JAI SHREE SIDDHIVINAYAK TRUST

B.R.HARNE COLLEGE OF ENGINEERING & TECHNOLOGY

DEPATMENT OF ELECTRICAL ENGINEERING

ELECTROMAGNETIC SPACE SHUTTLE LAUNCHER

BY,
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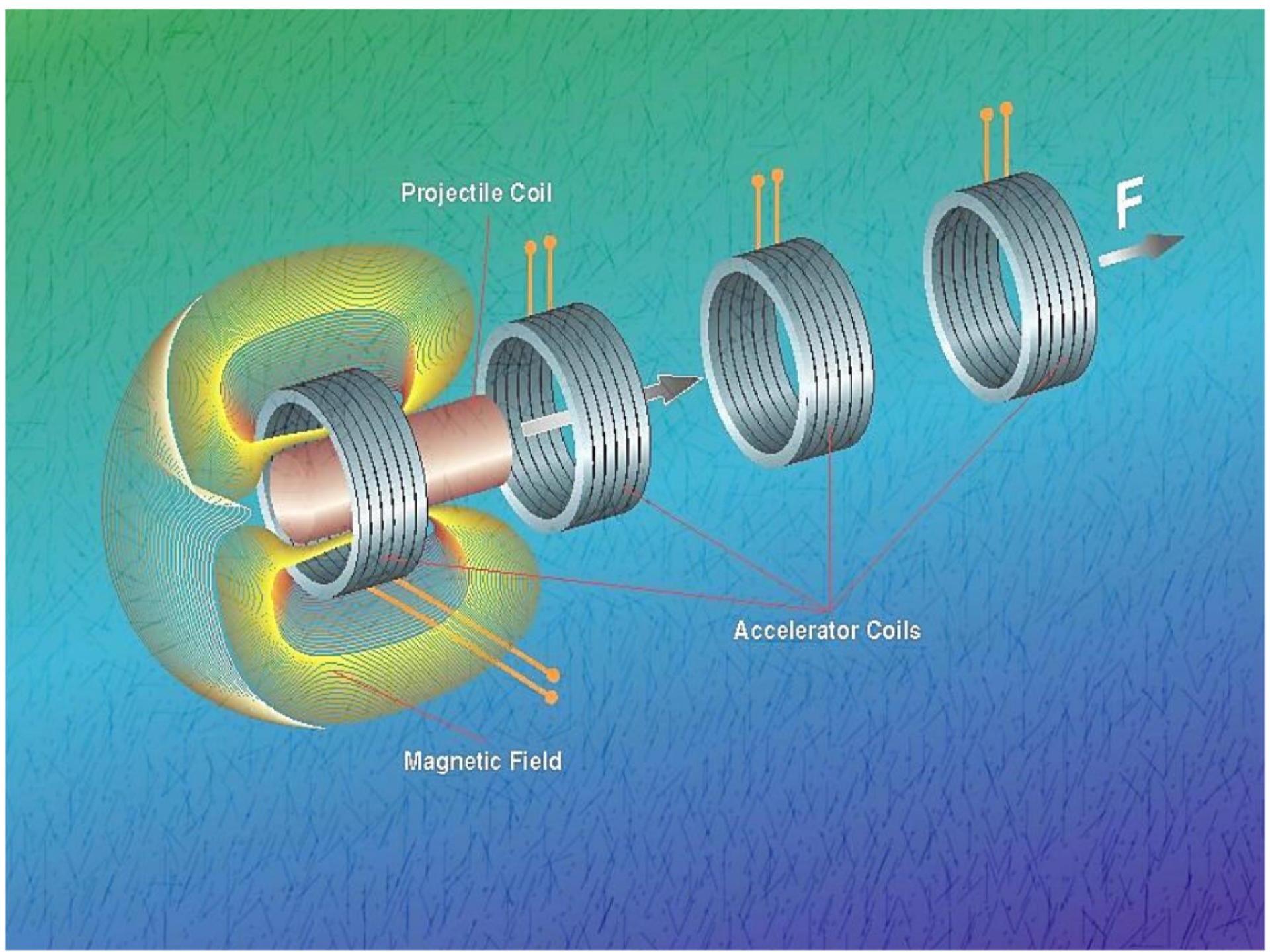
INTRODUCTION.

- **IN THE PAST 40 years, mankind has ventured into space using well-established rocket technology involving liquid fuels and/or solid propellants.**
- **This approach has the advantage for astronauts and fragile payloads that the rocket starts slowly from the surface of the Earth with its full fuel load, and, as the fuel is burned off, the altitude and speed increase. In addition to minimizing the aerodynamic and aero thermal loads.**
- **Because only a small fraction of the initial mass reaches orbit, rockets of substantial size are required to place tens of tons into near-Earth orbit.1 Offsetting these remarkable successes is the very high cost of burning chemical fuel with a modest efficiency in a rocket engine to get out of the Earth's gravitational well.**
- **Present estimates are that it costs $20000 to get one kilogram of material into orbit.**
- **Unless alternatives can be found, it seems likely that mankind's ventures into space will be limited to a few adventures that can only be undertaken by wealthy nations the science-fiction writer's dream of colonizing the planets and stars may be unaffordable.**

ELECTROMAGNATIC LAUNCHING

- **The ability to use electromagnetic energy to controllably propel objects to extremely high speeds has broad and important consequences for many elements of our society, including transportation, communications, energy, national defence and space, and it may even provide insight into the origins of the earth and solar system.**
- **Electromagnetic launchers can propel objects to these high speeds because they provide all of the accelerating force by the interaction of electromagnetic fields and strong electric currents.**
- **The fundamental principle of all electric launchers derives from the basic observation by Michael Faraday and others that a conducting wire carrying an electric current J subjected to a magnetic field of strength B, experiences a force called the Lorentz force**


Projectile Coil
F
Accelerator Coils
Magnetic Field

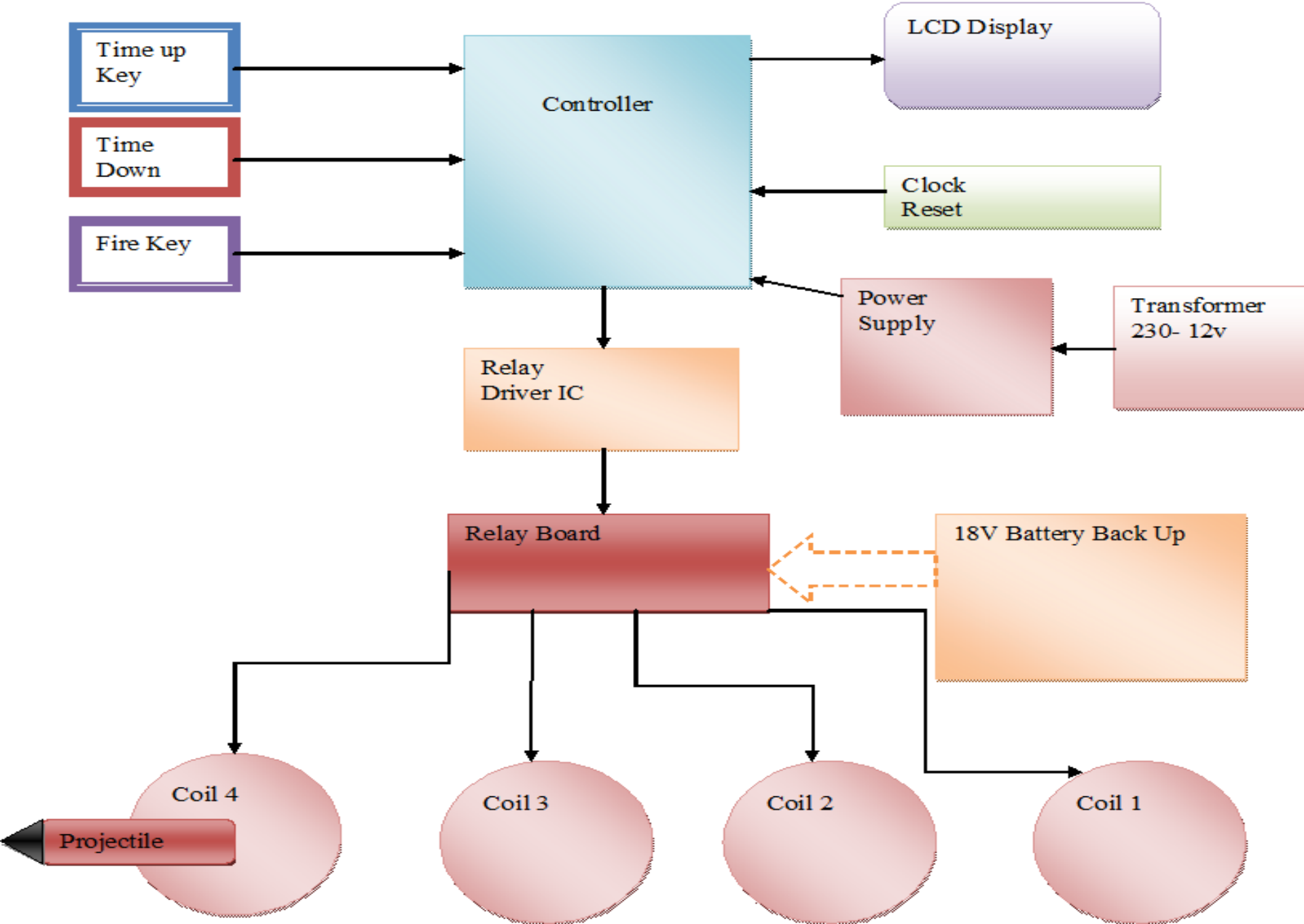
BENEFITS OF USING ELECTROMAGNATIC LAUNCHING PAD

- **It is possible to Launch space shuttle economically and everyday or rather every hour into the space.**
- **While current Navy guns have a maximum range of 12 miles, rail guns can hit a target 250 miles away in six minutes.**
- **These techniques have the advantage that the launch mechanism remains on the Earth and does not have to be lifted into space, as with a rocket.**
- **Reduction in the use of chemical propellant and thus it reduces the environmental related issues.**
- **Less hazardous compared to conventional launching system.**

DRAWBACKS

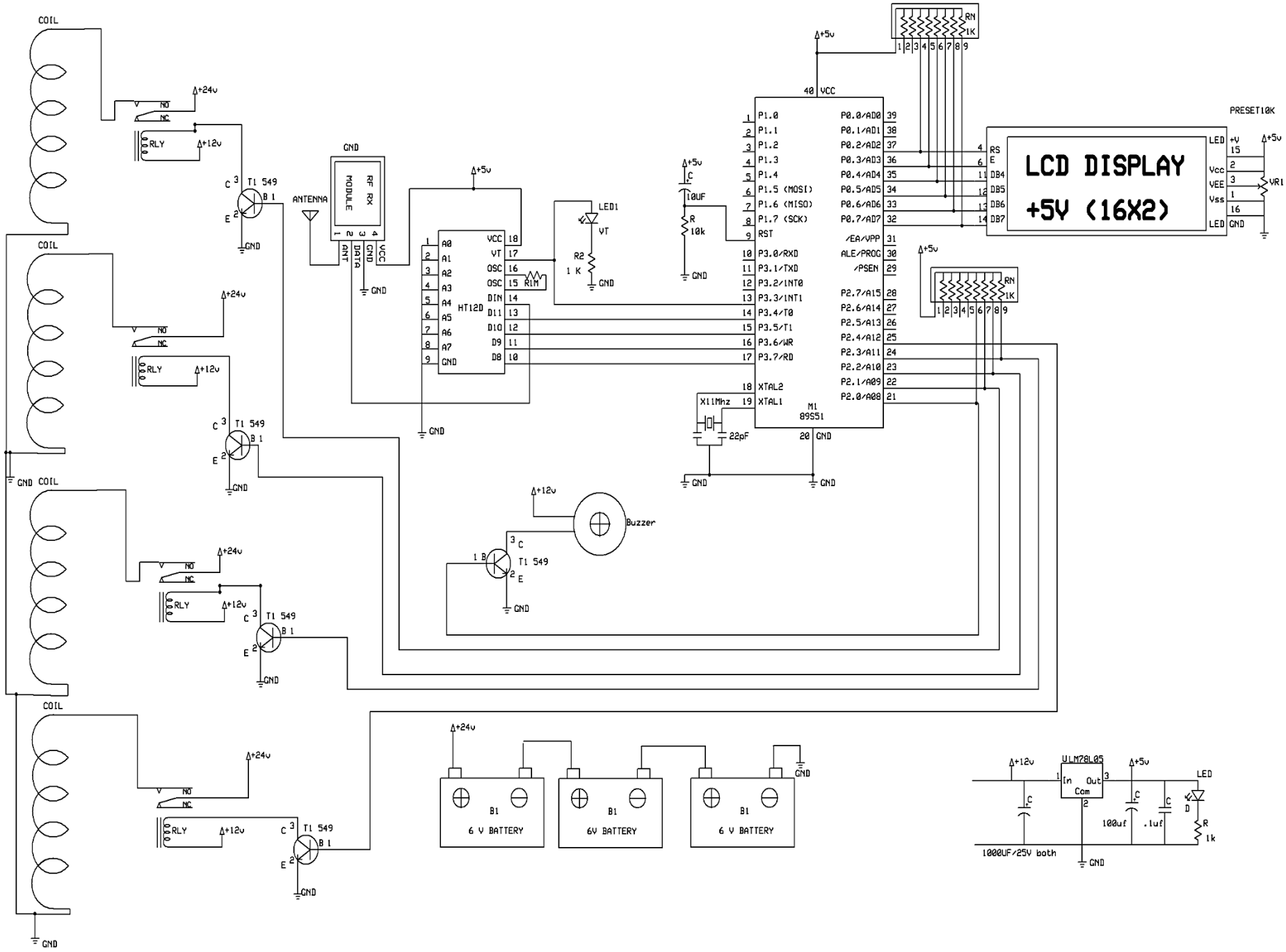
- **The major problems with coilguns are that they require very large power supplies, possibly unrealistically large for a space launch application, and also have to switch very large amounts of power in very short times. In addition, coilguns suffer from erosion of the rails after a few launches, and the designs based on plasma arcs have difficulties with uncontrolled arcing around the projectile or to the muzzle.**
- **Also the protection requirement for the system is complicate to design.**
- **It is not tested to propel the humans into the space.**

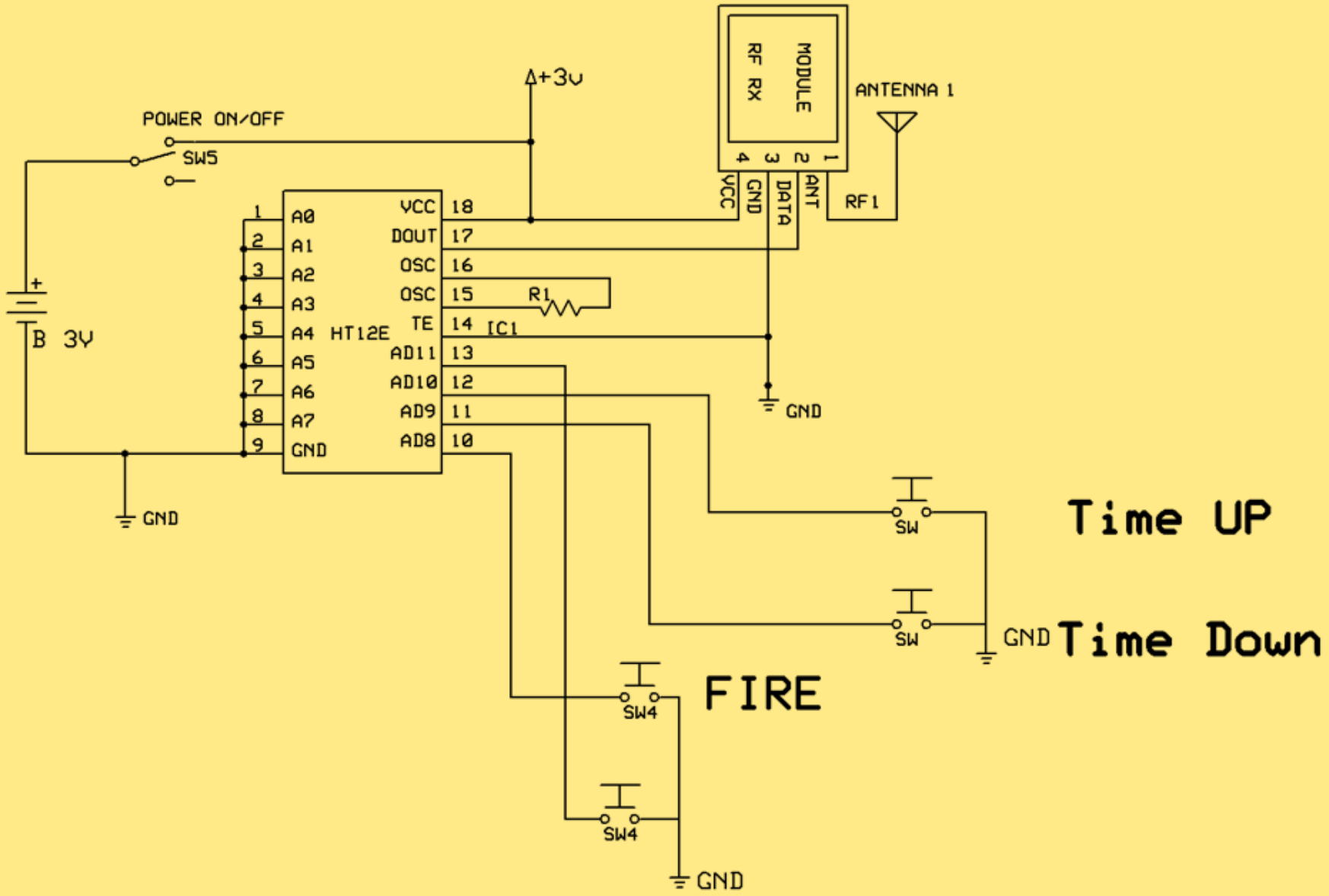
Block Diagram:



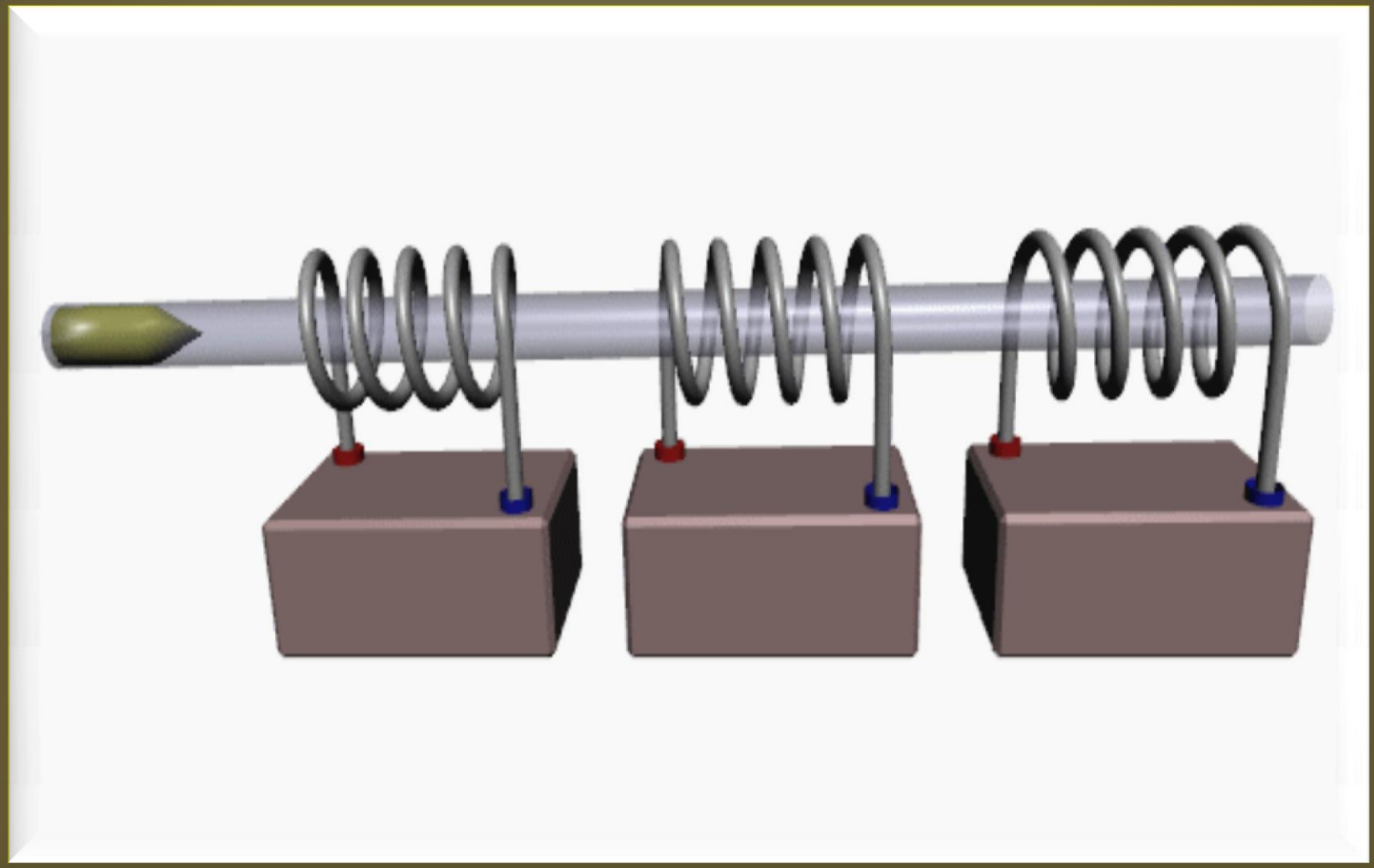
EM SPACE SHUTTLE LAUNCHER

- **It consists of a 2 metre long pipe with windings wound on it .**
- **A remote controlled command switching remote is provided to transmit the command to the micro-controller.**
- **Also a receiver to receive the command and to give the firing signal to the launcher through micro-controller.**
- **A projectile used as payload.**
- **LCD Display to display the progress.**

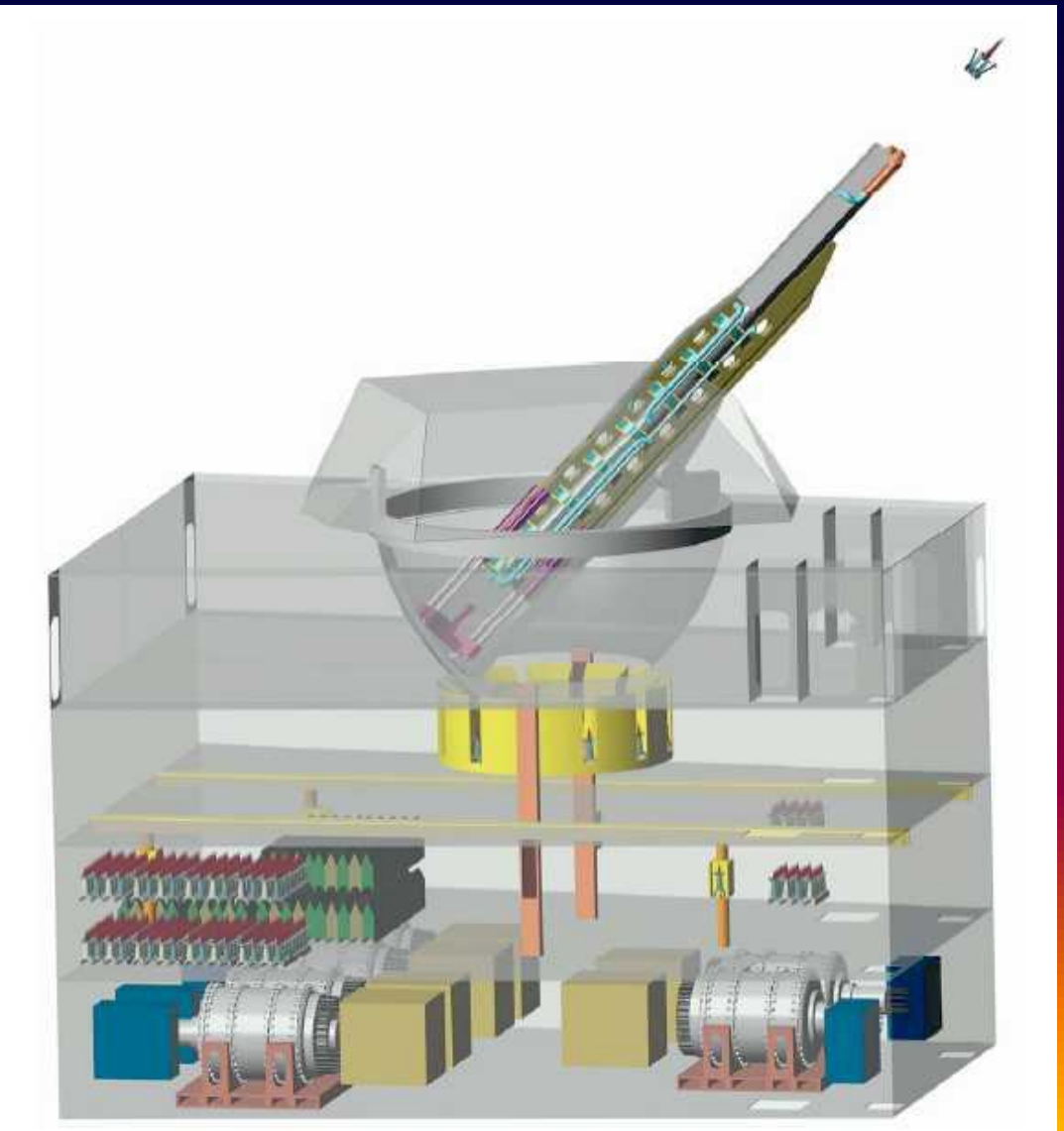

LCD DISPLAY
+5V (16X2)
PRESET10K
VR1
RN
1K
RF RX MODULE
ANTENNA
HT12D
89S51
M1
X11Mhz
22pF
10UF
10k
R1M
R2
1 K
LED1
Buzzer
T1 549
RLY
NO
NC
COIL
+24v
+12v
+5v
GND
6 V BATTERY
ULM78L05
1000UF/25V both
100uf
.1uf
1k

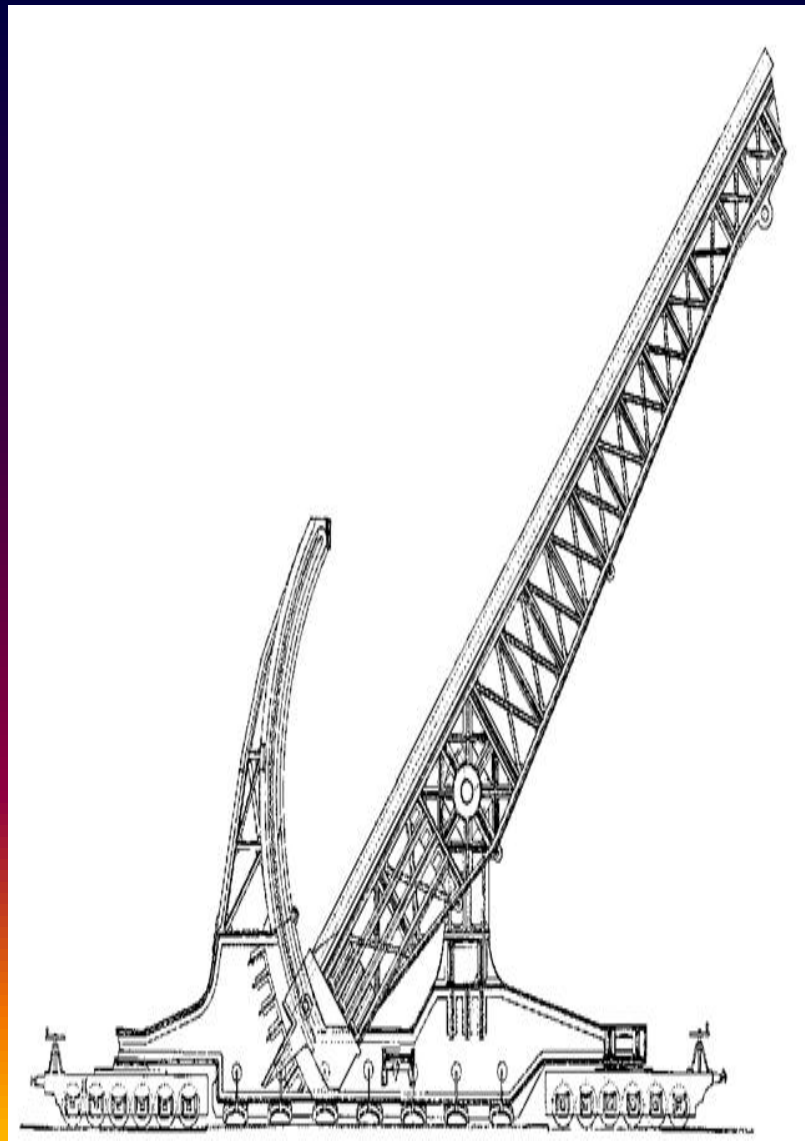

MODULE
RF RX
ANTENNA 1
4 3 2 1
VCC GND DATA ANT
RF1
+3v
POWER ON/OFF
SW5
B 3V
A0 A1 A2 A3 A4 A5 A6 A7 GND
VCC DOUT OSC OSC TE AD11 AD10 AD9 AD8
18 17 16 15 14 13 12 11 10
HT12E
R1
IC1
GND
SW
Time UP
SW
GND
Time Down
SW4
FIRE
SW4
GND

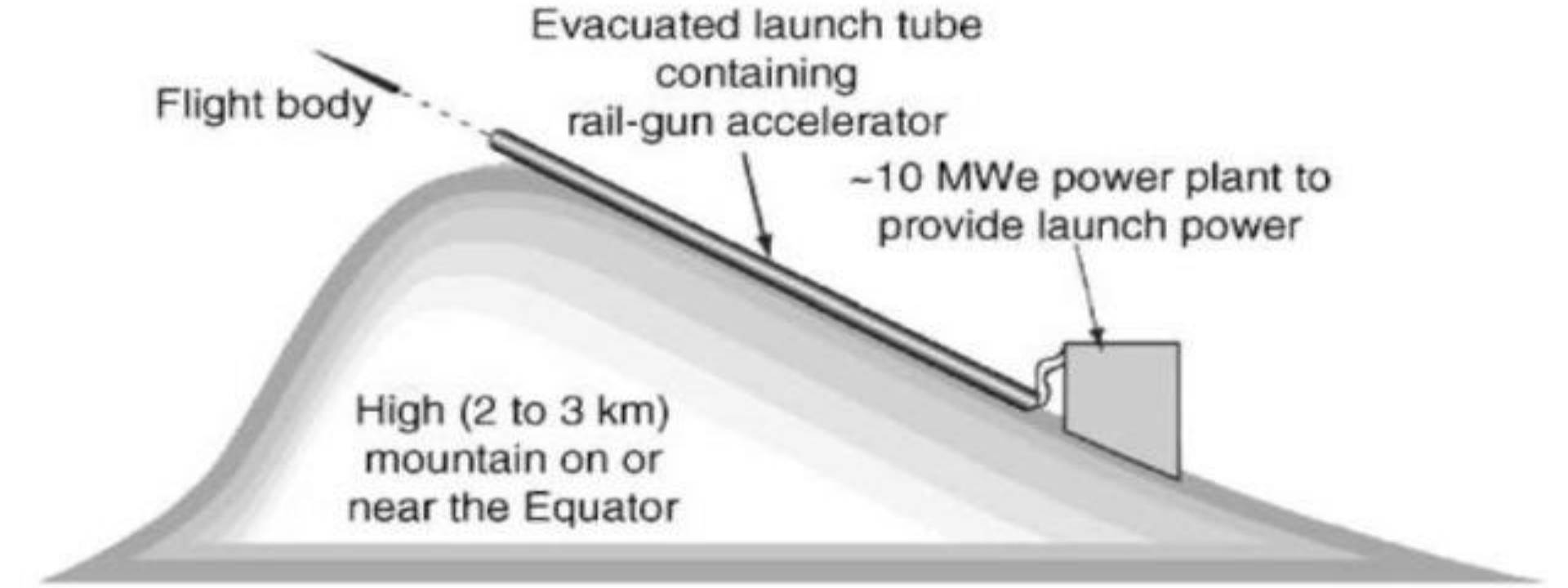
WORKING OF ELECTRICAL GUN

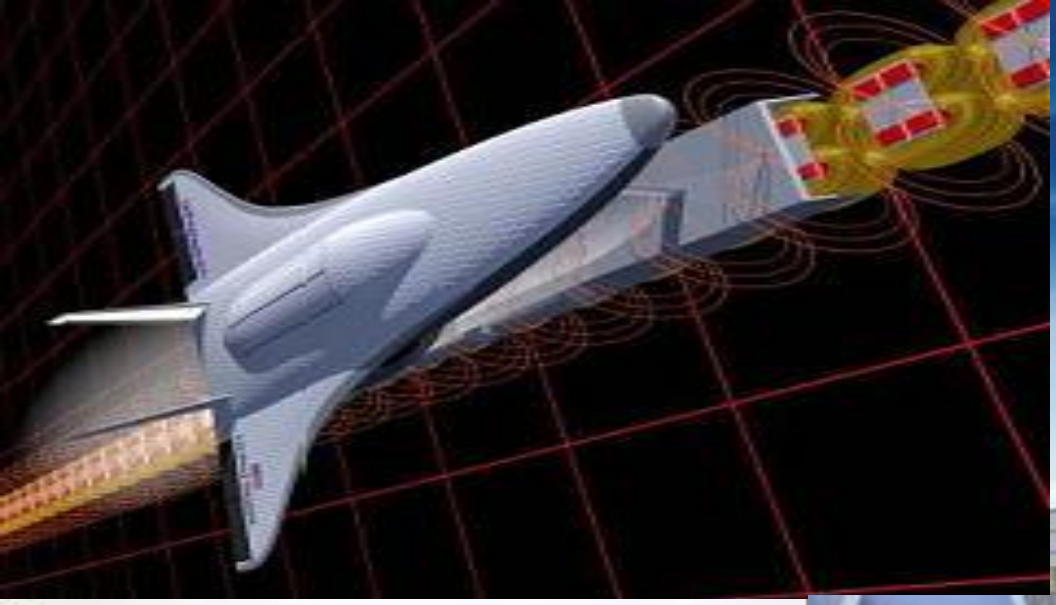


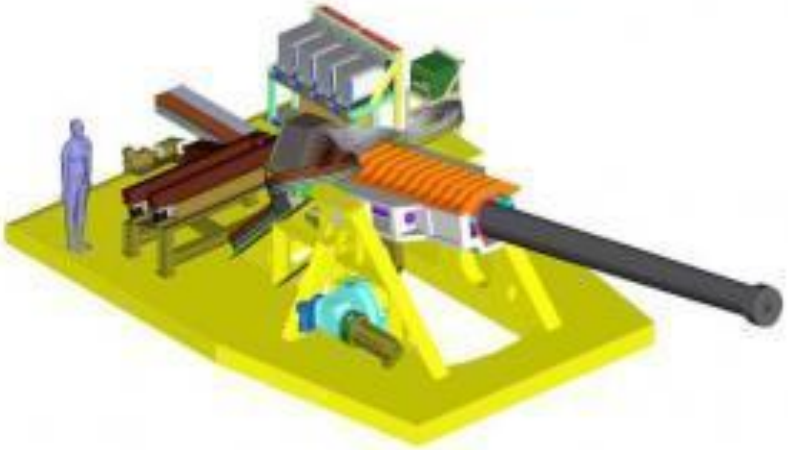
FUTURE POSSIBILITIES & NASA.






Evacuated launch tube
containing
rail-gun accelerator
Flight body
~10 MWe power plant to
provide launch power
High (2 to 3 km)
mountain on or
near the Equator





THANK YOU…