

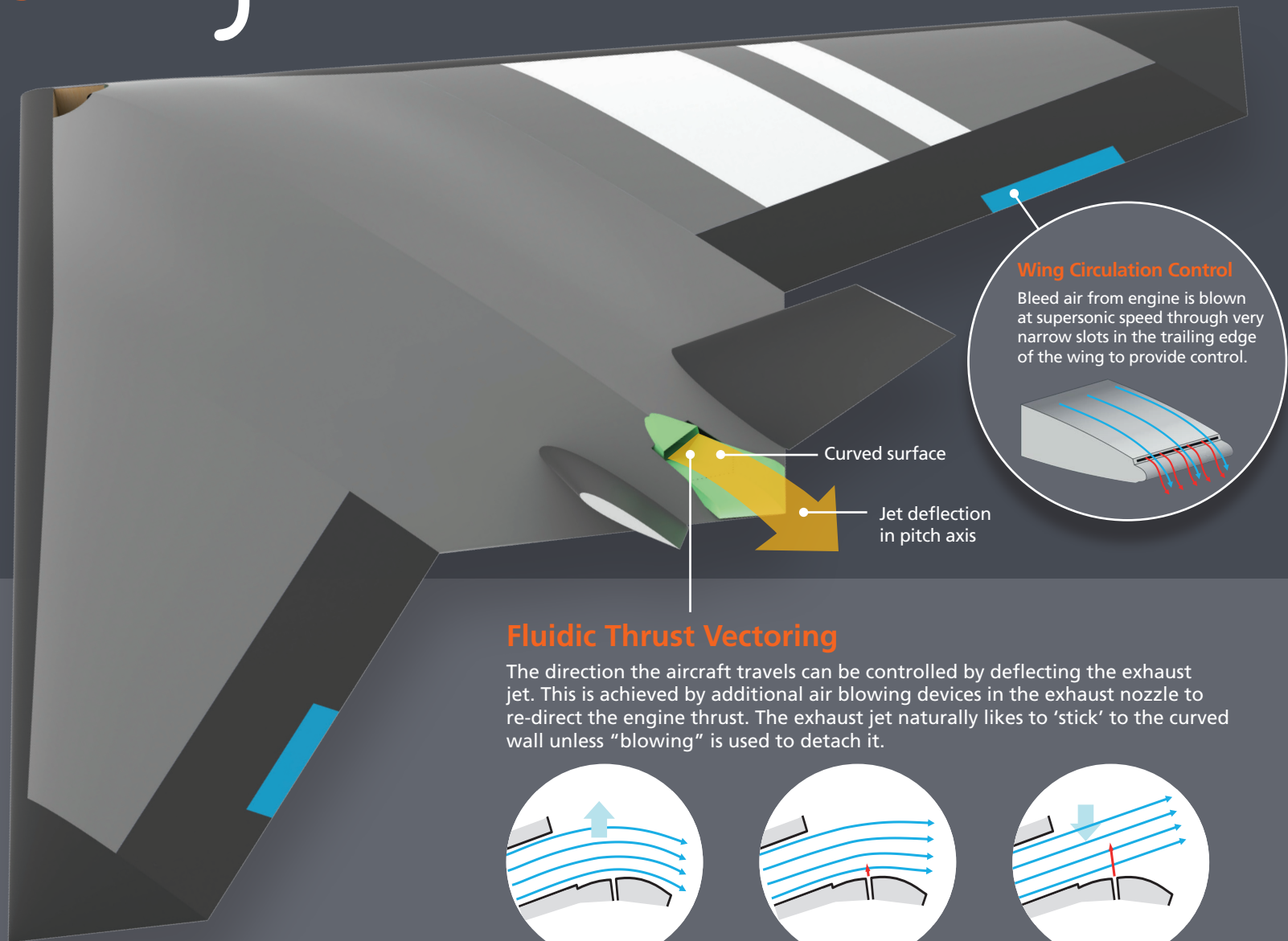
Flapless flight

MAGMA is an unmanned air vehicle designed and built in collaboration with the University of Manchester to demonstrate novel control technologies.

Adaptable Airframe

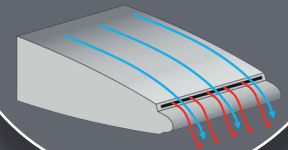
An adaptable airframe could deliver greater performance flexibility as it would be able to adapt from one role to another, even in-flight. Flapless technologies could also enhance stealth for future military aircraft.

MAGMA is being used to test fly a series of groundbreaking, flapless flight technologies that will help inform the development of the next generation high performance, adaptable air vehicles without the need for conventional control surfaces.



Wing Circulation Control

Bleed air from engine is blown at supersonic speed through very narrow slots in the trailing edge of the wing to provide control.

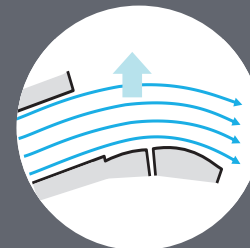


Curved surface

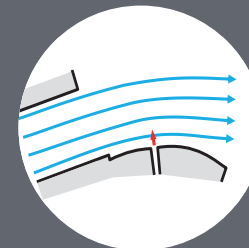
Jet deflection in pitch axis

Fluidic Thrust Vectoring

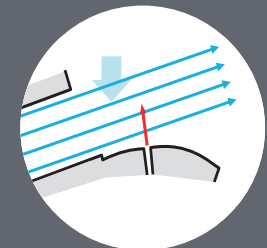
The direction the aircraft travels can be controlled by deflecting the exhaust jet. This is achieved by additional air blowing devices in the exhaust nozzle to re-direct the engine thrust. The exhaust jet naturally likes to 'stick' to the curved wall unless "blowing" is used to detach it.



Fully attached flow
(no blowing, max. nose down thrust vectoring)



Partially attached flow
(partial blowing, neutral thrust vectoring)



Fully detached flow (max. blowing, max. "nose up" thrust vectoring)

BAE SYSTEMS

INSPIRED WORK