MODELING OF THE EXPECTED PERFORMANCE FOR THE GERMAN ASTEROIDFINDER MISSION: M. Drentschew[1,2], G. J. Hahn[1], E. Kührt[1], S. Mottola[1], R. Dillmann[2], [1]DLR, Institute of Planetary Research, D-12489 Berlin, Rutherfordstrasse 2, Germany. (Maximilian.Drentschew@dlr.de), [2]Universität Karlsruhe (TH), Institut für Technische Informatik, D-76131 Karlsruhe, Haid-und-Neu-Str. 7, Germany.

Introduction: The German Aerospace Center (DLR) has selected the ASTEROIDFINDER (AF) experiment [1] to be flown as the first of a new series of national compact satellite missions. The main goal of the mission is to search for Inner Earth Objects (IEOs) from a low earth orbit, using a 30cm class wide-field telescope and an array of CCDs. The mission, which is currently in its Phase A and whose launch is envisaged for 2012, shall scan the region of sky at small solar elongations for a minimum lifetime of one year.

This study reports the results of the modeling of the performance of the AF survey, under varying observing conditions and strategies.

The basis for the simulations is a population of some 56000 orbital elements of synthetic NEAs [2], kindly provided by A. Morbidelli [3]. This distribution contains 1190 orbital elements for IEOs down to an absolute magnitude H=23.0. In addition, we also used the orbital elements of the currently known NEA population, taken from the database of the Minor Planet Center [4].

Goal of the Simulations: The main purpose of this study is to simulate as realistically as possible the expected performance of the AF mission and, by applying modern optimization techniques, to maximize the performance of the experiment. To achieve this goal, a software package has been developed which is based on a modular architecture, which allows the re-use of modules for different mission scenarios with only little effort.

Key components of the simulation include the satellite orbit, the observing strategy, the downlink and the data processing strategy (on-board vs. ground-based). Furthermore, the simulator includes realistic models of the telescope and detector system.

Modeling results will be presented and aspects of the various trade-off parameters will be discussed at the meeting.

References: [1] Mottola S. et al. (2007) 6th International Symposium of the International Academy of Astronautics (IAA), Berlin, 267 – 270. [2] Bottke, W. F. et al. (2002) Icarus 156, 399-433. [3] Morbidelli A. (2002) personal communication. [4] Extended Computer Service of the Minor Planet Center.