

Xatcobeo has its downlink in the UHF radio amateur band. Any ham radio amateur with the appropriate equipment can receive its beacons and TM frames.

Latest TLE

To be confirmed, but we are tracking object 2012-006F with good results:

2012-006F

1 38082U 12006F 12054.02764552 .00034536 00000-0 92775-3 0 291

2 38082 69.4841 217.2088 0777516 32.2720 332.3574 14.05841791 1347 **Frequency**

and modulation

Xatcobeo transmits in 437.365 MHz , this frequency was coordinated with [IARU](#) to avoid interferences with other satellites in the Amateur Satellite Service.

The modulation used by the TTC subsystem is FM with FFSK/MSK at 1200bps in the baseband. One cycle of 1200Hz represents a logic '1', one-and-a-half cycles of 1800Hz represents a logic '0'.

Output RF power is 27 dBm. A Turnstile antenna is used on-board.

CW beacon

Xatcobeo transmits a CW beacon every 75/150 seconds and may transmit housekeeping (HK) frames (see next section) intercalated between beacons if TM is activated. CW is transmitted at 20 WPM as an 800Hz audio on-off keyed signal in FM.

CW beacon can contain different parameters: battery voltage (V), signal received (dBm), temperatures (c, Celsius degrees)....

TM frames with live HK

Xatcobeo may transmit five frames with all the telemetry values of the satellite at the moment of transmission. Each frame has 40 bytes structured as follows:

Frame 1

Field		Size(bytes)	Value
RADIO ID	6	XATCOB	
Protocol header	3	variable	
SDU ID	1	0x13	
Timestamp	4	variable	
SID	1	0xA0	
+X/-X solar panel voltage	2	variable	
+X solar panel current	2	variable	
+X solar panel temperature	2	variable	
-X solar panel current	2	variable	
-X solar panel temperature	2	variable	
+Y/-Y solar panel voltage	2	variable	
+Y solar panel current	2	variable	
+Y solar panel temperature	2	variable	
-Y solar panel current	2	variable	
-Y solar panel temperature	2	variable	
+Z/-Z solar panel voltage	2	variable	
Padding	1	variable	
CRC	2	variable	

Frame 2

Field		Size(bytes)	Value
RADIO ID	6	XATCOB	
Protocol header	3	variable	
SDU ID	1	0x13	
Timestamp	4	variable	
SID	1	0xA1	
+Z solar panel current	2	variable	
+Z solar panel temperature	2	variable	
-Z solar panel current	2	variable	
-Z solar panel temperature	2	variable	
PDM solar panel voltage	2	variable	
+PDM solar panel current	2	variable	
+PDM solar panel temperature	2	variable	

-PDM solar panel current	2	variable
-PDM solar panel temperature	2	variable
Antenna deployment status	2	variable
Padding	3	variable
CRC	2	variable

Frame 3

Field		Size(bytes)□	Value
RADIO ID	6	XATCOB	
Protocol header	3	variable	
SDU ID	1	0x13	
Timestamp	4	variable	
SID	1	0xA2	
Battery discharge direction	2	variable	
Battery temperature	2	variable	
3,3V bus current	2	variable	
5V bus current	2	variable	
Unregulated bus current	2	variable	
EPS status	2	variable	
Battery voltage	2	variable	
Battery current	2	variable	
Corrected bytes by TTC	4	variable	
RSSI TTC	2	variable	
Padding	1	variable	
CRC	2	variable	

Frame 4

Field		Size(bytes)□	Value
RADIO ID	6	XATCOB	
Protocol header	3	variable	
SDU ID	1	0x13	
Timestamp	4	variable	
SID	1	0xA3	
Received frames	4	variable	
RX frames with errors	4	variable	
Transmitted frames	4	variable	
PA temperature	2	variable	
VCO temperature	2	variable	
RF frequency error in rx	2	variable	
TTC bootcount	4	variable	
OBSW mode	1	variable	
Padding	0	variable	
CRC	2	variable	

Frame 5

Field		Size(bytes)	Value
RADIO ID	6	XATCOB	
Protocol header	3	variable	
SDU ID	1	0x13	
Timestamp	4	variable	
SID	1	0xA4	
SRAD 5V bus voltage	2	variable	
SRAD 3,3V bus voltage	2	variable	
TTC 3,3V bus voltage	2	variable	
RDS 5V bus voltage	2	variable	
OBC 1,5V reference voltage	2	variable	
OBC 3,3V reference voltage	2	variable	
OBSW last TC executed	4	variable	
OBSW last eclipse current	2	variable	
Number of TCs received	4	variable	
Number of TCs received (direct)	4	variable	
Padding	0	variable	
CRC	2	variable	