For discussion **FCR(2017-18)35**
on 3 November 2017

ITEM FOR FINANCE COMMITTEE

CAPITAL WORKS RESERVE FUND
HEAD 708 – CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND EQUIPMENT
Hong Kong Police Force
New Subhead "Implementation of Marine Situational Awareness System"

Members are invited to approve a new commitment of $186,335,000 for the implementation of Marine Situational Awareness System.

PROBLEM

The existing communications systems of Marine Police can only transmit voice messages and limited text information. Marine Police also lack a system which can integrate data collected from various police vessels as well as land-based facilities and instantly share such data for use. To meet the operational needs of the Hong Kong Police Force (HKPF) in safeguarding maritime safety and conducting maritime rescue operations, a new platform which can share real-time images, videos and other key data amongst police vessels and command centres on land is needed.

PROPOSAL

2. The Commissioner of Police, with the support of the Secretary for Security, proposes to install the Marine Situational Awareness System (MARSAS) in 113 police vessels and eight command centres on land at an estimated cost of $186,335,000.

/**JUSTIFICATION** …..

JUSTIFICATION

Need for MARSAS

3. Since 1947, the HKPF has been using radios to communicate with civilian ships and vessels of other government departments at sea. In 1984, the Marine Police and other concerned government departments started using the Joint Maritime Communications System, which was digitalised in full in 2000 and became the Marine Region Communications System (MRCS) exclusively used by the HKPF since then. At present, the HKPF's Marine Regional Command and Control Centre (RCCC MAR) and police vessels are equipped with the sensor and security systems at Enclosure to detect and identify vessels within the waters of the Hong Kong Special Administrative Region, thereby maintaining maritime safety, preventing and detecting crimes, and conducting search and rescue operations as well as performing other daily operational duties. Information and data collected by these sensor and security systems can only be conveyed orally through MRCS.

Encl.

4. Despite the constant refinements of the communications systems of Marine Police, their functions remain restricted to the transmission of voice messages and limited text information. At present, RCCC MAR can only communicate with frontline police officers and assess on-scene situation through oral communications via MRCS and mobile communications network. This is often time-consuming and prone to mistakes, and may directly hamper the HKPF's ability to respond promptly to the on-scene situation. In addition, as the Marine Police do not have a platform capable of sharing real-time information, data collected from relevant land-based facilities, Barge Operating Platforms, police vessels and their sensors cannot be shared instantly for use.

The Proposed System and Major Features

5. In view of the existing constraints, the HKPF proposes to install MARSAS in 113 police vessels[1] and at eight command centres on land[2] with funding sought under this proposal to enable the transmission or sharing of

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[1] In addition to these 113 police vessels, 28 new police vessels in the pipeline will also be installed with MARSAS, the cost of which has been included in the construction cost of such vessels.

[2] Including –

(a) the Security Bureau's Emergency Monitoring and Support Centre,
(b) the HKPF's Headquarters Command and Control Centre,
(c) RCCC MAR/Marine Incident Command Centre,
(d) RCCC MAR's fallback site at RCCC New Territories North,
(e) Marine Port District's District Operations Room,
(f) Marine Outer Waters District's District Operations Room,
(g) Small Boat Division's Operations Room, and
(h) Maritime Counter-Terrorism Boat Team and Special Duties Unit's Operations Room/Briefing Room.

real-time information amongst police vessels and command centres, including emails, pictures, charts, videos, drawings or other graphical information as well as on-scene imagery (such as radar charts and video streaming, etc.) captured by the existing Electro-optical Sensor System, radar and other sensors on board vessels and on land.

6. MARSAS will overcome HKPF's current deficiency in maritime data-sharing and communications in terms of speed, reliability and coverage. MARSAS will complement various existing sensor and security systems and enhance land-based commanders' ability in acquiring real-time, accurate and detailed information for making better-informed decisions. It will also enable police vessels on scene to be better prepared for operations, thereby strengthening the HKPF's operational effectiveness. MARSAS will enhance the operational capability of Marine Police in the following ways –

(a) ***Information collection and correlation:*** MARSAS will automatically collect, correlate and manage information originating from various command centres and police vessels, with the aim of improving the speed with which senior commanders can make decisions during quickly evolving major maritime incidents and day-to-day policing operations;

(b) ***Coverage:*** MARSAS will address the existing coverage problem of individual systems, thereby enhancing the HKPF's overall detection and identification capabilities;

(c) ***Data integration:*** MARSAS will provide a single and real-time intelligence display through integration of various data provided by individual sensor and security systems to allow identification of suspicious movements and patterns which suggest criminal activities, thereby enabling more effective deployment of resources in response;

(d) ***Information transmission:*** MARSAS will use 4G networks or other technologies to ensure stable transmission of vessel, meteorological, navigational and operational information;

(e) ***Data storage:*** MARSAS will feature storage and replay capability of historical data to facilitate post-operational review and store digital evidence in an encrypted manner to prevent deletions or amendments; and

/(f) …..

(f) ***Enhanced safety:*** By providing police officers with more complete and better information about the movements and activities of other vessels and the development of incidents, MARSAS will improve their navigational and personal safety, particularly at night, under poor weather or in serious crime cases involving firearms or other weapons.

Benefits of MARSAS

7. MARSAS will strengthen the ability of the HKPF to respond to major maritime incidents, serious maritime disasters and acts of terrorism at sea, conduct maritime law enforcement, and carry out day-to-day patrols and operations, including interception of illegal immigrants. All of the above operations can also be executed in a safer and more effective way.

8. Take the interception of illegal immigrants as an example – criminal syndicates often use speedboats to smuggle illegal immigrants while manoeuvring aggressively to escape from police apprehension. With MARSAS, command centres or police officers on duty can label a particular suspicious vessel when it is found, even if it is hidden in a busy area of the sea. At the same time, commanders and police vessels on scene can be informed of the position of police vessels and the tracks of target vessels through the single intelligence display, and obtain real-time images and videos of the scene which are shared for use. Officers can thereby track the development of the situation at the same pace, thus eliminating any discrepancy caused by oral reporting. By using real-time information, a more detailed deployment can be made and the command and co-ordination of police vessels in the interception of target vessels can be enhanced.

9. In the HKPF's operations for combating other types of maritime crimes, including response to terrorist activities (such as hijacking of vessels), MARSAS can play a similar role in enhancing the HKPF's understanding of the on-scene situation and ability to respond.

10. In addition, in the event of an accident at sea, MARSAS can effectively improve the efficiency of rescue operations. At present, police vessels at the scene of the accident can only provide on-site information to command centres through MRCS or mobile phones. Information so provided is often fragmented, incomprehensive, and fails to depict the latest situation due to the quickly evolving nature of such incidents. Meanwhile, the radio network may be congested when many police vessels use MRCS at the same time, thus increasing the difficulty for command centres to be informed and assess the overall situation.

/With …..

With MARSAS, command centres and commanders on scene can directly obtain real-time information which is necessary for making prompt and accurate assessment on the situation, thereby making the most appropriate deployment. In addition, commanders can remotely control cameras installed on police vessels to monitor the scene, thereby enhancing operational efficiency.

11. When the accident escalates and requires support of land units, MARSAS can be activated instantly at command centres on land to provide commanders of land units with real-time information. Such information, including real-time position of police vessels with casualties on board and their estimated arrival time, live videos of the vessel in distress, and real-time sea traffic in different waters, etc., would help them understand the overall on-scene situation at sea. This would enable the HKPF to achieve better command, co-ordination and deployment.

Proof of Concept/Trials

12. The HKPF has engaged a supplier to provide a "proof of concept" to determine whether appropriate technology was available in the market to support MARSAS. The exercise demonstrated that it was feasible to deliver a system incorporating the features required by the HKPF using 4G networks and other data transmission methods.

13. In 2015-16 and 2016-17, the HKPF conducted testing and preparation work. The testing demonstrated the technical and functional feasibility of sharing information between a Medium Patrol Launch and RCCC MAR via 4G networks and other data transmission methods. The HKPF is now collecting more referencing data for the use of MARSAS in different operations in future.

ALTERNATIVES CONSIDERED

14. The HKPF has considered and assessed other alternatives, including the use of 3G networks. However, such alternatives fail to achieve real-time transmission of streaming images due to bandwidth constraints. The HKPF thus considers that the integration of 4G networks as a communication platform, i.e. MARSAS, is currently the only viable option.

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FINANCIAL IMPLICATIONS

Capital Expenditure

15. The HKPF estimates that the total capital expenditure of implementing MARSAS is $186,335,000. A detailed breakdown is as follows –

		$ '000
(a)	MARSAS hardware and software	12,000
(b)	Workstation hardware and software at eight command centres on land and police vessels	58,475
(c)	Communications equipment, portable receivers and tablets	20,070
(d)	System implementation and support services	52,800
(e)	Site preparation works	11,800
(f)	Communications network	10,000
(g)	Initial spares and consumables	4,250
(h)	Contingency [10% of items (a) to (g) above]	16,940
	Total	**186,335**

16. On paragraph 15(a) above, the estimate of $12,000,000 is for the acquisition of hardware and software for the main and resilience systems of MARSAS, including servers, processing sub-systems, databases, etc.

17. On paragraph 15(b) above, the estimate of $58,475,000 is for the acquisition of hardware and software for the workstations for the eight command centres on land and police vessels connecting to MARSAS, including terminal hardware and software, monitors, uninterruptible power supply, etc.

18. On paragraph 15(c) above, the estimate of $20,070,000 is for the acquisition of portable receivers and transmitters, tablets and communications equipment such as 4G routers for the eight command centres on land, Marine Divisional Headquarters and small vessels to connect to MARSAS.

19. On paragraph 15(d) above, the estimate of $52,800,000 is for the acquisition of implementation services, including project management, system installation and configuration services.

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20. On paragraph 15(e) above, the estimate of $11,800,000 is for site preparation or modifications of existing equipment rooms, command centres and vessels for the installation of new hardware and software.

21. On paragraph 15(f) above, the estimate of $10,000,000 is for the procurement of communications network equipment, including network modems, routers, firewall, etc., and for the establishment of private data network connecting to the equipment rooms for MARSAS and the eight command centres on land.

22. On paragraph 15(g) above, the estimate of $4,250,000 is for the acquisition of initial spares and consumables, including batteries, cables, antennae, etc.

23. On paragraph 15(h) above, the estimate of $16,940,000 represents a 10% contingency on the total cost of items in paragraph 15(a) to (g).

24. The estimated cash flow requirements are as follows –

Year	**$ '000**
2017-18	197
2018-19	6,803
2019-20	53,000
2020-21	77,000
2021-22	35,168
2022-23	9,667
2023-24	4,500
Total	**186,335**

Recurrent Expenditure

25. The HKPF estimates that the annual recurrent expenditure for MARSAS will be $8,270,000 in 2020-21 and will gradually increase to $17,531,000 in 2022-23 and onwards. It will cover hardware and software maintenance, day-to-day support services, use of communications networks, consumables and other expenses.

/**IMPLEMENTATION** …..

IMPLEMENTATION SCHEDULE

26. If funding approval is obtained within 2017, MARSAS can be commissioned in phases starting from the third quarter of 2020. The tentative implementation schedule is as follows –

	Activity	Tentative Completion Date
(a)	Tender preparation	July 2018
(b)	Site preparation, tendering and award of contract	March 2019
(c)	Delivery and commissioning of MARSAS –	
	• Eight command centres on land and first batch of 56 police vessels	September 2020
	• Second batch of 57 police vessels	March 2022
	• Third batch of 28 police vessels[3]	October 2022

PUBLIC CONSULTATION

27. We consulted the Legislative Council Panel on Security on the proposal on 14 March 2017. Members had no objection in principle to the submission of the proposal to the Finance Committee.

Security Bureau
Hong Kong Police Force
October 2017

[3] See footnote 1.

Enclosure to FCR(2017-18)35

Sensor and Security Systems Equipped in Hong Kong Police Force's Marine Regional Command and Control Centre and Onboard Police Vessels on Need Basis

System	Details
Central Command System	Land-based daylight cameras and night-time thermal imaging cameras in coastal areas to monitor offshore waters
Digital Radar Security System	To process raw radar data obtained from coastal radar sites and convert the data into electronic graphical information
Automatic Identification System	To track, identify and locate vessels by using radio communications
Automatic Vessel Location System	To determine the location of a Marine Police vessel using the global positioning system
Electro-optical Sensor System	A launch-based observation system consisting of both cameras and thermal imagers

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