Space Based Asteroid Radar Project

Horace Heffner March 19, 2004

Finding and cataloging all earth orbit crossing asteroids and comets is a difficult to impossible task - impossible because some may come from the Ort cloud or beyond and thus not have any possibility of being observed for periods of a century or more, much less cataloged. If an object approaches from out that far out it likely has not been around for decades, so is very unlikely to have been cataloged.

The only solution that has a chance of providing a really high quality warning system then it seems lies in building a space based radar (or LIDAR) system. Such a radar system would have to be very high powered, and would have to have a multidirectional receiver for long range and an omnidirectional receiver for short range. It would have to operate 24 hours a day in order to receive bounce signals. It would probably require a comparatively low noise environment in its bandwidth.

The subject radar should generate a continuous signal which is continually tagged with the time and celestial coordinates at which the beam is aimed. In that manner, when a return signal is received, it is possible to tell the coordinates of and distance to the object at the time of the signal bounce from the object. In addition, through doppler analysis, it might be possible to determine at least one component of the velocity as well. It likely would take multiple radar platforms with significantly differing orbits in order to achieve full coverage.

Using such an asteroid radar system, it should be possible to locate and catalog all nearby earth orbit crossing objects of significant size, and also to locate dangerous objects incoming from long range in sufficient time to either employ an asteroid deflecting system (if such is actually built) or to make the best possible arrangements for earth populations.

Such a radar base might be manned, but it seems that NASA has recently both demonstrated the great potential of and the need for robotic maintenance capabilities. Robots are clearly the main future of space exploration. Further, space platforms of the future should be designed in a modular fashion so as to permit robotic maintenance. If Hubble were so designed, for example, it could now be robot maintained, and its future would not be in jeopardy.

Robots go on one way trips. They do not require reentry vehicles, crew compartments, air, water, or waste removal. The only thing missing is sufficient robotic technology, but that is coming fast. It seems to me a national mission with much more return for the dollar, both to the space program, military, and the economy, than manned missions to the moon and Mars would be a mission on the order of the 60's space program to develop robotics and nanotechnology