

**November 2024**

For the office of the UN Special Rapporteur on the situation of human rights in the Palestinian territories occupied since 1967

**Private Sector involvement in the current war on Gaza**

Submitted by: Dr Mark Griffiths, Dr Mohamed El-Shewy, and Dr Craig Jones.

This submission to the UN Special Rapporteur on the situation of human rights in the Palestinian territories occupied since 1967 is focused on two pieces of hardware used in the current war on Gaza, F-16s and GBU bombs, both of which have been prominent in the destruction of Gazan life and landscapes. The following is drawn from peer-reviewed research published in the journal *Antipode* with the title 'Israel's War on Gaza in a Global Frame' (available [here](#)). The full reference if needed is:

El-Shewy M, Griffiths M, Jones C (2024) Israel's war on Gaza in a global frame  
*Antipode* DOI: 10.1111/anti.13094

This submission includes information on the following private sector organisations (in alphabetical order):

**BAE Systems**

**Boeing**

**Cyclone (subsidiary of Elbit Systems)**

**Elbit Systems**

**General Dynamics**

**Lockheed Martin**

**McDonnell Douglas**

**Northrup Grumman**

**RADA Electronic Industries (Israel-based subsidiary of Italian weapons producer Leonardo)**

**Rafael Advanced Defense Systems**

**Smiths Aerospace (a Maryland-based subsidiary of UK-based Smiths Group)**

Please use this information however you can in your inspiring efforts.

Sincerely,



Dr Mark Griffiths  
Reader in Political Geography at Newcastle University

The IAF operates a fleet of 362 F-16 fighter jets – the second largest in the world after the USAF – as its main strike aircraft. The F-16 was first developed by Virginia-based **General Dynamics** in the mid-1970s, entering USAF service in 1978 and sold to Israel the following year as part of the Peace Marble I Foreign Military Sales Program, an initiative to expand arms sales overseas. Early models (F-16A and F-15B) were codenamed Netz (“hawk” in Hebrew) while Barak (“bless”) referred to later ones (F-16C and F-16D, produced from 1984) as Israel developed expertise in modifying the jets for IAF-specific needs. The newest model, the F-16I or Soufa (“storm”), is produced by Maryland-based **Lockheed Martin** and was delivered to the IAF as part of Peace Marble V, the latest iteration of the Foreign Military Sales Program that was signed by the US and Israel in 2000. On delivery from **Lockheed Martin**’s factory at Greenville, South Carolina, the aircraft enters the Soufa modification programme that is recognised as collaborative and illustrative of ‘the strong bond between Lockheed Martin and Israel’ (quoted in Carlin 2023). In Israel, the aircraft is fitted with a range of bespoke technologies that make the F-16I a distinctive and re-saleable fighter jet. For example, the F-16I carries two removable conformal fuel tanks produced by the state-owned **Israel Aerospace Industries** (IAI) that free up space normally occupied by external tanks so as to increase payload. The avionics and electronic warfare suite for the F-16I is produced by **Elbit Systems** that also provides a range of other equipment: the Dash IV display and sight system in the pilot’s helmet, parts of the on-board computer systems, and structural retrofits of doors, external fuel tanks, and pylons through its manufacturing subsidiary, **Cyclone**. Israel’s expertise in modifying F-16s has formed a secondary market where, for instance, the Greek Air Force has purchased **Cyclone**-produced retrofits (Shamim 2007); the Polish Airforce is supplied with **Elbit**’s F-16 Full Mission Simulators (FMS), and the Croatian Airforce operates 12 Israel-supplied and modified F-16s.

A complementing range of companies is involved in supplying weapons for Israel’s F-16s. Beginning in 2002, **RADA Electronic Industries** (an Israel-based subsidiary of Italian weapons producer **Leonardo**) and **Smiths Aerospace** (a Maryland-based subsidiary of UK-based **Smiths Group**) provide the data acquisition system and recording system that use real-time communication networks to monitor the aircraft and to relay data to operators on the ground. To establish targets, Israeli F-16s are fitted with the Litening II targeting pods that were developed jointly by Virginia-based **Northrup Grumman** and the Israeli multinational, **Rafael Advanced Defense Systems**, and provide pilots with the ability to ‘detect, identify, acquire and track ground targets for the delivery of conventional and precision guided weapons, such as laser guided or GPS guided bombs’ (Airforce Technology 2020). The UK-based **BAE Systems** has provided Israel with electronic missile kits and gunsight technology (AFSC 2022), a contract that brought some scrutiny in the UK Parliament after Israel used them against civilians in Gaza in 2008 and 2009 (Pallister 2009). In 2011 and 2012, the UK refused a small number of export licenses to Israel over fears they were in contravention of the export control criteria (Stavrianakis 2022), but **BAE** continues to provide components for the aircraft’s head-up displays (HUDs) that produce in-flight information to pilots. There are many other collaborating partners that are invested in producing combat-ready F-16s for the IAF. For our purposes in

the limited space here, it is important to add finally that F-16s have been the main aircraft used in the bombing of Gaza since 7 October 2023.

A widely used bomb type is the Guided Bomb Unit (GBU), a so-called “smart bomb” that, perhaps more than any other technology, is central to this era of so-called “precision” warfare. After the first larger-scale use of guided bombs in the First Gulf War in 1991, the USAF debuted the JDAM (Joint Direct Attack Munition) system during the NATO bombing of Yugoslavia in 1999. JDAM was jointly developed by the USAF and Navy and contracted to Missouri-based **McDonnell Douglas** in 1995 and **Boeing** after a 1997 merger as a conversion kit that modifies stock bombs such as the 2,000-pound BLU-109/MK 84, the 1,000-pound BLU-110/MK 83, and the 500-pound BLU-111/MK 82 warhead into a guided munition. Once the JDAM kit is added to these bombs, their nomenclature is superseded, becoming ‘GBU—’. Boeing today boasts that the JDAM is ‘combat-proven’, the ‘warfighters weapon of choice’ with more than 500,000 kits built at its production facility in St. Charles, Missouri. Over the last two decades, JDAMs have become an important part of the arsenal deployed by the US and allied states. JDAM can also be upgraded to the Laser JDAM (LJDAM) where a collaboration between **Boeing** and **Elbit Systems** adds a laser to better track so-called ‘mobile targets’ (see Jones 2020). Though specifics about the United States supply of JDAM and GBUs to Israel are not released by the US government, reporting in the Wall Street Journal in December 2023 revealed that the ‘surge of arms’ delivered after 7 October included more than 5,000 Mk82 unguided bombs, 5,400 Mk84 2,000-pound bombs, 1,000 GBU-39 small diameter bombs, and approximately 3,000 JDAMs (Malsin and Youssef 2023). In March 2024, Washington quietly authorised a further transfer that included 1,800 MK84 and 500 MK82 bombs (Hudson 2024b). Israel has also received US-produced 100 BLU-109, 2,000-pound bunker buster bombs and also requested the newer GBU-72 model (Jamal and Gatapoulos 2023).

The GBUs that have been supplied and deployed are the cause of a large part of the damage and death visited on Gaza in recent months. The 2,000-pound bombs shipped to Israel are generally used sparingly by Western militaries because of the massive damage they cause, but satellite imagery from the early months of the ongoing war reveal more than 500 impact craters over 12 metres in diameter, consistent with those left behind by 2,000-pound bombs (CNN 2023). For comparison, those are four times the weight of the largest bombs the US used against ISIS in Mosul. Marc Garlasco, a former US defence intelligence analyst and former UN war crimes investigator, claims that the density of Israel’s first month of bombardment in Gaza had ‘not been seen since Vietnam’ (CNN 2023).