



RAPID RESEARCH SAMPLE – TECHNOLOGICAL INFORMATION QUERY

Research request:

I need info on the various technologies used in wireless telemetry. Can you also highlight some advantages and disadvantages of the technologies?

Clarification sought from the client:

- We would like to confirm our definition of 'wireless telemetry' with you. Our definition of wireless telemetry is: the transfer of data over a wide-area, third party (non-proprietary) wireless network between two or more non-mobile (normally fixed but can be portable) machines for monitoring, recording or controlling purposes. May we request you to please confirm the same.

Clarification provided by the client:

That seems fine.



TO: XYZ
FROM: commNOW Inc.
DATE: December 23, 2002
RE: Wireless Telemetry

INQUIRY:

- Technologies used in wireless telemetry
- Advantages and disadvantages

SCOPE: Standards and technologies used for wireless telemetry

RESEARCH LOGIC:

- A report by The Strategis Group titled 'The Wireless Telemetry Marketplace – Trends and Outlook' was used for an overview of the various technologies used in wireless telemetry.
- Several technology databases such as 'Whatis.com' were searched for further information regarding the technologies identified by using the report.
- Further information on some of the technologies such as CDPD and Mobitex was found by using several paid and free search engines. The search results led to the web pages of Ericsson, Xsilogy and Emory University that contained the most relevant information.

RESULTS:

Definition of Wireless Telemetry:

Wireless telemetry is defined as the transfer of data over a wide-area, third party (non-proprietary) wireless network between two or more non-mobile (normally fixed but can be portable) machines for monitoring, recording or controlling purposes. (Source: The Strategis Group).

Overview of the Technologies:

The various standards and technologies that are used for wireless telemetry can be classified into the following broad categories:

- Packet Data
 - CDPD (Cellular Digital Packet Data)
 - GPRS (General Packet Radio Services)
- Dedicated Data Networks
 - DataTAC
 - Mobitex
- Analog Cellular
 - AMPS (Advanced Mobile Phone Service)
 - Control Channel Technologies
- Digital Cellular
 - TDMA (Time Division Multiple Access)
 - GSM (Global System for Mobiles)

- CDMA (Code Division Multiple Access)
- Other Networks
 - Paging Networks
 - Satellite Networks

(Source: The Strategis Group).

Packet Data:

- CDPD:
CDPD is a technique used for transmission of small data packets over voice channels of existing cellular networks at a data rate of 19.2 Kb/s. The CDPD network implements a technique called channel hopping to integrate voice and data. In this technique, when a CDPD mobile data unit desires to initiate data transmission, it checks for availability of a cellular channel. Once an available channel is located, the data link is established and the mobile data unit transmits data packet bursts on it. However, if a cellular voice customer initiates voice communication on that channel "hops" on to another available channel. (Source: www.emory.edu).

An advantage of CDPD is that it is built as an overlay on existing digital cellular networks, which have the capability of data transmission in short bursts (SMS). Moreover, since CDPD involves packet-based transmission, it provides easy integration of the telemetry equipment with the rest of the communications network and the Internet. (Source: The Strategis Group). However, CDPD offers limited speed and coverage potential as compared to the other packet-based technologies and is viewed as just a transition technology. (Source: www.xsilogy.com).

- GPRS:
GPRS is a packet-based wireless communication service that promises data rates from 56 up to 114 Kbps with the data packets being transmitted using IP. GPRS is based on the GSM standard. (Source: www.whatis.com).

GPRS provides easy integration of the telemetry equipment with the rest of the communications network and the Internet because it is a packet based technology. Moreover, GPRS offers high data transmission rates and throughput. The high data rates and throughput will allow service providers to provide wireless telemetry services requiring high throughput. However, for standard telemetry applications that require low throughput, pricing, coverage and capacity issues may be deterrents to adoption of such systems. (Source: The Strategis Group).

Dedicated Data Networks:

- DataTAC:
DataTAC protocol is a radio-based data transmission service, with messages traveling as data packets through a national switching node and a series of local switching nodes before reaching transmitters. Network reliability is enhanced by the retransmission of messages from the local switching nodes until an available transmitter is located.
- Mobitex:
A Mobitex network is a data-only network and uses packet switching. It consists of interconnected cells, each of which is served by a radio base station that provides wireless access to the network for mobile users. The base stations and other network nodes are connected together by fixed links. The communication channels in a Mobitex network have a bandwidth of 12.5 kHz, thus making it a narrow-band network. (Source: www.ericsson.com).

DataTAC and Mobitex provide all the benefits to telemetry systems of packet data that were discussed earlier in case of CDPD and GPRS. Moreover, their coverage is superior to that of CDPD. (Source: The Strategis Group). Further, since they are data-only

networks, the passage of data cannot be blocked by voice calls. In fact, in case of Mobitex, as many as 400 users can share a single communications channel without any deterioration in service. (Source: www.ericsson.com).

Analog Cellular:

- **AMPS**

AMPS is a standard system for analog cellular transmission in the United States of America and other countries. AMPS allocates frequency ranges within the 800 and 900 Megahertz (MHz) spectrum for cellular transmission. The bands are divided into 30 kHz sub-bands, called channels. The division of the spectrum into sub-band channels is achieved by using Frequency Division Multiple Access (FDMA). (Source: www.whatis.com).

However, AMPS is not very suitable for wireless telemetry applications. This is because wireless telemetry results in many short bursty connections, with call-setup and tear-down timings being a large fraction of the total transaction. Thus, the wireless telemetry applications using AMPS become cost-prohibitive. (Source: The Strategis Group).

- **Control Channel Technologies:**

Control channel technologies are used in conjunction with AMPS to provide control channels that are used for all call initiations. The excess capacity of the control channels is utilized for transmission of low volume telemetric data. This results in wireless telemetry applications at low implementation cost and low equipment and service charges. (Source: The Strategis Group).

Digital Cellular:

Digital cellular technologies such as TDMA, GSM and CDMA have a benefit, over analog cellular technologies in wireless telemetry applications, that digital data need not be converted into a RF analog signal before transmission. Moreover, industry standards and existing cellular networks based on these digital cellular techniques support transmission of short bursts of data through the SMS service. Further, it is expected that the high data rates that CDMA can enable will allow service providers to provide wireless telemetry services requiring high throughput. However, for standard telemetry applications that require low throughput, pricing, coverage and capacity issues may be deterrents to adoption of such systems. (Source: The Strategis Group).

Other Networks:

- **Paging Networks:**

Narrowband paging networks offer much the same wireless telemetry capabilities, as do the DataTAC and the Mobitex networks. Coverage in case of paging networks is superior to all other terrestrial networks except for analog cellular. Superior in-building penetration is another advantage of paging systems. (Source: The Strategis Group).

- **Satellite Networks:**

Satellite networks are suitable for remote monitoring and controlling telemetry applications because they offer 100% coverage of the landmass. While coverage is the primary advantage satellite systems have over their terrestrial alternatives, pricing for both equipment and service is the main deterrent for adoption. The long latency inherent in most satellite systems is another concern for those customers who are looking for fast notification of malfunctions and other status updates. (Source: The Strategis Group).

Additional research:

1. Strategis predicts wireless telemetry service revenues in 2006 to be US\$412 million. More information is available in the report titled "The Wireless Telemetry Marketplace: Trends and Outlook", published by the Strategis Group.
Source: The Strategis Group

2. FCC ruling advances wireless medical telemetry. Source:
http://www3.medical.philips.com/resources/hsg/docs/en-us/custom/probe_fall00.pdf

Disclaimer

The information contained herein has been obtained from sources believed to be reliable. commNOW Inc. disclaims all warranties as to the accuracy, completeness or adequacy of such information. commNOW Inc. shall have no liability for errors, omissions or inadequacies in the information contained herein or for interpretations thereof.