

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

In the Matter of )  
 ) IB Docket No. 02-34  
Amendment of the Commission's Space )  
Station Licensing Rules and Policies )  
  
To: The Commission

**PETITION FOR CLARIFICATION**

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## Summary

By this Petition, Space Imaging LLC (“Space Imaging”) asks the Commission to clarify how the rules and policies adopted in the recent *Satellite Licensing Order* will apply to remote-sensing satellite system applications. Specifically, Space Imaging urges the Commission to rule that applications for new or modified non-geostationary satellite orbit (“NGSO”) satellite systems in the Earth Exploration Satellite Service (“EESS”) shall be processed under the first-come, first-served procedure applicable to geostationary satellite orbit-like (“GSO-like”) satellite systems and not under the modified processing round procedure applicable to NGSO-like systems.

A first-come, first-served procedure is better suited to applications for NGSO remote-sensing satellite systems than the modified processing round approach. Band segmentation is not required for the licensing of remote-sensing satellite systems, nor would the use of processing rounds in this context serve any useful purpose. Unlike typical NGSO-like systems described in the *Satellite Licensing Order*, such as NGSO mobile-satellite service systems, NGSO remote-sensing satellite systems are fully capable of sharing the same EESS band segments with other NGSO remote-sensing systems, and they also can share the EESS spectrum with GSO remote-sensing satellite systems as well. Indeed, the Commission has routinely licensed both NGSO and GSO remote-sensing satellite systems in the 8025-8400 MHz band on a *de facto* first-come, first-served basis, precisely because such systems are able to use EESS frequencies on a coordinated basis.

In addition, any application to *modify* an existing NGSO EESS license that is required to be placed in the application queue, such as an application to increase operating EESS spectrum,

also should be subject to the first-come, first-served procedure for the same reasons that new NGSO EESS system applications must be handled in this way.

The Commission should not apply to EESS system applications the policy announced in paragraph 58 of the *Satellite Licensing Order* that, in cases where there are no service rules establishing sharing criteria for NGSO and GSO satellite systems in a particular frequency band, it would consider only applications of the kind first filed, *i.e.*, NGSO or GSO, until sharing criteria are established. NGSO remote-sensing systems are able to share spectrum with each other and with GSO remote-sensing systems. Indeed, the Commission consistently has held that service rules were not required in the case of the EESS service, and it has licensed *both* NGSO and GSO remote-sensing satellite systems in EESS frequency bands given the licensees' ability to resolve potential interference problems through private coordination efforts.

Granting the requested relief would serve the public interest because it would clarify the Commission's intent with regard to the processing of NGSO remote-sensing applications; would ensure that remote-sensing satellite systems are licensed in accordance with a process that is "best suited" to this important service; and would lead to an orderly and efficient satellite licensing process.

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To: The Commission

**PETITION FOR CLARIFICATION**

Space Imaging LLC, licensee of a U.S. commercial remote-sensing satellite system, hereby requests the Commission to clarify how the rules and policies adopted in the above-referenced proceeding will apply to remote-sensing satellite system applications. Specifically, the Commission should rule that applications for new or modified non-geostationary satellite orbit (“NGSO”) satellite systems in the Earth Exploration Satellite Service (“EESS”) shall be processed under the first-come, first-served procedure applicable to geostationary satellite orbit-like (“GSO-like”) satellite systems and not under the modified processing round procedure applicable to NGSO-like systems.<sup>1</sup>

Space Imaging and other commercial EESS licensees operate or propose to operate remote-sensing satellite systems using X-band spectrum in the 8025-8400 MHz band. The X-band frequencies are used primarily to downlink satellite imagery data to a limited number of ground stations in the United States and to other ground stations located in other regions of the

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<sup>1</sup> This Petition is being filed within the applicable time period under Section 1.429 of the rules for filing petitions for reconsideration of the *Satellite Licensing Order* in the above-referenced proceeding. In the Matter of Amendment of the Commission's Space Station Rules and Policies and Mitigation of Orbital Debris, IB Docket Nos. 02-34 and 02-54, *First Report and Order and Further Notice of Proposed Rulemaking in IB Docket No. 02-34, and First Report and Order in IB Docket No. 20-54*, released May 19, 2003 (“*Satellite Licensing Order*”).

world. EESS systems are fully capable of sharing the same spectrum throughout the 8025-8400 MHz allocation because of the use of tracking earth stations that provide discrimination between the wanted and potentially interfering satellites. Indeed, the Commission has authorized multiple EESS systems to use overlapping frequencies based on the ability of remote-sensing licensees to coordinate their operations.

Typically NGSO satellite systems, such as NGSO Mobile-Satellite Service (“MSS”) systems, cannot operate in the same spectrum without causing unacceptable interference to each other, because the mobile earth terminals typically use near-omnidirectional antennas and therefore have no significant discrimination between the wanted and interfering satellites.<sup>2</sup> For this reason, the Commission’s recent *Satellite Licensing Order* adopted a modified processing round procedure using a spectrum-splitting framework for NGSO-like system applications. Unlike typical NGSO satellite systems, however, remote-sensing satellite systems using NGSO architecture *are fully capable of sharing the same spectrum with other remote-sensing systems*. Band segmentation of EESS spectrum therefore is not required to accommodate multiple remote-sensing systems in the same frequency bands. In fact, splitting the available EESS spectrum among various remote-sensing systems would deprive system operators of the wide band segments that are required for downlinking satellite imagery data. In this regard, NGSO EESS applications are akin to GSO Fixed-Satellite Service (“FSS”) operations because NGSO EESS systems, like GSO FSS satellites, generally are authorized to operate throughout broad frequency bands, and large frequency assignments do not preclude additional market entry.

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<sup>2</sup> The exception to this is the use of CDMA which does allow co-frequency MSS systems to co-exist without causing unacceptable interference. However, in this case, the spectrum capacity available to each co-frequency MSS system is correspondingly reduced in proportion to the number of systems sharing the same spectrum.

For this and other reasons discussed herein, new and modified NGSO EESS system applications should be subject to a first-come, first-served procedure by which they are processed one at a time in the order that they are filed. Issuance of a ruling to this effect would serve the public interest because it would clarify the appropriate licensing procedure to be used for NGSO remote-sensing satellite systems.

## **I. Background**

In the *Satellite Licensing Order*, the Commission revamped the satellite licensing process that has been in effect since the early 1980s. A principal objective of these procedural reforms was to accelerate the satellite licensing process and thereby eliminate the delay inherent in existing procedures. As a threshold matter, the Commission adopted an application queue for considering all new satellite proposals. Moreover, it concluded that different kinds of satellite systems raise different processing issues, and it therefore adopted two different licensing frameworks—a modified processing round approach for NGSO-like systems; and a “first-come, first-served” procedure for GSO-like systems.

The new framework adopted in the *Satellite Licensing Order* was based on the notion that band segmentation is preferable for some but not all satellite applications.<sup>3</sup> The Commission concluded that the following classifications should be used: (1) applications for NGSO satellite constellations and GSO satellite constellations with earth stations with omnidirectional antennas (“NGSO-like” applications), and (2) applications for GSO satellites communicating with earth stations with non-omnidirectional antennas (“GSO-like” applications). The Commission stated that NGSO-like satellite systems are those in which the earth station has little or no directivity towards a satellite, so that the earth station must provide the necessary gain towards the wanted

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<sup>3</sup> *Satellite Licensing Order*, ¶ 21.

satellite in all directions, such as hand-held satellite telephones. NGSO-like systems generally cannot operate on the same spectrum without causing unacceptable interference with each other. The *Satellite Licensing Order* describes GSO-like satellites, on the other hand, as those using earth stations with antennas with directivity towards the satellites, such as Fixed-Satellite Services (“FSS”), and Mobile-Satellite Service (“MSS”) feeder links which use GSO satellites. The Commission noted that GSO satellites can operate on the same spectrum at two-degree orbital spacing.<sup>4</sup>

The *Satellite Licensing Order* states that the NGSO-like classification describes the universe of satellite applications for which band segmentation is preferable because it promotes the goal of trying to license as many satellite systems as possible, thereby stimulating as much competition as possible for each satellite service.<sup>5</sup> The Commission noted that if it adopted the first-come, first-served procedure for NGSO-like satellite applications, then the first qualified applicant could request authority to operate in so much of the spectrum that additional market entry would be precluded. Thus, for NGSO-like systems, the Commission concluded that band segmentation is preferable because it facilitates competitive market entry, and the Commission therefore decided to award spectrum for NGSO-like systems through modified processing rounds with a pre-set band-splitting mechanism. Under this approach, the available spectrum will be divided equally among the qualified applicants for NGSO-like systems, which the Commission found to be the best way of issuing licenses to NGSO-like systems quickly and fairly.<sup>6</sup>

The Commission concluded, however, that a first-come, first-served procedure is the best option for licensing GSO-like satellite systems, *i.e.*, satellite systems where the earth station

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<sup>4</sup> *Id.*

<sup>5</sup> *Satellite Licensing Order*, ¶ 22.

<sup>6</sup> *Id.*



antennas accessing the satellites in that system can provide the necessary isolation toward satellites other than the one at which it is directly pointed. The Commission noted that a band segmentation approach for GSO FSS satellite applications would limit satellite operators to only a fraction of the frequencies in the band, and therefore would not allow them to develop a viable business.<sup>7</sup> The Commission stated that the concerns that led it to reject the first-come, first-served procedure for NGSO-like satellite systems do not apply to GSO-like systems. Specifically, using a first-come, first-served procedure for NGSO-like systems would allow an applicant to request so much spectrum as to preclude additional entry, but this concern does not apply to GSO-like systems because assigning a frequency band segment to one GSO licensee does not preclude other licensees from using the same frequency segments.<sup>8</sup> Thus, under the first-come, first-served procedure applicable to GSO-like satellite applications, the Commission will consider applications for a particular GSO satellite license one at a time in the order that they are filed.

While the *Satellite Licensing Order* adopts procedures for all satellite applications other than direct broadcast satellite (“DBS”) and digital audio radio satellite (“DARS”) systems, it does not specifically address NGSO remote-sensing satellite systems or explain precisely how the Commission will license such systems under the new framework. The Commission did observe, however, that historically it has granted licenses for remote-sensing satellite systems *outside of processing rounds*.<sup>9</sup> Space Imaging respectfully submits that there is no reason to change current licensing procedures for NGSO remote-sensing satellite systems, and that the

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<sup>7</sup> *Id.*, ¶ 78.

<sup>8</sup> *Id.*, ¶ 79.

<sup>9</sup> This assertion was made in the context of showing that the Commission is not legally bound to consider satellite license applications in processing rounds. *See Satellite Licensing Order*, ¶ 103.

Commission should continue to use the first-come, first-served procedure for new and modified remote-sensing satellite systems, whether an application proposes an NGSO or GSO system architecture.

## **II. The Commission Should License NGSO Remote-Sensing Satellites In Accordance With the First-Come, First-Served Procedure**

The Commission stated in the *Satellite Licensing Order* that it was basing its new licensing reforms on a determination “that one size does not fit all—that different procedures are better suited to applications for different kinds of satellite systems.”<sup>10</sup> The Commission recognized “that different kinds of satellite applications raise different kinds of issues, and therefore it may be reasonable to adopt different procedures to address the issues raised by each kind of satellite application.”<sup>11</sup> Essentially, Commission decided that satellite applications for which band segmentation is preferable, *i.e.*, NGSO-like applications, should be considered pursuant to a modified processing round procedure whereby the available spectrum would be divided equally among applicants, and that all other types of satellite applications, *i.e.*, those for which band segmentation is not required, would be processed on a first-come, first-served basis.

Unquestionably, the first-come, first-served procedure is “better suited” to applications for NGSO remote-sensing satellite systems than the modified processing round approach. Band segmentation is not required for the licensing of remote-sensing satellite systems, nor would the use of processing rounds in this context serve any other purpose. Unlike typical NGSO-like systems described in the *Satellite Licensing Order*, such as NGSO MSS systems, NGSO remote-sensing satellite systems are fully capable of sharing the same EESS band segments with other NGSO remote-sensing systems, and they also can share this EESS spectrum with GSO remote-

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<sup>10</sup> *Satellite Licensing Order*, ¶ 5.

<sup>11</sup> *Id.*

sensing systems as well. Indeed, the Commission routinely has licensed both NGSO and GSO remote-sensing satellite systems in the 8025-8400 MHz band on a *de facto* first-come, first-served basis, precisely because such systems are able to use EESS frequencies on a coordinated basis.<sup>12</sup>

Spectrum sharing between NGSO remote-sensing satellite systems is possible for two reasons:

First, the downlink transmissions of NGSO remote-sensing satellite systems are received by relatively large earth stations that track the movement of the NGSO satellite in its orbit. These receiving earth stations therefore point towards the intended satellite, and provide angular discrimination, and therefore signal suppression, for almost all of the time towards any other co-frequency NGSO satellite that might be visible in the sky. This ensures an extremely low probability of an interference event occurring, which is operationally acceptable to these types of systems.

Second, because the downlink transmissions of NGSO remote-sensing satellite systems are not continuous, but occur on a periodic basis only, EESS systems are able to coordinate their operations if necessary on a time scheduled basis. As explained by the Commission in the *Space Imaging Order*:

Typically, a Space Imaging satellite would contact any given earth station less than 10% of the time. For example, a satellite in a 98-minute orbit would be in range of an earth station for an average of about 8 minutes per orbit. Orbits that pass over 2 earth stations would give a maximum contact time of approximately 15 minutes for that orbit. Given these constraints, [Space Imaging] satellites will use data compression techniques to maximize the amount of useful

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<sup>12</sup> See Space Imaging, L.P., *Order and Authorization*, 10 FCC Rcd 10911 (IB 1995) (“*Space Imaging Order*”); Orbital Imaging Corporation, *Order and Authorization*, 14 FCC Rcd 2997 (IB 1999) (“*Orbital Imaging Order*”); EarthWatch Incorporated, *Order and Authorization*, 10 FCC Rcd 10467 (IB 1995) (“*EarthWatch Order*”); and AstroVision International, Inc., *Order and Authorization*, 15 FCC Rcd 22299 (IB 2000) (“*AstroVision Order*”).

data that can be transmitted from a satellite and minimize the amount of bandwidth required. *Consequently, it is undisputed that multiple systems could share the 8025-8400 MHz band requested by Space Imaging by coordinating orbits, orbit times, and the location of earth stations.* Space Imaging has agreed to coordinate its operations with those of any other licensed system operator to avoid harmful interference.<sup>13</sup>

Similarly, in authorizing Orbital Imaging to launch and operate an NGSO remote-sensing satellite system, the Commission noted that the Orbimage satellites “will transmit digitized image data to the ground only when they are within line of sight of a receiving earth station.”<sup>14</sup> The Commission observed that orbital dynamics and the location of Orbital Imaging’s two U.S. earth stations physically limit earth station visibility to a maximum of 12.5 minutes per 94-minute orbit, and that typically an Orbimage satellite would contact the two U.S. earth stations less than 15 percent of the time.<sup>15</sup> The Commission held that “because the Orbimage system will transmit only when a satellite is within view of a receiving earth station, it may be possible for other remote-sensing systems to share frequencies with Orbimage by coordinating orbital geometries, downlink data times, and the location of earth stations.”<sup>16</sup> Likewise, in authorizing EarthWatch’s NGSO remote-sensing satellite system, the Commission observed that “because the EarthWatch system is to transmit only when a satellite is within view of an EarthWatch earth station, it may be possible for other remote-sensing systems to share frequencies with EarthWatch by coordinating orbits and the location of ground stations.”<sup>17</sup>

The Commission also authorized AstroVision to launch and operate a remote-sensing system consisting of two *GSO satellites* in the 8025-8400 MHz band, finding that AstroVision’s

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<sup>13</sup> *Space Imaging Order*, 10 FCC Rcd at 10912 (footnotes omitted) (emphasis added).

<sup>14</sup> *Orbital Imaging Order*, 14 FCC Rcd at 2998.

<sup>15</sup> *Id.* at 3000.

<sup>16</sup> *Id.* at 3001.

<sup>17</sup> *EarthWatch Order*, 10 FCC Rcd at 10469.

GSO system could share the frequency band with NGSO remote-sensing satellite systems. AstroVision noted, among other things, that its system was designed to implement spatial diversity isolation between its system and other EESS licensed systems, *i.e.*, the ability to communicate with alternative earth stations in the event interference or other operational anomalies so require.<sup>18</sup> Based on AstroVision's showing, the Commission concluded:

AstroVision's proposed system appears to be technically sufficient and its operation will not preclude other commercial remote-sensing systems. AstroVision has demonstrated sufficient use of spatial diversity techniques that will maximize the potential for entry for new remote-sensing systems. Moreover, it may be possible for other remote-sensing satellite systems to share frequencies with AstroVision by coordinating their operating parameters and the location of earth stations.<sup>19</sup>

Thus, NGSO remote-sensing systems not only can share spectrum with each other, they also can share spectrum with GSO remote-sensing satellites as well.

Band segmentation plainly is not required to accommodate multiple NGSO remote-sensing satellite systems in the same frequency bands, and the use of processing rounds for licensing NGSO remote-sensing systems is therefore not necessary or appropriate. Indeed, there is no risk that a single lead NGSO remote-sensing applicant would gain access to so much of the spectrum resources that additional market entry would be precluded. On the contrary, NGSO remote-sensing systems can be licensed over wide frequency band segments, or even across the entire 8025-8400 MHz band, without precluding other remote sensing satellite systems from using the same spectrum.<sup>20</sup> NGSO remote-sensing systems are similar in this respect to GSO-

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<sup>18</sup> *AstroVision Order*, 15 FCC Rcd at 22302.

<sup>19</sup> *Id.* at 22304.

<sup>20</sup> Open market entry opportunities in the remote-sensing service have shaped other important FCC policies. For example, the Commission consistently has found that it is not necessary to hold remote-sensing licensees to any particular financial standard because grant of these licenses would not prevent other systems from pursuing and implementing competing remote-sensing systems. *Space Imaging Order*, 10 FCC Rcd at 10913; *EarthWatch Order*, 10 FCC Rcd at

like satellite systems : each type of licensee typically is authorized to operate throughout a broad frequency range, and large spectrum assignments to each type of applicant do not preclude additional market entry. Moreover, there is no need to adopt a pre-set method of assigning bandwidth (*i.e.*, dividing the spectrum equally among the applicants) in either case to expedite the licensing, essentially because the Commission relies successfully in these situations on the good faith coordination efforts of the respective licensees.

The formation of processing rounds—and an equal division of spectrum among qualified applicants--would be counterproductive in the case of remote-sensing systems because it would deprive licensees of wide band segments required for a viable business. As remote-sensing technology continues to mature, EESS spacecraft will require even wider bandwidths to downlink increasing amounts of data at faster rates.<sup>21</sup> The idea of segmenting the remote-sensing frequency bands and licensing operators to use only a fraction of the available bandwidth cannot possibly satisfy the spectrum needs of the remote-sensing operators. For this reason, the processing round approach adopted for typical NGSO-like satellite systems is unworkable in the case of NGSO remote-sensing satellite systems and should not be used. Therefore, NGSO remote-sensing satellite systems should be excluded from the defined term “NGSO-like satellite

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10469; *Orbital Imaging Order*, 14 FCC Rcd at 3001; and *AstroVision Order*, 15 FCC Rcd at 22305.

<sup>21</sup> One NGSO remote-sensing licensee, DigitalGlobe, Inc. (formerly EarthWatch), recently advised the Commission that spectrum requirements for its next generation system cannot be met at X-band, and that it anticipates applying to the Commission to use the EESS band at 25.5-27.0 GHz. See Comments of DigitalGlobe, Inc., dated May 15, 2003, filed in *Amendment of Parts 2, 25, and 87 of the Commission’s Rules to Implement Decisions From World Radiocommunication Conferences Concerning Frequency Bands Between 28 MHz and 36 GHz and to Otherwise Update the Rules in this Frequency Range; Amendment of Parts 2 and 25 of the Commission’s Rules to Allocate Spectrum for Government and Non-Government Use in the Radionavigation-Satellite Service*, Notice of Proposed Rulemaking, ET Docket No. 02-305, RM-10331, released October 7, 2002. See also Written *Ex Parte* Presentation of Space Imaging LLC in the same proceeding, filed June 24, 2003.

system” for purposes of applying the modified processing round procedures of Section 25.157 of the rules.

Applications for *new* NGSO remote-sensing satellite systems should be processed pursuant to the first-come, first-served procedure, and applications to *modify* existing NGSO EESS authorizations should be processed in the same manner. Thus, for example, any application to modify an NGSO EESS license that is required to be placed in the application queue, such as an application to increase operating EESS spectrum, should be subject to the first-come, first-served procedure for the same reasons that new NGSO EESS system applications must be handled in this way.<sup>22</sup>

The Commission also should clarify a related issue vis-à-vis the licensing of remote-sensing satellite systems. The Commission stated in paragraph 58 of the *Satellite Licensing Order* that, in cases where there are no service rules establishing sharing criteria for NGSO and GSO satellite systems in a particular frequency band, it would consider only applications of the kind filed first, *i.e.*, NGSO or GSO, until sharing criteria are established.<sup>23</sup> As shown above, NGSO remote-sensing satellite systems are able to share spectrum with each other and with GSO remote-sensing satellite systems as well. The Commission has consistently held that service rules were not required in the case of the EESS service, and it has licensed *both* NGSO and GSO remote-sensing satellite systems in EESS frequency bands given the licensees’ ability to resolve potential interference problems through private coordination efforts.<sup>24</sup> For this reason, the

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<sup>22</sup> See discussion of modification requests for GSO-like applications in the *Satellite Licensing Order*, ¶¶ 141-144.

<sup>23</sup> *Satellite Licensing Order*, ¶ 58.

<sup>24</sup> See *e.g.*, *Space Imaging Order*, 10 FCC Rcd at 10913; *EarthWatch Order*, 10 FCC Rcd at 10469; see also *Orbital Imaging Order*, 14 FCC Rcd at 3000-01; and *AstroVision Order*, 15 FCC Rcd at 22304-05.

Commission should continue to consider *both* NGSO and GSO remote-sensing applications despite the absence of EESS service rules. Applying the policy announced in paragraph 58 of the *Satellite Licensing Order* to remote-sensing satellite systems would serve no purpose, but would only frustrate the legitimate licensing expectations of the remote-sensing industry.

Finally, a ruling that NGSO remote-sensing satellite systems will be processed in accordance with the first-come, first-served procedure would serve the public interest in several respects. First, issuing a ruling will clarify the Commission's intent with regard to the processing of NGSO remote-sensing applications, especially since this matter was not specifically addressed in the *Satellite Licensing Order*. Second, such a ruling would ensure that NGSO remote-sensing satellite systems are licensed in accordance with a process that is "best suited" to this satellite service, especially considering the unique characteristics and spectrum requirements of the EESS service. Third, issuing the requested ruling will lead to an orderly and efficient licensing process for this important satellite service and this will achieve, in turn, the Commission's primary goal of expediting the satellite licensing process.<sup>25</sup>

### **III. Conclusion**

The *Satellite Licensing Order* did not discuss the unique characteristics of NGSO remote-sensing satellite systems or the capability of such systems to share the same frequency band segments with other NGSO and GSO remote-sensing systems. The Commission did note, however, that historically remote-sensing satellite systems have never been licensed through

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<sup>25</sup> The U.S. Commercial Remote Sensing Policy ("U.S. Policy") issued by the White House on April 25, 2003, solidifies the close relationship between the U.S. Government and the commercial remote-sensing industry, and it reflects the increasing reliance the Government intends to place on commercial remote-sensing satellite systems. The adoption of this U.S. Policy on remote sensing confirms the need for an efficient and orderly FCC licensing process for this important satellite service.



processing rounds. For reasons discussed herein, the modified processing round procedures adopted for NGSO-like applications should not apply to NGSO EESS systems. Instead, the first-come, first-served procedure is the only suitable approach for processing and licensing such systems. Accordingly, the Commission should rule that applications for new NGSO satellite systems in the EESS service shall be processed on a first-come, first-served basis; and applications for modification of EESS authorizations placed in the queue also should be licensed on a first-come, first-served basis.

Respectfully submitted,

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September 12, 2003

**CERTIFICATE OF SERVICE**

I, Vicki Lynne Lyttle, a legal secretary at Dow, Lohnes & Albertson, PLLC do hereby certify that on this 12th day of September, 2003, copies of the foregoing "Petition for Clarification" of Space Imaging LLC were served as follows:

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