A Hybrid MAC Mechanism for Multiple Load Intelligent Vehicle Transportation Network

Yuan LIU[1], Yuhao WANG*[1], Siyue CHEN[2], Xiao LI[1] and Zhengfa RAO[1]

[1] Department of Electronic and Information Engineering,

Nanchang University, Jiangxi, China, 330031

[2] Department of Electrical and Computer Engineering,

University of Calgary, Canada - T2N 1N4

Emails: wangyuhao@ncu.edu.cn, chens@ucalgary.ca

Submitted: Oct. 1, 2011 ***Accepted: Nov. 15, 2011*** ***Published: Dec. 1, 2011***

Abstract- The Media Access Control (MAC) mechanism of intelligent vehicle communication network meets a new challenge due to the multiple load data traffic and high speed mobility. This paper proposes a hybrid MAC mechanism which takes the advantages of both TDMA and CSMA mechanism. This hybrid mechanism is based on TDMA, while CSMA mechanism is added in time slots to improve the slot utilization in both high and low load networks. Through the simulation in NS2 we compare the results of the hybrid MAC protocol with those of using CSMA and TDMA individually. It is verified that in terms of flexibility and reliability in channel utilization, packet loss ratio and fairness index, the hybrid MAC protocol is superior. The hybrid mechanism makes the MAC layer self-adaptively switch between TDMA and CSMA according to the data traffic load.

Index terms*:* hybrid, MAC mechanism, multiple load, intelligent vehicle transportation, CSMA, TDMA.