RASCAL Systems Meeting
Action Items
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Introduction
- Does everyone know what Rascal is? (no)
    - initially proposed as an ELaNa mission
    - 2 spacecraft deployed together, separate, perform prox ops
    - Submitted proposal to Boeing, Boeing has agreed to sponsor the mission
        - We are required to deliver a 3U target spacecraft that can relay GPS position data to the primary spacecraft and have visual markers to assist in prox ops. Also deliver camera payload for navigating during prox ops and a propulsion unit compatible with Boeing's Colony I bus.
        - SWARTWOUT: there are a lot of programs that have proposed to do this kind of thing, but never on this small a scale
        - TOM: other, far more expensive spacecraft have attempted similar missions and failed. The biggest problem these missions have is staying close enough to the target to rendezvous
- Is there a propulsion unit on the dummy / target spacecraft?
    - TOM: No
    - Then how are we undocking?
        - TOM: we have to come up with that in the docking mechanism
        - SWARTWOUT: we may also need to figure out how to damp the acceleration to cancel out separation instabilities.
        - SWARTWOUT: in a previous mission we looked at using velcro and saw that one hoop & hook pair was enough to hold both spacecraft together through the flight profile
- SWARTWOUT: in the interest of time, we should focus on assigning tasks
Work done so far
- So far it's been two senior design projects, one focused on CE and ECE aspects of the payload, one Aerospace project focusing on mission design
    - We have no propulsion design concepts or docking design concepts
- We need to have an engineering design unit by August 1st (so says Boeing)
    - By EDU, we mean relatively functional and in the correct form factor, though not necessarily with flight ready materials / components
- Our main focus going forward will be the docking and propulsion systems, as well as flight navigation algorithms needed for the prox ops
Team Structure
- Dummy Spacecraft Team
    - Structure
    - Power
    - Communications
    - Command & Data Handling
    - Attitude Determination & Control

- SWARTWOUT: we should scale down what we think the Dummy needs to do, simplicity is the real benefit. We only need it to operate for a few hours or days to demonstrate mission success.
- So no solar panels for the Dummy / Target spacecraft?
  - SWARTWOUT: we should run that through a trade study, but simpler is better. Dumping the solar panels dramatically reduces cost and makes docking easier. Every program reaches a point where you start dumping things overboard. Less active parts is better
- Primary Spacecraft Team
  - Propulsion
- Docking Team
- When does Boeing want to launch?
  - SWARTWOUT: not anytime in the next 18 months, but they want to be able to show the Air Force / their supervisors that they can make progress with the money allocated in the time allowed. They want to use the EDU as a demo of this
- If we'er launching out of pods with a bunch of other spacecraft, what are the chances that we might hit another spacecraft?
  - We can delay the start of the mission until we're far enough away from everything. Mission start is after deployment and acquisition
- So are we controlling this through manual inputs?
  - No, we trigger the actions, but the maneuvers will be automated due to communication latency and the duration of our passes. We can override the experiment whenever necessary, but we are limited by our capabilities
- Is there anything worth doing after we complete the prix ops?
  - Extended ops are still an open question
  - SWARTWOUT: we could find something to do with the imaging system (earth observation) but we could try to go find other objects that might be launched into the same orbit

Subsystem Signups
- Initial where you feel like you want to work (see TOM's signup sheet)
- As a general lab practice thing, we have flight components for spacecraft in this lab, as soon as any flight component is done being used return it to the clean room.