

1-DSS-MISC-91



OCTOBER 12, 1990

FEDERAL COMMUNICATIONS COMMISSION  
COMMON CARRIER DOMESTIC SATELLITES  
P.O. Box 358160  
PITTSBURGH, PA. 15251-5160

RECEIVED

OCT 17 1990

Domestic Facilities Division  
Satellite Radio Branch

SUBJECT: REQUEST FOR TEMPORARY ORBITAL ASSIGNMENT

GENTLEMEN:

ALASCOM, INC. (ALASCOM) SUBMITS HERewith AN ORIGINAL AND FIVE COPIES OF REQUEST FOR TEMPORARY ASSIGNMENT OF ITS AURORA II SATELLITE TO 136° FOR TESTING AND CHECKOUT DURING AN EIGHT WEEK PERIOD NOT TO EXTEND BEYOND AUGUST 1, 1991.

ALSO ATTACHED IS EXECUTED FCC FORM 155 AND A CHECK IN THE AMOUNT OF \$500.00 TO COVER THE FILING FEE REQUIRED FOR THIS APPLICATION.

ANY QUESTIONS CONCERNING THIS MATTER SHOULD BE DIRECTED TO THE UNDERSIGNED.

VERY TRULY YOURS,

A handwritten signature in cursive script that reads 'Alexander F. Karman'.

ALEXANDER F. KARMAN  
ASSISTANT SECRETARY

Before The  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

In The Matter of a Request By )  
ALASCOM, INC. )  
For Temporary Assignment of its )  
AURORA II Satellite )  
\_\_\_\_\_ )

REQUEST OF ALASCOM, INC. FOR TEMPORARY ASSIGNMENT

Alascom, Inc., (Alascom) the licensee of Aurora II satellite, hereby requests authorization, subject to certain conditions as set forth herein, to launch and to operate Aurora II, on a temporary basis, at 136° W.L. for testing and checkout at that location, during an eight week period,<sup>1</sup> after which point Aurora II will be moved to its assigned operational orbital location at 139° W.L.

Alascom has contracted with GE American Communications, Inc. (GE Americom) to provide in-orbit testing and check out services for Aurora II and to provide telemetry, tracking and command for the satellite once it is operational. As explained below, the temporary assignment would begin May 1991, when Aurora II is scheduled to be launched, and will last approximately eight weeks,

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<sup>1</sup>This is predicated upon relief being granted to GE Americom's request (see FCC Report No. DS-1011 of October 10, 1990, File Nos. 65-DSS-ML-90 and 64-DSS-MISC-90), for an assignment of its Satcom IR satellite from 139° to 131° W.L. to support its Satcom IIIR satellite at the latter location, which is coupled with the related request for an interim assignment of its Satcom C-1 satellite from 137° W.L. to 139° W.L. to fill the role of Satcom IR at 139° W.L. pending the placement into service of Aurora II at that assigned orbital location.

after which time Aurora II will move to its assigned operational orbit location at 139° W.L. Alascom submits that a temporary assignment of Aurora II to 136° W.L. would constitute an efficient use of the radio spectrum, provide substantial benefits to tens of thousands of users who depend upon the satellite to carry telephone traffic within Alaska, would be consistent with the Commission's orbital assignment plan, and would not interfere with any other satellite.

#### INTRODUCTION

GE Americom has advised Alascom that construction of Aurora II is approaching the final stages of completion and ground testing, which GE Americom estimates will conclude in March 1991. A McDonnell-Douglas Delta vehicle has been reserved for its launch and has a scheduled launch date of May 2, 1991.

To place a spacecraft on station and to test it completely takes approximately eight weeks. After the spacecraft drifts onto station, it is turned on, and preliminary tests are performed on all transponders to document and measure their broad operating characteristics. The detailed tests are performed on each of the operating transponders and spare transponders to measure at least ten operational parameters. Concurrently, the satellite bus is tested, and calibration of components such as momentum wheels and thrusters are verified. In order to ready a spacecraft for operation, effort is made twenty-four hours a day and seven days a week.

The benefit to Alascom of temporarily locating Aurora II, for purposes of testing, at 136° is that it will accommodate the launch of GE Americom's C-1 spacecraft to an orbital position at which it will be available to provide in orbit protection to Alascom in the case of a launch failure of Aurora II or a satellite failure of the existing Aurora I spacecraft. Alascom and GE Americom have negotiated arrangements under which C-1 will be available to provide in orbit protection, and this arrangement contemplates locating C-1 (subject to appropriate Commission authorization) temporarily at 139° W.L., until Aurora II is placed into that location. Aurora I will be very near the end of its projected useful life at the time Aurora II is expected to be launched. It is therefore critical that all possible steps be taken to accommodate the availability of in orbit protection for Alascom to avoid disruption of essential lifeline telephone service to Alaska.

AURORA II SHOULD BE TESTED AT 136° W.L. TO PREVENT  
UNNECESSARY DISRUPTION OF TRAFFIC

A temporary assignment to a different orbital location is essential, because Aurora II cannot be tested in its assigned orbital location at 139° W.L. immediately following launch without premature and unnecessary disruption of traffic at that location. In furtherance of the Commission's two-degree spacing policy, Aurora II is being constructed with a vertical polarization. This will permit it to operate at its assigned orbital location at 139° W.L., two degrees west of Satcom C-1, which will be operating on a horizontal polarity at 137° W.L. Because Satcom IR is now

operating at 139° W.L. and is fully loaded with traffic, testing Aurora II at its assigned location immediately following launch would prematurely and unnecessarily disrupt Satcom IR traffic.<sup>2</sup>

THE COMMISSION SHOULD PERMIT ALASCOM A TEMPORARY ASSIGNMENT SO THAT AURORA II CAN BE TESTED AT 136° W.L.

Accordingly, Aurora II should be tested at a different location. In order to minimize expending fuel, maximize usable lifetime and avoid delays in placing the Aurora II into its assigned orbital location, the position most feasible for testing is 136° W.L. Assuming Satcom C-1 receives an interim assignment to 139° W.L. while Aurora II is being tested, GE Americom's assigned orbital location of 137° W.L., although vacant, would not be available for testing Aurora II, since C-1 will be operating at 139° W.L. in a vertical polarization,<sup>3</sup> which requires a similar vertically-polarized satellite to be located at least three degrees away. At 136°, Aurora II will also be two degrees separated from Galaxy 1, which continues to operate at 134° W.L., but at a horizontal (i.e., cross) polarization.

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<sup>2</sup>This traffic will temporarily be on Satcom C-1 at the 139° W.L. location if the Commission grants GE Americom's request to temporarily place Satcom IR traffic on Satcom C-1 at 139° W.L.

<sup>3</sup>C-1 is capable of operating at 139° W.L. in a vertical polarization and at 137° W.L. in a horizontal polarization because GE Americom has constructed that satellite with a capability to switch polarization to give it flexibility.

A TEMPORARY ASSIGNMENT TO 136° W.L.  
WOULD PRODUCE THE MOST ACCURATE TEST RESULTS

An assignment to 136° W.L. for testing and checkout will permit GE Americom to obtain the best estimate of how the satellite and its transponders will perform at 139° W.L. Alascom has been advised by GE Americom that the proximity provided by testing three degrees away from Aurora II's assigned location will produce results which will give a more reliable gauge of how the satellite will perform at its assigned location. Alascom is particularly interested in having the most accurate test results possible, since optimally reliable data will permit Alascom to design and implement the ground segment for Alaska telephone traffic without having to retest the satellite extensively at 139° W.L., an event which might jeopardize continuity of service to Alaska telephone subscribers.

AN ASSIGNMENT TO 136° W.L. WOULD BE IN THE PUBLIC INTEREST

Such a temporary assignment at 136° W.L. would meet other public interest benefits. In particular, a grant of this relief would serve the vital public interest of taking all reasonable measures to ensure uninterrupted availability of telephone service to Alaska by accommodating the availability of in orbit protection for Aurora II. This is a most critical need, particularly to Alascom's thousands of telephone subscribers living in remote communities, to whom satellite-carried telephone availability is a lifeline service.

The current projected end of life of Aurora I, which currently carries such traffic, is October 1991. Because of the need to

reorient approximately 150 remote antennas from 143° W.L. to 139° W.L., prior to the onset of inclement weather, Alascom plans to move traffic from Aurora I to Aurora II before September 1991. A smooth transaction, and one that does not involve more than the minimal interruption of service, will take at least four weeks, absent even a safety factor to cover any possible delay. This means that Aurora II should be fully tested and on station at 139° W.L. no later than July 1991.

To move Aurora II the three degrees from 136° W.L. to 139° W.L. at a rate that does not unduly consume fuel and reduce the end-of-life of this satellite, will involve two weeks. Relocating Aurora II to 139° W.L. from any other available location would take several additional weeks. Given the imminent end-of-life of Aurora I, coupled with the fact that severe weather in remote areas of Alaska can begin in early September, the time saved by testing Aurora II at the nearest available location is an important consideration.

A TEMPORARY ASSIGNMENT OF AURORA II TO 136° W.L.  
WOULD BE CONSISTENT WITH EXISTING ORBITAL ASSIGNMENTS  
AND WILL NOT AFFECT THE OPERATION OF ADJACENT SATELLITES

This relief will be temporary in nature and will not affect the 1988 Assignment Order, 3 FCC Rcd 6972 (1988), modified, order FCC 89-364 (released Jan. 11, 1990), 5 FCC Rcd 179 (1990), since there is an unassigned location for a vertically-polarized satellite available at 136° W.L. Galaxy 1, a horizontally polarized satellite, is still located at 134° W.L., not having yet moved to

the 133° W.L. location designated by the 1988 Assignment Order, supra. The temporary assignment of Aurora II to 136° W.L. for testing will not disrupt the operation of Galaxy 1, even at 134° W.L., because Aurora II has been designed and constructed to meet the technical standards necessary to operate in a two-degree spacing environment. Attached hereto as Attachment A is a technical study provided by GE Americom showing that in-orbit testing of Aurora II at 136° W.L. will not affect Galaxy 1 even at the latter satellite's present location of 134° W.L. Alascom has been advised that personnel of GE Americom and Hughes have met to discuss the technical characteristics of Aurora II and Galaxy 1. As a result of this discussion, and as demonstrated in Attachment A, there will be no interference into Galaxy 1.

A TEMPORARY ASSIGNMENT OF AURORA II TO 136° W.L.  
AND OF C-1 TO 139° W.L. SHOULD BE STRICTLY CONDITIONED  
ON A TIMELY SUBSEQUENT RELOCATION OF AURORA II AND C-1

Although Alascom supports GE Americom's plans for the launch, testing and positioning of their satellite C-1 and the related plans for Aurora II as presented herein, Alascom's schedule for transitioning its traffic from Aurora I to Aurora II is not flexible. Due to logistical concerns related to the onset of winter weather in the Arctic latitudes of Alascom's servicing area, Alascom must begin transition of its traffic no later than August 1, 1991.

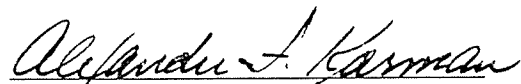
Alascom has over 150 remote, rural earth stations which must be repositioned to the Aurora II's permanent location at 139° W.L.



Repositioning these earth stations will involve flying personnel into some of the most rugged and remote locations in the nation during the onset of the Arctic winter season. For the reasons set forth above, Alascom supports the temporary location of C-1 to 139° W.L. and Aurora II to 136° W.L. However, this temporary authorization must be strictly subject to a condition requiring C-1 to vacate the 139° W.L. location and requiring Aurora II to be restored to its permanent 139° W.L. assigned location by no later than August 1, 1991. Failure to commence repositioning of Alascom's traffic by this date could jeopardize lifeline telephone services to Alaska's rural communities.

For the reasons given above, authorizing Alascom to launch and test Aurora II at 136° W.L. would be in the public interest, would not affect the planning made in the Commission's 1988 Orbital Assignment Order, and would not cause detriment to any other operator. Alascom respectfully requests that the above request be granted as soon as possible.

Respectfully submitted,



Alexander F. Karman  
Assistant Secretary  
Alascom, Inc.  
1726 M Street, NW  
Suite 801  
Washington, DC 20036

October 12, 1990

ATTACHMENT A

INTERFERENCE FROM THE AURORA II SATELLITE  
AT 136° WEST LONGITUDE  
INTO  
THE GALAXY 1 SATELLITE  
AT 134° WEST LONGITUDE

This document demonstrates that in-orbit testing by GE Americom of the Aurora II satellite at 136° West Longitude will not cause excessive or harmful interference into the Hughes Galaxy 1 satellite located 2° away at 134° West Longitude. GE Americom has performed an analysis of the interference into Galaxy 1 that would result from the proposed in-orbit testing of Aurora II. Table 1 shows the results of this analysis. Displayed in the last column of this table are values of single-entry carrier-to-interference ratio ( $C/I_{SE}$ ) due to the transmission of GE Americom's test carrier located at the center of the transponder under test. This test carrier would be uplinked either from the 30.0 meter diameter antenna at the Bartlett Earth Station in Alaska or the 13.0 meter diameter antenna at the South Mountain Earth Station in California. It can be seen from inspection of Table 1 that the worst interference (lowest value of  $C/I_{SE}$ ) into Galaxy 1 would be  $C/I_{SE}$  equal to 23.2 dB.

The FCC's Advisory Committee for the Implementation of Reduced Orbital Spacings Between United States Domestic Fixed-Satellites (2° Spacing Advisory Committee) has established criteria for adjacent satellite interference. In its Phase One Report this Committee recommended that for interference from one video carrier into another video carrier,  $C/I_{SE}$  should be a minimum of 22.0 dB. It should also be noted that numerous subjective tests conducted throughout the television industry have determined that an interference level 22.0 dB below the level of the carrier would not

be perceptible. For these reasons a single-entry protection ratio of 22.0 dB is appropriate for the video transmissions through the Galaxy 1 satellite. The  $C/I_{SE}$  values ranging between 23.2 dB and 33.0 dB in the last column of Table 1 demonstrate that interference from Aurora II into Galaxy 1 will meet the protection ratio criterion established by the FCC's Advisory Committee, and will not be perceptible.

In addition to tests employing a stationary carrier located at the center of the transponder, GE Americom plans tests in which the carrier will be swept across the frequency band of each transponder. In order to avoid excessive interference into Galaxy 1, GE Americom will conduct these tests at a power level backed-off from saturation. This will ensure that interference into Galaxy 1 during the swept or dynamic tests will be less than the interference shown in Table 1 for the static tests. Frequency excursions of the swept test carrier will be limited to  $\pm 1B$  MHz about the center frequency of each transponder except transponder 24. In transponder 24 the maximum frequency excursion of the test carrier will be restricted to avoid spectral overlap and interference into the command carrier of Galaxy 1, which is located at 6422 MHz, 17 MHz above the center frequency of the transponder.

In order to minimize interference into Galaxy 1, the Flux Control Attenuator (FCA) settings of the transponders on Aurora II will be 0 dB during the in-orbit tests. Switching tests of the FCAs will be performed with transponder power backed-off from saturation.

As stated previously, GE Americom's analysis indicates that in-orbit testing of the Aurora II satellite at 136° West Longitude will not cause excessive or harmful interference into Galaxy 1 located 2° away at 134° West Longitude. It is important to note that such a result should have been anticipated. The polarization plans of Aurora II and Galaxy 1 are orthogonal to each other. The two satellites are therefore in complete conformance with the FCC's requirements for 2° spacing between adjacent C-Band satellites. In any event, during the in-orbit testing of Aurora II, GE Americom will coordinate its transmissions with the traffic on Galaxy 1. If, contrary to analytic prediction, the traffic on Galaxy 1 should be interfered with, GE Americom will immediately cooperate with Hughes to eliminate the interference.

**TABLE 1**

INTERFERENCE FROM AURORA II AT 136° WEST LONGITUDE INTO GALAXY-1 AT 134° WEST LONGITUDE  
 SIDELobe CHARACTERISTIC OF INTERFERING UPLINK ANTENNA = 29-25 LOG @  
 INTERFERING CARRIER: TEST CARRIER LOCATED AT TRANSPONDER CENTER  
 POLARIZATION VECTORS OF ADJACENT SATELLITES ORTHOGONAL TO EACH OTHER: XPI = 10 dB

#	Receive Antenna Diameter (M)	Sidelobe Characteristic Of Receive Antenna	Diameter of Interfering Uplink Antenna (M)	Interfering Uplink Site	Aurora II		Single-Entry Carrier-To-Interference Ratio C/ISE (dB)
					Downlink Beam	Downlink Coverage	
1	3.8	29-25 log @	30.0	Bartlett	4UV1, 4UV2, 4UH2	Universal	30.8
2	3.8	32-25 log @	30.0	Bartlett	4UV1, 4UV2, 4UH2	Universal	27.8
3	5.0	29-25 log @	30.0	Bartlett	4UV1, 4UV2, 4UH2	Universal	33.0
4	5.0	32-25 log @	30.0	Bartlett	4UV1, 4UV2, 4UH2	Universal	30.0
5	3.8	29-25 log @	13.0	So. Mtn.	4UV1, 4UV2, 4UH2	Universal	30.5
6	3.8	32-25 log @	13.0	So. Mtn.	4UV1, 4UV2, 4UH2	Universal	27.5
7	5.0	29-25 log @	13.0	So. Mtn.	4UV1, 4UV2, 4UH2	Universal	32.5
8	5.0	32-25 log @	13.0	So. Mtn.	4UV1, 4UV2, 4UH2	Universal	29.8
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9	5.0	29-25 log @	30.0	Bartlett	4UH2	Alaska (Switched)	29.2
10	5.0	32-25 log @	30.0	Bartlett	4UH2	Alaska (Switched)	26.3
11	5.0	29-25 log @	13.0	So. Mtn.	4UH2	Alaska (Switched)	28.9
12	5.0	32-25 log @	13.0	So. Mtn.	4UH2	Alaska (Switched)	26.1
<hr/>							
13	5.0	29-25 log @	30.0	Bartlett	4UH1	Alaska (Hard-wire)	26.3
14	5.0	32-25 log @	30.0	Bartlett	4UH1	Alaska (Hard-wire)	23.3
15	5.0	29-25 log @	13.0	So. Mtn.	4UH1	Alaska (Hard-wire)	26.1
16	5.0	32-25 log @	13.0	So. Mtn.	4UH1	Alaska (Hard-wire)	23.2

NOTES:

1. The 12 odd-numbered (vertically polarized on the downlink) transponders on Aurora II will be hard-wired to a universal downlink beam configuration that will simultaneously irradiate CONUS, Alaska, Hawaii and the Caribbean region. The two downlink beams and the corresponding transponder numbers are as follows:

<u>Downlink Beam</u>	<u>Transponder Numbers</u>
4UV1	3, 7, 11, 15, 19, 23
4UV2	1, 5, 9, 13, 17, 21

Rows 1 through 8 of the matrix in Table 1 represent the interference from these transponders into Galaxy 1.

2. Six of the 12 even-numbered (horizontally polarized on the downlink) transponders will, upon uplink command from the earth, be switchable to one of two downlink beams. The first beam, 4UH2, will simultaneously irradiate CONUS, Alaska, Hawaii and the Caribbean region. The transponders on the 4UH2 beam are: Transponders 2, 6, 10, 14, 18 and 22. Rows 1 through 8 of the matrix in Table 1 represent the interference into Galaxy 1 from these transponders in the universal downlink beam configuration.

In the second switch position these transponders will irradiate Alaska. Rows 9 through 12 of the matrix in Table 1 represent interference from these transponders into Galaxy 1 when the 4UH2 beam is switched to cover Alaska.

3. Six of the even-numbered transponders on Aurora II (Transponders 4, 8, 12, 16, 20 and 24) will be hard-wired to irradiate Alaska (Downlink beam 4UH1). Rows 13 through 16 of the matrix in Table 1 represent interference from these transponders into Galaxy 1.
4. Interfered-with carrier was assumed to be full transponder video.

CERTIFICATE OF SERVICE

I, ALEXANDER F. KARMAN, ON THIS 12TH DAY OF OCTOBER, 1990 CERTIFY THAT A COPY OF THE FOREGOING "REQUEST" OF ALASCOM, INC. WAS MAILED BY FIRST CLASS UNITED STATES MAIL, POSTAGE PRE-PAID, TO THE FOLLOWING:

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