Optimising orbital transfers by crowdsourcing with online gamers

Stage topic description

"Crowdsourcing" (the act of delegating a task to a large diffuse group) of computationally-intensive problems has been demonstrated to be an effective tool in several projects such as Foldit, Google Image labeller, Galaxy Zoo etc. The goal of this stage is to provide an initial implementation of a web-based game application for the optimisation of orbital transfers by human players. This proof-of-concept would help determine the impact that such techniques could have on Space research.

Candidate's tasks

The candidate would develop the first and most simple version of the application from scratch in order to determine whether the concept is feasible and to gather initial data for subsequent analysis. The scenario currently imagined would be an Earth-Mars transfer with an elementary spacecraft model, with the minimum fuel consumed or transfer time used to measure the player's ranking.
The candidate must consider the appropriate programming language to use (e.g. Java), taking into account the scientific precision that may be required and the attractiveness of the application to users. In addition to designing, developing and testing the on-line application, the creation of an intuitive graphical user interface would be the primary focus as the application targets non-specialists and casual website visitors. Assistance with both the physical model of the orbital mechanics and with the infrastructure / interfaces would be provided by the ACT.

Candidate's qualifications

- Ability and will to understand the basic orbital mechanics
- Proficiency in design and development of web-based applications
- Excellent knowledge of designing Graphical-User Interfaces
- Confident team-player with the ability to solve problems independently

References

1. Howe, J. (2006). "The Rise of Crowdsourcing". Wired magazine June 2006
2. Dartnell, L. (2008). "How online games are solving uncomputable problems". New Scientist 05/11/2008
3. von Ahn, L., Maurer B., McMillen C., Abraham D. and Blum M. (2008). "reCAPTCHA: Human-Based Character Recognition via Web Security Measures". Science Vol 321 12/09/2008