5th Round Table on M / N – Technologies for Space ESTEC

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- who is RMT
- what are we doing
- our standard products
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mission statement

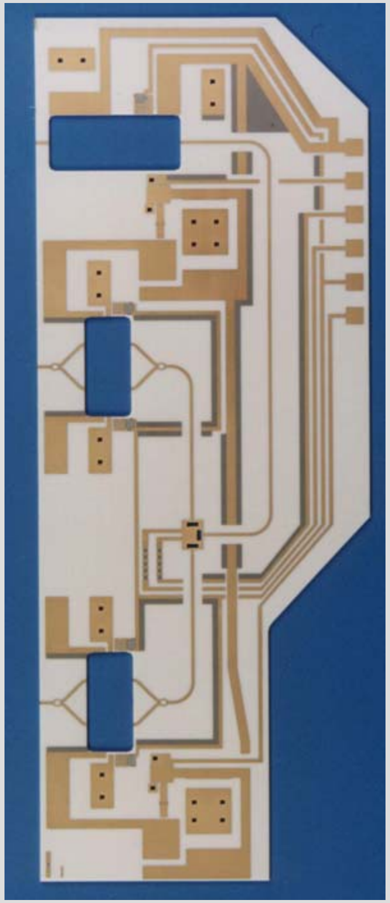
The Reinhardt Microtech Group is worldwide a leading manufacturer of thin film substrates for microelectronics, opto-electronics and highest frequency technology.

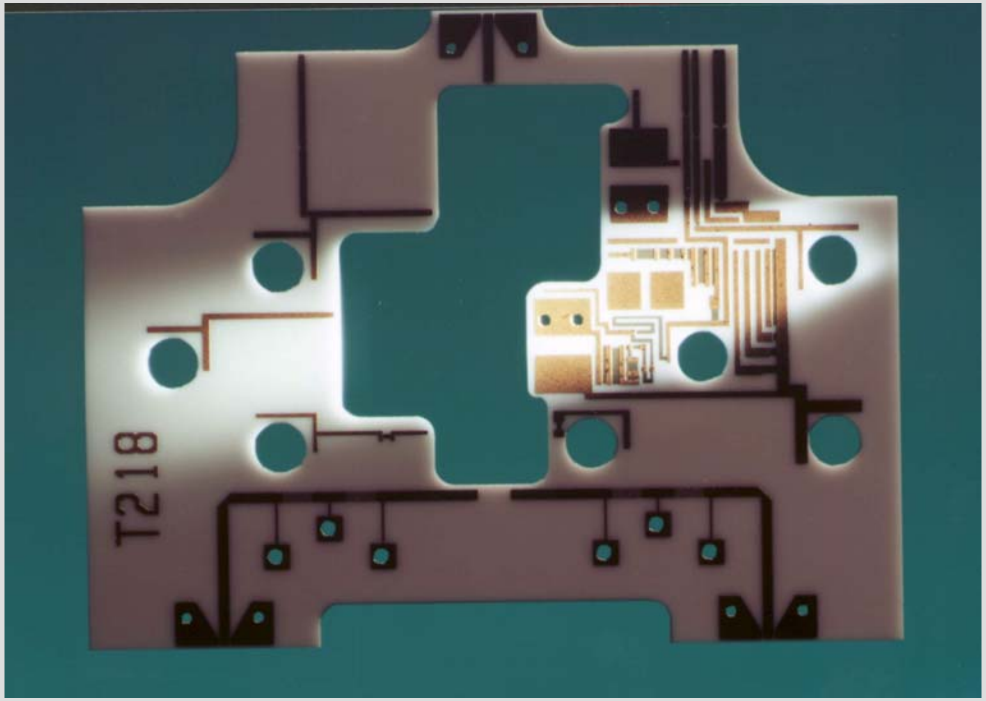
The Reinhardt Microtech Group wants to be the European industrial partner for the manufacturing of components in microsystem technology (MST).

reinhardt MICROTECH

thin film technology for microelectronics

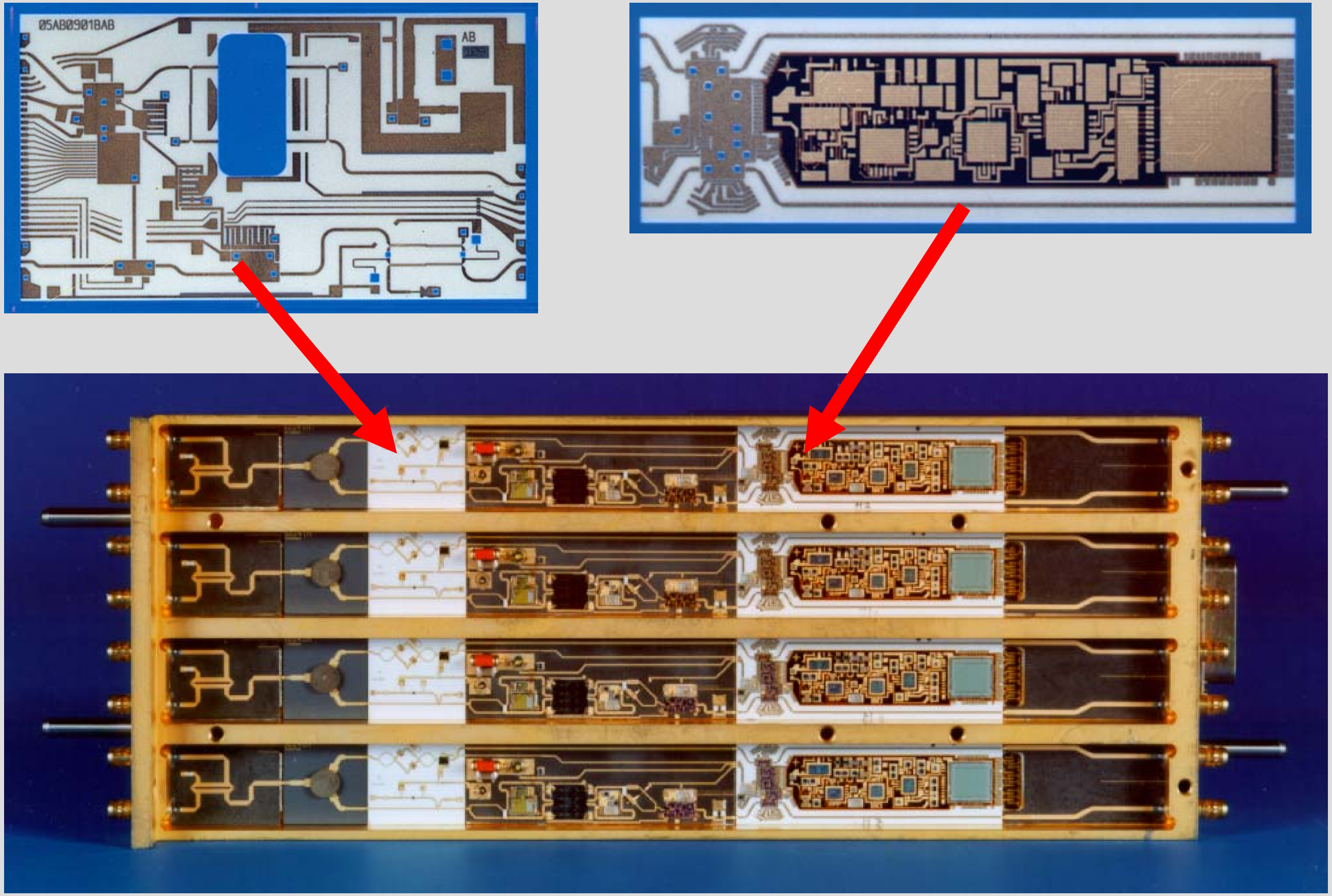
thin film products





thin film technology for microelectronics

thin film products



processes available at RMT

such as:

cleaning:	**US-bath, brushing, etc. ...**
sputtering:	**Cr, Ni, Au, Al, Cu, Pd, etc. ...**
evaporation:	**Sn, Au, ... etc., dielectric**
electroplating:	**Au, Cu, Ni ...**
structures:	**6“ – masks, 5“ – wafer, 4x4“** **critical dimension > 5µm**
wet etching:	**Au, Cr, Ni, Al, Si ...**
plasma etching:	**Si**
laser work CO_2:	**Al_2O_3, ALN, glass**
R- trimming:	**active, passive**
anodic bonds:	**Si, glass**
sawing:	**Al_2O_3, AlN, glass, etc. ...**

sputtering process

substrates: glass, Si-waver, Al_2O_3 etc. up to 6”

layer: Cr, NiCr, Ta_2N, Ni, Ti, TiW, Pd, Au, Al etc.

reinhardt
MICROTECH

thin film technology for microelectronics

wet chemical etching
resist spinning

thin film technology for microelectronics

areas of application 2004
Reinhardt Microtech Group

telecommunication 16%

antennas
base stations
cable TV
opto-electronics

medicine 28%

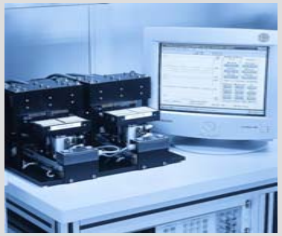
hearing aids
pacemakers

defence 31%

avionics
radar systems

industry 7%

measurement tools
sensors



space 3%

satellites
microwave circuits

automotive 10%

GPS
sensors

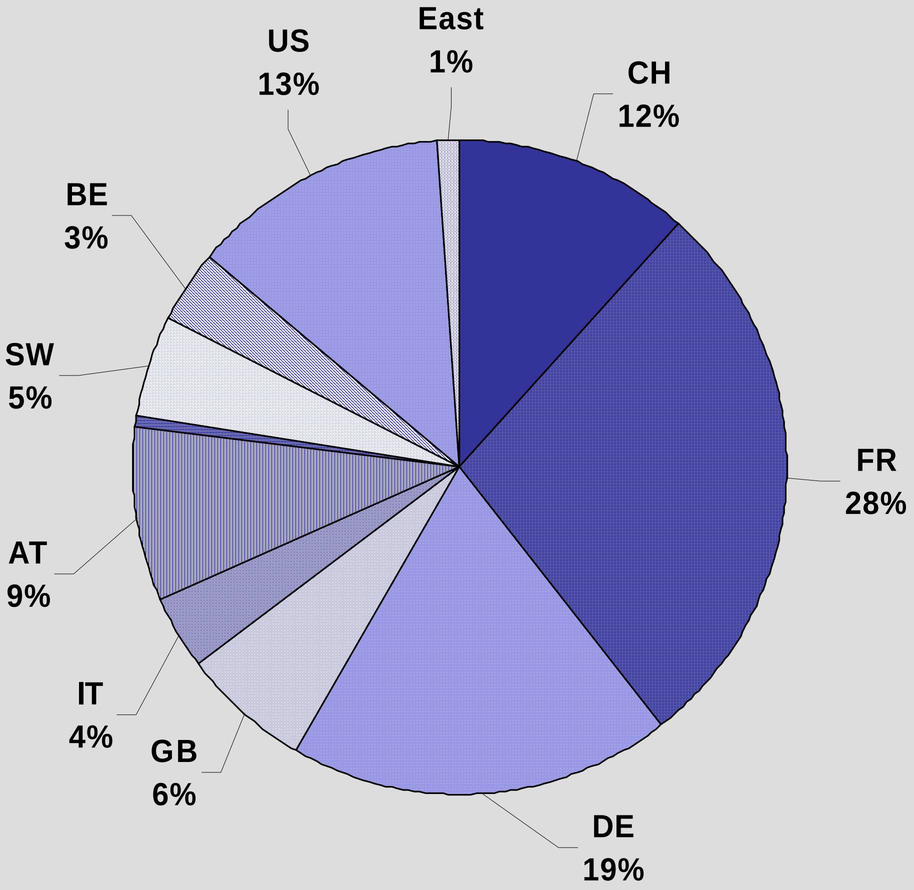
various 5%

high precision fan outs
MST, Laser work etc.

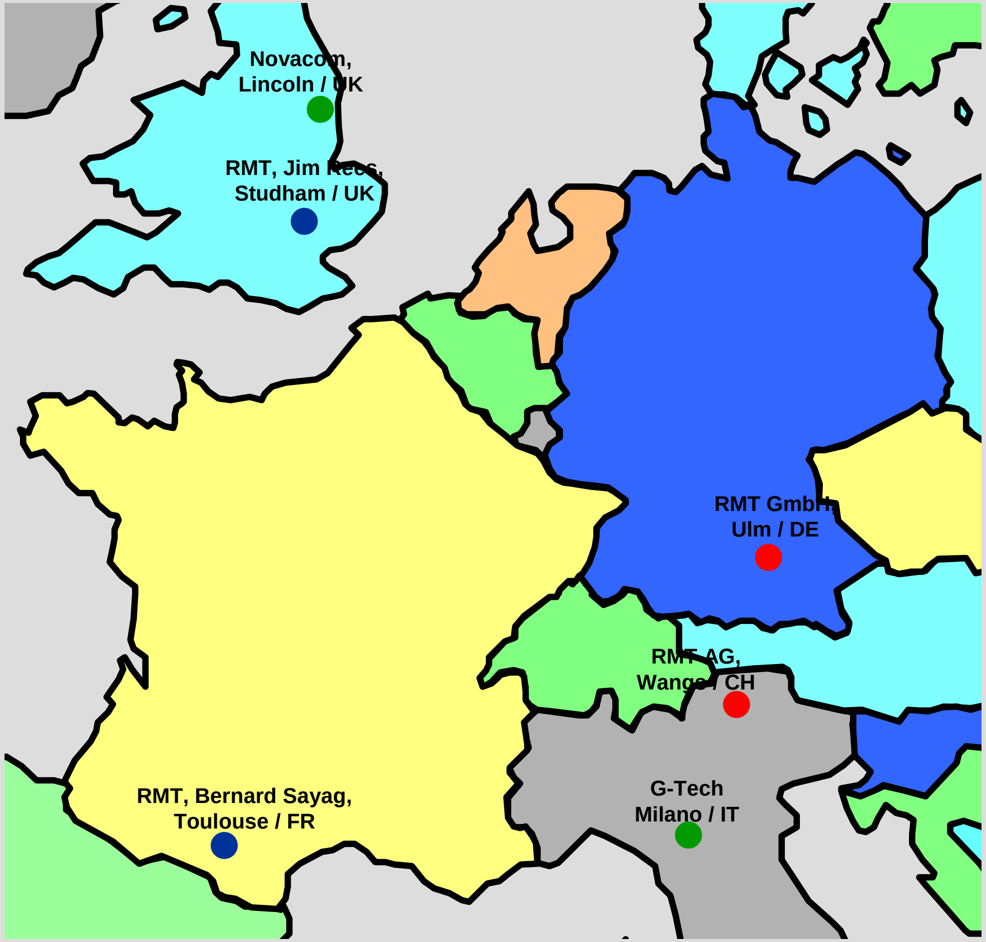
thin film technology for microelectronics

market 2004

Reinhardt Microtech Group



locations Europe



🔴 manufacturing and sales

🔵 sales offices

🟢 representatives

representative in Israel:

Emmtech, Gedera / Israel

company structure 2005

Reinhardt Microtech Group

- share capital (privately owned) : CHF 1‘800‘000.-
- company’s capital : EUR 600‘000.-

- number of personnel Wangs & Ulm : 70

- personnel structure

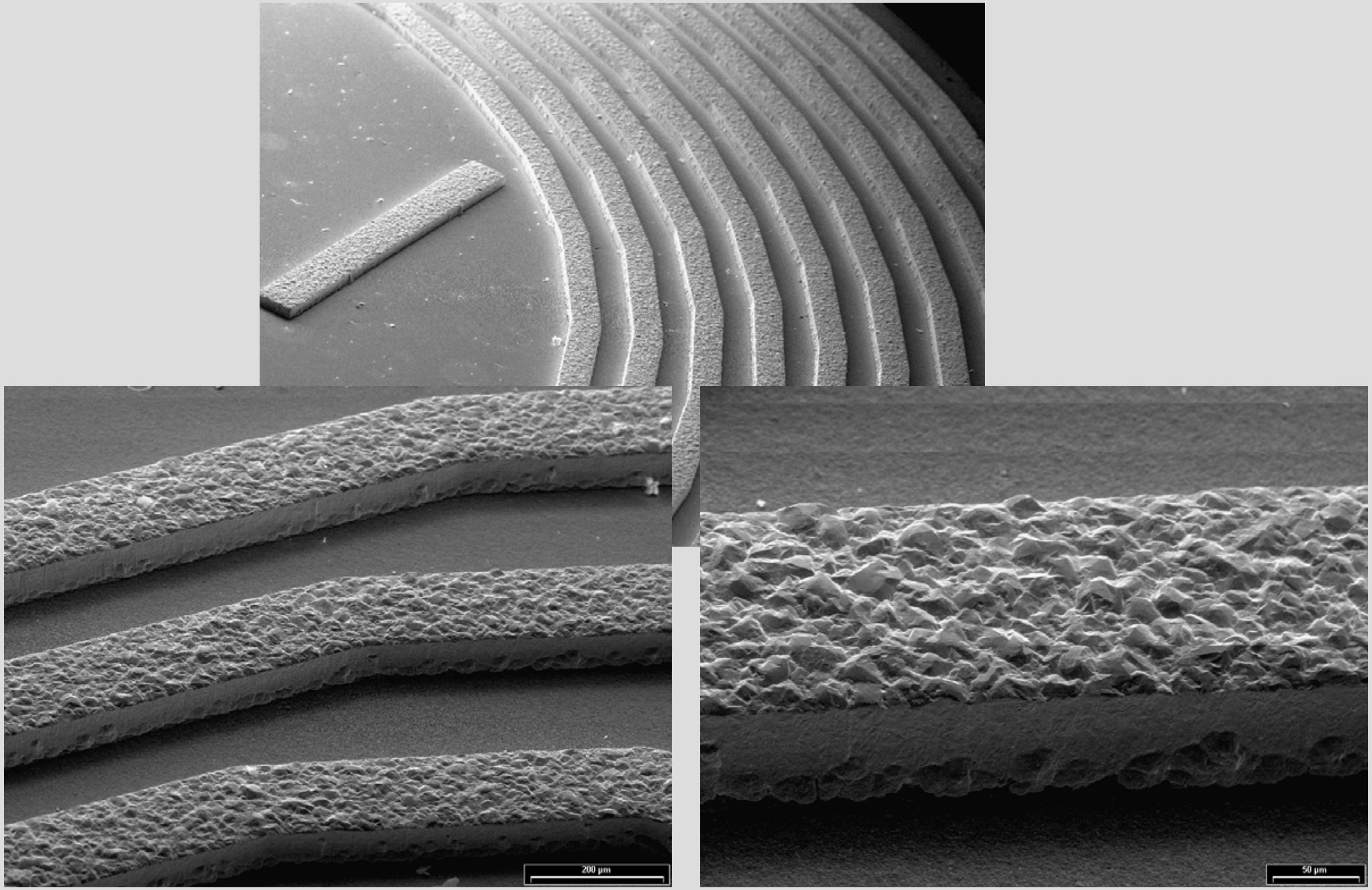
	Wangs	Ulm
physicist/chemist Dr. (PhD)	5	4
bachelor of science Eng.(HTL)	4	2
qualified personnel	24	13
semi-skilled personnel	15	3
	48	22

- male / female : 1/3 / 2/3

competence centre Wangs

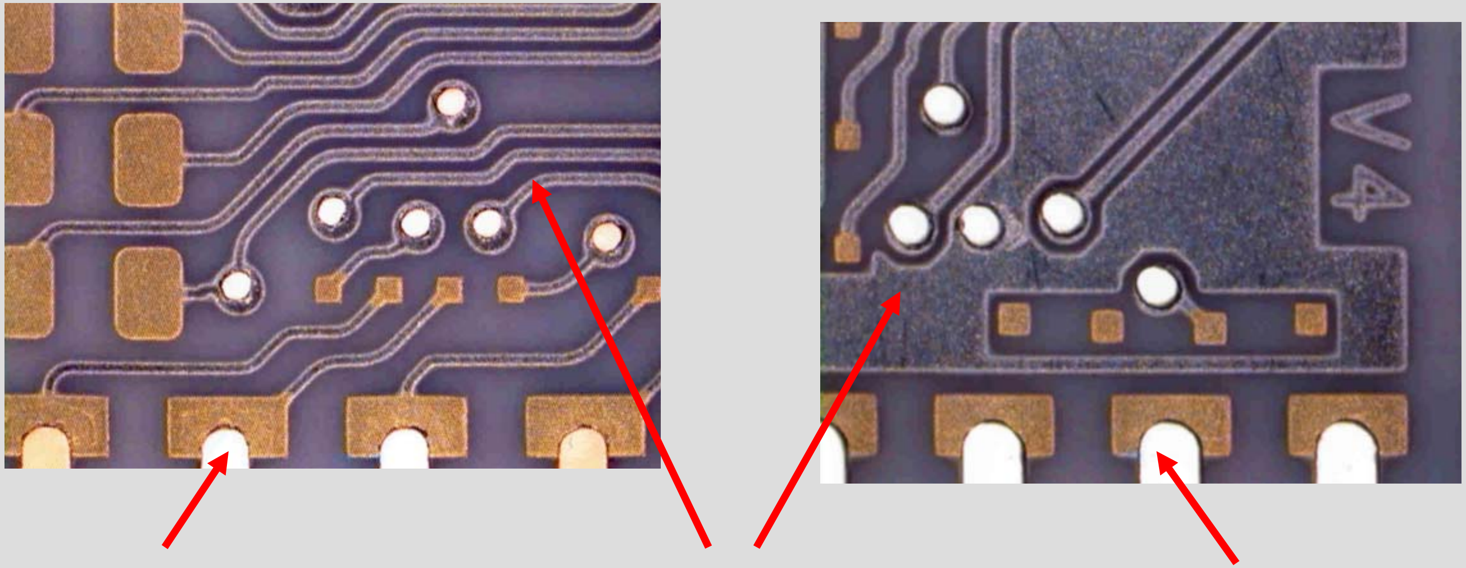
micro coil

substrates: Al_2O_3
layer: TiW + 80µm Au (elp.)
height: 80µm
strip line: 120µm



high density interconnect substrates

- enhanced design rules



circuit front side

circuit back side

half holes

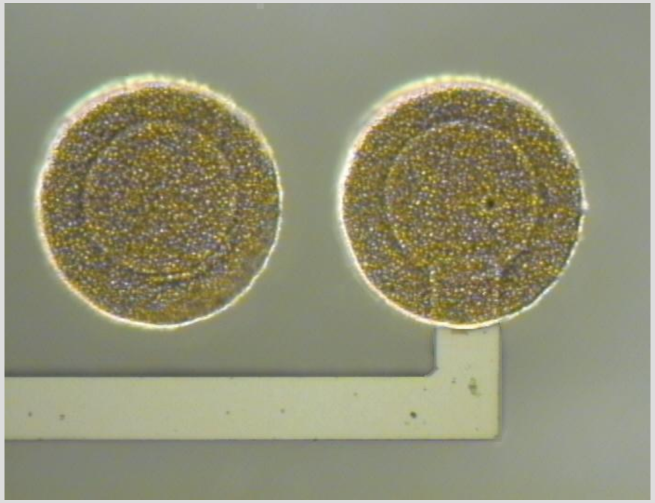
passivated NiOx

half holes

high density interconnect substrates

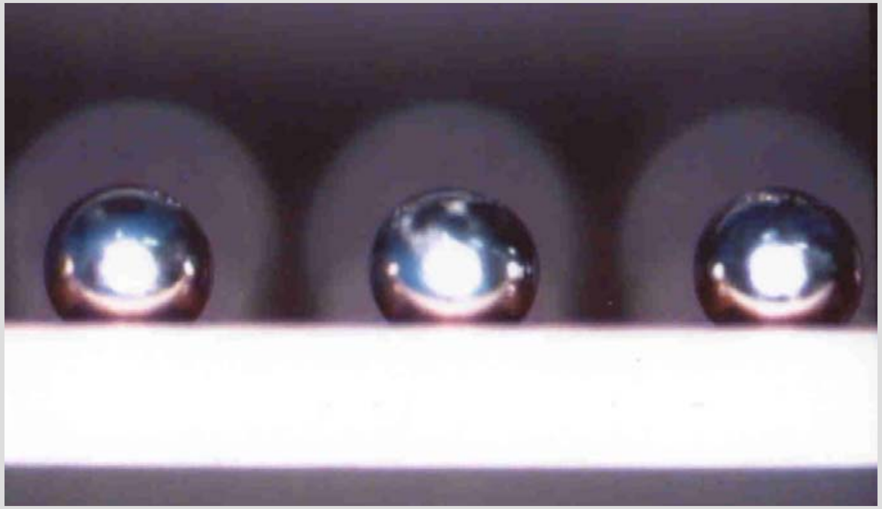
- solder bumps

solder AuSn evp dia. 60µm



top view

solder balls PbSn placed dia. 500µm



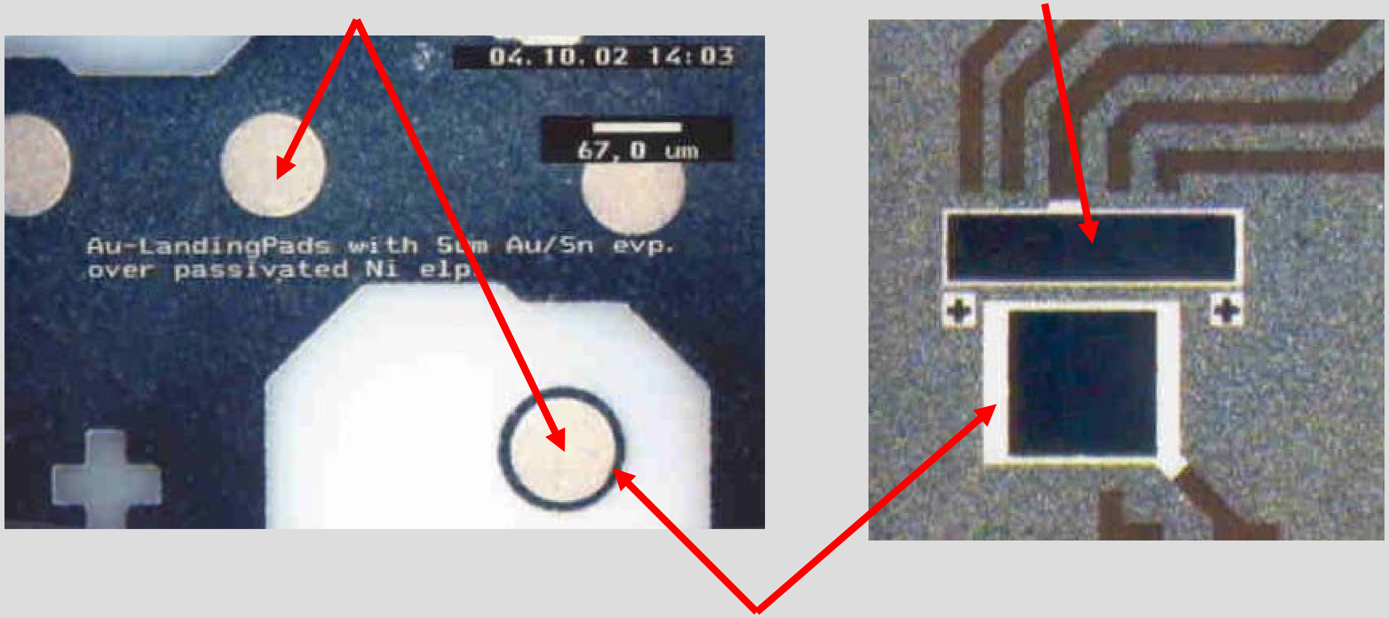
side view

high density interconnect substrates

- solder stop NiOx

solder balls AuSn

solder pads AuSn



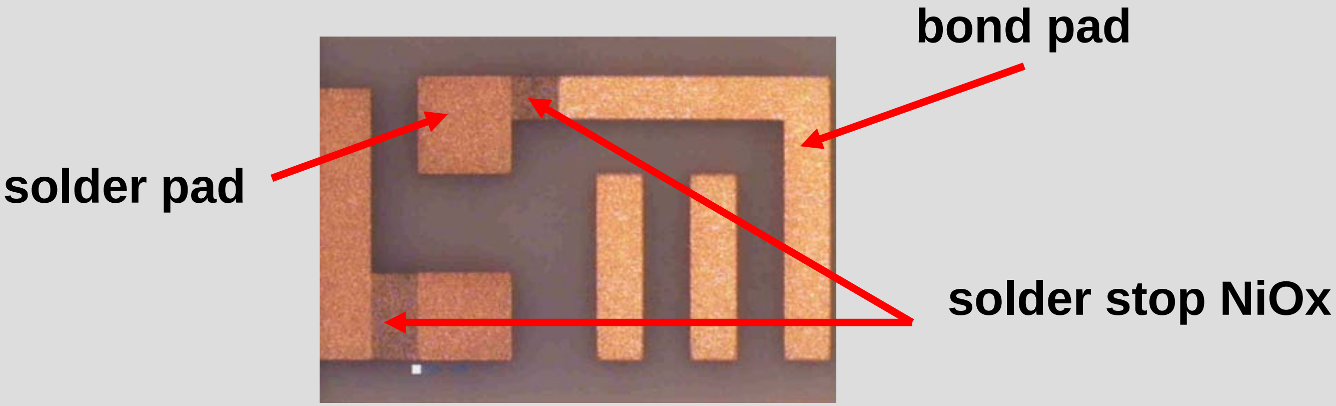
Au-LandingPads with 5um Au/Sn evp.
over passivated Ni elp.

solder stop NiOx

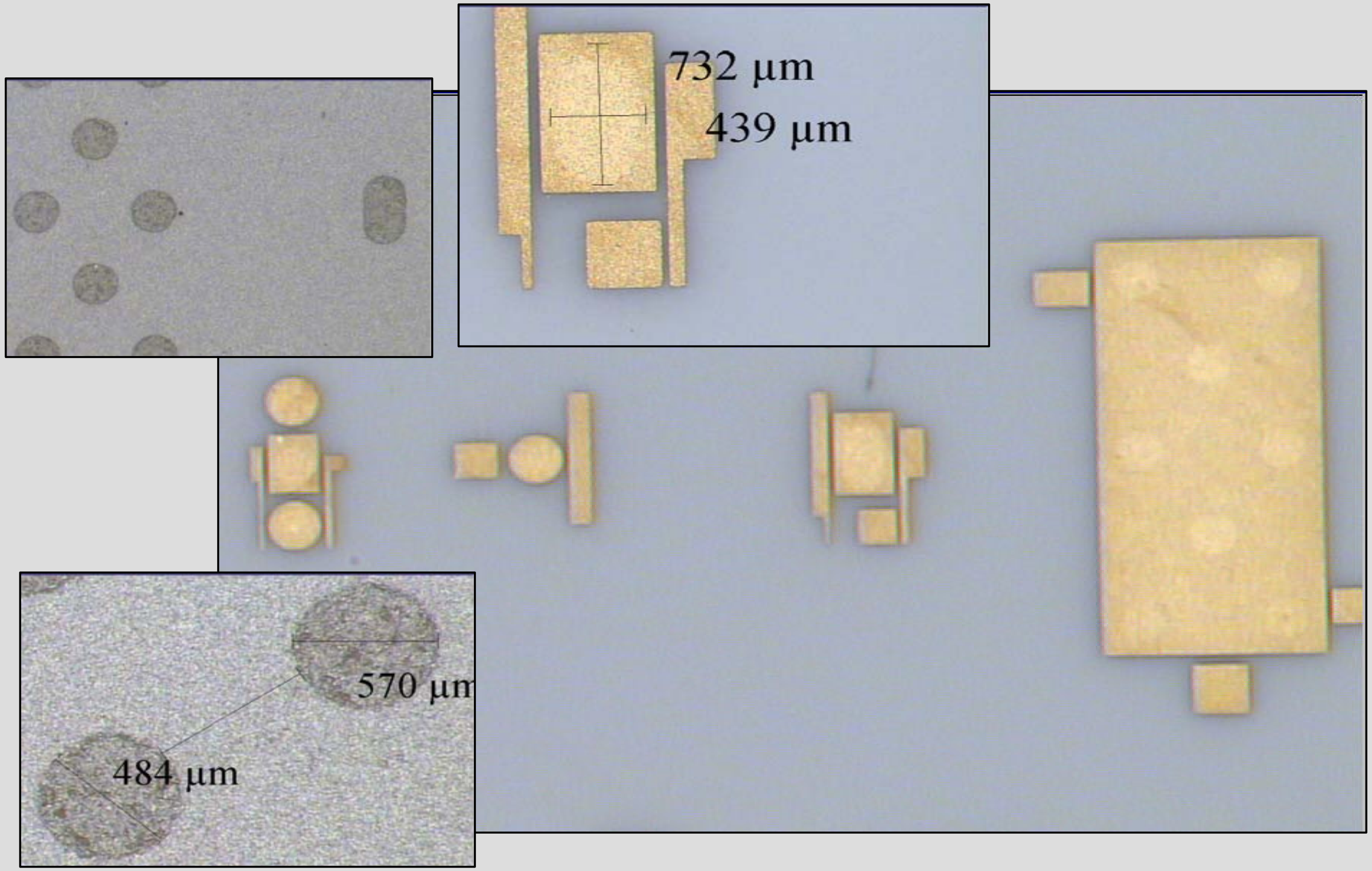
high density interconnect substrates

- enhanced bond & solder pads

application:	**high density flip chip substrates, submounts**
features:	**two level gold deposition**
	enhanced bondability and solderability for high yield assembly processes
bondability:	**eg. 2µm Au**
solderability:	**eg. 0.3 – 0.8µm Au**
solder barrier:	**Ni, Pd**

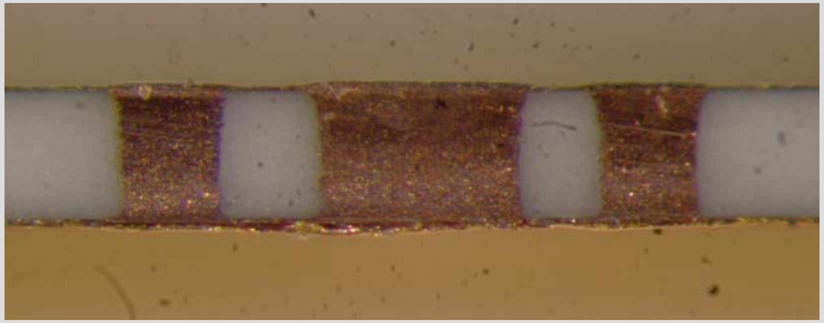


Cu filled via

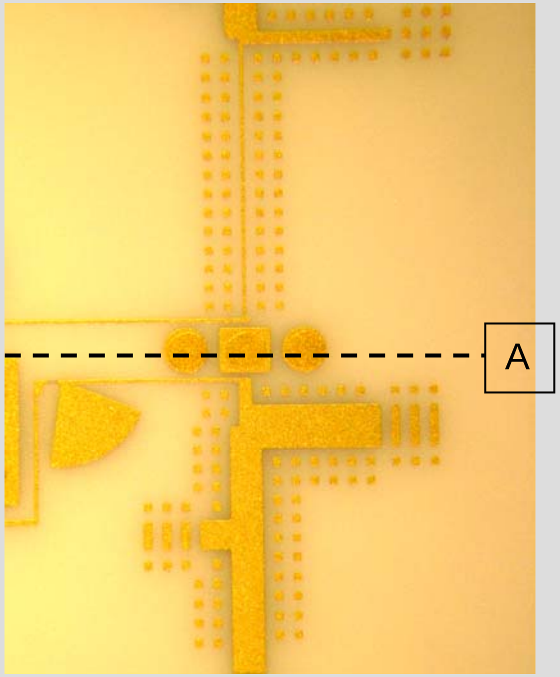


filled via with pure copper

cut through the filled via
(position A)

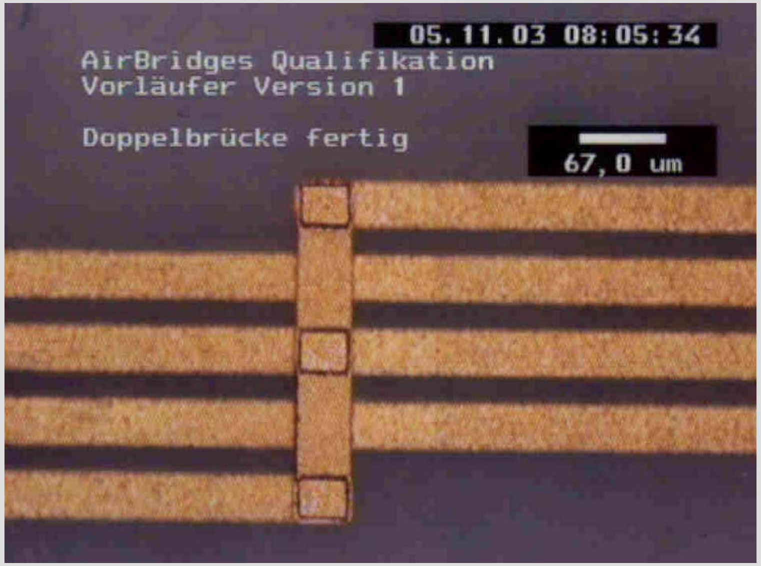


top view of
substrate showing
section information

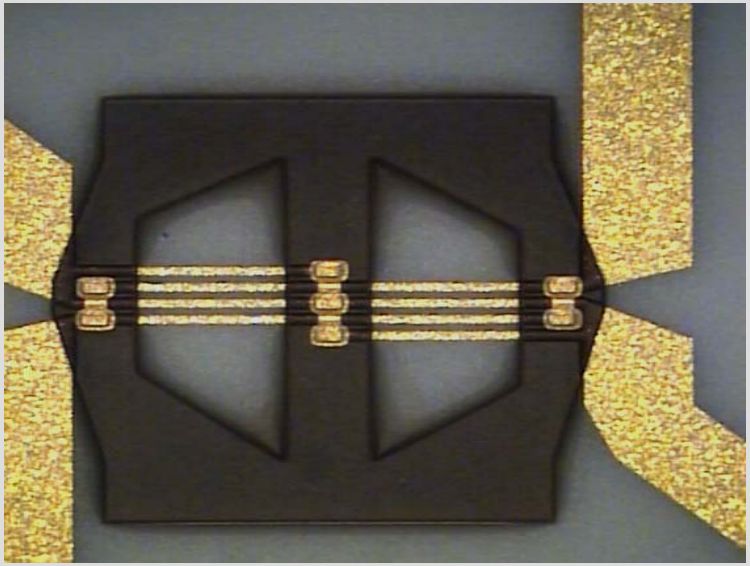


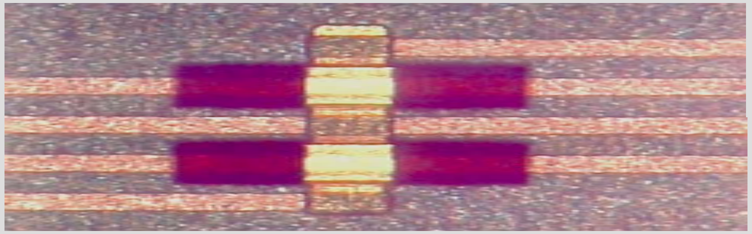
lange coupler with airbridges

cantilever airbridge

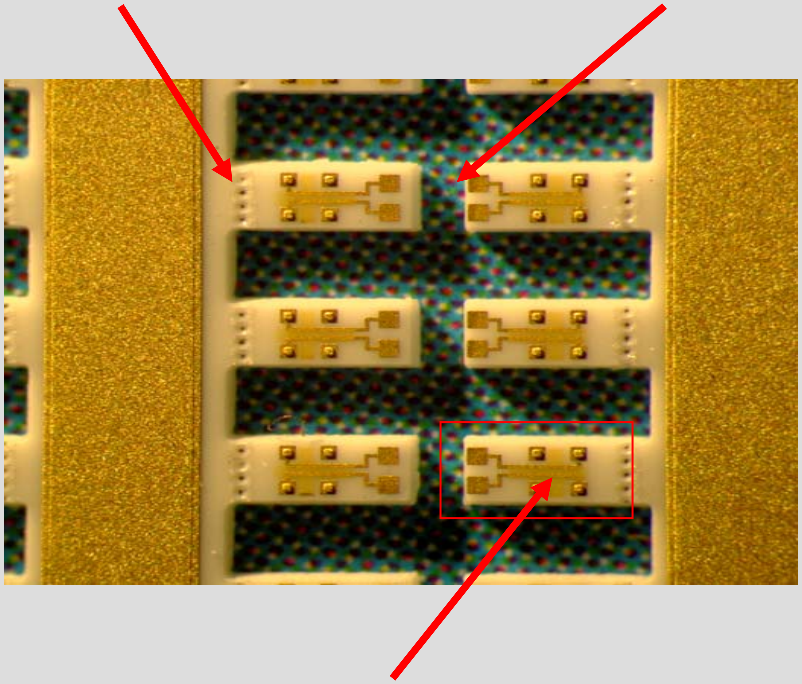


polyimide supported bridge





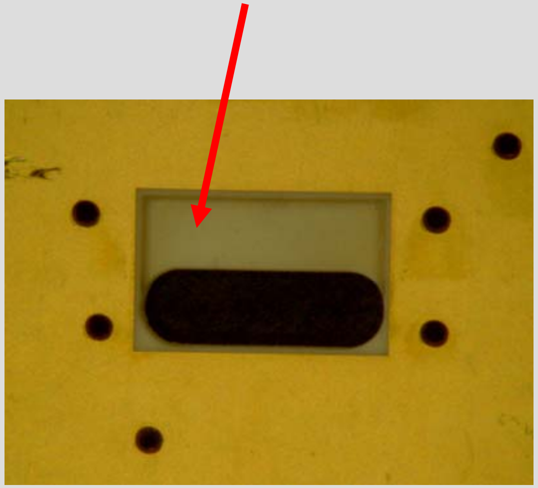
high precision laser - cut outs



laser scribing

laser cutting

dim.:1,2 x 0,5 mm



ceramic-cavity

ferrites

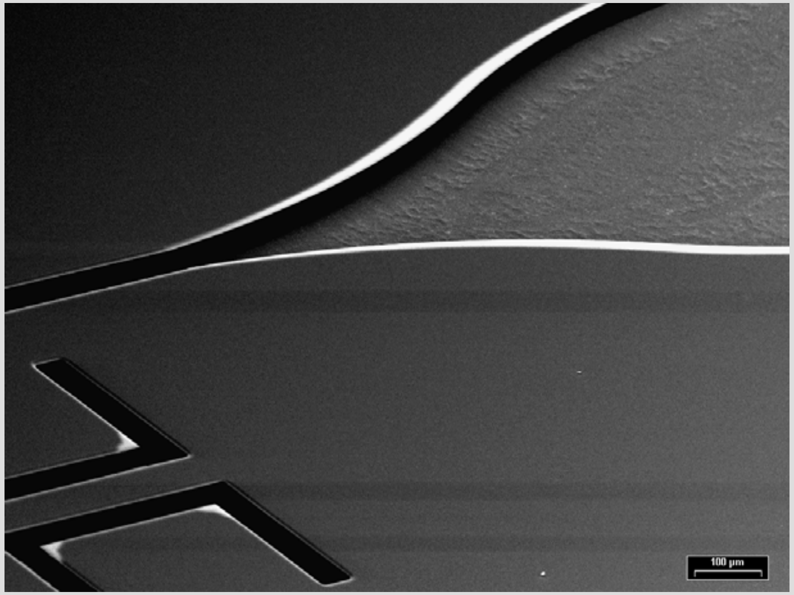
- thickness: 0,25 to 2 mm
- surface: polished or as fired
- integrated resistors
- edge metallisation
- through hole metallisation
- laser cut and drilled

synergies for MST - Technology at RMT

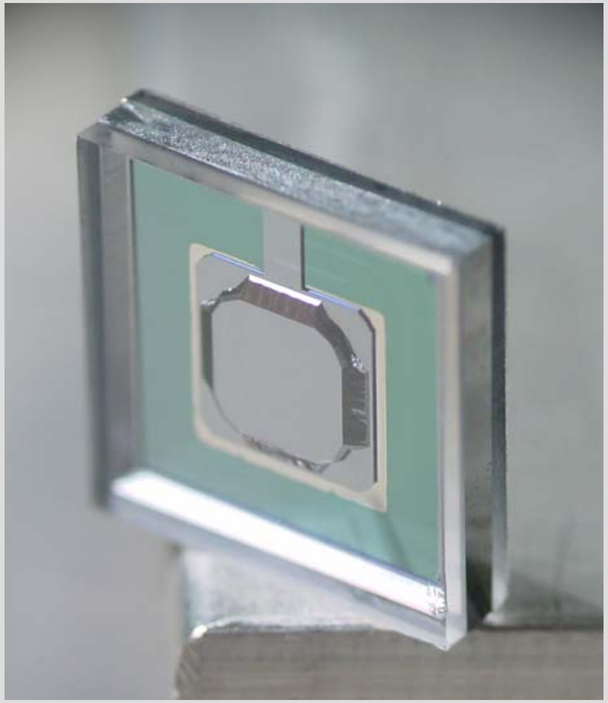
We use our standard processes to develop and manufacture MST – Products

Examples are:

TECAN



FESTO



Developments with the partner NTB / NMT

Why RF - MEMS Membrane Filters at RMT ?

- We will use our standard technology to diverse into components manufacturing.
- Reaction to commercial customer demand
- We will use our standard manufacturing processes in a new follow up
- We will enlarge our offer to an existing customer base later on

MST - technology

The Reinhardt Microtech Group is a technology driven company.

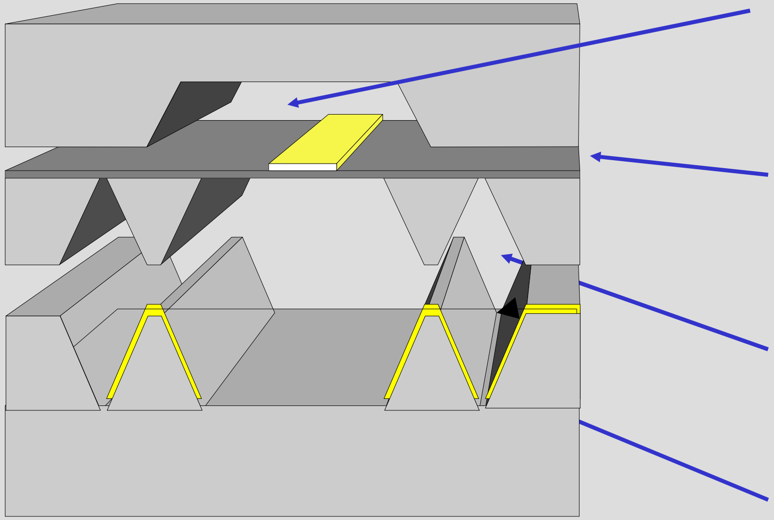
We have a leading position in Europe and are also a partner in several European projects such as:

- **Eureka**
- **Eurimus**
- **Prokosmos (D)**
- **KTI**

RMT sells technology as a service

Rf – MEMS Membrane Filter

Filter Basics



Upper cavity

Membrane

Vias groove

Lower cavity

- **novelty: Au coated cavities**

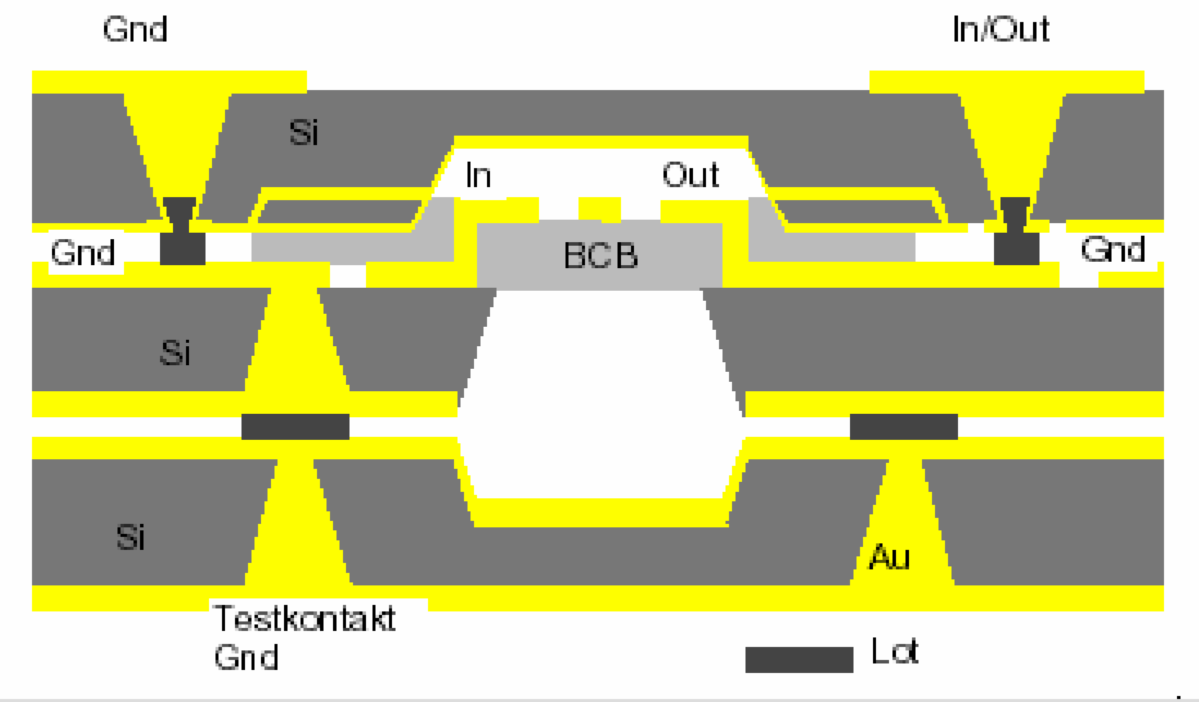
RF – MEMS Membrane Filter

Packaging concept I

- **easy SMT mountable device**
- **simple device test**
- **proper integration to RF – Environments**
- **different levels of Hermeticity**

RF – MEMS Membrane Filter

Packaging concept II



- **packaging concept with electroplated vias and soldering interconnections**

concluding remarks

- Project duration end of 2006
- First successful steps are performed
- Partners included
  - ESA
  - CNES
  - SSO
  - a French industrial group
  - a French university