The First Mauritian Nanosatellite
Paving the way for a Space Program for the Republic of Mauritius

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9th June 2022

65th session of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS)
The Republic of Mauritius

- Total Area: 2,040 sq Km
- Population estimate (2019): 1,265,475
- GDP (PPP): USD 25,029
- Exclusive Economic Zone (EEZ): 2.4 million sq km
- Ibrahim Index of African Governance: Improved from 82 to 52 (1st in Africa)
- Global Innovation Index 2020: 1st in Africa
- World Bank Doing Business 2020: 1st in Africa

Source: https://en.wikipedia.org/wiki/Mauritius
A blind spot over the Indian Ocean Region
Mauritius – now a Space Player – KiboCube 3rd Round Winner in 2018

• First ever spacecraft for Mauritius
• Went through all the key steps:
  • Registration to the ITU through our local Agency responsible for Telecommunications – ICTA: www.icta.mu
  • Registration of Radioamateur frequency with IARU
  • Help received from International expert RadioAmateur – Chris Thompson and Daniel Estevez
  • Informed ITU through ICTA once the Spacecraft phased out in April 2022
• Looking forward now to consolidating the Space Initiative – Development of a longer term and sustainable Space Program for Mauritius
Our Journey in Space

3rd Round Winner Kibocube in July 2018

Design and Build 3 years

Deployment

3rd June 2021

July 2018
Feb 2021

Re Entry 19th April 2022
MIR-SAT1 – Mauritius Radiocommunication and Imagery Satellite 1

1. Acquire knowledge and skills in satellite technology,

2. Build capacity in satellite/space technology

3. Satellite Communication Once in space

4. Use on-board payload to capture images of Mauritius and its EEZ

5. Test the Island-to-Island communication module

Launched to ISS 3rd June 2021
Re-entry 19th April 2022
Some 50 pics taken
Island to Island Communication via HAMS successful
High Level Steering Committee setup, chaired by the Minister of ITCI, comprising of several stakeholders.
MIR-SAT1 – a small satellite which paves the way for ambitious future ventures space/Satellite Technologies for Mauritius
First Mauritian Satellite
MIR-SAT1
Mauritius Imagery Radiocommunication Satellite 1

22nd June 2021 – MIR-SAT1 Deployed from the International Space Station
31st August 2021 – MIR-SAT1 Commissioning Completed
6th September 2021 – Registered MIR-SAT1 with UNOOSA
7th October 2021 – Unveiling of MIR-SAT1 Images

MIR-SAT1 Image of the Mauritian EEZ captured on 15th of September 2021 at 16:00

Technical Difficulties encountered by the MRIC Engineers during Commissioning Period
• Changed Download Protocol which was not planned
• Adapt simulation with terrain and satellite spin rate
• Plan operation to the nearest seconds
• Extensive Command Testing on FlatSat

MIR-SAT1 Image of Mauritius & Reunion captured on 20th of August 2021 at 16:36
MIR-SAT1 Image of South Coast of Madagascar captured on 10th of September 2021 at 12:45
School Decodes MIR-SAT1

Forest Side SSS (Girls) is the 1st school in Mauritius to have decoded MIR-SAT 1 telemetry on two occasions Saturday 24/07/2021 and uploaded same to Satnog. Forest Side SSS (Girls) was the second school to be equipped with a simplified Antenna and mini ground station training program Extend to whole Mauritius and Rodrigues MRIC offer built antenna to all schools
The Future!

Ensuring Sustainability

+ Tackling our Challenges – From data to Solution (Blue Economy)

+ Socio-economic benefits
FIRST MAURITIAN SATELLITE — UNRAVELS NEW OPPORTUNITIES

JOURNEY TO SPACE ALTHOUGH NOT EASY BUT EXTREMELY REWARDING AND OFFERS HIGHLY PROMISING FUTURE

✦ MAURITIUS NEWEST SIDS IN SPACE
  • Geolocation interesting for future space related activities
  • More advanced space nations interested to collaborate

✦ NEW ‘SPACE–FORCE’
  • Building highly technical capacity
  • Sophisticated ground station for future missions set up
  • Training of younger generation

✦ FUTURE SOCIO–ECONOMIC PILLAR
  • Space offers numerous possibilities for Mauritius. Data analytics, opportunities for R&D, business opportunities, intergovernmental collaborations.

✦ INSPIRATION FOR YOUNGSTERS
  • The training program on antenna building gave us an insight of the high level of enthusiasm for this new field. There is hope to enhance this interest further to build new capacity.

✦ PULL FACTOR FOR R&D
  • This historical initiative for the Republic of Mauritius promises to unlock new opportunities for research, innovation and socio-economic development.
Mauritius in the process of Planning its ‘Space Future’

- **Challenges and Needs**: Addressing the challenges and satisfying the needs
- **Space Curriculum**: Implementing a space curriculum at all educational levels
- **Career Opportunities**: Creating a prospering space job market
- **Space Infrastructure**: Providing the required infrastructure for space missions
- **International Partnership**: Promoting international collaboration to become a leading space player in the Indian Ocean
- **Space Organisation**: Establishing an organisational structure responsible for space sector missions
- **Legal Framework**: Establishing rules and regulations for use of space operating environment
Mauritius contribution for peaceful, sustainable and responsible utilization of space as a Small Island Developing State

- Mitigate Climate Change (preparedness for cyclones, tsunamis, flash floods etc)
- Better management of EEZ (security, fish resources, research, sustainable exploitation of ocean resources)
- Contribute and collaborate with the handful of SIDS having a space presence to devise space policies and laws which specifically apply to SIDS
- Engage into collaborative ventures with international stakeholders to engage in research in space/satellite technologies
DREAM IT

THEN

make it

HAPPEN

The First Mauritius

Space Adventure
MEET THE MIR-SAT1 TEAM

Faraaz Shamutally
Aerospace Engineer
Principal Investigator

Dr Vickram Bissonauth
Project Coordinator
Overall project management and coordination

Ziyaad Soreefan
Aerospace Engineer
Co-Principal Investigator

Koushul Narrain
Researcher
Ground Station Implementation
Facilitator & Lead on Awareness Events

Kiran Tatoree
Researcher
Lead on Antenna training program
Potential Areas Contributing to Space Exploration

• Ground Station as a Service (GSaaS)
Ground Station as a Service

A blind spot over the Indian Ocean Region

Use of Existing stations

OR

Set up of ground station network
Potential Areas Contributing to Space Exploration

• Ground Station as a Service (GSaaS)
• Spaceport
A potential **Spaceport** for launching and receiving Spacecrafts

Mauritius - Surrounded by large ocean with and EEZ of 2.4million square km

- No crowded airspace
- Safe downrange distance

Can be a potential spot for
- **Horizontal Take-offs**
- **Horizontal Landings**
- **Sub-Orbital flights**
Potential Areas Contributing to Space Exploration

• Ground Station as a Service (GSaaS)
• Spaceport
• Astronomical Observatory
A Mauritian Astronomical Observatory

• No large cities causing
  Less air pollution (no smog)
  Less light pollution (clearer sky)

• Easy access to remote location