Truepath & apogee calculation

Every height reading on the Nano starts life as a raw air pressure measurement, and during a flight that raw pressure gets knocked about by things that have nothing to do with the rocket's true height. True Path is the system that turns those raw readings into the clean flight you see in your data. This page explains, in general terms, what it does for you, why it runs after the flight rather than during it, and how your velocity and true apogee come out of it.

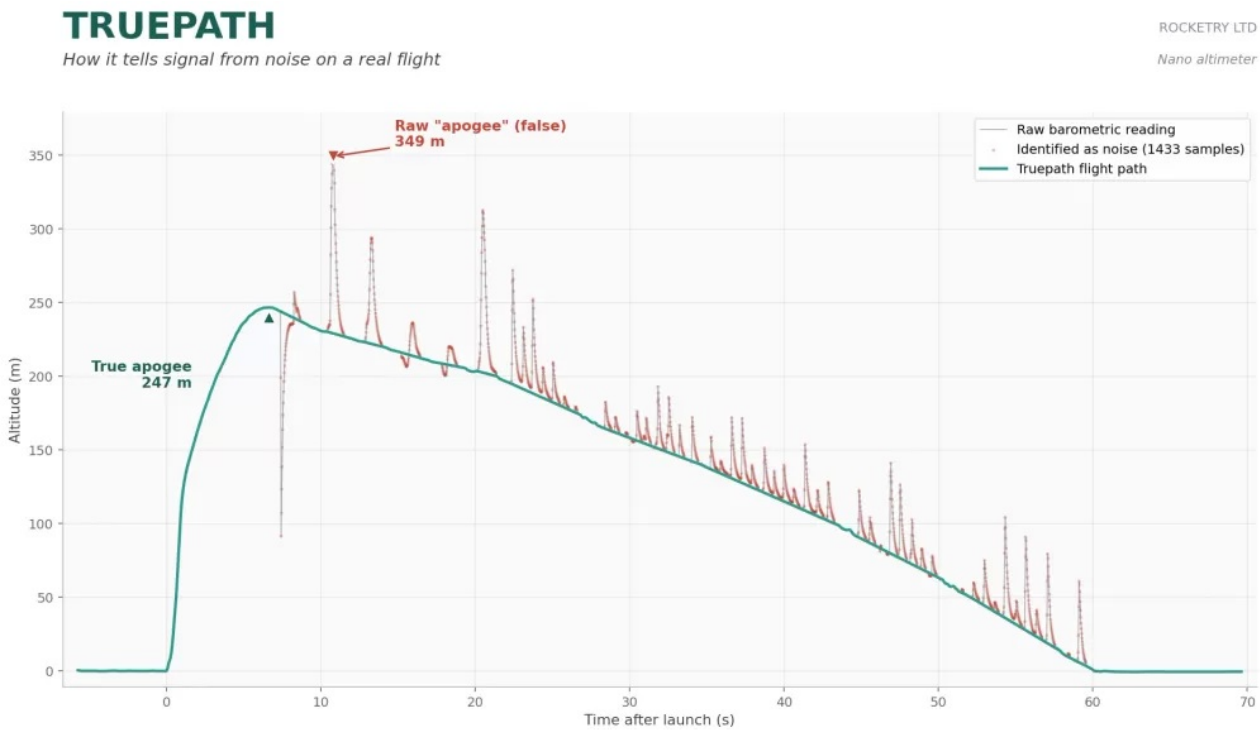
What True Path does

True Path is our own in-house developed filtering system. What it does for your data is easy to describe. During a flight the pressure around the sensor gets knocked about by all sorts of things that have nothing to do with how high the rocket is: the sharp pressure pulse from an ejection charge, the disturbance as the rocket pushes through the sound barrier, the buffeting and swinging as it comes down on its shock cord in the wind, and even sunlight falling on the sensor once it is out in the open. All of these show up in the raw trace as spikes and wobble that are not real changes in height.

True Path takes that raw trace and produces a clean height trace that follows what the rocket actually did. It removes the disturbances that are not real height changes, and does so without the lag you would get from simply averaging the readings together, so the quick, genuine moments, the hard acceleration off the pad and the turn at apogee, stay sharp.

In other words, you get a height trace you can trust, smooth where the flight was smooth and crisp where the flight was quick, rather than the jagged raw signal the sensor hands over.

It is worth being clear about what this does and does not mean. True Path does not invent data or estimate where your rocket went. It works only from the readings the Nano actually recorded during the flight, and it never predicts, fills in or makes up anything that was not measured. What it does is identify the readings that are clearly wrong, the spikes and disturbances that cannot be genuine changes in height, and remove them. What is left is the real flight the rocket flew, which is exactly what the name means: the true path through your data.



Example of an excessivly noisy chart tested through our True Path v1.0 filter

Why the Nano filters after the flight, not during it

Some altimeters double as flight computers, firing charges or driving airbrakes in the air, so they have to filter their readings live, the instant each one arrives. The Nano is a pure altimeter. It only records, so it has no reason to clean the data in real time. Instead it does the opposite: during the flight it simply logs the raw readings as fast as it can, up to 100 times a second on Rev4 and later boards and 50 times a second on earlier ones, and saves all the cleaning for afterwards.

True Path then runs over the whole flight in one pass when the log is saved, once the rocket is back on the ground. Working on the complete flight at once is a real advantage: the filter can look at what came both before and after each point, something a live filter can never do because the rest of the flight has not happened yet. That fuller picture is part of why the result comes out as clean as it does.

This happens whether the flight is saved the normal way at the end of recording, or rebuilt from the Nano's recovery system on the next power up if a normal save was ever missed. Either way, the log you end up with has been through True Path. There is more about the backup in the log recovery page.

Velocity and true apogee

Once True Path has corrected the pressure trace, the Nano uses that cleaned trace to work out the two figures most flyers care about. Both are calculated from the tidied data, not the raw readings.

Velocity on the Nano comes from the height trace, how quickly your height is changing, rather than from the accelerometer, so it depends directly on the trace being clean. After filtering, the Nano recalculates velocity from the corrected height, which means your speed figures are built on the tidied flight rather than on the noisy raw signal that would otherwise make them jump around.

It then picks out the true apogee, the genuine highest point of the flight, from the same cleaned trace. This matters because a single stray spike in the raw data could look like a brief jump in height and be mistaken for the peak. By reading apogee from the filtered trace, the figure you get reflects where the rocket really reached, not a momentary glitch.

So everything in your saved log, the height, the velocity and the apogee, is a True Path result. If you later adjust the sea level pressure or temperature on Altimeter Cloud, it re-derives the height from this same cleaned data, so your corrected flight stays just as clean.