

The dual educational model at AEM: one year of challenges & lessons learned

AGENCIA ESPACIAL MEXICANA

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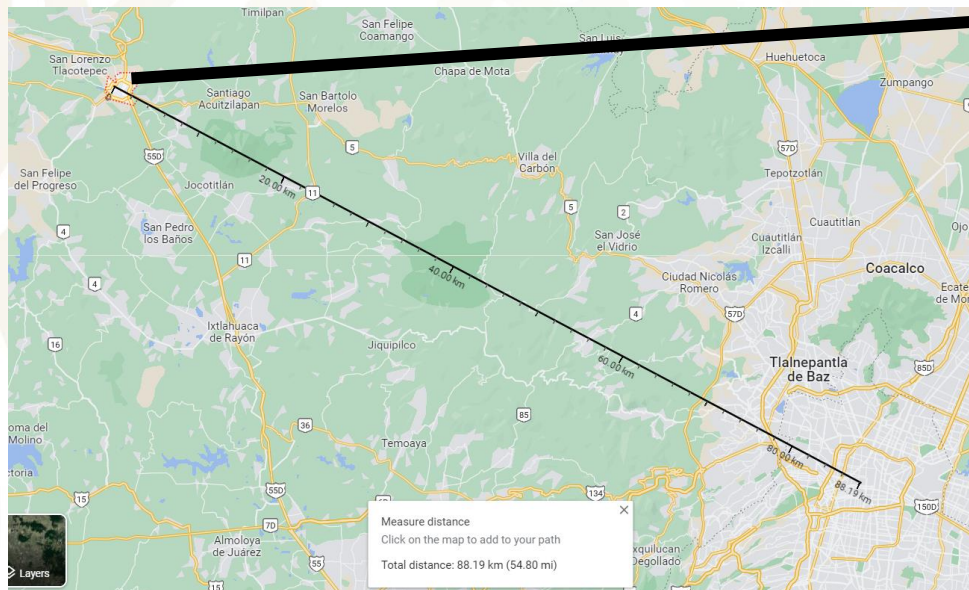
2023
AÑO DE
Francisco
VILLA

EL REVOLUCIONARIO DEL PUEBLO

Regional Centers for Space Development

CREDES EDOMEX, located ~ 120km from Mexico City, 3 laboratories:

- Experimental launch vehicles
- Image processing
- Satellite design & development



AEM CREDES EDOMEX.



What is dual educational model?

It involves three players: students, universities and public/private institutions.

Students spend time at private or public institutions, where they acquire engineering knowledge by be directly involved in professional activities. Moreover, they have their first contact with professional life.

This educational model is offered mainly by polytechnical universities and technological institutes.



Dual Educational Model Actors.

What have we done so far?

Agreement between AEM & Polytechnical University of Atlacomulco, which is a local university, to implement the pilot program with participations of students enrolled in robotics engineering and computer systems.

Legal &
administrative
frame.
Feb – Aug 2022

First review
50% of credits were obtained at AEM,
courses related to robotics were not
considered.
Students spend half-time at CREDES.
January 2023

Second year of
Educational
Model started.
September
2023

Pilot program
2 students
All credits were obtained at AEM.
Students spend full time at CREDES.
September 2022

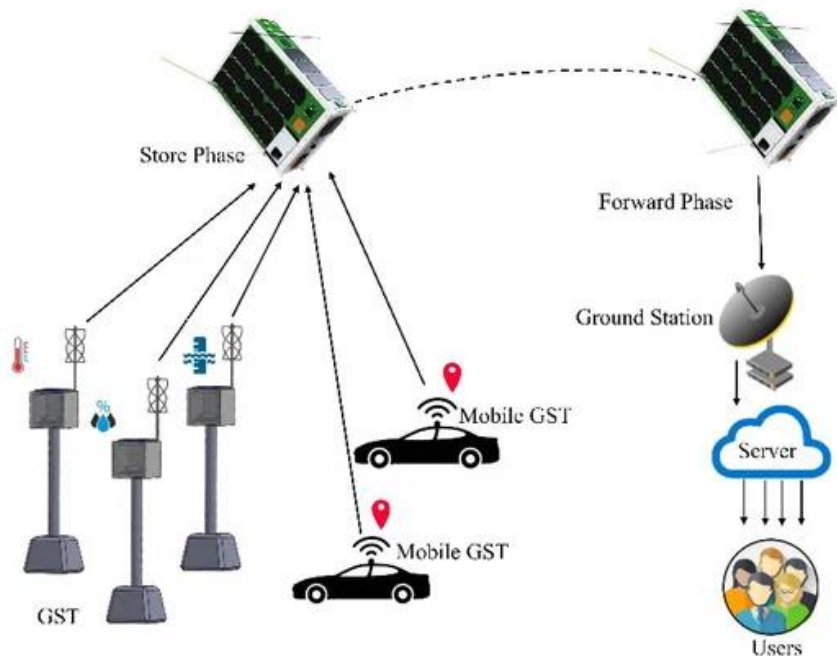
Pilot program
finished.
August 2023



Dual educational model implementation

Together with university professors, we seek for AEM projects which are suitable for students to acquire the required competencies.

The students are involved in three projects for 1 year, each project is supervised by a different AEM personnel.



Ground sensor terminal by Kyutech.



AEM Soldering Robot.

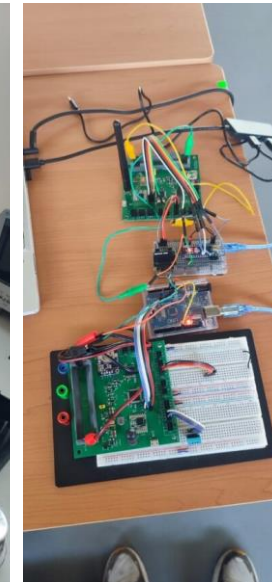
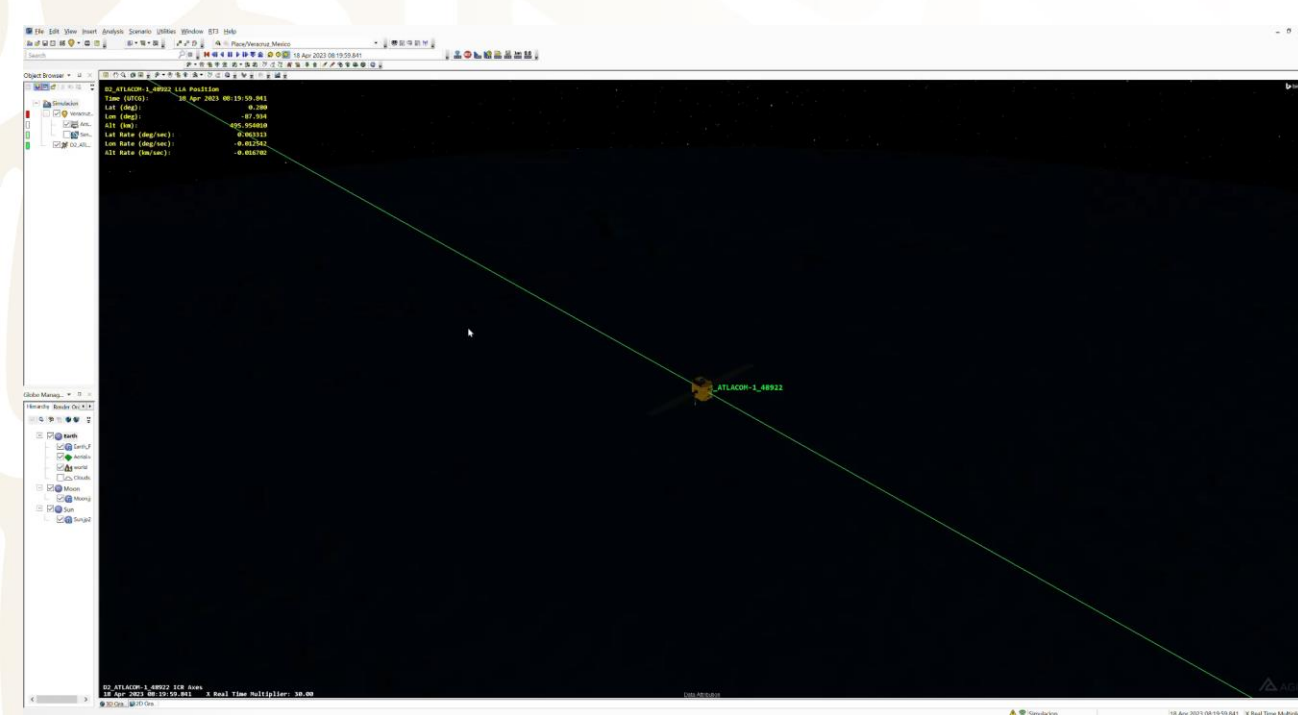


KIBO-RPC by UNOOSA.



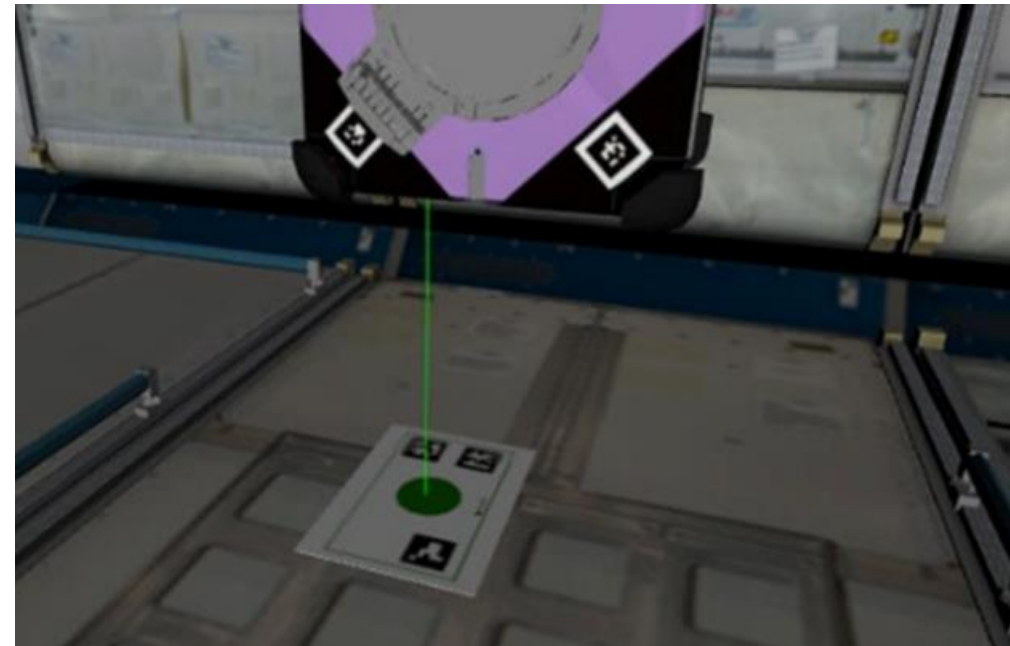
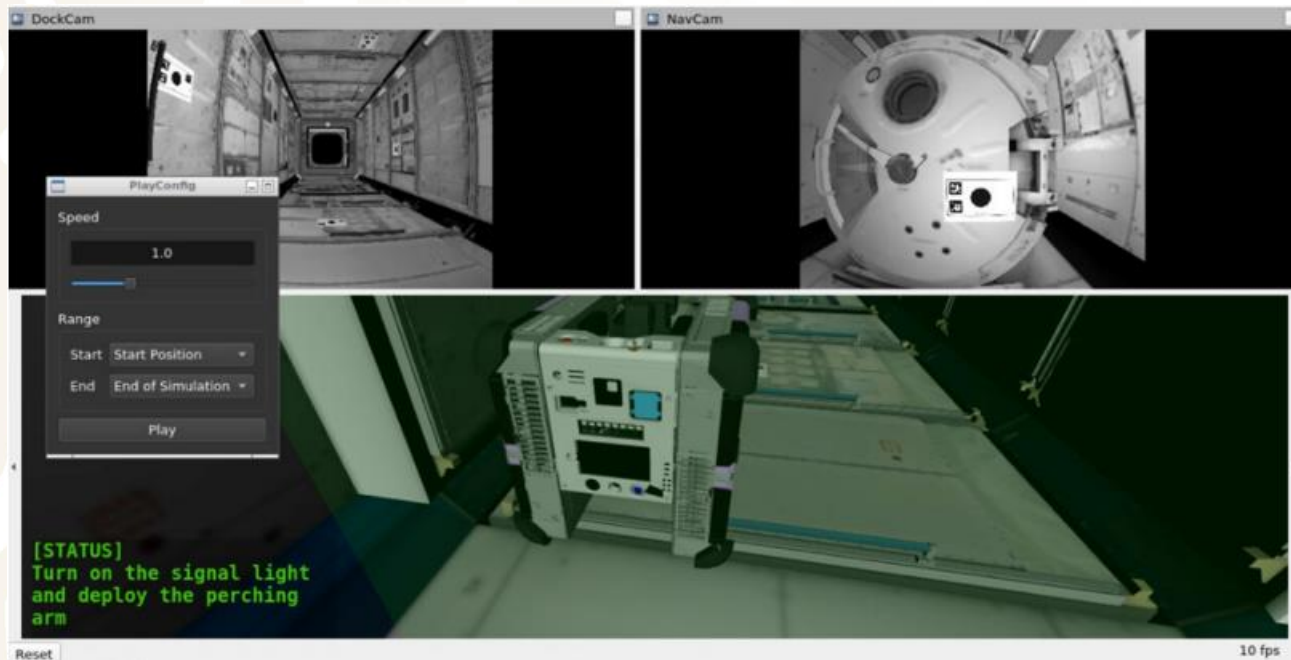
Dual educational model implementation

Ground sensor terminal: students used the information shared by Kyutech to develop the terminal. Skills such as: programming for embedded systems, mechanical design, analysis of electronic circuits, fundamental of orbital mechanics, among others.



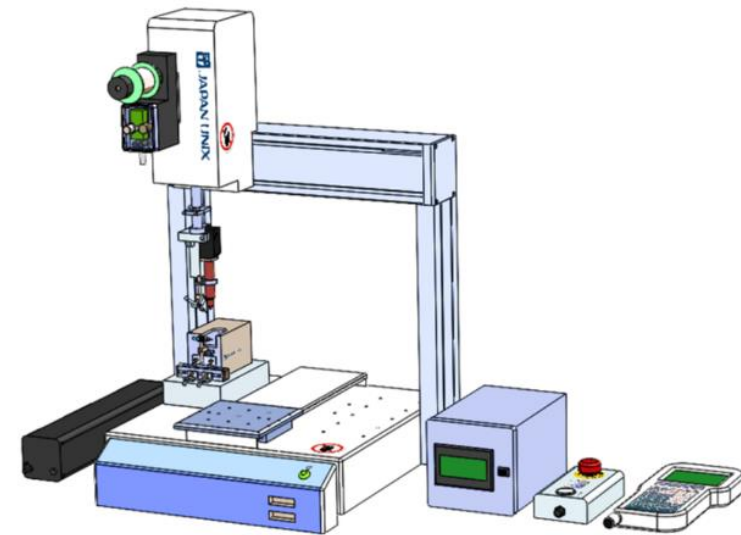
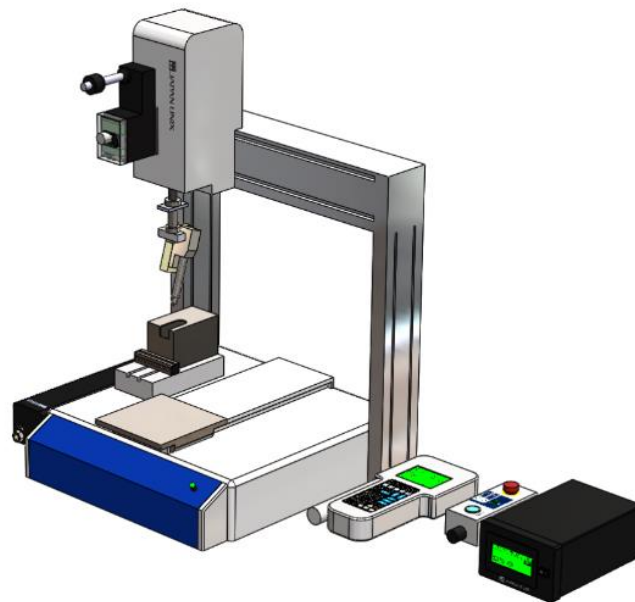
Dual educational model implementation

KIBO-RPC: the rules given by organizers were followed. Skills such as: programming, attitude motion, control systems, among others.



Dual educational model implementation

Robotic soldering: operate the robot and do reverse engineering to design some adaptors for specific applications. Skills such as: programming, soldering, mechanical design, mechanisms, among others.



What are our results?

The pilot program was successfully completed it on August 31st. Nowadays, both students are developing their graduation project; one at AEM, the other joined a company.

At this moment, there is no a comparative study between this model and the traditional one. However, we see some benefits:

- students have access to software and hardware that are not available at university.
- learning process is personalized.
- students got soft skills like time management, problem-solving, communication, among others.
- they learn how the company works; therefore, they have advantage in a recruitment process.



What have we face & learned?

Administrative process to buy components is slow, therefore hardware could be not available when is required.

Lack of fundamental engineering knowledge results in more time to develop the projects successfully.

It is difficult to substitute entire 1-year of curriculum, balance is important. We are still tuning...

AEM personnel are not teachers, they should put more effort to guide the students.

Self-learning students are more suitable for this model.

Students learn about space without noticing it.





Thank you!



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