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**The content and the ideas of the articles are solely of authors.**

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**Nepalese Journal**  
**on**  
**GEOINFORMATICS**

Jesth 2076, May 2019  
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**Product Price**

**Maps**

Page 14

**Control Points**

Page 14

**Price of Aerial Photograph**

Page 50

**Land Use Digital Data Layers**

Page 50

**Digital Orthophoto Image Data**

Page 50

**Digital Topographical Data**

Page 50

**Obituary**

Page 42

**Cover Page**

*Activities conducted during  
Everst Height Measurement  
Programme (2018-19).*

**Features**

Articles

1

**Remote Sensing of Nepal's  
Forests and Trees:Ascertaining  
the Front Line of Human-Induced  
Tree Cover Changey**

*Prof. Amulya R Tuladhar*

Page 1

2

**Application of Geographic  
Information Infrastructure: In  
the context of restructuring the  
country**

*By Er. Jyoti Dhakal*

Page 15

3

**Address System in Korea**

*By Byungyong Kwak, Susheel Dangol*

Page 21

4

**Image Fusion Technique:  
Algorithm to Application**

*Prakash Ghimire & Dr. Lei Deng*

Page 27

5

**Gravity for Geodetic Purpose:  
Geoid-Ellipsoid Separation and  
Orthometric Height System**

*Shanker KC*

Page 35

**Contents**

## Contents

**Nepal Geomatics  
Engineering Society  
(NGES)**  
Page 71

Professional  
Organization  
Pages  
**Nepal Surveyor's  
Association (NESA)**  
Page 72

**Nepal Remote  
Sensing and  
Photogrammetric  
Society**  
Page 73

Regular  
Column  
**Editorial**  
Page vi

**Forewords**  
Page ix

Diamond  
Jubilee Special  
**Messages**  
Page vii-viii

**Calender of  
International Events**  
Page 43

**Articles in Previous  
Issues**  
Page 64

Informations  
**Call for Papers**  
Page 74

**Instruction and  
Guidelines for  
Authors Regarding  
Manuscript  
Preparation**  
Page 74

## Contents

6 **Coding the Administrative Units  
of Nepal for Data Integration and  
Visualization**  
*Suresh Man Shrestha, Cartographic  
Engineer*  
Page 44

7 **Road Network Rating Based on  
Land Use of Pokhara**  
*Sushmita Subedi & Roman Pandit*  
Page 51

8 **Precise Point Positioning (PPP):  
Method and its Geodetic Usage**  
*By Timilsina, Sushmita*  
Page 59

## Advisory Council



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# EDITORIAL

Since 2058 BS (2002 AD) Survey Department has been publishing "Nepalese Journal on Geo-informatics" which has been an important asset as well as a means to propagate professional knowledge, skills and expertise in the field of Surveying, Mapping and Geo-information. Continuing its commitment to share knowledge, Survey Department is publishing the 18th issue of "Nepalese Journal on Geo-informatics".

In last seventeen issues more than 100 articles in a variety of themes related to Surveying, Mapping and Geo-information science and its applications in different field have been published. I would like to express sincere thanks to all those incredible authors for their contributions and members of Advisory Councils and Editorial Boards of all those issues of the journal for their persistent efforts to publish the journal.

This eighteenth issue of the journal contains a wide variety of interesting and worth reading articles on different topics viz. "Remote Sensing of Nepal's Forests and Trees: Ascertaining the Front Line of Human-Induced Tree Cover Change" by Prof. Amulya R Tuladhar, "Application of Geographic Information Infrastructure: In the context of restructuring the country" by Er. Jyoti Dhakal, "Address System in Korea" by Byungyong Kwak and Susheel Dangol, "Image Fusion Technique: Algorithm to Application" by Prakash Ghimire & Dr. Lei Deng, "Gravity for Geodetic Purpose: Geoid-Ellipsoid Separation and Orthometric Height System" by Shanker KC, "Coding the Administrative Units of Nepal for Data Integration and Visualization" by Suresh Man Shrestha, "Road Network Rating Based on Land Use of Pokhara" Sushmita Subedi & Roman Pandit, "Precise Point Positioning (PPP): Method and its Geodetic Usage" by Timilsina, Sushmita

At this point, I am very much thankful to the Survey Department for entrusting me with the responsibility of the Editor-in-Chief for this eighteenth issue of the journal. Following the advice and suggestions of Advisory Council, we, the members of Editorial Board have been able to bring forth the eighteenth issue of the journal. On behalf of all the members of the Editorial Board, I would like to express sincere thanks to all contributing authors, members of Advisory Council and all others who have contributed for the publication of this issue of the journal.

Before I stop, on behalf of the Editorial Board, let me humbly request all of you to contribute your valuable thoughts, articles, research papers, success story for the upcoming issue of this journal.

Karuna K. C.  
Editor-in Chief,  
Jesth, 2076

मा. पद्माकुमारी अर्याल  
मन्त्री

भूमि व्यवस्था, सहकारी तथा गरिवी निवारण मन्त्रालय



सिंहदरवार, काठमाडौं ।

प.सं. :

च.नं. :

शुभ-कामना



नापी विभाग स्थापनाको ६२ औं वर्ष पुरा भएको पुनीत अवसरमा "Nepalese Journal on Geoinformatics" को १८ औं अंक प्रकाशन हुन लागेको जानकारी पाउँदा हर्षित तुल्याएको छ। पेशागत मर्यादा तथा विकासमा उल्लेख्य भूमिका खेल्ने यस प्रकारका अध्ययन सामाग्रीको निरन्तर प्रकाशन गर्ने नापी विभागको यो प्रयास प्रशंसनीय रहेको छ।

राष्ट्रिय नाप नक्सा निकायका रूपमा कार्य सम्पादन गर्दै आइरहेको नापी विभागले भौगोलिक सूचना एवं भू-सूचनाको उत्पादन तथा वितरणमा उल्लेख्य भूमिका निर्वाह गर्नुका साथै अन्तराष्ट्रिय सिमाको नक्सांकन, खगोल तथा भू-मापन कार्य, भूमिश्रोत नक्सांकन जस्ता कार्यहरू गर्दै आइरहेको व्यहोरा बिदितै छ। उल्लेखित कार्यहरू विशुद्ध प्राविधिक एवं वैज्ञानिक प्रकृतिका भएकोले यी कार्यहरू सम्पादन गर्दा सूचना प्रविधिको प्रयोग र समय सापेक्ष परिशुद्ध तथ्यांक एवं सूचनाहरू संकलन तथा वितरण हुनु अपरिहार्य हुन्छ। नाप नक्साको क्षेत्रमा विकसित नवीनतम् प्रविधिको प्रयोग गर्दै समय सापेक्ष भौगोलिक तथा भू-सूचनाहरू संकलन गर्ने र ती प्रविधिहरूको प्रयोग गर्दै सेवा प्रवाहलाई प्रभावकारी बनाउने तर्फ नापी विभागको ध्यान जान जरूरी भएको छ। यस कार्यलाई अघि वढाउन आवश्यक दक्ष जनशक्तिको विकास र प्रविधिको अबलम्बनमा यस प्रकारका पाठ्य सामाग्रीहरू उपयोगी हुने विश्वास लिएको छु। यस वार्षिक प्रकाशनमा सूचनामूलक, अनुसन्धानमूलक, वैज्ञानिक, सेवा प्रवाहलाई प्रभावकारी तुल्याउने एवं नविनतम् प्रविधिको उपयोग गर्ने जस्ता विषयहरू समावेश भएकोले र Geoinformation को क्षेत्रमा कार्य गर्ने अध्येता, पेशाकर्मी लगायत सम्पूर्णमा सूचना प्रवाह गर्ने छ भन्ने समेत विश्वास लिएको छु।

अन्तमा नीति निर्माण, विकास निर्माण, योजना तर्जुमा एवं जग्गा प्रशासनका लागि आवश्यक सूचना उत्पादन तथा वितरण गरी राष्ट्रको सर्वाङ्गीण विकासमा आफ्नो क्षेत्रबाट अतुलनीय योगदान पुऱ्याउँदै आएको नापी विभागले स्थापनाको ६२ वर्ष पुरा गरेको सु-अवसरमा सवै कर्मचारीहरूलाई हार्दिक बधाई ज्ञापन गर्दछु। विभिन्न आरोह अवरोहको सामना गर्दै नापी विभागलाई आजको अवस्था सम्म ल्याई पुऱ्याउन प्रत्यक्ष एवं परोक्ष रूपमा योगदान पुऱ्याउनु हुने कर्मचारीहरू लगायत सम्पूर्णमा विशेष आभार प्रकट गर्नुका साथै ६२ औं वार्षिकोत्सवको पूर्ण सफलताको कामना गर्दछु।

इति संवत् २०७६ साल जेष्ठ १४ गते रोज ३ शुभम् ।

मा.पद्माकुमारी अर्याल  
मन्त्री



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**Message from the Secretary**

It is my pleasure to write few words in this annual publication of the Survey Department on different aspects of Geo-informatics. I also feel very happy to recall the days I used to work in the department during the starting phase of my career. I would like to congratulate Survey Department for coming up to the 18<sup>th</sup> issue of the annual publication of the department.

During last few years, I have noticed that the department has achieved a commendable progress in the field of Surveying, Mapping and Geo-information data generation, data sharing for supporting infrastructure development, finally contributing towards overall national development. As we all know that geo-information plays a vital role in infrastructure development and this journal definitely share information on development of different geo-information and developments in this field.

I feel equally proud to see that the department has conducted the field work for the measurement of height of Sagarmatha (Mt. Everest) and is determined to publish result in the stipulated time. Besides, that, department has gaining pace in different surveying and mapping activities like updating topographical base maps, boundary survey at Nepal-India boundary, land administration services, land use mapping and LiDAR survey. I am very much impressed by the achievement made by department in this matter. I have very positive impression that the department will definitely move ahead with the developments of technology in the field of Surveying and Mapping. In capacity of Secretary of Ministry of Land Management, Cooperatives and Poverty Alleviation, I do assure full support from the ministry to the department's undertakings.

Going through the contents of the journal, I feel enlightened in a few more aspects of Surveying, Mapping and Geo-information. I strongly recommend all professionals in the field of Surveying, Mapping and Geo-information to gain benefits from the articles of the journal and also request all the professionals to contribute and share experience in the next issue of the journal.

I would like to appreciate the efforts of Advisory Council and Editorial Board of this journal to bring out the eighteenth issue of "Nepalese Journal on Geo-informatics". In the meantime, I would also like to extend heartiest congratulations to the Survey Department and its entire staff members on the occasion of 62nd Anniversary of the establishment of Survey Department.

Thank you and enjoy reading

Gopi Nath Mainali  
Secretary  
Ministry of Land Management, Cooperatives and Poverty Alleviation  
Government of Nepal

# FOREWORDS



I am delighted to be able to write a few words on the eighteenth issue of "Nepalese Journal on Geo-informatics" on the Sixty-Second Anniversary of Survey Department. Let me take a moment on this special occasion of the Sixty-second anniversary, I would like to congratulate entire staff of the Department and extend sincere thanks to those who have contributed, in the past in different capacities for the betterment of the Department in the occasion of this 62nd anniversary of the department.

It is my pleasure to mention Survey Department, the only National Mapping Organization of Nepal, has been continuously contributing in the sector of Surveying, Mapping, Geo-information Science and Earth Observation, which are very much crucial for the planned development of the country. Furthermore, the organization is contributing not only in Land Administration but also in International Boundary Management.

Some initiative taken have the potential to leave a historic legacy of the department. Initiatives taken by the department to scale the Sagarmatha (Mt. Everest) has drawn attention of the international community. We consider this initiative to be not only a matter of pride for our profession but also an opportunity to enhance our capacity to cope with the challenges that has come alongside. Furthermore, department has also initiated the activities of LiDAR survey for the first time in country. This shall be a milestone for the development of high resolution Digital Elevation Model that will support in different development activities and disaster mitigation plan and management. Department is also conducting Land Use mapping that will support in optimum use, monitoring and management of land and land resources for implementation of Land Use Policy.

One of the major activity of the department is to prepare topographical base maps which is base for planning every development activities. Department is preparing activity plans for implementing National Spatial Data Infrastructure (NSDI). In this regard, geoportal is introduced for clearing house and sharing of data and information. We are further updating applications for the clearing house. Department prepared series of topographical base of whole country some decades ago and now running with the updates of these maps. In few years department will come up with updated topographical base maps. In near future, department is also planning to densify the Continuously Operating Reference Station (CORS) over the country.

After assuming the office of the Director General, I have been trying to invest all my energy in the endeavors aimed at strengthening the Department, its staff and the profession as a whole and my entire staff of the Department from their respective positions, have been together with me in every efforts taken to enhance the Department. I do believe in team work and coordination. I am confident that we will be successful in showing the tangible results if we continue our efforts sincerely in the days to come.

This year is the year of celebration for successful completion of Mt Everest expedition for the measurement of the height of the Everest. This year we are felicitating the expedition team who did a commendable job of expedition. Survey Department will work hard to disseminate the result of the height measurement program in stipulated time.

Finally, let me express my sincere appreciation to the fellow colleagues, the members of Advisory Council, and Deputy Director General Ms Karuna K.C, entire team of the Editorial Board, specially Chief Survey Officer Mr. Susheel Dangol for their invaluable contribution in this issue who deserves special thanks for their tireless efforts in bringing this issue in the stipulated time. More importantly, I extend sincere gratitude to all the authors for their resourceful professional contribution. I would expect such kind of support and professional contribution in the upcoming issues too. At the same time, I encourage fellow colleagues from the Department to contribute to the journal by providing quality articles.

As we were aware at the first issue, a journal needs commitment, not only from editors but also from editorial boards and the contributors. Without the support of our editorial boards we would not dare to start and continue. Special thanks, also, go to the contributors of the journal for their trust, patience and timely revisions.

I am confident that this journal is proficient not only to the surveying and mapping professionals, but also to other scientific community and researchers as well.

Enjoy Reading!

Thank you!

Jesth 14, 2076 (May 28, 2019)  
Kathmandu, Nepal

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