Bombs, Rockets,
Ammunition and Fuzes

CSD
DEFENSE COMPONENTS & SYSTEMS

ABOUT US

PONTA GROSSA - PR - BRAZIL

PONTA GROSSA - PR - BRAZIL

BLUMENAU - SC - BRAZIL

ARAUCÁRIA - PR - BRAZIL

CSD – Defense Components & Systems, operates in the Defense Sector and belongs to the Hübner Group. The company has expertise in the development and production of aviation bombs, rockets, fuzes, ammunition, and components for the defense sector.

CSD is part of the Defense Industrial Base of Brazil (BID), being a Strategic Defense Company (EED), approved by the Ministry of Defense of Brazil. In addition, several CSD products are accredited as Strategic Defense Products (PED) by the Brazilian authorities.

The Hübner Group is a private owned company and began its activities in 1980. The Group is currently one of the major suppliers to the automotive, agricultural, construction, railway, and capital goods industries, providing original equipment manufacturers (OEMs) and their suppliers. The company has expertise in development, production, and assembly of metallic components, through modern processes.

With four factories located in Brazil, the Group operates in the foundry, machining, and assembly areas.

The continuous project development has raised the standards of excellence and the integration between its enterprises, strengthening its position in the acting sectors.

CSD has developed partnerships and strategic alliances in several markets, reinforcing its operating strategy in the global defense market.

PORTFOLIO

MK 80 SERIES GENERAL PURPOSE AIRCRAFT BOMBS

MK 80 CONICAL FIN BOMB TAILS

MECHANICAL FUZE M904/BR

MECHANICAL FUZE M905/BR

FMU-152A/B ELECTRONIC FUZE

AB400 ELECTRONIC PROXIMITY FUZE

TRAINING BOMBS BDU-33

TRAINING BOMBS BEX-11

LASER GUIDANCE KIT FOR MK 80 BOMBS

70MM (2.75'') ROCKETS MODEL MK66

70MM (2.75'') ROCKETS MODEL MK40

MORTAR AMMUNITION 60MM

MORTAR AMMUNITION 81MM

MORTAR AMMUNITION 120MM

HOWITZER AMMUNITION 155MM

155MM - ARTILLERY POINT DETONATING FUZE

155MM - ELECTRONIC MULTI-OPTION FUZE M9121

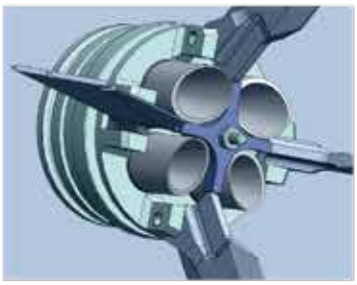
155MM - ELECTRONIC FUZE SETTER

UAV SOLUTIONS WITH WEAPONS SYSTEMS

SPECIAL PROJECTS

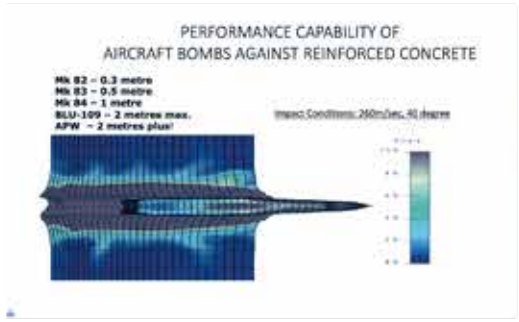
TECHNICAL CAPABILITY

The Hübner Group's quality procedures begin with its development projects and extend throughout the entire production process. The company has highly qualified professionals who work in the optimization of products and industrial systems.





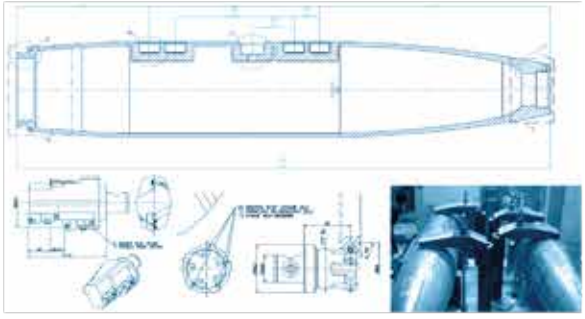






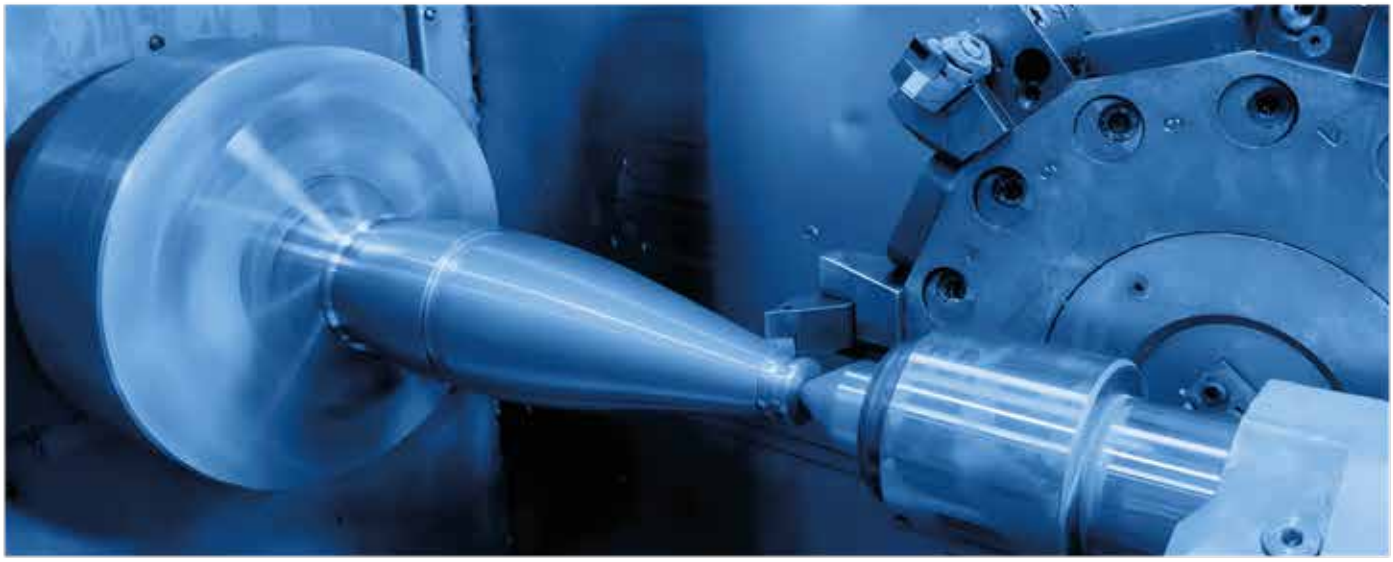


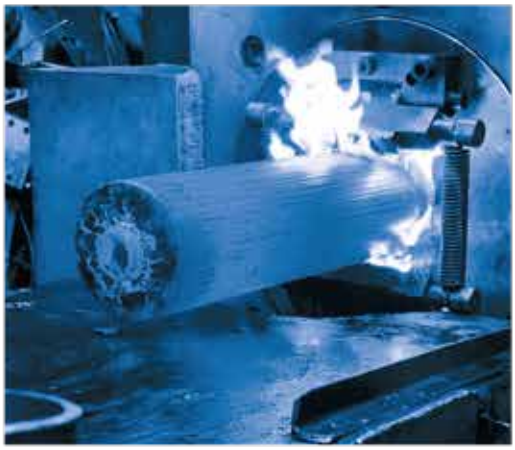




TECHNICAL CAPABILITY

The Hübner Group has ISO 9001, IATF 16949, and ISO 14001 certifications, certified by the SGS ICS, and has highly qualified laboratories for monitoring the quality of its products and equipments, which guarantees total quality and satisfaction to end customers.





MK 80 SERIES GENERAL PURPOSE AIRCRAFT BOMBS

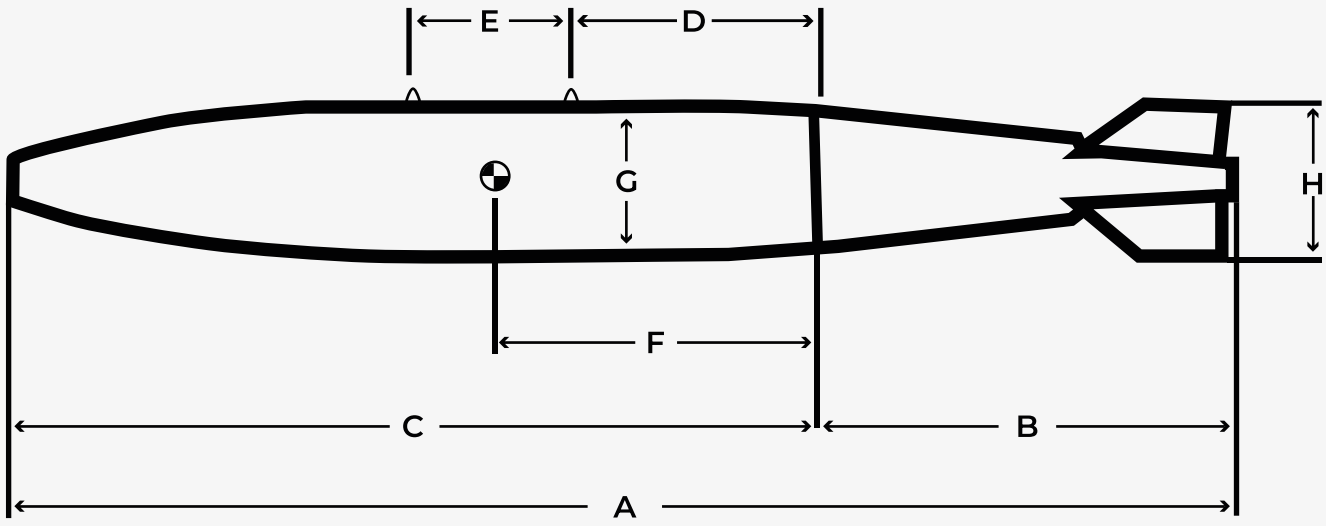
The CSD MK 80 Series General Purpose Aircraft Bombs are compatible with all aircraft and pylons qualified for the MK Series Bombs.

The CSD MK 80 Bombs are fully compliant with NATO, MIL. Specifications and AOP 12 Requirements.

These Bombs can be loaded with TNT, TRITONAL, COMPOUND B or PBXN-109 compositions.

TECHNICAL DATA

Dimensions	Key	MK 81		MK 82		MK 83		MK 84	
Overall Length (mm)	A	1,678		2,166		2,926		3,689	
Tail Length (mm)	B	600		665		1,085		1,247	
Warhead Length (mm)	C	1,078		1,501		1,841		2,442	
Tail Interface Rear lug (mm)	D	NATO	WARSAW	NATO	WARSAW	NATO	WARSAW	NATO	WARSAW
		244.4	297.15	462.5	515.3	475.9	528.7	684	745
Lug spacing	E	NATO	WARSAW	NATO	WARSAW	NATO	WARSAW	NATO	WARSAW
		14”	250mm	14”	250mm	14”	250mm	30”	480mm
Center of Gravity (mm)	F	444		655.9		762		985	
Body diameter (mm)	G	228		273.1		355.8		457.4	
Tail fin Diameter (mm)	H	332		390		500		640	



MK 80 CONICAL FIN BOMB TAILS

Stabilizing Low Drag Tails used on General Purpose Aircraft Bombs MK 81, MK 82, MK 83, and MK 84.

The tails have precise aerodynamics to provide stability during flight, both in the displacement phase coupled to the aircraft and in the launch, guaranteeing total operational safety in their use.

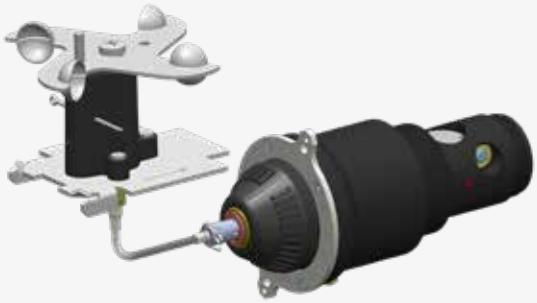
TECHNICAL DATA

Dimensions	MK 81	MK 82	MK 83	MK 84
Total lenght (mm)	600 ± 2.5	665 ± 2.5	1,085 ± 2.5	1,247 ± 2.5
Length fins (mm)	236 ± 2.50	278 ± 2.50	355 ± 2.50	442 ± 2.50
Diameter (mm)	200	223	324	408
Tail diameter (mm)	57.50	60.3	68	94
Length between fins (mm)	47.70	49.80	125	195
Tail length (mm)	332 ± 2.50	390 ± 2.50	500 ± 2.50	640 ± 2.50
Wheight (kg)	6.4	9.2	25.5	34.5

MECHANICAL IMPACT FUZING SYSTEM FOR AIRCRAFT BOMBS

M904/BR

M905/BR



TECHNICAL DATA

	Fuze M904/BR	Fuze M905/BR
Total length with booster (mm)	235.0	172.0
Body maximum diameter (mm)	69.5	69.5
Delay element	M9 (non-delay)	M9 (non-delay)
Fuze weight with the booster (kg)	1.0	0.8
Delay mechanism reduction	972:2	972:2
Time to arm	2 to 18 s	2 to 18 s
Arming time tolerance	± 20%	± 20%
Initiated by	Impact	Impact
Shell life (years)	10	10
Activated by	Helix	Anemometer ATU -35/B
Operation temperature	-40°C to +50°C	-40°C to +50°C
Storage temperature	-10°C to +40°C	-10°C to +40°C
Bomb interface	NATO standard 2” 12 Un 2A. Used in the 148/M150 adapter booster or similar	

FMU-152 A/B ELECTRONIC FUZE

The FMU-152A/B is an advanced fuze system for use in general-purpose and penetrating unitary warheads. The FMU-152A/B provides safing, in-flight cockpit selection, multifunction, and multiple delay arming and fuzing functions.

It is an electronic programmable soft/hard target fuze.

AB400 ELECTRONIC PROXIMITY FUZE

The Electronic safety time is user selectable: 4 – 18 in 2 seconds.

Point detonation super quick action serves as a backup to the proximity mode.

The fuze incorporates new state of the art technology using SFMCW, a proprietary technology ensuring height of burst accuracy of 6 meters ± 2 meters, also rendering the fuze immune to mutual interference, enemy jamming and battlefield disturbances such as dust, smoke and other radio emissions, utilizing comprehensive signal processing technology. Enhanced life cycle (no batteries or stored energy) increases shelf life up to 15 years if stored in original packaging in controlled depot condition environment.

TRAINING BOMBS

The BEX-11 (MK76) and BDU-33 Practice Bombs simulate launching conditions of the General Purpose Bombs, usually in terms of their ballistics trajectory, and were developed for pilots' training.

The BEX-11 Practice Bomb is used to simulate the dropping of MK Bombs and carries a pyrotechnic cartridge that produces a column of white smoke at the ground impact point.

The BDU-33 has a pyrotechnic cartridge to indicate the ground impact point with a red flash and white.

BDU-33

BEX-11

TECHNICHAL DATA

	BDU-33	BEX-11
Total Length (mm)	590	590
Maximum diameter (mm)	101.6	101.6
Total weight (kg)	11	11
Shelf life	Indefinite	Indefinite
Service life	Indefinite	Indefinite
Caftridge	MK4 mod 3 - CXU 3A-B	SN-11
Caftridge cloud smoke	Diameter: 1m Height: 6m	
Cadridge operational temperature	-20°C to +50°C	
Emission	Smoke	
Luminous intensity of the MK-4 mod 3	Flash-Smoke	-

LASER GUIDANCE KIT FOR MK 80 BOMBS

The advanced guidance system, converts conventional gravity bombs into precision guided munitions. The innovative and highly cost effective guidance package inside the computer control group (CCG) ensures more bombs on target.

A semi-active laser seeker and pneumatically controlled canards guide the weapon. The air foil group (AFG) includes extending wings to provide lift and stability.

- The best cost-benefit ratio.
- Interchangeable with existing CCGs and AFGs.
- High reliability.

GBU-12: MK 82, GBU-16: MK 83, GBU-10: MK84

70mm (2.75”) ROCKETS:

The 70mm Rocket is compatible with Unguided and Guided Operation and current In-Service Air and Ground Launchers.

The Rocket is operationally compatible with APKWS Guidance Kit, M151/OTB-EF1/ OTB-AA1, AS1 and OTB-FR1 Warheads, and M423 Fuze.

MODEL MK66

MODEL MK40

TECHNICHAL DATA

	70 MM MODEL MK66	70 MM MODEL MK40
Total Length	1,059mm	998mm
Caliber	70mm (2.75 in)	70mm (2.75 in)
Rocket Motor Mass	6.7 kg (14.8lb)	5.43 kg (12,07lb)
Fins type	Wrap-around	4 vertical fins
Propellant	Double Base	Double Base
Speed	812m/s	740m/s
Range	9 km	7.5 km
Launchers	M260 and similar NATO standard	
Compatible Aircrafts	Fixed and rotary wing aircraft	
Warheads	All NATO standard models for 70mm rockets	

MORTAR AMMUNITION

Mortar ammunition, model HE, in calibers 60, 81, and 120mm, compatible with standard NATO mortars, with high operational availability for both training and combat. Low operating cost, short time-lapse for quick stock replacement, safe and easy to handle.

60mm

81mm

120mm

TECHNICHAL DATA

	60MM	81MM	120MM
Caliber (mm)	60mm	81mm	120mm
Full Shot Weight (kg)	1.7	4.2	13.6
Burst Load Weight (kg)	0.250	0.8	2.1
Projection load weight (reference values) (kg)		0.176	0.6
Full Shot Length (mm)	328	484	640
Initial speed (m/s)	177	312	331
Range (m)	2,100	5,800	6,600
Use	Mtr AGR - Light Mortar Anteload 60 mm; 60 TDA Mortar (BRANDT)	Mtr AGR - Light Mortar Anteload 81 mm; Mtr 81 RO I16 or US M252	120mm Smothbore Mortar

HOWITZER AMMUNITION

155mm

The 155mm artillery ammunition have a high degree of compatibility with standard NATO artillery systems, making them exceptional ammunition for training and immediate combat use.

TECHNICHAL DATA

Artillery Projectile 155mm HE M107	
Caliber	155mm (Load M3) / 155mm (Load M4A1)
Full Shot Weight (kg)	43.1
Load	TNT/Comp B / Tritonal
Burst charge weight (kg)	7
Projection load weight (reference values):	2.8 kg (M3 load) / 6.3 kg (M4A1 load)
Full Shot Length (mm)	695
Initial speed	375 m/s (load 5) / 564 m/s (load 7)
Range	9,700 m (load 5) / 14,600 m (load 7)
Use	Howitzer 1500 M109 and M114

FUZING SYSTEM FOR 155MM AMMUNITION

ARTILLERY POINT DETONATING FUZE

It is used with High explosive shells of mainly 105 mm & 155mm artillery guns and howitzers. It offers a choice of super quick or delay action. When set to super quick, it detonates 170 micro seconds after impact.

Fuze AFPD – 85F0001/BR consists basically of Fuze M48A3/BR and M125 C1/BR Booster which has a set back pin for added handling and transportation safety.

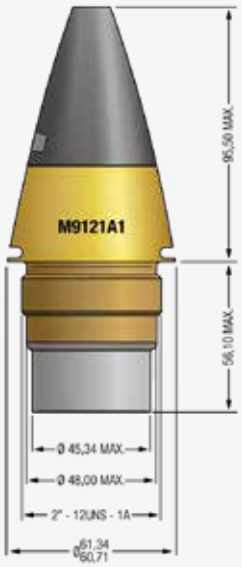
AF PD - 85 F0001/BR (VERSION PDM 572 C1/BR)

TECHNICHAL DATA

ARTILLERY POINT DETONATING FUZE AF PD - 85 F0001/BR	
Diameter	61mm
Length	151mm
Weight	1025 g Approximately
Impact Delay	0.05 Sec.
Distance	200 feet
Booster	2 in - 12 UNS-1A
Rotation	9Min. 2,000 RPM - Max. 20,000 RPM
Operating Mode	Super quick or Delay
Threads - Fuze	1.7 in - 14 UNS - 1A
Acceleration	Min. 10,000 m/Sec^2 - Max. 200,000 m/Sec^2

FUZING SYSTEM FOR 155MM AMMUNITION

ELECTRONIC MULTI-OPTION FUZE M9121



The Fuze has various operational modes of which the primary modes are hand selectable by means of a switch on the side of the Fuze. The secondary modes are induction settable by means of the applicable CSD Setter.

The Fuze setting can be read back by means of the applicable CSD Setter. Point Detonation Super Quick action serves as a backup to the proximity and time modes.

TECHNICHAL DATA

Electronic Multi-Option Fuze M9121	
Flick Ramming Safe	Flick ramming forces will not cause fuze arming
Mechanical	39 metres min
Electric	0.1 seconds minimum in PD mode and 1 second minimum in Proximity and Time mode.
Point Detonation	1 seconds min.
Proximity	3 seconds min.
Axial acceleration	1 500 to 30 000 g's
Spin	2 700 to 25 000 rpm
Muzzle Velocity	1 100 m/s max.
Angle of Impact	Greater than 10 degrees
Operating Temperature	-46˚C to +63˚C
Shelf Life	15 years min.
Point Detonation Super Quick.	

FUZING SYSTEM FOR 155MM AMMUNITION

ELECTRONIC FUZE SETTER

The setter is a hand held setting and reading device for induction programmable fuzes.

The Setter is powered by a Lithium battery with operating life in excess of 3 000 setting operations. Each Setter is supplied with a spare battery and auxiliary power supply that may be connected to a D.C. power source of 10 - 30V. The Battery Shelf Life is 10 years.

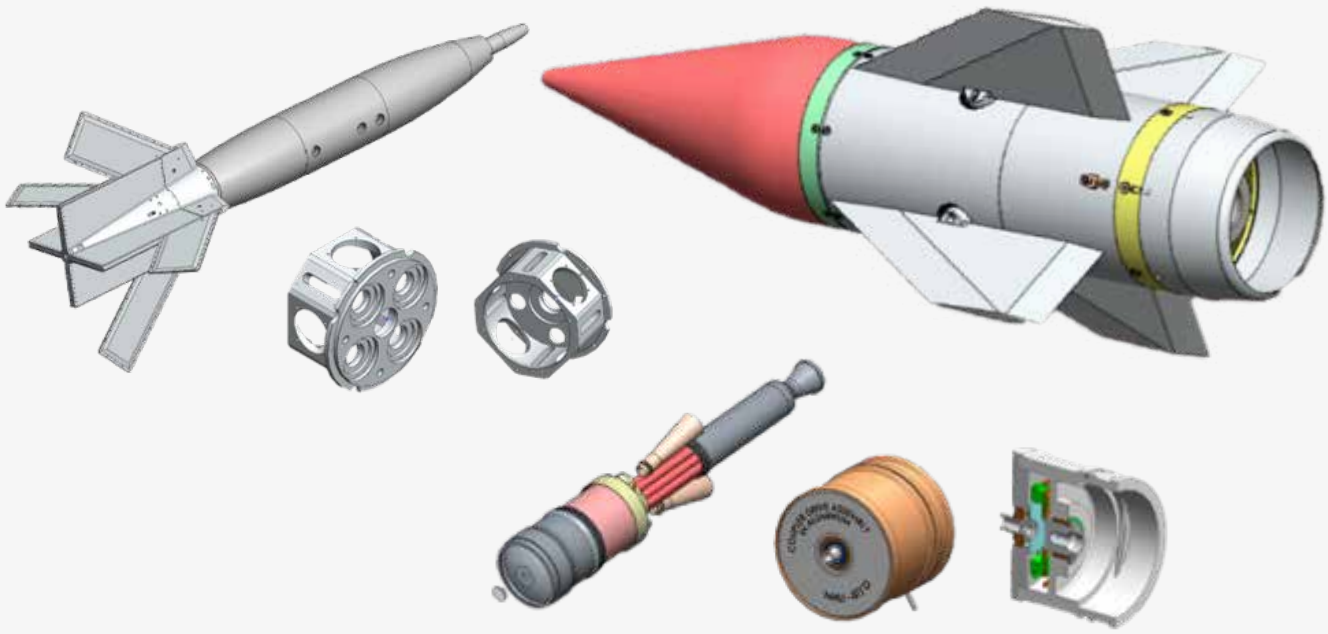
UAV SOLUTIONS WITH WEAPONS SYSTEMS

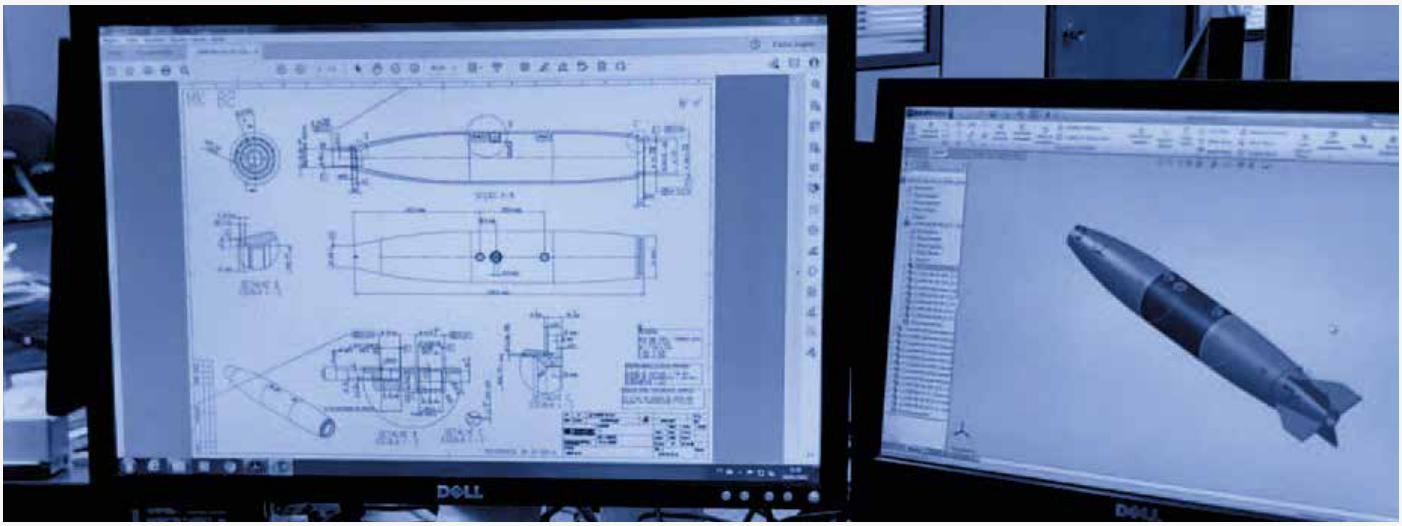
Basic Specifications	
Wing span	26.3ft
MTOM	Up to 850kg
Fuel tank capacity	190L + extra fuel tank of 200 L (Auto Motive Gasoline)
Takeoff distance	ground roll: 950 ft.
Landing distance	ground roll: 680 ft.
Ballistic Parachute	Yes (Optional)
Engine	4 cylinder 1.5L 130HP
Propeller	2 or 3 blades
Baseline certification	Structure and systems according to ASTM F2245 Airframe; Basically composites
Payload configuration	TBD: Under the fuselage for gimbal - Hard-points under the wings (Estimated Payload from 250kg up to 300kg)

Performances	
Max altitude	22,000 ft
Typical operating altitudes	12,000 18,000 ft
Speed in transfer to/from work area	112 kt to 162kt
Loitering speed	75 kt to 90kt
Endurance at transfer speeds	15 to 18 hours

SPECIAL PROJECTS

CSD cooperates with strategic partners and also works on special projects, offering solutions to other companies in the defense segment.

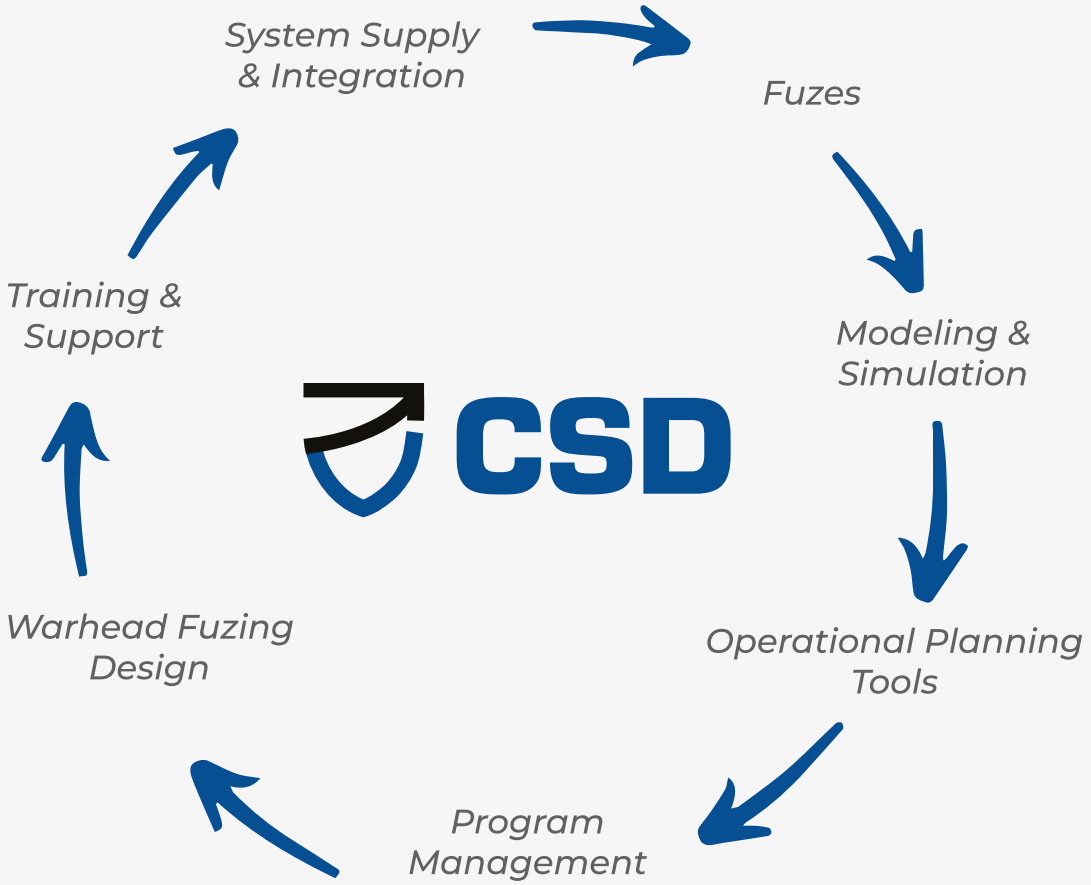




CSD SUPPORT SERVICES

- Handbooks for bombs and fuzes
- In-country training for aircrew and armament personnel on bombs and fuzes
- In-country support for real live weapon testing
- Spares
- Weaponeering support - weapon to target matching
- Supply of the BKEP operational planning tool

A World beating Defense Team



NATO
CAGE CODE
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