

Rockwell International AGM-130 In 1984 Rockwell International was given a \$6-1 million contract to begin 34 months of development work on a rocket-powered variant of the GBU-15. Estimated total cost of the programme is \$63 million. AGM-130 has three times the range of the GBU-15, and incorporates better avionics. It will be available in three versions: AGM-130A, based on the Mk 84 2,000lb bomb; AGM-130BB based on the SUU-54 airfield attack submunitions dispenser; AGM-130C carrying a 2,000lb BLU-109/B penetrating warhead.

Flight trials started in early December 1985 with tests of the -130A, and were completed in late 1987/early 1988. AGM-130 is undergoing Operational Test and Evaluation. Poor trials results during 1987 have resulted in minimal funding this year.

The SUU-54 payload of the -HOB carries 15 Boosted Kinetic Energy Penetrators (BKEP) and 75 British-designed HB876 area-denial submunitions. In the Royal Air Force's JP233 airfield-attack weapon, HB876s are ejected axially from the dispenser. Development of a version suitable for lateral ejection is funded by a USAF Armament Division contract awarded in 1985 to Hunting Engineering.

Rockwell International GBU-1S Production of the initial GBU-15(V)1/B version was ordered in September 1980. Aircrew may lock the TV guidance on to the target, or use manual guidance to steer the missile to impact. Control is via an AXQ-14 datalink and a control and display panel in the cockpit. Flight tests in 1986 by operational F-111 squadrons saw ten hits scored in ten launches from standoff ranges of up to 30km.

A follow-on infrared-guided GBU-15(V)2/B version is also being developed; this uses the IIR seeker used on the AGM-65D version of Maverick. Testing of this version started at Eglin AFB in 1987.

Operators US Air Force (B-52D, F-111, F-4E), Royal Australian Air Force (ordered to arm the F-111C fleet).

Texas Instruments GBU-24 Laser-Guided Penetrator Weapon Production of the GBU-24/A Paveway III low-level LGB has ended following just three years of low-rate manufacture. The same guidance package has been integrated with the BLU-109/B-2,000lb hard-target-penetrating warhead to create the GBU-24A/B. This incorporates a new software package, providing increased standoff range and improved flight profiles.

Northrop Inertially Aided Munition This add-on guidance kit was developed under a joint USAF/US Navy programme, and adds a strap-down INS and microprocessor to the standard Mk 80 series of iron bombs. As the weapon falls away from the launch aircraft, the guidance unit checks the bomb's position, modifying the trajectory as required, thus improving accuracy and angle of impact.

LTV Hypervelocity Missile LTV is developing this rocket-powered missile under a joint USAF, US Army, and USMC contract. The weapon will have a range of 6km, and uses sheer speed—around 1-5km/Sec—to penetrate armoured targets, rather than the explosive power of a Heat warhead. Rounds weigh less than 22kg, and up to 40 may be carried in a single launcher. The unit cost is expected to be less than \$10,000.

Guidance is by a track-while-guide fire-control system based on a laser radar. The missiles incorporate a laser receiver able to detect the beam transmitted by the launch aircraft. This will carry guidance commands on a timesharing system. A coarse beam is used to gather newly launched rounds, with a fine beam taking over for terminal guidance. The missile is spin-stabilised, with sideways-firing pyrotechnic squib thrusters being

used for steering. Development is continuing, but there has been no news of progress.

AGM-136A Tacit Rainbow Full-scale development of this air-launched anti-radiation missile is due to end in 1988, and should lead to a production order. Test setbacks with Tacit Rainbow led the House Appropriations Committee to recommend a \$60 million cut in FY 1989 spending on the programme. This would leave \$55 million, including \$11-9 million for funding a second source. A decision on low-rate production due to be taken in early 1988 was postponed pending the completion of initial operational tests.

Three industrial teams are competing for the full-scale development contract for the planned US Army ground-launched version, and to qualify as a second source of air-launched missiles. The rival teams are Northrop/LTV, Boeing/Texas Instruments, and Raytheon/McDonnell Douglas/E-Systems. Both contracts will be awarded early next year. The Army version will be launched from the existing MLRS vehicle.

The flight duration of Tacit Rainbow has been the subject of some controversy, with suggestions that its fuel is sufficient for a 40-minute mission only. This has been denied by Air Force Undersecretary James McGovern, who has stated that enough fuel is carried for at least 80 minutes of flight.

Boeing YGM-121B Seek Spinner Following a 12-month flight demonstration programme of the *Pave Tiger*, the USAF decided in early 1985 to stop work on this anti-radar RPV. In 1987 Congress ordered that the programme be revived, and Boeing was given a contract that December for a 22-month test programme to fit existing *Pave Tiger* airframes with new subsystems, such as Tacit Rainbow seekers and warheads. Test-flying was to start in mid-1988, but later in the year Congress ordered the programme to be suspended.

Boeing SRAM II Plans for a follow-on to the current Short-Range Attack Missile were first drawn up in 1983. System definition studies began in 1985; that December the USAF announced that Boeing had been selected to build the new missile. The weapon's first flight is scheduled for 1989, with service entry on the B-1B timetable for early 1993. A total of 1,633 rounds is expected to be procured, equipping B-1s and B-2s for a total cost of around \$2.5 billion.

SRAM II will be about two-thirds the size of the weapon it replaces, allowing the B-1B to carry 20 rounds on an internal launcher. It will be rocket-powered and will use composite materials wherever possible. The flight-control computer forming part of the guidance system will use very-high-speed integrated circuit (VHSIC) technology.

McDonnell Douglas Slam Development has begun of the Standoff Land Attack Missile (*Slam*), proposed by McDonnell Douglas as a multi-mission derivative of Harpoon. It uses a modified version of the current Harpoon midcourse guidance unit, a GPS receiver, the datalink used in the *Walleye* missile, plus the IIR seeker from the AGM-65 version of *Maverick*. *Slam* is 65cm longer than Harpoon and 90-7kg heavier. Flight-testing of an A-6 equipped with realistic *Slam* mockups started in May 1988, and should have ended by October. Deliveries of *Slam* are due to begin in late 1988.

Tactical Air-to-surface Stand-off Missile (TASM) Project definition of this proposed weapon is likely to begin later this year.

Joint Stand-Off Weapons (JSOW) A total of \$15.9 million has been allocated to this programme under the FY 1989 budget, but no money can be spent until the DoD provides Congress with a specific plan for standoff weapon development.

Advanced Interdiction Weapon System (AIWS) Some time this year the US Navy will select two companies/industrial teams (not four as originally planned) to carry out 18 months of demonstration/validation work on this low-cost unpowered stand-off weapon. Planned unit cost is no more than \$50,000. Requests for proposals were issued in late 1987, and the responses were submitted in January 1988. Bidders were Boeing, Grumman, McDonnell Douglas/Hughes, and Texas Instruments/LTV.

SOVIET UNION

AS-6 Kingfish This rocket-powered winged missile is carried by Tu-16 bombers. Its installation on the Tu-26 *Backfire* has often been reported but never confirmed. After release at an altitude of around 11,000m, it climbs to a cruising height of 18,000m, flying to the target area under inertial guidance. Active or passive radar seekers are used for terminal homing. On anti-ship missions, the round dives at the target at a near-vertical angle. The relationship between this missile and the externally similar but slightly larger AS-4 remains unclear, as is the reason why *Backfires* seem to carry the older weapon rather than the more modern AS-6.

AS-7 Kerry This command-guided missile is a Soviet equivalent of early US weapons such as *Bullpup*. It is normally launched at heights of 300-3,000m and has a maximum range of 11km. It entered service in the mid-1970s and can be carried by strike aircraft such as the MiG-27, Su-17/20 series, and the Su-24, although the latter probably only carries it as interim armament. *Kerry* has also been seen on the underwing pylons of the Yak-38 *Forger*.

Operators Soviet Union, Bulgaria, India, Yugoslavia?

AS-9 Kyle This turbojet-powered missile is fitted with a passive radar seeker, and has a range of 80-100km. It has been seen on Soviet Air Force Tu-16, Tu-26, and Su-24 aircraft. Although its main role seems to be anti-ship, it would also be effective against land-based radars. This could be the "X23" anti-radiation missile which Iran claims is being supplied to Iraq by the Soviet Union. One source claims that AS-9 is rocket-powered and uses the same motor as the AS-6.

AS-10 Karen MiG-27, Su-17, and Su-24 fighters are armed with this 3m-long weapon. Early reports suggested the use of semi-active laser homing, but *Maverick*-style electro-optical homing now seems more likely. The solid-propellant rocket motor gives a cruising speed of Mach 0.9 and a range of up to 11km.

AS-11 The weapon formerly linked to this designation is now thought to be the AS-14. AS-11 is known to be an anti-radiation missile which equips the MiG-25 *Foxbat F*.

AS-X-12 Kegl No details of this air-launched missile have been released. Like the AS-11 it could be based on the AS-9 but fitted with a different form of guidance.

AS-X-13 Developed as a replacement for the AS-4 *Kitchen*, this 800km-range missile can fly at speeds of up to Mach 3.5.

AS-14 Kedge Formerly associated with the designation AS-X-11, this is reported to be an electro-optically guided weapon with a maximum range of 40km. It may be related to the smaller AS-10 *Karen*.

Laser-guided bombs Frontal Aviation Units of the Soviet Air Force are equipped with laser-guided bombs. Based on the standard Warsaw Pact FAB-500, -750, and -1000 bombs, these are probably similar in concept to the US *Paveway* series. A new generation of LGBs is reported to be entering service.