

Minutes of the TIARA 5th Collaboration Council meeting

CERN, 18th of October 2016

GC participants:

In person : Roy Aleksan (RA, CEA), Ralph Assmann (RaA, DESY), Jean-Luc Biarrotte (JLB, CNRS), Reinhard Brinkmann (RB, DESY), Phil Burrows (PB, STFC), Antoine Chance (AC, CEA) representing Pierre Védrine, Tord Ekelof (TE, UU), Terence Garvey (TG, PSI) representing Leonid Rivkin, Piotr Malecki (PM, IFJ-PAN) representing Marek Jezabek, Eugenio Nappi (EN, INFN), Jose-Manuel Perez-Morales (JPM, CIEMAT), Maurizio Vretenar (MV, CERN).

By vidyo: Peter MacIntosh (PMI, STFC), Peter Spiller (PS, GSI)

Invitees: Daniel Schulte (DS, CERN), Jim Clarke (JC, STFC), Walter Wuensch (WW, CERN)

Excused: Frédérick Bordry (FB, CERN), Susanna Guiducci (SG, INFN), Oliver, Leonid Rivkin (LR, PSI)

Welcome (J.Perez)

The quorum is reached.

All documents relevant for the meeting are available on the CERN indico website at the following link: <https://indico.cern.ch/event/575309/>.

Approval of agenda (All)

The topic "Presentation of the new TIARA website" is cancelled.

Very sadly, **RA has announced that Giovanni VOLPINI has passed away a week ago.**

RA pays tribute to Giovanni's great kindness and skills.

EN will look within INFN at the best way to take over the tasks for which Giovanni was in charge.

Approval of the minutes of the 4th meeting on June 6th-7th, 2016

The TCC has no comment on the minutes, which are thus approved.

General information (RA)

Status past and future calls

RA recalls that 3 EC projects are presently running: EuCARD2, EuPRAXIA, EuroCirCol. RA informs about the outcome of the recent calls, which had a deadline on March 30, 2016.

The Integrating Activity (IA) proposal ARIES has been approved with the highest score: 14.5/15, which is even better than EuCARD2: 14/15. The total budget for ARIES is 10 M€ over 4 years and the planned starting date is early May 2017. The proposal AMICI submitted to the INNOV call has been approved with a score of 12/15. The weakest point of AMICI stated Evaluation Summary Report is the management of the project. The total budget is 2.2 M€ over 2.5 years. AMICI plans to begin end 2016. As a general comment concerning this latter call, one notes that there were very few proposals

submitted: only 5 proposal with 3, which did not passed the threshold. Therefore only 2 proposals have been approved. This call is not considered as very successful for the EC.

The next call deadline, for which the TIARA Collaboration Council (TCC) is considering the submission of projects, concerns INFRADEV-01-2017, Design Studies. In particular 2 proposals unsuccessfully submitted at the previous DS will be discussed later: ESSnUSB and CompactLight (previously called XbFEL).

The results at the FET-OPEN calls since the beginning of H2020 are a dramatically bad for our projects. Indeed, we had 3 projects, some of which were submitted several times since 2014. All three projects were repetitively rejected. For instance, HiFLUX was rejected for the 4th time with a grade of 4.2/5. RA does not know example of projects were successful. The success rate to this call is typically 1-2%.

RA shows a plot of the number of EC running projects over years and of the amount of the yearly allocated money by the EC. A peak was reach in 2008 with 6 projects and 11 M€. With the 2 recent successes (AMICI and ARIES), 4 projects will be running in 2017 and 2018 with a yearly total of 4 M€ provided by the EC. This number can increase in 2018 if new projects are approved.

Status Fee collection

RA gives the TIARA financial status. The fees have been received from almost all partners. CIEMAT has some administrative issues related, which are in the process to be solved. The fees from UU should arrive very soon. These delays has no negative impacts since the needs for funding are not urgent. Indeed, this money should be used for activities in 2017, either for a workshop (co-innovation with industry for instance), and/or in education, and/or for dissemination and outreach matter depending on ARIES needs. The use of this money will be discussed in the TCC.

Visit to EC

RA informs about the visit of MV, RA, and J-P. Caminade (representative from the French ministry for the Programme Committee on Infrastructure) to Brussels on September 2. The main topic was the future of the "super advanced" communities. RA explains what "super advanced" community means: a community which had up to 3 or 4 Integrated Activity projects. That is the case for the accelerator community and ARIES is thus the last Integrated Activity we could apply to.

EC starts discussing the Work Program 2018-2020 and FP9. It is thus important to bring our input to what we consider the next steps should be. EC agrees that capitalizing on our know-how and expertise build over time as a super advanced community is important. There are thus direct discussions with the top management of the EC Infrastructure Unit. The expertise areas of the accelerator community that EC is particularly sensitive to is the integration of infrastructure and co-innovation with industry.

Our proposal is to establish a new instrument for an Integrated Program rather than for individual projects: the calls to projects are directly managed by the accelerator community. By this way, there will be a single instrument for design studies, integrated activities and so on. TIARA goes thus to a higher level.

RA mentions the example of the existing flagship programs in FET with a very large budget (1G€) and a great flexibility. Currently, there are 2 running flagship programs: Brain and Graphene (with a 3rd one on Quantum World being implemented). We could propose a similar instrument with a very large EC budget (20-40 M€ per year over 6-7 years). That represents a lot of money for the Infrastructure Unit especially as there are today 12 advanced communities (not all could be financed).

The content of an Integrated Programme would be decided by a consortium and not by EC directly. Anyway, a procedure to select, monitor progress and review the projects within the programme must be set up.

Following the discussion with the EC, P. Froissard has decided to set up a workshop on 14 November 2016 in Brussels, in which the representatives of the “super advanced” communities are invited. The EC will discuss the programme of future calls and more particularly the H2020-WP2018-2020 and FP9. RA and MV will be present for the accelerator community (the number of people is limited to 2 persons per community). One of the main discussion topics will be about the needs of the “super advanced” communities to ensure more integration and sustainability and what type of new Instrument to implement for those communities, which are diverse and have different needs. The key word should thus be flexibility to satisfy the constraints of each one. The communities should be able to decide where to put more or less emphasis at a given time, e.g. transnational access, R&D, co-innovation with industry for instrument, design studies, preparatory phase, education and training... RA invites TIARA members to make suggestions, which can be sent to RA and MV.

The TCC finds that an “Integrated Program” as proposed is attractive if the budget increase is large enough compared to the present situation. RA recalls that the aim is to have a factor 5 to 10 compared to the present situation. EN answers that is fine but we could be more ambitious. Indeed, the accelerator impact is more than 1G€ per year. EN asks why not to submit a flagship program for the accelerators in which the EC budget is larger. RA answers that the requested funding would come from the Infrastructure Unit and we should not discourage them by asking a too big step. RA recalls that the total budget in infrastructure is about 2.5 G€ in H2020. If we assume that 3 or 4 communities would benefit from such a new scheme, the Infrastructure budget should be increased by 20 to 40%, which is already significant. We should remember that we are in competition with 12 other super advanced communities (like astronomy, social science): if we are too aggressive, we may fail. In any way, we will see how things evolves at the workshop and be eventually prepared to justify a higher budget.

Some concerns were raised about possible interconnections with other integrated activities. Some of the photon science activities may overlap with ours. Discussions are going on at DESY about the new EC instruments but the requirements are not completely clear. A big workshop is planned in 2017 by the photon science community to provide input and needs. In some cases, the boundaries are clear between the accelerator and the photon science like in PSI. In other cases, discussions are needed between both communities when applications to photon science are in play like with EuPRAXIA or CompactLight. However, RA stresses that TIARA does not aim at representing photon science but accelerator science. Concerning nuclear physics, there is no proposal for significant accelerator R&D outside of TIARA as far as we know. There are activities funded through EURATOM, but this is a different scheme to which TIARA has no direct access.

Coming back to the workshop in November, RA thinks that the discussion is not expected to focus on precise numbers but on defining the needs and the steps to overtake. The numbers should be discussed later whenever a coherent proposal is made. EC has realized that the accelerator community is very well organized and integrated a lot. The acquired expertise must be capitalized.

On a shorter term, as already mentioned, the EC is preparing the Work Programme 2018-2020. The usual calls like INFRA-DEV, INFRA-IA, INFRA-INNOV will be included in the WP2018-2020. Amongst those, we cannot apply to INFRAIA as ARIES has just been approved and as it will be the last IA. However we should be able to apply to INFRA-DEV (DS) and eventually INFRA-INNOV.

RA proposes to push for an ATTRACT-like call (breAkThrough innovaTion pRogrAmme for deteCtor /infrAstructure eCosysTem) targeted toward accelerator technologies. RA briefly presents the ATTRACT project, dedicated to sensor, imaging device and related computing development. The aim of this 20M€ project is to launch 180 projects with industry with 100 k€ per project over one year to boost co-innovation with industry. The most promising projects would then be selected after one year with more funding. Note that if ATTRACT is approved by the EC, we may be interested to propose small projects for beam instrumentation (e.g. diagnostics and imaging devices).

As already said, for WP2018-2020 we could propose a similar call on accelerator technologies. RA works with the French representative in the Programme Committee to push for such a call. It would be important that other members of the Programme Committee support this idea.

TIARA Collaboration Council Decision

The TCC supports the initiative to develop a new Instrument with the EC for the next Framework Programme (FP9) targeting the “super advanced” communities with much more ambitious objectives, greater flexibility and significantly larger funding.

The TCC agrees to invite Markus Nordberg, leading the ATTRACT effort, to make a presentation at the next TIARA meeting.

EuCARD2/ARIES (MV)

MV reports about the INFRAIA proposal ARIES, which has been approved by the EC. The success rate was 75% thanks to a fund increase for this call. ARIES got the best score of 14.5/15 and was ranked number 3 for this call (only 4 projects got the same mark). For Physics, the competition was with infrared astronomy, radio astronomy, and hadron physics. Hadron physics was rejected.

MV focuses on ARIES evaluation. The marks are : Excellence 5/5, Impact 5/5, and Implementation 4.5/5. ARIES loses a half-point because CERN is seen as too much involved. MV emphasizes the composition of the evaluator panel: only 2 physicists (and not accelerator physics). That is a good point to be able to write an accessible proposal to people who do not have the knowledge of accelerators. People from industry may find the risk analysis in the document a bit light.

MV gives the status of the signature of the grant agreement. MV shows the deadline for the Grant Agreement, which is end November 2016 and is tight for industrial partners. Indeed, there are still missing signatures for administrative reasons for 3 industrial partners (Bruker, CNI and HIT). A possible extension is under discussion. Otherwise the industry may have to be dropped, which can be a big issue (especially for Bruker). MV explains this delay: all the individuals must be registered and you have to send by normal mail the original of the documents, which takes time.

MV gives the status of the signature of the Consortium agreement. MV recalls that it was a nightmare in EuCARD2 with a lot of loops with lawyers. To avoid problem, ARIES will use a standardized model.

MV gives the next steps for ARIES. Patricia Postigo-McLaughlin is the new EC project officer. The practical starting date is proposed May 1st 2017 but we decide to set the official start to January 1st 2017 for administrative reasons. We would then extend of the duration of ARIES to 52 months. The kick-off meeting is scheduled on May 4-5 2017. The first steering committee will take place in March 2017. A new logo is under preparation.

MV gives the EuCard2 status. The periodic report was submitted on June 30th. The governing Board approved in September a readjustment of the budget of 144 k€ between the WPs. Mina KOLEVA is the new EC project officer for the 6 last months. MV announces the last EuCARD2 annual meeting which will take place in Strathclyde (Glasgow) for 3 days on March 28-30, 2017.

MV shows the deliverable progress: there are a few delays on the milestones but not a major issue.

MV lists the 4 major issues encountered: the deposition test facility at CEA Saclay, the cavity for fs stabilization at FLASH, the Nb₃Sc coating, and the HTS magnet test stand preparation.

MV gives the challenges of EuCARD2 ahead: a peak in the contractual contributions, the leaving of our project assistant with a small hope of an overlap a new person. It is hoped that this new person will be immediately productive person early 2017. The impact of EuCARD2 will be analyzed by Toms Torims from Riga University and he will also help drafting the EuCARD2 reports.

TIARA comments:

The TCC congratulates MV and the ARIES team (including EuCARD2) for this great success and looks forward the start of ARIES.

EuPRAXIA (Ralph ASSMANN)

RaA shows the infrastructures in the network and experiments linked to plasma acceleration (30 M€ in investment in average). RaA shows the scientific goals of EuPRAXIA and the strategy for Accelerator innovation from now to 2040's. EuPRAXIA is clearly an intermediate step in the 2020's.

RaA shows the EuPRAXIA outreach: the website, brochures, EuPRAXIA files, which are not a newsletter but more a collection of all kinds of publications. The news are distributed to Accelerating News.

RaA shows the project organization. RaA lists the participating institutes (16 beneficiary and 16 associated partners) and the industrial participation. Industry is not involved directly on purpose but is present by a cooperative way and stands in Scientific Advisory Board. RaA lists the new partners which ask to be associated. The document to be associated is a letter of intent to contribute.

The TCC asks the advantage to be associated. Admittedly, there is no funding (3M€ are not enough to fund them), but you gain access to the knowledge, to the data and to the scientific effort, you gain the possibility to be involved in future projects, and showing you are connected to projects like EuPRAXIA may be useful for other calls. The EuPRAXIA team gains a lot to have the expertise of these partners. The counterpart is that there is no contractual commitment to do the job from the associates. A specific issue is the partnership with US laboratories because the DOE refuses to sign any MoU. The LBNL is an exception because California University signed instead of the DOE.

RaA gives the status of the workshops per WP. RaA gives the timeline of EuPRAXIA. The next step is entering the ESFRI roadmap. RaA focuses on some EuPRAXIA workshops which took place last months: EuPRAXIA Laser workshop, for a 100 cube laser (100 J, 100 fs, 100 Hz) on May 18, 2016, the semi-annual meeting in Pisa on June/July 2016, and a user-oriented workshop in France on October 11-13, which is a good start with a lot of remaining work. RaA shows the highlights of EuPRAXIA with the inner loops. RaA focuses on the deliverable D1.2: a preliminary report on the EuPRAXIA concept with the different functional parts. RaA details the different schemes, with their respective parameter tables, and the different operating modes. RaA explains that the study cases will be published.

RaA details the approach and the objectives for the second year: a generic facility layout, realistic cost estimates to choose the scheme and performance comparison. A tradeoff will be done. RaA specifies that EC funds only a laser-driven plasma accelerator but there are in-kind plasma-driven contributions within EuPRAXIA, which are not funded.

RaA gives the scientific landscape: from EuroNAC2 to EuroNAC3 in Europe. RaA explicits the Japanese vision together with EuPRAXIA through Spring8/SACLA. The brochure of the project is presented. KEK is not officially involved.

RaA shows the next level of SPARC_LAB with EuSPARC, a possible site for EuPRAXIA. The study of such a future extension for beam and laser plasma driven systems is led by Massimo Ferrario. RaA adds that the German candidate for EuPRAXIA is SINBAD, which RaA presents. In the German agenda given by Helmholtz association, new generations of compact accelerators are in the recommendations.

RaA shows the strategy to go to the ESFRI roadmap (for 2018 or 2020): it is important to have realistic projects. RaA concludes and informs that the brochure exists and can be sent on request.

TIARA comments:

The TCC is very pleased of the effort and of the growing interest for these activities.

The objectives are ambitious and the question is the next step beyond the design study: it needs to be discussed with Brussels. Making a Preparatory Phase proposal is the normal way to proceed, but one needs to be included in the ESFRI roadmap in order to apply.

Concerning the ESFRI roadmap, the TCC agrees that it would be great to be ready in 2018 but to this end one needs a design report to enable the lobbying. Having such a document ready for end August 2018 seems to be very unlikely. **Therefore TCC recommends to have a document for the European strategy end 2018/beginning 2019 (like FCC) and then push to be included in the ESFRI roadmap in 2020. Clearly, much will depend on the achievements realized by then.**

EuroCirCol/FCC (Daniel Schulte)

DS reminds the EuroCirCol activity with the 4 main topics: Arc design, Interaction region design, cryobeam design and high-field magnets. DS lists the beneficiaries. DS gives the timeline from 2014 to 2018 with the lists of reviews and coordination meetings, milestones and deliverables (past and next). DS focuses on WP1 (management) with its milestones and deliverables.

DS gives the parameters and the (former and current) layout of FCC-hh. The changes are on the length of the insertions and the distribution of the functional parts. Because of the optimization on the civil engineering, the total length has changed. The ratio of the limestone (expensive to dig in) in the ground goes from 18% to 9%. The new layout is now the baseline and is under investigation.

DS shows the needed space for the FCC-hh detectors. DS shows the changes since the FCC week in Rome: a spectrometer has been added. The current aim is to reduce the needed space, reducing the cost of the interaction region.

The WP2 (Arc design and lattice integration) is working on the new layout. The main issue is to have injection and experiment in the same section. The injection section is before the experimental one. Both sections will overlap only if not possible. DS explains that the tools are under preparation (e.g. for tracking because of the number of elements). DS focuses on the collimation system and on the magnet shower protection (dispersion suppressor and collimation system). DS shows the status of the impedance studies. One of the consequences is not to have the pumping holes on the middle plane: we are at the limits on the beam stability otherwise. DS shows the spurious dispersion correction: the scheme is different from LHC.

DS shows the new triplet design studied in WP3 (Interaction region design). There are some issues for dynamic aperture with beam-beam with the Sixtrack code. DS shows the studies on the debris near the IP and the investigations on radiation damage. DS shows the lattices for the short (700-meter-long) experimental insertions near the injection sections. DS lists the other studies undertaken in WP3.

DS gives the status of the design of the beam pipe studied in WP4 (beam screen). The aim is to minimize the amount of copper to avoid Eddy currents if quench. DS shows the status of the prototype, which should be ready on time. DS focuses on the beam screen test at ANKA and the experimental setup. The test is scheduled in Eastern 2017. Other experiments are scheduled: a vacuum test at INFN and SEY studies.

DS focuses on WP5 (magnet design). DS gives a scope of the study, with three different designs under study: $\cos(\theta)$, slanted and block design. DS explains that the operating temperature is optimized with a cost estimate. The decision was made to run at 1.9 K, which is a very big step. DS explains that the margin on the conductor was reduced from 18% to 14%. US proposes an even more aggressive program with a margin of 10%. DS compares the designs between a margin at 18% and 14% (now). DS emphasizes the effect on the cables and the magnet cost. A cost model is under development: DS gives very first numbers on the total cost of the magnets.

TIARA comments:

The TCC strongly appreciates the effort in EuroCirCol with an impressive progress and looks forward the next yearly meeting in Berlin, in which many new information will be available.

The TCC found interesting some innovations like the vacuum design, very different from LHC.

ESSnuSB (TE)

TE presents the ESSnuSB consortium. TE informs that the EuroNuNet COST action was approved in March 2016 to combine efforts for a novel European facility for ν oscillation studies and ν - anti- ν symmetry-violation discovery. TE presents the EuroNuNet structure with its members, and its 3 observers. TE shows the ESS' letter of application to join EuroNuNet as an observer. TE presents the WGs.

Moving to the ESSnuSB Design study, TE presents the main proposed activities. TE presents the ESS construction site and the planned location of ESSnuSB on the site. TE shows a current overview of the ESS site, its construction progress, and where the n-beam would be implemented. TE presents the functional parts of the ESS Linac.

TE recalls the requirements to enable the ESS linac to operate at 10 MW with an 8% duty cycle and 28 GHz pulsing, such as dedicated tetrodes for the elliptical medium-beta cavities, the use of modulators for warm part and medium-beta or IOTs for high energy elliptical cavities.

TE presents the spoke cavity prototype and its performances within the specifications. TE presents the cryostat and the test bunker at the FREIA lab. TE summarizes the ESS linac upgrade for ESSnuSB: no show-stopper was found by the reviewers on the H- source upgrade to 5 MW. A technical note was released on the required modifications. TE shows an overview of the ESSnuSB accumulator ring with the evolution of the emittance with/out space charge. Space charge effects have tuning effects. More optimization is required on the painting at injection. TE shows another important aspect: the resonant multi-turn extraction to obtain slow extraction. TE shows a possible future upgrade of the accumulator ring by using 4 rings with permanent magnets.

TE lists some of the future presentations of ESSnuSB at conferences or workshops. TE shows a status of the studies to mitigate the high power effects in the target. TE shows a layout of the ESS super beam with the activity distribution in the concrete. TE shows the status of the study to use a SC solenoid to focus plus a dipole to separate in charge the pions.

TE shows the idea to produce intense beams of neutrinos and muons. TE shows the sketch of the beamlines and a tentative layout of ESS-nuSTORM. First feasibility study will be put in the ESSnuSB design study to study the use of the produced muons (the most intense muon flux in the world). TE presents GRIPnu (Garpenberg Research Infrastructure Project). TE speaks about the physical performance of ESSnuSB on the sensitivity on neutrino parameters (second oscillation maximum). TE focuses on the accuracy performance on δ_{CP} .

TE makes a history of the previous submission. TE was rejected with a mark of 13.5/15 in 2014. ESSnuSB was ranked ninth: only the first 8 projects were accepted. TE details the evaluation: Excellence 5/5, Impact 4.5/5 (some specific parameters are lacking), and Implementation 4/5. The weakest points were that the SWOT analysis is lacking for the ESS linac modifications (WP2) and accumulator ring (WP3) and that the interaction with ESS not considered in details, including cost estimates. TE comments this evaluation and disagrees with the latter criticism. Nevertheless the means to improve the proposal and clarify the controversial points should be investigated.

TE reminds that the EuroNuNet COST Action was accepted with a score of 57/65. TE shows the work plan for the 2017 ESSnuSB INFRADEV-1. The previous proposal will be a starting point. TE lists the points to be complemented for the next proposal. TE emphasizes the growing support for doing measurements at the 2nd oscillation maximum, e.g. a second Hyper-K detector in Korea is under discussions.

TIARA comments:

The TCC asks the position of the ESS direction. TE answers that no discussion is envisioned before the new management takes over (November 1st, 2016).

The TCC reaffirms the necessity for having an official position of the ESS direction before submitting the proposal.

Several proposed studies seems to be of great interest for a long term future of ESS. For example, the accumulator ring is an improvement for ESS and could be strongly supported by the direction. The TCC is concerned that the proposal may contain too many things (neutrinos, muons, improvement of the neutron beam) and may be confusing. The main focus may be diluted. TE claims that the clear priority is neutrino beam. The adaptation to other schemes should represent only 10% of the effort.

The neutron part is different: no work will be done on the target. That should cover only 5-10% of the effort. The muons will come on a much longer timescale, i.e. not in parallel to the neutrino beam.

The TCC is worried about the timeline for muons: 2050 may be much too late. The TCC reminds that the EC does not fund academic exercises but facilities to be built.

The TCC notes that there are many construction issues discussed in the project with a lot of technical information. But the proposal is for a design study and there is a risk that what is proposed to be designed does not come out clearly. The construction risks must be clarified. **The TCC recommends to make clear that the SWOT analysis of the construction will be carried out by the design study.**

The TCC adds that ESSnuSB is proposing a long-term program for ESS and that **the ESS direction has to give its vision of the future of ESS. It is of prime importance to have the strong support of the ESS management on this project for the proposal to be successful.**

The TCC recalls that this is the second submission. **In case of failure, it will be very difficult to submit a third time.**

The TCC asks to have a first draft well before the next TCC meeting scheduled on March 2nd. Maurizio Vretenar and Jean-Luc Biarrotte accept to read carefully the proposal and to give their feedback at the next meeting.

XbFEL (Jim Clarke)

JC announces that the proposal name is now CompactLight (instead of XbFEL before). JC presents the context. XbFEL was submitted at the INFRAIA-1-2014 and rejected. The lead institute was Elettra with 12 participants. The EU request was 2.9 M€ over 3 years for a total cost of 3.52 M€. JC details the feedback from EU: the marks were 4/5 for Excellence, 4/5 for Impact and 5/5 for Implementation for a total of 13/15. JC explains the weak points mentioned by the referees.

JC presents the new proposal CompactLight for INFRADEV-1-2017. The aim is to deliver a CDR for

- a compact, cost-effective to build and operate (low power consumption), “high” rep rate normal conducting **hard X-ray FEL facility**

In addition, the proposal will include “options” for using parts of design for other infrastructures

- soft X-ray FEL,
- Upgrading an existing accelerator to higher energy
- Compton back scattering X-ray sources
- The possibility to also operate these infrastructures at “low” rep rate

JC shows the interests of several countries for the different options above. JC shows an overview of the different FEL strategies in different institutes.

JC lists the participants from the old proposal and the new ones.

JC shows the work package structure (1 WP for management and 5 technical WPs) with the interactions between them. JC details the WPs with their main tasks:

- WP1: Management and coordination (Elettra).
- WP2: Facility design and integration (STFC)
- WP3: Gun and injector (Eindhoven)
- WP4: Main linac and RF systems (CERN)
- WP5: Undulators and Light production (To be defined)
- WP6: Beam dynamics and start to end modelling (IAT Ankara)

JC presents the timeline and the resources. The EU request is 3 M€ to start on January 2018.

JC presents the next steps: to complete the team, to confirm the WP leadership. The next meeting is scheduled on November 2016.

TIARA comments:

As a reply to a question asked by TCC members, JC explains that there is no external funding foreseen: the EC request covers all expenses. **The TCC states that full funding is allowed but it is useful to show that partners are willing to put additional resources.** DS gives the example of the EuroCirCol proposal: two tables were made with the funding from EC and lab contributions. At the submission, the second table is removed but that is useful to show the effort.

CompactLight is a standalone project. What has to be shown is how the money covers the expenses of the project.

The TCC asks what kind of site and how many sites the proposal are envisioned and whether entering the ESFRI roadmap is an objective for such a project. JC explains that the WP1 will decide the site at the end: the study is not site-specific. **The TCC recommends to consider where the project could be potentially implemented and to investigate the several possibilities, even though the decision of the final site could be left for after the completion of the DS.**

The TCC asks what is the scientific added-value of this proposal, compared to other accelerator facilities? What is its specificity, what does one gain compared to a C-band FEL for example, and what is the unique feature of such a FEL. In other words, is it just yet another FEL? JC answers that the advantage is to be cheaper than other machines with a high repetition rate (kHz). The TCC notes that any country can decide to build a national light source like SOLEIL or DIAMOND: you do not need a European design study before. The country just decides to make the study. To do a European DS, one needs to demonstrate that there are difficulties that requires an international collaboration.

In summary, the TCC recommends to show that CompactLight includes unique features, challenges and benefits, which call for design study.

The TCC asks for the proposal document before end of January. Terence Garvey and Reinhard Brinkmann accept to read carefully the proposal and to give their feedback at the next meeting.

Other projects (RA)

RA presents the CAMPUS proposal, which is at a less mature stage than the two previous proposals. RA thinks that is too risky to propose 3 accelerator projects. CAMPUS is thus likely to be rejected compared to more advanced proposals like ESSnuSB and CompactLight.

RA presents the concept and the goal of CAMPUS. RA gives the main features of this proposal. RA lists the potentially interested research fields. RA gives the different steps of the complex:

- Step 1: a CW Linac at 500 MeV (to be upgraded to 1 GeV). RA presents what can be done at this step and gives a parameter list at low and high repetition rate. Operating the complex in the ERL mode is foreseen for specific applications like a FEL or Compton sources. RA shows the sketch of the CAMPUS with the emittance evolution along the line. RA shows the baseline for an ERL at 500 MeV. For applications like Compton or THz radiation, you can use a one accelerating-pass ERL. RA explains that a strong synergy may be possible with PERLE, a multi-pass ERL, and should be explored. RA shows that a slow positron source (0 to 50 keV) or a neutron source are possible and would provide interesting performances. RA gives a parameter set.
- Step 2: CAMPUS becomes an X-ray source with the use of the Compton back-scattering. RA gives target parameters.
- Step 3: CAMPUS can be upgraded to a gamma-collider by doubling the structure. Real photon-photon scattering can be then investigated, which would be the first demonstration in the world. RA gives the cross sections for the different collisions gamma-gamma and stresses that collision $\gamma\gamma \rightarrow \gamma\gamma$ collisions were never observed. In addition many other processes could be studied with high accuracies, such as $\gamma\gamma \rightarrow e^+e^-$ or $\gamma\gamma \rightarrow e^+e^- e^+e^-$, providing precise QED tests.

RA explains that the support of the user community is mandatory and a workshop on applications is necessary. Recently, several countries have shown their interest in such a facility.

TIARA comments:

The TCC recalls that such an idea is not new with the IRIDE project (Interdisciplinary Research Infrastructure based on Dual Electron linac) at INFN in 2013. RA explains that the novelty is a multi-pass ERL. IRIDE was very expensive. The aim here is to make the project cheaper with less cavities thanks to an ERL. RA explains that the initiators of the project are from CEA in France. Discussions are

ongoing with IN2P3. The TCC asks what the motivation of the different disciplines (like THz radiation, neutron) is. One is likely to choose amongst the different applications. RA explains that the DS will be about a general facility. The different applications discussed show the possibility of such a complex but the decision of which applications and which physics one wants to undertake would depend on the communities, which will undertake the construction.

The TCC thinks that the CAMPUS proposal is too premature for a DS at this point and should be considered for a later call. Any comment to improve it is welcome.

Co-innovation with industry workshop (RA)

RA recalls that a WP with a budget of 1250 k€ is dedicated in ARIES to co-innovation with industry, and that the principle of the workshop was approved at previous meeting. The only objective of the proposed workshop is how to “enhance co-innovation with industry”. RA informs that Mr. Froissard from EC has shown a strong interest in this workshop and wants to participate.

RA explains that this workshop is scheduled in spring 2017 (April/May/June). The duration is under discussion: 1 or 2 days. Three locations are proposed: Brussels, CERN or Paris. RA prefers Brussels because that is a great opportunity to have the EC present with academy and industry.

RA shows a draft of the agenda. The program committee from 10 to 12 people would be appropriate.

TIARA comments:

RA gives precisions on the contribution from industry. Each topic will be co-animated by one person from academy and the other one from industry. The workshop will be focused on industry in general, even though it is understood that large and small industry may have different needs and constraints. In ARIES, both are present.

The TCC notes that, for the industry, the partners from academy are easily identified but the reverse is not always clear. A solution could be to have a roundtable with different institutes showing the possibilities of co-innovation with industry. The aim is not to give an exhaustive list of projects in which industry can be involved. **The program committee can help defining the right content when it is set.**

Participation of industry to the program committee will help setting up a program. It should be clear however that the aim is not the industry promotion neither a technical roadmap. **The main objective is to define and propose an attractive instrument to finance and to boost co-innovation with industry.** RA gives the example of ATTRACT which aims at a budget of 20 M€. RA explains that there are technological needs in present projects from which **industry can expect a promising market:** for instance development of fiber lasers, development of HTS material, development of efficient RF sources and so on **The aim is to provide money for industry to co-develop products with us. The procedure to select co-innovation programs and to select companies can be discussed to this workshop.**

The envisioned attendance to this workshop would be 80 people maximum. RA underlines however that failing to gather enough people from industry would not be a good message to EC. **The question is how to attract industry.** RA explains that, in France, it is rather simple with PIGES, which is a single entry point to be in touch with a set of industry. In Italy, there is something similar to PIGES. In other countries like UK, that may be more difficult.

RA is asked about the connections with AMICI, which is focused to co-innovation with industry as well. The initial aim of AMICI is to find means to finance infrastructures in between big projects. AMICI is more focused on infrastructure. **The TCC recommends to undertake discussions with AMICI to avoid overlapping and to make sure about the complementarity between AMICI and ARIES.**

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RA reminds the next TCC meeting: March 2nd 2017 at CERN. The core of the discussions will be about the design studies ESSnuSB and CompactLight. The TCC agrees to have a status on LHC/HL-LHC and a

presentation of ATTRACT. One can note that proposal for beam diagnostics and instrumentation could be made to ATTRACT calls. RA asks for advice concerning the date and venue the next TIARA meetings. After deliberation, the TCC decides that the next TCC meeting, should be in summer 2017 and would take place over 2 days in Warsaw. A doodle will be sent to fix the date. Details will be discussed later. Uppsala University may host a TCC meeting in 2018.

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