

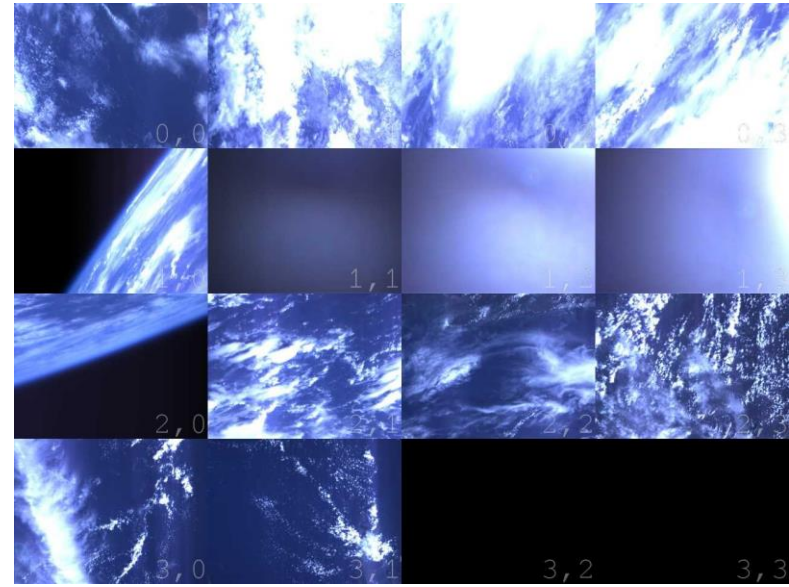


Bringing Space Down to Earth

# Mission Overview

Adrian Sinclair  
Operation Manager

[adrian@satellogic.com](mailto:adrian@satellogic.com)



# Some figures

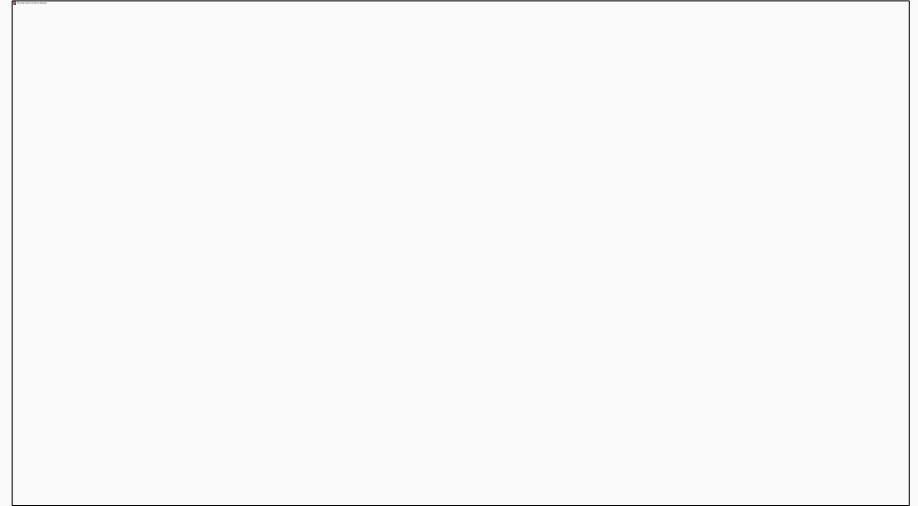
Current status...

Headquarters in Buenos Aires, Argentina for  
Ops and R&D, 65 employee's

Manufacturing Plant in Montevideo, Uruguay

Sales in USA, Images processing in Tel Aviv

10+ satellites planned in the next 18 months



# Launch History

## Cubebug 1, Capitan Beto

2U Cubesat, April 26th 2013

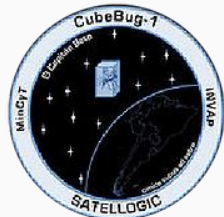
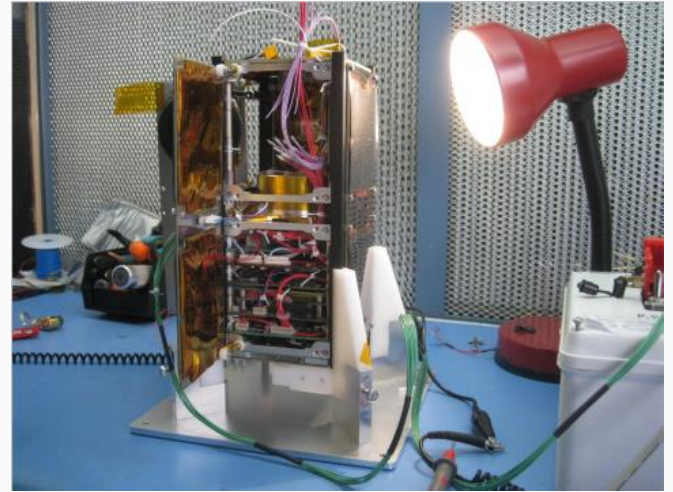
Built in 10 months, open architecture,  
documented and public domain

## Cubebug 2, Manolito

2U Cubesat, 21st November 2013

Reaction wheels, Star tracker, attitude  
Control

UHF communication radio in semi duplex 9600/1200 Bps in  
ham bands, AX25



# Launch history

## Bugsat 1, Tita

New platform, 22 Kg launched on 19th June 2014 from Dombarovsky Russia by Dnepr rocket.

The mission tests a number of custom designed components: three antennas, a mid-resolution camera system, a GPS receiver, a UHF radio based on COTS components, C band for HBR downlink



# Telemetry

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## Categories

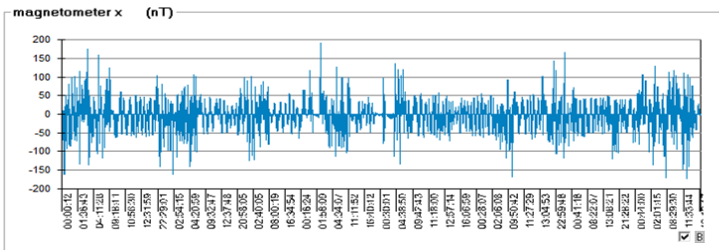
[\\$50SAT](#) (133)  
[3CAT2](#) (10)  
[4M](#) (18)  
[AAUSat](#) (471)  
[AFNFAS](#) (230)  
[AESP-14](#) (2)  
[AggieSAT](#) (7)  
[AlSat](#) (14)  
[AlST-1](#) (3)  
[AlST-2](#) (9)  
[ALMASat-1](#) (8)  
[AlSat-1N](#) (11)  
[ANDE-2](#) (99)  
[ANTELSat](#) (92)  
[AO-16](#) (12)  
[AO-27](#) (99)  
[AO-51](#) (126)  
[AO-7](#) (47)  
[ArduSat](#) (33)  
[ARISSat-1](#) (142)  
[ARTSAT2](#) (2)  
[Athenoxat-1](#) (5)  
[AubieSat-1](#) (299)  
[BEESAT](#) (94)  
[BIROS](#) (1)  
[BisonSat](#) (114)  
[BRICSat-P](#) (11)  
[BugSat-1](#) (310)  
[CADRE](#) (3)  
[CAERUS](#) (4)  
[CAPE](#) (115)  
[ChubuSat](#) (13)



Saturday, October 29th, 2016 by PE0SAT

One week BugSAT-1 Telemetry

Telemetry	ASCIi beacon	images/files	telemetry dump	signal strength	
<b>Platform</b>		<b>Mem / CDH / Thermal</b>			
<input type="radio"/> uptime	9540 [0d 02:39:00]	2016-10-22 00:00:12	<input type="radio"/> free heap bytes	27208	
<input type="radio"/> realtime clock	1477094410 (10/22/2016 00:00:10)		<input type="radio"/> last sequence no.	0	
<input type="radio"/> reset count	991		<input type="radio"/> antenna deploy stat	111	
<input type="radio"/> current mode	132		<input type="radio"/> CPU temp	20.37 C	
<input type="radio"/> last boot	136891800		<input type="radio"/> minor cell temp	11.15 C	
<b>Power</b>					
<input type="radio"/> low voltage counter	0	<input type="radio"/> battery current	1.71 A	<input type="radio"/> PCM 5v voltage	5.12 V
<input type="radio"/> nice battery	111.89 V	<input type="radio"/> PCM 3v3 voltage	3.35 V	<input type="radio"/> PCM 5v current	1.08 A
<input type="radio"/> raw battery	0.86 V	<input type="radio"/> PCM 3v3 current	2.56 A		
<b>ADCS</b>					
<input type="radio"/> mode	0	<input type="radio"/> wheel 1	0.00 rad/s	<input type="radio"/> wheel 3	0.00 rad/s
<input type="radio"/> IMU temp	16.88 C	<input type="radio"/> wheel 2	0.00 rad/s	<input type="radio"/> wheel 4	0.00 rad/s
<b>X-Axis</b>					
<input checked="" type="radio"/> magnetometer x	-69.80 nT	<input type="radio"/> magnetometer y	1.15 nT	<input type="radio"/> magnetometer z	28.50 nT
<input type="radio"/> gyroscope x	-0.60 deg/s	<input type="radio"/> gyroscope y	0.86 deg/s	<input type="radio"/> gyroscope z	-0.38 deg/s
<input type="radio"/> line gyro x	-0.05 deg/s	<input type="radio"/> line gyro y	0.79 deg/s	<input type="radio"/> line gyro z	-0.41 deg/s
<input type="radio"/> sun vector x	-0.62	<input type="radio"/> sun vector y	0.70	<input type="radio"/> sun vector z	-0.35
<b>Payload</b>					
<input type="radio"/> current state	0	<input type="radio"/> experiments run	904	<input type="radio"/> last experiment run	49
		<input type="radio"/> experiments failed	578		



Telemetry and payload images, software and demodulating tools, are available on the web see [DK3WN](#) web site.

# Aleph-1 Constellation

Real-time imaging of the entire planet on a daily basis

One-meter resolution for multispectral imaging

Precision agriculture food production

O&G Pipelines monitoring

Cartography Urban planning

Natural resources / Climate change

Disaster response

Infrastructure monitoring



# Ñusat 1 (Fresco) and Ñusat 2 (Batata)

Launched in May 30th 2016 from China  
40 cm × 43 cm × 75 cm, 37 kg mass  
Orbit is 500 km sun synchronous orbit with an inclination of 97.5° with a 10:30 LTAN.

Currently in commissioning phase





# Ñusat 1 (Fresco) and Ñusat 2 (Batata)

## TT&C:

Uplink in S band

Downlink in X Band @100 Kb/s custom protocol

## Payload:

Downlink in X Band DVBS-2

Also has a semi duplex UHF Ham frequencies @ 20Khz BW for experiments and linear transponder UHF/VHF @30 Khz BW





# Ñusat 3 (Milanesat)

Spacecraft is similar to Ñusat-1/2

Orbit 500 km 43 deg

Expected launch in March 2017

Currently on manufacturing plant

# Ground Segment

Downlink telemetry in X band 8030 Mhz @ 1 Mhz BW RHCP (Custom Protocol)  
Uplink Telemetry in S band in 2080 Mhz @ 1 Mhz BW RHCP (Custom Protocol)  
Downlink Payload Data in X band 8050 to 8100 Mhz @ 40 Mhz BW RHCP in DVBS2 protocol.

## **Ground Station requirements:**

**Payload:** Downlink gain 44 Dbi, Noise figure 0.8 Db, DVBS2 Modem

**TT&C:** Uplink gain 32 Dbi, Uplink S band power 30 Dbm, USRP to our own equipment

# Ground Segment

Ground Stations in Svalbard, Norway

Provide more than 10 passes per day, 2 antennas to support 2 satellites at the same time

Tortuguitas, Argentina

Our development feed, using standard components, custom converter, Ettus usrp and off the shelf SSPA to reduce ops cost



# Frequency Coordination

UHF channels in ham radio frequencies, were coordinated through AMSAT-LU to IARU, we had to adjust some parameters in BW

S/X bands via local administration with API preparation application SpaceCap

Coordination request were received from different countries to avoid harmful interference.



# Thanks for your attention

Questions ?

