RANGELAND MONITORING WITH VERY-LARGE SCALE AERIAL (VLSA) PHOTOGRAPHY

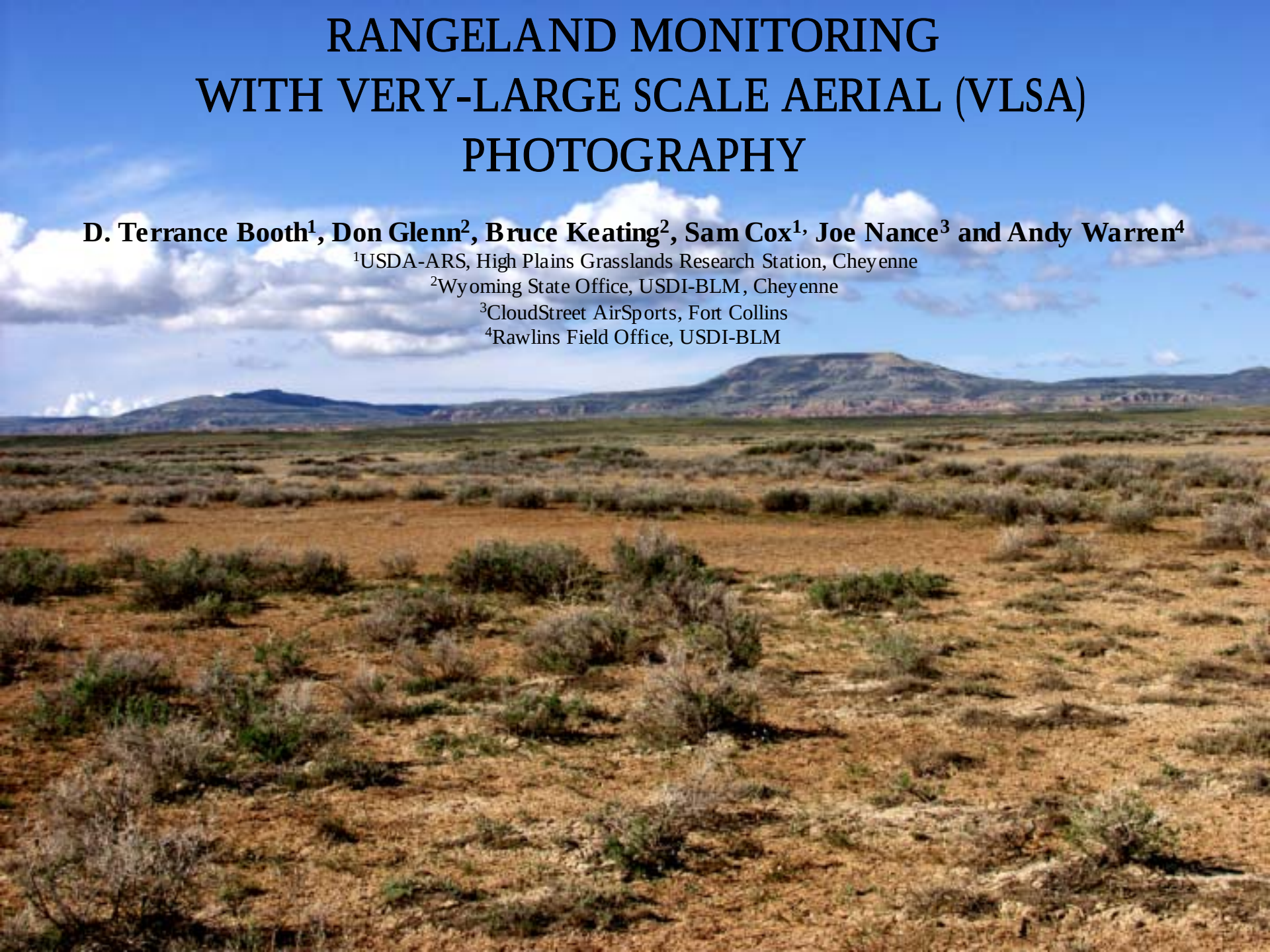
D. Terrance Booth[1], Don Glenn[2], Bruce Keating[2], Sam Cox[1], Joe Nance[3] and Andy Warren[4]

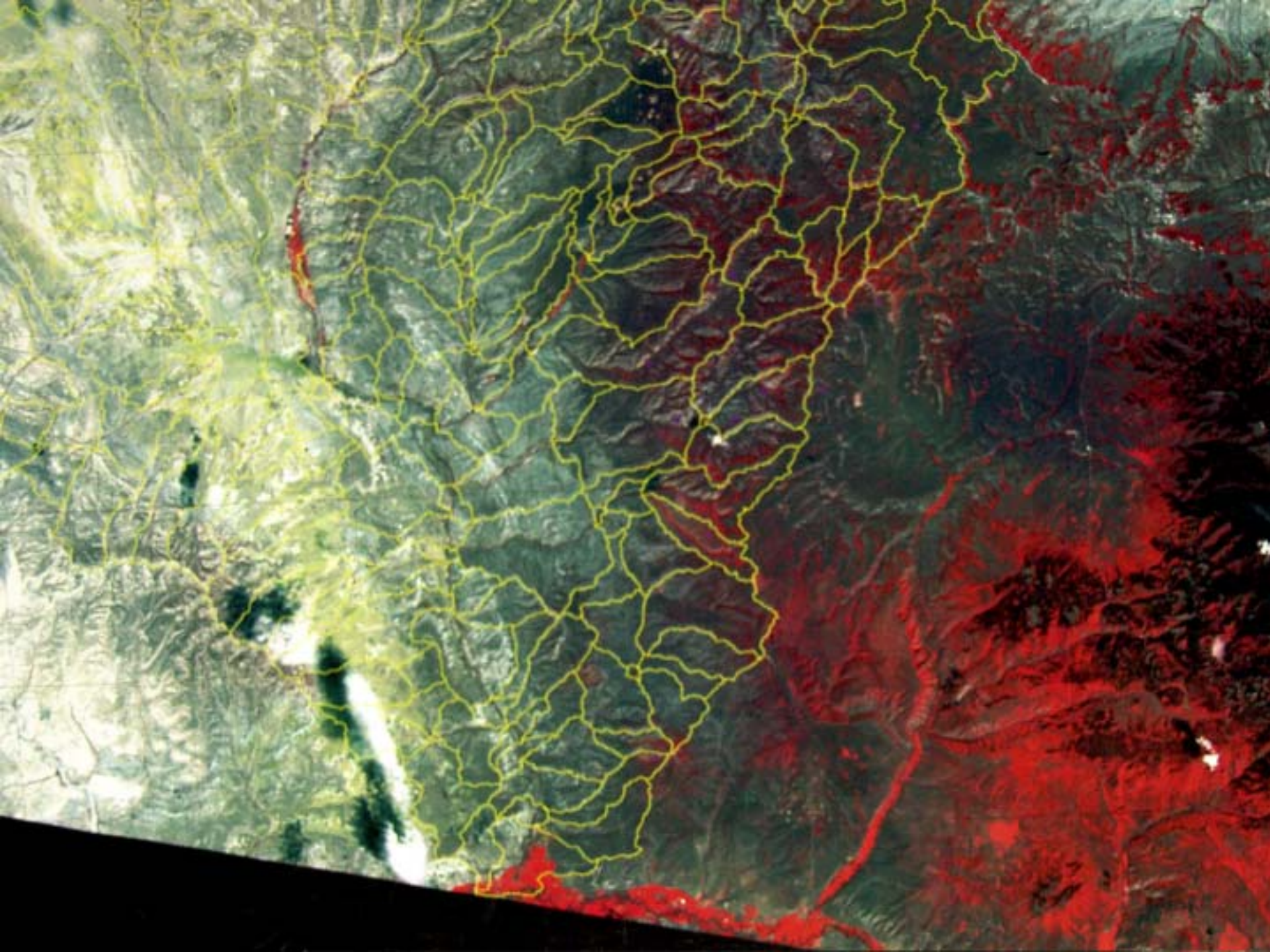
[1]USDA-ARS, High Plains Grasslands Research Station, Cheyenne

[2]Wyoming State Office, USDI-BLM, Cheyenne

[3]CloudStreet AirSports, Fort Collins

[4]Rawlins Field Office, USDI-BLM





There are two levels of observation in range inspection: one extensive and the other intensive. …Intensive observations on small areas are necessary to secure the detailed facts from which the only valid conclusions of range condition can be made.

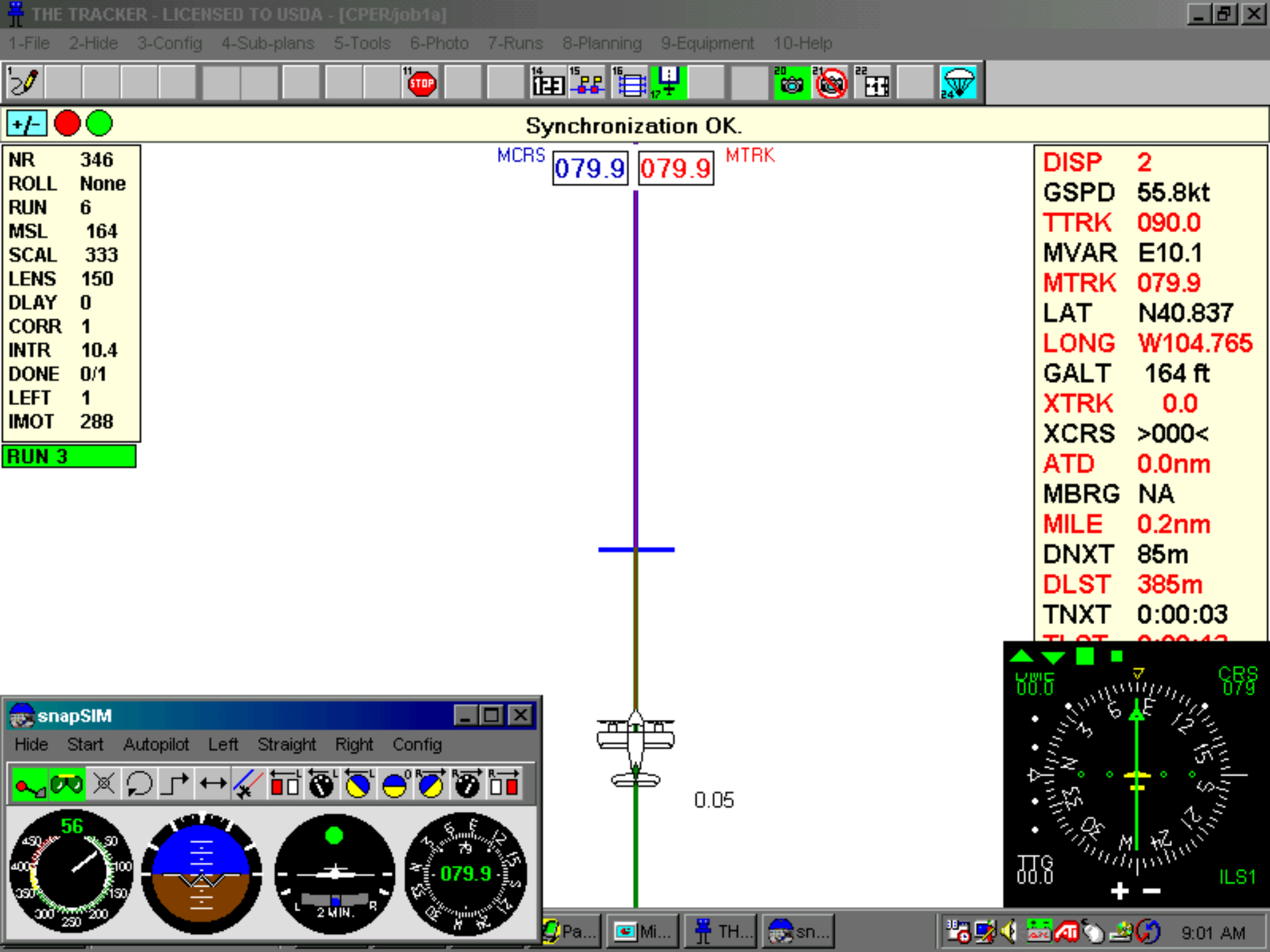
L. Ellison & A.R. Croft, 1944

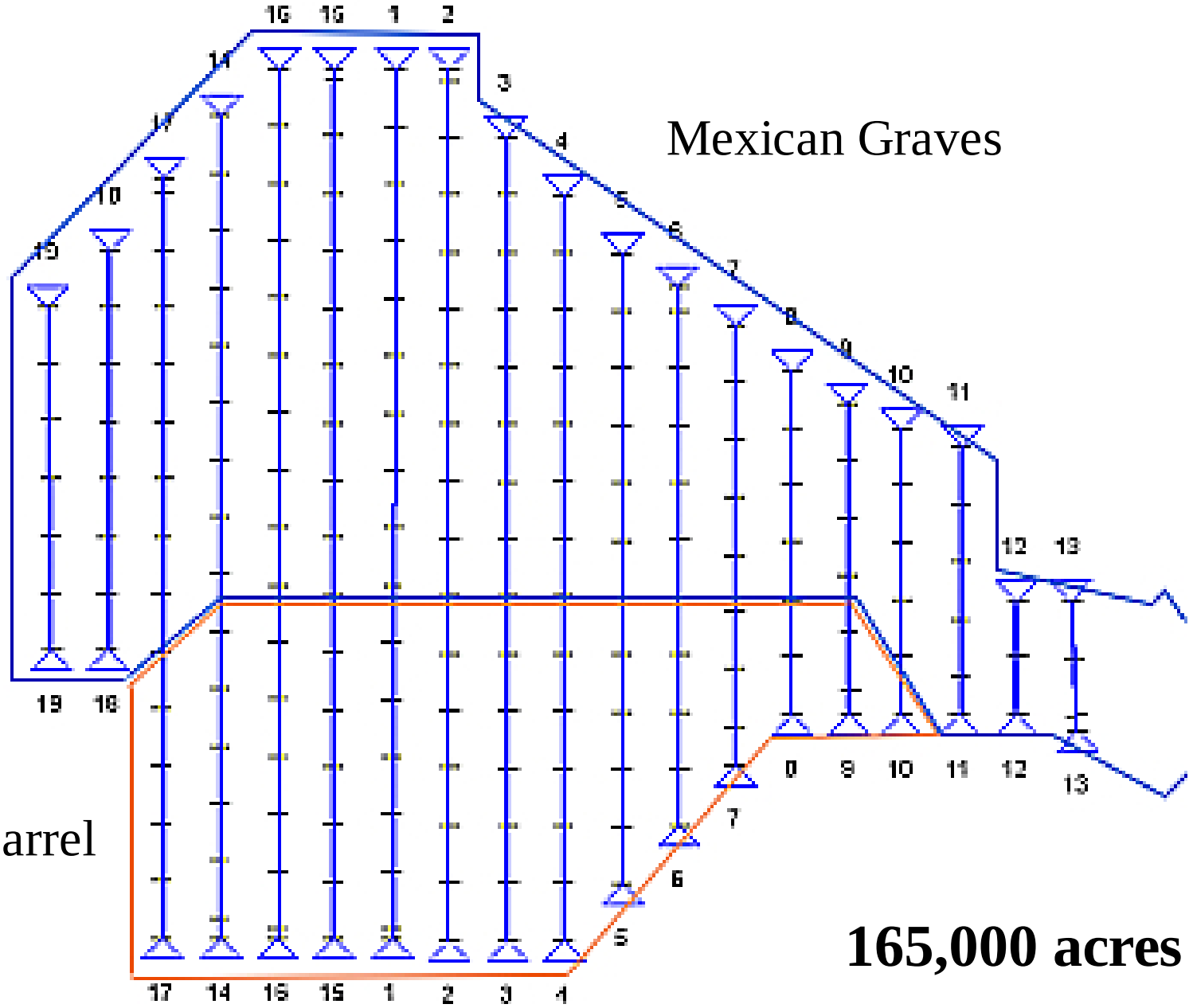
RANGY

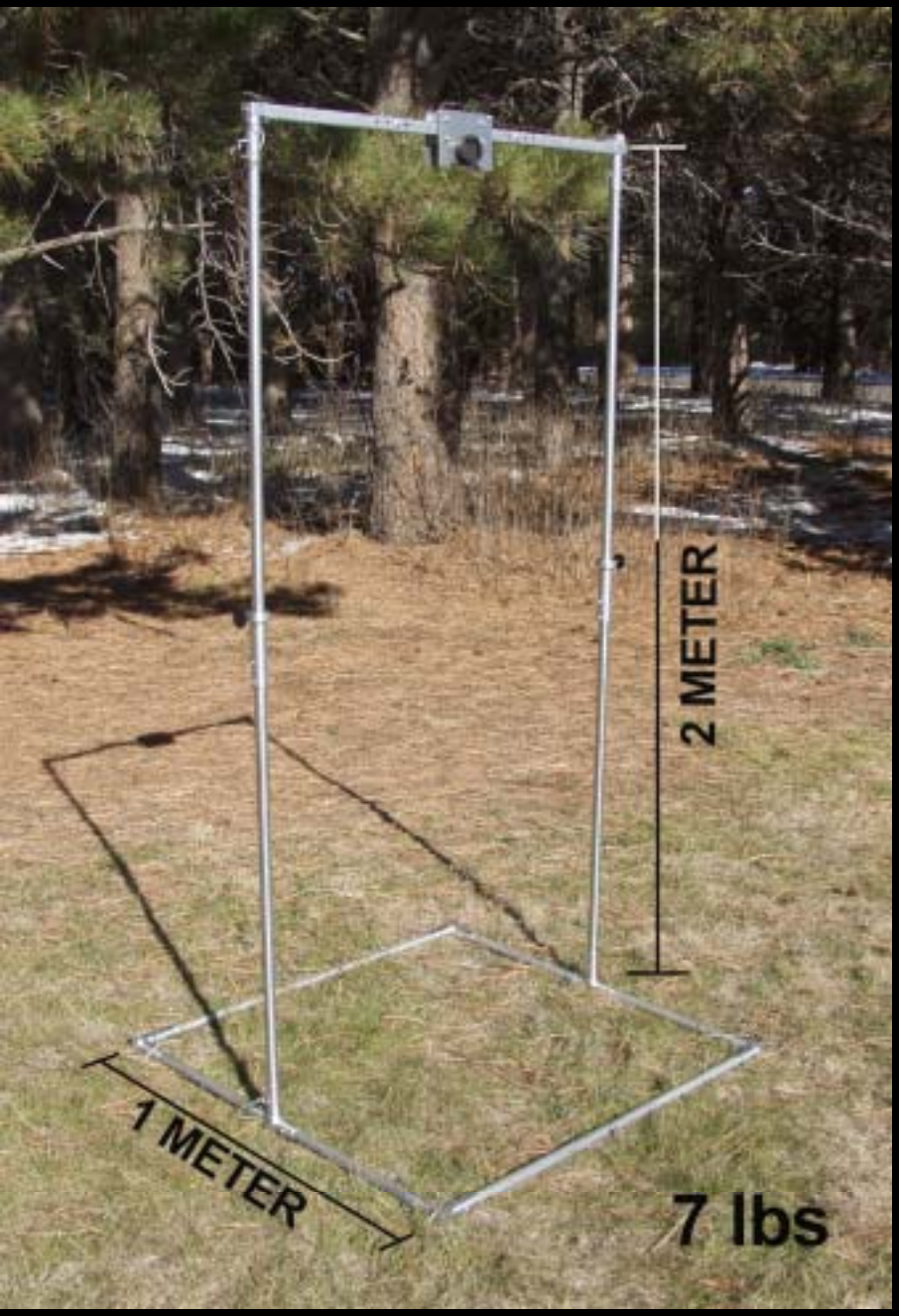
Hulcher 123

Color 70 mm film format
20 frames per second
Shortest shutter: 1/4,000 sec
500 mm Mamiya lens
100 m AGL:
Scale: 1:200
Field of View: 12 x 12 m
Resolution (scanned film): 1 pixel = 0.5 cm

RANS


THE TRACKER - LICENSED TO USDA - [CPER/job1a]
1-File 2-Hide 3-Config 4-Sub-plans 5-Tools 6-Photo 7-Runs 8-Planning 9-Equipment 10-Help
Synchronization OK.
MCRS 079.9 079.9 MTRK
NR 346
ROLL None
RUN 6
MSL 164
SCAL 333
LENS 150
DLAY 0
CORR 1
INTR 10.4
DONE 0/1
LEFT 1
IMOT 288
RUN 3
DISP 2
GSPD 55.8kt
TTRK 090.0
MVAR E10.1
MTRK 079.9
LAT N40.837
LONG W104.765
GALT 164 ft
XTRK 0.0
XCRS >000<
ATD 0.0nm
MBRG NA
MILE 0.2nm
DNXT 85m
DLST 385m
TNXT 0:00:03
0.05
snapSIM
Hide Start Autopilot Left Straight Right Config
CRS 079
ILS1
9:01 AM


Mexican Graves
South Barrel
165,000 acres


2 METER
1 METER
7 lbs

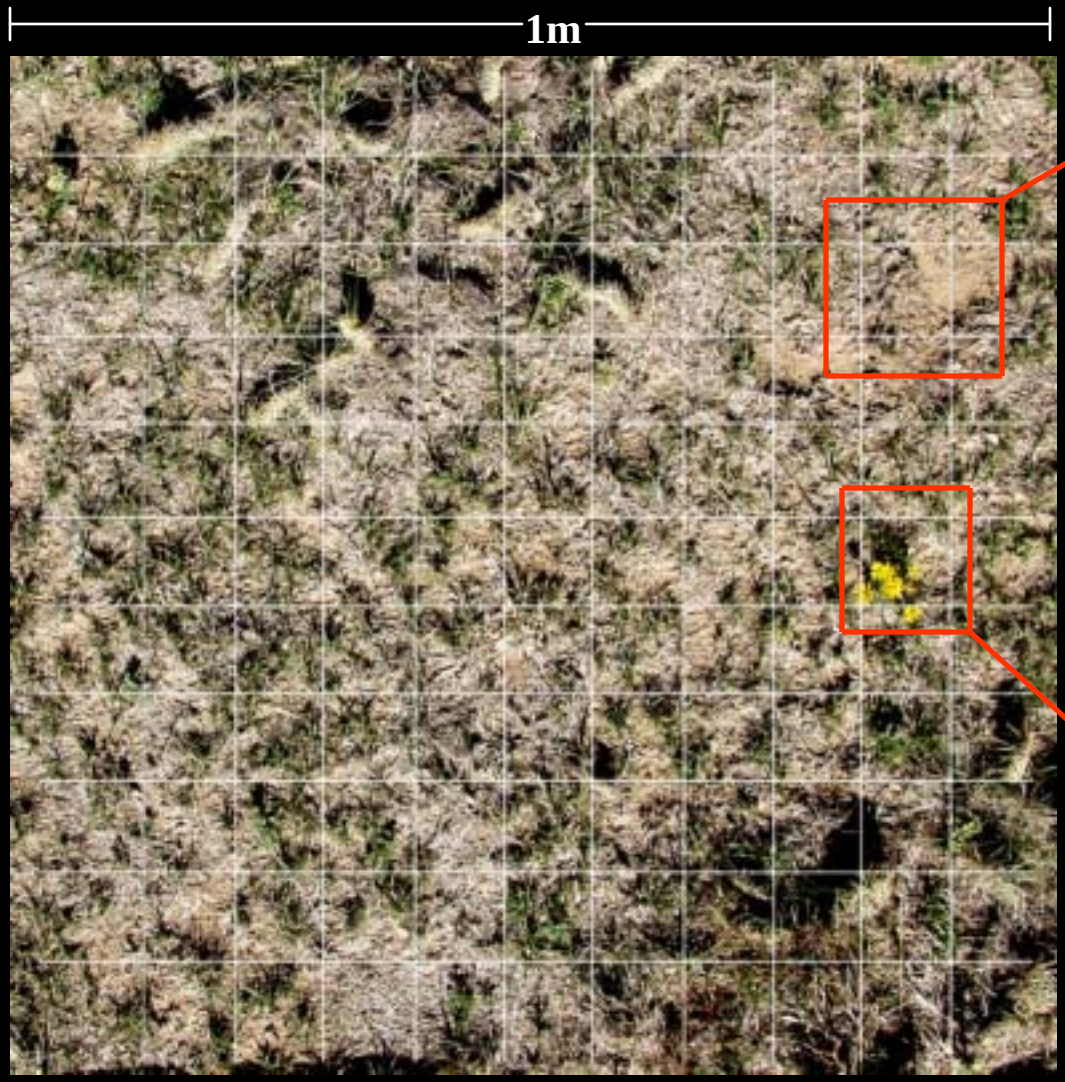
Olympus E20

2/3 inch Color (RGB) CCD
4.9 megapixel: 2560 x 1920
2 frames per second
Shortest shutter: 1/640 sec
35-140 mm Olympus lens

2 m AGL:
Scale: 1:60
Field of View: 1 x 1.4 m
Resolution: 1 pixel = 0.03 cm

Olympus Digital Camera

2 m AGL


1m

Muddy Creek Film Aerial 2002 - VegMeasurement

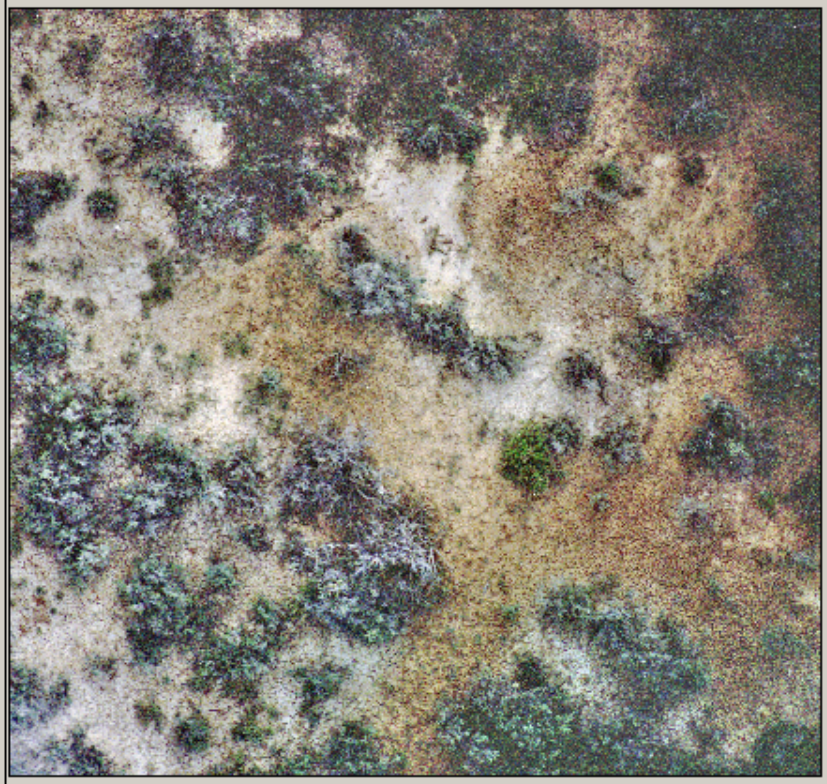
File Edit Image Project View Help

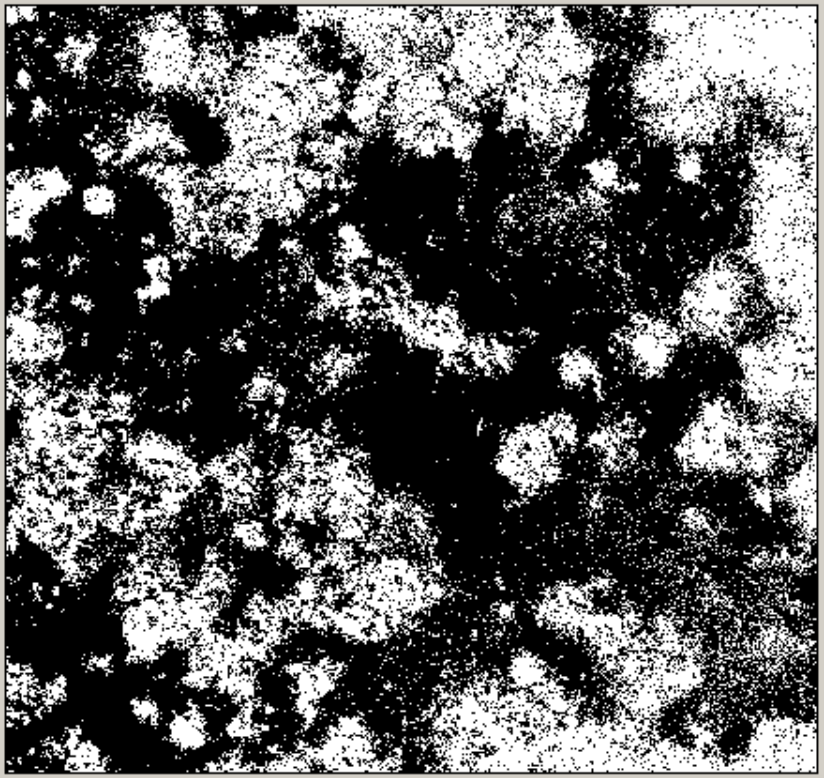
New Open Save Acquire Delete Properties Select Zoom Process

Order by Time

- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T
- Muddy Creek 5-02 T

All None Invert





Processing Attributes

Threshold: 0.116

Blue Band Gradient

Process

Preview

% White	36.434
% Black	63.566
Area White	0.3643 meters²
Area Black	0.6357 meters²

Image Attributes

Dimension: 1 X 1 Processed

Units: meters Status: New

Coordinate: Fix

Notes:

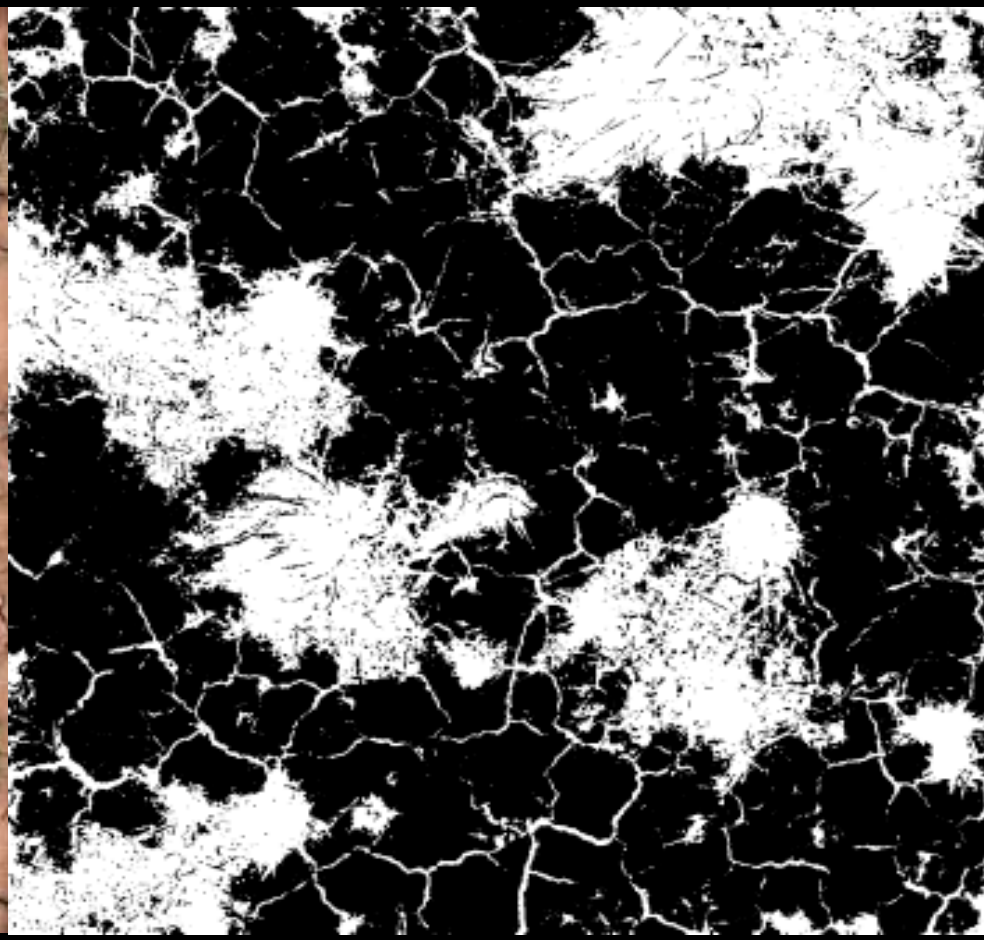
Ready GPS unit not connected 12:45 PM 12/23/2002

Start Microsoft PowerPoint - [S... WordPerfect 10 - [C:\...\... Muddy Creek Film Aeri... 12:45 PM

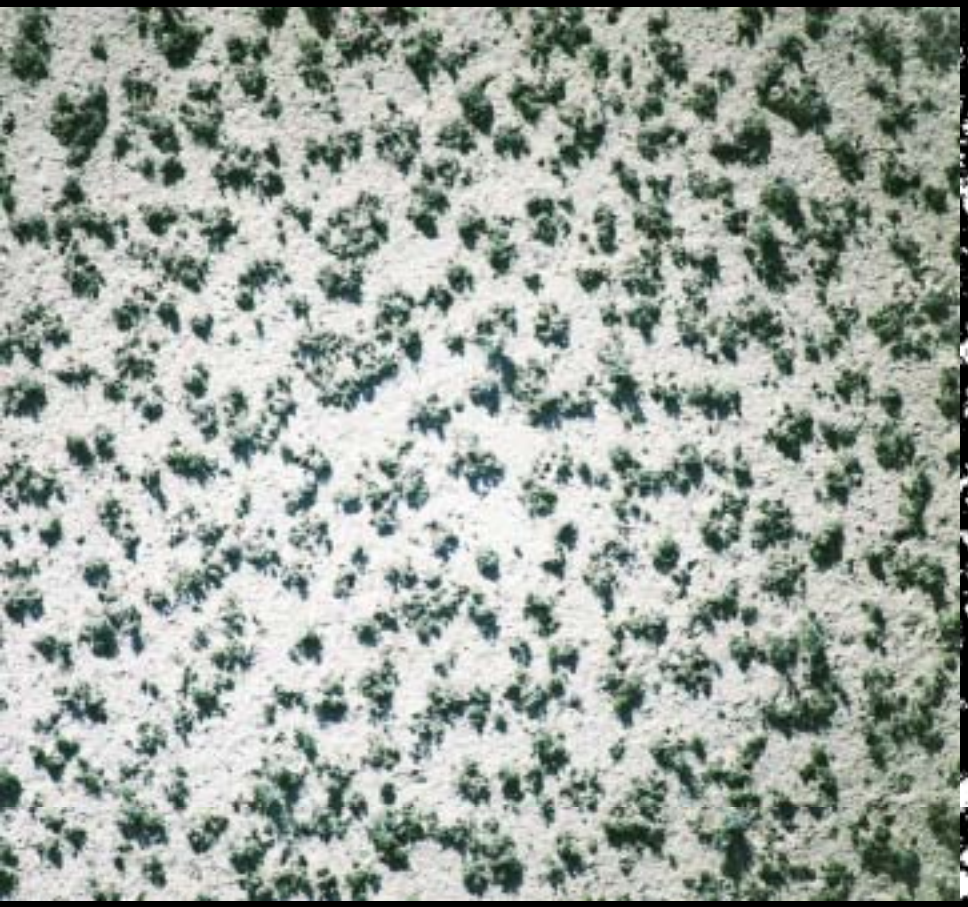
Hulcher Film Camera

100 m AGL

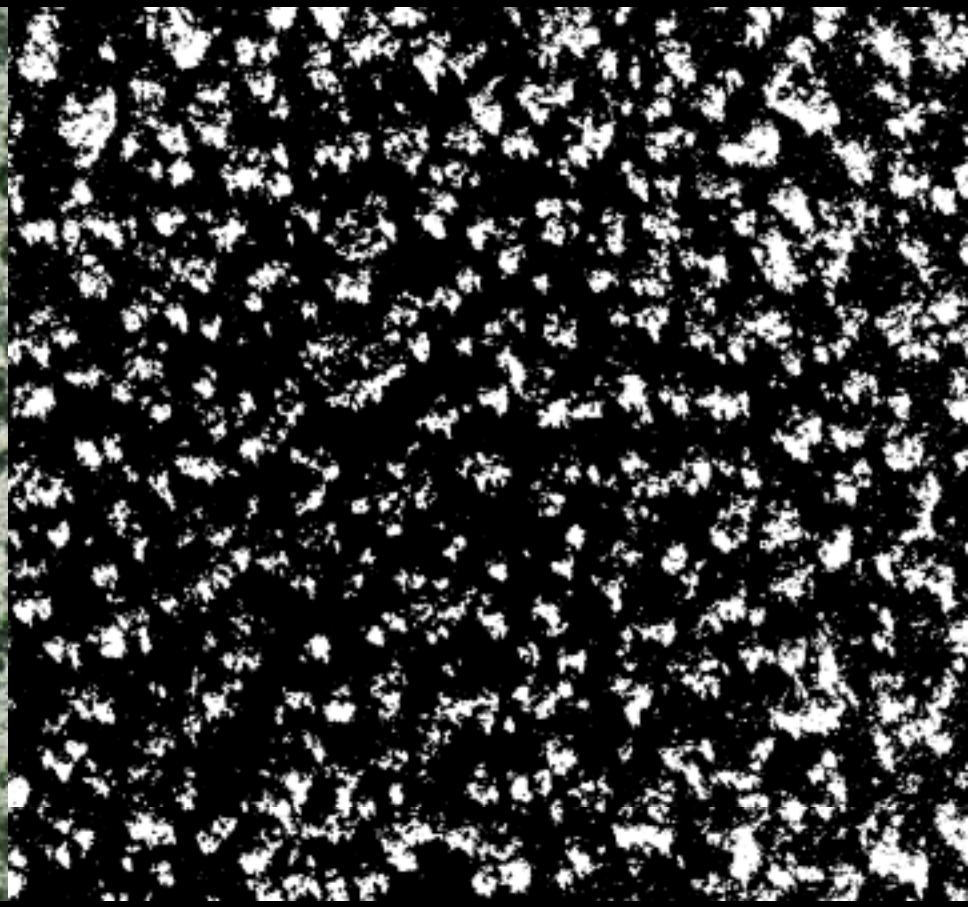
Olympus Digital Image



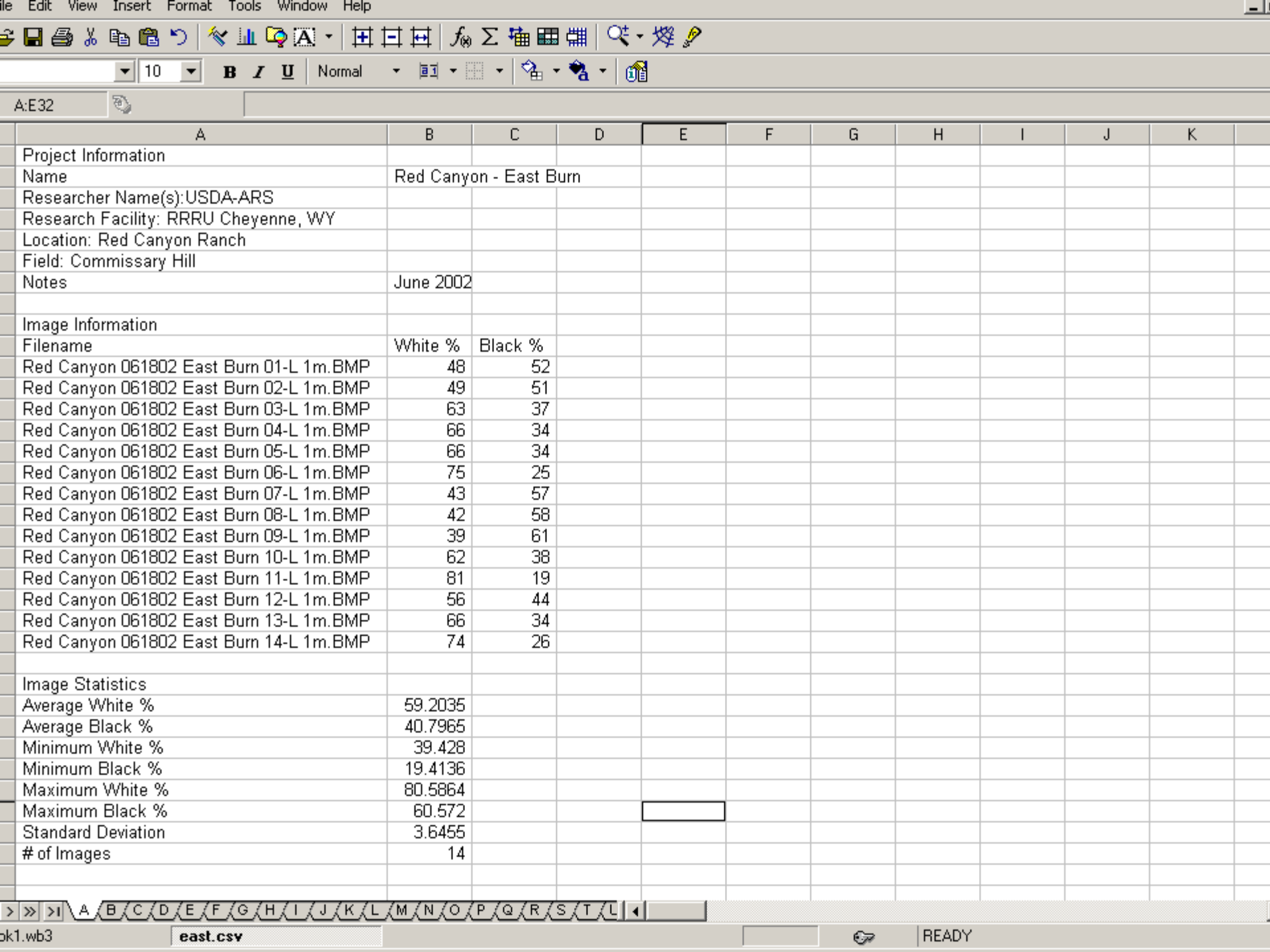
Processed Image



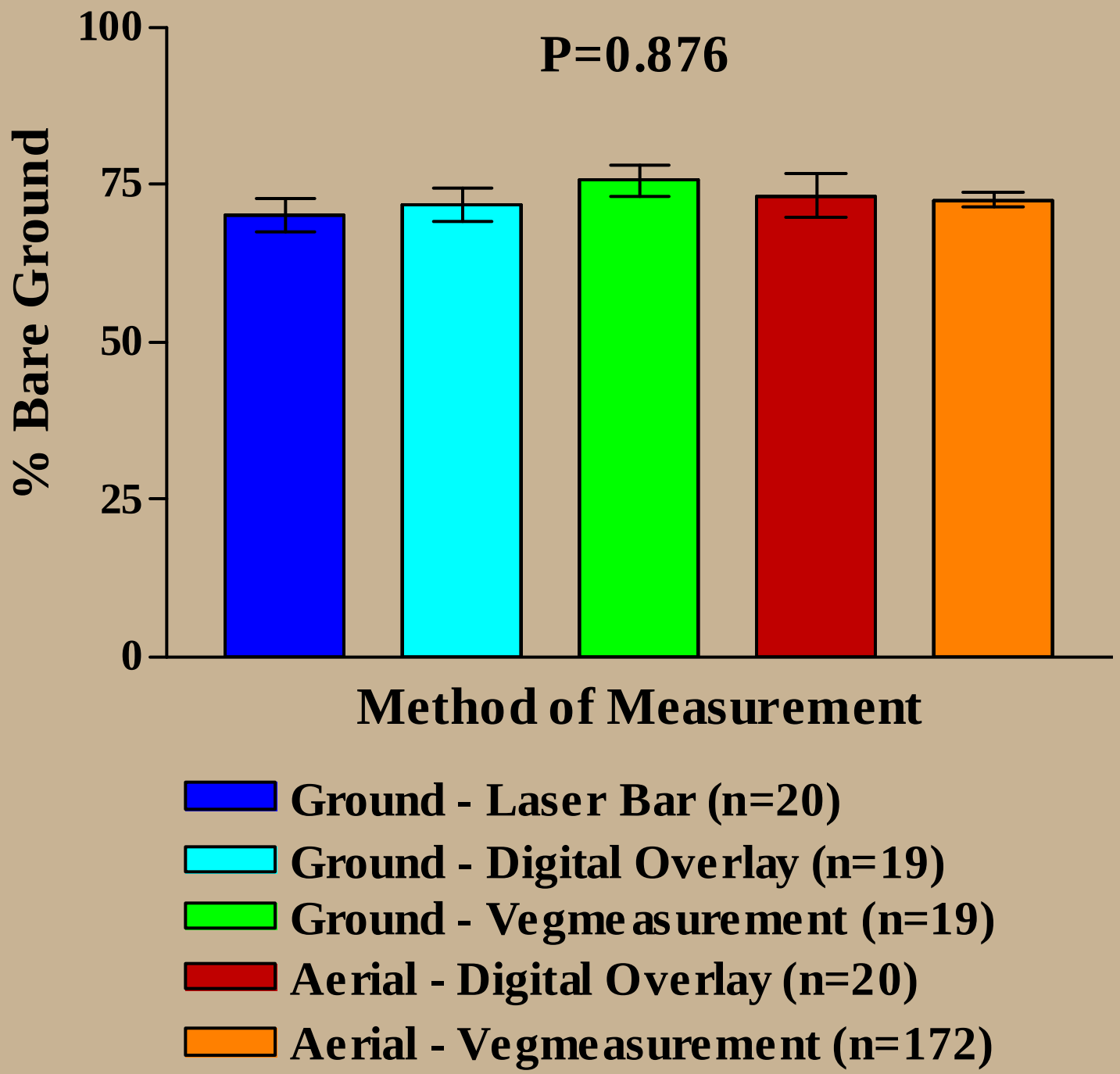
70 mm Image



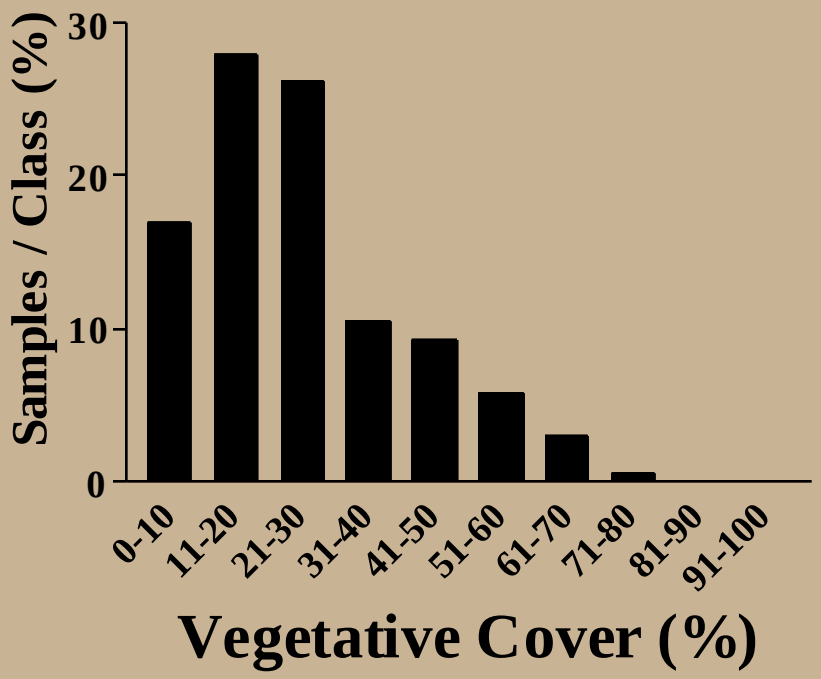
Processed Image

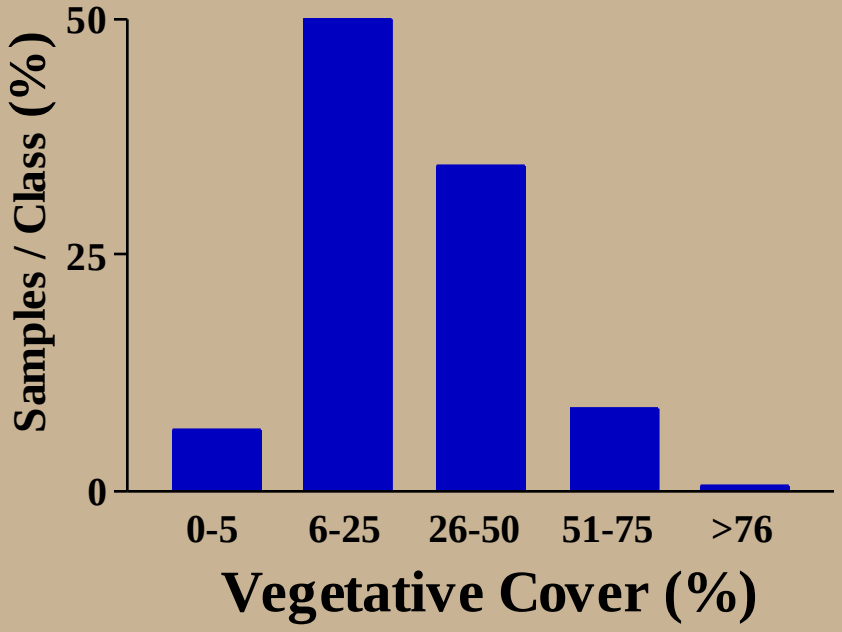


Project Information		
Name	Red Canyon - East Burn	
Researcher Name(s):USDA-ARS		
Research Facility: RRRU Cheyenne, WY		
Location: Red Canyon Ranch		
Field: Commissary Hill		
Notes	June 2002	
Image Information		
Filename	White %	Black %
Red Canyon 061802 East Burn 01-L 1m.BMP	48	52
Red Canyon 061802 East Burn 02-L 1m.BMP	49	51
Red Canyon 061802 East Burn 03-L 1m.BMP	63	37
Red Canyon 061802 East Burn 04-L 1m.BMP	66	34
Red Canyon 061802 East Burn 05-L 1m.BMP	66	34
Red Canyon 061802 East Burn 06-L 1m.BMP	75	25
Red Canyon 061802 East Burn 07-L 1m.BMP	43	57
Red Canyon 061802 East Burn 08-L 1m.BMP	42	58
Red Canyon 061802 East Burn 09-L 1m.BMP	39	61
Red Canyon 061802 East Burn 10-L 1m.BMP	62	38
Red Canyon 061802 East Burn 11-L 1m.BMP	81	19
Red Canyon 061802 East Burn 12-L 1m.BMP	56	44
Red Canyon 061802 East Burn 13-L 1m.BMP	66	34
Red Canyon 061802 East Burn 14-L 1m.BMP	74	26
Image Statistics		
Average White %	59.2035	
Average Black %	40.7965	
Minimum White %	39.428	
Minimum Black %	19.4136	
Maximum White %	80.5864	
Maximum Black %	60.572	
Standard Deviation	3.6455	
# of Images	14	


P=0.876
100
75
50
25
0
% Bare Ground
Method of Measurement
Ground - Laser Bar (n=20)
Ground - Digital Overlay (n=19)
Ground - Vegmeasurement (n=19)
Aerial - Digital Overlay (n=20)
Aerial - Vegmeasurement (n=172)

Entire Study Site



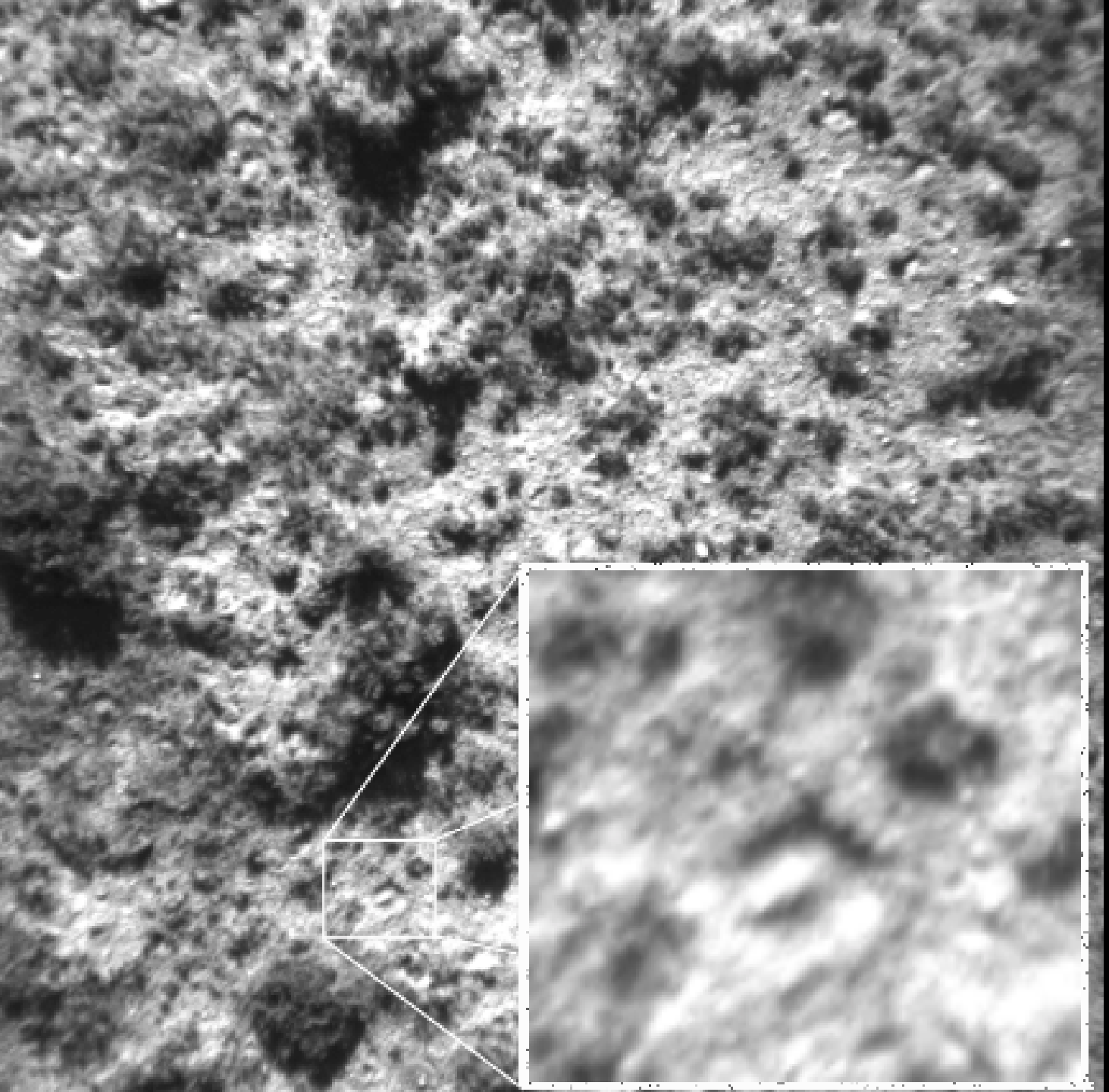


Pulnix TM-1020-15

1 inch Monchrome CCD
1.0 megapixel: 1008 x 1018
15 frames per second
Shortest shutter: 1/16,000 sec
50 mm Cosmicar lens
Cosmicar 2X Teleconverter

100 m AGL:

Scale: 1:360
Field of View: 9 x 9 m
Resolution: 1 pixel = 0.9 cm



Pulnix
Digital
Camera

100m
AGL

Canon EOS-1DS

1.4 x 1 inch Color (RGB) CMOS
11.1 megapixel: 4064 x 2704
3 frames per second
Shortest shutter: 1/4,000 sec
Auto aperture adjustment
Adapter available for current Mamiya 500 mm lens

100 m AGL:
Scale: 1:200
Field of View: 7 x 5 m
Resolution: 1 pixel = 0.17 cm