## EMERGING TECHNOLOGIES – REVIEW TABLE

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|  | **Question** | **Technology Candidate Response** | | **Working Group Response** |  | **G**  **r e e n** | **A**  **m b e r** | **R**  **e d** |  |
| **Infrastructure** | **User** |  | **Status** | | | | |
| 1. | Where has the referral come from? | China MSA, as a potential user of the technology, had been provided with information on the capability and performance detail of the candidate technology, and then convey relevant information to the IALA. |  |  |  | | | | |
| 2. | Name of technology and product name | ships’ air draft remote measurement technology (ADRMT) |  |  |  | | | | |
| 3. | Functional description | The system can be used for the 24-hour remote measurement of vessels’ air draft and traffic monitoring within a certain range of a bridge to support traffic organization service delivery and passage planning. |  |  |  | | | | |
| 4. | Proposed user group | Authorities in charge of marine safety, VTS, and bridge managers. |  |  |  | | | | |
| 5. | What are its Key limitations? | The ADRMT system, which is still in the prototype testing stage, has a maximum operating range of 9,555 meters, which may not sufficient for some very large vessels for their safe maneuvering once there is an unforeseen situation. Besides, error sauces may also include mechanical error, vibration, weather condition. |  |  |  | | | | |

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| 6. | Where is it currently used (geographic and/or industry)? | It's a new technology that hasn't been widely deployed on bridges. However, its component equipment has been maturely used in other fields, such as the high-precision electro-optical sensor terret has been maturely utilized in the military field. |  |  |  |
| 7. | How is it currently used? | The technology has not yet been applied in practical cases, but the test results of the bridge field show that it can be used for 24-hour remote monitoring and measurement of vessels’ air draft within a range of nearly 10 km. The system is observative enough, and the measurement error of all targets’ air draft within a range of 5 km can be less than 1 meter. |  |  |  |
| 8. | How could it be used within the maritime sector? | To a certain extent, as a supplement means for VTS authorities to monitor and obtain the actual air draft information of vessels in the vicinity of a bridge to support traffic organization service delivery and bridge passage planning. |  |  |  |
| 9. | Who developed it? | [Shanghai](javascript:;) [Maritime](javascript:;) [University](javascript:;) |  |  |  |

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| 10. | Is it commercial, non- commercial, or military? | The technology is now available commercially. |  |  |  | | | | |
| 11. | Is there an existing technology that meets the same requirements?  If so, what makes this different? | A similar means named VHD Ship’s Air Draft Measurement System(VHD refers to video high density) which is also based on the principle of visual imaging had been applied at Tsingma Bridge in Hong Kong for vessels' air draft remote measurement for several years with the assistance of its starlight camera. However, it can only manually select target vessels for remote tracking and measurement other than real-time automatic target capture. |  |  |  | | | | |
| 12. | Ease of implementation? | Not very easy, the overall cost of the system equipment is high and may need to lay additional network routes depending on the location of the bridge and the effectiveness of the local communication infrastructure, and the system deployment is relatively complicated. |  |  |  | | | | |
| 13. | What are the constraints for implementation? | Installation and application of the system may require the approval of the bridge owner and local regulatory authorities. At the same time, the frontend equipment of the system must be installed on the outside of the bridge with an additional installation bracket, which may not have been considered at the beginning of the bridge design and construction. But it is undeniable that once the system is established, it will bring great convenience to vessel traffic monitoring near the bridge. |  |  |  | | | | |

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| 14. | what is the capability of the technology? (i.e. nominal range; data throughput; support for audio / video?) | The detailed technical capability of the system has been described in the input paper. |  |  |  |
| 15. | What is the scalability of the technology? | Yes, the system has been designed with multiple data interfaces, which can access tide and hydrometeorological data as needed for users to grasp the real-time natural environmental condition in the bridge water. |  |  |  |
| 16. | Is the technology backward compatible? | Yes, with extensive backward compatibility, the data processing and analysis software system of this system is an open platform, which can be accessed by a variety of digital objects. And this system can also be used as a subsystem for others. |  |  |  |
| 17. | Is the technology dependent on another technology? | The concept architecture of this technology is completely independent of other technologies, but the performance of the system may be affected by the capability of equipment selected such as radar, electro-optical sensor turret, etc. |  |  |  |
| 18. | Can the technology be demonstrated? | Yes. A preliminary test and data accumulation in Zhoudai Bridge water had been conducted. |  |  |  |

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| 19. | Are there any results and test bed? Please List | There are no existing testbeds, but a field application test was conducted, the results of which had been mentioned in the input paper. |  |  |  | | | | |
| 20. | Is there a compliance summary? | The design and operation of the system comply with the following mandatory national standards of China:  GB/T 37417 IEC62065) Maritime navigation and radiocommunication equipment and systems track control systems operational and performance requirements, methods of testing and required test results  GB/T 25444.1(IEC61892) Mobile and fixed offshore units’ electrical installations--Part 1：General requirements and conditions |  |  |  | | | | |
| 21. | Are there legal issues associated with the implementation of the technology? | No. |  |  |  | | | | |
| 22. | Are there any intellectual property rights (essential patents) associated with the technology? | There is no patent right, which is under the application. |  |  |  | | | | |
| 23. | Is the technology safe to use? | Yes. |  |  |  | | | | |
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| 24. | Does the use of the technology require extra training? | No, the system UI is very easy for users to operate, no additional training is required. And a user manual is under development. |  |  |  | | | | |
| 25. | Are there environmental considerations with the technology? | No environmental impacts, no noise and light pollution will be produced though it hasn’t been marine or environmental qualified. Compliance mater has also been mentioned in item 20. |  |  |  | | | | |
| 26. | What are the financial considerations for implementation and use? | A periodical comprehensive maintenance may be required once the system is deployed so that a dedicated founds is required. Also, the cost of the first deployment of the system has been mentioned in item 12. |  |  |  | | | | |
| 27. | Is the technology secure (i.e. protected against hacking; privacy of data)? | Yes, it’s safe and reliable, since the system data transmission was designed through a dedicated line or LAN encryption network. |  |  |  | | | | |
| 28. | Readiness (EU Technology Readiness level - TRL) (level  of maturity of technology) | The system can be deemed as TRL 7- Demonstration in an Operational Environment since an application test and technical demonstration had been conducted. |  |  |  | | | | |
| 29. | Can you provide independent references? | Yes, to be supplied separately. Detailed information has been contained in the input paper. |  |  |  | | | | |