

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT6569988

SUBMISSION TYPE:	NEW ASSIGNMENT	
NATURE OF CONVEYANCE:	ASSIGNMENT	
CONVEYING PARTY DATA		
Name		Execution Date
NORTHROP GRUMMAN INNOVATION SYSTEMS LLC		01/11/2021
RECEIVING PARTY DATA		
Name:	NORTHROP GRUMMAN SYSTEMS CORPORATION	
Street Address:	2980 FAIRVIEW PARK DRIVE	
City:	FALLS CHURCH	
State/Country:	VIRGINIA	
Postal Code:	22042	
PROPERTY NUMBERS Total: 58		
Property Type	Number	
Application Number:	15290755	
Application Number:	16350312	
Application Number:	15290768	
Application Number:	16350311	
Patent Number:	9395164	
Patent Number:	9885550	
Patent Number:	10066911	
Patent Number:	10801819	
Application Number:	17069144	
Application Number:	15290844	
Patent Number:	10634472	
Application Number:	16873516	
Application Number:	63120968	
Patent Number:	10046867	
Patent Number:	10745151	
Application Number:	16995033	
Patent Number:	10029806	
Patent Number:	10752383	
Application Number:	16998516	
Patent Number:	9813145	

PATENT

Property Type	Number
Patent Number:	10325275
Patent Number:	10558986
Application Number:	16785813
Patent Number:	10739120
Patent Number:	10054404
Patent Number:	10323912
Patent Number:	10641570
Application Number:	16865705
Application Number:	15998269
Application Number:	15998144
Application Number:	16350321
Patent Number:	10648785
Application Number:	16873581
Application Number:	16501812
Application Number:	16501859
Application Number:	16501813
Application Number:	16501803
Application Number:	16501814
Application Number:	16501807
Application Number:	16602546
Application Number:	16602682
Application Number:	16501636
Application Number:	16827699
PCT Number:	US2020024351
Application Number:	16873057
Application Number:	16602796
Application Number:	16602904
Application Number:	16602843
Application Number:	16873118
Application Number:	16873122
Application Number:	16974169
Application Number:	63000066
Application Number:	63102090
Application Number:	63102171
Application Number:	63103302
Application Number:	63102801
Application Number:	63205043
Application Number:	63206114

CORRESPONDENCE DATA**Fax Number:** (612)315-4321

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 612-315-4100**Email:** skloss@cfid-ip.com**Correspondent Name:** CHRISTENSEN, FONDER, DARDI & HERBERT PLLC**Address Line 1:** 11322 86TH AVENUE NORTH**Address Line 4:** MAPLE GROVE, MINNESOTA 55369

ATTORNEY DOCKET NUMBER:	5052.00000001
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NAME OF SUBMITTER:	SHARI KLOSS
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SIGNATURE:	/Shari Kloss/
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DATE SIGNED:	02/25/2021
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Total Attachments: 10

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Patent Assignment

WHEREAS, Northrop Grumman Innovation Systems LLC, a limited liability company with a place of business at 45101 Warp Drive, Dulles, VA 20166 ("Assignor"), owns the patents and patent applications listed in the attached Schedule A, including all continuations, divisions, continuations-in-part, certificates of reexamination, extensions, substitutes, or reissues, any rights of priority resulting from the filing of the patents and the patent applications listed in Schedule A, and the right to sue for past damages, in the United States or any foreign country (hereafter referred to as the "Patents");

AND WHEREAS, Northrop Grumman Innovation Systems LLC exists as a result of a conversion of Northrop Grumman Innovation Systems, Inc. from a corporation to a limited liability company, such conversion occurring on and effective as of July 31, 2020;

AND WHEREAS, Assignor is a wholly-owned subsidiary of Northrop Grumman Systems Corporation, a corporation having a primary place of business at 2980 Fairview Park Drive, Falls Church, VA 22042 ("Assignee");

AND WHEREAS, Assignee desires to acquire the Assignor's entire right, title, and interest in and to the Patents, and Assignor and Assignee have mutually determined that Assignor's assignment of such right, title, and interest will mutually benefit Assignor and Assignee;

AND WHEREAS, Assignee will license Assignor rights in the Patents assigned herein upon execution of this assignment;

NOW, THEREFOR, in exchange for the consideration set forth herein, the receipt and sufficiency of which is hereby acknowledged, the Assignor hereby assigns and transfers Assignor's entire right, title, and interest in and to the Patents, including the right to sue for and collect damages for past infringement, and Assignee hereby accepts the same to be held and enjoyed by the Assignee for its use and enjoyment and for the use and enjoyment of its successors, assigns, or other legal representatives as the same would have been held and enjoyed by the Assignor if the assignment and sale had not been made;

AND the Assignor hereby agrees to do such things and execute such further lawful documents, assurances, applications, and other instruments as may be required to give effective legal and registered title to the Assignee in and to the Patents, all without further consideration, but at the sole expense of Assignee.

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Dated this 11th day of January, 2001.

FOR ASSIGNOR NORTHROP
GRUMMAN INNOVATION SYSTEMS
LLC



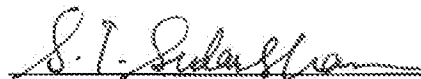
Signature

Richard N. Osborne

Print Name

Title

FOR ASSIGNEE NORTHROP
GRUMMAN SYSTEMS CORPORATION



Signature

Sushrta T. Sudarshan

Print Name

Title

Schedule A
Assigned IP

Title	Country	Application Number	Date Filed	Patent Number	Issue Date
	United States of America	15/290,755	11-Oct-2016		
	United States of America	16/350,312	30-Oct-2018		
	United States of America	15/290,768	11-Oct-2016		
	United States of America	16/350,311	30-Oct-2018		
METHODS OF PREPARING NITROCELLULOSE BASED PROPELLANTS AND PROPELLANTS MADE THEREFROM	United States of America	14/841,151	31-Aug-2015	9,395,164	19-Jul-2016
METHODS OF PREPARING NITROCELLULOSE BASED PROPELLANTS AND PROPELLANTS MADE THEREFROM	United States of America	15/214,081	19-Jul-2016	9,885,550	06-Feb-2018
METHODS OF PREPARING NITROCELLULOSE BASED PROPELLANTS AND PROPELLANTS MADE THEREFROM	United States of America	15/654,387	19-Jul-2017	10,066,911	04-Sep-2018
METHODS OF PREPARING NITROCELLULOSE BASED PROPELLANTS AND PROPELLANTS MADE THEREFROM	United States of America	16/121,456	04-Sep-2018	10,801,819	13-Oct-2020
METHODS OF PREPARING NITROCELLULOSE BASED PROPELLANTS AND PROPELLANTS MADE THEREFROM	United States of America	17/069,144	13-Oct-2020		
	United States of America	15/290,844	11-Oct-2016		
PREFRAGMENTED WARHEADS WITH ENHANCED PERFORMANCE	United States of America	15/466,476	22-Mar-2017	10,634,472	04-Apr-2020
PREFRAGMENTED WARHEADS WITH ENHANCED PERFORMANCE	United States of America	16/873,516	24-Apr-2020		
PREFRAGMENTED WARHEADS WITH ENHANCED PERFORMANCE	United States of America	63/120,968	03-Dec-2020		
EMERGENCY COMMUNICATIONS CHANNEL SYSTEMS AND METHODS FOR SATELLITE COMMAND	United States of America	13/438,377	03-Apr-2012	8,483,888	09-Jul-2013
EMERGENCY COMMUNICATIONS CHANNEL SYSTEMS AND METHODS FOR SATELLITE COMMAND	Germany	12714481.4	04-Apr-2012	2694374	15-Jan-2015
EMERGENCY COMMUNICATIONS CHANNEL SYSTEMS AND METHODS FOR SATELLITE COMMAND	Spain	12714481.4	04-Apr-2012	2694374	15-Jan-2015
EMERGENCY COMMUNICATIONS CHANNEL SYSTEMS AND METHODS FOR SATELLITE COMMAND	France	12714481.4	04-Apr-2012	2694374	15-Jan-2015

Schedule A
Assigned IP

Title	Country	Application Number	Date Filed	Patent Number	Issue Date
EMERGENCY COMMUNICATIONS CHANNEL SYSTEMS AND METHODS FOR SATELLITE COMMAND	United Kingdom	12714481.4	04-Apr-2012	2694374	15-Jan-2015
EMERGENCY COMMUNICATIONS CHANNEL SYSTEMS AND METHODS FOR SATELLITE COMMAND	Japan	2014-503939	04-Apr-2012	6054372	09-Dec-2016
SYSTEMS AND METHODS FOR MITIGATING DISTURBANCES IN A DUAL GRIDDED REFLECTOR ANTENNA	United States of America	13/558,080	25-Jul-2012	9,214,736	15-Dec-2015
SYSTEMS AND METHODS FOR MITIGATING DISTURBANCES IN A DUAL GRIDDED REFLECTOR ANTENNA	Germany	13745522.6	23-Jul-2013	2878039	17-Apr-2012
SYSTEMS AND METHODS FOR MITIGATING DISTURBANCES IN A DUAL GRIDDED REFLECTOR ANTENNA	Spain	13745522.6	23-Jul-2013	2878039	17-Apr-2012
SYSTEMS AND METHODS FOR MITIGATING DISTURBANCES IN A DUAL GRIDDED REFLECTOR ANTENNA	France	13745522.6	23-Jul-2013	2878039	17-Apr-2012
SYSTEMS AND METHODS FOR MITIGATING DISTURBANCES IN A DUAL GRIDDED REFLECTOR ANTENNA	United Kingdom	13745522.6	23-Jul-2013	2878039	17-Apr-2012
SYSTEMS AND METHODS FOR MITIGATING DISTURBANCES IN A DUAL GRIDDED REFLECTOR ANTENNA	Italy	13745522.6	23-Jul-2013	2878039	17-Apr-2012
SYSTEMS AND METHODS FOR MITIGATING DISTURBANCES IN A DUAL GRIDDED REFLECTOR ANTENNA	Japan	2015-524375	23-Jul-2013	6218829	25-Oct-23017
SYSTEMS AND METHODS FOR MITIGATING DISTURBANCES IN A DUAL GRIDDED REFLECTOR ANTENNA	Israel	236811	23-Jul-2013	236811	29-Mar-2018
SYSTEMS AND METHODS FOR MITIGATING DISTURBANCES IN A DUAL GRIDDED REFLECTOR ANTENNA	Russian Federation	2015106145	23-Jul-2013	2640099	26-Dec-2017
GROUND-BASED SATELLITE ANTENNA POINTING SYSTEM	United States of America	14/496,071	25-Sep-2014	9,853,356	26-Dec-2017
GROUND-BASED SATELLITE ANTENNA POINTING SYSTEM	United States of America	15/853,441	22-Dec-2017	10,770,788	08-Sep-2020
GROUND-BASED SATELLITE ANTENNA POINTING SYSTEM	European Patent Convention	14851452.4	26-Sep-2014		
GROUND-BASED SATELLITE ANTENNA POINTING SYSTEM	India	201617012119	26-Sep-2014		

Schedule A
Assigned IP

Title	Country	Application Number	Date Filed	Patent Number	Issue Date
GROUND-BASED SATELLITE ANTENNA POINTING SYSTEM	Japan	2016-517525	26-Sep-2014	6771711	02-Oct-2020
GROUND-BASED SATELLITE ANTENNA POINTING SYSTEM	Israel	244754	26-Sep-2014		
GROUND-BASED SATELLITE ANTENNA POINTING SYSTEM	Canada	2,925,575	26-Sep-2014		
MANEUVERING SYSTEM FOR EARTH ORBITING SATELLITES WITH ELECTRIC THRUSTERS	United States of America	14/858,240	18-Sep-2015	10,046,867	14-Aug-2018
MANEUVERING SYSTEM FOR EARTH ORBITING SATELLITES WITH ELECTRIC THRUSTERS	United States of America	16/103,337	14-Aug-2018	10,745,151	18-Aug-2020
MANEUVERING SYSTEM FOR EARTH ORBITING SATELLITES WITH ELECTRIC THRUSTERS	United States of America	16/995,033	17-Aug-2020		
MANEUVERING SYSTEM FOR EARTH ORBITING SATELLITES WITH ELECTRIC THRUSTERS	European Patent Convention	16847550.7	19-Sep-2016		
MANEUVERING SYSTEM FOR EARTH ORBITING SATELLITES WITH ELECTRIC THRUSTERS	Japan	2018-514270	19-Sep-2016		
MANEUVERING SYSTEM FOR EARTH ORBITING SATELLITES WITH ELECTRIC THRUSTERS	Israel	258110	19-Sep-2016		
MANEUVERING SYSTEM FOR EARTH ORBITING SATELLITES WITH ELECTRIC THRUSTERS	Canada	2999148	19-Sep-2016		
SYSTEMS AND METHODS FOR SATELLITE CONSTELLATION LAUNCH USING AIR-LAUNCHED VEHICLES	United States of America	14/788,214	30-Jun-2015	10,029,806	24-Jul-2018
SYSTEMS AND METHODS FOR SATELLITE CONSTELLATION LAUNCH USING AIR-LAUNCHED VEHICLES	United States of America	16/042,606	23-Jul-2018	10,752,383	25-Aug-2020
SYSTEMS AND METHODS FOR SATELLITE CONSTELLATION LAUNCH USING AIR-LAUNCHED VEHICLES	United States of America	16/998,516	20-Aug-2020		
ELECTRONIC SAFE/ARM SYSTEM AND METHODS OF USE THEREOF	United States of America	12/778,046	11-May-2010	8,573,124	05-Nov-2013
ELECTRONIC SAFE/ARM SYSTEM AND METHODS OF USE THEREOF	United States of America	13/858,438	08-Apr-2013	9,297,627	29-Mar-2016
SECONDARY PAYLOAD INTERFACE	United States of America	12/185,717	04-Aug-2008	8,355,359	15-Jan-2013

Schedule A
Assigned IP

Title	Country	Application Number	Date Filed	Patent Number	Issue Date
SECONDARY PAYLOAD INTERFACE	United States of America	13/740,672	14-Jan-2013	9,231,691	05-Jan-2016
SECONDARY PAYLOAD INTERFACE	Belgium	09251841.4	22-Jul-2009	2151930	01-May-2019
SECONDARY PAYLOAD INTERFACE	Switzerland	09251841.4	22-Jul-2009	2151930	01-May-2019
SECONDARY PAYLOAD INTERFACE	Germany	09251841.4	22-Jul-2009	2151930	01-May-2019
SECONDARY PAYLOAD INTERFACE	Denmark	09251841.4	22-Jul-2009	2151930	01-May-2019
SECONDARY PAYLOAD INTERFACE	Spain	09251841.4	22-Jul-2009	2151930	01-May-2019
SECONDARY PAYLOAD INTERFACE	France	09251841.4	22-Jul-2009	2151930	01-May-2019
SECONDARY PAYLOAD INTERFACE	United Kingdom	09251841.4	22-Jul-2009	2151930	01-May-2019
SECONDARY PAYLOAD INTERFACE	Italy	09251841.4	22-Jul-2009	2151930	01-May-2019
SECONDARY PAYLOAD INTERFACE	Luxembourg	09251841.4	22-Jul-2009	2151930	01-May-2019
SECONDARY PAYLOAD INTERFACE	Netherlands	09251841.4	22-Jul-2009	2151930	01-May-2019
SECONDARY PAYLOAD INTERFACE	Norway	09251841.4	22-Jul-2009	2151930	01-May-2019
SECONDARY PAYLOAD INTERFACE	Sweden	09251841.4	22-Jul-2009	2151930	01-May-2019
SECONDARY PAYLOAD INTERFACE	Japan	2009-0178372	22-Jul-2009	5277107	28-Aug-2013
SECONDARY PAYLOAD INTERFACE	Japan	2013-106106	30-Jul-2009	5507739	28-May-2014
SECONDARY PAYLOAD INTERFACE	Japan	2014-0056357	30-Jul-2009	5676031	25-Feb-2015
PROTECTION OF COMMERCIAL COMMUNICATIONS	United States of America	14/211,271	14-Mar-2014	9,686,008	20-Jun-2017
PROTECTION OF COMMERCIAL COMMUNICATIONS	United States of America	15/626,852	19-Jun-2017	10,419,105	17-Sept-2019
PROTECTION OF COMMERCIAL COMMUNICATIONS	United States of America	16/556,592	30-Aug-2019		

Schedule A
Assigned IP

Title	Country	Application Number	Date Filed	Patent Number	Issue Date
PROTECTION OF COMMERCIAL COMMUNICATIONS	European Patent Convention	14724854.6	14-Mar-2014		
HYBRID-CYCLE LIQUID PROPELLANT ROCKET ENGINE	United States of America	14/212,397	14-Mar-2014	9,650,995	16-May-2017
HYBRID-CYCLE LIQUID PROPELLANT ROCKET ENGINE	European Patent Convention	14721125.4	14-Mar-2014		
COMMUNICATIONS BANDWIDTH ENHANCEMENT USING ORTHOGONAL SPATIAL DIVISION MULTIPLEXING	United States of America	14/642,225	09-Mar-2015	9,813,145	07-Nov-2017
COMMUNICATIONS BANDWIDTH ENHANCEMENT USING ORTHOGONAL SPATIAL DIVISION MULTIPLEXING	United States of America	15/806,081	07-Nov-2017	10,325,275	18-Jun-2019
COMMUNICATIONS BANDWIDTH ENHANCEMENT USING ORTHOGONAL SPATIAL DIVISION MULTIPLEXING	United States of America	16/441,230	14-Jun-2019	10,558,986	11-Feb-2020
COMMUNICATIONS BANDWIDTH ENHANCEMENT USING ORTHOGONAL SPATIAL DIVISION MULTIPLEXING	United States of America	16/785,813	10-Feb-2020		
EXPLOSIVE SEPARATING JOINT	United States of America	16/175,020	30-Oct-2018	10,739,120	11-Aug-2020
CARRIER SUPPRESSION TYPE MODULATOR WITH ENCODED MODULATING SIGNALS	United States of America	10/856,801	01-Jun-2014	7,369,624	06-May-2008
CARRIER SUPPRESSION TYPE MODULATOR WITH ENCODED MODULATING SIGNALS	France	505483	31-May-2005	2871010	10-Jul-2009
CARRIER SUPPRESSION TYPE MODULATOR WITH ENCODED MODULATING SIGNALS	United Kingdom	511099.4	31-May-2005	2414877	26-Jul-2006
CARRIER SUPPRESSION TYPE MODULATOR WITH ENCODED MODULATING SIGNALS	Japan	2005-161041	01-Jun-2005	5010812	09-Aug-2012
CARRIER SUPPRESSION TYPE MODULATOR WITH ENCODED MODULATING SIGNALS	Japan	2011-276721	01-Jun-2005	5404757	05-Feb-2014
SYSTEMS AND METHODS FOR RECONFIGURABLE FACETED REFLECTOR ANTENNAS	United States of America	13/834,214	13-May-2013	9,203,156	01-Dec-2015

Schedule A
Assigned IP

Title	Country	Application Number	Date Filed	Patent Number	Issue Date
SYSTEMS AND METHODS FOR RECONFIGURABLE FACETED REFLECTOR ANTENNAS	United States of America	14/925,291	28-Oct-2015	9,673,522	06-Jun-2017
SYSTEMS AND METHODS FOR RECONFIGURABLE FACETED REFLECTOR ANTENNAS	United States of America	15/615,563	06-Jun-2017	10,020,576	10-Jul-2018
SYSTEMS AND METHODS FOR RECONFIGURABLE FACETED REFLECTOR ANTENNAS	United States of America	16/031,499	10-Jul-2018	10,553,942	04-Feb-2020
SYSTEMS AND METHODS FOR RECONFIGURABLE FACETED REFLECTOR ANTENNAS	European Patent Convention	14711404.5	04-Mar-2014		
SYSTEMS AND METHODS FOR RECONFIGURABLE FACETED REFLECTOR ANTENNAS	Russian Federation	2015139703	04-Mar-2014	2650841	17-Apr-2018
METHOD OF MANUFACTURING FLEXIBLE, LIGHTWEIGHT PHOTOVOLTAIC ARRAY	United States of America	15/076,081	21-Mar-2016	9,960,301	01-May-2018
PCB TRACE-FORMED HIGH PERFORMANCE FREQUENCY DIPLEXER AND METHOD	United States of America	09/944,781	30-Aug-2001	6,597,258	22-Jul-2003
DISTRIBUTIVE MULTIPLEXER FOR SPACE APPLICATIONS	United States of America	10/456,317	06-Jun-2003	6,707,350	16-Mar-2004
PHASE-ARRAY ANTENNA DIPLEXING	United States of America	10/456,760	06-Jun-2003	6,771,222	03-Aug-2004
SELF-MONITORING SATELLITE SYSTEM	United States of America	09/938,983	24-Aug-2011	6,667,713	23-Dec-2003
SHOCK SIMULATION METHOD AND APPARATUS	United States of America	12/874,211	01-Sep-2010	8,479,557	09-Jul-2003
AREA DENIAL COMMUNICATION LATENCY COMPENSATION	United States of America	15/838,213	11-Dec-2017	10,054,404	21-Aug-2018
AREA DENIAL COMMUNICATION LATENCY COMPENSATION	United States of America	16/106,921	21-Aug-2018	10,323,912	18-Jun-2019
AREA DENIAL COMMUNICATION LATENCY COMPENSATION	United States of America	16/401,313	02-May-2019	10,641,570	05-May-2020
AREA DENIAL COMMUNICATION LATENCY COMPENSATION	United States of America	16/865,705	05-Apr-2020		
AREA DENIAL COMMUNICATION LATENCY COMPENSATION	Australia	2017371361	11-Dec-2017	2017371361	14-Nov-2019

Schedule A
Assigned IP

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AREA DENIAL COMMUNICATION LATENCY COMPENSATION	Australia	2019257442	30-Oct-2019		
AREA DENIAL COMMUNICATION LATENCY COMPENSATION	European Patent Convention	17832617.9	11-Dec-2017		
AREA DENIAL COMMUNICATION LATENCY COMPENSATION	Korea	10-2019-7019124	11-Dec-2017	10-2111243	05-May-2020
AREA DENIAL COMMUNICATION LATENCY COMPENSATION	Saudi Arabia	519401962	11-Dec-2017		
AREA DENIAL COMMUNICATION LATENCY COMPENSATION	United Arab Emirates	P6000814/2019	11-Dec-2017		
	United States of America	15/998,269	26-Jul-2018		
	United States of America	15/998,144	09-Jul-2018		
	United States of America	16/350,321	01-Nov-2018		
MUNITION WITH CONTROLLED SELF NEUTRALIZATION	United States of America	16/350,299	29-Oct-2018	10,648,785	12-May-2020
MUNITION WITH CONTROLLED SELF NEUTRALIZATION	United States of America	16/873,581	11-May-2020		
	United States of America	16/501,812	10-Jun-2019		
	United States of America	16/501,859	19-Jun-2019		
	United States of America	16/501,813	10-Jun-2019		
	United States of America	16/501,803	07-Jun-2019		
	United States of America	16/501,814	10-Jun-2019		
	United States of America	16/501,807	10-Jun-2019		
	United States of America	16/602,546	28-Oct-2019		
	United States of America	16/602,682	19-Nov-2019		
	United States of America	16/501,636	14-May-2019		

Schedule A
Assigned IP

Title	Country	Application Number	Date Filed	Patent Number	Issue Date
SOLAR PANEL MODULE	United States of America	16/827,699	23-Mar-2020		
SOLAR PANEL MODULE	Patent Cooperation Treaty	PCTUS2020024351	23-Mar-2020		
	United States of America	16/873,057	23-Jan-2020		
	United States of America	16/602,796	03-Dec-2019		
	United States of America	16/602,904	20-Dec-2019		
	United States of America	16/602,843	10-Dec-2019		
	United States of America	16/873,118	04-Feb-2020		
	United States of America	16/873,122	05-Feb-2020		
	United States of America	16/974,169	29-Oct-2020		
	United States of America	63/000,066	26-Feb-2020		
	United States of America	63/102,090	28-May-2020		
	United States of America	63/102,171	01-Jun-2020		
	United States of America	63/103,302	29-Jul-2020		
	United States of America	63/102,801	02-Jul-2020		
	United States of America	63/205,043	10-Nov-2020		
	United States of America	63/206,114	28-Jan-2021		