CAKALELE, VOL. 6 (1995): 93–102

HISTORIC AERIAL PHOTOGRAPHS OF MALUKU

WARREN J. KEOGH
ALASKA PACIFIC UNIVERSITY

The University of Hawai‘i at Manoa houses a large collection of World War II era aerial photographs of the western Pacific and Southeast Asia that are held in Hamilton Library. Included among this 70,854-piece collection are nearly 6,000 black-and-white military reconnaissance aerial photographs of what is now Maluku, Indonesia. These previously unreported Maluku photographs were taken between 1944 and 1948. Most show North Maluku, especially the islands of Halmahera and Morotai, although there are photos of Central and South Maluku as well. This paper makes researchers and others aware that this little used primary resource exists, briefly describes the extent and nature of these photographs, and offers a tabular index guide to facilitate finding area-specific photographs within Maluku. These photographs may be seen as an untapped resource of historic value that may be utilized by scholars from diverse disciplines, especially the social and earth sciences.

Introduction

A unique collection of aerial photographs is located in Hamilton Library at the University of Hawai‘i at Manoa (UHM). Among this 70,854-piece collection of World War II–era photographs of Melanesia and Southeast Asia are 5,844 aerial photographs of Maluku Province, Indonesia, taken between 1944 and 1948. The purpose of this paper is to make researchers and others aware that this little known primary resource exists and to describe briefly the scope and nature of the Maluku photographs. A tabular index guide is offered to facilitate finding area-specific photographs for users of the Maluku portion of the collection. Though recent satellite technology allows remotely sensed images to be gathered from space, aerial photographs predating satellite images have significant potential value as a historic resource with diverse applications.

History and applications of aerial photographs

During World War II and the early postwar years, U.S. Navy photo-reconnaisance aircraft photographed Maluku and other areas. Military aerial photo-reconnaisance was often used as a means to gather intelligence that allowed a careful interpretation and analysis of visual data that held great tactical and strategic value. As an example, in 1944 U.S. Navy aircraft photographed Morotai, Halmahera, and other Maluku islands in preparation for Allied forces moving toward the Philippines from New Guinea. In this instance, 37,000 Japanese troops occupied a fortified and strategically important Halmahera. Americans needed an airfield and staging area for their invasion of the Philippines and Australians had similar needs for their Borneo invasion (Morison 1958: 19–29). Avoiding Japanese military strength on Halmahera, American strategists selected nearby Morotai as the island to invade, hold, and stage further offensive advances. The Allied invasion of Morotai on September 15, 1944 was preceeded and followed by numerous photo-reconnaisance sorties and the taking of hundreds of photographs that now are a portion of the UHM collection.

After the U. S. Government declassified these and other secret World War II–era photographs, the Department of Geography at the University of California, Los Angeles (UCLA), obtained them from the Office of Naval Research in the early 1960s (Nemeth 1985: 200). Underutilized for two decades and partially damaged by fire in 1983, UCLA divided the collection, giving part to Cheju National University in Korea and part to UHM. In 1983, UHM accepted the larger share of the UCLA Navy photograph collection that included over 70,000 photographs, most of which are of Indonesia and the Philippines—33,370 and 30,199 photographs respectively (Suzuki and Togashi 1992: 7). Approximately one-sixth of the Indonesia photos are of Maluku. Valued for military intelligence half a century ago, these reconnaisance photographs now have other potential applications.

Aerial photos show spatial distribution of surface physical and biological characteristics. Some of these early remotely sensed images may provide unique historical value for scientists and scholars, and could be utilized in geology, planning, anthropology, archaeology, conservation biology, geography, meteorology, hydrology, oceanography, history, and other disciplines (Johannsen and Sanders 1982; St. Joseph 1977; Vogt 1974; Avery 1968: 8). In one instance, Suzuki and Togashi (1992: 8) cite

an example of a major Hawaiian crop grower that used photos from the UHM collection to help determine the feasibility of an Indonesian agriculture project. In another example, American vulcanologists Tom Simkin of the Smithsonian Institution and Tom Casadevall of the U.S. Geological Survey assessed photographic evidence of active volcanism on Halmahera (pers. comm., December 1993). Other World War II military aerial photographs of Europe have been recognized for their historic value and utilized creatively to help answer thorny and controversial postwar social questions that benefit from irrefutable pictorial evidence (Stanley 1981: 347–351). Potential applications are varied, numerous, and multidisciplinary.

Fighter or bomber aircraft retrofitted with cameras made up the small Navy utility squadrons that photographed western Pacific and southeast Asian islands. The aircraft flew missions over predetermined areas, typically taking a sequence of three simultaneous overlapping photographs (one left oblique, one vertical, and one right oblique) along a relatively straight flightline. Individual photographic runs over Maluku resulted in as many as 303 and as few as two photographs taken per run. Flight altitudes varied from 10,500 ft. to 33,000 ft. but most photographs were taken from an altitude of 20,000 ft. or lower. (See Tables 2–4.) The photographs are 9-by-9-inch black-and-white panchromatic prints. Most have a title strip along one margin that indicates geographic location, photographic number and angle, coordinates, mission number, date and time, camera focal length, and altitude. Variables such as altitude, location, date, weather, camera operation, and film development resulted in prints of varying quality. While some photographs have clear images with high resolution at large scale, others are blurred by camera malfunction, obscured by clouds or haze, or are of very small scale. Many photographs are of limited or no value while others are rich in substantive visual data.

UHM library holdings of Maluku photographs

The aerial photographs housed at the M noa campus of the University of Hawai‘i are located in the Map Collection rooms of the Hamilton Library ground floor. In addition to the 70,854 U.S. Navy photos from UCLA, the UHM Map Collection holdings include an additional 15,000 aerial photos and 140,000 maps. Among the map holdings are reprinted, early 20th-century Dutch topographic sheet maps of Maluku that com-

plement and enhance the utility and historic value of the Maluku photos (Army Map Service 1944, 1945; Garren, Peterson, and Page 1982; U.S. Board on Geographical Names 1944).[1]

Table 1. Aerial photographs of Maluku by region

	NUMBER OF PHOTOGRAPHS	DATE TAKEN
MALUKU UTARA (North Maluku)		
Morotai	439	1944 or 1948
Halmahera	3080±	1944, 1947, 1948, or n.d.
Bacan Islands	0	
Obi	343	n.d.
Sula Islands	588	1948 or n.d. (1944?)
Subtotal - North Maluku	4450	
MALUKU TENGAH (Central Maluku)		
Seram	626±	1948 or n.d. (1944?)
Ambon	170±	1948
Buru	0	
Gorong Islands	0	
Banda Islands	0	
Damar Islands	48±	1944 or n.d.
Lucipara Islands	60	1948
Subtotal - Central Maluku	904	
MALUKU TENGGARA (South Maluku)		
Kai Islands	0	
Aru Islands	168	1944
Tanimbar Islands	100±	1944
Babar Islands	0	
Sermata Islands	0	
Leti Islands	0	
Romang	36	n.d. (1944?)
Wetar	186	n.d. (1944?)
Subtotal - South Maluku	490	
Total- Maluku	5844	

[1]The reprinted Dutch maps are 1:100,000 scale and richly detailed. All referenced gazetteers, as well as other uncited military gazetteers, are held in the UHM Map Collection room.

The aerial photograph collection is dominated by images of Indonesia and the Phillipines but also contains more than 7,000 photos of other parts of Southeast Asia, Papua New Guinea, the Solomon Islands, and an assortment of western Pacific Islands and other sites along the western Pacific Rim. The 5,844 photographs of Maluku unfortunately are not evenly distributed among its islands. (See Table 1.) Military needs of the 1940s dictated which areas were reconnoitered. Strategically important Halmahera and the Morotai islands were fairly comprehensively photographed, while other islands like Buru were apparently ignored.[2] There are 4,450 photos of Maluku Utara (North Maluku), 904 photos of Maluku Tengah (Central Maluku), and 490 photos of Maluku Tenggara (South Maluku) in the collection. Though many prints lack dates, most photographs are dated and span a four-year period from 1944 to 1948. The Damar Islands photos have the earliest date (15 March 1944) and Sula Islands photos the latest (6 December 1948).

The boxed aerial photographs from UCLA that came to UHM in 1983 arrived disordered, poorly sorted, inadequately indexed, and with 581 missing items (Suzuki and Togashi 1991). The photographs are now stored in folders in metal file cabinets and catalogued on 3-by-5-inch index cards. Lack of library funding and a shortage of personnel have precluded archiving other than the initial rudimentary filing and indexing accomplished shortly after their arrival from UCLA. The absence of digitization, computerized cataloguing, and/or flightline diagrams hinders efficient use of these resources. Using the present index system for photographs in the collection, including those labelled "Moluccas," requires the problematic use of the 72 index cards.[3] Numerous errors on index cards and the inherent deficiencies of the system restrict research. Index-card latitude and longitude coordinates may be missing or incomplete, geographic place names may be inaccurate or incomplete, files may contain photos of areas in other provinces, and individual files may

[2]An undetermined part of the collection was damaged and presumed lost in a UCLA fire in 1983. It is possible that some of the Maluku photos were lost in that event. Also, it should not be assumed that all U.S. Navy photographs of this time and era were obtained from the Office of Naval Research by UCLA Professor of Geography Joseph E. Spencer when he acquired them in the 1960s.

[3]This section of the photographic collection card file is labeled "MOLUCCAS: INDONESIA. NETHERLAND INDIES." The cards are numbered File I.E. 1–72.

contain photos from more than one island group.[4] Compounding these catalog deficiencies are the 50-year-old anglicized geographic descriptors used on the cards and photos, which frequently fail to match those on present-day maps, earlier Dutch maps, or military gazetteers of the era. Thus, searching for photographs of a specific area can be a tedious, time-consuming, and error-prone exercise.

Index guide to Maluku photographs

Lengthy searches prompted the design of tabular guides to facilitate the identification and search for Maluku photographs. (See Tables 2–4.) These tables were constructed by first plotting flightlines, as indicated by the latitudinal and longitudinal coordinates on the index cards or individual photographs,[5] on a 1:1,500,000 map of Maluku (Nelles Verlag n.d.). The majority of flightline plots were drawn after a visual cross-check and inspection of the photographs in applicable file folders. Data from the flightline diagrams map were then placed in tabular form oriented regionally and spacially. There is a table for each of the three main provincial regions: north, central, and south. Each provincial region is then subdivided into large islands or distinct island groups. Each photographed island or island group has an ordered file number list with a more specific area or vicinity noted for each file. Altitude, number of prints, and date are also indicated for each flight (file) to further assist the

[4]A few examples of the problems and errors found in the indexing system follow. (a) Almost one tenth of all Maluku photographs are found in one large unwieldly file: I.E. 21. This file contains nine individual flightlines over several islands in different island groups. One island is Ambon, which is not indicated on the index card. None of the possible beginning and ending flightline coordinates are indicated in the index card. (b) File I.E. 29 of "P. Sajang" contains photographs of Sayang Island, which is near Waigeo Island in Irian Jaya Province. (c) File I.E. 57 is mislabeled as Buru Island with inaccurate flight coordinates. The photographs are from a flight that transected the extreme northern arm of Sulawesi, approximately 15 miles south of Manado. (d) File I.E. 40 inaccurately indicates Morotai as the location of the photographs, and has incorrect coordinates as well. The photographs in this file show the extreme northwestern coastal area of north Halmahera, directly west of Galela.

[5]Beginning and ending flight coordinates for individual photographic sorties are usually indicated on the first and last photographs of the series taken for each flight.

reseacher. These tables supplement the current card catalogue system and, though inferior to flightline diagrams, serve as a time-saving tool.

Concluding remarks

The nearly 6,000 World War II–era aerial photographs of Maluku have been available for inspection for over 30 years at either UCLA or UHM. It appears that these Maluku photographs have seen little if any use since their initial application for military intelligence 50 years ago. Although the potential value of this collection of photographs is limited by the uneven geographic distribution and poor quality of many prints, valuable images are available.[6]

These photographs may complement or be complemented by other quantitative primary resources such as earlier cartography or more recent satellite imagery. Air photo interpreters can enhance the information on these remotely sensed "maps," thereby increasing their value. Reproduction and enhancement of the Maluku photos is restricted by the absence of original film negatives.[7]

This remotely sensed data may be of special value for the environmental historian or earth scientist, and has potential value for diverse scholars, scientists, and researchers. The intent of this note is to alert researchers to the existence of the photos. Though by no means definitive, the geographic index tables offered here significantly facilitate and enhance the user's ability to access the Maluku photographs. They provide a useful adjunct to the current index system until a computerized or more efficient system is implemented in the UHM library's collection of World War II era aerial photographs.

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[6]The following exemplify photos of potential use: (a) Galela Bay, Halmahera, with volcanic activity of Dukono, File I.E. 41, photo #766L; (b) Dukono, Halmahera, File I.E. 45, photo #735L; (c) Tidore, File I.E. 24, photo #6R; (d) Ambon, File I.E. 27, photo #146V; (e) Yamdena, Tanimbar Islands, File I.E. 48, photo #45V.

[7]Neither an earlier attempt by UHM staff nor my more recent attempt to locate films from this collection of Navy photographs in the U.S. National Archives has been successful.

Table 2. Photos of Maluku Utara

	File No.	No. Photos	Area/Vicinity	Altitude (ft.)	Date
Halmahera	I.E. 17	86	Kao/Wasile Bays	17,000	n.d.
	I.E. 18	162	Central, Gebe, Gag	20,000	11/12/48
	I.E. 19	200	N to NE Pen.	20,000	9/23/48
	I.E. 21	200±	South Pen.	20,000	10/26/48
	I.E. 23	327	NE Pen., Central	20,000	9/15/48
	I.E. 24	180	SE Pen., Central	20,000	3/24/48
	I.E. 25	45	Tidore, Makian	20,000	4/13/48
	I.E. 26	210	South Pen.	20,000	4/13/48
	I.E. 28	240	SE Pen., Central	20,000	9/24/48
	I.E. 30	93	South Pen.	20,000	4/13/48
	I.E. 32	75	NW Coast	20,000	2/18/48
	I.E. 33	90	Koa/Dodinga Bays	17,000	4/27/48
	I.E. 34	117	North Pen.	17,000	4/27/48
	I.E. 35	168	Sayafi Is., SE Pen., Central, Dodinga Bay	20,000	3/24/44
	I.E. 36	180	Payahe/Buli Bays, NE Pen.	17,000	4/27/47
	I.E.39	65	North Pen.	13,000	8/27/48
	I.E. 40	18	NW Coast	15,000	8/27/44
	I.E. 41	13	Galela Bay	13,000	8/27/44
	I.E. 44	27	Kao/Dodinga Bay	21,200	9/6/44
	I.E. 45	82	NW Coast	15,000	8/27/44
	I.E. 49	6	Buli Bay	28,500	7/13/44
	I.E. 50	24	Tagalaya & Miti Islands	23,800	9/10/44
	I.E. 51	92	NE Pen.	24,000	9/10/44
	I.E. 55	108	Kao to Tobelo	21,400	9/6/44
	I.E. 59	78	SE & NE Pens.	27,200	9/7/44
	I.E. 60	12	Galela	21,400	9/6/44
	I.E. 62	66	NE Pen.	32,500	7/23/44
	I.E. 63	36	NE Pen.	31,800	7/23/44
	I.E. 64	6	Lolobata	32,000	7/23/44
	I.E. 65	12	Buli Bay, NE Pen.	28,000	7/13/44
	I.E. 66	17	North Pen.	30,000	6/28/44
	I.E. 67	18	North Pen.	16,000	8/20/44
	I.E. 69	12	Gani Bay - South Pen.	12,000	8/20/44
	I.E. 72	2	Central	27,200	9/7/44
Morotai	I.E. 20	20	East Coast	20,000	1948
	I.E. 37	57	East Coast	18,000	8/10/44
	I.E. 38	39	Central	18,000	8/14/44
	I.E. 42	36	SW Coast	13,500	8/10/44
	I.E. 43	21	West Coast	18,000	8/14/44
	I.E. 52	21	SW	13,500	8/10/44
	I.E. 53	33	SW Coast	18,700	8/14/44
	I.E. 54	38	North-Central	13,500	8/10/44
	I.E. 56	16	SW Coast	27,000	7/31/44
	I.E. 58	47	East Coast	13,500	8/10/44

	I.E. 61	51	Central	33,000	7/21/44
	I.E. 70	27	SW Coast	18,700	8/14/44
	I.E. 71	33	NE	13,500	8/10/44
Loloda Utara Is.	I.E. 32	75	NW coast of Halmahera	20,000	2/18/48
Tifore	I.E. 68	9	All	16,000	8/20/44
Ternate	I.E. 24	8		20,000	3/24/48
	I.E. 25	7		20,000	4/13/47
Tidore	I.E. 24	15		20,000	3/24/48
	I.E. 25	12		20,000	4/13/47
Gebe	I.E. 18	162	All, Gag, Halmahera	20,000	11/12/48
Sula Islands	I.E. 3	231	Taliabu, Mangole Is.	17,000	n.d.
	I.E. 22	351	Taliabu, Mangole, Sanana Is.	26,000	12/6/48
Obi	I.E. 5	93	Central, Bisa Is.	12,500	n.d.
	I.E. 9	96	Central, Bisa Is.	12,500	n.d.
	I.E. 10	42	Central	12,500	n.d.
	I.E. 11	30	SW	25,000	n.d.
	I.E. 12	12		12,500	n.d.
	I.E. 13	70	East, Bisa Is.	12,500	n.d.

Table 3. Photos of Maluku Tengah

	FILE NO.	NO. PHOTOS	AREA/VICINITY	ALTITUDE (FT.)	DATE
Seram	I.E. 2	77	East	22,000	10/21/48
	I.E. 4	303	South Coast, Central	20,000	n.d.
	I.E. 21	170±	Seram Strait coast, SW, Nusa Laut Is.	20,000	10/26/48
	I.E. 27	76	SW, Ambon coast	22,000	10/26/48
Ambon	I.E. 21	170±	Hitu Pen., Timor Pen.	20,000	10/26/48
	I.E. 27	76	North coast, Seram	22,000	10/26/48
Lucipara Is.	I.E. 1	60	Mai & Penyu Is.	20,000	11/22/48
Damar Is.	I.E. 8	6	Terbang Utara Is.	20,000	n.d.
	I.E. 14	24	Damar Is.	20,000	n.d.
	I.E. 15	6	Terbang Selatan Is.	20,000	n.d.
	I.E. 48	12±	Nila & Serua Is.	10,500	3/15/44

Table 4. Photos of Maluku Tenggara

	FILE NO.	NO. PHOTOS	AREA/VICINITY	ALTITUDE (FT.)	DATE
Aru Islands	I.E. 46	84	Trangan Is.	20,000	4/19/44
	I.E. 47	84	Maikoor Channel	20,000	4/19/44
Tanimbar Is.	I.E. 48	100±	Yamdena & Sera Is.	13,000	3/15/44
Romang Is.	I.E. 16	36	All	20,000	n.d.
Wetar	I.E. 6	108	All	20,000	n.d.
	I.E. 7	78	North coast	20,000	n.d.

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