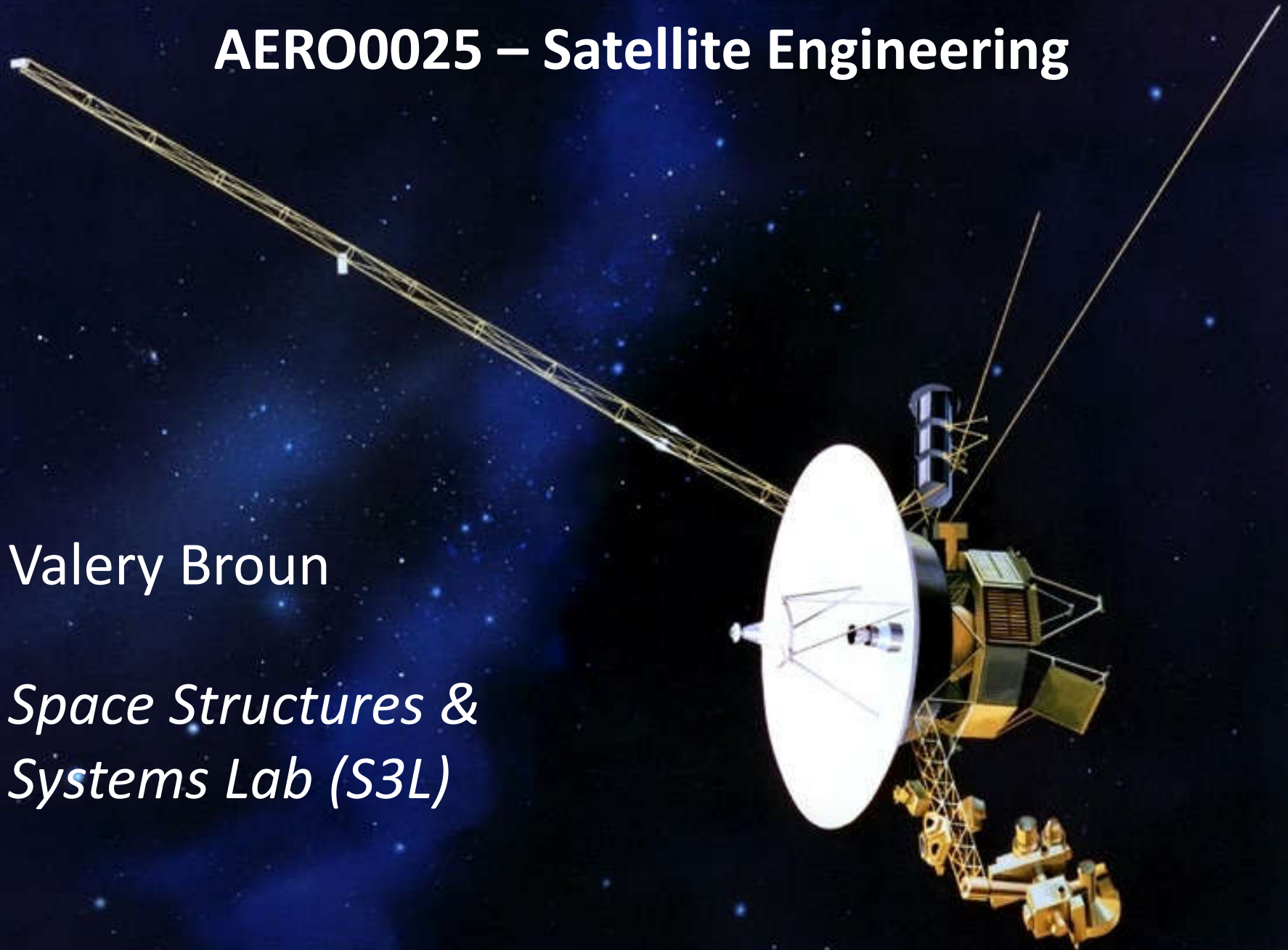


# AERO0025 – Satellite Engineering

Valery Broun

*Space Structures &  
Systems Lab (S3L)*



# Instructors

## Instructor — Valery Broun

### Contact details :

- [valery.broun@uliege.be](mailto:valery.broun@uliege.be) - [valery.broun@help.be](mailto:valery.broun@help.be)
- Space Structures and Systems Lab (S3L)  
Aerospace and Mechanical Engineering Department
- <http://www.s3l.be>

4h/week → 52h THEORY

## Former Instructor — Gaëtan Kerschen

# Motivation

- ❑ An introduction to spacecraft systems engineering.
  
- ❑ Presentation of the fundamental subsystems of a satellite :
  - Propulsion
  - electrical power
  - Structure
  - thermal control
  - attitude control
  - Telecommunications
  - ....

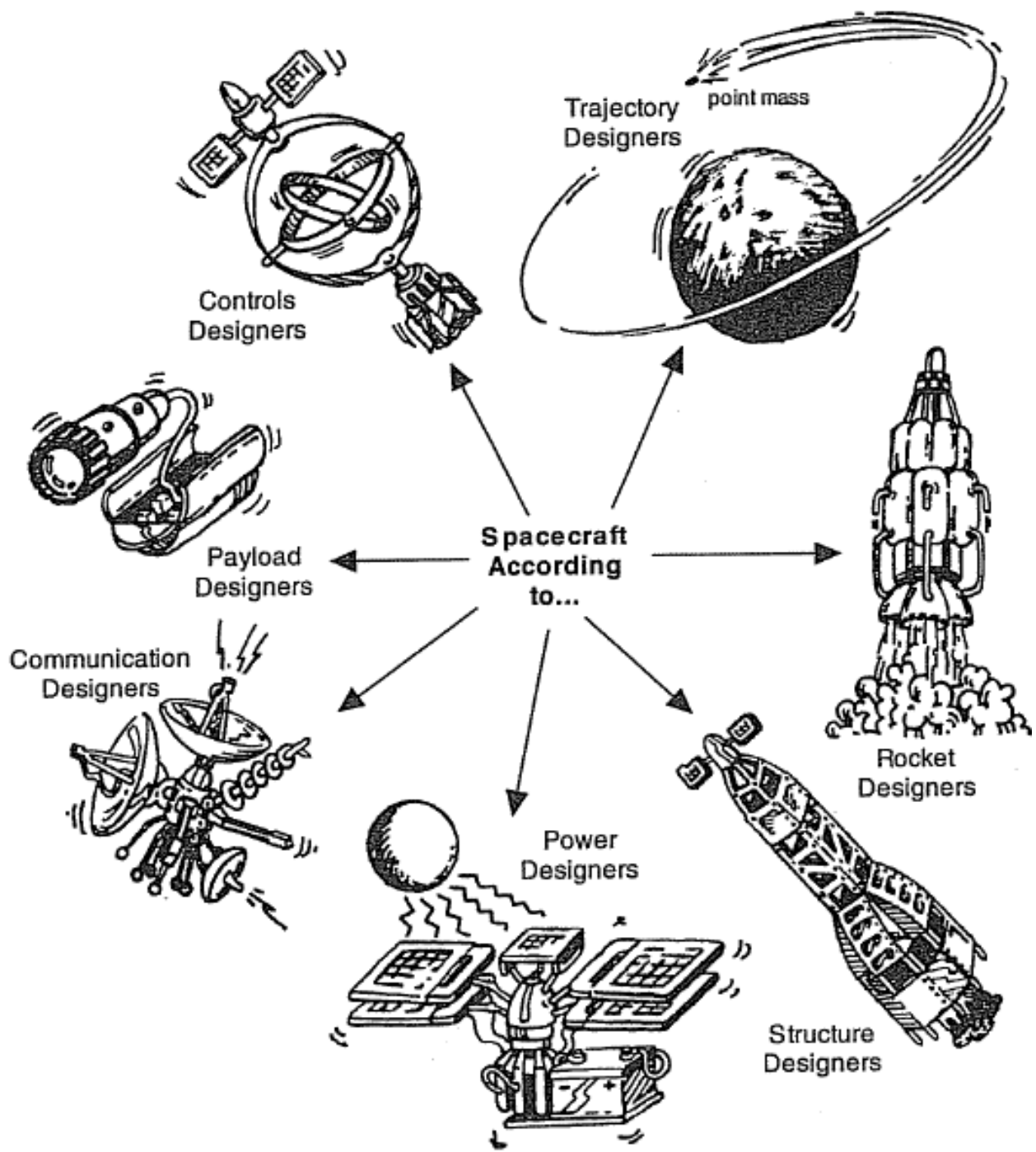
# The University System

Natural tendency to create specialists rather than generalists

Highly specialized courses in aerospace engineering at ULg and main focus on mechanical/structural aspects



A spacecraft designed by structural engineers



# Course Objectives

*A well-designed satellite is a sound compromise among the requirements of the different engineering disciplines*

1. Give you an overview of the different satellite subsystems and expose you to the inherently **multidisciplinary** aspect of satellite engineering.
2. Describe you subsystems **interactions** and introduce you to **systems engineering**.

# Next Year

Telecommunications  
Space environment  
Vibrations  
Space propulsion  
Composites

## **Bus design**

Astrophysics  
Earth observation  
Optics

## **Payload design**

Astrodynamics  
Reentry

## **Mission analysis**

Launch vehicle design

## **Launch vehicle**

# Course Details (<http://www.s3l.be>)

Date	14-16 h		16-18h	
	Sujet	Intervenant	Sujet	Intervenant
16-sept	Introduction	V, Broun (HEPL)	History	T. Pirard (Space Information Center)
23-sept	Satellite orbits	G. Kerschen (ULiege)	Launch vehicles	A. Squelard (Arianespace)
30-sept	Propulsion	A. Squelard (Arianespace)	Earth observation	C. Barbier (CSL)
07-oct	Astrophysics	O. Absil (ULiege)		
14-oct	Space environment	J. Loicq (CSL)		
21-oct	Thermal control	L. Jacques (CSL)		
28-oct	Spacecraft structures	A. Calvi (European Space Agency)		
04-nov	Attitude control	T. Delabie (KULeuven)		
11-nov		ARMISTICE		
18-nov	Telecommunications	M. Vandrogenbroeck (ULiege)		
25-nov	Nanosatellites	A. Denis (VKI)	On board software	P. Parisi (Spacebel)
02-déc	Electrical power	N. Chapuis (Thales Alenia Space)		
09-déc	Systems engineering	J. Tallineau (VEOWARE)		
16-déc		Visite CSL ?		





# Examination(s)

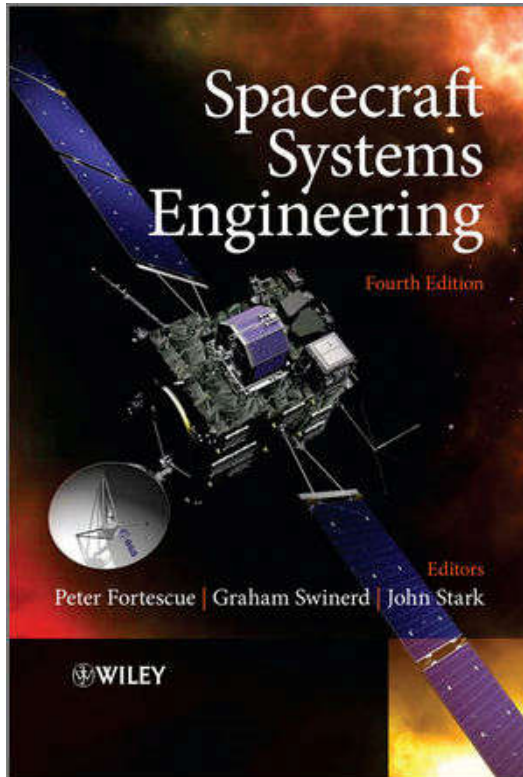
## **January :**

- Written examination
- Requires both a thorough knowledge and fundamental understanding of the material presented during the lectures.
- Closed book.
- 40 questions.

## **August :**

- Oral examination.

# References



## Spacecraft Systems Engineering

de Peter Fortescue, Graham Swinerd, et al. | 12 août 2011

★★★★☆ v 1

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Slides available on the website : <http://www.s3l.be/en/education>