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**U.S. TRADE AND DEVELOPMENT AGENCY**



**EXECUTIVE SUMMARY**

**Feasibility Study for the Wireless Local Loop Project for the Bulgarian Telecommunications Company: Final Report- Area 1**

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**Sector: Telecommunication  
Region: Europe  
Country: Bulgaria**

## **PART A - FEASIBILITY ANALYSES**

### **INTRODUCTION**

TRANSCOMM, Inc., headquartered in Falls Church, VA, was selected through a competitive process to carry out, on behalf of the Bulgarian Telecommunications Company (BTC), a study of the prospects for the deployment of Wireless Local Loop technology in Bulgaria. The BTC has taken this important initiative with the assistance of the U.S. Trade and Development Agency (USTDA): a project to demonstrate the feasibility of using terrestrial Wireless Local Loop (WLL) technologies to meet the needs of the population and to satisfy the economic growth requirements in the rural areas of the country. TRANSCOMM was awarded the BTC contract through TDA Grant No. GH8756443 on July 12, 1999 for this program, based upon its proposal dated November 20, 1998.

The program is composed of two phases: Area I, the assessment of WLL techno-economic feasibility in Bulgaria, and Area II, a Pilot Program demonstration of a WLL system based upon the activities of Area I. This document is the Final report for the Area I activities. The Final Report includes as Part A, an Overview of the Program, followed by summary presentations of the three additional major activity areas completed as part of the Program: National Characteristics and Policies, Technology Assessment and Consolidation, and Service Plans. It also includes, as Parts B and C, respectively, the Technical Specification (Task 7), and Terms of Reference (Task 8), both prepared for the Area II Pilot Program. These latter documents will be included with the Bid Package being prepared by BTC for tendering to Area II Pilot Program potential vendors-bidders.

### **OVERVIEW**

Currently, the Bulgarian Telecommunications Company (BTC) is in the midst of a substantial facilities expansion, focusing on the national network and its digitization. At the same time, however, there is increasing pressure on the BTC to acquire continuing funding for these and related projects despite the fact that the Bulgarian economy is still recovering from severe economic/financial problems, which has hindered BTC project funding. Additionally, the Government of Bulgaria (GOB) has impressed upon the BTC the immediacy of the needs to expand the availability of telephone services beyond the historical emphasis in urban centers of the country and, at the same time, to prepare for at least a partial privatization. In support of this activity, and on the basis of its almost 30 years of experience in all aspects of telecoms development,

TRANSCOMM has provided the analysis, planning and implementation for the Area I and Area II rural WLL Pilot Program with a 10-task program, shown in the Milestone Schedule & Activity Flowchart (Figure 1).

Initially, TRANSCOMM assessed the national rural market needs. This included acquiring and analyzing information regarding Bulgarian legislation and regulations; the prevailing rural telecom development policies worldwide (Bibliography in Appendix A); and the Bulgarian national network and current technology applications (Tasks 1, 2,4). This information became the basis for assessing the telecoms coverage throughout the country, establishing candidate sets of possible WLL technologies, and generally defining the national rural requirements for the 28 Regions and 255 Municipalities in Bulgaria (Tasks 3 and 5). These results became the basis for (a) subsequent screening, evaluation and selection of feasible candidate technology applications and (b) specific requirements definitions for the unserved or underserved rural locations, initially within four population categories of increasing size, with the largest no more than 25,000. These techno economic data were then combined to develop seven generic "problem types" subsequently reduced to four, which were representative of the 255 Bulgarian municipalities. For each of these four representative categories, four municipalities were selected for more detailed and specific technical cost-revenue analyses required for the Service Plan development (Task 6). The four candidate municipalities selected were Blagoevgrad, Kardjali, Momchilgrad and Etropole.

In order to develop the four Service Plans in Task 6, available technical, socio-economic and demographic data were supplemented with on site visits to various rural locations in Bulgaria to collect additional data. This data acquisition and subsequent analyses were used to define the specific rural locality coverage in each municipality that would be appropriate for the Area Pilot Program. Technical requirements and estimates of local subscribers' demand for services was developed for each of the local municipal coverage combinations selected. These latter values were based on the potential subscribers' socio-economic and demographic characteristics for selected localities within the four representative municipalities selected earlier. Appropriate wireless technologies (e.g., Cellular, TDMA, CDMA) were evaluated with respect to each of these four sets of technical - subscriber profiles to develop representative technology-based plans for serving these rural localities in each of the Task 6 Service Plans.

Most importantly, the Service Plans provided the basis for selecting a preferred geographic location for the Area II Pilot Program and, with respective cost analyses, established the techno-

economic feasibility of the WLL technologies. Both the geographic locations and vendor technologies were selected with substantial consideration of the unique opportunities and requirements that must be addressed by BTC for WLL implementation. These included, for example, the need for balancing the policy objectives of maximizing rural coverage with the practical considerations of the possible need for innovative government financial incentives, including creative financing and BTC "value enhancement", the latter in anticipation of completing the BTC privatization with the KPN (Dutch) and OTE (Greek) partnership. Within this framework, BTC has selected the municipality of Kardjali and the several localities identified in the Service Plan within the municipality as the basis for the Area 11 demonstration Pilot Project.

The System Specification (Task 7) and Terms of Reference (Task 8) were prepared for this Kardjali selection and are included as part of this Final Report. These documents, together with the Bid Package being prepared by BTC, will be used to solicit industry responses and to select the participating vendor for the Area 11 Pilot Project. The time required to complete the field testing of the Pilot Project is expected, at this time, to require nine months from vendor contract award.

Clearly, the success of this Feasibility Study relied upon the integrated knowledge and experience in the issues of rural telecom demand analysis, technologies and applications, socioeconomic and demographics, cost analysis and financial and business planning, all of which were integrated by TRANSCOMM, in coordination with BTC. The coordinated activities were fundamental to the success in necessarily modifying the originally proposed technical approach to compensate for the unforeseen difficulties in data acquisition and development. Thus, for example, unanticipated changes such as the development of representative municipalities, and use and development of alternative financial evaluation and technology selection techniques, have significantly contributed to meeting the overall goals of the program: to demonstrate the feasibility of rural WLL applications in Bulgaria and establish the framework for a vendor-supported WLL rural demonstration project. More specific summary information and conclusions derived from the selected task groupings, as shown in the Milestone Schedule & Activity Flowchart (Figure 1), is presented in the following sections.

## **NATIONAL CHARACTERISTICS AND POLICIES**

Tasks I (Environmental Scan) and 4 (Needs & Classification), the preliminary analyses of data on the current state of rural telecom development, were completed mostly relying upon the information supplied directly by BTC and the Institute for Scientific Research in