Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Third Report and Analysis of Competitive Market Conditions with Respect to Domestic and International Satellite Communications Services	)	IB Docket Nos. 09-16
	)	
Report and Analysis of Competitive Market Conditions with Respect to Domestic and International Satellite Communications Services	)	IB Docket No. 10-99

THIRD REPORT

Adopted: December 12, 2011 Released: December 13, 2011

By the Commission: Commissioners Copps and McDowell issuing separate statements.

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Heading Paragraph #

I. EXECUTIVE SUMMARY

1. This is the third report (*Third Report*) submitted by the Federal Communications Commission (Commission) to the United States Congress on the status of competition in domestic and international satellite communications services as required by Section 703 of the Communications Satellite Act of 1962, as amended (the *Act*).[1] In this *Third Report*, we focus on calendar years 2008, 2009, and 2010.

2. Here, as in previous Reports, we examine the organization of the satellite communications services industry. In addition, we describe wholesale and retail industry segments and discuss important inputs (*i.e.*, resources required to provide satellite services) to the communications satellite business, including spacecraft (satellites), earth stations and other kinds of terminal equipment, launch services, insurance and industry financing, and technical personnel. Further, we discuss the Commission's policies regarding foreign entry into the United States, as well as U.S. companies' access to markets in foreign nations.

3. This *Third Report*, examines three sectors of the satellite communications industry: (1) fixed satellite services (FSS); (2) mobile satellite services (MSS); and (3) satellite digital radio service (SDARS).[2] With respect to the FSS sector, we find that, in some respects, the record contains insufficient information to allow us to make anything more than limited competitive findings and conclusions with respect to such key factors as satellite transponder capacity. Also, because of the limitations of the record before us, and because the evidence that is available has mixed implications, we cannot make meaningful findings at this time regarding the allegations of anticompetitive conduct made by resellers/integrators against FSS operator Intelsat. Yet, the complaints do raise sufficient public interest concerns to warrant additional analysis in a formal proceeding. Thus, we will initiate a follow-up proceeding to develop an adequate record that will allow for a more complete exploration of the anticompetitive issues raised. With respect to the MSS sector, we do not make specific findings regarding competition given that the MSS industry currently is undergoing major technological and structural changes. With respect to SDARS, we

[1] Amendment to Communications Satellite Act, Pub. L. No. 109-34, 119 Stat. 377 (2005), *codified at* 47 U.S.C. § 703. Our previous Reports were *Annual Report and Analysis of Competitive Market Conditions with Respect to Domestic & International Satellite Communications Services*, IB Docket No. 06-67, First Report, 22 FCC Rcd 5954 (2007) ("*First Report"*) and *Second Annual Report and Analysis of Competitive Market Conditions with Respect to Domestic & International Satellite Communications Services*, IB Docket No. 07-252, Second Report, 23 FCC Rcd 15170 (2008) ("*Second Report*").

[2] Because satellite-based multichannel video programming distributors (MVPDs) (*i.e.,* Direct-Broadcast Satellite (DBS) services) are discussed in another annual competition report to be issued by the Commission, *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, Notice of Inquiry*, MB Docket No. 07-269, Notice of Inquiry, 24 FCC Rcd 750 (2009) (*Video Competition Report*), we do not address DBS in this Report; *see also Assessment of the Status of Competition in the Market for the Delivery of Video Programming, Notice of Inquiry*, MB Docket No. 07-269, Supplemental Notice of Inquiry, 24 FCC Rcd 4401 (2009); *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, Notice of Inquiry*, MB Docket No. 07-269, Further Notice of Inquiry, 26 FCC Rcd 14091 (2011).

note that several services are emerging as possible competitive alternatives.[3] The record, however, is insufficient to support a finding with respect to the current state of competition involving these services and SDARS.

II. INTRODUCTION

4. Section 703(a) of the Act[4] directs the Commission to "review competitive market conditions with respect to domestic and international satellite communications services," and to provide Congress with reports analyzing these conditions on an annual basis.[5] Section 703(b) states that the report shall include: (1) an identification of the number and market share of competitors in domestic and international satellite markets; (2) an analysis of whether there is effective competition in the market for domestic and international satellite services; and (3) a list of any foreign nations in which legal or regulatory practices restrict access to the market for satellite services in such nation in a manner that undermines competition or favors a particular competitor or set of competitors.[6]

A. Sources of Information

5. This *Third Report* is based in part on information submitted by interested parties in response to Public Notices issued by the International Bureau (Bureau).[7] In addition to using these filings to reach our conclusions herein, we also relied upon a variety of 2008-2010 publicly-available sources of industry information and data including Securities and Exchange Commission filings; trade association and government data; securities analysts' and other research companies and consultants; company news releases and websites; newspaper and periodical articles; and various public Commission filings, decisions, Reports, and databases.[8]

B. Overview of the Satellite Communications Industry

6. Figure II.1 lists major suppliers to the FSS, MSS, and SDARS operators in the far left-hand segment, and shows broad types of outputs produced by satellite operators in the far right-hand segment.

[3] *See Applications for Consent to the Transfer of Control of Licenses XM Satellite Radio Holdings, Inc., Transferor, to Sirius Satellite Radio, Inc., Transferee*, MB Docket No. 07-57, Memorandum Opinion and Order, 26 FCC Rcd 10539 (Media Bur. 2011)(*XM Sirius Transfer Order*).

[4] 47 U.S.C. § 703(a). The Communications Satellite Act is 47 U.S.C. §§ 701 *et seq.*

[5] We have consolidated our annual analyses for 2008, 2009, and 2010 into this *Third Report*.

[6] 47 U.S.C. § 703(b).

[7] *See, e.g., International Bureau Invites Comment for Fourth Annual Report to Congress on Status of Competition in the Satellite Services Industry,* Public Notice, 25 FCC Rcd 10049 (Int'l. Bur. 2010) (*2009 Public Notice*). Although the *2009 Public Notice* states that it seeks information for the *Fourth Report*, this document will actually be the third Satellite Competition Report to be released by the Commission. Appendix A contains a list of commenters.

[8] *See, e.g.,* Annual Reports, 10-Ks, and Futron data for SES.

FIGURE II.1

Overview of Satellite Communications Industry

C. Technology and Sector Overview

7. For purposes of this *Third Report*, the satellite communications industry consists of those entities that supply communications services involving the use of satellite infrastructure, such as satellite space stations (space segment) and earth stations (ground segment). These entities, along with related industries such as satellite space and earth station manufacturing and the satellite launch industry, comprise the satellite communications industry and ultimately participate in the wholesale and retail industry segments defined below.

8. The primary providers of the space segment portion of satellite communications are FSS and MSS operators. FSS operators provide much of their service from satellites located in geostationary orbits.[9] In the United States today, SES Global (through its subsidiary SES World Skies) and Intelsat (the privatized successor to the intergovernmental organization INTELSAT) are the two principal FSS operators. FSS is also provided by a number of smaller operators, such as EchoStar, Eutelsat, Satmex, and Telesat. MSS operators provide service via geostationary and non-geostationary satellites, but the communication is with mobile, as opposed to fixed, earth stations. In the United States during the period covered by this *Third Report*, the primary MSS operators were Globalstar, DBSD (formerly ICO Global Communications), Inmarsat, Iridium Satellite, LLC (Iridium), TerreStar Corporation (TerreStar), ORBCOMM, and SkyTerra (now LightSquared).

[9] Satellites in geostationary orbit (GSO) operate approximately 22,300 miles above the equator, and appear to be fixed above a particular point on the Earth. Satellites operating in non-geostationary orbit (NGSO) appear to come and go over the horizon. Both GSO and NGSO satellites can provide FSS to fixed earth stations and MSS to earth stations in motion, such as earth stations mounted on vehicles.

9. The ground segment of satellite communications consists of earth stations that communicate with space stations and the companies that operate those earth stations. These companies include, among others, teleport operators (which often operate numerous fixed earth stations) and network service integrators (which often obtain blanket authorizations for Very Small Aperture Terminal earth stations (VSATs) to be integrated into larger communications networks).[10] Heavy users of satellite communications services such as media companies, oilfield companies, and nationwide retailers sometimes provide their own ground segment.

10. Table II.1 provides an overview of world revenues for communications satellite services from 2005 through 2010,[11] and shows that world revenues for fixed-satellite services have grown steadily since 2005.[12] In particular, revenues increased by 12.9 percent between 2005 and 2006; by 14.0 percent between 2006 and 2007; 11.5 percent between 2007 and 2008; 13.1 percent between 2008 and 2009; and 4.3 percent between 2009 and 2010. World revenues for MSS are comparatively small and growing at a modest rate. MSS revenues increased by 17.6 percent between 2005 and 2006; 5 percent between 2006 and 2007; 4.8 percent between 2007 and 2008; remained steady between 2008 and 2009; and increased by 4.5 percent between 2009 and 2010.

11. Beyond FSS and MSS, revenues for nascent services such as end-user fixed-satellite broadband services remain comparatively small, although those revenues increased by 25 percent between 2008 and 2009 and 10 percent between 2009 and 2010. Similarly, satellite radio or audio, described below,[13] showed substantial growth in recent years: 100 percent increase between 2005 and 2006; 31 percent between 2006 and 2007; 19 percent between 2007 and 2008; remained steady between 2008 and 2009; and increased 12 percent between 2009 and 2010. Such revenue growth rates are not unusual for new services where subscribership may grow rapidly from a small base in the early years following launch.

[10] VSATs are earth-based terminals for transmissions to and from satellites. VSAT earth station antennas are smaller than 3 meters in diameter. Most VSAT earth stations range from 0.75 meters to 1.2 meters in diameter, and their data rates typically range from 56 kilobits per second (kbps) to 4 Megabits per second (Mbps). VSATs are most commonly used to transmit narrowband data (such as for credit card transactions), broadband data (for Internet access), or, in the receive mode, for video.

[11] The data reported in Table II.1 are taken from "State of the Satellite Industry Report," page 13, dated June, 2011 (*2011 SIA Report*), prepared by the Futron Corporation for the Satellite Industry Association. This Report is available at www.sia.org/IndustryReport.htm.

World revenues for satellite video services (DBS and direct-to-home (DTH) satellite antenna service), although not included within the scope of this *Report*, are reported in Table II.1 for purposes of comparison to the world revenues for FSS and MSS. Some historical data in Table II.1 have been revised and may differ slightly from comparable data reported in the *First* and *Second Reports*.

[12] Separate revenue data for U.S. domestic and international fixed satellite services are not available because we do not ask satellite operators to provide separate domestic and international revenue data; in 1996, the Commission eliminated the distinctions in its regulations for domestic and international satellite services. *See Amendment to the Commission's Regulatory Policies Governing Domestic Fixed Satellites & Separate International Satellite Systems*, IB Docket No. 95-41, Report and Order, 11 FCC Rcd 2429 (1996). Some expert opinion, however, estimates that U.S. domestic revenues in recent years are approximately 20 to 25 percent of world revenues. Estimate supplied by Futron Corporation.

[13] *See* Section III, *infra.*

TABLE II.1

WORLD SATELLITE SERVICES REVENUES (IN BILLIONS OF U.S. DOLLARS) [14]

SERVICE	2005	2006	2007	2008	2009	2010
Consumer	**41.3**	**48.9**	**57.9**	**68.1**	**75.3**	**83.1**
Satellite TV (DBS/DTH)	40.2	46.9	55.4	64.9	71.8	79.1
Satellite Radio (DARS)	0.8	1.6	2.1	2.5	2.5	2.8
Consumer Satellite Broadband	0.3	0.3	0.4	0.8	1.0	1.1
Fixed	**9.3**	**10.7**	**12.2**	**13.0**	**14.4**	**15.0**
Transponder Agreements[15]	7.3	8.5	9.6	10.2	11.0	11.1
Managed Services[16]	2.0	2.2	2.6	2.8	3.4	3.9
Mobile (Voice and Data)	**1.7**	**2.0**	**2.1**	**2.2**	**2.2**	**2.3**
Remote Sensing	**0.5**	**0.4**	**0.4**	**0.7**	**1.0**	**1.0**
TOTAL	**52.8**	**62.0**	**72.6**	**84.0**	**93.0**	**101.3**

Notes: Numbers may not sum exactly due to rounding.

Definitions of the terms used in Table II.1 are included below.[17]

[14] Data replicated from Futron Corp., Satellite Industry Association, *State of the Satellite Industry Report* (June 2011)

[15] Includes capacity for DTH platforms.

[16] Includes VSAT; Space Flight Management Services included in Managed Services beginning in 2010.

[17] A transponder agreement is an agreement under which a satellite system operator provides its customer with transponders for sale or lease for full-time or occasional use. These transponders are typically used to provide video and radio services, data/business services, and telephone relay services. Transponder capacity or time is sometimes re-leased or re-sold, but revenues stated in Table II.1 above do not reflect companies, other than satellite operators, engaged in the re-sale or re-lease of transponders or brokering of transponder time and/or capacity.

Managed network services include satellite-based data communication networks that are operated by government, corporate, and other entities to provide a mix of data, voice and video communications to widely separate or remotely located facilities through a transponder or transponders, often using VSATs. These also include network services provided by satellite operators, teleport operators, and other major resellers, but not the sale of ground stations or related equipment.

Mobile service includes mobile satellite telephony and mobile satellite data services such as messaging and paging, but not the costs of the end-user equipment.

Consumer Satellite Broadband, in Table II.1, refers to broadband or high-speed Internet access services provided via satellite directly to fixed residential and small business users.

Remote sensing, in Table II.1, refers only to satellite imagery sales and closely related services, such as creating ortho-rectified scenes or other first-order processing, but does not refer to other value-added services or enabled products, such as Geographic Information Systems or cartography.

D. Report Methodology

12. Any analysis of the nature and extent of competition in an industry requires a framework that identifies pertinent questions; organizes, evaluates, and interprets data; and reaches logical conclusions that are consistent with empirical information. The traditional analytical industrial organization framework used is the Structure-Conduct-Performance (SCP) paradigm,[18] which hypothesizes that elements of market or industry structure (*e.g.*, barriers to entry, number of buyers and sellers, cost structure, product differentiation) influence firm conduct (*e.g*., pricing behavior, plant investment, research and development), which, in turn, determines observed market performance (*e.g*., the extent that static and dynamic economic efficiency is achieved in the utilization of resources). The Commission has used the SCP framework in its competition reports on the mobile wireless and multichannel video programming distribution industries to organize industry metrics and information,[19] but has not drawn conclusions about the causal relationships among the structure, conduct, and performance of these industries.

13. As we noted in the *First* and *Second Reports*, although section 703(b)(2) directs the Commission to analyze "whether there is effective competition in the market for domestic and international satellite services,"[20] the term "effective competition" is not defined in section 703 nor in the context of satellite services generally. We note as well that there is no definition of "effective competition" widely accepted by economists or competition policy authorities such as the U.S. Department of Justice.[21] In this *Third Report*, we evaluate the evidence on competition in the record and make appropriate finding for each sector of the satellite communications industry covered by this *Report*.

14. This *Report* recognizes several key attributes of the commercial satellite communications industry that have a direct influence on the nature of competitive rivalry and performance observed in the major industry segments. More specifically, the Fixed-Satellite sector is dominated by wholesale transactions.[22] In general, the commercial satellite communications industry is dominated by a relatively few sellers and relatively few buyers compared to most retail markets for consumer goods and services. Unlike mass market retail transactions which are often impersonal and executed pursuant to standard terms and conditions of sale and uniform pricing to all retail customers, wholesale transactions for satellite communications services are typically individually negotiated between the wholesale customer and the satellite operator. The pricing of satellite communications services is bilaterally negotiated and

[18] Classic references on the SCP paradigm include Joe S. Bain, *Industrial Organization* (2nd ed., John Wiley & Sons, Inc., New York, 1968), and F.M. Scherer & David Ross, *Industrial Market Structure & Economic Performance* at ch. 1 (3rd ed. Houghton Mifflin Co., Boston, 1990) (Scherer & Ross). A contemporary textbook reference is Dennis W. Carlton & Jeffrey M. Perloff, *Modern Industrial Organization* at 4 (4th ed., Addison-Wesley, Boston, 2005) (Carlton & Perloff). The paradigm was originally developed by Edward S. Mason at Harvard University in the 1930s and 1940s.

[19] *See, e.g., Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services*, WT Docket No. 05-71, Tenth Report, 20 FCC Rcd 15908 (2005) ("*Tenth CMRS Competition Report*"); *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, MB Docket No. 05-255, Twelfth Annual Report, 21 FCC Rcd 2503 (2006) ("*Twelfth MVPD Competition Report*").

[20] 47 U.S.C. § 702(b)(2).

[21] *See* Department of Justice and Federal Trade Commission *Horizontal Merger Guidelines*, (Aug. 19, 2010). *See also Ex Parte* Submission of the United States Department of Justice, *Economic Issues in Broadband Competition, A National Broadband Plan for Our Future*, GN Docket No. 09-51 at 11 (filed Jan.4, 2010).

[22] By contrast, markets for multichannel video distribution services and wireless telecommunications services reported on annually in separate Commission competition reports are principally retail industry segments with thousands, or even millions, of retail customers.

will often differ from one transaction to another and from one wholesale customer to another.

III. ORGANIZATION OF THE COMMERCIAL COMMUNICATIONS SATELLITE INDUSTRY

A. Output Definitions and Industry Segments in the Communications Sector

15. The first two *Satellite Competition Reports* described the concept of relevant markets (as adapted from antitrust law) by noting that a relevant market has product and geographic dimensions; once a relevant market has been described in those two dimensions, market participants (*i.e.*, competitors) can be identified.[23] Our further analysis of the satellite communications industry, however, has led us to revise what previous *Reports* described as "product markets".

16. Previous *Reports* described product market groups (*e.g.*, Network Services or Capacity for Video Contribution) as specific applications.[24] An application is a standard or pre-determined bundle, or bundle of attribute bundles, specifically tailored for the transponder requirements of a particular group of wholesale customers (*e.g.*, broadcast television networks or private corporate VSAT networks). It is industry practice to group these attribute bundles in terms of specific applications, *i.e.*, attribute bundles are grouped according to the specific business context and objective that the wholesale customer expects to achieve by leasing transponder capacity.

17. Although such application-oriented concepts broadly describe the services offered by satellite carriers, they obscure what the wholesale customer actually negotiates and then buys from a satellite communications operator. The following clarifies and extends the analysis of our previous *Reports* by discussing the nature of output produced and sold by FSS and MSS satellite operators to wholesale customers. This discussion provides a more detailed and realistic view of the factors that determine the extent of substitution possibilities available to wholesale customers when choosing the transponder capacity offered by competing satellite operators. This more detailed analysis supports our determination that substitution is a constraint on both the profitability and exercise of market power of satellite carriers.

18. Given the complex, multidimensional nature of differentiation of attribute bundles in satellite communications, it is difficult to make broad generalities about substitution possibilities between and among one attribute bundle for another supplied by different satellite operators. Moreover, there is an important temporal dimension to any potential substitution of one attribute bundle for another supplied by a competing satellite operator. For any specific footprint or satellite coverage area required by a wholesale customer, the availability of a substitute attribute bundle depends crucially on whether some other satellite operator presently has excess transponder capacity that will generate the desired characteristics for the desired coverage area. Since satellite operators attempt to negotiate long term transponder leases, the availability of transponder capacity at the required frequency band, power, and coverage at the desired orbital location may be quite limited, notwithstanding the availability of excess capacity in general on the satellite. In other words, the extent of substitutability of one attribute bundle for another supplied by a competing satellite operator will differ substantially over time as transponder leases expire and satellites in a specific orbital location are replaced with new capacity with different

[23] *First Report*, 22 FCC Rcd at 5963-75, at ¶¶ 24-63; *Second Report*, 23 FCC Rcd at 15173-77, at ¶¶ 13-24. As noted in earlier *Reports*, the industry segments delineated in this *Report* may not reflect the appropriate markets to be considered in other Commission proceedings, such as merger reviews, rulemakings, and other reports to Congress. *See e.g.*, *Second Report*, 23 FCC Rcd at 15174, at ¶ 13 n. 15.

[24] *First Report*, 22 FCC Rcd at 5963-75, at ¶¶ 24-63.

payloads and technical configurations. As a result, each wholesale customer must negotiate for its bundle of attribute bundles with the satellite operator, with the balance of negotiating power favoring either the customer or the operator depending on the unique substitution possibilities available at that specific instance in time.

19. Since beam coverage is a critical attribute of the definition of the output produced by a satellite carrier, the geographic dimension of an industry segment where substitutable transponder capacity of a given satellite operator may be found is necessarily implicit in the product itself. If, for example, a wholesale customer requires beam coverage of the entire continental United States, then the only relevant substitutable bundles of transponder attributes must be provided by satellite operators with excess transponder capacity with continental beam coverage.[25] A satellite operator with transponders covering exclusively the Atlantic Ocean region cannot provide a substitute bundle of transponder attributes for the continental United States and is not a participant in the industry segment delineated by the boundaries of the continental United States.

20. In summary, defining the output of the satellite communications industry in terms of attributes and characteristics provides a detailed, realistic description of what satellite operators actually offer for lease to both wholesale and retail customers and provides a realistic conceptual approach for assessing the extent of substitutability of the output of one satellite operator for the output of a competitor. Thus, to describe a product market group, as we did in previous *Reports*, solely in terms of a specific application only partially captures how the various combinations of the above-mentioned attributes can be substituted one for another. A clearer understanding of what a wholesale customer actually buys and what a satellite operator is willing to sell provides a more detailed and realistic view of the substitution possibilities – *i.e.*, substitutes for what the satellite operator can provide – available in industry segments for domestic and international wholesale satellite services. This in turn enables a clearer view of competition in the satellite communications services industry.

[25] For some applications, terrestrial fiber optic cables may provide an effective substitute bundle of attributes in the geographic area delineated by the required beam coverage.

1. Wholesale and Retail Industry Segments

TABLE III.1 INDUSTRY OUTPUTS
Wholesale Domestic Transponder Applications
Video Services
Network Services (fixed & mobile)
Retail Transponder Service Applications
Broadband Services (fixed & mobile)
Mobile Broadcast Services (audio & video)
Network Services (Emerging) (fixed & mobile)

21. To simplify terminology throughout this *Third Report*, the term "application" is used as a shorthand to distinguish among the different outputs produced and supplied by satellite operators within the fixed and mobile satellite sectors. It is emphasized, however, that any assessment of the degree of substitutability of one application for another requires a careful assessment of the elements of the bundle of attributes that comprise any particular application for any given customer.[26] Further, the term *transponder service* or *lease of capacity* will generally imply an application that is not differentiated in terms of any particular user or user group.

22. Table III.1 identifies the major industry segments within the fixed and mobile satellite communications sectors. These industry segments represent broad groups of transponder service applications supplied by satellite operators.[27] The foregoing discussion explains why each transaction between a satellite operator and a wholesale customer is likely unique given the multiple technical, supporting, and contractual attributes involved in every sale, describing bundles of attribute bundles in terms of specific applications simplifies an otherwise complex, multi-dimensional, and technical description of the output produced and supplied by satellite operators to their wholesale customers. As noted previously, the geographic dimension of the industry segments is intrinsic to any particular application, since transponder coverage varies dramatically depending on the particular configuration of power, bandwidth, and antenna type.[28]

[26] Since the bundle of attributes comprising any given application will differ from one wholesale customer to the next, it is essential that the specific attributes of the customer are recognized in assessing the extent of substitutability of one application for another.

[27] The industry segments roughly correspond to groupings of applications offered by satellite operators in the contemporary satellite communications industry.

[28] The wholesale industry segments identified in Table III.1 do not necessarily represent a "relevant market" delineated from an antitrust perspective following the methodology of the U.S. Department of Justice and Federal (continued….)

23. The wholesale industry segments identified in Table III.1 differ from the retail segments in several important ways. In wholesale segments, each customer negotiates a transponder lease individually with the satellite carrier that is specifically tailored to the customer's requirements. By contrast, in retail segments, a satellite carrier, such as Wild Blue, for example, offers its end-user retail customers a pre-determined, fixed bundle of attributes at a fixed, uniform price. Nevertheless, we find that the framework for wholesale industry segments also reasonably applies to retail industry segments. In other words, viewing commercial satellite services as consisting of a bundle of attributes that provide characteristics to a consumer is a realistic way to view services provided to retail and wholesale consumers.

24. In both the *First* and *Second Reports*, transponder service applications were classified as domestic and international. For this *Third Report*, generally, we omit this distinction except where appropriate. Depending on the quantity of transponder bandwidth allocated to a given application and the transponder's coverage area, the same physical transponder may be used simultaneously to transmit and receive signal paths that include both domestic and international traffic. Additionally, some satellite operators are adding capacity, either owned or leased, to increase their span of coverage and becoming, in effect, global satellite systems despite their origins as domestic or regional satellite operators. The notion of domestic versus international satellite communication services as an operational business distinction is becoming less clearly drawn compared to earlier phases of industry evolution.[29] Further, in 1996, the Commission eliminated the regulatory dichotomy between the provision of international and domestic satellite services.[30]

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Trade Commission, *Horizontal Merger Guidelines* (August 19, 2010), available at http://www.justice.gov/atr/public/guidelines/hmg-2010.pdf.

Determining the relevant product and geographic markets in a horizontal merger case is specific to the unique factual circumstances of the proposed transaction. The relevant product and geographic markets in a different but similar proposed merger in the same broad industry may be quite different but appropriate for analyzing competitive effects given the specific facts of the case.

A purpose of antitrust market definition is to assist in the analysis of the probable incremental effects on competition resulting from a proposed horizontal merger. Our purpose here, however, is the assessment of the state of competition. For this purpose, our delineation of industry segments is appropriate and useful in our assessment of the state of effective competition.

Precise delineation of product and geographic markets is not necessarily crucial to assessing the extent of competitive rivalry prevailing in a given industry. What is essential is the identification of forces or factors that effectively constrain the conduct of the firm so that anticompetitive behavior harmful to consumers is deterred. This point is clearly explained in Franklin M. Fisher, John J. McGowan & Joen E. Greenwood, *Folded, Spindled & Mutilated: Economic Analysis & U.S. vs. IBM* at ch. 2, esp. 24-33 (MIT Press, Cambridge MA, 1983). A similar perspective is reflected in Professor Michael Porter's "five competitive forces" methodology for analyzing competition and formulating competitive strategy for a given industry. *See* Michael E. Porter, *On Competition* at 3-35 (chapter 1, titled *The Five Competitive Forces That Shape Strategy*) (Harvard Bus. School Pub. Corp., Boston, 2008).

[29] The notions of domestic and international satellite communication services were significant and important for business and operational purposes prior to the privatization of Intelsat and Inmarsat, which were organized as international cooperative organizations to provide international satellite connectivity between and among nations that were parties to the treaties establishing both organizations. Nevertheless, given the coverage of some Intelsat satellites in the geostationary arc, Intelsat, even prior to privatization, offered domestic transponder services to some member nations.

[30] *Amendment to the Commission's Regulatory Policies Governing Domestic Fixed Satellites and Separate International Satellite Systems, and DBSC Petition for Declaratory Rulemaking Regarding the Use of Transponders to Provide International DBS Service*, IB Docket No. 95-41, Report and Order, 11 FCC Rcd 2429 (1996) ("*DISCO I* (continued….)

25. The following discussion describes the wholesale industry segments listed in Table III.1 and the telecommunications entities (in addition to satellite operators) that offer possible competitive alternatives with varying degrees of potential substitutability. These descriptions are in many respects similar to the framework of previous *Reports*,[31] but we provide more detailed descriptions of segments that are changed or new. It is still true, as at the times of past *Reports*, that the ability of each satellite-based participant to compete in a segment will depend on the coverage areas of its satellites;[32] and that some telecommunications entities in some segments use technologies other than satellites.[33]

a. Wholesale

26. Video Contribution Applications. This segment consists of offering point-to-point transponder capacity for full-time contribution to, or occasional use by, providers of media services within the United States.[34] Satellite-based participants in this segment include FSS satellite operators (most notably Intelsat and SES); teleport operators; resellers; other specialized program providers engaged in occasional use for satellite news gathering; EchoStar; large media entities (*e.g.*, CBS) which self-supply some capacity; and all foreign-licensed FSS operators permitted to serve the U.S. market, either through an earth station license or by inclusion on the Commission's Permitted Space Station List ("Permitted List").[35] Other participants in this segment, on certain specific routes, are providers of wireline communications transmission services such as Level 3, AT&T, and Verizon.

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Order") (adopting policy permitting all U.S.-licensed FSS, MSS, and DBS systems to offer both domestic and international services, removing "outdated" regulatory barriers to greater competition in satellite communications services by eliminating distinction between U.S. domestic and separate satellite systems and allowing both space- and earth-segment operators to provide both domestic and international services).

[31] *First Report*, 22 FCC Rcd at 5963-75, at ¶¶ 25-62; *Second Report*, 23 FCC Rcd at 15173-77, ¶¶ 13-24.

[32] *See, e.g.*, Comments of Microcom, filed August 20, 2010 (Microcom Comments) (describing the coverage issues of Alaska and Hawaii).

[33] *First Report*, 22 FCC Rcd at 5966, ¶ 35; *Second Report*, 23 FCC Rcd at 15174, ¶ 16.

[34] By the terms "contribution" or "video contribution" in this context, we mean the transmission of news, sports, and other video programming from various remote locations to central video production studios. *See Constellation, LLC & Intelsat Holdings, Ltd., Application for Transfer of Control of PanAmSat Licensee Corp.*, IB Docket No 05-290, Memorandum Opinion and Order, 21 FCC Rcd 7368, 7376, ¶ 35 (2006); *First Report*, 22 FCC Rcd at 5968, ¶ 37.

[35] The Commission's Permitted List denotes all satellites providing Fixed-Satellite service in the "conventional C- and/or Ku-bands (*i.e.*, 3700-4200/5925-6425 MHz and/or 11.7-12.2/14.0-14.5 GHz), with which U.S. earth stations within routinely authorized technical parameters are permitted to communicate without additional Commission action, provided that those communications fall within the same technical parameters and conditions established in their earth stations' original licenses. *See Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic & International Satellite Service in the United States*, IB Docket No. 96-111, First Order on Reconsideration, 15 FCC Rcd 7207, 7213-16, ¶¶ 13-20 (1999). An unofficial list of satellites on the Permitted Space Station List is available at http://www.fcc.gov/ib/sd/se/permitted. html (visited Sept. 12, 2011). *See, e.g., Telesat Canada, Petition for Declaratory Ruling for Inclusion of ANIK F1 on the Permitted Space Station List*, DA 00-2835, 15 FCC Rcd 24828 (2000); *Telesat Canada, Petition for Declaratory Ruling for Inclusion of ANIK F2 on the Permitted Space Station List & Petition to Serve the U.S. Market Using Ka-band Capacity on ANIK F2*, DA 02-3490, 17 FCC Rcd 25287 (2002). In 2010, the Commission extended Permitted List treatment to non-U.S. licensed satellites providing fixed-satellite service in the conventional Ka-band (18.3-18.8 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz and 29.25-30.0 GHz). *See 2006 Biennial Regulatory Review – Revision of Part 25 Establishment of a Permitted List Procedure for Ka-band Space Stations*, FCC 10-20, 25 FCC Rcd 1541 (2010).

27. Video Distribution Applications. Video Distribution is the point-to-multipoint transmission of entertainment and news content between points within the United States. Participants in this industry segment include FSS operators; EchoStar; some local and regional teleports; the large media entities and terrestrial providers mentioned above; and all foreign-licensed satellite operators permitted to provide point-to-multipoint video transmissions in the United States.

28. Network Services Applications. Wholesale Network Services consist of the provision of point-to-point telecommunications transmissions to telecommunications operators and corporate users. This group of applications consists of two components. The first component is backbone capacity used for point-to-point trunking for voice, data, or Internet traffic; "backhaul" of communications services;[36] and redundancy and restoration of communications services when primary technologies fail. Participants in this component of the network services applications industry segment include U.S.-licensed and non-U.S.-licensed FSS satellite operators permitted to serve the United States; some teleport operators; resellers of satellite capacity; terrestrial wireline and wireless carriers where they have network facilities; some self-supplying carriers and government users; and "network integrators" (*i.e.*, companies that supply their retail customers with network services).

29. The second component consists of other fixed communications services between points within the United States, such as specialized voice and data services that a business uses to communicate between offices or between a location and many remote locations. These services may have steady or sporadic traffic patterns and may or may not be IP-based, symmetrical, and narrowband or broadband. Participants in this segment include U.S.-licensed FSS operators and those non-U.S.-licensed FSS satellite operators permitted to serve in the United States; several VSAT companies (including Hughes, iDirect, Gilat, Spacenet,[37] and ViaSat); Globalstar;[38] some teleport operators; the terrestrial participants described above; and some self-supplying military users and large enterprises.

30. The wholesale Network Services Applications industry segment also includes MSS. Traditionally, only MSS was used for point-to-point mobile applications (such as in trucks, airplanes, or ships); in some cases, however, new technology has made commercially available FSS applications competitive with MSS applications.[39] MSS providers include Iridium (acquired by GHL),[40] SkyTerra, Globalstar,[41] and Inmarsat.[42]

[36] We define "backhaul" as transmitting between a remote site or network and a central or main site, usually over a high capacity line and for purposes of efficient network management.

[37] Comments of Spacenet Inc., filed August 23, 2010 (Spacenet Comments) at 2.

[38] Comments of Globalstar Licensee, LLC, filed August 24, 2010 (Globalstar Comments) at 9 (asset tracking and fleet management).

[39] As the MSS/ATC Coalition notes, providers of MSS face intense competition from a variety of sources including FSS applications. Specifically the MSS/ATC Coalition notes that as a result of regulatory changes and technological developments, operators in FSS bands are now deploying mobile voice and broadband services to VSAT terminals that compete directly with services provided by satellite networks that operate in spectrum allocated only for MSS. Comments of MSS/ATC Coalition, filed June 15, 2009 at 11.

[40] *See generally* Comments of Iridium Satellite LLC, filed August 23, 2010 (Iridium Comments) at 1.

[41] *See generally* Globalstar Comments.

[42] TerreStar and ICO MSS companies are pre-operational but have launched satellites and are currently testing and developing MSS and Ancillary Terrestrial Component systems.

b. Retail

31. Fixed-Satellite Broadband Applications. In this *Third Report*, we describe an industry segment of Fixed-Satellite Broadband Applications with a local geographic aspect.[43] Fixed-Satellite Broadband Applications consist, as in past *Reports*, of point-to-point high-speed (or broadband) fixed-satellite Internet access service provided, for a fee, directly to retail consumers in the United States.[44] Previous *Reports* have referred to Fixed-Satellite Broadband Service by providers such as WildBlue, Hughes, and Starband (a subsidiary of Gilat Satellite Networks);[45] and, at the time of previous *Reports*, most satellite-based broadband service had a significantly lower bit-rate and higher price than broadband service provided by terrestrial carriers such as local exchange carriers (LECs), cable operators, and mobile wireless firms, such as Sprint and T-Mobile. These conditions continued in 2008, 2009, and 2010.

32. Table III.2 below provides an overview of the service offerings of three established satellite broadband operators.

TABLE III.2

COMPARISON OF SATELLITE-BASED BROADBAND OFFERINGS[46]

U.S. Satellite Broadband	Hughes	StarBand	WildBlue
Upload speeds	200 kbps to 300 Kbps	100 kbps to 256 kbps	128 kbps to 256 kbps
Download speeds	1.0 Mbps to 2.0 Mbps	512 kbps to 1.5 Mbps	512 kbps to 1.5 Mbps
Monthly service price	$50 to $100	$50 to $100	$50 to $80 (1st 24 months)
Consumer equipment costs	$10 per/month	$0 (with rebate)	variable
Installation costs	$150	$0 (with rebate)	variable

33. Mobile Broadcast Applications - Audio. Our *First Report* defined satellite digital radio service (SDARS) as an industry segment with a nationwide geographic scope.[47] The *Second Report* deferred discussion of SDARS until the Commission's decision regarding the merger of the two SDARS providers, XM and Sirius.[48] That Commission decision, released after its *Second Report*, reviewed a large amount of conflicting evidence about whether SDARS was a product market unto itself or part of a

[43] *First Report, 22 FCC Rcd* at 5972-73, ¶¶ 53.

[44] *First Report*, 22 FCC Rcd at 5972, ¶ 52; *Second Report*, 23 FCC Rcd at 15176, ¶ 22.

[45] *See, e.g., Second Report*, 23 FCC Rcd at 15176, ¶ 22.

[46] Data compiled by Futron from company websites. Websites last visited December 8, 2011.

[47] *First Report, 22 FCC Rcd* at 5972-73, ¶ 53.

[48] *Second Report*, 23 FCC Rcd at 15171, ¶ 4.

large market consisting of AM and FM radio and perhaps other portable audio technologies. The decision found the evidence inconclusive and, for purposes of reviewing the proposed merger, assumed a product market consisting of only SDARS, and a national geographic market.[49] For purposes of this *Third Report,* we define Mobile Broadcast Applications – Audio as an industry segment that offers retail consumers subscription services for audio-form content such as music, news, information, and other entertainment delivered to the consumer on a mobile basis. At present, the only entity providing such services is SiriusXM. Thus, this *Third Report* follows the Commission's approach towards the SiriusXM merger by including only one radio service in this industry segment – SDARS – which is currently populated by one firm – SiriusXM.

34. Mobile Broadcast Applications - Video. Our *Second Report* noted the possible emergence of a domestic retail segment for satellite-based Mobile Video Broadcasting to hand-held terminals for a fee.[50] Today, mobile video broadcasting, by both satellite and terrestrial wireless technologies and to both hand-held and in-vehicle receivers, is being offered. Satellite-based service installed in vehicles is offered by SiriusXM,[51] terrestrial wireless carriers offer service via Apple's iPhone,[52] MobiTV, [53] AT&T and RaySat Broadcasting,[54] and other devices. Domestic television broadcasters may also offer a similar mobile service on a significant scale.[55] We therefore define a retail industry segment of Broadcast Services – Video, which offers retail consumers characteristics such as music, news, information, and other entertainment while on the move and in video and audio form. Because most of these services are offered nationwide and consist of nationally-oriented content (as opposed to local broadcasts), the geographic aspect of this industry segment is nationwide.

35. Network Services Applications – Emerging Industry Segment. Several companies offer satellite-based network telecommunications services. Iridium and Globalstar, for example, offer mobile voice and data services.[56] In 2008, 2009, and 2010, these services did not functionally resemble the popular cellular and PCS Commercial Mobile Radio Services (terrestrial CMRS) of terrestrial mobile providers, principally because their handsets were significantly larger. Also, the satellite services' prices were significantly higher than terrestrial CMRS and their marketing was primarily to business and public safety users and persons in remote areas. The demand for such services by retail consumers was thus small in the years covered by this *Third Report*.

[49] *XM Satellite Radio Holdings Inc.*, MB Docket No. 07-57, Memorandum Opinion and Order and Report and Order, 23 FCC Rcd 12348, 12367-73, ¶¶ 37-49 (2008).

[50] *Second Report*, 23 FCC Rcd at 15176, ¶ 23.

[51] http://www.siriusxm.com/backseattv (visited Aug. 21, 2011).

[52] *The mobile video adoption still lags compared to other mobile media formats*, Communications Daily (Comm. Daily) at 9 (Jan. 12, 2009).

[53] *get mobitv*, http://www.mobitv.com/gettv/?utm_source=google&utm_medium=cpc&utm_term=mobile+video&utm_campaign=mobitv_northeast (visited Sept. 21, 2011).

[54] The CruiseCast service offered by AT&T in partnership with RaySat Broadcasting was launched and cancelled in 2009. *See* http://www.engadget.com/2009/11/03/atandt-cruisecast-satellite-service-halts-activations-will-refund/ (visited Sept. 21, 2011).

[55] Josh Wein, *Broadcasters Herald New Era with Mobile DTV Standard*, Comm. Daily at 2 (Oct. 16, 2009); *Timing of Mobile DTV Device Rollout Unclear, Says Sinclair CEO*, Comm. Daily at 3 (Aug. 6, 2009).

[56] *See, e.g.*, Globalstar Comments at 4.

B. Output Suppliers

1. FSS Operators

a. Facilities-Based FSS Operators

(i) Overview

36. As noted above, FSS service is provided by satellites to fixed locations on the Earth. Some fixed-satellites operate from a geostationary orbit while others operate from a non-geostationary orbit. The primary frequency operating bands are shown in Table III.3. FSS operators that wish to provide service to or from the United States are required to be licensed by the Commission, but FSS operators are not required to be regulated as common carriers or broadcasters and generally deal with their customers on an individualized basis.

TABLE III.3

PRIMARY DOMESTIC GSO FSS BANDS[57]

Space-to-earth (GHz)	Earth-to-space (GHz)	Band Designation
3.7–4.2	5.925–6.425	C-band
3.625-3.700	5.85-5.925 6.425-6.700	Extended C-band (international use only)
11.7–12.2	14–14.5	Ku-band
10.7-11.7	12.7-13.25 13.75-14.00	Extended Ku-band (international use only)
18.3–18.8 19.7-20.2	28.35-28.6 29.5-30.0 29.25-29.5	Ka-band (GSO)
18.8-19.3	28.6-29.1	Ka-band (NGSO)

37. FSS operators are the largest satellite operators, and the FSS sector is dominated by Intelsat and SES. The global fixed-satellite industry is comprised of approximately 40 commercial firms[58] – with fleet sizes that range from one to fifty-four satellites – that generally serve historically determined geographic areas.[59] For example, Intelsat has a strong North American presence while SES has historically primarily served Europe. But both firms can reach almost all the world's markets and

[57] Source: FCC staff.

[58] The 40-firm estimate is given in Euroconsult, *Company Profiles, Analysis of FSS Operators* (2010).

[59] Intelsat states that its fleet is comprised of 52 satellites. *See* http://www.sbv.spacenews.com/satellite_telecom/110318intelsat-signs-for-mdas-satellite-refueling-service.html (visited Mar. 11, 2011).

have expanded their international presence by either placing new satellites over new locations or purchasing extant ones. The global reach of Intelsat and SES stands in contrast to the largely regional reach of most other FSS operators.

38. Table III.4 shows the four largest satellite companies by revenue. These four firms accounted for approximately 50 percent of FSS global industry revenues in 2007,[60] and 42 percent in 2010.

TABLE III.4

TOP FOUR FSS OPERATORS, GLOBAL REVENUES, 2007-2010[61]

Firm Name	Satellites in Fleet	Total Revenue (billions US$)			
		2007	2008	2009	2010
Intelsat	52	2.2	2.4	2.5	2.5
SES	34	2.4	2.3	2.2	2.3
Eutelsat	24	1.2	1.3	1.3	1.6
Telesat	12	0.7	0.6	0.8	0.8
Total 4-Firm Revenues[62]		6.5	6.6	6.8	7.2
Total Industry Revenues[63]		13.0	14.5	16.4	17.1
4-Firm Share		50%	46%	42%	42%

[60] Data from Space News, *List of Top Fixed Satellite Operator* (June 30, 2008).

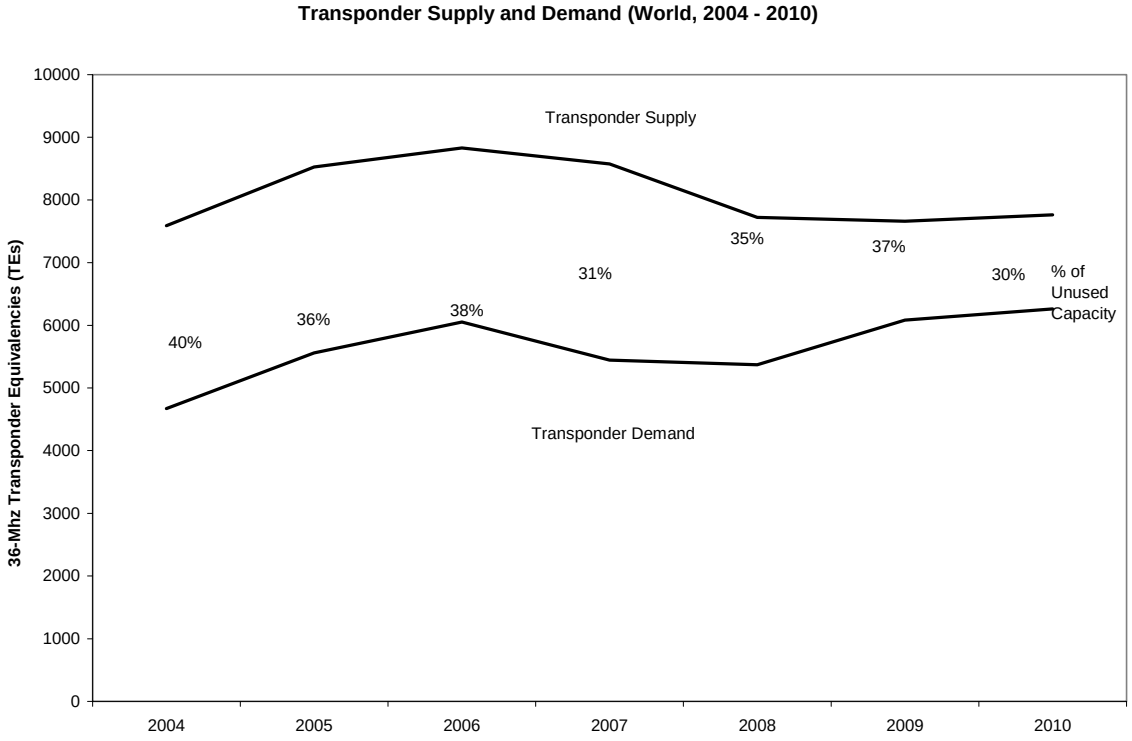
[61] Data from company reports and 10-K filings, then converted to US dollars using the average annual exchange rate for the original currency. Total industry revenues from Futron, p.13 http://www.sia.org/PDF/2011%20State%20of%20Satellite%20Industry%20Report%20(June%202011).pdf.

[62] Includes revenue from transponder sales and managed networks.

[63] Data replicated from Table II.1, Worldwide Communications Satellite Service Revenues, Line 1, Fixed (all categories of service).

Worldwide, the fixed satellite industry has significant unused capacity. The annual levels of worldwide unused capacity for the years from 2003-2010 are given in Figure III.1.

FIGURE III.1[64]

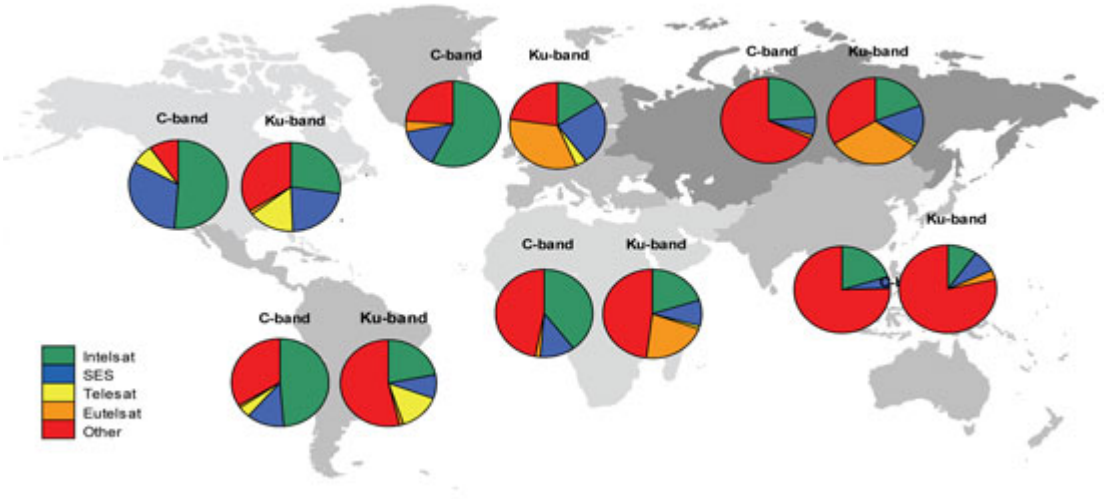


[64] Source: Futron Corporation.

39. Capacity varies by region. Figure III.2 shows worldwide capacity in C-band and Ku-bands by geographic region.

FIGURE III.2

GEO Commercial FSS Satellite Capacity Supply Distribution 10/2010[65]



(ii) Facilities-based Communications Satellite Operators, North America

40. The North American industry segment is broken into C- and Ku-bands.[66] In the C-band, Intelsat provides 55 percent of satellite capacity, SES 32 percent, Telesat 5 percent, and other smaller suppliers provide 8 percent.[67] In the Ku-band, Intelsat provides 27 percent of capacity, SES 22 percent, Telesat 13 percent, Eutelsat 3 percent, and other smaller suppliers provide 35 percent.[68] The data are summarized in Table III.5.

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[65] Data from *2010 Futron Forecast of Global Satellite Services Demand Overview 2010 Supply/Utilization, available at* http://www.futron.com/2010_Futron_Forecast_Supply_Utilization.xml.

[66] Data extrapolated from Futron Forecast at 4.

The C- and Ku- bands are among the bands most commonly associated with fixed satellite services. Broadcast television networks find C-band frequencies useful because C-band frequencies are less susceptible to weather interference and can provide coverage to a large geographic area, given the large dish size required to transmit on this frequency. Ku-band transponders operate at higher frequencies than C-band transponders and can, therefore, communicate with smaller dishes and offer more flexibility for customers. The military primarily uses Ku-band satellites because the dishes offer more mobility and are less conspicuous than C-band satellite dishes, and satellite television companies use this band to provide service. The Ku-band is also used to provide backup for corporate enterprise networks and for point-of-sale retail transactions, through VSAT networks.

[67] All percentages are approximations based on Figure III.2 of this *Report*.

[68] *Id.*

TABLE III.5

FSS FACILITIES-BASED OPERATORS SUPPLYING TRANSPONDER CAPACITY FOR DOMESTIC INDUSTRY SEGMENTS IN NORTH AMERICA
(percentages are approximate)[69]

	C-band Capacity (% of total)	Ku-band Capacity (% of total)
Intelsat	55	27
SES	32	22
Eutelsat	-	3
Telesat	5	13
Other	8	35

b. Non-Facilities-Based Communications Satellite Operators

41. In addition to the large suppliers such as Intelsat and SES, specialized service in the form of "enterprise" packages are offered by firms that lease existing satellite bandwidth and combine it with fully managed, end-to-end communications infrastructure. These firms serve government and corporate clients (*e.g.,* U.S. Army, Federal Bureau of Investigation, commercial shipping) that need communications in "thin" markets, *e.g.* Iraq, or need to extend the reach of their corporate networks.

42. Value-added resellers of this type include CapRock, Globecomm, Artel, and Segovia. CapRock was purchased for $525 million by the Harris Corporation on July 30, 2010. Harris Corporation is an international communications and information technology company whose principal customer is the United States government (particularly the Department of Defense and intelligence community), and earned over $5 billion in 2010, 76 percent of which was derived from government contracts.[70] Globecomm Systems Inc. is a publically-traded corporation that provides satellite-based communications infrastructure and managed networks and, in 2010, earned revenues of $227 million.[71] Artel also provides managed network solutions and, in 2008, earned revenues of approximately $215 million.[72] Segovia, Inc. is a wholly-owned subsidiary of Inmarsat.

2. MSS Operators

43. Currently, there are several frequency bands allocated for MSS: the L-band, the 2 GHz MSS band, and the Big and Little LEO bands. Voice and data services are permitted in the L-band, Big

[69] Data extrapolated from Futron at 4. The data are extrapolated from Figure III.2 of this report. The numeric data was derived by estimating the area of the given circle, where the areas depict market share, for C-band and Ku-band transponders covering North America.

[70] Harris Corporation, 10-K, 2010, http://investing.businessweek.com/research/stocks/financials/drawFiling.asp?docKey=136-000095012310082207-7O0J80FPJV1QRIAOHOOC9TLGHF&docFormat=HTM&formType=10-K.

[71] http://phx.corporate-ir.net/phoenix.zhtml?c=77373&p=irol-fundsnapshot.

[72] http://www.artelinc.com/frameset.htm.

LEO band and 2 GHz bands. The Little LEO band is limited to non-voice services.[73] Below, we review each of these frequency bands and provide a brief history in addition to discussing current licensees and operators in each band.[74]

TABLE III.6

MSS SYSTEMS PROVIDING DOMESTIC SERVICES[75]

	Frequency Band	Spectrum Bandwidth (MHz)	ATC Status	Satellite Type
LightSquared	L-band	26-30*	ATC	GSO
Inmarsat	L-band	26-30*		GSO
TerreStar	2 GHz	20	ATC	GSO
DBSD	2 GHz	20	ATC	GSO
Iridium	Big LEO	8		NGSO
Globalstar	Big LEO	25	ATC	NGSO
Orbcomm	Little LEO	3		NGSO

* LightSquared and Inmarsat share the L-band over North America, and their respective shares of bandwidth are governed by their December 2007 agreement. A small amount of the North American L-band is used by Mexican and Russian MSS operators.

a. MSS Frequency Bands[76]

(i) L-band

44. We license MSS operations in the 1525-1559 MHz and 1626.5-1660.5 MHz segments of the L-band, and Inmarsat and LightSquared are the two L-band satellite operators currently providing

[73] 47 C.F.R. § 25.142(b)(i).

[74] In 2003, the Commission adopted a Report and Order that permits MSS licensees (except in the Little LEO band) to provide Ancillary Terrestrial Component (ATC) to their mobile satellite systems using spectrum in certain portions of the MSS bands. *See generally* Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz band, the L-band, and the 1.6/2.4 GHz bands, *Report and Order and Notice of Proposed Rulemaking*, IB Docket No. 01-185, Order on Reconsideration, 18 FCC Rcd 1962 (2003) (*ATC Report and Order*), *modified sua sponte by Order on Reconsideration*, 18 FCC Rcd 13590 (2003), *reconsidered in part in Memorandum Opinion and Order and Second Order on Reconsideration*, 20 FCC Rcd 4616 (2005), *further recon. pending*. ATC consists of terrestrial base stations and mobile terminals that re-use frequencies assigned for MSS operations. To obtain ATC authority, an MSS operator must first satisfy certain "gating criteria," which collectively refers to the Commission's prerequisites that an MSS operator must demonstrate that it will satisfy in order obtain ATC authority. *ATC Report and Order*, 18 FCC Rcd at 1964-65, ¶¶ 1-2.

[75] Source: FCC licensing records.

[76] Ninety megahertz of MSS spectrum has been identified as potentially available for terrestrial broadband use. *National Broadband Plan* at 87. The 90 megahertz is comprised of 40 megahertz from each of the L-band and 2 GHz MSS allocations, and 10 megahertz from the Big LEO allocation. *Id.* The Plan at 88 also states, "At the same time, the FCC must take care to ensure that the MSS market continues to provide public safety and government users with mission-critical satellite capabilities."

service in the United States.[77] LightSquared has been granted ATC authority, while Inmarsat has not requested ATC authority. We discuss these operators in more detail below.

(a) Inmarsat

45. Inmarsat began as an inter-governmental organization created in 1978 to develop a global maritime satellite system to meet commercial maritime and safety communications needs of the United States and other foreign countries. That organization was privatized on April 15, 1999, and, in 2000, Congress enacted the ORBIT Act, which, among other things, specified a number of criteria for determining whether privatization was pro-competitive.[78] On October 9, 2001, the Commission released an Order in which it concluded that privatization was consistent with the non-IPO (initial public offering) requirements of the ORBIT Act.[79]

46. Inmarsat currently has 11 satellites in 9 orbital locations, including three satellites in Inmarsat's I-4 constellation.[80] In the United States, Inmarsat space segment was initially used primarily for the provision of maritime mobile satellite service (MMSS) in portions of the L-band. The Commission has also authorized use of Inmarsat space segment for the provision of domestic MSS, including land mobile satellite service.[81] The Commission has also authorized certain aeronautical mobile uses.[82]

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[77] Throughout this *Report*, we generally refer to LightSquared and its predecessors in interest all as "LightSquared," unless otherwise indicated. LightSquared predecessors in interest include SkyTerra Communications, Inc. (SkyTerra), Mobile Satellite Ventures (MSV), Motient Services Inc. and American Mobile Satellite Company (AMSC). The initial L-band license currently held by LightSquared was issued in 1989. *Order and Authorization*, FCC 89-183, Memorandum Opinion, Order and Authorization, 4 FCC Rcd 6041 (1989), *remanded by Aeronautical Radio, Inc. v. FCC*, 928 F.2d 428 (D.C. Cir. 1991); *Final Decision on Remand*, 7 FCC Rcd 266 (1992); *aff'd*, *Aeronautical Radio, Inc. v. FCC*, 983 F.2d 275 (D.C. Cir.1993); *see also* AMSC Subsidiary Corporation, *Memorandum Opinion and Order*, FCC 93-243, Memorandum Opinion and Order, 8 FCC Rcd 4040 (1993).

[78] Open-Market Reorganization for the Betterment of International Telecommunications Act, Pub. L. No. 106-180, 114 Stat. 48 (2000), *as amended*, Pub. L. No. 107-233, 116 Stat. 1480 (2002), *as amended*, Pub. L. No. 108-228, 118 Stat. 644 (2004), *as amended*, Pub. L. No. 108-371, 118 Stat. 1752 (Oct. 25, 2004), *as amended*, Pub. L. No. 109-34, 119 Stat. 377 (July 12, 2005).

[79] *Comsat Corp.*, FCC 01-272, Memorandum Opinion, Order and Authorization, 16 FCC Rcd 21661 (2001) (*Comsat Order*).

[80] Inmarsat plc, Annual Report and Accounts 2009, http://www.inmarsat.com/Downloads/English/Investors/Inmarsat_Annual_Report_2009.pdf, p. 2. *See also*, http://www.inmarsat.com/About/default.aspx. The I-4 series provide mobile broadband services and are 60 times more powerful than the I-3 series. They were first launched in 2005 and are anticipated to continue in commercial operation until about 2020. In August 2010, Inmarsat announced a contract with Boeing to build a constellation of three I-5 satellites. The I-5 satellites will operate in the Ka-band, with operations expected to start in 2014, and will enable Inmarsat to provide a global high speed mobile broadband service offering. *See* Press Release: "Inmarsat announces $1.2bn investment in next generation Ka-band satellite network," August 6, 2010, http://www.inmarsat.com/About/Newsroom/Press/00036066.aspx.

[81] *See Comsat Corporation et al*, Memorandum Opinion, Order and Authorization, 16 FCC Rcd 21661 (2001) (*Comsat Order*).

[82] In October 1989, amendments to the Inmarsat Convention and Operating Agreement allowed the organization to provide aeronautical services in addition to maritime services. *See also Provision of Aeronautical Services via the Inmarsat System*, CC Docket No. 87-75, 13 FCC Rcd 21155 (1998).

(b) LightSquared[83]

47. In 1987, the Commission determined that the available L-band spectrum could support only one U.S. space station licensee in addition to the then intergovernmental Inmarsat. The Commission directed the U.S. applicants in the L-band processing round to form a consortium.[84] Subsequent to this directive, LightSquared's predecessor in interest, AMSC, was formed, and in 1989 the Commission granted AMSC authority to construct, launch, and operate a three-satellite geostationary-satellite MSS system to operate in 28 MHz of L-band spectrum (14 MHz in each transmission direction).[85] AMSC was authorized to operate only in portions of the L-band, subject to international coordination.[86]

48. Since 1996, LightSquared has provided service covering North America via two geostationary satellites[87] that provide voice and low-speed data services to customers, including: (1) land-based applications (*e.g.*, voice, asset tracking); (2) maritime applications; and (3) government applications (*e.g.*, disaster relief).[88]

49. In 2003, in an effort to provide MSS providers greater flexibility in the delivery of their services by enabling them to integrate ATC into their MSS networks,[89] the Commission adopted ATC rules. The Commission stated that allowing ATC would, among other things, enhance MSS spectrum efficiency, expand the consumer market for MSS, lower consumer prices, increase competition, and enable operators to offer a single consumer device that could communicate with both the satellite and terrestrial network.[90] In 2004, LightSquared was granted ATC authority to operate facilities providing

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[83] Throughout this *Report*, we generally refer to LightSquared and its predecessors in interest all as "LightSquared," unless otherwise indicated. LightSquared predecessors in interest include SkyTerra Communications, Inc. (SkyTerra), Mobile Satellite Ventures (MSV), Motient Services Inc. and American Mobile Satellite Company (AMSC). The initial L-Band license currently held by LightSquared was issued in 1989 to AMSC. *Order and Authorization*, FCC 89-183, Memorandum Opinion, Order and Authorization, 4 FCC Rcd 6041 (1989), *remanded by Aeronautical Radio, Inc. v. FCC*, 928 F.2d 428 (D.C. Cir. 1991); *Final Decision on Remand*, 7 FCC Rcd 266 (1992); *aff'd, Aeronautical Radio, Inc. v. FCC*, 983 F.2d 275 (D.C. Cir.1993); *see also* AMSC Subsidiary Corporation, *Memorandum Opinion and Order*, FC 93-243, Memorandum Opinion and Order, 8 FCC Rcd 4040 (1993).

[84] *See Amendment of Parts 2, 22 and 25 of the Commission's Rules to Allocate Spectrum for and to Establish Other Rules and Policies Pertaining to the Use of Radio Frequencies in a Land Mobile Satellite Service for the Provision of Various Common Carrier Services, Hughes Communications Mobile Satellite, Inc.*, et al., Gen. Docket No. 84-1234, Memorandum Opinion, Order and Authorization, FCC 89-183, 4 FCC Rcd 6041 (1989), remanded by *Aeronautical Radio, Inc. v. FCC*, 928 F.2d 428 (D.C. Cir. 1991), Final Decision on Remand, 7 FCC Rcd 266 (1992), aff'd, Aeronautical Radio, Inc. v. FCC, 983 F.2d 275 (D.C. Cir. 1993).

[85] *Id.*

[86] *Id.*

[87] These satellites are MSAT-1 (at 106.5º W.L., Canadian licensed) and MSAT-2 (at 101º W.L.).

[88] *See SkyTerra Communications Inc., Transferor and Harbinger Capital Partners Funds, Transferee, Applications for Consent to Transfer Control of SkyTerra Subsidiary, LLC*, IB Docket 08-184, ¶33.

[89] *See* Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz band, the L-band, and the 1.6/2.4 GHz bands, IB Docket Nos. 01-185, 02-364, 18 FCC Rcd 1962, 1964-65, ¶ 1 (2003) (*ATCReport and Order*), modified by *Order on Reconsideration*, 18 FCC Rcd 13590 (2003), reconsidered in part in *Memorandum Opinion and Order and Second Order on Reconsideration*, 20 FCC Rcd 4616 (2005) (*ATC Second Reconsideration Order*), further reconsideration pending; *see ATC Second Reconsideration Order*, 20 FCC Rcd at 4619, ¶ 9.

[90] *ATC Report and Order*, 18 FCC Rcd at 1974-79, ¶¶ 22, 24-26, 28, 30.

voice and data communication for users equipped with dual-mode MSS/ATC devices.[91] On March 26, 2010, LightSquared's ATC authority was amended to allow flexibility for the technical design of LightSquared's ATC network.[92]

50. Now owned by Harbinger Capital Partners Master Fund I, Ltd. and Harbinger Capital Partners Special Situations Fund, L.P. (Harbinger),[93] LightSquared is constructing an integrated satellite/terrestrial 4G network.[94] In evaluating this transaction, the Bureaus considered LightSquared's plans to construct an integrated satellite/terrestrial "fourth generation" (4G) mobile broadband network, which would primarily use LightSquared's ATC authority and its next generation satellites to provide more advanced services than are possible using LightSquared's current MSS system. The network would provide both voice and broadband data mobile services nationwide, including to rural areas that lack service from existing terrestrial providers. LightSquared proposed to use its satellite/terrestrial network to provide services on a wholesale basis to a variety of retail distribution customers, increasing competition and benefitting consumers. LightSquared committed that its network would cover 100 percent of the U.S. population via the satellite component. In addition to satellite coverage, LightSquared has committed to a buildout schedule of its 4G terrestrial service that will provide United States population coverage of at least 100 million by December 31, 2012, at least 145 million by December 31, 2013, and at least 260 million by December 31, 2015.[95]

51. On November 15, 2010, as part of its new network, LightSquared launched a new satellite, SkyTerra 1, that LightSquared bills as "the nation's first wholesale-only integrated wireless

[91] Mobile Satellite Ventures Subsidiary LLC Application for Minor Modification of Space Station License forAMSC-1, File Nos. SAT-MOD-20031118-00333, SAT-MOD-20031118-00332, SES-MOD-20031118-01879, *Order and Authorization*, 19 FCC Rcd 22144 (Int'l Bur. 2004) (*MSV ATC Order*).

[92] *See* SkyTerra Subsidiary LLC Application for Modification Authority for an Ancillary Terrestrial Component, File No. SAT-MOD-20090429-00047, Call Sign: AMSC-1, File No. SAT-MOD-20090429-00046, Call Sign: S2358, File No. SES-MOD-20090429-00536, Call Sign: E980179, *Order and Authorization*, DA 10—534, Order and Authorization, 25 FCC Rcd 3043 (Int'l Bur., rel. March 26, 2010) (*2010 SkyTerra ATC Modification Order*).

[93] Harbinger finalized its acquisition of LightSquared on March 29, 2010. *See* Letter from Henry Goldberg and Joseph A. Godles to Marlene H. Dortch, Secretary, Federal Communications Commission (dated March 30, 2010), IB Docket No. 08-184. http://fjallfoss.fcc.gov/ecfs/document/view?id=7020399437.

[94] *See SkyTerra Communications, Inc., Transferor and Harbinger Capital Partners Funds, Transferee Applications for Consent to Transfer Control of SkyTerra Subsidiary, LLC*, IB Docket No. 08-184, Memorandum Opinion and Order and Declaratory Ruling, 25 FCC Rcd 3059, 3087 (IB, OET, WTB, rel. March 25, 2010) (*SkyTerra/Harbinger Order*). The *SkyTerra/Harbinger Order* provides background and history on the corporate structure and transactions that led to Harbinger Capital Partners Funds obtaining control of MSS licensee SkyTerra Subsidiary, LLC (now known as LightSquared). *Id.* at 3060-3064, ¶¶ 2-8; *see also* LightSquared Subsidiary LLC Request for Modification of its Authority for an Ancillary Terrestrial Component, SAT-MOD-20101118-00239 (filed Nov. 18, 2010) (LightSquared ATC Modification Request). Narrative at 1 n.1.

In approving LightSquared's ATC Modification Request, the Commission stated that "LightSquared may commence offering commercial service on its MSS L-band frequencies under the authority granted herein only upon the completion of the process for addressing interference concerns relating to GPS, as set forth in paragraphs 41-43" of the Order. *See LightSquared Subsidiary LLC Request for Modification of its Authority for an Ancillary Terrestrial Component*, DA 11-133, Order and Authorization, 26 FCC Rcd 566, 586-587, 588, ¶¶ 41-43, 48 (2011).

[95] *See* SkyTerra Subsidiary LLC Application for Modification Authority for an Ancillary Terrestrial Component, File No. SAT-MOD-20090429-00047, Call Sign: AMSC-1, File No. SAT-MOD-20090429-00046, Call Sign: S2358, File No. SES-MOD-20090429-00536, Call Sign: E980179, *Order and Authorization*, 25 FCC Rcd 3043 at 3085, ¶¶ 55 & 56 (Int'l Bur., rel. March 26, 2010) (*2010 SkyTerra ATC Modification Order*).

broadband and satellite network."[96]

52. L-band Coordination Agreement. In North America and nearby international airspace and maritime areas, five satellite operators provide service in the L-band's 66 megahertz (33 megahertz in each transmission direction) MSS allocation.[97] Under the International Telecommunication Union (ITU) Radio Regulations, operators of satellite systems are required to coordinate their spectrum use to prevent interference to, and receive protection from, other systems.[98]

53. In June 1996, the United States, Canada, Mexico, Russia, and the intergovernmental organization Inmarsat developed and agreed upon a unique framework that was intended to facilitate annual spectrum assignment agreements among the operators.[99] On December 21, 2007, Inmarsat and LightSquared signed a "Spectrum Coordination and Cooperation Agreement" that resolved outstanding differences between the operators regarding use of the L-band.[100] On March 26, 2008, the Commission reached government-to-government satellite coordination agreements with the United Kingdom and Canada, based upon the "Spectrum Coordination and Cooperation Agreement" between Inmarsat and Lightsquared.

54. The arrangement between Inmarsat and LightSquared provides a framework that allows both operators to have contiguous blocks of spectrum that in turn will facilitate the provision of both MSS and ATC broadband services in the North American L-band. Due to the substantial expenditures required by this arrangement, Inmarsat and LightSquared agreed to a two-phase plan. On August 18, 2010, LightSquared triggered Phase I of the L-band Coordination Agreement between it and Inmarsat by making the first of $337.5 million in total payments. [101] The payments will facilitate transition of Inmarsat users to new equipment and will make it possible to create four 10 MHz blocks that can be used for broadband services.[102] On January 28, 2011, LightSquared triggered notice of Phase II, under which

[96] http://www.skyterra.com/media/press-releases-view.cfm?id=234&yr=2010. *See* Comments of LightSquared Subsidiary LLC, in the Matter of Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-16626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz, ET Docket No. 10-142, September 15, 2010, p. 5. *See* Boeing Press Release, "Boeing Ships LightSquared's SkyTerra 1 Mobile Communications Satellite to Launch Site," October 19, 2010, available at http://www.skyterra.com/news_docs/releases/PR_Boeing_SkyTerra%201%20shipment_10-19-10.pdf , announcing shipment of LightSquared SkyTerra 1 to Kazakhstan for launch preparation.

[97] The five operators are: Lightsquared; Skyterra Canada, a Canadian operator; Telecomm, a Mexican-licensed operator; Volna, a Russian operator; and, following privatization, Inmarsat, a United Kingdom operator.

[98] *See generally* International Telecommunication Union's Radio Regulations Article 9.

[99] *See* International Action: "FCC Hails Historic Agreement on International Satellite Coordination," News Release, Report No. IN 96-16 (June 25, 1996).

[100] Press Release, "SkyTerra, Mobile Satellite Ventures and Inmarsat Sign Spectrum Coordination and Cooperation Agreement" (Dec. 21, 2007), available online at http://www.msvlp.com/media/press-releases-view.cfm?id=158&yr=2007.

[101] *See* LightSquared Press Release, "LightSquared Delivers Notice To Inmarsat Triggering Re-Banding Of L-band Radio Spectrum In North America," (August 18, 2010), http://www.lightsquared.com/press-room/press-releases/lightsquared-delivers-notice-to-inmarsat-triggering-re-banding-of-l-band-radio-spectrum-in-north-americ/.

[102] *See* Comments of LightSquared Subsidiary LLC, in the Matter of Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-16626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz, ET Docket No. 10-142, September 15, 2010, at 5.

Inmarsat will make additional spectrum available to LightSquared at an initial annual cost of $115 million.[103]

(ii) 2 GHz MSS Band

55. We license MSS systems domestically in the 2000-2020 MHz band and the 2180-2200 MHz segments of the S-band. Previously, the 2 GHz MSS band included 70 megahertz, but in 2003, the Commission reallocated 30 megahertz of spectrum in the band from MSS to terrestrial services.[104]

56. The Commission adopted MSS rules for the 2 GHz bands in 2000.[105] In 2001, the Bureau authorized eight satellite operators to provide MSS in the 2 GHz band. By the end of 2004, three of those satellite operators had their licenses cancelled for failure to meet milestone obligations.[106] In early 2005, another three 2 GHz MSS satellite operators – Iridium, Boeing, and Celsat – surrendered their licenses.[107] This left only two satellite operators, DBSD (then known as ICO) and TerreStar (then known as TMI), with spectrum reserved to provide MSS in the 2 GHz band.

57. In December 2005, the Commission adopted an *Order* reassigning the spectrum formerly assigned to Iridium, Boeing, and Celsat to DBSD and TerreStar. As a result, DBSD and TerreStar each have access to 20 megahertz of spectrum in the 2 GHz band.[108]

58. Both TerreStar and DBSD are now in bankruptcy and awaiting action on pending applications to have their respective licenses acquired by DISH Network Corporation.[109]

(a) **TerreStar Debtor-in-Possession (DIP)**

59. On July 1, 2009, TerreStar launched TerreStar-1[110] and completed in-orbit testing on

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[103] *See* LightSquared Press Release, "LightSquared Delivers Notice To Inmarsat Triggering Phase 2 of Re-Banding Of L-band Radio Spectrum In North America," (January 28, 2011), http://www.lightsquared.com/press-room/press-releases/lightsquared-delivers-notice-to-inmarsat-triggering-phase-2-of-re-banding-of-l-band-spectrum-in-north-america/.

[104] *Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile & Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems*, ET Docket No. 00-258, Third Report and Order, Third Notice of Proposed Rulemaking and Second Memorandum Opinion and Order, 18 FCC Rcd 2223, 2238, ¶ 28 (2003). Prior to this decision, the 2 GHz MSS band was 1990-2025 MHz and 2165-2200 MHz. *Id.* at 2225, ¶ 3.

[105] *Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band*, 15 FCC Rcd 16127, 16128, ¶ 1 (2000).

[106] The three licensees were Mobile Communications Holdings, Inc., Constellation Communications Holdings, Inc., and Globalstar.

[107] Specifically, Iridium LLC surrendered its authorization on March 16, 2005, the Boeing Company on March 28, 2005, and Celsat America, Inc., on April 12, 2005.

[108] *See Use of Returned Spectrum in the 2 GHz Mobile Satellite Service Frequency Bands*, IB Docket Nos. 05-220 and 05-221, Order, 20 FCC Rcd 19696 (2005), *recon. pending*.

[109] *DISH Network Corporation Files to Acquire Control of Licenses and Authorizations Held By New DBSD Satellite Services G.P, Debtor-in-Possession and TerreStar License Inc., Debtor-in-Possession*, DA 11-1557, Public Notice (Int'l Bur., rel. September 15, 2011).

[110] *See TerreStar Corporation, Form 10-K/A, Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, for the fiscal year ended 31 December 2009*, page 1. *See also* Comments of TerreStar Networks Inc., ET Docket No. 20-142, September 15, 2010, p.2. TerreStar-1 operates at 111.0 degrees W.L. TerreStar Networks (Canada) Inc. holds title to TerreStar-1. Epstein Declaration, Oct. 19, 2010, n. 12, at 7.

August 27, 2009. In September 2009, TerreStar entered into an agreement with AT&T Mobility, where AT&T would offer certain TerreStar satellite communications services to its government and enterprise customers.[111] On January 13, 2010, the Bureau granted TerreStar ATC authority for use of 20 MHz of S-band spectrum with its mobile wireless network.[112] TerreStar-2 is under construction and, prior to bankruptcy, completion was scheduled for October 2011.[113]

60. TerreStar entered into several spectrum agreements with Harbinger. For example, in September 2009, TerreStar leased Harbinger, with an option to purchase, certain 1.4 GHz terrestrial spectrum.[114] In January 2010, TerreStar and Harbinger negotiated an exclusive agreement related to TerreStar's S-band spectrum. That exclusive agreement expired on April 26, 2010, without an agreement for the use of TerreStar's S-band spectrum being executed.[115] On May 6, 2010, TerreStar and LightSquared entered into two agreements: the first was a 90-day exclusive agreement whereby both parties agreed to negotiate in good faith on a pooling arrangement for the S-band spectrum;[116] and the second was an agreement for LightSquared to purchase satellite minutes of voice and data transmission and satellite capacity on TerreStar-1.[117]

61. On October 19, 2010, TerreStar announced that TerreStar Networks, Inc. and other affiliates were filing petitions for reorganization under Chapter 11 of the U.S. Bankruptcy Code. TerreStar Networks entered into an agreement with EchoStar Corporation, a secured creditor, to provide TerreStar with a $75 million debtor-in-possession financing facility which would be used to continue operations during the restructuring process.[118]

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[111] *See TerreStar Corporation, Form 10-K/A, Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, for the fiscal year ended 31 December 2009*, page 2.

[112] *See* Order and Authorization, TerreStar Networks Inc., Application for Blanket Authority to Operate Ancillary Terrestrial Component Base Stations and Dual-Mode MSS-ATC Mobile Terminals in the 2 GHz MSS Bands, File Nos. SES-LIC-20061206-02100, SES-AMD-20061214-02179, SES-AMD-20070309-00336, SES-AMD-20070508-00582, SES-AMD-20070723-00978, SES-AMD-20070907-01253, SES-AMD-20080229-00217, SES-AMD-20091117-01464, Call Sign: E060430, available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-10-60A1_Rcd.pdf. *See also* TerreStar Press Release, "FCC Grants TerreStar ATC Authority: License Enhances TerreStar's Next Generation Mobile Wireless Network in US," January 14, 2010, available at http://www.terrestar.com/press/20100114.html.

[113] According to the Epstein declaration, TerreStar-2 is 90 percent complete and they have paid approximately 95 percent of the construction costs. Access to a completed and operational ground spare is currently a requirement for TerreStar's ATC authorization.

[114] *See* TerreStar 10K for the period ending Dec. 31, 2009, at 6. *See also*, Epstein Declaration, October 19, 2010, at 10-11.

[115] *See* TerreStar 10K for the period ending Dec. 31, 2009, at 6, and TerreStar 10-Q for the period ending June 30, 2010, at 20.

[116] *See* Epstein Declaration, at 11-12. During that 90-day period, TerreStar agreed not to solicit or encourage any proposal relating to the S-band spectrum or enter into an agreement relating to the S-band spectrum.

[117] *See* TerreStar 8-K filed May 7, 2010.

[118] *See* TerreStar Press Release, "TerreStar Networks Restructures to Strengthen Financial Position," October 19, 2010, available at http://www.terrestarinfo.com/Press%20Release%20Restructuring%20_1019.pdf .

(b) DBSD Debtor-in-Possession (DIP)

62. In 2004, ICO formed DBSD North America (DBSD NA)[119] to develop an integrated MSS/ATC system. New DBSD is a wholly-owned, indirect subsidiary of DBSD NA and is authorized to provide MSS. In May 2009, DBSD NA and eight other affiliated companies, including New DBSD, filed for bankruptcy protection under Chapter 11 of the United States Bankruptcy Code[120]; and on October 26, 2009, the bankruptcy court approved the debtors' proposed reorganization plan.[121] On December 11, 2009, New DBSD DIP filed applications to transfer control of earth station licenses for operations of its 2 GHz mobile satellite service system to DBSD[122] (the licenses include an authorization for ATC).[123] On September 29, 2010, the International Bureau granted New DBSD DIP's license transfer request.[124] Following additional court proceedings, on March 15, 2011, DISH Network received approval from the bankruptcy court to acquire a 100 percent stake in DBSD North America.[125]

(iii) Big LEO Bands

63. The Big LEO bands are the 1610-1626.5 MHz band and the 2483.5-2500 MHz band. The Commission adopted rules for the Big LEO bands in 1994.[126] At that time, five parties were seeking licenses in these bands. One of the five parties proposed to use Time Division Multiple Access ("TDMA") while the other four proposed Code Division Multiple Access ("CDMA").[127] The

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[119] ICO Global Communications formed DBSD NA in 2004 to develop an integrated MSS / ATC system. New DBSD is a wholly-owned, indirect subsidiary of DBSD NA. *In re DBSD North America, Inc*., 419 B.R. 179 (S.D.N.Y. 2009).

[120] *See* ICO Global 10Q for quarter ended June 30, 2010. On May 15, 2009, DBSD filed voluntary petitions for reorganization under Chapter 11 of Title 11 of the United States Bankruptcy Code (Chapter 11 cases) in the United States Bankruptcy Court for the Southern District of New York (Bankruptcy Court). On October 26, 2009, a decision was issued ruling in favor of confirmation of the Plan of Reorganization, and the Bankruptcy Court entered its order on November 23, 2009. On March 24, 2010, the Federal District Court for the Southern District of New York denied all appeals and affirmed the Bankruptcy Court order. *In re DBSD North America*, Inc. 427 B.R. 245 (S.D.NY. 2010).

[121] *In re DBSD North America*, Inc., 419 B.R. 179 (S.D.N.Y 2009). *In re DBSD N. Am., Inc.*, 421 B.R. 133 (Bankr. S.D.N.Y., Nov. 23, 2009)(NO. 09-13061)(REG), *aff'd* Memo. and Order, *In re DBSD N. Am., Inc.*, Case Nos. 09-10156, 09-10372, 09-10373 (S.D.N.Y. Mar. 24, 2010).

[122] File Nos. SES-T/C-20091211-01575 and SES-T/C-20091211-01576.

[123] http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-09-38A1.pdf, *See also*, Press Release, ICO, "ICO Approved for Ancillary Terrestrial Component Use by FCC," January 15, 2009, available at http://investor.ico.com/releasedetail.cfm?ReleaseID=359524.

[124] *New DBSD Satellite Services G.P., Debtor-In-Possession*, DA 10-1881, Order, 25 FCC Rcd 13664 (2010).

[125] http://www.bloomberg.com/news/2011-03-15/dish-network-s-revised-offer-for-bankrupt-dbsd-wins-court-s-approval.html.

[126] *See Amendment of the Commission's Rules to Establish Rules & Policies Pertaining to a Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Bands*, CC Docket No. 92-166, Report and Order, 9 FCC Rcd 5936 (1994) (*1994 Big LEO Order*), *recon.*, 11 FCC Rcd 12861 (1996).

[127] The TDMA technique assigns each remote earth station a different time to transmit and receive information. CDMA prevents interference between remote earth stations by assigning a different digital code to different earth stations. For a more detailed discussion of TDMA and CDMA, *see 2000 Biennial Regulatory Review -- Streamlining and Other Revisions of Part 25 of the Commission's Rules Governing the Licensing of, and Spectrum* (continued….)

Commission determined that the four CDMA operators could share spectrum with each other, but that their systems would not be compatible with the TDMA system.[128] Consequently, the Commission adopted a band plan for Big LEO systems that designated the 1621.35-1626.5 MHz band for bi-directional TDMA operations. The Commission also designated the 1610-1621.35 MHz and the 2483.5-2500 MHz bands for shared CDMA operations.[129] At that time, the Commission considered the possibility that not all of the proposed CDMA systems would ultimately be built and launched, and pledged to revisit its spectrum assignments in the event that only one CDMA system was launched.[130]

(a) Globalstar and Iridium

64. Iridium and Globalstar are the only licensees in these frequency bands. Globalstar operates a CDMA system, and Iridium operates a TDMA system. In October 2008, the Commission adopted an Order modifying Iridium's and Globalstar's licenses to be consistent with earlier revisions that it made in the Big LEO frequency band assignments.[131] Specifically, the Commission shifted some spectrum from Globalstar to Iridium.

65. Globalstar is now authorized to operate in the 1610-1617.775 MHz frequency band on an exclusive basis, and Iridium is authorized to operate in the 1618.725-1626.5 MHz band on an exclusive basis. Globalstar and Iridium are required to share the frequency band located between their two respective exclusive frequency assignments, *i.e.*, the 1617.775-1618.725 MHz frequency band.[132] In addition, Globalstar is authorized to operate in 2483.5-2500 MHz band. Globalstar has been granted ATC authority[133] while Iridium has not yet requested it.

66. Iridium, with its constellation of 66 satellites, provides mobile voice and data[134] communications services with global coverage. The U.S. government, directly and indirectly, is Iridium's largest customer, generating approximately 23.6 percent of its revenue. Iridium's customers include government and commercial operators who, in turn, provide service to maritime, oil and gas, mining, forestry, construction and transportation industries, as well as to first responders. Services include

(Continued from previous page)
Usage by, Satellite Network Earth Stations and Space Stations, IB Docket No. 00-248, Notice of Proposed Rulemaking, 15 FCC Rcd 25128, 25206-10 (App. E) (2000).

[128] *1994 Big LEO Order*, 9 FCC Rcd at 5954, ¶ 43.

[129] *Id.* at 5955, ¶ 44.

[130] *Id.* at 5959-60, ¶¶ 54-55.

[131] *Globalstar Licensee, LLC*, FCC 08-248 Order of Modifications, 23 FCC Rcd 15207 (2008).

[132] *Spectrum and Service Rules for Ancillary Terrestrial Components in the 1.6/2.4 GHz Big LEO Bands, Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands*, Second Order on Reconsideration, Second Report and Order, and Further Notice of Proposed Rulemaking, IB. Docket Nos. 07-253 and 02-364, 22 FCC Rcd 19733, 19741-42 ¶¶ 18-19 (2007) (*2007 Big LEO Spectrum Sharing Second Reconsideration Order*).

[133] *Application of Loral/Qualcom Partnership, L.P. for Authority to Construct, Launch, and Operate Globalstar, a Low Earth Orbit Satellite System to Provide Mobile Satellite Services in the 1610-1626.5 MHz/2483.5-2500 MHz*, Order and Authorization, 10 FCC Rcd 2333 (Int'l Bur. 1995).

[134] The high-speed maritime data service, Iridium OpenPort, introduced in October 2008 provided speeds of up to 128 kbps and up to three voice lines which can be used simultaneously, and also allowed for data rates to be adjusted up or down. *See Iridium Communications, Inc., Form 10-K, Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1924, for the year ended December 31, 2009, filed March 16, 2010*, p. 10.

telephony, e-mail and data transfer services in areas inadequately served by terrestrial networks.[135]

67. Iridium's next-generation constellation, Iridium NEXT, described as including new product and service offerings as well as upgrades to Iridium's current services including higher data rates, is expected to launch in 2015 and be fully deployed in 2017.[136]

68. Globalstar's constellation experienced degradation in 2007, which caused the downlinks in the 2483.5-2500 MHz band to become intermittent and unreliable. Globalstar was thus unable to provide reliable voice and duplex data services with that constellation. Globalstar continued to use the 1610-1618.725 MHz capabilities of its first-generation constellation while working on the launch of its next-generation constellation.[137] Globalstar's current data services are used for asset and personal tracking, data monitoring, and supervisory control and data acquisition applications.[138]

69. Globalstar's next-generation constellation will consist of 24 new NGSO satellites, along with the 8 replacement satellites that were launched in 2007. As of July 13, 2011, Globalstar has launched 12 of the 24 second-generation satellites. Globalstar has contracted for construction of an additional 24 second-generation satellites that it will be keep as ground spares. With this new constellation, Globalstar states that it will provide advanced voice, two-way data, and messaging services, with uplink speeds of 256 kbps and downlink speeds of up to 768 kbps (fixed service) or up to 256 kbps (mobile service).[139]

70. Globalstar has also used its ATC authorization by partnering with Open Range Communications, Inc. Open Range began providing wireless broadband service to rural subscribers in northern Colorado in November 2009, although Globalstar was not yet in compliance with the ATC gating criteria. On June 25, 2010, Open Range requested special temporary authority to continue operating on the spectrum allocated to Globalstar. On September 14, 2010, Open Range was permitted to provide terrestrial fixed and mobile service in this frequency band, limited to a listed set of markets, under a temporary authorization.[140] Globalstar's request for a 16-month extension to come into compliance with the Commission's ATC rules, however, was denied.[141]

(iv) Little LEO Bands

71. The Little LEO bands are the 137-138 MHz and 400.15-401 MHz bands. Originally,

[135] *Id.* at 1.

[136] Iridium Comments at 5. *See also* http://www.iridium.com/About/IridiumNEXT.aspx. The Iridium NEXT constellation will include 66 operational LEO satellites, as well as 6 in-orbit spares and 9 ground spares.

[137] Globalstar Comments at 3. *See also Globalstar 10-Q¸Quarterly Report Pursuant to Section 13 or Section 15(d) of the Securities and Exchange Act of 1934 for the period ended June 30, 2010,* at 27. Globalstar launched its eight spare satellites in 2007. All of the satellites launched prior to 2007 experienced anomalies over time, which has resulted in periods of time during which no two-way voice or data service is available. This did not adversely affect one-way data transmission services Globalstar was providing.

[138] Globalstar Comments at 4.

[139] Globalstar Comments at 5.

[140] *See In the Matter of Globalstar Licensee LLC Application for Modification of License to Extend Dates for Coming into Compliance with Ancillary Terrestrial Component Rules*, DA 10-1740, Order, 25 FCC Rcd 13114 (2010).

[141] *Id.* "We conclude that Globalstar has not justified its request for a further extension of time. Specifically, we find that Globalstar has not established that its failure to come into compliance with the ATC gating criteria within the established timeframe was due to circumstances beyond its control or other sufficient justifications."

three satellite system licenses were issued for these bands.[142] Later, the Commission concluded that there was sufficient spectrum available to authorize additional Little LEO systems.[143] In subsequent years, all the Little LEO licensees have either lost or surrendered their licenses with one exception – ORBCOMM. ORBCOMM has been operating since 2007.[144] The Little LEO systems are restricted to non-voice services because of the relatively small uplink bandwidth and the fact that they must operate in spectrum shared with terrestrial mobile operations.[145] The Little LEO systems are operationally restricted to low data rates. As a result, the ORBCOMM Little LEO MSS system is a niche system and will not be discussed further here.

3. SDARS Operators

72. SiriusXM is the sole company providing satellite digital audio radio service (SDARS) to the contiguous United States.[146] A recent Commission staff decision, however, identified various emerging consumer alternatives to SiriusXM, which include Pandora Media, Inc., Rhapsody, Slacker, Last.fm, and iheartradio. Additionally, Ford, Toyota, MINI, GM, Mercedes-Benz, and Hyundai are introducing Internet-based streaming radio in their vehicles.[147] Prior to the merger between Sirius and XM in 2008, Sirius (sometimes written as "SIRIUS") and XM operated separate SDARS networks. XM commenced service in September 2001, and Sirius began service in February 2002.[148]

73. In July 2008, Sirius' wholly owned subsidiary, Vernon Merger Corporation, merged with XM Satellite Radio Holdings Inc. On August 5, 2008, Sirius Satellite Radio Inc. changed its name to

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[142] *See Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Non-Voice, Non-Geostationary Mobile Satellite Service*, CC Docket No. 92-76, Report and Order, 8 FCC Rcd 8450 (1993).

[143] *See Amendment of Part 25 of the Commission's Rules to Establish Rules and Policies Pertaining to the Second Processing Round of the Non-Voice, Non-Geostationary Mobile Satellite Service*, Report and Order, 13 FCC Rcd 9111, at 9122 ¶ 25 (1997) (*Second Processing Round Report and Order*).

[144] ORBCOMM 2010 10-K at 1.

[145] 47 C.F.R. § 25.142(b)(1).

[146] SiriusXM provides satellite digital audio radio services in the 2320-2345 MHz band. The Commission originally licensed XM to launch and operate two geostationary satellites for SDARS. *See American Mobile Radio Corporation Application for Authority to Construct, Launch, and Operate Two Satellites in the Satellite Digital Audio Radio Service*, Order and Authorization, DA 97-2210, Order and Authorization, 13 FCC Rcd 8829 (Int'l Bur. 1997). The Commission originally licensed Sirius to launch and operate two satellites in geostationary orbit at the 80° and 110° West Longitude orbital locations. *See Satellite CD Radio, Inc. Application for Authority to Construct, Launch, and Operate Two Satellites in the Satellite Digital Audio Radio Service*, Order and Authorization, DA 97-2191, Order and Authorization, 13 FCC Rcd 7971 (Int'l Bur. 1997). Sirius later requested, and was granted, authority to change its satellite configuration from two geostationary satellites to three satellites in non-geostationary satellite orbits (NGSO). *See Sirius Satellite Radio Inc., Application for Minor Modification of License to Construct, Launch and Operate a Non-Geostationary Satellite Digital Audio Radio Service System*, Order and Authorization, DA 01-639, Order and Authorization, 16 FCC Rcd 5419 (Int'l Bur. 2001). SDARS is commonly referred to as "satellite radio." The Commission's rules define SDARS as "[a] radio communication service in which audio programming is digitally transmitted by one or more space stations directly to fixed, mobile, and/or portable stations, and which may involve complementary repeating terrestrial transmitters, telemetry, tracking and control facilities." 47 C.F.R. § 25.201.

[147] *See XM Sirius Transfer Order*,*supra*, fn. 3.

[148] Consolidated Application for Authority to Transfer Control of XM Radio Inc. and Sirius Satellite Radio Inc., XM Satellite Radio Holdings Inc., Transferor, and Sirius Satellite Radio Inc., Transferee (Mar. 20, 2007), MB Docket 07-57, at 3, 5. (Merger Application).

SiriusXM Radio.[149] SiriusXM broadcasts music, sports, news, talk, entertainment, traffic, and weather channels in the United States for a subscription fee through two proprietary satellite radio systems — the SIRIUS system and the XM system. SDARS radio receivers are used in cars, trucks, boats, aircraft, and homes, and are available for portable use. SiriusXM also provides content to subscribers using streaming audio over the Internet as well as DBS and wireless networks.[150] In 2009, there were approximately 19 million subscribers, and as of December 31, 2010, SiriusXM had 20.2 million subscribers.[151]

a. Revenues and Earnings

74. The primary source of revenue for SiriusXM is subscription fees. In 2009, SiriusXM earned $ 2.5 billion in revenue.[152] In 2010, revenues increased to $2.8 billion.[153] Over the same time period, operating expenses increased from $2.2 billion to $2.4 billion.[154] In 2009 operating cash flow was $434 million, increasing in 2010 to $513 million.[155] Over the same time period, free cash flow increased from $185 million to $210 million.[156]

b. **Programming**

75. SiriusXM offers more than 135 channels of music, sports, news, talk, entertainment, traffic, and weather. Subscribers with a la carte-capable radios may customize the programming they receive through their a la carte subscription packages. SiriusXM offers two a la carte programming options to consumers with eligible radios. SDARS radio receivers are used in cars, trucks, boats, aircraft, and homes, and are available for portable use. SiriusXM also provides content to subscribers using streaming audio over the Internet as well as DBS and wireless networks.[157] Prior to the merger in 2008, the fee charged by each of SDARS operator for its basic audio service was $12.95 per month.[158]

76. SiriusXM's primary means of distributing satellite radios is through the sale and lease of new vehicles. SiriusXM has agreements with every major automaker[159] to offer either SIRIUS or XM satellite radios as factory or dealer-installed equipment in their vehicles. As of December 31, 2009,

[149] Sirius Satellite Radio Inc. was incorporated in the State of Delaware as Satellite CD Radio, Inc. on May 17, 1990. *See* SiriusXM Radio, Inc. SEC Form 10-K for the Fiscal Year Ended Dec. 31, 2009 (SiriusXM 2009 10-K.) at 2.

[150] *Applications for Consent to the Transfer of Control of Licenses, XM Satellite Radio Holdings Inc., Transferor, to Sirius Satellite Radio Inc., Transferee.*, MB Docket 07-57, Memorandum Opinion and Order and Report and Order, 23 FCC Rcd 12348 (2008) (*Sirius XM Merger Order*).

[151] http://files.shareholder.com/downloads/SIRI/1338727714x0x463472/95E4B18E-37F5-48B1-B929-9445105FFAD6/Sirius_Proxy_and_Annual_Report.pdf (visited Oct. 27, 2011).

[152] SiriusXM 2009 10-K at 25 and 27.

[153] SiriusXM 2010 10-K at 26.

[154] SiriusXM 2010 10-K at 26.

[155] SiriusXM 2010 10-K at 40.

[156] SiriusXM 2010 10-K at 36, 48.

[157] See generally *Sirius XM Merger Order*, *supra* note 154.

[158] Merger Application at ii.

[159] Automakers offering pre-installed Sirius/XM radios include: Acura/Honda, Aston Martin, Audi, Automobili Lamborghini, Bentley, BMW, Chrysler, Dodge, Ferrari, Ford, General Motors, Honda, Hyundai, Infiniti/Nissan, Jaguar, Jeep, Kia, Land Rover, Lincoln, Lexus, Toyota, Scion, Subaru, Maybach, Mazda, Mercedes-Benz, Mercury, MINI, Mitsubishi, Porsche, Rolls-Royce, Volvo and Volkswagen. *See* SiriusXM 2009 10-K at 3.

satellite radios were available as a factory or dealer-installed option in substantially all vehicle models sold in the United States.

77. Post-merger, Sirius XM continues to operate Sirius and XM as separate networks, due to the technical challenges of unifying its space and ground systems. As of 2010, the Sirius satellite system consists of four in-orbit satellites in highly-elliptical orbits (HEO), over 125 terrestrial repeaters that receive and retransmit signals, and satellite uplink facilities and studios. The XM system consists of five in-orbit satellites,[160] over 650 terrestrial repeaters that receive and retransmit signals, satellite uplink facilities, and studios. Both satellite radio systems are designed to provide clear reception in most areas despite variations in terrain, buildings, and other obstructions. Subscribers can receive transmissions in all outdoor locations where the satellite radio has an unobstructed line-of-sight with an SDARS satellite, or is within range of a terrestrial repeater. Sirius does not maintain in-orbit insurance for three of its four operating satellites. XM currently has in-orbit insurance for two of its five satellites.[161]

c. FCC Conditions

78. The Sirius XM merger was approved subject to conditions[162] regarding programming, public interest and qualified-entity channels, equipment, subscription rates, and other service commitments. [163] Specifically, the conditions adopted in the *Sirius XM Merger Order* required SiriusXM to:

a. Offer a la carte, family friendly, mostly music, news, sports and talk, and best of both programming options for subscribers at specified prices.[164]

b. Enter into long-term leases or other agreements to provide to a Qualified Entity or Entities – defined as an entity or entities that are majority-owned by persons who are African American, not of Hispanic origin; Asian or Pacific Islanders; American Indians or Alaskan Natives; or Hispanics – rights to four percent of the full-time audio channels on the SIRIUS platform and on the XM platform. The Qualified Entity or Entities will not be required to make any lease payments for such channels, and SiriusXM will have no editorial control over these channels.[165] The Commission stated it would determine the implementation details at a later date.[166]

c. Make available four percent of the full-time audio channels on the SIRIUS platform and on the XM platform for noncommercial educational and informational programming for programmers that qualify under the DBS set aside rules.[167]

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[160] XM primarily provides its service directly to subscribers via five satellites in geostationary orbit at or near the 85° W.L. and 115° W.L. orbital locations. *See* SiriusXM 2009 10-K at 4.

[161] SiriusXM 2010 10-K at 5.

[162] SiriusXM 2009 10-K at 7.

[163] See generally *Sirius XM Merger Order*, *supra* note 154 and SiriusXM 2009 10-K at 7.

[164] *Sirius XM Merger Order*, 23 FCC Rcd at 12385, 12387, ¶¶ 79, 85.

[165] *See Sirius XM Merger Order*, 23 FCC Rcd at 12407-12411, ¶ ¶ 131-35.

[166] *See Sirius XM Merger Order*, 23 FCC Rcd at 12410, ¶ 135. In adopting the implementation details for the Leasing Condition, the Commission defined the term "Qualified Entities" to ensure that lessees are independent from SiriusXM and to make the criteria for selection of lessees race-neutral. The Commission also revised the condition to involve SiriusXM in the lessee selection process, with responsibility for making timely selections of entities that are both qualified for the set-aside and technically compatible with the SDARS platform. *See Applications for Consent to the Transfer of Control of Licenses*, MB Docket No. 07-57, Memorandum Opinion and Order, 25 FCC Rcd 14779 (2010).

[167] *Sirius XM Merger Order*, 23 FCC Rcd at 12413-15, ¶¶ 142-46.

d. Provide, on commercially reasonable terms, the intellectual property necessary to permit any device manufacturer to develop equipment that can deliver their satellite radio services. Chip sets for satellite radios, which include the encryption, conditional access and security technology necessary to access our satellite radio services, may be purchased by licensees from manufacturers in negotiated transactions with such manufacturers.[168]

e. Not raise the retail price for the basic $12.95 per month subscription package, the a la carte programming packages or new programming packages until July 28, 2011.[169]

f. Offer for sale an interoperable radio, and began offering such radio in early 2009.[170]

C. Input Suppliers

79. This *Third Report* includes, for the first time, a discussion of the input suppliers to the communications satellite services industry, *i.e.*, those firms that supply fixed and mobile satellite operators with spacecraft, terminal equipment, earth stations, finance, insurance, and launch services.

1. Spacecraft Manufacturers

80. Overview of the Satellite Manufacturing Industry The major U.S. corporations that manufacture large satellites for commercial satellite operators are Boeing Company, Space Systems Loral, and Lockheed Martin. Northrop Grumman, manufactures satellites but restricts its business to government satellites. Orbital Science Corporation manufactures small and medium- sized satellites. Internationally, two major manufacturing corporations are EADS Astrium and Thales Alenia, both European aerospace conglomerates. These companies are listed in Table III.7.[171]

81. Regarding the companies listed in Table III.7,[172] Boeing manufactures medium and high power FSS and MSS communication satellites, weather satellites, GPS satellites, and military communications satellites; Lockheed Space Company produces human space flight systems, remote sensing, navigation, meteorological and communications satellites, space observatories and interplanetary spacecraft among others;[173] Space Systems Loral (SS/L) supplies commercial market segments and government, including all satellite-based applications. SS/L designs, manufactures and integrates high power satellites systems for commercial and government customers worldwide; Orbital Science Corporation (OSC) provides service engineering, production and technical services for NASA, DoD,

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[168] *See Sirius XM Merger Order*, 23 FCC Rcd at 12404, ¶ 126.

[169] The Commission stated it would review the price cap condition six months prior to its expiration and determine whether to it should be modified, removed, or extended. *See Sirius XM Merger Order*, 23 FCC Rcd at 12395, ¶ 108. In July 2011, the Media Bureau determined that the price cap condition should not be extended beyond three years. *See Applications for Consent to the Transfer of Control of Licenses, XM Satellite Radio Holdings Inc., Transferor, to Sirius Satellite Radio Inc., Transferee.*, MB Docket 07-57, Memorandum Opinion and Order, 26 FCC Rcd 10539 (MB 2011).

[170] SiriusXM also committed not to originate local programming or advertising through their repeater networks. *See Sirius XM Merger Order*, 23 FCC Rcd at 12415 ¶ 145. SiriusXM further committed to file applications to provide SIRIUS service to Puerto Rico using terrestrial repeaters and to promptly introduce such service upon the Commission's grant of permanent authority to operate these repeaters. *Sirius XM Merger Order*, 23 FCC Rcd at 12415 ¶ 147.

[171] Smaller manufacturers such as Mitsubishi Electric Corp in Japan, ISS-Reshetnev Company in Russia, OHB technology in Germany, and Surrey Satellite Technology Ltd in the U.K. also produce satellites.

[172] Smaller manufacturers such as Mitsubishi Electric Corp in Japan, ISS-Reshetnev Company in Russia, OHB technology in Germany, and Surrey Satellite Technology Ltd in the U.K. also produce satellites.

[173] *See* http://www.Lockheedmartin.com/SSC.

commercial and academic space programs; EADS Astrium develops and markets communications systems, missiles, space rockets, satellites, and related systems;[174] and Thales Space manufactures commercial GSO and NGSO satellites, and builds large scientific modules for the International Space Station.

TABLE III.7

MAJOR FIRMS IN THE GLOBAL SPACECRAFT MANUFACTURING INDUSTRY
(Total Sales, All Activities, Billions of US$)

Firm	Country	Total Sales 2009
Boeing Company[175,176]	U.S.	33.7
Lockheed Martin[177]	U.S.	45.7
Space Systems/ Loral[178]	U.S.	1.0
Orbital Sciences Corporation[179]	U.S.	1.1
EADS	Pan-Europe	66.2
Thales Group	Pan-Europe	20.4

82. Nature of Services/Products Provided. The services and products supplied by the major satellite manufacturers vary from customer to customer depending on the specific requirements specified in the satellite construction contract. Previously, the satellite manufacturing process typically involved manufacturing and delivering a satellite to a storage facility[180] with the customer obtaining title to the satellite during storage. The customer was then responsible for obtaining the launch contract and on-orbit technical support. Today the satellite manufacturer more typically supplies a "turn-key" satellite system, in which the satellite is delivered on-orbit and the primary satellite tracking, telemetry and command (TT&C) earth station, or stations, is built by the satellite manufacturer. In addition to constructing the satellite, the manufacturer usually supplies the TT&C software and hardware required to operate the satellite and, often, the satellite contract will require the manufacturer to train a specified number of satellite operating technicians. It is also possible for the satellite buyer to enter into a long term contact with the satellite manufacturer, or another entity, for services related to the day-to-day operation of the satellite.

[174] *See* http://www.astrium.eads.net/.

[175] Boeing Networks and Space Div. $2.3B in 1Q2010 – chart 23; 2009 revenues 33.7 $B – chart 3 and backlog of 64.2 $B 1Q10 chart 4. This is 32% of total Boeing revenue-chart 23 [Investors Conference Presentation by President & CEO of Boeing Defense Space and Security, May 20, 2010]).

[176] *See* http://www.boeing.com/defense-space/space/bss/index.html.

[177] *See* Lockheed Martin 2009 SEC 10K.

[178] *See* Space Systems Loral IPO Registered with the SEC on June 9, 2010.

[179] Orbital Science Corporation 2009 Annual Report.

[180] Often the title to the satellite would change hands while the satellite was in storage in a state that had no sales tax, such as Delaware.

83. Entry Into Satellite Manufacturing. Entry into the satellite manufacturing industry requires substantial investment in facilities, technology, and highly specialized personnel. These costs make entry difficult for firms without substantial financial resources and technical expertise in the space communications industry. For example, impediments to entry include large capital requirements needed to design, test, and build satellites to diverse specifications. Moreover, the process of designing and manufacturing satellites requires a high degree of technical and scientific expertise that may limit new entrants into the industry.

84. Customers of Satellite Manufacturers. Entities buying manufacturing services include satellite operators and many other entities, private and governmental. The private entities are the satellite operators identified in this *Third Report* (such as Intelsat, SES, Sirius, and TerreStar); companies that launch satellites with a primary mission other than communications, such as remote sensing satellites; and companies that serve foreign markets (such as Eutelsat and Asia Satellite Telecommunications Co., Ltd.).[181] The government entities include parts of the U.S. government and foreign governments, including the Russian Federal Space Agency and the European Space Agency.

85. Nature of the Competitive Process. Satellite buyers generally do not own manufacturing facilities and must obtain spacecraft from manufacturers. In some instances, buyers require "turn-key" systems that take the process from design and manufacture, through launch, and provision of ground control operations post-launch. Others buyers have substantial physical and knowledge infrastructure that require far less involvement by the manufacturer after the completion of the manufacturing stage.

86. Satellite manufacturers compete on price and quality. While price is an important consideration, quality competition implies that buyers have varying requirements and often look for innovative solutions that require significant expertise and resources. Thus, while some buyers seek a straightforward solution that implies price competition dominates, others have more stringent technological requirements that call for greater technical expertise (quality) and expense.

2. Earth Station and Terminal Equipment Suppliers

87. Overview of Earth Station and Terminal Equipment Producers. There are numerous classes of earth stations and satellite user terminals. In general, there are three different general types of earth stations or terminals used with satellite systems: (1) telemetry, tracking and control (TT&C) earth stations; (2) feeder-link earth stations; and (3) user earth stations or terminals. TT&C earth stations provide the satellite system operator with a means to monitor and control the satellite(s). Feeder link earth stations used in the MSS and hub earth stations used in the FSS are used to connect the communication traffic flowing to and from the satellite to the public switched telephone network (PSTN), the Internet or a particular customer's premises, providing a means for the system users to communicate beyond the satellite system itself. Feeder link earth stations are sometimes combined with the TT&C station facility.

88. User earth station or user terminals connect the user directly with the satellite. These earth stations and terminals are different shapes and sizes depending upon the type of service provided. For example, FSS system user terminals can vary from the small antennas associated with ubiquitous VSAT, point-of-sale, and Internet distribution systems to the much larger antennas associated with industrial "teleports." FSS earth stations may be directly owned by the corporations renting satellite

[181] U.S. Federal Aviation Administration, *Quarterly Launch Report, 2nd Quarter 2009*, available at http://www.faa.gov/about/office_org/headquarters_offices/ast/media/2Q2009%20Quarterly%20Report.pdf (visited Sept. 9; 2010); *Semi-Annual Launch Report, Second Half of 2009* at A-1 to -2, available at http://www.faa.gov/about/office_org/headquarters_offices/ast/media/10998.pdf (visited Sept. 9, 2010); *May 2010* at A-1, available at http://www.faa.gov/about/office_org/headquarters_offices/ast/media/semi_annual_launch_ report _051810.pdf (visited Sept. 9, 2010) (collectively, "*FAA Reports*").

transponder bandwidth or by satellite teleport operators.

89. MSS systems utilize small laptop computer or mobile phone-like user terminals that are often sold by VARs (where the satellite manufacturer is a wholesale service provider). Newer MSS systems are being combined with ATC systems, and the user terminals for these systems can differ from some of the other MSS systems in that they are designed to operate with both the satellite and the terrestrial ATC system. While some of these operators are not directly developing user terminals, they are developing chip-sets that can access both the satellite and the terrestrial system and partnering with a terrestrial cellular system and/or mobile phone manufacturer to complete the dual system.

90. Entry Into Earth Station and Terminal Equipment Business. Barriers to entry into the manufacturing and fabrication of earth stations and terminal equipment used in satellite communications are moderate relative to other input suppliers, such as launch services. Efficient production is achieved at moderate levels of production, and the expertise and technical knowledge required to enter this supplier segment of the satellite communications industry is widely available. Firms producing earth stations and terminal equipment for commercial satellite communications are located around the globe.[182]

91. Nature of Competitive Process. The bidding process generally involves multiple vendors bidding to a functional specification produced by the system operator; most components are obtained through multiple vendors by competitive bidding or through multiple VARs. The post-contract award negotiation with satellite operators is unknown since the terminals are treated as consumer products and there are multiple potential vendors. There are probably no post-contract negotiations.

3. Launch Services (Including Manufacture of Launch Vehicles)

92. Overview of the Launch Services Industry.[183] In 2008-09, the following firms offered launch services: Arianespace; International Launch Services, Inc. ("ILS"); Sea Launch Co. LLC ("Sea Launch"); Space Exploration Technologies Corp. ("SpaceX"); Orbital Sciences; and Land Launch (affiliated with Sea Launch). Sea Launch's presence in the market was reduced by a launch failure in 2007 that idled it.[184] Sea Launch entered Chapter 11 bankruptcy in mid-2009[185] and the United Launch

[182] *See, e.g.*, *2011 International Satellite Directory* (Sonoma, CA: Satnews Publishers, 2011), vol. 1 - The Satellite Industry, Chapter 1.

[183] Several launch service providers urge that we not examine the launch services sector, noting that past *Reports* specifically eschewed such examination. Comments of International Launch Services filed September 24, 2010 (ILS Comments) at 1-2 and Comments of Arianespace, Inc. filed September 24, 2010 (Arianespace Comments) at 7-8, citing *First Report*, 22 FCC Rcd at 5957, ¶. 10 n.7; *Second Report*, 23 FCC Rcd at 15173, ¶ 8. Arianespace correctly notes that launch services are not within the scope of a "communications satellite system" as defined in 47 U.S.C. § 702(1). The scope of this *Third Report* is "satellite communications services," 47 US.C. § 703(a). Our assessment of the competitive constraint on the exercise of market power by satellite operators requires an assessment of the bargaining power of critical suppliers of inputs to the production of satellite communications services, and launch services are a critical input to satellite communications services.

[184] Michael A. Taverna, *Booster Blues: Difficulties of Launcher Supplier No. 3 Could Trigger Boeing Exit*, Aviation Week & Space Technology at 37 (June 29, 2009) (stating that at one point Sea Launch accounted for "about 15% of commercial spaceflights"); *see also* Alex Derber, *Sea Launch prepares to exit Chapter 11 & restart operations*, FLIGHTGLOBAL, http://www.flightglobal.com/articles/2010/05/25/342384/ sea-launch-prepares-to-exit-chapter-11-and-restart-operations.html (May 25, 2010) (visited Aug. 22, 2010).

[185] In late 2010, Sea Launch emerged from bankruptcy mostly Russian-owned. Peter B de Selding, *Divergent Satellite Market Forecasts Spark Debate*, Space News (Sept. 10, 2010) available at http://www.spacenews.com/satellite_telecom/091010divergent-satellite-market-forecasts-sparks-debate.html (visited September 20, 2011).

Alliance ("ULA"), U.S. companies Lockheed-Martin and Boeing,[186] market their launch services almost exclusively to the U.S. government.[187]

93. Launch services consist of the following activities: designing and building the rocket (or "launch vehicle"); building and operating a launch site,[188] receiving rockets and satellites at the launch site, mounting them onto the launch pad, fueling the rocket, performing final testing, performing the launch (perhaps including recovering the rocket), cleaning up after the launch, and (optional) having insurance against accidents. In some cases, the launch services provider also obtains the spacecraft (communications satellite) for the satellite operator. The launch services provider itself is primarily an integrator, obtaining the rocket and the launch site from other entities: ILS, for example, has only sixty employees.[189]

94. It appears that, in 2008-2009, the available commercial launch capacity was sufficient to meet the total demand for commercial launches.[190] Further, there appears to be some excess capacity on the supply side of the launch services market available to satellite operators.[191]

[186] Technically, Lockheed Martin addressed commercial customers through Lockheed Martin Commercial Launch Services.

[187] EchoStar Comments at 2 (in 2008 virtually all of ULA's capacity was used by the U.S. Government and therefore unavailable to private entities); Peter B. de Selding, *Sea Launch Bankruptcy Stokes Fears of Rising Prices*, Space.com (June 29, 2009), available at http://www.space.com/news/090629-busmon-sealaunch-bankruptcy.html (visited Sept. 20, 2011) (ULA's "two principal U.S. rockets, Atlas and Delta, have in effect removed themselves from the market to focus on more profitable U.S government business"); *CSIS Report* at 14 ("ULA has supported only two commercial launches in the past four years").

Another facet of these entities' commitment to serving the U.S. government is that they give low priority to commercial launches. Commercial customers are subject to delay and preemption by higher priority (government) missions, which may endanger their Commission-mandated deadlines for launch and operation.

[188] The major launch sites discussed herein are owned by governments, not companies that provide launch services.

[189] International Launch Services, *About Us*, http://www.ilslaunch.com/about-us (visited Sept. 8, 2010) (*ILS Web Page*). Rocket manufacturers are largely integrators themselves, often obtaining most of their components from subcontractors.

[190] U.S. Federal Aviation Administration, Quarterly Launch Report, 2nd Quarter 2009, available at http://www.faa.gov/about/office_org/headquarters_offices/ast/media/2Q2009%20Quarterly%20Report.pdf (visited Sept. 9; 2010); Semi-Annual Launch Report, Second Half of 2009 at A-1 to -2, available at http://www.faa.gov/about/office_org/headquarters_offices/ast/media/10998.pdf (visited Sept. 9, 2010); May 2010 at A-1, available at http://www.faa.gov/about/office_org/headquarters_offices/ast/media/semi_annual_launch_ report _051810.pdf (visited Sept. 9, 2010) (collectively, "FAA Reports").

[191] *Id.*

95. These facts about launch services companies are displayed in Table III.8.

TABLE III.8

CAPACITIES OF LAUNCH SERVICES PROVIDERS, 2008-09
(LARGE GEOSTATIONARY SATELLITES)

Launch Services Company	Launch Pads[192]	Estimated Annual Launch Capacity[193]
Arianespace	2	12
ILS	3	18
Sea Launch	1	6

96. Buyers of Launch Services. The buyers of launch services include commercial satellite operators, manufacturers, and other entities, including governments. The process by which a satellite operator chooses a launch services provider typically takes from two months to a year and begins with the issuance of a Request for Proposal ("RFP"). One common method is for the satellite operator to issue an RFP for a "turnkey" operation in which the winning launch services provider will obtain rockets and a launch site, and will conduct all the other activities described above. It is also common for a relatively experienced satellite operator to perform some of these activities itself and issue an RFP for relatively few activities. In another common variation, the commercial operator chooses the manufacturer of its satellites and that manufacturer issues the RFP and does the primary bargaining with launch services companies.[194]

97. In their responses to the RFP, competing launch services providers indicate launch price, launch site availability,[195] payment schedule, technical characteristics of their launch vehicles, value-added services, and the reliability of their launches.[196] Negotiations then occur between the satellite operator and the competing bidders. The satellite operator or its agent then makes its decision.[197]

98. Most decisions award the entire launch operation to one bidder, but split awards to several providers sometimes occur especially when many satellites are being launched. The contract

[192] For SpaceX, *see www.spacex.com/downloads/spacex-brochure.pdf*; for the others, Prashant Butani, *The Emerging Launch Market Threat?*, http://www.satmagazine.com/cgi-bin/display_article.cgi?number =1249759337 (Oct. 2008) (visited Sept. 21, 2011) (*Butani*).

[193] This assumes constant operation and 6 launches per pad annually (*see* note ["Sea Launch has a theoretical capacity"]-[two down] *infra*).

[194] In this variation, the satellite manufacturer may agree to transfer title to the operator only when the satellite is in proper orbit (delivery in orbit).

[195] *CSIS Report* at 16.

[196] *See, e.g.*, Arianespace *2008 Annual Report* at 8 (attributing growth in orders in 2008, "despite average prices higher than the competition, [to] Ariane 5's quality and reliability").

[197] *See generally* Arianespace at 5-6.

typically specifies a fixed price, which puts on the launch services provider the risk of currency fluctuation (a potentially significant factor for the French and Russian providers). Satellite operators with more than average bargaining power are able to inject into their contracts provisions for performance-based penalties, bonuses, liquidated damages, and "walk-aways." Performance of a contract for launch services typically requires more than 18 months.[198]

99. A satellite operator faces no substantial switching costs in changing from one supplier of launch services for one fleet to another for the next fleet. Indeed, sometimes a satellite operator will make one agreement with one launch services provider and a "back-up" agreement with another in case of an unforeseen problem involving the first one.[199]

100. Providers of launch services offer a relatively undifferentiated product to satellite operators, and derive a substantial share of their revenue from the commercial sector. Although some providers have more launch sites than others and some rockets have greater capacity than others, no provider of launch services has a lock on any satellite operator.

101. As indicated above, there appears to have been a modest excess of supply over demand for launch opportunities available to satellite operators in 2008-09. Consequently, it appears that launch suppliers have not unduly constrained the supply of launch services.

4. Launch Insurance Vendors

102. Overview of Launch Insurance Vendors. The space insurance industry consists of brokers, underwriters, re-insurers, and retrocessionaires. Brokers evaluate the insurance needs of satellite operators, and then engage underwriters who formally construct and finance the insurance policy. Underwriters typically engage re-insurers, who provide additional financial support for the policy. Re-insurers "insure" insurance companies, by providing additional financial resources once the insurance companies establish the parameters of the coverage.[200] Re-insurance allows the underwriters to diversify risk both by (a) shedding much of the risk of any particular contract and also by (b) releasing financial resources that permit the underwriter to write additional contracts.

103. In addition to brokers, underwriters, and reinsurers, retrocessionnaires provide "re-insurance" to reinsurers. Reinsurers and retrocessionaires often construct diversified packages of insurance policies into financial instruments that are then sold to private investors. These packages of insurance assets, sometimes referred to as "sidecars," provide buyers of packaged re-insurance with assets uncorrelated with other financial assets, hence providing diversification.

104. Globally, over thirty companies provide launch and in-orbit coverage. The ten largest companies provide approximately sixty percent of the total insurance coverage.

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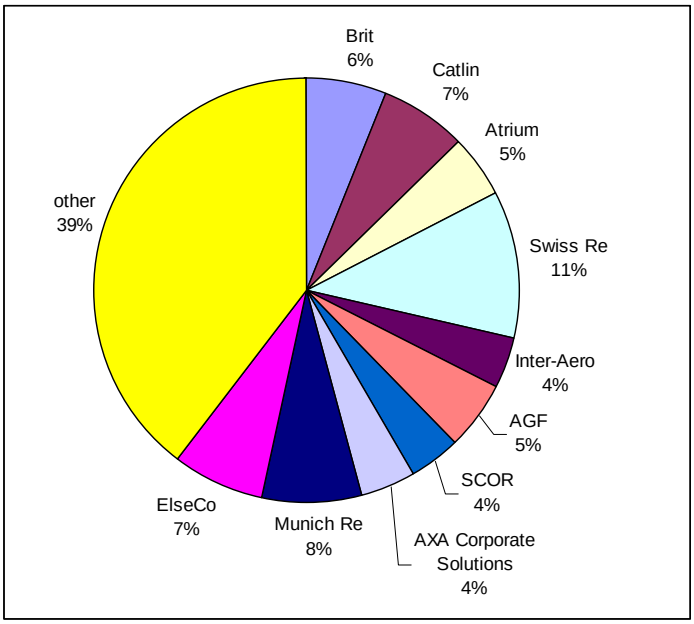
[198] The descriptions of the bargaining process in this paragraph, as well as other aspects of the satellite launch business, were obtained in conversations with executives at the Satellite Industry Association on June 16, 2010; Intelsat on August 19, 2010; Arianespace on August 19 and September 20, 2010; ILA on August 31, 2010; Lockheed Martin on September 1, 2010; Euroconsult on September 21, 2010. *See also Edwards*.

[199] In these cases, the satellite operator's contract with its satellite manufacturer may call for the satellites to be compatible with several rockets.

[200] Powers and Shubik suggest a square-root rule for reinsurers, *i.e.*, the optimal number of reinsurers is given by the square root of the number of primary insurers. Powers and Shubik, *A Note on a "Square-Root Rule" for Reinsurance*, Cowles Foundation for Research in Economics, Yale University, 2005.

FIGURE III.3

SPACE INSURANCE, COMPANY REVENUE SHARE[201]



105. Entry Into Launch Insurance Business. When profits rise in the space insurance industry, relative to the industry average, entry by small new firms is common. Many of the new entrants are, however, undercapitalized, and exit is frequent in the industry following losses of spacecraft.[202]

106. Buyers of Launch Insurance. Insurance can be purchased to cover satellite production, transportation, pre-launch, launch, and in-orbit operation. The most important types of insurance coverage are pre-launch, launch, and in-orbit insurance.[203]

107. In Figure III.4, cost of coverage is shown by the maximum, minimum, and average rates from 1969 to 2009. Rates are determined by the associated risk, which includes the track record of the technology and the expertise and success rates of the insured.

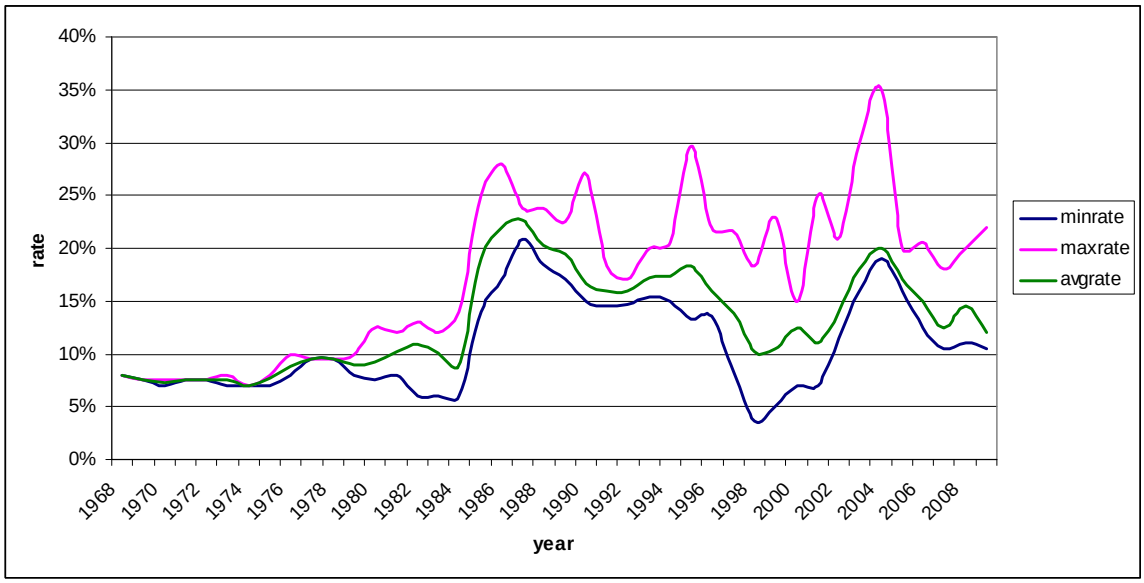
[201] Data from Piotr Manikowski, Poznan University, 2010, and Manikowski, Piotr and Mary A. Weiss, "*The Satellite Insurance Market and Underwriting Cycles*," 2007.

[202] Jeff Poliseno, CEO, ISB, *The Future of the Space Insurance Industry*, World Space Risk Forum, Dubai, March 2010.

[203] Schoffski, O. and Andre Wegener, "*Risk Management and Insurance Solutions for Space and Satellite Projects*," The Geneva Papers on Risk and Insurance, Vol. 24, No. 2, April, 1999.

FIGURE III.4

COST OF LAUNCH INSURANCE COVERAGE, 1969-2009[204]



108. Once a satellite is deployed and operational, much of the risk has been borne, and subsequent losses are less than total. For new satellites, the full coverage in-orbit period is typically between one and three years, after which the policy is renewed annually at lower coverage levels.[205]

109. Launch vehicle failure rates for geostationary satellites averaged approximately 7.9 percent for the period between 2002 and 2009.[206] First year failure rates for geostationary satellites launched since 2000 are approximately 6.6 percent, while second and subsequent years are approximately 1.8 percent.[207] Most losses occur either at launch (43 percent) or in the first month in orbit (43 percent).[208]

110. Approximately 130 insured satellites account for a total insurance coverage of $17 billion and all but $1 billion of these assets are in geostationary orbit.[209] This works out to about $130 million of average insured value per insured satellite.[210] Total insurance premiums for the industry range between $800 million and $1 billion annually. Thus, the annual premiums for extent coverage average

[204] Costs are expressed as a fraction of payload value. Data from Piotr Manikowski, Poznan University of Economics, 2010, and Manikowski, Piotr and Mary A. Weiss, "*The Satellite Insurance Market and Underwriting Cycles*," 2007. Data for 2010 are not available.

[205] *Satellite Communications: Arbitrator Perspective*, International Commercial Arbitration Practice: 21st Century Perspectives, Chapter 39 (LexisNexis 2010).

[206] Kunstadter, World Space Risk Forum, Dubai, 2010.

[207] *Id.*

[208] *Id.*

[209] Insurance Day, November 13, 2009.

[210] Insurance Day, November 4, 2009. The average is computed by dividing $17 billion by 130.

approximately 6 percent of the average value of in-orbit satellites.[211] One estimate of new launch plus one year in space coverage puts the cost at 13 percent of the cost of the satellite plus the cost of the launch.[212]

111. On average, the industry experiences two or three total losses per year.[213] If we assume that each loss ranges from $100 to $200 million and that there are 2.5 losses per year, total average annual losses are $375 million, which is consistent with recent reported industry loss figures of approximately $400 million.[214] Industry profits for 2009 are estimated at $400 million.[215]

112. Alongside relatively generic or recurring risks related to design, manufacturing, and launching, satellite operators and insurers confront random or individual risk in solar flares, meteors, and in-orbit collisions, including collisions with space debris, among other things.

113. Competition in the space insurance industry is cyclical. Profitability attracts new entrants who compete in price to gain market share. Rates fall to the point where premiums are inadequate relative to losses (as shown in Figure III.5), leading to bankruptcies and exit. Consequently, price competition softens and profitability is restored.

[211] Taking the high end of $1 billion, and dividing by $17 billion, yields 5.9 percent.

[212] *Satellite Communications: Arbitrator Perspective*, International Commercial Arbitration Practice: 21st Century Perspectives, Chapter 39 (LexisNexis 2010).

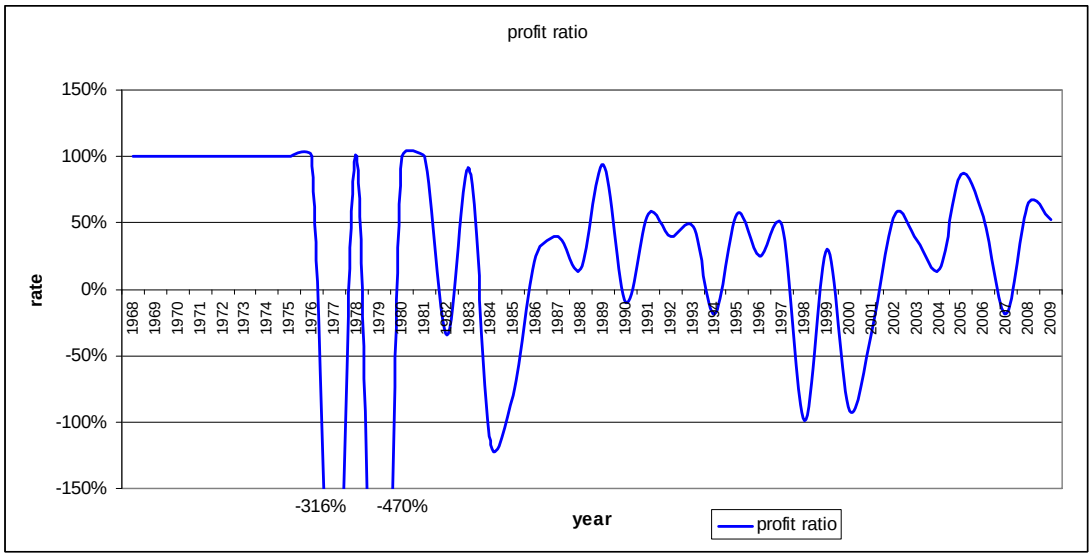
[213] Insurance Day, November 4, 2009.

[214] Insurance Day, November 30, 2009. For example, the industry reported total losses of approximately $400 million in 2009.

[215] Insurance Day, November 30, 2009.

FIGURE III.5

INDUSTRY PROFITABILITY[216]



114. Alternatives to Purchasing Insurance. Firms can choose to partially or fully self-insure.[217] Intelsat appears to choose a higher level of self-insurance. Self-insurance places the potential liability costs on the firm, and the decision to self-insure should occur only if the expected costs of insurance exceed the expected costs of self-coverage.

115. Insurance promotes technological innovation by protecting firms and venture capital from large losses and by providing expertise that helps the industry better understand the sources of failure.[218]

5. Industry Financing

116. The two largest firms in the FSS industry are Intelsat and SES. Each firm controls approximately 25 percent of the total global industry.[219]

117. Intelsat is the largest fixed-satellite operator when measured by revenue and is privately held. The company operates 52 satellites in geostationary orbit,[220] and 17 earth stations that provide tracking, telemetry, and control services for these satellites.[221] Of the 54 satellites, five are covered by in-

[216] Data from Piotr Manikowski, Poznan University of Economics, 2010, and Manikowski, Piotr and Mary A. Weiss, "*The Satellite Insurance Market and Underwriting Cycles*," 2007.

[217] For example, SES largely insures its entire fleet (and leverages the group coverage into lower rates), but retains part of the in-orbit risk. *See* SES Investor Day, Finance Update, 2008, at 9, and SES Annual Report, 2009, at 55.

[218] Schoffski, O. and Andre Wegener, "*Risk Management and Insurance Solutions for Space and Satellite Projects*," The Geneva Papers on Risk and Insurance, Vol. 24, No. 2, April, 1999.

[219] Space News, June 30, 2008.

[220] Intelsat S.A., 10-K, at14, 2010.

[221] *Id*. at 19.

orbit insurance,[222] eleven are in inclined orbit,[223] and three are operating at reduced transponder capacity.[224]

118. SES, the second largest fixed-satellite operator in the world when measured by revenue, was established by the Luxembourg government in 1985 as Europe's first private satellite operator. It currently has 47 geostationary satellites in orbit and another 13 satellites in production that are scheduled to be launched by 2014.[225]

119. Capital structure in the fixed-satellite industry is heterogeneous. By capital structure, we refer to the choice of debt or equity to finance operations. Some firms, such as Intelsat, use all debt to gain cash flow to finance their operations, while others, such as SES, primarily use equity. SES is a publicly-traded corporation, while Intelsat is (majority) held by BC Partners, a private equity firm.

120. In 2009, Intelsat reported revenues of $2.51 billion, operating expenses of $1.97 billion, total interest expense of $1.36 billion, and a net loss of $780 million.[226] Cash flow from operating activities was $870 million, and free cash flow from operations was (negative) $70 million.[227] Intelsat S.A. reported EBITDA (earnings before interest, taxes, depreciation, and amortization) of $1.4 billion.[228] The data are given in Table III.9.

121. In 2010, Intelsat reported revenues of $2.54 billion, operating expenses of $1.63 billion, and total interest expense of $1.38 billion, and a net loss of $510 million.[229] Cash flow from operating activities was $1.02 billion, and free cash flow from operations was $.36 million. Intelsat S.A. reported EBITDA of $1.7 billion.[230] The data are given in Table III.9.

122. In 2009, SES reported revenues of $2.23 billion, operating expenses of $590 million, and total interest expense of $300 million.[231] Cash flow from operating activities was $1.50 billion, and free cash flow from operations was $490 million. SES reported EBITDA of $1.66 billion.[232] The data are

[222] *Id*. at 20. Nine percent of Intelsat's fleet has in-orbit insurance, which implies the remaining 91 percent is self-insured.

[223] *Id.* at 16. Thus, approximately 20 percent of Intelsat's extant fleet is in inclined orbit. A satellite is in inclined orbit when the orbit varies from zero degrees with the equatorial plane. Satellites in inclined orbit are typically older satellites that are running short of station-keeping fuel, and drift along their north-south (and east-west) axis in a quasi-figure eight pattern to save fuel. This drift increases the cost of ground tracking, and reduces the value of transponder service.

[224] *Id*. at 21.

[225] http://www.ses.com/ses/PDFs/MediaRoom/Corporate/SES_Brochure_shanghai_E.PDF (visited Sept. 21, 2011).

[226] Intelsat S.A., 10-K, at 44, 2010.

[227] Intelsat S.A., News Release, 2010-7, 2010. Free cash flow is net cash from operating activities minus payments for satellites and other property and equipment, including capitalized interest. Free cash flow is a non-GAAP measure.

[228] EBITDA, a non-GAAP measure, is constructed by adding interest, taxes, depreciation, and amortization back into net income. EBITDA is a popular measure used in a variety of technology and communications industries financial reports, among others, and proponents of the measure claim it provides a useful intra-firm benchmark.

[229] Intelsat S.A., 10-K, 2011.

[230] *Id*.

[231] SES, Annual Report, 2009.

[232] *Id*.

123. In 2010, SES reported revenues of $2.31 billion, operating expenses of $580 million, and total interest expense of $300 million. Cash flow from operating activities was $1.47 billion, and free cash flow from operations was $260 billion. SES reported EBITDA of $1.72 billion.[233] The data are summarized in Table III.9.

[233] SES, Annual Report, 2010.

TABLE III.9

2009-2010 FINANCIAL DATA: INTELSAT AND SES[234]
(Millions US$,[235] except where noted)

	INTELSAT		SES	
	2009	2010	2009	2010
Revenues	2,513	2,545	2,252	2,309
Operating Expenses	1,968	1,633	593	584
Interest Expense	1,363	1,379	291	316
Net Gain or Loss	(782)	(508)	664	648
Cash Flow[236]	876	1,018	1,496	1,472
EBITDA	1,391	1,723	1,659	1,724
Free Cash Flow[237]	(163)	31	448	259
EBIT[238]	545	912	1,659	1,725
Operating Profit[239]	(259)	113	979	1,031
Ratios				
Debt/EBIDTA[240]	10.9	9.3	2.99	2.91
EBITDA/Interest Expense[241]	1.02	1.23	5.33	5.38

[234] Intelsat 10-K, 2009, 2010; SES, Annual Report, 2009, 2010.

[235] Data for SES converted from Euros using the average annual exchange rate given at http://www.federalreserve.gov/releases/g5a/current/.

[236] From operating activities.

[237] Operating cash flow minus capital expenditures

[238] Revenues minus operating expenses.

[239] EBIT minus depreciation and amortization.

[240] The total debt to EBIDTA (Earnings Before Interest, Depreciation, Taxes, and Amortization) ratio is a measure of long-term financial risk. The ratio provides a "snapshot" of the time (measured in years) it would take for a firm to retire its indebtedness at current EBIDTA levels. Lower values of the ratio imply lower financial risk, since indebtedness can be repaid sooner to bondholders. This reduces lenders' exposure to default or bankruptcy by the borrower. Higher values of the ratio imply the converse. An expanded discussion of this ratio is provided by Richard Brealey, Stewart Myers, and Alan Marcus, Fundamentals of Corporate Finance, (McGraw-Hill/Irwin, 2010), Chapter 4.

[241] The EBIDTA (Earnings Before Interest, Depreciation, Taxes, and Amortization) to interest expense ratio is a measure of short-term financial risk. This ratio yields a measure of the ease by which a firm can cover its annual interest expense. Higher ratio values imply lower financial risk for lenders, since the firm has ample resources to cover debt obligations. Lower values of the ratio imply the converse. An expanded discussion of this ratio is (continued….)

124. Government credit guarantees also play a role in the fixed-satellite industry. For example, France's export-credit agency Coface (the French counterpart of the Export-Import Bank of the United States), has been active in providing export credit facilities for SES (as well as Globalstar and Iridium).[242]

125. Other innovations in funding commercial spacecraft include contracting with a government partner, such as the military, to share in the cost of construction and launching commercial satellites. Such arrangements can provide the government partner with transponder capacity or other capabilities, provide the government partner cost savings relative to standalone spacecraft procurement, and reduce the financing requirements that the commercial satellite operator would otherwise have to meet.[243]

6. Technical Personnel

126. Technical personnel are essential inputs in the production of satellite communications services as well as the manufacturing of spacecraft and earth segment facilities that originate and terminate satellite communications. The skill levels required in the satellite communications industry vary from highly-trained engineers with degrees in a number of different engineering disciplines to skilled technicians with some formal training but years of hands-on operating experience in deploying, maintaining, and supporting complex communications satellite networks. These technical personnel perform many, diverse functions, including designing and engineering of spacecraft payloads, antennas, and launch vehicles; installing ground network facilities; managing and operating network control facilities; working for domestic and international regulatory changes, training staff and clients; testing and troubleshooting circuit problems; developing technical documentation; designing hybrid satellite-terrestrial communications network solutions for customers; and performing other technical functions essential to supplying and maintaining highly reliable transmission paths using satellites positioned around the globe. Additionally, satellite operators also retain highly-specialized consultants to assist satellite operator staff in the design, manufacturing and testing of new spacecraft, extend the marketing reach of the satellite operator, assist with the deployment of ground segment, and many other very specialized but perhaps non-recurring special projects.

127. Notwithstanding the highly specialized, even unique skills and knowledge required to qualify for employment in the satellite communications industry, the labor market for such skilled personnel tends to resemble many other labor markets for highly-trained workers. For a number of skill categories, communications satellite operators may today recruit worldwide for highly-trained professional staff, since many nations now have, or are developing, a domestic satellite communications industry. One consequence of this international dimension of the labor market for satellite communications is that labor shortages when demand exceeds supply are unlikely to persist for a substantial period of time.

128. Although highly-skilled technical personnel are generally well-compensated in the satellite communications industry, there is no evidence that such technical personnel taken as a whole are able to exercise sufficient bargaining power relative to the satellite operator such that the profitability of the satellite operator is appreciably constrained by the compensation expectations or salary negotiations

(Continued from previous page)
provided by Richard Brealey, Stewart Myers, and Alan Marcus, Fundamentals of Corporate Finance, (McGraw-Hill/Irwin, 2010), Chapter 4.

[242] Satellite Today, Jan.24, 2011, Investors: Finding Safety in Satellite Again.

[243] *Australia's Intelsat Hosted IS-22 Satellite*, Defense Industry Daily (April 28, 2010), available at http://www.defenseindustrydaily.com/?s=Intelsat+Australian+Defense+Forces.
.

of technical personnel. For the most part, satellite operators are able to recruit most staff from specific labor markets, often global in scope, that tend to be reasonably competitive when viewed from a longer term perspective.

7. Government Regulation of Spectrum and Orbital Resources

129. In the United States, the federal government is the only entity able to allocate spectrum. The regulatory responsibility for the radio spectrum (the radio frequency portion of the electromagnetic spectrum) is divided between the Commission and the National Telecommunications and Information Administration (NTIA), which is a part of the Commerce Department. The Commission administers spectrum for non-federal use (*i.e.*, state, local government, commercial, private internal business, and personal use) while NTIA administers spectrum for federal use (*e.g.*, military, federal agencies). Within the Commission, the Office of Engineering and Technology (OET) provides advice on technical and policy issues pertaining to spectrum allocation and use.

130. The Commission assigns, licenses, [244] and authorizes frequencies and associated orbital locations for radiocommunications consistent with the Commission's Table of Frequency Allocations ("Allocations Table").[245] The Allocations Table is a compilation of the U.S. Table of Frequency Allocations and the International Table of Frequency Allocations (in the International Table, the ITU has divided the world into three Regions, with the United States in Region 2).

131. One of the prime motivations behind the licensing policy established by the Commission is to expedite the licensing process and the delivery of services to consumers. With regard to issuing licenses, the Commission has two different licensing frameworks: a modified processing round approach for non-geostationary satellite orbit (NGSO)-like systems, and a "first-come, first-served" procedure for geostationary satellite orbit (GSO)-like systems.[246] Prior to Commission adoption of these licensing frameworks, licensing processing time could take two-to-three years; now, the vast majority of licenses is granted in less than one year.[247]

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[244] *See In the Matter of Amendment of the Commission's Space Station Licensing Rules and Policies, Mitigation of Orbital Debris*, IB Docket No. 02-34, First Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 10760, 10764 (Rel. May 19, 2003) (*Space Station Reform Order*).

[245] *See* 47 U.S.C. §§ 2.104-2.106. The general rules for reading the Table are: Primary services for a specific frequency or band of frequencies are printed in "capitals," *e.g.*, FIXED.

1. Secondary services are printed in "sentence case or normal characters," *e.g.*, Mobile. Stations of a secondary service:
    - Shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date;
    - Cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date; and
    - Can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date

[246] *See In the Matter of Amendment of the Commission's Space Station Licensing Rules and Policies, Mitigation of Orbital Debris*, IB Docket No. 02-34, First Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 10760, 10764 (Rel. May 19, 2003) (*Space Station Reform Order*).

[247] Changes in the satellite industry necessitated a change by the Commission, *e.g.*, more satellites were operating in two or three frequency bands; satellites increased their capacity and power levels; the ITU revised its procedures to require satellite operators to bring planned systems into use within seven years rather than nine as was allowed previously; MSS and NGSO applications could result in particularly long and complex licensing proceedings; and delays impose costs on service providers and customers. *First Space Station Reform Order* at 10765.

D. Major Customer Groups

132. Some of the major customer groups that utilize FSS include: content providers and broadcasters; direct-to-home (DTH) operators; government (military, weather, disaster relief); corporations; telecommunications providers; transportation; construction and energy companies.

133. Below we provide an illustrative list of the type of customers that used FSS and MSS in 2009. We also supply the percentage of revenues that these customers represented for the satellite operators listed below.

TABLE III.10

CUSTOMERS OF FSS OPERATORS[248]

	Intelsat[249]		Eutelsat		Telesat		SES	
	2009	2010	2009	2010	2009	2010	2009	2010
Video	31%[250]	31%	71%	69%	52%	55%	61%	63%
Network Services	49%[251]	49%	19%	21%	44%	41%	29%	28%
Government	17%[252]	19%	9%	10%	4%	4%	9%	8%

[248] Chart data for the FSS operators has been provided by Futron Inc.

[249] In particular, for the year ended December 31, 2009, ten of Intelsat's customers and their affiliates represented 20 percent of Intelsat's revenues. *See Intelsat Prospectus*, dated May 11, 2010, *available at* http://www.sec.gov/Archives/edgar/data/1156871/000119312510115820/d424b3.htm. Intelsat's customers include media companies, wireline and wireless telecommunications operators, data networking service providers, multinational corporations, and internet service providers. It also provides commercial satellite capacity to the U.S. government and other military organizations and contractors. According to Intelsat, "the span of [its] business ranges from global distribution of content for media companies to essential network backbones for communications providers in high-growth emerging markets." *Intelsat Prospectus* at 90.

[250] Intelsat's video or media customers include national broadcasters, content providers and distributors, cable programmers and direct-to-home platform operators. *Id.*at 95.

[251] Intelsat's network services customers include wireline and wireless telecommunications carriers, including global, regional and national providers, corporate network service providers, value-added services providers, such as those serving the oil and gas and maritime industries, and multinational corporations. *Id.* at 93.

[252] Intelsat's government customers include the U.S. military, civilian agencies, and commercial customers serving the defense industry. *Id.*at 97.

TABLE III.11

CUSTOMERS OF MSS OPERATORS, BY PERCENTAGE OF REVENUE[253]

	Inmarsat		Iridium		Globalstar[254]	
	2009	2010	2009	2010	2009	2010
Maritime Voice	15	13				
Maritime Data	36	36				
Land Mobile Voice	1	1				
Land Mobile Data	20	20				
Aeronautical	11	14				
Leasing	15	15				
Commercial[255]			50	54		
Government[256]			24	18		
Subscriber Equipment			26	28		
Government (including federal, local and state)						
Public Safety and Disaster Relief					24	23
Recreation and Personal					18	19
Maritime and Fishing					6	6
Other[257]					19	20

[253] Inmarsat and Iridium chart data for 2009 provided by Futron Inc. 2010 Inmarsat chart data based on Inmarsat's 2010 annual report. *See Inmarsat Annual Report and Accounts 2010 available at* http://www.inmarsat.com/Downloads/English/Investors/Inmarsat_Annual_Report_Accounts_2010.pdf?language=EN&textonly=False. Iridium chart data based on Form10-K for 2010 *available at* http://edgar.brand.edgar-online.com/EFX_dll/EDGARpro.dll?FetchFilingHTML1?ID=7780530&SessionID=aw-eHqvBONNlh47. Globalstar chart data based on Globalstar's combined operations within the United States and Canada. *See Globalstar, Inc., Form 10-K, Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for year ended December 31, 2009, available at* http://www.sec.gov/Archives/edgar/data/1037388/000119312510051613/d10k.htm (*Globalstar 2009 Form 10-K*). Globalstar chart data based on Form 10-K for 2010 *available at* http://investing.businessweek.com/research/stocks/financials/drawFiling.asp?docKey=136-000114420411019122-28DI43PPHB4RN57LR3FSUQJ2S4&docFormat=TXT&formType=10-K.

[254] The data in this column does not sum to 100 percent since it is restricted to business activity in the United States and Canada and does not reflect other international business activities of Globalstar.

[255] Commercial-based buyers are located in markets such as emergency services, maritime, utilities, oil and gas, mining, construction, forestry, and leisure. *See Iridium Communications Inc., Form 10-K, Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the year ended December 31, 2009, available at* http://www.sec.gov/Archives/edgar/data/1418819/000119312510058393/d10k.htm (*Iridium 2009 Form 10-K*).

[256] According to Iridium, the U.S. government is its largest customer. U.S. government customers include the Department of Defense (customer since 2000), the State Department and the Federal Emergency Management Agency. *See Iridium 2009 Form 10-K* at 1, 3.

[257] The remaining 19 percent of customers operate in the telecommunications, oil and gas, natural resources, construction and utilities markets. *See Globalstar 2009 Form 10-K.*

IV. INDUSTRY CONDUCT AFFECTING MARKET STRUCTURE AND SECTOR PERFORMANCE IN SATELLITE COMMUNICATIONS SERVICES

134. This section of the *Report* identifies certain behaviors of both satellite operators and customers that influence the structure of the various satellite industry sectors and determine how well these industry segments meet customer requirements. There are factors, however, other than seller and buyer conduct that may influence industry structure and performance. Such factors, considered exogenous forces that influence both industry structure and behavior, are discussed in Section IV.A and include technological change, U.S. government policies and actions, and the policies and actions of foreign administrations.[258] Following the discussion of exogenous factors, Section IV.B considers specific seller conduct that may affect industry structure and performance, namely, vertical integration, pricing behavior, and certain alleged anticompetitive acts by satellite operators. Finally, Section IV.C considers buyer behavior in both retail and wholesale industry segments.

A. Exogenous Factors Affecting Industry Behavior

1. Technological Change

a. Advances in Satellite Antennas and Signal Processing

135. The antenna of a satellite consists of a "feed structure" and a reflector. The feed structure illuminates the reflector with the Radio Frequency ("RF") power to be transmitted to earth. The reflector concentrates the power from the feed structure into a tight beam, or beams, much like the reflector of a flashlight concentrates light from the flashlight's lamp. With proper illumination from the feed structure, the satellite antenna can produce several hundred small beams on the earth's surface with the RF power in each beam being, more or less, independent of the power in the other beams. Changing the feed structure will vary the illumination on the reflector and result in a different configuration of spot beams, increasing or decreasing the number, size, and location of the spot beams on the earth's surface.

136. The same holds true in receiving power from a transmitter on the Earth's surface. The transmitted signal is "collected" by the satellite reflector and focused on the feed structure. Different parts of the feed structure receive the power and combine it as if the power came from several hundred spot beams. Changes to the feed structure can, again, modify the apparent size and location of the receive spot beams. Changes to the feed structure can be accomplished by adjusting hardware onboard the satellite, through satellite on-board signal processing or by transmitting the user signals received by the feed structure to the earth and performing the signal processing at a central processing station.

[258] Within the context of the discussion of Section IV.A, an *exogenous* factor or force refers to some variable or parameter that influences the outcome of the interplay between other variables, such as buyers and sellers interacting in a specific market where equilibrium output price and quantity are determined, but is not itself influenced by the interaction of the other variables. The notion of exogeneity generally is most sharply drawn in econometrics. See, for example, Robert F. Engle, David F. Hendry, and Jean-Francois Richard, "Exogeneity," *Econometrica* 51 (1983):277-304.

137. Skyterra-1, launched by LightSquared in 2010, has the largest commercial satellite antenna reflector on an MSS satellite and next year we expect that a satellite with an even larger reflector will be launched, again on a commercial MSS satellite.[259] As the size of the reflector increases, the satellite gains an increase in the effective transmit power (by concentrating the actual RF power into smaller spot beams) and an increase in receive sensitivity (due to the larger collection area of the reflector). Increases in the transmit power and receive sensitivity permit the satellite to operate with smaller user terminals, and the latest MSS satellites should be able to communicate with cell phone-size user terminals.

b. Ground Based Signal Processing

138. As mentioned, effective changes to the feed structure can be accomplished in a number of ways, including by processing the user signals passing through the physical antenna feed structure on the satellite. The latest trend in the MSS systems is to perform the signal processing on the ground. Using ground signal processing provides several advantages and at least one significant challenge. The challenge is that effective use of ground based processing requires that the user signals passing through the various elements of the feed structure be transmitted from the satellite to the central signal processing facility, or from the signal processing facility to the satellite. The feed structure can consist of, potentially, tens of physical transmit and receive elements. The actual signals from each element for the entire user frequency band must be up-linked to, and down-linked from, the satellite. This results in a very large requirement for feeder link capacity. This challenge can be met by dividing the user signal into portions small enough to fit into the feeder link assignment and using multiple earth stations spaced far enough apart that the feeder links associated with each earth station do not interfere with each other. The individual portions of the data streams received by each earth station can then be re-combined at the signal processing facility.

139. The most obvious advantages of using ground signal processing is that the satellite is simplified by the removal of the on-board processors. The simpler the satellite, the less there will be to go wrong. Another advantage has to do with Moore's Law, *i.e.*, commercially available computing power doubles roughly every two years. Once a satellite is constructed the satellite's computing power is fixed for the life of the satellite. Moving the signal processing to the ground permits the operators to take advantage of increases in computing power as they occur and are cost effective for the system. Additional signal processing, for example, to add interference suppression, signal enhancement, and flexible re-configuration of spot beams can be added to the system as the computer power and research into signal processing algorithms permits. For an MSS system that is also implementing ATC, the flexibility of ground signal processing permits the operators to more easily modify the spot beam coverage of the satellite as the ATC system grows. Additionally, by reconfiguring the spot beams, satellite capacity can be moved to and from areas of the earth as required, allowing more capacity to be provided to areas that have suffered loss of terrestrial communications through natural disasters.

2. U.S. Government Policies and Actions

a. Spectrum Allocations and Orbital Locations

140. As previously noted, in order to provide satellite communications into the United States, an operator must obtain the necessary government approval to use specific radio frequency spectrum and in many cases an associated set of orbital parameters. Although technological advances have steadily increased the ability to fit more users into any given band, radio spectrum remains a finite resource. As

[259] Because no comparably significant technological change in FSS occurred in 2008, this *Third Report* will discuss only changes in MSS.

the Commission noted in the *First* and *Second Reports* to address the fact that spectrum is scarce, the Commission has progressively implemented a more flexible, market-oriented model of spectrum assignment for commercial satellite services.[260] In addition to the two licensing frameworks previously described in this *Report*,[261] the Commission, coupled with certain safeguards against speculation, has also made it easier for licensees to sell their licenses,[262] and instituted secondary market reforms where satellite bandwidth can be put to more efficient uses in response to changing conditions and consumer demands.[263]

b. U.S. Government Policy Regarding Entry

141. Pursuant to the satellite market-opening commitments made by the United States in the World Trade Organization's ("WTO's") Agreement on Basic Telecommunications Services, the Commission has permitted many foreign-licensed satellites to provide FSS and MSS in the United States.[264] The Commission has also allowed entry into U.S. industry segments for satellite services not covered by its commitments.[265] For example, by inclusion on the Commission's Permitted List many non-U.S. licensed satellite operators are permitted to provide service in the United States.[266]

3. Foreign Administrations' Policies and Actions

142. In directing the Commission to prepare this *Report*, Congress requested that the Commission compile "a list of any foreign nations in which legal or regulatory practices restrict access to the market for satellite services in such nation in a manner that undermines competition or favors a particular competitor or set of competitors."[267] As directed by Congress, we requested comment on "the legal or regulatory practices of foreign nations that have the effect of restricting access to that nation's market for satellite services." We also asked commenters to tell us "what types of legal or regulatory practices hinder U.S. firms from fully participating in a given foreign market" and if there are "legal or regulatory practices that favor a particular competitor or set of competitors."[268] We summarize the comments in the record and, consistent with our prior *Reports*, make no determination on the information provided.[269]

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[260] In 2003, the Commission substantially revised the procedures for considering license applications, which had been in place since 1983. *First Space Station Reform Order*, 18 FCC Rcd 10760.

[261] *See supra* para. 131.

[262] *Id.* at ¶ 218.

[263] *Id.* at ¶ 215.

[264] The WTO was established pursuant to the *Marrakesh Agreement Establishing the World Trade Organization*, 33 I.L.M. 1125 (1994).

[265] *See, e.g., EchoStar Satellite, LLC For Blanket Authorization to operate 1,000,000 Receive-Only Earth Stations to provide Direct-to-Home Fixed Satellite Service in the United States using the Canadian-authorized ANIK F3 Satellite at the 118.7º W.L. Orbital Location*, DA 05-3227, Order and Authorization, 20 FCC Rcd 20083, 20087-89, ¶ 14 (2005).

[266] These U.S. government actions and policies are described in more detail in the *First Report*. *See First Report*, 22 FCC Rcd at 5988-91, ¶¶ 113-17.

[267] 47 U.S.C. § 703(b)(3).

[268] *Notice*, 24 FCC Rcd at 5429.

[269] *First Report*, 22 FCC Rcd at 5992, ¶121; *Second* Report, 23 FCC Rcd at 15191, ¶66. See *also* Appendix B.

143. In its comments SIA notes that, in many parts of the world, commercial satellite providers may face foreign competitors that are owned or heavily financed by their respective governments as well as regulatory requirements that raise barriers and favor domestic providers.[270] SIA includes in the record of this proceeding its comments to the United States Trade Representative's (USTR's) 2009 and 2010 Section 1377 Review of Telecommunications Trade Agreements. SIA notes that USTR has made particular mention of problems in China, India, Russia, Korea and other countries.[271] In Costa Rica, for instance, regulatory issues related to authorization of satellite Internet services have delayed licensing of service providers for over two years, though progress is being made.[272] SIA also notes that USTR discusses some of the challenges operators face in countries where government regulations pose unwarranted barriers to providing service.[273] In its comments, SIA identified market barriers established by foreign nations that may discourage entry by U.S. satellite operators or satellite service providers, including:[274]

- Lack of transparent, non-discriminatory and timely licensing procedures;
- Requirements for local presence or a local partner;
- No national treatment (*i.e.*, most favored nation status) for U.S. satellite operators;
- Requirements for completion of the ITU frequency coordination process prior to granting market access;
- Monopolies for domestic satellite operators or service providers;
- Prohibitions on U.S. satellite operators transporting broadcast video signals and associated audio signals; and
- Requirement for deployment of specific technologies.

Appendix B to this *Third Report* reproduces a list of nations that SIA – not the Commission – identified as engaging in one or more of the foregoing barriers to entry by U.S. satellite service providers. These barriers are described more fully in the *First Report.*[275]

[270] Comments of Satellite Industry Association, filed August 23, 2010 (SIA Comments) at 26.

[271] SIA Comments at 28, fn 123, *citing,* U.S. Trade Representative, 2010 National Trade Estimate Report on Foreign Trade Barriers (2010) ("2010 USTR Trade Estimate Report"), *available at* http://www.ustr.gov/sites/default/files/uploads/reports/2010/NTE_COMPLETE_WITH_APPENDnonameack.pdf.

[272] USTR 2011 Section 1377 Review of Telecommunications Trade Agreements, at 16, *available at* http://www.ustr.gov/webfm_send/2788.

[273] SIA Comments at 27, n. 122, USTR 2010 Section 1377 Review of Telecommunications Trade Agreements, at 10, *available at* http://www.ustr.gov/sites/default/files/2010%2003%201377%20REPORT%20 FINAL.pdf (last visited Aug. 22, 2010).

[274] Appendix B to this *Third Report* includes a list of the nations SIA identified as engaging in one or more of the foregoing barriers to entry by U.S. satellite service providers. *See also First Report,* 22 FCC Rcd at 5991-96, ¶¶ 118-137.

[275] *First Report,* 22 FCC Rcd at 5991-96, ¶¶ 118-137.

B. Seller Behavior

1. Vertical Integration in the Commercial Satellite Industry

144. Another trend observed in the satellite industry is vertical integration, *i.e.*, in addition to providing the space segment of satellite communications services the satellite operator also provides the earth segment. Vertical integration enables a satellite operator to provide a complete, customer-specific package.

145. Initially, vertical integration was observed in the emerging satellite systems, *e.g.*, PanAmSat, that competed with intergovernmental satellite bodies such as INTELSAT and INMARSAT. These entrants typically structured themselves in an integrated fashion that combined space and earth segment operations.[276] The privatization of INTELSAT and INMARSAT removed limitations on the ability of those entities to offer vertically integrated services.[277] For U.S. customers, direct access meant that they were no longer required to obtain INTELSAT access by transacting with COMSAT.

146. Some of the vertical integration of recent years has been accomplished via vertical mergers or acquisitions involving pairs of FCC licensees. For example, Inmarsat's acquisition of Stratos Global in April 2009 allowed Inmarsat to expand its distribution chain and sell satellite-based retail services directly to customers.[278] In approving Inmarsat's acquisition of Stratos, the Commission found that efficiencies were likely to result from the vertical combination.[279]

147. Intelsat expanded vertically in 2004 by creating its subsidiary Intelsat General Corp, (IGC), which is a combination of Intelsat Government Solutions Corp. and the acquired Comsat General Corp.[280] In approving the acquisition of Comsat General, the Chiefs of the FCC's International and Wireless Telecommunications Bureaus stated "we find that the combination of Intelsat's operations with the assets it proposes to acquire from COMSAT General Businesses should provide Intelsat with the ability to provide its customers greater end-to-end international communications solutions and allow Intelsat to realize economies of scale and scope."[281] Through IGC, Intelsat offers to corporate users

[276] *See* In the Matter of Establishment of Satellite Systems Providing International Communications, CC Docket No. 84-1299, 101 FCC 2d 1046, ¶ 46 (1985).

[277] 47 U.S.C. § 765(a). "(a) ACCESS PERMITTED.--Beginning on the date of enactment of this title, users or providers of telecommunications services shall be permitted to obtain direct access to INTELSAT telecommunications services and space segment capacity through purchases of such capacity or services from INTELSAT. Such direct access shall be at the level commonly referred to by INTELSAT, on the date of enactment of this title, as 'Level III'." Level III direct access permits non-signatory users and service providers to enter into contractual agreements with INTELSAT for space segment capacity at the same rates that INTELSAT charges its Signatories without having to use a Signatory as a middleman. Direct Access to the INTELSAT System, *Report and Order*, IB Docket No. 98-192, 14 FCC Rcd 15703 (1999) (*Direct Access Order*).

[278] *Robert M. Franklin & Inmarsat, PLC*, IB Docket No. 08-143, Memorandum Opinion and Order and Declaratory Ruling, 24 FCC Rcd 449 (2009) (*Robert M. Franklin & Inmarsat MO&O*).

[279] *Id.* at 24-25.

[280] http://www.intelsatgeneral.com/docs/news/2004-11-18_COMSAT.pdf.

[281] Public Notice, "Authorizations Granted, Applications of Comsat General Corporation, Lockheed Martin Global Telecommunications LLC, Comsat New Services, Inc., Intelsat LLC, and Intelsat MTC LLC to Assign Licenses and Authorizations and Request for a Declaratory Ruling on Foreign Ownership, IB Docket No. 04-235, DA 04-3418, October 27, 2004, at 3.

integrated space segment and earth segment operations along with terrestrial-based transmission facilities and network management services. These turnkey telecommunications "solutions" were formerly only available through terrestrial-based common carriers or satellite resellers/integrators.[282]

2. Pricing Behavior and Market Power

a. Nature of Market Power

148. Most firms have some degree of technical market power,[283] *i.e.*, an ability to raise price somewhat without losing all sales, at least with respect to some of the products supplied to certain industry segments.[284] Given the assumption that all satellite operators have a similar cost structure (although somewhat different cost levels), the pricing of satellite communications services above the marginal cost of production is a necessary attribute of satellite operator conduct essential to the recovery of total industry costs. Pricing by a satellite operator above marginal cost and beyond what is required to recover the total cost of production may be anticompetitive and harmful to consumers. Practically, measurement of technical market power in various segments of the satellite communications industry is both complex and difficult given the very limited data available in the record.

b. Retail and Wholesale Services

149. Both the conceptualization of market power and the pricing of wholesale satellite services differ significantly from retail satellite services. Although satellite radio is presently supplied to consumers by a single satellite operator, other retail satellite applications, such as mobile and fixed broadband services and mobile and fixed network services, are supplied by multiple satellite operators and, for some applications, by terrestrial telecommunications entities. Measuring the extent of market power for satellite operators facing some degree of rivalry requires a more complex theory than what is provided by the basic monopoly model. In particular, in retail industry segments, the satellite operator sells to many, largely anonymous customers. All retail customers pay essentially the same price for the same, homogeneous service, except for introductory or promotional offers, and are generally offered the same terms and conditions of service as disclosed and advertised, for example, on a satellite operator's website.[285]

150. By contrast, in wholesale industry segments, the satellite operator sells to relatively few customers that are generally well-known to the satellite operator. It is often the case that the wholesale

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[282] http://www.intelsatgeneral.com/aboutus/company_overview.aspx.

[283] *See* Louis Kaplow and Carl Shapiro, "Antitrust," Working Paper 12867, National Bureau of Economic Research, January, 2007 (available at http://www.nber.org/papers/w12867), at 3. Any firm facing a downward sloping demand curve (as opposed to a perfectly elastic demand curve) has technical market power.

[284] To avoid financial losses, total revenues must equal the total cost of production. If a firm prices its products or services at marginal cost, the firm will incur a loss equal to its fixed cost of production. A firm will therefore exercise its technical market power to set price somewhat greater than marginal cost so that its total cost of production is recovered. This exercise of market power is not harmful to consumers since pricing above marginal cost is required to make the output available to consumers on a continuing basis without the firm operating at a loss.

[285] The retail satellite service is homogeneous in the sense that all customers of a particular *service category* receive the same service at the same price. Satellite operators do offer retail customers alternative service categories with different features, terminal equipment, and subscription terms. Consequently, there may exist price discrimination *between* different service categories but not ordinarily *within* a given service. In other words, whatever price discrimination may exist between and among service categories does not depend on the *identity* of the consumer. Ordinarily, any consumer subscribing to the *same* service package will pay the same as any other customer selecting the same service.

customer will have a long-term, established business relationship with the satellite operator. Additionally, the wholesale customer is usually highly knowledgeable concerning both the satellite communications industry and satellite technology. The unit of sale in wholesale industry segments, often the lease of a substantial fraction of a transponder or even entire transponders, is far larger than the ordinary retail unit of sale and is typically for a far longer length of time compared to a retail sale. Moreover, compared to the retail unit of sale, the wholesale unit of sale (*i.e.*, a lease of transponder capacity) is intrinsically heterogeneous (*i.e.*, differentiated in terms of attributes).[286] For these reasons, some understanding of both satellite technology and the economic organization of a satellite services enterprise is essential to understanding both the pricing and exercise of market power in wholesale industry segment.

151. By way of background, price determination for satellite operators offering wholesale services is typically the result of bilateral negotiations or bargaining between the customer and the satellite operator.[287] It is possible to identify certain attributes of the bargaining environment that are predictive of the conduct of both satellite operators and wholesale customers.[288] Negotiations between a satellite operator and a wholesale customer are multidimensional and include much more than just the pricing of leased transponder services. Negotiations may also involve the terms and conditions of the transponder lease contract, including payment schedules, cancellation penalties, legal issues and other aspects of service delivery, including the nature and extent of customer support following contract execution. For both parties, building and sustaining a workable, ongoing, and long-term commercial relationship benefits both the satellite operator and the customer given the length of term of many transponder leases and the technical nature of the service which requires adjustments and modifications as technology evolves. However, the net or incremental economic benefits produced by the deal need not necessarily be shared on a pro rata basis between, or among, the parties. If the customer has credible outside options, such as alternative vendors of transponder capacity or the ability to substitute fiber optic transmission facilities for satellite transponder capacity and is not risk averse, then the negotiated price for leased transponder capacity may include little if any economic profit for the satellite operator.

152. Data from Futron Corporation summarize the results of the bargaining process for heterogeneous and multi-dimensional FSS wholesale transponder services (see Table IV.1). Futron reports average transponder lease rates, for the equivalent of 36 MHz per year of capacity, for three major spectrum categories: C-band, Ku-band, and Premium Ku-band (premium Ku-band is typically used to provide high-power services, generally 50 dBw or above). The data are reported for three time periods, spanning the years 2004 through 2009, and for four regions: North America, Europe/Middle East/Africa (EMEA), Asia/Pacific, and Latin America.

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[286] *See* the discussion and analysis of the nature of the output produced by the satellite industry in Section III.A of this *Report*.

[287] Bargaining as a method for effectuating exchange and implementing a contract between buyer and seller tends to replace impersonal market exchange with its parametric prices for consumers in cases where the number of buyers and sellers are *few*, and the good or service to be exchanged is relatively high in value. Since bilateral bargaining is costly in terms of the opportunity cost of the parties and in terms of the cost implied by a potential delay in striking a bargain, this method of effectuating exchange is too costly or inefficient for relatively low-valued transactions for a large number of customers, such as retail satellite services.

[288] This discussion addresses the major long-term contractual issues that are most directly related to the wholesale customer's acquisition of satellite transponder capacity as an investment decision, say, leasing transponder capacity for 10 or 15 years. There are other satellite industry segments where the dynamics of contractual negotiations may differ somewhat, such as the spot market for transponder capacity for satellite news gathering, which relate to the wholesale customer's very short term requirements for transponder capacity.

TABLE IV.1

AVERAGE TRANSPONDER LEASE RATES IN US $[289]

Average C-Band Transponder Lease Rates (36MHz/Year)				
	North America	**EMEA***	**Asia/Pacific**	**Latin America**
2004/2005	$1,300,000	$1,400,000	$1,250,000	$1,350,000
2006/2007	$1,300,000	$1,200,000	$1,400,000	$1,100,000
2008/2009	$1,600,000	$1,800,000	$1,350,000	$1,600,000
2010	$1,300,000	$2,000,000	$1,450,000	$1,400,000
Average Ku-Band Transponder Lease Rates (36MHz/Year)				
	North America	**EMEA***	**Asia/Pacific**	**Latin America**
2004/2005	$1,800,000	$2,000,000	$1,500,000	$1,500,000
2006/2007	$1,800,000	$2,000,000	$1,600,000	$1,700,000
2008/2009	$2,500,000	$3,000,000	$1,750,000	$1,800,000
2010	$2,000,000	$2,200,000	$2,000,000	$1,500,000
Average Premium Ku-Band[290] Transponder Lease Rates (36MHz/Year)				
	North America	**EMEA***	**Asia/Pacific**	**Latin America**
2004/2005	$2,600,000	$5,000,000		
2006/2007	$2,300,000	$5,000,000	$1,800,000	
2008/2009	$3,000,000	$4,000,000	$2,500,000	

* Europe/Middle East/Africa (EMEA)

153. Figures IV.1 through IV.4 provide a graphical representation of the transponder lease rate data reported in Table IV.1. Pricing behavior for transponder capacity over the years 2004/2005 through 2010 differs over time and between and among different global regions. In broad terms, transponder lease rates tend to mirror the intensity of demand at a given time in a particular region and the availability of transponder capacity for meeting this demand. In the North American region, lease rates have been relatively stable over the reported time period; the decline in both C-band and Ku-band transponder rates in 2010 may be attributed to general macroeconomic conditions.[291] In EMEA, declines in transponder rates in recent years are attributed to both economic weakness in Europe and significant increases in fiber optic cable capacity serving the African continent in addition to increases in terrestrial telecommunications facilities. Volatility in transponder pricing is anticipated in coming years as the increases in both fiber optic cable capacity and terrestrial telecommunications facilities are accommodated within EMEA.[292] In the Asia-Pacific region, demand for transponder capacity has steadily increased over the 2004/2005 to 2010 time period, especially for premium Ku-band capacity to meet the growing demand for various video services.[293] In the Latin America region, transponder pricing

[289] Based on data from Futron Corp.

[290] Ku-Band with high-power services, generally 50 dBw or above.

[291] Communication with Futron consultants, September 7, 2011.

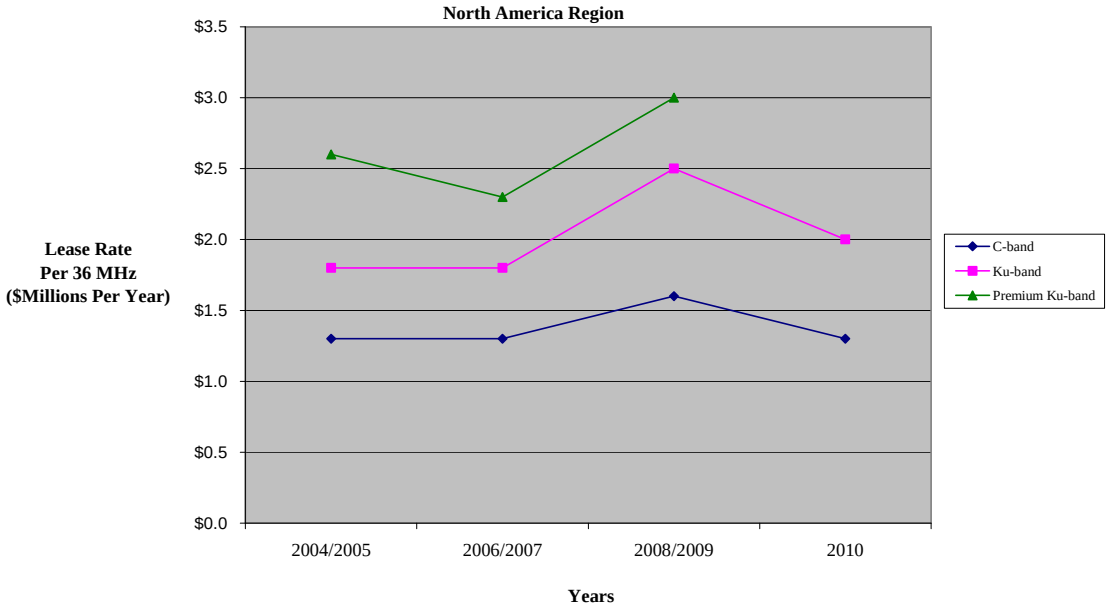
[292] *Id.*

[293] *Id.*

has weakened in the last several years, reflecting once again the relatively weak macroeconomic environment in Latin America and the accommodation to planned new transponder capacity that will serve this region in the near future.[294]

Average Transponder Lease Rates
2004-2010
(36 MHz Equivalent Per Year)

FIGURE IV.1



[294] *Id.*

FIGURE IV.2

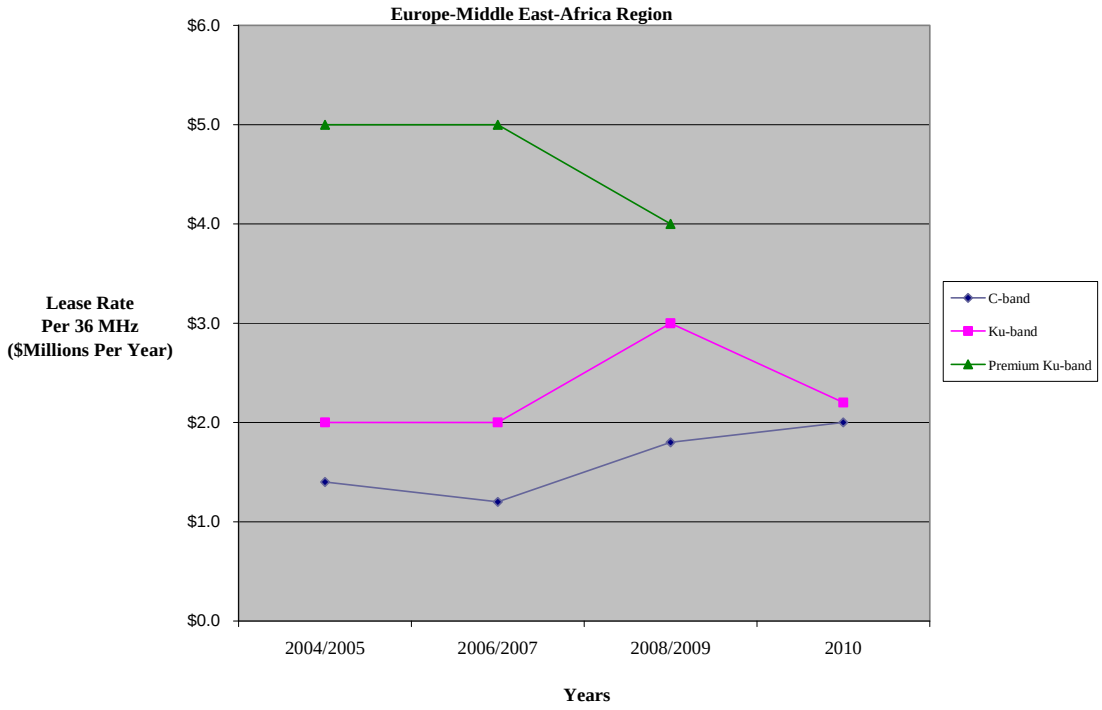


FIGURE IV.3

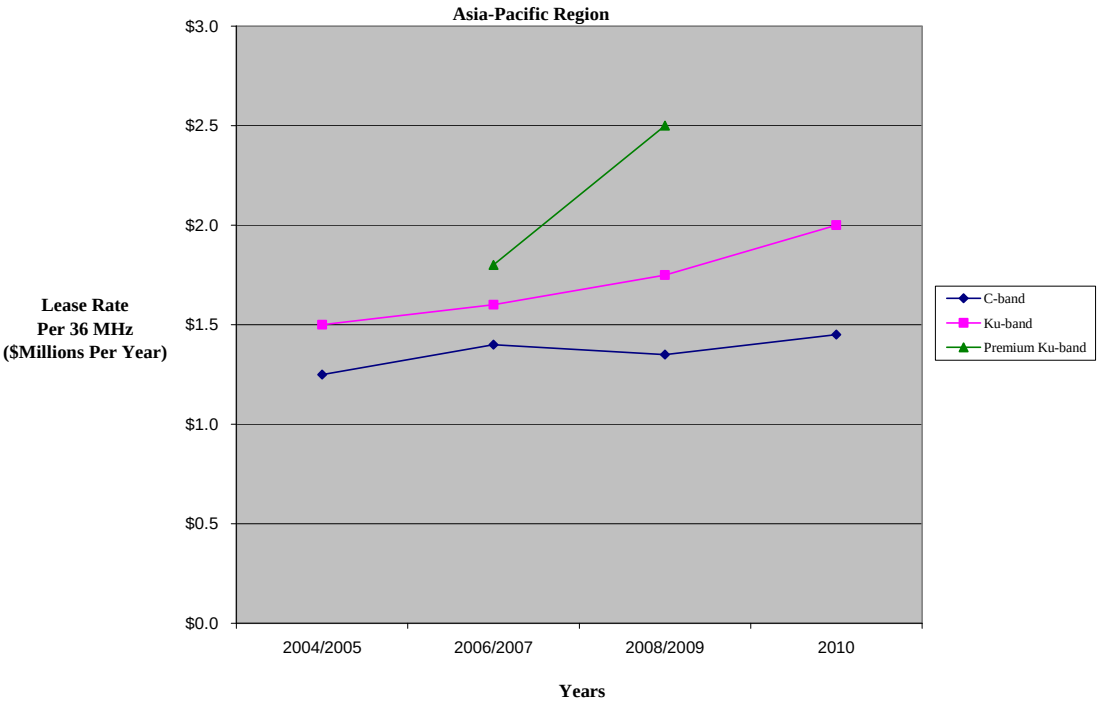
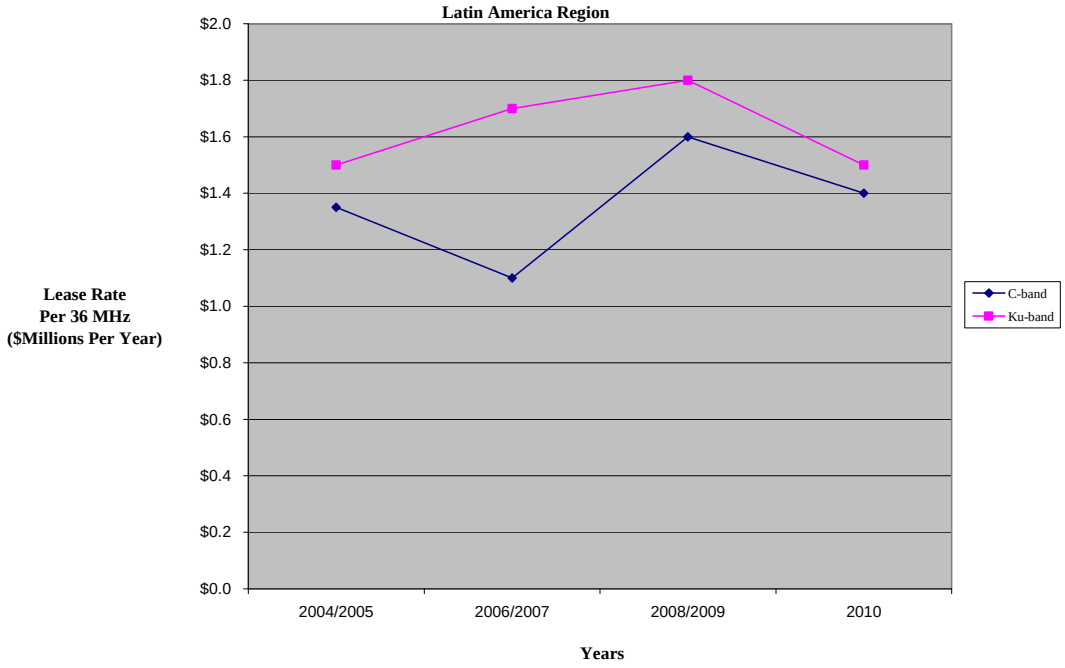


FIGURE IV.4



3. Allegations of Anticompetitive Behavior

154. This *Third Report*, discusses two allegations of anticompetitive behavior related to the FSS sector. First, it is alleged that Intelsat has anticompetitively foreclosed some independent reseller/integrator firms from obtaining space segment capacity. Second, it is alleged that the large incumbent FSS operators – *i.e.*, Intelsat and SES Americom – are anticompetitively hoarding or "warehousing" geostationary orbital slots and spectrum frequency assignments. Because neither of these issues falls into the category of *per se* anticompetitive behavior, we examine both allegations to determine whether there is substance behind the claims and, assuming that these are substantive allegations, whether economic inefficiency and consumer harm results. We consider them in turn below.[295]

a. Allegations of Vertical Foreclosure in the FSS Sector

155. During the first half of 2010, comments by some industry participants raised the possibility that one particular type of vertical anticompetitive behavior was occurring in the FSS sector. As described above in Section IV.B.1, Intelsat has integrated downstream, *i.e.*, Intelsat is now providing directly satellite network services via its marketing subsidiary IGC. This means that, in certain instances, Intelsat transacts directly with government and corporate customers, and provides them with customer-specific packages that include space and earth segment services as well as other related terrestrial

[295] Here we simply analyze the foreclosure and warehousing conduct allegations. The question of what these analyses mean for an ultimate finding regarding the state of competition in the FSS sector is addressed in Section VI.

transmission and management services.[296] Several reseller/integrator firms argue that, along with this integration, Intelsat has foreclosed them from acquiring transponder capacity, resulting in harm to government and corporate customers.

156. *Comments*.[297] The possibility that Intelsat harms the public interest by foreclosing resellers/integrators was first raised by certain commenters in the Commission's 11th ORBIT Act Report.[298] In the ORBIT Act Report, ARTEL, CapRock, and Globecomm all essentially argue that several factors – Intelsat's privatization; increased consolidation in the FSS sector; an absence of FSS entry opportunities; and an absence of terrestrial service alternatives – give Intelsat the incentive and ability to: (1) vertically integrate into the direct provision of end-to-end services to certain customers; and (2) foreclose resellers/integrators from these business segments.[299] Further, these commenters argue that the harms that result from this vertical integration and foreclosure of opportunities extend beyond them and affect government and corporate customers in the form of higher prices or inferior service packages.[300]

157. These firms argue that Intelsat's foreclosure behavior takes a number of forms.[301] First, when a reseller/integrator, in preparation for a bid, seeks a commitment of space segment capacity from Intelsat, Intelsat, in some instances, allegedly refuses to provide any pricing information for the requested space transponder service. For example, Intelsat allegedly effectively refuses to provide space segment capacity at any price, thus preventing the reseller/integrator from being able to fashion a bid for a prospective customer.[302] Second, the resellers/integrators also state that, at least in the case of one government bid, Intelsat made available only a package of space segment capacity that prevented the resellers/integrators from crafting different overall service solutions for the customer to consider. According to the commenters, this take-it-or-leave-it "forced bundle" made their bids uncompetitive.[303] Third, resellers/integrators also make a distinct claim of partial foreclosure: in some instances, where an incumbent resellers/integrator provides service pursuant to a particular contract and that contract is up for renewal, the resellers/integrators allege that Intelsat offers space segment at a lower price to the incumbent provider but at a higher price to competing resellers/integrators trying to win the business. This "incumbent pricing" policy allegedly predetermines that the incumbent integrator will win the

[296] *See, e.g.*, http://www.intelsat.com/services/, and http://www.intelsat.com/_files/resources/knowledge/datasheets/ds-ground-system-solutions.pdf.

[297] Because our purpose is to provide an analysis of the economic dispute here, and not to undertake a formal adjudication, we describe only those parts of the comments that are relevant to the vertical foreclosure claim.

[298] *FCC Report to Congress as Required by the ORBIT Act: Eleventh Report*, FCC 10-112, Report, 25 FCC Rcd 7834 (June 15, 2010) (*11th Orbit Act Report*).

[299] *See* the Orbit Act Comments of ARTEL, Inc., CapRock, and Globecomm Systems, Inc. These comments are also fully described in the *11th Orbit Act Report* at 22-26, 28-29.

[300] ARTEL Orbit Act Comments at i; CapRock Orbit Act Comments at 17.

[301] The reseller/integrator firms emphasize that the foreclosure is given effect by an Intelsat requirement that they deal not with Intelsat itself but rather with Intelsat's subsidiary IGC, which they view as their competitor in the downstream services market. We do not focus on this corporate organization point, but rather on the substantive fact that Intelsat has integrated downstream, offering transponder and related services directly to government and enterprise customers, and acting as both a supplier to and competitor of the resellers/integrators.

[302] ARTEL Orbit Act Comments at 5; Globecomm Orbit Act Comments at 4.

[303] CapRock Orbit Act Comments at 9.

bidding for the future business.[304] Fourth, the resellers/integrators allege that Intelsat not only unilaterally forecloses independent integrators, but also colludes with other space segment providers to prevent the integrators from bypassing Intelsat and obtaining space segment from those other sources,[305] *i.e.*, horizontal collusion in the upstream space segment market is facilitating and enhancing the vertical foreclosure of downstream independent resellers/integrators.

158. These commenters also allege that their protests against such foreclosure practices, either via direct complaint to Intelsat or formal challenge of a government contract award, have been subject to retaliation by Intelsat, *e.g.*, being denied space segment capacity that would enable them to bid for other, unrelated contracts.[306]

159. For purposes of this *Third Report*, CapRock repeats many of its ORBIT Act arguments. As a result of increased concentration in the satellite sector, CapRock contends that Intelsat has market power in the provision of international FSS, *i.e.*, transponder service between the U.S. and other regions of the world. Thus, CapRock believes a portion of international FSS traffic is not subject to effective competition.[307] CapRock also alleges at least one instance of foreclosure when Intelsat offered CapRock a "forced bundle" of capacity that did not meet CapRock's needs,[308] and at least one instance when Intelsat prevented CapRock from acquiring space segment capacity from other providers by essentially colluding with other satellite providers.[309]

160. In addition to actions by Intelsat, ARTEL, in an *ex parte* meeting, stated that Intelsat's decision to serve customers directly has been adopted by SES. Specifically, ARTEL stated that there has been further recent FSS "consolidation and vertical integration," including "SES's September 2010 announcement concerning the consolidation of its government solutions group."[310]

161. In response to the allegations raised against it in the 11th ORBIT Act Report, Intelsat stated that: the satellite sector is increasingly competitive, with multiple incumbents and new entrants providing service;[311] that one of the goals of Intelsat privatization was to "end this separation of Intelsat from end users, and to permit Intelsat to compete in the same manner as all other satellite providers";[312] and that the allegation of harmful foreclosure is simply an attempt by certain commenters to inject the FCC into a commercial dispute regarding a U.S. Navy contract awarded to Intelsat over the commenters.[313]

162. In their comments to this *Third Report*, Intelsat provides more detail and SES addresses the vertical foreclosure issue. The two incumbents argue that the relevant market is not FSS space

304 CapRock Orbit Act Comments at 8.

305 ARTEL Orbit Act Comments at 6; ARTEL Orbit Act Surreply at 3; Globecomm Orbit Act Surreply at 3.

306 Globecomm Orbit Act Comments at 4; ARTEL Orbit Act Comments at 6; CapRock Orbit Act Comments at 11.

307 CapRock Comments at 7-12.

308 *Id.* at 5.

309 *Id.* at 10.

310 ARTEL *Ex Parte* Notice, Dockets 10-70 and 10-99, November 9, 2010.

311 Intelsat Orbit Act Reply at 6-8.

312 *Id.* at 3-4.

313 *Id.* at 8-10.

segment capacity, but rather that the market includes terrestrial and MSS-based services;[314] that the market is broad in geographic scope, and that there are virtually no "thin market" locations that cable capacity does not serve;[315] that even if terrestrial and MSS competition are excluded, space segment providers have no market power due to actual competition within the FSS sector and ongoing entry by new providers;[316] and that there have been no concentration-increasing mergers since the FCC made its finding of effective competition in 2008 in the *Second Report*.[317] Intelsat and SES contend that the reseller/integrator complaints actually suggest an *increase* in competition,[318] and Intelsat notes that "[w]hen the U.S. Department of Defense was able to open its bidding process to satellite network operators such as Intelsat, the result was lower prices and greater efficiency."[319] Intelsat further contends that the reseller/integrator firms are confusing their own interest with the interests of competition, and that "none of the government and corporate customers has raised any concern about the state of competition for satellite communications services."[320] According to Intelsat, the only impact of its vertical integration has been "integration efficiency."[321]

163. *Economic Framework.* Economists have demonstrated that vertical relationships between firms are often multidimensional and complex. In addition, there is a wide variety of market environments in which vertical control or integration may be attempted, and a variety of the types of vertical control that may be attempted. Consequently, economic analysis of vertical conduct is complicated and varied, and diverse outcomes are possible.[322] For example, under certain conditions vertical integration in a market in which a firm exercises monopoly power has no impact because the firm already earns all available monopoly profits. Also, there are a number of models in which vertical integration benefits consumers, *e.g.*, lowering prices paid.[323] Further, some exercises in vertical control or integration can reduce market competition which, in turn, can constitute economic inefficiency harmful to consumers.[324]

164. The vertical foreclosure allegations raised by commenters can be categorized as "input foreclosure," *i.e.*, resellers/integrators are excluded from obtaining the input transponder services. A standard approach to analyzing an input foreclosure situation has several steps.[325] First, one can consider

[314] Intelsat Reply at 12-18; SES Reply at 3-4.

[315] Intelsat Reply at 11-12; SES Reply at 3-4.

[316] Intelsat Reply at 18-25; SES Reply at 2-3.

[317] SES Reply at 5.

[318] Intelsat Reply at 3-5.

[319] Intelsat Reply at 4. *See also* SES Reply at 13-16.

[320] Intelsat Reply at 1-2.

[321] *Id*. at 7.

[322] *See generally* Chapter 4, *Vertical Control*, of Jean Tirole, The Theory of Industrial Organization (1988).

[323] *See* Tirole at 174-181, for descriptions of vertical integration or control by an upstream firm possessing market power that serve to eliminate the problems of: double marginalization (that is, both upstream and downstream firms imposing a mark-up over the cost they incur); or downstream moral hazard (that is, non-optimal amount of promotional effort by the downstream firm).

[324] Phillip E. Areeda and Herbert Hovenkamp, Antitrust Law: An Analysis of Antitrust Principles and Their Application, Vol. IIIB, Third Edition (2008), at 8, ¶ 756.

[325] For descriptions of the analytical framework in situations where the vertical integration is accomplished via merger, *see* Michael H. Riordan & Steven C. Salop, *Evaluating Vertical Mergers: A Post-Chicago Approach*, 63 (continued….)

whether the foreclosure conduct actually excludes the affected firm(s) from acquiring the input. This would be true, for example, if the foreclosing firm is the only option for the downstream firms, but not true if there are other providers of an identical or closely substitutable input; *i.e.*, the question is whether the firm exercising vertical foreclosure possesses market power in the input market.

165. Second, one can consider whether the foreclosure results in increased price or degraded service quality in the downstream, output market. Exercising such power would not be possible if there are other, non-foreclosed firms in the output market that are effectively competitive constraints, or if the consumers themselves were able to switch their demand to substitute services and avoid entirely the offering of the integrated, foreclosing firm.

166. Third, one can consider whether the vertical foreclosure and integration of the upstream and downstream activities result in efficiencies, *e.g.*, cost savings from integrating production, benefits resulting from internalizing externalities and correctly aligning incentives, or savings from eliminating double marginalization.[326]

167. In the fourth and final step, one can consider the net effect on consumers, *i.e.*, weighing the impact of any harmful, anticompetitive effects against any positive effects of efficiencies. This means considering directly, for example, the net changes in price paid and quality realized.

168. As noted above in the review of comments, in addition to the primary dispute the record includes claims of collusive behavior. A key question is whether the vertical integration, by facilitating the sharing of pricing and related information, increases the likelihood of tacit or explicit coordinated behavior among the integrated firm and other input suppliers.

169. *Analysis of the Current Dispute*. As further explained below, we cannot definitively determine in this *Third Report* whether the vertical integration and foreclosure actions of Intelsat constitute anticompetitive behavior harmful to consumers and cause economic inefficiency. The factual information available regarding this dispute is quite limited, and the evidence we do have offers some support for each side's position.

170. The record regarding the vertical foreclosure allegations is significantly limited. The limitations prevent us from identifying the nature and scope of the claimed foreclosure. For example, the record does not document what time period the allegations cover, nor which international origin-destination pairs are involved, nor how many and which specific Intelsat contracts are involved. We know neither how much nor which space segment capacity is involved, nor which government or enterprise customers are affected. Neither do we know what the customers purchased, *i.e.*, exactly what combination of terrestrial transmission facilities, network management services, space and earth segment services were purchased. Additionally, we have no information regarding the size of the disputed business, either in absolute terms or relative terms (*i.e.*, relative to the size of commenters' business or Intelsat's business, or to the total demand of the affected customers).

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ANTITRUST L.J. 513 (1995), at 527-551, and Jonathan B. Baker, "Comcast/NBCU: The FCC Provides a Roadmap for Vertical Analysis," Antitrust, vol. 25, No. 2, Spring, 2011, available at 36-42.

[326] Double marginalization occurs when an upstream firm sells an input to a downstream firm at a price that exceeds marginal cost, and the downstream firm then sells its product in the downstream market at a price that exceeds its marginal cost. The margin charged by the upstream firm increases the marginal cost of the downstream firm, which results in a higher end-user price than would occur if the input had been priced at marginal cost. Vertical integration can eliminate the problem of double marginalization because the integrated firm, in determining the uniform price at which it will sell the downstream product, will consider the real economic cost of producing the input. Because vertical integration effectively reduces the marginal cost of the input in this situation, it results in the integrated firm setting a lower price for the downstream product, benefiting consumers. *See* Tirole at 174-75; Riordan & Salop at 526-27.

171. A second significant limitation involves possible efficiencies. While there are claims that integrative efficiencies result from Intelsat's vertical integration, we do not have a quantitative estimate of their magnitude, nor do we have even a descriptive statement of what those efficiencies are and how they arise.

172. A third major gap relates to the net effect of the foreclosure on the government and corporate customers. Despite claims about the harm and lack of harm to customers, there is no evidence regarding the direction and magnitude of any price changes, quantity changes, or quality changes that have been experienced by those customers.

173. A fourth deficiency in the record centers on the collusion issue. While claims on both sides are set out briefly, we do not have either detailed explanation of the nature and extent of the collusive behavior or detailed explanation that justifies the behavior of the satellite operators.

174. Largely as a result of these information limitations, we are unable to carry out confidently any of the steps in the vertical foreclosure analytical framework. For example, without knowing to which traffic or business segment(s) the allegations apply, we cannot assess the availability of alternative FSS, MSS, and terrestrial options to which the resellers/integrators might avail themselves. Similarly, we are unable to determine what entry barriers and entry prospects exist, and what switching costs the resellers/integrators may face.

175. Regarding the second step of the framework, not knowing the traffic/business segments at issue means we cannot determine the extent to which there may be other reseller/integrator firms, or other vertically integrated firms, that are not dependent on using Intelsat capacity, and can therefore serve as effective competitive constraints in the output market. Not knowing the customers affected means we cannot evaluate whether they have other closely substitutable options that do not depend on commercial satellite service. In the case of government customers, for example, we cannot determine whether non-commercial satellite service constitutes an effective constraint preventing harm. The absence of efficiency/cost saving evidence prevents the completion of the third step, and the inability to complete the first three steps of the analysis means that the net effect determination of the fourth step cannot be reached. Finally, we are similarly unable to evaluate the likely incentives for and success of collusive efforts by the satellite operators.

176. Beyond the fact that our data are limited in crucial ways, it is also true that the evidence and argument now available offers some support for each side's position. Several points suggest that public interest harm may have indeed resulted from Intelsat's vertical integration. First, it is undisputed that the foreclosure has occurred. Intelsat essentially concedes this, but argues that no public interest harm results because it possesses no market power.[327] Second, it does appear that the foreclosure has reduced competition in the largely undefined output market, since several firms have been excluded, and in every case the vertically integrated Intelsat has taken their place. Third, and perhaps most worrisome despite our limited information, is that it does appear that space segment operators sometimes partner and submit bids to customers, *e.g.*, the integrated Intelsat may plan to use some SES capacity to win output market bids for service. We recognize that it is standard industry practice for firms to make common cause and form bidding groups in an effort to win contracts from government or corporate customers; and the mere fact that Intelsat and SES may occasionally be on the same bidding team is not by itself evidence of harmful collusion. These joint undertakings do underline, however, that the FSS operators are both competitors and partners, and are likely sharing non-trivial market information. Thus rivalry among FSS firms may be less than if none of the firms were vertically integrated.

[327] This is in contrast to the typical situation in analyzing vertical mergers, where it is necessary to reach a predictive judgment about whether foreclosure is likely. Here, it is in effect not disputed that the behavior has occurred, and we can therefore presume that it has been profitable to Intelsat.

177. Other points, however, suggest that public interest harm is not a likely result from the vertical integration by Intelsat. First, a basic goal of the privatization was to enable "direct access:" that is, facilitate direct interaction between Intelsat and its customers.[328] The prior historic separation of space segment and earth segment services, a feature of the pre-privatization legal/regulatory framework, was essentially deemed inefficient. The more recent post-privatization downstream vertical integration by firms such as Inmarsat and Intelsat would appear to be a logical extension of the "direct access" policy choice,[329] and thus there is some reason to presume the integration is an efficient structural change.[330]

178. Second, we have received no complaints — indeed, no comments at all — from customers who would have been disadvantaged if Intelsat's vertical integration was indeed resulting in public interest harm. This may suggest that while the resellers/integrators have been adversely affected, customers have not, either because Intelsat lacks market power with regard to the output sector(s) involved, or because benefits from integrative efficiencies have been passed through to the customers.

179. Third, one large customer, the Department of Defense, has now abandoned its previous view that it benefited from procuring services via small reseller/integrator firms, and is transitioning (along with the General Services Administration (GSA)) to an open procurement process in which any entities, including resellers/integrators and satellite operators, may bid.[331] This suggests that, at least for large, sophisticated customers such as the federal government, the downstream integration by Intelsat and the resulting direct interaction between the customers and Intelsat may be an efficient development.[332]

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[328] 47 U.S.C. 765.

[329] We reject the argument that Intelsat's requirement that resellers/integrators deal with IGC is itself a conflict with the direct access policy. This argument puts too much weight on a fact of Intelsat's corporate structure. IGC is a wholly-owned subsidiary of Intelsat. It is not analogous to a separate corporation with distinct ownership that may have goals and incentives differing from those of Intelsat.

[330] The fact that we found, in approving Inmarsat's acquisition of Stratos, that efficiencies were likely to result from that vertical combination further suggests that the combination of space and earth segment services generally may create efficiencies. *See Robert M. Franklin & Inmarsat MO&O*, 24 FCC Rcd 449 at ¶¶ 24-25.

[331] This shift is being accomplished via the adoption of a new joint GSA/Defense Information Systems Agency (DISA) contracting vehicle, the Future COMSATCOM Services Acquisition (FCSA) program, and the ending of the current vehicle, the Defense Information Systems Network Satellite Transmission Services-Global (DSTS-G) process. *See* Future Commercial Satellite Communications Service Acquisition (FCSA), at http://www.gsa.gov/portal/content/105299. DSTS-G incorporates a guaranteed award of contracts to three small integrators. The three firms selected in 2001 to be recipients of the business set-aside were ARTEL, Arrowhead Space and Telecommunications, Inc.—subsequently acquired by CapRock—and Spacelink International—subsequently acquired by DRS Technologies, a subsidiary of Finmeccania. *See* SES Reply at 14; *see also* "COMSATCOM Alliance," at http://www.military-information-technology.com/mit-archives/206-mit-2009-volume-13-issue-9/2073-comsatcom-alliance.html; "Sea Change: Satcom operators scurry to meet surging government bandwidth demands," Aviation Week & Space Technology, April 12, 2010, at 52-53.

[332] Note that the dispute regarding a DISA/Navy contract, which is discussed in the comments we have received, involves a third, distinct contracting vehicle: the Commercial Broadband Satellite Program (CBSP). The particular CBSP request for proposals at issue, like the FCSA, was not limited to the three integrators but rather open to all entities. Intelsat's bid was the selected as the winner, based on the evaluation of numerous factors, one of which was price. This result was protested by ARTEL, CapRock, and one other losing bidder, but upheld in a May 2010 GAO ruling. *See* Decision, Matter of: CapRock Government Solutions, Inc.; ARTEL, Inc.; Segovia, Inc; File B-402490 *et al.*, May 11, 2010. The GAO decision focuses on whether procurement rules were followed correctly, and not on whether Intelsat's "forced bundle" behavior was harmful to the public interest. One point in the decision, however, is relevant here. One protester had argued that by virtue of the fact that Intelsat controlled certain satellites that other bidders would utilize if they were the successful bidder, then Intelsat possessed knowledge of certain costs (continued….)

180. Because essential information regarding this FSS vertical foreclosure dispute is not available, and because there is some evidence supporting each side's view of this issue, we cannot determine with confidence whether Intelsat's conduct constitutes anticompetitive behavior. That is, we cannot definitively determine whether the vertical foreclosure has resulted in economic inefficiency harming consumers.

b. Allegations of Warehousing

181. Some parties filing comments in the record supporting preparation of this *Third Report* claim that Intelsat is not making appropriate use of its orbital location and frequency resources and not complying with the Commission's Rules by failing to deploy fully functional spacecraft, *i.e.*, failing to replace aging spacecraft on a timely basis, or otherwise failing to provide transponder capacity at such orbital locations that reflects current technology.[333] Implicit in the raising of such concerns is the supposition that such behavior by Intelsat is harmful to competition in the FSS sector and that the Commission should act to deter such anticompetitive behavior. More specifically, Intelsat's failure to build and launch new spacecraft in all orbital locations as older spacecraft degrade in performance due to exhaustion of station keeping fuel and other age-related detriments may be viewed as "warehousing" of orbital locations, radio frequency spectrum, and transponder capacity that would otherwise be available if Intelsat had invested in new spacecraft.[334] Presumably, such warehousing adversely affects customers by restricting the availability of transponder capacity at the orbital locations with degraded capacity and adversely affects competing satellite operators by denying them access to the orbital locations and the up- and down-link frequencies held by Intelsat that such competitors are willing to use more efficiently by building and launching new spacecraft offering the benefits of advanced technology.[335] If true, competing satellite operators may be disadvantaged by Intelsat's sub-optimal use of orbital and spectrum resources, since such competitors often lease transponder capacity from each other to obtain geographic coverage beyond the reach of their own satellite networks.

182. However, Intelsat's alleged warehousing conduct may simply reflect, for example, its decision to delay the investment required to replace the end-of-life spacecraft until management believes it is better informed about ongoing technical change affecting the design and construction of communication satellites, or the nature of demand in the various regions around the globe, or the rate of absorption of global excess capacity, or other factors and perspectives that can affect the long term profitability of investments in replacement spacecraft. Thus, it is not clear whether, in the long term, Intelsat's alleged warehousing is anticompetitive or beneficial to consumers.

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the other bidders would incur. It also argued that Intelsat did not negotiate fairly regarding this satellite capacity, or consistent with standard industry practice. As a result of these facts, the protester argues, the award to Intelsat was in conflict with a procurement rule prohibiting "Organizational Conflict of Interest" (OCI). GAO ruled that even if the allegations against Intelsat were true, its behavior would not violate the OCI rule. And GAO went on to note that to extent the protester is arguing Intelsat gained an unlawful anticompetitive advantage by its actions, that issue would appropriately be considered by the Antitrust Division of the Department of Justice. *See* pages 24-25.

[333] CapRock Comments at 5.

[334] The Commission has addressed various warehousing theories of harm to competition in other proceedings. *See*, for example, *Tentative Decision and Request for Further Comments in Docket 82-345*, 94 FCC 2d 1019 (1983). In that Tentative Decision, the Commission rejected the warehousing theory that the major over-the-air broadcasting networks had the incentive to withhold certain off-network programming from independent television stations during their most lucrative time slots in order to increase the price of such programs. *Id.* at ¶¶ 199-201.

[335] The term "warehousing" is used in this discussion as only a short-hand for the allegations of anticompetitive behavior by Intelsat and does not constitute a confirmation of warehousing as a viable theory of potential harm to competition or as an established fact of anticompetitive behavior in the FSS sector.

183. The record supporting the preparation of this *Third Report* is too limited to make definitive findings concerning the harm to competition that may result from Intelsat's alleged warehousing of orbital resources and radio frequencies and the restriction of output that is the consequence of keeping degraded satellites in service.[336]

C. Buyer Behavior

184. The discussion in this section complements the discussion in Section IV.B by examining both retail and buyer behavior from the buyer's point of view. This discussion provides some insight concerning the relative bargaining power of both retail and wholesale customers of satellite communications services in purchasing output from satellite operators.

1. Retail Industry Segments in the Satellite Communications Industry

185. Unlike wholesale customers leasing transponder capacity, retail customers of satellite communications services, such as satellite-delivered broadband or mobile satellite services, do not individually negotiate the price or terms and conditions of their communications service with the satellite operator. Rather, for a given type of service, retail customers face uniform pricing and terms and conditions of sale, known as "posted-offer pricing." While satellite operators periodically offer promotional pricing to attract new subscribers, all retail customers ordinarily pay the same price for the same type of service. Retail customers, unlike wholesale customers, cannot individually negotiate with the satellite operator to gain price concessions or tailor the service to the customer's individual preferences such that the satellite operator's profitability is constrained and its market power attenuated.

2. Wholesale Industry Segments in the Satellite Communications Industry

186. As noted previously, a wholesale customer with outside options may be expected to obtain a more favorable outcome in its negotiations with the satellite operator than a wholesale customer with fewer outside options. Frequently, these options include the technical feasibility of using either terrestrial or undersea fiber optic capacity rather than satellites as the telecommunications transmission technology. An additional outside option is satellite transponder capacity elsewhere in the geostationary arc that could be substituted for transponder capacity that is subject to negotiation. Both factors may, but not always necessarily, augment the wholesale customer's bargaining power, restrain the market power of the satellite operator, and compress the price-cost margin that the satellite operator might earn from the negotiated lease.

187. A recent development in the domestic satellite communications industry is the formation of the Future Commercial Satellite Communications (FCSA) entity, a recent partnership of the Defense Information Systems Agency and the U.S. General Services Administration. This government partnership, established in July 2009, will aggregate both U.S. military and civilian requirements for commercial satellite communications and submit such requirements for competitive bids from both fixed and mobile satellite operators for leased transponder capacity, certain satellite communications subscription services, and customized end-to-end communications solutions tailored for individual government clients. In principle, FCSA will reduce the cost of government procurement by consolidating the procurement process for multiple federal agencies and improve the pricing and terms and conditions of service available to government buyers that would otherwise be available if each government entity negotiated separately for its own satellite communications requirements.

188. It is not clear presently whether the consolidation within the fixed-satellite services sector and mobile satellite services sector will induce consolidation among buyers of satellite communications

[336] Whether such alleged behavior violates the Commission's Rules notwithstanding either the presence or absence of harmful anticompetitive behavior is a separate matter and is not addressed here.

services in coming years. Such buyer consolidation would clearly limit the outside options of satellite operators and limit their ability to play one customer off against another in their negotiations with individual wholesale customers.[337]

V. INDUSTRY PERFORMANCE

189. This section reports on selected public financial data regarding FSS, MSS, and SDARS operators. Although the data may reflect, in part, the effects of competitive forces on profitability and the exercise of market power, the data provides a limited perspective on sector performance.

1. Sector Performance

a. Fixed Satellite Services

190. The assessment of performance in the FSS sector is, in general, difficult, given the limitations and availability of publicly-available data. For example, some FSS operators, such as Intelsat, are not presently publicly-traded companies; some FSS operators do not disaggregate their financial data from that of their corporate parent company; and a number of operators entered bankruptcy during the study period (with some exiting). As a result, assessment of directly comparable performance across different operators is not possible in many cases. Additionally, several large FSS operators operate fixed-satellite global networks and do not separately identify either revenues or costs that may be attributable to U.S. operations. However, as the U.S. domestic industry sector accounts for approximately 25 percent of global wholesale satellite revenue,[338] one can only estimate various financial measures, understanding that any estimates, based on globally consolidated data, can only serve as proxies for domestic data. Consequently, FSS performance comparisons that are necessarily based on globally-consolidate data only serve as proxies for performance in U.S. domestic industry segments.

(i) Allocation of Transponder Capacity by Application

191. An aspect of FSS industry performance is the allocation of transponder capacity to differing applications in response to the demands of wholesale customers. In 2008, 2009, and 2010, as shown in Table V.1, Intelsat has allocated roughly one-half of its domestic transponder capacity to network service applications, while utilizing approximately thirty percent of its domestic transponder capacity for video applications. SES Americom has allocated more than forty percent of its domestic transponder capacity to network services, while utilizing nearly another forty percent of its domestic transponder capacity to video applications.[339]

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[337] Both satellite operators and their customers may have outside options that strengthen their bargaining power in negotiations for transponder services. Customers may have other satellite operators or terrestrial telecommunications entities that are willing and able to supply telecommunications facilities and services that are reasonably substitutable for the transponder capacity that the customer may be negotiating with a given satellite operator. Similarly, a given satellite operator may have other customers that are willing to negotiate for the same capacity desired by some other customer. The extent of outside options available to either the satellite operator or the customer is not necessarily, or even likely, to be symmetrical. Among other factors, the extent of asymmetry of outside options between the satellite operator and the customer will determine which party to the bilateral negotiations will have the greater bargaining power.

[338] This estimate, provided by Futron, includes revenues reported by U.S.-based satellite operators and takes into account that satellite operators do not consistently report transponder lease revenues by country of service origination or destination.

[339] The data reported in Table V.1 showing the percentage allocation of FSS transponder capacity among specific applications provide an indicator of industry segment shares of output supplied by the major FSS operators. These (continued….)

TABLE V.1

PERCENTAGE ALLOCATION OF FSS TRANSPONDERS FOR U.S. DOMESTIC WHOLESALE APPLICATIONS[340]

Operators	Video Contribution and Distribution				Network Services			
	2007	2008	2009	2010	2007	2008	2009	2010
Intelsat	38	33	27	25	50	49	50	55
PanAmSat	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Loral Skynet	2	n/a	n/a	n/a	3	n/a	n/a	n/a
SES Americom	27	41	39	45	25	35	41	32
SES New Skies	4	n/a	n/a	n/a	8	n/a	n/a	n/a
Other	28	n/a	27	25	14	n/a	n/a	n/a

NOTE: SES consolidated 2008 and 2009 results for Americom and New Skies; Loral Skynet is now Telesat

b. Mobile Satellite Services

192. Similar to the FSS sector, publicly-available financial and operating data on mobile satellite service operators are limited. Data on privately-held MSS operators are not available. For some MSS operators, data on mobile satellite services are part of the consolidated financial reports of a corporate parent and are not sufficiently disaggregated to report revenues and operating data for mobile satellite services. Given these limitations, Table V.2a and Table V.2b only report publicly-available financial data for Inmarsat and other smaller MSS operators where data were available.

(i) Financial Overview for Major MSS Operators

193. Inmarsat was founded as a non-profit international enterprise in 1979, and became publically-traded in 1982. Major shareholders include Lansdowne Partners and the Blackstone Group. Some other MSS firms are new entrants, as some of the financial data reflect (*e.g.*, negative cash flows).

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statistics show that Intelsat has a stronger position in the supply of various network service applications, while SES Americom is somewhat stronger in the supply of video contribution and distribution service applications. Moreover, the relative positions in the supply of network and video service applications have tended to be stable between the major satellite operators in recent years. However, the data reported in Table V.1 should not be interpreted as estimates of industry market shares, since no specific market definition is implied or determined in this *Report* for such applications of transponder capacity.

[340] Source: Futron Corporation.

TABLE V.2a

SUMMARY ANNUAL OPERATING STATISTICS FOR MOBILE SATELLITE OPERATORS FOR 2009 (Millions US$)[341]

	INMARSAT	GlobalStar	ORBCOMM[342]	Iridium	TerreStar	DBSD
Revenue	1,038	64	28	76	2.4	0
Interest Expense	160	7	0.19	89	64	40
Net Operating Cash Flow[343]	622	(18)[344]	3	23	(113)	(27)
EBITDA	594	(31)[345]	1.5	53	n/a	n/a
Free Cash Flow	349	n/a	(29)	n/a	n/a	n/a

TABLE V.2b

SUMMARY ANNUAL OPERATING STATISTICS FOR MOBILE SATELLITE OPERATORS FOR 2010 (Millions US$)[346]

	INMARSAT	GLOBALSTAR	ORBCOMM[347]	IRIDIUM
Revenue	1,172	68	37	348
Interest Expense	127	5	0.19	17
Net Operating Cash Flow	744	(23)[348]	3.4	151
EBITDA	696	(18)[349]	9	128[350]
Free Cash Flow	470	(23)[351]	(3.7)	(86)[352]

[341] Source: Company 2009 Annual Reports and 10-Ks, except where indicated.

[342] All data from http://quotes.wsj.com/ORBC/financials/annual/income-statement and http://quotes.wsj.com/ORBC/financials/annual/cash-flow.

[343] Cash flow from operating activities.

[344] http://quotes.wsj.com/GSAT/financials/annual/cash-flow.

[345] http://quotes.wsj.com/GSAT/financials/annual/income-statement.

[346] Source: Company 2010 Annual Reports and 10-Ks, except where noted.

[347] All data from http://quotes.wsj.com/ORBC/financials/annual/income-statement and http://quotes.wsj.com/GSAT/financials/annual/cash-flow.

[348] http://quotes.wsj.com/GSAT/financials/annual/cash-flow.

[349] http://quotes.wsj.com/GSAT/financials.

[350] http://quotes.wsj.com/IRDM/financials.

[351] http://quotes.wsj.com/GSAT/financials.

194. DBSD-ICO Global has not yet reported revenues for its new service and financial information for SkyTerra/LightSquared are not publicly available.

195. Earnings during the reporting period of this *Third Report* in mobile satellite industry segments are relatively low, and sometimes negative. Such data reflect the new nature of the services offered coupled with the high start-up costs associated with building and launching satellites. However, little detailed company-specific data are available for assessing performance in these satellite segments.

196. The degree of terrestrial competition faced by MSS providers varies significantly among different mobile satellite services. MSS operators seem to have focused on different niches within mobile digital services. While they all can be characterized as mobile satellite operators, their services are not perfect substitutes for one another.

c. Satellite Digital Audio Radio Services

197. SiriusXM is currently the only satellite operator offering mobile subscription satellite audio service although, as noted in paras. 3 and 72, *supra*, various emerging consumer alternatives to SiriusXM recently have been identified.[353]

(i) Financial Overview of SiriusXM

198. Table V.3 reports summary financial data for SiriusXM as reported in company annual reports and annual SEC 10-K filings for 2009 and 2010.

TABLE V.3

SUMMARY ANNUAL OPERATING STATISTICS FOR SIRIUS-XM FOR 2009 and 2010 (Millions US$)[354]

	2009	2010
Revenue	2,526	2,817
Operating Expense	2,244	2,352
Interest Expense	316	296
Operating Cash Flow	434	513
EBITDA (adjusted)	462	626
Free Cash Flow	185	211
Ratios		
Debt/EBIDTA	6.1	4.3
EBITDA/Interest Expense	1.4	2.1

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[352] http://quotes.wsj.com/IRDM/financials.

[353] *See XM Sirius Transfer Order*, *supra*, fn. 3.

[354] Source: Company Annual Reports.

VI. COMPETITION ASSESSMENT AND CONCLUSIONS

A. Findings

1. FSS

199. As a conceptual matter, an assessment of the market power of FSS operators is difficult to make since the prices paid by FSS wholesale customers for transponder capacity result from negotiations between the satellite operator and each individual customer. The record supporting the preparation of this *Third Report* provides no information concerning the pricing or other terms and conditions of individually-negotiated transponder leases that might otherwise provide insight with respect to the possible exercise of market power and the effects of relative bargaining power on the negotiated outcomes between the FSS operator and the wholesale customer.

200. The financial and operating statistics may be consistent, however, with the exercise of some technical market power but not necessarily market power that produces excess profits.[355] Possible competitive forces, such as the availability of alternative telecommunications transmission facilities and alternative transponder capacity provided by multiple FSS operators in the various global regions, may constrain the overall profitability and market power of major FSS operators in the FSS industry segment.[356]

201. Data aggregated to the level of the firm may obscure, however, competitive problems at the level of output categories or individual transactions with customers.[357] For example, some resellers/integrators allege that Intelsat, in its role as wholesaler, retailer, and competitor to resellers/integrators, prices transponder capacity at uncompetitive levels and will only supply transponder capacity in predetermined bundles.[358] Resellers/integrators allege that such uncompetitive pricing and bundling behavior reflects the exercise of market power intended to disadvantage them in responding to competitive bids for satellite communications by the Department of Defense.[359] While it is not possible to evaluate fully such claims of anticompetitive behavior given that the record is limited, and that the evidence we do have has mixed implications, it is possible, given the individual bilateral bargaining between the satellite operator and the wholesale customer of most transponder leases, that some customers may pay transponder lease rates that reflect substantial price-cost margins while others may pay lease rates that reflect much smaller price-cost margins.[360] By contrast, wholesale customers that can

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[355] The notion of technical market power and its relevance in sunk cost, capital intensive industries is discussed in Section IV.B.2.b of this *Third Report*.

[356] The performance metrics for Intelsat and SES are taken as presumptively representative of the performance of the FSS industry sector *generally*, at least for fixed satellite services covering the North American region. Financial data sufficient to compute performance metrics for additional satellite operators are not available for preparation of this *Third Report*.

[357] This problem is not unique to the satellite communications industry but is a structural characteristic of high fixed and sunk costs industries generally. For example, railroads have often failed to earn profits sufficient to recover their high fixed costs of production or earn a rate of return on assets sufficient to recover their financial cost of capital in the *aggregate* across all transportation services supplied by the firm. Nevertheless, "captive shippers" often complain that railroads have "market dominance" and exercise market power in setting rates for a particular class of customer, notwithstanding the poor financial performance of the railroad as a business entity.

[358] *See, e.g.*, CapRock Orbit Act Comments at 9-11, and CapRock Comments at 5.

[359] *Id.*

[360] These differences between and among various transponder lease negotiated outcomes will reflect multiple factors, including the level of excess capacity in a given global region; the outside options retained by the wholesale (continued….)

readily substitute available fiber optic cable capacity, either terrestrial or undersea, may likely not face the exercise of market power by the FSS operator and may be able to negotiate transponder lease rates that reflect price-cost margins that produce no excess profits for the satellite operator.

202. Taken in its entirety, the record supporting the preparation of this *Third Report* is mixed and, in some respects, contradictory with respect to the extent of competition prevailing in the FSS sector during the reporting period. On the one hand, some evidence in the record appears to support a finding of rivalry among FSS operators sufficient to constrain both the profitability and market power of major FSS operators at an aggregate, firm level. Alternatively, the record also includes multiple allegations of anticompetitive behavior by Intelsat that, if confirmed by sufficient evidence, would be consistent with both the presence and exercise of market power at the level of individual customers. Such allegations, if sustained, would contradict a finding of competitive forces that are sufficient to constrain the exercise of market power that harms otherwise efficient competitors. Thus, we will initiate a proceeding to develop a more complete record to address the allegations of anticompetitive conduct in the FSS sector.

2. MSS Sector

203. The performance metrics for the MSS sector reported in Section V of this *Third Report* show that Inmarsat, Iridium, and ORBCOMM had positive net operating cash flow in 2009 and 2010, while other MSS operators for which data are available operated at a loss. This appears to be consistent with the exercise of some technical market power for Inmarsat, but not necessarily market power that produces excess profits. In broad terms, our review of competitive constraints with respect to MSS operators does not allow us to make definitive conclusions with respect to the general state of effective competition in the MSS sector of the satellite communications industry. Unlike the FSS sector, the MSS sector is an evolving, growing industry segment with a single, established dominant operator (Inmarsat), several viable small operators (*e.g.*, Iridium), and several startup and bankrupt operators. Competitive rivalry within the MSS sector appears to be developing but is currently uneven given the presence of failing, evolving, and successful operators.

204. Given the current developmental stage in the evolution of the MSS sector, the very limited record supporting the analysis of rivalry in mobile satellite services during 2008, 2009, and 2010, and the disparate observations on MSS conduct, it is not possible to make either complete or definitive findings concerning the extent of effective competition in MSS industry segments.

3. SDARS

205. Various emerging consumer alternatives to SiriusX have been identified,[361] including Pandora Media, Inc., Rhapsody, Slacker, Last.fm, and iheartradio, as well as Internet-based streaming audio by automobile manufacturers such as Ford, Toyota, MINI, GM, Mercedes-Benz, and Hyundai. However, because there are no direct subscription radio competitors and little information in the record as to the competitive impact of the emerging alternatives on SDARS operations, no findings or conclusions regarding the current state of competition in the SDARS sector are reported for 2008, 2009, and 2010.

(Continued from previous page)
customer; the customer's intensity and elasticity of demand, which reflects the customer's outside options; and the willingness of the customer to make long term commitments for specific leased transponder capacity.

[361] *See XM Sirius Transfer Order*, *supra*, n. 3.

VII. ADMINISTRATIVE MATTERS

206. This *Third Report* is issued pursuant to the authority contained in Section 703 of the Communications Satellite Act, 47 U.S.C. § 703.

VIII. ORDERING CLAUSES

207. **IT IS ORDERED** that the Secretary shall send copies of this *Third Report* to the appropriate committees and subcommittees of the United States House of Representatives and the United States Senate.

208. **IT IS FURTHER ORDERED** that the proceeding in IB Docket Nos. 9-16 and 10-99 **IS TERMINATED.**

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A

List of Commenters

May 14, 2009 Public Notice Comments

EchoStar Corporation
MSS/ATC Coalition
Satellite Industry Association
SkyBitz, Inc.

May 14, 2009 Public Notice Reply Comments

Inmarsat, Inc.
MSS/ATC Coalition
SkyTerra Subsidiary, LLC

July 22, 2010 Public Notice Comments

CapRock Communications, Inc.
Echostar Corporation, Intelsat Global S.A., SES World Skies, and Telesat Canada (Joint Comments)
Globalstar Licensee, LLC
Iridium Satellite LLC
Microcom
Satellite Industry Association
Spacenet Inc.

July 22, 2010 Public Notice Reply Comments

Arianespace, Inc.
Globalstar Licensee, LLC
Intelsat Global
International Launch Services
SES World Skies
Space Exploration Technologies Corp.

APPENDIX B

List Of Foreign Nations Identified By SIA In The Record As Raising Barriers To Maket Entry By U.S. Satellite Providers[362]

Countries identified as lacking transparent, non-discriminatory and timely licensing procedures for U.S. satellite operators:

- Brazil
- China
- Egypt
- India
- Israel
- Kazakhstan
- Malaysia
- Philippines
- Russia
- South Africa
- Thailand
- Venezuela
- Vietnam

Countries Identified as Not Providing National Treatment (*i.e.*, Most Favored Nation status) for U.S. Satellite Operators:

- Bangladesh
- Brazil
- China
- Egypt
- India
- Israel
- Kazakhstan
- Korea
- Malaysia
- Philippines
- Russia
- South Africa
- Vietnam
- Venezuela

Countries Identified as Not Permitting U.S. Satellite Operators to Transport Broadcast Video Signals and Associated Audio Signals:

- India
- Kazakhstan
- Russia

[362] This is a list of nations that SIA – not the Commission – identified as engaging in one or more of the foregoing barriers to entry by U.S. satellite service providers.

Countries Identified as Requiring a Local Presence or Local Partner for U.S. Satellite Operators:

- Bangladesh
- Brazil
- India
- Israel
- Kazakhstan
- Korea
- Mexico
- Philippines
- Russia
- Venezuela

Countries Identified as Requiring Completion of the ITU Frequency Coordination Process Prior to Market Access for U.S. Satellite Operators:

- Russia

Countries Identified as Having a Monopoly for the Domestic Satellite Operator:

- China
- Egypt (operator monopoly, four VSAT licensees)
- Kazakhstan
- Russia
- South Africa (duopoly)
- Thailand

Countries Identified as Requiring Deployment of Specific Technologies:

- Russia
- Kazakhstan
- India
- Mexico

STATEMENT OF
COMMISSIONER MICHAEL J. COPPS

Re: *Third Report and Analysis of Competitive Market Conditions with Respect to Domestic and International Satellite Communications Services and Report and Analysis of Competitive Market Conditions with Respect to Domestic and International Satellite Communications Services*, IB Docket No. 09-16 and 10-99

I am pleased that this satellite competition report offers some important improvements over the previous two reports. My thanks to the Chairman and the International Bureau for the more detailed analysis of the satellite market, dividing it into fixed and mobile sub-markets, along with satellite radio. This approach better reflects the competitive landscape and will no doubt improve future reports. I am also pleased that the report provides an analytical framework for analyzing potentially anti-competitive behavior in the market. While I am hopeful that we will continue to refine what "effective competition" means, this step represents real progress. I am also hopeful that we will continue to improve our collection and analysis of financial and other data to dig into the state of competition for satellite services. As the National Broadband Plan and our recent reform of the High Cost program make clear, satellite can play a key role in our broadband future. We must continue to foster competition in this unique and important sector of the communications market.

STATEMENT OF
COMMISSIONER ROBERT M. McDOWELL

Re: *Third Report and Analysis of Competitive Market Conditions with Respect to Domestic and International Satellite Communications Services and Report and Analysis of Competitive Market Conditions with Respect to Domestic and International Satellite Communications Services*, IB Docket Nos. 09-16 and 10-99, FCC 11-183.

I sometimes view FCC competition reports with a skeptical eye, as I do with today's report on the competitive market conditions of the domestic and international satellite communications services. What is different here, however, is that I am voting to approve this report. The new analytical approach – a more detailed analysis that includes separate discussions of the fixed satellite services, mobile satellite systems and the satellite digital audio radio industries – is sound. And, I thank Rod Porter and the team in the International Bureau for their thoughtful work in this regard.

Even so, given the current state of these markets, the record is insufficient at this time to support a finding of "effective competition" as required by Congress. On the other hand, as discussed in our recent order reforming part of the Universal Service Fund, the satellite industry is poised to play a key role in the broadband future. I look forward to continuing to develop opportunities to foster competition in this important market sector.