GUIDANCE NOTES

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CHINA CLASSIFICATION SOCIETY

# GUIDELINES FOR REMOTE SURVEY OF SHIPS

# 2022

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Beijing

## Foreword

In 2019, China Classification Society carried out research on remote survey of ships based on 5G communication technology on board. Under the impact of COVID-19 in 2020, 4G/5G communication technology and digital technology have been widely used in the field of ship survey to ensure remote survey has the same effectiveness as boarding survey. Looking ahead, the coexistence of remote survey and real ship survey will become the new normal in the post-epidemic era.

Based on the application experience of new technologies, China Classification Society has revised the Guidelines for Remote Survey of Ships, for the purpose of further standardizing the specific requirements for remote survey of ships. In addition to meeting the requirements of the Guidelines, the remote survey of ships is to meet the relevant requirements of CCS Rules for Classification of Sea-going Steel Ships, the Administration of the flag State, relevant conventions and regulations, port state control authorities and regional organizations.

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# Chapter 1 GENERAL

## 1.1 Objectives

1.1.1 The Guidelines specify the implementation requirements for ship remote survey of China Classification Society (hereinafter referred to as CCS) on the basis of the relevant survey requirements of CCS Rules for Classification of Sea-going Steel Ships, the Administration of the flag States, the related conventions and regulations, port state control authorities, regional organizations, etc, clarifying the specific requirements for the implementation of ship remote survey. The Guidelines can be used as the guidance document for the remote survey of ships by CCS surveyors, ship companies and ship officers.

1.1.2 The Guidelines specify the principles, processes, and procedures for implementing CCS remote survey, and the minimum requirements for remote survey. Surveyors have the right to propose other survey requirements according to the actual survey situation, aiming to ensure that the quality of ship survey is not reduced due to the use of remote survey, so that remote survey has the same effectiveness as boarding survey.

## 1.2 Application

1.2.1 The Guidelines are applicable to CSA classed ships of CCS, including self-propelled ships and non-self-propelled ships. If any statutory survey is involved, it is to be approved by the Administration of the flag State first before the following survey can be carried out remotely upon assessment and acceptance of CCS:

.1 annual survey items in the designated scope carried out mainly by means of real-time communication, and the annual survey items carried out remotely are part of the annual survey;

.2 non-overdue annual survey of non-self-propelled ships, such as unpowered barges or pontoons, carried out mainly by means of real-time communication;

.3 examination of the outside of the ship's bottom in floating state by means of real-time communication;

.4 items of planned maintenance scheme (PMS) for machinery (class notation: PMS) and continuous machinery survey (class notation: CMS);

.5 interim class survey and additional statutory survey, such as survey extension, issuance/extension/deletion of class conditions/statutory outstanding items, change of name survey, minor structural, mechanical, equipment damage or defect, equipment upgrading, replacement of spare parts, etc.;

.6 other survey items, for which remote survey can have the same effectiveness as boarding survey upon case by case assessment of CCS.

1.2.2 Verification, modification or reissuance of documents only, such as verification of drawings and technical documents, reissuance of certificates and supporting documents, addition or reduction of cargoes fit for carriage by ship, etc., which can be completed according to the existing documents and do not need to board the ship for actual verification, does not belong to remote survey.

**1.3 Definitions**

1.3.1 Remote survey refers to a means by which survey is realized by applying mobile communication technology to obtain the process or survey process information of the same degree as the on-site survey, without attendance on board by a surveyor.

1.3.2 Information and Communication Technology (ICT): refers to the technologies used in the scope of remote surveys for gathering, storing, retrieving, processing, analyzing, and transmitting information which includes both software and hardware.

1.3.3 Survey process information: refers to the electronic files or real-time communication content that can reflect the structure of a ship, the condition of equipment or its inspection process, and is generally transmitted by mobile

communication technology to provide the basis for survey and judgment for the remote surveyor. The electronic survey documents can be photos, videos, documents and data, statements of the Master or Chief Engineer, etc.

1.3.4 Unmanned aerial vehicle (UAV): refers to an unmanned aircraft, which is an unmanned aerial vehicle operated by wireless remote control device and its own programmed remote control device. It is controlled by a flight controller or pilot and can be used to collect survey process information.

1.3.5 Smart glasses: refers to wearable glasses integrated with intelligent functions such as video, image shooting and video communication, which can be used to collect survey process information.

1.3.6 Real-time communication: refers to the application service that realizes synchronous transmission of sound and video through video communication platform and using mobile communication technology.

## Chapter 2 IMPLEMENTATION CONDITIONS OF REMOTE SURVEYS

### 2.1 General requirements

2.1.1 When conducting remote surveys according to the Guidelines, attention is also to be paid to other relevant provisions of international conventions, flag State Administrations, port state control authorities, regional organizations and CCS Rules for Classification of Sea-Going Steel Ships. In case of any discrepancy between the Guidelines and the above requirements, the latter is to prevail.

2.1.2 The applicant has the responsibility and obligation to ensure that the information related to the remote survey is true and accurate, and assumes corresponding legal and economic responsibilities. CCS has the right to terminate the remote survey of ships that provide false survey process information. If it is found that there is fraud or falsification during the remote survey, CCS will withdraw the survey conclusion and/or cancel the corresponding certificate.

2.1.3 The applicant is to evaluate the risks posed to the crew due to assisting the remote survey according to the type and scope of the applied remote survey, develop corresponding preventive measures, and carry out crew training, so as to ensure a safe working environment for the crew during the process of assisting the remote survey, and prevent the occurrence of safety accidents.

2.1.4 Sufficient conditions are to be provided on board to ensure that the applied information and communication technology can meet the following requirements for conducting remote surveys:

.1 Obtaining sufficient survey process information complying with requirements;

.2 The surveyor can verify the survey items according to the obtained survey process information;

.3 The surveyor can complete the survey by verifying the survey process information, and achieve the same effectiveness as the boarding survey.

2.1.5 The survey process information includes the following four forms:

.1 Real-time communication;

.2 Video records provided by the applicant;

.3 Photo records provided by applicant;

.4 Other digital information or supporting documents.

The above information is to be sufficient for the surveyor to check and evaluate the survey items and to verify testing and maintenance.

## 2.2 Network conditions

2.2.1 In general, the ship is to have sufficient network stability and bandwidth to support the real-time communication required in 2.1.5.1 for remote survey, and the surveyor and the crew (or the shipowner's representative) can maintain a real-time video call. The quality of the video and audio of the communication is to be such as to ensure that the surveyor can make an accurate judgment on the survey situation. The network conditions are to be able to support the smooth transmission of video with sufficient resolution, and the personnel dialogue is clear and coherent to the satisfaction of the Surveyor.

2.2.2 The equipment for remote survey can be connected to the shore-based network through wireless WIFI, satellite communication or 4G/5G cellular communication system.

2.2.3 In order to implement real-time communication, the network arrangement is to cover the survey area, e.g. the annual survey can cover engine room, steering gear room, other machinery spaces, accommodation spaces, public spaces, service spaces, control stations, forecastle and cargo spaces, etc.

## 2.3 Hardware conditions

2.3.1 The applicant is to select the necessary information and communication technology hardware equipment for provision on board according to the applied survey items. The selected equipment is to be able to support the effective

implementation of remote survey. The equipment that can be selected includes:

.1 A host computer device, capable of receiving the streaming of video/audio/images/data. This is usually a laptop or desktop computer compatible with the software application used for the processing and transmitting survey process information;

.2 On board standalone device capable of capturing videos/images, e.g. digital cameras, camcorders, Unmanned Aerial Vehicles (UAVs), etc.;

.3 Smart devices, e.g. a smartphone, tablet, smart glass and other smart mobile devices;

.4 Auxiliary communication equipment, e.g. noise-cancelling headphones with call function, handheld tripod head, etc.

The above portable equipment is to be equipped with sufficient power capacity or portable backup power to maintain the operation of the equipment, and capable of supporting the completion of remote survey items

2.3.2 The communication equipment used for the live streaming is to ensure:

.1 The ship side and the shore side can display the captured synchronous video and audio at the same time, and maintain the real-time network communication connection;

.2 Two-way direct voice communication can be realized;

.3 Function of taking screenshots can be realized;

.4 When necessary, a suitable anti-shake device (e.g. handheld tripod head) is to be used to assist the handheld shooting, considering that the movement of the handheld shooting equipment at ship side may lead to lower image quality outputs.

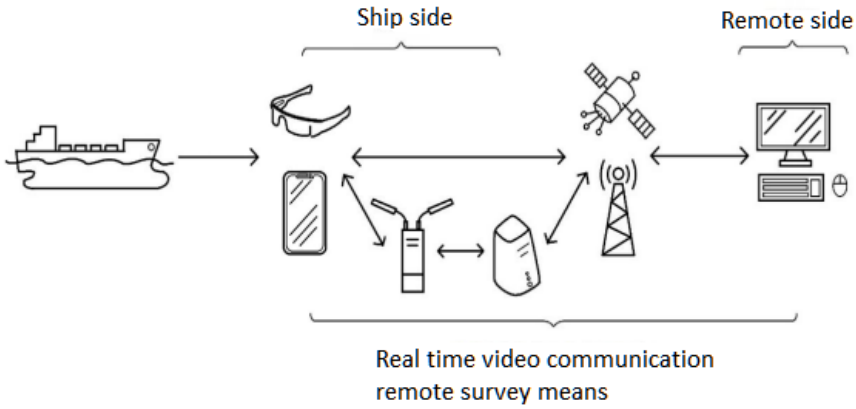
2.3.3 The applicant is to consider the restrictions on the use of electronic equipment, network connection, etc. in the company's safety management system or at the ship's

port of call, e.g. the explosion-proof requirements for electronic equipment used in the space under survey.

2.3.4 The following is an example of provision of communication equipment. The provision of equipment can be increased on decreased on board according to the ship type, ship size, port communication signal conditions and other factors and based on the requirements of the surveyor.

Table 2.3.4

| Item | Equipment | Remark |
|---|---|---|
| Ship side communication network equipment | Customer Premise Equipment | |
| | Individual Mesh Distributed Router | In order to ensure the quality of communication, in addition to the main individual equipment, the engine room is to be provided with 2 additional individual equipment, and at least one additional individual equipment is to be provided on the deck. |
| Ship side audio and video capture equipment | Smart phone + anti-shake tripod head + blue-tooth noise canceling headphone | |
| | AR smart glass | |
| Remote side hardware equipment | Computer or laptop | |
| Communication software | CCS remote survey platform | |

| | |
|---|---|
| Schematic diagram of the equipment architecture of the ship side and the remote side |  |

2.4 Software conditions

2.4.1 The hardware equipment is to be provided with software accepted by CCS, and the surveyor is to evaluate the software before the remote survey and confirm that it complies with the following requirements:

.1 The surveyor can conduct real-time communicate with and give instructions to the person conducting the remote survey on board through the software;

.2 The surveyor can supervise the survey behavior according to the displayed video and audio information;

.3 The functions of automatic storage or taking screenshots can be realized.

2.4.2 Based on digital technology, the surveyor can obtain digital information through the installed software or application program to assist in the implementation of the survey, and use auxiliary means to make survey decisions through each individual assessment as appropriate. These auxiliary means include:

.1 Artificial Intelligence (AI) recognition technology;

.2 Internet of things (IoT) for collecting parameters and evaluating acceptability/working condition of machinery and equipment;

.3 Data driven verification technology;

.4 Other means considered acceptable by CCS.

## 2.5 Data Security

2.5.1 The applicant is to confirm that the use of the software and application programs installed on the equipment complies with the relevant data security provisions of the shipping company, by referring to the relevant requirements of IMO MSC.428(98), MSC-FAL.1/Circ.3 and IACS Rec.166. Data related to remote survey is to be protected. Corresponding network security measures are to be taken for processes including collection, storage, processing, transmission etc., and the relevant requirements of CCS are to be satisfied.

2.5.2 Before the remote survey is carried out, if the software or application program is not designated by CCS, the surveyor is to evaluate whether the software and application program used for the survey implementation are acceptable or not according to the requirements of 2.4.1.

## Chapter 3 IMPLEMENTATION PROCEDURES OF REMOTE SURVEYS

### 3.1 Acceptance of survey application

3.1.1 The applicant may put forward the demand for remote survey to CCS through CCS customer service system (CSM), or in the form of fax, e-mail, etc.

3.1.2 The applicant is to promise to ensure the accuracy and completeness of the survey process information for the implementation of remote survey.

### 3.2 Evaluation of survey

3.2.1 The applicant is to submit the hardware conditions, software conditions, data security and cyber security conditions onboard ships to the survey unit for evaluation so as to determine whether the requirements for implementation of remote survey are met. Any comments on the implementation conditions are to be improved by the applicant according to the requirements provided by the survey unit.

3.2.2 After evaluation, if the real-time communication mode is adopted, the applicant is to organize the crew members participating in the remote survey to be trained on the application method of real-time communication software and operation safety regulations as required by the surveyor. The surveyor is to test the real-time communication effect before the survey to confirm that the network conditions onboard and the crew's familiarity with hardware and software can support the remote survey.

### 3.3 Implementation of survey

3.3.1 The applicant is to assign crew members to cooperate with the surveyor to carry out remote survey at an appointed time. In general, the survey is to be carried out by the means of real-time communication. The applicant is to provide the real-time communication hardware equipment for remote survey onboard the ship and inform the surveyor of the crew members who will participate in the survey. The applicant is to be responsible for the safety of the personnel onboard and take

appropriate safety measures to ensure that the crew members will not cause safety accidents due to the implementation of remote survey, i.e.: during the testing, meeting the requirements of operational procedures, and timely notifying the crew at spaces related to know the survey items being carried out onboard and taking safety precautions. When the applicant implements real-time communication, at least two persons onboard are to cooperate for each other, one of them is an officer, and smooth communication is to be available between the crew and surveyor. After the live streaming is connected with the surveyor, survey process information is to be collected in real time according to the requirements of the surveyor. In the process of information collection, the crew members may interrupt survey at any time to ensure safety, and continue it after the safety conditions are restored.

3.3.2 The surveyor is to be familiar with ship structure and equipment condition, and consult relevant drawings in advance, e.g. general arrangement plan, engine room arrangement plan, fire control plan and life-saving appliances arrangement plan, etc., when necessary.

3.3.3 The surveyor is to clarify survey scope and survey items to the crew members participating in remote survey, and inform them of involved survey scenario, structure, equipment, system, appliances as well as tests and testing to be verified.

3.3.4 Survey process information is to be collected under sufficient light condition. The video and photos are to truly reflect the condition and defects of hull structure, equipment and system, etc. The video is to be clear and consistent, and complete test or testing process can be recorded smoothly when necessary.

3.3.5 The surveyor is to verify survey items and check conformity of equipment test and system testing by verifying survey process information provided by the applicant. If it is deemed by the surveyor that the survey process information fails to fully reflect the actual condition of survey items, the applicant is to collect survey process information again according to the requirements of the surveyor until the surveyor can carry out accurate evaluation and judgement and draw survey conclusion.

3.3.6 In the case where a live streaming connection with the surveyor is not possible or is not continuous at the place of the survey (e.g., engine room), for specific survey item, data information required by 2.1.5.2/3/4, which is collected offline by the officers on board ship, may be accepted for verification, upon careful assessment by the surveyor. These data information may be recorded video and audio, photos, Master's/Chief engineer's Statement, Navigation Log, Engine Log and Owner's Statement, etc.

3.3.7 In order to verify survey items, when necessary, the applicant or master is to submit such documents as machinery and equipment maintenance report, supplier inspection record and report and report issued by the manufacturer and supplier as supplementary material according to the requirements of the surveyor.

3.3.8 During survey, the surveyor may decide to suspend survey if it is found that the technical condition of the ship cannot be equivalent to that for boarding survey or the communication condition cannot support continuation of remote survey. After the survey is suspended, following measures are to be taken according to actual condition:

.1 After waiting for recovery of network condition or taking adjustment measures, if it is deemed by the surveyor that the remote survey conditions are met again, the remote survey can be continued;

.2 If the remote survey condition cannot be recovered, with agreement between surveyor and applicant, the remote survey will not continue and the survey is completed. The survey items that have not been carried out are to apply for separate survey when the conditions for remote survey are met. On completion of this survey, there is not to be any overdue survey items, or extension is to be granted to survey items that are about to be due ;

.3 If the survey cannot be normally carried out due to the implementation conditions with unforeseen variation, the remote survey can be canceled after agreement is reached between surveyor and applicant;

.4 If the surveyor finds that the ship has defects, failures, damages etc. during the survey process, and the survey by the remote method can not reach the equivalence of the survey on board the ship, the applicant may be required to terminate the remote survey. The surveyor is to guide the ship to complete the temporary repair for the defects, failures and damages. The applicant is to develop the boarding survey plan according to the requirements of the surveyor, and the survey is to be completed upon satisfactory conformation by the survey unit, requiring the ship to arrive at the port or the shipyard with the boarding-survey conditions within the limited time to carry out the boarding survey.

### 3.4 Reports and Records

3.4.1 After completion of remote survey items according to the requirements of the rules and conventions, the surveyor is to verify the integrity and accuracy of the information during the survey process, and finally confirm the completion of the survey. If it is deemed necessary, the surveyor may ask the applicant to arrange the subsequent survey on board, and CCS will recheck the results of the remote survey.

3.4.2 The surveyor and the applicant are to keep records of the survey process information, which are to be collected promptly as required by surveyors, showing the date and time of collecting the survey process information. CCS need no save the live streaming video and audio of the entire survey process unless it is deemed necessary by the surveyor.

3.4.3 After the completion of the survey, the applicant is provide a statement signed by the Master to confirm the integrity and authenticity of the survey process information.

3.4.4 The Master is to record the implementation of the remote survey in the log, including the implementation time of the remote survey, the statement of the Master or the Chief Engineer, the survey process information and other documents submitted to the surveyor. The Master is to submit a copy of the relevant log page to the

surveyor.