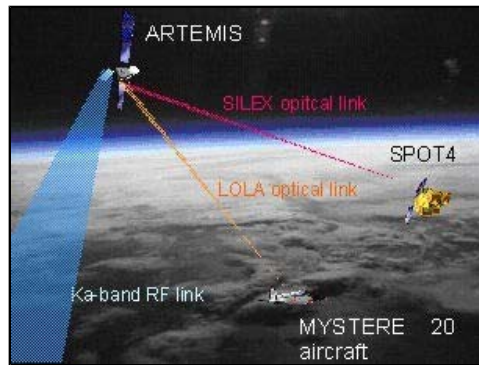


## Real-time LOLA demonstrations on the French Defence Procurement Agency stand at Le Bourget



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Le Bourget, 21 June 2007 – Real-time laser optical links are being demonstrated live at the Paris Le Bourget airshow on the Délégation Générale pour l'Armement (DGA) stand. The link, via an airborne Mystère 20 aircraft in the south of France and a geostationary satellite, is making it possible to achieve two-way communication between Le Bourget and the aircraft. The team on the DGA stand is in permanent contact with the flight crew. Exceptionally clear footage of the cabin and countryside below is being shown on screens on the stand, proving the operational performance of this kind of laser optical link.

These demonstrations are subsequent to a flight test campaign and a real-time demonstration which was successfully performed in front of French Army representatives on 30 May 2007 in Toulouse.

Last December, in a world first, **Astrium** achieved two-way laser optical links between a Mystère 20 aircraft, provided by the French Procurement Agency's Flight Test Centre at Istres, and the Artemis communications satellite. In early 2007 the Thales Alenia Space communications chain was integrated in the system, which for the first time enabled audio and video data communication to occur in real-time, between the aircraft and the ground, via the Artemis geostationary satellite. Since then, more than 50 successful communications have been achieved as part of the flight test programme. The programme was designed to define the characteristics of the propagation channel and assess system capability and reliability at various altitudes and in a range of weather conditions.

LOLA was made technically possible by Astrium designing and building an optical terminal which serves as a precursor to the future drone system. A number of technical innovations have been introduced on LOLA:

- The primary optical element of the terminal is made from silicon carbide (SiC) to achieve the required mechanical stability
- A CMOS sensor enables detection and tracking of the satellite despite the optical signal received only being low power
- A highly accurate hemispherical broadband pointing mechanism performs rapid satellite acquisition
- The communications chain connects a laser modem to powerful means of data processing including DVB-S2 self-correcting error codes and an innovative framework synchronisation system with an error bit rate of just 10<sup>-9</sup> (less than 1 error bit in 1 billion), despite significant signal fluctuations caused by propagation of the optical beam through the atmosphere.

These innovations have enabled Astrium to demonstrate exceptional system performance in an aeronautical environment:

- Flawless 50 megabits/s transmission
- Link acquisition in under a second
- Pointing with an accuracy of better than 1 microradian (the equivalent of pin-pointing a person in Moscow all the way from the Paris airshow)

The system architecture for programming and monitoring of the ground and aerospace segments has made a significant contribution towards the programme's success. Experience gained on LOLA will play a part in defining the future operational system.

The benefits of optical laser links for military applications are numerous – they are discrete, resistant to counter-measures, extremely difficult to intercept, compatible with RF eavesdropping and operate at high data-rate (100 Mbits/s to 1 Gigabit/s). Moreover, laser optical links are beneficial for civil or military applications due to the fact that there is no need for frequency coordination, overloading does not occur and they are low power. This is all due to use of the laser and the ability to simultaneously transmit information to multiple locations via the Ka-band space-ground link.

LOLA's success is the result of EADS Astrium Toulouse working together with Thales Alenia Space, as primary partner, and numerous other companies and agencies including ONERA, ESA, Météo France, the Istre Flight Test Centre, BOOSTEC, CILAS, DASSAULT, IXSEA, **LUMICS**, SAGEM, SODERN and SUPAERO CIMI. Following on from the SILEX programme, LOLA's success proves that optical link technology is mature and that an operational optical communications system of up to 1 gigabit per second is possible today, using existing technology.

### About Astrium

**Astrium**, a wholly owned subsidiary of EADS, specialises in civil and military space systems and space-based services. In 2006, **Astrium** achieved revenues of 3.2 billion euros and employed approximately 12,000 people in France, Germany, Spain, the Netherlands and the United Kingdom. The company's core business is divided into three areas: the two business units **Astrium Space Transportation** (for launch vehicles and space infrastructures) and **Astrium Satellites** (for satellites and ground segments), and the wholly owned subsidiary **Astrium Services** for the development and delivery of satellite-based services.

EADS is one of the world's leading suppliers of aerospace and defence systems and all associated services. In 2006, the company's revenues amounted to around 39.4 billion euros, with a workforce of more than 116,000 employees.

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