



CTBTO
PREPARATORY COMMISSION

PUTTING AN
END TO NUCLEAR
EXPLOSIONS

The Power of Together

Statement by CTBTO Executive Secretary Dr Robert Floyd
CTBTO Science and Technology Conference (SnT2023)
Vienna, Austria
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Two special welcomes. It is a great honour to welcome the Foreign Minister of Somalia, Foreign Minister Huruse. Your participation bears testament to Somalia's strong commitment to the CTBT. And I also want to welcome the Undersecretary from South Sudan - the youngest nation in the world, committing to the CTBT.

We have nearly 2000 people here or online at this conference this year - the largest number ever at our Science and Technology conference. Congratulations to you all for being a part of history.

Let me start by talking to everyone who's actually here, in this splendid hall.

As you arrived here this morning, you must have been worried - even nervous. Because as you entered this hall you looked up. You saw this amazing, massive ceiling. And you were thinking very hard about the sheer weight of that ceiling. The colossal tensions and pressures it exerts on the wooden beams. On the supporting walls. Outwards. And downwards.

And you were wondering: Won't that beautiful but very heavy ceiling fall and squash *us all*?

Call me an optimist. But I'm confident we'll survive - at least until the end of my speech. That ceiling and the roof of the Hofburg palace are strong. Solid. All being well, that ceiling will look down on fine events like this one for generations, even centuries, to come.

But why is it so solid? The people who built it had no computers. No email. No fancy design programmes. Not even Tik-Tok. They had no calculators. No laser gadgets. No power-tools.

What they did have was a way to *measure* things. They measured exactly what needed to be done, to design and build this hall. Then they measured exactly how they were going to do it. And here's the point. They could measure *exactly* because they had agreed standards of measurement.

On Thursday this week, the date will be 22 June. Let's go back two hundred and twenty-four years. Go back to 22 June 1799. In Paris. Not long after the French Revolution. On that day something happens that changes the world.

A metal bar representing a new standard measure (they called it 'the metre') is deposited in the National Archive in Paris. That bar has been carefully calculated. It's agreed to be one / ten millionth of the distance from the equator to the North Pole. They display copies of the bar on walls around Paris. People see what the new metre length looks like. And they start using it.

That bar *can't measure itself*. Instead, it sets the *standard* for measuring other things.

This new standard catches on around the world. Science needs systematic measurement and systematic standards. Not just for distance. For time, mass, temperature. For force and stress. Magnetism. Electric current. Radiation. But the principle stays the same. There's no measurement without an agreed standard of measurement. You can't be *accurate* without *a standard for accuracy*.

Nowadays, things have moved on. We don't use that metal bar to define a metre. Instead, we set the standard meter as the distance that light travels in a vacuum in just under one / three hundred millionth of a second.

International standards have replaced national and local standards, to ever-greater levels of sophistication. Internationally recognised bodies have been set up under treaties keeping those many standards in good order.

This is why this gathering here and online has such symbolic and practical significance. We at the CTBTO have helped bring together about 1775 scientists, technicians, experts, academics from around the world who use these standards.

And mixed with the technical audience we have at least 150 diplomats. They represent the states around the world who've agreed the treaties and conventions that set the legal and policy framework.

When we last counted, this conference brings together participants from some 147 countries, including the newest country in the world. Just think about all those languages. All those cultures.

Yet we have one common language – the language of our internationally agreed scientific standards. This is the *Power of Together* - what the CTBTO, in partnership with all the States Signatories, represents.

The CTBTO's mission stems from the simple obligation of Article One of The Comprehensive Nuclear-Test-Ban Treaty:

Each State Party undertakes not to carry out any nuclear weapon test explosion or any other nuclear explosion

Our job is to detect any signs that that obligation has been broken.

We use sophisticated sensors and sophisticated measurement to detect possible nuclear explosion tests anywhere, any time on Earth. We collectively are very good at detecting any explosion that might be a nuclear explosion. This makes them so much less likely to happen. Don't try it – you'll get caught.

Plenty of other national organisations and institutions around the world closely monitor seismic and other activities. They too can distinguish between an earthquake and a possible nuclear test. But the CTBTO is unique.

We gather seismic data, measuring vibration in the Earth's crust. Seismometers measuring velocity in meters per second. They're carefully aligned with geographic North: that allows us to determine the precise direction of seismic waves.

We gather hydroacoustic data, measuring vibration in the oceans. We gather infrasound data, measuring vibrations in the air. And we gather radionuclide data, looking for radioactive particles and gases from a nuclear explosion. In all of this, we partner with our States Signatories, putting data and analytical capability into their hands.

There's nothing else like this on Earth. It's not just that we bring all this data together and then analyse it speedily, to formidable levels of accuracy. We're international. Our work is even-handed and transparent. All that data is available to all our States Signatories and can be shared by the world's wider scientific community.

So, I say loud and clear to everyone here today. Scientists and diplomats alike. You and we TOGETHER represent global teamwork at its finest. We share a simple political and moral goal: *no more nuclear tests*.

And we share the best available technical ways to make sure we reach that goal. The Treaty; the CTBTO set up under the Treaty; the full participation of all of our States Signatories; and the global network of scientists who support this goal, and who invent smarter and smarter new ways to check we can be sure we're reaching it. This is the *Power of Together*.

Let's look at what our conference this week is contributing.

One technology we use is Infrasound. An exciting feature of this year's SnT is a metrology workshop. Experts will discuss recent successes on robust calibration practices for infrasound technology. By agreeing a new way to link the power of our technology to an agreed standard of measurement, what we're doing, we are opening up the way to all sorts of new developments.

This is CTBTO and you, our wider scientific family, helping define the philosophical frontiers of science to get things done in new and better ways. This is big stuff. So many of you have contributed to it, in so many ways.

Our planet makes a lot of noise. It's constantly creaking and gurgling, groaning, and sighing. We have to follow all that noise, to spot anything in it that might be a nuclear explosion. Our machines and technologies – the machines you here help invent – keep getting better and better, more and more 'sensitive'. So does our software for analysing that data.

This conference celebrates how this can work in practice. Our global network of sensors followed the impact of the Hunga Tonga Hunga Ha'apai eruption last year. We picked up that eruption with all three waveforms. The vibrations from that eruption went around the world for several days.

Other highlights of this conference? New technology for our On-Site Inspections.

Sensors and monitors do so much – but from a distance. When the Treaty enters into force, the Treaty also provides that scientific experts can visit the site where a suspected test may have taken place. To run first-hand checks, on and in and above the ground. Their instruments can rule in or rule out evidence of illicit nuclear test activity. There's a powerful exhibit here featuring a helicopter frame down below, and screens that show what might be done from the air in an On-Site Inspection.

Here's another example of the *Power of Together*. Most major scientific gatherings aren't like this one. They bring together experts in one or maybe two disciplines. Depth, not breadth.

But this event is completely different. It brings together so many different disciplines. Seismology, acoustics, meteorology, radiation physics, information technology, software engineering. And representatives of twelve different Scientific Societies are joining us this week. Again, quite different – and hugely important.

What an opportunity for thinking outside the box. For seeing so many other boxes to explore. For thinking of ways to combine different boxes. To make brand new boxes.

In short, here in Vienna today is a meeting of Global Team Science. It's taking place to advance one of the great technical issues of our time. One of the great moral issues of our time. Ending nuclear explosions.

My theme today – *the Power of Together* – isn't complete without a standard for who counts when we measure Together.

Let's be honest. Much of the world's scientific leadership has traditionally come from only certain parts of the world, and from one category of people – namely men. This has to change. This is changing.

I can see here some amazing champions foreseeing that change on gender in particular. The CTBTO is working really hard to broaden its representation and outreach. You'll see in our different language panels, presentations from experts from across the world and keen participation by younger people. Fifty percent of our presenters and panellists are women.

And, please, especially women and participants from less represented nationalities. Get inspired. Think about applying for jobs and join us at the CTBTO.

How to sum up?

The Comprehensive Nuclear-Test-Ban Treaty is a Treaty for the world. 186 States have signed the treaty. 177 States have ratified it.

Sri Lanka completed its domestic ratification process just two weeks ago. And it's my pleasure to tell you that on 9 June the House of the Parliament of Papua New Guinea agreed to ratify the CTBT. Can you feel the momentum? There are even more in the pipeline. This is not done yet.

On the ground, under the ground, in the sea, in the air, nuclear explosions will be detected. Before 1996 when the Treaty was agreed, there were over TWO THOUSAND tests. Since then, less than a dozen test events. No matter where they are, they will be detected. In this century, only one country has tested.

By any standard of policy and practice and by any measure of success, this is success - success on a grand scale.

It happened because the world's states themselves agreed that enough was enough. But it needed both science and diplomacy. Because the scientists showed that remote verification of nuclear tests was robust and reliable, the diplomats could agree the treaty. Here with us today are some people who were part of that process, agreeing that final language of our Treaty.

This is the *Power of Together*, that you all here today represent. We together use the best possible standards of measuring. And when necessary, we agree new robust standards. Then together we measure in incredible detail what's going on and analyse in incredible detail what's going on.

We together are very good at what we do. And, as each year passes, we're getting better and better, thanks to you. Don't try to test – you'll get caught.

I finish with good news, and wise words.

The good news? The ceiling has not fallen. Our conference continues.

Now the wise words. From someone who was both a towering scientist and something of a diplomat. The right person to guide us today. Leonardo Da Vinci:

Truth at last cannot be hidden. Nothing is hidden under the sun.

Thank you – and welcome to SnT 2023.