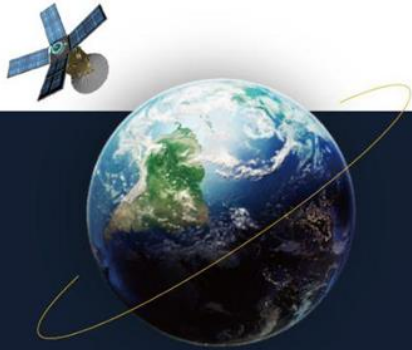# Tensor Tech Co., Ltd.

First Commercial Spherical Motor for
Spacecrafts and beyond

tensortech.co

**Motion Control Solutions,
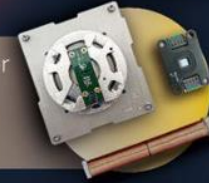Assembled by Standard
Product & Services:**

2024
Brochure

Integrated ADCS for NanoSat
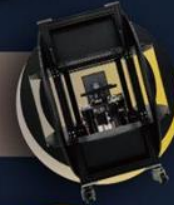Integrated ADCS for SmallSat

System

CMG based on Spherical Motor
Sun Sensor
Magnetorquer

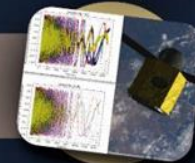**Component**
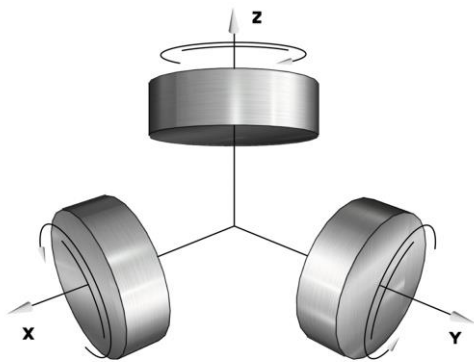
ADCS Testbed
Attitude Determination Test Platform

Equipment
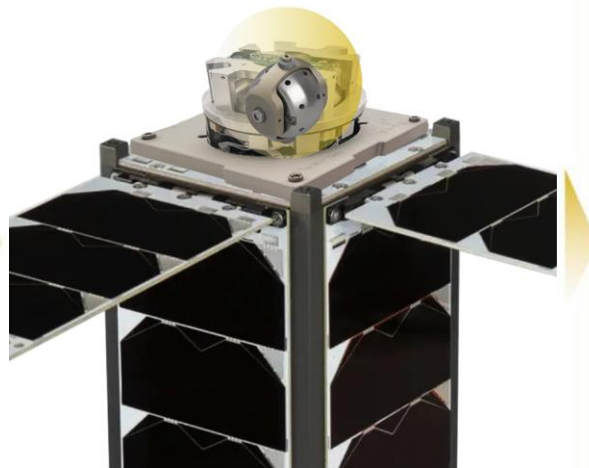
ADCS Test Services
Constellation Motion Control

Service

Past
3 X Single-axis Electric Motors

Now
One Spherical Motor

Killer Application:
Constellation Motion Control Service

Enabling
Formation Flying
Satellite-to-Satellite Pointing
Collision Avoidance

- One motor, that does the job of several
- Offers **X2** volume and mass budget for payload, maximizing profitability of space assets.
- Serving as a Control Moment Gyro (CMG). Offers **X10** torque-to-power ratio, such agility enables the constellation motion control.

Open-loop Gyroscopic Torque Exertion by SGCMG

tensortech.co

Traction

Founded in 2020
First Flight Heritage Achieved in Jan 2022

Tensor Tech
Company's introction

- 2.5M USD Raised to Date
- 4 Granted Invention Patents, 3 Pending Applications
- 20+ Clients Worldwide, Served by 2 Offices:

Business Development & Sales
2880 ZANKER ROAD, SUITE 103,
SAN JOSE, CA 95134, U.S.A.

UNITED STATES
CALIFORNIA

System Research & Development
10F., NO. 33, CHENGTIAN RD.,
TUCHENG DIST.,
NEW TAIPEI CITY 236039,
TAIWAN (R.O.C.)

TAIWAN
NEW TAIPEI

Clients

- **Commercial**

  ENDUROSAT

  REFLEX AEROSPACE

  Hanwha

- **Government**

  TASA

  Los Alamos
  NATIONAL LABORATORY

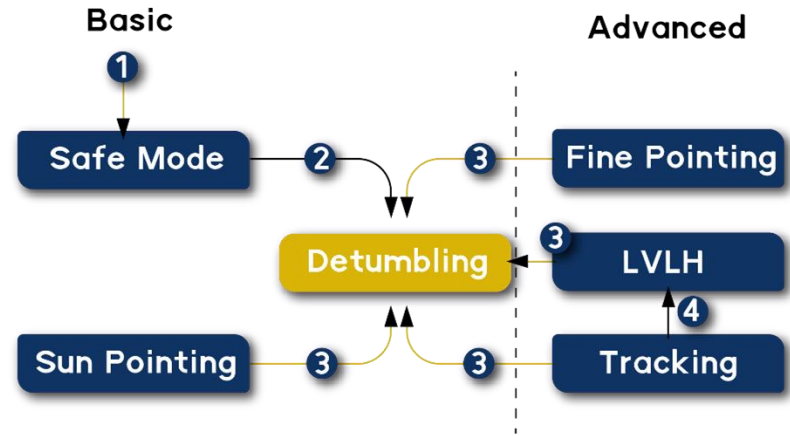- **Academic**

  UNIVERSITY OF TORONTO

  CAL POLY

Thank you for your time!

See some more Technical
Intros below:
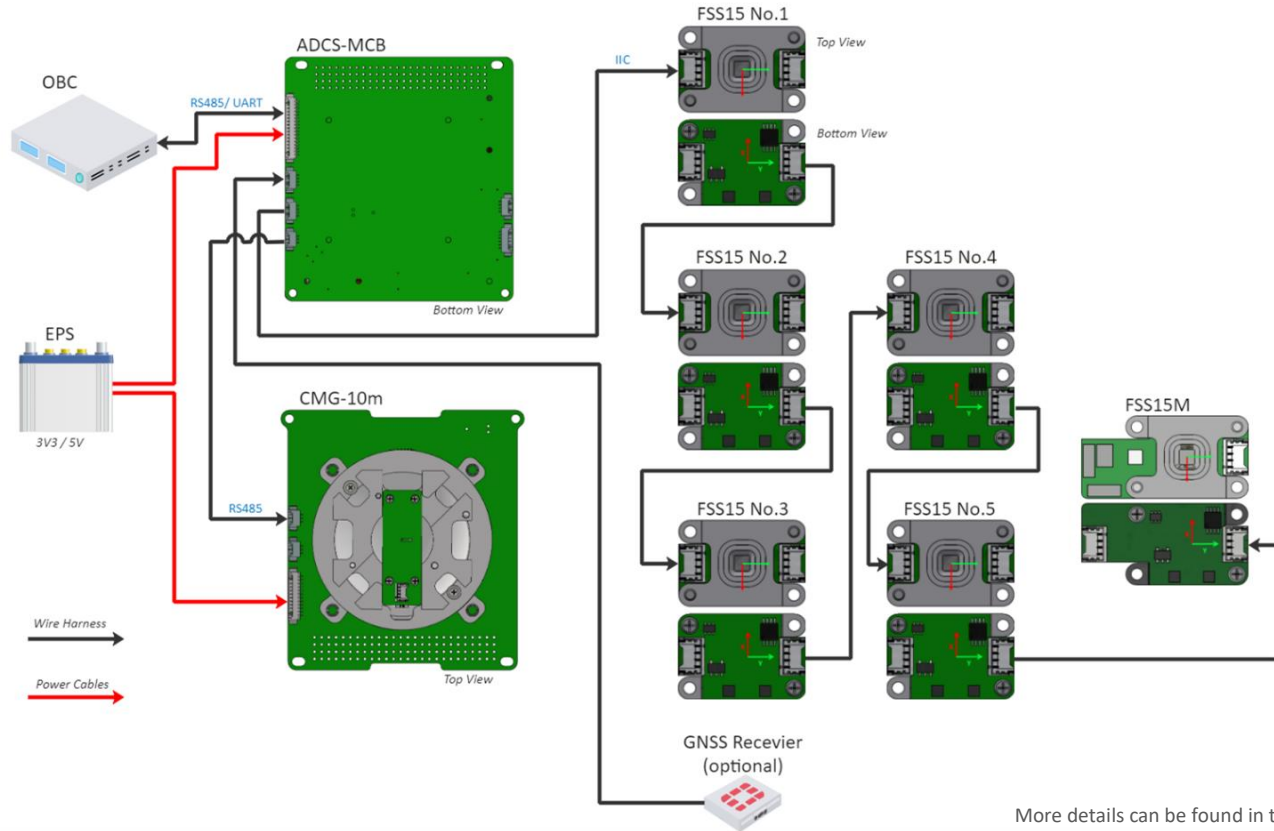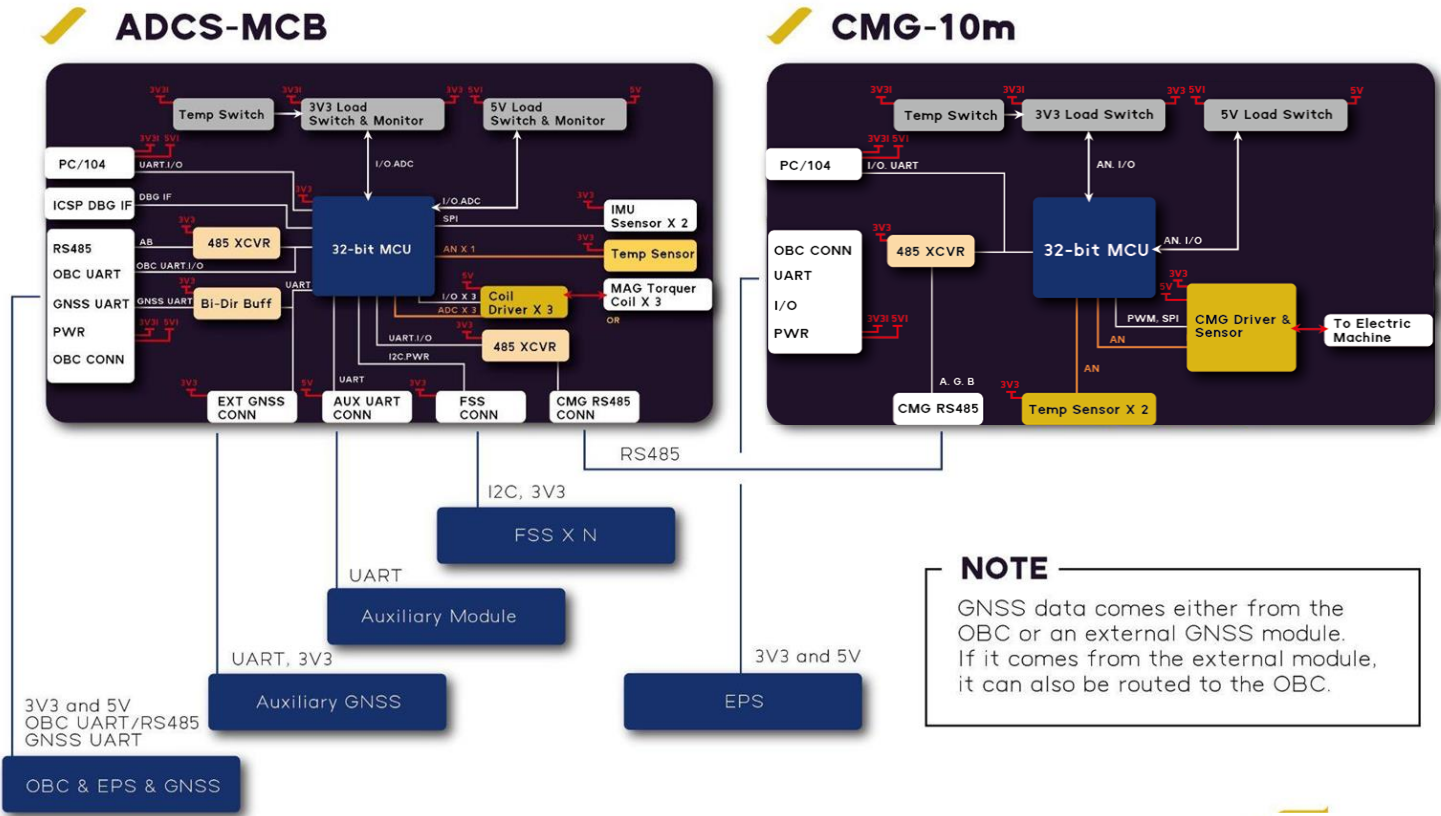
Integrated ADCS with Automatic Modes

- Condition ①: Soft Error or tumbling rate > 360 deg/second

- Condition ②: Tumbling rate between 5 deg/second to 360deg/second and rotor speed > 5 rpm

- Condition ③: Tumbling rate > 5 deg/second

- Condition ④: Target lost

Wiring Guidelines
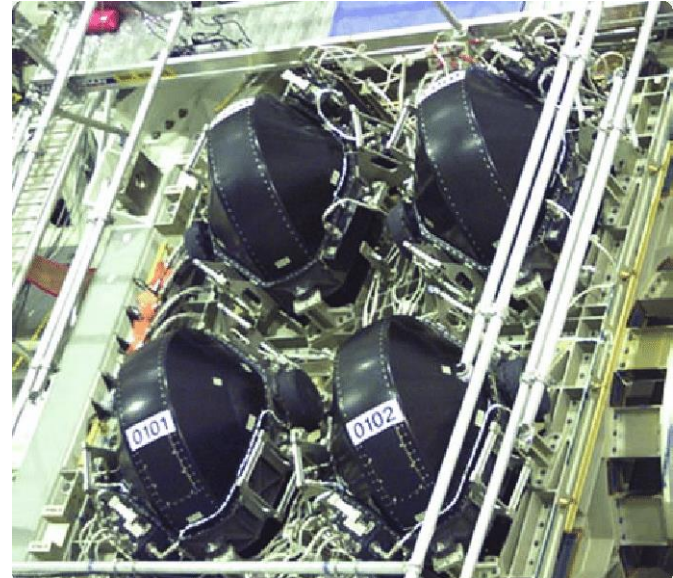
Electrical Connection Diagram

CMG Applications - Agile Satellites (WorldView 2-3-4, Pléiades, Spot 5-6-7, etc) and Large Spacecrafts (Space Stations)

Maxar's World View
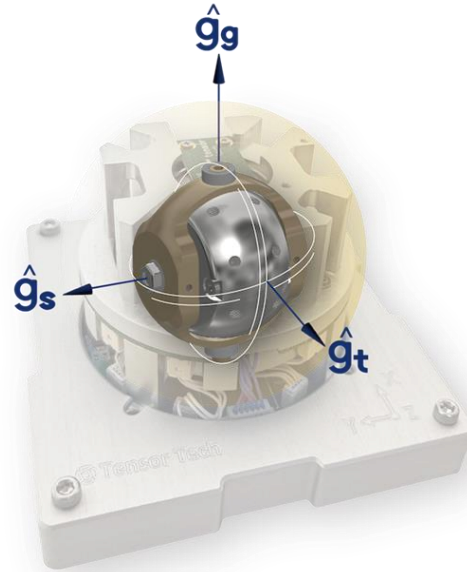(Remote Sensing)

International Space Station

Principle of Single-gimbal Control Moment Gyro (CMG)

$$\tau_s = I_s \dot{\omega}_s$$

$$\tau_t = I_s \omega_g \omega_s$$

$$\tau_g = I_g \dot{\omega}_g$$

Attitude & Heading Reference System (AHRS) Architecture for Antenna Control Unit (ACU)

LEO Satellites

1 AHRS with Better Accuracy:
- Smaller Uncertainty Cone,
- Shorter Searching Time

2 AHRS integrate with ACU
- Better Stability for Long Term Tracking
- Design for Specific Application

3 Inter-satellite Link:
- Position Propagation of the Target Satellite; Calculate the required beam angles

DynaSense

Introducing Tensor Tech's DynaSense - Advanced AHRS for Satellite Ground Equipment

tensortech.co