

PATENT ASSIGNMENT

Electronic Version v1.1
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SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	SECURITY AGREEMENT
CONVEYING PARTY DATA	
Name	Execution Date
Space Systems/Loral, LLC	11/02/2012
RECEIVING PARTY DATA	
Name:	Royal Bank of Canada
Street Address:	200 Bay Street
Internal Address:	P.O. Box 1, Royal Bank Plaza
City:	Toronto, ON
State/Country:	CANADA
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PROPERTY NUMBERS Total: 51	
Property Type	Number
Patent Number:	8301377
Patent Number:	8270899
Patent Number:	8179313
Patent Number:	8160575
Patent Number:	8135338
Patent Number:	8021069
Patent Number:	7874519
Patent Number:	7792070
Patent Number:	7787819
Patent Number:	7363960
Patent Number:	7219132
Patent Number:	7113851
Patent Number:	7028953
Patent Number:	6898428

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Patent Number:	6883588
Patent Number:	6879808
Patent Number:	6854510
Patent Number:	6776220
Patent Number:	6735501
Patent Number:	6725277
Patent Number:	6720918
Patent Number:	6695251
Patent Number:	6691955
Patent Number:	6672544
Patent Number:	6623826
Patent Number:	6591899
Patent Number:	6583994
Patent Number:	6583692
Patent Number:	6581880
Patent Number:	6570535
Patent Number:	6563404
Patent Number:	6559742
Patent Number:	6553286
Patent Number:	6543723
Patent Number:	6522306
Patent Number:	6517029
Patent Number:	6515579
Patent Number:	6501434
Patent Number:	6496682
Patent Number:	6478258
Patent Number:	6478257
Patent Number:	6477450
Patent Number:	6476772
Patent Number:	6476686
Patent Number:	6472951
Patent Number:	6456907
Patent Number:	6456824
Patent Number:	6454217
Patent Number:	6450453

	6448940
Patent Number:	6445981

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Date:	04/29/2013

Total Attachments: 13 source=SecurityInterestPatents#page1.tif source=SecurityInterestPatents#page2.tif source=SecurityInterestPatents#page3.tif source=SecurityInterestPatents#page4.tif source=SecurityInterestPatents#page5.tif source=SecurityInterestPatents#page6.tif source=SecurityInterestPatents#page7.tif source=SecurityInterestPatents#page8.tif source=SecurityInterestPatents#page9.tif source=SecurityInterestPatents#page10.tif source=SecurityInterestPatents#page11.tif source=SecurityInterestPatents#page12.tif source=SecurityInterestPatents#page13.tif
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NOTICE
OF
GRANT OF SECURITY INTEREST
IN
PATENTS

United States Patent Office

Ladies and Gentlemen:

Please be advised that pursuant to the Security Agreement dated as of November 2, 2012 (as the same may be amended, modified, extended or restated from time to time, the "Agreement") between the Debtor party thereto (the "Debtor") and Royal Bank of Canada, as Collateral Agent (the "Collateral Agent") for the Secured Parties referenced therein, the undersigned Debtor has granted a continuing security interest in and continuing lien upon the patents and patent applications set forth on Schedule 1 hereto to the Collateral Agent for the ratable benefit of the Secured Parties.

The undersigned Debtor and the Collateral Agent, on behalf of the Secured Parties, hereby acknowledge and agree that the security interest in the foregoing patents and patent applications (i) may only be terminated in accordance with the terms of the Agreement and (ii) is not to be construed as an assignment of any patents or patent application.

Very truly yours,

SPACE SYSTEMS/LORAL, LLC,
a Delaware limited liability company

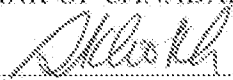
By: Michael Santoro

Name: Michael Santoro

Title: Senior Vice President and Chief
Financial Officer

Acknowledged and Accepted:

ROYAL BANK OF CANADA, as Collateral Agent

By: 

Name: Susan Khokher
Manager, Agency

Title:

[Signature Page to Notice of Grant of Security Interest in Patents]

Schedule 1**SPACE SYSTEMS/LORAL, LLC
(A Delaware limited liability company)****Issued U.S. Patents**

Patent#	Title	Filing Date	Issuance Date
8,301,377	Image Navigation Method Using Parametric Systematic Error Correction	14-May-10	30-Oct-12
8,270,899	Ground Based Beam Forming for Satellite Communications Systems	13-Aug-10	18-Sep-12
8,179,313	Antenna Tracking Profile Estimation	13-May-10	15-May-12
8,160,575	Methods for testing multibeam satellite system using input power telemetry and output noise power	23-Jul-01	17-Apr-12
8,135,338	Satellite System with Enhanced Payload Capacity	24-Dec-08	13-Mar-12
8,021,069	Redundant Radial Release Apparatus	23-Jun-08	20-Sep-11
7,874,519	Spacecraft Three-Axis Earth Acquisition from Sun Direction Measurement	22-Feb-07	25-Jan-11
7,792,070	Multi-Beam Satellite Network to Maximize Bandwidth Utilization	8-Aug-07	7-Sep-10
7,787,819	Ground Based Beam Forming for Satellite Communications Systems	25-Aug-06	31-Aug-10
7,363,960	Heat transfer of a remote heat source using a loop heat pipe	30-Mar-01	29-Apr-08
7,219,132	Dynamic Resource Allocation Architecture for Differentiated Services over Broadband Communication Networks	30-Mar-01	15-May-07
7,113,851	Practical orbit raising system and method for geosynchronous satellites	9-Jun-99	26-Sep-06
7,028,953	Two-sided deployable thermal radiator system and method	11-Nov-01	18-Apr-06
6,898,428	Satellite communication system with gateway switch networks	31-May-01	24-May-05
6,883,588	Spacecraft radiator system using a heat pump	24-Jul-00	26-Apr-05

Patent#	Title	Filing Date	Issuance Date
6,879,808	Broadband communication systems and methods using low and high bandwidth request and broadcast links	15-Nov-00	12-Apr-05
6,854,510	Spacecraft radiator system and method using cross-coupled deployable thermal radiators	24-Apr-01	15-Feb-05
6,776,220	Spacecraft radiator system using crossing heat pipes	19-Aug-99	17-Aug-04
6,735,501	Satellite commanding using remotely controlled modulation of satellite on-board telemetry parameters	30-Mar-00	11-May-04
6,725,277	CDMA code address data routing system and method	11-Mar-02	20-Apr-04
6,720,918	Antenna distortion estimation and compensation	17-Sep-02	13-Apr-04
6,695,251	Method and system for synchronized forward and Aft thrust vector control	19-Jun-01	24-Feb-04
6,691,955	Spacecraft having a momentum wheel configuration that prevents zero wheel speeds	27-Nov-01	17-Feb-04
6,672,544	Satellite harmonic torque estimator	1-Mar-02	6-Jan-04
6,623,826	Passive intermodulation free multilayer thermal blanket	29-Oct-01	23-Sep-03
6,591,899	Spacecraft multi-directional loop heat pipe thermal systems	21-Nov-00	15-Jul-03
6,583,994	Method and apparatus for soft switched AC power distribution	19-Jun-01	24-Jun-03
6,583,692	Multiple passband filter	8-May-01	24-Jun-03
6,581,880	Energy managed electric propulsion methods and systems for stationkeeping satellites	15-Oct-01	24-Jun-03
6,570,535	Single-receiver multiple-antenna RF autotrack control	13-Mar-02	27-May-03
6,563,404	Voltage tunable patch filter element with dielectrically loaded slot	13-Jun-01	13-May-03
6,559,742	Flexible waveguide with rounded corrugations	27-Mar-01	6-May-03
6,553,286	Spacecraft constellation formation keeping using inter-spacecraft distance measurement	16-Aug-01	22-Apr-03
6,543,723	Electric orbit raising with variable thrust	4-Sep-01	8-Apr-03

Patent#	Title	Filing Date	Issuance Date
6,522,306	Hybrid horn for dual Ka-band communications	19-Oct-01	18-Feb-03
6,517,029	Friction and stiction compensation for spacecraft attitude control	13-Sep-00	11-Feb-03
6,515,579	Switching apparatus for routing communication channels through a satellite payload	30-Sep-98	4-Feb-03
6,501,434	Multi-band corrugated antenna feed horn with a hexagonal aperture and antenna array using same	15-Nov-01	31-Dec-02
6,496,682	Satellite communication system employing unique spot beam antenna design	14-Sep-98	17-Dec-02
6,478,258	Spacecraft multiple loop heat pipe thermal system for internal equipment panel applications	21-Nov-00	12-Nov-02
6,478,257	Phase change material thermal control for electric propulsion	15-Jun-01	12-Nov-02
6,477,450	Noise screen for attitude control system	29-May-00	5-Nov-02
6,476,772	Waveguide slot array capable of radiating shaped beams	29-May-00	5-Nov-02
6,476,686	Dielectric resonator equalizer	21-Sep-01	5-Nov-02
6,472,951	Microwave multiplexer with manifold spacing adjustment	5-Jan-00	29-Oct-02
6,456,907	System and method for limiting the effects of actuator saturation to certain body axes of a spacecraft	31-Jan-00	24-Sep-02
6,456,824	Satellite communication system using RF power sharing for multiple feeds or beams in downlinks	14-Sep-98	24-Sep-02
6,454,217	Method and apparatus for rate integration supplement for attitude referencing with quaternion differencing	28-Sep-00	24-Sep-02
6,450,453	Active steering of an appendage on a spacecraft using piezoelectric actuators	6-Oct-00	17-Sep-02
6,448,940	Triple reflector antenna deployment and storage systems	20-Mar-01	10-Sep-02
6,445,981	Controller and control method for satellite orbit-keeping maneuvers	2-Mar-00	3-Sep-02

Patent#	Title	Filing Date	Issuance Date
6,441,794	Dual function subreflector for communication satellite antenna	13-Aug-01	27-Aug-02
6,439,509	Pre-bias scheme for roll momentum unloads on pitch momentum bias/yaw reaction wheel spacecraft	3-Jul-95	27-Aug-02
6,439,507	Closed-loop spacecraft orbit control	5-May-00	27-Aug-02
6,434,501	Automatic network analyzer having Noise/NPR test capability	21-Mar-00	13-Aug-02
6,414,646	Variable beamwidth and zoom contour beam antenna systems	2-Jan-01	2-Jul-02
6,411,262	Shaped Reflector Antenna System Configuration for Use on a Communication Satellite	22-Aug-00	25-Jun-02
6,400,696	Bent-pipe satellite system which couples a LAN to a gateway and uses a dynamic assignment/multiple access protocol	7-Nov-00	4-Jun-02
6,398,902	Method of end bonding tubular sections and bonding a flange on the end of tubular sections	14-Feb-00	4-Jun-02
6,397,039	Satellite communication system using multiple ground station RF power control in a single downlink beam	14-Sep-98	28-May-02
6,392,611	Array fed multiple beam array reflector antenna systems and method	17-Aug-00	21-May-02
6,380,834	Planar magnetic assembly	1-Mar-00	30-Apr-02
6,378,809	Aft deployable thermal radiators for spacecraft	16-Sep-98	30-Apr-02
6,367,509	Thermal harness using encased carbon-based fiber and end attachment brackets	27-Apr-01	9-Apr-02
6,356,171	Planar general response dual-mode cavity filter	27-Mar-99	12-Mar-02
6,320,490	Integrated planar transformer and inductor assembly	13-Aug-99	20-Nov-01
6,317,661	Argument of perigee correction with longitude control for inclined, eccentric, geosynchronous satellites	6-Jun-00	13-Nov-01
6,317,660	Method for using satellite state vector prediction to provide satellite sensor automatic scan inhibit and/or sensor switching	25-May-00	13-Nov-01
6,314,344	Automated orbit compensation system and method	17-Mar-00	6-Nov-01

Patent#	Title	Filing Date	Issuance Date
6,311,932	Yaw steering momentum system	30-Nov-99	6-Nov-01
6,311,929	Spacecraft and appendage stepping methods that improve spacecraft attitude pointing and cancel solar array slew disturbances	26-Nov-99	6-Nov-01
6,308,919	Spacecraft having a dual reflector holddown for deploying multiple reflectors in a single release event	25-Apr-00	30-Oct-01
6,304,228	Stepped waveguide slot array with phase control and satellite communication system employing same	6-Oct-00	16-Oct-01
6,297,715	General response dual-mode, dielectric resonator loaded cavity filter	27-Mar-99	2-Oct-01
6,296,207	Combined stationkeeping and momentum management	27-Jul-99	2-Oct-01
6,292,722	Magnetic torquer control with thruster augmentation	24-Feb-00	18-Sep-01
6,285,928	Onboard attitude control using reaction wheels	6-Jan-00	4-Sep-01
6,281,769	Electromagnetic transmission line elements having a boundary between materials of high and low dielectric constants	8-Dec-98	28-Aug-01
6,253,125	Method and apparatus for generating orbital data	1-Mar-00	26-Jun-01
6,248,950	Solar array augmented electrostatic discharge for spacecraft in geosynchronous earth orbit	21-Feb-98	19-Jul-01
6,243,048	Gregorian reflector antenna system having a subreflector optimized for an elliptical antenna aperture	4-Feb-00	5-Jun-01
6,242,976	Low cost linearized channel amplifier for use with high power amplifiers	9-Jun-99	5-Jun-01
6,237,876	Methods for using satellite state vector prediction to provide three-axis satellite attitude control	28-Jul-00	29-May-01
6,211,838	High efficiency dual polarized horn antenna	2-Feb-00	3-Apr-01
6,208,039	Apparatus to control multiple parallel batteries to share load current	17-Aug-99	27-Mar-01
6,205,378	Adaptive mass expulsion attitude control system	29-Jul-99	20-Mar-01

Patent#	Title	Filing Date	Issuance Date
6,196,501	Satellite architecture with deployable electrical equipment	7-Oct-98	6-Mar-01
6,191,664	Microwave multiplexer with tunable manifold and method of adjustment	24-May-99	20-Feb-01
6,188,279	Low cost miniature broadband linearizer	3-Nov-99	13-Feb-01
6,186,446	Solar array control for electric propulsion system	8-Jun-99	13-Feb-01
6,182,441	Drive circuit for electric propulsion thruster	4-Feb-00	6-Feb-01
6,169,668	Zero voltage switching isolated boost converters	27-Oct-99	2-Jan-01
6,169,513	Thinned multiple beam phased array antenna	8-Nov-99	2-Jan-01
6,157,161	Low cost battery charging systems	27-Jul-99	5-Dec-00
6,154,692	Spacecraft yaw pointing for inclined orbits	17-Sep-98	28-Nov-00
6,147,656	Active multiple beam antennas	1-Apr-99	14-Nov-00
6,142,422	Method to reorient a spacecraft using only initial single axis attitude knowledge	21-Jun-99	7-Nov-00
6,141,606	Wheel speed control system for spacecraft with rejection of null space wheel momentum	28-Jul-98	31-Oct-00
6,138,952	Transient free actuator switching	11-Jun-99	31-Oct-00
6,137,451	Multiple beam by shaped reflector antenna	30-Oct-97	24-Oct-00
6,135,394	Practical method and apparatus for satellite stationkeeping	8-Dec-98	24-Oct-00
6,133,818	Redundant fuse wire release device	11-Aug-99	17-Oct-00
6,118,342	System and method for providing precise RF amplifier gain control over temperature	13-Apr-99	12-Sep-00
6,073,887	High power spacecraft with full utilization of all spacecraft surfaces	16-Jul-97	13-Jun-00
6,053,455	Spacecraft attitude control system using low thrust thrusters	22-Jan-98	25-Apr-00
6,052,630	Thruster optimized pair selection	17-Dec-96	18-Apr-00
6,049,312	Antenna system with plural reflectors	11-Feb-98	11-Apr-00

Patent#	Title	Filing Date	Issuance Date
6,034,322	Solar cell assembly	1-Jul-99	7-Mar-00
6,023,291	Satellite camera attitude determination and image navigation by means of earth edge and landmark measurement	29-Sep-97	8-Feb-00
6,014,013	Battery charge management architecture	16-Dec-98	11-Jan-00
6,012,000	Simplified onboard attitude control based on star sensing	14-Jan-98	4-Jan-00
6,011,512	Thinned multiple beam phased array antenna	25-Feb-98	4-Jan-00
6,010,096	Deployment restraint and sequencing device	22-Jul-98	4-Jan-00
6,008,706	Wide band contiguous multiplexer having a contiguous diplexer	9-Sep-98	28-Dec-99
6,000,661	Autonomous spacecraft payload base motion estimation and correction	22-Sep-97	14-Dec-99
5,996,942	Autonomous solar torque management	22-Sep-97	7-Dec-99
5,977,910	Multibeam phased array antenna system	7-Aug-97	2-Nov-99
5,966,049	Broadband linearizer for power amplifiers	1-Dec-98	12-Oct-99
5,963,166	Precise spacecraft camera image navigation and registration	23-Jul-98	5-Oct-99
5,957,411	Method using double thruster firings to deadbeat flexible solar array structural oscillations	24-Dec-97	28-Sep-99
5,949,675	Transient-free gain switching within error threshold	1-Nov-96	7-Sep-99
5,945,960	Method and apparatus for reconfiguring antenna radiation patterns	2-Dec-96	31-Aug-99
5,940,034	Dual RF autotrack control	8-Aug-98	17-Aug-99
5,939,864	Lithium-ion battery charge control method	28-Oct-98	17-Aug-99
5,923,292	Dual antenna null elimination	11-Jul-97	13-Jul-99
5,909,191	Multiple beam antenna and beamforming network	1-Oct-97	1-Jun-99
5,899,945	Attitude control and navigation system for high resolution imaging	5-Sep-97	4-May-99

Patent#	Title	Filing Date	Issuance Date
5,886,499	Life extending operational regime for battery	11-Sep-97	23-Mar-99
5,862,462	Power enhancement techniques for high power satellites	12-Jul-96	19-Jan-99
5,841,398	Integrated navigation and communication satellite system	20-Nov-96	24-Nov-98
5,826,829	Spacecraft control system with a trihedral momentum bias wheel configuration	15-Jul-96	27-Oct-98
5,822,515	Correction of uncommanded mode changes in a spacecraft subsystem	10-Feb-97	13-Oct-98
5,793,813	Communication system employing space-based and terrestrial telecommunications equipment	6-Jun-96	11-Aug-98
5,790,077	Antenna geometry for shaped dual reflector antenna	17-Oct-96	4-Aug-98
5,789,978	Ku-band linearizer bridge	25-Nov-96	4-Aug-98
5,787,368	Spacecraft yaw control using only wheel speed measurements processed through a simple filter bank	3-Nov-95	28-Jul-98
5,785,280	Hybrid solar panel array	20-Jul-95	28-Jul-98
5,781,456	Software select and test	11-Jul-97	14-Jul-98
5,686,930	Ultra lightweight thin membrane antenna reflector	5-May-95	11-Nov-97
5,673,459	Deployment hinge apparatus	28-Sep-94	7-Oct-97
5,655,735	Post transition momentum management	3-Jul-95	12-Aug-97
5,649,310	Signal translation and amplification system including a thermal radiation panel coupled thereto	15-Jun-94	15-Jul-97
5,596,338	Multifunction antenna assembly	27-Jun-95	21-Jan-97
5,587,714	Spacecraft antenna pointing error correction	10-Mar-95	24-Dec-96
5,568,904	Steered perigee velocity augmentation	28-Aug-92	29-Oct-96
5,557,292	Multiple band folding antenna	22-Jun-94	17-Sep-96
5,515,016	High power dielectric resonator filter	6-Jun-94	7-May-96
5,486,399	Self-supporting convex cover for spacecraft	30-Sep-93	23-Jan-96

Patent#	Title	Filing Date	Issuance Date
5,477,132	Multi-sectioned power converter having current-sharing controller	22-Jul-94	19-Dec-95
5,471,224	Frequency selective surface with repeating pattern of concentric closed conductor paths, and antenna having the surface	12-Nov-93	28-Nov-95
5,429,888	Battery recharging technique	21-Nov-94	4-Jul-95

Pending U.S. Patent Applications

Serial No.	Title	Filing Date
12/082,818	Radial Release Device	04/14/08
12/629,707	Spacecraft Payload Orientation Steering	12/02/09
12/829,242	Deorbiting a Spacecraft From a Highly Inclined Elliptical Orbit	07/01/10
12/861,702	Multi-Beam Satellite Network to Maximize Bandwidth Utilization	08/23/10
12/925,386	Satellite Orbit Raising Using Electric Propulsion	10/20/10
12/928,135	Electrically Large Stepped-Wall and Smooth-Wall Horn for Spot Beam Applications	12/03/10
13/026,175	Satellite Having Multiple Aspect Ratios	02/11/11
13/044,278	Spacecraft Payload Positioning with Respect to a Virtual Pivot Point	03/09/11
13/053,084	Source Driver Current Fold-Back Protection	03/21/11
13/093,669	Broadband Satellite with Dual Frequency Conversion and Bandwidth Aggregation	04/25/11
13/101,944	High Capacity Broadband Satellite	05/05/11
13/068,655	Redundant Fuse Wire Release Device	05/17/11
13/115,370	Spacecraft Momentum Management Using Solar Array	05/25/11
13/164,414	Band Clamp with Redundant Load Path	06/20/11
13/170,813	RF Feed Element Design Optimization Using Secondary Pattern	06/28/11

Serial No.	Title	Filing Date
13/189,354	Current Collector Bar and Grid Pattern for a Photovoltaic Solar Cell	07/22/11
13/215,929	Extendable Antenna Reflector Deployment Structure	08/23/11
13/215,932	Reflector Deployment Techniques for Satellites	08/23/11
13/215,229	Preload Release Fastener and Release System Using Same	08/24/11
13/223,041	Chemical/Electric Optimized Propulsion System	08/31/11
13/237,761	Hold-down Mechanism for a Spacecraft Appendage	09/20/11
13/240,079	Antenna System With Multiple Independently Steerable Shaped Beams	09/27/11
13/247,243	Dual Mode Dielectric Resonator Loaded Cavity Filter	09/28/11
13/326,654	Spacecraft Momentum Management	12/15/11
13/332,145	High-efficiency Multi-beam Antenna	12/20/11
13/340,095	Microstrip Manifold Coupled Multiplexer	12/29/11
13/385,619	Methods for Testing Multibeam Satellite Systems Using Input Power Telemetry and Output Noise Power	02/27/12
13/442,252	Electrostatic Discharge Control for a Multi-cavity Microwave Filter	04/9/12
13/474,084	Low Profile Wide Beam Antenna	05/17/12
13/624,410	8-panel Sequencing Mechanism	9/21/12
13/644,632	Frequency and Bandwidth Tunable Microwave Filter	10/4/12
61/607,819	Frequency and Bandwidth Tunable Microwave Filter (Provisional)	3/7/12
13/647,207	Spacecraft Transfer Orbit Techniques	10/8/12
13/665,717	Roll up Contamination Cover	10/30/12
13/665,722	Shape Memory Alloy Pre-loaded Deployment Hinge	10/30/12
13/683,887	Spacecraft Momentum Unload and Station-keeping Techniques	11/21/12
13/692,551	Resonant Circuit with Improved Capacitor Quality Factor	12/3/12
13/728,745	WG T-switch Configuration	12/27/12

Serial No.	Title	Filing Date
13/729,848	Flexible Array Support Structure	12/28/12
13/793,922	Satellite System Resource Allocation Optimization	3/11/13
13/800,365	Mode Filter	3/13/13