A Synthesis Plugin for Auralization of Rotor Self Noise

Siddhartha Krishnamurthy[1]
NASA Langley Research Center, Hampton, VA, 23681, USA

Aric R. Aumann[2]
Analytical Services and Materials, Hampton, VA, 23681, USA

Stephen A. Rizzi[3]
NASA Langley Research Center, Hampton, VA, 23681, USA

Sound File Listing

Descriptions of sound files associated with the paper, "A Synthesis Plugin for Auralization of Rotor Self Noise," are as follows. In the descriptions below, "#" is a number from 1 to 4 representing the rotor number of the NASA quadrotor eVTOL concept vehicle.

- Sound files with the file name "Rotor#_atSource.wav" are each the sound of Rotor # of the NASA quadrotor eVTOL concept synthesized by the NAF Self Noise Synthesis plugin at a distance of 1 meter from the rotor center.
- Sound files with the file name "Rotor#_atSource_NAFsynth_prototypeSynth.wav" are each the sound of "Rotor#_atSource.wav" interleaved with the Rotor # synthesis sound from prototype synthesis process.
- Sound files with the file name "Rotor#_auralization.wav" are each the auralized sound of Rotor # that was synthesized using the NAF Self Noise Synthesis plugin and propagated to the ground observer in the NAF.
- Sound file "Quad_eVTOL_auralization.wav" is the auralized sound at the ground observer of the full NASA quadrotor eVTOL concept vehicle combining acoustic contributions from all four rotors.

A portion of the file "Rotor1_atSource.wav" time history is given in Fig. 9 of the paper.

A time history and spectrogram of "Quad_eVTOL_auralization.wav" is given in Fig. 11 of the paper.

All sound files are normalized, and sample values of all sound files are 16 bits per sample . To recover the original amplitudes, multiply the sound file data by the factor in the second column of the table below.

File Name	Multiplication Factor to Recover Original Amplitudes
Rotor1_atSource.wav	**18.9765**
Rotor2_atSource.wav	**18.9765**
Rotor3_atSource.wav	**18.9765**
Rotor4_atSource.wav	**18.9765**
Rotor1_atSource_NAFsynth_prototypeSynth.wav	**18.9765**
Rotor2_atSource_NAFsynth_prototypeSynth.wav	**18.9765**
Rotor3_atSource_NAFsynth_prototypeSynth.wav	**18.9765**

[1] Research Engineer, Structural Acoustics Branch, AIAA Senior Member.
[2] Research Engineer.
[3] Senior Researcher for Aeroacoustics, Aeroacoustics Branch, AIAA Fellow.

Rotor4_atSource_NAFsynth_prototypeSynth.wav	**18.9765**
Rotor1_auralization.wav	**0.1099**
Rotor2_auralization.wav	**0.1099**
Rotor3_auralization.wav	**0.1099**
Rotor4_auralization.wav	**0.1099**
Quad_eVTOL_auralization.wav	**0.1099**