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Guidelines for DGPS Survey for Mining lease / Forest Diversion and Compensatory Afforestation for Verification and Authentication at CGSAC, CCOST

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1. INTRODUCTION:

Chhattisgarh Space Application Centre (CGSAC), Raipur is identified as one of the Govt. agency to carry out DGPS survey for mining lease survey using high resolution satellite data in the State of Chhattisgarh. Verification and authentication of Forest Diversion Proposals (FDP) surveyed through DGPS, and Mining lease survey by private survey agencies “Submission of Georeferenced Digital data while filing Forest Diversion Proposal for non-forest use” under Forest Conservation Act,1980 as required by the Govt. of India, Ministry of Environment, Forest and Climate Change vide their circular F. No.11-9/98 dated 08.07.2011. Similarly for mining lease DGPS survey is to be carried out as per IBM circular No. N-11013/3/MP/90/CCOM VOL-VII 2/2010. CCOST proposes that if any compensatory afforestation project proposal in lieu of Forest Diversion Proposal (FDP) is forwarded by Forest Dept., and mining lease proposal is approved by Mineral Resource Department, CGSAC will carry out the verification and authentication of the data.

2. REQUEST FOR DGPS / ETS SURVEY

2.1 Any Central Govt. and State Govt. organization, Public Sector undertakings, Autonomous Agencies under Central and State Govt. departments desirous to carry out DGPS survey for FDP / Mining lease of any project proposal can request CGSAC to carry out DGPS survey and subsequent preparation of maps for FDP / mining lease using survey data on behalf of them CGSAC shall be entitled to carry out the job for these organizations. They can also carry out the work through any of the CGSAC / DGM empanelled survey agencies.

2.2 DGPS Survey of mining lease, Forest Diversion Proposal or Compensatory Afforestation Proposal for all private agencies / organizations would be carried out only through CGSAC / DGM empanelled DGPS survey agencies.

2.3 To select one of the survey agencies the user agency is to refer the list of CGSAC

or DGM empanelled survey agencies available in CCOST / DGM website.

2.4 After selection of survey agency, the user would submit a letter to “Director General, CCOST” along with an Index map of the project area mentioning the name of the selected survey agency, purpose of survey, area in which the project lies like Revenue village, Tehasil, District, Forest Division and Mining Circle (if the project area is a mine) and approximate co-ordinates of the project location.

3. ESTABLISHMENT OF BASE POINT / POINTS

3.1. Then the survey agency will submit the request letter along with the work order to CGSAC to provide two known locations to establish point / points to use as base point / points for further DGPS survey and processing of survey data for the proposal using the co-ordinates of these Base point / points. They can establish as many base points as required in the project area using these two known locations.

3.2. After the survey for base point / points, the agency would submit the survey data at CGSAC in RAW and RINEX format, to receive the co-ordinates of the point / points.

3.3. If it is more than one point, all the points should be properly networked (if the required base point is more than one), so that at the time of processing of the submitted data for co-ordinates of base points, the data fulfill all the parameters set by CGSAC for establishment of Principal Control Points (PCP).

3.4. After processing of surveyed data and receiving requisite processing fee, CGSAC will provide the co-ordinates of base point / points and communicate the same to concerned D.F.O, Tehasildar and Mining Officer (in case of a mine) with the request to depute their representatives to post forest pillars on identified points in the project area to be surveyed and should remain present at the time of survey.

4.0. OBSERVATION GUIDELINES FOR ESTABLISHMENT OF BASE POINT / POINTS

4.1. The PCPs or Base points will be established by simultaneous observation along with two reference points provided by CGSAC by trilateration method in Static mode of observation. The DGPS observation on PCP will be undertaken at 05 seconds epoch interval continuously for 2 hours if the distance of reference points is within 10 Km, 4 hours if the distance of reference points is between 10 Km to 50 Km and 8 hours if the

distance of reference points is between 50 - 200 Km. If more than one base point is required for the project above mentioned methodology should be followed.

4.2. All the observations should be carried out through Dual / Multi frequency standard DGPS Instrument.

4.3. The triangle of observation preferably is an equilateral triangle. However, no angle should be less than 30° or more than 120° and would not be acceptable.

4.4. Point of observation should be open to sky. The sky should be clear up to 15° Cut - off angle. There should not be any tower, power transmission line, etc. present nearby to affect the observation reading.

4.5. Threshold values of PDOP (Positional Dilution of Precision) / HDOP (Horizontal Dilution of Precision) for each observation should not exceed 05.

5.0. DGPS / ETS SURVEY IN THE PROJECT AREA:

5.1. Only after receiving the co-ordinates of base point / points the agency would proceed for further survey using CGSAC provided co-ordinates. Under, no - circumstances the agency would take up survey without receiving known points from CGSAC for the concerned project work.

5.2. The vendor shall collect the geo-coordinates in WGS-84 datum and UTM projection.

5.3. All the cadastral sheets involved in the project area / corridor (for Revenue forest areas) are to be geo-referenced through survey by taking minimum six points, being well identified and well distributed in the cadastral space (preferably tri-junction, bi-junction and well known features etc.) for each cadastral sheet.

5.4. All the boundaries of R.F / P.R.F / P.F / D.P.F patches proposed for diversion coming within project area or corridor are to be demarcated through detail survey.

5.5. For linear project proposals like road, railway, pipe line, power transmission line etc., if any part is coming within R.F / P.R.F / P.F / D.P.F should be demarcated through detail survey which include start points, end points and all the corner points.

5.6. The boundary of compensatory afforestation patches are to be demarcated through detail survey. If the proposal comes in Revenue area (Mining lease) then cadastral sheets involved in the project proposal also to be georeferenced through

survey along with demarcation of patch boundary with detail survey.

5.7. When a patch of R.F / P.R.F / P.F / D.P.F is coming within a project area (both under FDP and Compensatory Afforestation) adjacent to village boundary, to demarcate the forest boundary correctly, adjacent cadastral sheets are to be georeferenced (even if the sheet is not coming within the project boundary).

5.8. On all posted pillars for FDP and Compensatory Afforestation Proposals DGPS / ETS survey should be carried out.

5.9. Safety Zone area in case of mine is to be demarcated through detail survey.

5.10. Each survey point should have unique ID (shall not be repeated) in one project proposal and this ID should match with processed ID for that point.

5.11. All the survey should be carried out on posted pillars / points identified by Forest and Revenue Dept. officers for proposals other than mines and for mining areas the representative of Mining Dept. also remain present along with Forest and Revenue dept. representatives.

5.12. After completion of survey the map is to be generated using the surveyed data.

5.12.1 Survey of India topo-sheet(s), in original in 1:50,000 scale showing boundary of prospecting block; boundary of each patch of forest land located within the prospecting block; location of each sample plot or borehole site, roads or pathway (existing as well as new pathway to be shown separately) to be used for transportation of drilling equipment; boundary of the adjoining forests and protected areas located within ten (10) Kilometers distance from boundary of forest land identified for prospecting etc.

5.12.2 Legal status of the land identified to raise compensatory afforestation;

i) Details such as location, Survey or Compartment or Khasra number, area and distance from adjoining forest of each plot of non-forest area or degraded forest land identified for compensatory afforestation;

ii) Survey of India Toposheet (s), in original in 1:50,000 scale showing non-forest or degraded forest land identified for compensatory afforestation and adjoining forest boundaries enclosed?

5.12.3 Map showing the proposed NF/degraded forest area for CA and that of the nearby forest area and map of degraded forest land proposed.

a) Geo-referenced digital maps of CA (Polygon map with DGPS coordinates).

b) KML file of CA site in polygon shape to be uploaded online.

6.0. OBSERVATION GUIDE LINES FOR SURVEY OF SECONDARY CONTROL POINTS

6.1. RTK (Real Time Kinematic) mode of observation:

If the primary control point is within a distance of 2 to 3 Km, observation of these secondary control points may be taken through direct observation. Minimum period of observation should be 15 seconds or more with fixed solutions.

6.2. Rapid Static / Fast Static mode of observation:

If the primary control point is within a distance of 10 Km or less than observation of these secondary control points may be taken through Rapid Static or Fast Static mode of observation. Minimum period of observation should be 15 minutes or more with fixed solutions.

6.3. PPK (Post Process Kinematic) mode of observation:

If the primary control point is within a distance of 5 Km or less than observation of these secondary control points may be taken through PPK mode of observation. Minimum period of observation should be 5 minutes or more with fixed solutions (logging interval will be 5 seconds).

6.4. Total Station observation:

For use of Total Station prior permission is required from CGSAC. The application for permission should be attached with ground photo shots. After verification of ground photo shots, if CGSAC will fill the necessity then only permission will be given.

7.0. MAP GENERATION

7.1. All Revenue forest / Khasra Forest / Village forest / non-forest land recorded as forest plots proposed for diversion / compensatory afforestation are to be shown on the georeferenced cadastral sheets (the drawn plot boundaries in the submitted map should match with corresponding plot boundaries of cadastral sheet) and co-ordinates of all the boundary demarcation points of the forest plots are to be shown with derived co-ordinates.

7.2. The survey points used for georeferencing of cadastral sheet and the derived co-

ordinate points are to be shown in different symbols.

7.3. For the demarcation of R.F / P.R.F / P.F / D.P.F patch boundaries proposed for diversion / compensatory afforestation should be carried out only using the DGPS / ETS surveyed points.

7.4. During map generation the survey agency must compare the allotted area with map / surveyed area and if a variation of more than 5% between allotted area and map area is observed, then the plot wise variation must be brought to the notice of concerned officer through the user agency for necessary correction and after necessary correction the data should be submitted for verification.

7.5. All forest areas proposed for diversion should be shown within approved project boundary / corridor (in case of linear projects) and within DGPS surveyed ML boundary for ML areas.

After this the data (both survey as well as maps) would be submitted to concerned Divisional Forest Officer / Mining Officer for ground verification and verification of required documents. After his due verification, the D.F.O / Mining officer will forward the required data to CGSAC for verification and authentication.

8.0. DELIVERABLES AT CGSAC, CCOST:

8.1. All the survey data should be submitted at CGSAC for verification in both soft and hard copy format.

8.2. The vendor shall submit survey data in both RAW and RINEX format. Also the vendor should submit the Base line Report / Project file / Point list (used) of survey data and .shp files of survey points.

8.3. The co-ordinates of survey points in latitude / longitude and Easting / Northing shall be submitted with up to 5 digits after decimal point, and Elevation Height / Ellipsoid Height with up to 3 digits after decimal point.

8.4. Soft copy of georeferenced cadastral sheets (the cadastral sheet should be copied from mother sheet as it is i.e. without any distortion), .shp files of forest areas proposed for diversion / C.A. areas / .shp files of surveyed points and georeferenced derived points (separately) are to be submitted at CGSAC for verification.

8.5. KML file of forest areas proposed for diversion / C.A. areas in polygon shape shall

be submitted for online submission.

8.6. Authenticated land schedule from the concerned Tehasildar or equivalent Revenue authority for the project area showing both Govt. / Private land village wise Revenue Forest plots to be submitted along with other required data.

8.8. R.F / P.R.F / P.F / D.P.F areas allotted for the Project is to be certified by concerned D.F.O.

8.9. The signed format of Forest, Revenue and Mining (in case of mines) officers who remained present during the survey also to be submitted.

8.10. Minimum two sets of hard copy maps should be submitted for comparison with soft copy maps and certification.

8.11. The submitted hard copy map should clearly indicate the name of the Project, map direction, scale, DGPS survey co-ordinates, derived co-ordinates, and comparative area statistics i.e. allotted area with map area, legend and the name of the agency with its logo and signature of the authorized person of the agency.

8.12. If map set consist of more than one map then along with cadastral sheet wise Revenue forest areas and patch wise R.F / P.R.F / P.F / D.P.F area maps, one INDEX map should be submitted showing details of project area with other map information as mentioned above.

8.13. The right of acceptance or rejection of work / job will rest with CGSAC. In case of rejection / re-observation shall be made by the survey agency.

9.0. FEE STRUCTURE FOR VERIFICATION

9.1. For every Base Point processing (as many as Base points used for the DGPS survey in the project area) CGSAC will charge Rs.2000/- towards processing fee.

9.2. In case of linear projects, the processing charge will be charged on basis of points surveyed and submitted at CGSAC for verification. The processing charge for each point is Rs.800/-.

9.3. For other Projects the processing fee will be calculated on the basis of area involved in Ha. (for each Ha. processing fee is Rs.1000/-) or number of points surveyed and submitted at CGSAC for verification of project proposal @ Rs.800/- per point and the user agency will be charged the calculated higher amount.

9.4. The minimum processing fee for any Project is Rs.25000/-.

9.5. After submission of processing fee at CGSAC, the certified maps with letter to the D.F.O will be released.

10.0 DGPS SURVEY CHARGES

10.1 DGPS data collection Static mode Rs.6000/- per observation.

10.2 DGPS data collection RTK MODE 1500/ per observation.

10.3 High Resolution satellite Data cost As per NRSC charges.

10.4 Geo-rectification / digitization / integration of data 1, 25,000.

10.5 Administrative Charges 15%.

10.6 Depending upon number of observation points per hectare charges around Rs. 755/- to 1000/-

10.7 Other Charges as per the Project proponent requirement

10.8 Minimum mapping area 1000 hectare for above rates otherwise propositionally cost shall increase.

10.9 For DGPS survey 50% advance

N.B:

i) All the survey should be carried out in presence of Forest, Revenue and Mining Department representatives (if the project is within mining area) on the posted pillars or identified points.

ii) All the data should be submitted through concerned D.F.O at CGSAC for verification and authentication of the proposal.

REFERENCES:

1. The National Land Records Modernization Programme (NLRMP), Guidelines, Technical Manuals and MIS, Department of Land Resources, Ministry of Rural Development, Government of India, 2008-09.
2. Technical Manual for Cadastral Survey Using Modern Technology, Land Records & Surveys, Board of Revenue, Odisha, Cuttack, 2012.
3. Government of India, Ministry of Mines, Indian Bureau of Mines (IBM) Office of Chief controller circular No 11013/3/MP/90-CCOM Vol-VII 2/2010 dated 06/04/2010
4. Government of India, Ministry of Environment, Forest and Climate Change, Forest Conservation Act 1980
5. Government of India, Ministry of Environment, Forest and Climate Change, Forest Conservation Division circular No F.No. 11-423/2011-FC dated 8th Nov. 2017.
6. Forest (Conservation) Act, 1980 with Amendments Made In 1988 and Forest Conservation Rules, 2003 (Guidelines & Clarifications) Ministry of Environment, Forest and Climate Change, Government of India, F. No. 5-2/2017- FC dated 28th March 2019.