Input paper: [[1]](#footnote-1) VTS49-8.6.1

Input paper for the following Committee(s): check as appropriate Purpose of paper:

**□**ARM **□**ENG **□**PAP **□** Input

**□**ENAV **X**VTS **X** Information

Agenda item [[2]](#footnote-2) 8

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Proposal on the technology of Integration between ultra-range CCTV and VTS

# Summary

Considering the task of "Prepare a living document on Future VTS, including emerging technologies and human element" ( VTS Task Plan 2018-2022--1.4.3) will be launched at the VTS 49 meeting, this paper aims to share information about the integration of ultra-range CCTV and VTS based on the China MSA’s practices.

## Purpose of the document

## The purpose of this paper is to provide input for the VTS Committee to produce the living document.

## Related documents

VTS48-7.1 VTS Task Plan 2018-2022 (20191010)

# Background

Given the limitations of existing CCTV such as short focal range and insufficient coverage, which requires high density layout and leads to inconsecutive tracking between different CCTV, it is uneconomic and ineffective in achieving the integration of existing CCTV with VTS. Currently, image capture distance of ultra-range CCTV is over 20 nm with high quality of imaging capability. And mature technology is available for integration of ultra-range CCTV and VTS based on Cartesian coordinates system. VTS service will dramatically upgrade owing to the ultra-range CCTV.

# Discussion

* 1. **influence of ultra-range CCTV on VTS**

The technology of integrating ultra-range CCTV with VTS will benefit a lot, such as the information obtainment and service ability of VTS, ensuring the safety of life at sea, improving the safety and efficiency of navigation, protecting the environment and so on. The specific content is described below:

1. Enhancing the efficiency of information obtainment

Generally, the coverage of VTS radar is about 20nm, the technology can be realized as long as one camera of ultra-range CCTV is installed at radar station. Consequently, the information obtainment of VTS is greatly enhanced.

1. Strengthening the ability of pre-warning

The accident prevention ability will be improved by the utilization of this technology, which will strengthen the system's ability to detect dangerous situation and provide timely warning.

1. Promoting the capability of traffic organization

This technology visualizes vessel traffic flow, recognizes the unknown radar returns promptly, so as to optimize the traffic organization.

1. Improving monitoring on marine environment

The integration technology of ultra-range CCTV and VTS will make up for the lack of radar's ability to monitor oil spill, oil sewage, ballast water and atmospheric emission to improve the capability of environmental protection.

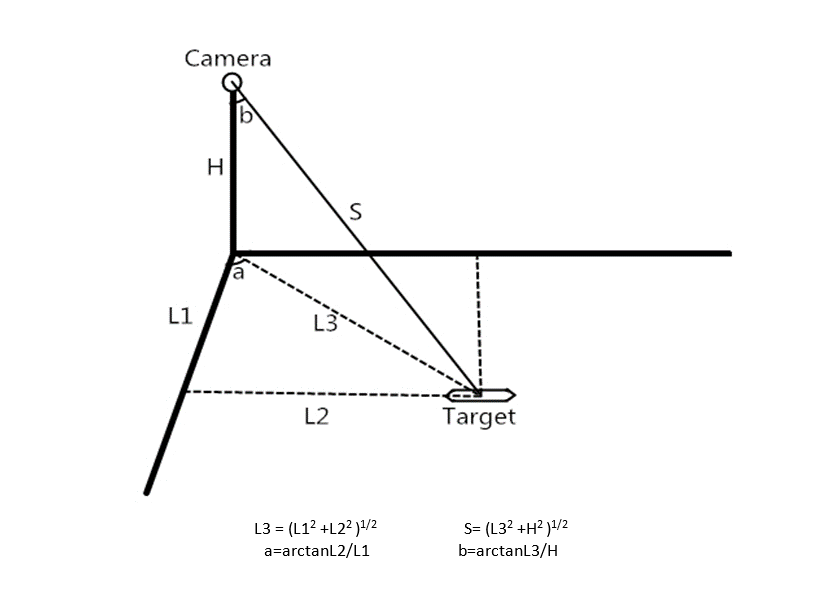
1. Diversifying ways of evidence obtainment

This technology is capable of obtaining the image data elaborated the illegal operations or accidents within VTS area.

* 1. **Principle of this technology**

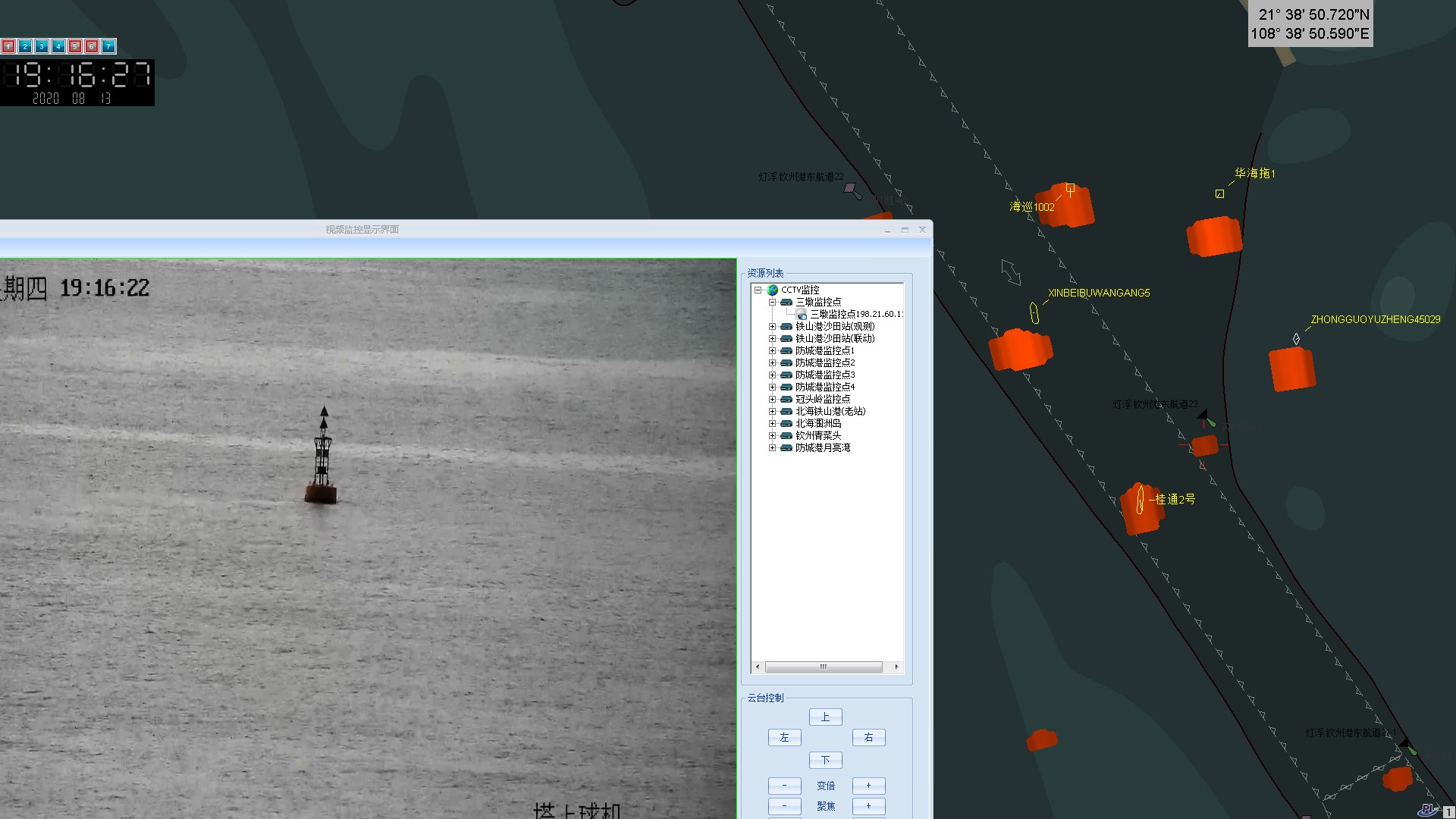
It is hard to comprehensively collect information in navigational environment of VTS area because of the weak ability of VTS in recognizing unknown radar returns, which impairs VTS ability of information service, traffic organization, navigation assistance. The problem mentioned above could be effectively addressed by the technology. As follow:

1. Distance and bearing between the camera of ultra-range CCTV and target can be calculated according to the position of radar return and camera. Subsequently, intelligent focus of ultra-range CCTV can be accessed by automatic control system.



*Figure 1 Schematic diagram*

1. The changing height of target affected by tidal variation can be corrected via image processing technology.
2. Continuous tracking can be carried out according to direction and speed of the radar returns.



*Figure 2* *The application case of this technology*

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*Figure 3 The application case of this technology*



*Figure 4 The application case of this technology*

# Action requested of the Committee

VTS committee is invited to note the application of this technology, and take this technology into consideration during the progress of developing "a living document on Future VTS ".

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)