COMMISSION OF INQUIRY
APPOINTED PURSUANT TO SECTION 2 OF THE COMMISSION OF INQUIRY ORDINANCE (CHAPTER 86) ON 22 OCTOBER 2012

WITNESS STATEMENT OF CHUNG SIU MAN

I, CHUNG SIU MAN, Assistant Director, Port Control Division, Marine Department, Room 2203, 22/F Harbour Building, 38 Pier Road, Central, Hong Kong, do say as follows: -

1. I am the Assistant Director of the Port Control Division of the Marine Department ("**Mardep**"). The Port Control Division is responsible for the marine traffic safety and operations of the port and the delivery of vessel traffic and search and rescue services. My duties include, amongst other things, establishing strategies and policies for the management of marine traffic, pilotage matters, port operations, and supervising the management and operation of the Vessel Traffic Centre, Maritime Rescue Co-ordination Centre and the harbour patrol services.

2. I possess a Class 1 (Foreign Going) Certificate of Competency. I joined the Mardep in 1987 and have taken up the office of Assistant Director of Port Control Division since November 2010.

3. I make this Witness Statement on behalf of the Director of Marine ("**Director**"), who has been granted leave to participate in the hearings of the Commission of Inquiry appointed pursuant to section 2 of the Commission of Inquiry Ordinance, Cap.86, on 22 October 2012 ("**Commission**") by the Ruling of the Commission made on 5 December 2012. Save where otherwise appears, the facts deposed hereto are within my personal knowledge or are derived from office files and records and sources to which I have access, and are true to the best of my knowledge, information and belief.

4. The purpose of this Witness Statement is to explain the existing regime of vessel traffic services offered by Mardep through its Vessel Traffic Centre ("**VTC**") and its role in vessel traffic management within the port of Hong Kong, and to address specifically the question of issuing warnings in potential collision or grounding situations and the equipment requirement that entails (item (13) and part of item (9) in the letter of Messrs. Lo & Lo dated 28 January 2013).

A. General Information on Marine Traffic in the Hong Kong Port

5. Hong Kong is one of the busiest international ports in the world. The marine traffic in the port of Hong Kong consists of ocean-going vessels ("**OGVs**"), river trade cargo and passenger vessels ("**RTVs**") and local vessels ("**LVs**") of different sizes, drafts and speed. In 2012, nearly 382,000 OGVs and RTVs arrivals and departures were recorded in the waters of Hong Kong. Together with the LVs, there are about 1,300 vessels being tracked by the VTS system in the waters of Hong Kong at any given time.

6. That being the case, proper and efficient traffic management is crucially important. The underlying premise for vessel traffic management in Hong Kong is two-fold, to ensure the efficient use of the Hong Kong waters to cater for the very large number of vessel users, and to uphold and maintain navigational safety.

7. The current system is devised based on (among other things) the fixed parameters of geography, the numbers and types of vessels using the Hong Kong port, and an analysis of the risks and consequences of accidents associated with the different type of vessels. Mardep establishes and implements traffic management measures assessed to be appropriate for OGVs, RTVs and LVs respectively.

8. The main traffic management measures to enhance navigational safety include the provision of vessel traffic services ("**VTS**") to vessels,

waterway management through the use of traffic separation schemes and fairways, and control of vessel speed in busy waters. For a flavour of the overall arrangement and layout of the Hong Kong habour, there is now produced and shown to me marked "**CSM-1**" copy of the Hong Kong Habour Facilities & Layout map for 2012.

9. In this Witness Statement I will focus on the VTS and its applicability to LVs.

B. Vessel Traffic Services

10. The VTC operates the VTS system to provide vessel traffic services to defined categories of vessels using the Hong Kong waters.

11. The VTS system is an integrated electronic system comprising a number of sub-systems such as radars, Automatic Identification System ("**AIS**"), CCTV, Very High Frequency ("**VHF**") radio and VHF Direction Finder. The system employs its sensors to build the traffic image and displays it on the electronic display units at the VTC. The technical details of the VTS system have been set out in the Statement of Yim Kit-ming made on 28 November 2012 in [**Marine8/3/1873-1877**].

12. The real time traffic images generated by the VTS system enable the VTS Operators ("**VTSOs**") to monitor and regulate marine traffic and to provide ship masters or persons in charge of the navigation, through VHF radio communication, with essential navigational information to ensure the orderly and safe use of Hong Kong waters. For example, the VTSO may schedule the arriving ships to use the East Lamma Channel to ensure ships seeking to enter Hong Kong could do so in a sequential and orderly manner alongside other vessels seeking to enter Hong Kong.

13. Under the VTS system the Hong Kong port is divided into 3 sectors, the "Eastern Approach", the "Western Approach" and the "Harbour"; in the Harbour sector an additional VTS workstation is assigned specifically for

monitoring the traffic at the Ma Wan Channel. Each of these sectors are monitored by VTSOs at the VTC around the clock: the Eastern and Western Approaches by 1 VTSO each; two VTSOs man the Harbour sector due to higher level of activities, and the Ma Wan Workstation by 1 VTSO. There is also a local marine traffic control station, the Kwai Chung Control Station, located at the Kwai Tsing Container Port dedicated to managing the traffic of the container terminal basin. Each VTSO is responsible for monitoring the real time traffic images generated by the VTS system in his sector, observing and interpreting the information displayed on screen, and providing information to the participating vessels through the VHF channel designated to that sector. There is now produced and shown to me marked "**CSM-2**" copy of a snapshot of the real time traffic images in respect of the Harbour sector displayed on screen in the VTC at any given time.

14. The delivery of vessel traffic service is an interactive process in which the participating vessels must be identifiable and be able to communicate with the VTC over VHF radio. Vessel traffic services are provided to visiting vessels (OGVs and RTVs) whose masters may not be familiar with the local condition and traffic situation. In Hong Kong, vessel traffic services are provided to OGVs over 300 GT, RTVs of 1,000 GT and above.

C. Setting of Alerts in the VTS System

15. The VTS system is capable of generating alerts for potential hazardous situations such as grounding and potential collisions based on the radar tracks of the participating vessels. These alerts serve as a reference and aid to the VTSOs in providing information and delivery of vessel traffic services to the participating vessels. That said, such provision of information does not and will not absolve the ship master or person in charge of navigation from taking responsibility for and action to avoid collision or grounding.

16. The setting of the VTS system collision alert, in the eastern and southern waters area (the outer zone) of Hong Kong is <360m for Closest Point of Approach ("**CPA**") and <3 minutes for Time of CPA ("**TCPA**"). The remaining waters area of Hong Kong (the inner zone) is <90m for CPA and < 3 minutes for TCPA. There is now produced and shown to me marked "**CSM-3**" copy of a plan indicating the outer and inner zones. The alert settings are based on (among other things) the considerations that:-

(1) The majority of the participating vessels are OGVs and RTVs which are substantial in size and length;

(2) In the outer zone, the encounters are much more likely to be between the participating vessels. The CPA is thus set at <360 metres; and

(3) In the inner zone, due to the presence of a large number of small vessels, which pass at close distance with the participating vessels, the CPA is reduced to <90 metres. This CPA strikes a balance between the reality in the inner zone where there are more encounters between vessels of varying sizes, and avoiding the system generating too large a number of alerts making it impossible for the VTSOs to comprehend, interpret and make decisions on dissemination of information in a meaningful manner.

17. As can be seen from "CSM-2", the real time traffic images displayed on the screens in the VTC throw up a vast amount of information including the disposition of vessels and their dynamic information such as course, speed, draft etc. The VTSOs have to note and interpret that information, which changes from minute to minute, and apply their judgment in determining whether a potential collision situation may arise (since the vectors of 2 vessels crossing does not necessarily mean potential collision as

either or both vessels may change course in the meantime), amidst the many other tasks the VTSOs have to perform at the same time.

18. In order to avoid generating excessive alerts and for the purpose of providing a comprehensible and readable traffic image for the VTSO to deliver effective VTS, the VTS system is set to eliminate the generation of collision alerts for non-participating vessels which are less than 35 metres in length (which complements the CPA setting criteria). This additional parameter will suppress the VTS system from generating collision alerts between vessels under 35 metres. The combined collision alert settings will ensure the number of alerts displayed on the screens are at a manageable level. If VTS is to be provided to local passenger vessels, the present setting eliminating vessels under 35 metres will have to be lowered, thereby generating a lot more alerts which will overload the screens and the VTSOs.

D. Limited Applicability of VTS System to Local Vessels

19. At present the vast majority of LVs are not VTS participants because of the limited applicability of the VTS system to LVs.

(D.1) Limitations arising from the characteristics and navigational behaviour of LVs

20. It must be appreciated that the nature and navigational behaviour of LVs are different from OGVs and RTVs. LVs, which are considerably smaller in size than OGVs and RTVs (71% of Class 1 passenger carrying LVs are below 20 metres), are more manoeuvrable and take much less time and space to carry out collision avoidance action. In general, LVs take collision avoidance action less than 1 minute away, and pass each other at around 50 metres apart.

21. This has an impact on the efficacy and capacity of the VTS system to handle LVs by providing collision alerts.

22. First on the issue of efficacy, small LVs built with Glass Reinforced Plastic ("**GRP**") are difficult to detect by radar. They often pass each other or other ships and objects at close range. In such encounters, there is a significant risk of loss of track, swapping of targets and generating of false alerts. The limitation concerning radar detection of small GRP vessel poses a significant problem in the provision of reliable vessel traffic services to this type of vessels.

23. Secondly there is the issue of system capacity.

(1) The VTS system as currently operated is already in its full capacity in terms of the number of targets the VTSOs have to handle. If one adds the LVs into the system, taking into account the number of LVs in Hong Kong and more pertinently the considerably larger number of trips they generate on a daily basis, the VTS system and the VTSOs will inevitably become overloaded since the real time information generated which has to be interpreted would increase substantially. Given the need to continuously assess the alerts generated, the VTSOs will be distracted from monitoring and regulating OGVs and RTVs which generally pose a more substantial risk in collision or emergency situations, and have an adverse impact on navigational safety in the Hong Kong waters generally.

(2) Take a single trip of a passenger ferry on the Yung Shu Wan to Central route as an example. There is now produced and shown to me marked "**CSM-4**" copy of the route of the local passenger vessel from Yung Shu Wan to Central on 10 February 2013. The vessel departed Yung Shu Wan pier at 2232 hours and arrived at Central pier at 2255 hours. During this 23-minute passage, six collision alerts had been generated by the system for this ferry. Had vessel traffic services been provided to this vessel, the

VTSO would have to call up the coxswain and alert him of the collision risk six times. Taking into account that there are 11 local passenger ferries underway in the Harbour Sector, the VTSO is potentially required to interpret over 66 collision alerts and communicates with the coxswains of the various ferries within the span of half an hour. The sample trip was taken at 2230 hours on 10 February 2013, the Chinese New Year's day when the traffic is significantly less than a normal working day. The task of handling the collision alerts for local passenger ferries on a normal day would be considerably more substantial and would impose a very heavy **additional** burden on the VTSOs.

It is also important to consider the effect of the six collision alerts given to a single coxswain within that sample half-hour trip, which is but one of the many trips that coxswain has to undertake that day since this is a regular ferry service. It is quite likely that the number of alerts so generated and given would distract the coxswain from focusing on navigation and paying attention to the traffic conditions, and would irritate him, or worse still, cause him to become "immunized" to them thinking that these alerts are only matters of routine.

(D.2) Limitations arising from limited airtime

24. At present there are 3 VHF channels assigned for communication with the VTC, one for each of the 3 sectors of the Hong Kong waters referred to in paragraph 13 above. In addition, there is one designated VHF channel for communication with the Kwai Chung Control Station. For the 3 sectors, 7,000 VHF calls on average are generated on a daily basis, which already place a heavy load on the current VHF channel capacity. If LVs are added to the pool of VTS participants, that would generate considerably more VHF calls, which

would literally "jam" the existing channels, and increasing the risk of potentially important messages not being able to be delivered to the parties concerned in time or at all.

E. Traffic Management Measures for Local Vessels

25. Although the majority of LVs are not VTS-participating, this does not mean that they are not subject to traffic management control by the Mardep. Apart from routine patrols, educational seminars and random inspections, the following are the measures devised by Mardep as appropriate for LVs.

(E.1) Speed Restricted Zones for Local Vessels

26. In addition to the speed restrictions in the Victoria Harbour which are applicable to all vessels, there are speed restrictions in 22 zones of high boating and marine leisure activities to regulate the speed of local vessels. The speed limit in those zones is 5 knots between the hours of 8 am and 12 midnight on any Saturday or public holiday, or on any day during the period from 1 July to 15 September (both dates inclusive) every year. Furthermore, the speed limit in all 14 typhoon shelters where local vessels congregate is set at 5 knots.

(E.2) Special Traffic Management for Major Events or Activities

27. From time to time, major events are held in the Victoria Harbour such as the International Dragon Boats Races, New Year's Eve Countdown, fireworks displays on Lunar New Year and the National Day, sea parade and the more recent cross harbour swimming race. On scene patrol services are provided to regulate marine traffic, facilitate the progress of the event and ensure navigational safety to all port users. Moreover, special operations targeting speeding, overloading, illegal carriage of passengers, non-compliance with local regulations, and patrols targeting recreational boating safety during

the summer season, etc are mounted regularly to deter illegal activities and ensure marine safety in the waters of Hong Kong.

(E.3) Speed Restriction Exemption System

28. To facilitate the efficient public transportation of passengers on ferry vessels to outlying islands, Macau and Pearl River Delta ports, high speed river trade and local passenger ferries are granted with Speed Restriction Exemption Permits ("**SREPs**"). The SREPs are subject to special safety requirements to ensure their safety while operating at a speed higher than the statutory speed limits; amongst them the requirements to install AIS, navigate in specific routes, and follow the fairways while within the Harbour. The SREPs are only valid and applicable in conditions where the visibility is above one nautical mile. The SREPs are valid for one year and are subject to re-assessment upon application for renewal.

F. Review of Marine Safety in the Port of Hong Kong

29. Although the VTS system does not apply to the majority of LVs, navigational safety of LVs is one of the key concerns of Mardep and is under constant review. The Mardep's approach to review and improvement is incremental; it analyzes accidents involving LVs to ascertain their locations, circumstances and causes, and considers what changes or improvement measures are apposite to address any safety issues arising from such accidents.

30. By way of background, statistics show that the marine traffic situation is safe in the port of Hong Kong. The average number of OGVs and RTVs arrivals and departures between 2008 and 2012 is nearly 412,000 annually. Amongst these visiting vessels, 42% of them are passenger vessels. **Table 1** below shows the number of collisions involving OGVs and RTVs in the last five years. It shows that the average incident rate is about 0.029% per annum. Considering the great number of visiting vessels and the high traffic

density of the Harbour, these figures show that the Hong Kong port is a very safe one.

Table 1

Year		2008	2009	2010	2011	2012*
OGVs	Cargo vessel	65 680	61 362	60 680	60 248	56 632
	Passenger Vessel	6 020	4 952	4 610	4 732	4 808
	Transit vessel	14 540	13 588	15 568	15 630	15 100
RTVs	Cargo vessel	201 220	179 500	182 078	169 390	156 150
	Passenger Vessel	161 800	165 196	176 258	174 970	164 124
Total	Cargo vessel	266 900	240 862	242 758	229 638	212 782
	Passenger Vessel	167 820	170 148	180 868	179 702	168 932
	No. of Collision	123	114	139	143	102
	Collision in %	0.027	0.027	0.032	0.034	0.026

*The 2012 statistic on vessel transits, arrivals and departures are provisional figures.

31. **Table 2** below shows the different kinds of passenger vessels and the corresponding incident rates between 2008 and 2012. In the case of local passenger vessels, the average incident rate is around 0.002%.

Table 2

Year		2008	2009	2010	2011	2012*
Ocean Going Passenger Vessel	Total number visiting	6 020	4 952	4 610	4 732	4 808
	Number of collision	0	0	1	1	0
	Incident rate	0	0	0.022%	0.021%	0
	Number of Death	0	0	0	0	0
	Number of Injury	0	0	0	0	0
River Trade Passenger Vessel	Total number visiting	161 800	165 196	176 258	174 970	164 124
	Number of collision	11	19	12	7	8
	Incident rate	0.007%	0.012%	0.007%	0.004%	0.005%
	Number of Death	0	1	0	0	0
	Number of Injury	16	6	0	2	0
2008 : 1 incident caused 5 injuries; and another 1 incident caused 11 injuries. *2009 : 1 incident caused 1 death and 1 injury; and another 1 incident caused 5 injuries* *2011 : 1 incident caused 2 injuries*						

Local Passenger Vessel	[1]Total number of trips per year of franchised and licensed ferry services and Kaito	609 000	609 000	609 000	609 000	609 000
	Number of collision#	16	14	8	15	13
	Incident rate#	0.003%	0.002%	0.001%	0.002%	0.002%
	Number of Death	0	0	0	0	39
	Number of Injury	8	12	7	3	109

2008 : 2 incidents caused 2 injuries each; and another 1 incident caused 4 injuries.
2009 : 1 incident caused 1 injury; and another 1 incident caused 11 injuries.
2010 : 1 incident caused 7 injuries.
2011 : 1 incident caused 3 injuries.
2012 : 1 incident caused 1 injury; 1 incident caused 11 injuries and 1 incident caused 39 deaths and 97 injuries.

 # The "number of collision" includes cases of all local passenger vessels while the "incident rate" is calculated using a smaller base of "total number of trips per year of franchised and licensed ferry services and Kaito". Therefore, it should be noted that, the incident rates shown above are larger than the actual incident rate.

33. After the incident on 1 October 2012, Mardep has, as with its previous practice, carried out a review and analysis of the accident to ascertain whether there is any scope for improvement. The review is still underway, but the Mardep is considering the introduction of additional measures on LVs to improve marine safety, by requiring LVs licensed to carry 100 or more passengers to install AIS[2] and VHF[3] radio on board. I should emphasise however that the intention behind proposing the installation of these equipment is not to turn these LVs into VTS-participating vessels. Rather the equipment would provide a means of communication with Mardep in case of emergency.

[1] 609,000 trips per year is estimated according to the frequency of franchised and licensed ferry services published on the Transport Department's web site. This is a very conservative figure because it does not include the trips made by the other passenger carrying launches such as Lamma IV (about 237 numbers in 2012) as they are not part of the franchised or licensed service.
[2] The current carriage requirements for AIS apply to local high speed passenger ferries and since 2008, newly licensed oil carrier of overall length exceeding 50 metres.
[3] The current carriage requirements for VHF apply to ferry vessels that ply outside the Victoria port, Class II vessels that operate within river trade limits, mechanically propelled Class II cargo vessels of overall length exceeding 50 metres and Class III(b) GRP fishing sampan when applying for port clearance.

It would also provide information (which is recorded and stored in the VTS system but will not be shown in real time mode) for Mardep to track their movements for the purpose of investigation, analysis and review in order to detect any dangerous manoeuvres or near-misses as a basis for devising improvement measures. Local passenger carrying vessels fitted with AIS will also be readily detectable by other AIS-equipped ships. The AIS signals provide clear indication of their identities, positions and movement to other vessels which would help contribute to marine traffic safety.

34. I confirm the contents of this Witness Statement to be true to the best of my knowledge, information and belief.

Dated this 14th day of February 2013

CHUNG SIU MAN

COMMISSION OF INQUIRY
APPOINTED PURSUANT TO SECTION 2
OF THE COMMISSION OF INQUIRY
ORDINANCE (CHAPTER 86) ON 22
OCTOBER 2012

WITNESS STATEMENT OF CHUNG SIU MAN

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