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MAR 1 1 1996

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

FEDERAL COMMUNICATIONS COMMISSIO.

OFFICE OF SECRETARY

In re Application of	
MOBILE COMMUNICATIONS) File Nos. 11-DSS-P-91;
HOLDINGS, INC.) 18-DSS-P-91;
) 11-SAT-LA-95;
) 11-SAT-LA-95; 12-SAT-AMEND-95 eived
For Authority to Construct, Launch, and)
Operate a Low Earth Orbit Satellite System in the	MAR 1 3 1996
1610-1626 5 MHz/2483 5-2500 MHz Bands	MAIT 5 1770

Satellite Policy Branch International Bureau

REPLY OF MCHI TO COMMENTS OF TRW, INC. AND MOTOROLA SATELLITE COMMUNICATIONS, INC.

Submitted by:

MOBILE COMMUNICATIONS HOLDINGS, INC.

Jill Abeshouse Stern Robert J. Cynkar Edmund D. Daniels Shaw, Pittman, Potts & Trowbridge 2300 N Street, N.W. Washington, D.C. 20037-1128 (202) 663-8380

Its Attorney

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12-SAT-AMEND-95

REPLY OF MCHI TO COMMENTS OF TRW INC. AND MOTOROLA SATELLITE COMMUNICATIONS, INC.

Mobile Communications Holdings, Inc. ("MCHI"), by its attorneys, respectfully submits this reply to the separate comments filed by TRW Inc. ("TRW") and by Motorola Satellite Communications, Inc. ("Motorola") on February 28, 1996 and February 29, 1996, respectively, concerning the Notice of Supplemental Authorities filed by MCHI on February 15, 1996. The purpose of the Notice was to call the Commission's attention to a reaffirmation of relevant national policy in the recently-enacted Telecommunications Act of 1996, which put the Commission on a pro-active course to eliminate "market entry barriers for entrepreneurs and other small businesses in the provision and ownership of telecommunications services."

The critical responses of TRW and Motorola, two giants in telecommunications, to our Notice, are not surprising -- after all, a smaller entrepreneurial enterprise is their competitor and

Pub.L.No. 104-104, § 257(a), 110 Stat. 56, 77 (signed Feb. 8, 1996) (hereinafter the "1996 Act").

one which will deliver better service at lower cost to the consumer. The TRW and Motorola comments are, however, extraordinary in their reliance on strawmen and mischaracterizations to reiterate their fundamental opposition to MCHI's application to provide "Big LEO service." We reply briefly to these comments in order to call the Commission's attention to these mischaracterizations (and their underlying motivations.)

1. A common theme in the TRW and Motorola comments is that the Commission's review of the Bureau's January 1995 decision with respect to MCHI's financial qualifications is somehow pointless or a waste of resources. *See* TRW Comment at 5 (chastising MCHI for "continuing to importune the Commission" by pursuing our Application for Review). As the Commission is aware, MCHI has previously submitted evidence of financial support for its system, from such companies as Westinghouse Electric Corporation and Israel Aircraft Industries together with a series of external commitments and vendor financing. Although the International Bureau may have concluded that these companies, and others supporting MCHI's application, had not demonstrated sufficient commitment to the project, MCHI does not accept the Bureau's determination as final (which it is not) and continues to believe that its prior financial showing reflected serious and credible business commitments (contrary to TRW's harsh, gratuitous and inaccurate characterization of this showing as "blue smoke and mirrors.")

Contrary to the implications of TRW and Motorola, MCHI and its investors are fully entitled under the Communications Act and agency rules to seek Commission review of the

[&]quot;Big LEO service" refers to low-Earth orbit mobile-satellite systems operating in the 1610-1626.5 and 2483.5-2500 MHz frequency bands.

Bureau's decision. MCHI sought this review by the timely filing of an Application for Review on March 2, 1995 -- more than one year ago. Commission review and clarification of the Bureau's decision is critical given the fact that financial rights and obligations (of MCHI and its investors) depend upon the Commission's ruling; business arrangements and corporate restructurings may be required in light of that ruling. Far from being a speculative applicant, MCHI and its partners have spent millions of dollars over the past five years to develop the ELLIPSOTM system which has been recognized by objective analysts, including Mitre Corporation and Draper Laboratory (a federal laboratory associated with MIT), as a superior design from both a technical and market standpoint. 4

2. Both TRW and Motorola somewhat frantically try to create the impression that the unmistakable congressional policy direction to the Commission that it eliminate "market entry barriers for entrepreneurs and other small businesses in the provision and ownership of telecommunications services" must be at war with the "sound application of a strict financial standard to the Big LEO Service." TRW Comment at 4. See also Motorola Comment at 2 (arguing that the Telecommunications Act of 1996 does not "alter" the Commission's "reasoning

See 47 U.S.C. § 155(c)(4). The filing of an application for review is a condition precedent to judicial review of the Bureau's decision. 47 U.S.C. § 155(c)(7). As a practical matter, the Commission's year-long delay in acting on MCHI's pending application for review has effectively prevented MCHI from obtaining judicial review of the Bureau's decision over the past year while MCHI's competitors have been allowed to move forward in the marketplace.

See L.M. Gaffney, N.D. Hulkower, L. Klein and D.N. Lam, The Mitre Corporation, A Reevaluation of Selected Mobile Satellite Communications Systems: Ellipso, Globalstar, IRIDIUM and Odyssey (May 1994).
See also March 5, 1996 letter from the Charles Stark Draper Laboratory, Inc. indicating that the "innovative ELLIPSO™ proposal for Mobile Satellite Communications Service has intrigued the Astronautical research community at MIT and the Charles Stark Draper Laboratory." (Exhibit A hereto)

 $[\]frac{9}{2}$ 1996 Act at § 257(a) (emphasis added).

for establishing strict financial qualification requirements for Big LEO applicants"). Through this device, TRW and Motorola suggest that "strict financial qualifications" are inherently at odds with the capabilities of entrepreneurs or small businesses, with the implicit corollary that where "strict financial qualifications" are warranted in licensing some telecommunications service only giant corporations like TRW and Motorola can possibly fit the bill. Given the cost of much cutting-edge technology in telecommunications, TRW and Motorola apparently advance this argument in order to simply define their most vigorous competition out of the regulated marketplace.

Of course strict financial qualifications and smaller telecommunications enterprises are not inherently at odds. It takes no "relaxation" of standards for entrepreneurs to be fully qualified to deliver the services regulated by the Commission. Just as rapid developments in technology have expanded the telecommunications available to consumers, so investors and other sources of capital have a variety of mechanisms by which new ideas and new enterprises might be financed. To be sure, many of these mechanisms are not used by large corporations like TRW or Motorola, but that does not make financial arrangements relying on such devices any less reliable for purposes of the financial standards being applied in this proceeding.

The flaw in the International Bureau's decision that our Notice was designed to highlight was the need to apply the Commission's financial standards with an eye toward the kinds of financing arrangements on which enterprises smaller than TRW and Motorola must rely. The key question is whether any particular licensee can bring to bear sufficient financial resources to make

Big LEO service a reality. Giants like TRW and Motorola might be able to rely on their balance sheets — even though they suffer no penalty if in the end they fail to draw on that balance sheet — while smaller enterprises might have to rely on a variety of commitments from investors to demonstrate the resources they have at their disposal and which in financial fact may amount to a stronger legal commitment. At bottom, though, this kind of analysis is an example of, not a constraint on, the kind of "wide discretion" Motorola notes the Commission has in the exercise of its licensing authority. Motorola Comment at 2-3. We have simply pointed out one important congressional policy, recently and clearly stated, that must inform that regulatory discretion because it serves to authoritatively define the public interest.

3. TRW -- which thus far has failed to announce any substantial outside financing for its Odyssey system -- wrongly attempts to drum Congress into service to aid their effort to create this false dichotomy between financial qualifications to establish Big LEO service and the capabilities of entrepreneurs and small business. TRW says: "As Congress itself has recognized, some services are so inherently capital intensive that they are ill-suited to entry by small business," citing a House report on the "Licensing Improvement Act of 1993" as support. TRW Comment at 4-5. Yet that report does not refer to financial capability at all, but says: "The Committee recognizes that the characteristics of some services are inherently national in scope, and are therefore ill-suited for small business."

Not only is TRW's characterization of this sentence a stretch in light of what that sentence actually says, but it becomes even more unsupportable when one sees that this single cited

⁶⁴ H. Rep. No. 111, 103d Cong., 1st Sess. 254 (1993).

sentence appears in a several paragraph discussion of the House Energy and Commerce

Committee's broad direction to the Commission to expand the opportunities in

telecommunications for entrepreneurs and small businesses. As the Committee articulated the

policy that the Commission is to follow:

[T]he Commission's regulations must promote economic opportunity and competition, and ensure that new and innovative technologies are readily accessible to the American people. The Commission will realize these goals by avoiding excessive concentration of licenses and by disseminating licenses among a wide variety of applicants, including small businesses. ¹¹

- 4. TRW similarly tries to conscript Congress as an ally with its footnoted observation that if Congress really wanted the Commission to abandon its strict financial standards for Big LEO licensing -- as TRW suggests MCHI would wish it to do -- Congress could have compelled the Commission to do so but did not. Here again, these proceedings do not constitute an attack on the Big LEO financial standards but an effort to seek Commission review of the International Bureau's *application* of those standards in a particular case. Not only does TRW muddle this fairly obvious distinction, but it seems to wrongly equate action by the Bureau with that of the full Commission.
- 5. TRW's and Motorola's concerns are fundamentally anti-competitive in nature. For example, TRW professes a fear that, if authorizations are handed out like "lottery tickets," a "crisis of confidence" will be caused among the investor community. (See TRW Comment at 6-7). This is nonsensical. The marketplace determines which systems are funded and investors do not typically rely on the FCC's determination of financial viability in making such judgments. On

 $[\]mathcal{I}$ Id.

the other hand, award of an FCC license can skew marketplace forces by giving certain companies a competitive advantage in raising funds, in the current case further hobbling small business competitors.

TRW's second concern -- that intersystem coordination will be "needlessly" complicated if other systems are licensed --- is equally transparent and self-serving. Although the Commission has concluded for the time being that four CDMA systems can be accommodated in the allocated spectrum, this conclusion is not compelled by the laws of physics. It is, in large part, a business decision based on the capacity (i.e., traffic load) each system requires to make a profit. As the number of operating systems in the band increases, the capacity of each system will be reduced because of the need to reduce power in order to coordinate with other systems (i.e., reduce noise to an acceptable level.) Thus, in reality, TRW's concern is not with the complications of coordination per se, but the fact that each additional CDMA system potentially diminishes the market share of licensed systems such as TRW.

6. Finally, Motorola charges that by taking into account Congress' instructions regarding small business, the FCC will allow the "warehousing" of spectrum. To this we reply that the application of the financial standards, or even a waiver of those standards here, can hardly result in warehousing. The FCC sought to safeguard against warehousing by establishing strict construction and launch milestones to which all licensees would be subject including MCHI whether it is found to qualify under the strict financial standard or is granted a waiver. While we do not believe that prevention of warehousing and encouragement of small business and

entrepreneurship constitute competing interests, certainly in the context and circumstances of this proceeding, the national policy articulated by Congress -- to eliminate market entry barriers for entrepreneurs -- should be the overriding public interest informing the Commission's decision.

Respectfully submitted,

MOBILE COMMUNICATIONS HOLDINGS, INC.

Bv:

Jill Abeshouse Stern Robert J. Cynkar Edmund D. Daniels

Shaw, Pittman, Potts & Trowbridge 2300 N Street, N.W. Washington, D.C. 20037-1128 (202) 663-8380

Its Attorneys

March 11, 1996

EXHIBIT A



555 Technology Square, Cambridge, Massachusetts 02139
Mail Station 86

Telephone (617) 258 - 1787

E50-96-110

5 March 1996

Mr. John E. Draim Advisor, Constellation Design Mobile Communications Holdings, Inc. 1120 19th Street, N.W., Suite 460 Washington, D.C. 20036

Subject:

Impact of ELLIPSO™ on Astronautical Research

Dear John:

During 1994 and 1995, the innovative ELLIPSO™ proposal for Mobile Satellite Communications Service has intrigued the Astronautical research community at MIT and the Charles Stark Draper Laboratory. This has resulted in significant analytical contributions as follows:

- Sabol, C. A., <u>Application of Sun-Synchronous</u>. <u>Critically Inclined Orbits</u> to <u>Global Personal Communications Systems</u>, <u>Masters Thesis submitted to</u> the Dept. of <u>Aeronautics</u> and <u>Astronautics</u>, <u>MIT</u>, <u>November 1994</u>.
- 2. Sabol, C. A., Cefola, P. J., and Metzinger, R.W., "Application of Sun-Synchronous, Critically Inclined Orbits to Global Personal Communications Systems," AAS/AIAA Pre-Print 95-222 presented to the AAS/AIAA Spaceflight Mechanics Conference, Albuquerque NM, February 1995 (also published in the Conference Proceedings)
- 3. Sabol, C. A., Draim, J. E., and Cefola, P. J., "Refinement of a Sun-Synchronous, Critically Inclined Orbits for the ELLIPSO™ Global Personal Communications Systems," AAS/AIAA Astrodynamics Conference, Halifax, Nova Scotia, August, 1995 (also published in the Conference Proceedings). [this work has also been submitted to the Journal of Astronautical Sciences for publication]
- 4. Draim, J. E., Sabol, C. A., and Cefola, P. J., "Optimal Orbit Transfer To A Sun-Synchronous, Critically Inclined Orbit For The Ellipso™ Personal Communication System", paper proposed for the AlAA/AAS Astrodynamics Conference, San Diego CA, July 1998.

This work provided an outstanding developmental opportunity for Mr. Chris Sabol who was a graduate student in the MIT Department of Aeronautics and Astronautics doing his thesis research at the Charles Stark Draper Laboratory with my supervision under the joint MIT/Draper Laboratory Education Program. This joint education

program provides the opportunity to take course work at MIT and to complete thesis research in a working laboratory; the program is an outgrowth of the time when the Draper Laboratory was part of the MIT Aeronautics Department. Chris Sabol was (and is) being supported by the USAF Phillips Laboratory Palace Knight educational program; his research activity at MIT provided him with directly relevant engineering experience for his USAF work tour at the Phillips Laboratory from December 1994 to August 1995. Chris is currently a Ph.D. student at the University of Colorado, Boulder; he will return to USAF employment after he completes his studies.

Quality interactions promote innovation and MCHI (the developers of the ELLIPSOTM system) has provided several opportunities for such interaction:

- John Draim visited the Draper Laboratory in July 94 for technical discussions of the research
- Chris Sabol and I traveled to MCHI in Washington DC to brief the results
 of the research to several MCHI staff members in November 1994
- John Draim was able to attend the Astrodynamics Conference in Halifax in August 1995

More recently, another MIT graduate student, Naresh Shah, has initiated studies of the Concordia portion of the ELLIPSO™ system. Naresh Shah is a 1995 graduate of US Air Force Academy and is participating in the MIT/Draper Laboratory Educational Program. Naresh's thesis objective is to develop and demonstrate satellite constellation design techniques based on the synthesis of:

- modern theories for the long term motion of satellites including the Semianalytical Theory employed by Chris Sabol [this theory was developed at Draper Lab and MIT and is evolving into an industry standard]
- distributed processing techniques including the combination of Semianalytical Theory and the Parallel Virtual Machine (PVM) paradigm [this was investigated by Scott Wallace at Draper/MIT]
- Genetic Algorithm-based search techniques that are particularly advantageous with parallel processing

There is other research in the MIT Aeronautics and Astronautics Department under the direction of Professor Dan Hastings that is directly relevant:

- 1. Violet, M., The Development and Application of a Cost per Minute Metric for the Evaluation of Mobile Satellite Systems in a Limited-Growth Voice Communications Market, Masters Thesis submitted to the Dept. of Aeronautics and Astronautics, MIT, September 1995.
- 2. Gumbert, C. G., <u>Assessing Future Growth Potential of Mobile Satellite Systems Using a Cost per Billable Minute Metric</u>, Masters Thesis submitted to the Dept. of Aeronautics and Astronautics, MIT, September 1995.
- 3. Gumbert, C., Violet, M., Hastings, D., Hollister, W., and Lovell, R., "Assessing Mobile Satellite Systems Using a Cost Per Billable Minute Metric," AIAA-96-1171-CP presented at the 16th International Communications Satellite System Conference, Washington DC, February 1996.

Capt. Mike Violet is currently assigned to the USAF 2nd Space Operation Squadron at Falcon AFB, Colorado Springs and Cary Gumbert is technical staff at the Hughes Space and Communications Group. MCHI is currently working with Mike Violet and Cary Gumbert to provide the data necessary for the inclusion of ELLIPSOTM into the Mobile Satellite System Cost Model prior to the archival publication of this research.

Other research is in progress at MIT, Draper, and the Arizona State University at Tempe regarding the application of GPSR onboard Navigation Solutions to Satellite Navigation.

Overall, the innovative aspects of the ELLIPSOTM design have intrigued the research community. Together with MCHI's open attitude regarding the analysis of their concept, this has led to challenging research opportunities for the Astronautical community. We are hopeful that the development of the ELLIPSOTM system will continue in the US and that these research opportunities will exist for future students.

Sincerely.

Faul J typeli

Program Manager, Astrodynamics Applications Draper Laboratory

Lecturer in Aeronautics and Astronautics, MIT

CERTIFICATE OF SERVICE

I, Felecia G. DeLoatch, do hereby certify that a true and correct copy of the foregoing document was sent by first-class mail, postage prepaid, or hand-delivered, on this Aday of March, 1996, to the following persons:

- * Chairman Reed E. Hundt
 Federal Communications Commission
 1919 M Street, N.W., Room 814
 Washington, D.C. 20554
- * Commissioner James H. Quello Federal Communications Commission 1919 M Street, N.W., Room 802 Washington, D.C. 20554
- * Commissioner Andrew C. Barrett Federal Communications Commission 1919 M Street, N.W., Room 826 Washington, D.C. 20554
- * Commissioner Rachelle B. Chong Federal Communications Commission 1919 M Street, N.W., Room 844 Washington, D.C. 20554
- * Commissioner Susan Ness Federal Communications Commission 1919 M Street, N.W., Room 832 Washington, D.C. 20554
- * Julius Genachowski, Esq.
 Special Assistant
 Office of the Chairman
 Federal Communications Commission
 1919 M Street, N.W., Room 814
 Washington, D.C. 20554

- * William E. Kennard, Esq.
 General Counsel
 Federal Communications Commission
 1919 M Street, N.W., Room 614
 Washington, D.C. 20554
- * Scott Blake Harris
 Chief, International Bureau
 Federal Communications Commission
 2000 M Street, N.W., Room 800
 Washington, D.C. 20554
- * Mark Grannis, Senior Legal Advisor International Bureau Federal Communications Commission 2000 M Street, N.W., Room 800 Washington, D.C. 20554
- * Jane E. Mago, Senior Legal Advisor Office of Commissioner Rachelle B. Chong Federal Communications Commission 1919 M Street, N.W., Room 844 Washington, D.C. 20554
- * Mary P. McManus, Legal Advisor Office of Commissioner Susan Ness Federal Communications Commission 1919 M Street, N.W., Room 832 Washington, D.C. 20554
- * Rudy L. Baca, Legal Advisor
 Office of Commissioner James H. Quello
 Federal Communications Commission
 1919 M Street, N.W., Room 802
 Washington, D.C. 20554
- * Brian J. Carter, Legal Advisor Federal Communications Commission 1919 M Street, N.W., Room 826 Washington, D.C. 20554

Lon C. Levin, Vice President American Mobile Satellite Corp. 10802 Parkridge Boulevard Reston, VA 22091

Bruce D. Jacobs, Esquire Glenn S. Richards, Esquire Fisher Wayland Cooper Leader & Zaragoza L.L.P. 2001 Pennsylvania Ave., N.W., Suite 400 Washington, D.C. 20006-1851

Philip L. Malet, Esq. Alfred M. Mamlet Steptoe & Johnson 1330 Connecticut Avenue, N.W. Washington, D.C. 20036

Barry Lambergman, Esq. Fletcher, Heald & Hildreth, P.L.C. 1300 North 17th Street Eleventh Floor Rosslyn, VA 22209

Robert A. Mazer, Esq. Vinson & Elkins 1455 Pennsylvania Avenue, N.W. Suite 700 Washington, D.C. 20004-1008

Norman R. Leventhal, Esquire Raul R. Rodriguez, Esquire Stephen D. Baruch, Esquire Leventhal, Senter & Lerman 2000 K Street, N.W., Suite 600 Washington, D.C. 20006-1809

Leslie Taylor, Esq. Leslie Taylor Associates 6800 Carlynn Court Bethesda, MD 20817-4302 John T. Scott, III, Esq. William Wallace, Esq. Crowell & Moring 1001 Pennsylvania Avenue, N.W. Washington, D.C. 20004-2505

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* Hand Delivered

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CERTIFICATE OF SERVICE

- I, Christopher A. Robles, hereby certify that a true and correct copy of the foregoing "Consolidated Response" was mailed, first-class postage prepaid, this 7th day of March, 1996 to the following:
- * Chairman Reed Hundt
 Federal Communications Commission
 1919 M Street, N.W., Room 814
 Washington, D.C. 20554
- * Commissioner James H. Quello Federal Communications Commission 1919 M Street, N.W., Room 802 Washington, D.C. 20554
- * Commissioner Andrew C. Barrett Federal Communications Commission 1919 M Street, N.W., Room 826 Washington, D.C. 20554
- * Commissioner Susan Ness Federal Communications Commission 1919 M Street, N.W., Room 832 Washington, D.C. 20554
- * Commissioner Rachelle B. Chong Federal Communications Commission 1919 M Street, N.W., Room 844 Washington, D.C. 20554

- * Scott B. Harris, Esq.
 Chief, International Bureau
 Federal Communications Commission
 2000 M Street, N.W.
 Room 830
 Washington, D.C. 20554
- * Thomas S. Tycz
 Chief, Satellite & Radiocommunication Division
 International Bureau
 Federal Communications Commission
 2000 M Street, N.W.
 Room 811
 Washington, D.C. 20554
- * Cecily C. Holiday, Esq.
 Deputy Chief, Satellite &
 Radiocommunication Division
 International Bureau
 Federal Communications Commission
 2000 M Street, N.W., Room 520
 Washington, D.C. 20554
- * Fern J. Jarmulnek, Esq.
 Chief, Satellite Policy Branch
 International Bureau
 Federal Communications Commission
 2000 M Street, N.W., Room 518
 Washington, D.C. 20554

Philip L. Malet, Esq.
Alfred M. Mamlet, Esq.
Steptoe & Johnson
1330 Connecticut Avenue, N.W.
Washington, D.C. 20036-1795
Counsel for Motorola Satellite
Communications, Inc.

Barry Lambergman, Esq.
Manager, Satellite Regulatory Affairs
Motorola Inc.
1350 I Street, N.W., Suite 400
Washington, D.C. 20005

Robert A. Mazer, Esq.
Vinson & Elkins, L.L.P.
Suite 700
1455 Pennsylvania Avenue, N.W.
Washington, DC 20004
Counsel for Constellation Communications

Jill Abeshouse Stern, Esq.
Jane M. Sullivan, Esq.
Shaw, Pittman, Potts & Trowbridge
2300 N Street, N.W.
Washington, D.C. 20037
Counsel for Mobile Communications
Holdings, Inc.

Robert Halperin, Esq.
William Wallace, Esq.
Crowell & Moring
1001 Pennsylvania Ave., N.W.
Washington, D.C. 20004-2505
Counsel for Loral/Qualcomm Partnership, L.P.

Leslie Taylor, Esq. Leslie Taylor Associates 6800 Carlynn Court Bethesda, MD 20817-4302

Dale Gallimore, Esq.
Counsel
Loral Qualcomm
7375 Executive Place, Suite 101
Seabrook, MD 20706

Gerald Hellman Vice President Policy and International Programs Mobile Communications Holdings, Inc. 1120 - 19th Street, N.W. Washington, D.C. 20036

John P. Janka, Esq. Latham & Watkins Suite 1300 1001 Pennsylvania Avenue, N.W. Washington, D.C. 20004-2505

Christopher/A. Robles