Annex A:

**Comparison of the Advantages and Disadvantages of the AtoNs with or without RCMS**

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|  | **AtoNs without RCMS** | **AtoNs with RCMS** |
| **Fault discovery and alarm** | It can not find out the fault of AtoNs in time, and can only rely on patrol, navigation aids user notification, etc. . | It can realize the 24-hour monitoring of the running state of the AtoNs, find the fault of the AtoNs and give an alarm at the first time. |
| **Fault type judgment** | Can not judge in advance the actual situation of the AtoNs failure, can not make targeted repair preparations. | It can accurately judge the fault types of AtoNs, and then carry out different repair methods according to the fault types, plan the resources of operators, AtoNs equipment, tools and vessels in advance, and improve the repair efficiency, shorten the failure time. |
| **Fault data statistics** | It is not convenient to accurately count the specific conditions of various kinds of faults, such as the number, type, reason, etc. . | It can conveniently and accurately count out the specific situation of the AtoNs fault, such as the number of the fault, the type of the fault and the way of repairing the fault, and provide reliable basis for analyzing the cause of the AtoNs fault and making improvement measures. |
| **AtoNs fault repair (adrift)** | When the buoy is dritfing, it can only be searched on a large scale in its original position, and can not be accurately searched. | The system can provide the real-time position of the adrift buoy, which is convenient to quickly and accurately recover the adrift buoy. |
| **The whole life cycle tracking of AtoNs** | It is not convenient to accurately grasp the life cycle of the AtoN and failure prevention. | It is convenient to master the whole life cycle of AtoNs, judge the stage of lanterns in time, and realize the failure prevention in advance. |
| **Field inspection** | It needs more manpower and material resources, lower efficiency and lower accuracy. | Reduce the frequency of site inspection, improve work efficiency, save manpower and material resources, reduce pollution and consumption, improve the ecological environment. |
| **AtoNs protection** | Unable to locate the vessel involved in the accident, unable to carry out work such as AtoN claims. | It can realize the track inquiry of the suspicious ships near the damaged AtoNs,which is convenient for carrying out the work of claiming for the AtoNs and cracking down on the acts of destroying the AtoNs. |
| **Marine meteorological data acquisition** | Unable to carry out information monitoring collection. | The RCMS is used to collect marine meteorological data, which is helpful for marine environmental monitoring, fishery breeding, tsunami prevention and meteorological monitoring. |
| **AtoN Data Sharing (MASS Study)** | Unable to share data. | Under the background of MASS research, conduct the research on the possibility of sharing the data of buoy with ship and VTS and the research on ship anti-collision alarm. |