Project Report on

"SURVEY OF HOSPITAL FACILITIES IN SONAI VILLAGE USING GPS TECHNOLOGY"

Submitted to,
Department of Biotechnology,
Government of India.
under
DBT Star College Scheme

Submitted By

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Year: 2020-21

MULA EDUCATION SOCIETY'S
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CERTIFICATE

मुळा एज्युकेशन सोसायटी
सोनई
॥ जो जे वांछिल तो ते लाहो ॥

This is to certify that the work incorporated in the dissertation entitled

"Survey of Hospital Facilities in Sonai village using GPS Technology"

Sumitted by Miss. JadhavGayatri, Miss. Tandale, Miss. Aaishwarya Patil, Miss. Kachare, Miss. Virkar Mr. Bade Mr. JareGauravUnder DBT Scheme, Department of Biotechnology, Government of India is carried out under my supervision and guidance at the Department of Geography , Mula Education Society's, Arts, Commerce and Science college, Sonai, Tal- Newasa Dist. Ahmednagar, during the academic year 2020-2021.

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DECLARATION

We hereby declare that the work done in this thesis entitled "Survey of Hospital Facilities in Sonai village using GPS Technology"is submitted to Department of Geography, MES, Arts, Commerce and Science College Sonai. This project is completed under the DBT Star College Scheme and the supervision of Dr. R.V. Wagh The works is original and not submitted in part or full by me or any other to this or any other University.

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"SURVEY OF HOSPITAL FACILITIES IN SONAI VILLAGE USING GPS TECHNOLOGY"

INTRODUCTION:

GPS is a positioning system based on a network of satellites that continuously transmit and digital coded information. The information transmitted from the satellites can be interpreted by receivers to precisely identify locations on earth by measuring distances from the satellites. This system is run by the –

1. The nominal GPS operational constellation consists of roughly 24 satellites. Each satellite has a number on your GPS screen. Newer satellites have been sent up to replace older ones.
2. The GPS signal communicates information about the precise position of the satellite and the precise time of the signal.
3. Each satellite orbits the earth in about 12 hours. The satellite orbits repeat roughly the same ground track each day. Learn to identify the time of day when satellite coverage is best in your area and plan your field work accordingly

The Global Positioning System was conceived in 1960 under the auspices of the U.S. Air Force, but in 1974 the other branches of the U.S. military joined the effort. The first satellites were launched into space in 1978. The System was declared fully operational in April 1995.

The Global Positioning System consists of 24 satellites, that circle the globe once every 12 hours, to provide worldwide position, time and velocity information. GPS makes it possible to precisely identify locations on the earth by measuring distance from the satellites. GPS allows you to record or create locations from places on the earth and help you navigate to and from those places. Originally the system was designed only for military applications and it wasn't until the 1980's that it was made available for civilian use also.

When a GPS receiver is turned on, it first downloads orbit information of all the satellites. This process, the first time, can take as long as 12.5 minutes, but once this information is downloaded; it is stored in the receiver's memory for future use. Even though the GPS receiver knows the precise location of the satellites in space, it still needs to know the distance from each satellite it is receiving a signal from. That distance is calculated, by the receiver, by multiplying the velocity of the transmitted signal by the time it takes the signal to reach the receiver. The receiver already knows the velocity, which is the speed of a radio wave or 186,000 miles per second (the speed of light). To determine the time part of the formula, the receiver matches the satellites transmitted code to its own code, and by comparing them determines how much it needs to delay its code to match the satellites code. This delayed time is multiplied by the speed of light to get the distance. The GPS receiver's clock is less accurate than the atomic clock in the satellite; therefore, each distance measurement must be corrected to account for the GPS receiver's internal clock error.

GPS Terminology 2D Positioning: In terms of a GPS receiver, this means that the receiver is only able to lock on to three satellites which only allows for a two dimensional position fix. Without an altitude, there may be a substantial error in the horizontal coordinate. 3D Positioning: Position calculations in three dimensions. The GPS receiver has locked on to 4 satellites. This provides an altitude in a addition to a horizontal coordinate, which means a much more accurate position fix. Real time differential GPS: Real-time DGPS employs a second, stationary GPS receiver at a precisely measured spot (usually established through traditional survey methods). This receiver corrects any errors found in the GPS signals, including atmospheric distortion, orbital anomalies, Selective Availability (when it existed), and other errors.

A DGPS station is able to do this because its computer already knows its precise location, and can easily determine the amount of error provided by the GPS signals. DGPS corrects or reduces the effects of: - Orbital errors - Atmospheric distortion - Selective Availability - Satellite clock errors - Receiver clock errors DGPS cannot correct for GPS receiver noise in the user's receiver, multipath interference, and user mistakes. In order for DGPS to work properly, both the user's receiver and the DGPS station receiver must be accessing the same satellite signals at the same time.

SIGNIFICANCE OF THE STUDY

Analyzing distribution of hospitals through GIS and GPS is a significant measure in health care facility because every category of population should get access to the hospital facility optimally. Spatial analysis of health care facilities using GIS is analysed in this chapter. Health care service in Varanasi district go from bad to worse, all it shortage of man power, especially of doctors, or negligence in providing health services, many government hospitals, primary health centers (PHCs), community health centers (CHCs) seem to be witnessing health care delivery services at their worst in the region. Buffer (Proximity) analysis is used widely for many situations – e.g. to understand the association between transportation facilities in the study area to existing health care facilities. Buffer technique also play a vital role in the health GIS application through which we can easily calculate the number of persons live within a 10 km. radius from a particular primary health centre's (PHCs) or community health centers (CHCs) or from the other governmental hospitals etc. of the district. By applying the proximity analysis of health centers, it is found that maximum rural population is totally depended on the existing government health centers. Shortest route estimation through network analysis is used for identifying the most efficient routes or paths for allocation of services.

DEVELOPMENT HISTORY OF GPS:

GPS is modern technology with the help of Satellite technology. Most of development in the GPS technology is more progress after the 1960. With these parallel developments in the 1960s, it was realized that a superior system could be developed by synthesizing the best technologies from 621B, Transit, Timation, and SECOR in a multi-service program. Satellite orbital position errors, induced by variations in the gravity field and radar refraction among others, had to be resolved. A team led by Harold L Jury of Pan Am Aerospace Division in Florida from 1970–1973, used real-time data assimilation and recursive estimation to do so, reducing systematic and residual errors to a manageable level to permit accurate navigation.

During Labor Day weekend in 1973, a meeting of about twelve military officers at the Pentagon discussed the creation of a *Defense Navigation Satellite System (DNSS)*. It was at this meeting that the real synthesis that became GPS was created. Later that year, the DNSS program was named ***Navstar***. Navstar is often erroneously considered an acronym for "Navigation System Using Timing and Ranging" but was never considered as such by the GPS Joint Program Office (TRW may have once advocated for a different navigational system that used that acronym). With the individual satellites being associated with the name Navstar (as with the predecessors Transit and Timation), a more fully encompassing name was used to identify the constellation of Navstar satellites, *Navstar-GPS*. Ten "Block I" prototype satellites were launched between 1978 and 1985 (an additional unit was destroyed in a launch failure).

The effect of the ionosphere on radio transmission was investigated in a geophysics laboratory of Air Force Cambridge Research Laboratory, renamed to Air Force Geophysical Research Lab (AFGRL) in 1974. AFGRL developed the Klobuchar model for computing ionosphere corrections to GPS location. Of note is work done by Australian space scientist Elizabeth Essex-Cohen at AFGRL in 1974. She was concerned with the curving of the paths of radio waves (atmospheric refraction) traversing the ionosphere from NavSTAR satellites.

After Korean Air Lines Flight 007, a Boeing 747 carrying 269 people, was shot down in 1983 after straying into the USSR's prohibited airspace, in the vicinity of Sakhalin and Moneron Islands, President Ronald Reagan issued a directive making GPS freely available for civilian use, once it was sufficiently developed, as a common good. The first Block II satellite was launched on

February 14, 1989, and the 24th satellite was launched in 1994. The GPS program cost at this point, not including the cost of the user equipment but including the costs of the satellite launches, has been estimated at US$5 billion (then-year dollars). Initially, the highest-quality signal was reserved for military use, and the signal available for civilian use was intentionally degraded, in a policy known as Selective Availability.

This changed with President Bill Clinton signing on May 1, 2000 a policy directive to turn off Selective Availability to provide the same accuracy to civilians that was afforded to the military. The directive was proposed by the U.S. Secretary of Defense, William Perry, in view of the widespread growth of differential GPS services by private industry to improve civilian accuracy. Moreover, the U.S. military was actively developing technologies to deny GPS service to potential adversaries on a regional basis.

Since its deployment, the U.S. has implemented several improvements to the GPS service, including new signals for civil use and increased accuracy and integrity for all users, all the while maintaining compatibility with existing GPS equipment. Modernization of the satellite system has been an ongoing initiative by the U.S. Department of Defense through a series of satellite acquisitions to meet the growing needs of the military, civilians, and the commercial market.

As of early 2015, high-quality, FAA grade, Standard Positioning Service (SPS) GPS receivers provided horizontal accuracy of better than 3.5 meters (11 ft),[43] although many factors such as receiver and antenna quality and atmospheric issues can affect this accuracy.

GPS is owned and operated by the United States government as a national resource. The Department of Defense is the steward of GPS. The *Interagency GPS Executive Board (IGEB)* oversaw GPS policy matters from 1996 to 2004. After that, the National Space-Based Positioning, Navigation and Timing Executive

Committee were established by presidential directive in 2004 to advise and coordinate federal departments and agencies on matters concerning the GPS and related systems.[44] The executive committee is chaired jointly by the Deputy Secretaries of Defense and Transportation. Its membership includes equivalent-level officials from the Departments of State, Commerce, and Homeland Security, the Joint Chiefs of Staff and NASA. Components of the executive office of the president participate as observers to the executive committee, and the FCC chairman participates as a liaison.

The U.S. Department of Defense is required by law to "maintain a Standard Positioning Service (as defined in the federal radio navigation plan and the standard positioning service signal specification) that will be available on a continuous, worldwide basis," and "develop measures to prevent hostile use of GPS and its augmentations without unduly disrupting or degrading civilian uses.

APPLICATION OF GPS:

Up until now, we've looked at how you can use GPS receivers to tell you where you are, to navigate between points and to make digital maps of various features. But GPS isn't just used by civilians; it's also used by pilots, boat captains, farmers, surveyors, scientists and the military (just to name a few!). While typical civilian handheld GPS receivers are usually accurate to about 5 meters, there are also very expensive, highly advanced GPS receivers that are capable of providing positions accurate to within a centimeter! These receivers have revolutions lots of industries, where highly accurate positioning is used for so many different tasks. The following sections provide a quick summary of how GPS is used in some industries. Aviation almost all modern aircraft are fitted with multiple GPS receivers. This provides pilots (and sometimes passengers) with a real-time aircraft position and map of each flight's progress. GPS also allows airline operators to pre-select the safest, fastest and most fuel-efficient routes to each destination, and ensure that each route is followed as closely as possible when the flight is underway. Marine When high accuracy GPS is fitted to boats and ships, it allows captains to navigate through unfamiliar harbors, shipping channels and waterways without running aground or hitting known obstacles.

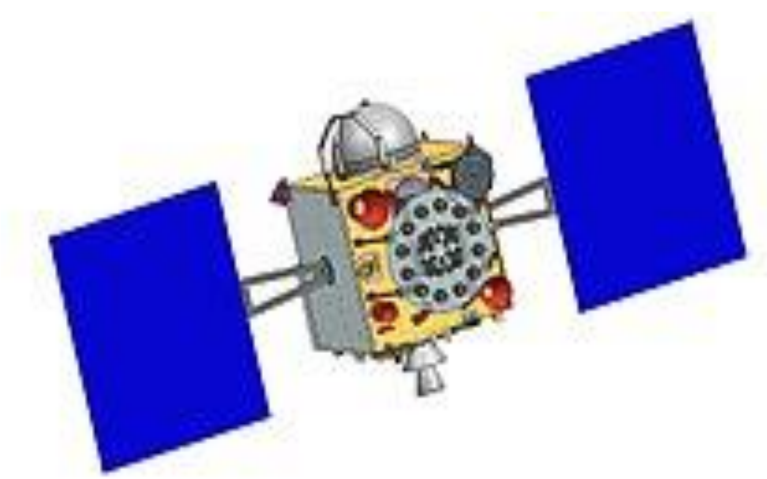
GPS is also used to position and map dredging operations in rivers, wharfs and sandbars, so other boats know precisely where it is deep enough for them to operate. Farming Farmers rely on repeat planting season after season to maximize their crop productions. By putting GPS receivers on tractors and other agricultural equipment, farmers can map their plantations and ensure that they return to exactly the same areas when sewing their seeds in future. This strategy also allows farmers to continue working in lowvisibility conditions such as fog and darkness, as each piece of machinery is guided by its GPS position instead of visual references. High accuracy GPS is also used to map soil sample locations, allowing farmers to see where the soil is most fertile across individual fields or even entire farms.

Scientists use GPS technology to conduct a wide range of experiments and research, ranging from biology to physics to earth sciences. Traditionally, when scientists wanted to understand where and how far animals roam, they had to tag animals with metal or plastic bands and then follow them to various locations to monitor their movement. Today, scientists can fit animals with GPS collars or tags that automatically log the animal's movement and transmit the information via satellite back to the researchers.

This provides them with more detailed information about the animal's movements without having to relocate specific animals. Earth scientists also use GPS technology to conduct a wide range of research. By installing high accuracy GPS receivers on physical features such as glaciers or landslips, scientists can observe and study both the speed and direction of movement, helping them to understand how landscapes change over time. Similarly, GPS receivers can be installed on solid bedrock to help understand very small and very slow changes in tectonic plate motion across the world.

GPS TECHNOLOGY IN INDIA:

The **Indian Regional Navigation Satellite System** (**IRNSS**), with an operational name of **Navic** (acronym for Navigation with Indian Constellation; also, *nāvik* 'sailor' or 'navigator' in Indian languages), is an autonomous regional satellite navigation system that provides accurate real-time positioning and timing services. It covers India and a region extending 1,500 km (930 mi) around it, with plans for further extension. An extended service area lies between the primary service area and a rectangle area enclosed by the 30th parallel south to the 50th parallel north and the 30th meridian east to the 130th meridian east, 1,500–6,000 km (930–3,730 mi) beyond borders. The system currently consists of a constellation of seven satellites, with two additional satellites on ground as stand-by.



The constellation is in orbit as of 2018, and the system was expected to be operational from early 2018 after a system check. NavIC will provide two levels of service, the "standard positioning service", which will be open for civilian use, and a "restricted service" (an encrypted one) for authorized users (including the military).

NavIC based trackers are compulsory on commercial vehicles in India and it is planned to become available in consumer mobile phones in the first half of 2020.

There are plans to expand the NavIC system by increasing its constellation size from 7 to 11.

GPS INSTRUMENT: GPS is simple instrument for the handling. It looks like our pocket mobile. It is connected with the satellite in that Geographical region.

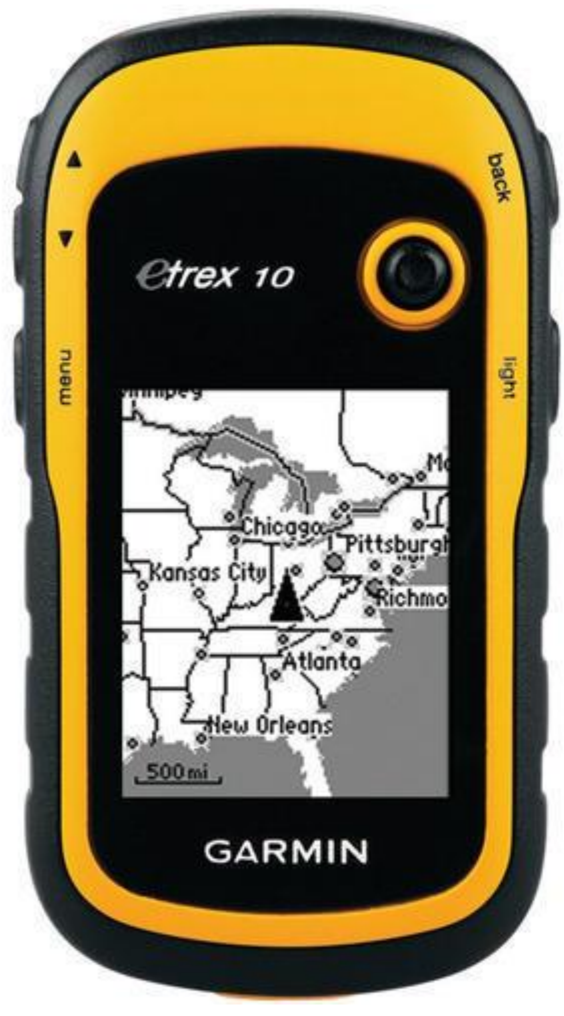


Diagram of Garmin GPS.

SURVEYING WITH GPS AND HOSPITAL MEDICAL FACILITY IN SONAI : Sonai is town located in the Newasa taluka. Total population of this town is 18000. Surrounding villages of Sonai town are – Belhekarwadi, Panaswadi, Landewadi, Kagoni, and Bramhani. This town has the lot of the education facility. There is suger factory these above facilities has effected on the living of standard Sonai is good irrigated region. After the foundation of suger factory and other education facility, this town had made fast growth. Now a day it has more need of medical facility. This town provides the medical facility to the Sonai and surrounding region. Hospital and Medical facility goes hands in hand together. That's why there are good number in medical shops. It has good medical facilities; we study those stations with the help of GPS instrument as below:

A) **Medical facilities:** A health facility is, in general, any location where healthcare is provided. Health facilities range from small clinics and doctor's offices to urgent care centers and large hospitals with elaborate emergency rooms and trauma centers. A health facility is, in general, any location where healthcare is provided. Health facilities range from small clinics and doctor's offices to urgent care centers and large hospitals with elaborate emergency rooms and trauma centers. The number and quality of health facilities in a country or region is one common measure of that area's prosperity and quality of life. In many countries, health facilities are regulated to some extent by law; licensing by a regulatory agency is often required before a facility may open for business. Health facilities may be owned and operated by for-profit businesses, non-profit organizations, governments, and in some cases by individuals, with proportions varying by country. See also the recent review paper,

Hospital Facility: experience to assist with development of new healthcare facilities, redesigns, and workflow optimization immersed in a logical, actionable approach.

Drawing on our experience of healthcare facility operations and processes, we can gauge the value and risks of the project and make recommendations accordingly.

The data will ultimately help determine the types of services that should be offered and their priority, the size of the institution, layout and work flow, its location, as well as potential hurdles in the development process.
Our hospital design and hospital planning methodology optimizes the Patient Experience, Patient Access, Patient Satisfaction and Support Services.

B) **Veterinary Facility:** Due to the irrigation facilities in this Sonai area, it has good dairy farming. Lot of milk collection is going to the daily bases. There is good quality of cows. That's why; it has need of the veterinary services. Though there are good facility of Veterinary, but according to the number of animal husbandry it has need of more veterinary facility. In this Sonai town there are following veterinary services.

METHODOLOGY: For this we have used the practical on the field. We take the portable GPS instrument and take the data from that medical facility. We take the primary data for the table representation.

OBSERVATION: This survey is based on the survey based. We take the data of GPS and made the observation. There was digital information.

CONCLUSION: Hence in the Geographical study, GPS technology is most important. It can be gives the digital information. With the help of this technology we can be measure the distances among the different of the location.

We had made the GPS survey, with the help of these GPS instrument. It had made good way, medical facilities. As medical facilities we consider the medical, hospital and veterinary facilities in this area. We had made following conclusion as the below:

1. There is good medical facility in the Sonai town.
2. Sonai town has a need of big hospital facility.

3. As a requirement of medical facility, there are good number of the medical shop and services in this town.
4. In this town it had need of good veterinary hospital in this town.
5. There is shortage of veterinary medical facility in the town.
6. In coming period education government should be started the medical and veterinary courses in this town.

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