

# Application of the Theory of Constraints Reduced TAP Fleet Downtime by 21%

*As seen in jornalTAP 118 dezembro/janeiro 2015 29-31  
Translated by Travis F. Higgins, Clearbranch Consulting*

Airplanes only generate revenue when they are flying and not during the necessary time for aircraft inspections. Reducing this downtime, known as Turn Around Time (TAT), is a key factor for airlines and therefore a strategic focus for TAP Maintenance and Engineering (M&E). A priority for the Aircraft Maintenance group within M&E is achieving TAT reduction in heavy maintenance, specifically “C checks” which require the most downtime and resources. Aircraft Maintenance began an improvement project, “TAT das Checks”, in September 2012 focused on identifying opportunities for TAT reduction and achieving the resulting increase in availability. Initially, the focus was increasing productivity by optimizing support processes to handle an increased workload. However, Aircraft Maintenance realized that in order to reduce TAT, it would also be necessary to change the way work was organized in Production. To do so, they decided to test applying the Theory of Constraints (TOC) in the planning and management of physical and human resources in C checks.

## **Theory of Constraints**

According to Pedro Costa, manager of the Processes and Continuous Improvement team of M&E, TOC “is a continuous improvement process with the objective to increase the capacity of organizations by identifying the constraints that limit their performance”. Continued Pedro, “We applied TOC in M&E by focusing on the constraints in each phase of the C check, so that we could improve control over the critical path and handle the inherent uncertainties that exist in any aircraft inspection”. Pedro explained, “the key elements of TOC are a reduction in the amount of projects in work at any time (low WIP – Work in Process), decreased multitasking per plane, clear priorities within and across projects, the utilization of time buffers to monitor the critical path, and the accountability of managers in optimizing available resources”.

## **Increase in Aircraft Availability**

The implementation of TOC in Aircraft Maintenance started in May 2014 with the execution of a pilot project in hanger 5, a C3 check of TAP aircraft CS-TNS. The excellent results, with emphasis on a 30% TAT reduction, drove the decision to implement this methodology in aircraft inspections starting in September 2014. In the remaining months of the year, TOC was applied on 11 aircraft, 7 from the TAP fleet and 4 client aircraft (one from SATA and three from Brussels Airlines). In the last project status meeting that occurred on January 30th 2015, Maria João Cardosa, director of M&E Aircraft Maintenance, highlighted the “great results achieved” that allowed for “a significant TAT reduction for TAP and customer C checks”. She affirmed, “With the achieved reduction it was possible to increase the availability of the TAP fleet, positively impacting flight operations, and free up slots in the hanger to conduct customer C checks that generated a nice increase in revenue”.

## **Main Achievements**

Pedro Costa summarized the main achievements of the implementation, “It allowed for a C11 inspection of the aircraft CS-TTE to be conducted in-house, while also freeing up one more narrow-body to support TAP aircraft operations between October 29th and December 5th, due to the 21% TAT reduction of TAP

fleet aircraft. 448 Aircraft Maintenance employees (direct labor), responsible for more than 154,000 man-hours billed, as well as 65 indirect employees of different areas of M&E participated in the implementation, full or part-time, helping to overcome the change management challenge associated with this kind of project. In addition, M&E had 15 weeks of support from Realization, a consulting company specializing in TOC (five weeks for the pilot project and 10 for the full implementation).

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