

# TAS – Belgium

## Rad Hard ASICS ( DPC and HSC)

### Maturity and innovation

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Analogue and Mixed-Signal Integrated  
Circuits for Space Applications  
Madrid May 31 - June 3



# Content

- **Maturity**
  - DPC CQFP Footprint and heritage
  - DPC BGA qualification and deployment
- **Innovation**
  - High speed controller  
(please refer to dedicated presentation from Marc Fossion)



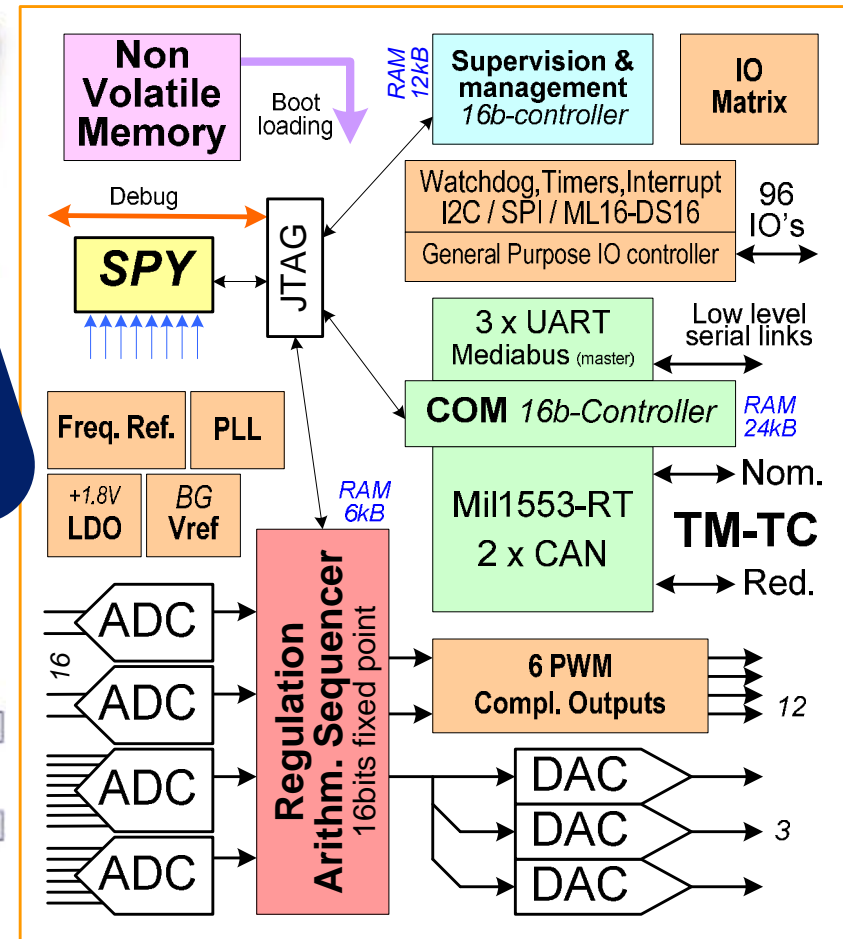
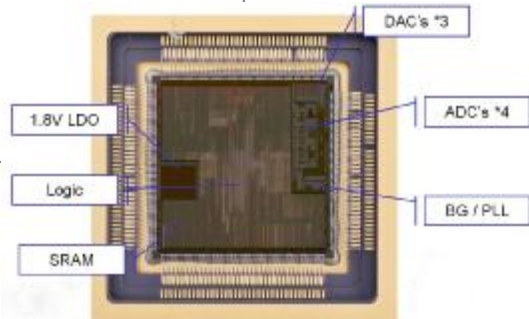
# DPC overview : reminder

## On chip :

- 4x CPU 16bits OpenMSP430
- No OS / One CPU = one task
- 42K memory
- RC oscillator + 120MHz PLL
- LDO +1.8V
- Bandgap
- 13bits ADC + input MUX
- 12 Bits DAC

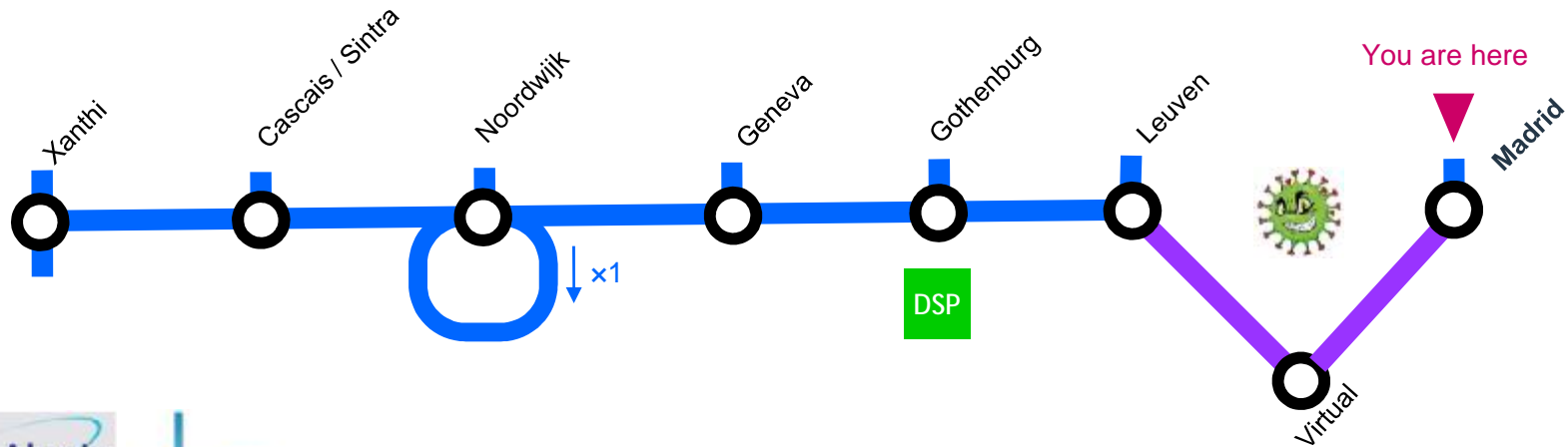
## Off Chip:

- E2prom
- +3.3V regulator
- DARE on UMC 180nm
- CQFP 256 pins



# Línea 1 – de AMICSA – TAS Belgium presentations

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IP cores on DARE180      DPC CQFP development      DPC CQFP qualification      DPC BGA Development      DPC BGA Qualification

**High Speed Controller**

HSC BGA Development      HSC BGA PVCC regulation

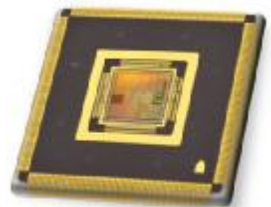
**GaN Integrated circuits**

GAN IC Development      GAN IC Update





# DPC Market footprint



Integrated in equipments

In flight :

In the pipe :



TELECOMMUNICATION

Around 30 DPC / GEO SATCOM



Since Jan '20



+ Telecom Export



OBSERVATION



Since Nov '21



EXPLORATION SCIENCE

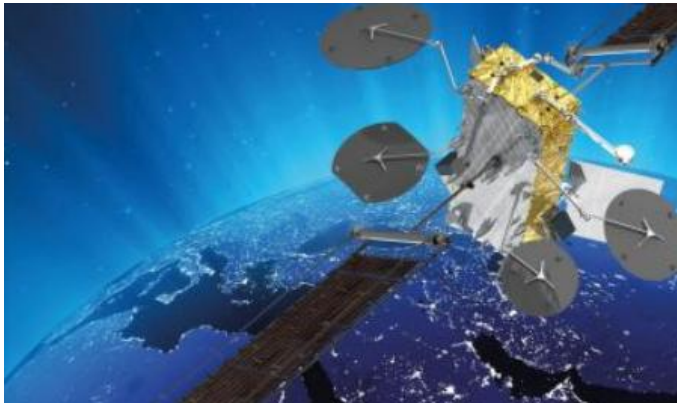


NAVIGATION

Around 16 DPC / G2G SAT



## DPC Flight heritage



mercredi 1 juin 2022

0	9	9	3	5	2	7
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Cumulated  
Hours in Orbit

0	0	1	1	3	,3	3
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Cumulated  
Years in Orbit

0	2	,3	7
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Years in Orbit since  
first flight

0	6
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Missions in orbit

One million  
hour flight  
heritage will  
be reached  
on Friday,  
during  
AMICSA



Multiple launches planned in the coming months



## NewSpace Components



Grade 1 & HiRel components for GEO and conventional space applications

RadHard Plastic Encapsulated devices (**RHPED**) = space qualified die (rad-hard) + industrial (automotive) production line and process (SPC control, etc.).  
Low quantity => Qualification required on each lot



New space components from completely different supply chains

(ultra) low cost components for Industrial Automotive applications



**COTS** : Reliability is ensured by very high volume production with SPC control, zero defect quality target (<1ppm) and millions of hours of life-test.

## DPC BGA : qualification

- DPC BGA qualification is now completed



- DPC BGA is very intensively integrated in almost all equipments inside the brand new GEO SAT COM from TAS , the Space INSPIRE



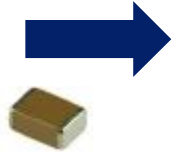
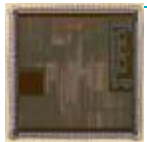
Compared to SpaceBus NEO with around 30 DPC/SAT, Space Inspire embarks 150 DPC/SAT





# Supply chain

DPC die



IMEC IClint  
Design house



Substrate manufacturing,  
assembly, molding & balling



BGA components



Performance  
characterization



In parallel,  
Another Assembly line in  
Europe

Consistent with **EEE components Sovereignty initiative**, where one subject is focusing on packaging & assembly.

