

Safe navigation on National Waterways

1. Introduction

Inland Waterways Authority of India (IWAI), a statutory body under the Ministry of Shipping, is responsible for the planning, development, maintenance, management and regulation of the national waterways for the purpose of shipping and navigation. Accordingly, the development of first three National Waterways in a systematic and phased manner has been taken up by IWAI with a view to provide the required infrastructure and safe navigable channel suitable for large scale transportation of cargo through inland water transport.

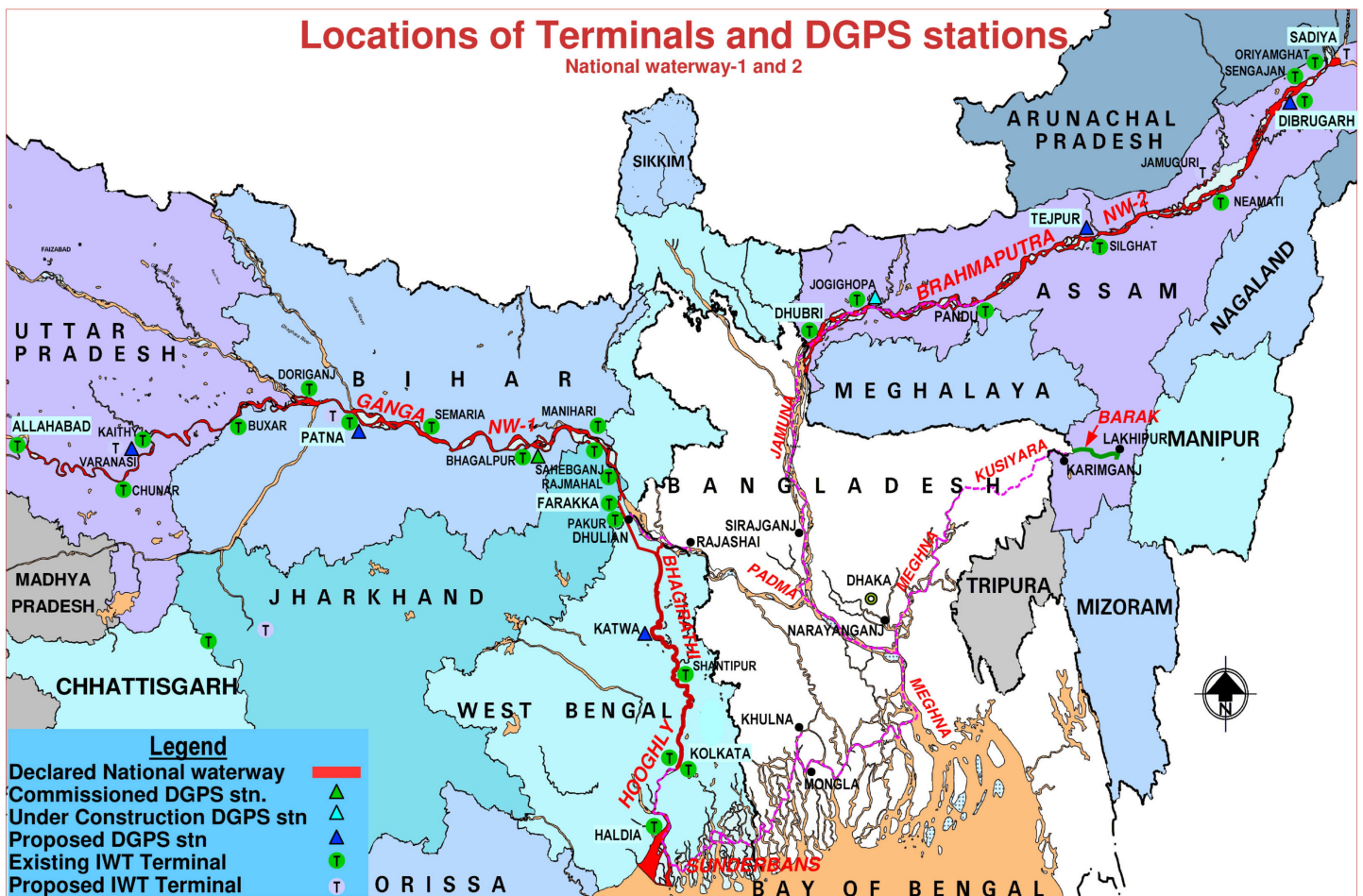
In order to ensure safe navigation and quick turn around of IWT vessels, IWAI has been striving to provide the state of the art and improved technology in the navigational aids along with conventional ones.

2. Proposed Project

Keeping in view the commitment to introduce more reliable and safe inland navigation, IWAI took a decision to introduce DGPS (Differential Global Positioning System) technique in National Waterway 1 and 2. Accordingly, a scheme for setting up of DGPS stations at five locations on NW-1 (Haldia – Alalhabad stretch on Ganga-Bhagirathi-Hooghly river system) and three locations on NW-2 (Dhubri – Sadiya stretch on river Brahmaputra) at an estimated cost of Rs.10 crore each was prepared in consultation with Director General Light House & Light Ships (DGLL) and the same has been sanctioned and is being executed in a phased manner.

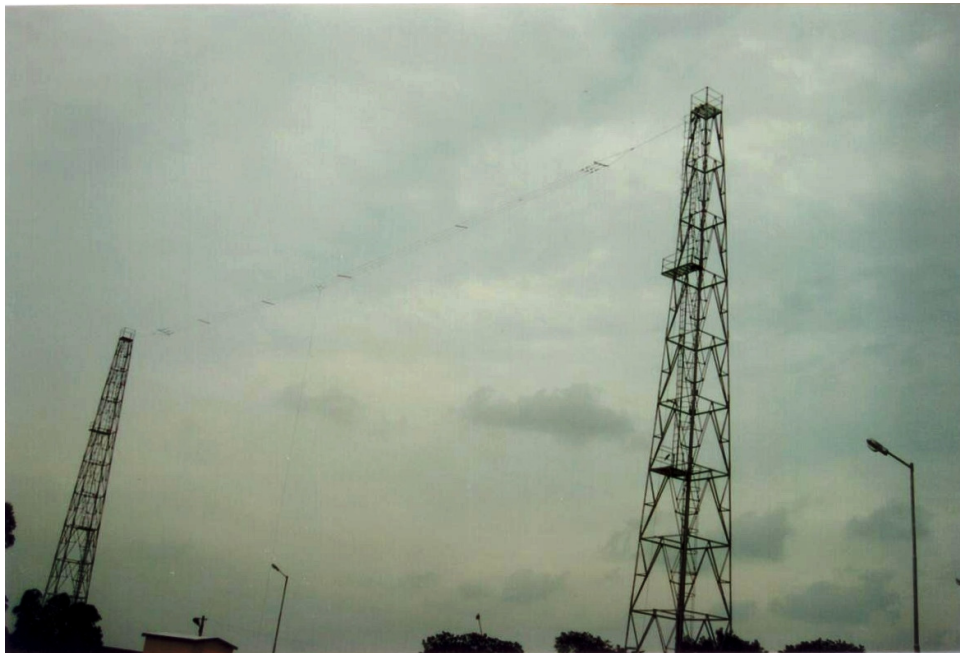
While DGPS station on NW-1 are proposed to be installed at Katwa, Bhagalpur, Patna and Varanasi to cover the entire waterway with the assistance of DGPS station already installed by DGLL (Directorate General of Light House & Light Ships) at Sagar Island, on NW-2 such

stations are proposed to be set up at Jogighopa, Tezpur and Dibrugarh. It is proposed to provide safe navigation through DGPS technique in NW-3 (Kottappuram to Kollam) with the assistance of the existing DGPS station at Cochin Port Trust. These stations are planned to provide a radial coverage of at least 150 Km with sub-metre accuracy in position.



3. DGPS stations in NW-1

The DGPS station at Bhagalpur has already been commissioned in August, 2009 and the same is now in operation. This is covering Farakka- Barh stretch (a range of 347 km.). DGPS station set up by Director General of Lighthouse and Lightships (DGLL) already exists in Sagar Island in West Bengal, which gives coverage up to Budge-Budge (132 km). The proposed station at Katwa will cover the stretch between Budge-Budge and Farakka (412 km), Patna station for the stretch Barh-Buxar (233 km) and Varanasi station for the stretch Buxar- Allahabad (423 km). The works for the balance stations are proposed to be taken up immediately after land acquisition and expected to be completed by December, 2010.



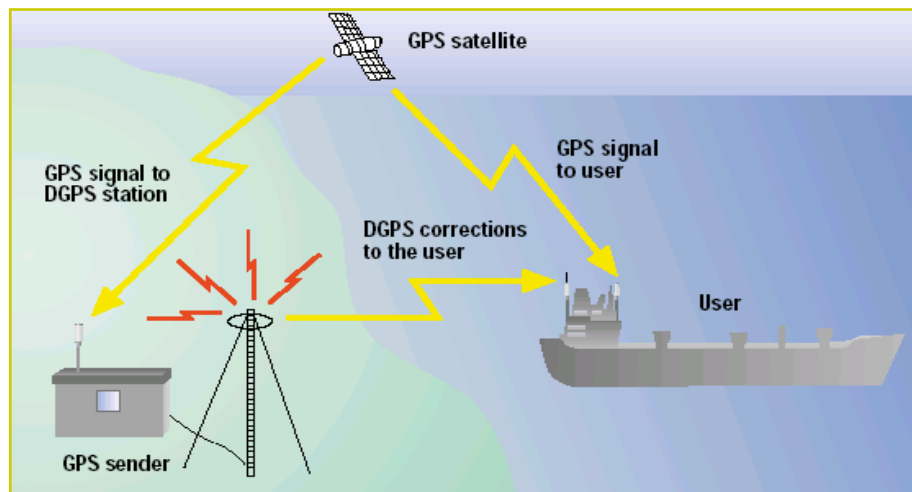
DGPS Station at Bhagalpur

4. DGPS stations in NW-2

The DGPS station at Jogighopa is under construction and its commissioning is expected by December, 2009, which will give coverage in the river stretch ranging from Bangladesh Border- Pandu (260 km). The proposed station at Tezpur will cover the stretch between Pandu - Jamuguri (370 km) and that at Dibrugarh will cover the stretch extending from Jamuguri- Sadiya (261 km). Work on Tezpur and Dibrugarh DGPS stations is expected to commence in the current financial year and completed by December, 2010.

5. Working principle of DGPS

The DGPS station is established at a location where its position is already known with respect to latitude and longitude. This station receives signals from the satellite systems stationed in the geo-stationary orbit and calculates the correction in position with respect to its actual position. This correction factor is continuously transmitted by the established DGPS station, which is received by the mobile DGPS receiver (normally called as Rover) fitted on board the vessel and that gives its accurate position during navigation on a real time basis. Hence, the mobile unit also gives sub-meter accuracy in position which enables the vessel to navigate along the exact route/channel.



6. Hardware requirement for availing DGPS technique

The Ganga and Brahmaputra being alluvial rivers are subjected to extensive meandering during lean season resulting in frequent changes of the navigational channel. Conventional channel marking using bamboo poles and lifting/relocation of lighted buoys are not practically feasible to demarcate the navigational channel in these rivers in a short span of time. Hence, IWAI had no other option but to think of implementing the modern concept of “Navigation with DGPS technique”.

To ensure safe navigation, IWAI has also developed real-time navigational display software with digital charts which can be effectively used during the voyage in NW-1, 2, 3 and Sunderbans waterways. The vessel fitted with a desktop computer (minimum P-IV configuration), one digital echo sounder, one DGPS receiver and the real-time navigational display software with pre-loaded digital charts of the respective waterway, can navigate safely by following the latest navigational route already loaded in the computer. The accuracy in this case is obtained as $\pm 1\text{m}$ within 150 Km radial distance from the station. With the above system, the navigation of the departmental vessels as well as one of the cruise vessels has been quite successful. Accordingly, there is plan to provide all the vessels of IWAI the required facilities to navigate in future with the assistance of this technique. The private IWT operators are also being encouraged to adopt the technique.

7. Hydrographic Survey activities

IWAI possess 19 state-of-the-art Survey Vessels fitted with automated hydrographic survey system and modern communication equipment. Channel monitoring is being done by taking up fortnight *thalweg* survey in NW-1 and NW-2 during lean season and monthly surveys during flood season and IWAI promulgates latest navigational information in the form of **River Notices** for the use of mariners/