

# Shielding Introduction

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**Center for Frontiers  
in Nuclear Science**

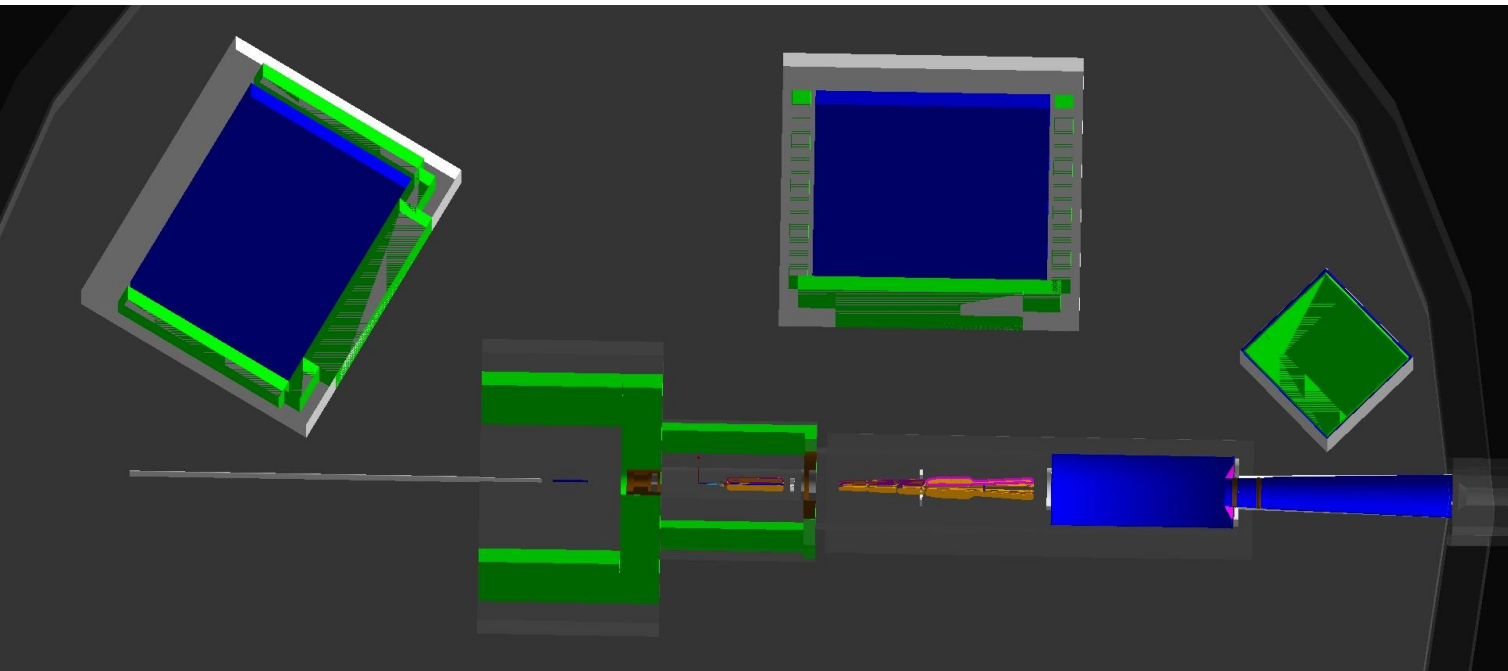
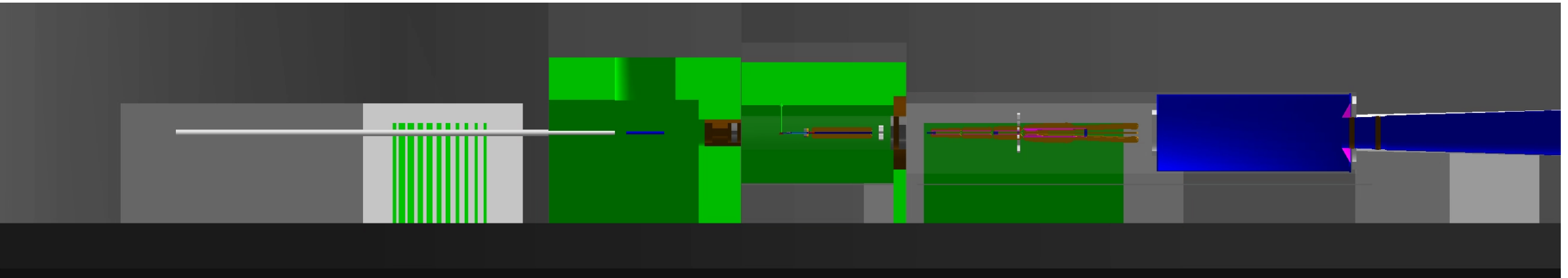


**Stony Brook  
University**



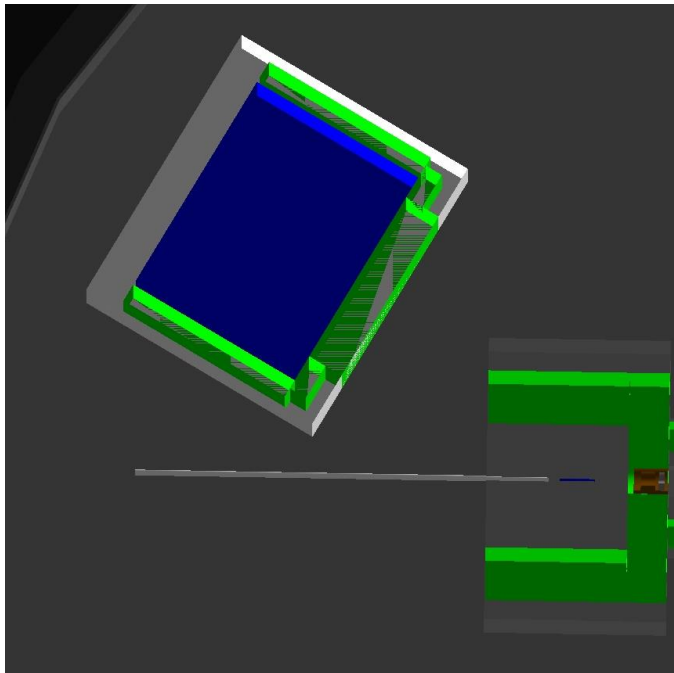
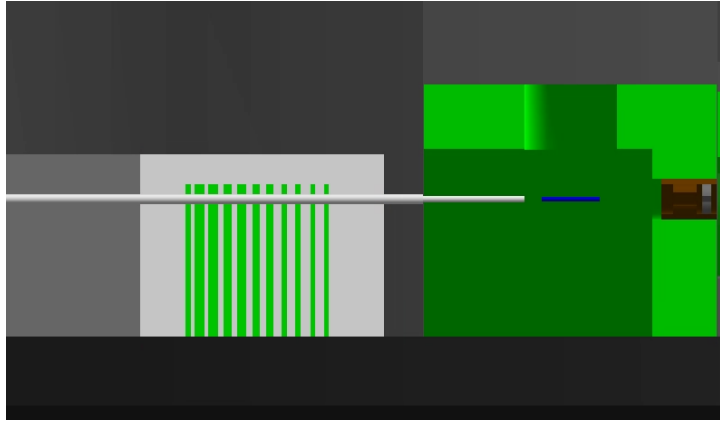
**Jefferson Lab**

# Current shielding design



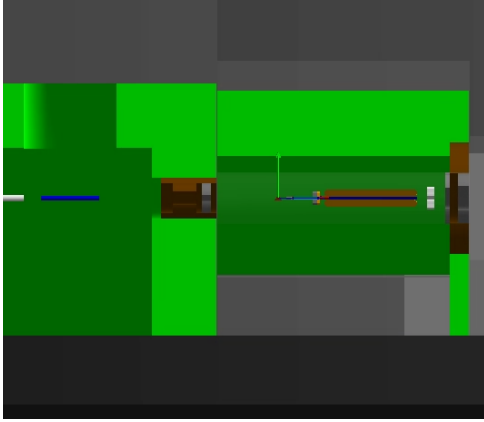
- The redesign effort in our simulation went hand in hand with the actual design done by Robin and her group in the CAD model
- We started from the target and we are progressing downstream
  - Currently evaluating the downstream torus region and drift pipe

# Target shielding changes

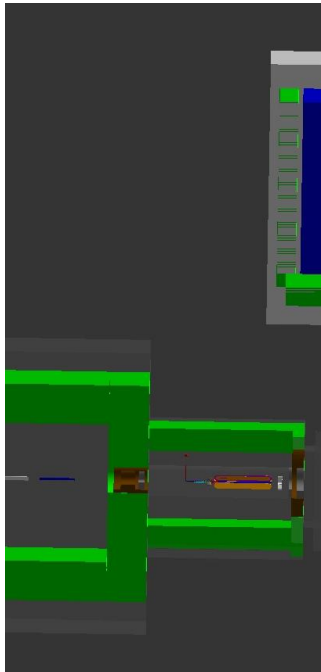


- Removed the upstream face of the target bunker
  - Checked we didn't have worrying rates at the entrance of the hall, Moeller polarimeter location and beamline electronics and readout
  - The increase at the front face of the SBS bunker doesn't lead to a significant dose inside the bunker itself
- Added 2m diameter hole on top of the roof to allow for utilities to make it to the target
  - Evaluated the increase of high energy neutrons at the roof of the hall
- Removed the Pb wall downstream of the target chamber
  - The overall radiation field after the target bunker is similar to the configuration we had at the last review

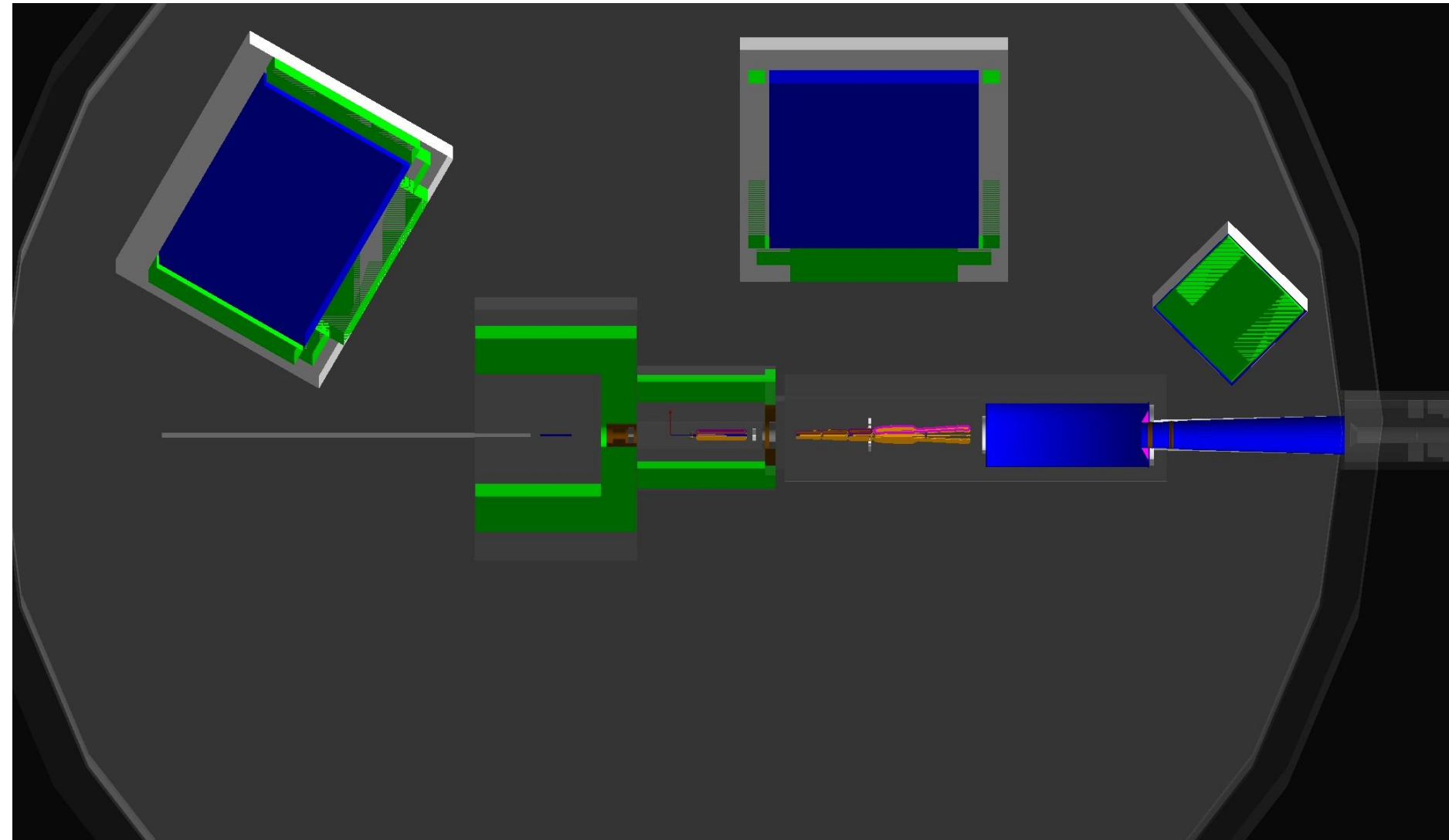
# Upstream torus shielding changes



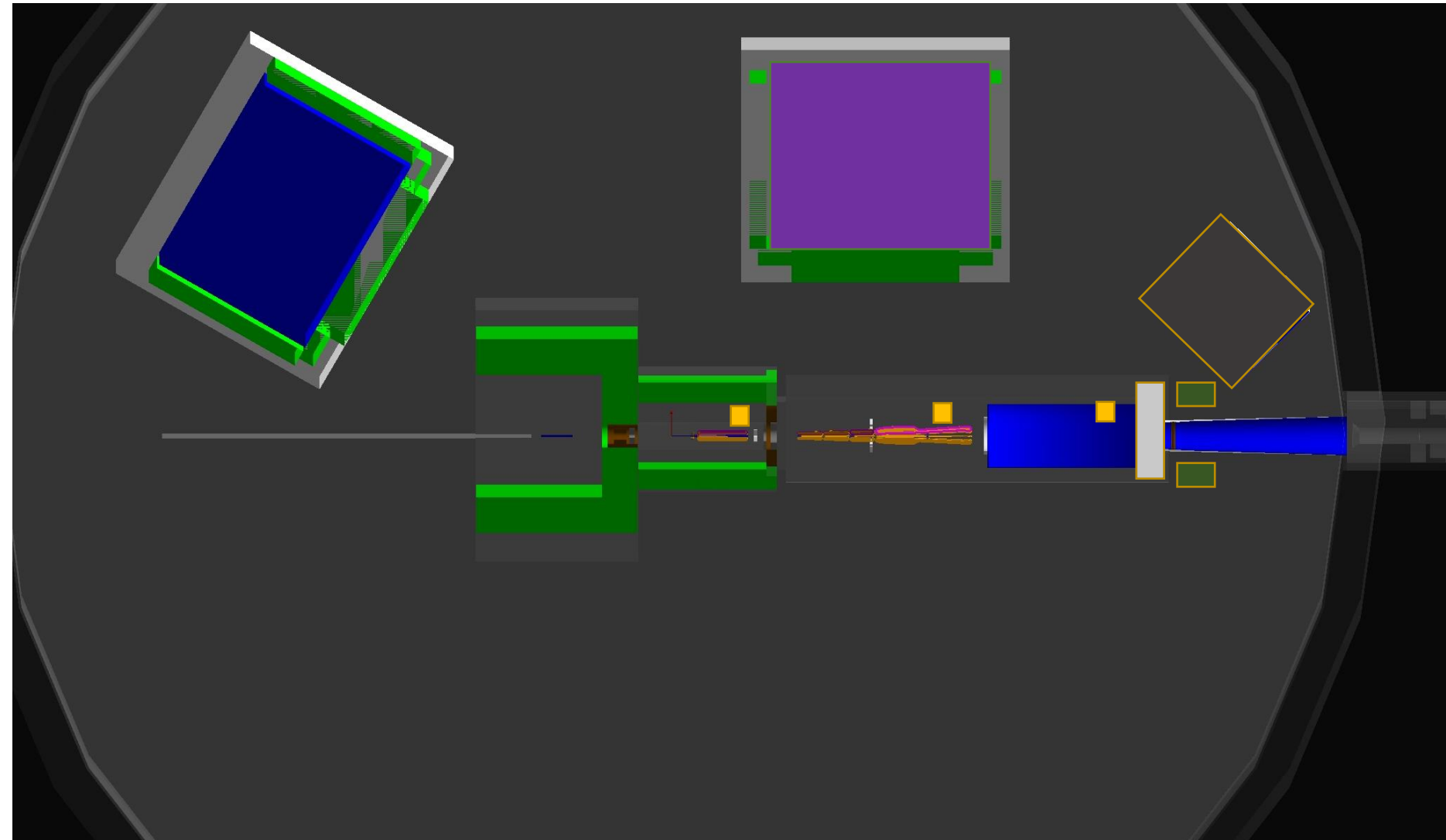
- The shielding will sit on top of a platform above the HRS links
  - This will allow utilities to the upstream torus region from below
- The lead wall downstream of the upstream torus has been replaced by two lead “donuts” followed by concrete radially out
  - The rates downstream of the this shielding has remained similar to previous levels
  - The rate from electrons scattering from the pivot iron is and reaching the main detector plane has been contained to acceptable levels
- The concrete roof remained the thickness we had at the last review to keep the neutron levels at the roof within reasonable ranges



# Shielding path forward



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- Magnet power supply bunker evaluation
- Radiation at vacuum pump locations
  - Local shielding may be needed
- New bunkers for GEM electronics (~0.5m in height)
- Do we need the extra electronics bunker
- Integrate additional wall at the collar 2 location