



THOMPSON RIVERS
UNIVERSITY

Umbilical Retrieval Mechanism (URM) Report

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Overview

1 General Overview

- Purpose/Function
- Problems
- Chain Drive Design

2 Performance

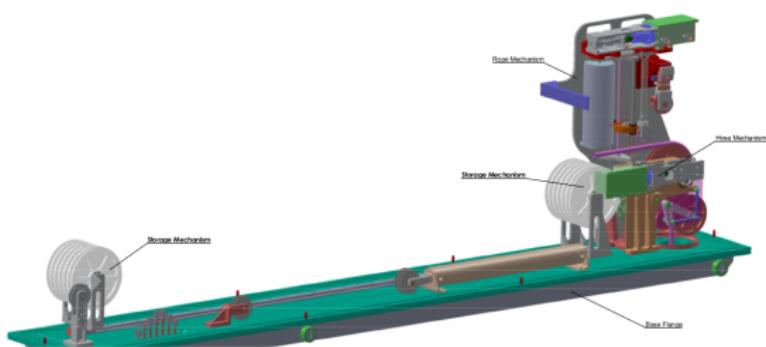
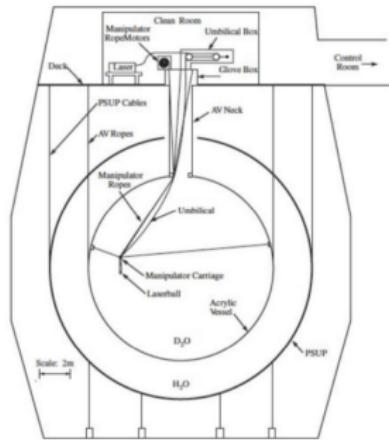
- Data
- Implementation

3 Future Goals

- Next Steps

URM Function

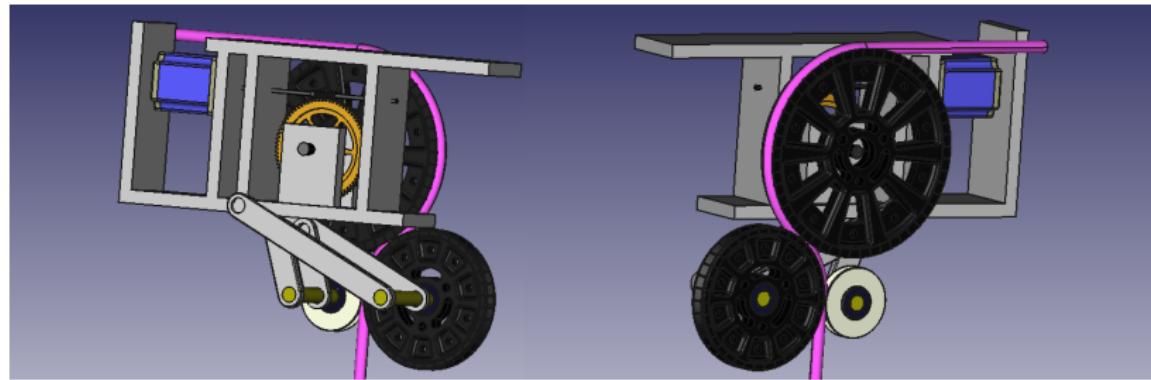
Controls the deployment and storage of the source umbilical for the SNO+ detector



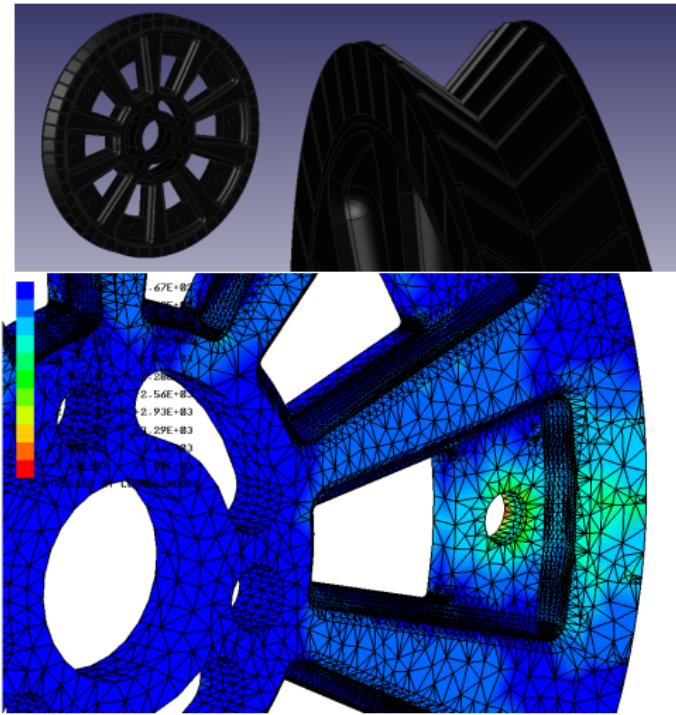
URM Problems

Sources of Slippage:

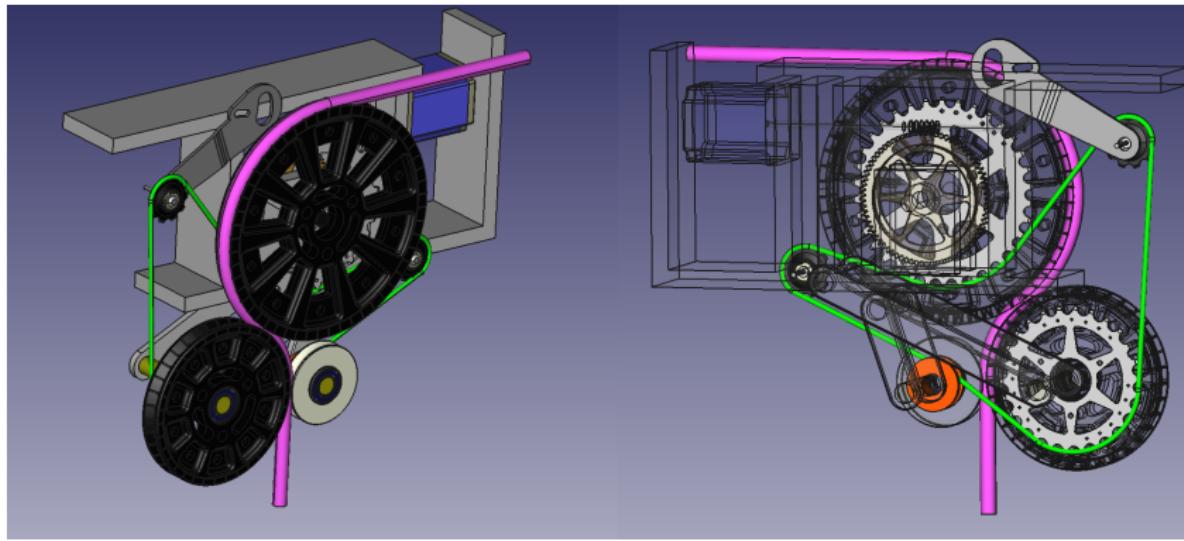
- ① LAB for Scintillation (low coefficient of friction)
- ② LAB compatible umbilical
- ③ Pulley Design (collects LAB reducing friction)
- ④ Umbilical Storage System (Pneumatic Cylinder)



The Drive Pulley Design

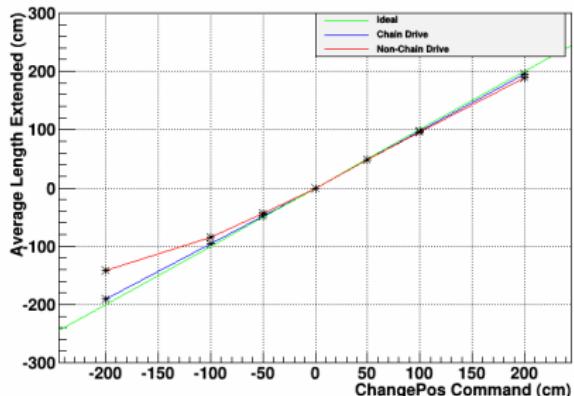


Chain Drive Design

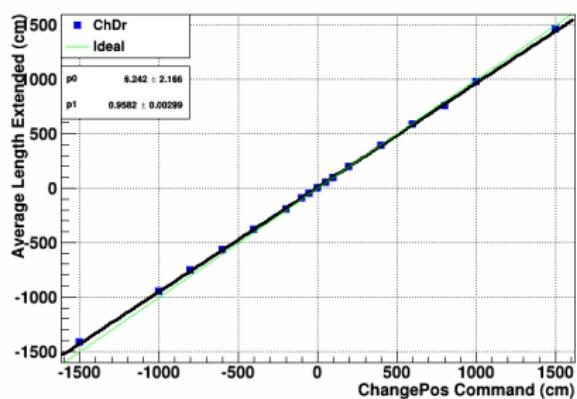


Chain Drive vs Non-chain drive

Average URM Extension/Retraction vs ChangePos

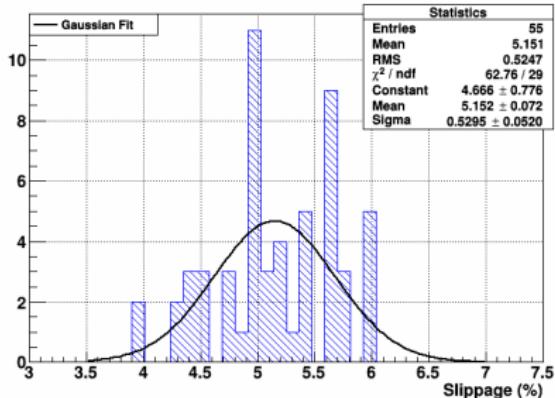


URM Extension/Retraction Fit

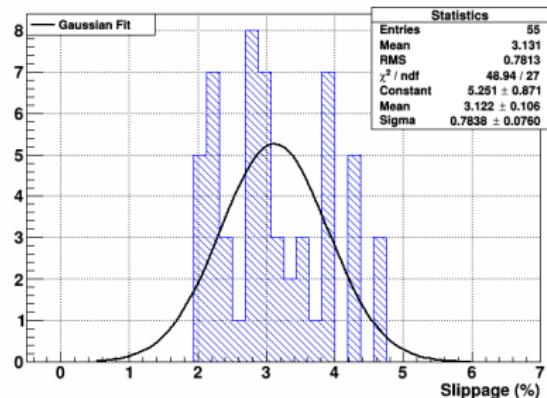


Chain Drive Consistency

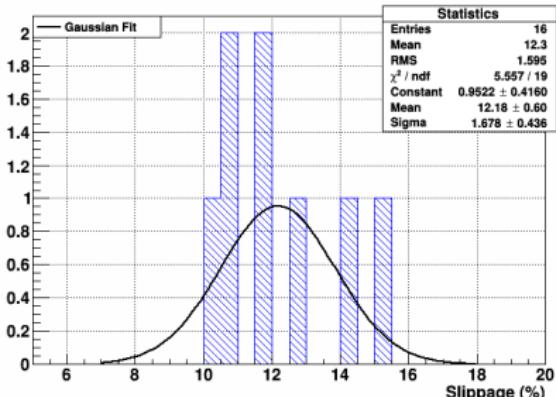
URM Extension Slippage Consistency



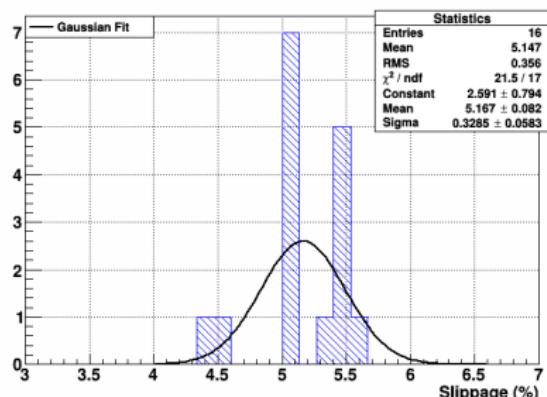
URM Retraction Slippage Consistency



URM Extension Slippage Consistency (Non-Chain Drive)

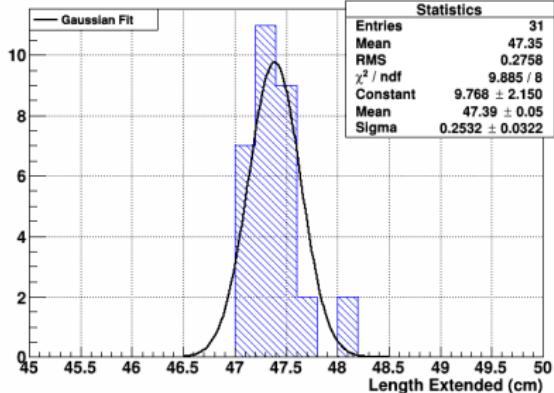


URM Retraction Slippage Consistency (Non-Chain Drive)

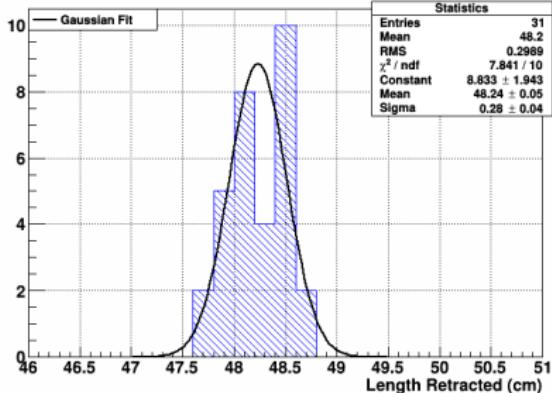


Chain Drive Consistency

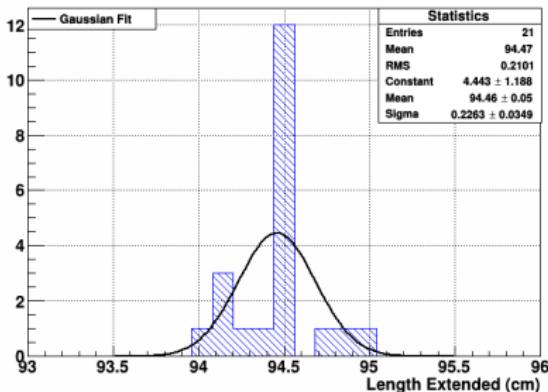
URM Extension Slippage Consistency (ChangePos -50)



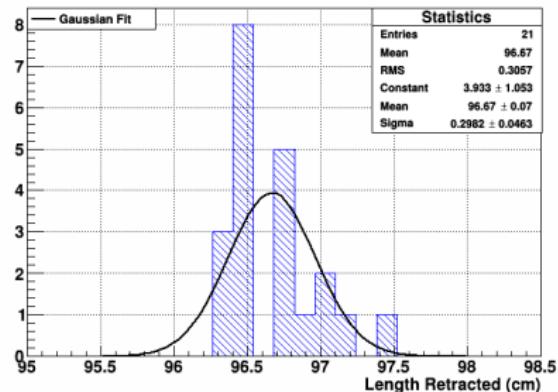
URM Retraction Slippage Consistency (ChangePos 50)



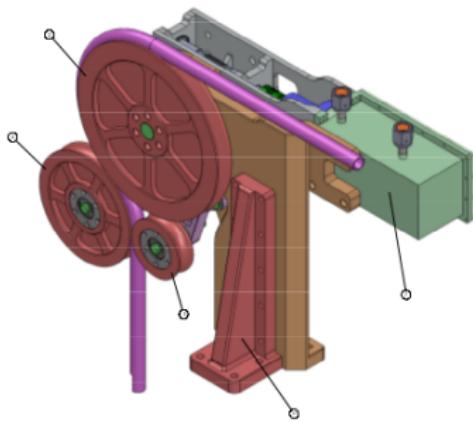
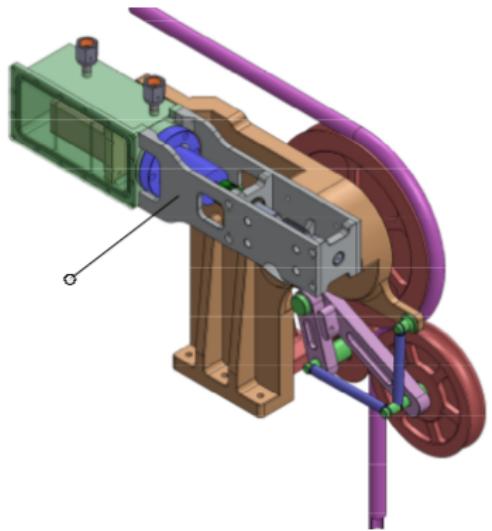
URM Extension Slippage Consistency (ChangePos -100)



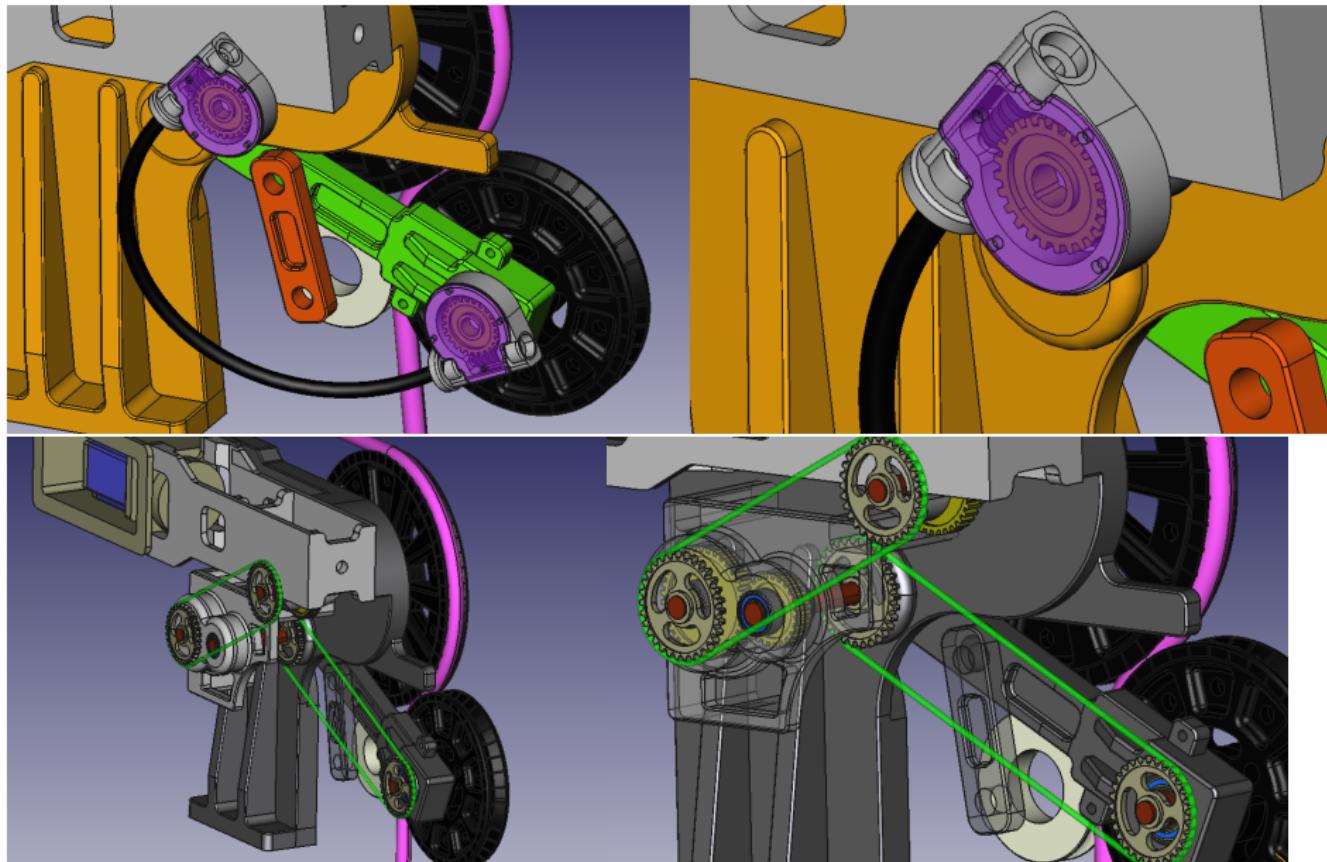
URM Retraction Slippage Consistency (ChangePos 100)



New URM Design



Flex Drive and Gear/Chain Drive



Future Goals

Next Steps:

- ① Investigate the possible Improvements of driving small pulley
- ② Complete LAB application system
- ③ 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

Pictures



Pictures



Pictures



Pictures

