TECHNICAL PROGRESS REPORT

Quarterly Report

Project Title: Wireless Mine-Wide Telecommunications Technology

Reporting Period Start Date: 10/01/02

End Date: 12/31/02

Principal Author: Zvi H. Meiksin

Date Issued: January 2003

DOE Award Number: DE FC26-01NT41065

Submitted by:

**TRANSTEK, INC.
35 Wilson Street, Suite 103
Pittsburgh, PA 15223-1719**

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

ABSTRACT

We added data transmission to the through-the-earth communications system using quadrature synchronous detection. The results are adequate for computer-to-computer communication as well as for sensor data transmission. We added a feature to the in-mine communications system that allows a person to call an individual, rather than broadcasting, by dialing an identification number before speaking.

TABLE OF CONTENTS

Executive Summary	5
Experimental	6
Results and discussion	7
Conclusions	8
References	9

EXECUTIVE SUMMARY

Transtek's through-the-earth wireless communication system was first built and tested using telephone handsets as human-machine interface. Miners suggested that it would be helpful if mobile two-way radios were used for the interface. Accordingly, we added this feature to the system. We also added data transmission capability to the system.

To the in-mine communication system, we added a feature that allows a caller to alert only a particular person when placing a call, rather than alerting all persons with access to the same channel

EXPERIMENTAL

To be able to use two-way hand-held radios for through-the-earth communication, it is necessary in addition to transmitting voice also have a means to activate the transmitter and the other end of the communications link when a message is received. We accomplished this by sending a DTMF signal that is decoded at the other end and caused the transmitter to remain open during the transmission period.

We obtained data communication through the earth by using quadrature detection. The result is suitable for computer-to-computer communication as well as sensor-to-display communication.

We added a feature to the in-mine communications system that makes it possible for a caller to activate a ring on the two-way radio of a particular person by dialing a key sequence on the keypad. This makes it possible for two persons to have a conversation without having all other persons on the same channel to have to hear the conversation.

We tested our systems with these added features in our laboratory. The experiments were successful giving expected results.

RESULTS AND DISCUSSION

Systems that we have installed in mines are in daily use and the users do not want to be without them. They say that they do not know how they ever got along without them. This indicates to us that we are filling a need. We look forward to be able to install both the through the earth system and the in-mine system in NIOSH's Lake Lynn mine to make it available for study and evaluation to the many mining groups that come for training and other visit purposes to the mine.

CONCLUSIONS

Progress made on this project has been steady without major hurdles. Certain setbacks have been overcome and we are meeting the project objectives.

REFERENCES

None