

# GNSS APPLICATION IN NEPAL

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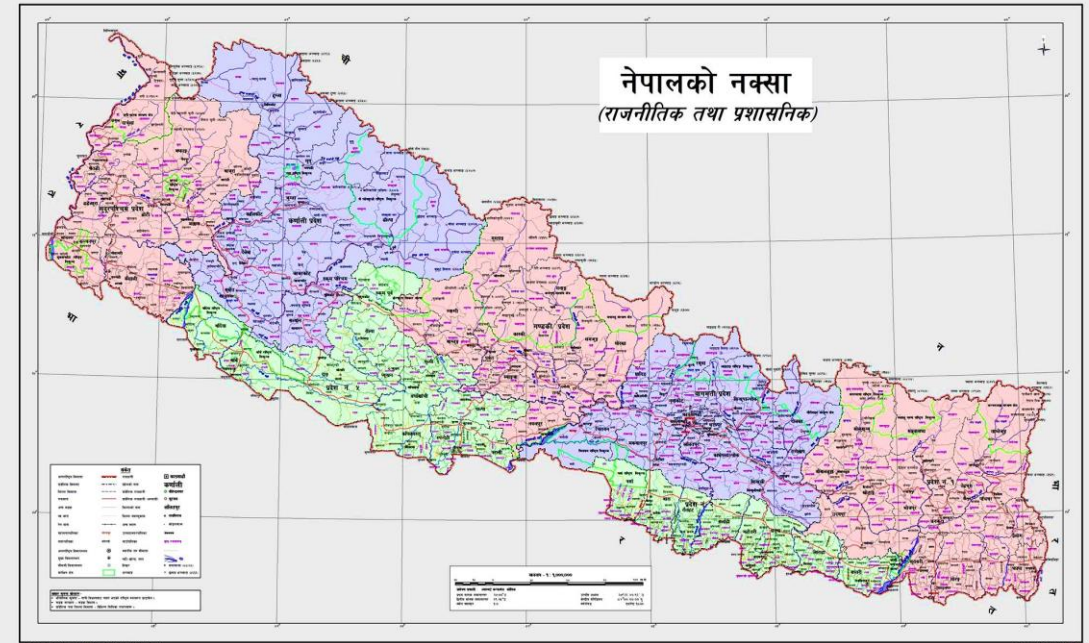
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# INTRODUCTION TO GNSS APPLICATION IN NEPAL

## Introduction, Nepal, GNSS, Application, Importance

- **Introduction:** Welcome to the presentation on the application of Global Navigation Satellite System (GNSS) technology in Nepal. This presentation will explore the significance and impact of GNSS in various sectors of Nepal's economy and society.
- **Nepal:** Nepal, a landlocked country nestled between India and China in South Asia, is known for its diverse landscapes that include high mountains, forests, and plains. The country is home to the world's highest peak, Mount Everest, attracting thousands of tourists each year.
- **GNSS:** GNSS technology encompasses a network of satellites that provide geospatial positioning and navigation services globally. In the context of Nepal, GNSS plays a crucial role in addressing the unique challenges in the country and improving various aspects of infrastructure and services.



# IMPORTANCE OF GNSS IN NEPAL

## Significance of GNSS Technology in Nepal

- **Surveying & Infrastructure:** GNSS enhances surveying for infrastructure in Nepal, aiding road, bridge, & hydropower projects with precise positioning data, facilitating efficient development.
- **Environmental Monitoring:** GNSS supports Nepal's environmental initiatives by tracking land-use changes, aiding biodiversity mapping, and facilitating sustainable resource management for conservation efforts.
- **Socio-Economic Development:** GNSS drives Nepal's socio-economic growth by improving service access, enabling e-commerce, supporting urban planning, and bridging the digital divide in remote areas for enhanced connectivity and empowerment.



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# IMPORTANCE OF GNSS IN NEPAL

## Significance of GNSS Technology in Nepal

- **Navigation and Transportation:** In a country with many challenges like Nepal, GNSS technology plays a crucial role in improving navigation for both land and air transportation. It enhances route planning, efficiency, and safety, especially vital for the tourism industry accessing remote areas and trekking routes.
- **Disaster Management:** GNSS technology provides real-time monitoring of ground movements, early detection of seismic activities, and coordination of emergency response efforts in disaster-prone Nepal. It supports earthquake preparedness, facilitates search and rescue operations, and aids in assessing post-disaster damage.
- **Agriculture:** Nepal's agriculture sector can benefit from GNSS technology for precision farming solutions such as soil mapping, crop monitoring, and yield optimization. By optimizing resource use and promoting sustainable practices, GNSS contributes to increased productivity and efficiency in agriculture.



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# CURRENT STATUS OF GNSS APPLICATION IN NEPAL

- Navigation:** GNSS technology is extensively used for navigation purposes in Nepal, especially in the transportation sector. It enhances route planning, vehicle tracking, and navigation for both land and air transportation, improving efficiency and safety.

- Surveying and Mapping:** The Geodetic Survey Division under the Survey Department of Nepal has been utilizing GPS technology since 1991 for land survey activities. GNSS technology is primarily employed for surveying and delineating international boundaries, establishing geodetic controls, and supporting infrastructure development projects.

- GNSS technology was also used to re-measure the height of Mount Everest in 2020. GNSS survey was conducted for 1 hour and 16 minutes on top of the world



Photo of Mount Everest

# CURRENT STATUS OF GNSS APPLICATION IN NEPAL

- Border control management e.g. Nepal has planned to equip the border boundary pillars along Indo-Nepal border to be equipped with positioning system using Nepal-India Boundary Global Navigation Satellite System (NIB GNSS).
- Government of Nepal and India had an initial level discussion on equipping all the border pillars with positioning system using GNSS technology, in order to allow the effective management of the boundary.
- Nepal-India Boundary Global Navigation Satellite System (NIB GNSS) would be used for Nepal-India boundary pillars.

# CURRENT STATUS OF GNSS APPLICATION IN NEPAL

- **Disaster Management:** We are trying to implement GNSS technology which can play a vital role in disaster management initiatives in Nepal, in order to get real-time positioning data for Early Warning Systems (EWS), disaster monitoring, and emergency response coordination, facilitating effective disaster preparedness and response efforts.
- We would like to request GNSS Service providers to allocate some band width to transmit EWS message for Nepal.
- Giving information about disasters in a locality
- Increasing public participation on information about disaster and support for open and collaborative government.



# CURRENT STATUS OF GNSS APPLICATION IN NEPAL

- **Infrastructure Development:** GNSS technology enhances surveying and mapping activities necessary for infrastructure projects in Nepal. Accurate positioning data enables precise land surveys, boundary delineation, and construction planning, promoting efficient and sustainable infrastructure development.
- **Environmental Monitoring and Resource Management:** GNSS technology supports environmental initiatives in Nepal by tracking land-use changes, monitoring biodiversity, and managing natural resources effectively. It aids in sustainable resource utilization and conservation efforts through precise data collection and analysis. Research are being conducted at academic level to gain carbon neutrality.
- **Socio-Economic Development:** The potential of GNSS technology to drive socio-economic development in Nepal is significant. It improves access to services, enables e-commerce and logistics, supports urban planning, and enhances connectivity in remote areas. GNSS bridges the digital divide and empowers communities with information and services.

# CURRENT STATUS OF GNSS APPLICATION IN NEPAL

- **Air Route Planning** e.g. Nepal completed WGS-84 (World Geodetic System-84) survey of the runway thresholds, critical positions of runway and navigation aids of TIA and all domestic airports in operation in 1999 and re-verification in 2010.
- **Agriculture** The agricultural sector in Nepal benefits from GNSS technology for precision farming applications, including soil mapping, crop monitoring, and yield optimization. GNSS enables efficient resource management in agriculture, leading to increased productivity and sustainability.
- **Capacity Building and Awareness:** Efforts to build capacity and awareness about GNSS technology in Nepal are ongoing, with training programs, workshops, and educational initiatives targeting government agencies, academia, and industry stakeholders. GNSS technology awareness and skill development are crucial for its effective utilization in various sectors.



# COLLABORATION OPPORTUNITIES WITH UNOOSA FOR GNSS IN NEPAL

## Enhancing Partnerships and Initiatives with UNOOSA for GNSS Development

- Collaboration with UNOOSA crucial for Nepal's GNSS utilization.
- UNOOSA provides technical aid, knowledge sharing, funding, and policy backing, aiding effective GNSS use for socio-economic development. For instance, post-2015 earthquake, UNOOSA supported disaster response by making satellite resources openly available.
- Hope to have more engagements and collaboration with UNOOSA in the future



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# CHALLENGES FACED IN GNSS IMPLEMENTATION IN NEPAL

## Obstacles and Hurdles in GNSS Technology Adoption in Nepal

- **Infrastructure and Connectivity:** Limited access to reliable power supply and internet connectivity in remote areas hampers the deployment and operation of GNSS infrastructure and applications. Inadequate infrastructure and connectivity constraints affect the reach and effectiveness of GNSS technology in various sectors in Nepal.
- **Technical Capacity:** The shortage of skilled professionals with expertise in GNSS technology, data processing, and application development poses a challenge to the adoption and utilization of GNSS solutions across different sectors in Nepal. Enhancing technical capacity and skills development is crucial for maximizing the benefits of GNSS technology.



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# CHALLENGES FACED IN GNSS IMPLEMENTATION IN NEPAL

## Obstacles and Hurdles in GNSS Technology Adoption in Nepal

- **Policy and Regulatory Framework:** We need more clear policies, regulations, and standards governing the use of GNSS technology in Nepal. Otherwise, it creates challenges for its integration into national development plans, infrastructure projects, and disaster management strategies. Establishing a conducive policy framework is essential for the effective implementation of GNSS technology.
- **Investment:** Government needs to invest more in GNSS infrastructure, research, and development. Otherwise, it impedes the expansion and enhancement of GNSS capabilities in Nepal. Insufficient financial resources constrain the potential of GNSS technology to address socio-economic challenges and promote sustainable development in the country.



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# FUTURE PROSPECTS FOR GNSS TECHNOLOGY IN NEPAL

## Exploring Opportunities and Innovations in GNSS Technology

- **Expansion of Infrastructure:** Future developments in GNSS technology in Nepal include expanding the infrastructure to improve signal coverage and accuracy, particularly in challenging terrains. Enhancing infrastructure capabilities can lead to more reliable and efficient positioning data for diverse applications.
- **Integration with Emerging Technologies:** The integration of GNSS technology with emerging technologies like IoT (Internet of Things) and AI (Artificial Intelligence) offers opportunities for innovative applications and solutions in various sectors. Combining GNSS with advanced technologies can enhance efficiency, automation, and data analytics capabilities.
- **Innovation in Application Development:** Fostering innovation in GNSS application development can lead to the creation of tailored solutions for specific challenges in Nepal. Customized applications for agriculture, disaster management, transportation, and infrastructure development can optimize the use of GNSS technology for targeted impact and benefits.



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# CONCLUSION AND RECOMMENDATIONS FOR GNSS IN NEPAL

- **Transformative Potential of GNSS:** The transformative potential of GNSS technology in Nepal is vast, offering significant benefits across multiple sectors from navigation to disaster management, agriculture, infrastructure development, and socio-economic advancement.
- **Collaboration and Investment:** Successful realization of the benefits of GNSS in Nepal requires ongoing collaboration and investment from government agencies, private sector stakeholders, academia, and international organizations to strengthen infrastructure, build capacity, and foster innovation in application development.
- **Sustainability and Resilience:** By leveraging GNSS technology effectively and addressing the current challenges, Nepal can enhance its sustainability and resilience to disasters and socio-economic changes, ensuring long-term prosperity and growth for its citizens.



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# RECOMMENDATIONS FOR GNSS IMPLEMENTATION IN NEPAL

- **Improving Infrastructure and Connectivity:** Enhancing access to reliable power supply and internet connectivity in remote areas is essential to facilitate the deployment and operation of GNSS infrastructure, expanding its reach and effectiveness across all regions of Nepal.
- **Building Technical Capacity:** Investing in training programs and educational initiatives to develop skilled professionals with expertise in GNSS technology, data processing, and application development is crucial to drive the successful adoption and utilization of GNSS-enabled solutions in Nepal.



Photo by Mohan Khadka on Unsplash



# RECOMMENDATIONS FOR GNSS IMPLEMENTATION IN NEPAL

- **Developing Policy Framework:** Establishing clear policies, regulations, and standards governing the use of GNSS technology in Nepal is essential to integrate it into national development plans, infrastructure projects, disaster management strategies, and ensure its sustainable and effective deployment.
- **Enhancing Investment:** Increasing investment in GNSS infrastructure, research, and development is necessary to expand and enhance the capabilities of GNSS technology in Nepal, enabling it to address socio-economic challenges and promote sustainable development effectively.

THANK YOU