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Domestic Facilities Division  
Satellite Radio Branch

NOV 13 1990

Federal Communications Commission  
Office of the Secretary

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C.

In re )  
 )  
 Application of GE American Communications, )  
 Inc. for Orbital Reassignment of Satcom 1R )  
 to 131° W.L. )  
 )  
 and )  
 )  
 Application of GE American Communications, )  
 Inc. for Interim Assignment of Satcom C-1 )  
 to 139° W.L. )  
 )  
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File Nos.  
 65-DSS-ML-90  
 64-DSS-MISC-90

COMMENTS OF  
HUGHES COMMUNICATIONS GALAXY, INC.

Hughes Communications Galaxy, Inc. hereby submits these comments on the above-referenced applications of GE American Communications, Inc. ("GE").

GE has filed two related applications with the Commission. One application requests authority to relocate the in-orbit Satcom 1R satellite from 139° W.L. to 131° W.L. so that Satcom 1R may replace the failing Satcom 3R satellite. The other application requests authority to operate Satcom C-1 initially at the 139° W.L. position, which will be vacated by Satcom 1R. When Aurora 2, the satellite assigned to 139° W.L., is launched and located at that position, GE proposes to move Satcom C-1 from 139° W.L. to its assigned 137° W.L. position.<sup>1/</sup>

<sup>1/</sup> In connection with GE's applications, Alascom, Inc. has filed an application for authority to operate Aurora 2 at 136° W.L. for a temporary, eight-week period to allow testing at that location. File No. 1-DSS-MISC-91. Alascom proposes to launch Aurora 2 into 136° W.L. in May 1991 and

HCG has examined the consequences of the proposed relocations of Satcom 1R and Satcom C-1. Based on the technical information about these satellites that GE has provided to HCG, HCG believes that the relocations themselves can be accomplished by mutual coordination and cooperation between GE and HCG.<sup>2/</sup> It is important to note, however, that the Commission's policy is clear: GE, as licensee of the new satellite, has the burden of coordinating its operations with the operations of HCG's in-orbit satellite.<sup>3/</sup> More specifically, under certain circumstances, the operation of Satcom C-1 at 137° W.L. presents a serious potential for disrupting millions of cable television viewers on HCG's Galaxy I satellite that must be avoided.

Galaxy I is one of the primary satellites utilized by the cable television industry and has been serving this industry ever since its launch in 1983 as a state-of-the-art satellite. It delivers video programming to over 55 million homes in the United States and currently operates at 134° W.L., but has been reassigned to 133° W.L.<sup>4/</sup>

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relocate Aurora 2 to its assigned 139° W.L. location in July 1991. At that time, Satcom C-1 will be relocated to 137° W.L.

<sup>2/</sup> HCG has found it somewhat difficult to ascertain Satcom C-1's exact technical characteristics from existing and somewhat inconsistent public documents, and is relying on information recently supplied informally to HCG by GE.

<sup>3/</sup> See American Telephone and Telegraph Company, 5 FCC Rcd 5590, ¶ 11 (1990) (a licensee of a new satellite is required to coordinate its operations with the operation of in-orbit satellites before bringing the new satellite into service).

<sup>4/</sup> See 1988 Orbit Assignment Reconsideration Order, 5 FCC Rcd 179, 181 (1990). HCG is required to move Galaxy I to 133°

The circumstances under which Satcom C-1 poses a threat to the operation of Galaxy I (at both 134° W.L. and 133° W.L.) are when transportable earth stations, or when any antennas smaller than nine (9) meters in diameter, are used to communicate with Satcom C-1 at the 137° W.L. location. The potential interference problems flow primarily from four factors. First, Galaxy I does not have attenuators in its receivers, which makes it relatively more sensitive to interference than the upcoming generation of satellites. The consequences of this sensitivity and the resulting interference problems presented by Satcom C-1 are set forth in the Technical Statement attached as Exhibit 1. Second, Galaxy I and Satcom C-1 will operate in a close orbital environment in the portion of the orbital arc used primarily for video services. Third, Satcom C-1 appears to be somewhat less sensitive than many other satellites and therefore requires higher uplink power, thus causing greater levels of interference into nearby, co-polarized satellites. Fourth, because of the manner in which they are used, small earth stations are susceptible to misalignment and other types of operator error which can cause unacceptable interference.<sup>5/</sup> The combination of these four factors makes it very possible that interference will occur if appropriate precautions are not observed and therefore mandates that GE carefully monitor the uplinks to Satcom C-1 to

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W.L. no later than September 1992, the scheduled date for Satcom C-4 to be launched into 135° W.L. See id.

<sup>5/</sup> See In re Amendment of Part 25 of the Commission's Rules, 2 FCC Rcd 762, ¶ 35 (1987) (NPRM) (recognizing problem caused by transportable uplinks).

ensure that interference is not caused to Galaxy I, a satellite on which a large portion of the public relies for its video entertainment.

Fortunately, it is important to note that the threat that Satcom C-1 poses should be a transitional one. The problem in all likelihood will be alleviated once Galaxy IR is launched and operating. Galaxy IR has been designed with step attenuators that provide HCG greater flexibility in dealing with interference from nearby satellites.<sup>6/</sup> Thus, the serious problem presented by Satcom C-1 should exist only for a limited period: from July 1991, when Satcom C-1 is scheduled to begin operating at 137° W.L., until about January 1994, when Galaxy I is expected to reach its end of life and Galaxy IR is scheduled to begin operations at 133° W.L.

As set forth above, Galaxy I has been in-orbit since 1983 and serves tens of millions of cable television viewers. When Satcom C-1 moves to 137° W.L. in July 1991, the Commission and the parties must face the challenge the Commission referred to when it recently stated: "The transition period where satellites of one generation operate in close proximity to satellites of a second generation provides the most challenge in maintaining compatible operations."<sup>7/</sup>

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<sup>6/</sup> Although adjusting attenuators and increasing uplink power to reduce interference allows greater flexibility, it also results in certain costs: uplinkers experience higher operational expenses and adjacent satellites experience higher levels of interference.

<sup>7/</sup> American Telephone and Telegraph Company, 5 FCC Rcd 5590, ¶ 12 (1990).

HCG has recognized its responsibilities and it has made, and will continue to make, good faith attempts to resolve the interference problem posed by Satcom C-1. HCG has already engaged in discussions with GE about these interference problems. In addition, HCG can and will relocate Galaxy I from its current location of 134° W.L. to 133° W.L. in early 1991, sooner than HCG otherwise is required to do so, and will accept the costs and risks associated with moving Galaxy I at this earlier date.<sup>8/</sup> HCG believes that this increased separation of Galaxy I and Satcom C-1 will help alleviate some of the interference problems, but will not totally solve them.<sup>9/</sup>

GE also has obligations, particularly because Satcom C-1 will be the "newcomer" satellite. It is of paramount importance that GE and its uplink customers scrupulously adhere to standard operating procedures and avoid interfering with Galaxy I when uplinking to Satcom C-1. As the Commission has

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<sup>8/</sup> HCG is not required to move Galaxy I until September 1992, the scheduled launch date of Satcom C-4.

<sup>9/</sup> As set forth in footnote 2 above, HCG's analysis is based on information about Satcom C-1 informally provided by GE. If this information is not accurate, the predicted interference from Satcom C-1 into Galaxy I may be more severe. In light of the tens of millions of homes that would be affected, it therefore may be necessary to take more extreme action to eliminate harmful interference, including moving Satcom C-1 to a new orbital location, such as 141° W.L., until Galaxy IR is launched.

recognized in proposing new regulations for transportable earth stations:

[M]ajor problems can be caused by small video uplink antennas, particularly if they are used to saturate the transponder, when they are set up very quickly and are poorly aligned.<sup>10/</sup>

#### CONCLUSION

For the reasons set forth above, HCG respectfully requests that the Commission put GE on notice that the operation of Satcom C-1 must be coordinated with Galaxy I so as to reduce the potential for interference to tens of millions of users of the in-orbit Galaxy I satellite. Specifically, GE must monitor the uplinks to Satcom C-1 during the transition period to the next generation, and, if necessary, require uplinkers to Satcom C-1 to reduce their power as necessary to prevent interference to Galaxy I.<sup>11/</sup>

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<sup>10/</sup> In re Amendment of Part 25 of the Commission's Rules, 2 FCC Rcd 762, ¶ 35 (1987) (NPRM) (footnote omitted).

<sup>11/</sup> See American Telephone and Telegraph Company, 5 FCC Rcd 5590, ¶ 12 (1990) (if authorized power levels on Telstars 401, 402 and 403 cannot be coordinated with adjacent operating satellites, AT&T will be required to reduce power levels); 1988 Orbital Assignment Reconsideration Order, 5 FCC Rcd 179, ¶ 11 (1990) (if NEXSAT cannot obtain operational agreements with adjacent satellite operators, it will be required to reduce power density levels).

Respectfully submitted,

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## TECHNICAL STATEMENT

All twenty-four of the transponders on Galaxy I have been sold for cable television distribution and have been operating since early 1984. Galaxy I has become a focal point for the cable television industry with tens of thousands of cable headends and several million home TVRO dishes receiving programming from Galaxy I. The operation of Satcom C-1 at 137° W.L. presents serious threats to the Galaxy I satellite primarily because of the difference in Saturated Flux Densities between the two satellites.

Typically, the uplink carrier-to-interference ratio caused by an adjacent, co-polarized satellite system equals the angular discrimination of the antenna of the interfering transmit earth station, assuming FM\TV traffic. For a 9 meter uplinking earth station antenna conforming to the sidelobe equation  $G_{sl} = 29 - 25 \log \theta$  and 4° spacing, the  $(C/I_a)_{UP}$  ratio is approximately 39 dB. However, due to the significant difference in Saturated Flux Densities between Galaxy I and Satcom C-1 (as much as 15 dB) this ratio for Galaxy I drops to 24 dB. The downlink carrier-to-interference ratio  $(C/I_a)_{DN}$  for a typical 5 meter receiving antenna and 4° spacing is approximately 29 dB. Combining this with the 24 dB  $(C/I_a)_{UP}$ , the overall single entry carrier-to-interference ratio  $(C/I_a)_{SE}$  could be as low as 22 dB.

A carrier-to-interference ratio of 22 dB represents the greatest amount of interference allowable into Galaxy I.<sup>1/</sup> This ratio would be even lower, and the interference into Galaxy I would be even greater, if smaller earth stations are used to access Satcom C-1. Therefore, the use of small (less than 9 meters in diameter) and transportable earth stations greatly increases the risk of unacceptable interference into Galaxy I.

This is not to say, however, that a carrier-to-interference ratio into Galaxy I as low as 22 dB always is acceptable. For certain transmissions on Galaxy I, a carrier-to-interference ratio of 22 dB still will result in harmful interference to that satellite.

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<sup>1/</sup> This value is the lowest protection ratio generally accepted in the industry for purposes of coordinating satellite operations. In addition, the FCC Advisory Committee on Reduced Orbital Spacing has recommended the adoption of single entry cofrequency protection ratios for FM-TV channels that range from 22.0 dB to 28 dB.

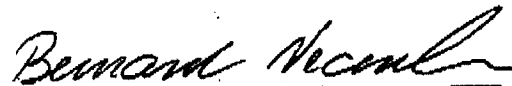


In sum, because of the significant difference in Saturated Flux Densities between Galaxy I and Satcom C-1, uplinks to Satcom C-1 must be monitored to ensure that they do not disrupt service on the existing Galaxy I satellite. If interference does occur, these uplinks to Satcom C-1 will need to reduce power.

#### Certification

I, Dr. Bernard F. Vecerek, have reviewed the foregoing Comments of Hughes Communications Galaxy, Inc. and have prepared the foregoing Technical Statement. To the best of my knowledge, the Technical Statement and Comments are true and correct.

Date: 11-13-90



Dr. Bernard F. Vecerek  
Manager, Galaxy Systems Engineering  
Hughes Communications Galaxy, Inc.

CERTIFICATE OF SERVICE

I, Kim S. Harris, hereby certify that on this 13th day of November, 1990, a copy of the foregoing Comments of Hughes Communications Galaxy, Inc. was mailed, first class mail, postage prepaid, to the following:

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\*HAND DELIVERED