

OCA Event Timer



OCA -UMR Gemini
Grasse - FRANCE

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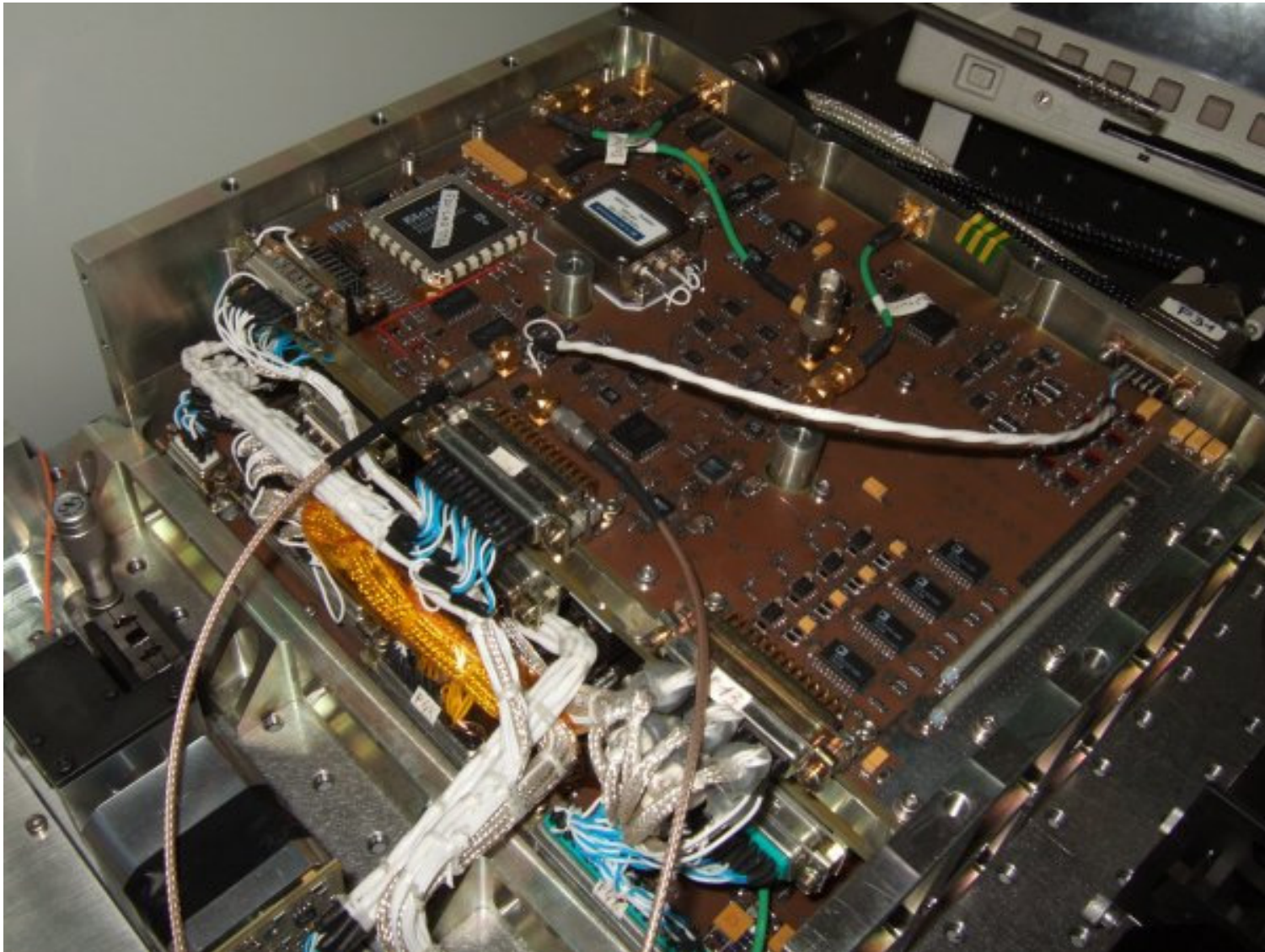


OCA Event timer

- OCA and CNES designed a Space event timer in the framework of the T2L2 project
- OCA can build a ground model for laser ranging station from the design of the space instrument
 - » Usual laser ranging activities
 - » T2L2 Time transfer



T2L2 Event timer Space instrument Engineering Model





Space instrument Characteristics

- Input frequency : 10 MHz sinus 0 dBm
- 1 input channel ECL Level
- Internal local oscillator: 100 Mhz
- Logical counter frequency: 100 MHz
- Vernier period: 20 ns
- Resolution : 0.1 ps
- Communication: Serial RS422 @ 1 Mhz
- Dead time: 3 μ s
- Internal fifo : 2 words
- Dimensions (one card with counter, frequency synthesis and Vernier) : 220 x 150 mm
- Power supply: 15 W

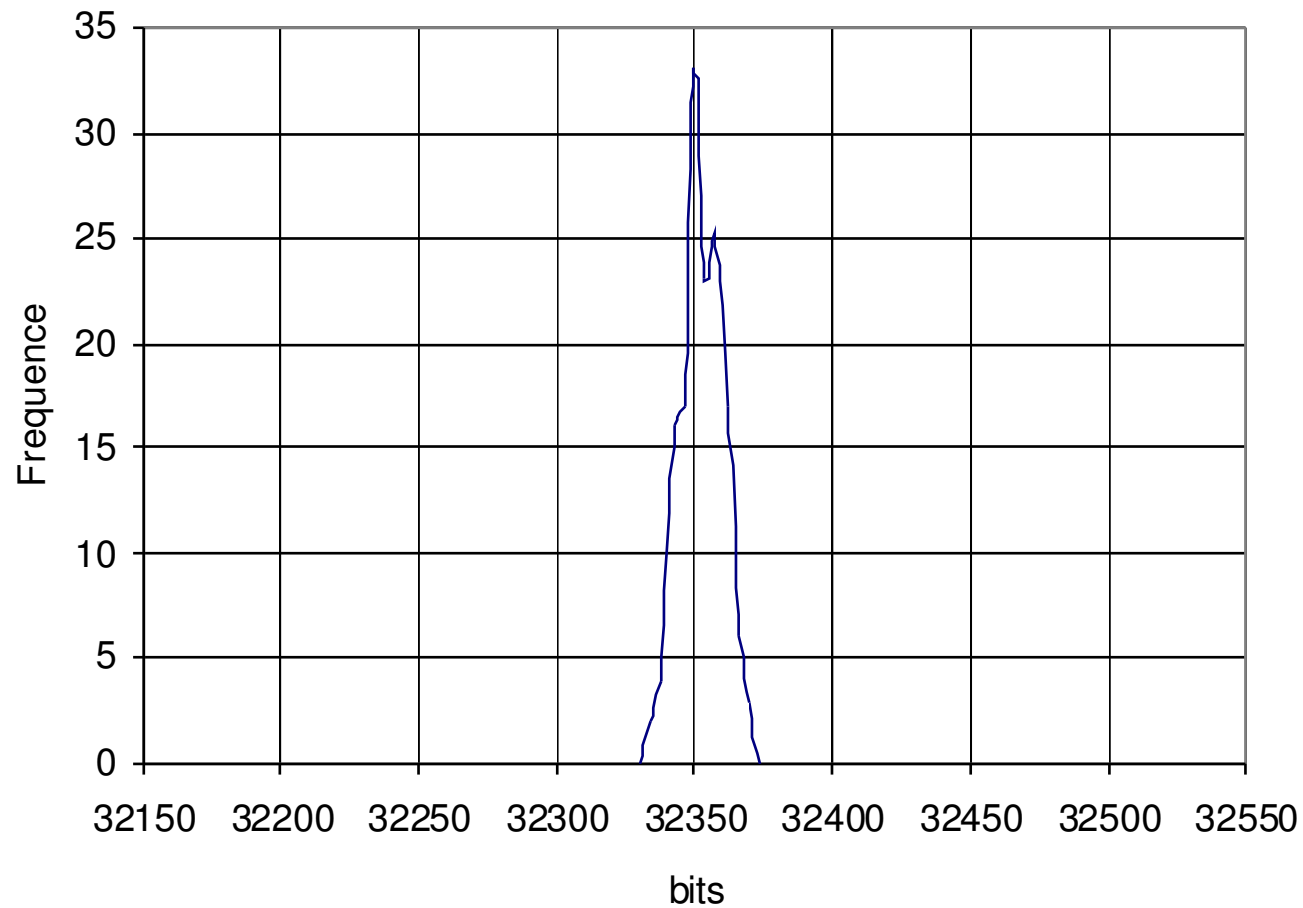


Space instrument General performances

- Precision < 2 ps (in calibration 0.9 ps)
- Linearity < 1 ps
- Time stability < 30 fs over 1000 s
- Thermal drift < 1 ps/°C
- Magnetic field sensitivity: no effect



Space instrument Calibration precision



Precision in auto-calibration mode: 0.9 ps



T2L2 Questionnaire

Event timer

STATION	BUS	DEAD TIME	FORMAT	Nb. Ch.	In F.	Out F.	PPS	EVENT	Mémoire
MLRS	Parallèle		Rack	4	10		NIM	NIM	oui
LVIV	Série	1	Card	2	5	5	TTL	NIM	oui
BOROWIEC	Parallèle	1	Card	3	10	10	NIM	NIM	oui
HARTEBEESHOEK	Parallèle	1	Rack	2	5 + 10	5	TTL	NIM	oui
URUMQI (mobile)	Ethernet	1	Rack	4	5 + 10	10	TTL	NIM	oui
KUNMING	USB		Card	4	10	10	TTL	TTL!!!	oui
SHANGHAI	Ethernet	1	Card	2	10	10	TTL	ECL	oui
CHANGCHUN	Parallèle	0.01!!!	Card	3	5 + 10	5	TTL	ECL	oui
KOGANEI	Ethernet	1	Rack	2	10	10	TTL	NIM	oui
YARRAGADEE	Parallèle		Rack	2	10	10	TTL	NIM	oui
MOUNT STROMLO	Parallèle	1		3	10	10			oui



Ground instrument Design

- 19 inches rack (3U)
- One card for frequency synthesis and counters
- One card for the Vernier; up to 4 Vernier
- Internal power supply
- Internal embeded PC
 - » Data conversion
 - » Internal storage
 - » Communication: Ethernet and Serial port...
- Trigger input
 - » Analogic with programmable comparator
 - » NIM



Ground instrument Design

- Input frequency: 10 MHz or 5 MHz sinus > 0 dBm
- Output frequency: 10 or 5 MHz
- Dead time $< 1 \mu\text{s}$ (600 ns min)
- Precision < 2 ps; < 1 ps upgrade (100 Mhz Vernier)
- Linearity < 1 ps



Ground instrument Development plan

	Nov	Dec	Jan	Feb	Mar	Apr	may	june	july	Aug	Sep	Oct
Specification	Orange	Orange										
Vernier Card prototype	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow						
Synthesis Card prototype	Orange	Orange	Orange	Orange	Orange	Orange						
Global design				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			
Programmable logic development		Orange	Orange	Orange	Orange	Orange	Orange					
Software development				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow		
Integration									Orange	Orange		
Tests and calibration						Yellow					Yellow	
Documentation												Orange

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