



Welcome back to the OpenAirInterface workshop !

For this new fall edition we have thought about giving a new shape for our bi-annual event. In fact, this workshop is the **first** where we at OAI, besides giving the status and roadmap update, are **showcasing our technology through demos and hands-on classroom sessions**.

Throughout this event, you will learn how to **build, deploy and run the OAI code – all hands-on**. We shall address all three project groups: 5G RAN, 5G CN & MOSAIC 5G.

Programming Tasks :

- Platform: Linux system
- Deployment target: “basic” deployment as described in the Lab1 of the workshop

Goal: The contestants should develop:

1. A simulation tool to test timing advance algorithm
2. This challenge is for OAI UE and rfsimulator, so the challenge require only a computer with Linux and OAI

Note: The organizer of the event will rank the submitted works of the participating teams based on the function completion and code execution efficiency. The top three teams will be awarded.

Copyright Notice: The copyright of all codes submitted by the contestants belongs to OpenAirInterface Software Alliance.

Operating environment:

During the development phase, developers need to build their own development environment, which must be compatible with the competition environment. A tutorial on how to have a developer environment is available [here](#)

Requirements for submission of works:

1. A git patch or a git branch from OAI RAN develop branch.
2. The submitted source code must be a non-obfuscated or encrypted version, with a clear and readable structure.
3. A description of how to compile and run, assuming the “Lab1” instructions are known and still applicable with your modification.
4. A demonstration of the system (screen record with voice comments) and a written analysis of the results and achievements. Please provide a link to the video in your email submission and please **do not attach the video**.
5. **The winning solution will then go through the OAI RAN Continuous Integration process in order to be fully integrated to the current source base.** This is a **FULL** requirement in order to receive the award compensation.



Programming Challenge (RAN5G): Mobility Channel Models Timing Advance

OAI Workshop Fall 2021 American and European Edition

Why participate?




1. Directly contribute to the world largest open source 5G project
2. Get big bonus and gifts
3. Get open-source contributor certification, your contribution will be recorded!





Awards

Awards are per team basis

- 1st prize: 1000 euros 
- 2nd prize: 700 euros 
- 3rd prize: 500 euros 

Team limit: 5 members per team

Validation of the solution: We will use the OAI 5G RF Simulator to validate the solution.

- **Starting point:**

- run the workshop tutorial with monolithic gNB
- the tutorial modifies in real time the parameter `noise_power_dB`

- The timing advance parameter is partially in place for you

- channel model parameter `offset`

- With your implementation, when we shift the samples, we should see the gNB start to send timing advance shift

- For this, enable L2 trace in wireshark with option `-opt.type wireshark` on nr-softmodem command line

- maybe the gNB doesn't implement it well, you may have to enhance the code

- The OAI UE will have to handle the order to counter balance the gNB TA order. Likely you

will have to make the TA control in UE

- **Test the 5G limits:**

1. Convert the offset in samples to physical distance

2. See if the UE can go beyond the maximum 5G standard cell range and what happen in this case

3. Move the UE by setting offset at a given ramp, equivalent to a UE speed

- See if the system can track the UE and when it loses it

- explain why we can go beyond the 5G 3GPP maximum speed

Evaluation:

We will evaluate your work based on the following criteria (not necessarily in the described order)

- Submit your code before the deadline.
- We will build your solution and test it as described above.
- We will evaluate your work by time consumption and correctness of your output.
- You will have another chance (only one) to re-submit your code before the deadline.
- After the deadline, we will work on the examination of your code. The final ranking will be based on the better result of your submission.

Reference: Current documentation on the channel model usage is available inside the repository at: <https://gitlab.eurecom.fr/oai/openairinterface5g/-/blob/develop/openair1/SIMULATION/TOOLS/DOC/rtusage.md>.

Important dates:



1) Deadline for Code Submission



2) Award notification
(might be delayed regarding the number of participants)

Submission process: by email

Contact: workshop@openairinterface.org