C.H.M. Broeders, A. Stanculescu 12.7.2005

Minutes of the
Third Meeting of the SAD/YALINA-B Steering Committee (SC)
JINR Dubna, Frank Laboratory of Neutron Physics, June 27-28, 2005

1) The chairman of the SC, **C. Broeders**, welcomed the participants in the 3rd SC meeting. Before entering the agenda, he asked for a few moments of silence in memory of two excellent Russian scientists, participants to the 1. SC meeting in Dubna, who passed since then: **Dr. Y. Shubin**, a few days ago and Prof. **V. Barashenkov** in the fall of 2004. The picture in Appendix 1 of Prof. V. Barashenkov, one of the initiators and promoters of the current SAD project, originates from the 1. SC meeting in Dubna. The list of participants is given in Appendix 2. The proposed agenda was accepted (Appendix 3)

2) **A. Sissakian,** JINR Director designate, welcomed the SCM3 participants. He underlined the important role of the SAD experiment in the roadmap of JINR development strategy with its strong international cooperation's. He stressed the importance of this SCM and wished a fruitful pleasant stay.

3) **W. Gudowsk**i, Chairman of the Contact Expert Group (CEG) for ISTC ADS and Transmutation Projects, informed about the current status of SAD/YALINA related activities, especially in connection with developments within the 6th. European Community Framework Program Integrated Project EUROTRANS. Because the ENEA Governing Board, end of 2004, did not approve the ENEA participation to IP EUROTRANS Domain 2 TRADE-PLUS, the content of a new program for the experimental support for coupling the components of a future ADS for nuclear waste incineration had to be redefined in a short time period. For this purpose an expert team was appointed to prepare a feasibility study for EUROTRANS Domain 2 ECATS "Experimental activities on the Coupling of an Accelerator, a spallation Target and a Sub-critical blanket". The SAD/YALINA SC members Broeders, Gonzalez and Gudowski participate to this expert group. At the 3rd ECATS meeting in Saclay on June 23 a first draft of the proposal was discussed. The SAD experiment will be part of ECATS program if official contracts between EC IP EUROTRANS and the other SAD partner JINR Dubna and ISTC Moscow concerning cooperation and commitments for funding will be signed in due time. W. Gudowski has a mandate to represent the IP EUROTRANS during discussions with ISTC Executive Director and JINR Director designate at the SAD/YALINA SCM3. Moreover, W. Gudowski reported about a meeting with B. Rhode, in charge of coordinating EC support to ISTC projects at the EC headquarters in Brussels. Although in general the funding for nuclear related projects in ISTC are decreasing, perspectives for continuation of funding of the relative expensive SAD experiment seem to be good. He stressed that extension of participation in SAD funding by other ISTC partner like USA and Japan would be very beneficial. Main objective of the current SCM is to prepare planning for SAD construction and experimental program in view of the participation to EC IP EUROTRANS.

4) The action plan of the SCM2 in Minsk was discussed on the basis of a copy of the corresponding part from the minutes of this meeting, with added comments (Appendix 4). All actions are completed or pending on schedule. Special attention was put on the ongoing general actions: target benchmark preparation, creation of group of young scientist to do experimental work in ADS area and preparation of IAEA CRP. It is foreseen that the first meeting of the IAEA CRP will be in the beginning of December 2005, probably together with a SAD/YALINA SCM.

5) The current status of the ISTC project #2267 SAD was presented in detail by **V. Shvetsov**, including timelines and cost estimates (Appendix 5). The project is very good on schedule. For successful continuation of the project SAD, 2 problem areas must be solved: funding of the quite high costs and availability of the PHASOTRON to deliver the required proton beam. For funding, a solution based on initially 1/3 funding each by JINR, ISTC and EUROTRANS, is intended. An unexpected problem is arised due to a fire in the PHASOTRON complex in the beginning of April 2005. This fire accident, caused by short-cut in high power supply with destruction of a number of cabling, was discussed in detail. The responsible persons for maintenance and reconstruction reported in detail about origin, extent and known consequences of the accident. Currently, it is not yet absolutely clear that reconstruction at reasonable costs will be possible. However, if no unexpected severe problems occur, recovering of the proton beam is planned for the end of 2006. It was also pointed out clearly that a main reason for fast recovering of the PHASOTRON proton beam is application for proton therapy purposes.

6) For the case of failing recovering of the PHASOTRON beam, alternatives for the SAD experiment were discussed. One possible solution could be to use the proton generator in Troitsk. This accelerator is now working at 200 MeV and can deliver higher beam power than PHASOTRON. The proton energy can be increased up till 500 MeV. Because of the JINR specific features of the SAD design, transposing SAD experiment to Troitsk seems not to be feasible. Moreover, in Troitsk the competence for performing such experiments is currently not available.

7) **A. Polanski** reviewed experiments on PHASOTRON connected with SAD project (Appendix 6). Concerning synergy effects between SAD/YALINA and other ISTC projects, collaboration with ISTC nuclear data experiments and experiments at BFS were discussed. Especially the possible role of BFS experiments related to SAD licensing and to measurement of SAD sub-criticality level was discussed in some detail. It was agreed that such BFS experiments, going from far sub-critical to critical, are highly recommended if they can be done at reasonable costs, either as separate ISTC project as proposed by A. Lopatkin or as part of SAD project.

8) **H. Kiyavitskaya** reported on “Booster (Cascade) Subcritical Assembly YALINA-B” (Appendix 7). The results obtained during ISTC project #B070 with YALINA experiment are now part of an IAEA benchmark investigation. Both experiments YALINA and YALINA-B will be integrated within the EUROTRANS DM2 ECATS. A MYRRHA–YALINA cooperation has already started. The proposal for a ISTC #B070 follow-up project is in preparation. It is proposed to start efforts to include the YALINA experiments in the "International Science Laboratory (ISL)", a joint scientific research venture between the Stepanov Institute (Minsk-Sosny, Belarus), the Fraunhofer Institute for Nondestructive Testing (Saarbrucken, Germany) and the International Science and Technology Center (ISTC).

9) The review of the SAD budget and the identification of different funding options for SAD, showed that it will be difficult to acquire funding for the SAD project:
   a) possible contribution of funding by JINR is restricted,
   b) ISTC funding for nuclear projects is decreasing, contribution of additional partner to EC, e.g. USA and Japan is desirable,
   c) EC IP EUROTRANS is willing to participate with a significant contribution if formal rules are fulfilled: written agreement documents between EURATOM/ EUROTRANS and responsible parties in Russia: JINR Dubna and ISTC.

   W. Gudowski summarized that a cost partition of 1/3 each between the partner JINR, ISTC and EUROTRANS-ECATS has good perspectives for realization. This issue was also discussed in detail during the meeting with ISTC Executive Director N. Jousten and with JINR Director designate A. Sissakian on June 28.

10) **Y. Gohar**, ANL representative, reported about a STCU Partnership Project between US and Ukraine to couple a 100 kW electron beam with an existing water cooled sub-critical system with low enriched Uranium core at 100-130 kW for ADS investigations. The conceptual design phase is in progress.

11) **D. Villamarin** presented “Potential SAD activities with significant contribution from EU partners” (Appendix 8). Experiments in BFS and with the 660 MeV PHASOTRON beam are discussed. A. Stanculescu offered IAEA CRP as umbrella for proposed benchmarks in BFS and PHASOTRON. For the time of shut-down of PHASOTRON, EUROTRANS/ECATS target experiments with proton beams can be envisaged in the NUKLUTRON accelerator in Dubna

12) On June 28 a SAD/YALINA SC core group started preparing the required project planning documents for IP EUROTRANS DM2 ECATS. W. Gudowski agreed to take the lead to prepare this document together with C. Broeders. The basis for this work are a very preliminary proposal by D. Struwe, EUROTRANS/FZK, presented at ECATS meeting 3 in Saclay on June 23, the 2nd draft for this proposal and the presentation of D. Villamarin (appendix 8). D. Villamarin agreed to prepare the proposal for special actions for “Young Generation” in ECATS.

13) “Round Table” discussion with Management of JINR.

On June 28 SAD realisation was discussed in a “Round Table” session. Participants were: **C. Broeders, Y. Gohar, W. Gudowski, N. Jousten, F. Mellier, A. Polanski, L. Tocheny, V. Shvetsov, A. Sissakian (JINR Designated Director General), A: Stanculescu, D. Villamarin, D.Shirkov (JINR-chief engineer) and A. Olshevsky (Director of the Laboratory of Nuclear Problems – PHASOTRON responsible)**. **A. Sissakian** welcomed the participants again and underlined the important role of the SAD experiment in the roadmap of JINR development strategy with its strong international cooperation’s. After the participants introduced themselves, **W. Gudowski** made an extensive presentation of the current status of SAD/YALINA, ISTC and EUROTRANS/ECATS. YALINA is very good complementary to the MUSE experiment of EC FP5 and will be continued in EC FP6 EUROTRANS/ECATS. The SAD project, also linked to the MUSE activity, has been progressed very well and realisation may be envisaged in the next 4 years. The ISTC project #2267, preparation of the realisation with detailed planning, can be successfully completed in this year. For the practical realisation in Dubna 2 problem areas must be solved: financing and recovery of PHASATRON proton beam. Both aspects were discussed in detail:

a) Financing

The estimated total costs and the possible contributions of the partner were discussed in some detail. The differences between Russian full cost calculation model and ISTC payment, mainly for personal costs, was explained. ISTC cost model is more effective, but only can be applied for restricted tasks. W. Gudowski proposed the following partition:

- 1/3 JINR, Dubna, mainly for infrastructure
- 1/3 ISTC, mainly for personal costs in Russia and nuclear material parts, including fuel manufacturing
- 1/3 IP EUROTRANS/ECATS, mainly for experiment support and for broad participation of scientists from EC

At this stage no absolute numbers were discussed, but the expectation was expressed that detailed negotiations for real realisation of the project can lead to significant cost reduction. The discussion to solve the financing of SAD was very constructive:

- ISTC Executive Director **N. Jousten** reminded the possible options to realise the partial funding of the high costs of SAD. A document with commitments for such support can be provided in July 2005.
- JINR Director designate **A. Sissakian** confirmed the objectives of JINR to realise the SAD experiment in due time, including recovering of the PHASATRON proton beam. Written agreements between JINR Dubna and EUROTRANS representatives will be prepared in July 2005.

b) Recovering of PHASATRON proton beam

The fire accident in PHASATRON complex was explained in detail by **D.Shirkov** (JINR-chief engineer) and **A. Olshevsky** (Director of the Laboratory of Nuclear Problems – PHASOTRON responsible). Currently, it is not yet absolutely clear that reconstruction at reasonable costs will be possible. However, if no unexpected severe problems occur, recovering of the proton beam is planned for the end of 2006. It was also pointed out clearly that a main reason for fast recovering of the PHASOTRON proton beam is application for proton therapy purposes. The round table discussion was followed by a common lunch.

14) The SCM meeting was finished with a short plenary session. **C. Broeders** and **W. Gudowski** reported the main results of the “Round Table Meeting”. It was pointed out that preparation of the required documents for EC IP EUROTRANS DM2 ECATS must be completed with high priority.

15) The near term **action plan** (Appendix 9) is focused on integration of the SAD experiment in a broad international cooperation, specifically to ensure smooth continuation after successful completion of phase I end of 2005, with construction of the experiment with assured funding by JINR, ISTC (EC) and EC FP 6 EUROTRANS DM2 ECATS. Efforts will be undertaken to broaden the funding, e.g. by ISTC support from USA and Japan.

16) The 4. SAD/YALINA SCM will be held in the neighbourhood of an international airport to enable a one day meeting, without long transportation times. Currently preferred date is September 19, 2005 in Stockholm. Another SCM is envisaged in connection with an IAEA CRP meeting in Minsk in the beginning of December 2005.

17) With respect to revision of the list of members of the SAD/YALINA SC, the following proposals were accepted:
   a) Replacement of S. Chigrinov by H. Kiyavitskaya as representative of JIPNR-Sosny Minsk
   b) Y. Gohar, ANL, agreed to become member of SC.
   c) It was proposed to invite other international representatives: K Mishima, Japan and I. Bolshinsky, US DOE
   d) It was proposed to nominate a second representative of Polish University, involved with experiments in Dubna.
   e) It is proposed to nominate Hamid Ait Abderrahim from SCK-CEN Mol, Belgium.

18) Appendices

Appendix 1

In memory of Prof. Barashenkov, iniator of SAD

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Appendix 2

List of participants

C. Broeders, FZK Karlsruhe – chairman, broeders@irs.fzk.de
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Appendix 3

Agenda of the SAD/YALINA SCM3, Dubna, June 27-28, 2005

SAD/YALINA-B Steering Committee
Third Meeting
June 27-28, 2005

Place: Frank Laboratory of Neutron Physics – Conference hall

Monday, June 27

9:00 – 9:15 Opening of the 3. SAD/YALINA-B SC Meeting, Approval of the Agenda

- Welcome by A. Sissakian, JINR Dubna
- W. Gudowski, Chairman CEG ISTC Projects ADS and Transmutation
- L. Tocheny, ISTC

9:15 – 9:30 Approval of the Minutes of 2nd SC Meeting in Minsk – C. Broeders

9:30 – 9:50 Review and discussion of Action Plan of 2nd SC Meeting – C. Broeders

9:50 – 13:00 Review of current projects:

9:50 – 11:00 Report on SAD status and progress, V. Shvetsov and others

With particular emphasis on:

- Cost assessment and uncertainties of the cost assessment
- Timelines for the project realization assuming ensured funding on an agreed level
- Possible visible showstoppers: assessment of licensing problems, priorities of the Institute etc.
- Consequences of the fire accident at PHASOTRON, plans for reconstructions, commitments of JINR,
- Review of experiments on PHASOTRON connected with SAD project
- Status of working group for SAD instrumentation support
- Status of Target Benchmark preparation
- Possible synergy with other on-going and planned ISTC projects

11:00 – 11:30 Coffee/Tea break

11:30 – 12:15 Report on YALINA status and planning.

YALINA as support experiment to SAD – A. Kiyavitskaya

12:15 – 13:00 Identification and discussion of critical issues of ongoing projects – all

13:00 – 14:15 LUNCH

14:15 – 16.15 Review of the SAD budget, identification of different funding options for SAD , with contributions of:

- JINR representative
- ISTC representative
- EUROTRANS representative
- DOE representative

16:15 – 16:45 Coffee/Tea break

16:45 – 17:30 Formulation of SAD tasks, workload, manpower which can be directly incorporated to ECATS. Assessing corresponding needs for the budget.

17:30 Adjourn

19:00 Dinner

Tuesday, June 28

8.30 – 11.00 Visit to the area for SAD experiment and YASNAPP building,
discussion of core group of SC with JINR management

11:00 Meeting with ISTC Executive Director N. Jousten

12:30 – 14:00 Lunch

14:15 – 15:00 Organizational Issues + buffer time for continuation of Monday's program

15:00 – 15:40 Action plan for SAD project for coming 3 years – V. Shvetsov

15:40 – 16:00 Action plan for YALINA project for coming 3 years – A. Kiyavitskaya

16:00 – 16:30 Coffee/Tea time

16:30 – 17:15 Working/Action plan for supporting YALINA and SAD experiments

17:15 – 17:30 Action plan SAD-YALINA Steering Committee,
updating list of SC members,
date and place next meeting

17:30 Adjourn

19:00 Dinner

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Appendix 4

Action plan of the SAD/YALINA SCM2, Minsk, July 13, 2004

Comments on Action plan of SCM2

Action plan from the 2-nd SAD/YALINA SC meeting

1) SAD short term actions
   a) Project time schedule with identified critical paths and milestones of special importance for EUROTRANS: 10 Feb. 2005 with 1-st draft distributed by Feb.6: responsible V. S. **(action closed)**
   b) Cost assessment, linked to the TS, exploring ISTC funding and ISTC-channeling and "Russian template": 10 Feb. 2005 with 1-st draft distributed by Feb.6: responsible V. S. **(action closed)**
   c) Cost assessment should be prepared according to the timeline with well defined parts for salary, design work, equipment manufacturing and construction work: responsible V. S. **(action closed)**
   d) Template for the cost assessment will be kindly provided by H.A.A. by Jan.28 2005: responsible H.A.A. **(action closed)**
   e) The document "White Paper", summarizing the objectives and the most important deliverables of the SAD. First draft to be prepared by Jan.31. This document will contribute to development of the "comparison table"/C.B./, which is the separate document, first circulation by Feb 1: final draft - Feb. 8 2005 responsible: C.B.&V.S. **(action closed)**
   f) The additional funding options are to be explored for example: USA or Japan support for physical security system of SAD/V.S./, collaborators cofunding/SC members/, Japan and/or USA through ISTC/W.G, C.B. &V.S./. **(action pending)**
2) SAD management prepares request to ISTC executive director for current project prolongation caused by exchange rate effect till the end of 2005. **(action closed)**
3) SAD management prepares the ISTC application for the Phase II as a prolongation of the SAD project for the second GB meeting of 2005. **(action closed)**
4) Recommendation from the SC to the EUROTRANS committee on the SAD experiment: Jan 31, responsible: SC members **(action closed, short mission report by C.B.)**
5) SAD management prepares annual report on ISTC project #2267 with description of the SAD design by the end of Feb. 2005. **(action closed ?)**

6) YALINA actions
   a) Formal proposal for continuation of the YALINA experiment. The proposal should have strong synergy components with SAD: by the Feb. 15 2005, responsible S.Ch., V.S. & C.B. **(action closed)**
   b) Calibration of the YALINA detectors at MOL facility. Yu. Pepelyshev from SAD team participates this activity.: by June 30 2005, responsible: S.Ch. & H.A.A. **(action continuing)**

7) General actions
   a) The Polish group from UMM prepares benchmark on SAD target induced activity.: first input by the end of Feb. 2005, responsible: G.D. with intensive consulting needed from C.B.&E.G. **(action ongoing)**
   b) The SAD/YALINA collaborators create a group of young students/researchers/engineers to join experimental work on YALINA and SAD. The seed of this group already exists. **(action ongoing)**
   c) SAD/YALINA collaborators to submit proposals for Research agreements and Research contracts to IAEA for the CRP " …ADS benchmarking… ".: by the end of Feb. 2005. **(action ongoing)**

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Appendix 5

Current status of ISTC Project #2267, SAD Experiment

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Review of experiments on PHASOTRON connected with SAD project

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Booster (Cascade) Sub-critical Assembly

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Potential SAD activities with significant contribution from EU partners

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Appendix 9

The following action plan was agreed:

1. Letters of intent of JINR to cooperate in the EUROTRANS project will be prepared until July 9, 2005 (V. Shvetsov).

2. Letters of intent of ISTC to support the continuation of ISTC Project #2267 SAD in the framework of EC FP 6 IP EUROTRANS DM2 ECATS have to be prepared in July 2005 (W.Gudowski, L .Tocheny, V. Shvetsov).

3. On the basis of the letters of point 1) and 2) written agreement between JINR, ISTC and EUROTRANS must be established in due time (W.Gudowski, L .Tocheny, V. Shvetsov, C. Broeders).

4. The required documents for the SAD/YALINA related work program of EC IP EUROTRANS DM2 ECATS will be prepared before August 31, 2005 (C. Broeders, W. Gudowski).

5. For the near future more frequently (tentatively every 6 weeks) SAD/YALINA SCM are envisaged.

6. Efforts to broaden the international support for the SAD experiment are encouraged (all), more specifically USA DOE (W. Gudowski) and Japan (C. Broeders)

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