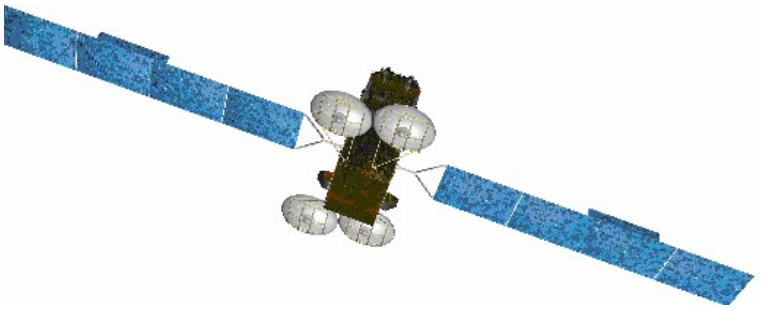
Skynet 5

Payloads

Briefing

Eurostar 3000



Skynet 5 is a series of four British military communications satellites that provide secure tactical and strategic telecommunications to the military forces of the United Kingdom. The system includes two operational satellites and one in-orbit spare. It is the follow-on to the last-generation Skynet 4 system, consisting of six satellites launched during 1990-2001. The last three Skynet 4s (4D, 4E, and 4F) are referred to as the Skynet Stage 2 series. The Skynet 5A and Skynet 5B satellites were launched in 2007. The Skynet 5C was orbited on June 12, 2008 and the Skynet 5D on December 19, 2012.

In May 1998, Lockheed Martin Missiles & Space teamed with BAE Defence Systems to study development of the Skynet 5 system. The team submitted a proposal to the British Ministry of Defence (MoD) for the Project Definition Study to define the military's satellite communication architecture for the follow-on to Skynet 4. In April 1999, the MoD awarded two competing 20-month contracts to Lockheed Martin Missiles & Space and EADS Matra Marconi Space (now Airbus Space Systems) to design a commercially-operated Skynet 5 satellite system. Each contract was valued at $48.23 million and called for the development of satellites owned by the winning industrial team.

In 2001, two separate industrial teams submitted bids for the Skynet 5 contract. One team was named "Rosetta Global Communications", consisting of British Telecom, BA Defence Systems, and Lockheed Martin Missiles & Space. The other team was named "Paradigm Secure Communications" and included Astrium, BAE Systems, Cable & Wireless, Cogent DSN, General Dynamics Decision Systems, Global Crossing, Logica, Paradigm Services, Serco Group, Stratos, and Systems Engineering & Assessments. On February 24, 2002, the MoD awarded Paradigm Secure Communications a $2.86 billion contract to build, launch, and operate two Skynet 5 satellites. That contract runs through 2018. Paradigm was chosen as the preferred bidder for the contract over the competing Rosetta Global Communications team led by Lockheed Martin Missiles & Space, British Telecommunications, and BAE Systems. The MoD and Paradigm signed a definitive contract on October 24, 2003.

Recent Developments

In July 2021, the UK Ministry of Defence signed a prime contract with Airbus Defence to develop and manufacture the Skynet 6A satellite based on the company's Neo bus. The contract is valued at more than $630 million.

Executive

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Note: Airbus Defence & Space leads a team of companies under the Paradigm Secure Communications venture. These companies include BAE Systems, Cable & Wireless, Cogent DSN, General Dynamics Decision Systems, Global Crossing, Logica, Paradigm Services, Serco Group, Stratos, and Systems Engineering & Assessments.

Specifications

Mass:	4,700 kg
Orbit:	geostationary
Design lifetime:	12 yr
Bands:	X, SHF, UHF

Subsystems

Frame

The frame of the satellites is based on a militarized version of the Eurostar 3000 modular bus, produced by *Airbus Space Systems* of Stevenage, United Kingdom.

Launch Systems

All four Skynet 5s were launched aboard Ariane 5ECA rockets from the Guiana Space center at Kourou, French Guiana. Ariane is marketed by *Arianespace SA* of Evry, France.

Guidance & Control

The satellites are 3-axis-stabilized. The master ground control station is located at the Royal Air Force's (RAF) Oakhanger facility at Hampshire, UK. Two additional stations are located at Rudloe Manor and Colerne. The RAF can also use the UK Defence Research Agency's facility at Defford. Software for the Satellite Control Centers (SCC) was developed by L-3 Communications' *Storm Control Systems Ltd*. of Basingstoke, UK. Integral Systems, Inc.'s *RT Logic, Inc*. of Colorado Springs, CO provided Telemetrix baseband systems, S-band modem systems, and other ground equipment for command and control functions. *LogicaCMG* of London, UK was the software contractor for the management system. *Serco Group plc* of Sunbury-on-Thames, UK was responsible for providing support services at all RAF 1001 Signals Unit (1001SU) sites, including military satellite operations activities and ancillary and domestic services at the Defford, Oakhanger, Colerne, and Hawthorn sites.

Ground Segment

The ground control segment was designed by *BAE Defense Systems Ltd*. of Farnborough, UK. *BAE Systems C4ISR* of Christchurch, UK supplied its Talon rapid deployment satellite communications terminals.

Power

Electrical power aboard each satellite is generated by a pair of solar arrays, as well as auxiliary body panels.

Payload

Airbus Space Systems of Portsmouth, UK provided the communications payload for the satellites.

Contract Briefs

Date	Source	Value	Details
Airbus Defence & Space			
04/00/99	UK MoD	$48,230,000	20-month contract Project Definition Design Study (PDDS) for Skynet 5.
Arianespace			
05/19/10	Airbus Space Systems	—	Contract to launch the Skynet 5D satellite aboard an Ariane 5ECA rocket in 2013.
01/04/06	Airbus Space Systems	—	Contract to launch the Skynet 5C satellite aboard an Ariane 5ECA rocket in 2008.
12/30/04	Airbus Space Systems	—	Contract to launch the Skynet 5A and Skynet 5B satellites aboard Ariane 5ECA rockets in 2006 and 2007. The contract includes an option for an additional launch.
BAE Systems, BAE Systems C4ISR			
07/23/02	Airbus Space Systems	—	Contract to supply 12 Talon rapid deployment satellite communications terminals for Skynet 5 by the end of 2002.
Com Dev			
11/19/03	Airbus Space Systems	$36,200,000	26-month contract to supply payload electronics, switches and multiplexers for the Skynet 5A and Skynet 5B satellites.
Integral Systems, RT Logic			
07/02/03	Airbus Space Systems	$2,000,000+	Contract to supply Telemetrix baseband systems, S-band modem systems, and other ground equipment for command and control of the NATO Skynet 4 and Skynet 5 satellite systems.
L-3 Communications, Storm Control Systems			
05/12/03	Airbus Space Systems	$7,500,000	Contract to supply satellite command and control software to use in the Skynet 5 and Skynet 5 Satellite Control Centers (SCC).
Lockheed Martin Missiles & Space			
04/00/99	UK MoD	$48,230,000	20-month contract Project Definition Design Study (PDDS) for Skynet 5.
Paradigm Secure Communications			

09/08/06	Netherlands MoD	—	Contract to provide secure X-band communications services via the Skynet 5 and Skynet 5 systems.
09/09/04	Portugal MoD	—	Contract to provide secure X-band communications services via the Skynet 5 system.
02/24/02	UK MoD	$2,860,000,000	Prime contract to build, launch, and operate two Skynet 5 military communications satellites through 2018. Contract includes provision of UHF and SHF payloads, secure satellite control link, anti-jam capability (nulling antenna), multiple, steerable spot beams, switchable connectivity, and support to legacy terminals.
Serco Group			
02/03/03	UK MoD	—	Contract to provide support services at all the UK Royal Air Force 1001 Signals Unit (1001SU) sites, including both military satellite operations activities and ancillary and domestic services at the Defford, Oakhanger, Colerne, and Hawthorn sites.

Costs

Estimated unit cost of Skynet 5 satellites was about $2 billion.

Teal Group Evaluation

The Skynet 5 contract to Paradigm was a groundbreaker for the UK Ministry of Defence, as well as for national military establishments in general. It represented the first major "Public-Private Partnership" between a commercial satellite company and government in the area of military satellite communications. There have been several examples of dual-use satellites which provide services to both commercial and military users. The French, for example, have long done this with their Telecom/Syracuse satellites as far back as the early-1980s. The Spaniards have been doing it with their Hispasats. The idea of militaries leasing capacity on commercial satellites is nothing new.

Skynet 5, however, is unique in its scope. The system has been built and is being operated mainly for the British MoD, as opposed to primarily being a commercial satellite that simply leases out capacity when needed. It is a subtle but clear difference. The model is more in line with Hisdesat of Spain and its proposed SpainSat/XTAR-EUR system than with traditional dual-use systems like Telecom/ Syracuse and Hispasat. And we think it marks the beginning of a trend in this direction, primarily because of the high costs of developing, building, and operating dedicated military satellites.

The fact that the technology gap between military and commercial satellites has dramatically been reduced during the past decade makes it all the more feasible to even consider a PPP relationship on systems such as Skynet 5. It is a win-win situation. The MoD has obtained the next-generation communications satellite system it requires at an affordable price and at almost no risk, while the Paradigm consortium has received a guaranteed long-term customer that will pay for a system whose excess capacity can then be sold to other customers, such as the Netherlands' MoD which in 2009 agreed to purchase Skynet 5 services, along with MoDs of other countries, including France, Holland, and Portugal.

Our sense is that the development and deployment of Skynet 5 moved forward fairly well. Following the 20-month study contracts awarded to Astrium (now Airbus Space Systems) and Lockheed Martin in April 1999, the Brits had the option to go back to conventional procurement procedures and they didn't take it. It is obvious to us that the main consideration in this program has been cost, and the deal

with Paradigm is probably as good as the MoD could have hoped to get from a reputable team of Western satellite contractors.

The successful launches of the four Skynet 5s in 2007-2012 occurred at about the right time. They came online as the Skynet Stage 2s were nearing the end of their design lifetimes. There has been very little talk about the successor to Skynet 5. We assume it would be designated the Skynet 6, and that it would consist of at least three satellites. The Skynet 5s have a design lifetime of at least 12 years, so we expect that the initial replacement satellites would be needed within the next five years.

Skynet 6

Serious planning for a next-generation Skynet system has, in fact, already begun with the recent signing of a prime contract for the first Skynet 6 satellite with Airbus Defence and Space. That deal is apparently valued at more than $630 million and reportedly calls for the satellite to be built and launched by 2025. The Skynet 6A satellite is viewed as a stopgap measure to prevent any diminishment of satellite communications capability for the British armed forces while the UK Ministry of Defence continues to consider exactly what it will need with its next-generation Skynet constellation.

