

**Commercial Space Transportation**

# **QUARTERLY LAUNCH REPORT**

Special Report:

## **Trends in Space Launch Services: Globalization and Commercial Development**



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## Trends in Space Launch Services: Globalization and Commercial Development

Launch service providers are leading the globalization of the space industry by forming international partnerships. The end of the Cold War has created an environment that favors cooperation between manufacturers of high technology launch systems, with less emphasis on national security concerns. As a result, an international marketplace in launch vehicle manufacturing has emerged in which manufacturers can coordinate and consolidate their technologies.

These companies offer a variety of launch vehicles from multiple countries and manufacturers, and can launch them from multiple launch sites. Launch customers now have the opportunity to choose from a wider assortment of launch vehicles and can benefit from the lower costs provided by a highly competitive market (see graph of the Global Commercial Launch Trend on page SR-3). The major players in the launch industry are diversifying to provide launch services across the full range of the market, from light weight

The most visible entrants in the global commercial launch market are a series of partnerships between western companies and the space enterprises in the former Soviet Union.

### International Launch Services (ILS)

A partnership between Lockheed Martin of the United States and Khrunichev and Energia of Russia, ILS offers customers the choice of the Atlas or the Proton launch vehicle for geosynchronous payloads. This arrangement allows customers to take advantage of greater flexibility in scheduling as well as cost benefits from consolidation of services.

### Starsem

A partnership between Arianespace and Aerospatiale of France, and the Russian Space Agency (RKA) and the Samara Space Center of Russia, Starsem will offer commercial launches on Russia's Soyuz launch vehicle. With Soyuz's ability to launch intermediate weight payloads to low earth

Launch Partnership	Companies Involved in Partnership	Launch Vehicle(s)	Payload Class
International Launch Services	Lockheed Martin Khrunichev Energia	Proton	Heavy
		Atlas	Medium
Starsem	Arianespace Aerospatiale Russian Space Agency Samara Space Center	Soyuz	Medium
Sea Launch	Boeing Kvaerner Yuzhnoye	Zenit	Heavy

#### Major International Launch Partnerships

LEO payloads to heavy geosynchronous satellites.

orbit, Starsem complements Ariane 5's heavy lift capability and allows Arianespace to compete across a wide range of launch services.

# Special Report

SR-2

## Sea Launch

Sea Launch represents an innovative partnership between Boeing of the United States, the ship-building company Kvaerner of Norway, and Yuzhnoye of Ukraine. Launching the Ukrainian Zenit from an ocean platform, Sea Launch provides a unique option for customers seeking to place their payloads in geosynchronous orbit. The ability of Sea Launch to launch from near the equator increases the maximum payload mass that Zenit can place in orbit.

ILS, Starsem, and Sea Launch also offer services on existing launch vehicles.

## Other Launch Partnerships

In addition to the three partnerships described above, the manufacturers of the Cosmos, Cyclone, and Rokot launch vehicles all have international partners to market their vehicles. The Surf venture, using a converted submarine ballistic missile system, also involves a U.S.-Russian partnership.

International partnerships are also being formed to take advantage of proven launch vehicle components. For example, Pratt and Whitney and Aerojet both have agreements to market Russian propulsion technology. The selection of the Russian RD-180 engine for the new Atlas 2AR and potentially for Lockheed Martin's Evolved Expendable Launch Vehicle (EELV) demonstrates how manufacturers can take advantage of foreign technologies now available in the international market. There are also several proposals to use Ariane 5 components for the EELV program.

Kistler Aerospace Corporation plans to use Russian designed NK-33 engines on its K-1 two-stage reusable launch vehicle and is

seeking an FAA license for a series of test flights.

Domestically, Lockheed Martin is developing the Atlas 2AR on a commercial basis, with company funding. In addition, Lockheed Martin recently won the NASA competition for the X-33, a technology pathfinder for the next generation reusable launch vehicle. The company contributed approximately one fourth of the early development costs for the X-33, and is expected to fully fund development of the orbital vehicle if the demonstrator is successful.

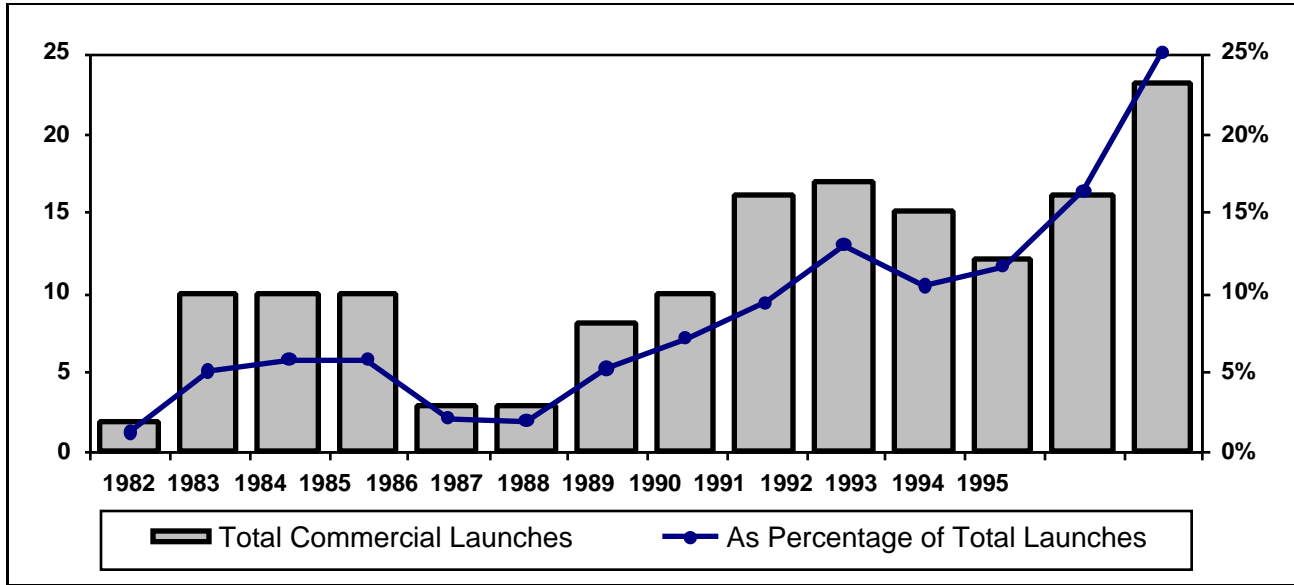
## Global Satellite Partnerships

The trend toward manufacturers forming consolidated service companies is not limited to the launcher market. Satellite manufacturers are also involved in the emergence of new international satellite communications services. Hughes has announced it will acquire PanAmSat and has shown interest in acquiring Nethold, a satellite television service provider based in the Netherlands. Such measures would allow Hughes to consolidate its television broadcast services into a global network.

Similarly, equity stake holders in Iridium include a wide variety of companies involved in satellite manufacturing as well as in communications services. The result is a consolidated commercial company that is service-oriented and can take advantage of opportunities in the international telecommunications market.

If Hughes' plan for the broadcast television market is carried out, it will become the single largest private satellite communications system provider, second only to the government-sponsored Intelsat organization in terms of overall system size.

# Special Report



Global Commercial Launch Trend, 1982 - 1995