



Health, Medicine and Biotechnology

Smart Probe

Instrument for Tissue Characterization

NASA has invented a probe that relates to navigation to, and imaging, sensing, diagnosing, and providing a prognosis for a medical condition of, a target site within a human or animal body. The probe allows navigation to a target site and uses results from several different tests to identify a malignancy, a disease, a benign condition, a normal condition or any other medical condition at the target site, consistent with the data obtained from various measurements and other information. It provides an active system for measuring and determining the location, geometric parameters and medical condition(s) of a target site (organelle, cell, tissue, organ, etc.) within the body. The probe works with quantitative measurements, with qualitative measurements and with other relevant information on the subject and the subject's family.

BENEFITS

- Minimally invasive
- Combines internal, external and heuristic measurements
- Reduces number of probable medical conditions
- Uses results from several different tests
- Allows inclusion or exclusion of one or more selected measurements

technology solution



NASA Technology Transfer Program

Bringing NASA Technology Down to Earth

THE TECHNOLOGY

The system relies upon measurements and other information from one or more of at least three types of sources to help determine one or more medical conditions of the target site : i) external measurements, from sources such as lymph node sampling, manual palpitation of the target site, mammograms, ultrasound scans, NMRI scans, CAT scans etc. for estimation of the target site size, surface roughness and/or calcification at the site and other similar functionalities; ii) internal sensor measurements, including mechanical stiffness, thermal responsiveness, optical reflectance and imagery, target margin behavior, blood flow estimation, interstitial fluid pressure, vascular size, density and architecture, pH and electrical characteristics; and iii) heuristic information involving prior medical history of the test subject and the subject's family. Neural net information processing is performed on the data from any of the preceding groups of internal measurements, external measurements, and/or from the groups of heuristic information and is preferably analyzed using a direct interface with analytical software. This provides a reduced set of probable medical conditions associated with the target data.



Smart Probe

APPLICATIONS

The technology has several potential applications:

- Medical diagnostics and Prognostic
- Tumor definition, location and ablation
- Sensors and Instruments
- Veterinary medicine
- Medical treatment

PUBLICATIONS

Patent No: 6,976,013

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NASA's Technology Transfer Program pursues the widest possible applications of agency technology to benefit US citizens. Through partnerships and licensing agreements with industry, the program ensures that NASA's investments in pioneering research find secondary uses that benefit the economy, create jobs, and improve quality of life.

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