For discussion **FCR(2012-13)11**
on 20 April 2012

ITEM FOR FINANCE COMMITTEE

CAPITAL WORKS RESERVE FUND
HEAD 708 – CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND EQUIPMENT
Marine Department
New Subhead "Replacement/Upgrading of Vessel Traffic Services System"

Members are invited to approve a new commitment of $558,200,000 for the replacement/upgrading of the Vessel Traffic Services system of the Marine Department.

PROBLEM

We need to plan ahead for the replacement and upgrading of the existing Vessel Traffic Services (VTS) system before it reaches the end of its serviceable life by around 2016, to maintain effective marine traffic control and ensure navigational safety in Hong Kong waters.

PROPOSAL

2. The Director of Marine, with the support of the Secretary for Transport and Housing, proposes to replace and upgrade the existing VTS system at an estimated cost of $558,200,000.

JUSTIFICATION

Importance of the VTS System

3. The VTS system is installed at the Hong Kong – Macao Ferry Terminal where the Vessel Traffic Centre (VTC) is located. Since 1989, the Marine Department (MD) has been providing VTS round the clock to ocean-going vessels (OGVs) and river trade vessels of 1 000 gross tonnage or over visiting or transiting

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Hong Kong to ensure their navigational safety, and facilitate their arrivals and departures as expeditiously as possible. The VTS system also maintains port call records of OGVs for issuance of invoices for port related charges and provides vessel information to port users, government agencies and the general public. In addition, the data obtained from the VTS system is shared with the Hong Kong Police Force and the Customs and Excise Department to support their law enforcement work.

Need for Replacement

4. Most of the components of the existing VTS system[1] have been in use for about ten years since 2002. The remaining components (i.e. 11 radars) have been in operation for almost 23 years since 1989. The Electrical and Mechanical Services Trading Fund (EMSTF) has recently examined the maintainability of the system and found that many of its components are showing signs of aging which may affect the system's reliability if not replaced in time. Some spare parts are also becoming unavailable in the market. MD therefore proposes to procure a replacement VTS system for commissioning in 2016.

5. The replacement will be a full-scale one and will include the 11 radars. MD needs to start the planning process now to allow the necessary lead time of around four years for tendering and production of VTS equipment, as well as installation and test runs which will be conducted under a phased programme, and system testing before commissioning.

6. MD will stipulate the use of the most advanced technology in the tender specifications in compliance with the latest international requirements as prescribed by the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and the International Maritime Organization (IMO).

Benefits of the Replacement Proposal

7. Timely replacement of the VTS system will ensure continued provision of reliable VTS for vessels visiting Hong Kong. It will also enable MD to monitor and regulate marine traffic more effectively and efficiently with up-to-date technology. The new VTS system can detect and track up to 10 000 vessels[2], as

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1 The components include multi-sensor fusion tracking and display, Very High Frequency radio communication and directional finders, microwave network, telephone and integrated voice communication system, VTS simulators and automatic identification system.

2 The tracking capacity of 10 000 vessels is a standard provision available in the market.

compared to the existing capacity of 5 000 vessels. With improved functions, small and fast vessels can be more readily detected by the new VTS system and the chance of losing vessel tracks under inclement weather will be reduced. It will improve MD's capability of responding to traffic congestions and bad weather hazards. The new VTS system can also capture more information relating to vessel movements and eliminate the need for manual data input. The new system is expected to meet the operational needs up to 2030.

8. Above all, the upgraded VTS system will be able to meet the evolving international operational standards of VTS equipment, which is important in reinforcing our position as a world-class shipping hub port and an international maritime centre. It can also support sharing of VTS data with neighbouring ports in Guangdong, Shenzhen and Macao for better regional traffic management as recommended by the IALA and IMO.

FINANCIAL IMPLICATIONS

Non-recurrent Expenditure

9. We estimate that the replacement/upgrading of the VTS system will incur a total non-recurrent expenditure of $558,200,000 with breakdown as follows –

			$ '000
(a)	Equipment to be procured –		336,500
	(i) radar	90,500	
	(ii) multi-sensor fusion tracking and display	69,500	
	(iii) Very High Frequency communication and directional finder	38,500	
	(iv) close circuit television	27,900	
	(v) microwave and network	21,900	
	(vi) Integrated Voice Communication and Private Automatic Branch Exchange	21,700	
	(vii) VTS simulator and ship simulator upgrade	19,000	
	(viii) power supplies	12,500	
	(ix) other systems such as Automatic Identification System, Vessel Height Detection System and Remote Control and Monitoring	15,000	
	(x) spare parts	20,000	

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		$ '000
(b)	System installation and commissioning	75,000
(c)	Construction and fitting out works for VTC and remote sites, etc	55,000
(d)	System transition arrangement	10,000
(e)	EMSTF project management charges	34,000
(f)	Contingency (10% of items (a) to (d) above)	47,700
	Total	**558,200**

10. On paragraph 9(a) above, the estimate of $336,500,000 is the equipment cost of various systems of the project. A brief description of their functions is at the Enclosure.

Encl.

11. On paragraph 9(b) above, the estimate of $75,000,000 is for the installation of the VTS equipment, testing of the system functions and commissioning.

12. On paragraph 9(c) above, the estimate of $55,000,000 is for the necessary construction and fitting out works at the VTC and remote sites to get prepared for the installation of the VTS equipment and its future operation.

13. On paragraph 9(d) above, the estimate of $10,000,000 is for meeting the expenses related to system transition arrangement to ensure the continual provision of VTS during installation of the new system.

14. On paragraph 9(e) above, the estimate of $34,000,000 is for meeting the charges of EMSTF for providing project management services, including detailed system design, preparation of tender specification, tender documentation and evaluation, contract administration as well as testing, commissioning and monitoring of all the equipment installed.

15. On paragraph 9(f) above, the estimate of $47,700,000 represents a 10% contingency on the items set out in paragraphs 9(a) to (d).

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16. We intend to phase the expenditure as follows –

Financial Year	**$ '000**
2012 - 2013	7,000
2013 - 2014	63,000
2014 - 2015	142,000
2015 - 2016	119,500
2016 - 2017	226,700
Total	**558,200**

Recurrent Expenditure

17. We estimate that the annual recurrent cost for maintenance of the new VTS system would be $24,200,000 from 2016-17 onwards, representing a slight increase of $2,200,000 over that for the existing VTS system at about $22,000,000 for 2011-12. This increase is due to the additional and more advanced equipment purchased. Such requirements will be reflected in the Estimates of the relevant years. A breakdown of the estimated recurrent expenditure upon commissioning of the new VTS system is given below –

		2016-17 ($'000)
(a)	Contractor maintenance services	13,200
(b)	Specialised supplies	3,300
(c)	Data processing	2,200
(d)	Other expenses	5,500
	Total	**24,200**

18. On paragraph 17(a) above, the estimated annual expenditure of $13,200,000 is for the employment of contractors and specialists to provide maintenance services for the VTS system.

19. On paragraph 17(b) above, the estimated annual expenditure of $3,300,000 is for the procurement of parts and consumables for the maintenance of the VTS system.

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20. On paragraph 17(c) above, the estimated annual expenditure of $2,200,000 is for the rental of data lines, and computer hardware and software maintenance service for the VTS system.

21. On paragraph 17(d) above, the estimated annual expenditure of $5,500,000 is for the general expenses including electricity, fuel, transportation, and other utilities.

Impact on Fees and Charges

22. We currently recover the full cost of the VTS system, including maintenance costs, from the fees and charges collected by MD for its services provided to vessels over the serviceable lifespan of the system. We estimate that the full cost of the existing VTS system, which was installed in 2002, will be fully recovered when the new system comes into operation in 2016. The full cost of the new VTS system will continue to be recovered in the same manner. In view of the present trend of steady number of vessel arrivals, we estimate that the replacement/upgrading of the VTS system would not lead to an increase in the current level of fees and charges.

IMPLEMENTATION PLAN

23. We plan to implement the replacement project according to the following timeframe –

Item	Activities	Timing
(a)	Preparation of tender documents	May 2012 – February 2013
(b)	Tendering, evaluation and award of contract	March 2013 – December 2013
(c)	VTS equipment manufacturing, delivery and installation by phases	December 2013 – February 2016
(d)	VTS testing and commissioning by phases	May 2015 – August 2016
(e)	Commissioning of the entire system	September 2016

PUBLIC CONSULTATION

24. The Port Operations Committee[3] indicated support for the proposed replacement of the VTS system when it was consulted on 2 September 2011. We then consulted the Legislative Council Panel on Economic Development on the proposal at its meeting on 17 January 2012. Members enquired about the long lead time for the replacement project and the need for procuring a system with an enhanced tracking capacity. We explained in detail the procedures and activities involved in the procurement and the installation of the new system, which had to be done under a phased programme, as well as the fact that the tracking capacity of 10 000 vessels is a standard provision available in the market. Members indicated support for the proposal.

BACKGROUND

25. The VTS system is an essential tool for improving the safety and efficiency of vessel traffic and protecting the marine environment. It is used by all major ports. When the first generation VTS system which was installed in 1989 reached the end of its serviceable life, the Finance Committee approved a commitment of $226,000,000 in 1999 for MD to replace all the components of the VTS system, except for the 11 radars. This second generation VTS system was commissioned in 2002.

Transport and Housing Bureau
April 2012

[3] The Port Operations Committee comprises members representing the interests of different port users, such as ship-owners, shippers, container terminal operators, dockyard, harbour tug operators, etc.

Major Electrical and Mechanical Equipment Installations for the Vessel Traffic Services (VTS) System

1. Radar

It consists of radar scanner, turning unit, radar transceiver and control electronic equipment for the detection of vessel movements in Hong Kong waters, especially in and along high-risk and busy waterways.

2. Multi-sensor fusion tracking and display

It is used for analysing target information provided by the radar and Automatic Identification System (AIS). By tagging each moving vessel target with a unique identifier, it is capable of identifying potential vessel conflicts and presenting the information on graphics-based display to facilitate overall efficient VTS operation. It comprises high performance computer servers, computer workstations, data communication network and associated specialised software.

3. Very High Frequency (VHF) communication and directional finder

It provides voice communication between the Vessel Traffic Centre (VTC) and vessels via international VHF marine radio channels. It also provides a digital readout of the bearing of any vessel calling on designated VHF marine radio channels on the tracking and display in the VTC.

4. Closed circuit television (CCTV)

It comprises cameras at strategic locations for the monitoring of vessel traffic within busy and high-risk waterways so that prompt actions can be taken by the VTC during emergency.

5. Microwave and network

It is an essential communication system for the transmission of radar target data, CCTV images, voice and data information between remote radar stations and the VTC.

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6. Integrated Voice Communication (IVC) and Private Automatic Branch Exchange (PABX)

The IVC enables transmission of voice communications between VHF marine radio channels and telephone system to facilitate effective communication and recording of verbal messages among operators in the VTC, vessel operators and other parties. The PABX provides automatic switching of external and internal telephone calls for operators in the VTC.

7. VTS simulator and ship simulator upgrade

The upgraded simulators, which are identical to the real VTS system, provide classroom operation trainings to MD staff without interrupting the smooth operation of the VTC.

8. Power supplies

The power supplies comprise alternative current supply facilities, emergency diesel generators and uninterruptible power supplies for the provision of smooth and stable electricity to all essential equipment at the VTC and remote stations.

9. Other systems

(a) **AIS**

AIS enables the collection of both static and dynamic information of the vessels that are equipped with an AIS transponder.

(b) **Vessel Height Detection System (VHDS)**

VHDS provides real-time measurement of vessel height when vessels pass through the detection point at sea.

(c) **Remote Control and Monitoring System (RCMS)**

RCMS monitors the real-time status of VTS equipment including VTS computers and software, network equipment, radar and AIS base stations to ensure the smooth and continuous operation of the VTC.

10. Spare parts

Spare parts to be procured are essential for immediate repair of the equipments as necessary to enable continued smooth operation of the VTS system.
