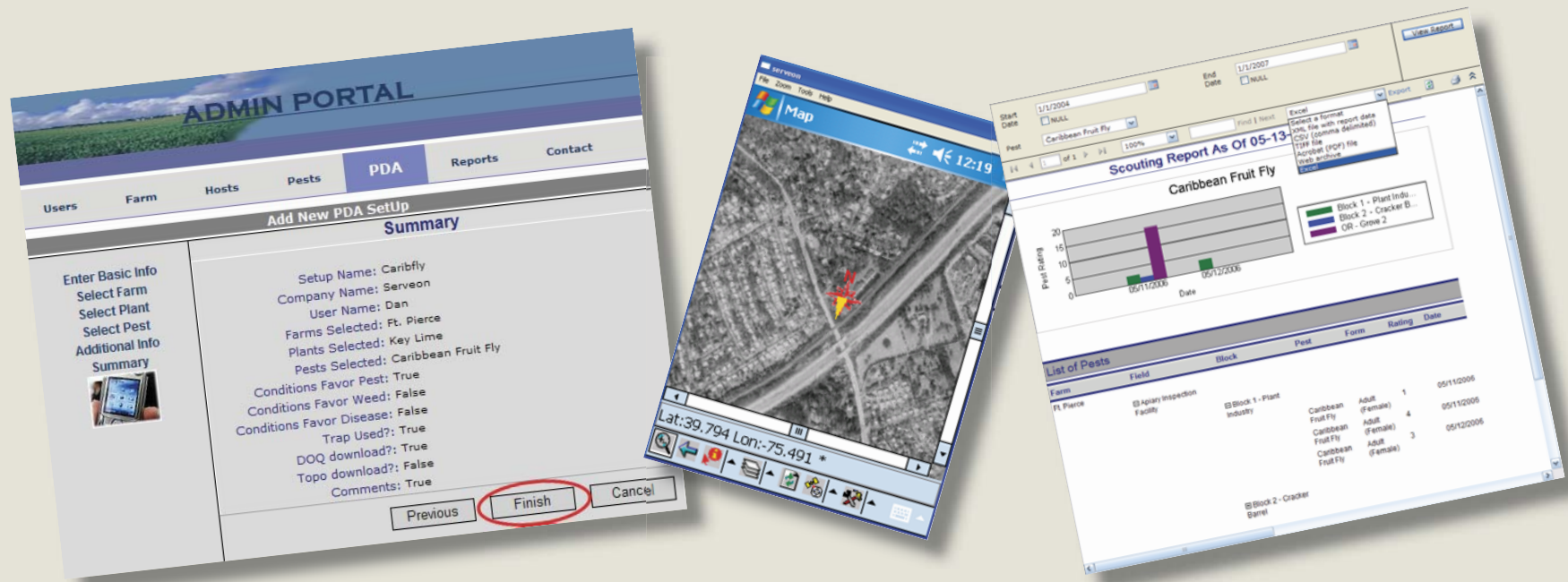




Internet-Based Survey and Modeling Systems for Agricultural Insects and Diseases

Fruit Fly, Canker and Greening Certification Programs



Steven Rogers, Herb Nigg, Isobel Clark, Daniel Hart, Reza Ehsani, Dave Brock & Ed Schuster



Digital, Interoperability and Immediacy

One of the driving forces behind the development of the technology we will describe is the need for better accessibility and interoperability in existing data.

“There is incredible untapped potential in unused data. Many of our most important research and marketing issues could be resolved today if existing agricultural information was digitally organized, interoperable and immediately accessible to the people who could make a difference.”

— *Steven Rogers, 2001*



Caribbean Fruit Fly Free Protocol

The Caribbean fruit fly imposes a trade barrier to shipping Florida grapefruit to Japan. Fruit can only be shipped after being certified as “fly free”.

JAPAN

The single most important export market for Florida grapefruit

Country	1000x	Change
United States	1,811	-9.2
Canada	258	-26.7
Europe	577	-34.7
Japan	930	-36.3
Other	35	+75.0
Total	3,611	-23.3

Source: January 2006 Florida Citrus Economic Indicators, DOC



TASC Grant from the USDA-FAS

Technical Assistance for Specialty Crops grants are targeted to those areas that support marketing activities to foreign export partners.

TASC FlyNet Project #04010 Description	
Sponsor	USDA-FAS/Indian River Citrus League
Project Number	USDA TASC Agreement #04010
Quarter Report	First Quarter Report
Date of Report	February 2006
Report Version	Version 2/28/06-c (Cooperators)
Market	Market JA; Commodity: CITRS
Trade Barrier Type	Pest Lists & Database Development
Funding Year	Year 2 of 3
Funding Allocation	\$242,000
Contact & Phone	Steven Rogers, 863-287-8587
Contact E-mail	steve@stever.com

Indian River Citrus League
 Florida Department of Agriculture
 United States Dept. of Agriculture
 University of Florida
 Mass. Institute of Technology
 Ecostat, Inc.
 Serveon, Inc.
 Geostokos, LTD



FlyNet

FlyNet technology is based on a proven commercial-level pest survey platform used in several countries and crop domains since the mid-1990's.

Internet-based

Universal platform
for any crop-pest
domain

Science/Technology

Insect & Disease Certification
Rapid Scale-Up for New Diseases
Improved Preharvest Inspection
Less Paperwork & Forms Preservation
Automated Certification Reports
Improved Traceability
Combined Insect & Disease Surveys
Improved Pest Trend Modeling
Real-Time Data for Researchers
Easier Grower Pest Scouting
Faster Pest-Yield Relationship Analysis
...and many more.



Fruit Flies, Canker, Greening and Others

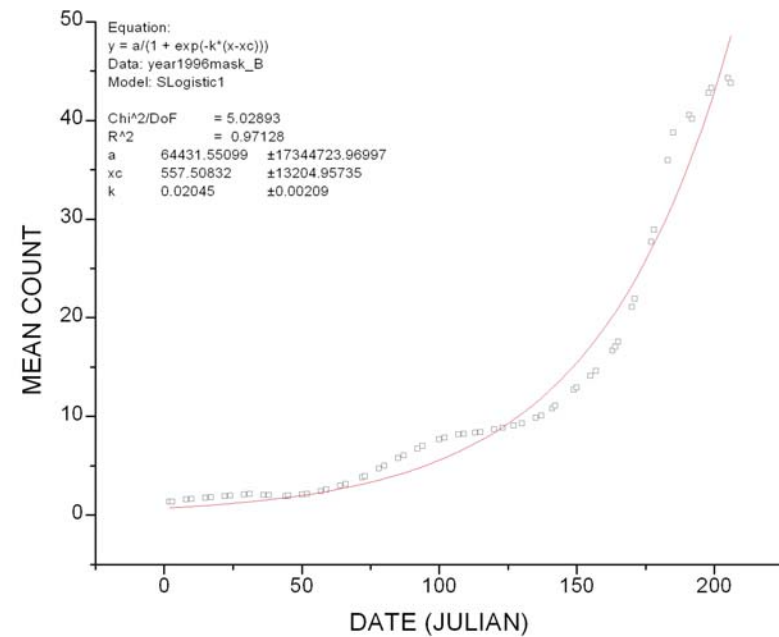
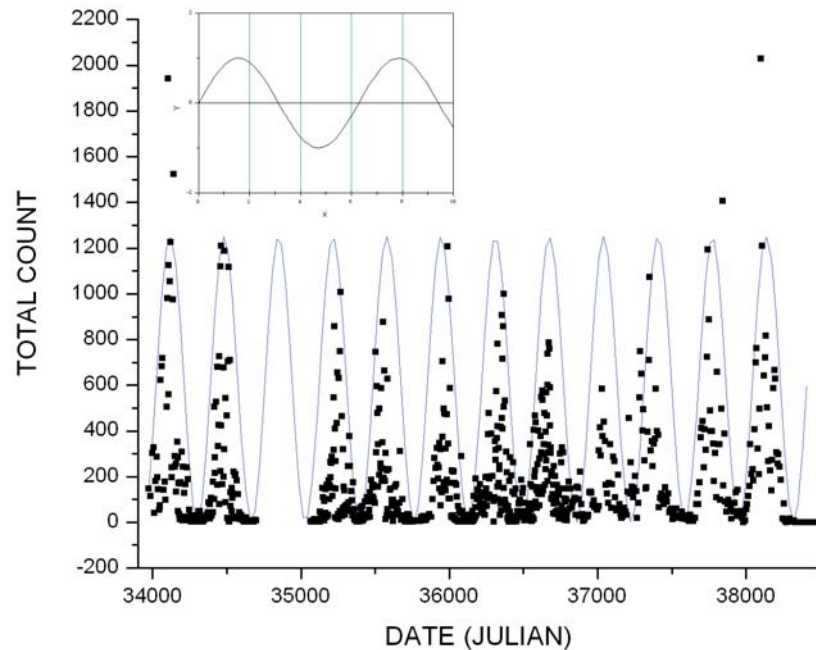
FlyNet can be repurposed within minutes if changes must be made in an inspection program due to introduction of a new exotic insect or disease.

- Short learning curve
- Individual customizable pest profiles for each user
- Full complement of data security features
- Flat and geographical OLAP cube reporting services
- ArcIMS-enabled
- Low hardware cost that includes full GPS capability
- No desktop software to install
- Wireless synchronization available



Logistic Model Describes Fly Growth

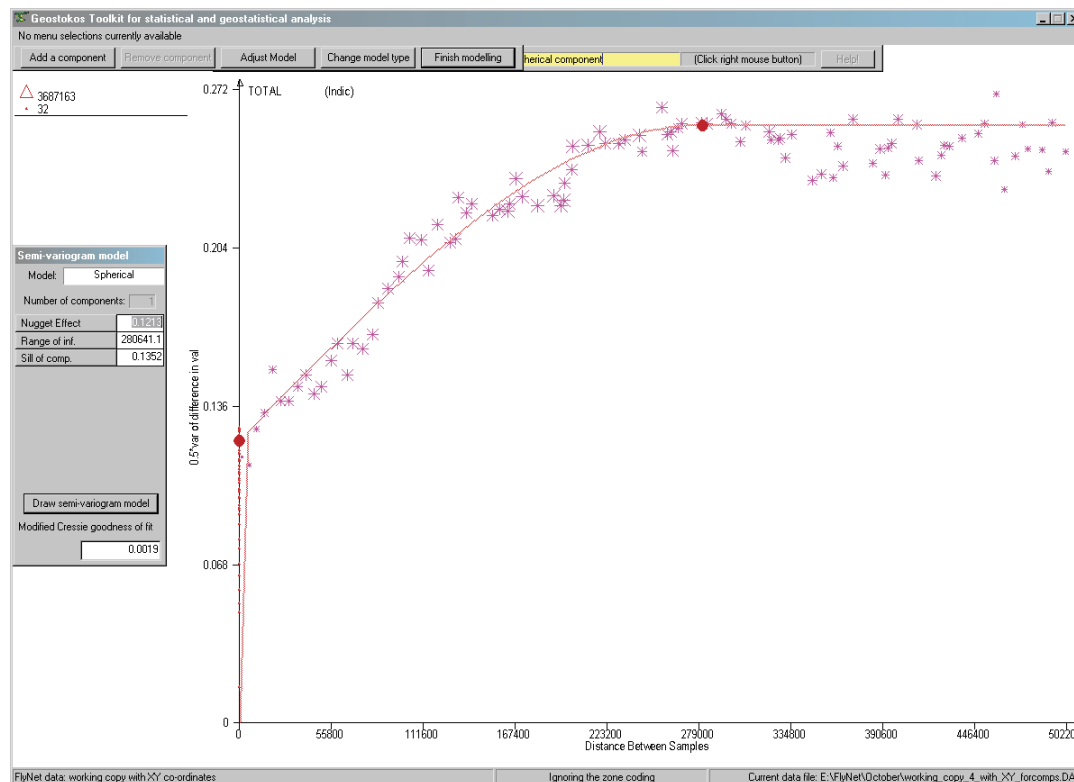
Parameters seem to align best with initial count, carrying capacity and temperature (and/or host fruiting) as the dominant development force.





Spherical Thirty-Mile Range of Influence

Geostatistical variography suggests there is a large nugget and an approx. 30-mile range of influence.

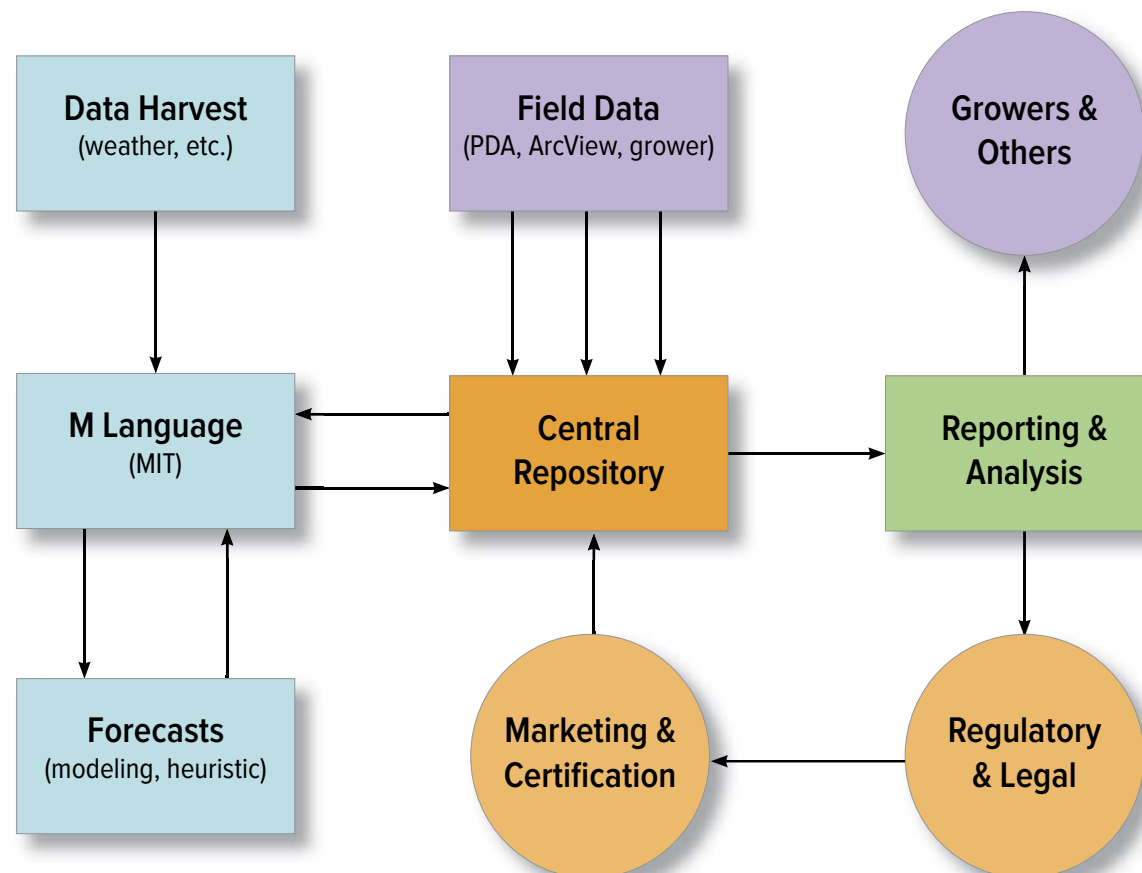


Binomial variography resulted in a better experimental variogram than using counts.



Central Repository is Interoperable

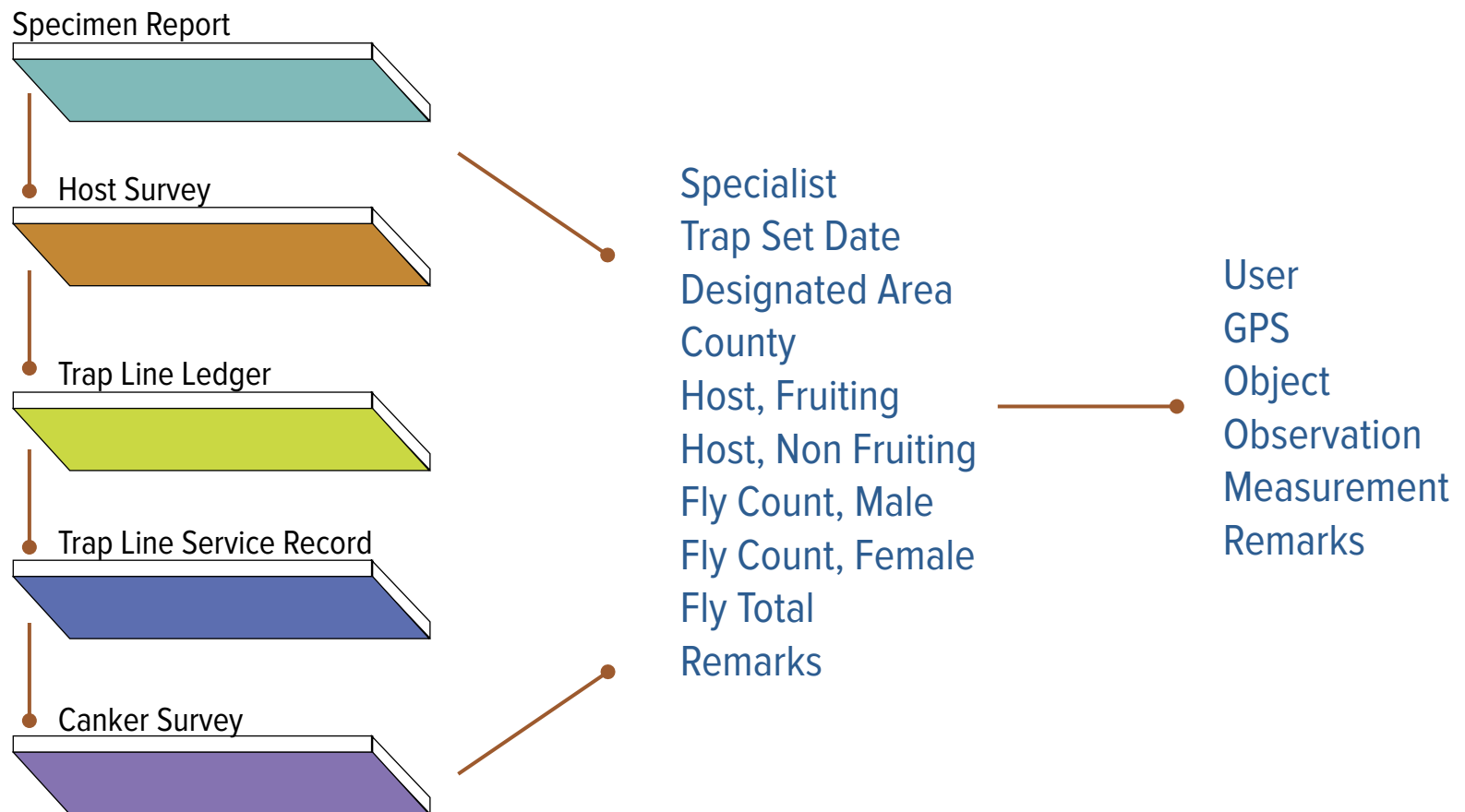
FlyNet is designed as an “M-prestaging” point. M is a project in cooperation with MIT to address interoperability between data sources.





Duplicate Forms • Duplicate Data

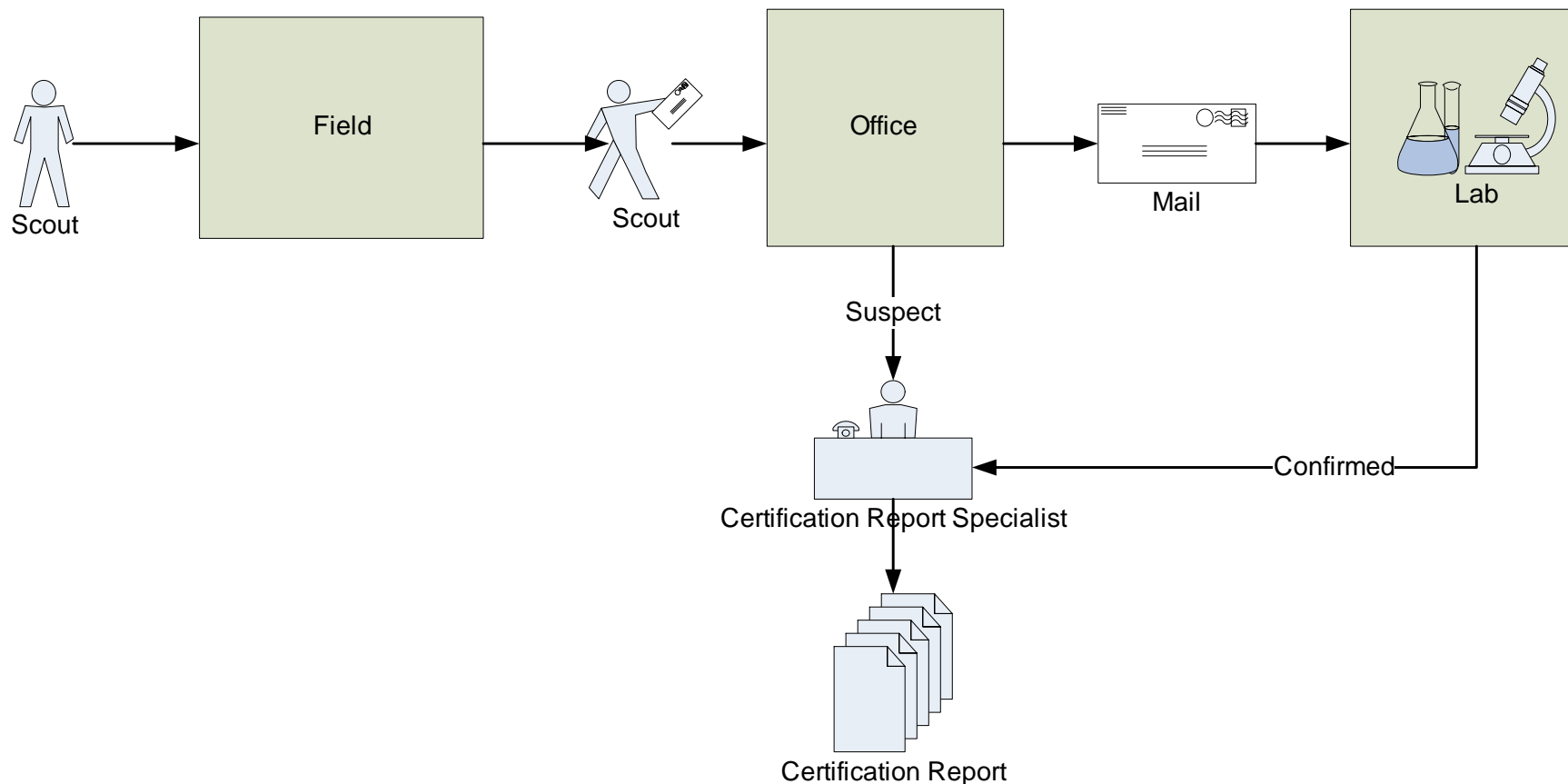
Inspectors use several forms, transferring the same data from form to form. Digital and automated data acquisition would reduce duplicative efforts.





Current Data Management Process

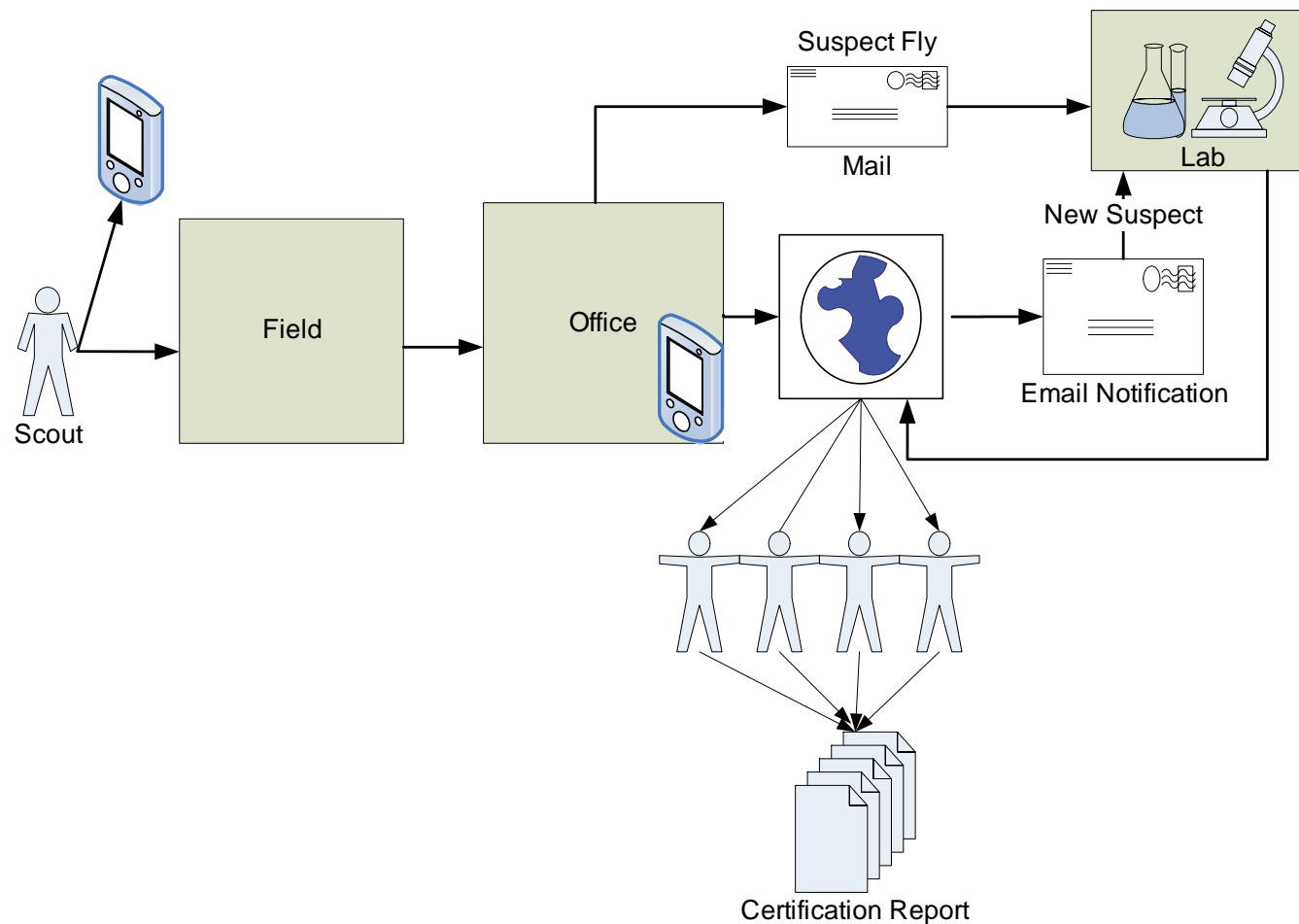
Current data management procedures involve forms, snail mail and other paper-based documentation procedures.





Digital Data Management

Redundant data is entered only once using validation procedures. Since all data types are system-resident, required forms can be automatically generated.





Three Main Steps to Using FlyNet

There is no desktop software. Users set up their PDA pest profiles from the FlyNet web portal, then download the profiles automatically during synchronization.

1

Web Admin

ADMIN PORTAL

Users Farm Hosts Pests PDA Reports Contact

Company Name: Serveon

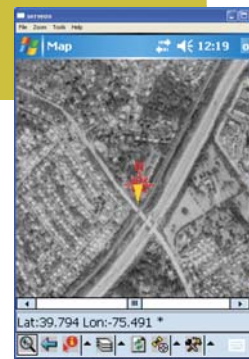
List of Pest/block/Field/Farm: Add Pest

Pest Name	Type	Block	Field	Farm
Bermudgrass	Weed	OR - Grove 1	Concord S - ORG	Coverdale
Bermudgrass	Weed	Corn3	Ephrata - Corn	Coverdale
Bermudgrass	Weed	Corn2	Ephrata - Corn	Coverdale
Black Nighthade	Weed	OR - Grove 1	Concord S - ORG	Coverdale
Black Nighthade	Weed	OR - Grove 2	Concord S - ORG	Coverdale
Black Nighthade	Weed	OR - Grove 3	Concord S - ORG	Coverdale
Black Nighthade	Weed	OPT - 1	Silverdale - OPT	Coverdale
Brown Rot	Disease	OR - Grove 1	Concord S - ORG	Coverdale
Canker	Disease	OR - Grove 1	Concord S - ORG	Coverdale
Canker	Disease	OR - Grove 2	Concord S - ORG	Coverdale

1 2 3 4 5 6 7 8 9

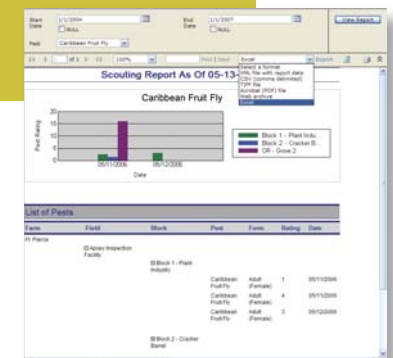
2

Collect Observations



3

Generate Reports





Step 1. Web Administration Portal

Inspection program design is performed using an online web administration portal. Profiles are downloaded to PDAs automatically during synchronization.

ADMIN PORTAL

Users Farm Hosts **Pests** PDA Reports Contact

Pest Pest Form Pest SubTypes

Edit Pest Information

Pest Common Name: Canker

Pest Scientific Name: Xac

Pest Type: Disease

Pest Sub Type: Bacterial

Pest Form: Lesions Pustules

Pest Rating Type: Severity(text based)

Range Scale: Absent-Present

Associated Farm: Ashland, Coverdale, Ft. Pierce

Associated Field: Concord S - ORG, E. Coverdale - Corn, Ephrata - Corn, Silverside- GFT

Associated Block: Corn 1, Corn 2, OR - Grove 1, OR - Grove 2, OR - Grove 3, Corn3, Corn2, GFT - 1, Montgomery

Comments

Submit Cancel

ADMIN PORTAL

Users Farm Hosts Pests **PDA** Reports Contact

Add New PDA Setup

Summary

Setup Name: Caribfly

Company Name: Serveon

User Name: Dan

Farms Selected: Ft. Pierce

Plants Selected: Key Lime

Pests Selected: Caribbean Fruit Fly

Conditions Favor Pest: True

Conditions Favor Weed: False

Conditions Favor Disease: False

Trap Used?: True

DOQ download?: True

Topo download?: False

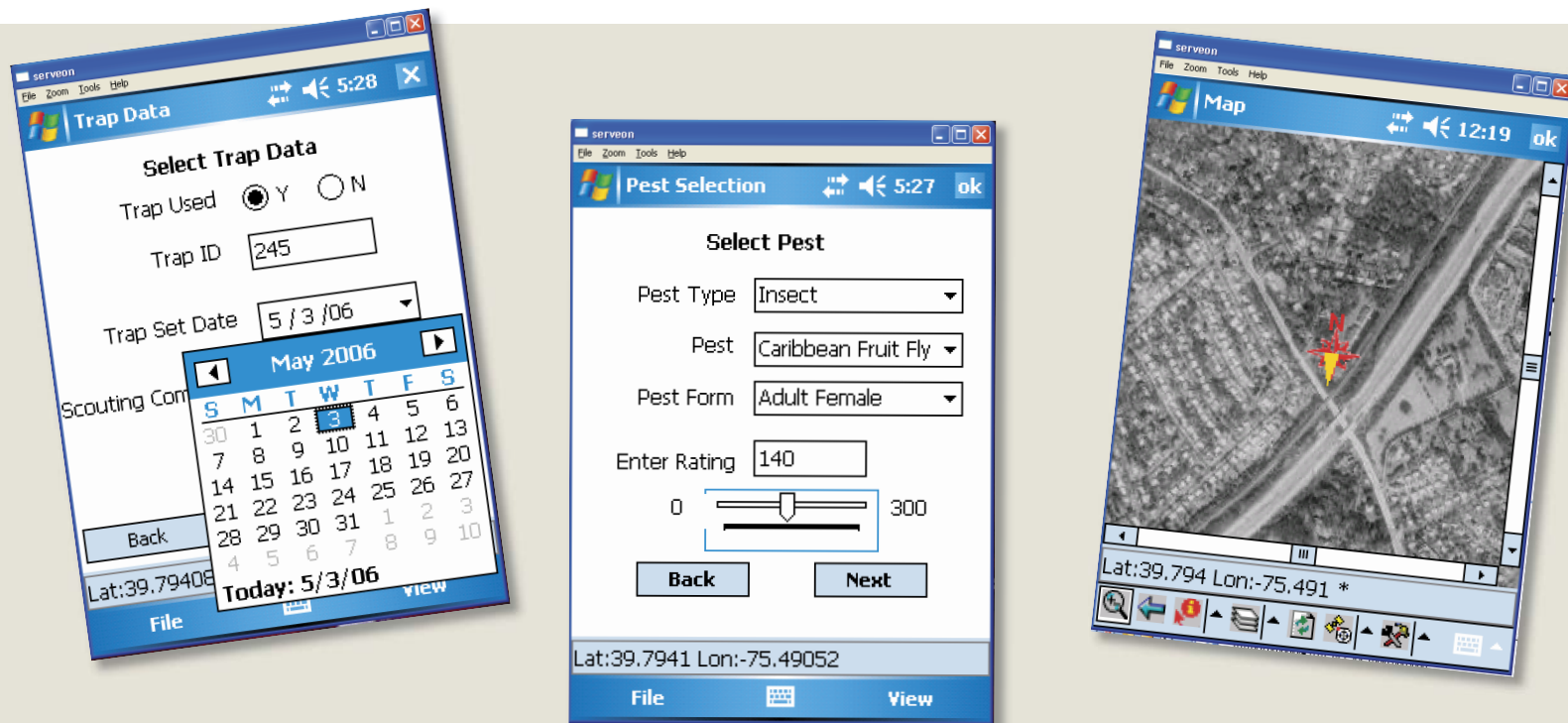
Comments: True

Previous **Finish** Cancel



Step 2. Handheld PDAs Data Capture

HP Ipaqs are used since they provide a low-cost hardware solution, Internet and wireless synchronization capability and GPS and image-capture features.



Host and pest observations are captured and represented live on the PDA maps. Data can be wirelessly synchronized for improved update capabilities.



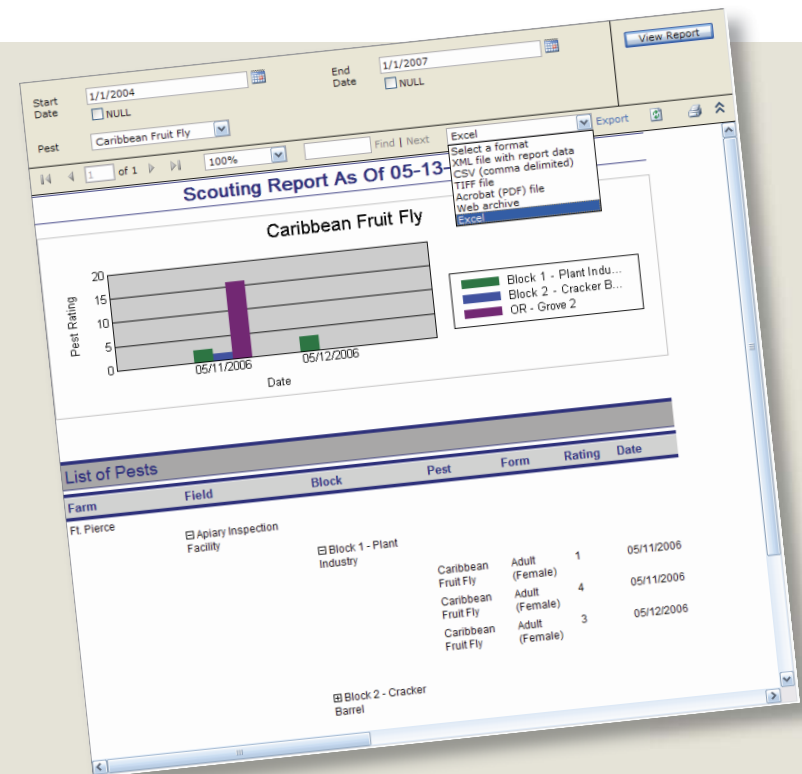
Step 3. Automated Reports Save Hours

Required forms can be generated automatically at pre-determined times. This saves hours of manual preparation time.

Content is automatically harvested from the resident database into which real-time information is being loaded.

Authorization protocols ensure that only approved reports are sent to recipients.

Data is exported to preferred formats for research purposes.





M Language–NOAA Weather Interoperability

Data interoperability will be leveraged using the M language. M is being developed at MIT in a consortium dedicated to finding commercial applications.

DESCRIPTOR	EXAMPLE
KEY	call.5
DEFINITION	call n. a telephone connection
SEMANTIC LINKS	Synonyms: phone call.1, telephone call.1 Type of: telephone.2, telephony.1 Part of:
SCHEMA	Data: <code>^[+][0-9]\d{2}-\d{3}-\d{4}\$</code> Attributes: party.5, duration.1, telephone_number.1
LOCALIZATION	Data: Japanese, Chinese, Indian, Russian, German



FlyNet Pilot Program Being Established

Subject to ratification by the IRCL Board, a pilot program to test FlyNet technology is being established for fruit flies and canker on Florida's east coast.

The Ledger-Lakeland
theledger.com

Lakeland, Florida | May 24, 2006

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Published Saturday, May 20, 2006
FLORIDA CITRUS CANKER

Quarantine Might Be Averted

By **KEVIN BOUFFARD**
The Ledger

LAKELAND — A top Florida agriculture official expressed "cautious optimism" Friday that a new proposal — including weekly canker inspections in some citrus groves designated for the fresh fruit market — would avert a federally imposed canker quarantine across the state.

"On Monday of this week, it appeared we were heading into a statewide quarantine. At least now, they're discussing whether we'll be able to ship fresh fruit to citrus-producing states," said Craig Meyer, the deputy commissioner at the Florida Department of Agriculture and Consumer Services.

Meyer was referring to top officials at

The Shipping News

Florida's fresh citrus groves and packaging area would total a significant share of the U.S. market if the U.S. Department of Agriculture adopts a proposal to impose a statewide citrus quarantine. Values are based on the "fresh orange" piece, or the price the shippers guarantee to buyers, an industry official says.

STATE	2003-04	2004-05	Citrus Ships Apr. 20	2005-06 Value
California	3,959,000	4,711,000	736,000	\$11.2 m
Louisiana	135,000	161,000	38,000	\$1.9 m
Texas	237,000	150,000	73,000	\$1.0 m
Arizona	—	1,000	2,000	\$14,300
Total to these states	4,331,000	5,113,000	849,000	\$14.5 m
Percent of exports	6.3%	6.7%	6.2%	
Total to all states	27,273,000	10,370,000	10,000,000	

SOURCE: U.S. Agricultural Committee, Lakeland, Apr. 18, 2006.

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Shipments
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FlyNet provides the universality, interoperability and robust system architecture required for a rapidly changing agricultural pest profile in Florida.