COATL mmWave RADAR

Design and Ethics Considerations

| **Capstone Team #** | 4 |
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| **Capstone Name** | COATL mmWave RADAR |
| **Team members** | Henry Sanders, Wallace McKenzie, Chris Kane-Pardy, Kamal Smith |

# Design Considerations

| **Consideration:** | **Yes/No/ Possibly** | **Why?** |
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| **Public health, safety, and welfare** | Possibly | While there is no significant direct impact on public health, safety, or welfare, there remains a minor risk associated with potential radar leakage from the container used to measure the moisture content of coffee beans. However, the likelihood and impact are considered very low. |
| **Global factors** | No | The use of the XM125 radar for measuring coffee bean moisture content is unlikely to have any global impact. The radar emits minimal energy and operates within non-ionizing radiation parameters, posing negligible risk. |
| **Cultural factors** | Possibly | There could be a positive cultural impact, as the introduction of a low-cost, accurate moisture detection method could benefit coffee producers, particularly small-scale and specialty roasters. |
| **Environmental factors** | Possibly | Similar to public health considerations, there is a minor potential for radar emissions to leak from the container. However, the environmental impact is expected to be very low and unlikely to affect people, animals, or ecosystems significantly. |
| **Economic factors** | Yes | The device has the potential to significantly lower the cost of measuring moisture content in green coffee beans, creating a positive economic impact. This may lead to lower prices across the coffee production and roasting industries, benefiting consumers and small businesses. |

# Ethics Considerations

| **Consideration:** | **Yes/No/Possibly** | **Why?** |
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| **Global** | No | There are no expected global ethical concerns associated with this project. The radar device operates at low power and uses non-ionizing radiation, making it safe for widespread use. |
| **Economic** | No | No significant ethical issues are anticipated regarding the economic impact of the device. |
| **Environmental** | Possibly | From an ethical standpoint, minor environmental concerns could arise if radar emissions were to leak and interfere with nearby devices or living beings. However, the risk is minimal and manageable. |
| **Societal** | Possibly | There is a slight ethical consideration regarding societal impacts. Smaller coffee roasters may initially experience slightly less accurate measurements compared to high-end devices like the RM-800 from Roastrite. However, future iterations and improvements to the system are expected to address any performance gaps over time. |