

# 特別講演

## 土地利用을 爲한 遠隔探査

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本講演資料는 第8次 韓日 科學技術長官의 實務者 會議의 合議事項에 따라 日本人 Remote Sensing 專門家 Dr. Shun Ji Muai 來韓을 계기로 本學會 教育分科委員長 白毅基博士의 周旋으로 이루어진 講演會 要旨는 아래와 같이 紹介한 것이다.

### DIGITAL PROCESSING FOR LANDSAT MSS CCT DATA

#### I. LANDSAT MISSIONS

LANDSAT-1 Launched on 23 July, 1972  
(ERTS) Terminated on 6 January, 1978  
LANDSAT-2 Launched on 22 January, 1975  
LANDSAT-3 Launched on 5 March, 1978  
LANDSAT-D Will be Launched in 1981  
Orbit : Sun-Synchronous  
Altitude : 900 Kilometers  
Inclination : 99.1°  
Repetition : 14 Orbits per day  
          same scene per 18 days  
          251 orbits in total  
Sensors : MSS: Multispectral Scanner  
          RBV: Return Beam Vidicon  
          DCS: Data Collection System

#### II. LANDSAT MSS

##### BAND LANDSAT 1, 2, 3

1 MSS 4 0.5 $\mu$ m~0.6 $\mu$ m Green 7 BITS (128)  
2 MSS 5 0.6 $\mu$ m~0.7 $\mu$ m Red 7 BITS (128)  
3 MSS 6 0.7 $\mu$ m~0.8 $\mu$ m Near IR 7 BITS (128)  
4 MSS 7 0.8 $\mu$ m~1.1 $\mu$ m IR 6 BITS (64)

##### LANDSAT 3

5 MSS 8 10.4 $\mu$ m~12.6 $\mu$ m Thermal

##### Products

Film 70 Millimeters (System Corrected)  
CCT (Computer Compatible Tape)  
9 Truck, 800 BPI (or 1600 BPI)  
HDDT (High Density Digital Tape)

##### Maximum Gain

MSS 4 High 2.48mW/CM<sup>2</sup> · SR



Low 0.83mW/CM<sup>2</sup> · SR  
MSS 5 High 2.00mW/CM<sup>2</sup> · SR  
Low 0.67mW/CM<sup>2</sup> · SR  
MSS 6 1.76mW/CM<sup>2</sup> · SR  
MSS 7 4.60mW/CM<sup>2</sup> · SR

##### Scene

100 Nautical Miles (185 Km) Cross  
96,4 Nautical Miles (177 Km) Along

##### IFOV

0,0623 Mili Radian (57 Meters) Cross  
0,0852 Mili Radian (79 Meters) Along

#### III. LANDSAT MSS CCT

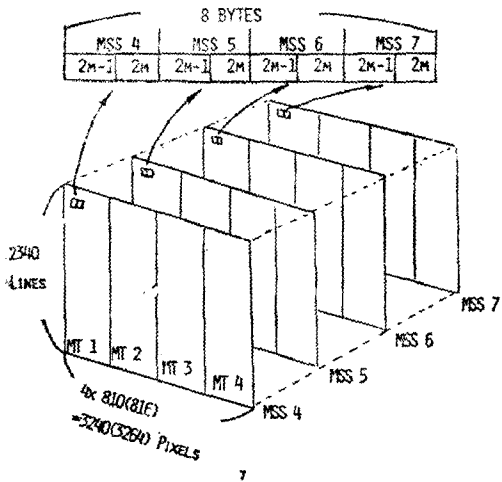
##### DATA

Spectral Image Data (Four Bands, 1 Byte)  
Calibration Data (6 Detectors×4 Bands)  
Sita Data (Altitude, Attitude)

##### FILE

Annotation File  
Four Files of Image Data and Calib. Data  
SIAT Data File

**IMAGE DATA**



**IV. GEOMETRIC DISTORTIONS**

- Scale(Pixel VS Line)=57 : 79=1 : 1,386)
- Skew due to Earth Rotation (0.0564 rad=3.23°)
- Altitude Variation (Scale Effect)
- Attitude Variation
  - Roll: cross truck error
  - Pitch: along truck error
  - Yaw: rotation error
- Scan Mirror Velocity: system error
  - Interval of Pixels varies due to not uniform velocity
- Tangent: transformed from cylindrical onto plane

**V. GEOMETRIC CORRECTION**

- Accuracy of Positioning**
  - System Correction Along 1000 meters
  - Ground Control Points Within One Pixel
- Procedures**
  - Rough Correction for Quick Look
    - H/V Scale and Skew
    - Line Printer or Dot Printer
    - Bands of Six Scan Lines Offset
    - One Half Pixel Column From Each
    - Other
  - Black Box Type Transform Using G.C.P.
    - Polinomials Transform
    - More Than Third Order Polinomials

To Acquire Accuracy within One Pixel  
More than Well Distributed Ten Ground Control Points

$$\begin{cases} U=F(x,y) \\ V=G(x,y) \end{cases} \quad \text{or} \quad \begin{cases} x=F(u,v) \\ y=G(u,v) \end{cases}$$

Parameters Are Determined by Least Square Method

System Correction and Transform Using G.C.P  
Tangent Correction Projected onto Plane  
Altitude, Attitude, Scan Mirror, Skew ETC  
Bi-linear Transform with use of not more than Ten G.C.P. After System Correction to Acquire Accuracy within One Pixel

**Scene Corrected**

- Regularly Spaced Distance
- Regularly Spaced Angles of Latitude and Longitude

**VI. RADIOMETRIC PROCESSING**

**Enhancement**

- Color Composite MSS4-B, MSS5-G, MSS7-R Simulated Infra-Red(Vegetation =Red)
- MSS4-G, MSS5-R, MSS7-B
- Enhanced Water Pollution in Yellow

**Ratioing**

- MSS4/MSS6
- MSS5/MSS7
- (MSS5-MSS7)/(MSS5+MSS7)

**Convolution**

- 3x3, 4x4, 5x5

**Principal Component (Linear Combination)**

**Classification**

- Maximum Likelihood Method with Ground Truth Data
- Decision Tree with Ground Truth Data
- Clustering without Ground Truth Data

**Results**

- Thematic Map without Geometric Correction
- Geometrically Corrected Thematic Map
- Tabulation of Area or Volume with Respect to Specified District or Political Boundary
- Change Detection for Dynamic Objects