Commercial Space Transportation

QUARTERLY LAUNCH REPORT

Special Report:

Bulk-Buy Practices by Satellite Operators Foster Further Commercialization of Launch Services Industry

3rd Quarter 1997

United States Department of Transportation • Federal Aviation Administration

Associate Administrator for Commercial Space Transportation

800 Independence Ave. SW Room 331

Washington, D.C. 20591

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INTRODUCTION

The satellite launch industry has steadily grown and matured to take on the features of a truly commercial industry. This year, commercial launches outnumber government launches for the first time. New launch systems, such as the Delta 3, Sea Launch, and H2A, are in development, supported almost entirely by commercial launch demand. An emerging development in the launch services business is the commercial bulk buy of launch vehicle services (that is, the commercial purchase of several launch opportunities through a single procurement, even when specific payloads may not have been selected for those launches). In the past, launch services were arranged for one or two satellites at a time, sometimes with options for more launches to be provided to the satellite operator at a later date.

The practice of buying launch services in bulk has emerged in the GEO launch market for three main reasons:

- First, the existing fleets of GEO-capable launchers have largely been booked through 1998 and part of 1999. The practice of bulk buying creates sufficient quantities of demand to allow existing or emerging launch service providers to begin development of new launch systems to increase supply
- Second, by fostering the development of new launch systems, launch customers are stimulating competition and are able to diversify the available supply of launch vehicles
- Third, bulk purchases typically involve volume discounts and therefore allow for a reduction in the price per launch. This practice is also true of the emerging big LEO markets, which will involve large constellation deployments during the next ten years.

Table 1. Recent Bulk Buys of Launch Services

Launcher	Customer	Number of Launches	Date of Contract	Date of Launches
Delta 2	Iridium	8	April 1994	1997-1998
	Globalstar	up to 6	March 1995	1997-1999
Delta 3	Hughes	10	May 1995	1998-2002
H2A	Hughes	10	September 1996	2000-2005
	Loral	10	September 1996	2000-2005
	Loral	5	February 1997	1999-2001
Proton	Hughes	4	April 1995	1997-1998
	Loral	5	September 1993	through 1998
	SES	4	March 1994	1996-1998
Sea Launch	Hughes	10	December 1995	through 2002
	Loral	10	July 1996	through 2002
Eclipse	Iridium	10 with options	October 1996	1999
K-1	Loral	10	January 1997	1999

Since the existing fleets of GTO-capable launchers were rapidly becoming over-booked, it was evident that new launchers would, at some point, have to be introduced. Satellite manufacturers and operators have, in part, been financing the development of these systems through bulk buys, effectively minimizing some of the risks associated with the development of entirely new launch systems.

This support has been provided much in the same way that the development of new commercial airliners is supported by customers that promise to buy a significant number of the new planes. In short, commercial launch vehicles are being bought in bulk providing the "guarantee" for the new launch systems.

Satellite manufacturers also have strong incentives to encourage a diversity of launch service providers. Greater supply helps ensure that at least one launch vehicle will be available to launch a particular satellite in a timely manner, and more market players force competition for the most attractive price. Also, in the event of a launch failure, other launchers can continue to fly while the faulty system remains grounded through the investigation.

Large satellite organizations, such as Intelsat and Inmarsat, typically contract directly with a launch service provider. Many commercial telecommunications and PTT organizations, on the other hand, are contracting directly with the satellite manufacturers to arrange for launch services as part of the conditions of sale. Two to three years ago, the US major satellite manufacturers, Hughes and Space Systems/Loral, began to buy as many as ten launches at a time, even before any specific payloads were chosen for the launches. This practice ensured that enough vehicles would be available to launch the satellites being produced by the manufacturers.

DELTA 3

The significance of the decision to develop Delta 3 lies in that it was entirely a commercial business decision, and no government money was needed. This demonstrates that the demand for commercial satellite services was large enough to stimulate the development of a new launch system.

The purchase of launch services in bulk also allows the launch customer to pay less per launch. At the time the agreement between Hughes and McDonnell Douglas was announced, it was stated that Hughes would pay less for launches on Delta 3 than it had been paying for previous launch services on similar vehicles.[1] This has allowed the manufacturers to sell more satellites as well. Steven Dorfman, president of Hughes Telecommunications and Space said at the time of the announcement, "Communications is an elastic marketplace – the lower we can get our costs the more [satellites] we can sell."[2] The first Delta 3 is expected to fly in 1998 and will carry the Hughes Galaxy 10 satellite.

SEA LAUNCH

The Sea Launch venture, also set to fly for the first time in 1998, is the result of a partnership led by Boeing to launch Ukrainian built Zenit rockets from an off-shore platform. Hughes's decision to buy ten launches on this new system in December 1995 was seen to be an extension of Hughes's approach with Delta 3, described above. Hughes spokesman Richard Dore said at the time of the announcement, "We're starting to build a stable of launch vehicles that we have access to. We think this is critical."[3]

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[1] "McDonnell Douglas Announces Delta Upgrade/ Hughes Deal for 10 Launches Provides Delta 3 Strong Start," *Space News*, May 15, 1995, p.1.

[2] Ibid.

[3] "Sea Launch Lands Hughes Contract/ ten-launch Deal Makes Boeing Instant Player in a Crowded Market," *Space News*, December 18, 1995.

Since the December 1995 announcement, Hughes has exercised three more options on top of the original ten launches, and Space Systems/Loral announced its own ten-launch buy in July 1996. The first launch of the Zenit Sea Launch is expected in late 1998, and will carry the Hughes Galaxy 11 satellite.

H 2A

Japan's H2 launcher has flown successfully all four times since its introduction in 1994, but was deemed to be prohibitively expensive to compete in the commercial launch market. Determined to control costs, NASDA decided in September 1995 to develop the lower-cost H2A and make it available for commercial launches beginning in 2000. In July 1996, early reports of a pending deal between Hughes and Rocket System Corp. (RSC), the marketing agency for H2A, indicated that Hughes would buy five launches for an average price of $78 million each. A deal was finally reached for ten launches, although the price terms were not disclosed. An RSC official quoted in ***Space News*** acknowledged that the planned cost reduction of the new H2A was enabled by the bulk purchase: "The cost reductions have been achieved not only because of streamlining of the rocket systems, but also because of foreign procurement."[4] Space Systems/Loral also secured ten launches for the H2A in September 1996.

PROTON

Russia's Proton also has a multiple launch contract through Hughes, Space Systems/Loral, and SES of Luxembourg. International Launch Services, the partnership to market both the Atlas and Proton launch vehicles, is working to expand capacity for its Proton business, which is nearly booked through 1999.[5]

LEO SYSTEMS

The new LEO communication systems have also bought their launches in bulk. To deploy a constellation, a large number of satellites needs to be deployed in a short period of time. Large launch vehicles like the ones used to launch GEO satellites tend to offer greater cost efficiency per pound to orbit and can deploy many satellites at once. Once the constellation is deployed, a mixture of small and large launch vehicles can be used to replenish the system.

Eclipse – In October 1996, Motorola announced it would buy 10 launches for its Iridium satellites aboard the Eclipse reusable small launcher being developed by Kelly Space & Technology. Eclipse Astroliner will use a modified F-106 aircraft that would be towed behind a Boeing 747. The vehicle will be released and then rocketed on a suborbital trajectory to a very high altitude where the payload and an upper stage are deployed. In this way, about 3,500 pounds could be delivered to low earth orbit. Eclipse would be used to replenish Iridium satellites on an as-needed basis.

For the initial deployment of the Iridium constellation, larger expendable launchers are being used to deploy several satellites at a time. McDonnell Douglas's Delta 2 will launch 40 of the satellites five at a time over eight launches. Russia's Proton will conduct three launches of seven satellites at a time through a special arrangement with Proton manufacturer Khrunichev. China's Long March 2C will launch six times carrying two satellites each. McDonnell Douglas also will launch three more sets of five to replenish the

[4] "Hughes Nears H2A Deal," *Space News*, July 8, 1996, p. 18.

[5] Various sources, including "Rocket Shortage Impacts Hughes, But Lockheed Finds Launchers," *Space Business News*, April 2, 1997.

constellation. To date, two Deltas and one Proton have already placed 17 Iridum satellites into orbit.

K-1 – Kistler Aerospace, another developer of a small reusable launch vehicle, signed a deal with Space Systems/Loral (the manufacturer of the Globalstar satellites) in January 1997 for ten launches on their two-stage K-1 launch vehicle. The payloads have not yet been identified, but a K-1 could lift three Globalstar-class satellites at once. The K-1 is designed to deliver 3,600 kg to low earth orbit, giving the K-1 roughly similar capabilities to the McDonnell Douglas Delta 2 launch vehicle. The first and second stages would be powered by the Russian designed NK-33 engine, the same engine used on the N-1 rocket in the 1970's as part of Russia's former manned lunar program. Both stages would be recovered after use through a system of parachutes and airbags. The first orbital test flight of the K-1 is now set for 1998.

Globalstar also has multiple launch agreements with McDonnell Douglas as well as with Starsem and Yuzhnoye to launch on the Russian Soyuz and Ukrainian Zenit launch vehicles.

If the new generation of commercially developed small launchers can deploy LEO satellites reliably and cost effectively, they may be able to capture a significant portion of the LEO replenishment market as well.