CTBTO PREPARATORY COMMISSION | COMPREHENSIVE NUCLEAR-TEST-BAN TREATY ORGANIZATION

People, Technology, Responsibility

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CHECK AGAINST DELIVERY

Excellencies. Distinguished guests. Colleagues. Friends

It's 6 August 1945 in Hiroshima. A bright summer morning. Thirteen-year old Shigeru Orimen – He is so excited! His mother has packed his lunchbox. It includes special potatoes. He's grown them from seed himself. His mother later finds the charred lunchbox. Near his body.

In July 1945 came that first fateful nuclear test in New Mexico. Then, just three weeks later, the bombings of Hiroshima and Nagasaki. We've just marked the 80th anniversaries of those events. I had the privilege to attend the commemorations in Japan.

Shigeru's lunchbox is there. In a museum. His lunch, never eaten. 80 years on – a good time to reflect.

CTBTO's first gathering of this sort took place back in 2006. Not yet on this scale. But even then, some 200 scientists from around the world. Were any of your at that event? Don't be shy! Raise a hand!

The first full official SnT conference was in 2011. It had grown! 800 participants. One of my predecessors, Tibor Tóth, talked about the exciting changes at the CTBTO. He recalled how in 2009 CTBTO had done its job in monitoring the second DPRK test.

And how CTBTO was looking to do even better, with lots of changes. The IMS was 80% complete. Far better global communications infrastructure. New software for processing noble gas data. Many states now had National Data Centres. Accessing CTBTO data for the first time. People. Technology. Coming together to deliver on a noble cause. Strengthening our verification capabilities. Honouring our responsibilities.

All that was fourteen years ago! So much more has happened since then. Even since the SnT Conference in 2023, we have a new interactive radionuclide review tool. And we've improved our infrasound technology.

This year's SnT is the eighth in the series. It's attracted the largest ever level of engagement. 2041 registrations! Nearly 900 abstracts sent in for consideration. Dozens of disciplines represented. Seismology. Noble gas monitoring. Infrasound. Oceanography. Machine learning. Data science. Too many to list you all!

People want to take part. Explore. Learn. Share ideas. Using CTBTO data for studying our soil and climate. Our seas and marine life. The air we breathe. Protecting people from natural disasters. All this while getting better and better at our core responsibility. Monitoring for nuclear tests.

How did we get here?

You all know the history. How there were over TWO THOUSAND nuclear weapons tests before the CTBT was open for signature in 1996. How to stop testing, once and for all? By ruling out testing in secret. By bringing together Diplomacy and Science. In a way never attempted before.

Good intentions weren't enough. The diplomats negotiating the Treaty had to assure their national leaders that the systems the Treaty set up really would detect ALL nuclear tests. The scientists knew that those systems had to be both *TRUSTED* and *TRUSTWORTHY*! Without fail! They did their job. These SnT conferences celebrate that unique success.

What has that meant in practice? Two examples.

Once upon a time our IMS network didn't exist! But it had to be made to exist! Otherwise, the Treaty couldn't be agreed.

Back in the 1990s scientists faced one huge practical issue: communications bandwidth! How much data could be streamed to a 'yet to be established' International Data Centre?

These days we stream to Vienna 36 Gigabytes/Day. The original aim using the best available technology was really ambitious. 3.1 Megabytes/Day! Wait. Just 3.1 Megabytes per day? Thats 10,000 times less data than today [per day]. How did anything get done with that limited bandwidth?

At this SnT we have three people to answer that very question! Victoria Oancea [wahn-cha], Rodolfo Console and Paul Richards. They helped design the IMS using that 1990s technology. They'll be here on 'FRIDAY'S FUTURE DAY' to tell us about the technical and operational challenges they faced. And how the international expert team solved them.

A second example. We at the CTBTO are rigorous in making sure that our data meets verification and monitoring requirements. All that data the IMS collects is available to all States Signatories. And thereby to the scientific community you represent here today.

But why *exactly* is all that data so useful? Again. People, technology, responsibility! Go back to the 1990s again. To the Group of Scientific Experts. They made some highly technical but really bold decisions for archiving and storing CTBTO data. Thanks to them, all the data gathered since then is both stable and searchable. Even after many updates!

Events today can be compared robustly with events five, ten or twenty years ago. This is why our databases are a global research resource like no other.

Other things to look out for at this year's SnT. We all know that the IMS is amazing. The Treaty plans for 321 stations and 16 laboratories, across the globe. We now have 307 facilities. A new one in China was added just last month. More than 90 percent complete! Don't you want to visit a few of them? See them in action, sometimes in harsh remote conditions?

We can't bring you to our monitoring stations. But we can bring some monitoring stations to you! This SnT conference has an exciting virtual reality facility. Put on VR headsets. Find yourself next to a couple of IMS stations. Look around them! Sense their scale. Impressive! Look out for all this and more on 'THURSDAY - TOGETHER DAY.'

Another exhibit this year shows what goes on inside an On-Site Inspection tent. And outside it. Just the sort of tent we'll be using at IFE26 – our On-Site Inspection Integrated Field Exercise next year.

How has the world of science changed in the 116 weeks since SnT 2023? One obvious answer. The explosion in so-called Artificial Intelligence systems and options! Large Language Models. Machine Learning. Generative AI chat bots. Even quantum science. These technologies are transforming how vast

datasets are processed. We can dig deeper and deeper into more and more data.

The potential for our work is obvious. We'll be talking about that tomorrow – Quantum Day! But, once again, it's all about being responsible. Getting it right. Are we analysing the right things? Are we analysing real things?

When are intriguing new patterns just coincidences? How to tell? That's why at CTBTO our final validators aren't machines. They're our human experts.

That's why we're realistic and transparent about the technologies we adopt. We are working together with our States Signatories to make sure the innovations we use are right for us. That's why redesigning our infrasound system took some 6 years. Why developing new detection capability tools, and NetVISA (the waveform network association software), has taken time, spanning several SnTs. No room for mistakes. No room for miscalculations. No short-cuts!

But that doesn't mean we're slow to react! Another exciting thing about this year's SnT – our keynote about the 2025 Kamchatka earthquake! That event occurred just over 5 weeks ago and already we're able to meet and exchange about it. Fantastic!

My big point today? It's all about people and technology.It's all about taking responsibility. Making good decisions. It's all so different TODAY. We can't imagine how different it will be by the time we get to SnT 2055! And that is thanks to the scientific and technological advances that so many of you here today are helping bring about. This conference doesn't do false modesty! We're dealing with Very Big Things. There are enormous ramifications for our world's peace and security when CTBTO shows that an event IS a nuclear test, or IS NOT a nuclear test

We saw this last year. In October two small earth tremors shook northern Iran. Within minutes social media rumours were racing around the world! *A NUCLEAR TEST BY IRAN?* We got to work! 40 different IMS stations, from as far away as Canada and Mongolia, detected these events. We analysed the data. We shared it with our States Signatories.

Two things were clear. There was no nuclear explosion signature. And the data were consistent with historical earthquakes in that area. We established hard scientific facts by using meticulous methodology. We cut right through all the

rumours and disinformation. The world knew what had happened. CTBTO quickly helped reduce global tensions. That's our job.

Since the CTBT opened for signature in 1996? Fewer than a dozen tests. From 2000 tests, to less than a dozen. A success story like no other. For global diplomacy. For global science. For global responsibility. Our 2025 international scene? Too many tensions. Too much conflict. The tone and trend of international security discourse? Frustrated. Negative. Pessimistic.

So different from the optimism of the early 1990s. Striking global deals for the common good. The 1970s and 1980s saw nuclear tests almost every week. A return to all that would be political and moral disaster. Our Treaty stands in the way of that disaster. Most countries in the world have signed and ratified it. The splendid global scientific and diplomatic community represented here in the Hofburg and joining us online - You - be proud! You're making a global difference.

Here's a date for your diaries. *14 January 2026.* Now just 18 weeks away. If – when – we get to 14 January without a nuclear test, the world will set a new record. The longest period without one single test since that first Trinity test in New Mexico in 1945!

What a way to start 2026. The year marking our Treaty's 30th anniversary! Imagine if we extend that record. Not by weeks and months. But by years. To SnT in 2035. 2045. Beyond even that. The power of together. People and technology. The power of getting it right. Ingenious. Ambitious. Above all, responsible.

Those commemorative gatherings in Hiroshima and Nagasaki last month were profoundly disturbing and deeply moving. And yet I felt uplifted by the commitment of the young people I met. Born so long after those dreadful events. So committed to ensuring that while Hiroshima was the first, Nagasaki will forever be the last.

That is our shared responsibility. That's what we owe to the memory of Shigeru Orimen. That boy with his precious lunchbox.

Thank you