

SWIFT-KTX is a re-programmable software defined radio that combines significant onboard processing power with a wideband K/Ka-band transmitter.

Capabilities

SWIFT-KTX provides small satellites with a high-throughput downlink in K-band. When paired with the next generation SWIFT baseband processor and sufficient link margin, real data rates of 500 Mbps or more are achievable using high order modulation (>3 bits/Hz) and Turbo/LDPC encoding. Two transmitter frontend modules are currently in development. Each module includes a two 2W PAs that directly drive two switchable WR-42 waveguide interfaces for left/right antenna polarization agility. A third ≈ 10 dBm waveguide output is available before the PAs for driving TWTAs and integrated K-band ESAs.

- >500 MHz real modulation bandwidth
- Two discrete designs covering approximately:
 - 18-23 GHz
 - 23-28 GHz
- ≈ 33 dBm saturated output power w/ ≈ 20 dB adjustable range
- Three switchable WR-42 waveguide outputs (two w/ HPAs)

Status

- Upconversion, filtering, and waveguide interfaces verified using prototype hardware
- Initial engineering modules currently in production for further environmental testing
- Associated “next generation” 500 MHz baseband processor hardware currently in initial engineering production
- Engineering units available late 2017/early 2018 with initial flight heritage expected late 2018/early 2019.

Target Specifications

- >3 year LEO mission design life
- 1/3U or smaller: $86 \times 86 \times < 40$ mm
- < 500 grams
- 6-36V unregulated DC
 - Integrated latch-up/fault detection and protection
- Flexible mounting options
 - Flanges for deck mounting
 - Ears for CubeSat rail mounting
- Power consumption:
 - Current generation 50 MHz baseband processor: ≈ 3 W
 - Next generation 500 MHz baseband processor: ≈ 15 W
 - K/Ka-band module power consumption for 33 dBm output: ≈ 16 W
- High-speed interface options:
 - 1Gbit Ethernet
 - 200 Mbps SpaceWire (LVDS)
 - 200 Mbps sync. HDLC over LVDS
 - 10+Gbps SERDES (next generation baseband processor only)



Prototype module for waveguide interface testing

COBRA™ Gimbal

3 DOF, High Accuracy, High Reliability Carpal-Wrist Gimbal



The COBRA Gimbal is a low SWAP, high performance mechanism providing continuous precision pointing and end effector positioning over a full hemispherical workspace.

Capabilities

- 3DOF actuation - az, el, and extension
- Provides continuous, singularity-free pointing without inducing cable twist/wrap while eliminating slip rings
- Holding torque allows position to be rigidly held with motors unpowered
- 3+ Year designed and tested system life
- Flight qualified to NASA GEVS (GSFC-STD-7000)
- Launch lock options available
- SWIFT®-based controller in development

COBRA-UPX



Specifications

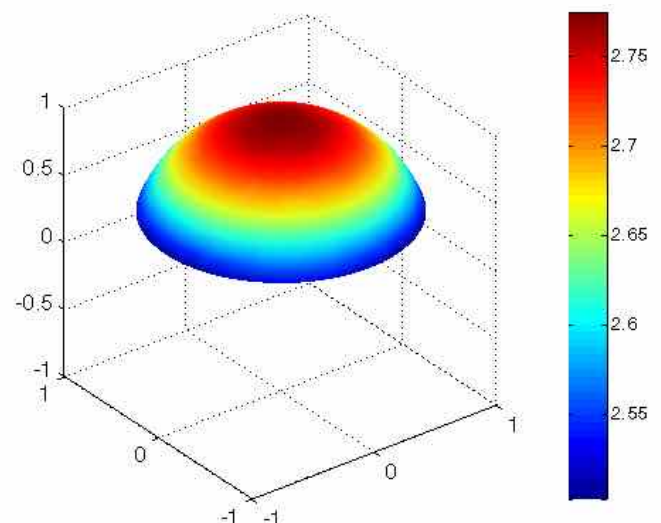
Model	COBRA-C	COBRA-HPX	COBRA-UHPX
Actuator	Open-Loop Stepper	Closed-Loop Stepper	Closed-Loop Brushless
Workspace	$> 2\pi$ sr	$> 2\pi$ sr	$> 2\pi$ sr
Pointing Resolution	≤ 120 arc-sec	≤ 276 arc-sec	≤ 3 arc-sec
Pointing Repeatability	$\leq \pm 20$ arc-min	$\leq \pm 234$ arc-sec	$\leq \pm 237$ arc-sec
Gimbal Mass	155 g	184 g (276 g) ¹	491 g
Stowed Footprint	\varnothing 100 mm	\varnothing 113 mm	\varnothing 165 mm
Stowed Stack Height	26 mm	29.2 mm	40 mm
Operating Power	< 2 W	2.4 W	< 10 W - Load Dependent
OG Payload Capacity ²	1200 g	1200 g	(500 g) ³

¹ Includes launch lock system.

² Payload capacity depends on 1G & OG pointing requirements and launch lock capacity.

Variations

- Actuator and sensor changes can increase payload capacity, resolution, and/or slew rates.
- Geometry changes can support increased workspace, reduced mass, and varied form factors.



COBRA-UHPX Pointing Resolution (arc-sec)