



# The ESA Academy Programme

## Hands-on projects and Training & Learning programme

**Presented by:**

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ESA Education Office  
Director General's Services

4<sup>th</sup> IAA Conference on University Satellite Missions and CubeSat Workshop  
Roma, 7 December 2017

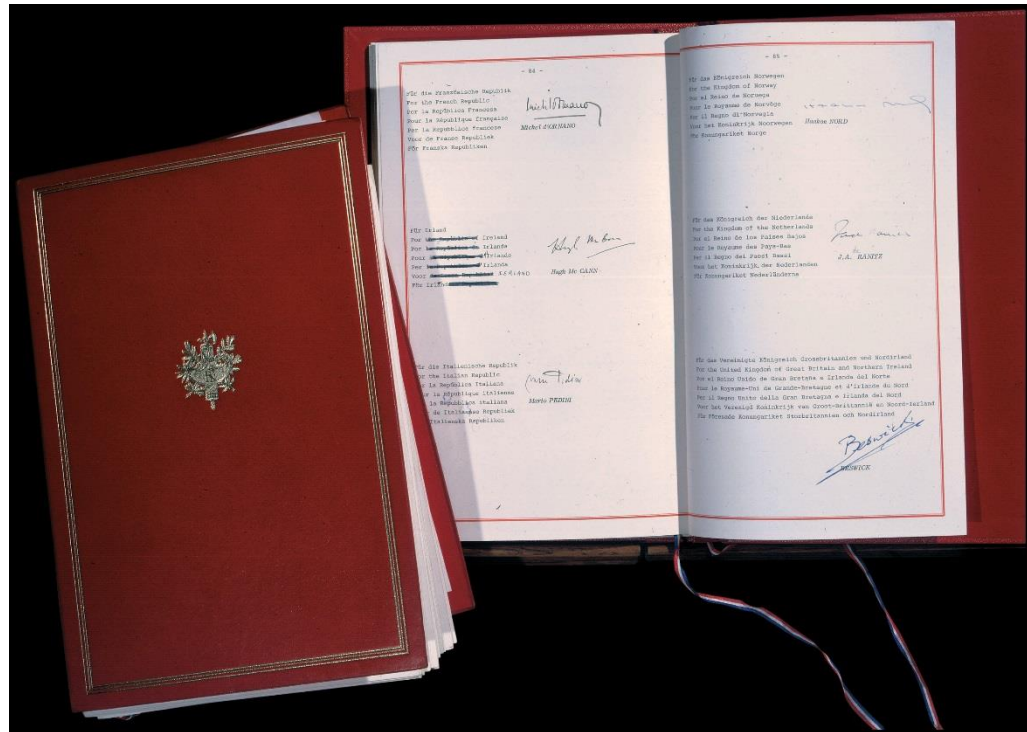
# Outline

1. Why Education is important at ESA?
2. Presentation of the ESA Academy programme
3. The diversity of ESA Academy opportunities
4. Where to find the ESA Academy on the web?



# Why Education is important to ESA?

Education is a mandatory activity in the  
Convention for the establishment of the European Space Agency!



## Article V

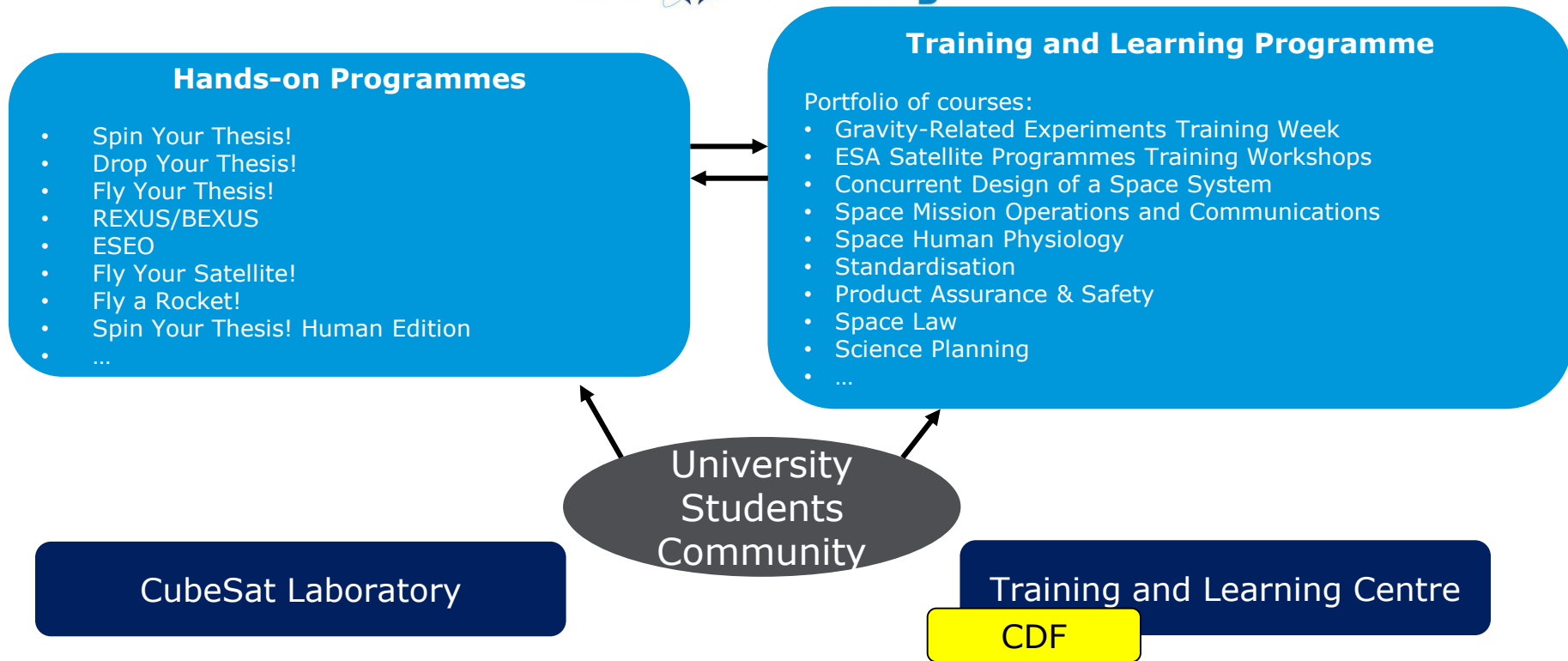
### ACTIVITIES AND PROGRAMMES

1.
  - a. With respect to the **mandatory activities**, the Agency shall:
  - i. ensure the execution of basic activities, such as **education**, documentation, studies of future projects and technological research work;

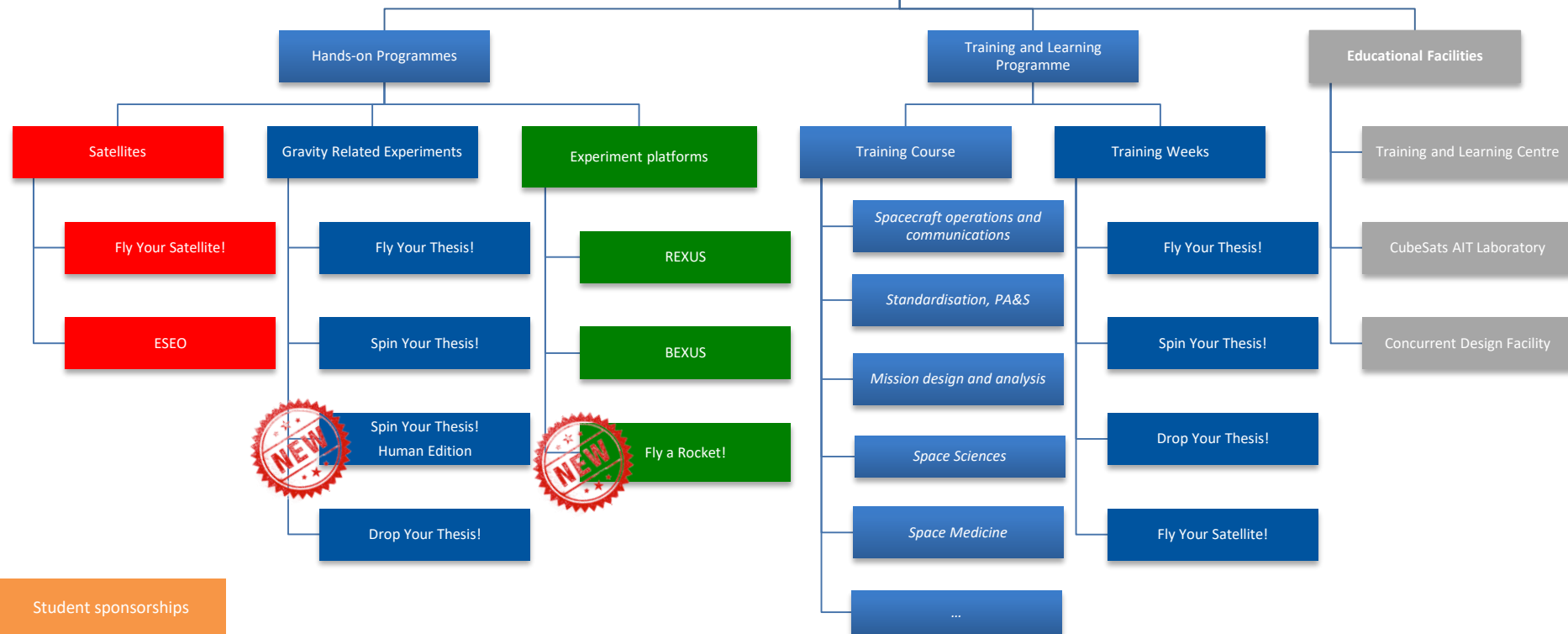
# ESA Academy overview



- **ESA Academy** has the objective to promote a **transfer of expertise**, know-how and standard professional practice in space related activities from ESA's and from other well recognised professionals to university students from ESA Member and Associate States
- The idea is to work in close **coordination** with **European academic institutions** and, whenever possible, in partnership with **European space industry** and other organisations involved in space activities
- ESA Academy is the combination of two components:
  - **Hands-on Programmes**
  - **Training and Learning programme**



# ESA Academy – Structure



# Fly Your Thesis!



## Parabolic Flight opportunity for Masters & PhD student experiment projects

**What:** Topics include physics, medicine, biology, technology demonstrations etc.

**When:** once a year (periodical calls for proposals)

**Who:** up to 6 student teams, (minimum 4 students per team)

**Facility:** A310 Zero-G aircraft operated by Novespace (France)

- 3 parabolic flights
- 31 parabolas per flight
- ~20s of weightlessness per parabola ( $10^{-3}$  g) → in total about 30min

**Campaign duration:** 2 weeks

### Status:

- 6 teams selected for FYT! 2017
- Campaign: 27 Nov – 8 Dec 2017
- Call for FYT!2018 **Closed.**



# Drop Your Thesis!



## Microgravity opportunity for university student projects

**What:** Topics include physics, biology, technology demonstrations, chemistry etc.

**When:** once a year (periodical calls for proposals)

**Who:** up to 2 student teams, (up to 4 students per team)

**Facility:** ZARM Drop Tower, Bremen (Germany)

- Two launch modes:
  - Drop mode : 4.7 s of microgravity ( $10^{-6}g$ )
  - Catapult mode : 9.3 s of microgravity ( $10^{-6}g$ )

**Campaign duration:** 2 weeks, 5 launches

### Status:

- 2 teams selected for DYT! 2017
- Campaign: 6 – 17 November 2017
- Call for DYT!2018 **Closed.**

**A team won the Muldau prize at IAC 2017**





# Spin Your Thesis!



spin your  
thesis!



## Hypergravity opportunity for university student projects

**What:** Topics include physics, biology, technology demonstrations, chemistry, etc.

**When:** once a year (periodical calls for proposals)

**Who:** up to 4 student teams, (4 students per team), per year

**Facility:** Large Diameter Centrifuge (LDC), ESA/ESTEC (Netherlands)

- Accelerations between 1 and 20 times the Earth's gravity for minutes/hours/days durations
- Durations and acceleration levels selectable by users, even interactively if desired

**Campaign duration:** 1 week, nominally 2.5 days access to the LDC per team



### Status:

- 2 teams selected for SYT! 2017
- Campaign: 11 – 22 September 2017
- Call for SYT!2018 **Closed.**



# Spin Your Thesis! Human Edition

**NEW!**

## Hypergravity opportunity for university student human physiology projects

**What:** Non invasive human physiology (cardiovascular, muscular, nervous, vestibular, psychological, human performance)

**When:** once a year (periodical calls for proposals)

**Who:** up to 4 student teams of 4-6 students per team

**Facility:** :envihab facilities at DLR Köln

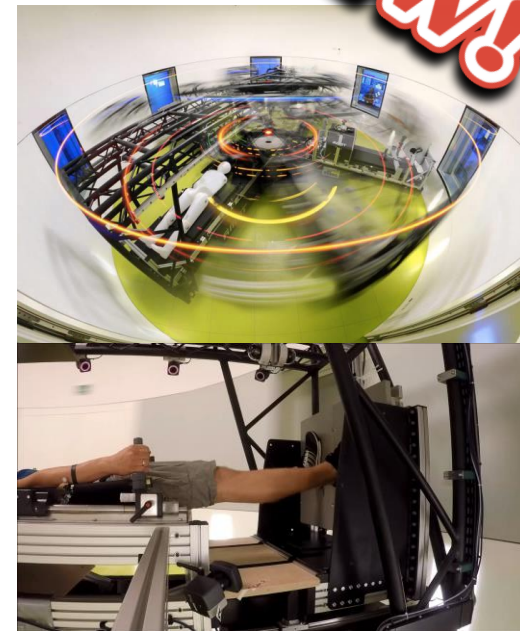
5 female, 5 male subjects – one protocol based on selected teams

2 day workshop at DLR/EAC after selection

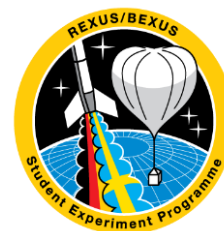
**Campaign duration:** 7 days

### Status:

- Website with more info:  
[http://www.esa.int/Education/Spin\\_Your\\_Thesis!\\_Human\\_Edition](http://www.esa.int/Education/Spin_Your_Thesis!_Human_Edition)
- Call **Open.**
- Call released 1<sup>st</sup> November - December 29<sup>th</sup> (Selection Jan/Feb)
- Workshop March
- Campaign end June 2018 (7 days)



# REXUS/BEXUS



## Rocket and Balloon EXperiments for University Students

Realised under a bilateral Agency Agreement between the German Aerospace Center (DLR) and the Swedish National Space Board (SNSB).

Available to students from other ESA Member and Associated States through a collaboration with the ESA.

**What:** Experiment topics include physics, biology, technology demonstrations, atmospheric sciences

**When:** once a year launch of 2 sounding rockets and 2 stratospheric balloons  
(periodical calls for proposals)

**Who:** up to 10-11 SNSB/ESA student teams

**Facility:** Launch site: Esrange Space Center, Kiruna (Sweden)

### Status:

- 11 teams for 10<sup>th</sup> cycle selected in December 2016
- BEXUS 24/25 launch campaign: 13-23 October 2017
- REXUS 23/24 launch campaign: 5-17 March 2018
- Call for 11<sup>th</sup> cycle **Closed.**



Deutsches Zentrum  
für Luft- und Raumfahrt  
German Aerospace Center



# Fly a Rocket!



## Online training and sounding rocket launch campaign for undergraduate students

Realised in cooperation with the Norwegian Centre for Space Related Education (NAROM) and the Norwegian Space Centre.

**What:** online course and rocket launch campaign

**Who:** 20 1<sup>st</sup> and 2<sup>nd</sup> year university students (beg. Bachelor level)

**Facility:** Andøya Space Center (Norway)

**Campaign duration:** 5 days

### Status:

- Online course closed
- Launch campaign: performed 27-31 March 2017
- New call TBD (as a target periodical calls)



## European Student Earth Orbiter

### What:

Micro-satellite (60kg, 33x33x66cm)

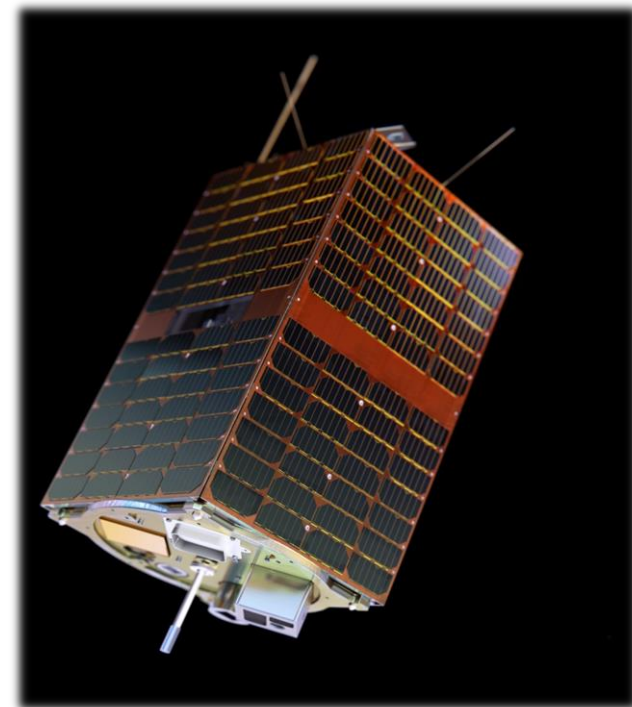
- About 600km altitude/sun synchronous
- P/L: micro cameras/radiation sensors/comms and GPS technology
- 6 months+ mission
- Drag sail for re-entry

### Who:

Many Universities (currently 10) involved

### Status:

- Phase C (detailed design) – CDR completed in 2015
- Phase D (AIT) – Qualification and Acceptance tests at S/S level on-going





# Fly Your Satellite!



**fly your  
satellite!**



## CubeSat opportunities for university student teams

### What:

- Support in the development of a CubeSat
- Current edition consist of four programme phases (Build, Test, Launch and Operate Your Satellite!)
- Future editions may also include design phase.

### Who:

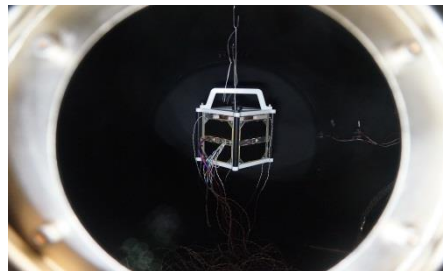
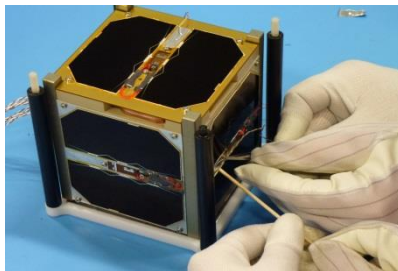
- University student teams with a finalized detailed design of their CubeSat

### Facility:

- Dedicated CubeSat Laboratory, ESA/Redu (Belgium)

### Status:

- 6 university students CubeSats selected for the current edition
- **CDRs on-going**



# Training & Learning Centre

- **Why?**

- **complement the standard academic knowledge** in space-related disciplines
- **attract** future scientists and engineers to the space sector
- better prepare the future workforce

- **How?**

**Transfer of knowledge, know-how and standards** via training sessions

- **Where?**

**Training and Learning Centre (TLC)** in ESEC, Belgium

- **Status**

- **TLC operational since March 2016**
- **19 training sessions delivered**
- Content for new training courses under development
- large number of applications from all ESA Member States
- positive feedback from students and experts
- Objectives:
  - ✓ **Offer a portfolio of training sessions in all fields of ESA expertise**
  - ✓ **up to 20 training courses/year**



# ESA Academy's Training Sessions



- **Typical format**
  - around 32 training hours (4 days) – students can claim 1-2 ECTS credits
  - 22 sponsored university students (up to 30 in 2018)
  - 1-6 experts/day
- **Target audience = science and engineering university students, from Bsc to PhD level**
  - students participating to ESA hands-on programmes
  - students preparing for a space related career
  - students never involved in the space domain but motivated to deepen their knowledge about it

--> Each training course specific student profile
- **Trainers**
  - mainly ESA staff (active or retired)
  - university professors
  - experts from space industry
- **Examples of training sessions topics:**
  - ESA experiment hands-on programmes training week
  - Concurrent Design
  - Guide to Spacecraft Operations and Communications
  - Human Space Physiology
  - Gravity-Related Research
  - Standardisation
  - Product Assurance & Safety
  - Introduction to Space Law
  - Space Debris
  - ...





# Sponsorships to Students to participate in Symposia, Conferences, Schools, Summer Schools ...



## A FEW EVENTS TYPICALLY SUPPORTED

- Symposium on Space Educational Activities (SSEA)
- International Astronautical Congress (IAC)
- International Conference on Space Operations (SpaceOps)
- European Week of Astronomy and Space Science (EUCYS)
- International Summer School in Astrobiology
- ELGRA Symposium
- Student Aerospace Challenge (ESA "Grand Prix")
- IAA Conference on Univ. Satellite Missions and CubeSat Workshop
- Alpbach Summer School & Post-Alpbach
- International Space University (ISU)
- GNSS Summer School

- To be informed about the opportunities check the web pages of the organisers of the event and of the ESA Education Office
- Sponsorships sometimes paid in the form of reimbursement to the students, sometimes as subsidies to the organisers

# Symposium on Space Educational Activities (SSEA)

## What:

- All types of activities related to space educational projects
- Focusing on tertiary education

## When: Every 2 years

- First edition in Dec. 2015 (Univ. Of Padova)
- Current (2<sup>nd</sup>) edition: 11-13 April 2017 in (Univ. Budapest)

## Who:

- students, professors & professionals

## Why:

- Forum: survey of edu. space-related activities
- Share experiences & networking
- Increase the understanding of academic, industrial, gov. Organisations on hands-on & training/learning opportunities

## Web:

- <http://ssasymposium.org/#top>
- [http://www.esa.int/Education/ESA\\_Academy/Symposium\\_on\\_Space\\_Educational\\_Activities](http://www.esa.int/Education/ESA_Academy/Symposium_on_Space_Educational_Activities)

**Status:** Registration: **Open**, call for abstracts: **Closed**.



# ESA Academy on the Web



- **Facebook:** <https://www.facebook.com/ESAEducation/posts/1829715417040217>

➔ Like us & Follow us ;)

- **ESA Website:** <http://www.esa.int/Education>

- Hands-on projects/Satellites
- Hands-on projects/Experiments
- Training & Learning programme/Training courses
- Training & Learning programme/Conferences

➔ You can sign up to the Newsletter/mailling list!

- **Twitter:** [https://twitter.com/esa\\_education](https://twitter.com/esa_education)

➔ Follow us ;)

- **LinkedIn:** <https://www.linkedin.com/groups/2884237>

➔ Join us ;)

The screenshot shows the ESA Academy website. A large red arrow points from the top right towards the 'Newsletter sign up' button, which is circled in red. The website header includes navigation links: EUROPEAN SPACE AGENCY, ABOUT US, OUR ACTIVITIES, CAREERS AT ESA, FOR MEDIA, FOR EDUCATORS, FOR KIDS. The main content area is titled 'esa academy' and lists various opportunities under 'CURRENT OPPORTUNITIES'. The first opportunity is the 'CubeSats Concurrent Engineering Workshop 2018', with a status of 'Call for applications open' and a deadline of 4 December 2017. The second opportunity is the 'Concurrent Engineering Workshop - February 2018', with a status of 'Call for applications open' and a deadline of 5 January 2018. The website also features a search bar and a 'Newsletter sign up' button in the bottom right corner.

# CubeSat Trainings

**1 - CubeSat Concurrent Engineering Workshop 2018 (16th to 19th January - Deadline: 4th Dec. 2018, 23:59 CET ):**

**Link:** [http://www.esa.int/Education/ESA\\_Academy/Turn\\_your\\_ideas\\_into\\_satellite\\_concepts\\_with\\_the\\_ESA\\_Academy](http://www.esa.int/Education/ESA_Academy/Turn_your_ideas_into_satellite_concepts_with_the_ESA_Academy)

**Deadline extended to 11th December 😊**



**2 - CubeSats Hands-on Training Week 2018 (26 February - 2 March 2018 - Deadline: 8th Jan. 2018, 23:59 CET ):**

**Link:** [http://www.esa.int/Education/ESA\\_Academy/Call\\_for\\_applications\\_Hands-on\\_training\\_week\\_for\\_small\\_satellite\\_design\\_and\\_testing](http://www.esa.int/Education/ESA_Academy/Call_for_applications_Hands-on_training_week_for_small_satellite_design_and_testing)



[http://www.esa.int/Education/ESA\\_Academy/Current\\_opportunities](http://www.esa.int/Education/ESA_Academy/Current_opportunities)

# Conclusions



**ESA Academy complements university education by means of:**

1. Hands-on Projects
2. Training sessions
3. Sponsorship for university students (international symposia, conferences, summer schools...)

**For questions related to ESA Academy Programme opportunities:**

[esa.tertiary.education@esa.int](mailto:esa.tertiary.education@esa.int)

**Follow us on Facebook, Twitter & [www.esa.int/education](http://www.esa.int/education)**



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