



Partnering for Prolific Radio Coverage

JERRY BUXTON, AMSAT VICE PRESIDENT ENGINEERING

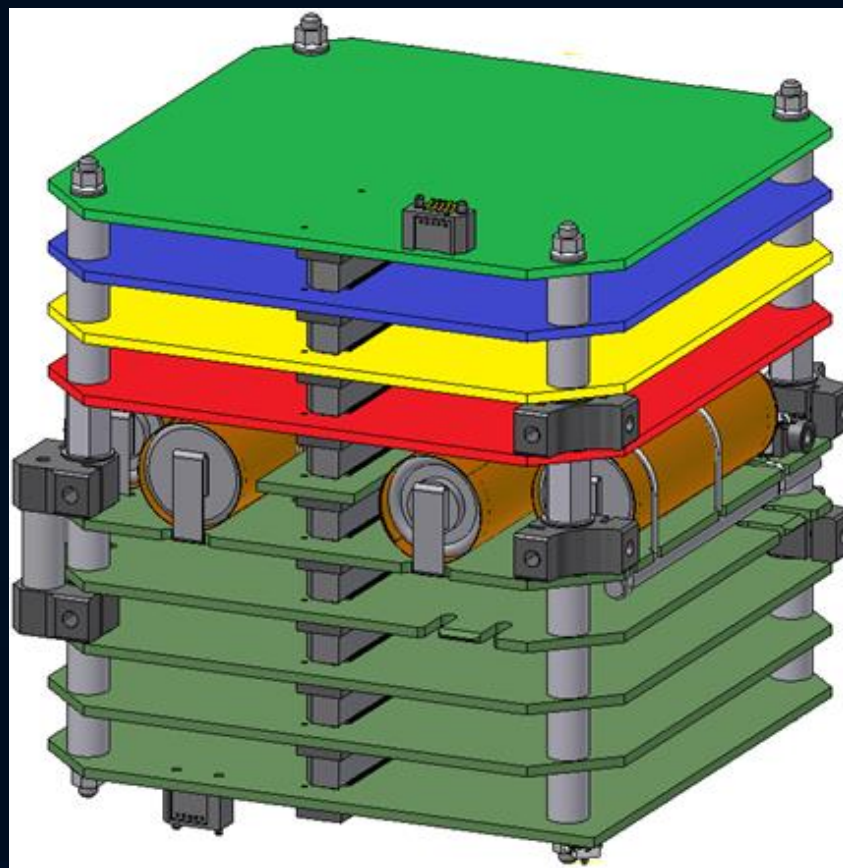
Radio Amateur Satellite Corp. (AMSAT)

- 501(c)(3) Incorporated in 1969
- Nine satellites launched
 - Sizes range from 1U (1 kg) to 400 kg
- Current Fox-1 CubeSat Project
 - Fox-1A AO-85 launched November 8, 2015 ELaNa XII
 - RadFxSat/Fox-1B ELaNa launch August 2017
 - RadFxSat-2/Fox-1E ELaNa launch December 2017
 - Fox-1D commercial Spaceflight/PSLV launch late 2017
 - Fox-1Cliff commercial Spaceflight SSO-A/SpaceX launch early 2018

Fox-1 1U Avionics Design

BASE AVIONICS

- Power
- IHU (CDH)
- Radios



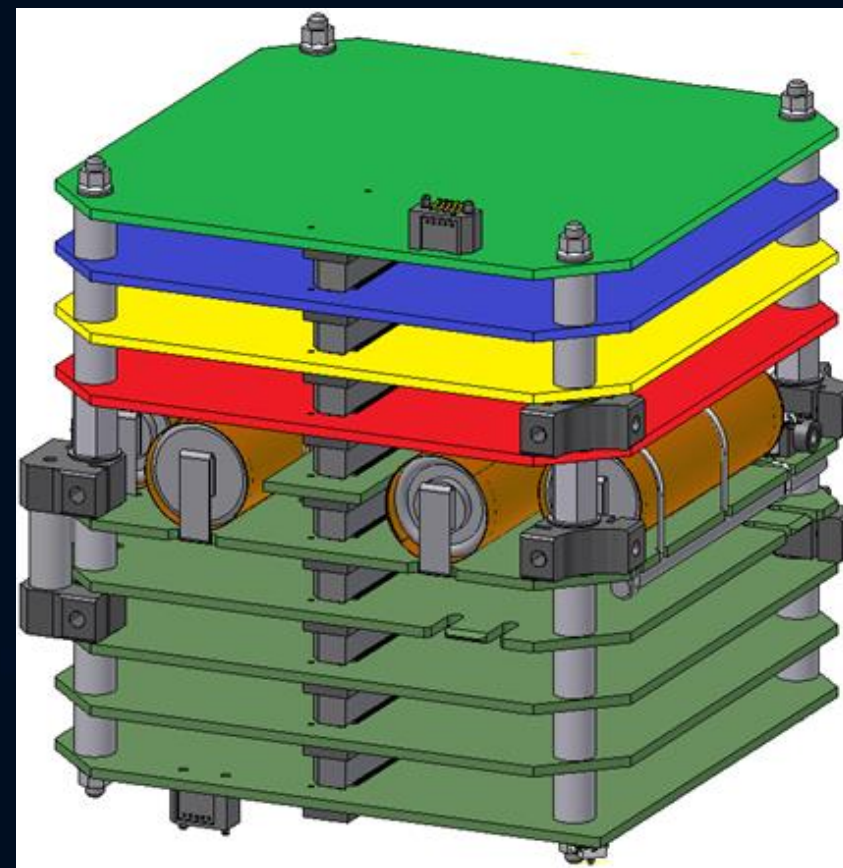
EXPERIMENTS

- Four slots available

Fox-1

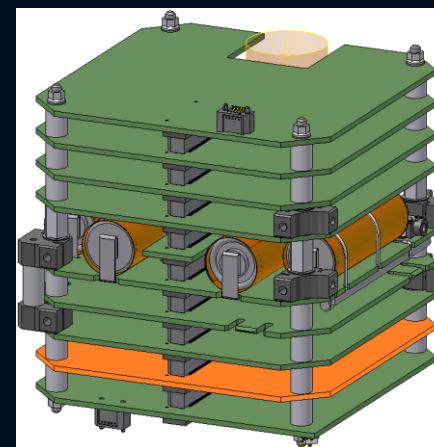
Hosted Experiments / Partnerships

- Fox-1A
 - Penn State Erie MEMS Gyro (on all Fox-1 satellites)
 - Vanderbilt University Radiation
- RadFxSat/Fox-1B
 - Vanderbilt University Radiation
- Fox-1Cliff
 - Virginia Tech JPEG Camera
 - Vanderbilt University Radiation
 - AMSAT L band uplink
- Fox-1D
 - University of Iowa HERCI
 - Virginia Tech JPEG Camera
 - AMSAT L band uplink
- RadFxSat/Fox-1E
 - Vanderbilt University Radiation

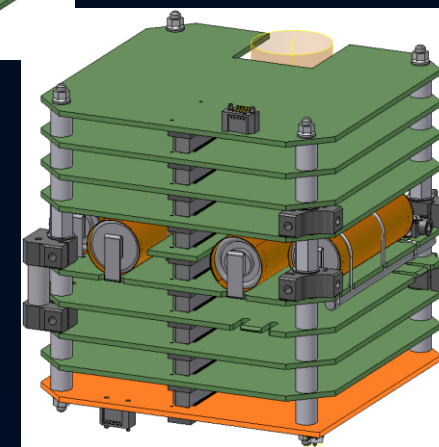


Communications System (Amateur Radio)

- Fox-1A-D
 - U/v FM repeater
 - Nominal 200 bps telemetry/experiment data stream as data under voice
 - Command selected 9600 bps high speed telemetry/experiment data only
 - University of Iowa requests high speed downlink of HERCI data during local pass
 - VT camera images 640x480 and 320x240 for all per AMSAT Ops



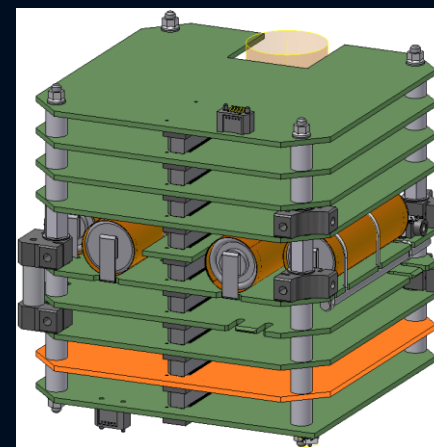
Receiver



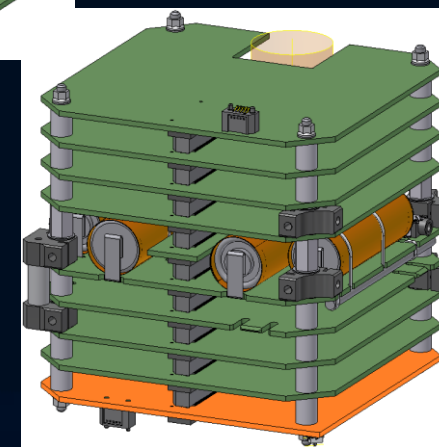
Transmitter

Communications System (Amateur Radio)

- Fox-1E
 - V/u analog transponder
 - Simultaneous and continuous 1200 baud BPSK telemetry/experiment data stream



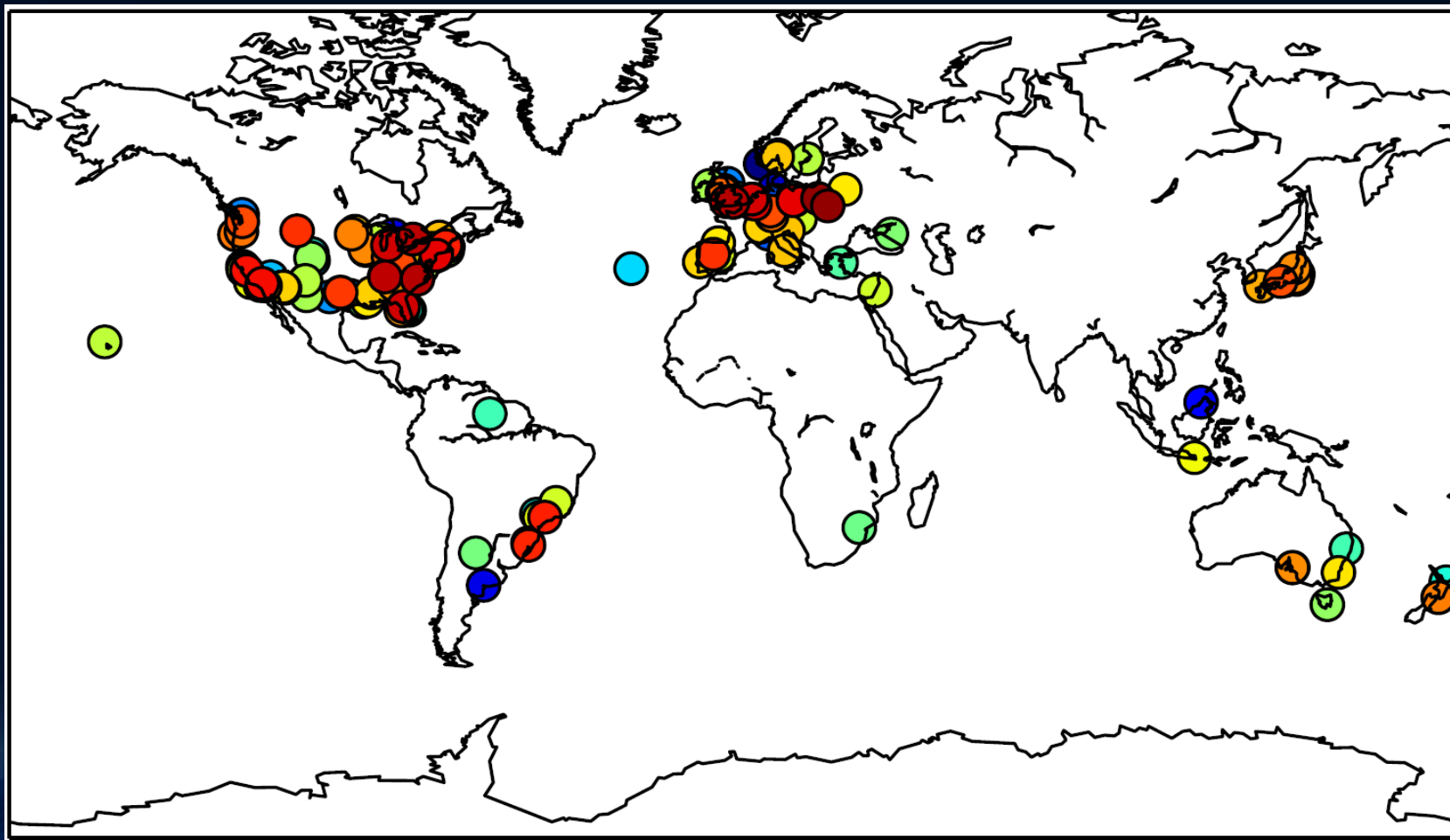
Receiver



Transmitter

Flying an Amateur Radio Transponder/Repeater is Key to Ground Station Participation

Telemetry Reception Coverage (AO-85)



AO-85 Telemetry Frames Received (as of 4/18/17)

Fox Server Leaderboard

amsat.org/tlm/leaderboard.php?id=1&db=FOXDB

Fox-1A Telemetry Leaderboard

Ground station	DUV Frames	9k6 Frames	Last 7 days
SP8CGR	292197	198	3752
SP5ULN	178637	15	1755
WA4SCA	154080	101	2598
PB0AHX	144486	81	3166
G7WIQ	135935	1	2802
N8MH	130937	853	1253
K4OZS	117063	508	1654
wa6wfw	115720	17	4052
G0MRF	115065	28	1476
G4MDH	97442	0	1126
SP3MCM	82236	33	774
N7DJX-DN13	78954	0	0
AC2CZ	72786	85	280
KB6LTY	69582	0	965
VE3HII	65906	32	
W2BFJ-Win1	61957	158	543
KD8CAO	56837	42	
ON5APO-JO21	50513	0	466
ON4HF	48953	4	467
M0SAT	45560	56	86
K9QHO	41550	21	860
N0JY	38029	278	
AD7MQ	36979	6	0
PU3XGS	36932	0	92
PY2RN	29908	0	
K4RGK	29751	143	1305
K6FW	28349	0	164
WN9Q-EN64	28177	12	449
EA1JM	26797	0	0
HB9AKP	24276	0	503
DK3WN	23976	13	1031
KO6TZ	22427	6	431
JA3FWT	22024	0	92

Fox-1A [latest spacecraft health](#)

Frames - last 24 hours: 6261 - last 90 mins: 894
 From ground stations:
 EU1XX G0MRF DK3WN SP5ULN SP3MCM
 G4MDH ON4HF G7WIQ PB0AHX W2JTM
 AC2CZ/VE2 W2BFJ-Win1 AC2CZ K4SQC K9EK
 WA4SCA W8AB K4RGK K4OZS VK5KJP
 PLOAU WN9Q-EN64

Total Frames since launch: 2849446

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Fly an AMSAT Amateur Radio

- Fox-1E linear transponder opportunities available 4Q 2017
 - Provides amateur radio operators an incentive to copy your telemetry
 - High ground based coverage makes up for need for high speed dumps over your home ground station
 - “Black Box” interface
 - Very competitive pricing
- University of Washington
 - Fox-1E linear transponder

AMSAT Projects and Plans

Partnership Opportunities

- Ragnarok Industries – Nano-Satellite Company “Heimdallr” CQC
 - C/X band digital transponder for control and navigation, amateur radio use
- LEO 3U series development with “space for rent” similar to Fox-1
- GTO/HEO opportunities with C/X band (“Five and Dime”) high bandwidth, “space for rent”



Thank you!

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