US 20230232350A1

(19) United States
(12) Patent Application Publication (10) Pub. No.: US 2023/0232350 A1
SHEN et al. (43) Pub. Date: Jul. 20, 2023

(54) METHODS AND SYSTEMS FOR TIME SYNCHRONIZATION AMONG UNMANNED AERIAL SYSTEMS

(71) Applicant: **Intelligent Fusion Technology, Inc.**, Germantown, MD (US)

(72) Inventors: **Dan SHEN**, Germantown, MD (US); **Genshe CHEN**, Germantown, MD (US); **Khanh PHAM**, Kirtland AFB, NM (US); **Erik BLASCH**, Arlington, VA (US)

(21) Appl. No.: **17/579,348**

(22) Filed: **Jan. 19, 2022**

Publication Classification

(51) **Int. Cl.**

H04W 56/00	(2006.01)
H04B 7/026	(2006.01)
B64C 39/02	(2006.01)

(52) **U.S. Cl.**
CPC ***H04W 56/0015*** (2013.01); ***B64C 39/024*** (2013.01); ***H04B 7/026*** (2013.01)

(57) **ABSTRACT**

A system includes at least one slave node and one master node that are for a method of time synchronization between the at least one slave node and the master node. The method includes: sending, by one slave node, a first message to the master node to launch a time synchronization between the slave node and the master node; upon receiving the first message, adding, by the master node, a receiving time on a master clock to the first message to form a second message; sending, by the master node, the second message back to the slave node; adding, by the slave node, a receiving time on the slave clock to the second message to form an updated message; and performing, by the slave node, a time adjustment to the slave clock based on the updated message, thereby synchronizing time between the slave node and the master node.