

REVIEWS ON THE MANUSCRIPT [33]

Reviewer 1:

Comments:

Only one design was tested, but thoroughly. The explanation that any other designs were ignored because of their complexity is unclear and insufficient, and should be extended (i.e.: why they were not considered?)

The experimental part is very extensive, but not described enough.

The strongest and the weakest aspect of the paper:

The strongest aspect of the paper is the amount of work done with the experiments and the use of image processing techniques.

The weakest aspect of the paper is its lack of discussion on some of the results obtained. Explain what conclusions do you draw from the results (figures 6, 7, 8, 11). Also, the effect of a number of parameters (type of balloon, its shape etc.) was neglected.

Organization and Presentation:

The paper has clear, well written structure (a very well written abstract, especially). Equations should be centered in line.

First picture is unclear. I would be better to put a photo/ scheme of your design only.

Style:

- The language is sometimes unclear or unspecific. In particular: "released energy its self", "spent to fill". You should write shorter sentences, and try to use non-hermetic phrases ("emptying diagrams").
- The authors use phrases that can be put in every solution to every task from the IYPT ("the physical experiments were also in charge to approve the theoretical assumptions). Be more specific.

Additional Questions:

- Figure 6: you are fitting a logarithmic function to your data. A linear fit to the same data would deliver a comparably high precision. Why did you choose the logarithmic fit?
- What are the sources for the secondary peaks in figure 3 (top curve)?
- What is the relative velocity of the jet? What do you understand by "jet"?

References:

Many places in the text clearly require referencing, e.g. the information about the NASA Balloon Car Contest or certain physical terms (Moulin's Effect, Head Loss (heat??), Euler Method. All these need a reference to an external source of information, for an interested reader at least. Authors don't refer to any additional literature or external sources, which is a drawback of the article. Please, add those references (and others alike), if possible.

Recommendations:

- Add references, especially to the topics mentioned above in "references" part

of review

- chapter (five sentences approx.) with a discussion of limitations of your solution (the description of limitations is scattered through the article)
- check the figure 6. Why did you choose to fit data with logarithmic function?
- sentence 1, paragraph 4 of introduction (“after when car is stopped...”) : The sentence is unclear. The reviewer understands the intention of using the energy conservation principle, but the description is not clear and should be changed or clarified.
- Describe your system and design. You use phrases “z-axis” without any description.
- Write a definition of efficiency that you use and clarify how the definition is understood.

Summary:

The manuscript is recommended for publication only after essential revisions.

Reviewer 2:

Good structure. Very well presented. Please add references to the paper.

I recommend this paper.

Editorial request

Concept: It appears clear that the authors consider only the cars where the deflating balloon provides propulsion (a *rocket-type* car.)

Please report this in the introduction and justify shortly *why* this concept is considered and why any other possible approaches are not. This explanation would equally work as a necessary introduction for the readers into your approach.

Figure 9: units of the y-axis and x-axis?