

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

WASHINGTON, DC 20549

FORM 10-K

Annual Report Pursuant to Section 13 or 15 (d)
of the Securities Exchange Act of 1934

FOR THE FISCAL YEAR ENDED
DECEMBER 31, 1998

COMMISSION FILE NO. 0-19437

CELLULAR TECHNICAL SERVICES COMPANY, INC.
(Exact Name of Registrant as Specified in Its Charter)

DELAWARE
(State or Other Jurisdiction of
Incorporation or Organization)

11-2962080
(IRS Employer Identification No.)

2401 FOURTH AVENUE, SEATTLE, WASHINGTON 98121
(Address of principal executive offices) (Zip Code)

Registrant's telephone number, including area code: (206) 443-6400

Securities registered pursuant to Section 12(b) of the Act: NONE

Securities registered pursuant to Section 12(g) of the Act:

COMMON STOCK, \$.001 PAR VALUE
(Title of Class)

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to the filing requirements for the past 90 days. Yes No
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Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of Registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. []

As of March 15, 1999, there were 2,281,509 shares of Common Stock, \$.001 par value outstanding. As of March 15, 1999, the aggregate market value of the Registrant's Common Stock, \$.001 par value, held by non-affiliates was approximately \$5.7 million. The aggregate market value of the Company's stock was calculated using the average of the high (\$2.625) and low (\$2.50) sale price for its Common Stock on March 15, 1999 as reported on The Nasdaq Stock Market (National Market System).

Documents incorporated by reference in Part III: The Company's definitive proxy statement to be filed in connection with the 1999 Annual Meeting of Stockholders.

Exhibit Index - see page 41

CELLULAR TECHNICAL SERVICES COMPANY, INC.

TABLE OF CONTENTS FOR FORM 10-K

PART I.....	3
ITEM 1. BUSINESS.....	3
ITEM 2. PROPERTIES.....	23
ITEM 3. LEGAL PROCEEDINGS.....	23
ITEM 4. SUBMISSION OF MATTERS TO A VOTE OF SECURITY HOLDERS.....	24
PART II.....	25
ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY AND RELATED STOCKHOLDER MATTERS.....	25
ITEM 6. SELECTED FINANCIAL DATA.....	26
ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS.....	27
ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK.....	38
ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA.....	38
ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE.....	38
PART III.....	39
ITEM 10. DIRECTORS AND EXECUTIVE OFFICERS OF THE REGISTRANT.....	39
ITEM 11. EXECUTIVE COMPENSATION.....	40
ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT.....	40
ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS.....	40

PART I

ITEM 1. BUSINESS

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K for Cellular Technical Services Company, Inc. (the "Company") contains certain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 that reflect the Company's views with respect to future events and financial performance. The Company uses words and phrases such as "anticipate," "expect," "intend," "the Company believes," "future," and similar words and phrases to identify forward-looking statements. Reliance should not be placed on these forward-looking statements. These forward-looking statements are based on current expectations and are subject to risks, uncertainties and assumptions that could cause, or contribute to causing, actual results to differ materially from those expressed or implied in the applicable statements. Readers should pay particular attention to the descriptions of risks and uncertainties described in this report and in the Company's other filings with the Securities and Exchange Commission. All forward-looking statements included in this report are based on information available to the Company on the date of this report. The Company assumes no obligation or duty to update any such forward-looking statements.

GENERAL

The Company's goal is to be a premier provider of real-time information processing and information management solutions for the worldwide wireless communications industry. Over the past 10 years, the Company has used its extensive experience with real-time wireless call processing to create technologically advanced solutions for this industry. Today, the Company develops, markets and supports both software and hardware as part of its integrated solutions for wireless communications fraud management, focusing primarily on "user/device authentication" and "service metering" applications.

User/Device Authentication

The Company's primary focus is in the area of "user/device authentication," which involves various forms of "pre-call" verification to ensure that the use of a wireless communications device (e.g., a wireless telephone) is legitimate before the device is allowed to connect to a wireless communications network. In this area, the Company is a leading provider of radio frequency ("RF") based solutions for the prevention of "cloning fraud." This term is used to describe the illegal activity of using a scanning device to steal the electronic serial number and mobile identification number of a legitimate wireless telephone while in use, then reprogramming the stolen numbers into other phones. These reprogrammed phones, or "clone phones," are then used to make illegal calls on a wireless communications network, without payment for the wireless services rendered.

The Company's suite of RF-based platform solutions in this area include the Blackbird'r' Platform, PreTect'TM' cloning-fraud prevention application, No Clone Zone'sm' roaming-fraud prevention service and related application products and services (collectively, the "Blackbird Platform Products"). The Company's Blackbird Platform Products are currently deployed in more than 2,000 cell sites in most major markets throughout the United States. The Company's customers have reported up to a 95% reduction in cloning fraud activity in market areas served by the Blackbird Platform Products.

The Company's Blackbird Platform is also designed to support a broad range of

additional products and services for the wireless communications industry, including both fraud and non-fraud products and services. The Company believes that the open, scalable architecture of the Blackbird Platform will allow the Company and others to develop application products and services that could run on or exchange information with the Blackbird Platform to meet the needs of this industry.

Service Metering

The Company also provides products and services in the area of "service metering." This primarily involves the collection of various forms of "post-call" information (within minutes after the end of the call) to ensure that a wireless subscriber has proper financial account status to make additional calls. In this area, the Company is a leading developer of real-time call rating technology used to control "subscription fraud." This term is used by the wireless industry to describe the illegal activity of submitting false information to open a new subscriber account for the use of wireless communications services, without payment of the wireless services when rendered. The Company's suite of platform solutions in this area include the Hotwatch Platform and related application products and services (collectively, the "Hotwatch Platform Products").

THE WIRELESS COMMUNICATIONS INDUSTRY

From its inception, wireless telephone service has been one of the fastest growing segments of the worldwide telecommunications industry. The Cellular Telecommunications Industry Association ("CTIA") has estimated that the number of wireless telephone subscribers in the United States increased from approximately 340,000 subscribers in December 1985 to approximately 65 million subscribers in 1998. Industry analysts believe that the number of wireless telephone subscribers may grow to in excess of 100 million in the United States and more than 300 million worldwide by the end of 2001. International market analysts have forecast that total worldwide wireless telephone service revenue will grow from \$195 billion in 1998 to \$280 billion by the end of 2000 and \$361 billion by the end of 2002.

Wireless telephone service is provided by carriers operating either analog networks or digital networks. Analog networks transmit radio signals over the air in the actual voice waveform. Digital networks digitize the voice waveform using various coding techniques before the signal is transmitted over the air. Digital networks contain certain technological advantages, including expanded feature capacity, greater privacy and enhanced security.

Throughout the 1980s, carriers in the United States and many other countries primarily installed and used analog networks. All analog networks in the United States use a common signal transmission standard, which, together with certain derivations, is known as the Advanced Mobile Phone Services ("AMPS") standard. This uniform standard enables carriers, through "roaming agreements" with carriers of other analog networks, to provide extensive coverage for their subscribers. As a result, subscribers using analog networks in the United States generally can use their analog phones wherever the subscriber is located, as long as an analog network is operational in the area. Today, service provided by analog networks continues to dominate wireless telephone services in the United States. The Company believes that approximately 85% of wireless telephone subscribers in the United States use analog networks today.

However, for a number of years, wireless telephone service in the United States has undertaken a gradual shift from the use of analog networks to the use of digital networks, primarily in the most populated markets. In recent years, this shift has intensified. Industry analysts predict that, by 2002, 58% of wireless telephone subscribers in the United States will use digital networks, compared to 15% digital subscriber usage today. This trend is fueled by increased competition derived from new frequency bandwidth licenses auctioned by the Federal Communications Commission ("FCC") over the past several years and continued improvements in digital wireless technology. Through this process, the industry has seen the emergence of personal communications service ("PCS") and enhanced specialized mobile radio ("ESMR"), which now compete directly with analog networks in most domestic markets. PCS and ESMR are digital networks operating on a higher frequency bandwidth than the embedded base of analog

networks. Sprint PCS, Western Wireless, AT&T Wireless Services, BellSouth Mobility, GTE Wireless and PCS PrimeCo are examples of wireless telephone carriers operating digital PCS networks in the United States. ESMR service in the United States is currently dominated by one carrier, Nextel Corporation.

4

Digital networks, such as PCS networks, currently operate under one of three principal digital signal transmission standards: Code Division Multiple Access ("CDMA"), Time Division Multiple Access ("TDMA"), or Global System for Mobile Communications ("GSM"). CDMA and TDMA are the most widely used digital standards in the United States, and GSM is the most prevalent worldwide. These digital standards are not currently compatible with each other. Thus, a subscriber of a digital network that uses CDMA, TDMA, or GSM currently will be unable to use a wireless phone when traveling in an area not operated under the same digital standard, unless the subscriber carries a specialized multi-mode phone that permits the subscriber to use the digital standard in that area or defaults to the analog network in that area. The Company believes that, without uniform digital standards in the United States, there will be a steady push by wireless telephone carriers to increase the use of multi-mode phones. This will provide continuity of service as a subscriber travels from one type of network (analog or digital) to another within the same market, or while roaming from the subscriber's "home" market to a different geographical market.

Despite the significant growth of digital networks, the Company believes that analog networks will continue to play a significant, yet declining, role in wireless telephone service for the foreseeable future. The Company believes that the continued viability of analog networks depends on a variety of factors, such as the current pervasive use of analog phones and the costs required to replace them with digital phones, the current capacity available on existing analog networks, the existence of multiple, incompatible digital transmission standards, and the need to provide widespread roaming service for subscribers.

KEY ISSUES FOR WIRELESS TELEPHONE CARRIERS - MARKET OPPORTUNITIES FOR THE COMPANY

Presently, the Company's existing and potential customers are wireless telephone carriers. These carriers operate in a dynamic, rapidly-changing environment and are subject to intense competition, cost sensitivity and other market forces which, in turn, impact the Company's existing products and services and influence the Company's direction for the future.

Effects of Competition on the Wireless Industry

Lower price per minute usage. Through licensing auctions conducted by the FCC, new frequency bandwidth allocations have driven a rapid expansion in the number of wireless telephone carriers in any given market. The increased competition has spawned a profusion of new pricing plans which has effectively driven the price per minute of wireless telephone usage to new industry lows. According to the Yankee Group, wireless rates have dropped an average of 40% from early 1995. As a result, wireless telephone carriers must implement new service offerings to not only grow, but also preserve their existing subscriber base to help recover their subscriber acquisition costs and analog to digital network upgrade costs.

Higher minutes of use. The trend toward a lower price per minute has also driven up the total number of minutes of usage to new highs. According to a study prepared by the Yankee Group, average wireless subscribers increased usage to between 300 and 400 minutes per month, up from the previous industry average of about 100 minutes per month. The decline in pricing and the increase in service providers available to subscribers is keeping the total average revenue per subscriber at current to slightly increasing levels.

Wireless displacing landline phones. In addition, the Company believes that all-inclusive rate plans and cost-effective service packages will continue to serve wireless telephone carriers well in their move to displace landline telephone service in the home with the mobility of wireless devices. Industry analysts predict that the United States market for wireless telephone service will achieve 95 million subscribers by year-end 2000 and 146 million by year-end 2005. This would mean that approximately 32% of the U.S. population is expected to subscribe for wireless service by the turn of the century.

Trends drive new services, market opportunities. These trends are driving new demands on wireless telephone carriers to provide a robust suite of services that not only replicate what landline service offers, but also provides

new ways to manage and access personal information through the wireless phone. Examples include reliable call quality and dependable availability, basic emergency services such as Enhanced 911 ("E-911") assistance, personalized information or "concierge" service, and others. The Company believes the effects of competition, including lower price per minute, higher minutes of usage and demand for new subscriber services, will continue to provide new market opportunities for the Company's existing products and services, as well as new offerings for the future.

Minimizing Customer Churn; Retaining Customers

A third of all new subscribers leave. Customer churn, the act of a subscriber switching from wireless telephone carrier to wireless telephone carrier in a short amount of time, has become a significant problem facing the wireless telephone carriers today, primarily due to the loss of sunk subscriber acquisition costs. Customer churn is running in the range of 25% - 35% per year for most carriers, according to industry sources. This level is expected to remain high as competition to attract new subscribers increases. The most frequently identified causes for a subscriber to switch wireless telephone carriers is quality and consistency of service, the variety of caller services offered and the price of such services.

Expanded capacity drives more services. To retain current customers for longer periods and increase overall customer satisfaction, wireless telephone carriers are investing in network improvements that will increase call quality, security and network capacity. An emerging technology called "geo-location" is currently being tested by wireless telephone carriers for use in multiple new subscriber applications, such as personal safety applications (i.e., E-911 and roadside assistance), asset tracking (i.e., fleet tracking) and information services (i.e., E-411 and traffic advisories).

By increasing a variety of cost effective, personalized services to subscribers, wireless telephone carriers can lock in existing customers and attract new ones. For example, industry analysts have estimated that the market for wireless geo-location technology and its commercial applications could reach \$8 billion in revenues worldwide. The Company believes the market of commercial geo-location and other similar applications will provide wireless telephone carriers with sources of revenue which will offset network upgrade costs as well as fraud and customer churn losses. The Company views its Blackbird Platform architecture and existing presence in most major domestic markets as an advantage to the Company for placement and support of future products and services, such as commercial geo-location applications. See "Business -- Blackbird Platform" below.

Industry Growth Fuels Fraud

The initial growth of wireless telephone service in analog networks created a significant and growing opportunity for fraudulent activity, primarily in the areas of cloning fraud, subscription fraud and wireless telephone theft. The CTIA estimated that, in 1996, cloning fraud in the United States resulted in more than \$1 billion in costs and lost revenues to wireless telephone carriers.

To combat the rising problem of cloning fraud, wireless telephone carriers operating analog networks implemented a variety of cloning-fraud detection and prevention technologies, including RF-based "fingerprinting" systems, such as the Company's Blackbird Platform Products, as well as other technologies, such as roamer verification reinstatement systems, profiler systems, personal identification numbers and, more recently, cryptographic authentication. Each of these technologies have had varying degrees of effectiveness. For example, the Company's Blackbird Platform Products have had significant success, with customers reporting up to a 95% reduction in cloning-fraud activity in market areas served by the Blackbird Platform Products. Overall, through the implementation and continued use of fraud prevention technologies, the CTIA now estimates that cloning fraud in the United States has been reduced to less than \$400 million in 1998.

Over the past few years, cryptographic authentication has emerged as an effective cloning-fraud prevention technology. One form of cryptographic authentication, commonly known as "A-Key authentication," uses a

6

complex algorithm derived from a mathematical cryptographic process containing a secret key (number) shared only by the phone and the carrier's network. A-Key authentication is expected to be the form of cryptographic authentication most widely adopted by wireless telephone carriers in the United States. Today, almost all new digital and analog phones for the U.S. market are being manufactured with A-Key authentication capability. A-Key authentication is now in extensive use by wireless telephone carriers operating digital networks and, to a lesser extent, is now in use by certain wireless telephone carriers operating analog networks. However, the Company believes that the use of A-Key authentication is currently limited in analog networks due to the large number of existing analog phones that were not manufactured with A-Key authentication capability.

The Company believes that cloning fraud will be held to current levels or gradually decline as fraud prevention technologies improve, more digital networks replace analog networks, and more digital phones manufactured with A-Key authentication capability are put into service. However, fraud remains an elusive and pervasive issue for wireless telephone carriers. With subscriber growth climbing at an annual rate in the range of 19% to 25%, the opportunity for fraudulent activity may also escalate. The Company expects that other forms of fraudulent activity will continue to rise, such as subscription fraud, roaming fraud and network access fraud. The Company believes it is well positioned to address these new fraud forms with current and new customers and may use its existing proprietary technology in alternate ways to provide a variety of real-time fraud detection and prevention solutions for fraud as it continues to evolve.

EFFECT OF INDUSTRY TRENDS ON THE COMPANY'S BUSINESS

Certain recent industry trends have had an adverse effect on the Company's business. These trends, and the Company's efforts to respond to them, are described below.

Industry Shift to Digital Networks. Presently, the Company's Blackbird Platform Products are used exclusively in analog networks. The Company believes that over 85% of wireless telephone subscribers in the United States use analog networks today, but that the industry is undertaking a shift to digital networks. See "Business -- The Wireless Communications Industry" above. While the Company believes that analog networks will continue to play a significant role in wireless telephone service for the foreseeable future, subscriber usage of analog networks has declined and will likely continue to decline over time in favor of digital usage.

Emergence of A-Key Authentication. A-Key authentication has recently emerged as an effective cloning-fraud prevention technology. See "Business -- Key Issues for Wireless Telephone Carriers - Market Opportunities for the Company" above. The Company does not believe that wireless telephone carriers will purchase RF fingerprinting fraud prevention solutions, such as the Blackbird Platform Products, for their digital networks unless the encryption technology that forms the basis for A-Key authentication is compromised. With respect to analog networks, the Company believes that A-Key authentication currently has certain limitations, primarily due to the large number of existing analog phones that were not manufactured with A-Key authentication capability. However, the Company believes that A-Key authentication poses significant future competition to the Company's PreTect cloning-fraud prevention application in analog networks.

Reduction in Cloning Fraud. Currently, most of the largest U.S. wireless telephone carriers operating analog markets are using cloning-fraud prevention products in varying degrees. The Company believes that the combined deterrent of RF fingerprinting, A-Key authentication, and other cloning-fraud prevention technologies has significantly reduced cloning fraud in domestic markets. See "Business -- Key Issues for Wireless Telephone Carriers - Market Opportunities for the Company" above. Although cloning fraud remains a serious concern for the wireless communications industry, the Company's customers have observed

significant and continual reductions in cloning fraud since their initial successful deployments of the Company's Blackbird Platform Products.

Effects on the Company's Business. The shift from analog networks to digital networks, the expanded use of alternative user/device authentication technologies such as A-Key authentication, the reduction in the levels of

7

cloning-fraud, and other developments in the wireless communications industry, have reduced and could continue to reduce demand for the Company's PreTect cloning-fraud prevention application. The Company believes that similar declines in demand have occurred and will continue to occur for competing cloning-fraud prevention technologies in the United States. The Company believes that this trend could also occur in international markets over time.

The Company's Restructuring Plan. The Company has incurred significant operating losses over the past three years, due in large part to the industry trends described above. During 1998, the Company implemented an aggressive restructuring plan, aimed at reducing its cost structure and restoring the Company toward sustainable profitability. The Company's restructuring actions included a significant reduction in workforce and related expenses, reduction of facilities and capital assets, and write-offs of unmarketable inventory. This restructuring effort has provided the catalyst to refocus the Company's strategic plan to better meet the needs of its customers as they deal with the highly competitive and rapidly changing wireless communications marketplace. Further information regarding these restructuring efforts and financial results may be found in this report under Part II, Item 7, entitled "Management's Discussion and Analysis of Financial Condition and Results of Operations," and Part II, Item 8, entitled "Financial Statements and Supplementary Data."

KEY ELEMENTS OF COMPANY'S STRATEGY

Through the development and enhancement of its suite of real-time processing platforms and applications, the Company believes its key differentiation is exemplified through its patented RF fingerprinting technology, its capability for real-time processing between networked distributed applications, and its embedded real-time system support technologies. The primary elements of the Company's strategy support these differentiating competencies.

Leveraging the Company's core strengths is the key:

1. Leverage customers' existing investment in the Blackbird Platform by providing new applications

Realize efficiencies with an extendible platform, designed for growth. The Blackbird Platform has been successfully preventing cloning fraud in more than 2,000 cell sites in the United States, including the majority of major metropolitan areas. The platform-based architecture approach was designed to service multiple real-time applications that consistently and reliably process on-demand, short response transactions through a high-speed network. The first application on the Blackbird Platform, the PreTect cloning-fraud prevention application, can detect and terminate a cloner call within a matter of seconds no matter where the call originates in the United States. Other time-sensitive applications, such as wireless E-911, could also benefit from the Blackbird Platform's internal high-speed communication infrastructure.

New applications lower the total cost of Blackbird ownership. The Company's consistent strategy has been to achieve market acceptance of all Blackbird Platform Products in a predictable and conforming manner, adhering to customer needs for reliability and high-value functionality. The Company plans to continue its research and development efforts to enhance its existing products and services and to develop new value-added products for the Blackbird Platform. Potential applications are currently being evaluated by the Company, such as RF engineering applications for network system analysis and geo-location based services, including personal safety applications (i.e., E-911 and roadside assistance), asset tracking applications (i.e., fleet tracking), information services applications (i.e., E-411 and traffic advisories services) and billing applications (i.e., location sensitive billing).

2. Leverage existing proprietary technology in new ways

Through the development and deployment of the Blackbird and Hotwatch Platforms, the Company has developed several core proprietary technologies. The Company believes that these core technologies may facilitate its development of products and services which complement its existing technology and result in new value-added products and services for its current and potential customer base.

8

Distributed real-time computing. The Company believes that it has developed unique expertise in the area of distributed real-time computing over high-speed, interlinked networks of a nationwide scale. This capability allows the Company to acquire data and perform information processing in the highly distributed environment encountered in wireless infrastructures. The Company's Blackbird Platform uses messaging methods transported on TCP/IP (Transmission Control Protocol/Internet Protocol) networks to allow communications and data exchange between distributed information processing elements with real-time response rates. For example, the Company's expertise in this area provided for the creation of the No Clone Zone service which processes RF "fingerprint" information at call set-up time over a nationwide network within seconds.

Real-time rating expertise. The Company has developed the ability to combine streams of telephone billing information, such as toll charges, discounts, promotions and surcharges to mimic a carrier's billing system on a real-time basis, within minutes after the end of the call, rather than in the typical batch process for monthly customer billing cycles. This currently allows the Company to determine account authorization for future telephone calls. The Company believes this expertise may be applicable to other systems that involve real-time billing processing.

Real-time database expertise. The Company has developed the ability to optimize database performance which enables systems to reach transaction decisions in very short time frames. For example, the Company's PreTect application can determine whether or not to connect or terminate a wireless cloned call within a few seconds of call origination.

3. Leverage ability to interconnect mixed technologies

Through its research and development efforts, the Company has developed technologies and expertise in inter-process communications between its products and third-party vendor technologies, providing transparent connectivity and real-time transaction processing between dissimilar systems. This expertise allows the Company's products to coexist transparently within the carrier's network without impacting call processing requirements.

Ability to seamlessly interface with carriers' networks. The Company's software and hardware products collect and utilize information resident at the carrier's cell site and/or switch technology. The Blackbird Platform Cell Site Systems, deployed in selected cell sites throughout a carrier's market, performs its cloning-fraud prevention duties transparent to normal call processing activities. While the Cell Site System intercepts all calls received at a cell site, it completes its task within seconds, passing the call through to the network without interruption of service. This is an important element in integrating future applications onto the Company's Blackbird Platform.

Ability to interface with billing systems. The Company has developed the ability to interface with the system infrastructures of major billing service companies in the wireless communications industry. As the markets for billing, prepaid and wireless commercial services expand, the Company believes it can apply its knowledge and service metering technologies in niche opportunities.

Real-time system monitoring. The Company has developed, as part of the Blackbird Platform suit of products and services, the ability to monitor the health and performance of networked embedded systems as well as physical network integrity, providing real-time notification of condition exceptions and performance degradations. Currently applied to the Blackbird Platform and PreTect application, the Company believes its technology and call center infrastructure are adaptable to monitor other applications and network configurations, such as the potential commercial applications of geo-location technology.

4. Deliver exceptional customer service

The Company believes the ability to provide knowledgeable, high quality customer service is a critical success factor for servicing the needs of wireless telephone carriers as they implement new commercial applications.

9

The Company currently provides real-time system monitoring 24 hours per day, 7 days per week for its PreTect fraud prevention and Hotwatch credit limit monitoring applications through its call center located at the Seattle headquarters. Additionally, the Company provides regional technical support personnel in major markets for on-site maintenance service of its systems, ensuring optimal uptime performance. The Seattle call center employs sophisticated commercial call tracking and system alarming software, integrated with the Company's own proprietary Blackbird and Hotwatch system monitoring technology, and is staffed with technicians who are required to meet continuous training objectives. Through its knowledge of unique customer technical requirements, the Company believes it can expand these same technical support service offerings to other technology vendors providing new commercial applications to wireless telephone carriers.

THE BLACKBIRD PLATFORM

Product Descriptions

The Blackbird Platform provides real-time collection, distribution, storage and reporting of pre-call data retrieved from a wireless communications network. The Blackbird Platform was designed to deliver centralized control and efficiencies of operation based on industry standards, open systems and real-time distributed messaging. This platform approach makes it possible for the Company to deliver a wide range of applications in a unique, modular fashion. Enhancement of the Blackbird Platform Products is expected to continue during 1999 and beyond.

The Company's products incorporate software and hardware designs that use the UNIX operating system with TCP/IP message transport networking, supporting both client-server and peer-to-peer communication architectures. This operating system environment is widely used and accepted in the telecommunications industry. The Company also uses database and advanced messaging technology which allows for flexibility in platform and database portability, particularly as the underlying computing infrastructure continues to evolve. The Company's products incorporate industry standard hardware for the centralized system and application processing functions for both the Blackbird and Hotwatch Platforms. The Blackbird Platform Cell Site System hardware, which is installed in selected cell sites, contains both proprietary and industry standard computer components.

PreTect Application

The PreTect application employs patented RF "fingerprinting" technology to proactively prevent cloning fraud in real-time. It accomplishes this by building RF fingerprints of legitimate subscribers' wireless phones using the pre-call data collected by the Blackbird Platform. An RF fingerprint is the wireless phone's unique electromagnetic signal waveform characteristics contained in each phone, with no two RF fingerprints being the same. The PreTect application compares RF fingerprints of incoming call requests to its database of RF fingerprints for validated legitimate subscriber phones and also examines usage characteristics to assist in verifying authenticity. It then directs automatic call "tear-down" or interdiction of a fraudulent call before connection is completed. The PreTect application enables proactive pre-call fraud prevention rather than post-call fraud detection. With the PreTect application, the Company also offers its customers a graphical user interface displaying pre-call activity in real time as it is occurring, a feature unique to RF user/device authentication systems. The PreTect desktop display is easy to learn and use, automates procedures with point and click operation, and enables fraud department personnel and customer service representatives to become productive in analyzing cloning fraud activity in a more effective and efficient manner.

The No Clone Zone Service

The Company has developed a roaming-fraud prevention service, known as the No Clone Zone service, which provides seamless, RF-based roaming fraud prevention.

The No Clone Zone service proactively and transparently prevents roaming cloning fraud in markets which utilize the Blackbird Platform and PreTect fraud

10

prevention application. The service delivers the same high performance call "tear down" or interdiction of fraudulent calls in roaming markets as the PreTect application does in a subscriber's home market. The service leverages the underlying power of existing Blackbird Platform deployments, and the Blackbird Platform's real-time distributed messaging performance, to quickly and seamlessly link participating carrier systems nationwide, into a private, high-speed network. The service also leverages the PreTect application, delivering real-time, system-wide data visibility with PreTect's superior usability, reporting and query capabilities. This service is currently operational in the majority of the domestic markets where the Company's Blackbird Platform and PreTect application are deployed.

Blackbird Platform Monitoring

In 1998, the Company introduced new system monitoring technology, which it markets as part of the Blackbird Platform suite of products and services. The new system monitoring technology provides real-time capabilities for monitoring overall system health of network-based distributed applications. It can be applied to both a client-server or peer-to-peer architecture environment. It provides sophisticated real-time alarming of system performance exceptions which can be directed to a centralized call center. The product is designed to support industry standards with the flexibility of open architecture and platform portability. In its initial release, the technology has been used to support the Blackbird Platform and PreTect application. The product is based on industry standard messaging protocols and architectures, such as Simple Network Management Protocol and Management Information Bases.

Customers may license the technology directly and integrate the Blackbird Platform Monitoring capability seamlessly into their existing Network Operations Center ("NOC") system. This allows customers to use their NOC personnel to perform Blackbird Platform Monitoring and execute first-level performance exception analysis. Additionally, the Company also provides a Blackbird Platform Monitoring service, available to all Blackbird Platform customers, which is hosted from the Company's Seattle headquarters call center. This provides a flexible alternative for customers who have limited personnel trained on the Blackbird Platform and available to perform the monitoring and related analysis functions. In some cases, customers prefer to take advantage of the Company's trained technical personnel and expertise to perform this critical component of fraud management to keep the Blackbird Platform Products at optimal performance 24 hours per day, 7 days per week.

Blackbird Backup & Restore

In 1998, the Company introduced a proprietary automated backup and restoral technology to provide RF fingerprint data integrity, as well as full system database safety and security. The Blackbird Backup & Restore product optimizes and validates the storage of critical data in the event of system failure so complete reconstruction can be performed easily. This product provides completely automated operation with customizable scheduling flexibility, requiring no manual intervention by customer personnel. Protecting system integrity and security, through a hands-off automated solution designed specifically for the Blackbird Platform, customers are protected from catastrophic crashes and long system outages, which would expose the customer to increased losses from cloning fraud.

Additional Services Related to the Blackbird Platform

Installation and Integration. Currently, the Company arranges to receive certain third-party vendor system equipment at its facilities where it integrates its proprietary software with such equipment and performs preliminary testing prior to shipment to the customer. Typically, the Company, its third-party vendors and/or the customer jointly perform installation services, with each bearing responsibility for different aspects of installation. The installation process, which commences upon execution of a customer's order, generally is completed within 30 to 90 days depending upon the deployment schedule agreed upon between the Company and the customer. The costs of installation may be separately

charged or included with system pricing.

Training and Documentation. The Company's personnel provide system training on-site or at the Company's facilities in Seattle. The training programs consist primarily of presentation materials, hands-on exercises and group demonstrations. Refresher training subsequent to completion of the initial training is provided for additional fees. User manuals and other materials relating to the Company's products are provided to training participants and supervisory personnel. Third-party computer equipment documentation typically is provided by the equipment vendor.

Custom Programming. The Company offers custom software development work upon customer request. Customers are charged hourly rates for such services or may contract with the Company for fixed fees.

Professional Services. The Company provides system performance analysis, system project planning, configuration, implementation and other professional services in connection with sales of its products. Customers are charged hourly rates for such services or may contract with the Company for fixed fees.

THE HOTWATCH PLATFORM

The Hotwatch Platform provides technological solutions primarily in the "service metering" area, which involves various forms of "post-call" verification to ensure that a wireless communications subscriber has proper account status to make additional calls. The Company's Hotwatch Platform Products provide real-time credit limit monitoring and solutions for real-time usage metering. These real-time "post-call" products support call data acquisition and rating features. Real-time "rating" means the ability to calculate, on a real-time basis, local and long distance toll charges and cellular air time charges for each call made on a cellular telephone system. The Company's real-time rating technology is capable of supporting multiple long distance rating and multiple airtime price plans. The Company believes that real-time data acquisition and rating on a call by call basis will enable carriers and resellers of prepaid services to improve cash flow, to more effectively manage their credit, collection, and billing functions, and to increase their subscriber base by allowing them to provide service to certain subscribers who might otherwise be deemed unacceptable credit risks. The Company is reviewing market opportunities to use the Hotwatch real-time technology in new value-added applications for the Blackbird Platform, or license the technology to other vendors.

PRODUCT DEVELOPMENT

For the years ended December 31, 1998, 1997 and 1996, the Company incurred gross research and development expenditures of \$5.1 million, \$9.8 million and \$7.0 million, respectively, prior to capitalization of software development costs during each period in the amounts of \$0.6 million, \$1.8 million and \$1.4 million, respectively. The Company's current research and development efforts are focused on new hardware and software products, and enhancing and improving existing hardware and software products, including developing new software applications and additional computer equipment interfaces. These enhancements and/or new products may, when and if developed, enable the Company to expand the use of its existing products so as to provide a broad variety of services and functions not presently offered. Costs included in the Company's gross research and development expenditures include costs for research, design, development, tests, preparation of training and user documentation and refining new and existing features (i.e., software and hardware maintenance) for inclusion in its product line. The Company anticipates that development expenditures will remain constant in response to increased market demand for new and enhanced products and services in the wireless communications marketplace. See also "Business Risks -- Dependence on New Product Development and Product Enhancements" below.

SALES, DISTRIBUTION AND MARKETING

To date, the Company has primarily focused its marketing efforts on wireless telephone carriers operating analog networks in the most heavily populated United States markets. To a lesser extent, over the past three years, the Company has also focused its efforts in developing international interest in its

products. The Company expects

12

to continue its efforts to further penetrate wireless communications markets, both domestic and international, as appropriate. The Company sells and licenses its products and services pursuant to agreements that typically provide for hardware purchases, software licenses, customer support and the provision of related services. The Company markets its products directly to wireless telephone carriers through proposals and presentations. International sales activities are performed through agents, distributors and/or the Company's employees. The Company also participates at targeted trade shows, conferences and industry events to augment its direct marketing efforts. The Company further meets with its current and prospective customers to gather product feedback that assists the Company in determining product direction. Achieving greater market acceptance and penetration of the Company's products will require, in addition to enhancing and improving such products, increased marketing efforts and the expenditure of funds to increase customer awareness of the Company and to inform potential customers of the benefits of the Company's products and service offerings. See also "Business Risks -- Fluctuations in Quarterly Performance" and "Business Risks -- International Operations" below.

In 1998, revenues from Blackbird Platform Products represented 96% of the Company's total revenues, as compared to 94% of total revenues in 1997 and 80% of total revenues in 1996. The Company anticipates that revenues from Blackbird Platform Products will continue to represent substantially all of the Company's total revenue in 1999. See also "Business Risks -- Dependence on Blackbird Platform Products; Uncertainty of Widespread Market Demand" below. Revenues from Hotwatch Platform Products were not material in both 1998 and 1997, compared to 19% of total revenues in 1996.

CUSTOMER SUPPORT AND SERVICES

Hardware maintenance, software maintenance, software subscription services (for software upgrades and new releases), the No Clone Zone service and Blackbird Platform Monitoring service are the primary recurring services provided by the Company to its customers. Customer service personnel diagnose and resolve problems, dispatch third-party vendors, provide provisioning and integration services, forward enhancement requests to the Company's product management staff, and coordinate with customers with respect to on software upgrades and new releases. From the Seattle headquarters centralized call center, the Company's customer service personnel continuously monitor and maintain a national high-speed network ensuring maximum uptime and continuous connectivity to all carrier's local area networks. In addition to the Seattle call center personnel, the Company maintains regional customer service for providing on-site maintenance services for selected customers. Software troubleshooting, maintenance and upgrades are conducted either via the Company's private data network or via modem over a standard telephone line. An on-line customer management system tracks problems and resolutions. Customer service is available 24 hours per day, seven days per week. Engineering research and development personnel assist in software support activities to the extent required.

MAJOR CUSTOMERS

Over the past three years, the Company has entered into agreements with AirTouch, BAM, GTE-California, GTE Mobilnet Service Corp. ("GTE Corp."), Ameritech and SNET to deploy and support Blackbird Platform Products. Currently, the Blackbird Platform Products are operational and/or being deployed in over forty of the largest markets throughout the United States with AirTouch, BAM, GTE-California, Ameritech and SNET, including New York, Boston, Hartford/New Haven, Philadelphia, Pittsburgh, Baltimore, Washington D.C., Chicago, Detroit, Milwaukee, Atlanta, Los Angeles, San Francisco, San Diego and Sacramento. Revenues from the Company's agreements with AirTouch, BAM, and Ameritech each accounted for greater than 10% of the Company's total revenues in 1998, and collectively accounted for greater than 80% of the Company's total revenues in 1998. See "Business Risks -- Limited Customer Base; Reliance on Significant Customers" below.

COMPETITION

The market for the Company's products and services is highly competitive and

subject to rapid technological change, regulatory developments and emerging industry standards. A number of companies currently offer one

or more products or services similar to the products and services offered by the Company. In addition, many wireless telephone carriers are providing, or can provide in-house, capabilities that are competitive with certain aspect of the Company's Blackbird Platform Products and Hotwatch Platform Products.

The Company is aware of various competitors which currently or are expected to compete directly with the Company's Blackbird Platform Products in the user/device authentication arena. One competitor, Corsair Communications, Inc., competes directly with the Company's RF-based user/device authentication products and services. The Company also competes with a number of alternative technologies in this arena, including roamer verification reinstatement systems, profiler systems, personal identification numbers and A-Key authentication systems. Companies marketing such technologies include, among others, GTE Telecommunications Services, Inc., Authentix Network, Inc., Lightbridge, Inc., Systems/Link Corporation, International Business Machines Corporation and Digital Equipment Corp. The Company believes that A-Key authentication, in particular, poses significant future competition for the Blackbird Platform Products in the user/device authentication arena. See "Business -- Effects of Industry Trends on the Company's Business" above. The A-Key authentication technology is provided by the combination of telephone switch manufacturers (e.g., Lucent Technologies, Inc., Ericsson Radio Systems AB, Motorola, Inc. and Nortel Networks), wireless telephone manufacturers (e.g., Nokia, Motorola, Inc. and Ericsson Radio Systems AB), authentication center providers (e.g., Synacom Technology, Inc.) and/or IS-41C software component and service providers (e.g., Intellinet Technologies and Trillium Digital Systems, Inc.).

The Company also is aware of a number of competitors which currently or are expected to compete directly with the Company's Hotwatch Platform Products. These companies include, among others, GTE Telecommunications Services, Inc., Boston Communications Group, Inc., EDS Personal Communications Corporation, Convergys Corporation, Lightbridge, Inc., Subscriber Computing, Inc., AG Communications Systems, National Telemanagement Corporation, CSC Intellicom, Brite Voice Systems, Inc. and Systems/Link Corporation as well as cellular carriers' proprietary systems operating in some of the most populated markets.

The Company believes that the principal competitive factors in the markets in which the Company competes include factors such as product effectiveness, quality and ease of use, technical support, customer service, price, the availability of real-time information and the financial stability of the vendor. An additional factor in the user/device authentication arena is the compatibility with user/device authentication products used by the carrier in other geographic markets and by the carrier's roaming partners. The Company believes that carriers purchasing RF fingerprinting fraud prevention products tend to purchase these products from the same vendor that supplies these products to their roaming partners. Thus, the Company believes it will be more difficult to market its Blackbird Platform Products to a carrier if the carrier's roaming partners are using RF fingerprinting fraud prevention products supplied by a competitor. See generally "Business Risks -- Competition" below for a more detailed description of the risks and uncertainties associated with competition involving the Company and its current and future products and services.

MANUFACTURING/ SUPPLIERS

The Company has been and will continue to be dependent on third-party vendors for the computer equipment, electronic components, manufacturing services, maintenance services and certain software that is incorporated in its products. While these are generally available from multiple sources, the Company currently obtains or licenses certain equipment, electronic components, manufacturing services, maintenance services and software from a limited number of suppliers. The Company's software programs were specifically designed to adhere to the UNIX operating system standard which can operate on standard computer equipment sold by numerous manufacturers and vendors. The Company currently purchases hardware and maintenance services from Hewlett-Packard Company ("HP"), its primary system hardware supplier, under a Channel Partner Program ("CPP"). As an HP value added

reseller ("VAR") within the CPP program, the Company qualifies for a number of services under HP's marketing, support and financial programs. The Company also maintains relationships with other hardware vendors. The Company currently purchases hardware components from its vendors at

14

discounts from list prices. These hardware components then become a cost component as the Company's systems are generally priced as bundled turnkey products (system, components, installation and training). The Company also currently maintains various software license arrangements with several suppliers. All of these licenses allow the Company's customers to use the software in perpetuity, with the result that the loss of a particular source would not affect any product already in use. See also "Business Risks -- Dependence on Third-Party Vendors" below.

The Company manufactures, as necessary, its proprietary Blackbird Cell Site System hardware which operates in connection with the system hardware described above. While certain parts and components of this system are industry standard and generally available from many suppliers, the Company designs and contracts manufacturing for certain proprietary printed circuit boards and other subassemblies. These standard components and custom manufactured subassemblies are then integrated and tested by the Company for delivery to the Company's customers. See also "Business Risks -- Risk of Hardware Manufacturing Activities" below.

PROPRIETARY RIGHTS

The Company's success will depend, in part, on its ability to protect its technology, processes, trade secrets and other proprietary rights from unauthorized disclosure and use and to operate without infringing the proprietary rights of third parties. The Company's strategy is to protect its technology and other proprietary rights through patents, copyrights, trademarks, nondisclosure agreements, license agreements and other forms of protection. The Company has been active in pursuing patent protection for technology and processes involving its Hotwatch Platform Products and Blackbird Platform Products that it believes to be proprietary and to provide a potential competitive advantage for the Company. To date, the Company has been granted patents on certain features of the Hotwatch Platform Products and Blackbird Platform Products and has patents pending for certain features of the Blackbird Platform Products. In addition, the Company has also licensed patents from third parties in an effort to maintain flexibility in the development and use of its technology, including exclusive and non-exclusive rights to use patents in connection with the Blackbird Platform Products. The Company also attempts to protect its proprietary rights through the use of nondisclosure agreements with its employees and consultants, and license agreements with customers, which contain restrictions on disclosure, use and transfer of proprietary information. The Company further employs various physical security measures to protect its software source codes, technology and other proprietary rights. See also "Business Risks -- Uncertainty Regarding Proprietary Rights" below.

EMPLOYEES

As of March 26, 1999, the Company had 48 full-time employees. In January 1998, in response to changing market conditions and continued operating losses, the Company began implementation of a restructuring plan that included, among other initiatives, streamlining the Company's operations to achieve more balance between expenses and revenues. See "Business -- Effects of Industry Trends on the Company's Business" above. None of the Company's employees are covered by a collective bargaining agreement. The Company believes that its relations with its employees are good. See also "Business Risks -- Dependence on Personnel" below.

BUSINESS RISKS

The Company operates in a dynamic and rapidly changing business environment that involves substantial risk and uncertainty. The following discussion addresses some of the risks and uncertainties that could cause, or contribute to causing, actual results to differ materially from those expressed or implied in this report or any other disclosures or statements, oral or written, made by or on behalf of the Company. Readers should pay particular attention to the

descriptions of risks and uncertainties described below and in other sections of this report and the Company's other filings with the Securities and Exchange Commission.

15

Dependence on Analog Networks; Industry and Technological Change. The Company's future success will depend on the continued and expanded use of its existing products and services, its ability to develop new products and services to meet the needs of the Company's target industries, and its ability to adapt existing products and services to keep pace with changes in the Company's target industries. Presently, the Company's Blackbird Platform Products are used exclusively in analog networks, although the Company believes that its Blackbird Platform Products may be adaptable for use in digital networks in the future. The Company believes that over 85% of wireless telephone subscribers in the United States use analog networks today, but that the industry is undertaking a shift to digital networks due to certain advantages of digital technology, including expanded capacity, greater privacy and enhanced security. In addition, alternative user/device authentication products are available in both digital and analog networks, such as A-Key authentication. See "Business -- Effect of Industry Trends on the Company's Business" above. The Company expects that A-Key authentication will be widely deployed in digital networks over time. Accordingly, the Company does not believe that wireless telephone carriers will purchase RF fingerprinting fraud prevention solutions, such as the Blackbird Platform Products, for their digital networks unless and until the encryption technology that forms the basis for A-Key authentication is compromised. The shift from analog networks to digital networks, the expanded use of alternative user/device authentication processes such as A-Key authentication, and other technological developments in the wireless communications industry, could each reduce or eliminate demand for the Company's Blackbird Platform Products. There can be no assurance that the Company will be successful in modifying or developing its existing or future products in a timely manner, or at all, to respond to changing market, customer or technological requirements. If the Company is unable, due to resource, technological or other constraints, to adequately anticipate or respond to changing market, customer or technological requirements, the Company's business, financial condition and results of operations will be materially adversely affected. Further, there can be no assurance that products or services developed by others will not render the Company's products and services non-competitive or obsolete.

Dependence on Blackbird Platform Products; Uncertainty of Widespread Market Demand. The Company's revenues have been and can be expected to continue to be derived from a limited number of products and services. See "Business -- Major Customers" above. Thus, the Company's future operating results will depend primarily on the continued demand for and market acceptance of the Blackbird Platform Products. Currently, a majority of the carriers in the largest markets in the United States are using user/device authentication products to some extent, and the Company anticipates that further market penetration of user/device authentication products in the United States will slow and may potentially decline over the next few years. If not offset by other sales opportunities, this trend would have a material adverse effect on sales of Blackbird Platform Products. Although the Company believes that the Blackbird Platform Products present the basis for growth for the Company's business, there can be no assurance that the Blackbird Platform Products will achieve widespread market penetration or that the Company will derive significant revenues from the sale of such products.

Dependence on New Product Development and Product Enhancements. The Company's future success will depend, in part, on its ability to timely develop, introduce and gain acceptance of new products and services and enhancements to existing products and services to meet the needs of the Company's target industries. The Company is continually seeking to enhance its existing products and to develop new products, including other application products utilizing the Blackbird and Hotwatch Platforms. However, the Company remains subject to all of the risks inherent in product development, including unanticipated technical or other development problems which could result in material delays in product introduction and acceptance or significantly increased costs. There can be no assurance that the Company will be able to successfully enhance existing products or develop new products, or to timely introduce and gain acceptance of such enhancements and new products in the marketplace.

Ability to Manage Changing Business Conditions. The Company's future operating results will depend, among other things, on its ability to manage changing business conditions. If the Company's management is unable to do so effectively, its business, financial condition and results of operations could be materially adversely affected. The Company's ability to manage changing business conditions depends, in part, on its ability to

16

attract, train and retain a sufficient number of qualified personnel to meet the ongoing needs of the Company. During 1998, the Company implemented a restructuring plan that included, among other initiatives, reducing its workforce to approximately one-fourth of December 31, 1997 staffing levels. See "Business -- Effect of Industry Trends on the Company's Business" above. Failure to manage the effects of such reduction may limit the Company's ability to attract, train and retain qualified personnel and may increase the Company's recruiting and training costs. If the Company were unable to recruit and retain a sufficient number of qualified personnel, it could be forced to limit its growth or possibly curtail its operations. There can be no assurance that the Company will be successful in attracting, training and retaining the required number of qualified personnel to support the Company's business in the future. Failure to manage the Company's operations with the reduced staffing levels discussed above may further strain the Company's management, financial and other resources, and could have a material adverse effect on the Company's business, financial condition and results of operations.

Limited Customer Base; Reliance on Significant Customers. The Company's potential customer base is relatively limited due to the significant concentration of ownership and/or operational control of wireless communication markets. Currently, the Company markets its products and services only to wireless communications carriers that operate analog networks. Historically, a significant portion of the Company's revenues in any given period have been attributable to a relatively small number of customers. This trend is likely to continue for the foreseeable future. Sales to customers aggregating 10% or more, either individually or combined as affiliates due to common ownership, were concentrated as follows: three customers whose purchases represented 41%, 20% and 19% of 1998 sales, four customers whose purchases represented 31%, 20%, 20% and 19% of 1997 sales and three customers whose purchases represented 42%, 38% and 15% of 1996 sales. The aggregate sales to these customers represented 80%, 90% and 95% of the Company's total systems and service revenues in 1998, 1997 and 1996, respectively. There can be no assurance that such customers will continue to maintain business relationships with the Company. Accordingly, the loss of one or more major customers could have a material adverse effect on the Company's business, financial condition and results of operations.

Competition. The market for the Company's products and services is highly competitive and subject to rapid technological change, regulatory developments and emerging industry standards. A number of companies currently offer one or more products or services similar to the products and services offered by the Company. In addition, many wireless communications carriers are providing or can provide, in-house, certain capabilities that are competitive with certain aspect of the Company's products and services. See "Business -- Competition" above.

The Company believes that, among other competing technologies, A-Key authentication poses significant future competition for the Blackbird Platform Products in the user/device authentication arena. See "Business -- Effect of Industry Trends on the Company's Business" above. The Company believes the demand for its Blackbird Platform Products would be materially adversely affected if wireless communications carriers implement A-Key authentication applicable to analog phones as their sole cloning fraud prevention solution in major markets, if wireless communications carriers adopt a uniform digital standard that reduces the need for digital phones to operate in analog mode while roaming, or if analog phone manufacturers change product designs and/or manufacturing standards in such a way as to impact the performance of the Blackbird Platform Products. See also "Business Risks -- Dependence on Analog Networks; Industry and Technological Changes" above.

In addition, trends in the wireless communications industry, including greater consolidation and technological or other developments that make it simpler or more cost-effective for wireless communications carriers to provide certain

services themselves, could affect demand for the Company's products and services and could make it more difficult for the Company to offer a cost-effective alternative to a wireless communications carrier's own capabilities. Current and potential competitors have established or may in the future establish collaborative relationships among themselves or with third parties, including third parties with whom the Company has a relationship, to increase the visibility and utility of their products and services. Accordingly, it is possible that new competitors or alliances may emerge and rapidly acquire significant market share. In addition, the Company

17

anticipates continued growth in the wireless communications industry and, consequently, the entrance of new competitors in the future. An increase in competition could result in price reductions and loss of market share and could have a material adverse effect on the Company's business, financial condition and results of operations.

To remain competitive, the Company will need to continue to invest in engineering, research and development, sales and marketing, customer service, manufacturing activities and administrative systems. There can be no assurance that the Company will have sufficient resources to make such investments or that the Company will be able to make the technological advances necessary to remain competitive. Many of the Company's current and potential competitors have significantly greater financial, marketing, technical and other competitive resources, as well as greater name recognition, than the Company. As a result, the Company's competitors may be able to adapt more quickly to new or emerging technologies and changes in customer requirements or may be able to devote greater resources to the promotion and sale of their products and services. There can be no assurance that the Company will be able to compete successfully with its existing competitors or with new competitors.

Uncertainty Regarding Proprietary Rights. The Company's success will depend in part on its ability to protect its technology, processes, trade secrets and other proprietary rights from unauthorized disclosure and use and to operate without infringing the proprietary rights of third parties. The Company's strategy is to protect its technology and other proprietary rights through patents, copyrights, trademarks, nondisclosure agreements, license agreements and other forms of protection. See "Business -- Proprietary Rights" above.

Patents issued and patent applications filed relating to products used in the wireless communications industry are numerous, and the patent positions of companies in this industry, including the Company, are generally uncertain and involve complex legal and factual issues. Accordingly, there can be no assurance that any pending or future patent application of the Company or its licensors will result in issuance of a patent or that, when a patent does issue, that the scope of protection of the patent will be sufficiently broad to protect the Company's technology or provide a competitive advantage for the Company. There can be no assurance that any issued patent will not be challenged, invalidated or circumvented. Litigation or regulatory proceedings, which could result in substantial cost and uncertainty to the Company, may be necessary to enforce patent or other proprietary rights of the Company or to determine the scope and validity of a third-party's proprietary rights. There can be no assurance that the Company will succeed or will have the resources necessary to succeed in any such litigation or regulatory proceedings.

Although the Company believes that its technology has been independently developed and that its products do not infringe patents known to be valid or violate other proprietary rights of third parties, it is possible that such infringement of existing or future patents or violation of proprietary rights may occur. There can be no assurance that the Company is aware of all third-party proprietary rights that may materially affect the Company's ability to make, use or sell its current or future products and services. United States patent applications, for example, are confidential while pending at the United States Patent and Trademark Office, and the laws of many foreign countries do not protect proprietary rights to the same extent as the laws of the United States. There can be no assurance that third parties will not assert infringement claims with respect to the Company's current or future products or services, or that any such claims will not result in litigation or regulatory proceedings or require the Company to modify its products or enter into licensing arrangements, regardless of the merits of such claims. See "Business

Risks -- Risk of Litigation" below. No assurance can be given that the Company will have the resources necessary to successfully defend against any such infringement claims or that any necessary licenses can be obtained in a timely manner, upon commercially reasonable terms, or at all. Parties making such infringement claims may be able to obtain injunctive or other equitable relief that could effectively limit or prohibit the Company's ability to make, use or sell its current or future products or services. The Company's failure to successfully defend against any such claims or obtain any such license could result in substantial cost and uncertainty to the Company and have a material adverse effect on the Company's business, financial condition or results of operations.

18

The Company employs various physical security measures to protect its software source codes, technology and other proprietary rights. However, such measures may not afford complete protection and there can be no assurance that others will not independently develop similar source codes, technology or other proprietary rights or obtain access to the Company's software codes, technology, or other proprietary rights. In addition, although the Company has and expects to continue to have internal nondisclosure agreements with its employees and consultants, and license agreements with customers, which contain restrictions on disclosure, use and transfer of proprietary information, there can be no assurance that such arrangements will adequately protect the Company's proprietary rights or that the Company's proprietary rights will not become known to third parties in such a manner that the Company has no practical recourse. The Company's failure to successfully defend against any such claims or obtain any such license could result in substantial cost and uncertainty to the Company and have a material adverse effect on the Company's business, financial condition or results of operations.

Risk of Litigation. The Company is a party to certain legal proceedings as described below:

Between July 1997 and September 1997, eight separate lawsuits were filed against the Company and two of its current or former executive officers. In February 1998, the lawsuits were consolidated pursuant to a revised consolidated complaint filed by plaintiffs. The consolidated complaint alleges violations of certain federal securities laws, and purports to seek unspecified damages on behalf of a class of persons, other than defendants and their affiliates, who purchased the Company's common stock or call options on the Company's common stock, or who sold put options on the Company's stock, during the period March 6, 1996 through July 30, 1997. In March 1999, the Company, together with the individually named defendants, entered into a Stipulation and Agreement of Settlement with the plaintiffs (the "Stipulation"), under which the parties have agreed to settle the lawsuit upon the following principal terms: (i) payment of \$4,100,000 made by the Company's insurers to plaintiffs; and (ii) the dismissal of the lawsuit against all defendants and related parties, with prejudice, but without any admission of liability or wrongdoing. The Stipulation requires court approval to become final, and is subject to certain other terms and conditions. While the Company anticipates that court approval will be forthcoming, there can be no assurance the court will approve the settlement or that all other conditions set forth in the Stipulation will be met. In the event that court approval of the settlement is denied, or if the settlement is otherwise terminated, the Company expects that the lawsuit will resume and that the Company will renew its vigorous defense of the claims. In the event of a renewal of the lawsuit, an award of monetary damages against the Company in excess of applicable insurance coverage, the expenditure of significant sums in the defense of the lawsuit, or the diversion of management's attention from other business concerns, could each have a material adverse effect on the Company's business, financial condition and results of operations.

In January 1998, Communications Information Services, Inc. filed an action against the Company and AirTouch Communications, Inc. for alleged infringement of United States Patent No. 5,329,591 ("the '591 patent") in the United States District Court for the Northern District of Georgia at Atlanta. In January 1999, the Court granted the Company's motion to transfer this lawsuit to the United States District Court for the Western District of Washington. The complaint asserts that the plaintiff is the exclusive licensee of all rights under the '591 patent, alleges that the Company's cellular telephone fraud prevention

technology infringes the '591 patent, and seeks damages in unspecified amounts. The Company believes this lawsuit is without merit and is vigorously defending against it. Although no estimate of any outcome of this action can currently be made, an unfavorable resolution of this lawsuit could have a material adverse effect on the Company's business, financial condition and results of operations.

From time to time, the Company is also a party to other legal proceedings in the ordinary course of business and/or which management believes will be resolved without a material adverse effect on the Company's business, financial condition or results of operations.

Need for Additional Financing. The Company's needs for additional financing will depend upon a number of factors, including, but not limited to, the commercial success of the Company's existing products and services, the timing and success of new products and services (if any), the progress of the Company's research and

development efforts, the Company's results of operations, the status of competitive products and services, and the timing and success of potential strategic alliances or acquisitions of businesses, technologies or assets. In addition, the Company historically has experienced uneven cash flow and operating results, and, during the past three years, significant operating losses. The Company believes the combination of existing cash reserves and projected cash flow from operations will provide sufficient cash to fund its operations for at least the next 12 months. However, if the Company experiences delays in achieving profitability or achieves sales growth requiring working capital beyond current amounts, the Company may be required to seek additional financing sooner than currently anticipated or may be required to curtail some of its activities. There can be no assurance that additional financing will be available on acceptable terms, or at all. The Company's failure to obtain such additional financing, if needed, could have a material adverse effect on the Company's business, financial condition and results of operations.

Fluctuations in Quarterly Performance. The Company has experienced fluctuations in its quarterly operating results and anticipates that such fluctuations may continue and/or intensify. The Company's quarterly operating results may vary significantly depending on a number of factors, such as the level and timing of revenues associated with the Blackbird Platform Products; the timing of the introduction or acceptance of product enhancements and new products and services offered by the Company and its competitors; the size, product mix and timing of significant orders; long sales cycles; competition and pricing in the markets in which the Company competes; product performance problems; disruption in sources of supply; the timing of payments by customers; changes in regulations affecting the wireless industry; technological changes or developments in the wireless industry; changes in the Company's operating expenses; uneven revenue streams; the Company's revenue recognition practices and policies; and general economic conditions. There can be no assurance that the Company's results of operations will not vary significantly among quarterly periods or that in future quarterly periods the Company's results of operations will not be below prior results or the expectations of public market analysts and investors.

Volatility of Stock Price. The market for the Company's common stock is highly volatile. The trading price of the Company's common stock has been and could continue to be subject to wide fluctuations in response to quarterly variations in operating and financial results, announcements of technological innovations or new products by the Company or its competitors, changes in prices of the Company's or its competitors' products and services, changes in the Company's revenue and revenue growth rates, changes in the Company's stock market listing status, as well as other events or factors. See "Business Risks -- Fluctuations in Quarterly Performance" above. Statements or changes in opinions, ratings, or earnings estimates made by brokerage firms or industry analysts relating to the markets in which the Company competes have resulted, and could in the future result, in an adverse effect on the market price of the Company's common stock. In addition, the stock market has from time to time experienced extreme price and volume fluctuations which have particularly affected the market price for the securities of many high technology companies and which often have been unrelated to the operating performance of these companies. These broad market fluctuations may adversely affect the market price of the Company's common stock.

History of Net Losses; Accumulated Deficit. As of December 31, 1998, the Company had an accumulated deficit of \$26.9 million, the majority of which has accumulated during the past three years. See Part II, Item 7, entitled "Management's Discussion and Analysis of Financial Condition and Results of Operations" below for a more detailed description of the Company's accumulated deficit and history of net losses. There can be no assurance that the Company's operations will be profitable on a quarterly or annual basis in the future or that existing revenue levels can be enhanced or sustained. Past and existing revenue levels should not be considered indicative of future operating results. Operating results for future periods are subject to numerous risks and uncertainties, including those specified elsewhere in this report. If the Company is not successful in addressing such risks and uncertainties, the Company's business, financial condition and results of operations will be materially adversely affected.

Dependence on Personnel. The Company's future success depends in large part on its ability to continue to

20

attract, motivate and retain highly qualified personnel, particularly the members of its senior management and certain other employees who may be difficult to replace. Competition for such personnel is intense and there can be no assurance that the Company will be successful in attracting, motivating and retaining key personnel. The Company also believes stock options are a critical component for motivating and retaining its key personnel. The decline in the Company's stock price during the past two years has made stock options previously granted with higher exercise prices less valuable to the Company's current employees and has consequently made it more difficult for the Company to retain its key personnel. The inability to hire and retain qualified personnel or the loss of the services of key personnel could have a material adverse effect upon the Company's business, financial condition and results of operations. The Company has entered into employment agreements with two of the members of its senior management, both of whom have terms expiring in 1999. There can be no assurance that either of these contracts will be renewed. The Company does not maintain any key-man life insurance policies on any of its employees.

Risk of Hardware Manufacturing Activities. For the most part, the Company's engineering resources historically have been devoted to software design and development. As a result, only a limited number of such resources were initially used in the design and prototype production of the Company's proprietary hardware. The Company continues to utilize third-party vendors for hardware design, engineering, manufacturing and integration of certain proprietary printed circuit boards, radio equipment and other subassemblies which are components of the Company's Blackbird Platform Products. The Company will continue to depend on third-party vendors for manufacturing activities with respect to the design and engineering of hardware, and its future success will depend on maintaining relationships with such third-party vendors, improving its inventory control systems, maintaining effective quality control and procuring sufficient quantities of component parts. Failure to achieve any of these factors could have a material adverse effect on the Company's business, financial condition and results of operations.

Dependence on Third-Party Vendors. The Company has been and will continue to be dependent on third-party vendors for computer equipment, network services, component parts, manufacturing services, maintenance services, systems integration and certain software all of which are incorporated in its products and services. While available from multiple sources, some of such equipment and software is obtained from a single supplier or a limited number of sources. Although the Company believes that there are currently available substitute sources for all such equipment and software, the Company could be required to redesign affected products to accommodate substitutes for certain of such equipment and software. The Company's reliance on third-party suppliers generally, and a sole or a limited number of sources in particular, involves several risks, including a potential inability to obtain an adequate supply of required components and reduced control over quality, pricing and timing of delivery of components. There can be no assurance that the Company will be able to procure necessary equipment and software on a satisfactory and timely basis. Any failure or delay in obtaining necessary equipment, component parts or

software, or if necessary, establishing alternative procurement arrangements, could cause delays in product commercialization and could require product redesign or modification. There can be no assurance that the Company could complete any necessary modifications in a timely manner or that modified or redesigned products would maintain current functionality or performance features or could be successfully commercialized. Any inability or delay in establishing necessary procurement arrangements or successfully modifying products could have a material adverse effect on the Company's business, financial condition and results of operations.

Risk of Product Defects. It is common for hardware and software as complex and sophisticated as that incorporated in the Company's products and services to experience errors or "bugs" both during development and subsequent to commercial deployment. In particular, the Company has encountered certain software and hardware errors in its Blackbird Platform Products and to date corrected the majority, but not all, of such errors identified to date. There can be no assurance that any errors in the Company's existing or future products will be identified, and if identified, corrected. Any such errors could delay additional installations of products and require modifications in products that have already been installed. Remedying such errors has been and may continue to be costly and time consuming. Delays in remedying any such errors could materially adversely

21

affect the Company's competitive position with respect to existing or new products offered by its competitors. In particular, delays in remedying existing or future errors in the Company's Blackbird Platform Products could materially adversely affect the Company's ability to achieve significant market penetration prior to widespread use of A-Key authentication or other user/device authentication products. Once the Company's products are installed, they are subject to compliance with certain contractual requirements, including acceptance testing to ensure that they are properly installed and performing in accordance with contractual specifications. While the Company has achieved acceptance of a substantial number of products shipped to date, there can be no assurance that current or future installations of the Company's products will satisfy all contractual requirements. In addition, software and hardware warranties are generally included as part of the Company's contractual obligations. To the extent that the software and hardware maintenance fees from its products are not adequate to cover the costs of making any necessary modifications or meeting the Company's warranty obligations, the Company could be required to make significant additional expenditures, which could have a material adverse effect on the Company.

Risk of System Failure. The Company operates and maintains internal computers and telecommunication equipment for, among other things, monitoring and supporting its products and services and operating its No Clone Zone roaming fraud prevention service. The Company's operations are dependent upon its ability to maintain such equipment and systems in effective working order and to protect them against damage from fire, natural disaster, power loss, communications failure, unauthorized entry or other events. Although the Company provides back-up for substantially all of its systems, these measures will not eliminate the risk to the Company's operations from a system failure. In addition to its own systems, the Company relies on certain equipment, systems and services from third parties that are also subject to risks, including risks of system failure. See also "Business Risks -- Year 2000 Compliance" below. There can be no assurance that the Company's property and business interruption insurance will be adequate to compensate the Company for any losses that may occur in the event of a system failure. Any damage, failure or delay that causes interruptions in the Company's operations could have a material adverse effect on the Company's business, financial condition and results of operations.

Year 2000 Compliance. The Company's products and services use and are dependent upon certain internally-developed and third-party software and hardware. The Company is currently utilizing internal resources to comprehensively identify and timely resolve the potential impact of the year 2000 and beyond on the processing of date-sensitive information by the Company's Blackbird Platform Products, Hotwatch Platform Products and systems used in the Company's internal operations. See Part II, Item 7, entitled "Management's Discussion and Analysis of Financial Condition and Results of Operations," for a more detailed description of the Company's efforts regarding year 2000 compliance. Based upon

available information, costs of addressing potential problems are not currently expected to have a material adverse impact on the Company's business, financial condition or results of operations in future periods. However, the Company's evaluation of year 2000 compliance issues is continuing, and there can be no assurance that additional year 2000 compliance issues will not be discovered which could present a material risk to the function of the Company's products and services or its internal systems. If the Company, its customers, or vendors are unable to adequately resolve such issues in a timely manner, the Company's operations and financial results may be adversely affected.

International Operations. In pursuing potential sales opportunities for the Company's products and services in international markets, the Company is and will remain subject to all the risks inherent in international sales activities, such as lengthy sales cycles, high costs of sales, changes in export, import, tariff and other trade regulations, currency exchange rates, foreign tax laws and other legal, economic and political conditions. There can be no assurance that the occurrence of any of the foregoing will not have a material adverse effect on the Company's business, financial condition and results of operations. Further, the laws of certain foreign countries do not protect the Company's intellectual property to the same extent as the laws of the United States. See "Business Risks -- Uncertainty Regarding Proprietary Rights." In certain international markets, the Company will need to modify its products or develop new or additional products to adapt to the different wireless technologies or network standards utilized by the carriers in such markets. There can be no assurance that the Company's marketing efforts and technological enhancements will result in successful commercialization or

22

market acceptance or penetration in such international markets. If the Company is unable to adequately anticipate and respond to marketing or technological requirements in the international marketplace, the Company's business, financial condition and results of operation could be materially adversely affected.

Government Regulation and Legal Uncertainties. While, for the most part, the Company's operations are not directly regulated, the Company's existing and potential customers are subject to a variety of United States and foreign governmental laws, regulations and other requirements. The terms of any existing laws, regulations or other requirements, or any changes thereto, may inhibit the growth of the wireless telecommunications industry, limit the number of potential customers for the Company's services and/or impede the Company's ability to offer competitive services to the wireless communications market or otherwise have a material adverse effect on the Company's business, financial condition and results of operations. Recently enacted federal legislation deregulating the telecommunications industry has caused and is expected to continue causing changes in the industry, including entrance of new competitors or industry consolidation, which could in turn subject the Company to increased pricing pressures, decrease the demand for the Company's products and services, increase the Company's cost of doing business or otherwise have a material adverse effect on the Company's business, financial condition and results of operations.

ITEM 2. PROPERTIES

The Company leases approximately 17,000 square feet of general office space at 2401 Fourth Avenue, Seattle, Washington for its corporate offices and approximately 1,200 square feet of space at 2001 Sixth Avenue, Seattle, Washington, which it uses for computer operations. Both of these spaces are under five year non-cancelable operating lease arrangements that expire in September and May 2000, respectively. Both leases contain five year renewal options and provide for the pass-through to the Company of increases in operating and other costs. The Company also leases approximately 1,500 square feet of executive office space in Valley Stream, New York with a term expiring in August 1999. In 1998 the Company entered into a short term sub-lease for space in Mukilteo, Washington for its assembly and testing operations which expired in September 1998. The Company subsequently negotiated a one year lease for the premises which expires in September 1999. The annual aggregate rental expense under the current leases is approximately \$0.3 million.

ITEM 3. LEGAL PROCEEDINGS

Between July 1997 and September 1997, eight separate lawsuits were filed against the Company and two of its current or former executive officers. In February 1998, the lawsuits were consolidated pursuant to a revised consolidated complaint filed by plaintiffs. The consolidated complaint alleges violations of certain federal securities laws, and purports to seek unspecified damages on behalf of a class of persons, other than defendants and their affiliates, who purchased the Company's common stock or call options on the Company's common stock, or who sold put options on the Company's stock, during the period March 6, 1996 through July 30, 1997. In March 1999, the Company, together with the individually named defendants, entered into a Stipulation and Agreement of Settlement (the "Stipulation") with the plaintiffs, under which the parties have agreed to settle the lawsuit upon the following principal terms: (i) payment of \$4,100,000 made by the Company's insurers to plaintiffs; and (ii) the dismissal of the lawsuit against all defendants and related parties, with prejudice, but without any admission of liability or wrongdoing. The Stipulation requires court approval to become final, and is subject to certain other terms and conditions.

In January 1998, Communications Information Services, Inc. filed an action against the Company and AirTouch Communications, Inc. for alleged infringement of United States Patent No. 5,329,591 ("the '591 patent") in the United States District Court for the Northern District of Georgia at Atlanta. In January 1999, the Court granted the Company's motion to transfer this lawsuit to the United States District Court for the Western District of Washington. The complaint asserts that the plaintiff is the exclusive licensee of all rights under the '591 patent, alleges that the Company's cellular telephone fraud prevention technology infringes the '591 patent, and seeks

23

damages in unspecified amounts. The Company believes this lawsuit is without merit and is vigorously defending against it.

From time to time, the Company is also a party to other legal proceedings which arise in the ordinary course of business and/or which management believes will be resolved without a material adverse effect on the Company's financial position, liquidity or results of operations.

See "Business Risks -- Risk of Litigation" above for a detailed description of the risks and uncertainties associated with the legal proceedings described in this Item 3.

ITEM 4. SUBMISSION OF MATTERS TO A VOTE OF SECURITY HOLDERS

On December 14, 1998, the Company held its annual meeting of stockholders. The matters described in this Item 4 were submitted to a vote of stockholders at the meeting. The voting results described in this Item 4 reflect the number of shares voted in person or by proxy at the meeting, and have not been adjusted to reflect the stock combination (reverse stock split) described below.

ELECTION OF TWO CLASS I DIRECTORS

James Porter and Joyce S. Jones were elected as Class I directors to the Company's Board of Directors to hold office until the Company's third annual meeting of stockholders following their election or until their successors are duly elected and qualified. In connection with the election of directors, the stockholders voted as follows:

Nominee	For	Withheld
James Porter	15,950,948	461,074
Joyce S. Jones	15,955,066	456,956

APPROVAL OF AMENDMENT TO 1996 STOCK OPTION PLAN

The stockholders approved a proposal to amend the Company's 1996 Stock Option Plan to increase the number of shares available for issuance upon exercise of options granted thereunder from 1,100,000 shares to 1,850,000 shares. In connection with this matter, the stockholders voted as follows:

For:	15,227,400	Against:	1,108,579	Abstain:	76,043
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APPROVAL OF AMENDMENT TO RESTATED CERTIFICATE OF INCORPORATION

The stockholders approved a proposal to amend the Company's Restated Certificate of Incorporation to effect a stock combination (reverse stock split) pursuant to which the Company's outstanding shares of Common Stock would be exchanged for new shares of Common Stock in an exchange ratio to be approved by the Board of Directors, ranging from one newly issued share for each four outstanding shares to one newly issued share for each ten outstanding shares. The Board of Directors subsequently approved a one-for-ten stock combination, which was implemented by the Company on January 5, 1999. In connection with this matter, the stockholders voted as follows:

For: 15,631,134 Against: 697,598 Abstain: 83,290

24

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY AND RELATED STOCKHOLDER MATTERS

The following table sets forth, for each quarter during fiscal 1997 and 1998 and for the period from January 1, 1999 through March 15, 1999, the reported high and low sales prices of the Company's Common Stock on The Nasdaq Stock Market (National Market System) (Symbol: "CTSC"). Prices and the number of shares of the Company's common stock described in this Item 5 have been adjusted to give effect to the one-for-ten stock combination (reverse stock split) described in this report, which was consummated as of January 5, 1999.

	Sales Price	
	High	Low
	----	---
1997		
First Quarter	196.25	88.75
Second Quarter	157.50	88.13
Third Quarter	80.63	35.63
Fourth Quarter	63.13	14.38
1998		
First Quarter	33.75	14.38
Second Quarter	20.94	4.06
Third Quarter	13.44	2.81
Fourth Quarter	8.75	2.81
1999		
First Quarter through March 15, 1999	4.38	2.00

As of March 15, 1999, the number of holders of record of the Company's Common Stock was 211, and the number of beneficial shareholders was estimated to be in excess of 7,000.

There were no dividends paid or other distributions made by the Company with respect to its Common Stock during 1998 or 1997.

On November 8, 1996, the Company issued an aggregate of 40,000 shares of Common Stock for a purchase price of \$6.5 million to Harvey Sandler, Phyllis Sandler, Fusion Partners LP, Rising Stars Off Shore Fund, Ltd., Rickey Sandler, Andrew Sandler, Martin Tash, Jeffrey M. Levine and David Ross in accordance with the terms of a stock purchase agreement. No sales commissions were paid in connection with this transaction. The securities were issued in reliance on the exemption from registration provided by Section 4(2) of the Securities Act of 1933, as amended. The securities were subsequently registered pursuant to a

Registration Statement on Form S-3 declared effective on April 21, 1997.

On February 17, 1998, the Company issued 2,000 shares of Common Stock to Circuit Concepts International, LLC as partial consideration for the Company's purchase of certain assets in accordance with the terms of an asset purchase and sale agreement. No sales commissions were paid in connection with this transaction. The securities were issued in reliance on the exemption from registration provided by Section 4(2) of the Securities Act of 1933, as amended.

25

ITEM 6. SELECTED FINANCIAL DATA(1)

Statement of Operations Data:	Year Ended December 31, (in 000's, except per share amounts)				
	1998 ----	1997 ----	1996 ----	1995 ----	1994 ----
Revenues	\$ 11,955	\$ 30,255	\$ 20,902	\$ 12,109	\$ 9,732
Gross Research & Development Expenditures(2)	5,112	9,814	7,010	5,819	4,088
Net Income (Loss)	(10,860)	(5,046)	(7,350)	63	1,550
Basic Earnings (Loss) Per Share(3)	(4.76)	(2.22)	(3.34)	0.03	0.81
Diluted Earnings (Loss) Per Share(3)	(4.76)	(2.22)	(3.34)	0.03	0.71
Weighted-Average Shares Outstanding:					
Basic	2,281	2,273	2,199	2,040	1,909
Diluted	2,281	2,273	2,199	2,277	2,193
Cash Dividends Declared	0	0	0	0	0

Balance Sheet Data:	December 31, (in 000's)				
	1998 ----	1997 ----	1996 ----	1995 ----	1994 ----
Working Capital	\$ 596	\$ 6,535	\$ 11,409	\$ 11,094	\$ 9,783
Cash	1,567	3,448	4,854	9,448	9,042
Capitalized Software Development Costs, net	535	3,391	3,599	3,347	2,606
Total Assets	8,102	20,721	32,352	18,371	15,477
Long Term Obligations	0	0	0	0	0
Total Stockholders' Equity	3,072	13,890	18,185	16,734	13,727

(1) Certain reclassifications have been made to the prior year financial statements to conform to current period's presentation.

(2) Gross research and development expenditures presented in this Statement of Operations Data are higher than research and development costs and expenses disclosed in the Statements of Operations due to the inclusion of capitalized software development costs and contract design and development services costs which are disclosed elsewhere in the financial statements. See "-- Management's Discussion and Analysis of Financial Condition and Results of Operations".

(3) Per common share amounts and weighted average shares outstanding have been

retroactively adjusted to give effect to the two-for-one stock splits in 1994 and 1996 and the one-for-ten reverse stock split effective January 5, 1999. In addition, the Company adopted Statement of Financial Accounting Standards ("SFAS") No. 128, "Earnings per Share" in 1997 and restated all prior periods presented as required under the SFAS. In years where the Company incurred a net loss, common equivalent shares were not used in calculating Diluted EPS as the effect would be antidilutive.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion and analysis provides information which management believes is relevant to an assessment and understanding of the Company's results of operations and financial condition. The discussion should be read in conjunction with the financial statements and notes thereto.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K for Cellular Technical Services Company, Inc. (the "Company") contains certain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 that reflect the Company's views with respect to future events and financial performance. The Company uses words and phrases such as "anticipate," "expect," "intend," "the Company believes," "future," and similar words and phrases to identify forward-looking statements. Reliance should not be placed on these forward-looking statements. These forward-looking statements are based on current expectations and are subject to risks, uncertainties and assumptions that could cause, or contribute to causing, actual results to differ materially from those expressed or implied in the applicable statements. Readers should pay particular attention to the descriptions of risks and uncertainties described in this report and in the Company's other filings with the Securities and Exchange Commission. All forward-looking statements included in this report are based on information available to the Company on the date of this report. The Company assumes no obligation or duty to update any such forward-looking statements.

OVERVIEW

The Company's goal is to be a premier provider of real-time information processing and information management solutions for the worldwide wireless communications industry. Over the past 10 years, the Company has used its extensive experience with real-time wireless call processing to create technologically advanced solutions for this industry.

Today, the Company develops, markets and supports both software and hardware as part of its integrated solution for wireless communications fraud management. The Company's radio frequency ("RF") based suite of platform solutions include the Blackbird'r' Platform, PreTect'TM' cloning-fraud prevention application, No Clone Zone'sm' roaming-fraud prevention service and related application products and services ("Blackbird Platform Products"). The Blackbird Platform Products are currently used to address the wireless communications industry's need to more effectively combat cloning fraud. In addition, the Blackbird Platform is designed to support a broad range of products and services for the wireless communications industry, including both fraud and non-fraud products and services. The Company believes that the open, scalable architecture of the Blackbird Platform will allow the Company and others to develop application products and services that could run on or exchange information with the Blackbird Platform to meet the needs of this industry.

Over the past three years, the Company has entered into agreements with AirTouch Cellular and certain affiliates ("AirTouch"), Bell Atlantic Mobile and certain affiliates ("BAM"), GTE Mobilnet of California Limited Partnership ("GTE-California"), GTE Mobilnet Service Corp. ("GTE Corp."), Ameritech Mobile Communications, Inc. ("Ameritech") and SNET Mobility ("SNET") to deploy and support Blackbird Platform Products. In 1998, revenues from Blackbird Platform Products represented 96% of the Company's total revenues. The Company anticipates that revenues from Blackbird Platform Products will continue to

represent substantially all of the Company's total revenue in 1999. Prior to 1996, the Company's revenues had been derived primarily from the Company's Hotwatch Platform and related application products and services ("Hotwatch Platform Products"). The Hotwatch Platform Products are designed to provide credit management and prepaid billing applications and services to the wireless communications industry. The Company expects that revenues from existing Hotwatch Platform Products will not be material in 1999. However, the Company is reviewing market opportunities to use the underlying real-time technology of the Hotwatch Platform Products in new value-added applications for the Blackbird Platform, or license the technology to other vendors.

EFFECT OF INDUSTRY TRENDS ON THE COMPANY'S BUSINESS

Certain recent industry trends have had an adverse effect on the Company's business. These trends, and the Company's efforts to respond to them, are described below.

Industry Shift to Digital Networks. Presently, the Company's Blackbird Platform Products are used exclusively in analog networks. The Company believes that over 85% of wireless telephone subscribers in the United States use analog networks today, but that the industry is undertaking a shift to digital networks. Industry analysts predict that, by 2002, 58% of wireless telephone subscribers in the United States will use digital networks, compared to 15% digital subscriber usage today. This trend is fueled by increased competition derived from new frequency bandwidth licenses auctioned by the Federal Communications Commission ("FCC") over the past several years and continued improvements in digital wireless technology. While the Company believes that analog networks will continue to play a significant role in wireless telephone service for the foreseeable future, subscriber usage in analog networks has declined and will likely continue to decline over time in favor of digital usage.

Emergence of A-Key Authentication. Cryptographic authentication has recently emerged as an effective cloning-fraud prevention technology. One form of cryptographic authentication, commonly known as "A-Key authentication," is currently available in both digital and analog networks, and is now in extensive use by wireless telephone carriers operating digital networks. It is expected to be the cryptographic authentication most widely adopted by wireless telephone carriers in the United States. Today, almost all new digital and analog phones for the U.S. market are being manufactured with A-Key authentication capability. The Company does not believe that wireless telephone carriers will purchase RF fingerprinting fraud prevention solutions, such as the Blackbird Platform Products, for their digital networks unless and until the encryption technology that forms the basis for A-Key authentication is compromised. With respect to analog networks, Company believes that A-Key authentication currently has certain limitations, primarily due to the large number of existing analog phones that were not manufactured with A-Key authentication capability. However, the Company believes that A-Key authentication poses significant future competition to the Company's PreTect cloning-fraud prevention application in analog networks.

Reduction in Cloning Fraud. A relatively small number of wireless telephone carriers operating analog networks constitute the potential customers for Blackbird Platform Products in the United States today. Currently, a large majority of these carriers in the largest domestic markets are using cloning-fraud prevention products in varying degrees. The Company believes that the combined deterrent of RF fingerprinting, A-Key authentication, and other cloning-fraud prevention technologies has significantly reduced cloning fraud in domestic markets. For example, the Company's customers have reported up to a 95% reduction in cloning-fraud activity in market areas served by the Blackbird Platform Products. Overall, through the implementation and continued use of fraud prevention technologies, the CTIA now estimates that cloning fraud in the United States has been reduced to less than \$400 million in 1998, down from an estimated \$1 billion in 1996.

Effects on the Company's Business. The shift from analog networks to digital networks, the expanded use of alternative user/device authentication processes such as A-Key authentication, the reduction in the levels of cloning fraud, and other developments in the wireless communications industry, have reduced and

could continue to reduce demand for the Company's PreTect cloning fraud prevention application. The Company believes that similar declines in demand have occurred and will continue to occur for competing cloning fraud prevention technologies in the United States. The Company believes that this trend could also occur in international markets over time.

The Company's Restructuring Plan. The Company has incurred significant operating losses over the past three years, due in large part to the industry trends described above. During 1998, the Company implemented an aggressive restructuring plan, aimed at reducing its cost structure and restoring the Company toward sustainable profitability. The Company's restructuring actions included a significant reduction in workforce and related

28

expenses, reduction of facilities and capital assets, and write-offs of unmarketable inventory. This restructuring effort has provided the catalyst to refocus the Company's strategic plan to better meet the needs of its customers as they deal with the highly competitive and rapidly changing wireless communications marketplace. Further information regarding these restructuring efforts and financial results can be found elsewhere in this report.

OUTLOOK

To offset the current decline in demand for the Company's PreTect cloning-fraud prevention application, the Company intends to continue its efforts to: (i) enhance its existing products and develop new products, including other application products utilizing the Blackbird Platform; and (ii) pursue business opportunities that complement the Company's existing business, including strategic alliances with, and acquisitions of, complementary technologies and businesses. There can be no assurance that the Company will be able to successfully achieve further domestic or international market penetration, enhance existing products or develop new products, acquire complementary technologies and businesses, or timely introduce and gain acceptance of such enhancements, new products, or complementary technologies in the marketplace. If the Company is unable, due to resource, technological or other constraints, to adequately anticipate or respond to changing market, customer or technological requirements, the Company's business, financial condition and results of operations may be materially adversely affected.

REVENUE GENERATION

Revenues

The Company currently generates revenues through two sources: systems revenues and service revenues.

Systems revenues are generated from licensing and sales of the Company's proprietary software and hardware products, the sale of third-party equipment sold in support of the proprietary systems and, to a lesser extent, fees earned associated with the installation and deployment of such systems. Revenue is recognized when all of the following conditions are met:

- (i) Persuasive evidence of an arrangement exists;
- (ii) Delivery has occurred. Contract criteria has been satisfied and there are no additional undelivered elements that are essential to the functionality of the delivered products. Revenues are deferred for undelivered, but non-essential elements, based on vendor specific objective evidence ("VSOE") of the fair value for all elements of the arrangement;
- (iii) The amount is fixed and determinable; and
- (iv) Collectability is probable.

VSOE is typically based on the price charged when an element is sold separately, or, in the case of an element not yet sold separately, the price established by authorized management, if it is probable that the price, once established, will not change before market introduction. Elements included in multiple element

arrangements could consist of software products, upgrades, enhancements, customer support services, or consulting services.

Service revenues are derived primarily from hardware and software maintenance programs, No Clone Zone'sm' roaming fraud prevention services, Blackbird Platform Monitoring service and related professional services provided, in support of the Company's currently deployed product base. Service revenues are recognized ratably over the period that the service is provided. Hardware and software maintenance generally begins after system acceptance. Prepaid or allocated maintenance and services are recorded as deferred revenues.

Revenue recognition for the Company's systems varies by customer and by product. Every element of a contract must be identified and valued based upon VSOE, regardless of any stated price in the contract. Revenues from

29

any undelivered elements of a contract are deferred. However, any undelivered element essential to the functionality of the delivered product will cause a 100% deferral of the sale. Amounts billed and received on sales contracts before products are delivered or before revenue is recognized or recognizable are recorded as customer deposits or deferred revenue. The significant factors used in determining revenue recognition generally include physical hardware and software delivery, definitions of system delivery and customer acceptance. For those agreements which provide for payment based upon meeting actual performance criteria, the Company may record a portion of the systems revenues and the majority of the systems costs at shipment or during the early stages of a system deployment. In certain cases no systems revenues or systems costs may be recorded at time of shipment, while certain operating costs may be recorded during the deployment process. Accordingly, revenues and direct margins recorded by the Company can be expected to be lower in earlier periods of deployment and inconsistent from quarter to quarter, especially during the initial market deployments under new agreements. The resulting deferral of revenue is recognized in subsequent periods upon meeting the performance criteria specified in the applicable agreement. The Company does not operate with a significant revenue backlog.

Costs and Expenses

Costs of systems and services are primarily comprised of the costs of: (i) equipment, which includes both proprietary and third-party hardware and, to a lesser extent, manufacturing overhead and related expenses; (ii) amortization of capitalized software development costs; (iii) system integration and installation; (iv) royalty fees related to the licensing of intellectual property rights from others; (v) customer support; and (vi) activities associated with the evaluation, rework and testing of replacement inventory parts returned from the field in connection with the Company's ongoing hardware maintenance service activities.

Research and development expenditures include the costs for research, design, development, testing, preparation of training and user documentation and fixing and refining features for the software and hardware components included in the Company's current and future product lines.

The Company expects that its costs and expenses in these and other areas will be significantly lower in 1999 as compared to 1998, but will continue to be incurred in the future, due to the ongoing need to: (i) make investments in research and development; (ii) enhance its sales and marketing activities; (iii) enhance hardware maintenance processes; (iv) enhance its customer support capabilities; and (v) enhance its general and administrative activities.

YEAR ENDED DECEMBER 31, 1998 COMPARED TO YEAR ENDED DECEMBER 31, 1997

Overview

Total revenues decreased 60% to \$12.0 million in 1998 from \$30.3 million in 1997 and the Company generated net losses of \$10.9 million, or \$4.76 per share in 1998 compared to net losses of \$5.0 million, or \$2.22 per share in 1997. The adverse operating results in 1998 and 1997 are primarily attributed to:

- (i) a reduction in domestic market opportunities for the Company's cloning fraud prevention technology, due to the effectiveness of this and other authentication-based products in combating cloning fraud;
- (ii) lower penetration than originally planned of Blackbird Platform Products into existing customers' markets and to new and/or additional markets;
- (iii) the Company's inability to gain additional new domestic and international customers; and
- (iv) an unbalanced cost structure in relation to the 1998 and 1997 revenues, which resulted in the Company implementing its 1998 restructuring plan that included, among other initiatives, streamlining the Company's operations and reducing its workforce to approximately one-fourth of January 1, 1998 staffing levels.

30

Systems Revenues

Systems revenues, which decreased 83% to \$4.4 million in 1998 from \$25.8 million in 1997, represent revenues primarily from Blackbird Platform Products. The Company attributes the decrease in revenues from Blackbird Platform Products to:

- (i) a reduction in domestic market opportunities for the Company's cloning fraud prevention technology, due to the effectiveness of this and other authentication-based products in combating cloning fraud;
- (ii) lower penetration than originally planned of Blackbird Platform Products into existing customers' markets and to new and/or additional markets; and
- (iii) the Company's inability to gain additional new domestic and international customers.

Systems revenues from Hotwatch Platform Products decreased 85% to \$0.2 million in 1998 from \$1.3 million in 1997. Systems revenues, if any, from Hotwatch Platform Products, which have not been actively marketed for several years, are not expected to be material in 1999.

Service Revenues

Service revenues increased 68% to \$7.5 million in 1998 from \$4.5 million in 1997 with approximately 92% and 89% of the 1998 and 1997 revenues, respectively, being derived from existing customers utilizing the Blackbird Platform Products. This increase is directly attributable to the increased installed base of systems originating from Blackbird Platform Product deployments in late 1997 and during 1998. The Company also expects that service revenues from Hotwatch Platform Products, as currently deployed, will not be material in 1999.

Cost of System and Services

Costs of systems and services, the majority of which relate to the Company's Blackbird Platform Products, decreased 25% to \$14.4 million in 1998 from \$19.2 million in 1997. Costs of systems and services, as a percent of total revenues, were 120% and 63% for the 1998 and 1997 periods, respectively. The increased percentage cost for 1998 relative to 1997 primarily reflects:

- (i) a decrease in systems revenues in 1998, resulting in a decrease in leveraging of its fixed overhead costs relating to manufacturing, installation and systems integration, despite significant cost reductions implemented in 1998 in connection with the Company's restructuring plan;
- (ii) an increase in the amount of inventory reserves to \$4.6 million in 1998 from \$1.8 million in 1997, reflecting provisions for excess inventory quantities resulting from lower future sales projections based on changing market conditions; and
- (iii) a change made effective January 1, 1998 resulting in an increase in and

the acceleration of the amortization of capitalized software costs to \$3.4 million in 1998 from \$2.0 million in 1997, reflecting current estimates to recoverability values resulting from lower future sales projections based on changing market conditions.

Conversely, the Company benefited from increased service revenues in 1998, resulting in an increased leveraging of its fixed customer support operating expenses. The Company also benefited from cost reductions implemented in 1998 in connection with the Company's restructuring plan.

Sales and Marketing Expenses

Sales and marketing expenses decreased 77% to \$.9 million in 1998 from \$3.8 million in 1997 while total revenues decreased 60% as explained above. Sales and marketing expenses, as a percent of revenues, decreased to 7% in 1998 from 12% in 1997. The decrease in sales and marketing expenses resulted primarily from:

31

- (i) a reduction in staffing levels and related expenses in connection with the Company's restructuring plan;
- (ii) reduction in trade shows and other events in which the Company participated; and
- (iii) lower incentive compensation expense, which varies with revenue.

General and Administrative Expenses

General and administrative expenses decreased 41% to \$2.6 million in 1998 from \$4.5 million in 1997, primarily due to:

- (i) a reduction in staffing levels and related expenses in connection with the Company's restructuring plan;
- (ii) reduction in legal expenses related to settled and pending legal proceedings; and
- (iii) no bad debt expense in 1998 compared to a bad debt expense of \$0.4 million in 1997.

Research and Development Expenditures

Research and development costs decreased 44% to \$4.5 million in 1998 from \$8.1 million in 1997. The decrease in expenditures in 1998 was primarily attributable to reduced staffing levels and reduced hardware research activities associated with cost reductions implemented in 1998 in connection with the Company's restructuring plan. Software development costs of \$0.6 million were capitalized in 1998, a decrease from the \$1.8 million that were capitalized during 1997, and relate to the development and enhancement of the Blackbird Platform Products. The decrease is attributable to the Company's decision, during the second quarter of 1998, to no longer capitalize software development and enhancement costs as a result of its review of projected product sales from a recoverability perspective. Some expenditures were undertaken for the investigation of additional application products for the Blackbird Platform, such as geo-location technology.

Loss on Disposal of Assets

In response to the Company's 1998 restructuring plans, the Company sold, wrote off or otherwise disposed of assets, having an original cost of \$3.1 million. The resulting loss, net of \$.03 million proceeds, totaled \$0.5 million. The loss originated from:

- (i) the sale of excess furniture and miscellaneous equipment;
- (ii) the unamortized balance of leasehold improvements associated with the consolidation of certain facilities at the Company's corporate offices; and

- (iii) the write off and/or disposal of assets no longer used in the Company's business.

Interest Income, Net

Interest income (net of interest expense) decreased 53% to \$0.1 million in 1998 from \$0.2 million in 1997. The decrease was primarily attributable to lower average cash balances invested during 1998 as compared to 1997 and, to a lesser extent, miscellaneous interest charges from suppliers in connection with the payment of supplier liabilities.

YEAR ENDED DECEMBER 31, 1997 COMPARED TO YEAR ENDED DECEMBER 31, 1996

Total revenues increased 45% to \$30.3 million in 1997 from \$20.9 million in 1996 and the Company generated net losses of \$5.0 million, or \$2.22 per share in 1997 compared to net losses of \$7.4 million, or \$3.34 per share in 1996. In light of the increased revenues in 1997 as compared to 1996, the adverse operating results in 1997 were primarily attributed the Company's:

32

- (i) delays in gaining new orders and acceptances beginning in the latter part of the Company's second quarter and continuing through the remainder of 1997; and
- (ii) an unbalanced cost structure in relation to the 1997 revenues.

Revenues and operating results have also been inconsistent since the beginning of the Company's introduction of the Blackbird Platform Products. Revenues for the six month periods ending June 30, 1996, December 31, 1996, June 30, 1997 and December 31, 1997 were \$3.7 million, \$17.2 million, \$24.1 million, and \$6.2 million respectively. Operating results for those same periods were losses of (\$4.5) million, (\$2.9) million, profits of \$3.4 million and losses of (\$8.5) million, respectively.

The Company attributed the slowdown to:

- (i) slower than anticipated roll-out of Blackbird Platform Products to existing customers and the continued uneven sales cycle with potential new domestic and international customers; and
- (ii) delays in the release and acceptance of a new version of its Blackbird Platform/PreTect application software during the second quarter of 1997.

Beginning in the fourth quarter of 1997, issues surrounding the delayed release and acceptance of the Company's software were resolved, additional customer acceptances were received for systems shipped in previous quarters, and a small number of reorders were made. However, the Company was unable to generate a substantial number of new orders for its systems that would result in profitability.

Systems Revenues

Systems revenues increased 30% to \$25.8 million in 1997 from \$19.8 million in 1996 and represent revenues primarily from Blackbird Platform Products from its customers described above. Systems revenues from Hotwatch Platform Products decreased 58% to \$1.3 million in 1997 from \$3.1 million in 1996 and originated from agreements with AT&T Wireless Services, Inc. and AllTel Corporation (formerly 360[d] Communications Company). The decrease in systems revenues from Hotwatch Platform Products is primarily due to lower non-recurring revenues from these customers.

Service Revenues

Service revenues increased 307% to \$4.5 million in 1997 from \$1.1 million in 1996 with approximately 89% and 16% of the 1997 and 1996 revenues, respectively, being derived from the Blackbird Platform Products. This increase is directly attributable to Blackbird Platform Product deployments in late 1996 and during 1997.

Costs of Systems and Services

Costs of systems and services, the majority of which relate to the Company's Blackbird Platform Products, increased 16% to \$19.2 million in 1997 from \$16.6 million in 1996. Costs of systems and services, as a percent of total revenues, were 63% and 79% for the 1997 and 1996 periods, respectively. The improvement in 1997 is primarily attributable to:

- (i) an increased value of system sales that carried higher direct variable margins;
- (ii) leveraging fixed overhead costs relating to manufacturing, installation and system integration; and
- (iii) increased service revenues that benefited from leveraging fixed customer support operating expenses.

However, the results were negatively impacted by:

- (i) an increase in the amortization of capitalized software costs of products being replaced earlier than anticipated in conjunction with the expected commercial release of new software in early 1998

33

(amortization of capitalized software was \$2.0 million in 1997 as compared to \$1.1 million in 1996; as a result of analysis of sales projections and future product releases, the lives used for amortization were reduced effective January 1, 1998 from four years to two years, which will result in increased amortization in future years); and

- (ii) an increase in the provision for obsolete and excess inventory from \$.4 million in 1996 to \$1.8 million in 1997 for the Company's resale and service parts inventories (the reserves were required to address excess and obsolete items resulting from changes in technology of the Company's cloning fraud interdiction methods and from lower than expected sales of its Blackbird Platform Products in 1997).

The Company believes that increased sales volumes and/or an increase in the number of acceptances of previously shipped systems during the last half of 1997 would have provided higher margins by achieving even greater leverage of its fixed overhead costs in the manufacturing, installation and customer support operations.

Sales and Marketing Expenses

Sales and marketing expenses increased 10% to \$3.8 million in 1997 from \$3.4 million in 1996 while total revenues increased 45% as explained above. Sales and marketing expenses, as a percent of revenues, decreased to 12% in 1997 from 16% in 1996 and reflect the leveraging of the Company's fixed expenses coupled with slightly lower variable sales incentive compensation.

General and Administrative Expenses

General and administrative expenses increased 51% to \$4.5 million in 1997 from \$3.0 million in 1996. The amounts for 1997 reflect:

- (i) increased legal and related expenses of \$0.7 million in 1997 for costs primarily associated with legal proceedings during the period;
- (ii) a bad debt expense in 1997 of \$0.4 million attributable to the sale to a distributor of certain parts which were planned to be used for a prospective customer in the Pacific Rim region. Subsequent to the sale date, certain governmental bidding requirements changed, thus rendering these parts previously sold as obsolete. The Company chose to write off the value of this receivable; and
- (iii) in 1996, the Company incurred \$0.4 million of non-recurring expenses related to the Company's proposed public offering which was subsequently withdrawn due to unfavorable stock market conditions.

Without the increased legal and related expenses and bad debt expense in 1997 and the non-recurring expenses associated with the proposed public offering in 1996, general and administrative expenses would have been \$3.4 million in 1997 as compared to \$2.6 million in 1996, a 31% increase. The increase was principally due to increased personnel and related costs associated with the anticipated expansion of the Company's business.

Research and Development

Research and development costs increased 46% to \$8.1 million in 1997 from \$5.5 million in 1996. The increase in expenditures was primarily attributable to the enhancement of the Company's cloning fraud detection and prevention products, while some initial research was undertaken for the investigation of additional application products for the Blackbird Platform, such as technology to provide enhanced 911 services that have been mandated by the FCC for implementation by wireless telephone carriers by October 2001. Software development costs of \$1.8 million were capitalized in 1997, a 29% increase over the \$1.4 million that were capitalized during 1996. and relate to the development and enhancement of the Blackbird Platform

34

Products. The percentage increase in capitalized development costs was lower than the percentage increase for research and development costs since a greater portion of the expenditures were for non-capitalizable research and design of potential new or enhanced products, and for maintenance activities associated with the Blackbird Platform Products. A significant portion of the Blackbird Platform Product enhancements are being commercially installed during the first quarter of 1998 while the balance are scheduled for commercial deployment at a later date. Including capitalized software development costs, and \$0.2 million of contract design and development costs recorded as costs of services in both 1997 and 1996, gross research and development expenditures increased 40% to \$9.8 million in 1997 from \$7.0 million in 1996, with the increase in expenditures being attributable to the factors discussed above.

Interest Income

Interest income decreased 23% to \$0.2 million in 1997 from \$0.26 million in 1996. The decrease was attributable to lower average cash balances invested at lower average interest rates during 1997 as compared to 1996.

LIQUIDITY AND CAPITAL RESOURCES

The Company's capital requirements have consisted primarily of funding:

- (i) software and hardware research and development;
- (ii) property and equipment requirements;
- (iii) working capital; and
- (iv) the Company's operating losses.

The Company has historically funded these requirements through issuance of Common Stock (including proceeds from the exercise of warrants and options) and from operating profits in certain periods. On December 31, 1998, the Company's cash balance was \$1.6 million as compared to \$3.4 million on December 31, 1997. The Company's working capital decreased to \$0.6 million at December 31, 1998 from \$6.5 million at December 31, 1997. Approximately \$4.6 million (78%) of this working capital decline is attributable to increased inventory reserves, reflecting the Company's ongoing recoverability review, as discussed above.

Cash Used in Operating Activities

Cash used in operating activities amounted to \$1.4 million in 1998, as compared to cash provided by operating activities of \$1.6 million in 1997 and cash used in operating activities of \$10.3 million in 1996. The major factors contributing to the Company's reduced cash flow from operating activities in 1998 were: (i) the \$10.9 million net loss that was recorded in 1998 that included significant non-cash charges for depreciation, amortization, loss on disposal of assets and

inventory reserves as discussed above; and (ii) the net changes in the balances of the major working capital components affecting cash flow from operating activities as described below.

- (a) Receivables decreased 10% or \$ 0.3 million in 1998 and primarily reflect timing differences arising from payment cycles and terms of recurring service revenues.
- (b) Inventories decreased 84%, or \$5.4 million in 1998 primarily as a result of: (I) systems sales recorded during the first half of 1998, the majority of which utilized existing inventory with only minimal inventory purchases required; and (II) the addition of \$4.6 million to inventory reserves for excess and obsolete inventory, primarily resulting from lower sales than expected, technology changes in the Company's cloning fraud interdiction methods, changing market conditions as discussed above and, most recently, no future projections of any significant sales.
- (c) Accounts payable and accrued liabilities declined 51%, or \$1.4 million in 1998 primarily due to: (I) a lower fixed cost structure resulting from implementation of the Company's 1998 restructuring plan; and (II) the reduction of inventory purchases in response to reduced sales levels.

35

- (d) Payroll related liabilities decreased 41%, or \$0.3 million in 1998 primarily as a result of substantial reduction in staffing levels and correspondingly lower liabilities for employee related benefits.
- (e) Taxes (other than payroll and income) decreased 77%, or \$0.4 million in 1998 and reflect payments made on certain liabilities accrued throughout 1997 that were payable on an annual basis.
- (f) Deferred revenue increased \$0.4 million in 1998, resulting from the growth of prepaid maintenance and service revenues related to system sales of the Blackbird Platform Products.

Cash Used in Investing Activities

Cash utilized in investing activities totaled \$0.5 million, \$3.8 million and \$3.1 million in 1998, 1997 and 1996, respectively. The Company's capital requirements during such periods were primarily for:

- (i) purchase of property and equipment totaling \$0.2 million, \$2.0 million and \$1.7 million in 1998, 1997 and 1996, respectively, primarily for furniture, leaseholds and equipment associated with maintaining the Company's business. Lower expenditures for property and equipment in 1998 reflect the Company's restructuring efforts as discussed above. Expenditures levels in 1999 are expected to be minimal as compared to prior periods, due to the cost and expenditure reductions implemented in 1998 in connection with the Company's restructuring plan. At December 31, 1998, the Company had no significant commitments for capital expenditures.
- (ii) capitalization of software development costs of the Blackbird Platform Products totaling \$0.6 million, \$1.8 million and \$1.4 million, respectively in 1998, 1997 and 1996. As discussed above, the Company does not expect to capitalize software development in the foreseeable future.

Cash Provided By Financing Activities

Cash provided by financing activities totaled \$0.0 million, \$0.8 million and \$8.8 million during 1998, 1997 and 1996, respectively. Exercise of stock options by the Company's directors, officers and employees totaled \$0.0 million, \$0.8 million and \$2.4 million during 1998, 1997 and 1996, respectively. Also contributing to available cash was the November 1996 sale of 40,000 shares of common stock to investors in a private placement with proceeds to the Company approximating \$6.4 million net of expenses.

History of Net Losses; Accumulated Deficit; Operating Trends

The Company has incurred operating losses of \$11.0 million, \$5.2 million and \$7.6 million for the years ended December 31, 1998, 1997 and 1996, respectively. Net non-cash charges included in the operating losses were \$9.9 million, \$5.5 million and \$2.4 million, respectively. As of December 31, 1998, the Company had an accumulated deficit of \$26.9 million, the majority of which has accumulated during the past three years.

During 1996 and 1997, the Company deployed its initial cloning fraud prevention Blackbird Platform Products and incurred substantial operating expenses during such deployment. During 1998, in response to changing market conditions and unfavorable operating results, the Company implemented a restructuring plan that included, among other initiatives, streamlining the Company's operations to better balance expenses and revenues, and directing additional development efforts and resources towards new products that can generate new sources of revenue. Through the end of 1998, the results of the Company's 1998 plan showed significant improvement towards its goals of achieving both positive cash flow by the end of 1998 and profitability during 1999.

Historically, the Company has experienced uneven revenues, operating results (including significant losses) and cash flow. Unaudited operating information for the past eight quarters is as follows (in 000's):

THREE MONTHS ENDED	REVENUES	NET INCOME (LOSS)	CASH PROVIDED FROM (USED IN)	
			OPERATING ACTIVITIES	EBITDA+
March 31, 1997	\$ 17,368	\$ 4,414	\$ 1,072	\$ 5,466
June 30, 1997	6,725	(996)	3,402	(101)
September 30, 1997	2,379	(4,749)	(3,432)	(3,376)
December 31, 1997	3,783	(3,715)	560	(1,643)
March 31, 1998	3,422	(1,789)	(1,450)	(1,036)
June 30, 1998	3,423	(3,916)	1,185	(527)
September 30, 1998	2,416	(2,447)	(634)	34
December 31, 1998	2,712	(2,706)	(530)	532

The uneven operating results and cash flow from operations originate primarily from:

- (i) operating losses resulting from a combination of lower than expected revenues, an unbalanced cost structure in relation to those revenues and the changing market conditions discussed above;
- (ii) uneven quarterly shipments and acceptances of systems;
- (iii) deferral of revenue in accordance with the Company's revenue recognition policy; and
- (iv) varying payment terms contained in customer agreements.

The EBITDA+ information shown above reflects earnings (loss) before interest and taxes, and certain non-cash charges to operations for depreciation, amortization, loss on disposal of assets and inventory reserves. This is one of the Company's important cash flow monitoring tools in evaluating the effectiveness of its 1998 restructuring plan. The positive trends experienced during each of the quarterly periods in 1998, evidence the effectiveness of the 1998 restructuring plan towards achieving the Company's goals of both positive cash flow by the end of 1998 and profitability during 1999. While the Company believes that its current cash reserves and projected cash flow from operations provide sufficient cash to fund its operations for at least the next twelve

months, further delays in achieving profitability, unanticipated changes in customer needs and/or other external factors may require additional financing and/or further expense reductions.

Year 2000 Compliance

The Company is currently utilizing internal resources and, where appropriate, outside resources to comprehensively identify and timely resolve the potential impact of the year 2000 and beyond processing of date-sensitive information as it applies to the Company's business. Generally, year 2000 processing issues are the result of systems that use two digits (rather than four digits) to define the applicable year. Thus, for example, any system that utilizes date-sensitive coding may recognize a date using "00" as the year 1900 rather than the year 2000, which could result in miscalculations or system failures. Year 2000 processing issues also may arise in other contexts, such as certain leap year calculations and in systems that use certain dates to provide special functionality. The Company believes that it has completed the majority of work required to address its year 2000 processing issues.

The Company's systems that process date-sensitive information can be divided into the following three categories: (i) Blackbird Platform Products; (ii) Hotwatch Platform Products; and (iii) systems used in the Company's internal operations. Each of these categories may include internally-developed applications, third-party applications, operating systems, outsourced systems and interfaces with external systems. The general status of each of these categories is described below.

37

Blackbird Platform Products - The Company has substantially completed its assessment of year 2000 compliance for its Blackbird Platform Products. The Company believes that its software incorporated in these products is year 2000 compliant, so long as all necessary software and hardware with which it operates is also Year 2000 compliant. With respect to third-party software incorporated in these products, all vendors of such software have indicated that their software is year 2000 compliant. In addition, the Company has tested and verified that the Blackbird Platform Products, when used in conjunction with such third-party software, is year 2000 compliant in all material respects.

Hotwatch Platform Products - The Company's Hotwatch Platform Products, which revenues are not currently material to the Company's financial position, results of operations, or cash flows, are not currently year 2000 compliant. The Company has identified the aspects of these products that would require enhancements to become year 2000 compliant, and is in the process of determining with its customers whether it will perform such enhancements. Currently, the Company expects that revenues from its Hotwatch Platform Products, as currently deployed, will be minimal in 1999 and beyond. The Company expects that any year 2000 compliance project for these products, if initiated, will be completed in a timely manner and that all related costs will be borne by its customers of these products.

Internal Systems - The Company continues to assess and test all systems used in the Company's internal operations for year 2000 compliance. To date, most of these systems have been confirmed to be either presently year 2000 compliant in all material respects, or year 2000 compliant with the purchase of readily-available software upgrades or alternatives that are currently identified to be year 2000 compliant. The Company expects that all of its year 2000 compliance projects for internal systems will be completed in a timely manner.

Costs incurred to date for year 2000 compliance issues have not been significant and costs to complete are not currently expected to have a material adverse impact on the Company's financial position, results of operations, or cash flows in future periods. If, however, the Company, its customers, or its vendors are unable to adequately resolve any year 2000 compliance issues not yet addressed in a timely manner, the Company's business, financial condition and results of operations may be adversely affected. In addition, the Company has on occasion agreed to warrant and/or indemnify certain of its customers for claims and losses arising out of the failure of its products to be year 2000 compliant. There can be no assurance that the Company's current and future products and

internal systems do not contain undetected errors related to year 2000 processing that may result in material additional costs or liabilities that could have a material adverse effect on the Company's business, financial condition and results of operations. Further, to the extent that the Company is not able to test the technology provided to it by third parties for its own use or for redistribution, or to obtain adequate assurances from such third parties that their products are year 2000 compliant, the Company may experience material additional costs or liabilities that could have a material adverse effect on the Company's business, financial condition and results of operations.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

None.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The financial statements and supplementary data required by this item are included in Part IV as indexed at Item 14(a) (1) and (a) (2).

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None

PART III

ITEM 10. DIRECTORS AND EXECUTIVE OFFICERS OF THE REGISTRANT

IDENTIFICATION OF DIRECTORS AND EXECUTIVE OFFICERS

The name, age, position with the Company and other information with respect to each of its directors and executive officers is as set forth below.

NAME	AGE	POSITION WITH COMPANY	YEAR FIRST	TERM OF
			ELECTED	OFFICE
Stephen Katz	55	Chairman of the Board of Directors, Chief Executive Officer and Acting President	1988	2000
Joyce S. Jones	51	Chief Operating Officer and Director	1998	2001
Lawrence Schoenberg(1),(2)	66	Director	1996	1999
James Porter(1),(2)	62	Director	1997	2001
Michael E. McConnell	48	Vice President and Chief Financial Officer	--	--
Kyle R. Sugamele	36	Vice President, General Counsel and Corporate Secretary	--	--

BUSINESS EXPERIENCE

Stephen Katz, Chairman of the Board of Directors, was Acting Chief Executive Officer and Acting President from November 1992 until February 1994, at which time he became Chief Executive Officer. Mr. Katz was re-appointed as Acting President in September 1998. Mr. Katz has been Chairman of the Board and a director of the Company since its inception and a member of the Management Committee of the predecessor partnership during the entire period of its existence. From September 1984 until September 1995, Mr. Katz was Chairman of the Board, Chief Executive Officer and until September 1993, President of Nationwide Cellular Service, Inc., which was the Company's majority stockholder until May 1992 and its largest stockholder, owning 34% of its outstanding

shares, until September 1995. At that time such shares were distributed to Nationwide's stockholders, immediately prior to Nationwide's merger with MCI Communications Corp. ("MCI"). In May 1996, Mr. Katz was appointed Vice-Chairman of the Board and Chief Executive Officer of Global Payment Technologies, Inc. (formerly Coin Bill Validator, Inc.) whose business is currency validation. In September 1996, Mr. Katz was appointed Chairman of the Board of Global Payment Technologies, Inc.

Joyce S. Jones joined the Company in February 1998 as Vice President of Marketing. In September 1998, Ms. Jones was promoted to Chief Operating Officer and Director. Prior to joining the Company, Ms. Jones was founder and President of Creative Business Solutions, a management consulting firm specializing in software startups. From August 1987 to April 1995, Ms. Jones held several positions with Attachmate Corporation, a manufacturer of enterprise data communication software and hardware. From 1993 to 1995, she was Executive Vice President of Worldwide Products in the Office of the President where she was responsible for product strategy, product management, product development and product marketing. From 1991 to 1993, Ms. Jones held the position of Vice President of System Engineering. Other positions with Attachmate Corporation included Product Marketing, Product Management, and Technical Sales Engineer.

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- (1) Member of the Compensation and Stock Option Committee
 - (2) Member of the Audit Committee

Lawrence Schoenberg joined the Company as a Director in September 1996. Mr. Schoenberg founded AGS Computers, Inc. in 1967 and served as Chief Executive Officer until 1991. The company was sold to NYNEX in 1988. The micro-computer segment subsequently became a part of Merisel, Inc. Mr. Schoenberg also serves as Director of Government Technology Services, Inc. (since December 1991), Merisel, Inc. (since November 1989), SunGuard Data Services, Inc. (since October 1991), and Penn America Group, Inc. (from 1994 to 1997). Former directorships include Systems Center, Inc., which was sold to Sterling Software, Inc., SoftSwitch, Inc., which was sold to Lotus/IBM Corp., Forecross Corporation (from 1993 to June 1996), and Image Business Systems, Inc. (from January 1992 to August 1994).

James Porter joined the Company as a Director in July 1997. Since February 1997, Mr. Porter has served as Chairman of CCI/Triad Systems Corporation, a provider of information management services and systems with more than 2,000 employees and nearly 15,000 corporate customers worldwide. From September 1985 to February 1997, he was President and Chief Executive Officer of Triad Systems Corp. Mr. Porter is a board member of Silicon Valley Bank and FirstWave Technologies, both publicly traded companies. He also serves on the Board of Regents of Pepperdine University and is a past member of the board of directors and executive committee of the Information Technology Association of America.

Michael E. McConnell has been Vice President and Chief Financial Officer of the Company since January 1992. Prior to joining the Company, from April 1991 to December 1991, Mr. McConnell engaged in personal investments. From 1986 to March 1991, Mr. McConnell was the Chief Financial Officer of Delphi Information Systems, Inc., a public company engaged in the development of software systems for the insurance field. Mr. McConnell is a certified public accountant.

Kyle R. Sugamele joined the Company in July 1995 as Vice President and General Counsel, and was named Corporate Secretary in June 1996. Prior to joining the Company, Mr. Sugamele practiced law at the law firm of Mundt, MacGregor, Happel, Falconer, Zulauf & Hall in Seattle. His practice has involved a wide range of commercial, corporate, banking and general business matters, with particular emphasis in the protection and licensing of intellectual property and trade secrets, commercial finance and business transactions.

The Company's Board of Directors is divided into three classes. The Board is composed of two Class I directors, Ms. Jones and Mr. Porter, one Class II director, Mr. Schoenberg, and one Class III director, Mr. Katz. The terms of the Class I, Class II and Class III directors expire on the dates of the 2001, 1999 and 2000 annual meetings, respectively. At each annual meeting, successors to the class of directors whose term expires at that annual meeting are elected for

a three-year term. Officers are elected annually at the discretion of the Board of Directors and serve at the discretion of the Board.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this item is incorporated by reference to the Company's definitive proxy statement relating to its 1999 Annual Meeting of Stockholders under the caption "Executive Compensation."

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT

The information required by this item is incorporated by reference to the Company's definitive proxy statement relating to its 1999 Annual Meeting of Stockholders under the caption "Security Ownership."

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS

The information required by this item is incorporated by reference to the Company's definitive proxy statement relating to its 1999 Annual Meeting of Stockholders under the caption "Executive Compensation - Certain Transactions."

PART IV

ITEM 14. EXHIBITS, FINANCIAL STATEMENT SCHEDULES, AND REPORTS ON FORM 8-K

(a) 1. FINANCIAL STATEMENTS:

The following financial statements of Cellular Technical Services Company, Inc. are included as required to be filed by Item 8.

	Page No.

Report of Ernst & Young LLP, Independent Auditors.....	43
Balance Sheets at December 31, 1998 and 1997.....	44
Statements of Operations for the years ended December 31, 1998, 1997 and 1996....	45
Statements of Stockholders' Equity for the years ended December 31, 1998, 1997 and 1996.....	46
Statements of Cash Flows for the years ended December 31, 1998, 1997 and 1996....	47
Notes to Financial Statements.....	48

2. FINANCIAL STATEMENT SCHEDULES:

Schedule II - Valuation and Qualifying Accounts.....	62
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All other schedules have been omitted because they are inapplicable, not required, or the information is included in the financial statements or notes thereto.

3. EXHIBITS:

3.1	Restated Certificate of Incorporation of the Registrant, as amended (1)
3.2	Amendment to Restated Certificate of Incorporation of the Registrant (9)
3.3	By-Laws of the Registrant (1)
3.4	Amendment I to By-Laws of the Registrant, dated October 28, 1993 (3)

- 4.1 Specimen Certificate for Common Stock of Registrant (1)
- 7.1 1991 Qualified Stock Option Plan (as amended as of November 30, 1993) (+) (2)
- 7.2 Amendment to 1991 Qualified Stock Option Plan dated July 11, 1996 (+) (9)
- 7.3 1991 Non-Qualified Stock Option Plan (as amended as of November 30, 1993) (+) (2)
- 7.4 Amendment to 1991 Non-Qualified Stock Option Plan dated July 11, 1996 (+) (9)
- 7.5 1993 Non-Employee Director Stock Option Plan (+) (3)
- 7.6 Amendment to 1993 Non-Employee Director Stock Option Plan dated July 11, 1996 (+) (9)
- 7.7 1996 Stock Option Plan (+) (7)
- 7.8 Amendment to 1996 Stock Option Plan dated December 14, 1998 (+) (9)
- 10.1 Employment Agreement between the Registrant and Joyce Jones dated September 18, 1998 (+) (9)
- 10.2 Employment Agreement between the Registrant and Kyle R. Sugamele dated June 29, 1995 (+) (6)
- 10.3 First Amendment to Employment Agreement between the Registrant and Kyle R. Sugamele dated August 25, 1998 (+) (9)
- 10.4 Agreement of Lease dated May 23, 1994 between the Registrant and Martin Selig Properties (4)
- 10.4A Amendment to Lease dated April 7, 1995 between the Registrant and Martin Selig Properties (6)
- 10.5 Master Purchase and License Agreement between the Registrant and AirTouch Cellular dated March 6, 1996 (c) (6)
- 10.6 Master Purchase and License Agreement between the Registrant and Bell Atlantic NYNEX Mobile dated August 27, 1996 (d) (8)
- 10.7 Master Purchase and License Agreement between the Registrant and GTE Mobilnet of California Limited Partnership dated September 30, 1996 (d) (8)

- 10.8 Master Purchase and License Agreement between the Registrant and Ameritech Mobile Communications, Inc. dated October 14, 1996 (d) (8)
- 10.9 Patent License Agreement between Registrant and The Boeing Company dated April 29, 1994 (b) (4)
- 10.10 Patent Sublicense Agreement between Registrant and Motron Electronics dated May 24, 1995 (a) (5)
- 10.11 Patent License Agreement between Registrant and AirTouch Cellular, dated December 22, 1995 (c) (6)
- 23.1 Consent of Ernst & Young LLP, independent auditors (9)
- 27 Financial Data Schedule (9)

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- (a) Confidential treatment granted pursuant to order of the Secretary of the Securities and Exchange Commission dated January 25, 1996 (File No. 0-19437).
 - (b) Confidential treatment granted pursuant to order of the Secretary of the Securities and Exchange Commission dated July 26, 1996 (File No. 0-19437).
 - (c) Confidential treatment granted pursuant to order of the Secretary of the Securities and Exchange Commission dated November 8, 1996 (File No. 0-19437).
 - (d) Confidential treatment granted pursuant to order of the Secretary of the Securities and Exchange Commission dated February 28, 1997 (File No. 0-19437).
 - (+) Management contract or compensation plan or arrangement required to be noted as provided in Item 14(a) (3).
 - (1) Incorporated by reference to Registration Statement on Form S-1 declared effective on August 6, 1991 (File No. 33-41176).
 - (2) Incorporated by reference to Registration Statement on Form S-8 filed on March 7, 1994 (File No. 33-76128).
 - (3) Incorporated by reference to Annual Report on Form 10-K filed on March 30, 1994 for the year ended December 31, 1993 (File No. 0-19437).
 - (4) Incorporated by reference to Annual Report on Form 10-K filed on March 28, 1995 for the year ended December 31, 1994 (File No. 0-19437).
 - (5) Incorporated by reference to Quarterly Report on Form 10-Q filed on August 8, 1995 for the quarter ended June 30, 1995 (File No. 0-19437).
 - (6) Incorporated by reference to Annual Report on Form 10-K filed on March 27, 1996 for the year ended December 31, 1995 (File No. 0-19437).
 - (7) Incorporated by reference to Registration Statement on Form S-8 filed on July 12, 1996 (File No. 333-08049).
 - (8) Incorporated by reference to Quarterly Report on Form 10-Q filed on November 14, 1996 for the quarter ended September 30, 1996 (File No. 0-19437).
 - (9) Filed herewith.

(b) REPORTS ON FORM 8-K

The Registrant did not file any Current Reports on Form 8-K during the quarter ended December 31, 1998.

REPORT OF ERNST & YOUNG LLP, INDEPENDENT AUDITORS

The Board of Directors and Stockholders
Cellular Technical Services Company, Inc.

We have audited the accompanying balance sheets of Cellular Technical Services Company, Inc. as of December 31, 1998 and 1997, and the related statements of operations, stockholders' equity and cash flows for each of the three years in the period ended December 31, 1998. Our audits also included the financial statement schedule listed in the Index at Item 14(a). These financial statements and schedule are the responsibility of the Company's management. Our

responsibility is to express an opinion on these financial statements and schedule based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Cellular Technical Services Company, Inc. at December 31, 1998 and 1997, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 1998, in conformity with generally accepted accounting principles. Also, in our opinion, the related financial statement schedule, when considered in relation to the basic financial statements taken as a whole, presents fairly, in all material respects, the information set forth therein.

ERNST & YOUNG LLP

Seattle, Washington
March 15, 1999

43

CELLULAR TECHNICAL SERVICES COMPANY, INC.
BALANCE SHEETS
(in 000's, except per share amounts)

	DECEMBER 31,	
	1998	1997
ASSETS		
CURRENT ASSETS		
Cash and cash equivalents	\$ 1,567	\$ 3,448
Accounts receivable, net of allowances of \$72 in 1998 and \$187 in 1997	2,860	3,190
Inventories, net	1,014	6,428
Prepaid expenses and deposits	185	300
	-----	-----
Total Current Assets	5,626	13,366
PROPERTY AND EQUIPMENT, net	1,941	3,964
SOFTWARE DEVELOPMENT COSTS, net of accumulated amortization of \$9,170 in 1998 and \$5,743 in 1997.	535	3,391
	-----	-----
TOTAL ASSETS	\$ 8,102	\$ 20,721
	=====	=====
LIABILITIES AND STOCKHOLDERS' EQUITY		
CURRENT LIABILITIES		
Accounts payable and accrued liabilities	\$ 1,358	\$ 2,799
Payroll-related liabilities	470	792
Taxes (other than payroll and income)	128	549
Customers' deposits	0	15
Deferred revenue	3,074	2,676
	-----	-----
Total Current Liabilities	5,030	6,831

STOCKHOLDERS' EQUITY

Preferred Stock, \$.01 par value per share, 5,000 shares authorized, none issued and outstanding		
Common Stock, \$.001 par value per share, 30,000 shares authorized, 2,281 shares issued and outstanding in 1998 and 2,279 in 1997	23	23
Additional paid-in capital	29,931	29,889
Accumulated deficit	(26,882)	(16,022)
	-----	-----
Total Stockholders' Equity	3,072	13,890
	-----	-----
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	\$ 8,102	\$ 20,721
	=====	=====

The accompanying footnotes are an integral part of these financial statements.

44

CELLULAR TECHNICAL SERVICES COMPANY, INC.
STATEMENTS OF OPERATIONS
(in 000's, except per share amounts)

	YEAR ENDED DECEMBER 31,		
	1998	1997	1996
	-----	-----	-----
REVENUES			
Systems	\$ 4,415	\$ 25,768	\$ 19,799
Services	7,540	4,487	1,103
	-----	-----	-----
Total Revenues	11,955	30,255	20,902
	-----	-----	-----
COSTS AND EXPENSES			
Cost of Systems and Services	14,402	19,199	16,617
Sales and marketing	857	3,755	3,401
General and administrative	2,625	4,481	2,966
Research and development	4,542	8,061	5,523
Loss on disposal of assets	482	2	
	-----	-----	-----
Total Costs and Expenses	22,908	35,498	28,507
	-----	-----	-----
LOSS FROM OPERATIONS	(10,953)	(5,243)	(7,605)
	-----	-----	-----
INTEREST INCOME	93	197	255
	-----	-----	-----
NET LOSS	\$ (10,860)	\$ (5,046)	\$ (7,350)
	=====	=====	=====
	-----	-----	-----
BASIC AND DILUTED LOSS PER SHARE	\$ (4.76)	\$ (2.22)	\$ (3.34)
	=====	=====	=====
	-----	-----	-----
WEIGHTED AVERAGE SHARES OUTSTANDING	2,281	2,273	2,199
	=====	=====	=====

The accompanying footnotes are an integral part of these financial statements.

45

CELLULAR TECHNICAL SERVICES COMPANY, INC.
STATEMENTS OF STOCKHOLDERS' EQUITY
(in 000's)

	COMMON STOCK		ADDITIONAL PAID-IN CAPITAL	ACCUMULATED DEFICIT	TOTAL
	SHARES	AMOUNT			
Balance, January 1, 1996	2,160	\$ 22	\$ 20,338	\$ (3,626)	\$ 16,734
Exercise of stock options	63	1	2,360		2,361
Sale of Common Stock	40		6,440		6,440
Net loss				(7,350)	(7,350)
Balance, December 31, 1996	2,263	23	29,138	(10,976)	18,185
Exercise of stock options	16		751		751
Net loss				(5,046)	(5,046)
Balance, December 31, 1997	2,279	23	29,889	(16,022)	13,890
Common Stock exchanged for assets	2		42		42
Net loss				(10,860)	(10,860)
Balance, December 31, 1998	2,281	\$ 23	\$ 29,931	\$ (26,882)	\$ 3,072

The accompanying footnotes are an integral part of these financial statements.

46

CELLULAR TECHNICAL SERVICES COMPANY, INC.
STATEMENTS OF CASH FLOWS
(in 000's)

	YEAR ENDED DECEMBER 31,		
	1998	1997	1996
OPERATING ACTIVITIES			
Net income (loss)	\$ (10,860)	\$ (5,046)	\$ (7,350)
Adjustments to reconcile net income (loss) to net cash provided by (used in) operating activities:			
Depreciation and amortization of property and equipment	1,454	1,219	817
Loss on disposal of assets	482	2	
Amortization of software development costs	3,426	1,961	1,123
Provision for inventory reserves and other non cash charges	4,632	1,818	390
(Reduction in) provision for accounts receivable reserves	(44)	528	116
Changes in operating assets and liabilities:			
Decrease (increase) in accounts receivable	374	7,898	(11,224)
Decrease (increase) in inventories	824	29	(6,718)
Decrease (increase) in prepaid expenses and deposits	115	531	(3)
(Decrease) increase in accounts payable and accrued liabilities	(1,441)	(3,566)	5,211

(Decrease) increase in payroll-related liabilities	(322)	57	512
(Decrease) increase in taxes (other than payroll and income)	(421)	(111)	462
(Decrease) increase in customers' deposits	(15)	(4,611)	4,606
Increase (decrease) in deferred	398	895	1,739
	-----	-----	-----
NET CASH (USED IN) PROVIDED BY OPERATING ACTIVITIES	(1,398)	1,604	(10,319)
INVESTING ACTIVITIES			
Purchase of property and equipment	(179)	(2,008)	(1,701)
Proceeds from sale of assets	266		
Capitalization of software development costs	(570)	(1,753)	(1,375)
	-----	-----	-----
NET CASH USED IN INVESTING ACTIVITIES	(483)	(3,761)	(3,076)
FINANCING ACTIVITIES			
Proceeds from sale of Common Stock			6,440
Proceeds from exercise of stock options		751	2,361
	-----	-----	-----
NET CASH PROVIDED BY FINANCING ACTIVITIES	-	751	8,801
	-----	-----	-----
NET DECREASE IN CASH AND CASH EQUIVALENTS	(1,881)	(1,406)	(4,594)
CASH AND CASH EQUIVALENTS AT BEGINNING OF YEAR	3,448	4,854	9,448
	-----	-----	-----
CASH AND CASH EQUIVALENTS AT END OF YEAR	\$ 1,567	\$ 3,448	\$ 4,854
	=====	=====	=====

The accompanying footnotes are an integral part of these financial statements.

CELLULAR TECHNICAL SERVICES COMPANY, INC.
NOTES TO FINANCIAL STATEMENTS

NOTE A - NATURE OF OPERATIONS AND SIGNIFICANT ACCOUNTING POLICIES:

Nature of Operations and Organization

Cellular Technical Services Company, Inc. (the "Company") is primarily engaged in the design, development, marketing, installation and support of integrated information processing and information management systems for the wireless communications industry. Although the Company's current customer base is comprised of domestic U.S. cellular service providers, management believes that demand for the Company's products extends to worldwide wireless service providers. The Company was incorporated in Delaware on August 19, 1988.

Estimates and Assumptions

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates.

Cash and Cash Equivalents

The Company considers all highly liquid investments with a maturity of three months or less when purchased to be cash equivalents.

Diversification of Credit Risk

The Company is subject to concentrations of credit risk primarily from cash investments and accounts receivable. Credit risk from cash investments is managed by diversification of cash investments among institutions and by the purchase of investment-grade commercial paper securities. The estimated fair values of the securities approximate cost. Credit risk associated with trade receivables is subject to ongoing credit evaluations. The Company does not

typically require collateral for receivables. Reserves for potential losses, if any, are maintained where appropriate.

Inventories

Inventories, which primarily consist of raw materials and finished components (including data processing and telecommunication equipment), are stated at the lower of cost or market value, with cost determined on a first-in, first-out basis. Inventories are integrated for delivery to customers by either the Company or its third-party integrators. The Company monitors inventory for obsolescence and considers factors such as turnover, technical obsolescence, right-of-return status to suppliers and pricing. Reserves for slow-moving and obsolete inventory, if any, are maintained where appropriate. Currently, the majority of the Company's inventory is being used as repair parts for servicing its installed customer base.

CELLULAR TECHNICAL SERVICES COMPANY, INC.
NOTES TO FINANCIAL STATEMENTS

NOTE A - NATURE OF OPERATIONS AND SIGNIFICANT ACCOUNTING POLICIES (CONTINUED):

Property and Equipment

Property and equipment, including leasehold improvements, are stated at cost, less accumulated depreciation and amortization. Depreciation and amortization commences at the time assets are placed in service and is computed using the straight-line method over the shorter of estimated useful lives of the assets of two to five years or terms of the associated operating leases. The Company capitalizes expenditures that significantly increase the life of the related assets, while maintenance and repairs are charged to operations. Gain or loss is reflected in results of operations upon the retirement or sale of assets.

Software Development Costs

Software development costs, consisting primarily of internally developed software, have been capitalized in accordance with Financial Accounting Standards Board Statement No. 86, "Accounting for the Costs of Computer Software to be Sold, Leased or Otherwise Marketed."

Capitalization of software development costs begins upon the establishment of technological feasibility. Capitalization ceases when products are completed.

Amortization begins when products are available for general release.

Amortization of capitalized software development costs is the greater of the amount computed using:

- (i) the ratio that current gross revenues for a product bear to the total of current and anticipated future gross revenues for that product, or
- (ii) the straight-line method over the remaining estimated economic life of the product, generally twenty-four months.

Ongoing assessment of the recoverability of these costs considers external factors including, but not limited to:

- (i) anticipated future net product revenues
- (ii) estimated economic life and changes in software and hardware technology

As part of an ongoing recoverability review to address i) the capitalization of new software development and enhancement costs and ii) the amortization of existing capitalized costs, the Company ceased capitalizing software development and enhancement costs in 1998. The Company also accelerated the amortization of certain capitalized costs reflecting the Company's estimates of recoverability values resulting from lower sales levels in 1998 and future sales projections, based on changed market conditions.

CELLULAR TECHNICAL SERVICES COMPANY, INC.
NOTES TO FINANCIAL STATEMENTS

NOTE A - NATURE OF OPERATIONS AND SIGNIFICANT ACCOUNTING POLICIES (CONTINUED):

Revenue Recognition

Statement of Position 97-2, Software Revenue Recognition (SOP 97-2) was issued in 1997 by the American Institute of Certified Public Accountants (AICPA) and was amended by SOP 98-4. The Company adopted SOP 97-2 effective January 1, 1998. Based upon its interpretation of SOP 97-2 and SOP 98-4, the Company believes its current revenue recognition policies and practices are consistent with these SOPs. However, full implementation guidelines for this standard have not yet been issued. Once available, such implementation guidance could lead to unanticipated changes in current revenue accounting practices, and such changes could materially adversely affect the timing of the Company's future revenues and earnings. Additionally, the AICPA recently issued SOP 98-9, which provides certain amendments to SOP 97-2, and which is effective for transactions entered into beginning January 1, 2000. The pronouncement is not expected to materially impact the Company's revenue recognition practices.

The Company generates revenues through two sources: (1) systems revenues, consisting primarily of bundled hardware and software products, and (2) services revenues, consisting primarily of hardware and software maintenance and related support services.

Systems revenues are recognized when all of the following conditions are met:

- (i) Persuasive evidence of an arrangement exists.
- (ii) Delivery has occurred. Contract criteria has been satisfied and there are no additional undelivered elements that are essential to the functionality of the delivered products. Revenues are deferred for undelivered, but non-essential elements, based on vendor specific objective evidence ("VSOE") of the fair value for all elements of the arrangement.
- (iii) The amount is fixed and determinable.
- (iv) Collectability is probable.

VSOE is typically based on the price charged when an element is sold separately, or, in the case of an element not yet sold separately, the price established by authorized management, if it is probable that the price, once established, will not change before market introduction. Elements included in multiple element arrangements could consist of software products, upgrades, enhancements, customer support services, or consulting services.

Service revenues are recognized ratably over the period that maintenance coverage is provided. Prepaid or allocated maintenance and services are recorded as deferred revenues.

Income Taxes

The Company follows the deferred method of accounting for income taxes whereby deferred tax assets and liabilities are determined based on differences between financial reporting basis and tax basis of assets and liabilities and are measured using the enacted tax rates and laws that are expected to be in effect when the differences are expected to reverse. The Company provides a valuation allowance for deferred tax assets that cannot be currently recognized due to the cumulative losses incurred by the Company.

CELLULAR TECHNICAL SERVICES COMPANY, INC.
NOTES TO FINANCIAL STATEMENTS

NOTE A - NATURE OF OPERATIONS AND SIGNIFICANT ACCOUNTING POLICIES (CONTINUED):

Net Loss Per Share

Basic loss per share is computed by dividing net loss available to common shareholders by the weighted average number of common shares outstanding for the period. Diluted earnings per share reflects the potential dilution of securities by including other common stock equivalents, including stock options and other securities or contracts, in the weighted average number of common shares outstanding for a period, if dilutive.

Stock-Based Compensation

The Company evaluates stock based compensation in accordance with Financial Accounting Standards Board Statement No. 123, "Accounting for Stock-Based Compensation." As provided for by Statement 123, the Company has chosen to measure stock-based compensation cost under the intrinsic-value method prescribed under Accounting Principles Board Opinion No. 25 and has adopted the disclosure only provisions of Statement 123.

Risks and Uncertainties

Management of the Company believes that the risks and uncertainties discussed below, whether viewed individually or combined, will not result in a significant unfavorable impact to the Company. However, there can be no assurance that any unfavorable outcome of the risks and uncertainties discussed below will not have a material adverse effect on the Company's financial position, results of operations or liquidity.

- a) Limited customer base; Reliance on significant customers: The Company's potential customers base is relatively limited due to the significant concentration of ownership and/or operational control of wireless communication markets. The nature of the Company's business is such that a single customer and its affiliates will account for more than 10% of the Company's product and service revenues during a given fiscal year. Sales to customers aggregating 10% or more, either individually or combined as affiliates due to common ownership, were concentrated as follows: three customers whose purchases represented 41%, 20% and 19% of 1998 sales, four customers whose purchases represented 31%, 20%, 20% and 19% of 1997 sales, and three customers whose purchases represented 42%, 38% and 15% of 1996 sales. The aggregate sales to these customers represented 80%, 90% and 95% of the Company's total systems and service revenues in 1998, 1997 and 1996, respectively. There can be no assurances that such customers will continue to maintain business relationships with the Company. Accordingly, the loss of one or more major customers could have a material adverse effect on the Company.
- b) Liquidity; Possible need for financing: Historically, the Company has experienced uneven cash flow and operating results, and, during the past three years, significant operating losses. These factors originated primarily from operating losses resulting from a combination of lower than expected revenues and an unbalanced cost structure in relation to those revenues. The operating losses were \$11.0 million, \$5.2 million and \$7.6 million for the years ended December 31, 1998, 1997 and 1996, respectively. Net non-cash charges included in the operating losses were \$9.9 million, \$5.5 million and \$2.4 million respectively. Cash (used in) provided by operating activities was (\$1.4) million, \$1.6 million and (\$10.3) million in 1998, 1997 and 1996 respectively. As of December 31, 1998, the Company had an accumulated deficit of \$27.0 million, the majority of which has accumulated during the past three years. As of December 31, 1998, the Company's working capital was \$0.6 million and its cash and cash equivalents balances were \$1.6 million.

CELLULAR TECHNICAL SERVICES COMPANY, INC.
NOTES TO FINANCIAL STATEMENTS

NOTE A - NATURE OF OPERATIONS AND SIGNIFICANT ACCOUNTING POLICIES (CONTINUED):

During 1996 and 1997, the Company deployed its initial cloning fraud prevention Blackbird Products and incurred substantial operating expenses during such deployment. During 1998, in response to changing market conditions and unfavorable operating results, the Company implemented a restructuring plan that included, among other initiatives, streamlining the Company's operations to better balance expenses and revenues, and directing additional development efforts and resources towards new products that can generate new sources of revenue. Through the end of 1998, the results of the Company's restructuring plan showed significant improvement towards its goals of achieving both consistent positive cash flow by the end of 1998 and profitability during 1999.

Going forward into 1999, the Company has reduced its fixed operating costs and has increased its recurring revenue base from its maintenance and services. Management believes that under its current business plans, its current cash balances and cash flows expected to be generated from operations are sufficient to fund its operations and capital requirements through at least the next twelve months. However, the Company's inability to successfully generate sufficient cash flow from operations would have a material adverse impact on the Company's financial position, liquidity or results of operations and may require the Company to reduce its expenditures further or curtail certain operations to enable it to continue its operations for at least the next twelve months.

- c) Legal proceedings: From time to time, the Company could be subject to involvement with legal actions and claims arising in connection with its business. The following significant legal matters are outstanding as of December 31, 1998:

Securities Class Action Litigation - Stipulation and Agreement of Settlement - See Note "I" below.

In January 1998, Communications Information Services, Inc. filed an action against the Company and AirTouch Communications, Inc. for alleged infringement of United States Patent No. 5,329,591 ("the '591 patent") in the United States District Court for the Northern District of Georgia at Atlanta. In January 1999, the Court granted the Company's motion to transfer this lawsuit to the United States District Court for the Western District of Washington. The complaint asserts that the plaintiff is the exclusive licensee of all rights under the '591 patent, alleges that the Company's cellular telephone fraud prevention technology infringes the '591 patent, and seeks damages in unspecified amounts. The Company believes this lawsuit is without merit and is vigorously defending against it. Although no estimate of any outcome of this action can currently be made, an unfavorable resolution of this lawsuit could have a material adverse effect on the Company's business, financial condition and results of operations.

The Company is also a party to other legal proceedings which arise in the ordinary course of business and/or which management believes will be resolved without a material adverse effect on the Company's business, financial condition or results of operations.

Reclassifications

Certain reclassifications have been made to the prior year financial statements to conform to the current period's presentation.

NOTES TO FINANCIAL STATEMENTS

NOTE B - INVENTORIES:

Inventory consists of the following (in 000's):

	DECEMBER 31,	
	1998	1997
Raw materials	\$ 372	\$ 2,571
Finished components	3,443	5,954
	3,815	8,525
Less inventory reserves	(2,801)	(2,097)
	\$ 1,014	\$ 6,428
	=====	=====

NOTE C - PROPERTY AND EQUIPMENT:

Property and equipment consist of the following (in 000's):

	DECEMBER 31,	
	1998	1997
Computer equipment and software	\$ 3,898	\$ 5,648
Furniture, fixtures and office equipment	950	1,922
Leasehold improvements	181	407
	5,029	7,977
Less accumulated depreciation and amortization	(3,088)	(4,013)
	\$ 1,941	\$ 3,964
	=====	=====

NOTE D - COMMITMENTS AND CONTINGENCIES:

Leases:

The Company leases office space under three non-cancelable operating leases with expiration dates from 1999 through 2000, which contain renewal options for additional terms ranging from two and one-half to five years. The Company also leases equipment and telecommunication lines and services under non-cancelable operating leases expiring through 1999. In addition, the Company leases office space, equipment and telecommunication lines and services under various rental agreements with initial terms ranging from one to twelve months. Amounts charged to operations under all lease and rental agreements totaled \$0.9 million, \$0.8 million and \$1.0 million.

million in 1998, 1997 and 1996, respectively. Future minimum annual lease payments at December 31, 1998, under those agreements with initial terms greater than one year are as follows (in 000's):

1999	\$ 580
2000	243
2001	13

Total	\$ 836
	=====

Employment Agreements:

At December 31, 1998, the Company has employment agreements with two officers, both of which have terms expiring in 1999.

NOTE E - EMPLOYEE RETIREMENT SAVINGS PLAN:

The Company has adopted an Employee Retirement Savings Plan covering substantially all employees who have been employed for at least one month and meet certain age and eligibility requirements. Each eligible employee may contribute up to 15% of his or her compensation per year, subject to a maximum limit imposed by federal tax law, into various funds. Under current plan provisions, matching contributions are made by the Company equal to two-thirds of the employee's contribution, subject to a maximum of 6% of compensation contribution by the employee. Company contributions charged to costs and expenses totaled \$133,000, \$176,000 and \$136,000 during 1998, 1997 and 1996, respectively.

NOTE F - INCOME TAXES:

At December 31, 1998, the Company had available for federal income tax purposes net operating loss carryforwards of approximately \$52 million and research and development tax credits of approximately \$1.1 million which begin to expire in 2003. The federal income tax net operating loss carryforwards exceed the retained deficit, primarily due to the differences between financial reporting and tax treatment of software development costs and deductibility of certain amounts on exercise of stock options. A portion of the net operating loss carryforward (approximately \$22 million) is attributed to the stock option deduction, the tax effect of which will be credited to additional paid-in capital when realized. The net operating loss carryforwards of the Company have been and will continue to be subject to limitations imposed by Section 382 of the Internal Revenue Code because there has been an ownership change of greater than 50% in the Company.

CELLULAR TECHNICAL SERVICES COMPANY, INC.
NOTES TO FINANCIAL STATEMENTS

NOTE F - INCOME TAXES (CONTINUED):

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Significant components of the Company's deferred tax liabilities and assets are as follows (in 000's):

DECEMBER 31,		
-----	-----	-----
1998	1997	1996
-----	-----	-----

Deferred tax assets:

Net operating loss carryforwards	\$ 17,688	\$ 15,024	\$ 14,049
Research and development tax credits	1,158	996	653
Reserves and allowances on financial statements in excess of tax returns	977	822	351
	-----	-----	-----
Total deferred tax assets	19,823	16,842	15,053

Deferred tax liabilities:

Depreciation on tax returns in excess of financial	90	137	107
Capitalized software development costs	125	1,072	1,434
	-----	-----	-----
Total deferred tax liabilities	215	1,209	1,541
	-----	-----	-----
Net deferred tax assets	19,608	15,633	13,512
Valuation allowance	(19,608)	(15,633)	(13,512)
	=====	=====	=====
Net	\$ --	\$ --	\$ --
	=====	=====	=====

The Company has provided a valuation allowance of 100% of the net deferred income tax asset related to the operating loss carryforward and temporary differences. The net change in the valuation allowance for deferred tax assets was an increase of approximately \$4.0 million, \$2.1 million and \$4.5 million and was attributable to the net operating losses incurred by the Company during 1998, 1997, and 1996 respectively.

The reconciliation of income tax computed at the U.S. federal statutory tax rate to income tax expense is as follows (in 000's):

	YEAR ENDED DECEMBER 31,		
	1998	1997	1996
	-----	-----	-----
Income tax provision (benefit) at statutory rate of 34%	\$ (3,692)	\$ (1,716)	\$ (2,499)
Losses producing no current tax benefit	3,692	1,716	2,499
	-----	-----	-----
Provision for income taxes	\$ 0	\$ 0	\$ 0
	=====	=====	=====

CELLULAR TECHNICAL SERVICES COMPANY, INC.
NOTES TO FINANCIAL STATEMENTS

NOTE G - STOCKHOLDERS' EQUITY:

Stock Splits

On June 14, 1996, the Company declared a two-for-one split of its Common Stock, \$.001 par value per share, effected by a 100% stock dividend whereby each holder of Common Stock received one additional share of Common Stock for each share held. All outstanding common shares and per share amounts in the accompanying financial statements reflect the split. See also Note "I" regarding the one-for-ten stock combination (reverse stock split) consummated as of January 5, 1999.

Private Placement

On November 8, 1996, the Company sold 40,000 shares of Common Stock to investors in a private placement. Proceeds to the Company net of estimated expenses of \$.1 million amounted to approximately \$6.4 million. A registration statement for the resale of such shares was declared effective by the Securities and Exchange

Commission in April 1997.

Stock Options

In 1991, the Company adopted a Qualified Stock Option Plan and a Non-Qualified Stock Option Plan. Pursuant to the 1991 Qualified Plan, as amended, the Company was authorized to grant options to purchase up to 280,000 shares of Common Stock to its officers and key employees, at a price not less than the fair market value per share of Common Stock on the date of grant and have a term of ten years. Pursuant to the 1991 Non-Qualified Plan, as amended, the Company was authorized to grant options to purchase up to 120,000 shares of Common Stock to its directors, officers, key employees and others who rendered services to the Company at such price as fixed by the Compensation and Stock Option Committee. Options granted under both the 1991 Qualified Plan and 1991 Non-Qualified Plan generally vest to the respective option holders at the rate of 20% per year commencing on the first anniversary date of the grant.

In December 1993, the Company adopted the 1993 Non-Employee Director Stock Option Plan which allows the Company to grant options to purchase up to 30,000 shares of Common Stock. Pursuant to the 1993 Non-Employee Director Plan, each non-employee director is to be granted options to purchase 2,000 shares of

Common Stock upon initial appointment as a director of the Company and an additional 1,200 options, in recurring annual increments, at a price equal to the fair market value per share of Common Stock on the date of grant. Options under the Non-Employee Director Plan vest to the respective option holder after one year and have a term of ten years.

In June 1996, the Company adopted the 1996 Stock Option Plan covering both incentive stock options and non-qualified stock options. Pursuant to action taken by the Company's Board and approved by a majority of the Company's stockholders, no new options will be granted under either the Company's 1991 Qualified Stock Option Plan or under the 1991 Non-Qualified Stock Option Plan. The 1996 Stock Option Plan, as amended, authorizes the grant of options to purchase a maximum of 185,000 shares (increased by amendment in 1998 from 110,000 shares) of the Company's Common Stock to employees (including officers and directors who are employees) of and consultants to the Company. Options granted under the plan may either be incentive stock options ("ISOs"), within the meaning of Section 422 of the Internal Revenue Code of 1986, as amended (the "Code"), or non-qualified stock options which do not qualify as ISOs. The exercise price, term and vesting provision of each option grant is fixed by the Compensation and Stock Option Committee with the provision that

CELLULAR TECHNICAL SERVICES COMPANY, INC. NOTES TO FINANCIAL STATEMENTS

NOTE G - STOCKHOLDERS' EQUITY (CONTINUED):

the exercise price of an ISO may not be less than the fair market value of the Company's Common Stock on the date of grant and the term of an ISO may not exceed ten years.

The Company has also granted options to purchase 92,000 shares of Common Stock at fair market value to certain directors and officers of the Company at exercise prices ranging from \$12.50 to \$61.30 per share. These options are in addition to those granted under the 1991 Qualified and Non-Qualified Plans, the 1993 Non-Employee Director Plan, the 1996 Stock Option Plan and the options previously granted to and subsequently exercised by Nationwide Cellular Service Inc., the Company's former parent. The options have terms ranging from five to ten years and vest to the respective option holder over periods ranging from two to five years.

Financial Accounting Standards Board Statement No. 123

The Company has chosen to measure stock-based compensation cost under the intrinsic-value method of Accounting Principles Board Opinion No. 25 (APB 25) and related interpretations because, as discussed below, the alternative fair value accounting provided for under Statement 123 requires use of option

valuation models that were not developed for use in valuing employee stock options. Under APB 25, if the exercise price of the Company's employee stock options equals the market price of the underlying stock on the date of grant, no compensation expense is recognized.

Pro forma information regarding net income and earnings per share is required by Statement 123 and has been determined as if the Company had accounted for its employee stock options under the fair value method of that Statement. In that regard, the fair value for options granted during 1998, 1997 and 1996 was estimated at the date of grant using a Black-Scholes option pricing model with the following weighted-average assumptions for 1998, 1997 and 1996, respectively: risk-free interest rates of 4.7%, 5.7% and 6.1%; dividend yields of 0.0%, 0.0% and 0.0%; volatility factors of the expected market price of the Company's common stock of .79%, .66% and .55% and a weighted average expected life of the options of 4.8, 5.1 and 5.1 years.

The Black-Scholes option valuation model was developed for use in estimating the fair value of traded options which have no vesting restrictions and are fully transferable. In addition, option valuation models require the input of highly subjective assumptions including the expected stock price volatility. Because the Company's employee stock options have characteristics significantly different from those of traded options, and because changes in the subjective input assumptions can materially affect the fair value estimate, in management's opinion, the existing models do not necessarily provide a reliable single measure of the fair value of its employee stock options. The weighted-average fair value of options granted during each of the three years ended December 31, 1998, 1997 and 1996 was \$10.57, \$52.80 and \$91.70, respectively.

For purposes of pro forma disclosures, the estimated fair value of the options is amortized to expense over the options' vesting period. The Company's pro forma information follows (in 000's, except per share amounts):

	1998 -----	1997 -----	1996 -----
Net loss - as reported	\$ (10,860)	\$ (5,046)	\$ (7,350)
Net loss - pro forma	\$ (11,248)	\$ (6,499)	\$ (8,042)
Loss per share - as reported	\$ (4.76)	\$ (2.22)	\$ (3.34)
Loss per share - pro forma	\$ (4.93)	\$ (2.90)	\$ (3.70)

CELLULAR TECHNICAL SERVICES COMPANY, INC.
NOTES TO FINANCIAL STATEMENTS

NOTE G - STOCKHOLDERS' EQUITY (CONTINUED):

The pro forma effect on net income for 1998, 1997 and 1996 is not representative of the pro forma effect on net income in future years because it does not take into consideration pro forma compensation expense related to grants made prior to 1995.

The following table summarizes information concerning outstanding and exercisable stock options as of December 31, 1997 (in 000's except per share amounts):

Options Outstanding		Options Exercisable	
-----		-----	
Weighted- Average Remaining	Weighted- Average	Weighted- Average	Weighted- Average

Range of Exercise Prices	Number Outstanding	Contractual Life	Exercise Price	Number Exercisable	Exercise Price
\$ 3.48 - \$ 5.00	47	5.74	\$ 4.59	0	\$ 0
6.88 - 29.69	38	6.03	17.68	21	14.57
40.00 - 61.25	49	5.15	60.12	49	60.32
63.75 - 188.75	53	6.83	97.13	33	97.06
\$ 3.48 - \$188.75	187	5.98	\$47.91	103	\$62.75

58

CELLULAR TECHNICAL SERVICES COMPANY, INC.
NOTES TO FINANCIAL STATEMENTS

NOTE G - STOCKHOLDERS' EQUITY (CONTINUED):

Information with respect to the Company's stock options is as follows (in 000's except per share amounts):

	Shares Under Option	Option Prices		Weighted-Average Exercise Price	
Balance, January 1, 1996	301	\$ 10.00	-	\$123.80	\$ 57.30
Granted	24	120.00	-	199.40	168.80
Exercised	(63)	10.00	-	109.40	37.30
Canceled	(30)	16.67	-	178.80	75.50
Balance, December 31, 1996	232	10.00	-	199.40	71.90
Granted	79	27.00	-	188.80	87.80
Exercised	(16)	10.00	-	109.40	48.10
Canceled	(48)	16.67	-	178.80	74.70
Balance, December 31, 1997	247	10.00	-	199.40	77.96
Granted	91	3.44	-	29.69	10.83
Exercised	0	-	-	-	-
Canceled	(151)	5.00	-	199.38	74.42
Balance, December 31, 1998	187	3.44	-	188.75	47.91
Exercisable at December 31, 1998	103	10.00	-	188.75	62.75
Available for grant at December 31, 1998	122				
Common Stock reserved for future issuance	309				

Shares exercisable at December 31, 1997 and 1996 were 110 and 79, respectively.

NOTE H - EARNINGS PER SHARE

The computation of earnings per share is as follows (in 000's, except per share amounts):

YEAR ENDED DECEMBER 31,

	1998	1997	1996
	-----	-----	-----
Basic and diluted earnings per share:			
Net loss for calculation of earnings per share	\$ (10,860)	\$ (5,046)	\$ (7,350)
	=====	=====	=====
Weighted average number of shares outstanding	2,281	2,273	2,199
	=====	=====	=====
Basic and diluted earnings (loss) per share	\$ (4.76)	\$ (2.22)	\$ (3.34)
	=====	=====	=====

Common stock equivalent shares have not been considered in the calculation because the effect would be antidilutive.

59

CELLULAR TECHNICAL SERVICES COMPANY, INC.
NOTES TO FINANCIAL STATEMENTS

NOTE I - SUBSEQUENT EVENTS:

Reverse Stock Split:

On January 5, 1999, the Company implemented a one-for-ten stock combination (reverse stock split) pursuant to the stockholders' approval at the Company's annual meeting of stockholders on December 14, 1998. All outstanding common shares and per share amounts in the accompanying financial statements have been retroactively adjusted to give effect to the one-for-ten stock combination.

Securities Class Action Litigation - Stipulation and Agreement of Settlement:

Between July 1997 and September 1997, eight separate lawsuits were filed against the Company and two of its current or former executive officers. In February 1998, the lawsuits were consolidated pursuant to a revised consolidated complaint filed by plaintiffs. The consolidated complaint alleges violations of certain federal securities laws, and purports to seek unspecified damages on behalf of a class of persons, other than defendants and their affiliates, who purchased the Company's common stock or call options on the Company's common stock, or who sold put options on the Company's common stock, during the period March 6, 1996 through July 30, 1997. On March 12, 1999, the Company, together with the individually named defendants, entered into a Stipulation and Agreement of Settlement with the plaintiffs (the "Stipulation"), under which the parties have agreed to settle the lawsuit upon the following principal terms: (i) payment of \$4,100,000 made by the Company's insurers to plaintiffs; and (ii) the dismissal of the lawsuit against all defendants and related parties, with prejudice, but without any admission of liability or wrongdoing. The Stipulation requires court approval to become final, and is subject to certain other terms and conditions. While the Company anticipates that court approval will be forthcoming, there can be no assurance the court will approve the settlement or that all other conditions set forth in the Stipulation will be met. In the event that court approval of the settlement is denied, or if the settlement is otherwise terminated, the Company expects that the lawsuit will resume and that the Company will renew its vigorous defense of the claims. In the event of a renewal of the lawsuit, an award of monetary damages against the Company in excess of applicable insurance coverage, the expenditure of significant sums in the defense of the lawsuit, or the diversion of management's attention from other business concerns, could each have a material adverse effect on the Company's business, financial condition and results of operations.

60

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange

Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Cellular Technical Services Company, Inc.

By: /s/ Stephen Katz

 Stephen Katz, Chairman of the Board
 of Directors and Chief Executive Officer
 March 30, 1999

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

/s/ Stephen Katz

 Stephen Katz, Chairman of the Board of Directors
 and Chief Executive Officer
 (Principal Executive Officer)
 March 30, 1999

/s/ Joyce S. Jones

 Joyce S. Jones, Director and
 Chief Operating Officer
 March 30, 1999

/s/ Michael E. McConnell

 Michael E. McConnell
 Vice President and Chief Financial Officer
 (Principal Financial and Accounting Officer)
 March 30, 1999

/s/ James Porter

 James Porter, Director
 March 30, 1999

/s/ Lawrence Schoenberg

 Lawrence Schoenberg, Director
 March 30, 1999

61

CELLULAR TECHNICAL SERVICES COMPANY, INC.
 SCHEDULE II - VALUATION AND QUALIFYING ACCOUNTS
 (in 000's)

	BALANCE AT BEGINNING OF PERIOD	ADDITIONS	DEDUCTIONS	BALANCE AT END OF PERIOD
	-----	-----	-----	-----
INVENTORY RESERVES				
Year ended December 31, 1996	\$ 218	\$ 390	\$ 146	\$ 462
	=====	=====	=====	=====
Year ended December 31, 1997	\$ 462	\$ 1,818	\$ 183	\$ 2,097
	=====	=====	=====	=====
Year ended December 31, 1998	\$ 2,097	\$ 4,590	\$ 3,886	\$ 2,801
	=====	=====	=====	=====
SALES AND RECEIVABLE ALLOWANCES				
Year ended December 31, 1996	\$ 70	\$ 116	\$ 85	\$ 101
	=====	=====	=====	=====
Year ended December 31, 1997	\$ 101	\$ 528	\$ 442	\$ 187
	=====	=====	=====	=====
Year ended December 31, 1998	\$ 187	\$ (44)	\$ 71	\$ 72
	=====	=====	=====	=====

STATEMENT OF DIFFERENCES

The trademark symbol shall be expressed as.....'TM'
The registered trademark symbol shall be expressed as.....'r'
The service mark symbol shall be expressed as.....'sm'
The degree symbol shall be expressed as.....[d]

CERTIFICATE OF AMENDMENT OF
RESTATED CERTIFICATE OF INCORPORATION

OF

CELLULAR TECHNICAL SERVICES COMPANY, INC.

It is hereby certified that:

1. The name of the corporation (hereinafter called the "Corporation") is Cellular Technical Services Company, Inc.

2. The Restated Certificate of Incorporation of the Corporation is hereby amended by adding the following at the end of the first paragraph of Article Fourth thereof (which sets forth the number and par value of the Corporation's authorized capital stock, none of which is being amended):

"Effective immediately upon filing an applicable Certificate of Amendment with the Secretary of State of the State of Delaware (the "Effective Date"), each ten (10) shares of common stock of the Corporation then issued, par value \$.001 per share, shall be automatically combined into one (1) share of common stock of the Corporation, par value \$.001 per share. In connection with such stock combination, no fractional shares or scrip representing fractions of a share shall be issued, but in lieu thereof, any stockholder that would otherwise be entitled to receive a fraction of a share, will receive cash (without interest) in lieu thereof in an amount equal to such fractional share of common stock multiplied by the closing price of the common stock of the Corporation as reported on the Nasdaq National Market System on the last trading day prior to the Effective Date (or if such price is not available, the average of the last bid and ask prices of such common stock on such day or other price determined by the Board of Directors of the Corporation)."

3. The amendment of the Restated Certificate of Incorporation herein certified has been duly adopted in accordance with the provisions of Section 242 of the General Corporation Law of the State of Delaware.

Signed and attested to as of December 21, 1998.

/s/ Joyce S. Jones

Joyce S. Jones, Chief Operating Officer

Attest:

/s/ Kyle R. Sugamele

Kyle R. Sugamele, Corporate Secretary

AMENDMENT NO. 1
TO
1991 QUALIFIED STOCK OPTION PLAN
OF
CELLULAR TECHNICAL SERVICES COMPANY, INC.
(Effective as of July 11, 1996)

Paragraph 10 of the Plan is hereby amended to read as follows:

"10. Administration of the Plan

The Plan shall be administered by the Committee which shall consist of two or more members of the Board of Directors whom the Board of Directors may appoint from time to time. During such time as the Company has a class of equity securities registered under Section 12 of the Securities Exchange Act of 1934, as amended, each member of the Committee shall be (a) a "disinterested person" within the meaning of Rule 16b-3 promulgated under such act until such time as the amendments to Rule 16b-3 adopted by the Securities and Exchange Commission on May 30, 1996 in Release No. 34-37260 become effective with respect to the Plan (the "New Rule Date") and (b) from and after the New Rule Date, a "Non-Employee Director" within the meaning of Rule 16b-3 (as the same may be in effect and interpreted from time to time, "Rule 16b-3"). Subject to the express provisions of the Plan, the Committee shall have authority, in its discretion, to determine the individuals to receive Options, the time when they shall receive them and the number of shares of Common Stock to be subject to each Option. Directors, including those that may be members of the Committee, shall be eligible to receive Options under the Plan.

Subject to the express provisions of the Plan, the Committee shall also have authority to construe the respective option agreements and the Plan to prescribe, amend and rescind rules and regulations relating to the Plan, to determine the terms and provisions of the respective option agreements (which need not be identical) from and after the New Rule Date, to approve any provision which under Rule 16b-3 requires approval by the Board of Directors, a committee of Non-Employee Directors or the stockholders to be exempt (unless specifically provided herein); and to make all other determinations necessary or advisable for administering the Plan. The Committee may correct any defect or supply any omission or reconcile any inconsistency in the Plan or in any option agreement in the manner and to the extent it shall deem expedient to carry it into effect, and it shall be the sole and final judge of such expediency. the determinations of the Committee on the matters referred to in this Section 10 shall be conclusive."

AMENDMENT
TO
1991 NON-QUALIFIED STOCK OPTION PLAN
OF
CELLULAR TECHNICAL SERVICES COMPANY, INC.
(Effective as of July 11, 1996)

Paragraph 10 of the Plan is hereby amended to read as follows:

"10. Administration of the Plan

The Plan shall be administered by the Committee which shall consist of two or more members of the Board of Directors whom the Board of Directors may appoint from time to time. During such time as the Company has a class of equity securities registered under Section 12 of the Securities Exchange Act of 1934, as amended, each member of the Committee shall be (a) a "disinterested person" within the meaning of Rule 16b-3 promulgated under such act until such time as the amendments to Rule 16b-3 adopted by the Securities and Exchange Commission on May 30, 1996 in Release No. 34-37260 become effective with respect to the Plan (the "New Rule Date") and (b) from and after the New Rule Date, a "Non-Employee Director" within the meaning of Rule 16b-3 (as the same may be in effect and interpreted from time to time, "Rule 16b-3"). Subject to the express provisions of the Plan, the Committee shall have authority, in its discretion, to determine the individuals to receive Options, the time when they shall receive them and the number of shares of Common Stock to be subject to each Option. Directors, including those that may be members of the Committee, shall be eligible to receive Options under the Plan.

Subject to the express provisions of the Plan, the Committee shall also have authority to construe the respective option agreements and the Plan to prescribe, amend and rescind rules and regulations relating to the Plan, to determine the terms and provisions of the respective option agreements (which need not be identical) from and after the New Rule Date, to approve any provision which under Rule 16b-3 requires approval by the Board of Directors, a committee of Non-Employee Directors or the stockholders to be exempt (unless specifically provided herein); and to make all other determinations necessary or advisable for administering the Plan. The Committee may correct any defect or supply any omission or reconcile any inconsistency in the Plan or in any option agreement in the manner and to the extent it shall deem expedient to carry it into effect, and it shall be the sole and final judge of such expediency. the determinations of the Committee on the matters referred to in this Section 10 shall be conclusive."

AMENDMENT NO. 1
TO
1993 NON-EMPLOYEE DIRECTOR STOCK OPTION PLAN
OF
CELLULAR TECHNICAL SERVICES COMPANY, INC.
(Effective as of July 11, 1996)

Paragraph 12 of the Plan is hereby amended to read as follows:

"12. Amendment and Termination

The Board may amend, suspend or terminate the Plan or any portion thereof at any time except that, until such time as the amendments to Rule 16b-3 ("Rule 16b-3") promulgated under the Securities Exchange Act of 1934 (the "Exchange Act") that were adopted by the Securities Exchange Commission on May 30, 1996 in Release No. 34-37260 become effective with respect to the Plan, or applicable law: (a) no provision of the Plan relating to the amount or exercise price of shares of Common Stock subject to options to be granted under the Plan or the timing of grants may be amended more than once every six months, other than to comport with changes in the Internal Revenue Code of 1986, as amended, the Employee Retirement Income Security Act of 1974, as amended, or the rules thereunder and (b) the Board may not, without the approval of the Company's stockholders within 12 months after the date of adoption of any such amendment or amendments, make any alteration or amendment thereof which (i) makes any change in the class of individuals eligible to receive options under the Plan, (ii) increases the maximum number of shares of Common Stock for which options may be granted under the Plan, except as provided in Article 10 hereof, (iii) decreases the exercise price of an option under the Plan, except as provided in Article 10 hereof, or (iv) materially increases the benefits accruing to participants under the Plan within the meaning of Rule 16b-3, and from and after the date such rules become effective with respect to the Plan, the Board may not, without the approval of the Company's stockholders within 12 months after the date of adoption of any such amendment or amendments, make any alteration or amendment thereof which (i) makes any change in the class of individuals eligible to receive options under the Plan, (ii) increases the maximum number of shares of Common Stock for which options may be granted under the Plan, except as provided in Article 10 hereof, (iii) decreases the exercise price of an option under the Plan, except as provided in Article 10 hereof, or (iv) makes any other change for which applicable law, regulations or rules requires stockholder approval. No amendment shall adversely affect the rights under any then outstanding option without the consent of the holder thereof."

EXHIBIT 7.8

AMENDMENT NO. 1
TO
1996 STOCK OPTION PLAN
OF
CELLULAR TECHNICAL SERVICES COMPANY, INC.
(Effective December 14, 1998)

Paragraph 2 of the 1996 Stock Option Plan of Cellular Technical Services Company, Inc. is hereby amended to increase the aggregate number of shares of Common Stock for which options may be granted under the Plan from 1,100,000 to 1,850,000.

EMPLOYMENT AGREEMENT

This Agreement is entered into as of September 18, 1998, between CELLULAR TECHNICAL SERVICES COMPANY, INC., a Delaware corporation (the "Company"), and JOYCE S. JONES (the "Executive"). In consideration of the mutual promises, covenants and obligations contained herein, the parties agree as follows:

1. Employment and Term. Company hereby employs Executive as the Chief Operating Officer of Company on the terms and conditions set forth in this Agreement, and Executive hereby accepts and agrees to such employment with Company, for an initial term beginning on September 18, 1998, and ending on the first (1st) anniversary of this Agreement, subject to renewal as set forth below and the other terms of this Agreement. This Agreement shall be renewed automatically for successive one-year terms, commencing on the first anniversary of this Agreement and continuing on each anniversary thereafter, provided that either party shall have the right to terminate this Agreement: (i) as of the end of the initial term and any given one-year renewal term if such party provides written notice of same to the other party at least thirty (30) days before the end of such initial or renewal term; or (ii) as otherwise permitted under this Agreement or as the parties otherwise agree to in writing.

2. Duties. Executive is employed to perform the duties of the Chief Operating Officer of Company and shall have such authority and perform such duties consistent with such position as may be assigned to Executive by the Chief Executive Officer and/or the Board of Directors of Company from time to time. The Executive shall perform such duties faithfully, diligently, to the best of Executive's ability, and in a manner consistent with the best interests of Company. Executive shall devote Executive's full time, skills, and efforts to the performance of such duties and to the furtherance of the best interests of Company. All of the foregoing duties and responsibilities will be subject to the terms of this Agreement, the supervision of the Chief Executive Officer and the Board of Directors of Company, and the then-current plans, practices, policies, and procedures established by Company and generally applicable to comparable executives of Company.

3. Compensation, Benefits, Vacation, and Expenses. In consideration for Executive's services under this Agreement, Executive shall receive the following compensation and benefits during the term of this Agreement:

3.1 Base Salary; Transportation Allowance. Executive shall receive an initial annual base salary at the rate of \$135,000.00 per year, which shall be paid in accordance with Company's usual payroll policies for comparable executives of Company. Company shall consider increases to such base salary at least annually. Such base salary shall not be subject to reduction except for Cause (as defined in Section 6, below). Any change in such base salary: (i) shall not serve to cancel this Agreement or otherwise limit or reduce any other right or obligation to Executive under this Agreement; and (ii) shall merely serve to amend this Subsection with respect to such change in base salary, and all of the other terms of this Agreement shall continue in full force and effect. In addition, Executive shall receive an initial transportation allowance at the rate of \$7,200.00 per year to defray Executive's transportation expenses. Such allowance shall be paid in accordance with Company's usual payroll policies of Company.

3.2 Incentive Compensation and Bonuses. Executive shall receive annual incentive compensation and bonuses in accordance with the terms of an annual Executive Incentive Compensation Plan prepared by Company for each calendar year, subject to Company's then-current plans, practices, policies, and procedures with respect to incentive compensation established by the

to comparable executives of Company.

3.3 Stock Options. Company will grant to Executive 200,000 options to purchase shares of voting common stock of Company, pursuant to the terms of that certain Stock Option Contract dated as of September 18, 1998 between Executive and Company. Such options shall be in such amounts, exercisable at such per-share exercise price, and vested under such vesting schedule as set forth in such Stock Option Contract. Such Stock Option Contract shall be subject to all of the terms and conditions of Company's 1996 Stock Option Plan.

3.4 Benefits. Executive and Executive's family shall be entitled to participate in and shall receive all benefits under all welfare benefit plans, practices, policies, and programs generally provided by Company (including without limitation all health, medical, dental, prescription, disability, salary continuance, life insurance, 401(k) retirement savings, and other benefit plans and programs) to comparable executives of Company.

3.5 Consolidated Annual Leave. Executive shall be entitled to accrue Consolidated Annual Leave at the rate of 13.33 hours per month (equivalent to 20 days per year) during the term of this Agreement, pursuant to the Consolidated Annual Leave Policy or like policies, practices, and procedures established by Company. Such leave may be scheduled in Executive's reasonable discretion, subject to reasonable oversight by the Chief Executive Officer and/or the Board of Directors of Company. Annual leave increases, accruals, and the like will be provided pursuant to the Consolidated Annual Leave Policy or like policies, practices, and procedures established by Company and generally applicable to comparable executives of Company.

3.6 Expenses. Executive shall be entitled to reimbursement for reasonable business expenses incurred by Executive for the benefit of Company. Executive shall present from time to time itemized accounts or receipts for such expenses in accordance with the plans, practices, policies, and procedures established by Company and generally applicable to comparable executives of Company.

4. Proprietary Rights. Executive and Company are parties to that certain Nondisclosure and Property Rights Agreement dated as of February 2, 1998. Executive shall fully comply with the provisions of such agreement.

5. Restrictive Covenants.

5.1 Nonsolicitation. During the term of Executive's employment with Company and for a period of twelve (12) months after the termination thereof, however caused, Executive shall not directly or indirectly do any of the following without Company's prior written approval: (i) communicate with or solicit any person or entity which was a customer of Company or which Company was actively soliciting to be a customer during the twelve (12) month period preceding termination of Executive's employment with Company (each being a "Customer") for the purpose of marketing services or products in competition with any services or products of Company, whether or not communication is initiated by the Customer, Executive, or any other party; (ii) in any manner interfere with Company's business relationship with any Customer or potential customer or otherwise urge any Customer or potential customer to discontinue business or not to do business with Company; or (iii) hire, offer to hire, solicit, or endeavor to entice away any employee, agent, or consultant of Company or any of its affiliates, or otherwise urge any such person to discontinue his or her relationship with Company, whether or not communication is initiated by such person, Executive, or any other party.

5.2 Noncompetition. During the term of Executive's employment with Company and for a period of twelve (12) months after the termination thereof, however caused (except

by Executive with Good Reason or by either party following a Change of Control, in which case the terms of this Subsection shall not apply), Executive shall not directly or indirectly do any of the following without Company's prior written approval: (i) engage as owner, employee, consultant, or otherwise, within the United States, in any facet of the business activities of Company or any of its affiliates, except as required in the ordinary course of Executive's employment with Company, or (ii) otherwise compete, within the United States, with the

business activities of Company or any of its affiliates; provided, that Executive shall have the right to make passive investments in any entity so long as Executive does not participate in the business of such entity in violation of this Subsection.

5.3 Nondisparagement. During the term of Executive's employment with Company and for a period of twelve (12) months after the termination thereof, however caused, Executive shall not make any disparaging remarks about Company or its products or services to any person or entity, provided that the terms of this Subsection will not limit Executive's right to give truthful testimony in the event that Executive is required to testify pursuant to a court order or applicable law.

5.4 Injunctive Relief. Executive agrees that if he violates the provisions of this Section 5 or otherwise threatens to do so, Company, in addition to any other rights and remedies available under this Agreement or otherwise, shall be entitled to obtain an injunction issued (without the necessity of a bond) by any court of competent jurisdiction restricting Executive from committing or continuing any such violation.

6. Termination of Employment.

6.1 Definitions. For purposes of this Agreement, the following terms shall have the following definitions:

6.1.1 "Cause" shall mean and be deemed to exist if any of the following events occur: (i) a material breach by Executive of Executive's obligations under this Agreement (other than as a result of incapacity due to Disability or death) caused either by Executive's willful misconduct committed in bad faith without reasonable belief that the conduct causing such breach is in the best interests of Company, or by Executive's gross negligence; (ii) actual fraud or embezzlement on the part of Executive; or (iii) the conviction of Executive of, or a plea of guilty or no contest by Executive to, a felony involving moral turpitude.

6.1.2 "Disability" shall mean the definition of the term "Disability" in Company's disability benefit plan covering executives of Company as in effect from time to time, or, if no such disability benefit plan exists, then such term shall mean the inability, by reason of any medically-determined physical or mental impairment, of Executive to satisfactorily perform Executive's duties hereunder for a period of more than ninety (90) consecutive days or an aggregate of more than ninety (90) days in any rolling twelve-month period.

6.1.3 "Good Reason" shall mean and be deemed to exist if any of the following events occur without the written approval of Executive (and regardless of whether the event occurs before or after a Change of Control of Company): (i) Company reduces, in any material respect, Executive's position, title, responsibilities, or then-current base salary contemplated by this Agreement without Cause or assigns Executive duties which are inconsistent, in any material respect, with such position, title, or responsibilities without Cause; (ii) Company fails to pay any amount when due to Executive hereunder or materially breaches any other obligation hereunder which is not remedied within thirty (30) days after receipt of written notice from Executive specifying such breach; or (iii) any failure by Company or any of its successors or assigns to comply with and satisfy their respective obligations under Subsection 9.2, below.

3

6.1.4 "Change of Control" shall mean and be deemed to exist if any of the following events occur:

(i) the occurrence of a change of "control" of Company (as such quoted term is defined in Rule 12b-2 promulgated under the Securities Exchange Act of 1934, as amended from time to time (the "Act")) or any change in the "ownership or effective control" or in the "ownership of a substantial portion of the assets" of Company (as such quoted phrases are used in Section 280G(b)(2) of the Internal Revenue Code of 1986, as amended from time to time (the "Code")); or

(ii) any "person" (as such quoted term is used in Sections 3(a)(9), 13(d), and/or 14(d)(2) of the Act) other than the Company, any entity controlled by the

Company, or any employee benefit plan (or trust) sponsored or maintained by the Company, becomes the "beneficial owner" (as such quoted term is used in Rule 13d-3 promulgated under the Act), directly or indirectly, of 25% or more of either: (A) Company's then-outstanding shares of voting common stock ("Outstanding Company Common Stock"), or (B) the combined voting power of the then-outstanding voting securities of Company entitled to vote generally in the election of directors ("Outstanding Company Voting Securities"); or

(iii) the following persons (collectively, the "Incumbent Board") cease for any reason to constitute a majority of the Board of Directors of Company: (A) individuals who, as of the date hereof, constitute the Board of Directors, and (B) individuals who become members of the Board of Directors after the date hereof whose election, or nomination for election by Company's shareholders, was approved by a vote of at least a majority of the directors then comprising the Board of Directors, but excluding, for this purpose, any director designated by a person who has entered into an agreement with Company to effect a transaction described in this definition of Change of Control or whose initial election or appointment to the Board of Directors occurs as a result of either an actual or threatened election contest (as such terms are used in Rule 14a-11 promulgated under the Act) or other actual or threatened solicitation of proxies or consents by or on behalf of a person other than the directors then comprising the incumbent Board of Directors; or

(iv) the approval by Company's shareholders of any merger, consolidation, or other business combination involving Company, other than a merger, consolidation, or other business combination with respect to which, immediately following such business combination: (A) all or substantially all of the beneficial owners, respectively, of the Outstanding Company Common Stock and Outstanding Company Voting Securities outstanding immediately prior thereto, are the beneficial owners of at least 60% of, respectively, the shares of voting common stock of the surviving entity, and the combined voting power of the voting securities of the surviving entity entitled to vote generally in the election of directors, outstanding immediately after such business combination in substantially the same proportion as their ownership in the Company immediately prior to such business combination, (B) no "person" (as such quoted term is used in Sections 3(a)(9), 13(d), and/or 14(d)(2) of the Act) other than the Company, any entity controlled by the Company, or any employee benefit plan (or trust) sponsored or maintained by the Company or the surviving entity, is the "beneficial owner" (as such quoted term is used in Rule 13d-3 promulgated under the Act), directly or indirectly, of 25% or more of either the then-outstanding shares of voting common stock of the surviving entity or the combined voting power of the then-outstanding voting securities of the surviving entity entitled to vote generally in the election of directors, and (C) at least a majority of the members of the board of directors of the surviving entity were members of the Incumbent Board at the time of the execution of the initial agreement providing for such business combination; or

(v) the approval by Company's shareholders of any sale, exchange, or other disposition (in one transaction or a series of related transactions) of all or substantially all of the assets of Company, other than to a corporation with respect to which, immediately following such disposition: (A) all or substantially all of the beneficial owners, respectively, of the Outstanding Company Common Stock and

Outstanding Company Voting Securities outstanding immediately prior thereto, are the beneficial owners of at least 60% of, respectively, the shares of voting common stock of such corporation, and the combined voting power of the voting securities of such corporation entitled to vote generally in the election of directors, outstanding immediately after such disposition in substantially the same proportion as their ownership in the Company immediately prior to such disposition, (B) no "person" (as such quoted term is used in Sections 3(a)(9), 13(d), and/or 14(d)(2) of the Act) other than the Company, any entity controlled by the Company, or any employee benefit plan (or trust) sponsored or maintained by the Company or such corporation, is the "beneficial owner" (as such quoted term is used in Rule 13d-3 promulgated under the Act), directly or indirectly, of 25% or more of either the then-outstanding shares of voting common stock of such corporation or the combined voting power of the then-outstanding voting securities of such corporation entitled to vote generally in the election of directors, and (C) at least a majority of the members of the board of directors

of such corporation were members of the Incumbent Board at the time of the execution of the initial agreement providing for such disposition; or

(vi) the approval by the shareholders of Company of any plan or proposal for liquidation or dissolution of Company.

Notwithstanding anything to the contrary, if a Change of Control occurs and if this Agreement or Executive's employment with Company is terminated prior to the date on which the Change of Control occurs, then a "Change of Control" shall be deemed to have occurred on the date immediately prior to the date of such termination, so long as Executive can reasonably demonstrate that such termination: (A) was at the request of a third party who had taken steps reasonably calculated to effect the Change of Control, or (B) otherwise arose in connection with or anticipation of the Change of Control.

6.2 Termination Upon Death of Executive. In the event of the death of Executive during the term of this Agreement, Executive's employment shall automatically terminate without further obligation to Executive's estate under this Agreement, except that Executive's estate shall be entitled to receive all monies and other rights to which Executive otherwise would have been entitled hereunder through the end of the calendar month after the month in which death occurred, plus all accrued and unpaid monies owing through such date under this Agreement, all of which shall be paid to Executive's estate or beneficiary, as applicable, in a lump sum in cash within thirty (30) days after the month in which death occurred.

6.3 Termination Upon Disability of Executive. If Company determines in good faith that the Disability of Executive has occurred during the term of this Agreement, Company may provide to Executive written notice in accordance with Subsection 9.1, below, of its intention to terminate Executive's employment. In such event, Executive's employment with Company shall terminate effective at the end of six (6) months after Executive's receipt of such notice, provided that within the six (6) month period after such receipt the Executive shall not have returned to full-time performance of Executive's duties hereunder. Until the termination of employment at the expiration of the six (6) month period, Executive shall receive Executive's regular compensation and benefits as specified in Section 3, above. If Executive's employment is so terminated, Company shall have no further obligation to Executive under this Agreement, except that Executive shall be entitled to receive upon the effective date of such termination all such monies and rights to which Executive is entitled hereunder through the effective date of such termination, plus all accrued and unpaid monies owing hereunder through such date, all of which shall be paid to Executive in cash within thirty (30) days after such date.

6.4 Termination For Cause, Etc. Notwithstanding anything to the contrary, Company may terminate Executive's employment with Company for Cause by providing Executive with prior written notice of termination in accordance with Subsection 9.1, below. If Company terminates Executive's employment for Cause in accordance with this Subsection or terminates Executive's

5

employment in the manner specified in Section 1, above, or if Executive terminates Executive's employment other than as provided under Subsection 6.5, below, Company shall have no further obligation to Executive under this Agreement, except that Executive shall be entitled to receive upon the effective date of such termination only such monies and rights to which Executive is entitled hereunder through the effective date of such termination, plus all accrued and unpaid monies owing hereunder through such date, all of which shall be paid to Executive in cash within thirty (30) days after such date.

6.5 Termination For Good Reason, Etc. Executive may terminate Executive's employment with Company for Good Reason by providing Company with prior written notice of termination in accordance with Subsection 9.1, below. In addition, if during the term of this Agreement (and regardless of whether before or after a Change of Control of Company): (i) Executive terminates this Agreement or Executive's employment with Company for Good Reason, or (ii) Company terminates this Agreement or Executive's employment with Company in any manner other than as expressly permitted under Subsections 1, 6.2, 6.3, or 6.4, above, then: (A) Company shall make a lump sum payment equal to a multiple of one (1) times the highest annual compensation (as reportable on Executive's IRS

W-2 form) received by Executive from Company during any of the most recent two (2) years ending on or prior to the date on which the termination occurs; (B) all stock options granted to Executive shall become fully vested and immediately exercisable at Executive's election, regardless of whether Executive exercises any other rights afforded Executive under this Agreement; (C) all welfare benefit plans, practices, policies, and programs applicable to Executive hereunder and in existence during the ninety (90) day period prior to the effective date of termination, or if more favorable to Executive those in effect generally at any time thereafter with respect to other comparable executives of Company, shall continue as to Executive for an additional one (1) year after the effective date of termination, provided, however, that if Executive becomes re-employed with another employer and is eligible to receive medical and other welfare benefits under another employer provided plan, the medical and other welfare benefits described herein shall not apply to the extent duplicative to those provided under such other plan during such applicable period of eligibility; and (D) Executive shall be entitled to receive upon the effective date of such termination all such monies and rights to which Executive is entitled hereunder through the effective date of such termination, plus all accrued and unpaid monies owing hereunder through such date. The payments described in clauses (A) and (D) above shall be paid to Executive in cash within sixty (60) days after the effective date of termination.

6.6 Effect of Termination. Upon the termination of this Agreement or Executive's employment with Company, all obligations of the parties hereunder shall cease, except the terms of Sections 4 through 9 hereof shall survive such termination for any reason.

7. Change of Control.

7.1 Acceleration of Vesting of Options. Upon the occurrence of a Change of Control of Company, all stock options granted to Executive shall become fully vested and immediately exercisable at Executive's election, regardless of whether Executive exercises any other rights afforded Executive under this Agreement.

7.2 Compensation Reduction. Notwithstanding any other provision of this Agreement to the contrary, if any payments or benefits made by Company to Executive hereunder or otherwise would be subject to the excise tax or taxes imposed by Section 4999 of the Code (collectively, the "Affected Amount"), such Affected Amount shall be reduced so that Executive shall be entitled to receive an Affected Amount with a "present value" (as determined for purposes of Section 280G of the Code) of not more in the aggregate than 2.99 times the Executive's applicable "base amount" under Section 280G of the Code (collectively, the "Limited Amount"); provided, however, that if the entire Affected Amount, when reduced by such excise tax or taxes, is greater than the Limited Amount, then no reduction shall be made under this Subsection. Unless the parties otherwise agree to in writing, any

6

reduction under this Subsection shall be conclusively determined by the independent certified public accounting firm regularly employed by Company during the ninety (90) day period prior to the effective date of the event triggering the payment of the Affected Amount to Executive, and the determination of such independent certified public accounting firm shall be final and binding on all parties.

8. Indemnification. Company shall indemnify and hold harmless Executive and Executive's family, heirs, estate, and legal representatives from and against any and all claims, damages, losses, liabilities, and expenses (including without limitation all reasonable attorneys' fees) arising out of or in connection with Executive's performance of Executive's duties and responsibilities hereunder in Executive's capacity as an officer or employee of Company or any of its affiliates to the maximum extent permitted by law. Executive shall notify Company of any indemnifiable claim coming to Executive's attention which may result in any indemnification obligation on Company's part hereunder. Company shall have the right to conduct the defense against any such claim brought by a third party with counsel of its selection. The obligations of Company under this Section shall continue following the termination of this Agreement and/or the termination of Executive's employment with Company. After a Change of Control of Company, Company shall pay promptly as incurred all

reasonable attorneys' fees and related expenses which Executive may incur as a result of any dispute or contest (regardless of the outcome thereof) by Company, Executive, or others with respect to the validity or enforceability of, or the rights and/or obligations under, any provision of this Agreement.

9. Miscellaneous.

9.1 Notices.

9.1.1 All notices hereunder by either party shall be given by personal delivery, by sending such notice by U.S. certified mail, postage prepaid, or by a reputable courier service, fees prepaid, to the other party at its address set forth on the signature page below. Any notice given in accordance with this Subsection shall be effective as of the date of receipt or attempted delivery (if receipt is refused), as the case may be. Each party may change its address for notice purposes upon written notification thereof to the other party in accordance with this Subsection.

9.1.2 All notices of termination described in Sections 1, 6.3, 6.4, and 6.5 shall be provided in writing in accordance with Subsection 9.1.1 and shall: (i) indicate the specific termination provision in this Agreement relied upon; (ii) to the extent applicable, provide in reasonable detail the facts and circumstances claimed to provide a basis for termination under the provision so indicated; and (iii) indicate the applicable effective date of termination. The failure by either party to set forth in the notice of termination any fact or circumstance which contributes to a showing of justification for termination shall not waive any right of such party hereunder or preclude such party from subsequently asserting such fact or circumstance in enforcing such party's rights hereunder.

9.2 Assignment; Binding Effect. This Agreement is personal to Executive and, therefore neither this Agreement nor any of Executive's rights, powers, duties or obligations hereunder may be assigned by Executive without Company's prior written approval. This Agreement shall be binding upon and inure to the benefit of Executive and Executive's heirs, estate, and legal representatives, and shall be binding upon and inure to the benefit of Company and its successors and assigns. Company shall require its successors and assigns to expressly assume and agree to perform under this Agreement in the same manner and to the same extent that Company would be required to perform if no such succession or assignment had take place, and Company's successors and assigns shall so expressly assume and agree to perform under this Agreement. For purposes of this Agreement, successors and assigns of Company shall include without limitation all persons acquiring, directly or indirectly, any voting securities or assets of Company which results in a Change of Control of Company,

7

whether by merger, consolidation, stock or asset purchase, or otherwise, and such successors and assigns shall thereafter be deemed "Company" for the purposes hereof.

9.3 Taxes. Company may withhold from any amounts payable under this Agreement such federal, state, or local taxes as shall be required to be withheld pursuant to any applicable law or regulation.

9.4 Headings. The headings in this Agreement are included for the convenience of reference and will be given no effect in the construction of this Agreement.

9.5 Severability. The invalidity or unenforceability of any provision of this Agreement shall not affect the validity or enforceability of any other provision of this Agreement. In the event that any provision of this Agreement is deemed invalid or unenforceable by any court of competent jurisdiction, such provision shall be deemed to be modified to the extent necessary for the provision to be legally enforceable to the fullest extent permitted by applicable law. Any court of competent jurisdiction may enforce or modify any provision of this Agreement in order that the provision will be enforced by the court to the fullest extent permitted by applicable law.

9.6 Waiver. Any waivers hereunder must be in writing. No consent or waiver, express or implied, by any party to or of any breach or default by the

other in the performance by the other of its obligations hereunder shall be deemed or construed to be a consent or waiver to or of any other breach or default in the performance by such other party of the same or any other obligations of such party hereunder.

9.7 Governing Law. This Agreement and the obligations of the parties hereunder shall be interpreted, construed, and enforced in accordance with the laws of the state of Washington applicable to contracts made and to be performed in the state of Washington, without regard to conflict of laws principles.

9.8 Entire Agreement; Amendments; Conflicts. This Agreement, together with the agreements referred to in this Agreement and Company's plans, practices, policies, and procedures in effect from time to time (which are incorporated herein by this reference): (i) contain the entire agreement and understanding between the parties with respect to the subject matter hereof; and (ii) supersede all prior agreements, negotiations, representations, and proposals, written and oral, relating to the subject matter hereof, including without limitation that certain Employment Agreement dated January 22, 1998 between Executive and Company and that certain Terms Sheet regarding Executive's employment dated September 18, 1998 as presented to the Board of Directors of Company. This Agreement may be modified, supplemented, and/or amended only by a writing signed by both Executive and an authorized representative of Company. In the event of any conflict between this Agreement and any other agreement between Executive and Company, the terms of this Agreement shall control.

EXECUTED as of the date set forth above.

EXECUTIVE:

COMPANY:

CELLULAR TECHNICAL SERVICES COMPANY,
INC.

By /s/ Stephen Katz

/s/ Joyce S. Jones

Signature

Stephen Katz

Print Name

JOYCE S. JONES

Print Name

Chairman of the Board and Chief Executive Officer

Title

Executive's Address for Notices:

13707 Rocky Ridge Road NW
Silverdale, Washington 98383

Company's Address for Notices:

2401 Fourth Avenue, Suite 400
Seattle, Washington 98121
Attention: Legal Department

FIRST AMENDMENT TO EMPLOYMENT AGREEMENT

This First Amendment to Employment Agreement ("Amendment") is entered into as of August 25, 1998, between CELLULAR TECHNICAL SERVICES COMPANY, INC., a Delaware corporation ("Company"), and KYLE R. SUGAMELE, an individual ("Executive").

Recitals

A. Company and Executive are parties to that certain Employment Agreement between the parties dated as of June 29, 1995 ("Agreement").

B. The parties desire to amend certain terms of the Agreement as set forth below. Unless otherwise specifically defined in this Amendment, all terms used in this Amendment with initial letters capitalized shall have the meanings ascribed to such terms as set forth in the Agreement.

NOW, THEREFORE, in consideration of the mutual promises and obligations contained herein, and for other good and valuable consideration, the adequacy and receipt of which are hereby acknowledged, the parties hereby agree as follows:

10. Amendments and Agreements.

10.1 Term. The text of Section 1 of the Agreement is hereby amended by deleting such text in its entirety and replacing it with the following text:

"The Company hereby employs the Executive as the Vice President, General Counsel and Corporate Secretary of the Company on the terms and conditions set forth in this Agreement, and the Executive hereby accepts and agrees to such employment, commencing on the date of this Agreement until extended, replaced, or terminated as set forth herein. As of September 1, 1998, and as of each September 1 thereafter, this Agreement shall be renewed automatically for successive one-year terms, provided that either party shall have the right to terminate this Agreement: (i) as of the end of a given one-year renewal term if such party provides written notice of same to the other party at least ninety (90) days before the end of such one-year renewal term; or (ii) as otherwise permitted under this Agreement or as the parties otherwise agree to in writing."

10.2 Salary Adjustment. Section 4(a) of the Agreement is hereby amended to reflect that Executive's annual base salary shall be increased to \$110,000 effective as of September 1, 1998.

10.3 Incentive Compensation. The Company hereby agrees to complete and implement a written Management Incentive Plan, as required by Section 4(b) of the Agreement, for calendar year 1999 no later than December 31, 1998. Such plan shall apply to Executive on the same basis as it applies to comparable executives of the Company.

10.4 Cash Bonus. The Company hereby agrees to pay Executive a cash bonus equal to \$10,000, which shall be paid in the following installments: (i) \$5,000 in cash or Company check on or before September 15, 1998; and (ii) \$5,000 in cash or Company check on or before December 15, 1998.

10.5 Stock Options. The Company acknowledges that it has granted an additional 45,000 stock options to Executive, pursuant to that certain letter from the Company to Executive dated August 5, 1998. The Company agrees to complete and enter into an appropriate stock

option agreement with Executive no later than November 1, 1998, which agreement shall incorporate the terms of such letter, as well as the Company's standard clause in executive stock option agreements providing for the acceleration of vesting upon a change of control of the Company.

10.6 Severance Payment Calculation. Section 5(d) of the Agreement is hereby amended by deleting the text of clause (A) of such Section in its entirety and replacing such text with the following:

"...(A) the Company shall make a lump sum payment equal to a multiple of the highest annual compensation (as reportable on Executive's IRS W-2 form) received by Executive from Company during any of the most recent two (2) years ending on or prior to the date on which the termination occurs, which multiple shall be equal to one (1) times such highest compensation if the per-share price of the Company's common stock is less than \$3.00 per share as of the close of business on the date that termination occurs, two (2) times such highest compensation if the price of the Company's common stock is between \$3.00 per share and \$4.50 per share as of the close of business on the date that termination occurs, and two and 99/100ths (2.99) times such highest compensation if the price of the Company's common stock is more than \$4.50 per share as of the close of business on the date that termination occurs;..."

10.7 Compensation Reduction. Section 5(d) of the Agreement is hereby amended by adding the following text at the end of such Section:

"Notwithstanding anything to the contrary, if any payments or benefits made by Company to Executive hereunder or otherwise would be subject to the excise tax or taxes imposed by Section 4999 of the Internal Revenue Code of 1986, as amended (collectively, the "Affected Amount"), such Affected Amount shall be reduced so that Executive shall be entitled to receive an Affected Amount with a "present value" (as determined for purposes of Section 280G of the Internal Revenue Code of 1986, as amended) of not more in the aggregate than 2.99 times the Executive's applicable "base amount" under Section 280G of the Internal Revenue Code of 1986, as amended (collectively, the "Limited Amount"); provided, however, that if the entire Affected Amount, when reduced by such excise tax or taxes, is greater than the Limited Amount, then no reduction shall be made under this Subsection. Unless the parties otherwise agree to in writing, any reduction under this Subsection shall be conclusively determined by the independent certified public accounting firm regularly employed by Company during the ninety (90) day period prior to the effective date of the event triggering the payment of the Affected Amount to Executive, and the determination of such independent certified public accounting firm shall be final and binding on all parties."

11. Agreement Remains in Full Force and Effect. Except as expressly modified by the terms of this Amendment, each and every provision of the Agreement shall be and remain in full force and effect. This Amendment shall be effective as of the date first set forth above and shall continue in full force and effect until the termination of the Agreement in accordance with its terms.

EXECUTED as of the date set forth above.

EXECUTIVE:

COMPANY:

CELLULAR TECHNICAL SERVICES
COMPANY, INC.

/s/ Kyle R. Sugamele

KYLE R. SUGAMELE

By /s/ Stephen Katz

Stephen Katz, Chief Executive Officer

EXHIBIT 23.1 CONSENT OF ERNST & YOUNG LLP, INDEPENDENT AUDITORS

We consent to the incorporation by reference in the Registration Statements (Form S-8) pertaining to the 1991 Qualified Stock Option Plan, 1991 Nonqualified Stock Option Plan, 1993 Non-Employee Director Stock Option Plan, and 1996 Stock Option Plan of our report dated March 15, 1999, with respect to the financial statements and schedule of Cellular Technical Services Company, Inc. in the Annual Report (Form 10-K) for the year ended December 31, 1998.

/s/ Ernst & Young LLP

Seattle, Washington

March 26, 1999

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5

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