

MY CLTP15 EXPERIENCE: FROM CLTP15 TO SARAWAK NEW SPACE CAPABILITY

Learning → Mission Design → Local Training → 3U CubeSat → Earth
Intelligence

72nd Virtual UNISEC-Global Meeting • CLTP15 Session

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i-CATS University College, Sarawak, Malaysia

19 September 2026



- International teamwork
- Hands-on satellite engineering
- Best Project Presentation
- Teaching practice & new collaborations

WHY SARAWAK NEEDS THIS

- Dense tropical forest holding high biodiversity and carbon stocks.
- Dispersed rural communities where terrestrial networks are costly.
- Large coastal and river systems that change fast and need watching.



Sarawak: 124,450 km² - the largest state in Malaysia

ALREADY PROVEN FOR SARAWAK

Sentinel-1 and Sentinel-2 fused with 245 field plots to map Sarawak mangroves. Reference results from i-CATS research.

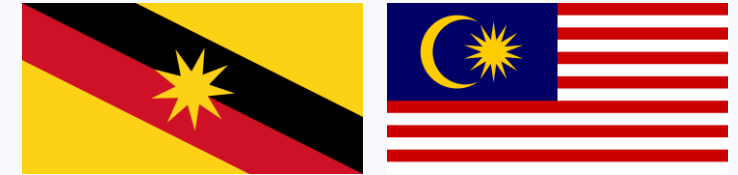
1,078.7 km²

88.8%

R² 0.72

AUC 0.960

PROFILE	ABDUL QAIYUM ALIDIN MALAYSIA
Present status	• Ph.D. Candidate, Universiti Putra Malaysia (UPM) • CLTP15 graduate and HEPTA-SAT train-the-trainer participant
Present Position	Deputy Dean & Senior Lecturer Faculty of Aerospace Engineering, i-CATS University College, Sarawak, Malaysia
Field of specialization	• Aerospace systems integration, test & verification • Small-satellite and UAS systems • Digital engineering • Climate and environmental applications
Research Interests	• Earth Observation & satellite data • Multispectral / thermal sensing • AI/ML • CubeSat/UAS payloads and mission applications



CLTP15 | i-CATS University College, Sarawak



Why CLTP15 matters

CLTP15 is already translating into collaboration, industry engagement and a practical capability pathway for Sarawak, Malaysia.

CLTP15

18–28 Aug 2026

Hands-on satellite engineering + train-the-trainer pathway

UNISEC-Global

19 Sep 2026

Today's 72nd virtual meeting is dedicated to the CLTP15 Session

Sarawak Science Centre

17 Sep 2026

Sarawak Science Centre visit: MARii, CREST and NAICO with industry showcase discussions

URIIS 2026

21–23 Sep 2026

Yayasan Sarawak Education Group showcase; i-CATS aerospace focus and 3U CubeSat research highlight

CLTP15: level up from participant to capability multiplier

The strongest outcome was not only technical or hands-on learning — it was learning how to reproduce the method at home.

3. Feedback from CLTP15

CLTP-15 connected theory, hands-on integration, mission thinking and teaching practice in one complete learning experience.

- CLTP-15 refreshed and strengthened my understanding of a complete small-satellite development cycle — from mission objectives and subsystem integration to communications, testing and troubleshooting.
- The progression from subsystem learning to assembly, hardware/software integration, mission design, implementation, test and debugging made the systems-engineering process much clearer and more practical.
- Working in an international team was one of the most valuable parts of the programme. Different technical backgrounds and cultures made the learning more practical and collaborative; our team was honoured with the Best Project Presentation.
- The final teaching practice reinforced my own understanding because explaining, guiding and troubleshooting with others turned the training into confidence to transfer the knowledge back home.



BEST PROJECT PRESENTATION

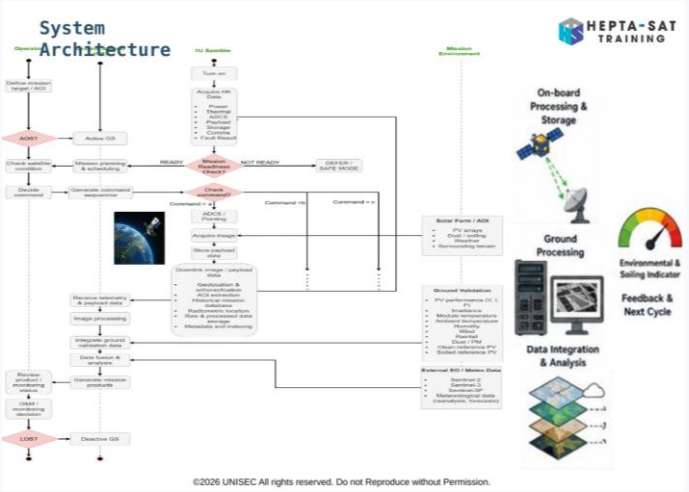
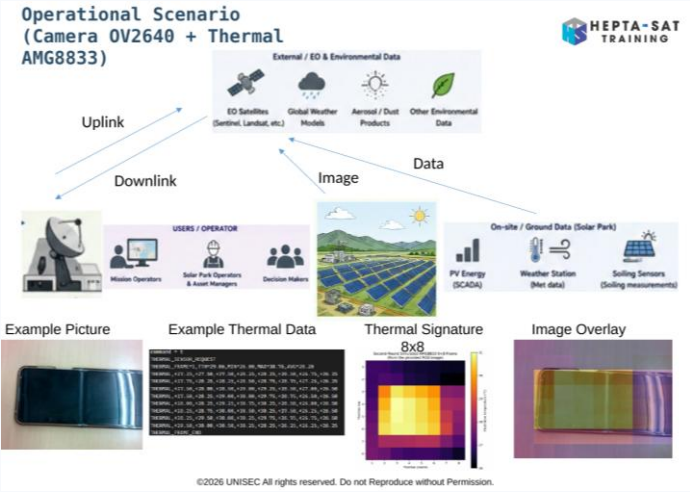
• International team • CLTP-15

BEST PROJECT PRESENTATION

- End-to-end systems engineering: requirements, integration, communications, mission design, testing and troubleshooting.
- International team mission design connected technical disciplines with clear user and stakeholder needs.
- Teaching practice converted knowledge into confidence to guide, explain and troubleshoot with others.
- Core takeaway: one participant should become a local trainer who creates opportunities for many more participants.

What we built at CLTP15: Solar PV monitoring mission

A complete mission chain from sensing, communications, ground operations and decision-support.



MISSION

Observe selected solar farms and detect environmental changes relevant to PV operation.

PAYLOAD / DATA

Visible image + thermal + multispectral + ground weather data; fuse satellite and terrestrial information.

OPERATIONS

Acquire → store → downlink → analyse → produce indicators / alerts for operators.



The engineering lesson: quantify → identify limitations → make design decisions

CLTP15 reinforced a discipline that directly applies to the i-CATS 3U mission.

- 1

Mission need

Start from users, AOIs and measurable success criteria
- 2

Quantify

Orbit, GSD, pointing, power, thermal, RF, structure
- 3

Challenge assumptions

Example: an 8×8 thermal array is unsuitable as the primary LEO imager
- 4

Close the design

Select optics, derive ADCS, complete link/power budgets, validate through test

Decisions		
Result	Limitation / margin interpretation	Design decision
~8.7 km displacement for 1° at 500 km	AOI targeting can fail without adequate pointing	Derive ADCS requirements from AOI + FOV
~92.6–96.7 min orbital period across 400–600 km	Altitude affects imaging more strongly than period	Trade altitude against GSD, revisit and lifetime
Visible GSD spans tens to hundreds of m/pixel in FOV trade	Optics dominate mission usefulness	Select/validate lens before freezing payload
Power / thermal / RF margins = TBD	Insufficient bus data for numerical closure	Acquire subsystem specifications and test data

Area	Assessment	Conclusion
Mission concept	Feasible	Logical chain from observation to data fusion is coherent
Visible imaging	Conditional	Feasibility depends on final optical design and GSD
Thermal imaging with AMG8833	Limited	Reference calculation does not support detailed solar-farm imaging from LEO
ADCS	Conditional	Requirements must be derived from AOI/FOV and verified
Power / thermal / communications / structure	Open	Numerical closure requires missing spacecraft-bus specifications
Data fusion / alert concept	Feasible	Strong candidate for ground-segment processing and future work

Applying CLTP thinking to the i-CATS 3U CubeSat

A Sarawak-focused technology demonstrator combining rural IoT connectivity with multispectral Earth observation.



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ALREADY PROVEN FOR SARAWAK

Sentinel-1 and Sentinel-2 fused with 245 field plots to map Sarawak mangroves. Reference results from i-CATS research.

1,078.7 km² mangrove extent mapped	88.8% classification accuracy	R² 0.72 biomass model fit	AUC 0.960 classifier performance
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Sentinel-class results. The 3U concept targets a comparable role at smaller scale.

HOW IT COMPARES

Miniaturised sensors now put application-grade Earth observation within reach of small platforms.

Sentinel-2	PlanetScope / SuperDove	i-CATS 3U Concept
1 140 kg satellite	3U CubeSat fleet	3U CubeSat

3U

10 × 10 × 30 cm

<15 m

target GSD

500–600 km

SSO target

2–3 yrs

mission life

Two payload/service pillars

- LoRa IoT: low-power telemetry from remote sensors for agriculture, forestry and infrastructure monitoring.
- Multispectral imaging: land-use, vegetation and environmental monitoring with a compact EO payload.

Mission value = technology + local talent + mission operations + environmental intelligence

The application base already exists: Earth intelligence for Sarawak

The i-CATS 3U CubeSat mission builds on demonstrated remote-sensing research.

Sentinel-1 + Sentinel-2 + 245 field plots → feature fusion → XGBoost/SHAP → mangrove extent, biomass and risk

1,078.7 km²

mapped mangrove extent

88.8%

classification accuracy

AUC 0.960

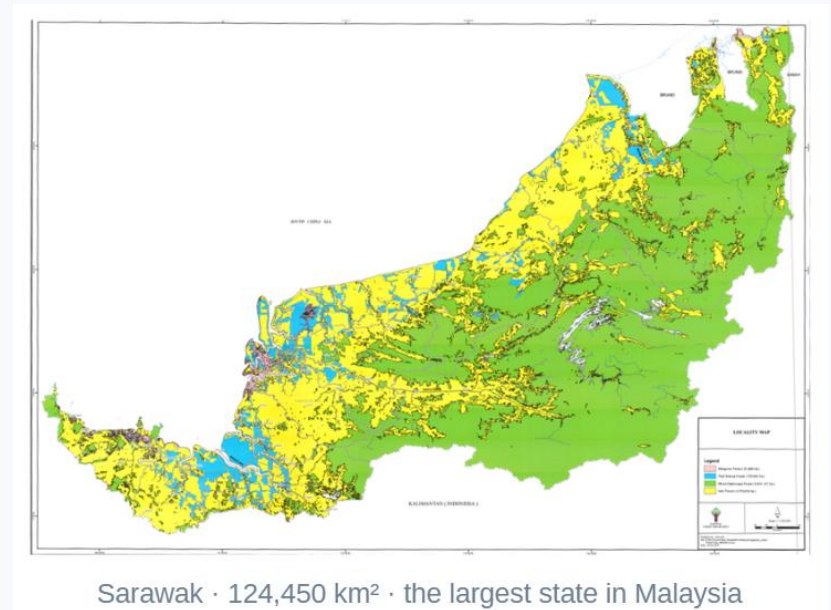
classifier performance

R² 0.72

biomass model fit

r = 0.85

predicted vs observed biomass



Strategic translation

- Use larger satellite missions as the baseline for science and algorithm development.
- Use the 3U platform for focused, repeatable local missions, data acquisition and workforce development.

Sarawak, Malaysia ecosystem momentum: the timing is unusually strong

Education, public engagement, industry and agencies are beginning to connect.

Visit by industry delegation supported by government agencies with complementing roles in Sarawak

FOUR CONNECTED STEPS: ENGAGE → CONNECT → SHOWCASE → BUILD

01
ENGAGE
17 SEP 2026

02
CONNECT
19 SEP 2026

03
SHOWCASE
21–23 SEP 2026

04
BUILD
Q1 2027



Sarawak Science Center visit
Sarawak Science Centre
Showcase + industry/agency collaboration
showcase discussion



UNISEC-Global
72nd Virtual Meeting
CLTP15 Session
Share results & strengthen networks



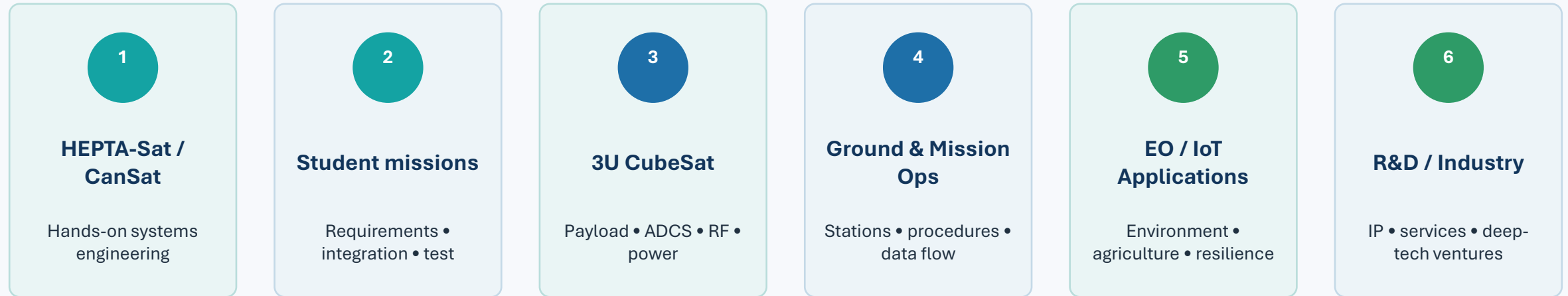
URIIS 2026
i-CATS 3U CubeSat
Research, investment & public visibility



Proposed next step
HEPTA-Sat Sarawak
local trainer pipeline
Student missions & mission readiness

The capability pathway: make CLTP repeatable in Sarawak

The objective is not a one-off workshop; it is a ladder from education to missions, operations, research and enterprise.



Proposed HEPTA-Sat Sarawak 2027:
~25–30 participants • 5–6 project teams • initial local trainer / teaching-assistant pool

Source: CLTP15 feedback vision and proposed next-step plan.

What's Next and Conclusion

Convert the momentum into a small number of visible, measurable deliverables.

- | | | |
|----|--------------------------------|---|
| 01 | Training | Coordinate HEPTA-Sat Sarawak 2027; certify/mentor local trainers and TAs. |
| 02 | Mission engineering | Peer review 3U mission requirements, payload trade-offs, ADCS, RF and verification plan. |
| 03 | Ground segment | Connect HEPTA-Sat / ground-station exercises to operational procedures and data pipelines. |
| 04 | International network | Link students and researchers with UNISEC chapters, Nihon University, relevant mission pathways. |
| 05 | Showcase & industry | Sarawak Science Centre, i-CATS University College and APACE/APRSAF as public-facing capability demonstrations and partner-entry points. |

Success measure: every international learning opportunity should create a local trainer, a student team, a demonstrator, or a mission capability.

“LEARN IT. BUILD IT. TEACH IT. BRING IT HOME.”

The real impact of CLTP begins after the course —
when knowledge becomes opportunity for others.

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Thank you · Q&A



- International teamwork
- Hands-on satellite engineering
- Best Project Presentation
- Teaching practice & new collaborations

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