Product Introduction

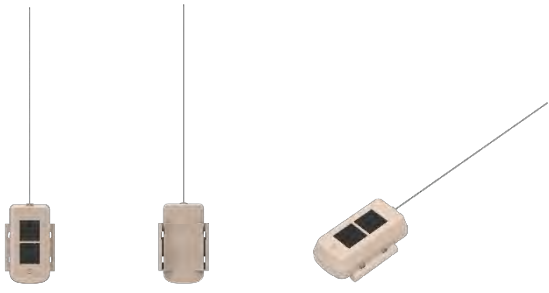# Debut® FLEX (Argos)

FLEX (Argos) is an PMT (Platform Messaging Transceiver) that supports data transmission through the Argos constellation of polar-orbiting satellites modules.

It provides both GNSS data and Doppler locations estimated by Argos. Besides, it is also equipped with multiple sensors to generate environmental and behavioral data.

Apart from scheduled Argos transmission, FLEX (Argos) can also transmit data to smart phone or Debut series gateways through patented INTELINK® technology. This enables tracker recovery as well as the data stored on board, and also in-situ modeling based on real-time raw acceleration data downloading and tagging using our special tool.

BASIC SPECIFICATIONS

MODEL	FLEX (Argos)
Appearance	
Dimensions (LWD)	67 mm × 33 mm × 24 mm (antenna not included)
Weight	30 g
Battery Capacity	210 mAh
Battery Life	FLEX (Argos) with a fully charged battery is able to transmit 1200 times via Argos. Or it can log over 2000 GNSS positions under optimal GNSS satellite view at 5-minute interval.
Battery Type	Lithium polymer rechargeable battery, with under-and-over-charging protection
Solar Type	GaAs solar unit (30% efficiency) with good performance under weak light
Transmission Band	Uplink: 399.90 MHz~401.69 MHz Downlink: 466 MHz

Output Power	29 dBm
Antenna	External, titanium alloy with protective coating
Housing	ABS injection molding with excellent toughness and environment tolerance, multiple harness threading holes
Available Colors	Light brown
GNSS Module	Precision: CEP （50%） 5m Maximum update rate: 10 Hz
Working Temperature	-20℃~60℃ (good for cold winter as close to animal body)
Waterproof	IP 68
Firmware Upgrade	Via INTELINK
Working Schedule	Configurable via INTELINK

DATA TYPES

- GNSS: longitude, latitude, altitude, geoid height, course, satellite quantity
- ENV: light intensity, temperature, voltage
- BHV: ODBA (overall dynamic body acceleration)
- ACC: x/y/z acceleration data (available only through INTELINK®)
- Doppler location*

Doppler locations is estimated by the Argos system. Each time a satellite passes over an Argos device, it collects messages transmitted by the device and measures the frequency of the received signals to derive a rough location with the accuracy at 250~1500m.

DATA COLLECTION MODES

You can choose from the following two data collection modes, and specify the related parameters to suit the condition and objective of the study.

■ Regular-Interval Mode

- GNSS interval: 5 min ~1 day
- ENV interval: 5 min ~1 day
- ODBA interval: 10 min/30 min

- ACC interval: 25 Hz, 3 seconds in every 10 min (by default)

Above ranges are selectable on website data platform or App. Contact us if other settings are required.

■ Sleep Mode

This mode is to deactivate certain type of data collection for:

- a certain period (from minutes to months)
- a regular period each day (up to 16 hours)

Transmission Frequency Bands

Duplex mode	f（MHz）	Uplink（MHz）	Duplex spacing（MHz）	Bandwidths（KHz）	Downlink（MHz）
single frequency	400	399.99-401.690	1.79	10	466

TRANSMISSION SCHEDULE

You can choose from the following four transmission modes, and specify the related parameters to suit the condition and objective of the study.

■ Periodical Mode

The device transmits data to Argos periodically. The following three parameters are programmable:

- Period: from 1 hour to 10 days
- Transmission interval: from 45s to the period length
- Duty ratio: adjustable

■ On-Time Mode

The device transmits data to Argos at certain hour(s) of a day. The following four parameters are programmable:

- Starting hour: from 0:00 to 24:00
- Period: from 1 hour to 24 hours
- Transmission interval: from 45s to the period length

- Duty ratio: adjustable

■ **Monitored Mode**

The device transmits only when it predicts or detects an Argos satellite passing overhead. This mode is most recommended for migratory species.

■ **Trigger Mode**

The device transmits on a certain triggering condition.
This condition is customized and sometimes requires extra hardware design. For example, you might set the device to start transmitting when the animal is out of water, and stops transmitting when it is under water.

During each transmission session, the device will send data at a preset frequency, one piece at a time. It will transmit the most recent a few pieces in sequence and recurrently. You can preset the amount of data that should enter this "transmission queue".

If you want to know more details or change the default transmission settings, please contact us for technical support.

INTELLIGENT FREQUENCY OPTIMIZATION (BOOST)

The BOOST function intelligently increases the frequency for data collection & transmission when the charging condition is good or the bird is flying.

With BOOST, the device utilizes extra energy complement to record more detailed movement tracks and attempts more frequent transmission without manual intervention, keeping long-term energy balance and avoiding the possibility of battery drain caused by radical settings during bad weather.

DATA STORAGE

Due to the limited transmission volume of Argos, much valuable data that cannot be transmitted will be stored in memory for later downloading.

- Flash memory: 16 MB
- Regular data storage: 460 days at default setting (1h GNSS+1h ENV+10min ODBA)
- BOOST data storage: 280,000 pieces
- ACC data storage: 28,700 pieces

EXTRA FUNCTIONS brought by INTELINK®

INTELINK® technology enables remote connection to your FLEX (Argos) devices to perform various operations and realize many amazing functions.

To establish such connection, you only need an ordinary smart phone or/and a Debut series gateway device.

Debut gateways could be a HUB, TAG or QUEST. The connection distance is 30~200m depending on environment. For more information about the gateways, please contact Druid or your local distributor.

- **Tracker Recovery**

    With ECOTOPIA App, a device and a mobile phone will automatically function as a beacon system. The mobile phone will ring if the device is detected nearby. The closer they are, the louder the ringing sound will be. This provides a convenient way to find lost devices.

- **Firmware Upgrade & Setting Modification**

    You can easily upgrade the firmware or change data collection settings and Argos transmission schedules for a device nearby using Ecotopia App.

- **Remote Data Downloading**

    FLEX (Argos) is capable of collecting much more data than the Argos transmission throughput limitation.

    If the bird wearing FLEX (Argos) device flies to somewhere near a Debut gateway*, the data stored in the device memory can be automatically downloaded and sent to the cloud server via network connection of the HUB. Then, the researcher can see the data in their accounts.

- **Raw Acceleration Data Collecting**

    Raw x/y/z acceleration data could be very useful for behavioral research, especially when the data can be combined with timestamps, GNSS, environmental data, and the bird's activity rhythm. However, the raw data can seldom be obtained due to its large size.

    With INTELINK, you can not only download the raw data from memory, but also obtain real-time raw acceleration data by connecting a mobile phone to a FLEX device.

- **In-situ Modeling**

    During the process of obtaining real-time raw data described as above, you can also mark

the data with behavior tags. Ecotopia App provides comprehensive tools for In-situ modeling, which includes real-time x/y/z acceleration visualization and data downloading, video shooting, and behavior tagging. All these data will be combined under the timestamps and saved for later verification and analysis.

With the help of Druid's AniAct® behavior algorithm platform, you will be able to generate acceleration-based behavior algorithm for different species.

Furthermore, such algorithm can be loaded into the tracker and be conducted on board. Then, the tracker will be able to send back continuous computed result of behavior tags instead of discontinuous raw data. This will expand the data dimensions and bring breakthrough on bird research and ecology conservation.

Druid Technology reserves the right to interpret the technical specifications and to make changes of the same without prior notice.