



MONET2

Project Full Title: Network of Excellence on Model-based Systems and Qualitative Reasoning.

Contract: Concerted Action / Thematic Network

Contract No: IST-33540

Deliverable NR2:

MONET Project Twenty-Four Month Report – January to December 2003

Date: 30th January 2004

Version: 2.3

Status: Release

MONET Project Office
Department of Computer Science
University of Wales
Aberystwyth
Ceredigion
SY23 3DB

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Authors

Iain Russell	MONET Project Administration
Janet Thomas	MONET Project Administration
Chris Price	MONET Project Director
Neal Snooke	MONET Project Director
Bert Bredeweg	MONET Project Steering Committee
George Coghill	MONET Project Steering Committee
Luca Console	MONET Project Steering Committee
Peter Lucas	MONET Project Steering Committee
Rob Milne	MONET Project Steering Committee
Peter Struss	MONET Project Steering Committee

1 Introduction

1.1 Purpose of this Document

The purpose of this document is to illustrate the achievements of the MONET Project over the past year. In order to make this information as clear as possible, we have made every effort to present it in as clear and concise a manner as possible. This document is a brief summary of the past year and does not include in-depth details on any Deliverable that has been described in a previous Report or Review. Any Deliverable that has not yet been described in full will be detailed in this document, but in order to keep the format as clear as possible, lengthy details are included in annexes.

1.2 Project Update in Brief

In brief, the project has delivered everything that has been required of it during the last year, although the fourth Newsletter has been slightly delayed, see Section 2.2.5. The Project and the Task Groups are now working towards their final year deliverables and planning how to make this next year of MONET even more successful than the previous two.

The Membership figures at the end of Year Two are shown below and compared to those of the End of Year One. A full list of MONET Members can be found in Annex One.

Members	Year One End	Year Two End
Total	47	79
University	37	52
Industry	8	21
Industrial members who are SME's	6	13
Research Institutions	1	6

2 Year Two Workpackage Deliverables

2.1 Introduction

This section contains a list of the Deliverables and Milestones that occurred in 2003. Many of the details of these have been covered in past Deliverables and Review Presentations and so details are included only for information which is new or updated.

2.2 Deliverables

Deliverable Number	Deliverable Title	Delivery Date	Status
NR1	First Annual Report	13	Delivered January 2003
ED2	Review of MBS&QR Technologies and their Usefulness for Teaching	15	Delivered August 2003 and detailed in Eighteen Month Report

MBD3	Collection of Industrial Reference Problems	15	Delivered August 2003 and detailed in Eighteen Month Report
A4	Automotive Roadmap (Version 1)	16	Delivered August 2003 and detailed in Eighteen Month Report
B2	Biomedical Roadmap (Version 1)	16	Delivered August 2003 and detailed in Eighteen Month Report
ED4	Education and Training Roadmap (Version 1)	16	Delivered August 2003 and detailed in Eighteen Month Report
MBD6	MBD/FDI Roadmap (Version 1)	16	Delivered August 2003 and detailed in Eighteen Month Report
TR1	Technological Roadmap (Version 3)	18	Delivered August 2003 and detailed in Eighteen Month Report
SS1	Summer School	18	Delivered September 2003 See Section 2.2.1
SS2	Summer School Educational Resources	18	Delivered See Section 2.2.2
NN3	Newsletter 3	18	Delivered August 2003
A2	Outline of Areas for Potential New Projects etc. for European Automotive Sector	19	Delivered See Section 2.2.3
B4	Biomedical Workshop	20	Delivered See Section 2.2.4
NN4	Newsletter 4	24	See Section 2.2.5

2.2.1 SS1 – Summer School

The MONET Summer School was held from the 8th to the 12th of September on the Greek Island of Crete. Its primary aim was to 'inspire and prepare the next generation of researchers in the field of MBS/QR'. The timetable was drawn up around demonstrations and practical use of applications, all giving hands-on experience to the students. A world class team of lecturers was brought together to deliver the Summer School presentations, as well as to be on hand to discuss issues with the students. The students in return were encouraged to use our evening 'Drop-in Sessions' to their advantage and to discuss problems and issues specific to their research.

The students were all given feedback questionnaires, the analysis of which can be found in Annex Two.

2.2.2 SS2 – Summer School Educational Resources

Every delegate was provided with a paper copy of the presentations and papers given at the Summer School. All these resources and others quoted during the Summer School (mainly the MONET Technological Roadmaps) were supplied on a CD for the presenters and students alike. These educational resources were then put on-line and students could

access the links and down-load any resources they wished. The resources were also put onto MIR for access by all registered users.

2.2.3 A2 – Outline of Areas for Potential New Projects etc. for European Automotive Sector

The goals of this deliverable are to demonstrate that the efforts of the Task Group and its Members in distilling industrial requirements have been a success and to identify areas of these requirements that the Members are willing to work together to solve. The details of this document were presented at the September 2003 Project Review Meeting.

2.2.4 B4 – Biomedical Workshop

The Workshop, entitled 'AIME'03 Workshop: Qualitative and Model-based Reasoning in Biomedicine' was held as part of The European Conference on Artificial Intelligence in Medicine (AIME'03). The event was held from the 19th to the 22nd of October, 2003 (<http://www.cs.kun.nl/~peterl/aime03-ws.html>), with the Workshop itself being held on Sunday, 19th October 2003.

Details of the Workshop and its programme are in Annex Three.

2.2.5 NN4 – Newsletter

The forth Newsletter was deliberately delayed until after Christmas in order to avoid potential losses due to the high volume of post at this time. We are also including a questionnaire examining our member's opinions on the self sustainability of the Network. To increase the chances of this being completed we have applied for an international freepost address and the final stages of this licence agreement are being concluded. Thus the Newsletter shall be going out in early February.

2.3 Milestones

Deliverable Number	Deliverable Title	Delivery Date	Status
MIR1	MIR data entry up to date	24	See Section 2.3.1
Auto TG	Holding of series of 'exchange centres' with the goals of <ul style="list-style-type: none"> • transferring technologies • singling out opportunities for the application of the technology 	24	These were outlined during the previous reports and the Review. The latest meeting is described in Section 2.5.4
Auto TG	Commencement of projects resulting from network influence <ul style="list-style-type: none"> • application projects • projects to identify potential new research opportunities, to address new problems emerging from applications 	24 - 36	Described in the Review
Ed&T TG	Initiate collaborative project utilising training over the Web.	18 - 30	See Section 3.2.3

2.3.1 MIR1 – MONET Information Resource Update

The MIR Database has now exceeded 2000 references and has over 300 full pdf's of papers and lecture notes, the details are shown in the Table below.

Reference Count (as of January 22 nd 2004)			
Authors	Publications	Lecture Notes	Applications
1826	2059	60	7
-	276 Full pdf's	58 Full pdf's	-

The Table below shows access statistics for MIR up to and including the 30th of January 2004.

Months 2003	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Number of Hits	4	7	12	22	16	11	15	17	11	13

Months 2004	Jan (so far)	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Number of Hits	12											

2.4 Additional Deliverables

2.4.1 WWW1 – MONET Web Site Revision and Update Strategy

This document has been drawn up to identify which sections of the MONET Web site require updating (and which do not) and how often. This document also specifies how and when this will be done. The entire web structure is shown in Annex One of the WWW1 document.

2.4.2 QA1 – MONET Documentation Quality Assurance

The purpose of this document is to describe the general layout and essential information content required in Reports and Deliverables produced by the MONET Project; and to specify the procedures for the production of such items.

2.4.3 CD1 – Copy of Website on CD

At the request of our Project Officer and the Reviewers we made a copy of the website and burned this onto CD. The copy was taken on the 14th of November and included all the deliverables required up to that date. The CD had a self start programme and contained the September 2003 Review Presentation, the start up page also had links to the Web Index page, the MIR page and the Summer School page which linked to all the on-line Proceedings.

2.5 Other Activities

2.5.1 IEEE Issue on BRIDGE

This publication is now in the final stages of preparation and will contain six articles (subject to the conditions of the review panel) on Bridge issues and should appear around the second quarter of 2004.

2.5.2 DX'04 – The 15th International Workshop on Principles of Diagnosis

Louise Travé-Massuyès, MONET's Bridge Task Group Leader, is the Organiser of this year's DX Workshop and thus this event has been specifically planned to further the aims of Bridge. DX'04 particularly encourages the interaction and exchange of theories, techniques and experiences amongst scientists with diverse interests concerning diagnosis, from different backgrounds: Artificial Intelligence, Control Theory, Systems Engineering, Software Engineering and other related areas.

Further details of DX'04 can be found in Annex Four.

2.5.3 AAI Special Issue – Published December 2003

Bert Bredeweg (Education and Training Task Group Leader) and Peter Struss (Industrial Expert) were recently guest editors for an AI Magazine special issue entitled 'The Qualitative Challenge: Automated Reasoning about the Physical World'. This has now been published and is creating a lot of interest in QR.

2.5.4 Invited "Bridge" talks at the Annual Meeting of Institute of Automation and Robotics and a Workshop on Diagnosis and Control

The German-French Institute for Automation and Robotics (IAR) organized its Annual Meeting in Duisburg, Germany, on November 27th and 28th, 2003, conjoined with a workshop on Diagnosis and Control on November 26th and 27th. In his invited talk on "Principles and Applications of Model-based Diagnosis – The Artificial Intelligence Perspective", Prof. P. Struss (Technische Universität München and OCC'M Software GmbH) highlighted the key ideas underlying the AI approach and used examples and demonstrations from applications in the automotive domain to illustrate these ideas and also the degree of maturity of the respective techniques. Prof. Dr.-Ing. J. Lunze's (Ruhr-Universität Bochum) talk on "Diagnosis of Quantised Systems" presented a particular technique for exploiting qualitative models for diagnosis.

2.5.5 Therapy Advisor - MBS&QR for Pacemakers

A project to investigate the potential of model-based and qualitative reasoning technology was started at the end of the 1990s by Associate Professor Peter Lucas (MONET Project Bio-Medical Task Group co-chair) with help from three of his final-year MSc students (Astrid Tholen, Marcel Kempers and Harold Soepenber) and researchers from Vitatron, a leading medical device company and creators of the world's first fully digital pacemaker series. This research has recently resulted in the 'Therapy Advisor'. Vitatron's new pacemakers can be adjusted to individual patient characteristics, however, physicians often do not have enough time to analyse the large amount of diagnostic data made available to them. As a solution, Vitatron's Therapy Advisor automatically alerts the physician to areas of interest or concern and offers programming advice.

2.6 Task Group Membership

2.6.1 Automotive Task Group Membership

Members	Year One End	Year Two End
Total	10	14
University	4	4
Industry	5	7
Industrial members who are SME's	3	4
Research Institutions	1	1

2.6.2 Bio-Medical Task Group Membership

Members	Year One End	Year Two End
Total	7	15
University	6	8
Industry	0	3
Industrial members who are SME's	0	2
Research Institutions	1	4

2.6.3 Education and Training Task Group Membership

Members	Year One End	Year Two End
Total	10	19
University	10	15
Industry	0	4
Industrial members who are SME's	0	3
Research Institutions	0	0

2.6.4 Bridge Task Group Membership

Members	Year One End	Year Two End
Total	20	32
University	17	22
Industry	3	8
Industrial members who are SME's	3	6
Research Institutions	0	2

3 Year Three Workpackage Deliverables

3.1 Introduction

The work towards this year’s deliverables has already begun. The Task Groups are looking at the work they need to do for this year and planning how best to complete the work whilst maintaining a clear focus on the overall goals of the project and requirements of the technologies. Below is a list of this year’s deliverables and a brief account of the planning that has already gone into them.

3.2 Deliverables

Deliverable Number	Deliverable Title	Delivery Date	Nature
NR2	Second Annual Report	25	This Document
A3	New Projects Arising from A2	25	In progress. See Section 3.2.1
MBD4	Model-based Fault Detection & Diagnosis Articles and Tutorials	27	In progress. See Section 3.2.2
B5	Report on Synergies between MBS&QR and other AI Approaches in Biomedicine	30	In progress. See Section 3.2.3
ED3	Review on Integration of MBS&QR with WWW	30	In progress. See Section 3.2.4
NN5	Newsletter 5	30	-
MBD5	Report on Evaluation of Solutions	32	-
A5	Automotive Roadmap (version 2)	34	-
B3	Biomedical Roadmap (version 2)	34	-
ED5	Education and Training Roadmap (version 2)	34	-
MBD7	MBD/FDI Roadmap (version 2)	34	-
B1	Biomedical Domain Status Document	35	-
DC6	CD-ROM	36	-
TR2	Technological Roadmap (version 4)	36	-
NN6	Newsletter 6	36	-
NR3	MONET 2 Final Report	36	-

3.2.1 A3 – New Projects Arising from A2

The Task Group has been looking at the areas covered in the last A2 Deliverable and will be discussing these and other potential areas for new projects at an Automotive Task Group Meeting in early February. For this reason this Deliverable will be slightly delayed.

3.2.2 MBD4 – Production of Tutorial Materials

The Articles and Tutorials have already been collected and grouped into the deliverable. However, to ensure that this Deliverable will be as useful and applicable in real-world situations as possible the Bridge Task Group has chosen to extend this deliverable in two ways. Firstly the deliverable will also be a fully integrated On-line document and secondly the Task Group are building an Index to the subjects and areas covered in all of the Articles and Tutorials. These two extra features should ensure that the document is of even greater value to Industrialists and Academics alike.

3.2.3 B5 – Report on Synergies between MBS&QR and other AI Approaches in Biomedicine

The Bio-Medical Task Group has been investigating this area and is working towards the production of the deliverable. Information has been drawn both from their own expertise and from the recent AIME'03 workshop which drew together experts with a practical knowledge of a wide range of AI modelling theories and applications. The Task Group will be meeting in April in order to discuss the completion of this document as well as the second versions of the Roadmap and Domain Status Document.

3.2.4 ED3 – Review on Integration of MBS&QR with WWW

The Education and Training Task Group has been looking into the application of MBS&QR Technologies to the World Wide Web. After discussion they have chosen to investigate the practicality of hosting an MBS&QR application on the web for learners to interact with and learn about. In order for this to happen the Task Group need to produce a Support Document (which shall be on-line) that will act as a guide to learners, ED3 will be this document.

4 References

N/A

5 Document History

<i>Version</i>	<i>Date</i>	<i>Changes made to document</i>	<i>Changed by</i>
1.0	16 TH December 2003	Draft Document Outline Prepared by Iain Russell	RIR
1.1	18 th December 2003	Document Proof read by Janet Thomas and sent to Steering Committee	JNT
2.0	7 th January 2003	Format updated after consultation with Steering Committee	RIR
2.1	13 th January 2004	Minor Updates	RIR
2.2	14 th January 2004	Proof Read and minor amendments and sent to Steering Committee	JNT
2.3	30 th January 2004	Release	RIR

Annex One : List of MONET Members

Institution	Country	Membership	Classification
Agents Inspired Technologies, S.A.	Italy	Full	U
British Maritime Technology Ltd	United Kingdom	Full	R
Brunel University	United Kingdom	Full	U
C.R.F. Società Consortile per Azioni	Italy	Full	U
Cancer Research UK	United Kingdom	Full	U
Centre Nationale de la Recherche Scientifique (CNRS-LAAS)	France	Full	U
Daimler Chrysler AG	Germany	Full	I
Dipartimento di Elettronica per l'Automazione, Università degli Studi di Brescia	Italy	Full	U
Dipartimento di Informatica – Università di Torino	Italy	Full	U
Dipartimento di Matematica e Informatica, Università di Udine	Italy	Full	U
Ecole Polytechnique Federale de Lausanne	Switzerland	Full	U
Enel Produzione S.p.a.	Italy	*	I (SME)
FirstEarth Ltd	United Kingdom	Full	U
France Telecom	France	*	U
Friedrich Schiller University Jena	Germany	Full	U
Fundacio ESADE	Spain	Full	U
Heriot-Watt University	United Kingdom	Full	U
Institut für Technische Informatik, Technische Universität Graz	Austria	Full	U
Institut National de Recherche en Informatique et Automatique	France	Full	U
Institute für Informationsverarbeitung und Computergestützte Neue Medien – Arbeitsgruppe für Softwaretechnologie	Austria	Full	U
Institute of Computing and Information Sciences, University of Nijmegen	The Netherlands	Full	U
Institute of Information Systems, Technische Universität Wien	Austria	Full	U
Istituto di Matematica Applicata e Tecnologia Informatiche – CNR, Pavia	Italy	Full	U
Instytut Podstawowych Problemow Techniki Polskiej Akademii Nauk	Poland	Full	U
Intelligent Applications	United Kingdom	Full	I (SME)
Jaume I University	Spain	Full	U
Laboratoire d'Automatique de Grenoble	France	Full	U
Linköping University	Sweden	Full	U
Loughborough University	United Kingdom	Full	U
Max-Planck Gesellschaft zur Foerderung der Wissenschaften e.V.	Germany	Full	U
OCCM Software GmbH	Germany	Full	I (SME)

Potsdam-Institut fur Klimafolgenforschung	Germany	Full	U
Public Authority of Industry	Kuwait	**	I
R.O.S.E Informatik GmbH	Germany	Full	I (SME)
Robert Bosch GmbH	Germany	Full	I
Spore Ltd	United Kingdom	Full	I
Technische Universitaet Berlin	Germany	Full	U
Technische Universitaet Dresden	Germany	Full	U
Technishe Universitaet Muenchen	Germany	Full	U
TUHH – Technologie GmbH	Germany	Full	I (SME)
Universidad de Malaga	Spain		U
Universidad de Sevilla	Spain	Full	U
Universidad de Valladolid	Spain	Full	U
Universidad Pontificia Comillas de Madrid	Spain	Full	U
Università degli Studi del Piemonte Orientale “Amedeo Avogadro”	Italy	Full	U
Universitaet Klagenfurt	Germany	Full	U
Universitat de Girona	Italy	Full	U
Universitat Politècnica de Catalunya	Spain	Full	U
Universitat Rovira I Virgili	Italy	Full	U
Universite Paris 13	France	Full	U
Universiteit van Amsterdam	The Netherlands	Full	U
Universitie des Sciences et Technologies du Lille	France	Full	U
University Koblenz-Landau	Germany	Full	U
University of Aberdeen	United Kingdom	Full	U
University of Edinburgh	United Kingdom	Full	U
University of Ferrara	Spain	Full	U
University of Huelva	Spain	Full	U
University of Hull	United Kingdom	Full	U
University of Lancaster	United Kingdom	Full	U
University of Leeds	United Kingdom	Full	U
University of South Australia	Australia	**	U
University of Strathclyde	United Kingdom	Full	U
University of Wales, Aberystwyth	United Kingdom	Full	U
University of Wuerzburg	Germany	*	U
University of Brasilia	Brazil	**	U
UReason Holding B. V.	The Netherlands	*	I (SME)
Vanderbilt University	USA	**	U

* Organisation has completed on-line application form but not yet signed a full Membership contract

** Organisation is outside the European Community, so cannot achieve full Membership status.

Annex Two : Summer School Feedback Questionnaire Analysis

At the end of the Summer School the Co-ordinators handed out feedback questionnaires, the full results of which are shown in Deliverable SS1 : MONET Summer School, which can be found on the MONET Deliverables web page:

(<http://monet.aber.ac.uk:8080/monet/members/deliverables.html>). Here we give a brief overview of the responses to this questionnaire and will highlight the positive and negative comments from students. In this section any words or phrase in italics are those of Summer School students themselves.

The students were asked to give an overall mark out of ten for how they rated the value of the Summer School; the average mark given was 8.68. This gives a clear indication of the value that the students placed on the event as a whole. However, some students did comment that the lectures were too long and detailed and that it was hard to maintain concentration in the long sessions. It was the intention of the organising committee that this would be a very involved course; the detail that went into the lecture notes and presentation slides was deliberate, in order for them to be used as a reference aid to the students in the future. We feel this was achieved and the result of the relevant question showed that nearly 54% of students stated that the complexity of the course was just right. On the positive side, other students commented that there were stimulating lectures and discussions and that the event was a great opportunity to meet and interact with key players and new researchers. One student stated that they thought that the Lecturers should have made their interesting findings more the focus of their lectures. This is one issue that will be considered if the MONET Summer School is repeated.

After the analysis of the feedback from the first MONET Summer School, we discovered that the students wanted to have much more hands on experience of the models and so for this event a large practical element was introduced to the timetable. However, just over a quarter of students stated that they thought there was still too much theory and they would have appreciated more hands - on modelling sessions; as well as the actual models the students also appeared very interested in how the application (themselves) work. As an overall reference over 61% of students stated that the balance between theory and practical was 'just right'.

One statistic that was very encouraging was that nearly 72% of the students stated that their interest in MBS&QR had increased as a result of the MONET Summer School and nearly half stated that they could now see 'new ways' to implement MBS&QR in their work. Amongst some of the comments made were that the event had helped my understanding of the area and sparked lots of thought / ideas as well as giving insights in new areas. It was also interesting to note that one student stated that they didn't realise there was so much research on this. This is of particular interest because when we asked the students to rate their knowledge of MBS&QR before the Summer School out of five we got an average of 1.99, while at the end nearly 80% of the students stated that they had learned enough / a lot by attending the course.

We also asked for marks out of five for a range of issues, a brief overview of these results are given here. When asked to give a score for the direct usefulness that the Summer School had had to their research, the average mark returned was 3.56. The students gave the presentational material an average of 3.45, the general atmosphere of the school in enabling open discussion and exchange of views a 4.49 and the overall administration of the Summer School a score of 4.83.

Annex Three : Bio-Medical Workshop Programme

AIME'03 Workshop: 'Qualitative and Model-based Reasoning in Biomedicine' held as part of The European Conference on Artificial Intelligence in Medicine (AIME'03), Cyprus

In order to assist with forwarding the wider understanding of the Bio-Medical MBS&QR field and for completion of Deliverable B4, the Bio-Medical Task Group has organised a Workshop at a major Bio-Medical AI Conference.

The focus of the Workshop was modelling, which is of central importance when tackling problems in medicine and human biology, as it is the biomedical researcher's aim to uncover the biological structures and mechanisms underlying biological processes. Their high complexity; their common non-linear mathematical nature, and the efforts required in collecting biomedical data makes it hard, and often impossible, to describe biomedical mechanisms quantitatively. However, it is often possible to describe various aspects of biomedical problems qualitatively, and one may argue that these qualitative descriptions are fundamental to the understanding of many processes studied by the life sciences.

Programme of the Workshop

Session I: 09:45 - 11:00

09:45 - 10:00 - **Peter Lucas** - Welcome

10:00 - 10:45 - Invited Talk - **Ivan Bratko**: Automated modelling with qualitative representations

Session II: 11:00 - 14:00

11:00 - 11:30 - Riccardo Bellazi, **Raffaella Guglielmann** and Liliana Ironi: Qualitative reasoning for modelling metabolic systems: a case study

11:30 - 12:00 - Liliana Ironi and **Stefania Tentoni**: Challenging QR research issues in electrocardiology

12:00 - 12:30 - **Elisa Fromont**, Marie-Odile Cordier, René Quiniou and Alfredo Hernandez: Kardio and Calicot: a comparison of two cardiac arrhythmia classifiers

Session III: 14:00 - 15:00

14:00 - 14:45 - Invited Talk - **Linda van der Gaag**: Model-based reasoning with qualitative probabilistic networks

Session IV: 15:00 - 16:30

15:00 - 15:30 - **Robert Trelease** and Jack Park: Qualitative reasoning in integrative biology: evolving a network experiment modelling system for collaborative multilevel systems research

15:30 - 16:00 - **Jung-Wook Bang**, Raphael Chaleil and Jon Williamson: Two-stage Bayesian network for metabolic network prediction

Session V: 16:30 - 17:45

16:30 - 17:00 - **Anand Kumar**, Barry Smith, Mario Stefanelli, Silvana Quaglini and Matteo Piazza: Implementing clinical guidelines in an organizational setup

17:00 - 17:30 - **Agnieszka Onisko** and Marek J. Druzdzel: Effect of imprecision in probabilities on Bayesian network models: an empirical study

Annex Four : DX'04 Workshop Details

DX'04 – The 15th International Workshop on Principles of Diagnosis

June 23-25, 2004
Carcassonne, France

<http://www.laas.fr/DX04>

The International Workshop on Principles of Diagnosis is an annual event that started in 1989, rooted in the Artificial Intelligence (AI) community. Its focus is on theories, principles and computational techniques for diagnosis, monitoring, testing, reconfiguration and repair of complex systems. Transfer of these theories, principles and techniques to industry-related disciplines and other application domains is amongst the important topics of the workshop.

DX-2004 particularly encourages the interaction and the exchange of theories, techniques, and experiences amongst scientists with diverse interests concerning diagnosis, and from different backgrounds: Artificial Intelligence, Control Theory, Systems Engineering, Software Engineering and other related areas.

DX is a lively forum that has traditionally adopted a single-track program and limited the number of participants in order to promote detailed technical exchange and debate. We welcome papers in a variety of areas related but not limited to:

- Formal theories and computational methods for: diagnosis, monitoring, testing, repair and therapy, reconfiguration, fault tolerance, diagnosability analysis and related topics.
- Modelling for diagnosis: symbolic, numeric, discrete, continuous, hybrid, probabilistic, functional, behavioural, qualitative, abstractions and approximations.
- Computational issues: controlling combinatorial explosion, use of structural and hierarchical knowledge, focusing strategies, resource-bounded reasoning.
- Diagnosis process: strategies for measurement selection, sensor placement, test actions design, active testing, embedded diagnosis systems, preventive diagnosis, fault tolerance strategies, distributed diagnosis.
- Bridge between DX and other areas: FDI control-based techniques, statistical and probabilistic methods, design, model checking, machine learning, non-monotonic reasoning, planning, execution, real-time languages, software verification and validation, debugging, hardware testing.
- Applications and technology transfer: real-world applications and integrated systems in a wide range of fields including transport systems, space and aeronautics, process industry, biomedical. Success (or failure) stories are especially welcome.

Location

DX-2004 will take place in Carcassonne, France.

Workshop Program Chair

Louise Travé-Massuyès LAAS-CNRS, France