

A large, stylized lightning bolt graphic in shades of blue and white, extending from the left side of the page towards the center. It has multiple branches and a bright, glowing core.

Electronic Components  
***KEMET***  
**CHARGED.®**

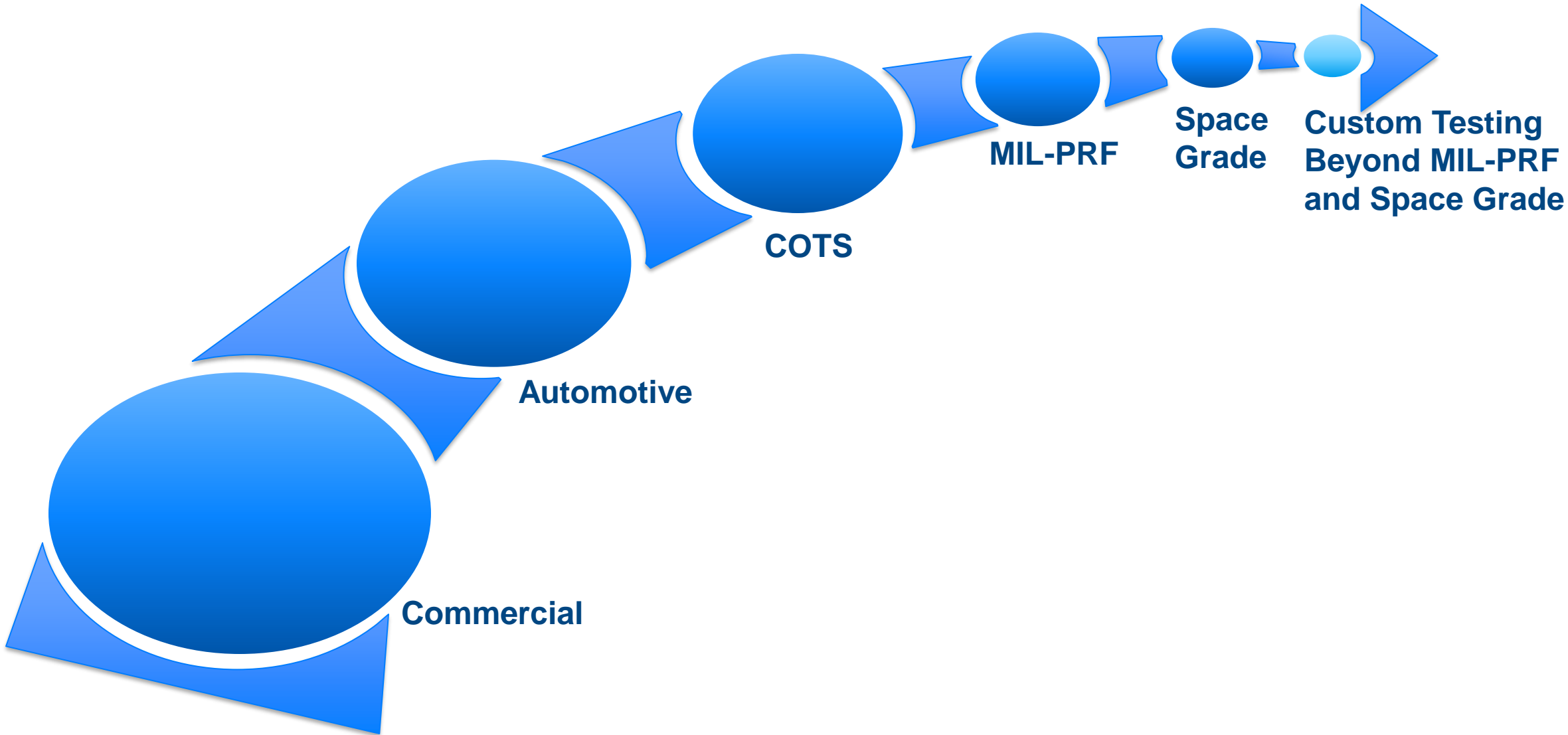
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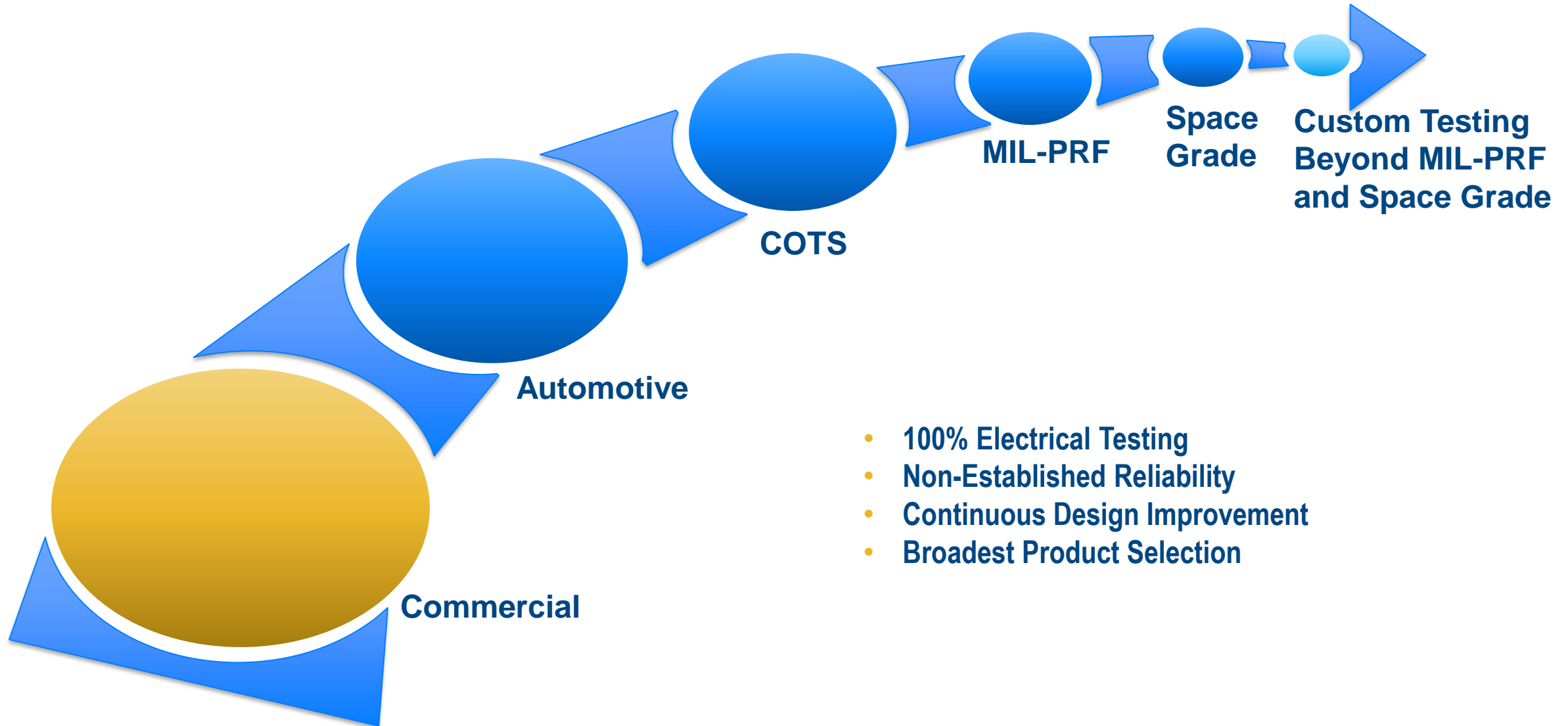
**Differences in Capacitor Grades**

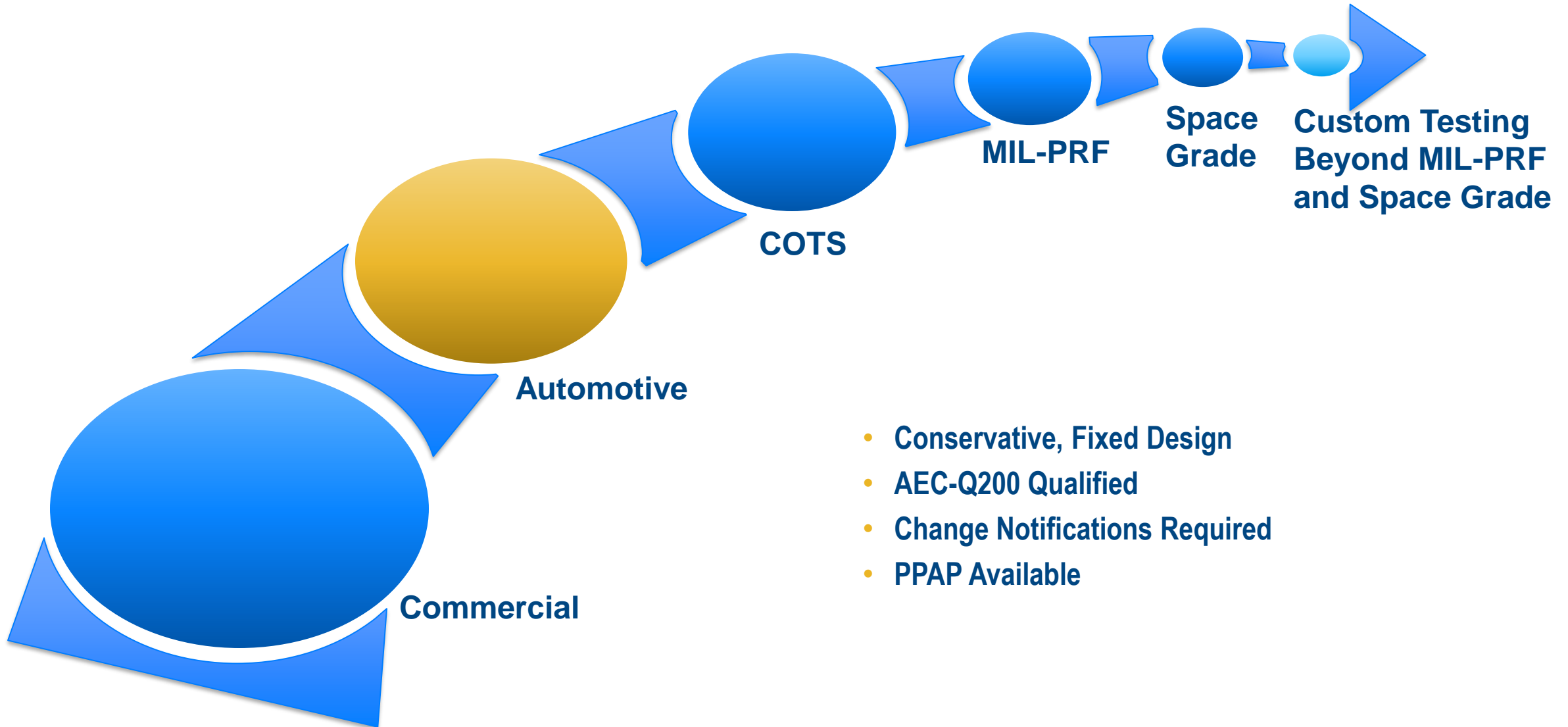
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Applications

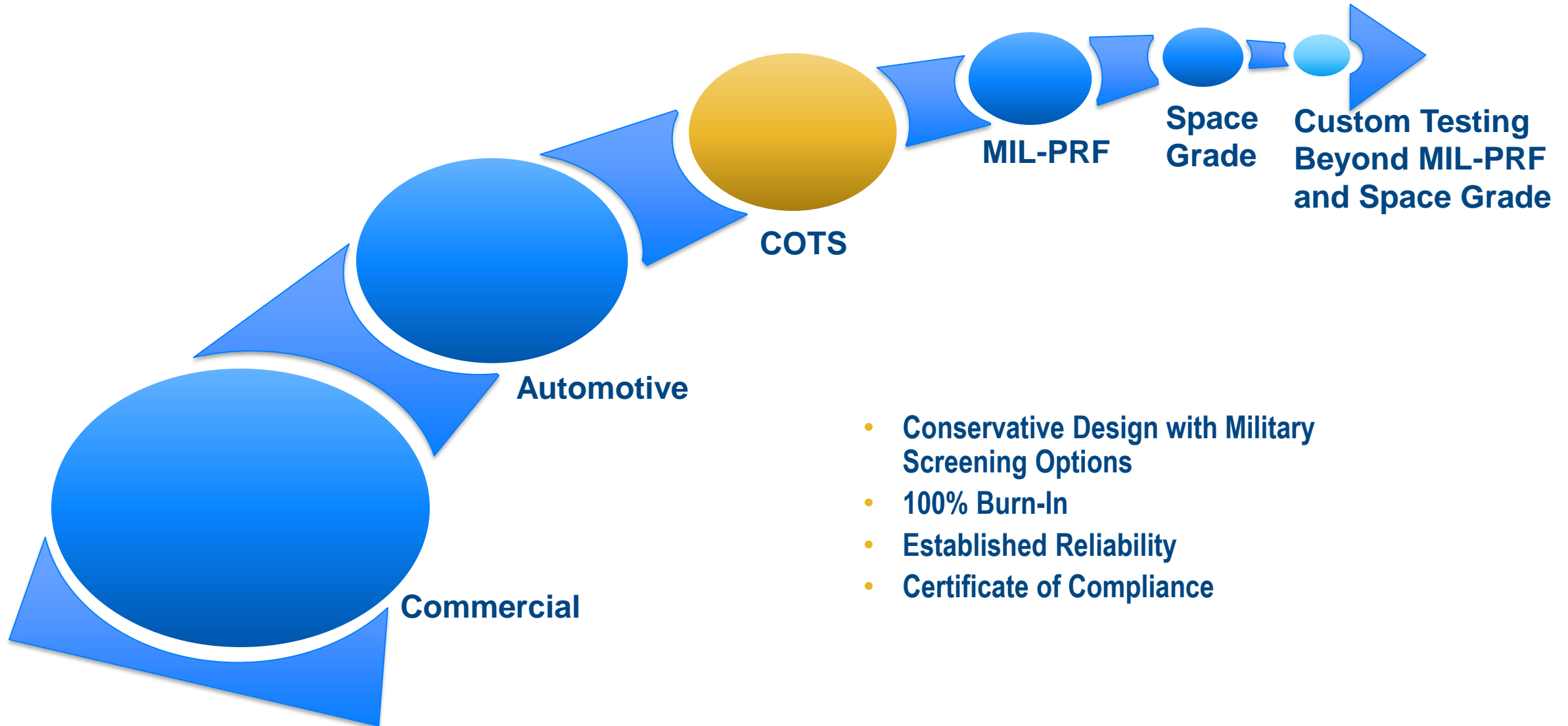
# Product Grades



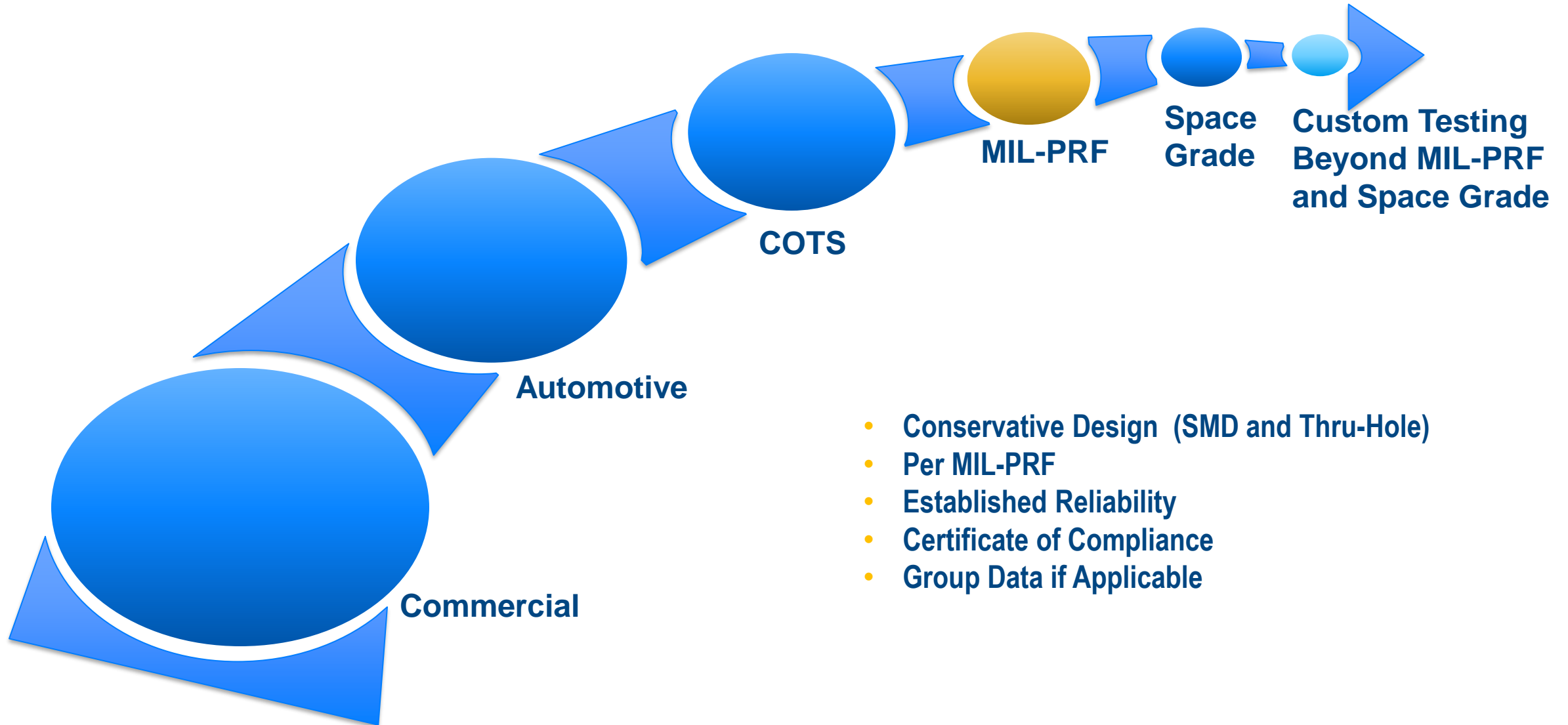


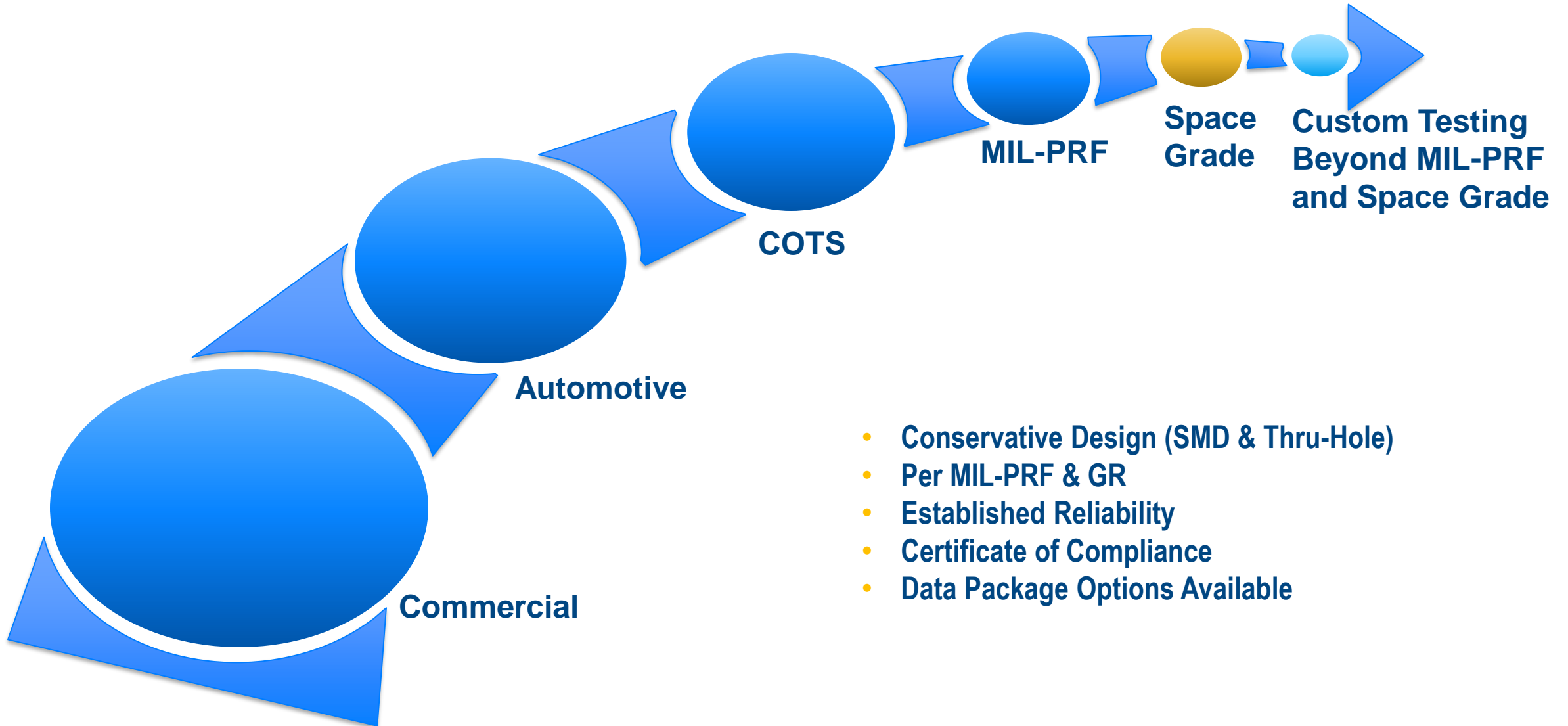


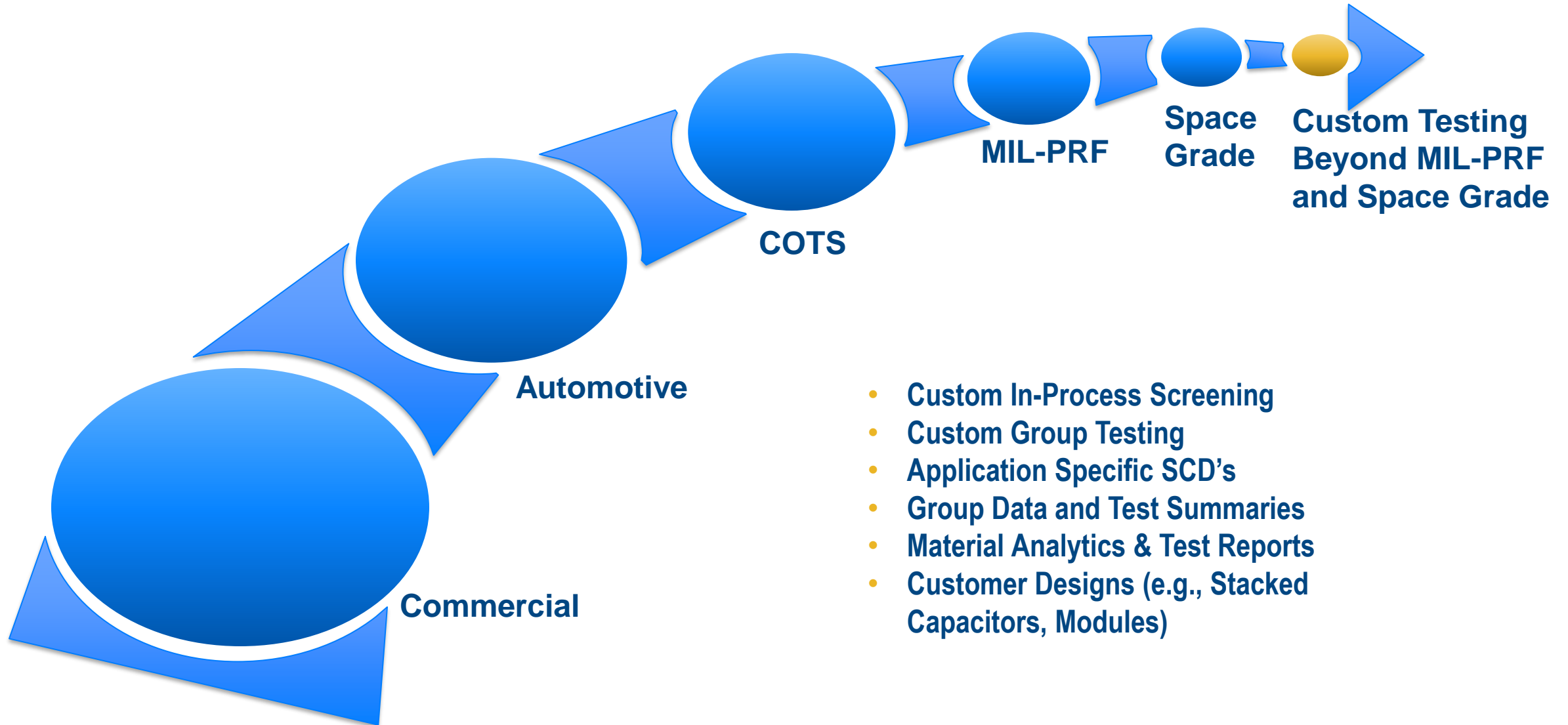
# COTS (Commercial “Off-The-Shelf”)



- Conservative Design with Military Screening Options
- 100% Burn-In
- Established Reliability
- Certificate of Compliance









# Capacitor Grade Examples

Surface Mount Multilayer Ceramic Chip Capacitors (SMD MLCCs)

## Commercial Off-the-Shelf (COTS) for Higher Reliability Applications, X7R Dielectric, 6.3VDC-200VDC

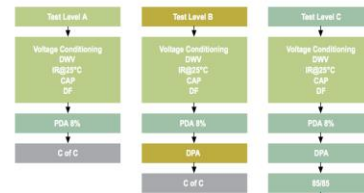


### Overview

KEMET's COTS program is an extension of our capability and knowledge regarding high reliability test criteria and requirements. As an established and trusted supplier of "up-screened" products, the COTS program was developed in response to the growing demand within the defense, aerospace, automotive, medical and consumer electronics industries for lower cost and commercially available products that offers the same high quality and high reliability as up-screened products. The COTS program addresses this demand and integrates commercial grade products with high reliability testing and inspection protocols that provide the accelerated conditioning and 100% screening necessary to eliminate infant mortal failures from the population.

KEMET's X7R dielectric features a 125°C maximum operating temperature and is considered "stable." The

All COTS testing includes voltage conditioning and post-electrical testing as per MIL-PRF-55681. For enhanced reliability, KEMET offers the following test level options and conformance certifications:



Surface Mount Multilayer Ceramic Chip Capacitors (SMD MLCCs)

## C0G Dielectric, 10 – 200 VDC (Commercial Grade)



### Overview

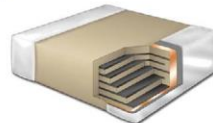
KEMET's C0G dielectric features a 125°C maximum operating temperature and is considered "stable." The Electronics Components, Assemblies & Materials Association (EIA) characterizes C0G dielectric as a Class I material. Components of this classification are temperature compensating and are suited for resonant circuit applications or those where Q and

stability of capacitance characteristics are required. C0G exhibits no change in capacitance with respect to time and voltage and boasts a negligible change in capacitance with reference to ambient temperature. Capacitance change is limited to  $\pm 30$  ppm/°C from -55°C to +125°C.

### Benefits

- 55°C to +125°C operating temperature range
- RoHS Compliant
- EIA 0201, 0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, and 2225 case sizes
- DC voltage ratings of 10 V, 16 V, 25 V, 50 V, 100 V, and 200 V
- Capacitance offerings ranging from 0.5 pF up to 0.47  $\mu$ F
- Available capacitance tolerances of  $\pm 0.10$  pF,  $\pm 0.25$  pF,  $\pm 0.5$  pF,  $\pm 1\%$ ,  $\pm 2\%$ ,  $\pm 5\%$ ,  $\pm 10\%$ , and  $\pm 20\%$
- No piezoelectric noise
- Extremely low ESR and ESL
- High thermal stability
- High ripple current capability
- Preferred capacitance solution at line frequencies and into the MHz range

- No capacitance change with respect to applied rated DC voltage
- Negligible capacitance change with respect to temperature from -55°C to +125°C
- No capacitance decay with time
- Non-polar device, minimizing installation concerns
- 100% pure matte tin-plated termination finish allowing for excellent solderability
- SnPb plated termination finish option available upon request (5% minimum)



### Ordering Information

High Reliability KEMET Organic Capacitor (KO-CAP)

## T540 Polymer Commercial Off-the-Shelf (COTS) Series



### Overview

The KEMET Organic Capacitor (KO-CAP) is a tantalum capacitor with a Ta anode and Ta<sub>2</sub>O<sub>5</sub> dielectric. A conductive organic polymer replaces the traditionally used MnO<sub>2</sub> as the cathode plate of the capacitor. This results in very low ESR and improved capacitance retention at high frequency. The KO-CAP may also be operated at steady state voltages at up to 90% of rated voltage for part types with rated voltages of  $\leq 10$  volts and up to 80% of rated voltage for part types > 10 volts.

The T540 Series KO-CAP offers the same advantages as the T525 Series but is also designed for the Commercial Off-the-Shelf (COTS) requirements of defense and aerospace applications. This surface mount product offers a tin lead (SnPb) leadframe finish, surge current testing options and standard or low ESR levels.

### Benefits

- Polymer cathode technology
- 125°C maximum operating temperature
- High frequency capacitance retention
- Benign failure mode

### Applications

Typical applications include decoupling and filtering in defense and aerospace applications that require low ESR or a benign failure mode.

MIL-PRF (CWR Style) Established Reliability

## T409 Series CWR09 Style MIL-PRF-55365/4



### Overview

The KEMET T409 Series is approved to MIL-PRF-55365/4 (CWR09) with Weibull failure rates of B level (0.1% failures per 1,000 hours), C level (0.01% failures per 1,000 hours), D level (0.001% failures per 1,000 hours), or T level (0.01% failures per 1,000 hours, Option C surge current, DPA, Radiographic

inspection, 100% visual inspection, DCL and ESR measurements within +3 standard deviations, and Group C inspection). This CWR09 product is a precision-molded device with compliant terminations and indelible laser marking. Tape and reeling per EIA 481-1 is standard.

### Benefits

- Established reliability options
- Taped and reeled per EIA 481-1
- Symmetrical, compliant terminations
- Laser-marked case
- 100% surge current test available on all case sizes
- Qualified to MIL-PRF-55365/4, Style CWR09
- Termination options B, C, H, K
- Weibull failure options B, C, D, and T
- Exponential failure rates M, P, R, S
- Voltage rating of 4 – 50 VDC
- Operating temperature range of -55°C to +125°C

### Applications

Typical applications include decoupling and filtering in Military and aerospace applications requiring CWR09 devices.



A large, stylized lightning bolt graphic in shades of blue and white, extending from the left side of the slide towards the center. The bolt is composed of multiple jagged, branching lines, creating a sense of energy and power. The background behind the bolt is a gradient of light blue and white, suggesting a bright, stormy sky.

Thank You!