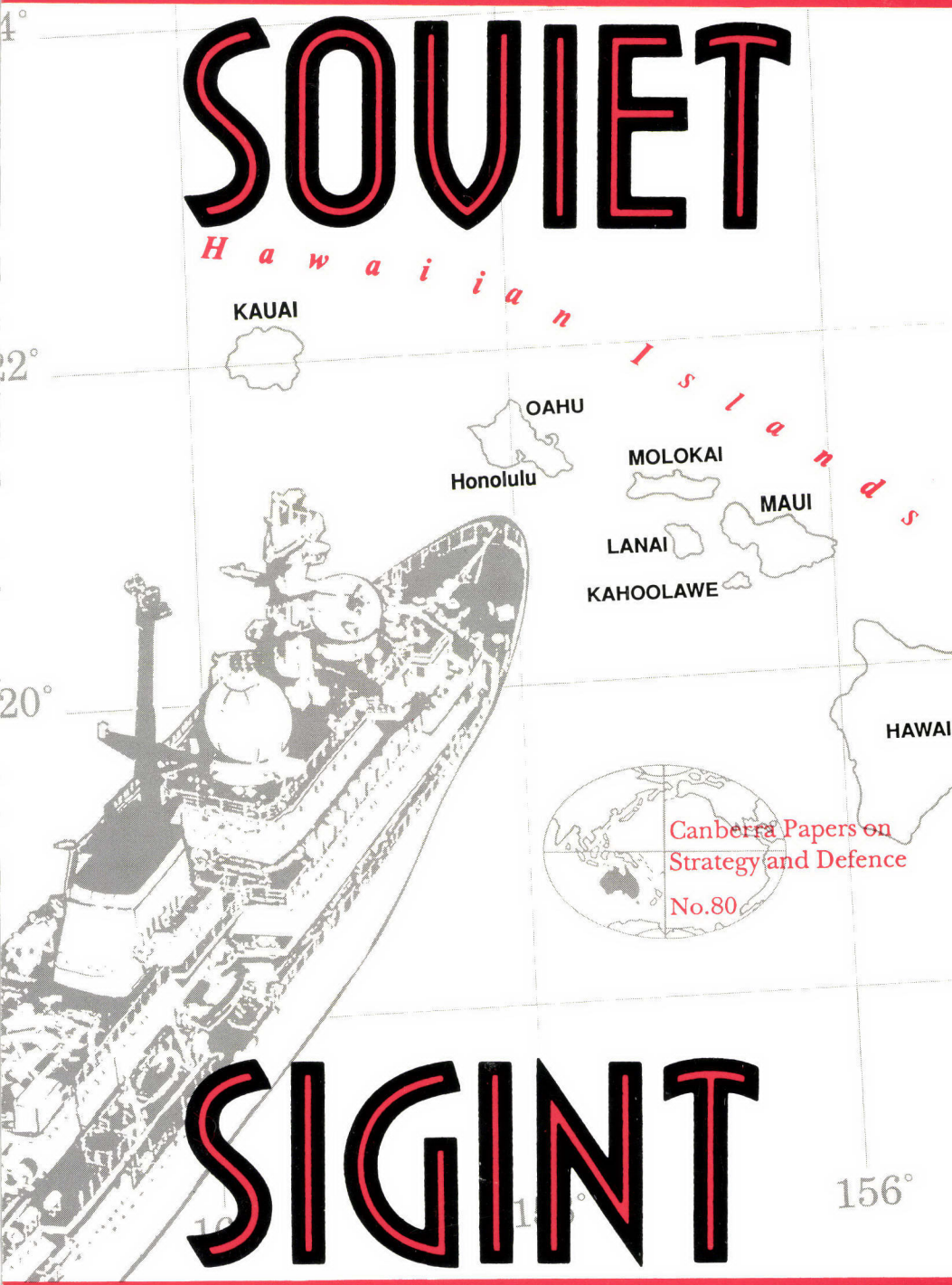
Desmond Ball

SOVIET SIGINT

Hawaii Operation



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SOVIET SIGINT: HAWAII OPERATION

Desmond Ball

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ABSTRACT

Since the mid-1980s, there has been a significant increase in Soviet signals intelligence (SIGINT) operations in the Asia/Pacific region. Soviet SIGINT operations concerning the Hawaiian islands exemplifies this activity in a particularly dramatic fashion.

This monograph describes the growth of the Soviet SIGINT operation concerning Hawaii, the range of signals being monitored by Soviet SIGINT systems and the missions of the Hawaii operation. It also discusses possible means of countering the operation.

Professor Desmond Ball is Head of the Strategic and Defence Studies Centre at the Australian National University. He is the author of more than 150 academic monographs and articles on nuclear strategy, nuclear weapons, national security decision-making, and Australia's defence policy. His major books include *Politics and Force Levels: The Strategic Missile Program of the Kennedy Administration,* (University of California Press, Berkeley, 1980); *A Suitable Piece of Real Estate: American Installations in Australia,* (Hale & Iremonger, Sydney, 1980), *A Base for Debate: The US Satellite Station at Nurrungar,* (Allen & Unwin, Sydney, London and Boston, 1987); and *Pine Gap: Australia and the US Geostationary Signals Intelligence Satellite Program,* (Allen & Unwin, Sydney, 1988). He is the co-author of *The Ties That Bind: Intelligence Cooperation Between the UKUSA Countries,* (George Allen & Unwin, Sydney, London and Boston, 1985, 2nd edn 1990); *Defend the North: The Case for the Alice Springs-Darwin Railway,* (George Allen & Unwin, Sydney 1985); and *Crisis Stability and Nuclear War,* (American Academy of Arts and Sciences, and Cornell University Peace Studies Program, Ithaca, New York, 1987). He is editor of *The Future of Tactical Air Power in the Defence of Australia,* (Australian National University, Canberra, 1977); *Strategy & Defence: Australian Essays,* (George Allen & Unwin, Sydney, 1982); *The ANZAC Connection,* (George Allen & Unwin, Sydney, 1985); *Air Power: Global Developments and Australian Perspectives,* (Pergamon Brassey's Defence Publishers, Sydney, 1988); and *Aborigines in the Defence of Australia,* (Australian National University Press, Sydney, 1991). He is co-editor of *Problems of Mobilisation in the Defence of Australia,* (Phoenix Defence Publications, Canberra, 1980); *Civil Defence and Australia's Security in the Nuclear Age,* (Strategic and Defence Studies Centre, Australian National University, Canberra, and George Allen & Unwin, Sydney, 1983); *Strategic Nuclear Targeting,* (Cornell University Press, Ithaca, New York, 1986); *A Vulnerable Country? Civil Resources in the Defence of Australia,* (Australian National University Press, Canberra, 1986); *The Future of Arms Control,* (Australian National University Press, Sydney, 1986); *Geographic Information Systems: Defence Applications,* (Pergamon Brassey's Defence Publishers, Sydney, 1989); *Security and Defence: Pacific and Global Perspectives,* (Allen & Unwin, Sydney, 1990); and *Strange Neighbours: The Indonesian-Australian Relationship,* (Allen & Unwin, Sydney, 1991).

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CONTENTS

Figures		xi
Table		xiv
Acronyms and Abbreviations		xv
CHAPTER ONE:	INTRODUCTION	1
CHAPTER TWO:	THE GROWTH OF THE HAWAII OPERATION	6
CHAPTER THREE:	THE SIGNALS MENU	24
CHAPTER FOUR:	MISSIONS OF THE HAWAII OPERATION	47
CHAPTER FIVE:	COUNTERING THE HAWAII OPERATION	71
Bibliography		75
Strategic and Defence Studies Centre		83
Publications		84

FIGURES

1	Oahu, Hawaii	3
2	The *Peleng* (SSV 447)	8
3	The *Barograf*, an *Okean* class AGI, operating off Oahu in September 1974	9
4	The SSV 493, a *Balzam* class AGI, photographed nine miles off Pearl Harbor, 17 September 1983	11
5	The *Semyen Chelyushin* (SSV 469), a *Nikolay Zubov* class AGI, operated off Hawaii in December 1984	13
6	The SSV 80, a *Balzam* class AGI, operated off Hawaii from 5-17 October 1987	16
7	The *Gavril Sarychev* (SSV 468), a *Nikolay Zubov* class AGI which operated off Oahu in 1988. Note the 6-foot diameter mesh dish for microwave interception	17
8	The *Vega* (SSV 474), a *Moma* class AGI, off Honolulu in 1988	18
9	The *Ilmen* (SSV 472), a *Moma* class AGI, operated off Oahu in 1988	19
10	The SSV 493, a *Balzam* class AGI, off Pearl Harbor in 1988	20
11	Trans-Pacific Undersea Cable Connections	26
12	Microwave Terminal at Makaha	27

13	Military Communications Network, Oahu	28
14	Commercial Communications Network, Oahu	29
15	Microwave Beams from Makaha to Nanakuli and from Wahiawa to Barbers Point and Hickam AFB	30
16	INTELSAT Earth Station Connectivity (DoD Circuits)	33
17	INTELSAT Ground Station at Paumalu/Sunset	34
18	COMSTAR and WESTAR Connectivity Between Hawaii and CONUS	36
19	*Aurora* Digital AUTOVON Routing	38
20	*Mystic Star* Routing	39
21	DSCS/FLTSATCOM Station at Wahiawa	42
22	DSCS Trans-Pacific Connectivity	43
23	Spot Beam of DSCS II Satellite Focussed on Wahiawa, Hawaii	45
24	AGI monitoring E-3 AWACS Flight off Oahu	50
25	AN/FRD-10 SIGINT array at Wahiawa	53
26	Telemetry Data Flow from Kwajalein Facilities	59
27	The *Chukotka*, a *Sibir* class MRIS, operated northwest of the Hawaiian islands in September 1987	62

28 The *Marshal Nedelin* MRIS, operated southwest of the Hawaiian islands in September-November 1989 64

29 The *Chazma*, a *Desna* class MRIS, operated southwest of the Hawaiian islands in September-November 1989 65

30 The *Spassk*, a *Sibir* class MRIS, operated west of the Hawaiian islands in October-November 1989 66

TABLE

1 Soviet AGIs Based in the Pacific 4

ACRONYMS AND ABBREVIATIONS

ac	area coverage
AFSATCOM	Air Force Satellite Communications
AGI	Auxiliary General Intelligence
ASW	Anti-submarine Warfare
ATC	Air Traffic Control
AT & T	American Telephone and Telegraph
AUTOVON	Automatic Voice Network
AWACS	Airborne Warning and Control System
BARSTUR	Barking Sands Tactical Underwater Range
CIA	Central Intelligence Agency
CINCPAC	Commander-in-Chief Pacific
COMSAT	Communications Satellite
COMSEC	Communications Security
CONUS	Continental United States
CSS	Central Security Service
dBi	Decibels
dBw	Decibel watts
DCA	Defense Communications Agency
DCS	Defense Communications System
DF	Direction Finding
DoD	Department of Defense
DSCS	Defence Satellite Communications System
DSD	Defence Signals Directorate
DSP	Defence Support Program
EAM	Emergency Action Message
ec	Earth coverage
ELINT	Electronic Intelligence
EORSAT	Electronic Ocean Reconnaissance Satellite
EPAC	East Pacific
ESC	Electronic Security Command
FBM	Fleet Ballistic Missile
FLTSATCOM	Fleet Satellite Communications
GHz	Gigahertz
HDRF	Honolulu Data Reduction Frequency
HF	High Frequency
HQ	Headquarters
ICBM	Intercontinental Ballistic Missile
INMARSAT	International Maritime Satellite

INSCOM	Intelligence and Security Command
INTELSAT	International Telecommunications Satellite
JTF	Joint Task Force
KMR	Kwajalein Missile Range
MHz	Megahertz
MRIS	Missile Range Instrumentation Ship
NATO	North Atlantic Treaty Organisation
nc	Narrow coverage
NCA	National Command Authorities
NCF	Net Control Facility
NMCC	National Military Command Center
NORAD	North American Air Defense
NSA	National Security Agency
NSG	Naval Security Group
OSIS	Ocean Surveillance Information System
PACAF	Pacific Air Forces
PACOM	Pacific Command
RIMPAC	Rim of the Pacific (navy exercise)
SAC	Strategic Air Command
SATCOM	Satellite Communications
SCT	Single Channel Transponder
SESS	Space Event Support Ships
SHF	Super High Frequency
SIGINT	Signals Intelligence
SIOP	Single Integrated Operational Plan
SLBM	Submarine Launched Ballistic Missile
SOSUS	Sound Surveillance System
SSV	Sudno Svyazy (communications vessel)
TT & C	Telemetry, Tracking and Control
UHF	Ultra High Frequency
US	United States
USS	United States Ship
USSR	Union of Soviet Socialist Republics
VHF	Very High Frequency
WPAC	Western Pacific
WSMC	Western Space and Missile Center
WWMCCS	World Wide Military Command and Control System

CHAPTER ONE

INTRODUCTION

The Soviet Union maintains the most extensive and comprehensive signals intelligence (SIGINT) capabilities in the world.[1] The Soviet SIGINT establishment currently employs more than 350,000 personnel (intercept operators, processors, cryptanalysts, etc.). It maintains more than 500 SIGINT ground stations, in both the USSR

---

1 This paper is a product of a major research project by the author concerning Soviet signals intelligence (SIGINT) capabilities and operations. Other papers by the author on this subject include Desmond Ball, 'Soviet Signals Intelligence', in Bruce L. Gumble (ed.), *The International Countermeasures Handbook,* (EW Communications Inc., Palo Alto, California, 12th Edition, 1987), pp.73-79; Desmond Ball, 'Soviet Signals Intelligence (SIGINT): The Use of Diplomatic Establishments', in Floyd C. Painter (ed.), *The International Countermeasures Handbook,* (EW Communications Inc., Palo Alto, California, 13th Edition, November 1987), pp.24-45; Desmond Ball, *The Use of the Soviet Embassy in Canberra for Signals Intelligence (SIGINT) Collection,* (Working Paper No.134, Strategic and Defence Studies Centre, Australian National University, Canberra, October 1987); Desmond Ball, 'Soviet Signals Intelligence: Vehicular Systems and Operations', *Intelligence and National Security,* (Vol.4, No.1), January 1989, pp.5-27; Desmond Ball, *Soviet Signals Intelligence (SIGINT),* (Canberra Papers on Strategy and Defence No.47, Strategic and Defence Studies Centre, Australian National University, Canberra, 1989); Desmond Ball, *Soviet Signals Intelligence (SIGINT): Intercepting Satellite Communications,* (Canberra Papers on Strategy and Defence No.53, Strategic and Defence Studies Centre, Australian National University, Canberra, 1989); Desmond Ball, *Soviet Signals Intelligence (SIGINT): Listening to ASEAN,* (Working Paper No.188, Strategic and Defence Studies Centre, Australian National University, Canberra, September 1989); and Desmond Ball and Robert Windrem, 'Soviet Signals Intelligence (SIGINT): Organisation and Management', *Intelligence and National Security,* (Vol.4, No.4), October 1989, pp.621-659.

and abroad. SIGINT systems are also maintained in Soviet diplomatic establishments in some 70 countries. Other SIGINT systems have been deployed on an extraordinary range of platforms, including submarines, surface ships (both 'ships of opportunity' and dedicated SIGINT vessels), aircraft, space satellites, and various trucks and other vehicles.

Moreover, there has been a dramatic increase in Soviet foreign intelligence collection operations, including SIGINT activities, since the mid-1980s. The number of diplomatic establishments hosting SIGINT operations has increased by an average of three per year over the last six years. New SIGINT satellite systems have been developed and deployed. New SIGINT ships (AGIs) have also been produced - including four *Balzam* class AGIs which became operational in 1980-87 (two of which are deployed in the Pacific) and seven *Vishnaya* class AGIs which became operational in 1986-90 (three of which are deployed in the Pacific). Soviet airborne SIGINT activities have also increased in the north Pacific over the last couple of years. In some areas, such as Southeast Asia, the Soviet SIGINT effort has almost doubled in the past half decade.[2]

The increase in Soviet SIGINT activity across the Pacific has been quite striking, particularly with respect to AGI operations. According to Lieutenant Commander Robert Anderson, a spokesman for the US Pacific Fleet,

> There has been a significant increase in Soviet AGI activity in the Pacific area since 1986.
>
> This intelligence collection activity has included an increased presence off the U.S. west coast, especially off of Southern California, and the Hawaiian islands.[3]

Soviet SIGINT operations concerning the Hawaiian islands have increased dramatically since the mid-1980s. An examination of these operations illuminates not only the increasing scope of Soviet

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2 See Desmond Ball, 'How Moscow Steals ASEAN's Secrets', *Pacific Defence Reporter*, (Vol.XV, No.12), June 1989, pp.8-14.

3 Cited in Melissa Healy, 'Soviet Spy Ship Activity Grows Off West Coast', *Los Angeles Times*, 27 May 1989, p.26.

Figure 1: Oahu, Hawaii

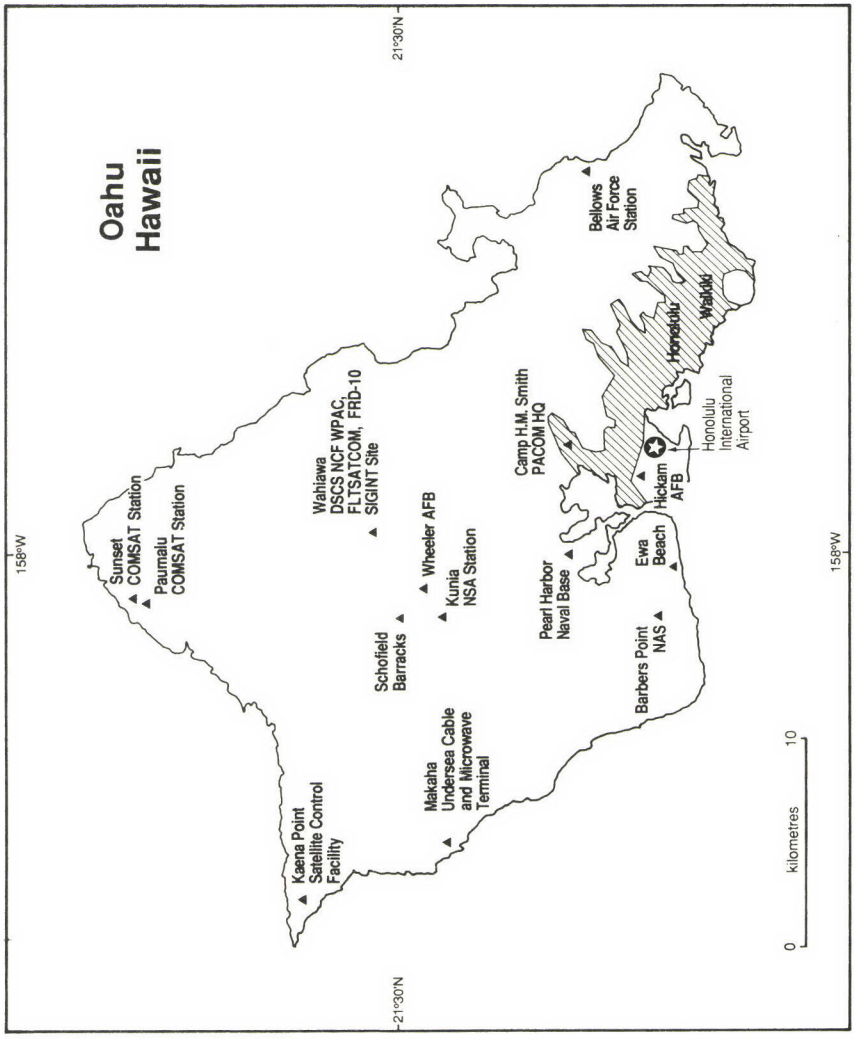

TABLE 1
SOVIET AGIs BASED IN THE PACIFIC

No.in Pacific	(No. in Class)	Class	Name
3	(7)	Vishnaya	SSV 208 SSV 535 SSV 201
2	(4)	Balzam	SSV 493 SSV 80
1	(1)	Bambuk	Kamchatka SSV 391
1	(1)	Kapusta	Kapusta SSV 33
2	(6)	Primorye	Selmon Zabaykalye SSV 464 Primorye SSV 465
2	(3)	Nikolay Zubov	Gavril Sarychev SSV 468 Semyen Chelyushkin SSV 469
2	(2)	Modified Pamir	Gidrograf SSV 480 Peleng SSV 447
2	(9)	Moma	Vega SSV 474 Ilmen SSV 472
0	(4)	Mirny	-
2	(8)	Mayak	Kursograf Aneroid
4	(15)	Okean	Gidrofon Ampermetr Deflektor Barograf
2	(2)	Dnepr	Protraktor Izmeritel
2	(4)	Alpinist	GS 7 GS 8
0	(7)	Lentra	-
25 (34%)	73		

SIGINT activities but also the changing purposes of these activities through the late 1980s.

CHAPTER TWO

THE GROWTH OF THE HAWAII OPERATION

In the case of the Hawaiian islands, the SIGINT collection operations primarily involve ships - AGIs, oceanographic vessels, satellite and missile test support ships, and 'ships of opportunity'. In addition, the islands are monitored by Soviet SIGINT satellites - including both the ELINT-3 and ELINT-4 satellite systems and the ELINT Ocean Reconnaissance Satellite (EORSAT) system. There have also been occasional airborne SIGINT collection operations around the islands. Soviet submarines have also been used to collect intelligence, including SIGINT, off the Hawaiian coast.[1]

The increase in Soviet AGI operations off Hawaiian waters has been quite extraordinary. Soviet SIGINT-equipped vessels first appeared in the mid-Pacific in the late 1950s, but were deployed only in connection with specific events such as the US nuclear tests in the Bikini/Eniwetok area in 1958.[2]

Soviet AGIs began operating in Hawaiian waters in the late 1960s. In 1967, the *Peleng* (SSV 447), a *Pamir* class AGI, operated off Oahu for some 13 days (30 April-12 May), sometimes coming to within four miles of the coast. During its sojourn, it monitored a US aircraft carrier conducting 'readiness exercises', watched US Navy ships entering and leaving Pearl Harbor, and engaged in SIGINT activity.[3] In 1968, the *Gavril Sarychev* (SSV 468), a *Nikolay Zubov* class

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1 See, for example, *The Honolulu Advertiser*, 28 April 1971.

2 Nigel West, *The SIGINT Secrets: The Signals Intelligence War, 1900 to Today*, (William Morrow, New York, 1988), p.277; 'Soviet Ships With Electronic Eyes Spy on U.S. A-Tests, Pentagon Says', *The Washington Post*, 26 May 1962, p.A11; and 'Soviet Ships Monitoring U.S. Tests, Cruising Near Christmas Is., Weapons Data Collected', *The Times* (London), 26 May 1962, p.8.

3 'Soviet Trawler Patrolling Off Oahu', *The Honolulu Advertiser*, 9 May 1967; Kay Lund, 'Soviet Ship is a Mystery', *Honolulu Star-Bulletin*, 9 May 1967; Gene Hunter, 'Russians Coming, Going Under Navy Surveillance', *The Honolulu Advertiser*, 10 May 1967, pp.1, A-2; and 'Soviet Trawler Ends Snoop of Island Waters',

AGI, twice visited Hawaii - on 8-19 September[4] and again in late October-early November 1968.[5] On the first occasion, it watched the aircraft carrier USS *Coral Sea* conduct 'routine operational readiness tests', and positioned itself for intercept operations off the Barbers Point Naval Air Station on the southwest coast of Oahu and off the island of Kauai.[6] The *Gavril Sarychev* again operated off Oahu for about a week in April-May 1970.[7] In August-September 1974, the *Barograf*, an *Okean* class AGI, spent several weeks sitting outside the entrance channel to Pearl Harbor.[8]

From the mid-1970s through the early 1980s, Soviet AGIs and oceanographic research vessels equipped with SIGINT systems visited Hawaiian waters about two or three times a year, generally remaining in the area for some 7-10 days, but sometimes staying for several weeks. For example, the *Ilmen* (SSV 472), a *Moma* class AGI, operated off Oahu for more than six weeks from about 14 December 1981 to early February 1982, sometimes sailing to within five miles of Pearl

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Honolulu Star-Bulletin, 13 May 1967.

4 'Russian Spy Ship Off Oahu', *The Honolulu Advertiser*, 15 September 1968; Leonard Lueras, 'Soviet Spy Ship Looks More Like Tuna Boat', *The Honolulu Advertiser*, 16 September 1968, pp.1, A-4; and 'Spy Ship Visit a Mystery to Navy', *Honolulu Star-Bulletin*, 16 September 1968.

5 'Russian Spy Ship Visits Again', *The Honolulu Advertiser*, 30 October 1968, p.B-11.

6 Leonard Lueras, 'Soviet Spy Ship Looks More Like Tuna Boat', *The Honolulu Advertiser*, 16 September 1968, pp.1, A-4; and 'Spy Ship Visit a Mystery to Navy', *Honolulu Star-Bulletin*, 16 September 1968.

7 'Russian Snoop Ship Spotted Off Oahu', *The Honolulu Advertiser*, 3 May 1970, p.A-5; and 'Soviets Leave Island Waters', *Honolulu Star-Bulletin*, 14 May 1970.

8 'Which Way to Russia?', *The Honolulu Advertiser*, 12 September 1974; 'Soviet Ships Off Isles', *Honolulu Star-Bulletin*, 12 September 1974; and 'Soviet Ships Heading North', *Honolulu Star-Bulletin*, 17 September 1974.

Figure 2: The *Peleng* (SSV 447)

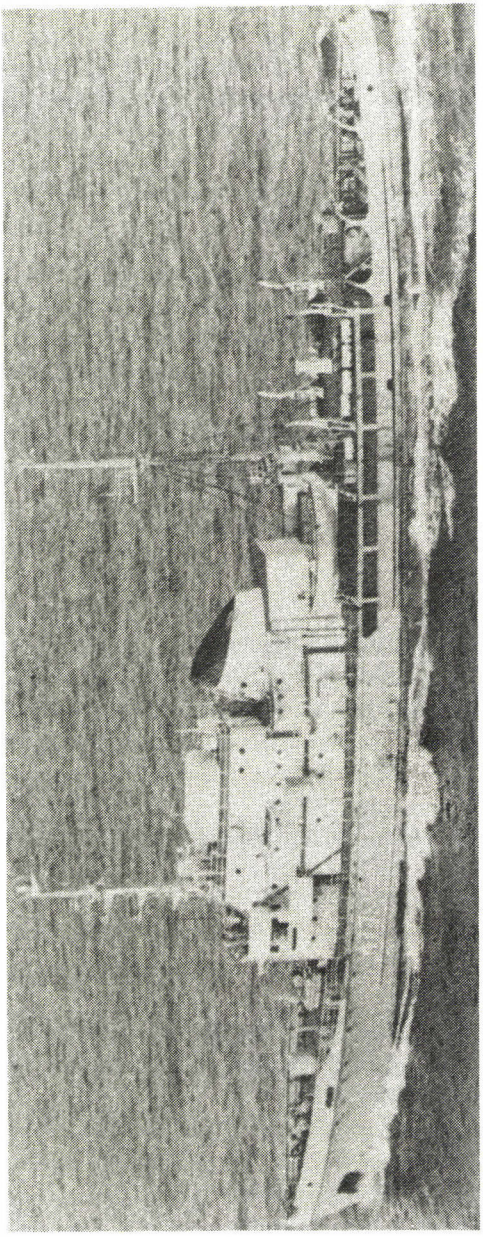
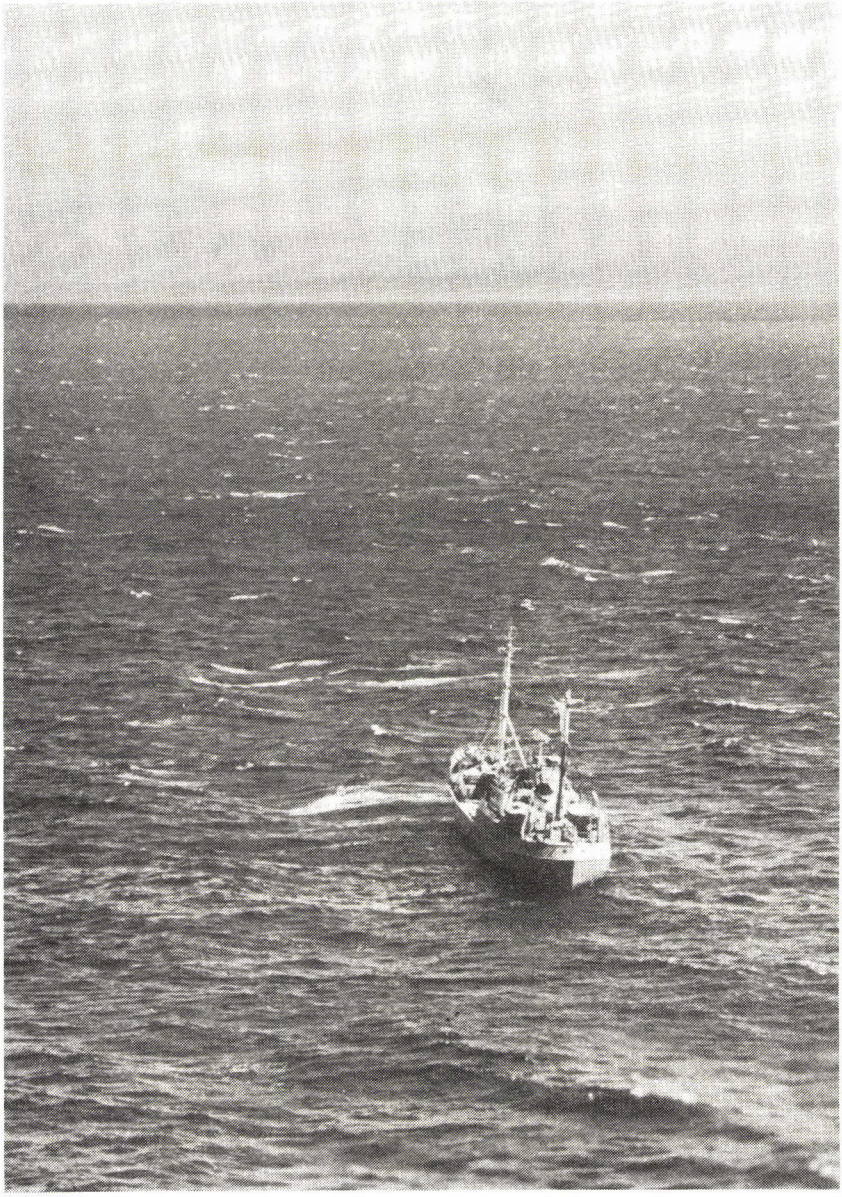


Figure 3: The *Barograf*, an *Okean* class AGI, operating off Oahu in September 1974



Harbor.[9] Following the departure of the *Ilmen* in February 1982, there was a long hiatus until September 1983, when the SSV 493, a *Balzam* class AGI, visited Hawaiian waters.[10]

In 1984, three Soviet SIGINT vessels operated off Oahu. The *Selmon Zabaykalye* (SSV 464), a 3,700-ton *Primorye* class AGI operated off Oahu for about two weeks in July-August 1984;[11] it returned to Hawaiian waters on 24 October 1984, having operated off the coast of southern California in the interim, and stayed near Hawaii until early November.[12] According to Lieutenant Commander Lewis Smith, a spokesman for the Third Fleet, during the October-November 1984 visit the *Selmon Zabaykalye* was 'probably' monitoring the US Navy's

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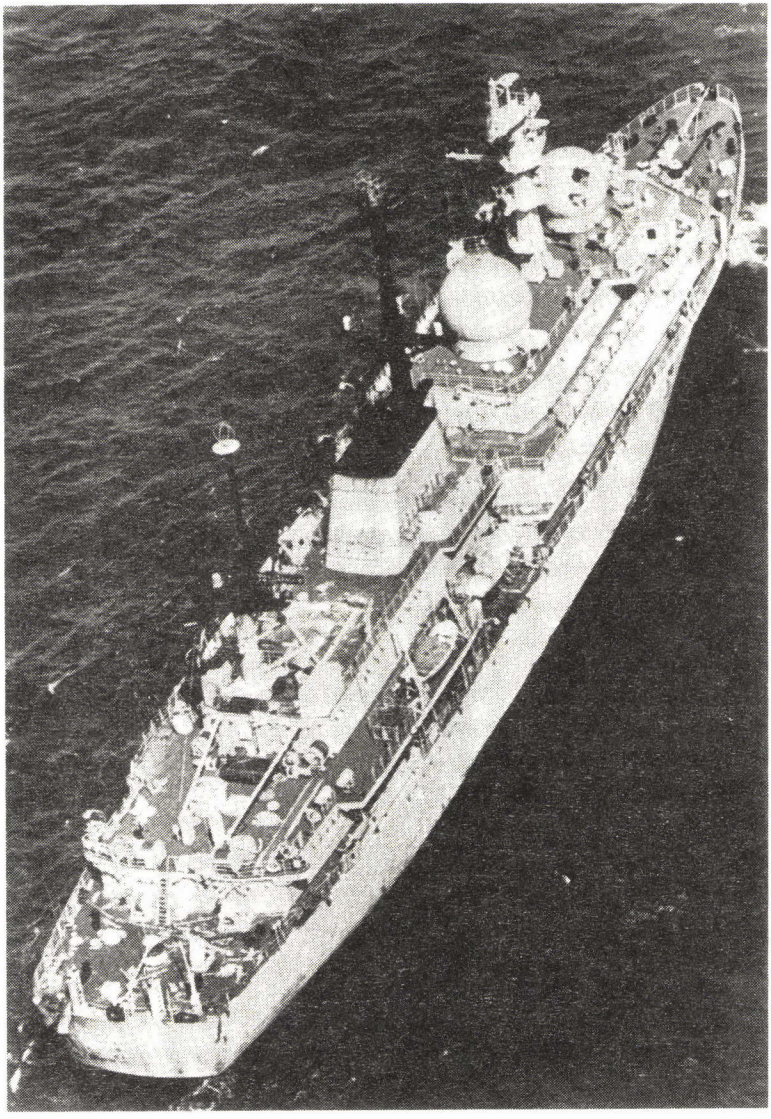
9 'Russians Play Peek-a-Boo Off Pearl', *The Honolulu Advertiser*, 15 December 1981; 'Russian Spy Ship Off Diamond Head', *Honolulu Star-Bulletin*, 16 December 1981; 'Soviet Spy Ship Moves Closer', *The Honolulu Advertiser*, 16 December 1981; 'Soviet Spy Ship Spends Christmas Off Oahu', *Honolulu Star-Bulletin*, 25 December 1981,; and Harold Morse, 'Lurking Soviet Spy Ship Makes No Waves', *Honolulu Star-Bulletin*, 26 January 1982, p.A-12.

10 Harold Morse, 'Armed Russian Spy Vessel Operating in Hawaii Area', *Honolulu Star-Bulletin*, 16 September 1983; 'Soviet Spy Ship At Work Off Oahu', *The Honolulu Advertiser*, 16 September 1983; 'Spy Ship', *Honolulu Star-Bulletin*, 17 September 1983; 'Spying on the Spies', *The Honolulu Advertiser*, 18 September 1983; and 'Russian Spy Ship Sailing Northwest', *Honolulu Star-Bulletin*, 20 September 1983.

11 'Soviet Ship May be Spying on U.S. Naval Operations', *Honolulu Star-Bulletin*, 31 July 1984; 'Soviet Vessel 5 Miles Off is Spy Ship', *The Honolulu Advertiser*, 31 July 1984; 'Two Soviet Spy Ships Spotted Off West Coast', *The San Diego Tribune*, 21 August 1984, p.A14; and 'Navy Coolly Eyes Soviet Spyships Off West Coast', *New York Post*, 22 August 1984, p.16.

12 'Soviet Spy Ship Back in Isle Waters', *The Honolulu Advertiser*, 25 October 1984; 'Second Soviet Ship in Isle Waters', *Honolulu Star-Bulletin*, 3 November 1984; and 'Second Soviet Ship Nosing Around', *Honolulu Star-Bulletin*, 5 November 1984.

Figure 4: The SSV 493, a *Balzam* class AGI, photographed nine miles off Pearl Harbor, 17 September 1983



Source: 'Spying on The Spies', *The Honolulu Advertiser*, 18 September 1983.

Fleet Ex '85 then being conducted near Hawaii.[13] The *Chirikov*, an oceanographic research vessel, also operated near Hawaii in October-November 1984,[14] and reportedly also observed the *Fleet Ex '85* manoeuvres.[15] And in December 1984, the *Semyen Chelyushkin* (SSV 469), a 3,100-ton *Nikolay Zubov* class AGI, also visited Hawaiian waters.[16]

In August 1985, the *Selmon Zabaykalye* (SSV 464) returned to Hawaiian waters for about a week.[17] Among other intelligence activities, it was able to monitor an air defence exercise involving B-52 bombers from Guam and aircraft from the carrier USS *Kitty Hawk* conducting mock air raids on Oahu.[18] In November 1985, the SSV 493 *Balzam* class AGI returned to Hawaiian waters.[19] And in late

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13 'Soviet Spy Ship Back in Isle Waters', *The Honolulu Advertiser*, 25 October 1984; and 'Navy Jet Crashes at Sea During Carrier Landing', *Honolulu Star-Bulletin*, 27 October 1984.

14 'Second Soviet Ship in Isle Waters', *Honolulu Star-Bulletin*, 3 November 1984; and 'Second Soviet Ship Nosing Around', *Honolulu Star-Bulletin*, 5 November 1984.

15 *Ibid.*.

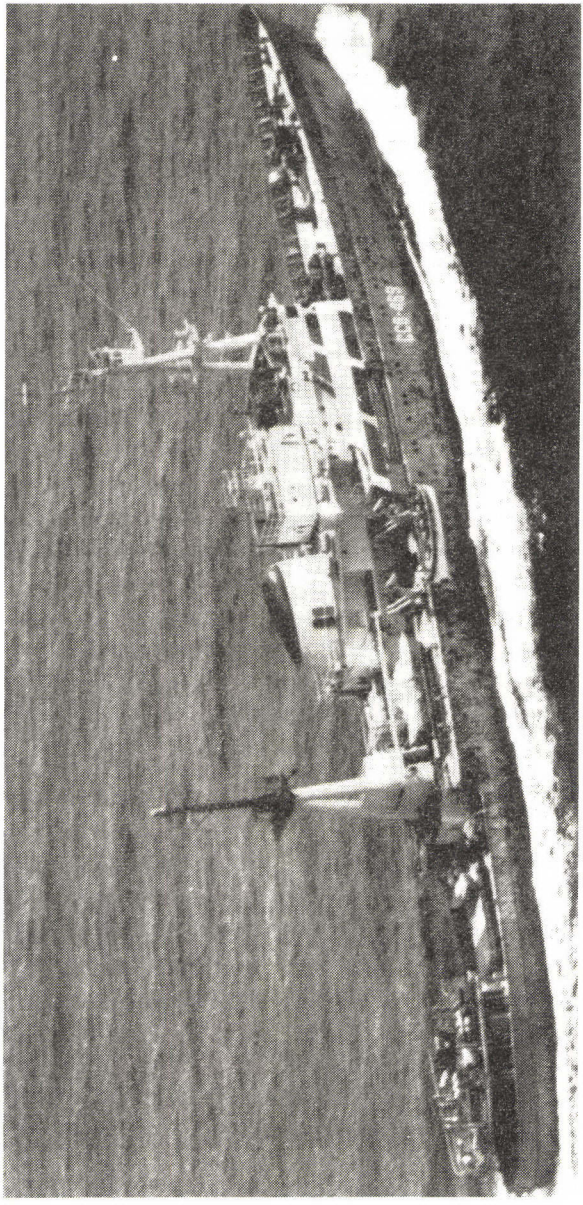
16 'Spy Ship Enters Hawaii Waters', *Honolulu Star-Bulletin*, 6 December 1984; 'Spy Ship Seen Near Oahu - Third Vessel Since July', *The Honolulu Advertiser*, 7 December 1984, p.A17; 'Navy Watches Spy Ship', *The San Diego Union*, 7 December 1984, p.A-24; and 'Spy Ship Semyen Chelyushkin Now 20 Miles South of Kauai', *The Honolulu Advertiser*, 9 December 1984.

17 'Russian Spy Ship Near Isles', *Honolulu Star-Bulletin*, 3 August 1985; 'Navy Keeping Eye on Soviet Spy Ship', *The Honolulu Advertiser*, 4 August 1985; 'Spy Ships Are Tracked Off Oahu', *Honolulu Star-Bulletin*, 6 August 1985; 'Navy Tracking Russian Spy Ships Off Oahu and State of Washington', *Honolulu Star-Bulletin*, 6 August 1985; and 'Spy Ship is Out of Region, Navy Reports', *Honolulu Star Bulletin*, 8 August 1985.

18 'Russian Spy Ship Near Isles', *Honolulu Star-Bulletin*, 3 August 1984.

19 'Armed Soviet Spy Ship is Off Kahuka', *Honolulu Star-Bulletin*, 7 November 1985, p.A-8; and 'Soviet Ship Being Watched', *The Honolulu Advertiser*, 8 November 1985.

Figure 5: The *Semyen Chelyushin* (SSV 469), a *Nikolay Zubov* class AGI, operated off Hawaii in December 1984



December 1985, the *Primorye* (SSV 465) arrived to begin a 4-week patrol around the islands.[20]

In summary, during the decade from the mid-1970s through to 1985, Soviet AGIs operated in Hawaiian waters for an average of about 30 ship-days per year.[21]

In 1986, the rate of AGI operations around Hawaii doubled to 60 ship-days.[22] The *Primorye* (SSV 465) which arrived at the end of December 1985 stayed until late January 1986.[23] At the end of February 1986, the *Gavril Sarychev* (SSV 468) spent a few days off Kauai.[24] On 21 March, a *Moma* class AGI began operations off Oahu and stayed in the area for more than three weeks.[25] It was joined by another AGI in mid-April 1986.[26]

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20 'Soviet Spy Ship Monitored Off Pearl', *The Honolulu Advertiser*, 1 January 1986, p.A-7; 'Soviet Spy Ship Still Being Monitored', *The Honolulu Advertiser*, 2 January 1986; 'Soviet Ship East of Maui', *The Honolulu Advertiser*, 3 January 1986; 'Soviet Spy Ship Moving Away Again', *The Honolulu Advertiser*, 5 January 1986; and 'Soviet Spy Ship Sighted Off Kauai', *Honolulu Star-Bulletin*, 26 February 1986.

21 See 'Excerpts from Remarks by Admiral David E. Jeremiah, Commander-in-Chief U.S. Pacific Fleet, at the Regional Meeting of the Western Washington Chapter of the Society of Professional Journalists, Bellevuie, Washington, 8 April 1989', *Navy Information*, (Public Affairs Office, Commander-in-Chief, U.S. Pacific Fleet, Pearl Harbor, Hawaii), 8 April 1989.

22 See Harold Morse, 'Soviets Seen Raising Naval Role in Pacific', *Honolulu Star-Bulletin*, 27 January 1989, p.A-6; Jim Borg, 'Navy Says Gorbachev Broke Pledge on Pacific Sub Force', *The Honolulu Advertiser*, 27 January 1989, p.1; and 'U.S. Admiral Reports New Soviet Sub', *The Washington Post*, 28 January 1989, p.A6.

23 'Soviet Ship East of Maui', *The Honolulu Advertiser*, 3 January 1986; and 'Soviet Spy Ship Sighted Off Kauai', *Honolulu Star-Bulletin*, 26 February 1986.

24 *Ibid.*.

25 'Smile, We're on Candid Camera', *The Honolulu Advertiser*, 7 April 1986; and 'Soviets Send Second Ship to Watch Isles', *The Honolulu Advertiser*, 14 April 1986.

26 *Ibid.*.

In 1987, the rate of AGI operations more than quadrupled again. On 26 January 1989, speaking at a ceremony aboard the USS *Coronado*, the flagship of the Third Fleet, Admiral David E. Jeremiah, Commander-in-Chief of the Pacific Fleet, stated:

> The presence of Soviet intelligence-collection ships in the near vicinity of the Hawaiian Islands has grown from 60 days in 1986 to more than 250 days in 1987 and 1988.
>
> I venture to say that my words are being recorded on one sitting off the harbor [i.e. Pearl Harbor] right now.[27]

And in March 1989, Admiral Jeremiah stated:

> Two years ago [i.e. 1986] Soviet spy ships spent about 60 days a year in the waters around Hawaii. Now they spend about 260 days a year there.
>
> There's one 14 miles south of Pearl Harbor at the moment.[28]

This increase in the number of ship-days off Hawaii (from 30 in the early 1980s to 60 in 1986 to 260 since 1987) is principally accounted for by an increase in the number of AGIs that visit the area. In 1988-89, for example, at least one AGI visited the islands each month. Further, however, the increased endurance of the newer AGIs such as the *Balzams* has allowed them to spend more time on station on each call; the Soviet Navy has also developed a system of using fishing boats and merchant vessels to resupply and refuel the AGIs while on station off Hawaii.[29]

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27 See Harold Morse, 'Soviets Seen Raising Naval Role in Pacific', *Honolulu Star-Bulletin*, 27 January 1989, p.A-6; Jim Borg, 'Navy Says Gorbachev Broke Pledge on Pacific Sub Force', *The Honolulu Advertiser*, 27 January 1989, p.1; and 'U.S. Admiral Reports New Soviet Sub', *The Washington Post*, 28 January 1989, p.A6.

28 Cited in William Matthews, 'U.S. Fleet in Pacific Bulwark for the Area's Prosperity', *Navy Times*, 3 April 1989, p.14.

29 *Ibid.*, p.15; and briefing by Brigadier General M. Covault, Director Policy and Plans, Commander-in-Chief Pacific (CINCPAC) and Major Thomas W. Shubert, ANZUS Desk Officer, CINCPAC, 3 March 1989.

Figure 6: The SSV 80, a *Balzam* class AGI, operated off Hawaii from 5-17 October 1987

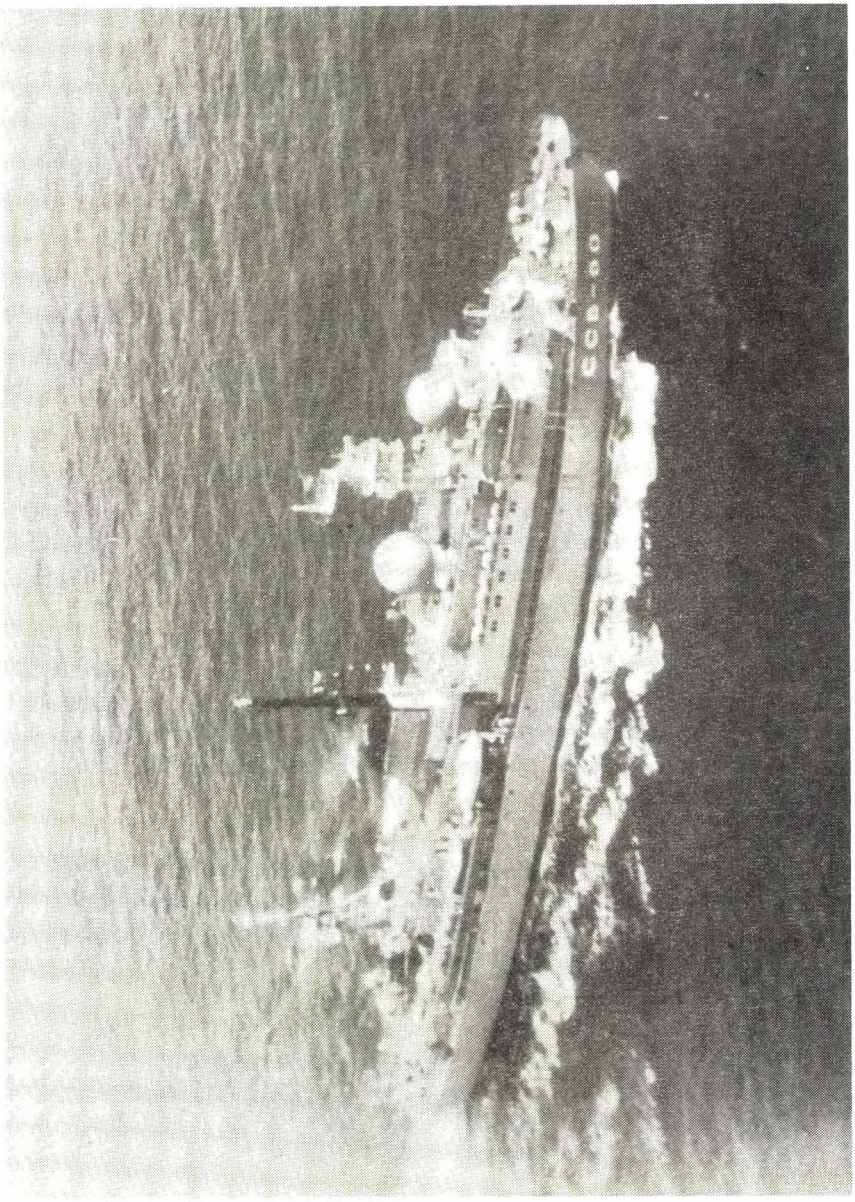


Figure 7: The *Gavril Sarychev* (SSV 468), a *Nikolay Zubov* class AGI which operated off Oahu in 1988. Note the 6-foot diameter mesh dish for microwave interception.

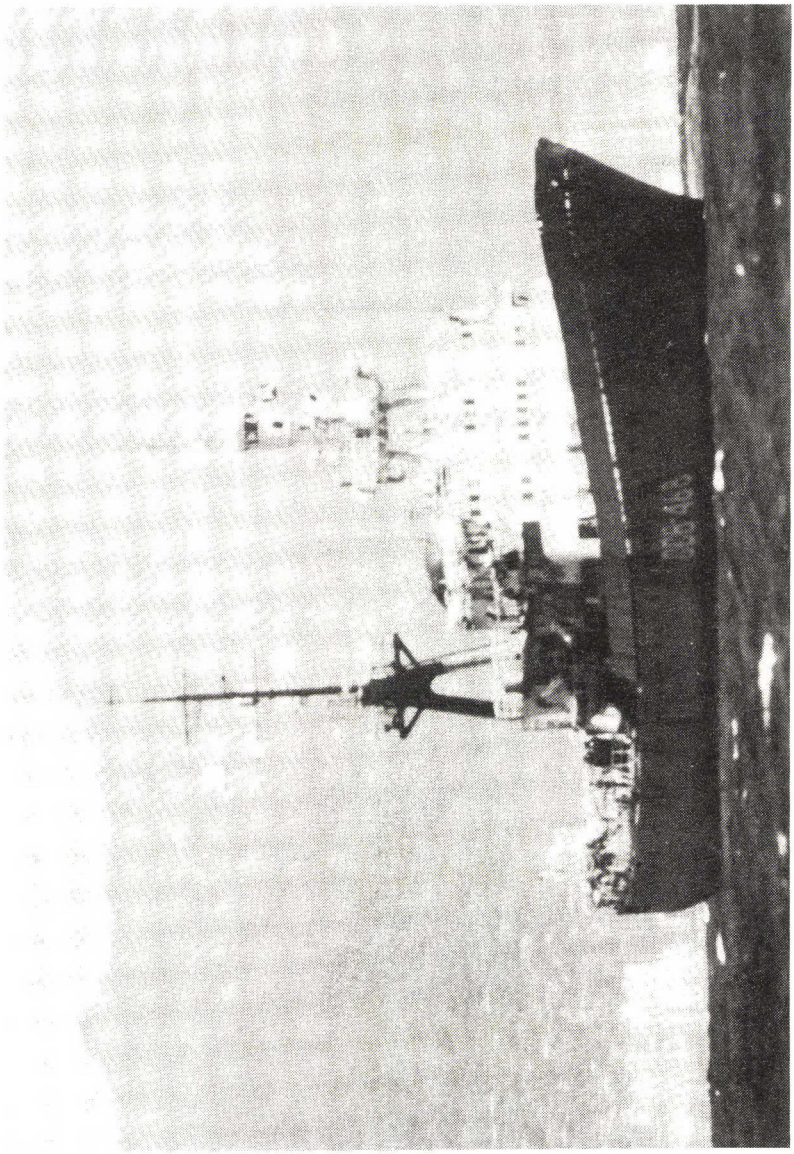


Figure 8: The *Vega* (SSV 474), a *Moma* class AGI, off Honolulu in 1988

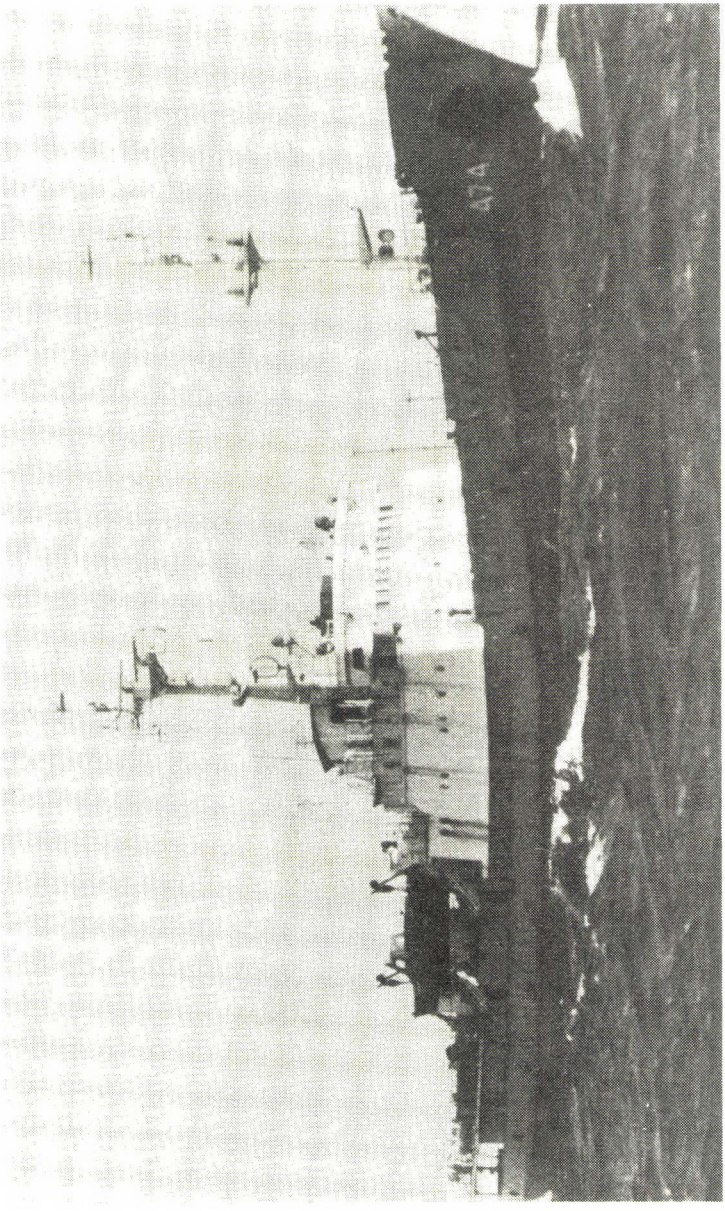


Figure 9: The *Ilmen* (SSV 472), a *Moma* class AGI, operated off Oahu in 1988

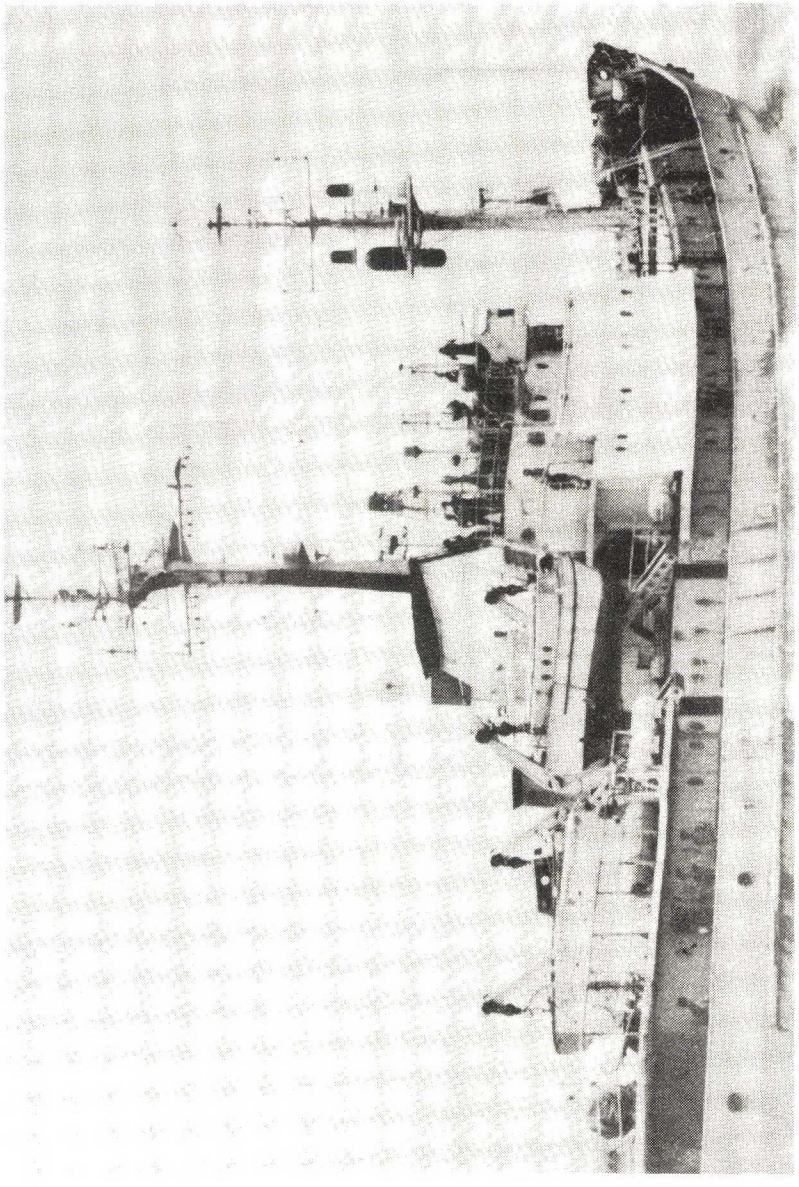
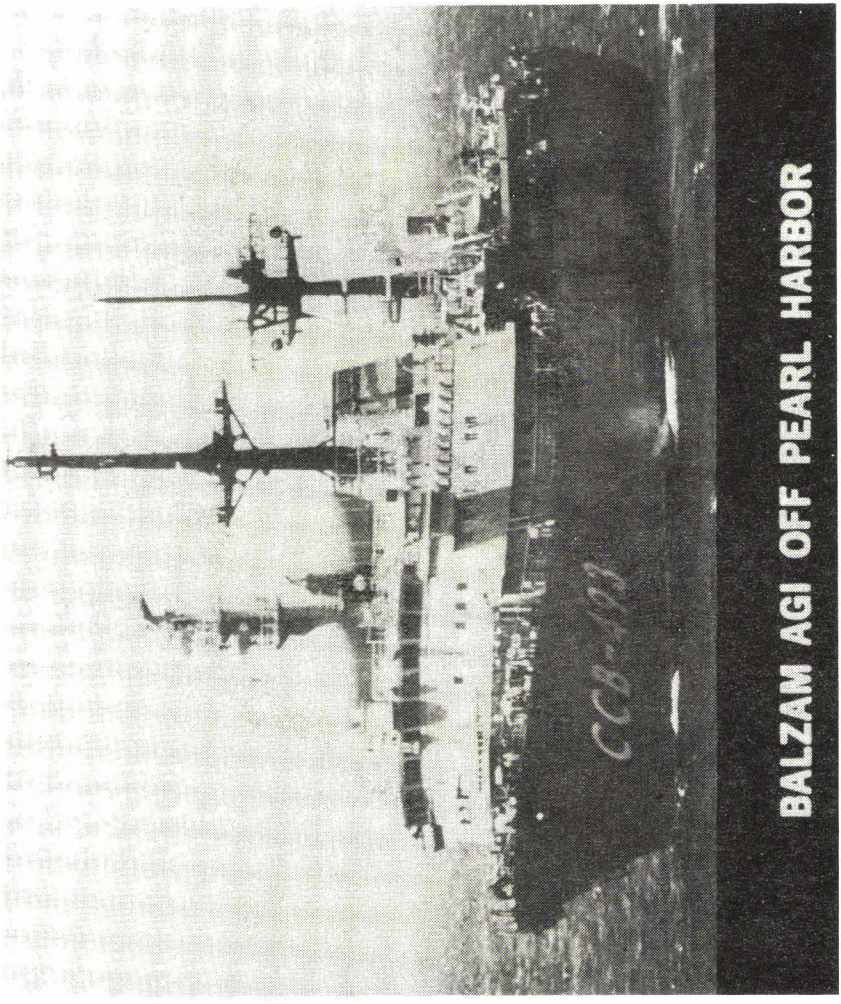


Figure 10: The SSV 493, a *Balzam* class AGI, off Pearl Harbor in 1988



Moreover, not only has the rate of AGI activity around Hawaii increased; the AGIs have also 'become increasingly sophisticated in their collection capabilities, evidenced in part by the continual growth in the number of electronic systems and antennas'.[30]

In the 1960s, the AGIs were configured only for high frequency (HF) and very high frequency (VHF) intercept operations, with various folded dipoles, vertical rods, disc cone omnidirectional receivers, and direction finding (DF) loop antennas. The *Primorye* class AGIs, which were designed in the late 1960s and which became operational in the early 1970s (and two of which are based in the Pacific), were equipped at the outset with microwave antennas for monitoring telecommunications and collecting telemetry. Subsequently, older AGIs have been fitted for microwave intercept operations as the mission has required. For example, the *Gavril Sarychev* (SSV 468), a *Nikolay Zubov* class AGI which operated off Oahu in 1988, was equipped for the occasion with a six-foot diameter mesh dish for microwave interception.

More recently, the *Balzam* class AGIs were designed from the outset to carry two large satellite communications antennas housed in 10-metre diameter radomes to monitor UHF and SHF satellite communications. Two of the class are based in the Pacific - the SSV 493, which began service in the Pacific in late 1982 and which first operated off Oahu in September 1983,[31] and the SSV 80, which began service in the Pacific in mid-1985. In addition to the *Balzams*, the Soviet Missile Range Instrumentation Ships (MRISs) and Space Event Support Ships (SESSs) are also used to conduct satellite communications (SATCOM) SIGINT operations. All of the MRISs are based in the Pacific, and sometimes operate near the Hawaiian islands. For example, in September 1987, the *Chukotka*, a *Siber* class MRIS equipped with two small SATCOM dishes, was stationed just to the northwest of the Hawaiian islands.[32] In September-October 1989, the *Marshal Nedelin* MRIS, equipped with a large *Ship Globe* SATCOM

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30 G. Jacobs, 'Soviet Navy AGIs', *Jane's Soviet Intelligence Review*, (Vol.1, No.7), July 1989, p.323.

31 'Special Soviet Spy Ship Prowls Coast', *The San Diego Union*, 26 March 1984, p.A-9.

32 Michael R. Gordon, 'Russian Lasers Reported Aimed at U.S. Planes', *The New York Times*, 3 October 1987, p.1.

antenna and three *Quad Ring* telemetry receivers, and the *Chazma*, a *Desna* class MRIS also equipped with a *Ship Globe* antenna, operated just to the southwest of the islands.[33] And in October-November 1989, the *Spassk*, a *Sibir* class MRIS, operated west of Oahu.[34]

The AGIs involved in the Hawaii operation have tended to station themselves as close as possible off Pearl Harbor or Honolulu while not infringing the US territorial waters - which, until the Reagan Administration extended US jurisdiction to 12 nautical miles on 28 December 1988, was three nautical miles. In 1986, for example, during the 60 ship-days that AGIs operated off Hawaii, they came within 12 miles of the coastline on some 200 occasions, generally parking themselves about five miles from the shore. According to a CINCPAC officer, a common pattern was for the AGIs to 'sit off Pearl Harbor during the weekdays, and then to move off Waikiki and Barbers Point Beach on weekends to watch the girls swimming and sun bathing'.[35] The decision to extend the US territorial limit to 12 miles was motivated in part by a desire to hinder the operations of these AGIs by keeping them further from the shoreline.[36] As President Reagan stated when proclaiming the 12 mile limit on 28 December 1988, 'extension of the territorial sea ... will advance the national interest and other significant interests of the United States'.[37] Indeed, it was a

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33 Jim Borg, 'Military Charges Soviets Playing "Laser Tag" in Pacific Encounters', *The Honolulu Advertiser*, 10 November 1989, pp.1, A-4; and 'Pacific Command Identifies Soviet Ships That Used Lasers', *Honolulu Star-Bulletin*, 10 November 1989. See also the captions on the US Navy photographs of the *Marshal Nedelin* and the *Chazma* released by the Department of Defense on 28 September 1989.

34 Jim Borg, 'Military Charges Soviets Playing "Laser Tag" in Pacific Encounters', *The Honolulu Advertiser*, 10 November 1989, pp.1, A-4; and 'Pacific Command Identifies Soviet Ships That Used Lasers', *Honolulu Star-Bulletin*, 10 November 1989.

35 Private discussions with CINCPAC officer, 3 October 1989.

36 See Andrew Rosenthal, 'Reagan Extends Territorial Waters to 12 Miles', *The New York Times*, 29 December 1988, p.A17; and 'Territorial Waters Extended to the Limit', *Insight*, 23 January 1989, p.25.

37 Cited in Andrew Rosenthal, 'Reagan Extends Territorial Waters to

photograph of the SSV 493 *Balzam* class AGI off Pearl Harbor taken in mid-1988 (see Figure 10) which, more than anything else, persuaded President Reagan to proclaim the 12 mile limit.[38] Since this proclamation, the AGIs have tended to station themselves about 14 miles from the shoreline.

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12 Miles', *The New York Times*, 29 December 1988, p.A17; and 'Territorial Waters Extended to the Limit', *Insight*, 23 January 1989, p.25.

38 Private discussions with CINCPAC officer, 3 October 1989.

CHAPTER THREE

THE SIGNALS MENU

HF and VHF Communications

There are numerous HF and VHF transmitters in Hawaii which provide an extremely lucrative source of signals intelligence. In the case of HF systems, for example, there is a HF transmitter at Bellows Air Force Station, Oahu, which is part of the Strategic Air Command (SAC) Pacific Giant Talk/Scope Signal III network; a transmitter at Ewa Beach, Oahu, which supports missile launches from the Western Space and Missile Center (WSMC) at Vandenberg Air Force Base, California; and a HF transmitter at the Naval Radio Transmitter Facility at Lualualei, Oahu, which provides HF communications for Navy operations across the Pacific.[1]

In the case of VHF transmissions, a lucrative source of SIGINT is air traffic control (ATC) communications at sites such as Barbers Point Naval Air Station and Hickam Air Force Base on Oahu. Barbers Point Naval Air Station, for example, is the homebase for Fleet Air Reconnaissance Squadron 3 (VQ-3), the Pacific TACAMO EC-130 aircraft which provide radio relay to the US Navy's Fleet Ballistic Missile (FBM) submarines in the Pacific, and for the Carrier Air Wings when aircraft carriers are at port in Hawaii. The ATC frequencies used at Barbers Point are 134.1 MHz for aircraft arrivals and departures, 126.2 MHz for the control tower, and 125.1, 123.8, 138.525, 138.55 and 138.975 for other ATC purposes.[2] Hickam Air Force Base is the homebase of the 9th Airborne Command and Control Squadron which operates four *Blue Eagle* EC-135J alternative airborne command centres for Pacific Command (PACOM). The relevant ATC frequencies used by Hickam are 125.1, 125.5, 125.8, 163.45, 164.2, 173.26 and 173.56 MHz.[3] (In addition, line-of-sight UHF communications with the *Blue*

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1 See William M. Arkin and Richard W. Fieldhouse, *Nuclear Battlefields: Global links in the Arms Race*, (Ballinger Publishing Company, Cambridge, Massachusetts, 1985), pp.186-188.

2 Tom Kneitel, *Air-Scan: Guide to Aeronautical Communications*, (CRB Research, Commack, New York, Fourth Edition, 1984), p.44.

3 *Ibid.*.

Eagle airborne command centres is provided out to a range of approximately 300 nautical miles via a remote antenna on Mount Kaala, the highest point on Oahu.)[4]

Terrestrial Microwave Communications

Hawaii is also the source of a large volume of extremely interesting and easily accessible terrestrial microwave communications. The most significant of these are those transmitted from the undersea cable/microwave terminal at Makaha on the northwest coast of Oahu and from the naval communications station at Wahiawa in the centre of the island.

Hawaii serves as a mid-point for trans-Pacific undersea cable communications, with most of the cable traffic from the continental United States (CONUS), Australia, Japan, Taiwan, Guam and other Pacific island states making landfall at Makaha. The actual terminal building is located about a hundred yards east of Farrington Highway. On the roof of the building are two 6-foot diameter microwave dishes pointed to a microwave relay station at Nanakuli some eight miles to the southeast (from which the connection runs to Honolulu).[5] An AGI stationed five miles south of Pearl Harbor or 14 miles south of Waikiki would be in direct line of sight of the Makaha-Nanakuli beam, allowing it to monitor all cable traffic from the CONUS, Australasia, East Asia and the Pacific island states addressed to Hawaiian destinations - including the telephone and data traffic to the large number of US military bases and intelligence facilities in Hawaii, commercial traffic from the mainland and Japan, and private telephone conversations.

Pacific Command also maintains a terrestrial microwave network on Oahu, with connections between Wahiawa and the US Air Force's Satellite Control Facility at Kaena Point, the Navy's transmission station at Lualualei, the Barbers Point Naval Air Station,

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4 Pacific Command, *PACOM Command and Control System Master Plan*, (Commander in Chief Pacific, Camp H.M. Smith, Hawaii, 26 March 1981), Enclosure 2, p.1.

5 *Ibid.*, Enclosure 5, p.22.

Figure 11: Trans-Pacific Undersea Cable Connections

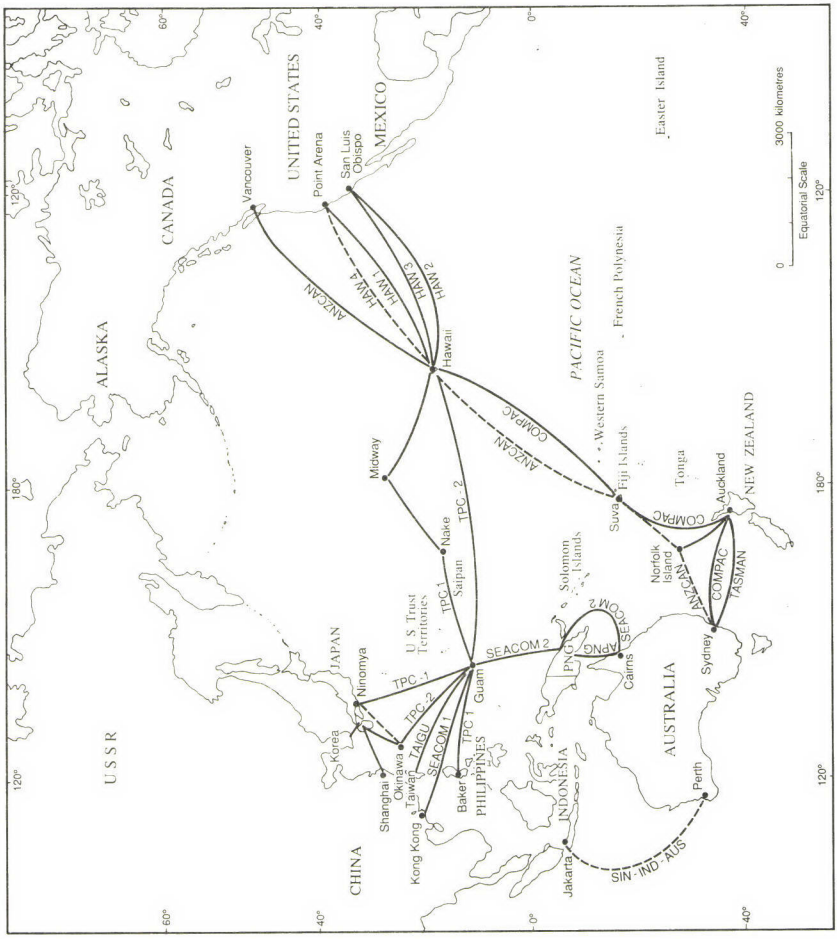
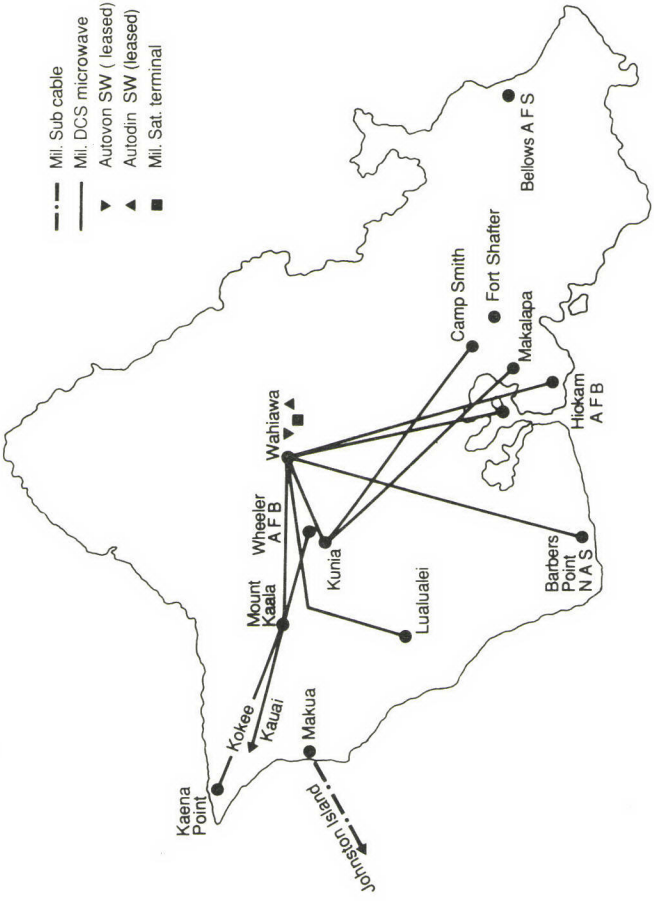


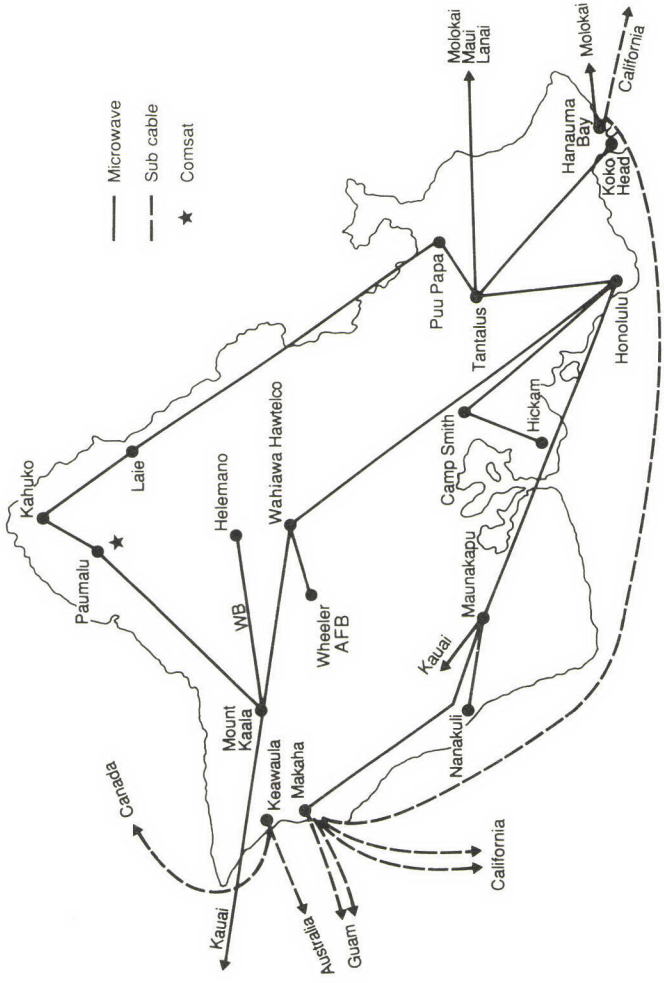
Figure 12: Microwave Terminal at Makaha

Figure 13: Military Communications Network, Oahu



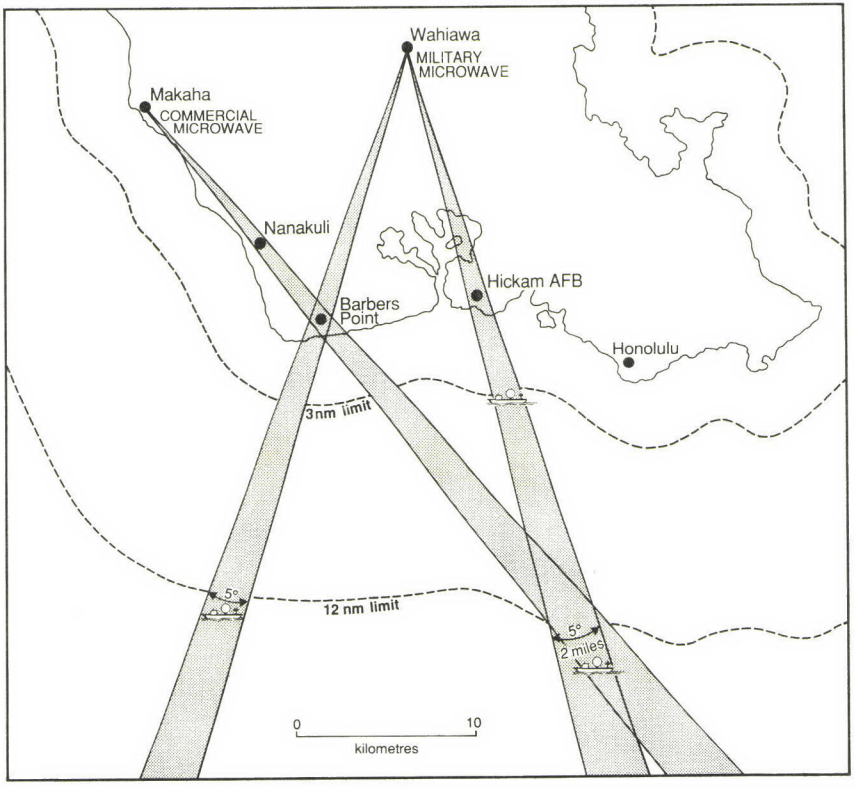
Source: Pacific Command, *PACOM Command and Control System Master Plan*, 26 March 1981, Enclosure 5, p.22.

Figure 14: Commercial Communications Network, Oahu



Source: Pacific Command, *PACOM Command and Control System Master Plan,* 26 March 1981, Enclosure 5, p.21.

Figure 15: Microwave Beams from Makaha to Nanakuli and from Wahiawa to Barbers Point and Hickam AFB



Hickam Air Force Base, and Camp H.M. Smith.[6] AGIs stationed 14 miles south of Barbers Point or Honolulu can easily monitor the microwave transmissions from Wahiawa to Barbers Point and Hickam Air Force Base respectively. (The latter AGI station also provides simultaneous access to the commercial microwave circuit from Makaha to Nanakuli.) (See Figure 15.)

Another interesting source of microwave signals is the US Navy's facilities at Barking Sands and Makaha Ridge on the island of Kauai, about 100 miles northwest of Oahu. Barking Sands is the base for the Barking Sands Tactical Underwater Range (BARSTUR), a 700 square mile range of highly instrumented underwater systems, including bottom-mounted hydrophones, used for testing carrier battle group operational procedures and techniques, submarine tactics, and naval weapons research and development; it generates an enormous volume of microwave telemetry and other signals. The facility at Makaha Ridge is an electronic warfare 'threat emitter' which simulates Soviet signal emissions in support of the naval activity at Barking Sands - signals which would be of immense interest to Soviet naval intelligence. In recent years, AGIs have stationed themselves off Kauai 'whenever there is activity there'.[7]

Satellite Communications

Hawaii is well-served by satellite communications (SATCOM) networks. The principal service is provided by the AT&T/COMSAT Corporation INTELSAT system via INTELSAT V satellites stationed at 174° E (the Pacific Ocean Region Primary Path satellite) and 179/180° E (the Pacific Ocean Region Contingency Spare satellite), with ground stations at Hickam and Paumalu on Oahu.[8]

The INTELSAT V satellites have 12,000 circuits for voice, telegraph, telex, facsimile and data services. Although the primary users are commercial and private subscribers, a small number are

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6 *Ibid.*, p.21.

7 'Loose Lips in Hawaii', *Newsweek*, 2 January 1989, p.4.

8 COMSAT Corporation, *Reference Guide to COMSAT Corporation's INTELSAT Satellite Services*, (COMSAT INTELSAT Satellite Services, Clarksburg, Maryland, January 1987), pp.13, 20-22, 30.

leased from INTELSAT by the US Defense Communications Agency (DCA). These DCA circuits are used for operational communications, intelligence communications, administrative and logistic communications, and communications with the US defence contracting community.

For example, the critical US missile early warning system uses Pacific Ocean INTELSAT circuits as a back-up service for communications between the Defense Support Program (DSP) satellite early warning system ground station at Nurrungar in South Australia and the US Air Force Space Command/Peterson Air Force Base and North American Air Defense Command (NORAD) complex at Colorado Springs, Colorado.[9]

The INTELSAT system is also used for intelligence communications. For example, ocean surveillance information collected by the Australian Defence Signals Directorate (DSD) high frequency direction finding (HF DF) SIGINT stations, and which is appropriate for the US Ocean Surveillance Information System (OSIS), is transmitted from Australia to Wahiawa on Oahu on a leased INTELSAT circuit code-named *Simpson*.

The INTELSAT V satellite stationed at 179/180° E is also equipped with UHF communications capacity that is leased by the INMARSAT COMSAT organisation. Since 1976, the US Navy has, in turn, leased UHF circuits from INMARSAT.

The INTELSAT V satellites have global, hemispheric, and 'spot' or 'zone' beam capabilities to limit the 'footprint' of the downlink. The global beams provide footprints which cover more than 40 per cent of the Earth's surface, while the hemispheric beams cover some 20 per cent. The footprints of the spot beams are also quite large - covering more than a million square kilometers of the Earth's surface. The satellites transmit in the 3.704-4.198 and 10.954-11.698 GHz ranges. Transmissions to the Paumalu and Hickam ground stations could be recorded without difficulty by the *Balzam* class AGIs or the MRISs operating hundreds of miles from Hawaii.

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9 See Desmond Ball, *Soviet Signals Intelligence (SIGINT): Intercepting Satellite Communications*, pp.11-15; and Desmond Ball, *A Base For Debate: The US Satellite Station at Nurrungar*, (Allen & Unwin, Sydney, London and Boston, 1987), pp.47-49.

Figure 16: INTELSAT Earth Station Connectivity (DoD Circuits)

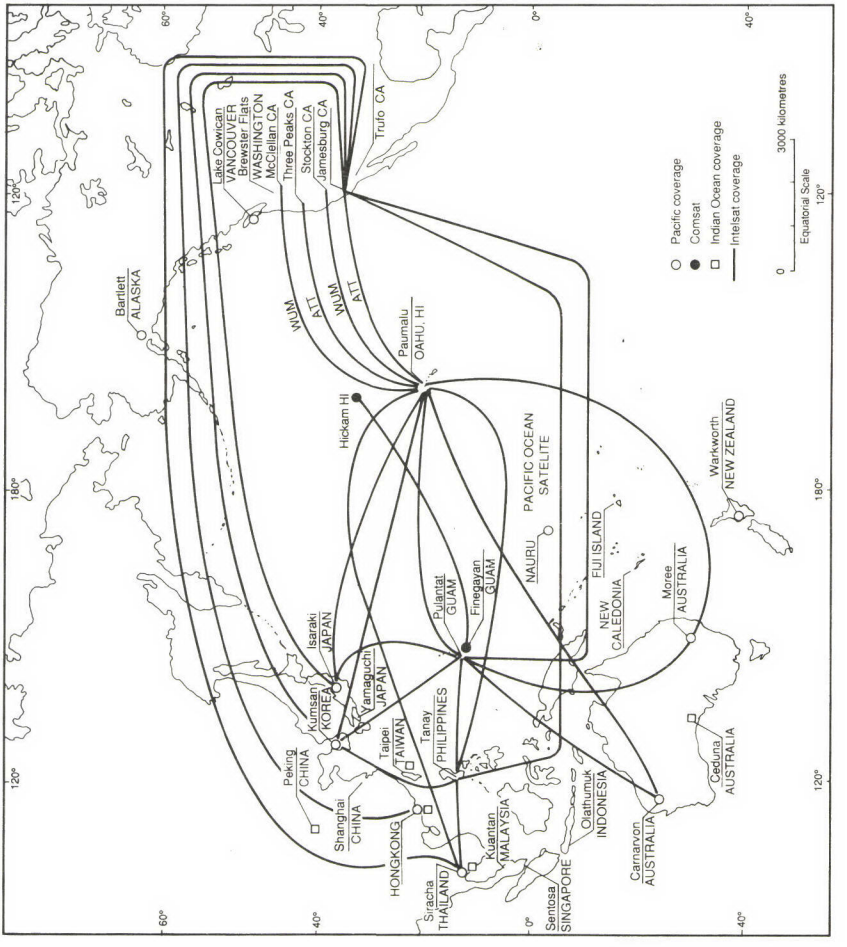

Figure 17: INTELSAT Ground Station at Paumalu/Sunset

In addition to INTELSAT, Hawaii is also serviced by Western Union WESTAR, COMSAT Corporation's COMSTAR, and Alascom Inc. *Aurora* COMSATs. These COMSATS are also used by the Department of Defense. For example, the Western Union/Hughes WESTAR satellites stationed at 99° E and 125.5° E are used to provide connectivity between Hawaii and the CONUS, with the 99° E WESTAR providing a link between Hickam in Hawaii and Stockton and Moffett Field in California, and the 125.5° WESTAR linking Wahiawa in Hawaii and McClellan Air Force Base in California.[10] Similarly, the COMSAT Corporation's COMSTAR is used by the DCA to provide a link between Sunset, near Paumalu, and Three Peaks in California.[11] The DCA has leased 48 circuits on the Alascom Inc. *Aurora* 1 satellite for AUTOVON communications traffic between the CONUS and Hawaii, via an earth terminal at Hickam.[12] In addition, *Aurora* circuits are leased by the DCA as part of the *Mystic Star* system which provides worldwide Presidential communications support, with a link from Hickam Air Force Base through McClellan Air Force Base in California to the *Mystic Star* control centre at Andrews Air Force Base near Washington, DC.[13]

Hawaii is a critical node in the US global defence satellite communications network. The Naval Communications Area Master Station Eastern Pacific at Wahiawa in the centre of Oahu is host to both a control station for the US Navy's Fleet Satellite Communication (FLTSATCOM) system, one of five such control stations located around the world, and a Net Control Facility (NCF) for the Western Pacific (WPAC) satellite of the Defense Satellite Communications System (DSCS).

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10 Defense Communications Agency (DCA), *Organization: Defense Communications Agency, Pacific Area*, (DCA Circular 640-45-5, Defense Communications Agency, Washington, D.C., 25 September 1984), Exhibit C-6.

11 *Ibid.*.

12 Information provided by National Gateway Telecom, Inc..

13 *Ibid.*.

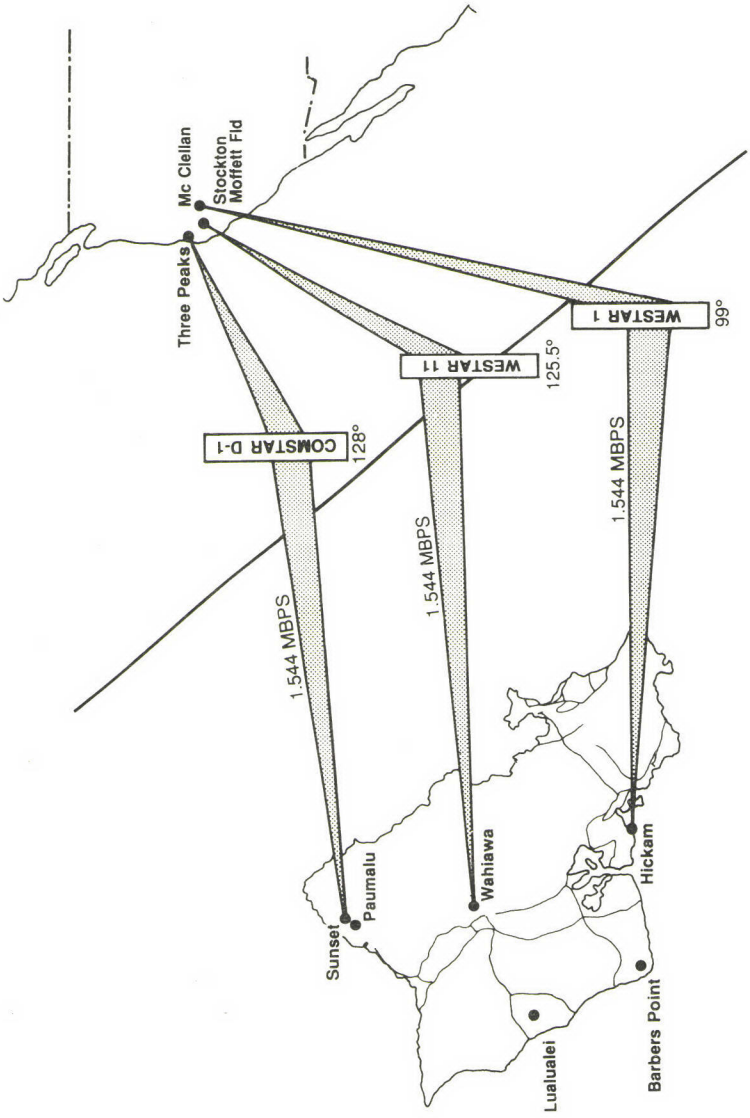

Figure 18: COMSTAR and WESTAR Connectivity Between Hawaii and CONUS

The US Navy's FLTSATCOM system was designed in the early 1970s to provide an Ultra High Frequency (UHF) fleet broadcast service to all US Navy ships, as well as providing command and control links for computer-to-computer exchange of digital data among shore stations, fleet ballistic missile (FBM) submarines, aircraft carriers, cruisers, selected aircraft, and other ships and submarines. It instantly connects the President and Secretary of Defense (collectively known as the National Command Authority) to field-level commanders over virtually the entire globe. It is also used for naval intelligence communications, providing a link between ocean surveillance information collection stations (such as SOSUS sites and *Classic Wizard/White Cloud* Ocean Surveillance Satellite ground stations), central ocean surveillance information processing and analysis stations, antisubmarine warfare (ASW) operations centres, and fleet assets.[14]

The antenna systems on the FLTSATCOM satellites include a 16-foot (4.88 metres) parabolic UHF system, a helical UHF receive antenna, an S-band omni-directional antenna, and a Super High Frequency (SHF) horn antenna used for up-link communications. Each spacecraft is equipped with 23 channels - nine 25 kHz wide-band channels for Navy relay communications; twelve 5 kHz narrow-band channels used by the Air Force as part of the AFSATCOM system for communications with Strategic Air Command (SAC) strategic nuclear forces; one 500 kHz wide-band channel used by the National Command Authorities (NCA); and one 25 kHz channel (SHF up and UHF down) for fleet broadcast.[15] The FLTSATCOM control terminal at Wahiawa is equipped with a 60-foot diameter AN/FSC-79 terminal,

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14 See Desmond Ball, 'The US Fleet Satellite Communications (FLTSATCOM) System: The Australian Connection', *Pacific Defence Reporter*, February 1982, pp.30-33; and 'Navy Space Expansion Requires Dedicated Satellites', *Defense Electronics*, (Vol.13, No.7), July 1981, pp.79-84.

15 'Fleet Satellite Communications System', in Floyd C. Painter (Executive Editor), *The C³I Handbook*, (EW Communications, Inc., Palo Alto, California, Second Edition, 1987), pp.71-72.

Figure 19: *Aurora* Digital AUTOVON Routing

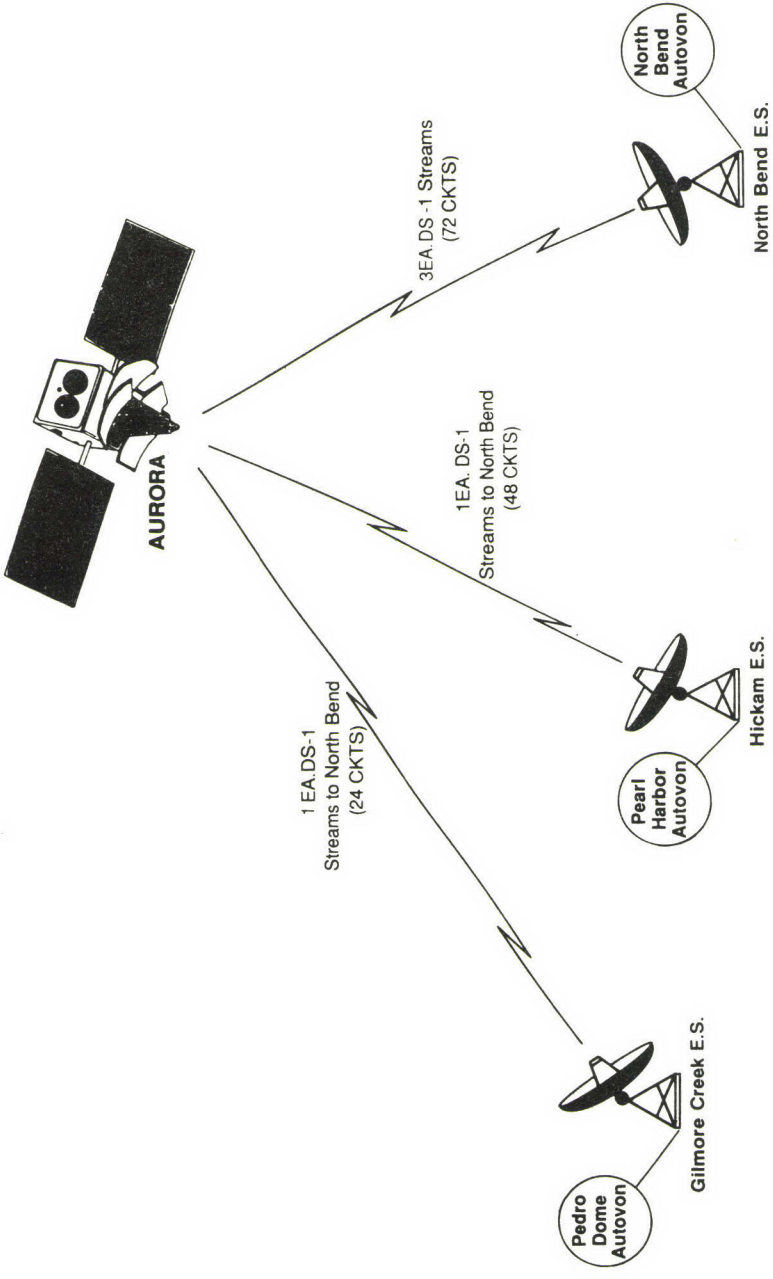
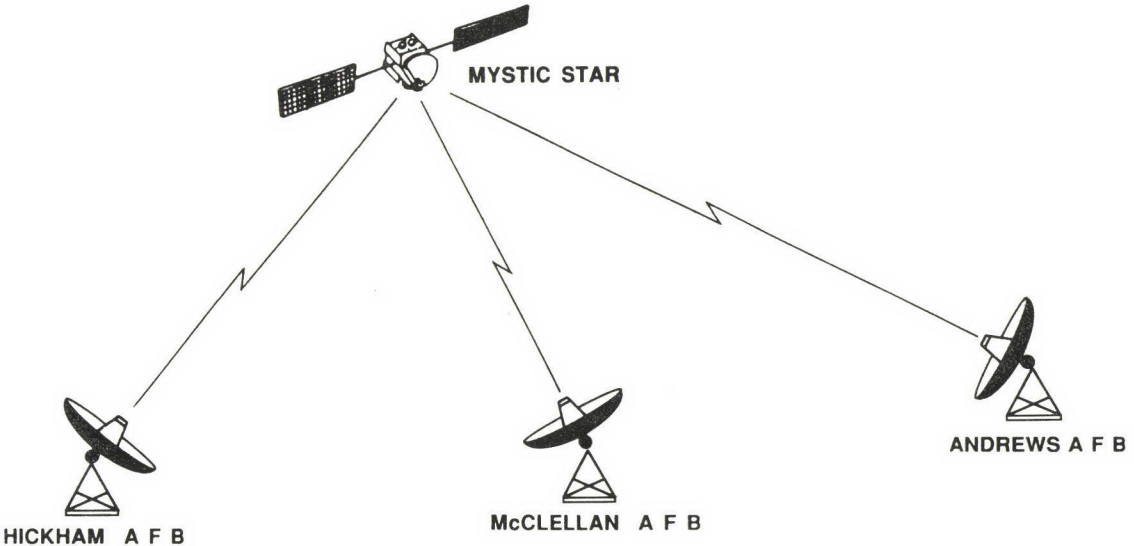


Figure 20: *Mystic Star* Routing

- Worldwide Presidential Support Circuits
- Control Center at Andrews A F B (Washington ,D C)



and is responsible for control of the FLTSATCOM satellite stationed at 172° E, which services the area from Southeast Asia across the Pacific to the west coast of the CONUS.[16]

The US Navy has long recognised the vulnerability of UHF SATCOM systems to interception. For example, Vice Admiral Gordon R. Nager, Director of Command and Control in the Office of the Chief of Naval Operations, testified on 23 June 1981 as follows:

> UHF satellites are susceptible to electronic jamming and earth terminal transmissions are vulnerable to intercept within line of sight.[17]

The Defense Satellite Communications System (DSCS) was designed primarily to support the long-haul communication requirements of a number of US Defense agencies and services, including the Defense Communications System (DCS) and the World Wide Military Command and Control System (WWMCCS). It provides communication services for the President, the National Command Authorities (NCA) and the unified and specified commands; the military services and combat forces; the early warning and other critical intelligence sites, including those maintained by the Central Intelligence Agency (CIA) and the National Security Agency (NSA); and NATO and allied governments as specified by international agreements. It provides analogue and digital transmission paths for virtually every type of telecommunication, including voice, data, facsimile, and high resolution imagery.[18]

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16 *Ibid..*

17 US Congress, House of Representatives, Committee on Armed Services, *Navy Leased Satellite (LEASAT) and Fleet Satellite (FLTSAT) Programs,* (U.S. Government Printing Office, Washington, D.C., 1981), p.8.

18 R.J. Raggett (ed.), *Jane's Military Communications 1986,* (Jane's Publishing Company Limited, London, 7th Edition, 1986), p.369.

The Wahiawa station is the Net Control Facility (NCF) for the West Pacific (WPAC) DSCS satellite stationed at 175° E. In addition, it provides a relay service with the CONUS via the East Pacific (EPAC) DSCS satellite stationed at 135° W. The DSCS terminals at Wahiawa consists of two 40-foot diameter AN/MSC-46 systems, two 60-foot diameter AN/FSC-78 systems, and an AN/TSC-54 terminal maintained on a contingency basis.[19] The DSCS WPAC satellite stationed at 175° E is a DSCS II satellite launched in October 1982, and is due for replacement by a DSCS III satellite in the near future. The DSCS EPAC satellite stationed at 135° W is a DSCS III satellite.

The antennae systems on the DSCS II satellite consists of an X-band multi-channel single-frequency conversion repeater with a bandwidth of 410 MHz and a capacity of 1,300 voice channels or up to 100 megabits per second of data; an Earth coverage (ec) antenna with a transmit beamwidth of 18°, a gain of 16-18 dBi, and an effective radiated power of 28 dBw; a steerable narrow-coverage (nc) antenna, with a beamwidth of 2.6°, a gain of 33 dBi, and an effective radiated power of 43 dBw; and a steerable area coverage (ac) antenna, with a beamwidth of 6.5°, a gain of 22 dBi, and an effective radiated power of 32 dBw. The nc and ac antennae are each steerable to ±10°, and they are both capable of receiving and transmitting simultaneously.

In addition, the satellite is equipped with an S-band biconical horn antenna with a torroidal beamwidth of 32° for the reception and transmission of telemetry and command data for satellite control.[20]

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19 Desmond Ball, *Code 777: Australia and the US Defense Satellite Communications System (DSCS)*, (Canberra Papers on Strategy and Defence No.56, Strategic and Defence Studies Centre, Australian National University, Canberra, 1989), p.92.

20 John W.R. Taylor (ed.), *Jane's All the World's Aircraft 1978-79*, (Macdonald and Jane's Publishers Limited, London, 1978), p.670; and R.J. Raggett (ed.), *Jane's Military Communications 1984*, (Jane's Publishing Company Limited, London, 5th Edition, 1984), p.791.

Figure 21: DSCS/FLTSATCOM Station at Wahiawa

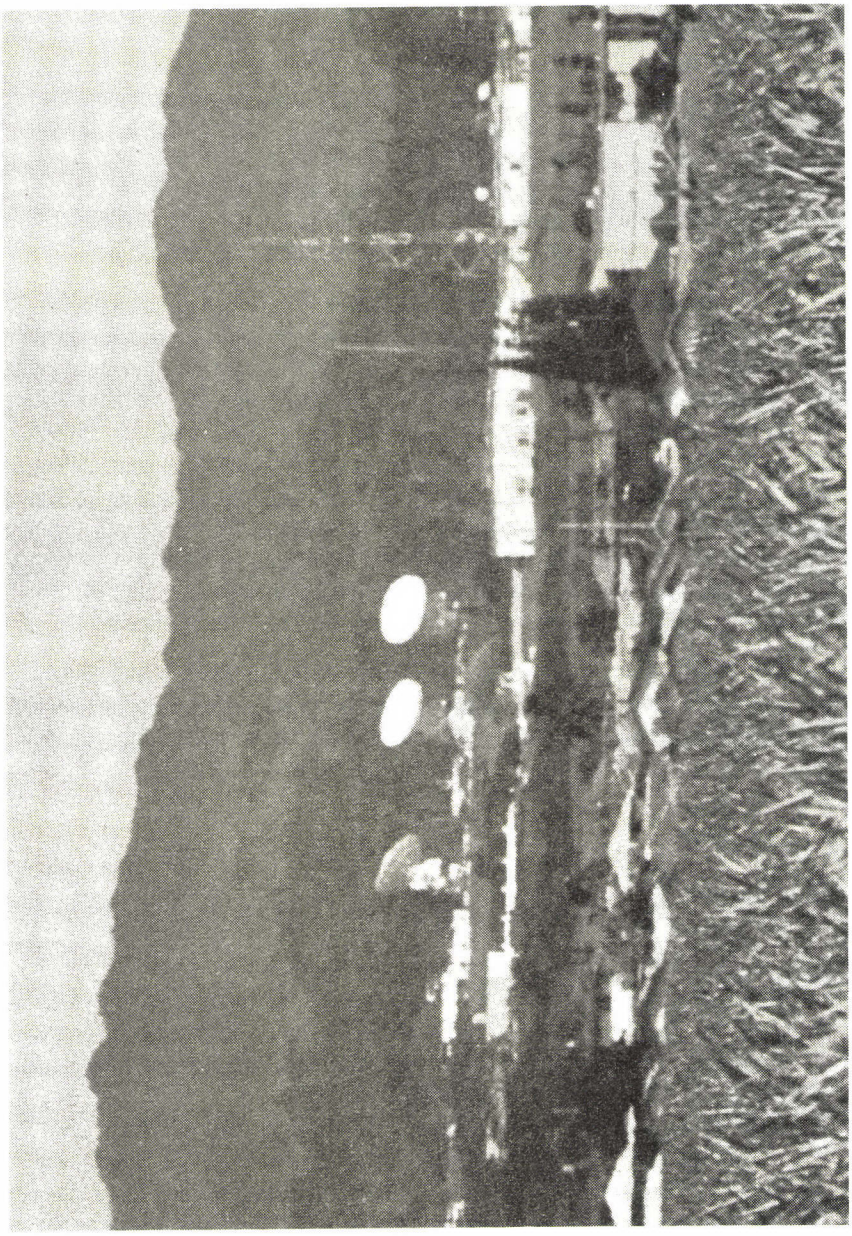
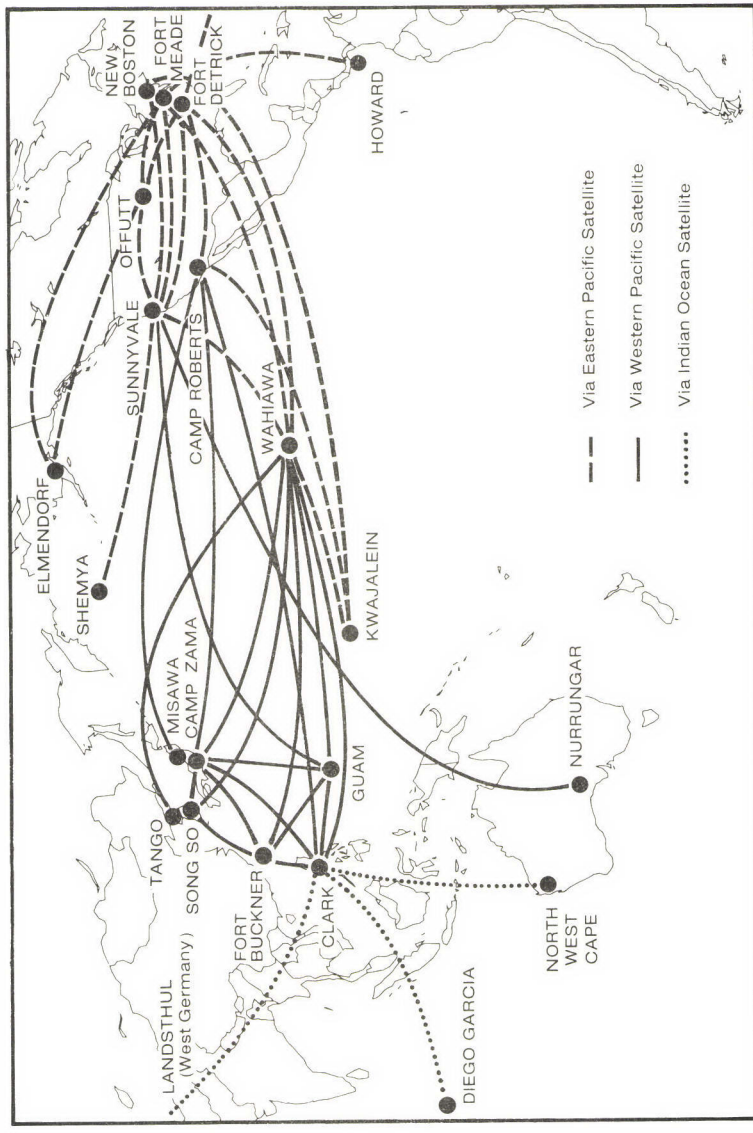


Figure 22: DSCS Trans-Pacific Connectivity

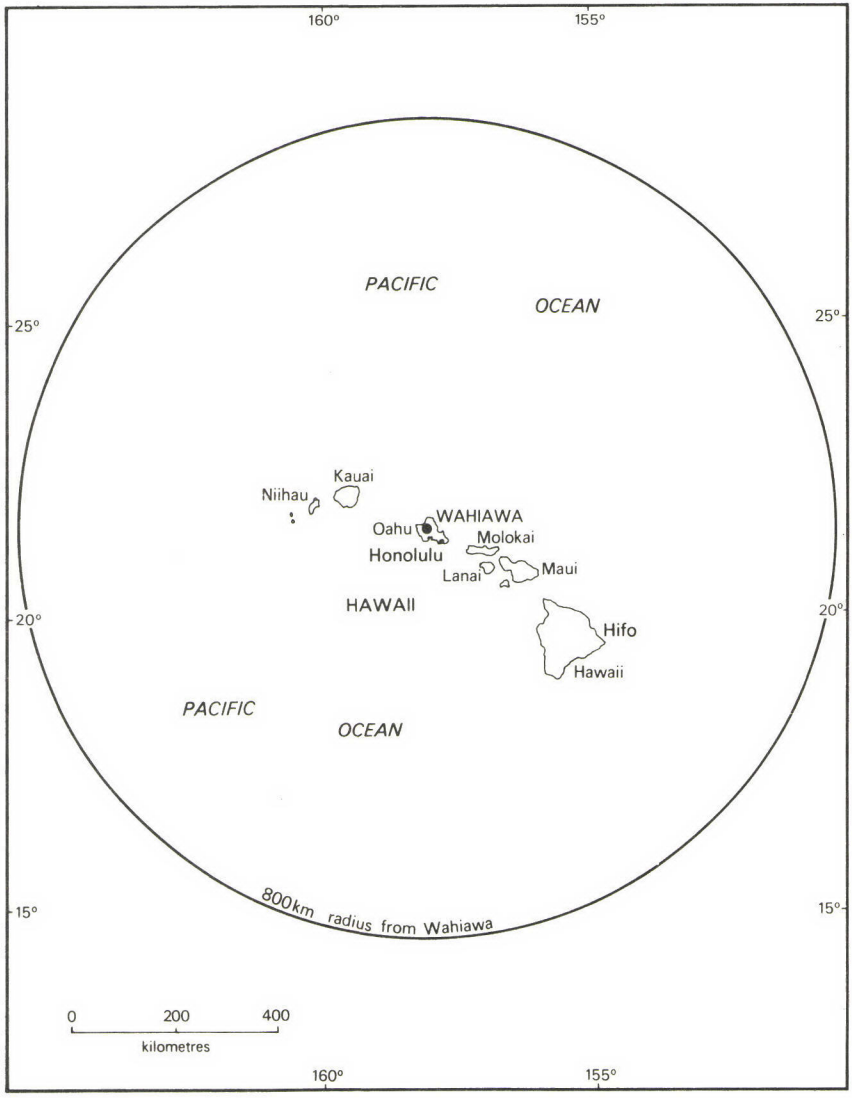


The earth coverage antenna on the DSCS II WPAC satellite, with a transmit beamwidth of 18°, provides coverage of an area measuring some 11,340 km in diameter - i.e. from Singapore across to California. The steerable area coverage antenna has a beamwidth of 6.5°, and provides coverage of an area some 4,100 km in diameter. The steerable narrow coverage antenna has a beamwidth of 2.5° and provides coverage of an area some 1,600 km in diameter. Hence, for example, communications from the Defense Support Program (DSP) early warning satellite ground station at Nurrungar, South Australia, transmitted to the continental United States (CONUS) via the narrow coverage DSCS WPAC satellite system and relayed through the DSCS WPAC NCF at Wahiawa, could be monitored by Soviet SATCOM intercept systems aboard ships stationed within some 800 km of the Oahu coast.

Similarly, SIGINT collected at the National Security Agency (NSA) stations at Misawa in Japan, Clark Field in the Philippines, Pyongtaek in South Korea, or Hanza or Futema on Okinawa, and transmitted to the NSA/Joint Intelligence Indications and Warning Centre at Kunia, near Wahiawa, via the DSCS II WPAC narrow beam, could also be monitored by Soviet SIGINT-equipped ships stationed within some 800 km of the coast.

The DSCS III satellite communications system consists of 10 antenna systems - four Earth-coverage horn systems (two each for reception and transmission); a 61-beam waveguide lens reception antenna, with an associated beam-forming network, which provides anti-jamming protection and a selective coverage capability; two 19-beam waveguide lens transmission antennae with beam-forming networks to rapidly produce selective coverage patterns tailored to the network of ground receiving terminals; a high-gain (3° beam) gimballed dish transmission antenna for spot-beam fixed coverage; and two UHF antennae, one a bow-tie reception system and the other a cross-dipole transmission system, for use by the Single Channel Transponder (SCT). The SCT is integrated into the spacecraft to provide secure and reliable dissemination of the Emergency Action Message (EAM) and Single Integrated Operational Plan (SIOP) communications for the US strategic nuclear forces and command systems. In addition, there is a dual-frequency (UHF/S-band and

Figure 23: Spot Beam of DSCS II Satellite Focussed on Wahiawa, Hawaii



SHF/X-band) Telemetry, Tracking and Control (TT&C) system for spacecraft control, tracking, positioning, and housekeeping.[21]

The 3° beamwidth high-gain gimballed dish transmission antenna provides a spot coverage of some 1,885 km diameter on the ground, while the two 19-beam waveguide lens transmission antenna provide spot coverages of 1°, or some 630 km diameter on the ground. Hence, for example, missile telemetry sent from Kwajalein in the Marshall Islands to Wahiawa via the 1° DSCS III spot beam, or early warning information sent from NORAD in Colorado to CINCPAC at Pearl Harbor, could be intercepted by SATCOM intercept systems aboard Soviet ships stationed within 300 km of the Oahu coast.

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21 Material on DSCS III satellites provided by Space Systems Division, General Electric, Valley Forge Space Centre, Philadelphia, Pennsylvania.

CHAPTER FOUR

MISSIONS OF THE HAWAII OPERATION

The Soviet AGIs and other SIGINT-equipped ships which are now stationed off the Hawaiian islands for more than 70 per cent of the time are capable of monitoring the complete frequency spectrum from the HF through the VHF and UHF to the SHF bands - thus providing access to HF and VHF radio communications, terrestrial microwave communications, and UHF and SHF satellite communications (SATCOMs). The intelligence collected includes naval and military communications, Department of Defense communications, intelligence communications, telemetry and other signals associated with weapons research and development, economic and commercial communications, and private telecommunications. The most significant recent trends, in addition to the dramatic increase in the overall level of Soviet SIGINT activity concerning Hawaii, are the increase in SATCOM SIGINT capability and the increasing interest and attention devoted to the collection of technical, industrial, economic and commercial communications.

Monitoring Naval Communications

A basic mission of all Soviet Navy SIGINT operations is monitoring US and Allied naval communications and other signals. As a spokesman for the 3rd Fleet stated when the *Semyen Chelyushkin* (SSV 469) visited Hawaiian waters in December 1984:

> While the specific mission is not known, previous Soviet deployments of this type were associated with collecting information on U.S. Navy submarine and surface operations.[1]

By sitting off Pearl Harbor, the homeport for ships of the 3rd Fleet and submarines of the Submarine Force Pacific and Submarine Force 3rd Fleet, the AGIs are able to visually and electronically monitor all submarine and surface movements in and out of the

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1 'Spy Ship Seen Near Oahu', *The Honolulu Advertiser*, 7 December 1984, p.A-17.

Harbor. Arrivals and departures are generally preceded by a marked increase in the volume of associated signal traffic - concerning not just operational orders, but also administrative and logistic arrangements, and personnel matters. The officers and sailors themselves will often telephone friends and families in the CONUS and elsewhere to inform them of their departures, schedules, ports of call and destinations.

More generally, the CINCPAC HQ at Pearl Harbor coordinates and controls all naval movements and operations throughout the Pacific, while the Naval Radio Transmitter Facility at Lualualei and the Naval Communications Area Master Station Eastern Pacific and the FLTSATCOM facility at Wahiawa provide communications support for these movements and operations. Monitoring the communications at Pearl Harbor and the transmissions of the Lualualei and Wahiawa facilities would provide Soviet naval intelligence with a detailed and comprehensive picture of US naval activities throughout the Pacific.

In addition to command and control communications, monitoring FLTSATCOM transmissions would provide access to digital data being exchanged by computers at shore stations with those aboard ships and submarines, as well as to naval intelligence communications concerning HF DF and SOSUS findings. The FLTSATCOM transmissions are of course encrypted, but the Soviets are known to possess technical manuals and other cryptographic material relating to the FLTSATCOM system.[2] In any case, even in the absence of an ability to decrypt and read the contents of the transmissions, analysis of the traffic patterns itself provides a lucrative and valuable source of intelligence.

Monitoring Other Military Communications

In addition to US Navy communications, Soviet SIGINT activities off the Hawaiian islands would also produce intelligence on other US military plans, deployments and operations. Monitoring air traffic control (ATC) communications, for example, would produce information on the status and movements of E-3 Airborne Warning

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2 See Desmond Ball, *Soviet Signals Intelligence (SIGINT): Intercepting Satellite Communications*, p.30.

and Control System (AWACS) aircraft, F-4C air defence fighters based at Hickam Air Force Base, and other US Air Force tactical fighter units. Communications relating to the maintenance and movement of nuclear weapons at West Loch, Pearl Harbor, as well as signals from the Pacific Air Forces (PACAF) HQ at Hickam Air Force Base concerning the release and dispersal of Air Force tactical nuclear weapons, would also be of great interest to Soviet intelligence.

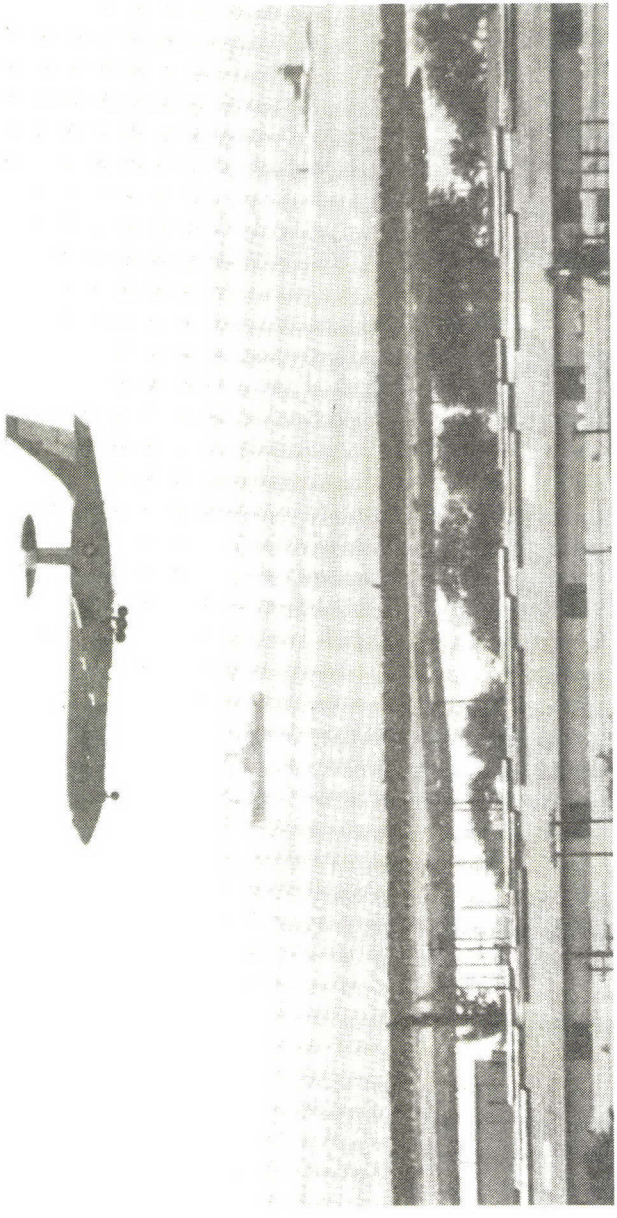
Monitoring National/Strategic Communications

Hawaii is the location not just of one national level command centre - US Pacific Command (PACOM) at Camp H.M. Smith at Halawa Heights, Oahu - but also of strategic communications facilities supporting the US National Command Authorities (NCA) and other national commands, such as the Strategic Air Command (SAC). For example, at Bellows Air Force Station and Hickam Air Force Base are transmitters and receivers respectively for the *Mystic Star* worldwide Presidential support system and the SAC Giant Talk/Scope Signal III network, used for transmitting Emergency Action Messages (EAMs) from the NCA to SAC bombers over the Pacific. Monitoring these communications would provide intelligence on US alert levels, movements of SAC forces, and movements of the senior Pacific commanders. In June 1980, for example, when a computer malfunction at NORAD in Colorado generated a false alarm of a Soviet missile attack, an AGI stationed off Oahu would have been able to monitor the take-off of the CINCPAC *Blue Eagle* alternative airborne command centre from Hickam Air Force Base - perhaps reporting it to Moscow even before the aircraft had reported its own movement to SAC HQ at Omaha, Nebraska, and the National Military Command Center (NMCC) in Washington!

Monitoring US Exercises

All major US naval exercises are invariably monitored by at least one Soviet SIGINT vessel especially detailed for the task. In addition, minor exercises are also monitored whenever a SIGINT vessel is in the area. For example, in May 1967 the *Peleng* (SSV 447), a *Pamir* class AGI, observed a US aircraft carrier conducting 'readiness

Figure 24: AGI monitoring E-3 AWACS Flight off Oahu



exercises' off Oahu.[3] In September 1968, the *Gavril Sarychev* (SSV 468) monitored the aircraft carrier USS *Coral Sea* conducting 'routine operational readiness tests' in Hawaiian waters.[4] And in August 1985, the *Selmon Zabaykalye* (SSV 464) monitored an air defence exercise involving B-52 bombers from Guam and aircraft from the carrier USS *Kitty Hawk* conducting mock air raids on Oahu.[5]

In October-November 1984, the *Selmon Zabaykalye* (SSV 464), together with the *Chirikov* 'oceanographic research vessel' monitored the *Fleet Ex '85* naval manoeuvres in Hawaiian waters.[6]

In July 1988, a *Balzam* class AGI monitored the RIMPAC 88 naval exercise (which involved 45 ships, seven submarines and 155 aircraft from the US, Canada, Australia and Japan), and at the conclusion of the exercise followed the aircraft carrier USS *Nimitz* right to the entrance to the channel to Pearl Harbor.[7] And in April-May 1990, an AGI 'dogged' the RIMPAC 90 exercise from when it began on 9 April off San Diego in southern California, into the manoeuvre area in the mid-Pacific (where according to exercise officials it 'forced cancellation of some sensitive RIMPAC operations'), to the conclusion of the exercise in Hawaii on 20 May 1990.[8]

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3 Gene Hunter, 'Russians Coming, Going Under Navy Surveillance', *The Honolulu Advertiser*, 10 May 1967, p.A-2.

4 'Spy Ship Visit a Mystery to Navy', *Honolulu Star-Bulletin*, 16 September 1968.

5 'Russian Spy Ship Near Isles', *Honolulu Star-Bulletin*, 3 August 1985.

6 'Soviet Spy Ship Back in Isle Waters', *The Honolulu Advertiser*, 25 October 1984; 'Navy Jet Crashes at Sea During Carrier Landing', *Honolulu Star-Bulletin*, 27 October 1984; and 'Second Soviet Ship Nosing Around', *Honolulu Star-Bulletin*, 5 November 1984.

7 'Spying on Rimpac', *The Honolulu Advertiser*, 22 July 1988.

8 Jim Borg, 'Admirals Agree RimPac Was Well Done', *The Honolulu Advertiser*, 16 May 1990; and Harold Morse, 'Soviet Ship Spied on RIMPAC Vessels', *Honolulu Star-Bulletin*, 16 May 1990.

Monitoring US Intelligence Operations

Many US intelligence operations in the Pacific are either controlled from or report through facilities in Hawaii. There are more than a dozen major intelligence collection and processing facilities on Oahu, including several control centres and processing facilities which receive intelligence collected at dozens of sites elsewhere in the Pacific - such as Japan, South Korea, the Philippines, Australia, Guam, and other Pacific islands. These are principally concerned with either SOSUS or SIGINT activities.

In the case of SOSUS undersea intelligence, the Oceanographic Systems Pacific facility at Pearl Harbor is the control and central processing facility for SOSUS data collected in the Pacific. Deployed around Hawaii is one of the world's largest networks of fixed hydrophone arrays, known as *Sea Spider*.[9] Other SOSUS facilities in the Pacific network are at Barbers Point Naval Air Station on Oahu, Adak Island in Alaska, Guam, the Philippines, and Japan. Data from these facilities is transmitted to Pearl Harbor via both FLTSATCOM and DSCS satellites.[10]

In the case of SIGINT, there are eight facilities in Hawaii, including the Naval Security Group (NSG) Pacific HQ and NSA/Central Security Service (CSS) Pacific HQ at Pearl Harbor; the Air Force Electronic Security Command (ESC) Pacific HQ at Hickam Air Force Base; the NSG Net Control Officer HF DF Net Pacific and AN/FRD-10 array at Wahiawa; and the US Army's Intelligence and Security Command (INSCOM) Field Station and NSA/Joint Intelligence Indications and Warning Center at Kunia.[11] Dozens of other SIGINT facilities throughout the Pacific report to these Hawaiian

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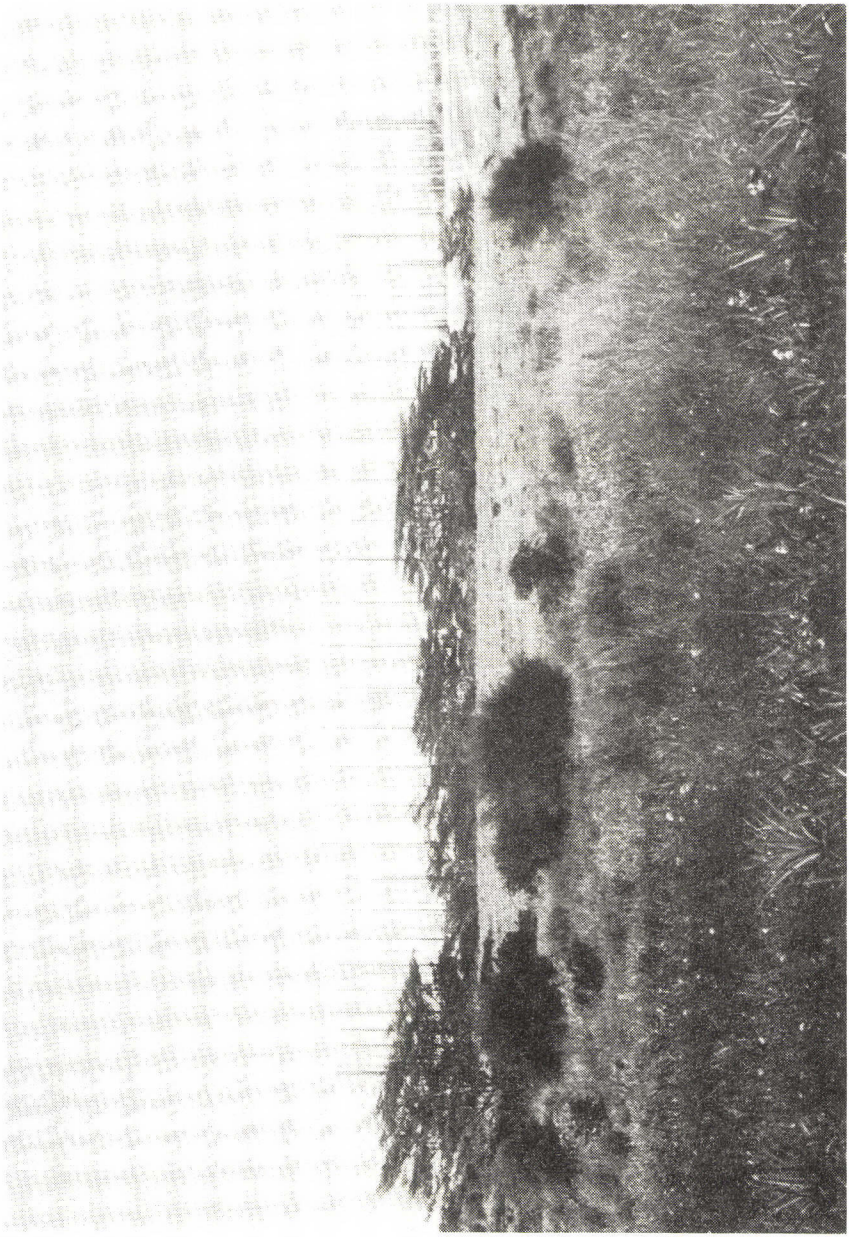
9 See Jeffrey T. Richelson and Desmond Ball, *The Ties That Bind: Intelligence Cooperation Between the UKUSA Countries - the United Kingdom, the United States of America, Canada, Australia and New Zealand*, (Unwin Hyman, Boston, Sydney, Wellington and London, Second Edition, 1990), pp.200, 201, 226.

10 *Ibid.*, pp.200, 201.

11 *Ibid.*, pp.336-337; Patrick D. Andres, 'Kunia: Yesterday and Today', *INSCOM Journal*, (Vol.5, No.2), February 1982, pp.16-17; and Carl Isakson, 'Tunnel Vision', *INSCOM Journal*, (Vol.5, No.2), February 1982, p.18.

Figure 25: AN/FRD-10 SIGINT array at Wahiawa



facilities. In the case of the NSG, for example, there are *Classic Wizard* Reporting System stations at Adak in Alaska, Misawa and Yokosuka in Japan, Hanza in Okinawa, Pyongtaek in South Korea, and in the Philippines, with numerous other subsidiary stations, which report to the Fleet Ocean Surveillance Information Center, Pacific (FOSIC PAC), at CINCPAC HQ at Pearl Harbor, via the *Rainform* Reporting System.[12] The ocean surveillance information reports are transmitted via the FLTSATCOM and DSCS satellites and HF radio networks.

One particularly fascinating US intelligence operation which was closely monitored by Soviet SIGINT ships was Project *Azorian/Jennifer*, which involved the attempted recovery of a Soviet *Golf II* ballistic missile submarine which sank about 750 miles northwest of Hawaii on 11 April 1968. The sound of an explosion aboard the submarine, as well as noises generated as the vessel sank to the ocean floor - including the sound of the implosion as the hull plates were rent apart by the increasing pressures as the submarine descended to the bottom - were detected by the *Sea Spider* hydrophone network and recorded at Pearl Harbor. As the Intelligence Center Pacific (IPAC) at Pearl Harbor reported details of the event to the Pentagon, NSA HQ at Fort Meade in Maryland, and the Naval Operational Intelligence Center (NOIC) at Suitland in Maryland, several AGIs, including a *Primorye* class vessel which had been operating off the *Polaris* submarine base at Guam, converged on the

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12 See 'Classic Wizard Reporting System', *CINCPACFLT Instruction S3251.1A*, 26 May 1982; 'Narrowband Assignment and Reporting Instructions for the Pacific High Frequency Direction Finding Net', *CINCPACFLT Instruction S3271.1A*, 17 February 1982; 'Rainform Formatted Message Reporting System', *CINCPACFLT Instruction C3431.1C*, 7 September 1977; 'Pacific Area Ocean Surveillance Report Services', *CINCPACFLT Instruction 3130.6F*, 8 November 1982; and 'Mission and Functions of Fleet Intelligence Center Pacific, Pearl Harbor, Hawaii', *CINCPACFLT Instruction 5450.1M*, 7 July 1984.

area where the submarine had sunk.[13] A continuous AGI presence in the area was maintained for several weeks.[14]

In 1971, the CIA contracted with Hughes/Global Marine Inc. to use the *Glomar II* undersea drilling ship to survey the ocean bottom where the *Golf* lay preparatory to implementing the project to recover the submarine. The activities of the *Glomar II* around the disaster site were monitored by five Soviet SIGINT-equipped ships.[15] Fearful of the Soviet presence (the USS *Pueblo*, a US SIGINT ship, had been seized and the crew captured by the North Koreans in January 1968), and unable to communicate with the CIA control group in Hawaii because the Soviet ships would monitor the communications, the *Glomar II* returned to Hawaii for a debriefing. One of the Soviet SIGINT ships followed the *Glomar II* until it entered Honolulu Harbor, then waited just outside the entrance of the bay for the *Glomar II*'s return to sea a few days later, and again pursued it back to the disaster site.[16]

In July-August 1974, the specially designed Hughes/Global Marine Inc. *Glomar Explorer* undertook the actual recovery operation. Again, the activities of this vessel were monitored by several AGIs and other SIGINT-equipped ships, including a Soviet Space Event Support Ship (SESS) equipped to monitor satellite communications.[17] Although the US Government has never disclosed what was recovered in this operation - it reportedly included the crushed and battered centre segment of the submarine containing the three SS-N-5 ballistic missiles, as well as two nuclear-armed torpedoes, radio equipment, the navigation system, the cypher machine and associated code books[18] - the Soviet SIGINT activity must have gleaned a considerable amount of information for Soviet naval intelligence.

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13 See Roy Varner and Wayne Collier, *A Matter of Risk*, (Coronet Books, Sevenoaks, Kent, 1980), p.24; and Clyde W. Burleson, *The Jennifer Project*, (Sphere Books Limited, London, 1979), pp.25-26.

14 *Ibid.*, p.28.

15 Varner and Collier, *A Matter of Risk*, p.45.

16 *Ibid.*, pp.46-47; and 'Russian "Invasion" of 1971 Explained', *Honolulu Star-Bulletin*, 19 March 1975.

17 Varner and Collier, *A Matter of Risk*, pp.127, 131, 132-133, 137, 142-143, 145, 164; and Burleson, *The Jennifer Project*, pp.105, 122-123.

18 *Ibid.*, pp.121-126.

Monitoring US Weapons Tests and Telemetry Transmissions

The initial deployments of Soviet SIGINT-equipped vessels into the mid-Pacific in the late 1950s and early 1960s were concerned with monitoring US nuclear weapons and satellite tests.[19] The first deployment occurred in 1958 in connection with US nuclear tests in the Bikini/Eniwetok area, and involved both SIGINT-equipped surface ships and submarines. During the course of these tests, the Soviet Union made several announcements which revealed accurate knowledge of the test program.[20] According to an intelligence assessment prepared for President Eisenhower on 22 October 1958, for example:

> The Soviet announcement of the detection of 32 U.S. tests was undoubtedly based on monitoring U.S. communications. A number of the tests were of such low yield as to almost certainly preclude their detection by long range detection methods. Furthermore, two of the announced test dates were false with no nuclear test having occurred.... However, the Joint Task Force (JTF) conducting the tests reports that on both of these dates a normal count-down was conducted, such count-downs being carried in the clear by radio communications to all the ships and installations supporting the Task Force. From other information furnished by the JTF, it is clear that the Soviets would have encountered very little difficulty in monitoring the internal communication system at the proving ground. Searches conducted by the JTF to clear the test area were primarily for safety reasons and were not directed toward detecting undersea craft. Even if a submarine stayed outside the

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19 See Nigel West, *The SIGINT Secrets*, p.277; and 'Soviet Ships Monitoring U.S. Tests, Cruising Near Christmas Is., Weapons Data Collected', *The Times* (London), 26 May 1962, p.8.

20 See Hanson W. Baldwin, 'Capital Suspects Atom-Test Spying by Soviet Agents', *The New York Times*, 10 October 1958, pp.1,9.

> test restricted zone, it could have been well within the general range of the local communications system. One additional item in support of the likelihood that the USSR information came from communication monitoring is the fact that one U.S. test, conducted on 26 July, was announced in Moscow within twenty-four hours after detonation. It is doubtful that espionage could have provided such rapid transmission of information....
>
> Our conclusion would be that the Soviet information came from official U.S. announcements about the test series, open broadcasts made for safety reasons announcing closed and restricted area for surface ships and aircraft at specific times and dates, and finally from monitoring of the JTF count-down communications from a point inside or immediately adjacent to the restricted area surrounding the test site.[21]

Soviet SIGINT-equipped vessels again visited the mid-Pacific in 1960, when the CIA was testing the technique of recovering photographic capsules from space, under the cover of the *Discoverer* biosatellite program, with the capsule re-entries occurring over Johnston Island, some 1,200 km southwest of Oahu.[22]

In May 1962, during the US nuclear test series in the Christmas Island (Kiritimati) area, some 1,750 km south of Oahu, three Soviet ships 'heavily loaded with electronic devices' - the *Shokalsky*, a 3,600 ton hydro-meteorological ship, together with two 'converted fishing trawlers' - stationed themselves within about 10-15 miles of the edge of the test area.[23] According to a Department of Defense spokesman, the three vessels were 'obviously engaged in a large-scale military

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21 Memo from the Special Assistant for National Security Affairs to President Dwight D. Eisenhower, *Comments on Baldwin Article*, 22 October 1958.

22 West, *The SIGINT Secrets*, p.277.

23 'Red Ships Spy on Pacific Nuclear Tests', *The Honolulu Advertiser*, 25 May 1962; and Jack Raymond, 'Soviet Ships in Area of U.S. Atom Tests', *The New York Times*, 26 May 1962, pp.1,7.

intelligence collection mission'.[24] The same three ships also collected electronic and other intelligence concerning the US nuclear tests near Christmas Island (Kiritimati) in May 1962,[25] and near Johnston Island in July and October 1962.[26]

Since the 1960s, the Soviet Navy has devoted considerable attention to monitoring the telemetry generated by US inter-continental ballistic missile (ICBM) and submarine-launched ballistic missile (SLBM) tests from the Western Space and Missile Center (WSMC) at Vandenberg Air Force Base in California across the western Pacific to the Kwajalein Missile Range (KMR) some 4,000 km southwest of Oahu. Data on the terminal phase of these missile flights is collected by land-based instrumentation facilities, transponders implanted on the ocean floor throughout the KMR, and *Caribou* aircraft flying from Kwajalein, and transmitted from Kwajalein to the WSMC Technical Control facility at Wheeler Air Force Base and the Honolulu Data Reduction Facility (HDRF) on Oahu via the DSCS EPAC satellite.[27] The telemetry is monitored by both AGIs stationed off Kwajalein and SATCOM SIGINT-equipped ships operating off Hawaii.

Another example of Soviet AGI activity concerned with monitoring telemetry generated in US weapons research and development programs is the activity directed at the US Navy's Barking Sands Tactical Underwater Range (BARSTUR) on the island of Kauai, as previously described. More than 900 anti-ship and anti-submarine missile launches are conducted at BARSTUR for test

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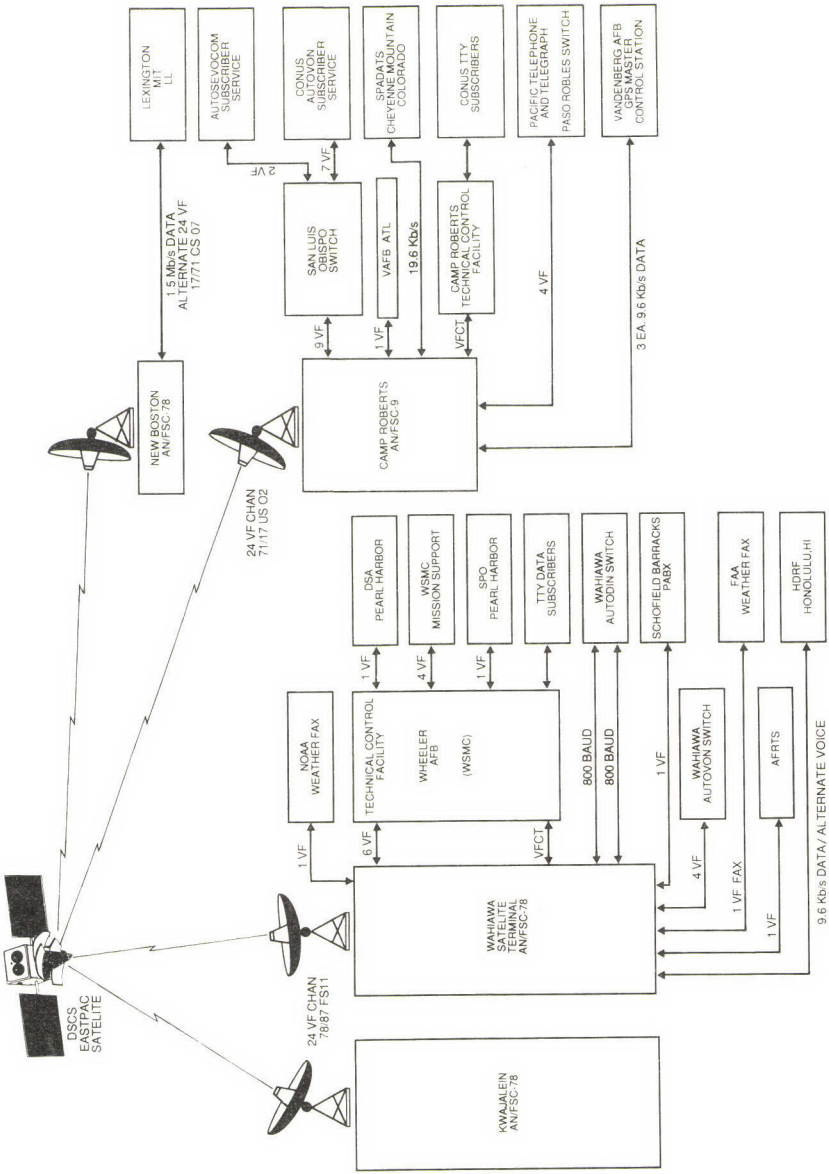
24 'Red Ships Spy on Pacific Nuclear Tests', *The Honolulu Advertiser*, 25 May 1962; 'Soviet Ships With Electronic Eyes Spy on U.S. A-Tests, Pentagon Says', *The Washington Post*, 26 May 1962, p.A11; and 'Soviet Ships Monitoring U.S. Tests, Cruising Near Christmas Is., Weapons Data Collected', *The Times* (London), 26 May 1962, p.8.

25 '13th N-Device Set Off Near Christmas Isle', *The Honolulu Advertiser*, 27 May 1962.

26 'Johnston Isle N-Blast Zone is Enlarged', *The Honolulu Advertiser*, 13 October 1962.

27 See Owen Wilkes, Megan van Frank, and Peter Hayes, *Chasing Gravity's Rainbow: Kwajalein and U.S. Ballistic Missile Testing*, (Report to Greenpeace Pacific, May 1990), p.9a.

Figure 26: Telemetry Data Flow from Kwajalein Facilities



purposes each year.[28] As noted above, AGIs station themselves off the Kauai Range 'whenever there is activity there'.[29]

Supporting Soviet Naval Exercises

Soviet AGIs and other SIGINT-equipped vessels generally accompany Soviet naval exercises and training manoeuvres in the mid-Pacific, on which occasions they perform several roles. First, they practice the support which they would provide to Soviet naval task forces in wartime. Second, they conduct communications security (COMSEC) operations in order to discern the details and patterns of electronic emissions which might compromise the movements and operations of the task forces to US and Allied monitoring activities. And, third, they monitor the communications and other signals of US and Allied ships and aircraft which might be themselves monitoring the Soviet exercises. In August-September 1974, for example, the *Barograf*, an *Okean* class AGI, operated near Hawaii in support of a three-ship Soviet task force (consisting of a *Kynda* class guided missile cruiser, a *Kamin* class guided missile frigate, and a fleet oiler) which exercised as close as 45 miles off Oahu in mid-September 1974.[30] And in April 1975 an AGI was part of a 20-ship Soviet naval task force (headed by the *Kiev* class anti-submarine carrier *Novorossiysk* and containing four guided missile cruisers and two frigates) which conducted training manoeuvres about 900 miles northwest of Midway Island.[31]

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28 Arkin and Fieldhouse, *Nuclear Battlefields*, p.186.

29 'Loose Lips in Hawaii', *Newsweek*, 2 January 1989, p.4.

30 'Which Way to Russia?', *The Honolulu Advertiser*, 12 September 1974; 'Soviet Ships Off Isles', *Honolulu Star-Bulletin*, 12 September 1974; and 'Soviet Ships Heading North', *Honolulu Star-Bulletin*, 17 September 1974.

31 'U.S. Says Soviet Naval Force is Training in Central Pacific', *The New York Times*, 15 April 1985, p.2.

Supporting Soviet Missile Tests and Space Launches

Since 1960, Soviet SIGINT-equipped ships have deployed to the mid-Pacific in connection with Soviet ICBM tests in the area. The ships are used to both track and collect telemetry from the missiles in their re-entry phase, and to monitor the activities of US ships and aircraft which might be observing the tests - in part, to determine what the US observers might be learning from the tests and how this information might be denied them.

The first Soviet ICBM launches into the mid-Pacific took place in January 1960. On that occasion, three *Sibir* class MRISs (including the *Chukotka*) were deployed to the impact area approximately 1,100 miles southwest of Hawaii.[32] The same three ships also supported a test series into a target area about 1,000 miles southwest of Hawaii in July 1960.[33]

In January-February 1961, four *Sibir* class MRISs - the *Sibir*, the *Chukotka*, the *Sakhalin*, and the *Suchan* (later re-named the *Spassk*) - deployed to a wide triangular area about 400 miles west of Midway Island and about 1,200 miles from Hawaii to support the *Sputnik* 7 satellite launch on 4 February and the *Venera* 1 Venus probe on 12 February 1961.[34]

The most recent Soviet ICBM tests into the mid-Pacific occurred in September 1987 and September 1989. On 29 and 30 September 1987, the Soviet Union test-fired two ICBMs (new versions of the heavy SS-18 ICBM) into a notified impact zone some 700 miles northwest of Kauai and 400 miles east of Midway Island. Two Soviet

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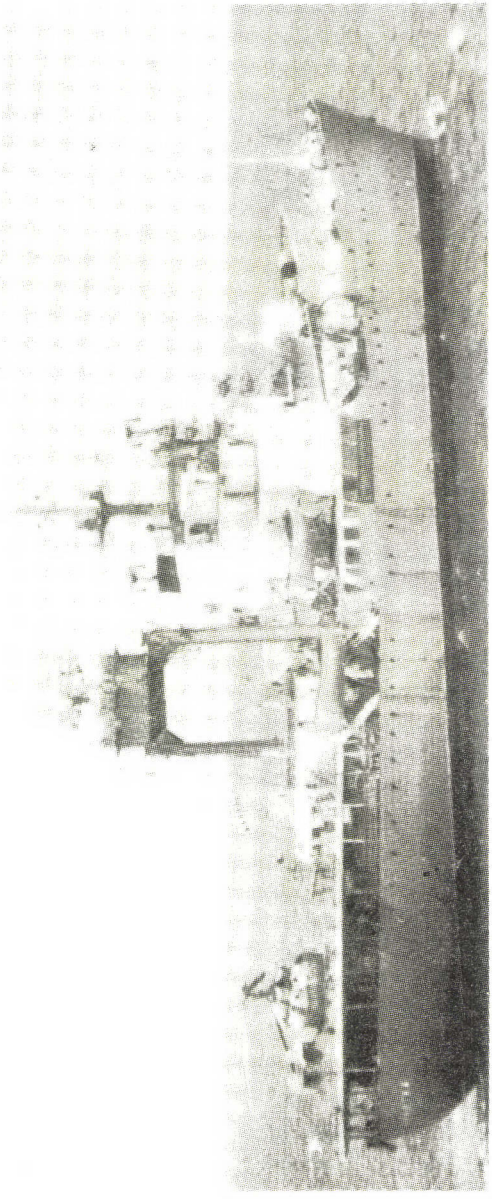
32 'Three Soviet Ships Patrol Pacific Test Area', *The Honolulu Advertiser*, 15 January 1960; and 'Check on Red Accuracy Abandoned', *The Honolulu Advertiser*, 24 January 1960.

33 Henry Chartzenbusch, 'Rocket-Missile Tests Ready to Start: Russia Sends Telemetry Ships Southwest of Isles', *The Honolulu Advertiser*, 5 July 1960.

34 'Red Missile Shot Hinted; Ships Sighted in Pacific', *The Honolulu Advertiser*, 11 January 1961; 'Soviet Missile Watch Ships Hold Positions', *The Honolulu Advertiser*, 24 January 1961; and 'Russia Ships Leave Pacific Tracking Stations', *The Honolulu Advertiser*, 17 February 1961.

Figure 27: The *Chukotka*, a *Sibir* class MRIS, operated northwest of the Hawaiian islands in September 1987



SIGINT-equipped ships were stationed in the area to support the tests. One of these, the *Chukotka*, a *Sibir* class MRIS, was involved in an incident on 30 September 1987 when it directed laser illumination at US P-3 and WC-135 aircraft monitoring the test launches.[35]

In September 1989, two MRISs - the *Chazma* and the *Marshal Nedelin* - supported the Soviet ICBM test series in which not only did impacts occur in the zone to the northwest of Kauai, but one missile actually overflew the Hawaiian Island chain to impact about 250 miles southwest of Oahu.[36] On four subsequent occasions - on 17 October, 28 October, and twice on 1 November 1989 - the *Marshal Nedelin* and the *Spassk* (a *Sibir* class MRIS) directed laser illumination at US P-3, HC-130 and WC-130 aircraft even though there was no Soviet missile test activity at the time.[37]

Collecting Political Intelligence

A major factor in the worldwide increase in Soviet SIGINT activities since the mid-1980s has been President Mikhail Gorbachev's need for accurate and timely political intelligence. And as Lieutenant Commander Robert Anderson, a spokesman for the US Pacific Fleet at

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35 Michael R. Gordon, 'Russian Lasers Reported Aimed at U.S. Planes', *The New York Times*, 3 October 1987, p.1; Arnold Beichman, 'All Quiet on the Soviet Affronts', *Washington Times*, 21 January 1988, p.F-3; Matthew Bunn, 'Soviet Missile Tests Near Hawaii Arouse Controversy', *Arms Control Today*, (Vol.17, No.9), November 1987, pp.22-23; and Jim Borg, 'Military Charges Soviets Playing "Laser Tag" in Pacific Encounters', *The Honolulu Advertiser*, 10 November 1989, p.A-4.

36 Information provided by the US Department of Defense.

37 Jim Borg, 'Military Charges Soviets Playing "Laser Tag" in Pacific Encounter', *The Honolulu Advertiser*, 10 November 1980, pp.1,A-4; 'Pacific Command Identifies Soviet Ships That Used Laser', *Honolulu Star-Bulletin*, 10 November 1989; Stephen Engelberg, 'U.S. Says Lasers Strike Its Planes', *The New York Times*, 10 November 1989, p.15; and 'USA Accuses Soviets Over Laser Incidents', *Jane's Defence Weekly*, (Vol.12, No.20), 18 November 1989, p.1091.

Figure 28: The *Marshal Nedelin* MRIS, operated southwest of the Hawaiian islands in September-November 1989

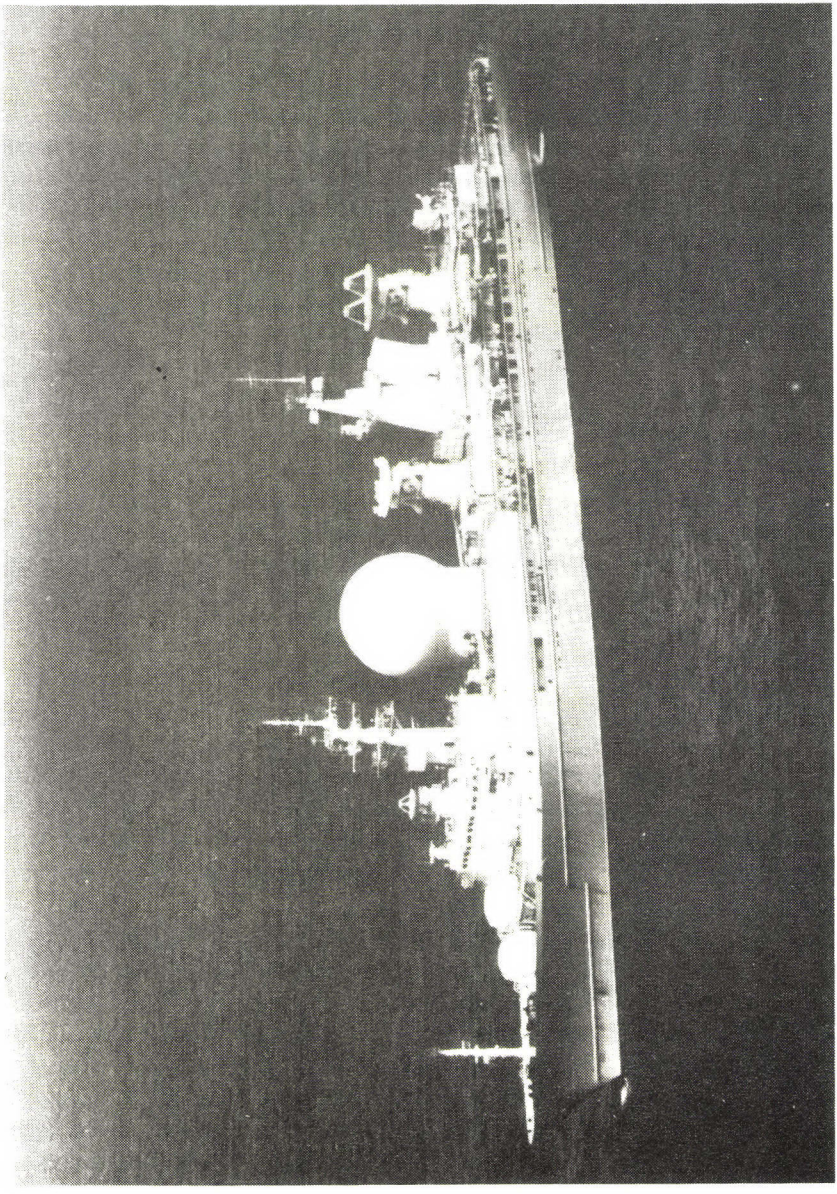


Figure 29: The *Chazma*, a *Desna* class MRIS, operated southwest of the Hawaiian islands in September-November 1989

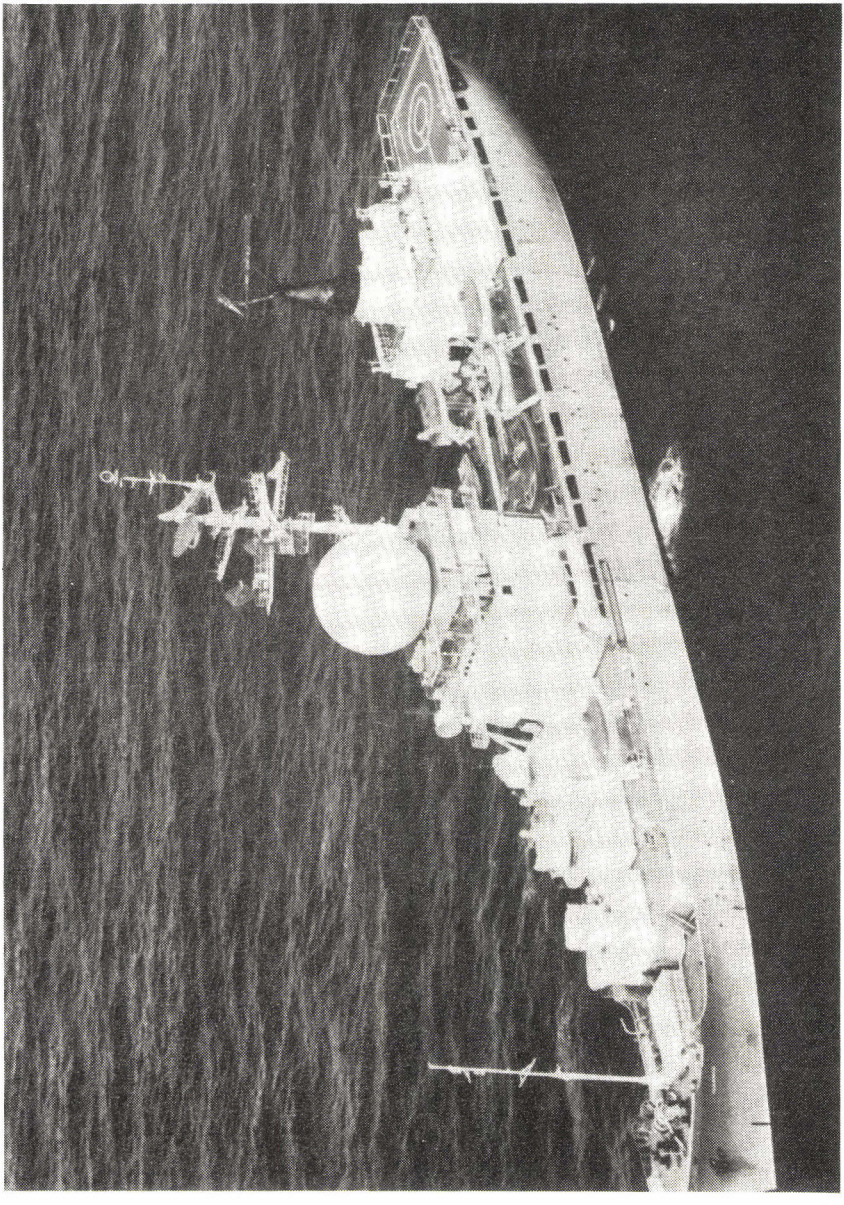
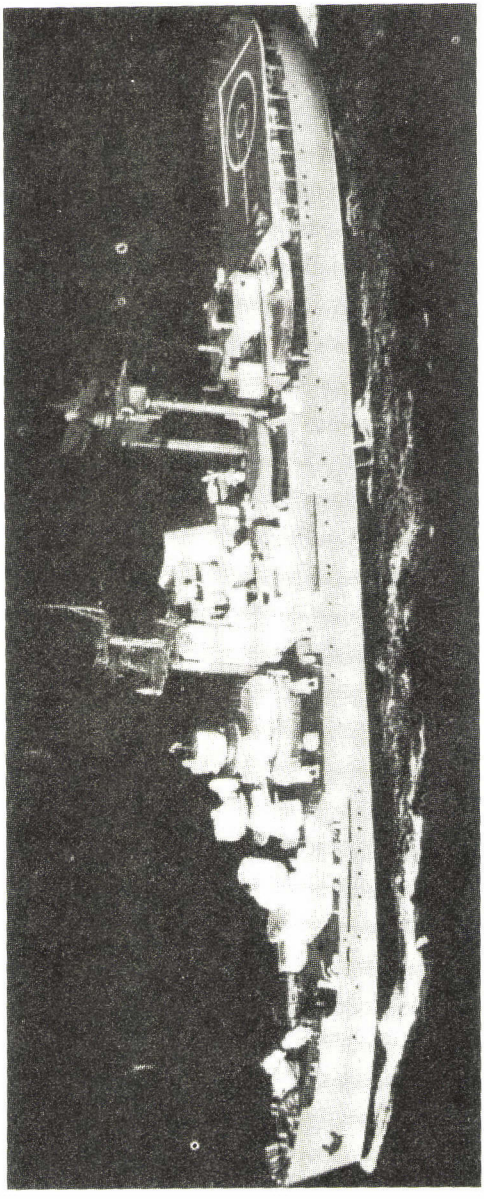


Figure 30: The *Spassk*, a *Sibir* class MRIS, operated west of the Hawaiian islands in October-November 1989



Pearl Harbor, stated in May 1989, the collection of political intelligence is one of the missions of the increased Soviet SIGINT activity off Hawaii.[38]

President Gorbachev needs to be able to monitor regional reactions to his geopolitical initiatives, such as his proposal for an all-Asian security conference, which he first put forward on 21 May 1985 - which has generally been received in the region as being premature and of little practical utility; his proposal proffered in Vladivostok on 28 July 1986 that a new security regime for the Asia/Pacific region be instituted in which reliance upon military capabilities would give way to political means of conflict resolution and security enhancement - a conception which was generally viewed within the region as an effort to undermine the US military presence and create a situation in which the Soviet Union would emerge as preponderant simply by virtue of geographical proximity; and his proposal at Krasnoyarsk on 16 September 1988 that the levels of naval and air forces in the northwest Pacific be frozen and that both the Soviet Union and the United States withdraw from foreign bases in the Pacific, with a specific coupling of a US withdrawal from its bases at Clark Field and Subic Bay in the Philippines with a Soviet disengagement from its facilities at Cam Ranh Bay in Vietnam - a proposal not taken seriously in the region because of the asymmetry of the respective US and Soviet assets.

Gorbachev also needs to be apprised of the views within the region of such issues as the state of the US-Japan political relationship, proposals for confidence-building on the Korean Peninsula, the prospects for a political settlement in Cambodia, the future of US bases and facilities in the Philippines, political developments in the South Pacific, etc. With Hawaii as the hub of trans-Pacific satellite and other communications systems, there are few better places for collecting this intelligence than off Hawaii itself.

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38 'Soviet Spies "Sweeping the World" for Secrets', *The Australian*, 29 May 1989, p.7. See also Melissa Healy, 'Soviet Spy Ship Activity Grows Off West Coast', *Los Angeles Times*, 27 May 1989, pp.1, 26, 27.

Monitoring Technical, Industrial, Economic and Commercial Communications

The single most important factor in the worldwide increase in Soviet SIGINT activity over the past half decade has been the Soviet Union's desperate need for technical, industrial and commercial intelligence to support Gorbachev's efforts at technological modernisation and restructuring of the Soviet economy. In Southeast Asia, for example, the dramatic increase in Soviet SIGINT activity concerning the ASEAN countries in recent years is almost wholly explicable in terms of the collection of economic intelligence.[39]

Similarly, the focus of much of the recent increase in the Soviet SIGINT activity concerning Hawaii has been technical, industrial, economic and commercial communications. As Admiral David E. Jeremiah, Commander of the US Pacific Fleet, stated in an interview with the *Navy Times* in March 1989:

> There is an enormous amount of financial data that filters through Honolulu because Honolulu is in a time zone that can work New York and Tokyo simultaneously.... Intelligence agencies collect a lot of things, including commercial intelligence.
>
> Economics is what drives the world today. [And the Pacific Ocean] is where our technology is today, where our export markets are, and where our import providers are today.[40]

The Soviet Union has been attracted by the economic dynamism of the Pacific and the possibility of using intelligence on it for the design of sound technological and economic modernisation. The Northeast Asian economies have grown more rapidly for longer than any others in world economic history. Northeast Asia has become the main source of dynamism in international trade and

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39 See Desmond Ball, *Soviet Signals Intelligence (SIGINT): Listening to ASEAN*, (Working Paper No.188, Strategic and Defence Studies Centre, Australian National University, Canberra, September 1989), p.2.

40 Cited in William Matthews, 'U.S. Fleet in Pacific Bulwark for the Area's Prosperity', *Navy Times*, 3 April 1989, p.3.

international investment. Japan is the world leader in such new technologies as ferromagnetic materials, advanced functional carbon composite materials, glass and amorphous materials, biotechnology, gallium arsenide and other compound semiconductors, microelectronic circuits and their fabrication, fibre optics, and machine intelligence/robotics, and is the world's single largest source of foreign investment capital. Hong Kong is the largest port in the world in terms of the dollar value of goods shipped, and Singapore in terms of the tonnage of goods shipped. Monitoring the telecommunications traffic through Hawaii would provide the Soviet Union with intelligence on such matters as trade trends, financial transactions, investments, commodity price movements, the details of economic planning, the development of high technology products and processes, and the viability of major energy, agricultural and industrial projects in the Asia/Pacific region. Information culled from satellite-borne telephone conversations and facsimile and data transmissions would be invaluable to Soviet industry.

In addition to the collection of such economic and industrial intelligence by AGIs and SATCOM SIGINT vessels operating off Hawaii, SIGINT-equipped oceanographic research vessels operating in the mid-Pacific are also concerned with longer-term aspects of economic development. As Admiral Jeremiah stated in March 1989:

> There is substantial activity throughout the Pacific by Soviet research ships. In a large measure, they are working problems associated with economic development.[41]

Monitoring Private Communications

According to Admiral Jeremiah, one of the missions of the Soviet SIGINT activity off Hawaii is monitoring private telephone conversations.[42] Such private communications would include information on commercial transactions, and naval movements and other military operations, and would provide Soviet intelligence

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41 *Ibid.*.

42 'Loose Lips in Hawaii', *Newsweek*, 2 January 1989, p.4.

agencies with information on individuals who might be blackmailed or otherwise recruited to their service.

CHAPTER FIVE

COUNTERING THE HAWAII OPERATION

The Soviet SIGINT operation off Hawaii, although still maintained for only about 70 per cent of the time - being limited by the number and endurance of the SIGINT-equipped ships in the Soviet Pacific Fleet - provides a capability to monitor a very wide range of communications and other signals in the mid-Pacific. The frequencies monitored range from the HF band through the SHF band, and include HF and VHF radio, terrestrial microwave and COMSAT transmissions. The intelligence collected concerns naval movements and operations, other military activity, intelligence operations, weapons research and development, political developments, and economic, industrial and commercial matters. It is a haemorrhage which is not easy to seal.

Until December 1988, the Soviet SIGINT ships were able to sit as close as three miles off the Hawaii coast, although in practice they typically anchored about five miles offshore. Since the US proclaimed the 12 mile territorial sea limit in December 1988, they have stationed themselves about 14 miles offshore. So long as they do not infringe the 12 mile limit, there is little that can be done about them - at least in peacetime! As Admiral Jeremiah, Commander of the Pacific Fleet, stated in an interview with the Navy Times in March 1989, 'We pay very careful attention to where they are with respect to the 12-mile limit', but so long as they remain in international waters they are free to come and go as they please.[1] And as Lieutenant Commander Robert Anderson, a spokesman for the Pacific Fleet, stated in May 1989:

> Beyond 12 miles [off the coast], it's international waters, and they're perfectly legitimate there.
>
> Obviously you take measures to reduce what they can collect, but you can't deal with the fact that they're there.[2]

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1 See William Matthews, 'U.S. Fleet in Pacific Bulwark for the Area's Prosperity', *Navy Times*, 3 April 1989, p.2.

2 Cited in Melissa Healy, 'Soviet Spy Ship Activity Grows Off West Coast', *Los Angeles Times*, 27 May 1989, p.27.

The options available to US military and security intelligence authorities are quite limited. One possibility would be to redesign the various communications architectures throughout the Hawaiian islands so that emissions are not receivable offshore. Given the very large number of communications systems involved, amounting to many hundreds of millions of dollars of sunk investment, this would be very expensive even if it were technically feasible. In fact, technical and geographic factors combine to make it practically unfeasible. There are eight major islands and several smaller ones with some habitation, stretching in an arc of some 600 km from Niihau in the northwest to Hawaii in the southeast. There are undersea cables linking the islands of Kauai, Oahu, Molakai, Lanai, Maui and Hawaii itself, but HF, VHF and microwave connections have proliferated because they are relatively inexpensive to install and maintain, and can be configured to suit particular communications requirements. Moreover, there is limited internal space on the islands. Oahu, the most populated island, is less than 50 miles across at its widest point (from Kaena Point on the northwest coast to Makapuu Point on the southeast coast). In practice, even low-powered HF, VHF and microwave propagations cannot be confined to the island interiors; inevitably, they can be received by sensitive equipment on offshore platforms. In the case of satellite communications, even the narrowest spot beams currently in operation (i.e. the 1 beam on the DSCS III satellites) are receivable within an area of some 630 km diameter on the earth's surface.

It is, of course, technically possible to jam the receivers aboard the Soviet SIGINT vessels to prevent their reception of particular frequencies. However, this option is also of limited practical application. Broadband jamming of the frequencies and geographic expanses covered by HF and SATCOM transmissions would simply deny these media to general usage. High-powered directional microwave jamming could be employed in some circumstances, but it would be limited to particular line-of-sight configurations between the Soviet SIGINT platforms and the jamming stations. In the particular case of AGIs stationed 14 miles off Pearl Harbor/Honolulu/Waikiki, there would usually be numerous commercial and pleasure craft operating in the intervening waters. The need to avoid injuring people aboard these vessels would allow high-powered microwave bombardment in only abnormal circumstances.

Another possibility is to confuse or overload the collection and processing capabilities of the Soviet SIGINT systems by transmitting false information or large volumes of 'garbage' through the various communications circuits. In general, however, this is only possible in very particular instances. At a minimum, it requires witting and cooperative receivers - which may be possible in the case of military or intelligence communications networks, although even here there would be a considerable risk of impairment or disruption of the substantive operations.

Most signals which would remain accessible and of interest to the Soviet SIGINT activity would normally be encrypted to prevent reading or understanding their message or data content. This is of course routine in the case of military and intelligence communications and is becoming increasingly common in the case of industrial and commercial communications. However, much intelligence can still be gleaned from analysis of traffic patterns, especially with respect to military lines of command, movements and operations. Moreover, even with the most sophisticated forms of encryption there is no guarantee that Soviet intelligence agencies do not have the means of decryption. It was learnt in the aftermath of the Walker/Whitworth espionage case, for example, that 'more than a million' encrypted US messages, most of them transmitted via satellite communications systems, had been deciphered by Soviet intelligence agencies in the mid-1970s and early 1980s as a result of their access to US cryptographic machines, operating manuals, key lists and daily message traffic.[3] Whether or not the Soviet intelligence agencies have any similar source of access to current US cryptographic systems is of course not known, but the possibility cannot be excluded. In any case, a large volume of military and commercial communications is encrypted to levels which can undoubtedly be decrypted by the Soviet cryptanalytic services, while a large proportion of commercial communications and computer data links, and virtually all private telecommunications, remain completely unencrypted.

In the end, the Soviet SIGINT operation concerning Hawaii can only be addressed through much greater public awareness of the

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3 John Barron, *Breaking the Ring: The Bizarre Case of the Walker Family Spy Ring*, (Houghton Mifflin Company, Boston, 1987), p.148.

extent and capabilities of the Soviet activity. As the Senate Select Committee on Intelligence reported in September 1986:

> Public awareness of the hostile intelligence threat to domestic communications is essential, because there are real limits to what the U.S. Government can do to provide secure communications for the private sector.... The protection [of non-governmental communications] must depend on the willingness of private organisations to invest in secure communications, not only for their immediate self-interest, but for the larger interests of the nation as a whole.[4]

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4 US Congress, Senate Select Committee on Intelligence, *Meeting the Espionage Challenge: A Review of United States Counterintelligence and Security Programs,* (U.S. Government Printing Office, Washington, D.C., 1986), p.34.

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STRATEGIC AND DEFENCE STUDIES CENTRE

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