Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of	)	
	)	
Momentus Inc.	)	File No. SAT-STA_____
	)	
Application for Special Temporary Authority to Launch and Operate an In-Space Transportation Spacecraft	)	

APPLICATION FOR SPECIAL TEMPORARY AUTHORITY

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Dated: February 10, 2021

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APPLICATION FOR SPECIAL TEMPORARY AUTHORITY

I. Introduction

By this application, Momentus Inc. ("Momentus") requests Special Temporary Authority, pursuant to 47 C.F.R. § 25.120, to launch and operate the Vigoride-1 ("VR-1") non-geostationary orbit spacecraft in low-Earth orbit and to transport and deploy multiple, separate customer payloads at a specified final orbital destination.[1] VR-1 will operate in the S-band (2025-2110 MHz) for Space Operations (Earth-to-space) and in the Ultra High Frequency ("UHF") band (400.15-401 MHz) for Space Operations (space-to-Earth). VR-1 is expected to be deployed from a Space Exploration Technologies Corporation ("SpaceX") Falcon-9 launch in June 2021, and the mission is expected to have a duration of 180 days, *i.e.*, from June 2021 to November 2021. Momentus will be communicating on the requested frequency bands, as necessary, for the full 180 days. It is possible that some portion of the 180 days will include time when VR-1 has a perigee lower than 300 km. For clarity, spacecraft disposal - *i.e.*, the period of

[1] This application is materially identical to the previously submitted VR-1 application, IBFS File No. SAT-STA-20200609-00068 (including supplemental letters), except this version includes: an updated Orbital Debris Assessment Report ("ODAR") associated with a new launch (*see infra* at 4 and Exhibit 3); an update on National Oceanic and Atmospheric Administration ("NOAA") licensing (*see infra* at n.12); a revised ownership exhibit (*see* Exhibit 2); and a new International Telecommunication Union ("ITU") filing (*see infra* at § IV and Exhibit 1).

time following the lowering of perigee to 300 km - is planned to begin prior to the 180-day mark. To the extent possible, Momentus will continue to conduct telemetry, tracking, and command ("TT&C") communications during the period when the perigee of VR-1 is below 300 km.

Momentus is a private U.S. company headquartered in Santa Clara, California. Momentus is engaged in the design, construction, and operation of in-space transportation spacecraft. Since its founding in 2017, Momentus has brought together a team of aerospace professionals, drawn from throughout the industry, united with the singular goal of changing how the world thinks about space transportation infrastructure. Through its revolutionary Vigoride spacecraft, each capable of transporting and delivering small satellites to tailored orbital locations, Momentus will provide efficient and inexpensive "connecting flights" in space. The ability to customize orbits using Vigoride spacecraft empowers small satellite operators by enabling greater and lower-collision risk use of all orbits, including high-density orbits. Additionally, introducing the orbit flexibility of the Vigoride spacecraft into the existing commercial rideshare launch market can accelerate commercial space station deployments by expanding the orbital reach of existing launches, thereby increasing total ridership and contributing to lower launch prices. Cheaper, faster and smarter commercial space transportation has the capability to fundamentally change how space operators interact with on-orbit infrastructure. For all of these reasons, Momentus submits that the public interest would be served by grant of the application.

II. System Description

A. General System Descriptions

1. Vigoride VR-1 Spacecraft

The Vigoride spacecraft is a self-propulsive, free-flying spacecraft designed to transport and deploy customer payloads. The Vigoride spacecraft is capable of the transportation and

deployment of dozens of individual payloads. Customer spacecraft will be deployed after orbital insertion and prior to any orbit raising maneuvers. For the initial mission, Vigoride VR-1 will be transporting five (5) individual payloads (individually, "Payload 1" through "Payload 5," and collectively, the "Payloads"), on behalf of four (4) customers (collectively, the "Customers"). Table 1 below provides a summary of the payloads and customer information.

Payload:	**Launched on behalf of:**	**Licensing Jurisdiction:**	**Size**	**Mass**
AURORASAT[2]	Aurora Propulsion Technologies Oy	Finland	1.5U	2.0kg
LABSAT	SatRevolution	Poland	3.0U	4.0kg
STEAMSAT[3]	Steamjet Space Systems Ltd.	United Kingdom	1.5U	1.8kg
SWIFTVISION	SatRevolution	Poland	3.0U	4.0kg
VZLUSAT-2	SpaceManic CZ s.r.o.	Czech Republic	3.0U	4.4kg

Table 1: VR-1 Customer Payloads

All Payloads are commercial customer satellites. Furthermore, each customer is contractually obligated to obtain all necessary authorizations for operation of its spacecraft prior to integration with VR-1 and the launch vehicle, and Momentus has confirmed that each customer has all the necessary authorizations. If necessary, and in order to meet the VR-1 launch schedule, Momentus may replace a customer spacecraft with a mass dummy. Any such mass dummies would simulate the mechanical interfaces and mass of the customer spacecraft and allow Momentus to conduct a technology demonstration. Momentus, however, would not

[2] AuroraSat has onboard propulsive capability.
[3] SteamSat has onboard propulsive capability.

deploy the mass dummy in orbit. The casualty risk assessment in the ODAR includes a scenario in which mass dummies would remain on board the spacecraft throughout the mission and during re-entry. The mass dummies will be composed of aluminum and designed for demise. The ability to replace any customer satellite with a mass dummy is key to the ongoing certification of the VR-1 mass properties to the launch service provider. For the avoidance of doubt, should a representative mass be substituted for a customer payload, that representative mass would not be deployed on orbit.

The spacecraft is propelled primarily by a novel microwave electrothermal thruster ("MET"), which uses non-toxic and low-pressurized water propellant to provide orbit transfers. Momentus' innovative technology and propulsion system recently won a NASA iTech award.[4] Additionally, earlier this year, Momentus successfully completed a Phase I SBIR contract in collaboration with the United States Air Force (AFWERX) and Air Force Research Lab (AFRL) to accelerate innovations for in-space transportation services and satellite upper stage technologies.

The VR-1 mission operations center is located at the company headquarters in Santa Clara, California. All primary telemetry and commanding will be handled through this facility, via commercial ground stations, using encrypted links. Additional information on the Ground Segment is in section B.4. below.

VR-1 has a planned launch on a Falcon-9 rideshare in June 2021. VR-1 will be affixed directly to the Falcon-9 and deployed into a targeted 525 km (±25 km) circular sun-synchronous

[4] *See NASA iTech Winners Impress with Tech Ideas for use in Space, on Earth*, NASA, https://go.nasa.gov/365KB8N (last edited Jul. 16, 2019).

orbit with approximately a ~98 degree inclination.[5] After separation from the launch vehicle, VR-1 will undergo commissioning and, upon completion, will deploy Payloads 1 through 5. Subsequent to payload deployment, VR-1 will conduct orbit-raising maneuvers to a targeted maximum 570 km circular sun-synchronous orbit with a ~98 degree inclination. *See* Table 3 below (summarizing the relevant orbital parameters for the Payloads and VR-1).

As an integral part of the orbit raising concept of operations, Momentus will calculate and monitor propellant consumption and reserve a sufficient amount of propellant to ensure that VR-1 will be capable of conducting a final de-orbit maneuver, as discussed below. VR-1 will operate with an approximately 18% margin of propellant, in addition to the propellant necessary to achieve the operational concept (including lowering of perigee to 300 km at end of mission). Momentus contemplates that this reserve will serve as support for all contingencies during the VR-1 mission, including orbital debris avoidance maneuvers. To clarify, VR-1's capacity for "real time collision avoidance and orbital maintenance maneuvers," is constrained by the availability of uplink and downlink opportunities and thus such maneuvers may not be available in real time during those parts of orbit that are outside of ground station range. The amount of reserve remaining following an orbital debris avoidance maneuver would depend on the nature and duration of the avoidance maneuver. Anecdotally, however, a single kg of propellant can power many kilometers of orbital adjustment. Additionally, there is historical evidence that collision avoidance maneuvers are rare, and conjunction avoidance is usually accomplished with orbital adjustments of less than 1 km. Accordingly, Momentus expects to have sufficient

[5] For the purposes of this application, Momentus assumed a 550 km maximum insertion orbit. In the event of the launch vehicle operator selecting an alternative insertion orbit, Momentus will notify the FCC.

propellant reserves to conduct multiple contingency operations, including during spacecraft disposal.

As demonstrated in the attached ODAR, a 570 km circular sun-synchronous orbit would be the worst-case scenario in the assessment of orbital debris risk, and VR-1 would re-enter the Earth's atmosphere in approximately 17 years at that altitude. Following demonstration of the orbit adjustment capabilities of the spacecraft, VR-1 will engage in de-orbit maneuvers to lower the perigee of the spacecraft to a target of 300 km altitude. Momentus intends to reserve propellant so that there will be sufficient propellant to execute the de-orbit maneuvers necessary to achieve the targeted 300 km perigee. At a 570 (maximum) x 300 km orbit, Momentus calculates that VR-1 will de-orbit within approximately 2 years. Naturally, if VR-1 does not reach a 570 km circular orbit, the VR-1 de-orbit period will be compressed further following completion of the de-orbit maneuver.

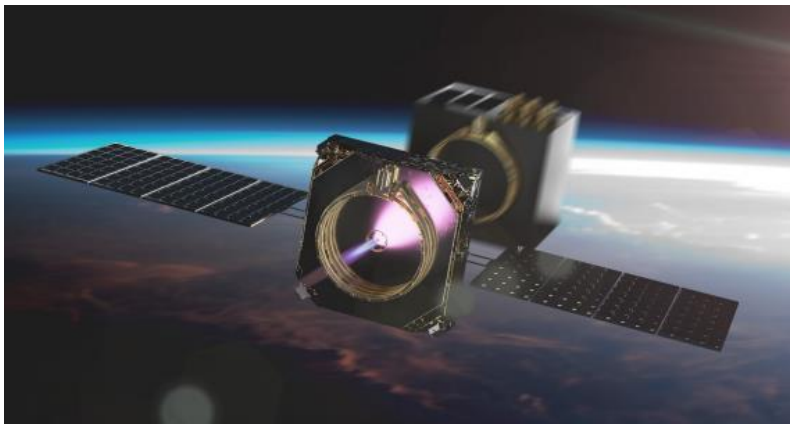

Figure 1: Artist's rendering of Vigoride deploying a customer spacecraft

2. The Momentus "Plaza Deck"

As part of the VR-1 mission, Momentus will also be deploying a number of additional payloads from a fixed "plaza deck," which will be permanently affixed to the Falcon-9.[6] The "plaza deck" does not require use of spectrum and is not subject to the spectrum request in this application. Nonetheless, Momentus is providing this information for completeness.

On the "plaza deck," one ISILaunch cubesat deployer and three Alba Orbital PocketQube picosat deployers will be mounted.[7] Customers being deployed from the "plaza deck" are all contractually obligated to obtain all necessary authorizations for operation of its spacecraft or payload prior to integration with the plaza deck and the launch vehicle. Momentus has confirmed that each customer has all necessary authorizations. As of the filing of this application, all payloads currently under contract with Momentus to be deployed from the Plaza Deck can be found in Table 2, below.

Payload:	**Launched on behalf of:**	**Licensing Jurisdiction:**
ISILaunch Quadpack	Innovative Space Logistics, B.V.	Netherlands
NUTSAT-0	Gran Systems Co., Ltd.	Taiwan
Alba PocketQubes (#3)	Alba Orbital Deutschland, U.G.	Germany

Table 2: Plaza Deck Payloads

[6] VR-1 will also be deployed from the plaza deck.
[7] Momentus will fly mass dummies for three of the four ISILaunch cubesat deployers the previous application identified.

B. Technical Specifications

1. Orbital Parameters

The VR-1 concept of operations is as follows[8]:

1. Launch vehicle arrives at initial orbit (maximum 550 km altitude circular sun-synchronous orbit)[9]
2. VR-1 separates from launch vehicle
3. VR-1 undergoes commissioning and preliminary testing
4. VR-1 conducts orbit raising maneuvers to second orbit (maximum 570 km circular sun-synchronous orbit, based on a planned 20 km raise from a notional maximum 550 km initial orbit)
5. VR-1 deploys Payloads 1 through 5
6. VR-1 performs detailed system functional testing
7. VR-1 conducts de-orbit maneuvers (targeting 300 km perigee)

[8] VR-1 concept of operations is in addition to the deployment of Momentus customer payloads from the plaza deck.
[9] SpaceX reports a planned injection orbit of 525 km (± 25 km).

	Insertion and Payloads 1 through 5 Orbit	VR-1 Transfer Orbit	VR-1 End-of-Life Orbit
Apogee Altitude	550 km (max)	570 km (max)	570 km (max)
Perigee Altitude	550 km (max)	570 km (max)	300 km[10]
Inclination	~98° (Sun-Synchronous)	~98° (Sun-Synchronous)	~98°
Period	96 mins	96 mins	90-96 mins
Argument of Perigee	N/A	N/A	N/A
Local Time of the Ascending Node (LTAN)	~1:30	~1:30	~1:30
Maximum De-Orbit Life	VR-1[11] 21 years	VR-1[12] 17 years	VR-1 2 years

Table 3: Orbital Parameters

2. Frequency Bands

VR-1 will operate in the S-band (2025-2110 MHz) for Space Operations (Earth-to-space) and in the UHF band (400.15-401 MHz) for Space Operations (space-to-Earth). *See* Table 4 below. The use of those frequencies will be primarily for TT&C. However, Momentus will also downlink imagery generated from an on-board camera to confirm successful deployment of the Payloads.[13] Momentus is aware that there are federal and other operations in these frequency

[10] The target perigee as a result of de-orbit maneuvers is expected to be 300 km.
[11] This is the de-orbit duration if VR-1 has a propulsion system *and* a solar array deployment failure after deployment from the launch vehicle.
[12] This is the de-orbit duration if VR-1 has a propulsion system failure after raising the orbit to 570 km altitude.
[13] Momentus has obtained a commercial remote sensing license from NOAA for the operations of imaging sensors and intends to comply with all necessary NOAA regulatory requirements. *See* 15 C.F.R. Part 960.

bands and intends to coordinate its proposed operations with affected operators prior to operations.

Criteria	Uplink (Earth-to-space)	Downlink (space-to-Earth)	Notes
Center Frequency	2075.0 MHz[14]	400.5 MHz	
Bandwidth	0.1 MHz	0.04 MHz	The wider uplink bandwidth accommodates forward error correction ("FEC").
Data Rate	38.4 kbps	38.4 kbps	Data rate is configurable from 1.2 kbps to 38.4 kbps.
Modulation & Coding	2-GFSK (no coding)	2-GFSK (no coding)	Links may include FEC.
Transmit Power	12W	1.8W	
Transmit Antenna	3.0 m (dish)	Dipole (2x monopoles)	
Transmit Antenna EIRP	43 dBW	-9.1 dBW	
Receive Antenna	Patch (7 dBiC)	Yagi (2.5λ)	
Receive Antenna G/T	-32.8 dB/K	-11.6 dB/K	

Table 4: Radio Frequency Plan

[14] Both the identified center frequencies are representative frequency channels. As a result of coordination with federal operators, Momentus may select another channel within the identified frequency bands for its operations. Moreover, Momentus previously coordinated the use of these same frequencies for the VR-1 mission.

Attached to this application, please find antenna gain contours for transmit and receive antenna beams showing, in 2 dB steps, to 10 dB below max gain.[15] The peak gain value for the transmit beam is 5.15 dB. The peak gain value for the receive beam is 6 dB.

3. Frequency Tolerance and Emission Limitations

Momentus will comply with the frequency tolerance requirements of 47 C.F.R. § 25.202(e) and the emission limitations of 47 C.F.R. § 25.202(f). In addition, VR-1's transmitter does not turn on automatically, and manual commands from the ground are required to initiate communications from the spacecraft. Accordingly, VR-1 complies with 47 C.F.R. § 25.207.

4. Ground Stations

For the VR-1 mission, Momentus intends to use Leaf Space S.r.l. ("Leaf Space"), via their "Leaf Key" ground segment as a service solution, as the ground segment provider. Leaf Space currently has four operational ground stations in Europe and plans to operate additional stations in other locations, including the United States. Leaf Space received a license from the Italian Ministry of Economic Development ("MISE") on April 4, 2020 to operate their Vimercate (Milan area) ground station in support of the VR-1 mission within the parameters described herein. Leaf Space has also obtained a license for operation of the VR-1 spacecraft using an additional ground station located in Cork, Ireland. Communications between Momentus HQ and Leaf Space will be protected by levels of encryption appropriate to secure control over the VR-1. TT&C transmissions will be encrypted. Table 5 below identifies the ground stations from which Leaf Space plans to communicate with the VR-1 spacecraft.

Location	**Latitude (°N)**	**Longitude (°E)**	**Status**
Vimercate, Italy	45.59	9.36	Operational

[15] *See* Exhibit 4.

Cork, Ireland	51.90	-8.48	Operational

Table 5: Ground Station

5. Microwave Electrothermal Thruster

VR-1 uses a radiofrequency generator that emits electromagnetic energy at a maximum theoretical power level of 40 watts (16.53 dBW) to operate the thruster. The electromagnetic emissions of the VR-1 thruster would not exceed 15 uV/m at a distance of 300 meters. Our calculations indicate the thruster is expected to produce electromagnetic emissions at levels less than 10 uV/m at a distance of 300 meters.

This generator uses a gallium nitride solid-state device to efficiently produce this level of power output, which, in turn, is delivered via a specially shielded coax cable directly to the thruster injector. The location of the generator and the application of shielding mitigates the radiation of emissions outside of the injector. The emission frequency generated by the RF Power Module ("RPM") is controlled and can be adjusted over the frequency range 10.25 to 10.60 GHz as needed. The frequency generator uses a crystal-controlled reference oscillator with a frequency accuracy of 0.28 parts per million, and the synthesizer employed is adjustable over the frequency range, with a resolution of better than 1 kHz. Prior measurements have confirmed that emissions radiating outside of the injector cavity are 100 dB below the maximum generated power output of the RPM. EMI emission levels from the flight thruster payload have been measured in an anechoic facility to ensure that radiated levels do not exceed an RF power level of greater than -50 dBm within the vicinity of the MET (measured at 1 meter from the propulsion system) and that all emissions are contained within a bandwidth of no more than 5 MHz.

Momentus' proposed thruster operations will not cause harmful radiofrequency interfere to incumbent services. The frequency range 10.25 to 10.60 GHz is used on a primary basis by

Radiolocation, Fixed, and Mobile services and is used on a secondary basis by the Amateur and Amateur-Satellite radio services in all three ITU regions.[16] The power flux density at the Earth's surface from 300 km, the estimated closest operational distance to the satellite, is far below the PFD threshold specified in the ITU Radio Regulations.[17] At the calculated emission levels, no emissions will be detectable (by a very large margin) by radar, mobile, fixed, or amateur systems. All other emissions from the thruster (*e.g.*, harmonics and sub-harmonics) will be further attenuated by at least an additional 20 dB.[18]

III. Waiver Requests

The Commission may waive any of its rules if there is "good cause" to do so.[19] In general, waiver is appropriate if (1) special circumstances warrant a deviation from the general rule; and (2) such deviation would better serve the public interest than would strict adherence to the rule.[20] Generally, the Commission will grant a waiver of its rules in a particular case if the relief requested would not undermine the policy objective of the rule in question and would otherwise serve the public interest.[21] Here, the development of efficient, flexible and non-toxic space transportation infrastructure, and the benefits such a service provide – including, critically,

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[16] *See* 47 C.F.R. § 2.106.
[17] *See* ITU Radio Regulations 21.16.
[18] Due to the operation of the equipment as part of the spacecraft, Momentus believes the VR-1 thruster should not be characterized as Industrial, Scientific or Medical equipment. *See* 47 C.F.R. §18.101, *et. seq.* In any event, as discussed above, due to the low calculated emissions levels, the frequency range within which the thruster will operate, and the operations of the equipment in space, the emissions from the propulsion system are unlikely to cause harmful interference to any authorized services.
[19] *See* 47 C.F.R. § 1.3; *Northeast Cellular Tel. Co. v. FCC*, 897 F.2d 1164 (D.C. Cir. 1990); *WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969).
[20] *See Northeast Cellular*, 897 F.2d at 1166.
[21] *See WAIT Radio*, 418 F.2d at 1157.

the potential to assist in orbital debris risk mitigation – represent a special circumstance warranting waiver of the FCC rules.

A. U.S. Table of Frequency Allocations

1. 2025-2110 MHz TT&C Uplink

This band is allocated to Space Operations and Earth-Exploration Satellites Services ("EESS"), *inter alia*, in all ITU regions. In the United States, Space Operations are limited to federal operators, and EESS use by commercial operators is subject to conditions as may be applied on a case-by-case basis and the limitation that any use may not cause harmful interference to authorized operations.[22] As discussed above, Momentus plans to use ground stations in Italy and Ireland, operated by Leaf Space, to communicate with VR-1 for the provision of in-space transportation services. Accordingly, to the extent necessary, Momentus requests waiver of the Table of Allocations to use the 2025-2110 MHz band (Earth-to-space) for TT&C. Given the limited use of the frequencies during the brief 180-day mission, Momentus' commitment to coordinate use of these frequencies, and the public interest justification supporting the mission, Momentus submits that waiver is warranted.

2. 400.15-401 MHz TT&C Downlink

The 400.15-401 MHz band is allocated for Space Operations (space-to-Earth) on a secondary basis in all ITU regions. As discussed above, Momentus will use these frequencies primarily for TT&C.[23] Given the limited use of the frequencies during the brief 180-day mission, Momentus' commitment to coordinate use of these frequencies, and the public interest justification supporting the mission, Momentus submits that waiver is warranted.

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[22] *See* 47 C.F.R. § 2.106 n. US347.

[23] Such use will also include transmission of limited imagery of the Payloads during deployment primarily to ensure mission safety and success.

Momentus is aware that the FCC established an October 15, 2019 cut-off deadline for requests to operate, *inter alia*, in the 400.15-401 MHz band for the provision of Mobile-Satellite Service.[24] Momentus proposes to use this band for Space Operations on a secondary basis, consistent with the U.S. Table of Frequency Allocations, and its brief and limited use of the band for TT&C is not mutually exclusive with other operations on a long-term basis. Accordingly, the request to use these frequencies should be considered outside of the 400.15-401 MHz processing round.

B. 47 C.F.R. § 25.113(g)

The Commission's rules require orbital deployment approval and operating authority to be applied for and granted prior to orbital deployment and operation of a space station. In this case, given (1) the short operational life of the VR-1 spacecraft; (2) the similarity in function of VR-1 to an upper stage launch vehicle; (3) the information contained in this application regarding spacecraft operations and debris mitigation plans; and (4) the public interest justification supporting the mission, Momentus believes the underlying purposes of the rule (to provide sufficient information for the FCC to evaluate the satellite mission) is met and that grant of the requested waiver is justified. Further, the FCC has granted similar applications for in-space transportation spacecraft in the recent past.[25]

In any event, to the extent necessary, Momentus provides responses to questions 29-34 and 36-40 of the Form 312 and attaches a Schedule S. Section 310(b)(4) of the Communications

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[24] *See Cut-off Established for Additional NVNG MSS Applications or Petitions for Operations in the 399.9-400.05 MHz and 400.15-401 MHz Bands*, Public Notice, DA 19-779 (rel. Aug. 15, 2019).

[25] *See* Application of Spaceflight, IBFS File No. SAT-SAT-20180523-00042 (granted Oct. 12, 2018); Application of Spaceflight, IBFS File No. SAT-SAT-20150821-00060 (granted Oct. 26, 2016).

Act of 1934, as amended, establishes certain limitations on indirect foreign ownership and voting of certain common carrier and broadcast licensees. By definition, these limitations do not apply to the non-broadcast, noncommon carrier operations of Momentus, as proposed in this application.

- Question 29: NO
- Question 30: N/A. See discussion above.
- Question 31: N/A. See discussion above.
- Question 32: N/A. See discussion above.
- Question 33: N/A. See discussion above.
- Question 34: N/A. See discussion above.
- Question 36: NO
- Question 37: NO
- Question 38: NO
- Question 39: NO

IV. ITU Compliance

Momentus has prepared the ITU Advance Publication Information submission for its proposed system and is contemporaneously providing this information to the FCC under separate cover. Attached as an exhibit to this application is a signed ITU cost recovery letter.

Respectfully submitted,

/s/ Philip Hover-Smoot

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Dated: February 10, 2021

EXHIBIT 1

ITU Cost Recovery Letter

DECLARATION

I, Philip Hover-Smoot, hereby declare the following:

Momentus Inc. ("Momentus") is aware that as a result of actions taken at the International Telecommunication Union's 1998 Plenipotentiary Conference, and further modified by the ITU Council in subsequent years, processing fees will now be charged by the ITU for satellite network filings. As a consequence, Commission applicants are responsible for any and all fees charged by the ITU. Momentus hereby states that it is aware of this requirement and unconditionally accepts all cost recovery responsibilities associated with the ITU filings for the Vigoride-1 or VR-1 satellite network. Please address all correspondence related to the Vigoride-1 satellite network to the following point of contact:

Point of Contact Name: Philip Hover-Smoot

Organization Name: Momentus Inc.

Address: 3050 Kenneth Street
Santa Clara, CA 95054

E-Mail: philip.hover-smoot@momentus.space

Telephone Number: +1-415-254-1295

Sincerely,

/s/ Philip Hover-Smoot

Philip Hover-Smoot
Deputy General Counsel
Chief Ethics & Compliance Officer
Momentus Inc.

February 10, 2021

EXHIBIT 2

Ownership Information

Momentus Inc. ("Momentus") is a privately held corporation.

Listed below are the entities that currently have a 10% or greater equity and/or voting interest in Momentus: [1]

1. **Mikhail Kokorich directly and/or indirectly**
   c/o Momentus Inc.

   3050 Kenneth Street

   Santa Clara, CA 95054

   Ownership Interest: approximately 19% (see discussion below)

   Voting Interest: approximately 47% (see discussion below)

   Nationality: Russia

2. **Olga Khasis directly and/or indirectly[2]**
   16047 Collins Avenue, Unit 1603

   Sunny Isles Beach, Florida 33160

   Ownership Interest: approximately 17% (see discussion below)

   Voting Interest: approximately 36% (see discussion below)

   Nationality: U.S.

3. **Dakin Sloss**
   General Partner, Prime Movers Lab ("PML")

   PO Box 12829

   Jackson, WY 83002

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[1] The ownership percentages listed in this application are fully diluted percentages. All voting interests listed in this application are based on outstanding stock, taking into account that certain classes of stock are "high vote" stock with 10 votes per share.

[2] Ms. Khasis is the wife of Momentus' co-founder Lev Khasis, who is a Russian citizen and a U.S. permanent resident.

PML Ownership Interest: approximately 29%

PML Voting Interest: approximately 10%

OFFICERS, DIRECTORS, AND SENIOR LEADERS

All of the directors, officers, and senior leaders of Momentus may be reached at the following address:

c/o Momentus Inc.
3050 Kenneth Street
Santa Clara, CA 95054

CEO, Director	*Dawn Harms*[3]
President	*Dr. Fred Kennedy*
Director, Chairman	*Dakin Sloss*
Director	*Vince Deno*
General Counsel	*Alexander Fishkin*
Assoc. General Counsel	*Philip Hover-Smoot*
CFO	*Jikun Kim*
CTO	*Rob Schwarz*
Controller	*Temitope Oduozor*

Further Discussion

Momentus recently underwent a significant change in our senior leadership. Effective January 23, 2021, Mr. Kokorich, one of the co-founders of Momentus, resigned as CEO and as a member of Momentus's Board of Directors. Dawn Harms, who was previously the company's Chief Revenue Officer, has been appointed as interim CEO and has been elected as a member of the Board of Directors.

In parallel with Mr. Kokorich's resignation, and with the express goal of fully addressing the U.S. government's national security concerns, Mr. Kokorich and Ms. Khasis and their related

[3] Each senior leader or director listed is a U.S. citizen. Additionally, the following leaders hold current or unassigned but activatable Personal Security Clearances: Dawn Harms (TS/SCI), Fred Kennedy (TS/SCI), Philip Hover-Smoot (S), and Rob Schwarz (S).

entities are committing to divest all shares they hold in Momentus directly or indirectly. Mr. Kokorich and entities related to him plan to give up their voting rights in Momentus by placing all Momentus shares they own into trusts whereby a proxyholder designated by Momentus will vote such shares and these shareholders will cooperate with Momentus by agreeing to the divestiture of their shares by the trusts. The proxyholder will vote all of Mr. Kokorich's shares in his or her sole discretion. The voting interest held by Mr. Kokorich (directly and indirectly) is planned to be assigned to the interim CEO of the Company, Dawn Harms. After his and his related entities' shares are moved into trusts, Mr. Kokorich will not be able to exert any control with respect to Momentus. Prior to the placement of the shares in trust, Mr. Kokorich and his related entities are committing to refrain from voting their shares or taking any action to influence Momentus. The Momentus shares owned by Ms. Khasis also will be moved to a trust to be divested and the voting of such shares will be controlled by a designated proxyholder who is a U.S. citizen.

Momentus plans to merge with Stable Road Acquisition Corp. (Nasdaq ticker symbol: SRAC) ("SRAC"), which is a publicly traded special purpose acquisition company and will be listed as a publicly traded company (the "SPAC Transaction"). After the closing, no persons will have any board appointment or nomination rights. Momentus and SRAC have agreed that the six-member board will consist of (1) the interim CEO of Momentus, Dawn Harms (who is a U.S. citizen), (2) Brian Kabot, the Chairman and Chief Executive Officer of SRAC (who is a U.S. citizen), (3) three independent directors, Vince Deno, David Siminoff, and Chris Hadfield (Mr. Deno and Mr. Siminoff are U.S. citizens and Mr. Hadfield is a Canadian citizen); and (4) a sixth independent director who has not yet been identified, which were jointly agreed between Momentus and SRAC, subject to approval by a majority vote of SRAC's shareholders.

Momentus will update the Commission of changes.