

Global Submarine Capacity and Infrastructure Development

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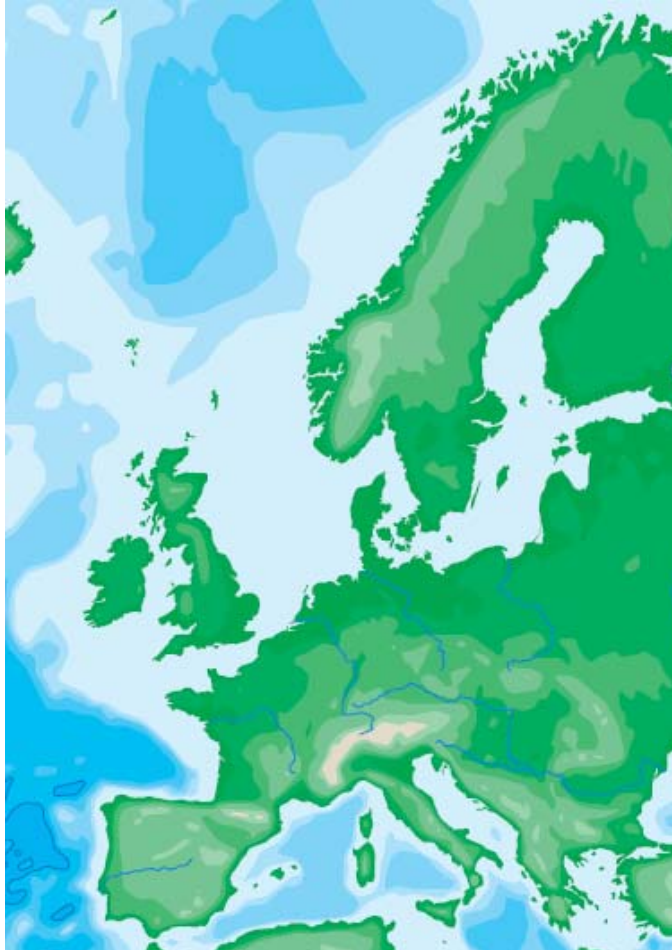
MARKET ANALYSIS

- The two pillars of the submarine cable industry – transatlantic and transpacific
- The industry's “hot spot” – south Asia
- Overview of activity on other routes

Transatlantic: Historical Center of the Industry



Transatlantic



<u>Facts and Figures</u>		
		Europe
Population (Mil)	522.2	
GDP (\$Bil)	\$13,252	>US
Fixed-Line Subscribers (Mil)	252.6	48%
Mobile Subscribers (Mil)	445.6	85%
International Internet Bandwidth (Gbps)	2,759	12kbps/ user
Internet Users (Mil)	217.2	41%
Broadband Subscribers (Mil)	74.2	34% of users
International Voice Minutes (Mil)	46,774	

Source: World Bank, UNDP, ITU, Nat'l. Regulators, Terabit Analysis



Transatlantic Cables

Cable Name	RFS Date	Route Km	Capacity (Gbps)	Design Capacity, Est. (Gbps)	Owner(s)	Investment (\$Millions)	Supplier(s)
Columbus-2	1994	12,188	2	2	Consortium	\$345	AT&T-SSI (Tyco), Alcatel, Pirelli (Alcatel)
CANTAT-3	1994	7,500	5	5	Teleglobe (VSNL)	\$385	STC (Alcatel)
TAT-12/TAT-13	1995	12,553	30	30	Consortium	\$750	Alcatel, AT&T-SSI (Tyco)
Atlantic Crossing-1 (AC-1)	1998	14,000	140	140	Global Crossing (ST)	\$875	AT&T-SSI/TSSL (Tyco)
Columbus-3	1999	10,000	20	40	Consortium	\$273	TSSL (Tyco), Alcatel, Pirelli (Alcatel)
Yellow (Level-3) / Atlantic Crossing-2 (AC-2)	2000	6,960	320	1,280	Level 3, Global Crossing (ST)	\$700	TSSL (Tyco)
Hibernia Atlantic	2001	11,700	220	1,920	Columbia Ventures	\$680	TSSL (Tyco)
FLAG Atlantic-1 (FA-1)	2001	12,800	320	2,400	FLAG Telecom (Reliance)	\$750	Alcatel
TAT-14	2001	15,000	640	640	Consortium	\$1,400	KDDI-SCS
VSNL Transatlantic (Tyco)	2001	12,500	480	2,560	VSNL	\$900	Tyco
Apollo	2003	13,000	320	3,200	Cable and Wireless	\$950	Alcatel
Total: 11 Systems, 20.4% lit		128,201	2,497	12,217	7 operators plus consortia	\$8,008	

Source: Terabit Consulting

Transatlantic Highlights



June, 2001: 360networks files for bankruptcy protection

August, 2001: Level 3 acquires Viatel's transatlantic assets, boosts Yellow share to 50%



January, 2002: Global Crossing files for bankruptcy protection

April, 2002: FLAG Telecom files for bankruptcy protection

September, 2002: WSJ reports that the C&W had unsuccessfully tried to buy 360atlantic and have it decommissioned

December, 2002: Financial crisis at Cable and Wireless



April, 2003: Columbia Ventures acquires 360atlantic (Hibernia Atlantic)



November, 2003: TAT-14 experiences failure in both cables; exposed segments were later reburied

December, 2003: Singapore Technologies acquires majority stake in Global Crossing; company reorganized



January, 2004: Reliance Infocomm acquires FLAG Telecom for \$207 million

2002-2004: TAT-8, TAT-9, TAT-10, TAT-11, PTAT-1 and Gemini removed from service



July, 2005: VSNL acquires Tyco Global Network for \$130 million

September, 2005: FLAG Atlantic-1 says wavelength sales have surged 500%, purchases Xtera DWDM equipment



February, 2006: VSNL acquires Teleglobe for \$239 million

February, 2006: Level 3 purchases 300 Gbps of capacity on Apollo, with option for additional 300 Gbps - becomes "anchor tenant"

March, 2006: Hibernia announces major capacity agreement with RCN

Transatlantic Cable Operators

	Lit Capacity	Design Capacity
Consortium	28%	6%
VSNL (Incl. Teleglobe)	19%	21%
Cable and Wireless	13%	26%
Global Crossing (ST)	12%	6%
FLAG Telecom (Reliance)	13%	20%
Columbia Ventures	9%	16%
Level 3	6%	5%

Source: Terabit Consulting

Transatlantic Customers in the East: Major EMEA Carriers

	Mkt. Cap (\$Bil)	P/E	52-wk Perf	Outlook
BT	35	10	Up	Positive
DT	70	11	Down	Positive
Etisalat	24	25	Down	Neutral
FT	60	15	Down	Positive
KPN	30	14	Down	Positive
Mobile Telesystems	16	11	Up	Positive
OTE	10	Loss	Up	Positive
Portugal Telecom	15	25	Up	Positive
Telekom Austria	12	40	Up strongly	Positive
Telecom Italia	30	29	Down	Neutral to Pos
Telefonica	80	18	Down	Positive
Telenor	33	20	Up strongly	Positive
Telkom SA	13	9	Up strongly	Neutral
Telia Sonera	30	18	Up	Positive
Turk Telecom	13	10	Up strongly	Neutral

15 carriers total

52-wk perform. =
4 up strongly;
5 up
6 down

Outlook =
11 positive
1 neutral to pos.
3 neutral

Source: Terabit Consulting



Transatlantic Customers in the West: Major American Carriers

	Mkt. Cap (\$Bil)	P/E	52-wk Perf	Outlook	Comment
AT&T	100+	19	Up	Merger	Merger with BellSouth will intensify competition
Bellsouth	60	19	Up	Merger	
Qwest	13	Loss	Up	Weak	Now seeing increased pressure for merger
Verizon	100+	14	Up	Positive	Strongest US competitor
Bell Canada	20	15	Even	Positive	
American Movil	63	14	Up strongly	Positive	

6 (5?) carriers total

52-wk perform. =
1 up strongly;
4 up
1 even

Outlook =
3 positive,
1 weak,
2 merger

Source: Terabit Consulting



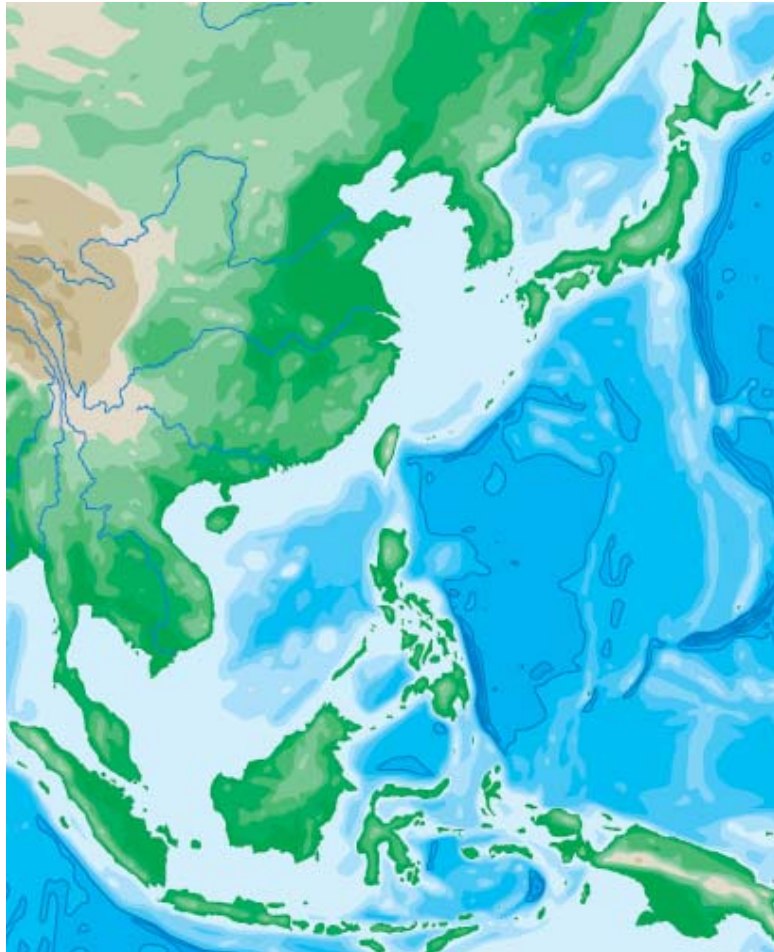
Transatlantic Conclusions

- Broadband subscriptions (74.2 mil.) coming on strong
- 6 DWDM systems
- 2003 was turning point; news has been positive since then
 - 300 Gbps capacity sale on Apollo seemingly positive
- C&W, Reliance, VSNL, and Columbia hold most design capacity
- 2005 was a decent year for European operators, and outlook is strong
- There are only a handful of major American operators left

Transpacific: Fueling the Asian Tigers



Transpacific



<u>Facts and Figures</u>		
	East Asia	Europe
Population (Mil)	2,060.2	522.2
GDP (\$Bil)	\$7,907	\$13,252
Fixed-Line Subscribers (Mil)	439.3	252.6
Mobile Subscribers (Mil)	586.2	445.6
International Internet Bandwidth (Gbps)	367	2,759
Internet Users (Mil)	237.6	217.2
Broadband Subscribers (Mil)	66.1	74.2
International Voice Minutes (Mil)	17,225	46,774

1.5 Kbps/user

Source: World Bank, UNDP, ITU, Nat'l. Regulators, Terabit Analysis



Transpacific Cables

Cable Name	RFS Date	Route Km	Capacity (Gbps)	Design Capacity, Est. (Gbps)	Owner(s)	Investment (\$Millions)	Supplier(s)
TPC-5	1995	22,560	20	20	Consortium	\$1,240	AT&T-SSI (Tyco), KDDI-SCS
Pacific Crossing-1 (PC-1)	1999	13,076	180	640	Pacific Crossing Ltd.	\$1,350	TSSL (Tyco)
China-US Cable Network	2000	30,800	80	80	Consortium	\$1,400	Alcatel, Fujitsu, KDDI-SCS, NEC, TSSL (Tyco)
Japan-US Cable Network	2001	21,000	400	640	Consortium	\$1,150	Alcatel, Fujitsu, NEC, KDDI-SCS
VSNL Transpacific (Tyco)	2002	24,100	320	7,680	VSNL	\$900	Tyco
Total: 5 Systems, 11.0% lit		111,536	1,000	9,060	2 operators plus consortium	\$6,040	

Source: Terabit Consulting

Transpacific Highlights



2001: China-US is cut twice, in February and September, bringing Chinese Internet to a halt
June, 2001: 360networks files for bankruptcy protection, squelching plans for 360pacific



January, 2002: Global Crossing files for bankruptcy protection
April, 2002: FLAG Telecom files for bankruptcy protection, squelching plans for standalone FLAG Pacific-1
July, 2002: Pacific Crossing files for bankruptcy protection



April, 2003: Pivotal Equity signs asset purchase agreement for PC-1; rescinds offer in 2004



2003-2004: TPC-3/HAW-4, TPC-4/HAW-5, NPC removed from service



June, 2005: Creditor Tyco tries to block PC-1 reorganization
July, 2005: VSNL acquires Tyco Global Network for \$130 million



January, 2006: PC-1 exits bankruptcy with "all major customer contracts retained"

Transpacific Cable Operators

	Lit Capacity	Design Capacity
Consortium	50%	8%
VSNL	32%	85%
Pacific Crossing Ltd.	18%	7%

Source: Terabit Consulting

Transpacific Customers in the West: Major Asian Carriers

	Mkt. Cap (\$Bil)	P/E	52-wk Perf	Outlook
China Netcom	12	9	Up strongly	Positive
Chunghwa Telecom	19	12	Down	Neutral
NTT	70	8	Up	Positive
Reliance *	8	N/A	N/A	Positive
PT Telekomunikasi	15	25	Up strongly	Positive
Singtel	25	14	Up	Weak
SK Telecom	17	9	Up	Neutral
SwissCom	20	13	Down	Neutral
Telstra	32	12	Down sharply	Weak
VSNL *	3	45	Up strongly	Neutral

10 carriers total

52-wk perform. =
3 up strongly;
3 up,
2 down,
1 down sharply

Outlook =
4 positive,
4 neutral,
2 weak

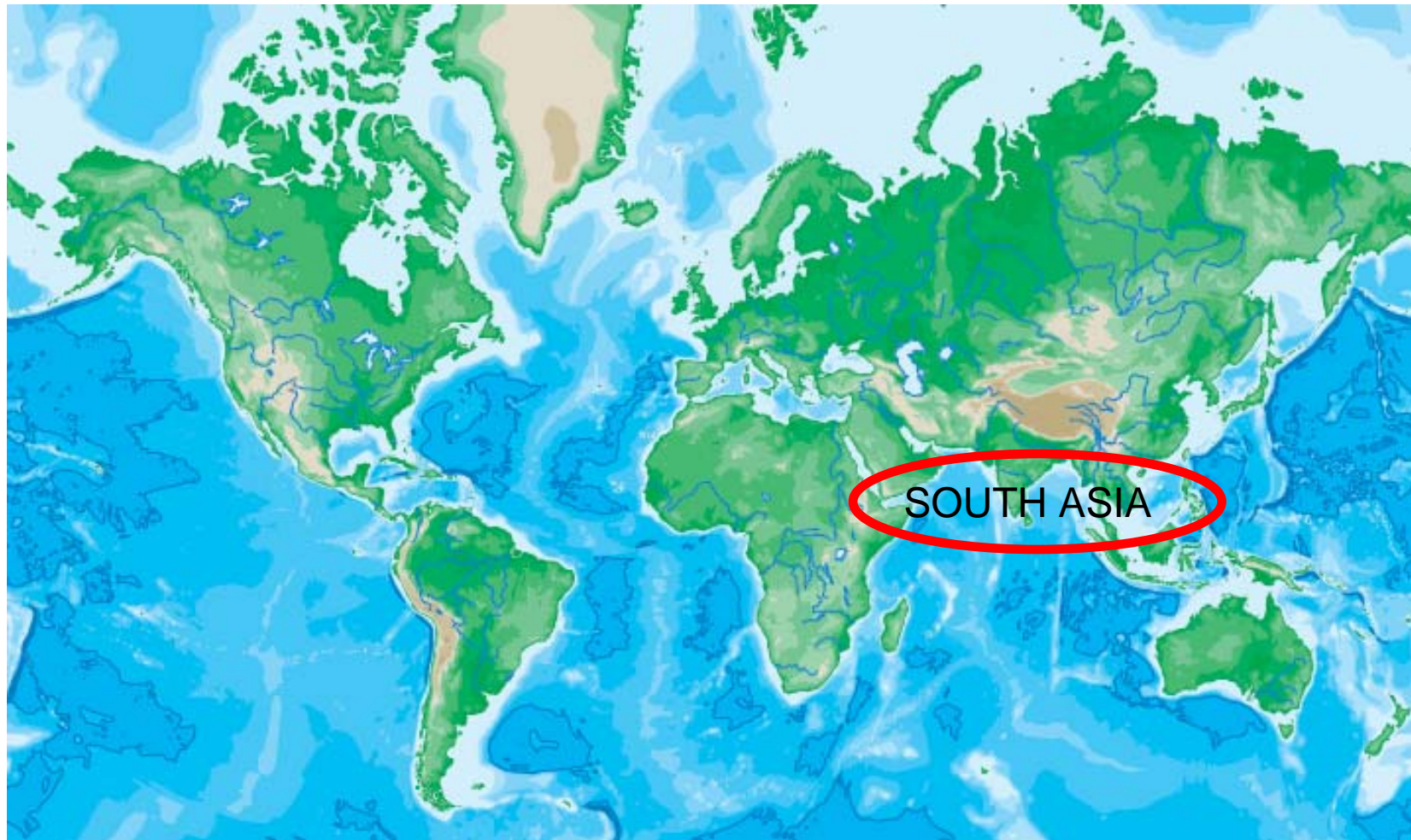
Source: Terabit Consulting



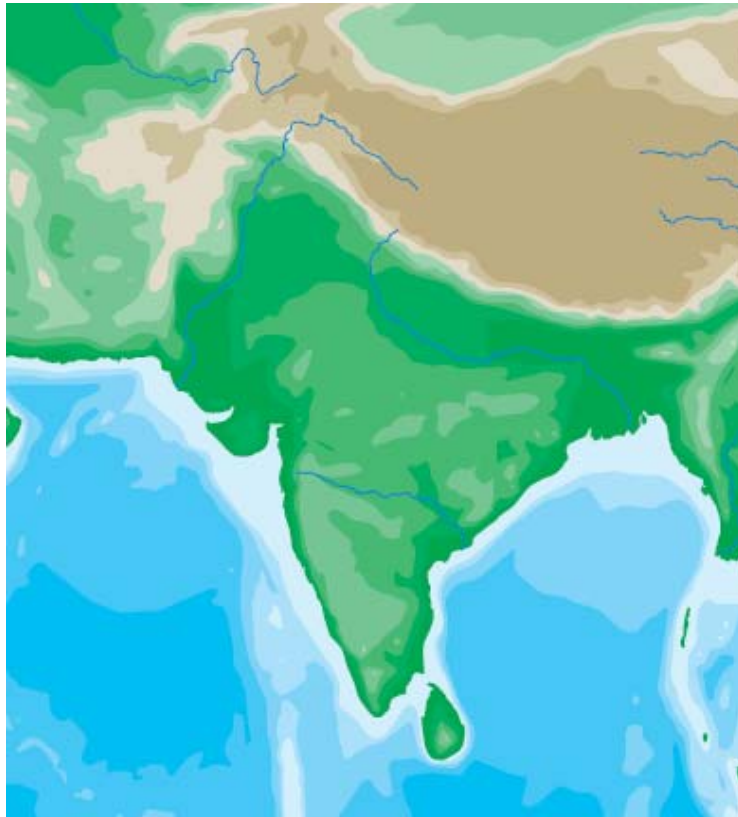
Transpacific Conclusions

- Internet, broadband, fixed-line, and mobile numbers as good or better than Europe, but international internet bandwidth per user is 1/8
- 3 DWDM systems
- Although decline was not as severe, the transpacific market was slower to recover than the transatlantic
 - 2006 seems to be turning point
- VSNL holds 85% of design capacity
- Performance, outlook for Asian operators mixed

South Asia – The Industry’s Hot Spot



South Asia



<u>Facts and Figures</u>	
	South Asia
Population (Mil)	1,441.1
GDP (\$Bil)	\$879
Fixed-Line Subscribers (Mil)	50.8
Mobile Subscribers (Mil)	58.2
International Internet Bandwidth (Gbps)	15
Internet Users (Mil)	37.8
Broadband Subscribers (Mil)	0.3
International Voice Minutes (Mil)	994

Source: World Bank, UNDP, ITU, Nat'l. Regulators, Terabit Analysis



South Asian Cables

Cable Name	RFS Date	Route Km	Capacity (Gbps)	Design Capacity, Est. (Gbps)	Owner(s)	Investment (\$Millions)	Supplier(s)
Sea-Me-We-2	1994	18,000	1	1	Consortium	\$780	AT&T-SSI (TyCom), STC (Alcatel), Pirelli.
FLAG (Fiberoptic Link Around the Globe)	1997	27,763	10	20	FLAG Telecom (Reliance)	\$1,600	AT&T-SSI (TyCom), KDD-SCS
Sea-Me-We-3	1999	39,000	58	80	Consortium	\$1,300	Fujitsu, Alcatel, KDD-SCS, TSSL (TyCom), Pirelli
i2i (ISCN)	2002	3,200	160	8,400	Bharti Group, Singtel	\$259	Alcatel, Fujitsu
SAT-3/WASC/SAFE (South Atlantic-3/West Afr	2002	27,850	30	120	Consortium	\$581	Alcatel, TyCom
Tata Indicom Chennai-Singapore (TICSCS)	2004	3,100	320	3,175	Tata (VSNL)	\$96	Tyco
Sea-Me-We-4	2006	20,000	160	1,280	Consortium	\$500	Alcatel, Fujitsu
Falcon	2006	10,300	90	2,560	FLAG Telecom (Reliance)	\$270	Alcatel
Total: 8 systems, 5.3% lit		149,213	829	15,636		\$5,386	

Source: Terabit Consulting

South Asian Highlights

Submarine Communications 2006, Lisbon, March 29-30



July, 2002: Plans for Bangladesh Submarine Cable Network are halted amidst claims of corruption

September, 2002: 13 carriers announce plans for Sea-Me-We-4



June, 2003: Dishnet scraps plans for SEACN

November, 2003: VSNL announces plans for Tata Indicom Chennai-Singapore Cable



February, 2004: FLAG announces plans for Falcon

March, 2005: Indian regulator TRAI lowers IPLC ceiling by 70%; prices still 5x other markets like Singapore, Hong Kong, and Tokyo

May, 2005: BSNL announces plans for India-Singapore cable but seriously entertains alternative bandwidth offer from VSNL



July, 2005: Data Access shelves plans for India-UAE cable

September, 2005: Dhiraagu and Sri Lanka Telecom partner to build Maldives-Sri Lanka cable

October, 2005: BSNL and SLT agree on \$18 million, 325-km cable to Sri Lanka

November, 2005: BSNL and MTNL partner to build India-Singapore cable, encouraged by IT Minister

December, 2005: Reliance and China Telecom sign agreement for first direct connection between world's two largest countries



Early-2006: Indo-UAE coaxial cable (also known as Gulf Cable) scheduled for decommission after 19 years

March, 2006: Scheduled RFS for TWA-1 (India-Oman-UAE), Pakistan's first private cable

South Asian Cable Operators

	Lit Capacity	Design Capacity
Tata (VSNL)	39%	20%
Consortium	30%	9%
FLAG Telecom (Reliance)	12%	17%
Bharti Group	10%	27%
Singtel	10%	27%

Source: Terabit Consulting

South Asian Conclusions

- Clearly the center of activity for the submarine industry – expectation is that raw numbers will follow development of international infrastructure
- Connecting India to the international infrastructure that Indian companies control
- 4 DWDM systems
- VSNL, Reliance, consortium = major players

WHAT'S HAPPENING ELSEWHERE

Africa



SAT-3 wrangling: ICASA enquiry held up

East African Submarine Cable System (EASSy)

West African Festoon System (WAFS)

Adonas: Angola Telecom festoon

Project West Africa (Infinity Worldwide)

Globacom Nigeria-UK unlikely

Other Activity

Asia: C2C receiver Ferrier Hodgson says sale is “imminent”

Asia: New connectivity to Vietnam (Tricom, VNPT, Viettel)

Asia: Indonesian systems (PT Telkom, PT Indosat)

Australia: SIACS (Singtel-Optus)

Australia: PNG cable (relay of Pacrim West)

Australia: New Caledonia cable

Caribbean: multiple projects (Antilles Crossing, Fibralink, GCN, TCCN, BTC)

Conclusions

- The transatlantic and transpacific markets have turned the corner
- Prices have stabilized
- South Asia is the hub of interest – will raw numbers follow?
- If South Asian demand picks up, it will have a carryon effect to Atlantic and Pacific
- A handful of major operators will control capacity buys (Verizon and AT&T in US)
- The consortium model isn't dead
- Near-term deployment will be mostly carrier-owned regional systems

Thank You!

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