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AAD News

A newsletter of the ANS Accelerator Application Division

Your AAD Leadership Team

Officers:

Reg Ronningen – Past Chair
William C. Horak – Chair
Gregory E. Dale – Vice-Chair
Valeriia N. Starovoitova –
Secretary
Lin Shao – Treasurer

Executive Committee (3 year term):

Eva R. Birnbaum (2022)
Irina I. Popova (2022)
Rolland P. Johnson (2022)
Blair Bromley (2021)
Lawrence Heilbronn (2021)
Fredrik Tovesson (2021)
John D. Galambos (2020)
Michal Mocko (2020)
Lin Shao (2020)
Philip L. Cole (2019)
Richard C. Lanza (2019)
Ross F. Radel (2019)

Message from the Chair

All members should have received a copy of the ANS 2020 change plan which was approved by the ANS Executive Committee at the Winter Meeting in Washington DC. The change plan was written in order to enact the 1ANS strategy that was developed to address a long term financial shortfall in the society and to better position it to meet the challenges facing the nuclear energy community in the future. The ANS change plan received significant feedback from the professional division chairs in a series of phone calls before the meeting and at a meeting with ANS president and chief executive officer at the winter meeting. As a result of those meetings, the elements of the change plan affecting the professional divisions, including how divisions are to be budgeted and funded, along with the management of technical meetings sponsored by divisions, were not implemented as originally proposed. The CEO is now engaged in a series of conference calls with the professional division chairs on how to address these issues with the goal of making a set of recommendations to the executive committee at the end of March

2020. I encourage all division members to read the change plan and forward any comments or suggestions to myself or the other officers so we can incorporate your input into these conference calls.

The division organized two sessions at the winter meeting. The first, organized and chaired by Reg Ronningen, addressed one of the ANS grand challenges on materials research for advanced nuclear systems. The discussion was extremely lively and will lead to further panel sessions on this topic in the future. The second session, chaired by Tarik Saleh (who stepped in at the last minute), covered general topics on accelerator applications, including the increase in industrial facilities such as the SHINE facility being built in Wisconsin. As a reminder, the deadline for submittal of abstracts for the 2020 annual meeting in Phoenix, Arizona is January 6, 2020.

Finally, preparations are well underway for Accelerator Applications 2020 in Vienna, Austria at the Vienna International Center, headquarters of the International Atomic Energy Agency. The organizing

committee had been working hard and has developed an exciting and challenging program, including what promises to be an entertaining evening at the Weingut am Reisenberg on Wednesday night. I want to thank the chairs, Phillip Cole, Aliz Simon, and Valeriia Starovoitova for all the hard work they have put in to make the meeting a success. The deadline for abstracts is also January 6, 2020. If you need to make a decision as to whether to submit your paper to AccApp 2020 or to the national meeting in Phoenix, I can only say that based on my experience the weather in Vienna in April will be much better than the weather in Phoenix in June.

Sincerely,
William C. Horak



Spotlight Article: High activity gamma sources and alternative technologies

By Valeriia Starovoi

Applications of radioisotopes have come a long way and today hundreds of radioisotopes, both natural and man-made, are routinely employed in medical, industrial, and research fields.

When these sources decay, and are no longer suitable for their intended purposes they have to be disposed. Unfortunately, in many countries management of radioactive wastes and the long-term safety and security of disused radioactive sources remains a concern.

Several incident databases exist, including the IAEA Incident and Trafficking Database (ITDB) and CNS database. They report several hundred incidents every year and most of them involve industrial and medical radioactive sources, such as cobalt-60 and cesium-137.

While the majority of incidents do not necessarily imply malicious use of radioactive sources, there have been attempts to buy and sell radioactive and nuclear material. While small quantities of cobalt or cesium cannot be used to make a nuclear bomb, they are capable of causing radiation poisoning and sickness. This makes high activity sources an attractive target for terrorists seeking to build a so-called “dirty” bomb.

A dirty bomb, also known as a radiological dispersal device (RDD), combines radioactive material with a conventional explosive to spread it. A radiological weapon would not produce a nuclear explosion and would cause few, if any, immediate casualties. However, if used in a major city, an RDD could potentially

contaminate a significant area, spread panic, and cause serious financial losses.

What can be done to reduce the risk and minimize the probability of such a frightening event? One of the answers is to minimize the number of sources. Indeed, many benefits of radioactive sources without their risks can be provided through alternative technologies. Many governments are concerned about high activity source security and provide support for the development of non-radioisotopic alternatives.

The most common substitution for radioactive sources are electron accelerators. The main advantages of these alternative technologies is their ability to be turned on and off for safety and their minimal security risks.

“Several hundred incidents are reported annually by participating countries and most of them involve industrial and medical radioactive sources.”

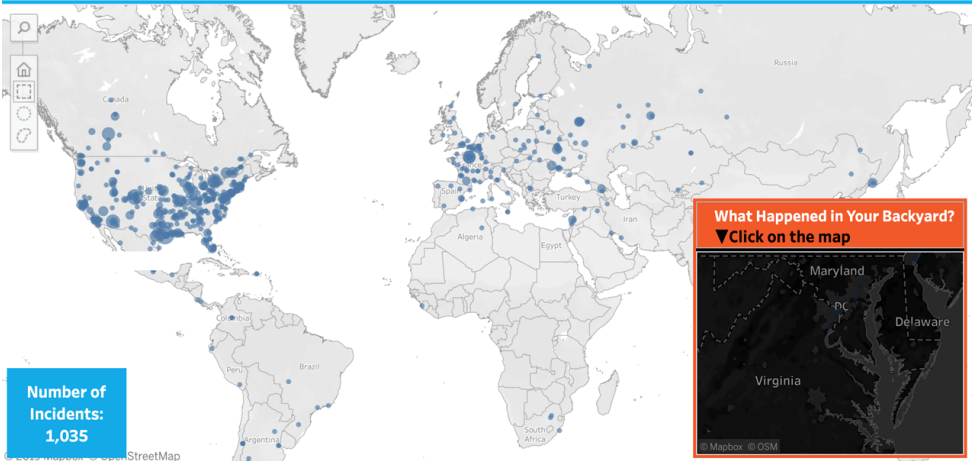
What Happened in Your Backyard?

Global Incidents and Trafficking Database, 2013-2018



Country (All)	Type of Incident (All)	Application (All)	IAEA Category (All)	In Transport (All)	Material Type (All)
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▼ Search for incidents geographically using the magnifying glass. Click the options above to filter the data



Screenshot of the CNS Database showing >1,000 incidents from 20013 to 2018
<https://www.nti.org/analysis/articles/cns-global-incidents-and-trafficking-database>

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High activity gamma sources and alternative technologies (cont.)

Accelerators can potentially replace radioisotopic sources in many applications. For example, numerous cesium-137 sources used for blood irradiation have already been successfully replaced with low-energy x-ray units. These machines are compact and self-shielded so they can easily be installed in a regular room in a hospital. Many research institutes, universities, and government laboratories also consider and even already have begun the conversion from cesium and cobalt sources for R&D purposes to x-ray devices or electron accelerators. Replacement of cobalt-60 teletherapy units for cancer treatment is also



Rad Source blood irradiator
www.radsources.com

ongoing. Industrial cobalt-60 irradiators have been used for decades for phytosanitary applications and medical device sterilization. However, raising security concerns, recent perturbations in cobalt supply, and sharp increases in its cost

have made many users consider alternative technologies including E-beam and X-ray irradiation. For many applications, alternative, technologies have been around for a while, but due to their complexity and high costs, these methods were often overlooked.

Raising safety and security concerns increased interest to these techniques. For some applications, such as blood irradiation, the transition is very successful. For other applications, such as industrial sterilization of medical devices, the progress is not as great due to the lack of powerful, reliable, and inexpensive accelerators. Further development of accelerator technology should continue to be widely supported.

"Accelerators can replace radioisotopic sources in many applications."



Mediscan facility to sterilize medical products with electron accelerator
www.mediscan.at

Awards and Scholarships

We would like to congratulate **Dr. Paul P. Wilson**, our ANS Board Liaison for receiving Members Advancement Award! We would also like to congratulate **Carl A. Willis** for Landis Public Communication and Education Award!



Carl A. Willis receiving Landis Public Communication and Education Award

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Dr. Paul P. Wilson receiving Young Members Advancement Award (YMG)

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Upcoming Events

THE 15TH WORKSHOP ON SHIELDING ASPECTS OF ACCELERATORS, TARGETS, AND IRRADIATION FACILITIES (SATIF-15)

East Lansing MI, USA
September 8-11, 2020

SATIF workshops are experts' meetings addressing important aspects related to the modeling and design of accelerator shielding.

Main objectives of SATIF workshops are:

- Promoting the exchange of information among experts in the field of accelerator shielding and related topics;
- Identifying areas where international collaboration can be fruitful;
- Creating task forces in order to achieve progress in specific priority areas.

Note that the SATIF-15 workshop will be held immediately before the ICRS 14 / RPSD 2020 meeting that will take place on September 13-18, 2020 in Seattle, WA, USA.

11TH INTERNATIONAL PARTICLE ACCELERATOR CONFERENCE

Lakehouse, Mol, Belgium
10-15 May, 2020

IPAC is the main international event for the worldwide accelerator community and industry. Attendees will be presented advanced accelerator research and development results and gain the latest insights into accelerator facilities across the globe.

With over 1000 delegates and 70 industry exhibits this is a unique opportunity to network with, learn from and meet a wide range of decision makers, opinion leaders, buyers and newcomers to the field.

Job Opportunity

Position Description: Responsible for software programming of all aspects of the electron accelerator controls. Must have experience and proficiency in low level hardware/C interfaces and Java/javascript as well as GUI creation with programming experience in advanced custom automation and control system applications. Will be integrating big data FPGA based sources with GUI front ends and database backends. Must have experience in concurrent java, real time threading applications in java and C and understanding of integration with the VIVADO toolchain. General knowledge of Perl and Python a plus.

Please see <https://www.scantechsciences.com/en/about/careers/>, and if interested contact careers@www.scantechsciences.com.

Have a Story to Tell?

Would you like to contribute a news item or article to a future edition of the ANS ADD Newsletter? Member contributions to the newsletter are always welcome. Please send your article to Valeriia Starovoitova (starvale@isu.edu).



SATIF-15
15th Workshop on Shielding aspects of Accelerators, Targets, and Irradiation Facilities
8-11 September, 2020
Hosted by the Facility for Rare Isotope Beams
Michigan State University
640 South Shaw Lane
East Lansing, MI 48824

Topics

- Source terms and related topics
- Shielding and dosimetry
- Induced radioactivity and decommissioning
- Code status, advances, and model converters
- Code benchmarking and intercomparison
- Radiation damage to materials
- Heavy ion, medical, and industrial accelerators
- Beam-plasma and laser-plasma interactions and acceleration
- Follow-up of past SATIF agreements and future actions

Scientific Committee

- Francesco Cerutti (CERN)
- Anna Ferrari (HZDR)
- Dali Georgobiani (FRIB, Chair)
- Robert Grove (ORNL)
- Hideo Hirayama (KEK)
- Hee-Seock Lee (PAL)
- Michael Mocko (LANL)
- Nikolai Mokhov (FNAL)
- Gunter Muhrer (ESS)
- Hiroshi Nakashima (JAEA)
- Stefan Roesler (CERN)
- Sayed Rokni (SLAC)
- Marco Sileri (CERN)
- Shuichi Tsuda (NEA)
- Timothy Valentine (ORNL)
- Pedro Vaz (IST)

Local Organizing Committee

- Dali Georgobiani (Chair)
- Georg Bollen
- Mikhail Kostin
- Anastasia Lesage

For more information visit <https://indico.frib.msu.edu/e/SATIF-15>

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