



Federal Technology Transfer with the Private Sector

*“Partnering with ARS to Adopt
and Commercialize Research
Outcomes: Mechanisms and
Opportunities”*

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Assistant Administrator of ARS

Office of Technology Transfer

NP 306 Customer / Stakeholder Workshop

Baltimore, MD, June 10-11, 2008



Our Current Environment...

Budget deficits (national, states), \$135 / barrel oil, global warming, food shortages, water issues, food safety housing meltdown, weak \$, unemployment rising, erosion of global competition, emerging plant diseases, natural disasters ---

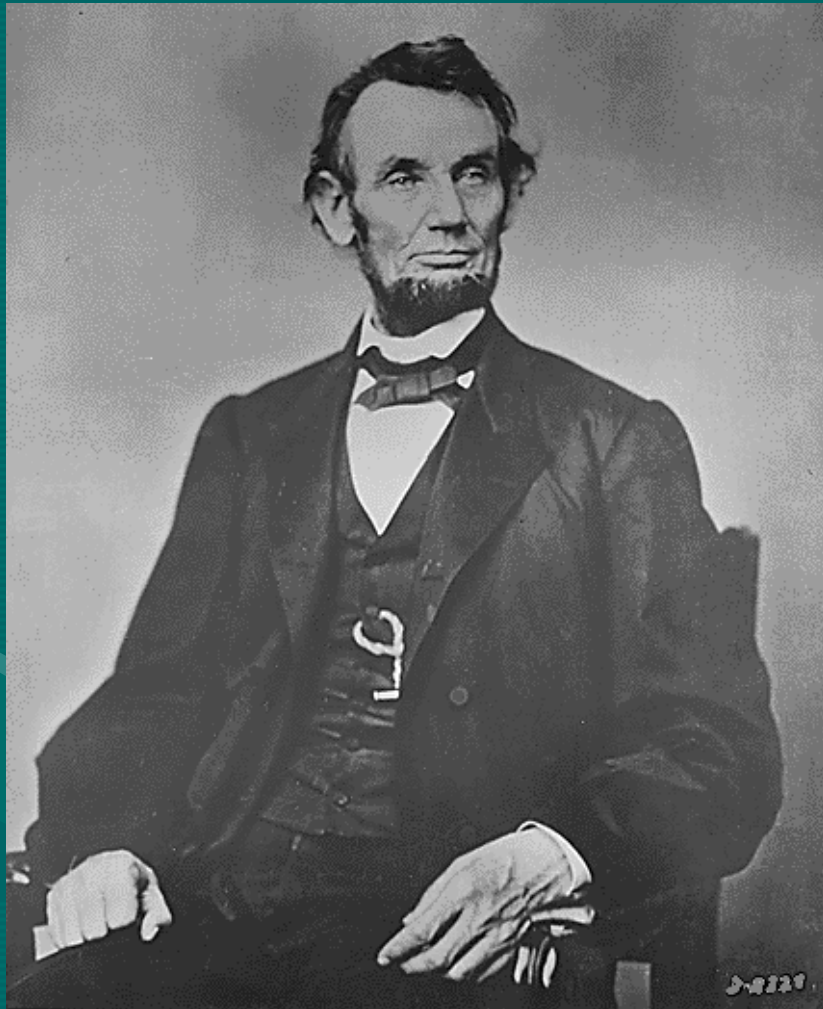
When has there ever been a more urgent need for innovation and partnerships to transfer research outcomes to our customers and stakeholders?!



Presentation Overview

- “Roots” of federal technology transfer and landmark legislation
- Challenges today, and accessing intellectual property from ARS, & forming research partnerships
- Some ARS successes in NP 306 and elsewhere
- The next 5-year cycle

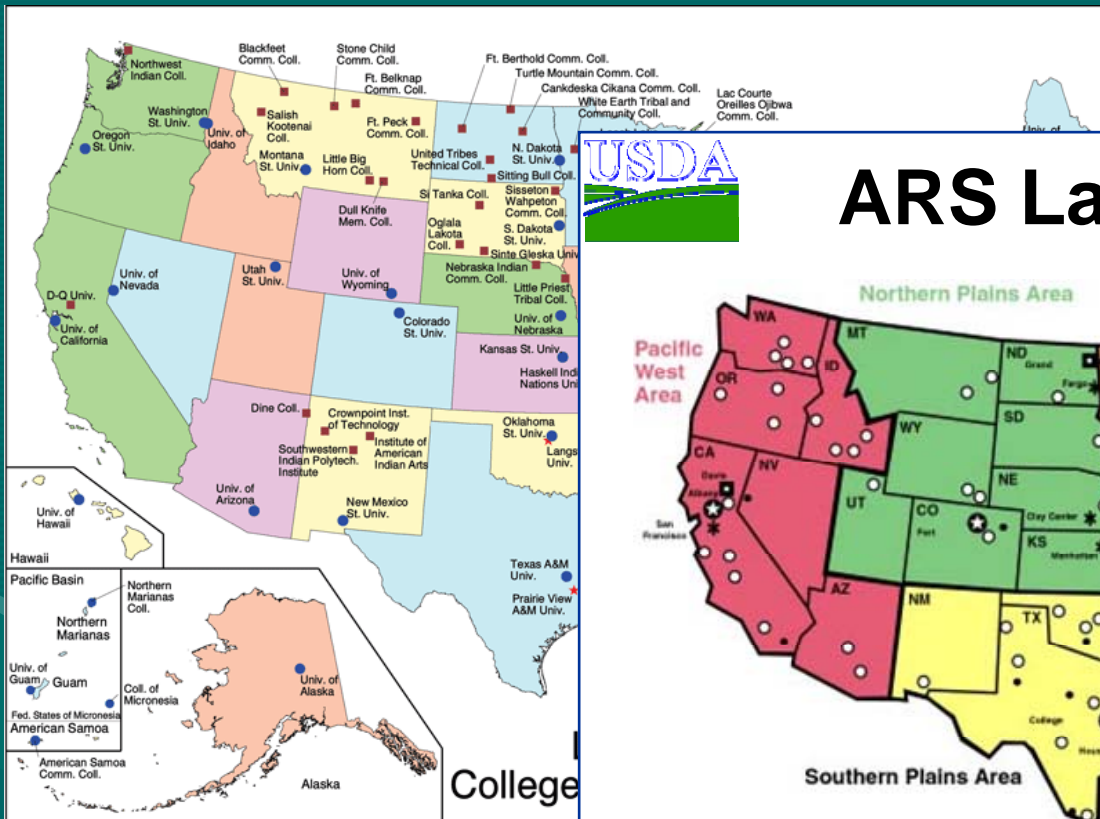
In the Beginning ...



**“The People’s
Department...”**



Today ...

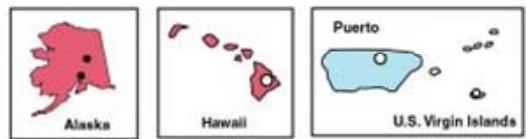


ARS Laboratory Locations



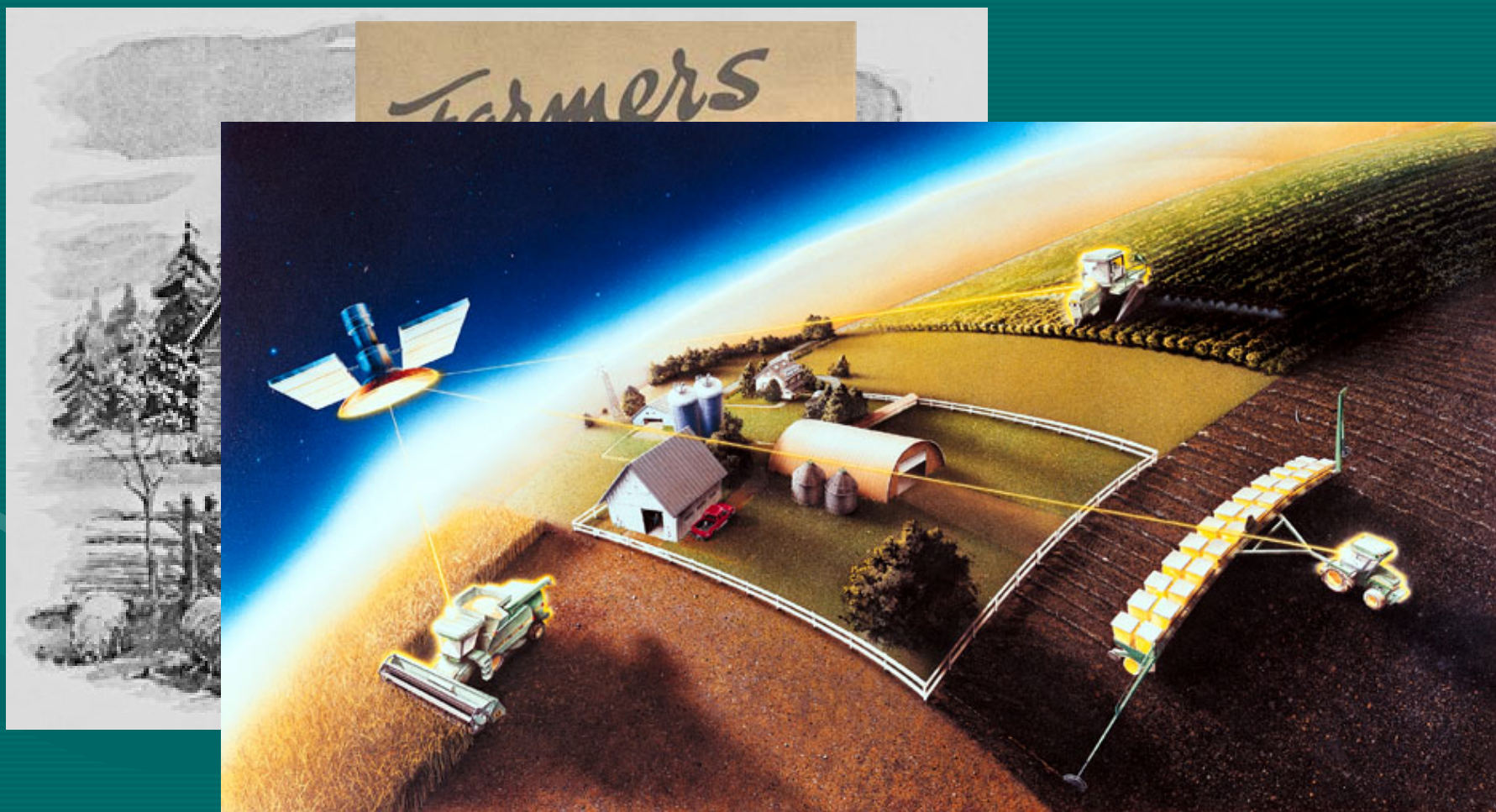
USDA U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Assessment Division
Washington, D.C. June 2003

Map ID: m2783
For Proper interpretation, see Ex
Analysis for this map at our web s
for "USDASOTL" to locate our m





The Changing Landscape of Technology ... and Technology Transfer





Impact of Landmark Legislation

Stevenson-Wydler (1980) / FTTA (1986)

Before

After

Discouraged; “academic independence”

Cooperative Research with Industry Partners

Encouraged (CRADA); mission priorities, relevance, impact

No incentive for USG or scientist

Patenting

Part of career promotion recognition; revenue sharing

Non-exclusive, royalty free (little or no advantage for industry or USG inventor)

Licensing

Full flexibility & right of enforcement (strong advantage for industry in competitive global economy)

Tech Transfer in the 1940's ...

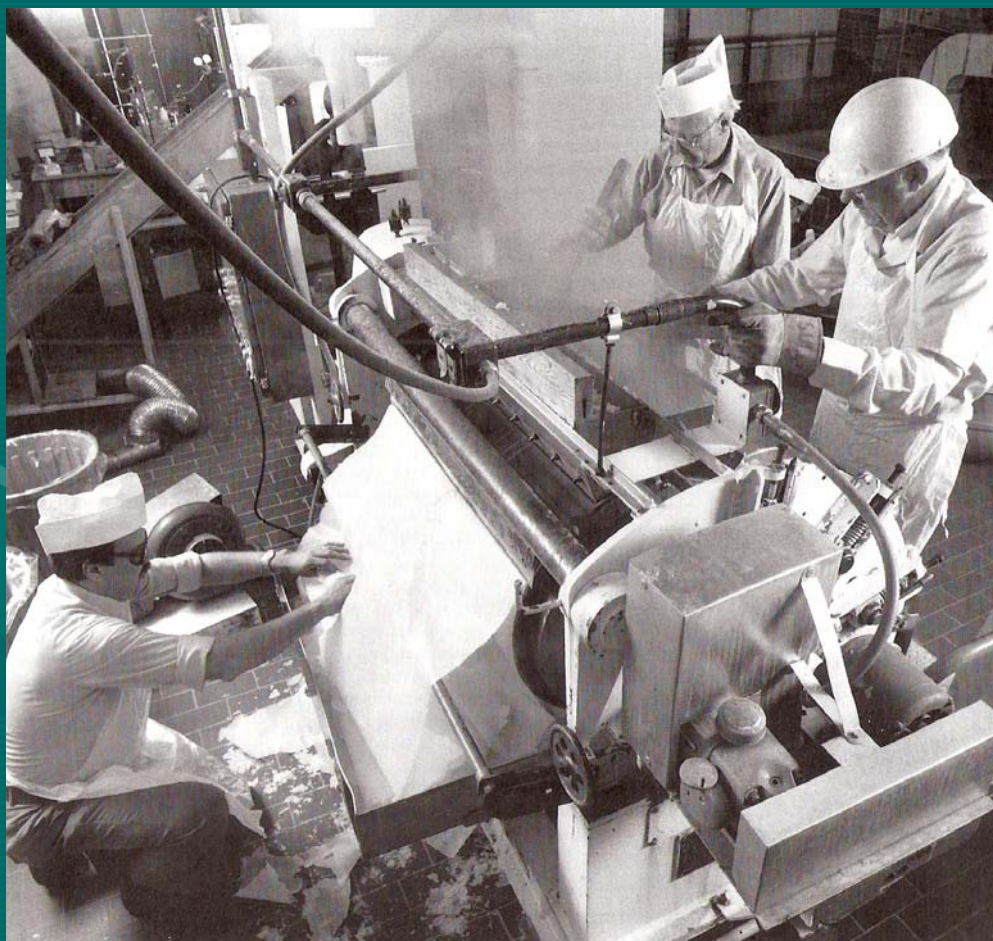




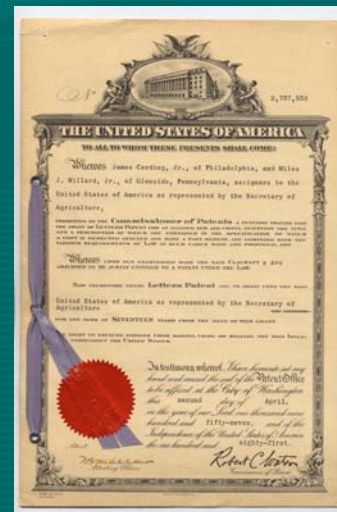
The past ...

Tech Transfer in the 1950's-70's ...

Development of potato flake and dehydration technology:
ARS responding to urgent needs of an industry



1950's -1970's:
9 patents, 68+
publications





The past ...

Tech Transfer in the 1950's - 70's ...

Development of mosquito / insect repellent: ARS responding to urgent needs of the Department of Defense



Developed by
Beltsville chemists
in 1954 (with
Orlando /
Gainesville lab)

More than 250
products containing
DEET are EPA
approved

“Normal use safe..”
declared by EPA;
billions of doses
delivered



The recent past ... under FTTA

Embrex: Trials and Tribulations (licensed in 1988, 2-person company)

Pfizer Animal Health Poultry Health Division

Respected science today.
Solutions for your business tomorrow.

embrex.**INOVOJECT**.systems

The Embrex Inovoject® Egg Injection System: The worldwide standard for *in ovo* delivery

The Embrex Inovoject System is Pfizer Poultry Health Division's patented platform technology, enabling the delivery of biologicals and pharmaceuticals to chick embryos. It is a controlled, sanitary, less labor-intensive system that delivers nearly 100 percent inoculation rates; it makes possible an early stimulation of the immune system, and minimizes stress to the bird. Studies show these combined

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Internet Business Solutions, Development and Design by [digitalwave.com](#)

Sales became strong in 1996

Today, >85% of North American broilers are immunized with process

>300 employees, revenue of \$50 M

Acquired by Pfizer Animal Health



The Challenges of Today...



Bruce P. Mehlman
Former Assistant
Secretary of
Commerce for
Technology Policy;
“Partners on a
Mission: Federal
Laboratory
Practices
Contributing to
Economic
Development,”
Nov. 2003

“...American leadership is anything but assured in today’s global economy – in fact, it’s very much at stake. We face more significant challenges to our innovative capacity and long-term competitiveness than ever before. To succeed in the face of growing challenges we’re going to need extraordinary efforts from industry, educators, and policy makers.

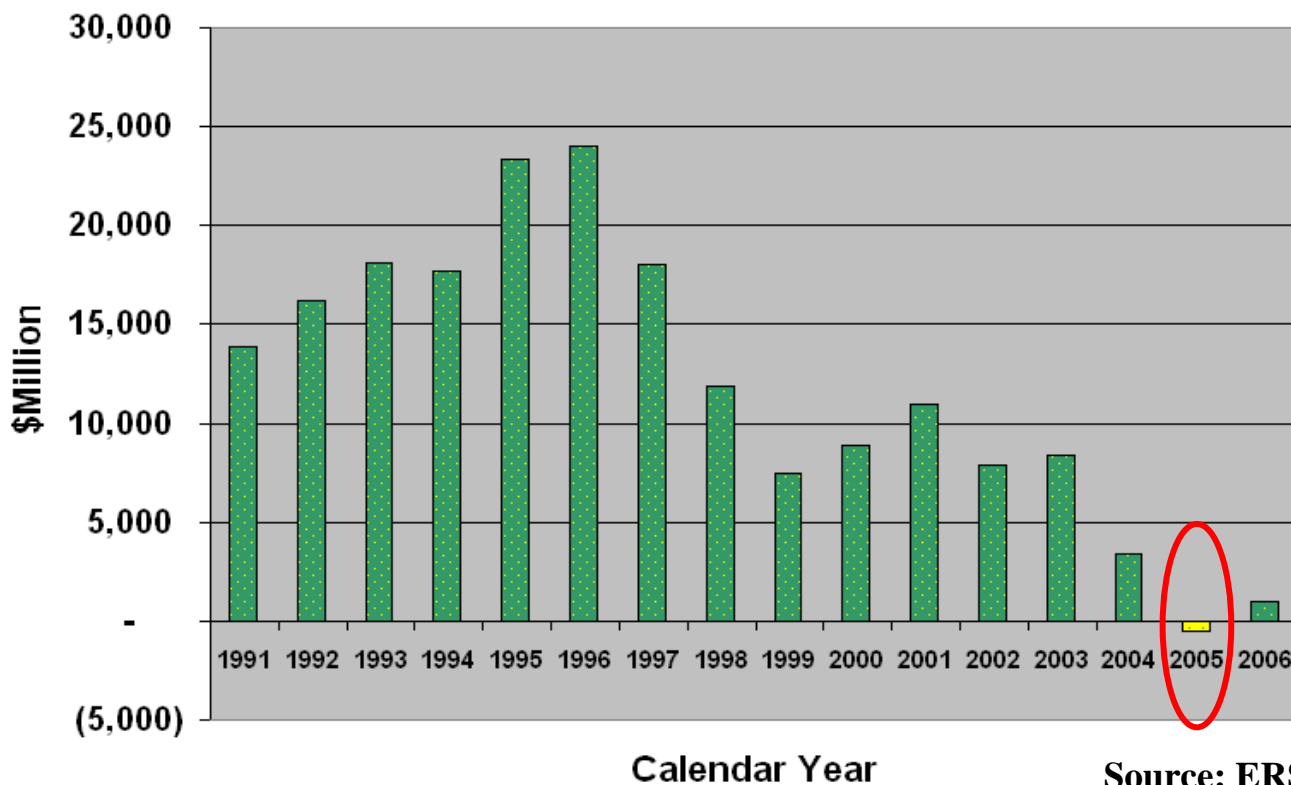
And we’re going to need our federal labs to continue in their long tradition of rising to meet our toughest challenges.”



The present ... intense global competition

ARS Researchers --- Ready to Assist Industry!

Agriculture Trade Balance



Source: ERS (3/07)



Technology Transfer: *the adoption of research outcomes for public benefit*





Culture of ARS: “*The People’s Department*”

- Integration of T2 with research mission and priorities
- ARS protects intellectual property *primarily when necessary* to transfer technology
 - Prefer public release of plant varieties (this is changing)
 - Do not patent animals, nor research tools
- Goal of licensing is to facilitate technology transfer, as opposed to a principal purpose of generating revenue for research.
- Permit license-free research with any ARS technology; Facilitate development of cooperative research agreements, promote further research



How Does Industry Partner with ARS for Commercialization / R&D?

Through the Office of Technology Transfer...

- **Licensing** current protected technologies (including plants) to private sector firms for commercial production.
- **Cooperative Research and Development Agreements (CRADAs)** establish research partnerships to solve industry problems.

<http://www.ars.usda.gov/Business/Business.htm>



Office of Technology Transfer

- Manages intellectual property issues for the Secretary of Agriculture
 - Has sole authority for licensing any inventions developed within any of the USDA agencies (including Forest Service, Food Safety Inspection Service (FSIS), Animal Plant Health Inspection Service (APHIS))
- Has authority to develop and sign Cooperative Research And Development Agreements (CRADAs) for ARS (reviews for other USDA agencies)
- Coordinates all Tech Transfer activities in ARS



Office of Technology Transfer

Centralized in policy and approvals, licensing, marketing; decentralized in negotiation and implementation of CRADAs

Patenting

- 10 registered patent agents
- Located in Beltsville, MD; Peoria, IL; Albany, CA

Marketing

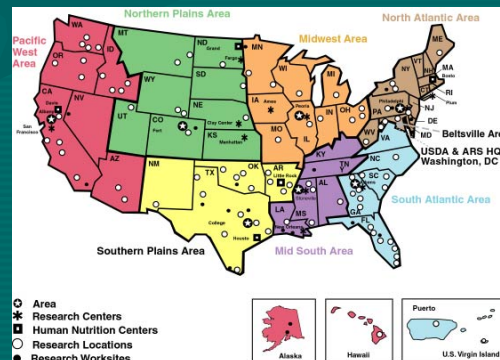
- Targeted marketing
- Web subscribe *Tech Alerts*
- Partnering opportunities

Licensing

- 4 senior licensing specialists
- HQ based

Tech Transfer Coordinators

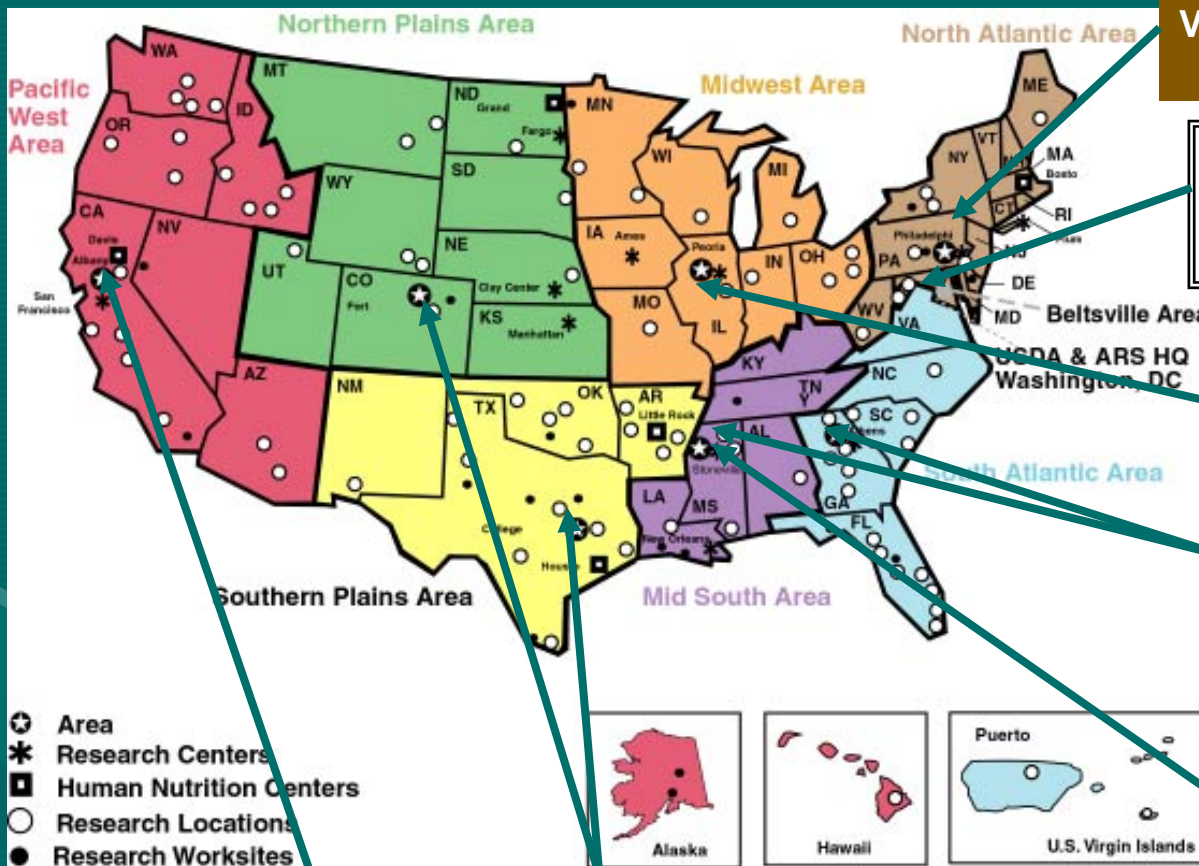
- 7 specialists with life science / ag background
- Distributed across geographic Areas of ARS





Office of Technology Transfer

Technology Transfer Coordinators



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Models for Developing and Transferring Technologies to the Private Sector

Background Invention
(developed in USDA)

Seek Private Sector Interest For Commercialization

The screenshot shows the USDA Agricultural Research Service website. The main content area displays a patent listing for 'New Method to Make an Industrial Lubrication Fluid'. The listing includes the following information:

- Patent Title:** New Method to Make an Industrial Lubrication Fluid
- Projects:** Chemical Systems For Soybean Oil Conversion To Industrial Products
- Midwest Area National Center for Agricultural Utilization Research**
- Docket Number:** 7106
- Serial Number:** 11717524
- Technology Description:** Agricultural Research Service (ARS) scientists in Illinois have developed a way to make a vegetable oil based material using several natural compounds. This technology can be used in formulation of biobased-industrial lubrication fluid, potentially replacing petroleum-based fluids. One of ARS's compounds can be poured at cold temperatures—a property required by the lubrication industry. The compounds also have structures which have the potential to be used to form a new type of surfactant. Many other commercial lubricants and surfactants are available; however, ARS's biodegradable compounds are more environmentally friendly. The technology has been shown to be usable on the small scale. Global lubricant demand is more than 30 million tons annually, and current surfactant use in the United States and Canada is more 3 million tons per year.
- ARS is seeking a cooperative research and development partner to further evaluate the compounds in this invention, as well as conduct extensive lubricant testing. In addition, more research needs to be accomplished to develop the technology's use as a commercial surfactant. Companies that produce surfactants and are looking to**

Marketing Section

- Creates summary for web
- Targets industry

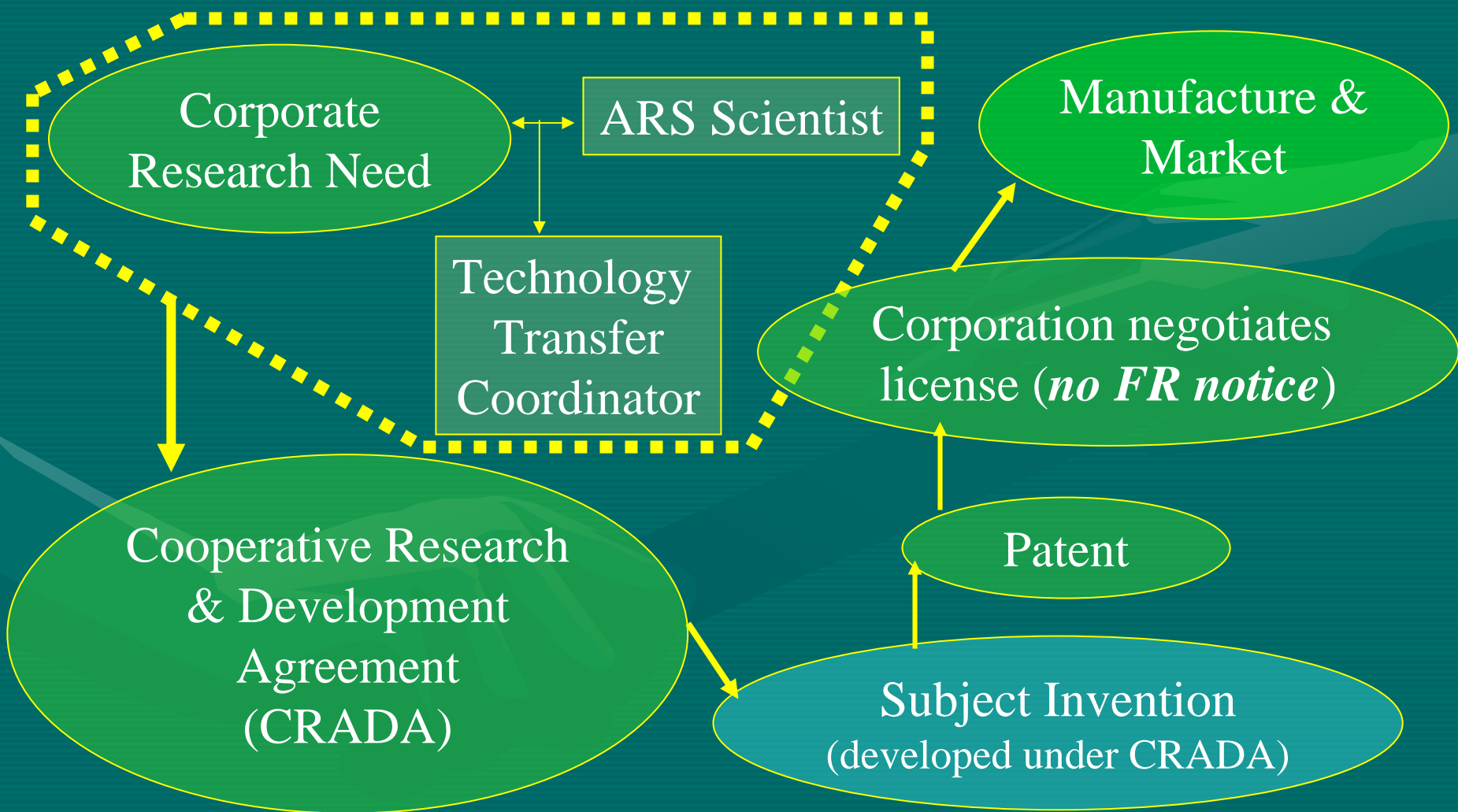
Federal Register Notice

Licensing Section

Corporate response



The CRADA Model for Developing and Transferring Technologies to the Private Sector





Cooperative Research and Development Agreement (CRADA)

- A joint research and development effort (with at least one non-Federal, U.S. partner) where an outcome has the possibility of developing to a commercial product
- A cooperative partnership *that may lead* to the development of intellectual property



Cooperative Research and Development Agreement (CRADA)

➤ **Benefits to Firms:**

- Access to ARS research capacity
- First right to negotiate Exclusive License for Subject Inventions without FR notice
- Confidentiality (competitive advantage)
- Opportunity to compete in global markets

➤ **Benefits to ARS:**

- Results-Oriented Research/Impact
- Market information
- Identification of Licensee
- Resources (For the Project)



CRADA Negotiations

Firms May Provide:

← Expertise

← Employees

← Materials

← Money

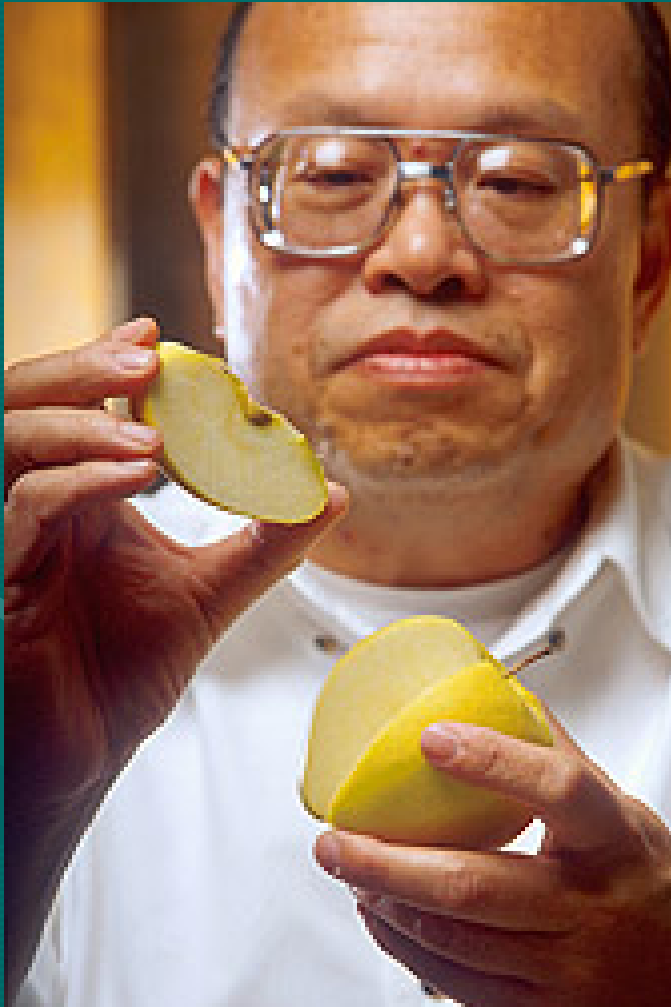
← Equipment

← Facilities

*ARS May Provide Any of the Above
Except Money*



Current Technologies on the Road to Success ...



Preserving color,
crispness, and
flavor of fresh
cut apples ---
“Apple
Dippers”® (Attila
Pavlath /
Dominic Wong;
Mantrose-
Hauser)
(CRADA)



Current Technologies on the Road to Success ...



100% natural
fruit bars from
fruit puree
(Tara McHugh;
HR Mountain
Sun; “Gorge
Delights”)
(CRADA)



Current Technologies on the Road to Success ...



Helping people
with peanut
allergies:
“Sunbutter”®
(Harmeet
Guraya / Isabel
Lima; Red
River
Commodities)
(CRADA)



Current Technologies on the Road to Success ...



Table grape varieties -- (David Ramming; California Table Grape Commission)



Current Technologies on the Road to Success ...



George
Inglett
(Oatrim, Z-
trim, Nutrim,
Calorie-trim)



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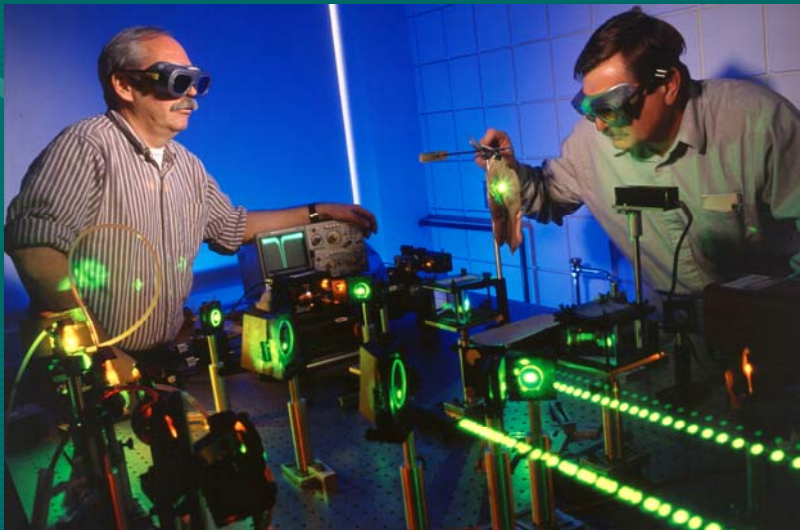


Current Technologies on the Road to Success ...



Tom Casey, Mark Rasmussen
Jacob Petrich (Iowa State U.)

(CRADA)





Current Technologies on the Road to Success ...



Licensed
exclusively to
Agrilube /
Bunge (Feb
2006)

First sale
reported
within
months!

Biodegradable soy-based
hydraulic fluid (Sevim
Erhan; test with National
Park Service)



Annual Report to Congress on Technology Transfer --- "Downstream Outcomes"

U.S. DEPARTMENT OF AGRICULTURE
FY 2007
ANNUAL REPORTING ON
TECHNOLOGY TRANSFER

January 3, 2008

Biobased Products



Domestic production of hypoallergenic rubber -- Natural rubber is a strategic raw material used in over 40,000 applications. The United States consumes over 20% of the world supply of natural rubber.

Crop Production and Protection

medic
Region
in Mar
the sc
been



Novel sweetener reaches market -- ARS researchers at the USDA/ARS Bioproducts and Biocatalysis Research Unit at the National Center for Agricultural Utilization Research (NCAUR), in Peoria, IL, are working in partnership with Cargill on the use of enzymes to convert sugar and corn syrup to value-added complex carbohydrates. Using ARS-developed methods to produce

and characterize novel carbohydrate products from agricultural materials, ARS and Cargill surveyed more than 100 microbial isolates from culture collections and natural isolations. This research led to the discovery of a novel low-glycemic index sweetener, called Xtend™ sucromalt. The new product provides food and beverage customers with a natural and slow release carbohydrate syrup. This fully digestible, low glycemic syrup provides natural sweetness for products such as nutritional beverages and bars, cereals, ice cream, jams and jellies, and yogurts. The product is named sucromalt because it is derived from a combination of sucrose (cane or beet sugar) and maltose (corn sugar).

<http://www.ars.usda.gov/Business/Business.htm>



Summary of Processes for Commercialization Partnerships with Private Sector (Stevenson-Wydler / Federal Tech Transfer Act 1986)

- Authorized licensing of “background” inventions *exclusively*, but with a “fair and transparent” process
 - Requires *Federal Register Notice of intent to license exclusively*
 - Must resolve objections to notice of intent to license exclusively (through negotiation)
 - U.S. companies / U.S. manufacture
- Can preferentially license to a small business, but cannot select one small business over another
- Guarantees that private sector partners have right to negotiate an exclusive license to “Subject inventions” developed under CRADAs *without Federal Register Notice.*, up to 5 yrs. Confidentiality from FOIA



In Summary...Technology Transfer Process for NP 306

Incorporate this process early in the 5 year cycle

- Identify transfer mechanisms (adoption) for each expected outcome
 - publication
 - personal interface and exchange
 - patenting and licensing
- Evaluate its commercial potential
- Identify partner(s) and formalize relationship(s), as appropriate
- Develop and document technology

*Transferring the technology enhances the
impact of ARS research outcomes!*



Photo: Quiet Waters Park, Annapolis, MD
(Joann Perkins)

Richard J. Brenner, Ph.D.
Assistant Administrator

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[http://www.ars.usda.gov/Business/
Business.htm](http://www.ars.usda.gov/Business/Business.htm)

*IP management and R&D
partnerships for our scientists,
customers & stakeholders*