

Motorola's Vision for 3G CDMA

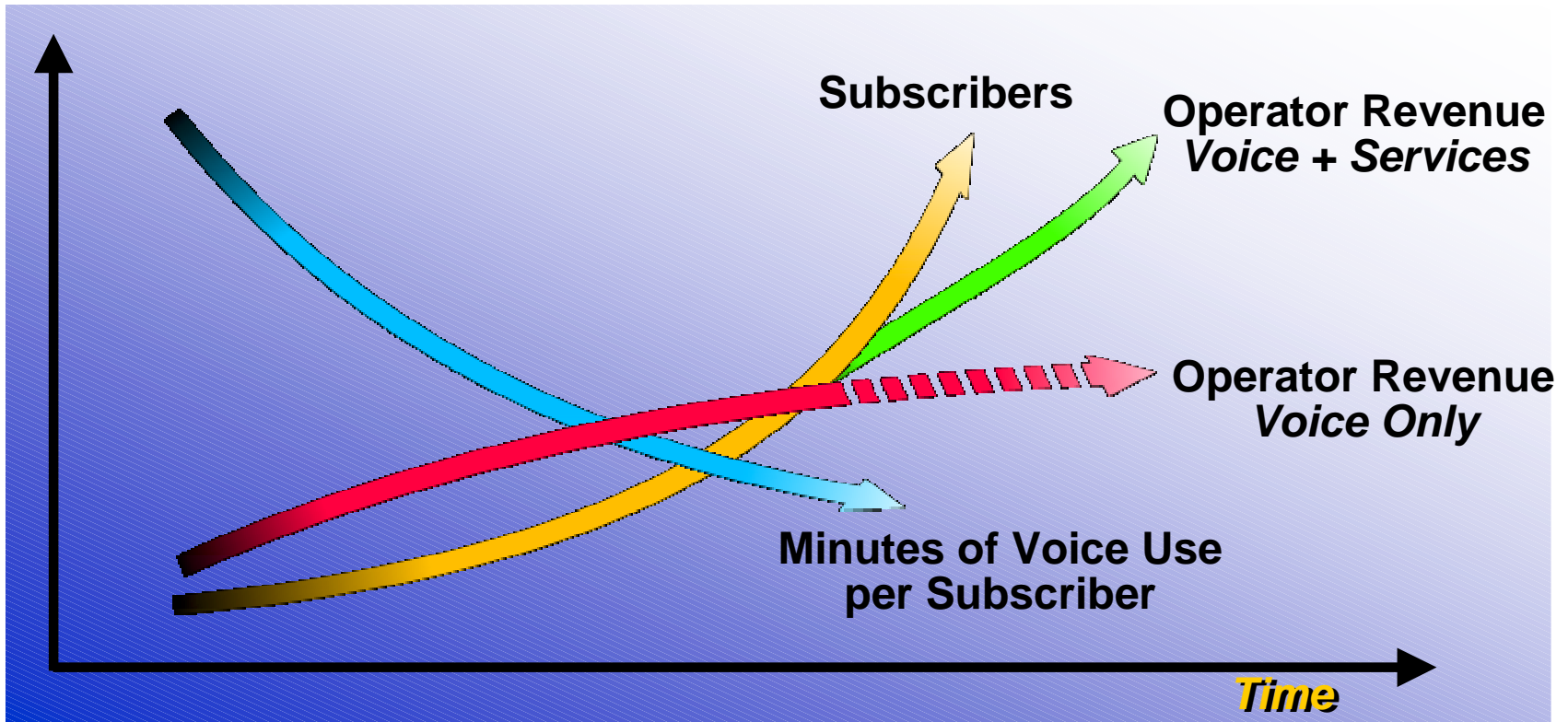
**Sub-Regional Seminar
Warsaw, Poland**

October 4, 2001

Discussion Topics

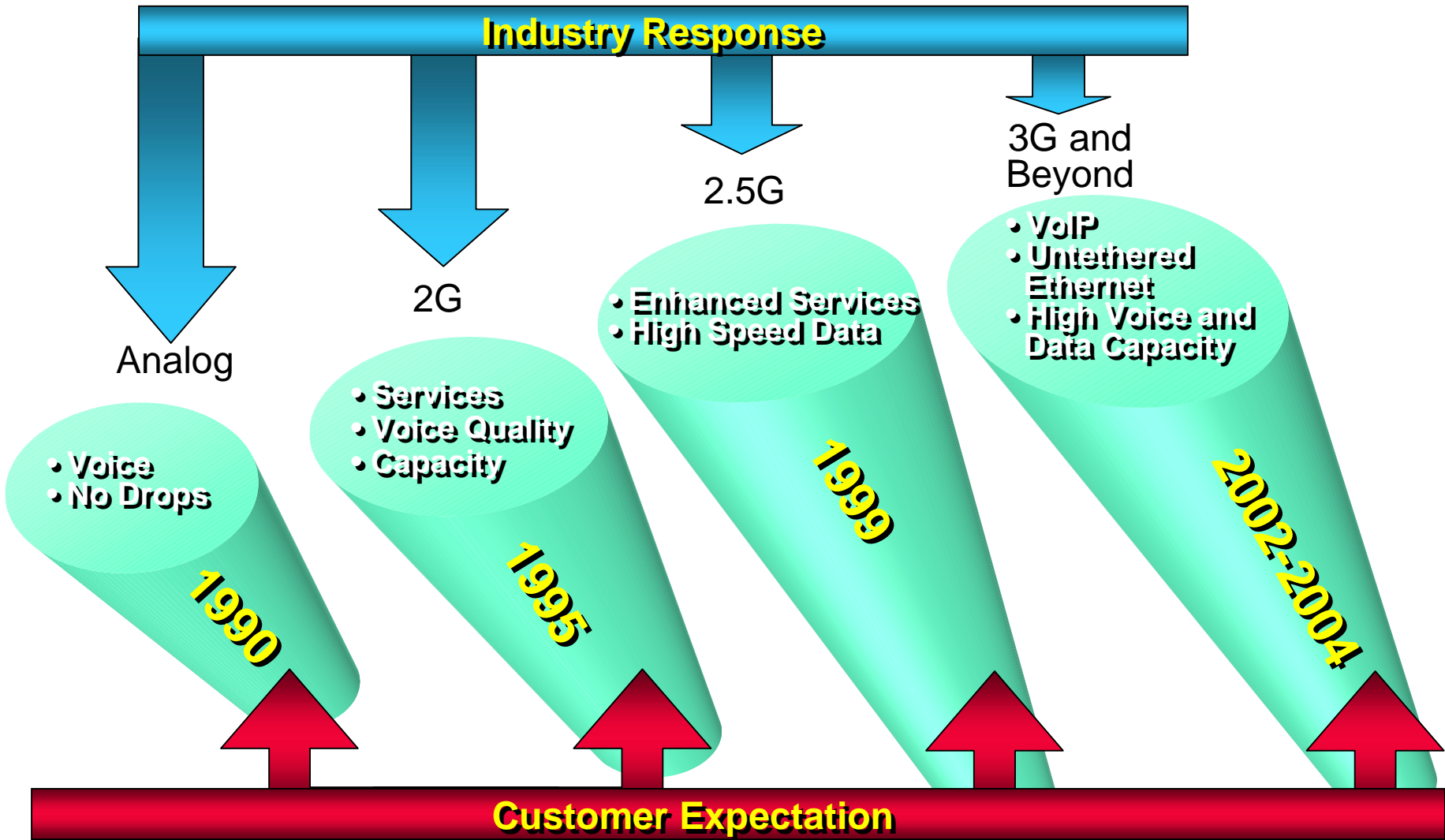
- **CDMA Market Overview**
 - Trends
 - Growth
 - Evolution
- **3G Is Here and CDMA Is Ready**
 - Successful Path
 - Significant Role in 3G

Wireless Market Trends

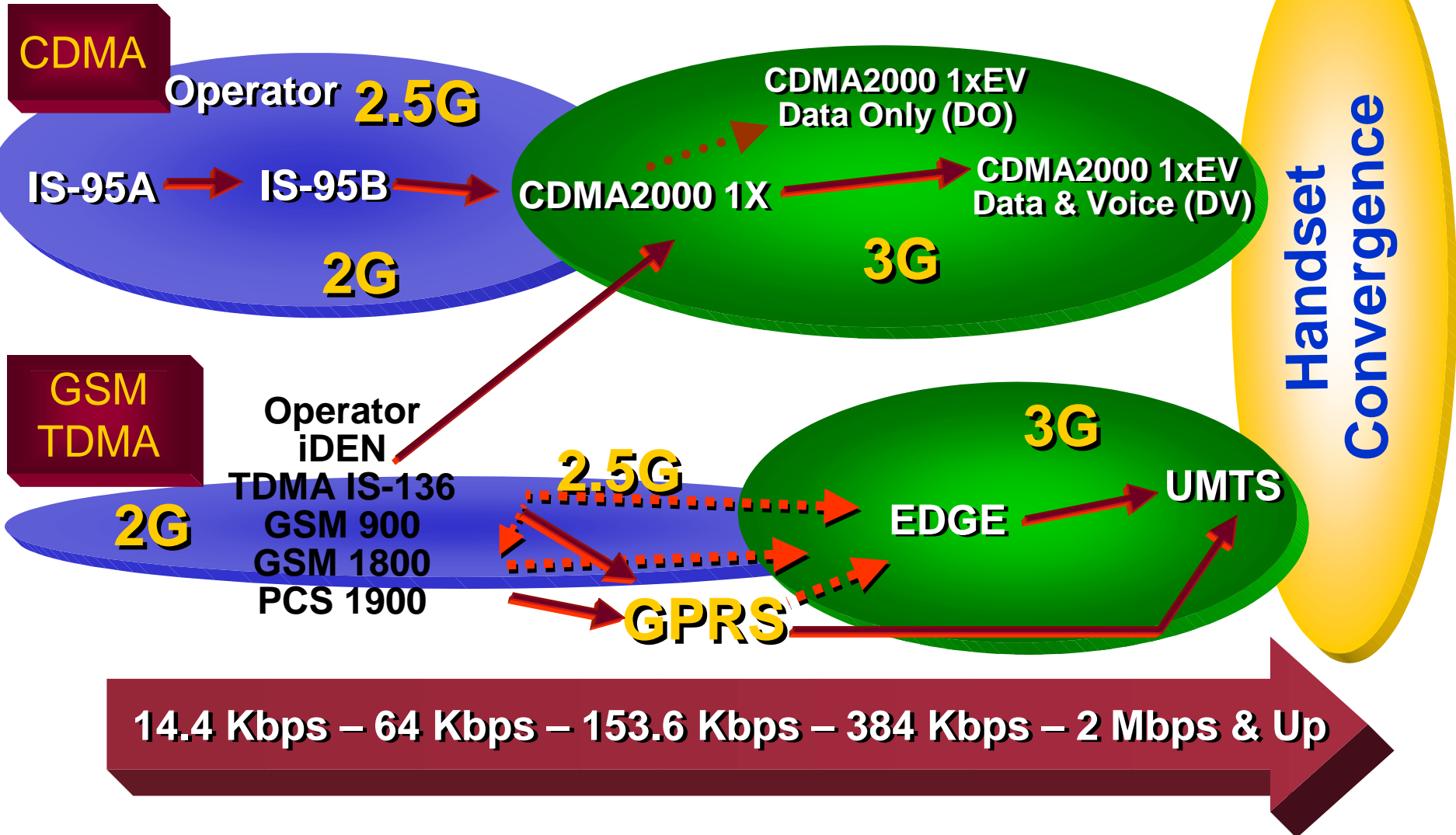


✓ **Future Growth Will Be Driven by Non-Voice Services, Increasing Network Complexity and New Revenue Generation**

Benefits and Value Migration



Migration Paths to 3G



CDMA vs. Other Technologies

CDMA IS-95B (64 Kbps)
commercial
deployments in Japan
and Korea

CDMA2000 1X service
rollout (up to 153.6 Kbps)

CDMA industry
commercializes 1xEV-DV
(up to 4.8 Mbps) service

Korea introduces
commercial
CDMA2000 1X
(up to 153.6
Kbps)

CDMA industry
1xEV-DO (up to 2.4 Mbps)
deployment targeted



GSM industry
commercializes GPRS
(26 Kbps) service

GSM industry
EDGE deployment
targeted

GSM industry
commercializes WCDMA
(2 Mbps) service

The Wireless Internet Begins...

- Data penetration still less than 10% but growing rapidly.
- 60% Mobile Internet penetration already in Japan.
- Sprint, BT Cellnet, DoCoMo, J-Phone, KDDI, Nextel, and Verizon all exceed 1 million data subscribers.
- Over 15% of all telecom service revenue will come from Mobile Internet in 2005.

Mobile Internet Subscribers

Carrier	Subs (M)
DoCoMo*	23.0
KDDI*	7.2
J-Phone*	6.7
BT Cellnet	1.3
Shinsegi (Korea)	0.5
Sprint PCS	1.5
Verizon	1.0
AT&T	0.6
Nextel	1.1
Telefonica	0.5
Omnitel	0.1
TIM	0.1
France Telecom	0.7
Others	1.65
Total*	46.0

Source: Company and Industry Reports,
Japan Telecommunications Carriers Association

* As of 4/30/01

3G Concept Devices / Applications



Voice & Multi-Media Playback messaging
PIM and synchronization
live communication

Infotainment

entertainment picture messaging
chat



Multi-Media Tablet



entertainment location
live communication

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 - **Successful Path**
 - **Significant Role in 3G**

Today CDMA2000 1X Provides...

- **Support of CDMA2000 1X Air Interface**
 - Enables new revenue generating data opportunities
 - Nearly doubles voice capacities
- **Orderly Migration Path**
 - Maximizes re-use of existing equipment
 - Minimizes risk to existing voice services
 - Simplifies BTS upgrades
- **Introduction of Packet Components**
 - Packet Data Service Node
 - Authentication, Accounting, and Authorization Server

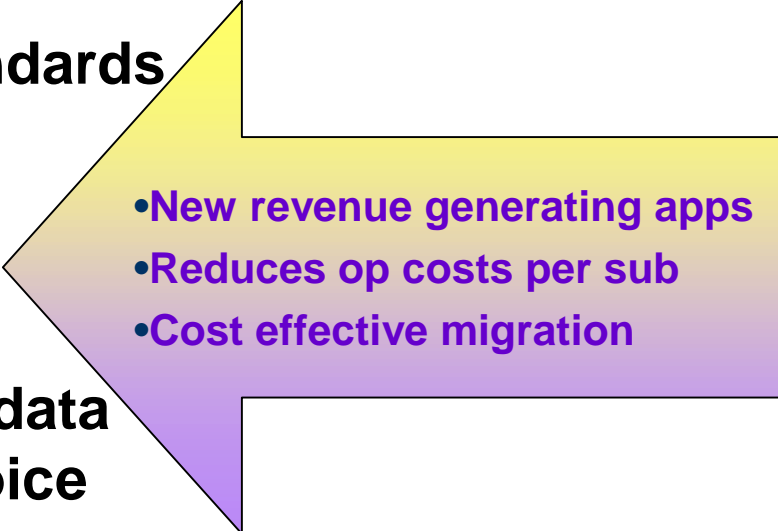
CDMA2000 1X Enhancements Summary

- **Technical Improvements**

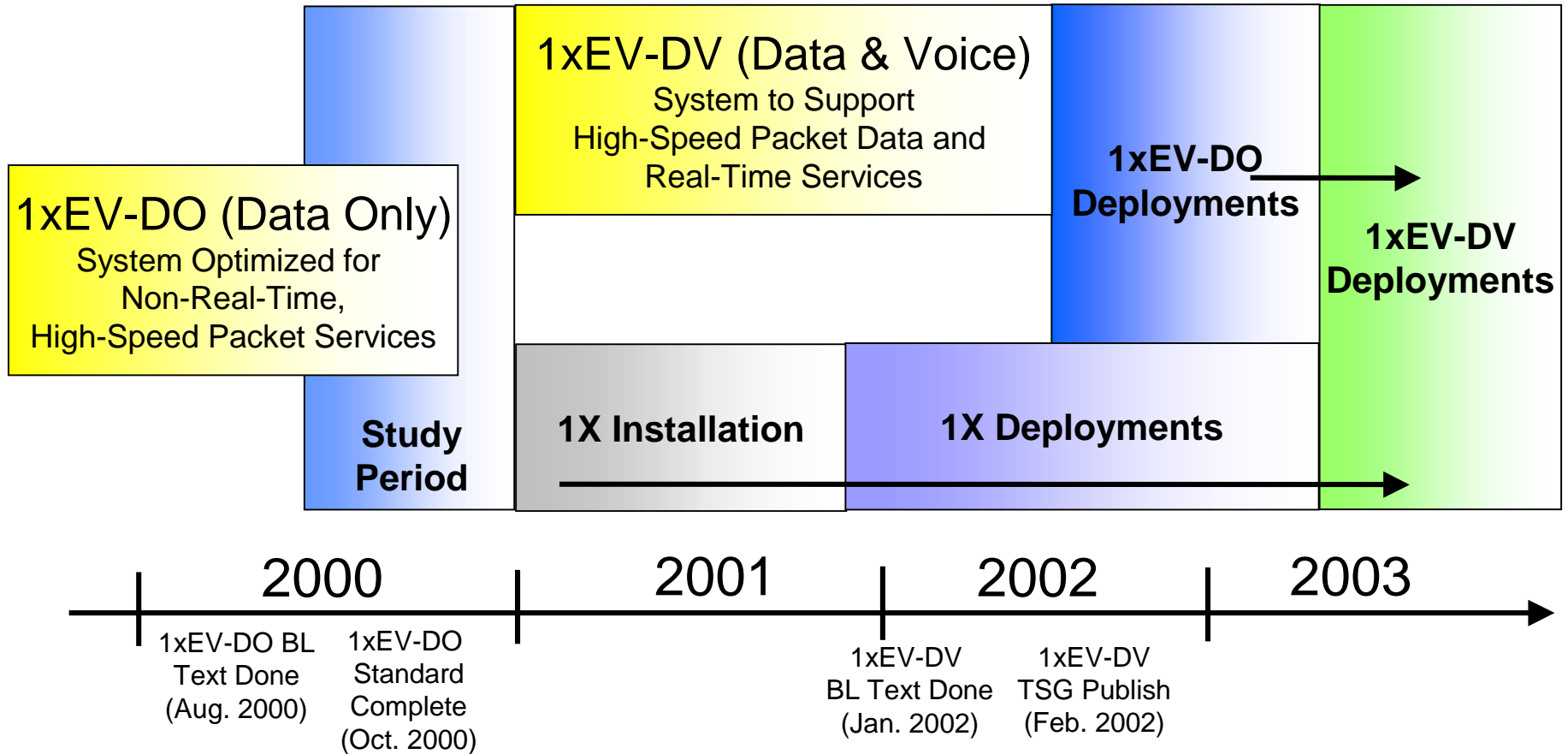
- MAC and turbo codes for data
- Fast forward and reverse link power control
- Forward link transmit diversity
- Re-use of IS-95A and IS-95B standards

- **Benefits**

- 153.6 Kbps data rate
- Up to 4-6X capacity increase for data
- Up to 2X capacity increase for voice
- Migration strategy from IS-95A/B

- 
- New revenue generating apps
 - Reduces op costs per sub
 - Cost effective migration

The CDMA Cost Effective, Smooth 3G Migration Path

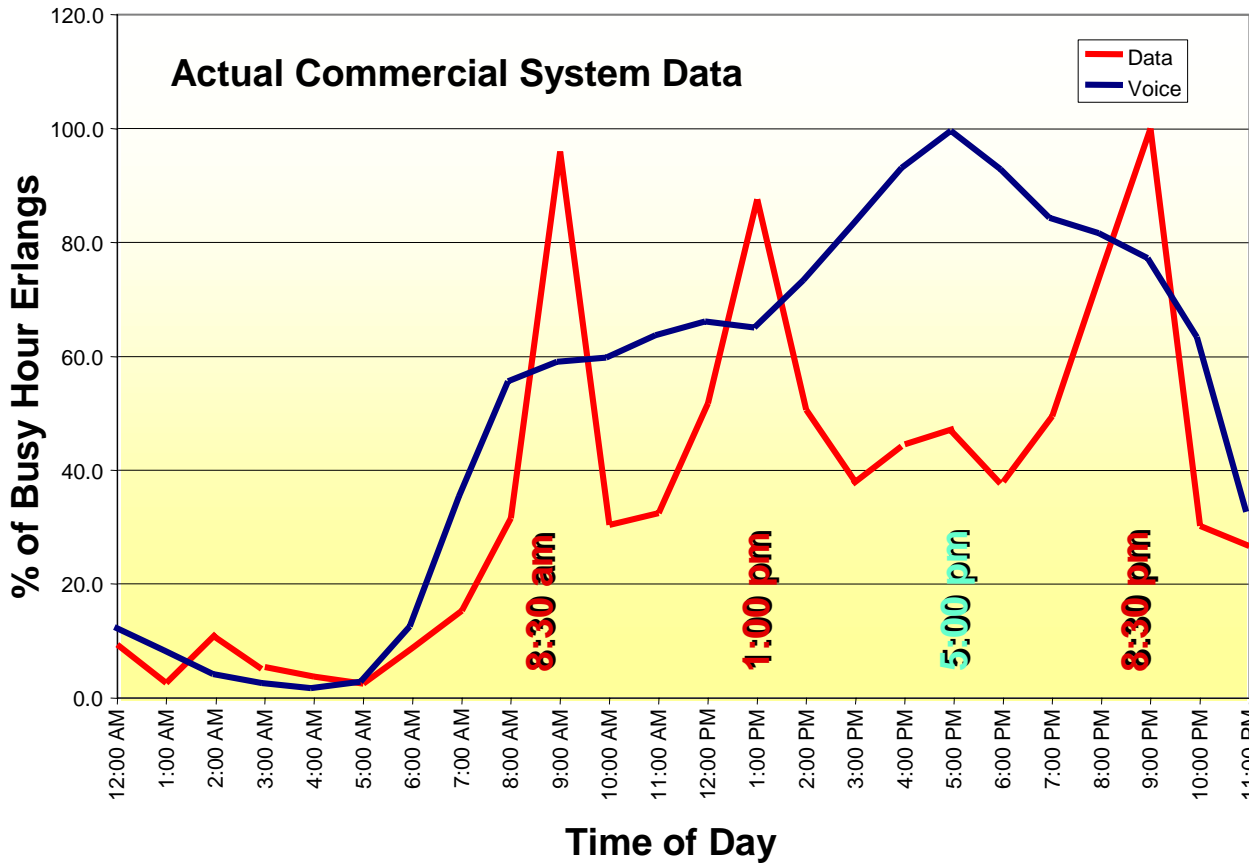


1xEV-DV Overview

- **Peak data rate of 4.8 Mbps--unmatched data capacity of 1.0 Mbps within 1.25 MHz**
- **Reverse link peak data rate of 614 Kbps**
 - 1.38 Mbps reverse link peak rate under investigation
- **Backward compatible with IS-95A/B and 1X**
- **Supports voice, mixed voice/data, and real-time, 2-way on a single carrier**
- **Flexibility to deploy data only carriers to maximize end-user data rates**
- **Background, interactive, streaming, and real-time/2-way services**
- **WCDMA/HSDPA and 1xEV-DV share common CDMA technology**

1xEV-DV

Mixed Voice and Data Economies



Voice and data busy hours are NOT coincident

Possible to support data traffic with unused voice capacity

Data-only overlays increase operators' cost model

Standards-based voice and data networks promote economies of scale

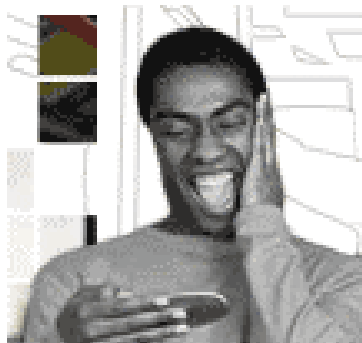
1xEV-DV – 2-Way, Simultaneous Voice and Data – Future Ready



See Each Other



Talk to Each Other



Be Totally Connected

1xEV-DV Proposal Partners

- **Motorola** has over 110 contracts to deploy cdmaOne™ systems in 24 countries worldwide
- **Nokia** is the world's leading mobile phone company with over 30% market share in 2000
- **Texas Instruments** is the leading semiconductor provider of 2G & 2.5G wireless terminal solutions
- **Altera** is the leading supplier of programmable logic solutions
- **Philips** is the leading supplier of ICs, discrete components, and systems solutions for wireless communications

Final Thoughts...

Motorola Is Ready for 3G

- **3G is really here and it profoundly changes the wireless industry by delivering new and compelling voice, data, and integrated services.**
- **1xEV-DV is the evolution path for CDMA2000. This technology will continually drive the industry to meet the expectations that customers have for wireless.**
- **Motorola is a leader in CDMA2000 and plans to continually contribute to the 3G efforts together with the CDG and other CDMA industry leaders.**

Motorola Leadership

- Worldwide Leadership
 - Deployed world's first commercial cdmaOne™ and first cdmaOne systems in Japan, China, United States, Latin America, Africa, and Israel
 - Over 110 contracts to deploy cdmaOne systems in 24 countries
 - Commercially deployed 3.1 Mcps HSPD in Japan
 - Leading proposal for 3.1 Mcps HSPD in 3GPP2
- Product Leadership
 - First to deploy IOS internationally
 - Innovation: concept creator of “wearable” phone
 - Deployment flexibility, increased capacity and coverage: CDMA base transceiver subsystem solutions
 - Proven reliability: Japan – 7.2 million subscribers on Motorola IS-95B networks