For discussion
on 10 June 2022

FCR(2022-23)17

ITEM FOR FINANCE COMMITTEE

CAPITAL WORKS RESERVE FUND
HEAD 710 – COMPUTERISATION
Immigration Department
New Subhead "Development and Implementation of the Advance Passenger Information System"

Members are invited to approve the creation of a new commitment of $296,064,000 for the development and implementation of the Advance Passenger Information system of the Immigration Department.

PROBLEM

The Immigration Department (ImmD) needs to implement the Advance Passenger Information (API) system in Hong Kong in order to meet the requirement and recommendations of the International Civil Aviation Organization (ICAO), bring Hong Kong on par with other aviation hubs around the world, as well as further enhance ImmD's passenger clearance and enforcement capabilities to prevent the undesirables from boarding the flights heading to Hong Kong.

PROPOSAL

2. The Director of Immigration, with the support of the Secretary for Security (S for S) and the Government Chief Information Officer, proposes to create a new commitment of $296,064,000 for the development and implementation of the API system.

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JUSTIFICATION

International Obligation

3. Aviation security has been a global issue of concern in the midst of the growing threats of terrorism and extremism in different parts of the world in the last two decades, and various measures have been implemented over time to address the concern. In 2018, ICAO updated the "Convention on International Civil Aviation" (CICA)[1], which includes a new requirement for each Contracting State to establish an API system. The People's Republic of China is one of the signatories to CICA, and the Convention is also applicable to the Hong Kong Special Administrative Region. As defined by ICAO, an API system refers to an electronic communications system whereby required data elements are collected and transmitted to the border control agencies prior to flight departure. In short, the requirement involves the capture of passengers and crew members' personal data and flight details by the aircraft operator/agent and their subsequent transmission, before the flight takes off from the last port, to the immigration authority of the destination port.

4. In particular, ICAO recommends that each Contracting State should consider the introduction of an interactive Advance Passenger Information (iAPI) system, which is a more advanced version that allows two-way communications (between the airlines and border control agencies) in near real-time and on a passenger-by-passenger basis, as compared with the traditional batch API system which needs to gather all passenger data for transmission to the border control authorities in a single "passenger manifest" message. ICAO also advises that the implementation of API system of each Contracting State shall be supported by appropriate legal authority and be consistent with the internationally recognised standards.

5. At present, over 100 countries already have an API system in place, of which 22 have implemented an iAPI system, including Singapore, New Zealand, the United States of America, the United Kingdom, Canada, Australia, the United Arab Emirates, Qatar and some Member States of the European Union such as Finland. The Mainland has since 2008 implemented the API system (initially a traditional batch API system and changed to an iAPI system in 2018).

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[1] Please refer to Chapter 9 of Annex 9 to CICA - Fifteenth Edition. CICA was signed on 7 December 1944 in which the Contracting States had agreed on certain principles and arrangements in order that the international civil aviation might be developed in a safe and orderly manner and that international air transport services might be established on the basis of equality of opportunity and operated soundly and economically.

6. Against this backdrop, a new section 6A has been added to the Immigration Ordinance (Cap. 115) (the Ordinance) to empower the S for S to make regulations to provide for the requirements for implementing the API system[2] in Hong Kong via the Immigration (Amendment) Ordinance 2021, which took effect on 1 August 2021.

Feasibility Study and its Recommendations

7. To prepare for the development and implementation of the API system in Hong Kong, ImmD commissioned a feasibility study in November 2020 and the study was completed in September 2021. The feasibility study aimed to define the precise project scope; identify the suitable business and operation models, as well as implementation approaches; and work out the cost estimations and implementation schedule for an API system in Hong Kong. During the course

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[2] Section 6A of the Ordinance reads –

Regulations relating to persons on board carriers –

(1) The S for S may make regulations –

(a) to provide for the supply to the Director of information or data relating to a carrier, its passengers or members of its crew, as may be specified in the regulations; and

(b) to empower the Director to direct that a passenger or a member of the crew of a carrier may or may not be carried on board the carrier.

(2) Without limiting subsection (1), regulations made under this section may –

(a) provide for the time at which, the means or systems through which, and the form and way in which, the information or data is to be supplied to the Director;

(b) provide for the handling or disposal of information or data collected under the regulations; and

(c) provide for the exercise or performance by the Director or any public officer of any powers or functions under the regulations.

(3) Regulations made under this section may –

(a) require the carrying out of any act by a person (wherever the person may be) and regulate any act or matter that may be done or happen wholly or partly outside Hong Kong;

(b) be of general application or make different provisions for different cases or classes of cases;

(c) empower the Director to exempt any person or carrier, or any class of persons or carriers, from any of the requirements under the regulations; and

(d) contain any incidental, consequential, evidential, transitional, saving or supplementary provisions that the S for S considers appropriate.

(4) Regulations made under this section may provide that a contravention of a regulation (including a contravention in relation to any act, matter or omission that is done or happens wholly or partly outside Hong Kong) is an offence punishable by a fine not exceeding level 6.

(5) In this section –

carrier (運輸工具) means an aircraft or any other means of transportation as may be specified in the regulations made under this section;

member of the crew (乘組人員), in relation to a carrier, means a person actually employed in the working or service of the carrier;

passenger (乘客) means a person carried, or to be carried, on board a carrier, other than a member of the crew.

of the feasibility study, relevant stakeholders (e.g. major local airlines) were engaged to seek their preliminary views on the system requirements. The feasibility study also provided technical advice on how to integrate the proposed API system with other existing systems of ImmD to maximise synergy.

8. In the study, it is noted that there are two main types of API systems adopted by different countries, viz. the traditional batch API system (where passenger data are sent in a single "passenger manifest" message in advance) and the iAPI system (where passenger data are sent in near real-time and on a passenger-by-passenger basis). A comparison of the traditional batch API system and the iAPI system is at Enclosure 1. Having evaluated the merits of the two options and taking into account the fact that Hong Kong has the busiest international cargo airport and one of the busiest international passenger airports in the world, the feasibility study recommended that an iAPI system should be adopted in Hong Kong.

Encl. 1

9. The iAPI system will be a large-scale system which supports instant transmission of a large amount of data and enables near real-time communications among different parties. The existing computer systems or applications within ImmD do not have the capabilities or capacity to support the various requirements under the iAPI system, nor can they be modified or expanded to cover the API-related functions. Hence, a separate and tailored-made system has to be developed. The operation of the entire iAPI system involves three major components: (1) the development of ImmD's iAPI system; (2) the engagement of a data broker; and (3) the setting up of two command centres, which will be elaborated in the ensuing paragraphs.

The Proposed iAPI System

(i) Development of ImmD's iAPI system

10. The iAPI system will be implemented at the Hong Kong International Airport (HKIA) and Macau Ferry Terminal (MFT), which are the only two control points now handling civil aircraft heading to Hong Kong. During the check-in procedure at the departing port, the airline will transmit the API data via the iAPI system to ImmD. In particular, the iAPI system will be built in with the "API Analytics" component for risk assessment and record checking which will enable instant processing of the data and provision of a response message (i.e. "board" or "no board" directive) for each passenger and crew member back to the airline. To ensure stable system performance at all times for supporting round-the-clock processing of the API data, and for efficient and timely handling of messages and enquiries from airlines all over the world, the iAPI system should be supported by

a robust data network and information technology infrastructure with very high availability and reliability. ImmD will engage a service provider for the provision of system hardware and software; analysis and design; system development, installation and testing; training; production rollout; as well as support and maintenance services.

(ii) Engagement of a data broker

11. The feasibility study, among others, recommended the iAPI system to be designed and developed with a single vendor end-to-end solution approach. Furthermore, instead of having direct connections between the airlines and ImmD's iAPI system, the feasibility study recommends ImmD to employ an experienced service provider, i.e. a "data broker", to develop and host secure, private and resilient network services to link all the relevant airlines with the iAPI system of ImmD. This connection model is adopted by many countries with iAPI system in place and is proved to be an effective and reliable connection between the iAPI system and airlines. Major airlines around the world, including those currently operating in Hong Kong, are already familiar with this connection model. By adopting the said connection model, the lead-time required for developing and implementing the iAPI system, as well as the time required for testing and training with the airlines should be minimised, as compared with the time required if a direct connection model is adopted. An experienced data broker with a well-established data network connecting to airlines around the world should have accumulated ample experience in operation. It may also enjoy economy of scale in terms of the specialists and resources required for securing stable operation of the data network and resolve any technical issues that may arise during operation. It is therefore not cost-effective for ImmD to take up this specialised area of work and the on-going maintenance of the data network.

12. We would therefore adopt a "connection via data broker" model for the iAPI system. In the actual operation, upon check-in for a particular flight at the departing port, the required API data of a passenger (or crew member) will be captured by the concerned airline from the Machine Readable Zone of the passenger's travel document. It will then be transmitted from the Departure Control System (DCS)[3] of the concerned airline (or web portal if it does not have its own DCS) to the data broker. The API data, after automatically checked for completeness by the data broker, will then be transmitted via its data network to the iAPI system of ImmD (while the data will not be stored by the data broker). Upon analysis by the "API Analytics" component of ImmD's iAPI system, a "board" or "no board" directive will be transmitted via the network of the data

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[3] A DCS is a system that automates processing an airline's airport management operation, which may include managing information required for airport check-in, printing boarding cards, baggage acceptance, boarding, load control, aircraft checks and interface with immigration control.

broker back to the airline's DCS (or web portal). The whole turnaround time, from the transfer of API data by the airline to the receipt of "board"/"no board" directive from ImmD, is expected to be about four to six seconds only. The process is briefly illustrated in the flowchart at Enclosure 2.

Encl. 2

(iii) Setting up of two command centres

13. Against the backdrop that HKIA is one of the busiest airports in the world, we have to ensure that the implementation of iAPI system will not affect its daily operation. In this connection, to support round-the-clock operation of the iAPI system, it is necessary for ImmD to set up two command centres to maintain effective and efficient communication with over 100 airlines with flights connecting to Hong Kong. The command centres will be stationed with ImmD officers for case assessment; review and analysis of passenger/crew member profiles; online communication with the airlines; as well as system operation and maintenance. The feasibility study also recommended two fully-equipped command centres be established to ensure full compliance with the very stringent resilience and reliability requirements of the iAPI system. This proposed arrangement is instrumental in ensuring that timely response is provided to the airlines upon check-in by the passengers (or crew members) and facilitating smooth air traffic with round-the-clock oversight of interactive communications, even when one of the centres is unable to operate normally.

Expected Benefits

14. As the iAPI system is an entirely new system serving a new function, there will be no direct savings or cost avoidance. This said, the implementation of the iAPI system will provide various intangible benefits, including strengthening border security; prevent potential undesirables including non-refoulement claimants from entering Hong Kong; and facilitating faster immigration clearance at control points.

15. The expected benefits of implementing the iAPI system are further elaborated as follows –

(a) Enhancing Aviation Security

When a passenger checks in for a flight, his/her API data will be automatically captured by and sent from the airline to ImmD via the data broker under the iAPI system. The near real-time response messages will be sent to the airline by ImmD in a reverse direction, allowing or disallowing the passenger to board the flight.

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When compared with the absence of an API system or implementation of a traditional batch API system, ImmD can proactively prevent potentially high risk passengers/terrorists from boarding flights at the place of departure, thereby substantially enhancing aviation security.

(b) Strengthening Border Control Capabilities

Through the iAPI system, airlines are required to transmit the API data of all inbound passengers, including transit passengers and crew members, to ImmD for record check upon check-in. It helps prevent high risk passengers, including potential non-refoulement claimants, from entering Hong Kong. Hence, the border security and control capabilities can be further strengthened.

(c) Enhancing Efficiency of Immigration Clearance Process

The API data effectively provides information on the types and profiles of travellers prior to their arrivals to Hong Kong, so that ImmD may immediately conduct risk assessment through the analytic tools of the system. It also enables faster passenger and crew clearance at the HKIA and MFT. The overall efficiency for immigration arrival clearance process may be enhanced.

(d) Other Benefits

When compared with the traditional batch API system, the iAPI system allows near real-time record check against all passenger/crew member data during the check-in procedure which will reduce airlines' exposure to the risk and penalties for carrying undocumented passengers or passengers whose travel documents are not valid to enter or transit through Hong Kong.

FINANCIAL IMPLICATIONS

Non-recurrent Expenditure

16. The proposal involves an estimated non-recurrent expenditure of $296,064,000 over a four-year period from 2022-23 to 2025-26, which includes the procurement of hardware and software; establishing the communication network (in-house network connection of ImmD); implementation services; employment of contract staff; site preparation and contingency. Its yearly breakdown is as follows –

/(a) …..

		2022-23 ($'000)	2023-24 ($'000)	2024-25 ($'000)	2025-26 ($'000)	Total ($'000)
(a)	Hardware	-	15,669	54,843	7,835	78,347
(b)	Software	-	9,359	32,756	4,679	46,794
(c)	Communication Network	-	565	746	371	1,682
(d)	Implementation Services	-	18,318	64,112	9,159	91,589
(e)	Contract Staff	5,380	18,253	17,627	4,512	45,772
(f)	Site Preparation	-	993	3,476	496	4,965
(g)	Contingency	538	6,316	17,356	2,705	26,915
	Total	**5,918**	**69,473**	**190,916**	**29,757**	**296,064**

17. On paragraph 16(a) above, the estimated expenditure of $78,347,000 is for acquisition of computer hardware, including network equipment, system servers, storage devices, system backup equipment and workstations for the three-layer resilience design.

18. On paragraph 16(b) above, the estimated expenditure of $46,794,000 is for acquisition of computer software, including system software and software packages for the three-layer resilience design.

19. On paragraph 16(c) above, the estimated expenditure of $1,682,000 is for acquisition of communication network and related services for connecting the information technology component and equipment between various offices/locations and with the data broker.

20. On paragraph 16(d) above, the estimated expenditure of $91,589,000 is for hiring of services from external service providers to implement the project, including system analysis and design, security risk assessment and audit, system development, installation, configuration and nursing.

21. On paragraph 16(e) above, the estimated expenditure of $45,772,000 is for engagement of services of contract staff to provide support in project planning, monitoring system implementation and system nursing.

22. On paragraph 16(f) above, the estimated expenditure of $4,965,000 is for site preparation and cabling works for the iAPI system.

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23. On paragraph 16(g) above, the estimated expenditure of $26,915,000 represents about 10% contingency on the costs items set out in paragraphs 16(a) to (f) above.

Other Non-recurrent Expenditure

24. The system development will require a project team in ImmD for project management; procurement of hardware, software and implementation services including the system analysis and design; site preparation; user acceptance tests; implementation support, etc. It will entail a non-recurrent staff cost of $84,573,000 from 2022-23 to 2025-26. ImmD will review the staffing requirement as the project progresses.

Recurrent Expenditure

25. The estimated recurrent expenditure for the proposal will be $36,778,000 in 2025-26, and will increase to $73,554,000 from 2026-27 onwards. This covers the costs for hardware and software maintenance; communications network; on-going support and maintenance; as well as the service charge payable to the data broker. The breakdown is as follows –

		2025-26	**From 2026-27 onwards**
		($'000)	**($'000)**
(a)	Hardware and Software Maintenance	17,902	35,804
(b)	Communication Network	373	745
(c)	System Maintenance and Data Broker Services Charges	17,257	34,513
(d)	Contract Staff	1,246	2,492
	Total	**36,778**	**73,554**

26. On paragraph 25(a) above, the estimated annual expenditure of $35,804,000 is for provision of hardware and software maintenance, and for software license fee to support the iAPI system with the maintenance of the three-layer resilience design.

27. On paragraph 25(b) above, the estimated annual expenditure of $745,000 is for the communication network rental charges.

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28. On paragraph 25(c) above, the estimated annual expenditure of $34,513,000 is for provision of system maintenance services and data broker services.

29. On paragraph 25(d) above, the estimated annual expenditure of $2,492,000 is for engagement of services of contract staff to provide support in system maintenance of the iAPI system.

30. Besides, the round-the-clock operation of the two proposed command centres, as well as system administration, operations and support will involve an annual staff cost of $71,692,000 after roll-out of the system targeted in the third quarter of 2024.

IMPLEMENTATION PLAN

31. Subject to funding approval of the Finance Committee (FC), ImmD will carry out the tendering for the proposals as soon as possible, with a view to awarding contracts in the first quarter of 2023. During the system development process, we will continue to engage the airlines and relevant stakeholders on various implementation issues, including the API requirements; system design and interface; network connection; system testing and training, etc. so as to ensure that the iAPI system will be rolled out smoothly. According to the latest assessment, roll-out of the iAPI system is targeted in the third quarter of 2024 the earliest. The implementation timetable is planned as follows –

Key Activity	Target Completion Date
Tendering	Q1/2023
System Analysis and Design	Q3/2023
System Development and Testing	Q1/2024
User Acceptance Test	Q3/2024
System Roll-out	Q3/2024

PUBLIC CONSULTATION

32. We consulted the Legislative Council Panel on Security on 3 May 2022. Panel Members supported the submission of the proposal to FC for funding approval.

Security Bureau
Immigration Department
June 2022

Comparison between a Traditional Batch Advance Passenger Information (API) System and an Interactive Advance Passenger Information (iAPI) System

	Traditional Batch API System	iAPI System
Mode of transmission	API data for all passengers and crew members on a flight are gathered during the check-in process into a single manifest message and transmitted in a single batch to the border control authority in the destination country/region	Two-way communications on a passenger-by-passenger basis between the aircraft operator/agent and the border control authority in the destination country/region during the check-in process
Boarding directive	Nil	The border control authority can provide aircraft operator/agent with near real-time boarding directive
Time of transmission	The batch message is normally transmitted after check-in closure and/or immediately after flight departure	Near real-time communication upon check-in process
Benefit	The border control authority can have the capability and additional time to analyse the passengers' and crew members' data in a batch before the flight's arrival in order to identify "passengers of interest" and to prepare for their arrival	With near real-time response messages to an airline operator/agent on passenger-by-passenger basis, the border control authority can prevent undesirables from boarding the aircraft, thereby strengthening border security and control capabilities more efficiently as compared to a traditional batch API system.
Command centre	Since instant processing of the API data and response messages to the airline is not required, a dedicated command centre is not a necessary requirement	A command centre is necessary to enable round-the-clock effective and efficient communication between aircraft operators/agents and border control authority, and provide necessary technical and operational support
Enforcement capability	With only a manifest of passenger and crew data of a particular flight, the capability to enhance enforcement by the border control authority is limited	With the functionality of near real-time two-way communication, the capabilities on border control and enforcement for enhanced security can be strengthened

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Flowchart of iAPI System