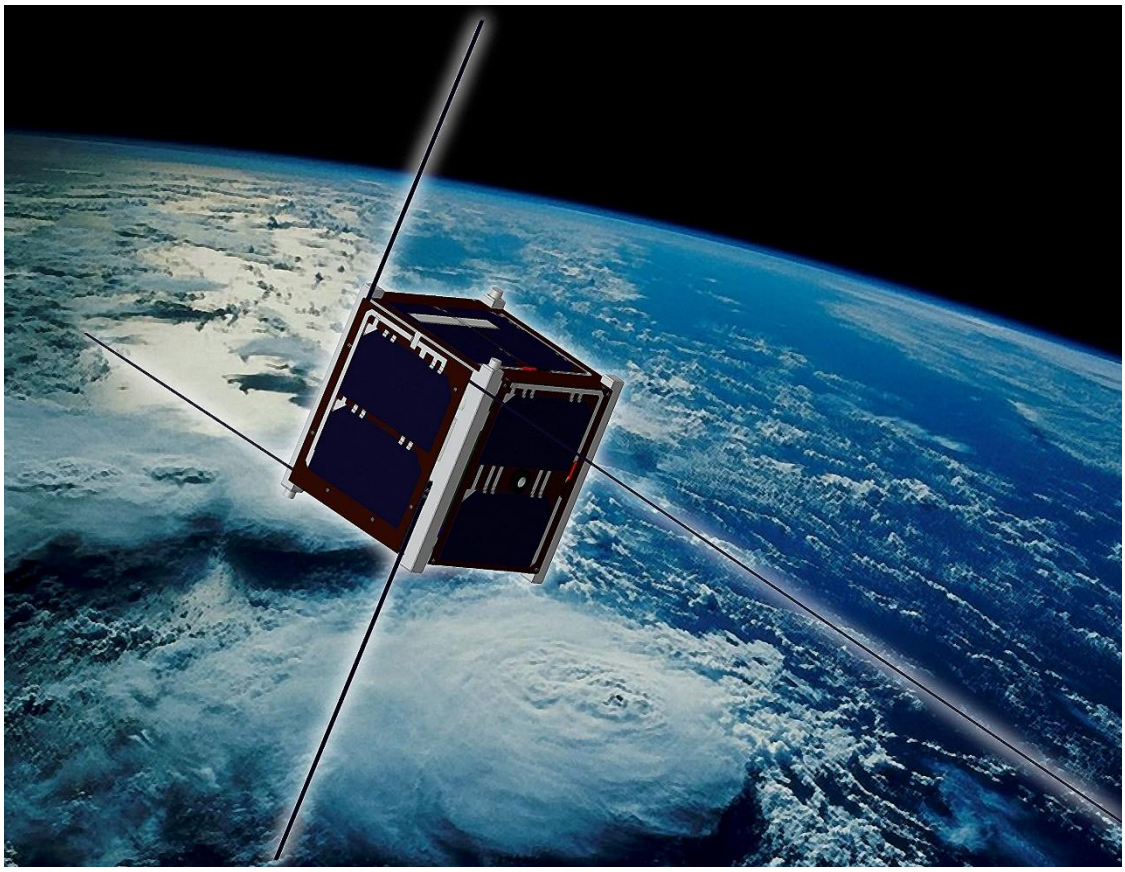

Amateur Communication Technology Demonstration Satellite NEXUS

「About initial operation immediately after separation」

Ver.3.0	Date：2019/01/15

Revision History

Version	Date	Revision	Autor	Approval
1.0	2018/12/28	-	Yamaguchi	
2.0	2019/01/11	Modify sentences	Yamaguchi	
2.1	2019/01/11	Correction of TLE	Yamaguchi	
3.0	2019/01/15	Correction of TLE with postponement launch (postponement date 1/18) etc.	Yamaguchi	

1. Introduction

This document describes initial operation immediately after separation.

2. Overview of initial operation

NEXUS will be launched from “JAXA, Uchinoura Space Center” in Kagoshima Prefecture on January ~~17~~ 18, 2019(JST) by epsilon rocket No.4. It is separated from the rocket after 4100[s] from launch and powered on simultaneously with separation. Telemetry information is output from the satellite at CW 16 minutes and 40 seconds after the power is turned on. The time schedule for initial operation is as shown in Table 2-1.

Table 2-1 The time schedule for initial operation

Time (UTC)	Time (JST)	Time (Based on launch)	Event
0:50:20 ~ 0:59:37	9:50:20 ~ 9:59:37	0s	Launch of epsilon rocket No.4
1:58:40 ~ 2:07:57	10:58:40 ~ 11:07:57	After 4100s	NEXUS separation ※See Figure 2-1 for satellite separation position
2:15:20 ~ 2:24:37	11:15:20 ~ 11:24:37	After 5100s	Start of CW radiation ※See Figure 2-1 for the CW radiation start position CW telemetry format refer to「Section 3, Regarding CW radiation during initial operation」and 「NEXUS_CW_telemetry_format.pdf」.

The satellite separation position and CW radiation start position is Figure 2-1.

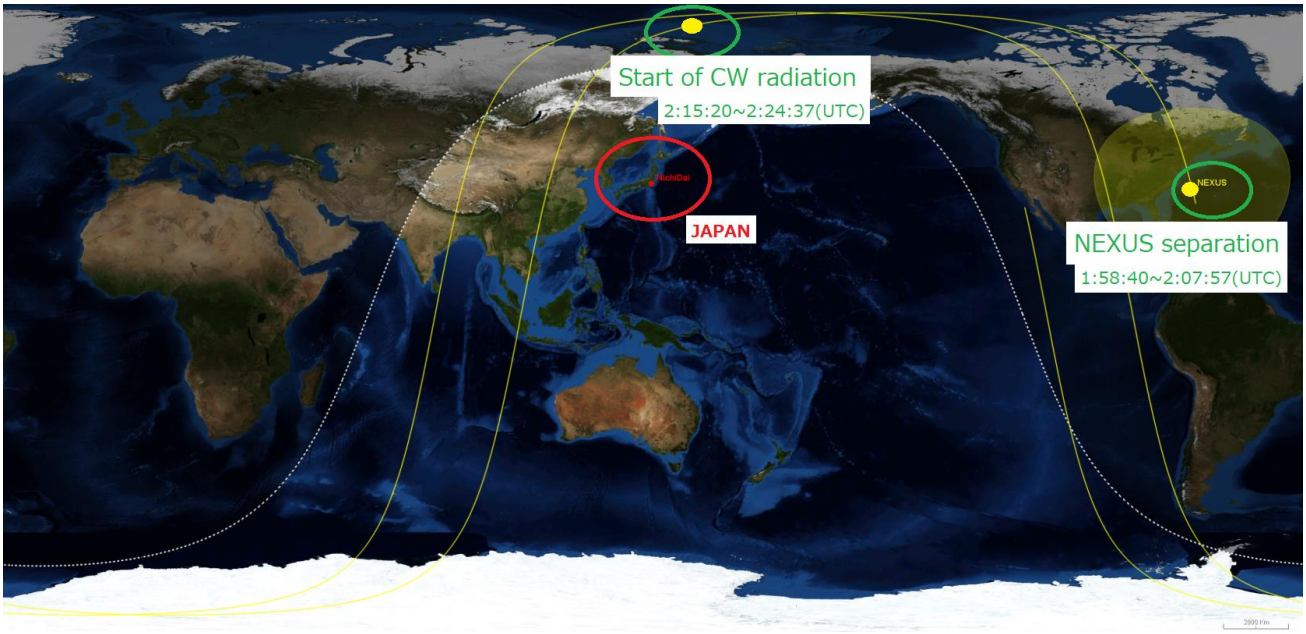

Figure 2-1 NEXUS separation position

The TLE of the input orbit refer to 「~~NEXUS_initial_TLE_2.txt~~ NEXUS_initial_TLE_3.txt」. In this TLE, it is assumed that the launch time is 0:50:20(UTC).

For reference, the operation time of Nihon university ground station is shown.

Table 2-2 The operation time of Nihon university ground station (Update Jan.15,2019)

Day	-	AOS	PE	LOS
2019/1/18,1st	Time	20:21:23	20:27:00	20:32:40
	Azimuth	151.73	74.51	357.34
	Elevation	0.02	40.03	-0.02
2019/1/18,2nd	Time	21:56:21	22:00:53	22:05:28
	Azimuth	215.56	268.10	320.80
	Elevation	0.02	10.24	-0.02
2019/1/19,1st	Time	09:26:31	09:32:15	09:37:55
	Azimuth	11.41	101.50	191.99
	Elevation	0.02	86.98	-0.02
2019/1/19,2nd	Time	20:01:39	20:06:57	20:12:16
	Azimuth	138.44	71.34	4.52
	Elevation	0.03	22.33	-0.01
2019/1/19,3rd	Time	21:35:22	21:40:34	21:45:50
	Azimuth	200.13	265.13	330.39
	Elevation	0.02	18.76	-0.02

3. Regarding CW radiation during initial operation

The output frequency of CW is as follows.

Table 3-1 The output frequency of CW

The output frequency of CW	437.075 [MHz]

Immediately after separation, NEXUS operates in ①CW normal mode. However, in this mode the call sign comes out only about every minute. Therefore, we plan to change CW mode to ②CW custom mode at the earliest possible timing. It is planned to inform NEXUS's HP that changing CW mode from ① to ②, so please check it. The flow of CW radiation is shown in Figure 3-1.

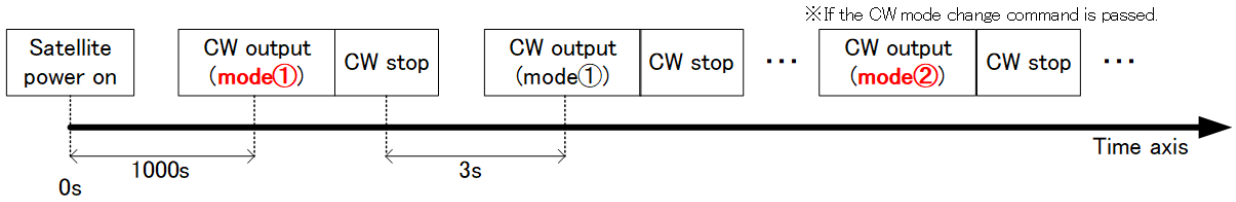

Figure 3-1 The flow of CW radiation

The data format of ①CW normal mode is as shown in Table 3-2.

Table 3-2 CW normal mode (Total 57[words])

Call sign	Satellite name	CW mode	Satellite time	Switch info	Reset info
JS1YAV	NEXUS	02	8[words]	2[words]	10[words]
Battery voltage	Battery current	Battery temp 1	Battery temp 2	Regulator 1 temp	Regulator 2 temp
4[words]	4[words]	4[words]	4[words]	4[words]	4[words]

The data format of ②CW custom mode is as shown in Table 3-3.

Table 3-3 CW custom mode (Total 37[words])

Call sign	Satellite name	CW mode	Satellite time	Switch info	Reset info	Battery voltage
JS1YAV	NEXUS	04	8[words]	2[words]	10[words]	4[words]

For the meaning of each value, see "NEXUS_CW_telemtry_format.pdf".