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PEAK OF FLIGHT

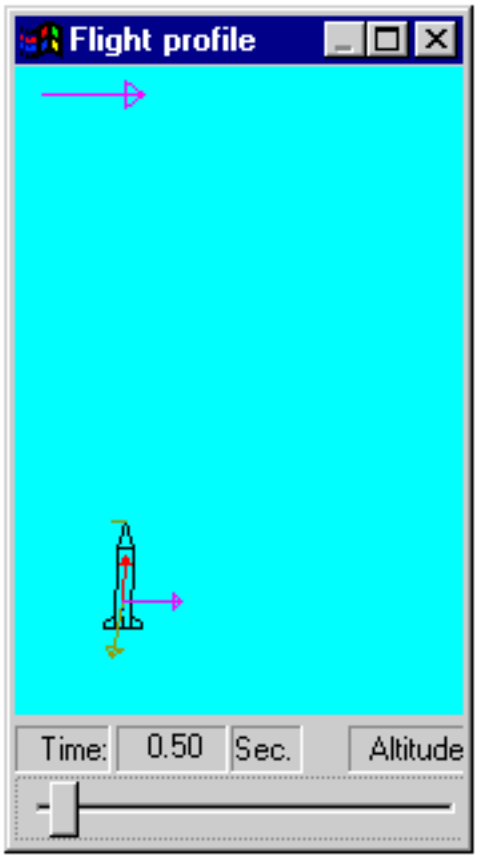
NEWSLETTER

Selecting Rocket Motors for Your Models: Part 1

By Tim Van Milligan

In this week's article, I'm going to try to give some "basic" generalized guidelines for selecting rocket motors for your models. These won't be selection "rules," because to every rule there is an exception. I'd suggest using this guidelines just as a starting point.

Often times, you'll wnat to narrow the choices by doing some computer simulations. I have been recommending this for a long time. I'm a firm believer that those that practice through simulations are "safer" modelers.



Motor selection is the process of matching the proper motor to the rocket so as to achieve a flight with the desired "profile." In effect, this is the same thing NASA does when it decides which rocket to launch a satellite into orbit. First they decide what orbit the rocket needs to go into (altitude, inclination, etc.). Based on this, they select the rocket with the right characteristics to achieve that mission. We do the same thing with our rocket motors. We start by defining the profile.

To see what I mean by "profile," I recommend downloading the free demo verion of the RockSim software from the Apogee Components' web site. When you perform a simulation, you can display the rocket's flight in a 2-D profile mode.

The profile is more than just the trajectory (flight path). It encompasses a lot more information. This includes things like: launch rod exit velocity, maximum velocity, burnout location, rocket orientation throughout the flight, deployment time, location of burnout (both altitude, and downrange distance), velocity at deployment, and the orientation of the rocket at deployment.

The newest version of RockSim will also calculate drift rate of the parachute, so you can also modify the trajectory for "close proximity recovery." This seems to be all the rage for high power launches these days, since we're all a bit lazy when it comes to hiking long distances after our rockets. We'd rather have them lasd as close to the launch pad as possible. At the time of this writing, there isn't a demo version of RockSim 5, so just keep checking back to the Apogee web site often.

You may not see it, nor understand it yet, but all those factors of the flight profile are important. Just like a $100 million satellite placed into the wrong orbit is useless; if the model rocket doesn't perform all correct elements of the predicted flight profile; it would be considered a failure.

Motor selection is probably one of the more important elements in meeting the flight profile criteria. That is why I'm going to spend a little bit of time discussing it.

In part 2 of this article, I'll start to talk about the different elements of the flight profile, and why they are important.

Related article that might be of interest to you: "How are your flying skills?"

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