

Centre for Operations Excellence

Security Queuing Analysis and Staff Scheduling for a Canadian International Airport

Client Profile

The client manages the operation of Canada's second busiest airport. In 2001, the airport accommodated some 15.5 million passengers, approximately 229,000 tonnes of cargo, and 274,400 take-offs and landings. It is also the second largest international passenger gateway on the West Coast of North America.

Business Challenge

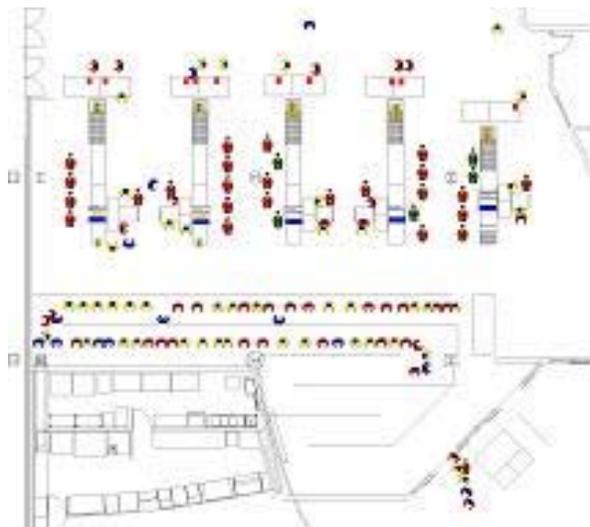
Following the events of September 11th, the Government of Canada created the Canadian Air Transport Security Authority (CATSA), which is responsible for several key aviation security services at all Canadian airports, including screening passengers before boarding (pre-board screening). At the airport, the client sought to institute a more rigorous pre-board screening process. The Centre for Operations Excellence (COE) was contacted to construct a simulation program to determine the ideal number of staff and X-ray machines to minimize passenger waiting time. The COE was also solicited to construct a staff-scheduling program to ensure optimal staffing levels.

Value Delivered

The COE contributed the following:

1. Identified bottlenecks in the current process and proposed screening and queuing changes.
2. In conjunction with the airport authority, determined optimal and achievable service levels.
3. Provided the airport authority with a prediction of screening demands.
4. Determined the optimal staff allocation and staffing levels for the airport pre-board screening.
5. Provided the airport authority with a simulation model, which can be used to determine staffing scenarios in the future.

The COE Approach



1. *Process Mapping*
The COE team conducted site visits and interviews and created process maps of the airport pre-board screening.
2. *Simulation*
The COE developed an animated simulation model to test different staffing scenarios based on different service levels. The model was validated against actual operations data collected by the COE team.
3. *Forecasting*
The COE predicted screening demands from flight schedules provided by the client and airlines.
4. *Queuing Theory*
The optimal staffing levels were determined by the COE.
5. *Linear Programming*
The COE team selected shifts to ensure optimal staffing levels.