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TULPAR

AEROSPACE & DEFENCE INC.







TULPAR
AEROSPACE & DEFENCE INC.

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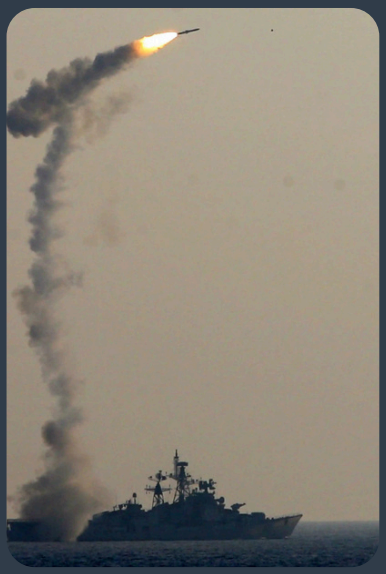



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ABOUT US

TULPAR Aerospace & Defence Inc. is an agile, R&D-driven manufacturing company established in 2019 in Kocaeli, Türkiye, specializing in the design and production of critical components for defence and aerospace systems.

With a clear mission to reduce foreign dependency and strengthen domestic technological capabilities, Tulpar focuses on delivering high-performance, reliable, and application-specific solutions. We do not position ourselves as a conventional supplier, but as a trusted engineering partner—working closely with our partners to understand their challenges and develop effective, tailored solutions.

Our strength lies in our fully integrated engineering and manufacturing capability. All key processes—including R&D, design, engineering, prototyping, validation, and serial production—are carried out in-house. This enables us to ensure full control over quality, performance, and traceability throughout the entire product lifecycle.

Tulpar has strong expertise in the development and manufacturing of energetic materials, along with advanced capabilities in:

- Pyrotechnic systems, including actuators, explosive bolts, and ignition units
- Hermetic glass-to-metal sealing technologies for harsh environments
- Water-activated battery systems for naval applications
- Anti-Drone (FPV) Solutions
- Parachute systems designed for defence platforms and munition systems

Our products are engineered to perform reliably under extreme operational conditions, including high shock, vibration, pressure, and temperature variations.

Quality and reliability are at the core of everything we do. All our quality systems are designed in full compliance with AS9100 standards, ensuring that our processes meet the rigorous requirements of the defence and aerospace industries. Our disciplined approach to quality, combined with our engineering flexibility, allows us to deliver consistent and dependable results.

As a fast-moving and solution-oriented organization, Tulpar is committed to building long-term partnerships based on trust, technical competence, and responsiveness. We aim not only to deliver products, but to solve complex engineering problems and create value for our partners.



2014 • Energetic materials development

2015 • Payload production for unmanned aerial vehicles (UAVs)



2016 • Unmanned aerial vehicle (UAV) manufacturing



2019
- Parachute manufacturing
- Development of water-activated batteries
- Establishment of Tulpar





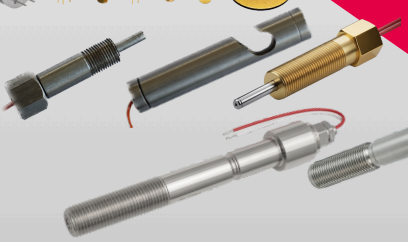
2020 • Epoxy-based ignition units



2021 • Development of glass-to-metal hermetic ignition units



2022
- Pyrotechnic actuators (pin pushers)
- Pyrotechnic cutters



2023 • Explosive bolt developments

2024 • Development of multi-cell water-activated batteries



2025 • Anti-drone (FPV) launcher development



PRODUCT COUNT : 1
CUSTOMER COUNT : 1

2019

PRODUCT COUNT : 4
CUSTOMER COUNT : 1

2020

PRODUCT COUNT : 6
CUSTOMER COUNT : 2

2021

PRODUCT COUNT : 9
CUSTOMER COUNT : 3

2022

PRODUCT COUNT : 13
CUSTOMER COUNT : 5

2023

PRODUCT COUNT : 22
CUSTOMER COUNT : 8

2024

PRODUCT COUNT : 26
CUSTOMER COUNT : 13

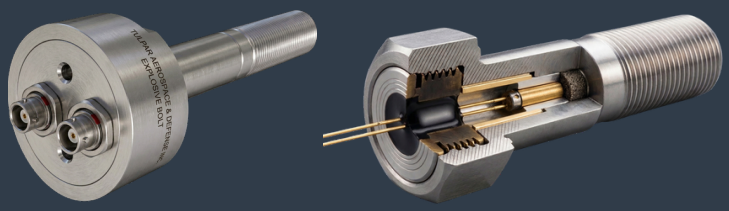
2025

STRATEGIC PARTNERSHIPS AND BUSINESS PARTNERS

MKE
ROKETSAN
BAYKAR
aselsan
ICEMAK
DEFENCE & SECURITY
Kale Jet Motorları
EST 1873
HFI
PYROTECHNICS INC.

PYROTECHNIC BOLTS FOR SEPARATION SYSTEMS







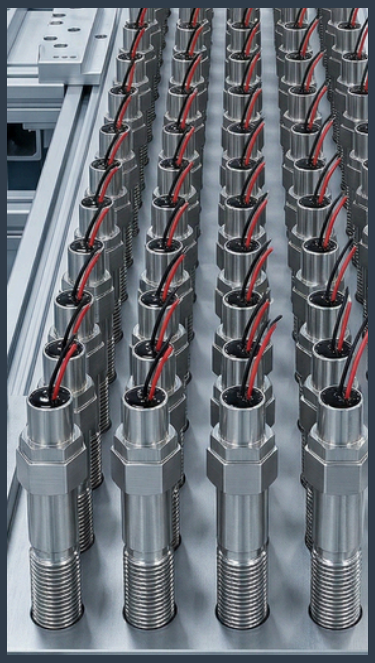
OVERVIEW: THE CRITICAL LINK IN TACTICAL DYNAMICS

Tulpar's Pyrotechnic Separation Bolts, precisely engineered as controlled fragmentation devices, solve the most difficult challenge in tactical missile airframe dynamics: maintaining extreme structural coupling under high-G loads while ensuring a "zero-stiction" clean break upon ignition.

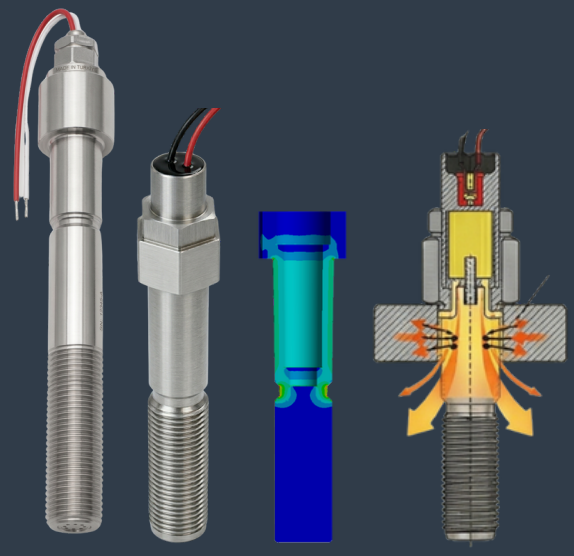
These bolts are not merely fasteners; they are dual-function, mission-critical components that transition instantaneously from a robust, load-bearing state to a high-speed release actuator at the exact millisecond of command. During logistics, transport on TEL vehicles, sea-state vibrations on warships, or captive-carry flight on fighter aircraft, Tulpar separation bolts provide the necessary structural stiffness to safeguard sensitive internal guidance systems and seeker heads from harmful harmonic frequencies and fatigue.

The Power of Optimization:

By utilizing a controlled fragmentation design philosophy, we deliver a highly compact solution where space and weight savings are not just benefits—they are tactical imperatives. A typical Tulpar separation bolt, with a mass of only 400g, can substitute complex mechanical latching systems that weigh many times more, directly contributing to increased range, payload capacity, and overall missile agility. This optimized mass-to-thrust ratio, combined with custom metallurgy and precisely machined fracture planes, offers an economical yet uncompromisingly reliable solution for high-volume guided munition and tactical missile platforms.

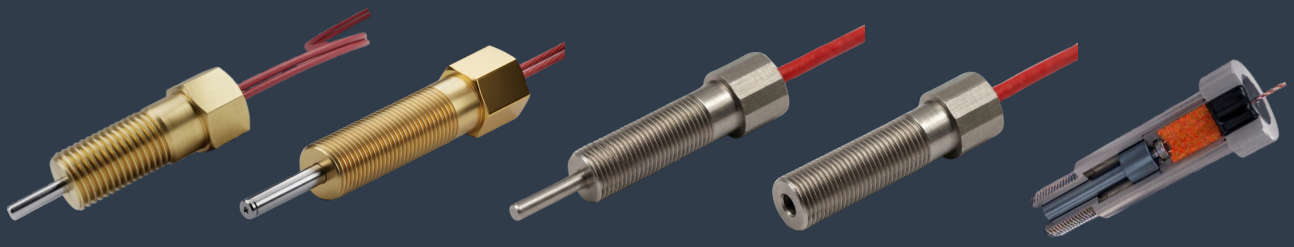


Parameter	Specification
Tensile Strength	Up to 450 kN
Separation Time	Less than 20 ms
Operating Temperature	54°C to +96°C
Hermeticity	≤ 1×10^{-6} cc/s (Helium leak rate)
No-Fire Condition	1 A / 1 W
All-Fire Condition	3.5 A
Initiation Type	Electrical



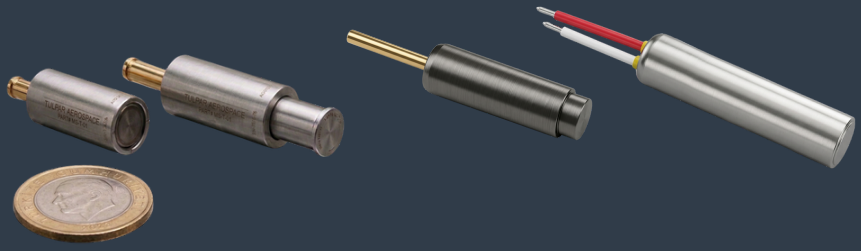


PYROTECHIC ACTUATORS (PIN PUSHERS)









Tulpar Pyrotechnic Actuators (Pin Pushers / Pistons) are compact, single-use devices that convert stored chemical energy into precisely controlled linear motion within milliseconds. Designed for high-dynamic environments, they deliver reliable actuation under extreme G-loads, vibration, and constrained volumes.

These actuators enable critical post-launch functions such as missile fin deployment, warhead arming (S&A), umbilical separation, and subsystem activation including thermal battery initiation and fluid release systems.

Featuring a hermetic (non-venting) design, all generated gases are fully contained within the actuator body, eliminating external flame or gas discharge. This allows safe integration near sensitive electronics, guidance systems, and propellant tanks.

Tulpar actuators offer high energy density, delivering strong mechanical output within a very compact volume, with performance levels configurable according to mission requirements. Activation occurs with deterministic timing and minimal latency, independent of continuous external power at the moment of actuation.

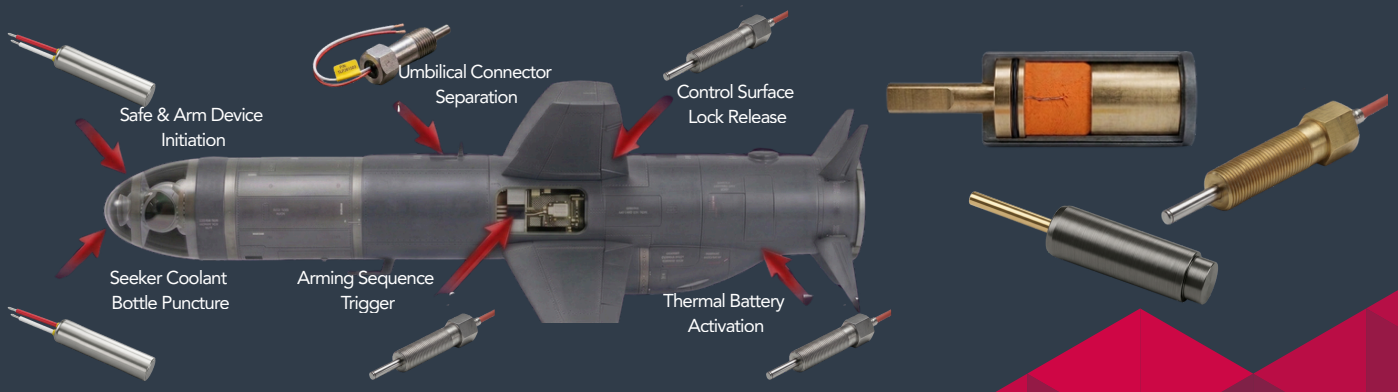
Each actuator can be fully customized in terms of stroke length (push or pull), force profile, locking mechanisms, and mechanical interfaces—ensuring seamless integration into a wide range of tactical systems.

Compared to conventional actuation technologies, pyrotechnic solutions provide zero-delay response, high reliability, and superior force-to-weight ratio, making them ideal for applications where timing certainty and robustness are mission-critical.

Key Features

- Hermetic (non-venting) design – no external gas or flame discharge
- High energy density within compact volume
- Deterministic activation with millisecond response time
- Independent of continuous external power during actuation
- High reliability with simple mechanical architecture
- Configurable output force and stroke characteristics

Parameter	Specification
Tensile Strength	Up to 450 kN
Separation Time	Less than 20 ms
Operating Temperature	54°C to +96°C
Hermeticity	≤ 1 × 10^{-6} cc/s (Helium leak rate)
No-Fire Condition	1 A / 1 W
All-Fire Condition	3.5 A
Initiation Type	Electrical



ENERGETIC MATERIAL MANUFACTURING

As Tulpar, we independently develop and manufacture the energetic materials used in our defense systems, including explosive bolts, pyrotechnic actuators, and pyrotechnic cutters.



Unlike many suppliers, we do not rely on third-party sources for energetic materials. All critical processes—including synthesis, pressing, and final assembly—are carried out entirely within our own facilities. This integrated approach ensures full process control, high reliability, and traceability across all production stages.

Our energetic material portfolio includes:

- **Lead Styphnate** primary ignition compound with high sensitivity
- **RDX** high-energy explosive with stable performance characteristics
- **Nickel Hydrazine Nitrate (NHN)** gas-generating composition suitable for controlled actuation
- **PETN** high brisance explosive used for fast energy transfer
- **ZPP (Zirconium Potassium Perchlorate)** reliable pyrotechnic composition for ignition systems



By maintaining in-house energetic material production capabilities, Tulpar delivers mission-critical components with enhanced performance consistency, reduced supply chain dependency, and strict compliance with defense industry requirements.





ELECTRICAL IGNITION UNITS (INITIATORS)

Tulpar specializes in the design and manufacture of high-reliability headers and ignition units for the most demanding defense and aerospace platforms. We provide the "heart" of the ignition chain, ensuring consistent performance from the first micro-second.

MICRO-ASSEMBLY EXCELLENCE

Our production line is optimized for extreme electrical stability and precision:

- Precision Bridgewire: Optional in-house welding capabilities for wire diameters down to 45µm.
- Tight Tolerances: We guarantee resistance stability within an ultra-narrow range of <±0.2Ω.
- Flexible Supply Models: * Sub-Component Supply: High-insulation "empty" headers for customers who perform their own loading.
    - Full Initiation Units: Fully integrated and tested units ready for system assembly.

HOUSING & SEALING TECHNOLOGIES

We offer two distinct engineering solutions based on your operational environment:

1. Tulpar Proprietary Epoxy

Developed by our R&D team, this specialized resin formula outperforms standard epoxies:

- Aging Resistance: Prevents micro-cracking and maintains structural integrity over long shelf lives.
- Thermal Shock Protection: Optimized for extreme temperature cycles without losing insulation properties.

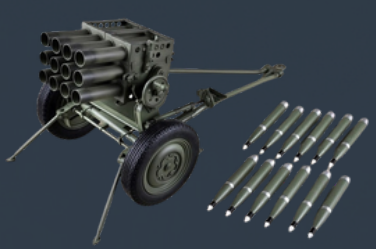
2. Hermetic Glass-to-Metal (GTMS)

For missions where failure is not an option:

- Vacuum & Pressure Integrity: Helium leak rates of <1×10−7 mbar · l/s.
- Frit-Fill Process: High-precision powder glass filling for complex geometries.
- Glass Preform Integration: Tablet-based molding for maximum uniformity and dimensional stability in high-volume production.
- Extreme Durability: Available in Compression Seal and Matched Seal options for high-altitude and deep-sea applications.

CUSTOM ENGINEERING & INTEGRATION

- Bespoke Pin Patterns: Specialized mold designs to match any electrical interface or connector type.
- Platform Integration: We provide technical support for the mechanical housing and interface requirements of our units.
- Advanced Surface Finishing (2026): In-house Gold, Nickel, and Silver plating capabilities to be fully operational by Q4 2026, ensuring ultimate conductivity.





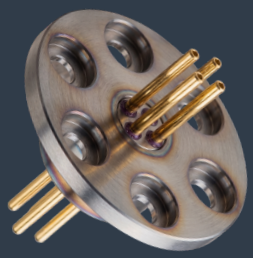


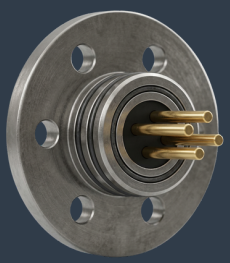


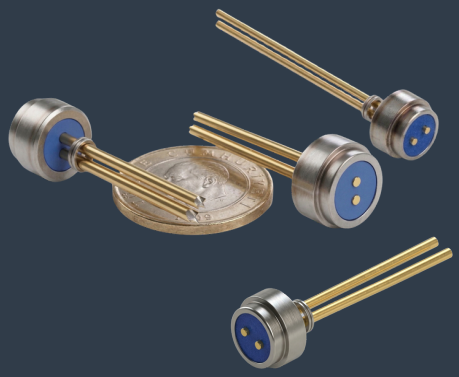


Parameter	Epoxy-Based	Glass-to-Metal
Housing Material	Tulpar Proprietary Resin	Stainless Steel / Kovar / Cold Rolled Steel
Sealing Technology	High-Bond Epoxy Fill	Frit-Fill or Glass Preform Molding
Hermeticity (He)	High Moisture Resistance	<1×10−7mbar · l/s
Bridgewire (Min.)	Up to 45µm (Optional)	Up to 45µm (Optional)
Resistance Tolerance	<±0.2Ω	<±0.2Ω
No-Fire Safety	1.0A / 1.0W (5 min)	1.0A / 1.0W (5 min)
Operational Temp.	−55°C to +125°C	−65°C to +175°
Standard Compliance	MIL-DTL-23659	MIL-DTL-23659

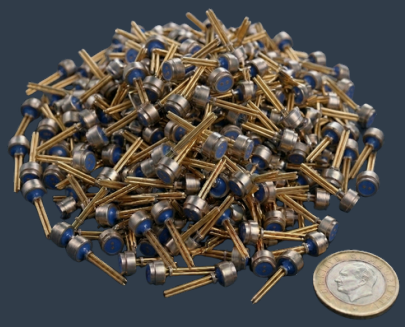








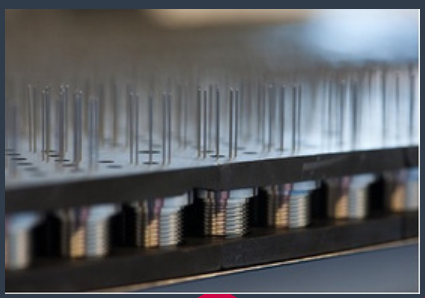












SAPAN: KINETIC ANTI-FPV DRONE INTERCEPTOR

"The Physical Hard-Kill Solution Where Electronic Warfare Fails"

SAPAN is a compact, high-impact kinetic defense system engineered to neutralize the most persistent modern threats: FPV kamikaze drones. Whether the threat is autonomous, AI-driven, or controlled via fiber-optic cables—making it immune to Electronic Warfare (EW)—SAPAN provides a definitive physical solution.

THE TACTICAL EDGE: BEYOND JAMMING

Conventional signal jammers are often helpless against the latest generation of wire-guided or autonomous drones. SAPAN fills this critical security gap by creating a physical kill zone.

- Anti-Fiber Optic Defense: Deploying a high-strength polymer net, SAPAN physically locks drone rotors, rendering electronic countermeasures irrelevant.
- Standalone Ergonomics: As a standalone pistol (580g), it ensures the operator's primary rifle remains unencumbered and ready for immediate lethal engagement during sudden ambushes.
- Mass Deployment Ready: Designed for cost-effective, wide-scale distribution, turning every soldier into a mobile air defense unit.

KEY OPERATIONAL ADVANTAGES

- Rapid Re-Engagement: The innovative Quick-Coupling mechanism allows for a reload in under 5 seconds, enabling soldiers to counter swarm attacks or successive threats effectively.
- Hard-Kill Physics: The specialized polymer net is engineered to withstand high-RPM rotors, instantly entangling the motors and forcing the drone to the ground.
- Independent Safety: Features a dedicated cocking/safety system to prevent accidental discharge during high-intensity movement or tactical transport.

TERMINAL ENGAGEMENT SCENARIO

When an FPV drone enters its final high-speed dive—often through electronic "dead zones" or via wire-link—the infantryman deploys SAPAN. Within milliseconds, a 3x3m physical barrier is established, neutralizing the threat before impact.

SAPAN isn't just a tool; it's the infantryman's final insurance policy.

SAPAN: KINETIC ANTI-FPV DRONE INTERCEPTOR

Parameter	Operational Value
Weight	~580 g (Ultra-Lightweight & Compact)
Propulsion	Standard 9mm Blank Ammunition
Net Dimensions	3x3 Meters (High-Tensile Polymer)
Effective Range	3-21 Meters (Optimized @45° Angle)
Reload Time	< 5 Seconds (Rapid Cartridge Exchange)
Safety System	Cocking Lever Mechanism



PARACHUTE APPLICATIONS

Advanced Engineering for Munitions, Rockets & Tactical Assets

Tulpar specializes in the design and manufacture of high-performance parachute systems engineered for specialized military and industrial applications. Our expertise lies in providing high-durability, mission-critical solutions for payloads ranging from 30 cm to 40 meters in diameter. Focused on reliability and precision, Tulpar serves as a strategic partner for the defense industry's most demanding platforms.

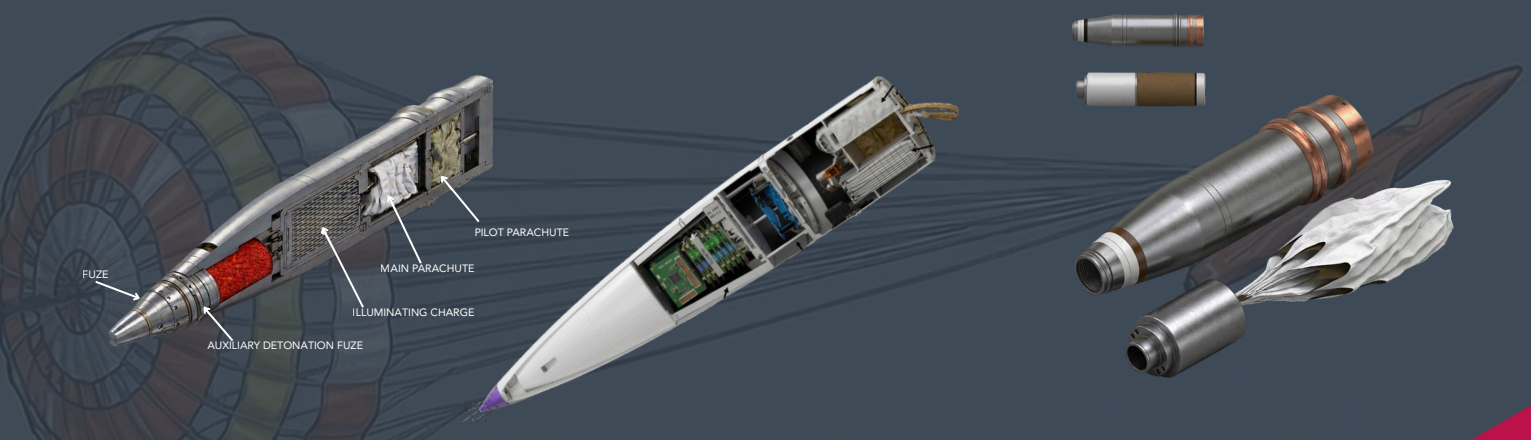
STRATEGIC APPLICATIONS

- Munition Systems: High-performance solutions for night visibility and deceleration, integrated into mortar rounds, artillery shells, and flares.
- Tactical UAV Recovery: Engineered for high-value Unmanned Aerial Vehicles, ensuring safe and controlled recovery for professional-grade tactical platforms.
- Rocket & Payload Recovery: Optimized for the multi-stage recovery of rocket components and sensitive scientific or military payloads.
- Ordnance Retardation: Specialized designs for gravity bombs to ensure controlled descent and high-accuracy delivery.
- Torpedo Stabilization: Precision aerodynamic control for seamless water entry and underwater operational stability.
- Search and Rescue (SAR) Payloads: Reliable deployment systems for professional SAR equipment and emergency supplies.

SPECIALIZED MUNITION INTEGRATION

Tulpar's illumination and deceleration parachutes are integral to high-stakes munitions, ensuring maximum operational effectiveness for:

- Artillery: 155mm Howitzer Shells.
- Mortar Rounds: 60mm, 81mm, and 120mm systems.
- Tactical Flares: 1" Hand-held illumination flares and rockets.
- Small Arms Ordnance: 40mm illumination rounds.



PARACHUTE APPLICATIONS

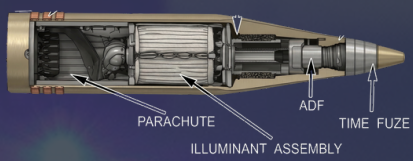
Type	Operational Focus
Round	Standard ammunition stabilization and vertical descent.
Ringsail	High-performance recovery for rockets and large-scale munitions.
Ribbon	High-drag designs for supersonic or high-velocity projectile deceleration.
Cross	Superior stability for specialized tactical systems and SAR equipment.
Ringslot	Controlled descent for high-speed industrial and military payloads.
Ballute	Specialized for torpedo stabilization and advanced bomb retardation.

TECHNICAL SPECIFICATIONS & MIL-SPEC COMPLIANCE

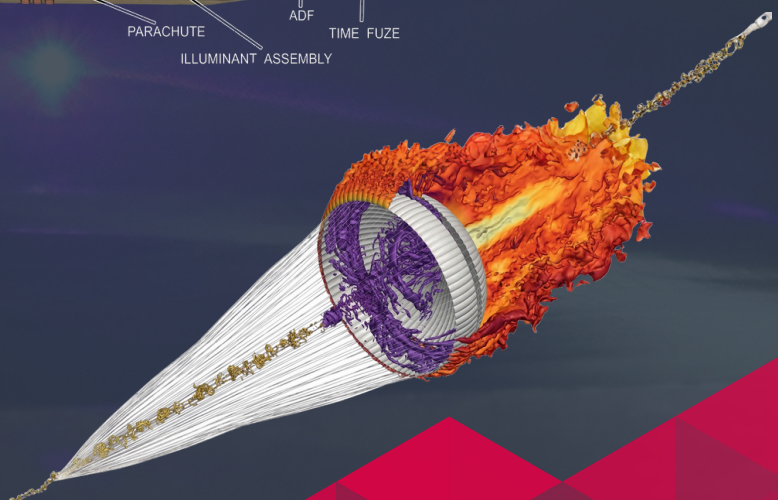
Our systems are manufactured with rigorous adherence to U.S. Military Standards to withstand extreme operational stresses.

- **Fabrics:** MIL-C-7020, MIL-C-7350, or MIL-C-44378.
- **Cords/Lines:** MIL-C-5040, MIL-C-5651, or MIL-C-43976 (Kevlar, Nylon, Spectra, or Polyester).
- **Webbing:** MIL-W-4088, MIL-W-43668, or MIL-T-87130 (Kevlar, Nylon, Polyester).
- **Dimensions:** Fully scalable solutions from 30 cm to 40 meters.
- **Load Dynamics:** Custom-engineered to meet specific G-force and velocity requirements.





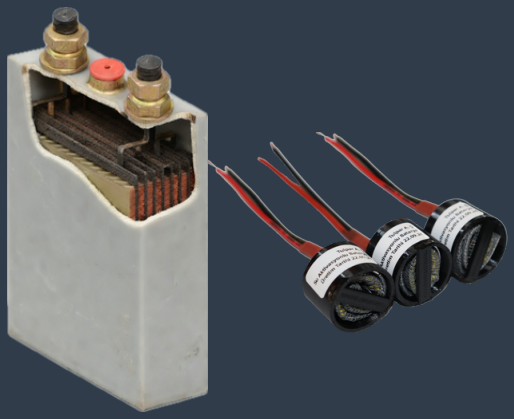




SEA-WATER ACTIVATED BATTERIES

The AgCl/Mg series is a high-performance reserve battery system that activates instantly upon contact with seawater or any water source. Since it contains no electrolyte until activation, the battery remains completely inert during storage, providing exceptional long-term reliability.

Key Specifications:
Nominal Cell Voltage: 1.5 – 1.6 V
Activation Time: < 500 ms
Energy Density: 90 – 150 Wh/kg
Shelf Life: 5 – 10 years (up to 12+ years under proper conditions)
Operating Temperature: -2°C to +70°C
Pressure Resistance: Up to 60 bar



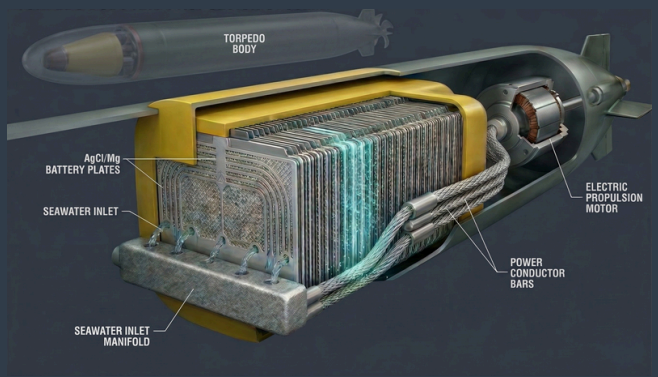
Main Advantages:
Unlimited storage life with zero self-discharge
No maintenance or charging required
High safety level (non-flammable)
Rapid and reliable activation
Excellent performance in high-pressure marine environments

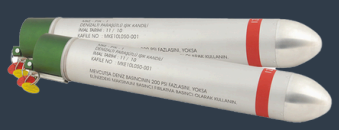
These batteries are ideally suited for torpedo propulsion systems EPIRB devices, sonobuoys, marine markers, and other marine rescue equipment.
Designed for demanding maritime and defense applications, AgCl/Mg seawater-activated batteries deliver proven reliability and instant power when it matters most.











ENGINEERING & CUSTOM SOLUTIONS

At Tulpar, we go beyond manufacturing—we deliver engineering. We solve complex aerospace and defense challenges through tailored, application-specific solutions. While our products are already proven in serial production, our core strength lies in developing customized systems aligned with our partners' operational needs.

With our vertically integrated structure, we manage the full lifecycle—from concept and design to prototyping, validation, and industrialization—under one roof.

OUR ENGINEERING CAPABILITIES

Custom Engineering & R&D: Mission-specific solutions based on system requirements, environmental conditions, and performance constraints.
Rapid Prototyping: Fast conversion of concepts into functional prototypes for quick validation and iteration.
Simulation, Testing & Validation: Advanced analysis and testing to ensure compliance with demanding operational and military standards.
Pre-Serial Industrialization: Pilot production to validate processes and prepare for scale.
Scalable Production Transition: Seamless transfer to serial manufacturing with full quality assurance.

WHY PARTNER WITH TULPAR?

"Engineering Under One Roof"
Integrated design, development, prototyping, and production reduce lead times, ensure confidentiality, and guarantee full control over quality at every stage.



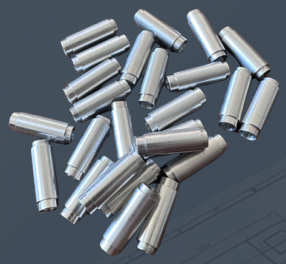
Preformed fragments



Explosive Charge Body



Parachute Systems



Machined Metal Parts



Bellow Actuators Metal Case



TULPAR
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