THOMPSON RIVERS UNIVERSITY

Umbilical Retrieval Mechanism (URM) Update

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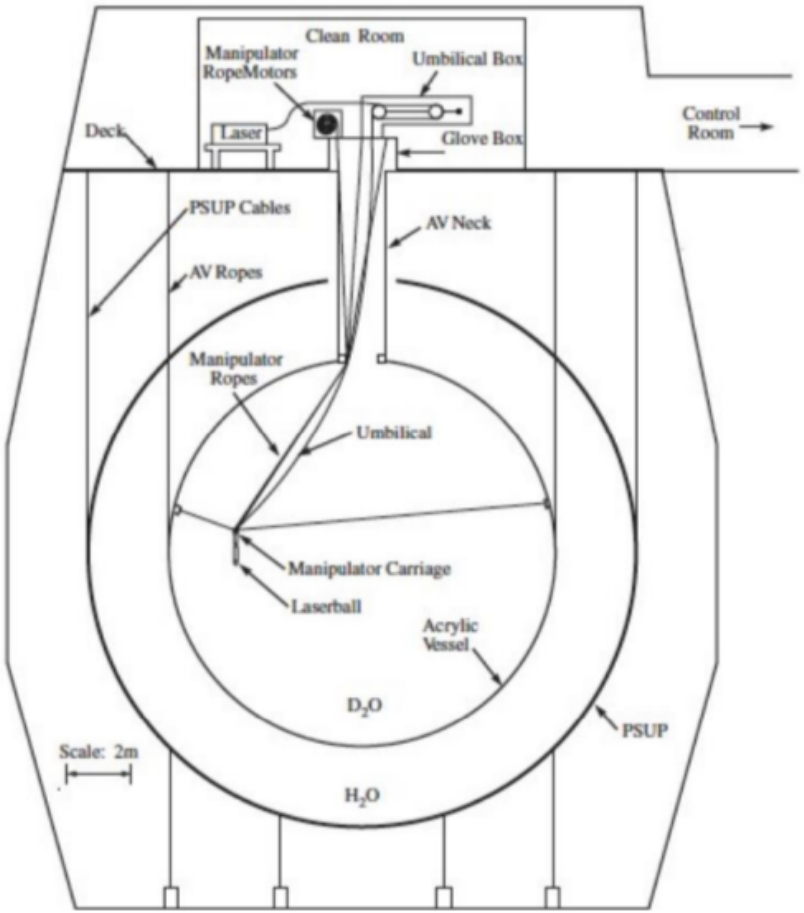
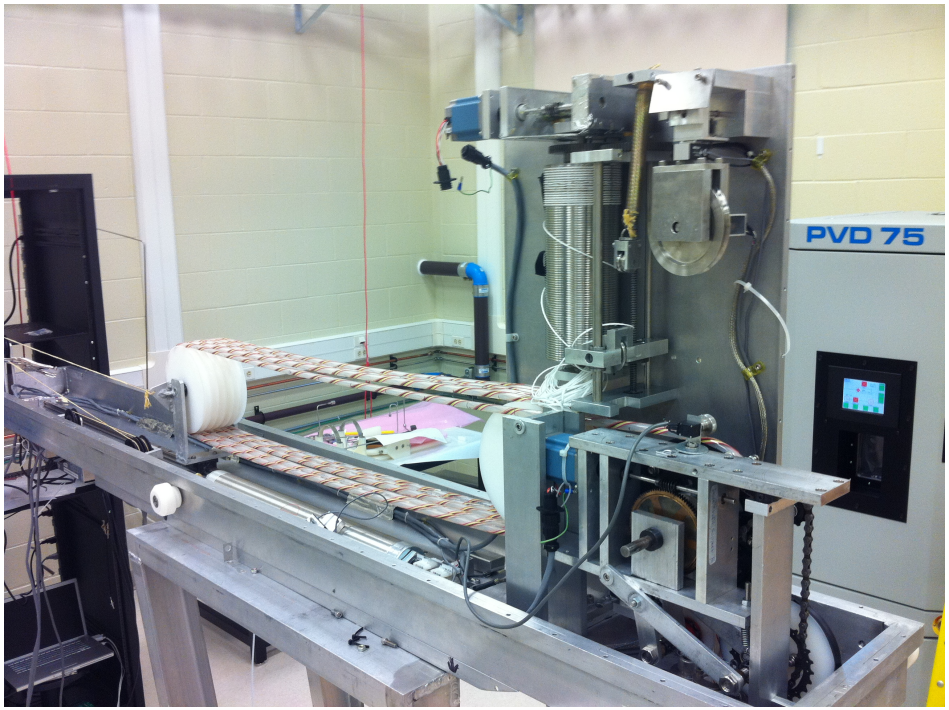
Overview

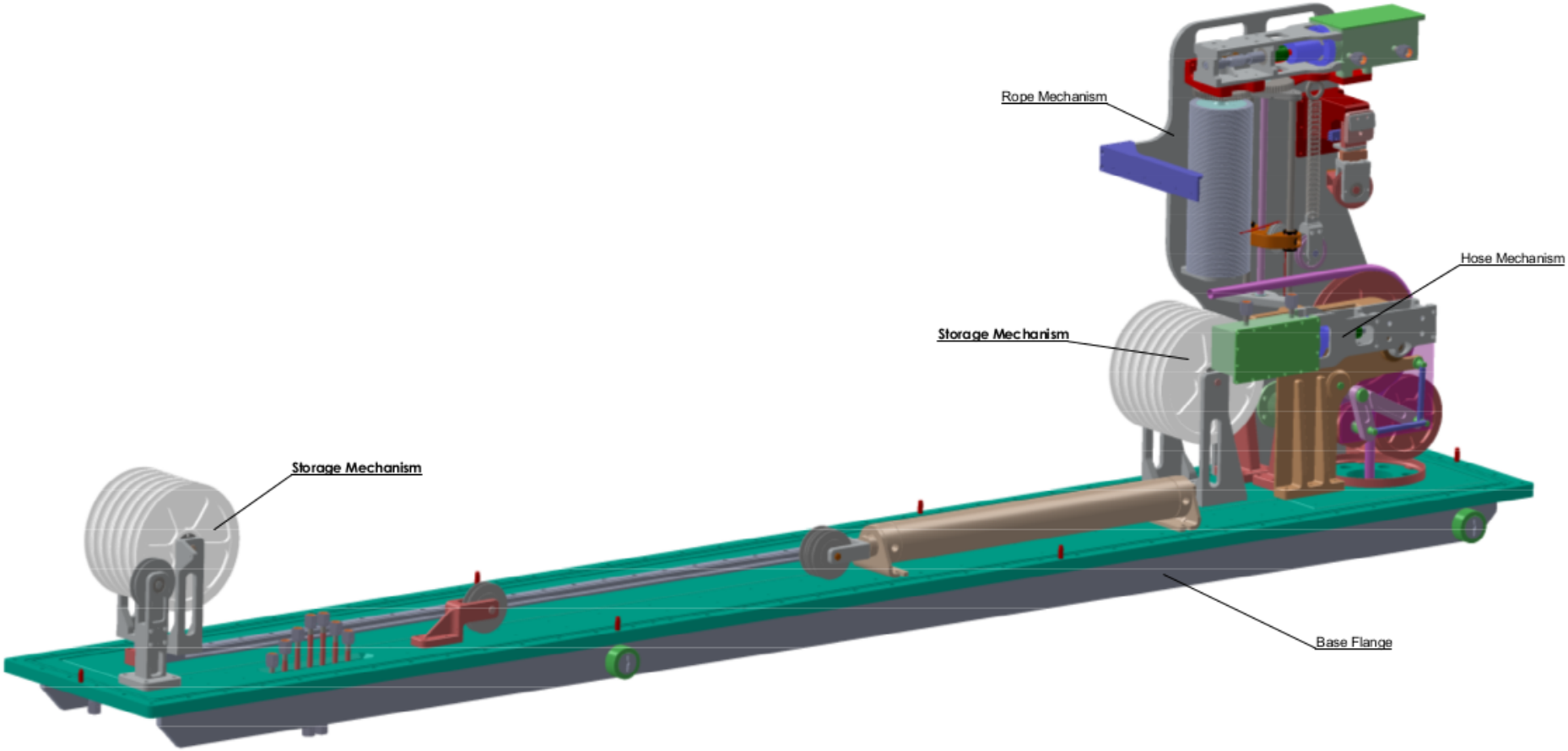
URM Function

Controls the deployment and storage of the source umbilical for the SNO+ detector



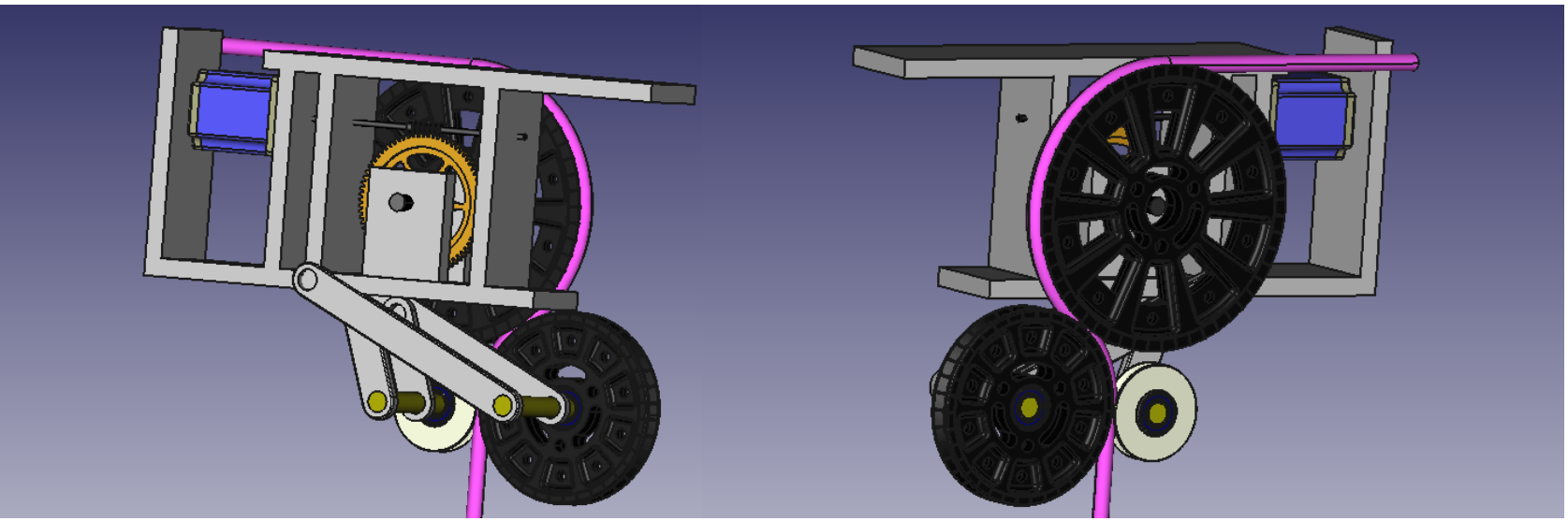


How it Works


Rope Mechanism
Hose Mechanism
Storage Mechanism
Storage Mechanism
Base Flange

Drive Pulley Assembly Before:

The drive pulley assembly extends and retracts the umbilical

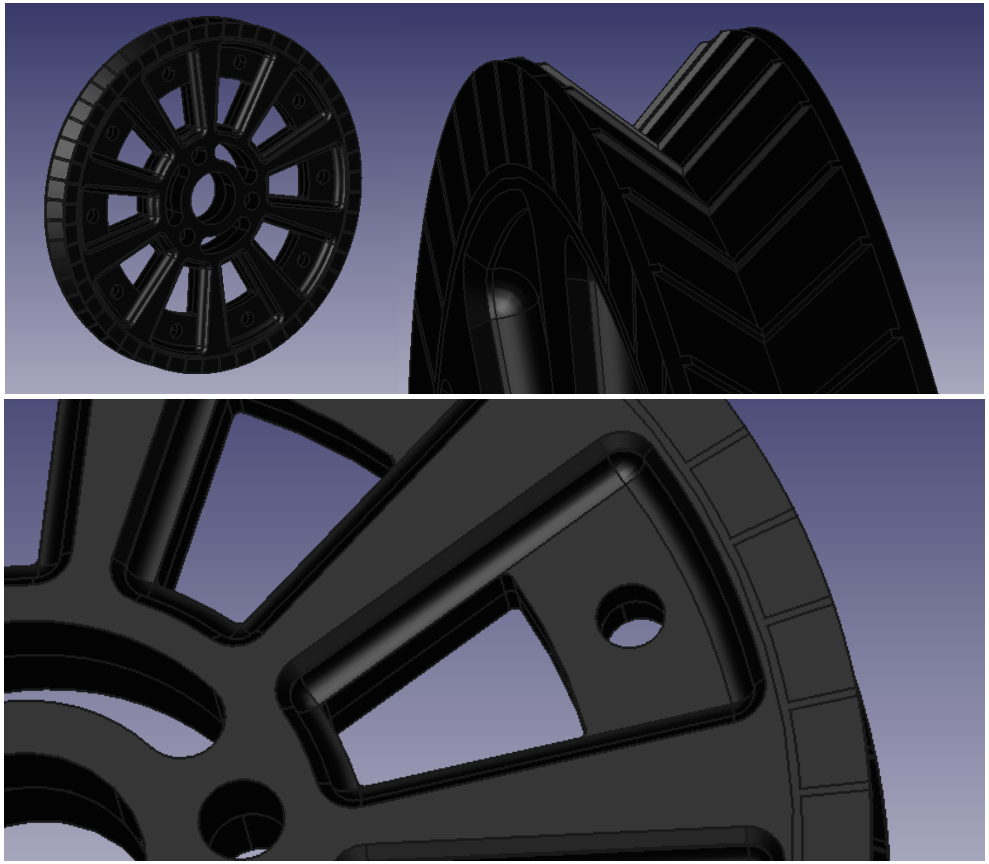


URM Problems

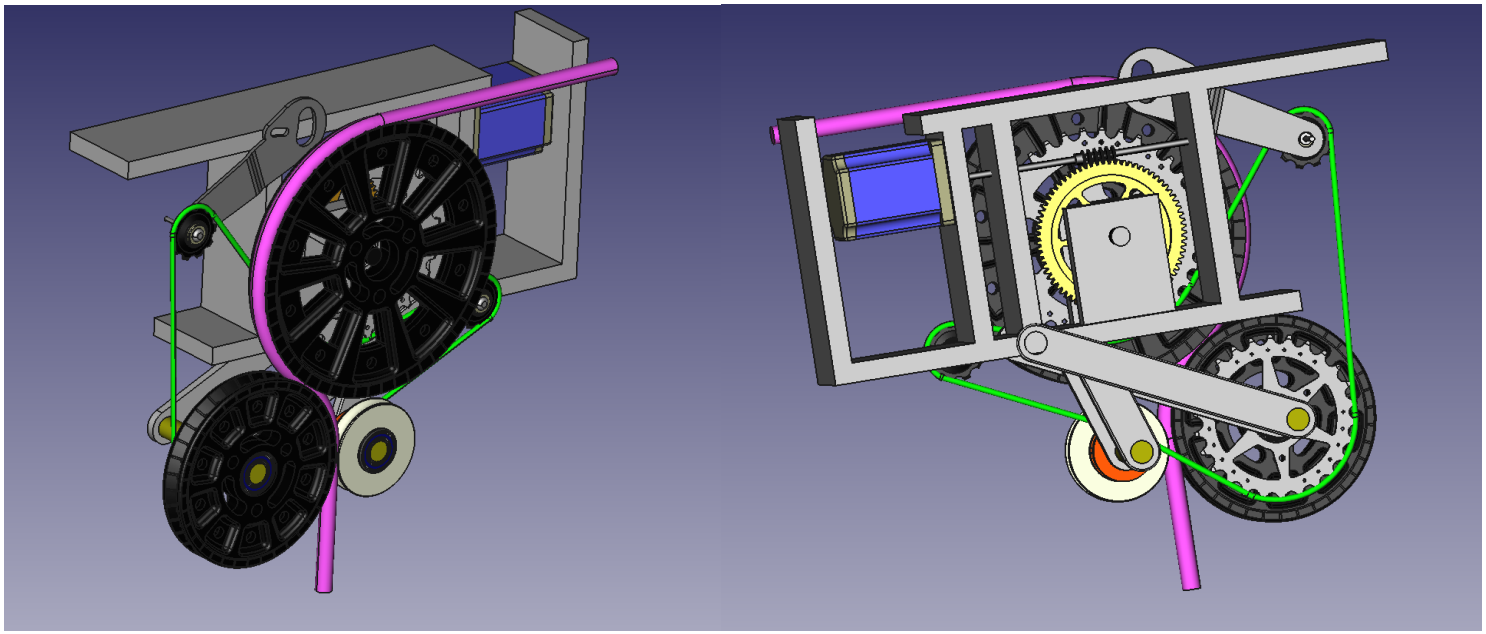
Sources of Slippage:

1. LAB as Scintillator (low coefficient of friction)
2. LAB and Water compatible umbilical
3. Pulley Design (collects LAB reducing friction)
4. Umbilical Storage System (Pneumatic Cylinder)

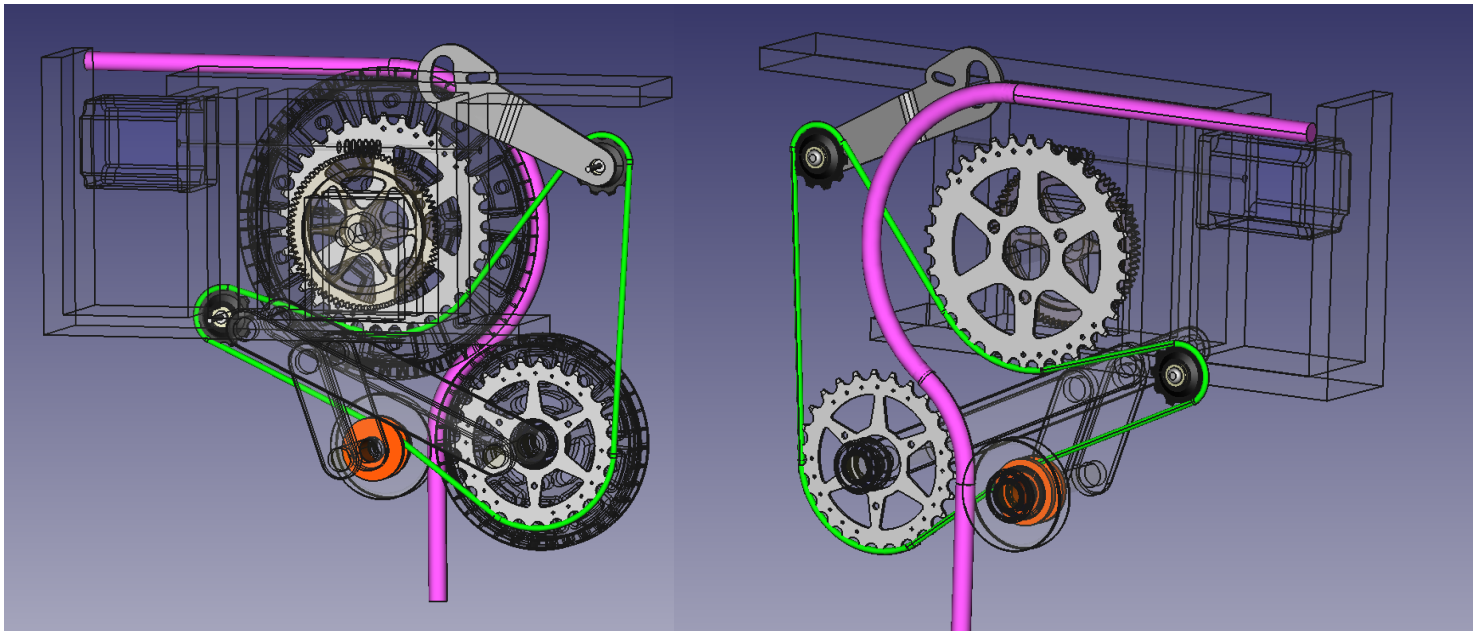
The Drive Pulley Design



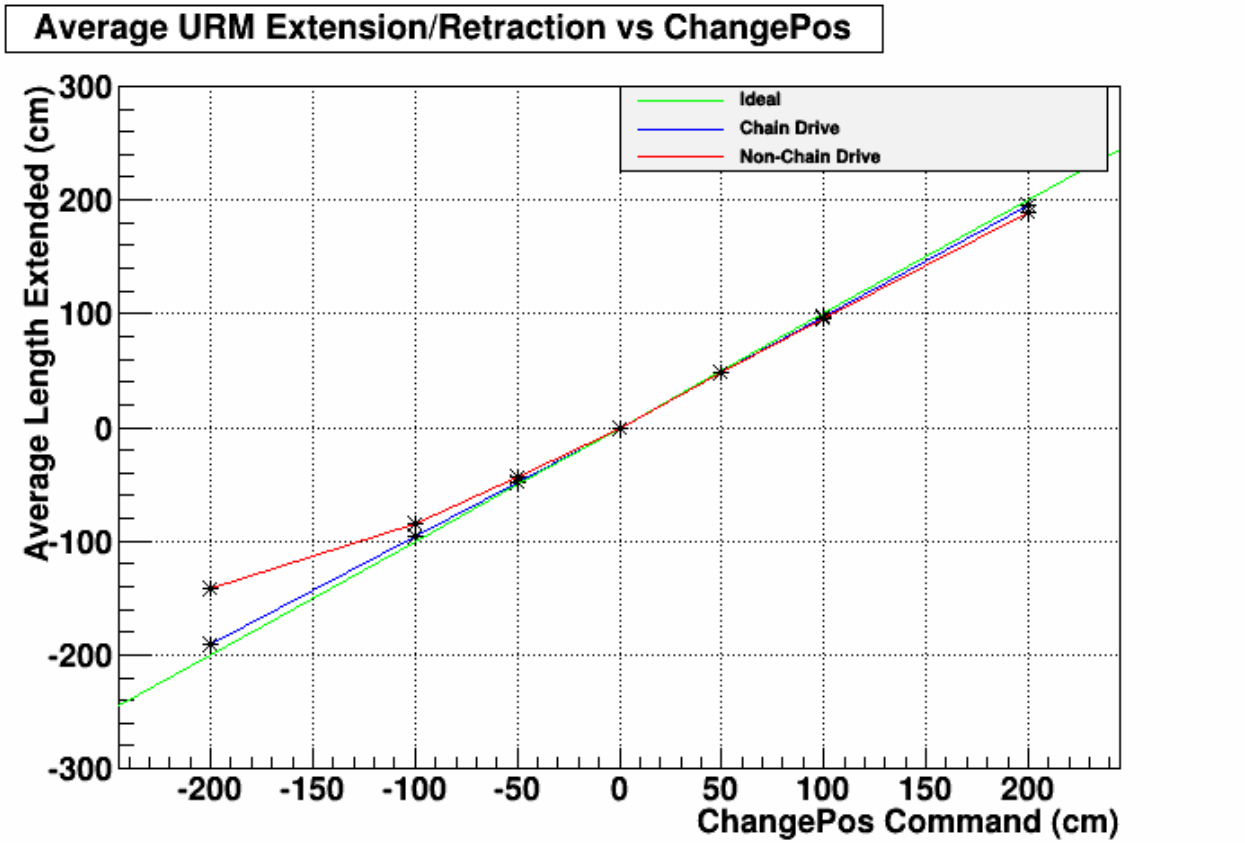
Chain Drive Design



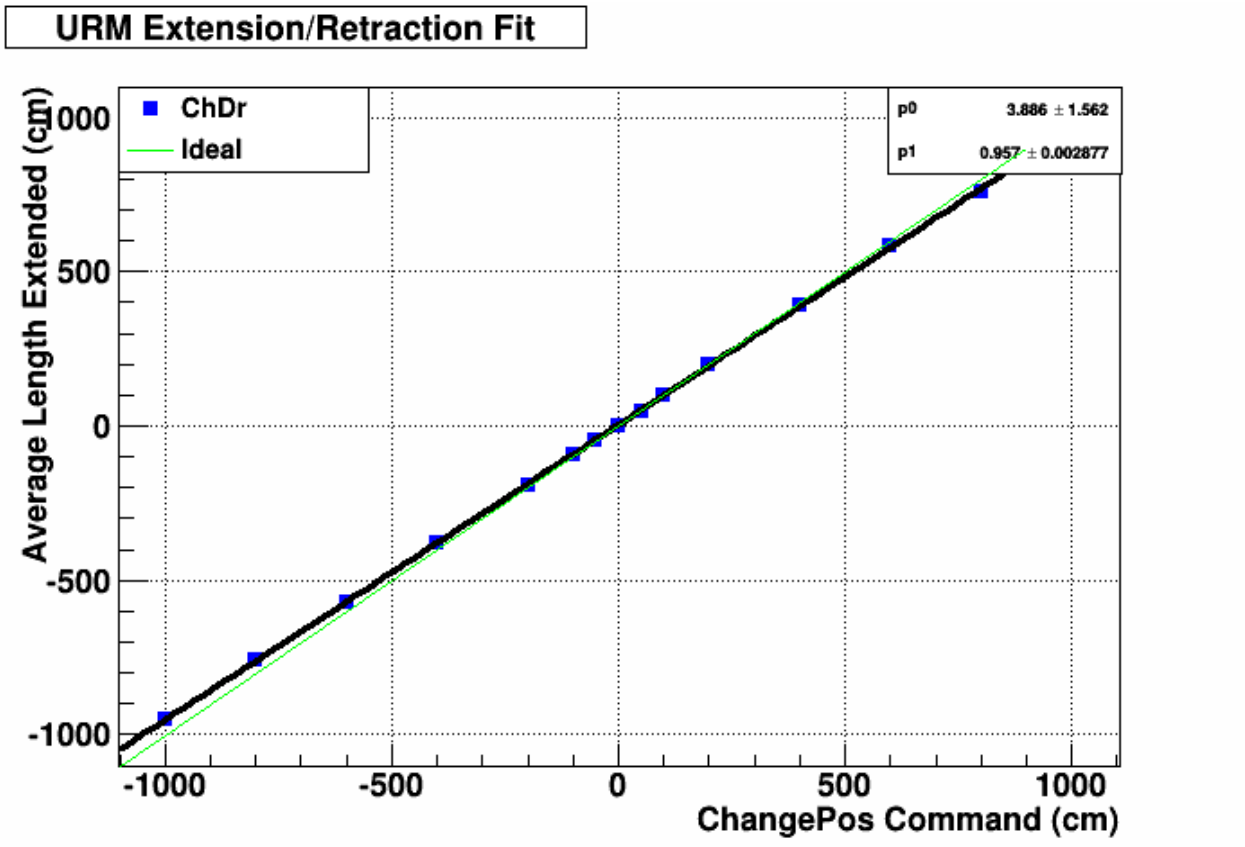
Chain Drive Design



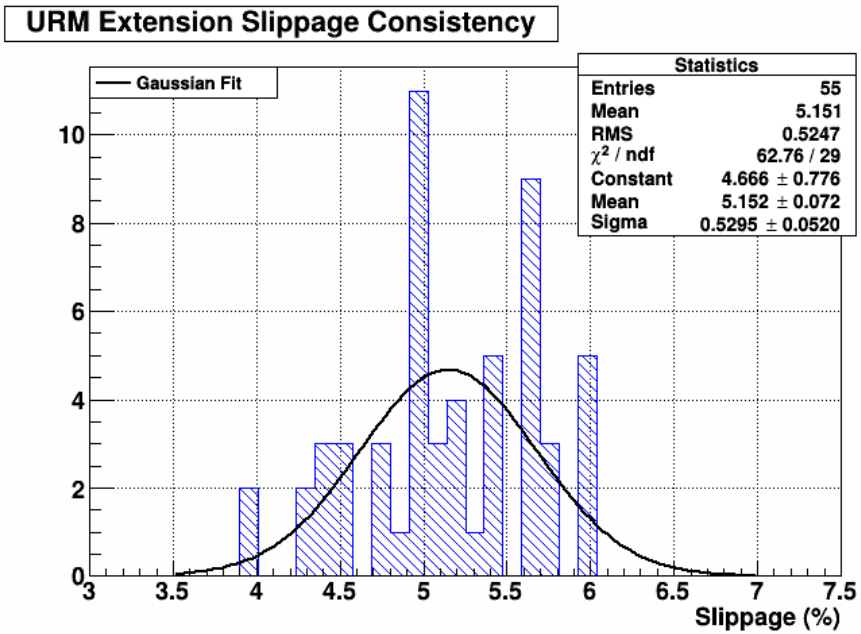
Chain Drive vs Non-chain drive

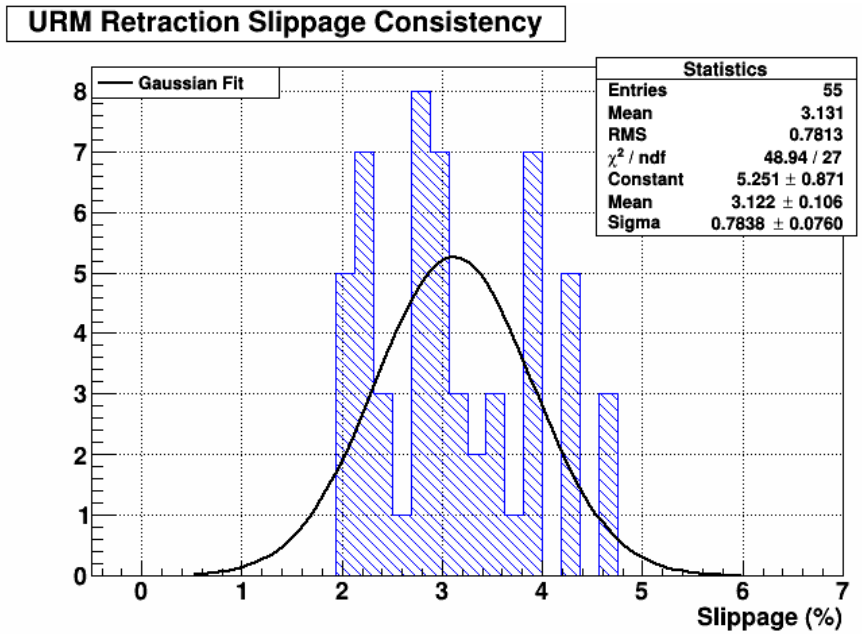


Chain Drive Fit

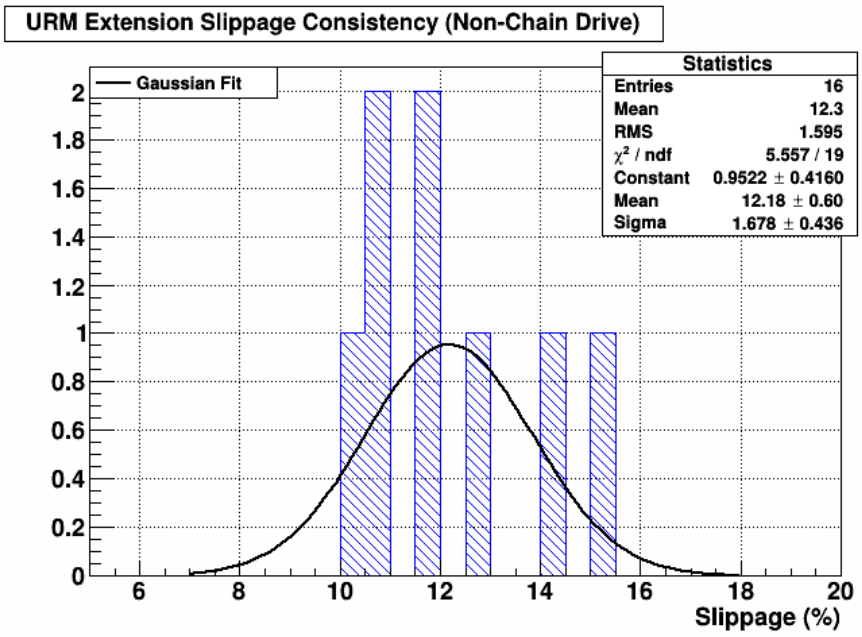


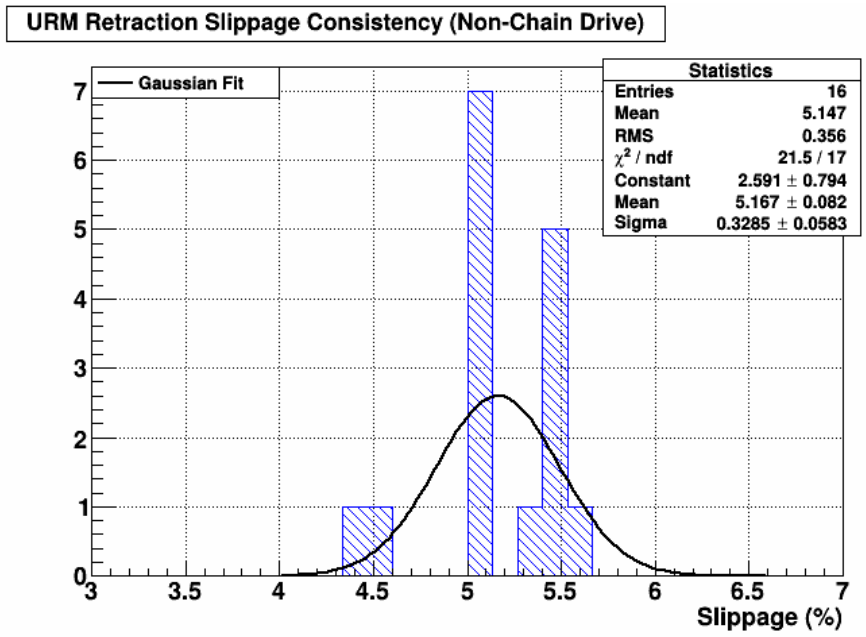
Chain Drive Consistency



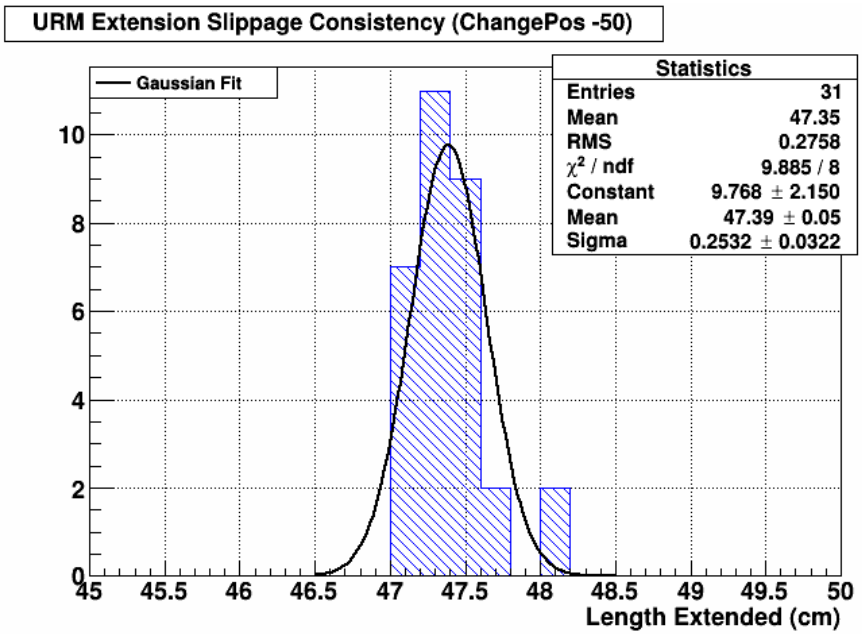


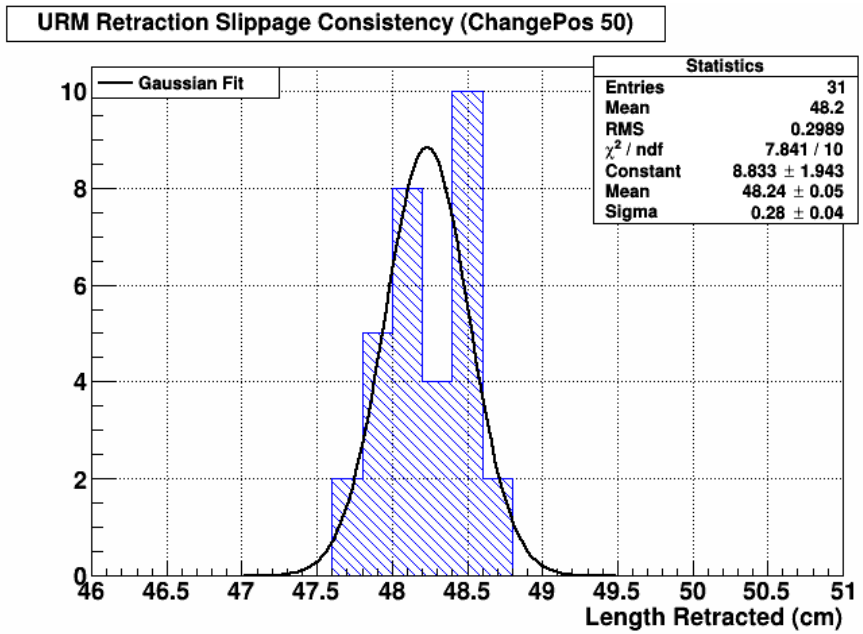
Non-Chain Drive Consistency



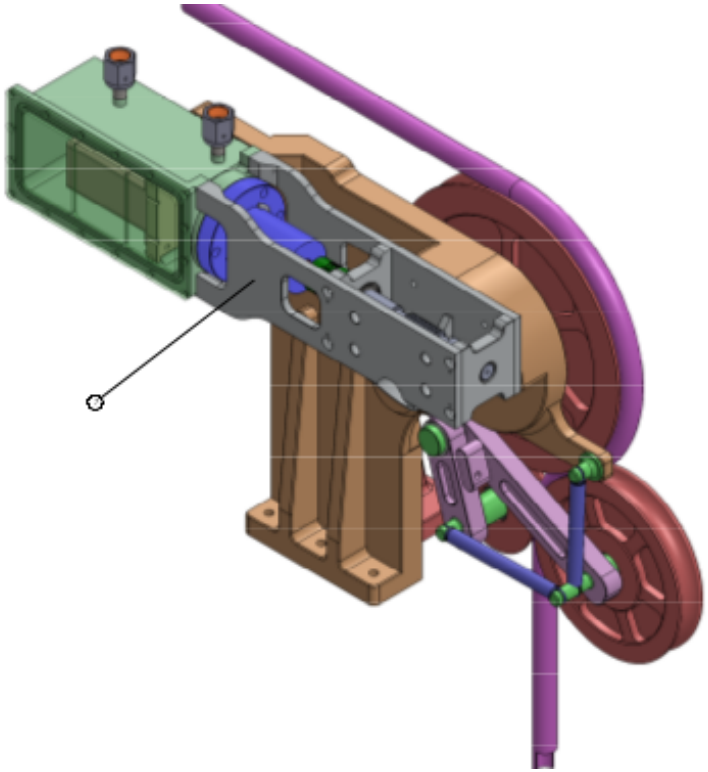


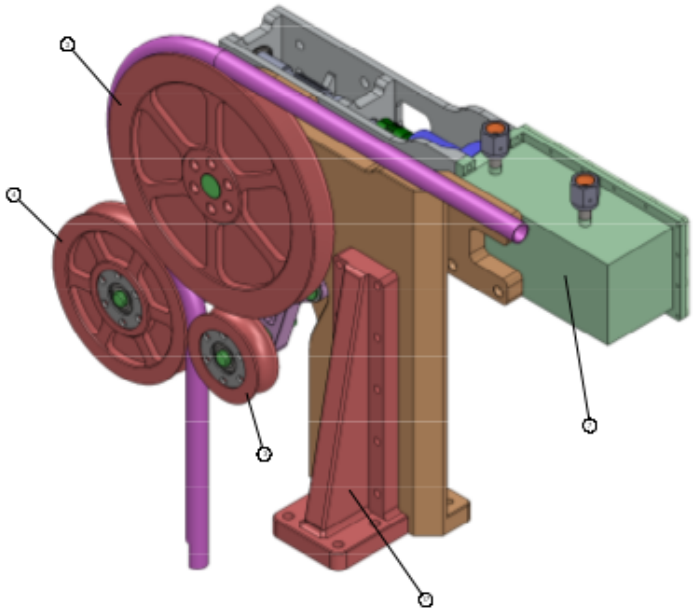
Chain Drive Consistency



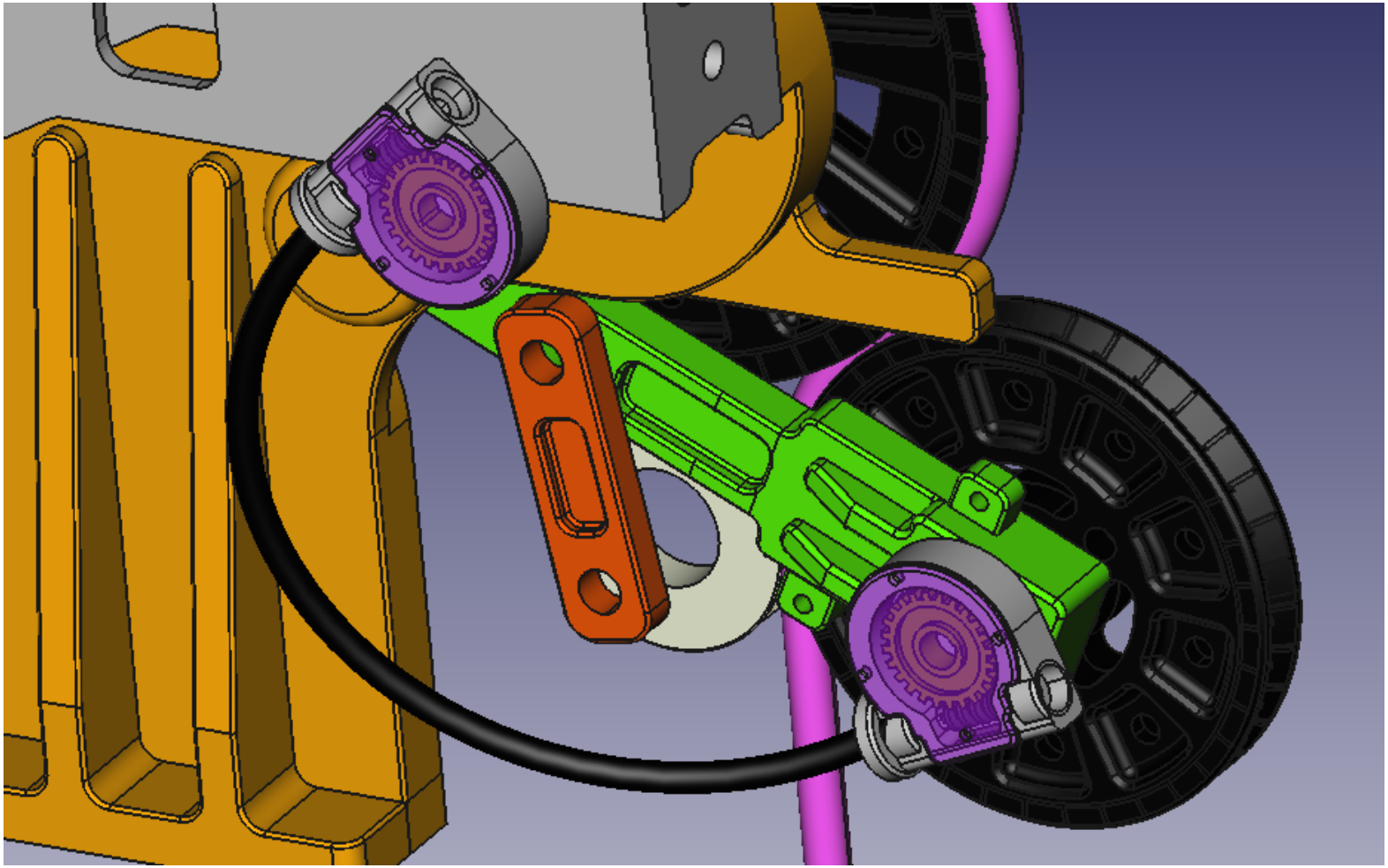


New URM Design

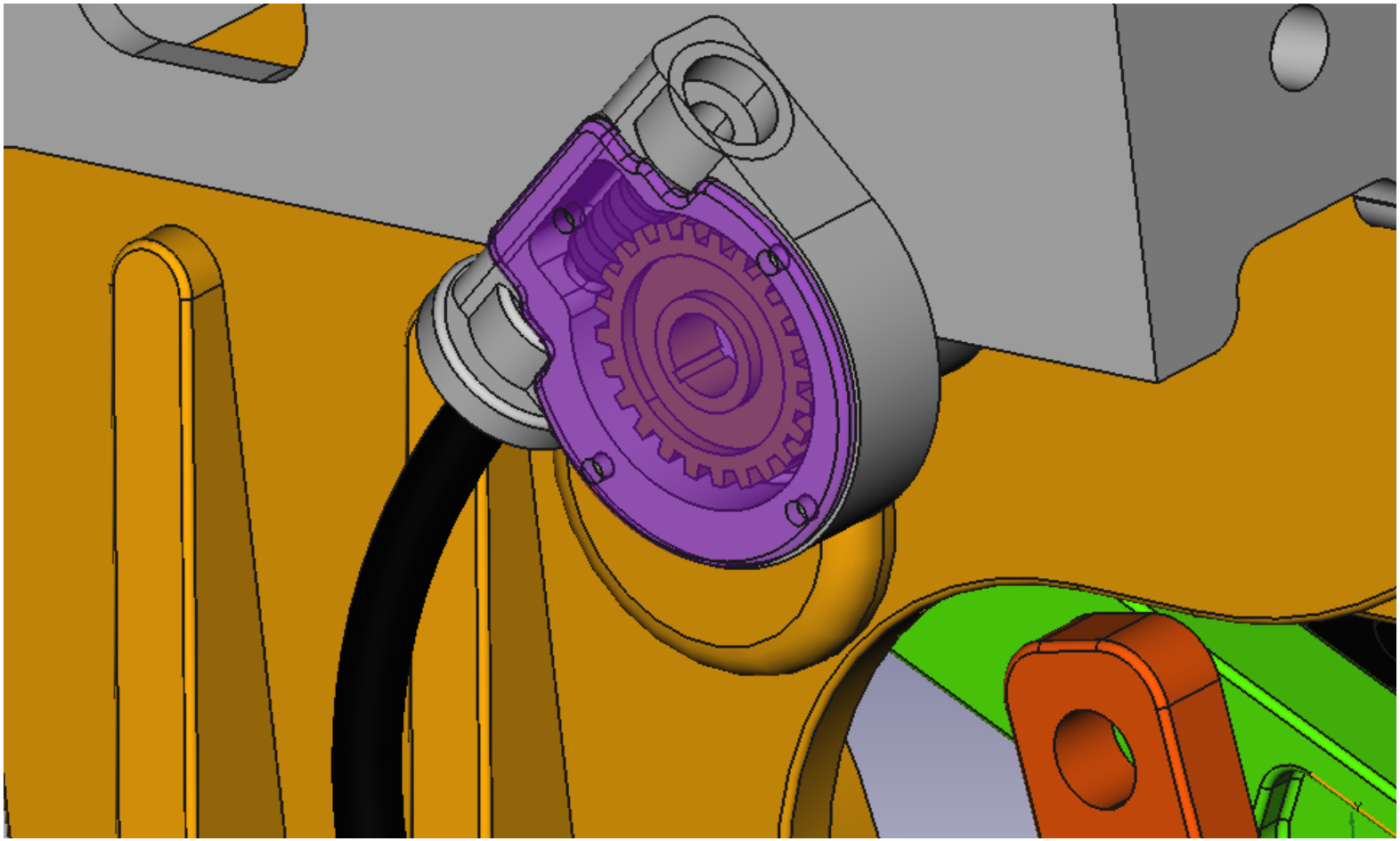




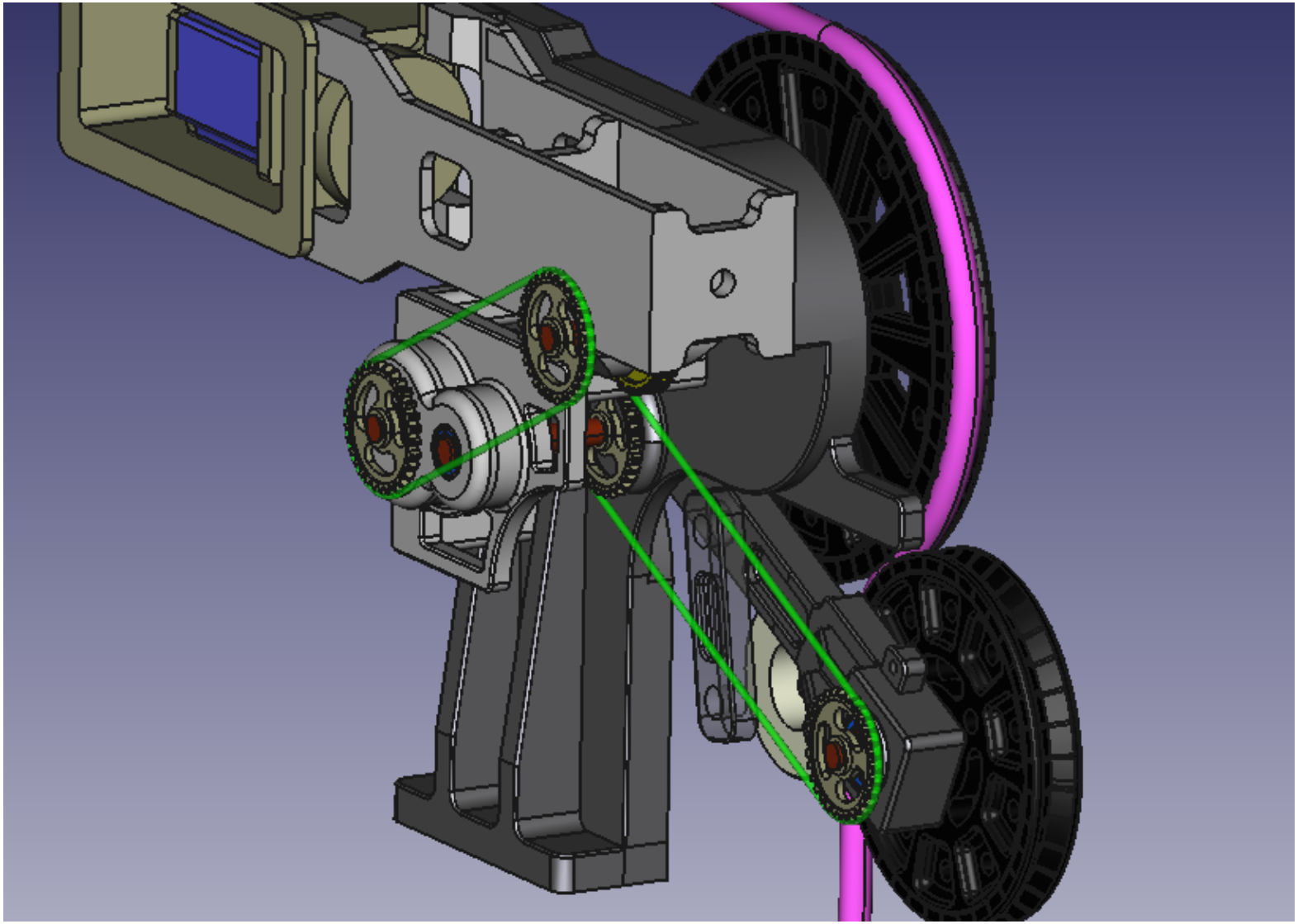
Flex Drive



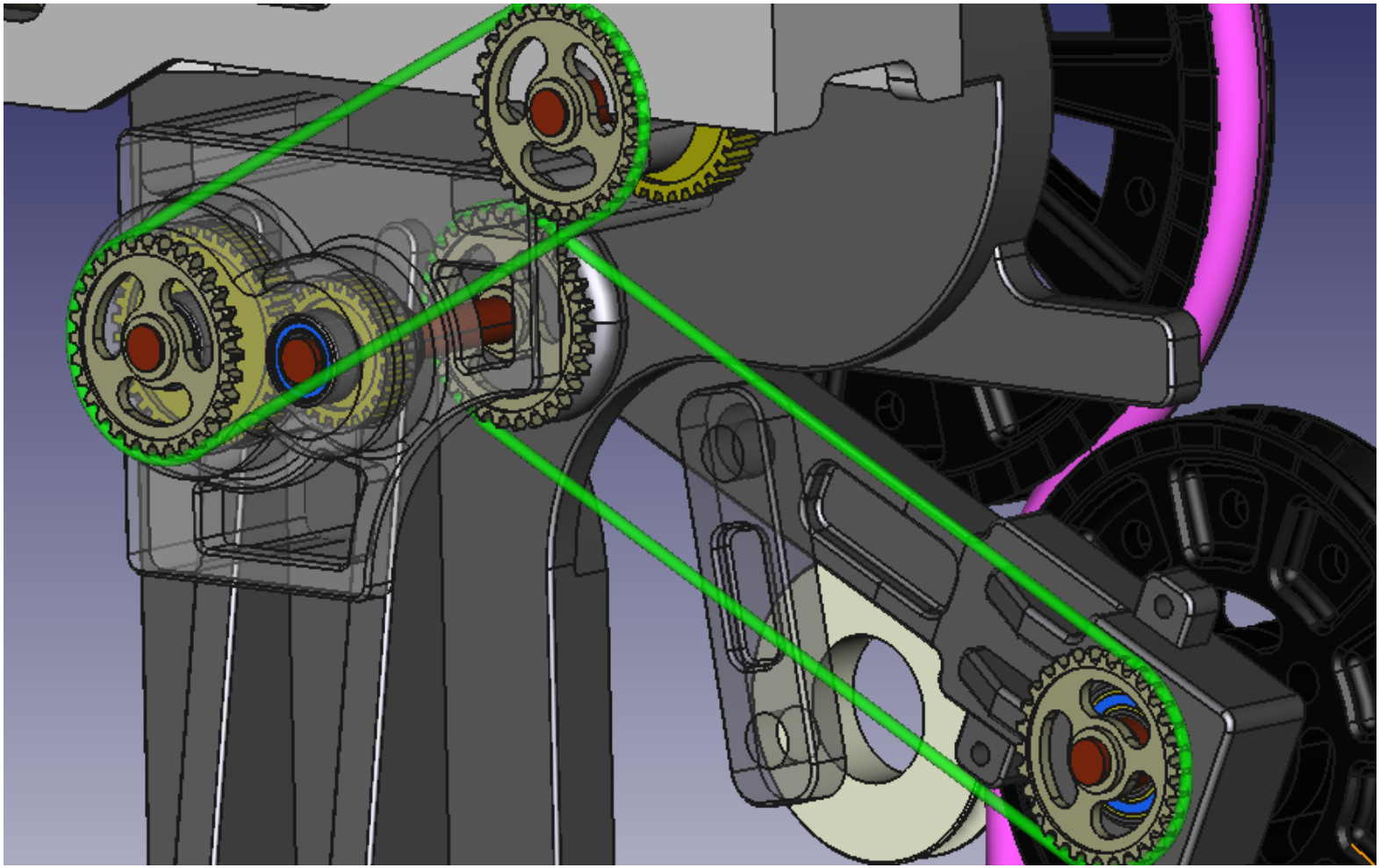
Flex Drive



Chain/Gear Drive



Chain/Gear Drive



Future Goals

Next Steps:

1. Determine Consistency of Chain Drive system
2. Investigate the possible Improvements of driving small pulley
3. Complete LAB application system
4. Investigate Implementing Drive System to new URM design

References

Lawrence Garcia (2014)

Umbilical Tests and Detector Data Analysis

Jose Maneira, Rui Alves (2013)

URM design for SNO+, LIP-Coimbra

Thank-you