**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 all again as these are same groups from the round 1 pitching session. (JUST ENGAGED THE FUCK OUT OF THEM, LIKE THAT IS SOME GOOD SHIT RIGHT THERE, CHECK BOXES FOR DAYS, SEND HELP I’M STUCK ON CAPS)

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 to operators to relocate satellites from collision paths.

Our Client Celine (Celine is a human not a fucking acronym you dense motherfuckers) of the Advanced Instrumentation Technology Centre AITC is developing a new semi-conductor 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 critical our client, for comparison testing and final demonstration of the her new semiconductor laser, against the 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 we had a preliminary verification / redirection review of our major deliverable the System – Subsystem specifications document, which specifies all the developed design requirements, constrains and interfaces. We achieved verification for foundation SSS and have continued building momentum as a team since. As of last Friday we hit out next major milestone with the delivery over 120 preliminary requirements and 14 design constraints for review. Key stake holders have the opportunity to raise considerations for further analysis and critique requirements before our final review.

**J - Design Concepts**

Having completed many of the broad brush stroke requirement development activities the team has commenced refining activities in the form of initial design concepts. While remaining design agnostic we are able to raise design limitations with the client as well as possible design solutions. These provide indicators where further requirement development is required as well as previously not recognised design constraints. As stated, we are remaining design agnostic, but accelerating the systems engineering process as there is limited time frame to maximise value to the client and large amounts of information to convey.

**A - Explain Concepts**

One result of the verification / redirection review was that our client, Celine, wanted multiple conceptual designs to account for the different possible combinations of lasers.

THIS

I won’t be going into any details of these designs but we will show the high level design images, and I encourage you to ask for more in the questions. The first of these designs, shown here, includes all three lasers. The next is a combination of the ANU and toptica laser. Finally we have a design with the EOS and ANU laser. A conceptual design for the Toptica and EOS lasers 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.

OR THIS based on time?

The first design contains all three lasers. Here you can see the breadboards which have already been built to hold the EOS laser have been turned vertically which will allow enough floor space for the other lasers to be free standing and propagate their lasers into the boards where transfer optics will divert the beam through the central axis of the telescope shown here.

The second design includes just the ANU and Toptica lasers. Without the EOS breadboards we can add a new breadboard to hold the ANU laser and optics which can select between a beam from each laser.

The final design shows the EOS laser with its breadboards in the originally intended locations with some possible placement options for the GSL. A conceptual design for the Toptica and EOS lasers 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.

**Challenges**

One of challenges has managing the vast number of requirements and linking the constraints, without high power sys-eng software such as Telelogic Doors. Thank you to Markus we were able to overcome this by the developing our own requirement management macros in Latex which has project appropriate level functionality and creates a professional appearance. This code is available on tech launcher for experienced Latex users.

As the client is in their own development cycle large amounts of our specific detail for our requirements is trapped in the heads of key stakeholders as formal documentation would not be appropriate at their phase in the progress. Thankfully, we have been afforded the opportunity share a workspace without client during Friday office hours. 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.

Entering to questions time we should introduce our selves so questions can be appropriately directed.

**Key Questions to preload the other groups**

1. 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?
2. 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?
3. Can you give some examples of subsystems and requirements you have already determined?
4. What do you expect to have achieved by the end of the project/semester? E.g. List of reqs, CAD design, scale prototype.
5. How are you adding value for the client?
6. Why are you aiming to incorporate three lasers, when only one is needed to implement Adaptive Optic techniques?
7. What are each of your roles within the project?
8. What steps are you taking to ensure you’re working as an effective team?
9. 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 is adaptive optics using GSL/LGSs used in astronomy? How is that different to using it to track space debris? Why is this so unique?
* How does NASA/ESA currently track space debris? How effective is that?
* What are the fundamental differences between Radar and Lidar?
* Why/how is the ANU involved in this project? What are the ultimate aims and objectives? What sort of funding do you have?
* What types of lasers are there? Different generations?
* How do semiconductor lasers work? How do fibre lasers work?