The CubeSat developed at the University of Liège, BELGIUM

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Outline

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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

Uplink: ~ 145 MHz
Downlink: ~ 435 MHz

User A

No repeater

Anywhere in world: Europe, US,…

User B
Situation 2: Using CubeSat and ULg repeater

Uplink: ~ 145 MHz
Downlink: ~ 435 MHz

CubeSat footprint

D-STAR zone ULg
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
- C&DH
- ADCS
- Thermal system
5. Schedule and launch

Ground station and repeater installed at ULg

Mission defined

Phase A 03.08 06.08

Phase B1

Critical elements defined

Phase B2 12.08

Leodium ready to be built

Phase C & D 06.09

Vega Maiden Flight?

07.09

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

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Thank you for your attention!

→ Questions?