Presentation on

Nepalese Space Expert Training in Japan through Satellite Systems Engineering

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Kyushu Institute of Technology
Kitakyushu, Japan

Kyutech
Kyushu Institute of Technology

Agenda

1. Self-Introduction
2. Kyushu Institute of Technology & BIRDS
3. 14th Plan of NPC (Space Technology)
4. Push for Nepal
5. Output
6. Outcome
7. FAQ

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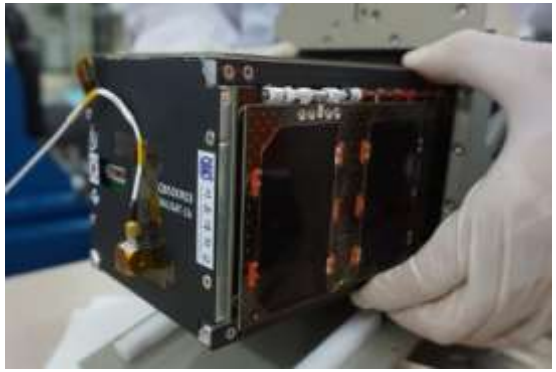
1. Self-Introduction

- Education
  Budhanilkantha School
  Seoul National University
  (Undergraduate & Masters)
- SNUSAT-1/1b, SNUSAT-2
  Lead Hardware Engineer
- Start-up scene (Tech & Food)
- UN/MEXT BSTI Fellow
  Kyushu Institute of Technology
  Post-graduate Study on Nano Satellite Technologies (PNST) under
  Basic Space Technology Initiative Fellowship



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Master's Thesis (2014-2016)

Fig. 5 IFCAM BBM
[Photo by Maskey, 2015]

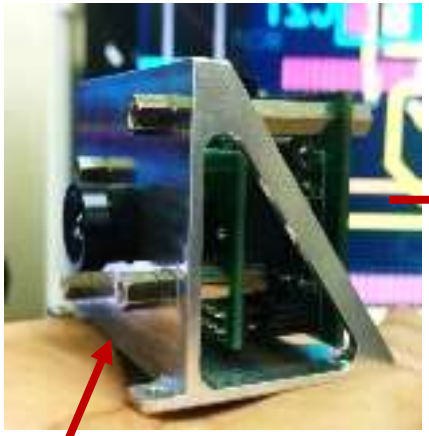


Fig. 7 IFCAM EQM
[Photo by Maskey, 2016]

Fig. 8 IFCAM EQM Near Field/Far Field Test
[Photo by Maskey, 2016]

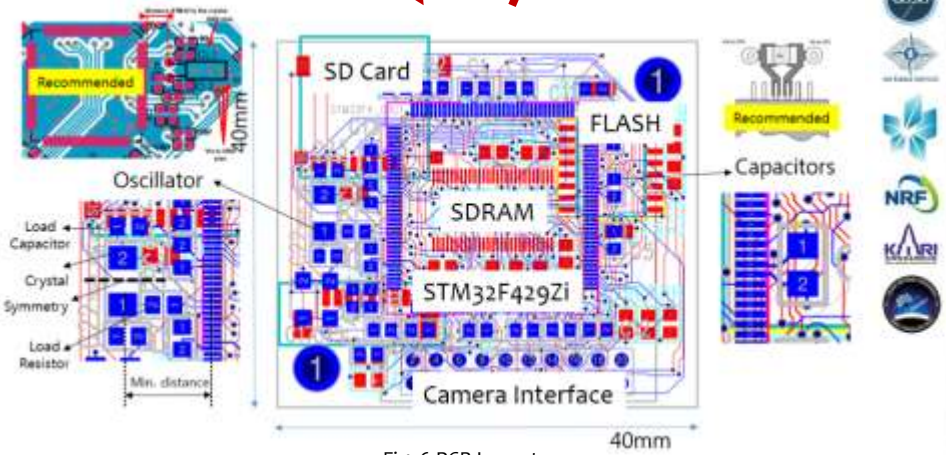
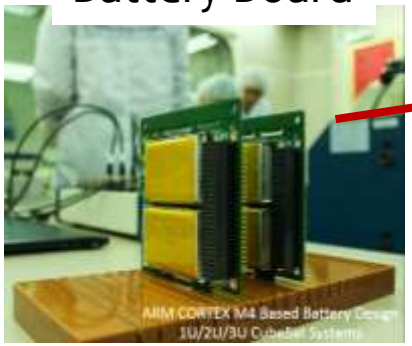


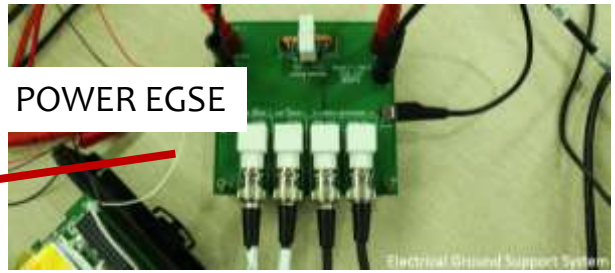
Fig. 6 PCB Layout
[Photo by Maskey, 2016]

Fig. 9 IFCAM FM with Space Environment testing
[Photo by Maskey, 2016]

SNUSAT-1/1b & SNUSAT-2

Battery Board



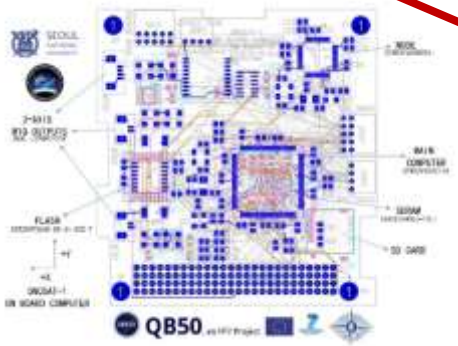


POWER EGSE

SNU BROCHURE

SNUSAT

OBC



SNUSAT EGSE

CanSat: Cheap Edu. Satellites

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2. Kyutech & BIRDS

Bangladesh

BIRDS-1

STATUS: LAUNCHED

May 2017

Bhutan

BIRDS-2

STATUS: DEVELOPING

May 2018

BIRDS-3: SRILANKA
May 2019

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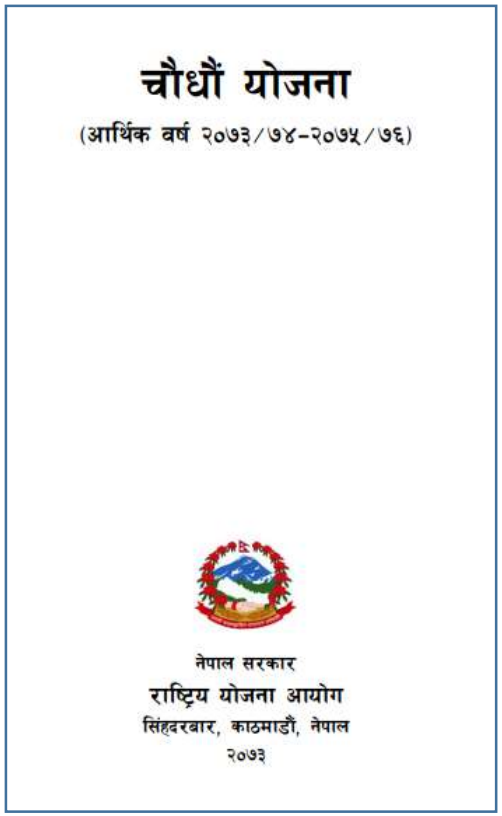
3. 14th Plan of NPC



चौधौं योजना

(आर्थिक वर्ष २०७३/७४–२०७५/७६)

नेपाल सरकार
राष्ट्रिय योजना आयोग
सिंहदरबार, काठमाडौं, नेपाल
२०७३

६.२ विज्ञान, सूचना तथा प्रविधि

६.२.१ विज्ञान प्रविधि

३.४ रणनीति

१. वैज्ञानिक अनुसन्धान, अन्वेषण र विकासलाई गतिशील बनाउन आवश्यक पर्ने पूर्वाधार र क्षमताको विकास गर्ने ।

२. उच्च क्षमतायुक्त प्राविधिक युवा जनशक्तिको विकास गरी मुलुकमै उनीहरूको क्षमता उपयोग गर्ने ।

३.५ कार्यनीति

१. देश विकासका लागि आवश्यक पर्ने दक्ष तथा अर्धदक्ष जनशक्ति विकास र त्यसको व्यवस्थित उपयोगका निम्ति निजी क्षेत्रको समेत सहभागितामा एकीकृत मानव संसाधन विकास योजना तयार गरिनेछ । (१)

२. उच्च वैज्ञानिक तथा प्राविधिक शिक्षाका अवसरहरू उपलब्ध गराएर श्रमबजारमा प्रतिस्पर्धा गर्नसक्ने गुणस्तरीय जनशक्ति तयार गरिनेछ । (२)

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५. परमाणु प्रविधि, अन्तरिक्ष प्रविधि, जैविक प्रविधि र सूक्ष्म प्रविधिलगायतका प्रविधिहरूको विकास तथा उपयोगका लागि समयसापेक्ष नीति निर्माण तथा परिमार्जन गरिनेछ । (१)

१४. अन्तरिक्ष प्रविधि, जैविक प्रविधि, साइबर प्रविधि तथा परमाणु प्रविधिको विकासका लागि राष्ट्रिय अनुसन्धान केन्द्रहरूको स्थापना गरिनेछ । (३)

अन्तरसम्बन्धित विकास नीतिहरु | २३९

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NPC Tenure Keywords

- Vision 2030
  Status: Being drafted
  Instead the usual 3-year plans
  Middle-income country
- National Pride Projects
  Definition:
  National, time-bound initiatives that are deemed by the government to be transformative in terms of the economic, social, cultural or environmental impact on the quality of lives and **the collective identity of the people of Nepal.**

  ->Technology.

  Projects: "affordable and technologies used in the project should be known, tested and available"

  Not legally bound

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4. Push for Nepal

April 11-12, 2017


Joint Global Multinational Birds Project (BIRDS-3) Proposal

NEPALESE SPACE EXPERT TRAINING THROUGH SATELLITE SYSTEMS ENGINEERING

Submitted to:

Government of Nepal
Ministry of Science and Technology

2017-2019 | 2019-2022 | 2022-2025

Nepal's Participation in BIRDS-3 (1U) | 2U Satellite development in Nepal | 3U Satellite for various applications

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From Kyushu Institute of Technology (Kyutech), Japan
G. Maeda, M. Cho
20 April, 2017

Meeting at Ministry of Science & Technology

Meeting with NPC Members

Meeting at Ministry of Information and Communications

Meeting at Kathmandu University

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Meeting at BP Memorial Planetarium (Not shown)

Budget Breakdown

Table 2 Cost Breakdown

Parameters	Comments	Cost*
Satellite Hardware Satellite Testing Satellite Launch	Fixed Cost	JPY 15,000,000 [NRs.1,42,30,135] [USD 138, 075]
Student Education Student Living	Per year per student	JPY 2,500,000 [NRs. 23,71,690] [USD 23,013]

Table 3 Case by Case Total Cost. The number of years have been taken into account.

Case	Comments	Total Cost* (inclusive of all costs)
CASE I (Acceptable Case)	2 PhD Students	JPY 30,000,000 [NRs. 2,84,60,270] [USD 276,150]
CASE II (Acceptable Case)	1 PhD, 1 Masters Student	JPY 27,500,000 [NRs. 2,60,88,581] [USD 253,138]
CASE III (Best Case)	2 Masters Students	JPY 25,000,000 [NRs.2,37,16,892] [USD 230,125]
CASE IV (Worst Case)	1 PhD Student	JPY 22,500,000 [NRs.2,13,45,203] [USD 207,113]
CASE V (Worst Case)	1 Masters Student	JPY 20,000,000 [NRs.1,89,73,514] [USD 184,100]

*Can change according to the exchange rate. Calculated with exchange rates given on 16.04.2017

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CRA: Cooperative Research Agreement
One time payment

Timeline & Requirements

Table 1 Timeline for BIRDS-3 Project

Time	Oct 2017	June 2018	Jan 2019	May 2019	May-Sep 2019	Sep 2020
Schedule	BIRDS-3 commences	Critical Design Review (CDR)	Flight Model (FM) ready	Launch	Ground Station (GS) Operation Sep 2019: Masters return	PhD returns

1) Must be passionate about space
2) Must have a bachelor degree in any field of engineering (Civil, Chemical, Electrical, Mechanical and so forth)
3) Must have graduated in the top 10 percent of their graduating class
4) Must be willing to return home for the development and deployment of aerospace related activities

Further information on applicants:

1) Applicants can apply for PhD or Masters degree
2) Selected applicants will commence the project from October, 2017
3) Young fresh graduates with no experience preferred

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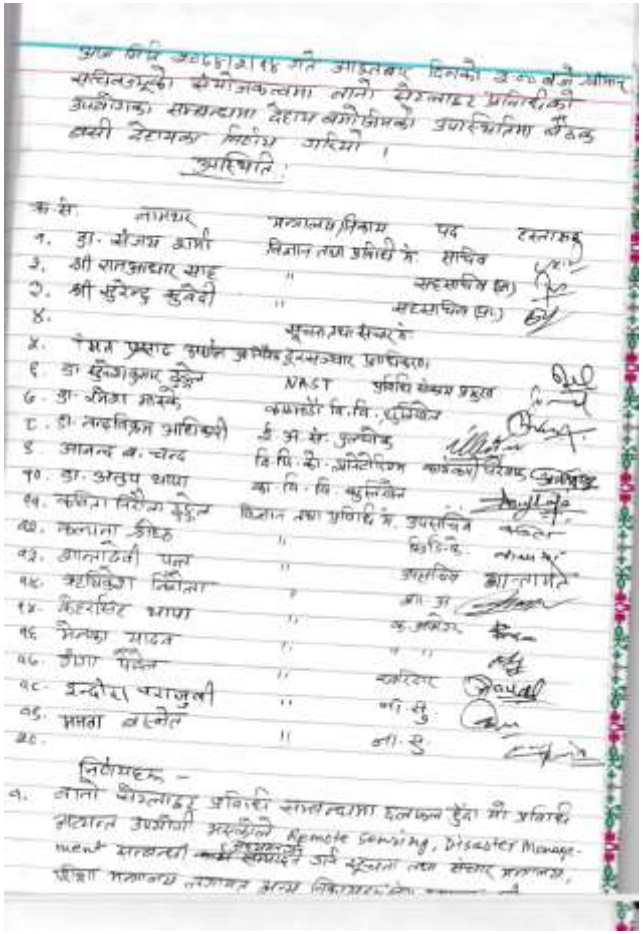
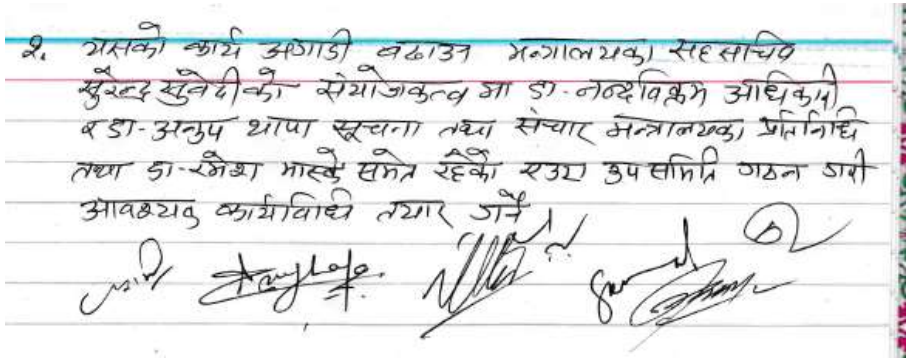
Follow-up Meeting





28 May, 2017
New Secretary **Dr. Sanjay Sharma**
Ministry of Science and Technology

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NAST Meeting

Presentation about BIRDS-3 at NAST

16.08.17
Meeting at NAST:

1) Budget insufficient
2) NAST will take full responsibility for the section of students
3) Planetarium (Science City)

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NPC Members

Dr. Sunil Babu Shrestha
(Science and Tech)

Dr. Swarnim Wagle
Vice-Chairman

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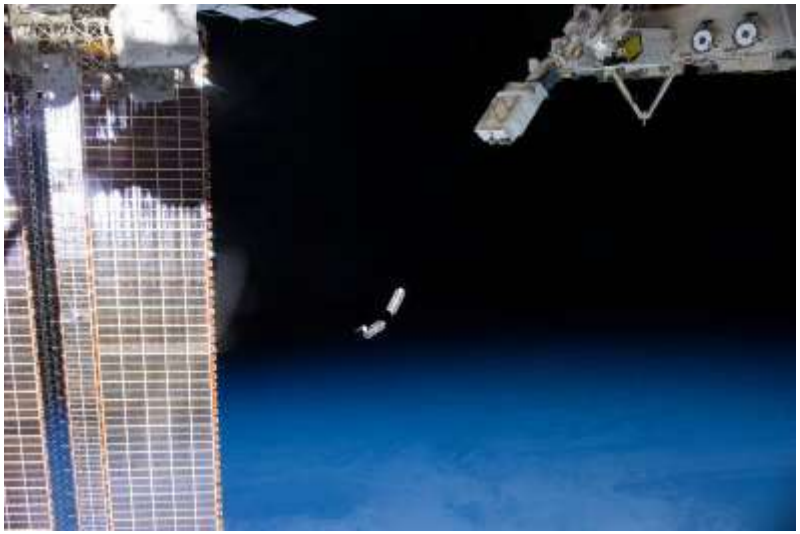
5. Direct Output

- Historic period where Nepal will launch its own satellite entirely built through Nepalese engineers in **two years'** time
- Huge media interest: immediate impact on science and technology education



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6. Outcome

- **Reliable Nepalese Space Experts:** Core group of space experts who can be called upon when government creates space policies, collaborates with other countries to build satellites or to receive advice on space technology
- **Human Networking:** Access to Kyutech's vast Alumni and BIRDS network for future collaboration in space
- **Education:** Educating mass to solve real-grass root problems through the process of Satellite Systems Engineering
- **Satellite Development for Nepalese Problems**: Disaster monitoring, agriculture and environment

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FAQ: Application

FIRST MISSION SELECTION

Serious Application

Complexity

Higher Risk

Failure

Not recommended but possible

Simple Application

Less Complex

Lower Risk

Higher Success

Recommended

Pic Credits: JPL, NASA

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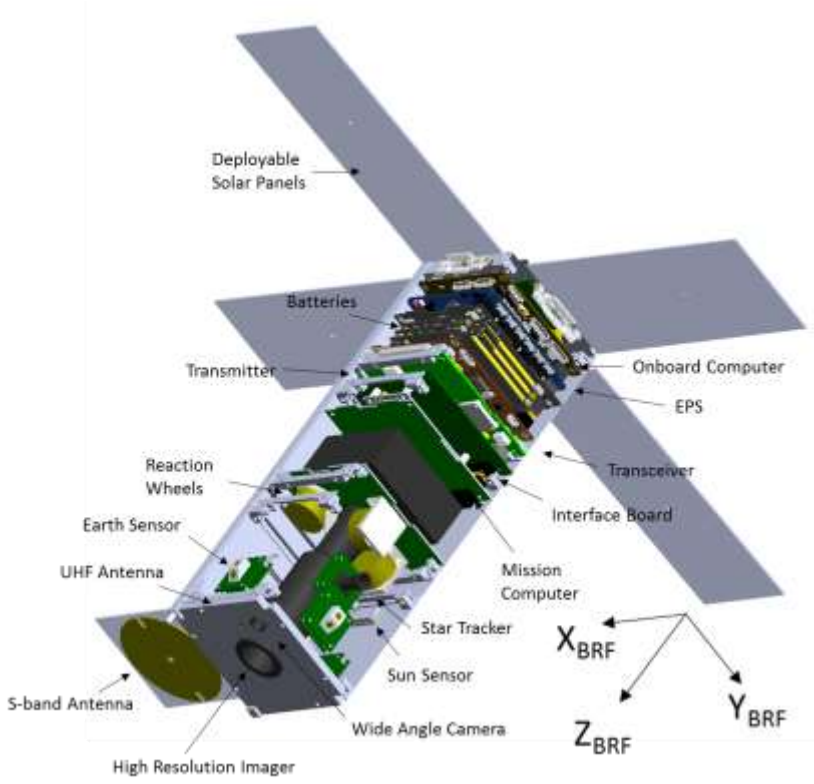
Serious Mission?



SNUSAT-2

Key Areas
1) Zero Gravity Experiments
2) Environment (GLOF)
3) Disaster Prediction & Management
4) Agriculture (NDVI)

Key Bottle-necks
1) Volume
2) Data Transmission
3) Power

LANDSAT-8 (30m)

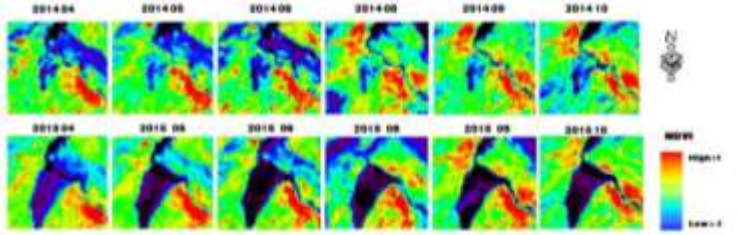


Fig. 2 Normalized Difference Vegetation Index (NDVI) calculation through MSI [Maskey, 2016]

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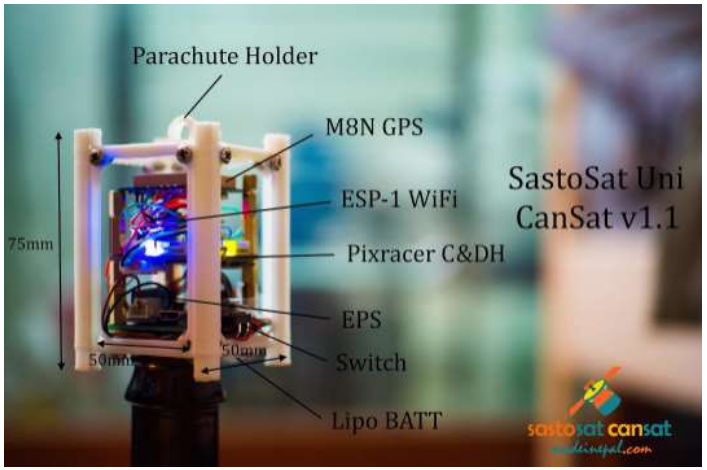
Worst Case

- I will be going to Japan alone
- PhD will continue
- Human networking, BIRDS networking through unofficial channels
- SastoSat -> Flight Model, look for launching opportunities



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Article

madeinepal

http://www.madeinepal.com/2017/06/satellite-engineering-education-for.html

editor@madeinepal.com

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Posted by Madeinepali · June 04, 2017

SATELLITE ENGINEERING EDUCATION FOR SOLVING REAL, MEANINGFUL NEPALI PROBLEMS

When India's Polar Satellite Launch Vehicle (PSLV) blasted off to space from Sriharikota spaceport on Feb 15, 2017, the rocket broke a record. On the launcher's 38th consecutive successful flight, it took along a mindboggling 104 satellites up to space. 88 of those

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Thank You

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