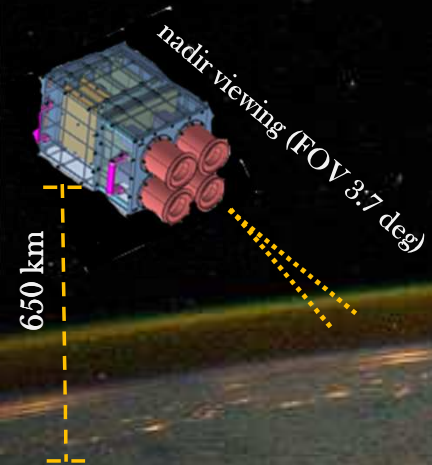


GLOW Project: Airglow Photometer



- Science
- SPEC
- Management
- Tests
- Teamwork
- Success
- Bonus

by GLOW team

NASA_Goddard_Photo_and_Video

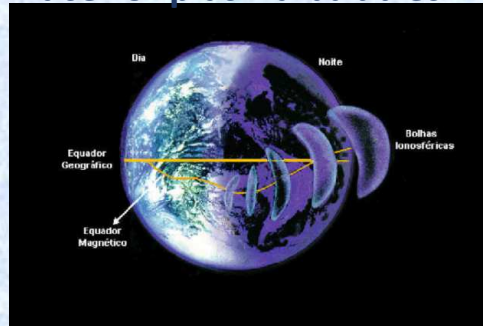
© D. Gobbi
August, 2016



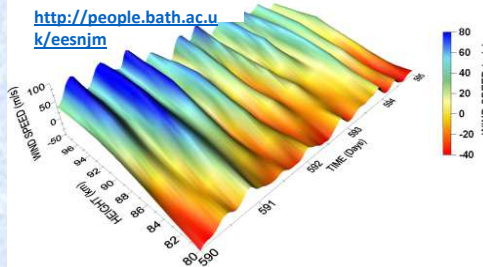
Science Objectives

Airglow emission as tracer of the upper atmosphere dynamics (neutral and ionized)

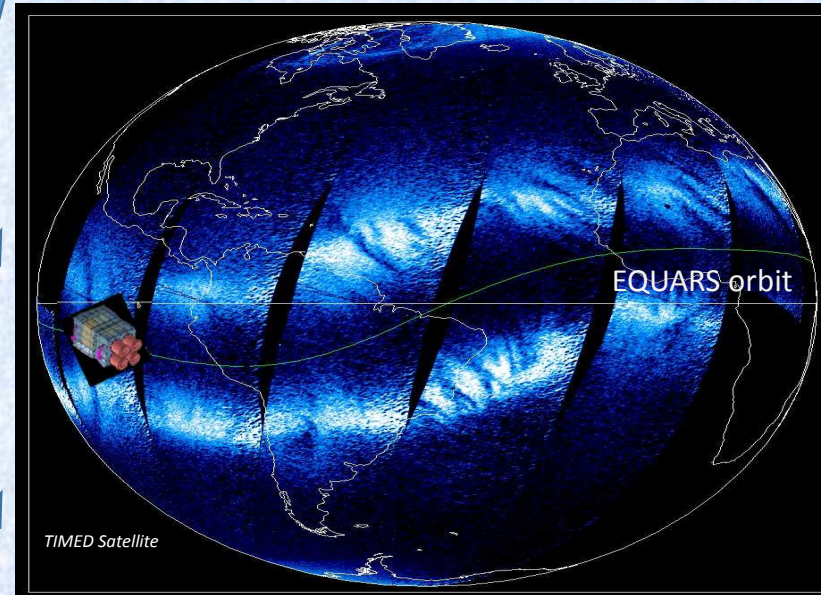
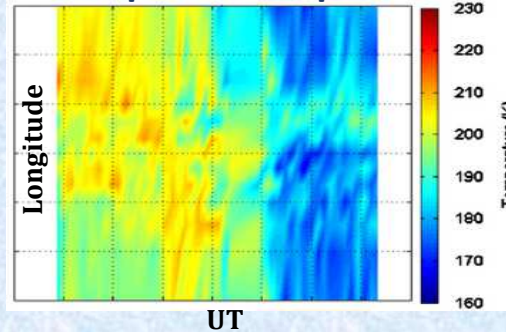
Tracer of plasma bubbles:



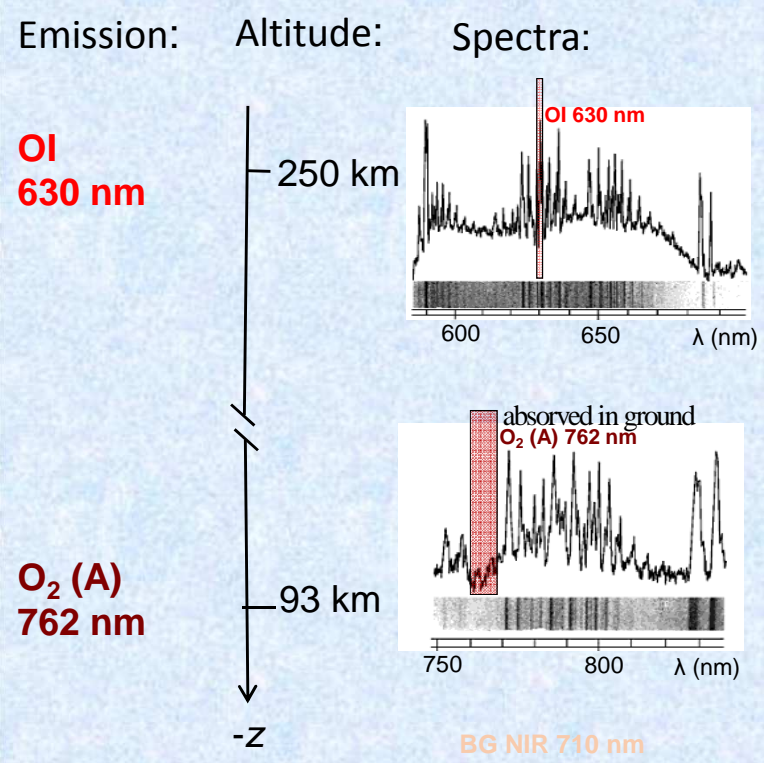
Tracer of planetary waves:



Mesospheric Temperature:



http://people.bath.ac.uk/eesnim/airglow.htm

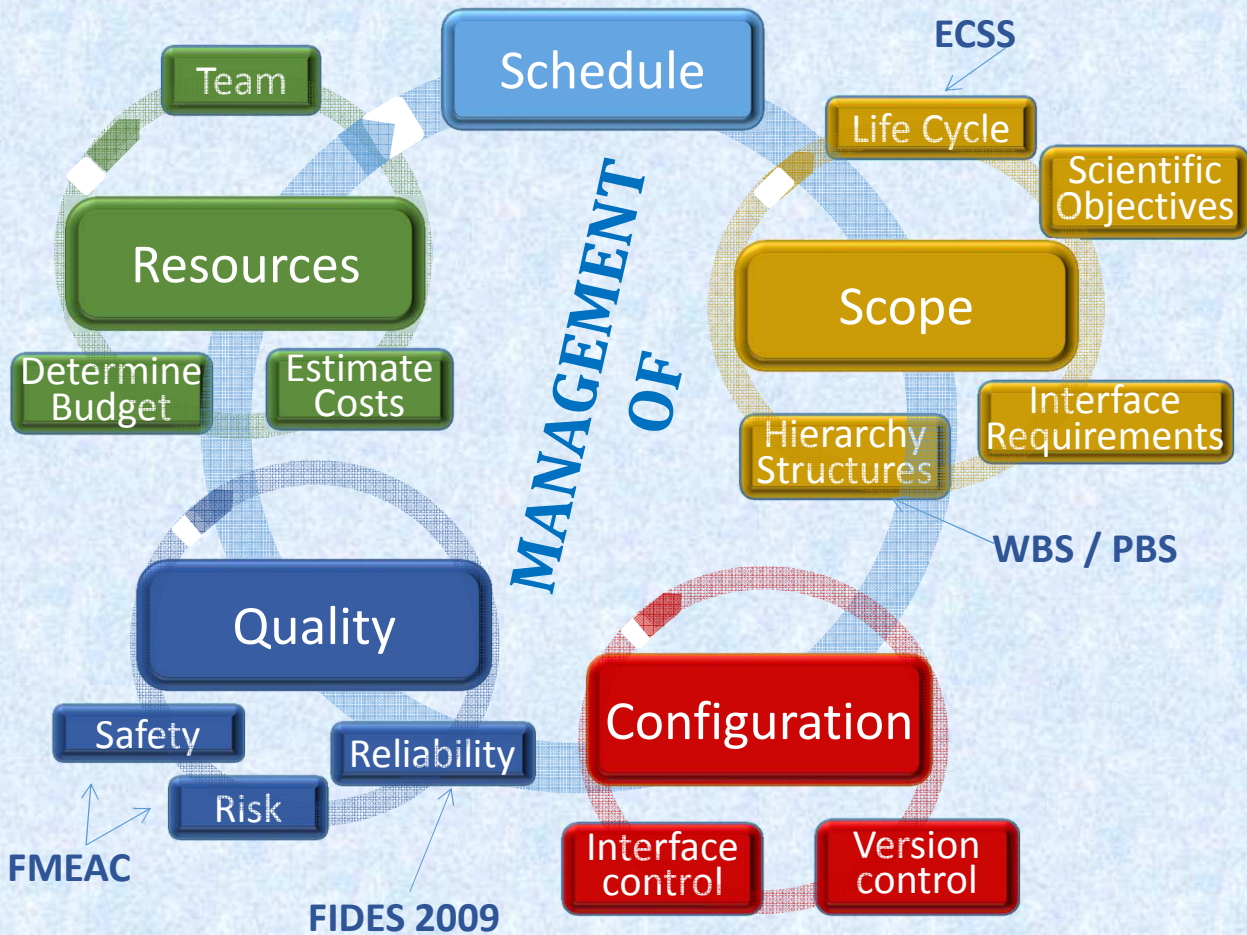


Basic Specifications

Acronym	GLOW
Full name	4-Channel Airglow Photometer
Purpose	Properties of Upper Atmosphere Dynamics
Mass (kg)	12 ± 0.5
Dimensions L × W × H (mm)	462.9 × 274.0 × 266.0 (±0.1)
Nominal Power (W)	9.9
Op. Temperature Range (°C)	-10 to 35 (passive modelling, FEM)
Optical Sensor Type	Hamamatsu Photosensors (photocounting mode)
Viewing Direction / FOV (°)	Nadir / 3.75 (linear)
Operation Duty Cycle	50% (during eclipse)
Data Rate (per orbit)	7.2 Mbits
Communication	Serial EIA-422 & TC pulses
Long Term Failure Rate / MTTF	10 900 FITs / 9.5 years (@35°C)*

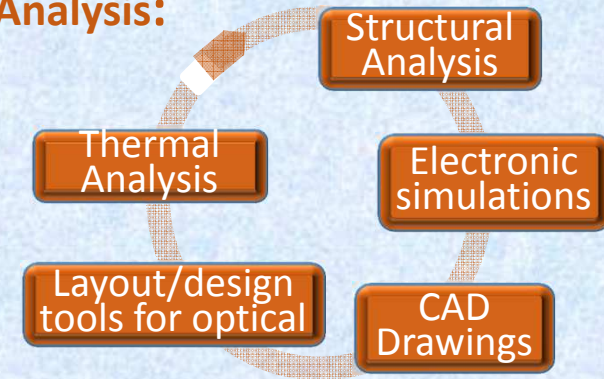


Project Plan

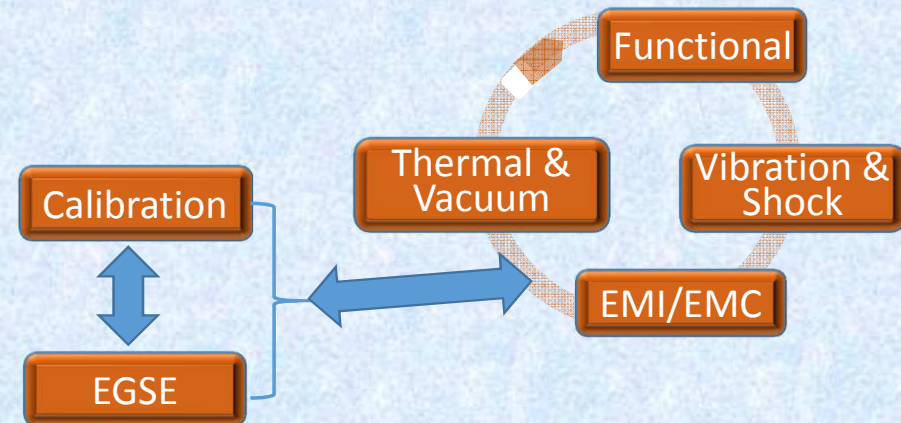


System Verification & Validation

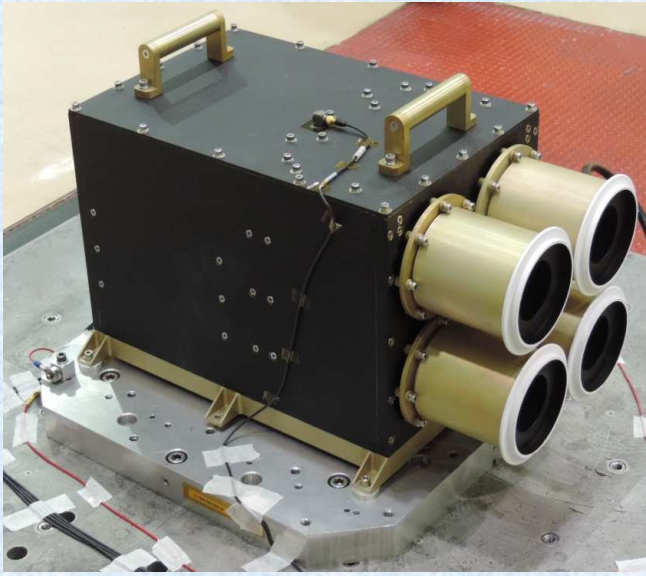
by Analysis:



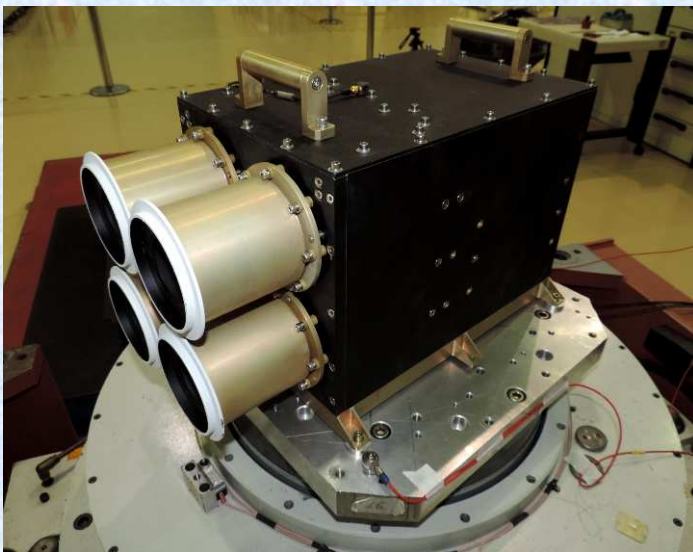
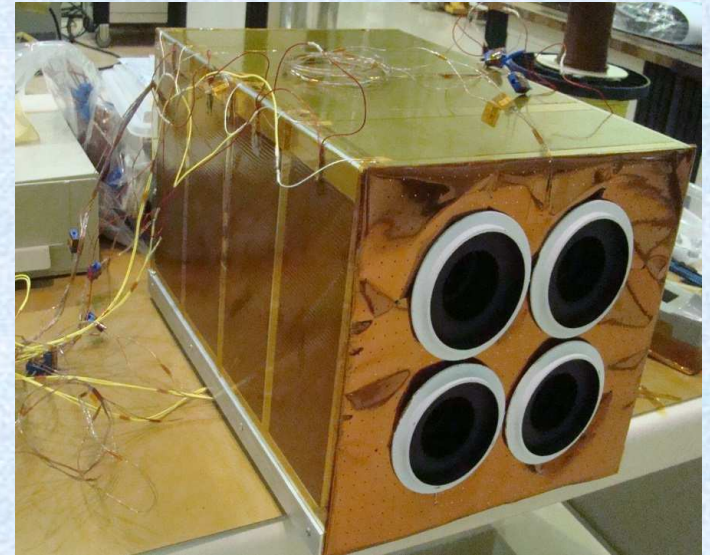
by Testing:



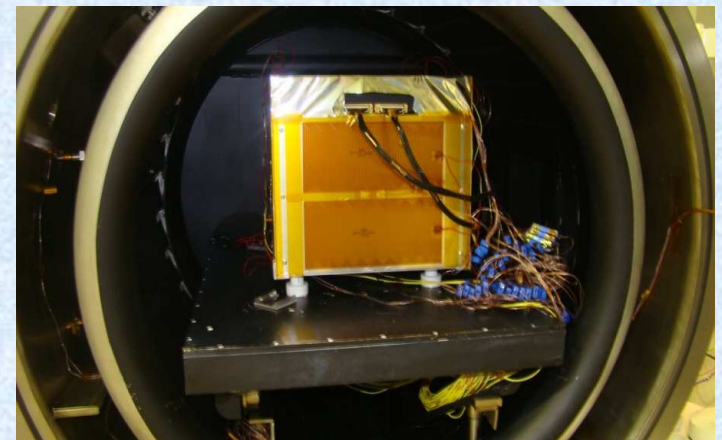
GLOW Photometer: Qualification



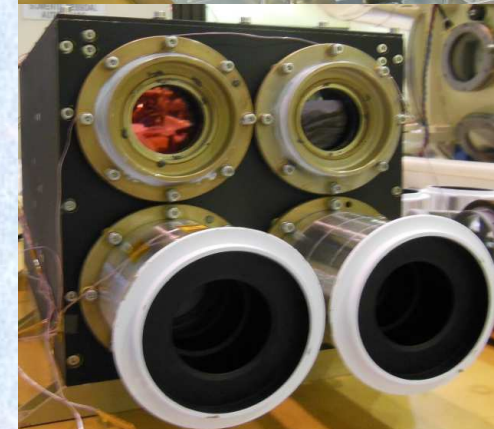
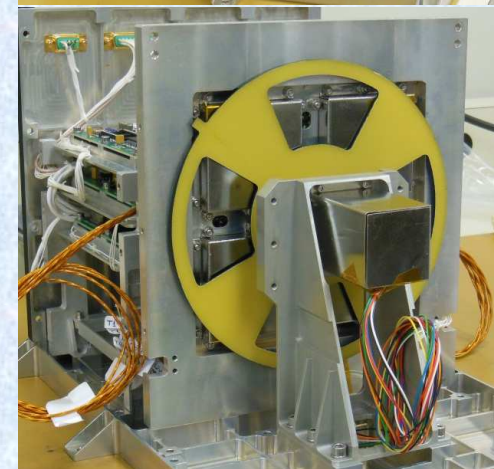
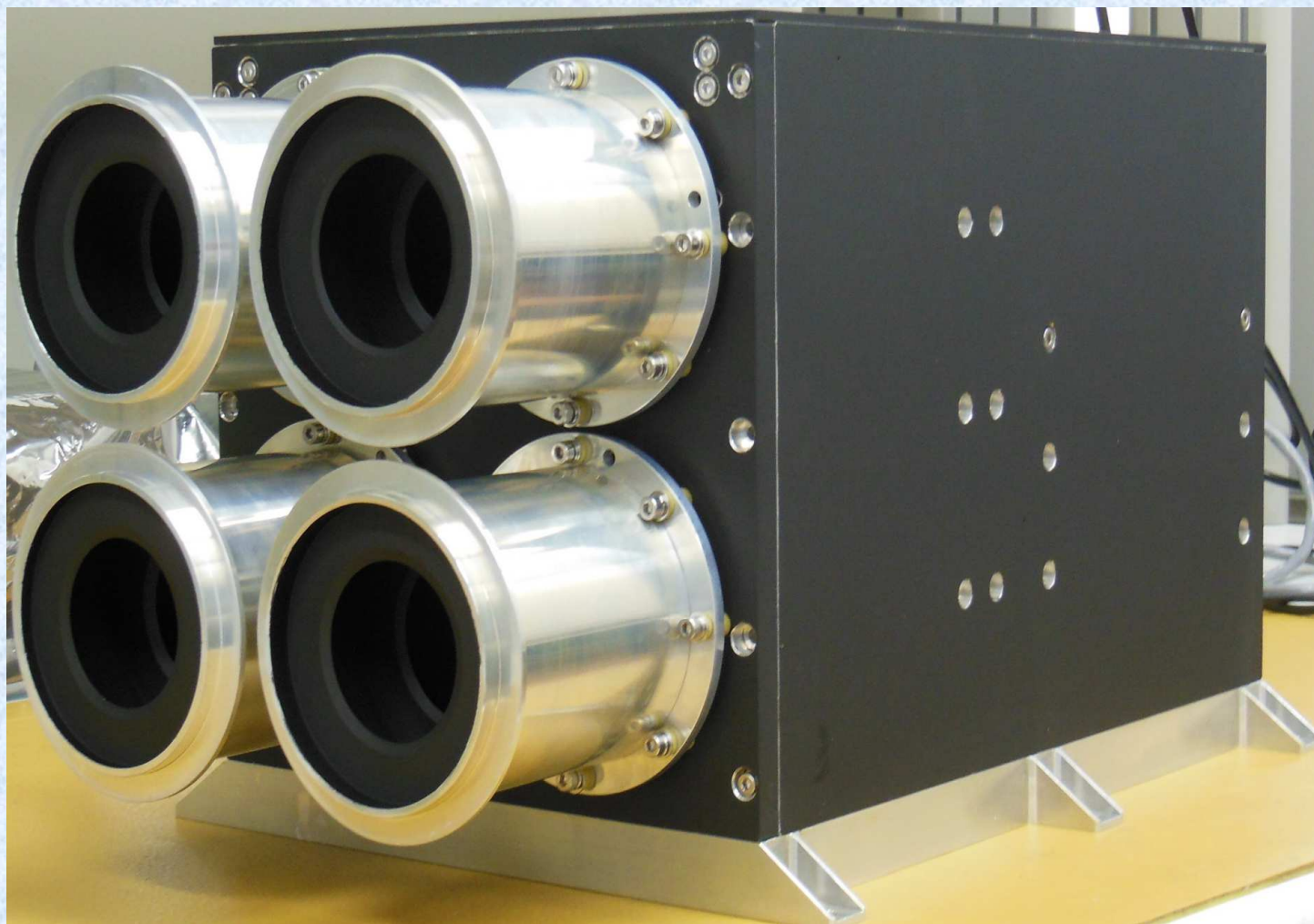
Dynamics test :
Vibration (*Sin/Random*)
Shock ($\frac{1}{2}$ *Sin-profile*).



**Thermal-Vacuum
test:**



GLOW Photometer: Product (P/FM)



Teamwork

LEADERSHIP TEAM:

**Aeronomy Division, INPE
Funcate**

CORE TEAM (*GLOW team*):

**Delano Gobbi (PI)
Fabiola F. T. B. da Costa
Marcel Ogawa
Primavera Botelho (PM)**

**Special thanks to
Barclay Robert Clemesha**

SUPPORT TEAM:

**Agnaldo Eras
Hisao Takahashi
Sebastião E. C. Varotto
W. Kenkiti Takahashi
Issamu Muraoka
Júlio C. Araujo
Laercio Siqueira
Miriam Nishimori
Renata Rapuano
Mário L. Selingardi
Braulio F. C. Albuquerque
Nelsinho !!
&
Funcate staff (Luciana Fernandes, et al.)**

OVERSIGHT:

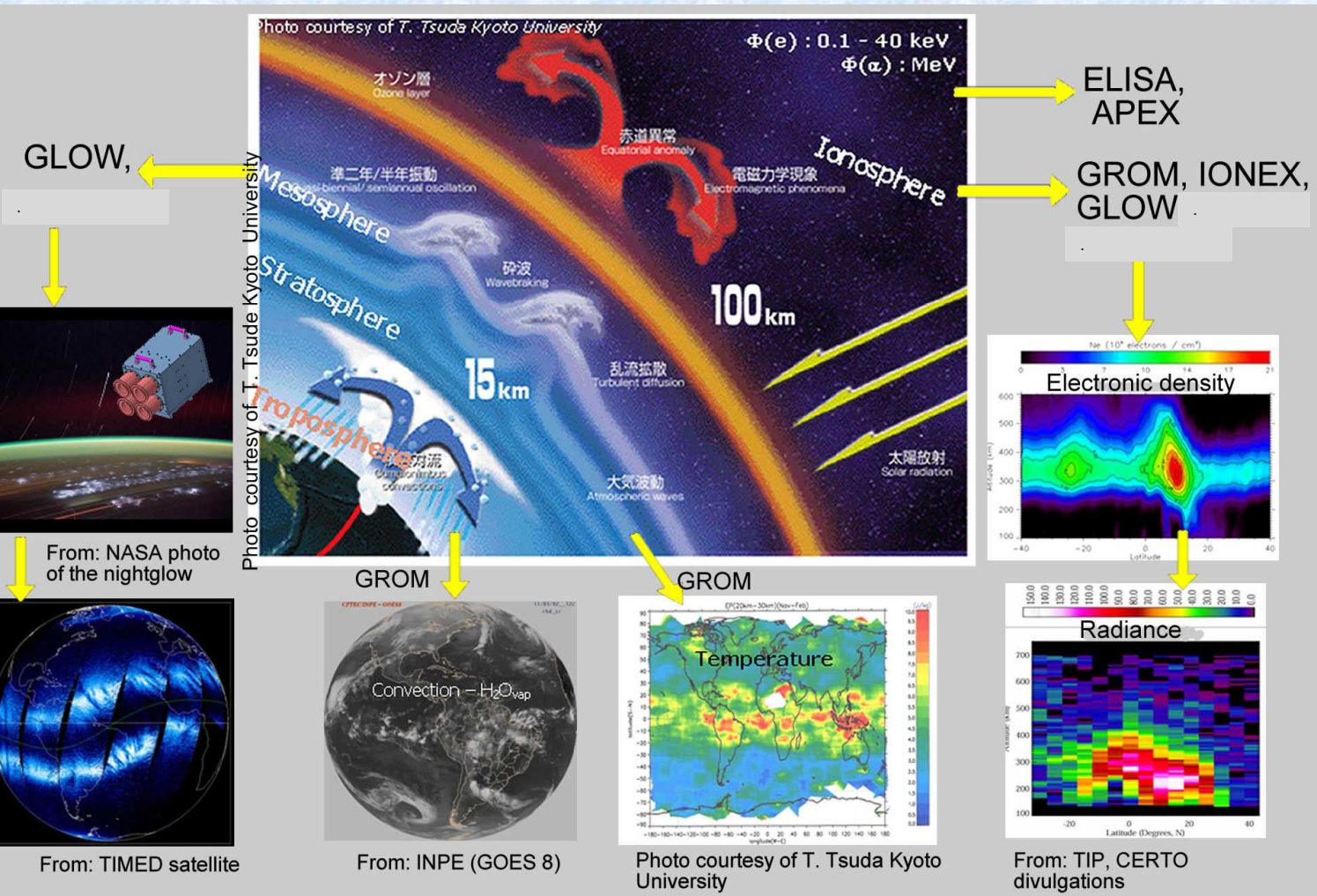
- *Opto Eletrônica S.A.* (São Carlos)
- *Analysis Engenharia & Consultoria* (S.J.C.)
- **Polyane Freitas** (S.J.C.)
(IPC-certification)
- *Eletrônica Qualificada Espacial EQE* (S.J.C.)

“A multidisciplinary team is system engineer’s most powerful tool.”

Success Criteria



Synergy Conception to the EQUARS instruments:



Mission Success:

- Instruments in operational mode, acquiring scientific data in equatorial orbit;
- Establishes the synergy between the aeronomic instruments

Inovação

“A inovação é a invenção que encontrou uma utilidade prática e demanda do mercado. É quando o protótipo se transforma em produto comercializável.” (ROSEMBERG e KLEINE)

Fotômetro GLOW:

Tecnologia empregada: soluções convencionais (não é o estado da arte!)

Processos: segue a recomendações das agências espaciais NASA, ECSS

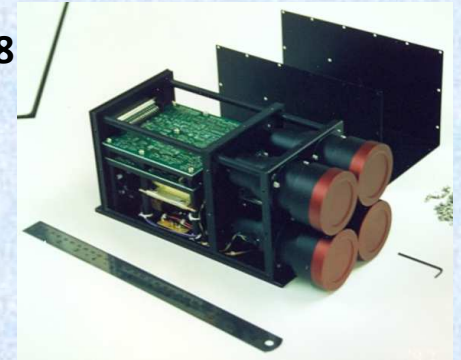
➔ **Invenção Incremental (?)**

Ciência – Questões abertas:

(1) A interação entre os eventos de ondas de média escala (MSTID) e estrutura de bolha de plasma pode controlar os aspectos de dinâmica da bolha?

(2) As oscilações do campo elétrico de polarização na base da região F, associado às perturbações MSTID extra equatoriais, é o principal mecanismo de origem das bolhas de plasma ionosféricas ?

PhotoEx, 1998



GLOW, 2015

