

EXECUTIVE SUMMARY

Astrome, LLC is an aerospace company focused on developing technology for space exploration and increasing public interest in space. The company specializes in innovative product solutions for an integrated team environment as well as control, guidance and estimation algorithms. The mission statement of Astrome, LLC is “Develop new sustainable technology in the space industry to facilitate space exploration.”

The Spacecraft Design Platform (SDP) is a web application created by Astrome, LLC which allows team collaboration on space design projects from start to finish. One of the initial projects to be discussed here is the Spacecraft Design Platform Planner (SDP2) which not only manages the project timeline and task division for a space project but also optimizes such a timeline and task division according to a predetermined Gantt chart and Work Breakdown Structure (WBS) through task optimization algorithms.

Market Analysis: In order to gauge the requirement of such a product we conducted a market survey across the globe among profit and non-profit organizations/institutions/companies. The sample size was 104 unique organizations with employee strength varying from 10 to 5000. We enquired them about design integration software i.e. software to integrate different subsystem designs across teams into one complete whole while incorporating the interdependencies. We also enquired them about various parameters, for instance, how efficient is their task allocation, tracking in designing complicated interdependent system through current arrangement that they have. The survey result showed that for 77% organizations, 15% project timeline is required for payload development viz a viz satellite/spacecraft design and development. The data emerged highlighted that more than 75% of these organizations don't have any design integration

software. Those organizations which do use either customized or off the shelf product, majority of them reported that their software does not enable them to see the effects of changing design parameters on other parts of the design. The survey also showed that as number of teams (>3) and their respective sizes (> 5 members) increase, task allocation when designing a complicated interdependent system for 57% organizations becomes ineffective. Similarly for such a setup 59% organizations find it ineffective in communicating and performing design changes between technical teams during the project. The survey also showed that for about 61% organizations there is no effective mechanism to track the progress of the design project and are generally dependent on manual tracking and project management skills.

Based on our survey we have decided that primary target group is the academic community. Further segmentation of the target market is that we will focus principally on markets which are cash rich but technologically less developed. The secondary target group would be the space industry and world community which are solving big problems like asteroid deflection, space debris removal, etc. The space industry can not only be the clients for our software but also can be potential investor who will get ownership in return for their funding. Also the platform can be easily tailored to suit the communications industry as it can benefit by expediting their design process. The SDP2 will enable aficionados from around the world to participate in design projects hosted on our website to address important space issues. Potential funding for such an online design project is sought in the form of donations and sponsorship of the developed spacecraft.

Product Description: The Spacecraft Design Platform guides and assists in managing teams to efficiently design a space mission. In a space mission usually a number of teams with specific expertise work together to complete the design. The various subsystem designs are always

interlinked and hence strongly depends on coordination between different design teams. The SDP platform not only helps in viewing the effect of changes in parameter made by a team on other subsystems but also provides an efficient way of communicating these changes when they are committed. Besides that, the SDP provides an easy way to track interdependencies by optimizing task and time allocation of each team member to achieve specific design goals.

It also assists less experienced teams who are primarily interested in designing the payload by taking the design overhead and guiding them to build the supporting subsystems. The SDP will provide specific design steps to the novice at the same time provide flexibility to the experts to customize their design by being able to include new tasks and design parameters. The platform will enable teams to monitor the progress of all other teams through convenient graphical online representations. Ultimately, international teams can design missions for a common cause which will help in building a connected space community.

Intellectual Property Status: Under U.S copyright law, software is considered to be “literary work”. The author of a work is automatically the owner of a copyright in the work. Copyright lasts the life of the author plus another 50 years if the author is a natural person or for 150 years if the author is a corporation. Due to the fundamental nature of U.S laws as described above, the intellectual property of Astrome’s SDP2 will be protected by copyright law immediately upon completion of code. A patent law will be filed a year after the SDP2 has been out in market.

Competitive Differentiation: The current market is flooded with plethora of project management and design integration tools which try to differentiate it from each other based on functionalities. The common thread however that run through all these products are that they are based on architecture where agent needs to be installed on individual machines, all these tools

are generic and need lot of complicated customization and most of them are high end products. Our product offering has thus been tailored around this common thread.

In our offering, the platform retains all the major features that a similar product has in it; for instance, it has collaborative capabilities, issue tracking system, scheduling, project portfolio management, resource management, document management, workflow system, reporting and analyses. It however differentiates from its competitors by providing enhanced user experience as apparent from the features discussed below.

The platform differentiates itself by being the only product which is catering to spacecraft design. Since the primary target market is the academic community, it positions itself by being the most value for money product in this category. The tool is specially design for spacecraft design therefore it has the ability to show design dependencies and interconnections better than general software. Due to the same customization, we are able to provide the user with easy tracking of effect on other design parameters due to a change in one. This is very important for the spacecraft design which has high interdependencies between parameters.

Management Team: Shen Ge is a space entrepreneur in Houston, Texas. He graduated with an MS in the Aerospace Engineering working under the supervision of Dr. Hyland from Texas A&M University in August 2011 and a dual major BS in Aerospace Engineering and Physics from Georgia Institute of Technology in December 2008. Neha Satak is a final year doctoral graduate student at the Department of Aerospace Engineering at Texas A&M University. She received her Masters of Science in Aerospace Engineering at the Indian Institute of Science, India. Her undergraduate degree is in Electronics and Communication Engineering from the Rajasthan University.

Financial Highlights: Astrome has chosen to place a pricing model based on groups of end users. Our project management software is expected to have the lowest possible lines of code (LOC) of 10000 LOC, the maximum possible LOC of 100000 LOC, and the most likely size of 50000 LOC giving an expected LOC of 51670. Assuming an average software engineer's salary of \$4000/month and a corresponding rate of work of 150 LOC/day, this is equivalent to 344 days for one software engineer or ~\$46000, or more likely, two software engineers for half the time.

The selling price for the software can be estimated based on knowing three factors: 1) Estimated Development Cost which has just been estimated; 2) Estimated Market Size; 3) Competitor Prices. The estimated market size is ~500 based on the number of aerospace universities and small space companies around the world which is our primary market. Considering our development cost is \$46000 and the market size is assumed to be 500 user accounts annually, a minimum charge of \$92 per annum is required to cover the development cost and a maximum charge of \$200 per annum is acceptable given the competition. We choose to go with a competitive \$150 per annum.

Company Offering: The current status of the SDP2 is that in the development stage and will require another six months before beta testing. Based on beta testing the platform would take another +5 months for full launch. Total investment that we seek to accomplish the project is \$56000 with \$46000 for development and \$10000 for testing and marketing. The funding for the requisite amount would be through investments from angel investors, donations, private funding, award money from competitions like (New Space) and loan assistance from US SBA. In lieu of the amount invested, the investor would be 10% ownership in the revenue generated from the project / partnership in the company. The break even for the amount invested is one year and we seek to achieve annual revenue of at least \$75000 from Year 2014 onwards.