



High Energy Physics Applications

presented to:



Who is Orolia

What We Offer

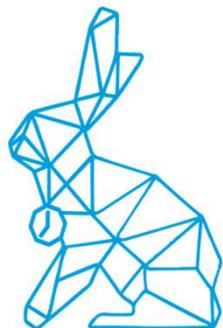
Who is Orolia

Our Products

Our Research

Our Services

Contact Us



Who is Orolia and Seven Solutions?

Seven Solutions

- World leader in picosecond level time sync over networks and long distances
~50 employees, most highly technical with advanced degrees

Pilar Gil

- R&D Eng Mgr, High Energy Physics Products
- pilar.gil@orolia.com

Juan Fernández

- Technical Lead
- juan.fernandez@orolia.com

Pedro García

- Hardware Engineer
- pedro.garcia@orolia.com

Orolia

- World leader in Resilient Position, Navigation, and Timing (R-PNT)
- ~500 employees

Ankeny, IA.US
Rochester, NY.US
Montreal, QC.CA

Granada, ES
Guidel, FR
Les Ulis, FR
Sèvres, FR
Neuchâtel, CH



Who is Orolia

What We Offer

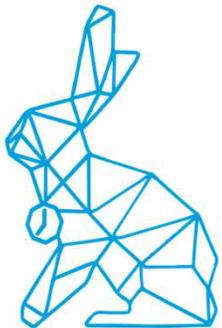
Who is Orolia

Our Products

Our Research

Our Services

Contact Us



Particle Accelerator Synchronization

Worldwide support of particle accelerator synchronization

- France – ITER
- Switzerland - CERN
- Spain – ESS Bilbao
- Sweden – ESS Lund
- Japan – IFMIF/EVEDA
- Spain – IFMIF/DONES
- Germany -- GSI
- Israel – Soreq Applied Research Accel Facility (SARAF)



GSI Helmholtzzentrum für Schwerionenforschung GmbH



Our Products

What We Offer

Who is Orolia

Our Products

Our Services

Contact Us

Our Products – High Energy Physics

Software & Services

- ✓ On-site & off-site Support
- ✓ Radiofrequency and Control
- ✓ uTCA and drivers
- ✓ Timing

Timing Systems

Radiofrequency control, monitoring, timing system and services

RF Generation & Distribution

- ✓ 10 MHz Master Oscillator - Low Jitter
- ✓ RF distribution with low phase noise (< 10fs rms)



BPMs - Beam Position Monitors

- ✓ CPI-e
- ✓ uTCA
- ✓ Standalone



LLRF - Precise Low Level RF Generators

- ✓ CPI-e
- ✓ uTCA
- ✓ Standalone



Our Products

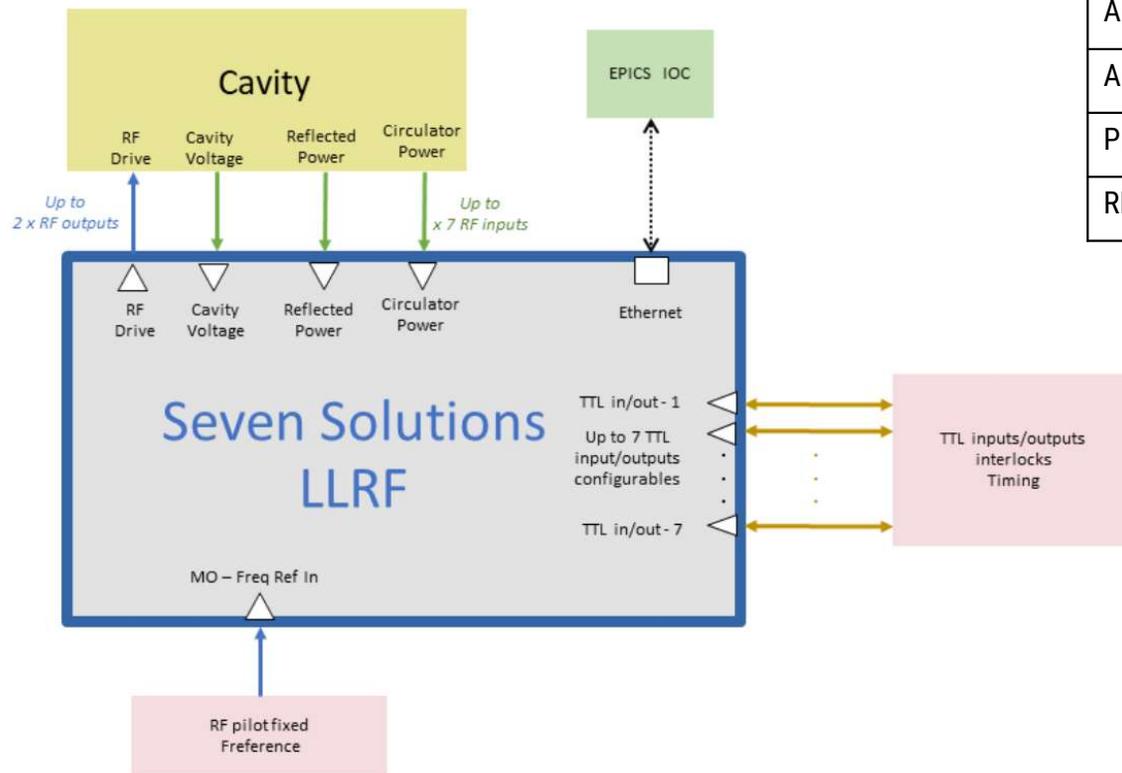
RF Distribution with Low Phase Noise

- Design and manufacturing of two equipment for RF distribution with a very low phase noise ($< 100 \text{ fs rms [10Hz, 1MHz]}$)
- Controlled by EPICS
- Tested in ESS Bilbao



Our Products

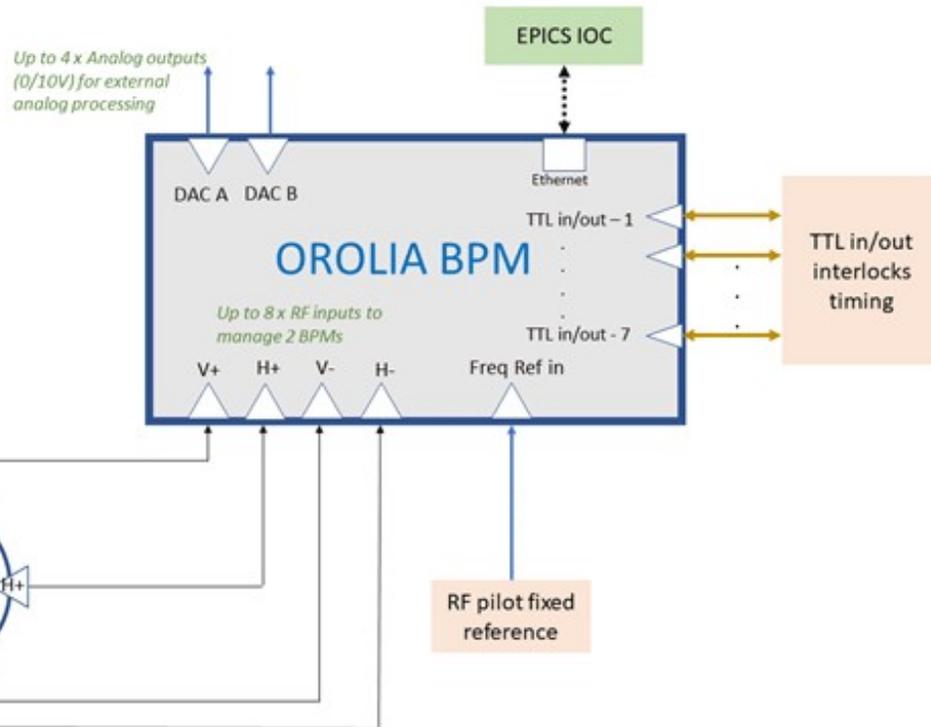
Control Systems



Amplitude/Phase Stability	0.02% - 0.3 degree
Amplitude/Phase precisión	0.03% - 0.03 degree
PI delay	< 1us
RM Jitter	182fs



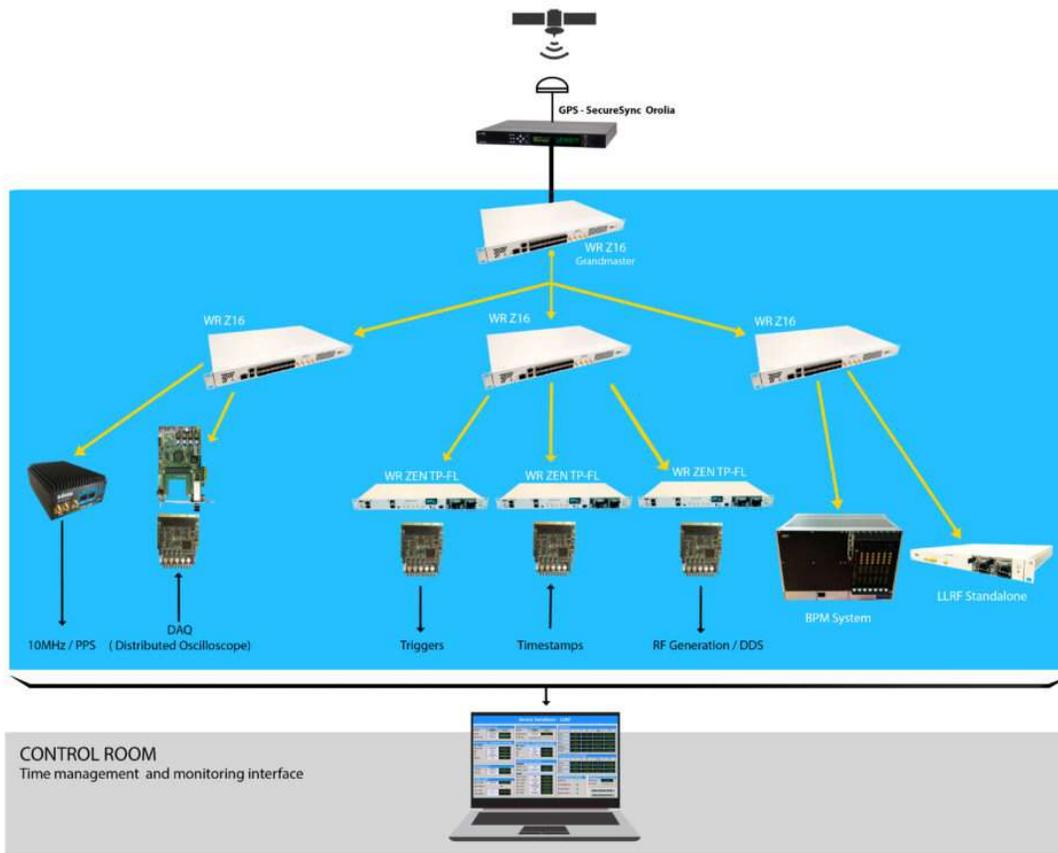
Diagnostics for Accelerators



- Dynamic range: **[-75, 0] dBm**
- Position precision **< 25um**
- Phase precision **< 0.1°**
- Position, phase and current alarms with response time **< 2us**:
 - Position precision **< 250um**
 - Phase precision **< 1°**



White Rabbit-based Networks



- **Subnanosecond** and deterministic time transfer.
- **Subpicosecond** phase noise frequency dissemination.
- Very **high scalability and large distance** links support.
- Data and time transfer over the same Ethernet **optical fiber link**.
- From nanosecond to picosecond events **timestamping**
- **No calibration** needed