ABSTRACTS

48th

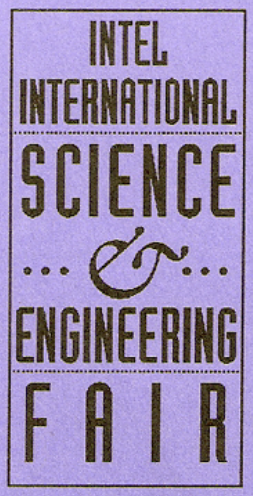
International

Science

and Engineering

Fair

Louisville, Kentucky



Science Service Washington, DC

REDUCING RADIO FREQUENCY INTERFERENCE THROUGH SPECTRUM ANALYSIS

Charvat, Greg L.
325 McMillan, Grosse Pointe Farms, MI, 48236
Grosse Pointe South High School, Grosse Pointe Farms MI

I designed, built and tested equipment to analyze the radio spectrum of our school radio telescope in order to find out the frequency of man-made RF transmissions, and to counteract RFI (Radio Frequency Interference) disturbances.

A new superheterodyne receiver was designed and built that was different from the old direct conversion receiver that was originally used. Research was done on the operation of spectrum analyzers. A spectrum analyzer was built to detect radio signals in the frequency vs. amplitude domain.

The Bandpass Separator was created to separate the spectrum into four channels. On each channel the frequency and the amplitude of the strongest signal was displayed through two output voltages to strip chart recorders and A/D converters.

Data were first collected on the "bare bones" receiver. This showed a typical 1400 MHz receiver's performance without RFI countermeasures. Then data were collected on the entire system. This showed how the system has been able to log data in the frequency vs. amplitude domain. Data were also collected on all system components using oscilloscopes, spectrum analyzers, a network analyzer, and other diagnostic tests.

Scans were done indicating the Bandpass Separator is able to output the frequencies and signal strengths of the strongest signals in each of their four bandpasses. Bench testing of the filter chassis indicates it is able to switch the video in phase with the sweep oscillator within the sweep generator's output.

AWARDS WON AT THE 48th ISEF * * * * * * * * * * * * * * * * *

Honorable Mention	-	Acoustical Society of America
TRIP	-	National Aeronautics and Space Administration
Second Place	-	Engineering - Intel

ENERGETIC APPLICATION OF COAL IN THE REGIONAL DEVELOPMENT

Katherine Alva Casana
Av. Luis Valle Goicochea 244, Trujillo, La Libertad, PERU
National School "Santa Rosa" Trujillo, La Libertad, PERU

Even though there are great amounts of coal (natural energetic resource) in the Province of Trujillo, Region of La Libertad to the North of Peru, the population of the region doesn't use coal inasmuch as they are unaware of its importance. Instead, they spend a high percentage of their family budget in the item of fuel (electricity, domestic gas or Kerosene).

The present project aims at providing information about the good features that the coal offers as energy generator at low cost and a long duration period.

This project came up as the result of the direct observation on how some people of the region use the Coal as fuel, with good results and at a low cost.

The students of "Santa Rosa" School, aware of the importance of this product when visiting the coal production area, had the great idea of informing the community about its importance in order to contribute to the economic and social development of the population.

The use of coal as fuel, reduces the excessive expenses in the family budget, considering the serious economic situation that our country, member of the Third World, is facing. The coal should not only be exploited for domestic use but also exported.

Along the presentation of this project to areas around Trujillo, we demonstrated that the cost of using gas or Kerosene represents 90% and that the cost of using coal is 10%. As a result, coal is being used by different Mother Clubs in the rural areas.