

The Need for Nile River Vessel Traffic Services (NVTs)

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Abstract: Rivers are the basic natural resources for various human activities. For that reason, the river banks have encouraged pioneers to construct their new towns. River transport has always been of vital importance for the economy of various nations. This could be done through descriptive and analytic navigation in rivers and navigation at sea specially in confined waters. Vessel traffic services (VTS) system deals with managing ship traffic and suggesting best routes for vessels at busy and confined waters. Nile traffic service (NTS) as a Nile traffic monitoring system established by rivers protective authorities, can be alike to VTS maximum economic returns coming from river routes can be recognized with assistance of Nile traffic services which keep significant river information available for all users at all times. It also helps keep waters safer and more controlled by detecting illegal cargo activities the paper aims to re-plan River Nile for using in navigation and transportation due to its significant importance for a country like Egypt.

Key words: Nile River, VTS, river transport, navigation, NVTs.

1. Introduction

Industrial development has flourished along rivers because numerous industrial processes depend on water. Water is used as a raw material; it is also used to cool down the hot things and it is used in generation of electricity.

Rivers provide primary channels of inland waterways in the form of navigable waterways. Rivers are also being used for recreation; tourist promotion and fishing activities in a big way. A Nile traffic service (NTS) is systems that use radar, closed-circuit television (CCTV), VHF (very high frequency) radiotelephony and automatic identification system to keep track of vessel movements and provide navigational safety across Nile River [1].

Managing traffic for marine routes is a task as difficult as it is important. NTS deals with managing ship traffic on river routes, suggesting best routes for a vessel and checking no two vessels run into each other on Nile traffic routes. All these and much more ensure that river information always flows smoothly over all marine routes and Nile traffic remains organized.

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By analyzing previous studies it was found that in a conference paper Ref[2], a plan was proposed for safe navigation on the Nile River through discussing exestuation of hydrographic survey, producing of navigational charts and design of navigational path using aids for navigation and vessel traffic management. The author recommended establishing of ship reporting system and vessel tracking system.

In a study of director of Water Resources Research Institute titled “Dredging the Shallow Water in Egyptian Fairway” [3], stated that it is recommended, to implement as soon as possible a river information service (RIS). In another study [4] discussed the electronic navigational chart for safe navigation through Nile River and also recommended applying vessel tracking system using inland electronic navigational chart (IENC). It is clear from previous studies that there is a research gap which is the need for a system for managing Nile River traffic service.

The previous studies explained the problems of navigation, surveying, navigational marks, navigational maps, non-qualified crews and ports. The number of these ships is inadequate and does not meet the international standards for receiving passengers and goods, but did not mention VTS in detail but they only

mentioned it in the recommendations concept of NTS came into being with increasing need for a single body to regulate ship traffic.

2. Importance of Nile River for Transportation Service

In the 1990s, with the advent of road transport as a quick solution to some internal transport problems, the time component began to be of great importance in the transport market and the river transport method became non-competitive. As the problems of high road traffic congestion and accompanying negative effects on the overall development of the state have been worsened, it has been necessary to return once again to revitalize the river transport sector and to activate its role in the transfer of movables suitable to it, through the development of infrastructure by the state.

River transportation has several advantages of high competitiveness in the transfer of cargo by the rest of the other means of transportation, including: the ability to transfer types of movables of large sizes in which time and speed does not represent great importance, lower costs of the driving force, fuel economy, low investment costs in river transport, the least negative effects on the environment, availability of local manufacturing capabilities of river units, and reduce the number of fatalities caused by road accident [5].

3. The Current Situation

The quantity of cargo transported by Nile River varies from 23.5 million tons in 2010 to 20.7 million in 2013 of a percentage 0.54% to 0.42% of total transported cargo of other means of transportation [6]. Fig. 1 illustrates the movement of cargo transportation between river ports from 2010 to 2013.

4. The Future Situation

High expectations of port projects in attracting demand targeted transport volumes during the coming

period from 6% to 7% from 60 to 70 million tons [7]. Fig. 2 shows the expected transported cargo by Nile River for the period 2012 up to 2027 in million tons according to a study prepared by Agency Francoise de development AFD in 2012. The study shows the present situation, the medium inland water transport case and the high inland water case.

The paper of [2] stated that there are no aids to navigation and no vessel traffic information service available on the Nile, also Attia's research paper recommended implementing as soon as possible an RIS [3]. Moreover, Kamal recommended applying IENC in vessel tracking system [4].

5. River Nile Navigational Routes

The part of Nile River, which runs through Egypt, is about 1,520 km long. In north of Cairo, the Nile splits into two branches, the Damietta branch to the east and the Rosetta Branch to the west. Lake Nasser stretches over a distance of 312 km. There are four main River Nile navigational routes in Egypt which mostly lay at Delta area and serve the sailing vessels and small barges [8].

5.1 Cairo-Alexandria Route

The length of this route is 220 km across El-Rayah El-Behery then El-Noubarayah Canal. It is connected to the maritime transport by Alexandria Port.

5.2 Cairo-Damietta Route

Damietta Branch is 247 km from Delta Barrage to the Mediterranean Sea; Cairo/Damietta waterway is formed by the greater part of Damietta Branch and the connection canal.

5.3 Cairo-Aswan Route

The length of this route is 960 kilometers across the main route of the River Nile. It can be used up and down and used by all units transporting goods, and also by tourist vessels.

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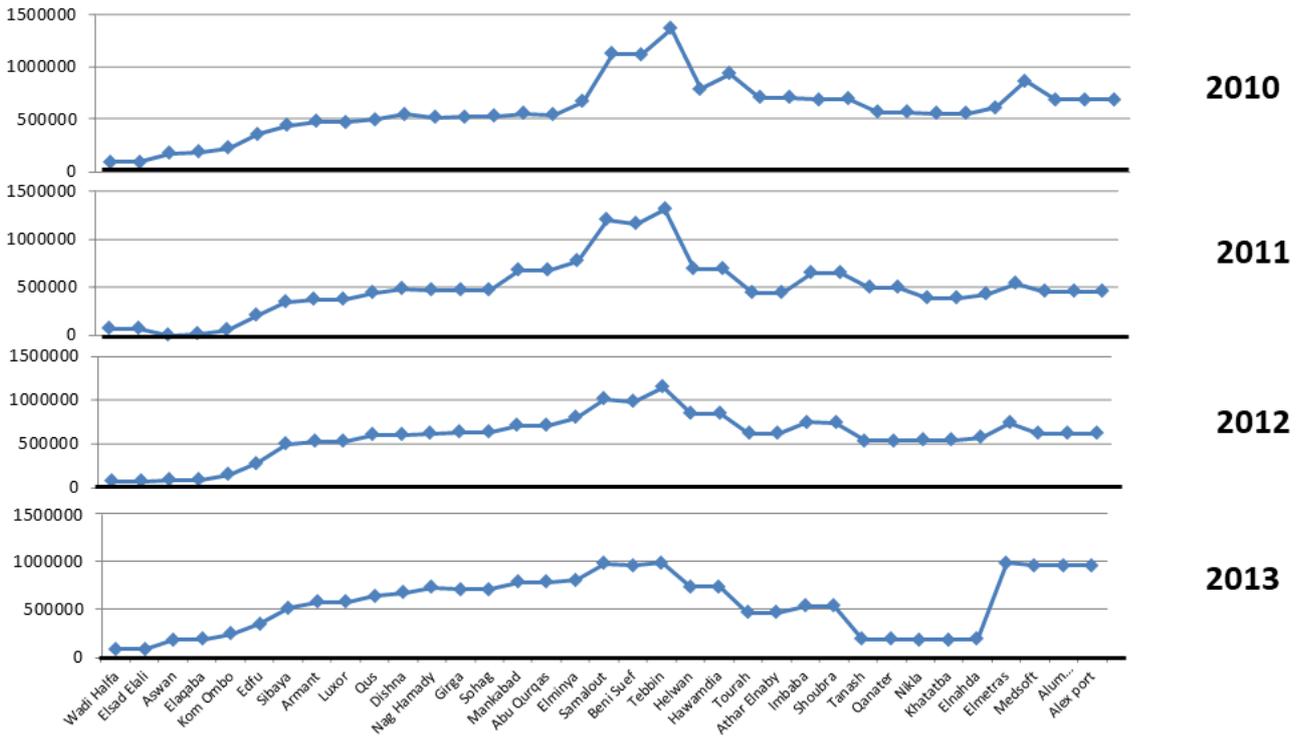


Fig. 1 Movement of cargo transportation among river ports [6].

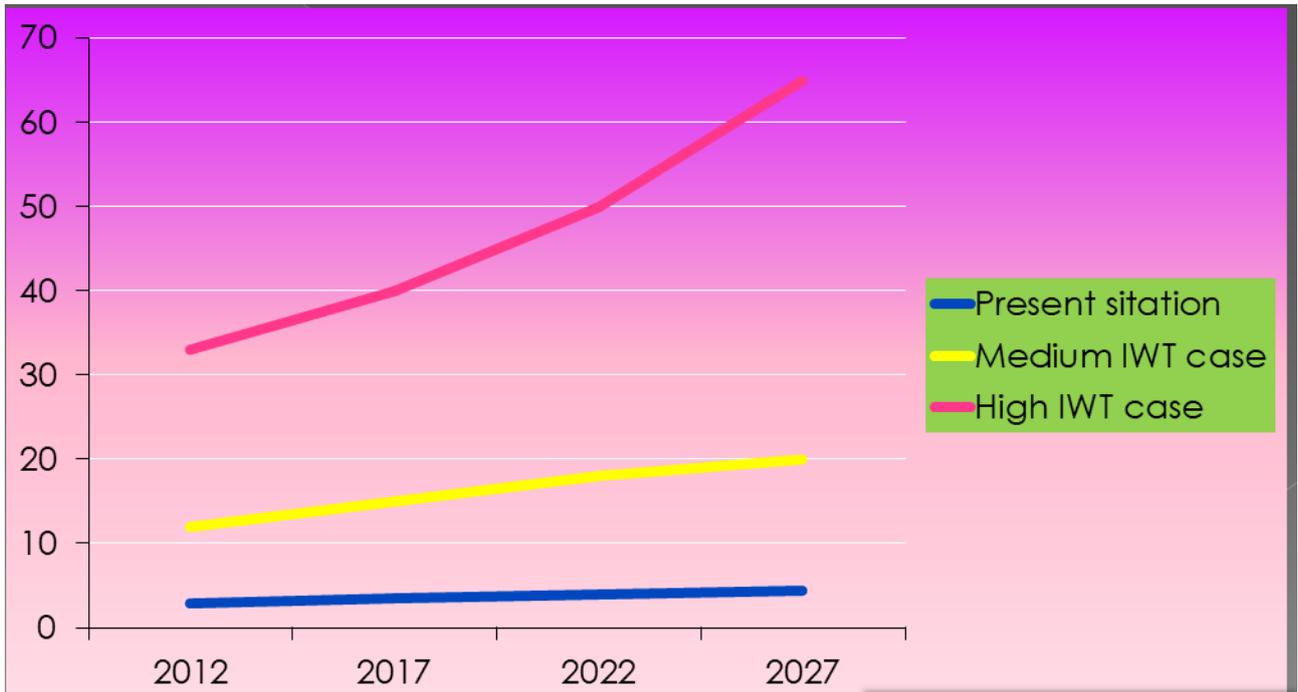


Fig. 2 Prediction of cargo transportations in Egypt per million ton [9].

5.4 Aswan-Halfa (Sudan)

The length of this route is 350 km starting from High Dam Port across Nasser Lake to Halfa in Sudan. There are three harbors on the eastern river side, first is Abu-Sembel which is used for tourism, second and third are used for cargo at Aswan [10].

The current river navigational routes are non-navigational by night, which increases the voyage time, also suffering absence of aids to navigation which is the main reason of sinking barges and many vessel accidents. Another factor concerning the navigation obstacles is the authorized interposition of ministry of irrigation through controlling the amount of water that should flow through the High Dam into the inland waterways, which are in conjunction with the needs of agriculture, and drinking affairs, apart from the needs of the river transport operations [8].

6. Vessel Traffic Services (VTS) and Its Importance

VTS contributes to the safety of life at sea, safety and efficiency of navigation, the protection of the marine environment, the adjacent shore area, worksites, and offshore installations from possible adverse effects of maritime traffic (SOLAS V-12). Importance of VTS can be better understood from the functions it plays in managing ship traffic. The key importance of VTS is for managing vessel traffic. This further helps ensure safety of ships, along with helping attain maximum traffic flow from any given route.

Maximum economic returns can be realized from a marine route with help of these traffic services that keep important marine information available for all mariners at all times. It even helps in keeping a tab on movement of unauthorized cargo movements, making waters safer and more controlled. However, one of the most important roles of these services is to act as a vessel finder. The information gathered, stored and replayed by various sensors helps in keeping a tab on

movements of vessels at all time. This crucial marine information is available at all times and can be used to find a vessel if it goes missing [11].

7. Types of VTS

VTS chiefly includes devices to collect and transmit maritime information which includes traffic images. The information is further transmitted to various vessels in a given VTS zone. This helps the vessels' captains to make better navigational decisions and decide their routes. Several devices are used for purpose of gaining and transmitting the information. Depending on type medium used to gain this information, VTS can be classified as below.

7.1 Surveilled

They consist of land based sensors for attaining important marine information. These sensors include radars, AIS and closed circuit television sites. Signals from these sensors are sent to central locations where trained VTS personnel analyze the information and guide ship traffic as shown in Fig. 3

7.2 Non-surveilled

It consists of one or more reporting points at where ships notify about their identity, course, speed and other data. Using these data, courses of various vessels are mapped out and regulated to avoid any mishaps.

Uniformity is attained in between surveilled and non-surveilled sensors for complete coverage of entire marine traffic. Hence understanding nature and working of these sensors would be important to any mariner.

8. VTS Berwick Bay in USA

VTS Berwick Bay (VTSBB) commenced operations in 1975, the purpose of VTSBB is to enhance navigation, vessel safety, marine environmental protection, and promote safe vessel movement by reducing the potential

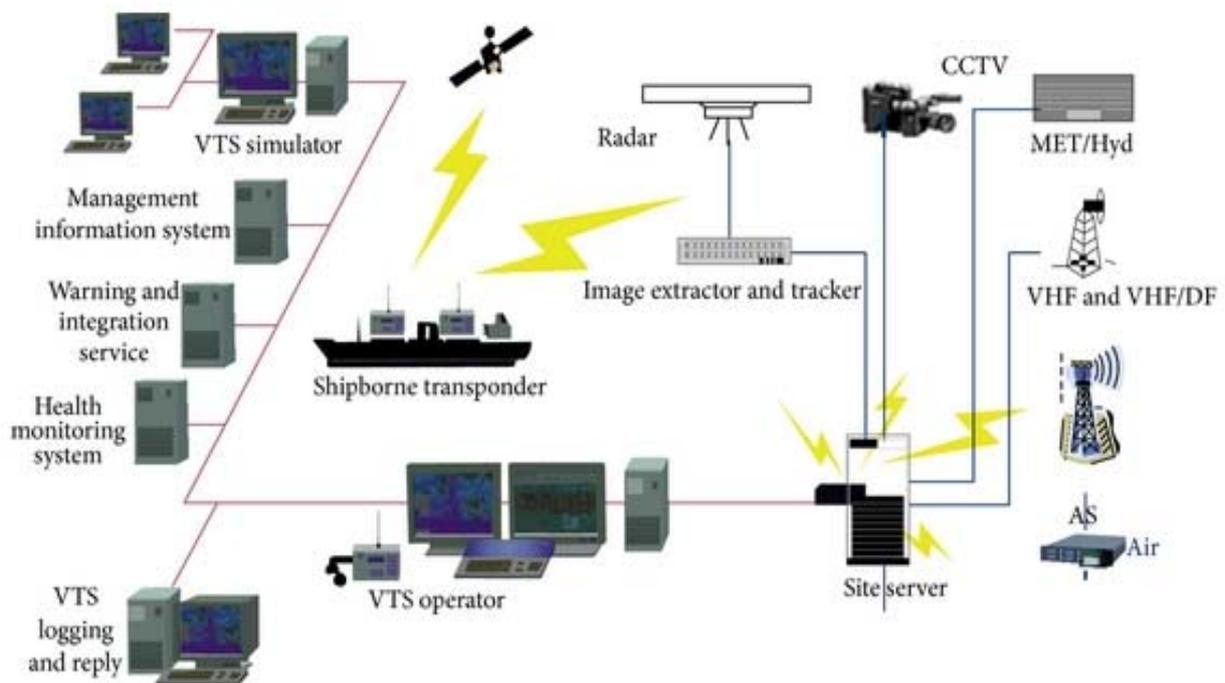


Fig. 3 VTS surveilled type component [12].

for collisions, ramming, groundings, the loss of lives and property associated with these incidents within vessel traffic service area (VTSA). VTS provides the mariner with information related to the safe navigation of the VTSA. The information, coupled with the mariner's compliance with direction and regulations, enhances the safe routing of vessels through congested waterways or waterways of particular hazard.

The objective is to issue the proper directions and provide accurate information to mariners to facilitate the safe movement of vessels, and minimize the inherent risks associated, while they transit the VTSA. Using installed communications and surveillance equipment along with Captain of the Port regulations and VTS specific regulatory authority, the VTS is able to help prevent vessel collisions and in some cases, groundings, before they happen. The VTS also has the capabilities to command, monitor aids to navigation and anchorages, and provide search and rescue and law enforcement assistance [13].

9. The Need for Implementation of VTS in River Nile

The implementation of VTS system in the River Nile became essential for safety, security, marine environment protection, and information exchange and economy progress and could be called NTS. This includes navigational rules and regulations, routing schemes, visual and electronic aids to navigation, training and certification system for crew and NTS personal. The benefits of implementing a NTS are that it allows identification and monitoring of vessels, strategic planning of vessel movements and provision of navigational information and assist in prevention of pollution.

IMO Resolution [14] entitled "Guidelines for Vessel Traffic Services" recommends the establishment of VTS system if one or more of eleven conditions exist in navigational area. Most of them particularly exist in the River Nile:

- Traffic carrying hazardous cargoes and complex navigation patterns.
- Difficult hydro graphic and metrological elements.
- Shifting shoals, and other local hazardous also environmental considerations.
- Narrow channels and record of maritime casualties.

Therefore, the Nile River is one of the navigational areas that seriously need VTS to be established.

10. RIS

RIS is defined as a concept of harmonized information services to support traffic and transport management in inland navigation, including interfaces to other modes of transport [15].

RIS system composed of authority, RIS operators, lock operators, terminal operators, harbor operators, skippers, and fleet manger and calamity centers as shown in Fig. 4

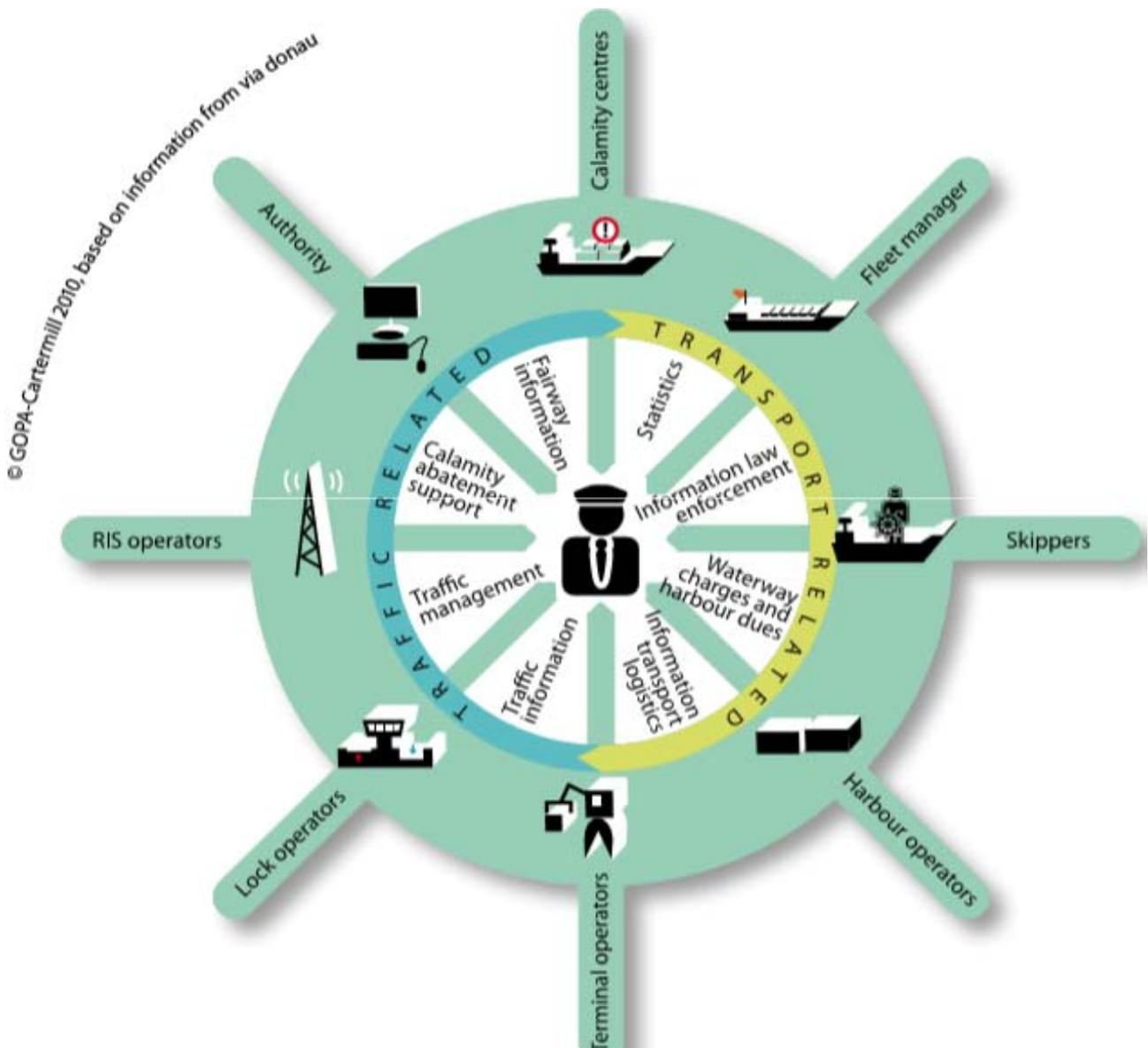


Fig. 4 RIS components [15].

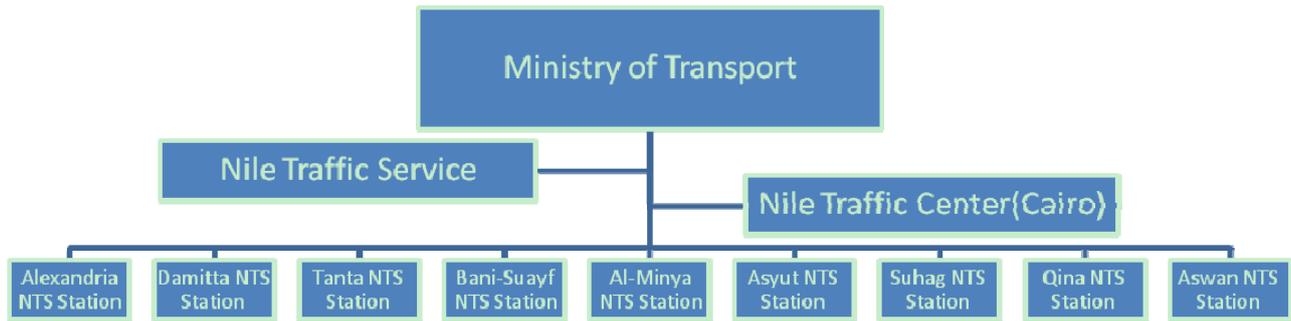


Fig. 5 Proposed structure model of NTS. Source: author.

10.1 Proposed Model of Implementation of NTS

10.1.1 Basic Requirements for Building an NTS Model

The Ministry of Transport is the authority which made it responsible for safety, including environmental safety and protection, also efficiency of vessel traffic as it is shown in fig. 5

- Nile traffic service (NTS)—a service applied by the Ministry of Transport, planned to increase the safety and efficiency of Nile traffic.
- NTS authority—the authority with responsibility for the management, operation and co-ordination of the NTS, interaction with participating vessels and the safe and effective provision of the service.
- NTS area—is about 1,500 km long, North of Cairo, the Nile splits into two branches, the Rosetta Branch to the west and the Damietta branch to the east. Lake Nasser man-made lake stretches over a distance of 312 km.
- NTS center—in Cairo—is the center from which the NTS operated. A number of sub-areas along NTS, Cairo-Alexandria Route, Cairo-Damietta Route, Cairo-Aswan Route and Aswan-Halfa (Sudan) have its own sub-center.
- NTS supervisor—a properly skilled person acting one or more jobs contributing to the services of the NTS.
- NTS navigating plan—a plan which is equally approved between an NTS Authority and the master of a vessel about the sailing of the vessel in an NTS area [11].
- NTS surveillance—the superficial image of vessels movements in a NTS area.

- NTS services—NTS should contain an information service to ensure that essential information becomes available in time for masters to prevent the development of dangerous maritime traffic situations.

10.2 NTS Guidelines

The following guidance concerning the services that are rendered by an NTS:

- (1) The information service is provided by broadcasting information at fixed times and intervals by the NTS or at the request of a vessel, and may include for example reports on the position, identity and intentions of other traffic; waterway conditions; weather; hazards; or any other factors that may influence the vessel's transit.
- (2) The navigational assistance service is especially important in difficult navigational or meteorological circumstances or in case of defects or deficiencies.
- (3) The traffic organization service concerns the operational management of traffic and the forward planning of vessel movements to prevent congestion and dangerous situations. The service may also include mandatory reporting of movements in the NTS area, routes to be followed, speed limits to be observed or other appropriate measures which are considered necessary by the NTS authority.
- (4) When the NTS is authorized to issue instructions to vessels, these instructions should be result-oriented only, leaving the details of execution, such as course to be steered or engine maneuvers to be executed, to the master [16].

(5) NTS area can be formed of NTS center in Cairo and nine NTS stations in Alexandria, Damietta, Tanta, Bani-Suayf, Al-Minya, Asyut, Suhag, Qina and Aswan as shown in Fig. 6



Fig. 6 Proposed model of distribution of NTS center and stations. Source: author.

11. Conclusion

One of the basic natural resources for various human activities in Egypt is Nile River. Its significant importance comes from using it in navigation and transportation: navigation, surveying, navigational marks, navigational maps, non-qualified crews and ports are types of problems explained by previous studies. Also this paper discussed the international standards for receiving passengers and goods, of the vessels and ports receiving passengers and cargo, but mentioned VTS in recommendations without any detail. The increasing need for a single body to regulate ship traffic is the concept of applying NTS. The NTS concept aims at implementing information services to support the planning and management of traffic and transport operations. Implementing NTS has not only improved traffic safety and environmental protection but also simultaneously enhanced the efficiency of transport operations and increased competitiveness. The NTS consolidates all data to ensure prompt access to all available types of information from the state organizations and agencies, creation of analytical and statistical data base in the field of maritime and river transport.

Recommendations

- (1) Establishing NTS system covering all Nile River.
- (2) Qualifying and training staff to work as supervisors and coordinators in the NTS center and stations.

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