

Executive Forum on Microelectronics



PANACIS
MEDICAL

'Consumerization' of Medical Devices

October 2008

Consumerization - More than a way to annoy English teachers

- Healthcare needs have spawned many successful medical products that are designed for use by medical professionals in a controlled healthcare setting
- Use of these products was limited to Professional use due to:
 - Training
 - Cost
 - Facility Requirements
 - Medical Approvals
- Advanced microelectronics and other technologies allows each of these limitations to be addressed, ultimately leading to these professional products moving into less controlled environments, possibly even into your home
- I call this 'Consumerization' of medical devices, but perhaps someone can suggest a real word that fits this better?

Defibrillators Everywhere

- Ten years ago Defibrillators were almost exclusively limited to hospital use only.
- Training -
 - Advanced bio-sensing and processing technologies
 - Product will NOT apply a pulse to a person unless they need it
- Cost -
 - Charge storage and control in smaller spaces
 - Smaller size, cheaper components and higher volumes
- Facility Requirements -
 - Essentially eliminated, you only need to keep it dry and charged
- Medical Approvals -
 - Approvals can be more difficult for a product used by everyone
 - Targeting known treatment methodologies simplifies approvals
 - Would not target a new treatment that is released to the general public
- Results?

Some examples that Panacis was involved in...

It is useful to focus on the concept. What can you take from a Hospital setting and move to a Doctor's Office or patient's home using microelectronics and other advanced technologies?

(but first, some shameless self promotion)

Panacis Space in Medical Device Value Chain

<u>Research</u>	<u>Development</u>	<u>Regulatory and Clinical Trials</u>	<u>New Product Introduction (NPI)</u>	<u>Early Commercialization</u>	<u>Fully Commercial</u>
Academics	Focus on first unit	Non-Invasive easier to approve	Optimization of manufacturing and quality processes	Expand markets	Takeover by mature market player (GE, Philips)
Scientists	Prime time for joint development, partnerships and licensing	Company experience and history plays key role in easier approvals	Increase margins and intellectual property	Focus on early sales and thought leaders	Continued revenue from royalties
Medical Professionals				Build relationships with new partners and targets to buy-out technology	
Functional prototype					
Early clinical evidence and/or testing complete					



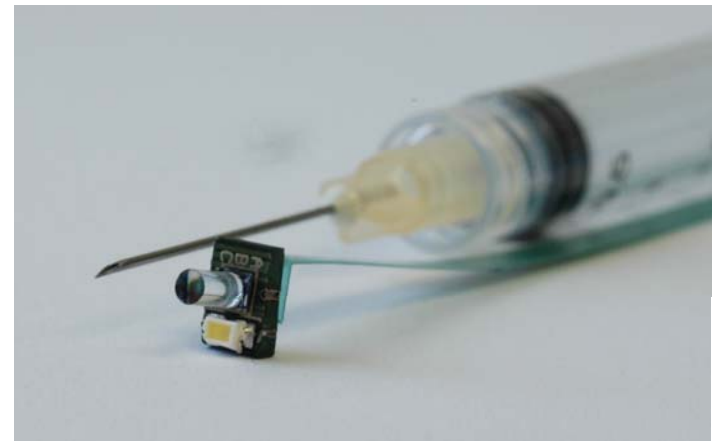
Panacis Core Competency is product development through to Commercialization

Medical Imaging - Smaller by Cell Phones

Panacis Medical designed an airway intubation tool that can be used to position an endotracheal tube (ETT) in the airway of a patient, even when the airway is obstructed or not visible.

This product represents the worlds smallest camera system that has a self-focusing lens and illumination, all designed by Panacis.

The goal of the system is to put airway intubation into the hands of people with less training, or even no training at all.

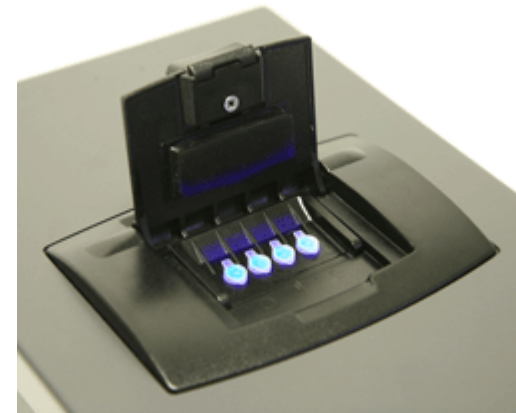


Portable DNA Analyzer - Spartan DX

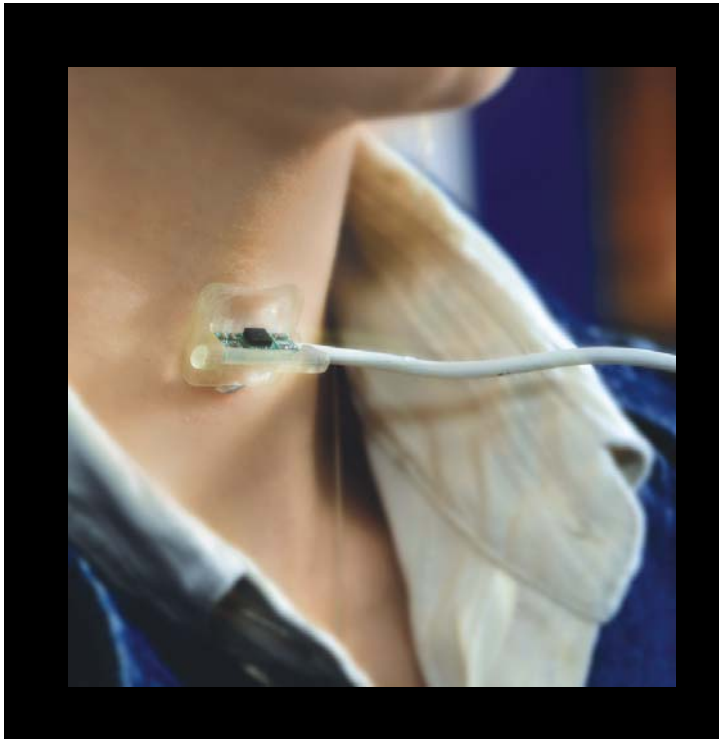
This high speed DNA Analysis machine based on PCR uses a unique image analysis system combined with integrated heaters, high accuracy temperature sensors and ultra-bright solid-state single frequency light sources – many device that were only recently made available through advances in a variety of fields.

Currently we manufacture this product for Spartan and have also managed their safety approvals processes.

This system brings large DNA batch analysis machines, normally only found in large labs... to your doctors office and potentially to your home.



Dysphagia Monitoring with MEMs Sensor



Device for monitoring swallowing function in survivors of stroke.

Approximately 70% of stroke survivors are afflicted with some level of swallowing disorder.

- Use of MEMs accelerometer key to detection of swallowing dysfunction
- Large conventional accelerometers tended to damp the signals from the body too much
- Allows diagnosis and monitoring previously done by video fluoroscopy to be done bedside
- Will find it's way into the home as a daily monitoring tool during meal times

Mobile Medical Power



As a class of products, the advent of Lithium Polymer technologies, especially of the “superior” type, coupled with compact high-power electronics will allow previously tethered applications to go mobile.

- Artificial hearts will run long enough to send a person home, or go on a shopping trip
- Gas analyzers can be put in a backpack to enable field sensing of hazardous chemicals
- Ultrasound units can be put in ambulances
- Electric wheelchairs can be folded up and put in the back of your car

How Big Is The Market?

- Healthcare is the largest segment of the US economy
 - US\$2 trillion
- Medical device sales in the US worth US\$71 billion
- Non-invasive medical devices represent more than 60% of all medical devices
- Targeted devices add value to attract new customers who were previously out of reach
- Convergent technologies creates opportunities for development of new and innovative products



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