

ITEM FOR FINANCE COMMITTEE

CAPITAL WORKS RESERVE FUND HEAD 708 - CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND EQUIPMENT

Civil Aviation Department

New Subhead “Replacement of Doppler Very High Frequency Omni- Directional Range and Distance Measuring Equipment at Tung Lung Island”

Members are invited to approve the creation of a new commitment of \$33.4 million for replacing the existing Doppler Very High Frequency Omni-Directional Range and Distance Measuring Equipment at Tung Lung Island.

PROBLEM

The existing Doppler Very High Frequency Omni-Directional Range and Distance Measuring Equipment (DVOR/DME) at Tung Lung Island is aging and has become increasingly costly to maintain.

PROPOSAL

2. The Director-General of Civil Aviation (DGCA), with the support of the Secretary for Economic Development and Labour, proposes to replace the DVOR/DME at Tung Lung Island.

/JUSTIFICATION

JUSTIFICATION

3. The DVOR/DME is a long-range radio navigation aid providing essential navigation information for aircraft to/from Hong Kong. Currently, five facilities located at strategic positions in Hong Kong form the DVOR/DME network to provide coverage to the Hong Kong airspace and Flight Information Region. The function of the five facilities and a map showing their location are at the Enclosure.

Encl.

4. The DVOR/DME at Tung Lung Island is an essential and integral part of the whole DVOR/DME network to provide the necessary information for safe navigation. The equipment has been in continuous service for more than 19 years. It has become increasingly difficult and costly to maintain. In 2003, the maintenance cost for the equipment was \$2 million. Despite intensive maintenance, the fault rate of this DVOR/DME averaged at 14 occurrences per year between 2001 and 2003. We expect that the fault rate will increase in the coming years, causing more outages of the DVOR/DME. Furthermore, the equipment supplier of this particular DVOR/DME model has ceased the production of spare parts to support the system maintenance since 1999. To ensure reliability of the equipment, maintain the overall integrity and robustness of the whole navigation network, and to reduce maintenance cost, there is an urgent need to replace the DVOR/DME.

5. The replacement DVOR/DME will incorporate the latest technologically advanced processors to achieve more stable and reliable operation of the equipment. As opposed to the current design of having part of the equipment embedded in concrete slabs, the replacement DVOR/DME will be accommodated in a surface-level equipment room. The new design facilitates easy and direct access to the equipment for checking and repair and reduces disruption to normal operation of the system. This will in turn improve the stability and reliability of air traffic control (ATC) operations and enhance flight safety.

FINANCIAL IMPLICATIONS

Non-recurrent Cost

6. Based on the latest market information, DGCA estimates that the replacement proposal would incur a non-recurrent cost of \$33.4 million (to be amortised over 15 years), broken down as follows –

/(a)

	\$ million
(a) Equipment provision and installation	13.7
(b) Building modification and building services works	14.6
(c) Flight calibration for system commissioning	0.8
(d) Technical services by the Civil Aviation Department's (CAD's) maintenance contractor	1.3
	<hr/>
Sub-total	30.4
(e) Contingency (10%)	3.0
	<hr/>
Total	33.4
	<hr/>

7. As regards paragraph 6(a) above, the expenditure of \$13.7 million is for the acquisition of the replacement DVOR/DME, metallic antenna counterpoise, uninterruptible power supplies and initial spare parts, installation, testing and commissioning of the equipment, and training for staff on equipment maintenance.

8. As regards paragraph 6(b) above, the expenditure of \$14.6 million is for the refurbishment of a 60-metre-diameter concrete slab for antenna counterpoise installation (\$0.5 million), construction of a new surface-level equipment room (\$2.8 million), replacement of the obsolescent power supply cables to the station (\$5.9 million), reprovision and renovation works on building services facilities (including replacement/reprovision of power supply, standby generators, air-conditioning, fire fighting and lightning protection facilities, etc. at a total cost of \$4.3 million), and engagement of consultancy service by the Architectural Services Department (\$1.1 million).

9. As regards paragraph 6(c) above, the expenditure of \$0.8 million is for the flight calibration of the replacement DVOR/DME in accordance with the prescribed international standards before commissioning of the equipment.

10. As regards paragraph 6(d) above, the expenditure of \$1.3 million is for the acquisition of technical services for dismantling the existing DVOR/DME, assisting in the new equipment installation on site, and integrating the new equipment into a central control and monitoring system at the Hong Kong International Airport for 24-hour watch keeping.

11. The cashflow in the coming years is estimated to be as follows -

Financial Year	\$ million
2004-05	4.7
2005-06	13.1
2006-07	13.6
2007-08	2.0
Total	33.4

Recurrent Cost

12. The replacement DVOR/DME will be maintained by CAD's maintenance contractor and no additional staff is required for CAD. DGCA estimates that the total recurrent cost on spare parts and light and power consumption will be about \$1.48 million per annum. All recurrent costs arising from the proposed replacement will be absorbed within CAD's existing provision for the maintenance of its ATC equipment and facilities.

Implication on Fees and Charges

13. In accordance with established practice, the amortised cost of the replacement project will be recovered through the ATC and En-route Navigation Services Charges^{Note}. Assuming that the replacement equipment will commence operation in 2006-07 and that the ATC Services Charge will be shared by over 120,000 flights, the additional cost per flight is estimated to be around \$15, an increase of 0.3% compared to the current charge level. The additional En-route Navigation Service Charge will be \$4 per overflight, or an increase of 0.4%. We believe that the increase in charges will be insignificant vis-à-vis the total operating costs of airlines. The benefits will outweigh the additional cost, as the replaced equipment will improve flight safety and ATC efficiency, thus enhancing airlines' safe operation and the development of civil aviation in Hong Kong.

/IMPLEMENTATION

^{Note} ATC services are provided by CAD on a cost-recovery basis. ATC Services Charge (for aircraft landing at the Hong Kong International Airport (HKIA)) are recovered indirectly from aircraft operators through the Airport Authority. En-route Navigation Services Charge (for overflying aircraft without landing at HKIA) are recovered directly from aircraft operators.

IMPLEMENTATION PLAN

14. We plan to implement the proposal according to the following schedule -

Activity	Target completion date
Tender invitation	July 2004
Award of contract	February 2005
Station building modifications	January 2006
Equipment delivery	February 2006
Installation and commissioning	May 2006

15. To ensure aviation safety, flight procedures and ATC procedures are designed to have adequate back-up so that the non-availability of a single navigational aid for a certain period will have minimal effect on flight safety. We expect that there would be a seven-month gap between decommissioning of the existing DVOR/DME and commissioning of the replacement equipment. During that period, CAD will use the facilities at Tathong Point and Cheung Chau to provide the navigation service. Pilots will have one less radio navigational aid for cross-checking their positions. There will also be some increase in the workload of air traffic controllers. However, these transitional effects are considered to be acceptable in view of the adequate back-up arrangements in place.

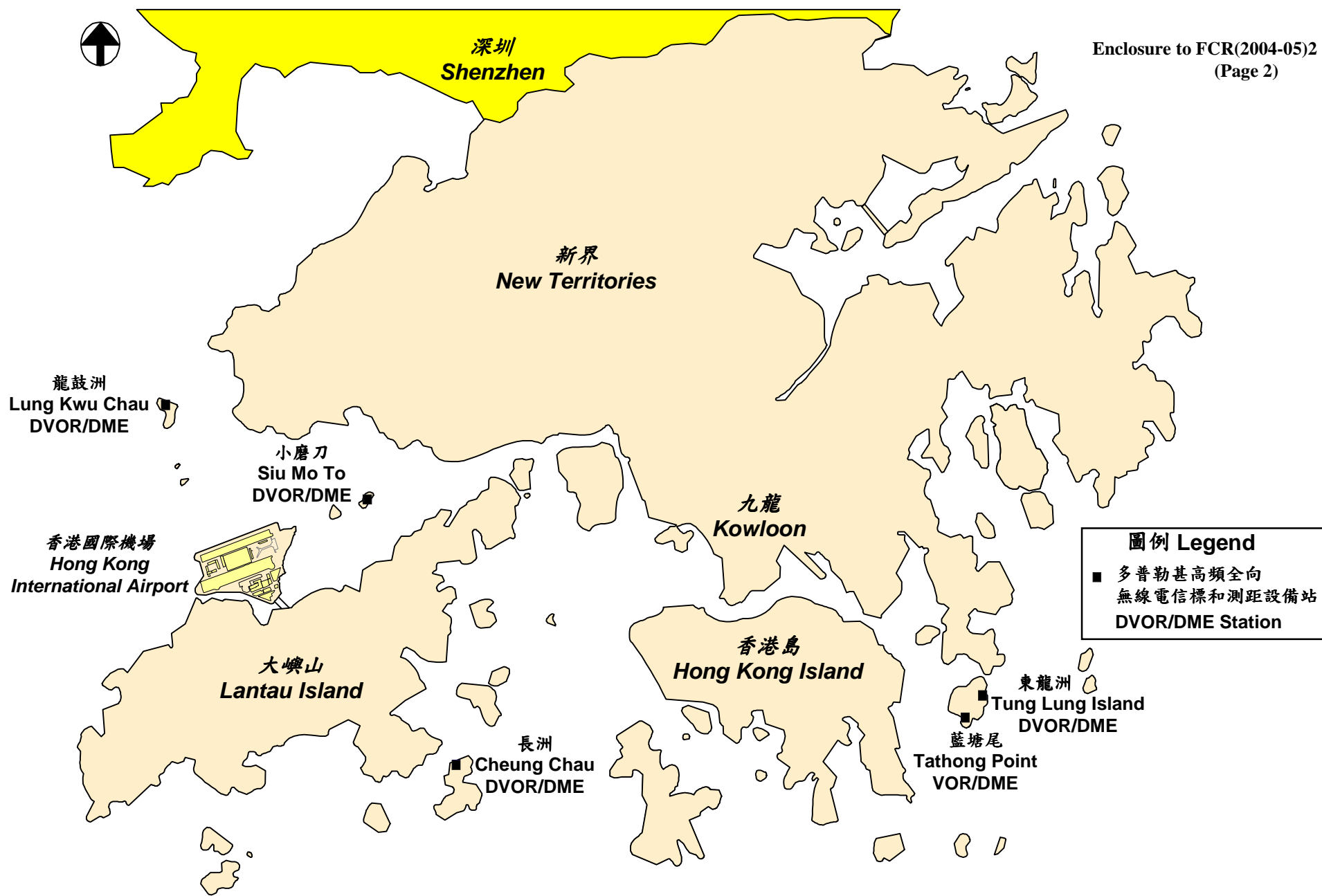
CONSULTATION

16. We consulted the Aviation Advisory Board and the Legislative Council Panel on Economic Services on 9 and 23 February 2004 respectively. Both indicated support for the proposal in principle.

Doppler Very High Frequency Omni-Directional Range and Distance Measuring Equipment (DVOR/DME) Network in Hong Kong

Five facilities form the DVOR/DME network in Hong Kong. A map showing their location is attached. Each facility provides essential navigation information to aircraft within a specified range of coverage and acts as back-up in the event of non-availability of a single navigational aid. The functions of the five facilities are as follows -

Navigational aid	Range of Coverage (Nautical Miles)	Primary Functions	Back-up Functions
Tung Lung Island Station	200	<ol style="list-style-type: none"> 1. Primary long-range navigational aid for en-route use. 2. For arrival procedures to Hong Kong. 3. For departure procedures from HK Runway 07L/R. 4. For departure procedure from Macao. 5. For navigation on Hong Kong – Macao Helicopter Route. 	
Tathong Point Station	70		As a back-up to the short-range functions of Tung Lung Island Station.
Cheung Chau Station	190	<ol style="list-style-type: none"> 1. For arrival procedure to Macao. 2. For navigation on Hong Kong – Macao Helicopter route 	As a back-up to the long-range functions of Tung Lung Island Station.
Siu Mo To Station	25	<ol style="list-style-type: none"> 1. For arrival procedure to HK Runway 07L and 25R. 2. For missed approach/departure procedures from HK Runway 07L. 3. For arrival procedures to Macao. 	As back-up the Instrument Landing Systems for HK Runways 07L and 25R.
Lung Kwu Chau Station	40	<ol style="list-style-type: none"> 1. For Missed Approach Procedure from HK Runway 25R. 2. For arrival/missed approach/departure procedures from Macao. 3. For transfer of control between HK/Shenzhen/Zhuhai. 	



在香港的多普勒甚高頻全向無線電信標和測距設備位置圖
Location Map for Doppler Very High Frequency Omni-Directional Range
and Distance Measuring Equipment (DVOR/DME) in Hong Kong