AS91522 - Physics 3.2

Circular Motion of a Stunt Glider

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Contents

1 Vertical Circle: Loop the loop including Dip and Arch

1.1 Achieved

During motion, 3 forces are acting on the stunt glider:

1. Gravity ($\vec{F_g}$) (i.e. Weight) always vertically downwards (i.e. toward center of Earth).
2. Lift ($\vec{F_L}$) perpendicular to direction of velocity, toward the center of the circular path.
3. Air Resistance ($\vec{F_R}$) (i.e. Friction, Drag) opposite to direction of velocity.

For simplicity, air resistance will be ignored as its effects are negligible?
The force of gravity is always constant in both magnitude and direction regardless of the glider's velocity or position in the loop (top, bottom, and anywhere else).
Conversely, the force of lift varies in both direction and magnitude depending on these factors.
Its magnitude is greatest at the bottom of the circular path, because to maintain circular motion the centripital force ($\vec{F_c} = \vec{F_L} + \vec{F_g}$) needs to be greater than the force of gravity that is in the opposite direction.
It's magnitude is least at the top of the circular path, because the force of gravity already provides

1.2 Merit

1.3 Excellence

2 Banked Corner

2.1 Achieved

2.2 Merit

2.3 Excellence

3 Additional Info

3.1 Comprehensive Version History

Access to all prior versions of this document during process of creation is publicly available at:
`https://github.com/NathanTaskerPersonal/AS91522`

3.2 Graphical Analysis Files

Access to all graphical analysis files are publically available at:
middletonschoolnz-my.sharepoint.com/...

3.3 Bibliography