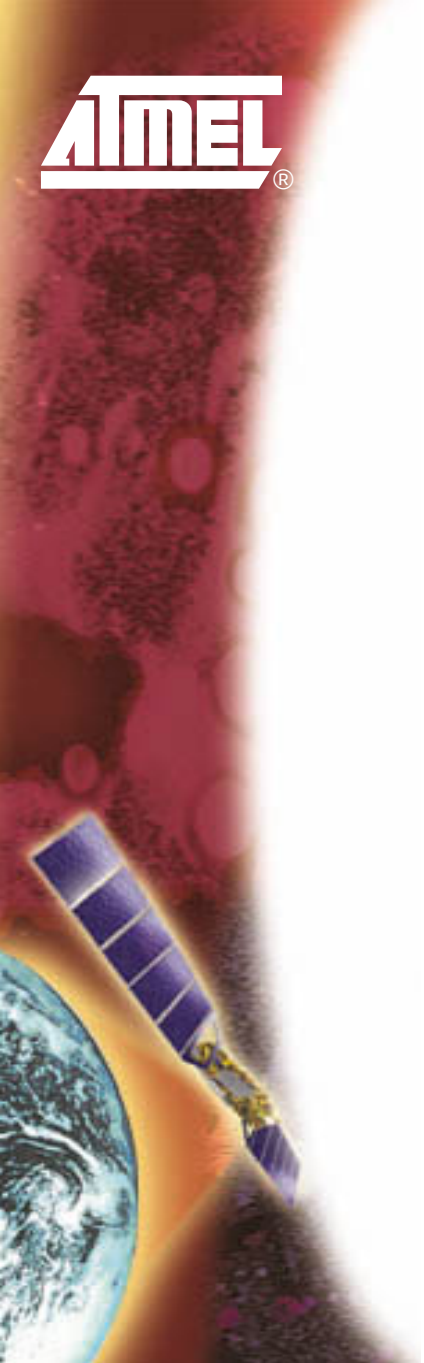


MPW Program for Space
ESA Contract: 17767/03/NL/FM

Jean BOUILLON

MDP ESA Feb 4th, 2004

MPW Space Objectives

- For ATC18RHA ASIC family
- Share the set of reticules and silicon costs between several designs
- Prototyping
- Flight Models compliant with the Space requirements
- A service for the European Space Industry

ATC18RHA status

- **Alpha Design Kit**
  - Already available (upon special Atmel/Customer agreement)
  - No design manual
  - LVDS, PECL & PLL not included yet
  - Dynamic characterization based on to date process parameters
- **Beta Design Kit**
  - Release in March 2004 (upon special Atmel/Customer agreement)
  - Design manual, LVDS, PECL and PLL included
  - No correlation with Si yet
- **Final Design Kit**
  - Release end 2004

MPW for Space Program

- **ESA Contract: 17767/03/NL/FM**
  - **Kicked-off in October 2003**
- **Engineering activity**
  - **Set-up of the MPW Space service**
  - **Verification on a Validation Run**
  - **Completion in Q4 2004**
- **Production activities**
  - **ESA funding for production runs**
  - **4 lots (25w each), ESA proprietary**
  - **Starting Q1 2005**
  - **2 lots per year foreseen**

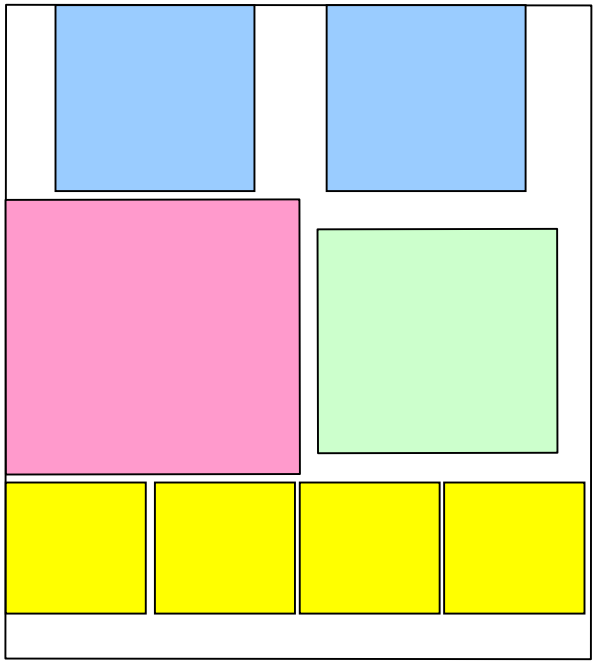
ATC18RHA Matrices

- **Pre defined matrices and pad frames (95µm pad pitch)**

Die Size (mm)	Surface (mm2)	Nb of pads	Typ Nb of gates
M1 : 6.19 sq	38.3	216	1M
M2 : 8.76 sq	76.7	324	2.2M
M3 : 10.66 sq	113.6	404	3.5M
M4 : 13.03 sq	169.8	504	5.5M

Some MPW Space Technical constraints

- **Wafer fab**
  - Metal filling between circuits
- **Probe**
  - Starting point for each design
  - Repetition step compatible with equipment
  - Dedicated process for inking die not to be picked up
- **Assembly**
  - Repetition step compatible with sawing equipment
  - Recognition of the die to be picked-up
  - Pick and Place process for die assembly
- **Logistic**
  - Adaptation of our production tracking system to keep the tracability



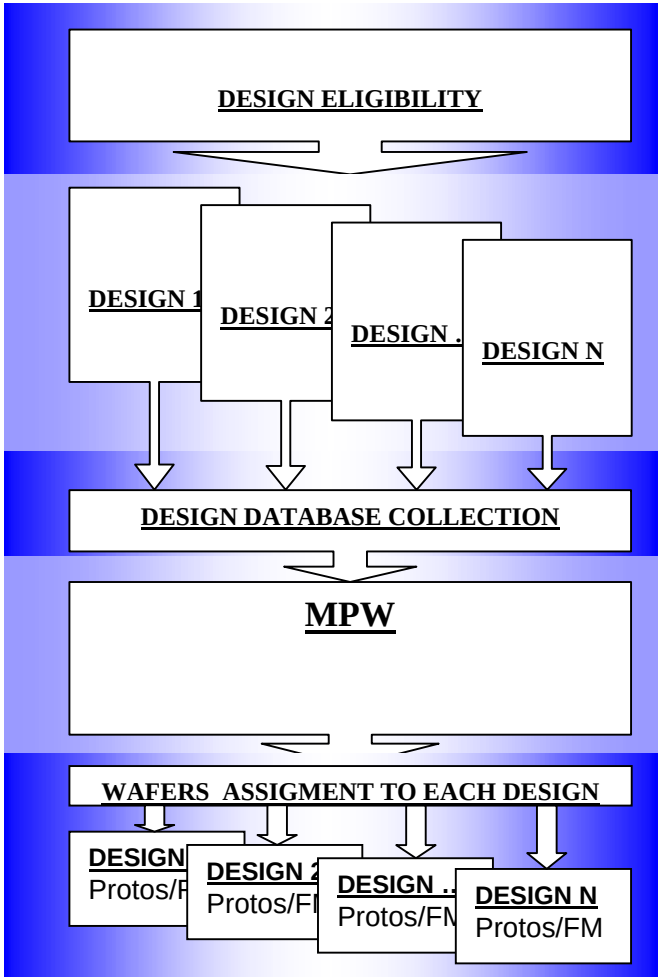
This will lead to the definition of a set of rules for organizing the reticule

MPW Space Validation run

- **Purpose: validation of the solutions**
- **Will embark external customer designs**
  - **Engineering lot**
  - **No Hirel guaranty for Flight Models**
  - **Prototypes only**
- **Planning**
  - **Launch Q2 2004**
  - **Validation Q4 2004**

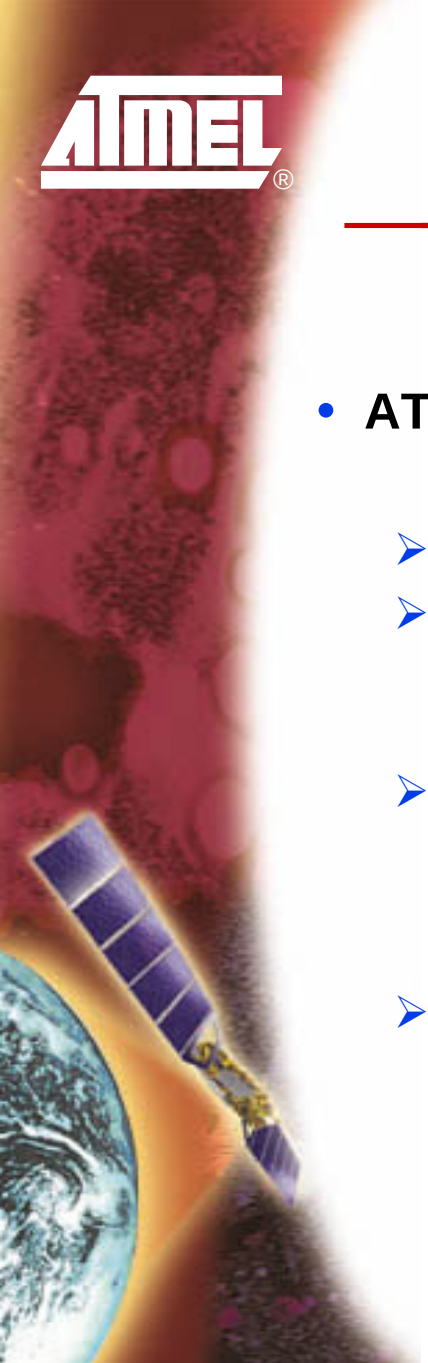
MPW Space flow (1)

- **The MPW is limited to reticules and wafers lot**
  - **Before DR step, no specific technical constraints**
  - **But, new milestones during design to secure the planning**
  - **From the probe step, MPW wafers lot split in mono-project lots**
- **Each wafer is worked in sacrificial mode**
  - **Only 1 product extracted per wafer**



MPW Space flow (2)

- **ATMEL commitment on any MPW production run**
  - **25 wafers launched**
  - **Prototypes**
    - **5# per design**
    - **16 weeks Lead time**
  - **Fight Models**
    - **Committed 15# to 25# per design (TBC) depending on matrix size for a standard 25w lot**
    - **Standard lead time**
  - **For higher quantities, additional wafers can be launched**



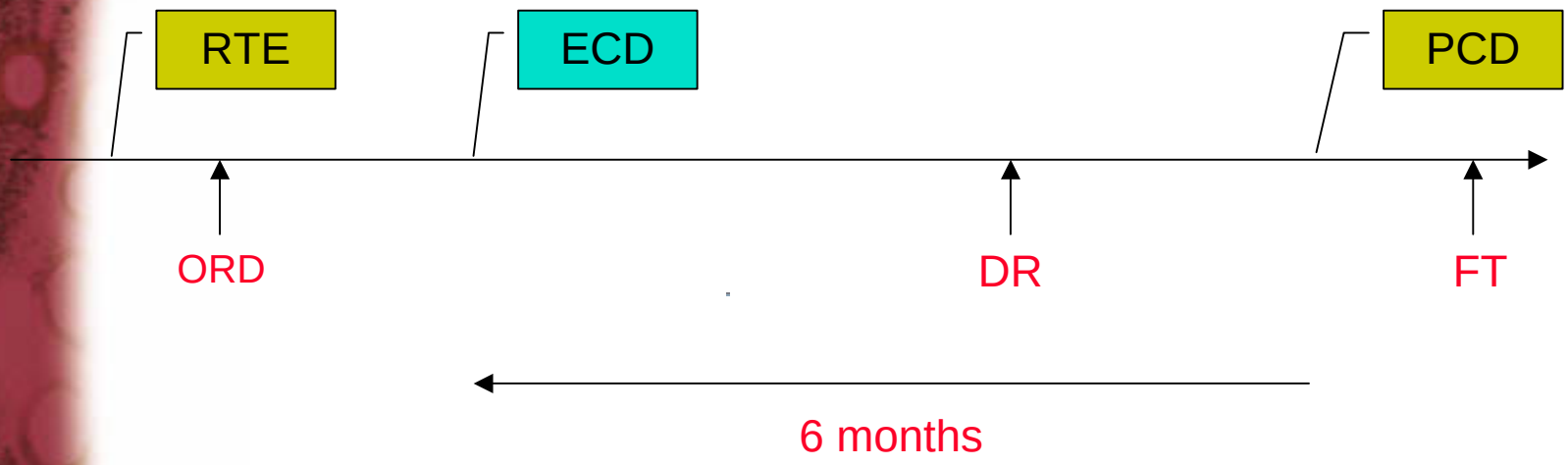
MPW Space New milestones (1)

- **Production Closing Date (PCD)**
  - **Start of MPW reticule and lot manufacturing**
  - **Fix date, communicated to the space community**

MPW Space New milestones (2)

- **Request to embark and Eligibility Approval (RTE)**
  - **has to be included in the RFQ**
  - **Eligibility Approval will be taken into account in the feasibility study answer and quotation**

MPW Space New milestones (3)



- **Eligibility Closing Date (ECD)**
  - **Mutual commitment (Customer and Atmel) for reservation on MPW**
  - **Frame of the reticule defined**
  - **From ECD, Penalties apply in case of withdrawal**

MPW SPACE Promotion

- **WORKSHOP at ESTEC in June 2004**
  - **Detailed presentation of the MPW SPACE service to Space community**
- **ATMEL Web site**
  - **Announcement available on the ATMEL Website since December 2003**
  - **To be complemented in Q2 2004**

Prices benefits

Simulation for 2 representative projects		Mono Project	ESA MPW (*)
✓Large die ✓Pad limited ✓Average density	NRE	60	16
	FM (25#)	40	40
	Total (base 100)	100	56
✓Small die ✓Pad limited ✓Average density	NRE	70	8
	FM (25#)	30	30
	Total (base 100)	100	38

- (*) foundry funded by ESA

Conclusion

- 0.18um rad hard European Source
- Competitiveness
- Industrial solution