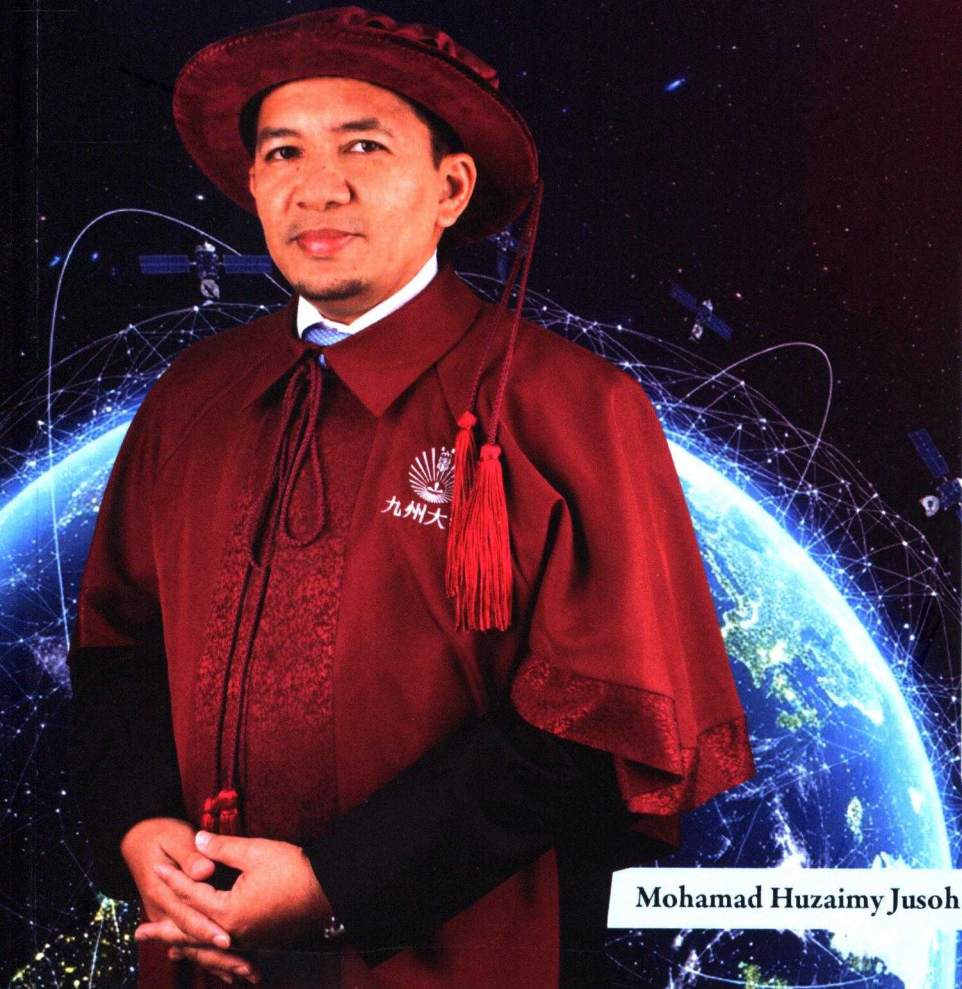




UNIVERSITI  
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MARA

# LEAN SATELLITE INNOVATION

FOR INDIGENOUS SPACE TECHNOLOGY DEMONSTRATION  
AND SPACE WEATHER RESEARCH



UiTM Professorial  
Lecture

Mohamad Huzaimy Jusoh

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# **PREFACE**

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More than a decade ago, UiTM had no satellites. It had no space weather monitoring network and no presence in international space research. The field was unfamiliar. The pathway was unclear. Whether a Malaysian university could build genuine space research capability was still an open question.

It is no longer open. UiTM now leads ASEANSAT, a regional satellite collaboration involving universities from across Southeast Asia. It operates a national space weather monitoring network, produces internationally recognised research, and contributes observational data to global scientific programs. What was once unfamiliar has become a field of active contribution. This book traces how that transition happened.

## **HOW TO READ THIS BOOK**

This book is written as a journey of capability building. It does not need to be read as a technical manual. It should be read as a story of how space research at UiTM developed from early scientific interest into satellite development, national monitoring capability, and regional leadership.

The Introduction explains the background of the journey. It describes how space weather research began, how the CubeSat

# **CHAPTER 1**

## **UiTM'S NANOSATELLITE PROGRAM - FROM BIRDS-2 TO ASEANSAT**

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### **1.1 THE BIRDS-2 PROGRAM AND UiTM'S STRATEGIC DECISION**

The opportunity came through existing research collaborations with Japanese institutions that had been maintained since 2010. When the BIRDS-2 program at Kyushu Institute of Technology was identified as a viable pathway into satellite development, the question was not whether it was technically achievable. The question was whether UiTM was prepared to commit resources to something that had never been attempted by a Malaysian university. The constraints were real: limited funding, limited satellite engineering expertise, and the task of selecting and preparing a team for more than two years of work in Japan. What made the decision possible was institutional support from UiTM's senior management, who saw the program as consistent with the university's long-term role in national technology development, and confidence built from years of working within the Japanese research model.

The BIRDS-2 project is a joint multi-nation satellite development program coordinated by Kyushu Institute of Technology (Kyutech), Japan. The program was designed to enable universities from non-spacefaring countries to develop nanosatellites by working through the complete engineering cycle, from mission

This book presents Prof. Ir. Dr. Mohamad Huzaimy Jusoh's sustained pursuit to establish UiTM's scientific and technological capability in space weather research and nanosatellite development. His work is driven by the need to build local expertise in a field once unfamiliar to Malaysian universities. Through comprehensive studies on geomagnetic monitoring, equatorial ionospheric behaviour, satellite systems and lean CubeSat development, the book documents the progression from MAGDAS-based ground observations to UiTMSAT-1, ASEANSAT and UiTMSAT-2. These efforts are integral to strengthening Malaysia's capability in space science, satellite engineering, data acquisition, mission operations, and infrastructure resilience. The outcomes have contributed to research publications, human capital development, regional collaboration, and national space policy alignment. The book ultimately highlights the importance of sustained university-led space research in supporting MSE2030, MySTIE, MySpaceU, and Malaysia's aspiration toward indigenous space capability.

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He has supervised more than 20 postgraduate students, secured over 10 research grants, and published more than 100 scientific articles. He leads several international initiatives, including UiTMSAT-1, ASEANSAT, the MAGDAS Project, Antarctic and Arctic scientific explorations, and the development of Space-based IoT networks. Since 2018, he has served as a Visiting Professor at the Kyushu Institute of Technology, Japan, while also contributing as a Co-Chairman, Visiting Engineer, and Technical Consultant for various satellite-related industry and government projects, including space weather mitigation and the National Satellite Project.