Modernising the Land Recors

6’th February 2014 Presented by Ratan Awasthi

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Land as Resource

- Land is a collection of all naturally occurring resources whose supply is inherently fixed.
- Land is the most Important resource existing
- It is a major source of energy such as fossil fuel
- Food cultivation and agriculture would be impossible without land
- Land is also crucial for mineral resources

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Various owners

- Railways
- CPWD
- Defense
- Ports
- Municipalities
- Power Gen companies

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Indian Perspective

- 6.4 lacs village mapped in 19’th and 20’th Century
- 32.87 lakh Sq Km is the Land mass
- 21.6 Lakh Sq km is to be covered by NLRMP
- 43% of this land is in Plains
- 30% in Mountains
- And 27% in Plateus

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Motivation

- Pedigreed Record of Rights
- Conclusive Land Titling
- Economic Activity
- RoR as Legal document
- Digital Cadastral Data Base
- Digital crop/land use data base

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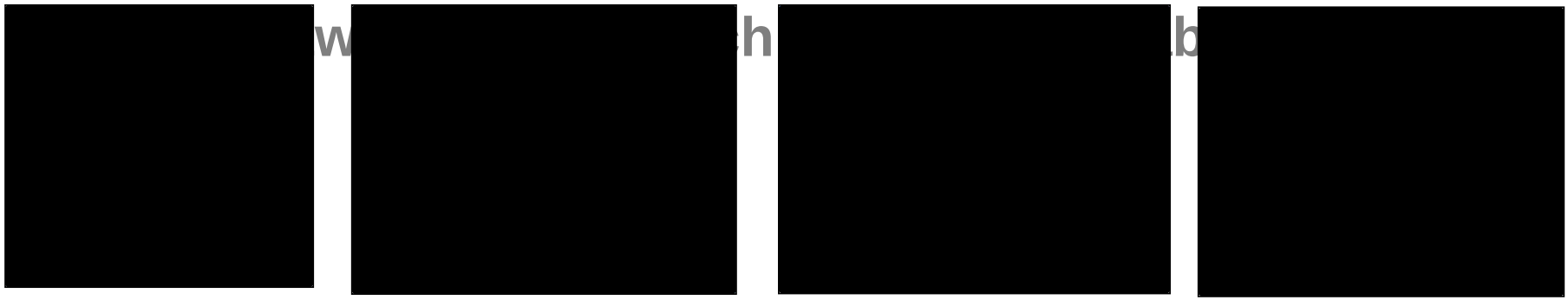
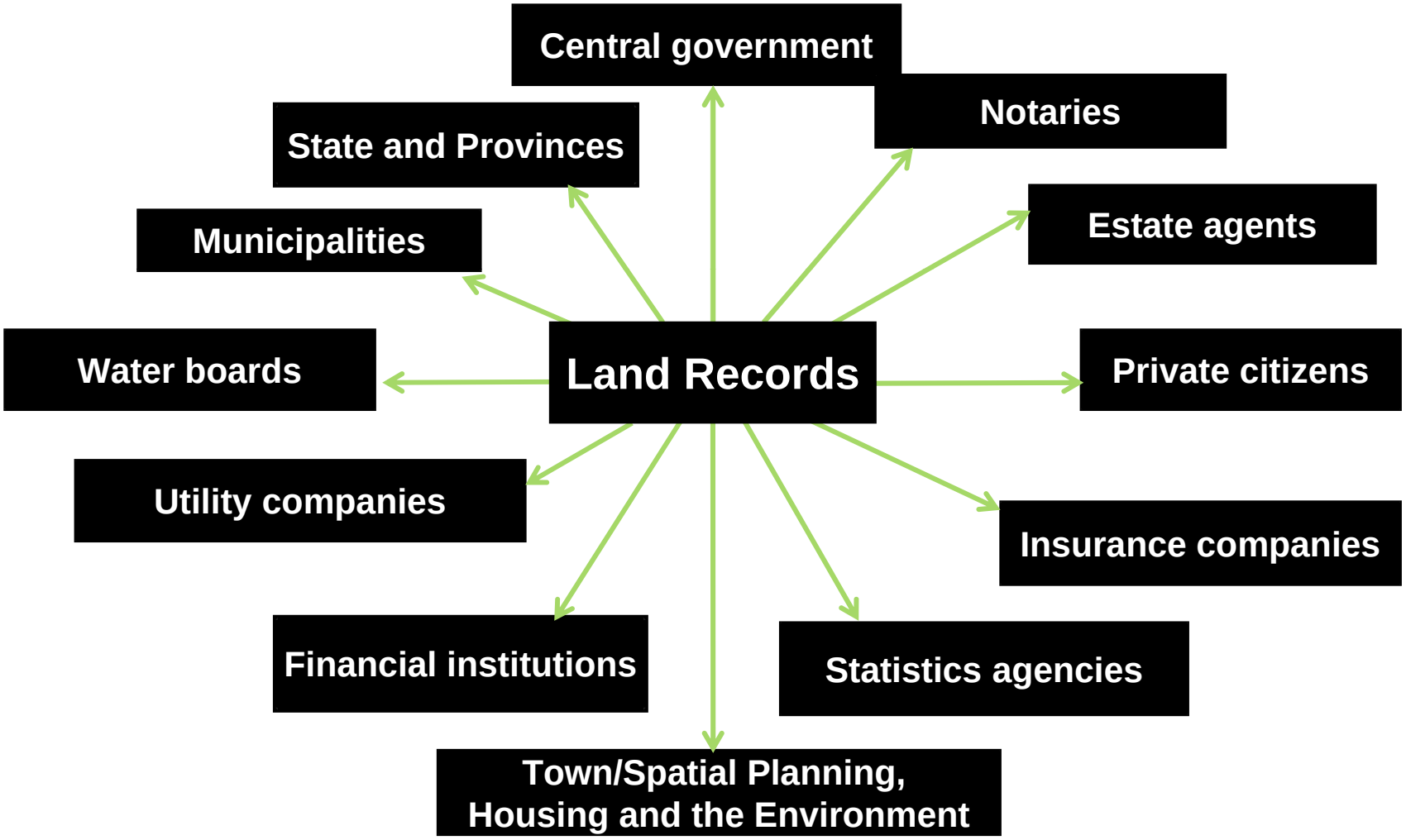
Global Trends in Land Parcel Management

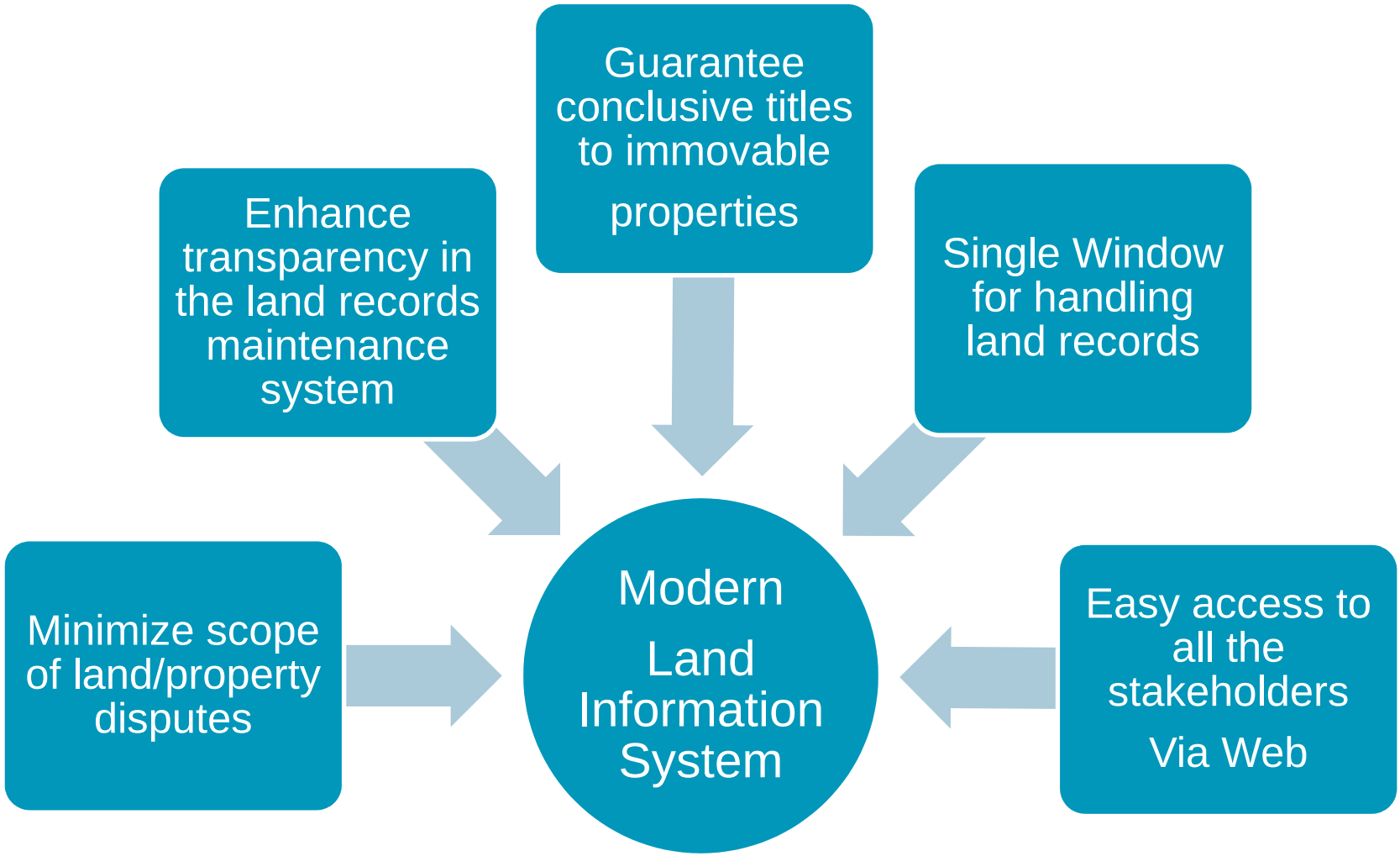
- Use of cutting edge technology “Hybrid”
- Use of Clearinghouses for information sharing over an SDI
- Sufficient amount of time to technology transfer and upgrade -5-7 year
- Demand for 3D visualization to better understand spatial information- City Level
- Use of various online and offline tool to update information



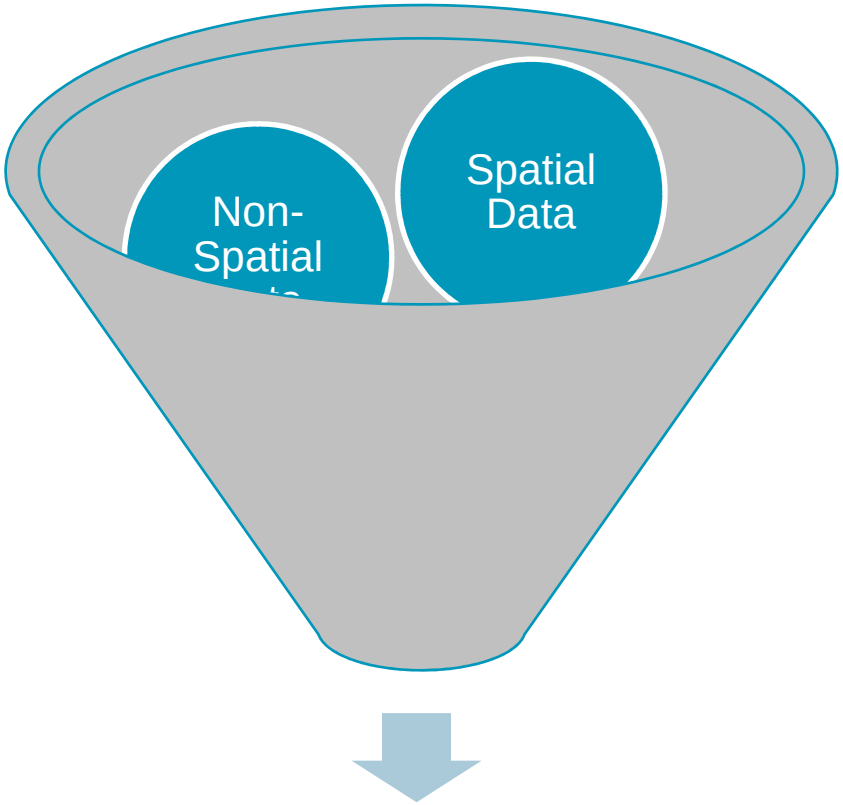
The users of Land Information data



Objectives - “ Modern Land Management system “



Essence of LIS



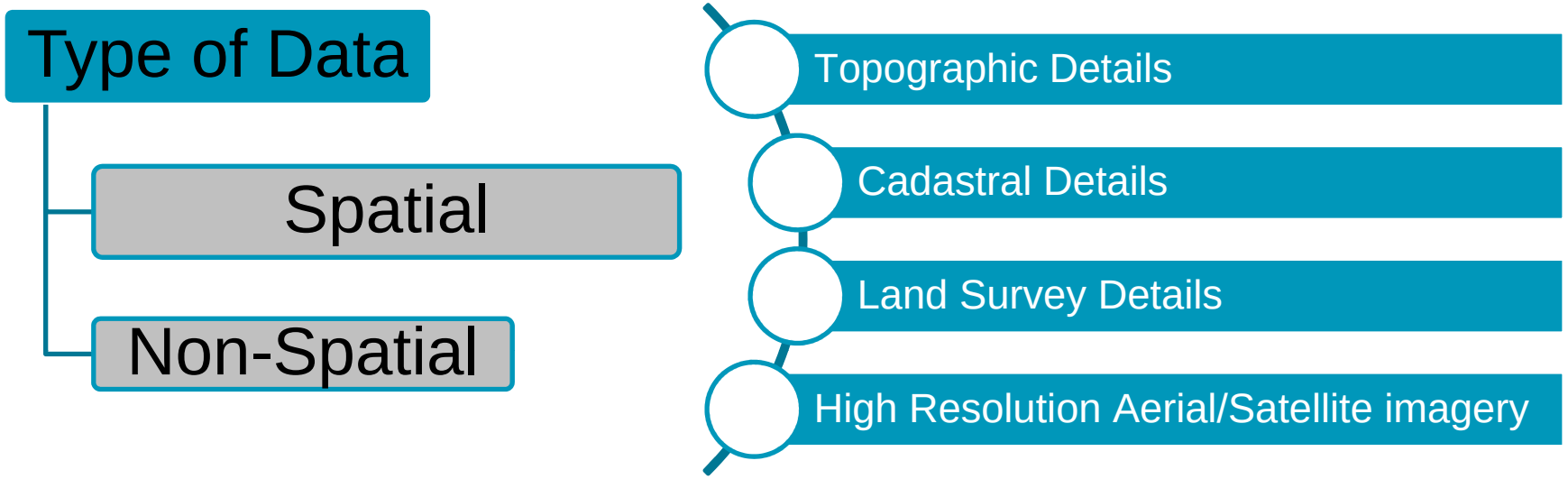
Land Information System

Land Information System

Any modern Land Information System is in place to …

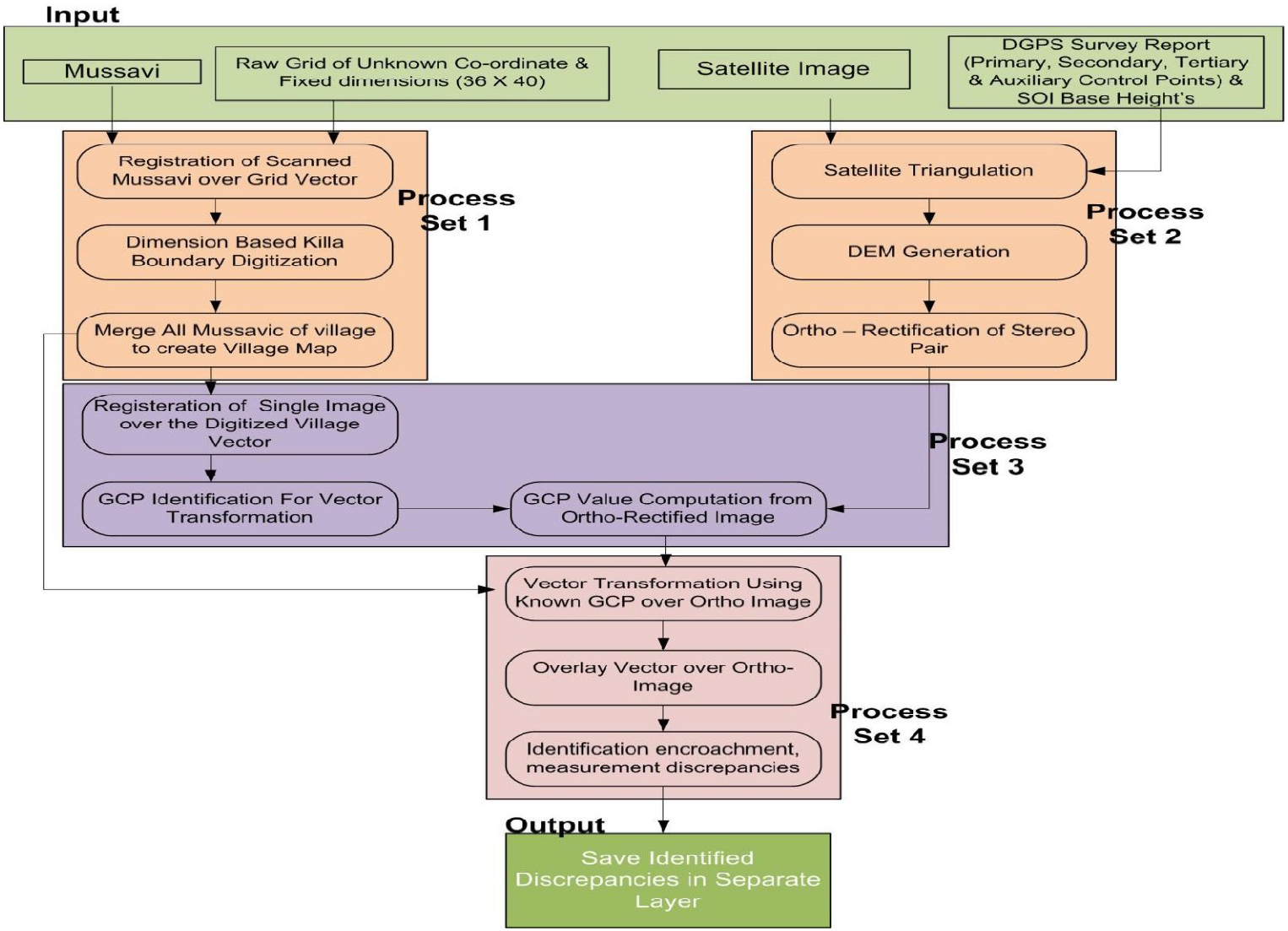
- minimize scope of land/property disputes,
- enhance transparency in the land records maintenance system,
- facilitate conclusive titles to immovable properties in the country

Spatial and Non-Spatial Data ….

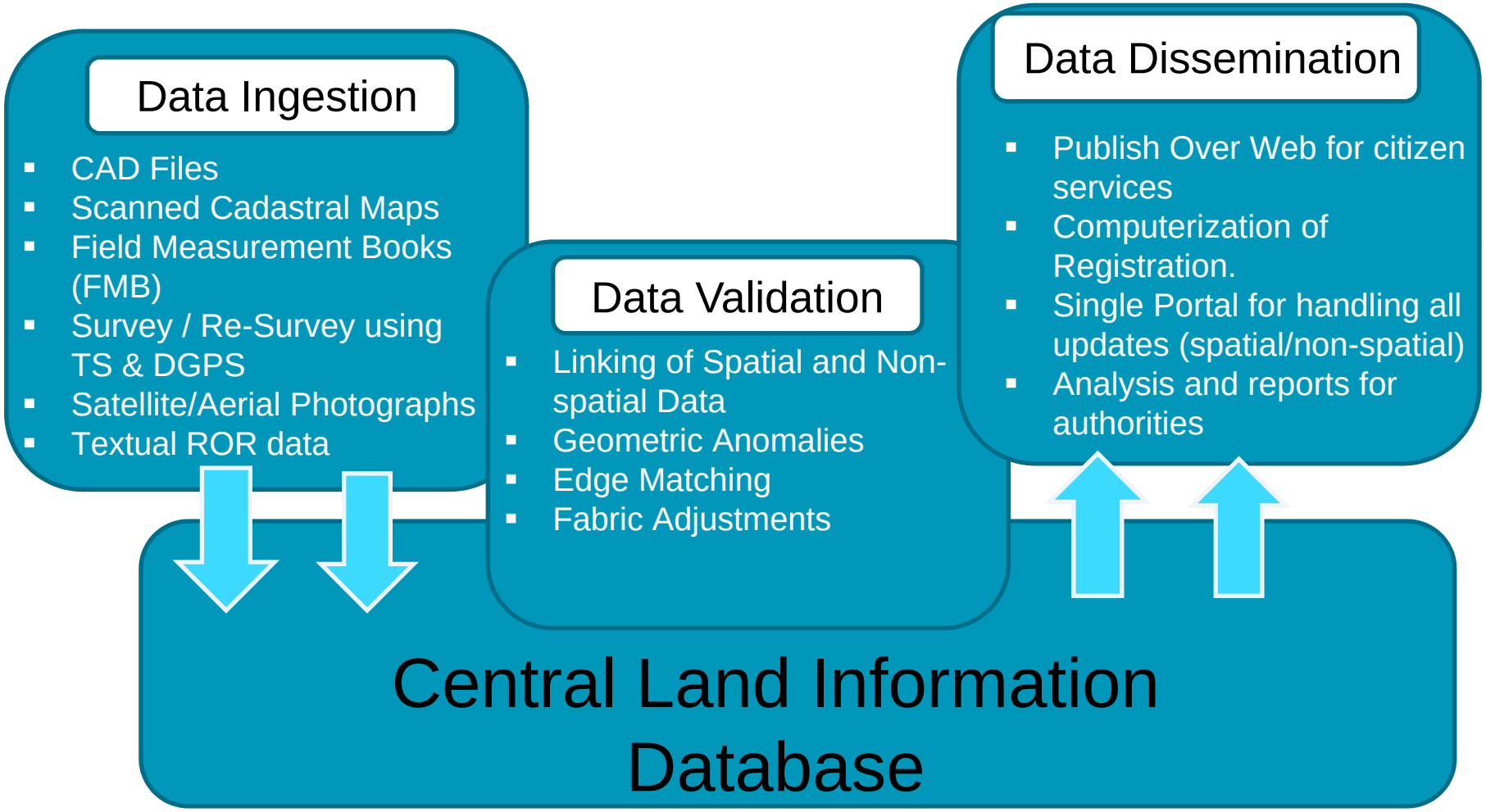


- **Ownership details**
- **Market Value**
- **Land Use**
- **Tax Value**
- **Legal Authority in-charge of the parcel**
- **Past Ownership details**
- **Encumbrance details**
- **Demographic details for each parcel (No. of Persons/ Household, Gender ratio etc.)**
- **Socio-economic details (like Average Family Income, Employment etc.)**

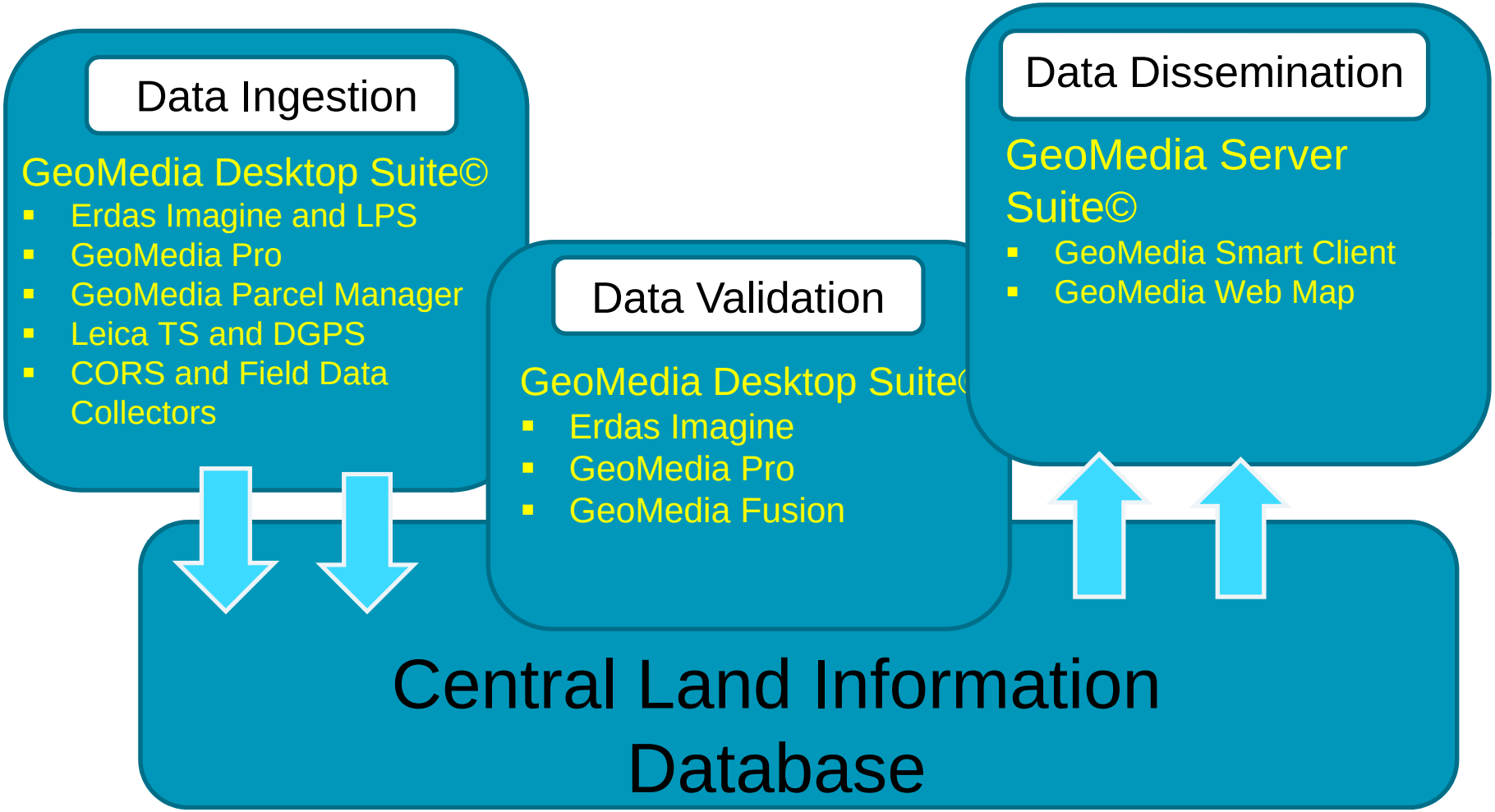
Geo-Spatial Data Generation - Process Flow



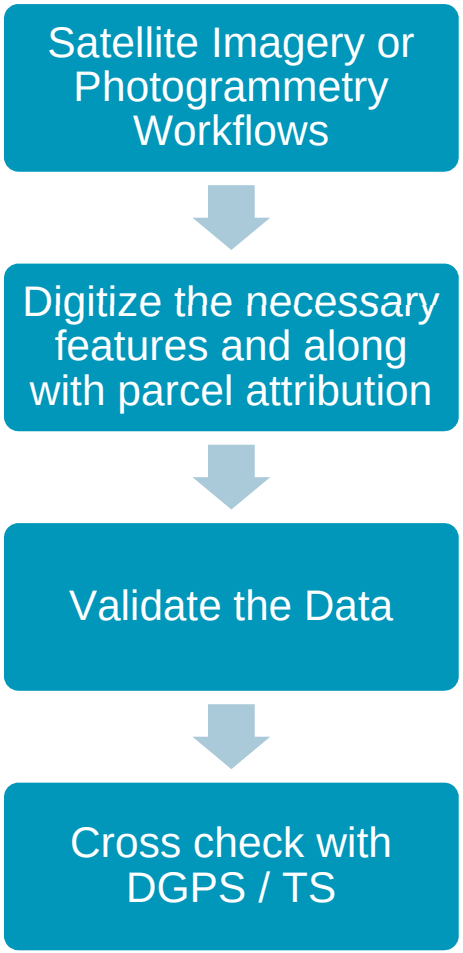
An Effective Land Information Management System



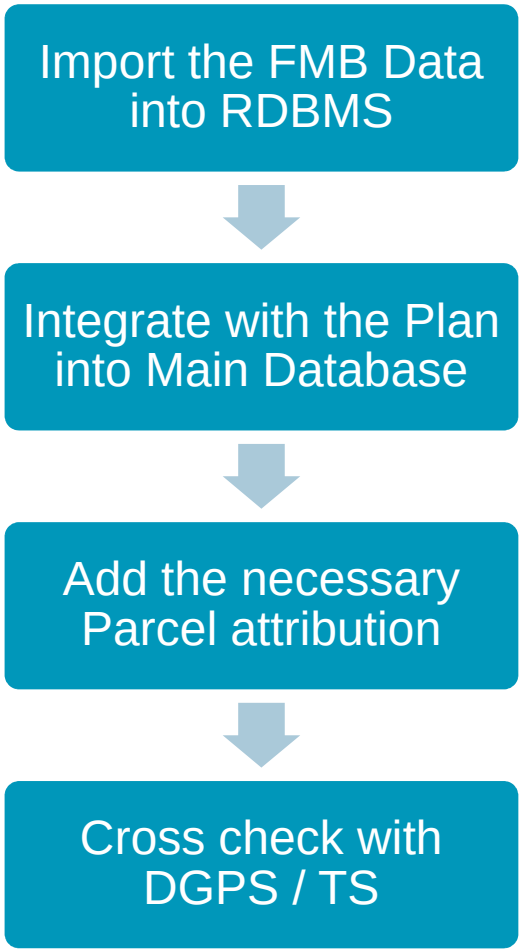
Hexagon solution for a Land Information Management System

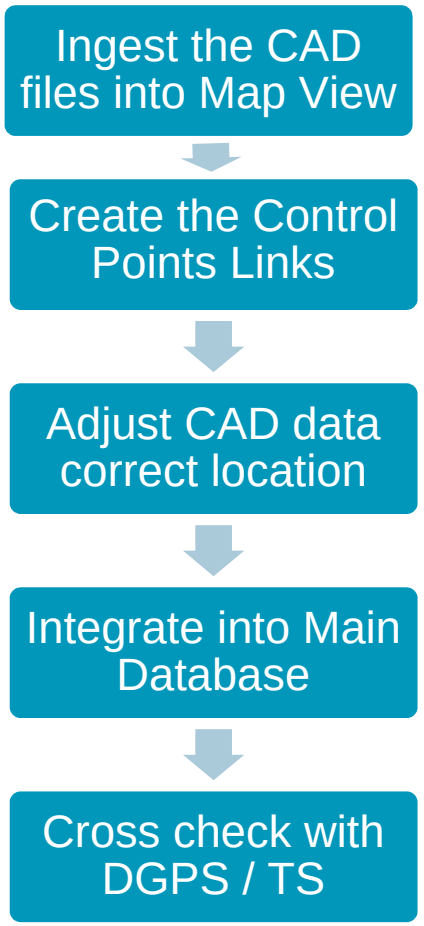


Workflow for New Data creation

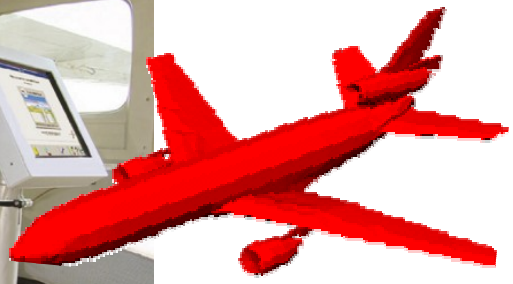


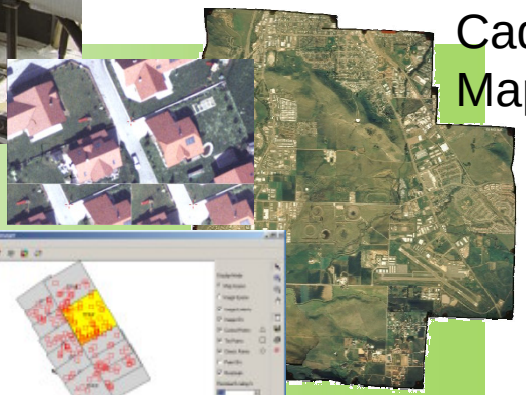
Bringing in Existing Data



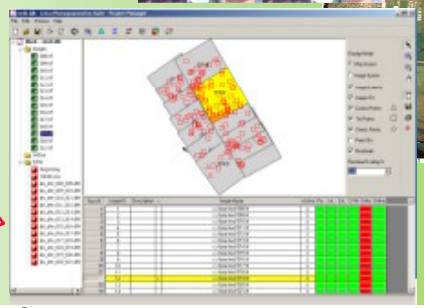


From Data Capture to the Web Based Management



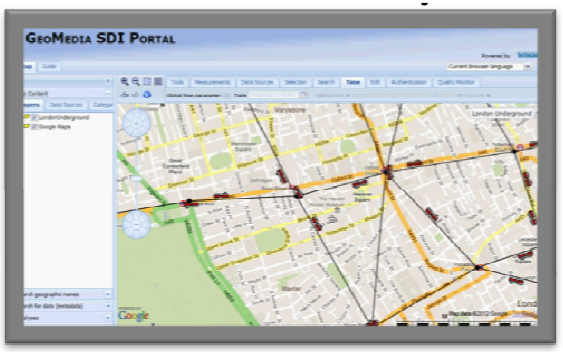


Cadaster Mapping

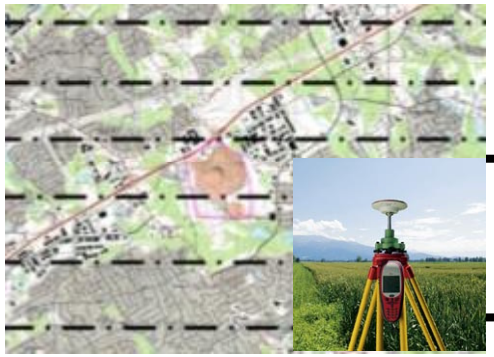


Web Based cadaster Management System

Mapping /Photogrammetry

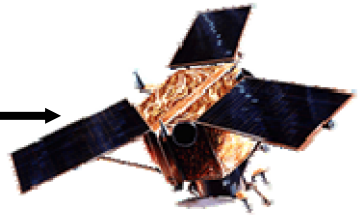


Workflow – Hexagon Approach

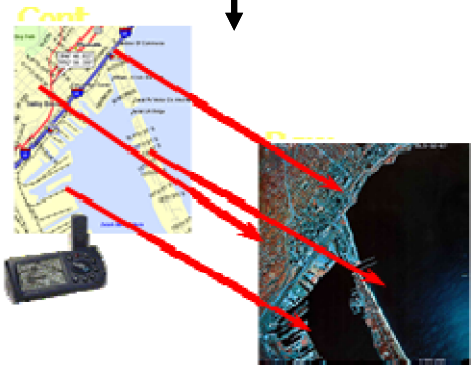


Planning, Direction & GPS survey

Aerial Data Capture



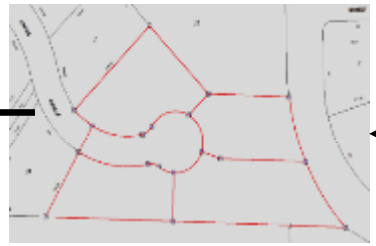
Aerial Triangulation & Ortho Generation



Cadastral Map registration with Ortho Images

&

Field Data collection/FMB's



Map Digitization and Data Integration

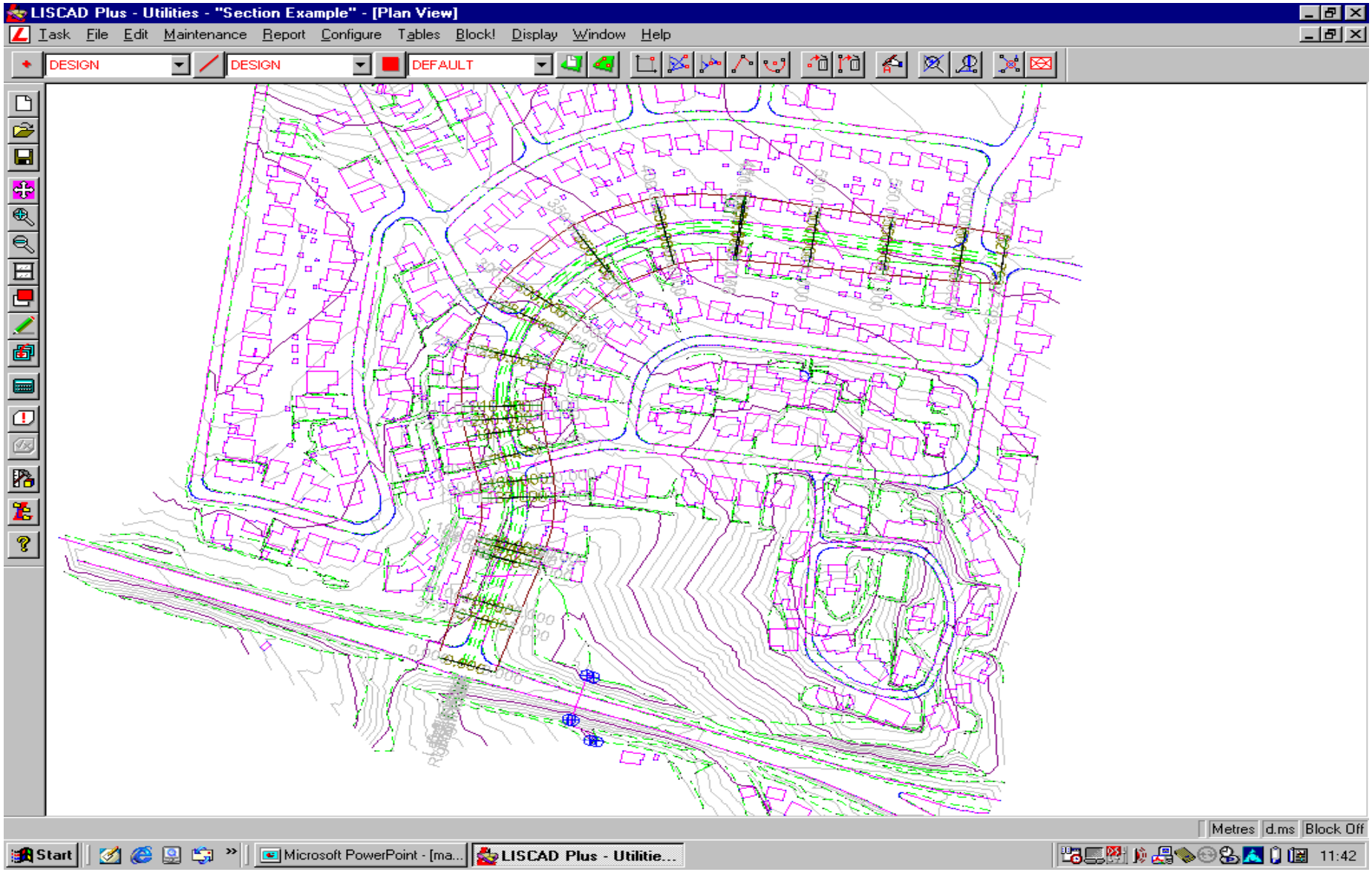
Data Dissemination

Using SMART CLIENT

Leica Total Station

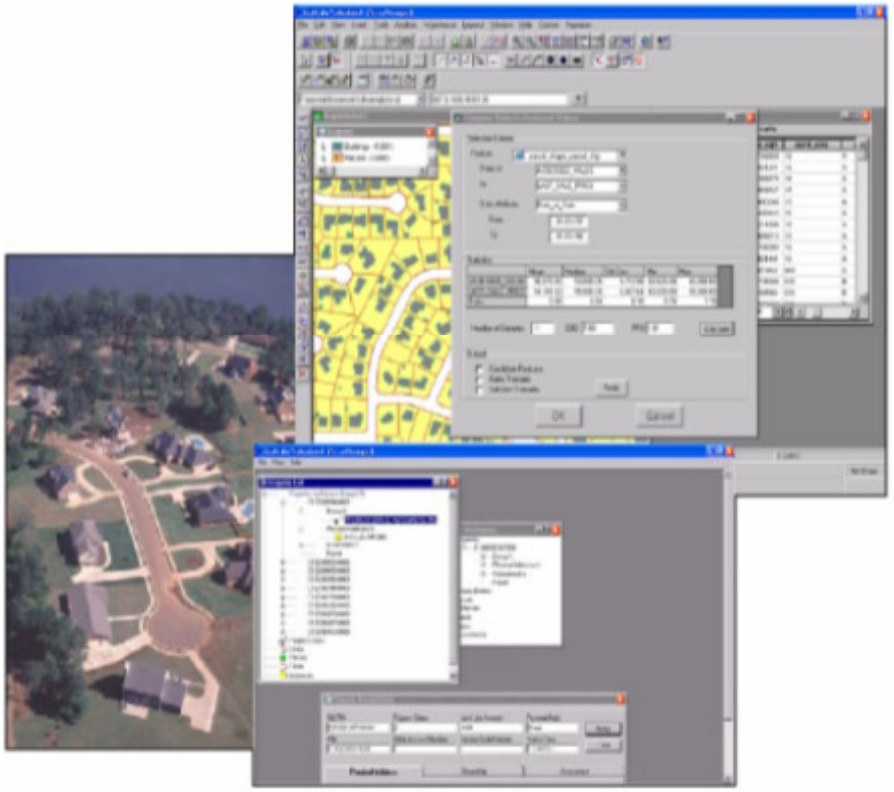
Leica DGPS

Hexagon Survey Software



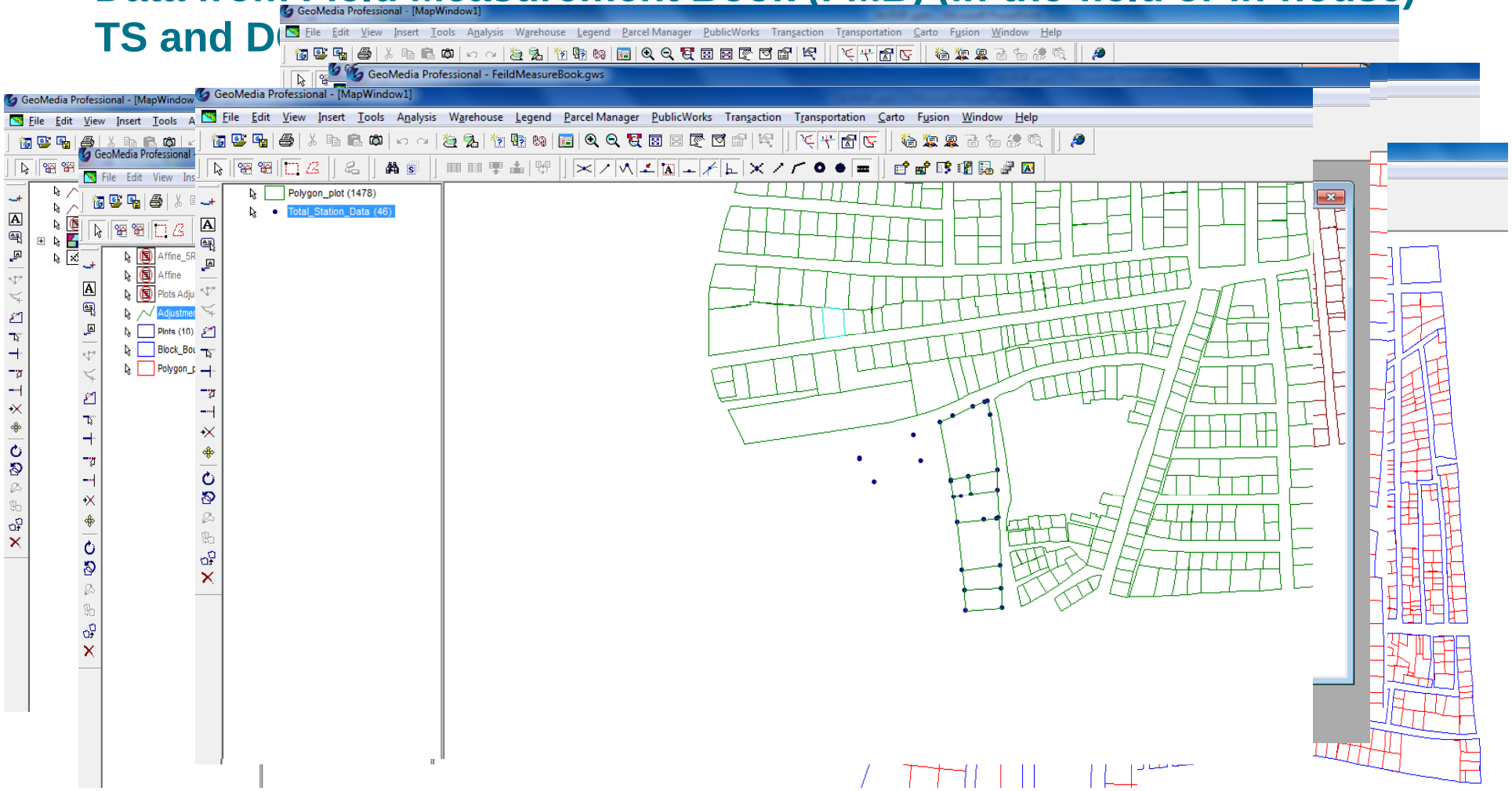
Intergraph Cadaster tools

- Intergraph Parcel Manager is a leading edge solution for Parcel and Boundary maintenance
- Parcel Manager enables you to implement modern land management with the help of configurable and customizable functions and commands
- Specifically Tailored workflows for cadastral and property mapping industries
- Efficient data collection and maintenance of parcel boundaries and related land information using the workflows.

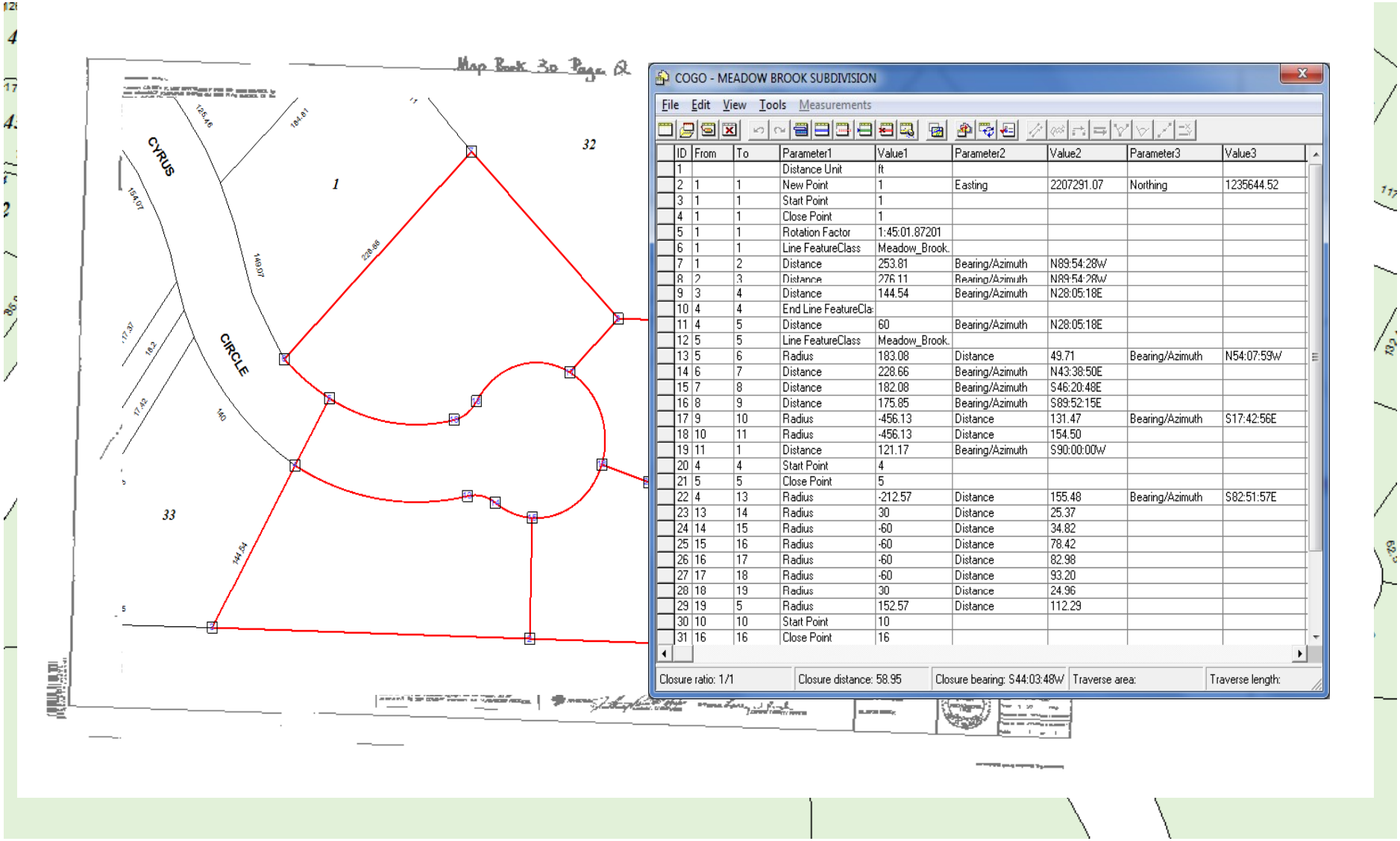


Workflows

Cadastral Map Digitization
Fabric Adjustments
Data from Field Measurement Book (FMB) (in-the-field or in-house)
TS and D



FMB Data using Coordinate Geometry Input

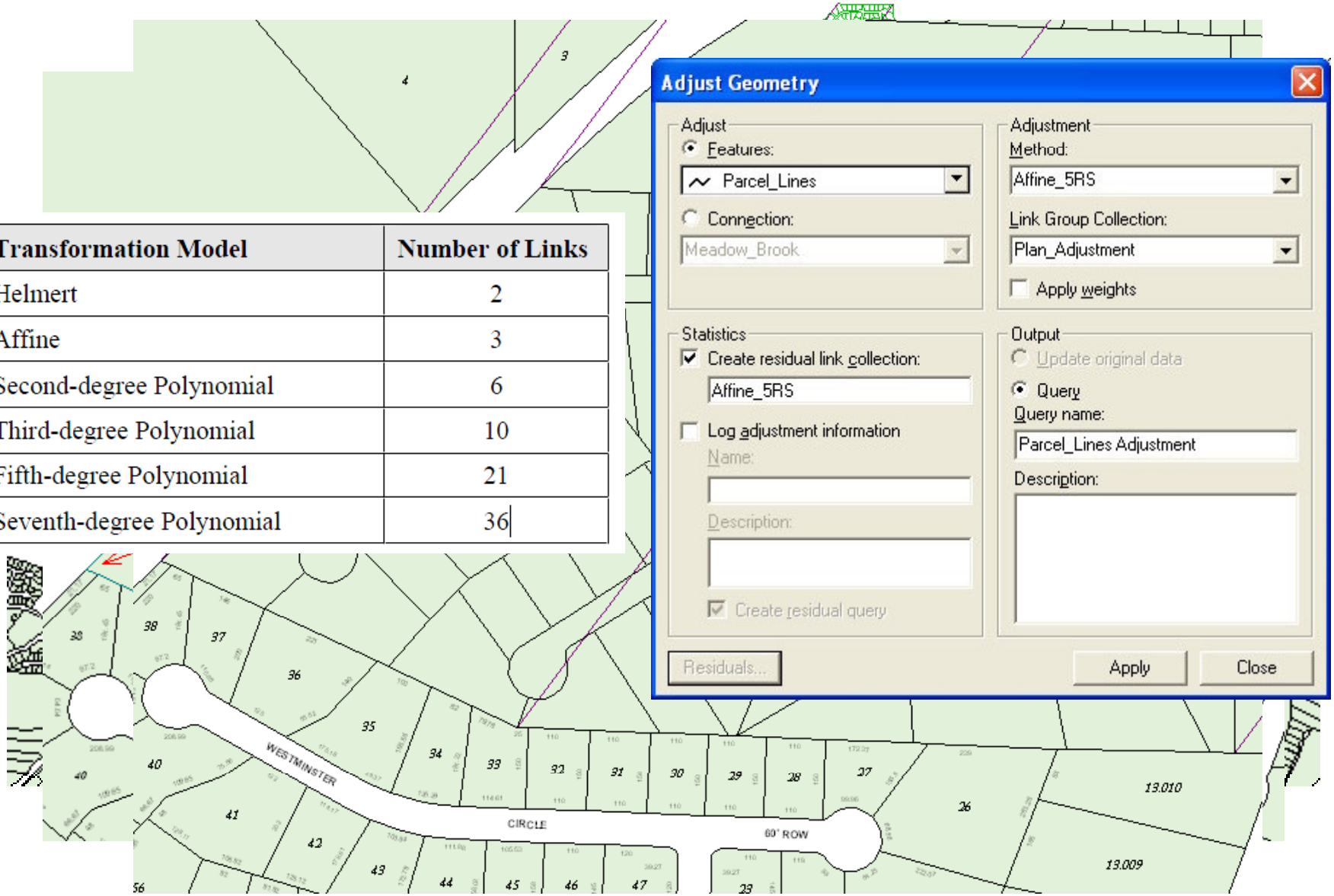


ID	From	To	Parameter1	Value1	Parameter2	Value2	Parameter3	Value3
1			Distance Unit	ft				
2	1	1	New Point	1	Easting	2207291.07	Northing	1235644.52
3	1	1	Start Point	1				
4	1	1	Close Point	1				
5	1	1	Rotation Factor	1:45:01.87201				
6	1	1	Line FeatureClass	Meadow_Brook.				
7	1	2	Distance	253.81	Bearing/Azimuth	N89:54:28W		
8	2	3	Distance	276.11	Bearing/Azimuth	N89:54:28W		
9	3	4	Distance	144.54	Bearing/Azimuth	N28:05:18E		
10	4	4	End Line FeatureCla:					
11	4	5	Distance	60	Bearing/Azimuth	N28:05:18E		
12	5	5	Line FeatureClass	Meadow_Brook.				
13	5	6	Radius	183.08	Distance	49.71	Bearing/Azimuth	N54:07:59W
14	6	7	Distance	228.66	Bearing/Azimuth	N43:38:50E		
15	7	8	Distance	182.08	Bearing/Azimuth	S46:20:48E		
16	8	9	Distance	175.85	Bearing/Azimuth	S89:52:15E		
17	9	10	Radius	-456.13	Distance	131.47	Bearing/Azimuth	S17:42:56E
18	10	11	Radius	-456.13	Distance	154.50		
19	11	1	Distance	121.17	Bearing/Azimuth	S90:00:00W		
20	4	4	Start Point	4				
21	5	5	Close Point	5				
22	4	13	Radius	-212.57	Distance	155.48	Bearing/Azimuth	S82:51:57E
23	13	14	Radius	30	Distance	25.37		
24	14	15	Radius	-60	Distance	34.82		
25	15	16	Radius	-60	Distance	78.42		
26	16	17	Radius	-60	Distance	82.98		
27	17	18	Radius	-60	Distance	93.20		
28	18	19	Radius	30	Distance	24.96		
29	19	5	Radius	152.57	Distance	112.29		
30	10	10	Start Point	10				
31	16	16	Close Point	16				

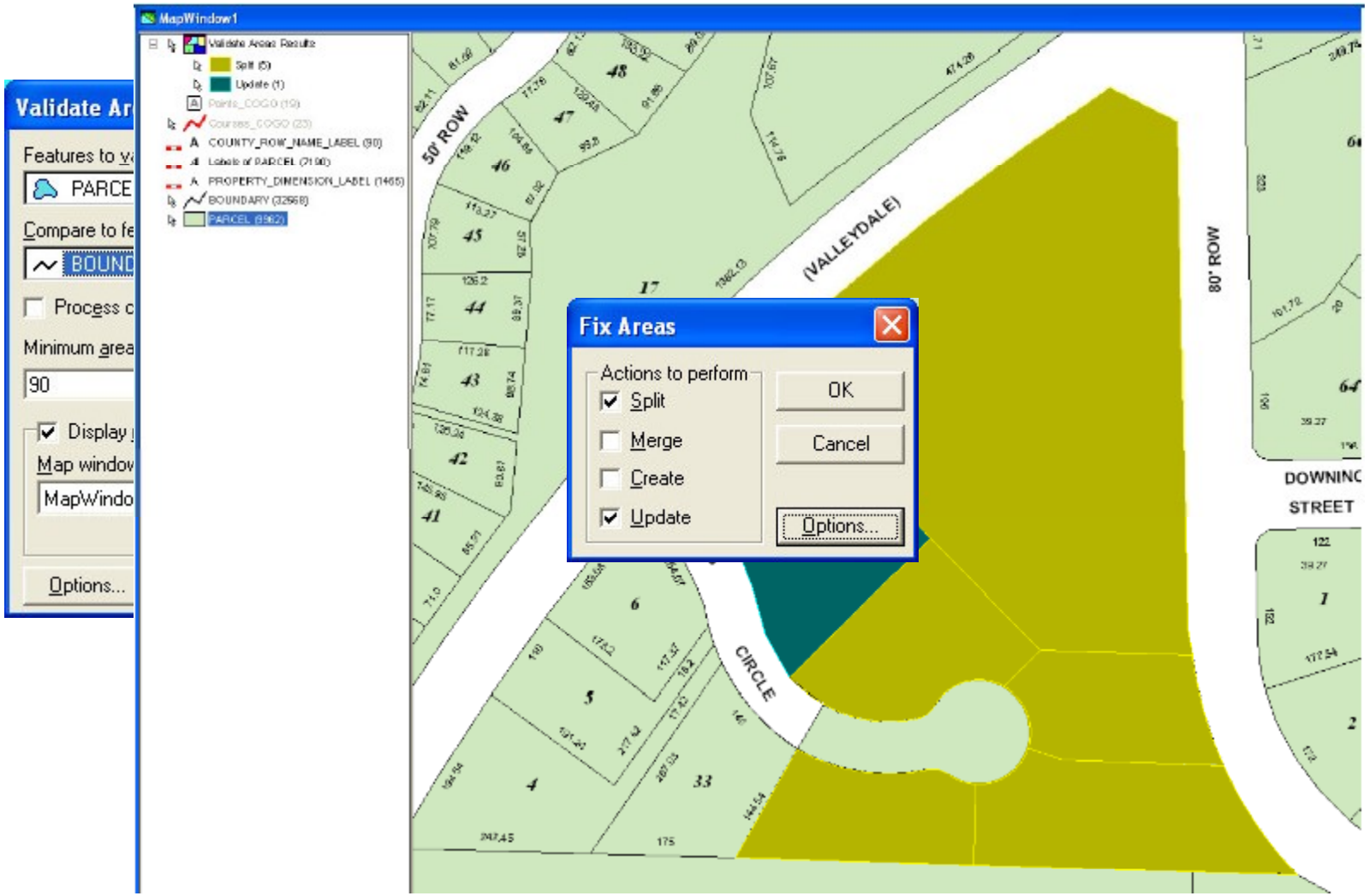
Closure ratio: 1/1 | Closure distance: 58.95 | Closure bearing: S44:03:48W | Traverse area: | Traverse length:

CAD Data using Adjustments

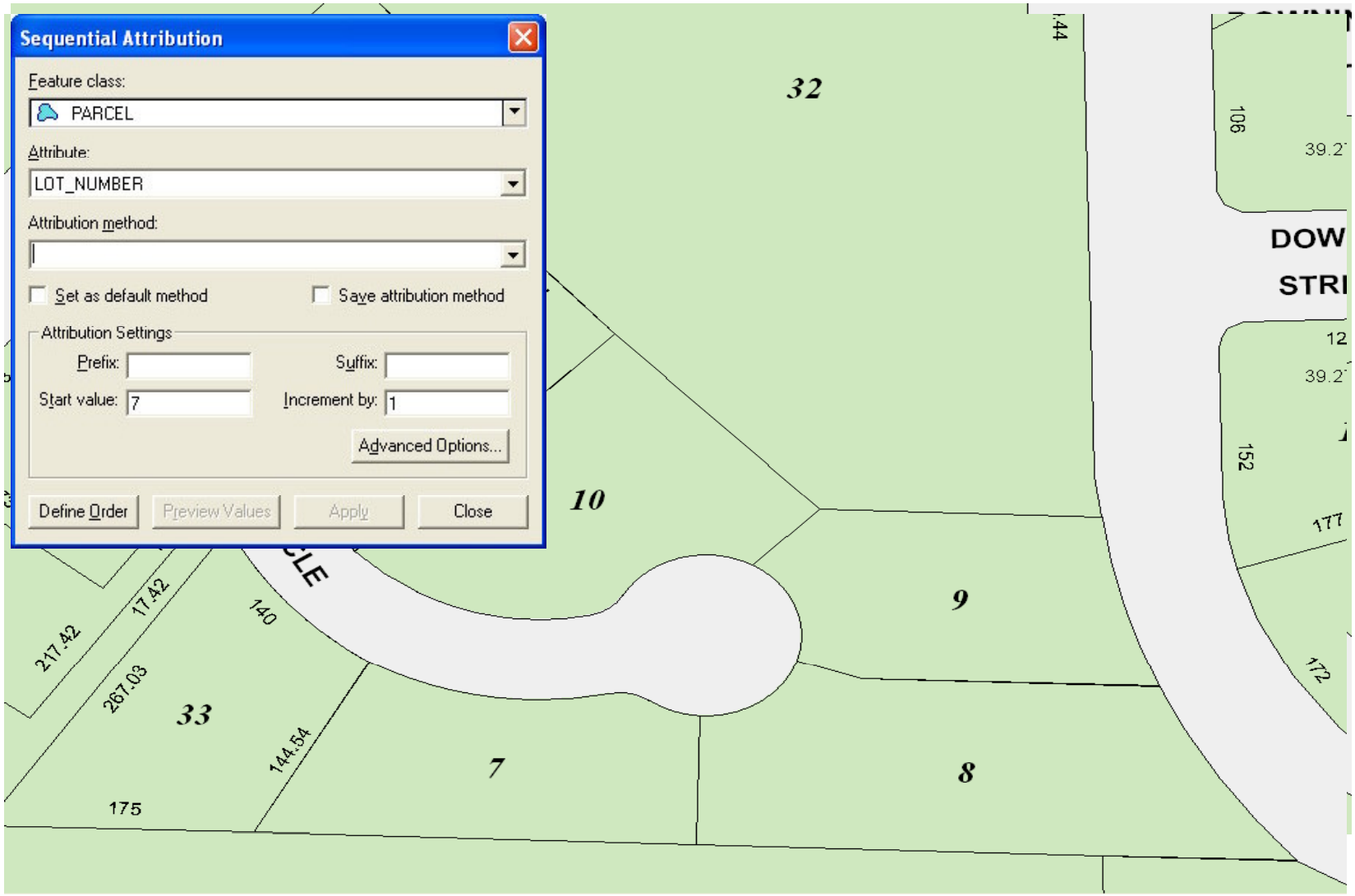
Transformation Model	Number of Links
Helmert	2
Affine	3
Second-degree Polynomial	6
Third-degree Polynomial	10
Fifth-degree Polynomial	21
Seventh-degree Polynomial	36



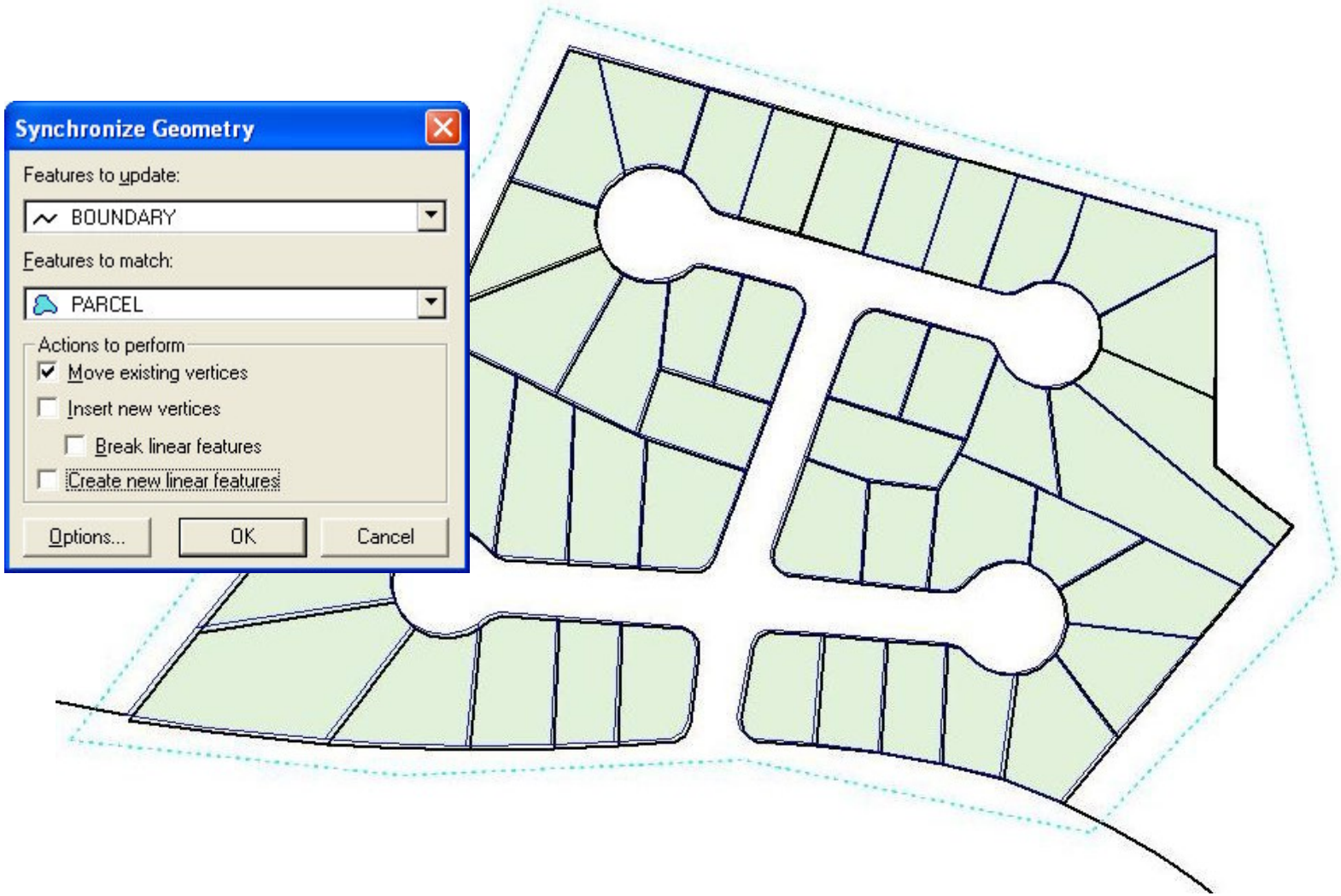
Validating Areas



Labeling

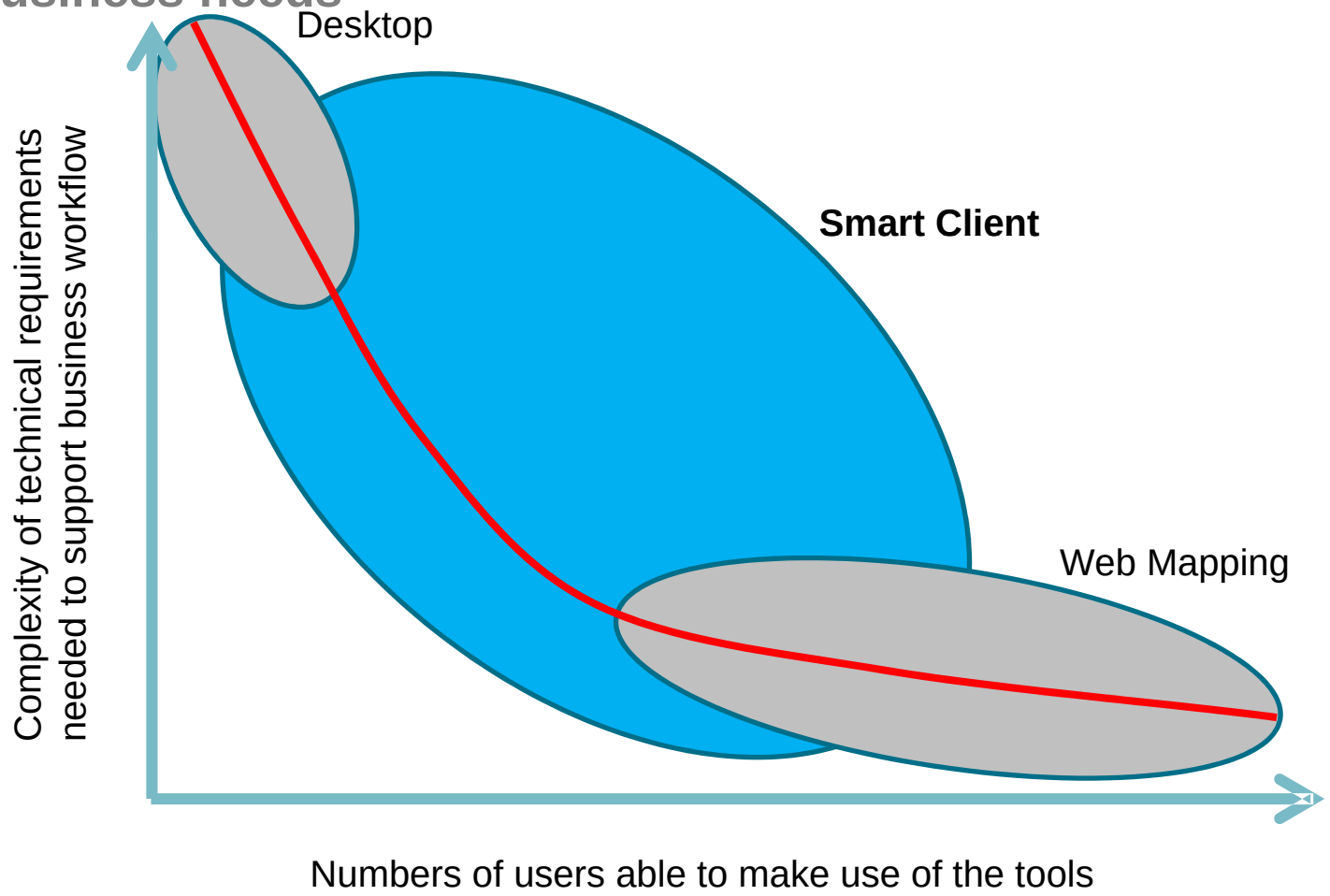

Sequential Attribution
Feature class:
PARCEL
Attribute:
LOT_NUMBER
Attribution method:
Set as default method
Save attribution method
Attribution Settings
Prefix:
Suffix:
Start value: 7
Increment by: 1
Advanced Options...
Define Order
Preview Values
Apply
Close
32
10
9
33
7
8
106
39.2
DOW
STRI
12
39.2
152
177
172
140
17.42
217.42
267.03
144.54
175

Synchronizing Geometry

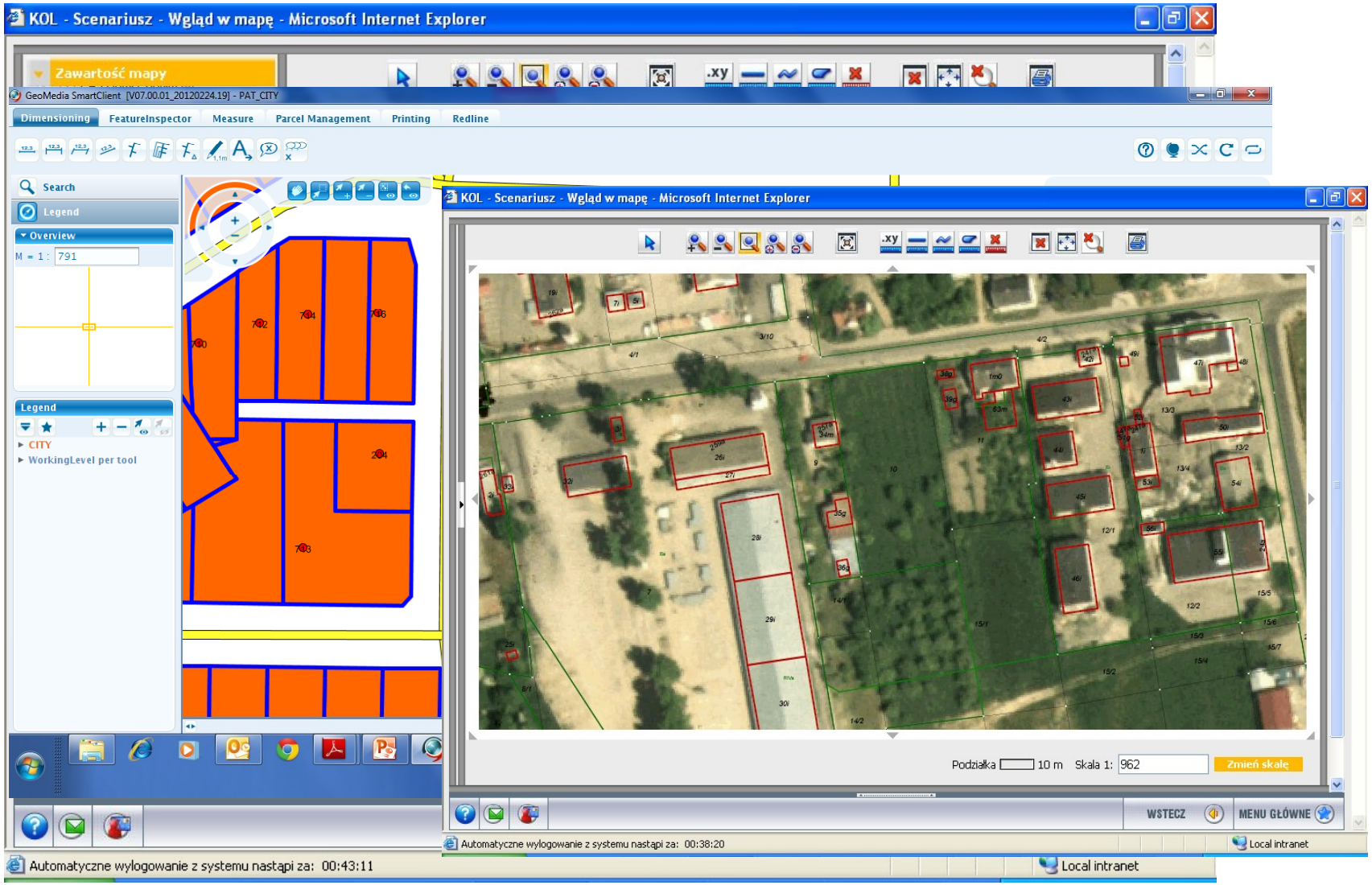


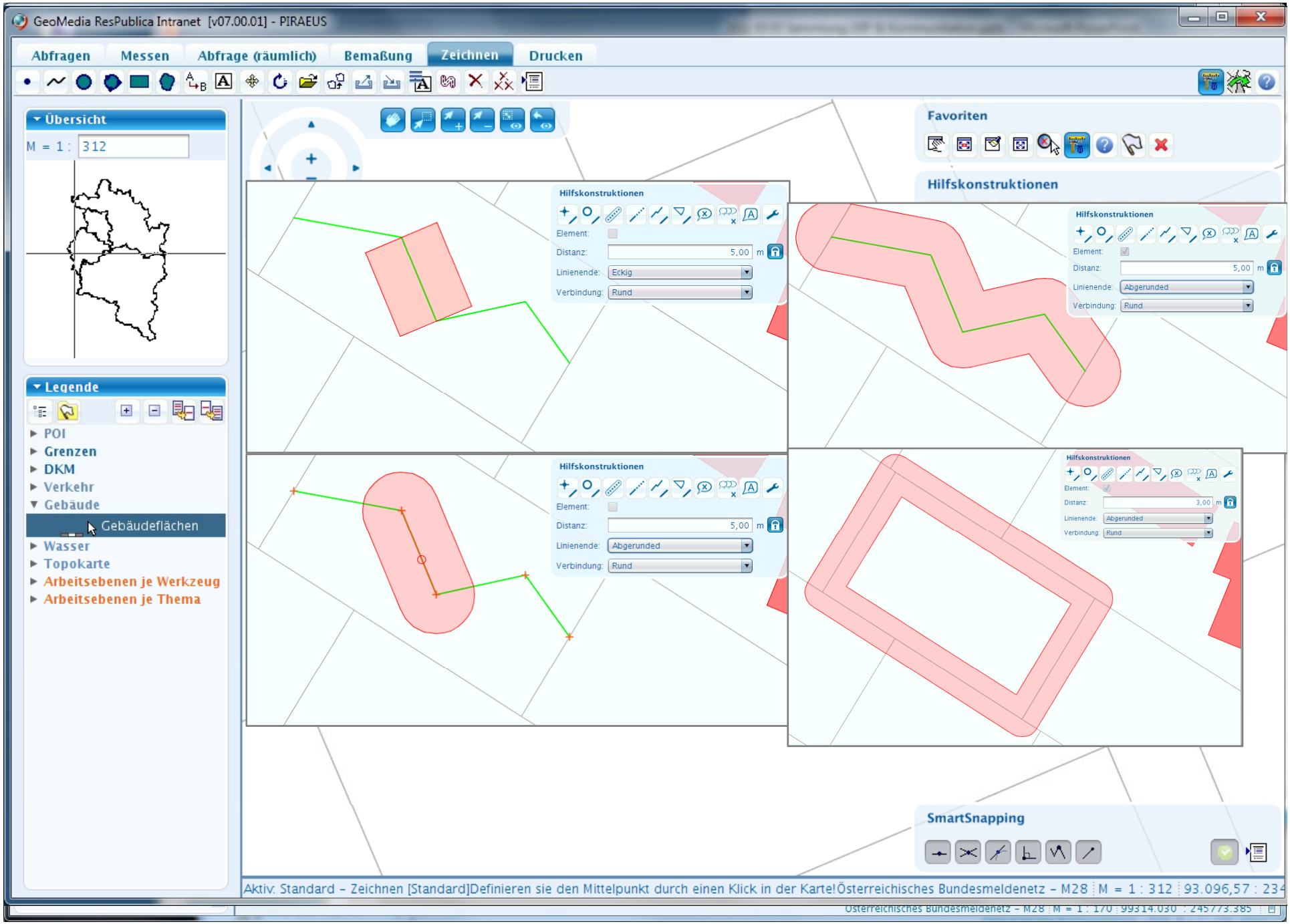
Web Based Editing and Delivery via Intergraph Smart Client

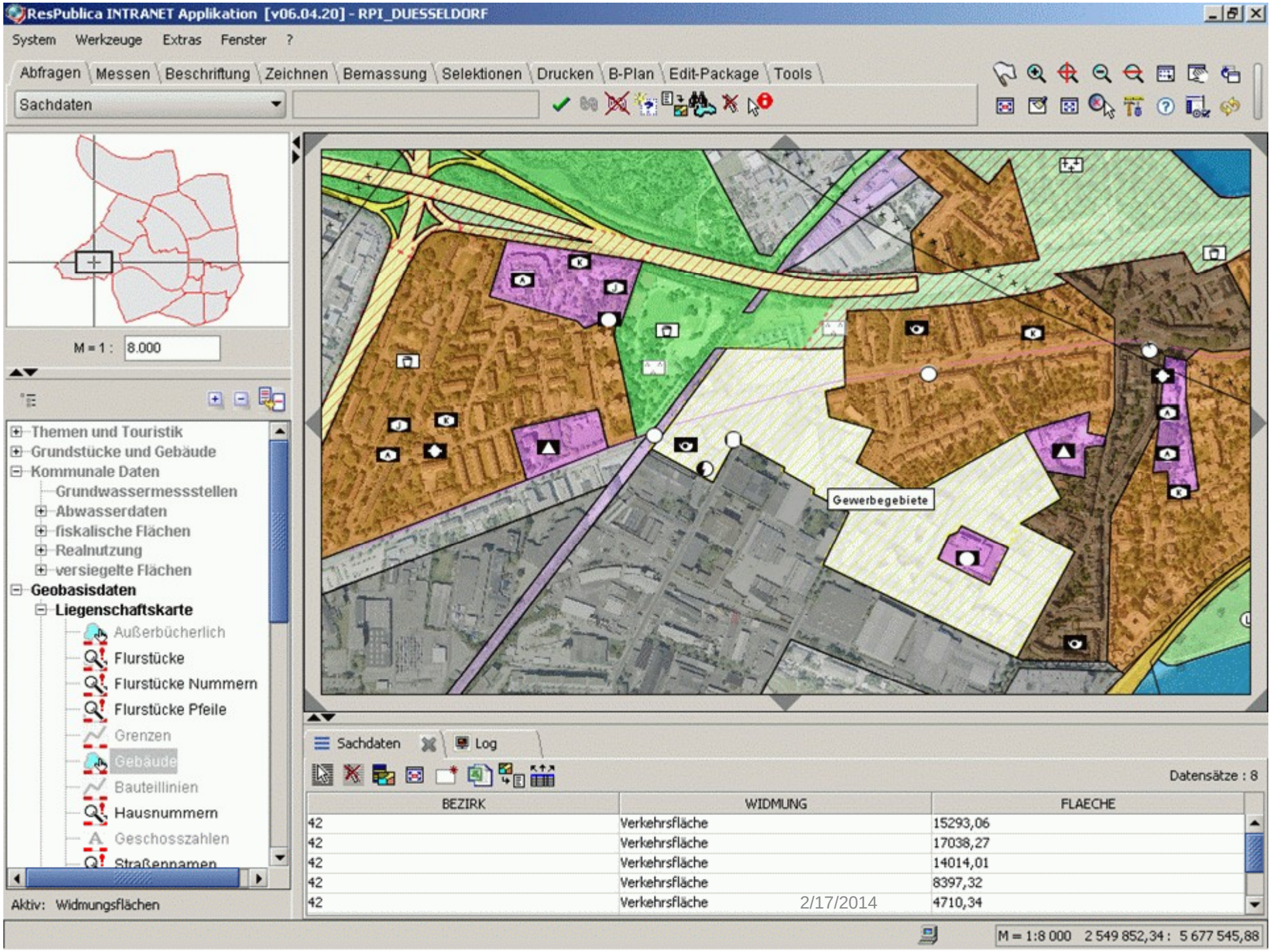
Matching the delivery of spatial functionality to users' abilities and business needs



Workflow enabled Smart Clients




GeoMedia ResPublica Intranet [v07.00.01] - PIRAEUS
Abfragen
Messen
Abfrage (räumlich)
Bemaßung
Zeichnen
Drucken
Übersicht
M = 1 : 312
Legende
POI
Grenzen
DKM
Verkehr
Gebäude
Gebäudeflächen
Wasser
Topokarte
Arbeitsebenen je Werkzeug
Arbeitsebenen je Thema
Favoriten
Hilfskonstruktionen
Element:
Distanz:
5,00 m
Linienende:
Eckig
Abgerundet
Verbindung:
Rund
SmartSnapping
Aktiv: Standard – Zeichnen [Standard]Definieren sie den Mittelpunkt durch einen Klick in der Karte!Österreichisches Bundesmeldenetz – M28 M = 1 : 312 93.096,57 : 234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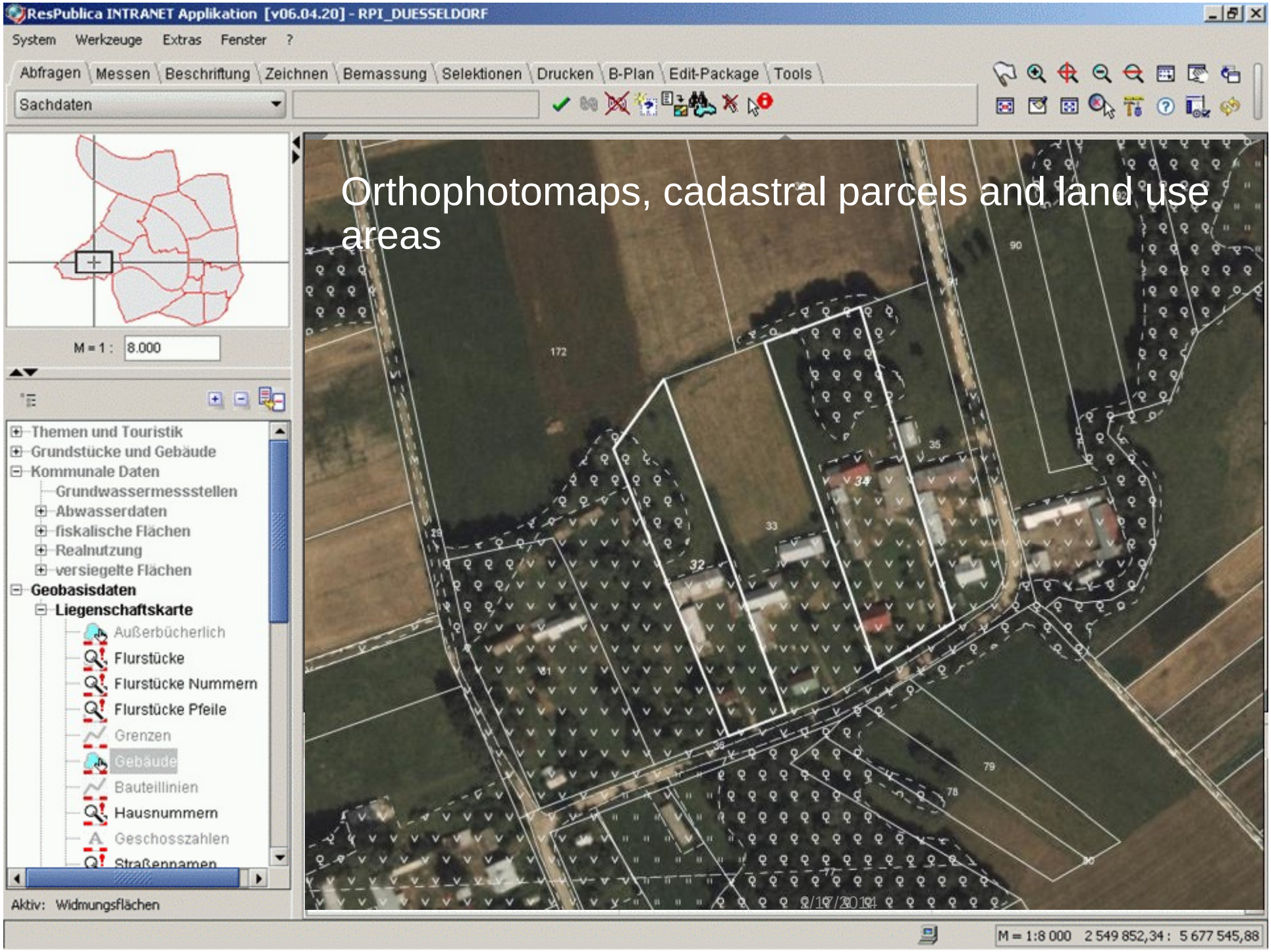
System
Werkzeuge
Extras
Fenster
?
Abfragen
Messen
Beschriftung
Zeichnen
Bemassung
Selektionen
Drucken
B-Plan
Edit-Package
Tools
Sachdaten
M = 1 :
8.000
Themen und Touristik
Grundstücke und Gebäude
Kommunale Daten
Grundwassermessstellen
Abwasserdaten
fiskalische Flächen
Realnutzung
versiegelte Flächen
Geobasisdaten
Liegenschaftskarte
Außerbücherlich
Flurstücke
Flurstücke Nummern
Flurstücke Pfeile
Grenzen
Gebäude
Bauteillinien
Hausnummern
Geschosszahlen
Straßennamen
Gewerbegebiete
Sachdaten
Log
Datensätze : 8
BEZIRK
WIDMUNG
FLAECHE
42
Verkehrsfläche
15293,06
42
Verkehrsfläche
17038,27
42
Verkehrsfläche
14014,01
42
Verkehrsfläche
8397,32
42
Verkehrsfläche
4710,34
Aktiv: Widmungsflächen
2/17/2014
M = 1:8 000 2 549 852,34 : 5 677 545,88


ResPublica INTRANET Applikation [v06.04.20] - RPI_DUESSELDORF
System Werkzeuge Extras Fenster ?
Abfragen Messen Beschriftung Zeichnen Bemassung Selektionen Drucken B-Plan Edit-Package Tools
Sachdaten
M = 1 : 8.000
Themen und Touristik
Grundstücke und Gebäude
Kommunale Daten
Grundwassermessstellen
Abwasserdaten
fiskalische Flächen
Realnutzung
versiegelte Flächen
Geobasisdaten
Liegenschaftskarte
Außerbücherlich
Flurstücke
Flurstücke Nummern
Flurstücke Pfeile
Grenzen
Gebäude
Bauteillinien
Hausnummern
Geschosszahlen
Straßennamen
Aktiv: Widmungsflächen
Orthophotomaps, cadastral parcels and land use areas
M = 1:8 000 2 549 852,34 : 5 677 545,88

Integration of Intergraph software and Leica Geosystems CS25GNSS For Field Data Updates and Editing

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34

GPS Reference Station Network for Land Cadaster

- A network of continuously operating GPS reference stations is more efficient than a traditional triangulation and traverse network.
- The stations can be set up at convenient locations in areas
- Network geometry is not as critical as with traditional networks, and the accuracy is higher and more consistent.
- Users set up their field receivers in the areas in which they are working, download reference station data via the Internet, and compute their positions.
- The stations can also transmit RTK and DGPS data for direct use by RTK and GIS field rover equipment.
- Such a network can be of almost any size. Whilst one or two stand-alone reference stations may be all that is required for a local area, town, municipality, opencast mine or engineering site, a multi-station network will usually be needed to provide full GPS service coverage for a state or entire country.

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Challenges

- Central Data Unification.
- Data Standardization.
- Various Projection System.
- Various Nomenclature.
- Low level of Technical penetration.

Benefit

- Introduction of Modern Accurate , Authorataive Actionable Cadaster Map making system
- Central Data Repository
- Updation of Old Map via Phtogrammetry+ Survey+ Mapping technique

Thank You