Oufti - 1
The CubeSat developed at the University of Liège, BELGIUM

S. Galli(1), J. Pisane(1), P. Ledent(1), A. Denis(1), J.F. Vandenrijt(1), P. Rochus(1,2), J. Verly(1), G. Kerschen(1), L. Halbach(3)

(1) University of Liège, Liège, BELGIUM
(2) Centre Spatial de Liège, University of Liège, BELGIUM
(3) Spacebel, Liège, BELGIUM
Outline

1. University of Liège
2. Objectives
3. About D-STAR…
   • What?
   • Why?
   • How?
4. System overview
   • Ground station
   • Space segment
5. Schedule and launch
6. Conclusions
1. University of Liège (« ULg », Belgium)
2. Objectives

Primary Goal

→ Hands-on satellite experience for students
2. Objectives

Primary Goal

→ Hands-on satellite experience for students

Long-term Goal

→ Series of CubeSats for scientific experiments

Granular materials (Prof. Vandewalle)

MEMS (ULg - CSL)
2. Objectives

Primary Goal
→ Hands-on satellite experience for students

Long-term Goal
→ Series of CubeSats for scientific experiments

Short-term Goal
→ OUFTI - 1
2. Objectives

OUFTI - 1

• « Waouv ! »

• *Orbital Utility For Telecomunication Innovation*

• **First** nanosatellite from the University of Liège

• **First** nanosatellite ever developed in Belgium

• **First** CubeSat fitted with D-STAR

• Corresponding D-STAR ground station and ground repeater
3. About D-STAR…

What?

Digital Smart Technologies for Amateur Radio

- Amateur-radio digital radiocommunications protocol
- Simultaneous voice & data transmission
- Complete routing capacity, including roaming
- “Amateur radio over Internet”
- 3 frequencies and 2 data rates
  - 144 MHz (2 m, VHF), 4.8 kbit/sec
  - 440 MHz (70 cm, UHF), 4.8 kbit/sec
  - 1.2 GHz (23 cm, SHF), 4.8 kbit/sec or 128kbit/sec
- Open protocol
3. About D-STAR...

Why?

D-STAR vs. FM
3. About D-STAR...

How?

Situation 1: Users in CubeSat’s footprint

- **CubeSat footprint**
- **No repeater**
- **Anywhere in world: Europe, US,…**

- **User A**
- **User B**

- **Uplink:** ~ 145 MHz
- **Downlink:** ~ 435 MHz
3. About D-STAR…

How?

Situation 2: Using CubeSat and ULg repeater
3. About D-STAR...

How?

Situation 3: Using CubeSat, ULg repeater and Internet
4. System Overview

Ground segment

ON0ULG D-STAR repeater
4. System Overview

↪ Space segment

Structures and mechanisms

Power system

Communication

ADCS

C&DH

Thermal system
5. Schedule and launch

Phase A
11.07
Ground station and repeater installed at ULg

Phase B1
03.08
Mission defined

Phase B2
06.08
Critical elements defined

Phase C & D
12.08
Leodium ready to be built

06.09

07.09
Vega Maiden Flight ?
Project defended at ESA/ESTEC in January 08
7. Conclusions

► Challenging schedule but...
  • motivated team
  • simplicity
  • strong academic and industrial support

► Unique, exciting, enriching experience

► Innovative communication system

► Belgium’s first D-STAR repeater

► World’s first D-STAR satellite
7. Conclusions

☞ www.oufti.ulg.ac.be

Thank you for your attention!

→ Questions?