

IT & TELECOMMUNICATIONS IMPACT ON DEVELOPING ECONOMIES



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WASHINGTON, D.C.**

TOPICS FOR DISCUSSION

- **POLICY OBJECTIVES**
- **INTERNET - WHAT DOES IT MEAN?**
- **UNIVERSAL SERVICE AND UNIVERSAL ACCESS**
- **INTERNET CONCERNS**
- **IP TELEPHONY AND THE PSTN**
- **DIGITAL DIVIDE**
- **SATELLITE AND INTERNET INDUSTRIES**
- **WTO AGREEMENT**
- **IP VIA SATELLITE**
- **WWW SITES**
- **SATELLITE PROBLEM**

POLICY OBJECTIVES

- **FOSTER COMPETITIVE AND INNOVATIVE INTERNET AND MULTIMEDIA INDUSTRIES**
- **MINIMIZE REGULATION AND ENACT FLEXIBLE REGULATORY POLICIES**
- **PROMOTE MARKET ACCESS AND ADOPTION OF OPEN, NON-DISCRIMINATORY, TRANSPARENT POLICIES**

INTERNET

**THE INTERNET HAS ENABLED THE
CREATION OF BUSINESSES
WITHOUT MUCH CAPITAL. IT HAS
ENLARGED THE COMPETITION --
NOT ONLY THE SHOP DOWN THE
STREET BUT THE SHOP HALFWAY
AROUND THE WORLD.
GEOGRAPHICAL BOUNDARIES ARE
DISAPPEARING.**

THE INTERNET REVOLUTION

- **A RECENT U.S. STUDY (OCT. 2000) CALCULATED THAT USE OF INTERNET E-MAIL INCREASED PRODUCTIVITY OVER THE LAST YEAR BY A VALUE OF \$13,000 PER EMPLOYEE.**
- **THE SAME STUDY FOUND THAT EMPLOYEES SAVE 326 HOURS PER YEAR BY USING E-MAIL (THERE ARE ABOUT 2100 HOURS IN THE U.S. GOVT. WORK YEAR)**
- **NOT WITHOUT A DOWNSIDE, THE SAME STUDY FOUND THAT EACH EMPLOYEE WASTES 115 HOURS PER YEAR WITH PERSONAL E-MAIL AND SPAM.**

DAILY E-MAIL GROWTH

1999 - 3.5 BILLION

2003 - 11 BILLION

DOMAINS

.AERO

.ARPA

.BIZ

.COM

.COOP

.(COUNTRY CODES)

.EDU

.GOV

.INFO

.INT

.MIL

.NET

.MUSEUM

.NAME

.ORG

.PRO

UNIVERSAL SERVICE AND UNIVERSAL ACCESS

- **IT IS UNDERSTOOD THAT MARKET SOLUTIONS WILL NOT ENSURE THE EXPANSION OF NETWORKS TO ECONOMICALLY LESS VIABLE AREAS**
- **UNIVERSAL SERVICE OR UNIVERSAL ACCESS OBLIGATIONS AND FUNDING ARE A NATIONAL POLICY ISSUE**

INTERNET CONCERNS

FRAUD

CYBERSTALKING

SECURITY

GAMBLING

MONEY LAUNDERING

DRUG TRAFFICKING

PORNOGRAPHY

TAXES

SPAM

QUALITY

IPR

IP TELEPHONY AND THE GLOBAL TELECOM MARKET

**YEAR 2000 - GLOBAL
TELECOMMUNICATIONS MARKET WAS
\$1 TRILLION**

**YEAR 2000 - GLOBAL INTERNET
PROTOCOL TELEPHONY MARKET OF
\$500 MILLION
(FIVE TEN-THOUSANDTHS OR 0.05%)**

WORLD TELECOMMUNICATION POLICY FORUM ON IP TELEPHONY

7 - 9 MARCH 2001, GENEVA

- **IMPLICATIONS OF IP TELEPHONY FOR DEVELOPING COUNTRIES WITH RESPECT TO POLICIES AND REGULATORY FRAMEWORKS, AND TECHNICAL AND ECONOMIC ASPECTS**
- **ASSISTING CONSEQUENTIAL ADAPTATION TO CHANGES IN THE TELECOMMUNICATIONS ENVIRONMENT DUE TO IP TELEPHONY**
- **ASSISTING IN MEETING THE HUMAN RESOURCE DEVELOPMENT CHALLENGES PRESENTED BY NEW TELECOMMUNICATION TECHNOLOGIES SUCH AS IP TELEPHONY**

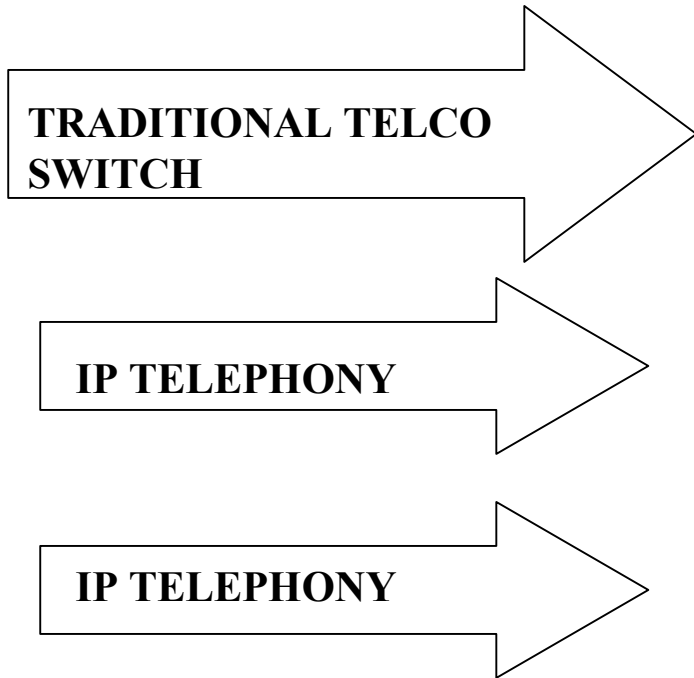
PSTN AND IP TELEPHONY

- **PSTN IS BASED ON CIRCUIT-SWITCHED TECHNOLOGY, EVOLVED AS A VOICE NETWORK (HIGHLY REGULATED)**
- **INTERNET BASED ON PACKET-SWITCHED TECHNOLOGY, EVOLVED AS A DATA NETWORK (LARGELY UNREGULATED)**
- **INTERNET IN 2000 WAS 3 % OF GLOBAL INTERNATIONAL TRAFFIC TOTAL**

PSTN AND IP TELEPHONY RELATIVE COSTS

- **IP TELEPHONY CAN BE OFFERED AT PRICES SIGNIFICANTLY BELOW THOSE FOR PSTN TELEPHONY**
- **PSTN PRICING IS DISTANCE-SENSITIVE - - PRICING OF IP TELEPHONY IS LARGELY INDEPENDENT OF DISTANCE (LIKE SATELLITE COMMUNICATIONS)**
- **IP TELEPHONY TODAY MEANS A TRADE-OFF BETWEEN QUALITY AND COST**

VoIP VS CIRCUIT NETWORK COST



SOLUTION	INVESTMENT	CAPACITY	ADVANTAGES
CLASS 5 SWITCH	US \$20 MILLION	20,000 LINES	<ul style="list-style-type: none"> • QUALITY • RELIABILITY • PROVEN TECHNOLOGY
INTERNET POP	US \$0.1 MILLION	400,000 MINUTES PER MONTH	<ul style="list-style-type: none"> • EFFICIENCY • NEW SERVICES POTENTIAL • SCALABILITY
IP FULL OPERATION	US \$3 TO 5 MILLION	35 MILLION MINUTES PER MONTH	

IP TELEPHONY PERMITTED

ANGOLA
ANTIGUA AND BARBUDA
ARGENTINA
AUSTRALIA
AUSTRIA
BELGIUM
BHUTAN
CANADA
CHINA
CONGO
COSTA RICA
CYPRUS
CZECH REPUBLIC
DENMARK
DOMINICAN REPUBLIC
ESTONIA
ETHIOPIA
FINLAND
FRANCE
GAMBIA
GERMANY
GREECE
GUATEMALA
GUYANA
HONG KONG SAR
HUNGARY
ICELAND
IRELAND
ITALY
JAPAN

KENYA
KOREA (REP)
KYRGYZSTAN
LUXEMBOURG
MADAGASCAR
MALAYSIA
MALTA
MEXICO
MOLDOVA
MONGOLIA
NEPAL
NETHERLANDS
NEW ZEALAND
PERU
PHILIPPINES
POLAND
PORTUGAL
SINGAPORE
SLOVAK REPUBLIC
SPAIN
SRI LANKA
ST. LUCIA
ST. VINCENT
SWEDEN
SWITZERLAND
TONGA
UGANDA
UNITED KINGDOM
UNITED STATES
VIET NAM

EUROPEAN COMMISSION INTERNET POLICY

**INTERNET TELEPHONY IN GENERAL
FALLS OUTSIDE THE DEFINITION OF
VOICE TELEPHONY AND NO SPECIAL
LICENSE IS REQUIRED**

DIGITAL DIVIDE

- **ONLY 5 TO 6 % OF THE WORLD HAS ACCESSED INTERNET AND 90 % OF THEM ARE IN INDUSTRIALIZED COUNTRIES.**
- **AFRICA AND MIDDLE EAST ACCOUNT FOR JUST 1 % OF INTERNET USERS.**

PROBLEM AND SOLUTIONS

PROBLEM:

TECHNOLOGY HAS WIDENED THE DIGITAL DIVIDE BETWEEN DEVELOPED AND DEVELOPING COUNTRIES.

SOLUTION: *

- 1. COUNTRIES SHOULD IMPROVE THEIR EDUCATIONAL SYSTEMS, AND**
- 2. EXPAND THEIR TELECOMMUNICATIONS NETWORKS**

DATA AND TEXT VS VOICE

- **SOME COUNTRIES HAVE CHOSEN TO PROMOTE INTERNET FOR TEXT AND DATA SERVICES BUT NOT FOR VOICE**
- **MOTIVE MAY BE TO PROTECT INCUMBENT OPERATORS FROM POTENTIAL COMPETITION**
- **THOSE OPERATORS MAY BE ILL-PREPARED FOR THE FUTURE GLOBAL ENVIRONMENT**

CONVERGENCE TO INTERNET

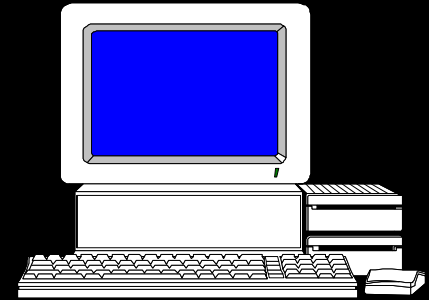
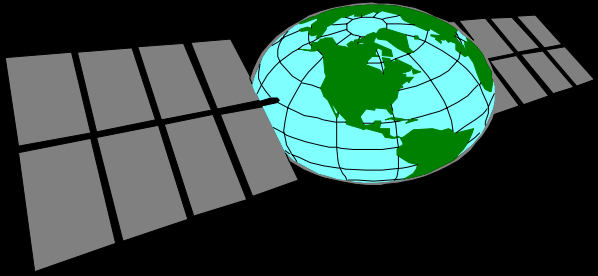
- **TREND IS TOWARDS THE CONSOLIDATION OF VOICE, VIDEO AND DATA SERVICES IN THE INTERNET**
- **PROGRESS TOWARD THIS CONSOLIDATION WILL BE VIA DEVELOPMENTS SUCH AS UBIQUITOUS BANDWIDTH, INCREASED EASE OF USE, GREATER CONNECTIVITY AND IMPROVED SECURITY**

NEW INTERNET MULTIMEDIA APPLICATIONS

SOFTWARE TO DOWNLOAD:

- **MUSIC**
- **PHOTOGRAPHS**
- **GAMES AND ENTERTAINMENT TO
MOBILE WIRELESS DEVICES**
- **LOCATION-BASED MAPPING**

SATELLITE AND INTERNET INDUSTRIES STAND TO MUTUALLY BENEFIT

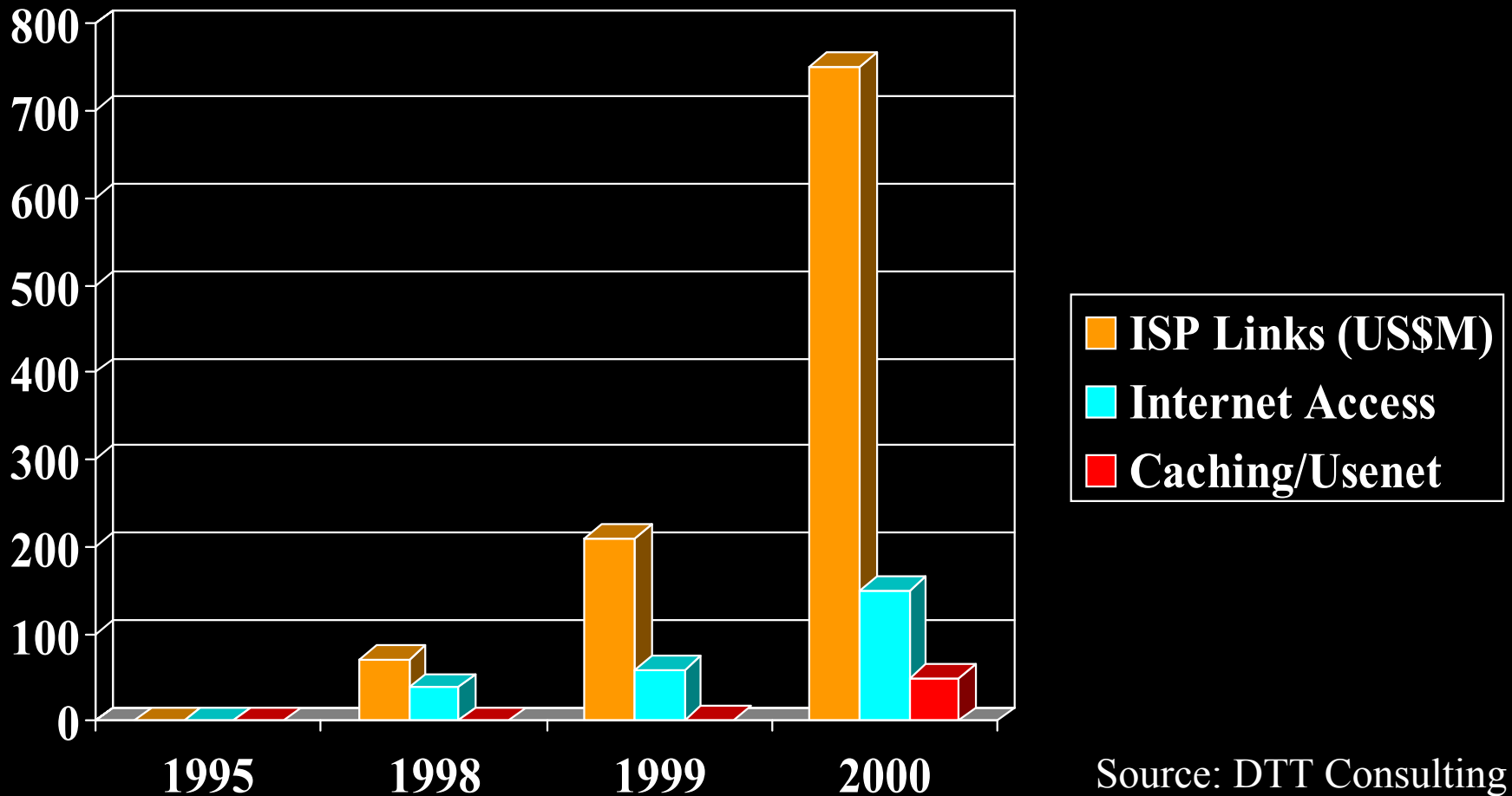


- Satellites represent the only Internet access alternative in many rural areas and developing nations.
- Satellites provide instant infrastructure to ISPs.
- Satellites provide a cost advantage over wireline networks in areas with sparse population.
- Satellites provide an efficient means of Internet access for customers with asynchronous Internet usage patterns and from the ability to multicast content.
- Satellites allow residential and business customers to bypass the local loop with speeds higher than the transmission rate received through a standard phone line.
- Internet transmission represents fastest growing segment of the FSS industry. (Source: Merrill Lynch)
- Internet traffic over satellites doubles every six months. (Source: Industry Reports).
- Internet traffic is projected to constitute a major revenue stream for the new generation of satellite systems in the Ka and V bands.

WTO AGREEMENT

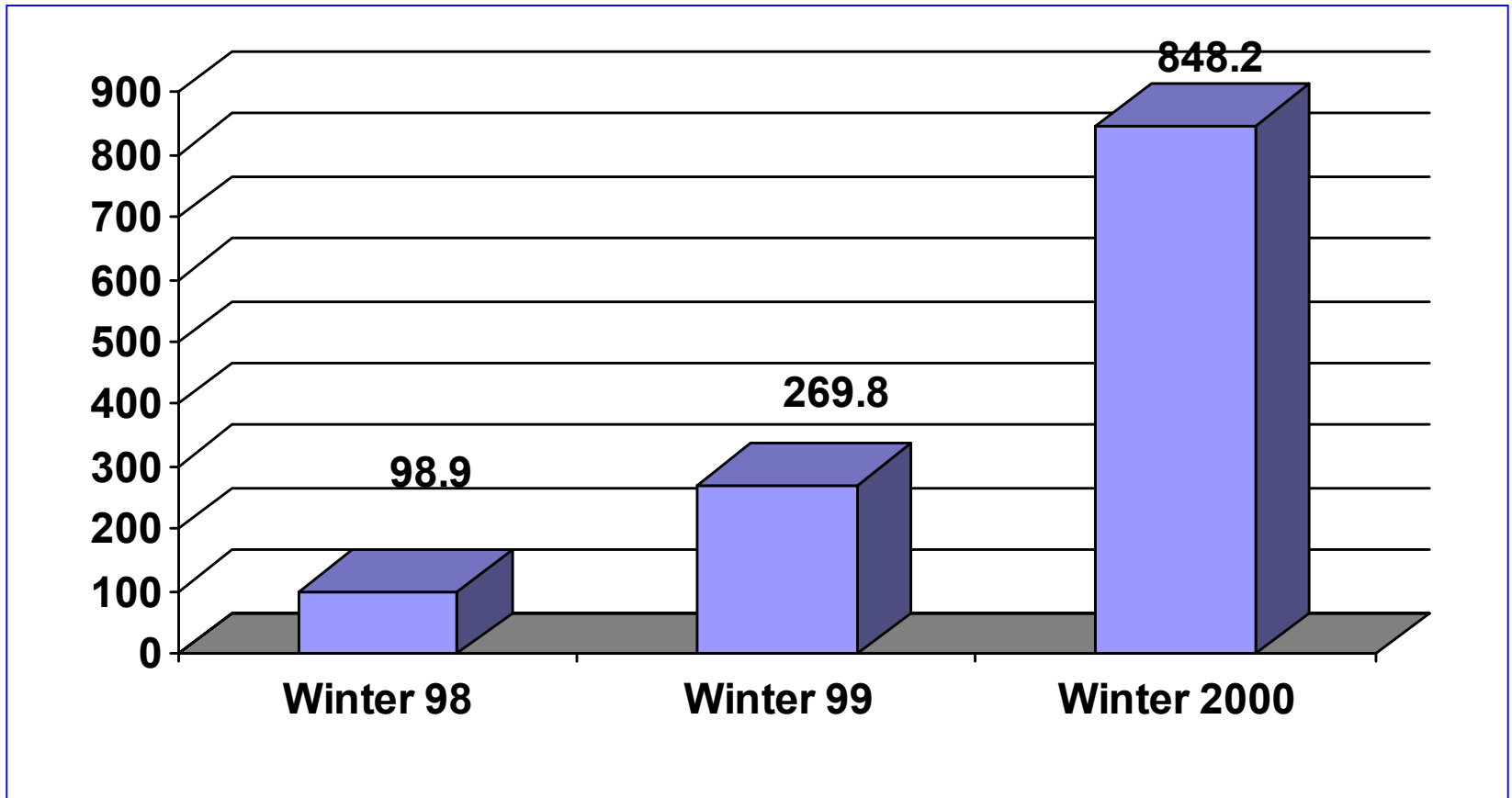
- **OPENS MARKETS FOR BASIC TELECOMMUNICATION SERVICES, INCLUDING SATELLITE SERVICES OTHER THAN DTH, DBS, AND DARS SERVICES**
- **OPENS MARKETS FOR SATELLITE SERVICES IN 49 COUNTRIES WHICH REPRESENT 80% OF TOTAL GLOBAL MARKET FOR SATELLITE SERVICES.**
- **AGREEMENT SHOULD FOSTER INTERNET VIA SATELLITE INDUSTRY.**

IP VIA SATELLITE: A SERVICE EMERGES

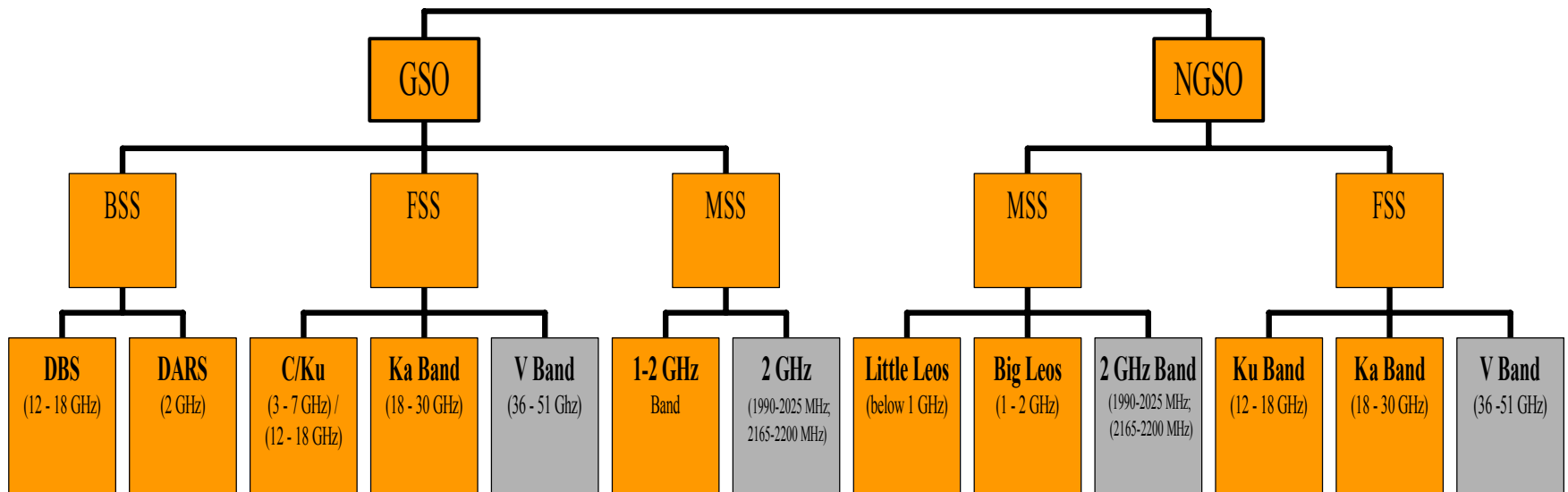


Source: DTT Consulting

VALUE OF IP VIA SATELLITE MARKET

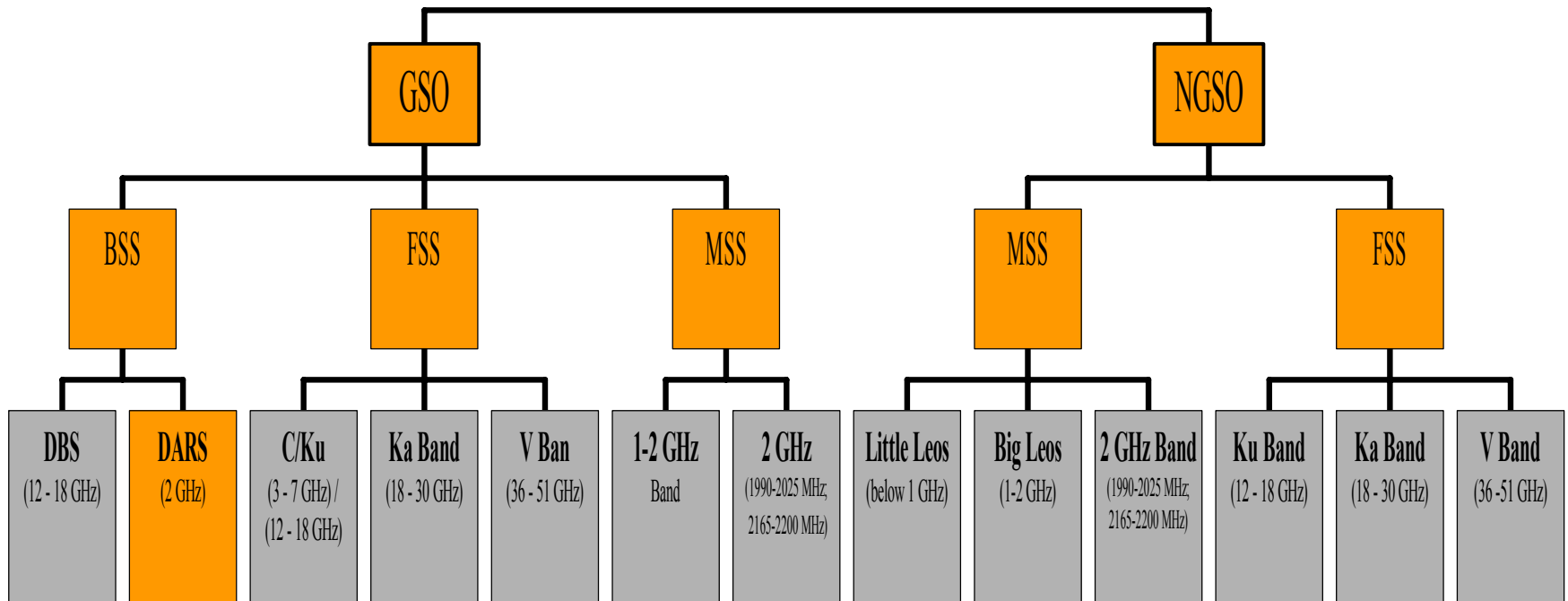


INDUSTRY STRUCTURE BY BANDS



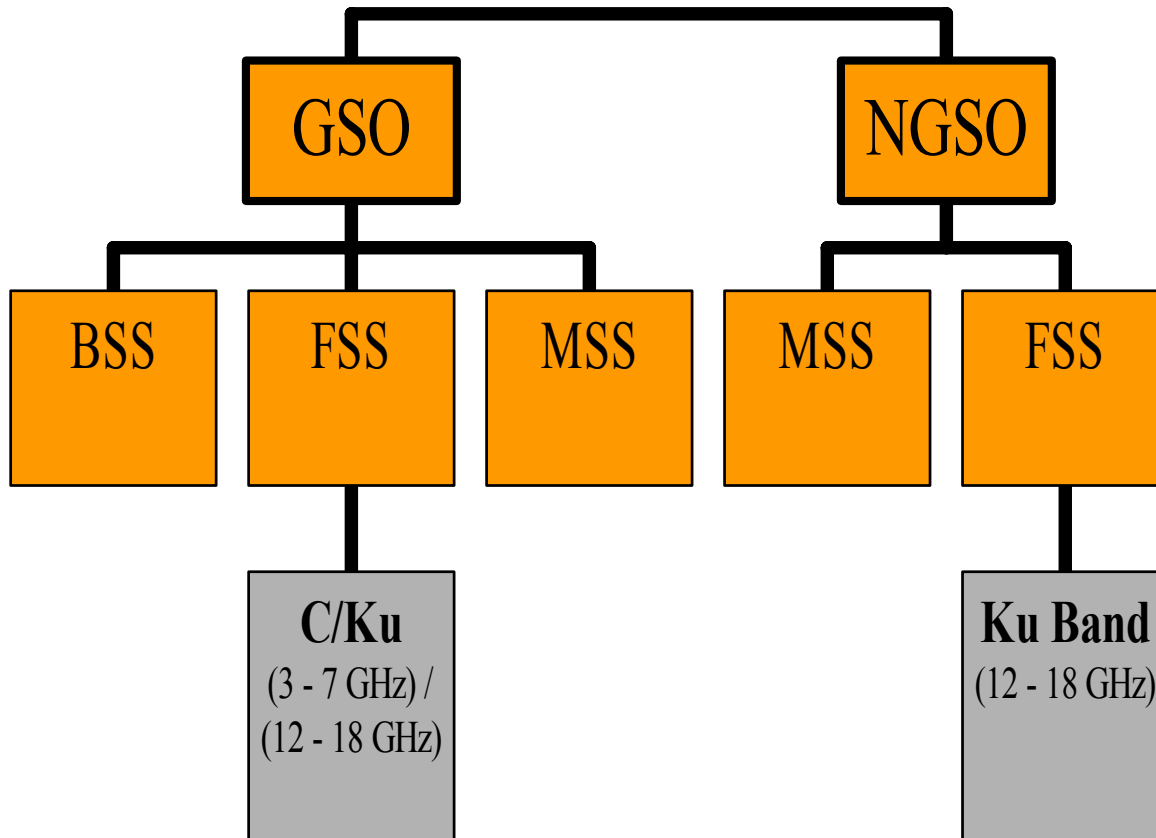
No licenses have been issued yet.

BANDS CURRENTLY OFFERING OR EXPECTING TO OFFER SOME TYPE OF INTERNET SERVICE



Internet Bands

C & Ku BAND



- C and Ku Bands used by GSO satellites account for most of the Internet traffic today.

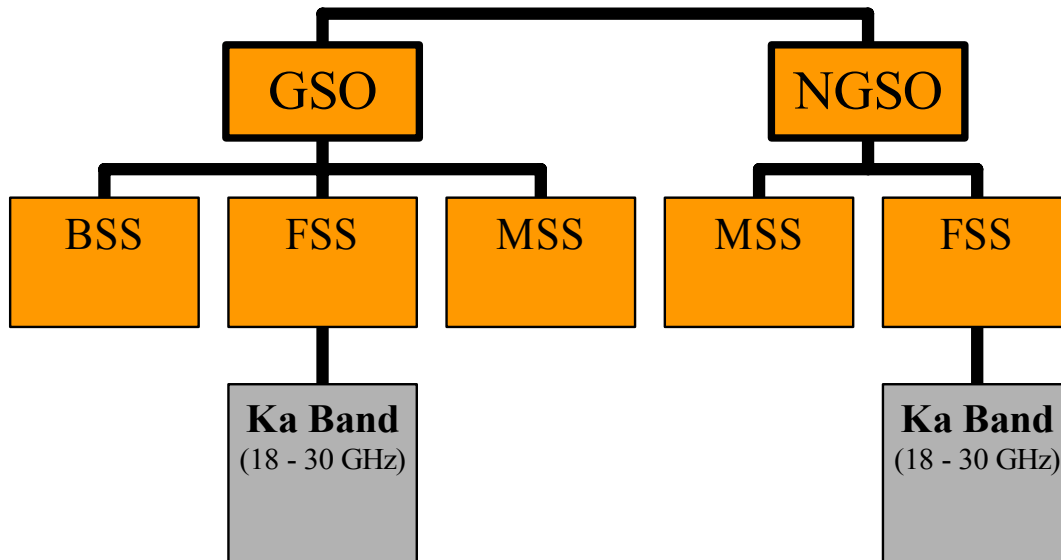
- Thirty-three 36 MHz equivalent transponders devoted to Internet service.

(Source: DTT consulting).

- LMGTT estimates 70% of new transponder leases are Internet related.

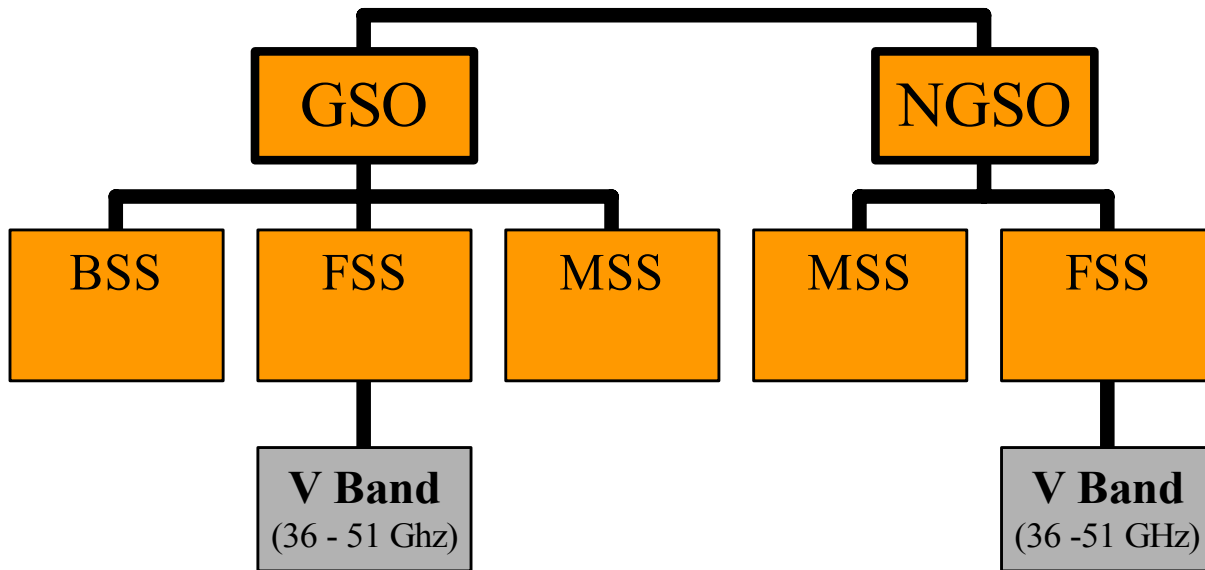
- Direct-to-consumer Internet access quickly emerging.

Ka BAND



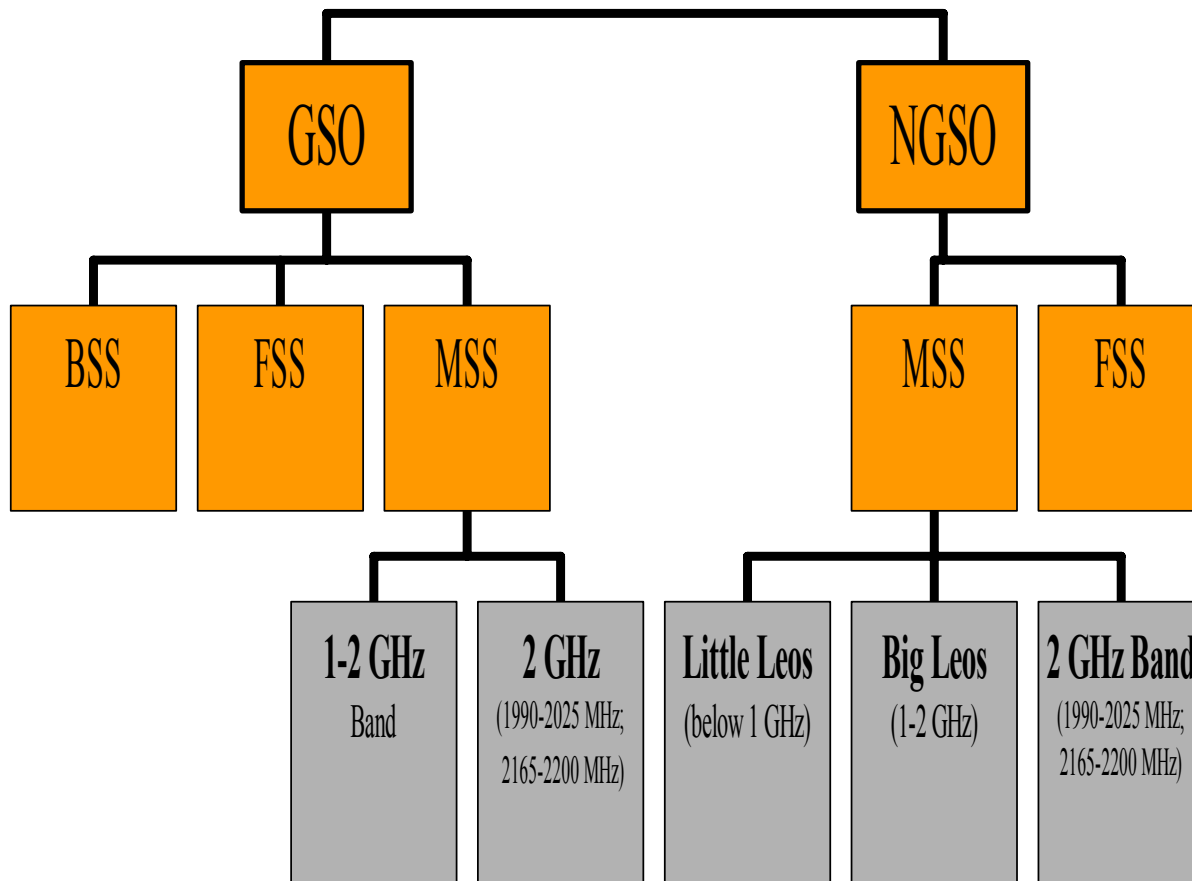
- Alternative to highly congested C and Ku Bands.
- Ka band systems promise advanced, high speed networks at speeds 64 Mbps and over.
- Proposed services: high speed Internet & Intranet access; data trunking; video conferencing; distance learning; tele-medicine; private data networks.
- Currently 14 licensed systems
 - Teledesic (LEO System)
 - 13 GEO Systems
- 2nd licensing round is underway.

V BAND



- 16 applicants requesting V band spectrum (8 GSO only; 6 NGSO only; 2 GSO & NGSO)
- Proposed speeds of 64 Mbps and higher.
- Proposed services similar to Ka band offerings, including high speed Internet access & Intranet; data trunking; video-conferencing.
- Industry analysts believe the V band systems are likely to supplement the Ka systems currently in development.

MOBILE SATELLITE SERVICE BANDS

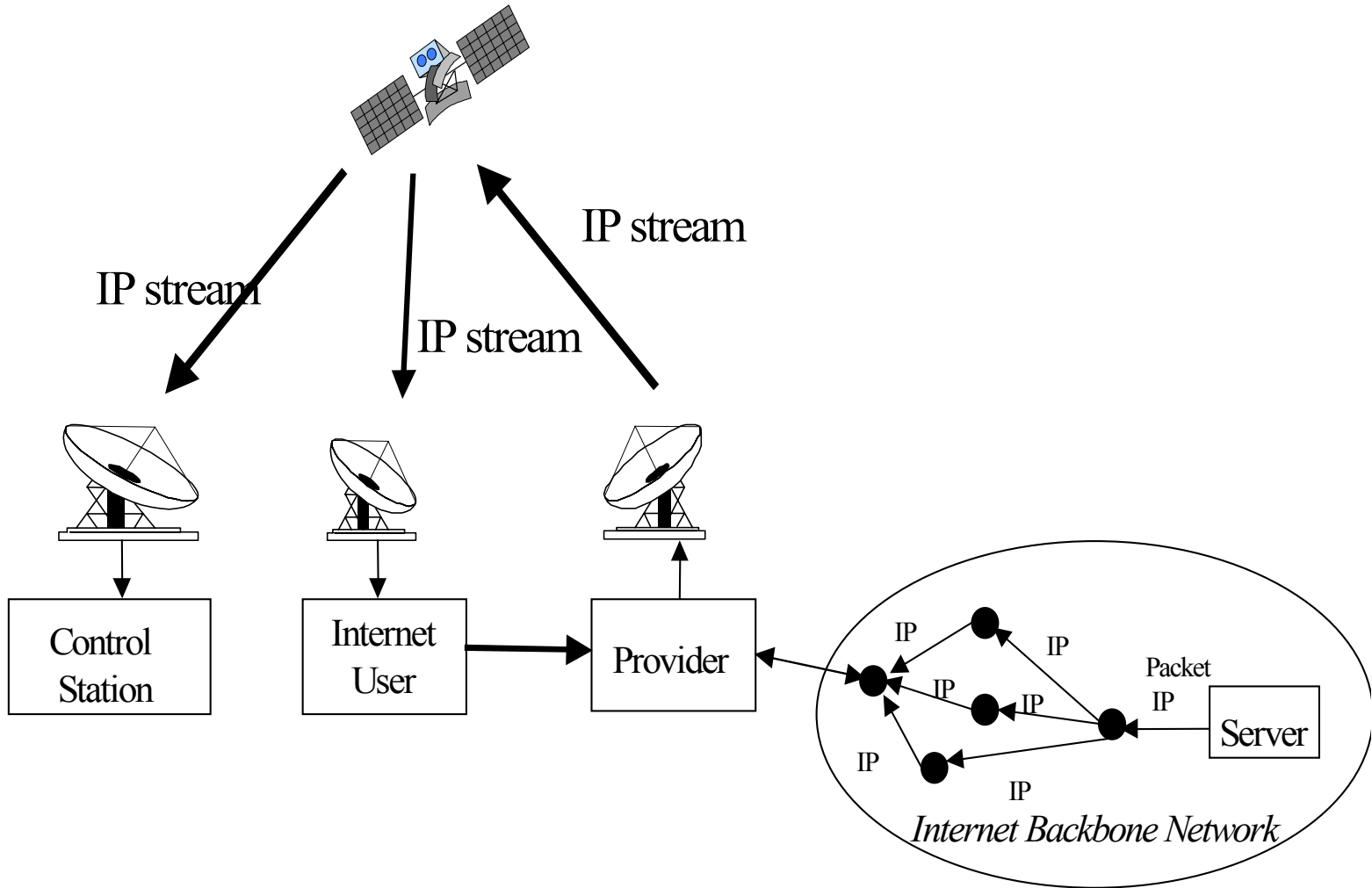


- Little and Big Leo Systems propose to offer two-way email messaging services, and plan to transmit paging messages over the Internet.

- Systems underway for 2nd GHz band. (3 GSO; 6 NGSO)

- Highest data rate proposed at 2 GHz band is 384 Kbps.

SATELLITE DTV AND IP



INTERNET ACCESS VIA SATELLITE (GSO)

GILAT - - FIRST TO SERVICE (V-SAT)

STARBOARD - - NOVEMBER 2000

DIRECT PC - - DECEMBER 2000

BOEING CONNEXION (AIRCRAFT) - - PENDING

WWW SITES OF INTEREST

WWW.CNN.COM

WWW.ERO.DK

WWW.IARU.ORG

WWW.ITU.INT

WWW.FCC.GOV

WWW.RSSI.RU

WWW.SPACECOM.AF.MIL

WWW.SEC.NOAA.GOV

STRATEGIS.IC.GC.CA

SATELLITE PROBLEM

GIVEN:

Diameter of Earth = 8000 miles

Geostationary orbit above Earth = 22,300 miles

QUESTIONS:

1. If you are standing still at the equator, are you moving at all?

YES NO

2. If you are moving, at what speed and direction?

3. Is a geostationary satellite hovering above the equator actually moving? YES NO

4. If the satellite is moving, at what speed and direction?

5. What is the geostationary arc distance of one (1) degree?

.....

Hints: circumference = $2\pi(\text{radius})$; distance = (rate)(time);

Use proportionality

1 mile = 1.6 kilometer; $\pi = 3.14$