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present:

# SCIENCES EDUCATION WITH PLANÈTE SCIENCES: A SQUADRON OF TOOLS AND PROGRAMMES TO GO ON SPACE CONQUEST

IAA 1<sup>st</sup> SYMPOSIUM  
ON PRIVATE HUMAN  
ACCESS TO SPACE  
PARIS-BOUVIÉ May 28 to 30, 2008  
FRANCE



# PLANÈTE SCIENCES & CNES: A PARALLEL EVOLUTION



1961

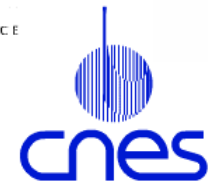


2002

1962



1977



AGENCE FRANÇAISE DE L'ESPACE



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## ORIGINAL MISSION: SUPPORT TO AMATEURS



# PLANETE SCIENCES TODAY

Associations  
 Network  
 Techniques  
 Promotion  
 Activities  
 Sciences  
 Europe  
 Practical  
 Experimentation  
 France  
 Youth  
 Safety  
 Clubs  
 Leisure  
 Project  
 Management  
 Team work  
 Programmes  
 Exchanges  
 Events  
 Contests  
 Workshops  
 Summer camps  
 Volunteers  
 Pedagogy  
 Partners  
 Ministries  
 Organizations  
 Space activities  
 Meteorology  
 Energy  
 Astronomy  
 Environment  
 Robotics



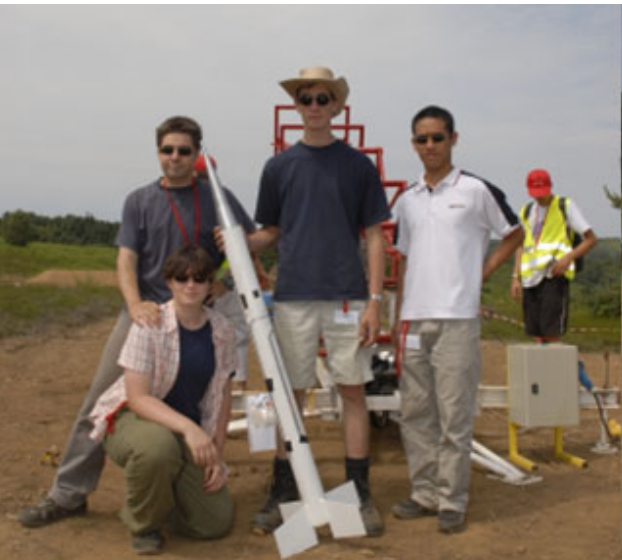
SPACE CLUBS: WHO ARE THEY ?

*SAME PASSION*



SETS... FACIL... ESIEE ESPACE... EUREKA+... ESO... AERO IPSA... UCG...

*SAME MOTIVATION*



# FIRST STEP TO SPACE: WATER ROCKETS

➤ Because anyone can be a rocket scientist!



1'000s rockets  
each year



## WATER ROCKETS

From 6 years old, build a basic rocket from soda bottle and launch it to discover about action-reaction principle, stability and safety.

0.1km



At school, in a summer camp, in a club

# FIRST STEP TO SPACE: MICRO-ROCKETS

➤ Because anyone can be a rocket scientist!



50'000 rockets  
each year

**MICRO-ROCKET**

From 8 years old, design and build a small rocket from cardboard, plastic, and expect a flight above 100m. Experiment and learn about flight mechanism, stability in full safety.

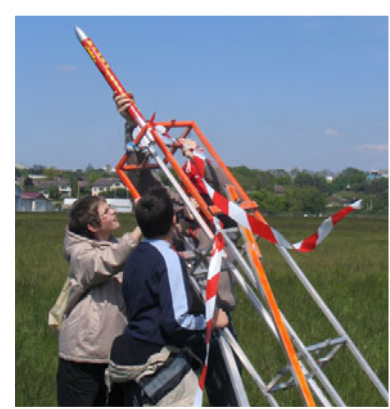
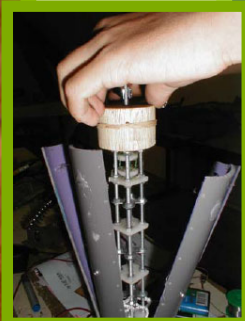
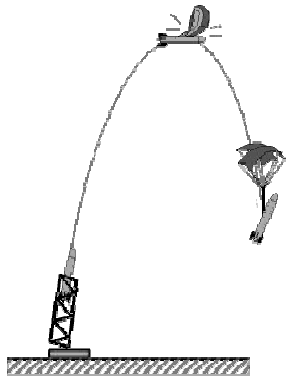


At school, in a summer camp, in a club



# A STEP HIGHER: MINI-ROCKETS

➤ Because space must not remain a dream!



120 rockets  
each year

**MINI-ROCKET**  
From 14, team up to design and build a stable rocket capable to reach 600m with ejection of a slowing down system. Deal and experiment with mechanics, electronics.

At junior-high school,  
in a summer camp, in a club



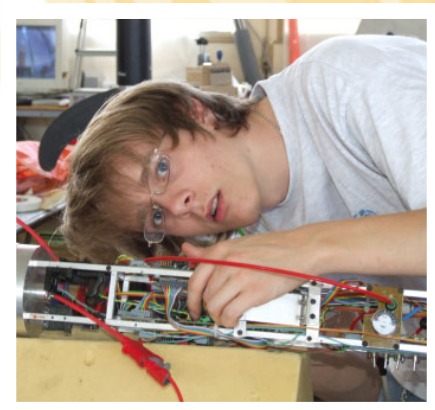
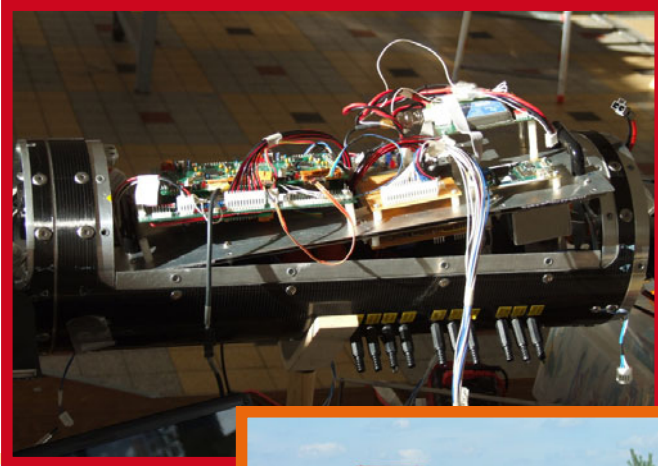
0.5km



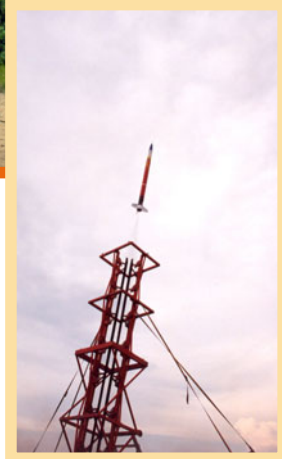


# REACHING THE CLOUDS: EXPERIMENTAL ROCKETS

➤ Because space must not remain a dream!



20 rockets  
each year



**EXPERIMENTAL  
ROCKET**

From 16, team up to design and build your own 2m tall sounding rocket, including telemetry, and process data collected at 1.5 km.

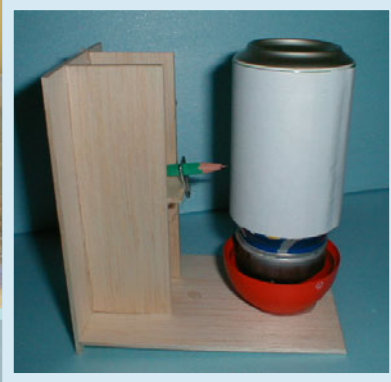
1.5km



At high school, at university  
in a summer camp, in a club

# FLIRTING WITH SPACE: WEATHER BALLOON

➤ Get a bird's eye view, and more!



30km

150 balloons  
each year

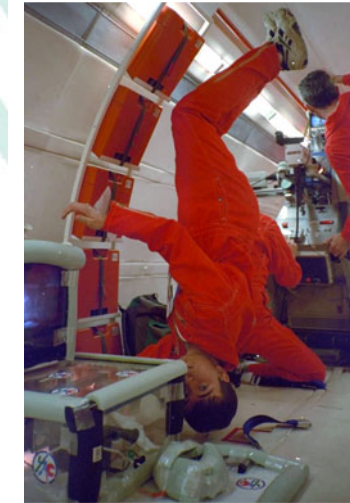
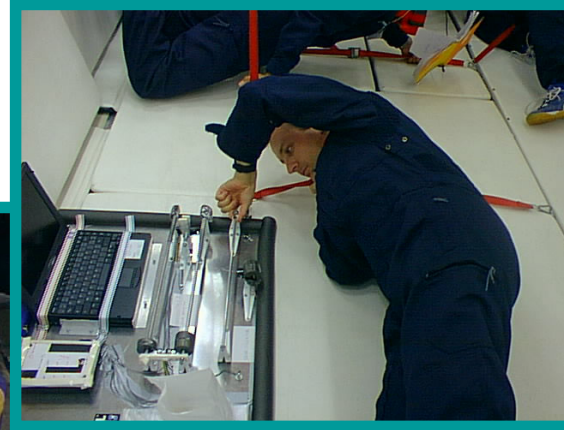


**WEATHER BALLOON**  
From 10, team up to design and build experiments to be carried under a probe, flying above 30km. Learn about Archimedes, electronics, meteorology...

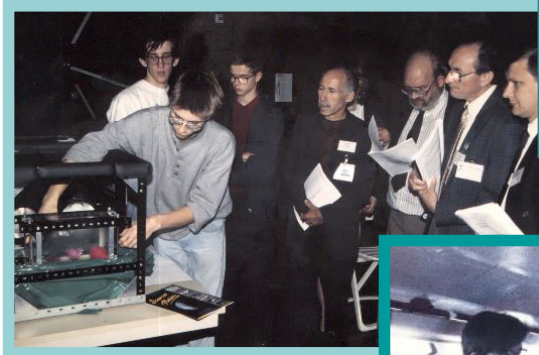
At school, at university  
in a summer camp, in a club

# FLYING LIKE AN ASTRONAUT: PARABOLIC FLIGHT

## ➤ The ultimate experience...before space!



6 groups,  
3 projects  
each year



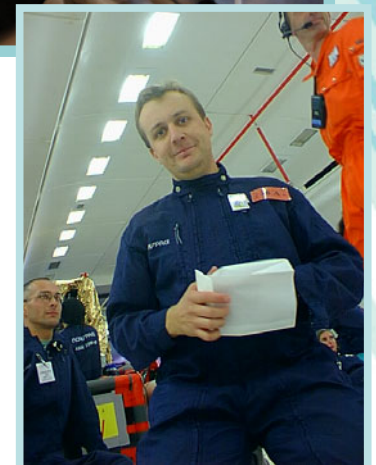
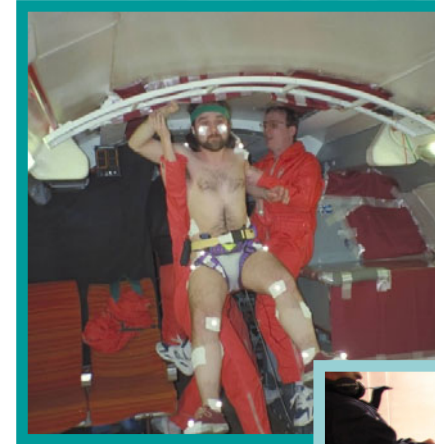
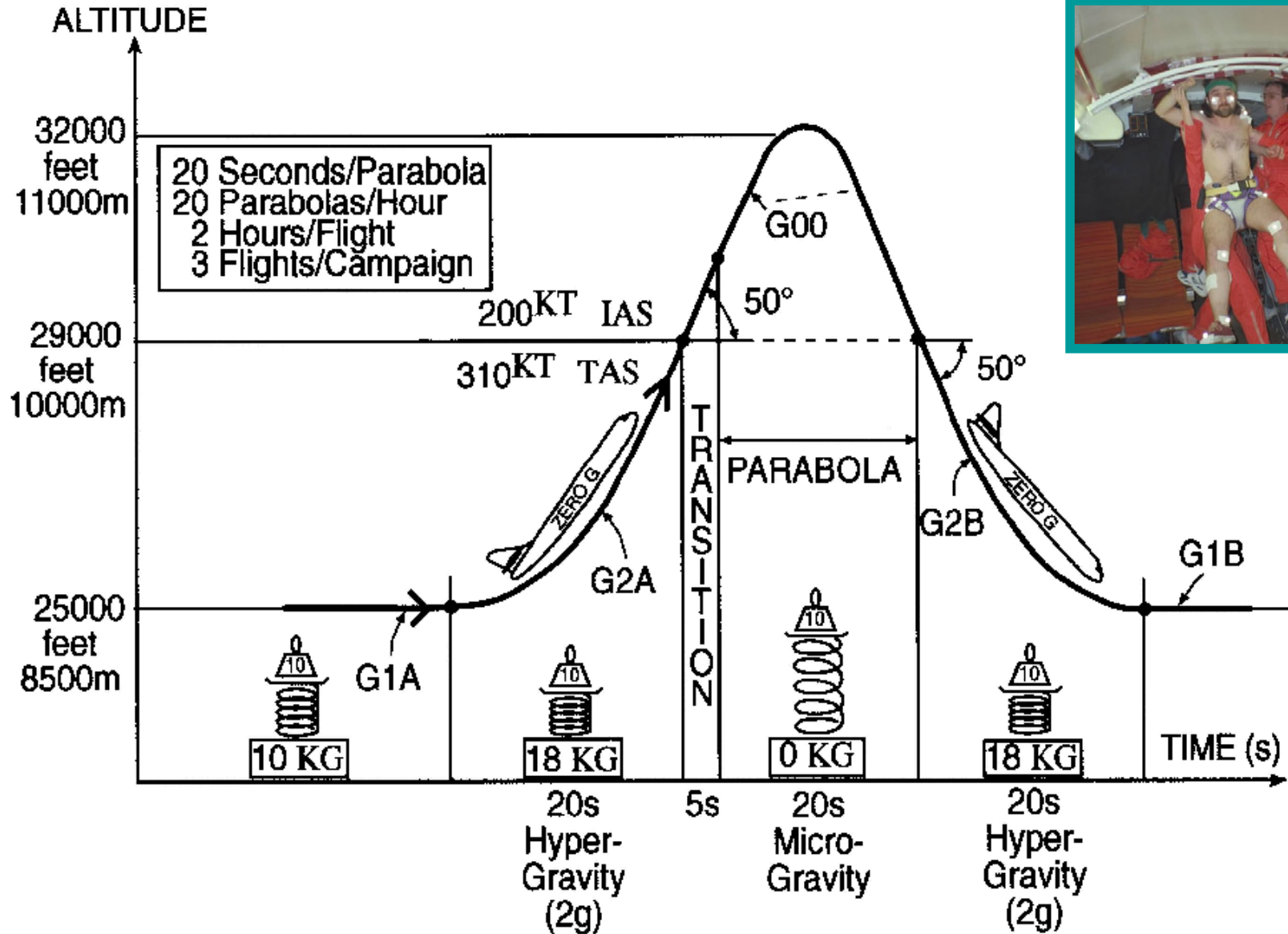
At high-school, at university, in a club



11km

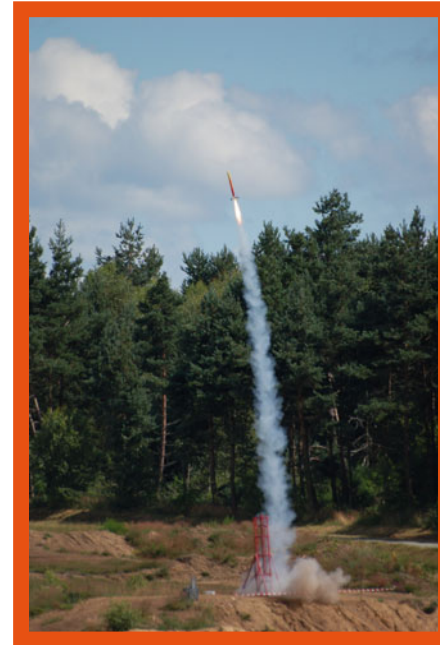
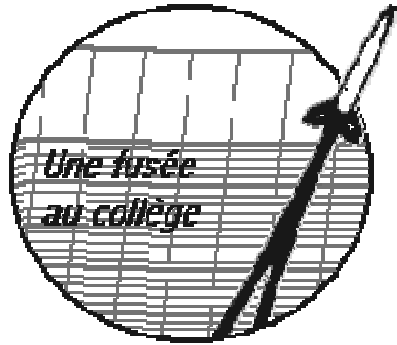


# MICROGRAVITY?



# NATION-WIDE PROGRAMMES: A ROCKET AT SCHOOL (UFAE)

## ➤ A space-related pedagogic school programme



20 schools,  
90 projects  
each year



**UFAE**

Deal with mathematics,  
physics, mechanics,  
electronics, media...  
within a team, all  
along the school year,  
to build your  
mini-rocket.

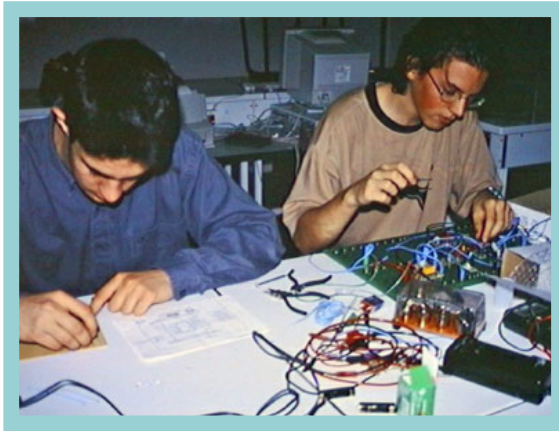
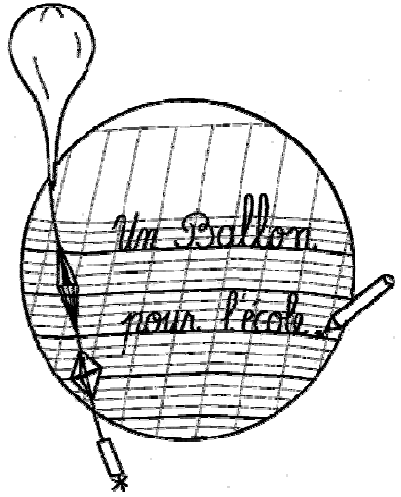


0.5km

At junior-high school, at high-school

# NATION-WIDE PROGRAMMES: A BALLOON AT SCHOOL (UBPE)

## ➤ A space-related pedagogic school programme



30km

140 schools  
each year



**UBPE**  
Deal with mathematics, physics, electronics, meteorology, media... within a team, all along the school year, to build your balloon's experiments.

At school



# SPACE PROPAGATION: TRAININGS

## ➤ Spread the practices, not just the word



30 sessions  
each year



30km



11km



1.5km



0.1km



### TRAININGS

To master rocket flight mechanics, to master safety, to launch rockets, to become a telemetry expert, to learn about pedagogy, to become a trainer.

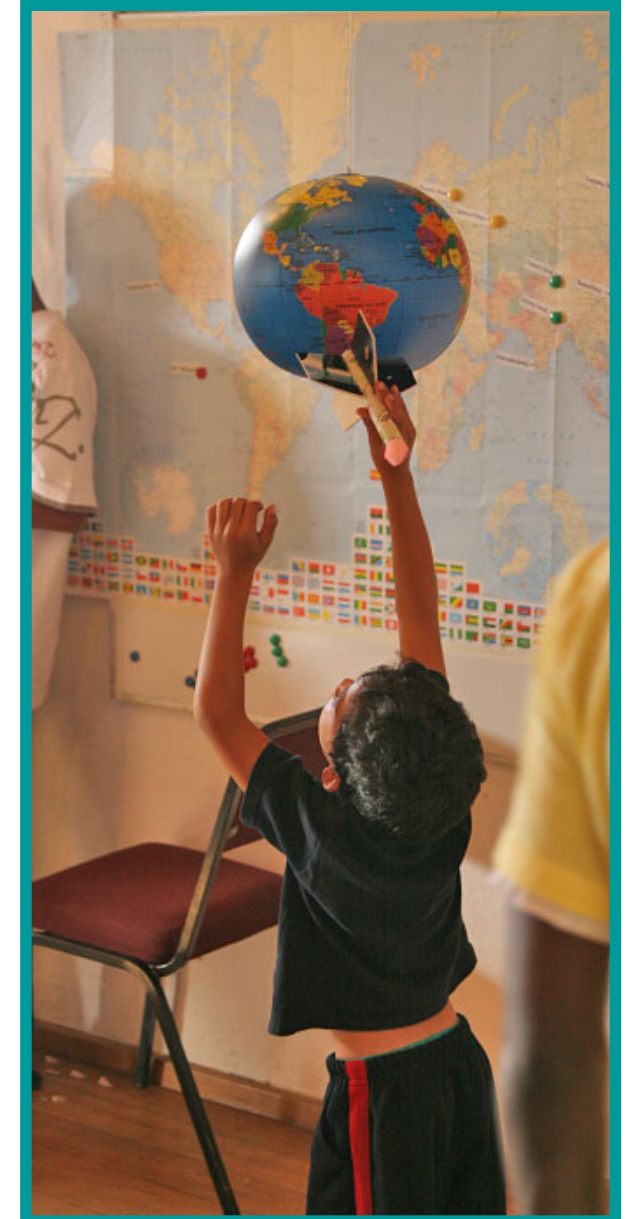
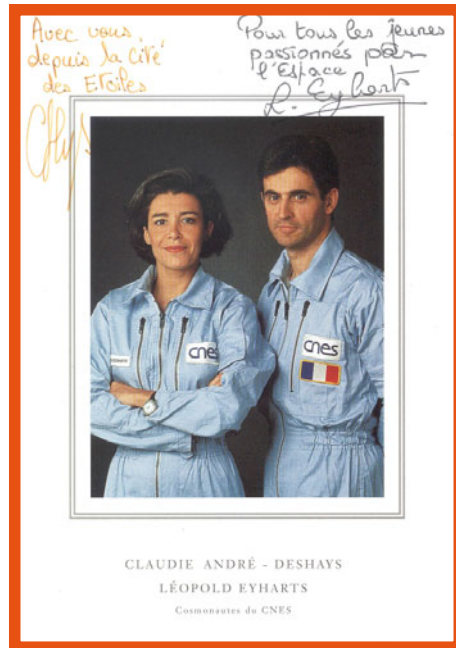
# SPACE CONQUEST !



100km



- Develop sciences and techniques scholarship
- Develop space culture and increase space awareness to ease space projects funding from state or private organizations
- Fly ever higher and achieve space dreams





## BACKUP SLIDES: DO YOU WANT TO KNOW MORE?



DO NOT DO IT YOURSELF!

What do we provide?

CONSTRUCTION OF A MODEL ROCKET

FROM SCIENTIFIC CLUB

- Registration
- Project
- Team work
- Constraints
- Calibration
- Interpretation
- Partners
- Volunteers
- Controls
- Clubs
- Youth
- Experiments
- Management
- Safety
- Simulation
- Tutorials
- Recovery
- CNES
- Reviews
- Campaign
- Definition
- Pedagogy
- Telemetry
- Integration
- Advisors
- Exchanges
- Launch

EDUCATIONAL CONVENTION & TEAM

CONSTRUCTION OF A MODEL ROCKET

Debug - Control - Approval - Set up in good...

CONSTRUCTION OF A MODEL ROCKET

Engine - Control - Launch - Parachute - Recovery

TELECOMUNICATIONS

CONSTRUCTION OF A MODEL ROCKET

## I WANT TO MAKE A ROCKET...

➤ Do **NOT** do it yourself!



E-MAIL

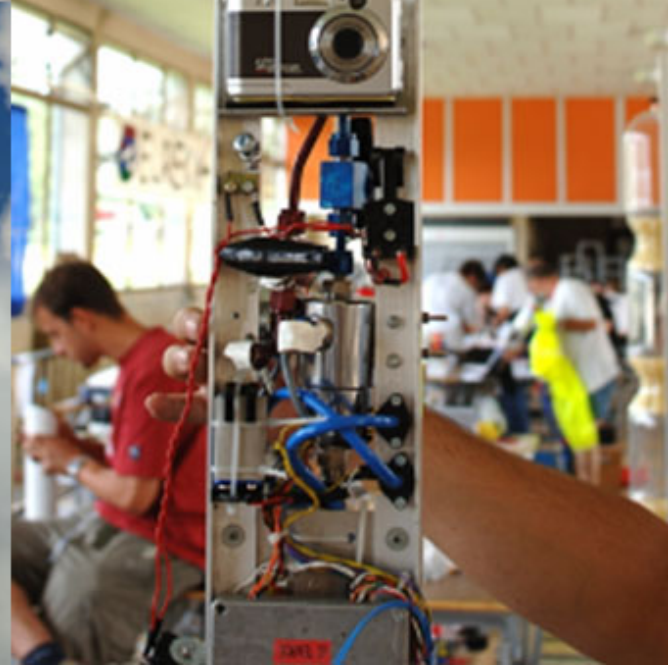
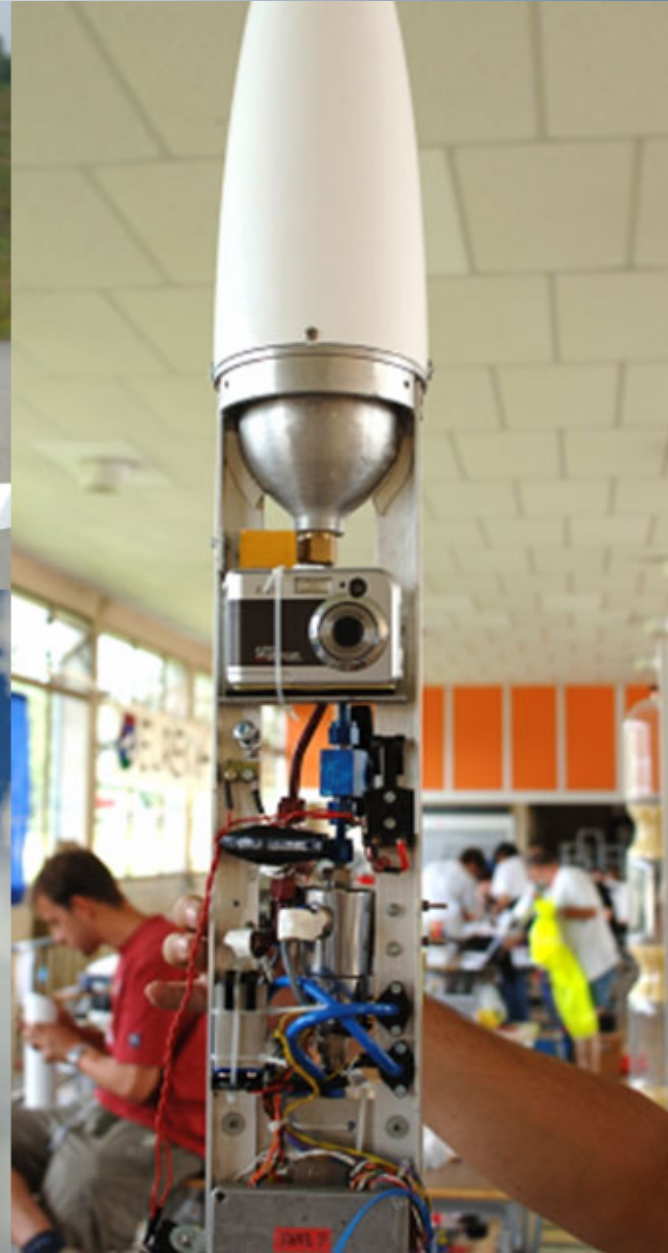
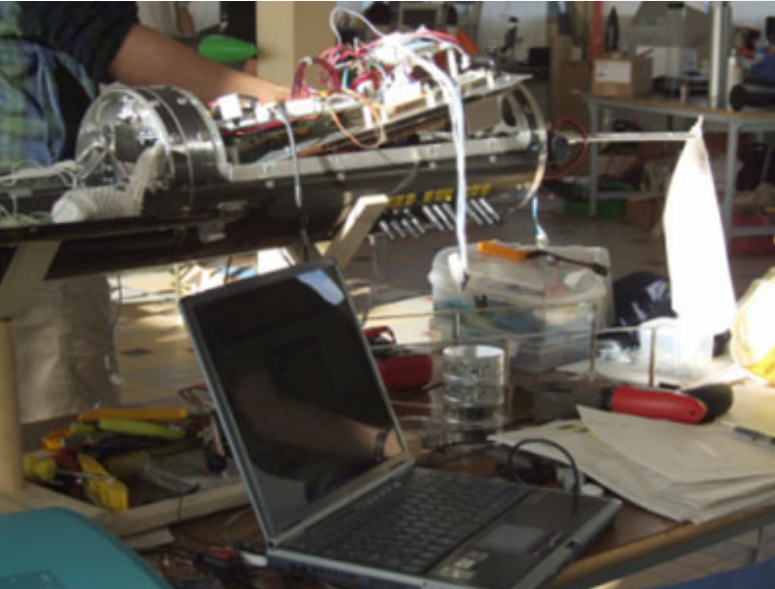


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➤ What do we provide ?



# DID YOU SAY EXPERIMENTAL ROCKET ?



# FROM DREAM TO REALITY



A dream on paper...



... becoming reality

Registration Clubs Youth  
 Project Experiments Definition  
 Team work Management Pedagogy  
 Skills Safety  
 Constraints Simulation  
 Stability Tutorials  
 Calibration Telemetry  
 Recovery Integration  
 Interpretation CNES Advices  
 Partners Reviews Exchanges  
 Volunteers Campaign Launch  
 Controls

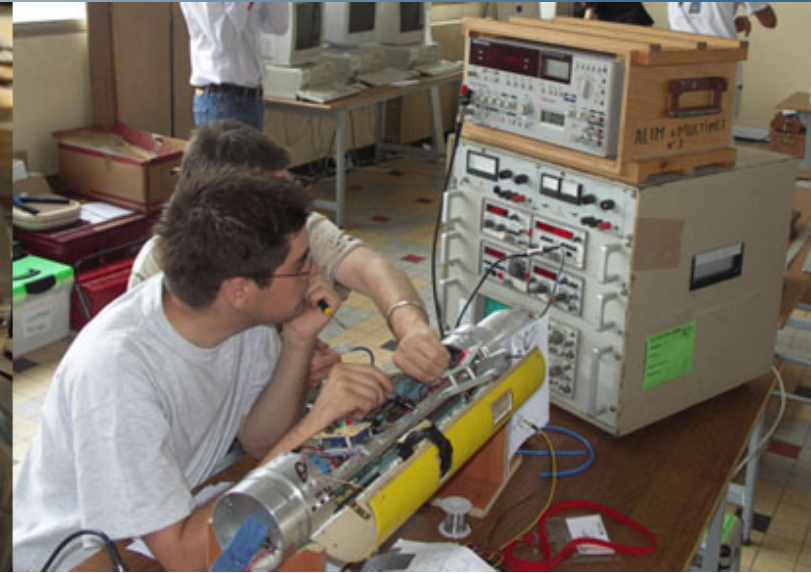
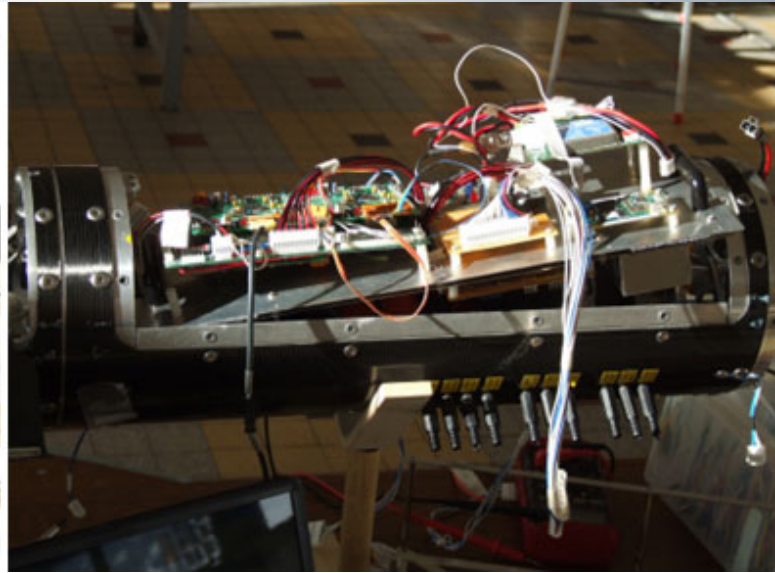
## A LAUNCHING CAMPAIGN: A TEAM



**Pyrotechnics, Safety, Telemetry, Energy, Recovery, Coordination, Entertainment, Transport, Welcome, Controls, Expertise, International relations, Equipment, Launching, Public, Organisation, Logistics, Partners....**



## A LAUNCHING CAMPAIGN: FINAL PREPARATION



Debug

...

Controls

...

Approval

...

Set up in pad ...

CLUB	PROJET	MECANIQUE	EXPÉRIENCE	RECUP	VAL SIMULÉ	TOUR CUL. VAL	RESULTAT
STS	Solaris						
Furo	Flying coucou						
GareF	Horus V						
GSA	XXX						
S&TE	Wermes	3					
STS	ALBINA	OK	OK	OK	OK	3rd	
KIT	KIT-06	1	3				
UC6	UC6-06	3					



# A LAUNCHING CAMPAIGN: COUNTDOWN & FLIGHT



Engine...



Countdown ...



Launch...



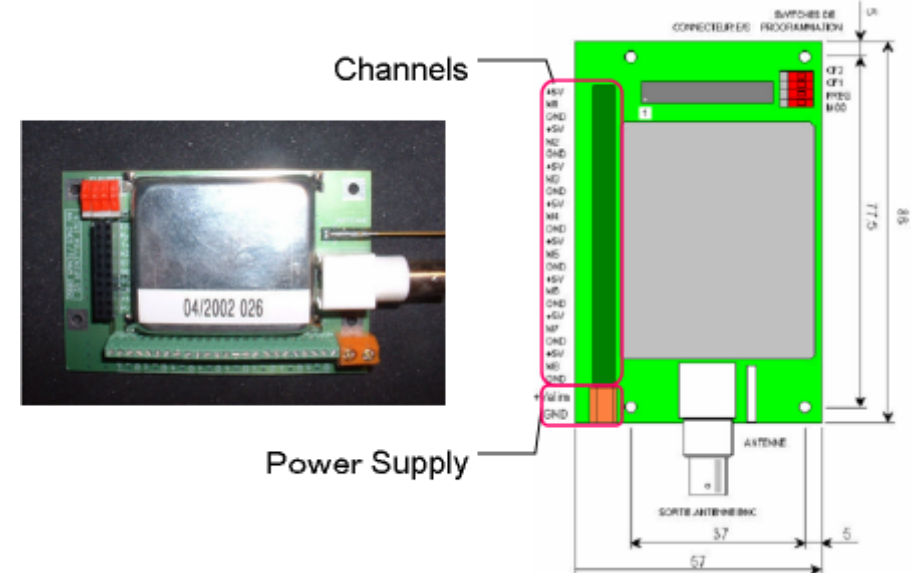
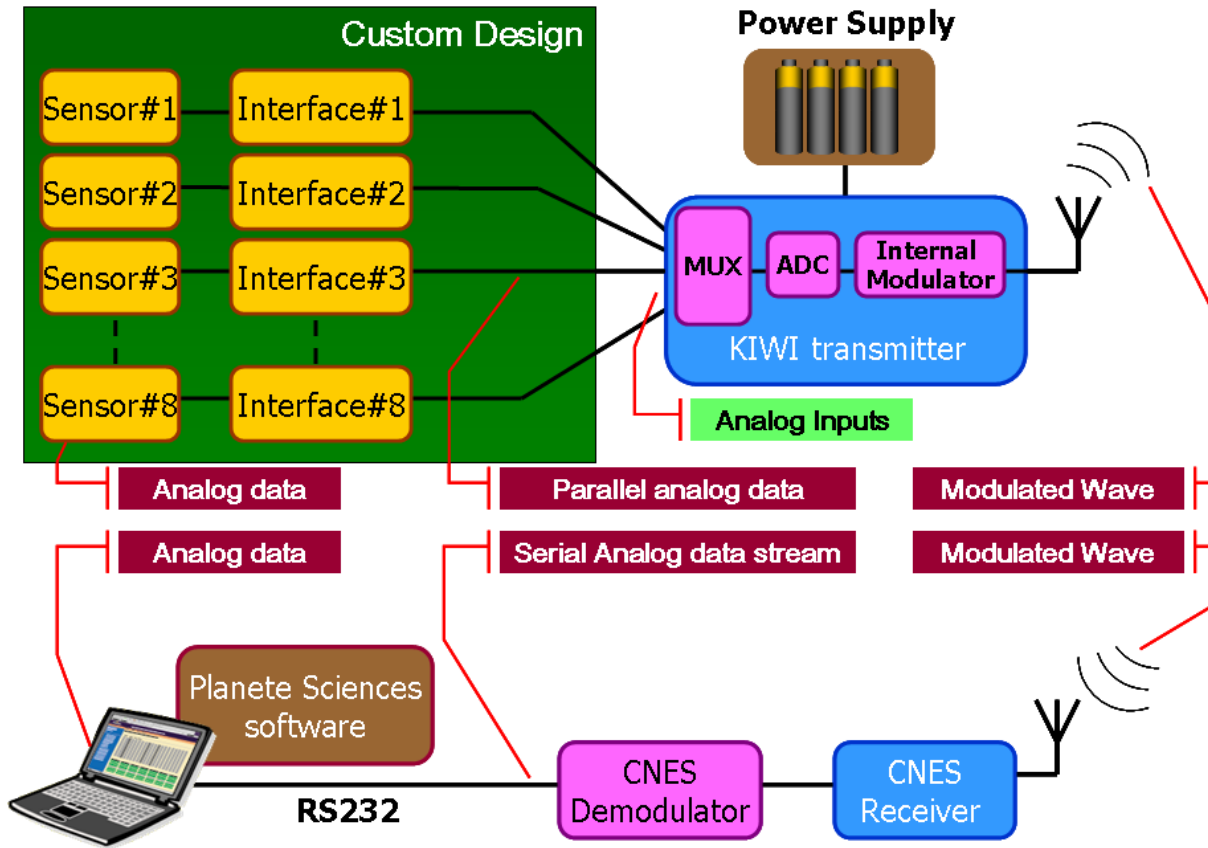
Parachute...

Recovery



## TELEMETRY SYSTEM: "KIWI"

General overview of a 8 ANALOG channels transmission with KIWI





# ENGINE: EXAMPLE OF "CHAMOIS"



UCG06

