

# **j2 Universal Tool Kit**

## **Software in a Performance**

### **Prediction Role**

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The j2 Universal Tool-Kit Performance Plug-in Derives Even More Value From The Leading Aircraft Design, Analysis and Aircraft Modelling Software Solution



**AIRCRAFT DYNAMICS**  
*Predicting Performance*



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# 1 EXECUTIVE SUMMARY

**J2 Performance** is the latest addition to the j2 Universal Tool-Kit design, analysis and aircraft modelling software solution. **J2 Performance** is a fully integrated plug-in that accesses existing aircraft data without any need for writing code, import/export of data or re-compilation.

The **j2 performance** plug in provides the user with the capability to undertake analysis of the aircraft performance characteristics at a specific point in the flight envelope. The performance analysis tool is built around the aircraft trimming rules which already exist within the j2 Universal Tool Kit.

However, when trimming the aircraft, all the points of interest need to be defined (e.g. Altitude Velocity etc.) The **j2 Performance** plug-in is able to find the specific values of parameters required to achieve certain defined goals (max/min values). In this way, for example, a specific velocity can be found that satisfies a certain criteria at a given altitude.

**The j2 Performance plug-in uses the existing aircraft model data and enables searches and max/min values to be found coupled with the new trim rules required to achieve the same.**

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## 2 USER CAPABILITY

The **j2 Performance** is a fully integrated plug in module that uses your existing aircraft model information. The user is able to run the following point performance analyses.

1. Maximum Lift/Stall Calculations
2. Turning and Manoeuvring Flight (load factors)
3. Ground Run Velocities
4. Maximum Rate of Climb & Ceiling

Each of these parameters can be presented as trimmed values or instantaneous ones depending upon the particular area of interest.

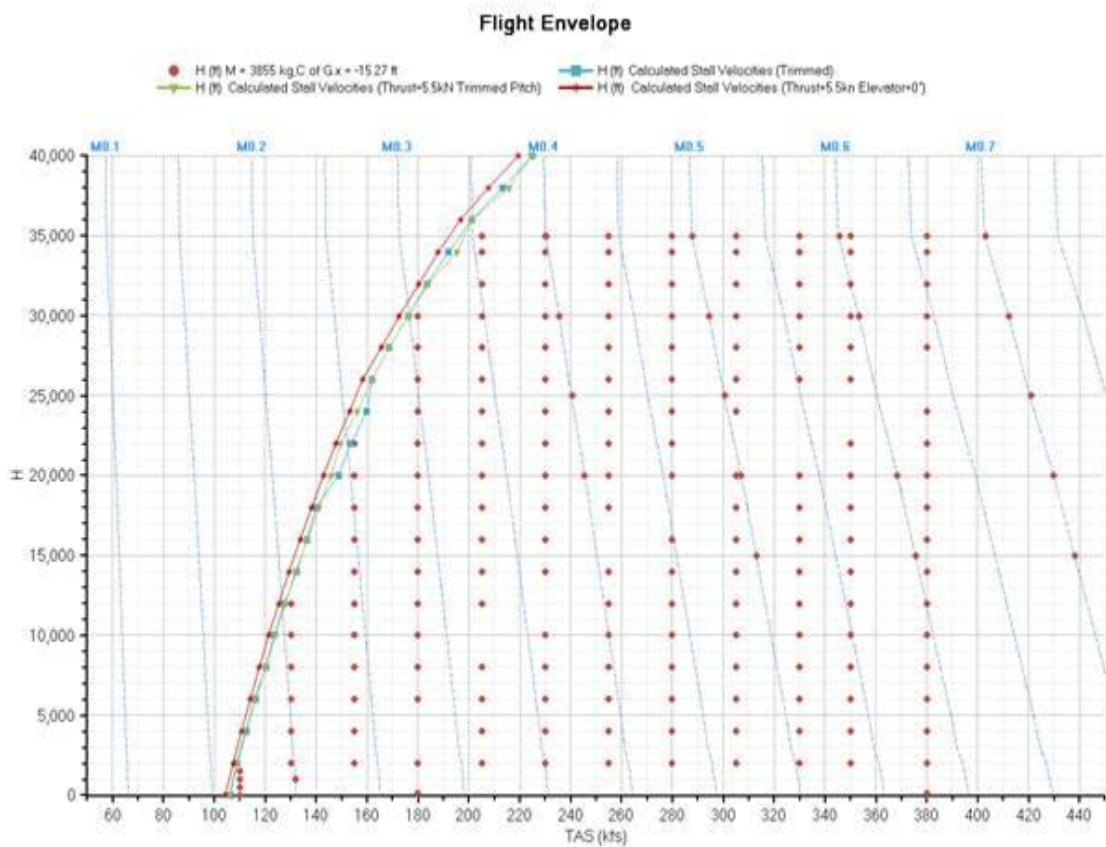
**J2 Performance** also has a search rule feature. This highly valuable feature enables users to apply search rules that can be used to maximise/minimise other factors and parameters not necessarily related to performance calculations.

### 3 EXAMPLE AIRCRAFT CASES

#### 3.1 Stall Characteristics

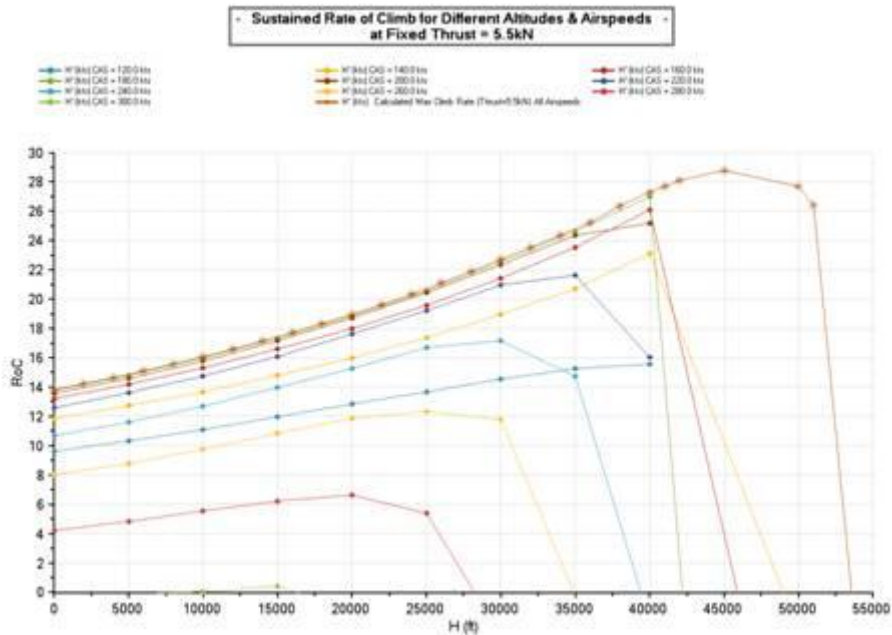
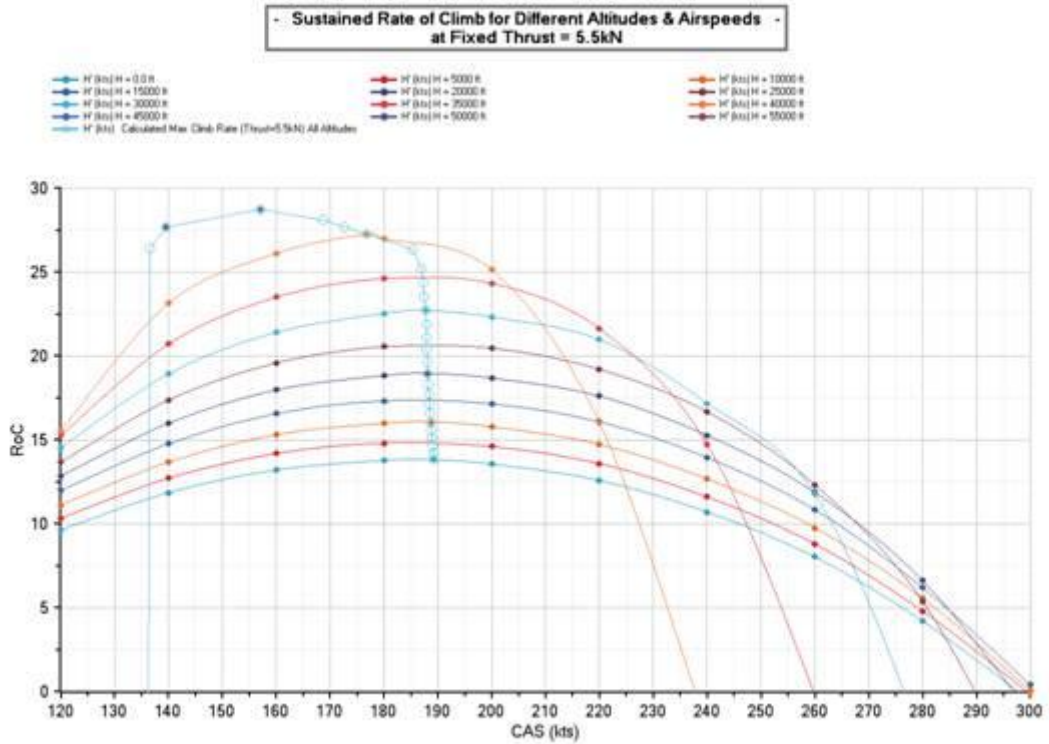
The Flight Envelope is calculated using the standard trim rules already written by the user in j2 software. **J2 Performance** then undertakes several, minimum speed searches to establish different stall boundaries for the following:

- Fully Trimmed Flight
- Pitch Trimmed Flight at Constant Throttle (5.5kN)
- Fixed Throttle (5.5kN) and Fixed Elevator (0°)



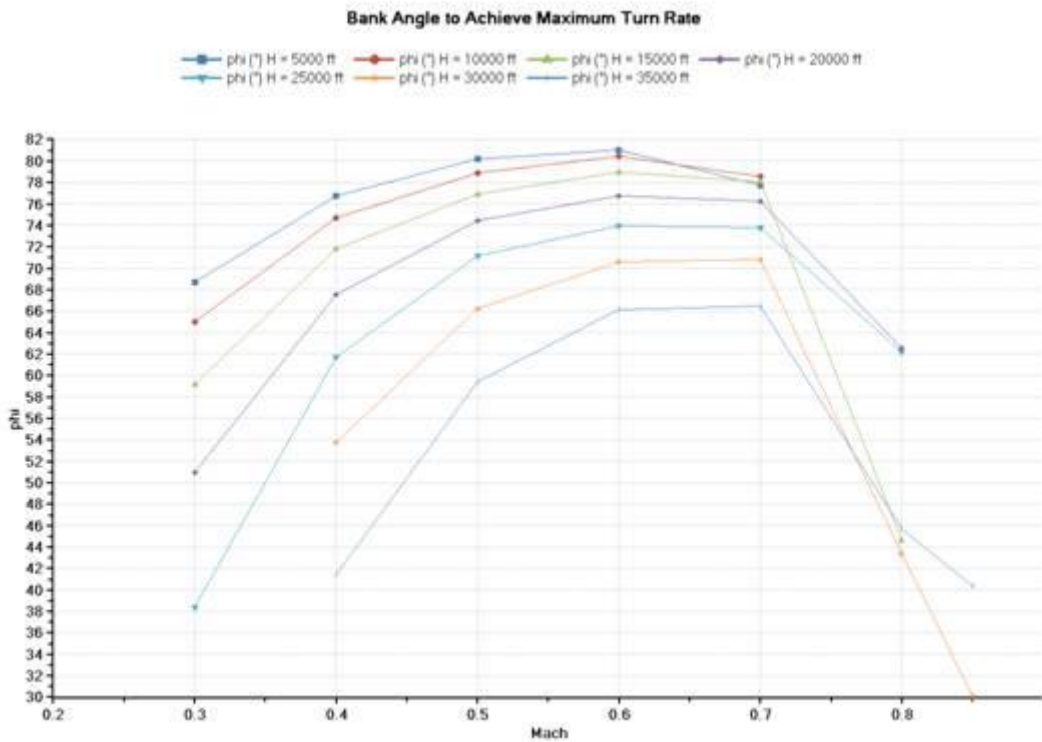
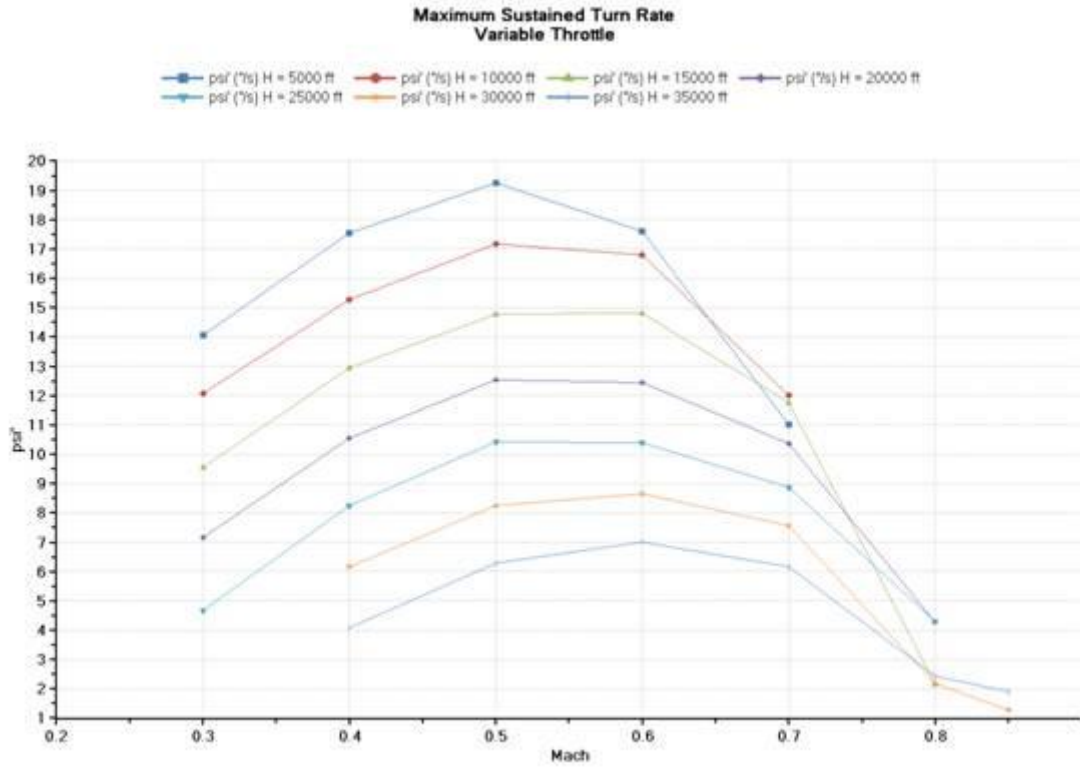
### 3.2 Climb Characteristics

**J2 Performance** allows the user to run a series of **Maximum Climb Trims** over a range of airspeeds and altitudes to establish Basic Climb Profiles. The **j2 Performance Search routine** can be used to identify the speed at which the maximum climb rate can be achieved at fixed throttle:



### 3.3 Maximum Turn Rate

For a given airspeed and altitude **j2 Performance** is used to find the maximum sustainable turn rate and corresponding bank angle ( ). In this scenario the throttle is trimmed to sustain the turn rate. The search rule finds and then graphically represents the two parameters below:





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## FURTHER ANALYSES

Use j2 Performance to examine and analyse the performance outcomes from the following:

- Different configurations of your aircraft
- Changes to external structures
- Different engine decks
- Control surface changes
- Impact of high lift devices
- Failure modes
- Atmospheric changes especially hot and high.
- Flexible aircraft.

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## ABOUT J2 AIRCRAFT

j2 Aircraft is a leading provider of its own aircraft design, analysis and modelling software. Its software is used by global aircraft manufacturers and it has developed a niche expertise in developing aircraft models to drive different levels of simulation and simulation platform technology.

The j2 capability covers all aspects of aircraft modelling across the full range of fidelity. Our international presence gives j2 Aircraft Dynamics the experience and flexibility to meet a customer's needs anytime, anywhere.

j2 Aircraft Dynamics sells its Universal Tool Kit software solution around the world. In addition, j2 are able to offer a complete range of aircraft design and analysis consulting services using their global associate network.

j2 staff have provided Universal Tool Kit software to the likes of Embraer, Cassidian, Lockheed Martin and Boeing for use within their design team operations.

The most recent development is the launch of the J2 Flight Test Suite to help drastically reduce the cost of flight test programmes.