

Market Interest in Fleet Management On Orbit Services – a Commercial Approach

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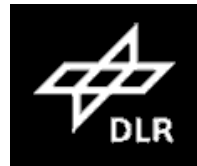


Description

- A company owned by:



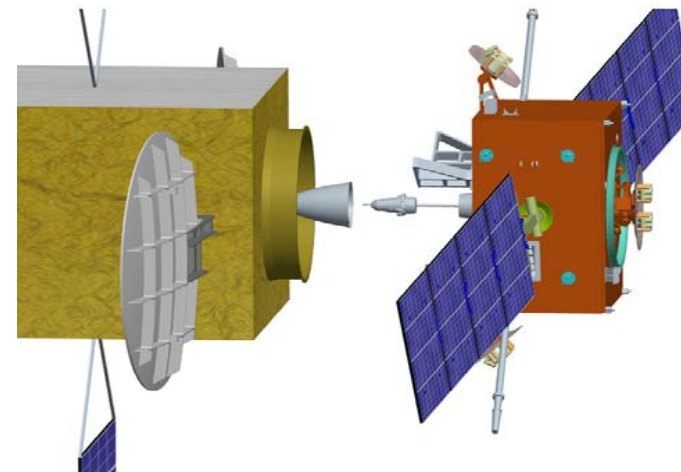
- Partner for docking technology:



- By attaching to the target satellite, the “OLEV”, a space “tug” that:
 - Provides propulsion and controls the satellite’s station keeping and pointing
 - Can dock, undock and re-dock an unrestricted number of times during its life
 - 12 years total life extension potential for 2000 kg host satellite

Enabling

- **Life extension** – extend the life of satellites by several years
- **Relocation** – fleet management
 - Move target satellite to different orbital slot
 - Move target satellite to a different orbit
- **“Rescue”** – restore lifetime of satellites launched into low energy transfer orbits
- **De-orbiting** – “graveyard” satellites at the end of the satellite’s life



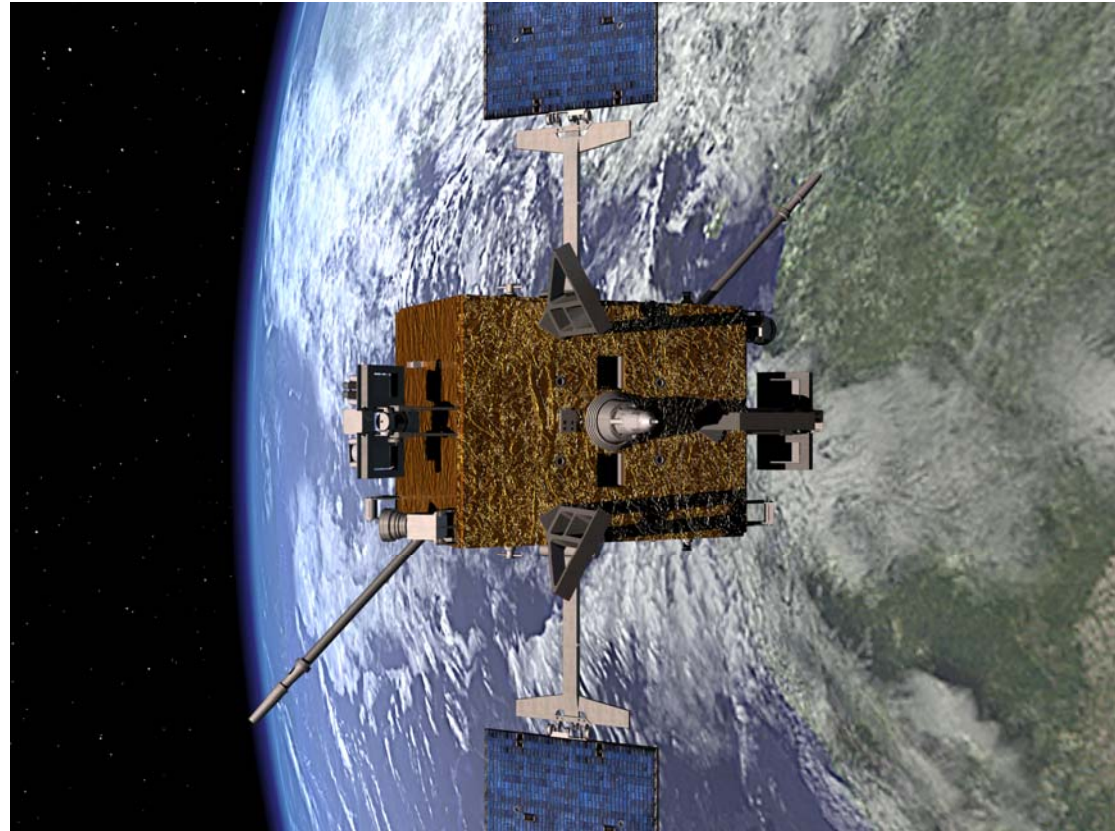
Initial Market Survey

- The initial market research (which was performed 8 years ago) covered a large number of commercial telecom satellite operators who were asked:
 - If this service (lifetime extension) existed, would it be of interest to you?
 - At what price?
- Uniformly positive reactions received: “Yes, definitely interesting if costs can be kept down to 30-50% of buying replacement satellite”
- A Europe-based marketing company was set up with financing coming from a group of small space companies. A satellite development program with ESA financing and oversight took the ConeXpress-OLEV through a full and successful PDR process.
- An initialled contract with a launch customer, Optus, had to be abandoned due to satellite development and recurrent costs substantially exceeding the levels required for a profitable venture



CX-OLEV becomes SMART-OLEV

- A new and more cost-efficient satellite platform was chosen, based on the SSC SMART-1 design
- A delta-phase B financed by industry was undertaken leading to a successful PDR mid-2009 with significant involvement of the new launch customer Eutelsat
- Using a purely commercial approach and following an open procurement philosophy, development and recurrent satellite prices were brought to reasonable levels



Financing – the hurdle

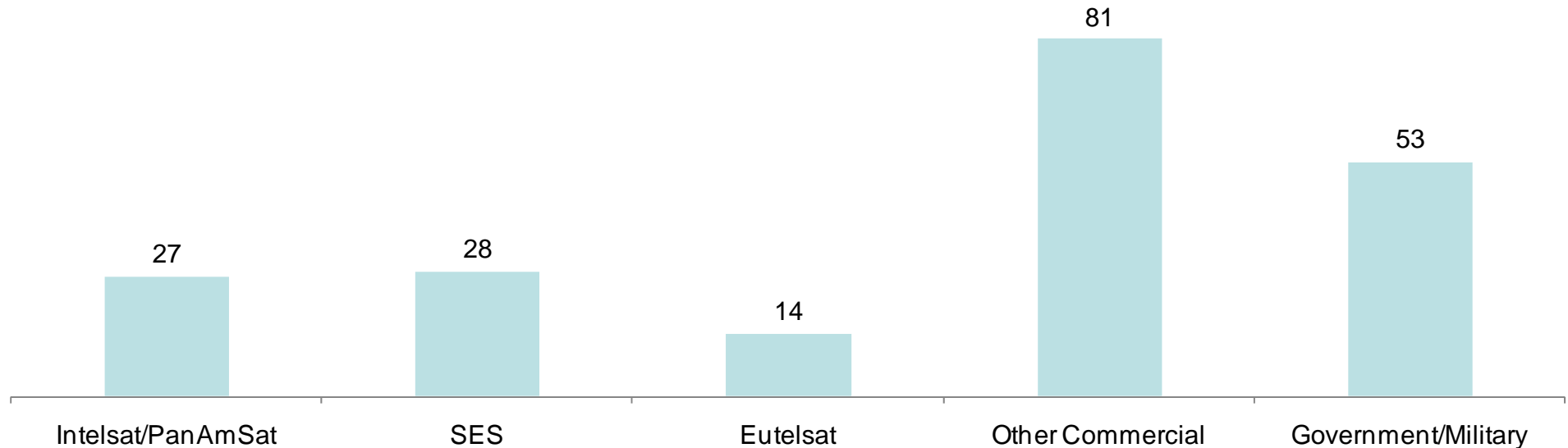


- Commercial satellite operators expect to try new technology at a rebate – to the extent they are willing to do it at all!
- The industrial shareholders could not self finance the development costs of the S-OLEV → investment required → strategic partner / financing entities
- In parallel, continued marketing of the service



Most Addressable Market: Satellite Life Extension

Satellites Reaching End of Life Between 2012 and 2022

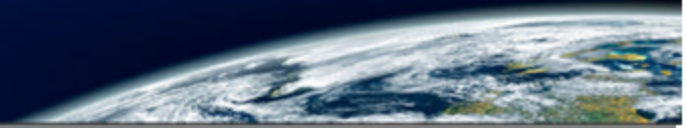


- Approximately 140 commercial telecom satellites currently flying and “eligible” for life extension
 - 15 to 20 new satellites launched each year
- Estimated total number of satellites reaching end of life¹ between 2012 and 2022 = 203
- Of which 150 are commercial and 53 government/military

Sources: Union of Concerned Scientists

Notes: (1) Source: Union of Concerned Scientists. SES satellites include satellites from Includes SES Americom, SES Astra, SES Sirius, Star One (SES Global) and Asia Satellite Telecommunications Co. Ltd. (SES Global). Government satellites include hybrid government satellites with civil or commercial uses

The Market Traction



- Apart from Optus and Eutelsat, several operators engaged in preliminary technical and commercial discussions
- Usefulness of service not limited to life extension:
 - In-orbit launch and LEOP failure protection
 - Lower cost initial market access
 - Orbital slot protection....
- Each of the last four years a satellite has experienced a partial launch failure which could have been addressed by an OLEV:
 - ArabSat 4A: Launch failure in February 2006 resulted in commanded re-reentry
 - Rascom-QAF1: Propulsion system failure in December 2007 limited useful life from 15 years to 2 years
 - AMC-14: Launch failure in March 2008 potentially limited useful life from 15 years to 4 years
 - Palapa-D: Launch failure in August 2009 potentially limited useful life from 15 years to 9 years

Current Status



- Market is there and “waiting”
- Financial crisis has severely limited opportunity for equity/loan financing
- Strategic partnership – large communications satellite manufacturers perceive conflict

An opportunity!