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**NUCLEAR ENERGY AGENCY
NUCLEAR SCIENCE COMMITTEE**

Cancels & replaces the same document of 22 May 2003

**WORKSHOP ON COMMON TOOLS AND INTERFACES FOR DETERMINISTIC
RADIATION TRANSPORT, FOR MONTE CARLO AND HYBRID CODES**

First Announcement

**25-26 September 2003
NEA Headquarters, Issy-les-Moulineaux, France**

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NUCLEAR SCIENCES COMMITTEE

**Workshop on Common Tools and Interfaces for
Deterministic Radiation Transport,
for Monte Carlo, and
Hybrid Codes
(3D-TRANS-2003)**

OECD/Nuclear Energy Agency,
12 boulevard des Iles
92130 Issy-les Moulineaux
France

25-26 September 2003

FIRST ANNOUNCEMENT

Deadline for Registration:

12 July 2003

Sponsorship

The workshop will be held on 25 and 26 September 2003, at the OECD/NEA Headquarters at Issy-les-Moulineaux (Paris), France, and is a follow-up to the workshop on “Advanced Monte Carlo Computer Programs for Radiation Transport”, held at Saclay, France, from 27 to 29 April 1993, and the workshop on “3D Deterministic Radiation Transport Computer programs: Features, Applications and Perspectives”, held on 2 and 3 December 1996, at OECD, Paris, France. It is also related to the benchmark activities on 3D radiation transport problems carried out in the framework of the OECD/NEA Nuclear Science Committee (NSC). This workshop is sponsored by the NEA, the NEA Data Bank and its Nuclear Science Committee and by the Radiation Safety Information Computational Center (RSICC), Oak Ridge, TN, USA.

Background and Purpose of the Benchmark Workshop

At workshop and international conferences concerned with detailed radiation transport modelling, the need for a close cooperation between specialists in stochastic (MC) and deterministic (DT) methods has been frequently expressed. The reasons are as follows:

- 3D modelling will be used almost exclusively in the future.
- Conventional and/or manual geometry modelling in discrete ordinates or cartesian co-ordinates is cumbersome, lengthy, expensive, and error-prone.
- The younger generation will not use such codes: automatised mesh generation, easy visualisation, fast diagnostics and insight are required to attract them.
- Monte Carlo has its limitations; deterministic methods are also needed for many applications and for independent verification.
- In computational mechanics, this issue was addressed already in the early days of development; radiation transport codes are in this respect old fashioned and difficult to use. Tools for facilitating geometry descriptions have been developed for the most widely-used Monte Carlo codes. Most of these are not in the public domain.
- The most expensive part of modelling is the time spent by the problem analyst/ modeller. Reducing modelling time is of great interest.
- Benchmark experiments are interpreted with deterministic and stochastic methods. When comparing calculations and experiments we need to ensure that the different methods solve the same problem within a specified precision. So far in benchmarking a lot of time was wasted in identifying sources of discrepancy due to lack of precise model comparison.
- Generation of input geometry in deterministic and stochastic methods is quite different. Is the derivation of a common geometry description possible? (through CAD?)
- For the radiation transport codes distributed by the NEA Data Bank and RSICC to be useful, tools for facilitating complex modelling need to be available.

The intention is to present in particular recently developed tools for modelling 3D problems, including an automated mesh generation, (X-Y-Z), (R-THETA-Z) and the visualisation of the corresponding results to facilitate interpretation and for improved documentation. Presentation and discussion of methods and ideas for ensuring that the same models are used in MC and DT for benchmarking; development of compatible and common mesh generation and visualisation tools for MC and DT; methods for 3D Sensitivity Analysis/Uncertainty Analysis should also be demonstrated.

How can adaptive grid techniques used in computational mechanics finite element codes be applied to neutronics? There are problems, one of which is the exceedingly large number of material interfaces, particularly in reactor physics. There is also the need to refine the angular and energy approximations in some way consistent with spatial refinements.

Topics proposed

1. 3D deterministic methods/stochastic methods - common issues, hybrid methods
 - applying adaptive grid techniques for radiation problems with large numbers of material interfaces
 - need for refining the angular and energy approximations in ways consistent with spatial refinements.
2. 3D sensitivity/uncertainty analysis
3. Tools for 3D meshing/visualisation
4. Common interfaces and modules for 3D geometry description with Monte Carlo for hybrid methods and documenting IRPhE/SINBAD evaluations
5. Applications to challenging benchmarks
6. Status of 3D benchmark exercises
7. Efforts and budgets required to make reasonable progress

Agenda

The agenda of the meeting will be proposed once interested participants have provided their feedback, and the titles of the presentations they intend to make.

Technical Programme Committee

The technical programme committee will take care of shaping the programme, inviting speakers, screening proposed presentations and organising a discussion session aimed at drawing conclusions and agreeing on specific common actions that would strengthen progress in this area of work. The members of the TPC are:

| Name | Organisation |
|----------------------|---------------------------|
| Raymond Alcouffe | LANL |
| Christian Aussourd | CEA |
| Yousry Azmy | PSU |
| Wolfgang Bernnat | IKE |
| Jean-Pierre Both | CEA |
| Forrest Brown | LANL |
| Cassiano de Oliveira | Imperial College London |
| Jess Gehin | ORNL |
| Alireza Haghighat | U-Florida |
| Ivo Kodeli | IAEA |
| Elmer Lewis | NW-University |
| Chan Hyo Kim | Seoul National University |
| Byung Chan Na | OECD/NEA |
| Keisuke Okumura | JAERI |
| Roberto Orsi | ENEA Bologna |
| Richard Sanchez | CEA Saclay |
| Enrico Sartori | OECD/NEA |
| Elizabeth Selcow | LANL |

The **local organisation** will be taken care of by the OECD/NEA Secretariat.

This Workshop will be held in connection with the SNA-2003 conference
<http://sna-2003@cea.fr>.

Participation

Participation will be restricted to authors/managers of 3D radiation transport codes and tools that facilitate their use. Needs as expressed by user organisations and agencies financing such developments will also be represented. The number of participants will be limited to 25.

Fees

No fees will be charged for participating. Luncheons plus refreshments will be available at a price of approximately 10 Euros/day.

Organisational Information

1. Location

The Workshop will be held at the OECD/NEA Headquarters, 12 boulevard des Iles, 92130 Issy les Moulineaux (near suburb of Paris), France.

2. Secretariat address

Secretary of the Meeting : Enrico Sartori, OECD/NEA Headquarters, e-mail: sartori@nea.fr, fax: +33 1 4524 1110.

3. Accommodation / Transportation

Participants are requested to make their own hotel reservations. Hotels in the neighbourhood of the workshop premises can be found in: <http://www.nea.fr/html/general/hotels.html>. Participants attending both the SNA-2003 conference and the workshop are advised to stay at the same hotel for the full period. The OECD/NEA premises can be reached by public transport.

More details on how to reach OECD/NEA are provided in:
<http://www.nea.fr/html/general/nea-access.html>.

4. Deadline for registration

The Participation Form should be returned by 12 July 2003.

Authors of papers are requested to submit the title of the presentation they intend to make.

5. Instructions for Authors

Although this workshop aims principally at an exchange of ideas and agreeing on concrete actions for enhancing co-operation in common tools development for facilitating the use of 3D radiation transport codes, we intend to publish proceedings containing the texts of the presentations, summary of the discussion, and conclusions. All the papers and oral presentations should be in English. Further instructions can be found at the Internet address: <http://www.nea.fr/html/science/docs/authors.pdf>. The document is a PDF data file and can be read with Acrobat Reader.

Computer Codes that could be discussed (not exhaustive)

| Code Name | Authors' Organisation |
|----------------------|--------------------------|
| APOLLO | CEA |
| ATTILA | LANL |
| BOT3P3 | ENEA Bologna |
| CHAPLET | TEPSYS |
| CRX | KAIST |
| DANTE | LANL |
| DANTSYS | LANL |
| DeCART | KAERI |
| DOG-IV | Hitachi Engineering |
| DOORS (DORT TORT) | ORNL, MHI |
| DORTDAT2 | JAERI |
| DORT-GRS | GRS |
| DRAGON | EPM |
| EVENT | Imperial College |
| FLUKA | INFN |
| FNSUNCL3 | SAEI |
| GEFCOP | Kurchatov Institute |
| GRTUNCLE-3D | NUPEC |
| HELIOS | StudsvikScandpower |
| KATRIN 1.0 | KIAM |
| MARS | FNAL |
| MCCG3D | IPPE |
| MCNP5 | LANL |
| MCNP-VISED | PNNL |
| MCNPX | LANL |
| MORITZ | WRS |
| MVP | JAERI |
| PANDA(2D) | CEA |
| PARCS | Purdue University |
| PARTISN | LANL |
| PENELOPE | U-Barcelona |
| PENTRAN | U-Florida |
| PERICLES | LANL |
| SABRINA | LANL /WRS |
| SCOPE2 | NFI |
| STRUCTURE | Kurchatov Institute |
| STYX (2D/3D) | CEA |
| TART | LLNL |
| TRISTAN | MAPI |
| UNKGRO | Kurchatov Institute |
| VARIANT-ISE | ANL |
| VARIANT-SE | ANL |
| VIM | ANL |
| WEDGEHOG | LANL |
| ZATHRAS | LANL |

Participation Form

**Workshop on Common Tools and Interfaces for
Deterministic Radiation Transport, for Monte Carlo, and Hybrid Codes
(3D-TRANS-2003)**

25-26 September 2003 at OECD/Nuclear Energy Agency,

Send participation form by **12 July 2003** to:

sartori@nea.fr

or fax to Enrico Sartori: +33 1 4524 1110

Name:

Address:

Tel:

Fax:

E-mail:

I wish to participate in this workshop.

I would present under topic <...> a short paper entitled:

Author(s)

Title:

It would cover ideas concerning the following 3D-radiation transport codes and tools:

References to code documentation:

In summary these are the ideas I wish to present:
(add brief abstract)

I think cooperation would be most valuable in the following areas and I propose the following concrete actions: