

# CT- 2020

Leveraging its heritage in producing advanced star trackers, BAE Systems introduces the CT-2020, a low-cost, rad-hard, high performance, fully U.S.-sourced, commercial star tracker.

**BAE SYSTEMS**

## Overview

- Optics and electronics combined into one fully integrated rad-hard assembly
- Baffle protection for direct sun and earth illumination
- 1024 x 1024 STELLAR (CMOS) detector with Thermo-Electronic Cooler
- Embedded software outputs full-frame video and attitude quaternions simultaneously
- Embedded Star Catalog compliant to DoD instruction 4650.06 and meets DoD Celestial Reference Frame traceability
- Robust algorithms developed from >50 years of experience
- 1024-megabyte memory supports data processing, storage, seasonal catalog upload, re-calibration post-launch
- Hardware-in-the-loop mission modeling capability
- Operates in directed search or autonomous search mode

Technical Specifications			
Environmental Characteristics		Performance and Robustness	
Operating temperature range (°C)	-25 / +45	Sensitivity	6.5 Mi
Storage temperature range (°C)	-34 / +71	Field of View	10°x10° square
Mechanical environment (in/out of plane)	Random 14.1 gRMS	Bias (worst case)	< 10 arcsec
Mechanical environment (in/out of plane)	Shock 1556 g	Thermo-elastic error (worst case)	< 0.04 arcsec/°C @ nominal performance temperature
Size	5.8" diameter x 12" tall	Total altitude accuracy, 1 $\sigma$ , Includes LSFE, HSFE and NEA	1.5 arcsec; < 1.5 arcsec in directed search mode
Mass	3.75 kg	Time for lost-in-space (typ)	2.0 s (<10 sec worst case)
TRL	8 in 2023, 9 in Q1 2025	Slew rate in acquisition	5°/s
Reliability, Availability and Lifetime		Slew rate in tracking	8°/s
EEE parts class	IEEE INST-02 EEE parts with full traceability	Acceleration	3°/s <sup>2</sup>
Reliability (MIL-HDBK-217F method)	848 FIT (worst case temperature)	Solar flare acquisition/tracking	Robust
LEO lifetime (years)	7	Full moon in the field of view	No performance degradation
GEO lifetime (years)	18	Baffle sun exclusion angle	33°
Performance and Robustness		Baffle Earth exclusion angle	25°
Power supply (V)	22 to 34		
Power consumption (W, typical for single head @ 20°C)	8		
Command and data interfaces	MIL-STD-1553B or RS422		
Full frame image output at 10Hz	High Speed LVDS		
Output rate (Hz)	10		