SURVEY OF LOCATION TECHNOLOGIES

TO SUPPORT MOBILE 9-1-1

Survey Conducted for State of California Department of General Services
Telecommunications Division, Sacramento, California and for the Association of Public Safety Communications Officials (APCO)

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C.J. DRISCOLL & ASSOCIATES

C.J. Driscoll & Associates, based in Rancho Palos Verdes, California, provides consulting services on automatic vehicle location and mobile communications to fleets and industry suppliers. Clients include major cellular operating companies, Fortune 100 electronics manufacturers, venture capital start-up companies and government agencies.

Clement Driscoll, principal of C.J. Driscoll & Associates, has over 15 years of experience in the fields of navigation, radiolocation and mobile communications. Mr. Driscoll formerly directed the marketing of PacTel Teletrac's fleet vehicle location system. He also served as Product Line Manager for Magnavox's commercial GPS and satellite communication products. Mr. Driscoll has conducted numerous proprietary studies for client companies and has written articles on vehicle location and mobile communications for publications including *Automotive Fleet*, *GPS World* and *Communications* magazines.

INTRODUCTION

Purpose of the Study

The purpose of this study is to identify location technologies which could be deployed to provide 9-1-1 response organizations with the capability to locate a caller using a wireless phone to request emergency assistance. Presently, wireless 9-1-1 calls do not have caller location information, precluding the intelligent routing of the call to the proper response agency. Many wireless callers are not aware of their location and the emergency situation adds to their disorientation. This lack of information extends the call interrogation process and delays the dispatch of the appropriate response agency.

Scope of the Study

This report identifies location systems and technologies which could be applied to mobile 9-1-1. The author believes that the systems covered in this study are representative of the state of the technology, though it is unlikely that all systems capable of locating mobile 9-1-1 callers have been covered. The study only covers systems developed by U.S. suppliers.

As the purpose of this study is to address the feasibility of automatically locating mobile 9-1-1 callers using cellular, PCS or ESMR networks, the study does not attempt to cover systems which utilize a vehicle mounted or handheld device other than a mobile phone to request police or medical assistance. However, it is appropriate to note that a number of companies are expected to offer systems in configurations other than mobile phones for requesting emergency assistance. It is anticipated that a number of vehicle-mounted systems will use GPS for location.

Organization

This report is divided into two sections. The first section covers systems which compute the location of the caller using signals transmitted over the network on which the call was placed. A number of these systems require an overlay to the wireless network. Other systems require a modification to the software or hardware in the phone. This section also covers several companies which have radiolocation technologies that could be applied to locating mobile 9-1-1 callers, but which are not currently developing a system targeted at this application.

The second section covers location systems which rely on an external network or infrastructure to compute location. These systems either use an existing network or infrastucture to compute location or compute position based on a proprietary network of antennas deployed around a metropolitan area. These systems require either that a

receiver module be embedded in the wireless phone or that an external module be interfaced to the phone. Some of these systems use the Global Positioning System (GPS) to compute location and one system makes use of the existing commercial FM radio infrastructure.

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