

Update

We just got smaller!

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THE UMBRAS PROJECT

I. Jordan

Well, we didn't actually get smaller...but our occulter ideas did.

The UMBRAS Project represents the work of about a dozen people from industry and academia who are working on the definition of an achievable freeflying occulter mission to allow imaging of extrasolar planets within the next decade. With the latest mission idea, NOME (Nexus Occultation Mission Extension), a new class of occulter is presented. The "piggy-back extension" or "minimal occulter" concept is the lowest-cost, most adaptable type of freeflying occulter yet conceived, and represents an attractive option for demonstrating and performing useful high-contrast occultation astronomy.

With the NOME occulter, a template technique is presented for modifying planned Sun-Earth L2 missions into occulters for use with the *Next Generation Space Telescope* (NGST). Preliminary studies have shown that the piggy-back mission extension idea can be adapted to some of the currently planned L2 science missions.

The "NOME" type occulter is 'piggyback" because instead of requiring an independent launcher and spacecraft, the elements supplement or modify existing mission hardware. It qualifies as a mission "extension" because the occulter only deploys and becomes operational *after* the conclusion of the prime spacecraft's mission. In the NOME study, all changes and upgrades were charged to the occulter's required mass budget. We found that less than a 1/7th fractional mass increase is required for adapting Nexus into a fully controlled occulter for NGST.

In the table below, some basic mission parameters for some planned L2 missions are given along with brief comments about their transformability into occulters. With an anticipated launch of NGST in 2009, many of these spacecraft will have finished their prime missions and be available for use with NGST.

UMBRAS is an evolving project with all results freely available. A PDF version of the <u>198th AAS 'NOME' poster</u> will be posted on the UMBRAS web site upon conclusion of the conference. Publications and other information are accessible at the UMBRAS web site: <u>http://www.stsci.edu/~jordan/umbras/</u>.

		Length	Launcher	Occulter Adaptability Issues
3,300	2007	3+ yr	Ariane 5	Sunshield closely compatible with NOME configuration.
1,500	2007	1.5+ yr	Ariane 5	Alternate occulter screen design necessary.
2,500	2010	TBD	H2-A	Unresolved thermal issues.
3,000	2009-12	5 yr	Ariane 5	Sunshield & s/c configuration issues.
900	-	3-6 mo	STS	Mission Cancelled.
800	2001	2-3+ yr	Delta 2	Infeasiblelaunch planned in 2001.
_	(kg) 3,300 1,500 2,500 3,000 900 800	(kg) 3,300 2007 1,500 2007 2,500 2010 3,000 2009-12 900 - 800 2001	(kg) Length 3,300 2007 3+ yr 1,500 2007 1.5+ yr 2,500 2010 TBD 3,000 2009-12 5 yr 900 - 3-6 mo 800 2001 2-3+ yr	(kg) Length 3,300 2007 3+ yr Ariane 5 1,500 2007 1.5+ yr Ariane 5 2,500 2010 TBD H2-A 3,000 2009-12 5 yr Ariane 5 900 - 3-6 mo STS 800 2001 2-3+ yr Delta 2

Candidate Earth-Sun L2 missions to consider augmenting with occulter capabilities for use with NGST