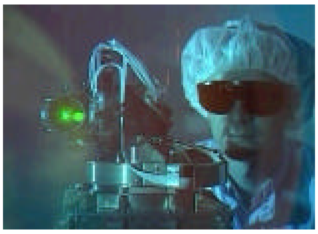
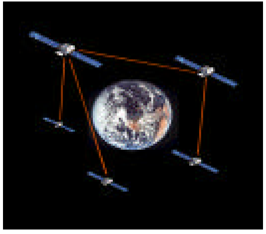
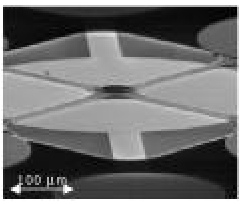
Fine Pointing Device for Intersatellite Link

Alex Dommann

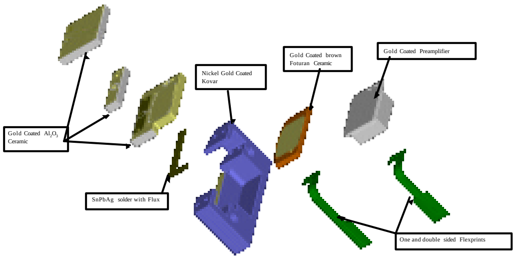


The strong demand for MEMS and Microsystems by a rapidly growing market has generated strong interest in quality control and failure analysis.

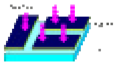




Schematic scheme for the Sensor Block FPA



Structuring of Futuran Ceramic

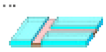


Structuring

Of the Foturan with UV Light

Recrystallization

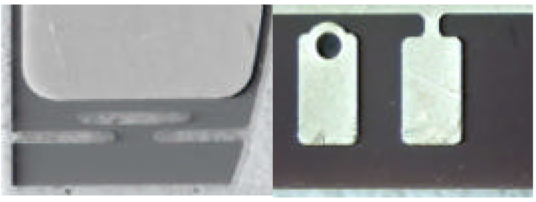
between 500º and 600ºC



Etching

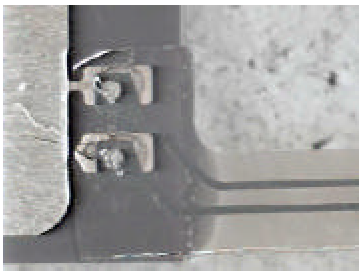
10% HF at RT 20 x faster

Driver Plates



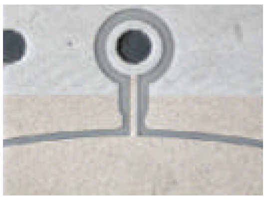
IμS

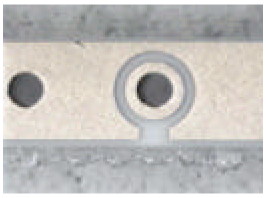
Foturan with Flexprint



IμS

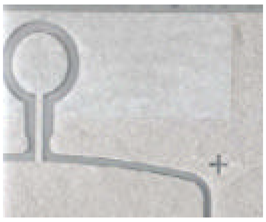
Upper and middle sensor Plate

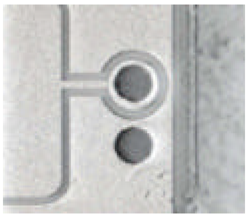




IμS

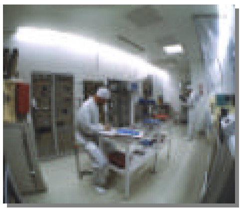
Lower Sensor Plate





IμS

Infrastructure of the Institute

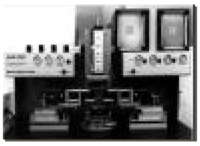


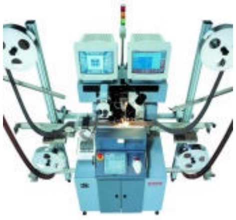
IμS

Coating equipment

IμS

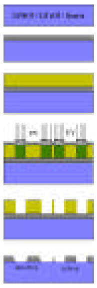
Bonding and Packaging





Etch- and Liftoff Process

Etch - Process



1. Clean substrate

2. Metallisation sputtered Al (evaporated Al)

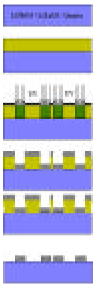
3. Photoresist Spin - coating

4. UV-Light Exposure through mask

5. Development of exposured resist

6. Etch-step: wet etch (anisotrope) dry etch (isotrope) remove of resist

Liftoff - Process



1. Clean substrate

2. Deposition of photoresist Spin - coating

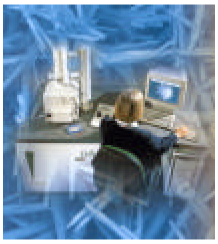
3. UV-light exposure and development of resist

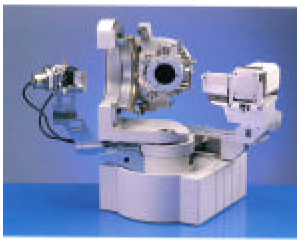
4. Metallization evaporated Al (defined angle of incidence)

4b Metallization on a different photoresist geometry

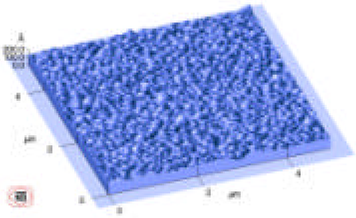
5. Lift-off Remove photoresist to get final structure

Analysis

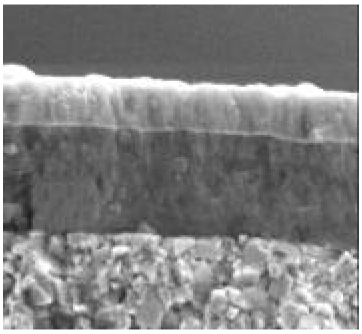




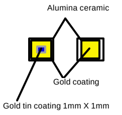
AFM Measurement

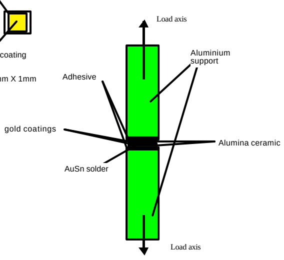


SEM



Test for the AuSn Soldering

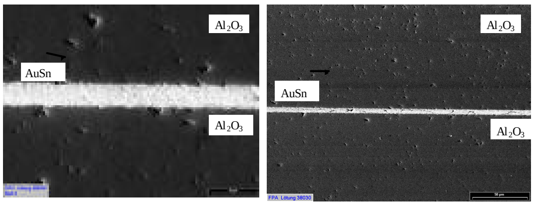




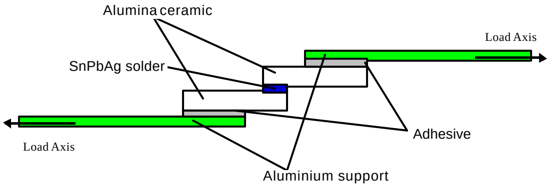
Results:

30N/mm^2 to 65N/mm^2

Cross-section through the AuSn Soldering



Test for the SnPbAg Soldering


Alumina ceramic

Load Axis

SnPbAg solder

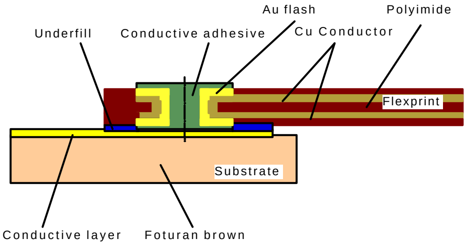
Adhesive

Load Axis

Aluminium support

Result: 20N/mm^2

Conductive Adhesive with Flexprints


Au flash

Polyimide

Underfill

Conductive adhesive

Cu Conductor

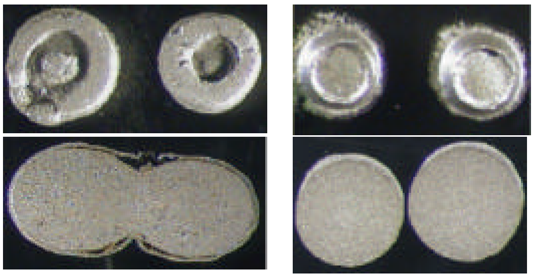
Flexprint

Substrate

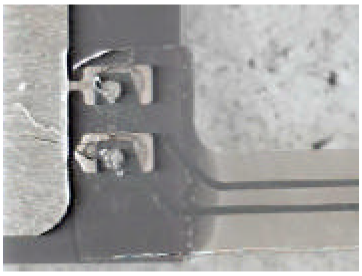
Conductive layer

Foturan brown

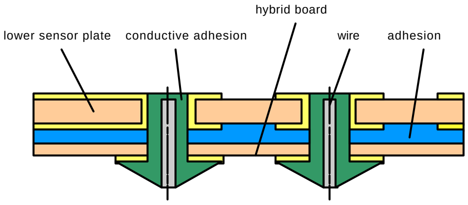
Conductive Adhesive for Pads



mounted Flexprint



Conductive Adhesive for Vias


hybrid board

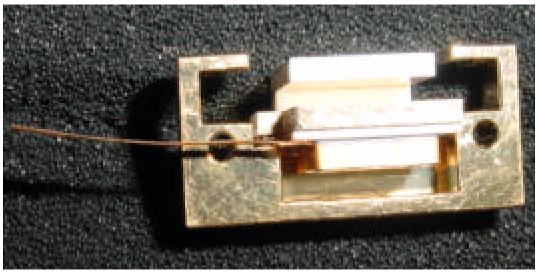
lower sensor plate

conductive adhesion

wire

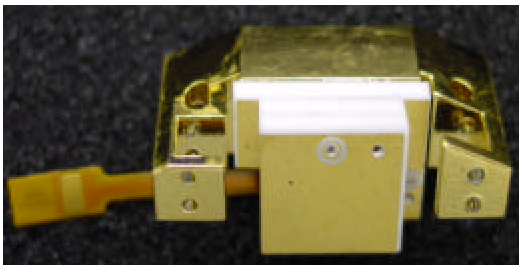
adhesion

FPA soldered front view



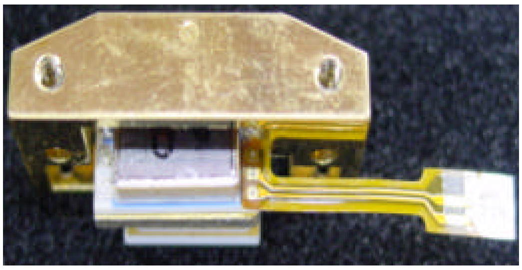
I μ S

FPA soldered top



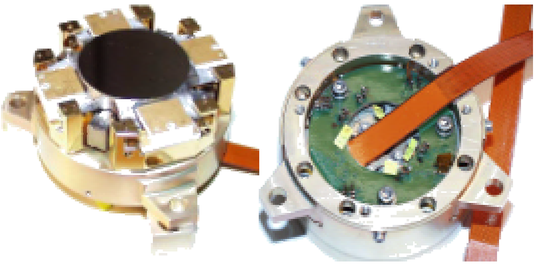
I μ S

FPA solderd down



I μ S

Fine Pointing Assembly



I μ S

FPA with Cover

I μ S

Complete FPA ready for Mounting

I μ S

Acknowledgements

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