

**For discussion
14 March 2017**

Legislative Council Panel on Security

Implementation of Marine Situational Awareness System

Purpose

This paper aims to introduce to the Panel the proposal of the Hong Kong Police Force (HKPF) to implement a Marine Situational Awareness System (MARSAS) to integrate different sensor and security systems (at **Annex**) currently equipped in the HKPF's Marine Regional Command and Control Centre (RCCC MAR) and on board police vessels with the aim of strengthening the HKPF's ability to respond to major maritime incidents, mass casualty disasters or acts of terrorism at sea and conducting safer and more effective day-to-day operations, including the interception of illegal immigrants.

Background

2. Since 1947, the HKPF has been using radios to communicate with civilian ships and other Government Departments at sea. In 1984, the Marine Police, Marine Department, Civil Aviation Department and other related Government Departments started using the then newly developed Joint Maritime Communications System, which was digitalised in full in 2000 and became the Marine Region Communications System (MRCS) exclusively used by the HKPF. At present, RCCC MAR is equipped with various sensor and security systems to detect and identify vessels within the waters of the Hong Kong Special Administrative Region and thereby maintain the integrity of the Hong Kong Boundary of Administration, prevent and detect crimes, and conduct search and rescue operations as well as other relevant daily operational duties.

3. 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 its frontline officers and assess on-scene situation through oral communication via the MRCS and mobile communication network. This is often time-consuming and prone to mistakes, and may directly hamper the HKPF's ability to promptly respond to on-scene situations. In addition, as the Marine Police do not have a platform / medium capable of sharing real-time

information, information collected from the relevant land-based facilities, Barge Operating Platforms, police vessels and their sensors cannot be shared instantly for use.

Proposal and Justifications

4. In the light of the above, the HKPF proposes to install the MARSAS¹ on 141 police vessels and at eight land command centres² to enable the transmission or sharing of real-time information among police vessels and the command centres, including emails, pictures, charts, videos, drawings or other graphical information as well as other on-scene imagery (such as radar charts and video streaming, etc.) captured by the Electro-optical Sensor System, radar and other sensors on board vessels and on land.

5. The MARSAS will overcome the shortfall in the HKPF's current capability in maritime data-sharing and communication in terms of speed, reliability and potential coverage insufficiency. The MARSAS will supplement and collaborate with the various existing sensor and security systems, and enhance land-based commanders' ability to acquire real-time, accurate and detailed information to make better-informed decisions, and also enable police vessels on scene to be better prepared for operations, thereby strengthening the HKPF's operational effectiveness. The MARSAS will enhance the operational effectiveness of Marine Police as follows:

- (a) Automatically collect, correlate and manage the communications system information originated from various Government command centres and police vessels, with the aim of dramatically improving the speed with which senior commanders can make prompt decisions during swiftly evolving major maritime incidents and day-to-day policing operations;
- (b) Address the existing coverage problem of individual systems, thereby enhancing the HKPF's overall detection and identification capabilities;
- (c) Provide a single and real-time intelligence display through the integration of pieces of information contributed by individual systems

¹ Including 4G routers, network equipment, monitors, portable transmitters and tablets, etc.

² Including Security Bureau's Emergency Monitoring and Support Centre, the HKPF's Headquarters Command and Control Centre, RCCC MAR / Marine Incident Command Centre, RCCC MAR's fallback site at RCCC New Territories North, Marine Port District's District Operations Room, Marine Outer Waters District's District Operations Room, Small Boat Division's Operations Room, and Maritime Counter-Terrorist Boat Team, and Special Duties Unit's Operations Room / Briefing Room.

through the MARSAS to allow identification of suspicious movements and patterns suggesting criminal activity, thereby enabling more effective deployment of resources in response;

- (d) Use 4G networks or other technologies to ensure the stable transmission of vessel information, meteorology information, navigational information and information on operations;
- (e) Incorporate storage and replay capability of historical data to facilitate after-action-review;
- (f) Store digital evidence in an evidentially encrypted manner to prevent deletions or amendments; and
- (g) The MARSAS will improve navigational and personal safety of officers, particularly at night, in poor weather or in serious crime cases involving firearms or other life-threatening weapons.

6. Citing the interception of illegal immigrants as an example, criminal syndicates often use speedboats to smuggle illegal immigrants whilst manoeuvring aggressively to escape from police apprehension. After the installation of the MARSAS, the command centres or the police officers on duty can use the MARSAS to label a particular suspicious vessel when it is found, even if it is hidden in a busy sea. At the same time, the commanders and police vessels at the scene can grasp the positions of police vessels and the tracks of the target vessels through the single intelligence display, and share real-time images and videos of the scene, so that related officers can understand the development of the situation at the same pace, thus eliminating the possible discrepancy caused by verbal reporting. By using such real-time information, a more detailed deployment can be made and the command and coordination of police vessels in the interception of target vessels can also be enhanced.

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

8. In addition, in the event of an accident at sea, the 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 the command centres through the MRCS or mobile phone, and the information provided is often fragmented, incomprehensive, and fails to thoroughly describe the situation due to the swiftly evolving nature of incident. Meanwhile, the

radio network may be congested when many police vessels use the MRCS, thus increasing the difficulty for the command centres to understand and assess the situation. With the MARSAS, the command centres and commanders at site can directly obtain real-time information necessary to make more prompt and accurate assessment on the situation, and thus make the most appropriate resource allocation. In addition, the commanders can also remotely control the cameras installed on police vessels to monitor the scene, thereby enhancing work efficiency.

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

Proof of Concept / Trials

10. The HKPF has engaged a supplier to provide a ‘proof of concept’ to determine whether appropriate technology was available in the market to support the MARSAS, and such subsequently demonstrated the feasibility of delivering a system incorporating the features required by the HKPF using 4G networks and other data transmission methods.

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

Alternative(s) Considered

12. The HKPF has considered and assessed other alternatives, including the use of 3G networks. However, such alternative fails 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. the MARSAS, is the only viable option for now.

FINANCIAL IMPLICATIONS

Non-recurrent expenditure

13. The HKPF estimates that the total non-recurrent expenditure of implementing the MARSAS is HK\$ 186.335 million³. The detailed breakdown is as follows:

	HK\$ '000
(a) MARSAS hardware and software	12,000
(b) Workstation hardware and software at the eight command centres 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 for police vessels and the eight command centres	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

14. The estimated cash flow requirements are as follows:

Year	HK\$ '000
2017-18	1,000
2018-19	12,000
2019-20	94,000
2020-21	60,000

³ The amount under this proposal includes the installation of the MARSAS on eight land command centers, and the first and second batch totaling 113 police vessels. The third batch of 28 police vessels are new launches, and the relevant cost of construction, including the costs of installing relevant communications systems (such as the MARSAS) on such vessels, has been approved in the non-recurrent expenditure of capital accounts in 2015.

Year	HK\$ '000
2021-22	10,335
2022-23	9,000
Total	186,335

Recurrent expenditure

15. The HKPF estimates that the annual recurrent expenditure for the MARSAS will be HK\$ 8.270 million in 2020-21 and will gradually increase to HK\$ 17.531 million in 2022-23 and onwards. It will cover hardware and software maintenance, day-to-day support services, use of communication networks, consumables and other expenses.

IMPLEMENTATION SCHEDULE

16. Subject to Members' comments on the proposal, we plan to seek funding approval from the Legislative Council in accordance with established procedures. If funding approval is obtained within the second quarter of 2017, the MARSAS can be commissioned in phases starting from 2020. The tentative implementation schedule is as follows:

Activity	Tentative Completion Date
(a) Tender preparation	January 2018
(b) Site preparation, tendering and award of contract	September 2018
(c) Delivery and commissioning of the system	
- eight land command centres and the first batch of 56 police vessels	March 2020
- the second batch of 57 police vessels	September 2021
- the third batch of 28 police vessels ⁴	April 2022

⁴ See footnote 3.

ADVICE SOUGHT

17. Members are invited to comment on the above proposal.

**Security Bureau
Hong Kong Police Force
March 2017**

**Sensor and Security Systems Equipped in RCCC MAR
and on board 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.