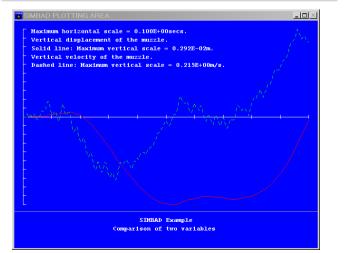
<u>SIMBAD + SIMBIB + SIMVED</u>

All three programs have an extensive results plotting facility which enables comparison of different variables and simulations.

otting results with file: testtr2	
Muzzle vertical displacement Muzzle vertical velocity Angular displacement of the muzzle Angular velocity of the muzzle	XY plane XZ pla
Recoil displacement of the breech face Barrel iumo in the vertical direction	Scale maximum: 0.292E-02
Maximum absolute value for plotting is 0.292E-02m.	
Centre point fixed 🔽 🛛 First shape plotted 🛛 🔄	Last shape plotted 40 🔺
Plot against shot position 🗖	Help for Plotting
Plot second variable	
Muzzle vertical displacement	XY plane • XZ plane •
Angular displacement of the muzzle Angular velocity of the muzzle	Selected result code: MV
Recoil displacement of the breech face Barrel iump in the vertical direction	Scale maximum: 0.215E+00
Maximum absolute value for plotting is 0.215E+00m/s.	
Plot second variable 🔽 Use for XY plot 🗖 Help	9
Plot second and third file	
Plot second file 🗖 result\man13dr	▼ Update plots
Plot third file 🗖 result\balan3r	
Egit Plot in black and white 🗖 Plot	ot to HPGL file Edit labels

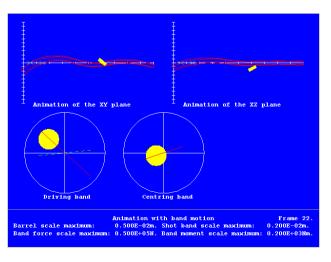


EASY TO USE INTERFACE

Simulations are controlled from clearly labelled menus in all three programs.

BAD Simulation	
Graphics	Simulation type
No run time graphics C	2D Simulation C
Standard run time graphics 📀	3D Simulation @
Animation C Maximum scale: 0.003	Single or multiple run Single simulation ເຈ
Help Time ticks: 🗖 💡	Use a multiple run file C
Gravity	Test a multiple run file C
Driving band engraved 🧟 Zero shot band moment C	Multiple run data Filename:
No gravity on the shot C	Repeat fire 🗖
Simulation without gravity C	Number of repeats 1
Help	Use data file 🗖
Simulation limits	Help Parameter study 🗖
Use limit values	SIMVED Include vehicle simulation T
Cancel	Continue

The results from **SIMBAD** or **SIMVED** simulations can be animated and frames saved to produce an AVI file.





Analyse weapon and vehicle performance before manufacture, purchase or future development, and determine those parameters which enable performance to be improved and optimised.

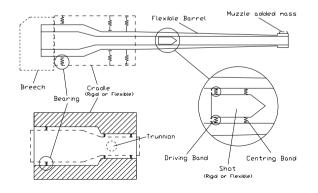
SIMBAD SIMulation of BArrel Dynamics SIMulation of Barrel Internal Ballistics SIMVED SIMulation of VEhicle Dynamics

Already used in 14 countries around the world, and under constant development since 1984. The programs provide a cost effective method to assist in design, development and assessment. They can be licensed for individual or combined use, and for an additional consideration, source code may also be licensed. The programs are designed to run under Windows 95/98/ME/NT4/2000/XP.

DANBY ENGINEERING Ltd.

High Gill House, Low Row, Richmond, NorthYorkshire. DL11 6NE, England, UK. Tel: +44 (0) 1748 886345 Fax: +44 (0) 1748 886014 or Contact: sales@danbyengineering.co.uk **SIMBAD** is designed to simulate the motion of the barrel, its support, and the shot, and predict shot launch conditions. The program has been extensively developed since 1984, and is now used in 14 countries around the world by government research establishments and private companies. It is normally used on conventional guns from small to large calibres, with smooth and rifled bores, together with projectiles ranging from simple rigid lumped masses to flexible long rod penetrators and sabots. It can also be used with rocket-assisted projectiles, and has the ability to be tailored to specialised systems such as electromagnetic launchers and multiple launch rocket systems.

Non-linearities can be simulated with ease, and a special facility enables parameter studies to be automated. The basic model is shown below.



SIMBIB is an internal ballistics program designed to calculate the pressure, shot velocity, shot travel, and propellant burnt when a gun is fired. The simulation is based on well established laws that form the basis of most internal ballistic codes which use 'lumped parameter' or 'zero dimensional' models.

The program can be used as an independent aid to propellant design, or combined with a SIMBAD simulation.

SIMBAD + SIMBIB + SIMVED

Individual files are used to describe the separate components such as the cradle, the barrel, the shot, the primer, the charge, the vehicle body, the turret, etc. Full editing facilities are provided, and data entry is simplified with clearly defined labels. Where possible data can also be checked with the built in plotting routines.

SIMBAD and **SIMVED** each have a user defined area which includes integration routines, user defined results, access to look up tables, and the ability to monitor and change variables during the solution. External routines may also be linked to the simulation.

The three programs can be licensed individually, or as a combined and comprehensive simulation tool. **SIMVED** is designed to predict the pitch, roll and bounce motion of a multiple wheeled vehicle when subject to ground inputs. If a gun is mounted on the vehicle, it can also be used with **SIMBAD** to predict the vehicle, barrel and shot motion when the gun is fired. The turret is included and enables different azimuth and elevation angles to be set.

User defined areas of the program enable non-standard suspension systems to be simulated, additional body forces to be included, and, as with SIMBAD, the users own routines can be called.

