**Extensive Cost Estimating methodologies for the CDF GaiaNIR study**

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1. **Introduction**

In the frame of the GaiaNIR Concurrent Design Study, this paper shows the wide range of cost estimating methodologies adopted at various stages of the study, converging to the final programmatic assessment. The main objective of the appointed cost chair was “design-to-cost” and evaluation of the compatibility of the CDF GaiaNIR concept with respect to the Cost at Completion budget constraints. Thanks to strong similarities with the ESA Gaia mission, the estimate exercise for the CDF GaiaNIR study could start with a bottom up approach, which is very unusual for the type of early estimates performed in pre-Phase A stages. This exercise continued evolving with a wide range of methodologies and a series of analyses for which the required details are usually not available during CDF iterations. Detailed knowledge of the Gaia design, the participation of the (former) Gaia project team to the sessions, in combination with access to the project cost details allowed to perform a very complete programmatic evaluation.

This paper describes the estimating process, the procurement approach consistently with geo distribution assumptions, as well as the various cost and related system-engineering considerations: obsolescence due to the considerable time gap between Gaia and GaiaNIR and its impact on the implementation schedule, major science requirement differences between the two missions, equipment capabilities evolution, and various cost reduction options.

1. **References**

[1] CDF Study Report, GaiaNIR Study to Enlarge the Achievements of GAIA with NIR Survey, CDF-175 (A), October 2017

[2] CDF Study Report, GaiaNIR Industrial and Operations Cost Estimate, CDF-175 (B), October 2017

[3] TEC-ESSB-HB-E-002, issue 1, rev.0, Guidelines for the use of TRLs in ESA programmes, 21 August 2013

[4] M.O. van Pelt, The RACE Model: a tool for fast and early cost estimates in the CDF, CESpace04, 30th Sept –1st Oct 2004, ESTEC, The Netherlands

[5] Elisabetta Lamboglia, RACE with ME: modelling the market effects on space projects, Project Control Professional, pp. 16-24, ACostE, November 2011

[6] Elisabetta Lamboglia, A tool for rapid and early schedule estimates, Project Control Professional, pp. 16-24, ACostE, May 2014