MEMORANDUM OF AGREEMENT
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AND
THE U. S. NAVAL OBSERVATORY

1. Introduction

The National Aeronautics and Space Administration (NASA) and the United States Naval Observatory (USNO) have a mutual interest in the development of the Space Interferometry Mission (S M), and the astrometric data it will provide. The purpose of this document is to establish an agreement between NASA and the USNO to address our cooperation on SIM. This Memorandum of Agreement (MOA) documents the scope of cooperation between NASA and the USNO during the entire life cycle of SIM.

SIM is a major mission within the NASA Navigator program under the cognizance of NASA's Office of Space Science. NASA is interested in SIM as a technology development vehicle for interferometry in space, and in the many scientific investigations that can be accomplished with microarcsecond precision astrometry. SIM is a technological and scientific precursor to the Terrestrial Planet Finder mission. In particular, SIM will identify planets around neighboring stars and their associated masses. This information will support the primary goal of the Navigator Program, identifying planets, within other solar systems, that may contain life.

The USNO has as its mission to determine the positions and motions of celestial bodies, the motions of the Earth and precise time; to provide the astronomical and timing data required by the Navy and other components of the Department of Defense for navigation, precise positioning and command, control, and communications; to make these data available to other government agencies and to the general public, and to conduct relevant research. USNO is interested in SIM as a source of microarcsecond accuracy astrometric observations. This will provide significantly more accurate positions, proper motions, and parallaxes in support of the USNO mission.

2. Objectives of the Space Interferometry Mission

SIM is a NASA space-based optical interferometer with a 10-meter baseline to observe stars as faint as 20th magnitude. SIM will measure the positions, proper motions, and parallaxes of selected stars in any location on the sky to an accuracy of better than 30 microarcseconds. SIM must define and observe a grid of approximately 3000 stars to define the reference frame for science observations during the mission. In addition, observations will be made of stars of interest for scientific investigations. The

anticipated schedule for the SIM mission is a launch no earlier than 2009. The spacecraft is expected to operate for a minimum of 5 years, with a goal of 10 years. Jet Propulsion Laboratory (JPL) has been designated the lead center for SIM by NASA.

3. USNO's Roles and Responsibilities

   a. The USNO will deliver to JPL by launch, an astrometric input catalog of stars with accuracies of 100 milliarcseconds (mas) at epoch of SIM launch, for stars in the catalog brighter than visual magnitude 16th. The catalog will contain a minimum of 3000 grid stars, and 10000 science targets to a limit of 16th magnitude.

   b. The USNO will deliver to JPL by launch, an astrometric input catalog of positions for stars in the catalog as faint as 20th magnitude (up to 100 targets) with relative accuracies of 100 mas at epoch of SIM launch.

   c. The USNO will provide astrometric input catalog positions for additional stars subject to resources available from USNO and JPL, as a continuing service during the mission.

   d. The USNO will participate in the data analysis planning, algorithm preparation, data analysis, simulations and verification of results.

   e. The USNO will be represented on the SIM Science Team either through USNO staff competitively selected or through a USNO nomination, which must be approved by NASA.

   f. To support the above activities a-e, the USNO will commence work starting at the beginning of Phase B for SIM, and continuing through the life of the project, nominally 3 years after the last SIM data are acquired.

4. NASA's Roles and Responsibilities

   a. NASA will ensure USNO representation on the SIM Science Team, with equal rights and responsibilities as other team members, except that if NASA appoints a non-competitively selected member, this member will not be given any guaranteed scientific observing time on SIM.

   b. NASA, through its JPL contract, will convene SIM Science Team meetings on a regular basis.

   c. NASA, through its JPL contract, will provide to the USNO a preliminary input catalog of science stars, guide stars, and grid stars, whose astrometric positions are required, 2 years before launch, and the final catalog 1 year before launch. The catalog will contain positions accurate to better than 2 arcseconds for all objects.

d. NASA, through its JPL contract, will provide USNO with simulated data, in the form of calibrated instrument delays, for purposes of developing and validating USNO astrometric software, prior to SIM launch.

e. NASA, through its JPL contract, will provide USNO with preliminary calibrated data from the astrometric grid, when it becomes available, during the mission.

f. NASA, through its JPL contract, will provide to USNO, after the mission is completed, the final astrometric catalog.

5. USNO and NASA Collaborative Responsibilities

a. The USNO and NASA will maintain regular communications to ensure successful collaboration and scientific results for the SIM project.

b. USNO, in the same manner as NASA, will honor science data periods of exclusivity granted to investigators as set forth in NASA's Announcements of Opportunity and NASA Research Announcements for SIM.

c. NASA and the USNO will each bear the costs of discharging its respective responsibilities as defined by this MOA, including travel and subsistence of its own personnel, and transportation of all equipment for which it is responsible. Further, it is understood that the ability of each organization to carry out their obligations is subject to the availability of appropriated funds.

d. The release of public information regarding SIM may be made by the appropriate party for its own portion of the activity as desired, and, insofar as participation of the other is involved, after suitable consultation.

6. Points of Contact

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7. Effective Date

This MOA is effective upon the signature of both approving parties. It will remain in force until the end of the Space Interferometry Mission or when it is mutually agreed by the approving parties that it should be terminated.

11-30-01

Edward Weiler
Associate Administrator
NASA Office of Space Science

11/21/01

Kenneth Johnston
Science Director
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