# Wireless Data Networks

## Peter Rysavy Rysavy Research



MICROSOFT CORP. EXHIBIT 1021

Find authenticated court documents without watermarks at docketalarm.com.



http://www.rysavy.com mailto:rysavy@rysavy.com 1-541-386-7475

#### **Background**

Peter Rysavy is the president of Rysavy Research, a consulting firm specializing in wireless communications and other technologies related to personal and mobile communications. Since 1993, Peter has worked with numerous clients including investment firms, cellular carriers, cellular infrastructure vendors, communications software companies, semiconductor manufacturers, network hardware companies, automotive electronics companies, research organizations and universities.

His firm, Rysavy Research, does market research, develops products and services, analyzes business opportunities, and manages technology deployment. From 1988 to 1993, Peter was vice-president of engineering and technology at Traveling Software (makers of LapLink) where his last major project was LapLink Wireless. He managed the development of LapLink and connectivity solutions for a broad variety of mobile platforms. Prior to that, he spent seven years at Fluke Corporation where he designed communications hardware and software for data acquisition products.

Peter is the chair of the standards and architecture committee of the Portable Computing and Communications Association (PCCA), a group that produces wireless-data recommendations and standards. He also teaches seminars and writes articles about wireless communications.

DOCKE

#### WIRELESS DATA NETWORKS Table of Contents

- 1. Wireless Data Networks
- 2. Overview
- 3. The Promise
- 4. Why Wireless?
- 5. What Will Drive Wireless?
- 6. Crossing the Chasm
- 7. Mobile Network Summary
- 8. OSI Reference Model
- 9. Interconnections
- 10. Circuit Switched / Packet Switched
- 11. Wide Area versus Local Area
- 12. Radio Modulation
- 13. Error Control
- 14. Electromagnetic Spectrum
- 15. Effects of Latency
- 16. Slow Link Aware
- 17. Mobile Platforms
- 18. Conventional Remote Access
- 19. Wireless-Optimized Remote Access
- 20. Smart Phones
- 21. Wireless Application Protocol
- 22. WAP Architecture
- 23. Wireless Knowledge
- 24. Mobile IP
- 25. Virtual Private Networking
- 26. IP Telephony
- 27. WLANs in Perspective
- 28. IrDA
- 29. Bluetooth
- 30. Bluetooth Overview
- 31. Bluetooth Piconets
- 32. Bluetooth Scatternets
- 33. Wireless LANs
- 34. WLAN Summary
- 35. Wireless LAN Capacity
- 36. Wireless LAN Protocol Stacks
- 37. 802.11 Physical Layer Evolution
- 38. Unlicensed National Information Infrastructure
- 39. HiperLAN1
- 40. HiperLAN2
- 41. Narrowband Data Networks
- 42. Paging Highlights
- 43. Two-Way Paging Applications
- 44. DataTAC Architecture
- 45. DataTAC Characteristics
- 46. DataTAC Air Link
- 47. BellSouth Wireless Data Mobitex
- 48. BellSouth Wireless Data Mobitex
- 49. Mobitex Architecture
- 50. Mobitex Air Link
- 51. Cellular Networks

DOCKE.

Δ

52. Mobile Network Summary

LARM Find authenticated court documents without watermarks at <u>docketalarm.com</u>.

- 53. Cellular Data Overview
- 54. Cellular Networks
- 55. Cellular / PSTN Interconnection
- 56. Cellular Roaming
- 57. AMPS
- 58. Data over Analog Cellular
- 59. Modem Pools
- 60. CDPD (Cellular Digital Packet Data)
- 61. CDPD Overview
- 62. CDPD Inter-carrier and Internet
- 63. CDPD Protocol Stacks
- 64. Digital Cellular and PCS
- 65. Cellular Generations
- 66. Digital Cellular Architecture
- 67. Data Services
- 68. Centralized Data Facilities
- 69. Circuit Data over Digital Cellular
- 70. Digital Cellular Fax Service
- 71. Short Message Service (SMS)
- 72. Internet Interworking Function
- 73. IS-136
- 74. IS-136 Interfaces
- 75. Time Division Multiple Access
- 76. IS-136 Air Link
- 77. TDMA Data Evolution
- 78. GSM Overview
- 79. GSM Interfaces
- 80. GSM Air Link
- 81. GSM Framing (Mobile to Base, Full Rate)
- 82. GSM Data Evolution
- 83. HSCSD
- 84. General Packet Radio Service (GPRS)
- 85. GPRS Related Standards
- 86. GPRS Architecture
- 87. GPRS / GSM Architecture
- 88. GPRS Protocols
- 89. GPRS Quality of Service
- 90. IS-95 CDMA Overview
- 91. CDMA Interfaces
- 92. CDMA Air Link
- 93. IS-95 CDMA Data Evolution
- 94. Other Cellular Systems
- 95. Third Generation Systems
- 96. Mobile Network Summary
- 97. Third Generation Mobile Systems
- 98. 3GPP and 3GPP2
- 99. Mobile Wireless Internet Forum (MWIF)
- 100. 3G-IP
- 101. 3G Spectrum Requirements
- 102. Platforms
- 103. 3G/4G Evolution
- 104. IP Cellular Architecture
- 105. IPv6

DOCKE

- 106. Enhanced Data Rates for GSM Evolution
- 107. EGPRS-136 and GPRS Roaming
- 108. EDGE Air Interface
- 109. EDGE Modulation and Coding Schemes
- 110. EGPRS-136

- 111. EGPRS-136 and TIA/EIA-136 Integration
- 112. Wideband CDMA
- 113. UMTS Architecture
- 114. UMTS Data
- 115. UMTS Protocols
- 116. UMTS QoS Architecture
- 117. QoS Parameters
- 118. UMTS All IP Architecture
- 119. cdma2000
- 120. cdma2000 Architecture
- 121. 1XRTT
- 122. 1XRTT and 3XRTT
- 123. cdma2000 Multimedia Standards
- 124. CDMA HDR
- 125. HDR Architecture
- 126. CDMA Convergence
- 127. CDMA Convergence
- 128. Other Networks
- 129. Mobile Network Summary
- 130. Enhanced Specialized Mobile Radio
- 131. iDEN
- 132. iDEN System
- 133. Metricom Ricochet Network
- 134. Ricochet Mesh Network
- 135. Ricochet2
- 136. Cellemetry
- 137. Fixed Point-to-Point Systems
- 138. Microwave Systems
- 139. Broadband Wireless Access
- 140. Local Multipoint Distribution Service (LMDS)
- 141. Multi-Channel Multi-Point Distribution Service
- 142. Point to Multipoint
- 143. Broadband Deployment
- 144. High Altitude Long Endurance
- 145. Satellite Systems
- 146. Bent Pipes vs. Switching Systems
- 147. Geosynchronous vs. Low Earth Orbiting
- 148. Some Geosynchronous Systems
- 149. Some Non-Geosynchronous Systems
- 150. Course Conclusion

DOCKET

ALARM

### DOCKET A L A R M



## Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

#### **Real-Time Litigation Alerts**



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

#### **Advanced Docket Research**



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

#### **Analytics At Your Fingertips**



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

#### API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

#### LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

#### FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

#### E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.