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OPTIMIZATION OF BOARDING PROCESS ON REMOTE PARKING POSITIONS IN TERMINAL PUENTE AÉREO (BOG)

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1 PROBLEM DESCRIPTION

Avianca is the biggest airline in Bogotá, and its International Airport El Dorado, with 350 daily flights to national and international destinations. All national flights (60% of all flights) arrive and depart from Terminal Puente Aéreo (TPA). Since 2010, Avianca has had positive dynamic increasing its national flights each year, with new routes and aircrafts (Airbus 32S family and ATR72.)

Nevertheless, gates are not growing with same rhythm, thus, remote parking position have been used to supply Avianca's rising demand. On Time Performance (OTP) in remote parking positions, where a flight was classified as on time if it departed the gate within 15 minutes of the scheduled departure time, has a worst performance if it is compared with Gate positions.

These delays generate three undesirable consequences. First, they impact negative all network route and overall OTP. Second, they increase costs in function of overused GSE (Ground Support Equipment) and Staff. Finally, they could influence awfully customer willingness to fly with Avianca losing its leading position in Bogotá .

2 MODEL DEVELOPMENT, VALIDATION AND TESTS.

The main objective was found a alternative or a set of alternative which improve actual scenario of boarding process in parking remote positions, which belongs to critical path of flight's departure process. To reach this objective, next steps were taken:

- Data collection and indicators of actual performance: 42 random flights in a week was chosen to collect data and establish two system's performance indicators (SPI). First is Cycle Time (time lapse since boarding room is available until to flight's departure) which is 99.6 minutes and second is percentage of delay flights, departure time is major than schedule time.

- Simulation model and validation: Simulation model was build in *Rockwell Arena Enterprise.* It simulates 30 days with 73 daily flights which have maximum occupation. 15 replications was chosen to satisfy a error margin of 5%. To validate simulation model were made statistical hypothesis tests for 2 real SPI. Evidently, model simulation reflects adequately system reality.

- Solution alternatives tests: Five alternatives were tested subject to two constraints, costs and implementation easiness. First alternative is a system signaling improvement. Second is a imitation of gate's boarding process. Third is to implement better technology to board passengers in remote parking position. Fourth is a better distribution of boarding remote gates. Finally, fifth alternative is a coalescence among first and fourth alternative.

3 RESULTS

Five alternatives were tested in actual model with positive results over current scenario. Cycle Time and Percentage of delayed flights show some improvement (positive difference related to initial value) with first, fourth and fifth alternative (Figure 1).

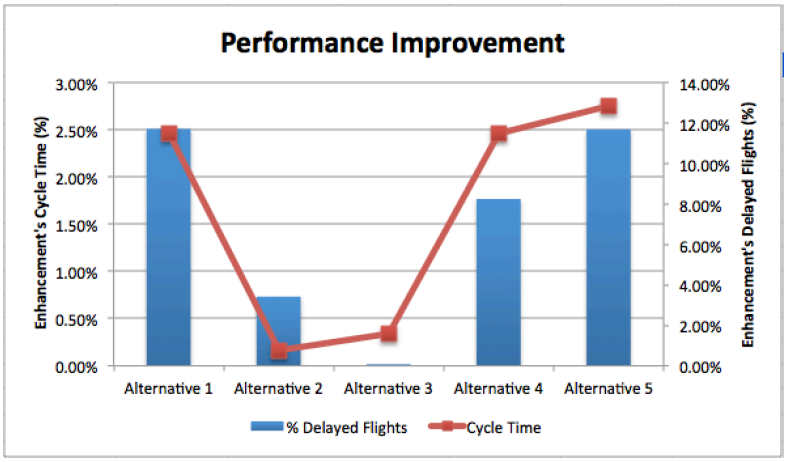

Figure 1. System's performance improvement (Percentage)

Statistical Hypothesis tests were applied to these five alternatives to choose final option to be implemented in real system. All choices were statistically significant expect second, so, it was not be chosen. Third preference has not a notable improvement and its implementation is expensive and difficult, thus, it was not selected. Final decision was implement fifth alternative in remote parking positions boarding process.

4 IMPLEMENTATION

Final option was applied in TPA. Staff was trained to guide correctly at passenger and different signaling were implemented in GSE to avoid mistakes in boarding process. Moreover, better distribution of remote boarding gates decreases customers' walking and waiting time. Cycle Time performance for each scenario, and its confidence's interval, can be seen in Figure 2.

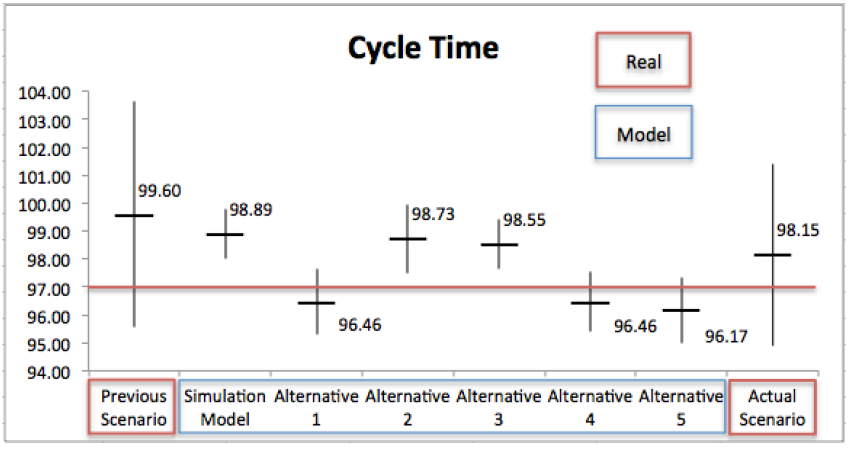

Figure 2. Cycle Time Performance (minutes)

In conclusion, actual Cycle Time (98.15) is not enough to achieve final goal (97 min) but it is better than initial data (99.6 min). Besides that, final variance is smaller than previous scenario improving OTP because Avianca has more flights departure on time. Moreover, it allows to show other issues in boarding process which they have been mapped with the objective to achieve a better customer quality service.