ADAS-EU

ADAS for fusion in Europe

Grant: 224607

Hugh Summers, Martin O'Mullane, Francisco Guzman and Luis Menchero

Review 1

1 July 2010

Workpackages : 26-5-1
Category : PU

Review 1

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Abstract: *Review of reporting period: months 1-18*

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Preface

The review document is one of series of three, deliverable under the ADAS-EU project. The review includes titles and contents pages of the collection of reports scheduled for completion during the reporting period.

H P Summers
1 July 2010

Chapter 1

Overview

The objectives of ADAS-EU in its first eighteen months have largely been met. Set-up of the project experienced some delays, particularly in recruitment, but sub-contract design and placement moved ahead of schedule. The duration of sub-contracts was in many cases increased from the orginally intended 12 months to 18 months. From discussions, it was evidently difficult, particularly with sub-contracts involving experimental measurements on external facilities, to achieve completion in 12 months. This is not a time critical part of ADAS-EU delivery at this stage and 18 months was accepted.

Substantial effort has been made to make information about ADAS-EU accessible in the public domain. Posters describing ADAS-EU and its commitments to supporting fusion in Europe were prepared and widely circulated (see Appendix A. Dr. Whiteford created a web site (http://www.adas-fusion.eu) to propagate news, announcements and access to technical information about ADAS-EU. Its front page is shown in Appendix B. He followed the pattern of the existing ADAS web site (http://www.adas.ac.uk)

Dissemination in the first period has progressed very well. The level of interest in the ADAS-EU course exceeded expectations and the attitudes of participants to shared learning, mutual support and future collaborations were exceptionally good. There have been several cross-visits between participants and initiated collaborative work stemming directly from the ADAS-EU course in the past nine months.

The OPEN-ADAS web site, which is the pathway for public domaain release of data from ADAS-EU has been operating without problem since the beginning of the project. There has been a very large number of users and downloads (see section 2.2). The website is http://open.adas.ac.uk. Its front page is shown in Appendix C.

The detailed reports due at this time have been assembled and are available as separate documents. The titles and front pages are included in Chapter 2 for information. Attention is drawn to the PUBL series of reports. These contain the full scientific and computational application details of the main themes of ADAS-EU and are due for completion and publication towards the end of the ADAS-EU project. They are works 'in progress'. As a scientific work package item and its background theory are completed, the appropriate chapters and sections are written up in the relevant PUBL. They are available to the scrutinisers and the Governance Committee of ADAS-EU but should not be released further at this stage. Reference is made in the SCIENCE reports to sections of the PUBL documents which may be helpful or clarifying.

1.1 Staffing

The ADAS-EU Director (Professor Hugh Summers) was appointed at 20% FTE from 1 Jan. 2009. The ADAS-EU managers (Dr. Allan Whiteford and Dr. Martin O'Mullane) were appointed at 40% FTE and 10% FTE respectively from 1 Jan. 2009.

The first ADAS-EU post-doctoral research associate (Dr. Francisco Guzman) was appointed at 100% FTE from 1 Jul. 2009. Dr. Guzman is based at FZ Juelich until 31 Dec. 2010. The second ADAS-EU post-doctoral research associate

(Dr. Luis Menchero) was appointed at 100% FTE from 1 Feb. 2010. Dr. Menchero is based at IPP Garching.

The ADAS-EU Special Advisor (Professor Ratko Janev) was appointed at 10% from 1 Jun. 2010.

Adminstrative, employment and payroll issues concerning UK University staff placement full-time in Europe, subject to local tax and insurance regimes, proved complex and led to some delay in initial post advertisement and recruitment. It was sought to advertise and recruit for both posts at the same time. Dr. Guzman was successfully employed, but the second post was not filled. Readvertisement and recruitment for the second post took place in Autumn 2009 and Dr. Menchero was successfully appointed.

These delays caused a loss of 10 months of ADAS-EU postdoctoral scientific input. As a compensating step, Dr. Adam Foster, a fusion plasma/atomic physics specialist, and former PhD student of Strathclyde University, supervised by Professor Summers, was employed on a temporary post from 1 Mar -30 Jun 2009. Dr. Foster was at that time preparing to take up a position at Harvard-Smithsonian in the USA, which he did in Jul 2009. Dr. Foster's employment enabled accelerated progress on the ADAS-EU heavy element theme 1, as detailed in the SCIENCE and PUBL reports (see sections 2.3 and 2.4).

Professor Janev's 10% FTE was scheduled to be fulfilled each year in a single one month block, based at FZ Juelich and designed to overlap with the FZ Julich placement of Dr. Guzman. The delay in start-up of Dr. Guzman made it expedient to delay the start of Professor Janev's appointment until 2010. This was done. Professor Janev fulfilled his 5% FTE for 2010 from 1 - 30 Jun. 2010 at FZ Juelich and successfully collaborated with Dr. Guzman there.

This still leaves a gap of 7 months of postdoctoral scientific input to ADAS-EU. In light of the very successful contribution to ADAS-EU by the short term appointment of Dr. Foster, it is planned to recover at least part of the 7 month gap, from Autumn 2010, by temporary employment of other newly-completed and atomic physics-trained PhDs in transit to other posts.

Unexpectedly, Dr. Allan Whiteford decided to leave Strathclyde University for the commercial sector. He resigned from 14 Oct. 2009 leaving a 40% FTE gap in management and scientific leadership of ADAS-EU. Professor Summers increased his assigned time to ADAS-EU from 20% to 40% from 1 Nov. 2009 and Dr. O'Mullane increased his assigned time to ADAS-EU from 10% to 30% from 1 Jan. 2010. These are interim measures until a suitable replacement for Dr. Whiteford is obtained.

It is noted that Dr. Whiteford was leading the Electron Working Party coordination activity for ADAS-EU, planned as part of the atomic data uplift of ADAS-EU. This activity was scheduled to begin after the initial set-up of ADAS-EU and establishment of the baseline data and models. As described in the OPEN, SETUP and SCIENCE reports (see chapter 2), ADAS-EU is nearly at the time point to shift emphasis to uplift. It is planned to appoint Professor Nigel Badnell at 20% FTE to mastermind this, with Professor Summers relinquishing a corresponding amount of time. It is intended that this be put in place from late Summer 2010. It is noted that Professor Badnell, based at the Department of Physics, University of Strathclyde, is one of the most outstanding electron collisional and computational theorist in the world today.

1.2 Finances

1.3 Forward planning

In broad terms, the ADAS-EU project can continue with its work packages in the originally specified timeframes. However, in a project of this length, which is designed to be strongly supportive and interactive with the fusion programme in Europe, there is some shifting of priorities and points of greatest interest and impact at any given time.

For these reasons, it is intended to bring the complete heavy species theme infrastructural concepts to completion soon. Our developments, such as superstages, have been taken up strongly by the plasma modellers and this material bears on other projects in Europe such as the Integrated Tokamak Modelling project. Also the beam emission theme items should be moved forward. A number of advanced developments were scheduled to be implemented in ADAS-EU. Our background academic research development of these is now well on and it is desirable to move them into ADAS-EU exploitation somewhat in advance of the original plans. It is noted that ADAS data on neutral beams enter codes such

as the Princeton TRANSP/NUBEAM package and so have worldwide use.

Also, there is an opportunity to bring forward the special feature theme. Our background academic research in this aspect is progressing quickly. Some parts, such as the pedagogical AFG, have already been moved into application in ADAS and it seems desirable to move the whole package into ADAS-EU exploitation while the work is fresh.

The NEW-CHEAP plan must be put back. The departure of DR. Whiteford, removes the expected lead developer from the ADAS-EU team. But also, among the fusion laboratory based diagnostic spectroscopy personnel, there is a lack of clarity of the precise expectations and wishes from this development. It is preferable to conserve some of the seven month deficit of postdoctoral scientific input explained in the overview above for this purpose when matters clarify.

The lifting of the database is the principal task for the future and it is the attention to this which will make best use of the supporting ADAS-EU sub-contracts as they come to fruition. Our plan is to exploit the strengths of the ADAS-EU post doctoral staff in ion-atom collisions. On the electron collision side, Professor Badnell's joining of the project opens up the possibility of very substantial coordinated effort in this area, which it is in ADAS-EU's interests to promote. ADAS-EU does rely on the effectiveness of the background academic research of our academic staff, outwith their time allocation to ADAS-EU. It is our intention to see if commitment to a coordinated theoretical/computational electron collision plan can be realised over the next months, which will, to a large degree, unify European capability in this area for fusion. It is expected that time on European supercomputers will be necessary for some of the most difficult targetted systems.

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Chapter 2

Available reports

- SCIENCE1, SCIENCE2, SCIENCE3
- OPEN1
- SETUP1, SETUP2
- DISSEM1

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2.1 Reports: SCIENCE1, SCIENCE2, SCIENCE3

ADAS-EU R(10)SC01

ADAS-EU
ADAS for fusion in Europe

Grant: 224607

Hugh Summers, Martin O'Mullane, Francisco Guzman and Luis Menchero

Scientific progress report 1

29 June 2010

Workpackages : 1-1, 6-1 [+ 6.4, 6-5], 7-1, 26-1-1
Category : PP

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ADAS-EU R(10)SC02

ADAS-EU
ADAS for fusion in Europe

Grant: 224607

Hugh Summers, Martin O'Mullane, Francisco Guzman and Luis Menchero

Scientific progress report 2

30 June 2010

Workpackages : 1-2, 2-1, 2-3, 6-4, 7-2, 7-3, 17-1, 26-1-2
Category : PP

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ADAS-EU R(10)SC03

ADAS-EU
ADAS for fusion in Europe

Grant: 224607

Hugh Summers, Martin O'Mullane, Francisco Guzman and Luis Menchero

Scientific progress report 3

7 July 2010

Workpackages : 1-3, 2-2, 3-1, 3-2, 3-4, 6-2, 6-3, 13-1, 16-2, 18-1, 18-2, 18-3, 19-1, 22-2-1, 23-2-1, 22-2-2,
Category : PP

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2.2 Report: OPEN1

ADAS-EU R(10)OP01

ADAS-EU
ADAS for fusion in Europe

Grant: 224607

Hugh Summers, Martin O'Mullane, Allan Whiteford, Francisco Guzman and Luis Menchero

OPEN-ADAS report 1

24 June 2010

Workpackages : 26-2-1
Category : PU

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2.3 Reports: SETUP1, SETUP2

ADAS-EU R(10)SE01

ADAS-EU
ADAS for fusion in Europe

Grant: 224607

Hugh Summers, Martin O'Mullane, Francisco Guzman and Luis Menchero

ADAS-EU setup report 1

22 June 2010

Workpackages : 22-1-1, 23-1-1, 25-1-1, 25-2-1, 26-3-1
Category : PP

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ADAS-EU R(10)SE02

ADAS-EU
ADAS for fusion in Europe

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Hugh Summers, Martin O'Mullane, Francisco Guzman and Luis Menchero

ADAS-EU setup report 2

22 June 2010

Workpackages : 22-1-2, 22-2-1, 23-1-2, 23-2-1, 25-1-2, 25-2-2, 26-3-2
Category : PP

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2.4 Report: DISSEM1

ADAS-EU R(10)DI01

ADAS-EU
ADAS for fusion in Europe

Grant: 224607

Hugh Summers, Martin O'Mullane, Francisco Guzman and Luis Menchero

Dissemination report 1

24 June 2010

Workpackages : 20-1-1, 20-2-1, 21-1-1, 21-2-1, 26-4-1
Category : PU

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2.5 Reports in development: PUBL1, PUBL2, PUBL3, PUBL4

ADAS-EU R(10)PU01

ADAS-EU
ADAS for fusion in Europe

Grant: 224607

Adam Foster, Martin O'Mullane and Hugh Summers

Charge exchange spectroscopy for fusion plasmas

17 June 2010

Workpackages : 2.34
Category : DRAFT

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ADAS-EU R(10)PU02

ADAS-EU
ADAS for fusion in Europe

Grant: 224607

Christopher Nicholas, Hugh Summers and Martin O'Mullane

PUBL2: Special features and spectral analysis for fusion plasmas

22 Jun 2010

Workpackages : 26-6-1
Category : DRAFT

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ADAS-EU R(09)01

ADAS-EU
ADAS for fusion in Europe

Grant: 224607

Hugh Summers, Adam Foster, Stuart Loch, Martin O'Mullane
and Allan Whiteford

Heavy species in fusion plasma modelling and spectral analysis

25 May 2010

Workpackages :
Category :

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ADAS-EU R(10)PU04

ADAS-EU
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Stuart Henderson and Hugh Summers

PUBL4: Neutral Beam Emission: The Motional Stark Effect

26 May 2010

Workpackages : 26-6-4
Category : DRAFT

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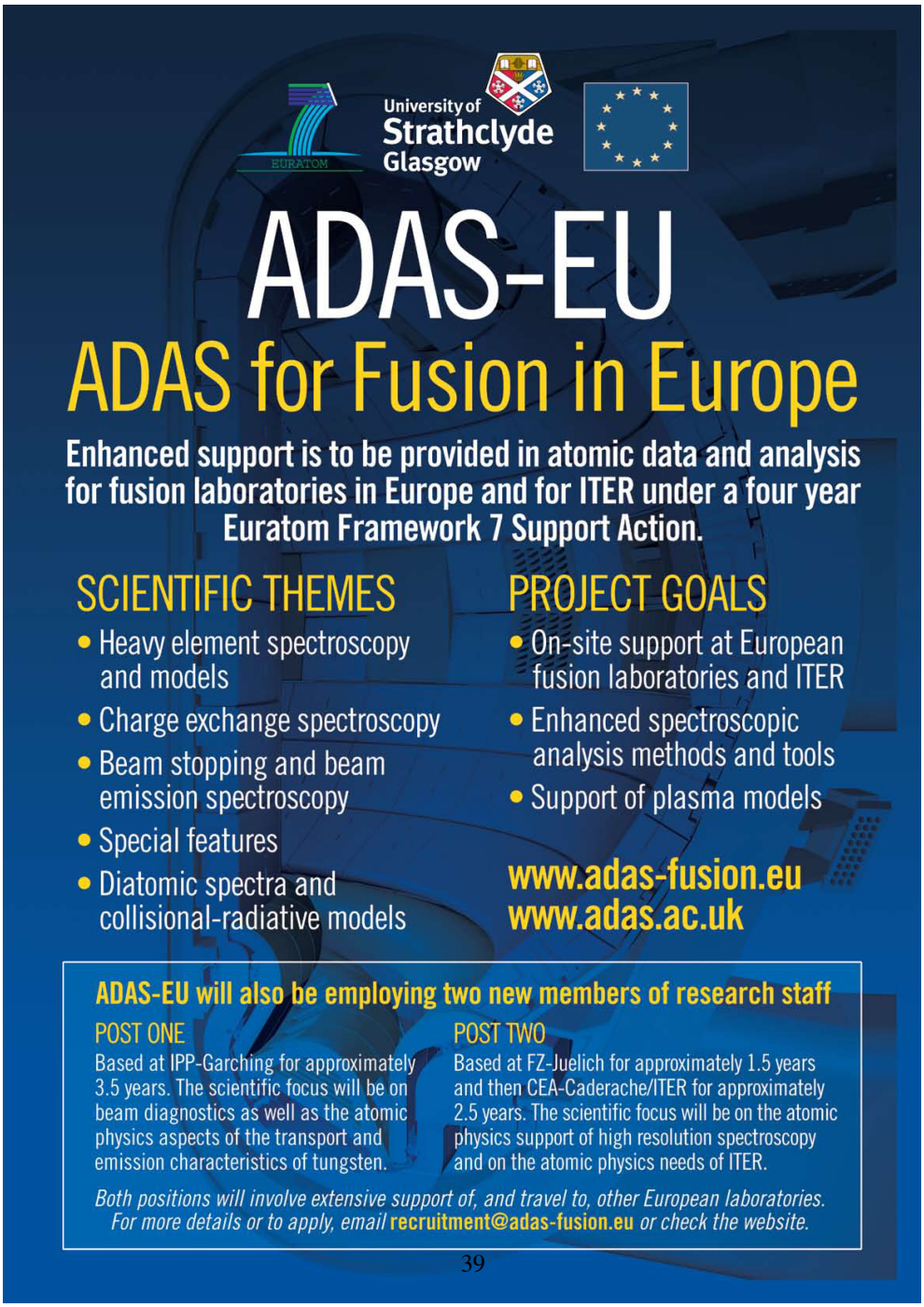
Appendix A

ADAS-EU Advertisement



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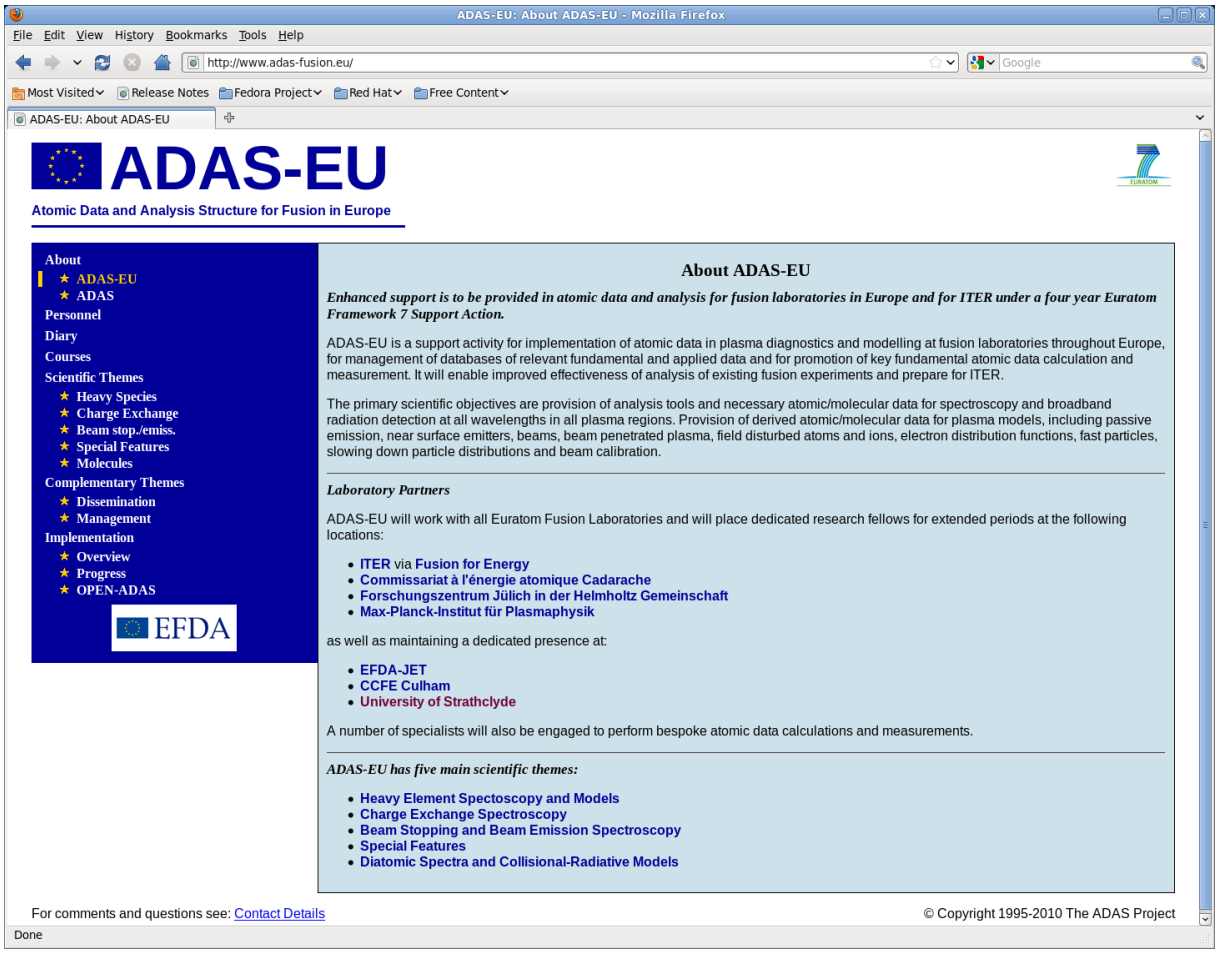
Appendix B

ADAS-EU website: www.adas-fusion.eu



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Appendix C

OPEN-ADAS website: www.open.adas.ac.uk