

RIT Space Exploration Project Design Document Standard Format and Sample Content

Philip Linden^{*†}, Austin Bodzas[‡], Drew Walters[§]

Abstract—A standard format for Project Design Documents is key to organize and document the many projects members of RIT Space Exploration wish to pursue. The goal of the SPEX Standard is to organize, refine, and archive space exploration research. Documentation is vital to sharing and maintaining the wealth of ideas and information developed by all students at RIT. Project Design Documents aim to provide a foundation for new projects to grow, or premature projects to develop months or years in the future. A standard for project design documents and reports shall provide SPEX with a robust method to maintain a healthy ecosystem of projects in all stages of development including the event where a SPEX member goes on co-op or graduates.

NOMENCLATURE

PDD	Project Design Document
RIT	Rochester Institute of Technology
SPEX	RIT Space Exploration

I. INTRODUCTION

EXAMPLES of proper formatting, organizational techniques and content make writing Project Design Documents as easy and painless as possible. Writing documentation such as design documents and reports is a lot of work, but it supports the continued growth of knowledge and experience in science and engineering for SPEX as a whole. In technical research and academia, communicating one's thoughts and ideas is arguably more important than the ideas themselves. For example, when applying to a grant from a scientific foundation, receiving funding to continue research impinges on how the motives and techniques of a research group resonate with the goals and objectives of the foundation.

In the case of SPEX, a PDD carries value in the act of documenting ideas and effectively communicating them with others within and external to RIT Space Exploration.

II. PRIMARY OBJECTIVE

The SPEX Standard defines format and style guidelines for project documentation. The Project Design Document Standard controls these guidelines as applicable to young, exploratory ideas.

The ultimate goal of a PDD is to capture all ideas (including ones that are beyond our capability, interesting ideas, or things we just don't have time for, in addition to the ones that we

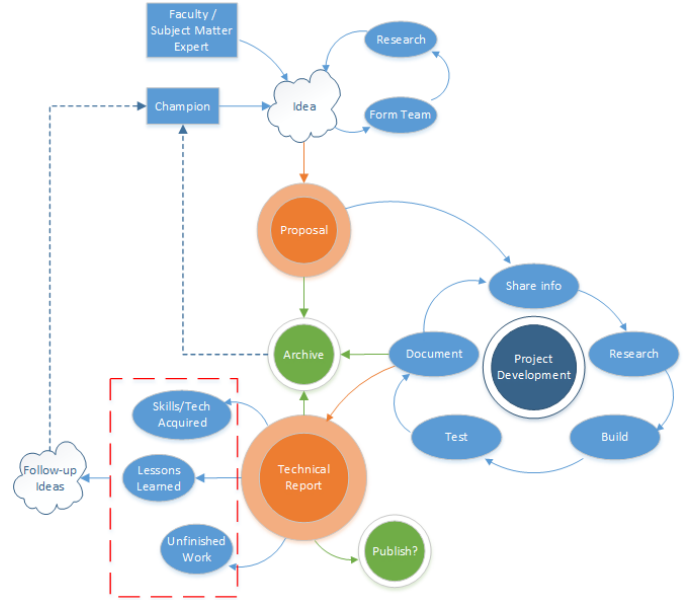


Fig. 1. A PDD is the first piece of documentation to be archived in the project life cycle. Since the life cycle can be iterative, a new design document may also refer to one or more previous SPPs.

actually work on and develop) and archive them such that if a student goes on coop or graduates, these ideas would not leave with them.

III. BENEFIT TO SPEX

By writing design documents and familiarizing undergraduate and graduate students from any discipline with this type of approach and execution, SPEX members will be better equipped convey their ideas to others in a methodical and organized manner. Ideally, an abundance of ideas and projects encapsulated in PDDs would outlive their respective authors and continue to sustain SPEX with valuable research opportunities invariant of individual members' absences due to co-ops or graduations. Perhaps in the future, SPEX design documents may be used as baselines for grant applications and other funded research efforts.

A. Mindset

Firstly, it gets people in the right mindset for thinking about what is important and what needs to be considered before taking off on a project. Publishing a PDD imbues a sense

^{*}Project Champion

[†]BS/MEng '17, Mechanical Engineering

[‡]BS '19, Computer Science

[§]BS '18, Mechanical Engineering Technology

of formality that hopefully makes its way into the level of seriousness and merit that is desirable for SPEX to pursue.

B. Traceability

Similarly, a PDD serves to provide the foundation for traceability in requirements and objectives to projects as they grow and change. This prevents blockers such as feature creep, rabbit holes, and spun tires, and hopefully prevents good projects from dying by getting too off track.

C. Accessibility

Having a “plug-and-play” template is the first step to learning how to one’s own SPP. It removes a major barrier of starting from scratch, providing example content to which one could refer when creating their own. L^AT_EX may prove to be daunting for some people, but it is arguably better to encourage people to learn LaTeX than to rely on something like Microsoft Word.

IV. IMPLEMENTATION

In the ideal case, every project begins with a design document. That design document gets sent around to SPEX members (and non-members) to draw support and build a team. Research and work takes place, documented along the way until an ending point is reached (e.g. project completion, end of the semester, team attrition, etc.).

At the end of the project (or end of semester, whichever comes first), the team writes a report of the project with what they did, if it was successful, and recommendations for future projects. A future SPEX member might pick up where the last paper left off, and the cycle repeats.

A. Deliverables

B. Milestones

V. EXTERNALITIES

A. Prerequisite Skills

B. Funding Requirements

C. Faculty Support

D. Long-Term Vision

As SPEX student members get more experience writing these papers, the group will build a library of meaningful work and be able to save it in an organized manner. Knowledge will be preserved and easily shared. Perhaps Project Design Document could eventually get published, in a journal or otherwise...

ACKNOWLEDGEMENTS

The author would like to thank Dr. Bill Destler for being an exemplary human.

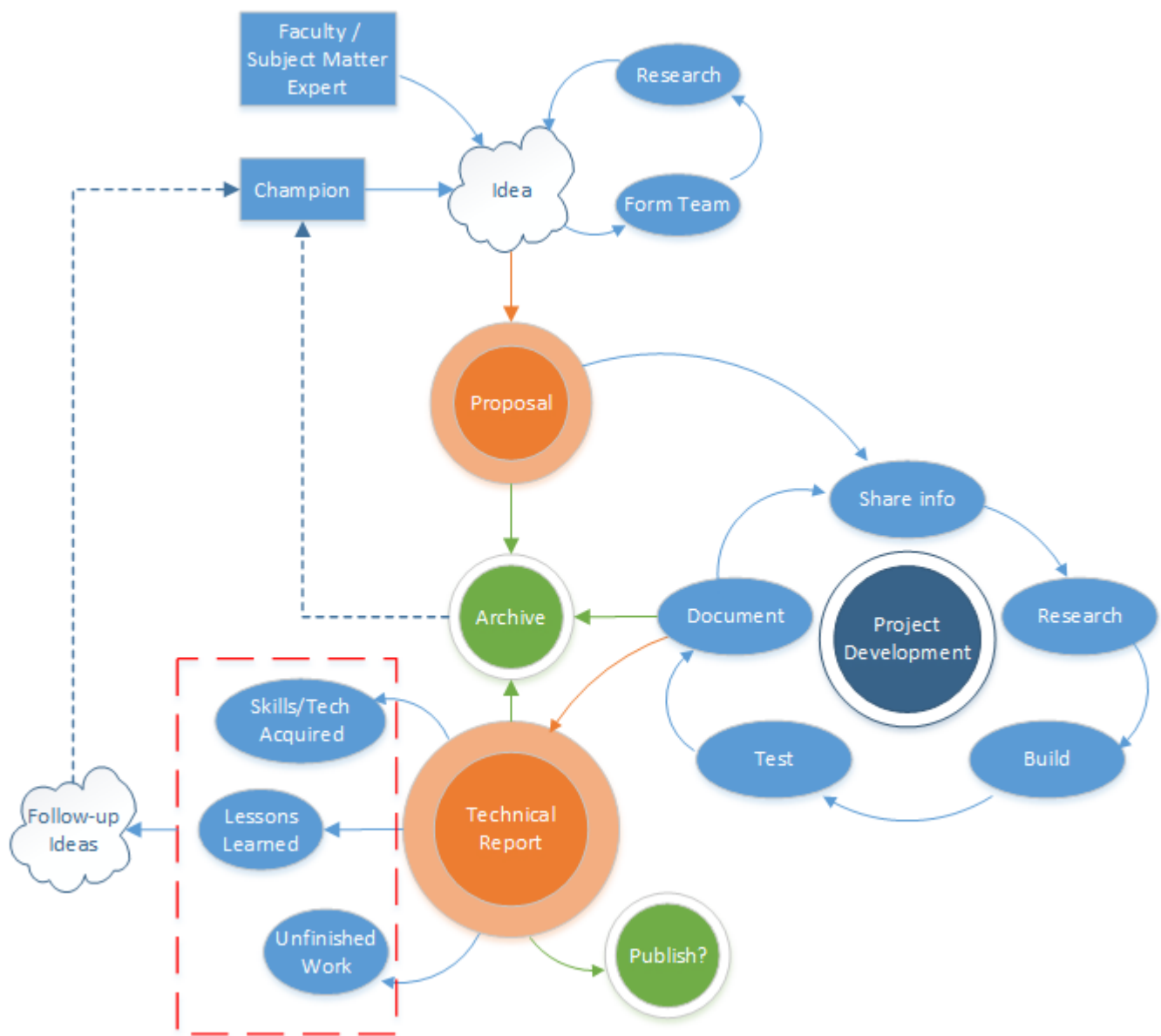
APPENDIX A
PROJECT LIFE CYCLE

Fig. 2. Enlarged version of the diagram in Figure 1.