

UNIDIR Workshop, May 22-23 2024, Online

SETI/Unistellar Citizen Science Network: Toward a Decentralized Digital Telescope Network

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UNISTELLAR



HQ in Marseille
Office in San Francisco

Useful
for Science



Since 2019
eVscope
eQuinox
eVscope 2
Equinox 2

Cool
Consumer
Product

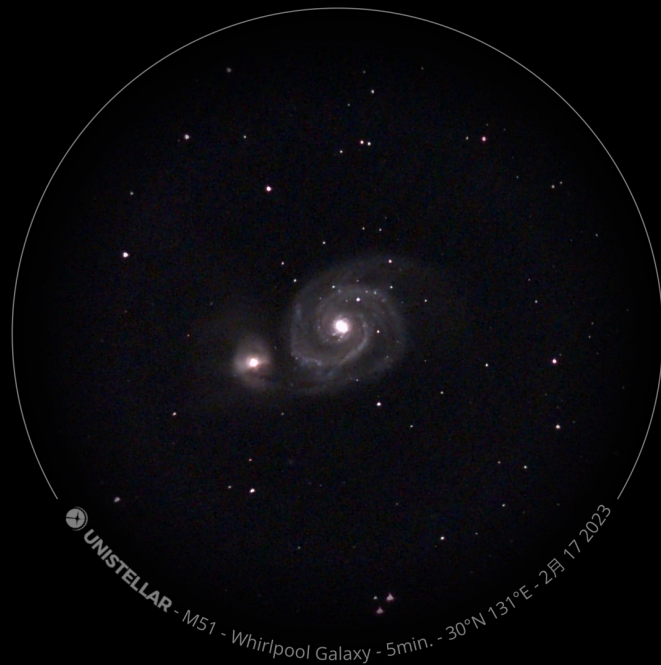


Since 2024
Odyssey
Odyssey pro

Educative
Device

Price range : \$2,500-\$4500 US

"Come for the pretty pictures, Stay for the Science"



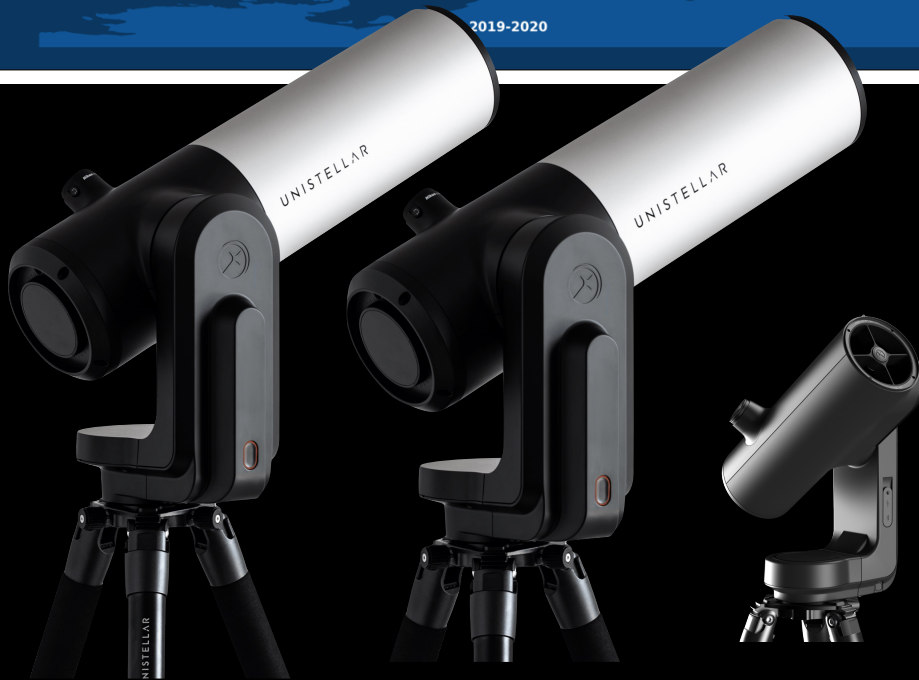
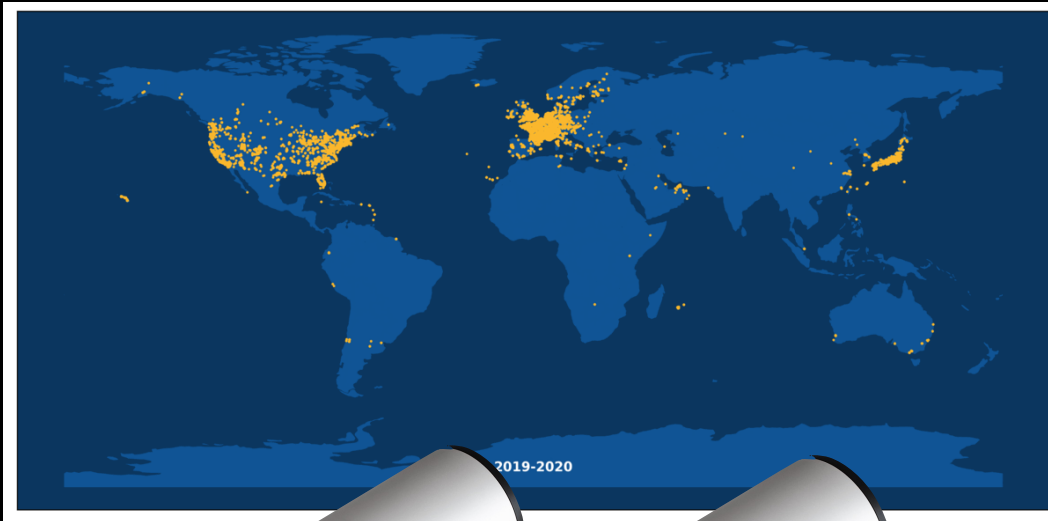
Whirlpool Galaxy



Comet Atlas (2020)



**Eagle nebula +
Pillars of creation**



Unistellar Citizen Science

- **eVscopes**
 - Control with phone app
 - Autonomous field detection
 - Real time stacking
 - Aperture: 114 mm
- **Network > 10,000 eVscopes**
- **Science Campaigns:**
 - Occultations
 - Exoplanets
 - Planetary Defense
 - Comets
 - Transients
 - Satellites <- NEW!

SCIENTIFIC PARTNERSHIPS

afa Association Française d'Astronomie

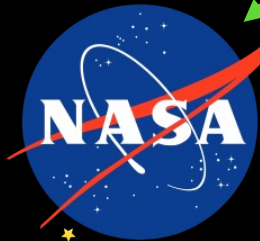


MOU

?ETI
INSTITUTE



Official Partner



l'Observatoire
de Paris



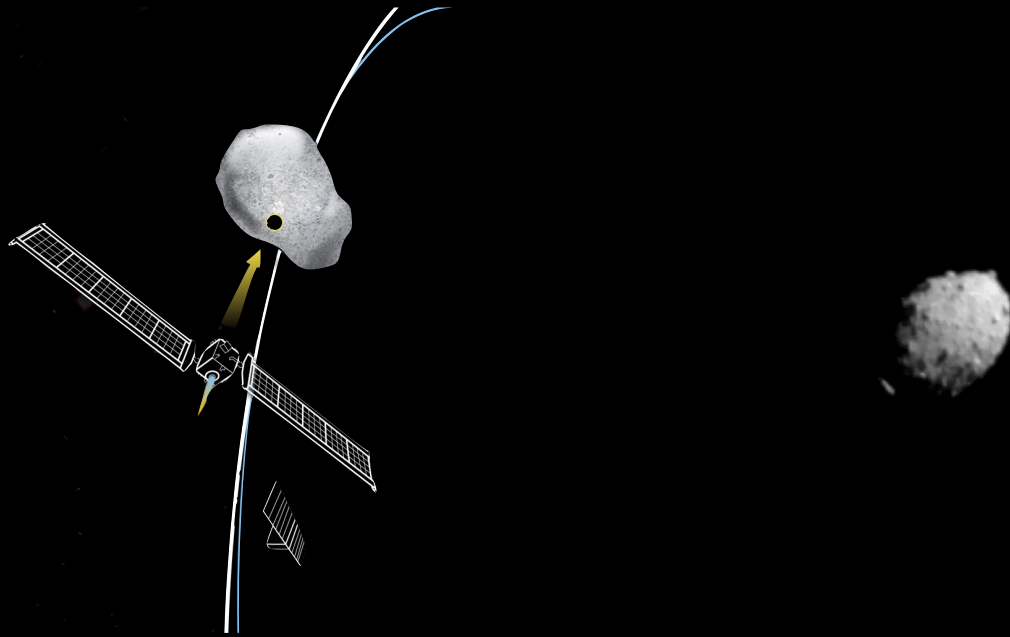
Charles University



UNISTELLAR +

?ETI
INSTITUTE

Impact of DART into Dimorphos



Observer: DRACO
Location: DART Spacecraft
Date: September 26, 2022

Impact of DART into Dimorphos

Observer: Bruno Payet (eVscope)

Location: Réunion Island

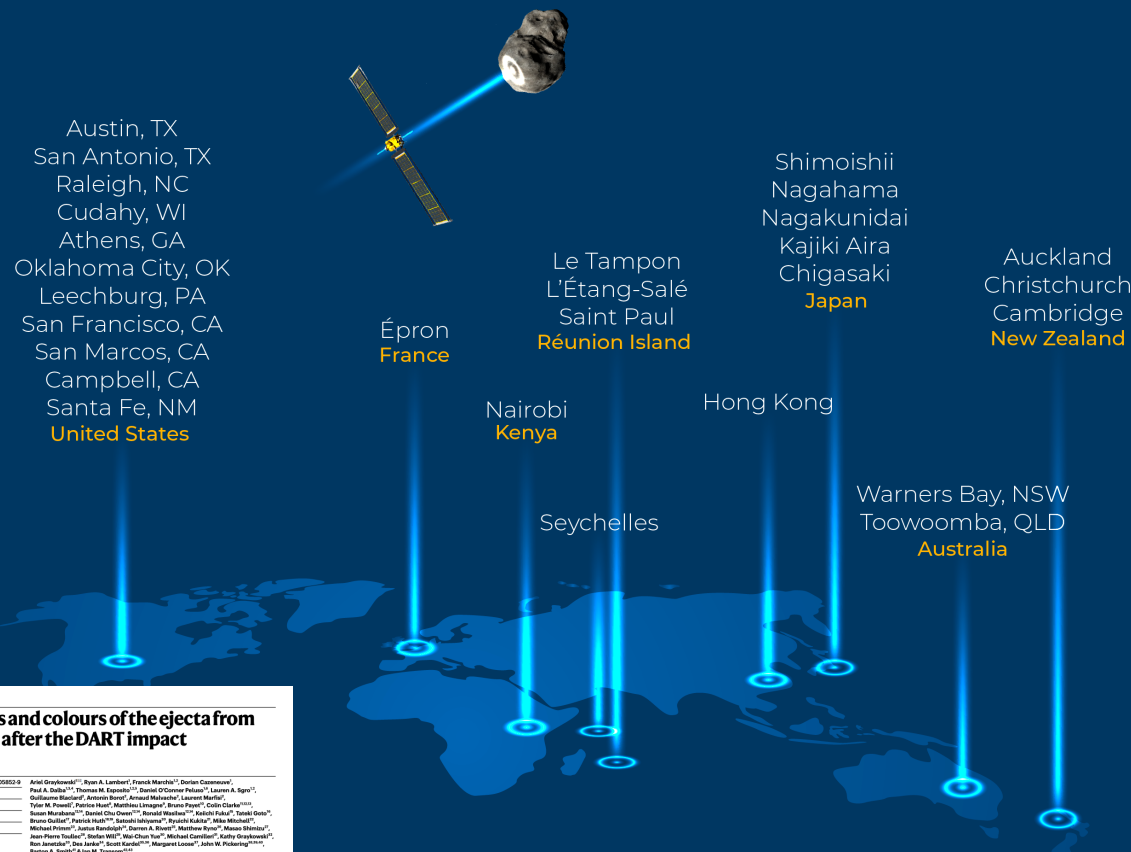
Date: September 26, 2022

The Unistellar Network Contributes to NASA's DART Mission

9 professional scientists

31 citizen scientists

4 observations of impact



Article Light curves and colours of the ejecta from Dimorphos after the DART impact

<https://doi.org/10.1093/mnras/stz303>
 Received 16 November 2022
 Accepted 15 February 2023
 Published online 1 March 2023
 Open access
 © Check for updates

On 26 September 2022, the Double Asteroid Redirection Test (DART) spacecraft struck Dimorphos, a satellite of the asteroid 65803 Didymos, because it is a binary system, it is possible to determine how much the orbit of the satellite changed, as part of a test of what is necessary to deflect an asteroid that might threaten Earth with an impact. In nominal cases, pre-impact predictions of the orbital period reduction ranged from roughly 8 to 17 min orbits. 23.1 hours we report optical observations of Dimorphos before, during and after the impact, from a network of citizen scientists' telescopes across the world. We find a maximum brightening of 2.26 (± 0.34 mag) in impact. Dimorphos fades back to its pre-impact brightness over the course of 23.7 (± 0.7) days. We estimate lower limits on the mass contained in the ejecta, which was 0.3–0.5%. Dimorphos mass depends on the dust size. We also observe a reddening of the ejecta on impact.



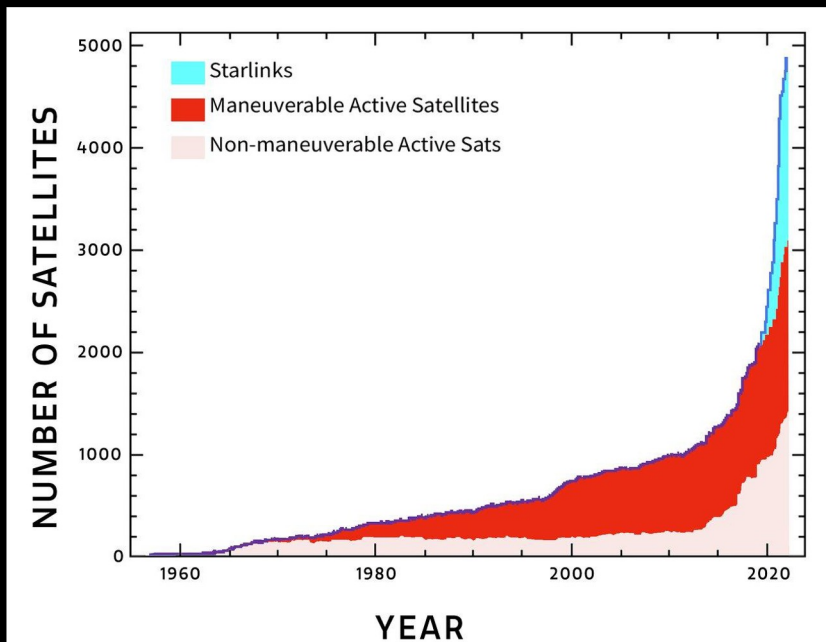
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ns APL/SCIENCE PHOTO LIBRARY

Satellite Constellations: A New Problem



>80,000 satellites in 2036!



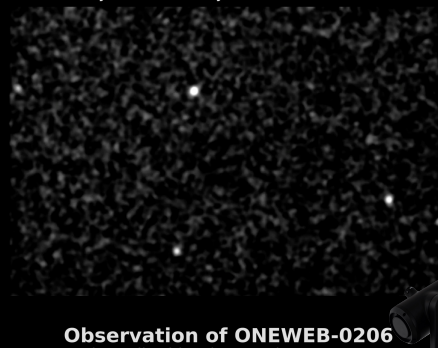
Now OneWeb, soon Kuiper and more...

- **Increased risk of collisions:** More satellites in orbit raise the possibility of catastrophic collisions, creating debris fields and hindering future space activities.
- **Space debris problem:** Even minor collisions or malfunctions can generate debris, further increasing collision risks and posing threats to existing satellites and spacecraft.
- **Astronomical interference:** Large constellations of satellites can obstruct the view of the night sky, impacting astronomical observations and potentially hindering scientific discoveries.
- **Radio frequency congestion:** As the number of satellites grows, competition for limited radio frequencies intensifies, potentially disrupting communication and navigation services.
- **Policy and regulation challenges:** The rapid growth of the satellite population outpaces existing regulations, creating challenges for managing space traffic and ensuring long-term sustainability.

Satellite Constellations: The Solution?

Data

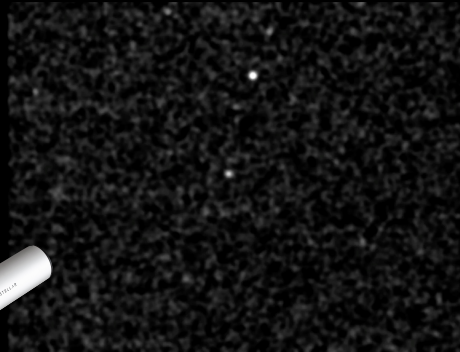
Observation of ONEWEB-0654
by Neil Yoblonsky on Feb. 25, 2024



Observation of ONEWEB-0206
by Neil Yoblonsky on Feb. 26, 2024



Observation of STARLINK-30808
by Neil Yoblonsky on Feb. 26, 2024

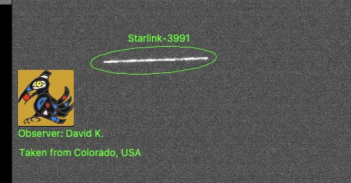
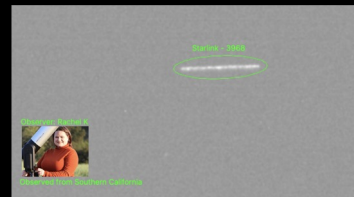


Observation of STARLINK-31191
by Anonymous on Feb. 27, 2024



Citizen astronomers, professional telescopes, established networks,...

Analysis



Identification, Brightness, location,...

Results



Orbits, Close encounter, safe orbits,...

A Marketplace for the Universe



Observers

Unistellar Network

data

Amateur Astronomers

Professional Observatories

Astronomical Archives

Observers

acquisition

SkyLab
Software Dev
Governance
Partnership

SkyMapper
a Marketplace for Astronomy
Map the Universe and Safeguard
Earth Space environment

Scheduler
Anonymous requests



Customers

data

New Space Industry

Universities

Research Institutes

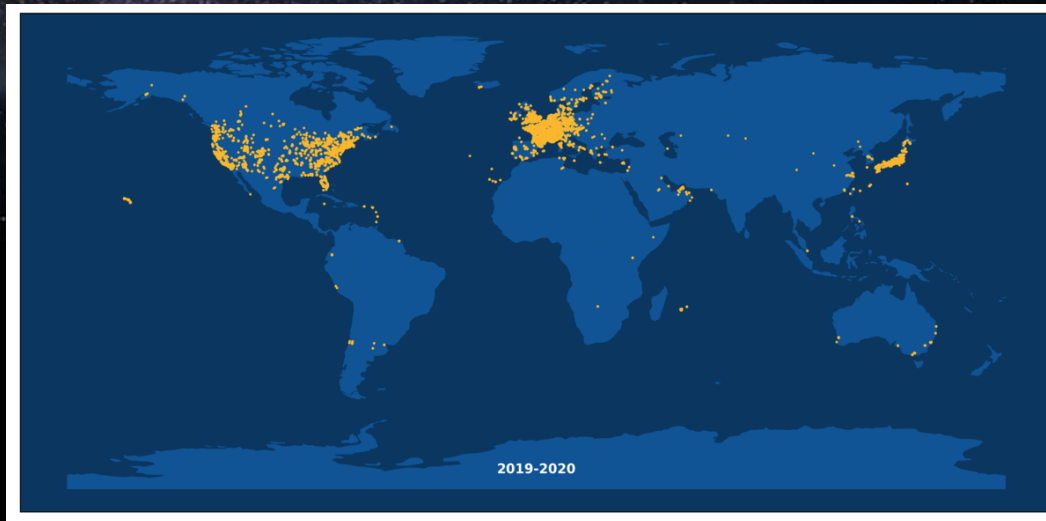
Governmental Organizations

requests

Customers

Conclusion

- Unistellar revolutionizes astronomy with user-friendly telescopes.
- Our telescopes can be used for Space Situational Awareness
- More monitoring is essential to characterize and verify space activity
- We envision an accessible, decentralized astronomy marketplace prioritizing data integrity and affordability, called **SkyMapper**.
- Your inputs & your thoughts?



@AllPlanets

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