

**CONTINUING PROJECT REPORT**  
**WTFRC Project Number: TR-06-600**

**YEAR: 3 of 3 (Extension)**

**Project Title:** Orchard automation and mechanization

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**Cooperators:** Grower Cooperators, Grower Committee

**Total project funding request: Year 1:**108,175      **Year 2:** 5,646      **Year 3:**

**Other funding Sources: USDA - SCRI – CASC \$690,000**

*Other funding sources is for informational purposes only, for WTFRC to understand the scope of the project. These estimated costs are not presented as formal cost-sharing and therefore do not constitute a cost-share obligations on the part of Washington State University. Moreover, there is no requirement for WSU to document this other support of project as part of any cost-share or matching obligation.*

**WTFRC Collaborative expenses:**

Item	2007	2008	2009
Stemilt RCA room rental			
Crew labor		\$4,646	
Shipping			
Supplies			
Travel		\$1,000	
Miscellaneous			
<b>Total</b>		\$5,646	

**Footnotes:** Crew Labor and travel is for OTR operation

**Budget 1:****Organization Name:** Washington State Univ.**Telephone:** 509.335.7667**Contract Administrator:** M.L. Bricker**Email address:** mdesros@wsu.edu

Item	2007	2008	
Salaries	17,190		
Benefits	4,985		
Wages			
Benefits			
Equipment	11,000		
Supplies	1,600		
Travel	16,000		
Miscellaneous			
Total	50,775		

**Footnotes:****Budget 2:****Organization Name:** Vinetech**Telephone:** 509.665.8271**Contract Administrator:** Kathy Schmidt**Email address:** kathy@treefruitresearch.com

Item	2007	2008	
Salaries			
Benefits			
Wages			
Benefits			
Equipment	57,400		
Supplies			
Travel			
Miscellaneous			
Total	57,400		

**Footnotes:** Paid in full

**Objectives:**

1. Field evaluate Over the Row (OTR) machine and compare labor efficiencies and quality of work to tasks completed on ladders and mobile platform.
2. Identify best management practices for multi platform equipment.
3. Determine optimal number of platforms for OTR machines.
4. Incorporate OTR in comprehensive automation studies
5. Incorporate OTR in on-going vision studies
6. Incorporate OTR in application technologies field projects
7. Construct prototype of the energy absorbing grate and field test several energy absorbing foams for application to passive bin filling.

Objectives 1-6 have been met. I have not been successful in securing transportation for OTR. OTR is currently housed at WSU Prosser.

Objective 7 is a new objective. This work is being done in partnership with Carnegie Mellon and Penn State.

**Significant Findings:** OTR travels through the orchard quite well – it is stable and responsive. It can maneuver around obstacles; all functions (hydraulics, E stops, multidirectional and turning mechanisms) were tested and performed as expected.

**Materials and Methods:****1. Efficiency measurements:**

- 1) # feet / time unit
- 2) # trees/ time unit
- 3) Tops only
- 4) Complete tree

**2. Economic Assessment:**

- 1) Cost per unit (tree/row/block)
- 2) AgProfit Assessment for IRR/ROI/NPV

**3. Quality of work:**

- 1) Subjective / Qualitative

**4. Best Management Practices:**

- 1) Number of people per platform
- 2) Employee interview/survey
- 3) Ergonomic mitigation

**5. Green Fruit Thinning Treatments**

- 1) OTR
- 2) Mobile Platform (BlueLine)
- 3) Ladder