CONTINUING PROJECT REPORT **YEAR**: 3 of 3 (Extension)
WTFRC Project Number: TR-06-600

Project Title: Orchard automation and mechanization

PI:	Karen Lewis	**Co-PI (2):**	Tom Auvil
Organization:	WSU	**Organization:**	WTFRC
Telephone/email:	509.754.2011 X 407 kmlewis@wsu.edu	**Telephone/email:**	509.665.8271 auvil@treefruitresearch.com
Address:	POB 37	**Address:**	1719 Springwater
City:	Ephrata	**City:**	Wenatchee
State/Province/Zip	WA 98823	**State/Province/Zip:**	WA 98801

Co-PI (3):	Jack Maljars
Organization:	Vinetech
Telephone/email:	509.788.0900 jackm@vinetechequipment.com
Address:	335 N. Gap Road
City:	Prosser
State/Province/Zip	WA 99350

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			
Total		$5,646	

Footnotes: Crew Labor and travel is for OTR operation

Budget 1:
Organization Name: Washington State Univ. **Contract Administrator:** M.L. Bricker
Telephone: 509.335.7667 **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 **Contract Administrator:** Kathy Schmidt
Telephone: 509.665.8271 **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 f 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 Carneigie Melon 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