

LYCÉE RENÉ PERRIN

Building mini Airbus jets in the classroom with SolidWorks Education Edition



Lycée René Perrin, a French vocational-technical school, used SolidWorks Education Edition software to team up with schools from Germany, Hungary, and Spain to produce functional replicas of the Airbus A380 jet as part of the BAC Pro Machining Technician (TU) program.

The Lycée René Perrin is a French vocational-technical school that takes its name from René Perrin, a French engineer known for his development of the Ugine-Perrin process, a rapid method for casting steel. The educational institution offers several vocational training courses and certifications, including the BAC Pro Machining Technician (TU) program.

Due to the modernization of production systems and new organizational methods associated with the digital data chain, BAC Pro machining technicians must become fully proficient in the use of CAD and CAM technologies in order to operate in today's industrial environments. Holders of TU certificates are important contributors to the aviation industry and work for aircraft manufacturers, aeronautical suppliers, and aeronautical maintenance companies.

To provide TU students with real-world experience, Lycée René Perrin collaborated with vocational educational institutions in Germany, Hungary, and Spain to develop a unique study project to create four fully functional, 1:32 scale replicas of Airbus A380® passenger jets. The project was designed to be carried out over the course of two years, during the first and final years of the TU program, within a collaborative framework, with each school's team taking on distinct portions of the planes' design and production.

During the initial planning for the project, educators from each of the four vocational schools realized that creating and communicating the plane's design—as well as generating engineering drawings for production—represented the biggest challenge for such a multinational collaboration, according to Lycée René Perrin Mechanical Engineering Professor Marc Treillhou, who served as project manager. To overcome this challenge, the teaching team decided to use the SolidWorks® Education Edition design solution to develop design and production documentation.

Challenge:

Equip students at four European vocational-technical schools to design and build four fully functional, 1:32 scale replicas of Airbus A380 jets as part of the BAC Pro Machining Technician (TU) program.

Solution:

Leverage SolidWorks Education Edition software to execute every step of the project, from initial design and modeling to testing simulation, and manufacturing.

Results:

- Assembled and flew four mini Airbus A380 jets
- Drove teamwork across four vocational schools
- Supported two-year TU study project
- Facilitated cross-institutional collaboration

"At each stage of this project, a meeting of representatives from each institution was required to identify and resolve technical issues and monitor responsibilities and progress," Treillhou stresses. "We chose SolidWorks as our development platform because it is easy to use and provides the common 3D 'language' required to facilitate this type of project."

Exchanging skills, ideas, and responsibilities

Each educational institution was responsible for developing a part of the plane, so working in the common SolidWorks Education Edition design environment facilitated an exchange of skills, ideas, and responsibilities among all four partners. Lycée René Perrin students were not only responsible for managing the initial pilot study and overseeing the entire development cycle for the project, but also for designing and producing the front and rear landing gears for the planes.

The teamwork required for completing a project of this magnitude meant that students were compelled to consider other people's ideas, cultures, and ways of learning. The project involved a lot of sharing, which made the students more open to the input of their multinational partners. With SolidWorks as the common engineering thread, the students were able to collaborate successfully—across international and cultural borders—on a highly sophisticated development project.

"Using SolidWorks Education Edition software on this project allowed us to show our students the technical reality of a product development cycle on an international scale," Treillhou notes.

Paralleling real development cycles

Once the entire mini Airbus A380 plane had been modeled in SolidWorks software, the development cycle for the four mini planes paralleled steps and procedures followed in the development of real products. "The mechanical construction stages were exactly the same as those used in industry," Treillhou explains. "First, the students designed and modeled some of the landing gear parts. They then drew up the blueprint, output images of the overall design, and generated a comprehensive set of exploded view drawings for the overall assembly and each subassembly.

"The students then completed testing and analysis—using SolidWorks simulation capabilities—and made calculations with respect to material resistance and stresses on key parts. The goal was for the students to make the appropriate choices in terms of materials and mechanical components," Treillhou adds. "Manufacturing required the students to complete production processes, such as purchasing raw materials and scheduling."

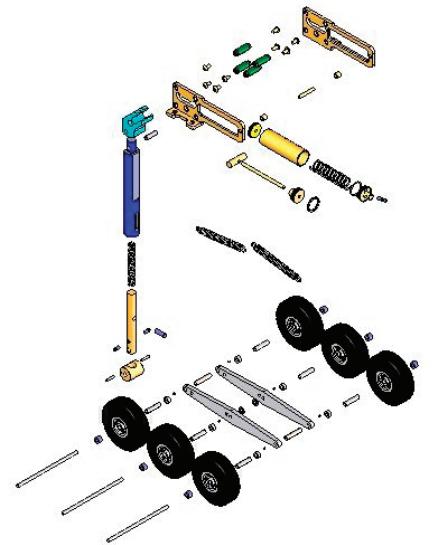
Flying on schedule

The collaborative, multinational educational effort culminated in the successful takeoff and landing of all four planes, whose maiden flights were attended by hundreds of spectators, including educational representatives, local dignitaries, and participating students.

"The students learned how to complete a comprehensive, collaborative product development cycle using SolidWorks software," Treillhou says. "This project was a concrete, realistic, and enriching experience that provides students with a real advantage as they pursue their future careers."

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Marc Treillhou
Mechanical Engineering Professor



This collaborative, multinational effort enabled students at four vocational-technical schools to gain valuable experience by paralleling the steps and procedures used to develop real products.



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