AÉRO MONTRÉAL

CASE STUDY COMPETITION 2020

Aerospace case study virtual competition held as part of Vitrines 2020

Devise a process to ensure better tool control during aircraft maintenance operations

Theme

Tomorrow's innovations in the MRO (Maintenance, Repair and Overhaul) sector: Ensuring reliable and efficient tool control during maintenance operations on commercial aircraft.

Introduction

MRO, or maintenance, repair and overhaul, is the sector of activity aimed at ensuring the safety and airworthiness of aircraft. Indeed, to comply with the legislation in force, an aircraft must undergo several inspections and repairs periodically, whether they are planned in advance by the manufacturer or in order to prevent failures. MRO also comes into play in the event of breakdowns during aircraft operation. In these cases, it is essential to quickly identify the problem in order to find a solution that can be certified by the authorities and implemented. Aircraft maintenance involves a multitude of trades, governed by standards regulated by Transport Canada. In Québec, many companies are involved in aircraft maintenance and repair, thus ensuring a reliable and safe airspace. Every day, several thousand technicians and engineers ensure the general condition of commercial, charter and military fleets.

A maintenance operation involves numerous steps, the complexity of which varies according to the type of maintenance to be carried out. In order to carry out any kind of repair, the operator will then have to use specific tools that enable it to carry out the task according to the process in effect.

The industry encounters problems when tools are not put back in its place after use. Simply put, this is a loss of efficiency in the process, which has an impact on the timing and cost of the repair.

In the worst-case scenario, tools may be forgotten in the aircraft structure. It is critical that any tools used in the aircraft are removed at the end of each maintenance operation. Any object left in the aircraft can have serious impacts. A simple screwdriver can block flight controls, pierce membranes, create short circuits, etc. It goes without saying that such an omission can cause serious consequences and be very costly for a maintenance company.

To prevent this problem, the industry has put in place some robust and safe processes. You are now being asked to find other innovative solutions or to improve existing solutions.

Objective

Rethink a tool control process during a long-lasting maintenance visit.

The proposed solution will have to take into account the safety aspect of developing the tool control process to ensure that after each operation on an aircraft, all tools are returned to their proper places.

The jury's attention will be focused on the originality and feasibility of the proposed process. Thus, the proposal will have to reflect the use of new technologies: artificial intelligence, digital technologies, etc. to facilitate the technician's work.

The team will have to demonstrate the commercial advantages that a company would have in implementing this new process to carry out the maintenance of its aircraft. The solutions will have to consider reducing costs for airlines and/or increasing their revenues.

Rules

Participants must be students enrolled in a CEGEP or university at the undergraduate or graduate level in Québec. Teams can be composed of 2 to 4 people.

A bonus point will be awarded to multidisciplinary teams. It is recommended that your team be composed of members from at least two different disciplines (e.g. engineering, administration, science, aircraft maintenance, marketing, materials and composites, etc.).

The selection of finalists will be based on the quality of the file submitted in the first stage of the selection process.

Elements to include in the proposal

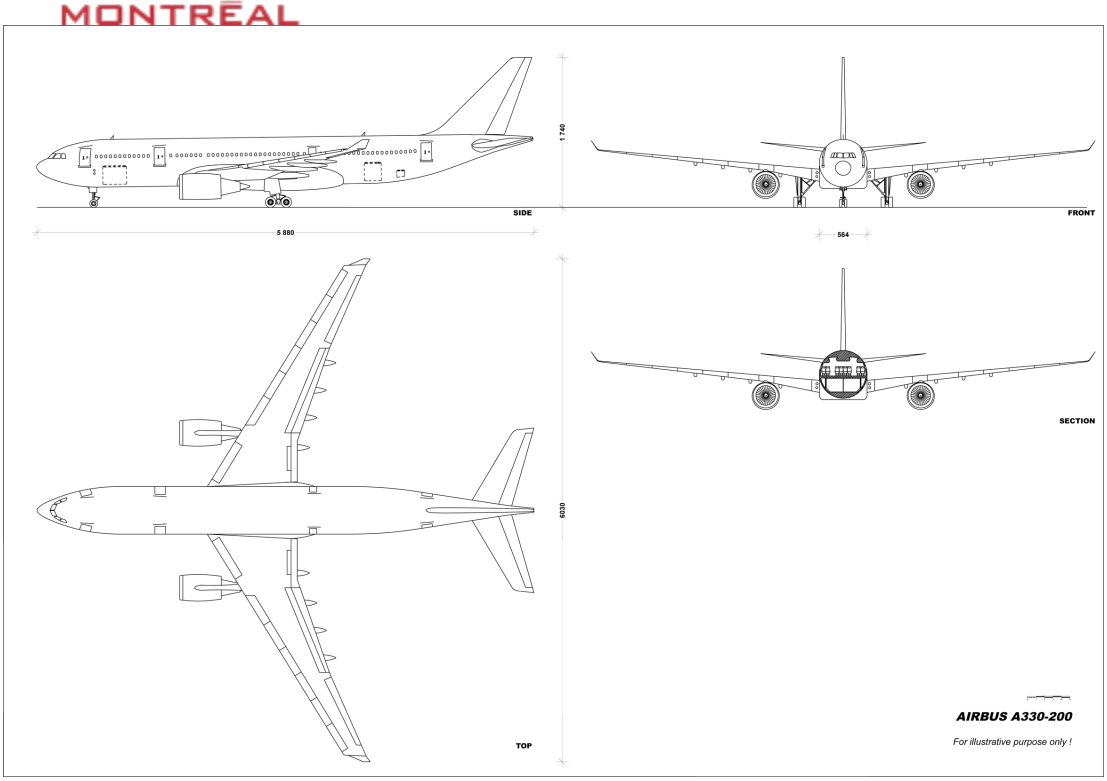
- Proposed solution and process;
- Profitability and development costs;
- Technical feasibility;
- Safety and reliability;
- Value proposition for the company – sales and marketing arguments for the proposed solution.
- Legal aspect of certification of the proposed solution

Constraints – Contextualization of the study

A flight to Montréal YUL will land at 2 p.m. on December 16. The aircraft is an A330-200 and requires a C-check maintenance visit. It has already happened that during this type of visit, tools have been left in the aircraft after the operation. In order for maintenance to be carried out successfully, without too much effort vis-à-vis the technicians and in the shortest possible time, you need to put in place a strategy to ensure that the tools used are both well calibrated when they are used, and stored in their place after use for the next maintenance operations so as not to compromise the aircraft's flying condition the next time it is used.

Reference aircraft– Airbus A330-200

Engines: 2 Rolls Royce Trent 772B
Fuel tank capacity: 111,272 kg (245,316 lbs.)
Cruising speed: 870 km/h (Mach 0.82)
Maximum take-off weight: 233,000 kg (509,042 lbs)
Overall length: 58.8 m (188' 8")
Wingspan: 60.3 m (197 ft 10 in)
Tail height: 17.4 m (57 ft 1 in)
Maximum distance travelled: 9,600 km (6,000 nautical miles)
Seats: Redesigned cabin: 345 (12 in Club Class and 333 in Economy Class) or 332 (12 in Club Class and 320 in Economy Class)



Evaluation grid

CRITERIA	DETAILS	SCORE GIVEN
Answer to the problem at hand	Does the proposed solution meet the challenge put forward and constraints?	**/5**
Innovation technique	Is the solution technically viable? Is it innovative and feasible?	**/5**
Profitability and commercial potential	Manufacturing and installation costs, investments required	**/5**
Quality of the presentation and answers to questions	Quality of the presentation, respect for allotted time, relevance of the answers to the jury's questions, creativity and dynamism.	**/5**
TOTAL		**/20**

+1 point will be awarded to multidisciplinary teams

How the competition will work

The competition will take place in two stages:

1. Receipt of submissions until midnight on December 7, 2020 and selection by the jury of the 3 finalist teams based on the quality of the submissions;
2. Remote presentation in front of a jury of experts on December 16, 2020 and announcement of the winning team during the Vitrines 2020 event.

Prize

The winning team will receive a $2,000 scholarship and a company visit. (*The date will be confirmed at a later date*).

Important dates

- **Starting on November 23, 2020** – Register your team by completing the online form on Eventbrite and registering all the participants in your team.
    - PDF format
    - Max. 5 pages excluding title page, table of contents and bibliography;
    - Possibility to add a maximum of 10 pages of annexes;
    - Cambria 12 font, 1.5 line spacing, standard margins;
    - Inclusion of photos, 3D rendering and diagrams is encouraged.

- **December 7 at midnight** : Deadline for applications to be sent to aeroportail@aeromontreal.ca

- **December 16**: Virtual grand finale on the occasion of "Vitrines 2020" day. The video conference presentation of each finalist team will be 15 minutes followed by a 10-minute question period. Presentations can be made in French or English.
  The winners will be announced on December 16 during Vitrines 2020 day.

Composition of the jury

- **Jean Trépanier, Director Quality & Technical Training, Air Transat**
- **Matthieu Duhaime, President & COO, Avianor**
- **Jean-Pierre Bastien, Executive VP Operations, Pole air**
- **Yves Patrice, Sales Manager Canada, Lufthansa Technik**
- **Julien Dorion, Repair Development Engineer, MRO Component Repair Engineering, Pratt & Whitney Canada**

Materials for the final presentation

- PowerPoint presentation in screen sharing
- Computer equipped with a camera and a working microphone