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Short Communication

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The National Authority for Arms Control and Disarmament of Angola (ANCAD) - Framework for the Implementation of the Treaty

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Abstract

This study examines the strategic and technical path for the implementation of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) in Angola, focusing on the transition from strengthening a diplomatic commitment to a robust national verification capability. The methodology is based on an analysis of the current national seismic network, composed of stations managed by the National Institute of Meteorology and Geophysics (INAMET), and on the evaluation of the Integrated Plan for the Use of IMS Data and IDC Products, which is being developed by the National Authority for Arms Control and Disarmament (ANCAD). A central innovation of this work is to consider the possibility of Angola using its space potential, such as the integration of internet services from the Angosat-2 satellite as a primary communication redundancy layer, to maintain the continuity and integrity of the CTBTO IMS data and IDC product flow, mitigating the local connectivity challenges that are common in developing countries. Furthermore, the article discusses the importance of regional empowerment in Africa, embodied in linguistic equity within the framework of the Comprehensive Nuclear-Test-Ban Treaty (CTBT), to avoid technical asymmetries. The results suggest that the "dual-use" application of CTBT data for civil protection and mining security, among other areas, combined with resilient communications and supported by the aerospace industry, could position Angola as a technical leader in the Southern African Development Community (SADC) region. This model could serve as a paradigm for other Portuguese-speaking and developing countries seeking to reconcile global non-proliferation objectives with national scientific development.

Keywords: Pushing Gravity, Rotations, Revolutions, Orbital Drive, Counter Clockwise, Barycenter.

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Introduction

The Comprehensive Nuclear-Test-Ban Treaty (CTBT) represents one of the most sophisticated pillars of the global non-proliferation regime, underpinned by an International Monitoring System (IMS). The gap between cutting-edge advancements in Vienna and the local infrastructure in developing countries is a significant obstacle to the Treaty's universal effectiveness. To overcome this obstacle, the CTBT promotes capacity-building programs and the "CND-in-a-Box" software package. However, after the Science and Technology Conference (SnT 2025), a critical question remains: how to ensure that this cutting-edge technology does not become a "white elephant" in developing countries that are still structuring their technological bases? In the specific case of Angola, the challenge is multifaceted, involving not only the operationalization of the recently implemented National Data Centre of Angola (NDC-AO), but also overcoming the linguistic barriers inherent in a system where Portuguese—the official language of Angola—is not one of the official languages of the United Nations [3]. However, for Portuguese-speaking countries like Angola, the technical appropriation of these tools requires a differentiated effort. If the linguistic factor results in slower integration or limited access to specialized training, a silent

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asymmetry is created that contradicts the principle of sovereign equality among the States Parties, as foreseen in the Treaty. This article explores future prospects for the implementation of the CTBT in Angola, so that regional empowerment is based on transforming the NDC from a data receiver into a center of excellence in geophysics and using seismic data for national development.

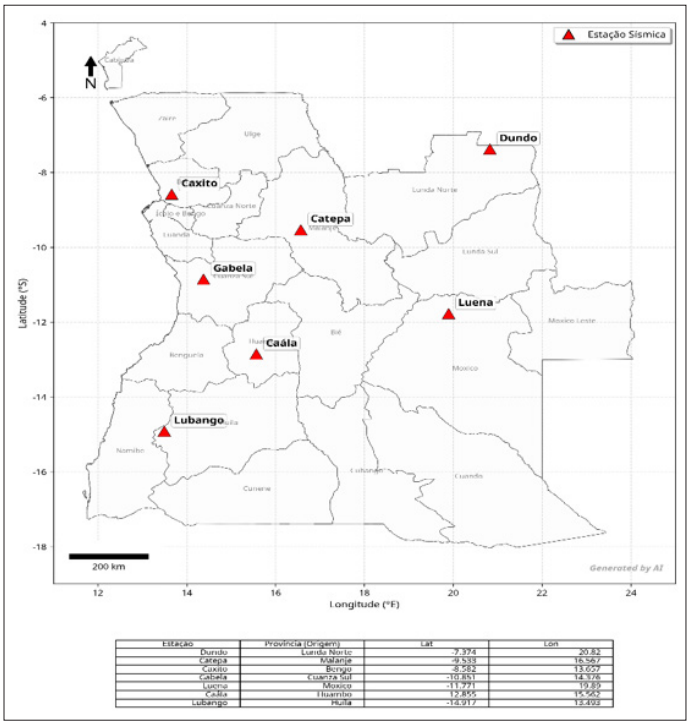
The Culture of Disarmament in a Developing Country

Angola signed the CTBT on September 27, 1996, in New York and formally deposited the instrument of ratification on March 20, 2015, becoming the 164th State to fully ratify the agreement. In 2024, the NDC was established within the National Authority for Arms Control and Disarmament (ANCAD), an entity belonging to the Ministry of National Defence, Former Combatants and Veterans of the Homeland (MINDENACVP). On this basis, ANCAD plays a fundamental role in verifying nuclear explosions in the region [1]. The implementation of the CTBT in developing countries transcends the diplomatic sphere, constituting a pillar of scientific sovereignty and national security. In the Angolan context, the operationalization of the NDC, under the tutelage of ANCAD, reflects the construction of a disarmament culture based on technological appropriation and infrastructural resilience. Angola's strategy focuses on the Integrated Plan for the Use of IMS Data and IDC Products, which aims to break the NDC's technical isolation. This plan establishes the basis for a "dual-use science," where nuclear monitoring data also serves civilian and civil protection purposes. Following evidence from countries like Congo-Brazzaville, which used tools such as Geotool and GPMCC to manage national crises (such as the 2012 ammunition depot explosion), Angola is designing rapid response protocols that integrate geology, environment, and defense agencies. Aligning with Botswana's vision on the importance of academic linkage, the Angolan plan foresees the involvement of higher education institutions to ensure that CTBT data analysis becomes a permanent competence in the country. One of the biggest global challenges in implementing CTBT in developing countries is maintaining uninterrupted connectivity for real-time data transmission to Vienna. Angola addresses this challenge through a cutting-edge solution: the integration of Angosat-2 into its NDC ecosystem.

Angosat-2 has been operating in its orbital position (23° East) since November 4, 2022, following its successful launch on October 12 of the same year. It operates with high-speed transmission technology, consisting of 6 C-band transponders covering all of Africa and part of southern Europe, and 24 Ku-band beams covering the southern region and part of the center of the African continent. The integration of Angosat-2 into the Integrated Data Use Plan of the IMS and IDC Products has the fundamental perspective of functioning as the main redundancy layer for the Global Communications Infrastructure (GCI). This integration will guarantee the constant permanence of the internet and the integrity of the data flow, mitigating failures in terrestrial infrastructures. By using its own space capabilities, Angola will not only meet the technical requirements for data availability of the Treaty, but will also strengthen its technological autonomy in the SADC region, ensuring that its commitment to disarmament is not affected by limitations in external connectivity. For a culture of disarmament to be effective, Angola has argued in various multilateral forums that technical proficiency should not be limited by language barriers. Since Portuguese is an official language and not a working language of the United Nations, equal treatment among Member States is a fundamental principle of the Treaty, and this principle should also be reflected in greater linguistic accessibility to the CTBTO tools. The objective is to prevent the technological gap from being exacerbated by a communication gap, allowing Portuguese-speaking experts to contribute on an equal footing to global verification.

Angola's Seismological Network and Technical Monitoring Infrastructure

The implementation of the CTBT in Angola, consolidated by the effective operationalization of the NDC-AO, represents a milestone in the scientific integration of the African continent into the global verification regime. This study demonstrates that, for developing countries, the success of the Treaty depends not only on technology transfer, but also on its appropriation and adaptation to local realities. The technical analysis of the national seismological network, composed of 7 seismological stations under the management of INAMET, revealed that Angola possesses the necessary basis for robust monitoring [2]. The seismic stations are installed in the municipalities of Dundo (Lunda Norte), Catepa (Malanje), Caxito (Bengo), Gabela (Cuanza Sul), Luena (Moxico), Caála (Huambo), and Lubango (Huila).



Estação	Província (Origem)	Lat	Lon
Dundo	Lunda Norte	-7.374	20.82
Catepa	Malanje	-9.535	16.567
Caxito	Bengo	-8.582	13.657
Gabela	Cuanza Sul	-10.851	14.376
Luena	Moxico	-11.791	19.89
Caála	Huambo	12.855	15.562
Lubango	Huíla	-14.917	13.492

Figure 1: Angola Seismic Monitoring Network

Angola's seismic network is currently undergoing modernization and expansion, with support from the Ministry of Telecommunications, Information Technologies and Social

Communication (MINTTICS). One of the main drivers of this growth is the Towards Seismic Hazard Assessment in Portuguese-speaking African Countries (TSHAPS) project, a multilateral initiative involving the Portuguese Foundation for Science and Technology (FCT) and the Aga Khan Foundation. This project has already enabled the installation of the Caála station, and plans are underway to integrate two more stations in Ganda (Benguela) and Chicomba (Huíla). This expansion aims to reach a total of 11 operational stations, significantly increasing the detection threshold for seismic events nationwide.

The TSHAPS project aims to:

- Promote risk assessment in Angola;
- Apply Earth Observation techniques, primarily satellite imagery and LiDAR data acquired by drones, to advance the identification and study of active structures;
- Conduct field investigations of seismic faults to improve seismic risk mitigation;

Conclusion

Ultimately, the Angolan model—which combines the rigor of classical seismology with cutting-edge aerospace technology and regional cooperation—serves as a paradigm for other Portuguese-speaking countries and developing nations. It thus proves that a commitment to a world free of nuclear tests is simultaneously a commitment to the advancement of science and global collective security, where technological and linguistic equity must be the foundation for a truly universal treaty.

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Declarations

Conflict of Interest: The author declares that there is no conflict of interest, whether financial or non-financial.

Ethics Statements: Consent to Participate

Consent to Publication: Not Applicable

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