International Civil Aviation Organization

Fifth Meeting of the Asia/Pacific Regional Search and Rescue Working Group (APSARWG/5)

Video Teleconference, 09 – 11 June 2020

Agenda Item 4: Asia/Pacific and inter-regional SAR planning, coordination and cooperation

- ***SAR capability status update***

PROGRESS OF TARGET RECOGNITION METHODS IN UAV SAR

(Presented by China)

SUMMARY

This paper outlines the current exploration of target recognition methods in Unmanned Ariel Vehicle (UAV) SAR, and the airborne communications used for UAVs.

1. INTRODUCTION

1.1 UAV technology has many advantages, including safety, low cost, small size, and flexible control, compared to traditional aircraft.

1.2 With the rapid development of UAV technology, many areas including infrastructure monitoring, fire detection, vegetation monitoring, sea surface monitoring, natural change observation, disaster management, traffic monitoring, etc. use UAVs as an image acquisition tool.

1.3 Target recognition based on Convolutional Neural Networks (CNN) is developing rapidly and can be used for UAV target recognition. This article outlines the current status of UAV target recognition methods in marine SAR.

2. DISCUSSION

Target Recognition Method for UAV

2.1 Due to the complex and changeable marine environment during the operation of unmanned aerial vehicles, the marine parameters and the non-fixed the rescue object, the traditional identification method cannot meet the processing of complex marine big data. As the main method of target recognition, machine learning uses deep learning and reinforcement learning to achieve fast target retrieval and recognition.

2.2 In deep learning, CNN have better results than other methods in processing image information, while restricted Boltzmann machines (RBM) have better advantages in speech.

2.3 Night target recognition can be equipped with photoelectric pod cold infrared sensor targets for detection. The collected infrared data is processed on the ship base or shore foundation to achieve night SAR identification and detection of human life conditions.

2.4 Relying on the research of maritime search and rescue project, China research team proposed the YOLO method.

2.5 UAV airborne communication equipment includes: airborne VHF, AIS, BDS RDSS, high precision RTK and so on.

2.6 UAV as maritime cooperative search and rescue equipment, near-shore search and rescue can use airborne VHF and AIS to achieve short-range ship-based and shore-based communication.

2.7 Offshore SAR uses the BDS RDSS and RNSS integration or high-precision RTK modules to achieve continuous positioning and communication during the search and rescue process. When the drone is far from the search and rescue ship, the searched target can be connected to the ground control center through the BDS satellite, and then to the sea rescue center, and the rescue center formulates the rescue strategy.

3. ACTION BY THE MEETING

3.1 The meeting is invited to note the information contained in this paper.

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