

How to Learn FreeFlyer Astrodynamics Software



The FreeFlyer team provides many resources to help you save time and effort as you evaluate the software or prepare for our FreeFlyer Certification Exams. In this article, we would like to point you to the 5 primary channels that are available for you to use:



First is the [a.i. solutions YouTube channel](#) where you can find series of both “[FreeFlyer Fundamentals Training](#)” and “[FreeFlyer How-To](#)” videos that breakdown some of our Sample Mission Plans and explain key analysis concepts.

The “FreeFlyer Fundamentals Training” videos are an in-depth introduction to the FreeFlyer paradigm. The three fundamentals videos total to 90 minutes long and cover the following topics:

- Navigating FreeFlyer
- The Spacecraft Object
- Generating Basic Output
- FreeFlyer Script Essentials
- The Step Command
- Creating Ephemeris Files
- List & Formations
- Procedures
- Debugging a Mission Plan
- Output Window Objects
- Improving Your Visualizations

Hands-On Examples

- Part 1: Start Building a Mission Plan
- Part 2: Add More Output
- Part 3: Add a Second Spacecraft
- Part 4: Add the GPS Constellation
- Part 5: Create a Procedure
- Part 6: Customize Output Windows

Our shorter “FreeFlyer How-To” video series explains how to accomplish analysis tasks in FreeFlyer. Here are a few of the topics we’ve covered so far:

- [Modeling and Visualizing the Lunar Gateway Orbit](#)
- [Spacecraft-to-Ground station Comm Analysis using the RFLink Object](#)
- [Space to Ground Contact Analysis Using Terrain](#)
- [Modeling BattleSpace Contact Timelines](#)
- [How to Perform Constellation Coverage Analysis in FreeFlyer](#)

If there’s a topic you’d like us to cover please let us know at sales@ai-solutions.com!

The FreeFlyer Help File

Another extremely valuable resource that comes with your FreeFlyer installation is the [FreeFlyer Help File](#). This is available directly from your FreeFlyer software by selecting “Help” at the top of the screen and then “Show Help Contents” (the first option in the drop-down menu that appears). The Help File is now also available online if you would like to peruse it on a machine which does not have FreeFlyer installed. The Help File provides information about every object, property, and method available in FreeFlyer, and should be able to answer most questions that you have. For example, you can look into the [Spacecraft.Epoch property](#); below is the description of the Epoch property available in the Help File:

“The current spacecraft date and time in International Atomic Time (TAI) in the Modified Julian Date format. The returned value has units of days, measured from January 5, 1941 at 12:00:00.000 TAI.”

You can also find this page by navigating to the Spacecraft object page in the Help File (“Objects and Functions > Nanosecond Mode > Objects > S > Spacecraft”), then selecting the Epoch property from the table on that page, by right-clicking the Spacecraft.Epoch property in FreeFlyer Script and clicking “Go To Help File,” or by searching for “Epoch” in the Search tab at the top of the Help File.

We highly recommend users working on their [Level 1 Certification](#) utilize the Help File while taking the open-book Certification Exam.

FreeFlyer Sample Mission Plans

One more resource that is very valuable is FreeFlyer’s directory of over 200 Sample Mission Plans (SMPs) that comes included with your installation. This is located in your FreeFlyer directory in My Documents under “Sample Mission Plans > Mission.” The Mission Plans span a wide range of topics and complexity levels and are organized into the following topic folders:

- Coverage & Contact Analysis
- FreeFlyer Scripting
- Generating Output
- Interfacing with External Resources
- Interplanetary Analysis
- Maneuvering & Targeting
- Mission Plan Wizards
- New Features
- Orbit Determination
- Spacecraft Propagation

Sample Mission Plans provide examples with different levels of complexity. In general, the Demo Mission Plans are the most complex samples, which demonstrates how FreeFlyer is used in support of various missions types. Some SMPs cover one concept but are based largely in script, and there are also some which use no scripting at all, creating an entire Mission Plan using only GUI-based elements. You can read a brief description of all of the Sample Mission Plans in the Help File under “Getting Started > Sample Mission Plans”.

The Sample Mission Plans can be quite valuable as users can edit our existing mission plans and tailor them for their mission without having to start from scratch. You can also enhance your current workflow by copying procedures and different approaches provided in the SMPs.

FreeFlyer University Guide

There’s also the [FreeFlyer University Guide](#) that is designed to aid in teaching basic astrodynamics concepts through the use of FreeFlyer to University-level students. You may have already taken an astrodynamics course, but the University Guide contains step-by-step instructions to practice problems based on a variety of topics that you could go through to help familiarize yourself with FreeFlyer. The

University Guide covers topics such as Spacecraft Attitude, Maneuvering, Targeting, Interplanetary Analysis, and has many modeling examples. It is one of the easiest ways to get started with FreeFlyer.

FreeFlyer Technical Support Team

Finally, our world-class Technical Support team is always available to answer your questions and will work with you on any challenges you might have. If you are just getting started or if you are working on a sophisticated problem, our team will be there to assist! You can reach them at techsupport@ai-solutions.com.

In summary, if you're looking to quickly get started with FreeFlyer, we would recommend starting with our [Youtube training videos](#). If you come across a topic in these videos that you have more questions on, you can then look it up in the [FreeFlyer Help File](#) to find more information or browse the Sample Mission Plans to see how it's applied in similar scenarios . If you come across something that you don't feel is clear or is not addressed in these resources, you can always reach out to our Technical Support team at techsupport@ai-solutions.com.

As you learn FreeFlyer, you can always validate your proficiency and set yourself apart by becoming certified in FreeFlyer. [Click here](#) to get started with the free FreeFlyer Level 1 Certification.