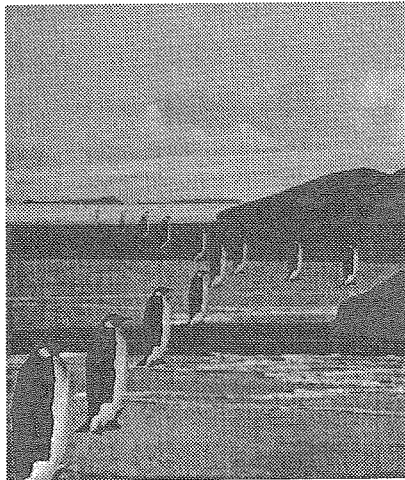


# **Technology Roadmap for Future Interferometric Facilities**

**Proceedings of the European Interferometry  
Initiative Workshop organized in the context of  
the 2005 Joint European and National  
Astronomy Meeting “Distant Worlds”**

**6 - 8 July 2005**



**Liège University, Institute of  
Astrophysics and Geophysics**

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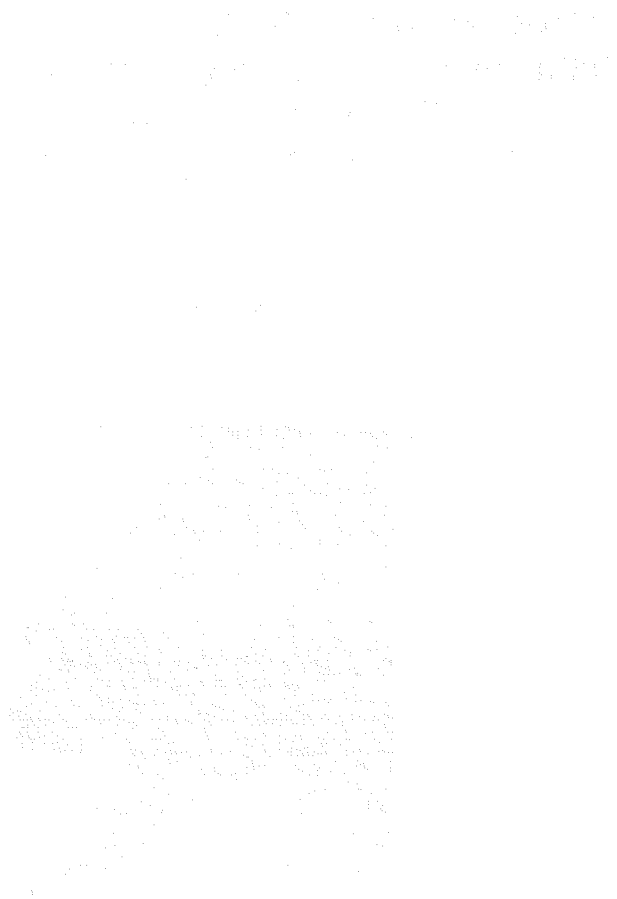
**Edited by**

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# Technology Roadmap for Future Interferometers

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## FOREWORD

Among the planned activities of the Optical Interferometry Network of the European Interferometry Initiatives (EII, OPTICON/FP6), Workpackage 3 directly aims at developing the vision of a next-generation interferometric facility (post VLTI era).

Link: <http://www.strw.leidenuniv.nl/~eurinterf/Activities/OPTICON-NA/index.html>

The Network Activity (NA) Committee, presently composed of Eric Bakker, Andrzej Niedzielski, Romain Petrov, Andreas Quirrenbach and Jean Surdej, has proposed to the EII board to first address the science cases for next generation interferometric facilities. In this context, a 4-day scientific workshop on "Sciences Cases for Next Generation Optical/Infrared Interferometric Facilities (the post VLTI era)" has been organized on 23-26 August 2004 in Liège. The proceedings of this workshop have been published (March 2005) and are available upon request.

Link: <http://www.astro.ulg.ac.be/colloques/2004/meeting2.html>

Following this workshop, it was decided to organize a second one dedicated to a "Technology roadmap for Future Interferometric Facilities". Formulation of several sets of top-level instrumental requirements has been addressed. Review of known concepts has been made, and assessed in how far they meet the above requirements. Following the identification of several critical relevant technologies (e.g. beam transport, detector technology, information technology, adaptive optics theory, etc.), reviews of their current status have been presented as well as plans on how to develop these to meet the proposed requirements.

We present here the proceedings of this second workshop that has been organized in Liège during three afternoons (6-8 July 2005) of the parallel JENAM sessions.

Link: <http://www.astro.ulg.ac.be/RPub/Colloques/JENAM/interfero/interfero.html>

The Scientific Organizing Committee (SOC) of this workshop was composed of:

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The science programme that was adopted is given below. All lectures were presented in one of the “Amphitheatres of Europe” located on the Liège University Campus (Sart Tilman, Liège, Belgium):

<b>Thursday – 7 July 2005</b>	
09h50-10h40 <i>Plenary talk</i>	Perspectives for next generation ground- and space-based interferometers O. Absil & D. Mawet
<b>Wednesday - 6 July 2005</b>	
13h30-14h05	Summary of last year's Liège conference recommendations and thoughts about a strategic roadmap for future interferometers J. Surdej
14h05-14h40 <i>Invited talk</i>	Complementarity between space and ground-based interferometry V. Coudé du Foresto
14h40-14h55	Scientific requirements for space interferometric missions C.V.M. Fridlund
14h55-15h30 <i>Invited talk</i>	A high-level technical overview of prototype and first-generation optical arrays D. Buscher
16h00-16h15	Cophasing and Fringe Tracking for future interferometers M. Gai, D. Bonino, L. Corcione, D. Gardiol, M.G. Lattanzi, D. Loreggia, G. Massone, S. Menardi and E. Ribak
16h15-16h50 <i>Invited talk</i>	Long baseline beam transport G. Perrin
16h50-17h05	Concept of a pupil densification assembly using optical fibers F. Patru, D. Mourard, O. Lardièrre, A. Spang, J.M. Clause, P. Antonelli, Y. Bresson and S. Lagarde
17h05-17h40 <i>Invited talk</i>	Single mode beam combination for interferometry P. Kern
17h40-17h55	Algol-CPNG: The new generation photon counting cameras for visible interferometry A. Blazit, E. Thiébaud, F. Vakili, L. Abe, A. Spang, J.-M. Clause, D. Mourard and X. Rondeau
<b>Thursday - 7 July 2005</b>	
13h30-14h05 <i>Invited talk</i>	Arrays with a wide field of view combination A. Quirrenbach
14h05-14h40 <i>Invited talk</i>	Reconfiguration of 8m class telescopes M. Kraus
14h40-15h15 <i>Invited talk</i>	Synergies between interfacing a future generation interferometer and ELTs F. Delplancke
15h15-15h30	Using interferometry to achieve high dynamic range imaging S. Lacour & G. Perrin

<b>Thursday - 7 July 2005</b>	
16h00-16h35 <i>Invited talk</i>	The Large Binocular Telescope Model Extrapolated to ELTs Th. Herbst
16h35-17h10 <i>Invited talk</i>	Future optical very long baseline interferometers: the OVLA model - a well- populated array F. Vakili
17h10-17h45 <i>Invited talk</i>	Arrays without delay lines V. Borkowski
17h45-18h00	Direct imaging: the natural choice for cophased interferometry F. Martinache & O. Lardiere
<b>Friday - 8 July 2005</b>	
09h00-09h35 <i>Invited talk</i>	Site considerations for the next generation of optical arrays: Mid-latitude sites versus Antarctica M. Sarazin
09h35-10h10	Perspective of Interferometry in Antarctica B. Lopez, F.X. Schmider, F. Vakili and E. Aristidi
10h40-11h40 <i>Plenary talk</i>	Chance and necessity revisited <i>Professor CHRISTIAN DEDUVE (Nobel Prize)</i>
11h45-12h20 <i>Invited talk</i>	AT telescopes at Dome C O. Pirnay
13h30-13h45	Aladdin on the road to Darwin Vincent Coudé du Foresto
13h45-14h20 <i>Invited talk</i>	EC proposal for FP7 and research infrastructures in astronomy P. Moschopoulos
14h35-15h20	General conclusions and discussion A. Quirrenbach

<b>Posters</b>	
VIDA: a direct imaging instrument for the VLTI and a first step toward hypertelescopes O. Lardière et al.	
The OVLA concept for kilometeric ground-based hypertelescopes O. Lardière	
Dome C site testing : first results of the winter campaign E. Aristidi, K. Agabi, E. Fossat, J. Vernin, M. Azouit, T. Sadibekova and F. Martin	

Some 60 scientists have taken active part in this meeting. One JENAM plenary talk (50 minutes), thirteen invited talks (35 minutes each with discussion), eight contributed talks (15 minutes with discussion) and three posters were presented. Very enlightening conclusions have been presented by Andreas Quirrenbach. These proceedings are representative of the highlights of the workshop.

It is our pleasure to thank the members of the Scientific and Local Organizing Committees and in particular Prof. J.-P. Swings, as well as several colleagues from the Liège Institute of Astrophysics and Geophysics for having participated to the good organisation of this workshop.

The organisation of this meeting was made possible through various financial grants received from OPTICON (EII, FP6), the European Astronomical Society, “Fonds National de la Recherche Scientifique”, AMOS, the Province of Liège, the European Space Agency, the Belgian Science Policy, “Communauté Française de Belgique” and the Liège University. We address our thanks to all these organizations for their encouragements and financial support.

Liège, 23 May 2006

Jean Surdej, Denise Caro and Alain Detal