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)

### Target Specifications

- >3 year LEO mission design life
- 1/3U or smaller: 86x86 x < 40mm
- < 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: ≈3W
  - Next generation 500 MHz baseband processor: ≈15W
  - K/Ka-band module power consumption for 33 dBm output: ≈16W
- High-speed interface options:
  - 1Gbit Ethernet
  - 200 Mbps SpaceWire (LVDS)
  - 200 Mbps sync. HDLC over LVDS
  - 10+Gbps SERDES (next generation baseband processor only)

### 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
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

**Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>COBRA-C</th>
<th>COBRA-HPX</th>
<th>COBRA-UHPX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator</td>
<td>Open-Loop Stepper</td>
<td>Closed-Loop Stepper</td>
<td>Closed-Loop Brushless</td>
</tr>
<tr>
<td>Workspace</td>
<td>&gt; 2π sr</td>
<td>&gt; 2π sr</td>
<td>&gt; 2π sr</td>
</tr>
<tr>
<td>Pointing Resolution</td>
<td>≤ 120 arc-sec</td>
<td>≤ 276 arc-sec</td>
<td>≤ 3 arc-sec</td>
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<tr>
<td>Pointing Repeatability</td>
<td>≤ ±20 arc-min</td>
<td>≤ ±234 arc-sec</td>
<td>≤ ±237 arc-sec</td>
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<tr>
<td>Gimbal Mass</td>
<td>155 g</td>
<td>184 g (276 g)¹</td>
<td>491 g</td>
</tr>
<tr>
<td>Stowed Footprint</td>
<td>Ø 100 mm</td>
<td>Ø 113 mm</td>
<td>Ø 165 mm</td>
</tr>
<tr>
<td>Stowed Stack Height</td>
<td>26 mm</td>
<td>29.2 mm</td>
<td>40 mm</td>
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<tr>
<td>Operating Power</td>
<td>&lt; 2W</td>
<td>2.4 W</td>
<td>&lt; 10 W - Load Dependent</td>
</tr>
<tr>
<td>0G Payload Capacity</td>
<td>1200 g</td>
<td>1200 g</td>
<td>(500 g)³</td>
</tr>
</tbody>
</table>

¹ Includes launch lock system.
² Payload capacity depends on 1G & 0G pointing requirements and launch lock capacity.
³ Tested in 1G; 0G capacity is greater.

**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.