

Technology Titans Innovation Challenge

Sample First Round Idea Summary #1

(fictionalized sample from an actual technology that will not be in the competition)

Title: System for Using Noninvasive, Low-Risk Imaging to Detect Changes in Temperature of Fluid Flow in Reflux Diseases or Cancer

Category: Medicine/Health

Team: Team Reflux; Shirley Innovative, captain

1. Description. This idea is for an imaging device that uses electromagnetic (EM) radiation to noninvasively detect disease in the urinary, gastrointestinal and cardiovascular systems of the human body. This EM radiation, which we think will originate from microwaves or ultrasound, serves a dual purpose. Under the current design, the EM radiation warms the bodily fluid, and then the apparatus detects the fluid response to radiation at a different wavelength as it flows to adjoining tissues or vessels. Disease that is linked to abnormal flow of fluid can be detected by tracking the temperature change in the corresponding tissues as the warmed fluid flows in the opposite direction or in undesignated tissues compared to what it should. In vesicoureteral reflex (VUR), a condition in which urine backflows abnormally from the bladder toward the kidneys, this new system of detecting flow is especially useful.

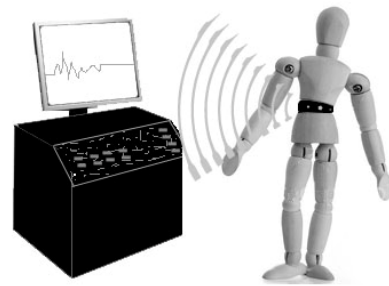


Figure 1: Device transmits microwaves and detects changes in the returning waves that indicate temperature change from warmed fluid flow in tissues

2. Background/Origin. The idea for this technology came when the newborn nephew of team member Jamie Smith was born with a form of VUR and underwent a highly traumatic procedure that included a catheter. In a research design class, Jamie reviewed literature about methods of treating VUR. Having read a magazine article about ultrasound therapy, Jamie approached Professor Smith to advise her on this project.

Cases of urinary tract infection (UTI) lead to more than one million visits to pediatricians' offices per year (Catholic Health System). Of children diagnosed with UTI, 30% to 40% have primary vesicoureteral reflex, which is best detected by a VCUG. Therefore, this idea has the potential of improving the diagnosis of hundreds of thousands of children annually.

3. Innovation. The process of heating the body fluids (hyperthermia) to analyze the flow will likely be based substantially on existing technology. However, the method of doing so, and the device that detects the blood flow, is new.

4. Value. The currently preferred means of diagnosing VUR is a voiding cystourethrogram (VCUG), an invasive procedure involving the use of catheters or tubes. During a VCUG, x-ray imaging captures the bladder filling and emptying with radiopaque contrast introduced via the catheter in the patient's urethra. The VCUG procedure is painful, especially for young children who are the primary sufferers of VUR, and follow-up VCUG exams are often required. It is potentially harmful because the patient is exposed to dyes and radiation from the x-ray imaging. Also, treatment depends on the availability of x-ray equipment for long visits.

This thermal detection system is superior to the VCUG procedure because the system is faster, much more comfortable for patient and provider (physician, nurse, etc.) alike. While a VCUG captures the artificial filling and emptying of the bladder, this invention merely follows existing urine flow. If a sufficient amount of the urine is indicated to flow backward from the bladder toward the kidneys, then VUR is indicated.

5. Plan. We plan to develop a prototype during the next three years. The use of hyperthermia as part of this system will likely require Class III FDA approval. Therefore, if this product receives approval, then production will be able to begin at the end of 2009.

Prize money from The Technology Titans Innovation Challenge will assist us in devoting time and resources to test existing technologies. We plan to apply for available research grants through XYZ College and the Reflux Foundation to pay for equipment.