Topic Series 00

FO 4313/6313 Spatial Technologies

Draft Statement by the Remote Sensing and Photogrammetry Working Group [1]

Forest management is a complex discipline. However, fundamentally it involves the manipulation of the vegetative cover on the land under management so as to achieve the goals of the owners of that land. If this is to be done effectively and ef ficiently, the manager must have sound information regarding that vegetation, the sites on which it is growing, the topography of the land,, the drainage system, and the transportation net, Insofar as the vegetation is concerned, the manager must know what species complex are present, what condition it is in (tree sizes, stand density, vigor, etc), and where it is located, Probably the most efficient way to acquire this information is through the use of remotely sensed imagery, primarily the vertical aerial photograph, This is true on small as well as large tracts but as tract size increases the effectiveness of aerial photography increases.

In activities related to forest management per se, such as wood procurement, fire control, insect and disease detection, and damage appraisal, the aerial photograph is usually the prime source of site specific information. The monitoring of conditions over widely spread or large tracts of land is a problem of considerable magnitude, The advent of nonphotographic- remotely sensed imagery from satellites, coupled with computer analysis of that imagery and the use of computerbased geographic information systems, has made an almost continuous surveillance of such lands feasible, At least one industrial organization is using such a system in an operational mode. Others are interested and will probably follow that lead. The rate of establishment of such monitoring systems will undoubtedly increase as commercially-acquired imagery becomes available.

As can be seen, the use of remotely sensed imagery, especially vertical aerial photographs, is difficult to avoid if one works as a forester. However, inclusion of this material in the curricula of accredited schools or departments of forestry is very uneven (refer to a recent study by Meyer, Harding, and Ulliman), Many graduates of these schools have little or no background in remote sensing of any kind, others may have taken courses in remote sensing but, because of the nature of the courses offered, have little or no exposure to vertical aerial photographs and, even if they have had an opportunity to do some work with vertical photographs, they have not been taught about the limitations of such photographs, Such limitations include the distortions that prevent vertical photographs from being the equivalent of maps, the limitations caused by small scales on the resolution of detail, the limitations brought about by the use of inappropriate film-filer-season combinations, and even by inappropriate print making. The problem of insufficient technical background in remote sensing spills over into the area of geographic information systems and their use in modern forest management, Monitoring the land and its cover and updating the G.I.S. can only be done efficiently using remote sensing. Coverage of this material is sparse to non-existent in most forestry curricula,

The Remote Sensing and Photogrammetry Working Group is sufficiently concerned with this

---

[1] from A2-ASPRS Remote Sensing and Photogrammetry Working Group, August 1984,

situation that it hereby requests that the SAF give very serious consideration to an accreditation standard that would make inclusion of instruction in remote sensing mandatory. The subject matter should include material on the characteristics and use of the vertical aerial photograph up to but not including topographic mapping, and in the fundamentals of non-photographic remote sensing systems that have a place in forestry, The Working Group also is of the opinion that instruction in the development and use of geographical information systems will be essential for persons entering the field of forestry and rising to levels of responsibility at the District Ranger or equivalent level and, consequently, should be included in accredited forestry curricula. Fundamental to the material in remote sensing is an adequate background in mathematics, physics, and surveying. The Working Group urges the SAF to broaden its accreditation standards to include specific minimal levels in these areas. For remote sensing the minimal level in mathematics is a working knowledge of trigonometry and solid geometry, In the area of physics the student should have a working knowledge of electromagnetic radiation so that he/she can understand how the several imaging systems work. The need of foresters with a good background in surveying has long been recognized and it is difficult to understand how persons can be considered foresters if they lack knowledge of surveying procedures.

IMPORTANCE OF 29 REMOTE-SENSING SKILLS AS RATED BY ALL RESOURCE MANAGERS[1]

	Remote-Sensing Skill	(%) Important vs. Not Important	(%) Very Important
1.	Measure areas	90	82
2.	Make timber type maps	85	71
3.	Plan for road construction	84	52
4.	Measure distance on imagery	79	53
5.	Estimate forest density	79	32
6.	Update maps using aerial photography	76	45
7.	Determine the location of sample plots in the field (with aerial photographs)	75	50
8.	Map planimetric detail (e.g. drainages, ridgetops, etc.)	72	39
9.	Familiarlization with standard land cover classification systems	70	32
10.	Determine scale of imagery	69	38
11.	Carry out a photo stratification for ground cruising	64	36
12.	Do photo interpretation using stero-scopic analysis	64	36
13.	Make land use maps	61	29
14.	Plan for trail construction	59	29
15.	Plan for control of soil erosion	56	18
16.	Order photography from outside source	50	15
17.	Make soil maps	49	15
18.	Detect plant vigor	47	20
19.	Use aerial photo timber volume tables	41	20

	Remote-Sensing Skill	(%) Important vs. Not Important	(%) Very Important
20.	Determine heights of objects	40	12
21.	Conduct recreatinal surveys	35	12
22.	Compile contour maps	34	4
23.	Prepare controlled mosaics	32	4
24.	Inspect the quality of contract photography	31	17
25.	Use image enhancement equipment	29	14
26.	Prepare uncontrolled mosaics	28	2
27.	Plan flights for acquisition of photography	28	8
28.	Use computer classification algorithms for analysis of digital imagery	16	9
29.	Make densitometric measures of grey tones grey tones on film transparencies	9	4

[1]Mead, Roy A. and D., Ann Rasberry. 1978. Current use of remote sensing by foresters in the South. Southern Journal of Applied Forestry, pp. 143-147.

Student's Honor Code School of Forest Resources Mississippi State University

"I WILL NOT CHEAT OR TOLERATE ANYONE WHO DOES"

The purpose of this code of ethics statement is to promote and further the honor, integrity, and character of the students of the School of Forest Resources of Mississippi State University. The establishment and maintenance of high standards of conduct and behavior for the students is highly desirable, as it will lead to the development of mutual confidence and respect among fellow students and the faculty. Achievement of this relationship will enable faculty members to give their maximum service to the students.

This code cannot begin to cover all of the diverse circumstances and variables which may occur when attempting to apply the code to everyday situations. Instead it is proposed that the code be used as a guideline; a motivator by whose influence or "spirit" the student body willfully abides.

This code is the students' code and it is their responsibility to maintain it and encourage their colleagues to respect its purpose. The faculty will be charged with enforcement of University policy for offenders and creation of an atmosphere conducive to achieving the goals of the Code.

In order for the code to be effective each faculty member will make the Code available to his students and explain how it applies to problems unique to his class in regard to tests, reports, and homework.

Endorsed by:

Mississippi State University Student Chapter
Society of American Foresters
April 19, 1976

Alpha Theta Chapter
Xi Sigma Pi
April 27, 1976

Mississippi State University
Forestry Club
April 27, 1976

Name: ______________________________________

FO-4313/6313 Algebra and General Math Pre-Test

This pre-test covers material you should have learned in high school algebra and prerequisite forestry courses. You do not have to pass the pre-test to continue with FO 4313/6313, but if you do poorly, particularly in the algebra section, you will have to spend a little extra effort to overcome your deficiency.

1. Given the equation RF = PD/GD, choose the correct equation for GD:

A. GD = RF/PD

B. GD = RF + PD

C. GD = (RF)(PD)

D. GD = PD/RF

E. None of the above

2. Given the equation:PSR= (H-h)/f, choose the correct equation for f:.

A. f = PSR/(H-h)

B. f = PSR (H-h)

C. f = (H-h)/PSR

D. f = (H/PSR) - h

E. f = PSR(H) - h

3. Given the equation PSR = (H-h)/f, choose the correct equation for H:

A. H = f (PSR) - h

B. H = f (PSR + h)

C. H = f (PSR)/f

D. H = h(PSR)/f

E. H = f (PSR) + h

4. Given the equation PSR = (H-h)/f, choose the correct equation for h.

A. h = f(PSR) - h

B. h = f(PSR - h)

C. h = H - f(PSR)

D. h = f(PSR)/H

E. h =H(PSR)/f

5. Given the equation: dh = [(H-h) (dP)] / [P + (dP)], choose the best answer for H:

A. H = [(P + dP)/dp] + h

B. H = dh[(P + dP)/dP] + h

C. H = dh (P)

D. H = dh [P + dP] dP

E. H = dh [P + dP^2] dP

6. Given the equation: d/r = dh/(H-h), choose the best answer:

A. d = (H-h)/[r(dh)]

B. r = dh/[d(H) - d(h)]

C. dh = d(H + h)/r

D. h = H - [r(dh)/d]

E. None of the above

7. Given the equations PSR = GD/PD and PSR = (H-h)/f, choose the best answer for f:

A. f = (PD)(H-h)/GD

B. f = (H-h)/PSR

C. f = [H(PD) - h(PD)]/GD

D. Both A and B

E. All three (A, B & C)

8. Solve the equation: [10,000 - 2,000]/0.5, the answer is:

A. 24,000

B. 16,000

C. 8,000

D. 6,000

E. 4,000

9. Given: 5280 ft. = 1 mile, choose the best answer for: 225 miles per hour =

A. 19,800 ft. per second

B. 330 ft. per second

C. 0.0625 miles per second

D . Both answers B and C

E. None of the above

10. In one chain there are:

A. 10 feet

B. 33 feet

C. 66 feet

D. 99 feet

E. 100 feet

11. Choose the best answer for: 1 acre =

A. 5,280 square feet
B. 43,560 square feet
C. 10 square chains
D. Both answers B and C are correct
E. Both answers A and C are correct

12. Choose the one best answer:

A. 1 hectare = 2.471 acres
B. 1 acre = 2.471 hectares
C. 1 hectare = 10,000 square meters
D. Both A and C are correct
E. Both B and C are correct

13. Choose the one best answer:

A. 1 meter = 1000 mm
B. 1 meter = 39 inches
C. 1 cm = 2.54 inches
D. Both A and C are correct
E. Both B and C are correct

14. Choose the one best answer for: 24,000 inches =

A. 2,000 feet
B. 609.60 meters
C. 9,448.82 cm
D. Both A and B are correct
E. Both B and C are correct

15. Choose the one best answer for: There are (is):

A. 640 acres in a section
B. 36 square miles in a township
C. One square mile per section
D. All the above are correct
E. A and C only are correct

16. The west 1/2 of the northeast 1/4 of Sec. 12, T11S, R5W has:

A. 12.5 acres
B. 40 acres
C. 100 acres
D. 640 acres
E. None of the above

17. Choose the one best answer for: One inch is:

A. 25.4 millimeters

B. 254 millimeters

C. 2.54 centimeters

D. Both A and C

E All three (A, B, and C)

18. Choose the one best answer for: One meter is:

A. 10,000 millimeters

B. 1,000 millimeters

C. 100 centimeters

D. 39.37 inches

E. 3.28 feet

F. B, C, D & E are correct

19. Given a right triange with sides A and B and hypotenuse C, choose the correct statement:

A. Sin $\alpha = A/B$

B. $C^2 = A^2 + B^2$

C. Cos $\alpha = A/B$

D. tan $\alpha = A/B$

E. Both B and D are correct

F. Both C and D are correct

20. Given a camera focal length of 8.25 inches; the focal length can be expressed as:

A. 0.6875 feet

B. 20.955 cm

C. 209.55 mm

D. Both A and B are correct

E. Both B and C are correct

F. A, B, and C are correct