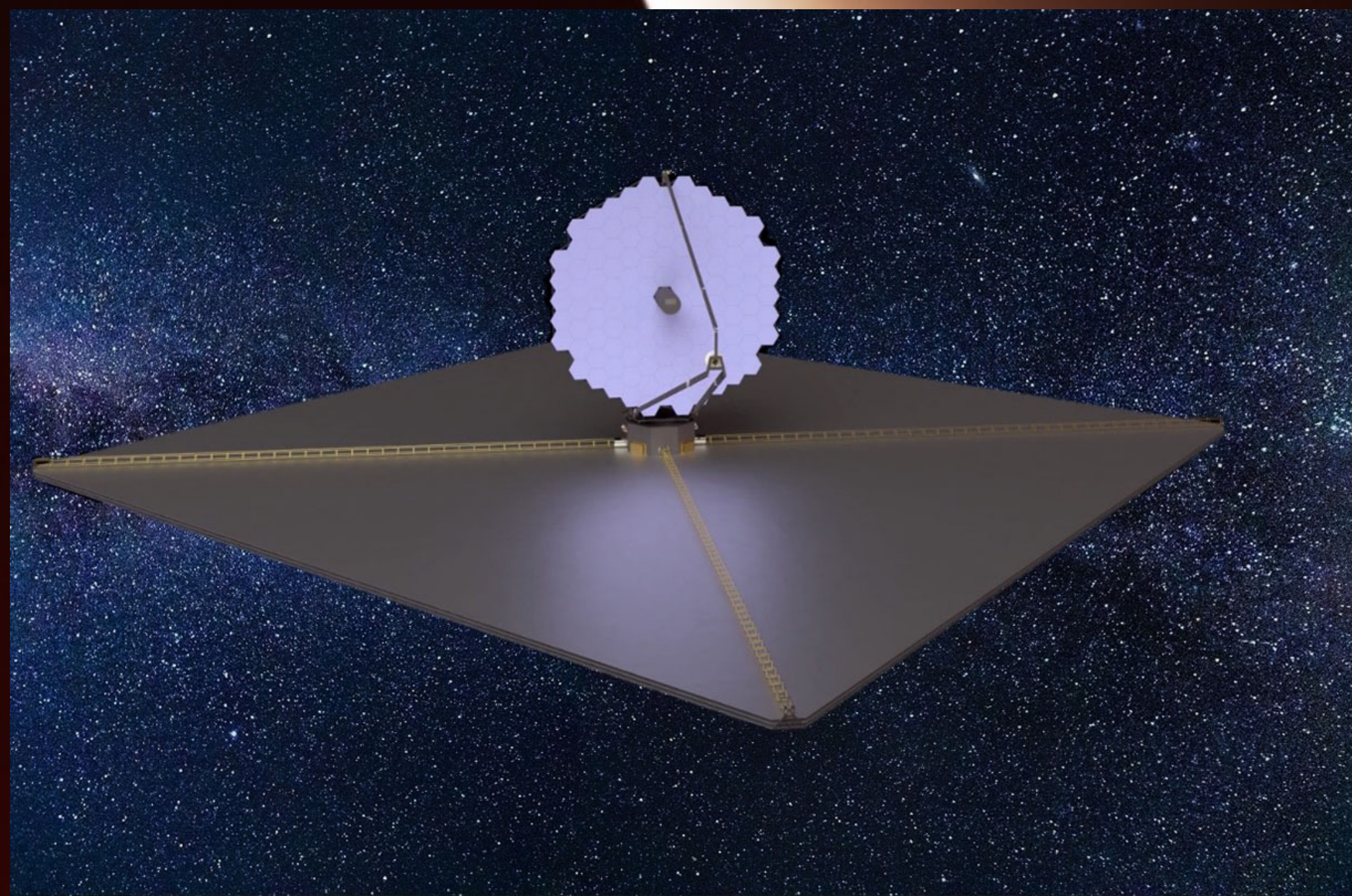


The value of RV in an EPRV world

Rob Wittenmyer and the MINERVA-Australis Team

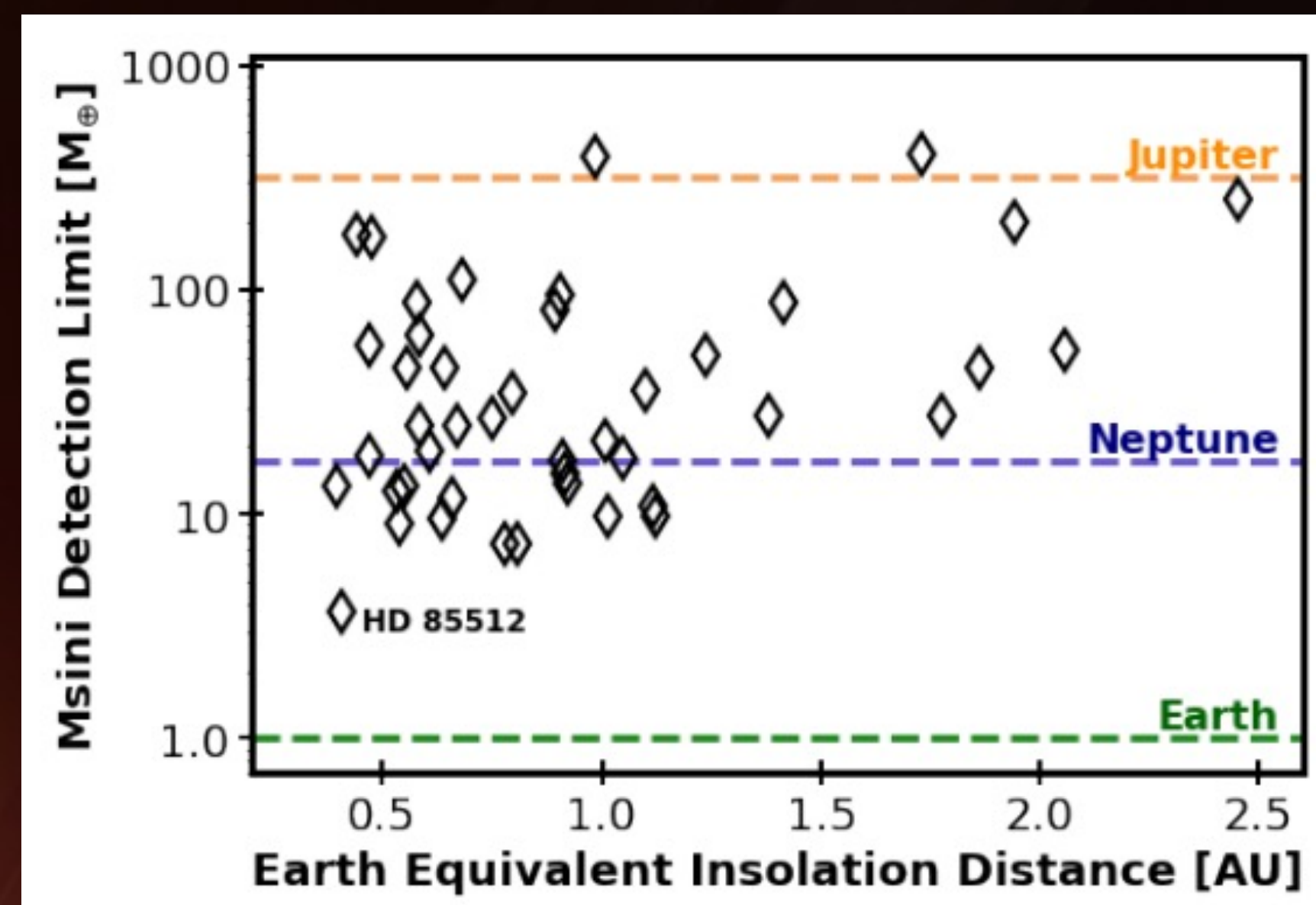
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Abstract. In a world where radial-velocity precisions are routinely measured in centimetres per second, what becomes of sites that can deliver not "EPRV," but only "RV"? The detection of potentially habitable Earth-mass planets orbiting the nearest stars is an audacious undertaking that requires complementary data from less-precise instruments. In the coming decades, 1-metre-class telescopes delivering RV precisions of a few m/s will be able to do the critically necessary vetting of candidate systems. These data include the detailed characterisation of stellar activity, the refinement of orbits for larger planets in those systems, and the exclusion of dynamically troublesome bodies near their habitable zones. These aims require significant dedicated time on (P)RV instruments. EPRV machines are necessary, but not sufficient, to fully understand the planetary systems to be probed by the next generation of flagship space telescopes.



Habitable Worlds Observatory

Mission: To image rocky planets in the habitable zones of the nearest ~100 Sun-like stars. Launch 2040s



Good News:

The likely targets are well-studied by decades of radial-velocity programs.

Bad News:

For many of them, we STILL cannot rule out Saturn-mass planets lurking in the habitable zone (Lalotit+ 2023). This is extraordinarily bad.

Solution:

We need MUCH more RV data! The best time to start was 20 years ago. The second best time is now.

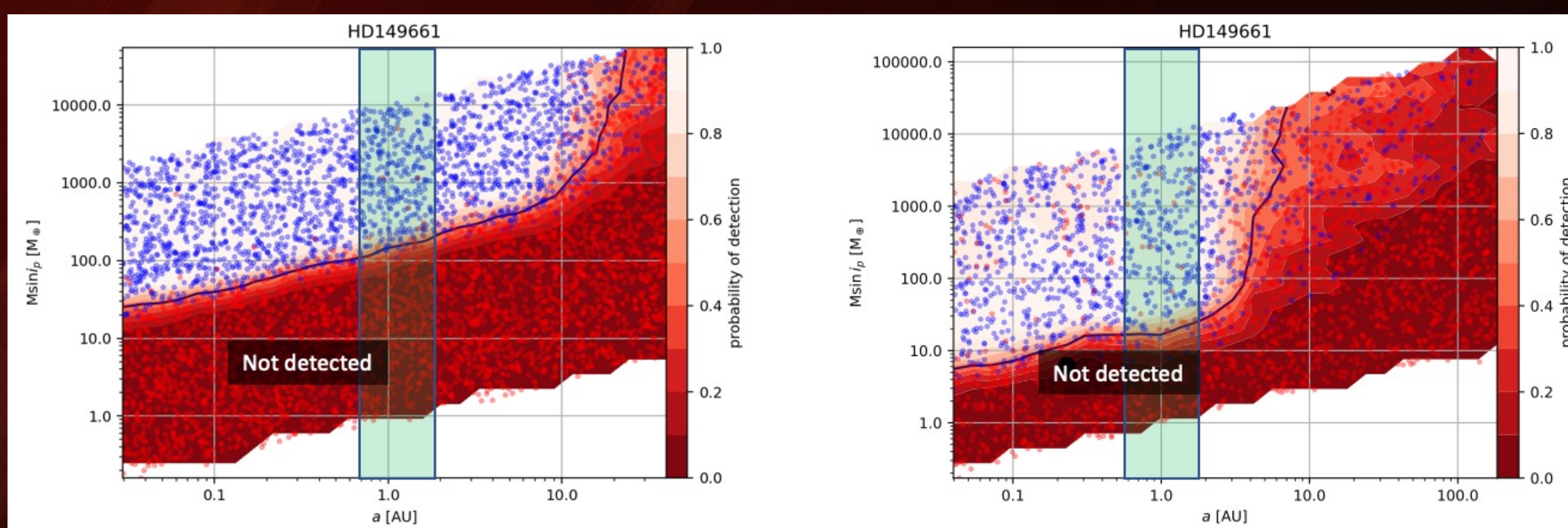


MINERVA-Australis to the rescue

An Australian 4-telescope observatory fully dedicated to radial velocity measurements of exoplanets.

Monitoring every Southern *Habitable Worlds Observatory* target at 10-day cadence would take less than 20% of available clear-sky time.

Our dedicated array of 1m-class telescopes can fulfill this urgent need, optimising target selection for *Habitable Worlds Observatory* and saving millions of dollars in precious flagship space-telescope time.



Left: Existing RV data can only rule out planets to ~150 Earth masses in the habitable zone. The solid black line indicates 50% detectability.

Right: 3 years of new data from MINERVA-Australis at 10-day cadence with ~5 m/s precision takes detection limit down to ~20 Earth masses.