Contact: vrijmoet@astro.gsu.edu www.recons.org Eliot Halley Vrijmoet¹², Todd Henry¹, Wei-Chun Jao¹², RECO **Orbital Architectures of M Dwarf Systems:** Andrei Tokovinin³, Serge Dieterich⁴, Jennifer Winters⁵, Research Consortium on Nearby Star Elliott Horch⁶, & the RECONS Team Building the P vs. e Diagram 1 REsearch Consortium On Nearby Stars, 2 Georgia State University, 3 Cerro Tololo Inter-American Observatory, 4 Space Telescope Science Institute, 5 Center for Astrophysics | Harvard & Smithsonian, 6 Southern Connecticut State University M dwarfs host companions spanning a factor of 100,000 in mass (planets \rightarrow 0.6 M $_{\odot}$ stars) The orbits seen today are Period (days) shaped by their that orbit on sub-AU to 1,000-AU scales. So 6000 2000 4000 8000 10000 0 how do you know where a companion may be formation configuration 1.0 and subsequent lurking? We are **mapping** ~**120 orbiting RECONS** orbits N = 99 (so far), $<0.6 M_{\odot}$ dynamical evolution. In companions within 25 pc to establish the orbits from lit turn, these outcomes are distributions of their **orbital elements**, seeking P = 16 vrdictated by primary clues to their formation and orbital evolution. 5 R.A. (AU) 0.8 mass, mass ratio, environment, age, and Orbits come from: more (Bate 2015). (NY) 0 Astrometry -0.2 at CTIO 0.9m (22+ yr) eccentricity 7.0 Other mass realms are • Speckle interferometry = 17 yr not quite identical: P = 0.7 yrat SOAR 4.1m (2+ yr) -2 (AU) -0.6 -0.4 -0.2 0.0 R.A. (AU) • RVs & imaging Solar (Raghavan+ 2010) (literature) ~1 M⊙ 0.4 Bonus: we will determine P = 18 vrdynamical masses for -5 R.A. (AU) 0 1 R.A. (AU) the systems overlapping Period (years) 0.2More eccentric on both the astrometry + P = 11 vrthan circular and speckle lists. Very low mass (Dupuy & Liu 2017) • ≈0.1 M⊙ References: 0.0 More often circular? Bate, M. 2015, Living Together: P = 24 yrPlanets, Host Stars and Binaries, 496, 37 -10 -5 0 R.A. (AU) 30 10 15 20 25 Dupuy & Liu 2017, ApJS, 231, 15 5 Raghavan, D., McAlister, H., Henry, T., et al. 2010, ApJS, 190, 1 Tokovinin, A., Cantarutti, R., Tighe, R., et al 2016, PASP, 128, 125003 Period (years) 10 20 Period (years)