

# The Remote Sensing Facilities at Cheju National University: Rationale and Development

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Our world from the air is a kaleidoscopic jumble of natural and man-made features... This veneer, spread by a divine designer over the earth and inlaid with an infinite variety of shapes, materials and colors, reflects the finest oscillations of man's aspirations and achievements, of his failures and frustrations, and of his understanding but also of his ruthless disregard for nature.<sup>1)</sup>

—E. A. Gutkind

## I. Introduction

Pacific Island Studies will become an important new research field in the 1990's.<sup>2)</sup> This is an inevitable response to the rapid emergence of the Pacific rim and basin region as an economic

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1) Gutkind, E.A. "Our World From the Air: Conflict and Adaptation", in William L. Thomas, Jr. (editor) *Man's Role in Changing the Face of the Earth*, Volume 1, pp. 1-44. Chicago : The University of Chicago Press, 1956.

2) The enhancement of university-level regional studies concerning Pacific questions was the topic of a recent interview with a leading California university administrator. See "Cross-Ocean Tieup Among Higher Learning Institutions Necessary, *Korea Times*, March 12, 1985, p. 5.

colossus. During the past century of rapid space/time convergence, the geopolitical pivot of history first shifted dramatically from the Eurasian heartland to the "Midland Ocean" of the North Atlantic, and has since leaped to the vast Amerasian Pacific lake and its shores of vigorous industrial and financial activities. Indeed, the present age is now called the "Pacific Era" by many foreign policy experts and journalists. Korea and Cheju Island are well-positioned to advantage many aspects of future growth trends in the region.<sup>3)</sup>

Within the entire Pacific Ocean arena of roughly 25,000 islands, of various sovereign nations, and of tremendous natural and human resources, the Asian Pacific, and particularly the north-western Pacific area centering geographically on Korea, is now experiencing a most dynamic growth. It is therefore quite appropriate 1) that there be an interdisciplinary Island Studies curriculum developed in the northwest Asian Pacific region, and 2) that this new intellectual nexus be institutionalized and located deep within the growth vortex of the region, perhaps founded on Korea's centrally-positioned Cheju Island, at Cheju National University.

Cheju National University (CNU) is Korea's only island university, and, with its new scientific and study facilities, classrooms, and potential for research, is a most obvious candidate as an academic center for a Pacific Island Studies Center. Since Cheju Island is also an international tourist destination with the most modern transportation and communication facilities, research scholars and students from major surrounding nations—China, Japan and Taiwan—will find their commuting convenient, and their destination pleasant and inspiring. Symbolically, Cheju Island represents the dual spirits of the Pacific rim and basin in transition, striking an appropriate balance between the Asian Pacific region's sense of mystical neo-Confucianism and its aspirations for pragmatic Western-style modernization and development.

This technical report strongly advocates CNU's potential as a northwestern Pacific Island Studies Center by introducing the centripetal attraction of the Joseph E. Spencer Aerial Photograph Collection and Remote Sensing Laboratory at the CNU Central Library as an existing and rich primary resource . ready to serve the scholars and students of the surrounding region, and will: 1) review some of the various and important uses of aerial photography and remote sensing ; 2) describe the importance of the Spencer Collection as a medium with which to teach a synoptic view of the northwestern Pacific Island region ; 3) relate the scope and history of the Spencer Collection ; 4) illustrate procedures by which the Collection has been organized and outline how it can be easily accessed and utilized, and ; 5) introduce some interesting career opportunities which are becoming increasingly available to those college students who are interested in the techniques and applications of air photo interpretation and remote sensing.

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3) At present, Japan has taken the initiative in organizing a new economic order in the eastern Pacific. Korea and the United States have major stakes in the future of Pacific economic development. United States Trade Representative William E. Brock recently informed the American Stock Exchange that U.S. trade was shifting dramatically from Europe to the Pacific. In view of this trend, President Ronald Reagan has said "Today the nations of the Pacific Rim—the vast stretch of nation-states rimming the eastern and western boundaries of the great ocean—comprise one of the most dynamic regions of the globe", and, University of California President David P. Gardner has termed the phenomenon "our Pacific Century" (*U. C. Clip Sheet*, Volume 13, January 8, 1985)

U. S. Secretary of State George Shultz observes "We may well be at the threshold of a new era in international relations in the Pacific Basin" (*Korea Herald*, October 21, 1984, p. 1.).

## II. Regional Cooperation and Remote Sensing

The Republic of Korea is at the forefront of those many Pacific nations presently seeking mechanisms for regional cooperation. Why is regional cooperation important? Most Pacific nations, despite their diverse cultures and histories, and despite mutual animosities of the past, are anxious to become members, if not leaders, of a single great economic community. As cultural and intellectual exchanges proceed from economic partnerships, Pacific community nations will hereafter be experiencing their increasing needs to learn more about one another, and about the holistic nature of the Pacific rim and basin region.

Such holistic thinking, however traditional in the intellectual history of the Far East, is alien to the geographically expansive arena of international politics. Therefore, modern leaders in the Pacific region must gradually overcome their isolationist and anti-foreign tendencies in order to transcend short-term nationalistic considerations and achieve a traditionally appropriate metaphysical attitude about the collective destiny of the entire Pacific rim and basin community during this unprecedented era of modernization. Whether south Koreans are to eventually become masters of humane technological progress in the vast Pacific region depends much on the quality of their present and future intellectual attitudes toward themselves in relation to their various sovereign neighbors.<sup>4)</sup>

Proper management and use of Pacific rim and basin aerial photography and other forms of remotely-sensed imagery of the Pacific island world is an excellent way to provide the comprehensive view that is necessary to enhance regional understanding in the 1990's.

Although the airplane first gave the synoptic, or comprehensive, view of the earth surface on a regional scale, the present era of earth-orbiting satellites has enlarged the concept of a region to global proportions. Moreover, there is now a vast array of earth surface imagery in addition to aerial photographs that can help combine with high altitude flight and mass media to convey a synoptic view of the earth and its contents to the general public. With the global perspective comes the hope of world peace.

In the meantime, aerial photography and other forms of remote sensing are providing for a wide range of special scholarly, scientific and—regretably, but of necessity, —military uses. Let us now briefly consider the scope of the study called remote sensing, and the place of aerial photography within that subject field.

## III. Aerial Photography: Some General Considerations

Aerial photographs are a special kind of image of the earth surface taken from high above the ground, usually from a position where high altitude aircraft and their cameras are remote from

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4) Korea officially exhibits ambivalence regarding the Pacific area cooperation issue. Ahn Seung-chul, President of the Korea Development Institute, expresses a parochial attitude in this recent press release: "The thorniest issue, perhaps, is the membership of a Pacific cooperation group. In geographical terms, the Pacific Basin is such a vast area that it would not be meaningful or feasible to admit all the Pacific Basin countries to a regional institution" (*Korea Times*, January 1, 1985, p. 17).

their subject matter at the earth surface. A camera appended to an aircraft or satellite is actually a remote sensing instrument that produces imagery--the visible representations of energy received by the camera and stored on film pending their processing into prints, which then are analyzed.

Black and white (panchromatic) aerial photography was the first remote sensing technique to produce imagery of the earth surface. However, the black and white photographic image, which uses the energy reflected by visible light falling on the earth surface, captures only that very narrow range of the electromagnetic spectrum which our eyes can see. This is called visible radiant energy, and it was the first part of the spectrum to be used during the rapid development of many remote sensing techniques.

In addition to visible light, other forms of electromagnetic energy can now be remotely sensed and their imagery analyzed: These include heat and radio waves.<sup>5)</sup> Thus, aerial photography is only one of several remote sensing systems that have been developed during the 20th century. Although the ability to comprehend the basic features of electromagnetic radiation are prerequisite to the general discussion of imagery analysis, this present article restricts its discussion to those non-technical aspects of aerial photography relevant to introducing the development and uses of the imagery collection and analysis program at Cheju National University.

#### **IV. The Joseph E. Spencer Aerial Photograph Collection and Remote Sensing Laboratory at Cheju National University Central Library.**

In the early 1960's the eminent geographer Professor Joseph E. Spencer acquired many Pacific island aerial photographs from the Office of Naval Research for his Department of Geography at the University of California, Los Angeles (UCLA). The photographs pertained mainly to Western Pacific islands and also included several parts of the mainland, including parts of the Korean peninsula. In 1983 the UCLA Department of Geography offered the Navy photograph collection to two universities located in and near the areas photographed: Cheju National University, and the University of Hawaii at Manoa. These two island universities each received a portion of the UCLA U.S. Navy photograph collection.

President Hyun Pyung-hyo of Cheju National University has provided his university's official support to acquire, maintain and develop the air photographs and imagery-related research at CNU. The CNU Central Library staff has accordingly initiated a special program for the careful maintenance and proper use of the U.S. Navy collection, which has been renamed "The Joseph E. Spencer Aerial Photograph Collection." This Collection will be housed beginning August, 1985, in a separate Remote Sensing Laboratory facility in the newly constructed Central Library.

The Spencer Collection now centers on tens of thousands of declassified United States Navy high and low altitude photographs taken between 1942 and 1949. In general, islands of real or potential interest to military strategists involved in the Pacific theater of World War II were totally or partially photographed. The coasts and beaches of Pacific island battlefields were

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5) Sabins, Floyd D. Jr., *Remote Sensing: Principles and Interpretation*. San Francisco: W.H. Freeman and Company, 1978.

captured for eternity in these striking and informative aerial photos. Plot maps and related briefing materials are also included in the Spencer Collection. In addition, maps, atlases and gazetteers are being gathered to support the Collection; many of these items are being donated to CNU by the University of Hawaii, which is closely cooperating with CNU in the organization of its aerial photograph collection and remote sensing laboratory. UCLA is also maintaining its interest in the development of the Spencer Collection at CNU.

The face of the land in the Western Pacific has changed dramatically in some places, while in other places there has been little visible change during the past 40 years.<sup>6</sup> It is mainly due to the historical nature of these photographs that the potential uses of the Spencer Collection at CNU appear limitless. The Collection is a unique primary resource for Pacific Island Studies. Geographers, engineers, agricultural and forestry experts, coastal geomorphologists, anthropologists and archeologists, environmental and urban planners, sociologists, historians, plant and animal ecologists, meteorologists, oceanographers, hydrologists, and others, should benefit from consulting the Spencer Collection.<sup>7</sup>

Air photo analysts may focus on a variety of surface features according to their interests. Generally speaking, coastlines and beaches are the major features consistently photographed for all islands in the Spencer Collection; harbors, ports and port facilities are ubiquitous features. Inland, human constructions like airfields, bridges, roads, railways and dikes were frequently photographed. Coastal cities occasionally appear in the photographs, and port towns more so, as well as numerous rural villages. However, uninhabited areas dominate many of the areas photographed: Reefs, rocks, sands and soils, bays and other bodies of water, seemingly endless coastlines, jungles, grasslands and croplands are all well represented. Many photographs were taken under hazardous wartime conditions and during air attacks, and the devastation of aerial attack is captured on many photographs in the Spencer Collection. This should be of great interest to the military historian.

Comparative systematic studies of Far Western Pacific islands are especially encouraged by the contents of the Collection, which covers a wide range of latitude between Hokkaido, Japan, in the north, to the Coral Sea in the south, and from the Vietnamese and Chinese coasts in the west, to the New Hebrides group in the east. In general, the real strength of the Spencer Collection holdings is in the area most proximate to Cheju Island itself; that is, in the long island arc between Taiwan and Hokaido, and from Inchon, Korea, eastward to the Bonin Islands. Main Japanese islands, especially Kyushu, are very well represented in the Collection.

The Spencer Collection is still being catalogued, and will grow larger with each passing year as more aerial photographs and sophisticated satellite imagery become added to the files. Meanwhile, the CNU Central Library is doing everything possible within the limits of its resources to aid and assist potential users of the Spencer Collection. The library Director, Boo Jang Cheol and section Chiefs Kim Keon-il, Yang Sang-Suk and Kim Sung-Hwan welcome the attention and the enquiries of foreign scholars and scientists.

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6) Two classic introductions to the Pacific basin region are: Otis W. Freeman (editor), *Geography of the Pacific*. New York: J. Wiley, 1951; Andrew P. Vayda (editor), *Peoples and Cultures of the Pacific*, New York: The Natural History Press, 1968.

7) For a more detailed explanation of the value of aerial photography to scholars and scientists, see J. K. S. St. Joseph, *The Uses of Aerial Photography: Nature and Man in a New Perspective*. London: John Baker Publishers, Ltd., 1966.

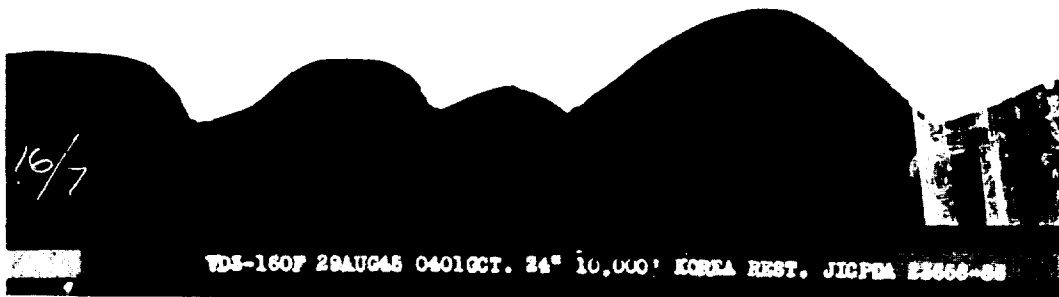
### 1. Introduction and Guide to the Organization and Use of the Spencer Collection

At present, the following classification system is used to divide the Spencer Collection into major geographical regions for reference purposes:

Group Number (Index no.)	Major Geographical Area
1	Korea
2	Japan, major islands
3	Japan, Ryukyus and Okinawa
4	Taiwan
5	Philippines
6	Melanesia (A) and Netherlands Indies (B)
7	Miscellaneous and Unidentified

It is recommended that potential users of the Spencer Collection consult the file cards before handling the photographs: this reduces unnecessary wear and tear of the envelopes protecting them. The file card contents were prepared mainly from information given on the photographs, and also come from pertinent sources selected by the curator. The index card used by the Spencer Collection is very similar to that used by the University of Hawaii for its U.S. Navy photos.

It is often easy to orient oneself to the site and situation of a place photographed by reading the information printed onto the photograph when the film was developed for analysis by the U.S. Navy. Almost every photograph has a titling strip across its bottom margin. The titling strip contains much useful information relevant to the photographic occurrence. For example:



This is a reproduction of the titling strip for Figure 2. As indicated, important information about the photograph was transferred from the titling strip to the Spencer Collection index cards during cataloging. For example:

Index No	.....	Mission/proj.	.....	VD3-160F
Locatin	.....	KOREA	.....	
Coordinates	.....		.....	
Date	29 AUG 45	Time	.....	0401
F. L.	24"	Altitude	.....	10,000'
Angles	.....	Print nos	.....	Total exp

Let us examine the index card contents in detail. Please refer to Figures 1-6 as examples, as noted below. Each card provides space for the following information: Index No.; Mission/proj.; Location; Coordinates; Date; F. L.; Altitude; Angles; Print nos.; Total exp.

**Index no (목록번호).** The geographical area grouping. This number is provided by the curator of the Collection based on information provided on the titling strips. Photographs with incomplete or missing titling strips are often assigned their Index no. based on an educated guess, or, they are grouped as Index no. 7 (Miscellaneous and Unidentified). Note: Figure 2 is a photograph of the dockside at Pusan harbor, which is located in geographical reference area Index no. 2 (Korea)

**Mission/proj (임무 : 사업).** A set of aerial photographs taken during one flight is called a "mission," "project," or "sortie," and identified in each titling strip by code name and number. Note: Figure 3 indicates that the photographic mission over Amami O Shima was Mission/proj. CV15-19.

**Location (위치).** The name of the location photographed is sometimes included on the titling strip. An atlas, map or gazetteer is useful to identify some of the more obscure named locations in the Collection. Note: Figure 2 identifies the place photographed as "Korea."

**Coordinates (경위도).** "Coordinates" are provided on some titling strips to indicate the exact position of a particular place on the earth surface by its latitude and longitude. Latitude is measured in degrees (°) and minutes (') either north or south of the equator (0°0'). Longitude is measured in the same units either east or west of the prime meridian (0°0'). Note: Figure 4 has the coordinates of the area photographed entered on the index card: 31°20' N 130°41' E (as determined from the plot map).

Date (날짜). The day, month and year of the photographic occurrence appears on many titling strips. In some cases the day and month were mistakenly transposed by U.S. Navy personnel, creating some uncertainties. Note: Figure 6 indicates that Espirito Santo Island was photographed on 10 June 43; (June 10, 1943).

Time (시간). The exact time the photographing portion of the mission commenced may also appear on the titling strip. The 24-hour clock is used. Note: Figure 6 also indicates the time that Espiritu Santo Island was photographed: 0857.

Focal length (F.L.). (촬영거리). The camera focal length appears on most titling strips because this information is necessary to establish scale, which aids in identifying various features on the earth surface. Scale is focal length divided by the height of the camera above the ground surface (*which is not the same as altitude above sea level*). Focal length appears on the titling strips either as millimeters or as inches. To convert: 152.4mm. is 6". Note: Figure 1 indicates that the camera focal length on this mission over Kyushu was 24".

Altitude (고도). The height of the camera above sea level appears on most titling strips along with focal length in order to facilitate the calculation of scale. Note: Figure 1 also indicates the altitude at which the photograph was taken: 10,000'.

Angles (각도). Indications may appear on the titling strip as to whether the photographs are Verticals (V), Right Obliques (OR), or Left Obliques(OL). Note: Figure 4 indicates a vertical photograph of the Kagoshima landscape, while Figure 3 shows Amami O Shima as photographed from an oblique angle.

Print nos. (사진번호). Each photograph is uniquely numbered, usually near the beginning of the titling strip, and this number is part of a sequence of photographs taken during a "run" or "pass" over the target landscape. A mission may include several runs. Occasionally there are missing photographs in a numbered sequence, or, entire runs may be missing from the Spencer Collection. A new sequence of print nos. is usually given for each angle photographed. Note: Figure 1 is a vertical photograph that was one of a total of nine sequentially numbered photographs.

Total exp. (총사진숫자). The actual or estimated number of photographs for this mission/proj. has been provided by the curator during cataloging. Note: Figure 1 is one of nine photographs of Kyushu taken during the CV9 3933 mission that the Spencer Collection owns.

There are several other items of information on the index cards provided by the curator during cataloging:

Plot map(s) (지도). Plot maps may accompany aerial photographs. These graphically indicate the exact progress of the photo "runs" during the mission. The existence of such maps are indicated on the lower left-hand corner of the index card. Note: Figure 4 indicates that there are plot maps accompanying this photograph.



Print size (사진크기). Most of the U.S. Navy air photographs in the Spencer Collection are prints measuring 9"×9" (23cm×23cm). There are also many excellent 9"×18" (23cm×46cm) prints, and a very few 4"×5" (10cm×12.5cm) photographs.

REST JICPOA (기밀의 번호). "REST" on the titling strip indicates "RESTRicted" for war-time security reasons. All Spencer Collection photographs have since been declassified. The JICPOA number is a useful way to determine the exact sequence of photographic missions in lieu of other means. JICPOA numbers accrued during the course of the war in a chronological sequence. This number usually can be found printed last on the titling strip, and is entered on the back of most cards.

To summarize. Locating the places photographed by the U.S. Navy in the Western Pacific is generally made easy by consulting useful information entered on the titling strips of the prints. However, not every photograph contains adequate information to ensure place identification. Fortunately, many prints are accompanied by pilot maps and other supporting materials, including ground-level historical photographs culled by the Navy from missionary and travel records. The curator has noted the nature of some of this supporting data, as well as indicated some of the potential uses of certain sets of photographs for specific research purposes. When using the Spencer Collection, be sure to check for handwritten notes on the back of the index cards.

## 2. How to View the Photographs

The air photo should always be examined with the shadows of distinctive objects (trees, chimneys, cliffs, etc) falling toward the viewer. Since most photos in the Collection were taken on bright mornings or afternoons, shadows are profuse, and these may be compared to give some indication of the relative height of the surface features casting the shadows.

Those photos which were taken vertically rather than obliquely make special demands on the viewer, since the vertical view of an object provides a less familiar perspective than a side view. This makes the object harder to identify. The angle of the side, or oblique view may be high or low, with the low oblique photographs taken at minimal elevations creating the most familiar perspective for the average viewer. The Spencer Collection in fact contains some excellent low oblique photographs of Seoul, Inch'on and Kunsan, in Korea. Most photographs in the Collection, however, were taken from high oblique and vertical angles. Fortunately, many places represented in the Collection were photographed from vertical and high oblique simultaneously by using a synchronized multiple-lense camera. Such trimetrogon photography offers the analyst a continuous view of the area by scanning from left horizon to right horizon directly below the aircraft. The viewer should be aware that in most cases the camera-carrying aircraft has performed its photographic mission while advancing over the terrain in a very systematic fashion. The normal system of aerial photography is one in which the airplane flies back and forth in parallel runs over the terrain. The result is a considerable amount of overlap and duplication in subsequent and adjoining photographs, but containing no omissions. This total coverage in vertical and oblique views enables the photo analyst to consult several different photographs, if necessary, in order to make a better determination about any surface features in question.

The systematic aerial photography of Pacific islands represented in the Spencer Collection enables a stereoscope to be used to enhance photo interpretation capabilities. The stereoscope is a small instrument commonly used by air photo analysts to create clear three dimensional

impressions of areas photographed. Without the stereoscope, quick and accurate determinations of altitude, ruggedness and slope of terrain in some areas may be severely handicapped. The remote sensing laboratory at CNU Central Library has stereoscopes available for the convenience of visitors using the Spencer Collection.<sup>8)</sup>

## V. Exciting Career Opportunities in Imagery Analysis

It is a great pleasure to conclude this report by drawing the reader's attention to the fact that many government and private organizations in the Pacific rim and basin region have demonstrated their increasing need during the 1980's to hire air photo interpreters and remote sensing imagery analysts. In particular, intelligence- and defense-minded governments insist that more and more economists, engineers and military personnel receive some special training in imagery analysis. Such professionals study remotely-sensed imagery in order to determine agricultural and industrial production capacities worldwide (e.g. "Will the Soviet Union have another poor grain harvest this year?"; "How soon will the new oilfields in Indonesia be operational?") to keep abreast of the changing deployment of military forces (e.g. "How many enemy combat divisions can be quartered in new constructions photographed near the DMZ?"), and to follow the development, testing and production of new weapons systems (e.g. "Have the Chinese made any new breakthroughs in their nuclear development program?").

The intelligence value of imagery provides increasing numbers of college graduates with the opportunity to enter a challenging career as imagery analysts. Their special training begins with an appreciation of air photo interpretation, and then progresses to satellite imagery analysis.<sup>9)</sup> College students who are political, social, physical and earth science majors all have appropriate backgrounds to eventually become skilled in the intelligence applications of imagery analysis.

Government and private organizations in the intelligence field will usually provide on-the-job training, and provide opportunities for their trainees to visit foreign institutes and facilities in order to meet other interesting people in the intelligence community. Employers will also normally pay for additional job related training, and even send their employees to national and international professional meetings and workshops. There is, therefore, excellent career opportunities for both men and women college students who are interested in aerial photo interpretation and remote sensing techniques.

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8) A good English-language introduction to the procedures used in air photo analysis is provided by G.C. Dickenson in *Maps and Air Photographs*. London: Edward Arnold (Publishers), Ltd., 1970 (Available in the CNU Central Library).

9) The awesome perspective of the earth surface now available from satellite imagery is presented in Charles Sheffield's *Earth Watch*. New York: MacMillan Publishing Company, Inc., 1981 (Available in the CNU Central Library).

Figure 1: Extensive surface mining on Kyushu, Japan.

Contour strip surface mining, as shown in this dramatic photograph, is the most damaging form of mining from an environmental perspective. Coastal hills are systematically peeled away to extract minerals for wartime construction purposes, and these are transported. Wastes from the massive operation may be dumped locally and offshore pollution endangers marine life. Miners and their families are housed amidst the unsightly rubble and industrial noise, and are made to endure a poor quality living environment.

Index No.....	2	Mission/proj	CY 9 3933
Location...	Kyushu	near	Saeki?
Coordinates	.....		
Date	14 May 45	Time	1635
F.I.	24"	Altitude	10,000'
Angles..V...	Print nos. 1-9	Total exp.	9
	○		18"

Figure 2: The dockside at Pusan, Korea.

Railroads serving interior Korea feed into the massive port facilities at Pusan harbor. Great warehouses on two major wharfs jut into the bay in order to facilitate the transfer of inbound and outbound raw materials and manufactured goods.

Index No.....	1	Mission/proj	YD3 160F
Location...	Pusan	.....	
Coordinates	.....		
Date	29 Aug 45	Time	0401
F.I.	24"	Altitude	10,000'
Angles..V...	Print nos. 1-23	Total exp.	23
	○		18"



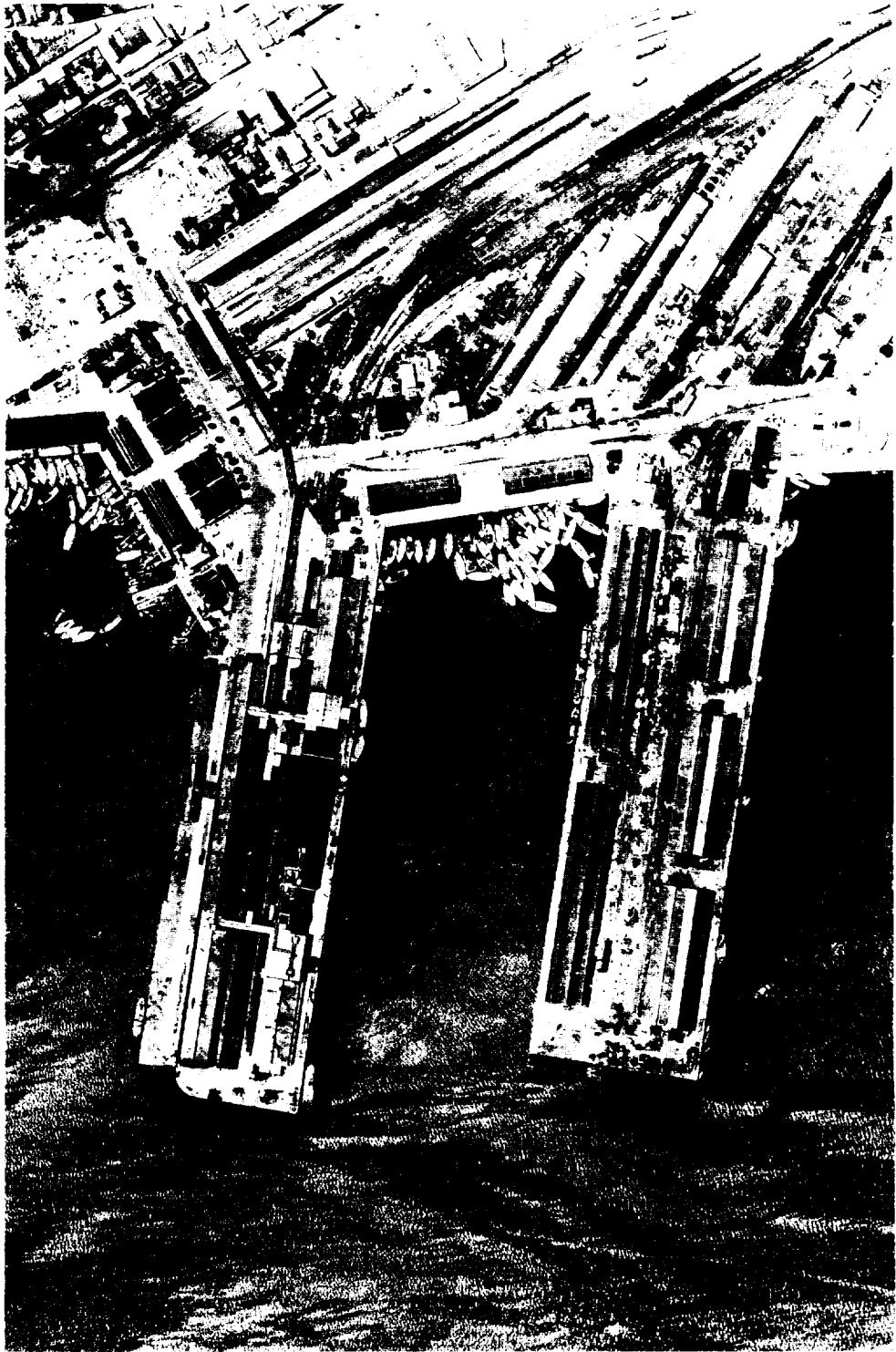


Figure 3 : Sand-swept agricultural landscape on Amami O Shima. Northern Ryukyu Islands, Japan.

Sand dunes encroach on hedge-protected farm plots of various shapes and sizes. Villagers live on the lee side of the island, fronting a picturesque bay. A bombed-out Japanese military installation is visible in left-center on the photograph (see tall smokestacks).

Index No.	3	Mission/proj.	CY15-19
Location	Amami O Shima		
Coordinates			
Date	14 April 45	Time	1000
F.L.	24"	Altitude	1500'
Angles	0	Print nos.	1-13
		Total exp.	13

○

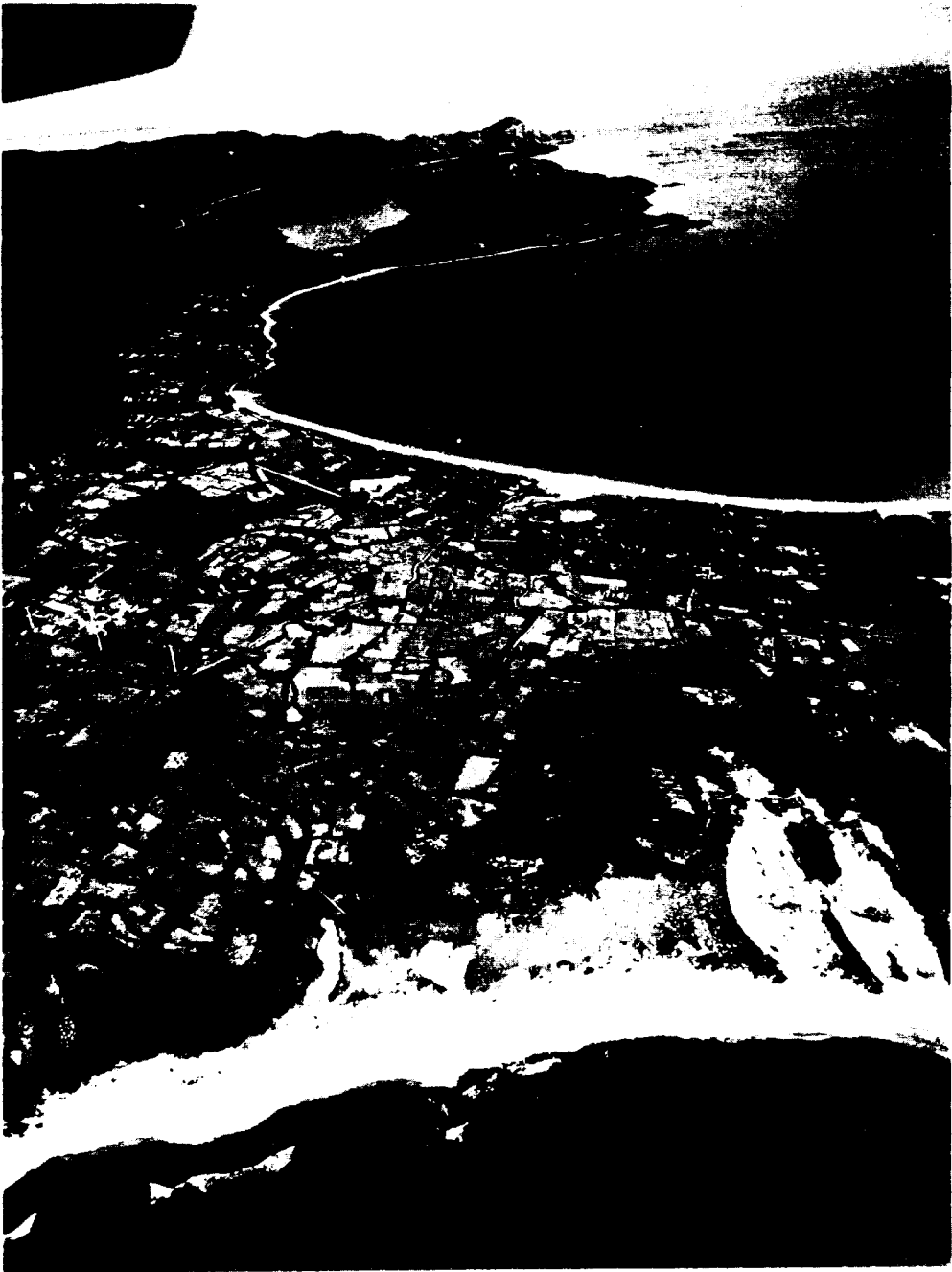
Figure 4 : A volcano-dominated landscape on Kagoshima Bay, Kyushu Island, Japan.

Rugged volcanic terrain and sterile lava flows permit human occupancy only near the coast. Sea-side villagers are insulated from the interior wilderness by their patchwork of fields. A highway hugs the coast, snaking from village to village. Life here in the shadow of a great volcano must be much like life on Cheju Island, where Halla Mountain dominates the landscape.

Index No.	2	Mission/proj.	CY12788
Location	Kyushu Kagoshima area		
Coordinates	31° 20' N 130° 41' E		
Date	12 May 45	Time	-
F.L.	152.3 mm	Altitude	15,000'
Angles	Y	Print nos.	1-76
		Total exp.	76

plot maps

○



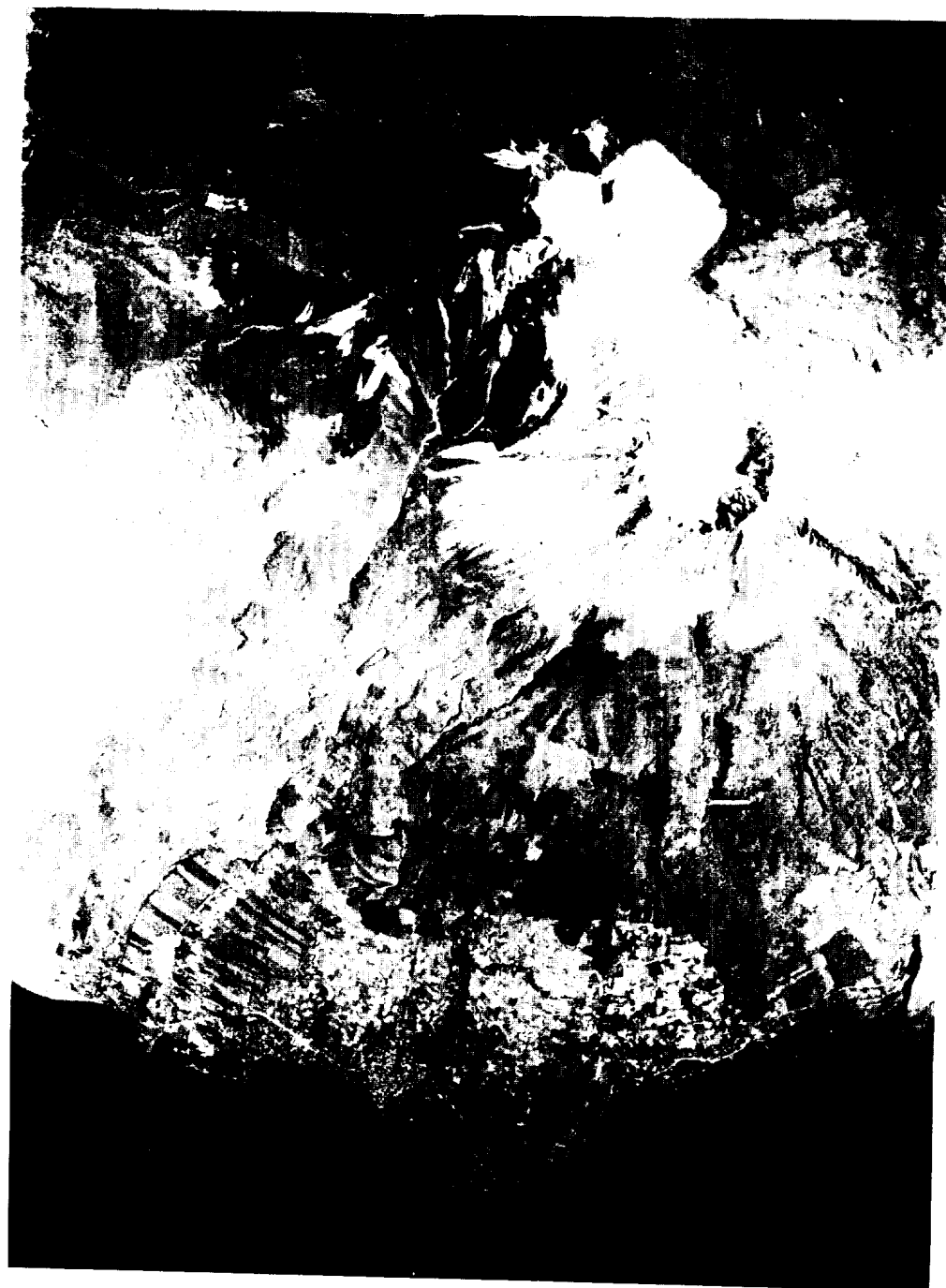




Figure 5 : Agricultural exploitation on a small islet near New Guinea.

Coconut trees on this plantation islet form neat rows and geometric shapes. Also visible are several jetties and an airstrip. The shadow of the aircraft which took this photograph is visible near the longest jetty.

Index No.....	Special Project #1	
.....	Mission/proj.	338.RS
Location.....	.....	
.....	.....	
Coordinates .....	.....	
Date ..	6 Oct 48	Time .....
F.I. ....	Altitude .....	.....
Angles..	V	Print nos. ....Total exp.....
○		

Figure 6 : Interior jungle villages, Espiritu Santo island, New Hebrides.

Inhabitants of the dense jungle landscape of the interior plateau of Espirtu Santo Island live within circular clearings of various sizes.

Index No...	6A	Mission/proj.	MPS 1109
Location...	Espiritu Santo	New Hebrides	.....
.....	.....		
Coordinates ..	167° E	15° 30' S	.....
Date ..	10 June 43	Time	0857
F.I. ....	12"	Altitude	10,000'
Angles.....	Print nos.	Total exp.	± 400
○			





國文抄錄

國立濟州大學校의 Remote Sensing\* 설비들 / 그 당위성과 개발

데이비드 네म्스

國立濟州大學校는 이전에 없던 성장 기간을 맞아 서북 태평양 지역의 도서연구(島嶼研究) 중심지로서의 커다란 잠재력을 지니고 있다. 본 대학 중앙도서관에 있는 Joseph E. Spencer의 항공사진 수장품(收藏品)과 대기권외 또는 고공(열선·적외선사진) 자료실(Remote Sensing Laboratory)은 많은 외국학자와 과학자들에게 호기심을 불러 일으킬 것이다. 본교에서는 항공사진의 효율적 사용 방법과 대기권외 또는 고공 자료들에 대하여 개관하였다. Spencer 수장품의 범위와 역사를 덧붙였으며, 그 수장품들의 배가(配架) 방법에 대해서도 예시하였다. 또한 대학생들에게 대기권외 또는 고공 자료 분석가(imagery analysts)가 되는 기회를 가질 수 있게 소개하였다.

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\* remote sensing이란 대기권외에 또는 고공에서 光線·熱線·赤外線·radio waves 등을 이용하여 찍은 사진들을 뜻함. 여기서는 '대기권 또는 고공자료'라고 옮겼음.