PRASHANT SURVEYS
(Advanced Land Survey & Geospatial Solutions)

‘Corporate Brochure’

# 204, Mayfair Arcade, 563 Nana Peth,
Besides Chacha Halwai, Laxmi Road, Pune 411002.
M +91 98900 55670, 9890 614614, 98900 90888.

Email : business@prashantsurveys.com;
prashantsurveys@gmail.com
Website : www.prashantsurveys.com

Last Updated on :
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1. About “Prashant Surveys”:

- We are a 29 years old professional Land Surveying & Mapping company based in Pune, India, providing Complete 3D Geospatial Solution to our clients with Land Surveying, Mapping & GIS requirements.

- We use the 'state of the art' advanced technology of Survey grade 3D Mobile LiDAR Scanning / NSV (Network Survey Vehicle), UAV (Unmanned Aerial Vehicle) / Drone, GPR (Ground Penetrating Radar), dual frequency DGPS / GNSS (Differential Global Positioning System / Global Navigation Satellite System), High Resolution Satellite images, Aerial Photogrammetry & customized GIS solution.

- We offer our cost-effective quality services to Government, Semi Government, Private Organizations & Corporates all over the globe, with high speed and best in class accuracy.
2. Our Management Team:

- **Mr. Shivanand A. Alatgi**  +91 98900 90888
  - Managing Director, Administration
  - (Retired from 'Survey of India'; 48+ years of experience)

- **Mr. Prashant S. Alatgi**  +91 98900 55670
  - Head : Technical, R&D and Business Development
  - (Ph.D. Research Scholar, M.E. Civil, B.E. Civil; 21+ years of experience)

- **Mr. Kiran S. Alatgi**  +91 9890 614614
  - Head : GIS & Marketing
  - (MBA Systems & Marketing, B.E. Computers; 10+ years of experience)

- **Mr. D. N. Jadhav**
  - Chief Technical Officer; Retired from Survey of India
  - (B.A. Hons., M.Sc. Geo-informatics; 48+ years of experience)
3. Why Choose us:

➢ 29 years experienced & well reputed firms based in Pune, India, for providing complete 3D Geospatial Solution with Land Surveying, Mapping & GIS requirements.

➢ Continuously adopt the most Advanced Land Surveying & Mapping technologies viz. 3D Mobile LiDAR Scanning / NSV (Network Survey Vehicle), UAV (Unmanned Aerial Vehicle) / Drone, GPR (Ground Penetrating Radar), dual frequency DGPS / GNSS, High Resolution Satellite images, Aerial Photogrammetry & GIS solution.

➢ Have successfully completed more than 12,000 chainage Kms of highway surveys throughout India using 3D Mobile LiDAR & NSV (Network Survey Vehicle) technology since year 2015. Completed more than 100 prestigious projects of Land Surveying and mapping during past 29 years.
3. Why Choose us: (Contd…)

➢ Founder, Mr. Shivanand Alatgi, (Retd. form Survey of India), having 48 years of hardcore experience in the field of Land Surveying & Mapping, assisted with Technical consultants and advisers retired from Survey of India with 40+ years of experience.

➢ Head: Technical, R&D and Business Development, Mr. Prashant S. Alatgi, (Ph.D. Research Scholar, MIT - WPU, Pune, India; M.E., Civil, C&M, 1st Rank MIT, 2nd Rank, University of Pune, India), having 21 years of experience in advanced Land Survey, Mapping & Geospatial Solution, using ‘state of the art’ 3D Mobile LiDAR / NSV, UAV / Drone, GPR, DGPS, ETS, RS & GIS technology.

➢ 1st Company in India to procure ‘Leica Pegasus One’ Survey grade Mobile LiDAR mapping system in March 2015 and the 1st private Company in India to procure ‘Leica Total Station’ (ETS) Electronic Total Station instrument, in the year 1998.

Network Survey Vehicle (NSV): 'Leica Pegasus Two' with pavement Camera
3. Why Choose us : (Contd…)

➢ 1st Land Surveying company in India to possess 2 numbers of ‘Leica Pegasus Two’ Mobile LiDAR Systems in the year 2017. Have the capacity to capture LiDAR data of highways for about 200 Kilometers per day using two instruments, with accuracy of about +/- 2 cm.

➢ Use DGCA type approved Survey Grade UAV / Drone ‘Lookout VTOL’ with onboard PPK NovAtel GNSS for data capture and ‘Pix4D Professional Mapper’ software to produce accuracy upto 10 cm in X, Y, Z coordinates.

➢ Strives to develop the innovative advanced Survey grade mapping technologies and provides the best geospatial solution for timely completion of large-scale Smart City & infrastructure projects, with required accuracy and optimum cost.
4. List of Survey Equipment's:

- Leica ‘Pegasus Two’ Mobile LiDAR / NSV systems. : 02 Nos.
- DGPS / GNSS Receivers (Dual frequency). : 15 Nos.
- UAV / Drone, Lookout VTOL (DGCA Type approved) : 01 No.
- Leica Electronic Total Stations. : 12 Nos.
- Leica Digital Levels ‘Sprinter 150M’. : 02 Nos.
- Leica LGO / Infinity, TBC for GNSS data processing. : 08 Nos.
- Leica ‘Mapfactory’ licenses for Arc GIS. : 08 Nos.
- Leica ‘Auto P’ & ‘Waypoint Inertial Explorer’ licenses. : 02 Nos.
- Pix4d Professional & ‘3D Reshaper’ license. : 03 Nos.
5. List of Hardware’s & Assets :

- Desktop Computers / Workstations, I 7 processors. : 13 Nos.
- Desktop Computers, Intel Pentium I 5 processors. : 10 Nos.
- Laptop Computers, Intel Pentium I 7 & I 5. : 05 No.
- Four-wheeler (Mahindra Scorpio) SUV. : 04 Nos.
- Four-wheeler (Maruti Eeco). : 01 Nos.
- Plotter 36 inch, Hp designjet T830 MFP colour. : 01 Nos.
- Scanner 36 inch, Hp designjet T830 MFP colour. : 01 Nos.
- Office space 2,500 Sq. ft in Pune, India. : 01 Nos.
6. Services Provided:

- 3D LiDAR Survey of Expressways & Highways for DPR / FSR
- Network Survey Vehicle (NSV) Survey of 2/4/6/8 lane Highways
- Land Plan Survey of Highways by Mobile LiDAR
- Base Map Survey for Smart City & 3D City Mapping
- Optical Fiber Cable (OFC) Surveys by Mobile LiDAR
- PPK UAV / Drone Survey, Mapping & inspection
- Ground Penetrating Radar (GPR) Survey of Roads
- DGPS / RTK Survey for Ground Control Points (GCP's)
- Data Processing of Mobile LiDAR, Satellite Images & GIS

To some of our Clients:
7. Testimonials of Government projects:

- Completed about **3,114 Km Land Plan Survey** of various State Highways for PWP&IWTD Divisions: Haveri, Gadag, Bidar, Koppal, Vijayapur, Bagalkot, Chikkodi & Belgavi in Karnataka in last 5 years.

- All above projects executed using the most advanced Mobile LiDAR & DGPS / GNSS technology.

- All above Land Plan Survey works were awarded to us by open tendering e-procurement system based on the approved PWP&IWTD Schedule of Rates 2014-15, item 38.45, on page No. 302 with estimated rate of Rs. 36,000/- per linear Km.

- The authentication from the concerned Land Record Department was obtained on all the original Land Plan Survey sheets and work completion certificates also obtained for all.

<table>
<thead>
<tr>
<th>Sr.</th>
<th>Name of LiDAR Survey Works</th>
<th>Authority with address</th>
<th>Date of Award</th>
<th>Length in Kms</th>
<th>Work Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Land Plan Survey for 328.94 Km on SH-6, Karwar-Kaiga_Ilkal Rd, in Haveri Executive Engineer, 17-11-2014.</td>
<td>PWP&amp;IWTD, Haveri. Govt. of Karnataka.</td>
<td>328.94</td>
<td>Completed</td>
<td></td>
</tr>
<tr>
<td>2)</td>
<td>Land Plan Survey for 257.1 Km on SH 136, Gajendragad-Sorab Road, in Karnataka using Mobile LiDAR. Executive Engineer, 11-03-2015.</td>
<td>PWP&amp;IWTD, Gadag. Govt. of Karnataka.</td>
<td>257.10</td>
<td>Completed</td>
<td></td>
</tr>
<tr>
<td>4)</td>
<td>Land Plan Survey for 361.3 Km on State Highways in Bagalkot Division, PWP&amp;IWTD, Bagalkot. Executive Engineer, 22-04-2015.</td>
<td>Karnataka using Mobile LiDAR. Govt. of Karnataka.</td>
<td>361.30</td>
<td>Completed</td>
<td></td>
</tr>
<tr>
<td>5)</td>
<td>Land Plan Survey for 670.8 Km on State Highways in Chikkodi Division, PWP&amp;IWTD, Chikkodi. Executive Engineer, 08-05-2015.</td>
<td>Karnataka using Mobile LiDAR. Govt. of Karnataka.</td>
<td>670.80</td>
<td>Completed</td>
<td></td>
</tr>
<tr>
<td>6)</td>
<td>Land Plan Survey for 626.7 Km on State Highways in Belgavi Circle, PWP&amp;IWTD, Belgavi. Executive Engineer, 11-06-2015.</td>
<td>Karnataka using Mobile LiDAR. Govt. of Karnataka.</td>
<td>626.70</td>
<td>Completed</td>
<td></td>
</tr>
<tr>
<td>7)</td>
<td>Land Plan Survey for 191.11 Km on SH 122, SH 123, in Bidar District, PWP&amp;IWTD, Bidar. Executive Engineer, 15-06-2015.</td>
<td>Karnataka using Mobile LiDAR. Govt. of Karnataka.</td>
<td>191.11</td>
<td>Completed</td>
<td></td>
</tr>
<tr>
<td>8)</td>
<td>Land Plan Survey for 297.5 Km on State Highways in Koppal Division, PWP&amp;IWTD, Koppal. Executive Engineer, 08-07-2015.</td>
<td>Karnataka using Mobile LiDAR. Govt. of Karnataka.</td>
<td>297.50</td>
<td>Completed</td>
<td></td>
</tr>
</tbody>
</table>

Total Length in Km = 3114.35
Work Done Certificates from E.E. Haveri, Gadag, Vijayapur:
Work Done Certificates from E.E. Bagalkot, Chikkodi, Belgavi:

GOVERNMENT OF KARNATAKA
PUBLIC WORKS, PORTS & INLAND WATER TRANSPORT DEPARTMENT

Office of the Executive Engineer
Public Works, Ports & Inland Water Transport Department, District Chikkodi.

Date: 24 MAY 2018

No. EEP/WDC/D/AB/1-2017/18:

WORK DONE CERTIFICATE

To Whomsoever It May Concern

This is to certify that Mr Prashant Surveys, 204 Mayfair Arcade, 563 Nana Peth, Pune - 411002, has been awarded the work of Carrying out Survey work & Preparing Land Plan Survey sheets of State Highways in Chikkodi Division., for total 670.77 Km length, vide work order No. 3757/19-20 dated 05-05-2019, for Rs. 3,60,000.00.

The work involved carrying out Topographical Survey work & Preparing Land Plan Survey sheets of the State Highways SH-12, SH-72, SH-78, SH-87, SH-06,SH-31, SH-103,SH-134, SH-140 & SH-53 in Chikkodi Division, by advanced methods of LIDAR survey technology. Accordingly the work was carried out efficiently by using Leica Geosystems mobile LIDAR System, Trimble / Leica Dual frequency DGPS instruments & thus preparing land plans by superimposing the available revenue records.

The authentication with signature & seal of the concerned Land Records authority was also obtained on the prepared Land Plan Survey sheets for all the 5 Taluks viz. Bagalkot, Hessarghatta, Jamkhandi, Ragi and Kolar. The total worth of the project for 670.77 Km length was about Rs. 2,25,000.00 Lacs.

The above survey work has been executed and completed the work Satisfactorily by

Yours faithfully,

Prashant Surveys, 204 Mayfair Arcade, 563 Nana Peth, Pune - 411002, for information.

To,

Prashant Surveys,
(Advanced Land Survey & Geospatial Solutions)
204, Mayfair Arcade, 563 Nana Peth,
Besides Oshaa Halway, Laxmi road,
PUNE - 411002

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GOVERNMENT OF KARNATAKA
PUBLIC WORKS, PORTS & INLAND WATER TRANSPORT DEPARTMENT

Office of the Executive Engineer
Public Works, Ports & Inland Water Transport Department, District Belgavi.

Date: 24 MAY 2018

No. EEP/WDC/D/AB/1-2017/18:

WORK DONE CERTIFICATE

To Whomsoever It May Concern

This is to certify that Mr Prashant Surveys, 204 Mayfair Arcade, 563 Nana Peth, Pune - 411002, has been awarded the work of Carrying out Survey work & Preparing Land Plan Survey sheets of State Highways in Belgavi Division., for total 605.34 Km length, work order No. 3398/ 15-16 dated 22-04-2015, for Rs. 2,62,09,157.00.

The work includes Topographical Road Survey work & Preparing Land Plan Survey sheets of the State Highways SH-12, SH-72, SH-78, SH-87, SH-06,SH-31, SH-103,SH-134, SH-140 & SH-53 in Belgavi Division, by advanced methods of LIDAR survey technology. Accordingly the work was carried out efficiently by using Leica Geosystems mobile LIDAR System, Trimble / Leica Dual frequency DGPS instruments & thus preparing land plans by superimposing the available revenue records.

The authentication with signature & seal of the concerned Land Records authority was also obtained on the prepared Land Plan Survey sheets for all the 5 Taluks viz. Bagalkot, Hessarghatta, Jamkhandi, Ragi and Kolar. The total worth of the project for 605.34 Km length was about Rs. 2,62,09,157.00 Lacs.

The above survey work has been completed by Mr Prashant Surveys, Pune & the performance of Mr.Prashant Atagi & Shivnandan Atagi with their entire team members was excellent. We recommend them for executing future similar types of projects elsewhere.

Yours faithfully,

Prashant Surveys,
(Advanced Land Survey & Geospatial Solutions)
204, Mayfair Arcade, 563 Nana Peth,
Besides Oshaa Halway, Laxmi road,
PUNE - 411002

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ISO 9001 : 2015
GOVERNMENT OF KARNATAKA

OFFICE OF THE EXECUTIVE ENGINEER
Public Works, Ports & Inland Water Transport Department Division Koppal

No: EE/PWD/KPL/JE-1/2014-15

Date: 8 JAN 2015

Work Done Certificate

To Whosesoever It May Concern

This is to certify that Mrs Prashant Surveys, 204 Mayfair Arcade, 563 Nana Peth, Pune – 411002, have been awarded the work of ‘Carrying out Survey work & Preparing Land Plan Survey sheets of State Highways in Koppal Division’ for the stretch of 55.3 Km length, vidal work indent No. 10643 & work order No. PWD/PWD/KPL/JE/2014-15 dated 10 Feb 2014 by this office. The agreement amount for this work is Rs. 64,11,740.50.

The work involved carrying out Topographical Survey work & Preparing Land Plan Survey sheets of the State Highways SH-122, SH-123, in Koppal Division, by advanced methods of LiDAR Survey Technology. Accordingly the work was carried out efficiently by using ‘Leica Pegasus Two’ Mobile LiDAR System, Leica Dual Frequency DGPS / LiDAR, Electronic Total Station Instruments, digitizing & thus preparing Land plans by superimposing the available revenue records.

The authentication with signature & seal of the concerned Land Records authority was also obtained on the prepared Land Plan Survey sheets for all the Taluks 44.55 km, Nale, Asal, Bhalki, Basavanagudi. The total worth of the project for 195.11 Km length was about Rs. 64.11 lakhs.

The Work done certificate is issued for the purpose of settling the tender.

To,
Mrs Prashant Surveys,
204, Mayfair Arcade, 563 Nana Peth,
Pune – 411002.

Executive Engineer,
PWP & WTD, Koppal Division,
Koppal.
8. Events & Conferences:

Mr. Prashant Alatgi, Head: Technical, R&D and Business Development of ‘Prashant Surveys’, was a speaker / presenter on advanced ‘Mobile LiDAR / NSV / GPR / UAV / Drone Technology’ in various international & national conferences as listed below:

<table>
<thead>
<tr>
<th>No</th>
<th>Name of Conference</th>
<th>Venue &amp; Dates</th>
<th>Topic / Title</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>‘HxGN live 2015’, hosted by Leica Geosystems AG / Hexagon AB.</td>
<td>18&lt;sup&gt;th&lt;/sup&gt; to 20&lt;sup&gt;th&lt;/sup&gt; Nov., 2015, Hong Kong, China.</td>
<td>“First Mobile Mapping Project in India – 2,500 Km in High speed data acquisition”.</td>
<td>Speaker</td>
</tr>
<tr>
<td>2.</td>
<td>“Geosmart India 2016”, Division of Geospatial Media &amp; Communications.</td>
<td>01&lt;sup&gt;st&lt;/sup&gt; to 03&lt;sup&gt;rd&lt;/sup&gt; March, 2016, India Expo Centre &amp; Mart, Greater Noida, India.</td>
<td>“Mobile LiDAR Technology - High speed data acquisition”.</td>
<td>Speaker</td>
</tr>
<tr>
<td>3.</td>
<td>‘HxGN live 2016’, hosted by Leica Geosystems AG / Hexagon AB.</td>
<td>13&lt;sup&gt;th&lt;/sup&gt; to 16&lt;sup&gt;th&lt;/sup&gt; June 2016, Anaheim, California, USA.</td>
<td>“2,700 Km of Highways Surveying in India with Pegasus: One”.</td>
<td>Speaker</td>
</tr>
<tr>
<td>4.</td>
<td>“Survey India 2016”, Survey And Mapping Association of India (SAMA).</td>
<td>07&lt;sup&gt;th&lt;/sup&gt; to 08&lt;sup&gt;th&lt;/sup&gt; Sept., 2016, Holiday Inn, New Delhi, India.</td>
<td>“Mobile LiDAR Technology – Leadership address”.</td>
<td>Speaker</td>
</tr>
</tbody>
</table>
8. Events & Conferences : (Contd…)

<table>
<thead>
<tr>
<th>No</th>
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<th>Topic / Title</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>‘HxGN live 2017’, hosted by Leica Geosystems AG / Hexagon AB.</td>
<td>13th to 16th June 2017, Las Vegas, Nevada, USA.</td>
<td>“3,000 Km of State Highway Surveying in India, for DPR projects, using Leica Mobile LiDAR Pegasus Two”.</td>
<td>Speaker</td>
</tr>
<tr>
<td>6</td>
<td>‘HxGN Local 2017’, hosted by Leica Geosystems AG / Hexagon AB.</td>
<td>13th October 2017, Hyderabad, India.</td>
<td>“4,000 Km of Highways Surveying in India, with Leica Pegasus Two”.</td>
<td>Speaker</td>
</tr>
<tr>
<td>7</td>
<td>‘Leica M3D Road Show’, hosted by Leica Geosystems AG / Hexagon AB.</td>
<td>07th December 2017, Hyderabad, India.</td>
<td>“7,000 Km of Highways Surveying in India, with Leica Pegasus Two”.</td>
<td>Speaker</td>
</tr>
<tr>
<td>8</td>
<td>‘HxGN live 2018’, hosted by Leica Geosystems AG / Hexagon AB.</td>
<td>12th to 15th June 2018, Las Vegas, Nevada, USA.</td>
<td>“Leica ‘Pegasus Two’ a perfect Network Survey Vehicle (NSV) for Road Asset Management &amp; pavement analysis for the Highways Infrastructure projects in India”.</td>
<td>Speaker</td>
</tr>
<tr>
<td>9</td>
<td>“Geosmart India 2019”, Division of Geospatial Media &amp; Communications.</td>
<td>11th to 13th Feb., 2019, Hotel Pullman, Greater Noida, India.</td>
<td>“Mobile LiDAR Technology for Highways &amp; Smart Cities in India”.</td>
<td>Speaker</td>
</tr>
</tbody>
</table>
8. Events & Conferences : (Contd…)

<table>
<thead>
<tr>
<th>No</th>
<th>Name of Conference</th>
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<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td>“Geospatial World Forum 2019”, Division of Geospatial Media &amp; Communications.</td>
<td>02\textsuperscript{nd} to 04\textsuperscript{th} April, 2019, TAETS Art and Event Park, Amsterdam, The Netherlands.</td>
<td>“Smart City Mission: Precise 4D asset mapping above and below the ground using Hybrid Technology of Mobile LiDAR &amp; GPR systems along with Drones”.</td>
<td>Speaker</td>
</tr>
<tr>
<td>11.</td>
<td>“HxGN live 2019”, hosted by Leica Geosystems AG / Hexagon AB.</td>
<td>10\textsuperscript{th} to 14\textsuperscript{th} June 2019, Las Vegas, Nevada, USA.</td>
<td>“Smart City : Precise asset mapping above and below the ground using Leica Pegasus: Stream, Mobile LiDAR and GPR system along with PPK UAVs / Drones”.</td>
<td>Speaker</td>
</tr>
<tr>
<td>12.</td>
<td>“INTERGEO 2019”, HxGN Live TV interview.</td>
<td>18\textsuperscript{th} Sept 2019, Stuttgart, Germany.</td>
<td>“Generating high precise base maps for smart city projects”.</td>
<td>Speaker</td>
</tr>
<tr>
<td>13.</td>
<td>“Geosmart India 2019”, Division of Geospatial Media &amp; Communications.</td>
<td>03\textsuperscript{rd} to 05\textsuperscript{th} Dec., 2019, HICC, Hyderabad, India.</td>
<td>“Lidar Survey for Infrastructure Projects”.</td>
<td>Speaker</td>
</tr>
<tr>
<td>14.</td>
<td>“Indian Road Congress, 80\textsuperscript{th} Annual Session 2019”.</td>
<td>19\textsuperscript{th} to 22\textsuperscript{nd} Dec., 2019, Patna, Bihar.</td>
<td>Indian Road Congress, 80\textsuperscript{th} Annual Session 2019.</td>
<td>Attended</td>
</tr>
</tbody>
</table>
9. Data Processing & outputs :

• The Leica ‘Pegasus Two’ mobile LiDAR / NSV System can capture :

(i) ‘3D Scan point cloud data’ in 360 degrees.

(ii) ‘High Resolution photographs’ in all directions including the pavement data.

(iii) ‘Trajectory file’/position information, by GNSS Receivers

• Above data can be captured for about 80 to 100 Km per lane per day depending upon the road & site conditions.

• Sufficient DGPS base stations observations are required.

• LiDAR scan point cloud Resolution is about 6 mm.

• Overall accuracy of the LiDAR data is upto + / - 2 cm.
‘3D Scan point cloud data’ captured by using NSV / Mobile LiDAR ‘Leica Pegasus Two’:
‘3D Scan point cloud data’ captured by using NSV / Mobile LiDAR ‘Leica Pegasus Two’:
‘High Resolution Photographs’ captured using NSV / Mobile LiDAR ‘Leica Pegasus Two’: 
Screen Shot of ‘Photographs’ & ‘3D Scan point cloud data’ in ‘Leica Map Factory’:
‘Trajectory file’ generated using NSV / Mobile LiDAR ‘Leica Pegasus Two’:
'3D Plan of Mobile LiDAR data, captured by 'Leica Pegasus Two':
‘3D Plan of Mobile LiDAR data, captured by ‘Leica Pegasus Two’:
‘3D Plan of Mobile LiDAR data, captured by ‘Leica Pegasus Two’: 
‘3D Plan of Mobile LiDAR data, captured by ‘Leica Pegasus Two’:
‘3D Plan of Mobile LiDAR data, captured by ‘Leica Pegasus Two’:
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes):

‘NSV ‘Leica Pegasus Two’ with pavement camera':
NSV / LiDAR Data Processing work flow and software's used for generating outputs:

- The data captured by NSV / mobile LiDAR is processed in the following Software's:
  - ‘Waypoint Inertial Explorer’, for trajectory.
  - ‘Leica Auto P’, for point cloud registration.
  - ‘Leica Map factory- Arc GIS' for feature extraction / vectorisation (point, line, polygon) for all the Road Asset Mapping (RAM).
  - Leica ‘Road Assessment Tools’ for calculating the IRI, Crack Index, Rut depth, Pot holes.
  - ‘3D Reshaper’ for DEM & Contours.
  - Arc GIS / Autocad, MS Excel for drawings and data display.
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes):

‘Road Assessment Tools’ for pavement analysis:
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes) :

‘IRI with Road Assessment Tools from pavement camera’ :
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes):

NSV Delivery : Part 1. ‘Road Inventory data’:
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes):

Start Point
CH 00/000

NSV Delivery: Part 1. ‘Road Inventory data’:
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes):

NSV Delivery: Part 1. ‘Road Inventory data’:
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes)

NSV Delivery : Part 2. ‘Pavement / Road Condition’ data (Crack Index)
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes):

NSV Delivery: Part 2. ‘Pavement / Road Condition’ data (Crack Index)
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes):

NSV Delivery : Part 2. ‘Pavement / Road Condition’ data (Crack Index)
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes):

Automatic detection of Cracks on pavement (Camera & point cloud):
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes):

Automatic detection of Cracks on pavement (Camera & point cloud):
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes):

Automatic detection of Cracks on pavement (Camera & point cloud):
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes):

Automatic detection of Cracks on pavement (Camera & point cloud):
Pavement analysis using ‘Leica Pegasus’ NSV (IRI, Crack Index, Rut Depth, Potholes):

Automatic detection of Cracks on pavement (Camera & point cloud):
‘Land Plan’ Survey of the Highways to ascertain the Government land width:

• Leica Pegasus Two LiDAR System / NSV can be effectively used for ‘Land Plan Survey’ projects to ascertain the Government Land Width, required under Highway administration act.

• Government can remove the road side encroachments & solve litigations raised by farmers using our authenticated ‘Land Plan’ Survey drawings.

• We have executed more than 4,000 Km Land Plan Survey works in 9 Divisions of PWP&IWTD, North Karnataka using the Mobile LiDAR technology.

• Revenue records were scanned and accurately superimposed on the existing LiDAR Survey drawings.

• All the Land Plan Surveys sheets were authenticated from the concerned Revenue authorities for the correctness of the Govt. Land width of the highways.
‘Land Plan’ Survey : Contd…

- **Land Plan Survey** is the systematic process of finding out the Road / Highway Land Width available with the Government.

- This process can be broadly classified in four parts:
  1. Data collection on site and preparing the existing survey drawings using advanced LiDAR technology.
  2. Collection & digitization of revenue records.
  3. Superimposition of these revenue records accurately on the Survey drawings to prepare the Land Plan sheets.
  4. Verification & authentication of the prepared Land Plan sheets from concerned Land Record authorities with signature & seal on each and every original sheets.

- PWP&IWTD can know the exact Authenticated road / highway Land width available with them & maintain these records.

- The encroachment made within this land width along the highways can be known and removed if necessary for further widening of the highways.

Sample Land Plan Survey dwg:
Sample Land Plan Survey Drawing:
Other Additional Works; Pillar fixing on ROW boundary of Land Plan:

• Since the Land Plan Survey Item mentioned in the * PWP&IWTD Schedule of Rates 2014-15, item 38.45, on page No. 302, does not include the fixing of pillars on the ROW boundary, this item has to be separately executed after completion of the Land Plan Surveys.

• Demarcation / Stake out Survey has to be again carried out using the state of the art, DGPS RTK technology or equivalent.

• The exact boundary pillar positions on the ROW boundary authenticated in the Land Plan Surveys, on both sides of the highway to be marked upto 5 cm accuracy and pillars fixed as per specifications.
DGCA Type approved Drone / UAV surveys & data processing by Pix4D Mapper:

- **DGCA Type Approved, PPK Survey Grade, NPNT, UAV / Drone:**

- **Type:** (RPA Category: Micro, Quad Copter, NPNT) Remotely Piloted Aircraft System, RPAS model **LookOut VTOL Lite™- Model TALV2400_C** Mapper Series Industrial Unmanned Aerial System for Aerial Mapping, with onboard PPK / RTK NovAtel OEM7700 GPS / GNSS.

- **Sensor:** Calibrated A6000 Sony camera with Exmor® R CMOS of 24.3 Megapixels.

- **Accuracy:** X & Y = 2 cm to 5 cm, Z = 5 cm to 10 cm with with PPK Novatel OEM 7700 GPS. Ground sampling Distance (GSD) of 2.4 cm.

- **GPS receiver:** Leica GS14 / Trimble R8 Dual frequency GPS receiver for base station observations.

- **UAV Data Processing Software:** Pix4d Professional Mapper Photogrammetric Software, Version 4.3.31
DGCA Type approved Drone / UAV surveys & data processing by Pix4D Mapper:

Sample Ortho Mosaic DSM of a site prepared in Pix4D Mapper:
GNSS / DGPS Base Stations / Ground Control Points (GCP’s) :

- The precise GNSS / DGPS Base Station network sometimes called Ground Control Points (GCP’s) is the backbone of all the data capture methods (Mobile LiDAR, UAV / Drone, GPR).

- These have to be established by Dual Frequency Survey Grade GNSS receivers with triangulation method and proper adjustments.

- GPS data is observed in static mode for at least two hours per base station with more than 4 satellites.

- These base station points are established on existing permanent structures or monumental pillars and database maintained for future references.
Base Stations, using Leica GS14 / Trimble R8 DGPS receivers:
10. Contact us:

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