Synergy between ARIEL and NGTS

Peter Wheatley
University of Warwick

on behalf of the NGTS consortium:
UK (Belfast, Cambridge, Leicester, Warwick),
Switzerland (Geneva), Germany (DLR Berlin)

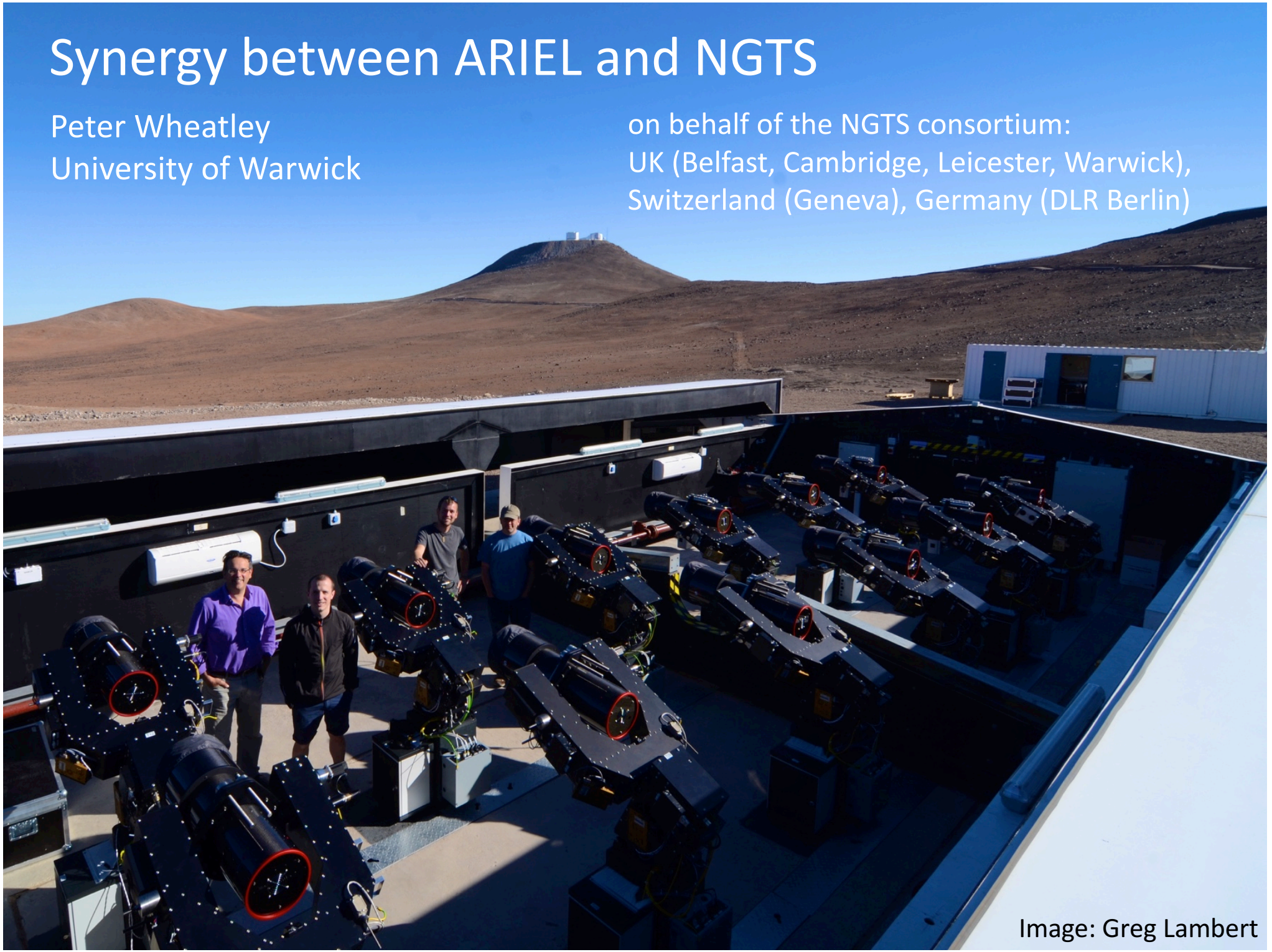
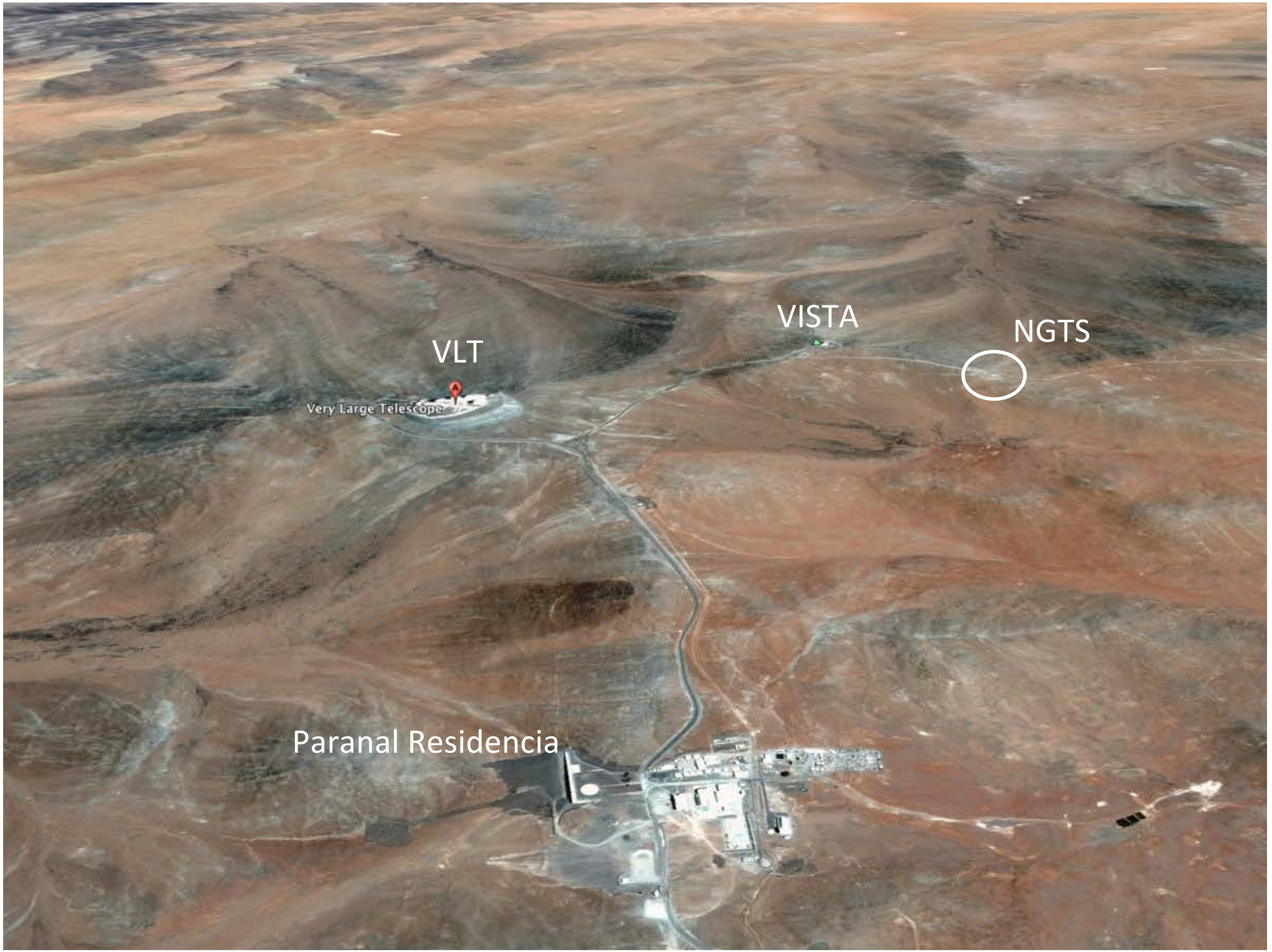
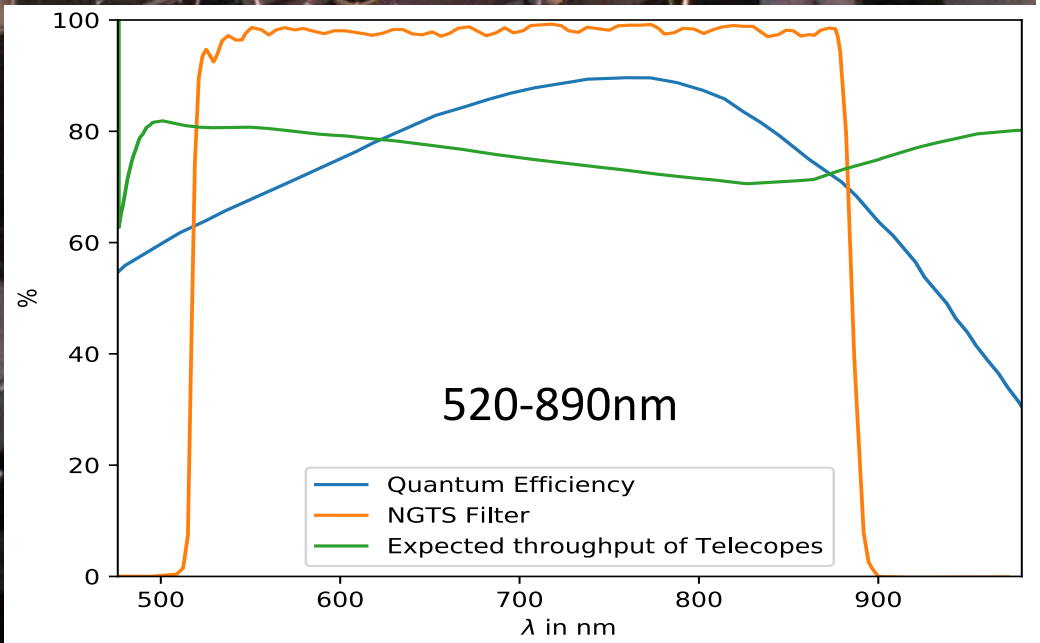
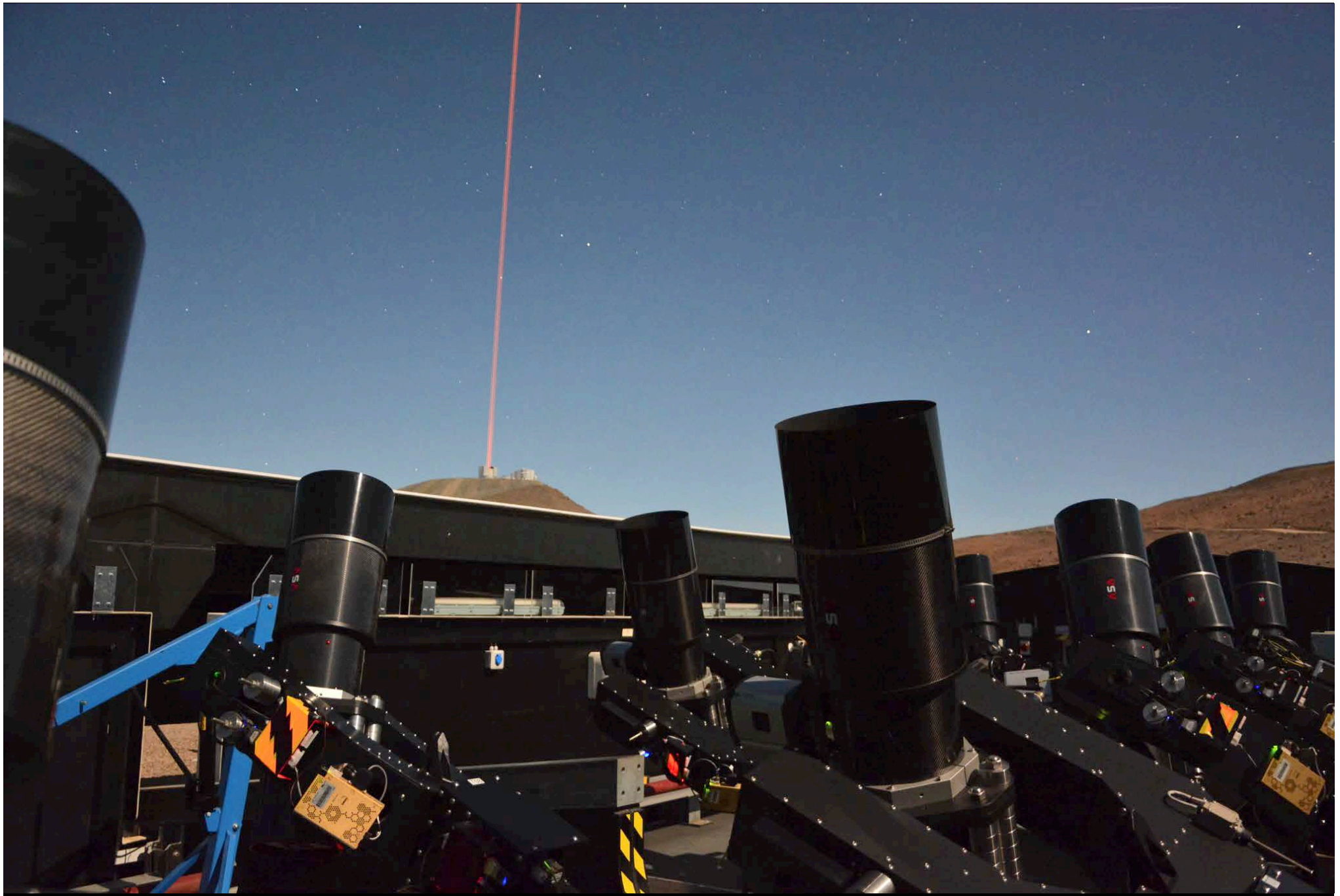


Image: Greg Lambert


VISTA
NGTS
VLT
Very Large Telescope
Paranal Residencia

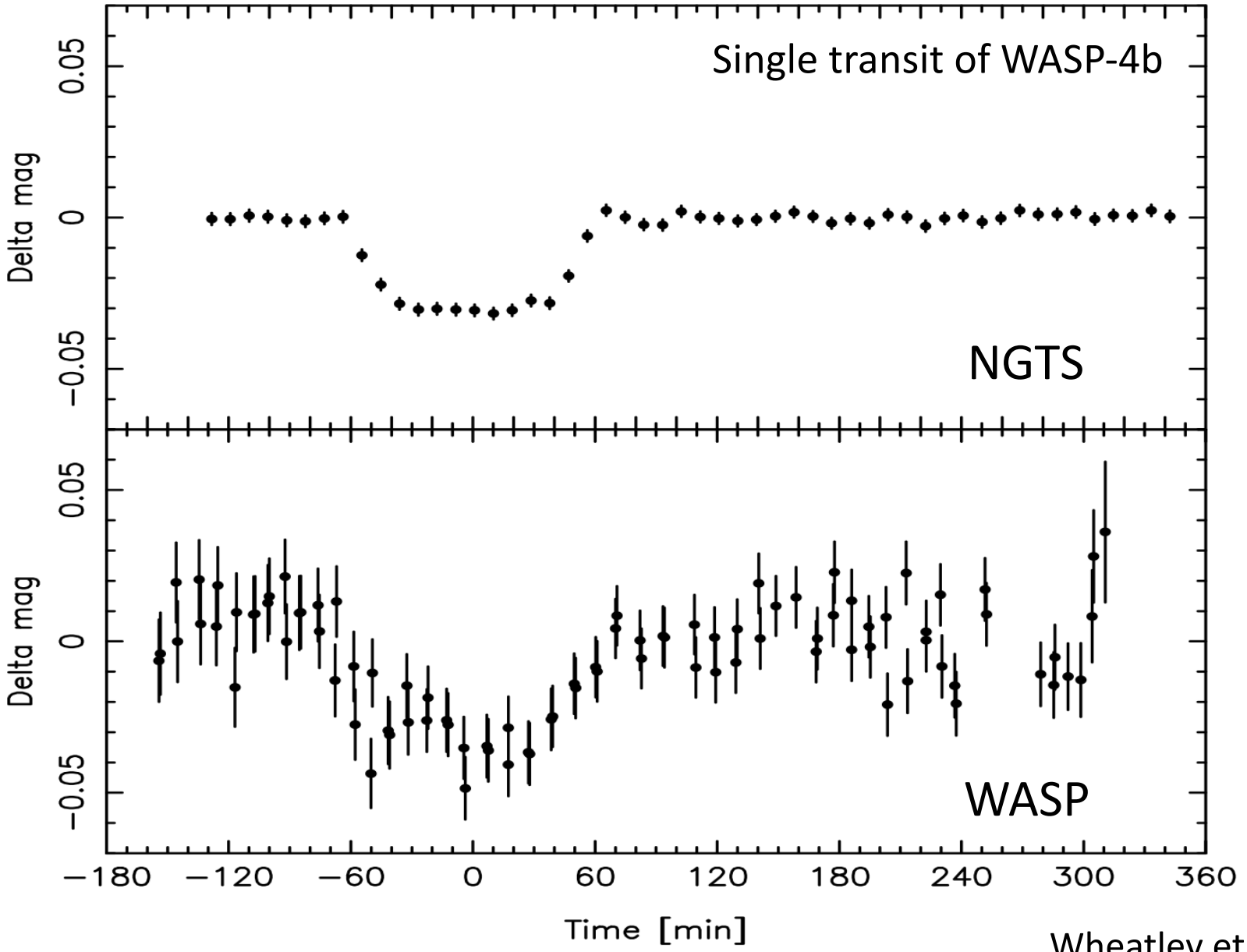
12 x 20cm f/2.8 telescopes on independent mounts
96 sqr deg total FoV; 5 arcsec pixels
Full-frame images at 13s cadence
Wheatley et al, 2018





Movie: Peter Wheatley

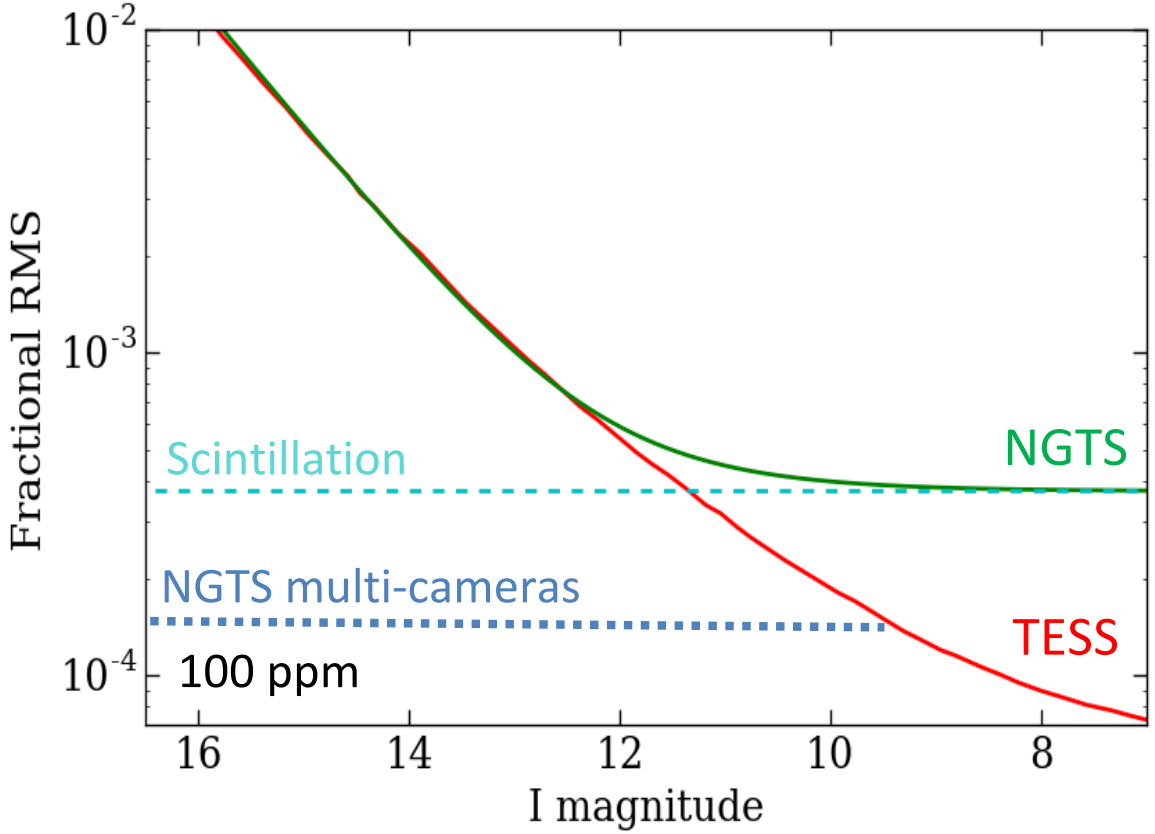
Comparison with WASP



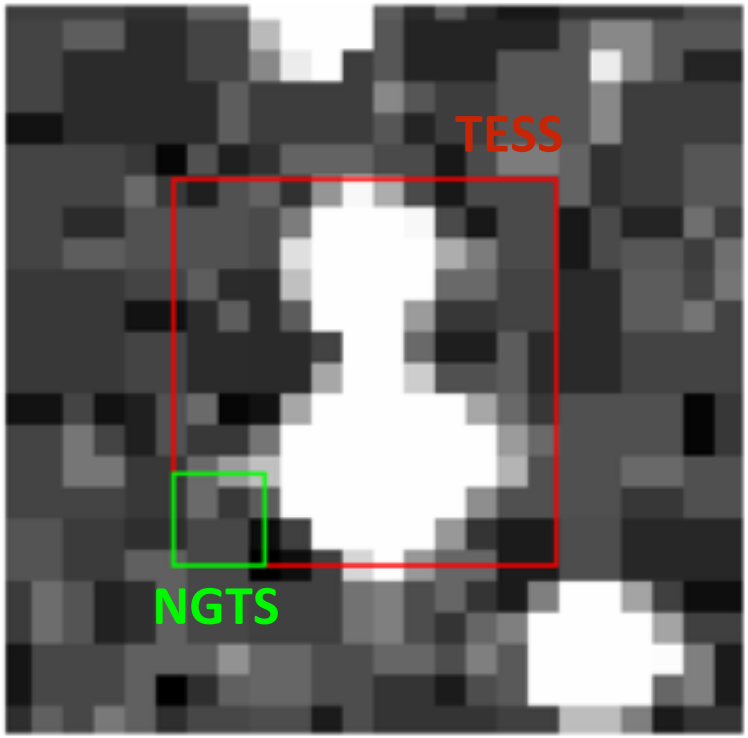
Wheatley et al, 2018

Comparison with TESS

Photometric precision in 30min



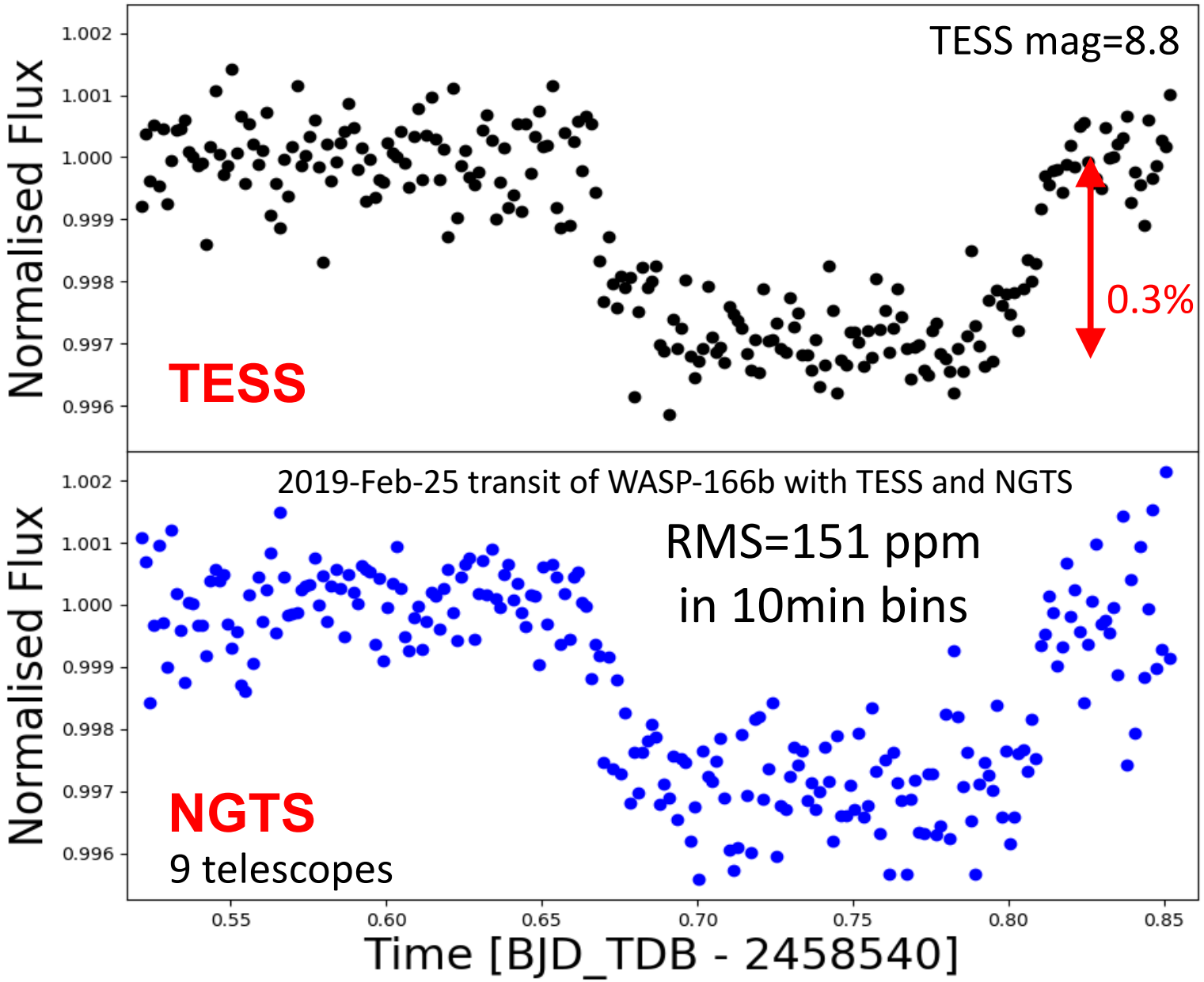
Pixel scale



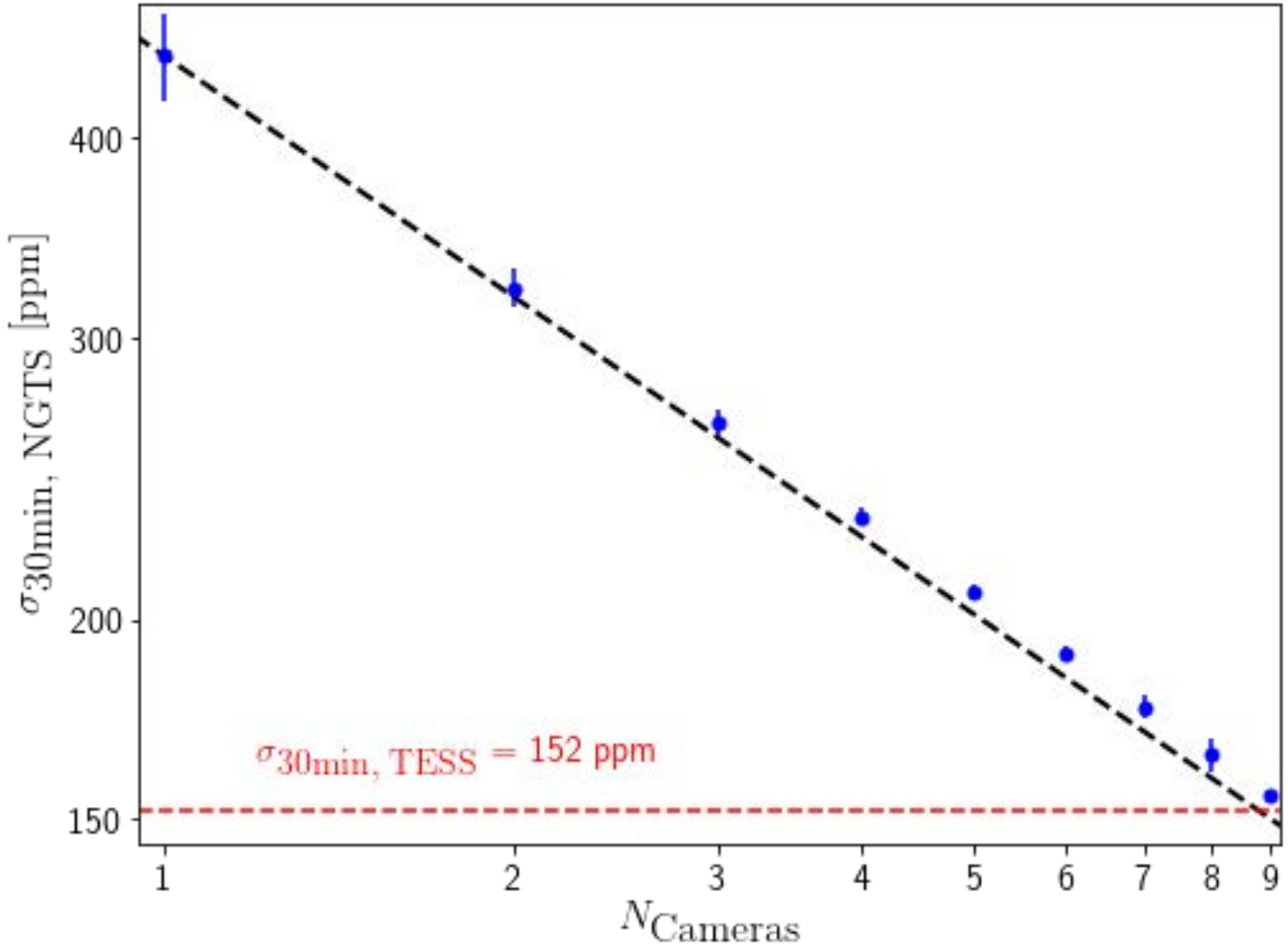
Full frame images at 13s cadence

Wheatley et al, 2018

Space-like photometry with multiple NGTS cameras

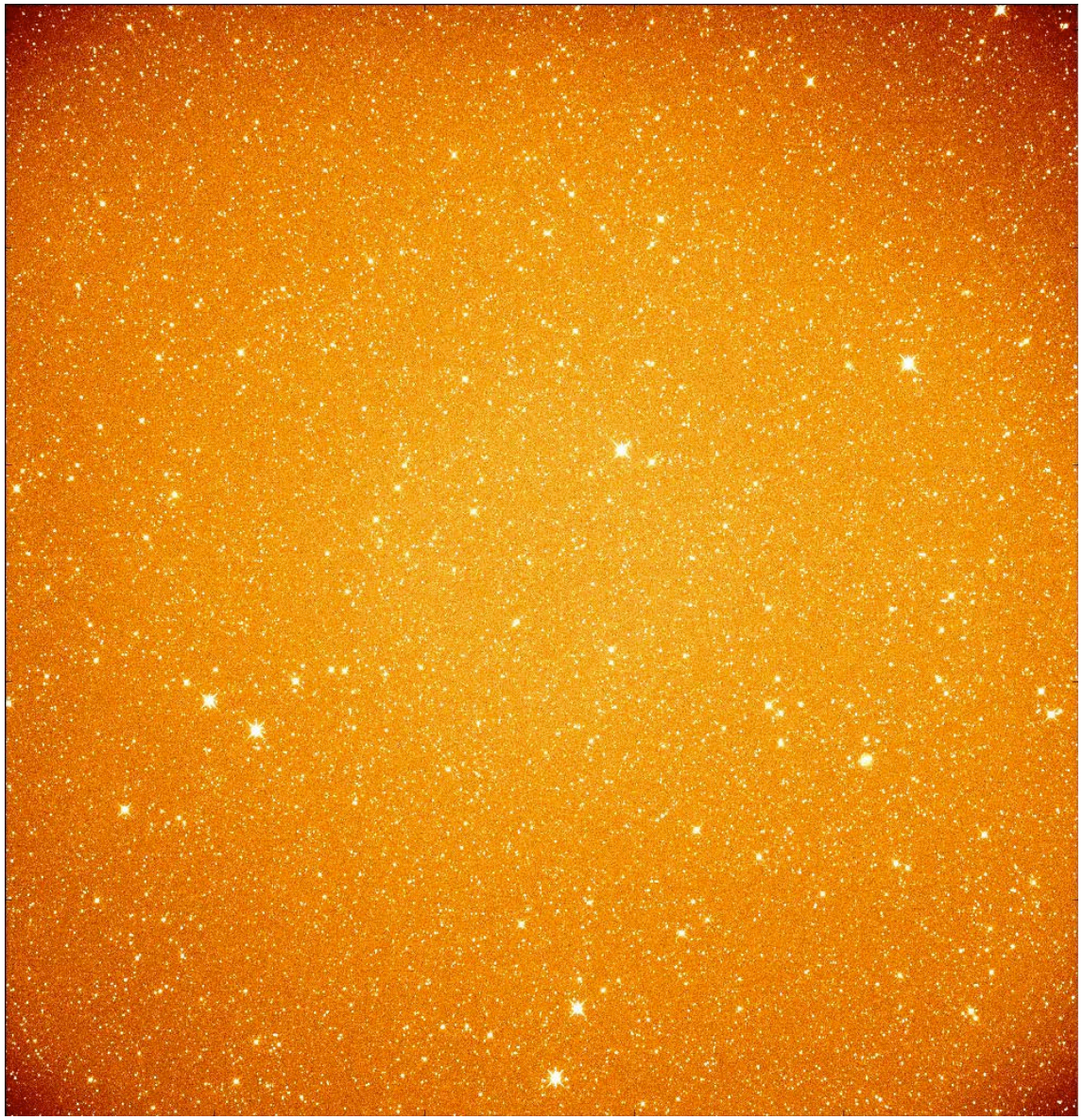


Residuals bin as white noise as cameras combined



Precise autoguiding with “Donuts” algorithm

Full image



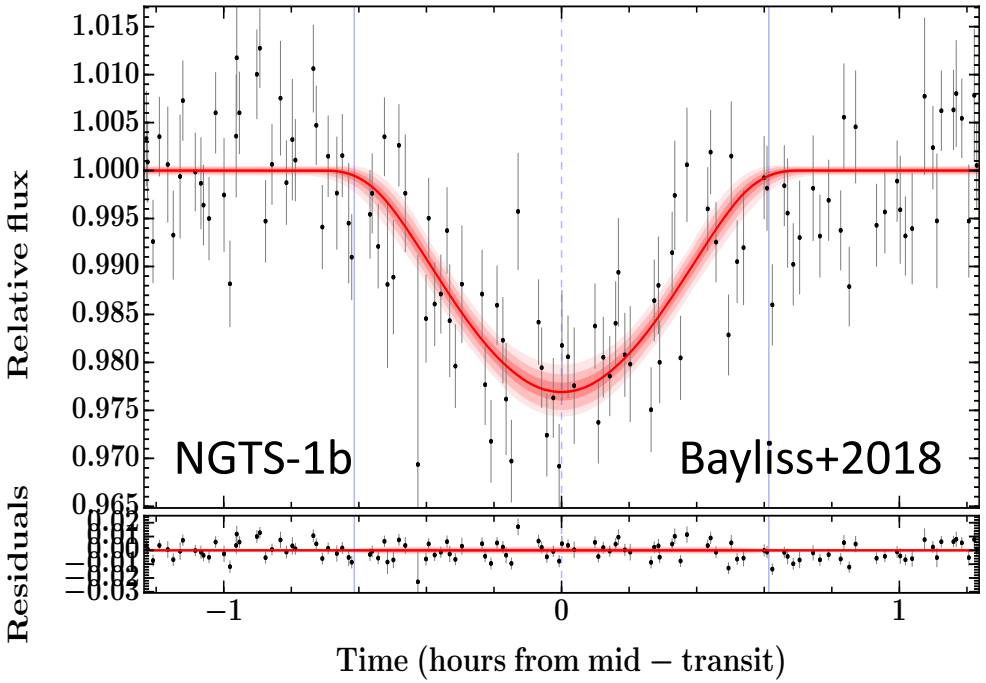
Guiding precision 0.03 pixels over 6 months

Individual star

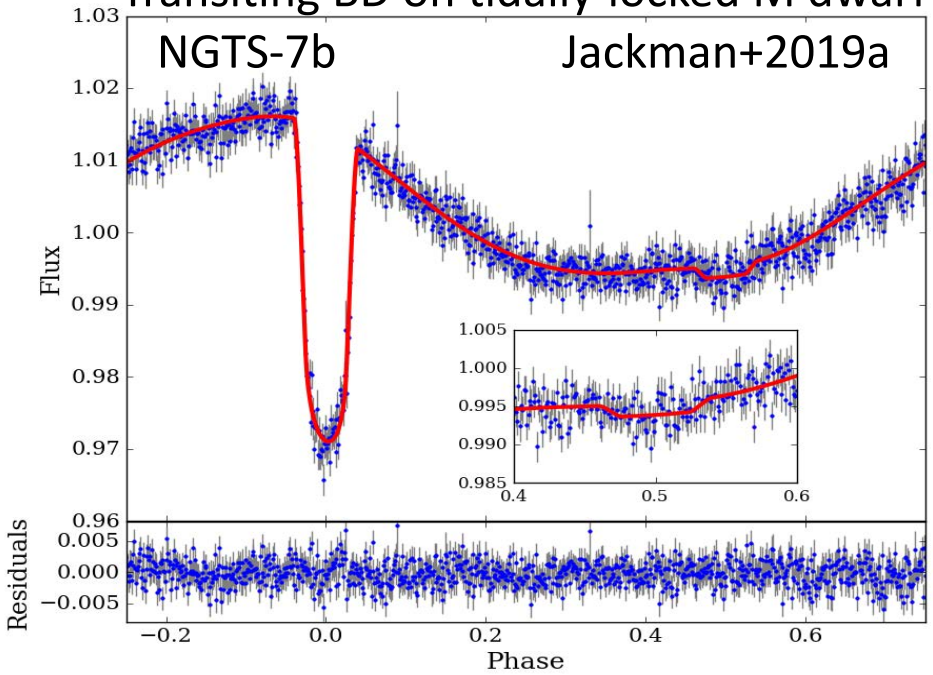
McCormac et al, 2013, 2016
Wheatley et al, 2018

ARIEL Synergy I: targets

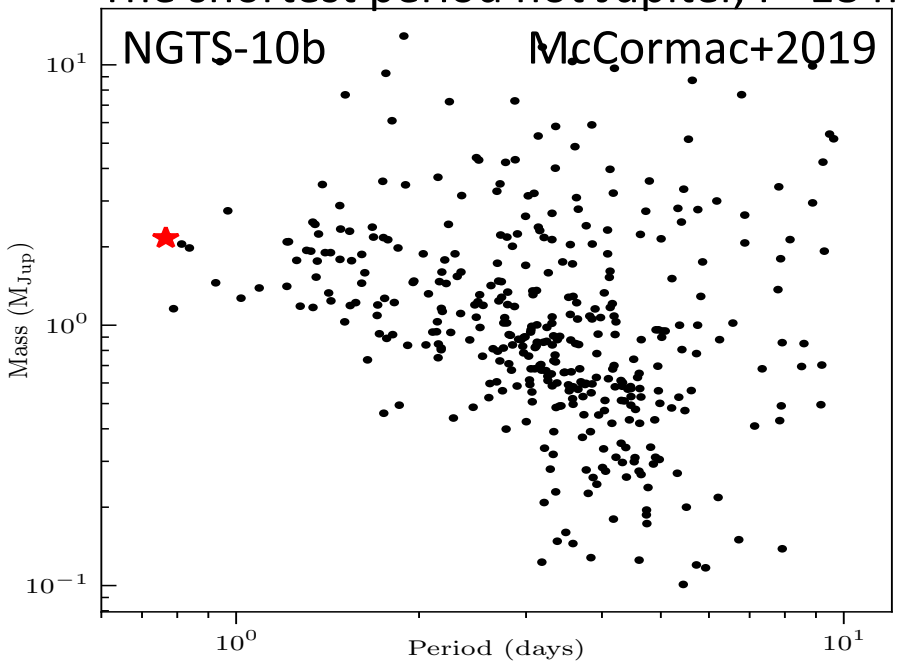
Hot Jupiter orbiting an M-dwarf



Transiting BD on tidally-locked M dwarf



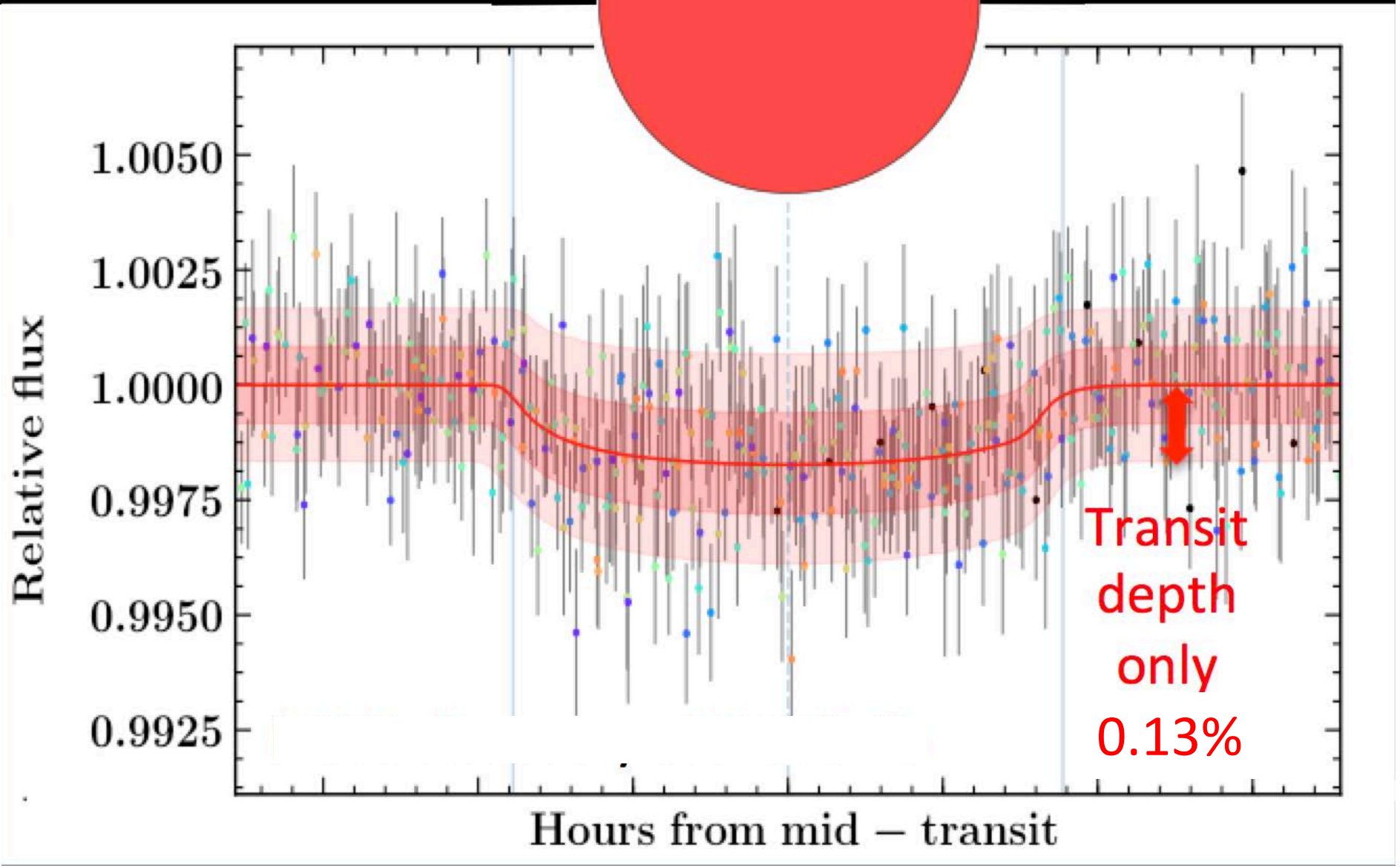
The shortest period hot Jupiter, P=18 h

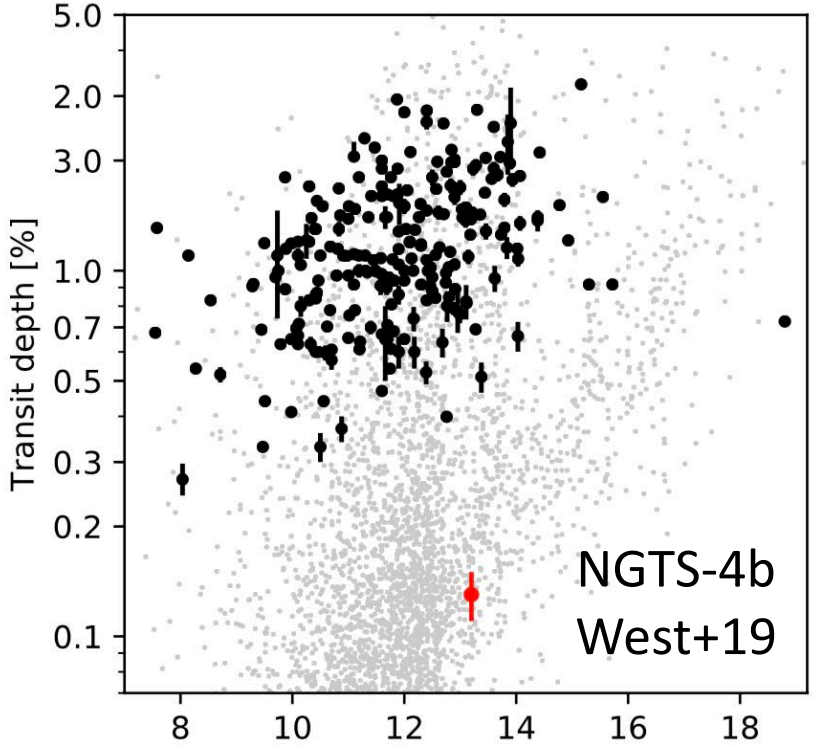


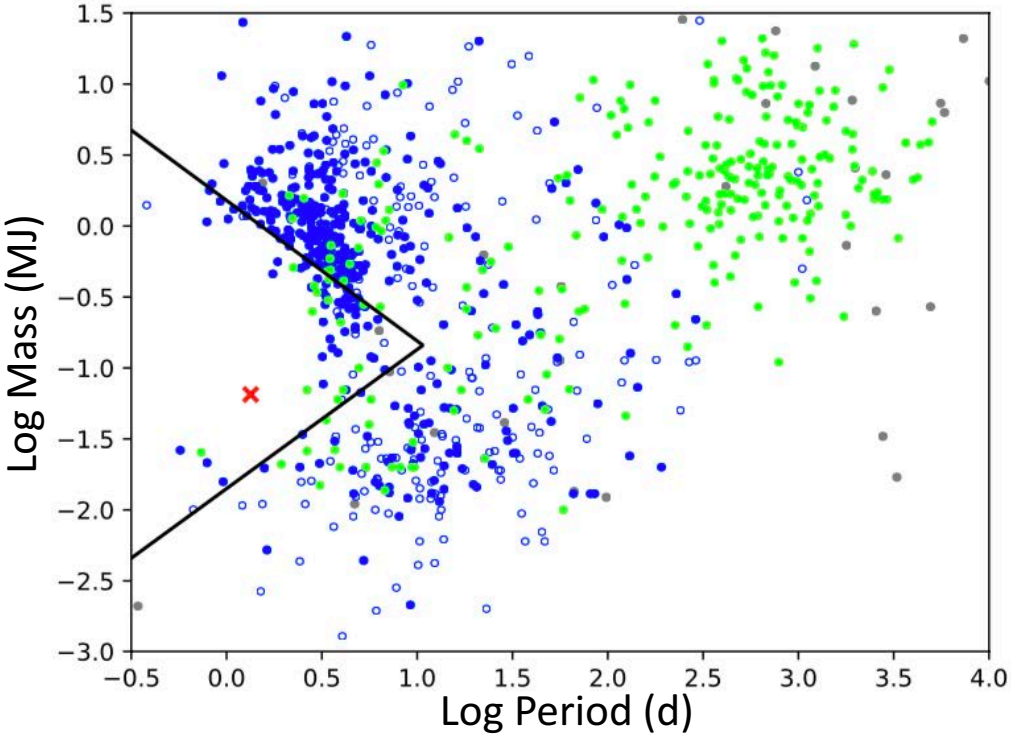
ARIEL Synergy I: targets

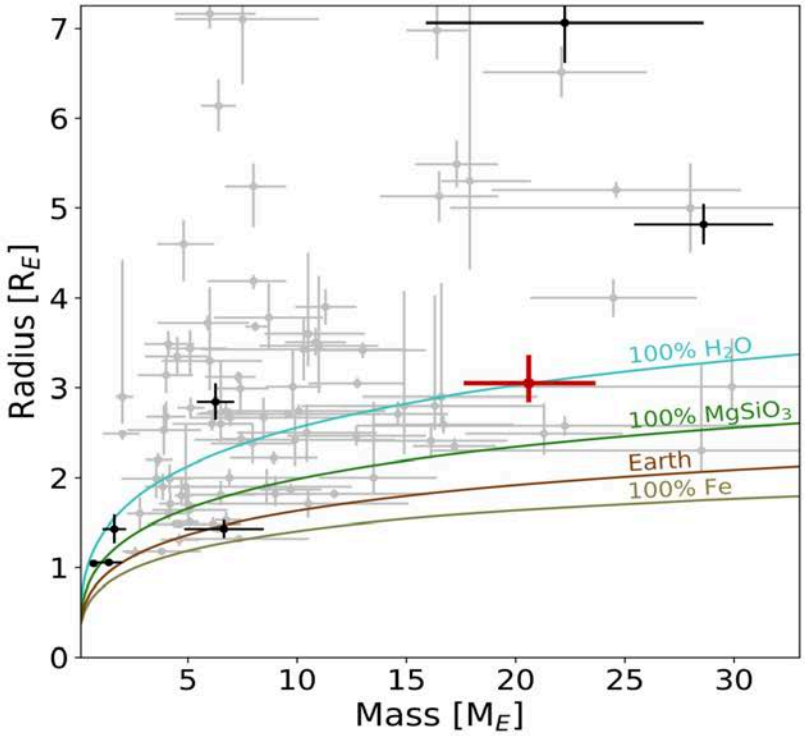
NGTS-4b West et al. 2019

3 Earth radius sub-Neptune
in the Neptunian desert




Transit depth [%]
NGTS-4b
West+19

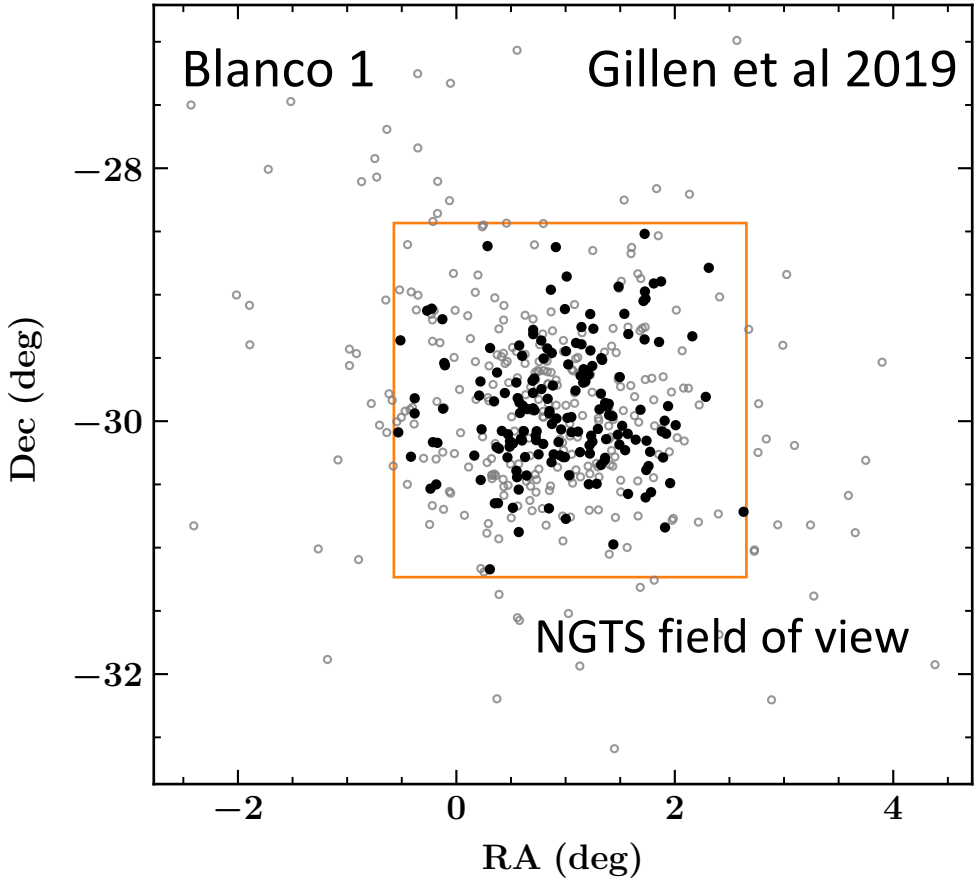

Log Mass (MJ)
Log Period (d)

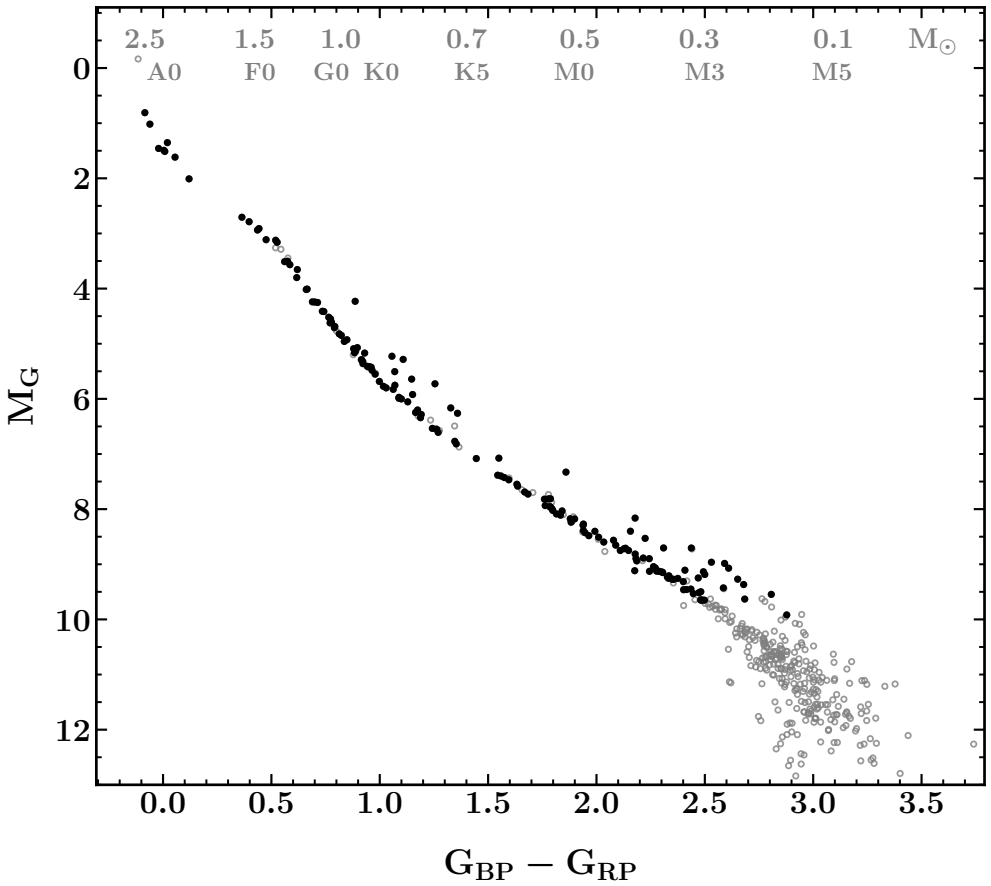

Radius [R_E]
Mass [M_E]
100% H2O
100% MgSiO3
Earth
100% Fe

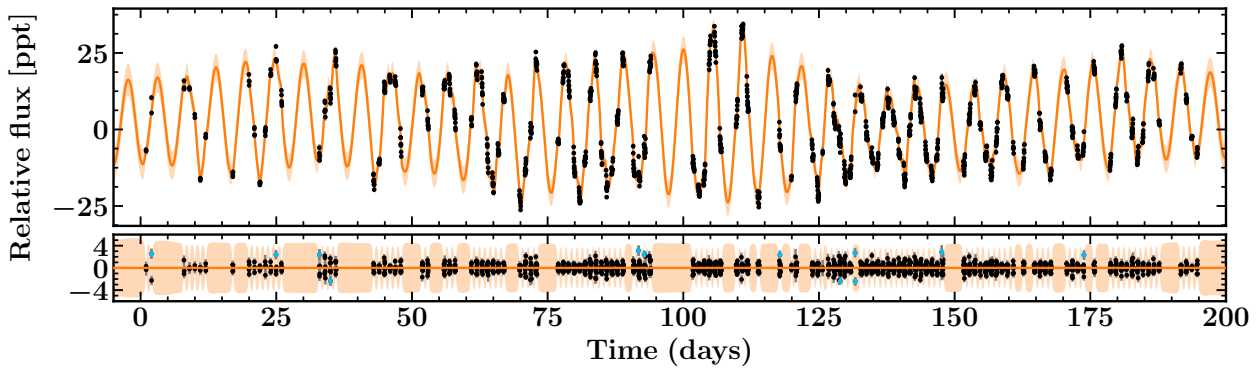

“The Forbidden planet”
Warwick / Mark Garlick

ARIEL Synergy I: targets

Young planets in open clusters and star forming regions

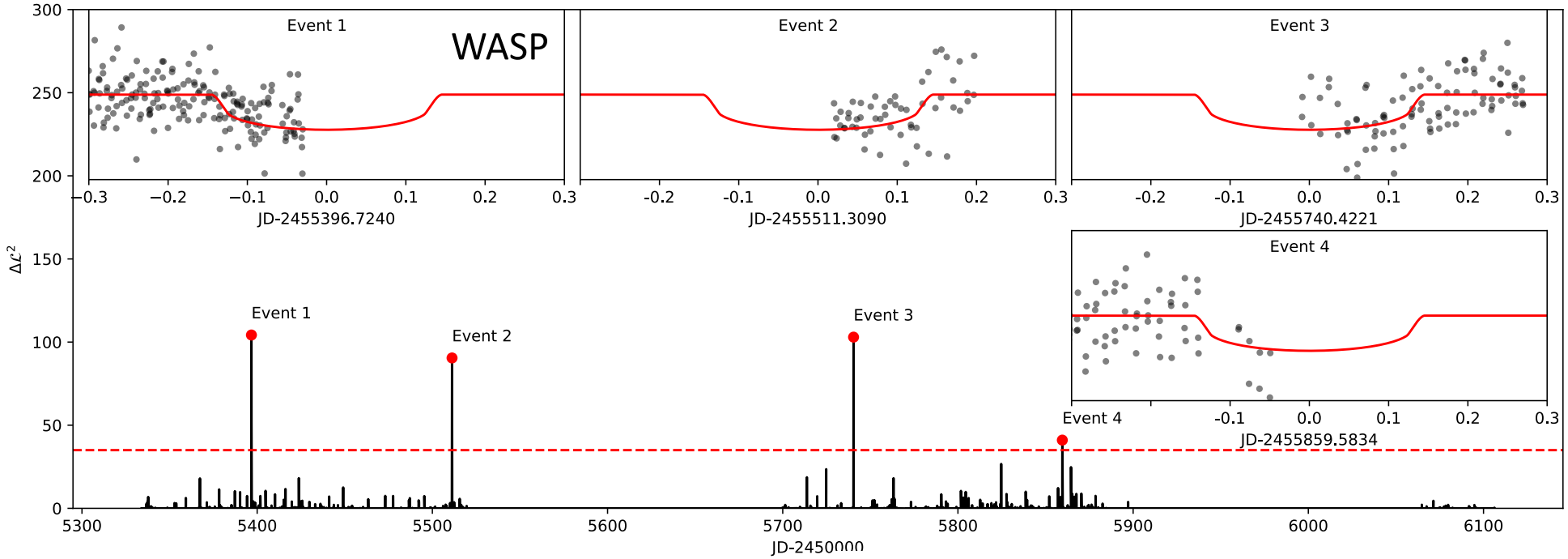






ARIEL Synergy I: targets

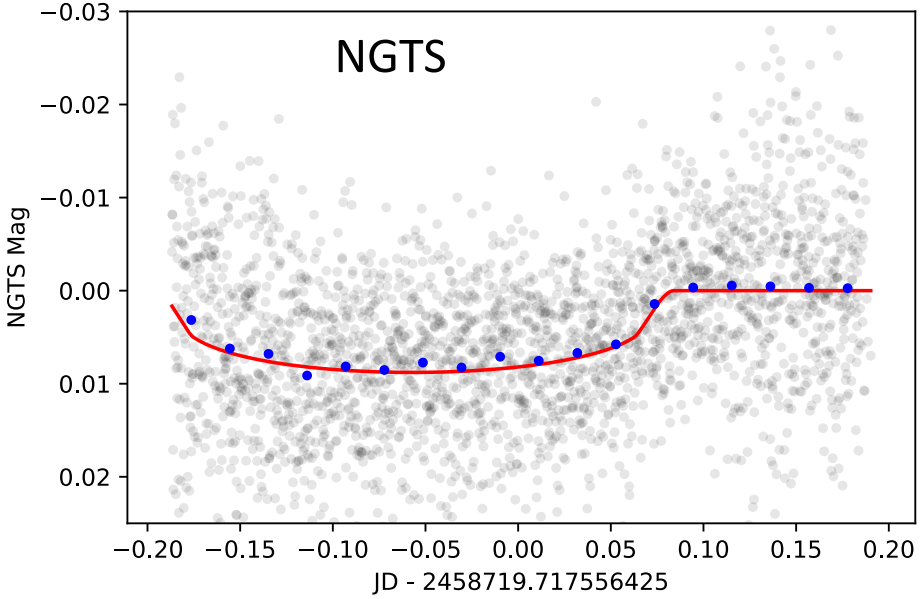
Long-period transiting exoplanets from TESS mono-transits



TIC-238855958

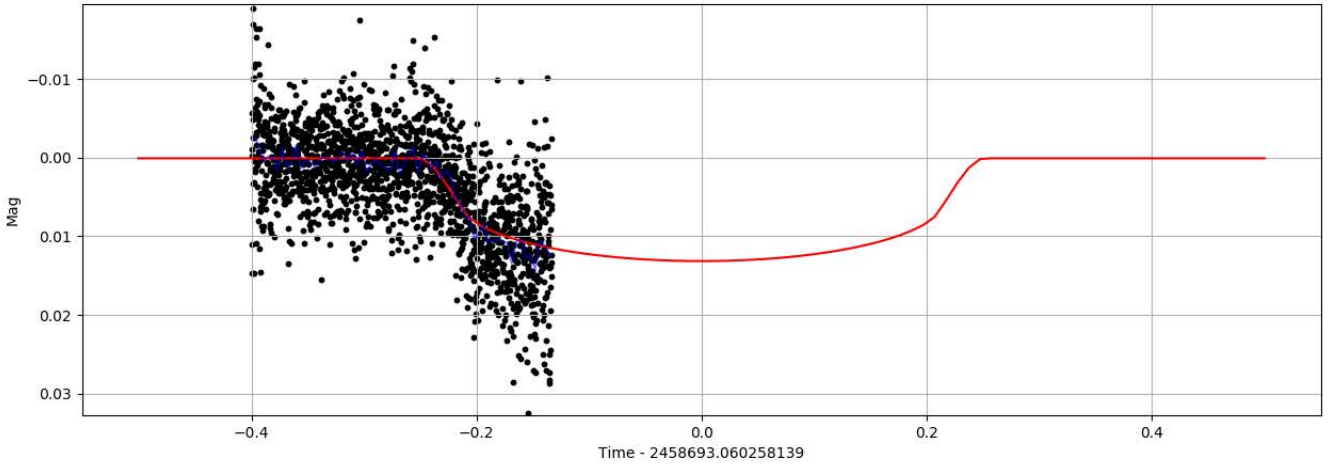
38 day low-mass eclipsing binary

Gill et al, 2019

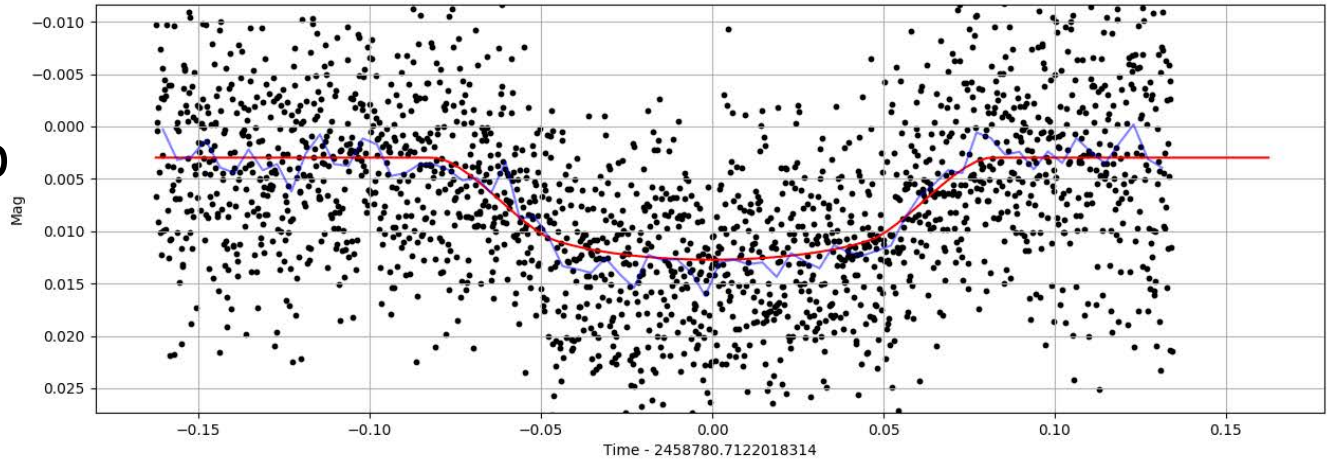


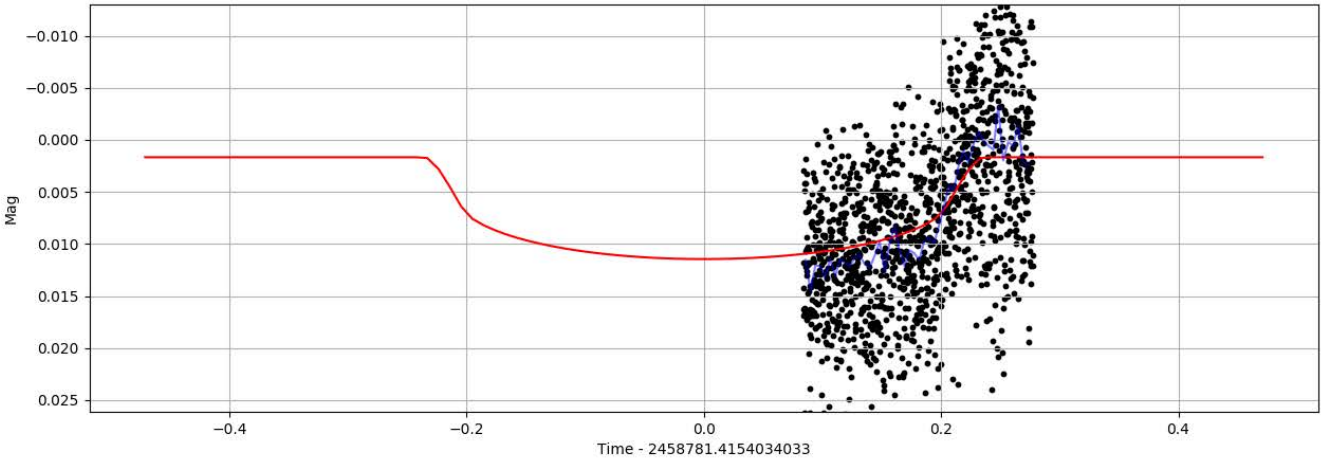
ARIEL Synergy I: targets

Long-period transiting exoplanets from TESS mono-transits



Photometric follow up with NGTS

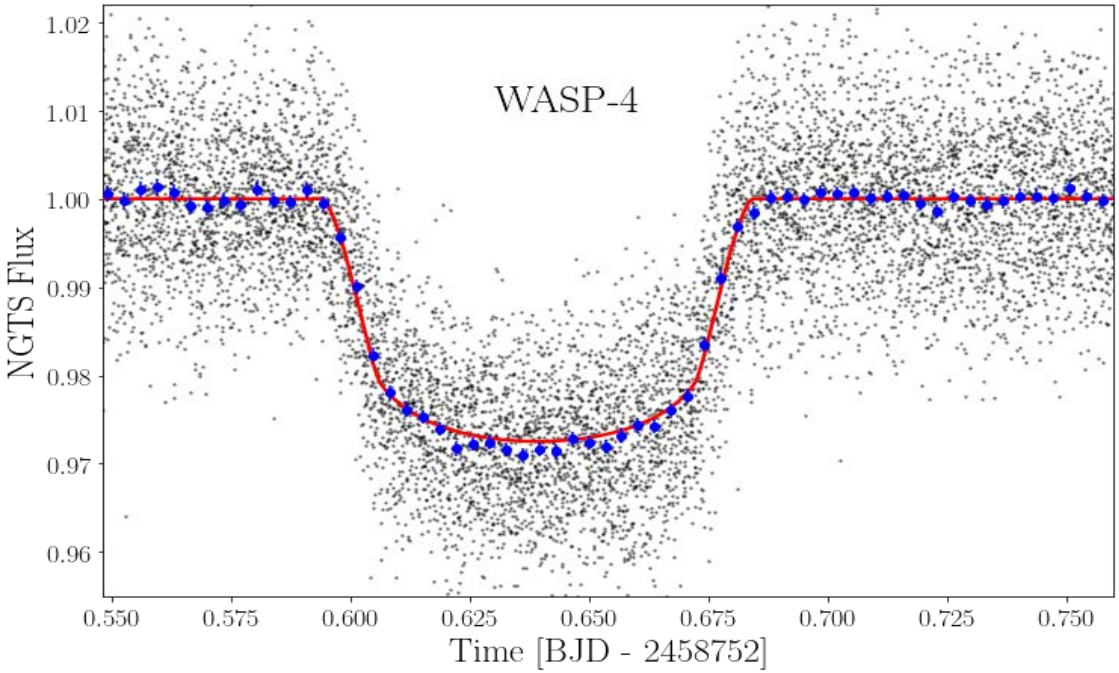




ARIEL Synergy II: ephemerides

Hot Jupiter

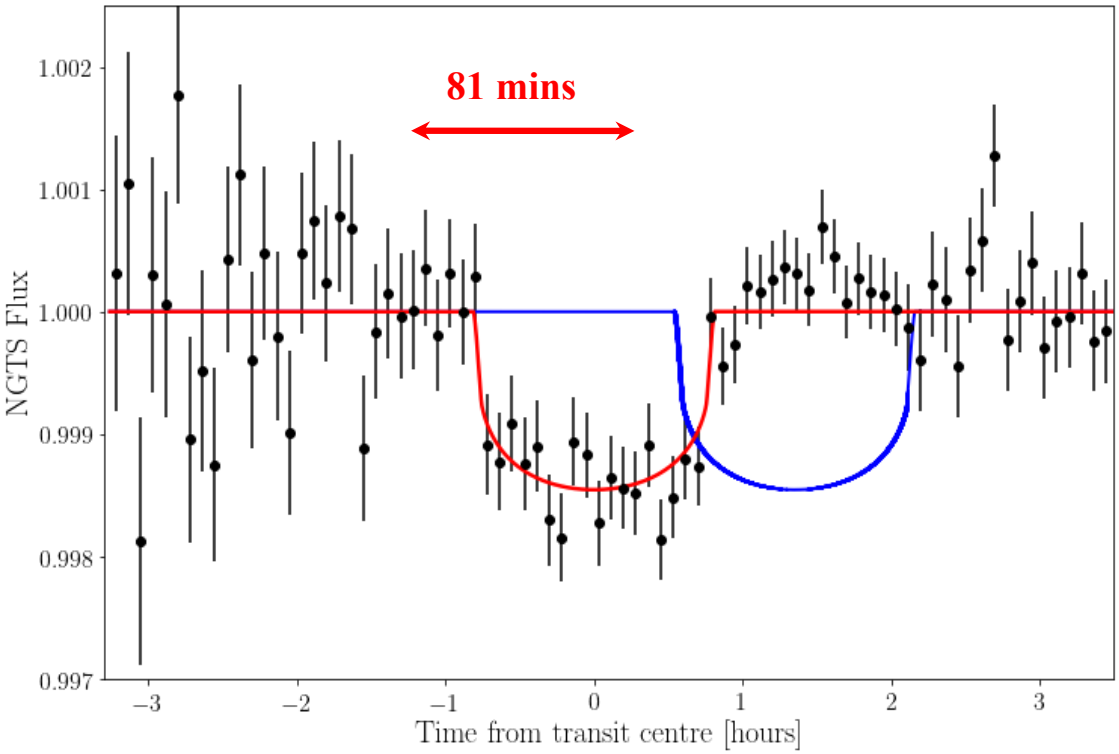
NGTS 15 sec timing precision



1 mmag transit

NGTS 5 min timing precision

Armstrong et al. submitted

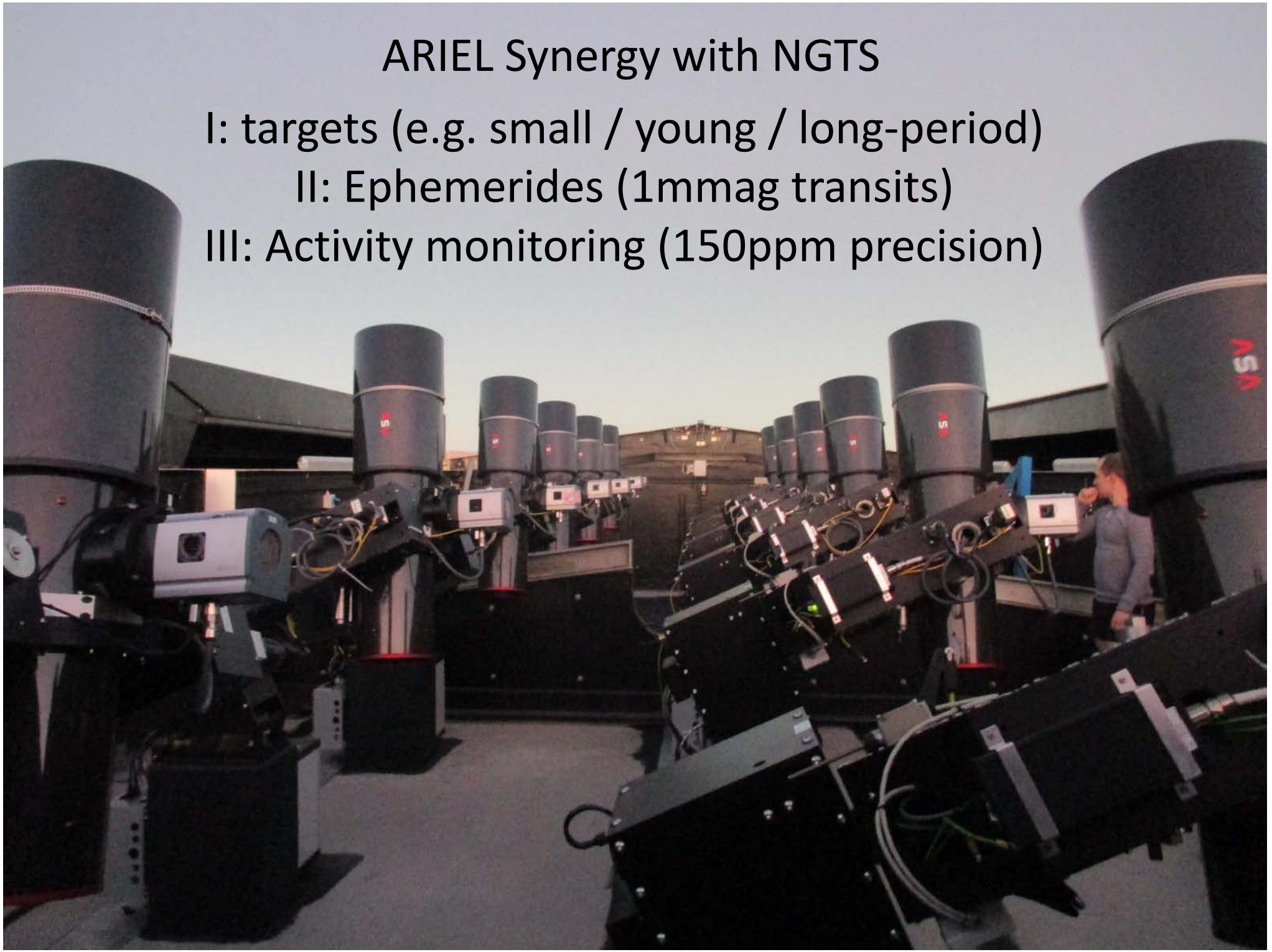


ARIEL Synergy with NGTS

I: targets (e.g. small / young / long-period)

II: Ephemerides (1mmag transits)

III: Activity monitoring (150ppm precision)



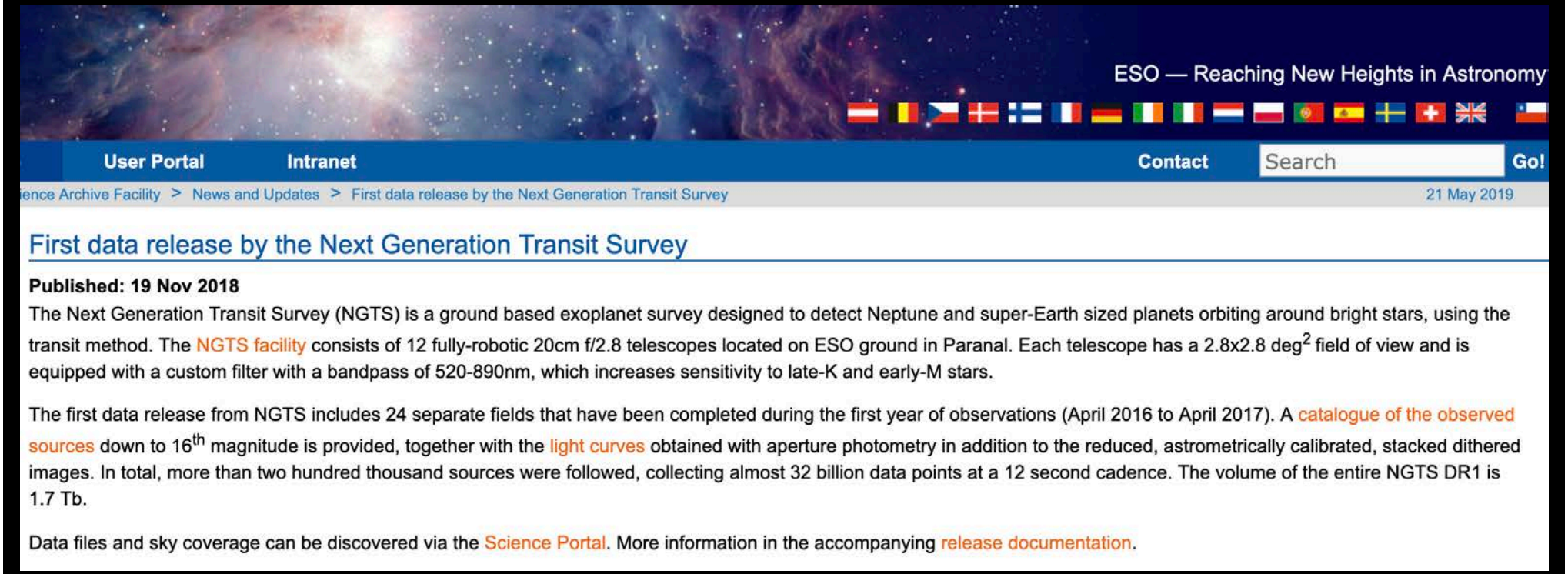
NGTS Data Access

NGTS DR1 Available at ESO archive:

1.7 TB, 2×10^5 stars, 3×10^{10} photometric points

DR2 coming soon:

72 fields, 13 millions images, 6×10^5 stars, 1×10^{11} points



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ence Archive Facility > News and Updates > First data release by the Next Generation Transit Survey 21 May 2019

First data release by the Next Generation Transit Survey

Published: 19 Nov 2018

The Next Generation Transit Survey (NGTS) is a ground based exoplanet survey designed to detect Neptune and super-Earth sized planets orbiting around bright stars, using the transit method. The NGTS facility consists of 12 fully-robotic 20cm f/2.8 telescopes located on ESO ground in Paranal. Each telescope has a 2.8x2.8 deg^2 field of view and is equipped with a custom filter with a bandpass of 520-890nm, which increases sensitivity to late-K and early-M stars.

The first data release from NGTS includes 24 separate fields that have been completed during the first year of observations (April 2016 to April 2017). A catalogue of the observed sources down to 16^{th} magnitude is provided, together with the light curves obtained with aperture photometry in addition to the reduced, astrometrically calibrated, stacked dithered images. In total, more than two hundred thousand sources were followed, collecting almost 32 billion data points at a 12 second cadence. The volume of the entire NGTS DR1 is 1.7 Tb.

Data files and sky coverage can be discovered via the Science Portal. More information in the accompanying release documentation.

NGTS Consortium also welcomes proposals for collaboration from the community
Either on individual targets, or as external collaborators on wider projects

www.ngtransits.org

NGTS
NEXT-GENERATION TRANSIT SURVEY

www.ngtransits.org

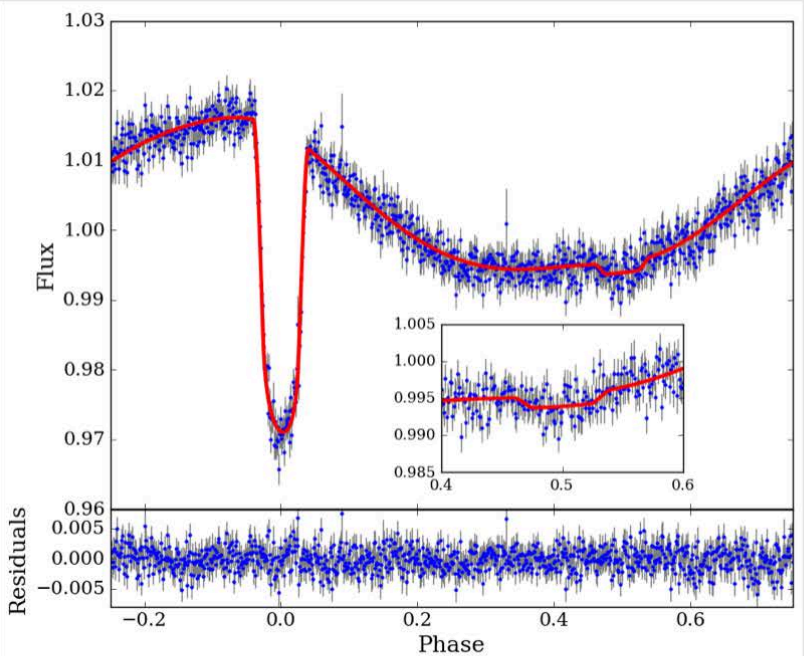
Access to NGTS data

NGTS data are publicly available though the ESO Data Archive.

The first data release, NGTS DR1, was made in Nov 2018 and includes data for 24 fields that were completed between the beginning of the NGTS survey in April 2016 and April 2017. NGTS DR1 includes data for more than two hundred thousand sources and a total of 32 billion photometric data points (corresponding to 1.7 TB of data). A second, larger data release is planned for Autumn 2019.

If you would like advice on using NGTS data in your research, or are interested in forming a collaboration with the NGTS consortium, please don't hesitate to contact us.

Please note that any publications making use of NGTS data must include the following acknowledgement: "Based on data collected under the NGTS Project at the ESO La Silla Paranal Observatory."



The folded NGTS light curve of the transiting brown dwarf NGTS-7Ab. (Credit: J. Jackman)

Hints and Tips

The first NGTS data release covers relatively small patches of the sky that have been surveyed intensely. These are scattered across the sky, so a cone/box search for individual objects is not a natural way to access the data.

From the source catalogue query page, just hitting "search & view" without including any coordinates returns a list of all objects in the data release, which can be downloaded in a range of formats. This might be useful if you want to run your own cross match using e.g. topcat.