

## **ITEM FOR FINANCE COMMITTEE**

### **CAPITAL WORKS RESERVE FUND HEAD 708 – CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND EQUIPMENT**

#### **Fire Services Department**

#### **New Subhead “Replacement of the Mobilising and Communications System of the Fire Services Department”**

Members are invited to approve a new commitment of \$1,713,700,000 for the replacement of the existing mobilising and communications system of the Fire Services Department.

### **PROBLEM**

The Third Generation Mobilising System (TGMS) of the Fire Services Department (FSD) will reach the end of its extended serviceable life by 2022. It needs to be replaced.

### **PROPOSAL**

2. The Director of Fire Services, with the support of the Secretary for Security, proposes to develop the Fourth Generation Mobilising System (4GMS) at an estimated cost of \$1,713,700,000 to replace TGMS.

**/JUSTIFICATION .....**

## JUSTIFICATION

### Need for Replacing the TGMS

3. The mobilising and communications system currently used at the Fire Services Communications Centre (FSCC), namely the TGMS, was fully commissioned in 2007. The TGMS serves to receive emergency calls and support the FSCC in deploying an optimal set of fire and ambulance resources to the scene of incidents for firefighting and rescue operations. The System also facilitates communications during emergencies through providing on-scene personnel with incident and operational information in electronic format, which can be accessed through more than 300 remote control terminals installed in fire stations and ambulance depots as well as more than 800 mobile data terminals installed on fire appliances, ambulances and fireboats. The TGMS has a design serviceable life of ten years, which may be further extended by five years, to 2022. The maintenance services for the System could not be sustained beyond 2022 because the software would be obsolete and the supply of spare hardware components would be discontinued.

4. As the TGMS will reach the end of its extended serviceable life in 2022, FSD commissioned a consultancy study (the Study) in 2014 on the options for the future mobilising and communications services to cope with the growing complexity of emergency incidents and the projected increase in the number of emergency calls over the next 15 years.

5. The Study concluded that, taking into account the technical risk, cost and efficiency of the use of resources, further extending the serviceable life of the TGMS to meet the demand for emergency services for the next 15 years is impracticable. The Study recommended a total replacement of the TGMS for the following reasons –

*(a) Maintenance problems*

Certain core hardware and software components of the TGMS are becoming obsolete or approaching the end of their serviceable life. Meanwhile, the maintenance of these hardware components largely relies on spare part inventories, as most of their manufacturers have already discontinued support in relation to the production, stock and maintenance of such. These spare parts and obsolete software will likely be unable to sustain the TGMS's maintenance beyond 2022; and

*/(b) .....*

(b) *Partial replacement or upgrading not feasible*

The TGMS is a highly integrated and custom-made system for FSD's emergency resource mobilisation. Its effective performance is underpinned by multiple sub-systems working interactively and simultaneously for data and information exchange. Any partial replacement or upgrading of the TGMS could inevitably affect the functionality and reliability of the system as a whole. This might result in delays in the mobilisation and dispatch of resources, impairing the delivery of emergency services. A partial replacement or upgrading of the TGMS is therefore considered infeasible.

### **The Proposed System and its Major Features**

6. Having regard to the Study's recommendations and the demand for emergency services that is anticipated to rise continuously due to the growing and ageing population of Hong Kong, FSD plans to develop the 4GMS to replace the TGMS. The major enhancements include –

(a) *Improved operational and geographical resilience*

The operational and geographical resilience of the new mobilising and communications system will better meet the international standards on emergency management. For example, the National Fire Protection Association (NFPA)<sup>1</sup> Standard 1221 recommends that an alternate communications centre shall be separated geographically from the primary communications centre at a distance that ensures continuity of services in case of emergency. The Resilience Guidelines for Providers of Critical National Telecommunications Infrastructure promulgated by the Electronic Communications Resilience and Response Group (EC-RRG) of the UK<sup>2</sup> also state that wherever reasonable, essential equipment should not be concentrated, particularly in one building, to the extent that overall network security is jeopardised.

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<sup>1</sup> Established in 1896, NFPA is a global non-profit organisation, widely recognised for promoting codes and standards designed to minimise the risk and effects of fire by establishing criteria for building, processing, design, service, installation around the world.

<sup>2</sup> The EC-RRG is established to ensure the availability of electronic communications infrastructure for the UK and to provide an industry emergency response capability through the ownership and maintenance of the UK National Emergency Plan for Telecommunications.

For the existing TGMS, both the primary and fallback sites of the FSCC as well as data centres of the TGMS are located on different floors of the same building, rendering the TGMS vulnerable to single point of failure such as major fires, structural collapse, prolonged electricity outage, leakage of gas or terrorist attacks. An accident impacting the building would adversely affect both the primary and fallback sites of the FSCC. Such risks to the mission-critical mobilising and communications operations should be avoided.

Under the proposed 4GMS, two active FSCCs will be established in two geographically separated sites, one in Kowloon and the other in the New Territories. Each will be responsible for the mobilising and communications operations for incidents in different regions, one primarily for incidents in Hong Kong Island (including outlying islands) and Kowloon, the other primarily for incidents in the New Territories. In the unfortunate event that one FSCC fails, the other FSCC will have the capability and capacity to immediately take over and handle incidents of the entire territory of Hong Kong, thereby enhancing the resilience of FSD's mobilising and communications operations.

In addition, the 4GMS core network backbone will be constructed with enterprise-grade network equipment and optical fibre connections which is more reliable and resistant to attack. All critical devices and sub-systems of the 4GMS will be connected via a multi-path and multi-route network to support the safe operation of the two active FSCCs. In addition, each critical gateway of the 4GMS network infrastructure will be equipped with multi-layer firewalls and network intrusion protection devices to safeguard the system from cyber or network attacks.

*(b) Better handling of complex and major incidents and more efficient mobilisation of resources*

To enhance support for FSCC operators and on-scene operational personnel in handling complex and major incidents, the proposed 4GMS can perform the following functions –

- (i) the new system will provide an electronic means for real-time monitoring and tracking of incident-related tasks as well as resources allocated to the incidents. For example, an incident checklist will be automatically generated to assist FSCC operators in monitoring the progress of outstanding, on-going and completed actions;

/(ii) .....

- (ii) the new system will allow instantaneous transmission of information to FSCC operators, on-scene operational personnel as well as the departmental management, providing a comprehensive overview of the operations, supplemented with multimedia data, such as geographic information and videos capturing the incident scenes received from the public or other means;
- (iii) in addition to identifying the location of a fixed-line caller, the new system will include the function of identifying a mobile phone caller's location so that emergency calls initiated in a remote place without significant landmark can be responded to speedily. This is also in line with one of the recommendations made by the Audit Commission in its Report No. 67 published in October 2016<sup>3</sup>. FSD will safeguard personal data security and restrict access to the mobile phone callers' information to only authorised persons responsible for handling emergency calls; and
- (iv) through a more accurate identification of the location of an incident, a precise tracking of resources deployment as well as utilisation of real-time traffic information in identifying the fastest route to an incident scene, the proposed 4GMS is also expected to increase the speed and efficiency with which responding resources are deployed.

(c) *Better data for future service improvement*

The proposed system will be able to provide analysis of historical and real-time incidents and operational data collected by the system over time. Such analysis will enable FSD to gain better insights into the future demand for its emergency services. For example, the automated analysis of historical incidents, building characteristics and fire safety records would facilitate FSD to better prioritise fire safety inspections of high-risk buildings and channel FSD's fire protection efforts to those most in need.

Furthermore, analysis of mobilising and communications data including call-taking, incident response and resource coverage etc., will enable the department to review its strategy from time to time and react promptly to areas in need, such as through redeployment of resources, as and when necessary.

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<sup>3</sup> Chapter 3 of Report No. 67 is on "Procurement and maintenance of fire services equipment".

7. At the initial stage when the 4GMS is commissioned, the existing TGMS will run in parallel until the new system is robustly and thoroughly tested to maintain uninterrupted service to public and to achieve a smooth and secure transition.

## FINANCIAL IMPLICATIONS

### Capital Expenditure

8. It is estimated that the capital expenditure of developing the proposed 4GMS is around \$1,713,700,000. The detailed breakdown is as follows –

	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	Total
	\$ '000	\$ '000	\$ '000	\$ '000	\$ '000	\$ '000	\$ '000
(a) Hardware	-	118,288	118,288	177,432	118,288	59,144	591,440
(b) Software	-	35,139	35,139	52,708	35,139	17,569	175,694
(c) System implementation services	-	98,769	98,769	148,153	98,769	49,384	493,844
(d) Site preparation	-	55,818	83,727	83,727	27,830	27,909	279,011
(e) Training	-	-	-	-	5,400	-	5,400
(f) Consumables	-	-	-	-	1,700	-	1,700
(g) Assessments & audit services	-	-	350	1,100	-	-	1,450
(h) Contingency	-	30,793	33,619	46,303	28,706	15,394	154,815
(i) Contract staff	896	2,249	2,323	2,400	2,478	-	10,346
<b>Total</b>	<b>896</b>	<b>341,056</b>	<b>372,215</b>	<b>511,823</b>	<b>318,310</b>	<b>169,400</b>	<b>1,713,700</b>

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9. On paragraph 8(a) above, the estimate of \$591,440,000 is for the acquisition of computer, control and communications hardware, including servers, workstations, field equipment (such as on-board units, mobile data terminals and mobile devices), network and security devices, storage systems, telephony equipment, wireless data communication equipment, backup and recovery equipment, etc.

10. On paragraph 8(b) above, the estimate of \$175,694,000 is for the acquisition of computer software, including dispatch system software, database management software, virtualisation software, mobile device management software, enterprise system management software, system security software, data analytic software, operating system software, etc.

11. On paragraph 8(c) above, the estimate of \$493,844,000 is for the system implementation services, including system analysis and design, system development and installation, system integration and testing, system cutover, system nursing and acceptance, etc.

12. On paragraph 8(d) above, the estimate of \$279,011,000 is for the site preparation, including rental and set-up of temporary offices, building fitting-out works for the two FSCCs, data centres and offices, building services works, etc.

13. On paragraph 8(e) above, the estimate of \$5,400,000 is for the training of operational and system supporting staff on system administration, management and operational workflow.

14. On paragraph 8(f) above, the estimate of \$1,700,000 is for the acquisition of start-up consumables, including printing paper, toner cartridges, backup tapes, headset, batteries for field equipment, etc.

15. On paragraph 8(g) above, the estimate of \$1,450,000 is for the acquisition of privacy impact assessment, security risk assessment and audit services.

16. On paragraph 8(h) above, the estimate of \$154,815,000 represents about 10% contingency on the items set out in paragraph 8(a) to (g) above.

17. On paragraph 8(i) above, the estimate of \$10,346,000 is for the engagement of contract staff to provide project management services during the system development and implementation.

### **Other Non-recurrent Expenditure**

18. The proposed implementation of the 4GMS will require a project team for project management, system analysis and design, site preparation, user acceptance tests, implementation support and system commissioning, etc. This will entail an initial annual non-recurrent staff cost of around \$4,162,000 from 2017-18 to 2021-22, representing a total of 300 man-months of five disciplined and technical staff. FSD will review the staffing requirement as the project progresses.

### **Recurrent Expenditure**

19. The proposal will entail an annual recurrent expenditure of \$68,328,000 in 2021-22, increasing to \$223,293,000 from 2023-24 and onwards to cover the costs of system maintenance and support, network facilities rental, consumables, licences and subscription, building services maintenance, etc. FSD will review the staffing requirement to implement the proposed 4GMS nearer the time when the system is commissioned.

### **Cost Saving**

20. Upon the decommissioning of the existing TGMS from 2022-23 onwards, the maintenance cost of \$78,000,000 per annum could be saved.

Encl. 21. A cost and benefit analysis for the proposed development of 4GMS is at Enclosure.

### **IMPLEMENTATION PLAN**

22. We plan to implement the proposed 4GMS according to the following schedule –

/Activity .....



Activity	Target completion date
(a) Preparation of tender specifications	August 2017
(b) Tendering and award of contract	March 2018
(c) System analysis, design and development; site preparation and building services works; system installation	February 2021
(d) System testing and training	April 2021
(e) System trial run, nursing and acceptance	March 2022
(f) System full commissioning	April 2022

## PUBLIC CONSULTATION

23. We consulted the Legislative Council Panel on Security on the proposal on 14 March 2017. Members supported the proposal and raised no objection to submitting it to the Finance Committee for funding approval.

## BACKGROUND

24. FSD is responsible for firefighting and rescue on land and at sea and providing emergency ambulance services for sick and injured persons. When an emergency call is received, the FSCC, through a mobilising and communications system, deploys an optimal set of fire and ambulance resources to the scene of incidents for firefighting and rescue operations.

25. On 12 May 2000, the Finance Committee approved a commitment of \$718,600,000 for FSD to acquire the TGMS to replace the Second Generation Mobilising System to cope with the then demand for emergency services and improve firefighting and rescue operations. The TGMS was fully commissioned in 2007.

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Security Bureau  
May 2017

### Cost and Benefit Analysis for the Replacement of the Mobilising and Communications System

	Cash flow (\$'000)							
	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
<b>Cost of the proposal</b>								
Capital expenditure	896	341,056	372,215	511,823	318,310	169,400	-	1,713,700
Non-recurrent staff cost	4,162	4,162	4,162	4,162	4,162	-	-	20,810
Sub-total	5,058	345,218	376,377	515,985	322,472	169,400	-	1,734,510
Recurrent expenditure	-	-	-	-	68,328	91,462	223,293	383,083
<b>(A) Total cost</b>	<b>5,058</b>	<b>345,218</b>	<b>376,377</b>	<b>515,985</b>	<b>390,800</b>	<b>260,862</b>	<b>223,293</b>	<b>2,117,593</b>
<b>Savings</b>								
<u>Recurrent</u>								
Realisable savings	-	-	-	-	-	78,000	78,000	156,000
<b>(B) Total savings</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>78,000</b>	<b>78,000</b>	<b>156,000</b>
<b>(C) Net cost</b>								
<b>(C) = (A) – (B)</b>	<b>5,058</b>	<b>345,218</b>	<b>376,377</b>	<b>515,985</b>	<b>390,800</b>	<b>182,862</b>	<b>145,293</b>	<b>1,961,593</b>
<b>Net cumulative cost</b>	<b>5,058</b>	<b>350,276</b>	<b>726,653</b>	<b>1,242,638</b>	<b>1,633,438</b>	<b>1,816,300</b>	<b>1,961,593</b>	

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