FLIGHT-X MAIN OPTIONS

** LOAD AIRPLANE (see database) **

- **Performance Charts**
  - Aerodynamics
  - Specific Air Range
    - All Engines operating
      - **Enter: [Atmospheric temperature, winds, weight intervals]**
    - One Engine inoperative
      - **Enter: [Atmospheric temperature, winds, weight intervals]**
    - Centre of gravity effect
  - Engine Envelopes
    - **Enter: [Mach number]**
  - Flight Envelopes
  - Propeller
  - WAT (take-off)
    - **Enter: [wind speed]**
    - Change other default parameters:
      - [Runway condition, tyre slip ratio, runway gradient, flap, CG position]
  - Balanced Field Length
    - Single-point Balanced Field Length
      - Option to change the following:
        - [GTOW, runway conditions, tyre slip ratio, airfield altitude, winds, air temperature, runway gradient, flap setting, CG position]
    - Balanced Field Length charts
  - Payload-range
    - **Enter: [cruise winds]**
  - Economic Mach number
  - CG effects
  - Buffet Boundaries
  - Specific Excess Power
  - Go-Around Charts
    - **Enter: [AUW, altitude AGL, flight path angle, wind, temperature, OEW]**
  - Atmosphere-Speed Charts
    - Pressure-altitude versus geo-potential altitude
    - Altitude-TAS-CAS-Mach
  - Holding Charts
    - **Enter: [Altitude, time, air temperature, GPS coordinates]**
    - **Enter: Flight into dust cloud or volcanic ash [Y/N]**
  - Maximum Descent Rates
  - V-n Diagram
  - Climb Polar
  - Longitudinal Trim
  - Gust Response
  - Aircraft Volumes
- **Mission Analysis**
  - Fuel Planning

- Required range
  - **Enter: [Origin/destination GPS coordinates; Required stage length]**
- Required bulk payload
- Required passenger load
- Atmospheric winds
  - Cruise winds
  - Take-off & climb-out winds
  - Approach & landing winds
  - Change ATM Wind-speed profiles
- Air temperature
  - Standard day, uniform deviation, arctic temperature model
- Relative humidity
- Aerodynamic deterioration
- Engine deterioration
- Other flight parameters (options)
  - Continuous descent approach
  - Perfect flight trajectory
  - Taxi-in time
  - Taxi-out time
  - Engine derating
  - Time delay for flap deployment
  - Final approach glide slope
  - Runway state (both take-off/landing)
  - Airfield altitude
  - Turn in climb-out
  - Flight level separation
  - Noise arrays extension
- Aircraft Range
  - Passenger load (*not available for cargo and drone-type aircraft*)
  - Bulk load
  - Fuel load
- Endurance
  - Passenger load (*not available for cargo and drone-type aircraft*)
  - Bulk load
  - Fuel load
- Matrix Fuel-Plan
- Equal-Time Point
  - → Same Options as Fuel Planning
- Fly generic trajectory
  - Fly generic cruise trajectory
  - Fly into dust cloud/atmosphere
    - **Parse DUST cloud file (see separate documentation)**
  - **ADS-B trajectory (see separate documentation)**
- Modify airplane configuration

- **Aircraft Noise**
  - Take-off & Departure
  - Arrival & Landing
  - Arbitrary trajectory
    - **Enter filename with trajectory data**
  - Noise footprints

- Take-off/departure
  - Select grid
    - Self-generated
      - **Enter: [x-dimension; y-dimension; mesh resolution]**
      - Ignore atmospheric winds: Yes/No
    - Externally generated
      - **Enter:**
        - Trajectory file name
        - Ignore atmospheric winds: Yes/No
        - Ignore MIK outside build-up area: Yes/No
        - Restart footprint (if available): Yes/No
- Arrival/landing
  - Select grid
    - Self-generated
      - **Enter: [x-dimension; y-dimension; mesh resolution]**
      - Ignore atmospheric winds: Yes/No
    - Externally generated
      - **Enter**
        - Trajectory file name
        - Ignore atmospheric winds: Yes/No
        - Ignore MIK outside build-up area: Yes/No
- Departure + Landing
- Ground properties
  - **Enter option: [Snow, grass, Sand, Water, Tarmac/concrete]**
- Atmospheric turbulence properties
  - **Enter Option: [Still air, moderately still, moderate, turbulent]**
- **Post-Processing Operations**
  - Difference between Noise Footprints
  - Translate Noise Footprint
    - **Enter Longitudinal shift**
  - Remove isolated points of "silence"
- Stacking patterns
  - Footprint: Single take-off and landing
  - Footprint: Multiple take-offs and landings
    - **Enter: [time separation between landings; 3D trajectories]**
    - Output option: raw SPL [dB], OASPL [dBA]
  - Trajectory: Multiple flights
    - **Enter: configuration filename**
- Directivity analysis
  - **Enter: filename with case data**
- Options, Utilities and Defaults
  - Options include the following:
    - Parameter sensitivity analysis
      - **Single-parameter perturbation**
      - **Multiple-parameter perturbation**
    - Change ground-turbulence properties
    - Change Noise Propagation Model
    - Change sub-component noise models
      - **Slats noise**
      - **Flaps noise**
      - **Jet noise**

- - **Wing/fuselage scattering (toggle)**
  - Switch background noise
    - **Single-value background dBA**
    - **Use default noise spectrum**
    - **Read noise spectrum from data file**
  - Switch APU noise
  - Switch Fan Liner Boundary Layer
  - Switch Noise Topography Effects
  - Switch Wing-Fuselage Noise Shielding
  - Switch Fan Temperature Control
  - Convert noise trajectory to 2D
  - Refine noise carpet/footprint
  - Reset Atmospheric Winds
  - Generate fly-over trajectory
  - Debug jet noise
- **Exhaust Emissions**
  - Exhaust emissions versus range
    - **Enter: [pax load, cruise winds, air temperature, bulk payload]**
  - Emissions sensitivity analysis
    - **Enter: [Required range, pax load, cruise winds, cruise temp, bulk load]**
    - **Options: ICAO Databank, Surrogate model, Own model**
  - Taxi/ground roll emissions
  - Contrail analysis
- **Flight Optimisation**
  - Minimum climb-fuel[1]
    - **Enter: [En route flight distance; Flight level at terminal point]**
  - Optimum climb between flight levels
    - **Select weight intervals: [kilograms; pound-force]**
  - Fuel tankering analysis
    - **Enter: [same data as Fuel Planning; fuel price differential]**
- **Manoeuvre Analysis**
  - Landing in a downburst
    - **Enter: [height of cloud base, downburst diameter, vertical speed]**
      - Wind model output
      - Downburst flight path
- **Trim Analysis**
  - Minimum control speed on the ground, VMCG
  - Minimum control speed in the air, VMCA[2]

- **Direct Operating Costs[3]**
- **Utilities**
  - Generate Unix "makefile" (*Owner only)*
  - Calculate distance between two GPS points (*great circle distance*)
    - **Enter two points separated by blank space**

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[1] Solution may be impossible, depending on input data.
[2] Solution may be impossible; sensitive to aerodynamic derivatives.
[3] Uses default DOC database, which can be edited by user.