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June 4, 1991

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Ms. Donna R. Searcy  
Secretary  
Federal Communications Commission  
1919 M Street, N.W.  
Washington, D.C. 20554

Re: File Nos. 9-DSS-P-1(87)  
CSS-91-010  
11-DSS-P-91(6)

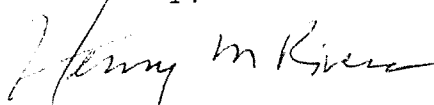
Dear Ms. Searcy:

Transmitted herewith, on behalf of RDSS Inc., is an original and four copies of its comments on the above-captioned applications.

Recognizing that the filing window closed yesterday, RDSS Inc. nevertheless seeks FCC consideration of the enclosed comments. RDSS Inc. believes it has a unique perspective on RDSS and that its comments will therefore assist the Commission in its deliberations concerning the above-captioned application; the public interest will, thereby, be served.

If additional information is required, please contact the undersigned.

Sincerely,



Henry M. Rivera

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Enclosures

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

JUN 4 - 1991

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

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In re Applications of )  
 )  
MOTOROLA SATELLITE )  
COMMUNICATIONS, INC. )  
 )  
For Authority to Construct, Launch )  
and Operate a Low Earth Orbit )  
Satellite System )  
in the 1610-1626.5 MHz Band )  
\_\_\_\_\_ )

File Nos. 9-DSS-P-1(87)  
CSS-91-010

ELLIPSAT CORPORATION )  
 )  
For Authority to Construct )  
ELLIPSO® I, an Elliptical Orbit )  
Communication Satellite System )  
in the 1610-1626.5 MHz and )  
2483.5-2500 MHz Bands )  
\_\_\_\_\_ )

File No. 11-DSS-P-91(6)

COMMENTS OF RDSS INC.

RDSS Inc., by its attorneys, hereby submits its comments in the above-captioned proceeding. These comments discuss RDSS Inc.'s concerns with the Commission's consideration of non-radiodetermination satellite service in the 1610-1626.5 MHz band and with the two above-referenced applications.

RDSS Inc. has an interest in the above-referenced applications because it will provide spread spectrum radiodetermination satellite service ("RDSS"). The RDSS Inc. system architecture is that which the Commission chose as the "baseline" for RDSS systems.<sup>1</sup> That RDSS will be a serious player

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<sup>1</sup> See Amendment to the Commission's Rules to Allocate Spectrum

in the RDSS can be judged by its founding directors, who include the designer of the baseline RDSS system; a former Vice-President of Comsat Corporation; a National Medal of Science winner who was, for 25 years, Director of Research for the Hewlett-Packard Corporation; and a scientist who was Science Advisor to the President of the United States for five years.

I. THE PROVISION OF RDSS IN THE L BAND OFFERS UNIQUE BENEFITS TO THE PUBLIC

RDSS is unique to non-government spectrum allocations because of the degree of the high degree of position accuracy it allows.<sup>2</sup> RDSS is particularly useful for safety-of-life and crime prevention because it allows for the provision of high accuracy positions in a differential mode, giving the actual difference in distance and the direction from one user (e.g., Coast Guard; police or other rescuer) to another (e.g., an

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for, and to Establish Other Rules and Policies Pertaining to, a Radiodetermination Satellite Service, Second Report and Order, 104 FCC 2d 650 (1986) ("RDSS Licensing Order") RDSS Inc. intends to seek the necessary FCC authorizations for its system within the next few weeks. Rather than utilizing dedicated satellites, its system will lease existing space segment capacity on satellites, including special satellites, that are already in-orbit. Accordingly, RDSS Inc. does not need to seek space segment authorization for its RDSS system at this time.

<sup>2</sup> The only system that can achieve comparable accuracy is the precision version of the government's Navstar system, which employs a totally different architecture. Although there are provisions for non-government access to the Navstar system, non-government parties may not be afforded the position accuracy, and certainly will not have the ancillary message capability, of an RDSS system. Amendment of the Commission's Rules to Allocate Spectrum for, and to Establish Other Rules and Policies Pertaining to, a Radiodetermination Satellite Service, First Report and Order, 58 RR2d 1416 (1985) ("RDSS Allocation Order") at note 4.

accident or crime victim).<sup>3</sup> The L band 1610.0 - 1626.5 MHz allocated for RDSS is the only frequency band available for the crucial RDSS uplink from the user to the satellites.

Advances in electronics during the past several years have made it technically and financially easier for parties to provide RDSS.<sup>4</sup> Moreover, in recent years, a new generation of higher power C-band transponders have been placed in orbit, permitting high quality reception and decoding of an outbound C-band signal without sacrificing link margin.

RDSS Inc., and possibly other parties, will provide these and other true RDSS services. As explained below, by granting the Motorola and/or Ellipsat applications, the Commission would risk prematurely crippling the ability of those parties to offer the very RDSS services for which the spectrum is currently and specifically allocated.

## II. CONCERNS WITH UTILIZING NON-RDSS SYSTEMS IN THE L BAND

By their own admission, the proposed IRIDIUM and Ellipsat systems are not RDSS systems but nothing more than conventional voice and data systems that will produce narrow-band (roughly 150

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<sup>3</sup> See Appendix A for a more thorough analysis of the RDSS applications and functions.

<sup>4</sup> For example, the ability to decode a spread spectrum sequence with electronic solid-state elements, rather than requiring surface acoustic wave filters, now make it practical and economical to work with longer spread-spectrum codes and to achieve higher signal to noise ratios than were possible earlier. These advances allow using lower power levels in the downlink transmitter that sends the outbound signal from the RDSS hub computers to the users.

KHz) spikes of noise power in one or more of the RDSS bands. IRIDIUM and Ellipsat should not be permitted to use the L band for these purposes because about ninety-nine percent of the non-RDSS portion of the radio spectrum below 3 GHz is already allocated for such narrow-band signals, which are optimized for voice. In contrast, only the L-band 1610.0 - 1626.5 MHz frequencies (0.5 percent of the spectrum below 3 GHz) exist for the necessary RDSS uplink. By opening a filing window for these applications, the FCC is encouraging other non-conforming applications to be filed in this band on a waiver basis.

A. NON-RDSS USE IN THIS BAND IS LIKELY TO HARM RDSS OPERATIONS

RDSS Inc. is concerned about the adverse impact on RDSS systems that would result from granting non-RDSS applications in the L band. -

1. Restricted Usage

RDSS Inc. is particularly concerned that the proposed IRIDIUM system would seriously jeopardize RDSS Inc.'s ability to serve its users adequately, that IRIDIUM would foreclose the possibility of developing low cost RDSS transceivers, and that by Motorola's own admission IRIDIUM would solve Motorola's spectrum needs only for one to three years.

Motorola's proposed use of this spectrum would decrease the capacity for RDSS users by approximately 30 percent. Indeed, by Motorola's own admission, the implementation of its proposal would cause a 20 percent reduction in RDSS capacity. Such a

reduction will strike at the heart of the RDSS concept, which is that RDSS user transceivers should eventually be produced at a low enough price to be affordable by all who need them. It is envisioned that the number of RDSS users will ultimately grow to the point where it would be economically sustainable to finance and build large multi-beam RDSS satellites. Those satellites will have larger, much higher gain L-band receive antennas, and therefore will be able to receive burst transmissions from lower powered (and thus less expensive) RDSS transceivers.<sup>5</sup> Two large RDSS multi-beam satellites will be capable of serving several million RDSS users in the United States alone.

This forecasted growth will be achieved if a number of true RDSS systems (i.e., those producing low duty cycle L-band message and position report spread spectrum signals distributed in time) were to coexist. However, that growth would be closed forever if even one low earth orbiting high duty cycle (i.e., voice) system like IRIDIUM were permitted to operate in the RDSS band. It should be noted that if Motorola's analysis of interference from IRIDIUM into a multibeam RDSS system<sup>6</sup> is extended to the case of

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<sup>5</sup> These satellites will have higher gain L band receive antennas and therefore the user transceivers transmitting to them at L band will be able to operate at about 5 watts power rather than the initial 40 watts. RDSS Inc. estimates that this power reduction would save substantially on the cost of transceivers to the users.

<sup>6</sup> See note 9 infra.

a 5 watt transceiver, the resulting carrier-to-interference ratio ("C/Io") would almost certainly insure that multibeam RDSS systems would not be economically viable.<sup>7</sup>

## 2. Harmful Interference

If Motorola operates its IRIDIUM system in full accordance with its April 1991 supplemental application, the IRIDIUM system and RDSS systems could coexist.<sup>8</sup> In its application, Motorola indicates a C/Io ratio of 62.2 dB to RDSS systems from all IRIDIUM transmissions.<sup>9</sup> RDSS Inc. believes that this C/Io ratio would cause tolerable interference to RDSS Inc.'s operations.

However, RDSS Inc. is concerned that Motorola's system may cause harmful interference to RDSS Inc.'s system if IRIDIUM does not operate in full accordance with the Motorola filing. RDSS Inc. would be strongly opposed to a C/Io ratio above 62.2 dB. The Commission must not permit Motorola to increase its C/Io ratio above 62.2 dB. If, at some future time, Motorola realizes that some element of its interference analysis is incorrect, the Commission must require Motorola to maintain an overall C/Io ratio of 62.2 dB.<sup>10</sup> RDSS Inc. does not question the ability of

<sup>7</sup> -----  
Motorola estimates that the C/Io would be 53.16 dB, which would be unacceptable for multibeam RDSS development.

<sup>8</sup> There would however be substantial reductions in RDSS capacity. See Section II(A)(1) supra.

<sup>9</sup> Motorola Supplemental Application, CCIR Fact Sheet at Appendix A, Table A-2. The 62.2 dB figure is derived from the RDSS C/Io due to the PCLEO with RDSS singlebeam 66.67 dB figure on the bottom line of the top table and the 64.11 dB figure on the bottom line of the bottom table.

<sup>10</sup> For example, if the cross polarization element is only 1 dB

Motorola's engineers. However, RDSS providers and users should not suffer degraded service as a result of errors or unrealistic assumptions on Motorola's part. If the Commission grants Motorola's application, the burden for ensuring that the IRIDIUM system does not interfere with RDSS systems should be on Motorola. RDSS Inc. is not in a position to carry out Motorola's system engineering for it, nor should it be responsible for doing so.

3. RDSS Inc. Must Have the Opportunity to Avert Potential Interference

Although RDSS Inc. remains skeptical of Motorola's ability to comply with the 62.2 dB C/I<sub>o</sub> ratio, it does not intend by these comments to formally oppose Motorola's application. RDSS Inc. understands that, according to FCC policies and procedures, the Commission will afford RDSS Inc. an opportunity to be heard if Motorola or any other licensee in the RDSS band interferes with its system. During the application stage, all proposed interference levels (and any changes thereto) will be subject to notice and comment, thereby providing RDSS Inc. with an opportunity to review such levels and the supporting figures and oppose them if the levels appear to cause undue interference to its system. If the Commission elects to license such systems,

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rather than the 4 dB assumed by Motorola, the Commission should require it to limit the L-band transmitted power from IRIDIUM to 3 dB less than it specified to offset its mistake. Similar modifications must be made if Motorola is mistaken or overly optimistic about its assumptions regarding the sidelobe levels of the IRIDIUM spacecraft, the number of IRIDIUM transceivers in a "shadowed state", and/or the "FBW" term.



the FCC should assure that these licensees coordinate their systems with all RDSS providers, including RDSS Inc., pursuant to Section 25.392(f) of the Commission's Rules.<sup>11</sup>

4. Proposed Waivers Would Provide Only A Temporary Fix

Motorola admits that its demand for spectrum is so great that using RDSS L band spectrum would satisfy only 15 percent of its spectrum needs. Thus, Motorola would shortly return to the Commission seeking a total of 100 MHz of L band spectrum.

III. A DOMESTIC AND INTERNATIONAL REALLOCATION OF SPECTRUM IS NECESSARY TO PERMIT SUCH EXTENSIVE NON-CONFORMING USE IN THIS BAND

The vast majority, if not all, of these applicants' proposed services clearly are not RDSS (or ancillary thereto) and thus, pursuant to Section 25.392(d) of the Commission's Rules, such services are not permissible communications in this band. Both applicants recognize this fact and have sought waivers of that rule section. Although styled as applications and waiver petitions, the essence of these parties' documents is a petition that the FCC reallocate RDSS frequencies for admittedly non-conforming use without the requisite domestic formal rulemaking and the international coordination process necessary for such a reallocation of spectrum.

A. GRANT OF MOTOROLA'S AND ELLIPSAT'S PETITIONS FOR WAIVER WILL MAKE A TRAVESTY OF THE COMMISSION'S DOMESTIC REALLOCATION PROCESS

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<sup>11</sup> RDSS Inc. would participate in any coordination either directly or in conjunction with the interfering licensees' coordination with the licensees of the space segments from whom RDSS Inc. will lease capacity.

When the Commission undertakes a domestic allocation, it releases a notice of proposed rulemaking describing the frequencies involved, the frequencies' present allocation, the frequencies' proposed allocation, the rationale for the change, and the affected parties. Pursuant to such a rulemaking, interested parties have an opportunity to file comments and reply comments addressing these proposals. Only after these filings have been received and the FCC has had an opportunity to analyze them does the Commission determine whether to revise the allocation of the spectrum. Thereafter, the Commission will grant a license for applicants meeting the technical and legal parameters adopted in the rulemaking proceeding.

Indeed, in determining to allocate spectrum for RDSS, the Commission engaged in this precise process. In 1984, the Commission initiated a formal notice and comment rulemaking to explore allocating spectrum for RDSS.<sup>12</sup> Pursuant to this rulemaking, in the RDSS Allocation Order, the Commission allocated the 1610-1626.5 MHz, 2483.5-2500 MHz, and the 5117-5183 MHz bands for RDSS.<sup>13</sup> Also, as part of this rulemaking, in the RDSS Licensing Order, the Commission adopted policies and rules

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12 Amendment of the Commission's Rules to Allocate Spectrum for, and to Establish Other Rules and Policies Pertaining to, a Radiodetermination Satellite Service, Notice of Proposed Rulemaking, 49 Fed. Reg. 36512, FCC No. 84-319, Gen. Docket Nos. 84-689, 84-690 (1984). More than 100 parties filed comments and reply comments in response to the Notice.

13 These frequencies were subsequently reallocated for these purposes on a worldwide basis at the 1987 Mobile World Administrative Radio Conference ("WARC").

to govern the provision of RDSS, creating a new Section 25.392 of the Commission's Rules. All four companies that applied for RDSS authorizations were subsequently granted licenses.<sup>14</sup>

B. SIMILARLY, GRANT OF SUCH WAIVER PETITIONS WOULD MAKE A TRAVESTY OF THE INTERNATIONAL ALLOCATION PROCESS

When the Commission is faced with a service that is inconsistent with existing worldwide spectrum allocations, the Commission forwards information on the proposed service to the International Frequency Registration Board ("IFRB") of the International Telecommunications Union. The information is subsequently published so that comments from other nations can be sent to the IFRB. Thereafter, a coordination process is initiated at an internationally convened WARC at which the spectrum may ultimately be reallocated throughout, or in certain regions of, the world. Indeed, this identical process was used to allocate spectrum internationally for RDSS.<sup>15</sup> Although the FCC has made certain RDSS-related reallocation proposals in preparation for WARC-92,<sup>16</sup> such proposals have not yet been

<sup>14</sup> See, e.g., Geostar Corporation, Mimeo No. 6144 (released August 7, 1986). Although none of these original RDSS licensees were able to bring their systems to full RDSS operation, Geostar received authorization for, and provided, an interim system leasing space segment satellite facilities and utilizing special receive-only satellite relays at L band. Those relays are still in orbit and operational. Geostar Positioning Corporation, Order and Authorization, File No. 2670-DSE-MISC-88 (released May 25, 1989).

<sup>15</sup> See RDSS Allocation Order at para. 24.

<sup>16</sup> Contrary to existing worldwide spectrum allocation, the Commission has proposed to elevate mobile satellite service to co-primary status in the RDSS band. An Inquiry Relating to Preparation for the International Telecommunication Union World

adopted by the world, and ultimately may not be. Of course, if WARC-92 does not grant the IRIDIUM's spectrum reallocation proposal, any domestic spectrum reallocation would not provide protection to a domestic licensee from interference originating outside the country of license.

C. GRANTING THE REQUESTED WAIVERS WOULD BE CONTRARY TO SOUND REGULATORY POLICY

Reallocation proceedings ensure that the Commission engages in reasoned deliberations regarding the national and international ramifications surrounding the most appropriate use of the spectrum, rather than addressing such an issue on an ad hoc waiver basis. These deliberative processes would be substantially compromised if the Commission permitted parties, such as Motorola and Ellipsat, to achieve, via a waiver, what should otherwise be earned after vigorous public debate during reallocation proceedings.

These parties' contention that the L band is not presently being used should not be decisional. When spectrum is allocated or reallocated in normal proceedings, not only are the present needs considered but, also, future needs. RDSS Inc., and possibly other parties, shortly will make active use of this spectrum for true RDSS. The Commission should not allow such use

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Administrative Radio Conference For Dealing with Frequency Allocations in Certain Parts of the Spectrum, Second Notice of Inquiry, Gen. Docket No. 89-554, para. 70 (1991).

to be threatened without first engaging in formal domestic and international reallocation proceedings, particularly where the uses RDSS Inc. contemplate are within the existing allocations.

Motorola's and Ellipsat's purported grounds for a waiver are more appropriately made in a petition for rulemaking. Therefore, RDSS Inc. respectfully requests that the Commission defer processing the above-referenced applications (or similar ones yet to be filed) unless and until both domestic and international proceedings have been conducted to reallocate spectrum for services in addition to RDSS.

#### IV. CONCLUSION

In sum, a grant of the above-referenced applications would pollute the L band with non-conforming uses and validate spectrum grabs without due process via waiver applications. As the Commission stated only a few years ago, "...there is an outstanding need for ... [RDSS. It] would provide to the end user ... a number of innovative applications that heretofore have not been possible." (footnote omitted)<sup>17</sup> The need recognized by the Commission and by the members of the 1987 Mobile WARC still exists. This L band spectrum is the only one available for RDSS user-to-satellite uplink use

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<sup>17</sup> See, e.g., RDSS Allocation Order at para. 4.

and should be preserved for future RDSS expansion. This is particularly true here because alternative spectrum is currently allocated for the applicants' proposed non-RDSS services.

Respectfully submitted,

RDSS INC.

By: 

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June 3, 1991

Its Attorneys

## APPENDIX A

In the domestic and international proceedings allocating spectrum for RDSS, the FCC (and various nations during the 1987 Mobile WARC) focused on the safety-of-life and crime prevention benefits of RDSS. They concluded that those purposes are best satisfied by the following set of satellite-dependent functions:

- 1) Positioning of user transceivers to high accuracy.
- 2) Radiolocation to high accuracy (i.e., the provision of position information on a specific transceiver to a central dispatch point, such as a fleet control center, air traffic control center, etc.
- 3) Ancillary digital data transmission from user transceiver to a central control hub and from there to another transceiver or via other (non-RDSS) means to a message destination.
- 4) Ancillary digital data transmission to a user transceiver, individually digitally addressed, from a central control hub or via that hub from a non-RDSS message source.

The four basic functions of RDSS are critical to satisfying with a unique efficiency a number of applications:

- a) Navigation of land vehicles, marine craft and aircraft to high accuracy by the provision to the moving transceiver of information on position, velocity, and course to destination.
- b) Location of mobile land, sea and air vehicles for fleet control at central headquarters (for example, a traffic control center.)

- c) Collision avoidance in the case of aircraft and marine craft.
- d) Terrain hazard avoidance for aircraft, through the comparison of aircraft track with terrain information stored and updated in the central control hub.
- e) Shoreline and offshore hazard avoidance for marine craft, through the comparison of track with digitized marine chart information stored and updated in the central control hub.
- f) Emergency location.
- g) Precise guidance to accident sites, and ancillary communication between rescue teams, emergency dispatch centers and accident victims for rescue parties in search and rescue operations for aircraft, boats, vehicles or individual people in distress.
- h) Protection against crime, by the provision of all four listed functions to transceivers mounted in police vehicles and others (handheld and battery operated) carried by citizens; and by service to transceivers carried by aircraft, marine craft and individual officers engaged in anti-crime activity including specifically anti-drug activity.



- i) Monitoring of the positions of marine aids to navigation to alert users and the Coast Guard to drifting buoys or other out-of-place markers.

CERTIFICATE OF SERVICE

I, Laura Campos, a secretary in the law firm of Ginsburg, Feldman and Bress, Chartered, do hereby state that on this 4th day of June, 1991, I have caused to be mailed by first-class U.S. mail the foregoing to the following:

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