**Trajectory Plotting Work Package**

This work package includes data in .csv format from 9 different trajectories. Those labeled 1a-5 are phugoidal, “s” is sinusoidal, and “fh” is shaped like a fish hook. The trajectories all share the same launch point and aim point but you will find that they do not all reach the intended aim point. Additionally, the flight paths of the different trajectories have different characteristics in 3-dimensions that we would like to visualize. The following describes what types of plots we hope to produce with the csv data.

1. A 3d plot containing all of the trajectories in one visualization. We’d like to see the distribution of where the trajectories intersect the ground plane. This can be done in 3d space, and/or on a projected space as shown in the example we gave, using down range, cross range, and altitude (FYI: down range and cross range are distances measured along the surface of the earth, in the S-N and W-E directions respectively). The latter option often brings more readable views, especially for long distances.
2. A 2d plot including 1a, s, and fh showing altitude versus ground range.
3. A 2d plot for each trajectory that includes yaw and pitch angles versus time
4. A 2d plot for each trajectory that includes Mach number versus time.
5. Any additional plots you can create based on the TrajectoryPlotExample.pdf in this directory
6. Use the GURU\_Colors.pdf in this project file as a guide to make stylistic choices about plot data visuals.

**Data Description:**

TTIME\_S - elapsed time since start of simulation

TRXI\_M - x position in m (earth centered)

TRYI\_M - y position in m (earth centered)

TRZI - M - z position in m (earth centered)

TGRNKM\_KM - ground range in km

TALTKM\_KM - altitude in km

TDRNGE\_M - downrange distance in m

TCRNGE\_M - crossrange distance in m

TVRMAG\_M/S - earth relative velocity in m/s

TAIMAG\_M/S2 - acceleration magnitude in ms/^2

TABXB\_M/S2 - x direction acceleration magnitude in m/s^2

TABYB\_M/S2 - y direction acceleration magnitude in m/s^2

TABZB\_M/S2 - z direction acceleration magnitude in m/s^2

TPITCH\_DEG - pitch angle in degrees

THEADG\_DEG - heading (yaw) angle in degrees

TAMACH - Mach number

\*\*Note: see below for figure of earth centered coordinate system

