Education Under the United Nations/Japan (PNST) Program

Perspectives of a Graduate

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• I am Hala from Sudan.
• Electrical and Electronic Engineer.
• Researcher at the Institute of Space Research and Aerospace (ISRA), Sudan.
My dream was to build a satellite that orbit into space
Sudan – [ KN-sat1]

2010: Cubesat

- Development
- Local means
ST2UOK Ground Station

- University Ground Station
- 30 m above sea level
- VHF/UHF
I wish it can be launched into space
• Cubesat project was a great start.
• KN-Sat1 is a prototype with **no opportunity for launch**.
• No space or satellite technology education in my country at that time.
• Need for **more education**!

**PNST**
Post-graduate Study on Nano-Satellite Technologies (PNST)

**Goal:** Back home with the know-how that will push the peaceful uses of outer space in my country.

I applied, I got selected!
Post-graduate Study on **Nano-Satellite Technologies (PNST)**
• Special Satellite courses
• Research and development
• Real satellite project (Horyu-4)
• Tools and facilities
• Experience
• Life lessons
• Cultural and social activities
Advanced Courses and R&D
Courses and research

• Special Oriented Courses

Satellite Engineering International Course (SEIC)
My research topic

“Environment Test Campaign of Aluminium Substrate Solar Panel for Lean-satellites”

Qualification process

Low cost
Fast delivery
• Arc Event Generator and Investigation Satellite
• Nano-satellite.
• Main mission.
• Launched on Feb 2016.

http://kitsat.ele.kyutech.ac.jp/horyu4WEB/horyu4.html
Horyu-4

Missions design

Horyu-4, Kyutech

BBM ➔ EM ➔ FM
Horyu-4

Bread boards

Horyu-4, Kyutech

BBM → EM → FM
Horyu-4

Into Printed Boards

Horyu-4, Kyutech

BBM → EM → FM
Horyu-4, Kyutech

Integration

BBM → EM → FM

Horyu-4, Kyutech
Horyu-4

EM/FM Testing

Horyu-4, Kyutech

BBM ➔ EM ➔ FM

End-to-End test
My role in Horyu-4

- Solar Panels Design and manufacturing
- Qualification through testing

Horyu-4 solar panels
My role in Horyu-4

Comparison between images of Himawari (13:30) and HORYU-IV
My role in Horyu-4

Value: Outreach

Source: Internet
Values in Horyu-4

- Team work
- Exchange experiences
- Handling space grade materials
Activities
Learning activities

• Orientations in visits
Learning activities

- Project Based Learning
- Proposal of ‘moon sighting satellite’
Learning activities

• International and local Conferences NSAT/JSASS.
Visits and conferences

- Exhibitions
- Networking
Life in Kyutech
Why PNST is Special?

– Young researchers and engineers return home in short time with great knowledge.

– PNST exposes students to an advanced theoretical and practical level of education.

– PNST encourages graduates to return back and maintain a solid and sustainable peaceful use of space and space technology.
Why PNST is Important?

– Graduates are connected to keep in update with the cutting edge technologies worldwide.

– This reflects on the awareness, education, utilization, cooperation between developing countries.
Why PNST is Important?

Knowledge and experience

Usual post-graduate education

Research

Courses
Why PNST is Important?

- Knowledge and experience
- Research
- Satellite project
- Multicultural team work
- Publications
- Courses
- R&D Facilities

PNST at Kyutech
I joined as project manager of ISRASAT1
ISRA Vision

- **Awareness** of space science and engineering in Sudan.
- Involves in Space activities in more practical way.
- Capacity building.
- Establishing small satellites projects.
- Promotes the peaceful uses of the outer space.
- Focuses on the economical and social **benefits** of outer space.
- Strengthens **connections** with other research entities.
• Departments

Ministry of Higher Education and Scientific Research

- University
- Research Institute

National Center of Research (NCR)

ISRA

Satellite Projects
- Ground Stations
- Aeronautics and Aerospace
- Astronomy and Astrophysics
- Applied Programming
Activities at ISRA

Astronomical Observation

ISRASAT1 Prototype

High Altitude Balloon
ISRASAT1 Project

- Attitude determination and VGA camera mission.
- Next→ EM/FM.
- Looking forward for a launch opportunity.

Knowledge transfer

Structure
Assembly
Camera Test
Conclusion

– Space education and research in developing countries is the first step towards utilizing space for their economical and social development.

– Researchers will help raising the awareness of the useful uses of space and satellite technologies.

– Building capacity and reducing brain drain will encourage and strengthen the cooperation between countries in space projects.

– PNST program is a successful example of UNOOSA and Kyutech, Japan, efforts on establishing indigenous capacities in basic and advanced space technology.
I achieved one dream at Kyutech. Launching ISRASAT1 is my next dream!

A great experience for all of us!