Sightseer evtol simulation

Release notes

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# 1 GITHUB source code and documents

<https://github.com/andymancan2/evtol_sightseer_sim>

GIT HUB Notes:

* Code is viewable in HTML “exportToHtml” folder.
* This doc is documents folder “Sightseer evtol simulation release notes”

# 2 Additional simulation notes

Don’t plan to re-state the original evtol simulation take home assignment.

* The passengers are viewed as sightseers in regards to scheduling.
* A random # of passengers between 1 and 5 is selected for a mission.
* A best fit of available vehicles is attempted. Example: a single passenger mission may pick a Delta or Echo company, since these companies have a max capacity is 2.
* The simulation is conducted on a 1 minute interval including:
  + Getting a vehicle in flight (1 a minute), so the first 20 minutes can have 20 missions started.
  + For flight safety a mission will end with less than 1 minute battery capacity.
  + For flight safety a mission will overcharge the battery by a fractional minute.

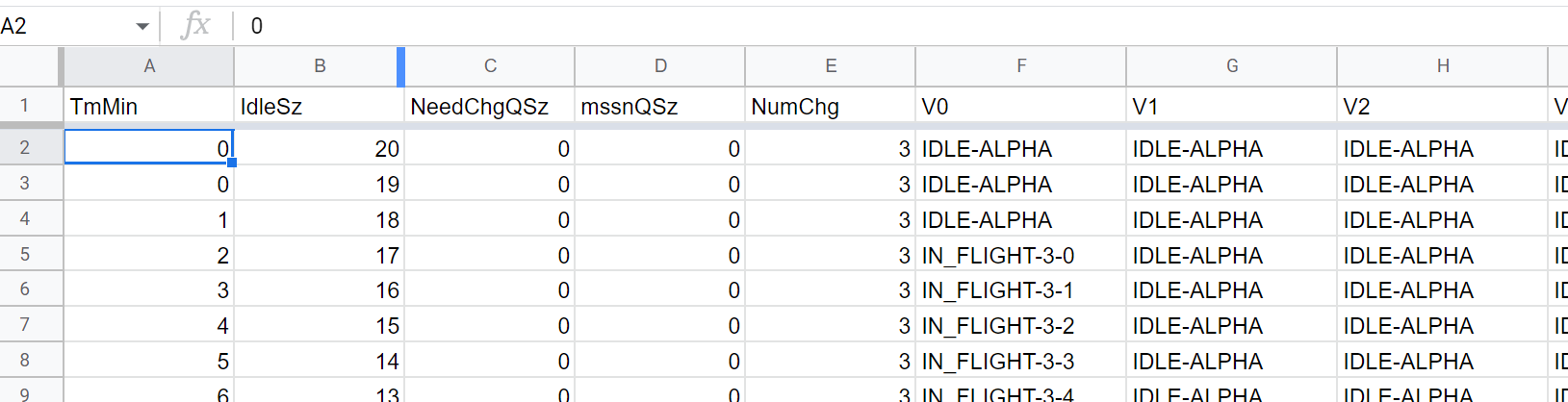
# 

# 3 Log file (documents folder)

Filenames:

simLog.tsv (tab separated)

simLog.xlsx (google sheets).



TmMin column shows the minute tick for the simulation.

IdleSz shows the size of the queue of idle vehicles.

NeedChgQSz shows the size of the queue of vehicles that need charging.

mssnQSz shows the size of mission queue that can grow to 20.

numChg shows the number of chargers available.

V0, V1, V2,...V19 shows the state of vehicle.

“IN\_FLIGHT-3-1” : Vehicle is in flight with 3=3 passengers, 1-1 minute of flight time.

# 4 Full program output.

This contains both unit-tests and simulation results. I bolded the simulation results, which several pages down..

Hello, World!

Exception caught:0

Exception caught:1

Exception caught:2

Exception caught:3

evol properties:tst

cruise speed: 1

bat kwh: 2

time to charge hrs: 3

energy use kwh/mile: 1

max passengers: 5

fault probability per hour: 7

max distance: 2

max cruise hrs: 2

evol properties:alpha

cruise speed: 120

bat kwh: 320

time to charge hrs: 0.6

energy use kwh/mile: 1.6

max passengers: 4

fault probability per hour: 0.25

max distance: 200

max cruise hrs: 1.66667

evol properties:ALPHA

cruise speed: 120

bat kwh: 320

time to charge hrs: 0.6

energy use kwh/mile: 1.6

max passengers: 4

fault probability per hour: 0.25

max distance: 200

max cruise hrs: 1.66667

evol properties:BRAVO

cruise speed: 100

bat kwh: 100

time to charge hrs: 0.2

energy use kwh/mile: 1.5

max passengers: 5

fault probability per hour: 0.1

max distance: 66.6667

max cruise hrs: 0.666667

evol properties:CHARLIE

cruise speed: 160

bat kwh: 220

time to charge hrs: 0.8

energy use kwh/mile: 2.2

max passengers: 3

fault probability per hour: 0.05

max distance: 100

max cruise hrs: 0.625

evol properties:DELTA

cruise speed: 90

bat kwh: 120

time to charge hrs: 0.62

energy use kwh/mile: 0.8

max passengers: 2

fault probability per hour: 0.22

max distance: 150

max cruise hrs: 1.66667

evol properties:ECHO

cruise speed: 30

bat kwh: 150

time to charge hrs: 0.3

energy use kwh/mile: 5.8

max passengers: 2

fault probability per hour: 0.61

max distance: 25.8621

max cruise hrs: 0.862069

Perform visual inspection that above print statements match the company specs.

Alpha name = ALPHA

kCompany: 0

kBattKwh: 320

cruise min energy: 3.2

vFlightMins = 98

vChargeMins:36

charge per min: 8.88889

kCompany: 1

kBattKwh: 100

cruise min energy: 2.5

vFlightMins = 38

vChargeMins:12

charge per min: 8.33333

kCompany: 2

kBattKwh: 220

cruise min energy: 5.86667

vFlightMins = 36

vChargeMins:48

charge per min: 4.58333

kCompany: 3

kBattKwh: 120

cruise min energy: 1.2

vFlightMins = 98

vChargeMins:38

charge per min: 3.22581

kCompany: 4

kBattKwh: 150

cruise min energy: 2.9

vFlightMins = 50

vChargeMins:18

charge per min: 8.33333

company = 0

rndVehiclesLeftCnt = 15

company = 1

rndVehiclesLeftCnt = 11

company = 2

rndVehiclesLeftCnt = 6

company = 3

rndVehiclesLeftCnt = 4

rndVehCntByCompany: 5, 4, 5, 2, 4

v size = 0

company = 0

rndVehCntByCompany[ company ] = 5

v size = 5

company = 1

rndVehCntByCompany[ company ] = 4

v size = 9

company = 2

rndVehCntByCompany[ company ] = 5

v size = 14

company = 3

rndVehCntByCompany[ company ] = 2

v size = 16

company = 4

rndVehCntByCompany[ company ] = 4

v size = 20

v size = 20

**Display vehicle statistics for simulation results.**

**Random seed used for allocating mix of evotl companies: 0**

**Random seed used for starting the simulation: 1000**

**Vehicle: V0, Company: ALPHA, numFlights: 1, numCharges: 0**

**Average flight time per flight (minutes) = 99.000000**

**Average distance traveled per flight (miles) = 198.000000**

**Average time charging per charge session (minutes) = No charge cycles were found.**

**Total number of faults = 1**

**Total number of passenger miles = 594**

**Vehicle: V1, Company: ALPHA, numFlights: 1, numCharges: 0**

**Average flight time per flight (minutes) = 99.000000**

**Average distance traveled per flight (miles) = 198.000000**

**Average time charging per charge session (minutes) = No charge cycles were found.**

**Total number of faults = 0**

**Total number of passenger miles = 594**

**Vehicle: V2, Company: ALPHA, numFlights: 1, numCharges: 0**

**Average flight time per flight (minutes) = 99.000000**

**Average distance traveled per flight (miles) = 198.000000**

**Average time charging per charge session (minutes) = No charge cycles were found.**

**Total number of faults = 1**

**Total number of passenger miles = 594**

**Vehicle: V3, Company: ALPHA, numFlights: 1, numCharges: 0**

**Average flight time per flight (minutes) = 99.000000**

**Average distance traveled per flight (miles) = 198.000000**

**Average time charging per charge session (minutes) = No charge cycles were found.**

**Total number of faults = 0**

**Total number of passenger miles = 594**

**Vehicle: V4, Company: ALPHA, numFlights: 1, numCharges: 0**

**Average flight time per flight (minutes) = 99.000000**

**Average distance traveled per flight (miles) = 198.000000**

**Average time charging per charge session (minutes) = No charge cycles were found.**

**Total number of faults = 0**

**Total number of passenger miles = 198**

**Vehicle: V5, Company: BRAVO, numFlights: 2, numCharges: 2**

**Average flight time per flight (minutes) = 39.000000**

**Average distance traveled per flight (miles) = 65.000000**

**Average time charging per charge session (minutes) = 13.000000**

**Total number of faults = 0**

**Total number of passenger miles = 325**

**Vehicle: V6, Company: BRAVO, numFlights: 2, numCharges: 1**

**Average flight time per flight (minutes) = 39.000000**

**Average distance traveled per flight (miles) = 65.000000**

**Average time charging per charge session (minutes) = 13.000000**

**Total number of faults = 0**

**Total number of passenger miles = 520**

**Vehicle: V7, Company: BRAVO, numFlights: 2, numCharges: 1**

**Average flight time per flight (minutes) = 39.000000**

**Average distance traveled per flight (miles) = 65.000000**

**Average time charging per charge session (minutes) = 13.000000**

**Total number of faults = 0**

**Total number of passenger miles = 325**

**Vehicle: V8, Company: BRAVO, numFlights: 1, numCharges: 1**

**Average flight time per flight (minutes) = 39.000000**

**Average distance traveled per flight (miles) = 65.000000**

**Average time charging per charge session (minutes) = 13.000000**

**Total number of faults = 0**

**Total number of passenger miles = 260**

**Vehicle: V9, Company: CHARLIE, numFlights: 2, numCharges: 1**

**Average flight time per flight (minutes) = 37.000000**

**Average distance traveled per flight (miles) = 98.666667**

**Average time charging per charge session (minutes) = 49.000000**

**Total number of faults = 0**

**Total number of passenger miles = 296**

**Vehicle: V10, Company: CHARLIE, numFlights: 1, numCharges: 1**

**Average flight time per flight (minutes) = 37.000000**

**Average distance traveled per flight (miles) = 98.666667**

**Average time charging per charge session (minutes) = 49.000000**

**Total number of faults = 0**

**Total number of passenger miles = 98.6667**

**Vehicle: V11, Company: CHARLIE, numFlights: 2, numCharges: 1**

**Average flight time per flight (minutes) = 37.000000**

**Average distance traveled per flight (miles) = 98.666667**

**Average time charging per charge session (minutes) = 49.000000**

**Total number of faults = 0**

**Total number of passenger miles = 394.667**

**Vehicle: V12, Company: CHARLIE, numFlights: 2, numCharges: 1**

**Average flight time per flight (minutes) = 37.000000**

**Average distance traveled per flight (miles) = 98.666667**

**Average time charging per charge session (minutes) = 49.000000**

**Total number of faults = 0**

**Total number of passenger miles = 394.667**

**Vehicle: V13, Company: CHARLIE, numFlights: 2, numCharges: 1**

**Average flight time per flight (minutes) = 37.000000**

**Average distance traveled per flight (miles) = 98.666667**

**Average time charging per charge session (minutes) = 49.000000**

**Total number of faults = 0**

**Total number of passenger miles = 394.667**

**Vehicle: V14, Company: DELTA, numFlights: 1, numCharges: 0**

**Average flight time per flight (minutes) = 99.000000**

**Average distance traveled per flight (miles) = 148.500000**

**Average time charging per charge session (minutes) = No charge cycles were found.**

**Total number of faults = 0**

**Total number of passenger miles = 148.5**

**Vehicle: V15, Company: DELTA, numFlights: 1, numCharges: 0**

**Average flight time per flight (minutes) = 99.000000**

**Average distance traveled per flight (miles) = 148.500000**

**Average time charging per charge session (minutes) = No charge cycles were found.**

**Total number of faults = 0**

**Total number of passenger miles = 148.5**

**Vehicle: V16, Company: ECHO, numFlights: 1, numCharges: 1**

**Average flight time per flight (minutes) = 51.000000**

**Average distance traveled per flight (miles) = 25.500000**

**Average time charging per charge session (minutes) = 19.000000**

**Total number of faults = 2**

**Total number of passenger miles = 25.5**

**Vehicle: V17, Company: ECHO, numFlights: 2, numCharges: 1**

**Average flight time per flight (minutes) = 51.000000**

**Average distance traveled per flight (miles) = 25.500000**

**Average time charging per charge session (minutes) = 19.000000**

**Total number of faults = 0**

**Total number of passenger miles = 51**

**Vehicle: V18, Company: ECHO, numFlights: 1, numCharges: 1**

**Average flight time per flight (minutes) = 51.000000**

**Average distance traveled per flight (miles) = 25.500000**

**Average time charging per charge session (minutes) = 19.000000**

**Total number of faults = 1**

**Total number of passenger miles = 25.5**

**Vehicle: V19, Company: ECHO, numFlights: 1, numCharges: 1**

**Average flight time per flight (minutes) = 51.000000**

**Average distance traveled per flight (miles) = 25.500000**

**Average time charging per charge session (minutes) = 19.000000**

**Total number of faults = 0**

**Total number of passenger miles = 25.5**

**Process finished with exit code 0**

# 5 High-level-design

