Response to recommendations from VI mid-term evaluation

We thank the VI mid-term review committee for the overwhelmingly positive assessment of the Virtual Institute, which was rated with the highest possible grade "A". In the following, all recommendations from the mid-term review are extracted and commented on. Questions that are not listed did not require any response.

Question 3:
*How would you assess the **networking** on structural and content/topic issues that the VI has set up (expertise, methods, infrastructure)?*

1. *Networking of the Helmholtz centre with **university partners** (including associated partners).*
   The VI has shown that there are strong collaborations between the VI and several institutes, especially in the field of simulations and diagnostics: e.g. with University of Hamburg, Strathclyde, Townsville, JAI, IST Lisbon. However, we recommend that the VI establishes closer networking with other institutes and the wider community in order to profit from their expertise and to foster knowledge exchange.

   - Response: We have been approaching new strategic partners over the last year to extend the collaboration network of the VI. CERN has now agreed to become an associate member and will be represented in the collaboration board by Dr. Edda Gschwendtner. In addition, former VI DESY collaborator Eckhard Elsen has become Research Director at CERN and has expressed his desire to intensify the collaboration in the field covered by this VI. Internationally, we have applied for beam time at the Brookhaven Accelerator Test Facility for FLASHForward preparatory test experiments. The beamtime was granted and is foreseen to be scheduled in 2016. The partnership with German universities has also been strengthened. The collaboration with the University of Hamburg has been intensified, a joint research proposal with the University of Jena has been submitted to BMBF, and the group of Prof. Stefan Karsch at LMU Munich has been approached to identify mutual interests as a basis for collaboration. We continue to actively seek further collaborators and are open to suggestions for further collaboration.

2. *Cooperation with **international partners**?*
   The cooperation with international partners such as LBNL and SLAC is very good. We would encourage the VI to reach further out for new international community (e.g. ICUIL, ELI) to promote and cross-fertilize innovative technologies. It would be also desirable for CERN, one of the biggest international particle physics labs, to become a partner.

   - Response: As remarked above, CERN has became an associate member of the VI. The VI spokesperson is a member of ICUIL and presented the last ICUIL report to ICFA of behalf of the Chair. LUX, one of the Hamburg-based plasma experiments, which is a member, together with FLASHForward of the overarching LAOLA collaboration, is contractually linked to ELI Beamlines, Prague, and acts as a testbed for one of their XUV beamlines.

3. *Was the VI able to create the **necessary critical mass**, or is the size of the consortium sub- critical or too large?*
   The size of the VI is appropriate, additional new associate partners such as IST Lisbon, INFN Frascati, JCU Townsville have been created. Further association with new partners would be desirable.

    - Response: As remarked above, CERN has now become a VI associate member. We continue to be open to adding additional VI partners when this is beneficial to the collaboration.

Question 6:
*What measures have been created to foster **equal opportunity** and performance-related **career development** and how would you rate their implementation?*
The implementation of performance-related career development seems to be successful: several researchers obtained additional research grants and were offered high-profile positions: Dr. Charlotte Palmer, Dr. Christopher Behrens, Dr. Zhanghu Hu, Dr. Osterhoff, Prof. Dr. Bernhard Hidding, and the four DESY fellows indicates the attractiveness of the VI. However, possibilities to foster equal opportunities seem not to be fully exploited, the committee strongly encourages the VI to implement additional measures for equal opportunities to raise standards both on the student level and the management level.

- Response: we have been able to add a female member in the collaboration board: Edda Gschwendtner. A female PhD student of the VI, Violetta Wacker, was awarded a fellowship of the Christiane Nüsslein-Volhard-Stiftung. She will receive funds to support child care for her newborn daughter and allow her to continue her research. Another (male) PhD student has been supported by agreeing flexible working hours and remote work schemes to allow him to embrace his new role as a father while simultaneously continuing his studies. We have had discussions with those responsible for equal opportunities at DESY and asked them for any further measures that we should carry out. They have shown themselves satisfied with our procedures and have not recommended that we take any further actions. We will continue to be in close contact and open to any further measures we could take in this area.

Question 7:
*Does a **transfer** of results take place either by using appropriate measures or by involving suitable partners (e.g. industrial enterprises) or are transfer activities planned? How do you estimate these transfer activities? (Criteria for VIs undertaking application-oriented research)*
There are some transfer activities: two patents have been registered.
However, given the fact that the VI is on innovative new accelerator technologies, it would be desirable for more attention to be paid to these activities. For example, the Wakefield principle is based on relativistic coherence, and thus coherence is realized one way or another and greater coherent products may be attained, such as an injector to a compact XFEL, a compact coherent betatron radiation source, and other shorter-term applications. It should also help to emphasize not only high-energy physics applications but also ultrafast science reach. The latter may have a shorter timeline so that industrial and/or societal applications may develop more easily.

- Response: This is a salutary example of volunteering too much information. Our VI is not classified as “applied” and therefore is not required to demonstrate technology

transfer or to report on it. Nevertheless, since we have indeed been keen to become involved with industry and have made significant contributions, we noted this in our VI submission. The main goal of the core project of the VI, FLASHForward, is to demonstrate the possibility of photon-science applications with a plasma-based accelerator. Our main focus therefore does not lie on high-energy physics applications, although we believe that FLASHForward is indeed capable of making significant contributions to assessing the feasibility of an energy-frontier linear electron-positron collider. Other possible applications that we will investigate within the framework of this VI include the development of a new plasma injector concept in laser-driven plasma accelerator tests at FLASHForward. Simultaneously, the construction of a tunable betatron radiation source is another project goal. While keeping our focus on the main scientific goals of FLASHForward, we believe that we have demonstrated by e.g. our patent applications that we are sensitive to possible applications both industrial and in other branches of science and are committed to exploiting such advances fully as and when we identify them.

Question 8:
*What **management** and leadership structure has the VI set up and does it lead to effective structures for communication, participation and decision-making between the partners? Are there mechanisms for coordination of the partners as regards new appointments in the VI's field of work?*
Meetings of the entire VI take place once a year. The VI has setup four working groups: Simulations and Theory (WG1), Beam Diagnostics and Transport (WG2), Plasma Targets and Diagnostics (WP3) and Photon Generation and Application (WG4). This grouping seems quite adequate from the scientific point of view.
Simultaneously, the committee feels the need that all participating institutes, universities and associated partners be more involved in the decision-making process and that communication among all partners could be improved.
The VI is very active in different network activities, advertising the VI itself and helping the recruitment of new partners. The director is active in public relations.

- Response: We have taken steps to improve communications. For example, we began to issue a quarterly VI newsletter, which was sent out for the first time in December 2015. We have received several appreciative comments about the Newsletter. In addition, a workshop to reevaluate scientific priorities will be held at DESY on April 5 and 6, 2016. This meeting will involve VI partners in decisions on future research strategy. Furthermore, at the last VI Annual Meeting in September, Prof. A. Seryi (JAI) agreed to chair the Collaboration Board, which held its first meeting. One of its main purposes is to improve communication and decision making within the VI. We expect it to hold its next meeting in conjunction with the next Annual Meeting, tentatively agreed to be held in conjunction with the AAC meeting in Washington DC in July/August of 2016.

Question 9:
*Are the **financial resources** available to the VI **adequate** for addressing its research topic (funding from the INF, the partners' own contributions), or rather too small or over-dimensioned in relation to the objectives and results achieved? Is the division of finances between the VI's sub-projects appropriate or does it needs to be adjusted?*
The financial resources seem to be adequate up to 2018 and funds key scientific personnel of Hamburg-based cooperation partners.

Funding after 2018, however, is not confirmed. New funding needs to be secured.

- Response: We are aware of a need for additional funds for personnel after summer 2018 and are investigating various additional third-party funding schemes with a view to making applications in the course of this year.

Question 10:
*Should the VI be **further developed or modified** in terms of theme or structure are concerned? If so, in what way?*
The time-line of FLASHForward has slipped by 12 months because of contention for resources within DESY specialist accelerator groups with XFEL and PETRA-III. The VI program has to be adapted accordingly.
There is a need of more advocacy for and priority of FLASHForward in the DESY management. This committee states that this project is fascinating and important enough that the management is advised to champion this point.

- Response: The Spokesperson of the VI has written to the DESY directorate requesting a response to this suggestion. A response is believed to be pending.