Massachusetts Institute of Technology

Model United Nations Conference

Background Guide

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Letter from the Secretary General

Dear Delegates,

I am very excited to welcome you to Massachusetts Institute of Technology's 17th annual Model United Nations Conference - MITMUNC XVII! After months of planning, training and organizing, we hope this conference will be a new, challenging, and enriching experience for you.

With all the difficulties the world has experienced last year and is currently still experiencing, we still look forward to a brighter future. Building a sustainable future requires a lot of collaboration and effort and we are all hopeful to see that from you, the leaders of tomorrow.

This year, we decided to focus on technology and its impact on our societies and the whole world to test the pros and cons of technological advancement. Tech diplomacy is an important theme that defines MITMUNC XVII, especially with the prevalence of Artificial Intelligence. Technological advancements have paved the way for great and helpful solutions, yet they also opened up space for tech-abuse, which really makes us think, where are we heading? What's next?

Dialogue, international relations and collaborations create the backbone of tech diplomacy and we are all looking forward to see your creativity spark during the conference to help implement tech diplomacy around the world, and fight technology-abuse that harms the international community.

Having experienced MITMUNC as a chair, then as a Secretary General, I am humbled and thrilled to guide MITMUNC into its best conference yet. Do not hesitate in contacting me or the secretariat team should you encounter any doubts along the way. I wish you the best of luck!

Sincerely,

Your Secretary General: Jad Abou Ali

For further inquiries, do not hesitate to contact us at sg-mitmunc@mit.edu.

MITMUNC XVII 2025

Letter from the Chairs

Dear Delegates,

Welcome to MITMUNC XVII! We are very excited to be your chairs for the Crisis Committee at MITMUNC and to meet all of you. We can't wait to hear all about the ideas that you come up with in our committee this February.

The realm of telecommunication has become an essential component of our interconnected world, influencing everything from daily life to global security. This committee will focus on the complexities and challenges that arise in the wake of crises like the Great Outage of 2055 and beyond. Given the advanced nature of this committee, we anticipate rigorous, well-researched debates and creative solutions from all of you.

Within this guide, you will find a wealth of preliminary information to help you understand the historical context and current landscape of global telecommunications. We expect you to use this as a foundation to explore your delegation's positions and develop comprehensive strategies to address the issues at hand.

We look forward to learning from your perspectives as much as we hope you will learn from this experience.

Happy researching, and see you in February!

Sincerely,

Your Chairs: Jeff Zhu and Eduardo Hernandez

For further inquiries, do not hesitate to contact us at jeffzhu@mit.edu.

MITMUNC XVII 2025

Committee Introduction

The Crisis Committee of Global Telecommunication Operations is a specialized United Nations body formed to address and manage urgent global issues that require immediate and coordinated international action. Established in response to the Great Outage of 2055, the committee's mission is to mitigate the impact of the crisis and restore stability through swift diplomatic negotiations and strategic interventions.

In 2055, following the Great Outage, it became apparent that traditional channels of international diplomacy were insufficient in managing the complexities of rapidly escalating global crises. The Great Outage caused widespread unrest as citizens of the world were unable to access the internet and daily tasks became arduous, or at other times, were simply unable to be completed. Factories used to manufacture goods went to a complete standstill. Countries were unable to communicate important information to civilians. Thus, the Crisis Committee was created to provide a platform for real-time collaboration among member states, fostering innovative solutions to multifaceted problems.

The committee's inaugural session focused on the Great Outage, setting a precedent for its role in subsequent global emergencies. Over the years, the committee has expanded its purview to address issues ranging from cyber-attacks on critical infrastructure and satellite disruptions to large-scale data breaches and the regulation of artificial intelligence in telecommunications, demonstrating its adaptability and critical importance in the UN framework.

Today, the Crisis Committee continues to be a pivotal forum for addressing the world's most pressing challenges, employing both diplomatic negotiation and direct intervention to achieve its objectives. As we convene to tackle the current crisis of global telecommunication security in the face of emerging threats, the committee’s commitment to swift, decisive action and international cooperation remain its guiding principle.

Topic: Navigational Blackout, The Global GNSS Crisis

I. Introduction

The Global Navigation Satellite System (GNSS) is an essential component of modern global infrastructure, underpinning critical services such as transportation, banking, military operations, and emergency response. Systems like the United States' GPS, the European Union's Galileo, Russia's GLONASS, and China's BeiDou provide the backbone for navigation and timing services worldwide. However, the world faces a potential crisis: the disruption of a GNSS due to a suspected cyberattack, technical failure, or sabotage.

Such a scenario would lead to widespread chaos, crippling essential operations ranging from aviation and shipping to financial transactions and disaster response. The consequences would be especially dire for nations heavily reliant on GNSS for economic and societal functions. Meanwhile, geopolitical tensions would escalate as countries accuse one another of negligence or malice, threatening international stability.

This crisis calls for immediate and coordinated international action to restore GNSS services, investigate the cause of the disruption, and strengthen the resilience of satellite navigation systems. The committee will grapple with challenging questions surrounding cybersecurity, international trust, space governance, and the development of redundant systems to prevent future catastrophes. Delegates must address these issues with a focus on equitable solutions, technological innovation, and global cooperation to ensure that GNSS systems remain secure and reliable for all nations.

The Global Satellite Navigation Crisis serves as a wake-up call to reevaluate the fragility of critical global infrastructure and the necessity of fostering unity in the face of shared vulnerabilities.

II. History

Global Navigation Satellite Systems (GNSS) trace their origins to military innovation during the Cold War. The United States' Global Positioning System (GPS) was developed in the 1970s as a strategic tool for enhancing military precision in navigation, targeting, and communication. Its ability to provide accurate, real-time positioning revolutionized warfare, enabling the effective deployment of troops, precision-guided munitions, and synchronized operations across vast distances.

The Soviet Union soon followed with the development of GLONASS in the 1980s, underscoring the role of satellite navigation in maintaining strategic parity. These systems were initially restricted to military use, providing nations with critical advantages in reconnaissance, missile guidance, and secure communication. For example, during the Gulf War in the early 1990s, GPS demonstrated its transformative impact on modern warfare, allowing coalition forces to navigate challenging terrain and conduct precision airstrikes with unprecedented accuracy.

Despite its military origins, GNSS quickly found applications beyond the battlefield. Recognizing the potential for civilian and commercial benefits, the U.S. government made GPS available for public use in the 1980s. This decision marked a turning point, catalyzing a global expansion of satellite navigation technology.

Today, GNSS underpins a vast array of civilian and commercial applications. From enabling real-time navigation in smartphones and vehicles to facilitating global shipping, aviation, and disaster response, satellite navigation has become an integral part of daily life. Financial systems rely on GNSS for precise time synchronization, ensuring the smooth operation of banking and stock markets. In agriculture, it supports precision farming, improving crop yields and resource efficiency.

The transition from exclusive military reliance to widespread civilian adoption has also led to the emergence of additional GNSS providers, including Europe's Galileo and China's BeiDou systems. This diversification reflects the increasing global reliance on satellite navigation, with over 6 billion GNSS-enabled devices in use worldwide by 2020.

However, this growing dependency has exposed critical vulnerabilities. The very infrastructure that enables modern conveniences and economic activity remains susceptible to cyberattacks, technical failures, and geopolitical tensions. The dual-use nature of GNSS—supporting both military and civilian functions—amplifies these risks, as any disruption could have cascading effects across sectors and nations.

This evolution from a military innovation to a global necessity highlights both the transformative power and the fragility of GNSS. The current crisis underscores the need for international collaboration to protect and sustain this vital infrastructure, ensuring its resilience for both strategic and civilian purposes.

III. International Actions

A. Cybersecurity Measures

In response to the increasing threat of cyberattacks on GNSS systems, the international community has taken several steps to enhance cybersecurity. One major initiative is the formation of a global task force under the International Telecommunication Union (ITU) to develop and implement cybersecurity protocols specifically for satellite navigation systems. This task force collaborates with cybersecurity experts, governments, and private sectors to ensure that GNSS infrastructures are protected against potential cyber threats.

Another significant action includes the United Nations' endorsement of the "Space Cybersecurity Accord", a non-binding agreement that encourages member states to adopt best practices for securing their space assets. The accord emphasizes the importance of transparency, information sharing, and joint exercises to prepare for and respond to cyber incidents.

B. Redundancy and Diversification

Recognizing the vulnerability of relying on a single GNSS, countries have begun investing in redundant systems and diversifying their navigation infrastructure. The European Union's Galileo, China's BeiDou, and India's NavIC systems have been expanded and integrated into global networks to reduce dependency on any single provider.

Moreover, regional collaborations, such as the Asia-Pacific Space Cooperation Organization (APSCO), have emerged to foster the development of localized GNSS augmentation systems. These efforts aim to ensure that even if one GNSS is compromised, alternative systems can provide continuity of service.

IV. Countries' Positions

A. United States

The United States operates the GPS system, which is the most widely used GNSS worldwide. GPS underpins global transportation, financial systems, and military operations. It was the first GNSS to be fully operational and has been integrated into billions of devices globally.

B. Germany (European Union)

Germany represents the European Union's Galileo system, which provides civilian GNSS services. Galileo is designed to offer high-precision positioning independent of other systems like GPS. It is vital for Europe's economy, including transportation, agriculture, and disaster response.

C. Russia

Russia operates the GLONASS system, which is crucial for its military, aviation, and national infrastructure. GLONASS is one of the four fully operational GNSS systems globally. It is used extensively in Russia and neighboring countries for both civilian and military applications.

D. China

China operates the BeiDou Navigation Satellite System (BDS), which became fully operational in 2020. BeiDou supports over 100 countries, particularly in Asia and Africa, for services like agriculture, transportation, and disaster relief. China has invested heavily in BeiDou as part of its Belt and Road Initiative.

E. India

India operates the NavIC (Navigation with Indian Constellation) system, a regional GNSS providing coverage over India and the surrounding region. NavIC is used in agriculture, transportation, and disaster management. It is integrated into many domestic industries and increasingly into smartphones.

F. Japan

Japan operates the Quasi-Zenith Satellite System (QZSS), a regional GNSS designed to enhance GPS accuracy over the Asia-Pacific region. QZSS is critical for Japan's high-precision applications, including autonomous vehicles and disaster response systems.

G. Brazil

Brazil relies on GNSS, especially GPS, for agriculture, which accounts for a significant portion of its GDP. GNSS is also crucial for its transportation and trade infrastructure. Brazil is involved in space cooperation with international partners but does not have its own GNSS system.

H. Australia

Australia depends on GNSS for transportation, agriculture, and mining industries, which form major parts of its economy. Remote regions rely on satellite-based systems for connectivity and infrastructure management. Australia is working on improving GNSS reliability through its national SBAS (Satellite-Based Augmentation System).

I. South Korea

South Korea uses GNSS, primarily GPS, for its advanced technology industries, logistics, and defense. It is also developing its own regional navigation system, the Korean Positioning System (KPS), expected to be operational by the 2030s.

J. Canada

Canada relies heavily on GNSS for agriculture, transportation, and Arctic navigation. It uses GNSS for monitoring climate change and managing natural resources. The country is an active participant in space research and innovation but does not operate its own GNSS.

K. United Kingdom

The UK relies on GPS for navigation but lost access to EU's Galileo after Brexit. It is considering building its own GNSS system, UK GNSS, but the project is still in exploratory stages. GNSS plays a vital role in its transportation and financial systems.

L. Saudi Arabia

Saudi Arabia uses GNSS for oil logistics, transportation, and the management of the Hajj pilgrimage. It is a key user of GPS and has also invested in space exploration and satellite technology as part of Vision 2030.

M. Turkey

Turkey depends on GNSS, mainly GPS and Galileo, for aviation, transportation, and military operations. It is developing its space sector and launched its first indigenous observation satellite, Göktürk-1, in 2016.

N. Mexico

Mexico relies on GNSS for agriculture, disaster management, and transportation. It uses GPS for most of its satellite navigation needs. GNSS disruption would significantly impact its trade and public safety systems.

O. Ukraine

Ukraine uses GNSS for military, transportation, and agriculture. GPS is critical for its defense operations, especially during the ongoing conflict with Russia. It has also been involved in satellite technology development with international partners.

P. South Africa

South Africa uses GNSS for transportation, agriculture, and telecommunications. It is a leading African nation in space technology and hosts the South African National Space Agency (SANSA), which works on space science and technology initiatives.

Q. Israel

Israel uses GNSS for its defense and technology sectors. It is a leader in cybersecurity and satellite technology, with a focus on securing space assets. GNSS disruption would affect its military operations and advanced industries.

R. Pakistan

Pakistan uses GNSS for agriculture, aviation, and disaster response. It relies on GPS for navigation and positioning and is part of China's BeiDou network through its economic partnership in the China-Pakistan Economic Corridor (CPEC).

S. United Arab Emirates

The UAE uses GNSS for commerce, transportation, and infrastructure management. It has rapidly developed its space program and launched the Hope Mars Mission in 2020. GNSS disruption would impact its logistics and trade routes.

T. Argentina

Argentina relies on GNSS for agriculture, which is a cornerstone of its economy, as well as for transportation and trade. It has participated in space-related research and international cooperation, including partnerships to improve satellite technology in South America.

U. Nigeria

Nigeria relies on GNSS for agriculture, trade, and telecommunications. It is an emerging leader in Africa's space technology sector, with the Nigerian Space Research and Development Agency (NASRDA) working on satellite initiatives.

V. Indonesia

Indonesia uses GNSS for maritime navigation, disaster management, and infrastructure development. Its reliance on GNSS is crucial for managing its vast archipelago and responding to frequent natural disasters.

V. Projections and Implications

A. Economic Impacts

The disruption of GNSS systems has far-reaching economic implications. Industries such as aviation, shipping, agriculture, and telecommunications rely heavily on accurate positioning and timing data. A prolonged outage could result in significant economic losses due to halted operations, delayed deliveries, and compromised services.

Economic projections suggest that a major GNSS failure could cause global losses amounting to billions of dollars per day. To mitigate these risks, countries are investing in backup systems and exploring alternative technologies, such as terrestrial-based navigation systems and low-Earth orbit satellite constellations, to provide resilience against GNSS disruptions.

B. Geopolitical Tensions

The GNSS crisis is likely to exacerbate geopolitical tensions as countries may accuse one another of intentional sabotage or negligence. The lack of a clear international framework for attributing responsibility in space-related incidents can lead to increased mistrust among nations.

To address this, diplomatic efforts are underway to establish a "Space Incident Attribution Protocol", which would provide guidelines for investigating and attributing responsibility for space-based disruptions. This protocol aims to reduce the likelihood of conflict by fostering cooperation and ensuring accountability in the use of space assets.

VI. Conclusion

The Global Satellite Navigation Crisis highlights the indispensable role of GNSS in modern society and the vulnerabilities that accompany our reliance on such systems. The disruption of navigation satellites has created widespread economic, security, and technological challenges, demonstrating the need for swift, coordinated action among nations. It calls for strengthening cybersecurity measures, establishing redundancy through regional or alternative systems, and fostering equitable access to satellite services. Additionally, nations must evaluate existing frameworks, such as the Outer Space Treaty, to ensure they adequately address emerging threats like cyberattacks and space debris. As delegates prepare to engage in this crisis, they are encouraged to explore innovative solutions that balance national priorities with global needs.

VII. Questions to be Addressed

- How should countries collaborate to restore GNSS functionality without compromising their national security?
- How can nations safeguard GNSS systems from future cyberattacks?
- What protocols should be established for attributing responsibility in the event of cyberattacks on satellite infrastructure?
- Should nations develop regional or decentralized GNSS systems to reduce reliance on global providers?
- How can developing countries ensure equitable access to navigation systems during and after the crisis?
- What contingency plans should be developed to prevent similar disruptions in the future?

VIII. Bibliography

1. GPS.gov

"The Global Positioning System." U.S. Government. Accessed January 2025.
https://www.gps.gov

2. European Space Agency

"Galileo Overview." European Space Agency. Accessed January 2025.
https://www.esa.int/Applications/Navigation/Galileo_overview

3. China Satellite Navigation Office

"BeiDou Navigation Satellite System (BDS)." Accessed January 2025.
http://www.beidou.gov.cn

4. Russian Federal Space Agency (Roscosmos)

"GLONASS Information Center." Accessed January 2025.
https://www.glonass-iac.ru/en/

5. United Nations Office for Outer Space Affairs (UNOOSA)

"Outer Space Treaty (1967)." Accessed January 2025.
https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html

6. European GNSS Agency (GSA)

"Economic Benefits of GNSS Applications." Accessed January 2025.
https://www.gsa.europa.eu

7. NASA Orbital Debris Program Office

"Space Debris Risks and Kessler Syndrome." National Aeronautics and Space Administration. Accessed January 2025.
https://orbitaldebris.jsc.nasa.gov

8. Secure World Foundation

"The Impact of Satellite Failures on Global Systems." Accessed January 2025.
https://swfound.org

9. International Telecommunication Union (ITU)

"Emerging GNSS Technologies and Applications." Accessed January 2025.
https://www.itu.int

10. RAND Corporation

"GNSS Dependency and Risks: A Global Perspective." Accessed January 2025.
https://www.rand.org