PDC2017
Tokyo, Japan

IAA-PDC-17-02-05

Please send your abstract to iaapdc (at) iaamail.org

You may visit www.pdc.iaaweb.org

(please choose one box to be checked)
(you may also add a general comment - see end of the page)

☐ **Key International and Political Developments**
☒ **Advancements and Progress in NEO Discovery**
☐ **NEO Characterization Results**
☐ **Deflection and Disruption Models & Testing**
☐ **Mission & Campaign Designs**
☐ **Impact Consequences**
☐ **Disaster Response**
☐ **Decision to Act**
☐ **Public Education & Communication**

THE PAN-STARRS SEARCH FOR NEAR EARTH OBJECTS

Richard Wainscoat[(1)], Rob Weryk[(1)], Eva Lilly[(1)], Ken Chambers[(1)], Larry Denneau[(1)], Serge Chastel[(1)], Marco Micheli[(2)]
[(1)]*University of Hawaii, Institute for Astronomy, 2680 Woodlawn Drive, Honolulu, HI 96822, USA, +1-808-956-8429, rjw@hawaii.edu, weryk@hawaii.edu, lilly@ifa.hawaii.edu, chambers@ifa.hawaii.edu, denneau@hawaii.edu, schastel@hawaii.edu*
[(2)]*ESA NEO Coordination Centre, Frascati (RM), Italy; SpaceDyS s.r.l., Cascina (PI), Italy, INAF-IAPS, Roma (RM), Italy, marco.bs.it@gmail.com*

Keywords: *NEO discovery, ground-based search*

ABSTRACT

The two Pan-STARRS telescopes, located on Haleakala, Maui, Hawaii, are 1.8-meter diameter telescopes equipped with 1.4 Gigapixel cameras that deliver 7 square degree fields of view. Pan-STARRS1 has become the leading Near Earth Object discovery telescope, and is presently responsible for more than half of the discoveries of larger (H<22) NEOs. The second telescope, Pan-STARRS2, has been commissioned, and its camera has been upgraded. It will provide a large increase to the NEO search capability. The optimum search strategy that combines the two Pan-STARRS telescopes is still being explored. The Pan-STARRS telescopes deliver excellent astrometry and photometry.

The location of the Pan-STARRS telescopes in Hawaii, at latitude +20º, has allowed the search area to be extended south to –49º declination, meaning that 87% of the

sky is accessible. For many years, the principal NEO search assets have been located in the southern hemisphere. As a result, the southern sky has been somewhat neglected. The searches of the southern sky by Pan-STARRS have been very productive.

The efficiency of the Pan-STARRS search has been examined by comparing the number of NEO discoveries in each field with the number of times that the field was imaged during the last 3 years. The resultant efficiency map suggests that NEO searches should extend at least 30 degrees north and south of the ecliptic, and for at least 70 degrees longitude east and west of opposition. Pan-STARRS has had some success searching for NEOs close to the Galactic Plane, but recovery of NEO candidates is more difficult due to the high background star density. Most NEO searches avoid the Galactic Plane.

The Pan-STARRS telescopes are very efficient at detecting cometary activity. PS1 has discovered more than half of the new comets during the last 3 years, and discovered 10 comets in 10 nights in November 2014.

Taking into account the Galactic Plane, the NEO discovery efficiency study suggests that at least 6,000 deg^2 should be searched each lunation during the dark moon period. This is possible using PS1 and PS2 along with the newly augmented G96 telescope of the Catalina Sky Survey; repeat coverage will be needed in order to recover most of the NEO candidates found. Weather challenges will likely make full and repeated coverage of such a large area of sky difficult to achieve. Some simple coordination between the observing sites will likely lead to improvement in efficiency.

****