



## The next-generation Event Horizon Telescope

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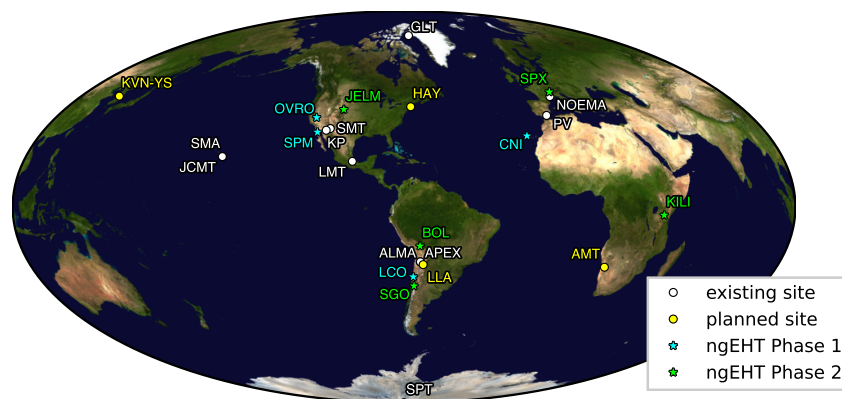
The next-generation Event Horizon Telescope (ngEHT) is a transformative new array that will be capable of making real-time and time-lapse movies of supermassive black holes on event horizon scales. These movies will resolve complex structure and dynamics on Schwarzschild radius dimensions, bringing into focus not just the persistent strong-field gravity features predicted by General Relativity (GR), but details of active accretion and relativistic jet launching that drive large scale structure in the Universe. This effort builds upon recent results by the Event Horizon Telescope (EHT): the first image of M87’s supermassive black hole and its magnetic field structure, as well as resolved images of, SgrA\*, the central black hole at the heart of the Milky Way.

These images, though scientifically rich, show that evolution of the EHT to a more capable array can address even deeper questions across physics and astronomy. The central concept behind the ngEHT is that the addition of many modest-diameter dishes at new geographic locations will enable high-dynamic-range imaging and time-resolved dynamical studies of the black hole boundary that cannot be obtained with incremental improvements to the existing global mm/submm VLBI array.

The central elements of the ngEHT are to:

- Add 10 modest-diameter dishes in new geographic locations that maximize new interferometric baselines.
- Enable tri-band (86, 230, 345 GHz) simultaneous observations to increase fourier spatial frequency sampling, and enable multi-frequency modeling and imaging.
- Increase bandwidth for higher sensitivity, moving to a per-station data capture rate of > 256Gb/s
- Develop a high throughput data processing and analysis pipeline that speeds time to science.

We have developed a phased approach to realizing the ngEHT. In Phase 1 (2023-2026) we will add five new VLBI stations and enhance the current array in a way carefully designed to achieve several of the key science goals identified by the international astronomy community. In Phase 2 (2026-2030) additional VLBI stations will be added to reach the full set of ngEHT science objectives. In this talk, we will describe the current status of the ngEHT, Key Science Goals, prototyping of sub-systems, and implementation plans.



**Figure 1.** Distribution of potential ngEHT sites around the globe. Sites that have already joined EHT campaigns are shown in white, additional ngEHT Phase 1 sites are shown in cyan, and ngEHT Phase 2 sites are shown in green. Several other existing or upcoming sites that plan to join EHT/ngEHT observations are shown in yellow.