505257272 12/31/2018

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2 EPAS ID: PAT5304044

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
JOYDEEP RAY	07/03/2017
TRAVIS T. SCHLUESSLER	06/15/2017
PRASOONKUMAR SURTI	02/22/2018
JOHN H. FEIT	12/17/2018
NIKOS KABURLASOS	06/15/2017
JACEK KWIATKOWSKI	06/19/2017
ABHISHEK R. APPU	11/08/2018
JAMES M. HOLLAND	11/18/2018
JEFFERY S. BOLES	11/10/2018
JONATHAN KENNEDY	06/16/2017
LOUIS FENG	04/23/2017
ATSUO KUWAHARA	02/21/2018
BARNAN DAS	06/15/2017
NARAYAN BISWAL	06/15/2017
STANLEY J. BARAN	02/21/2018
GOKCEN CILINGIR	06/15/2017
NILESH V. SHAH	06/15/2017
ARCHIE SHARMA	06/15/2017
MAYURESH M. VARERKAR	06/15/2017

RECEIVING PARTY DATA

Name:	INTEL CORPORATION
Street Address:	2200 MISSION COLLEGE BOULEVARD
City:	SANTA CLARA
State/Country:	CALIFORNIA
Postal Code:	95054

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	15494742

PATENT REEL: 047995 FRAME: 0663

505257272

CORRESPONDENCE DATA

Fax Number:

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.

Email: admin2@jordaniplaw.com
Correspondent Name: JORDAN IP LAW, LLC

Address Line 1: 12501 PROSPERITY DRIVE

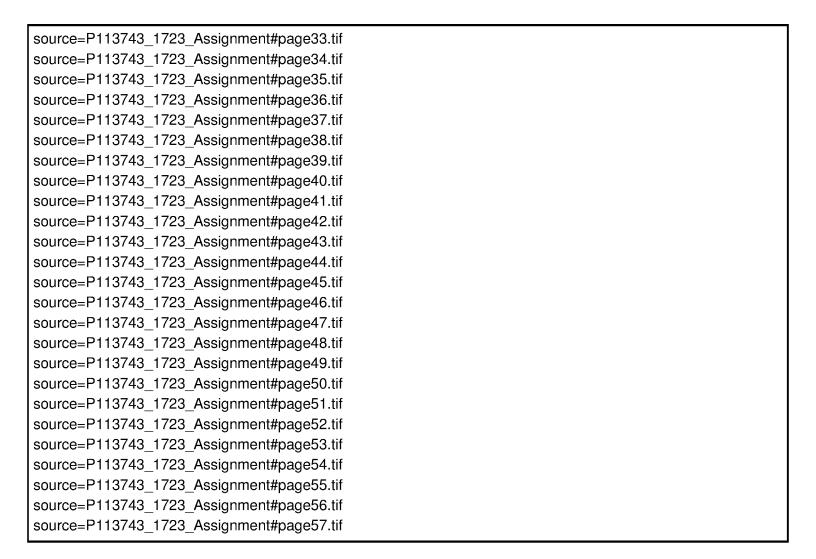
Address Line 2: SUITE 401

Address Line 4: SILVER SPRING, MARYLAND 20904

ATTORNEY DOCKET NUMBER:	P113743 1999-1723
NAME OF SUBMITTER:	B. DELANO JORDAN
SIGNATURE:	/B. Delano Jordan/
DATE SIGNED:	12/31/2018

Total Attachments: 57

source=P113743 1723 Assignment#page1.tif source=P113743 1723 Assignment#page2.tif source=P113743 1723 Assignment#page3.tif source=P113743 1723 Assignment#page4.tif source=P113743 1723 Assignment#page5.tif source=P113743_1723_Assignment#page6.tif source=P113743 1723 Assignment#page7.tif source=P113743 1723 Assignment#page8.tif source=P113743 1723 Assignment#page9.tif source=P113743_1723_Assignment#page10.tif source=P113743 1723 Assignment#page11.tif source=P113743 1723 Assignment#page12.tif source=P113743 1723 Assignment#page13.tif source=P113743 1723 Assignment#page14.tif source=P113743 _1723_Assignment#page15.tif source=P113743 1723 Assignment#page16.tif source=P113743 1723 Assignment#page17.tif source=P113743 1723 Assignment#page18.tif source=P113743 1723 Assignment#page19.tif source=P113743 1723 Assignment#page20.tif source=P113743 1723 Assignment#page21.tif source=P113743 1723 Assignment#page22.tif source=P113743 1723 Assignment#page23.tif source=P113743 1723 Assignment#page24.tif source=P113743 1723 Assignment#page25.tif source=P113743 1723 Assignment#page26.tif source=P113743 1723 Assignment#page27.tif source=P113743 1723 Assignment#page28.tif source=P113743 1723 Assignment#page29.tif source=P113743_1723_Assignment#page30.tif source=P113743 1723 Assignment#page31.tif source=P113743 1723 Assignment#page32.tif



ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignce"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(i nereoy authoria	ce ana reque	st any attorney having appropriate authority from the assignee to inse	ert on the
designated lines b	elow, the fili	ng date and application number of said application when known.)	

62,455,0	928 988	1 36 W 3	

which was filed on		April 24, 2017		_as	
USUS	***************************************	Application Numbe	r	15/494,742	and

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below.

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

Page 1 of 3

ail Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

covenant with said Assignee, its successors, assigns, and legal representatives that no assignment, grant, mortgage, license, or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

Joydeep Ray	Date signed
Travis T. Schluessler	Date signed
Prasoonkumar Surti	Date signed
John H. Feit	Date signed
Nikos Kaburlasos	Date signed
Jacek Kwiatkowski	Date signed
Abhishek R. Appu	Date signed
James M. Holland	Date signed

Page 2 of 3

Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
	6/15/2017
Barnan Das	Date signed
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
Gokcen Cilingir	Date signed
Nilesh V. Shah	Date signed
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby author	tize and request an	attorney having	appropriate authori	ity from the assignee to	insert on the
designated lines	below, the filing da	te and application	a number of said am	plication when known.	}
. N.	S 350	: ** **	a ne accesa est est accidentation establish		¢.

	***************************************	April 24, 2017		
COUNTRY or later	national Office	Application Number	\$ 37.66 X 66 X 66 X	and

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements:

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

Page 1 of 3

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignce, its successors, assigns, and legal representatives; and

covenant with said Assignee, its successors, assigns, and legal representatives that no assignment, grant, mort gage, license, or other agreement affecting the rights and property herein conveyed has been made to others by the un-dersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

Joydeep Ray	Date signed
Travis T. Schluessler	Date signed
Prasoonkumar Surti	Date signed
John H. Feit	Date signed
Nikos Kaburiasos	Date signed
Jacek Kwiatkowski	Date signed
Abhishek R. Appu	Date signed
James M. Holland	Date signed

Page 2 of 3

CONTRACTOR OF THE CONTRACTOR CONTRACTOR CONTRACTOR OF THE CONTRACTOR CONTRACT	
Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
Barnan Das	Date signed
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
Gokcen Cilingir	Date signed
Nilesh V. Shah	Date signed
	A 15 7207
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

real was trical for	April 24, 2017	as as	
US CONTRACTOR TO	Application Number	15/494,742	anc

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

Page 1 of 3.

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

covenant with said Assignee, its successors, assigns, and legal representatives that no assignment, grant, mortgage, license, or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

	Joydeep Ray	Date signed
	Travis T. Schluessler	Date signed
	Prasoonkumar Surti	Date signed
*	John H. Feit	Date signed
	Nikos Kaburlasos	Date signed
	Jacek Kwiatkowski	Date signed
	Abhishek R. Appu	Date signed
	James M. Holland	Date signed

٠	Jeffery S. Boles	Date signed
ä	Jonathan Kennedy	Date signed
8 æ	Louis Feng	Date signed
* *	Atsuo Kuwahara	Date signed
-	Barnan Das	Date signed
e é	Narayan Biswal	Date signed
ø	Stanley J. Baran	Date signed
ن د	Gokcen Cilingir	Date signed
Ş	Nilesh V. Shah	Date signed
4	Archie Sharma	Date signed
<u> </u>	7/////////////////////////////////////	<u></u>
	Mavuresh M. Varerkar	Date signed

<u>ASSIGNMENT</u>

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby authorize and request any a designated lines below, the filing date		authority from the assignee to insert on said application when known.)	the
which was filed on	April 24, 2017		
US COUNTRY or International	Application Number	15/494,742	_ and

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignce may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

Page 1 of 3

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

covenant with said Assignee, its successors, assigns, and legal representatives that no assignment, grant, mortgage, license, or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

Joydeep Ray	Date signed
Travis T. Schluessler	Date signed
Prasoonkumar Surti	Date signed
John H. Feit	Date signed
Nikos Kaburlasos	Date signed
Jacek Kwiatkowski	Date signed
Abhishek R. Appu	Date signed
James M. Holland	Date signed

Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
Barnan Das	Date signed
<u> </u>	06/15/2014
Narayan Biswal	Date signed
D2 3 1 B	
Stanley J. Baran	Date signed
Gokcen Cilingir	Date signed
Nilesh V. Shah	Date signed
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray: Travis T. Schluessler: Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos: Jacek Kwiatkowski; Abbishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Barao; Gokeen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2260 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby authorize and request any attorne designated lines below, the filing date and a	y having appropriate anti pplication number of said	sority from the assignee to insert on application when known.)	tbe
which was filed on	April 24, 2017	85	
US COUNTRY or International Office	Application Number	15/494,742	and

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below.

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filled in the United States and all other countries and international filling offices on any of said inventions and improvements; and in and to all original and ressued patents that have been or shall be issued in the United States and all other countries and international filling offices on said inventions and improvements; and in and to all rights of priority resulting from the filling of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements.

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, tasigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

coverant with said Assignce, its successors, assigns, and legal representatives that no assignment, grant, mortgage, license, or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

Joydeep Ray	Date signed
Travis T. Schluessler	Date signed
Prasoonkumar Surti	Date signed
John H. Feit	Date signed
Nikos Kaburlasos	Date signed
Jacek Kwiatkowski	Date signed
Abhishek R. Appu	Date signed
James M. Holland	Date signed

Page 2 of 3

Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
Baman Das	Date signed
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
Wer	6/15/2017
Gokcen Cilingir	Date signed
Nilesh V. Shah	Date signed
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

Page 3 of 3

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby authorize and request any attorney having appropriate authority from the assignee to insert on the designated lines below, the filing date and application number of said application when known.)			he
which was filed on	April 24, 2017	as	
US COUNTRY or International Office	Application Number	15/494,742	and

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

covenant with said Assignee, its successors, assigns, and legal representatives that no assignment, grant, mortgage, license, or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

Joydeep Ray	Date signed
Travis T. Schluessler	Date signed
Prasoonkumar Surti	Date signed
John H. Feit While Kehreles	Date signed 6/15/2017 Date signed
Jacek Kwiatkowski	Date signed Date signed
Abhishek R. Appu	Date signed
James M. Holland	Date signed

Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
Barnan Das	Date signed
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
Gokcen Cilingir	Date signed
Nilesh V. Shah	Date signed
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby authorize and request any attorney having appropriate authority from the assignee to insert on the designated lines below, the filing date and application number of said application when known.)											
which was filed on	April 24, 2017	as									
US COUNTRY or International Office	Application Numbere	15/494,742	and								

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

covenant with said Assignee, its successors, assigns, and legal representatives that no assignment, grant, mortgage, license, or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

Joydeep Ray	Date signed
Travis T. Schluessler	Date signed
Prasoonkumar Surti	Date signed
John H. Feit	Date signed
Nikos Kaburlasos	Date signed
Jacek Kwiatkowski	Date signed
Abhishek R. Appu	Date signed
James M. Holland	Date signed

Jeffery S. Boles	Date signed
Keined	16th June 2017
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
Barnan Das	Date signed
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
Gokcen Cilingir	Date signed
Nifesh V. Shah	Date signed
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokeen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I bereby authorize and request any attorney having appropriate authority from th	
designated lines below, the filing date and application number of said application w	

33.1		W.																											
																13.0													

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, commutation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements.

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to curry out in good faith the intent and purpose of this Assignment, the undersigned will execute

Page Lof 3

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee. Its successors, assigns, and legal representatives, and

covenant with said Assigned, its successors, assigns, and legal representatives that no assignment, grant, mortgage, license, or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

 Joydeep Ray	Date signed
 : T Glado	6/35/17
Travis T. Schluessler	Date signed
 Prasoonkumar Surti	Date signed
 John H. Feit	Date signed
 Nikos Kaburlasos	Date signed
 Jacek Kwiatkowski	Date signed
Abhishek R. Appu	Date signed
 James M. Holland	Date signed

Page 2 of 3

Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
 Lovis Feng	Date signed
Atsuo Kuwahara	Date signed
 Barnan Das	Date signed
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
Gokcen Cilingir	Date signed
 Nilesh V. Shah	Date signed
 Archie Sharma	Date signed
 Mayuresh M. Varerkar	Date signed

Page 3 of 3

<u>ASSIGNMENT</u>

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby authorize and request any attorne designated lines below, the filing date and ap	y having appropriate oplication number of	authority from the assignee to insert on the said application when known.)
which was filed on	April 24, 2017	
COUNTRY or International Office	Application Number	15/494,742and

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications: as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements:

and agree that said Assigned may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

Page 1 of 3

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful ouths, assignments, powers of attorney, and other papers; communicate to said Assignce, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignce, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignce, its successors, assigns, and legal representatives; and

covenant with said Assignee, its successors, assigns, and legal representatives that no assignment, grant, mort gage, license, or other agreement affecting the rights and property herein conveyed has been made to others by the un-dersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

Joydeep Ray	Date signed
Travis T. Schluessler	Date signed
Prasoonkumar Surti	Date signed
John H. Feit	Date signed
Nikos Kaburlasos	Date signed
Tarak Baraka	73 / 3 / 4 / 7 / 70 / 7
Jacek Kwiatkowski	Date signed
Abhishek R. Appu	Date signed
James M. Holland	Date signed

Page 2 of 3

	Jeffery S. Boles	Date signed
	Jonathan Kennedy	Date signed
	Louis Feng	Date signed
	Atsuo Kuwahara	Date signed
	Barnan Das	Date signed
	Narayan Biswal	Date signed
***************************************	Stanley J. Baran	Date signed
	Gokeen Cilingir	Date signed
	Nilesh V. Shah	Date signed
	Archie Sharma	Dute signed
	Mayuresh M. Varerkar	Date sioned

Page 3 of 3

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby authorize and request any attorney having appropriate authority from the assignee to insert on the designated lines below, the filing date and application number of said application when known.)												
which was filed on _	April 24, 2017	as										
US	Application Number	15/494,742	and									
COUNTRY or Interr	ational Office											

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

covenant with said Assignce, its successors, assigns, and legal representatives that no assignment, grant, mort gage, license, or other agreement affecting the rights and property herein conveyed has been made to others by the un - dersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

Jayleo Rece	}-3-13-
Joydeep Ray (Date signed
Travis T. Schluessler	Date signed
Prasoonkumar Surti	Date signed
John H. Feit	Date signed
Nikos Kaburlasos	Date signed
Jacek Kwiatkowski	Date signed
Abhishek R. Appu	Date signed
James M. Holland	Date signed

Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
Barnan Das	Date signed
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
Gokcen Cilingir	Date signed
Nilesh V. Shah	Date signed
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby authorize and request any attorney having appropriate authority from the assignee to insert on the designated lines below, the filing date and application number of said application when known.)			
which was filed on	April 24, 2017	as	
US COUNTRY or International Office	Application Number	15/494,742	and

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

covenant with said Assignee, its successors, assigns, and legal representatives that no assignment, grant, mortgage, license, or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

Joydeep Ray	Date signed
Travis T. Schluessler	Date signed
Prasoonkumar Surti	Date signed
John H. Feit	Date signed
Nikos Kaburlasos	Date signed
Jacek Kwiatkowski	Date signed
Abhishek R. Appu	Date signed
James M. Holland	Date signed

Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
4	04/23/2017
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
Barnan Das	Date signed
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
Gokcen Cilingir	Date signed
Nilesh V. Shah	Date signed
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby authorize and request any attorney baving appropriate authority from the assignee to insert on the
designated lines below, the filing date and application number of said application when known.)

which was filed on	<u> </u>	2017	as	
US	Application	Number	15/494,742	and
COUNTRY or Inter	mational Office	,		

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

Joydeep Ray		. :	***************************************	Date signed
	×.			
Travis T. Schluessler				Date signed
Prasoonkumar Surti				Date signed
John H. Feit				Date signed
Nikos Kaburlasos			······································	Date signed
	.*			
Jacek Kwiatkowski	,	* *		Date signed
Abhishek R. Appu				Date signed
James M. Holland	<u></u>	× .	······································	Date signed

Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
Barnan Das	Date signed
NY	Data slaved
Narayan Biswal Stanley Jo Boro Stanley J. Baran	Date signed
Skindey J. Baran	Date/signed
Gokcen Cilingir	Date signed
Nilesh V. Shah	Date signed
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

I hereby authorize and request any attorney having appropriate authority	from the assignee to insert on the
designated lines below, the filing date and application number of said appli	cation when known.)

which was filed on	Apríl 24, 2017		
US COUNTRY or International Office	Application Number	15/494,742	_ and

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

Joydeep Ray	Date signed
Travis T. Schluessler	Date signed
Prasoonkumar Surti	Date signed
John H. Feit	Date signed
Nikos Kaburlasos	Date signed
Jacek Kwiatkowski	Date signed
Abhishek R. Appu	Date signed
James M. Holland	Date signed

Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	2/21/2019 Date signed
/3000 Kowanga	7 Date signed
Barnan Das	Date signed
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
Gokcen Cilingir	Date signed
Nilesh V. Shah	Date signed
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby authorize and request any attorney having appropriate authority from the assignee to insert on the designated lines below, the filing date and application number of said application when known.)					
which was filed on	April 24, 2017				
US COUNTRY or International Office	Application Number	15/494,742	and		

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

Page 1 of 3

PATENT

REEL: 047995 FRAME: 0705

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

	Joydeep Ray	Date signed
	Travis T. Schluessler	Date signed
	DAND.	02/22['18 Date signed
	✓ Prasogenkumar Surti	Date signed
	John H. Feit	Date signed
	Nikos Kaburlasos	Date signed
	Jacek Kwiatkowski	Date signed
	Jacea izwianowski	Date signed
	Abhishek R. Appu	Date signed
<u></u>	James M. Holland	Date signed

Jeffery S. Boles	Date signed	
Jonathan Kennedy	Date signed	
Louis Feng	Date signed	
Atsuo Kuwahara	Date signed	
Barnan Das	Date signed	
Narayan Biswal	Date signed	
Stanley J. Baran	Date signed	
Gokcen Cilingir	Date signed	
Nilesh V. Shah	Date signed	,
Archie Sharma	Date signed	•••••
Mayuresh M. Varerkar	Date signed	

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokeen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby authorize and	request any attorne	y having appropriate	authority from t	the assignee to	nsert on the
designated lines below,	the filing date and ap	plication number of	said application	when known.)	

which was filed on	April 24, 2017	38		
US COUNTRY or International Office	Application Number		494.742	and

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below.

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

Joydeep Ray	Date signed
Travis T. Schluessler	Date signed
Prasoonkumar Surti	Date signed
John H. Feit	Date signed
Nikos Kaburlasos	Date signed
Jacek Kwiatkowski	Date signed
Abhishek R. Appu	Date signed
James M. Holland	Date signed

Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
Barnan Das	Date signed
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
Gokcen Cilingir	Date signed
NOSAL	6/15/2017
Nilesh V. Shah	Date signed
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby authorize and request any attorney having appropriate authority from the assignee to insert on the designated lines below, the filing date and application number of said application when known.)			
which was filed on	April 24, 2017	as	
US COUNTRY or International Office	Application Numbere	15/494,742	and

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

Date signed
Date signed
11. 6. 2018 Date signed

Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
Barnan Das	Date signed
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
Gokcen Cilingir	Date signed
Nilesh V. Shah	Date signed
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

COUNTRY or International Office

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby authorize and request any designated lines below, the filing dat			ert on the
which was filed on	April 24, 2017	as	
118	Karathan San Standard	1 2 122 4 22 2	

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof, and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

Joydeep Ray		Date signed	~~~
Travis T. Schluessler		Date signed	
Prasoonkumar Surtí	· come come	Date signed	
		77	
John H. Feit		Date signed	
	ereare. de		**********
Nikos Kaburlasos	3	Date signed	
Jacek Kwiatkowski		Date signed	
Abhishek R. Appu		Date signed	
	e e e e e e e e e e e e e e e e e e e		
James M. Holland		Date signed	

	Attorney Docket No.: P113743
4 B/2	11-10-18
Veffery S. Boles	Date signed
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
Barnan Das	Date signed
	*
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
· · · · · · · · · · · · · · · · · · ·	
Gokcen Cilingir	Date signed
Nilesh V. Shah	Date signed
A TON COME. I V. BY ACKED	waa ngura
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(1 nereby authorize and request a	ny attorney having app	propriate auth	ority from the as:	agnee to insert on the
designated lines below, the filing of	late and application m	umber of said	application when	known.)
		6. 19	**	
	at the second of	a.a. a.c		
which was Elast on	A	363.7	****	

Willow May Reda Ott			
US	Application Number	15/494,742	and
COUNTRY or International Office	(,)		7.

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

Joydeep Ray	Date signed
Travis T. Schluessler	Date signed
Prasoonkumar Surti	Date signed
VL)	12/17/2018
John H (Fei)	12/17/2019 Date signed
Nikos Kaburlasos	Date signed
Jacek Kwiatkowski	Date signed
Abhishek R. Appu	Date signed
James M. Holland	Date signed

Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
Barnan Das	Date signed
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
Gokcen Cilingir	Date signed
Nilesh V. Shah	Date signed
Archie Sharma	Date signed
V V	
Mayuresh M. Varerkar	Data cionad

ASSIGNMENT

In consideration of good and valuable consideration, the receipt of which is hereby acknowledged, we, the undersigned inventor(s):

Joydeep Ray; Travis T. Schluessler; Prasoonkumar Surti; John H. Feit; Nikos Kaburlasos; Jacek Kwiatkowski; Abhishek R. Appu; James M. Holland; Jeffery S. Boles; Jonathan Kennedy; Louis Feng; Atsuo Kuwahara; Barnan Das; Narayan Biswal; Stanley J. Baran; Gokcen Cilingir; Nilesh V. Shah; Archie Sharma; Mayuresh M. Varerkar

hereby sell, assign, and transfer to:

Intel Corporation

a corporation of Delaware, having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California, 95054 USA ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all other countries, in and to any and all inventions and improvements that are disclosed in the application for the patent entitled:

AUGMENTED REALITY VIRTUAL REALITY RAY TRACING SENSORY ENHANCEMENT SYSTEM, APPARATUS AND METHOD

(I hereby authorize and request any attorney having appropriate authority from the assignee to insert on the designated lines below, the filing date and application number of said application when known.)					
which was filed on	April 24, 2017	as			
US COUNTRY or International Office	Application Number _	15/494,742	and		

which has been executed by the undersigned prior hereto or concurrently herewith on the date(s) indicated below,

and in and to said application and all Additional Applications, and all other patent applications that have been or shall be filed in the United States and all other countries and international filing offices on any of said inventions and improvements; and in and to all original and reissued patents that have been or shall be issued in the United States and all other countries and international filing offices on said inventions and improvements; and in and to all rights of priority resulting from the filing of said applications; as used herein "Additional Applications" includes but is not limited to design, utility, utility model, divisional, continuing, continuation-in-part, substitute, renewal, reissue, and national phase applications on said inventions and improvements;

and agree that said Assignee may apply for and receive a patent or patents for said inventions and improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute

all Additional Applications, and all other patent applications on any and all said inventions and improvements; execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said inventions and improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or legal representatives in securing and maintaining proper patent protection for said inventions and improvements and for vesting title to said inventions and improvements, and all applications for patents and all patents on said improvements, in said Assignee, its successors, assigns, and legal representatives; and

	Joydeep Ray	Date signed
	Travis T. Schluessler	Date signed
odilodistrionochu solitika	Prasoonkumar Surti	Date signed
	John H. Feit	Date signed
	Nikos Kaburlasos	Date signed
***************************************	Jacek Kwiatkowski	Date signed
	Abhishek R. Appu	Date signed
-4	James M. Holland	11/13/18 Date signed
1	Januch IVI. Pronume	Date Stoned

Jeffery S. Boles	Date signed
Jonathan Kennedy	Date signed
Louis Feng	Date signed
Atsuo Kuwahara	Date signed
Barnan Das	Date signed
Narayan Biswal	Date signed
Stanley J. Baran	Date signed
Gokcen Cilingir	Date signed
Nilesh V. Shah	Date signed
Archie Sharma	Date signed
Mayuresh M. Varerkar	Date signed

Page 3 of 3

PATENT REEL: 047995 FRAME: 0722

RECORDED: 12/31/2018