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Dmitriy Nikonov
International Atomic Energy Agency

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INSEN: 10 years and Beyond

By Dmitriy Nikonov

Education Officer, IAEA Division of Nuclear Security

This year, 2020, we mark the 10th anniversary of the International Nuclear Security Education Network – INSEN as we all have come to know it. In these ten years we have seen the nuclear security education community grow and mature. We have also seen a growing number of nuclear security professionals around the world who graduated from INSEN-members' university programmes, received diplomas and certificates, and have become a dedicated, knowledgeable community, speaking a common technical language and sharing the same nuclear security culture.

The Network's annual meeting, usually held in Vienna in the middle of the summer, was anticipated by many as an opportunity to celebrate, reflect, and plan for the future. But, as we know, the COVID-19 global pandemic brought change of plans, with many international events postponed until the risk subsides. The situation, however, should not prevent us from celebrating, albeit remotely, what has become a remarkable success story.

I. The Network

In 2010, INSEN was launched by university educators, nuclear security policy makers, and IAEA technical officers to harmonize and increase quality of education in a complex and multi-dimensional field of nuclear security. It became a partnership between academic institutions, the IAEA, and other organizations interested in promoting excellence in nuclear security education. Prior to INSEN's inception, there was no comprehensive graduate degree programme that focused exclusively on nuclear security, as it was understood in the international community and practiced by individual countries. Yet, many expressed an interest in such a programme. They believed that, while nuclear security remains a national responsibility, addressing the persistent threat requires a coordinated global response and the people who are knowledgeable, passionate, and committed to the task.

That same year, the IAEA published what was, at the time, one of only a few international guidance documents on nuclear security – the Nuclear Security Series No. 12 Educational Programme in Nuclear Security. This document provided technical guidance on the content and structure of a Master of Science curriculum and a certificate programme curriculum for academic institutions interested in including nuclear security in their teaching. In March 2010, a group of about 30 academic experts met in Vienna to think of ways to promote this new guidance in a wider university community. Thus came the idea of a dedicated network.

The main objective of INSEN is to support, sustain, and promote nuclear security education through:

- Development and review of teaching materials and tools as well as academic programmes and curricula, consistent with IAEA-defined terminology and guidance.
- Assistance in the different areas of nuclear security education through faculty professional development and exchanges, infrastructure, good practices, expertise, and information sharing.
- Promotion of nuclear security education among INSEN members as well as other interested institutions and stakeholders.

The initial meetings of the newly established network were filled with excitement and enthusiasm. But first the group needed a strategy, a structure, a mechanism to operate and achieve its objectives, an action plan, a name, and a logo. Fortunately, the first network chair appointed at the inaugural meeting, Professor Tariq Majeed from the Pakistan Institute of Engineering and Applied Sciences, skillfully navigated the Network through its first year.

Subsequent years have seen rapid growth of INSEN – both in membership and geographic representation, with many countries having multiple institutions participate in various Working Groups and activities. At the time of this publication, INSEN consisted of 194 institutions from 65 countries in all regions, and the inquiries about the membership continue to flow.

INSEN MEMBERSHIP GROWTH

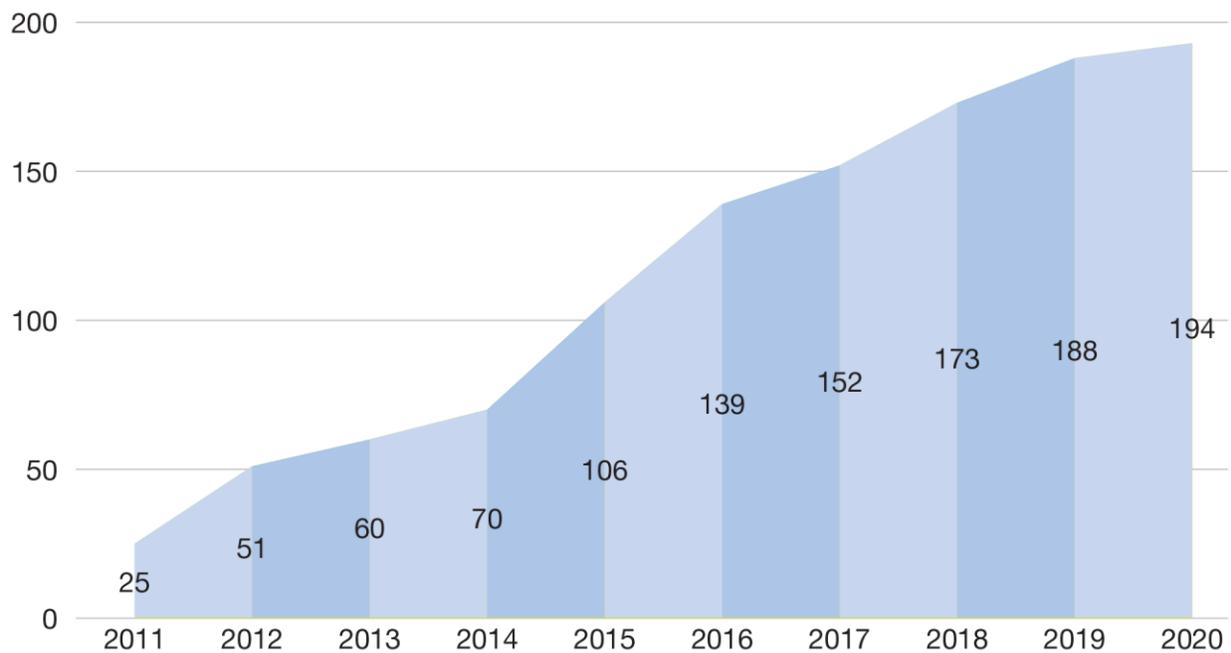
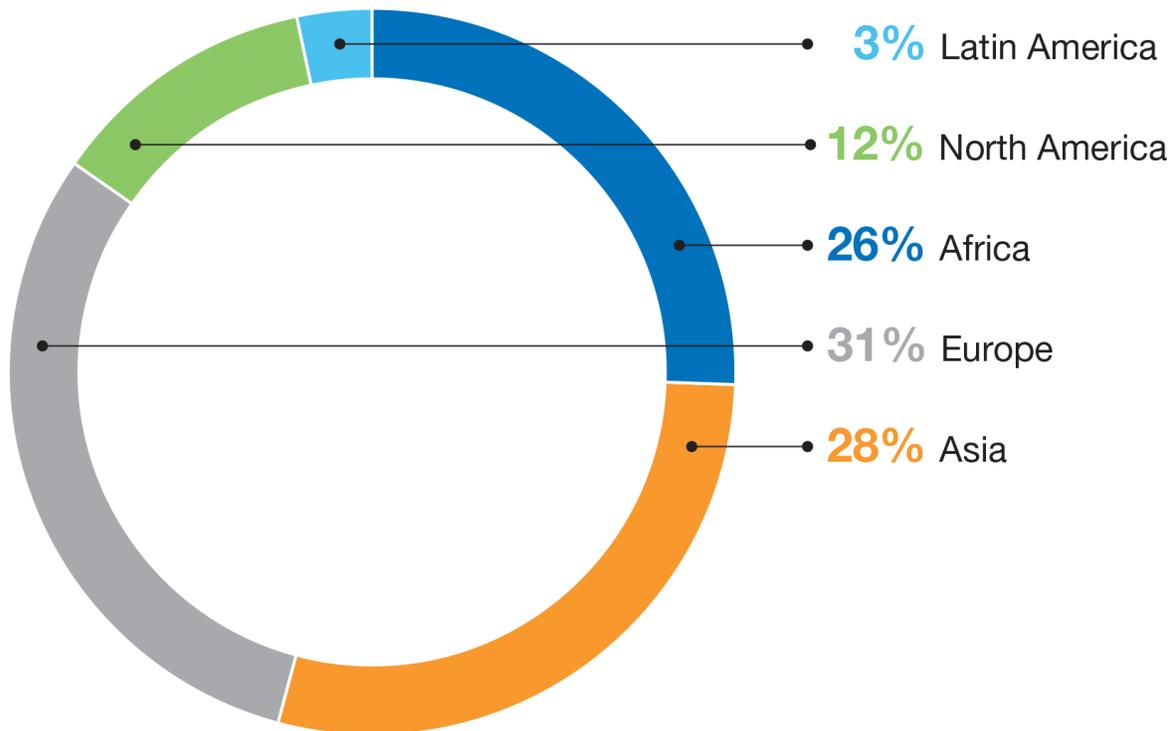


Fig. 1. INSEN Membership Growth, 2011-2020

INSEN actively promotes geographic and gender equality, both in its membership and in its leadership. Network and working group chairs have included men and women. At its annual meetings, INSEN regularly hosts a special panel on Women in Nuclear Security to help raise awareness of the importance of gender balance in this field, share the stories of successful women in nuclear security, and discuss opportunities and strategies for attracting women to careers in nuclear security. As a network consisting of universities and other educational institutions, INSEN makes a difference in creating equal opportunities for young women not only in nuclear security but, more broadly, in science, technology, engineering, and mathematics (STEM). The IAEA Marie Skłodowska-Curie Fellowship Programme, announced in March 2020, is a new initiative that helps young women become better engaged in nuclear science, engineering, and nonproliferation. The IAEA, is currently looking to enhance this engagement to include nuclear security, by soliciting dedicated contributions to the Nuclear Security Fund. INSEN is committed to this cause and makes every effort to promote equal opportunities in nuclear security for all its members, faculty, and students.

INSEN GEOGRAPHIC DISTRIBUTION**Fig. 2. INSEN Geographic Representation**

The first INSEN Terms of Reference reflected the needs and aspirations of a growing network. Accordingly, the three established Working Groups focused on developing teaching materials for instructors, offering professional development opportunities for faculty interested in teaching nuclear security, and promoting both INSEN and nuclear security education among wider nuclear and academic communities. With assistance from IAEA and other partners, these objectives have been largely achieved: INSEN and other international experts developed 24 teaching material packages and several textbooks that are in line with IAEA nuclear security guidance. Hundreds of university instructors participated in faculty development courses, many of which were offered by INSEN institutions. The Network has become widely known in the professional and academic communities around the world.

Recognizing these achievements and the Network's growing maturity, INSEN, in 2019, adopted the revised Terms of Reference, which shifted the Network's focus from the development of teaching materials and expertise to programme, curriculum, and faculty development; knowledge management; and sharing of information and experience.

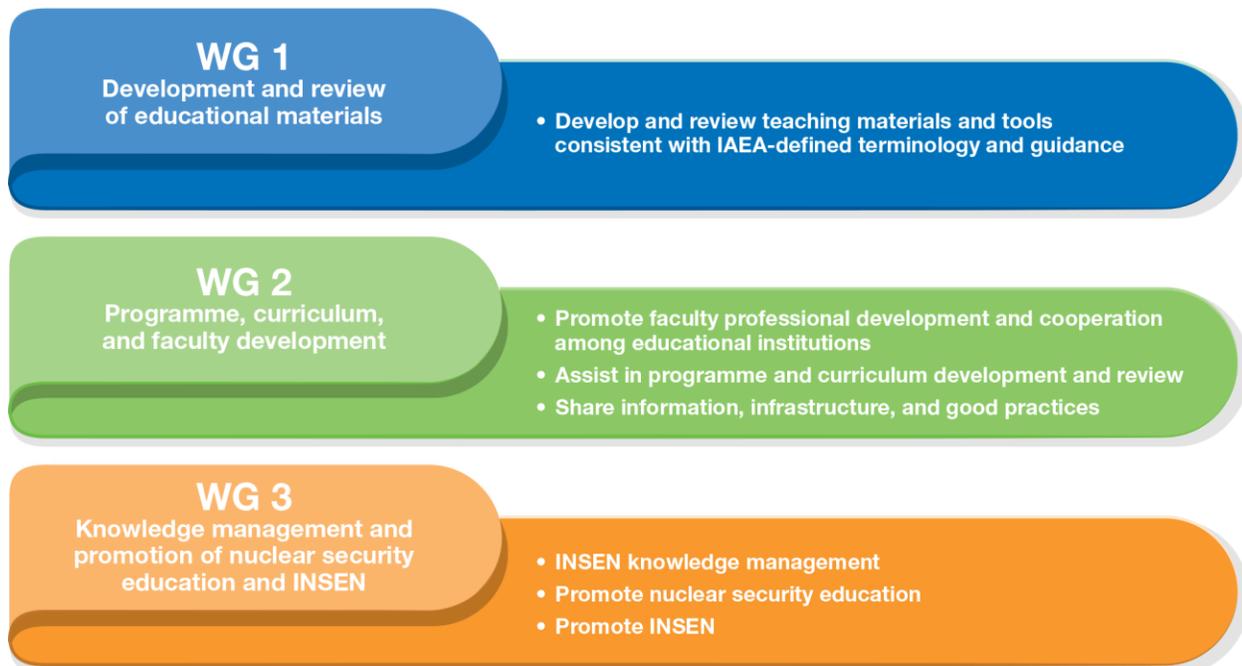


Fig. 3. INSEN Working Groups and Their Portfolios

II. Nuclear Security Education

In 2012, a group of several European universities decided to run a pilot degree programme based on the curriculum proposed in the IAEA guidance document. This pilot programme, which resulted in six Master's graduates from several countries, was an invaluable experience for all INSEN members and an excellent example of how such programmes can and should be established and sustained.

Today, a growing number of degree-granting INSEN members offer graduate programmes in nuclear security. These range from fully comprehensive programmes, taught as part of existing related curricula, to programmes leading to concentrations or diplomas. Presently, the University of National and World Economy in Bulgaria and the Brandenburg University of Applied Sciences in Germany are implementing a comprehensive Master's programme in nuclear security. The vast majority of INSEN members also regularly teach courses and modules in nuclear security using INSEN-developed teaching materials, textbooks, and other instructional tools. Such arrangements help ensure that the academic programmes in nuclear security are fully integrated into the existing curricula and can be implemented sustainably, with full cognizance of the national needs. A number of universities are even developing and implementing combined degrees in nuclear safety, security, and safeguards and are partnering with their peers at the national and regional level to establish more sustainable programmes for students in their countries.

Over all, since the inception of INSEN, an estimated 2,500+ graduate and undergraduate students have participated in these academic programmes. Many graduates went on to professional careers in nuclear security or related fields in regulatory agencies, law enforcement, research institutions, and operating nuclear facilities or radioactive sources. In a recent survey, students and graduates reflected on their academic experience and the impact it had on their careers. Over 50% of responders work in a field related to nuclear security. Almost 60% believe that their education helped them advance professionally through promotions, assignment of new responsibilities, or by serving as consultants at the national or international level. More than 75% of graduates continue to share with others the knowledge they received – through teaching or training, presentations and publications, or serving as experts.

After 10 years of successful implementation, the Nuclear Security Series No. 12 Educational Programme in Nuclear Security is up for a revision. It was initiated for two main reasons: (1) to incorporate in nuclear security the new concepts, knowledge, and understanding from almost 40 series publications on nuclear security, many of which were released after 2010, and (2) to incorporate in nuclear security the experience and lessons learned from implementing INSEN’s educational programmes for the past ten years. The new Master’s curriculum, to be published in 2021, is much better aligned with the most recent IAEA guidance and recommendations, and it incorporates in this field practical recommendations on designing and implementing academic programmes by educational institutions around the globe (see Fig.4).

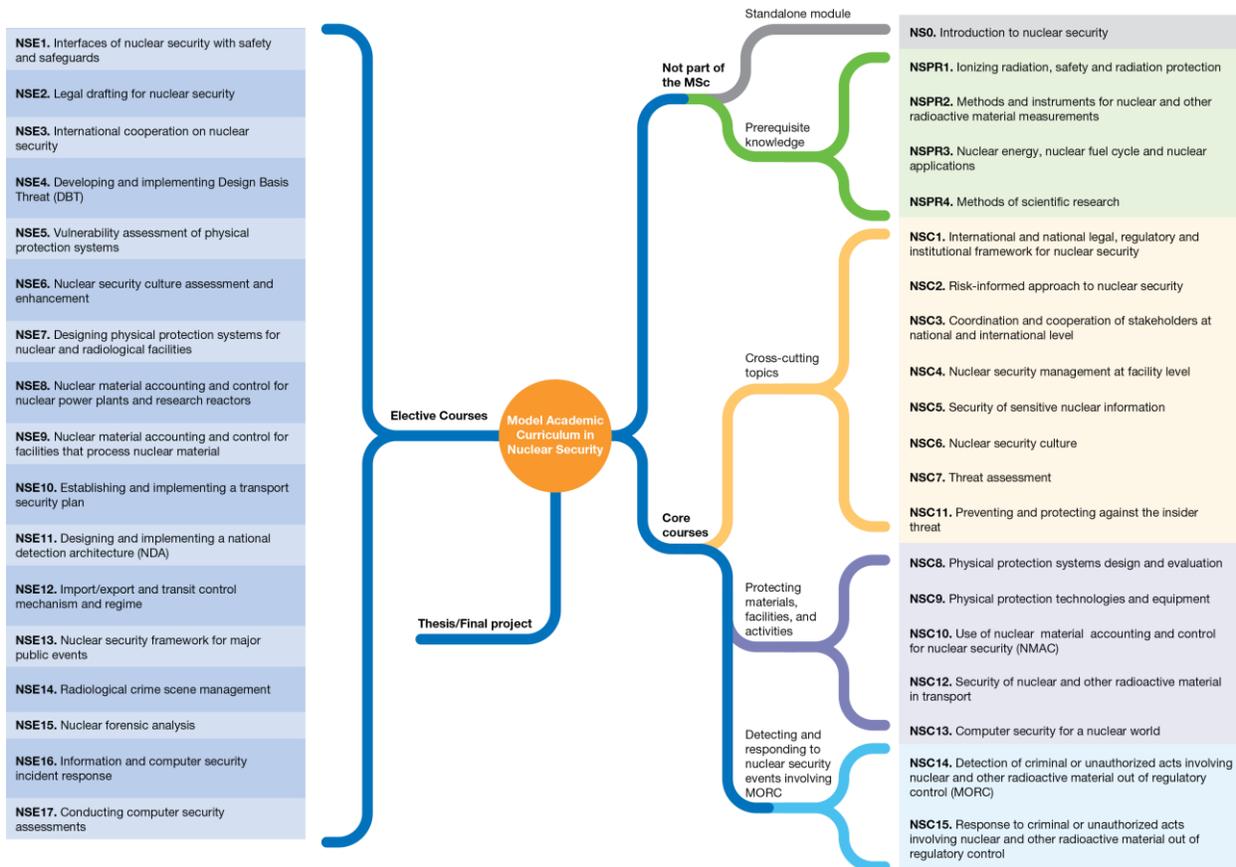


Fig. 4. Revised Model Academic Curriculum in Nuclear Security

III. INSEN: The Next Ten Years

IAEA member states have consistently supported INSEN and its activities. Resolutions of the General Conference and dedicated contributions to the Nuclear Security Fund earmarked for INSEN and broader educational activities on nuclear security were crucial for developing INSEN.

Given the current success, what can INSEN do to maintain the momentum and continue to provide students – as well as countries – much-needed educational opportunities in nuclear security? The first steps on this path have already been made: the focus of the Network now is to emphasize adaptability and sustainability of the educational resources and programmes that INSEN offers its members. With the teaching materials revised to reflect new IAEA guidance and recommendations, new instructional tools, new methodologies, and new experiences shared among members, INSEN institutions are well-equipped

to offer their students a competitive advantage in the growing nuclear field and to help their countries nurture the next generation of nuclear security professionals.

In addition to providing quality educational opportunities, the Network seeks to preserve and maintain the knowledge and expertise it has already accumulated through the years. While the IAEA offers INSEN a dedicated web portal, its full potential can only be realized if all members contribute up-to-date information and resources, making it a powerful tool for knowledge management, information sharing, and outreach.

At the moment, some of this information and these experiences exist only in their intangible forms: lessons learned by more experienced members in designing, planning, launching, and implementing their nuclear security education programmes and courses. They must be shared with others. To facilitate this exchange, the IAEA plans to develop a technical publication that summarizes these experiences of INSEN members, which would help preserve them for current and future members. At the same time, the need to maintain and share this knowledge makes in-person meetings (such as INSEN annual meetings or professional development courses for faculty) even more important.

Although the COVID-19 global pandemic presented challenges to INSEN and to educational institutions worldwide due to suspension of classroom teaching and other important activities, it also highlighted the opportunity and promise of new information and instructional technologies. Faced with uncertainty, universities and individual faculty had to rely on distance learning technologies to continue teaching, even though some had to learn to use them from scratch. While it is difficult to imagine that the effectiveness of an online webinar would equal that of a face-to-face seminar, we must prepare for contingencies such as the one we all experienced in 2020, and we must learn to use existing and emerging tools for effective education.

Finally, ten years is a sufficiently long experience for an educational network to realize its own impact. By reaching out to students and graduates and by soliciting feedback from INSEN faculty members, we are able to see a broad picture of a very successful programme. The technical publication currently under development by the IAEA and INSEN that looks at programme sustainability will also include a methodology for impact assessment, which will be implemented subsequently.

IV. Conclusion

Over the decade, INSEN enjoyed support and commitment from its members and international community at large. INSEN members consistently comment on the value that the network brings them; the impact that participation in INSEN activities has had on their careers; and the personal and professional development of themselves and of their students. Many members have established flourishing institutional, national, and regional partnerships and are collaborating on research projects and in teaching. Thousands of students have been educated on nuclear security and are now working in national authorities, operators, and academic institutions, using the knowledge and expertise they gained to the benefit of their countries. In these ten years, INSEN has also become a true family, where all members respect and value each other, are eager to learn from their colleagues and friends, and truly enjoy working together in this critical field of education. All these factors will undoubtedly be the key to INSEN's continued success.