



## **The ExoLife Finder (ELF) telescope project — a cutting-edge hybrid interferometer telescope explicitly designed for the high-contrast direct detection of exoplanets.**

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*The ExoLife Finder (ELF) is a groundbreaking ground-based facility that will transform exoplanet research through direct imaging and characterisation of terrestrial exoplanets. Our mission is to identify biomarkers within their atmospheres, and we are poised to achieve unparalleled performance levels by leveraging cutting-edge technologies. A significant advancement in our project is the development of advanced, ultra-light, and ultra-thin self-correcting mirrors crafted using state-of-the-art 3D printing technology with electro-active actuators. We are confident that these innovations will significantly enhance our ability to uncover the secrets of distant worlds.*

*The ELF consortium, headquartered at the Instituto de Astrofísica de Canarias (IAC) in Tenerife, is constructing a 3.5-meter SELF (Small-ELF) prototype. This technology demonstrator will pave the way for the larger 25-meter ELF telescope. SELF will comprise 15 off-axis active "live" mirrors, each with a diameter of 0.5 meters, arranged in a tensegrity structure. This configuration will function as a fixed pupil interferometer, engineered for high-contrast imaging through direct "dark hole" coronagraphy. To meet the rigorous demands of this system, we are also implementing specialised extreme adaptive optics (XAO) systems to effectively manage the diluted apertures and ensure the highest contrast results.*

*The conclusion of the SELF project is scheduled to take place at IAC's Teide Observatory in the coming years. The goal is to showcase how technological innovations can enhance performance in cost-effective, larger telescopes, especially in the search for extraterrestrial life within a few parsecs of the Sun. This presentation will outline the telescope's design, its specialised high-contrast imaging capabilities — including new developments in wavefront sensing — and the groundbreaking advancements in producing self-correcting "live" mirrors.*