

**Description of Modification of License Application**

With this application, DG Consents Sub, Inc. (“DigitalGlobe”) requests modification of WorldView-1, one of its non-geostationary satellite orbit (“NGSO”) Earth Exploration Satellite Service (“EESS”) satellites licensed under Call Sign S2129.<sup>1</sup> Specifically, DigitalGlobe proposes to adjust the descending node of WorldView-1, with accompanying modifications to the satellite’s orbital inclination and right ascension of the ascending node.

In support of its request for a modification, DigitalGlobe provides the following information in accordance with Section 25.114 of the Commission’s rules.<sup>2</sup> DigitalGlobe provides this information only to the extent that it has changed from the information currently on file for WorldView-1 under Call Sign S2129, and hereby certifies that the remaining information has not changed.<sup>3</sup>

**I. Proposed Adjustment of WorldView-1.**

DigitalGlobe proposes to transition the WorldView-1 satellite from its existing 10:30 descending node orbit to a 13:30 descending node orbit. This shift from a morning orbit to an afternoon orbit will enable DigitalGlobe subsequently to launch WorldView-3 into the vacated morning orbit, which it is contractually obligated to do pursuant to an agreement entered into with the Federal government to support the EnhancedView commercial imagery program.<sup>4</sup> The WorldView-1 transition will be gradual, and DigitalGlobe anticipates that the entire adjustment will take place over a 12- to 24-month period. To accomplish the transition, the orbital inclination of WorldView-1 will be modified and the right ascension of the ascending node will change during the transition period. The orbital apogee and perigee will not be modified. Table 1 below contains a comparison of the authorized and proposed orbital parameters.

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<sup>1</sup> DG Consents is a subsidiary of DigitalGlobe, Inc. WorldView-1 was added to DigitalGlobe’s EESS satellite system in 2005. See *DigitalGlobe, Inc.*, Order and Authorization, 20 FCC Rcd 15696 (Sat. Div. 2005) (“*DigitalGlobe Order*”). No modification is requested herein of the other satellites (QuickBird, WorldView-2 and WorldView-3) comprising DigitalGlobe’s EESS system licensed under Call Sign S2129.

<sup>2</sup> 47 C.F.R. § 25.114.

<sup>3</sup> See 47 C.F.R. § 25.117(d)(1).

<sup>4</sup> Through the EnhancedView program, DigitalGlobe provides products and services to help meet the increasing geospatial intelligence needs of the Intelligence Community and Department of Defense. See <http://media.digitalglobe.com/manual-releases/NGA-Awards-EnhancedView-Commercial-Imagery-Contract> (last visited March 25, 2014).

**Table 1: Authorized and Proposed Orbital Parameters for WorldView-1**

	<b>Authorized WorldView-1 Orbital Parameters</b>	<b>Modified WorldView-1 Orbital Parameters</b>
Inclination Angle (deg)	97.36	97.36 +1.2/-0.1
Orbital Period (seconds)	5670	Unchanged
Apogee (km)	521	Unchanged
Perigee (km)	506	Unchanged
Right Ascension of the Ascending Node (RAAN) (deg)	156.763 This RAAN value at the epoch below yields Local Mean Time (LMT) at Descending Node = 10:30AM. RAAN changes daily at sun synchronous rate.	135.035 RAAN will change faster than sun-synchronous rate during transition to 13:30PM LMT. RAAN will be within a range of +48.75/-3.75 degrees versus a nominal sun-synchronous profile.
Argument of Perigee (deg)	90	Unchanged
Orbit Epoch Date	21 Mar 2008, 12:00:00 UTC	1 Mar 2014, 12:00:00 UTC

The changes reflected in Table 1 will cause no increase in the interference envelope for WorldView-1, and thus should be deemed a minor modification to the underlying authorization. The Commission has determined in previous cases involving non-GSO satellites in other services that increases in orbit altitudes (and associated changes in such related parameters as inclination angles) are not considered to be major unless they increase the potential for interference.<sup>5</sup> Those same principles apply to the change in orbital configuration of the WorldView-1 satellite that DigitalGlobe proposes in this modification request.

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<sup>5</sup> See, e.g., *Orbital Communications Corp.*, Order and Authorization, 13 FCC Rcd 10828, 10838-39 (Int'l. Bur. 1998); *Teledesic Corp.*, Order and Authorization, 14 FCC Rcd 2261, 2266 (Int'l. Bur. 1999) (changes in orbital configuration, including number of satellites, number of planes, orbit altitude and inclination angle, not considered major without increase in interference to other systems or increase in difficulty in sharing).

Table 2 below contains the anticipated ranges of accuracy to which the WorldView-1 orbit will be maintained after the transition is complete.<sup>6</sup> These ranges are unchanged from those included as part of the initial application for WorldView-1, and are offered here for reference.

**Table 2: Anticipated Ranges of Accuracy to Which WorldView-1  
Orbital Parameters Will Be Maintained**

Orbital Parameters	WorldView-1 Orbital Parameters
Inclination Angle (deg)	+/- 0.1
Apogee (km)	+/- 2
Perigee (km)	+/- 2
Right Ascension of the Ascending Node (deg)	+/- 3.75 relative to nominal sun-synchronous profile

**II. Schedule S.**

The technical characteristics of the modified WorldView-1 satellite are detailed in the Schedule S portion of the FCC Form 312 of this Application, a copy of which is included as Attachment A hereto. DigitalGlobe completed the electronic version Schedule S to the best of its ability since the form is more readily suited for geosynchronous communication satellites. Any discrepancies between the data in the electronic version of Schedule S and the version included in the print out in Attachment A should be resolved in favor of the print version in Attachment A.

**III. Public Interest Considerations.**

The grant of this modification application will serve the public interest by permitting DigitalGlobe to transition WorldView-1 from its existing morning orbit to an afternoon orbit, thereby making it possible for WorldView-3 to be launched into the vacated morning orbit. DigitalGlobe is contractually obligated to place WorldView-3 in a morning orbit (from where it will operate more optimally) pursuant to an agreement entered into with the Federal government to support the EnhancedView program. The optimized characteristics of WorldView-3 will enable DigitalGlobe both to provide the National Geospatial-Intelligence Agency, Intelligence Community and Department of Defense with enhanced data imagery as well as to support humanitarian and crisis support efforts. The proposed transition of WorldView-1 to an afternoon orbit will have no effect on the services which that satellite currently offers.

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<sup>6</sup> See 47 C.F.R. § 25.114(d)(iii).

**IV. Orbital Debris Mitigation.**

The changes proposed herein will have no impact on the orbital debris mitigation showing on file with the Commission for WorldView-1. Specifically, the proposed new orbital parameters will not increase the satellite's susceptibility to collisions or fragmentation events. In addition, the proposed changes will not hamper execution of the post-mission disposal arrangements that were accepted and approved by the National Oceanic and Atmospheric Administration ("NOAA") and subsequently relied upon by the Commission in the *DigitalGlobe Order*.<sup>7</sup>

**V. Extent of Communications with WorldView-1 During Descent to the Atmosphere.**

The changes proposed herein will have no impact on the extent of communications with WorldView-1 during its descent to the atmosphere. DigitalGlobe intends to utilize WorldView-1 for imaging services until imaging services are no longer possible. After terminating services, DigitalGlobe will prepare the satellite for eventual reentry and end all communications with it.

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<sup>7</sup> See *DigitalGlobe Order*, 20 FCC Rcd at 15704-05. DigitalGlobe notes that the Commission last August adopted a new rule permitting applicants for commercial remote sensing space stations to, in lieu of submitting detailed post-mission disposal plans to the Commission, certify that they have submitted such plans to NOAA for review. See *Comprehensive Review of Licensing and Operating Rules for Satellite Services*, Report and Order, 28 FCC Rcd 12403 (2013) (amending 47 C.F.R. 25.114(d)).

**TECHNICAL CERTIFICATE**

I, Jeff Culwell, hereby certify, under penalty of perjury, that I am the technically qualified person responsible for the preparation of the engineering information contained in the technical portions of the foregoing amendment and the related attachments, that I am familiar with Part 25 of the Commission's Rules, and that the technical information is complete and accurate to the best of my knowledge and belief.

*/s/ Jeff Culwell*

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Jeff Culwell  
VP Operations  
DigitalGlobe, Inc.

Dated: March 25, 2014

Attachment A

Schedule S

**FEDERAL COMMUNICATIONS COMMISSION  
SATELLITE SPACE STATION AUTHORIZATIONS  
(Technical and Operational Description)**

**S1. GENERAL INFORMATION** Complete for all satellite applications.

a. Space Station or Satellite Network Name: <b>USASAT 30A</b>	e. Estimated Date of Placement into Service: <b>1/3/2008</b>	i. Will the space station(s) operate on a Common Carrier basis? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
b. Construction Commencement Date: <b>8/1/2003</b>	f. Estimated Lifetime of Satellite(s): <b>7</b> Years	j. Number of transponders offered on a Common Carrier basis: <b>0</b>
c. Construction Completion Date: <b>7/20/2007</b>	g. Total Number of Transponders: <b>0</b>	k. Total Common Carrier Transponder Bandwidth: <b>0</b> MHz
d. Estimated Launch Date: <b>9/18/2007</b>	h. Total Transponder Bandwidth (No. Transponders x Bandwidth): <b>0</b> MHz	l. Orbit Type: Mark all boxes that apply. <input type="checkbox"/> GSO <input checked="" type="checkbox"/> NGSO

**S2. OPERATING FREQUENCY BANDS** Identify the frequency range and transmit/receive mode for all frequency bands in which this station will operate. Also indicate the nature of service(s) for each frequency band.

Frequency Band Limits				e. T/R Mode	f. Nature of Service(s): List all that apply to this band
Lower Frequency ( Hz)		Upper Frequency ( Hz)			
a. Numeric	b. Unit (K/M/G)	c. Numeric	d. Unit (K/M/G)		
8025	M	8400	M	T	Earth Exploration Satellite Service
2025	M	2110	M	R	Earth Exploration Satellite Service

**S3. ORBITAL INFORMATION FOR GEOSTATIONARY SATELLITES ONLY:**

a. Nominal Orbital Longitude (Degrees E/W):			b. Reason for orbital location selection:		
Longitudinal Tolerance or E/W Station-Keeping:		e. Inclination Excursion or N/S Station-Keeping Tolerance:	Range of orbital arc in which adequate service can be provided (Optional): _____ Degrees E/W		
c. Toward West: _____ Degrees	d. Toward East: _____ Degrees		f. Westernmost: _____ g. Easternmost: _____		
h. Reason for service arc selection (Optional):					

**FEDERAL COMMUNICATIONS COMMISSION  
SATELLITE SPACE STATION AUTHORIZATIONS  
FCC Form 312 - Schedule S: (Technical and Operational Description)**

**S4. ORBITAL INFORMATION FOR NON-GEOSTATIONARY SATELLITES ONLY**

S4a. Total Number of Satellites in Network or System: 3

S4c. Celestial Reference Body (Earth, Sun, Moon, etc.): E

S4b. Total Number of Orbital Planes in Network or System: 3

S4d. Orbit Epoch Date: 3/1/2014

For each Orbital Plane Provide:

(e) Orbital Plane No.	(f) No. of Satellites in Plane	(g) Inclination Angle (degrees)	(h) Orbital Period (Seconds)	(i) Apogee (km)	(j) Perigee (km)	(k) Right Ascension of the Ascending Node (Deg.)	(l) Argument of Perigee (Degrees)	Active Service Arc Range (Degrees)		
								(m) Begin Angle	(n) End Angle	(o) Other
1	1	97.36*	5670	521	506	135.035**	90			

\*nominal, +1.2/-0.1

\*\* RAAN will change faster than sun-synchronous rate during transition to 13:30PM LMT. RAAN will be within a range of +48.75/-3.75 degrees versus a nominal sun-synchronous profile.

**S5. INITIAL SATELLITE PHASE ANGLE** For each satellite in each orbital plane, provide the initial phase angle.

(a) Orbital Plane No.	(b) Satellite Number	(c) Initial Phase Angle (Degrees)	(a) Orbital Plane No.	(b) Satellite Number	(c) Initial Phase Angle (Degrees)	(a) Orbital Plane No.	(b) Satellite Number	(c) Initial Phase Angle (Degrees)	(a) Orbital Plane No.	(b) Satellite Number	(c) Initial Phase Angle (Degrees)
1	1	0									

















**FEDERAL COMMUNICATIONS COMMISSION  
SATELLITE SPACE STATION AUTHORIZATIONS  
FCC Form 312 - Schedule S: (Technical and Operational Description)**

S14. Is the space station(s) controlled and monitored remotely? If YES, provide the location and telephone number of the TT&C control point(s).  YES  NO

**Remote Control (TT&C) Location(s):**

S14a. Street Address <b>1601 Dry Creek Drive, Suite 260</b>			
S14b. City <b>Longmont</b>	S14c. County <b>Boulder</b>	S14d. State / Country <b>CO/USA</b>	S14e. Zip Code <b>80503</b>
S14f. Telephone Number <b>303-684-4589</b>		S14g. Call Sign of Control Station (if appropriate)	

S14a. Street Address			
S14b. City	S14c. County	S14d. State / Country	S14e. Zip Code
S14f. Telephone Number		S14g. Call Sign of Control Station (if appropriate)	

S14a. Street Address			
S14b. City	S14c. County	S14d. State / Country	S14e. Zip Code
S14f. Telephone Number		S14g. Call Sign of Control Station (if appropriate)	

S14a. Street Address			
S14b. City	S14c. County	S14d. State / Country	S14e. Zip Code
S14f. Telephone Number		S14g. Call Sign of Control Station (if appropriate)	

S14a. Street Address			
S14b. City	S14c. County	S14d. State / Country	S14e. Zip Code
S14f. Telephone Number		S14g. Call Sign of Control Station (if appropriate)	

S14a. Street Address			
S14b. City	S14c. County	S14d. State / Country	S14e. Zip Code
S14f. Telephone Number		S14g. Call Sign of Control Station (if appropriate)	



**FEDERAL COMMUNICATIONS COMMISSION  
SATELLITE SPACE STATION AUTHORIZATIONS  
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**S15. SPACECRAFT PHYSICAL CHARACTERISTICS WV 60**

S15a. Mass of spacecraft without fuel (kg) <b>2050.0</b>	Spacecraft Dimensions (meters)	Probability of Survival to End of Life (0.0 - 1.0)
S15b. Mass of fuel & disposables at launch (kg) <b>383.0</b>		
S15c. Mass of spacecraft and fuel at launch (kg) <b>2433.0</b>	S15f. Length (m) <b>2.54</b>	S15i. Payload <b>0.9735</b>
S15d. Mass of fuel, in orbit, at beginning of life (kg) <b>383.0</b>	S15g. Width (m) <b>2.54</b>	S15j. Bus <b>0.866</b>
S15e. Deployed Area of Solar Array (square meters) <b>13.1</b>	S15h. Height (m) <b>3.94</b>	S15k. Total <b>0.8435</b>

**S16. SPACECRAFT ELECTRICAL CHARACTERISTICS**

Spacecraft Subsystem	Electrical Power (Watts) At Beginning of Life		Electrical Power (Watts) At End of Life	
	At Equinox	At Solstice	At Equinox	At Solstice
Payload (Watts)	(a) <b>56</b>	(f) <b>56</b>	(k) <b>56</b>	(p) <b>56</b>
Bus (Watts)	(b) <b>1954</b>	(g) <b>1954</b>	(l) <b>1954</b>	(q) <b>1954</b>
Total (Watts)	(c) <b>2010</b>	(h) <b>2010</b>	(m) <b>2010</b>	(r) <b>2010</b>
Solar Array (Watts)	(d) <b>3574</b>	(i) <b>3440</b>	(n) <b>2929</b>	(s) <b>2819</b>
Depth of Battery Discharge (%)	(e) <b>35 %</b>	(j) <b>35 %</b>	(o) <b>35 %</b>	(t) <b>35 %</b>

**S17. CERTIFICATIONS**

a. Are the power flux density limits of § 25.208 met?	<b>YES</b>	<b>NO</b>	<b>X N/A</b>
b. Are the appropriate service area coverage requirements of § 25.143(b)(ii) and (iii), or § 25.145(c)(1) and (2) met?	<b>YES</b>	<b>NO</b>	<b>X N/A</b>
c. Are the frequency tolerances of § 25.202(e) and the out-of-band emission limits of § 25.202(f)(1), (2), and (3) met?	<b>X YES</b>	<b>NO</b>	<b>N/A</b>

**In addition to the information required in this Form, the space station applicant is required to provide all the information specified in Section 25.114 of the commission's rules, 47 C.F.R. § 25.114.**