

Singapore Country Handbook

1. This handbook provides basic reference information on Singapore, including its geography, history, government, military forces, and communications and transportation networks. This information is intended to familiarize military personnel with local customs and area knowledge to assist them during their assignment to Singapore.
2. This product is published under the auspices of the U.S. Department of Defense Intelligence Production Program (DoDIPP) with the Marine Corps Intelligence Activity designated as the community coordinator for the Country Handbook Program. This product reflects the coordinated U.S. Defense Intelligence Community position on Singapore.
3. Dissemination and use of this publication is restricted to official military and government personnel from the United States of America, United Kingdom, Canada, Australia, NATO member countries, and other countries as required and designated for support of coalition operations.
4. The photos and text reproduced herein have been extracted solely for research, comment, and information reporting, and are intended for fair use by designated personnel in their official duties, including local reproduction for training. Further dissemination of copyrighted material contained in this document, to include excerpts and graphics, is strictly prohibited under Title 17, U.S. Code.

CONTENTS

KEY FACTS	1
U.S. MISSION	2
U.S. Embassy	2
Entry Requirements	4
Passport/Visa Requirements	4
Immunization Requirements	4
Custom Restrictions	4
GEOGRAPHY AND CLIMATE	4
Geography	4
Land Statistics	4
Topography	6
Climate	7
Weather	7
Environment	8
TRANSPORTATION AND COMMUNICATION	8
Transportation	8
Roads	8
Rail	9
Air	11
Maritime	12
Communication	12
Radio and Television	12
Telephone and Telegraph	13
Newspapers and Magazines	13
Postal Services	14
Internet	14

Contents (Continued)

CULTURE	14
Statistics	14
Society	15
Education and Literacy Rates	15
Religion	17
Customs and Courtesies	18
Greetings	18
Gestures	19
Visiting	19
Dining	19
MEDICAL ASSESSMENT	20
Infectious Disease Risks to Deployed U.S. Personnel	20
Foodborne or Waterborne Diseases	20
Vector-borne Diseases	21
Sexually Transmitted Diseases	21
Respiratory Diseases	21
Water-contact Diseases	21
Animal-contact Diseases	22
Medical Capabilities	22
Key Medical Facilities	23
HISTORY	27
Chronology of Key Events	28
GOVERNMENT AND POLITICS	30
Government	30
Key Government Officials	30
National Level	30
Local Level	31
Politics	31
Elections	31
Suffrage	31
Political Parties	31
Foreign Relations	32

Contents (Continued)

ECONOMY	33
Statistics	33
Resources	35
Industry	35
Agriculture	35
Tourism	35
THREAT	35
Crime	35
Travel Security	36
Terrorism	37
Drug Trafficking	37
Major Intelligence Services	37
Opposition Forces	37
ARMED FORCES	37
Organization	37
Mission	37
Strategy	38
Personnel	39
Key Defense Personnel	41
Capabilities	41
Force Modernization	41
Army	41
Organization	41
Personnel	43
Disposition	43
Equipment	43
Air Force	45
Organization	45
Personnel	46
Disposition	46
Equipment	46

Contents (Continued)

Navy	47
Organization	47
Personnel	48
Disposition	48
Equipment	48
Naval Aviation	49
Paramilitary Forces	49
Coastal Defense Forces)	50
National Police	50

APPENDICES

A. Equipment Recognition	A-1
B. International Time Zones	B-1
C. Conversion Charts	C-1
D. Holidays	D-1
E. Language	E-1
F. International Road Signs	F-1
G. Deployed Personnel's Guide to Health Maintenance	G-1
H. Individual Protective Measures	H-1
I. Dangerous Animals and Plants	I-1
J. International Telephone Codes	J-1

Contents (Continued)

LIST OF ILLUSTRATIONS

Singapore	viii
National Flag	1
National Emblem	2
U.S. Embassy in Singapore	3
Southeast Asia	5
Topography	6
Singapore Weather	7
Road in Singapore	8
Transportation Network	9
Mass Rapid Transit System	10
Mass Rapid Transit Train	11
Singapore Coastline	15
Downtown Singapore	16
Outside Church	18
Singapore Rice Noodles	20
Raffles Hospital	23
President Nathan Sellapan Rama	30
Market	34
Armed Forces Structure	38
Rank Insignia	40



Singapore

KEY FACTS

Country Name. Singapore

Official Name: Republic of Singapore

Short Form: Singapore

Head of State: President Sellapa Rama Nathan

Capital: Singapore

National Flag: Two equal horizontal bands of red (top) and white; near the hoist side of the red band, there is a vertical, white crescent (closed portion is toward the hoist side) partially enclosing five, white stars arranged in a circle.

Time Zone: GMT/UTC +8

Telephone Country Code: 65

Population: 4.43 million (2005 estimate)

Languages: Chinese, Malay, Tamil, and English

Currency: Singapore dollar (SGD). SGD1 = 100 cents. Coin denominations are 1, 5, 10, 20, and 50 cents, and SGD1. Note denominations are 2, 5, 10, 50, 100, 500, and 1,000 Singapore dollars. Cash is always useful and usually necessary when making small purchases such as for meals



National Flag



National Emblem

and from street vendors. All major credit cards are widely accepted. Most ATMs will accept Visa, MasterCard, and cards accepted by the Plus or Cirrus network. Travelers Checks are a safe and reliable alternative should ATMs, credit card dial-up links, or cash card systems fail.

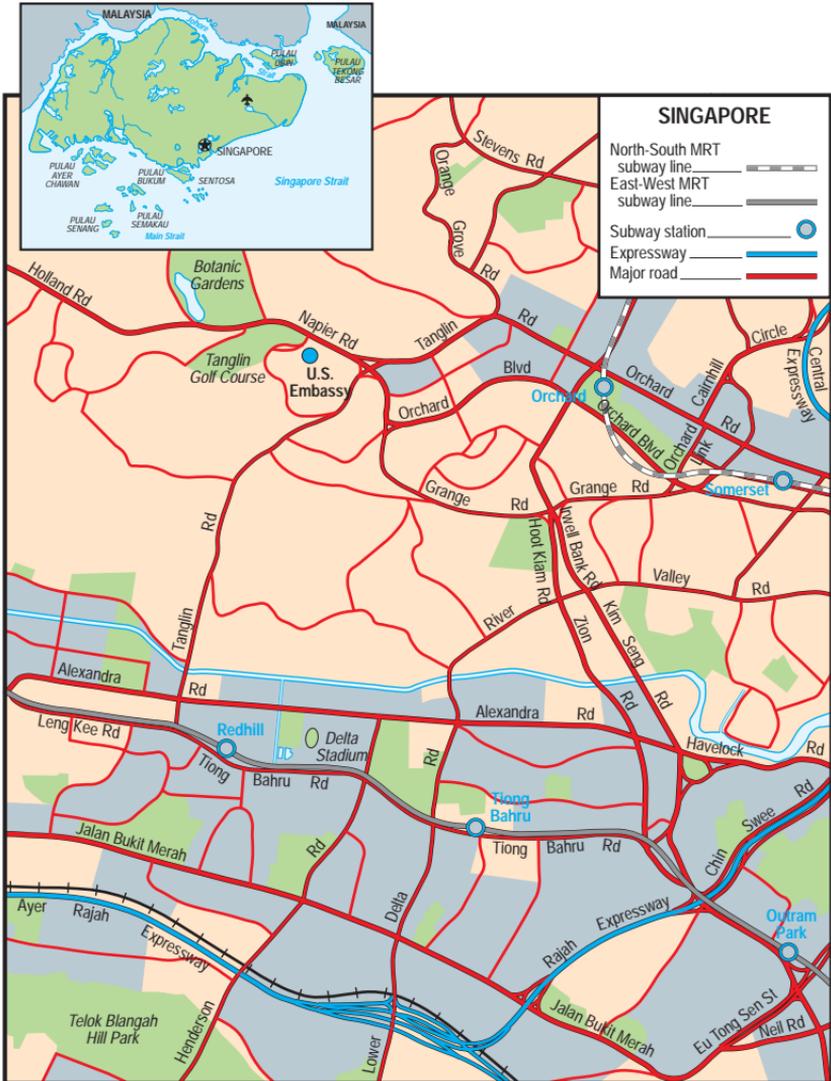
Exchange Rate: US\$1 = SGD1.69 (January 2004)

Calendar: The fiscal year in Singapore is from 1 April to 31 March (Gregorian Calendar).

U.S. MISSION

U.S. Embassy

Address	27 Napier Street Singapore 258508 FPO AP 96534
Telephone	011-65-476-9100
Hours	0830 to 1715 (Monday to Friday)
Fax	011-65-476-9240 (unclassified)
STU III	011-65-476-9340
Message Address	USDAO SINGAPORE SN



U.S. Embassy in Singapore

Entry Requirements

Passport and Visa Requirements

A valid passport is required. U.S. citizens do not need a visa for visits lasting 90 days or less. Travelers to the region should note that some neighboring countries do not allow Americans to enter with a passport that is scheduled to expire in less than 6 months from arrival.

Immunization Requirements

Yellow fever vaccination certification must be current when entering Singapore. Vaccination against influenza and Japanese encephalitis is recommended.

Customs Restrictions

Singapore customs authorities enforce strict regulations concerning the temporary import or export of weapons, certain religious materials, chewing gum, videotapes, CDs, DVDs, and software (for reasons of censorship or copyright protection). Narcotics and pornography are strictly forbidden.

The definition of *weapon* enforced by Singapore customs is very broad. In addition to firearms, *weapon* includes many items that are not necessarily seen as weapons in the United States (e.g., dive knives, kitchen knives, handcuffs, and expended shell casings). Possession of any of these items without permission may result in immediate arrest.

GEOGRAPHY AND CLIMATE

Geography

Land Statistics

Area

<i>Total</i>	693 square kilometers (268 square miles)
<i>Land</i>	683 square kilometers (264 square miles)
<i>Water</i>	10 square kilometers (5 square miles)

Comparative Size

Slightly larger than 3.5 times the size of Washington, D.C.

Singapore consists of numerous islands located at the southeast tip of the Malay Peninsula. Singapore is connected to Malaysia by a causeway that stretches more than 2 kilometers (1.2 miles) across the Johor Strait, which skirts Singapore's northern coastline. The southern coastline is bounded by the Singapore Strait. Indonesia lies to the west across the Strait of Malacca.

Topography

The main island of Singapore is 625 square kilometers (241 square miles). There are 58 smaller islets, of which only 20 are inhabited. The terrain is mostly flat, excepting a few slightly elevated lowlands. Most of Singapore Island is urban and industrialized. There are numerous riv-



Topography

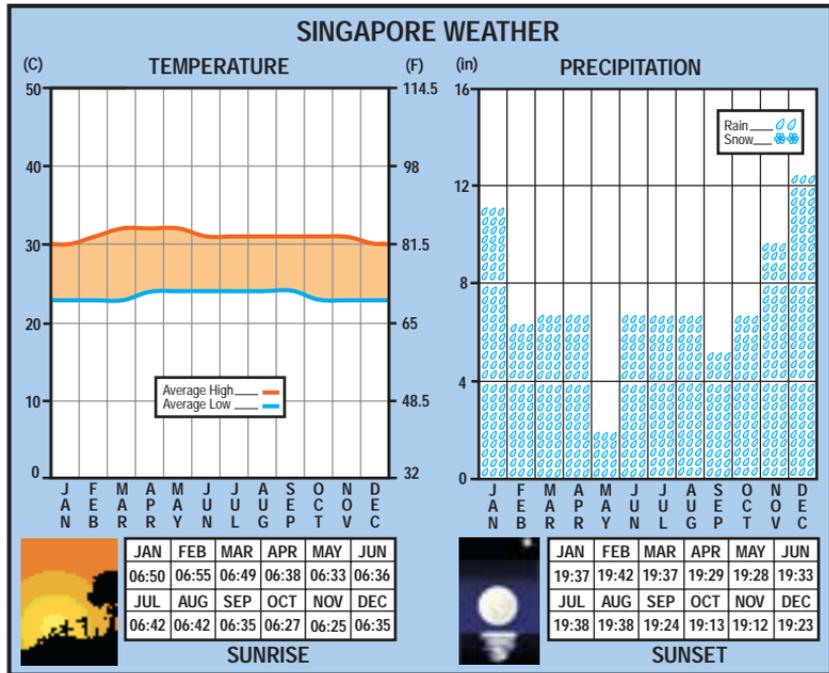
ers and mangrove swamps in Singapore; however, land reclamation projects are rapidly changing the water network and coastline.

Climate

Weather

Singapore is known as the land of eternal summer due to its hot, humid climate. Daily temperatures reach about 26°C (80°F). Rain is plentiful throughout the year, particularly from November to January. Some parts of the island have rain everyday.

There are two distinct monsoon seasons: Northeastern monsoon, from December to March, and Southwestern monsoon, June to September.



Singapore Weather

Environment

The center of the island is covered by rain forests; the coast is primarily mangrove swamp. The greatest environmental threats are industrial pollution and limited natural freshwater resources. Other issues include limited land for waste disposal and seasonal smoke and haze caused by forest fires in Indonesia.

TRANSPORTATION AND COMMUNICATION

Transportation

Roads

Singapore's road system, with at least 150 kilometers (93 miles) of expressway, is modern and well maintained. A causeway connects Singapore with western Malaysia, which also has a well-developed road system.

Bus service is frequent and affordable. It is provided by a government-licensed, privately owned bus company. A list of bus routes can be pur-



Road in Singapore



Transportation Network

chased at most bus stations. Because not all bus drivers understand or speak English, riders should know the routes and fares before boarding. During peak hours, buses have the right of way in bus lanes.

Rail

The Mass Rapid Transit (MRT) system opened in 1987; it is one of the world's best underground transportation systems. The MRT system comprises the North-South, East-West, and North-East lines, almost 90 kilometers (55 miles) of track, and 51 stations. There also are two Light Rail Transit (LRT) networks (Bukit Panjang and Sengkang) in operation. They serve as feeders for the MRT. Work began on a 10-kilometer (6-mile) LRT in Punggol in 2000. This new LRT is expected to be operational by 2005.



Mass Rapid and Light Rail Transit Systems



Mass Rapid Transit Train

Singapore is constructing the Circle Line, a fully automated metro along the sea front. The first phase of the Circle Line is expected to open in 2007. Completion of the remaining four phases is expected by 2010.

A heavy rail line operated by Malayan National Railroad links Singapore's Keppel Station to Kuala Lumpur and Penang, with connections in Bangkok and other points in Thailand. Keppel Station is a terminus of the Eastern and Oriental Express, a luxury train service running between Singapore's Keppel train station to Thailand.

Air

Singapore has nine airports with permanent-surface runways. Twenty-nine airlines provide service to Singapore. Two of the largest airports are Singapore-Changi and Singapore-Seletar.

Airport, Coordinates	Elevation	Runway Length/Type	Remarks
Singapore-Changi 012160N 103595E	6.7 m (21.9 ft)	4,000 m (13,123 ft)/ Bituminous concrete	20 km (12.4 mi) from Singapore City
Singapore-Seletar 012500N 103522E	11 m (36 ft)	1,632m (5,354 ft)/ Bituminous concrete	13 km (8 mi) from Singapore City

Maritime

Singapore is a crossroads of international trade and the busiest port in the world in terms of shipping tonnage. Approximately 250 shipping lines link Singapore with more than 600 ports in 123 countries. Singapore has a sheltered, natural, deep-water harbor. Its extensive facilities cater to supertankers, container ships, bulk carriers, cargo freighters, luxury ocean liners, coastal vessels, lighters, trawlers, and other craft.

Singapore's port system comprises 4 container terminals (Tanjong, Pagar, Keppel, Brani, and Pasir Panjang), 37 berths (5 more are under construction), and 2 docks (Sembawang and Jurong). Singapore's container facilities have 1.5 million square meters (1.8 million square yards) of transit shed and warehouse space.

Singapore has its own merchant marine fleet, although many vessels are foreign-owned. It's 900 ships (1,000 GRT and above) include the following types:

136 bulk	290 petroleum tanker	2 refrigerated cargo
84 cargo	41 liquefied gas	4 combination bulk
186 container	96 chemical tanker	2 multifunction large-load
32 vehicle	10 specialized tanker	5 roll-on/roll-off
3 livestock	8 combination ore/oil	1 short-sea/passenger

Communication

Radio and Television

The state-owned Singapore Broadcasting Corporation (SBC) broadcasts from 0600 to 2400 daily in English, Mandarin, Malay, and Tamil on sepa-

rate AM and FM frequencies. Programs are varied. The news is reported on the hour. Voice of America morning and evening newscasts are heard on shortwave, and BBC *World Service* broadcasts are relayed 24 hours a day on FM. Singapore also has a 24-hour FM popular music station that broadcasts in English and Indonesian from a nearby Indonesian island.

SBC broadcasts television programs daily in English, Mandarin, Malay, and Tamil. Weekday telecasts begin in late afternoon and end at 2400. Many American programs are shown, including popular series and documentaries (most about a year old). CNN International is also available.

Singapore Cable Vision, a government-linked company, provides cable television service. All channels are monitored to prevent the broadcasting of programs deemed undesirable by the government.

Telephone and Telegraph

Every home in Singapore is assessed to have access to a fixed telephone line. Approximately 83 percent of the population, more than 3.3 million subscribers, use mobile telephones. Calls to the United States from Singapore are easy to place and inexpensive.

Reliable commercial telegram service to the United States is available. Telegrams can be booked by telephone or sent from airports, hotels, post offices, and other locations.

Newspapers and Magazines

Two daily newspapers written in English are published in Singapore: *The Straits Time* and *The Business Times*. *The International Herald Tribune* and *USA Today* are printed in Singapore via satellite and made available at newsstands. International editions of foreign newspapers are available. American magazines appear on newsstands about a month late and cost two to three times as much as they do in the United States.

Postal Service

Postal delivery in Singapore is very efficient. Most post offices are open 0800 to 1800 Monday through Friday, and 0800 to 1400 on Saturday.

Internet

There are many places to access the Internet in Singapore (from about US\$3 per hour). Hotels (even inexpensive hotels) typically have Internet access. Many schools and public libraries have broadband access. There are more than 2 million internet subscribers in Singapore.

CULTURE

Statistics

Population	4,425,720 (2005 est.)
Population growth rate	1.56% (2005 est.)
Age structure	(2005 est.)
<i>0–14 years</i>	16% (male 366,971/female 342,295)
<i>15–64 years</i>	75.9% (male 1,639,842/female 1,719,829)
<i>65 years and older</i>	8.1% (male 157,636/female 199,147)
Birth Rate	9.49 births/1,000 population (2005 est.)
Infant mortality rate	(2005 est.)
<i>Total</i>	2.29 deaths/1,000 live births
Life expectancy at birth	(2005 est.)
<i>Total population</i>	81.62 years
HIV/AIDS prevalence	4,100 (2003 est.)
Ethnic groups	Chinese 76.7%, Malay 14%, Indian 7.9%
Religions	Buddhism, Islam, Christianity, Hinduism, Sikhism, Taoism, Confucianism, Judaism
Languages	Malay, Mandarin, Tamil, and English



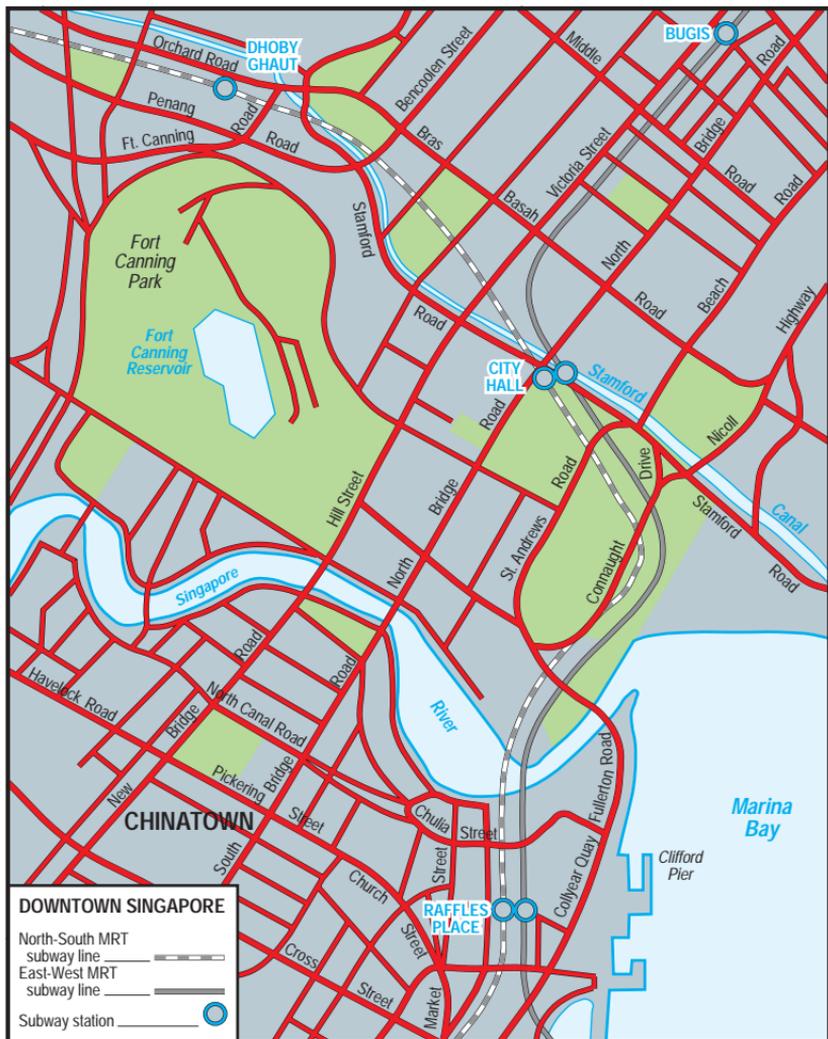
Singapore Coastline

Society

Singapore is one of the most densely populated countries in the world. Its people are prosperous and well educated. Singaporeans enjoy the second highest standard of living of all the Asian nations—second only to Japan. Singapore's multiplicity of languages reflects its racial diversity. The four official languages are Malay, Chinese, Tamil, and English. Mandarin and Malay are the national languages, and English is the language of administration. All Singaporeans are expected to learn English, which is most widely used in science, technology, commerce, and tourism. The Chinese speak several dialects (e.g., Hokkein, Chaozhou, and Cantonese), but Standard Chinese, also called Putonghua or Mandarin, is gradually replacing all other forms of Chinese. Most Singaporeans are bilingual or multilingual. The government encourages the use of all the languages to maintain traditional cultures and values.

Education and Literacy Rates

All students take the same courses, including English, their native language, mathematics, and civics and moral education, for the first 4



Downtown Singapore

years of primary school. In the fifth and sixth years of primary school, students are divided based on their capacity to learn foreign languages and mathematics. Nearly all children complete 6 years of primary education. Primary school students take an exit exam. Their scores are used to place them in secondary schools. A high percentage of secondary school graduates continue their studies in vocational schools or pre-university programs. Schools have moved to reduce the traditionally heavy academic load in order to help children develop greater creativity and to relieve them of intense pressure to achieve high test scores. The National University of Singapore and various other technical schools offer higher education. Many students also travel abroad for higher degrees.

The literacy rate, the segment of the population at least 15 years old that can read and write, was estimated at 92.5 percent in 2002. The literacy rate among 15- to 19-year-olds approaches 100 percent.

Religion

Singaporeans enjoy constitutionally guaranteed freedom of worship. Slightly more than half the population is ethnic Chinese, either Buddhist or Taoist, and practices a combination of Buddhism, Taosim, and Confucianism. Nearly all Ethnic Malays, who constitute 15 percent of the total population, are Muslim. Fifteen percent of Singaporeans are Christian, and about 4 percent (mostly ethnic Indian) are Hindu. Christians generally are either ethnic Chinese or Caucasian. A significant minority (many of them Ethnic Chinese), are either atheists or agnostics (called free-thinkers). Singapore has two Jewish synagogues.

Singaporeans discuss religion freely and openly. For certain family matters such as marriage, religions are allowed to establish government-recognized laws for their members.



Outside Church

Customs and Courtesies

Greetings

Greeting customs vary according to age and ethnicity; however, a handshake is the most common gesture of greeting. The Chinese and older people add a slight bow. Malays greet with the *salaam*: two people bring right palms together as if to shake hands, then slide them apart, and touch their palms to their hearts. Traditional Indians join their palms together in prayer position at chest level, raise them in front of their faces, bow slightly, and say *Vanakkam* (Tamil for “Hello”). Friends and relatives address each other by given (or personal) names. Titles and family names are used in formal settings. Chinese names begin with the family name followed by a two-character given name.

Various languages are used for greetings, but English is common and acceptable. An exchange of business cards often accompanies a greeting between business representatives and other officials,.

Gestures

Touching another person's head is impolite. Singaporeans cross legs at the knee; they do not rest an ankle on the knee. It is impolite for the bottom of the foot to point at a person. Also, feet are not used to move objects. Hitting the fist into the cupped hand is inappropriate. One beckons by waving all fingers of the right hand with the palm facing down. Finger gestures, such as pointing or forming the rounded okay sign, are considered rude. A slight bow when joining, leaving, or passing a group of people shows courtesy. Malays and Indians do not touch members of the opposite sex in public. For all groups, public displays of affection are inappropriate.

Visiting

Visitors are expected to be punctual to meetings and other events. Hosts consider it impolite not to offer their guests something to drink. Chinese typically serve tea or juice; Malays, juice or coffee; Indians, tea or coffee. On special holidays, hosts arrange sweetmeats and other refreshments on the coffee table for all guests to enjoy. If a host or guest gives a gift, the recipient opens it later, not in the giver's presence. Compliments are appreciated by hosts, but will be politely denied for modesty's sake. Shoes are removed when visiting religious buildings (e.g., temples, shrines, and mosques).

Dining

Because Singapore is a cosmopolitan society, etiquette and table manners vary according to the style of food served and the people eating it. Most diners sit at a table to eat, but Malays and Indians may sit on a floor mat for traditional meals and festive occasions. In Indian and Malay homes, men eat first, followed by women and children.

Restaurants typically serve individual bowls, plates, or even banana leaves of rice. Each person can also take small portions of meats and vegetables from serving dishes placed in the center of the table or mat.

A diner does not put a full meal in the bowl at the beginning but takes small amounts from the various dishes throughout the meal.

Chinese use chopsticks for rice. Malays and Indians eat with the fingers of the right hand. All groups use spoons and forks for some types of food. In restaurants, a service charge is included in the bill; therefore, tips are not usually necessary and may be discouraged in some cases.



Singapore Rice Noodles

Hosts offer to guests second and third helpings. It is polite to accept a second helping but leave a little food behind (on the serving dishes, not in one's own bowl) to show one has been well fed. If all the food is eaten, the host feels the guests have not been adequately provided for, or the guests are considered greedy.

MEDICAL ASSESSMENT

Infectious Disease Risk to Deployed U.S. Personnel

Singapore is assessed as low risk for infectious diseases. Sanitation and living standards are comparable to those in the United States. However, dengue fever and Japanese encephalitis, which occur at low levels, may adversely affect mission effectiveness unless force health protection measures are implemented.

Food- and Water-borne Diseases

Viral gastroenteritis (e.g., Norovirus) and food poisoning (e.g., *Bacillus cereus*, *Clostridium perfringens*, *Staphylococcus*) may cause significant outbreaks.

Vector-borne Diseases

Dengue fever is transmitted year-round and countrywide. Rare cases may occur in U.S. personnel in the absence of countermeasures, with the potential for higher numbers of cases (up to 50 percent of personnel per month) during large outbreaks in the local population. Japanese encephalitis is transmitted year round, primarily in rural areas. Rare cases may occur in the absence of countermeasures.

Sexually Transmitted Diseases

Gonorrhea, chlamydia, and other infections such as chancroid, herpes, syphilis, and venereal warts may affect an operationally significant percentage of personnel who have sexual contact, particularly with prostitutes. Rare cases of hepatitis B could occur in unvaccinated personnel having unprotected sexual contact, particularly with prostitutes. Rare cases of HIV could occur among personnel having unprotected sexual contact. Though the immediate impact of HIV/AIDS and hepatitis B on an operation is limited, the long-term health impact on individuals is substantial.

Respiratory Diseases

The annual incidence of active tuberculosis in 2002 was estimated at 36 per 100,000 (compared to the U.S. rate of approximately 6 per 100,000). Prolonged contact with the local population may result in conversion rates to tuberculosis skin testing (TST/PPD screening) that may be elevated over the U.S. military baseline.

In addition, deployed U.S. forces may be exposed to a variety of common respiratory infections in the local population. These include influenza, pertussis, viral upper respiratory infections, and viral and bacterial pneumonia. U.S. military populations living in close-quarter conditions are at risk for substantial person-to-person spread of respiratory pathogens.

Water-contact Diseases

Activities that involve extensive contact with freshwater sources (e.g., lakes, rivers, and streams) may result in rare cases of leptospirosis. An

increased number of cases may occur in groups with prolonged exposure to heavily contaminated areas. In addition, bodies of surface water may be contaminated with human and animal waste. Activities such as wading or swimming may result in exposures to enteric diseases such as diarrhea and hepatitis through incidental ingestion of water. Prolonged water contact also may lead to the development of a potentially debilitating skin condition such as bacterial or fungal dermatitis.

Animal-contact Diseases

The World Health Organization recognizes Singapore as being “officially rabies-free”.

Medical Capabilities

Singapore has one of the most developed health care systems in Asia. Public and private medical facilities provide care comparable to that in the United States. The country has 13 public hospitals and specialty centers, 16 private hospitals, 17 polyclinics, and approximately 1,900 private medical clinics.

The two-tiered health care delivery system provides primary health care and secondary or tertiary specialist care. Private medical clinics and outpatient polyclinics provide primary care; public and private hospitals provide secondary or tertiary specialist care.

The Singapore Civil Defence Force (SCDF) provides an emergency ambulance service with qualified medical staff and equipment. This public service provides care and transport to the nearest capable hospital. Dial 995 for the SCDF fire and ambulance service.

Hospitals, polyclinics, and medical clinics are available throughout the country. Guidance on where to obtain health care should be sought through the U.S. Embassy or supporting military medical unit.



Raffles Hospital

Domestic and imported medicines and pharmaceuticals are available and of good quality. It may be difficult to translating dosage and use instructions on packaging and inserts.

Blood collection, storage, and testing meet U.S. standards. All donations are screened for hepatitis B, hepatitis C, HIV, and syphilis; pre-transfusion screening is performed for clinically significant red cell antibodies and compatibility with recipients.

Key Medical Facilities

There are 11 public and 10 private hospitals in Singapore. Singapore General Hospital historically has provided the best care. Medical professionals generally are highly trained; however, private hospitals provide premium care to those who can afford more sophisticated procedures.

Alexandra Hospital

<i>Location</i>	378 Alexandra Road
<i>City</i>	Singapore
<i>Coordinates</i>	011707N 1034807E
<i>Telephone</i>	6379 3794
<i>Type</i>	Public
<i>Beds</i>	462
<i>Capabilities</i>	Medical —dentistry, emergency medicine, endocrinology, general medicine, neurology, occupational medicine, physical medicine and rehabilitation, podiatry, psychiatry, radiology; Surgical —anesthesia, general surgery, ophthalmology, orthopedic surgery, otorhinolaryngology (ENT); Ancillary —emergency room, laboratory, operating room, pharmacy, physical therapy, respiratory therapy, x-ray
<i>Comments</i>	Designated to receive SCDF ambulance patients. Multiple 3-story buildings.

Changi General Hospital

<i>Location</i>	2 Simei Street 3
<i>City</i>	Singapore
<i>Coordinates</i>	012020N 1035656E
<i>Telephone</i>	6788 8833
<i>Type</i>	Public
<i>Beds</i>	801
<i>Capabilities</i>	Medical —cardiology, dermatology, emergency medicine, endocrinology, gastroenterology, general medicine, infectious diseases, nephrology, neurology, physical medicine and rehabilitation, podiatry, psychiatry, pulmonology, radiology; Surgical —anesthesia, general surgery, neurosurgery, oral-maxillofacial surgery, ophthalmology, orthopedic surgery, ENT, urology;

Capabilities **Ancillary**—cardiac care unit, emergency room, medical and surgical ICUs, laboratory, operating room, pharmacy, x-ray

Comments Designated to receive SCDF ambulance patients. Nine-story building.

Gleneagles Hospital

Location 6A Napier Road

City Singapore

Coordinates 011814N 1034913E

Telephone 6470 5674

Type Private

Beds 380

Capabilities **Medical**—cardiology, dentistry, dermatology, endocrinology, gastroenterology, general internal medicine, family medicine, hematology, nephrology, neurology, oncology, pediatrics, physical medicine and rehabilitation, psychiatry, pulmonology;
Surgical—anesthesia, cardiothoracic surgery, cardiovascular surgery, general surgery, neurosurgery, obstetrics-gynecology, oral (maxillofacial) surgery, ophthalmology, orthopedic surgery, ENT, plastic surgery, urology;
Ancillary—blood bank, emergency room, ICU, neonatal ICU, laboratory (chemistry, hematology, microbiology, serology-immunology), operating room, pharmacy, physical therapy

Comments Coordinates international medical evacuation services in conjunction with other medical assistance companies.

Mount Elizabeth Hospital

Location 3 Mt. Elizabeth

City Singapore

Coordinates 011815N 1035009E

Telephone 6737 2666

Type Private

Beds 505

<i>Capabilities</i>	<p>Medical—cardiology, dentistry, dermatology, endocrinology, gastroenterology, general internal medicine, family medicine, neurology, oncology, pathology, pediatrics, physical medicine and rehabilitation, psychiatry, pulmonology, radiology;</p> <p>Surgical—anesthesia, cardiothoracic surgery, general surgery, neurosurgery, obstetrics-gynecology, oral (maxillofacial) surgery, orthopedic surgery, ENT, pediatric surgery, plastic surgery;</p> <p>Ancillary—ambulance, blood bank, emergency room, helipad, ICU, neonatal ICU, laboratory (chemistry, hematology, microbiology, serology-immunology), operating room, pharmacy, physical therapy, respiratory therapy, x-ray</p>
<i>Comments</i>	Internationally renowned facility.

National University Hospital

<i>Location</i>	5 Lower Kent Ridge Road
<i>City</i>	Singapore
<i>Coordinates</i>	011729N 1034705E
<i>Telephone</i>	6779 5555
<i>Type</i>	Public
<i>Beds</i>	957
<i>Capabilities</i>	<p>Medical—cardiology, dentistry, dermatology, endocrinology, gastroenterology, general medicine, hematology, nephrology, oncology, pediatrics, physical medicine and rehabilitation, pulmonology;</p> <p>Surgical—anesthesia, cardiothoracic surgery, general surgery, obstetrics-gynecology, ophthalmology, orthopedic surgery, orthopedic surgery, ENT, pediatric surgery;</p> <p>Ancillary—emergency room, ICU, neonatal ICU, laboratory (chemistry, hematology, microbiology, serology-immunology), operating room, pharmacy, physical therapy, respiratory therapy, trauma unit, x-ray</p>
<i>Comments</i>	Designated to receive SCDF ambulance patients.

Singapore General Hospital

<i>Location</i>	Outram Road
<i>City</i>	Singapore
<i>Coordinates</i>	011647N 1035006E
<i>Telephone</i>	6222 3322
<i>Type</i>	Public
<i>Beds</i>	1374
<i>Capabilities</i>	Medical —cardiology, dermatology, emergency medicine, endocrinology, gastroenterology, general medicine, family medicine, hematology, infectious diseases, nephrology, nuclear medicine, occupational medicine, pathology, physical medicine and rehabilitation, psychiatry, pulmonology, radiology; Surgical —anesthesia, general surgery, neurosurgery, obstetrics-gynecology, ophthalmology, oral (maxillofacial) surgery, orthopedic surgery, ENT, plastic surgery, proctology, urology; Ancillary —blood bank, burn unit, emergency room, medical ICU, surgical ICU, laboratory, operating room, pharmacy, x-ray
<i>Comments</i>	Designated to receive SCDF ambulance patients. National referral and teaching hospital.

HISTORY

The island of Singapore, once known as *Temasek*, originally was inhabited by fishermen and pirates, and served as an outpost of the Sumatran empire of Shrivijaya. It remained under Shrivijaya control until the 14th century, when the Javanese Majapahit Empire, followed by the Siamese Ayutthaya kingdom, gained control.

During the early 15th century, Singapore became part of the Muslim Malacca Empire. Portugal held control over the area in the 16th century, the Netherlands, in the 17th century. However, in 1819 the British East

Indian administrator, Sir Stamford Raffles, established the port settlement of Singapore as the center of British colonial activity in Southeast Asia. In 1832 Singapore became the administrative seat for the Straits Settlements comprising Singapore, Penang, Malacca, and Labuan.

The opening of the Suez Canal in 1869 and the advent of steamships brought an era of prosperity to Singapore. During this era, Singapore became a major shipping outlet for the region's tin and rubber resources, and began to develop its current reputation as one of Southeast Asia's most important ports.

After World War I, the United Kingdom built a large naval base at Singapore that came to symbolize British power in Southeast Asia. However, in 1942 Japanese forces overran the Malay Peninsula and forced the surrender of the large British garrison in Singapore. Japan occupied Singapore until their surrender in 1945, when it was restored to the United Kingdom. In 1946 the Straits Settlements was dissolved and Singapore became a separate crown colony. Singapore achieved full internal self-government in 1959 and became a part of the Malay Federation in 1963. In 1965 Lee Kuan Yew, leading the Chinese majority, separated from the Malay Federation and declared Singapore an independent state. As prime minister and later president of Singapore, Lee Kuan Yew achieved a legendary reputation as the leader most responsible for unifying the country and setting it on the path to economic development. Today, Singapore remains one of the most stable and prosperous countries in Southeast Asia.

Chronology of Key Events

- 1819** Sir Stamford Raffles lands in Singapore.
- 1858** Singapore becomes a crown protectorate.
- 1869** Suez Canal opens.
- 1942-45** Japan occupies Singapore.
- 1945** Singapore is returned to the United Kingdom.
- 1946** Singapore becomes a crown colony.
- 1948** First elections are held; state of emergency is declared.

- 1955** David Marshall becomes chief minister after first elections.
- 1956** Marshall resigns (June).
- 1959** Singapore gains independence, People's Action Party (PAP) is victorious in election.
- 1959** Lee Kuan Yew is sworn in as prime minister.
- 1963** Singapore joins Malaysia.
- 1965** Agreement with Malaysia is terminated (7 August).
- 1965** Singapore becomes sovereign republic.
- 1965** Treaty with Malaysia on defense and mutual assistance is signed.
- 1968** PAP wins all 58 seats in general election.
- 1971** British Far East Command is closed, Five Power Defense Arrangement (FPDA) is inaugurated.
- 1981** PAP loses one seat to Workers Party in local by-election.
- 1984** PAP loses two seats in general election.
- 1986** Opposition leader is prevented from standing for election.
- 1987** 27 are arrested under Internal Security Act.
- 1990** Goh Chok Tong succeeds Lee Kuan Yew as prime minister.
- 1991** PAP gains 77 seats in general elections.
- 1993** Ong Teng Cheong is elected president.
- 1996** Senior minister Lee Kuan Lew draws controversy by suggesting another merger with Malaysia.
- 1997** U.K. and Singaporean navies agree to more frequent exercises and training exchanges.
- 1998** Singapore agrees to allow U.S. war ships to use Singapore's planned naval base for port visits and maintenance beginning in 2000 (15 March).
- 1999** The ruling PAP Central Executive Committee is elected; Nathan S.R. is elected President.
- 2000** Singapore and Japan pledge to establish a free trade agreement by December 2001 (October).
- 2001** A political rally by the Workers Party of Singapore is allowed by the government, the first rally permitted outside an election period.

- 2003** SARS virus infects 206 people and kills 31; in May, the World Health Organization declares that Singapore is SARS free.
- 2003** Free trade agreement between Singapore and the United States enters into effect.

GOVERNMENT AND POLITICS

Government

Key Government Officials

President	Nathan Sellapan Rama
Prime Minister	Lee Hsien Loong
Senior Minister	Go Chok Tong
Minister of Defense	Teo Chee Hean
Minister of Foreign Affairs	Jayakumar Shunmugam
Ambassador to the United States	Chan Heng Chee

National Level

Executive Branch. According to the constitution as amended in 1965, Singapore is a republic with a parliamentary system of government. Political authority rests with the prime minister and his cabinet. The prime minister is the leader of the political party — or coalition of parties — that holds the majority of seats in parliament. Before 1991, the president was primarily a ceremonial leader. However, in 1991 the constitution was amended to expand presidential power and influence by granting



President Nathan Sellapan Rama

to the president the authority to veto budget proposals, safeguard the national treasury, and release detainees who are being held under the Internal Security Act (Singapore's domestic counterterrorism legislation).

Legislative Branch. The unicameral parliament consists of 84 members, up to 9 of which are appointed by the president and a special select committee. All members serve up to a 5-year term. Constitutional provisions require that at least three opposition members hold seats in the parliament (even if they are not elected).

Judicial Branch. A three-body Supreme Court represents the highest judicial authority. It consists of the High Court, Court of Appeals, and the Court of Criminal Appeals. One chief justice and seven judges serve on the Supreme Court. In addition to the Supreme Court, Singapore has 17 district courts, 13 magistrates' courts, 1 juvenile court, 1 coroner's court, and a small claims tribunal.

Local Level

Singapore does not have local government divisions. The common properties of housing estates within towns are managed and maintained by town councils.

Politics

Elections

Presidential elections are held every 4 years, and parliamentary elections every 5 years.

Voting

All citizens 21 years or older, except those serving criminal sentences, are eligible to vote.

Political Parties

- PAP (governing party)
- Democratic Progressive Party
- National Solidarity Party

- Singapore Democratic Alliance
- Singapore Justice Party
- Singapore National Malay Organization
- Singapore People's Party
- Workers' Party
- Singapore Democratic Party

Foreign Relations

Singapore maintains a wide range of international diplomatic and political relationships to enhance its military and economic security. Singapore is a member of the Association of Southeast Asian Nations (ASEAN), Non-Aligned Movement (NAM), and FPDA with Malaysia, Great Britain, Australia, and New Zealand. Singapore also has an army training camp in Taiwan, complete with a reserve armor force, and a training school in Brunei. Australia, France, the United States, and many other nations provide air force facilities to Singapore due to the lack of available space within Singapore, and participate annually in multinational land, sea, and air exercises.

Australia. Singapore's relations with Australia are based on shared economic and security interests. Australia is Singapore's primary trading partner in Southeast Asia. The trading relationship between the two countries was strengthened in February 2003 with the signing of a new free trade agreement. The two countries also share a strong military-to-military relationship reinforced by annual military exercises and a series of bilateral security agreements.

Indonesia. Although relations between Indonesia and Singapore historically have been strained by Indonesia's anti-Chinese past, the two countries have been cooperating on counterterrorism initiatives—especially those directed toward maritime security—since 2001. Indonesia and Singapore share an interest in securing vital sea routes and preventing the spread of terrorism. Such shared interests ensure the continuation of strong military-to-military ties despite a history of suspicion between the two countries.

Malaysia. Although the people of Singapore and Malaysia share a common history and culture, relations between the two countries traditionally have been strained due to disputes over water resources, land reclamation works on Johor, maritime boundaries, and Singapore-occupied Pedra Branca Island/Pulau Batu Putih. Despite these disputes, Malaysia and Singapore have recently begun to forge a relationship based on common economic and security concerns. Chief among these concerns is the rising threat of terrorism and piracy throughout Southeast Asia.

United States. Since the 1990s, Singapore has been one of the United States' most important allies in Southeast Asia. This relationship primarily is based on mutual economic and security interests. Singapore has been one of the most active supporters of the U.S.-led Global War on Terror; it has recently been involved in several arrests of terrorist and maritime security initiatives. The military-to-military relationship is further strengthened by Singaporean aircraft stationed at U.S. bases, a series of annual multilateral exercises, and frequent port calls.

ECONOMY

Singapore has one of the most successful economies in Southeast Asia, despite the Asian Financial Crisis of 1997-98. Unlike many of its Asian neighbors, Singapore recovered from the crisis with only a short-term drop in growth. Today the economy is characterized by a sustained high rate of growth and relatively low rate of inflation. Such factors make Singapore a major hub for foreign investment capital.

Statistics (2004 estimates)

GDP	US\$120.9 billion (purchasing power parity)
GDP Growth	8.1%
Per capita GDP	US\$27,800 (purchasing power parity)
Inflation Rate	1.7%
Revenues	US\$17.05 billion

Expenditures	US\$18.45 billion
Exports	US\$174 billion
<i>Commodities</i>	Machinery and equipment (including electronics), consumer goods, chemicals, and mineral fuels
<i>Trade partners</i>	Malaysia 15.8%, United States 14.3%, Hong Kong 10%, China 7%, Japan 6.7%, Taiwan 4.7%, Thailand 4.3%, and South Korea 4.2% (2003 est.)
Imports	\$155.2 billion
<i>Commodities</i>	machinery and equipment, mineral fuels, manufactured goods, foodstuffs, chemicals and crude materials.
<i>Trade partners</i>	Malaysia 16.8%, United States 14.1%, Japan 12%, China 8.7%, Taiwan 5.1%, and Thailand 4.3% (2003 est.)



Market

Resources

Industry

Singapore produces electronics, chemicals, oil drilling equipment, rubber products, and processed food and beverages. Its companies are engaged in petroleum refining, rubber processing, biotechnology, financial services, and ship repair.

Agriculture

Singapore's agricultural products include rubber, copra, fruit, orchids, vegetables, poultry, eggs, fish, and ornamental fish.

Tourism

The tourism industry is crucial to Singapore's economy. Recent efforts to attract tourists' dollars include the development of the Singapore Tourist Promotion Board and the construction of new facilities for accommodating conventions.

THREAT

Crime

Singapore is relatively safe due to Singapore's firm and swift manner in dealing with crime. Laws are strict and heavily enforced. While criminal activity is rare, petty crimes such as pocket picking and purse and briefcase snatching occur in tourist areas, in hotels, and at the airport. The death penalty is mandatory for trafficking illegal drugs or firearms, using a firearm to cause bodily harm, and committing murder and rape. The following offenses are subject to fines or imprisonment:

- Possessing illegal drugs.
- Creating conditions favorable for propagating or harboring disease-bearing insects (e.g., allowing water to stagnate in gutters or drip dishes under potted plants).

- Leaving chewed gum in a public place or selling gum.
- Copying documents to sell or import.
- Possessing or selling pirated videotapes.
- Displaying cruelty to animals.
- Failing to license dogs and have dogs tattooed for identification, sterilized, muzzled, and leashed. In addition, owners must bond and insure their dogs. Some breeds are banned.
- Possessing fireworks.
- Jaywalking.
- Littering on streets and pavements; throwing objects from buildings.
- Speeding, reckless driving, and driving under the influence of alcohol or drugs, failing to use seat belts, and failing to use restraining seats for children under 8 years of age (motorists).
- Smoking in public places.
- Spitting in public.
- Failing to flush a public toilet.
- Touting and selling counterfeit goods.
- Possessing weapons and firearms (maximum penalty is caning).
- Soliciting.
- Gambling (except government controlled horse-racing and sweepstakes).
- Possessing pornography.
- Displaying public drunkenness.

Travel Security

U.S. government facilities worldwide are at a heightened state of alert. Americans residing in or traveling to Singapore and neighboring countries should exercise particular caution, especially in places where Westerners congregate such as clubs, discos, bars, restaurants, hotels, places of worship, schools, outdoor recreation venues, tourist areas, resorts, beaches, and tourist attractions.

Terrorism

Since December 2001, Singapore security services have detained more than 35 members of Jemaah Islamiyah, a terrorist organization with links to al Qaida. These arrests uncovered plans to target the Singaporean government, and U.S. businesses and military interests.

Drug Trafficking

Singapore has long been a transit point for heroin from the Golden Triangle and for other narcotics despite strict laws against drug trafficking.

Major Intelligence Services

Singapore's intelligence services include domestic and foreign elements. The Internal Security Department of the Ministry of Home Affairs is in charge of counterintelligence and internal security. Foreign intelligence responsibilities are assigned to the Security and Intelligence Division of the Ministry of Defense.

Opposition Forces

Singapore contains a variety of ethnic groups that could pose a substantial threat if they were to organize into a militant opposition (e.g., Malay, Chinese, Tamil, Pakistani, and various Hindu). However, Singapore has not experienced any organized opposition from these groups since the large-scale, anti-Chinese rioting that occurred in the 1970s.

ARMED FORCES

Organization

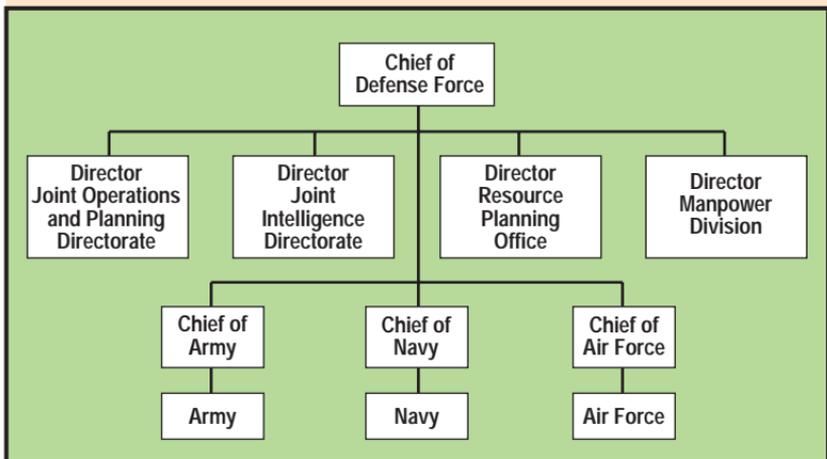
Mission

Singapore's major defense concerns focus on the coast of Singapore island and the other 54 islands that compose the republic. They include maintaining domestic stability in a predominantly Chinese society with significant Malay and Indian minorities. Singapore's strategic location

along the major sea lanes of Southeast Asia has prompted the development of an efficient coastal patrol force. Since 11 September 2001, Singapore has become more aware of the terrorist threat. In late 2001 Singaporean authorities foiled an attempt by radical Muslim terrorists to bomb the U.S. and other foreign embassies in Singapore. The terrorist threat in Singapore remains significant because of Singapore's support of U.S.-led Operation Iraqi Freedom (OIF) and the terrorist bombings in Bali (2002) and Jakarta (2003). Singapore's support of OIF included a C-130 transport aircraft, a landing ship, and a team of police instructors. Officials have stressed that it is in Singapore's own interests to put its military personnel in harm's way. In December 2003, Prime Minister Goh publicly said, "If small countries like Singapore don't support the United States in Iraq, and Washington were to fail in its mission there, terrorism will be the winner."

Strategy

Singapore's defense strategy has been shaped by its key vulnerabilities — limited area, small population, and lack of natural resources. Considering



Armed Forces Structure

these vulnerabilities, Singapore traditionally has emphasized the development of a powerful deterrent capability and the development of military and political relationships with major Asian allies and the United States. This was demonstrated by its active participation in tsunami relief efforts in Indonesia (2005), the Global War on Terror, and OIF.

Singapore considers strong military ties with the United States to be a key component of its deterrent strategy. Singapore became the headquarters of the U.S. Navy's Logistics Command after the withdrawal of U.S. forces from the Philippines in mid-1993. Singapore also provides basing rights and repair facilities to the U.S. Navy and Air Force. To compensate for its limited land area, Singapore bases several of its aircraft in the United States. Annual exercises and frequent port-calls by the U.S. Navy reinforce military-to-military ties.

The United Kingdom provided the primary defense of Singapore until the FPDA was signed in 1971. The FPDA is a multilateral defense arrangement including the United Kingdom, Singapore, New Zealand, Australia, and Malaysia. It provides an organizational and defense framework to deal with external threats.

Today, Singapore is a member of ASEAN, a regional economic and political organization that is taking on the role of a military alliance. Other members are Brunei, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam.

Singapore remains part of the British Commonwealth of Nations. In the event of a major conflict, Singapore would depend on the naval forces of other Commonwealth and ASEAN members for aid.

Personnel

The president is the constitutional and ceremonial commander in chief of the armed forces. However, the prime minister has actual control of national defense policymaking and operational issues.

The deputy prime minister and the minister of defense head the ministry of defense. The minister of defense is the nominal director of national

defense policy. The rest of the ministry consists of several second ministers for defense policy, and the commanders of the military services, which include the army, air force, navy, and civil defense force. The SCDF consists of the home guard, police, and Gurkha battalions.

The total active manpower of the Singapore armed forces is approximately 55,500 personnel. NS men must serve 2 or 2.5 years on active

COMMISSIONED OFFICERS	SECOND LIEUTENANT	LIEUTENANT	CAPTAIN	MAJOR	LIEUTENANT COLONEL	
						
	COLONEL	BRIGADIER GENERAL	MAJOR GENERAL	LIEUTENANT GENERAL		
						
ENLISTED PERSONNEL AND WARRANT OFFICERS	LANCE CORPORAL	CORPORAL	THIRD SERGEANT	SECOND SERGEANT	FIRST SERGEANT	STAFF SERGEANT
						
	MASTER SERGEANT		2ND WARRANT OFFICER	1ST WARRANT OFFICER	MASTER WARRANT OFFICER	SENIOR WARRANT OFFICER
						

Rank Insignia

duty and 13 years in the reserve. The relatively small number of personnel on active duty would require a massive mobilization of reserve forces in the event of a conflict. Therefore, the reserve forces have been organized to allow rapid force mobilization.

Key Defense Personnel

Chief of Defense Forces	Lieutenant General Ng Yat Chung
Chief of the Army	Major Gen Desmond Kuek Bak Chye
Chief of the Air Force	Brig Gen Goh Yong Siang
Chief of the Navy	Rear Admiral Lui Tuck Yew

Capabilities

In general, the armed forces are professional, well trained, and motivated. Capabilities are focused on the chief priority of defending the island against an external threat (most likely from Malaysia or Indonesia), and on defending against internal enemies (e.g., insurgents and terrorists). Capabilities are enhanced by Singapore's aggressive procurement strategy, which includes a sophisticated indigenous weapons industry.

Force Modernization

Protecting airspace and sea lines of communication is emphasized.

Army

Organization

In 1991 the Singapore army formed three combined arms divisions—a significant departure from its previous organization of separate arms formations. On 1 January 1995, the Singapore army implemented the reorganization of the combined arms divisions. Each combined arms division has two infantry brigades and one armored brigade. A combination of active (Singapore infantry regiment [SIR]) and reserve (National Service [NS]) battalions make up the brigades. In the 6th Division, the 2nd Brigade has two SIR battalions and one NS battalion. The 6th Division's armor brigade has one full-time-conscript battalion and two NS

battalions. The army can place more responsibilities on each division as it develops the combat doctrines and methods for Army 2000. Within the army, the Guards and Commandos are considered elite forces. The Guards are a three-brigade light infantry force trained in air-mobile and amphibious operations. The Commandos are a two-battalion special operations force capable of airborne and amphibious infiltration, direct action, and strategic reconnaissance. The army structure is as follows:

3 Combined Arms Divisions (3rd, 6th and 9th) (14,000 strong)

Brigades and battalions comprise reserve and active formations.

- 2 infantry brigades (3 battalions each)
- 1 armor brigade
- 1 artillery group
- 1 division-support command

2 Army Operational Reserve Divisions (21st and 25th)

25th Division

- 4 infantry brigades (composed of troops who have completed their 13 years of mandatory service).

21st Division (SAF's rapid deployment force)

- 3 Guards brigades (airmobile)
- 2 infantry brigades (1 active and 1 reserve)
- 1 artillery group
- 1 division support command

Singapore acknowledges the 21st Division as an operational reserve division rather than a rapid deployment force.

Non-Divisional Units

1 air defense systems division (part of the Air Force)

- Air Defense Brigade (ADB) operates national-level ground-based systems, including I-Hawk and Rapier, and supporting radars
- Divisional Air Defense Artillery Brigade, provides mobile air defense (Mistral, IGLA, RBS70, and radars) for army
- 1 Commando command (1 active and 1 reserve battalion)

- 5 engineering battalions
- 1 amphibious engineering battalion
- 1 signal battalion

People's Defense Force (30,000 strong)

Two commands, composed of second-line reservists, are dedicated to homeland defense.

- 7 Brigade groups
- 21 Battalions

Personnel

The army has no aviation wing. Total manpower for the army is approximately 55,500 active duty troops and 250,000 reservists.

Disposition

The active forces of the Singapore army are deployed in detachments along the coast. The territorial defense force monitors the Singapore-Malaysian border, with active force troops to the rear. Singapore also has an army training camp in Taiwan, complete with reserve armor force, and a training school in Brunei. The Brunei detachment numbers about 500 personnel and has five UH-1 helicopters. Neighboring nations provide Singapore with air force facilities due to the lack of available space in Singapore itself and participate annually in multinational land, sea, and air exercises.

Equipment

Small Arms

Type	Role	Quantity
5.56-mm M16A1	Assault Rifle	Unk
5.56-mm SR 88A	Assault Rifle	Unk
5.56-mm SAR 80	Assault Rifle	Unk
5.56-mm SAR 21	Assault Rifle	Unk
5.56-mm Ultimax 100 Mk 3	Machinegun	Unk

Type	Role	Quantity
7.62-mm L1A1	Assault Rifle	Unk
7.62-mm FN MAG	Machinegun	Unk
9-mm H&K MP5	Submachinegun	Unk
12.7-mm Barrett 82A1	Antimateriel	Unk
.50 cal. Browning M2 HB	Heavy machinegun	Unk
40-mm M203	Grenade Launcher	Unk
40-mm 40GL, 40AGL	Grenade Launcher	Unk

Armor

Type	Role	Quantity
AMX-13 SM1	Light tank	350
AMX-10 PAC 90	Armored reconnaissance	22
Centurion Mk 13	Main battle tank	60
Singapore IFV 25, 40/50	Infantry fighting vehicle	Unk
M113 (Singapore Upgrade)	Armored personnel carrier	720
V-100 Commando Scout	Armored reconnaissance	30
Cadillac Gage V-200	Armored personnel carrier	220
V-150 Commando	Armored personnel carrier	30
AMC-10P	Armored personnel carrier	22

Artillery

Type	Role	Quantity
155-mm SOLTAM M-71S	Towed howitzer	38
155-mm M68	Howitzer	45
155-mm M114A1	Howitzer	16
155-mm/52 FH 2000 r	Gun-howitze	17
155-mm FH88	Towed Howitzer	100
155-mm SPSH Primus	Howitzer	Unk
105-mm LG-1 Mk II	Field gun	36
160-mm TAMPELLA	Mortar	12
120-mm SOLTAM	Self-propelled mortar	50
81-mm M125A1/A2	Self-Propelled Mortar	Unk
81-mm SOLTAM	Mortar	500
60-mm ST Kinetics	Mortar	Unk

Antiarmor

Type	Role	Quantity
75-mm CA1 AMBRUST	Rocket Launcher	300
89-mm M20	Rocket Launcher	Unk
84-mm CARL GUSTAV	Recoilless Rifle	200
106-mm M40A1AT	Recoilless Rifle	90
MILAN	Rocket Launcher	30

Air-Defense

Type	Role	Quantity
20-mm GAI-B01	Air Defense Artillery	Unk
20-mm GAI-C01	Air Defense Artillery	30
20-mm GAI-C04	Air Defense Artillery	Unk
35-mm GDF-001	Twin Air Defense Artillery	Unk
35-mm GDF-002	Twin Air Defense Artillery	34
35-mm GDF-003	Twin Air Defense Artillery	Unk
35-mm GDF-005	Twin Air Defense Artillery	Unk
40-mm L/60	Air Defense Artillery	Unk
40-mm L/70	Air Defense Artillery	16
RBS-70 Ray-Rider	Surface-to-Air	Unk
I-Hawk	Launcher	16

Air Force

Organization

The Republic of Singapore Air Force (RSAF) is well trained and very well equipped, especially when compared to its Southeast Asian neighbors. The RSAF consists of ground-based air defense and aircraft units as listed below:

- 3 Fighter/ground-attack squadrons
- 2 Fighter squadrons
- 1 Airborne early warning squadron
- 2 Transport squadrons
- 1 Reconnaissance squadron
- 3 Helicopter squadrons
- 3 Training squadrons

The air force is also responsible for ground-based air defense, with specific air base defense by the reserve forces. Air defense is organized in three SAM battalions and one air defense artillery battalion.

Personnel

The total manpower of the RSAF is 6,000 active duty personnel, including 3,000 conscripts, and approximately 7,500 reservists.

Disposition

The RSAF is deployed in the following manner:

Headquarters

Paya Lebur	Sembawang	Tengah	Changi
C-130, KC-130	UH-1H, AS-500, S-332	F-16, A-4U, F-5, E-2C	Skyvan

Equipment

Fixed Wing

Type	Role	Quantity
F-16A/B	Multirole fighter	7
F-16C/D	Multirole fighter	30
A-4S/S1 Skyhawk	Attack	70
S211	Light attack	27
F-5E Tiger II	Fighter, ground attack	36
Hawker Hunter FGA-74	Fighter-bomber, recon.	28
RF-5E Tigereye	Armed Reconnaissance	8
E-2C Hawkeye	Surveillance	4
Blue Horizon II UAV	Surveillance	4
Searcher UAV	Surveillance	20
Chukar II UAV	Surveillance	24
Fokker 50 Enforcer	Maritime Patrol	4
KC-135R Stratotanker	Tanker-transport	4
C-130H Hercules	Transport	5

Type	Role	Quantity
KC-130B, KC-130H Hercules	Tanker-transport	5
C-130H-30 Hercules	Transport	2
SC7 Skyvan	Transport	6
S211	Trainer	22
TA-4S/S1 Skyhawk	Trainer	16

Rotary

Type	Role	Quantity
AH-64D LONGBOW	Attack	8
AS 550E ECUREIUL	Trainer	6
AS 550C-2/U-2 ECUREIUL	Reconnaissance	20
UH-1B Huey	Transport	9
UH-1H Huey	Transport	30
AB205A/A-1	Transport	4
AS 532B Cougar	Search & Rescue	14
AS 332M Super Puma	Transport	20
CH-47D/SD	Transport	16

Missiles

Type	Role	Quantity
AIM-9 J/P/S Sidewinder	Air-to-Air	Unk
AIM-7m Sparrow	Air-to-Air	Unk
Bloodhound 2	Surface-to-Air	Unk
Improved Hawk	Surface-to-Air	16
Rapier	Surface-to-Air	10
Helitow	Air-to-Surface	Unk

Navy

Organization

The Republic of Singapore Navy (RSN) was originally designed as a coastal defense force; however, it is gaining a bluewater capability. It is

organized into three groups: Fleet Command, Coastal Command (COSCOM), and Naval Logistics Command (NALCOM).

Operational deployments of naval assets come under Fleet Command. COSCOM conducts peacetime operations in the Singapore Straits. NALCOM carries out all naval logistics operations.

Personnel

The total RSN strength is 4,500 active duty personnel, including 1,800 conscripts, and approximately 4,500 reserve personnel.

Disposition

The RSN deploys from the main naval bases at Changi (newly-built, adjacent to the international airport at the extreme eastern edge of the island-state) and Tuas, on the western edge of the island.

Equipment

Type	Type	Quantity
CHALLENGER Class SS	Submarine	4
VICTORY Class PGG	Corvette	6
LURSSSEN TNC 45 Class PTG	Fast attack craft	6
FEARLESS PG	Patrol craft	11
ST FB 31 PB	Patrol craft	12
14-M FIC PB	Patrol craft	6
LANDSORT (BEDOK) MHC	Mine warfare	4
ENDURANCE Class LST	Tank landing ship	4
RPL LCM	Mechanized landing craft	6
VOSPER Type	Fast attack	6
ST 13.6-M LCVP	Landing craft	100
ST 23-M LCVP	Landing craft	30
PERSEVERANCE Class ASR	Auxiliary	1
NEFTEGAZ (M/V KENDRICK) AG	Auxiliary	1
Various small, portable assault craft		450

Missiles

AGM-84, RGM-84 HARPOON	Antiship	Unk
AM 39 EXOCET	ASM, SSM	Unk
GABRIEL	Antiship	Unk
BARAK	Theater defense	Unk

Naval Aviation

Singapore has no dedicated naval aviation assets, although this may change in the near term. The RSAF operates five FOKKER 50 ENFORCER Mk 50 and four E-2C HAWKEYE, which are used in maritime patrol.

Paramilitary Forces

Singapore relies heavily on paramilitary forces. A 34,000-member home guard, known as the People's Defense Force (PDF), maintains internal security. The PDF is organized into 2 commands, with 7 brigades and 21 battalions, and is administered by the army.

The Singapore Civil Defence Force (SCDF), consisting of approximately 100,000 personnel, primarily is tasked with local defense and military construction projects; it maintains one construction brigade with 2,500 personnel. Although the CDF primarily is a volunteer organization, up to 34,000 army reservists may fulfill their military obligation through civil defense service. Some conscripts may also be assigned.

There is also a paramilitary force consisting of land and marine police units. Approximately 11,600 personnel serve in this force, including about 750 Gurkha soldiers (one Gurkha Guard battalion). The marine police inventory includes over 80 coastal patrol craft of British and Singaporean design.

Coastal Defense Forces

Customs Service Craft

Type	Quantity
GP 50 Class pilot boat (Cheoy Lee SY design)	18
CE 5 Class pilot boat (Singapore SB & Eng. design)	4
CE 1 Class pilot boat (Vosper Thornycraft design)	4
MATA IKAN Class hydrographic survey craft	3

Marine Police Patrol Craft

Type	Quantity
PT 12 Class (Singapore SB & Eng. design)	8
PT 1 Class (Singapore SB & Eng. design)	11
PX 10 Class (Sembawang SY design)	24
PC 32 Class (Vosper Thornycraft design)	37

National Police

In 1983 the police force was divided into locally based neighborhood police posts. There are about eight police posts per station, which are built directly on the ground floors of high-rise blocks or in special kiosks in major residential areas. At least 25 constables are assigned to each post and are directly involved in the daily life of the residents. This force parallels the successful Japanese koban system of crime control. The post constables disseminate crime prevention information and work with community organizations.

APPENDIX A: Equipment Recognition

INFANTRY WEAPONS

5.56-mm M16A1



Caliber	5.56- mm/45
Fire Modes	Automatic (semiautomatic 3-rd burst available)
System of Operation	Gas direct action, selective fire, air-cooled
Effective Range	800 m
Cyclic Rate of Fire	700 rounds/minute
Automatic Rate of Fire	60 to 80 rounds/minute
Single-Shot Rate of Fire	40 to 50 rounds/minute
Feed Device	20- or 30-round detachable box magazine
Overall Length	990 mm
Weight (Loaded)	3.85 kg (20-round magazine)
NOTE: optional bayonet (knife and wirecutter) and under-barrel grenade launcher (M203) available.	

5.56-mm SR88A Assault Rifle



Caliber	5.56 x 45 mm
Fire Modes	Selective fire
System of Operation	Gas
Effective Range	800 m
Cyclic Rate of Fire	700 to 900 rounds/minute
Feed Device	Detachable box magazine
Overall Length	0.81 m
Weight (unloaded)	3.68 kg

NOTE: Options and variations include a retractable butt stock and carbine (shortened barrel and retractable stock). An adapter is available for mounting the 40-mm 40GL grenade launcher.

5.56-mm SAR 80



Caliber	5.56 x 45 mm
Fire Modes	Automatic and semiautomatic
System of Operation	Gas piston
Effective Range	400 m
Cyclic Rate of Fire	600 to 800 rounds/minute
Feed Device	20- or 30-round box magazine
Overall Length	0.97 m
Weight (unloaded)	3.7 kg

NOTE: M16-type box magazines are compatible. Available with fixed butt or folding stock.

5.56-mm SAR 21



Caliber	5.56 x 45 mm
Fire Modes	Selective
System of Operation	Gas
Effective Range	800 m
Cyclic Rate of Fire	450 to 650 rounds/minute
Feed Device	20- or 30-round curved magazine
Sights	x1.5 optical attached (x3 available); optional laser aiming device (projects visible red and infrared light)
Overall Length	0.81 m
Weight (Loaded)	4.28 kg

NOTE: The SAR 21 is made extensively of high-strength plastic and composite materials. The magazine is translucent, allowing observation of rounds in the magazine. Attached x1.5 optical sight does not require zeroing

5.56-mm Ultimax 100 Mk 3



Type	Machinegun
Effective Range	1,300 m
Caliber	5.56-mm x 45
System of Operation	Gas, automatic
Overall Length	1.024 m
Magazine Capacity	100-rd drum, 20- or 30-rd detachable box magazines
Weight (Loaded)	6.8 kg

7.62-mm L1A1



Effective Range	600 m
Caliber	7.62- x 51-mm
System of Operation	Gas, selective or automatic fire
Length	1.095-m, stock extended; 0.845 m, stock folded
Feed	20-round steel or light box magazine
Weight (Loaded)	5.17 kg

NOTE: adapted from the Belgian FN FAL rifle.

7.62-mm FN MAG



Effective Range	1,500 m
Caliber	7.62- x 51-mm NATO
System of Operation	Gas, automatic
Overall Length	1.26 m
Feed Device	Belt
Weight (Loaded)	13.92 kg (with butt stock and bipod)

9-mm H&K MP5



Caliber	9 x 19 mm
Fire Modes	Selective fire
System of Operation	Delayed blowback
Cyclic Rate of Fire	800 rounds/minute
Feed Device	Detachable 15- or 30-round box magazine
Overall Length	0.68 m
Weight (unloaded)	2.54 kg

12.7-mm Barrett Model 82A1



Caliber	12.7 x 99 mm
Fire Modes	Semiautomatic
System of Operation	Short recoil
Effective Range	2,000 m
Feed Device	Detachable box magazine
Overall Length	1.45 m
Weight (empty)	14 kg

NOTE: The Model 82A1 was designed for explosive ordnance disposal and long-range interdiction.

.50 cal. Browning M2 HB



Effective Range	1,500 m
Caliber	50 caliber (12.7 x 99-mm)
System of Operation	Short recoil
Overall Length	1.651 m
Feed Device	100-round disintegrating-link belt
Weight (Loaded)	38 kg

40-mm M203 Grenade Launcher



Caliber	40 x 46 mm
Mode of Operation	Breech loaded, sliding barrel
Sights	
Effective Range	Point target 150 m; area target 350 m
Overall Length	380 mm
Weight (Loaded)	

NOTE: The M203 grenade launcher was originally designed for attachment to the M16-series assault rifles. The M203 can be used attached to an M16 assault rifle or M4 carbine, or as a standalone weapon attached to a modified stock.

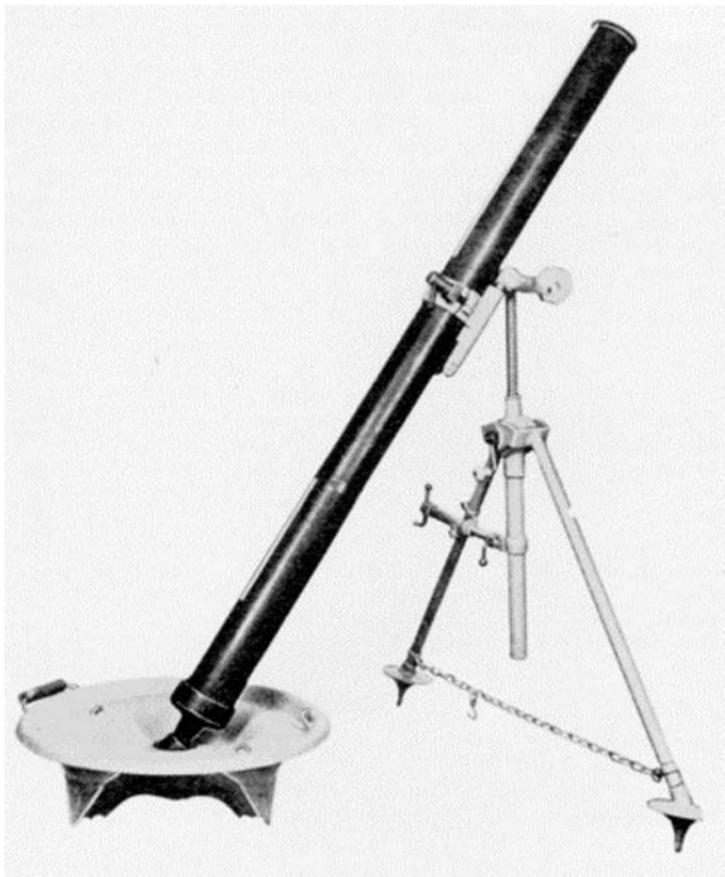
40-mm 40GL, 40AGL Grenade Launcher



Caliber	40 x 46 mm
Mode of Operation	Break-open, single-shot
Sights	Folding leaf, adjustable for elevation and azimuth, graduated in 50-m steps
Effective Range	400 m
Overall Length	655 mm
Weight (Empty)	1.95 kg (without stock)

NOTE: in standard form, the 40GL is fitted with a stock, but with the stock removed and adapter fitted, it can be mounted beneath the barrel of an assault rifle similarly to the M203.

81-mm Soltam Mortar



Caliber	81 mm
Range	150 to 5,000 m
Traverse	360 degrees
Elevation	+43 to +85 degrees
Combat Weight	44 kg
Barrel Length	1,560 mm

60-mm ST Kinetics Mortar



Caliber	60 mm
Range	150 to 2,555 m
Traverse	116 mils
Elevation	188 to 1,420 mils
Combat Weight	15.5 kg
Barrel Length	740 mm

ARMOR

AMX 13, AMX 13 SM1



Crew	3
Type	Light tank
Armament	
Main	75-, 90-, or 105-mm gun
Coaxial	7.62-mm machinegun with 3,600 rounds
Road Range	400 km (500 km for the SM1)
Maximum Road Speed	60 km/h
Vertical Step	0.65 m
Gradient and Side Slope	60 percent (40-percent side slope for the SM1)
Trench	1.6 m
Fording	0.6 m
Combat Weight	15,000 kg
Length x Width x Height	6.36 (gun forward) x 2.51 x 2.3 m
Fuel Capacity	480 L

NOTE: the SM1 is a Singapore upgrade to the original AMX-13. In the upgrade, the original gasoline engine is replaced with a turbocharged diesel engine and fully automatic transmission.

Centurion Mk 13



Crew	4
Type	Main battle tank
Armament	
Main	105-mm rifled L7A2
Coaxial	7.62-mm and 12.7-mm machineguns
Auxiliary	7.62-mm machinegun exposed on turret
Road Range	190 km
Maximum Road Speed	35 km/h
Vertical Step	0.91 m
Gradient/Side Slope	60/30 percent
Trench	3.35 m
Fording	1.45 m (2.74 m with preparation)
Combat Weight	51,800 kg
Length x Width x Height	9.85 x 3.39 x 3.01 m
Fuel Capacity	1,037 liters

AMX-10 PAC 90, -10P Marines



Crew/Passengers	3/8
Type	Amphibious infantry fighting vehicle
Armament	
Primary	Turret-mounted 90-, 20-, or 25-mm gun and coaxial 7.62-mm MG, or 12.7-mm heavy MG
Auxiliary	7.62-mm or 12.7-mm machinegun
Maximum Road Speed	65 km/h
Maximum Water Speed	10 km/h
Vertical Step	0.7 m (forwards)
Gradient/Side Slope	60/30 percent
Trench	2.1 m
Combat Weight	14,500 kg
Length x Width x Height of Hull	5.90 x 2.83 x 1.95 m

Singapore IFV 25, 40/50



Crew/Passengers	3/7
Type	Infantry fighting vehicle
Armament	25-mm M242 Bushmaster cannon and 7.62-mm coaxial machinegun (IFV 25), or 40-mm automatic grenade launcher and 12.7-mm machinegun (IFV 40/50)
Maximum Road Speed	70 km/h
Vertical Step	0.80 m
Side Slope	30 percent
Combat Weight	23,000 kg
Length x Width x Height	5.90 x 2.70 x 2.60 m
NOTE:	the 12.7-mm machinegun fires sabot light armor-penetrating (SLAP) ammunition.

M113 (Singapore Upgrade)



Crew/Passengers	2 + 11
Type	Tracked
Armament	40-mm automatic grenade launcher and 12.7-mm machinegun, or 25-mm chain gun and coaxial 7.62-mm machinegun (Singapore upgrade)
Maximum Speed	74 km/h (Singapore upgrade)
Range	480 km
Fuel Capacity	360 liters
Combat Weight	12,094 kg
Length	4.92 m
Width	3.11 m
Height	2.52 m
Night Vision	Yes
NBC	Yes
Fording	Amphibious
Gradient	60 percent
Vertical Obstacle	0.61 m
Trench	1.68 m

NOTE: Data is for standard M113A1 unless specified otherwise. Singapore has modified some M113A1 as 120-mm self-propelled mortars.

V-100 Commando Scout



Crew	2 (+1 radio operator in the command variant)
Type	Armored reconnaissance vehicle
Armament	
Main	Twin 7.62-mm MG; 7.62-mm and .50 cal MG or 40-mm grenade launcher combination; 106-mm recoilless rifle; TOW; 20-mm gun; or 30-mm gun
Coaxial	7.62-mm machinegun
Road Range	1,287 km
Maximum Road Speed	96 km/h
Vertical Step	0.61 m
Gradient/Side Slope	60/30 percent
Trench	1.14 m
Fording Depth	1.2 m
Combat Weight	6,600 kg
Length x Width x Height	5.00 x 2.06 x 2.16 m
Fuel Capacity	212 L
NOTE:	The Chaimite APC is a copy of the Scout, but it is armed with 2 turret-mounted HK21 7.62-mm machineguns.

Cadillac Gage V-200



Crew	3 + 2
Type	Amphibious armored personnel carrier
Armament	RBS 70 SAM system and 7.62-mm machinegun
Auxiliary Gun	7.62-mm machinegun
Maximum Road Speed	96 km/h
Fording	Amphibious
Combat Weight	12,730 kg

NOTE: The V-200 is a larger version of the V-100 Commando Scout that reportedly was sold only to Singapore.

V-150 Commando



Crew/Passengers	3/9
Type	Amphibious armored personnel carrier
Armament	12.7-mm MG, or 90- or 20-mm gun
Road Range	800 km
Maximum Road Speed	112 km/h
Maximum Water Speed	5.0 km/h
Vertical Step	0.61 m
Gradient/Side Slope	60/30 percent
Combat Weight	9,136 kg
Length x Width x Height	6.37 x 2.26 x 2.08 m

ARTILLERY

155-mm/52 FH 2000 Gun-Howitzer



Crew	6
Caliber	155 mm x 52 caliber
Maximum Range	19 to 40 km, based on projectile
Rates of Fire	
Sustained	2 rounds/minute for 30 minutes
Maximum	6 rounds/minute for 3 minutes
Burst	3 rounds in 20 seconds)
Travelling Weight	13,200 kg
Elevation	-3 to +70 degrees
Traverse	30 degrees left and right
Traveling Length x Width x Height	11.05 x 2.80 x 2.29 m
Gradient	45 percent
Fording	0.76 m
Prime Mover	6 x 6 truck

155-mm/39 FH 88 Gun-Howitzer



Crew	6
Caliber	155 mm x 39 caliber
Maximum Range	30,000 m
Rates of Fire	
Sustained	2 rounds/minute
Maximum	6 rounds/minute
Burst	3 rounds in 15 seconds
Travelling Weight	12,800 kg
Elevation	-3 to +70
Traverse	60 degrees
Traveling Length x Width x Height	9.16 x 2.8 2.29 m
Gradient	45 degrees
Fording	0.76 m
Prime Mover	6 x 6 truck
NOTE:	The FH88 replaced the Soltam 155-mm M-71S.

155-mm SOLTAM M-71S Howitzer



Crew	8
Maximum Range	30,000 m
Rate of Fire	5 rounds/minute (sustained 2 rounds/minute)
Combat Weight	9,200 kg
Length x Width x Height	7.5 x 2.58 x 2.12 m
Prime Mover	6 x 6 truck
NOTE: The M-71S is the Israeli Soltam M-71 upgraded by Singapore	

155-mm M114



Crew	11
Maximum Range	14,600 m
Rate of Fire	40 rounds/h
Combat Weight	5,760 kg
Length	7.315 m
Width	2.438 m
Height	1.803 m
Prime Mover	6 x 6

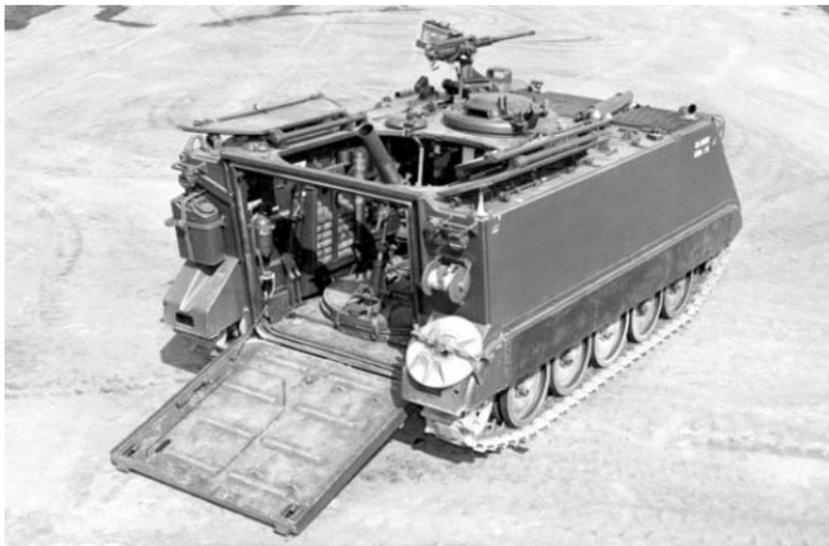
NOTE: The M114A1 is almost identical to the M114 shown, except that it has an M1A2 carriage. The M114A2 has a slightly longer barrel, and its tube has a greater twist internally, which extends the range of projectiles.

105-mm LG1 Mk II



Crew	7
Caliber	105.0 mm x 30 caliber
Range	11,680 (conventional), 19,000 (extended)
Rates of Fire	
Sustained	4 rounds/minute
Normal	6 rounds/minute
Burst	12 rounds/minute
Elevation	-5 to +70 degrees
Traverse	18 degrees left and right
Travelling Weight	1,450 kg
Traveling Length x Width x Height	5.20 x 1.89 x 1.62 m

81-mm M125A1/A2 Self-Propelled Mortar

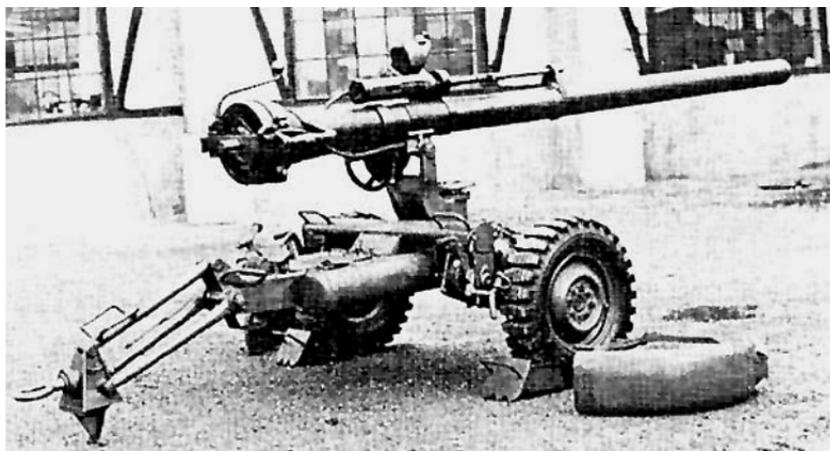


Crew	6
Main Gun	81-mm M29 mortar mounted on turntable
Range	72 to 4,500 m
Sustained Rate of Fire	4 to 8 rounds/minute
Elevation	+45 to +85 degrees
Traverse	360 degrees
Auxiliary Gun	0.50 cal. M2 machinegun
Maximum Road Speed	60.4 km/h
Vertical Step	0.61 m
Gradient	60 percent
Trench	1.68 m
Fording	Amphibious
Combat Weight	11,365 kg
Length x Width x Height	4,86 x 2.69 x 2.52 m
Fuel Capacity	360 liters

NOTE: Based on M113A1. The mortar can be deployed away from the vehicle. Pictured is the M106, which has a larger mortar than the M125.

ANTITANK

106-mm M40A1 Recoilless Rifle



Caliber	105 mm
Maximum Range	6,900 m (indirect fire)
Rate of Fire	5 rounds/minute
Elevation	-17 to +22 degrees
Traverse	360 degrees
Rifle Weight	113.9 kg (combat order)

84-mm M2 Carl Gustav



Caliber	84-mm
Weight	15.2 kg
Length	1.13 m
Ammunition (Maximum Ranges)	HEAT 551 (700 m), He 441B (1,100 m), Smoke 469B (1,300 m), HEDP (1,000 m)
Armor Penetration	>400 mm (HEAT 551)

Description: The M2 Carl Gustav is a manportable, recoilless gun designed for multiple purposes including antitank roles. The rear of the gun has a cone-shaped exhaust.

3.5-in M20 Rocket Launcher



Caliber	89 mm
Type of Round	HEAT rocket filled with 0.87 kg of Composition B
Maximum Range	1,200 m (110 m against armor)
Launcher Weight	5.5 kg
Length	1.55 m, assembled

75-mm CAI Ambrust Rocket Launcher



Maximum Range	1,500 m
Caliber	Launcher: 75-mm; MisOORFORsile: 67-mm
Penetration	300 mm
Length	850 mm
Weight	6.3 kg

MILAN Ground Launcher



Range and Flight Endurance	2,000 m in 12.5 seconds
Night Vision Device	Thermal imaging
Warhead Type	Unitary shaped charge
Warhead Penetration	1,000 mm of RHA
Guidance/Command Link	SACLOS/Wire
Attack Profile	Direct line of sight
Launch Platforms	Ground tripod, compact turret

AIR DEFENSE

40-mm Bofors L/70



Crew	5
Caliber	40 mm/70
Ranges	
Tactical	2,500 m (optical), 4,000 m (radar)
Horizontal	12,600 m (horizontal)
Vertical	7,800 m
Rate of Fire	240 to 300 rounds/minute
Elevation	-5 to +90 degrees
Traverse	360 degrees
Emplacement Time	3 minutes
Weight	Up to 5,150 kg
Length x Width x Height	7.29 x 2.23 x 2.35 m
Travel Speed (towed)	Up to 60 km/h
NOTE: many upgrades are available to improve nearly all aspects of system performance.	

20-mm GAI-C01, -C04 ADA



Crew	3 (1 on gun)
Caliber	20 mm
System of Operation	Gas, auto, single (C01) or dual feed (C04)
Effective Vertical Range	1,500 to 2,000 m
Rate of Fire	1,050 rounds/minute (cyclic)
Feed	75-round box magazine (x1 for C01, x2 C04)
Elevation	-7 to +83 degrees
Traverse	360 degrees
Weight (no ammunition)	535 kg
Length x Width x Height (Firing)	3.87 x 1.7 x 1.45 m
Towing Vehicle	Light 4x4 truck

35-mm GDF-002



Crew	3
Operation	Gas, automatic feed
Maximum Range	4,000 m (vertical)
Rate of Fire	550 rounds/minute (per barrel)
Combat Weight	6,300 kg
Travel speed	Towed up to 60 km/h
Prime Mover	5-ton (6x6) truck

RBS-70 with Mark 2 Missile



Crew	2
Type	2-stage, low-altitude SAM
Guidance	Modulated laser beam riding
Minimum Range	Approximately 200 m
Maximum Range	7,000 m head on, less than 4,000 m crossing
Minimum Altitude	Ground level
Maximum Altitude	4,000
Reload Time	Less than 7 seconds
Length	1.745 m (with end caps)
Weight	26.5 kg (container-launcher with missile)
Warhead	1.5-kg HE-fragmentation
Fuze	Impact and active laser proximity

Improved-HAWK



Type	Single-stage, low- to medium-altitude SAM
Guidance	Semiactive radar-homing with proportional navigation
Maximum Speed	Mach 2.7
Effective Range	1,500 to 40,000 m (varies by missile type)
Minimum Effective Altitude	60 m
Maximum Effective Altitude	13,700 to 17,700 (varies by missile type)
Launcher	mobile, triple-round trainable, trailer-mounted
Warhead	Blast-fragmentation warhead with 54 kg (MIM-23SA) or 75 kg (MIM-23B) of high explosive
Fuze	Proximity with contact override

AIRCRAFT

Hawker-Hunter FGA74, T75, T75A



Mission	Fighter-bomber; reconnaissance
Armament	
Primary	4x 30-mm Aden guns
Secondary	2x 227-kg bombs, 4x 11.4-kg practice bombs, 12x 3-in rockets, 48x to 74x 2-in folding-fin rockets, and/or 2x 454-liter or 2x 1,040-liter drop tanks; and 2x additional 454-liter drop tanks or 24x 3-in projectiles with 12-lb warheads on wingtip pylons (454-liter drop tanks may be used as napalm bombs)
Performance	
Range, No Reserves	2,965 km
Maximum Level Speed	Mach 0.92 (approximately 1,100 km/h)
Service Ceiling	15,250 m
Maximum Takeoff Weight	10,885 kg
Length x Wingspan x Height	14.90 x 10.26 x 4.01 m

F-16A, B, Block 50/52 (DJ) FALCON



Mission	Multirole fighter
Armament	
Primary	Air-to-air missiles or air-to-surface missiles, including Harpoon
Secondary	20-mm guns
Performance	
Range	3,890 km (2,415 miles)
Maximum Speed	Mach 2.0 (approximately 2,400 km/h)
Service Ceiling	15,240 m
Maximum Takeoff Weight	16,057 kg with external load
Length x Wingspan x Height	15.09 x 9.45 x 5.09 m
NOTE: Block 50/52 (DJ) (pictured) includes provisions for Harpoon antiship missiles, AIM-7 BVR air-to-air missiles, and electronic countermeasures.	

A-4S-1, SU, SU Trainer Super Skyhawk



Mission	Attack
Crew	1 (2 in tandem in trainer)
Armament	2x 20-mm MK 12 cannons; centerline and 4x underwing pylons for bombs, missiles, and gun pods
Range	1,158 km with maximum payload; 3,791 km with maximum internal and external fuel stores
Maximum Speed	628 kn (1,163 km/h)
Combat Ceiling	12,200 m
Maximum Takeoff Weight	10,206 kg
Length x Wingspan x Height	12.72 x 8.38 x 4.57 m

NOTE: S-1 designates engine upgrade, SU designates avionics upgrade—both upgrades performed in Singapore.

F-5E TIGER II



Mission	Fighter, ground attack
Armament	
Primary	Air-to-air or air-to-surface missiles
Secondary	20-mm gun
Performance	
Range	2,483 km
Maximum Speed	Mach 1.64 (approximately 2,000 km/h)
Service Ceiling	15,790 m

RF-5E TIGEREYE



Mission	Armed Reconnaissance
Armament	
Primary	2x AIM-2 Sidewinder AAMs
Secondary	20-mm gun
Performance	
Mission Radius	1,102 km (with 3 drop tanks)
Maximum Speed	Mach 1.64 (approximately 2,000 km/h)
Service Ceiling	15,790 m

Aermacchi (SIAI-Marchetti) S.211-A



Mission	Trainer and light attack
Crew	2
Maximum Speed	740 km/h
Armament	7.62-mm, 12.7-mm, or 20-mm gun pods; various rockets and bombs (<150 kg each) on 4x underwing hardpoints (A variant also has an underbelly hardpoint)
Maximum External Load	660 kg (1,090 kg for 2.211A))
Takeoff Weight, Armed	3,150 kg (4,000 kg for S.211A)
Length x Wingspan x Height	9.53 x 8.46 x 3.73 m

SF-260M, WARRIOR



Mission	Trainer, light attack, low-level strike, forward air control, forward air support, armed reconnaissance
Crew	2
Armament	7.62-mm or .50-cal gun pods, small bombs, parachute flares, cartridge throwers on 2x underwing hardpoints
Range	1,314 km
Maximum Speed	437 km/h
Service Ceiling	6,100 m
Maximum Takeoff Weight	1,350 kg
Length x Wingspan x Height	7.10 x 8.35 x 2.41 m

C130 B, H, H-30, H-MP



Mission	Tactical transport and multimission
Crew	4 or 5
Passengers	92 troops, 64 paratroopers, or 74 litter patients with 2 attendants (H); 128 troops, 92 paratroopers, or 97 litter patients with 4 attendants (H-30)
Range with Maximum Payload	3,791 km
Maximum Cruising Speed	602 km/h (400 miles/h)
Maximum Payload	19,356 kg (H), 17,645 kg (H-30)
Maximum Normal Takeoff Weight	70,310 kg
Service Ceiling	10,060 m

NOTE: H-30 variant increases troop and cargo space by 40 percent. H-MP variant is for maritime patrol—2:30 search time for 3,333-km radius, 16:50 for 370-km radius; maximum payload 18,630 kg.

KC-135R



Mission	Mid-air refueling
Total Mission Time	5.5 hours
Cruising Speed	856 km/h
Operating Weight, Empty	44,663 kg
Maximum Takeoff Weight	134,715 kg
Length x Wingspan x Height	41.53 x 39.88 x 11.68 m

E-2C HAWKEYE



Mission	Airborne early warning
Crew	5
Performance	
Time on Station	4 hours 24 minutes (320 km from base)
Endurance with Maximum Fuel	6 hours 15 minutes
Maximum Speed	626 km/h
Service Ceiling	11,275 m
Maximum Takeoff Weight	24,687 kg
Length x Wingspan x Height	17.53 x 24.56 x 7.58 m (see note)
NOTE:	the width can be reduced to 8.94 m with wings folded.

FOKKER 50, F50 Mk 2S Enforcer



Mission	Transport, maritime patrol (Mk 2S)
Crew/passengers	2 to 5/46 to 58
Armament	Harpoon ASM, mines, A-244S torpedoes
Performance	
Range	3,083 km (5,000 km for Mk 2S)
Operational Speed	522 km/h (463 km/h for Mk 2S)
Service Ceiling	4,300 m (8,990 m for Mk 2S)
Maximum Takeoff Weight	19,950 kg
Length x Wingspan x Height	25.25 x 29.00 x 8.32 m
NOTE: pictured is the F50 Mk 2S	

AH-64D LONGBOW



Crew	2
Type	Attack
Armament	30-mm chain gun; 70-mm rockets (19-round pod); 16x HELLFIRE (LONGBOW) ATGMs
Maximum Speed	365 km/h
Range	482 km
Rotor Diameter	14.63 m
Maximum Takeoff Weight	10,432 kg
Length x Width x Height	17.6 x 14.6 x 4.9 m (rotors turning)

UH-1H, AB205A, AB205A-1



Type	Multirole utility
Crew	3
Armament	Assorted guns, rockets, and missiles
Maximum Speed	237 km/h
Range	532 km
Maximum Takeoff Weights	
Internal Load	4,310 kg
External Load	4,762 kg
Hovering Ceiling	3,350 m
Weight, Empty	2,356 kg
Overall Length x Width x Height	12.78 x 2.76 x 4.48 m

AS550 Fennec, AS550A2, AS350B, EC350B3



Type	Light multipurpose
Crew	2
Armament	20-mm GIAT M621 or 7.62-mm gun pod, and assorted rockets, or ATGMs/AAMs
Maximum Speed	287 km/h
Range	Up to 700 km
Cargo Capacity or Sling Load	905 to 1,400 kg (varies by model)
Maximum Design Takeoff Weight	1,950 to 2,250 kg
Service Ceiling	Up to 4,800 m
Weight, Empty	1,065 to 1,200 kg (varies by model)
Overall Length x Width x Height	12.94 x 10.69 x 3.14 m (rotors turning)

AS 332B, AS 332M SUPER PUMA



Type	Multirole, medium lift
Crew/Passengers	2/25
Maximum Payload	8,350 kg
Sling Load	4,447 kg
Engines	2x turboshaft engines
Main rotor	
No. of blades	4
Diameter	15.58 m
Tail rotor	
No. of blades	5
Diameter	3.04 m
Overall Length x Width x Height	18.73 x 15.58 x 4.92 m (rotors turning)
Cruising speed	300 km/hr
Range	890 km
Armament (optional)	2x 20-mm guns or 7.62-mm MGs; 2x AM 39 Exocet ASMs; or 2 light-weight torpedoes

CH-47D



Crew/Passengers	3/33
Type	Medium lift
Armament	7.62-mm machinegun
Maximum Speed	315 km/h
Range	2,024 km (internal and auxiliary tanks)
Maximum Design Takeoff Weight	22,680 kg
Cargo Handling Capacity	
Sling Load, fore and Aft Hooks	11,340 kg
Sling Load, Center Hook	11,793 kg
Overall Length x Width x Height	30.18 x 18.3 x 5.8 m (rotors turning)

Blue Horizon 2 UAV



Type	Fixed-wing unmanned aerial reconnaissance vehicle
Crew	3
Cruising Speed	130 km/h
Maximum Speed	240 km/h
Endurance	16.0 hours
Service Ceiling	5,486 m
Mission Radius	150 km
Maximum Design Takeoff Weight	150 kg
Maximum Payload	37 kg
Sensors	FLIR; real-time video
Overall Length x Wingspan	3.2 x 6.0 m
System Makeup	2x air vehicle; ground control station
Support Vehicles	2x HMMWVs or similar

NOTE: performance specifications according to placard information.

Searcher MOD



Type	Unmanned aerial reconnaissance vehicle
Crew	3
Cruising Speed	111 km/h
Maximum Speed	204 km/h
Endurance	14 hours
Mission Radius	120 km (220 km with relay)
Service Ceiling	5,200 m
Maximum Design Takeoff Weight	329 kg
Maximum Payload	63 kg
Sensors	FLIR; television; laser rangefinder; laser target designator
Wingspan	7.8 m
System Makeup	Vehicle and ground control station housed in a shelter

NOTE: capable of wheeled takeoff and launch aided by pneumatic catapult or JATO rockets.

SHIPS

CHALLENGER (SJOORMEN) Class SS



Type	Attack submarine
Complement	23
LOA x Beam x Draft	51 x 6.1 x 5,8 m
Displacement	1,130 t surfaced; 1,210 t dived
Cruising Speed	12 kn surfaced; 20 kn dived
Endurance	21 days
Operating Depth	150 m
Torpedoes	4x 21-in bow tubes for 10x FFV Type 613 antisurface torpedoes; 2x 16-in tubes for 4x FFV Type 431 antisubmarine torpedoes
Other weapons	Minelaying capability
Radar	Terma I-band navigational
Sonar	Plessey Hydra hull-mounted MF passive search and attack

VICTORY Class (MGB 62 design)



Type	Corvette
Complement	49
LOA x Beam x Draft	62.4 x 8.5 x 3.1 m
Displacement	595 t, full load
Cruising Speed	35 kn
Missiles	8x Harpoon SSMs; 16x Barrak 1 SAMs
Guns	OTO Melara 3-in/62 Super Rapid; 4x 12.7-mm machineguns
Other weapons	6x 324-mm Whitehead B 515 torpedo tubes; Whitehead A 244S torpedos
Radar	Ericsson/Radamec Sea Giraffe 1550HC G/H-band surface-search; Kelvin Hughes 1007 I-band navigational; 2 Elta EL/M-2221(X) I/J/K-band fire control
Sonar	Thomson Sintra TSM 2064 VDS active search and attack

FORMIDABLE (Project Delta) Class FFG



Type	Frigate
Complement	Approximately 60
LOA x Beam x Draft	110.0 x 16.0 x 5.0 m
Displacement	3,200 t, full load
Cruising Speed	27 kn
Aircraft	Hangar for 1 medium (NH 90, Seahawk, or Cougar)
Missiles	8x Harpoon SSMs; 32x Aster 15 SAMs
Guns	OTO Melara 3-in/62 Super Rapid; 2x 20-mm; 2x 12.7-mm machineguns
Other weapons	6x 324-mm torpedo tubes for Eurotorp A 244/S Mod 3 torpedoes
Radar	Thales Herakles 3-D radar multifunction E/F-band air and search radar; 2 Terma Scanter 2001 I-band surface search and navigational radar; 2 EADS Nagir 2000 Optronics directors (weapons control)
Sonar	EDO980 ALOFTS VDS low-frequency (2 kHz)

NOTE: *Formidable* is expected to be commissioned in 2005 and become operational in 2007. The Sikorsky S-70B reportedly has been selected as the shipborne helicopter for this class.

LURSSEN TNC 45 Class (SEA WOLF) PTG



Type	Fast attack-missile
Complement	41
LOA x Beam x Draft	44.9 x 2.5 x 7 m
Displacement	258 t, full load
Cruising Speed	35 kn
Range	950 nmi
Missiles	4x Harpoon SSMs; 4x Gabriel I launchers; Matra Simbad twin launcher for Mistral SAM
Guns	Bofors 57-mm/70
Radar	Racal DECCA I-band surface search; Signaal WM28/5 I/J-band fire control

FEARLESS Class PCM/PGM



Type	Patrol
Complement	32
LOA x Beam x Draft	55 x 8.6 x 2.7 m
Displacement	500 t, full load
Cruising Speed	20 kn
Missiles	Matra Simbad twin launcher for Mistral SAM
Guns	OTO Melara 3-in/62 Super Rapid
Other weapons	6 x 324-mm Whitehead B515 tubes for Whitehead A244S torpedoes
Radar	Elta EL/M-2228(X) I-band surface search and fire control
Sonar	Thomson Sintra TSM 2362 Gudgeon hull-mounted MF active attack (towed array fitted in <i>Brave</i>)

NOTE: The first 6 vessels in this class are configured for ASW and have water-jet propulsion rather than diesel. Towed array replaces Simbad SAM in *Brave*. *Sovereignty* has a deck crane to facilitate special operations.

BEDOK (LANDSORT) Class



Type	Mine hunter
Complement	31
LOA x Beam x Draft	47.5 x 9.6 x 2.3 m
Displacement	360 t, full load
Cruising Speed	15 kn
Range	2,000 nmi
Guns	Bofors 40-mm/70; 4x 12.7-mm machineguns
Other weapons	2 mine rails
Radar	Norcontrol DB 2000 I-band navigational

NOTE: equipment includes two PAP 104 Mk V remotely operated vehicles and two sets of the Swedish SAM minesweeping system.

ENDURANCE Class LST



Type	Tank landing ship
Complement	65
LOA x Beam x Draft	141 x 21 x 5 m
Displacement	8,500 t, full load
Military Lift	350 troops; 18 tanks; 20 vehicles; 4 LCVPs
Cruising Speed	15 kn
Helicopters	2x Super Puma
Missiles	2 x Matra Simbad twin launchers for Mistral
Guns	Otobreda 76-mm/62 Super Rapid
Radar	Elta EL/M-2238 E/F-band air/surface search

RPL 60 through RPL 65 Class



Type	Mechanized landing craft
Complement	6
LOA x Beam x Draft	36.7 x 8.5 x 1.8 m
Displacement	151,000 kg
Cruising Speed	10.7 kn
Military Lift	2 tanks, 450 troops, or 110 tons of cargo

PERSEVERANCE Class LSL



Type	Support ship
Complement	61
LOA x Beam x Draft	125.6 x 18.2 x 4 m
Displacement	5,674 t, full load
Cruising Speed	15
Helicopters	Platform for 2 medium
Missiles	2x Matra Simbad twin launchers for Mistral
Guns	Bofors 40-mm/70; 6x 12.7-mm machineguns
Radar	Norcontrol DB 2000 I-band navigational
NOTE: Formerly U.K. MV (LOWLAND LANCER) Class survey craft. <i>Perseverance</i> reportedly has been made a submarine rescue ship.	

Vosper Type Fast Attack



Type	Coastal patrol
Complement	19 to 22
LOA x Beam x Draft	33.5 x 6.4 x 1.8 m
Displacement	142 t, full load
Cruising Speed	27 kn
Range	1,100 nmi
Guns	Bofors 40-mm/70; Oerlikon 20-mm/80; 2x 12.7-mm machineguns
Radar	Racal DECCA ARPA I-band surface search

SHARK Class WPB



Type	Coastal police patrol
Complement	15
LOA x Beam x Draft	22.7 x 6.2 x 1.6 m
Displacement	45.7 t, full load
Cruising Speed	32 kn
Guns	Oerlikon 20-mm GAM-BO1; 2x 12.7-mm machineguns
Radar	DECCA 1226 I-band surface search

GP 50 Class (Cheoy Lee SY design)



Type	Customs
Complement	14
LOA x Beam x Draft	30.0 x 6.3 x 1.7 m
Displacement	105 t
Cruising Speed	25 kn

FB 31 to FB 42 PB



Type	Inshore patrol
Complement	5
LOA x Beam x Draft	14.5 x 4.2 x 1.1 m
Displacement	20 t, full load
Cruising Speed	30 kn
Guns	40-mm grenade launcher; 12.7-mm machinegun; 2x 7.62-mm machineguns
Radar	Racal; DECCA I-band surface search

PT 1 to PT 19 WPB



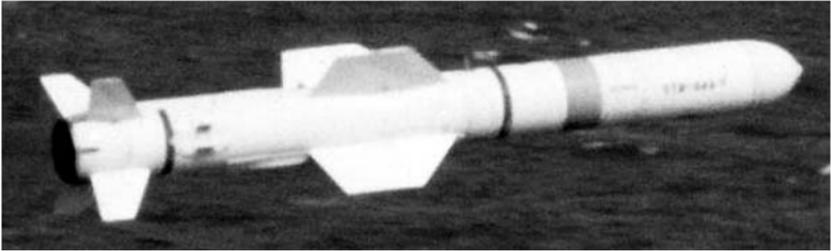
Type	Patrol craft
Complement	4 (plus 8 spare berths)
LOA x Beam x Draft	14.5 x 4.2 x 1.2 m
Displacement	20 t, full load
Cruising Speed	30 kn
Range	310 nmi
Guns	7.62-mm machinegun
Radar	Furuno or Racal DECCA Bridgemaster I-band surface search

PX 1 to PX 33 Patrol Craft



Type	Patrol
Complement	3
LOA x Beam x Draft	11 x 3.2 x 0.5
Displacement	11 t, full load
Cruising Speed	30 kn

AGM-84, RGM-84C (Block 1B) Harpoon



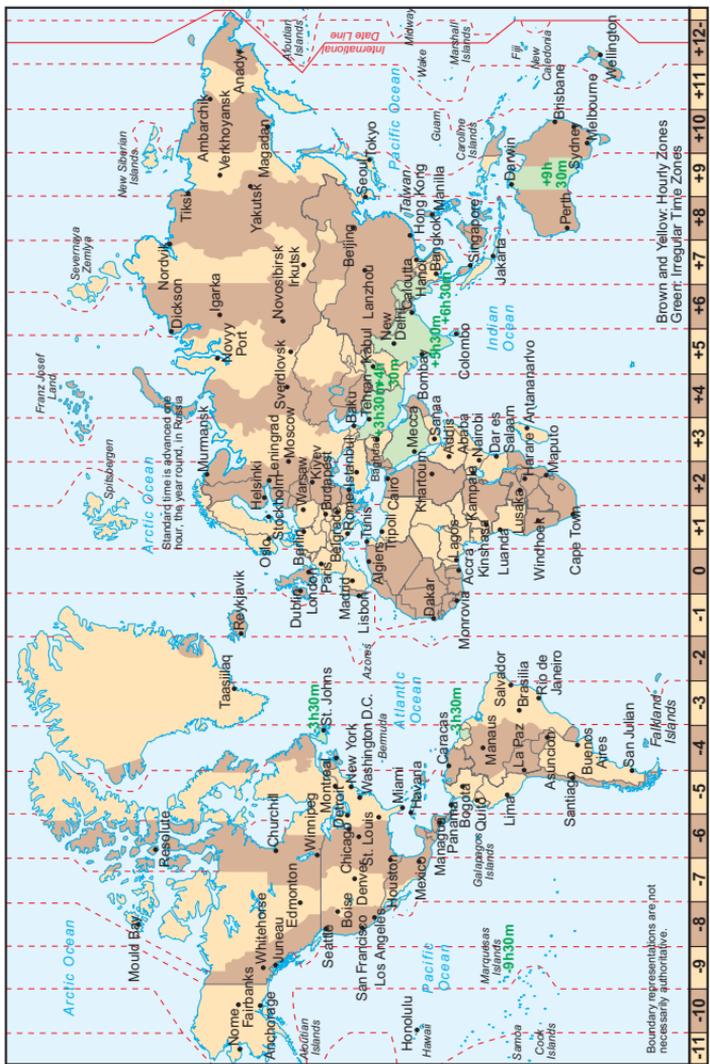
Type	Land-/ship- or air-launched antiship missile
Maximum Speed	Mach 0.85
Range	92 km (RGM-84); 120 km (AGM-84)
Weight	5.19.3 kg
Length x Wingspan x Diameter	3.84 x 0.83 x 0.34 m
Warhead	221.6 kg
Guidance	Inertial and active radar
Launchers	Mk 140
Associated Radar	ZW 06; MW 28

AM 39 Exocet



Type	Air-to-surface or surface-to-surface missile
Range	50 to 72 km
Weight	670 kg
Length x Wingspan x Diameter	4.7 x 1.1 x 0.35 m
Warhead	165 kg HE shaped-charge fragmentation
Fuze	Active radar and impact
Guidance	Inertial and active radar

APPENDIX B: International Time Zones



Coordinated Universal Time (UTC)

To use the table, go to the country you are interested in, and add the number of hours corresponding to the United States time zone to the current time. The UTC is also known as Greenwich Mean Time (GMT).

Country	UTC	Eastern	Central	Mountain	Pacific
Afghanistan	+4.5 H	+9.5 H	+10.5 H	+11.5 H	+12.5 H
Albania	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Algeria	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
American Samoa	-11.0 H	-6.0 H	-5.0 H	-4.0 H	-3.0 H
Andorra	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Angola	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Antarctica	-2.0 H	+3.0 H	+4.0 H	+5.0 H	+6.0 H
Antigua and Barbuda	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Argentina	-3.0 H	+2.0 H	+3.0 H	+4.0 H	+5.0 H
Armenia	+4.0 H	+9.0 H	+10.0 H	+11.0 H	+12.0 H
Aruba	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Ascension	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Australia North	+9.5 H	+14.5 H	+15.5 H	+16.5 H	+17.5 H
Australia South	+10.0 H	+15.0 H	+16.0 H	+17.0 H	+18.0 H
Australia West	+8.0 H	+13.0 H	+14.0 H	+15.0 H	+16.0 H
Australia East	+10.0 H	+15.0 H	+16.0 H	+17.0 H	+18.0 H
Austria	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Azerbaijan	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Bahamas	-5.0 H	+0.0 H	+1.0 H	+2.0 H	+3.0 H
Bahrain	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Bangladesh	+6.0 H	+11.0 H	+12.0 H	+13.0 H	+14.0 H
Barbados	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Belarus	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Belgium	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Belize	-6.0 H	-1.0 H	+0.0 H	+1.0 H	+2.0 H
Benin	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Bermuda	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Bhutan	+6.0 H	+11.0 H	+12.0 H	+13.0 H	+14.0 H
Bolivia	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Bosnia Herzegovina	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H

Country	UTC	Eastern	Central	Mountain	Pacific
Botswana	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Brazil East	-3.0 H	+2.0 H	+3.0 H	+4.0 H	+5.0 H
Brazil West	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
British Virgin Islands	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Brunei	+8.0 H	+13.0 H	+14.0 H	+15.0 H	+16.0 H
Bulgaria	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Burkina Faso	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Burundi	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Cambodia	+7.0 H	+12.0 H	+13.0 H	+14.0 H	+15.0 H
Cameroon	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Canada East	-5.0 H	+0.0 H	+1.0 H	+2.0 H	+3.0 H
Canada Central	-6.0 H	-1.0 H	+0.0 H	+1.0 H	+2.0 H
Canada Mountain	-7.0 H	-2.0 H	-1.0 H	+0.0 H	+1.0 H
Canada West	-8.0 H	-3.0 H	-2.0 H	-1.0 H	+0.0 H
Cape Verde	-1.0 H	+4.0 H	+5.0 H	+6.0 H	+7.0 H
Cayman Islands	-5.0 H	+0.0 H	+1.0 H	+2.0 H	+3.0 H
Central African Rep.	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Chad Republic	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Chile	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
China	+8.0 H	+13.0 H	+14.0 H	+15.0 H	+16.0 H
Christmas Island	-10.0 H	-5.0 H	-4.0 H	-3.0 H	-2.0 H
Colombia	-5.0 H	+0.0 H	+1.0 H	+2.0 H	+3.0 H
Congo	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Cook Island	-10.0 H	-5.0 H	-4.0 H	-3.0 H	-2.0 H
Costa Rica	-6.0 H	-1.0 H	+0.0 H	+1.0 H	+2.0 H
Croatia	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Cuba	-5.0 H	+0.0 H	+1.0 H	+2.0 H	+3.0 H
Cyprus	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Czech Republic	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Denmark	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Djibouti	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Dominica	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Dominican Republic	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Ecuador	-5.0 H	+0.0 H	+1.0 H	+2.0 H	+3.0 H

Country	UTC	Eastern	Central	Mountain	Pacific
Egypt	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
El Salvador	-6.0 H	-1.0 H	+0.0 H	+1.0 H	+2.0 H
Equatorial Guinea	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Eritrea	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Estonia	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Ethiopia	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Falkland Islands	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Fiji Islands	+12.0 H	+17.0 H	+18.0 H	+19.0 H	+20.0 H
Finland	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
France	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
French Antilles	-3.0 H	+2.0 H	+3.0 H	+4.0 H	+5.0 H
French Guinea	-3.0 H	+2.0 H	+3.0 H	+4.0 H	+5.0 H
French Polynesia	-10.0 H	-5.0 H	-4.0 H	-3.0 H	-2.0 H
Gabon Republic	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Gambia	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Georgia	+4.0 H	+9.0 H	+10.0 H	+11.0 H	+12.0 H
Germany	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Ghana	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Gibraltar	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Greece	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Greenland	-3.0 H	+2.0 H	+3.0 H	+4.0 H	+5.0 H
Grenada	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Guadeloupe	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Guam	+10.0 H	+15.0 H	+16.0 H	+17.0 H	+18.0 H
Guatemala	-6.0 H	-1.0 H	+0.0 H	+1.0 H	+2.0 H
Guinea-Bissau	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Guinea	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Guyana	-3.0 H	+2.0 H	+3.0 H	+4.0 H	+5.0 H
Haiti	-5.0 H	+0.0 H	+1.0 H	+2.0 H	+3.0 H
Honduras	-6.0 H	-1.0 H	+0.0 H	+1.0 H	+2.0 H
Hong Kong	+8.0 H	+13.0 H	+14.0 H	+15.0 H	+16.0 H
Hungary	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Iceland	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
India	+5.5 H	+10.5 H	+11.5 H	+12.5 H	+13.5 H

Country	UTC	Eastern	Central	Mountain	Pacific
Indonesia East	+9.0 H	+14.0 H	+15.0 H	+16.0 H	+17.0 H
Indonesia Central	+8.0 H	+13.0 H	+14.0 H	+15.0 H	+16.0 H
Indonesia West	+7.0 H	+12.0 H	+13.0 H	+14.0 H	+15.0 H
Iran	+3.5 H	+8.5 H	+9.5 H	+10.5 H	+11.5 H
Iraq	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Ireland	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Israel	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Italy	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Jamaica	-5.0 H	+0.0 H	+1.0 H	+2.0 H	+3.0 H
Japan	+9.0 H	+14.0 H	+15.0 H	+16.0 H	+17.0 H
Kazakhstan	+6.0 H	+11.0 H	+12.0 H	+13.0 H	+14.0 H
Kenya	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Kiribati	+12.0 H	+17.0 H	+18.0 H	+19.0 H	+20.0 H
Korea, North	+9.0 H	+14.0 H	+15.0 H	+16.0 H	+17.0 H
Korea, South	+9.0 H	+14.0 H	+15.0 H	+16.0 H	+17.0 H
Kuwait	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Kyrgyzstan	+5.0 H	+10.0 H	+11.0 H	+12.0 H	+13.0 H
Laos	+7.0 H	+12.0 H	+13.0 H	+14.0 H	+15.0 H
Latvia	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Lebanon	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Lesotho	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Liberia	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Libya	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Liechtenstein	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Lithuania	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Luxembourg	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Macedonia	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Madagascar	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Malawi	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Malaysia	+8.0 H	+13.0 H	+14.0 H	+15.0 H	+16.0 H
Maldives	+5.0 H	+10.0 H	+11.0 H	+12.0 H	+13.0 H
Mali Republic	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Malta	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Marshall Islands	+12.0 H	+17.0 H	+18.0 H	+19.0 H	+20.0 H

Country	UTC	Eastern	Central	Mountain	Pacific
Mauritania	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Mauritius	+4.0 H	+9.0 H	+10.0 H	+11.0 H	+12.0 H
Mayotte	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Mexico East	-5.0 H	+0.0 H	+1.0 H	+2.0 H	+3.0 H
Mexico Central	-6.0 H	-1.0 H	+0.0 H	+1.0 H	+2.0 H
Mexico West	-7.0 H	-2.0 H	-1.0 H	+0.0 H	+1.0 H
Moldova	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Monaco	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Mongolia	+8.0 H	+13.0 H	+14.0 H	+15.0 H	+16.0 H
Morocco	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Mozambique	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Myanmar (Burma)	+6.5 H	+11.5 H	+12.5 H	+13.5 H	+14.5 H
Namibia	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Nauru	+12.0 H	+17.0 H	+18.0 H	+19.0 H	+20.0 H
Nepal	+5.5 H	+10.5 H	+11.5 H	+12.5 H	+13.5 H
Netherlands	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Netherlands Antilles	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
New Caledonia	+11.0 H	+16.0 H	+17.0 H	+18.0 H	+19.0 H
New Zealand	+12.0 H	+17.0 H	+18.0 H	+19.0 H	+20.0 H
Newfoundland	-3.5 H	+1.5 H	+2.5 H	+3.5 H	+4.5 H
Nicaragua	-6.0 H	-1.0 H	+0.0 H	+1.0 H	+2.0 H
Nigeria	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Niger Republic	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Norfolk Island	+11.5 H	+16.5 H	+17.5 H	+18.5 H	+19.5 H
Norway	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Oman	+4.0 H	+9.0 H	+10.0 H	+11.0 H	+12.0 H
Pakistan	+5.0 H	+10.0 H	+11.0 H	+12.0 H	+13.0 H
Palau	+9.0 H	+14.0 H	+15.0 H	+16.0 H	+17.0 H
Panama, Rep. of	-5.0 H	+0.0 H	+1.0 H	+2.0 H	+3.0 H
Papua New Guinea	+10.0 H	+15.0 H	+16.0 H	+17.0 H	+18.0 H
Paraguay	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Peru	-5.0 H	+0.0 H	+1.0 H	+2.0 H	+3.0 H
Philippines	+8.0 H	+13.0 H	+14.0 H	+15.0 H	+16.0 H
Poland	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Portugal	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H

Country	UTC	Eastern	Central	Mountain	Pacific
Puerto Rico	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Qatar	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Reunion Island	+4.0 H	+9.0 H	+10.0 H	+11.0 H	+12.0 H
Romania	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Russia West	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Russia Central 1	+4.0 H	+9.0 H	+10.0 H	+11.0 H	+12.0 H
Russia Central 2	+7.0 H	+12.0 H	+13.0 H	+14.0 H	+15.0 H
Russia East	+11.0 H	+16.0 H	+17.0 H	+18.0 H	+19.0 H
Rwanda	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Saba	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Samoa	-11.0 H	-6.0 H	-5.0 H	-4.0 H	-3.0 H
San Marino	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Sao Tome	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Saudi Arabia	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Senegal	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Seychelles Islands	+4.0 H	+9.0 H	+10.0 H	+11.0 H	+12.0 H
Sierra Leone	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Singapore	+8.0 H	+13.0 H	+14.0 H	+15.0 H	+16.0 H
Slovakia	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Slovenia	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Solomon Islands	+11.0 H	+16.0 H	+17.0 H	+18.0 H	+19.0 H
Somalia	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
South Africa	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Spain	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Sri Lanka	+5.5 H	+10.5 H	+11.5 H	+12.5 H	+13.5 H
St. Lucia	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
St. Maarten	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
St. Pierre & Miquelon	-3.0 H	+2.0 H	+3.0 H	+4.0 H	+5.0 H
St. Thomas	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
St. Vincent	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Sudan	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Suriname	-3.0 H	+2.0 H	+3.0 H	+4.0 H	+5.0 H
Swaziland	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Sweden	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Switzerland	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H

Country	UTC	Eastern	Central	Mountain	Pacific
Syria	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Taiwan	+8.0 H	+13.0 H	+14.0 H	+15.0 H	+16.0 H
Tajikistan	+6.0 H	+11.0 H	+12.0 H	+13.0 H	+14.0 H
Tanzania	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Thailand	+7.0 H	+12.0 H	+13.0 H	+14.0 H	+15.0 H
Togo	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Tonga Islands	+13.0 H	+18.0 H	+19.0 H	+20.0 H	+21.0 H
Trinidad and Tobago	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Tunisia	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Turkey	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Turkmenistan	+5.0 H	+10.0 H	+11.0 H	+12.0 H	+13.0 H
Turks and Caicos	-5.0 H	+0.0 H	+1.0 H	+2.0 H	+3.0 H
Tuvalu	+12.0 H	+17.0 H	+18.0 H	+19.0 H	+20.0 H
Uganda	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Ukraine	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
United Arab Emirates	+4.0 H	+9.0 H	+10.0 H	+11.0 H	+12.0 H
United Kingdom	+0.0 H	+5.0 H	+6.0 H	+7.0 H	+8.0 H
Uruguay	-3.0 H	+2.0 H	+3.0 H	+4.0 H	+5.0 H
USA Eastern	-5.0 H	+0.0 H	+1.0 H	+2.0 H	+3.0 H
USA Central	-6.0 H	-1.0 H	+0.0 H	+1.0 H	+2.0 H
USA Mountain	-7.0 H	-2.0 H	-1.0 H	+0.0 H	+1.0 H
USA Western	-8.0 H	-3.0 H	-2.0 H	-1.0 H	+0.0 H
USA Alaska	-9.0 H	-4.0 H	-3.0 H	-2.0 H	-1.0 H
USA Hawaii	-10.0 H	-5.0 H	-4.0 H	-3.0 H	-2.0 H
Uzbekistan	+5.0 H	+10.0 H	+11.0 H	+12.0 H	+13.0 H
Vanuatu	+11.0 H	+16.0 H	+17.0 H	+18.0 H	+19.0 H
Vatican City	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Venezuela	-4.0 H	+1.0 H	+2.0 H	+3.0 H	+4.0 H
Vietnam	+7.0 H	+12.0 H	+13.0 H	+14.0 H	+15.0 H
Wallis & Futuna Is.	+12.0 H	+17.0 H	+18.0 H	+19.0 H	+20.0 H
Yemen	+3.0 H	+8.0 H	+9.0 H	+10.0 H	+11.0 H
Yugoslavia	+1.0 H	+6.0 H	+7.0 H	+8.0 H	+9.0 H
Zaire	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Zambia	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H
Zimbabwe	+2.0 H	+7.0 H	+8.0 H	+9.0 H	+10.0 H

APPENDIX C: Conversion Charts

When You Know

Units of Length	Multiply by	To find
Millimeters	0.04	Inches
Centimeters	0.39	Inches
Meters	3.28	Feet
Meters	1.09	Yards
Kilometers	0.62	Miles
Inches	25.40	Millimeters
Inches	2.54	Centimeters
Feet	30.48	Centimeters
Yards	0.91	Meters
Miles	1.61	Kilometers

Units of Area

Sq. Centimeters	0.16	Sq. Inches
Sq. Meters	1.20	Sq. Yards
Sq. Kilometers	0.39	Sq. Miles
Hectares	2.47	Acres
Sq. Inches	6.45	Sq. Cm
Sq. Feet	0.09	Sq. Meters
Sq. Yards	0.84	Sq. Meters
Sq. Miles	2.60	Sq. Km
Acres	0.40	Hectares

Units of Mass and Weight

Grams	0.035	Ounces
Kilograms	2.21	Pounds
Tons (100kg)	1.10	Short Tons
Ounces	28.35	Grams
Pounds	0.45	Kilograms
Short Tons	2.12	Tons

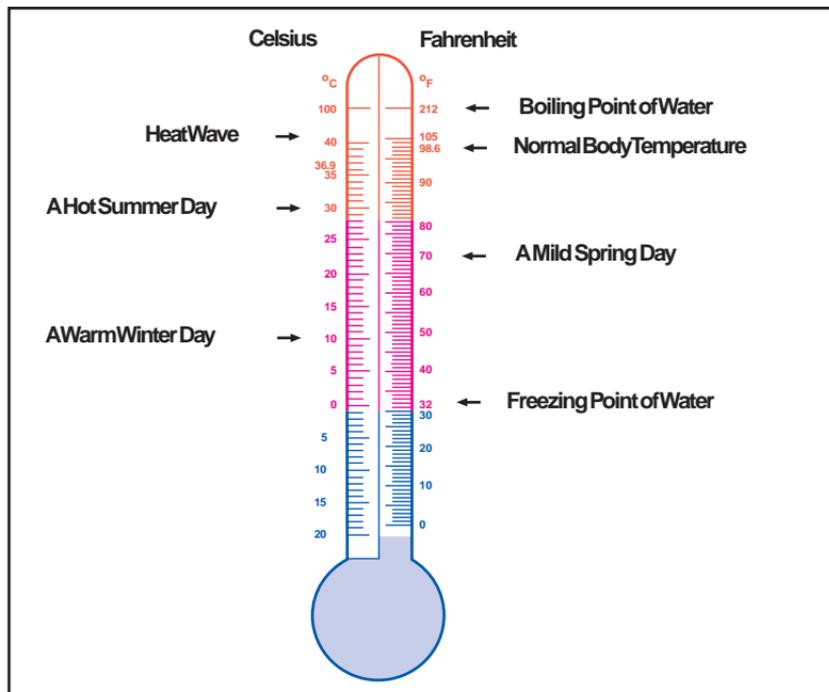
Units of Volume	Multiply by	To find
Milliliters	0.20	Teaspoons
Milliliters	0.06	Tablespoons
Milliliters	0.03	Fluid Ounces
Liters	4.23	Cups
Liters	2.12	Pints
Liters	1.06	Quarts
Liters	0.26	Gallons
Cubic Meters	35.32	Cubic Feet
Cubic Meters	1.35	Cubic Yards
Teaspoons	4.93	Milliliters
Tablespoons	14.78	Milliliters
Fluid Ounces	29.57	Milliliters
Cups	0.24	Liters
Pints	0.47	Liters
Quarts	0.95	Liters
Gallons	3.79	Liters
Cubic Feet	0.03	Cubic Meters
Cubic Yards	0.76	Cubic Meters

Units of Speed

Miles per Hour	1.61	Km per Hour
Km per Hour	0.62	Miles per Hour

Temperature

To convert Celsius into degrees Fahrenheit, multiply Celsius by 1.8 and add 32. To convert degrees Fahrenheit to Celsius, subtract 32 and divide by 1.8.



Temperature Chart

Currency Conversion: SINGAPORE DOLLAR to U.S. DOLLAR												
Rate	1.50	1.60	1.70	1.80	1.90	Rate	1.50	1.60	1.70	1.80	1.90	
S I N G A P O R E D O L L A R S	1	\$0.67	\$0.62	\$0.59	\$0.56	\$0.53	19	\$12.67	\$11.88	\$11.18	\$10.56	\$10.00
	2	\$1.33	\$1.25	\$1.18	\$1.11	\$1.05	20	\$13.33	\$12.50	\$11.76	\$11.11	\$10.53
	3	\$2.00	\$1.88	\$1.76	\$1.67	\$1.58	25	\$16.67	\$15.62	\$14.71	\$13.89	\$13.16
	4	\$2.67	\$2.50	\$2.35	\$2.22	\$2.11	30	\$20.00	\$18.75	\$17.65	\$16.67	\$15.79
	5	\$3.33	\$3.12	\$2.94	\$2.78	\$2.63	35	\$23.33	\$21.88	\$20.59	\$19.44	\$18.42
	6	\$4.00	\$3.75	\$3.53	\$3.33	\$3.16	40	\$26.67	\$25.00	\$23.53	\$22.22	\$21.05
	7	\$4.67	\$4.38	\$4.12	\$3.89	\$3.68	45	\$30.00	\$28.12	\$26.47	\$25.00	\$23.68
	8	\$5.33	\$5.00	\$4.71	\$4.44	\$4.21	50	\$33.33	\$31.25	\$29.41	\$27.78	\$26.32
	9	\$6.00	\$5.62	\$5.29	\$5.00	\$4.74	60	\$40.00	\$37.50	\$35.29	\$33.33	\$31.58
	10	\$6.67	\$6.25	\$5.88	\$5.56	\$5.26	70	\$46.67	\$43.75	\$41.18	\$38.89	\$36.84
	11	\$7.33	\$6.88	\$6.47	\$6.11	\$5.79	80	\$53.33	\$50.00	\$47.06	\$44.44	\$42.11
	12	\$8.00	\$7.50	\$7.06	\$6.67	\$6.32	90	\$60.00	\$56.25	\$52.94	\$50.00	\$47.37
	13	\$8.67	\$8.12	\$7.65	\$7.22	\$6.84	100	\$66.67	\$62.50	\$58.82	\$55.56	\$52.63
	14	\$9.33	\$8.75	\$8.24	\$7.78	\$7.37	200	\$133.33	\$125.00	\$117.65	\$111.11	\$105.26
	15	\$10.00	\$9.38	\$8.82	\$8.33	\$7.89	300	\$200.00	\$187.50	\$176.47	\$166.67	\$157.89
	16	\$10.67	\$10.00	\$9.41	\$8.89	\$8.42	400	\$266.67	\$250.00	\$235.29	\$222.22	\$210.53
	17	\$11.33	\$10.62	\$10.00	\$9.44	\$8.95	500	\$333.33	\$312.50	\$294.12	\$277.78	\$263.16
	18	\$12.00	\$11.25	\$10.59	\$10.00	\$9.47	1000	\$666.67	\$625.00	\$588.24	\$555.56	\$526.32
Currency Conversion: U.S. DOLLAR to SINGAPORE DOLLAR												
Rate	1.50	1.60	1.70	1.80	1.90	Rate	1.50	1.60	1.70	1.80	1.90	
U S D O L L A R	\$1	1.50	1.60	1.70	1.80	1.90	\$19	28.50	30.40	32.30	34.20	36.10
	\$2	3.00	3.20	3.40	3.60	3.80	\$20	30.00	32.00	34.00	36.00	38.00
	\$3	4.50	4.80	5.10	5.40	5.70	\$25	37.50	40.00	42.50	45.00	47.50
	\$4	6.00	6.40	6.80	7.20	7.60	\$30	45.00	48.00	51.00	54.00	57.00
	\$5	7.50	8.00	8.50	9.00	9.50	\$35	52.50	56.00	59.50	63.00	66.50
	\$6	9.00	9.60	10.20	10.80	11.40	\$40	60.00	64.00	68.00	72.00	76.00
	\$7	10.50	11.20	11.90	12.60	13.30	\$45	67.50	72.00	76.50	81.00	85.50
	\$8	12.00	12.80	13.60	14.40	15.20	\$50	75.00	80.00	85.00	90.00	95.00
	\$9	13.50	14.40	15.30	16.20	17.10	\$60	90.00	96.00	102.00	108.00	114.00
	\$10	15.00	16.00	17.00	18.00	19.00	\$70	105.00	112.00	119.00	126.00	133.00
	\$11	16.50	17.60	18.70	19.80	20.90	\$80	120.00	128.00	136.00	144.00	152.00
	\$12	18.00	19.20	20.40	21.60	22.80	\$90	135.00	144.00	153.00	162.00	171.00
	\$13	19.50	20.80	22.10	23.40	24.70	\$100	150.00	160.00	170.00	180.00	190.00
	\$14	21.00	22.40	23.80	25.20	26.60	\$200	300.00	320.00	340.00	360.00	380.00
	\$15	22.50	24.00	25.50	27.00	28.50	\$300	450.00	480.00	510.00	540.00	570.00
	\$16	24.00	25.60	27.20	28.80	30.40	\$400	600.00	640.00	680.00	720.00	760.00
	\$17	25.50	27.20	28.90	30.60	32.30	\$500	750.00	800.00	850.00	900.00	950.00
	\$18	27.00	28.80	30.60	32.40	34.20	\$1000	1500.00	1600.00	1700.00	1800.00	1900.00

Currency Chart

APPENDIX D: Holidays

1 January

January or February

March or April

April (Varies)

1 May

May

May

9 August

November

25 December

New Year's Day

Chinese New Year

Hari Raya Pausa

Good Friday

Labor Day

Visak Day

Hri Raya Haji

Independence Day

Deepavali

Christmas

APPENDIX E:

Language

Key Phrases

English

Hello.
Good day.
Good morning.
Good afternoon.
Good evening.
See you tomorrow.
Welcome.
Goodbye.
See you later.
Yes.*
No.*
Please.
Allow me.
Thanks.
You are welcome.
I am sorry.
Wait a minute.
Not yet

Mandarin

nin hau.
r-an.
zau-an.
wu-an.
wan-an.
ming-tyan-yan.
hwan-ying.
dzai-yan.
hwei-tou-yan.
dwei-le.
bu-dwei.
ching.
rang wo.
sye-sye.
bu-sye.
dwei-bu-chi
deng-yi-deng.
hai mei-you.

Bahasa Malay

Selamat bertemu
Selamat tengah hari
Selamat pagi
Selamat petang
Selamat malam
Jumpa esok
Selamat datang.
Selamat tinggal
Jumpa lagi
ja
tidak
Silahkan
Membenarkan
Terima kasih
Sama sama
maaf
Sebentar
Belum lagi

*An affirmative answer is generally expressed by repeating the main verb of the interrogative sentence. A negative answer can usually be expressed by repeating the question verb, preceded by *bu*.

English

Listen!
Look out!
Be careful.
I'm glad to meet you.

I do not understand.
I do not know.
Write it down.

Mandarin

ting!
ju-yi!
syau-syin.
wo hengau-sying de jyan
dau nin.
wo bu dung.
wo bu jr-dau.
ching sye sya lai.

Bahasa Malay

Mendengar
jaga!
berawas-awas
Saya gembira bertemu
dengan anda.
Saja tidak mengerti
Saja tidak tahu
Harap ditulis

English

Go away!
 Help!
 Police!
 Fire!
 This is an emergency.
 Stop here.
 Explain.
 How are you?
 What?
 What did you say?
 What is that?
 What is this?
 When?
 Where?
 Why?
 How?
 How long?
 How far?
 How much?
 How many?
 Who?
 What is your name?
 What do you do for a living?
 Do you speak English?
 Where is the American Embassy?
 Where is the police station?
 Do you understand me?
 What is wrong?
 What street is this?
 Can we walk there?
 How much do I owe you?
 May I use the telephone?

Mandarin

dzou-kai ba!
 jyou-ming a!
 jing-cha!
 hwo-shau!
 jei shr yi-ge jin-ji shi-jyan
 ching ting dzai jer.
 jye-shr.
 nin hau ma?
 shem-ma?
 nin shwo shem-ma?
 nei shi shem-ma?
 jei shi shem-ma?
 shem-ma shr-hou?
 dzai nar?
 wei shem-ma?
 dzem-ma-yang?
 dwo jyou?
 dwo ywan?
 dwo-shau?
 ji-ge?
 shei?
 nin gwei-sying?
 nin dzwo shem-ma shi?
 ni shwo ying-wen ma?
 mei-gwo da-shr-gwan dzai nar?
 jing-cha-jyu dzai nar?
 ni dung bu-dung wo shwo de shr ma?
 ze me le?
 jei-tyau jye jyau shem-ma?
 wo-men ke bu ke-yi dzou qui na li?
 wo yi-gung chyan nin dwo-shau chyan?
 jye-yung dyan-hwa yi-sya?

Bahasa Malay

jauh diri dari!
 tolong!
 polis!
 tembak!
 Kecemasan.
 Berhenti di sini
 menerangkan
 apakhabar
 apa?
 Apadia?
 apakah itu?
 apakah ini?
 bila?
 dimana?
 kenapa?
 bagaimana?
 Berapa lama?
 Jauh tak?
 betapa?
 Berapa?
 Siapa?
 Apa nama kamu?
 Anda bekerja sebagai apa?
 Adakah anda berbahasa
 Inggeris?
 Berapa jauh kedutaan
 besar?
 Berapa jauh balai polis?
 Adakah anda faham?
 Sakit apa?
 Jalan ini?
 Boleh jalan kaki tak ke
 sana?
 Berapa harganya?
 Boleh pakai telefon?

English

May I leave a message?

What time is it?

How is the weather today?

Mandarinwo ke bu ke-yi lyou yi-ge
dz-tyau?

shem-ma shr-hou le?

jin-tyan de tyan-chi dzem-
ma-yang?**Bahasa Malay**

Boleh tinggalkan pesanan?

Pukul berapa?

Bagaimana cuacanya?

Common Signs and Public Notices**English**

Admission

Attention

Bus stop

Clinic

Closed

Danger

Departure

Down

Emergency exit

Enter

Entrance

Exit

Forbidden

Hospital

No smoking

No trespassing

Pedestrians only

Pull

Push

Refuse

Silence

Toilet

Up

Vacant

Warning

Zoo

Bahasa Malay

kebenaran masuk

perhatian, minat

perhentian bas

klinik

tertutup

bahaya

pemergian

sedih

Keluar

masuk

mempesonakan

keluar

yg dilarang

hospital

Dilarang merokok

Jangan masuk

pejalan kaki

menarik

tolak

menolak permintaan

kesunyian

tandas, bilik air

atas

kosong

Bahaya

taman haiwan

Mandarin Pronunciation

ru-chang

ju-yi

(gung-gung chi) -che-jan

jen-lyau-swo

bu-kai-men

wei-syan

chi-cheng

sya

tai-ping men

jin ru

ru kou

chu kou

jin-ji

yi-ywan

jin yan

bu syu shan-ru

syung ren jwan yung

la

twei

la se

an-jing

tse-swo

shang

kung de

jing-gau

dung-wu-ywan

Key Words

English	Bahasa Malay	Mandarin (Phonetic)
accident	kemalangan	shur-goo
accommodation	rumah tumpangan, penginapan	fahng-jyen
address	alamat	dee-jur
after	sesudah, setelah	yee-hoh
afternoon (1500-dusk)	petang	hsyah-woo
age	umur	nyen-jee
agreement	perjanjian, persetujuan	wortoong-yee
allow/permit	membiarkan, membenarkan	hsyew-ker jung
boundary/border	sempadan	byen-jyeh
bridge	jambatan	chyow
building	bangunan	fahng-dzur
bus	bas	goong-goong chee-chur
call on telephone	memanggil, telefon	dah dyen-dyen
church	gereja	jyow-tahng
city	kota, bandaraya	chung-shur
cold(temperature)	sejuk, dingin	lung
day	hari	tyen
direction	jurusan, arah	fahng-hsyang
do not!	jangan!	boo-yow
doctor	doktor	yee-shung
door	pintu	mun
drink	minuman	hur
east	timur	doong
embassy	kedutaan besar	dar-shur-gwahn
emergency	darurat	ching-kwahng
enter	masuk	roo-koh-choo
exchange rate	kadar petukaran, wang asing	dway-hwahn lyew
excuse me!	maafkan!	low-jyah
exit	keluar	choo-koh
fever	demam	fah-show
fire	api	jow-hwor-lur
flood	banjir	hoong-shway
floor	lantai	loh

English	Bahasa Malay	Mandarin (Phonetic)
food	makanan	shur-woo
foot	kaki	jjow
Friday	Jumaat	hsing-chee-woo
gasoline station	stesyen minyak	jjah-yoh jahn
girl	gadis, anak perempuan	nyew
go back	balik, berbalik	hway
good	baik, bagus	how
government	pemerintah, kerajaan	jung-foo
guest	tamu	kur-run
hair	rambut	toh-fah
hand	tangan	shoh
hat	topi	mow-dzur
head	kepala	toh
heavy	berat	joong
high	tinggi	gow
hill	bukit	shahn
holiday	cuti	jjah-chee
home, house	rumah	fahng-dzur
hospital	rumah sakit	yee-yew-ahn
hot (temperature)	panas	jih-tyen
hotel	hotel, rumah, penginapan	fahn-dyen
hour	jam	hsyow-shur
how are you?	apa kabar?	mah
how many?	berapa banyak?	dwor-show
how much?	berapa?	chyen
how?	bagaimana?	dzun-mur
hungry	lapar	ur
hurt (injured)	luka	tung
I	saya, aku	wor
important	penting	joong-yow
information	keterangan	hsyow-hshee
inside	dalam	dzai-lee
keep, to	simpan, menyimpan	lyoh
key	kunci	yow-shur
lady	wanita, perempuan	nyew-shur
last night	tadi malam, semalam	dzwor-tyen-wahn-shahng

English

later
 leave, depart
 look out!
 lost (direction)
 man
 many, much
 market
 me
 medicine
 meeting
 menu
 midday
 morning
 mother
 name
 need
 newspaper
 night
 noon
 north
 open
 outside
 pardon me?
 permit, license
 please (request help)
 police
 postponed, delayed
 program, schedule
 question
 quiet
 ready
 region
 reservation
 school
 shirt
 shoes

Bahasa Malay

nanti
 pergi, berangkat
 awas!
 menyasar
 lelaki, laki-laki, orang
 banyak
 pasar
 saya
 ubat
 pertemuan
 daftar makanan
 tengah hari
 pagi
 ibu
 nama
 keperluan, kebutuhan
 surat khabar
 malam
 siang, tengah hari
 utara
 buka, terbuka
 luar, di luar
 coba ulangi?
 menijinkan
 tolong
 polis
 tertunda, ditunda
 acara
 pertanyaan
 sepi, sunyi
 siap
 daerah
 pesanan
 sekolah
 baju
 kasut

Mandarin (Phonetic)

hoh-lai
 dzoh
 hsyow-hsin!
 wor mee-loo-lur
 nahn-run
 hun dwor
 shur-chahng
 wor
 hshee-yow
 hway-yee
 tsai-dahn
 joong-woo
 dzow-shahng
 moo-chin
 ming-dzur
 wor hsyew-yow
 bow-jur
 yur
 joong-woo
 bay
 kai-dur
 wai-myen
 shwor shun-mur
 hsyew-kur jung
 mah
 jing-chah
 wahn-dyen
 lyeh-chur shur kur byow
 wun-tee
 ahn-jing
 jun-bay how-lur
 dee-chew
 yew-ding
 hsyew-ehhsyow
 chun-yee
 hsyeh

English

sick
slow
son
south
straight ahead
teacher
telephone call
thank you
that, those
there
thirsty
this, these
today
toilet
tomorrow
town
train
trouble
welcome!
you're welcome!
west
what?
when?
where?
who?
why?
woman
yes
yesterday
you
you're welcome!

Bahasa Malay

sakit
perlahan, lambat
anak laki-laki
selatan
terus, lurus
guru
panggilan telefon
terima kasih
itu
di sana, di situ
haus
ini
hari ini
tandas
besok, esok
kota, bandar
keretapi
kesusahan
sama-sama!
kembali!
barat
apa?
bila?
mana?
siapa?
kenapa?
perempuan
ya
kelmarin, semalam
engkau, kamu, awak
kembali, sama sama!

Mandarin (Phonetic)

yoh-bing
mahn
ez-dzur
nahn
yee-jur chow-chyen
low-shur
dyen-hwah
hsyeh-hsyeh
nay-gur
dzai
wor koh-kur
jay-gur
jin-tyen
tsur-swor
ming-tyen
chung-jun
hwor-chur
mah-fahn
hwahn-ying dow
boo-yoong hsyeh
hshee
shun-mur
shun-mur shur-hoh
dzai
shay
way-shun-mur
foo-nyew
shur-dur
dzwor-tyen
sing
kur chee

Key Words

English	Bahasa Malay	English	Bahasa Malay
accident	kemalangan	call on telephone	memanggil telefon
accommodation	rumah tumpangan, penginapan	church	gereja
address	alamat	city	kota, bandaraya
afraid	takut, bimbang	climate	iklim
after	sesudah, setelah	clock	jam
afternoon (1500-dusk)	petang	clothing	pakaian
again	lagi	cloudy, overcast	mendung
age	umur	cold(temperature)	sejuk, dingin
agreement	perjanjian, persetujuan	culture	kebudayaan
alley/lane	lorong	cut/slice	potongan
allow/permit	membiarkan, membenarkan	day	hari
ambassador	duta	daybreak	fajar
angry	marah	destination	tujuan
answer	jawab	direction	jurusan, arah
authority/ person in charge	orang yang berwibawa	dirty	kotor
automobile	kereta	division	bahagian
baby	bayi	do not!	jangan!
bad/rotten	buruk	doctor	doktor
baggage	barang-barang	document/letter	surat
bath	mandi	door	pintu
bay	teluk	downtown	pusat
beach	pantai	drink	minuman
bed	katil	dry(weather)	kemarau
boundary/border	sempadan	dusk	senja
bridge	jambatan	east	timur
brush	berus	eat	makan
building	bangunan	embassy	kedutaan besar
bus	bas	emergency	darurat
		enemy	kosong
		energy	tenaga
		enter	masuk
		equal	sama
		establish/set up	memdirikan

English	Bahasa Malay	English	Bahasa Malay
estimate	taksir, kira	gift	hadiah
exactly! just so!	betul!	girl	gadis, anak perempuan
examine	periksa, memeriksa	glass (for drinking)	gelas
exchange rate	kadar pertukaran wang asing	go around	keliling
excuse me!	maafkan!	go back	balik, berbalik
exit	keluar	go home	pulang
expense	biaya	good	baik, bagus
expert	pakar	government	pemerintah, kerajaan
face, to	ke hadapan, berhadapan	greetings	salam
fail	gagal	guard, to	jaga, menjaga
fall, to	jatuh	guest	tamu
false	palsu, bohong	guide, lead	antar, mengantar
fast	cepat, lekas	hair	rambut
fertile	subur	hand	tangan
fever	demam	happening, incident	kejadian
fight over, to	berebut	hard (solid)	keras
fight(physically)	lawan	hat	topi
find, to	temukan, dapat	head	kepala
fire	api	heart	hati, jantung
first	pertama	heavy	berat
fish	ikan	hidden	tersembunyi
fix(to repair)	betulkan, membetulkan	high	tinggi
flood	banjir	hill	bukit
floor	lantai	hinder, to	menghambat
flu	pilek, flu, selesma	hit, strike	pukul, memukul
food	makanan	hold onto, grasp	pegang, memegang
foot	kaki	hole	lobang
forbidden	dilarang, larangan	holiday	cuti
Friday	Jumaat	home, house	rumah
function, to work	jalan, berjalan	hospital	rumah sakit
gasoline	minyak petrol	hot (temperature)	panas
gasoline station	stesyen minyak		

English	Bahasa Malay	English	Bahasa Malay
hotel	hotel, rumah penginapan	lady	wanita, perempuan
hour	jam	lake	danau
how are you?	apa kabar?	land	tanah
how many?	berapa banyak?	large	besar
how much?	berapa?	last night	tadi malam, semalam
how?	bagaimana?	last	terakhir
hungry	lapar	late	terlambat, telat
hurt (injured)	luka	later	nanti
I	saya, aku	laugh, to	tertawa, ketawa
ice	ais, air batu	laws, legislation	undang-undang, hukum
important	penting	leave, depart	pergi, berangkat
impossible	tidak mungkin	left side	kiri
information	keterangan	letter	surat
insect	serangga	line up, to	beratur
inside	dalam	listen	dengar
insult	cacian	little (small)	kecil
invitation	undangan	load up, to	muat, memuat
invite, to	ajak	lock	kunci
involve, to	melibatkan	lock, to	mengunci
iron	besi	look out!	awas!
island	pulau	lost (direction)	menyasar
jail	penjara	low	rendah
job	pekerjaan, tugas	luggage	beg
join together, to	sambung, gabung	madam	puan
jump, to	lompat, melompat	magazine	majalah
jungle	hutan	man	lelaki, laki-laki, orang
keep, to	simpan, menyimpan	many, much	banyak
key	kunci	map	peta
kill, murder	membunuh	market	pasar
king	raja	married	kawin, nikah
kitchen	dapur	maybe	mungkin
knife	pisau	me	saya
knock, to	ketuk, mengetuk		
knowledge	pengetahuan		

English	Bahasa Malay	English	Bahasa Malay
measure, to	ukur, mengukur	opposed, to	melawan
meat	daging	order (command)	perintah
medicine	ubat	organize, arrange	mengatur, mengurus
meeting	petemuan	outside	luar, di luar
menu	daftar makanan	own, to	memiliki, mempunyai
message	mesej	package	bungkus
midday	tengah hari	paid	lunas
morning	pagi	painful	sakit
mother	ibu	paper	kertas
mountain	gunung	pardon me?	coba ulangi?
name	nama	parents	orang tua
nearby	dekat	party	pesta
necessary, must	harus, mesti	payment	pembayaran
need	keperluan, kebutuhan	peaceful	damai
never	tidak pernah	people	rakyat
new	baru	percent	persen
news	berita, khabar	percentage	peratus
newspaper	surat khabar	performance	pertunjukan
night	malam	perhaps, probably	barangkali
noon	siang, tengah hari	permit, license	menijinkan
normal	biasa	pick up, lift	angkat, mengangkat
north	utara	please	tolong
not yet	belum	(request help)	
notes	catatan	please	silahkan, mari
now	sekarang	(go ahead)	
nude	telanjang, bogel	please	minta
occupation	pekerjaan	(request something)	
ocean	laut, samudera	poison, poisonous	racun
odor, bad smell	bau	police	polis
off, turn off	mematikan	pond	telaga
often	sering	pool	kolam
oil	minyak	poor	miskin
on, turn on	pasangkan, hidupkan		
open	buka, terbuka		

English	Bahasa Malay	English	Bahasa Malay
postponed, delayed	tertunda, ditunda	restrain, to	tahan, tahankan
prayer	doa	run, to	lari
pregnant	hamil	safe	sedih
prepare, to make ready	siapkan	salary	gaji
pressure	tekanan	salt	garam
price	harga	satisfied	puas
priest	paderi	save, keep	simpan
private	rahasia	schedule	jadual waktu
program, schedule	acara	school	sekolah
proof	bukti	sea	laut
public	umum	seat	tempat duduk, kerusi
pull, to	tarik, menarik	seek, to	cari, mencari
push, to	dorong, mendorong	servant	pembantu, pekerja
put inside	masukkan, memasukkan	shack	pondok
put together	pasang, memasang	shave, to	cukur, mencukur
put, to place	taruh, menaruh	ship	kapal
quarter	suku	shirt	baju
queen	ratu	shoes	kasut
question	pertanyaan	show, to	menunjukkan, memperlihatkan
quiet	sepi, sunyi	sick	sakit
rain	hujan	side	samping
read	baca	sign, to	tanda tangani, menanda tangani
ready	siap	silent, quiet	diam, sepi
receive	terima, menerima	sir	tuan
recognize	kenal, mengenal	sleep, to	tidur
recovered, cured	sembuh	slow	perlahan, lambat
region	daerah	slowly	perlahan-perlahan
reply, response	balasan, jawaban	small	kecil
reservation	pesanan	smoke	asap
resident, inhabitant	penduduk	snake	ular
rest, relax	isirahat	snow	salji
		soap	sabun
		socks	stoking pendek

English	Bahasa Malay	English	Bahasa Malay
soft	lembut, lunak	tie, to	mengikat
sold	terjual	time	waktu
some	beberapa	today	hari ini
son	anak laki-laki	toilet	tandas
soon	sekejap, tidak lama lagi	tomorrow	besok, esok
south	selatan	top	atas
speed	kecepatan, laju	town	kota, bandar
stay overnight, to	bermalam	train	keretapi
stay, to	tinggal, berdiam	trouble	kesusahan
stick, pole	batang	try	coba, mencoba
stone	batu	uncooked	mentah
store	kedai	understand, to	mengerti
stop, to	berhenti, stop	university	universiti
straight ahead	terus, lurus	unnecessary	tidak usah, tidak perlu
study, learn	belajar	use, to	pakai, memakai
suddenly	tiba-tiba	useless	tidak berguna, sia sia
sugar	gula	usual	biasa
suitcase	beg pakaian	vaccination	suntik
table	meja	valid	laku, berlaku
take	ambil, mengambil	view, to look at	memandang
tall	tinggi	village	kampung, desa
taste	rasa	visit	lawatan, kunjungan
tea	teh	wait for, to	tunggu, menunggu
teach, to	ajar, mengajar	warm	hangat
teacher	guru	warn, to	memberi, amaran
telephone call	panggilan telefon	warning	amaran
thank you	terima kasih	wash	cuci, mencuci
that, those	itu	watch over, guard	mengawasi
then	lalu, kemudian, lantas	water	air
there	di sana, di situ	weak	lemah
they, them	mereka	weapon	senjata
thirsty	haus	weather	cuaca
this, these	ini		
throw away	buang		

English

welcome!
you're welcome!
well, good
west
wet
what?
when?
where?
where to?
who?
why?
wind, breeze
wine
wire
with

Bahasa Malay

sama-sama!
kembali!
baik
barat
basah
apa?
bila?
mana?
ke mana?
siapa?
kenapa?
jendela
air anggur
wayar
dengan, sama

English

without
witness
wood
woman
year
yell, to
yes
yesterday
you
you're welcome!
youth

Bahasa Malay

tanpa
saksi
kayu
perempuan
tahun
teriak, berteriak
ya
kelmarin,
semalam
engkau, kamu,
awak
kembali,
sama sama!
remaja

APPENDIX F: International Road Signs



Crossroads



Maximum speed



No through road



Road narrows



Fallen/falling rock



No entry for
vehicular traffic



Motorway



Stop and give way



Low flying aircraft or
sudden aircraft noise



No left turn



One way street



Tourist
information point



Traffic signals



No u-turn



Cable height
16' - 6"

Overhead cables,
Maximum height



Failure of
traffic light signals



Sharp deviation

APPENDIX G:

Deployed Personnel's Guide to Health Maintenance

DoD-prescribed immunizations and medications, including birth control pills, should be brought in sufficient quantity for deployment's duration.

Only food, water, and ice from approved U.S. military sources should be consumed. Consuming food or water from unapproved sources may cause illness. Food should be thoroughly cooked and served hot.

Thorough hand-washing before eating and after using the latrine is highly recommended, as is regular bathing. Feet should be kept dry and treated with antifungal powder. Socks and underwear should be changed daily; underwear should fit loosely and be made of cotton fiber.

Excessive heat and sunlight exposure should be minimized. Maintaining hydration is important, as are following work-rest cycles and wearing uniforms properly. Sunglasses, sunscreen (SPF 15 or higher), and lip balm are recommended. Drinking alcohol should be avoided. Personnel with previous heat injuries should be closely monitored.

Uniforms should be worn properly (blouse boots). DEET should be applied to exposed skin and uniforms treated with permethrin; permethrin is not intended for use on skin. Proper treatment and wear of uniform, plus application of DEET to exposed skin, decreases the risk of diseases transmitted by biting insects.

Overcrowded living areas should be avoided. Ventilated living areas and avoiding coughing or sneezing toward others will reduce colds and other respiratory infections. Cots or sleeping bags should be arranged "head to toe" to avoid the face-to-face contact that spreads germs.

Contact with animals is not recommended. Animals should not be kept as mascots. Cats, dogs, and other animals can transmit disease. Food should not be kept in living areas as it attracts rodents and insects, and trash should be disposed of properly.

Hazardous snakes, plants, spiders, and other insects and arthropods such as scorpions, centipedes, ants, bees, wasps, and flies should be avoided. Those bitten or stung should contact U.S. medical personnel.

All sexual contact should be avoided. Properly used condoms offer some protection from sexually transmitted diseases but not full protection.

Stress and fatigue can be minimized by maintaining physical fitness, staying informed, and sleeping when the mission and safety permits. Alcohol should be avoided as it causes dehydration, contributes to jet lag, can lead to depression, and decreases physical and mental readiness. Separation anxiety, continuous operations, changing conditions, and the observation of human suffering will intensify stress. Assistance from medical personnel or chaplains is available.

Additional Information

Water

If unapproved water, as found in many lakes, rivers, streams, and city water supplies must be used in an emergency, the water may be disinfected by:

- Adding calcium hypochlorite at 5.0 ppm for 30 minutes;
- Adding Chlor-Floc or iodine tablets according to label instructions;
- Heating water to a rolling boil for 5 to 10 minutes; or
- Adding 2 to 4 drops of ordinary chlorine bleach per quart of water and waiting 30 minutes before using it.

Either U.S. military preventive medicine or veterinary personnel should inspect bottled water supplies. Bottled water does not guarantee purity; direct sunlight on bottled water supplies may promote bacterial growth.

Water in canals, lakes, rivers, and streams is likely contaminated; unnecessary bathing, swimming, and wading should be avoided. If the tactical situation requires entering bodies of water, all exposed skin should be covered to protect from parasites. Following exposure, it is important to dry vigorously and change clothing.

Rodents

Rodents should not be tolerated in the unit area; they can spread serious illness. Diseases may be contracted through rodent bites or scratches, transmitted by insects carried on rodents (such as fleas, ticks, or mites), or by contamination of food from rodent nesting or feeding. Personnel can minimize the risk of disease caused by rodents by:

- Maintaining a high state of sanitation throughout the unit area;
- Sealing openings 1/4 inch or greater to prevent rodents from entering unit areas;
- Avoiding inhalation of dust when cleaning previously unoccupied areas (mist these areas with water prior to sweeping; when possible, disinfect area using 3 ounces of liquid bleach per 1 gallon of water).
- Promptly removing dead rodents. Personnel should use disposable gloves or plastic bags over the hands when handling any dead animal and place the dead rodent/animal into a plastic bag prior to disposal.
- Seeking immediate attention if bitten or scratched by a rodent or if experiencing difficulty breathing or flu-like symptoms.

Insects

Exposure to harmful insects, ticks, and other pests is a year-round, worldwide risk. The following protective measures reduce the risk of insect and tick bites:

- Use DoD-approved insect repellents properly;
- Apply DEET on all exposed skin;
- Apply permethrin on clothing and bed nets;
- Tuck bed net under bedding; use bed net pole;
- Avoid exposure to living or dead animals;
- Regularly check for ticks;
- Discourage pests by disposing of trash properly; eliminate food storage in living areas; and

- Cover exposed skin by keeping sleeves rolled down when possible, especially during peak periods of mosquito biting (dusk and dawn); keep undershirts tucked into pants; tuck pant legs into boots.

Uniforms correctly treated with permethrin, using either the aerosol spray-can method (reapply after sixth laundering) or with the Individual Dynamic Absorption (IDA) impregnation kit (good for 6 months or the life of the uniform) will help minimize risks posed by insects. The date of treatment should be labeled on the uniform.

Bed nets should be treated with permethrin for protection against biting insects using either the single aerosol spray can method (treating two bed nets) or the unit's 2-gallon sprayer. All personnel should sleep under mosquito nets, regardless of time of day, ensure netting is tucked under bedding, and use poles to prevent bed nets from draping on the skin.

DoD-approved insect repellents are:

IDA KIT: NSN 6840-01-345-0237

Permethrin Aerosol Spray: NSN 6840-01-278-1336

DEET Insect Repellent: NSN 6840-01-284-3982

Hot Weather

If heat is a threat in the area, personnel should:

- Stay hydrated by drinking water frequently;
- Follow work-rest cycles;
- Monitor others who may have heat-related problems;
- Wear uniforms properly;
- Use a sun block (SPF 15 or higher), sunglasses, and lip balm;
- During hot weather, wear natural fiber clothing (such as cotton) next to the skin for increased ventilation;
- Seek immediate medical attention for heat injuries such as cramps, exhaustion, or stroke. Heat injuries can also occur in cold weather;

- Avoid standing in direct sunlight for long periods; be prepared for sudden drops in temperature at night, and construct wind screens if necessary to avoid blowing dust or sand.

Sunscreens:

Sunscreen lotion: NSN 6505-01-121-2336

Non-alcohol lotion base sunscreen: NSN 6505-01-267-1486

WORK/REST TABLE

Heat Cat	WBGT Index (° F)	EASY WORK		MODERATE WORK		HARD WORK	
		Work / Rest	Water Intake (Qt/Hr)	Work / Rest	Water Intake (Qt/Hr)	Work / Rest	Water Intake (Qt/Hr)
1	78 – 81.9	NL	1/2	NL	3/4	40/20 min	3/4
2	82 – 84.9	NL	1/2	50/10 min	3/4	30/30 min	1
3	85 – 87.9	NL	3/4	40/20 min	3/4	30/30 min	1
4	88 – 89.9	NL	3/4	30/30 min	3/4	20/40 min	1
5	> 90	50/10 min	1	20/40 min	1	10/50 min	1

The work/rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hours of work in the specific heat category. Individual water needs will vary +/- (plus/minus) 1/4 qt/hr.

NL = no limit to work time per hour. Rest means minimal physical activity (sitting or standing) and should be done in shade if possible.

Caution: Hourly fluid intake should not exceed 1 ½ quarts. Daily intake should not exceed 12 quarts. Note: MOPP gear adds 10° to WBGT Index.

Food

High risk food items such as fresh eggs, unpasteurized dairy products, lettuce or other uncooked vegetables, and raw or undercooked meats should be avoided unless they are from U.S. military approved sources. Those who must consume unapproved foods should choose low risk foods such as bread and other baked goods, fruits that have thick peels (washed with safe water), and boiled foods such as rice and vegetables.

Human Waste

Military-approved latrines should be used when possible. If no latrines are available, personnel should bury all human waste in pits or trenches.

Cold Weather

If cold weather injuries are a threat in the area, personnel should:

- Drink plenty of fluids, preferably water or other decaffeinated beverages;
- Closely monitor others who have had previous cold injuries;
- Use well-ventilated warming tents and hot liquids for relief from the cold. Watch for shivering and increase rations to the equivalent of four MREs per day;
- Not rest or sleep in tents or vehicles unless well ventilated; temperatures can drop drastically at night;
- Dress in layers, wear polypropylene long underwear, and use sunglasses, scarf, unscented lip balm, sunscreen, and skin moisturizers;

WIND SPEED		COOLING POWER OF WIND EXPRESSED AS "EQUIVALENT CHILL TEMPERATURE"																				
KNOTS	MPH	TEMPERATURE (°F)																				
CALM	CALM	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	-60
		EQUIVALENT CHILL TEMPERATURE																				
3 - 6	5	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	-60	-70
7 - 10	10	30	20	15	10	5	0	-10	-15	-20	-25	-35	-40	-45	-50	-60	-65	-70	-75	-80	-90	-95
11 - 15	15	25	15	10	0	-5	-10	-20	-25	-30	-40	-45	-50	-60	-65	-70	-80	-85	-90	-100	-105	-110
16 - 19	20	20	10	5	0	-10	-15	-25	-30	-35	-45	-50	-60	-65	-75	-80	-85	-95	-100	-110	-115	-120
20 - 23	25	15	10	0	-5	-15	-20	-30	-35	-45	-50	-60	-65	-75	-80	-90	-95	-105	-110	-120	-125	-135
24 - 28	30	10	5	0	-10	-20	-25	-30	-40	-50	-55	-65	-70	-80	-85	-95	-100	-110	-115	-125	-130	-140
29 - 32	35	10	5	-5	-10	-20	-30	-35	-40	-50	-60	-65	-75	-80	-90	-100	-105	-115	-120	-130	-135	-145
33 - 36	40	10	0	-5	-10	-20	-30	-35	-45	-55	-60	-70	-75	-85	-95	-100	-110	-115	-125	-130	-140	-150
Winds Above 40 MPH Have Little Additional Effect		LITTLE DANGER					INCREASING DANGER Flesh may freeze within 1 minute					GREAT DANGER Flesh may freeze within 30 seconds										

- Insulate themselves from the ground with tree boughs or sleeping mats and construct windscreens to avoid unnecessary heat loss; and
- Remember that loss of sensitivity in any body part requires immediate medical attention.

First Aid

Basic Lifesaving

Those caring for injured persons should immediately:

- Establish an open airway,
- Ensure the victim is breathing,
- Stop bleeding to support circulation,
- Prevent further disability,
- Place dressing over open wounds,
- Immobilize neck injuries,
- Splint obvious limb deformities, and
- Minimize further exposure to adverse weather.

Injuries and Care

Shock

■ **Symptoms:**

- Confusion
- Cold, clammy skin
- Sweating
- Shallow, labored, and rapid breathing
- Rapid pulse

■ **Treatment:**

- An open airway should be maintained.
- Unconscious victims should be placed on their side.

- ❑ Victims should be kept calm, warm, and comfortable.
- ❑ Lower extremities should be elevated.
- ❑ Medical attention should be sought as soon as possible.

Abdominal Wound

■ Treatment:

- ❑ Exposed organs should be covered with moist, clean dressing.
- ❑ Wound should be secured with bandages.
- ❑ Displaced organs should never be reintroduced to the body.

Bleeding

■ Treatment:

- ❑ Direct pressure with hand should be applied; a dressing should be used if available.
- ❑ Injured extremity should be elevated if no fractures are suspected.
- ❑ Pressure points may be used to control bleeding.
- ❑ Dressings should not be removed; additional dressings may be applied over old dressings.

■ Tourniquet:

- ❑ **NOTE: Tourniquets should only be used when an injury is life threatening.**
- ❑ A 1-inch band should be tied between the injury and the heart, 2 to 4 inches from the injury, to stop severe bleeding; wire or shoe strings should not be used.
- ❑ Band should be tight enough to stop bleeding and no tighter.
- ❑ Once the tourniquet is tied, it should not be loosened.
- ❑ The tourniquet should be left exposed for quick visual reference.
- ❑ The time that the tourniquet is tied and the letter “T” should be written on the casualty’s forehead.

Eye Injury

■ **Treatment:**

- ❑ Embedded objects should not be removed; dressings should secure objects to prohibit movement.
- ❑ Bandages should be applied lightly to both eyes.
- ❑ Patients should be continuously attended.

Chest Wound

■ **Symptoms:**

- ❑ Sucking noise from chest
- ❑ Frothy red blood from wound

■ **Treatment:**

- ❑ Entry and exit wounds should be identified; wounds should be covered (aluminum foil, ID card).
- ❑ Three sides of the material covering the wound should be taped, leaving the bottom untaped.
- ❑ Victim should be positioned to facilitate easiest breathing.

Fractures

■ **Symptoms:**

- ❑ Deformity, bruising
- ❑ Tenderness
- ❑ Swelling and discoloration

■ **Treatment:**

- ❑ Fractured limb should not be straightened.
- ❑ Injury should be splinted with minimal movement of injured person.
- ❑ Joints above and below the injury should be splinted.

- ❑ If not in a chemical environment, remove clothing from injured area.
- ❑ Rings should be removed from fingers.
- ❑ Check pulse below injury to determine blood flow restrictions.

Spinal, Neck, Head Injury

■ Symptoms:

- ❑ Lack of feeling and/or control below neck

■ Treatment:

- ❑ Conscious victims should be cautioned to remain still.
- ❑ Airway should be checked without moving injured person's head.
- ❑ Victims who must be moved should be placed, without bending or rotating victim's head and neck, on a hard surface that would act as a litter (door, cut lumber).
- ❑ Head and neck should be immobilized.

Heat Injuries

Heat Cramps

■ Symptoms:

- ❑ Spasms, usually in muscles or arms
- ❑ Results from strenuous work or exercise
- ❑ Loss of salt in the body
- ❑ Normal body temperature

Heat Exhaustion

■ Symptoms:

- ❑ Cramps in abdomen or limbs
- ❑ Pale skin
- ❑ Dizziness, faintness, weakness
- ❑ Nausea or vomiting

- ❑ Profuse sweating or moist, cool skin
- ❑ Weak pulse
- ❑ Normal body temperature

Heat Stroke

■ **Symptoms:**

- ❑ Headache, dizziness
- ❑ Red face/skin
- ❑ Hot, dry skin (no sweating)
- ❑ Strong, rapid pulse
- ❑ High body temperature (hot to touch)

■ **Treatment:**

- ❑ Victim should be treated for shock.
- ❑ Victim should be laid in a cool area with clothing loosened.
- ❑ Victim can be cooled by sprinkling with cool water or fanning (though not to the point of shivering).
- ❑ If conscious, victim may drink cool water (2 teaspoons of salt to one canteen may be added).
- ❑ Seek medical attention immediately; heat stroke can result in death.

Burns

Burns may be caused by heat (thermal), electricity, chemicals, or radiation. Treatment is based on depth, size, and severity (degree of burn). All burn victims should be treated for shock and seen by medical personnel.

Thermal/First Degree

■ **Symptoms:**

- ❑ Skin reddens
- ❑ Painful

■ **Treatment:**

- ❑ Source of burn should be removed.
- ❑ Cool water should be applied to the affected area.

Thermal/Second Degree

■ **Symptoms:**

- ❑ Skin reddens and blisters
- ❑ Very painful

■ **Treatment:**

- ❑ Source of burn should be removed.
- ❑ Cool water should be applied to the affected area.
- ❑ Blisters should not be broken.
- ❑ A dry dressing should cover the affected area.

Thermal/Third Degree

■ **Symptoms:**

- ❑ Charred or whitish looking skin
- ❑ May burn to the bone
- ❑ Burned area not painful; surrounding area very painful

■ **Treatment:**

- ❑ Source of burn should be removed.
- ❑ Clothing that adheres to burned area should not be removed.
- ❑ A dry dressing should cover the affected area.

Electrical Burns

■ **Treatment:**

- ❑ Power source must be off.
- ❑ Entry and exit wounds should be identified.
- ❑ Burned area should be treated in accordance with its severity.

Chemical Burns

■ Treatment:

- Skin should be flushed with a large amount of water; eyes should be flushed for at least 20 minutes.
- Visible contaminants should be removed.
- Phosphorus burns should be covered with a wet dressing (prevents air from activating the phosphorous)

Cold Injuries

Hypothermia

■ Symptoms:

- Body is cold under clothing
- Victim may appear confused or dead

■ Treatment:

- Victim should be moved to a warm place.
- Wet clothing should be removed; victim should be dressed in warm clothing or wrapped in a dry blanket.
- Body parts should not be rubbed.
- Victims must not consume alcoholic beverages.

Frostbite

■ Symptoms:

- Skin appears white or waxy
- Skin is hard to the touch

■ Treatment:

- Victim should be moved to a warm place.
- Affected area should be warmed in 104 to 108° F (40° C) water for 15 to 30 minutes (NOT hot water).
- Affected area should be covered with several layers of clothing.

- ❑ Affected area must not be rubbed.
- ❑ Victim must seek medical attention.

Emergency Life-Saving Equipment

Equipment may be improvised when necessary. Following is a list of possible uses for commonly found items.

Shirts	Dressings/Bandages
Belts, Ties	Tourniquets, Bandages
Towels, Sheets	Dressings/Bandages
Socks, Panty Hose, Flight cap	Dressings/Bandages
Sticks or Tree Limbs	Splints
Blankets	Litters, Splints
Field Jackets	Litters
BDU Shirts	Litters/Splints
Ponchos	Litters/Bandages
Rifle Sling	Tourniquets, Bandages
M-16 Heat Guards	Splints

APPENDIX H: Individual Protective Measures

Security Threats

Individual protective measures are the conscious actions which people take to guard themselves against physical harm. These measures can involve simple acts such as locking your car and avoiding areas where crime is rampant. When physical protection measures are combined they form a personal security program, the object of which is to make yourself a harder target. The following checklists contain basic individual protective measures that, if understood and followed, may significantly reduce your vulnerability to the security threats overseas (foreign intelligence, security services, and terrorist organizations). If you are detained or taken hostage, following the measures listed in these checklists may influence or improve your treatment.

Foreign Intelligence and Security Services

- Avoid any actions or activities that are illegal, improper, or indiscreet.
- Guard your conversation and keep sensitive papers in your custody at all times.
- Take it for granted that you are under surveillance by both technical and physical means, including:
 - Communications monitoring (telephone, telex, mail, and radio)
 - Photography
 - Search
 - Eavesdropping in hotels, offices, and apartments
- Do not discuss sensitive matters:
 - On the telephone
 - In your room
 - In a car, particularly in front of an assigned driver

- Do not leave sensitive personal or business papers:
 - ❑ In your room
 - ❑ In the hotel safe
 - ❑ In a locked suitcase or briefcase
 - ❑ In unattended cars, offices, trains, or planes
 - ❑ Open to photography from the ceiling
 - ❑ In wastebaskets as drafts or doodles
- Do not try to defeat surveillance by trying to slip away from followers or by trying to locate “bugs” in your room. These actions will only generate more interest in you. If you feel you are under surveillance, act as naturally as possible, go to a safe location (your office, hotel, U.S. Embassy), and contact your superior.
- Avoid offers of sexual companionship. They may lead to a room raid, photography, and blackmail. Prostitutes in many countries report to the police, work for a criminal organization, or are sympathetic to insurgent or terrorist organizations; in other words, are anti-U.S. Others may be employed by an intelligence service.
- Be suspicious of casual acquaintances and quick friendships with local citizens in intelligence/terrorist threat countries. In many countries, people tend to stay away from foreigners and do not readily or easily make contact. Many who actively seek out friendships with Americans may do so as a result of government orders or for personal gain.

In your personal contacts, follow these guidelines:

- Do not attempt to keep up with your hosts in social drinking.
- Do not engage in black market activity for money or goods.
- Do not sell your possessions.
- Do not bring in or purchase illegal drugs.
- Do not bring in pornography.
- Do not bring in religious literature for distribution. (You may bring one Bible, Koran, or other religious material for your own personal use.)

- Do not seek out religious or political dissidents.
- Do not take ashtrays, towels, menus, glasses, or other mementos from hotels or restaurants.
- Do not accept packages, letters, etc., from local citizens for delivery to the U.S.
- Do not make political comments or engage in political activity.
- Do not be lured into clandestine meetings with would-be informants or defectors.
- Be careful about taking pictures. In some countries it is unwise to take photographs of scenes that could be used to make unfavorable comparisons between U.S. and local standards of living or other cultural differences. Avoid taking any photographs from moving buses, trains, or aircraft.

The following picture subjects are clearly prohibited in most countries where an intelligence or terrorist/insurgent threat is evident:

- Police or military installations and personnel
- Bridges
- Fortifications
- Railroad facilities
- Tunnels
- Elevated trains
- Border areas
- Industrial complexes
- Port complexes
- Airports

Detention

Most intelligence and security services in threat countries detain persons for a wide range of real or imagined wrongs. The best advice, of course, is to do nothing that would give a foreign service the least reason to pick

you up. If you are arrested or detained by host nation intelligence or security, however, remember the following:

- Always ask to contact the U.S. Embassy. You are entitled to do so under international diplomatic and consular agreements, to which most countries are signatories.
- Phrase your request appropriately. In Third World countries, however, making demands could lead to physical abuse.
- Do not admit to wrongdoing or sign anything. Part of the detention ritual in some threat countries is a written report you will be asked or told to sign. Decline to do so, and continue demanding to contact the Embassy or consulate.
- Do not agree to help your detainer. The foreign intelligence or security service may offer you the opportunity to help them in return for releasing you, foregoing prosecution, or not informing your employer or spouse of your indiscretion. If they will not take a simple no, delay a firm commitment by saying that you have to think it over.
- Report to your supervisor immediately. Once your supervisor is informed, the Embassy or consulate security officer needs to be informed. Depending on the circumstances and your status, the Embassy or consulate may have to provide you assistance in departing the country expeditiously.
- Report to your unit's security officer and your service's criminal investigative branch upon returning to the U.S. This is especially important if you were unable to report to the Embassy or consulate in country. Remember, you will not be able to outwit a foreign intelligence organization. Do not compound your error by betraying your country.

Foreign Terrorist Threat

Terrorism may seem like mindless violence committed without logic or purpose, but it is not. Terrorists attack soft and undefended targets, both people and facilities, to gain political objectives they see as out of reach by less violent means. Many of today's terrorists view no one as innocent.

Thus, injury and loss of life are justified as acceptable means to gain the notoriety generated by a violent act in order to support their cause.

Because of their distinctive dress, speech patterns, and outgoing personalities, Americans are often highly visible and easily recognized when they are abroad. The obvious association of U.S. military personnel with their government enhances their potential media and political worth as casualties or hostages. Other U.S. citizens are also at risk, including political figures, police, intelligence personnel, and VIPs (such as businessmen and celebrities).

Therefore, you must develop a comprehensive personal security program to safeguard yourself while traveling abroad. An awareness of the threat and the practice of security procedures like those advocated in crime prevention programs are adequate precautions for the majority of people. While total protection is impossible, basic common sense precautions such as an awareness of any local threat, elimination of predictable travel and lifestyle routines, and security consciousness at your quarters or work locations significantly reduce the probability of success of terrorist attacks.

To realistically evaluate your individual security program, you must understand how terrorists select and identify their victims. Terrorists generally classify targets in terms of accessibility, vulnerability, and political worth (symbolic nature). These perceptions may not be based on the person's actual position, but rather the image of wealth or importance they represent to the public. For each potential target, a risk versus gain assessment is conducted to determine if a terrorist can victimize a target without ramifications to the terrorist organization. It is during this phase that the terrorist determines if a target is "hard or soft." A hard target is someone who is aware of the threat of terrorism and adjusts his personal habits accordingly. Soft targets are oblivious to the threat and their surroundings, making an easy target.

Identification by name is another targeting method gathered from aircraft manifests, unit/duty rosters, public documents (Who's Who or the

Social Register), personnel files, discarded mail, or personal papers in trash. Many targets are selected based upon their easily identifiable symbols or trademarks, such as uniforms, luggage (seabags or duffle bags), blatant national symbols (currency, tatoos, and clothing), and decals and bumper stickers.

Travel Security

Travel on temporary duty (TAD/TDY) abroad may require you to stay in commercial hotels. Being away from your home duty station requires increasing your security planning and awareness; this is especially important when choosing and checking into a hotel and during your residence there.

The recent experiences with airport bombings and airplane hijacking suggest some simple precautions:

- You should not travel on commercial aircraft outside the continental U.S. in uniform.
- Prior to traveling by commercial aircraft, you should screen your wallet and other personal items, removing any documents (that is, credit cards, club membership cards, etc.) which would reveal your military affiliation.

NOTE: Current USMC policy requires service members to wear two I.D. tags with metal necklaces when on official business. Also, the current I.D. card must be in possession at all times. These requirements include travel to or through terrorist areas. In view of these requirements, the service member must be prepared to remove and conceal these and any other items which would identify them as military personnel in the event of a skyjacking.

- You should stay alert to any suspicious activity when traveling. Keep in mind that the less time spent in waiting areas and lobbies, the better. This means adjusting your schedule to reduce your wait at these locations.
- You should not discuss your military affiliation with anyone during your travels because it increases your chances of being singled out as a symbolic victim.

- In case of an incident, you should not confront a terrorist or present a threatening image. The lower profile you present, the less likely you will become a victim or bargaining chip for the terrorists, and your survivability increases.

Hostage Situation

The probability of anyone becoming a hostage is very remote. However, as a member of the Armed Forces, you should always consider yourself a potential hostage or terrorist victim and reflect this in planning your affairs, both personal and professional. You should have an up-to-date will, provide next of kin with an appropriate power-of-attorney, and take measures to ensure your dependents' financial security if necessary. Experience has shown that concern for the welfare of family members is a source of great stress to kidnap victims.

Do not be depressed if negotiation efforts appear to be taking a long time. Remember, chance of survival actually increases with time. The physical and psychological stress while a hostage could seem overpowering, but the key to your well-being is to approach captivity as a mission. Maintaining emotional control, alertness, and introducing order into each day of captivity will ensure your success and survival with honor.

During interaction with captors, maintaining self respect and dignity can be keys to retaining status as a human being in the captor's eyes. Complying with instructions, avoiding provocative conversations (political, religious, etc.), and establishing a positive relationship will increase survivability. Being polite and freely discussing insignificant and nonessential matters can reinforce this relationship. Under no circumstance should classified information be divulged. If forced to present terrorist demands to the media, make it clear that the demands are those of the captor and that the plea is not made on your behalf. You must remember that you are an American service member; conduct yourself with dignity and honor while maintaining your bearing.

Hostages sometimes are killed during rescue attempts; consequently, you should take measures to protect yourself during such an action.

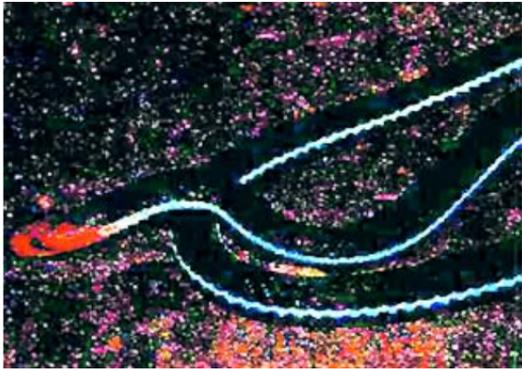
Drop to the floor immediately, remain still and avoiding any sudden movement; select a safe corner if it offers more security than the floor. Do not attempt to assist the rescuing forces but wait for instructions. After the rescue, do not make any comment to the media until you have been debriefed by appropriate U.S. authorities.

APPENDIX I: Dangerous Animals and Plants

Blue Long-Glanded Coral Snake

Description:

Adult length usually 0.6 to 0.9 meters; maximum of about 1.5 meters; relatively slender. Background color dark blue black above with white or pale blue lateral lines. Head, entire belly, and tail bright red. Head small, not distinct from body.



Habitat:

Tropical and montane rain forests, especially near streams. Not generally found in open or dry areas.

Activity and behavioral patterns:

Terrestrial and nocturnal. Slow moving. When disturbed, may squirm violently; in defense, raises and coils tail, revealing red belly.

Banded Long-Glanded Coral Snake

No Photograph Available.

Description:

Adult length usually 0.3 meters; maximum of 0.5 meters. Background color brown to black above, generally with longitudinal black, yellow, and whitish lines; belly alternately barred black and white. Tail red above and below.

Habitat:

Common in forested areas up to elevations of 1,100 meters.

Activity and behavioral patterns:

Secretive; hides under logs and beneath vegetable litter. When molted, makes no attempt to escape; in defense, raises tail to display brightly colored ventral surface, and writhes and tumbles about.

Venom's effects:

Little known of venom, likely neurotoxic. Cases of envenomation reported.

Oriental Coral Snake**Description**

Adult length is 0.3 to 0.5 meters; maximum of 1.0 meter. Narrow body; diameter the size of a finger. Background color variable; color



can be from russet to pink, with narrow, widely separated black crossbands and wide cream band across the base of the head, or brown to crimson, with three longitudinal black stripes from head to tail, and a narrow cream headband. Head is small, barely distinct from neck.

Habitat

Scrub jungles and monsoon forests. Often found near human habitats. Avoids dry terrain.

Activity and behavioral patterns

Nocturnal, remaining hidden during the day within humus of forest floor, or beneath logs, stones, and other debris. Occasionally active in early morning.

Venom's effects:

Likely neurotoxic. Little is known of venom. Few bites recorded. One fatality reported from Nepal.

Malayan Krait

No Photograph Available.

Description:

Adult length usually 1.2 to 1.4 meters. Background color black with white or yellowish crossbands speckled with black on body and tail; belly pure white. Head not distinct from neck. Tail ends in a sharp tip.

Habitat:

Common in lowland forests and moist areas.

Activity and behavioral patterns:

Nocturnal and very timid. Active at dusk. Inoffensive; will not bite unless stepped on. Often found near inhabited places on trails at night.

Venom's effects:

Potent neurotoxin. Most victims bitten while asleep in huts at night. Locally symptoms generally minimal. Symptoms may include abdominal discomfort, headache, and giddiness. Neurotoxic symptoms include ptosis, facial paralysis, and inability to open mouth, swallow, or protrude tongue. Fatalities reported.

Red-Headed Krait, Yellow-Headed Krait

No Photograph Available.

Description:

Adult length usually 1.0 to 1.2 meters; maximum of 1.6 meters. Background color blue-black above and below, with or without yellow vertebral line; head red or yellow; tail and sometimes posterior part of body orange-red. Head not distinct from neck.

Habitat:

Forest and jungle, primarily in hilly or mountainous areas.

Activity and behavioral patterns:

Nocturnal and terrestrial. Slow moving. When provoked, raises head and wags tail slowly. Rarely seen.

Venom's effects:

Little known of venom; likely neurotoxic. Few bites recorded.

Branded Krait**Description:**

Adult length usually 1 to 1.2 meters; maximum of 2 meters. Background color is pattern of alternating light and dark bands encircling body. Light bands pale to bright canary yellow; dark bands generally black and wider. Dis-



tinctive black spear-shaped mark beginning between eyes and extending back along neck. Prominent dorsal ridge down back and tail gives thin, emaciated appearance. Tail blunt or slightly bulbous at tip.

Habitat:

Most commonly found in grassy fields, meadows, and cultivated areas, often adjacent to streams, rivers, and lakes. Found at elevations up to 1,550 meters.

Activity and behavioral patterns:

Normally nocturnal; may prowl during day during and after rains. Unaggressive and stealthy. Hides head beneath body if molested; may twitch or writhe spasmodically but seldom attempts to bite even when aggravated.

Venom's effects:

Potent neurotoxin. Minimal local pain, redness, or edema. Systemic symptoms develop slowly; include general achiness, paralysis, shock, and respiratory failure. Fatalities recorded.

King Cobra

Description:

World's largest venomous snake. Adult length usually 3 to 4 meters; maximum of about 5.5 meters. Background color olive, brown, or greenish yellow, becoming darker on tail. Head scales edged with black. Throat yellow or orange, sometimes with dark markings.



Habitat:

Found in open country, cultivated areas, dense or open forests, bamboo thickets, dense mangrove swamps, and hilly jungles. Often found near streams. Range extends from sea level up to 1,800 meters elevation. Species widespread but uncommon.

Activity and behavioral patterns:

Diurnal and very active. Primarily terrestrial, but sometimes found in trees and water. Constructs elaborate nest of dead leaves and other decaying vegetation. Unlikely to attack unless provoked. When confronted, expands hood and may rise as high as 1.8 meters. When angry, gives deep resonant hiss similar to growl of small dog. Reports of aggressiveness and unprovoked attacks likely untrue.

Venom's effects:

Potent neurotoxin. Severe local pain and tenderness almost immediately following bite. Bites uncommon, but usually severe and may be rapidly fatal.

Sumatran Spitting Cobra

No Photograph Available

Description:

Maximum length about 1.5 meters. Background color variable. In some areas, color usually uniform yellow or yellowish green; elsewhere, color uniform jet black with bluish black belly and pale markings on neck and chin.

Habitat:

Tolerates variety of habitats. Common in open plains, jungles, and areas populated by man.

Activity and behavioral patterns:

Generally nocturnal. Timid; seeks to escape when encountered. When cornered, rears up and spreads hood; bites as last resort. Most dangerous when surprised in close quarters. When biting, tends to hold and chew savagely. Highly developed ability to “spit” venom at intruders; can spit venom several feet.

Venom’s effect:

Potent neurotoxin. Local symptoms may include pain, swelling, and necrosis. If venom enters eyes, may cause immediate burning pain with inflammation and permanent blindness.

Malayan Pit Viper**Description:**

Adult length usually 0.6 to 0.8 meters; maximum of 1 meters. Background color gray, pale brown, or pale reddish brown. Dorsal pattern of alternating dark, triangular markings with apices toward vertebral



line and series of dark spots on flanks. Belly pale with dark mottling. Relatively short, thick set snake with flattened body and large triangular-shaped head; pointed and slightly upturned snout. Well-defined dark postocular patch, sometimes with white edge above and below.

Habitat:

Coastal forest; bamboo thickets; overgrown, unused farmland; forest adjacent to plantations. Generally inhabit lowlands, but also found in mountains to almost 2,000 meters elevation.

Activity and behavioral patterns:

Mainly nocturnal but sometimes diurnal. Terrestrial. Highly aggressive; bad tempered and quick to strike if disturbed. Shelter in piles of litter, beneath and within fallen logs, or in clumps of grass or bamboo.

Venom's effects:

Potent hemotoxin. Local swelling may begin within minutes after bite, followed by blistering and necrosis. Hemoptysis, apathy thirst rapid thready pulse, and decreased blood pressure may occur. Bites fairly common. Case fatality rate low, but deaths have been attributed to cerebrovascular accidents, shock, tetanus, septicemia and anaphylaxis.

Mountain Pit Viper**Photo Not Available****Description:**

Adult length usually 0.6 to 0.8 meter; maximum of 1.1 meters. Relatively thick-set snake. Background color light olive, reddish, or orange-brown; one or two dorsal rows of squarish patches meeting or alternating at vertebral line. Belly pale, spotted with brown. Dark brown or black triangular head, distinct from neck.

Habitat:

Inhabits mountains or plateaus from coastal lowlands up to more than 2,000 meters elevation. Found in tea fields, cultivated areas, under shrubs, and among vegetation. Often found near human habitation and sometimes in homes.

Activity and behavioral patterns:

Semi-arboreal, but commonly found on forest floor near streams. Slug-gish disposition, but ready to bite when irritated.

Venom's effects:

Hemotoxic. Reported symptoms include severe local bleeding and swelling, thrombocytopenia, and coagulopathy.

Pope's Pit Viper

Photo Not Available

Description:

Maximum length up to 1.0 meter. Background color uniform green above; lighter green or yellow below. May have indistinct white or yellow below. May have indistinct white or yellow stripe on each side near abdomen. Tip of tail usually reddish brown. Distinctive triangular head and pointed snout.

Habitat:

Most abundant in hilly and mountainous country from 900 to more than 1,500 meters elevation. Commonly found on tea plantations.

Activity and behavioral patterns:

Arboreal and largely nocturnal. Generally not aggressive; often permits human intruder to approach closely without striking. When aroused, threatens with open mouth and strikes vigorously and quickly.

Venom's effects:

Likely hemotoxic. Little data available. No reliable reports of bites.

Flat-Nosed Pit Viper

Description:

Maximum length of about 1.0 meters. Background color light brown with darker markings. Light, dark-edged streak behind each eye. Tail and belly mottled brown; darker than upper surface. Flattened, slightly upturned snout.



Habitat:

Lowland forest

Activity and behavioral patterns:

Strictly arboreal; found as high as 20 meters above ground. Very sluggish. Rarely seen.

Venom's effects:

Hemotoxic. Few bites reported. Reported symptoms include immediate burning pain and swelling.

Mangrove Pit Viper**Description:**

Adult length usually 0.7 to 0.8 meter; may exceed 1.0 meter. Background color purple-brown or yellow-brown; may have white line along each side of body. May have series of large brown saddle-shaped markings with small spots on flanks. Belly white.

**Habitat:**

Widely distributed along coastal regions in mangrove and swampy forests. Found most often on offshore islands, but may be found in inland bamboo jungles up to 600 meters elevation.

Activity and behavioral patterns:

Primarily terrestrial, but commonly encountered in low bushes. Very aggressive.

Venom's effects:

Potent hemotoxin. Envenoming may cause severe local pain, local swelling involving entire affected limb, tender enlargement of local lymph nodes, local necrosis, and incoagulable blood. Bites common. Fatalities recorded.

Sumatran Pit Viper**Photo Not Available****Description:**

Maximum length about 1.6 meters; relatively slender snake. Background color bright green with dark crossbands; row of pale brown or

pink spots on both side of vertebral line. White line along sides of body. Tail green with brown spots; wholly brown in posterior half. Belly yellow-green. Pale postocular streak.

Habitat:

Lowland forests and cocoa and pepper plantations adjacent to fringes of forest.

Activity and behavioral patterns:

Largely nocturnal and arboreal. Very aggressive. Will strike at slightest movement.

Venom's effects:

Hemotoxic. Little known of venom; bites followed by severe pain and swelling.

***Temple Pit Viper,
Wagler's Pit Viper***

Description:

Adult length ususally 1.0 to 1.3 meters; relatively thick-set snake. Background color green or blue-green. Each scale with black edging. Series of narrow transverse bright yellow or



greenish yellow stripes. Disporportionately large head. Top of head black with yellow-green markings. Yellow-green postocular streak edged above with black; labials and chin yellow.

Habitat:

Lowland forests, in low shrubs and bushes, and small trees, at elevations up to 600 meters.

Activity and behavioral characteristics:

Arboreal and primarily nocturnal. Sluggish and docile during day. Rarely strike even when severely threatened.

Venom's effects:

Hemotoxic. Symptoms may include immediate bleeding, pain and swelling at site of bite. No deaths recorded.

Arthropods

Scorpions

Although scorpions in the region are capable of inflicting a painful sting, none are known to be life-threatening.



Spiders

Although there are several spider species found in the region that are capable of inflicting a painful bite, including some very large and physically imposing tarantulas, none are known to be life-threatening.

Centipedes

Although area centipedes are capable of inflicting a painful bite, none are known to be life-threatening.



Millipedes

Millipedes do not bite and in general are harmless to humans. However, when handled, some larger millipedes (may be more than 50 millimeters long) secrete a very noxious fluid that can cause severe blistering upon contact; some can squirt this fluid at least 2 feet.

Insects

Paederus are small (usually 4 to 7 millimeters), slender rove beetles that do not look like typical beetles and have very short wing covers that expose most of their flexible abdomens. When crushed, their body fluid contains an agent that will blister skin on contact. The lesions take about a week to heal and the area remains painful for two weeks. The substance is extremely irritating if it gets into the eyes; temporary blindness has been reported.

Plants

Rosary Pea

Other names:

Precatory bean, coral pea, crab's eyes, lucky beans, Paternoster beans.

Mechanisms of toxicity:

Contains several indole alkaloids such as abrine and abrin (a toxalbumin), which can kill. The unchewed seeds are impervious and will pass through the GI tract without harm. Seeds are attractive and fre-



quently used to make rosaries, necklaces, etc. Poison can be absorbed through breaks in the skin if integrity of the hull is compromised; for example, while stringing beads for a necklace. Onset of toxicity usually in one to three days. Rosary pea is documented to have a quickly fatal potential (neurotoxin and hemocoagulant), having killed a child who thoroughly chewed one seed. Dermatitis may also occur from wearing a necklace of stringed beads.

Comments:

The genus includes 17 species of slender, twining vines with a woody base supported by other plants or a fence. Fruit is a dehiscent pod; inside the pod are three to five glossy, red and black seeds (used by many as ornaments). Note: Rosary pea seeds are black at the site of attachment (hilum) and are easily confused with the much less toxic Mexican Rhynchosia (piule). The colors are reversed in piule seeds. Symptoms of toxicity include nausea and vomiting with abdominal pains, bloody diarrhea, fever, shock, coma. Used in South America and Africa in folk medicine.

Mexican Poppy**Other names:**

Prickly pear, Argemony.

Mechanisms of toxicity:

The entire plant contains alkaloids, sanguinarine, bergerine, protopine, and various isoquinolone and dihydrosanguinarine alkaloids (can be transmitted through milk). Has caused "epidemic dropsy" (vomiting, diarrhea, glaucoma, abdominal swelling) in India through the seeds contaminating home-grown grains. Prickles cause skin irritation.

**Comments:**

Found in arid areas.

Milky Mangrove

No Photograph Available.

Other names:

Blinding tree, sinugaga, blind-your-eye, scrub poison tree.

Mechanisms of toxicity:

Contains copious, extremely acrid, milky sap with diterpene resin, which can cause damage to the eyes, mucous membranes, and skin of those chopping or sawing its wood.

Comments:

Small evergreen trees that grow to 45 feet with shiny green, leathery leaves and greenish flowers in narrow spikes; native to Indo-malaysian, Pacific Islands, Australia. Contains large quantities of milky sap.

Tung Nut**Other name:**

Tung oil tree, candlenut, varnish tree, lumbang nut, banucalad.

Mechanisms of toxicity:

Contains a milky latex with a toxalbumin and a saponin. The brown drupe has a seed containing a phytotoxin and an irritant ester (a saponin that causes dermatitis). Several episodes are on record of tung oil mistakenly used as cooking oil resulting in vomiting and diarrhea in those ingesting food cooked with it. The oil will cause severe contact dermatitis

with vesicles and bullae; blindness has resulted from exposure of the eyes to the oil.

Comments:

A tree grown for commercial use. Oil is used as a wood preservative.



Crownflower

Other Name:

Milkweed

Mechanisms of toxicity:

Sap has extremely irritant effect on the eyes; also causes an allergic type contact vesicant skin reaction. The active principles include calcium oxalate, a proteolytic enzyme, digitalis-like glycosides, and an unidentified allergen.



Comments:

Flowers are candied by Chinese in Java. Poisonings have resulted in death. In Africa, the plant has been used to make arrow poison, and the roots have been used as chew-sticks.

Croton

Other names:

Ciega-vista, purging croton.

Mechanisms of toxicity:

Long-lasting vesicular dermatitis results from contact with the toxic resin. The cathartic and purgative properties of the toxins (croton oil, a "phorbol," in



leaves, stems, and seeds) causes severe gastroenteritis, even death; 20 drops potentially lethal (the oil applied externally will blister the skin). Many members covered with hundreds of sticky hairs that cling to the skin if contacted. Contact with the eyes can be very serious.

Comments:

Croton is a woolly-haired annual herb, or evergreen bush, or small tree with smooth ash-colored bark, yellowish-green leaves, small flowers, fruit, and a three-seeded capsule. Ciega-vista is a 3-foot high bush found in the underbrush of arid areas. Small light green flowers, leaves, and stems are covered with nearly-white hairs.

Blistering Ammania

Photo not available

Mechanisms of toxicity:

Found mostly in wet places; has an extremely acrid sap that produces intense pain and blistering on contact with skin

Comments:

Often confused with loosestrife plants in the primrose family.

Spurge Laurel**Other names:**

February daphne, merezon, mezereon.

Mechanisms of toxicity:

Bark, leaves, and fruit contain toxic agents called diterpene alcohols and coumarin glycosides. Has a yellow dye (umbelliferone), mallic acid, oil wax, gum, and mezerein resin. Entire plant is toxic. Resin is acrid; has been used in the past as pepper substitute, with fatal consequences. Vesicular dermatitis when skin contact is made



(extract used by beggars to induce skin lesions to arouse pity).

Comments:

A very dangerous ornamental. A folk remedy for many symptoms (dropsy, neuralgia, snakebite, etc.).

Jimsonweed**Other names:**

Thorn-apple, stinkweed, Devil's trumpet.

Mechanisms of toxicity:

The entire plant is toxic because of tropane alkaloids. Fragrance from the flowers may cause respiratory irritation, and the sap can cause contact dermatitis. People have been poisoned through consumption of crushed seeds accidentally included in flour; also through attempting to experience the hallucinogenic high. Can kill. In particular, jimsonweed has a quickly fatal potential.

**Comments:**

Originally called Jamestown weed after the mass poisoning of soldiers who were sent to quell Bacon's Rebellion in 1666, and who ate the seeds during a severe food shortage. Jimsonweed is often confused with Angel's Trumpet.

Annual/French Mercury**No Photograph Available****Other names:**

Dog's Mercury

Mechanisms of toxicity:

Native to Europe; entire plant is toxic. Has been mistaken for edible greens. Emetic and purgative. Has proven fatal.

Comments:

Dye source; carpeting rhizome herb often characteristic of disturbed woodland.

Mole Plant

Other names:

Caper spurge, Mexican fire plant, milkweed, red spurge, poison spurge, mala mujer, cypress spurge, cat's milk, wartwort, sun spurge, candelabra cactus, Indian spurge tree, milkwood, pencil tree, pencil cactus, rubber euphorbia.



Mechanisms of toxicity:

Herbs, often with colored or milky sap, containing complex terpenes; irritate the eyes, mouth, and gastrointestinal tract, and many cause dermatitis by direct contact. In some cases rain water dripping from the plant will contain enough toxic principle to produce dermatitis and keratoconjunctivitis; can blind. Some contain urticating hairs (skin contact breaks off ends and toxic chemicals are injected). The caper spurge has killed those who mistook the fruit for capers. The Mexican fire plant was known for having medicinal properties in the first century and has killed children. Red spurge causes dermatitis. The pencil cactus has an abundant, white, acrid sap extremely irritating to the skin; has caused temporary blindness when accidentally splashed in the eyes, and has killed as a result of severe gastroenteritis after ingestion.

Comments:

Genus contains 2,000 species of extremely variable form; may appear as herbs, shrubs or trees — many are cactus-like. Fruit is usually a capsule opening in three parts, each one seeded; sometimes a drupe.

Cow Parsnip

Other names:

Wild rhubarb, Giant hogweed, Hogweed.

Mechanisms of toxicity:

Many species within this genus contain furocoumarins; roots and rind have phototoxic sap resulting in acute bullous dermatitis a few hours to 2 days after contact if then exposed to the sun, followed by pigmentation (may take months to years to disappear).



Marking nut tree

No Photograph Available

Other names:

Tar tree, anacardium

Mechanisms of toxicity:

Often occupied by biting ants. Many of the plants have reputations for causing severe contact dermatitis. Anacardium fruit may drip a black, oily resin that hardens like lacquer. The resin can also produce a severe dermatitis. Toxic principles are similar to mango tree or poison ivy.

Comments:

Tree indigenous to India; used to make a liquid used to mark laundry in India and Malaysia. Fleshly swollen basal parts of the fruits are edible.

Freshwater Mangrove

No Photograph Available

Other names:

Putat, bitung, laut.

Mechanisms of toxicity:

Saponins and hydrocyanide have been isolated from fruit and seeds. Used as fish poisons in many Pacific islands. Fruit contains a triterpenoid saponin, and the seeds are emetic and have been shown to induce hypoglycemia in rodents.

Comments:

Large tree found growing along shorelines; have large (20-38 centimeters-long, 10-15 centimeters-wide) non-toothed leaves, white to pink flowers (on individual stalks; square in cross section), and one-seeded fruits (9-13 centimeters-long; square in cross-section). Seeds are crushed and used as fish poison by Australian troops and aborigines.

Physic Nut**Other names:**

Purging nut, pinon, tem-pate, Barbados nut.

Mechanisms of toxicity:

Quickly fatal potential. Fruit has two or three black, oily, pleasant tasting, poisonous seeds (also toxic roots and leaves)

containing a plant lecithin (a toxalbumin called curcin) which, in contrast to many of the toxic lecithins, causes toxicity rapidly (has caused death — severe toxicity can follow ingestion of a single seed); also has intensely cathartic oils (some have used the oil for lamps, etc.); has caused fatal intoxication. Bark has been used as a fish poison. Also a skin irritant (hairs), as are all euphorbs.

Comments:

170 species of warm and tropical northern American trees or shrubs, usually with red flowers. Naturalized worldwide. Fruit is a three-sided capsule in many species.



Panama Tree

Other names:

Castano, tartarugum.

Mechanisms of toxicity:

Seeds are edible, but pods have internal stiff bristles that easily penetrate skin, causing intense irritation.

Comments:

There are 200 tropical species.



Wood nettle

Other names:

Moroides, stinger, gympie

Mechanisms of toxicity:

The leaf edges, stems, stalks and fruit-bearing parts have stiff, sharp, stinging hairs — frequently not conspicuous.

On contact the hair tips break and an extremely irritating liquid is injected into the skin. Light contact results in intense burning pain. Poses a serious threat to forestry workers and jungle troops. Death was reported regarding a man who contacted the dried bark.

Comments:

Tends to be particularly thick in areas of regrowth or replanted forests. Chopping or slashing the bushes can produce prolonged sneezing and intense throat irritation. Light contact tends to be more painful than strong contact — described as tingling interspersed with sharp, stabbing pains accompanied by red inflammation with a large flare area.



Mango

Other name:

Indica.

Mechanisms of toxicity:

The leaves, stem and fruit's skin on this tree contain urushiol and other similar long-chain phenols. Other allergens are also present. Dermati-



tis can occur from eating the fruit with the skin intact. Blisters may be confined to the lips and face, or can be generalized. Climbing the tree can result in severe dermatitis. There is also immediate hypersensitivity in some individuals. Ensuring the fruit is peeled prior to ingestion can prevent the reaction.

Comments:

Genus includes 35 species, usually large trees, primarily in Indo-malaysia. Frequently found near human dwellings. These trees grow from 40 to 100 feet, and have lance-shaped leaves. Cultivated varieties have excellent fruit (in some wild-growing plants the fruit is unpleasant) edible raw or cooked. Ground seed is used as a flour; its fruit is used in chutney, pickles, squashes, etc.

Manghas

No Photograph Available

Mechanisms of toxicity:

The seed contains irritant toxins and cardiac glycosides, which can result in severe purging, even death, if eaten.

Comments:

Has a milky sap, formerly used in ordeal poisons and for suicide; also used as a fish poison. Green fruit used in India to kill dogs.

Velvet Bean

Other names:

Cowitch, cowhage, pica-pica, ox eye bean, horse-eye bean.

Mechanisms of toxicity:

Many of the species' pods and flowers are covered with irritant hairs (proteolytic enzymes). Can be dangerous if they become embedded in the eye. Beans tend to be foul tasting, even after thorough boiling, so little danger of ingestion exists.

Comments:

Many species are widely naturalized.



Castor Oil Plant

Other Name:

Castorbean

Mechanisms of toxicity:

Used to make a feed supplement; a lecithin, which is a highly toxic chemical, and some low-molecular weight glycoproteins with allergenic activity have resulted in serious poisoning. Factors making this a high-risk plant threat are its attractive nuts with a hazelnut-like taste; the highly toxic ricin present in high concentration (2-6 seeds can be fatal); and stability of ricin in the presence of gastric enzymes. The seeds are used to make necklaces, requiring boring a hole through the seed, and breaking the otherwise impermeable coat, allowing the possi-



bility of toxin to reach the skin and enter the body through minor abrasions. Poisoning becomes evident after several hours.

Comments:

The seeds of this ancient plant have been found in Egyptian graves dating as far back as 4000 B.C. Cultivated worldwide for 6,000 years for producing castor oil.

Strychnine

Other names:

Nuxvomica tree, Snake-wood tree

Mechanisms of toxicity:

The entire plant, including the seeds, contains the powerfully acting indole alkaloid strychnine, which can kill.



Comments:

Genus of 190 different species of trees, shrubs and vines with berry-like fruits, found in most tropical regions. Some have the reputation of having edible fruit despite dangerous seeds. It is a source of curare obtained by stripping and soaking its bark. Curare, now used as a muscle relaxant, was formerly used as an arrow poison by South American Indians.

Sasswood

No Photograph Available.

Other names:

Ordealtree, mancona bark, ironwood, camel poison, black bean, Cook-town ironwood.

Mechanisms of toxicity:

Extremely poisonous; the two main species have similar toxicities. Alkaloids of esters and amides of cinnamic acid have been isolated.

Most of the alkaloids are esters of diterpenoid carboxylic acids including cardiotoxic alkaloids. Powerful analgesic to the mucous membranes.

Comments:

A fish poison.

Chinaberry

Other names:

White cedar, African lilac, bead tree

Mechanisms of toxicity:

Yellow globose berry with three to five smooth, black, ellipsoidal seeds; has a resin; all parts have a saponin, triterpene neurotoxins, and a gastrointestinal irritant of uncertain chemical nature. Widely varying genetic variable toxicity. Has killed adults.



Comments:

Widely cultivated.

Balsam apple

Other names:

Leprosy gourd, bitter gourd, cucumber gourd

Mechanisms of toxicity:

Seeds and outer rind of ripe fruit contain a toxalbumin called momordin; the ripe fruit also has an hypoglycemic agent. Small amounts cause



headache, flushing, salivation, dilated pupils, emesis, diarrhea, abdominal pain. Can kill.

Comments:

A slender vine with small yellow flowers. Fruits have a rough outer rind, variable shape but like a gourd, usually yellowish with reddish pulp.

Pokeweed**Other names:**

Pokeberry, poke salet.

Mechanisms of toxicity:

Mature stems, roots, and berries are poison (saponins mostly in foliage and roots). Death possible when not prepared properly.

**Comments:**

Young shoot tips, less than 6 inches, are eaten in many cultures, including Canada; requires proper preparation (boiled with water changes; water contains toxic substances — kills snails that carry bilharzia). Dye from berries used to color ink, wine, and sweets.

May apple**Other name:**

American mandrake

Mechanisms of toxicity:

A dangerous plant used in many folk-remedies. The podophyllin resin is in all parts; the rootstock, leaves, and unripe fruit contain the toxin podophylloresin (purgative), the glycoside podophyllotoxin (a lignan), and the antimetabolic peltatin. All parts are



poisonous except the ripe fruit, which is edible. Ingestion results in vomiting and severe diarrhea; fatalities have resulted from repeated ingestion or topical application of an extract of the rootstock. Was used by Amerindians for suicide.

Comments:

Found in east Asia, the Himalayas, and North America. Historically used by many cultures as a medicinal.

Rattlepod

Other names:

Rattlebox, rattleweed, chillagoe, horse poison.

Mechanisms of toxicity:

Contains pyrrolizidine alkaloids (monocrotaline, heliotrine, retrorsine); can kill. Low-level ingestions can cause lung damage; high levels will damage the liver. Some species have caused toxicity through the contamination of flour or when incorporated in teas.

Comments:

The fruits are inflated dehiscent legumes (pods) with parchment-like walls; the ripe seeds come loose within the pods and rattle when shaken. The flowers are pea-like. Found in open woods, roadsides, margins, sandy soils, and fields.

Bulb Yam

Other Name:

Air potato, wild yam.



Mechanisms of Toxicity:

Bulb yam, air potato, and wild yam have tubers that contain diosgenin, a steroidal saponin, the alkaloid dioscorine, and a norditerpene lactone (diosbulbine). They and some other yams are poisonous when eaten raw. Causes gastroenteritis (nausea, bloody diarrhea). Some individuals eat them after special preparation. Has been used to commit murder. Found mainly in the lowlands.

**Comments:**

A prickly climber with a cluster of tubers just below the soil surface. Considered the chief “famine-food” of the tropical East. Poisonous unless properly prepared. Other species of this genus are good to eat with no special preparation, such as gyoa yam and buck yam.

Shanshi**Mechanisms of toxicity:**

Contains a number of alkaloids. Causes hallucinogenic effects due to glycosides that have not yet been identified. Has caused death.



Comments:

This is a group of deciduous shrubs or small trees with red, yellow or purple/black berry-like fruit. Has five one-seeded nutlets. Bark used for tanning, crushed fruit as a fly poison. Used in folk remedies.

Heliotrope**Other names:**

Cherry pie, scorpion's tail, Indian heliotrope.

Mechanisms of toxicity:

Contains pyrrolizidine alkaloids. Cause of large epidemics (Afghanistan, India) of illness following ingestion of bread made with flour contaminated with members of this genus. The pathologic effects (Budd-Chiari syndrome) take weeks to months, and death comes slowly over years. Chronic copper poisoning has occurred associated with this plant.

**Comments:**

A large genus of worldwide distribution (250 tropical and temperate trees and shrubs).

APPENDIX J:

International Telephone Codes

International Telephone Codes

Algeria	213	Malta	356
Australia	61	Mexico	52
Austria	43	Morocco	212
Bahrain	973	Netherlands	31
Belgium	32	Nigeria	234
Brazil	55	New Zealand	64
Canada	1	Norway	47
China	86	Oman	968
Cyprus	357	Philippines	63
Denmark	45	Portugal	351
Djibouti	253	Qatar	974
Egypt	20	Republic of Korea	82
Ethiopia	251	Saudi Arabia	966
Finland	358	Senegal	221
France	33	Seychelles	248
Gabon	241	Singapore	65
Germany	49	Somalia	252
Greece	30	South Africa	27
Hawaii	1	Spain	34
Hong Kong	852	Sweden	46
Indonesia	62	Switzerland	41
Iran	98	Syria	963
Iraq	964	Taiwan	886
Ireland	353	Tanzania	255
Israel	972	Thailand	66
Ivory Coast	225	Tunisia	216
Japan	81	Turkey	90
Jordan	962	UAE	971
Kenya	254	United Kingdom	44
Kuwait	965	United States	1
Libya	218	Yemen	967
Madagascar	261	Zambia	260
Malaysia	60	Zimbabwe	263
AT&T (public phones)	0072-911 or 0030-911	On-base	550-HOME or 550-2USA

