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December 5, 2001

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By Federal Express

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 12th St., SW
Washington, DC 20024

Re: 47 CFR §1.1206(b)(1) Written Ex Parte Presentation

Deployment of Wireline Services Offering Advanced Telecommunications Capability, CC Docket No. 98-147; Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, CC Docket No. 96-98.

Ms. Salas:

Attached are four copies of a presentation that representatives of Alcatel USA provided to members of the Commission's Common Carrier Bureau on Tuesday, December 4, 2001. Pursuant to Section 1.1206 of the Commission's rules, Alcatel is submitting two copies of this presentation for each of the dockets indicated. Additionally, copies of this disclosure and the attached presentation are being forwarded to certain staff members of the Common Carrier Bureau.

Please date stamp the enclosed copy and return in the self-addressed stamped envelope. Thank you.

Sincerely,

Paul W. Kenefick
Senior Regulatory Counsel

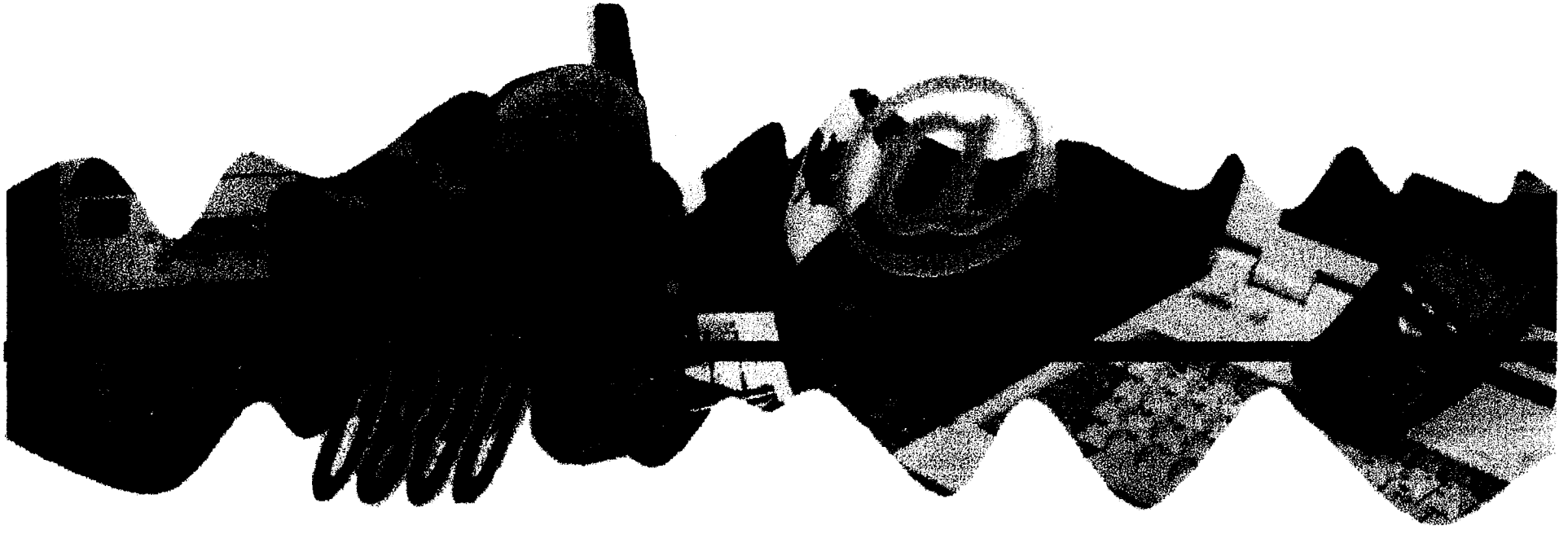
Attachment

cc: Jessica Rosenworcel
Brent Olson

No. of Copies rec'd 0+3
List ABCDE

Alcatel USA, Government Relations, 1909 K Street NW, Suite 800, Washington, DC 20006
Tel: (202) 715 3707

Passive Optical Networks



Niel Ransom
CTO
Alcatel Americas

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Overview

- Benefits of Fiber-to-the-User
- Alternative broadband access approaches
- Passive Optical Networks (PON) technology
- PON Applications
- Economics of Fiber-to-the-User via PONs
- Regulatory issues

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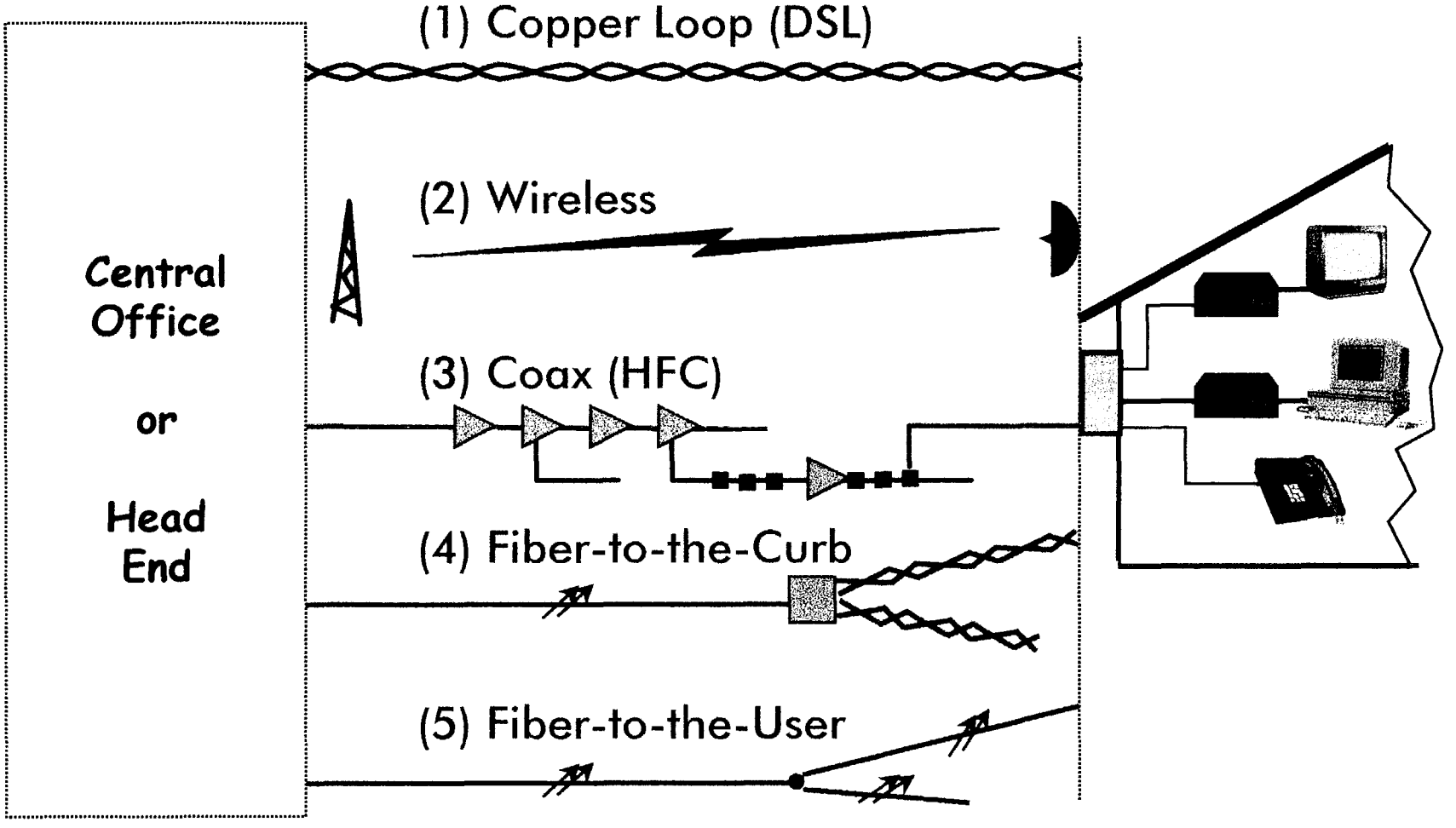
Last Mile Alternatives



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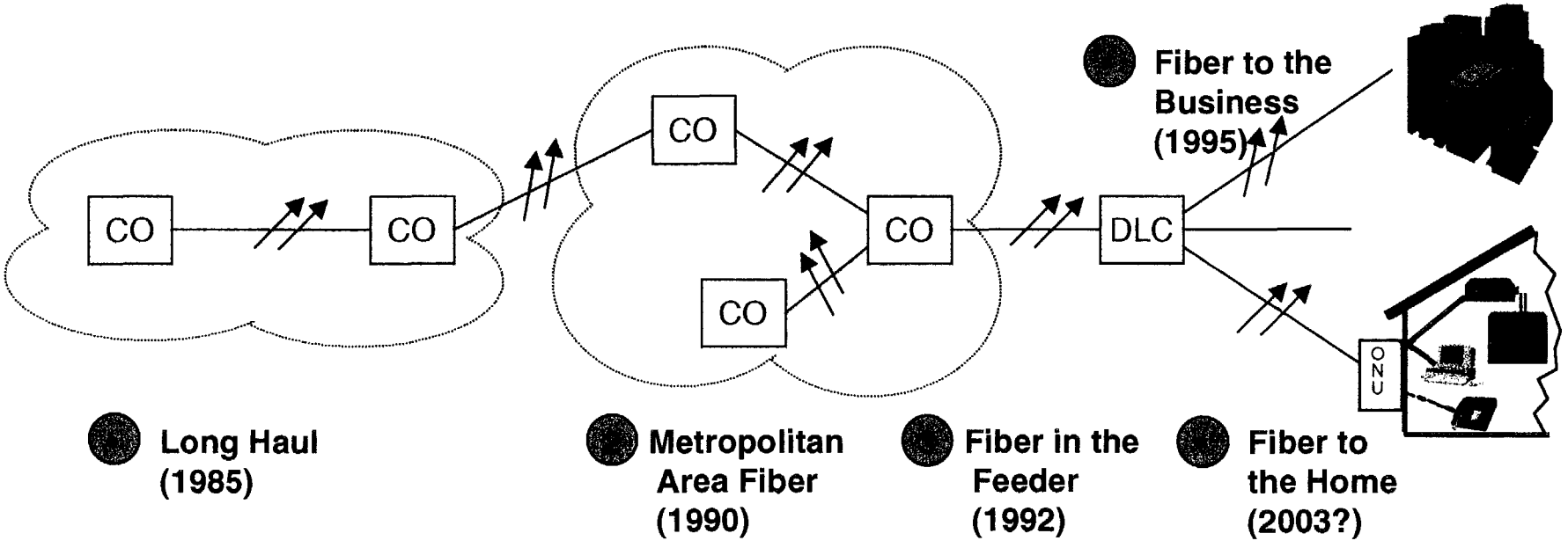
Broadband Access Comparisons

	High-Speed Data	Video Delivery	POTS	Initial Deployment Cost	Lifetime Cost	Limitation of Reach / Return Path
HFC	↑	↑	●	●	↓	↓
Wireless	●	↓	↓	●	↑	↓
VDSL	↑	●	↑	↓	●	↓
ADSL	●	↓	↑	↑	●	↓
FTTC	↑	●	↑	↓	↑	↑
FTTH	↑	↑	●	↓	✕ ↑	✕ ↑

Source: Verizon / CIBC World Markets

✕ Alcatel Revisions

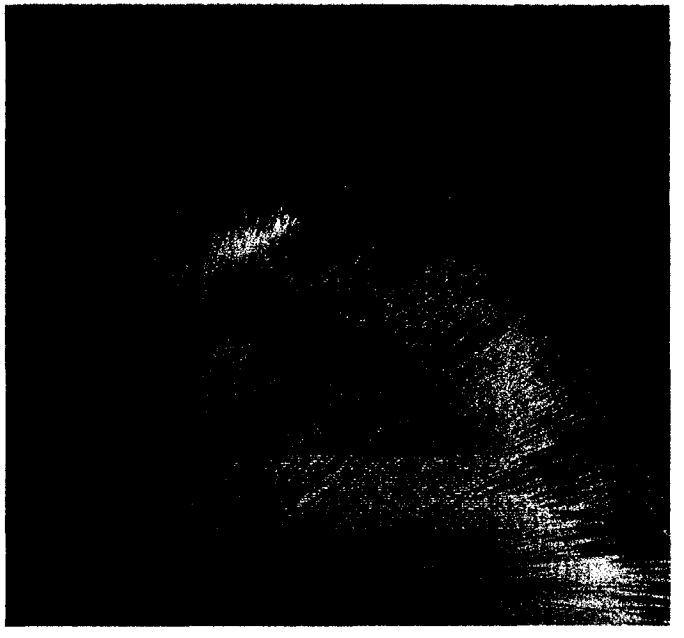
Fiber's Manifest Destiny



Evolution of Applications

Why Fiber to the User?

- Enables advanced services
  - ✓ Virtually unlimited bandwidth upstream and downstream
  - ✓ Improved security
  - ✓ No crosstalk effects



- Long service life
  - ✓ Not subject to corrosion
  - ✓ No outside plant electronics
  - ✓ Faster restorals to cable cuts
  - ✓ Not subject to lightning-induced surges

Challenges impeding Fiber to the User

- Cost of lasers / optical receivers
- Powering issues
- Installation costs
- Cost of cable splices
- Changes to operation support systems / OAM&P
- Combining voice, data, video business cases
- Regulatory issues

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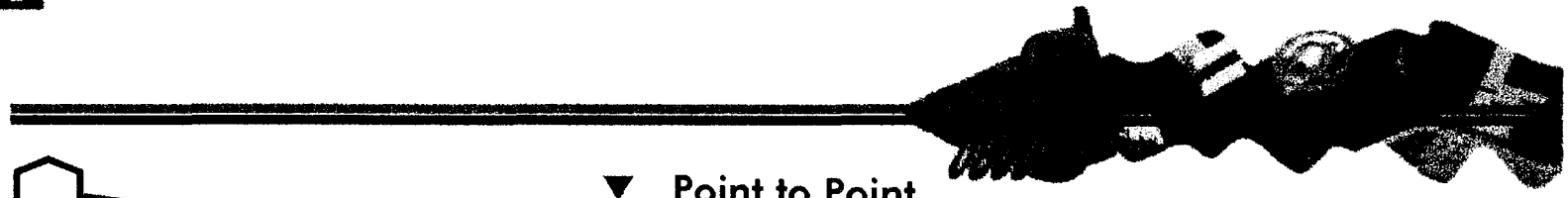
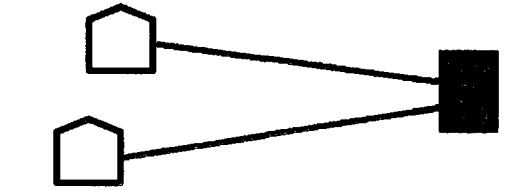
What changed to make FTTH now viable?

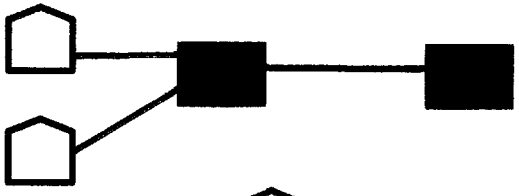
- Continued technology evolution
  - ✓ Vastly less expensive lasers / optical receivers (50% in last year)
  - ✓ Continued reduction in cost of fiber
  - ✓ Reductions in price of passive optical components (e.g., optical splitters)
  - ✓ Improved fiber installation techniques reduced installation time
- Competitive model evolving to bundled service packages
- Willingness to pay for high-speed internet access
- Applications demanding bandwidth beyond ADSL / Cable Modems
  - ✓ E.g., HDTV
  - ✓ Interactive video
  - ✓ Work-at-home (symmetric 100baseT Ethernet)
- International standards for Passive Optical Networks

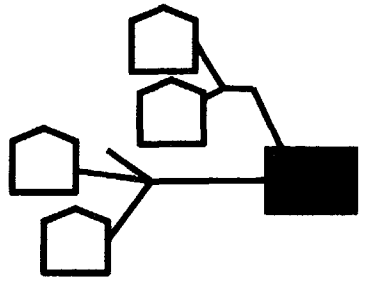
PON Technology

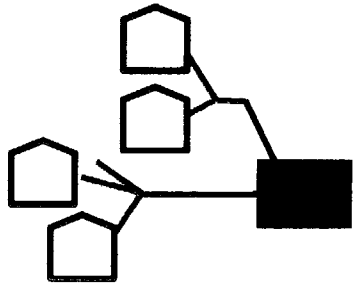
FTTH Technology Options





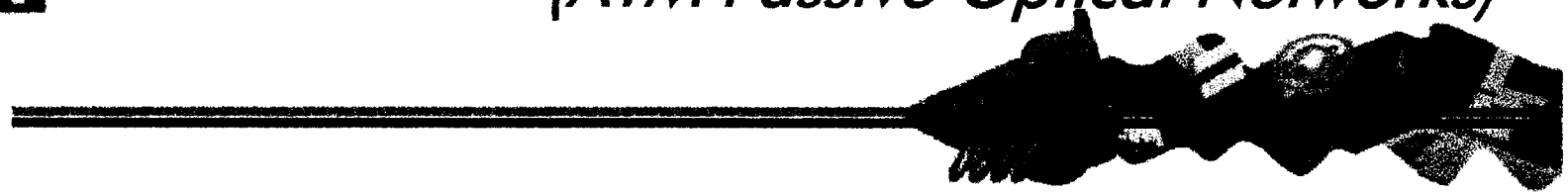


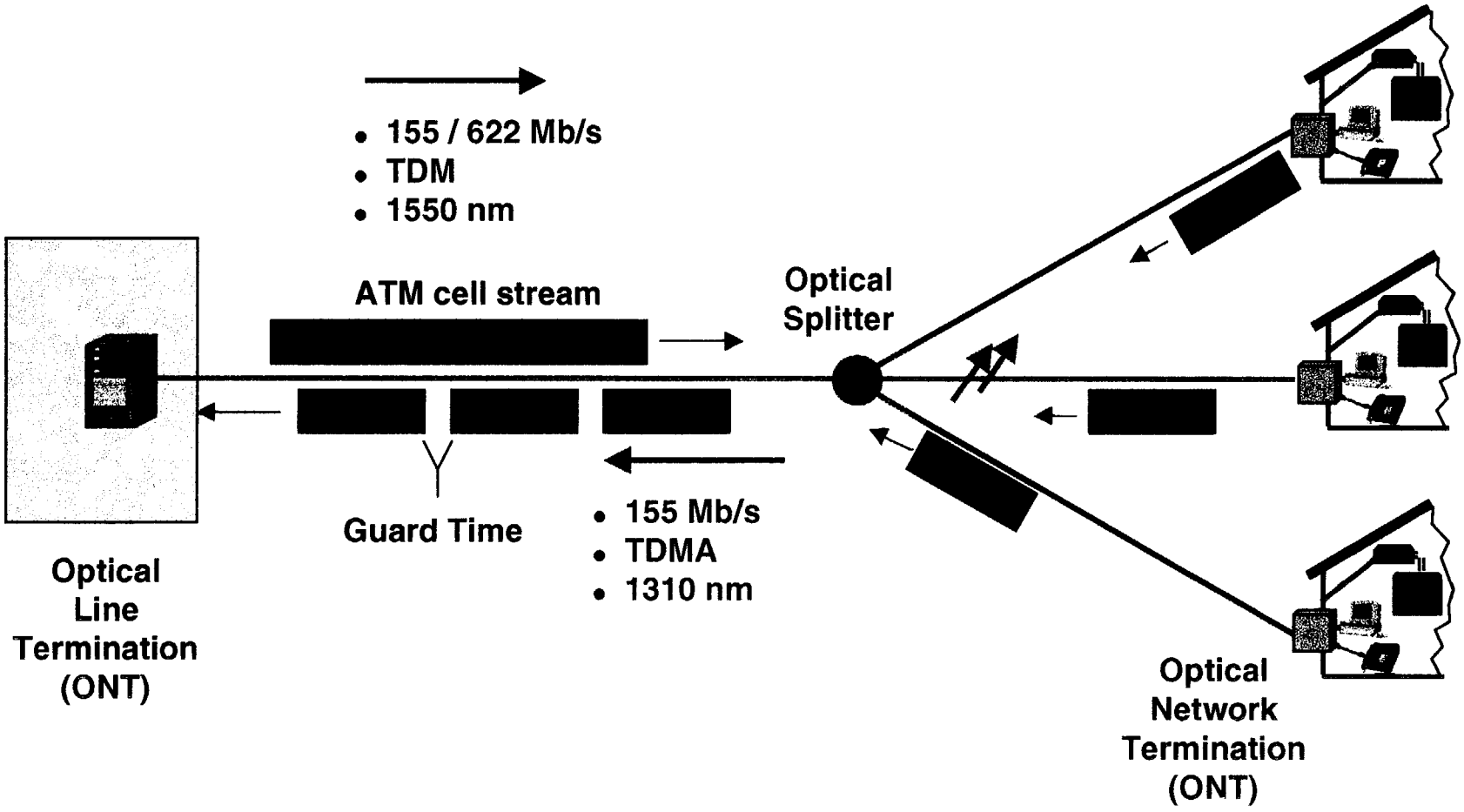




- **Point to Point**
  - ↑ High bandwidth flexibility
  - ↑ Passive cable plant
  - ↓ High cost (fiber and equipment)
- **Active Star**
  - ↑ Reduced fiber to CO
  - ↓ Active node in the field
- **PON:**
  - ↑ Passive cable plant
  - ↑ Dynamic bandwidth sharing
  - ↑ Low cost
  - ↑ International standard
- **WDM**
  - ↑ Passive cable plant
  - ↑ High bandwidth per user
  - ↑ Security
  - ↓ High cost (DWDM components)

What is APON?
(ATM Passive Optical Networks)





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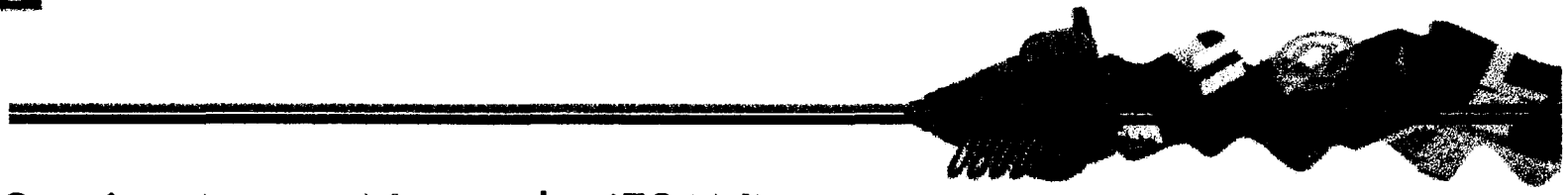
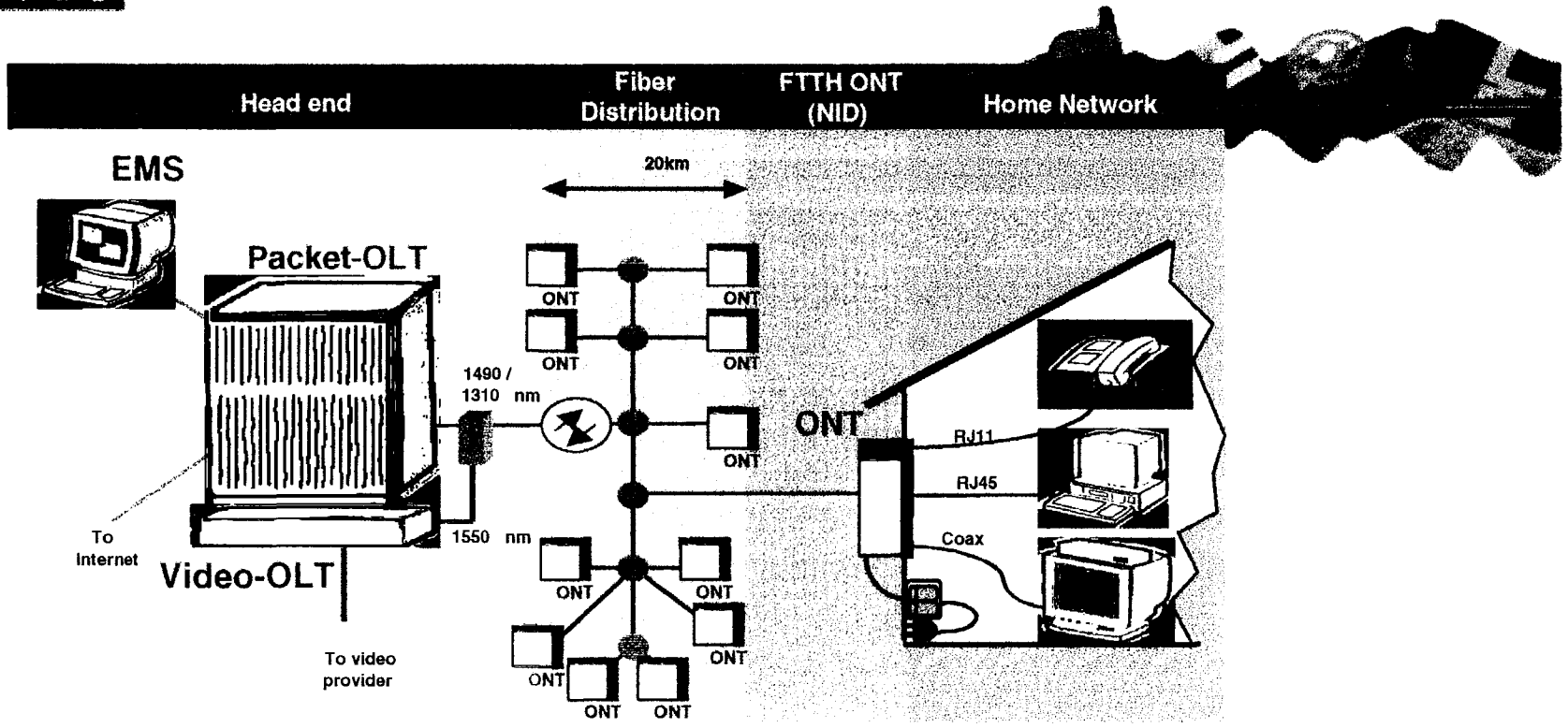
APON Standardization



- Full Service Access Networks (FSAN)
  - ✓ Initiated in 1995
  - ✓ Collaborative group of international network operators
  - ✓ Supported by major equipment suppliers
  - ✓ Identify technologies and network architectures to cost-effectively support a wide range of narrowband and broadband services
- Identified APON as best alternative
  - ✓ Allows up to 64 users to share single fiber
  - ✓ "Churning" function for security of user data
  - ✓ "Ranging" capability supports users up to 20 km away
- Adopted as international standard by ITU-T
  - ✓ G.983.x

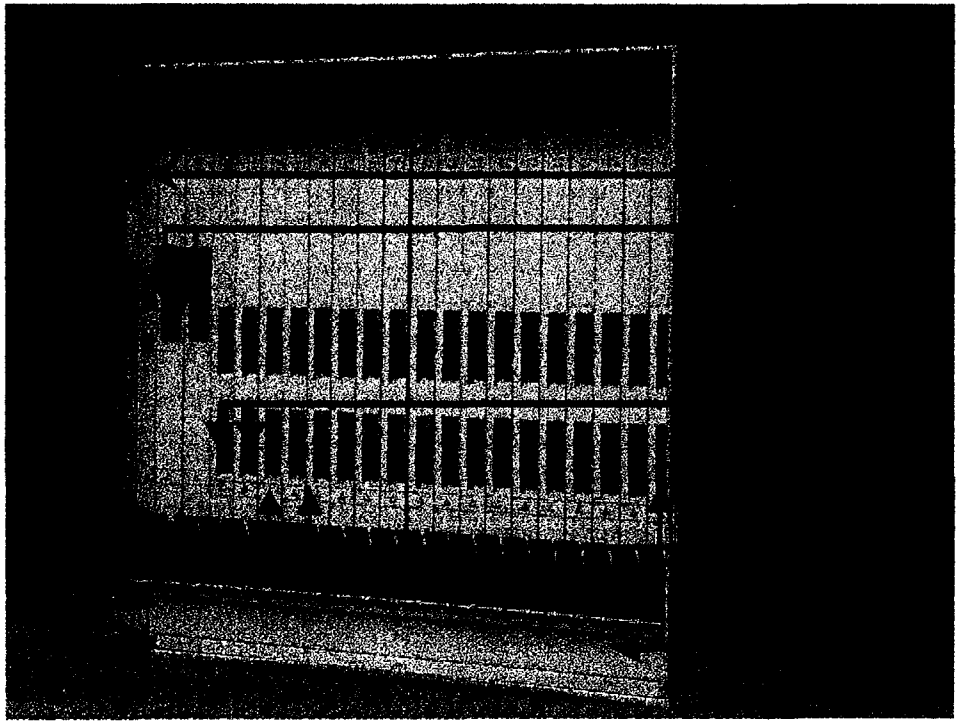
ITU G983.3



- 5 elements: ONT, P-OLT, V-OLT, EMS, OSP
- 622/155, 155/155 Mbps Broadband Passive Optical Network (BPON)
- 1490nm Downstream, 1310nm Upstream, 1550nm Downstream
- 20km ranging distance
- PON can be split to support 32 subscribers

FTTH OLT Shelf Assembly

1152 ONTs Supported From First Shelf



Alarm and Control Unit (ACU)

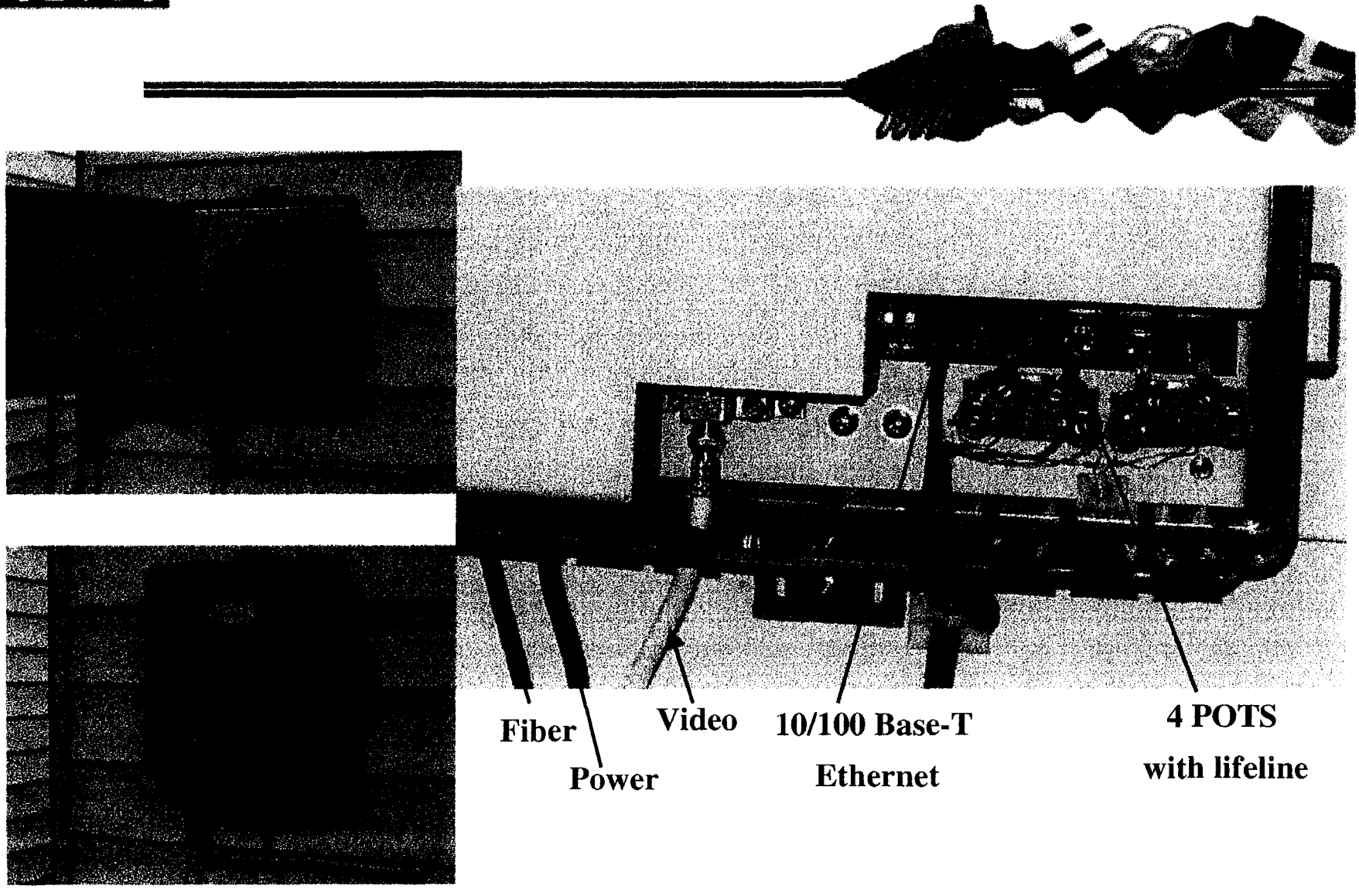
Network Interface (OC-3, OC-12)
Growth to 5G, 10G matrix

IP Gateway, Voice Gateway (future)
(slots can be used for PON LIMs also)

18 PON LIMs
(2 PONs/LIM, 4-6 future)

>10 Gbps Backplane

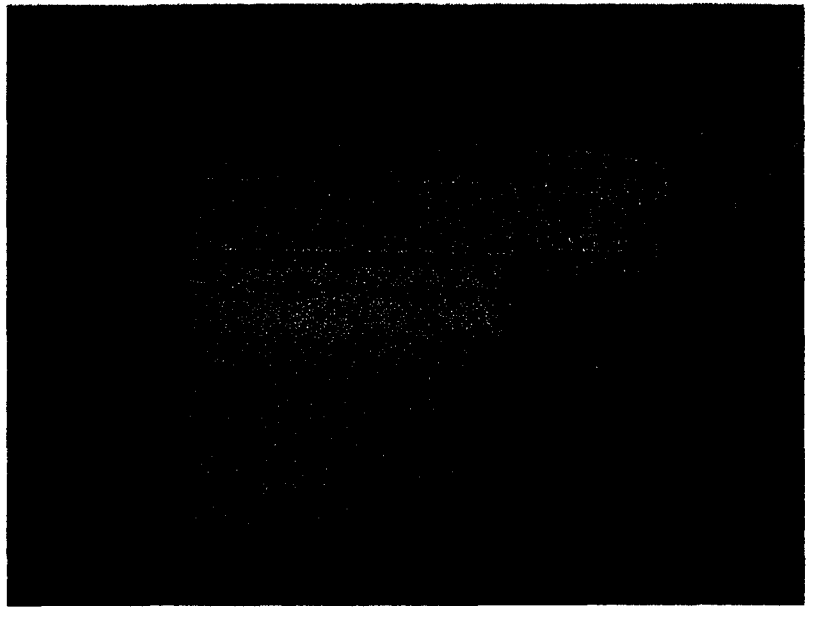
FTTH Network Interface Device



ONT Powering

▼ Uninterruptable Power Source

- ✓ 120 VAC input
- ✓ 12 VDC output - low voltage
- ✓ Eight hours battery backup
- ✓ Commercial battery
- ✓ Visual status indicator



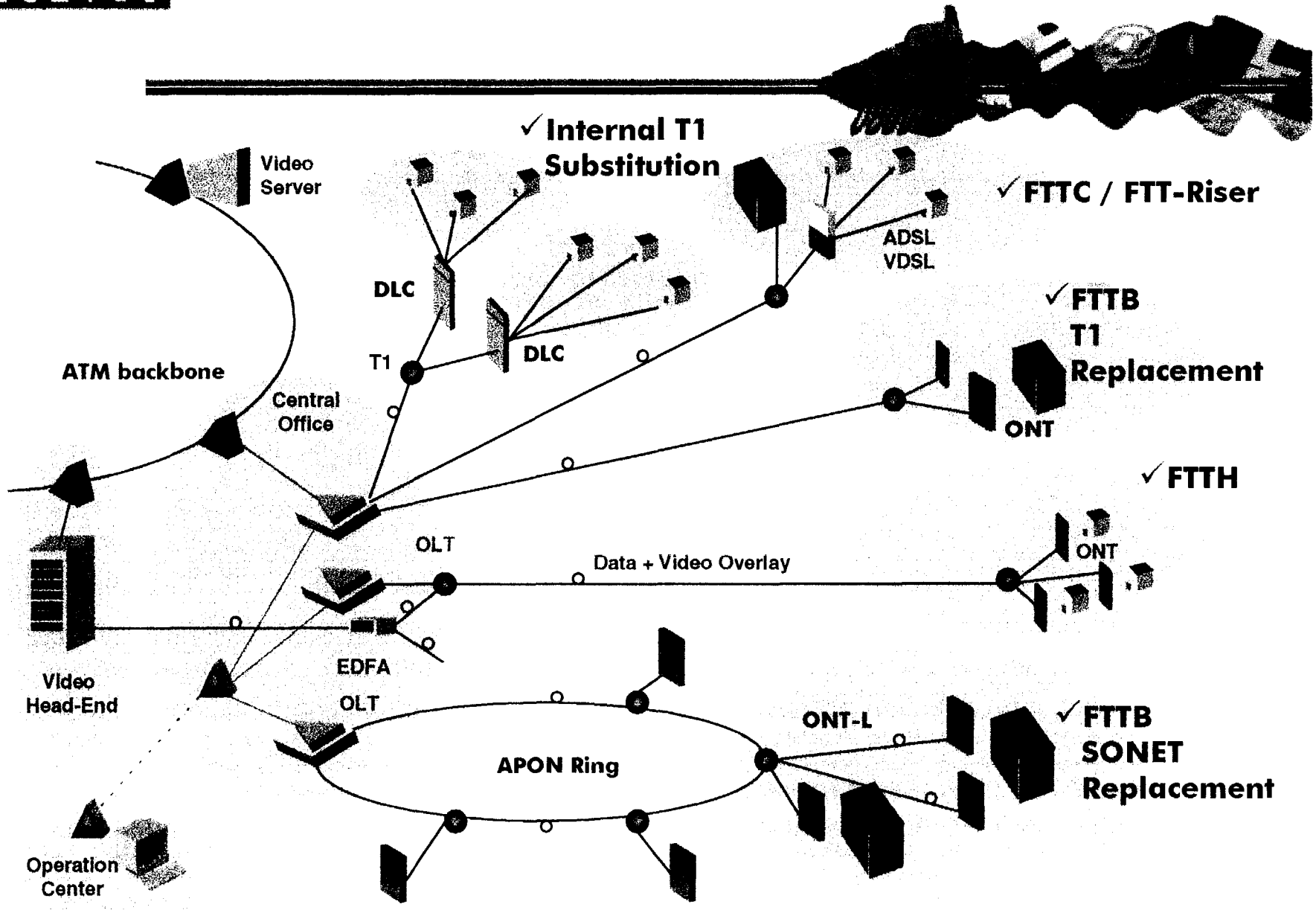
▼ Wall Mount Inside Home

- ✓ Extends battery life
- ✓ Compact size
- ✓ ONT up to 100 feet away
- ✓ UL certified

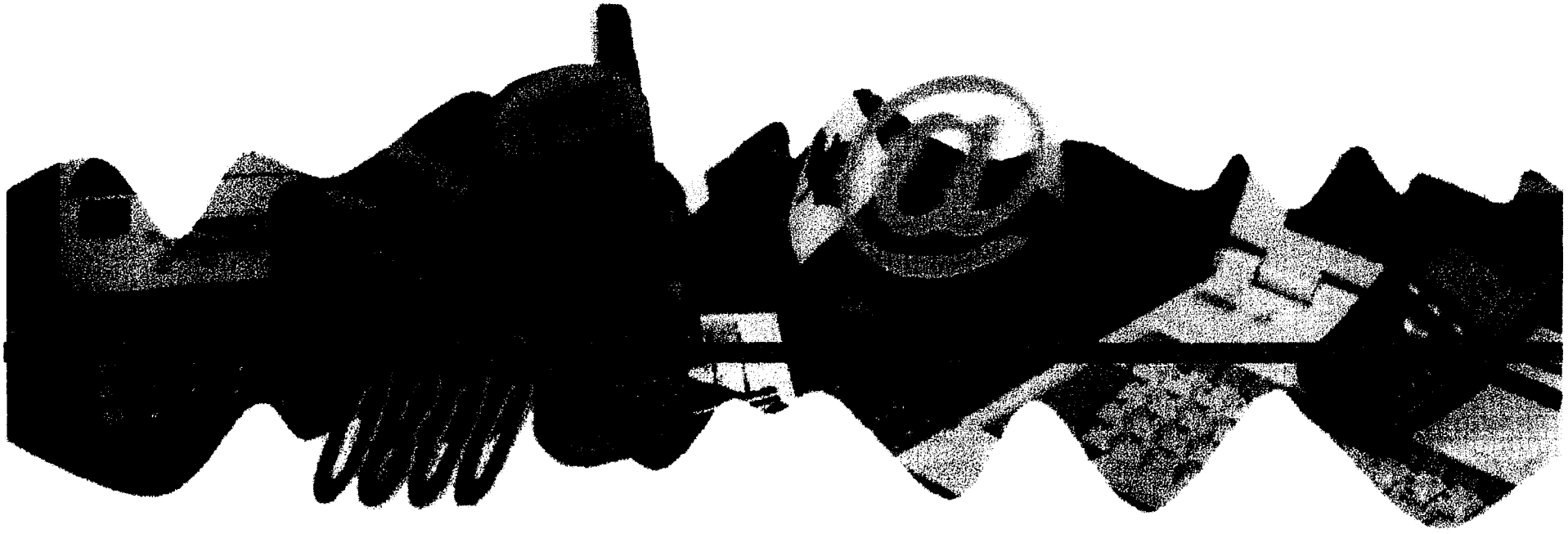
▼ Battery Status Monitored by Network

- ✓ Voltage level
- ✓ Power fail
- ✓ Battery condition

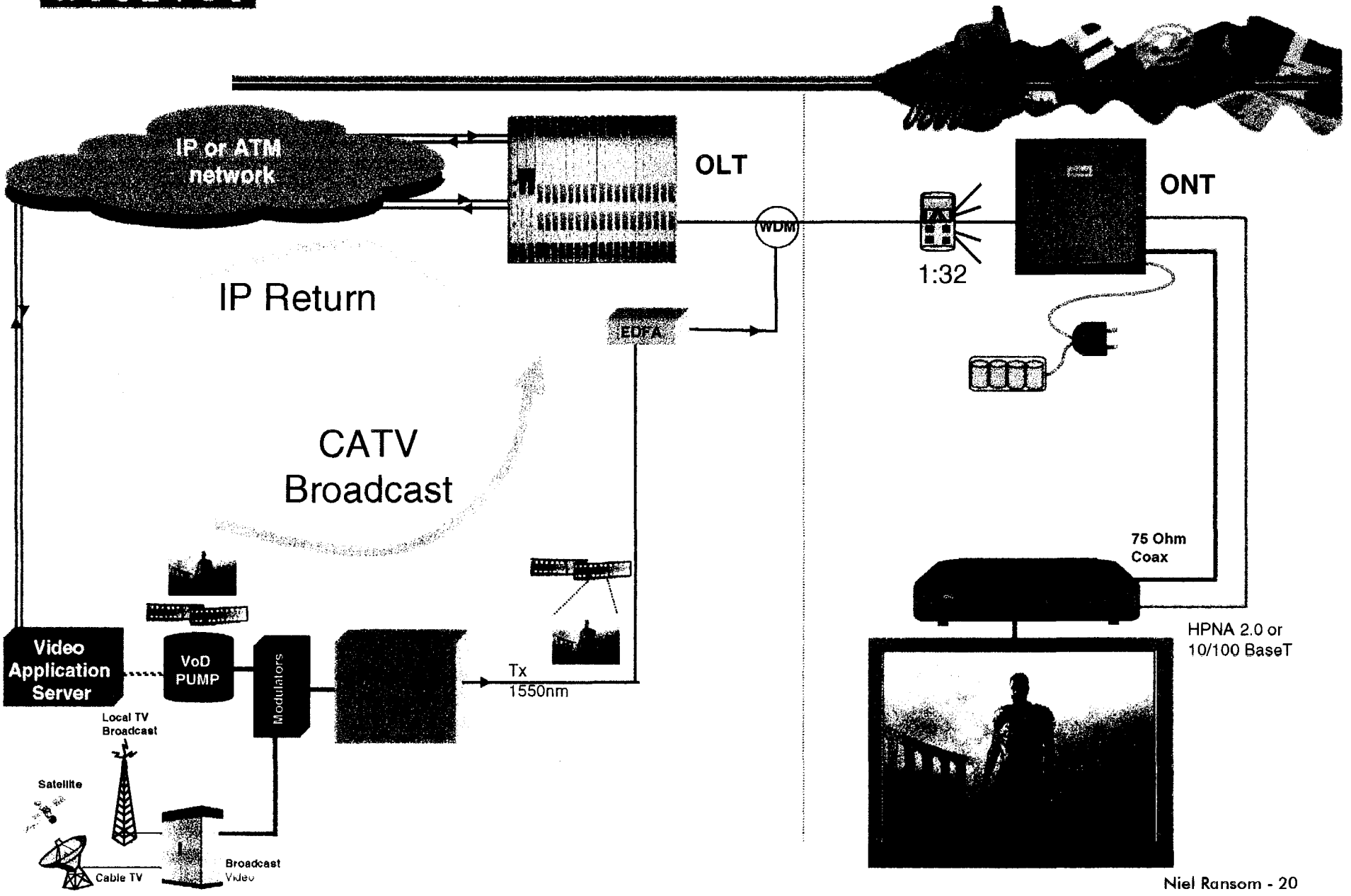
APON Applications



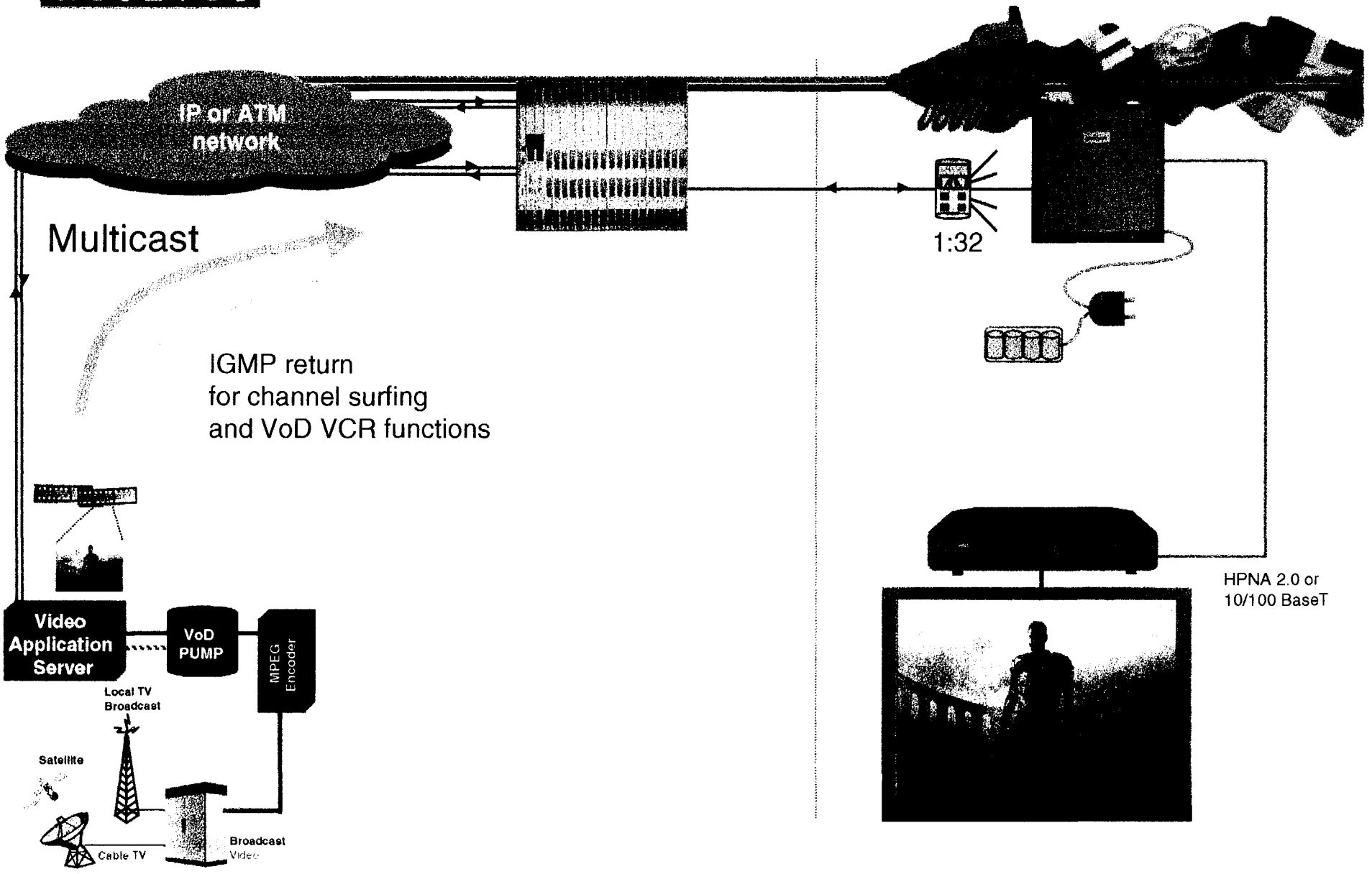
PON Applications



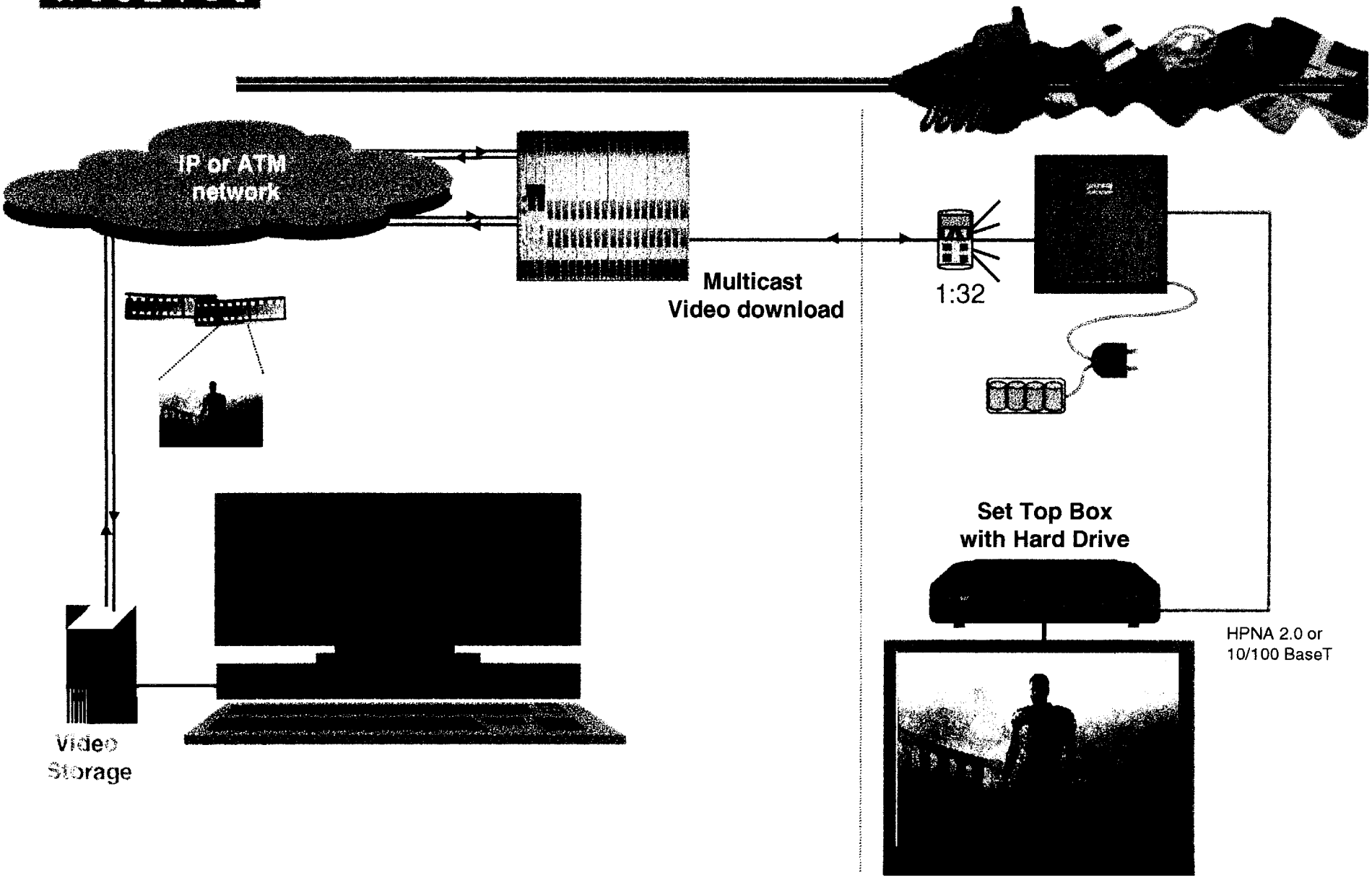
Interactive CATV Video Broadcast



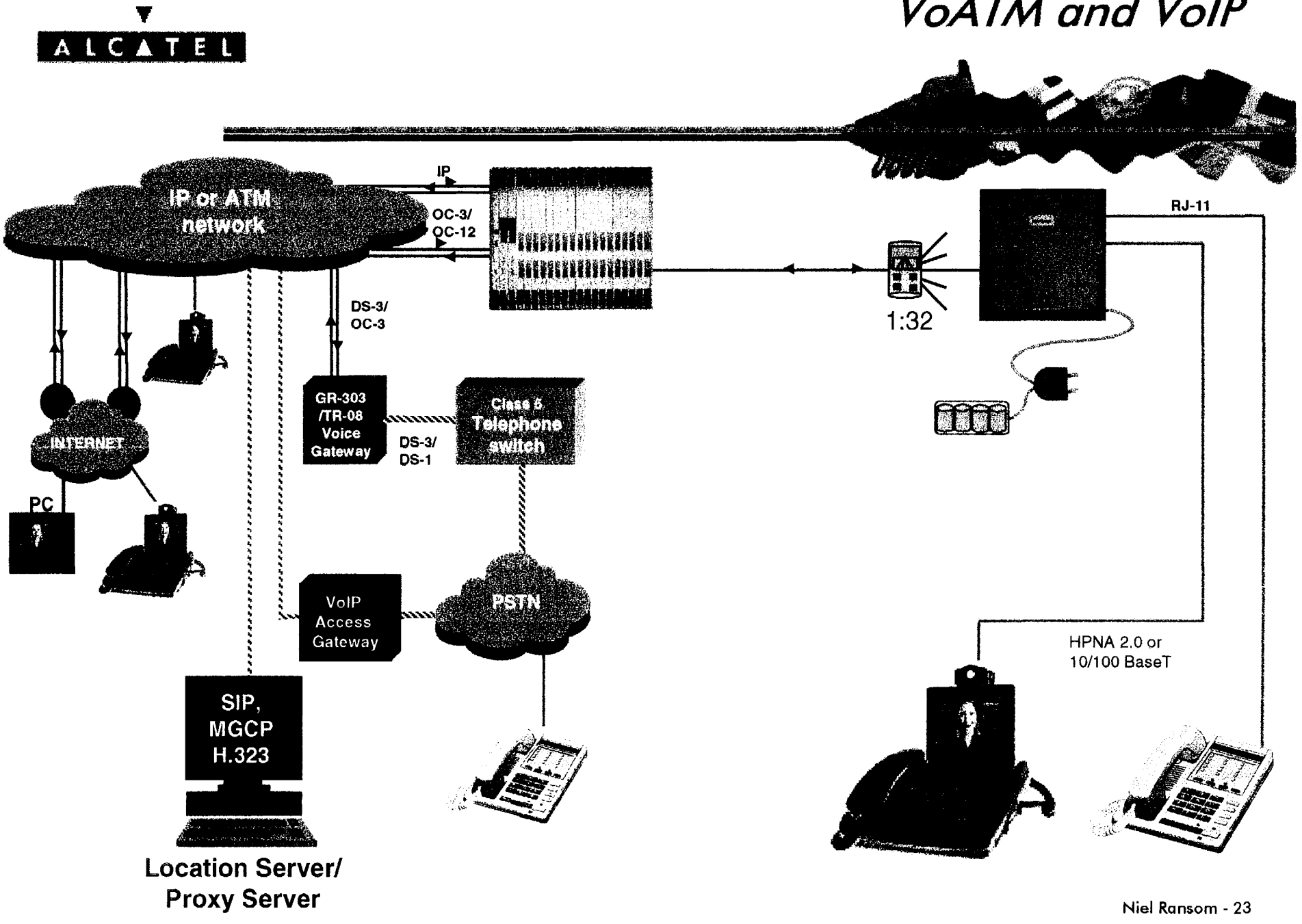
Multicast SDV Video Broadcast



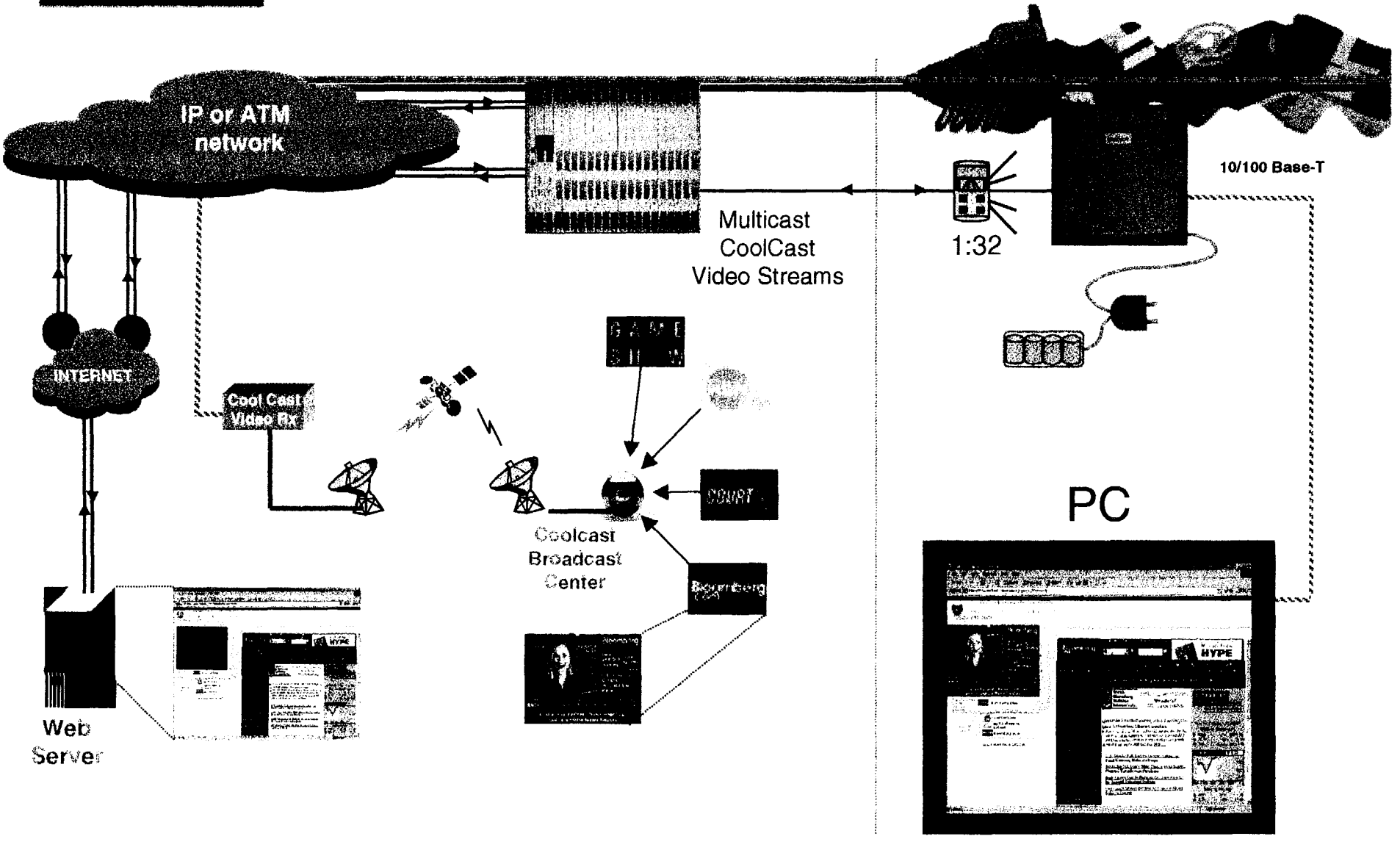
IP Video Download



VoATM and VoIP



Video Enhanced Internet



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Gaming and Game Rental

- Simple and inexpensive to implement
- Inexpensive and secure way to distribute games
- Game downloaded via Internet
- Essential files will reside on the server for security
- Provides a value added service
- Requires no additional equipment (e.g. set top box)
- Revenue potential over $10/month per subscriber

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Home Office

- Expected increase from less than 10 to 70 million in 5 years
- National security
- Employee Tele-presence: just like being in office
- Secure mainframe/server access
- PBX functions
  - ✓ Conference, transfer, etc.
  - ✓ ACD features
  - ✓ Supervisor assistance

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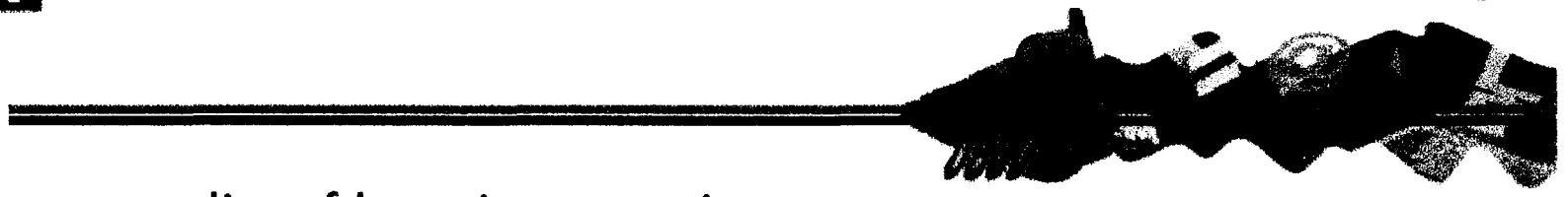
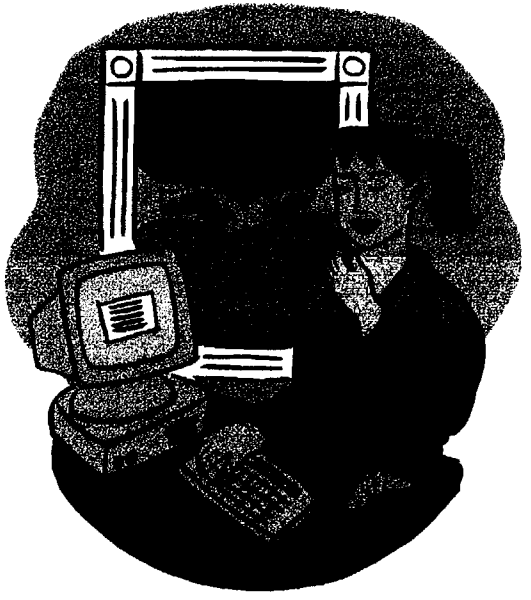
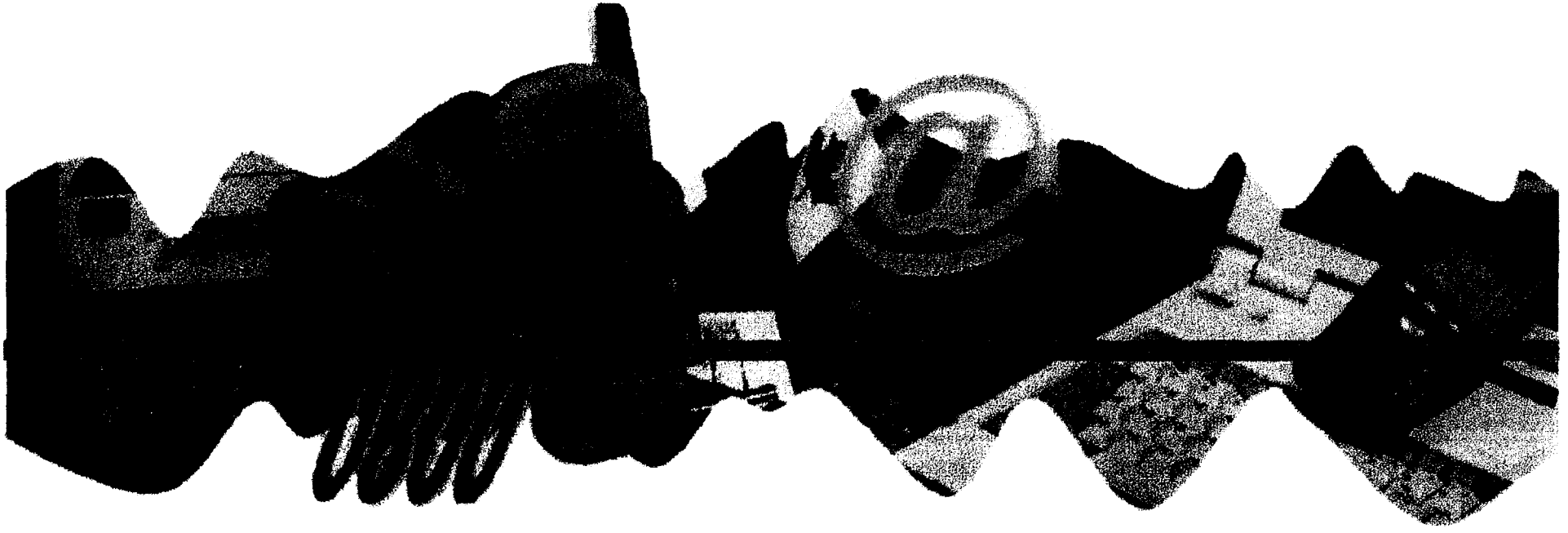
Distance Learning



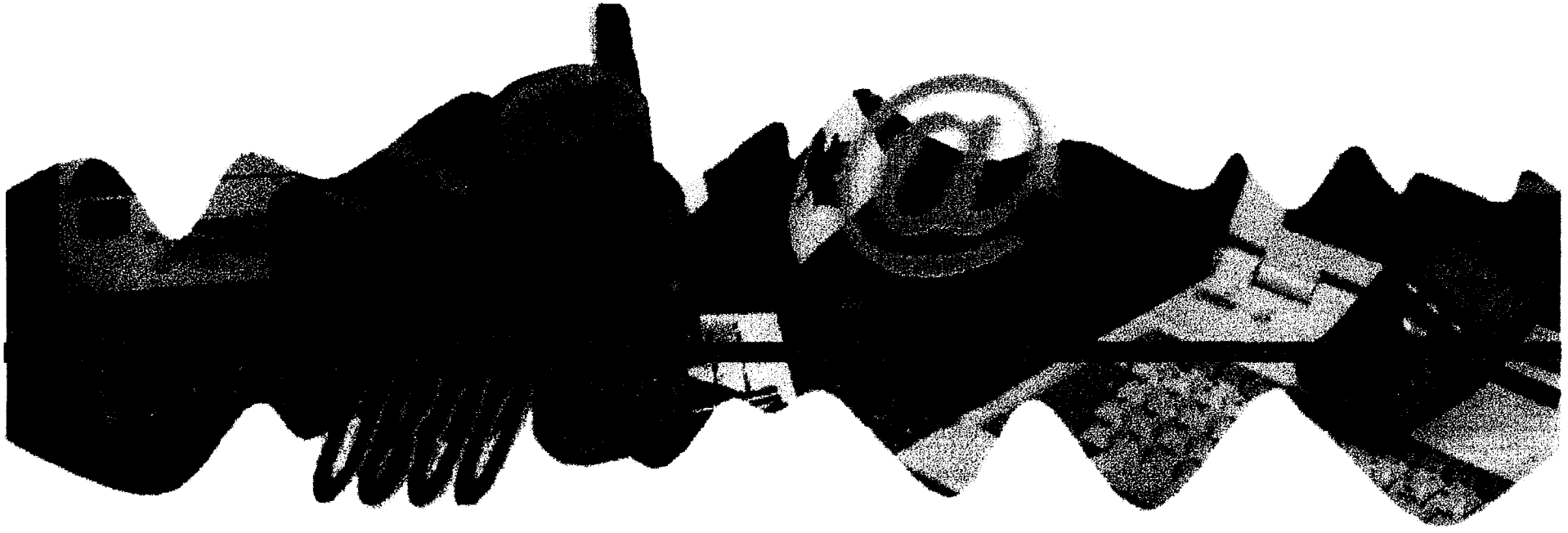
- Increase quality of learning experience
- Make education available to more students
- Access to special classes and information
- Real time sharing of information across large distances
- Full interactivity; teacher/student, student/student interaction



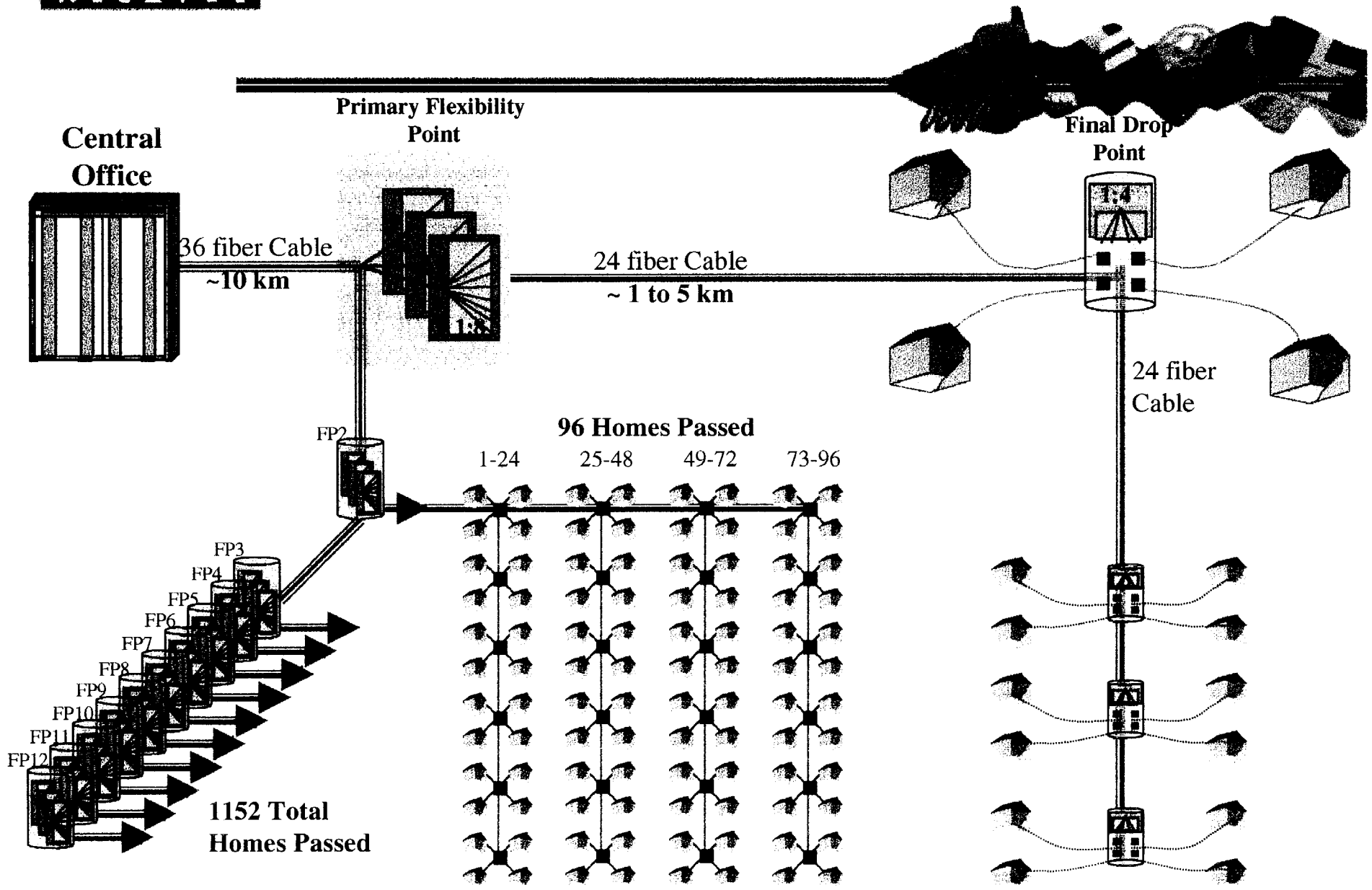
PON Economics



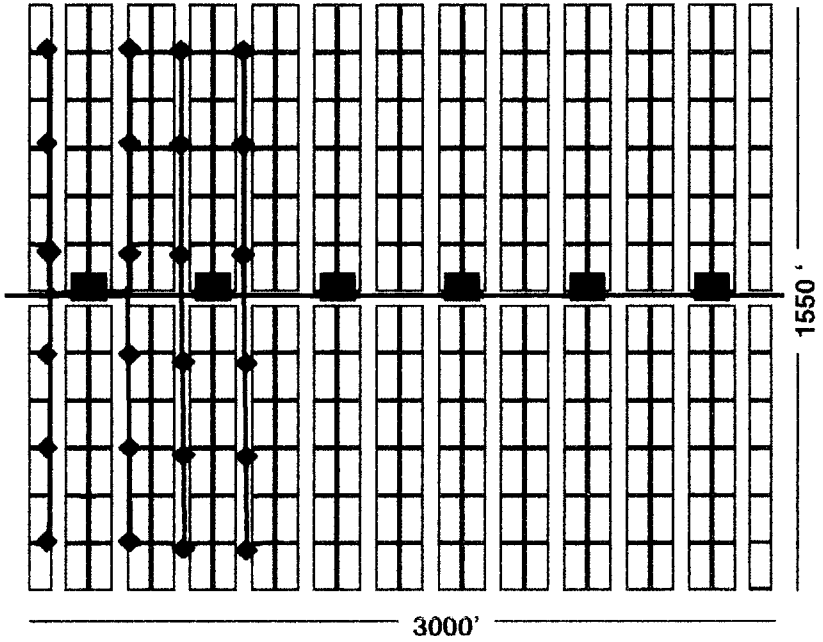
PON Economics



FTTH OSP Architecture Example



Business Case Methodology



- Network Model Definition
  - ✓ Subscriber density
    - Living units per mile
  - ✓ Outside plant topology
    - Fiber length, split count
- Service Mix Evaluation
  - ✓ Feature portfolio
    - Voice, data, or video
    - Number of POTS lines, data rates, video channels
  - ✓ Service penetration
  - ✓ Service rollout timing

Example Business Case

- Greenfield (new build) Location
- Total number of homes passed: 25,000
- Total number of subscribers: 22,500
- Services and subscriber penetration
  - ✓ Video: 40%
  - ✓ Voice: 90%
  - ✓ High speed data: 35%
- Model entire network
  - ✓ Outside plant
  - ✓ Shared equipment
  - ✓ Subscriber equipment
  - ✓ Service revenues

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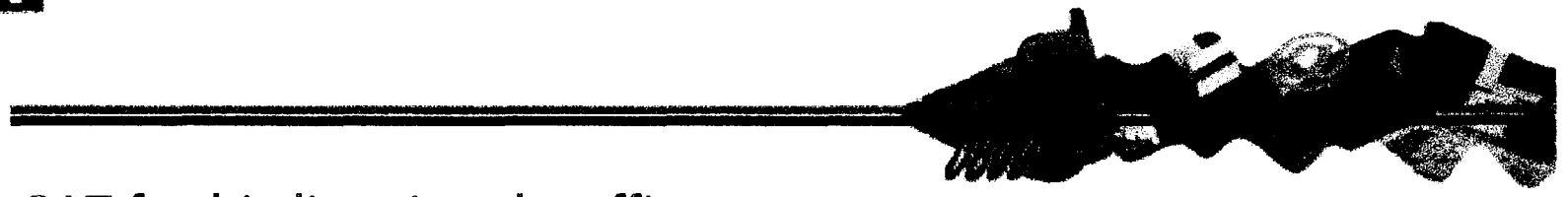
Outside Plant

- Model in regions of 1,152 subs
- Approximately 34,000 foot span (CO to home)
- 32-way split
- Aerial plant

Item	Quantity	Unit Cost	Total Cost
Number of Homes per Region	1,152		
24 Fiber Armored Cable	144,000	$ 0.80	$ 115,200
36 Fiber Armored Cable	30,000	$ 1.00	$ 30,000
1x4 splitter (drop connectorized)	288	$ 300.00	$ 86,400
1x8 splitter	36	$ 500.00	$ 18,000
Splitter enclosure - large	12	$ 350.00	$ 4,200
Splitter enclosure - small	288	$ 250.00	$ 72,000
Splice	1,520	$ 50.00	$ 76,000
Installation Materials	36	$ 50.00	$ 1,800
Labor (aerial)	174,000	$ 0.70	$ 121,800
Total per region			$ 525,400
Total for entire network			$ 11,401,910
OSP Cost per Home Passed			$ 456

Shared Equipment



- Packet OLT for bi-directional traffic
- Video OLT for broadcast video service
- Video headend
- ATM switch (data concentration and grooming)

Item	Quantity	Unit Cost	Total Cost
P-OLT (per home passed)	25,000	$ 140	$ 3,500,000
V-OLT (per home passed)	25,000	$ 100	$ 2,500,000
Video head end (analog + digital)	1	1,000,000	$ 1,000,000
ATM switch (or IP switch)	1	$ 200,000	$ 200,000
Total shared opto-electronics			$ 7,200,000
Total cost per Home Passed			$ 288

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Subscriber Equipment

- ONT - supporting voice, data, and video
- Drop cable with installation
- Voice gateway, 1.5 lines per subscriber

Item	Quantity	Unit Cost	Total Cost
Homes connected	22,500		
Drop Cable (150 feet)	22,500	$ 80	$ 1,800,000
Installation at home	22,500	$ 50	$ 1,125,000
POTS penetration	90%		
Voice lines per subscriber	1.5		
Total Voice Lines	30,375	$ 70	$ 2,126,250
Subscribers using set tops	40%		
Digital set tops	9,000	300	$ 2,700,000
ONT (voice, data, video)	22,500	$ 1,200	$ 27,000,000
Total Subscriber Connection Equipment			$ 34,751,250
Per subscriber cost for residential hookup			$ 1,544

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Monthly Revenue

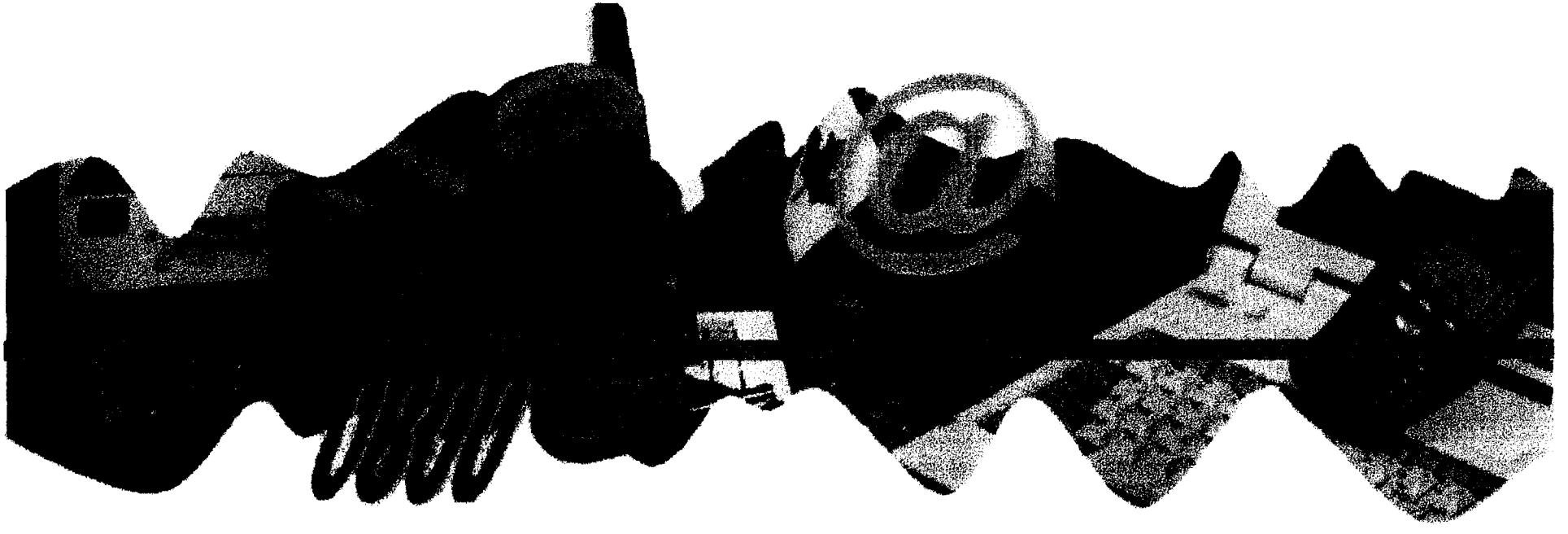
- Video: broadcast and premium
- Voice: local loop and enhanced services
- Data: high speed internet

Item	Quantity	Rate	Total Revenue
Total homes passed	25,000		
Total number of subscribers	22,500		
Video penetration (of subscribers)	40%		
Digital video penetration	50%		
Video content cost (% of revenue)	33%		
Monthly standard video revenue		$ 40.00	$ 360,000
Monthly digital premium revenue		$ 10.00	$ 81,000
Primary POTS penetration	90%		
Monthly revenue for primary POTS		$ 15.00	$ 303,750
Secondary POTS penetration (of primary lines)	50%		
Monthly revenue for secondary POTS		$ 10.00	$ 78,750
Telephony enhanced services and long distance		$ 25.00	$ 393,750
Total POTS revenue			
High speed data penetration	35%	$ 40.00	$ 315,000
Total Monthly Revenue			$ 1,464,750
Average Revenue per Subscriber			$ 65.10
Average Opex per Subscriber			$ 20.00

Business Case Result

- Budgetary numbers for OSP and equipment
- Network buildout cost of $53M
- Monthly revenue of $1.5M
- 5 year positive discounted cash flow
- 17 percent internal rate of return
- Other services can be offered
- Represents new build model

PON Regulatory Issues



PON Regulatory Issues

- Powering
- Functionality of Optical Network Termination (ONT)
- Video rules
- Unbundling

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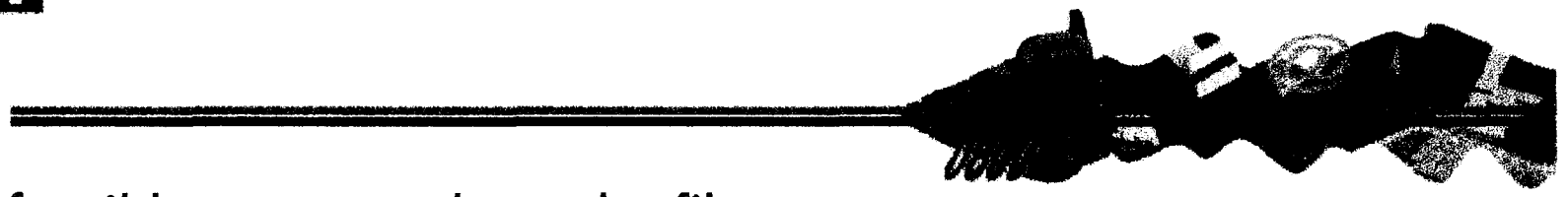
Powering Options



- Not feasible to power down the fiber.
- Network powering via separate copper pair negates savings of the copper loop.
- Only realistic approach is local powering with battery backup.
- Issues:
  - ✓ Length of backup required, e.g., 8 hours
  - ✓ Backup of video and data interfaces
  - ✓ Types of batteries: rechargeable or dry cell
  - ✓ Location of batteries: inside or outside of home
  - ✓ Access to power receptacle
  - ✓ Access to battery location
  - ✓ Network or customer ownership of batteries

Functionality of ONT

- Provides Service Demarcation
- Provides consistency in user interface across multiple access technologies (VDSL, HFC, FTTH, LMDS, etc.)
- Potential interfaces towards customer:
  - ✓ Four POTS with lifeline (RJ11)
  - ✓ Video Services 75 Ω Coaxial "F" connector
  - ✓ 10/100 Base-T (RJ45)
  - ✓ 10 Mb/s HPNA 2.0
  - ✓ IEEE 802.11b wireless
- Allowed functionality
  - ✓ SIP gateway for VoIP
  - ✓ Headend for home networking

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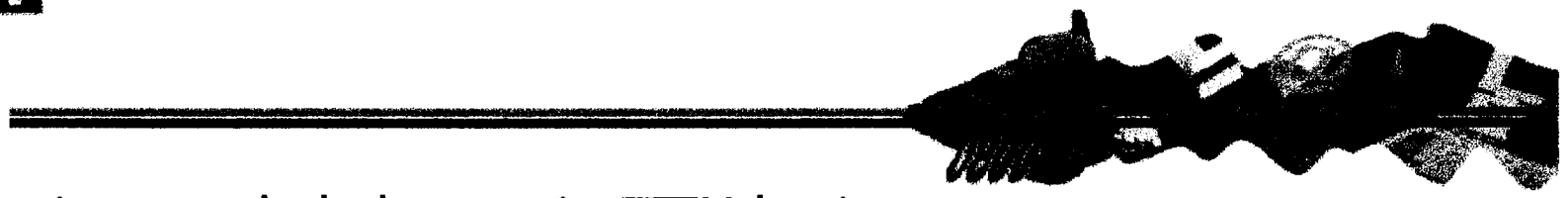
Video



- Video is a needed element in FTTH business case
- Franchise rules have buildout requirements
  - ✓ Inconsistent with initial new-build deployments
  - ✓ Inconsistent with no buildout requirements for cable telephony
- Video Dial Tone / Open TV rules have negative business cases
- IP Video may make current distinctions irrelevant
  - ✓ Some video services already becoming available over high-speed Internet
  - ✓ Under which circumstances and arrangements can ILECs participate in video services
- What equipment can be within the regulated network
- Video rules have direct impact on the design of PONs

FTTH Unbundling

- What unbundling requirements will be placed on Passive Optical Networks?
- Will there be "line sharing" requirements?
- What interface points must be opened for competitive interconnection?
- Requirements for maintaining displaced copper loops?

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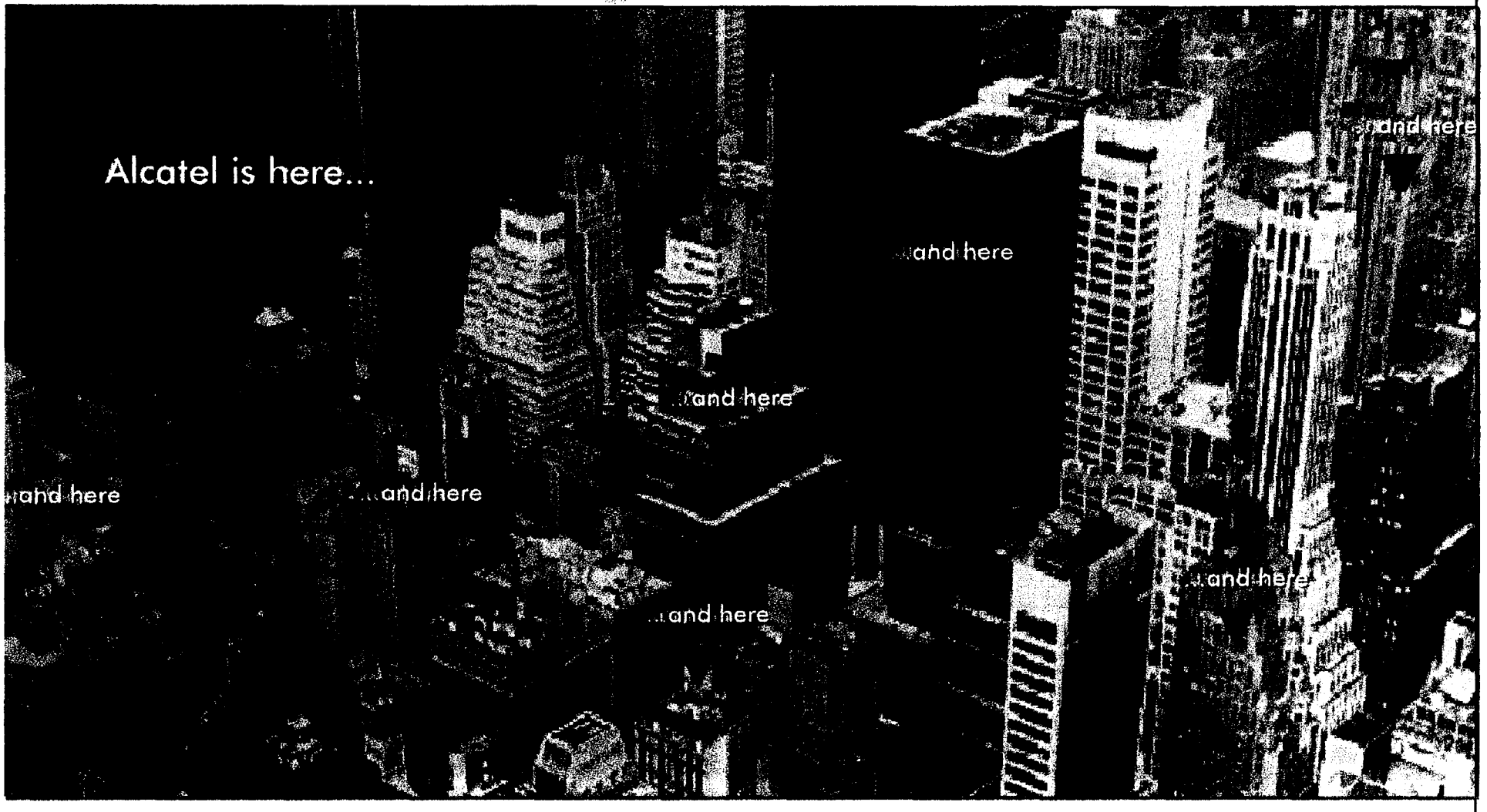
Economic Conclusions

- FTTH appears to bring significant economic benefits to U.S. telecommunication users
- FTTH technology has matured to where it is economic for new build deployment
- Actual development of FTTH products will depend upon the regulatory conditions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