

17 October 1961

Dear Sir:

Enclosed is a draft of an outline of the manual,  
"Collection and Field Mensuration Techniques for Ground  
Photographs." The contents are undergoing additional  
refinement.

Your comments and suggestions will be very much  
appreciated.

STATINTL

Sincerely yours,



RMN/jb

Enclosures - 3 copies of outline

**Declass Review by NIMA/DOD**

COLLECTION  
AND  
FIELD MENSURATION TECHNIQUES  
FOR GROUND PHOTOGRAPHS

(Tentative Outline)

PART I -- COLLECTION OF GROUND PHOTOGRAPHS FOR METRICAL DATA

Chapter I. Introduction (Purpose, Scope, Approach and Organization  
of the Manual)

Chapter II. Purpose and Principles of Metrical Photography

A. Purpose of Metrical Photography

1. Why Such Photography is Needed
2. Kind of Metrical Data Needed (With Annotated Illustrations)

B. Principles -- Geometry and Methods of Approach (Basic Ideas)

C. Basic Requirements

Chapter III. How to Approach the Job

A. Mission Hazards — NO

B. The Camera as a Metrical Tool

C. Operator Preparation

1. Thinking Geometrically
2. Familiarity with Equipment, Requirement
3. Mission Planning
4. Practice

Chapter IV. Requirements and Variations

A. Need for Angular Orientation

B. Lens/Camera Selection

C. Control Needs

D. Types of Targets and Problem Areas.

- E. Photo-Data Correlation
- F. Photo System Comparison

Chapter V. Mission Planning

- A. Problem Analysis
- B. Photo Mission
- C. Mission Simulation
- D. Mission Critique

Chapter VI. Perspective Variations

- A. Cultural Information for Angular Orientation
  - 1. Single Photograph
  - 2. Panorama Photography
    - a. Horizontal Orientation
    - b. Oblique Orientation
    - c. Horizontal-Oblique Combinations
  - 3. Subject Evaluation -- Qualitative Analysis
    - a. Multiple Lens/Photo Cover
    - b. Area/Distance Considerations
- B. Topographic Problems

Chapter VII. Dimensional Control Techniques

- A. Object Dimensions
  - 1. Exterior
  - 2. Interior
  - 3. Small Objects
- B. Camera-Object Distances

C. Baselines

D. Map Information

Chapter VIII. Multiple Station Photography

A. Object Resection

1. Photographic Cover

a. Horizontal

b. Oblique

c. Combination

2. Control Data

3. Photo-Data Correlation

B. Control Extension

1. Photographic Cover

2. Control Techniques

3. Photo-Data Correlation

*out*

Chapter IX. Two Station Photography OR MORE

A. Stereo Orientations

1. Photographic Cover

a. Horizontal techniques

b. Oblique techniques

2. Control Techniques

3. Data Correlation

B. Panorama Methods —

*rot 360°*

1. Photographic Cover

a. Horizontal Method

b. Oblique Methods

- c. Horizontal-Oblique Combinations
- 2. Control Data
- 3. Data Correlation

Chapter X. Single Station Photography

A. Stereo-Camera Techniques

- 1. One Set Exposure Method
  - a. Techniques (Horizontal/Oblique)
  - b. Control
  - c. Data Correlation
- 2. Panorama Exposure Method —
  - a. Techniques (Horizontal/Oblique)
  - b. Control
  - c. Data Correlation

B. One Photo Techniques

- 1. Horizontal Exposures
- 2. Oblique Exposures
- 3. Control
- 4. Data Correlation

C. Multiple Exposure Techniques — Explain

- 1. Wide Angle Overlapping Narrow Angle Photo Methods
  - a. Techniques
  - b. Control
  - c. Data Correlation

- 2. Panorama Exposures — *play down or remove*
    - a. Horizontal Methods
      - (1) Techniques
      - (2) Control
      - (3) Data Correlation
    - b. Oblique Methods
      - (1) Techniques
      - (2) Control
      - (3) Data Correlation
    - c. Horizontal-Oblique Combination Methods
      - (1) Techniques
      - (2) Control
      - (3) Data Correlation
- O.K.*
- Clarify*

Chapter XI. Problems in Movement

- out*
- A. Single Stationary Camera Stations (Moving Object)
    - 1. Image "Streak" Method
    - 2. Time Interval Method
  - B. Multiple Stationary Camera Stations (Moving Object)
    - 1. Image "Streak" Correlations
    - 2. Time Interval Methods
  - C. Moving Camera Station
    - 1. Fixed Object Methods
      - a. Techniques
      - b. Control Methods
      - c. Data Correlation

2. Moving Object Methods
  - a. Object Dimensional Data
    - (1) Techniques
    - (2) Controls
    - (3) Data Correlation
  - b. Object Velocity
    - (1) Techniques
    - (2) Controls
    - (3) Data Correlation



PART II -- FIELD DETERMINATIONS OF METRICAL DATA FROM GROUND

PHOTOGRAPHS

*Cut down number of methods*

Chapter I. Introduction

Purpose, Scope, Approach, and Manual Organization

Chapter II. Planning Photographic Data Reduction (Basically a Description  
of How to Use Part II of the Manual)

- A. Listing Required Product Data
- B. Photographic Layout
- C. Analysis for Angular Orientation
- D. Analysis for Dimensional Determinations
  - 1. Single Photo Methods
  - 2. Stereo Methods
  - 3. Panorama Methods
  - 4. Two Station Methods
  - 5. Multiple Station Techniques
- E. Object Dimension Determinations
- F. Object Angle Determinations
- G. Velocity Determinations

Chapter III. Angular Orientation

- A. Principal Point Determinations
- B. Cultural Perspective Techniques
  - 1. Horizontal Photo Techniques

- a. Horizon Location
    - (1) Two Vanishing Point Method --  
Horizontal Lines
    - (2) Inaccessible Vanishing Point Method --  
Horizontal Lines
    - (3) Diagonal Line Method -- Vertical Plane
    - (4) Sloping Line Method
    - (5) Shadow Methods
    - (6) Reflection Methods
  - b. Principal Line -- Isocenter Location (Circle Method)
  - c. Image Distance Determinations
    - (1) Circle Method
    - (2) Plane View Method
  - d. Tilt Determination
  - e. Limits of Horizontal Orientations
2. Oblique Photo Techniques
- a. Horizon Location Methods
  - b. Nadir-Zenith Techniques
  - c. Tilt Developments
3. Panorama Photo Methods - *Play down as remote*
- a. Wide Angle Overlapping Narrow Angle Cover
  - b. Single Station Overlapping Photography

- c. Two Station Overlapping Photography
  - (1) Stereo Orientation
  - (2) Non-Stereo Orientation
- d. Multiple Station Overlapping Photography
- C. Imaged Horizon Techniques
- D. Topographic Techniques
  - 1. Assumed Horizontal Photography
  - 2. Photo-Map Methods
    - a. Triangle Comparison Method
    - b. Circle-Ellipse Method
    - c. Coordinate Comparison Method

Chapter IV. One Camera Station Dimensional Methods

- A. Single Horizontal Photo Orientations
  - 1. Rectification and Scale with Control Data (Cultural Perspective Methods)
  - 2. Unknown Dimension Determinations
  - 3. Angle Determinations
- B. Single Oblique Photo Orientation
  - 1. Rectification and Scale with Control Data
  - 2. Unknown Dimension Determinations
  - 3. Angle Determinations
- C. Panorama Orientations
  - 1. Horizontal Photo Techniques
    - a. Control Extension Methods
    - b. Unknown Dimension and Angle Determinations

2. Oblique Photo Techniques
    - a. Control Extension Methods
    - b. Unknown Dimension and Angle Determinations
  3. Horizontal-Oblique Photo Combinations
    - a. Control Extension Method
    - b. Unknown Dimension and Angle Determinations
- D. Stereo-Camera Techniques
1. One-Set Exposures
  2. Panorama Exposures

Chapter V. Two Camera Station Methods

- A. Perspective Construction Techniques
1. Map Control
  2. Camera-Base Control
  3. Object Dimension/Distance Control
- B. Stereo Techniques
1. Scale - "Parallax" Method
  2. Dimension Comparison Method

Chapter VI. Multiple Camera Station Methods

- A. Object Resection Techniques
1. Perspective Construction Techniques
  2. Comparison Method
- B. Control Extension Techniques
1. Map Control
  2. Camera-Base Control

3. Object-Dimension/Distance Control
4. Traverse Procedure

Chapter VII. Problems in Movement

A. Single Camera Station Methods

1. Single Photo Image "Streak" Technique (Velocity of Moving Object)
2. Time Interval Method

B. Multiple Camera Station Methods

1. Moving Camera Station
  - a. Map Control and Orientation
  - b. Object-Dimension Control and Orientation
  - c. Fixed Object Determinations
  - d. Moving Object Velocity Determination
2. Stationary Camera Stations
  - a. Time Interval Methods
  - b. Image Streak Correlations

Appendix A -- Graphical Construction Techniques

Appendix B -- Measurement Techniques with a Scale

**BIBLIOGRAPHY**