{innovation}
comes with b com

IRT B-COM Presentation

Eric GATEL eric.gatel@b-com.com

IRT b-com

- As a trusted research and innovation partner for businesses, b<>com is a IRT specializing in next-generation digital technologies for decarbonization.
- b<>com and its investors create research programs to develop innovative technologies that boost industrial performance.
- Its collaborative model fosters both technology and competitiveness while mitigating the risks associated with innovation.
- **Considered as a SME for European commission**
- **Located in Rennes, France**

<key figures>

2012	year of creation
7000	m² scientific campus
70	b<>comians
23	investor members
40	technologies & services
400+	current patents
140	softwares
20	European projects
22	International Awards and distinctions
3	sites (Rennes, Brest, Lannion)
2	spin off

Expertise and Europeans projects

Expertises

- Advanced Connectivity
- Computer Vision
- IA & Data
- Cloud/ DevOps/ MLOps
- Human Factors
- Digital And Society

Verticals

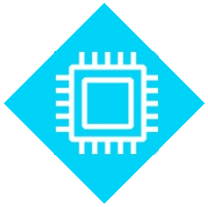
European projects

EDINAF, SUSTAIN 6G, ARTWIN, Hexa-X, 5G EVE, 5G-TOURS, XR 4ALL, Nepaas, 5G-Transformer, MonB5G, DIGITAL INNOVATION HUB BRETAGNE, 5GINFIRE, ONE5G, ARDITO, WORTECS, SENDATE, MEDIRAD, 5G-Ensure, ORPHEUS Object-Based Audio Experience

xG Cellular networks and signal processing:

- RAN 5G/6G architectures
- Signal processing (detection, synchronisation, channel estimation, new waveforms, full duplex)
- Corrector codes/FEC (LDPC, polar codes, turbocodes)
- Radio ressources allocation/ MAC layer scheduling
- Terrestrial Network/ Non Terrestrial networks

Hardware studies:



- HW/RF board designs
- FPGA developments for communication systems (FEC, low-PHY, DFE)

Software architecture and developpment

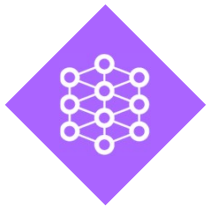
- SDR approach
- Layer 1/layer 2, real time

Integration, tests & deploiements xG

- E2E tests: UE, RAN, CORE, Applications
- RF performances tests
- Radio coverage studies
- On -field deploiements and uses cases

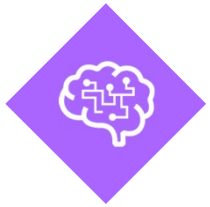
Data, Signals & Mathematical Foundations

- Radio, physiological & time-series signal processing
- Natural Language Processing (NLP)
- Statistics, stochastic modeling & optimization
- Data engineering & pipelines, Big Data architectures



Predictive AI & Machine Learning

- Classical ML: regression, classification, clustering, anomaly detection
- Time-series analysis, forecasting & flow prediction
- Predictive maintenance & failure-risk modeling
- Operational research, decision-support & planning optimization



Generative & Advanced AI

- Large Language Models (LLM) & multimodal AI
- Retrieval-Augmented Generation (RAG), embeddings & vector databases
- Prompt engineering & AI agents/orchestration
- Trusted, Sovereign, Efficient & Edge-Ready AI Systems

Reliability, Deployment & Responsible AI

- MLOps, lifecycle management, monitoring & cloud/GPU architectures
- Model robustness, evaluation & benchmarking
- Governance, ethics, bias & regulatory compliance
- Privacy & data protection

6G topics and studies

Technological Areas	Topics	b<>com Experience / assets	Next steps
MIMO signal processing techniques	Discrete communications using cell-free massive MIMO	1 PhD thesis ongoing, research papers	Design prototype / PoC
	Full Duplex Self interference cancellation techniques	1 PhD thesis completed, research papers	Design prototype / PoC
Non terrestrial networks	GEO / IoT	- 1 PhD thesis ongoing on MAC layer scheduling optimization - NB-IoT (3GPP Rel'13) eNB developed by b<>com (SDR platform)	- Rel'17 NB-IoT support - NTN IoT field tests with partner using an existing GEO constellation
	LEO / 5G-NR broadband	Initial study of the rel'18 specifications	Leverage on bcom 5G-NR platform to demonstrate 5G NTN capabilities
	TN-NTN integration	Work not yet started	
AI	Application to Layer 1 real time receiver processing : time & frequency synchronization, channel estimation, equalization…	Research papers on AI use for PRACH preambule detection, time and frequency offset estimation	Leverage on bcom 5G-NR platform to introduce IA based innovations
	Optimization of 5G MAC scheduling : QoS management, slicing	1 PhD thesis completed on 5G resource allocation & scheduling in the context of 5G IAB, research papers	
New waveforms	Study new waveforms in the context of integrated sensing and communication (ISAC)	Research papers on OCDM, AFDM, OTFS	Design prototype / PoC
Sustainability	Power efficiency Use cases/KVIs (energy, agriculture, …)	Participation to SUSTAIN-6G SNS project	- Wireless optical communications PoC design (ongoing) - Demonstrate gnB L1 power optimization

b<>com

Radio Unit

b<>com

Distributed Unit

RLC
MAC
PHY

OPEN AIR INTERFACE

Centralized Unit

SDAP | RRC
MAC
PDCP

obvios.

free5GC

core network

eCPRI

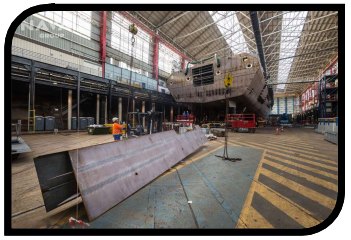
F1

container

NG

- n38 band (2.6GHz), TDD, 2Tx / 2Rx
- 40MHz bandwidth, cavity RF filter
- 2x37dBm output power, Digital Pre-distortion
- eCPRI Fronthaul, split 8 (7.2 under development)
- GNSS, GPSDO

- FR1 TDD duplexing
- Up to 100 MHz bandwidth
- 30kHz subcarrier spacing
- 2Tx 2Rx, 1 layer
- PHY: PSS/SSS, PBCH, PDCCH, PDSCH,PUCCH (F0), PUSCH, PRACH (A1/A2/A3)
- MAC: SIB1, RA procedure, dynamic UL/DL scheduler, SR handling



- **HORIZON-JU-SNS-2026-STREAM-B-01: Collection, Generation and Validation of Datasetssuitable for training AI Models for 6G Networks and for AIaaS**

- **HORIZON-JU-SNS-2026-STREAM-C-01: SNS experimental infrastructure**

<thanks>

eric.gatel@b-com.com