



Flexible 3-bit RFID Antenna System for Military Applications

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The lives of soldiers are based on sacrifice and selflessness for their nations. They have to take care of each and every citizen in our nation from different terrorist attacks. For that, they spent their lives on the border of the nation, even in extreme environmental conditions without considering their own lives. During the terrorist attack, their lives became more crucial and most of them lost their lives. But many of them lost their lives without getting proper medical aid in immediate effect. A flexible 3-bit RFID antenna system designed at L band (1-2 GHz) printed on the soldier's uniform helps in identifying these victims using a transceiver system in unmanned aerial vehicles (UAV). The methods involved in the development of RFID antennas are: design of antenna for L-band, antenna printing, chip attachment & impedance matching, over-the-air performance testing [1]. A layer of fleece was used as a substrate for the fabrication of the fully-textile tags, and an adhesive non-woven conductive fabric was used for the conductive components [2]. Various tests, such as Magnetic test, Metal strip test, Bending test, Water immersing test, Multi-stack test, Machine washing test & spinning, Multi-stack test (wet) and Drying test are carried out to test the performance of textile integrated RFID [3]. By receiving the signals from the identifiers on their uniform, we can readily identify the exact person. As a result, the authorities can decode the history of the authorized soldiers from the dataset and deliver immediate medical assistance. Based on this proposed system we can save the lives of soldiers.

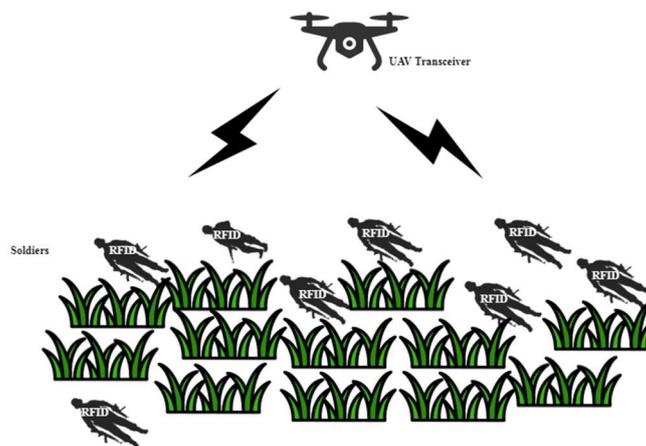


Figure 1. Schematic of Proposed System

1. Baumbauer, C.L., Anderson, M.G., Ting, J. et al. Printed, flexible, compact UHF-RFID sensor tags enabled by hybrid electronics. *Sci Rep* 10, 16543 (2020). <https://doi.org/10.1038/s41598-020-73471-9>

2. Corchia, L.; Monti, G.; De Benedetto, E.; Cataldo, A.; Angrisani, L.; Arpaia, P.; Tarricone, L. Fully-Textile, Wearable Chipless Tags for Identification and Tracking Applications. *Sensors* 2020, 20, 429. <https://doi.org/10.3390/s20020429>

3. Wagih M, Wei Y, Komolafe A, Torah R, Beeby S. Reliable UHF Long-Range Textile-Integrated RFID Tag Based on a Compact Flexible Antenna Filament. *Sensors (Basel)*. 2020 Jun 17;20(12):3435. doi: 10.3390/s20123435. PMID: 32560570; PMCID: PMC7349570.