IVP

- Acronym : IVP
- Full title : Intracorporeal VideoProbe
- Number : IST-2001-35169
- Project Participants:

IMS	D
KST	D
UoW	UK
KULRD	B
SSSA	I

- Contact person :
  - Company : Institut fuer Mikroelektronik Stuttgart
  - Country : Germany
  - Last & first name : Dr. Harendt, Christine
  - Tel. : (49-711) 21855 403
  - Fax : (49-711) 21855 111
  - Email : HARENDT@IMS-CHIPS.DE
- Project web site : http://ivp.ims-chips.de
- Budget
  - total cost : 2439265
  - EC contribution : 1800000
- Timetable:
  - start date : 01/Apr/2002
  - duration : 36 months

- Keywords :

medical imaging for surgical planning and intervention, minimally invasive systems autonomous videoprobe, diagnostic system, CMOS image sensor,

Objectives :

Visualisation of the status of organs health is one major task in medical diagnosis and therapy. Endoscopy and minimal invasive surgery are techniques for this purpose, which use the miniaturisation of optical, micro-electronical and micro-mechanical equipment for medical applications. In many cases, however, treatments are still painful or at least unpleasant for the patient due to the size of equipment or wiring. Additionally the high price of the devices and risks or costs of sterilisation procedures limits the use.

Recent developments in microelectronics allow the fabrication of advanced and highly integrated image sensors and improved solutions for wireless data transmission in standard technologies. In combination with additional improvements in micro-mechanical components for medical equipment a new type of videoprobes becomes feasible:

Wired and wireless probes with advanced performance for reasonable prices.

These probes are equipped with miniaturised CMOS image sensors and circuitry for data procession and transmission, which are suitable for volume production. Thus additional fields of medical applications ranging from disposable autonomous video-capsules used in gastroenterology to wired probes and short-term implants are markets for IVP products.

Results :

Two prototypes of IVP products will be developed and evaluated in the project :

- A wired videoprobe
- an autonomous video-capsule with a telemetric link for image data transfer to an external PC-based system.

The image sensor is fabricated in a major silicon foundry in state-of-the-art CMOS technology. The implementation of an advanced technology (Thin-film-on-CMOS) for the photo-sensor allows a reduction of the pixel size and enables miniaturised sensors. The extended usable illumination range of the logarithmic response image sensor and its high colour constancy will be additional features of the device.

The processing, compression and telemetric transmission of the image data is another important task of the development. The integration of processing and compression algorithms and the balance of power consummation and performance is a challenging issue.

The IVP probe will work with a PC-based diagnostic expert system, which manages the procession, presentation and storage of the image data. The system will use advanced image processing techniques and innovating intelligent learning algorithms in order to support medical diagnosis of abnormalities/lesions and ensure maximum efficiency and minimum risk of misinterpretation. It will provide windows based user interface and will be developed in close contact with medical users.

The probes are equipped with illumination and optics as well as with mechanical components for tilting or movements. The work-plan assures that all components and materials used for the systems are judged according to the International Standards for medical devices in order to enable a market access of the products in the near future.

CMOS image sensor on ceramic package