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## FACT, An open project for SmallSat building capacity

The emergence of experimental nanosatellites and especially CubeSats for space exploration and experimentation, gives low-cost access to space technologies to emerging countries, such as Tunisia. In fact, CubeSats can be easily made since their components are widely available. Moreover, CubeSats have versatile applications in different domains, such as: communications, remote sensing for agriculture and territorial management, border and environmental risks surveillance, geolocation, etc.

On the other hand, the majority of space applications are within the scope of the National Research Priorities in Tunisia.

In fact, every space application involves one or more national priorities. As an example, space technologies in general and CubeSats in particular would help in: the digital and industrial transition (CubeSat prototypes and systems); securing energy, water, and food (space surveillance); Education (new profiles); etc. The space segment would also help in the implementation of new smart applications, such as smart cities, smart agriculture, smart transportation, IoT, etc., without the dependence on other countries.

For all these reasons, it is very important for Tunisia to start its first space project by making and testing CubeSats, which have a high Technology Readiness Level (TRL). This would also provide important capacity building in space technologies for students and engineers, which in turn would help in creating new jobs for new profiles. The project is based on open source software and hardware.

The FACT project : Fabrication and Application of CubeSats in Tunisia, Conducted by 4 partners: Research Centre, Academic Research Lab., Robot Compagny and National Centre for Earth Observation, would allow different specific objectives, such as:

- Acquiring the important concepts of space technologies having high economic added value applications, at relatively low costs.
- Capacity building of engineering, masters, and Ph.D. students in emerging technologies.
- Management of the research collaboration between the members of the consortium composed of a research center, a higher education and research institute, a private company, and a research center belonging to the Ministry of Defense.
- Implementation of CubeSat mounting and testing facilities that can be used for collaboration on other industrial aerospace projects (national or international).
- Help in the implantation of new aerospace companies (national or international) in Tunisia by providing qualified engineers in space technologies.
- Contribution to reinforce national Research and Innovation activities related to space technologies in accordance to different studies (OCDE, BERD, UN, ESCWA, and UNOOSA).

The FACT project would generate the following results:

- Acquisition and installation of high tech equipment that would allow the fabrication and testing of CubeSats in collaboration with the project partners.
- Upgrade the technical levels of researchers and engineers of the different consortium members by introduction of space technologies.
- Training on the “System Approach” used in developing a space mission (NASA documents)
- Research development of new electronic embedded systems and modules rated for space missions and space use
- Fabrication of the first Tunisian CubeSat prototype using national skills, which will give access to important international financing and collaboration on bigger projects.
- Help in the implantation of the space industry in Tunisia (in the Sousse Technopark in particular) and the

creation of new startups for the development of space modules and systems.

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