

# Potential Use of GNSS Application in Mountainous Country Nepal

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# Outline

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- **General Trends In Geomatics Knowledge Generation**
- **Issues to improve the status of GNSS Education in Nepal**
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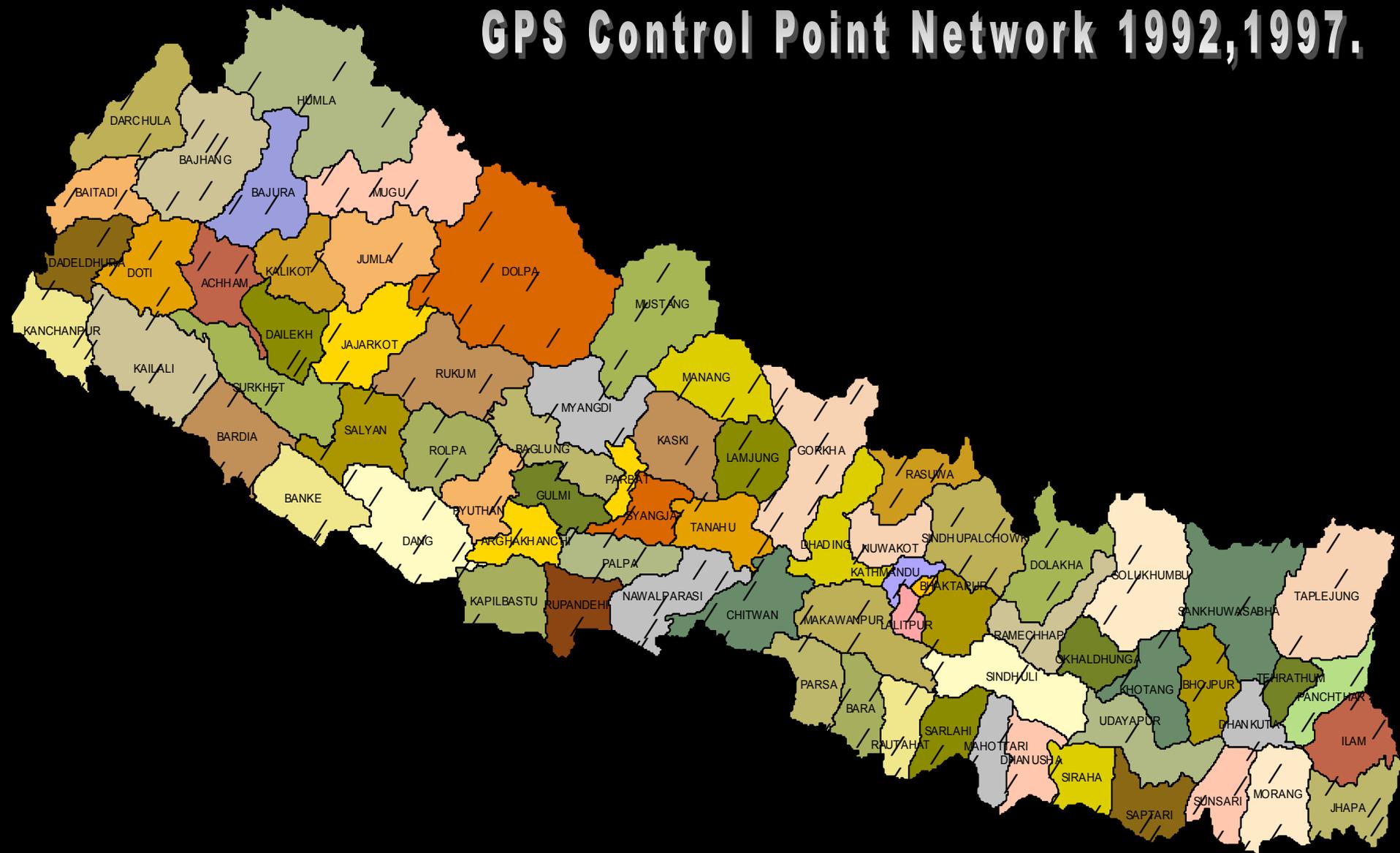
# Introduction

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- ▶ Geodetic activities was started in Nepal in 1970.
- ▶ For the first time, Topographical Survey Branch of Survey Department bought a pair of WMI02 GPS receivers and used in Nepal-India boundary survey in 1988.
- ▶ Lumbini Zone Topographic Mapping Project, funded by Government of Japan, Trimble receivers were used for the topographical mapping works in 1988.
- ▶ During 1992-95 Eastern and Western Nepal Topographic Mapping Project, funded by Finland Government, also contributed to GPS receiver handling training with Ashtech receivers.



# GPS Control Point Network 1992,1997.



## Cont....

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- ▶ The collaborative project of the University of Colorado and Massachusetts Institute of Technology (USA) brought Trimble and Ashtech receivers and set up new GPS stations at 29 different locations covering Nepal. They captured satellite data from those stations in 1991. In 1996 the University again tracked continuous data from those stations for few days for crustal movement studies.

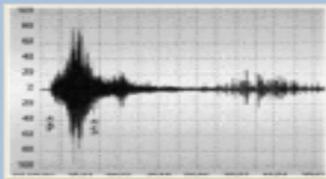


# Global Navigation Satellite System( GNSS) and its Application in Nepal

- Nepal has limited work on the GNSS
- Capacity building is essential in this field



Meteorological Applications



Earthquake Monitoring



Offshore & Inland Water Transport Control System



Marine Search & Rescue



Offshore Tide Data Transmission



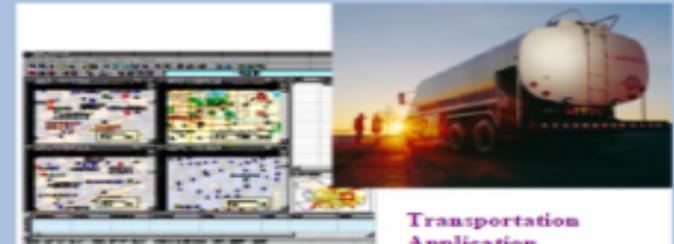
Land Survey Mapping



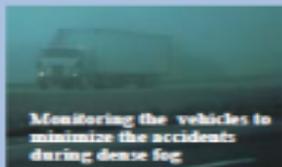
GNSS in optimizing crop cultivation



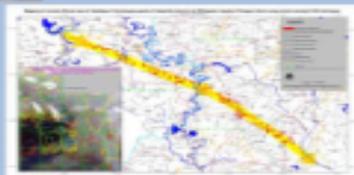
GNSS in rescue operation during disasters



Transportation Application



Monitoring the vehicles to minimize the accident during dense fog



Car Navigation



Aircraft Positioning and Navigation

# Applications

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- ▶ *The following areas need the precise location of primary data*
  - Military.
  - Search and rescue.
  - Surveying.
  - Tourism
  - Forestry
  - Satellite positioning and tracking.
  - Geographic Information Systems (GIS).
  - Recreation etc.



# GNSS Education Status in Nepal

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- ▶ GNSS education and training is lacking behind in Nepal. Since the emergence of GPS in the middle 1980's and lately GNSS, there has been a shortage of skills in its use at several levels.
- ▶ Recently few Universities and government's institutions and agencies taking the lead in GNSS Education.
- ▶ Few private industries such as GNSS vendors are also running specialized short courses, specifically hardware and software specific. Those courses come from utility companies, the military and non-governmental organizations.
- ▶ And there seem to be very few (about hundreds) of different GNSS and related textbooks from abroad at local book stall.
- ▶ Use of GNSS with little knowledge is leading to serious threat of data quality and accuracy.



# GNSS Education Programs In Nepal

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- ▶ In Nepal, GNSS education started in Geography and Civil Engineering Curricula, but limited scope.
- ▶ Only basics and principle is taught. No practical.
- ▶ GNSS education and training programs appears under Geomatics field of study.
- ▶ Geomatic study primarily entered university curricula in the 2007s at the (Private university )Kathmandu University which commenced its B.E. program in Geomatics.
- ▶ GNSS education and training programs in Nepal can be grouped into formal education programs, short-courses and other programs.



# Formal GNSS Education Programs

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- ▶ Kathmandu University (KU), in collaboration with Land Management Training Centre (LMTC), is taught courses in GNSS with 24 students. Bachelors in Geomatics Engineering contain subjects such as GPS, Geodesy, GPS Applications in Surveying and GIS since 2007 .
- ▶ Western Regional Campus under Trivubhan University (Government University ) started course in it's Bachelor of Gematics with 48 students since 2011.
- ▶ Center for Geomatics and space science research is going to initiate GNSS application research and initiative for master courses in pashchimanchal campus , Institute of Engineering Tribhuvan university in coming year 2015.



# Short-Courses

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- ▶ Land Management Training Centre offers courses in GNSS and related topics in its one year long Senior and Junior Survey Training as a part of in-house HRD programs. These courses are mainly focused on field Surveys.
- ▶ Land Management Training Centre also offers specific short training courses in GNSS specially to Survey Department personnel. The training course is aimed at imparting the participants with knowledge about GPS/DGPS/GNSS, its working principles and modern day applications.
- ▶ More importantly, it covers the practical aspects of the technology from user's point of view. In addition, it provides information about GPS data collection in the field, and suggests data filtering techniques and ways to avoid data corruption.



# Other GNSS Education Programs

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- ▶ Local institutions also organize seminars and meetings on Space technology, GNSS and related field.
- ▶ The other parties that offers short-courses, which on the other hand focuses on instrumentations – hardware and software – are GNSS related vendors.
- ▶ Non Government Organizations such as Open Street Mapping Nepal and ICIMOD provide training to their staff about the use of GNSS



# General Trends In Geomatics Knowledge Generation

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- ▶ In this era of the so-called GNSS era, it is well known fact that the innovative activity which, is the primary source of knowledge generation, concentrated only in a number of developed nations. Within these developed nations, these activities are only concentrated and dominated by only a small number of corporations.
- ▶ In developing nations, the primary mode of promoting technology advances is through technology acquisition. However, in this new era of economy, the focus hold direct towards on innovation and the creation of new technology and higher value-added activities by increasing basic and applied research.



# Issues to improve the status of GNSS Education in Nepal

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- ▶ Universities should focus on research, seminars and workshop related to GNSS.
- ▶ Training for Trainers
- ▶ Academic and Training institute should conduct survey camps which should focus not only in data acquisition but also in data processing
- ▶ GNSS topics should be introduced to student project.
- ▶ Collaboration between national and international organizations
- ▶ Continues leading academic and research activities is needed in this field instated of project oriented work



# CONCLUSIONS

- ▶ Capacity building is one of the weakest components in the development and application of GNSS technology in Nepal in GPS Data Processing and Network Adjustment.
- ▶ Implementation the new teaching curricula and training trainers is needed.
- ▶ The regional cooperation would give valuable results in solving many of the emerging tasks by using the existing GNSS networks, international cooperation and good practices.
- ▶ Developing of the common South Asian geodetic datum and interoperable reference networks, NSDI and open data sharing would benefit the society from the GNSS technology.



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Attention !!**

