

# Challenges of building a cost-effective, resilient and secure network in Today's world - Use case: The GCI IV

Roland Mfondoum  
Nay Htun Linn  
Rafis Saifulin

CTBTO, IDC Division, Operations Section, PO Box 1200, 1400 Vienna Austria



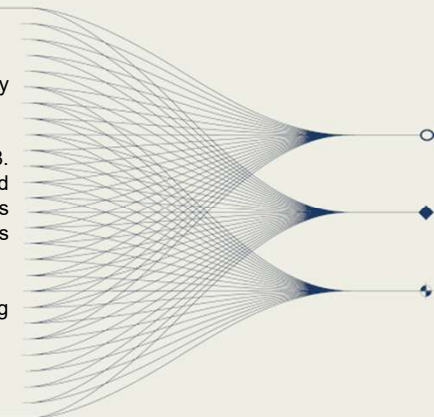
## ..... INTRODUCTION AND MAIN RESULTS

The Global Communications Infrastructure (GCI) is the backbone through which the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) fulfills its mandate to receive, distribute, and report data in support of Treaty verification [Article IV. Verification, Section A, Paragraph 14 (a)].

In several years of operations, the GCI network has evolved and is currently operating in its third generation, and is preparing to transition to the fourth by 2028. Spanning more than 600 links across 100+ countries, including the polar and Antarctic regions, the GCI demands significant effort and resources for operation and maintenance. The rapid emergence of technologies such as Low Earth Orbit satellites, artificial intelligence, and quantum computing/algorithms brings both opportunities for innovation and risks of disruption, contributing to the challenge of developing a coherent and modern architecture for GCI IV that responds with agility to the demands and needs.

To address this, a SWOT ((Strength, Weakness, Threat, Opportunity) analysis is presented, mapping the challenges to the risks and threats they create, while identifying opportunities to leverage innovation for the future GCI.

.....  
DISCLAIMER: The views and opinions expressed in this presentation are those of the authors and do not necessarily represent official policy or position the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO).



## GCI IV SWOT Analysis

Trade-offs: Achieving balance between affordability, availability, and security is the core challenge

### Learn - Together - Experience



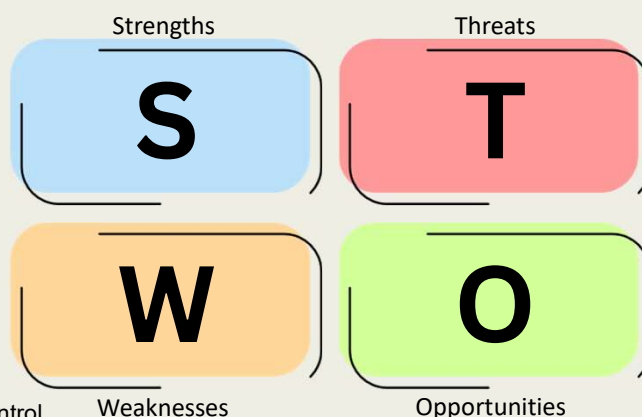
- We work together
- We Learn through Experience
- Our strong network of Points of Contacts

Building on close to 30 years of global network operations and lessons from GCI III, supported by local Points of Contact to navigate site-specific changes.

### External Factors beyond control

- External environmental risks beyond operational control (infrastructure at IMS stations, weather...)
- Regulatory and market limitations constraining technology adoption.
- Delays in adopting emerging technologies

Addressing site-specific and global challenges beyond PTS control through risk assessment and mitigation measures tailored to local conditions.



### Supply Chain - Economy - Security

- Global Regulatory Uncertainty possibly disruptive to the GCI Supply chain (Regulation, Import & Export restrictions, Technological limitations).
- Global Economic Strain posing a risk to contract cost (Inflation, Taxation, Budget).
- Growing cyber security threats (AI driven, Quantum computing and more).

### Leverage on emerging technologies

- LEO: Increased bandwidth with Low Earth Orbit Satellite
- AI: Adopt Artificial Intelligence to support GCI operations
- PQE: Adopt post-quantum encryption to future-proof security.
- Become energy efficient at IMS Station Sites (Reducing hardware footprint, consuming the bare minimum).
- Innovate by adopting Low hardware footprint solutions (GCI SoftVPN, SDWAN, Cloud)



Agility  
Tech. Foresight  
Balance



DISCLAIMER: The views and opinions expressed in this presentation are those of the authors and do not necessarily represent official policy or position the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO).