



AMATEUR RADIO DIGITAL COMMUNICATIONS

DC

2024.04.10 BIRDS BUS Open Source Webinar #21

BIRDS-X Satellite Project "Dragonfly"



Mission statement

"Foster space technology and space access democratization through amateur radio satellite communications systems."

Stakeholders



AMATEUR RADIO DIGITAL COMMUNICATIONS

Amateur Radio Digital Communications (ARDC)

is a private foundation that exists to support amateur radio and digital communication science and technology





BIRDS-X Satellite Project



Project Members



BIRDS-X Project Timeline



Dragonfly Flight Model



Dragonfly Internal Configuration



Dragonfly Internal Configuration



APRS

Automatic Packet Reporting System:











Bulletins







- Packets are sent over the AX.25 Protocol
- AFSK (Audio Frequency Shift Keying) modulation
- Rate speed up to 1200 bps on VHF

APRS Payload Competition



Objectives: Increase the number of users of the amateur radio community

and help people get involved in creating and operating an APRS payload



Webinars

| | Phase 1 | | | Phase 2 | |
|------------|-----------|-----------|-----------|-----------------|-----------|
| | Webinar 1 | Webinar 2 | Webinar 3 | Webinar 4 | Webinar 5 |
| Date | Jan 14 | Jan 24 | Feb 8 | Apr 1 | Apr 21 |
| Applicants | 59 | 40 | 43 | Qualified teams | |



APRS Payload Competition

350 people from **25 countries** applied for the 1st phase and **11 teams** from **10 countries** successfully passed to the 2nd phase.





4 boards from **3 countries** will be integrated into the FM

EM Received Payloads



JASPER (Canada)



Butterfly Effect (Egypt)



ACCIMT **(Sri Lanka)**



Zimteam (Zimbabwe)x2



EIRU-4S (Paraguay)



Qhapaq Ñan (Peru)







Poás (Costa Rica)

FM Received Payloads



JASPER (Canada)



ACCIMT (Sri Lanka)



EIRU-4S (Paraguay)



ACCIMT (Sri Lanka 2)



Marites (Phillipines)

Ground Terminal Competition



Objectives: Create outreach for the radio amateur community and allow

anyone to communicate with the satellite

145.825 MHZ (NHF)





Entry Categories:

a. Power output up to 50 W

b. Power output up to 25 W

c. Power output up to 10 W



GT Competition Application Form

Operator Information

- Email
- Callsign
- Last and First Name
- Address (Country/State/Province/City)
- Nationality

Station Information

- Callsign
- Station Location (Coordinates or Grid Locator)
- Station Type (Fixed, Mobile, Handheld radio)
- Transceiver Info (Brand, Model)
- Max. Power Output
- TNC (Software, Hardware, Build-In)
- Antenna type (Directional, Omnidirectional)

| | Cambiar de cuenta | 0 |
|--|--|---|
| El nombre y la foto envíes este formu |) asociados a tu cuenta de Google se registrar: Iario. Solo el correo que introduzcas forma par | án cuando subas archivos y te de tu respuesta. |
| * Indica que la pre | gunta es obligatoria | |
| Correo * | | |
| Tu dirección de co | rreo electrónico | |
| Callsign * | | |
| Tu respuesta | | |
| | | |





Points awarding

- Based on a ranking system with multipliers
- Participants should submit proof of communication

(Log file + Elevation data + Power output during transmission)

- Information provided by participants must be correct
- All GS operators must have a valid license





Multipliers table

| Every contact confirmed will be awarded by 1 point | | | | |
|--|-------------------------------|----|--|--|
| Antonno Tuno | Omni | X2 | | |
| Antenna Type | Directional (Tracking system) | X1 | | |
| | Fixed | X1 | | |
| Station type | Mobile | X2 | | |
| | Handheld | ×5 | | |
| | Over 60° | X1 | | |
| Elevation angle | Between 20° to 60° | X2 | | |
| | Less than 20° | X3 | | |

Volcano Monitoring

Objective: Operate the satellite APRS reference payload in the store-and-

forward mode and continuously observe and monitor the volcanic activity



Feasibility Study

Sensors:

- SO₂ sensor
- Weather wind meter
- Thermal sensor



Location: • "Choyo-Sanso" near the Aso mountain • Active volcano • 6.7 km from the Nakadake Crater 1

Alternative UHF Transceiver

Objective: Develop an alternative UHF TRX for CubeSats that offers

comparable performance, data rate, and low power consumption to the

existing commercial UHF TRX that the BIRDS project uses



- ≈7000 USD
- proprietary



- ≈300 USD
- open-source

Join us in 2024!









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CONTACT US

birds-x-project@kyutech-laseine.net

http://birds-x.birds-project.com

Jorge Rubén Casir Ricaño Project Manager

casir-ricano.ruben-jorge589@mail.kyutech.jp

