


# OUFTI - 1

The CubeSat developed at  
the University of Liège,  
BELGIUM 

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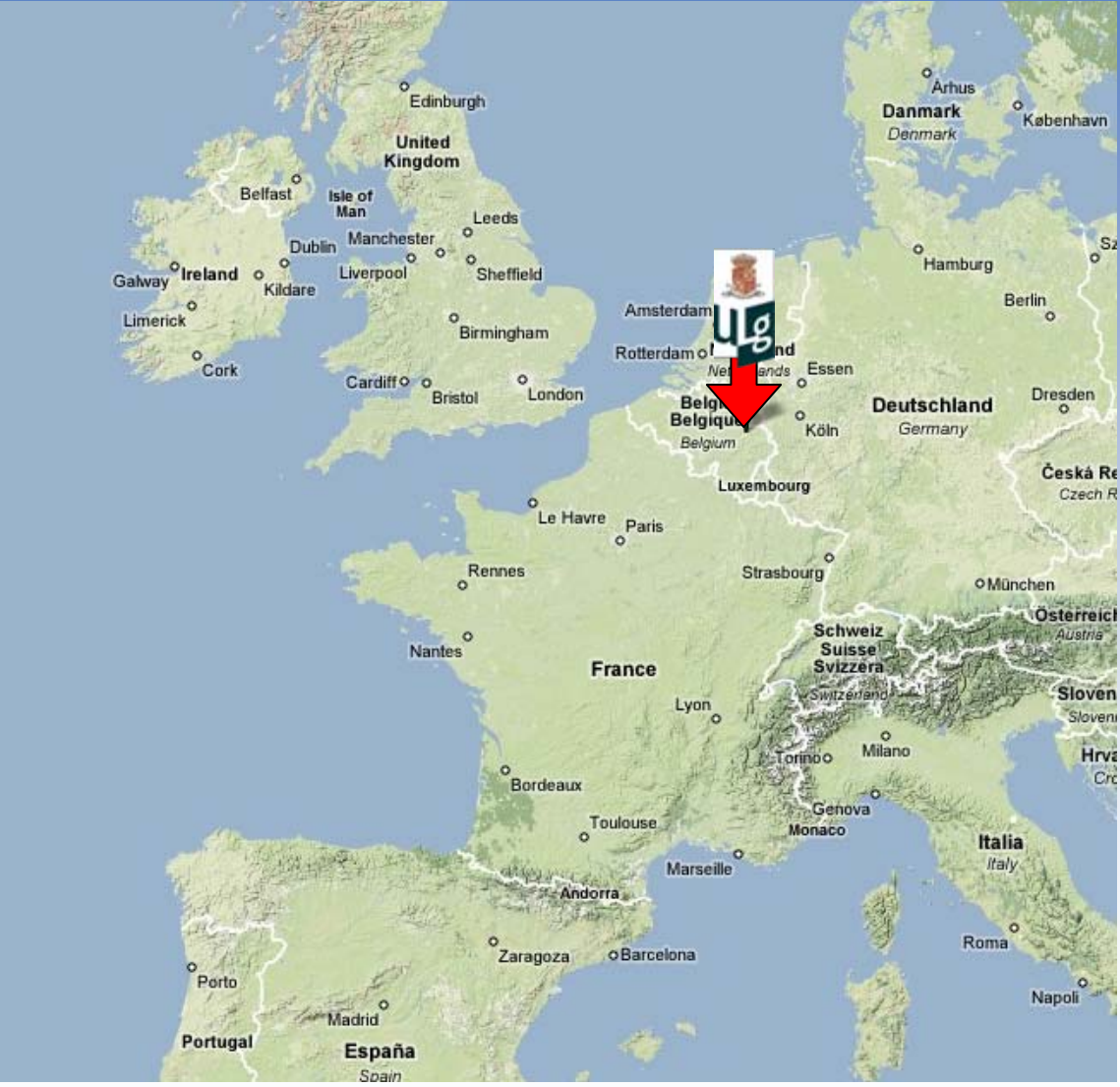
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1. University of Liège
2. Objectives
3. About D-STAR...
  - What ?
  - Why ?
  - How ?
4. System overview
  - Ground station
  - Space segment
5. Schedule and launch
6. Conclusions

# 1. University of Liège (« ULg », Belgium)





# 2. Objectives

## Primary Goal

→ Hands-on satellite experience for students



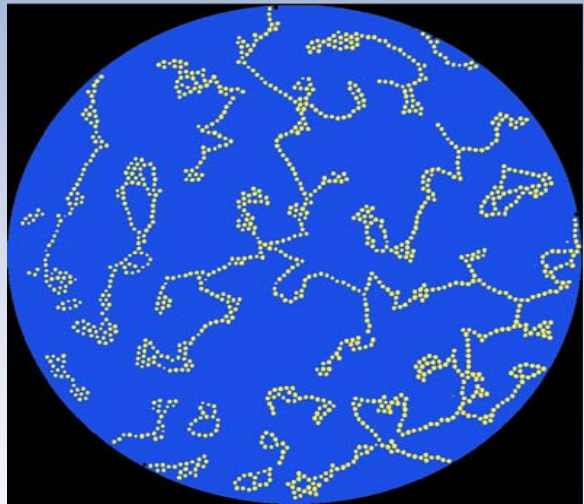
# 2. Objectives

## Primary Goal

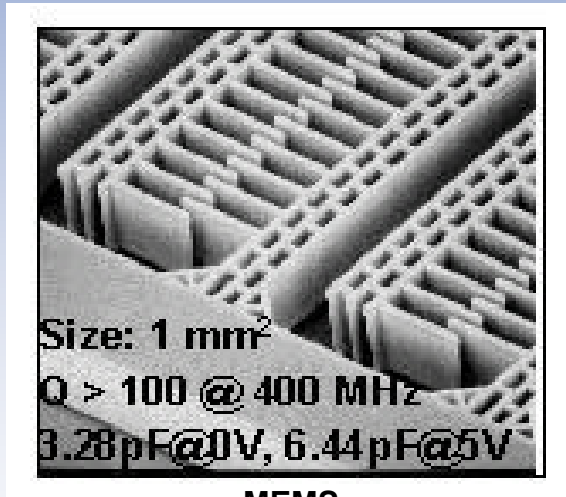
→ Hands-on satellite experience for students

## 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



## OUFTI - 1

- « Waouv ! »
- Orbital Utility For Telecommunication 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 ?



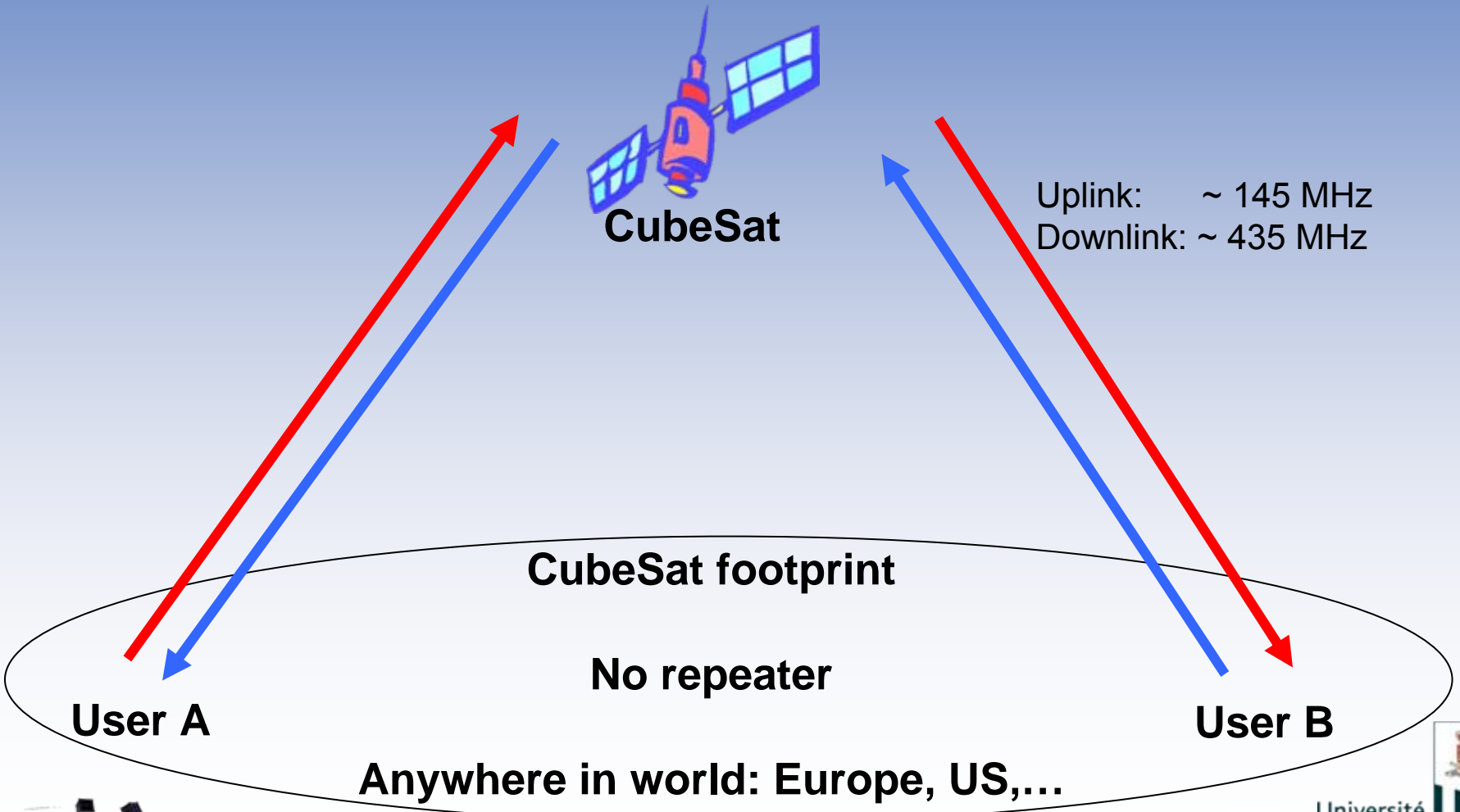
D-STAR vs. FM



# 3. About D-STAR...

↪ How ?

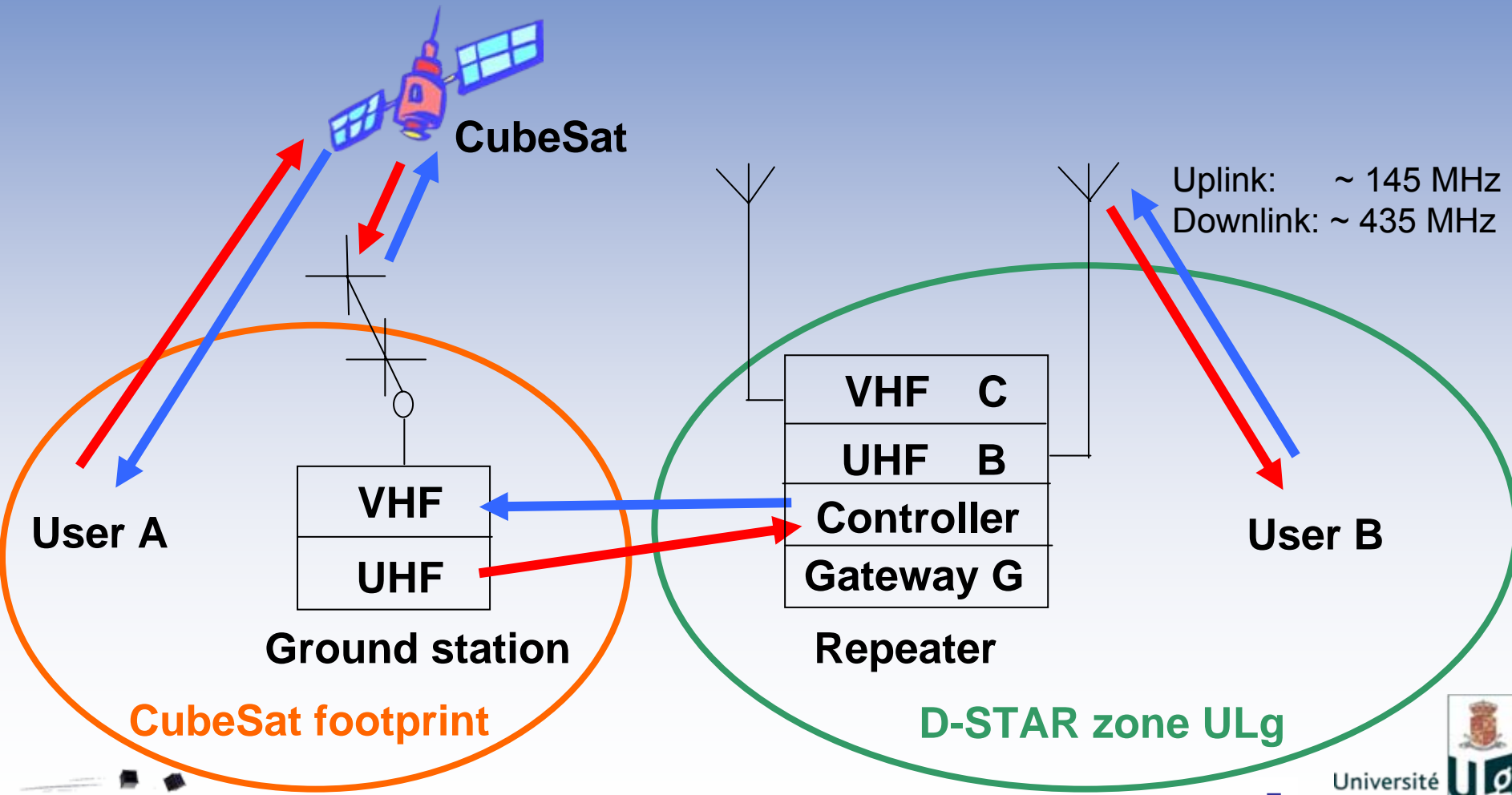
## Situation 1: Users in CubeSat's footprint



# 3. About D-STAR...

## ↪ How ?

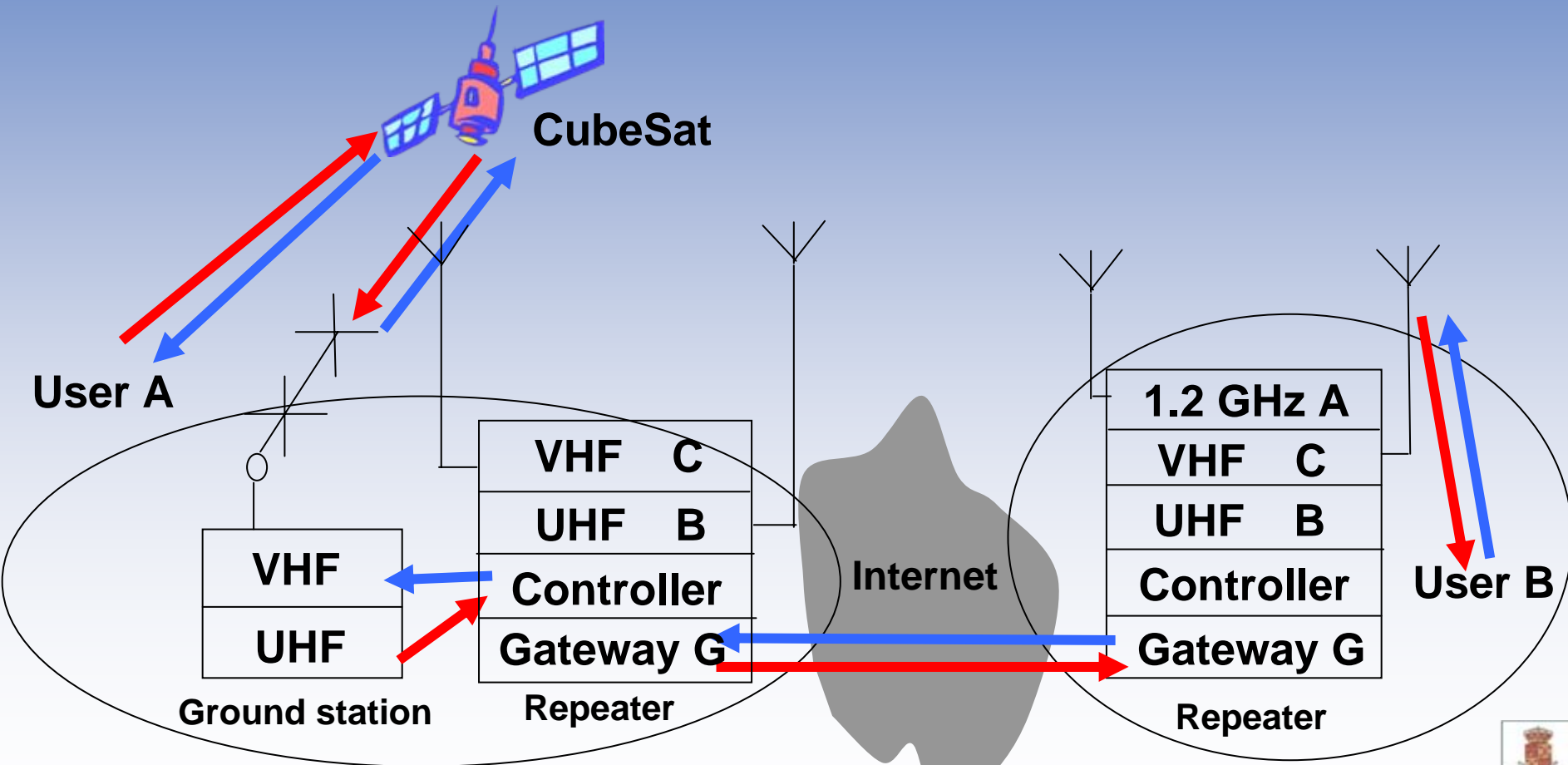
### Situation 2: Using CubeSat and ULg repeater



# 3. About D-STAR...

↪ How ?

## Situation 3: Using CubeSat, ULg repeater and Internet

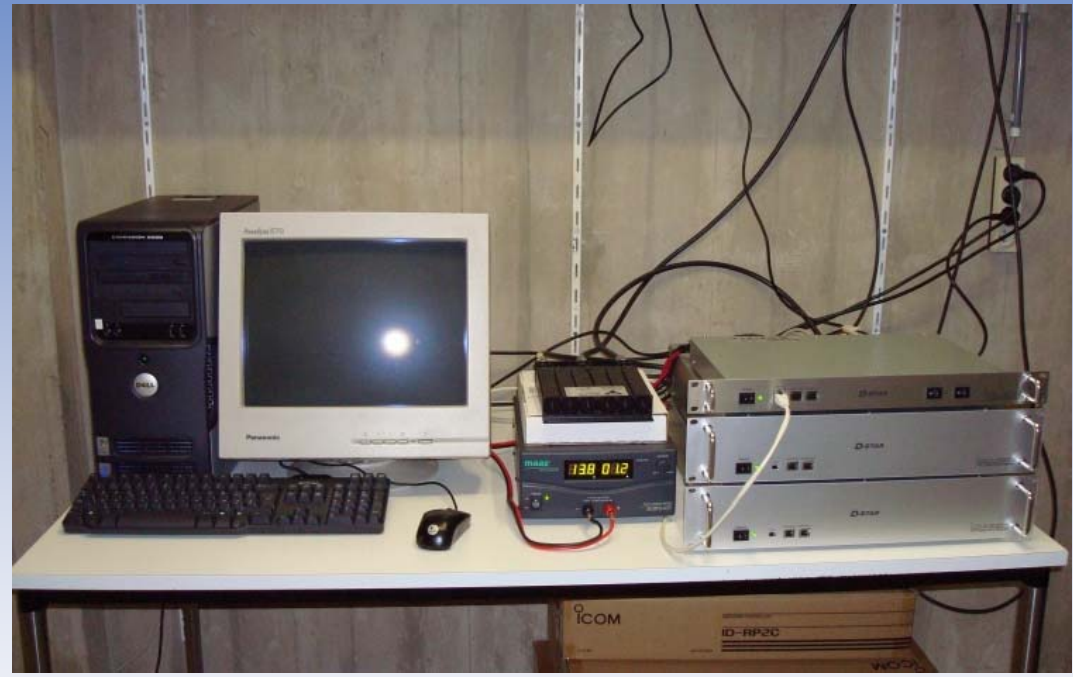


D-STAR zone ULg

D-STAR zone

# 4. System Overview

## ↳ Ground segment



ON0ULG D-STAR repeater



# 4. System Overview

↳ Space segment

**Structures and mechanisms**

**Power system**

**Communication**

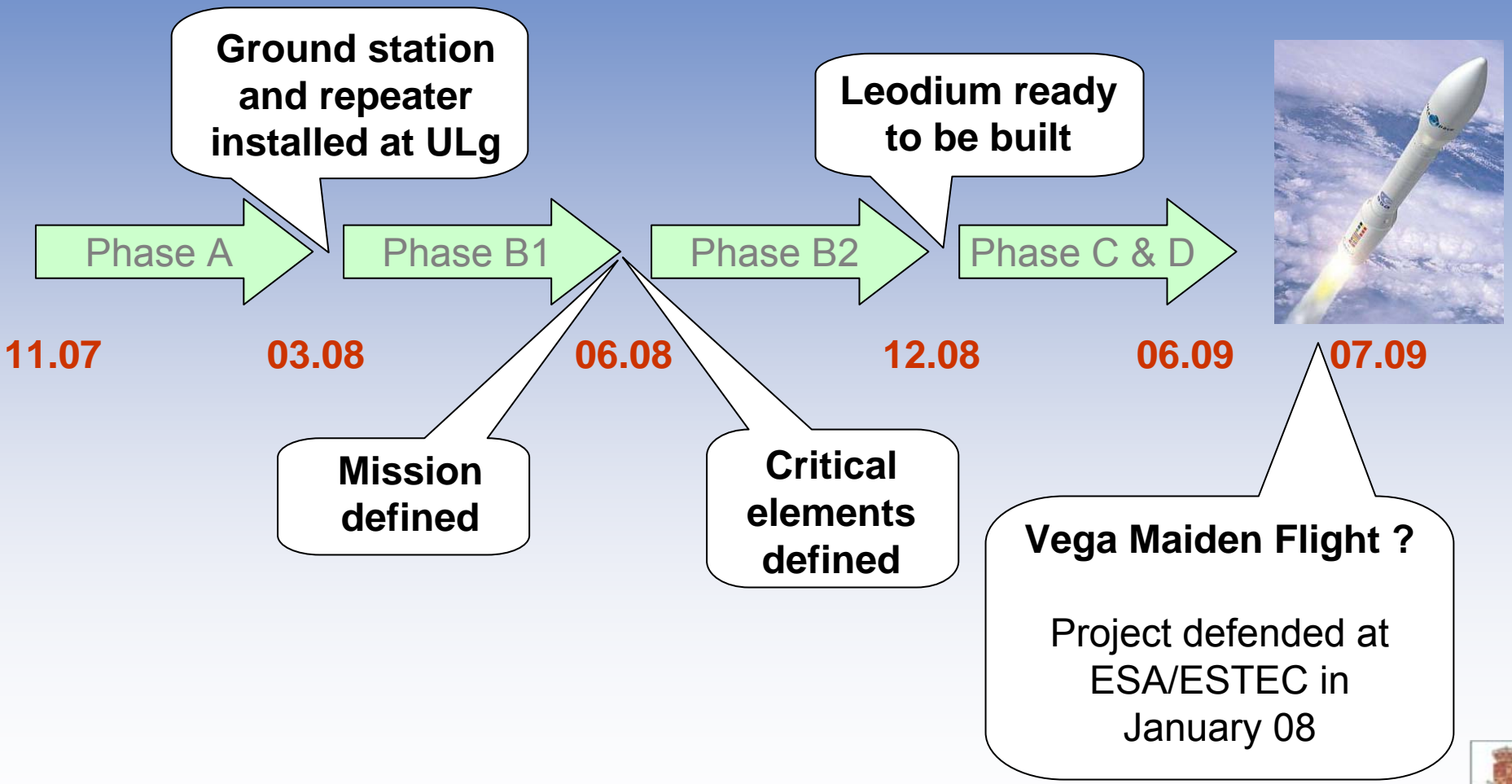
**C&DH**



**ADCS**

**Thermal system**

# 5. Schedule and launch



# 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

 [www.oufti.ulg.ac.be](http://www.oufti.ulg.ac.be)

**Thank you for your attention !**

**→ Questions ?**