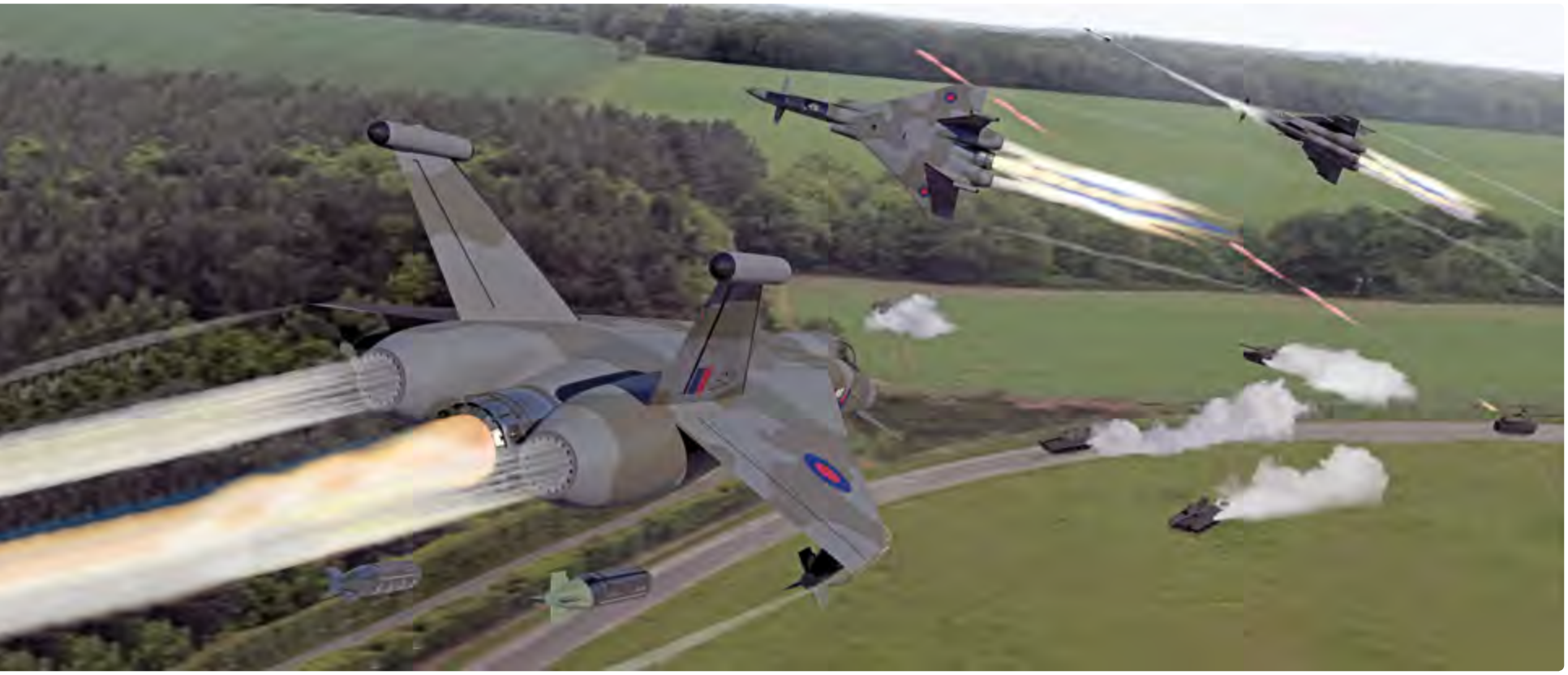

LEFT ***A speculative artwork by LUCA LANDINO depicting a pair of base-burning Hawker Siddeley HS.1191 strike aircraft drawing the fire of a ZSU-23/4 Shilka, while a third roars in to deliver IBL755 cluster-bombs on a formation of Soviet T-72s on the North German Plain in 1988. © 2023***

IT'S ALL ABOUT THAT BASE

Base-burning (noun); an aerodynamic technique in which gas is expelled into the low-pressure area behind a moving object to reduce base drag

Intrigued by a recent mention in a book of a peculiarly counter-intuitive but oddly familiar-sounding aerodynamic theory, **CHRIS GIBSON** plumbed the archives to find out more about the dark magic of "base-burning", a technique explored in depth by some of Britain's foremost designers while contemplating concepts for a future strike aircraft for the 1980s

THE RESEARCH FOR this article was prompted by a single mention of a curious aerodynamic technique in a book on British bombers, which got me wondering — what does "base-burning" have to do with a replacement for the Sepecat Jaguar? "Base-burning" rang a bell, and after some digging in the archives, a fascinating story unfolded, involving East/West divides and Soviet military developments, resulting in the following examination of another of those aerospace technologies that fell by the wayside.

I love it — what is it?

Alongside weight, drag is the enemy of efficient flight and the effort to reduce drag has taken many forms, ranging from polishing aircraft surfaces to Handley Page's efforts in laminar-flow control (LFC). Base-burning is another, and, like LFC, has been on the backburner since the early 1970s.

That bell that rung with base burning dates back to 1980, to the University of Aberdeen library where, rather than reading up on triple-point diagrams (chemical and geological), most of this author's time was spent reading defence journals. At the time, the big news in artillery was range improvement by what is called "base-bleed", which was advertised as providing a 20–30 per cent increase in range over conventional shells by reducing, or even eliminating, base drag. Defined as "a pressure drag owing to flow separation at the base of a projectile or termination of an aircraft fuselage with a flat area", base drag could be much reduced by base-bleed.

Originally patented in Sweden by the *Försvarets forskningsanstalt* (FOA — Swedish National Defence Research Institute), base-bleed was developed to increase the range of coastal defence guns. As a conventional shell moves through the air, a region of reduced pressure, not quite a vacuum, develops as a recirculation zone in the projectile's wake, causing base drag. By installing a small gas-source in the base of the shell, the gas expands into the recirculation zone, which prevents the formation of the low-pressure zone and reduces base drag with the ultimate result that range is increased.

The rights to base-bleed technology were acquired by the innocuous-sounding Space Research Corporation (SRC), whose founder, Dr Gerald Bull, is more famous for his work on "Project Babylon", also known as the Iraqi Supergun. Bull applied the technology to artillery shells and ended up in prison, having broken sanctions against apartheid-era South Africa. SRC had developed the G5 155mm howitzer for the South African Army, whose 1940s-vintage artillery had been outranged by Soviet-supplied guns in Angola and South West Africa (Namibia).

As this is an aviation journal, that's more than enough on artillery. Aircraft are, by convention,