

**For discussion  
on 7 July 2015**

**Legislative Council Panel on Security  
Long Range Search and Rescue Service of  
the Government Flying Service**

**Purpose**

This paper aims to brief Members on the long range search and rescue (SAR) service of the Government Flying Service (GFS) and its future development.

**Background**

2. The GFS was established under the Government Flying Service Ordinance (Cap. 322) in 1993 to provide a wide range of flying services, including SAR, air ambulance, fire fighting, aerial survey and support for law enforcement, for various departments of the Government and people in need.

3. The GFS conducts two types of SAR operations, namely inshore and long range SAR. Inshore SAR refers to a mission within the Hong Kong waters, while long range SAR refers to a mission carried out within the Hong Kong Maritime Search and Rescue Region (which covers the Hong Kong Flight Information Region) (see **Annex I**).

**Working conditions of GFS' long range SAR**

*Mode of fleet operation*

4. The GFS fleet currently comprises four fixed-wing aircraft and seven helicopters. Among them, two Jetstream 41 (J-41) fixed-wing aircraft and three Super Puma helicopters can carry out long range SAR missions. Specifications and equipment of the two types of aircraft are at **Annex II**.

5. Generally speaking, upon receipt of a long range SAR call-out from the Aeronautical Rescue Coordination Centre of the Hong Kong Civil Aviation Department (CAD) or the Hong Kong Maritime Rescue Coordination Centre of the Marine Department, the GFS will deploy one J-41 fixed-wing aircraft and one Super Puma helicopter to the waters where the incident takes place. With higher cruising speed, the fixed-wing aircraft will be the first to arrive at the waters in question for an initial search and, as soon as the location of the rescue target is confirmed, guide the helicopter to the scene for the rescue mission. The fixed-wing will then stay above the waters to act as the on-scene commander of the SAR operation.

#### *Crew members*

6. As far as crew members for each call-out are concerned, two pilots and one air crewman officer are normally required on a J-41 fixed-wing aircraft, while two pilots and two air crewman officers are required on a Super Puma helicopter. Duties of the air crewman officers include assisting the pilots in flying missions, winching rescue of people in need, and working with accompanying medical officers to give first aid or other treatment for the injured at the scene and during the return flight to increase their chance of survival and recovery. The GFS currently has 10 fixed-wing aircraft pilots, 27 helicopter pilots and 33 air crewman officers<sup>1</sup> who are qualified for carrying out long range SAR operations. All of these air crewman officers are capable of administering first aid.

#### *Deployment situation*

7. Between 2010 and 2014, the emergency flying services provided by the GFS increased by about 25% (see **Annex III**) in terms of flying hours, and there was a significant increase in the number of call-outs for various emergency services. As far as SAR services are concerned, the flying hours increased by 20% from 574 hours in 2010 to 687 hours in 2014. The number of call-outs for inshore SAR operations increased by 44% from 371 cases in 2010 to 535 cases in 2014, while that for long range SAR operations remained at around 30 cases each year (see **Annex IV**). Details of major long range SAR operations in the last two years are at **Annex V**.

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<sup>1</sup> Including five non-civil service contract crew members.

## **Future development**

8. The GFS was given funding approval of \$776 million by the Finance Committee of the Legislative Council in June 2009 to replace the two J-41 fixed-wing aircraft procured in 1997 and the associated mission equipment. According to the contract, the original planned delivery dates for the two new aircraft were November 2013 and January 2014 respectively. However, during the flight tests, the contractor found that the camera sliding cover at the bottom of the aircraft caused unforeseeable stability problems at an extreme attitude. The contractor had to redesign the relevant components before conducting the flight tests again. The delivery of the new aircraft was delayed as a result.

9. The revised design of the two new Challenger 605 (CL 605) fixed-wing aircraft has now passed the major flight tests. The final stage of fuselage modification is in progress at the aircraft manufacturing plant. Pending completion of all mission equipment installation and passage of the remaining flight tests, the GFS will proceed with checking and acceptance of the aircraft together with CAD officers. According to the contractor's latest estimation, the two new CL 605 fixed-wing aircraft will be delivered in end 2015 and the first quarter of 2016 respectively. It is anticipated that the new aircraft will be fully operational between the second and third quarters of 2016.

10. For the smooth commissioning of the new fixed-wing aircraft, some crew members and engineering officers of the GFS have already completed the training required for the operation of the new fixed-wing aircraft at the training base of the aircraft manufacturer. Training for other personnel is also in progress and will be completed at the time around the delivery of the second aircraft. To cope with the maintenance work of the new fixed-wing aircraft, the Engineering Section of the GFS has installed specially designed maintenance platforms, as well as suitable tools and equipment at the headquarters' hangar, and has obtained maintenance certificates issued by the CAD. Upon delivery of the new aircraft, the GFS will provide practical flight training for other Government officers, such as the relevant officers from the Lands Department and the Hong Kong Observatory, who may need to use the new fixed-wing aircraft for their duties.

11. With longer endurance and cruising speed 1.8 times faster than the J-41 fixed-wing aircraft (a comparison of the performance between the new and old fixed-wing aircraft in long range SAR operations is at **Annex VI**), the new CL 605 fixed-wing aircraft will, upon entering into service, significantly enhance the efficiency and effectiveness of the fleet in SAR operations as the aircraft can reach the scene of the incident more quickly and remain on scene for longer and more thorough search when performing long range SAR missions. As such, the chance of survivors being located will increase, their exposure time in hostile environment will be reduced, and their chance of survival enhanced.

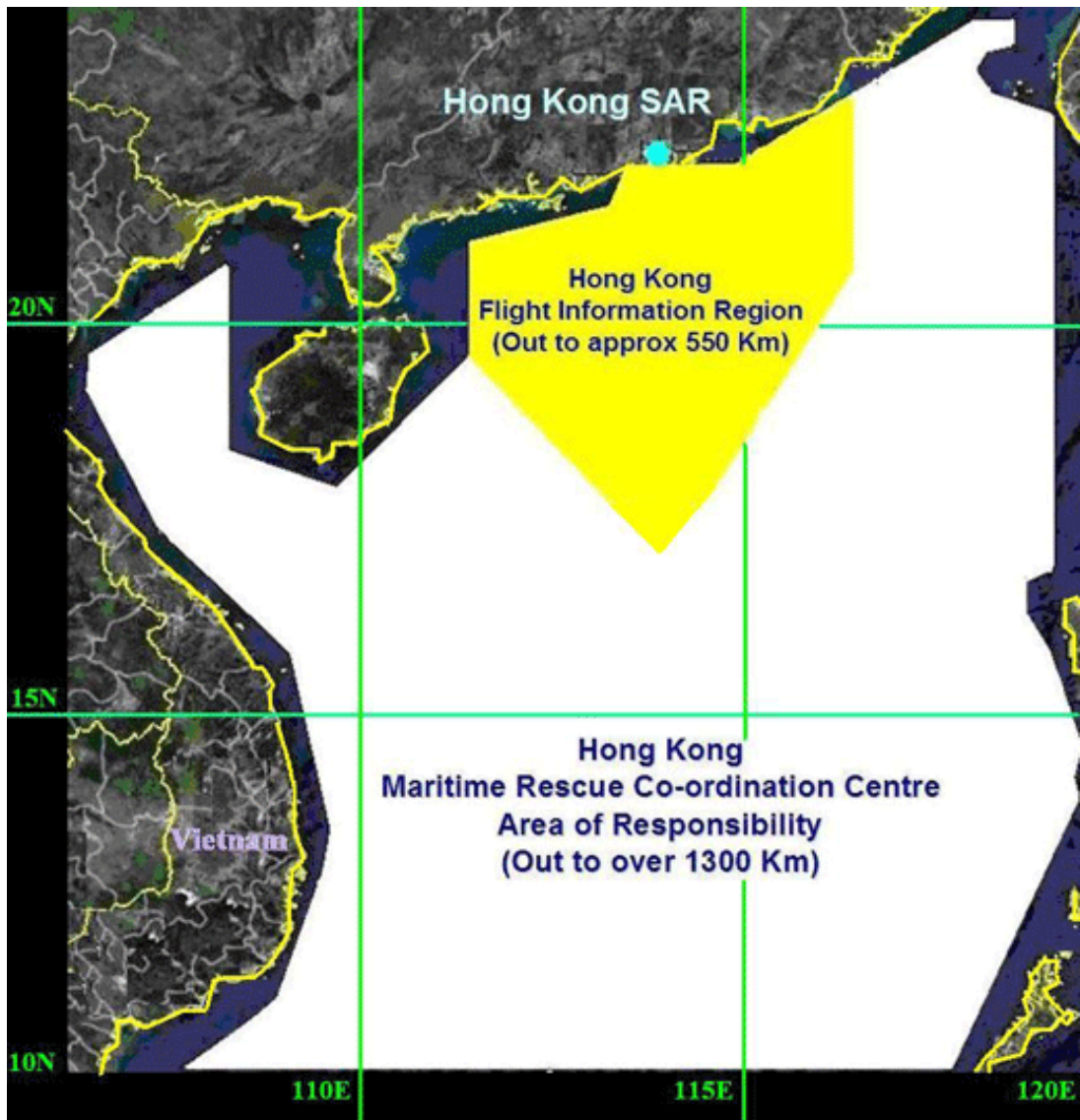
12. Furthermore, the equipment installed on the CL 605 fixed-wing aircraft adopts digital technology and can be fully integrated with the flight management and navigation systems on board. This will enable real-time data sharing among the different systems on board (e.g. the global positioning system on the new aircraft can be integrated with the forward looking infra-red detection system for the pilots to confirm the location of the search target much more quickly) as well as communication between the aircraft and the ground stations (e.g. the GFS Air Command and Control Centre may use the real-time data up-link function to provide latest weather information and other operation-related details to the pilots as a means to reduce the risk of inclement weather for the flight). In this way, operational efficiency of the fleet and flight safety can be enhanced.

### **Advice Sought**

13. Members are invited to note the content of this paper.

**Security Bureau**  
**Government Flying Services**  
**June 2015**

**Area Covered by GFS Long Range Search and Rescue**



## Annex II

### Specifications and equipment of GFS aircraft

	<b>J-41 fixed-wing aircraft</b>	<b>Super Puma helicopter</b>
Maximum speed	295 knots/hour	170 knots/hour
Radius of action	500 nautical miles (with 55 minutes on scene time) or 300 nautical miles (with 2 hours 30 minutes on scene time)	200 nautical miles
Crew members	2 pilots and 1 air crewman officer	2 pilots and 2 air crewman officers
Maximum seating capacity	5 persons	2 pilots and 2 air crewman officers plus 20 seats, of which 13 seats can be removed for placing 6 stretchers
Special equipment for search and rescue	Satellite communications system Direction finding system VHF, UHF & 406MHz Mission communication system in VHF, UHF & FM bands Air droppable equipment (air droppable life-rafts, smoke location markers, sea-dye markers and datum marker buoy)	Night-sun Search radar Rescue hoist with backup hoist Automatic search/let down/hover system Emergency medical system kit

**Annex III****Statistics on Flying Hours for Various Emergency Services Provided  
by GFS in 2010-2014**

(Percentage of Change on a Yearly Basis)

<b>Types of service</b>	<b>Flying hours</b>					<b>Percentage of change between 2010 and 2014</b>
	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	
Air ambulance	1010 (+4.8%)	1100 (+8.2%)	1236 (+12.4%)	1317 (+6.6%)	1270 (-3.6%)	+26%
Search and rescue	574 (+11.2%)	488 (-15%)	592 (+21.3%)	567 (-4.2%)	687 (+21.2%)	+20%
Support for law enforcement	178 (-10.1%)	232 (+30.3%)	185 (-20.3%)	210 (+13.5%)	211 (-0.5%)	+19%
Fire fighting	77 (-53%)	212 (+175.3%)	94 (-55.6%)	130 (+38.3%)	127 (-2.3%)	+65%

**Annex IV****Statistics on Call-outs for Various Emergency Services Provided  
by GFS in 2010-2014**

(Percentage of Change on a Yearly Basis)

Types of services	Number of call-outs					Percentage of change between 2010 and 2014
	2010	2011	2012	2013	2014	
Air ambulance	1 702 (+4%)	1 823 (+7.1%)	2 100 (+15.2%)	2 247 (+7%)	2 133 (-5.1%)	+25.3%
Search and rescue	Inshore:371 Long range: 40 Total: 411 (-4.4%)	Inshore:362 Long range: 29 Total: 391 (-4.9%)	Inshore:465 Long range: 27 Total: 492 (+25.8%)	Inshore:468 Long range: 28 Total: 496 (+0.8%)	Inshore:535 Long range: 32 Total: 567 (+14.3%)	+38%
Support for law enforcement	97 (-20.5%)	125 (+28.9%)	122 (-2.4%)	144 (+18%)	149 (+3.5%)	+53.6%
Fire fighting	62 (-52.7%)	145 (+133.9%)	70 (-51.7%)	76 (+8.6%)	72 (-5.3%)	+16.1%



**Annex V**

**Details of major long range search and rescue missions  
conducted by GFS in the last two years**

<b>Date</b>	<b>Location/ SAR target</b>	<b>Aircraft</b>	<b>Pilot</b>	<b>Air Crewman Officer</b>	<b>Total flight time</b>
14 June 2015	70 nm southwest of Hong Kong / Night transfer for 1 passenger who had a heart attack on a cruiser	1 J-41 fixed-wing aircraft and 1 Super Puma helicopter	4	3	4.4 hours
3 March 2015	187 nm south of Hong Kong / Transfer for 1 crew member on a cargo vessel	1 J-41 fixed-wing aircraft and 1 Super Puma helicopter	4	4	6.1 hours
1 November 2014	164 nm southwest of Hong Kong / Night transfer for 1 crew member on a Macau fishing vessel	1 J-41 fixed-wing aircraft and 1 Super Puma helicopter	4	3	5.7 hours
16 September 2014	38 nm and 34 nm southwest of Hong Kong / Night SAR operation for 14 crew members on a Chinese cargo vessel and a barge during the strike of Typhoon Kalmaegi	2 Super Puma helicopters	4	4	3.7 hours

5 May 2014	5 nm southwest of Hong Kong / SAR operation for 11 crew members on a sinking fishing vessel	5 flights of J-41 fixed-wing aircraft & 2 flights of Super Puma helicopter	14	9	24.6 hours
21 February 2014	216 nm southwest of Hong Kong / Transfer for 1 crew member on a Taiwan fishing vessel	1 J-41 fixed-wing aircraft & 1 Super Puma helicopter	4	3	9.5 hours
18 October 2013	130 nm southwest of Hong Kong / SAR operation for 10 crew members on a sinking yacht	1 J-41 fixed-wing aircraft & 1 Super Puma helicopter	4	3	6.8 hours
14 August 2013	43 nm southwest of Hong Kong / SAR operation for 21 crew members on a sinking cargo vessel during the strike of Typhoon Utor	1 J-41 fixed-wing aircraft & 2 Super Puma helicopters	6	5	7.3 hours
18 July 2013	216 nm southeast of Hong Kong / Evacuation of 6 crew members from a Vanuatu fishing vessel	1 J-41 fixed-wing aircraft & 1 Super Puma helicopter	4	4	6 hours

**Comparison of the performance between  
CL 605 and J-41 fixed-wing aircraft in long range SAR operations**

Situation: The GFS received a request to conduct a SAR operation for missing fishermen at 920 km (500 nautical miles) south of Hong Kong in South China Sea. The aircraft has to return to Hong Kong after the operation.

	<b>J-41 Fixed-wing Aircraft</b>	<b>CL 605 Fixed-wing Aircraft</b>
Cruising speed (knot/hour)	250	460
On-scene time (minutes)	130	75
On-scene SAR time (minutes)	<60	>150

The CL 605 fixed-wing aircraft can travel to the scene 70% faster than J-41 fixed-wing aircraft with an on-scene SAR time of more than 2.5 hours, while J-41 fixed-wing aircraft has less than 1 hour of time for SAR operation due to its endurance constraint.