



DoubleSShot

Work Package #1

De-spin System for Payload Capsule

Rev. 2010/09/30

Work Package #1 (WP#1)

Work Statement

During ascent, the rocket vehicle will develop roll, also referred to as “spin”, about its longitudinal axis. The roll will be either intentionally induced by design or alternatively result from unavoidable slight misalignments of the fins. In any case, since there will be no way of dampening the roll during the climb to apogee, the roll will continue even after descent has begun, including following separation of the Booster and Payload Capsule.

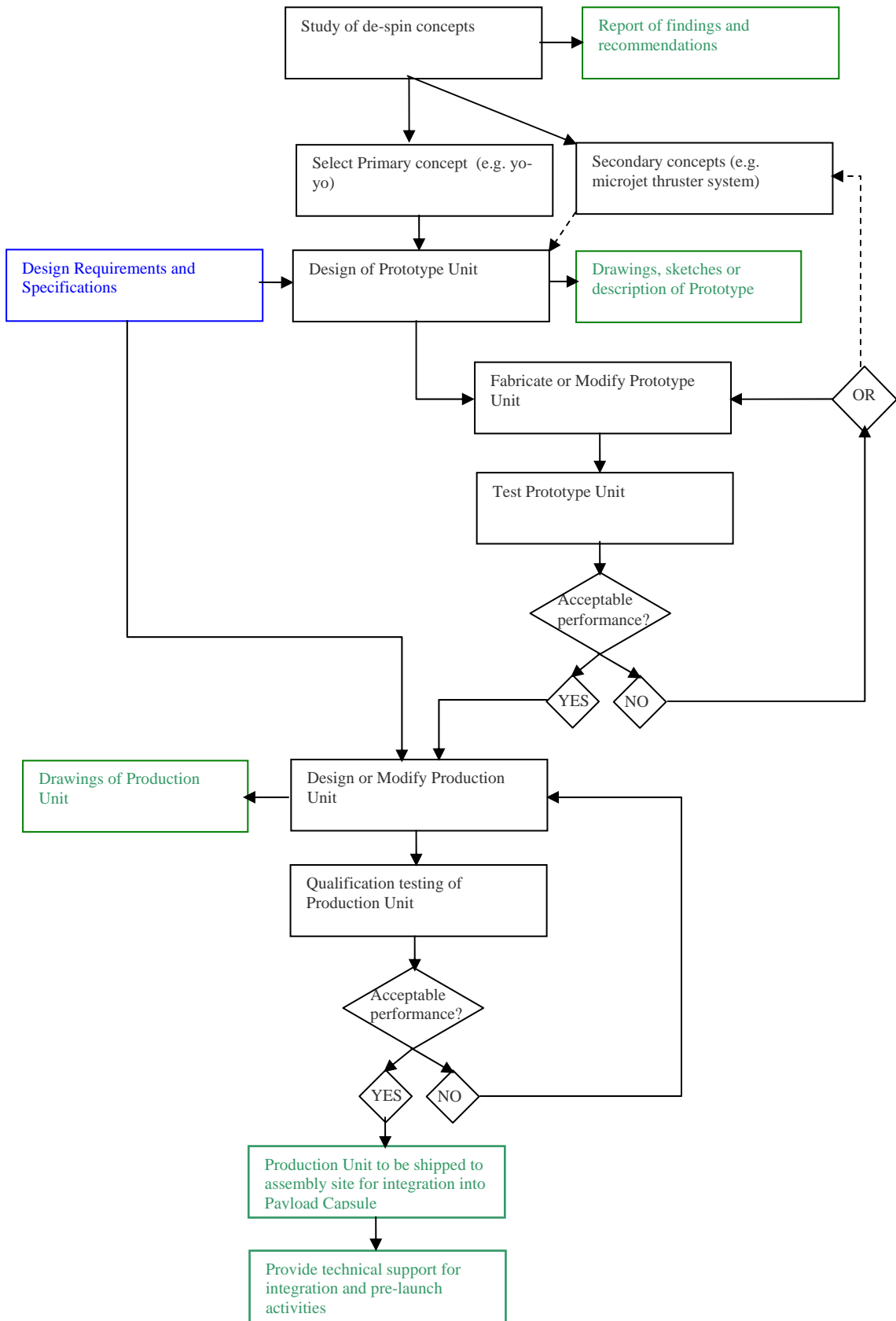
It is desirable to diminish or eliminate the roll of the Payload Capsule for two reasons

1. to prevent wind-up of the parachute tether
2. to provide for superior video footage during descent

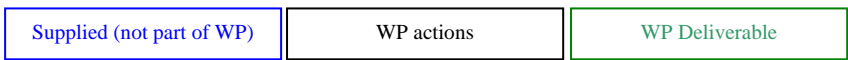
To diminish or eliminate roll, a de-spin system is to be incorporated in the Payload Capsule. **A suitable system is required to be researched, designed, tested, prototyped and a production unit fabricated and delivered for timely installation at the vehicle integration site.**

Technical Requirements and Specifications, as well as budget, will be supplied to the WP owner.

**SS2S DoubleSShot Project
 Vehicle Re-entry De-spin System
 Work Package (WP) Overview**



LEGEND



Task Descriptions

1. Study of de-spin concepts

1. Conduct a literature search of existing de-spin solutions applicable to our application
2. Query other SS2S team members for information and advice

2. Select Primary concept

Based on study, and discussions with SS2S team members, select the concept that would seem to be most suitable, taking into account key basic requirements such as:

1. available volume is fairly limited
2. mass is critical and needs to be minimized
3. good reliability is desired but not mission critical
4. funds are quite limited
5. development time is moderate
6. existing expertise of such systems is minimal
7. no SS2S precedent for such a system

3. Secondary concepts

Based on study, select a concept that can serve as a backup in case primary choice runs into technical issues that cannot be resolved within the framework of this WP.

4. Design of Prototype Unit

Based on supplied Design Requirements and Specifications, a fully functional Prototype to be designed which will serve as “proof of concept” and expose unforeseen technical issues. The Prototype should be simple and inexpensive, and can be fabricated in a reasonably short time.

5. Fabricate or Modify Prototype Unit

Fabrication of the Prototype, or modification if deemed necessary based on testing. Fabrication of any or all parts may be done by the WP owner or, if a request is made to Project Manager, by an outside party.

6. Test Prototype Unit

Functional testing to be performed under conditions similar to those specified in the Design Requirements and Specifications. Agreement is required by Project Manager on test plan. Any failures, deficiencies or other issues to be reported to Project Manager. If feasible, suitable modifications to be made to the unit to overcome problem, and re-testing conducted. If an issue is felt to be beyond the scope of modification, WP owner will consult with Project Manager with the aim of developing an alternative design.

7. Design or Modify Production Unit

Fabrication of the Production Unit, or modification if deemed necessary based on testing. Fabrication of any or all parts may be done by the WP owner or, if a request is made to Project Manager, by an outside party.

8. Qualification testing of Production Unit

Functional testing to be performed under conditions as close as practical to those specified in the Design Requirements and Specifications. Agreement is required by Project Manager on test plan. Any failures, deficiencies or other issues to be reported to Project Manager. Suitable modifications to be made to the unit to overcome problem, and re-testing conducted.

Deliverables

1. Report of findings and recommendations

Upon completion of task-1, a technical report, using standard SS2S template, to be prepared which will describe the problem, present possible solutions, and indicate the primary choice.

Drawings, sketches or description of Prototype

Sketches (hand drawn) or drawings (CAD) will be prepared which will describe in detail the proposed design of the Prototype unit. As necessary, a verbal description will accompany the sketches or drawings which clarify how the prototype is to be fabricated and how it functions. This deliverable will be sent to Project Manager for review & approval.

Drawings of Production Unit

CAD produced drawings are to be produced of the proposed Production Unit and sent to Project Manager for review & approval.

Production Unit to be shipped to assembly site for integration into Payload Capsule

Provide technical support for integration and pre-launch activities

Technical support to be provided (typically by e-mail or Skype) by the WP owner during installation of the de-spin unit into the vehicle and during functional testing, to ensure unit is installed properly and will function as intended.

Risk management

1. If any task runs into technical or other issues that may affect completion of a deliverable within agreed upon time frame, this must be reported to Project Manager in a timely manner. An action or action plan will then be worked out between WP owner and Project Manager to resolve the issue or plan a course of action to mitigate the effect upon the project.
2. Secondary concept required to be researched and selected.

Progress reporting

A brief synopsis of progress made is to be supplied to the Project Manager on a weekly basis. Typically by the end of each Sunday, in the form of an e-mail message. Submission of photos and/or videos are strongly encouraged, for inclusion in the project's Weekly Activity Report.

Funding

Funds for this Work Package will be supplied as required to cover expenses. Significant expenditures (greater than \$100) need prior approval of Project Manager. Expenses should be tracked for reimbursement upon completion of WP or as agreed upon with Project Manager. As SS2S is a volunteer, minimal budget program, donation of parts and labour needed for fulfilling this WP is highly encouraged, by both the WP owner and SS2S team.