Sears GIS Return on Investment Opportunities

Steve Jones

National Routing Manager

Sears Product Repair Services

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Sears GIS Users

- Product Repair Services
  - Computer Aided Routing System (CARS)
  - Sears Smart Toolbox (SST)
  - Capacity Allocation Management System (CAMS)
- Logistics (Home Delivery) Group
  - Enhanced Home Delivery System (EHDS)
  - Warehouse Operations Optimization
- Marketing
  - Demand Forecasting

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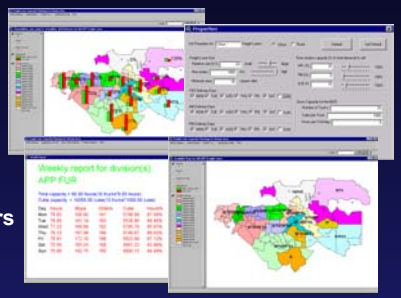
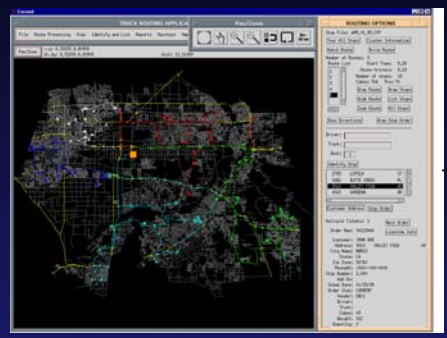
Sears Enterprise GIS Usage for Product Repair Services and Home Delivery

Historical Demand
Current Demand
Forecasted Demand
Geography
  Zip codes, travel time
Available Fleet
  Vehicles, capacity,drivers
  Work load balancing

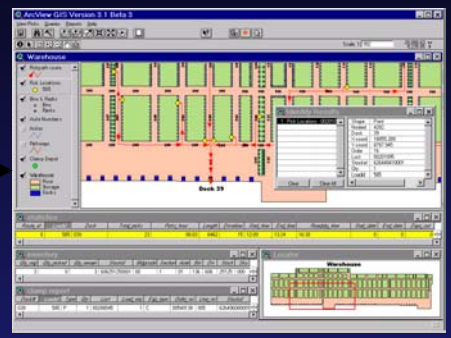


GIS Based Service Area Planning



Sears Enhanced Home Delivery System (EHDS)

Nationwide GIS Street Level Geocoding and Route Optimization



Warehouse Optimization using GIS

Routing of forklifts within Sears Distribution Centers to pick merchandise for truck loading

Customer Request

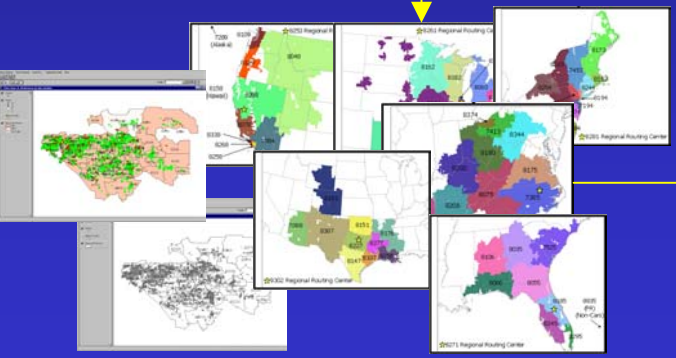
Home Delivery of Merchandise
OR
Home Product Repair

Mainframe CIS

Customer Service

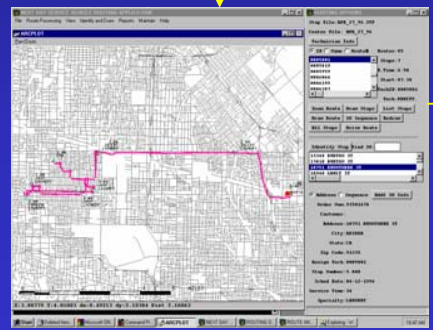
Delivery Vehicle departs to your home to Deliver Merchandise

Service Technician Departs to your home for Product Repair



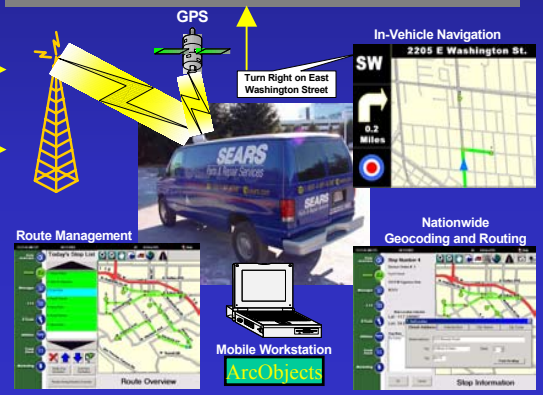
Capacity Area Management System (CAMS)

Planned Capacity of available service technicians assigned to geographic work areas



Sears Computer Aided Routing System (CARS)

Nationwide GIS Street Level Geocoding and Route Optimization



Sears Mobile Mapping

In-Vehicle Navigation

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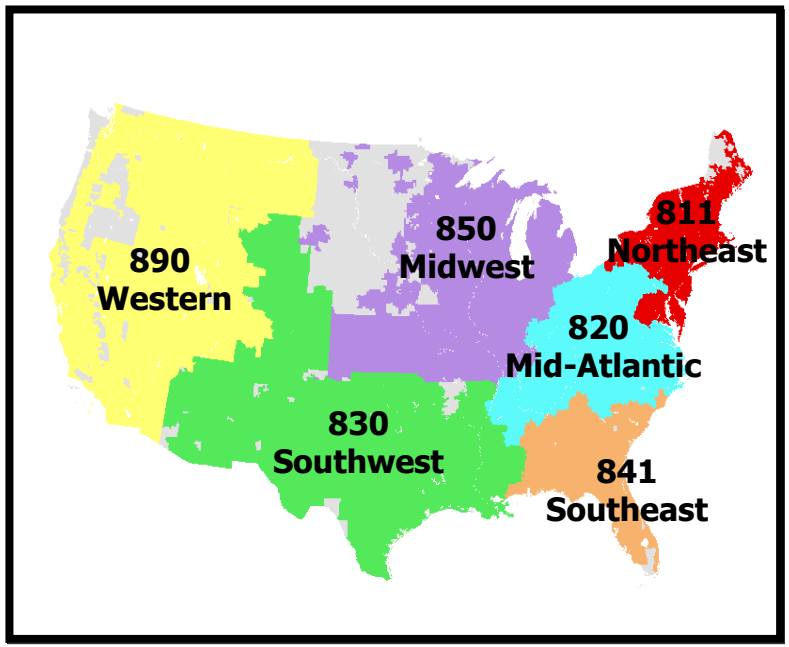

- 6 distinct geographic regions with 53 independent districts
- Over 10,000 technicians nationwide
- Over 11,000,000 in-home service orders completed last year

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Routing Service Technicians

- Technicians have sets of assigned specialties
- Sears services over sixty specialties covering tens of thousands of merchandise types
- Geographic call densities vary
- Optimizing routes was a major concern

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Product Repair Services GIS

- CARS: Computer Aided Routing System
  - Developed in conjunction with ESRI in 1995
  - Many upgrades done over the years
  - Unix based application
    - Uses ArcInfo 8.02
    - Accessed via the Sears Intranet
    - Planned Migration to ArcGIS under development
  - Maps procured from GDT as coverage files
  - Each district has its' own map and application

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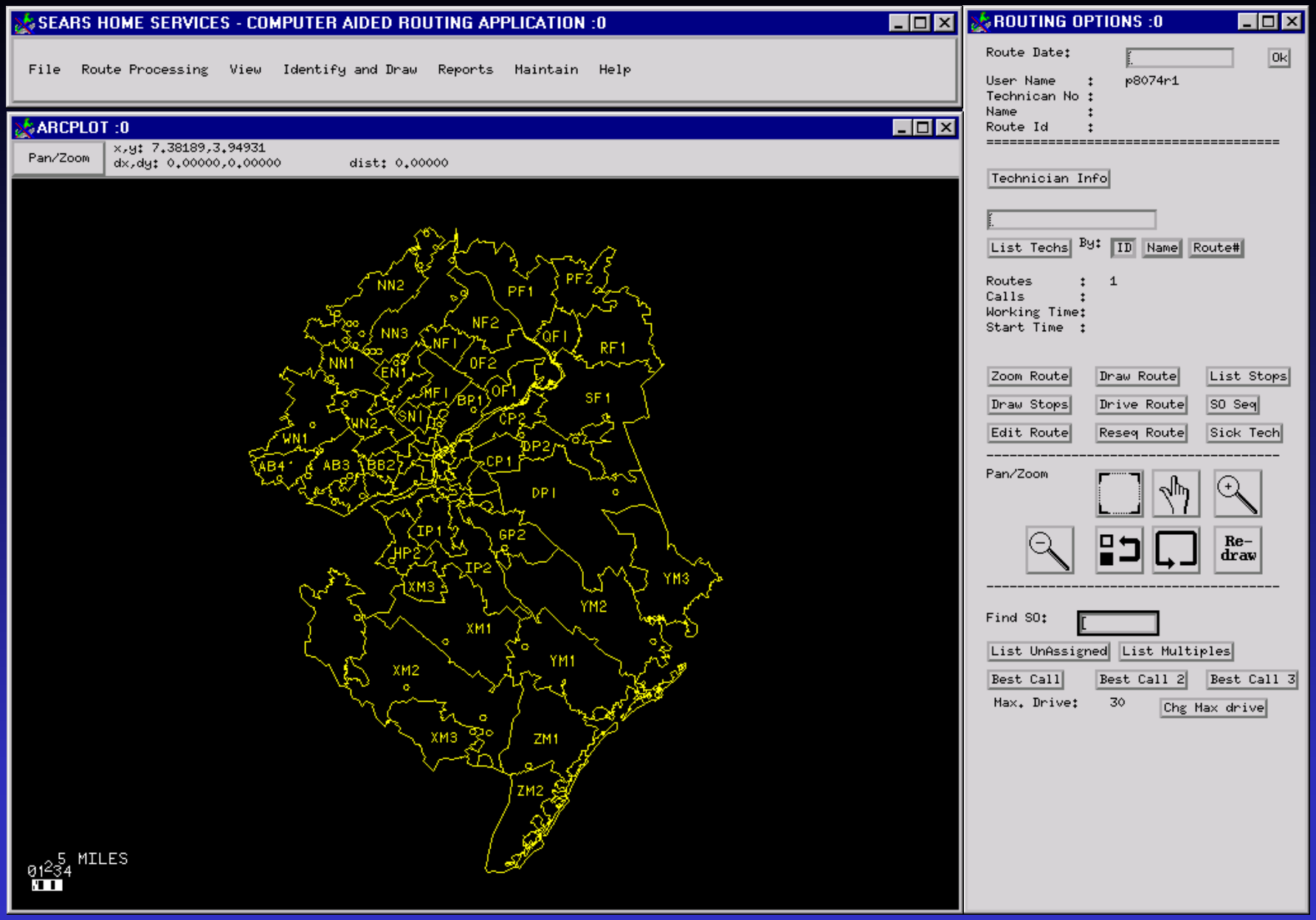

CARS Application

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Potential Savings with GIS

GIS Improvements:

- Reduce travel time and mileage per stop
- Automate support work

Economic Results:

- Improve technician productivity
- Lower truck expense per stop
- Reduce overtime
- Lower support costs

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Call Assignment

- Shortest Path Algorithm (SPA) used
- Other cost functions applied with SPA
- Optimize call assignment based on:
  - Transit Time
  - Customer Time Window
  - Amount of Work Already Incrementally Assigned
  - Technician Overtime

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Sequencing Calls

- Sequencing algorithm uses weighting factors:
  - Travel time
  - Overtime
  - Meeting customer time windows
  - Route infeasiblity
- Sequencing applied several times during (and sometimes after) route creation

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Improve Productivity

- Reductions in travel time and mileage per stop make the route more efficient
- Accumulated reductions in travel time and mileage will allow an additional stop(s) to be added to routes

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Service Call Duration

The time to accomplish each call is made up of two components:

- Travel time to reach customer
- Service time to conduct work

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How Can Productivity Increase?

- Pre-GIS
  - Assume 30 minutes travel and 30 minutes service time per call
  - On average, about 8 calls a day can be attempted
- Post GIS
  - Service times do not change, so travel time reductions must be sufficiently large to allow another attempt to be made
  - If you reduce travel time to 20 minutes per call you get another attempt per day per technician

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Lower Truck Expense Per Stop

- Reductions in travel time and mileage will lower truck costs between stops on an average basis
- If calls are added, overall route time and miles may stay the same but are improve per stop if productivity increases
- If productivity cannot be improved you may be able to end day early

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How Can Fleet Costs Be Reduced?

- Without productivity gains, savings can still be attained
- Less driving time/mileage reduces truck expense
- Less driving time reduces payroll costs (if you can send associates home early)

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How Can Fleet Costs Be Reduced?

- Each minute the day is shortened at $15 per hour saves $0.25 in labor
- Each minute reduction in driving at 25 mph (about 0.42 miles) with $0.40 cost per mile results in $0.17 cost savings
- Reducing 3 minutes per stop at 8 stops per day results in ~$10 savings per truck per day

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Reduce Overtime

- The GIS will allow better route planning
- Overtime costs can be reduced

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Other Support Cost Savings

- Pre-GIS, more dispatchers are needed
- GIS can allow one person to handle 3-5 times more technicians
- District territory can increase, reducing the number of other support associates needed
- IT costs to support GIS are more than made up by other savings

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Sears PRS Results

- Productivity increased over 0.5 calls per day per technician
- Mileage and travel time per stop were reduced about 15-30%
- Some impact on overtime reduction
- # of PRS districts reduced by over 60%
- # of dispatchers reduced by 75%
- Only a small IT staff needed to support

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New GIS Applications Under Development by ESRI & Sears

SST

- Deploying spring/ summer 2004
- New rugged-ized laptop for service technicians
- Map display/update route and visual/ audible driving directions

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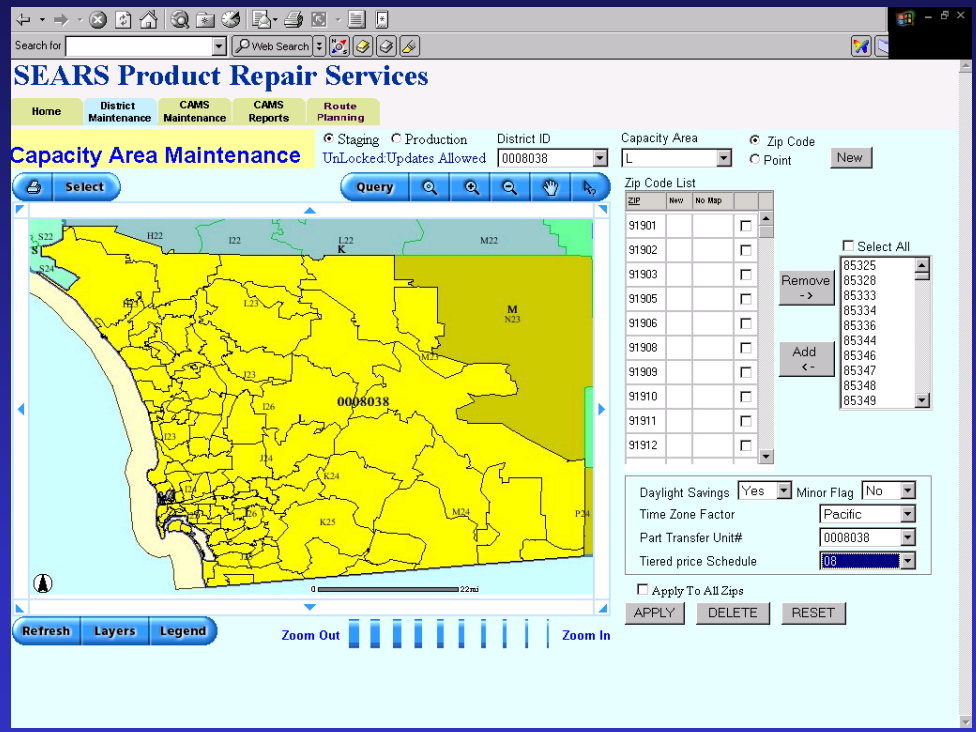
New GIS Applications Under Development by ESRI & Sears

CAMS

- Deploying summer 2004
- Ties capacity management to map
- Allows better design and management of call volumes and work areas



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Summary

- With a large vehicle fleet, huge cost savings and/or productivity benefits can be realized with the use of GIS and optimization techniques
- Reductions in support costs can also be realized by making associates more efficient and able to dispatch more technicians/vehicles

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Conclusion

- Sears is exploring further updates and advancements using newer GIS technologies in partnership with ESRI and GDT
- Almost any mobile workforce can benefit greatly from a well-designed and managed GIS due to the low cost and flexibility of ESRI tools/products

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Questions?

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