

UNIP



System Critical Review Expectations

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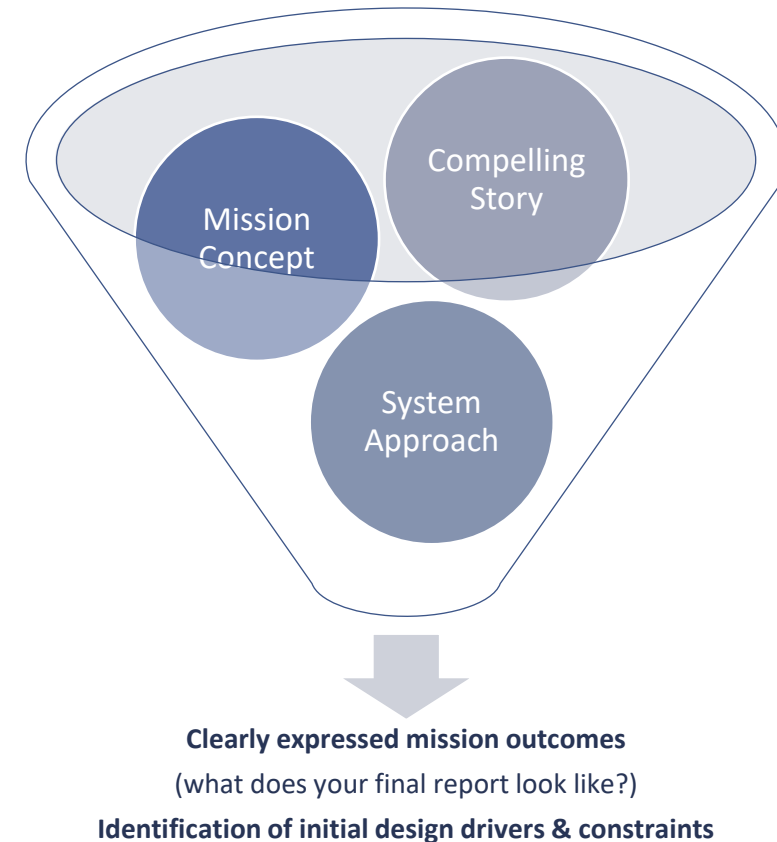
**Exploration Research and
Technology Programs**



UNP SCR: What are reviewers looking for?



- Understanding of mission/science objectives
 - What and why, why again?
 - Mission Objectives and Success Criteria Identified
- A plan that articulates what information you need to gather and analyze to achieve mission outcomes
- Initial system concept that shows a clear understanding of how it is going to be accomplished
 - How the science and data is going to be collected
 - What can you realistically do
 - Critical mission geometry



UNP SCR: Potential Topics of Discussions



- What is the experiment you want to conduct in space?
- What data product will be delivered from this mission?
- Why are you interested in this experiment?
- Who is your customer?
- Can this experiment realistically be done on-orbit?
- Is there value in the science of this mission?
- Has the experiment been done before?
- Why does this experiment need to be done in space?
- Is there a timeframe this needs to occur and why?
- What is the relevance / contribution?

UNP Where/How do I start to prepare for SCR?



- You already are! – SCR is not new material!

Mission Overview

- High level intro to the mission and supporting satellite system
- Includes mission objectives, minimum/full success criteria, and a discussion on military & NASA relevance

Experiment Plan

- Addresses what experiment(s) the satellite will perform. Not a step-by-step procedure.
- Payload being used, what it is measuring/performing, goal/result of experiment, data products and/or high-level vehicle operations are required

Concept of Operations (CONOPS)

- Describes phases & modes of the system
- Includes timeline and spacecraft operations
- Mission Concept User Guide Section 4.2.1

Your Story: How Objectives Led to the Payload Used

UNP Where/How do I start to prepare for SCR?



- You already are! – SCR is not new material!

Mission Overview by SCR

- Comprehensive 1st draft
- All expected information should be known

Experiment Plan by SCR

- First draft
- Trying to understand what activities are happening to get which data and some relation to order/timeline
- Details specific to hardware/software selection may be TBD, but high-level needs for mission objectives & success criteria discussed

Concept of Operations (CONOPS) by SCR

- First draft
- Trying to understand if there are critical events or particular sequences that matter and how to handle off nominal scenarios
- Details specific to hardware/software selection may be TBD, but high-level needs for mission objectives & success criteria discussed

UNP Where/How do I start to prepare for SCR?



- Plan with the next stage in mind: SCR to System Requirements Review (SRR)
- Are your objectives, success criteria, system concept good enough to help you:
 - Start developing lower level requirements?
 - Help you make decisions or “go do” these next steps?

SCR to SRR: Mission Concept User Guide

Mechanical

- Basic structure concept definition in CAD
- Look angles, FOVs, power generation surfaces drive the layout

Avionics

- Requirements & Specification Development
- Mission needs drive design: high power, high data, link needs, etc.

Software

- Planning: development plan, config control, practices & standards
- Software concept definition & req: functional & reliability requirements and risk assessment
- Driven by functionality needed, fault protection, special data processing

Ground

- Concept Definition: Developed alongside satellite concept/included in analyses
- HW/SW including RF needs, data processing, commanding

UNP Other things to keep in mind for SCR



- Ideally, reviewers have read your documentation, but that won't always be the case
 - Be as clear and detailed as you can in the time you have available
 - Assume the reader has no prior familiarity with your mission
- The soundtrack is as important as the slides
 - Understanding why/how you got to the result you are showing helps reviewers understand what matters most to you, what you have and have not considered so that together everyone can help you refine and clarify your concept
- A template is the starting line, not the finish line

UNP Other things to keep in mind for SCR



- A “successful” review does not mean you are guaranteed to succeed in your mission
 - It is a temperature check that from the expertise available to you, your approach makes sense
 - Reviewers are not judging you. They are trying to share their experience so you have the best outcomes possible
 - No questions/discussion does not necessarily mean you had the best review
 - Your team is in charge of what you do with the advice and information you are given at the review

UNP Other things to keep in mind for SCR



- Pre-SCR is the time to really question if you have alternate ways of getting what you want – embrace this!
 - Is there more than one way to accomplish your objectives? Why did you choose your path?
 - Understanding “off ramps” / alternatives may help you simplify in the future
- New team members are a great way to help refine ideas as you prepare for SCR
 - Are you explaining things clearly enough that anyone can understand?
 - What have you overlooked that someone without all the context might see?



MISSION DESIGN
DOCUMENTS



SCHEDULE



PROTECTION PLAN
(RECOMMENDED)

Due on Friday June 16, 2023



POWERPOINT

Due before your presentation begins



Tuesday: 6/27		Wednesday: 6/28	
Time	Team Presenting	Time	Team Presenting
8:00 am	Columbia University	8:00 am	Tarleton State University
10:00 am	Florida Institute of Technology	10:00 am	University of New Mexico
12:00 pm	Break	12:00 pm	Break
1:00 pm	Missouri University of Science and Technology	1:00 pm	University of South Florida
3:00 pm	New Mexico State University	3:00 pm	University of the Virgin Islands

All interning students must attend at least 2 additional SCRs besides their own

