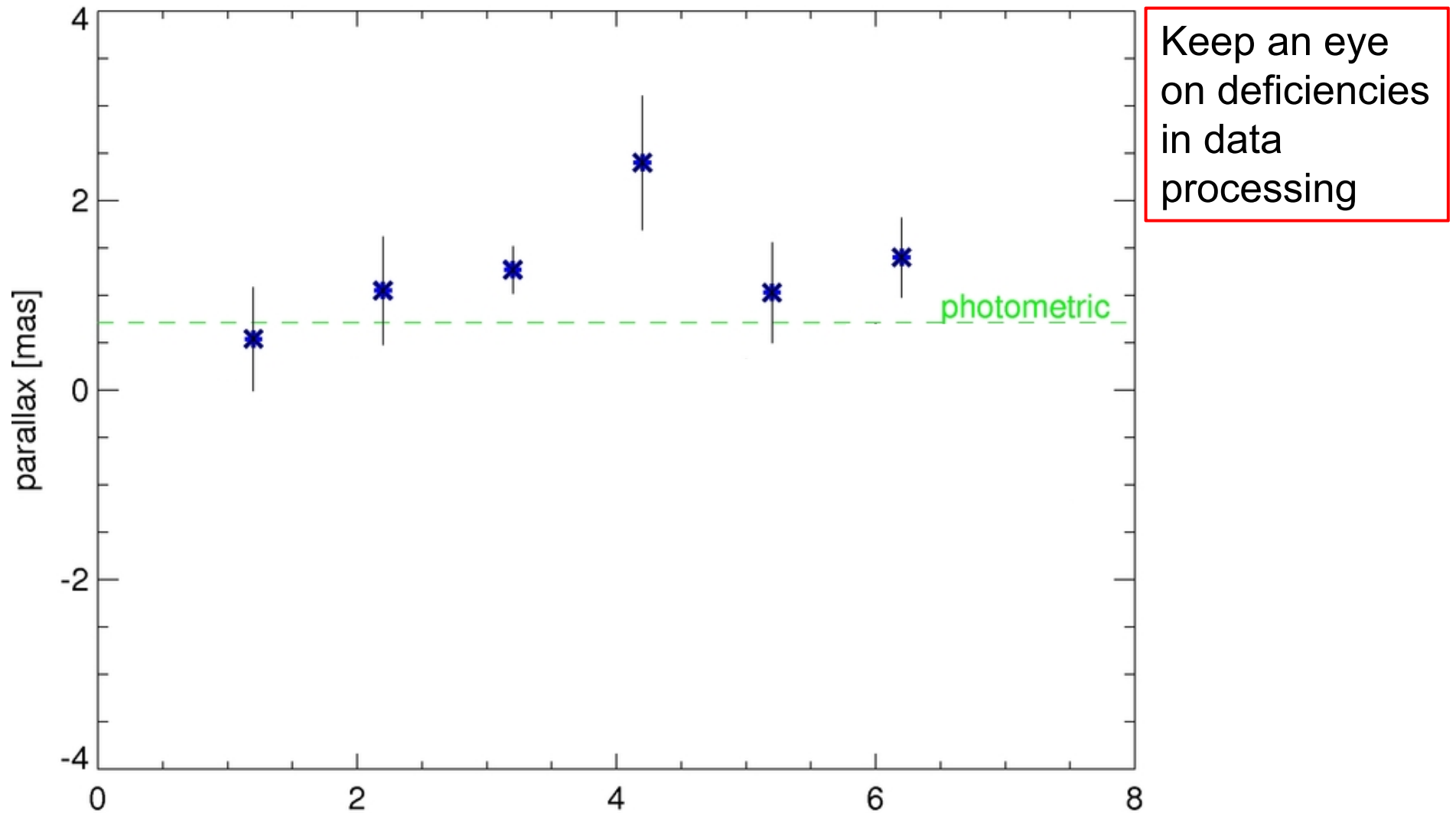
- Signature of scanning law *is* expected
 - Number of observations/source.
 - Standard errors & correlations.
 - ...
- Signature of scanning law is *not* expected
 - Astrophysical quantities
 - Parallaxes
 - ...

Local parallax errors

NGC 6231 in Hipparcos



NGC 6231 in Hipparcos 2



Row reignites over distance of Pleiades star cluster

New measurement points to possible error in ESA survey that could also affect the agency's new Gaia mission.

Gaia gremlin?

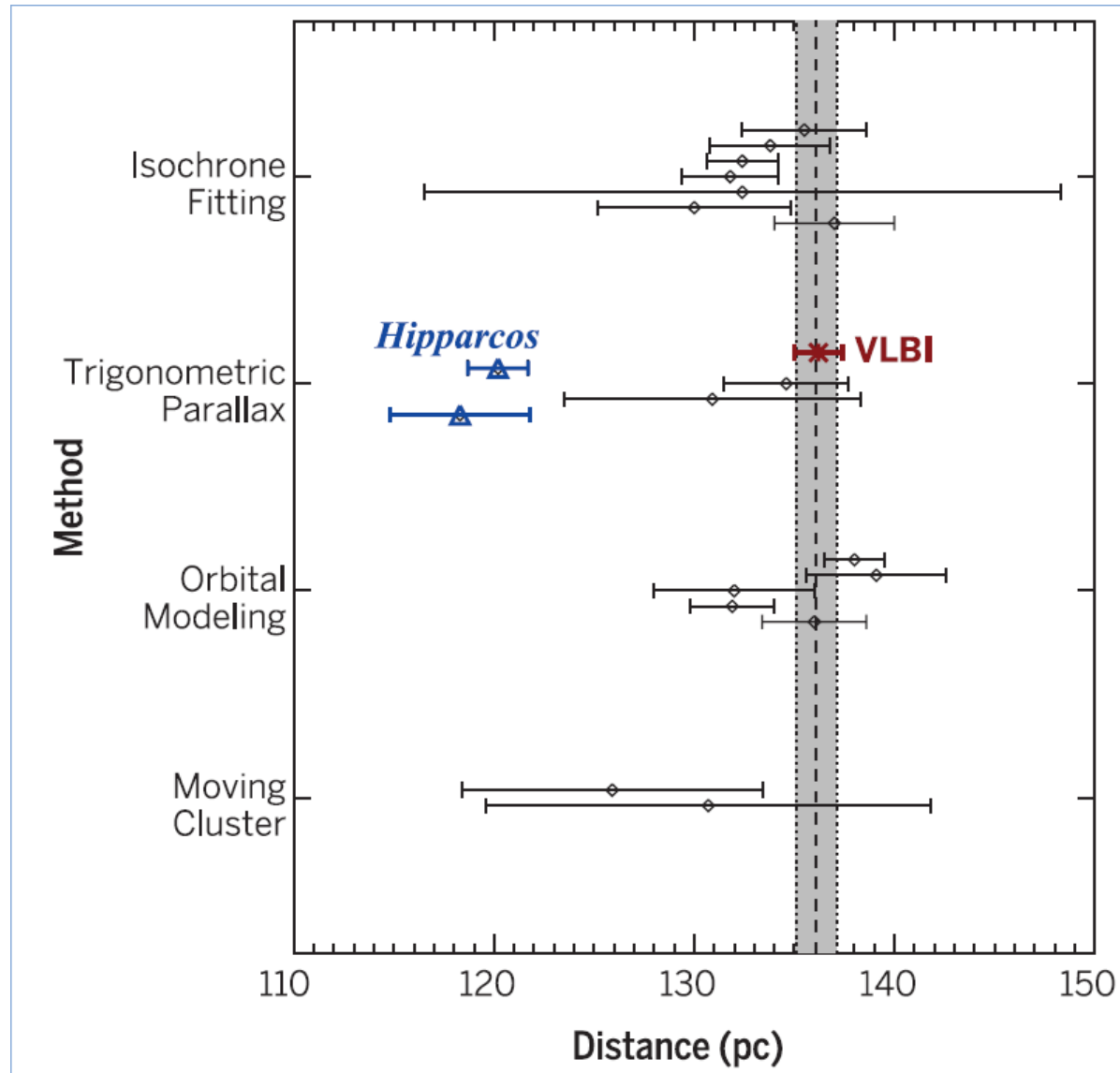
Melis and Soderblom say that if a systematic error skewed the Hipparcos data last month. similar gremlin could also bedevil ESA's Gaia space telescope, which was due to map the distances to roughly a billion stars in our Galaxy over the next five years.

unrecognized Hipparcos error itself (if it does)? VLBI distances like those presented by an important cross-check near its predicted precision.

The most precise measurement yet of the distance to the Pleiades star cluster is reviving a dispute that has split the astronomy community largely down a trans-Atlantic divide for the past 17 years.

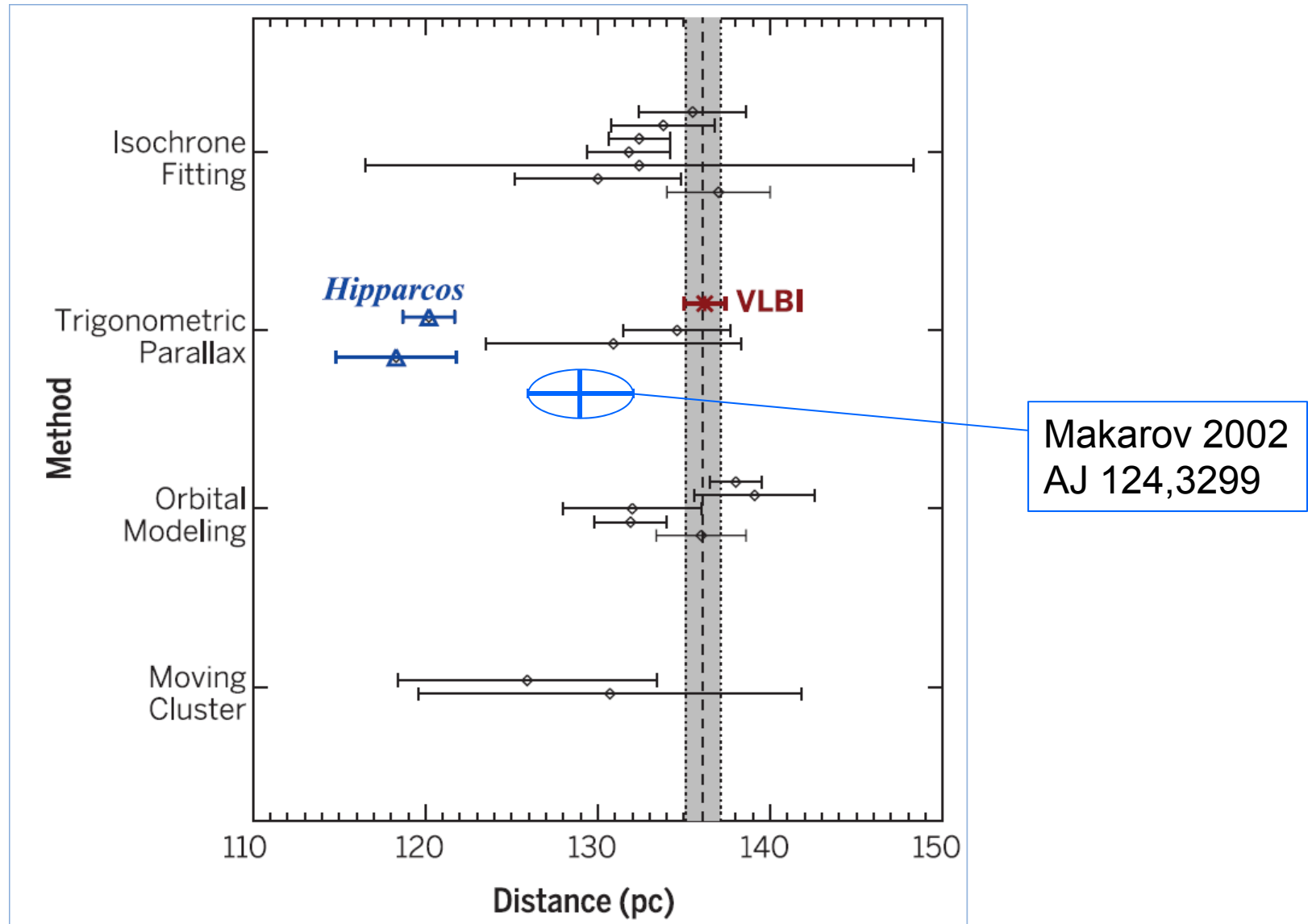
output

Distance to the Pleiades



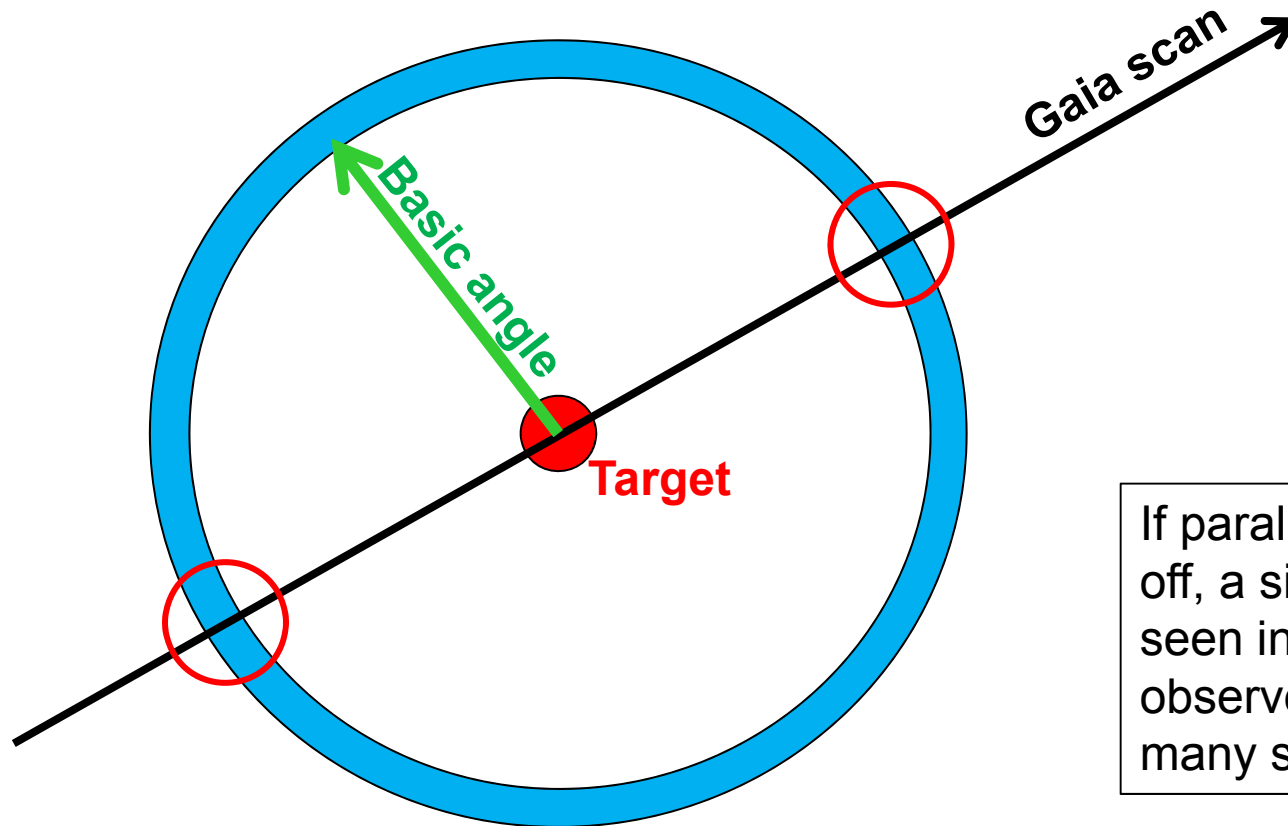
Melis et al., Science 345, 1029 (2014)

Distance to the Pleiades



Melis et al., Science 345, 1029 (2014)

Gremlin check in one target area



If parallax of target area is off, a signature will be seen in simultaneously observed areas, when many scans are combined

May be reformulated in terms of attitude anomalies

Ideas for astrometric validation

- Negative parallaxes, distribution
- Residuals versus colour, observation details
- Study excess noise (residuals vs formal errors)
- Gremlin exorcism (correlations, attitude anom.)
- Vary initial conditions
 - Initial attitude
 - Source selection
- Compare with external catalogues, e.g. VLBI
- Determine light deflection by Sun
- Properties of clusters

Quis custodiet ipsos custodes

- Several tiers of validation
- Slightly overlapping validation tasks
- Validation
 - Provides a health certificate: Realistic expectations
 - Shows expected statistical effects
 - Contributes to the catalogue documentation
- Final validation comes from using the data
 - Feedback after early releases is important and welcome.



Thank you!