Leann Nguyen

From: Joseph Hill
Sent: Monday, August 9, 2021 10:05 AM
To: Leann Nguyen; Jeanette Spriggs
Cc: ELB-Coordination-Info
Subject: RE: [EXTERNAL]: Re: Request for Info - File # 0169-EX-CN-2021

IB has completed its review. This is acceptable for grant.

From: Leann Nguyen <Leann.Nguyen@fcc.gov>
Sent: Friday, August 06, 2021 7:33 AM
To: Joseph Hill <Joseph.Hill@fcc.gov>; Jeanette Spriggs <Jeanette.Spriggs@fcc.gov>
Cc: ELB-Coordination-Info <ELB-Coordination-Info@fcc.gov>
Subject: FW: [EXTERNAL]: Re: Request for Info - File # 0169-EX-CN-2021

Hi Joseph/Jeanette,
Could you please check the status of this application?

Thanks,
Leann Nguyen

From: Alicia Irene Johnstone <aijohnst@calpoly.edu>
Sent: Thursday, August 5, 2021 8:07 PM
To: Leann Nguyen <Leann.Nguyen@fcc.gov>
Subject: [EXTERNAL]: Re: Request for Info - File # 0169-EX-CN-2021

Hi Leann,

Do you know if the IB has any more concerns regarding this application, or if the response below was sufficient? The spacecraft's delivery date is next month, and we'd like to be sure we've answered all questions and concerns to everyone's satisfaction.

Thanks,
Alicia

ALICIA JOHNSTONE
Cal Poly CubeSat Laboratory
RF Licensing Specialist and Systems Engineer

From: Alicia Irene Johnstone <aijohnst@calpoly.edu>
Date: Friday, July 23, 2021 at 4:52 PM

To: Leann Nguyen <Leann.Nguyen@fcc.gov>
Subject: Re: Request for Info - File # 0169-EX-CN-2021

Response to correspondence: 63475

Hello Leann,

The D3 team response is as follows (supporting documents attached):
Upon ejection from ISS, after detumbling is completed (7 hours), the D3 spacecraft will deploy its 4, 3.7 meter by 4 centimeter drag surfaces (booms) in the back end. The 4 booms operate as motorized measuring tape and are inclined 20 degrees towards the back end of the satellite. The spacecraft will be aerodynamically attitude stabilized, with the 4 surfaces in a dart configuration. The spacecraft will start its orbital decay and maintain its booms fully deployed until a 311 km altitude is reached, when drag modulation will being to target a specific re-entry interface location (specified longitude and latitude above ocean). Drag modulation consists in small retractions and deployments of the booms, according to published algorithms (S. Omar, R. Bevilacqua, "GUIDANCE, NAVIGATION, AND CONTROL SOLUTIONS FOR SPACECRAFT RE-ENTRY POINT TARGETING USING AERODYNAMIC DRAG", Volume 155, February 2019, Pages 389-405, Acta Astronautica, also attached). The spacecraft will start burning up around 120km and demise, as calculated by NASA (D3 complies with 1 over 10,000 casualty probability as no parts reach the surface with more than 1J of energy).
The D3 is equipped with GPS, thus, its operators will know its position and provide it to Space Force – Space Force will also provide their tracking info to the operators.
Given the ability to track D3's position, a conjunction or collision can be predicted ahead of time. In the event of a predicted conjunction/collision, the booms will be maneuvered to avoid the other object as described in the paper: S. Omar and R. Bevilacqua, " Spacecraft Collision Avoidance using Aerodynamic Drag" JOURNAL OF GUIDANCE,CONTROL,AND DYNAMICS, Vol. 43, No. 3, March 2020 (also attached).
To conclude, NASA also provided an overall collision probability for D3 of less than 0.000001 as shown on page 14 of the ODAR, based on DAS calculations, which is the probability of the need to implement the above described strategy.

We hope this satisfies the IB's concerns. Please let us know if further details or explanations are needed.

Thank you,
Alicia

ALICIA JOHNSTONE
Cal Poly CubeSat Laboratory
RF Licensing Specialist and Systems Engineer

From: "oetech@fcc.gov" <oetech@fcc.gov>
Date: Thursday, July 22, 2021 at 12:06 PM
To: Alicia Irene Johnstone <aijohnst@calpoly.edu>
Subject: Request for Info - File # 0169-EX-CN-2021

To:	Alicia Johnstone, University of Florida aijohnst@calpoly.edu
From:	Leann Nguyen Leann.Nguyen@fcc.gov

Applicant:	University of Florida
File Number:	0169-EX-CN-2021
Correspondence Reference Number:	63475
Date of Original Email:	07/22/2021

e provide the expected altitude the spacecraft will be located at when the booms deploy. 2. Please describe the design and operational strategies, if any, that will be used to minimize the risk of collision and avoid posing any operational constraints to inhabitable spacecraft, i.e., the Chinese space station.

The items indicated above must be submitted before processing can continue on the above referenced application. Failure to provide the requested information within 30 days of 07/22/2021 may result in application dismissal pursuant to Section 5.67 and forfeiture of the filing fee pursuant to Section 1.1108.

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