**Pitch 2 Outline**

***Requirements***

*Each team will deliver a 5-minute pitch for tutors, examiners, other teams, clients and invited guests. Each pitch will be followed by 5 minutes for questions.*

*Your pitch should cover the following:*

* *What problem are you solving*
* *How are you solving it and how is your approach different*
* *If applicable, a demo of the latest developments*
* *If applicable, ask for the things you need to continue the project*

**J - Miniature Pitch**

First of, hi all, it is good to see you again as these are same groups from the round 1 pitching session.

As a refresher, One nut in space has the same kinetic energy as a car moving at 90km/h!

There is now enough stuff in space that a single collision could start a chain reaction, resulting in catastrophic (**SLIDE**) loss of telecommunication satellites. Tracking space debris enables early warning for operators to relocate satellites from collision paths.

Our client, Celine, of the Advanced Instrumentation Technology Centre is developing a new semiconductor laser, which improves on current tracking by an order of magnitude, with the added benefit of being significantly smaller and lighter than the EOS project specific laser and commercially available Toptica laser.

Our scope is to perform a systems engineering analysis and initial concept generation of an interface which enables comparison and final demonstration testing between our client’s new semiconductor laser, Toptica and EOS lasers on the 1.8m telescope on Mount Stromlo.

**A - Progress Since we last met**

When we last met, we spoke of our initial progress, milestones and plans. Since then, our major deliverable - the System Subsystems Specification document - has undergone preliminary verification by our client. This document specifies all the developed design requirements, constraints and interfaces. Our client is happy with our progress, and we have continued building momentum as a team since. Last Friday we hit a major milestone with the delivery of over 120 preliminary requirements and 14 design constraints for review enabling key stakeholders to now raise considerations and areas for further analysis before our final review.

**A – Conceptual Designs**

Our client expressed the need for multiple conceptual designs to account for different combinations of laser systems. I won’t be going into much detail about these designs, but I will show the high-level concept images, to note there more specific versions currently under development on solid works. I encourage you all to ask questions afterwards!

The first of these designs is a conservative approach that reflects the original design of EOS, combined with the work in progress (WIP) ANU laser. The next combination is a more ambitious design, that includes all three lasers. Finally we have a custom design with the Toptica and ANU Laser.

The design we are looking into first includes the ANU and EOS lasers. There will have to be some form of additional beam transfer optics to get the beam from the ANU laser over to where the beam enters the telescope. While this concept only includes the ANU and EOS lasers at this stage, there is nothing excluding the Toptica also being included in the future.

A conceptual design for the Toptica and EOS laser combination has not been done as the project focus is on getting the ANU laser mounted and demonstrated. It is also very unlikely that the Toptica laser will be purchased if the EOS laser is mounted and functioning.

**J-Challenges**

One of challenges has been managing a vast number of requirements and constraints, without high power sys-eng software such as Telelogic Doors. With a big thank you to Markus, we were able to overcome this by developing our own requirement management macros in LaTeX, which has project appropriate level functionality and creates a professional appearance. This code has been made available on TechLauncher for confident LaTeX users.

Our client and key stakeholders are all active research scientists and engineers, working on projects that have their own development cycles. This means large amounts of specific detail that we require are not written down in formal documentation - rather, they are trapped in the heads of key stakeholders! This had been aided with the development of interface diagrams to ensure that we are capture all required data and that thankfully, we have been afforded the opportunity to share a workspace with our client during office hours every Friday. This opportunity has been used to develop a strong relationship with our happy client!

**J - From Here**

We are currently on schedule and have organised facetime with subject matter experts located on Mt Stromlo, which is the only resource we need to progress at this time.

Fill in if available time

(\* Introduce ourselves as we enter into question time - audience can then direct questions appropriately \*)

**Key Questions**

1. Could you expand upon the conceptual designs?
2. How did you go about developing the conceptual designs and what are you ruling out
3. This seems like a vast and complicated interdisciplinary problem. How will you use your systems engineering knowledge to handle this situation and create an appropriate solution?
4. What systems engineering techniques are you using in particular?
   1. How do you approach gathering and coding information from so many different people and sources?
   2. How do you analyse and prioritise all the requirements, and resolve any conflicts that arise?
5. Can you give some examples of subsystems and requirements you have already determined?
6. Will you be developing a prototype this semester?
7. How does this laser prevent the loss of internet?
8. What are control systems and how are they related to this project
9. What steps are you taking to ensure you’re working as an effective team?
10. What is the most significant issue/risk to project delivery that you expect to face?

**Secondary Questions**

* What it is like working at Mount Stromlo, with so many different companies and organisations? (AITC, EOS, Systems Engineers, Astronomers, Physicists, Technical Staff etc)
* How do you track small and fast moving objects in space? What sort of relativistic effects (ie light travel time) do you have to consider?
* How does NASA/ESA currently track space debris? How effective is that?
* Why/how is the ANU involved in this project? What are the ultimate aims and objectives? What sort of funding do you have?