Glenda Project

"Lone Tree" Launch Site – Dayton, WA – October 1st, 2011

The Pieces Come Together

Latest "Lone Tree" Launch Site Aerial View from Google Earth

“Lone Tree” Launch Site – October 1st, 2011

The goal for the 2011 series of Glenda flights was to gather a set of “baseline” data from the BMR “Lone Tree” launch site in order to develop a more accurate prediction model of vehicle performance concerning drift so that builders remain compliant with safety codes.

The Glenda Project has been working on this problem for several seasons at “Lone Tree” and has come up with an “enhanced” prediction model.

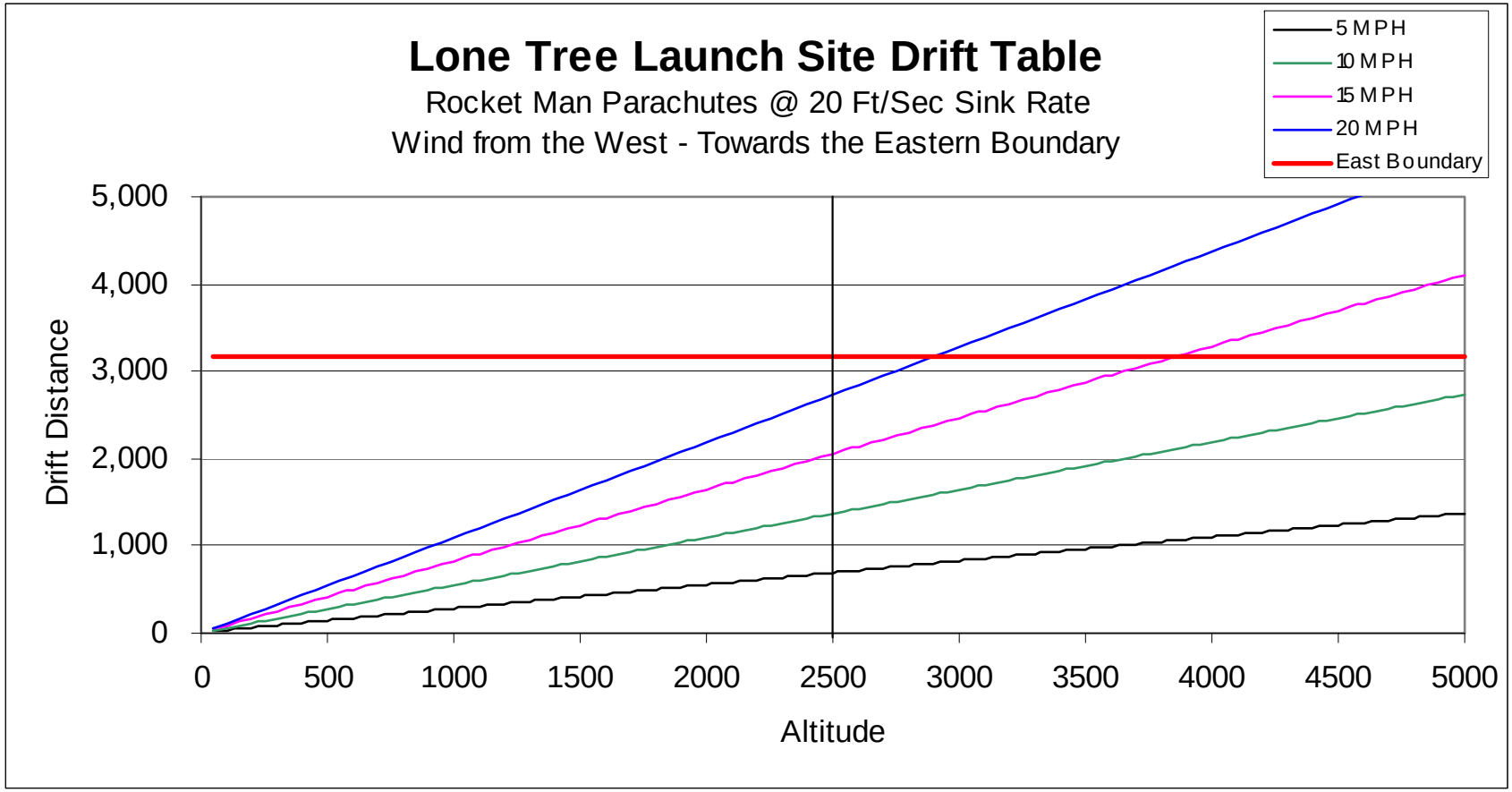
These flights would not have been possible without the continuing support of BMR members who have provided numerous hours of launch and recovery support.

Three flights were made during the October 1st launch and successfully captured the necessary data using the Holux GPS datalogger system combined with Google Earth and 4D mapping software.

Flight 3 is used as a representative example of flight and system performance.

“Lone Tree” Launch Site – October 1st, 2011

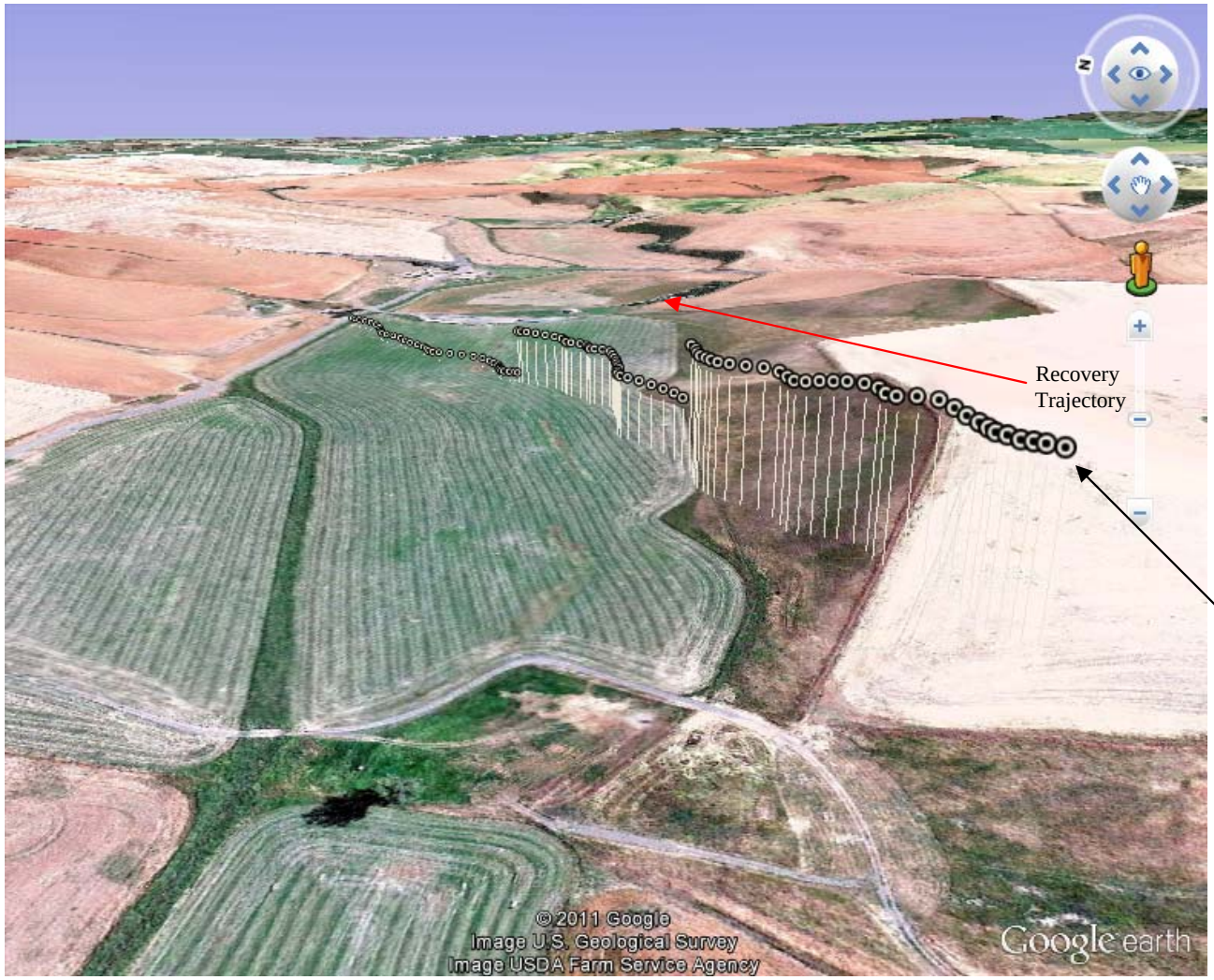
Flight 3 – 7554 Booster – I211-M – Predicted Performance



Flight 3 was launched at 12:05pm with a ground level wind speed of 14.5 mph.
Based on the existing BMR Drift Chart, this flight should land well within launch site boundaries.

“Lone Tree” Launch Site – October 1st, 2011

Flight 3 – 7554 Booster – I211-M – Actual Performance



October 1st
7554 Booster – Aerotech I211
Apogee: 2,354

The actual flight exceeded site boundaries by close to 500 feet landing east of the launch site and across the gravel road.

Note: This is over a 1,000 foot deviation from the Drift Prediction Chart

“Lone Tree” Launch Site – October 1st, 2011

The existing BMR Drift Charts were developed using a baseline sink rate of 20 feet per second, a hobby and safety standard. The Glenda capsules were designed to those same standards and in clear air exhibit exactly those characteristics.

The “Lone Tree” site is known for its updraft behaviors. However, there has been no viable method to predict its intensity, or its boundaries.

During the past several years, numerous ideas have been tested and rejected as to the cause of these updrafts from site temperature inversions to alfalfa height and all of these ideas have been disproved based on flight gathered data.

However, the GPS mapping data has found the cause of the updrafts.

“Lone Tree” is a unique terrain micro-climate and the ground wind speed flows out of the surrounding canyons and up the sides of the valley walls creating a natural updraft condition.

Basically, the stronger the wind speed, the stronger the updraft. All driven by the local terrain.

While this sounds simple, it took the GPS mapping data to provide the direction for a solution

“Lone Tree” Launch Site – October 1st, 2011

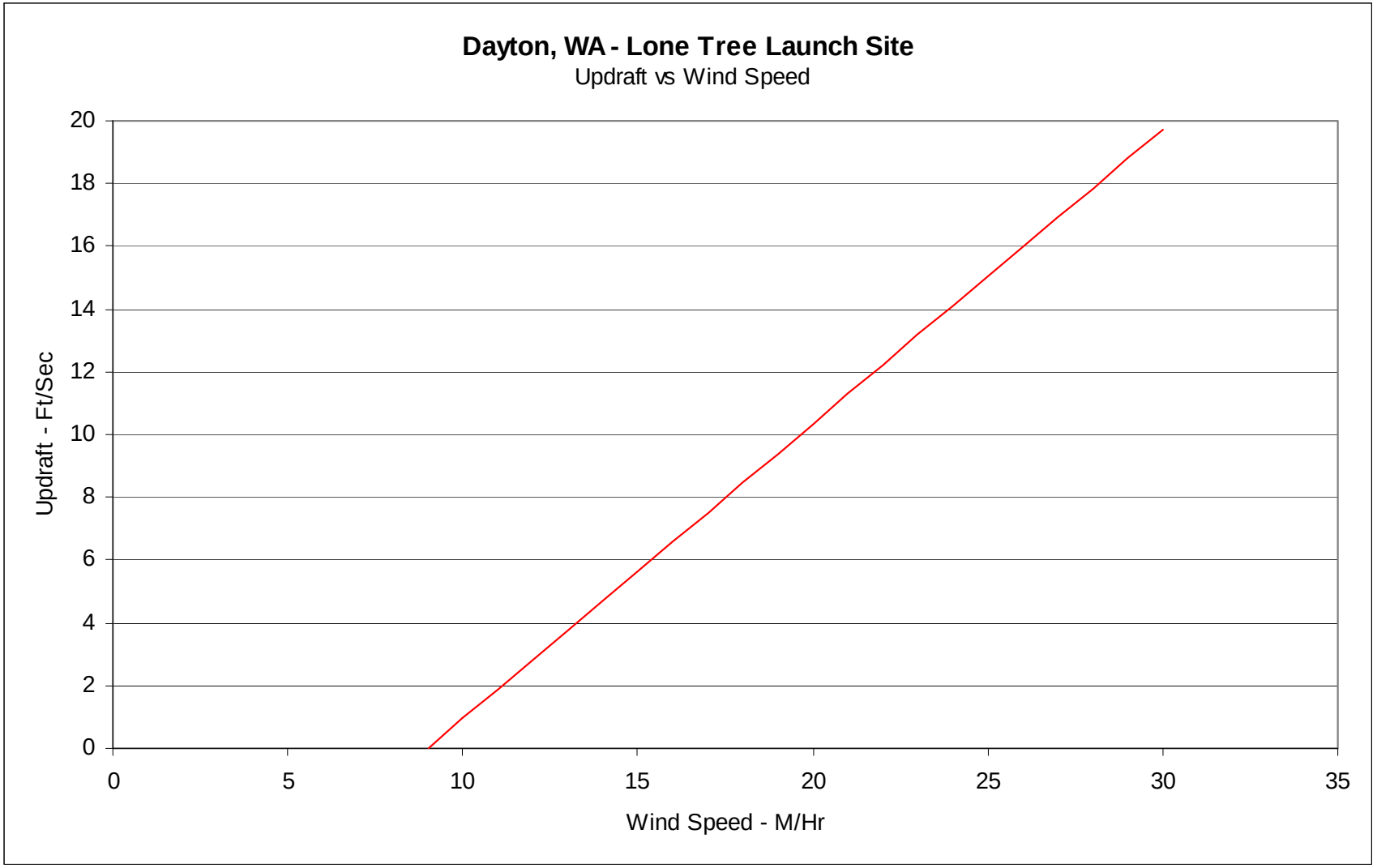
The data GPS positioning and ground wind speed data collected from the May, June, and October flights produced an interesting pattern.

As the ground wind speed increases, the updraft intensity increases in almost a linear fashion.

The following chart displays the condensed results from the 2011 flights.

As a reference, the flights from May, and June are also displayed against the background of the launch site.

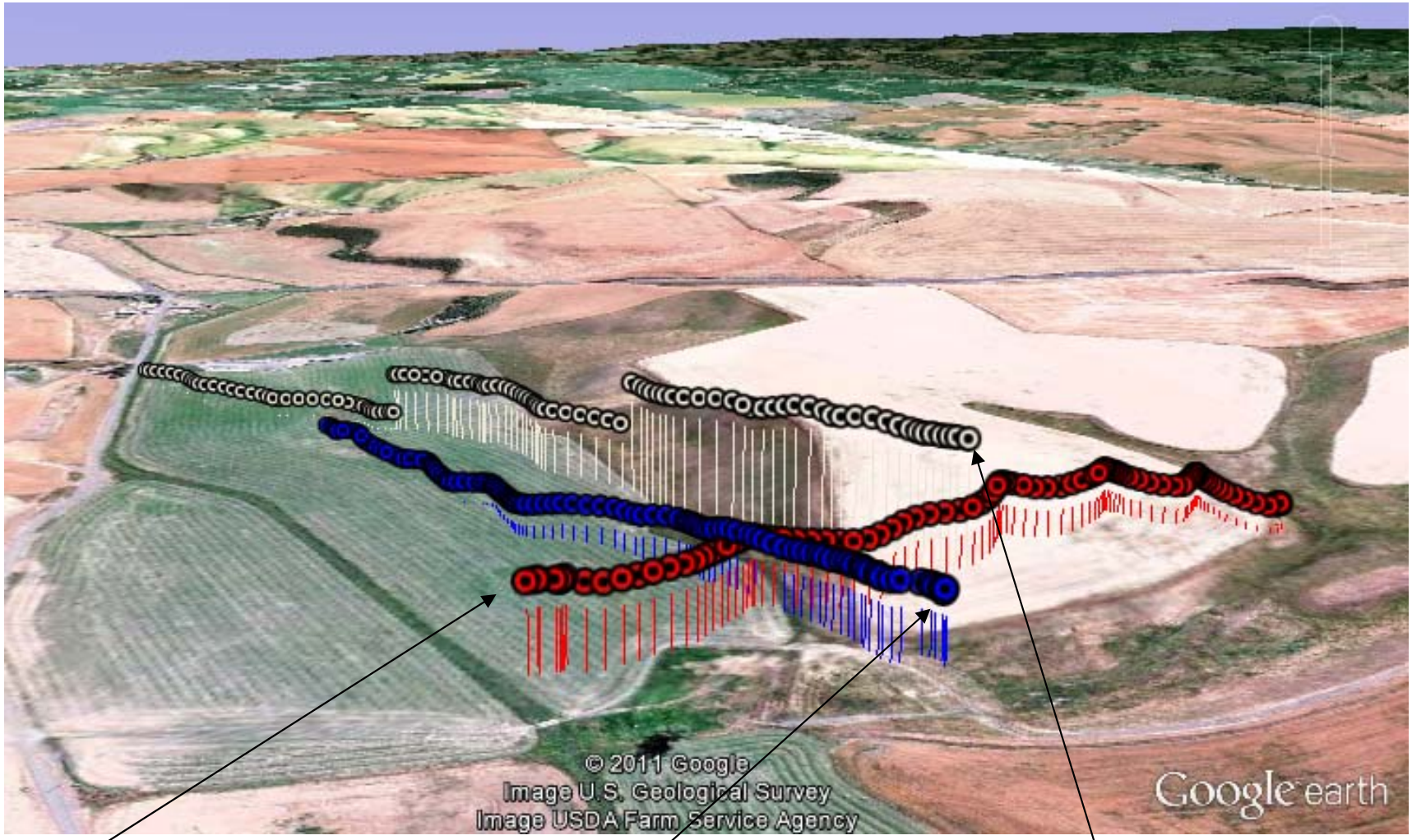
“Lone Tree” Launch Site – October 1st, 2011



Note: As ground wind speed goes above 10 mph, the updrafts increase rapidly

“Lone Tree” Launch Site – 2011 Test Flights

May 14th, June 11th, and October 1st Recovery Trajectories



May 14th
7554 Booster – Aerotech I211
“Thunderstorm Intercept”
Apogee: 2,706 Feet

June 11th
9875 Booster – CTI I170
Apogee: 2,211 Feet

October 1st
7554 Booster – Aerotech I211
Apogee: 2,354

“Lone Tree” Launch Site – October 1st, 2011

This new information will have a significant impact on the BMR Drift Charts.

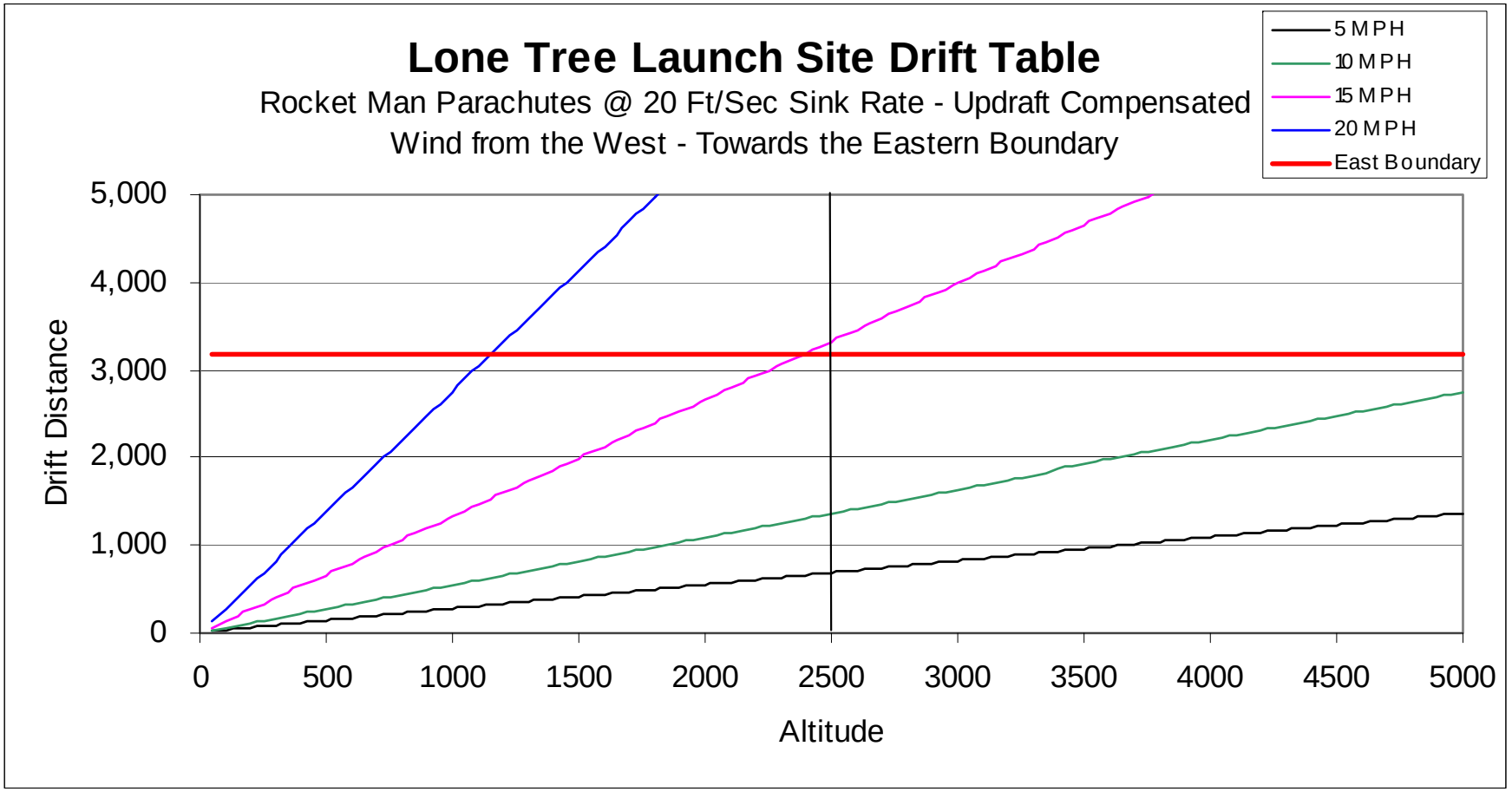
The 5 mph and 10 mph lines will have no significant impact.

However, the 15 mph and 20 mph lines will be significantly impacted.

The updated Drift Chart for Flight 3 is in the following chart, reflecting this improvement.

“Lone Tree” Launch Site – October 1st, 2011

Flight 3 – 7554 Booster – I211-M – Updated Performance



Based on the Updated BMR Drift Chart, now compensated for the updrafts, this flight would not have been allowed due to the launch site boundary safety code constraint.

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Conclusions

Based on how the resident updrafts are effecting flight performance by wind speeds, the BMR Drift Charts will ned to be updated to reflect these new conditions.

The parachutes used by the Glenda flights are of the Rocketman design, and exhibit a sink rate between the traditional “round” and “x-form” pattern. Performance of all of the parachute designs are effected and none are totally immune from the updraft effects.

Flights above 2,000 are discouraged if the wind speed exceeds 15 miles per hour.

Flights to 3,000 feet are not recommended if you are using traditional kit parachutes when wind speeds exceed 10 miles per hour.

Flights above 3,000 are of very high risk, when wind speeds are above 10 miles per hour, unless dual deployment, or other forms of recovery methods are employed.

Compliance to safety codes is important. Plus it also keeps vehicles from landing in neighboring properties.