

Imagery for Supporting FSA Farm Programs

Objectives of Presentation:

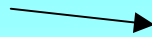
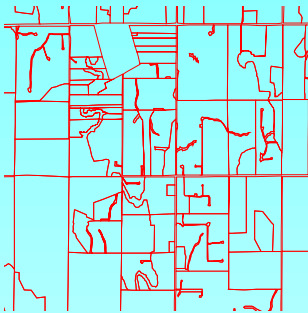
- Review FSA Requirements for Imagery
- Identify and Evaluate Possible Alternatives
- Recommend Plan of Action

Ortho Imagery

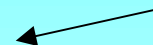
Foundation for GIS

Key to linking farm records to the land

CLU

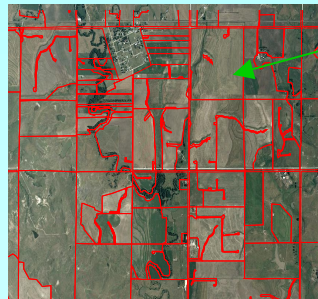


Ortho Imagery



Farm Records

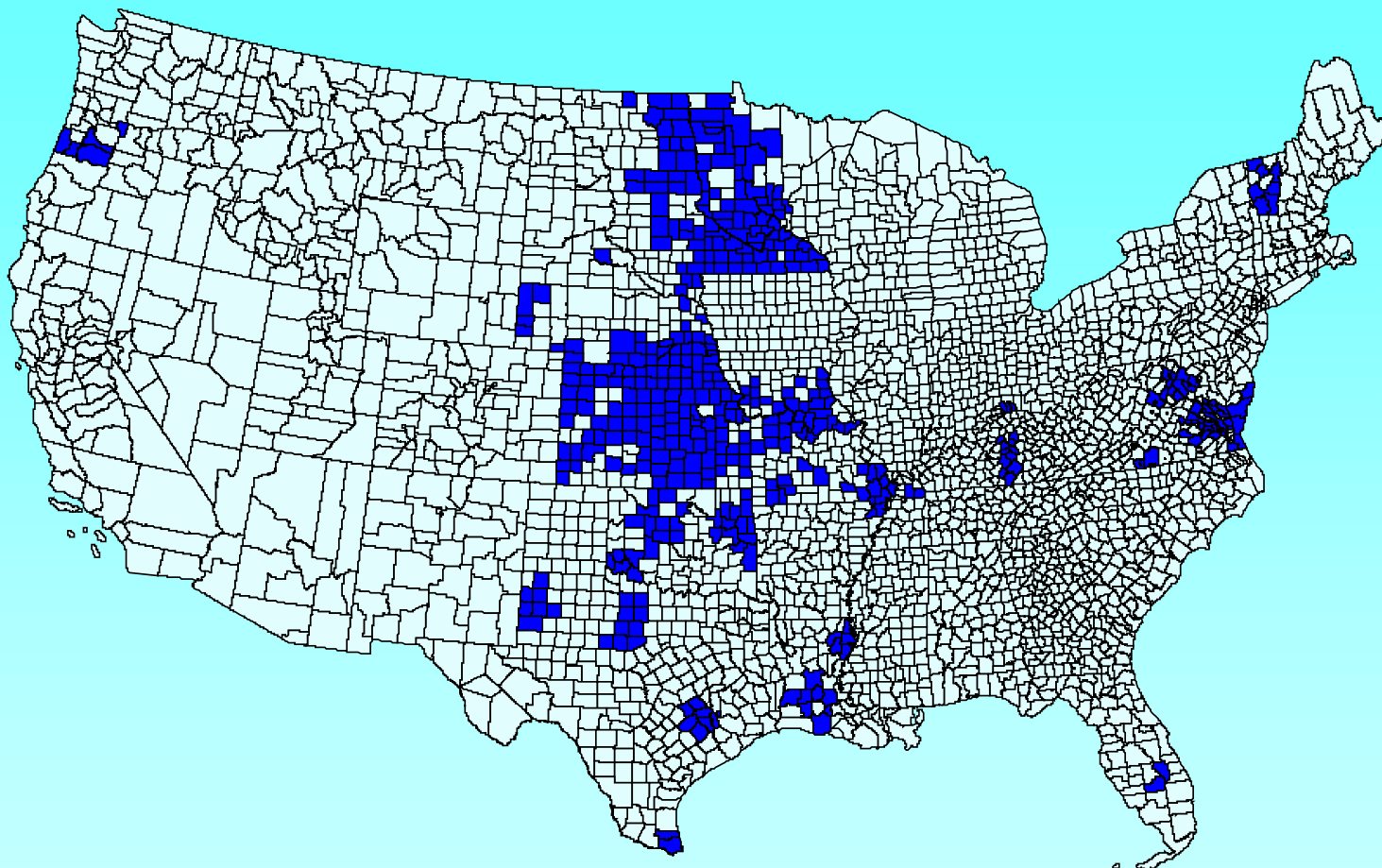
CLU	Tract	Farm	HEL	acres
21	300	450	no	45
22	300	450	no	24
23	400	500	no	30
24	400	500	no	40



CLU	Tract	Farm	HEL	Acres
21	300	450	no	45

GIS

FSA GIS Implementation



■ Counties with CLU (450)

By 5/1/02

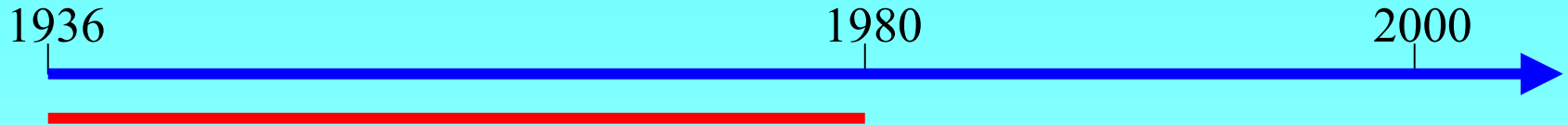
FSA Imagery Requirements

Requirements

- Maintain Farm Records (CLU boundaries)
- I.D./Verify Crop type
- Measure Acreage
- Coordination in Image Acquisition
- Data Sharing
- Support GIS
- FAA Security

FSA Imagery Requirements

Historical Perspective



Requirements

Maintain Farm Records
Measure Acreage

FSA County Based Photography

5 million exposures at APFO
plus 4 million at National Archives

FSA Imagery Requirements

- **Maintain Farm Records**

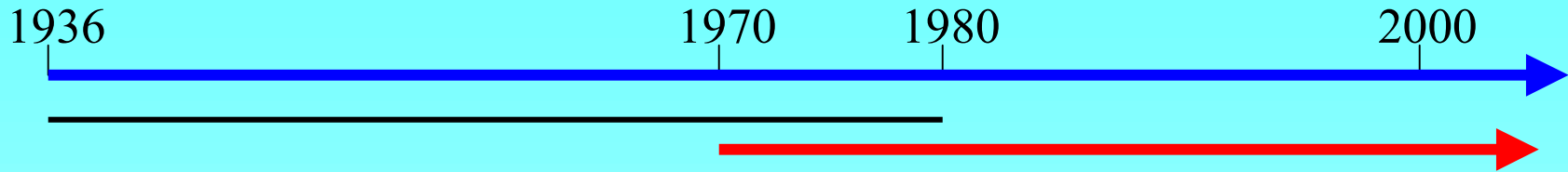
- I.D. and delineate farm field boundaries, etc.
 - Current with 5-7 years

- **Measure Acreage**

- Within +/- .1 acre

FSA Imagery Requirements

Historical Perspective



Requirements

Aerial Compliance

Maintain Farm Records
Measure Acreage
I.D./Verify Crop type

In 1987:
2,800 counties
50,000 rolls 35mm film
1,250,000 slides

FSA Imagery Requirements

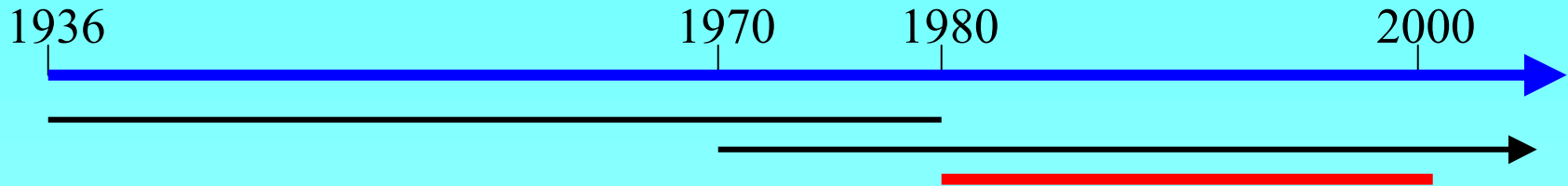
- I.D./Verify Crop Type

 - Aerial Compliance

 - Imagery acquired **annually** growing season
 - Color
 - Full county coverage
 - need to access/view any field

FSA Imagery Requirements

Historical Perspective



Requirements

Maintain Farm Records

Measure Acreage

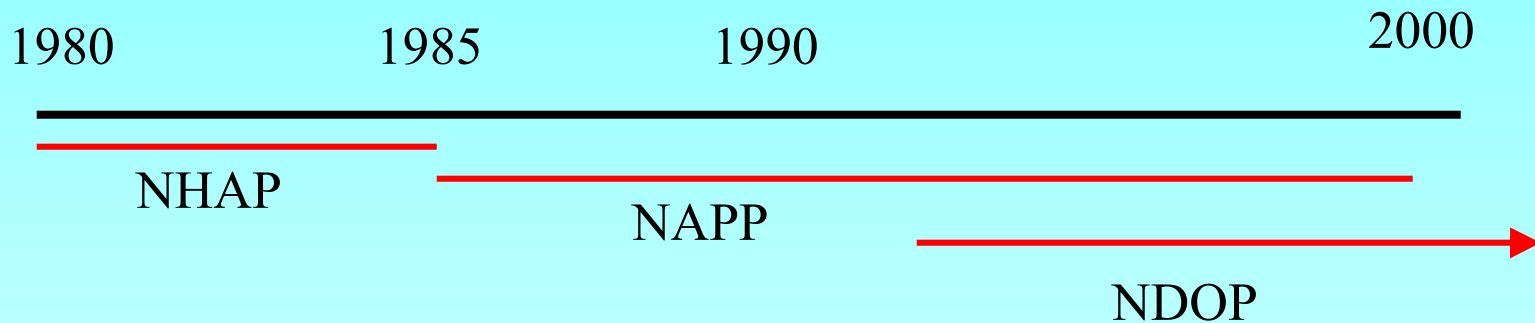
I.D./Verify Crop Type

Coordination in Image Acquisition

National Imagery Programs

FSA Imagery Requirements

- Coordination in Image Acquisition
National Imagery Programs



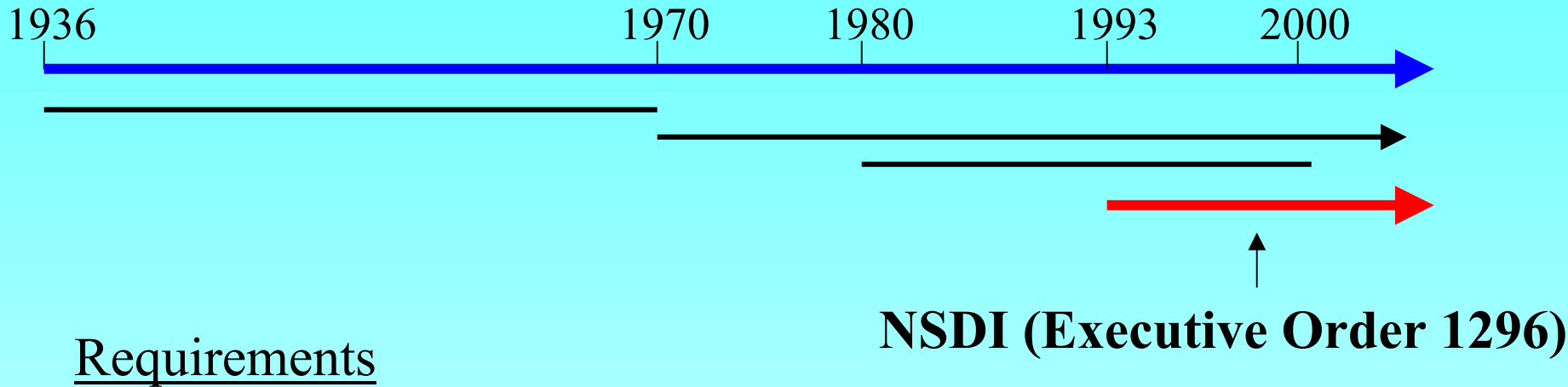
NHAP National High Altitude Aerial Photography Program

NAPP National Aerial Photography Program

NDOP National Digital Ortho-Photography Program

FSA Imagery Requirements

Historical Perspective



Maintain Farm Records

Measure Acreage

I.D./Verify Crop Type

Coordination in Image Acquisition

Data Sharing

FSA Imagery Requirements

- NSDI, FGDC

Coordination in Image Acquisition

metadata

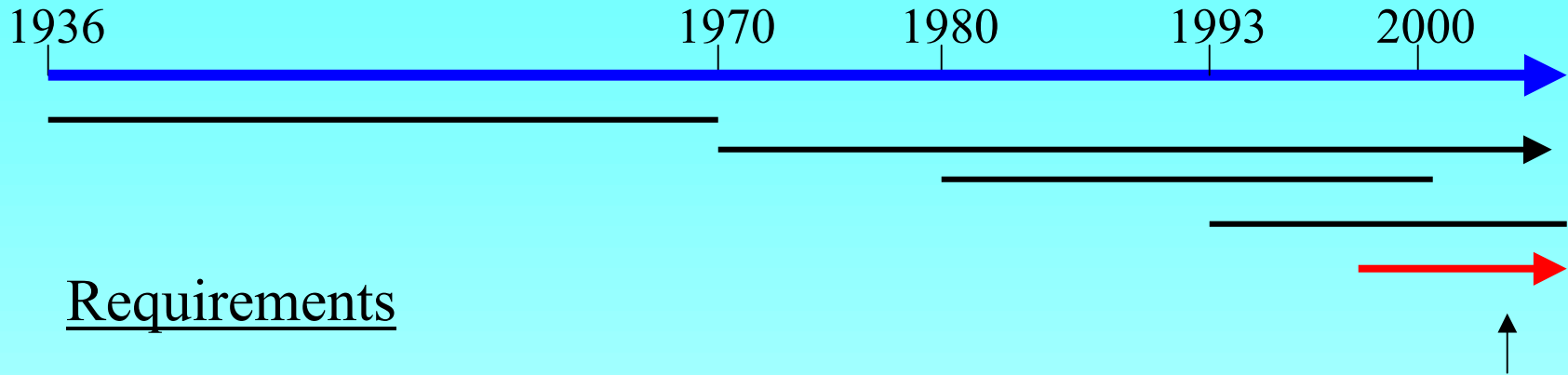
information about the imagery
coordinated fed and state level

Data Sharing (in public domain)

(future) distributed geodata warehouse

FSA Imagery Requirements

Historical Perspective



Maintain Farm Records

Measure Acreage

I.D./Verify Crop Type

Coordination in Image Acquisition

Data Sharing

Support GIS

GIS Implementation

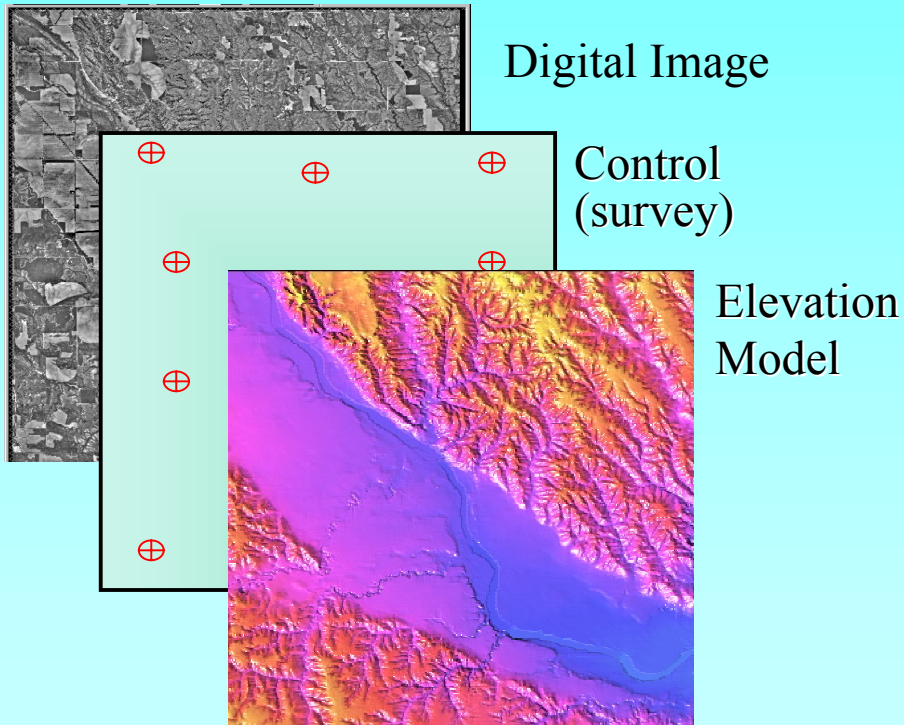
FSA Imagery Requirements

Requirements

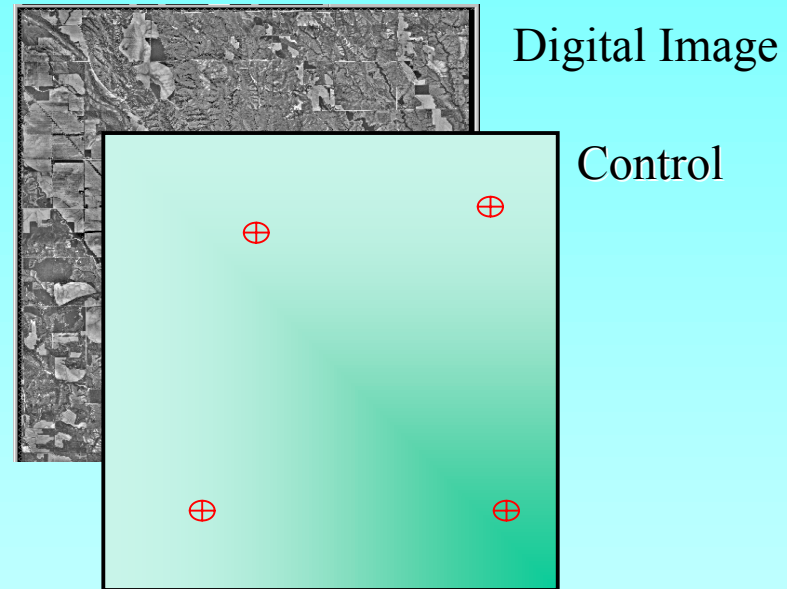
- Support GIS - Implementation Phase
 - Digital format
 - Map accuracy and standards are critical
 - Base Imagery is **Ortho-rectified**

Definitions

Ortho Rectified

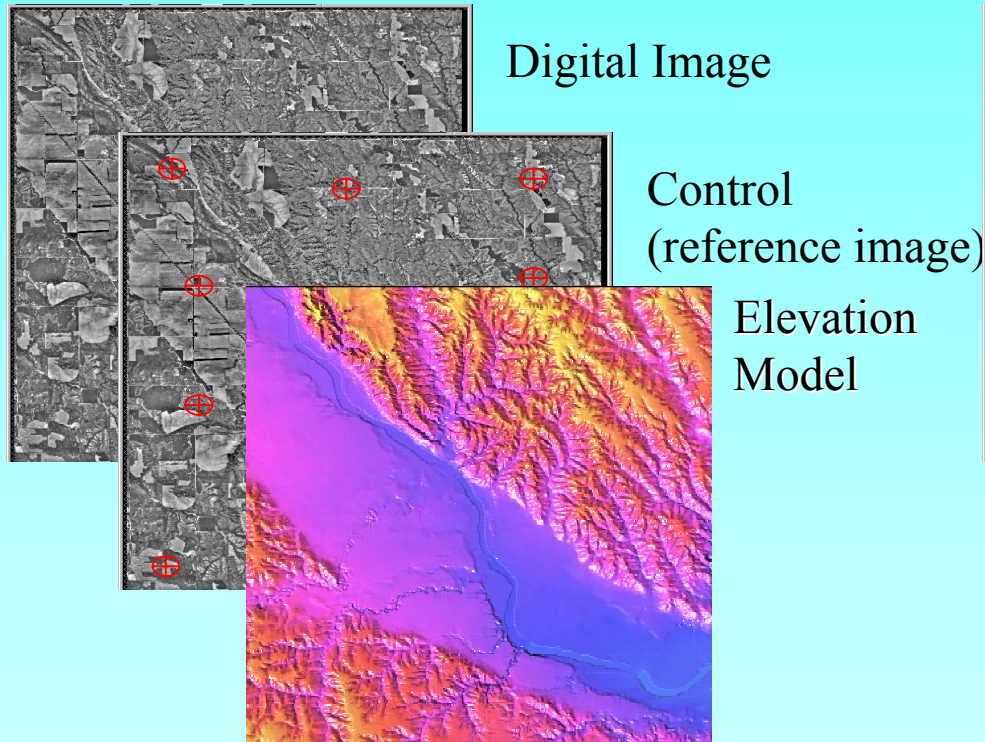


Rectified

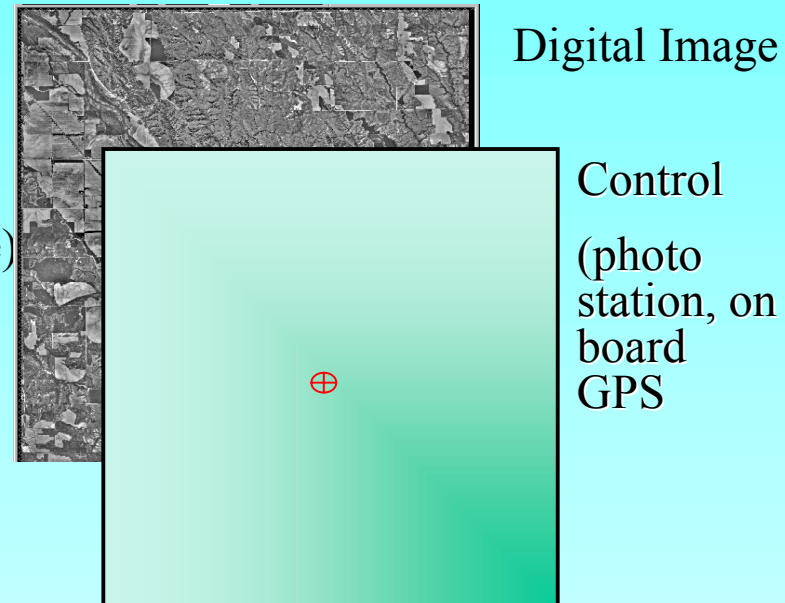


Definitions

Geo-Rectified



Geo-Referenced



FSA Imagery Requirements

Support GIS Implementation

- Digitize CLU from best possible base
- Data formatted for county, delivered ready to use

Three Products

- DOQs Digital Ortho Quadrangles
- MDOQS Mosaicked DOQS
QA/QC DOQS
- Compressed County Mosaic (SID compressed MDOQs)

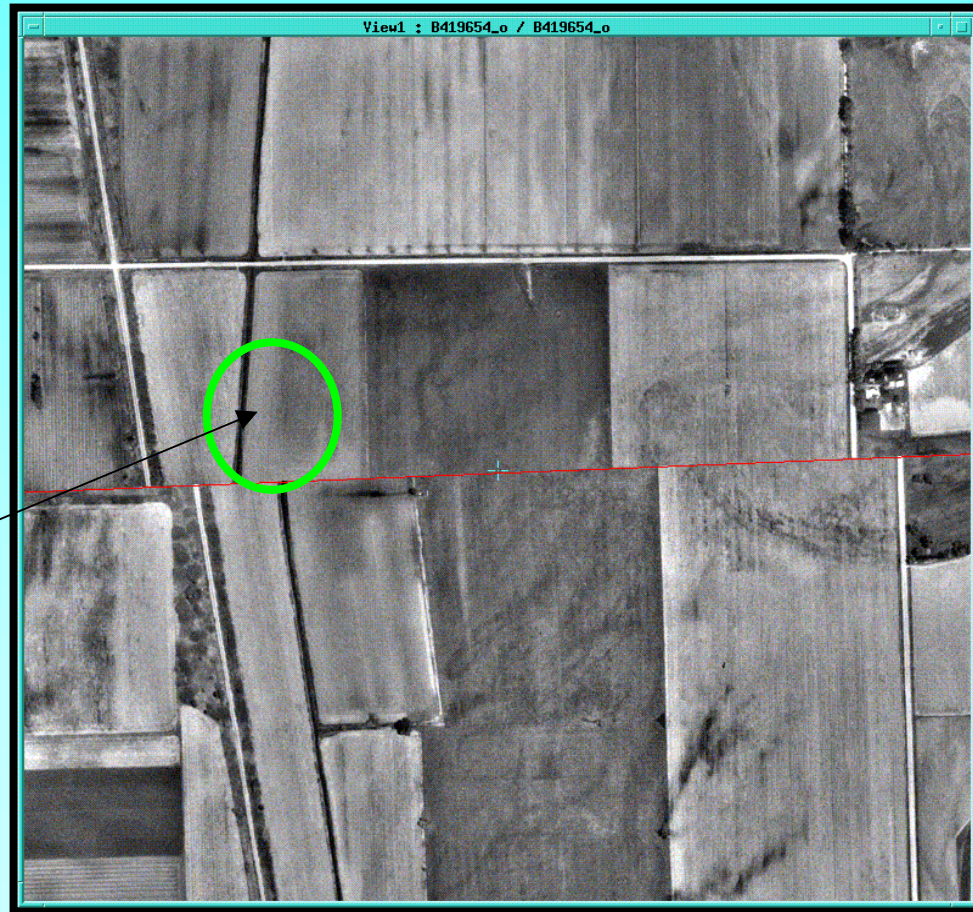
Delivery

- to Public, other agencies

DOQs

Offset between DOQs

> 20
meters

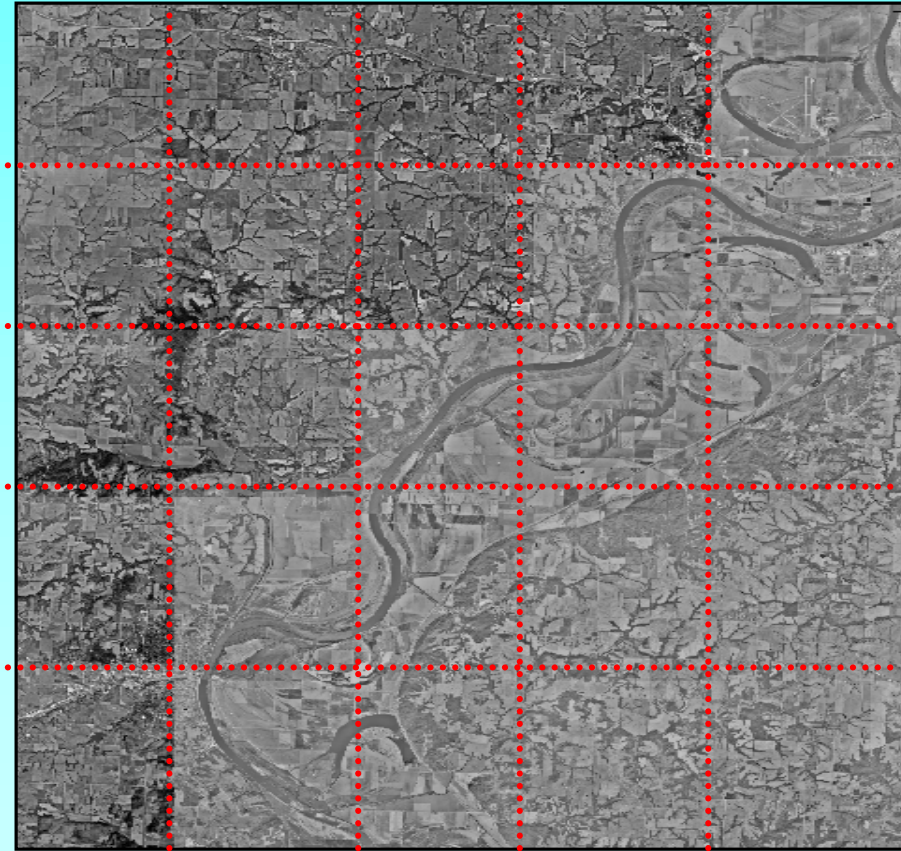


DOQ 1

DOQ 2

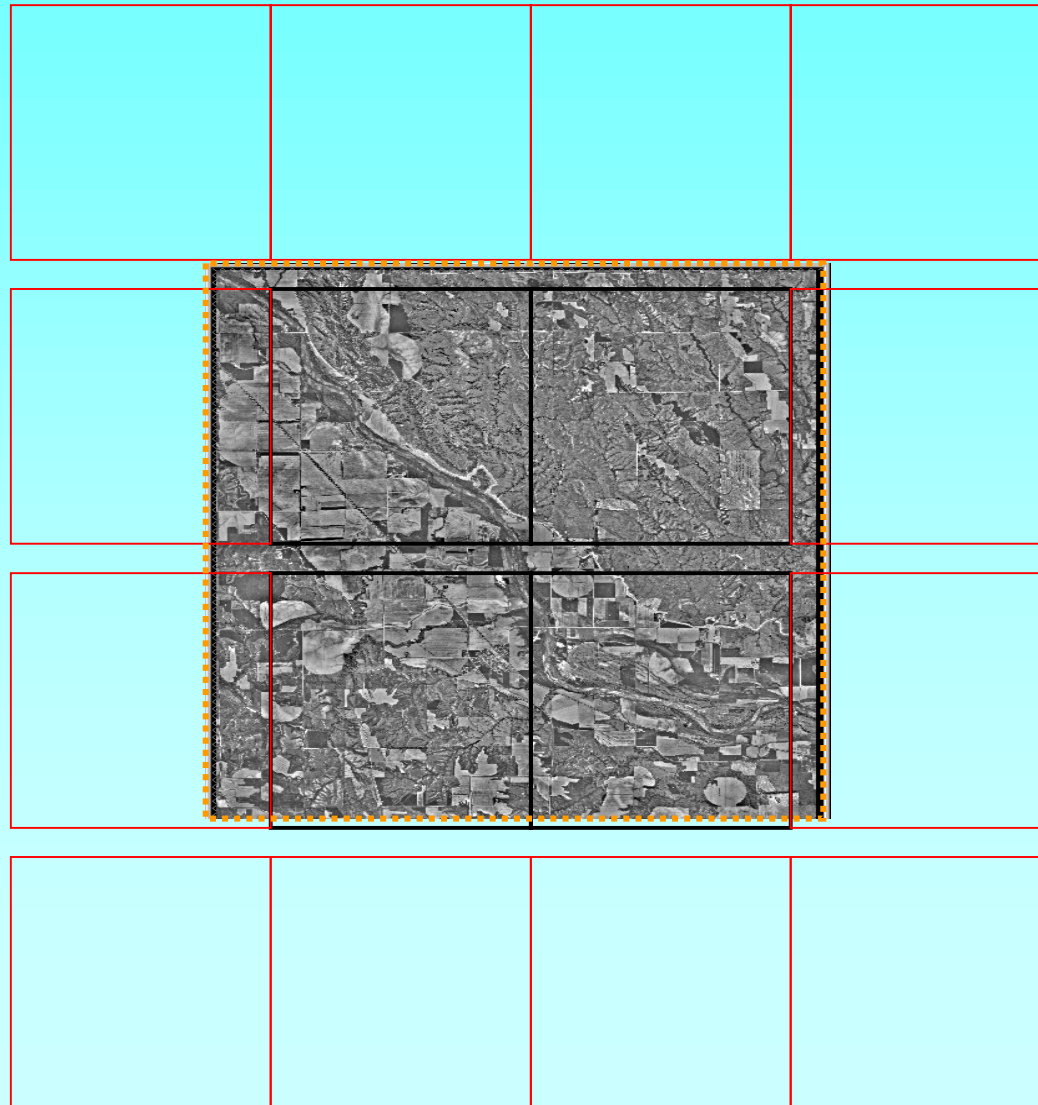
DOQs

multi dates within county



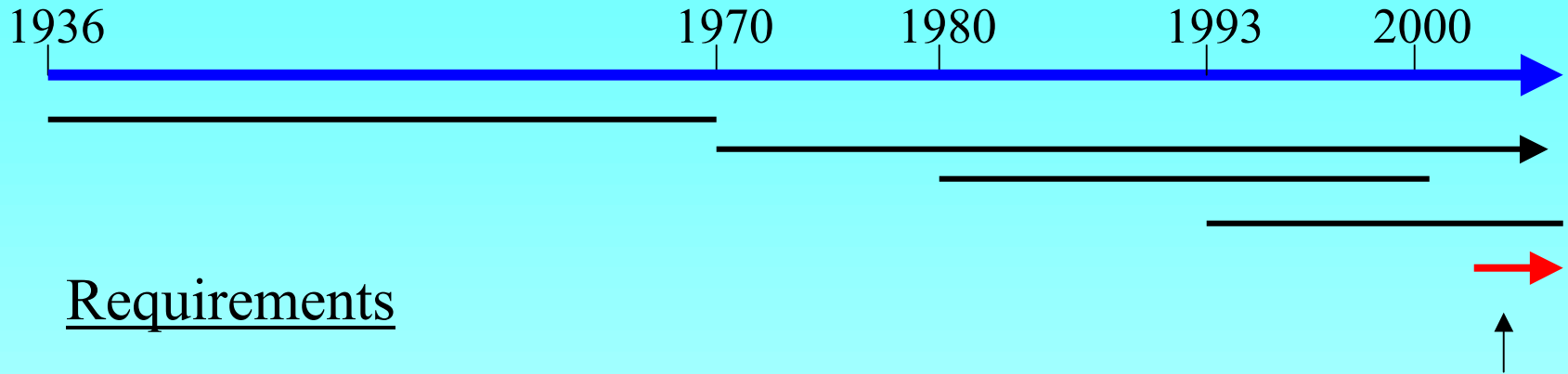
MDOQs

Mosaicked DOQs (7.5'tile)



FSA Imagery Requirements

Historical Perspective



Requirements

Maintain Farm Records

Measure Acreage

I.D./Verify Crop Type

Coordination in Image Acquisition

Data Sharing

Compatible with GIS

FAA Requirements

September 11

FSA Imagery Requirements

Requirements

FAA Commercial Aviation Requirements

- Flight Plans filed within 24 hours
 - must stay with it
- Instrument Flight Rules (IFR)
 - Transponder on board
- Visual Flight Rules (VFR)
 - more common with local contracts
 - (two separate occurrences since 9/11)

Meeting FSA Requirements in 2002

Current Solution

Multi-Source Program

1. Small Format

- locally acquired
- film or digital
- film scanned at Service Center
- Annually acquired during growing season
- Color
- Rectified at Service Center

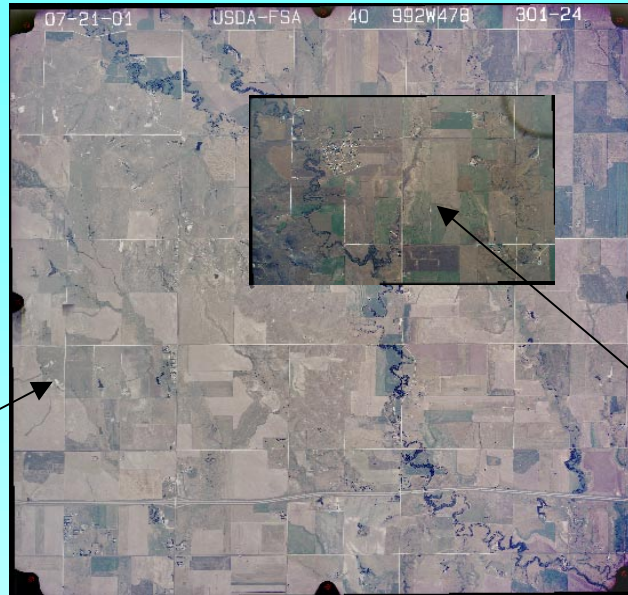
2. Digital Ortho Quarter Quads (DOQs)

NDOP - fed/state cost share

5+ year cycle

Definitions

Imaging Format



Large Format

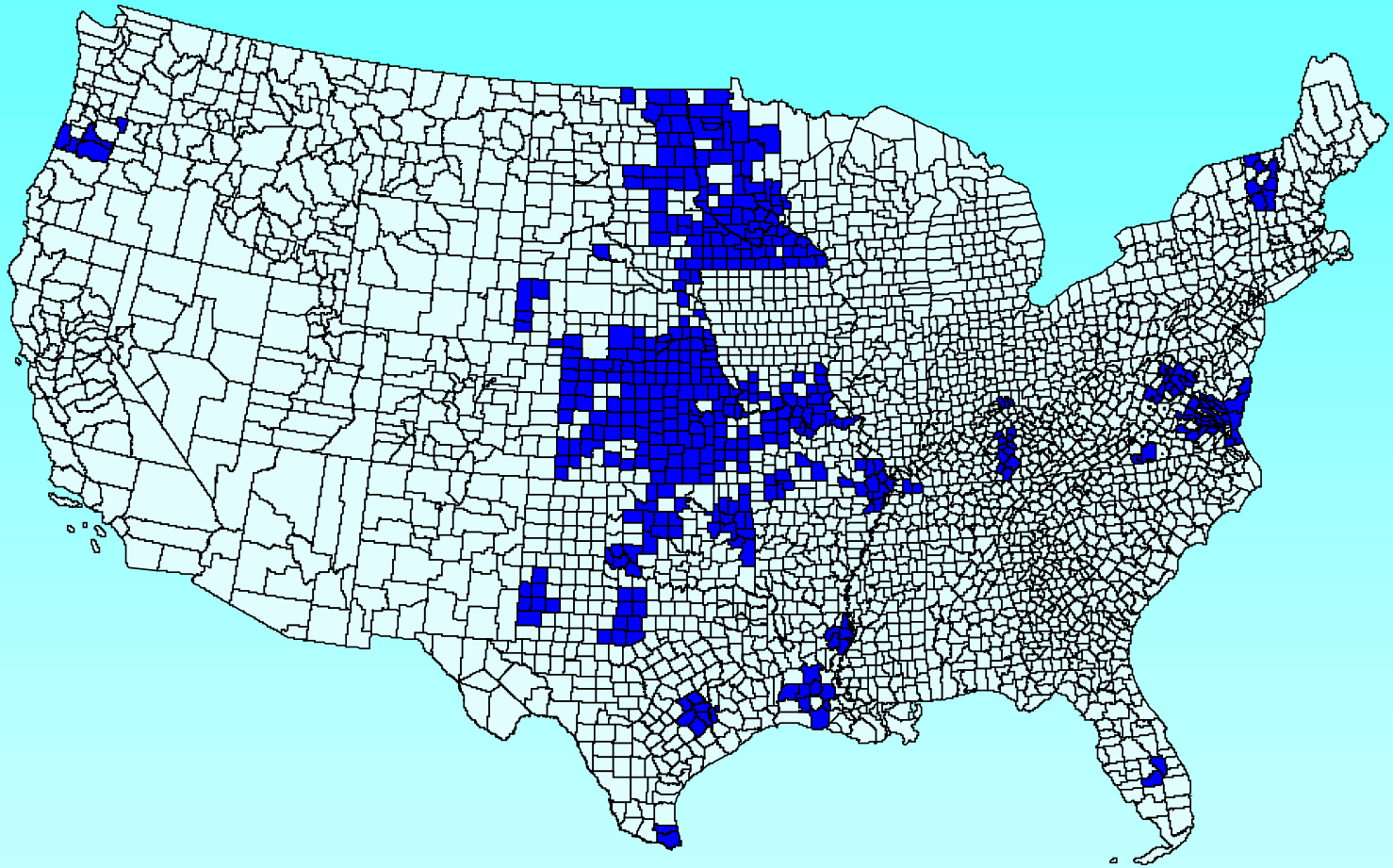
- Mapping Camera
- 9" x 9" film
- 25 sq. miles @ 20,000 feet

Small Format

- 35mm Camera
- 3 sq. miles @ 8,000 feet

- Digital Camera
- 3 sq. miles @ 10,000 feet

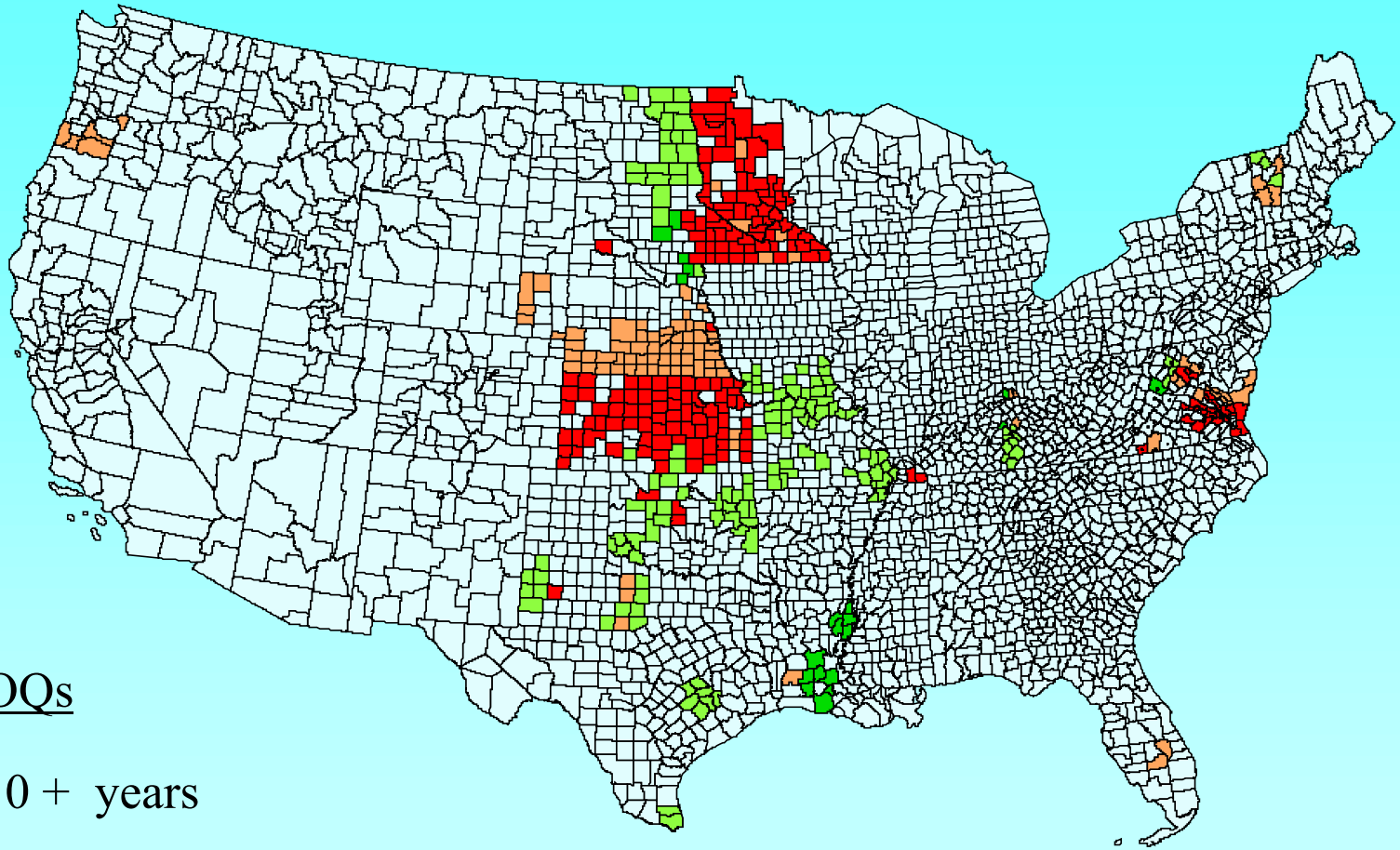
Status of GIS Implementation in FSA Service Centers



■ Counties with CLU (450)

By 5/1/02

Date of Ortho Image Base (DOQs) in FSA GIS Service Centers



Date of DOQs

- 10 + years
- 7 to 9
- 4 to 6
- 1 to 3

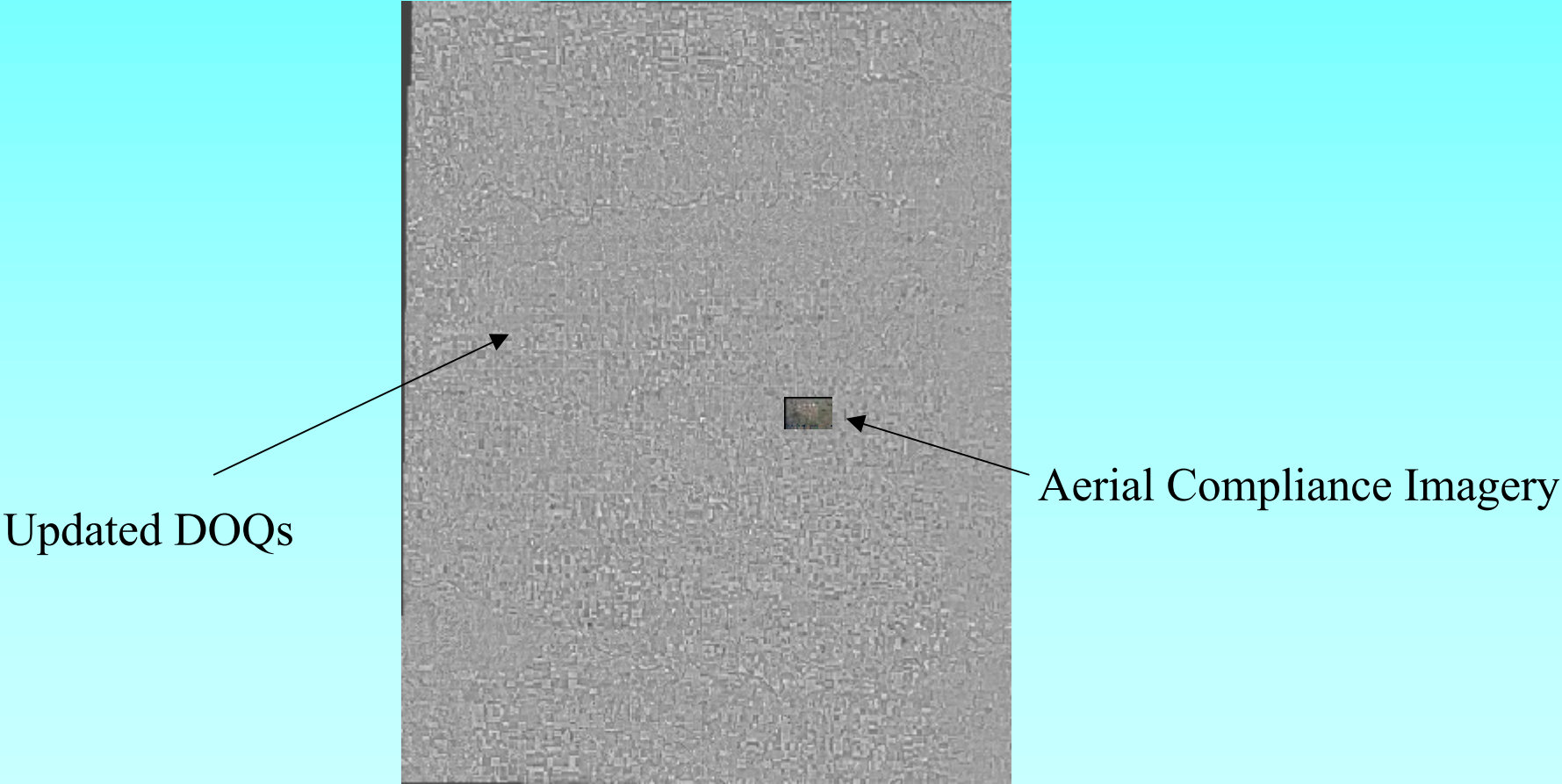
Image Acquisition

Alternative 1

Based on Current Programs

- DOQs/MDOQs
- FSA small format photography
 - Acquired locally
 - acquired annually
 - film scanned locally,or digital camera

Alternative 1



Alternative 1



Updated MDOQ



Rectified Aerial Compliance
(digital camera)

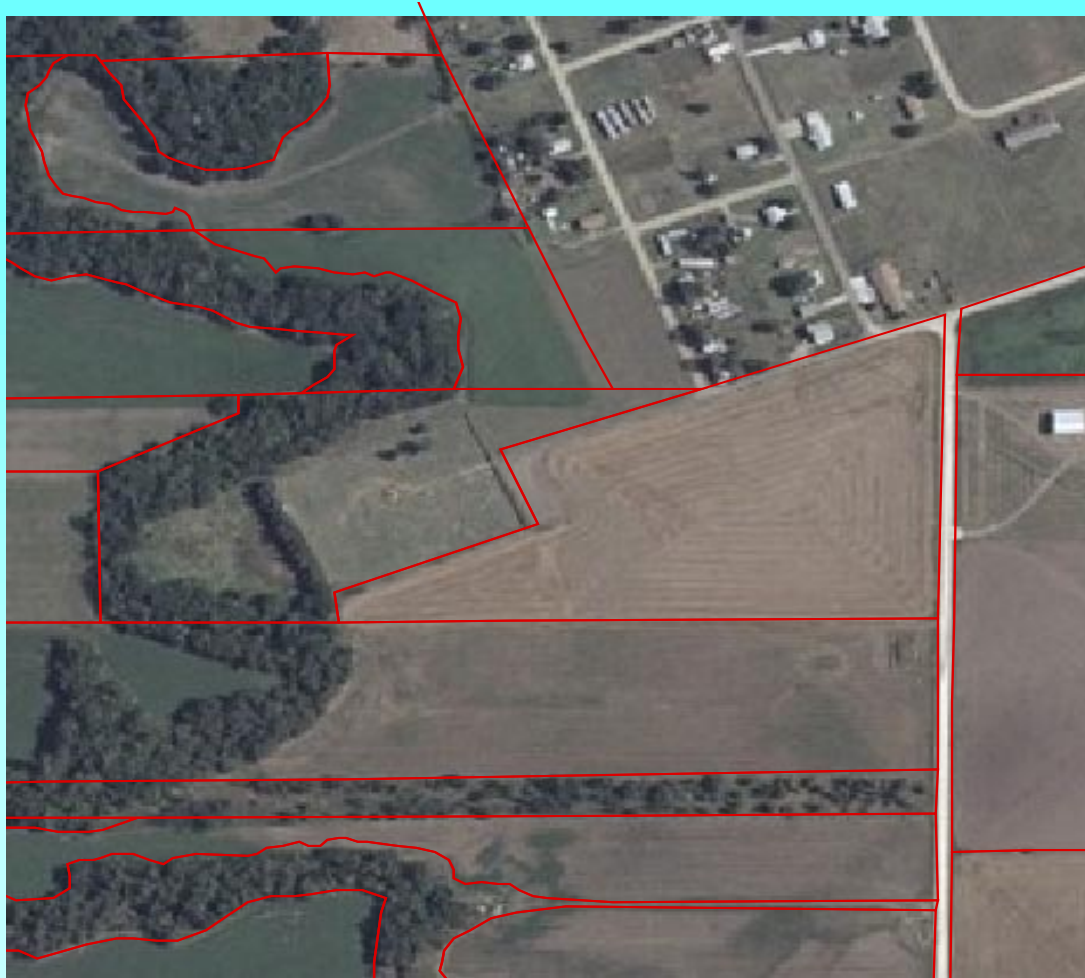
Image Acquisition

Alternative 2

FSA Geo-Rectified Imagery (Piloted in KS/NE)

- Acquired annually during growing season
- Color
- 2 meter **GSD** (ground sample distance)
- Delivered in time for compliance
- Ortho-rectified

Alternative 2



Ortho rectified Image
(2001 KS/NE Pilot)

Alternatives

Image Acquisition

Alternative 3

- FSA Large Format Photography (piloted in KS/NE)
 - 2 meter **geo-referenced** digital image
 - color
 - delivered in time for compliance (< 60 days in pilot)
 - Ortho rectified on five year (average) cycle
 - 1 meter GSD ortho produced from film

Alternative 3

examples



2 meter Scan, Geo-Referencing
(2001 KS/NE Pilot)



Geo-Rectified Image
(2001 KS/NE Pilot)

Image Acquisition

Cost Share Opportunities

Large Format Aerial Photography

- Film can be scanned at higher resolution (at .5 meter GSD)
Potentially used for National Resource Inventory (NRI)
- Film can be used to generate digital ortho imagery
Potentially by NDOP/state programs

Image Acquisition

Cost Share Opportunities

Example

Arcview Demo - High resolution scans for NRI

Meeting FSA Requirements

Evaluating Alternatives

DOQs Small Format	Possible	Yes	Yes	Difficult	Possible	Difficult
FSA Ortho	Yes	Yes	Yes	Yes	Yes	Yes
Large Format FSA Ortho	Yes	Yes	Yes	Yes	Yes	Yes
	Maintain CLU	Measure Acreage	I.D. Crops	Coordination and Data Sharing	GIS	FAA

Costs

Image Acquisition

Estimated Average Annual Costs
average county

	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Annual Cost	
Alternative 1	\$18,750	\$3,000	\$3,000	\$3,000	\$3,000	\$30,750	\$6,150	
Alternative 2	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$60,000	\$12,000	
Alternative 3	\$12,300	\$8,300	\$8,300	\$8,300	\$8,300	\$45,500	\$9,100	

Does not include staff time

Does not include cost sharing

Highlight: Ortho photography

Costs

Image Acquisition

Estimated Annual Costs (5 years)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Annual Cost
Alternative 1	\$18,750	\$3,000	\$3,000	\$3,000	\$3,000	\$30,750	\$6,150
Alternative 2	\$12,000	\$12,000	\$12,000	\$12,000	\$12,000	\$60,000	\$12,000
Alternative 3	\$12,300	\$8,300	\$8,300	\$8,300	\$8,300	\$45,500	\$9,100
	FY02	FY03	FY04	FY05	FY06		
	450	1400	2400	3200	3200		
Alternative 1	\$2,767,500	\$8,610,000	\$14,760,000	\$19,680,000	\$19,680,000		
Alternative 2	\$5,400,000	\$16,800,000	\$28,800,000	\$38,400,000	\$38,400,000		
Alternative 3	\$4,095,000	\$12,740,000	\$21,840,000	\$29,120,000	\$29,120,000		

Does not include staff time

Does not include cost sharing

Additional Costs

Alternative 1

Data Management

	File Size	Files		Gbytes
Large Format 4x4 miles	60	70		4.2
Small Format 1x2 miles	9	450	6.4X	4.05
Small Format 1x1 mile	4.5	900	13X	4.05

Average County 1000 sq miles

Additional Costs

Alternative 1

Rectification - measuring acreage

	Files	Control Points	
Large Format	70	280	
Small Format 1x2 mile	450	1800	6.4X
Small Format 1x1 mile	900	3600	14X

Average County 1000 sq miles

Additional Costs

Alternative 1

Coordination

Data Sharing

- Metadata collection and management
- Distribution

Recommendations

Recommend Alternative 3 in FY02

Recommendations

Follow on plan

- Pursue partnership and cost share opportunities
 - KS, OK, TX , IA (NDOP DOQs)
 - contribute film.
- Coordination at State and National Level
- Pursue hi-change area ortho updates idea
 - in-house production
 - augment with contracts
 - ID hi change areas