Outcome of the INMM-ESARDA Working Group 4 on Education and Training

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Abstract

This short paper discusses the outcome of the WG 4 on Education and Training of the INMM-ESARDA Workshop in Aix-en-Provence in October 2011. This WG was the follow-up of a similarly named WG during the previous INMM-ESARDA Workshop in 2008 in Tokyo. From the latter, a number of actions were executed, which led, amongst others, to the set-up of a dedicated international group, baptized NuSaSET: Nuclear Safeguards and Security Education and Training. In Aix-en-Provence, the WG reviewed the actions from 2008, discussed the results achieved, analysed the remaining and new challenges, opened a number of new avenues and thus came-out with a new action list, which was presented to the plenary meeting at the end of the workshop.

Introduction

Training and Education are key activities to develop new ideas, underpin capacity building, maintain competences and allow proper implementation of nuclear safeguards, non-proliferation and nuclear security. The urgent need for dedicated efforts in this field were recognized, also internationally, more than ten years ago, in parallel to the dwindling knowledge in the nuclear field in general. This is due to both the lack of new students and the lack of professionals choosing e.g. at mid-career to move into nuclear in general and nuclear safeguards, non-proliferation and nuclear security more in particular. As a consequence, when colleagues with large experience are leaving, it is very unlikely to find similar competence on the job-market. It is even difficult to recruit young graduates who know the basis of nuclear safeguards, non-proliferation and nuclear security.

Thus important efforts are needed to both invest in in-house training (e.g. at IAEA, US-DoE and the European Commission) for this purpose and to further motivate university professors and training centres to include the topic of nuclear safeguards, non-proliferation and nuclear security in their curricula. The challenge is all the more difficult, due to the multidisciplinary nature of the field of work, going from basic physics, radiochemistry, nuclear measurements, applied statistics and advanced information technologies, all the way to international political studies and legal instruments.

Achievements since 2008.

Since the last WG on Training and Education, held during the INMM-ESARDA meeting in Tokyo in 2008, and during which a substantial action list was agreed upon, a lot of progress has been made. This was discussed during the WG in Aix-en-Provence 2011, mainly during the first afternoon, and the following main points are retained:
In line with the ESARDA WG on Training and Knowledge Management, and in addition to the well-functioning student chapters at INMM, there was the formation of a dedicated INMM Education and Training Committee at the end of 2010.

Through the outreach activities of pro-active INMM and ESARDA members, there was in recent years a good Initial ANS and ENS engagement on nonproliferation and safeguards issues.

As a full novelty since 2008, it is very valuable to be able to report that five export control trainings for the IAEA Department of Safeguards have been organized in the last years, confirming the notable signs of cultural change also in the safeguards approaches at IAEA.

Also in the IAEA nuclear security department substantial progress in educational activities has been made and a very active programme is being run.

When looking on a world-scale it is gratifying to note that there is an increasing number of university programs and courses in the area of safeguards and nonproliferation.

Several new nuclear training centers came into operation, typically focusing on nuclear security but including also modules on safeguards, non-proliferation and nuclear security.

In addition, it is clear from the reporting of the different partners, that there is a growing recognition of the importance of nuclear security and nonproliferation challenges by emerging nuclear countries.

Some progress has been made w.r.t. quantifying and qualifying needs of T&E but further work is deemed needed.

For share information, e.g. on T&E opportunities, it is noted that there is an increasing use of social media and technology.

W.r.t. internship opportunities, a three fold increase in number of safeguards internships in the United States was achieved since 2008 whereas there is a stable but limited number in Europe.

The creation of new professional development networks (e.g. NuSaSET, INENS, NGSPN) for the next generation in nuclear security and safeguards was welcomed and was discussed in some detailed presentation in the 2011 WG meeting.

Figure 1: The professor at work...

Thomas Jonter, Chair of ESARDA WG TKM, speaking about knowledge management.
Contributions to WG4 of the INMM-ESARDA 2011 Aix-en-Provence meeting

Because of the multidisciplinary nature of the topics of safeguards, non-proliferation and nuclear security, it is quite a challenge to run a WG during the INMM-ESARDA meetings with specialists only dedicated to training and education. In fact, many colleagues who attended also other WG’s were contributing actively to WG4, also when not being present all the time. We in addition had topical contributions from colleagues connected per videoconference. There was a very good participation from all the different stakeholders: universities, professional training centres, international student networks, research and development, industry, operators and safeguards authorities / inspectors.

Based on the outcome of the Japan meeting in 2008 and the results of related meetings (like the Human Capital Development Workshop, under the US-DOE NGSI initiative, held at JRC Ispra in 2009) and several NuSaSET (Nuclear Safety and Security Education and Training) Working group meetings, the “new” questions which had been put forward for this WG 4 meeting were phrased as follows:

- Do we fill the gap in the current nuclear safeguards and security E&T?
- How do we prepare best for the future nuclear safeguards and security E&T esp. in emerging nuclear countries?
- Which best practices, for E&T concepts, can be shared and transferred and how do they differ between academic and professional teaching? Discuss the different approaches with pro and cons and derive best practices from experience, student feedback and industry needs. (e.g. Train the trainer, In-field training, Class-room training, Internships, On the job learning, Retraining / long-live learning etc)
- Which efficient E&T tools are used for which purpose, at different stages in the learning cycle and which ones remain to be developed? (e.g. E-Learning, Virtual reality, Hands-on Exercises, Theoretical case-studies, Role-plays etc)
- How can we address the multi-facettted challenge on Knowledge Management in view of E&T in nuclear safeguards and security? (e.g. Manage the knowledge of staff and resources, Maintain historical knowledge, Information gathering, structuring, sharing, use, Collaborative environment (e.g. wiki’s, forum, etc))
- Which synergies can we valorize between safeguards and security E&T (possibly also looking at safety)?

The following speakers contributed to the programme:

- M. Scholz : US-DoE, US
- W. Janssens : JRC, Italy
- S. Zero : AREVA, France
- M. Goettsche : Hamburg University, Germany
- S. Grape : Uppsala University, Sweden
- R. Berndt : JRC, Italy
- S. Synetos: DG ENER Euratom Luxembourg
- E. Martika : STUK, Finland
- T. Jonter : Chair ESARDA WG TKM – Stockholm University, Sweden
- J. Baute : IAEA : Director SGIM, Vienna
- F. Sevini : for the Deputy chair ESARDA WG TKM – JRC, Italy
- Mr. Damamme : Institut Etudes Superieures Nucleaire de Defence, France
- C. Guet : I2EN : International Institute of Nuclear Energy, France
- Pete Heine : ANL : Export Control Training, US
- Jong UK Lee KINAC : Intl. Training centre – S. Korea
- L.V.Bril : EU- External Action Service, Brussels, Belgium
- Meena Singeleee : INENS, UK
- Craig Everton : Asian-Pacific Safeguards Network, Australia
- A. Braunegger : IAEA : Nuclear Security Department – per VIDEOCONFERENCE

**Outcome of the WG4 of INMM-ESARDA 2011**

The lively debates, expression of needs and presentation of different initiatives by the participants, led to the compilation of a new action list of this WG. These action items can serve as guidance to both INMM and ESARDA in their future engagements to stimulate Education and Training. It is clear that partnerships and collaborations with all stakeholders, mentioned also above, are essential to achieve good results and create the desired and needed impact.

The actions below correspond to the presentation to the plenary meeting at the end of the Aix-en-Provence workshop. It is clear that some actions can be broken down into more ingredients and subtasks, whereas other can be grouped or treated together as synergies exist. An analysis of the follow-up and/or implementation of these actions will be done also at the subsequent INMM-ESARDA meetings.

1. Establish INMM-ESARDA minimum standard for safeguards education and training modules
   a. Develop a recommendations document based on lessons learned and consensus of key stakeholders
   b. Feed innovative approaches into education and training cycle
   c. This can benefit both emerging nuclear countries, as well as promoting cultural change

2. INMM-ESARDA should examine ways to promote making safeguards/ nonproliferation a mandatory element of nuclear engineering curricula
   a. Raise awareness in academic circles
   b. Proactive outreach to university faculty
   c. Tap into student INMM chapters
   d. Share materials of success cases
   e. Develop alongside security and safety curricula / models

3. INMM-ESARDA should foster the availability of funding for E&T activities
   a. Close interaction with U.S. DOE/NNSA/NGSI and EC, which have these funding capabilities
   b. Reach out to additional national and regional sponsors
   c. Relevant for both domestic and international applications

4. Fostering exchange of students and trainees (geographically, cross-disciplinary)
   a. Tapping into existing national internships, courses, fellowships
   b. Provide access to sensitive facilities under international safeguards
5. It is essential to guarantee access to relevant nuclear infrastructure for training purposes
   a. Maintain or create dedicated training facilities
   b. Provide access to operational plants
   c. In addition and complementary to the above, there is a need to further develop simulation, model-based, virtual reality tools, and e-learning modules

6. Expand INMM-ESARDA interactions with other networks and stakeholders
   a. Both in safeguards: e.g. with APSN, ABACC, NGSI
   b. And in security: e.g. dedicated nuclear security training centers (Korea, Japan, ...)

7. Provide increased attention to Knowledge Management
   a. There is not enough emphasis in E&T on the topic “tools for the brain”
   b. The option of a NuSaSET portal should be investigated
   c. Foster exchange and dissemination of course materials
   d. Build a more collaborative approach to support cultural change

8. Stimulate further cross-fertilization between export controls and safeguards
   a. Both Content-wise
   b. And with respect to the training methodology (multiple layers of engagement)
   c. Use the concept of risk-based prioritization
   d. Provide outreach to promote compliance
   e. Analyse the role of front-line inspector versus the investigator role of analysts

9. Promote training geared towards teamwork, making better use of different experiences in a group dynamic; collaborative analysis

10. Address special focus groups with E&T initiatives, including diplomats, media, or interpreters

11. Deepen integration with NGOs, including proactive engagement to build partnerships in E&T

Figure 2: WG4 participants are debating the WG outcomes and action list...
Conclusions

The WG 4 work during the INMM-ESARDA meeting in Aix-en-Provence was dynamic and creative, and profited from a diverse set of contributions. The chairs are very grateful to all contributors, both those attending full time and the other experts coming in with specific contributions, while also attending other WG’s. They also look forward to see the many discussions and action points result in real progress in the field in the coming years, with dedicated training and education activities, availability of additional funding and the achievement of valuable results. This will allow “our safeguards community” to both continue to execute excellent work and stay at the forefront of developments, science and technology.