

## MONITORING THE BREATH THROUGH MECHANICAL MOVEMENTS OF THE CHEST USING CONTINUOUS WAVE BIORADAR SYSTEM

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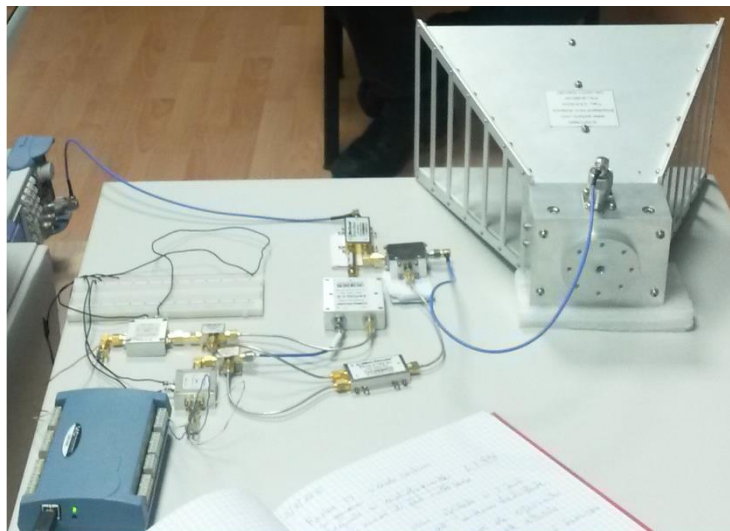
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In space missions, during the long isolation at extreme condition for human health is most important monitoring vital signs. One of these is the breathing detection. Indeed several factors can induce some breathing anomalies during the sleep, which may cause apnea episodes. In order to act timely with the right therapy, an early diagnosis is required. A new, innovative, way to perform this kind of measurement is continuous wave bioradar, shown in Figure 1, operating in the microwave frequency. This is effective contactless tool for monitoring the respiratory activity through the measurement of chest deformation due to inhalation and exhalation. This system emit a low power electromagnetic wave at a single frequency, which is reflected by the human chest. Through to measuring of the phases shift between the incident and reflected wave is possible discovering and monitoring the respiratory rate. In this paper, the continuous wave bioradar measurement technique and test campaign experimental results are presented. Furthermore, to this end, bioradar results are compared with data recorded by a spirometer, which is a standard and noted medical device that measures the air volume inhaled and exhaled by the subject. Finally, the measurement standard uncertainty of the bioradar system is defined, and the system performance is evaluated.



*Figure 1 – set-up measurement of Bioradar System*