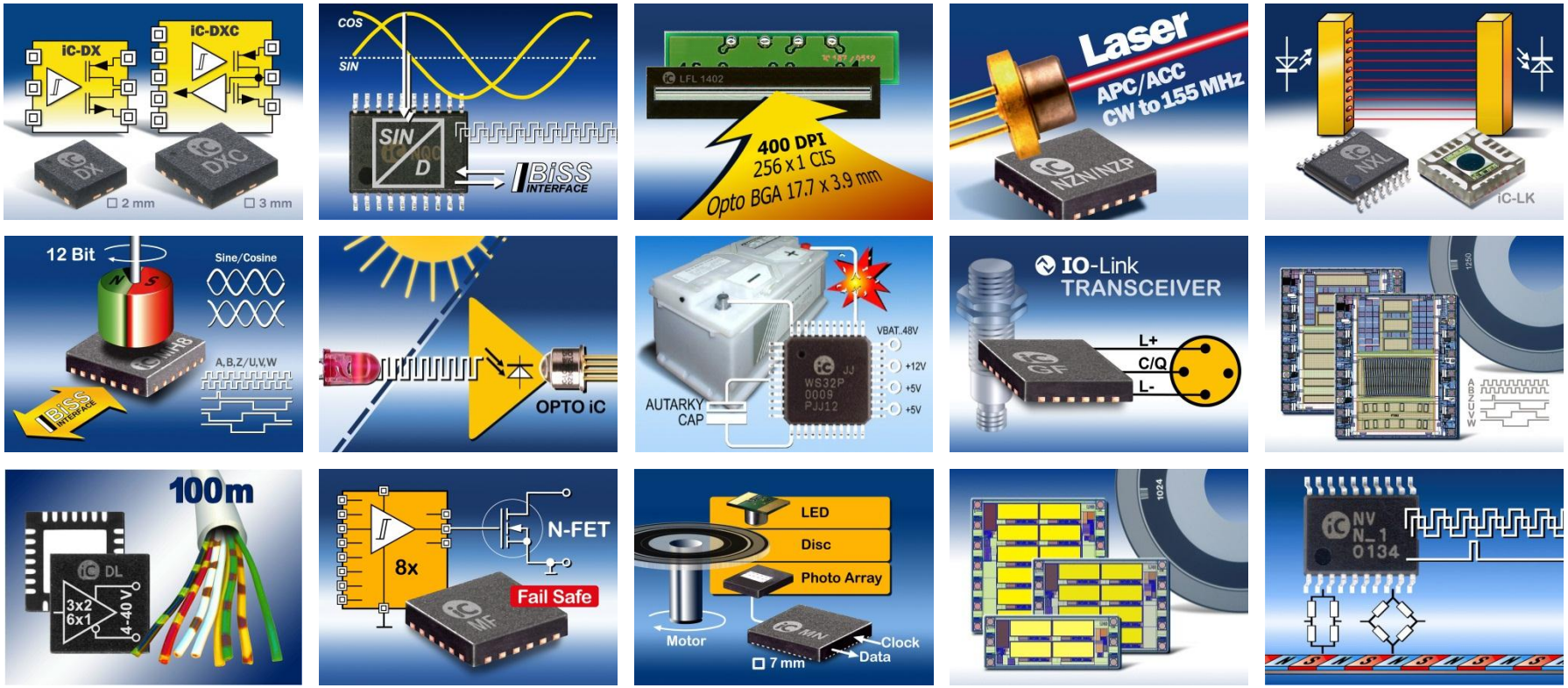
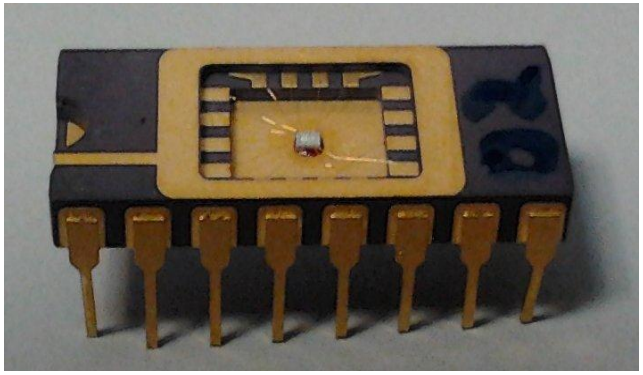


DRIT-CMOS. Presentation at CERN 17/01/2013

Este proyecto ha sido cofinanciado por el Fondo Europeo de Desarrollo Regional, FEDER
This project has been jointly funded by the European Regional Development Fund, ERDF

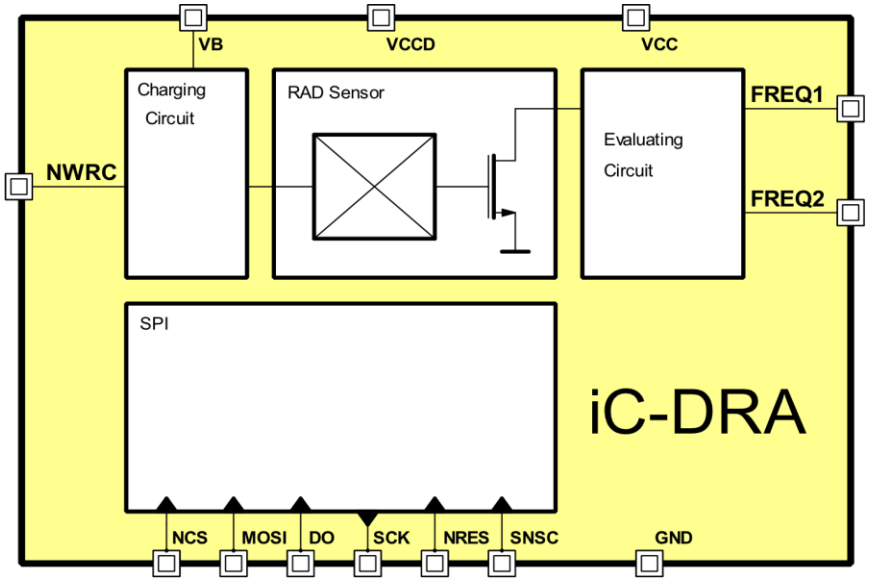
Status:



- Floating gate based
- Two Prototype Demonstrator incorporating:
  - Floating-gate Sensor
  - Readout circuitry
  - Frequency or Digital output

- Currently working on a new prototype with both outputs.

Prototype iC-DRA



- Two Frequency output (reference and radiation)
- Rechargeable
- Some configurations for debug purpose
- Posibility of programming two different sensor areas

Prototype iC-DRA. Processing of signals

Pasive Reading

- No Supply is needed
- Suitable for personal dosimetry
- For doses lower as 5Gy (10 Gy)
- After reading the doses, the floating gate can be recharged

Prototype. Calibrating the devices. Discussion.

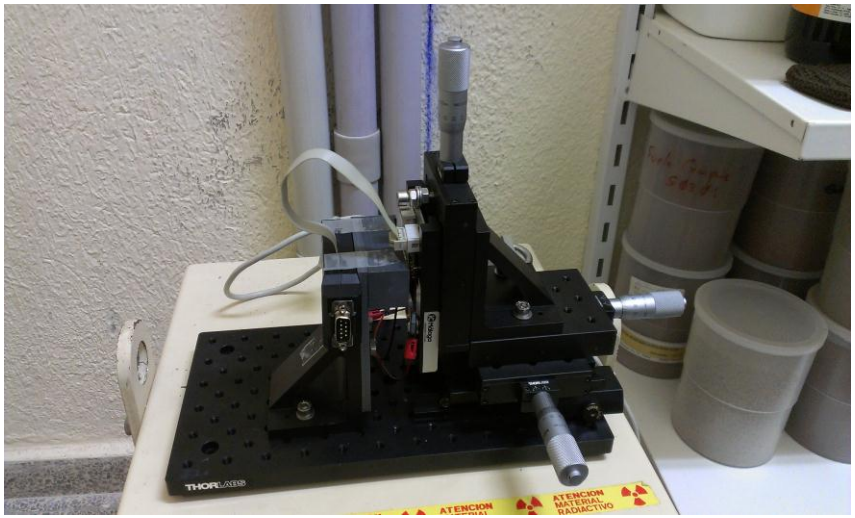
- Propotype iC-DRA has to be calibrated for each sample.
- During wafer test, each device should be pre-charged.
- For Temperature compensation, a characterization in temperature as described should be done after assembly. Probably an internal Id. number has to be written in an on-chip non volatile memory, and some information about the output frequency. (Not clear if a single linear approximation will work for all devices, or one for each is needed)
- A controlled radiation dose is applied after the assembly.
- The customer gets a partially discharged device, with another output frequency.

Possible Aplications

- **Personal Dosimetry**,
  - Under 1Gy and Low Radiation rates
  - Pasive Dosimetry
- **In Vivo Dosimetry.**
  - Up to 100Gy and High Radiation rates
  - Pasive or active Dosimetry
  - Single, linear or sensor matrix.
- **Spacial**
  - Up to 100Gy and low Radiation rates
- **Other Dosimetry aplications?**

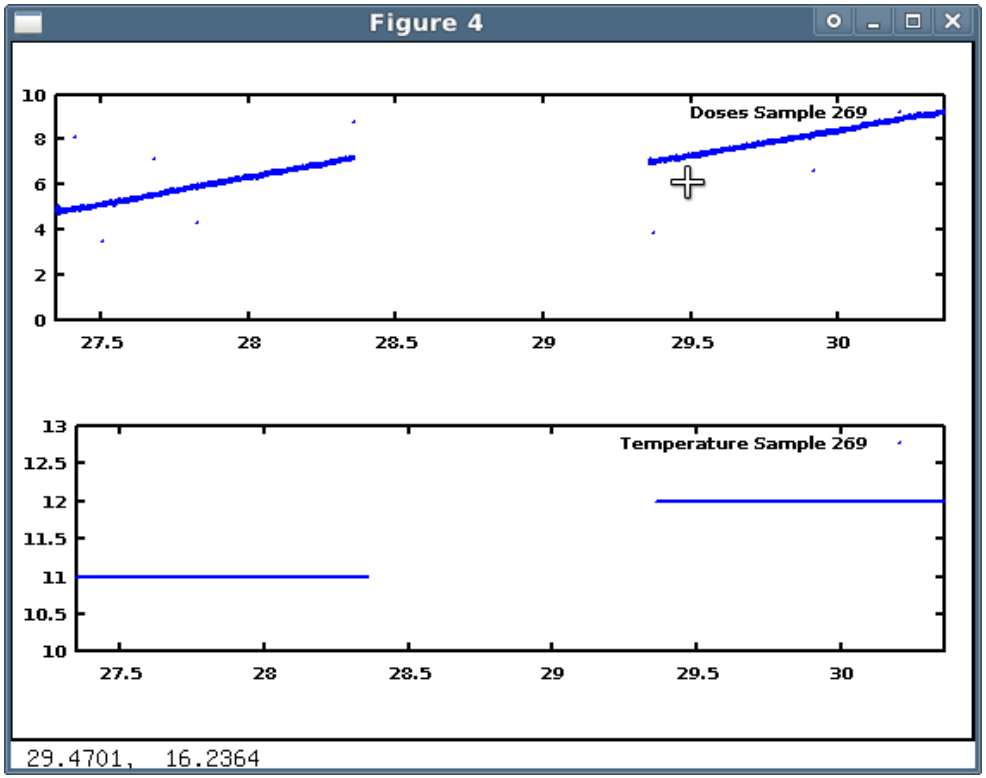
New versions design depending on market feedback

UIB measurement



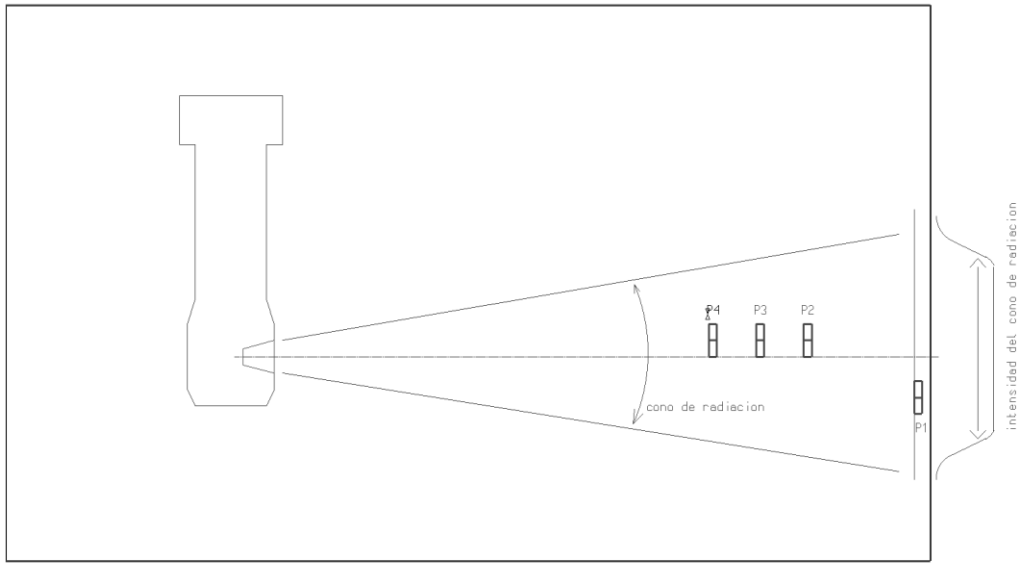
- Co60
- Activity 37 Bq
- Area 1mmx1mm

UIB measurement



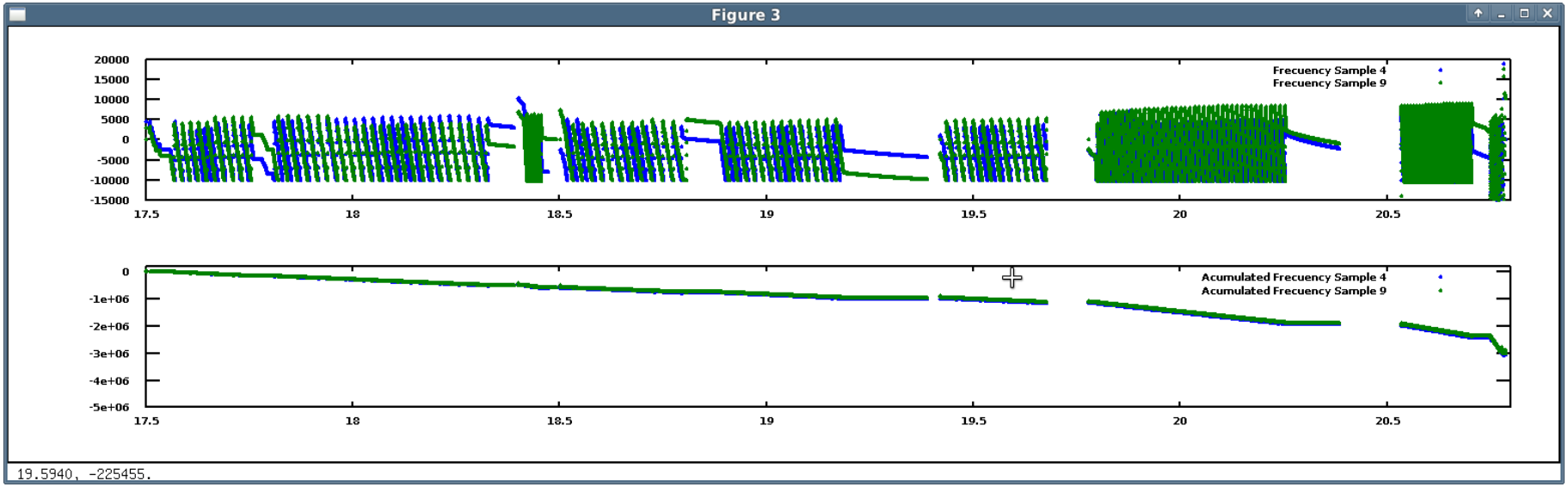
- Exposed about 8 hours, (2 x 2Rads)
- Linear response, but some temperature effects

Radiation Physics Laboratory (USC)



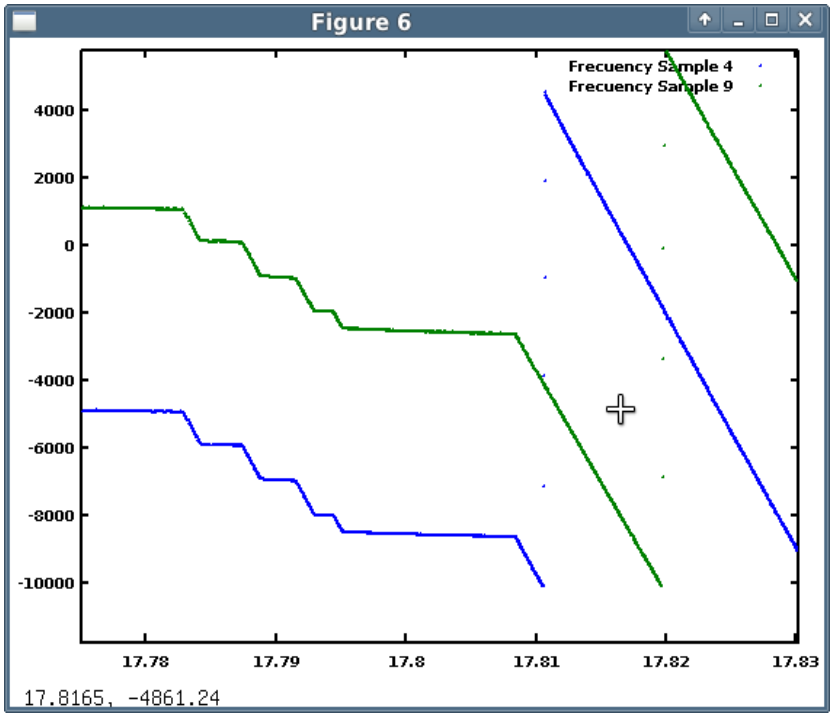
- More that 8 Krads
- About 100 Rad/hour, 300Rad/hour and 500Rad/hour
- In collaboration with INTA (Instituto de técnicas aeroespaciales)
- From 17 to 21 Dec 2012

Radiation Physics Laboratory (USC)



- More that 200 recharges
- Some annealing for high Dosis Rates
- No degradation is observed

Radiation Physics Laboratory (USC)



- Detail of four series, three of 2 minutes and one of 1 minute
- Dose equivalent 3.38Rads for 2 minutes and 1,69 for one minute.
- Sensibility 290±10Hz/rad
- Thermal variation 180Hz/ºC, without compensation

Radiation at CERN facilities

…. is the next topic