

# International Conference on Space Optics—ICSO 2008

Toulouse, France

14–17 October 2008

*Edited by Josiane Costeraste, Errico Armandillo, and Nikos Karafolas*



## *Challenges in the optical system of GAIA*

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International Conference on Space Optics — ICSO 2008, edited by Josiane Costeraste, Errico Armandillo, Nikos Karafolas, Proc. of SPIE Vol. 10566, 105661R · © 2008 ESA and CNES  
CCC code: 0277-786X/17/\$18 · doi: 10.1117/12.2308235

## Challenges in the optical system of GAIA

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### Abstract:

The precision aimed at by ESA's Astrometry and Radial Velocity mission GAIA surpasses that of the successful HIPPARCOS mission by more than 2 orders of magnitude, while at the same time increasing the number of objects 10000 times. This overwhelming increase in performance (statistical weight increased by ~ 8 orders of magnitude) is achieved by insisting on a full description in terms of photon shot noise as the fundamental limiting factor.

Yet such measurements refer to wave front topography to be understood to the level of better than 100 pico meters, in an optical system a few meters across.

Obviously such understanding relies heavily on the expected stability, and chromatic effects also are of dominant importance, requiring stellar spectral energy distributions to be determined.

It is fascinating that the experience of HIPPARCOS can indeed generate sufficient confidence for these performance specifications to be within reach.

Elaborating the design specifications and tolerances I hope to convince you of GAIA's imminent success.