Road Map Technology Update 2004

MONTMORENCY CHERRIES
THE HEALING FRUIT

Karen M. Lewis

WSU Grant-Adams
Area Extension

What happened to profitability in the national tree fruit industry?

- Can we do anything about it?
- What do we mean by *technology?*
- A new, national effort for tree fruit

Challenges to U.S. Agriculture

- Global markets, Local inputs
- Labor cost & availability
- Trade policies
- Consumer demand stagnant
- Retail consolidation
- Environmental accountability
- Competing uses for farmland, water
- Food safety & biosecurity

11/19/2001
The Packer

Apple growers jockey for room in export race

China and Washington state squeeze other producers

By Chris Koger, Staff Writer

When apple shippers discuss their export sales, it's a case of East meets West.

08/20/2001
The Packer

Supply cuts lack support, leaving apple promotion the only option

Tom Karst, Executive Markets Editor

Reduce supply or enhance demand. In the end, those are the options that Desmond O'Rourke outlined in a speech before the World Apple and Pear Association in Brussels, Belgium, earlier this month. And only one choice is really viable.

07/16/2001
The Packer

Ag bill clears U.S. House

The apple industry wins $150 million in market loss assistance under the $74.2 billion outlay

By Jim Offner, Senior Writer

WASHINGTON, D.C. -- Produce leaders in the nation's capital say they don't anticipate any major problems in the Senate now that the House of Representatives has passed its $74.2 billion agriculture appropriations bill.

Saturday, August 11, 2001
Seattle TImes

Incentive program to chase away old apples

By Linda Ashton
The Associated Press

YAKIMA — Just weeks before the 2001 harvest begins, the Washington apple industry is preparing to spend up to $5 million to keep a lot of last year's crop out of the fresh market

Marketing, promotion, and $$ assistance help, but is there anything else we can do?

- What happened to profitability in the national tree fruit industry?
- **Can we do anything about it?**
- What do we mean by *technology?*
- A new, national effort for tree fruit

Sure!

We can figure out who to blame!

domestic/foreign competitors

government regulators

marketers

retailers

consumers

ourselves

return to top

TWO BOOKS: TWO HYPOTHESES

The End of Agriculture in the American Portfolio

Stephen Blank, 1999

- average net return to agriculture negative since 1994
- "farmers could do better just depositing their money in the bank"
- food production will shift to low cost producers

The Lexus and the Olive Tree

Thomas Friedman, 1999

- "Technology created globalization and it is technology that will enable the US to compete globally"

We can use technology to change the way we do business

- Lower unit costs of production and processing
- Continually improve and redefine product quality
- Develop new products and processes
- Restructure industry/research interaction

These are research challenges that require new investment

Lower Unit Costs

- Apply existing knowledge and technology more fully
- Develop and implement new technology, e.g. precision agriculture
- Improve every step of the road to market

Improve Product Quality

Quality is far more than color, size and firmness

Activists, consumers, distributors, government, etc. are demanding that food provide traditional attributes PLUS additional product qualities and assurances

New Products and Processes

- Consumers will not eat more of the same
- Explore changing tastes and habits
- Develop products that meet emerging needs
- Are GMOs in our future?

Restructure and Reinvent

- Industry firms and institutions must change
  - more market-oriented
  - technically adept and innovative
  - set an overall vision
- Commodity groups must cooperate
- Work force must understand technology and innovation
- Science and Business must work better together

- What happened to profitability in the national tree fruit industry?

- Can we do anything about it?

- **What do we mean by *technology?***

- A new, national effort for tree

What is technology?

Systematic treatment of an art

The practical application of knowledge

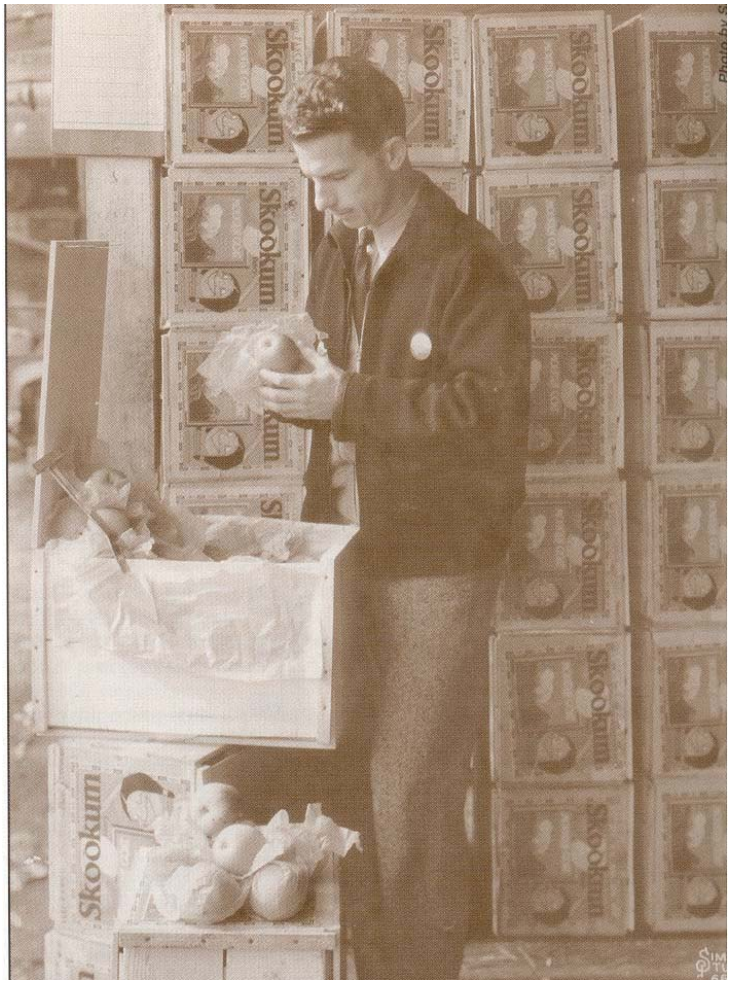
A manner of accomplishing a task, especially using technical processes, methods, or knowledge

In the digital age, add information technology

As appropriate, add biotechnology

EARLY TECHNOLOGY IN THE ORCHARD

EARLY TECHNOLOGY IN FRUIT HANDLING



RECENT INNOVATIONS IN FRUIT PRODUCTION

RECENT INNOVATIONS IN FRUIT HANDLING

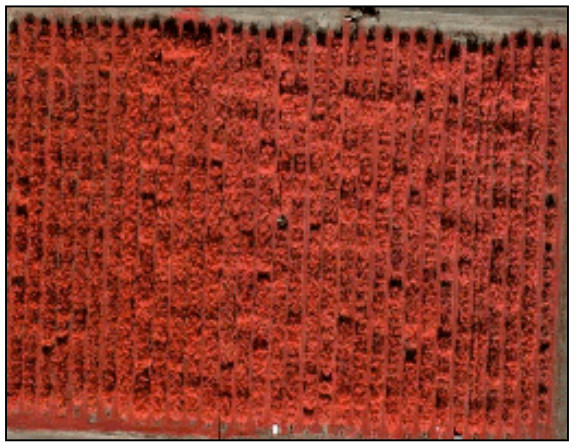
Automated Orchard Systems?

Orchard design

Robotic tractors

Water management

Canopy management



Remote sensing

Mechanical harvest

Appropriate technologies exist

Our national tree fruit industry can compete:

- climate, soils, water
- capital
- proximity to markets
- access to technology

Now is the time for action

- What happened to profitability in the national tree fruit industry?
- Can we do anything about it?
- What do we mean by *technology?*
- **A new, national effort for tree fruit**

THE TECHNOLOGY ROADMAP FOR TREE FRUIT PRODUCTION

RESEARCH PRIORITIES TO ENHANCE TREE FRUIT PRODUCTION THROUGH TECHNOLOGICAL INNOVATION

STEERING GROUP

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To be profitable in a globally competitive marketplace, the U.S. tree fruit industry must deliver the highest quality fruit and reduce production costs 30% by 2010

Overview of roadmap

Defines the problem -- increased global competition in traditional US markets

Identifies key technical barriers

- escalating production costs
- increased demands for fruit quality

Describes essential R&D areas

Sets specific R&D priorities to overcome technical barriers

Key Technical Barriers

National Steering Group 2002

Herb Aldwinkle
Cornell Univ
Geneva NY

Phil Baugher
Adams County Nursery
Aspers PA

Scott Cameron
USDA-ARS
Beltsville MD

John Hickman
John Deere
Moline IL

Jim McFerson
WTFRC
Wenatchee WA

Fran Pierce
Washington State Univ
Prosser WA

Darek Swietlik
USDA-ARS
Kearneysville WV

2002 Committee on Appropriations Report (S2801)

"The Committee believes the U.S. tree fruit industry is of the...

Develop a new, national strategy for tree fruit R&D

Sens. Murray and Cantwell, and Reps. Walsh, Hinchey, Nethercutt

National Steering Group 2004

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E Lansing MI

Phil Korson
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Jim McFerson
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Wenatchee WA

Pete Nowak
Univ Wisconsin
Madison WI

Fran Pierce
Washington State Univ
Prosser WA

Clark Seavert
Oregon State Univ
Hood River OR

Darek Swietlik
USDA-ARS
Kearneysville WV

Mary Symms-Pollot
ID Dept Ag
Boise ID

ROADMAP PROGRESS

Establish broad-based national steering group.

September, 2002

Obtain input from tree fruit producers and processors and the scientific, engineering and business communities.

Nov 2002-Feb 2003

Nationalize the Tree Fruit Technology Roadmap through a participatory workshop.

Mar 2003

Synthesize workshop input.

Mar-Apr 2003

Obtain further Congressional support.

July 2003

Define national industry/research effort.

Nov 2003

House Committee on Appropriations Report 2003 (108-193)

"T

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ap

Initiate a new, national strategy for tree fruit R&D

With help from USApple, Northwest Horticultural Council, Sens. Murray and Cantwell, and Reps. Walsh, Hinchey, Nethercutt

Roadmap priorities

Plant breeding, genetics, and Genomics

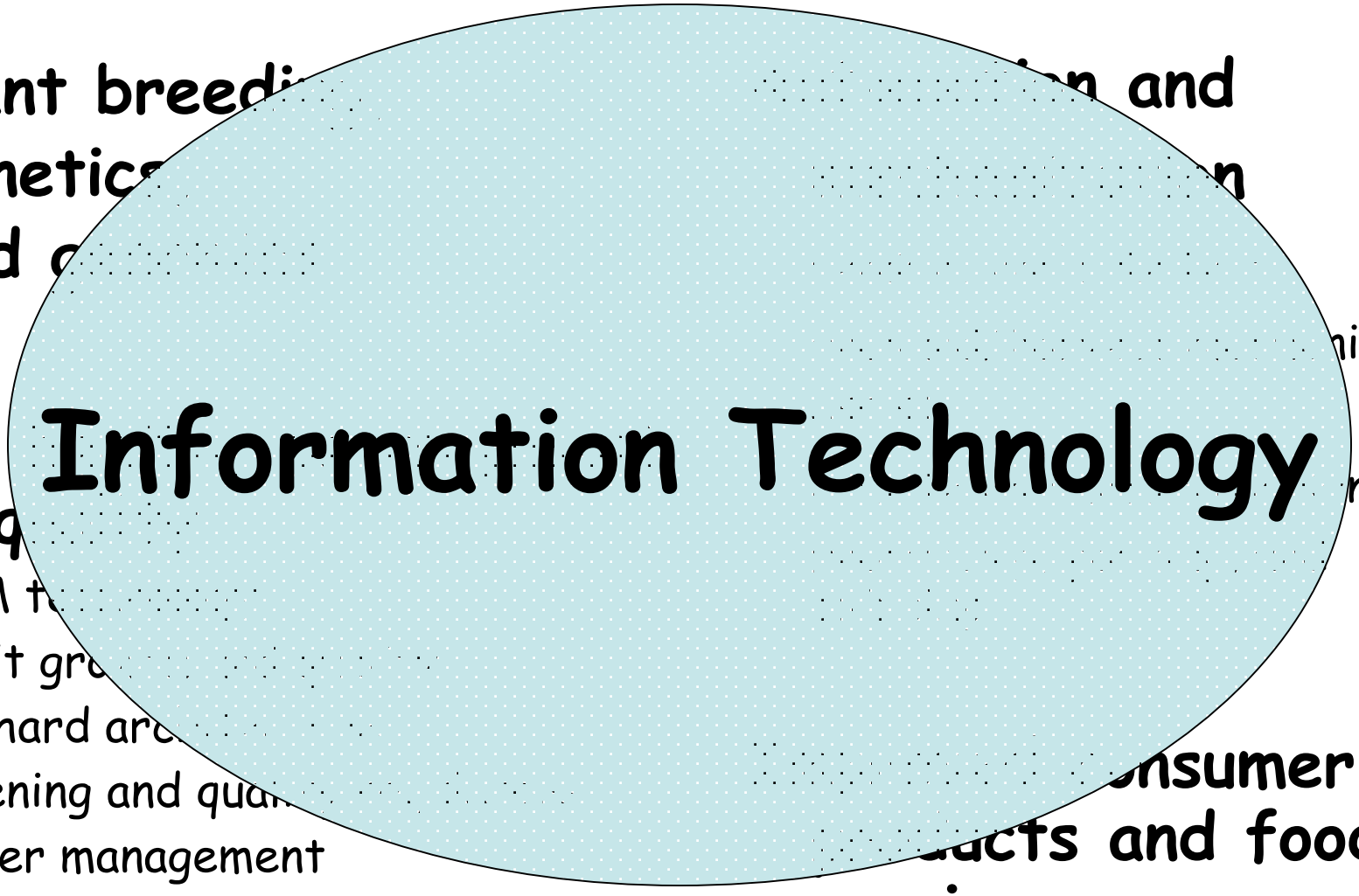
Sensors, automation, and mechanization

Information technology

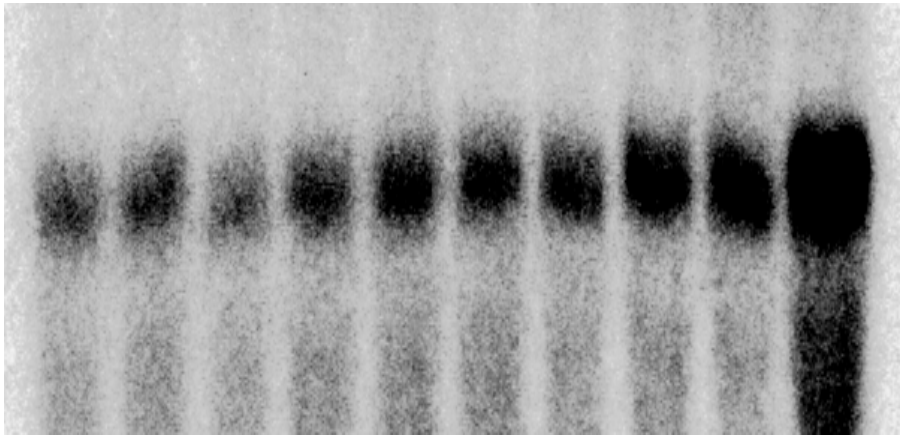
Crop health, development & quality

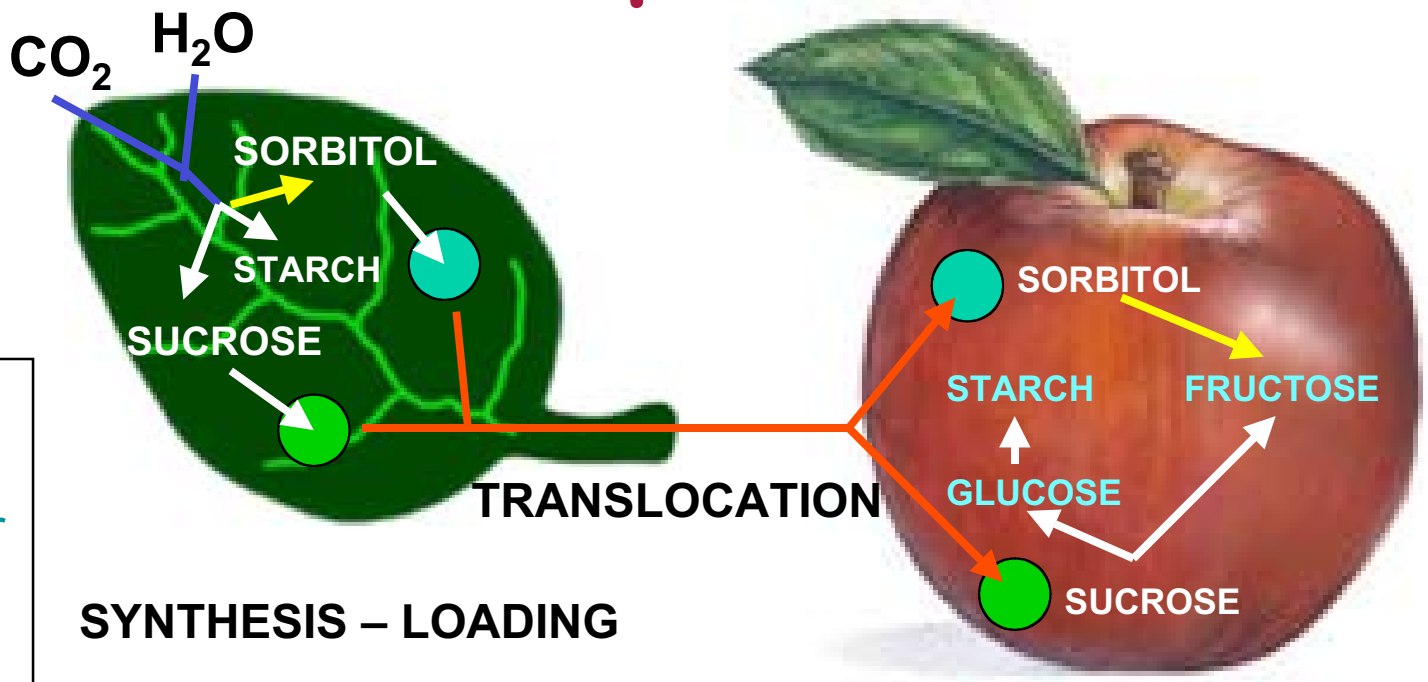
Improved consumer products and food services

Roadmap Priorities



Genomics and genetics to understand and manipulate fruit quality attributes



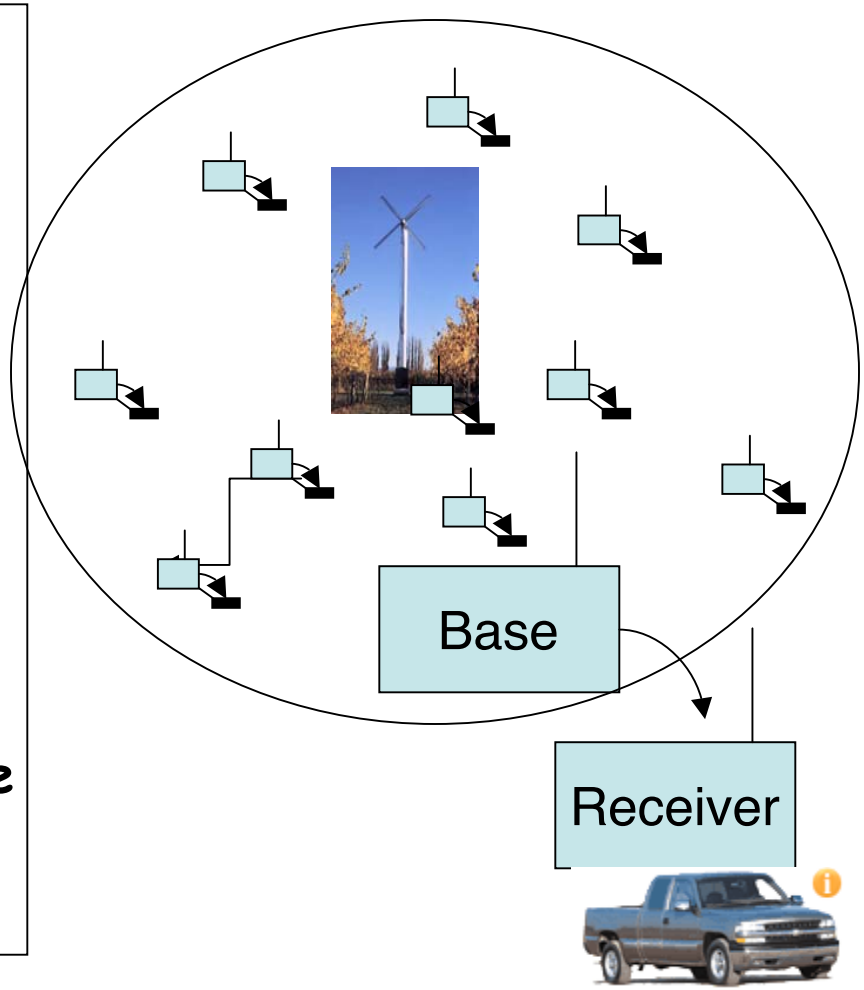


Gianni Teo,
Ted DeJong,
Abhaya Dandekar
UC-Davis
Lailiang Cheng,
Cornell Univ

AgFrostNet™

- One minute real-time Temperature Broadcast to Base
  - 2 minute random interval broadcast
- Multiple receivers
  - Encrypted
- Signal Wind Machine

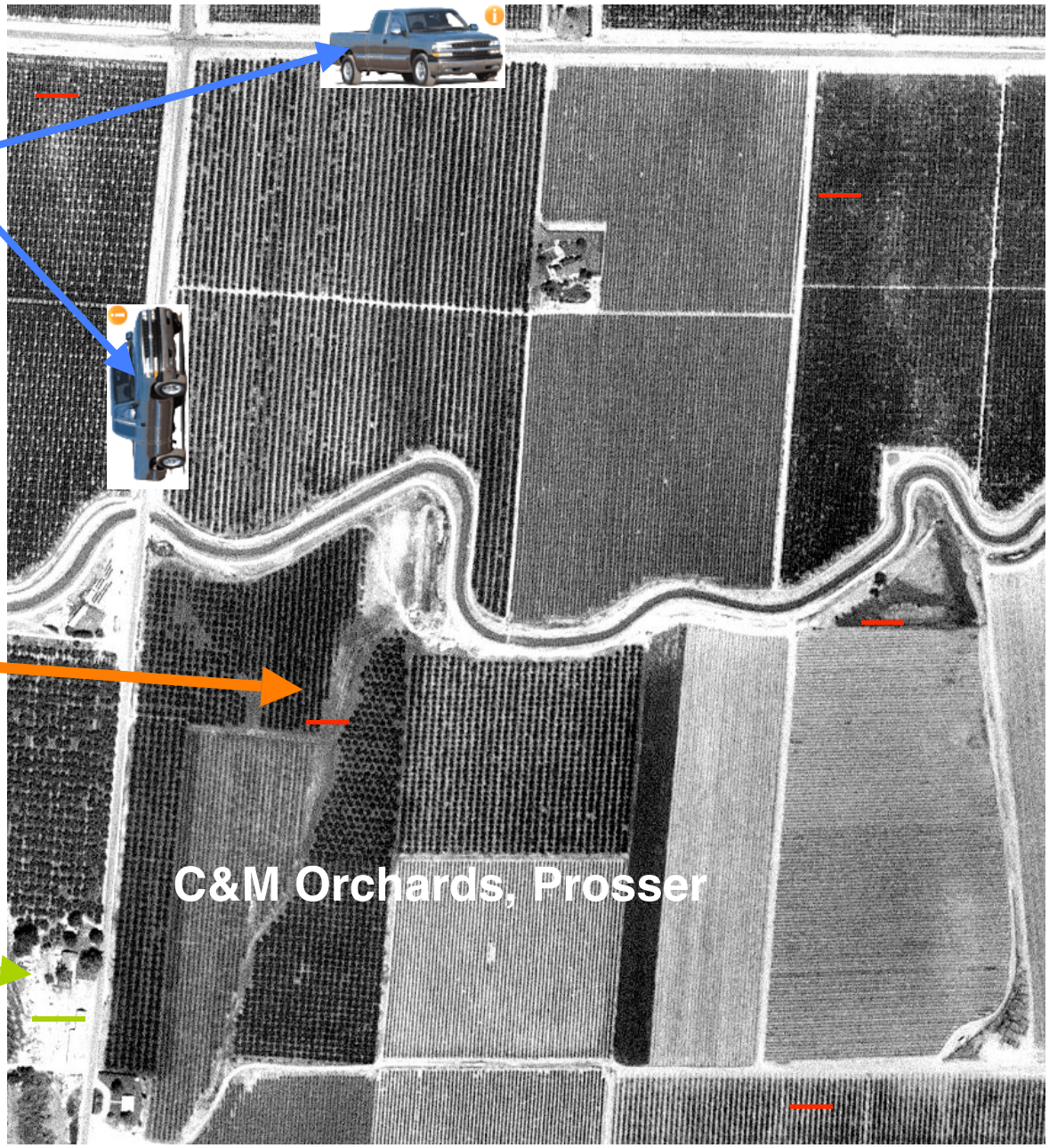
New Firmware, same hardware



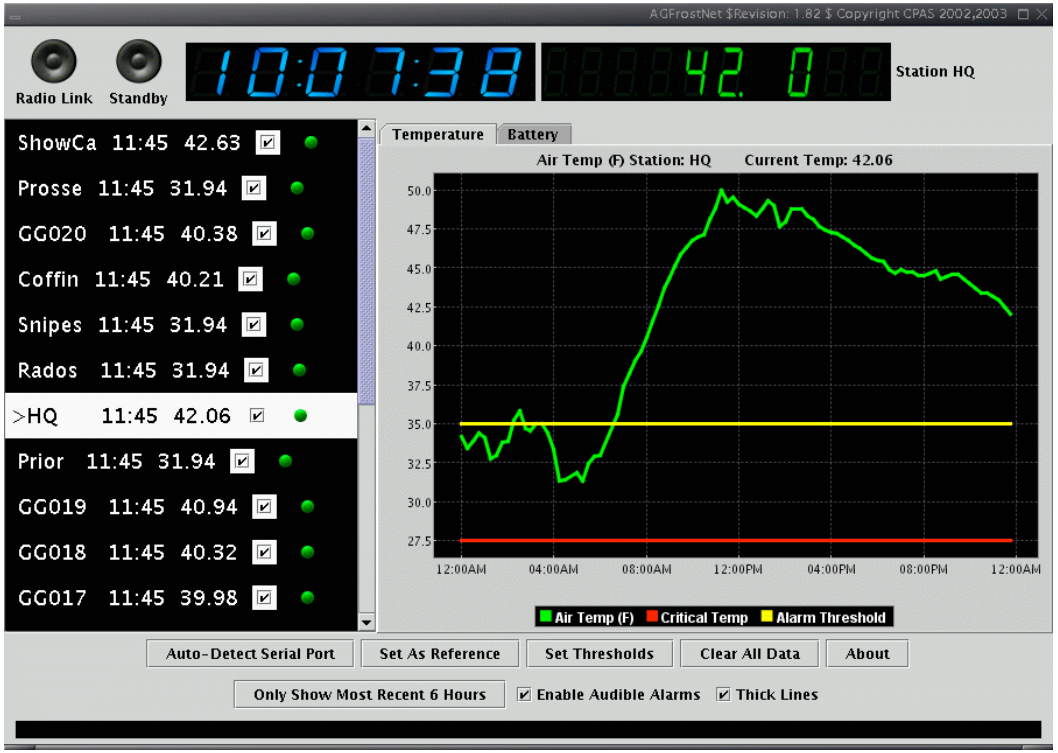
Rover

Temp Station

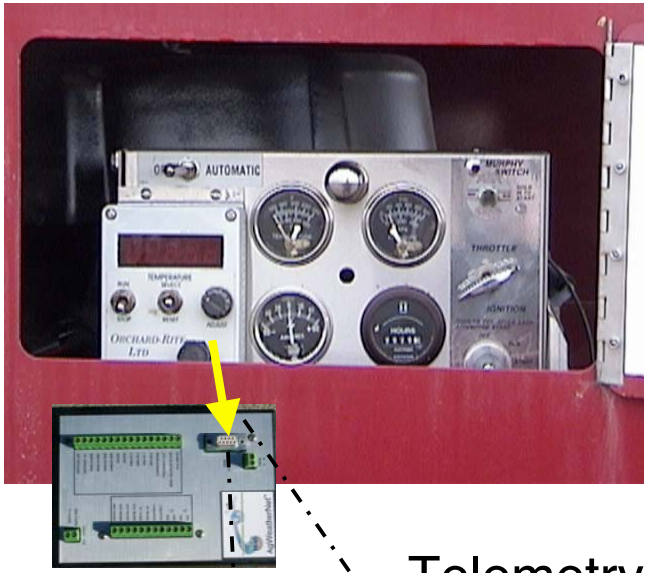
Master/
Base

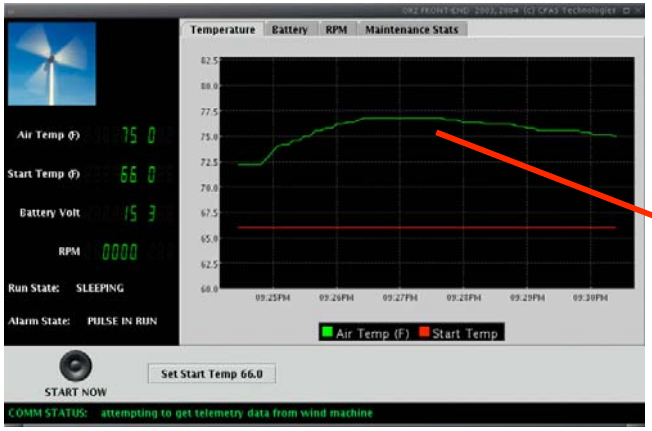


AgFrostNet™ Software

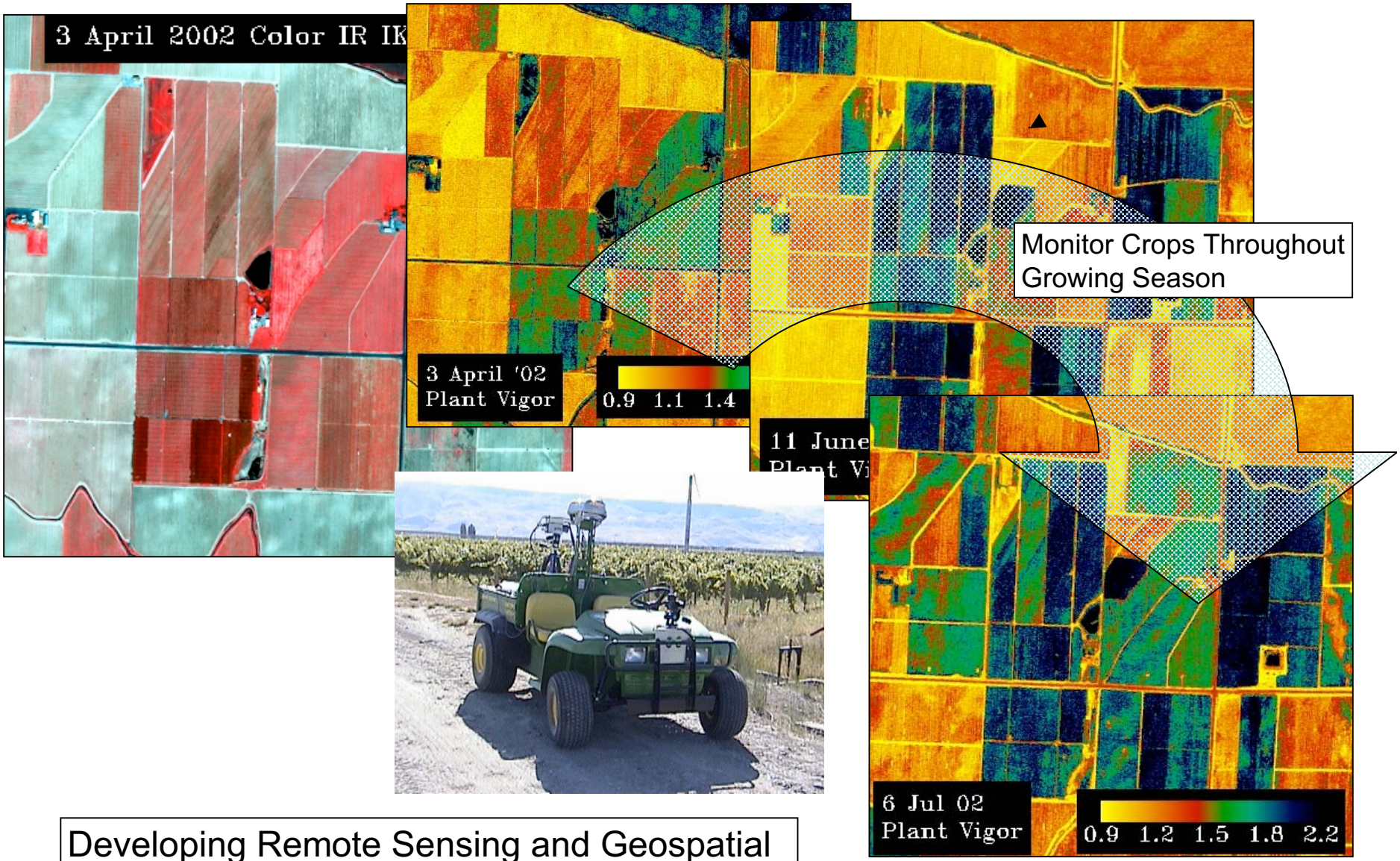


Challenge
Start a wind machine motor here and now!

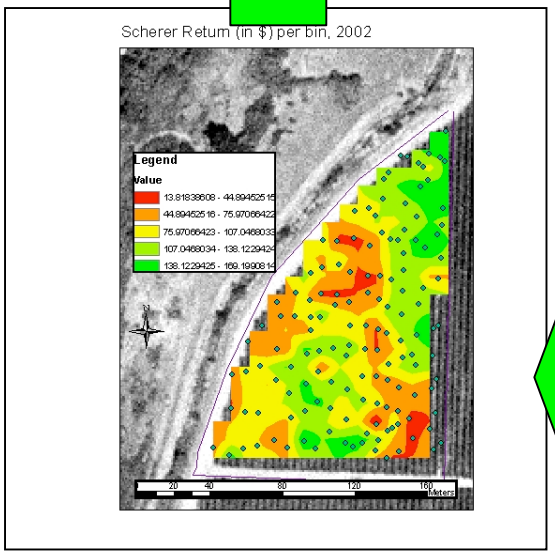




Telemetry link



Developing Remote Sensing and Geospatial Analysis To Improve Tree Fruit Production



Profitability mapping

Robotic Vehicles

John Deere September 2003

New Technologies in IPM

Jay Brunner
Vince Jones
WSU-Wenatchee

Attract and Kill for leafrollers

Fibers for codling moth and leafrollers

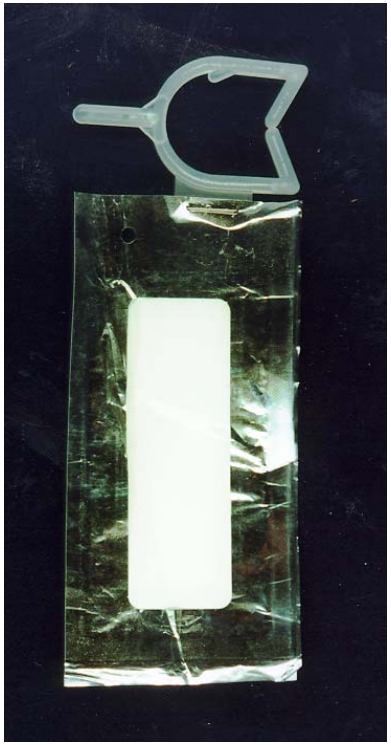
2003 Fiber Applicator

PDA Based Spray Recommendation Databases for Deciduous Fruits

Gary Grove
Vince Jones
WSU

Pheromone dispensing systems

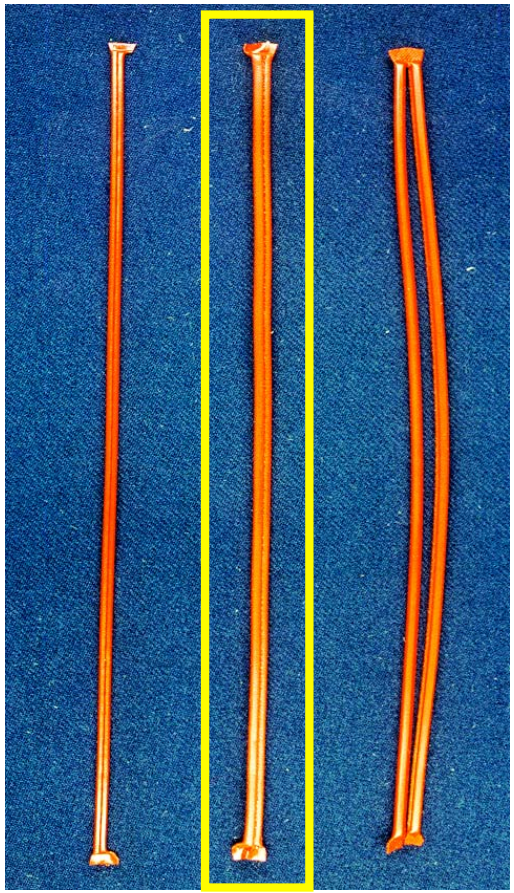
Checkmate



NoMate

Disrupt

Isomate



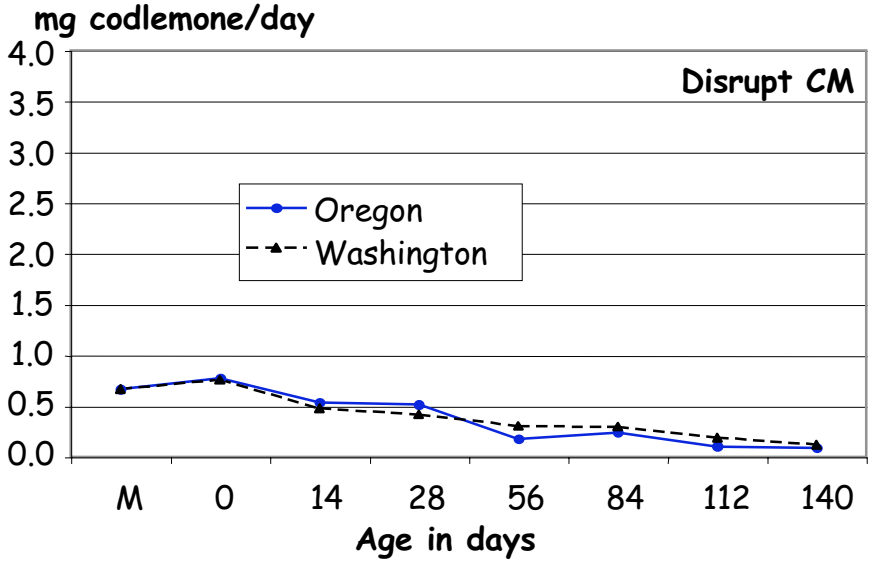
Are all dispensers created equal?

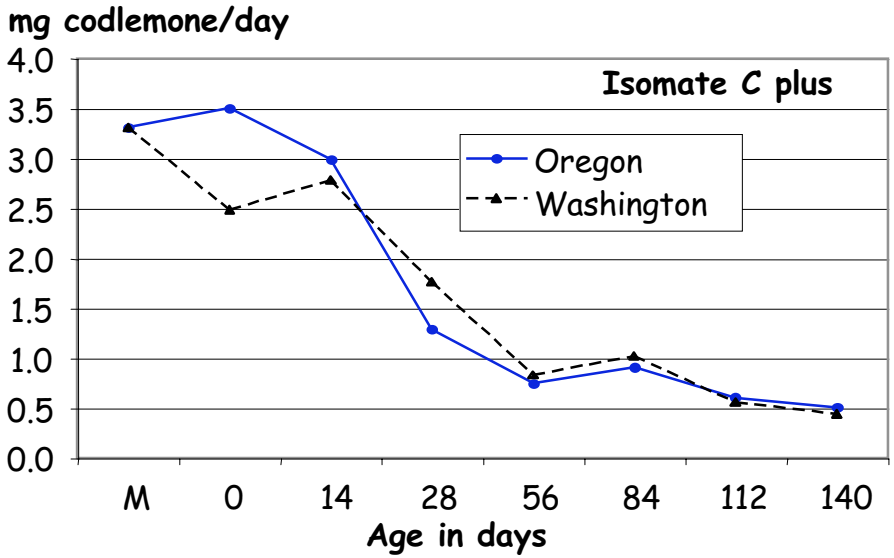
Evaluating pheromone dispensing systems

Vince Hebert
Jay Brunner
Vince Jones
WSU

Volatile trapping system (VTS)

- Aged dispenser placed into teflon chamber and clean air passed over.
- Volatile pheromone released and trapped.
- Trapped pheromone extracted and the amount determined by GC-MS.





Volatile Compound Sensor

- Uses chemiresistor technology
- Polymer coated on wirelike electrodes on a chip swells as it absorbs a volatile compound. The swelling changes the electrical resistance in proportion to the chemical vapor concentration. Polymers shrink when chemical is removed and their resistance returns to original state.

Sandia National Laboratory, Albuquerque, NM

SENSORS Online

Putting pieces together to improve pest management

+

+

=

+

ANTICIPATED OUTCOMES

Precision agriculture and automation in fruit production, handling, and processing operations

Tree fruit genomics, breeding, and germplasm

Bio-intensive crop health programs with optimized fruit quality, safety, and nutritive value

Innovative, resource-efficient orchard systems

New fruit products

Real-time sensor and imaging capabilities carried via affordable and accessible rural

Roadmap Principles

- A multi-disciplinary, cross-industry approach.
- Progress in single, isolated, technical areas will not be sufficient.
- Research projects conducted in a parallel and coordinated manner.
- No single organization has the breadth and depth of research skills required for the overall needs.
- Research support may be given to one area, but this should be done in concert with other projects within the cross-industry system.

ANTICIPATED IMPACTS

Maximizing worker productivity and safety while minimizing low-skill tasks

Reducing production and handling costs while providing the consumer a superior product

Enhancing stewardship of natural resources

Progress since 2001

Support from WA organizations

Support from other state organizations:

ID, MI, NY, OR, PA, VA

National industry-researcher workshop

Support from Congress

First funding initiative underway

New research underway