

	NYASIM versions		
	M16	M20	VS21
<p>Holistic tool for developing flight models of large jet airplanes.</p> <p>The developed flight models are equipped with the engine CFMI CF56-5A.</p> <p>This tool provides a module for the estimation and the analysis of the flying and handling qualities of airplanes.</p> <p>Data set provided with the software tool: A320 (direct and normal law)</p>	✗	✓	✓
<p>Holistic tool for developing flight models of turboprop airplanes.</p> <p>The developed flight models are equipped with the engine PT6A-68B and the propeller Hartzell E8991 KX 5-bladed.</p> <p>Possible number of engines for the user's flight model: 1 or 2 engines (PT6A-68B)</p> <p>Data set provided with the software tool: PC-21</p>	✗	✓	✗
<p>Holistic tool for developing flight models of single- or twin-piston engine airplanes.</p> <p>The developed flight models are equipped with the engine E4-C (Austro Engine) and the Hartzell propeller: MTV-6-R-F 3-bladed.</p> <p>Possible number of engines for the user's flight model: 1 or 2 engines (E4-C)</p> <p>Data set provided with the software tool: DA42-VI</p>	✓	✓	✗
<p>Flight mechanics workshop</p> <p>This module provides documents and tools for analyzing the flying and handling qualities of airplanes. This analysis is conducted on the base of the linearized equation of motion as well as by means of a flight simulation tool. Thus, it facilitates a deeper understanding of such technical terms like Bode and Nyquist plots, transfer function, state space representation, characteristic polynomials, poles, damping ration, decay constant, frequencies...</p> <p>The flight simulation tool provided with this module allows a large flexibility in the development of the flight models. Not only the parameters but also the structure of all the aircraft specific submodels can be defined by the user (flight control, propulsion, aerodynamics, landing gears).</p>	✓	✓	✗



NYASIM M16. MATLAB based tool.

Features

I. Flight Simulation

- Manual flight or flight controlled by the automatic flight control systems (autopilot).

II. Parameter Tuning

- In-flight parameter tuning for the aerodynamics model and automatic flight control systems. The parameter tuning allows a practical understanding of the effect of the aerodynamics coefficients as well as of the stability and control derivatives on the flight performances, the handling and flying qualities. The tuning occurs by means of sliders.

III. Flight Mechanics Workshop

- Large flexibility for the development of your own flight model for a large jet airplane. Ability to access and modify the source code of the following aircraft specific models: *Propulsion, Aerodynamics, Flight Control System, Weight and Balance*.

IV. Additional Features

- FlightGear and X-Plane interfaces
- Interface for the ELITE flight simulator
- Simulation data package for the Diamond DA42-VI included

V. Model Validation

- Validation data package for large jet aircraft. Based on engineering data. For more information, please go to http://www.flightdynamics.de/en/links_en.html.



NYASIM M20. MATLAB based tool.

Features

I. Estimation of the Model Parameters

- Semi-empirical Roskam's method (essentially DATCOM, https://en.wikipedia.org/wiki/USAF_Stability_and_Control_DATCOM).
- Aircraft drag polar and pitch attitude estimation based on flight data. These parameters are estimated by means of the regression analysis.

II. Analysis of the Model Parameters

- Bode and Nyquist plots
- Flight dynamics characteristics: damping ratio, natural frequency, decay coefficient, period, ...
- Transfer functions and time response.
- Analysis of the flying and handling qualities according to the Cooper-Harper rating scale
<https://ntrs.nasa.gov/citations/19690013177>

III. Flight Simulation

- Simulation for manned, autonomous flying and remotely piloted aircraft. The simulation of the remote flight is achieved by introducing a time delay between the generation of the input signals and the airplane response. This delay corresponds to the time the signal takes to reach the airplane.

IV. Parameter Tuning

- In-flight parameter tuning for the aerodynamics model and automatic flight control systems.
- Pole placement. The pole placement allows to modify the dynamics characteristics of a given airplane in order to reach a desired flight behavior.

V. Flight Management System

- Target tracking.
- In-flight definition of new way points.
- Autonomous emergency flight to the nearest airport.



NYASIM M20. MATLAB based tool.

Features

VI. Model Validation

- Automatic qualification test guide (AQTG). All the automatic tests required for the EASA FNPT II qualification can be executed automatically. The test results are saved as text files during the tests. Afterward the results can be plotted in pdf documents.
- Validation data package for large jet aircraft. Based on engineering data http://www.flightdynamics.de/en/links_en.html

VII. Flight Mechanics Workshop

- Large flexibility for the development of your own flight model for a large jet airplane. Ability to access and modify the source code of the following aircraft specific models: *Propulsion, Aerodynamics, Flight Control System, Weight and Balance*

VIII. Additional Features

- FlightGear and X-Plane interfaces
- Interface for the ELITE flight simulator
- Simulation data package for the A320, the PC-21 and the DA42-VI



NYASIM VS21. MATLAB and MS Visual Studio based tool.

Features

I. Estimation of the Model Parameters (*MATLAB*)

- Semi-empirical Roskam's method (essentially DATCOM, https://en.wikipedia.org/wiki/USAF_Stability_and_Control_DATCOM).
- Aircraft drag polar and pitch attitude estimation based on flight data. These parameters are estimated by means of the regression analysis.

II. Analysis of the Model Parameters (*MATLAB*)

- Bode and Nyquist plots
- Flight dynamics characteristics: damping ratio, natural frequency, decay coefficient, period, ...
- Transfer functions and time response.
- Analysis of the flying and handling qualities according to the Cooper-Harper rating scale <https://ntrs.nasa.gov/citations/19690013177>

III. Estimation of the Model Parameters (*MS Visual Studio*)

- Aircraft drag polar and pitch attitude estimation based on flight data

IV. Flight Simulation (*MS Visual Studio*)

- Simulation for manned and autonomous flying aircraft

V. Parameter Tuning (*MS Visual Studio*)

- In-flight parameter tuning for the aerodynamics model and automatic flight control systems



NYASIM VS21. MS Visual Studio based tool.

Features

VI. Flight Management System (*MS Visual Studio*)

- Target tracking
- In-flight definition of new way points
- Autonomous emergency flight to the nearest airport

VII. Model Validation (*MS Visual Studio*)

- Automatic qualification test guide (AQTG)
- Validation data package for large jet aircraft. Based on engineering data

VIII. Additional Features

- FlightGear and X-Plane interfaces
- Interface for the ELITE flight simulator
- Simulation data package for the A320