

## **ABSTRACT**

Papua region, especially the area between Tiom and Wamena, is dominated by a range of mountains with the height of more than 14000 ft. These areas is very dangerous for aeroplanes because they should fly at the height of less than 9000 ft, then they should fly between those mountains. In addition, the bad weather shortens visibility and it often makes the pilots disoriented. Navigation aids from the ground were not available and the antennas of ATC guides could penetrate those mountains. As a result, lots of aeroplanes were trapped and they were in danger of crashing the slopes of those mountains. To overcome the problem, another system was badly needed to help pilots determine the right flying tracks.

This study was to design the prototype of navigation system to monitor an aeroplane by applying GPS operated in a Papua province, especially in the areas of Tiom an Wamena. The system consisted of two units. The first unit consisting of GPS Receiver, Microcontroller, and VHF Transmitter was placed inside the craft. The second unit, consisting of VHF Receiver, Serial USB Converter, Personal Computer was located at the ATC of the airport. The first unit received data from navigation satellit, processed, and sent the data using VHF wave to ATC in the airport. The received data was then further processed and displayed on PC monitor in the form of aeroplane position (Cordinate, heading, velocity, and traffic time according the data). The unit at the ATC was then guide pilot using VHF Transceiver.

The design has been successfully constructed and tested. The unit placed inside the aeroplane received the navigation data from the navigation satellite. The PC monitor at the ATC displayed navigation data in the form of map that easily read by the staff of ATC. They, then were able to inform the positions or the track to the pilot in the aeroplane immediately Therefore, the design developed in this study, namely navigation system based on GPS, might solve the navigation problem in Papua areas, especially the route between Tiom and Wamena.