November 2, 2010

Dear Roger Blandford
Alan Boss
Adam Burrows
Alan Dressler
Debra Elmegreen
Kim Griest
Fiona Harrison
Martha Haynes
Lynne Hillenbrand
Wesley Huntress
Charles Kennel
Thomas Young:

We are writing to express our strong support for substantial US participation in ESA's proposed Euclid mission, which is currently in competition within the Cosmic Visions program for a scheduled 2018 launch.

Euclid is a mission optimized to study dark energy via weak gravitational lensing and baryon acoustic oscillations, two powerful and complementary cosmological probes. Euclid would thus probe the nature of dark matter and dark energy and search for possible modifications to General Relativity. In doing so, Euclid would also perform a deep near-infrared imaging and spectroscopic survey over the entire extragalactic sky, a boon for a wide variety of astrophysical studies. Euclid's hardware is also well-suited to a high cadence survey of galactic stars to perform a microlensing search for planets. Thus, Euclid is responsive to many of the scientific goals that the US Decadal Survey laid out for WFIRST. As a matter of fact, the Survey specifically stated, "There have been discussions between the U.S. agencies and ESA about mounting a joint mission, which could be a positive development if it leads to timely execution of a program that fully supports all of the key science goals of WFIRST (planet microlensing, dark energy science, general investigations) and leads to savings overall." In addition, the AAAC concurred with the NAC statement that "NASA should keep open the option of a possible partnership with ESA on the Euclid mission" and "If Euclid is selected by ESA, NASA's goal should be the negotiation of a joint ESA/NASA program that meets the science goals of both the Euclid and WFIRST missions and comprises either a single combined mission or two complementary missions."

Because Euclid has received the top science ranking by several panels in Europe, including the October 2009 Cosmic Visions Definition Phase selection, it is likely to proceed even without US involvement. It would be a missed opportunity for the US not to participate in a major way, and US participation would enhance the mission in critical ways that will benefit US as well as European scientists. US hardware and operational contributions to Euclid could increase survey efficiency, scientific reach, and mission

duration, while the US data processing and archiving contributions would ensure access to a unique and powerful legacy data set of substantial interest to a very wide swath of the US astronomical community.

We recognize that some aspects of Euclid's current design, particularly its neglect of supernovae and the limited duration of its planned microlensing survey, mean that it does not address all of the recommended Decadal Survey science goals. We also recognize that ESA's selection of Euclid would require the reexamination of the WFIRST mission in its current form, which would likely not launch until 2022 at the earliest, 4 years after Euclid. However, by achieving an early and substantial US stake in Euclid, we stand an excellent chance of enhancing that mission, influencing its final design and survey strategy, and accomplishing many of the stated Decadal Survey goals in a timely manner in light of incredible budget pressure.

This letter is intended to signal Dark Energy science community support for US participation in Euclid to the maximum extent possible. We believe that US participation of at least 1/3 share of Euclid (including 4 out of 12 science team members) would produce a major science payoff for moderate cost. This approach deserves serious consideration as a route to the Astro2010 recommendation that the US play "a leading role" in a mission to achieve the panel's top priorities in space astronomy. We are confident that there will be substantial support in the broader community when confronted with the budgetary and scientific reasons that make it so attractive.

Signed,

Professor Charles Baltay (Yale)
Professor Gary Bernstein (University of Pennsylvania)
Professor Richard Ellis (Caltech)
Professor Chris Hirata (Caltech)
Professor Craig Hogan (FNAL/University of Chicago)
Professor Bhuvnesh Jain (University of Pennsylvania)
Professor Steven Kahn (Stanford /SLAC National Accelerator Laboratory)
Professor Nikhil Padmanabhan (Yale)
Dr. Jason Rhodes (JPL)
Dr. David Schlegel (LBNL)
Professor David Spergel (Princeton)
Dr. Albert Stebbins (FNAL)
Professor Yun Wang (University of Oklahoma)
Professor Ned Wright (UCLA)