



Goals and achievements of studying my PhD under PNST fellowship

A success story of:
Mohamed Yahia Edries



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Mohamed Yahia Edries



◆ Education:

- ◆ BSc. Electrical Engineering, Faculty of Engineering, Cairo University (**2000**)
- ◆ MSc. Electrical Engineering, Faculty of Engineering, Cairo University (**2009**)
- ◆ PhD. Integrated Systems Engineering, KYUTECH (**2016**)

◆ Experience:

- ◆ Researcher at Electrical and Electronics Dep., Space Division
- ◆ **18 years** in Egyptian Space Program (Now EgSA)
- ◆ Satellite System Engineer and leader of Electrical Power Systems group
- ◆ Lecturer of Power Electronics in the Egyptian Universities
- ◆ Supervisor of graduation projects of the BSc. students



What is PNST?



- ◆ The PNST fellowship is a post-graduates programmes on nanosatellite technologies
- ◆ launched in 2013 by the Kyushu Institute of Technology (Kyutech) in Japan and the United Nations Office for Outer Space Affairs (UNOOSA)
- ◆ Targeting the students from developing countries or nations that do not yet have space-faring capabilities



Motivations to Join PNST fellowship



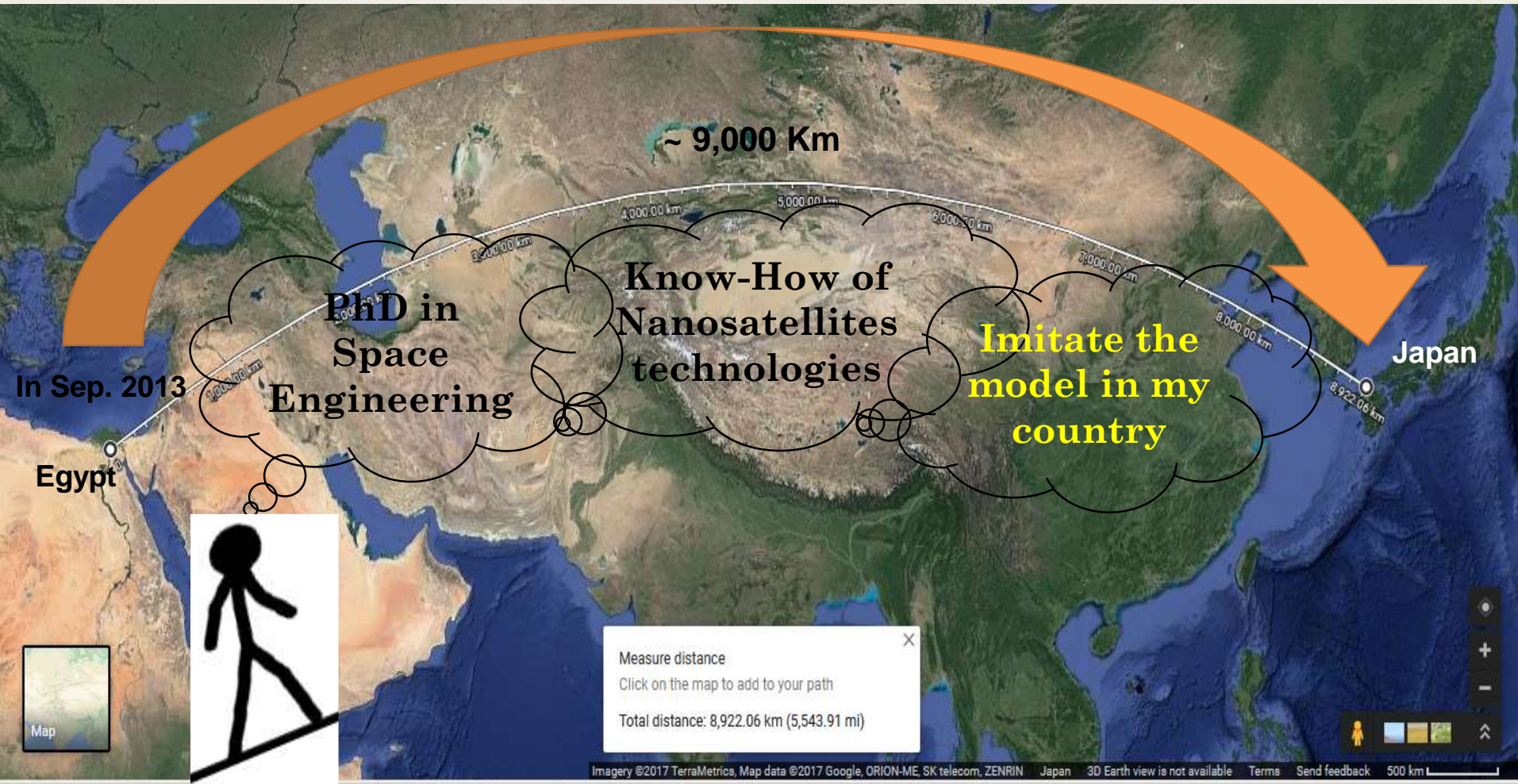
- ◆ I need to devote enough time to study PhD
- ◆ My colleague in NARSS joined DNST in 2011
(Dr. Mohamed Ibrahim)
- ◆ I was so enthusiastic to deal with advanced facilities not available in Egypt
- ◆ To discover the secrets of Japan



http://www.letstalkaboutwork.tv/wp-content/uploads/2014/04/WWOTD_041714_michael-john-bobak-quote.png



My Goals...





Road to PhD.



Laboratory of Spacecraft Environment Interaction Engineering (LaSEINE)

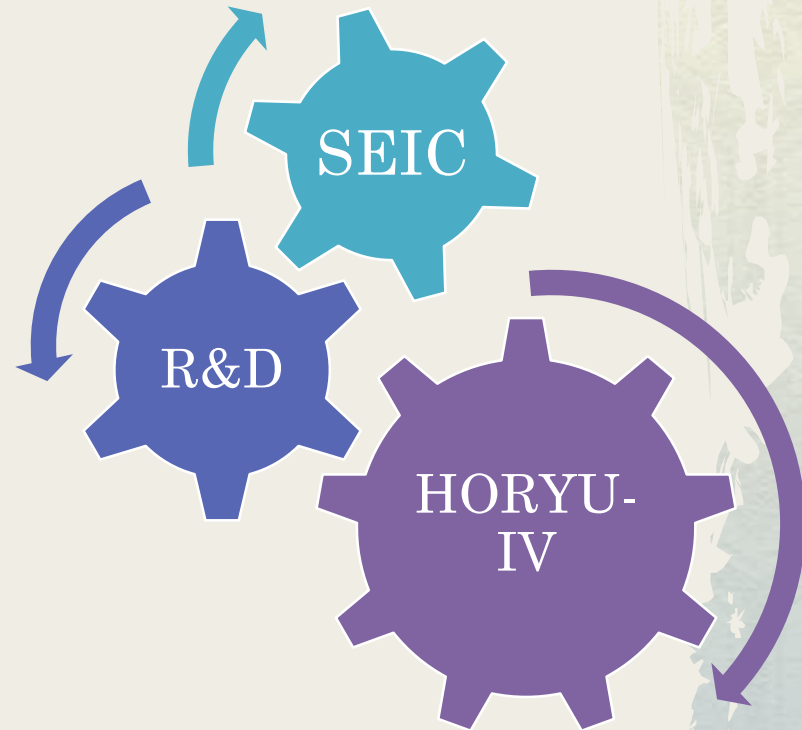


Road to PhD.

◆ SEIC

Space Engineering International Course

- ◆ Space Systems Engineering
- ◆ Introduction to Satellite Engineering
- ◆ Satellite Power System
- ◆ Space Environment Testing
- ◆ Power Semiconductor Devices
- ◆ Project-Based Learning
- ◆ Japanese Language



◆ R&D

- ◆ Optimization of EPS development
- ◆ Design and Carrying out of Experiments
- ◆ Project Based Learning
- ◆ Publishing papers



Single Event-latchup test at Kyoto University



IAA award MIC'2014



SEL test at Takasaki's reactor



TID test at Kyushu University



Road to PhD. (Cont.)



HORYU-IV Team

HORYU-IV after attachment to H-IIA No.30 Rocket, JAXA© Digital Achieves
<http://jda.jaxa.jp/result.php?lang=j&id=732e418b959d1311b20ba7766120c700>

Mass : 12 Kg
Dim. : 30 x 30 x 30 cm
Orbit : 570 Km, 31°

Launched in Feb. 17th., 2016

Main Mission: High voltage (~300V) generation and investigation of the arcing on Solar Panels due to interaction with the space environment
Aux. Missions: CAM, Digi-Singer and Space environment measurements



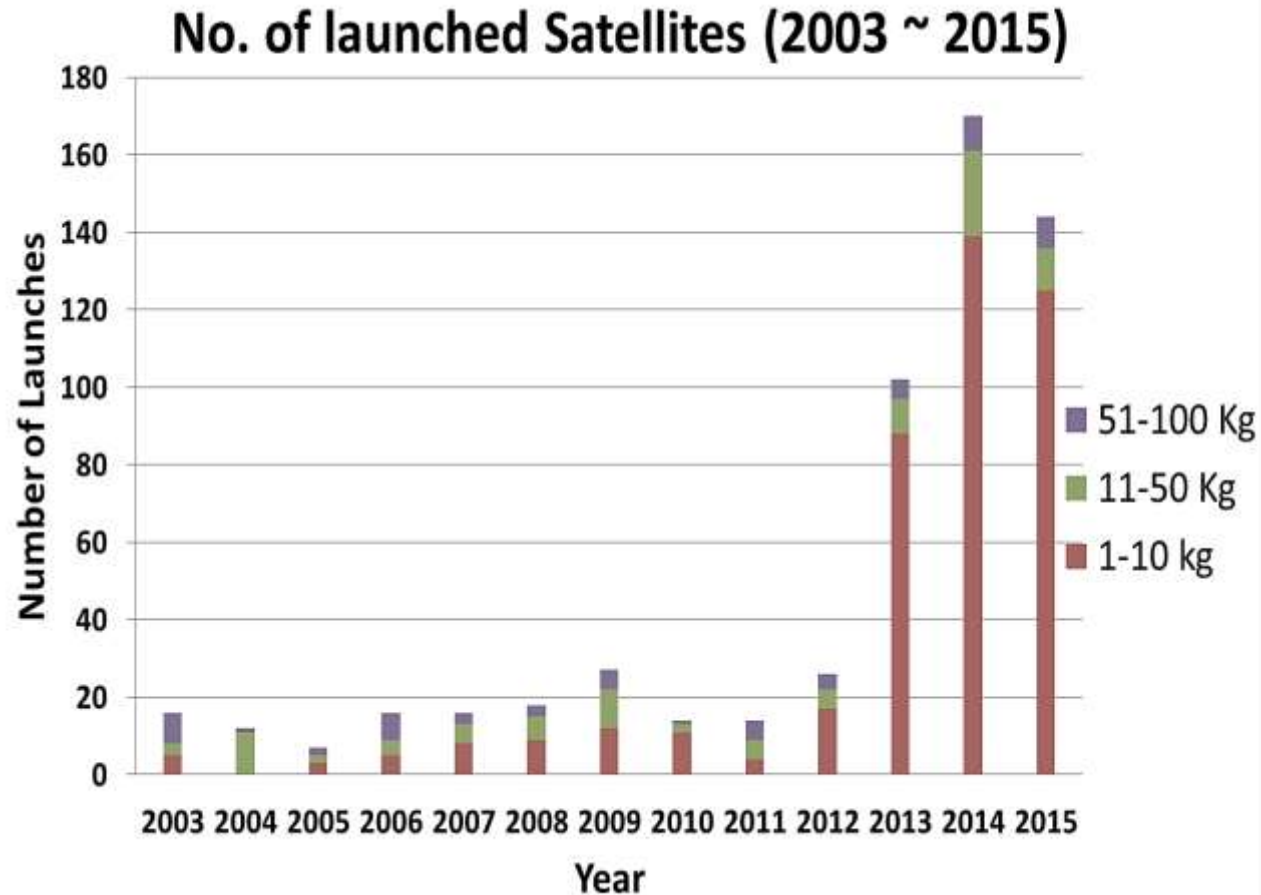
Purpose of the Research



- ◆ To develop a “Lean” EPS for lean satellites
- ◆ To meet all design requirements
- ◆ To propose testing methods and procedures
- ◆ To investigate all expected faults in the system and do FTA

Why we apply “Lean” concepts?

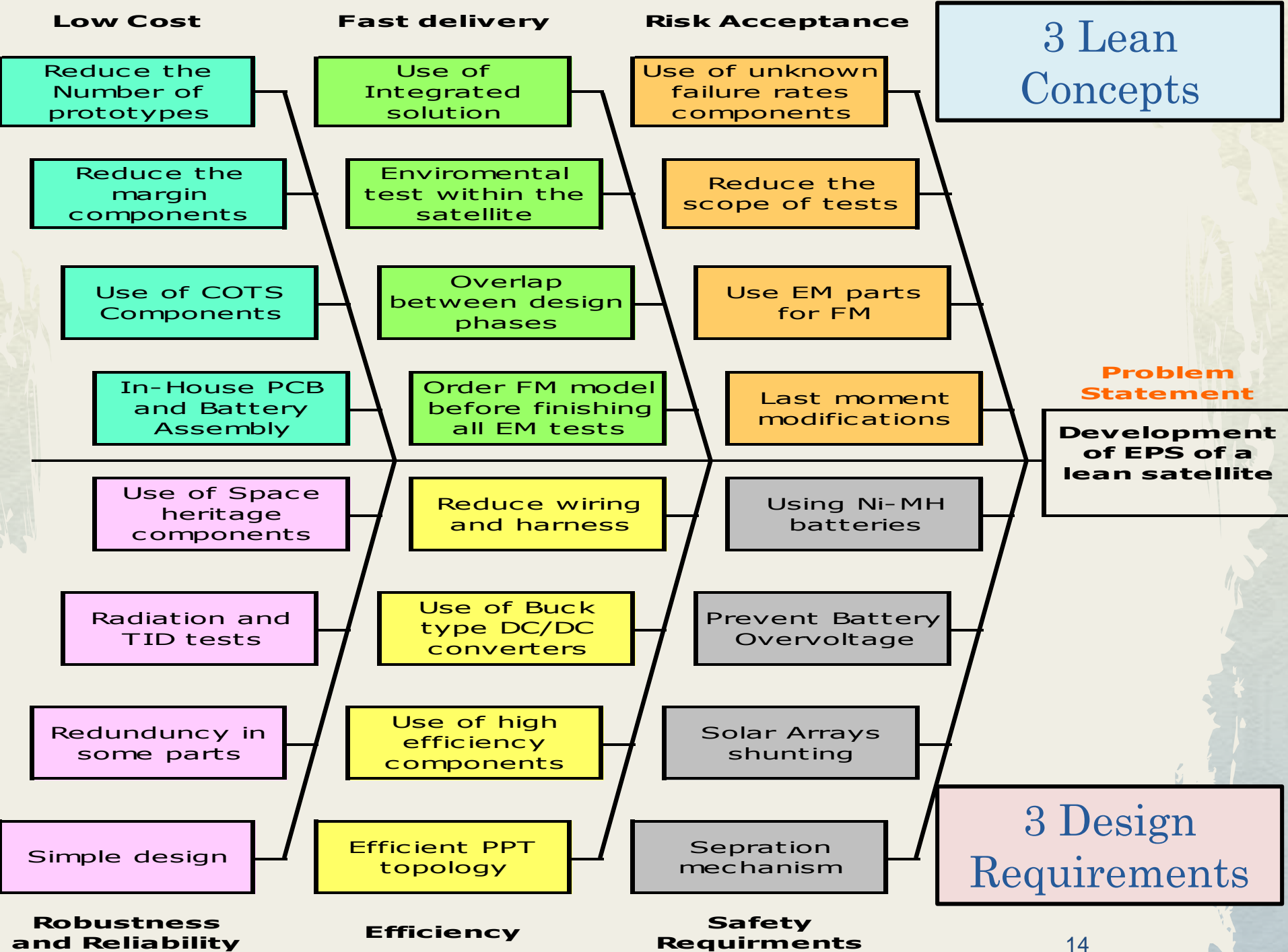
- To give the customers and stakeholders a kind of value to invest more in satellites development
- To define a New Standards to combine the Satellites comply for Lean



Number of launched Satellites < 100 kg
(Source: Kyutech)

What are the “Lean” concepts?

- Concepts and philosophies in both the development and the management processes
- “Lean” satellite perfectly describes any satellite which uses optimization concepts in its development
- Low cost, fast delivery, and risk acceptance





“Lean” EPS Development Matrix

C O N C E P T S



M E T H O D S

	Low Cost	Fast Del.	Risk Acc.	Reliability	Efficiency	Safety
Management	<ul style="list-style-type: none"> Reduce prototypes Reduce margin 	Overlap between design phases	Use of unknown	Use space Heritage comp.	Use of high efficiency components	Use Ni-MH Batteries
Design	COTS	Use Integrated Solutions	Last moment modifications	Simple	<ul style="list-style-type: none"> Use of Buck Conv. Efficient PPT 	<ul style="list-style-type: none"> Prevent Battery Overcharge Shunting
Manufacturing	In-House Assembly	Order FM before EM test finish	Use EM parts for FM model	Redundancy	Reduce Harness	
Testing		Environment Test within Satellite	Reduce scope of tests	SEL and TID tests		Separation Mechanism

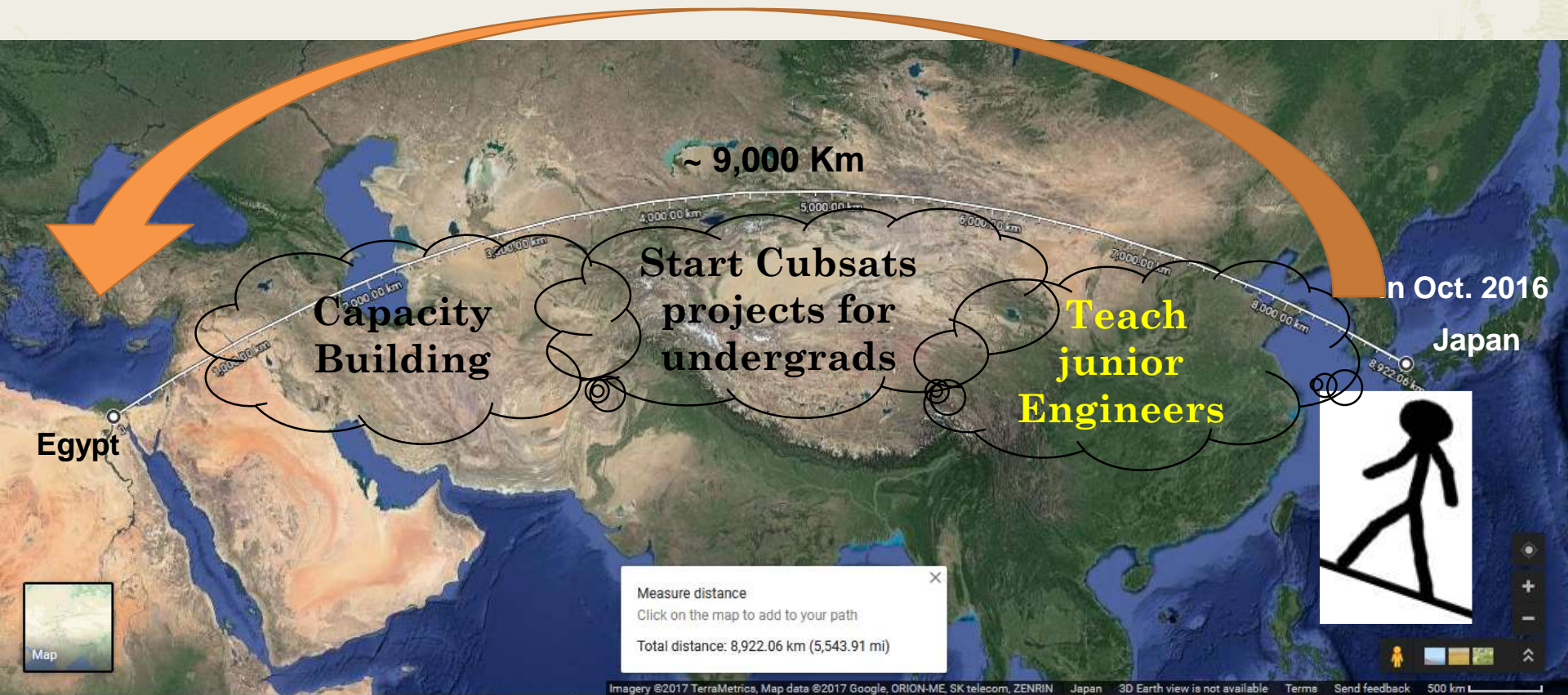


What did PNST Fellowship add to me?

- ◆ Having PhD in 3 years in advanced technologies
- ◆ Practicing satellite development life-cycle
- ◆ Enhance my scientific thinking and hands-on experience
- ◆ How to adapt in a multicultural system
- ◆ Establish solid and versatile connections with many people
- ◆ Strengthen the commitment towards my country



How can I transfer the gained knowledge to my country?





After PhD.....!

- ◆ Promoted to a Researcher position at NARSS Space Division
- ◆ Promoted to a head of Electrical Systems Department in EgSA
- ◆ A Principal Investigator of a project for design and implementation of a nanosatellite PCDU
- ◆ A System Engineer of “TeDDSat” Alliance
- ◆ A System Engineer of “NExSat” nanosatellite
- ◆ Electrical Power System Designer of “NARSSCube” satellites
- ◆ A Lecturer for “Power Electronics” in one of the Egyptian Universities
- ◆ A Supervisor of many Graduation Projects



Lessons learned from study in Japan

- ◆ Laboratory is my HOME
- ◆ Safety is the first priority
- ◆ Be Accurate and neat
- ◆ Publish or perish
- ◆ Together Everyone Achieves More
- ◆ Learning Japanese language is a must



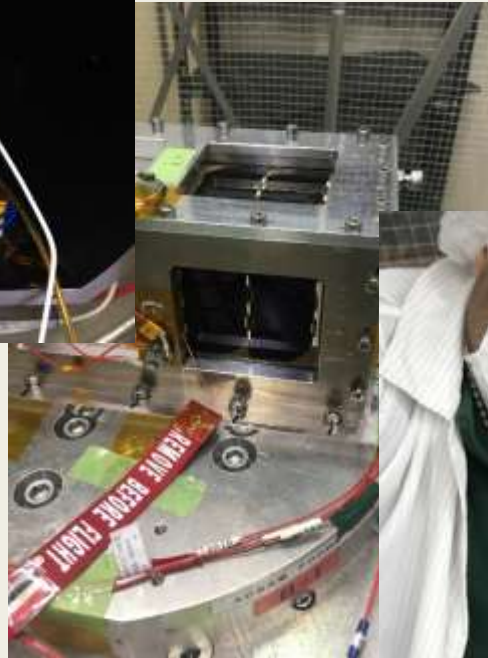
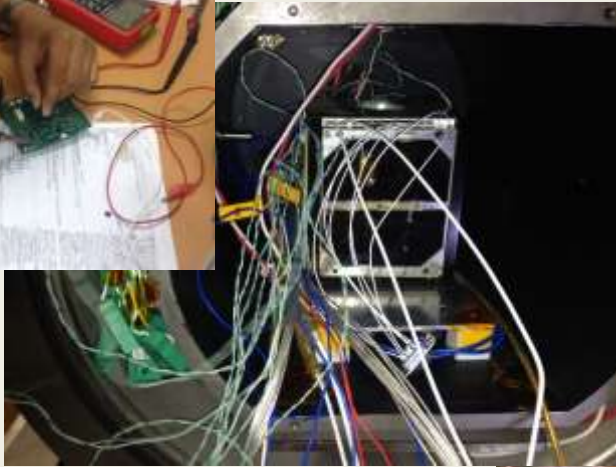
<http://newsabc.net/wp-content/uploads/2016/04/45-Motivational-quotes-for-students-to-study-hard-Quotes-1.jpg>



Satellite Projects in Egypt since 2016

Designed and Made in Egypt

Tested in and Launched from Japan





My life in Japan



December 14, 2020

Mohamed Yahia

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The background of the slide is a photograph of a tropical beach. In the foreground, there is a sandy beach with several palm trees. The ocean is visible in the middle ground, and the sky is a clear, bright blue. The overall scene is bright and sunny.

Thanks