Risk Mitigation **Michael Dorin**

SEIS-601/610 Moon Landing

2/19/2019

a. No experience editing, compiling, or building java programs.

On 2/13/2019, the SEIS-601 class has practiced editing, compiling, and building java programs. Several programs were built that evening. We have a high degree of confidence that this is no longer a risk.

b. No experience outputting data from a java program.

As part of the effort on 2/13/2019, programs requiring input were created and tested.

c. No experience inputting data into a java program.

As part of the effort on 2/13/2019, programs requiring output were created and tested.

d. No experience saving data in persistent storage.

This remains a risk. However, a five minute YouTube video https://youtu.be/BxCbxfpwC7Q seems to show adequate information for persistence for our purposes. We have decided that the risk is mitigated enough to continue.

e. No experience processing data.

During the 2/13/2019 practice exercise, we wrote programs to calculate results of formulas related to free fall. Data was input, calculations were done, and results were output. We are confident in processing data.

f. No physics background.

A bit of research has found equations for a zero angle drop. (See below) We believe this sufficient for our purposes and will not stop the project.

1. velocity = velocity_original + acceleration * time;

2. upward_acceleration = resultant_force (newtons, N) divided by mass (kilograms, kg).

3. To find resultant force:
   resultant_force = thrust – weight
4. To find weight: mass * gravity
5. simplifying upward_acceleration = (thrust - mass * gravity)/mass

   Simplifying again: upward_acceleration = thrust/mass – gravity

6. height=height_original+velocity_original*time+ 1/2* acceration * time^2

The equations are from here:
https://www.sciencelearn.org.nz/resources/397-calculating-rocket-acceleration
here: http://hyperphysics.phy-astr.gsu.edu/hbase/mot.html#mot4

g. No experience with graphics.

This remains a risk, but one that we can live with. Project boundaries already indicates that this will be text only initially. We will do our best to mitigate this risk later, but is not a risk worthy of stopping the project.