

Testing Document – ELEC 477 – Lab 4

The testing strategy for this simulation was designed to cover the main functionalities introduced in this lab, specifically focusing on the leaving, and entering the Toronto airport through the 8nm barrier within a 0.5nm buffer zone or the 3000 ft barrier within a 500 ft buffer. The test cases below detail the meaning of the output corresponding to the validation of our implementation.

Simulation Setup

To view all the different query flights at once, the terminals were setup in the following manner:

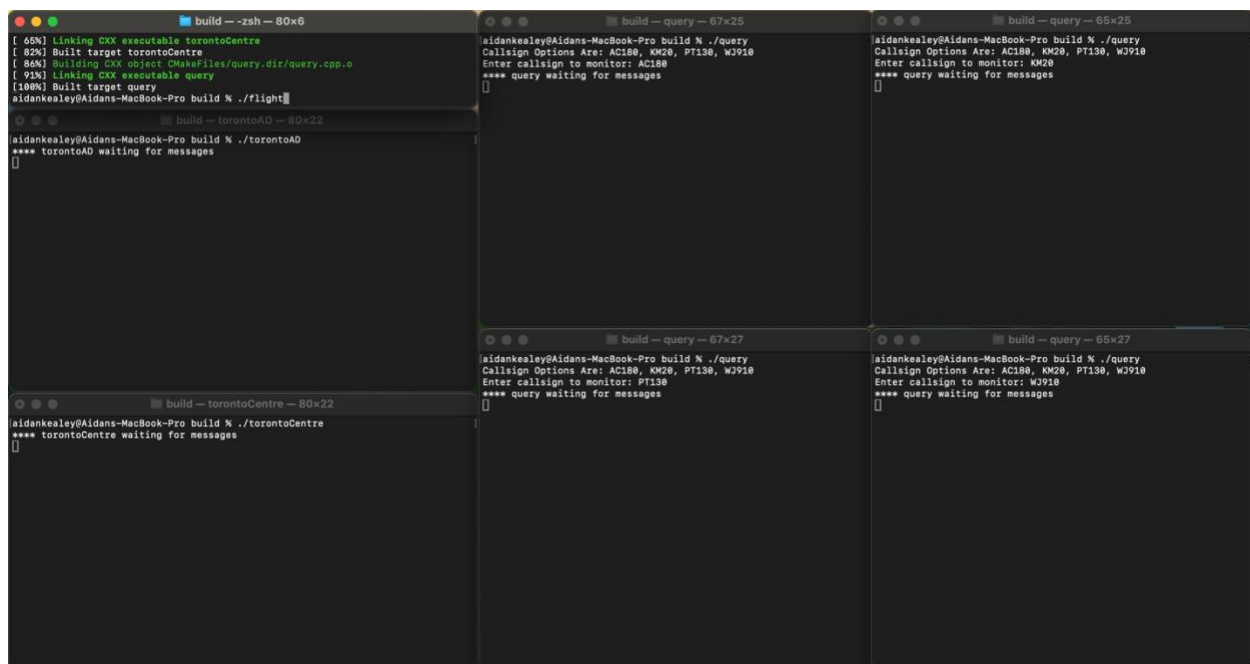


Figure 1: Simulation Setup (before running the program)

As seen by Figure 1, we have the Toronto AD and Toronto Centre terminals on the left side of the screen below the flights window, which will show all messages received by the controllers. Then on the right side of the screen are the 4 different queries for the 4 different planes: AC180, PT130, KM20, and WJ910.

The following displays the results after executing the simulation:

```
callsign PT138
unregistering flight AC188
unregistering flight KM28
unregistering flight PT138
unregistering flight WJ918
aidankealey@Aidans-MacBook-Pro build %

**** subTorontoAD received: 395
**** subTorontoAD received: 396
**** subTorontoAD received: 397
**** subTorontoAD received: 398
**** subTorontoAD received: 399
**** subTorontoAD received: 400
**** subTorontoAD received: 401
**** subTorontoAD received: 402
**** subTorontoAD received: 403
**** subTorontoAD received: 404
**** subTorontoAD received: 405
**** subTorontoAD received: 406
**** subTorontoAD received: 407
**** subTorontoAD received: 408
**** subTorontoAD received: 409
**** subTorontoAD received: 410
**** subTorontoAD received: 411
**** subTorontoAD received: 412
**** subTorontoAD received: 413
**** subTorontoAD received: 414
./torontoAD: no samples?
aidankealey@Aidans-MacBook-Pro build %

**** subTorontoCentre received: 395
**** subTorontoCentre received: 396
**** subTorontoCentre received: 397
**** subTorontoCentre received: 398
**** subTorontoCentre received: 399
**** subTorontoCentre received: 400
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**** subTorontoCentre received: 409
**** subTorontoCentre received: 410
**** subTorontoCentre received: 411
**** subTorontoCentre received: 412
**** subTorontoCentre received: 413
**** subTorontoCentre received: 414
./torontoCentre: no samples?
aidankealey@Aidans-MacBook-Pro build %

**** Received alert from TorontoCentre
| Flight : "AC188"
| Source : "zone:centre"
| Destination : "zone:AD"
| Timestamp : "1666331238"
aidankealey@Aidans-MacBook-Pro build %

**** Received alert from TorontoAD
| Flight : "PT138"
| Source : "zone:AD"
| Destination : "zone:centre"
| Timestamp : "1666331282"
aidankealey@Aidans-MacBook-Pro build %

**** Received alert from TorontoCentre
| Flight : "PT138"
| Source : "zone:centre"
| Destination : "zone:AD"
| Timestamp : "1666331866"
aidankealey@Aidans-MacBook-Pro build %

**** Received alert from TorontoAD
| Flight : "WJ918"
| Source : "zone:AD"
| Destination : "zone:centre"
| Timestamp : "1666331238"
aidankealey@Aidans-MacBook-Pro build %
```

Figure 2: Simulation Setup (after running the program)

From the simulation setup, to see each test case, we simply can zoom in to where the respective boundary alert, alert receive and query take place for a specific plane.

Test Case 1: Aircraft leaving Toronto AD by crossing the 8nm barrier.

Toronto AD:

```
**** subTorontoAD received: 70
----TorontoAD Boundary Alert----

Aircraft leaving Toronto AD by crossing the 8nm barrier
| Flight : "PT130"
| Distance from airport : "7.91772nm"
| The plane is heading AWAY from the airport
| Geo Altitude : "2000ft"
**** subTorontoAD received: 71
```

Toronto Centre:

```
**** subTorontoCentre received: 72

**** Received alert from TorontoAD
| Prepare for "PT130" transfer
| Flight : "PT130"
| Source : "zone::AD"
| Destination : "zone::centre"
| Timestamp : "1656331282"

**** subTorontoCentre received: 73
```

Query:

```
**** Received alert from TorontoAD
| Flight : "PT130"
| Source : "zone::AD"
| Destination : "zone::centre"
| Timestamp : "1656331282"
```

Test Case 2: Aircraft entering Toronto AD by crossing the 8nm barrier.

Toronto AD:

```
**** subTorontoAD received: 60

**** Received alert from TorontoCentre
| Prepare for "PT130" transfer
| Flight : "PT130"
| Source : "zone::centre"
| Destination : "zone::AD"
| Timestamp : "1656331270"

**** subTorontoAD received: 61
```

Toronto Centre:

```
**** subTorontoCentre received: 58

----TorontoCentre Boundary Alert----

Aircraft entering Toronto AD by crossing the 8nm barrier
| Flight : "PT130"
| Distance from airport : "8.45516nm"
| The plane is heading TOWARDS the airport
| Geo Altitude : "2000ft"

**** subTorontoCentre received: 59
```

Query:

```
aidankealey@Aidans-MacBook-Pro build % ./query
Callsign Options Are: AC180, KM20, PT130, WJ910
Enter callsign to monitor: PT130
**** query waiting for messages

**** Received alert from TorontoCentre
| Flight : "PT130"
| Source : "zone::centre"
| Destination : "zone::AD"
| Timestamp : "1656331270"
```

Test Case 3: Aircraft leaving Toronto AD by ascending through 3000 feet.

Toronto AD:

```
**** subTorontoAD received: 28

----TorontoAD Boundary Alert----

Aircraft leaving Toronto AD by ascending through 3000ft
| Flight : "WJ910" -- is climbing
| Distance from airport : "1.73153nm"
| The plane is heading AWAY from the airport
| Geo Altitude : "2587.48ft"

**** subTorontoAD received: 29
```

Toronto Centre:

```
**** subTorontoCentre received: 28

**** Received alert from TorontoAD
| Prepare for "WJ910" transfer
| Flight : "WJ910"
| Source : "zone::AD"
| Destination : "zone::centre"
| Timestamp : "1656331238"

**** subTorontoCentre received: 29
```

Query:

```
aidankealey@Aidans-MacBook-Pro build % ./query
Callsign Options Are: AC180, KM20, PT130, WJ910
Enter callsign to monitor: WJ910
**** query waiting for messages

**** Received alert from TorontoAD
| Flight : "WJ910"
| Source : "zone::AD"
| Destination : "zone::centre"
| Timestamp : "1656331238"
```

Test Case 4: Aircraft entering Toronto AD by descending through 3000 feet.

Toronto AD:

```
**** subTorontoAD received: 20

**** Received alert from TorontoCentre
| Prepare for "AC180" transfer
| Flight : "AC180"
| Source : "zone::centre"
| Destination : "zone::AD"
| Timestamp : "1656331230"

**** subTorontoAD received: 21
```

Toronto Centre:

```
**** subTorontoCentre received: 19

----TorontoCentre Boundary Alert----

Aircraft entering Toronto AD by descending through 3000ft
| Flight : "AC180"
| Distance from airport : "3.4598nm"
| The plane is heading TOWARDS the airport
| Geo Altitude : "3487.54ft"

**** subTorontoCentre received: 20
```

Query:

```
Callsign Options Are: AC180, KM20, PT130, WJ910
Enter callsign to monitor: AC180
**** query waiting for messages

**** Received alert from TorontoCentre
| Flight : "AC180"
| Source : "zone::centre"
| Destination : "zone::AD"
| Timestamp : "1656331230"
```