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ESA Space Telescope Euclid Is All Set For Launch To Observe 'Dark Side' Of Universe

Why In The News?

- The **European Space Agency's Euclid Mission** Has Reached A Significant Milestone As It Gets Fueled In Preparation For Its Upcoming Launch On A **SpaceX Falcon 9 Rocket**.
- The Spacecraft Is Planned To Launch On A SpaceX Falcon 9 Launch Vehicle From Cape Canaveral, Florida, USA, **On 1st July 2023**.



What Is ESA's Euclid Mission?

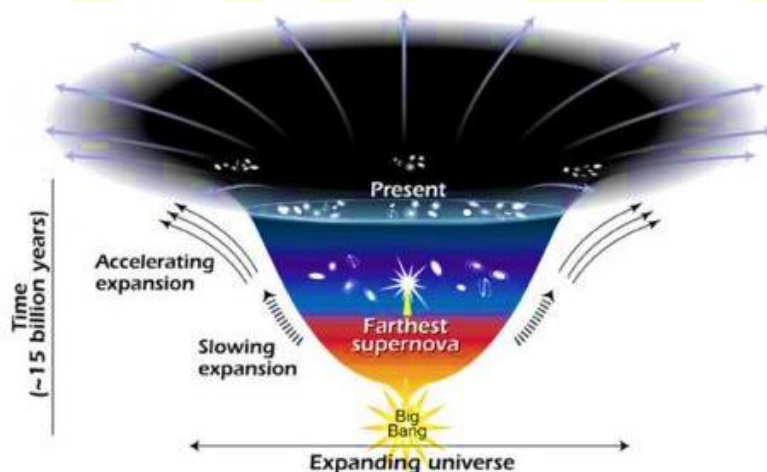
- ESA's Euclid Has Been Designed To **Explore The Composition And Evolution Of The Dark Universe**, Delving Into The Mysteries Of Dark Energy And Dark Matter.
- The Space Telescope Will Create The **Most Comprehensive And Accurate 3D Map Of The Universe Ever Assembled**, Spanning Vast Distances And Observing Billions Of Galaxies Up To 10 Billion Light-years Away, Covering Over One-third Of The Sky.

- By Studying The **Expansion Of The Cosmos And The Distribution Of Large-scale Structures Across Space And Time**, The Mission Will Provide Valuable Insights Into The Fundamental Nature Of Gravity, Dark Energy, And Dark Matter.



Aim Of ESA's Euclid Mission

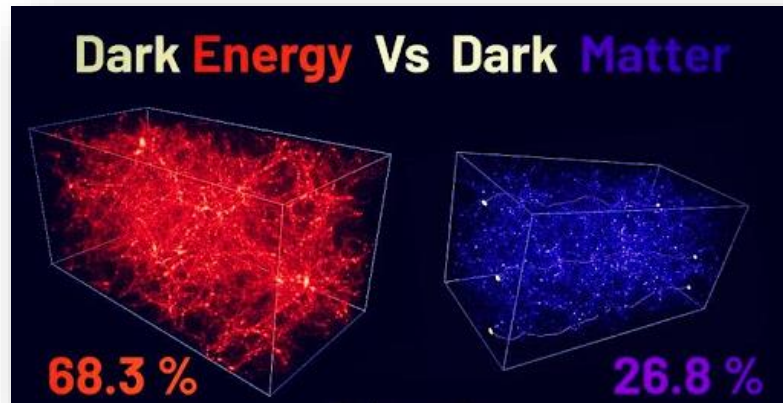
- The Main Goal Of The Euclid Mission Is To **Study The Effects And Activities Of Dark Energy And Dark Matter** - Both Of Which Are Considered Mysterious Forces In The Universe. This Is Because Neither Of These Two Materials Can Be Directly Seen Or Felt.



Why Is Study Of Dark Energy & Matter Important?


- **Dark Energy** Is An Unidentifiable Form Of Energy That Scientists Believe Is Responsible For Helping The Universe Expand. **Dark Matter** Is A Material That Also Affects The Expansion Of The Universe.
- Astronomers Have Theorized That **Dark Matter Exists Because Of Gravity's Observed Effects On Galaxies And Groups Of Galaxies.**
- Astronomers Believe **Dark Energy Makes Up About 68 Percent Of The Universe**, While **Dark Matter Makes Up Around 27 Percent**, The American Space Agency

NASA Reports. But Beyond That, Very Little Is Known About The Two “Dark” Elements.




About The Euclid Spacecraft

- The Euclid Spacecraft Is **4.7 Meters Tall And 3.7 Meters Around**. It Contains Two Main Parts, Called **Modules**. One Module Is Made Up Of A **Telescope** And Two Scientific Instruments. The Other Contains **Satellite Systems, Power Controllers, Data Processors And Other Equipment**.
- Euclid Will Travel To An Orbiting Spot **About 1.5 Million Kilometers From Earth**. The Area Is Called The **Second Lagrangian Point**. This Is Where Nasa’s **James Webb Space Telescope** And **ESA’s Orbiting Observatory Gaia** Operates.



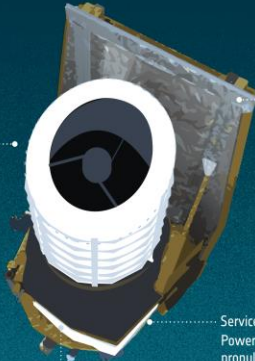
EUCLID SPACECRAFT

Euclid is designed to provide both excellent quality imaging in the visible, and spectroscopy and photometry in the near-infrared. The sunshield keeps the telescopes and instruments shaded from the Sun to ensure thermal stability and highly sensitive measurements. It will make sure **VIS operates at -33 °C** and **NISP at -180 °C**. To store the large data volume that will be accumulated during observations, Euclid has a mass memory of 4 terabits.



Euclid's mass in orbit will be 2 tonnes

- 800 kg payload module
- 850 kg service module
- 40 kg balancing mass
- 210 kg propellant



Telescope 1.2 m diameter


Sunshield

Solar panels

Service module
Power distribution, attitude control, propulsion, telecommands, telemetry and data handling

Instruments VIS and NISP*

The Euclid spacecraft is 4.7 m tall and 3.7 m in diameter



* VIS: VISible instrument
NISP: Near-Infrared Spectrometer and Photometer

About The Launch

- Mission Leaders Say **Euclid Will Capture Images In Optical And Near-infrared Light**. The Images Will Cover About One-third Of The Universe Beyond Our Milky Way Galaxy.
- In Addition To Studying Dark Matter And Dark Energy, Euclid Will Use Its Infrared Instruments To **Collect Data On Hundreds Of Millions Of Galaxies And Stars**.
- Astronomers Say This Will Permit Them To Investigate The **Chemical Makeup And Motion Behaviors** Of Many Different Space Objects And Environments In Greater Detail.



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