



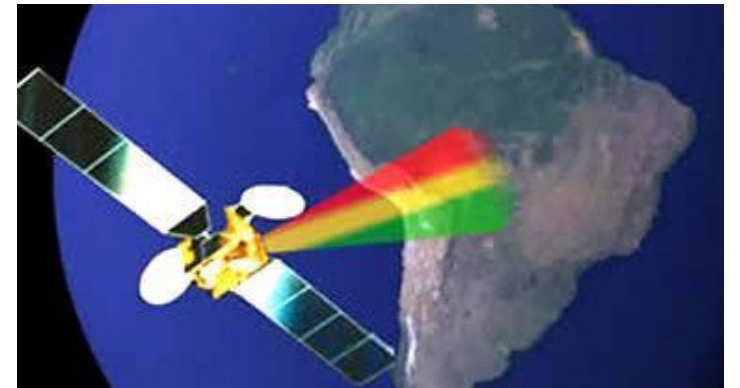
# Self-Introduction Session

---

M. ENG. EDDY MARCELO VINO CONTRERAS  
UNIVERSIDAD MAYOR DE SAN ANDRES  
LA PAZ - BOLIVIA

# La Paz- Bolivia

---



# APPLIED ELECTRONICS INSTITUTE

---

## Topics of Interest

Digital Television

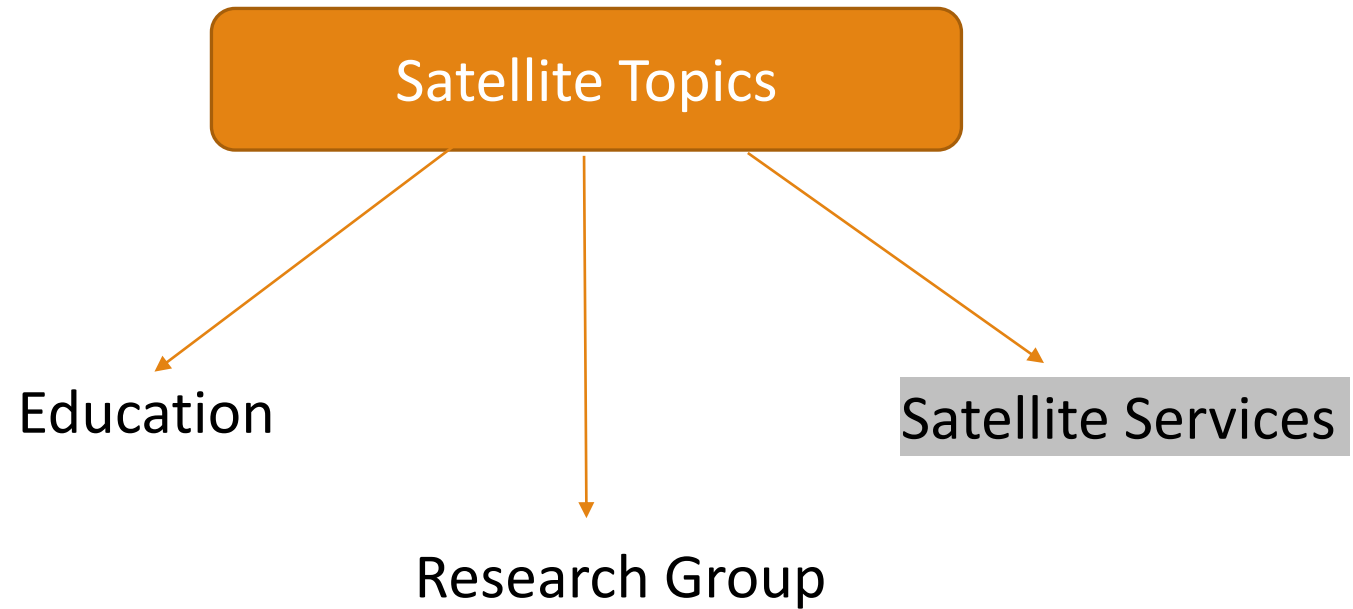
Real Time Systems

Digital Signal Processing

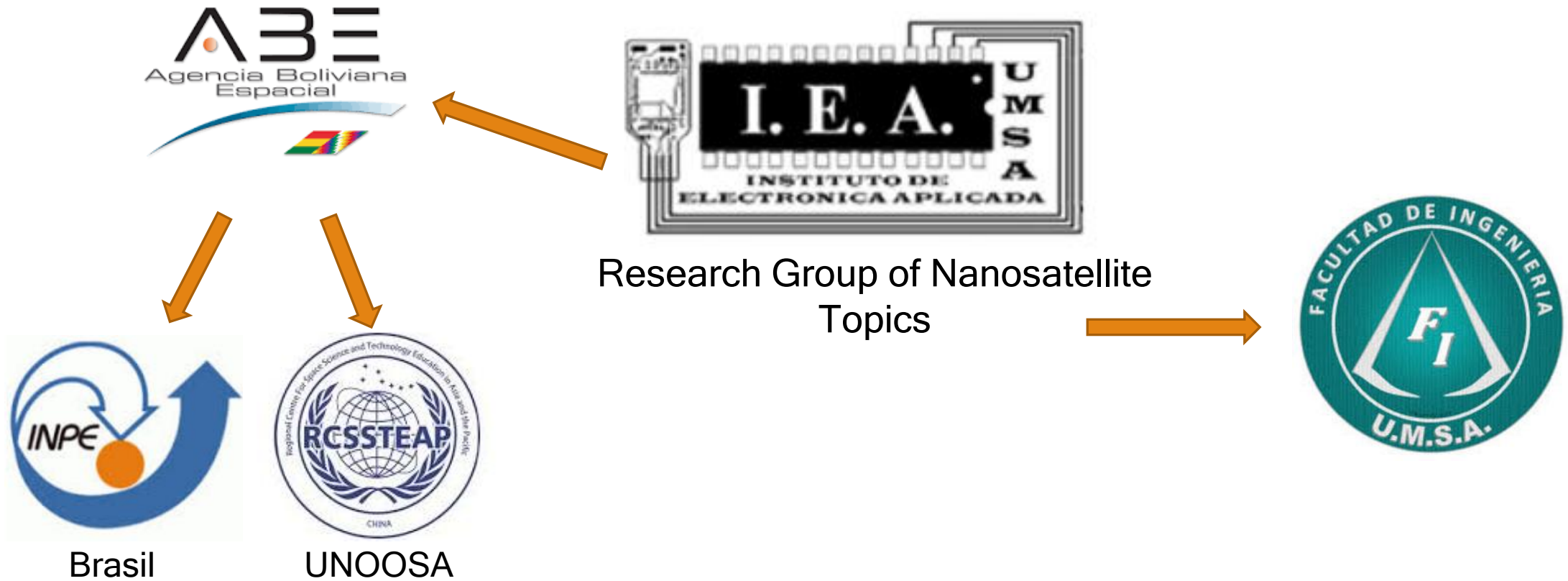
Open Source

Robotics

Satellite Topics



# Created Network



Conferences  
Seminars  
Courses

Education and  
Promotion of  
Space

Space  
Project

Launcj of the 1<sup>st</sup>  
Nanosatellite  
made in Bolivia

Bibliography  
Revision

Implementation of an  
Educative Satellite

Action Lines

Research Projects  
Degree Projects  
Internships  
Field Tests  
Publications  
Network Expansion



# Current Work

---

Satellite Fundamentals

Videoconferences

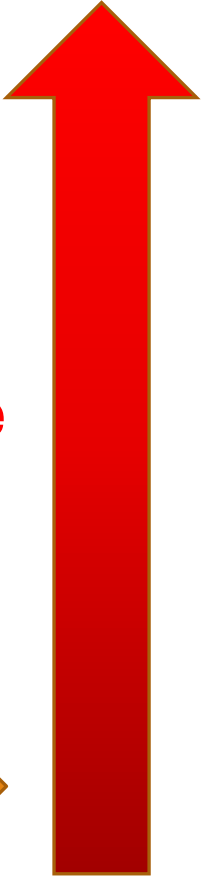
Data repository

Publications  
Conferences  
Seminars

Stratosphere  
Launch

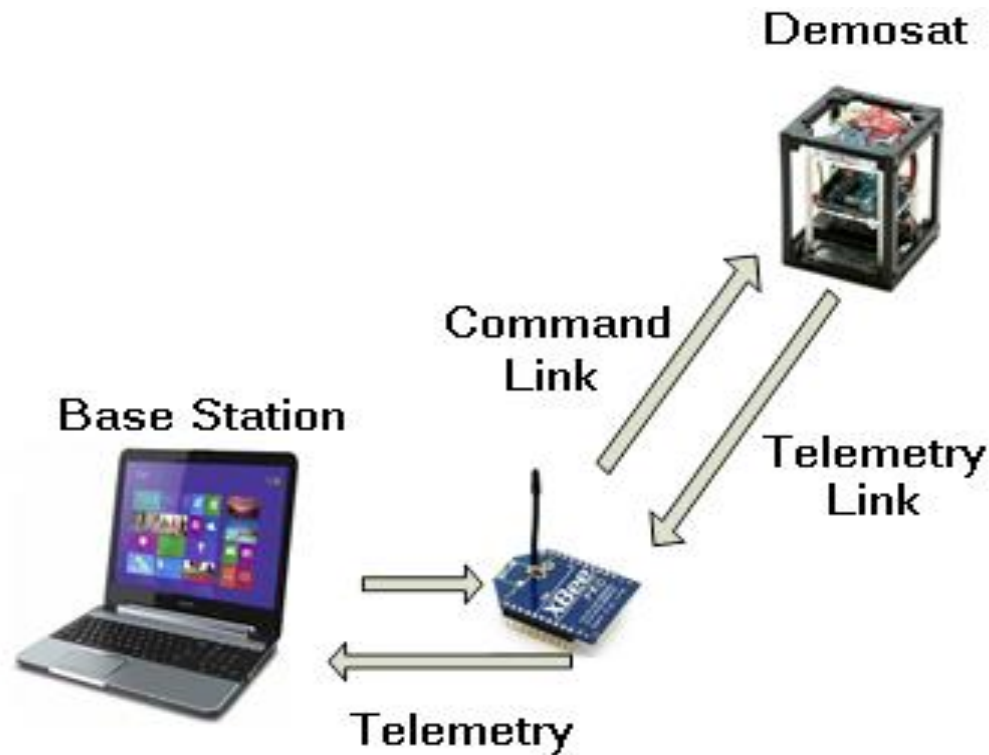
Payload  
Proposals

Design, implementation and Test of the first  
Educative Bolivian Small Satellite



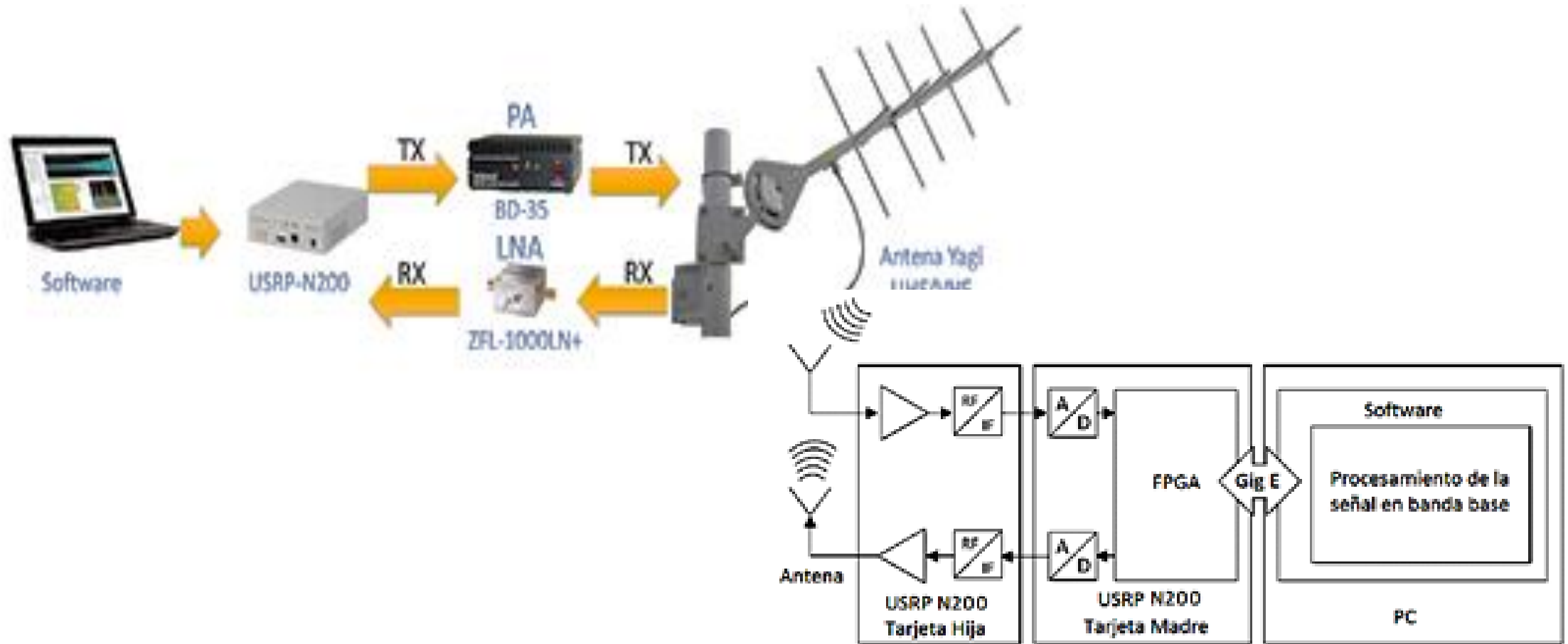
# TT&C Subsystem of an Educative Satellite

*Características de sensores de Temperatura*



Distribuidor	Modelo	Rango [°C]	Precisión [°C]	Voltaje [V]	Corriente [uA]	Acond. y Bus	Herencia de vuelo	Costo [Sus]
Sparkfun Electronics INC.	TMP102	-25 a 85 -40 a125	+/-2.0 +/-3.0	1.4a 3.6	10	No requiere I2C,SMBus	Ardusat-1 Ardusat-x	2,05
Digi-Key Electronics	MCP9808	-20a 100 -40 a125	+/-0.5 +/-1.0	2.7 a 5.5	200	No requiere I2C	-	1,13
Digi-Key Electronics	TMP112	0 a 65 -40 a125	+/-0.5 +/-1.0	1.4 a 3.6	15	No requiere I2C, SMBus	-	3,12
Newark	TMP175	-25 a 85 -40 a125	+/-0.5 +/-1.0	2.7 a 5.5	100	No requiere I2C, SMBus	-	2,75
Digi-Key Electronics	TMP103	-10a 100 -40 a125	+/-2.0 +/-3.0	1.4 a 3,6	15	No requiere I2C, SMBus	-	1,60
AVNET	LM75	-2 a 100 -55 a125	+/-2.0 +/-3.0	3 a 5.5	250	No requiere I2C	UAPSAT-1	0,58

# Communications Platform for an Educative Earth Station





# Earth Station GUI

INTERFAZ GRAFICA IEA

**DATOS DE UBICACION Y ENTRADA**

Latitud = -16.5 ; Longitud = -68.15 ; Altitud = 3700 msnm  
 La Paz, Bolivia  
 Satellite = SAUDISAT 1C (SO-50)

**DATOS Y RESULTADOS**

Hora local UTC: 14:49:21  
 Hora local : 10:49:21

TLE:  
 SAUDISAT 1C (SO-50)  
 1 27607U 02058C 16334.50676396 .0000100 00000-0 35113-4 0 9994  
 2 27607 64.5564 15.7215 0048341 177.1409 182.9979 14.75254466749654

Latitud = 37.42 Longitud = -120.53  
 Rango: 7809.5  
 Periodo: 96.9 [min]  
 Azimuth: 318.75 [°]  
 Elevacion: -31.55 [°]  
 Altitud = 595.26 [Km]  
 Velocidad: 27221.3 [Km/h]

**PREDICCIÓN DE PASOS SOBRE LA UBICACION** GUARDAR

**SO-50 - Visible Passes**

Search period start: 30 November 2016 00:00  
 Search period end: 10 December 2016 00:00  
 Orbit: 610 x 678 km, 64.6° (Epoch: 29 November)

Passes to include:  visible only  all

Click on the date to get a star chart and other pass details.

**MAPA DE SEGUIMIENTO DEL TRAYECTORIA**

PAUSAR/REANUDAR SEGUIMIENTO

**ENVIO Y RECEPCION DE DATOS**

DECODIFICAR AUDIO MORSE    GENERAR AUDIO MORSE

Satelite = SAUDISAT 1C (SO-50)

Hora local UTC: 14:57:40

Hora local : 10:57:40

SAUDISAT 1C (SO-50)

XW-2C

XW-2D

OSCAR 7 (AO-7)

JAS-2 (FO-29)

AO-85

SW	Latitud [°]	Longitud [°]	Rango [Km]	Periodo [Min]	Azimit [°]	Elevación [°]	Altitud [Km]	Velocidad [Km/H]
Satview	58.36	-169.73	11001.1	97.6	326.75	-52.79	644.88	27120.79
Programa	59.41	-171.18	10948.2	97.3	327.41	-52.63	616.35	27180.26

# Future Projects

---

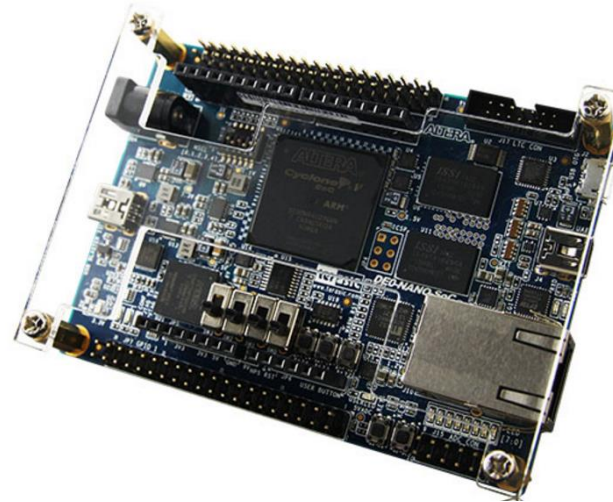
- ❑ Hybrid Earth Station Implementation
  - Software Defined Radio using USRP
  - Helicoidal and Cross Yagi Antennas
  - Database connected the SatNOGS network
- ❑ One Axis Attitude Control for the Educative Satellite
- ❑ Attitude determination based on IMU sensors plus GPS from the Demosat using the TRIAD method
- ❑ Inertial Wheel Design and Implementation
- ❑ Design and Implementation of a Helmholtz Cage
- ❑ Design and Implementation of the Cubesat Structure

# Projects for the Future

---



SatNOGS Project



Soft Processors from  
Altera and ARM Processor



**IEA Earth Station**

**Atmospheric Payloads for Future Launches**

**THANKS FOR YOU ATTENTION**