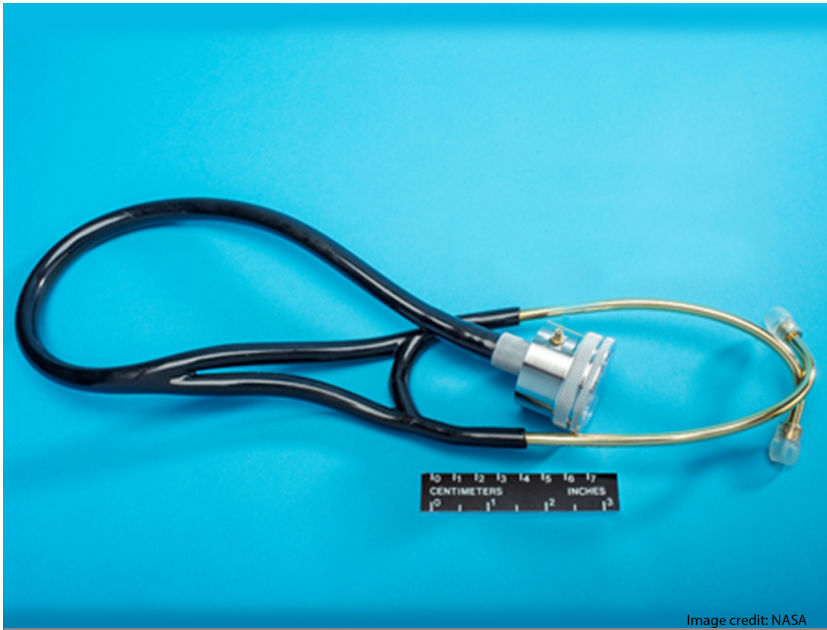




TECHNOLOGY SOLUTION

Health, Medicine and Biotechnology



Full Spectrum Infrasonic Stethoscope for Screening Heart, Carotid Artery, and Lung Related Diseases

Allow physicians to screen heart, carotid artery, and lung related diseases at an early stage using full spectrum phonocardiography

NASA Langley Research Center has developed an infrasonic stethoscope that detects a broader range of physiological conditions than conventional stethoscope, use of which has declined mainly due to availability of other advance technologies such as the echocardiogram. The echocardiograms can be complex, costly and require the need of a specialist for correct interpretation. Further, it is estimated that more than 85% population of the world does not have access to advanced diagnostic tools such as echocardiogram and CT scans. This scope provides additional data to physicians by monitoring signals across full frequency bandwidths that include cardiac, carotid artery, and respiration activities something that is not available in conventional stethoscopes.

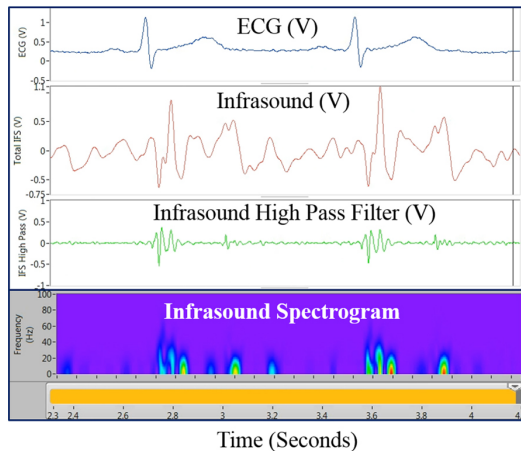
BENEFITS

- Can record heart, carotid artery, and lung sounds that cant be monitored by using a traditional stethoscope
- Measures systolic and diastolic time intervals
- Inexpensive alternative for screening of heart, carotid artery, and lung related diseases
- Provides real time fetal heart monitoring



THE TECHNOLOGY

Microphones and stethoscopes are regularly used by physicians to detect sounds when monitoring physiological conditions. These monitors are coupled directly to a person's body and measure in certain bandwidths either by listening or by recording the signals. The physiological processes such as respiration and cardiac activity are reflected in a different frequency bandwidth from 0.01 Hz to 500 Hz. This technology can monitor physiological conditions in the entire bandwidth range. Signals can also be wirelessly transmitted, using Bluetooth, to other recording devices at any other location.



Recorded simultaneous electrocardiogram and infrascope waveforms. Image credit: NASA

APPLICATIONS

The technology has several potential applications:

- Cardiac and respiratory patient monitoring
- Emergency use by First Responders
- Fetal heart monitoring
- Spirometry
- Other medical uses where simultaneous respiratory and cardiac monitoring is critical

PUBLICATIONS

Patent No: 9,867,591

A Portable Infrasonic Detection System, Qamar A. Shams, Cecil G. Burkett, Allan J. Zuckerwar, Christopher C. Lawrenson, and Michael Masterman, 2008 Meeting of the Military Sensing Symposia (MSS) Specialty Group on Battlespace Acoustic and Seismic Sensing, Magnetic and Electric Field Sensors, August 19-21, 2008,

<https://ntrs.nasa.gov/citations/20080034649>.

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