

# IMAGE FUSION MILESTONE

## 1992 HERMES SOFTWARE FUSION BREAKTHROUGH

**CT, Prostate Cancer**      **PET-CT Fusion, Prostate Cancer**      **FDG PET, Prostate Cancer**

*Images courtesy of Professor Richard Baum, Bad Berka PET Center, Germany.*

**IMAGE FUSION** is an advanced computer software technique allowing integration of data from multiple medical imaging modalities (CT, MRI, PET, SPECT, Ultrasound) by registering multidimensional datasets to common display coordinates and creating a fused image representation. Fused images provide a synergistic combination of complementary biological and physical information obtained by several imaging modalities which is highly beneficial to physicians (ex. Response to chemotherapy or surgery).

### CANCER FUSION BY HERMES

35% of patient management changed after utilizing Image Fusion Software (Professor Richard Baum, Bad Berka PET Center, Germany).

**SPECT-CT Fusion Case**

A 20 year-old female developed hypercalcaemia from primary hyperparathyroidism during pregnancy. At 3 days post-partum a neck exploration located 3 normal parathyroid glands. A SestaMIBI study located a suspected ectopic parathyroid gland, likely in the chest. This revealed an intense focal abnormality in the mediastinum. A CT scan showed no abnormality except for a possible lesion in the thymus. HERMES successfully fused the SestaMIBI images with the CT. The fusion showed the lesion's location anterior to the superior vena cava (SVC) in the pericardial fat. The image was emailed to the cardio-thoracic surgeon & he altered his surgical approach after seeing the fusion image. The 1.6cm parathyroid adenoma was easily found anterior to the SVC in the pericardial fat, exactly where HERMES had localized it. The fused image was accurate & convincing to the surgeon, given its ability to combine structure & function.

**Diagram Breast Cancer**

No palpable Nodes      4/15 Nodes Involved

*Images courtesy of Professor Keith Britton, St. Bartholomew's Hospital, London, UK.*

### HEART FUSION BY HERMES

64,400,000 Americans have one or more forms of cardiovascular disease (CVD) in 2001 (American Heart Association).

**PET-CT Fusion**

Image courtesy of Dr. Miroslaw Dziuk, Brigham & Women's Hospital, Harvard Medical School, Boston, USA.

Software fusion of functional and structural imaging in cardiology could be a solution for precise diagnosis and differentiation of all reversible and irreversible forms of myocardial dysfunction (Provided by Dr. Miroslaw Dziuk, Military Institute of Health Services, Warsaw, Poland).

**SPECT-MRI Fusion**

**MYOCARDIAL VIABILITY**  
Image courtesy of Dr. Miroslaw Dziuk, Mikołaj Szrochowski, Szpital Pielizykowski & Warszawski, Military Institute of Health Services, Warsaw, Poland.

### BRAIN FUSION BY HERMES

4.5 Million Americans suffer from Alzheimer's Disease according to statistics (Alzheimer's Association).

**PET-MRI Fusion, Alzheimer's Disease**

64 year old male with a history of chronic schizophrenia with negative symptoms. His twin sister suffered from depression and committed suicide.

**PET-MRI Fusion, Fronto-temporal Dementia**

63 year old male construction engineer complains of forgetfulness (ex. phone numbers, etc.), increasing inattention, slow reactions and tacturnity since 1 year prior to diagnosis.

**SPECT-MRI Fusion, Parkinson's Disease**

69 year old male patient noticed a subtle resting tremor of the left arm 6 months prior to diagnosis. Also, he realized problems buttoning up his clothes since 4 months prior.

*Images courtesy of Professor Klaus Tatsch, University of Munich (LMU), Munich, Germany.*

**FUSION HISTORY** Medical Image Fusion Software was first introduced to the marketplace in 1992 as a result of a joint collaborative project between Jan Bertling, CEO & President of Hermes Medical Solutions (Nuclear Diagnostics AB), of Stockholm, Sweden and Physicist Piotr Slomka (then a Physicist at the London Health Sciences Center, London, Canada). Current Hermes software fusion is primarily based on volumetric techniques for image registration such as the Mutual Information algorithm & other related methods. Hermes software can be used to automatically align images from various modalities to common three-dimensional coordinates. As of 2004, HERMES Image Fusion software is being utilized in over 1,200 hospitals in over 30 countries worldwide. **Hermes Medical Solutions** was established in 1976 by Jan Bertling and has grown into an international company with global headquarters in Stockholm, Sweden.

**HERMES**      **HERMES**

*Photo: Piotr Slomka, Institute; Jan Bertling, CEO.*

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In November 2004, the International Museum of Surgical Science, [www.imss.org](http://www.imss.org), in Chicago, Illinois, USA selected

Hermes Medical Solutions (Nuclear Diagnostics), to be featured in an exhibit called MILESTONES IN MEDICAL IMAGING: from X-Ray to Nuclear Medicine from November 30th, 2004 thru December 2005. HERMES was selected due to its unique contribution as the first company globally to commercially introduce medical image fusion software to the marketplace in 1992 together with collaborator Piotr Slomka. The reverse side is a copy of the original panel from the Milestones' Exhibit, which will be a permanent part of the International Museum's Collection.