



# **THE TELECOMALARM**

**An Engineer's Design of Tackling  
Several Forms of Vandalism**

**By Peter Bobo**

**(An Exhibition accompaniment)**



# Introduction

- Telecom alarm telephones out when detect an alarm condition.
- Alarm conditions:
  - Cutting transmission tower member
  - Transformer oil drainage
  - Cutting substation earthing wire
  - Any other condition that output a signal (a voltage)



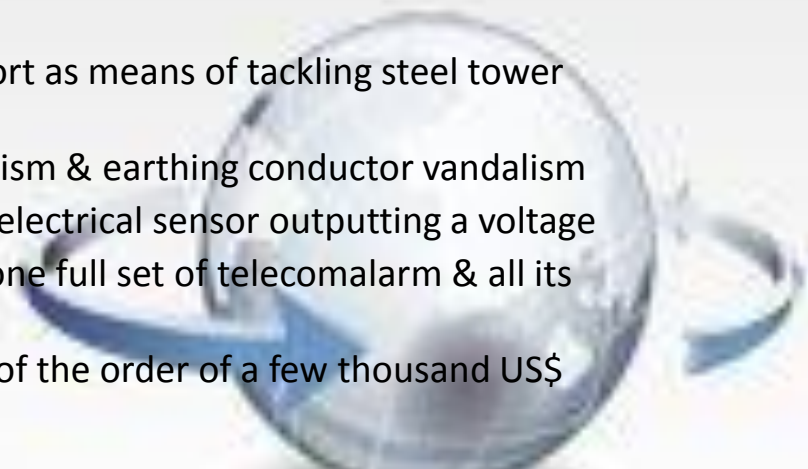
# Summary

- Proven-to-be-successful anti-vandalism way — guarding (electronically) proposed
- Telecomalarm schematic set up given
- Set ups given for detecting:
  - Transformer oil drainage
  - Cutting substation earthing wire
  - Cutting transmission tower member
- Some telecomalarm complications are highlighted and more are called for
- Tackling vandalism straight on is recommended
- Technical research for sorting our other problems is also recommended



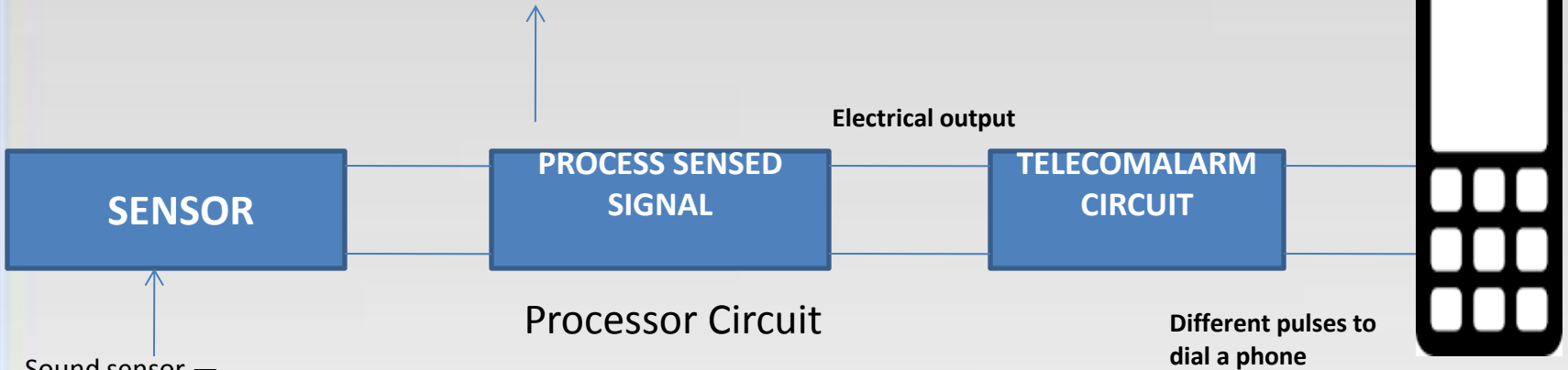
# The Telecommunicating Alarm (Telecomalarm) —a cheap gadget

- Vandals (Call them thieves) are people of broken down morals
  - Winning their hearts and souls is not quite possible (it has proven so).
  - Their primary society (family) probably had repeatedly failed to discipline them.
  - Instilling sense of ownership in the public (through society leaders etc) is not quite working.
- Is stealing a new thing?.....  
How has it been successful tackled before?.....
- What works to safeguard assets— guarding
  - Persons
  - electronically
- Many & wide spread assets (as in the case of an electric power utility).
  - persons guarding not economical
  - Telecomalarm practical option
- Telecomalarm 1<sup>st</sup> proposed in an engineer's training report as means of tackling steel tower vandalism.
  - Now further advanced to tackle transformer vandalism & earthing conductor vandalism
  - Actually can detect any condition that results in an electrical sensor outputting a voltage
  - Project not more than US\$400 to make and install one full set of telecomalarm & all its accessories.
  - Cost effective considering guarded asset per site is of the order of a few thousand US\$



# TELECOMALARM SCHEMATIC SETUP

E.g. amplify microphone output, change float switch switching into transistor switching. Processor setup depends on sensor output type



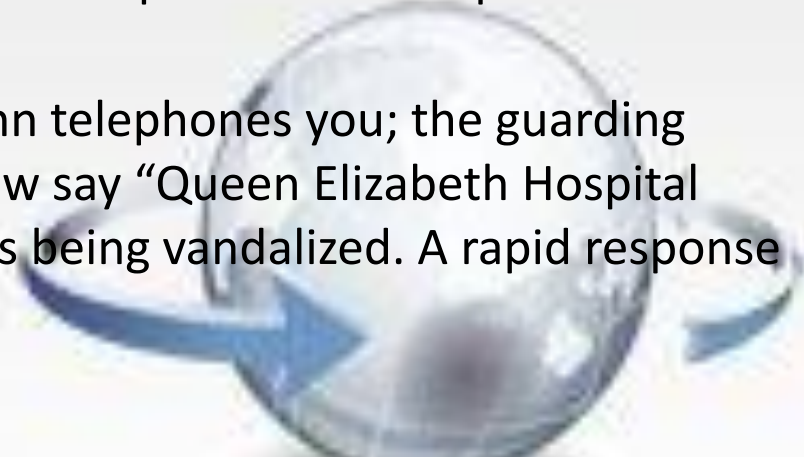
- . Sound sensor — Microphone.
- . Light sensor—LDR, photocell.
- . Touch sensor— piezo/pressure sensor.
- . Temperature sensor— thermistor
- . Voltage sensor— zener/varistor.
- . Continuity/discontinuity sensor—limit switch, float switch



# SAME TELECOMALARM DETECTING DIFFERENT VANDALISM ACTIONS

## 1. Set up of telecommunicating vandalism of transformer oil is as follows:

- circuit can be put in the Transformer tank or Conservator or in a compartment affixed to the transformer tank.
- dual or trio power source for reliability
  - 12V or 18V battery bank
  - dc supply from mains
  - solar panel
- float switch sensor switches when oil level goes below float switch set level
- float switch switching converted to transistor switching which output a signal to telecomalarm circuit.
- telecomalarm then sends several signals to a cellphone to dial a preset telephone (guarding office).
  - Your cellphone shows “John” when John telephones you; the guarding officer’s cellphone will be made to show say “Queen Elizabeth Hospital substation 995” when substation 995 is being vandalized. A rapid response will then be set in operation.



## 2. Set up of telecommunicating distribution substation earthing vandalism (Transformers easily get burnt due to this vandalism)

- Sensor is as done in protection relay trip circuit supervision
  - i.e. Discontinuity sensing.
    - Can be used to sense bank strongroom opening, bedroom/house door opening e.g. at my house.
    - Several arrangements possible to make earth conductor cutting to be a discontinuity e.g. if from one leg of substation H-pole structure, the conductor zigzags into the ground then come out up the other H-pole leg (multiple earthing).
- The substation earth wire discontinuity gets converted to a voltage & this gets outputted at telecomalarm's input.
- Telecomalarm sends dial signals to the cellphone to dial a preset telephone (guards).



### 3. Set up for telecommunicating vandalism of steel tower (Pylon) Members

- i. Capacitor/piezoelectric microphone is used to sense tower member cutting or unbolting sound.
  - The sound gets amplified and filtered (to segregate against non-vandalism sounds like wind, birds, children playing etc).
  - Filter (like sound system graphic equaliser allows through some sound frequencies and blocks others).
  - Allowed through sound of tower member cutting or unbolting was got from experimenting to be around 2.5KHz (tunable).
- ii. Once sound of around 2.5KHz is sensed, the sound amplifier outputs a signal to the telecomalarm input
- iii. The telecomalarm sends dial signal to the cellphone to dial a preset telephone(guards).





## SOME TELECOMALARM COMPLICATIONS, BUTS AND WHATS IF'S

- DC power supply source for the telecomalarm up a transmission tower may be a problem.
  - A small solar panel charging a battery is proposed.
- It may not be possible to just start dialing the phone since the phone may have some unattended to missed calls or sms`s.
  - a reset pulse putting the phone to “desktop” has to come first before dialing starts.
- High voltage may present operation complications to low voltage dc device.
  - Opto-isolators are used for this
- A cellphone totally enclosed in a metal (tank or conservator) will have its transmitted signal absorbed by the metal enclosure.
  - The enclosure may be part of the cellphone antenna.



## COMPLICATIONS, BUTS AND WHATS IF'S (cont'd.....)

- To double ensure a rapid response operation is not set up against what turns out to be a false alarm:
  - the site cellphone can have its microphone (mouth piece) side pressing against structures on site. This cellphone be put in auto-answer mode so that site sounds can be listened to when the guarding office telephone the site cellphone.
- One or two but`s or what if`s should not render any idea undoable
  - First aircraft hard no pressurization for high flying
  - First car had no lights for night travel;
  - This being just a thought up and tried out design, any envisaged but`s and what if`s are invited.....



# A Call For Further Actions

- Vandalism has come to really bad levels.
  - Need to tackle it straight on
  - Use proven-to-be-successful ways
- Telecomalarm electronic guard
  - Economical
  - Faithful
  - An opportunity for those serious at tackling vandalism
- Telecomalarm also serves to show that through technical trials and experiments we can sort out our other problems
- Why is it that we are not doing technical research (No EPRI's) ?.....
  - May be we don't have problems? .....
  - Or is it that we think that the west (& the east) is gonna sort out our problems for us ?...
  - Or may be we under-rate our brains ? .....
- Talking fundamental science;
  - human being is scientifically called Homo sapiens meaning man thinker

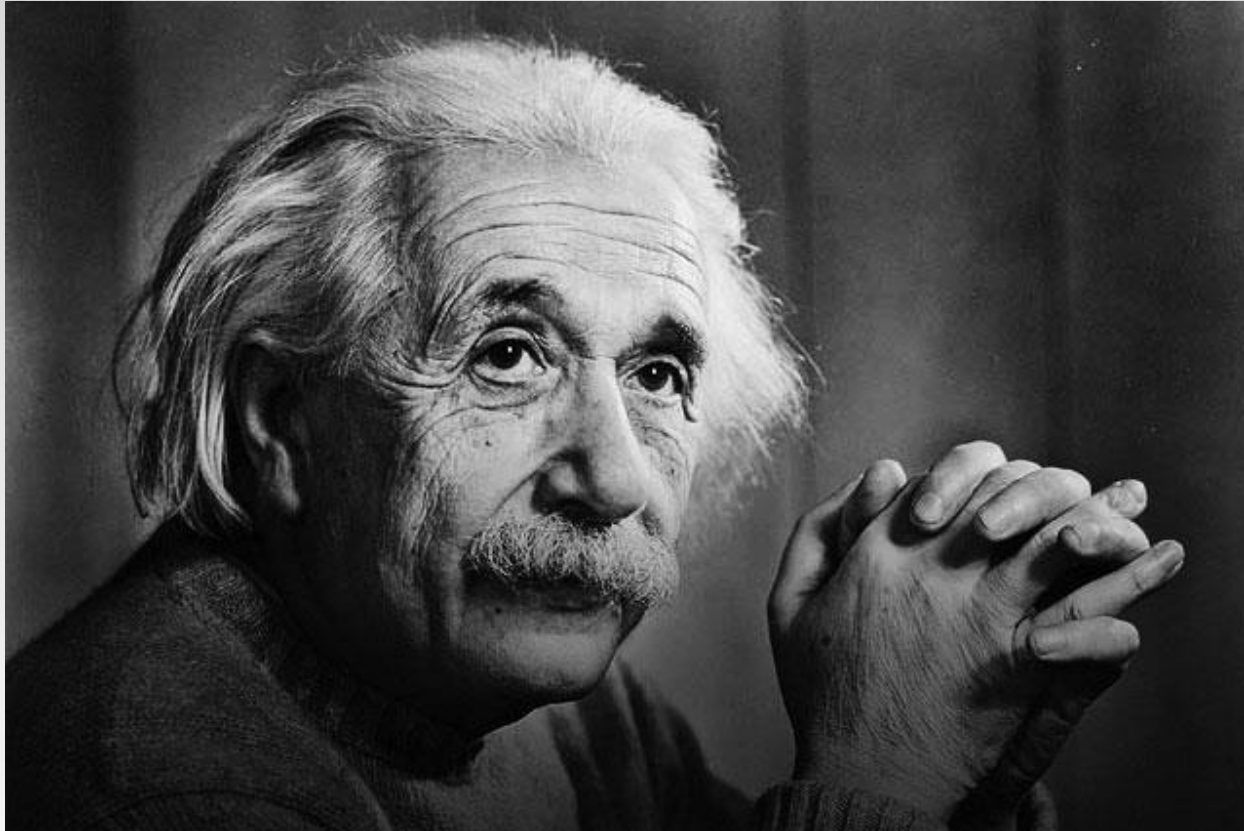


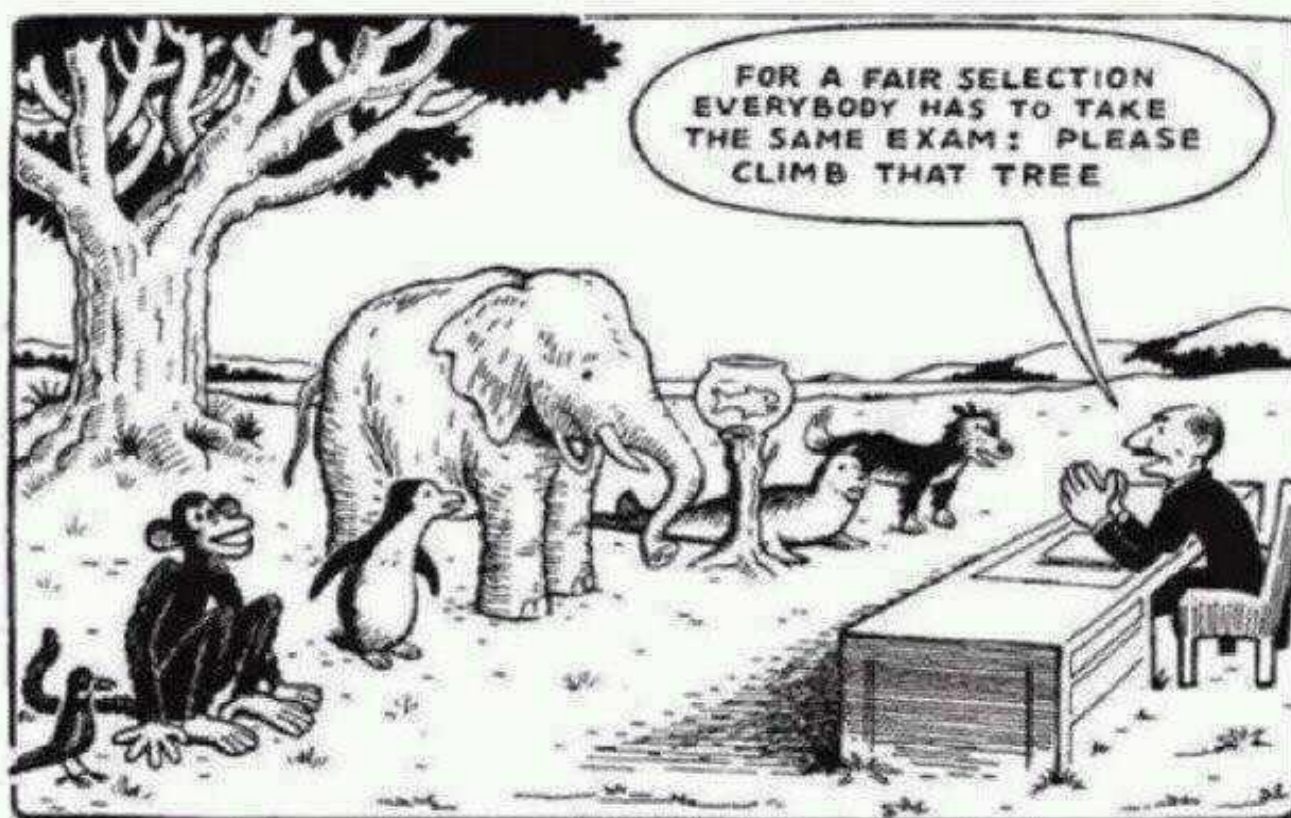
# Call For Further Actions (Conti'd....)

- From this science, the human brain(of an african, a European, an Asian) has immense thinkal power – being inventive and innovative
- Every body is a potential inventor and innovator.(A commonly found quote from Albert Einstein, the greatest thinker of the last century)



# Albert Einstein (Voted greatest thinker of the 1900's)





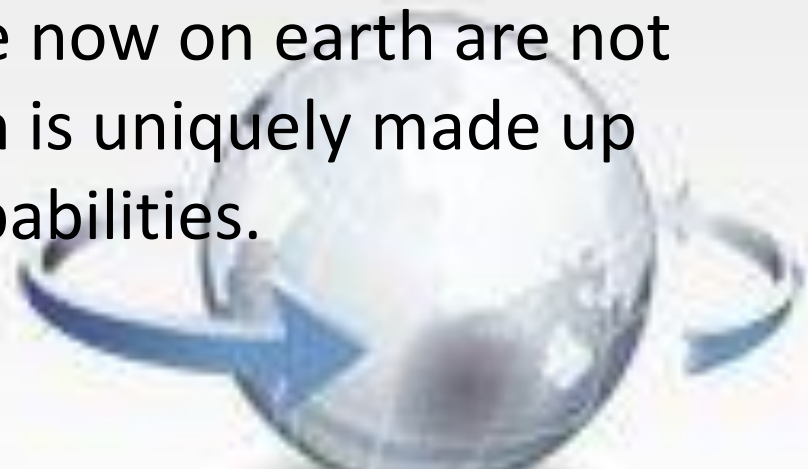
# Our Education System

*"Everybody is a genius. But if you judge a fish by its ability to climb a tree, it will live its whole life believing that it is stupid."*

*- Albert Einstein*

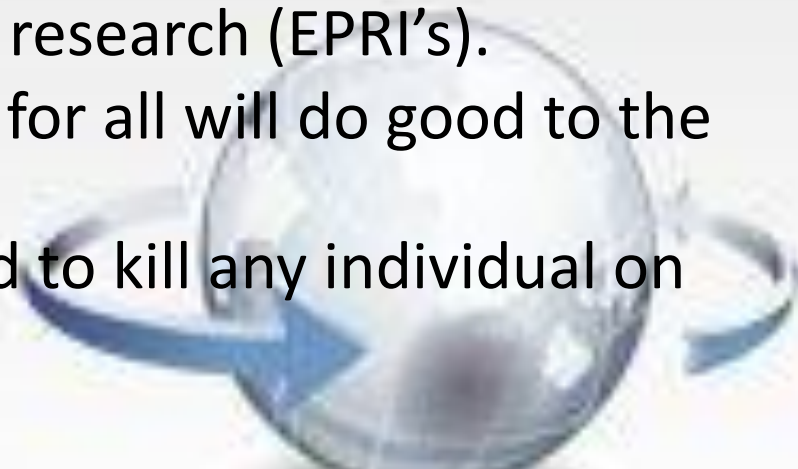
# Call For Further Actions (Conti'd....)

- Every body is unique & has unique capabilities which no one has and which no other will ever have .
  - (Talking fundamental science; everybody`s building blocks or protein make up signature is unique to the individual only. Its also been long known that everybody`s finger and tongue prints are unique to that person only)
  - So the 7 billion or so people now on earth are not redundant entities but each is uniquely made up and so also with unique capabilities.



# Call For Further Actions (Conti'd....)

- Need to exploit out these uniqueness in individuals else the world loses forever for a person with those uniqueness never existed before and never will exist in future.
  - That's why African solutions for African problems said by AU heads of states should translate in putting up resources in research.(Stealing transmission tower members to use them for fabricating ox-carts, stealing stay rods to use them for fabricating bicycle parts are African problems ; they are not there in UK, German nor USA — they will not research on these for us).
  - That's why we need technical research (EPRI's).
  - That's why tertiary education for all will do good to the world.
  - That's why we must not afford to kill any individual on this earth.





# My serious joke

- *AIDS disease is still without cure because the British doctor who was to discover the cure formula for any virus disease got prematurely killed during First World War, and look; the whole world is suffering the consequences.*

