MINISTRY OF DEFENCE

Military Aircraft Accident Summary

Aircraft:	Tornado ZA454
Date of accident:	30 April 1990
Parent Airfield:	RAF Bruggen
Place of accident:	22nm North-East of Goose Bay, Canada
Crew:	Two
Casualties:	None

Circumstances

1. The crew of Tornado ZA454 planned and briefed an Operational Low Flying sortie as part of a routine exercise in Canada. While flying at low-level 60 miles south of Goose Bay, the aircraft experienced an engine failure which resulted in a right hand engine fire; this engine was subsequently shut down. These problems gave rise to other engine and flight control difficulties. These resulted in the crew losing control of the aircraft during the recovery to Goose Bay. The crew successfully ejected from the aircraft.

Cause

2. The failure of one or more high-pressure stator vanes led to a major uncontrolled Titanium fire within the right hand engine high pressure compressor. This fire burnt through the aircraft keel and damaged other vital aircraft systems; the associated cockpit warnings were many and varied. Damage to the left hand engine electrical wiring resulted in a loss of throttle control to the left hand engine which remained at a fixed power setting for the rest of the flight. The "fly-by-wire" flight control system was also severely damaged and this led to a reduction in the authority of the aircraft's flying controls. During the recovery to Goose

Bay, a progressive fuel imbalance developed in the wing drop tanks which gradually reduced the pilot's ability to control the aircraft in the roll axis and eventually resulted in loss of control of the aircraft.

Subsequent Actions

3. The aircraft was totally destroyed in the accident. Research is being conducted into improving the resistance of Tornado engines to this sort of fire. Concurrently, a review of fire protection within the keel area between the two engines is being undertaken to identify ways of protecting the wiring of the engine and flying controls more effectively. Additional advice to aircrew on Tornado handling characteristics and stores jettison when fuel imbalances are present is being provided.