



Bombs, Rockets,  
Ammunition and Fuzes



**CSD**

DEFENSE COMPONENTS & SYSTEMS

# ABOUT US



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CSD – Defense Components & Systems, operates in the Defense Sector and belongs to the Hübner Group. The company has know-how 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 (OEM) 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 projects development increased the standards excellences, and the integration between its enterprises, strengthen its position on the acting sectors.

With the strategy of expanding its activities, CSD was honored to create a partnership with IMBEL, a company belonging to the Brazilian Army, with over 100 years of experience and tradition in producing explosive chemicals, artillery ammunition, weapons, and others.

CSD also established another essential partnership with OTNA Defense LLC. OTNA is a Defense Contractor Specializing in the Design, Development, Testing of Weapon Systems & Sub-Systems, which has a management team with over 45 years of combined experience in the Defense sector.

# 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



CSD HIGH PERFORMANCE  
PENETRATOR WARHEADS



CSD BLU-109/BR



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



ADVANCED WARHEAD  
SYSTEMS FOR 70MM ROCKETS



MORTAR AMMUNITION 60MM



MORTAR AMMUNITION 81MM



MORTAR AMMUNITION 120MM



HOWITZER AMMUNITION  
155MM



UAV SOLUTIONS  
WITH WEAPONS SYSTEMS



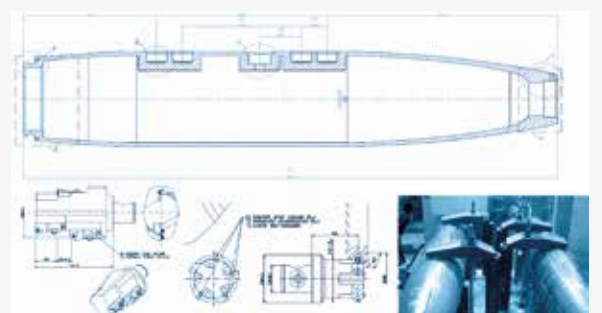
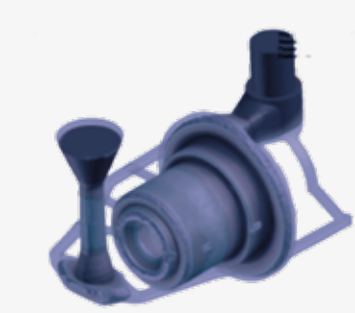
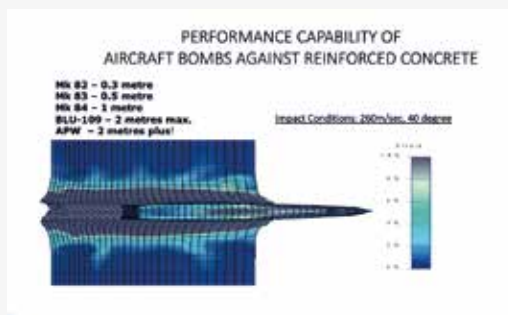
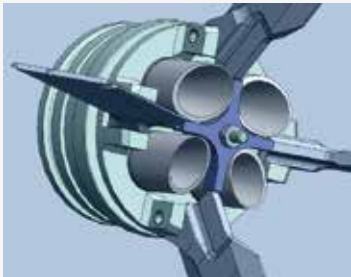
SPECIAL PROJECTS





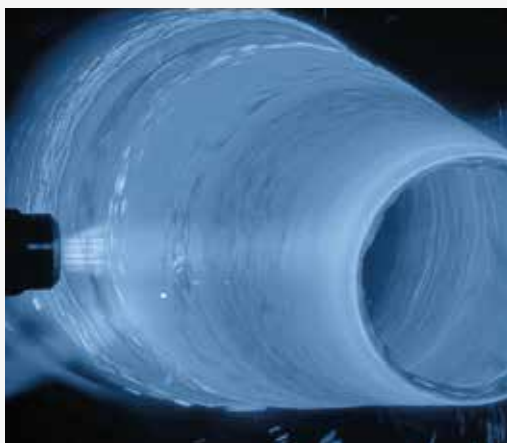
# TECHNICAL CAPABILITY

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, by the SGS ICS certifier, 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



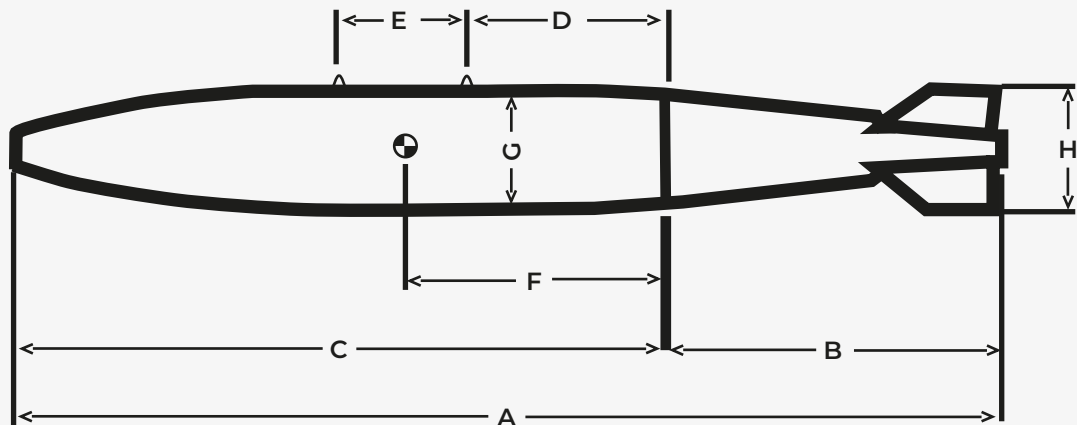
The CSD MK 80 Series General Purpose Aircraft Bombs are compatible with all aircraft and pylons qualified for the MK Series Bombs.

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.

## PHYSICAL SPECIFICATIONS

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 as well as in the launch, guaranteeing total operational safety in its use.



## PHYSICAL SPECIFICATIONS

Dimensions	MK 81	MK 82	MK 83	MK 84
Total length (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
Weight (kg)	6.4	9.2	25.5	34.5



# MECHANICAL IMPACT FUZING SYSTEM FOR AIRCRAFT BOMBS

## M904/BR



## M905/BR



### PERFORMANCE CHARACTERISTICS

	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-152A/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, and multifunction and multiple delay arming and fuzing functions.

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.

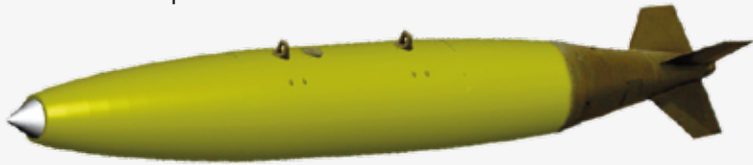
The fuze incorporates new state of the art technology using SFMCW, a proprietary technology ensuring height of burst accuracy of 6 meters  $\pm$  2 meters, also rendering the fuze immune to mutual interference, enemy jamming and battlefield disturbances such as dust, smoke and other radio emissions, 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.



# CSD HIGH PERFORMANCE PENETRATOR WARHEADS



The CSD Advanced Penetrator Warhead (APW) is compatible with all aircraft and pylons qualified for the MK 80 Series Bombs, and is fully compliant with NATO, MIL. Specifications and AOP 12 Requirements.



## ADVANCED PENETRATOR WARHEAD – APW1 (500LB CLASS)

The APW1 is a 500lb Class Penetrating Warhead. It has the same external characteristics (lug and FZU pockets) and external dimensions as a standard NATO compliant MK 82 GP Bomb.

The warhead is capable of penetrating 2 METERS of reinforced concrete.

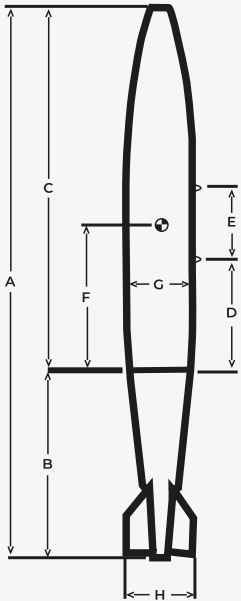
## ADVANCED PENETRATOR WARHEAD – APW2 (1,000LB CLASS)

The APW2 is a 1,000lb Class Penetrating Warhead. It has the same external characteristics (lug and FZU pockets) and external dimensions as a standard NATO compliant MK 83 GP Bomb.

The warhead is capable of penetrating 3 METERS of reinforced concrete.

## PHYSICAL SPECIFICATIONS

Dimensions	Key	APW1		APW2	
Overall Length (mm)	A	2,166		2,926	
Tail Length (mm)	B	665		1,085	
Warhead Length (mm)	C	1,501		1,841	
Tail Interface Rear lug (mm)	D	NATO	WARSAW	NATO	WARSAW
		462.5	515.3	475.9	528.7
Lug spacing	E	NATO	WARSAW	NATO	WARSAW
		14"	250mm	14"	250mm
Center of Gravity (mm)	F	655.9		762	
Body diameter (mm)	G	273.1		355.8	
Tail fin Diameter (mm)	H	390		500	



The CSD Advanced Penetrator Warheads are fully compliant with: GBU-12 Paveway Kit (APW1) / GBU-16 Paveway Kit (APW2) / JDAM / Conical Fin Tail / FMU-152A/B and FMU-139D/B Fuzes / NATO, FRENCH, SWEDISH Ground Attack Aircraft, and associated bomb racks.

# CSD BLU-109/BR



The CSD Bomb Live Unit (BLU)-109/BR is a 2,000 lb hardened penetration bomb. It penetrates concrete bunkers, buildings, bridges, ships, and other hardened structures before exploding. The warhead is capable of penetrating 2 METERS reinforced concrete.

The CSD BLU-109/BR has a steel casing filled with TNT, TRITONAL, COMPOUND B or PBXN-109 compositions. It has a delayed-action tail-fuze. It is also used as the warhead of electro-optically guided bombs, laser-guided bombs, and rocket-boosted weapons.

The Class Penetrating bomb is fully compliant with:

- GBU-10 Paveway Kit.
- JDAM.
- Conical Fin Tail.
- FMU-152A/B and FMU-139D/B Fuzes.
- NATO, FRENCH, SWEDISH Ground Attack Aircraft and associated bomb racks.





# 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**



## TECHNICAL 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
Cartridge	MK4 mod 3 - CXU 3A-B	SN-11
Cartridge cloud smoke	Diameter: 1m Height: 6m	
Cartridge 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



### TECHNICAL 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	



# ADVANCED WARHEAD SYSTEMS FOR 70MM (2.75") ROCKETS



The systems can be Air (Fixed and Rotary) and Ground Launched and are compatible with Guided and Unguided Operation.

No electrical connections to the launch pod or the launch platform are required. There is the possibility of mixed launch warhead types according to the mission targets.

Warhead System: MURAT/IM Compliant, Interchangeable with M151 Warhead and Fuzing System. Compliant with NATO Standards.

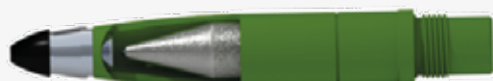
OTB-EP1: ENHANCED  
FRAGMENTATION WARHEAD  
SYSTEM WITH PROXIMITY/IMPACT FUZE



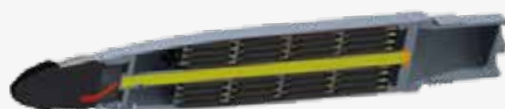
OTB-AA1: ANTI-ARMOUR  
WARHEAD SYSTEM  
WITH PROXIMITY/IMPACT FUZE



OTB-AS1: ANTI-STRUCTURES  
WARHEAD SYSTEM  
WITH IMPACT/DELAY FUZE



OTB-FR-1: FLETCHETTE  
ROUND WITH PROXIMITY FUZE



# 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



## TECHNICAL 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)	0.018	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	Mtr 120 M2 Raiado; 120 mm Rifled Towed (RT) Mortar TDA



# HOWITZER AMMUNITION



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.



155MM

## TECHNICAL 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) / 14600 m (load 7)
Use	Howitzer 1500 M109 and M114





# UAV SOLUTIONS WITH WEAPONS SYSTEMS



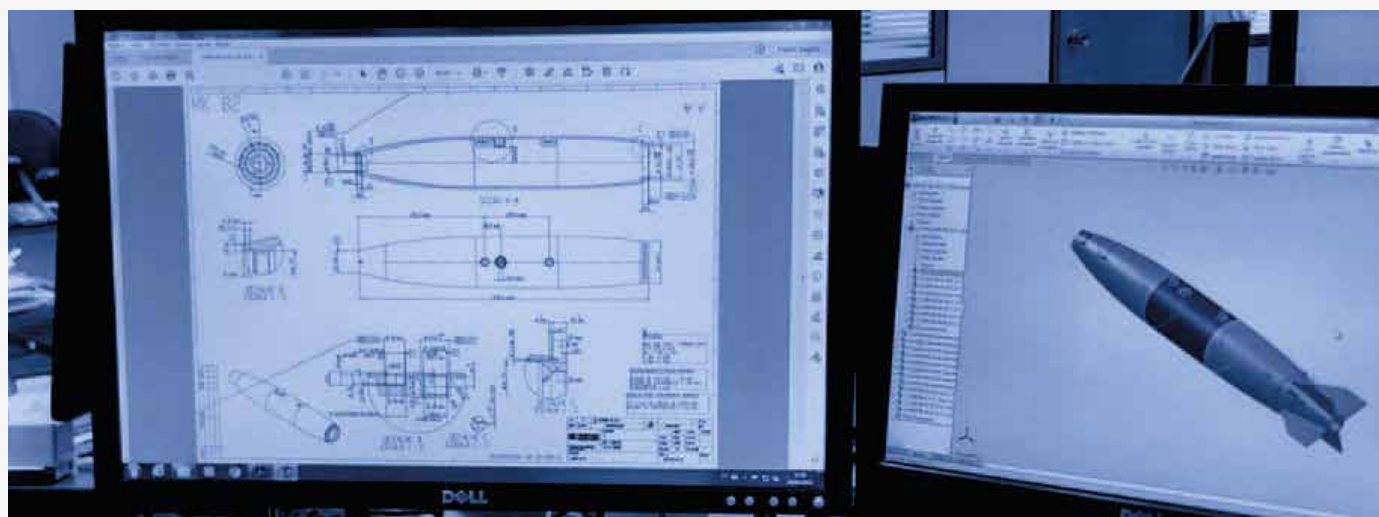
Basic Specifications		
Wing span	26.3ft	
MTOM	Up to 850kg	
Fuel tank capacity	190L + extra fuel tank of 200 L (Auto Motive Gasoline)	
Takeoff distance	ground roll: 950 ft.	
Landing distance	ground roll: 680 ft.	
Ballistic Parachute	Yes (Optional)	
Engine	4 cylinder 1.5L 130HP	
Propeller	2 or 3 blades	
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



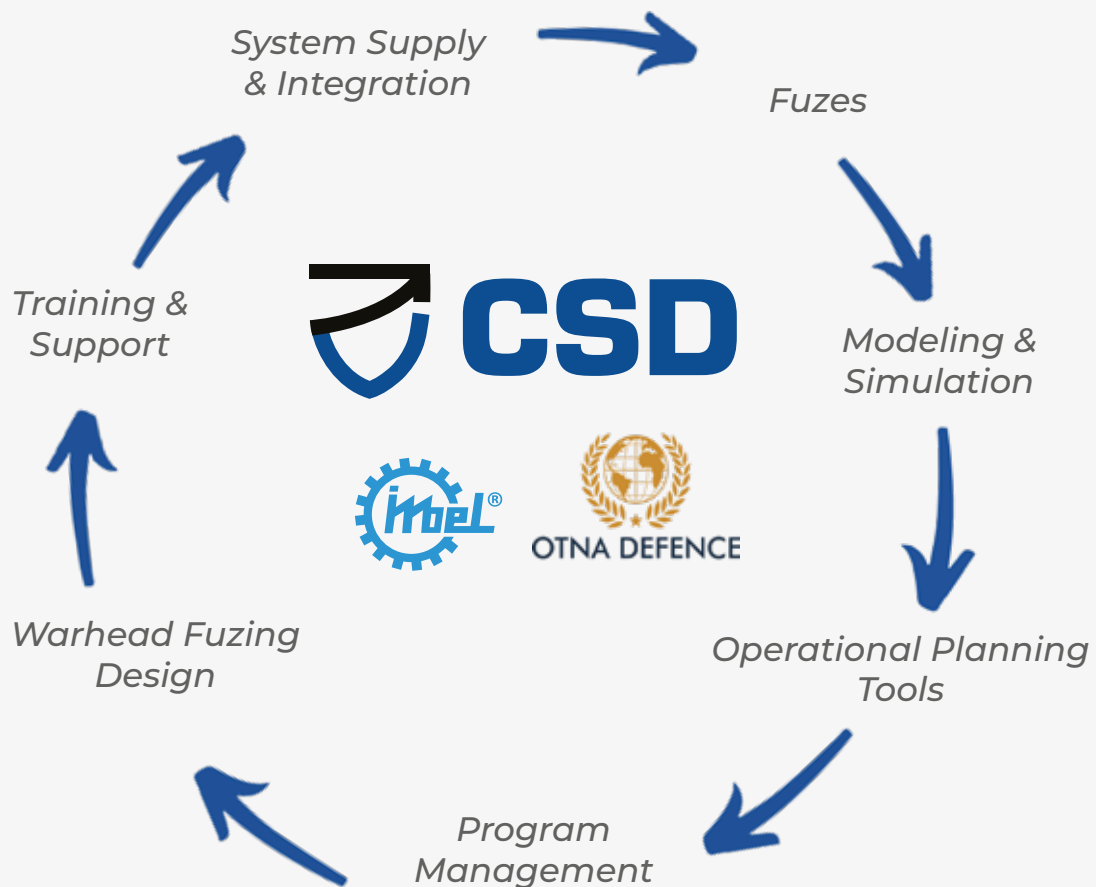
CSD cooperates with strategic partners and also works on special projects, offering solutions to other companies in the defense segment



# 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
- Weaponneering support - weapon to target matching
- Supply of the BKEP operational planning tool

## A World beating Defense Team



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