

PILOTAGE ADVISORY COMMITTEE

**Replacement/Upgrading of Hong Kong
Vessel Traffic Services (VTS) System**

Purpose

1. This paper serves to provide members with a general picture about the new Vessel Traffic Services (VTS) System.

Briefing

2. A briefing paper is attached at Annex. It summaries the new features and functionality of the new HKVTS system in the beginning of the 21st century.

Presentation

3. This paper will be presented by Mr. M. K. CHAN of the Marine Department.

VTS Branch

Marine Department

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Upgrading of VTS System

1. INTRODUCTION

In September 2000, the Electrical and Mechanical Services Department signed the Contract with HITT, Holland Institute of Traffic Technology B.V. for the Replacement/Upgrading of the Vessel Traffic Services (VTS) System for the Marine Department. This project is aimed at providing a new VTS system of state-of-the-art technology to ensure continued safe and efficient control and monitoring of marine traffic in the Hong Kong waters.

The project comprises the design and provision of :

1. Radar subsystem
2. Automatic Identification of Ships (AIS) subsystem
3. VHF Radio Direction Finding (VHF-DF) subsystem
4. Multi Sensor Fusion, Tracking and Display subsystem
5. VHF radio communication subsystem
6. Voice communication and control subsystem
7. Closed Circuit TV (CCTV) subsystem
8. Microwave subsystem
9. Voice, data and video logging subsystem
10. VTS training and simulation subsystem
11. Supervisory Control and Data Acquisition (SCADA) subsystem
12. Power subsystem

The present VTS system for Marine Department was commissioned in 1989. Since the majority of the VTS equipment is meeting the end of life, the present VTS system will be replaced/upgraded.

2. SYSTEM OVERVIEW

Surveillance information on ship movements in the Hong Kong waters was collected through radar systems, AIS transponder base stations and VHF Direction Finders at remote sites. This surveillance information is integrated and presented to the VTS operators in the Vessel Traffic Centre (VTC) located in the Outer Pier of the Macau Ferry Terminal. Closed Circuit Television (CCTV) cameras will be installed to further support the VTS operator for monitoring traffic situations.

Communication between the VTS operators in VTC and ships is performed by means of a VHF radio communication subsystem. To realize coverage for radio communication in the Hong Kong waters, VHF radio base station are installed at remote sites.

A microwave communication subsystem is used to route all the information (radar, AIS, VHF-DF, VHF communication) between the remote sites and the VTC.

3. SUBSYSTEM OVERVIEW

3.1 Radar

Existing radar equipment at the remote sites will be replaced by state-of-the-art radar transceivers. This new radar equipment will improve the radar coverage and the detection of small targets in adverse weather conditions. The turning unit of the radar antenna at Kau Yi Chau will also be upgraded to withstand strong wind of speed up to 200 km/hr.

3.2 Automatic Identification of Ships (AIS)

The Universal AIS is a shipboard broadcast transponder system, operating in the VHF maritime band, capable of sending the ship's information such as identification, position, heading, ship length, beam, type, and draught, hazardous cargo information, to other ships also to shore stations. It is capable of handling well over 2,000 reports per minute and updates as often as every two seconds.

The system's coverage is similar to other VHF applications; i.e. quasi-optically depending on the height of the antenna. Transponder base station will receive the information of the shipboard transponders.

The 72nd Session of the IMO's Maritime Safety Committee decided which ships would be required to carry AIS equipment. Mandatory carriage of AIS transponders will start from 1 July 2002 and will be completed 1 July 2007, depending on the type of ships.

AIS information will be integrated with radar information in order to provide surveillance information in areas without radar coverage as well as automatic identification of ships in the VTS coverage area. In the future, AIS can support communication from the VTC towards ships. This will enable so-called "Silent VTS" in the next decade.

3.3 VHF Radio Communication

VHF radio communication station will be installed at remote sites to enable optimal coverage for this kind of radio communications.

3.4 CCTV Cameras

The CCTV system will consist of daylight colour cameras with night vision image intensifiers. In total 7 cameras will be provided at strategic locations, with an option for another 3 cameras to be installed at Green Island. The camera image will be presented at CCTV monitors in the VTC and in Ma Wan Traffic Control Station.

The CCTV system will facilitate the VTS Operators to monitor the traffic situation in searching, tracking and identifying vessels. The cameras can be pointed in any directions through a remote control panel. Integration with the Traffic Display will provide a pointing facility from the Traffic Display.

3.5 VHF Radio Direction Finder (VHF-DF)

(VHF-DF) are used in the VTS system to support VTS Operators for identifying vessel. A Radio Direction Finder will provide bearing information on a VHF radio transmission from a vessel, which is presented on the Traffic Display. An additional (VHF-DF) will be established at Black Point to enhance the identification of vessels from the west.

3.6 Multi Sensor Fusion, Tracking and Display Subsystem (MSFTD)

The Multi Sensor Fusion, Tracking and Display subsystem integrates the information from the radar, AIS base stations and Radio Direction Finder systems in a comprehensive overview on the Traffic Display. The information is presented in an overlay on map information. Additional information on vessel and vessel journey like vessel name, ETA, cargo, etc. is also presented in the same Traffic Display. This information is retrieved from the Marine Department Informatics Computer System.

4. IMPLEMENTATION

The replacement and upgrading will be implemented with minimal interruption to VTC's operations. The implementation will be performed in 2 sections. In section 1 the equipment in VTC will be replaced whereas the equipment at the remote sites will be replaced in section 2.

Implementation schedule

2001	2002	2003
Section 1		
	<ul style="list-style-type: none">•VTC•Radar data processing•Displays•AIS (partly)•VHF•CCTV (partly)•Communications system	Section 2
		<ul style="list-style-type: none">•Radar replacement•MW replacement•AIS•VHF-DF•CCTV

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