

Application of Satellite remote sensing technology in Fishing Technology

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SUMMARY

Many countries operate satellite technology to observe earth and ocean, which in turn helps the scientific community to understand the movement of earth crust and oceans state through remote sensing. As remote sensing has wider range of applications in the field of resource mapping and fishing. The present paper aimed to provide an insight on the application of satellite technology in modern fishing technology particularly on locating fishing vessel, finding fish shoal, navigating fishing vessel, communicating with vessel and land and studying ocean information like sea surface temperature, ocean colour, chlorophyll content, suspended sediment concentration, yellow substance concentration, wave characteristics, potential fishing zone (PFZ), ocean current, height information, water depth, shallow waters seafloor habitat, wave and wind information.

INTRODUCTION

Remote sensing is a branch of sciences of obtaining information about an object or area from far off place by using satellite. These satellites are generally used as platform for carrying sensors to acquire data from the objects. There are two types of remote sensing sensors are used in the satellite namely active sensors and passive sensors. Active sensors send own source of light to the interested object which is then measured while it reflects back by the object. A passive sensor relies on solar radiation that is reflected from objects. Remote sensing technique replaces the traditional, time-consuming, tedious, on the ground, costly data collection methods with quicker and accurate method. This enables the collection of extremely large areas data for everyday applications, ranging from weather forecasts to reports on natural disasters or climate change. Considering the above advantages, it is widely applied in the field of geology, geography, oceanography, weather forecasting, forestry, agriculture, fisheries, engineering, planning and development etc.

Satellites-Based Maritime Communication System

A communication satellite is an artificial satellite that transmits the signal through a transponder by creating a channel between the transmitter and the receiver at different Earth locations. The examples are Telephone, radio, television, internet, and military applications use satellite communications. Maritime satellite communications rely upon services operating on certain frequencies (L-band, C-band, Ku-band, Ka-band, HTS), depending on users' budget and needs. The maritime communication systems primarily use satellites to provide a wider coverage. Among various communication satellite constellations, some popular ones are Inmarsat, IsatM2M, Iridium, Orbcomm and Thuraya. Inmarsat relies on a 14 geostationary earth orbit (GEO) satellite constellation operating in the L-band to provide near-global connectivity with relatively high data rates reaching up to 50 Mbps.

Satellite phone

Satellite phone is a kind of hand held mobile phone that connects to other phones network by radio link through satellites which is orbiting the Earth. These satellite phones are used for voice calling, text messaging and low-bandwidth Internet access. The major benefit of a satellite phone is that it can be used in regions where terrestrial communication infrastructures facilities like landline and cellular networks, are not available. While comparing the cost towards purchase of satellite phone and their services like voice call and text messaging it is very costlier than normal mobile phone.

Distress alert devices

COSPAS-SARSAT is an international satellite based search and rescue system jointly developed by Canada, France, USA, Denmark and Russia. COSPAS stands for "Space System for the Search of Vessels in

Distress while SARSAT means Search and Rescue Satellite-Aided Tracking. It is a satellite-based distress alert device that detects and locates emergency beacons operate on a 406MHz frequency. When the beacon is activated in the ship, the satellite will detect distress signal. The signal contains information such as unique identification number which holds information such as the ship's identification, date of the event, the nature of distress, emergency contacts and the ship position etc. EPIRB (Emergency Position Indicating Radio Beacon) is another device using same 406MHz frequency having greater role during emergency or distress or maritime security on deeper water. These devices are carried on board vessel to faster locate to alert search and rescue services in the case of untoward incidences or emergency.

Satellite Navigations

Satellite navigation system is used to determine the exact location of the vessel on the sea and it allows for accurate vessel tracking and monitoring. Further it is used for navigating from one place to another in the shortest and safe route thereby saving time and fuel. There are four global based satellite navigational systems such as GPS (USA), GLONASS (Russia), Galileo (European Union), BeiDou (China) and two regional satellite navigation systems QZSS (Quasi Zenith Satellite System) developed by Japan, and NavIC is by India are used. These satellite systems are used in finding out the position of fishing vessel, finding out Potential Fishing Zone, locating distressed vessel position, navigating the vessel, Rerouting of the ship, Ice accumulation on ship route, Loss of track etc.

Remote sensing in oceanography

The use of remote sensing got wider applications in the field of oceanography particularly on estimating the Sea Surface Temperature, Weather Conditions, Ocean Colour, Sea Floor Topography, chlorophyll content, suspended sediment, Bathymetry, tides, waves, sea level, currents, surface water, temperature, potential fishing zone (PFZ), pollution detection and monitoring. These information are collected using optical, thermal, and microwave remote sensing techniques. This will help the scientist to understand the dynamics of the ocean and change in the coastal ecosystem. Further, it will be helpful to alert the fishermen on weather conditions, wave pattern and potential fishing zone etc.

Vessel Monitoring

Satellites are used in Vessel Monitoring System (VMS) and Automatic Identification System (AIS). These two common vessel tracking system are commonly used around the world to monitoring fishing vessels effort and safety and security. A basic VMS unit comprises of a GPS receiver which provides the position of the vessel. VMS monitoring a fishing vessel can be done by satellite communications and geo-position satellite networks.

Advantage and disadvantage

In recent years remote sensing has been used increasingly in many fields considering the following advantages,

- Easy to acquire data
- Can collect data from the place where it is difficult to collect data
- Can collect data from larger area at quicker time
- Can prepare in variety of scale
- Saves man power
- Very cheaper
- Can collect repeated regular sampling continuously for many years

Disadvantages

Even though remote sensing is having many advantages, this modern method too have disadvantages that are discussed below.

- Remote sensing instruments need to be continuously monitored for correctness of data
- The instruments must be calibrated at regular interval
- needs lot of space for storing high resolution data
- need experienced person to analyse the data

CONCLUSION

Satellites play a very important role in our day today life that too particularly in fishing technology it contributes a lot by making it possible to locate fishing vessel, safe navigation, weather forecast, identify potential fishing zone, distress alert and communication etc. Besides the above, it also saves time and fuel through more efficient determination of destination. Further, through satellite navigation, users can obtain accurate information on position and time on any ocean anywhere in the world and in all weather conditions. These advantages make fishermen more rely on satellite technology then the traditional methods like celestial navigation, use of nautical chart, magnetic compass, sextent, etc. Although it is believed that over reliance on advanced technology leads to disappearance of traditional technology, the advancement is inevitable and many traditional technology is still used despite significant advance in technology.

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