



Moog Australia

Turreted Weapon Systems

Aerospace/AI/Robotics opportunities in Australia

November 24, 2022

MOOG

Moog Inc.



Bill Moog – Founder, Innovator

- Founded in 1951 by Bill Moog
 - Over 70 years of leading-edge solutions rooted in solving our customer's most difficult Aerospace and Defense challenges
- Headquarters in East Aurora, NY
 - Over 300-acre campus
- Global company
 - 26 countries
- Over 12,000 employees worldwide
- \$2.9 billion in revenue (FY 2021)
- Organized under the following collaborative operating segments
 - Aircraft
 - Space and Defense
 - Industrial
- Precision component, control systems, and customer-centric system-of-systems solutions provider

Moog Japan

- Established in 1970
- Located in Hiratsuka, Kanagawa

Supports the following operating segments in Japan:

Moog Industrial

- Electro-hydraulic and Electro-mechanical actuation
- Power Generation
- Industrial Machinery
- Trains
- Test

Moog Aircraft

- Commercial Aircraft flight control actuation
- Military Aircraft flight control actuation

Moog Space and Defence

- Servo valves
- Specialty Actuators



Moog Australia, Space and Defence Group Asia-Pacific

- **Established in 1979, moved to our Heatherton facility (South-East Melbourne) in 2014, expanded in April 2021.**
 - 2,700 square meters, modular factory fit-out
 - Optimized **Lean layout**, designed for multi-platform support (Air, Land, Sea)
 - High security, video surveillance and access system
 - **AS9100D** Certification (design and manufacture)
 - Allowing us to service growth in **APAC Defence** markets from our Australian facility. Opened an additional office in South Korea in 2021.
- **Mission:** Centre of Excellence for Defence Control Systems across Air, Land and Sea domains. Development of local IP Created, Produced and Exported within Region and ultimately globally.



MOOG DEFENSE

EQUIPPING THOSE WHO DEFEND FREEDOM
ACROSS MULTI-DOMAIN OPERATIONS

CAPABILITIES

MULTI-DOMAIN SUSTAINMENT SERVICES



LAUNCH VEHICLES

- Power & Control Electronics
- Thrust Vector Control Systems
- Chemical & Cold Gas Engine Systems
- Main Engine Fluid Controls
- Secondary Payload Adaptors & Delivery Systems
- Vehicle SoftRide* Isolation



SATELLITES & PAYLOAD DELIVERY SYSTEMS

- Propulsion Systems
- Integrated Flight Avionics
- Structures & Isolation Solutions
- On-board Mechanisms & Control Electronics
- Spacecraft Bus Solutions



ROTARY WING

- Weapon Stores Management Systems (SMS)
- Missile Launchers & Simulators
- Flight Control Systems
- Vibration Control
- Slip Rings



FIXED WING

- Weapon SMS
- Flight Control Systems
- Motion Control for ISR Search Radar
- Stabilized Motion Control for Turrets
- Engine Control Systems
- Media Converters/Ethernet Switches
- Missile Launchers & Simulators



MISSILES & KILL VEHICLES

- Thrust Vector Control
- Fin Control
- Wing Deploy
- Integrated Propulsion Systems & Fluid Control
- Seeker Motors
- Avionics & Sensor Integration
- Structures & Isolation Solutions
- Control Electronics



UAS

- Flight Control Systems
- Weapon SMS
- Missile Launchers & Simulators
- Actuators
- Vehicle Management Systems



SENSORS AND SURVEILLANCE

- C-UAS Solutions
- Pan/Tilt Positioners & Tripods
- Integrated Sensors & Video Tracking
- Automatic Runway FOD Detection
- Weapons Scoring & Trajectory Analysis



RADAR

- Radar Deployment Systems
- Cooling Equipment Units
- Slip Rings



COMBAT & TACTICAL VEHICLES

- Turret Weapon Systems & Integration
- Stabilized Motion Control
- Driver's Vision Enhancer
- Fire Control
- Ammunition Handling



LAUNCHERS

- EH to EM Conversions & Upgrades
- High Power Elevation & Azimuth Control
- Directed Energy
- Weapon SMS
- Slip Rings



SURFACE VESSELS

- EMA Actuation
- Weapon SMS
- Stabilized Motion Control for Turrets
- Gun Control Units
- Ride Control
- Ammunition Handling



AUV / UUV

- Propulsion Systems
- Steering & Dive Control Systems
- Subsea Utility Motors



SUSTAINMENT SERVICES

- OEM Product Support
- OEM Modernization & Upgrades
- Service & Support
- Training
- Engineered Solutions

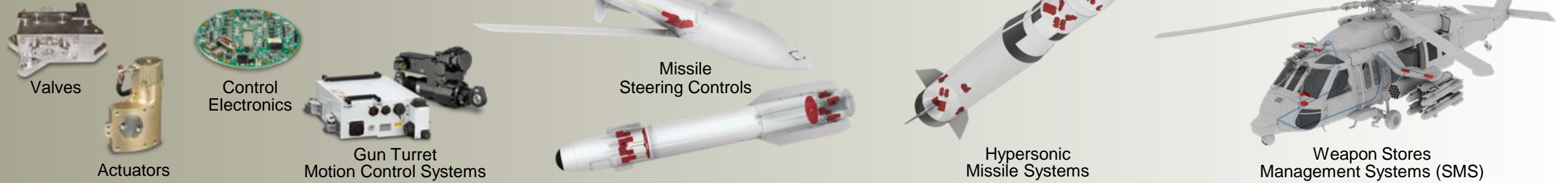
EXPERIENCES

SPACE	ROTARY WING	FIXED WING	MISSILES & KILL VEHICLES	UAS	SENSORS AND SURVEILLANCE	RADAR	COMBAT & TACTICAL VEHICLES	LAUNCHERS	SUBMARINES	SURFACE VESSELS	AUV / UUV	
LEO/MEO/GEO & Beyond DOD Commercial Civil	Black Hawk V-22 Seahawk S-92 S-76 AW129 AW159 V-280 MD530F Bell 407	F-35 AC-130J Ghost Rider Caravan Eurofighter AT-802 MC-145B Scorpion Bronco II PredSR	Tactical & Strike Systems Hypersonic Missile Systems Long Range Ballistic Missiles Air & Missile Defense	X-47B Mantis Predator Gray Eagle	Border/Perimeter Security Mobile/Stationary Surveillance Critical Infrastructure Protection Test Ranges RF/SATCOM Positioning Tarsier*	G/ATOR AN/TPY2 Sentinel AN/TPQ-53 MEADS Aegis TRML-4D	M-SHORAD LAV-A7/25 Stryker CV90 PZH 2000 Bradley	MLIDS Abrams M113A54 RCH 155 CWS-Heavy	MML HIMARs MLRS	Seawolf Class Virginia Class Ohio Class Columbia Class Scorpene Class Dreadnought Class Barracuda Class Mark 48 Torpedo	Ford-class Aircraft Carrier Littoral Combat Ship Types 45 23 122-124	XLUUV UUV-FoS Echo Ranger Echo Voyager CLASSIFIED RMMV

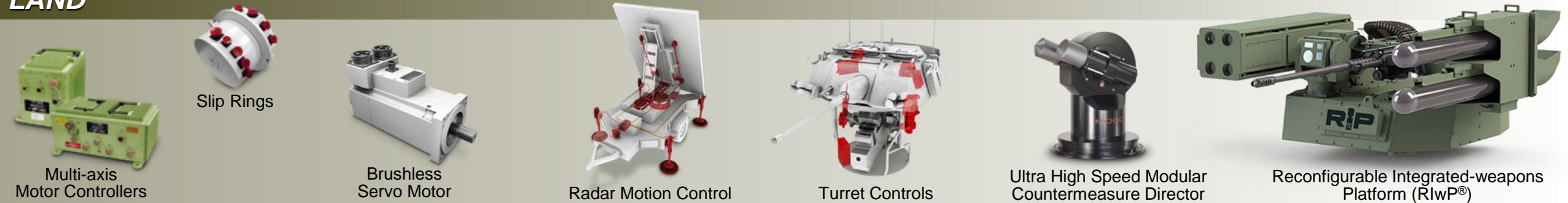
Solutions for Defense

Moog provides components, sub-systems, and full systems to the defense market.

AIR



LAND



SEA



Existing Defence Applications

Moog Australia supports the following ADF platforms:

- ASLAV, M113AS4, M1A1
- C27J Spartan, MH-60R Seahawk
- Collins-Class submarine, Air-Warfare Destroyer, Anzac-Class frigates, Landing Helicopter Dock

ASLAV and M113 Gun Turret Drive Systems

- Full systems test capability
- Dedicated MRO&U cells
- ANSI/ESD S20.20
- IPC-A-610 / IPC-A-620 / IPC-7711 / IPC-7721
- Fully trained Engineers and Technicians

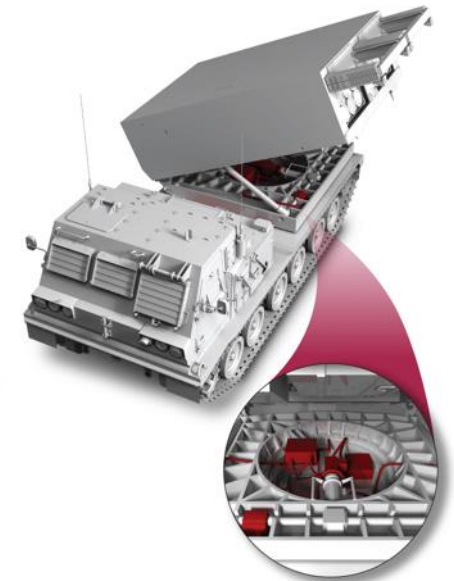
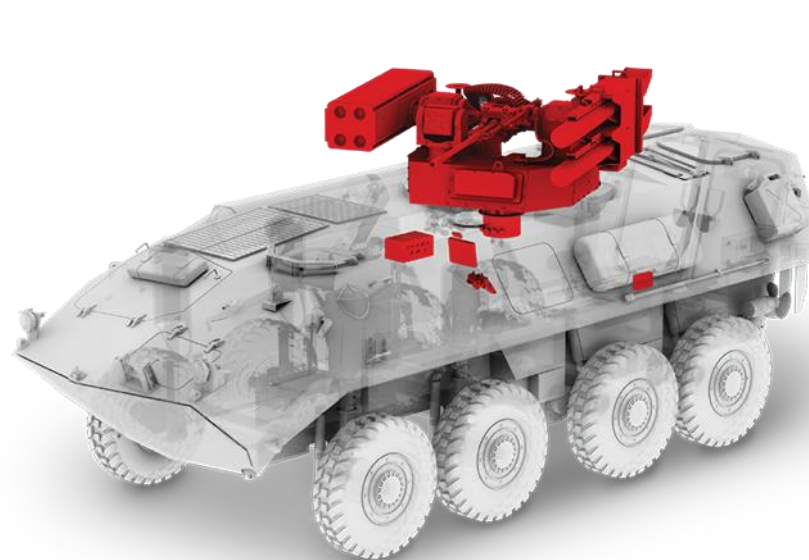


Defense – Land

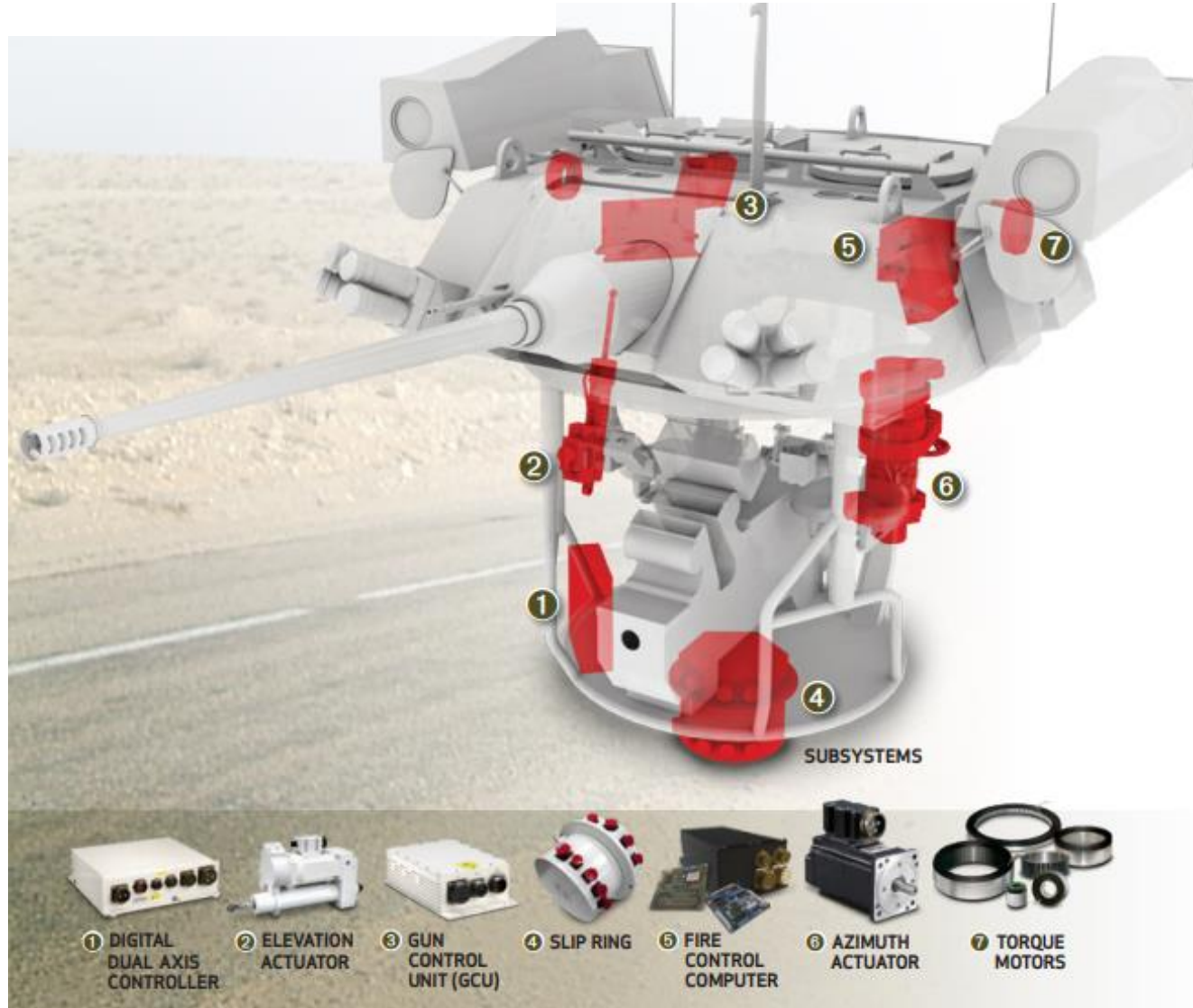
- Turreted weapon systems and **integration**
- **Stabilized** motion control for turrets, launchers, and radar systems
- Remote **weapon operation** and **fire control**
- Counter-UAS solutions
- Complex defense **automation**
- Ultra-high-speed directors for APS (active protection systems)
- Conversions and upgrades (EH and EM)



Credit: U.S. Army



Turret Driving and Control Systems



Precision Motion Control & Stabilisation Systems

- Gun Laying and Stabilisation
- Ammunition Handling
- Weapon Systems Integration
- Sensor and Radar Stabilisation
- Inherent Safe Erection Drives
- Conversion and Upgrades

Delivered today

Light armored vehicles – 3500 axis

Infantry Fighting vehicles – 4500 axis

Main Battle Tank & Artillery – 5000 axis

Flexible Missile Platform (FMP)

Flexible Missile Platform

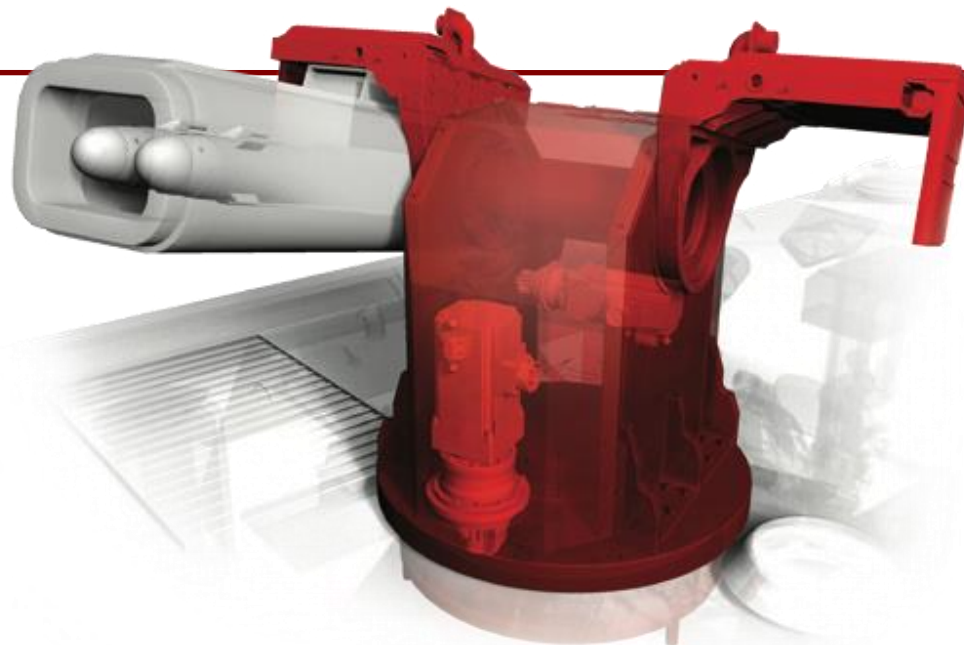
- Missile, mission and platform agnostic
- Allows user to fire missiles of choice from vehicle of choice
- Moog's Weapon Stores Management technology
- **Stabilization** system for shoot on the move capability



Flexible Missile Platform (FMP)

Specifications

- Approx. 350kg (without missile launchers)
- Power: 28 Vdc Per MIL-STD-1275D
- 360 degree continuous rotation
- -10 to +30 elevation range
- Height approx. 850mm / Diameter approx. 800mm



Flexible Missile Platform



Optically-Guided / Heat-Seeking Missiles



c-UAS / Anti-Tank Missile



Precision-Guided Munitions

Summary

- Non-ITAR & Non-BAFA. Australian designed and manufactured options
- MRO&U and product life extension
- Customised weaponization of Air, Land and Sea assets
 - Missile, mission and platform agnostic
 - Stabilization, automation
- Turret and weaponization upgrades, both manned and unmanned.
- Tailored kinetic response - APS and Smoke launchers

***Delivering tailored over match
against our opponents***



MOOG

When Performance Really Matters

