

Astrophysical Objects

Planet Formation

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**SCHOOL OF
PHYSICAL SCIENCES
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The Kepler satellite

The Kepler space telescope is a disused space telescope launched by NASA in 2009 **to discover Earth-sized planets orbiting other stars.** Named after astronomer Johannes Kepler, the spacecraft was launched into an Earth-trailing heliocentric orbit.

After nine and a half years of operation, retirement on October 30, 2018.

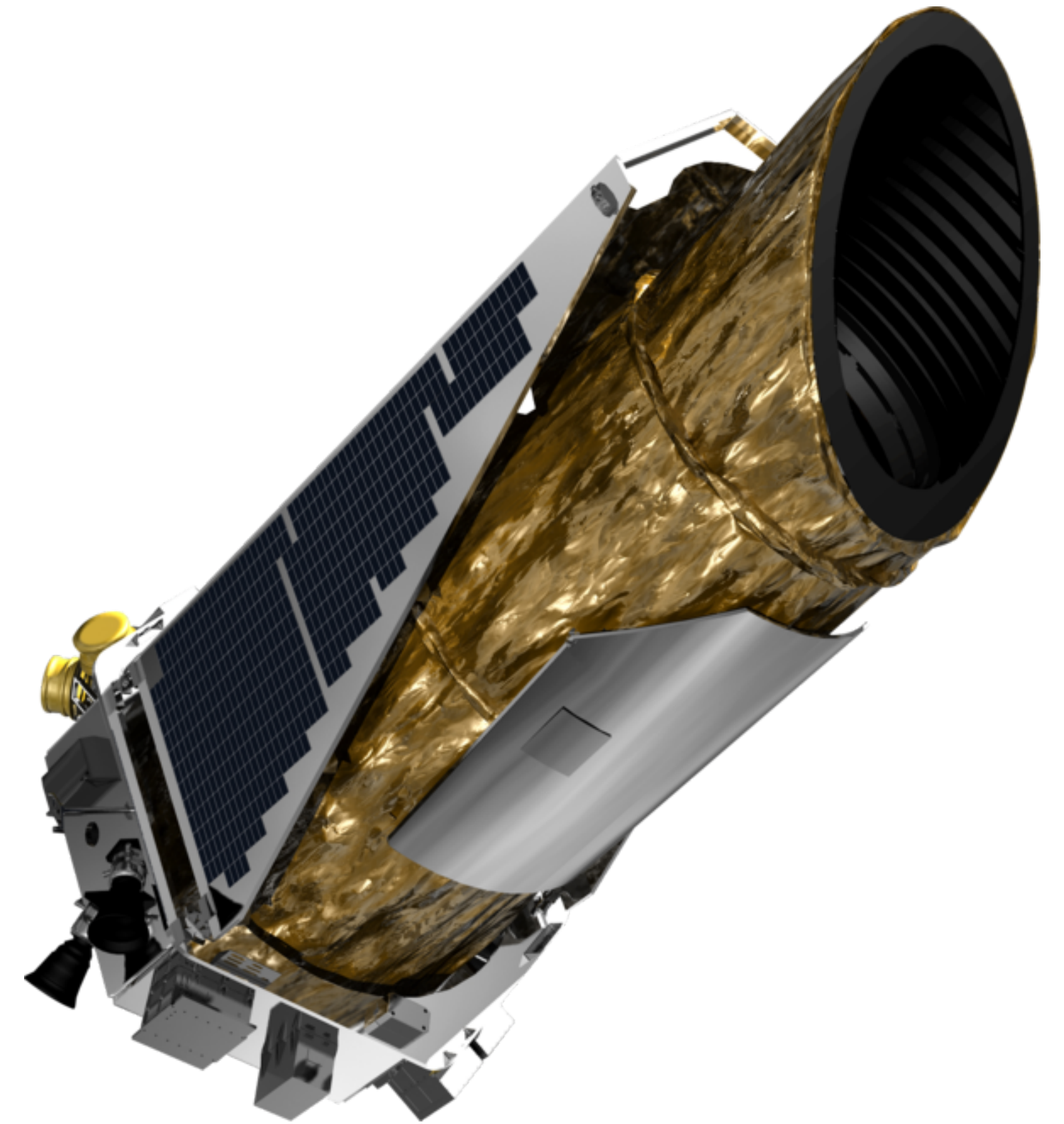
Designed to survey a portion of Earth's region of the Milky Way to discover Earth-size exoplanets in or **near habitable zones and estimate how many of the billions of stars in the Milky Way have such planets,**

Kepler's sole scientific instrument is a **photometer that continually monitored the brightness of approximately 150,000 main sequence stars in a fixed field of view.**

The data were analyzed to detect **periodic dimming** caused by exoplanets that cross in front of their host star.

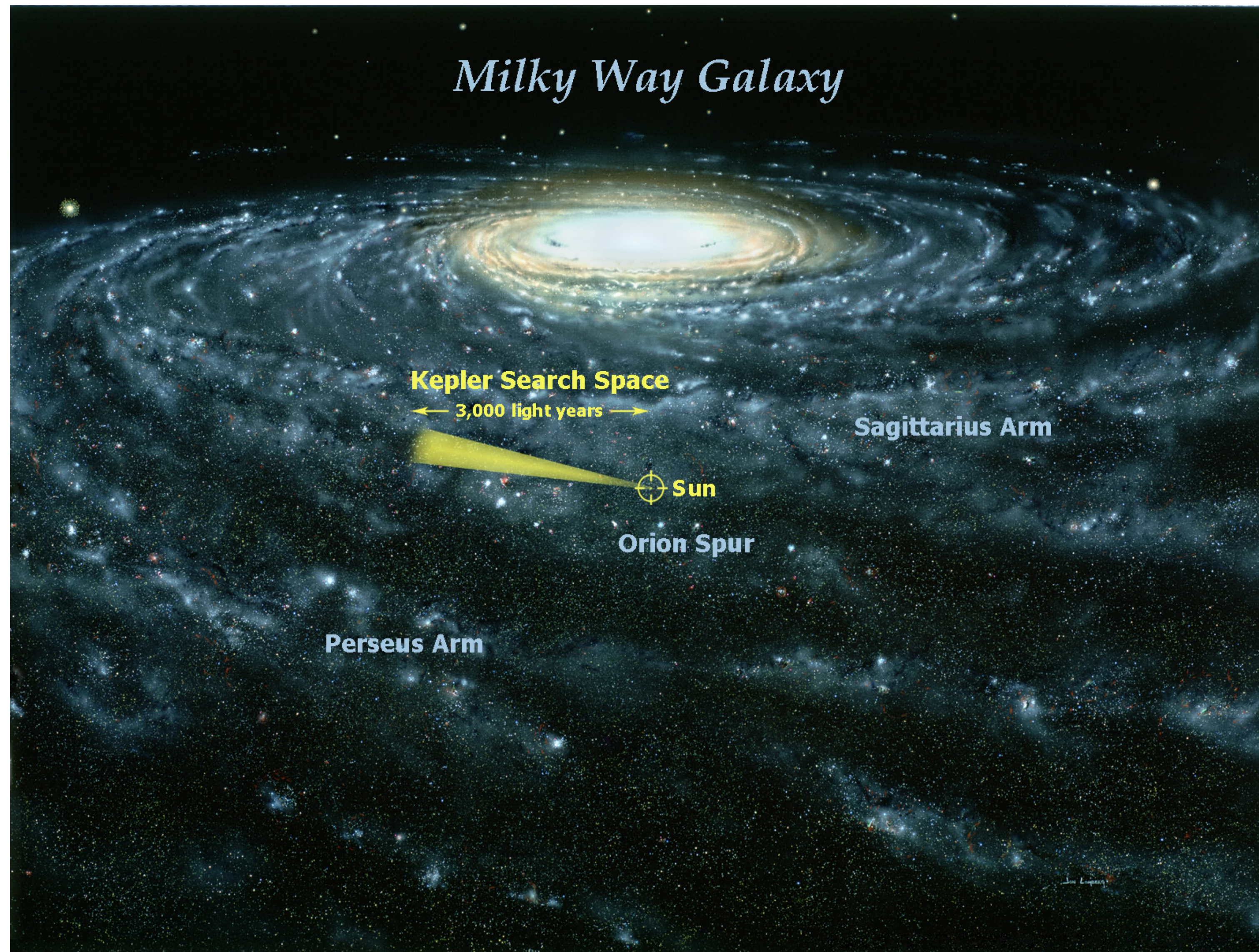
Only planets whose orbits are seen edge-on from Earth could be detected.

Kepler observed 530,506 stars and detected 2,778 confirmed planets as of June 16, 2023.



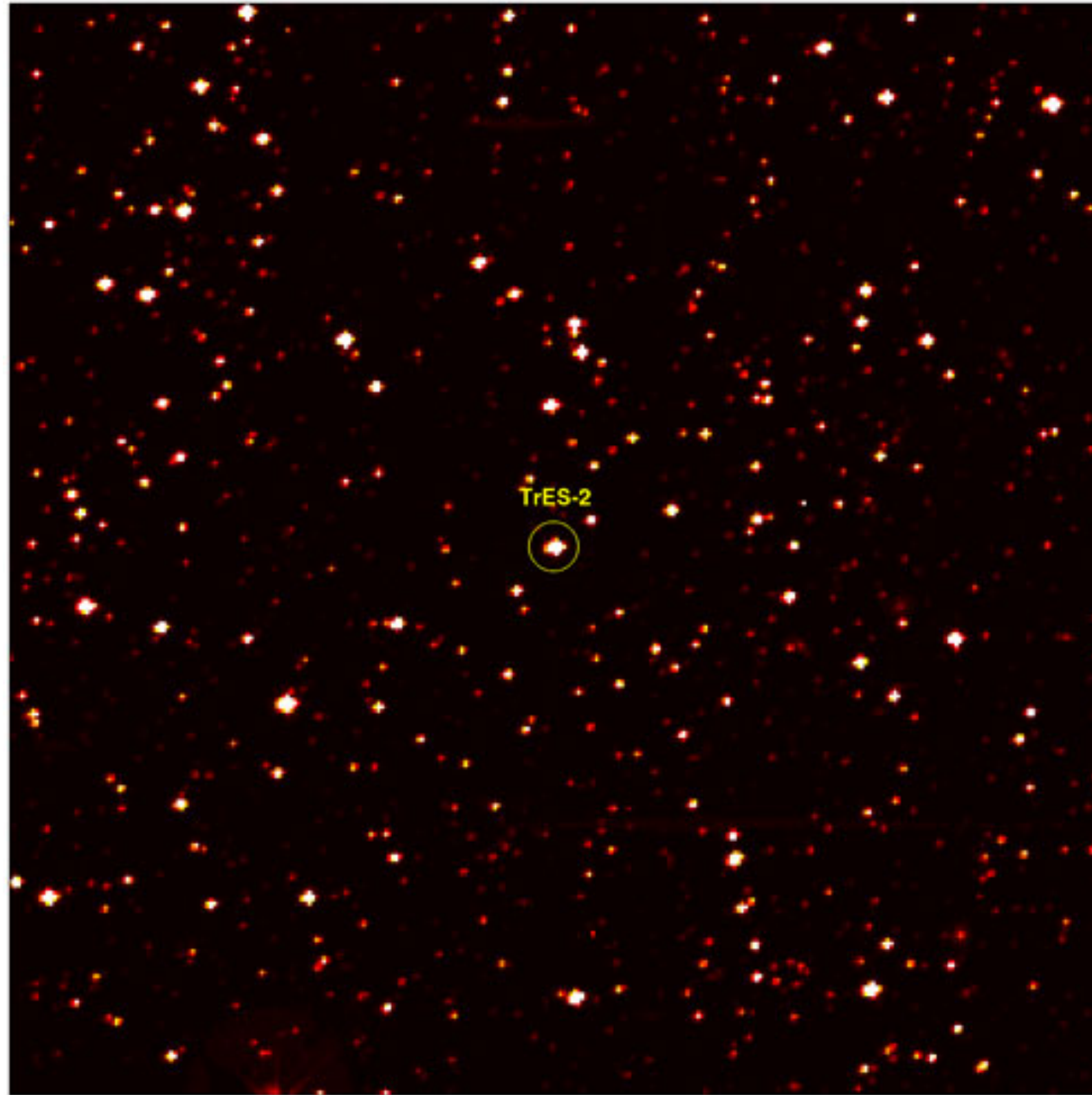
The Kepler satellite

Kepler's search volume, in the context of the Milky Way

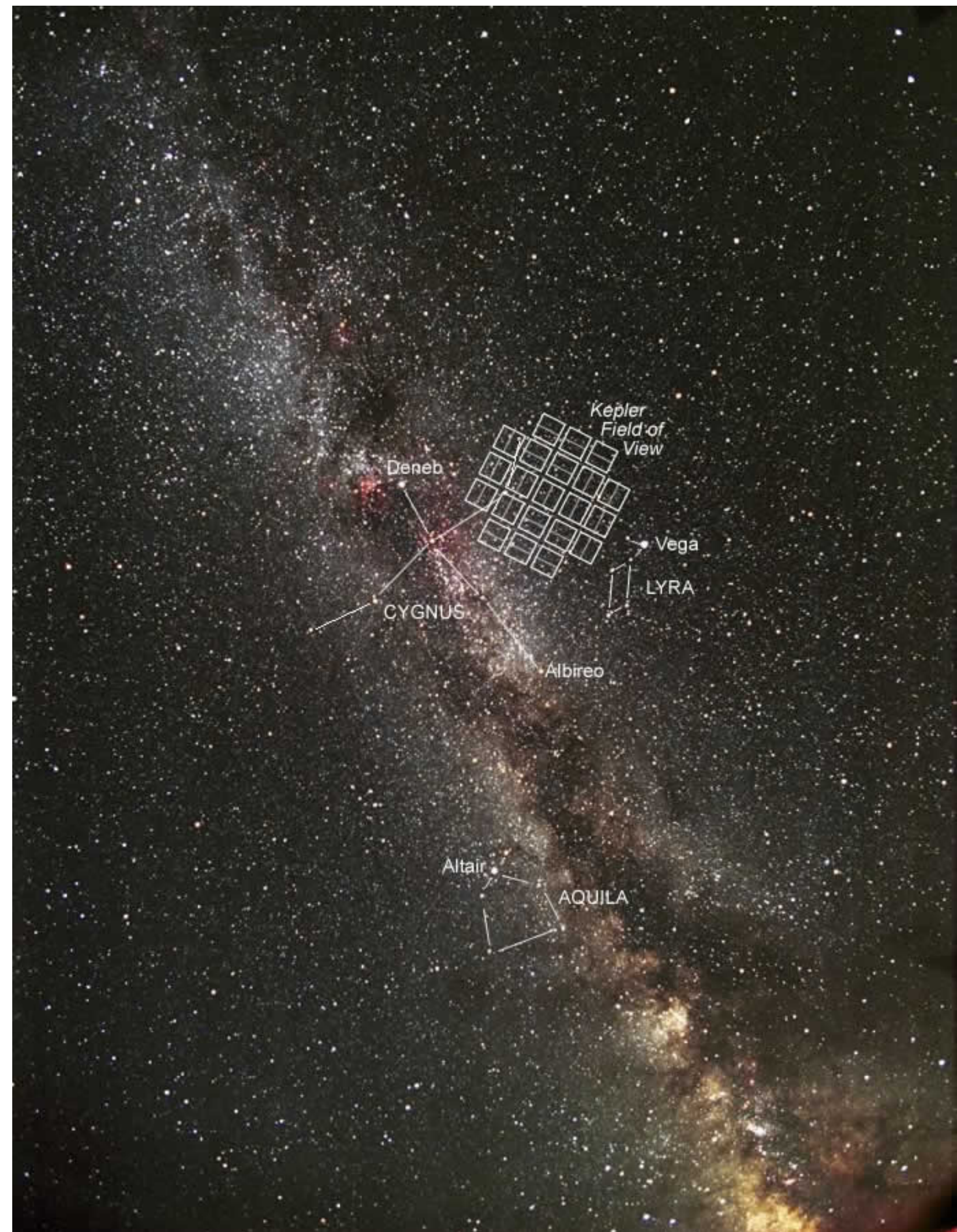


The Kepler satellite

Kepler's field of view.

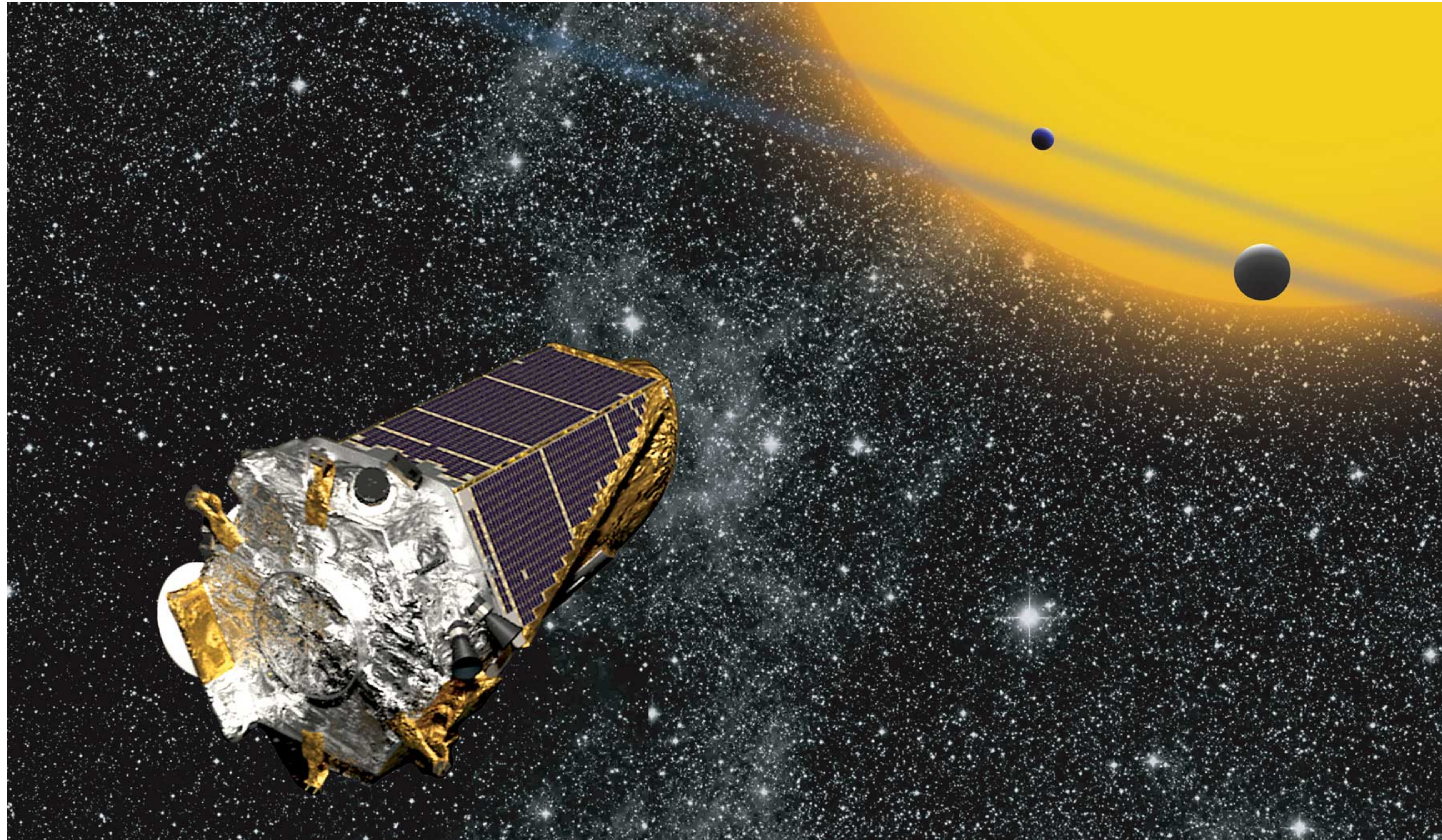


Detail of Kepler's image of the investigated area. The location of TrES-2b within this image is shown.



The Kepler satellite

Artist impression of Kepler



The Kepler satellite

Lightkurve python package to analyse data
<https://docs.lightkurve.org/index.html>

Lightkurve v2.4

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Lightkurve

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Documentation

A friendly Python package for making discoveries with Kepler & TESS.

Lightkurve offers a user-friendly way to analyze time series data on the brightness of planets, stars, and galaxies. The package is focused on supporting science with NASA's Kepler and TESS space telescopes, but can equally be used to analyze light curves obtained by your backyard telescope. Lightkurve aims to lower barriers, promote best practices, reduce costs, and improve scientific fidelity by providing accessible open source Python [tools](#) and [tutorials](#) for time domain astronomy.

```
[5]: import lightkurve as lk
pixelfile = lk.search_targetpixelfile("Trappist-1")[1].download()
pixelfile.to_lightcurve(method="pld")
```

[5]: KeplerLightCurve length=3357 LABEL="EPIC 246199087" QUARTER=None
CAMPAIGN=12

time		flux	flux_err	centroid_col	
		electron / s	electron / s	pix	
object	float64	float64	float64	float64	
2905.3769167939536	5658.24845969592	4.79782582157124	992.9287843224479	27	
2905.397348964376	5674.028889504439	4.799150852752048	992.8999442967024	27	
2905.417781134791	5670.548238957181	4.7957925476054495	992.8700333455679	2	