102-SAT-P/LA-98

ORIGINAL

RINI, CORAN & LANCELLOTTA, P.C.

Attorneys at Law

Dupont Circle Building
1350 Connecticut Avenue, N.W.
Suite 900
Washington, D.C. 20036-1701

(202) 296-2007
Fax (202) 429-0551
www.RCLPC.com

December 22, 1997

Via Hand Delivery

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
1919 M Street, NW
Washington, DC 20554

Re: KaStarcom. World Satellite, LLC
Application to Construct, Launch and
Operate a Geostationary Orbit Fixed
Satellite Service in the Ka-Band

Dear Ms. Salas:

KaStarcom. World Satellite, LLC, by its attorneys, hereby files a backup copy of its Application to Construct, Launch and Operate a Geostationary Orbit Fixed Satellite Service in the Ka-band. The original and nine copies were filed with the Commission in Pittsburgh today via Berry Best Couriers, Ltd., Control No. 103705. Please stamp the enclosed "Stamp and Return" copy for our records.

Please contact the undersigned directly if there are any questions concerning this matter.

Respectfully submitted,

Stephen E. Coran

SEC:do
Enclosures (2)

f:\doneil\kastarco\corr\611-1222.lt1

READ INSTRUCTIONS CAREFULLY BEFORE PROCEEDING

(1) LOCKBOX #

FEDERAL COMMUNICATIONS COMMISSION
REMITTANCE ADVICE

PAGE NO. 1 OF 1

APPROVED BY OMB 3060-0589

SPECIAL USE

FCC USE ONLY

SECTION A - PAYER INFORMATION

(2) PAYER NAME(if paying by credit card, enter name exactly as it appears on your card): Televerde Communications, L.P.

(3) TOTAL AMOUNT PAID (dollars and cents): $ 173,030

RECEIVED
DEC 22 1997
Federal Communications Commission
Office of Secretary

(4) STREET ADDRESS LINE NO. 1: 10858 Warwick Boulevard

(5) STREET ADDRESS LINE NO. 2: Suite A

(6) CITY: Newport News

(7) STATE: VA

(8) ZIP CODE: 23601

(9) DAYTIME TELEPHONE NUMBER (include area code): (757) 599-9470

(10) COUNTRY CODE (if not in U.S.A.)

IF PAYER NAME AND THE APPLICANT NAME ARE DIFFERENT, COMPLETE SECTION B
IF MORE THAN ONE APPLICANT, USE CONTINUATION SHEETS (FORM 159-C)

SECTION B - APPLICANT INFORMATION

(11) APPLICANT NAME(if paying by credit card, enter name exactly as it appears on your card): KaStarcom. World Satellite, LLC

(12) STREET ADDRESS LINE NO. 1: P.O. Box 1471

(13) STREET ADDRESS LINE NO. 2:

(14) CITY: Evergreen

(15) STATE: CO

(16) ZIP CODE: 80439

(17) DAYTIME TELEPHONE NUMBER (include area code): (303) 526-1039

(18) COUNTRY CODE (if not in U.S.A.)

COMPLETE SECTION C FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEETS (FORM 159-C)

SECTION C - PAYMENT INFORMATION

(19A) FCC CALL SIGN/OTHER ID	(20A) PAYMENT TYPE CODE (PTC)	(21A) QUANTITY	(22A) FEE DUE FOR (PTC) IN BLOCK 20A	FCC USE ONLY
None	B B Y	2	$ 4,940	

(23A) FCC CODE 1:

(24A) FCC CODE 2:

(19B) FCC CALL SIGN/OTHER ID	(20B) PAYMENT TYPE CODE (PTC)	(21B) QUANTITY	(22B) FEE DUE FOR (PTC) IN BLOCK 20B	FCC USE ONLY
None	B N Y	2	$ 168,090	

(23B) FCC CODE 1:

(24B) FCC CODE 2:

(19C) FCC CALL SIGN/OTHER ID	(20C) PAYMENT TYPE CODE (PTC)	(21C) QUANTITY	(22C) FEE DUE FOR (PTC) IN BLOCK 20C	FCC USE ONLY
			$	

(23C) FCC CODE 1:

(24C) FCC CODE 2:

(19D) FCC CALL SIGN/OTHER ID	(20D) PAYMENT TYPE CODE (PTC)	(21D) QUANTITY	(22D) FEE DUE FOR (PTC) IN BLOCK 20D	FCC USE ONLY
			$	

(23D) FCC CODE 1:

(24D) FCC CODE 2:

SECTION D - TAXPAYER INFORMATION (REQUIRED)

(25) PAYER TIN: 0 5 4 1 8 0 6 0 1 6

(26) COMPLETE THIS BLOCK ONLY IF APPLICANT NAME IN B-11 IS DIFFERENT FROM PAYER NAME IN A-2

APPLICANT TIN: 0 5 4 1 8 6 1 6 4 8

SECTION E - CERTIFICATION

(27) CERTIFICATION STATEMENT

I, David M. Drucker (PRINT NAME), Certify under penalty of perjury that the foregoing and supporting information are true and correct to the best of my knowledge, infomation and belief. SIGNATURE

SECTION F - CREDIT CARD PAYMENT INFORMATION

(28)

MASTERCARD

MASTERCARD/VISA ACCOUNT NUMBER:

EXPIRATION DATE: MONTH YEAR

VISA

I hereby authorize the FCC to charge my VISA or MASTERCARD for the service(s)/authorizations(s) herein described.

AUTHORIZED SIGNATURE

DATE

SEE PUBLIC BURDEN ESTIMATE ON REVERSE

FCC FORM 159 JULY 1997 (REVISED)

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Attorneys at Law

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EVAN D. CARB
DAVID G. O'NEIL
SARAH H. EFIRD
E. LAWRENCE ZOLT
R. BRADLEY KOERNER
*ADMITTED IN VA

OF COUNSEL:
T. MICHAEL JANKOWSKI

December 22, 1997

VIA COURIER

Ms. Magalie Roman Salas
Federal Communications Commission
International Bureau, Satellites
P.O. Box 358210
Pittsburgh, PA 15251-5210

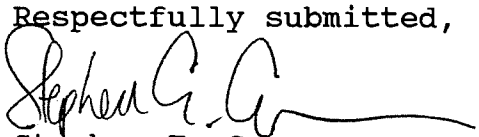
Re: KaStarcom. World Satellite, LLC
Application to Construct, Launch and
Operate a Geostationary Orbit Fixed
Satellite Service in the Ka-Band

Dear Ms. Salas:

KaStarcom. World Satellite, LLC, pursuant to Part 25 of the Commission's Rules and by its attorneys, hereby files an original and nine copies of its Application to Construct, Launch and Operate a Geostationary Orbit Fixed Satellite Service in the Ka-band. Also enclosed is a check made payable to the Federal Communications Commission in the amount of $173,030 to cover the filing fees.

Please contact the undersigned directly if there are any questions regarding this matter.

Respectfully submitted,



Stephen E. Coran

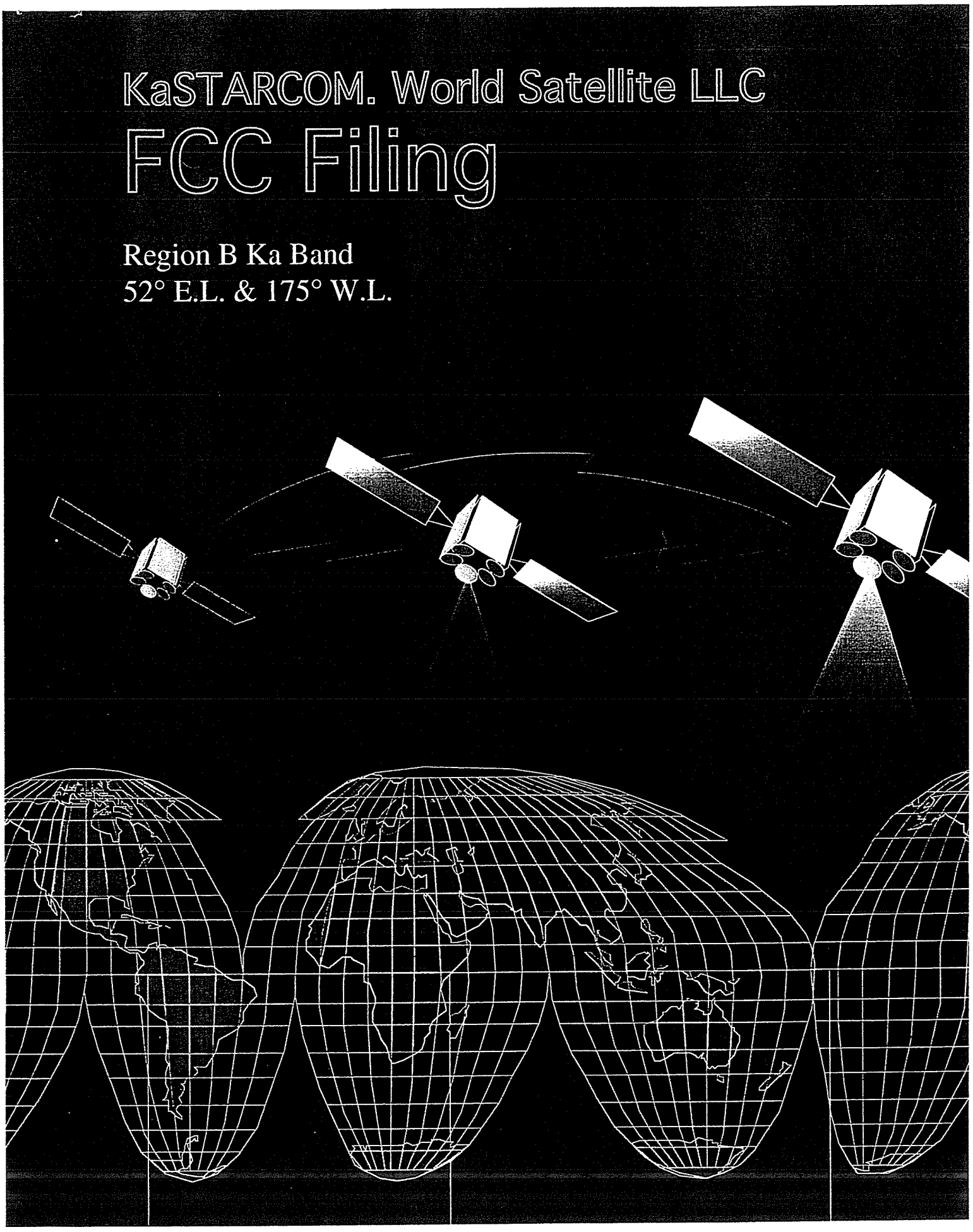
SEC:do
Enclosures (10)

f:\doneil\kastarco\corr\611-1222.ltr

KaSTARCOM. World Satellite LLC

FCC Filing

Region B Ka Band
52° E.L. & 175° W.L.



FCC 312
Main Form

FEDERAL COMMUNICATIONS COMMISSION
APPLICATION FOR SATELLITE SPACE AND EARTH STATION AUTHORIZATIONS

Approved by OMB 3060-0678
Est. Avg. Burden Hours Per Response: 10 Hrs.

FCC Use Only
File Number:
Call Sign:

PAYOR AND FILING FEE INFORMATION

a. Payor Name			b. Daytime Telephone Number
Televerde Communications, L.P.			(757) 599-9470
c. Mailing Street Address or P.O. Box			d. FCC Account Number
10858 Warwick Boulevard, Suite A			0541806016
e. City	f. State	g. Zip Code	h. Country Code (if not U.S.A.)
Newport News	VA	23601	

i. Payment Type Code	j. Quantity	k. Fee Due for Payment Type Code in (i)	l. Total Amount Paid	FCC Use Only
BBY & BNY	2	$86,515	$173,030	

APPLICANT INFORMATION

1. Legal Name of Applicant			2. Voice Telephone Number
KaStarcom. World Satellite, LLC			(303) 526-1039
3. Other Name Used for Doing Business (if any)			4. Fax Telephone Number
N/A			(303) 670-5103
5. Mailing Street Address or P.O. Box		6. City	
P.O. Box 1471		Evergreen	
ATTENTION: David M. Drucker		7. State / Country (if not U.S.A.)	8. Zip Code
		CO	80439
9. Name of Contact Representative (If other than applicant)			10. Voice Telephone Number
Stephen E. Coran, Esq.			(202) 296-2007
11. Firm or Company Name			12. Fax Telephone Number
Rini, Coran & Lancellotta, P.C.			(202) 429-0551
13. Mailing Street Address or P.O. Box		14. City	
1350 Connecticut Avenue, NW Suite 900 ATTENTION:		Washington	
		15. State / Country (if not U.S.A)	16. Zip Code
		DC	20036

CLASSIFICATION OF FILING

17. Place an "X" in the box next to the classification that applies to this filing for both questions a. and b. Mark only one box for 17a and only one box for 17b.

- [ ] a1. Earth Station
- [X] a2. Space Station

- [X] b1. Application for License of New Station
- [ ] b2. Application for Registration of New Domestic Receive-Only Station
- [ ] b3. Amendment to a Pending Application
- [ ] b4. Modification of License or Registration
- [ ] b5. Assignment of License or Registration
- [ ] b6. Transfer of Control of License or Registration
- [ ] b7. Notification of Minor Modification
- [ ] b8. Other (Please Specify):

18. If this filing is in reference to an existing station, enter:
Call sign of station:
N/A

19. If this filing is an amendment to a pending application enter: N/A
(a) Date pending application was filed:
(b) File number of pending application:

TYPE OF SERVICE

20. NATURE OF SERVICE: This filing is for an authorization to provide or use the following type(s) of service(s): Place an "X" in the box(es) next to all that apply.

[X] a. Fixed Satellite [ ] b. Mobile Satellite [ ] c. Radiodetermination Satellite [ ] d. Earth Exploration Satellite [ ] e. Other (please specify) _____

21. STATUS: Place an "X" in the box next to the applicable status. Mark only one box.

[ ] a. Common Carrier [X] b. Non-Common Carrier

22. If earth station applicant, place an "X" in the box(es) next to all that apply. N/A

[ ] a. Using U.S. licensed satellites [ ] b. Using Non-U.S. licensed satellites

23. If applicant is providing INTERNATIONAL COMMON CARRIER service, see instructions regarding Sec. 214 filings. Mark only one box. Are these facilities: N/A

[ ] a. Connected to the Public Switched Network [ ] b. Not connected to the Public Switched Network

24. FREQUENCY BAND(S): Place an "X" in the box(es) next to all applicable frequency band(s).

[ ] a. C-Band (4/6 GHz)

[ ] b. Ku-Band (12/14 GHz) [X] c. Other (Please specify) Ka-band

TYPE OF STATION

25. CLASS OF STATION: Place an "X" in the box next to the class of station that applies. Mark only one box.

[ ] a. Fixed Earth Station [ ] b. Temporary-Fixed Earth Station [ ] c. 12/14 GHz VSAT Network [ ] d. Mobile Earth Station [X] e. Space Station [ ] f. Other (Specify) _____

If space station applicant, go to Question 27.

26. TYPE OF EARTH STATION FACILITY Mark only one box. N/A

[ ] a. Transmit/Receive [ ] b. Transmit-Only [ ] c. Receive-Only

PURPOSE OF MODIFICATION OR AMENDMENT N/A

27. The purpose of this proposed modification or amendment is to: Place an "X" in the box(es) next to all that apply.

[ ] a -- authorization to add new emission designator and related service
[ ] b -- authorization to change emission designator and related service
[ ] c -- authorization to increase EIRP and EIRP density
[ ] d -- authorization to replace antenna
[ ] e -- authorization to add antenna
[ ] f -- authorization to relocate fixed station
[ ] g -- authorization to change assigned frequency(ies)
[ ] h -- authorization to add Points of Communication (satellites & countries)
[ ] i -- authorization to change Points of Communication (satellites & countries)
[ ] j -- authorization for facilities for which environmental assessment and radiation hazard reporting is required
[ ] k -- Other (Please Specify)

ENVIRONMENTAL POLICY

28. Would a Commission grant of any proposal in this application or amendment have a significant environmental impact as defined by 47 CFR 1.1307? [ ] YES [X] NO
If YES, submit the statement as required by Sections 1.1308 and 1.1311 of the Commission's rules, 47 C.F.R. §§ 1.1308 and 1.1311, as Exhibit A to this application.

A Radiation Hazard Study must accompany all applications as Exhibit B for new transmitting facilities, major modifications, or major amendments. Refer to OET Bulletin 65.

ALIEN OWNERSHIP

29. Is the applicant a foreign government or the representative of any foreign government?	☐ YES	☒ NO
30. Is the applicant an alien or the representative of an alien?	☐ YES	☒ NO
31. Is the applicant a corporation organized under the laws of any foreign government?	☐ YES	☒ NO
32. Is the applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	☐ YES	☒ NO
33. Is the applicant a corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	☐ YES	☒ NO
34. If any answer to questions 29, 30, 31, 32 and/or 33 is Yes, attach as Exhibit C an identification of the aliens or foreign entities, their nationality, their relationship to the applicant, and the percentage of stock they own or vote.		

BASIC QUALIFICATIONS

35. Does the applicant request any waivers or exemptions from any of the Commission's Rules? If Yes, attach as Exhibit D, copies of the requests for waivers or exceptions with supporting documents.	☒ YES	☐ NO
36. Has the applicant or any party to this application had any FCC station authorization or license revoked or had any application for an initial, modification or renewal of FCC station authorization, license, or construction permit denied by the Commission? If Yes, attach as Exhibit E, an explanation of the circumstances.	☐ YES	☒ NO
37. Has the applicant, or any party to this application, or any party directly or indirectly controlling the applicant ever been convicted of a felony by any state or federal court?	☐ YES	☒ NO
38. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attempting unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition?	☐ YES	☒ NO
39. Is the applicant, or any person directly or indirectly controlling the applicant, currently a party in any pending matter referred to in the preceeding two items?	☐ YES	☒ NO
40. By checking Yes, the undersigned certifies, that neither the applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.	☒ YES	☐ NO

41. Description. (Summarize the nature of the application and the services to be provided).

Application for license to launch and operate Digital International Geostationary Orbit Fixed Satellite Service System in the Ka-band.

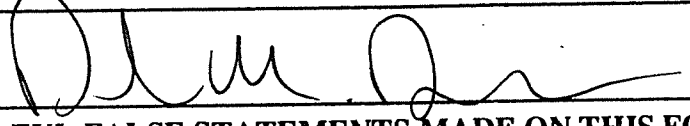
CERTIFICATION

The Applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

42. Applicant is a (an): (Place an "X" in the box next to applicable response.)

☐ a. Individual ☐ b. Unincorporated Association ☐ c. Partnership ☐ d. Corporation ☐ e. Governmental Entity ☒ f. Other (Please specify) Limited Liability Company

43. Typed Name of Person Signing	44. Title of Person Signing
David M. Drucker	President, Televerde Communications Corp., Sole Manager

45. Signature	46. Date
	December 19, 1997

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

EXHIBIT D-1

REQUEST FOR WAIVER

KaStarcom. World Satellite, LLC ("KaStarcom"), pursuant to Section 1.3 of the Commission's Rules, hereby requests waiver of the financial requirements showing of Section 25.140(b)-(e). As demonstrated herein, grant of a waiver would be consistent with Commission precedent and the public interest in encouraging new entrants into the emerging satellite industry.

The Commission's rules generally require a Part 25 applicant to demonstrate its current financial ability to fund the estimated costs of construction, launch and first-year operation of its proposed satellite system. See Section 25.140(d).[1] This showing can be made either by submitting evidence of internal financial wherewithal or irrevocable external financing. See Section 25.140(d)(2); Space Station Licensing, 58 RR 2d 1267, 1272-73 (1985).

Included in Part IV of this application is a copy of a letter from KaStarcom's investment banker, Legg Mason Wood Walker, Incorporated ("Legg Mason"), indicating that "there will be a number of potential investors who will seriously consider equity and/or debt investments" in KaStarcom's venture and indicating its interest in assisting KaStarcom in its financial plans. Moreover, as explained elsewhere in this application, KaStarcom is prepared to raise funds by leasing transponder capacity and investment financing.

Pursuant to Section 1.3, the Commission may waive its rules for "good cause shown." Sound administrative procedure contemplates such waivers, especially where "special circumstances warrant a deviation from the general rules and such deviation will serve the public interest." Northeast Cellular Telephone Co. v. FCC, 897 F.2d 1154, 1166 (D.C. Cir. 1990); see also WAIT Radio v. FCC, 418 F.2d 1153, 1159 (D.C. Cir. 1969). The special circumstances present in this case satisfy this standard for grant of the requested waiver, if it were determined that the Legg Mason Letter, coupled with KaStarcom's other potential financing sources, do not demonstrate compliance with Section 25.140(b)-(e).

First, the Commission has in the past waived its financial requirements for satellite applicants, including Ka-band applicants, in order to create entry opportunities in the particular service being licensed.[2] In cases where the Commission can accommodate all pending applications

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[1] Consistent with Section 25.140(c), KaStarcom has provided its estimated construction, launch and first-year operation expenses elsewhere in this application.

[2] See Teledesic Corporation, DA 97-527 at 5-6 (IB rel. Mar. 14, 1997); KaStar Satellite Communications Corp., DA 97-972 at 4-5 (IB rel. May 9, 1997); Lockheed Martin Corporation, DA 97-973 at 5 (IB rel. May 9, 1997); Loral Space & Communications, Ltd., DA 97-974 at 5 (IB rel. May 9, 1997); PanAmSat Licensee Corp., DA 97-978 at 4-5 (IB rel. May 9, 1997); Hughes Communications Galaxy, Inc., DA 97-971 at 5-6 (IB rel. May 9, 1997).

and there is sufficient remaining capacity for future entry, the Commission has waived its financial requirements.[3] Indeed, in the first Ka-band processing round, the Commission waived its financial requirements for numerous applicants because the grant of an authorization to one applicant did not prevent another qualified applicant from going forward with a proposal in the same service.[4] An affiliate of KaStarcom, KaStar Satellite Communications Corp. ("KaStar"), was one of the permittees that was granted a waiver. KaStar has attracted substantial interest from both potential strategic partners and investment bankers in its efforts to develop its Ka-band satellite system. KaStarcom expects to have even greater interest in the satellites proposed herein.

The instant situation presents exactly the same conditions for waiving the financial requirements. KaStarcom's application seeks two orbital locations in the so-called "Region B" of the Ka-band. Region B presently has available numerous orbital locations, including several vacated by AT&T. If Region B can accommodate the needs of each Ka-band applicant in this second processing round, waiver of the financial requirements for KaStarcom would be appropriate.

Second, the public interest justifies a waiver. KaStarcom is a new entrant into the satellite communications field that has developed a unique business plan designed to augment PCS and other communications industries with satellite-based interactive services. As demonstrated elsewhere in this application, KaStarcom's research shows that there is sufficient demand for such services, and that future demand will grow over time as new technologies becomes available. Grant of a waiver will encourage the development and implementation of space and ground station technology to meet consumer demand. See Norris Satellite Communications, Inc., 71 RR 2d 187, 189 (1992) ("NorSat").

Third, waiver of Section 25.140(d) will not contradict the basic purpose of the financial showing requirements. To the contrary, waiver will promote use of the Ka-band spectrum. As the Commission stated in NorSat:

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[3] See Amendment of the Commission's Rules to Allocate Spectrum for, and to Establish Other Rules and Policies Pertaining to, a Radiodetermination Satellite Service, 104 FCC 2d 650 (1986) (Commission required only detailed business plan because all pending RDSS applicants could be accommodated and future entry possible). The Commission also waived its financial requirements recently for NGSO FSS and GSO FSS applicants in the Ka-band. See cases cited at n.2.

[4] See generally In the Matter of Amendment of the Commission's Rules to Establish Rules Pertaining to a Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Band, 9 FCC Rcd 5936, 5948-49 (1994); see also authorizations issued to RDSS and Ka-band applicants, nn. 2 & 3.

> The general principle underlying our financial qualification standards is that scarce orbit-spectrum resources should not lie fallow nor should implementation of service to the public be delayed because of an applicant's financial inability to construct, launch and operate its authorized system in a timely manner. Here, the orbit-spectrum resource will continue to remain fallow if the standard is not waived. Nor is service to the public likely to be unduly delayed.

Id. at 190 (emphasis in original) (footnote omitted). A fortiori, the Legg Mason letter and KaStar's experience illustrates that there is expected to be sufficient interest in funding KaStarcom's venture such that the Commission can be assured that KaStarcom's plans are not speculative and will not result in the warehousing of spectrum.

Fourth, there are compelling policy reasons to grant the requested waiver. Waiver would foster the Commission's policy of encouraging competition in the FSS marketplace.[5] In addition to such non-facilities-based competition, the deployment of KaStarcom's satellite and business plans (as further described in this application) will promote facilities-based competition with other technologies. This will be especially true as the demand and uses for PCS and interactive services grow, and other technologies offer competing services.

KaStarcom believes that its application demonstrates its qualifications to construct, launch and operate a space station, and the unique services it plans to offer will promote the Commission's policies and satisfy current and future demand. Accordingly, KaStarcom requests that the Commission grant KaStarcom a waiver of the financial requirements of Section 25.140.

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[5] See Satellite Business Systems, 98 FCC 2d 762, 769-70 (1984); Advanced Business Communications, Inc., 94 FCC 2d 1, 3 (1983); Space Station Licensing, 58 RR 2d 577, 581 (1983); Hughes Communications, Inc., 84 FCC 2d 578, 581 (1981); Space Station Licensing, 88 FCC 2d 318, 321-22 (1981); Establishment of Domestic Communications Satellite Facilities by Non-Governmental Entities, 35 FCC 2d 844 (1972).

EXHIBIT D-2

REQUEST FOR CONTINGENT WAIVER

KaStarcom World Satellite, LLC ("KaStarcom"), pursuant to Section 1.3 of the Commission's Rules, hereby requests a waiver of Section 25.140(f) to operate its proposed Geostationery Orbital Fixed Satellite Service ("GSO FSS"), to the extent the commonality of ownership interests of KaStarcom and KaStar Satellite Communications Corp. ("KaStar") is deemed to apply. KaStarcom submits that waiver is not required because KaStarcom and KaStar are not the same "applicant" and propose to operate in different portions of the Ka-band. Nevertheless, if required, grant of such a waiver would be consistent with the Commission precedent and serve the public interest in encouraging new entrants into the emerging satellite industry.

The KaStarcom system proposes to operate a GSO FSS system at two orbital locations in the so-called "Region B" of the Ka-band. Some of the members of KaStarcom also hold ownership interests in KaStar. KaStar is authorized to construct, launch and operate Ka-band satellites at 73° W.L. and 109.2° W.L., both of which are in the so-called "Region A."[1]

The Commission's Rules generally limit a Part 25 "applicant" to one additional orbital location beyond its current frequency authorization in each frequency band in which it is authorized to operate. See Section 25.140(f). The applicant must have essentially used all of the capacity on its in-orbit satellites and have no more than two unused satellites. See id. Commission rules do not specifically define the word "applicant" for purposes of Section 25.140(f). In the absence of any guidance or notice with respect to the definition of "applicant" in this context, it would be unfair and prejudicial to deem KaStarcom and KaStar to be the same applicant.

In addition to the fact that KaStarcom and KaStar are not the same entity, a waiver is not required because KaStar and KaStarcom function independently. Although KaStarcom and KaStar have similar owners, they do not have identical ownership. The controlling shareholder of KaStar is Televerde Communications, L.P.,[2] while Televerde Communications Corp. is the manager of KaStarcom. KaStarcom and KaStar have different ownership structures (one is a limited liability company and the other is a corporation) and are organized in different states. In all respects, KaStarcom and KaStar are separate and distinct entities. companies to operate as a global satellite system.

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[1] See KaStar Satellite Communications Corp., DA 97-972 released May 9, 1997.

[2] Televerde Communications Corp. is the sole general partner of Televerde Communications, L.P.

Moreover, KaStarcom and KaStar propose to operate satellite systems in different portions of the Ka-band. KaStar has authority to launch, construct and operate a GSO FSS system in Region A (domestic) of the Ka-band. KaStarcom requests authority to construct, launch and operate a GSO FSS system in Region B (international) of the Ka-band. KaStar will provide full CONUS service as well as service to North, Central and South America. KaStarcom proposes to provide service to much of the rest of the world. The two systems will have limited overlapping service areas in portions of the Pacific Rim and Western Europe. Neither KaStar nor KaStarcom can change their operations to provide coverage to a substantial portion of each other's proposed service area. Thus, KaStarcom could not provide service to KaStar's customers in the event KaStarcom's satellites are operating at peak capacity and vice versa. Therefore, the principal concerns of Section 25.140(f), warehousing of orbital locations, will not occur.

Grant of a waiver request would be consistent with Commission precedent. In cases where the Commission can accommodate all pending applications and where there is sufficient remaining capacity for future entry, the Commission has waived the requirements of Section 25.140 and authorized applicants to operate from more than two orbital locations. Indeed, in the first Ka-band processing round, the Commission waived its satellite ownership limitations for numerous applicants because the grant of an authorization to one applicant did not prevent another qualified applicant from going forward with a proposal in the same service.[3] There is no reason for the Commission to change its policies, without notices with respect to KaStarcom's application, to the extent KaStarcom is deemed to be the same "applicant" as KaStar.

The instant situation presents exactly the same conditions for waiving Section 25.140(f). KaStarcom's application seeks two orbital locations in the so-called "Region B" of the Ka-band. Region B presently has available numerous orbital locations, including several vacated by AT&T. If Region B can accommodate the needs of each Ka-band applicant in this second processing round, waiver of Section 25.140(f) for KaStarcom would be appropriate.

The public interest justifies a waiver. KaStarcom is a new entrant into the satellite communications field that has developed a unique business plan designed to augment PCS and other communications industries with satellite-based interactive services. As demonstrated elsewhere in this application, KaStarcom's research shows that there is sufficient demand for such services, and that future demand will grow over time as new technologies becomes available. Grant of a waiver will encourage the development and implementation of space and ground station

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[3] See Lockheed Martin Corporation, DA 97-973 released May 9, 1997; Loral Space & Communications, Ltd., DA 97-974, released May 9, 1997; PanAmSat Licensee Corp., DA 97-978, released May 9, 1997; and Hughes Communications Galaxy, Inc., DA 97-971, released May 9, 1997.

technology to meet consumer demand. See Norris Satellite Communications, Inc., 71 RR 2d 187, 189 (1992) ("NorSat").

There also are compelling policy reasons to grant the requested waiver. Waiver would foster the Commission's policy of encouraging competition in the FSS marketplace. See Satellite Business Systems, 98 FCC 2d 762, 769-70 (1984); Advanced Business Communications, Inc., 94 FCC 2d 1, 3 (1983); Space Station Licensing, 58 RR 2d 577, 581 (1983); Hughes Communications, Inc., 84 FCC 2d 578, 581 (1981); Space Station Licensing, 88 FCC 2d 318, 321-22 (1981); Establishment of Domestic Communications Satellite Facilities by Non-Governmental Entities, 35 FCC 2d 844 (1972). In addition to such non-facilities-based competition, the deployment of KaStarcom's satellite and business plans (as further described in this application) will promote facilities-based competition with other technologies. This will be especially true as the demand and uses for PCS and interactive services grow, and other technologies offer competing services.

KaStarcom believes that its application demonstrates its qualifications to construct, launch and operate a space station, and the unique services it plans to offer will promote the Commission's policies and satisfy current and future demand. Accordingly, KaStarcom requests that the Commission grant KaStarcom a waiver of the requirements of Section 25.140.

Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, DC 20554

Application of

KASTARCOM. WORLD SATELLITE, LLC

for

Authority to Construct, Launch and Operate

A Ka-Band Digital International Region B
Fixed Communications Satellite System

December 22, 1997

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TABLE OF CONTENTS

		Page
Application of KaStarcom World Satellite, LLC		1
Certification of David M. Drucker		6
McKnight Associates, Inc. Certification		7
PART I	General Description of System Facilities, Operation And Services	8
I.A.	Executive Summary	8
I.B.	Description	9
I.C.	Corporate Background	10
I.D.	Supplement Summary	11
PART II	Service And System Description	14
II.A	Purposed Services And Demand For Service	14
II.A.1	Introduction	14
II.A.2	Market Analyses	15
II.A.3	Potential Market	15
II.A.3.a	Current Markets	15
II.A.3.a.1	Terrestrial And Undersea Cable And Fiber Network Linking And Restoration	15
II.A.3.a.2	Business Communications	16
II.A.3.a.3	Phone Systems	18
II.A.3.a.4	Social Services	22
II.A.3.a.5	Entertainment And Leisure Activities	24
II.A.3.a.6	Utilities And Services	25
II.A.3.A.7	Air Traffic Control	25
II.A.3.a.8	Government	26
II.A.3.b.	FUTURE MARKETS	26
II.A.3.b.1	Business Communications	26
II.A.3.b.2	Entertainment And Leisure Activities	27
II.A.3.b.3	Social	28
II.A.3.b.4	Phone Systems	28
II.A.3.b.5	Distance Learning	29
II.A.3.a.6	Telemedicine	29
II.A.4	The Market And Demand For KaStarcom Services	30
II.A.5	Operations And Marketing	31

Page

II.B Proposed System 32

PART III Public Interest Considerations 35

PART IV Financial Qualifications 37

IV.A System Costs 37

IV.B Financial Demonstration 39

1. KaStarcom. World Satellite Corp. Unaudited Balance Sheet - November 1997.. 40

2. Certification of David M. Drucker 41

3. Legg Mason Wood Walker, Incorporated Letter Re: Financial Information 42

PART V Legal Qualifications of Applicant 43

V.A. Applicant Information 43
V.B. Equal Employment Opportunity 43

1. Form 430 44
2. Exhibit V 46
3. Exhibit VI 47
4. Exhibit VII 48
5. KaStarcom Certification of Formation 49
6. Model EEO Program Report 52

PART VI Technical Description 53

VI.A System Description 53
VI.A.1 System Concept 53
VI.A.1.a. Overview 53

VI.A.2 Communication System Architecture 60
VI.A.2.a Low Rate Data 68
VI.A.2.b High Rate Data 70

VI.B. System Design Description 74

PART VII General Technical Information 77

VII.A System Operational Characteristics 77

	Page
VII.A.1 Satellite Control Facilities	77
VII.A.2 Frequency Plan	79
VII.A.3 Emission Designations	81
VII.A.4 Communications Coverage	82
VII.A.5 Power Flux Densities	83
VII.B.1 Spacecraft Overview	83
VII.B.2 Communications Subsystem Description	103
VII.B.3 Business Subsystems	106
VII.B.3.a Propulsion Subsystem	106
VII.B.3.b Attitude Control Subsystem	106
VII.B.3.c Electrical Power Subsystem	107
VII.B.3.d Telemetry, Tracking And Command Subsystem	107
VII.B.3.e Thermal Control Subsystem	107
VII.B.3.f Mechanisms	108
VII.B.3.g On-Board Processor	108
VII.B.4. Spacecraft Reliability	108
PART VIII Communication Performance	109
VIII.A Low Data Rate (Ldr)	110
VIII.B High Data Rate (Hdr)	112
VIII.C Intersatellite Cross-links	113
PART IX Interference Analysis	115
IX.A Adjacent Satellite Interference	115
IX.B Inter System Interference	118
IX.C Coordination With Terrestrial Systems	119
PART X Preferred Locations	120
X.A Requested Orbital Location	120
X.A.1 Maximizing Terminal Connectivity	120
X.A.2 Maximizing System Utilization	121
X.A.3 Exploiting Synergy's with Other Satellite Systems	121
X.A.4 Availability	122
X.B Miscellaneous Alternatives	122

Page

PART XI Schedule 123

XI.A Contract Milestones 123
XI.B Satellite Milestones 123

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In re:

KASTARCOM. WORLD SATELLITE, LLC	)	
	)	
Application for Authority to	)	
Construct, Launch and Operate	)	File No. _____
a Geostationary Orbit Fixed	)	
Satellite Service System	)	
in the Ka-band	)	

APPLICATION OF
KASTARCOM. WORLD SATELLITE, LLC

KaStarcom. World Satellite, LLC ("KaStarcom"), pursuant to Sections 308, 309 and 319 of the Communications Act of 1934, as amended, and Part 25 of the Federal Communications Commission's ("FCC" or "Commission") Rules, hereby requests authority to construct, launch and operate a Ka-band geostationary orbit fixed satellite service("GSO FSS") system on a non-common carrier basis in "Region B" of the Ka-band in the preferred orbital locations of 175° W.L. and 52° E.L.

I. Introduction

KaStarcom's system will be comprised of two geostationary satellites. KaStarcom requests orbital locations at 175° W.L. and 52° E.L. The satellite located at 175° W.L. will provide coverage over the Pacific Rim including Japan, Korea, China, Philippines, Indonesia, Australia and New Zealand, while the satellite located at 52° E.L. will provide coverage over Europe, Western Russia and selected areas of China, Southeast Asia, India and Africa. The two orbital locations will permit KaStarcom to provide service in a significant portion of Region B.

KaStarcom's affiliate, KaStar Satellite Communications Corp. ("KaStar"), is the permittee of a Ka-band satellite system at orbital locations of 109.2° W.L. and 73° W.L. See KaStar Satellite Communications Corp., DA 97-972, released May 9, 1997. These two locations provide full CONUS service as well as service to North, Central and South America. With the fully deployed constellation of four satellites, KaStarcom and KaStar would provide coverage to nearly all significant portions of the planet and serve the public interest by providing additional competition for global satellite services.

KaStarcom's system will provide new, innovative and affordable satellite services at high transmission rates to residential and commercial users in Region B. These services would include data, voice and video services.

This Application contains all of the information specified in Appendix B of the Commission's 1983 Space Station Filing Procedures[1] decision and Part 25 of the Commission's Rules. KaStarcom will provide additional information as requested by the Commission.

In support of this Application, KaStarcom provides the following information:

1. Name and Address of Applicant

KaStarcom. World Satellite, LLC
P.O. Box 1471
Evergreen, CO 80439
(303) 526-1039

---

[1] Filing of Applications for New Space Stations in the Domestic Fixed Satellite Service, 93 FCC 2d 1265 (1983).

2. Names and Addresses of Persons To Be Contacted

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Counsel to KaStarcom

3. Type of Authorization Requested

KaStarcom requests authority to construct, launch and operate two geostationary orbit satellites to establish a fixed satellite service in Region B of the Ka-band. KaStarcom will submit the necessary earth station applications at a later date.

4. Description of the Overall System

KaStarcom proposes a satellite communications system consisting of two GSO FSS in Region B of the Ka-band. The orbital slots requested are at 175° W.L. and 52° E.L. The KaStarcom system is designed to operate in conjunction with KaStar's satellites at 73° W.L. and 109.2° W.L. as a global broadband data communications network. Individual ground terminals will have the capability of receiving and sending data through the system.

KaStarcom does not intend to enter the business of designing, manufacturing or distributing the ground terminals used to communicate with the KaStarcom satellites. KaStarcom anticipates that it will work closely with equipment and satellite manufacturers to ensure that the products that

they develop are compatible with the KaStarcom system.

A more detailed description of the KaStarcom system is included in Sections VI through VIII of this Application.

II. Market and Demand for Services

A description of the market and demand for services for the KaStarcom system is included in Section II of this Application.

III. Public Interest Considerations

A description of the public interest considerations of the KaStarcom system is included in Section III of this Application.

IV. Contract and Satellite Milestones

Contract and Satellite Milestones for the KaStarcom system are included as Section XI of this Application.

V. Estimated Program Costs

The estimated costs of the KaStarcom system are provided in Exhibit IV of this Application.

VI. Legal Qualifications of Applicant

KaStarcom's legal qualifications are demonstrated in Section V of this Application.

VII. Financial Qualifications

The financial qualifications of KaStarcom are demonstrated in Section IV of this application.

VIII. Determination of Common Carrier Status

KaStarcom intends to offer all of the available transponders on this satellite system on a non-common carrier basis. The transponders carried on-board may be offered for sale or lease to customers over the lifetime of the satellite at the option of KaStarcom.

IX. Waiver of Claims Pursuant to Section 304 of the Act

Pursuant to Section 304 of the Communications Act of 1934, as amended, KaStarcom hereby waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license, or otherwise.

X. Certifications of KaStarcom

KaStarcom. World Satellite, LLC, applicant herein, hereby certifies, pursuant to Section 1.2002 of the Commission's Rules implementing Section 5301 of the Anti-Drug Abuse Act of 1988, that neither KaStarcom. World Satellite, LLC nor any party to this Application is subject to a denial of federal benefits by federal and/or state courts under authority granted in 21 U.S.C. Section 853a.

The undersigned, individually and for the Applicant, hereby certifies that the statements made in this application are true, complete and correct to the best of his knowledge, information and belief, and are made in good faith.

This Application shows that KaStarcom. World Satellite, LLC's application for authority to construct, launch and operate a digital international GSO FSS system in Region B of the Ka-band will serve the public interest. Furthermore, this Application demonstrates that KaStarcom. World Satellite, LLC is legally, financially and technically qualified to construct, launch and operate the aforesaid system. Accordingly, KaStarcom. World Satellite, LLC respectfully requests that the Commission grant its Application.

Respectfully submitted,

KASTARCOM. WORLD SATELLITE, LLC

David M. Drucker
President

Date: December 19, 1997

McKNIGHT ASSOCIATES INC. CERTIFICATION

We hereby certify that we are the technically qualified persons responsible for preparation of the engineering information contained in this application. We hereby certify that this application is complete and accurate to the best of our knowledge.

E. R. Walthall
Senior Technical Consultant

T. J. McKnight, President
McKnight Associates Inc.

McKnight Associates Inc.
P.O. Box 463
Newtown, PA 18940

PART I GENERAL DESCRIPTION OF SYSTEM FACILITIES, OPERATIONS AND SERVICES

I.A. EXECUTIVE SUMMARY

KaStarcom. World Satellite, LLC ("KaStarcom") hereby requests FCC authority to Construct, Launch And Operate A Digital International Geostationary Orbit Fixed Satellite System ("GSO FSS") Service in "Region B" of the Ka-band.

The KaStarcom system will provide new, innovative and affordable satellite services across the United States and throughout the world, to a wide range of commercial and residential users. It will be known as the "Global Interactive Satellite System."

The KaStarcom system will be a telecommunications switch in the sky. It will provide a wide range of video, audio, and data services at high transmission rates and will complement the existing telecommunications structure.

KaStarcom proposes initially to provide international service at its two orbital locations of 52 E.L. and 175 W.L. KaStarcom eventually proposes to operate as a global system in association with orbital locations held by KaStar Satellite Communications Corp. ("KaStar") at 109.2° W.L. and 73° W.L. These locations will provide for full global two-way services for customers. The grant of this application will enhance existing usage of space communications and promote new and innovative ones.

The KaStarcom system will provide inexpensive, high speed, switch data, video and video telephone satellite communications services to individual and business users. The KaStarcom system will incorporate multi-use spot beams to provide two-way services including services to Alaska, Hawaii, Latin America, Asia, Europe, and India. The KaStarcom system will have spot beams, on-board switching and small easily installed ground terminals providing digital transmissions.

The system will utilize its spot beam network with a high degree of spectrum efficiency. Each spot beam will cover an area of about 400 miles and will use 125 MHz of band width with twelve (12) times frequency re-use.

The KaStarcom system will use at least two (2) types of ground hubs. One will be an end-user satellite termination at the place of business and the other will be a radio port from which there will be an interface existing at the new PCS networks.

I.B. DESCRIPTION

KaStarcom hereby applies for authority, pursuant to Sections 308, 309, and 319 of the Communications Act of 1934, as amended, and Part 25 of the FCC Rules, to Construct, Launch, and Operate a Digital International GSO FSS.

KaStarcom, a Delaware Limited Liability Company formed in August of 1997, is substantially owned by principals of KaStar. Affiliates of the companies own various television and radio stations in Colorado, Florida and Alaska. KaStar's bona fides to hold a Commission license are a matter of record before the FCC.

As demonstrated herein, KaStarcom, its corporate affiliates and its principals, possess the technical, legal and financial qualifications necessary to support the award of a Region B Ka Band authorization by the Commission.

KaStarcom proposes a digital satellite transmission system that will provide Ka-band service available to users throughout the United States. The Application, as required by Part 25, contains a description of the design and the capabilities of the proposed system, including the types of proposed services, technology to be employed and all pertinent legal and financial background.

Management of the proposed system will be provided by KaStarcom and its affiliated companies. In addition, participation from new employees with varied experience in the satellite field will be sought.

KaStarcom's proposal to construct, launch and operate a dgital international GSO FSS system in Region B of the Ka-band will serve the public interest by implementing efficient, economical, interference-free satellite delivered services. These services will include not only traditional switched telephony services, programming and ancillary information services, but also messaging and other services that will be utilized by end users as varied as Personal Communications Services ("PCS") licensees and providers to the commercial transportation industries.

It is anticipated the KaStarcom will utilize the Dual Launch Delta II or similar U.S. Launch vehicle. The design will allow for launch with Ariane if U.S. facilities are unavailable.

The power levels and other technical parameters of the proposed system are in full compliance with the standards established by the World Administrative Radio Conference (WRC). Miniature satellite receiving antennas will provide interactive two-way digital services to its commercial and consumer customers.

I.C. CORPORATE BACKGROUND

In addition to KaStar, KaStarcom is affiliated with individuals who have a substantial interest in a number of radio and television stations in Colorado, Florida and Alaska. The principals have a wide background in the business and communications industry, including cable television, broadcasting and satellite communication.

Supplemental Summary

KaSTARCOM. **plans to build, launch and operate a global digital, Ka band, satellite system** that will provide on-demand, low cost, two-way interactive, wide bandwidth to operators offering services to users throughout the World. The KaSTARCOM. satellites are unique because of their extreme flexibility due to spot beams and on-board processing capabilities. No previous satellite systems have had this flexibility or capability. More than a 'bent-pipe" satellite operation, *KaSTARCOM.* will be a "router in the sky" and provide on-demand, high speed, two-way data transmission working with other land based operators to provide inexpensive systems as well as direct-to-site options for businesses or more remote locations.

How often do you get on the internet? As of January 1997 the estimate is that 57 million people access information on the internet regularly and that number continues to grow. It is projected that by the year 2000 over 707 million people in the world will be accessing internet.[1]

"Accessing" is the key word for *KaSTARCOM.* World Satellite LLC. Today the majority of people access internet using their plain old telephone service (POTS). This method of access is slow and inefficient and future improvements will be slow in deployment. *KaSTARCOM.* will quickly provide on-demand, high speed, two-way data transmission (minimum of "T-1", 1.544 Mbps) at affordable prices to individuals and businesses across vast areas. Reaching across continents, *KaSTARCOM.* will connect internet users easily and quickly using ultra-small antennas (dinner plate size) or in conjunction with local, land based operators and the KaSTARCOM. Satellite System. The "world wide web" will no longer be the "world wide wait".

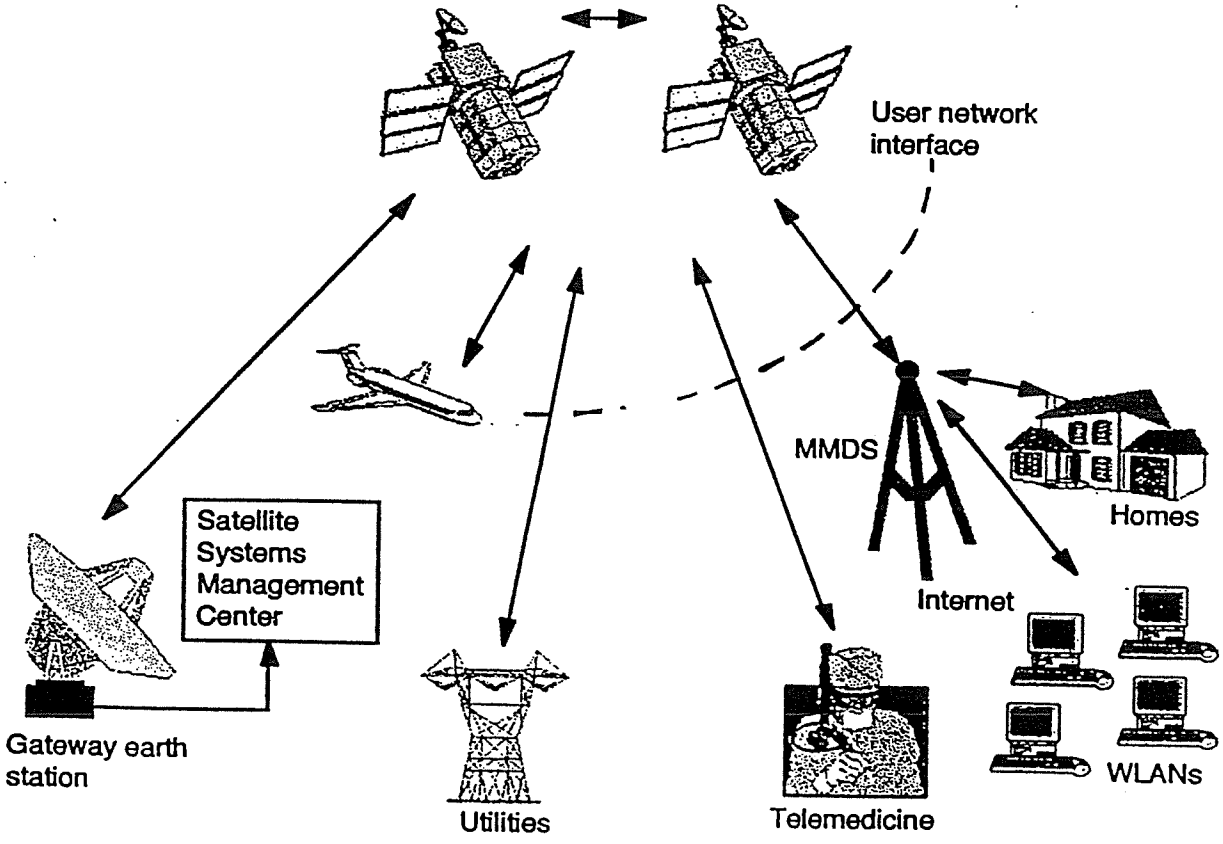
The Advanced Communications Technology Satellite (ACTS), sponsored by the National Aeronautics and Space Administration (NASA) has already shown that the capabilities of Ka band coupled with onboard switching uniquely enable or lower the cost of high speed data transmission. Other key advantages of Ka band include the use of lower power and smaller aperture user terminals (66 cm antennas) than C or Ku band; greater frequency reuse of the valuable radio frequency spectrum; and a significant cost advantage for providing on-demand services due to the spot-beam system's efficiency.

[1] Matrix Information and Directory Services (MIDS), from *Matrix News*, 7(1), January, 1997.

KaSTARCOM.'s unique spot beam design will support approximately 30 million users per satellite. KaSTARCOM.'s satellites are designed to allocate maximum power/bandwidth to the heaviest traffic load regions such as New York, Los Angeles, Buenos Aires, London, Hong Kong and other heavily populated areas within the coverage area. By using a "router" approach vs. a "switch" approach, KaSTARCOM. will reuse the radio spectrum and maintain at least 99.9% access availability.

Recent developments such as the rapid growth of internet users, the sharp rise of direct broadcast satellite (DBS) systems in the U.S. and the agreement among 70 countries to open up the telecommunications business within their countries all contribute to KaSTARCOM.'s vision of providing global, satellite, internet access to individuals as well as businesses.

KaSTARCOM. Satellite System



KaSTARCOM. is capable of supporting a variety of growth businesses such as internet service providers (ISPs), direct broadcast systems (DBS) providers, personal communication systems (PCSs), wireless local area networks (WLANs), telemedicine, gaming/gambling, utilities companies and other businesses requiring affordable, high speed, digital bandwidth to succeed.

With only 10,000 virtual "T-1" connections sold at an average price of $1,750 per month per connection, KaSTARCOM. will generate over $112 million in operating cash flow with one satellite in the first year of operation. Once the second satellite is operational and sales reach 30,000 virtual "T-1" connections, annual operating cash flows exceed $300 million. Within five years the net present value of this investment at a 12% cost of capital exceeds $2 million and by the fifteenth year (the estimated satellite life), net present value of this investment exceeds $500 million.

***KaSTARCOM.* Satellite Communications Corporation** was incorporated in Augustl of 1997 in Colorado. The principal of the company is one of the two original founders of EchoStar Satellite Corporation. The principal and affiliates of the company own various television and radio stations in Colorado, Florida, and Alaska and have extensive knowledge and expertise in the broadcasting, cable and satellite industries.

The *KaSTARCOM.* Intelligent Satellite System will conveniently deliver advanced communication capacity for the 21st century.

PART II SERVICE AND SYSTEM DESCRIPTION
II.A PURPOSED SERVICES AND DEMAND FOR SERVICE

II.A.1 INTRODUCTION

The need for high data rate communications will grow as there are millions of potential users for the KaStarcom services to home and office PC's.

The KaStarcom system will utilize at least two (2) types of ground hubs. One will be an end-user satellite terminal at the place of business and the other will be a radio port from which there will be an interface existing at the new PCS networks and at the principal headends of cable systems.

KaStarcom plans to make the capacity available through sales and non-common carrier leases, consistent with the Commission's decision in Domestic Fixed Satellite Transponder Sales, 90 FCC 2d 1238 (1982), aff'd sub. nom. World Communications v. FCC, 735 F. 2d 1465 (D.C. Cir. 1984).

KaStarcom has determined there is a significant demand for satellite services in the 30/20 GHz frequency band and that this demand will increase into the next century. KaStarcom anticipated that demand will increase in the following market segments:

i. Increased use of telecommunications for voice, data and video transmission, including PCS.

ii. Growth of VSAT networks.

iii. Growth in services such as video conferencing, video telephoning and business video.

iv. Growth in the use of data transfer, including telecopiers, and the use of this equipment in homes.

v. Development of digital compression for high definition television (HDTV).

vi. The use of the Ka-band facilities for mobile satellite services and other similar uses.

vii. The KaStarcom system will compliment the NASA ACTS Program.

II.A.2 MARKET ANALYSES

KaStarcom has analyzed different forms of the two-way transmission of telephony and the interrelated networks including those of cellular, PCS, wireline and fiber optic.

These analyses have concluded that Ka-band digital two-way services can compete effectively over the long term with terrestrial providers if the Ka-band service: (a) is of sufficient value to capture consumer interest and loyalty over the long term; and (b) provides a more efficient and convenient delivery system thereby creating consumer demand for the Ka-band product.

The KaStarcom system will compliment and follow-up on the service of the NASA ACTS Satellite. The KaStarcom system will be able to provide digital HDTV video capacity in addition to providing services to PCS systems that are described below.

The full delivery of a Ka-band KaStarcom service offers to the consumer and general business a communications delivery mechanism at the lowest per unit cost possible.

II.A.3 POTENTIAL MARKET

The market for the KaStarcom service divides into current and future markets. Current markets are those which can immediately use the service and do not require the development of new technology, only the implementation of Ka-band transponders and packet switching and decoding electronics using existing and available commercial off-the-shelf technologies. Thus, the users in these markets can be rapidly brought into operation. By contrast, the future markets require the development of new technologies before they will exist in a usable form. In most cases, these required technologies are in areas other than the communications part and in all cases they are currently being developed. That is, the identified future markets are all real and being currently prepared for exploitation by other groups and agencies.

II.A.3.a CURRENT MARKETS

II.A.3.a.1 Terrestrial and Undersea Cable and Fiber Network Linking and Restoration

These are the traditional markets for existing FSS communications satellites at C- and Ku-band frequencies. But as communication systems transition to digital technologies and data rates increase to the gigabit ranges, the existing satellites will find it increasingly difficult to adequately provide this service. Hence, there is a need for a KaStarcom system specifically designed to support this type of high rate traffic becomes apparent. The particular applications within this general market are:

- Cable and fiber optic (SONET) network linking
- Cable restoration
- Microwave link restoration

II.A.3.a.2 Business Communications

It is well known that the business communications market is expanding rapidly. Existing C and Ku-band FSS satellites are already being increasingly used to provide capacity for:

- VSAT
- Computer networking
- Wide area networks (WAN's) linking local area networks (LAN's) within a corporate network
- Linking of the head office to field offices
- Private intra-office phone networks
- B-ISDN
- Video teleconferencing
- Point of sale debit/credit card transaction approvals
- Distribution of software products to corporate customers and retail outlets.

In all these cases, the bandwidth capacity requirements are increasing rapidly as the users apply the technology to ever broader ranges of problems. For example, VSAT's are currently estimated at an installed base of 200 networks and over 80,000 terminals, and are increasingly being used to carry compressed video and voice transmissions for business purposes as well as the traditional data traffic. As the actual video and voice traffic goes entirely digital and the TVRO terminals decrease in size, the distinctions between video, voice and data traffic and between a VSAT and a TVRO for domestic use become increasingly blurred. The transition of all traffic types to ATM will complete the merging and thus make the KaStarcom system a natural medium for handling this traffic since it is specifically designed for it. The other feature of the system which makes it so suitable for this business communications market is the "communications on demand" aspect: businesses need satellite links to be obtainable at a moment's notice without having to reserve transponder capacity on a "deliberate assignment" basis either permanently or

well ahead of time. The economics of both orderwire-based "demand" high data rate system or of the real-time data packet header address-based low data rate system will make the KaStarcom communications system a perfect match for these business needs.

Personal (desktop) video conferencing is fast gaining in corporate popularity as the cost of the hardware and software falls from the present $2000 towards the $1000 per seat range. At the latter price level the placement of such a seat in the home of two "telecommuting" employees becomes a very real possibility. But the successful and economic development of a universal video conferencing system is widely acknowledged to depend on the adoption and installation of the ATM technology. This technology needs to go right to the desktop system as any interim solution such as an Ethernet-to-ATM bridge will cause system hang-ups; this is due to the varying data frame lengths in the Ethernet protocol causing contention in two way video data stream communications. The KaStarcom system's dedicated user terminal will take the ATM connection directly to the human interface equipment.

Clearly, as is already happening to an increasing extent, the distinction between the home and the office will also become less obvious as the number of home-based businesses increases from the current estimate of 39 million homes and as telecommuting becomes a more accepted practice for a firm's employees. These trends can only be encouraged by the development and mass marketing through normal commercial retail outlets of very small and inexpensive VSAT/TVRO terminals. Providing any home or small business user with a communications capability equal to the bigger companies but at a "domestic appliance" price will accelerate the social and democratic re-engineering of the workplace to the benefit of all concerned. The access to this communications capability will be truly democratic and irrespective of geographic location, available equally and at the same price to both the urban and the rural user.

This current trend is exemplified by the recent announcements by America OnLine and CompuServe that they would immediately be adding basic Internet email and FTP access to their connection services for both corporate and individual customers. This has been done in response to the demand from users for truly global networking and email capabilities. In the case of CompuServe, announcing the more comprehensive offering of the two contenders, the service will be provided immediately for their current 9600 baud customers, with an imminent upgrade to a full T1 (1.544 Mbps) speed connection — using frame relay and X.25 services — for access to the company's private TCP/IP network and to the public Internet. This demonstrates in a real, business-like way the increasing drive towards ubiquitous communications at ever higher data rates for all classes of User: private and corporate.

Distribution of software products electronically via satellite to corporate clients and retail outlets has recently been started as a new business venture by Hughes Network Systems and IBM: "DirecPC." Similarly, the Arizona corporation: LCD WorldComm, has recently been associated into the Arizona Technology Incubator to develop their on-line information and interactive communications services aimed at the manufacturing industry. This system will permit Users to work on and to perform on-line changes to applications such as CAD, data bases, and other

electronic documents. The KaStarcom system will stimulate the continued development of these markets by providing the high rate, point-of-use data communication links so crucial to these endeavors in an economic and efficient manner.

II.A.3.a.3 Phone Systems

The telephone companies were the first users of communications satellite capacity and it is only in recent years that television has overtaken and displaced the phones as the primary user. This has been caused in no small part by the increased availability on a global scale of inexpensive television receivers plus the human desire for non-participatory entertainment and emotional thrills. Therefore, the demand for television channel choices, including language choices, has sharply increased. However, phone traffic still accounts for a large percentage of the satellite capacity and this demand has been further enforced by the recent development of the Personal Communication Network (PCN) — also (less correctly) known as the Personal Communication System (PCS). But PCN is not so much a network technology as a service concept. It is intended to provide high-quality two-way communication services — both speech and data — to users on the move, outdoors and indoors. In this respect it is an enhancement and extension of the existing cellular phone systems and most of the standards being considered as a basis for the PCN standards were originally developed in the cellular market.

The current development of the Big LEO mobile phone systems seeks to profit from the boom in cellular (and PCN) telephone usage by making possible direct phone handset access via a satellite rather than via the cellular plus PSTN switches. This becomes clear by referring to Figure II.A.3.a.3-1[1]; this shows the generic architecture for a cordless phone system. In this case the interfacing service network is a PSTN or a PBX; however, it could as easily be a satellite network if the "service network" function is replaced by a satellite gateway station. The latter approach is illustrated in Figure II.A.3.a.3-2.[2] This illustrates a network communications system via a traditional bent-pipe, i.e., non-switching and traffic routing payload, communications satellite. As can be seen, the mobile communications terminal communicates via the satellite in the same way as any other type of user terminal: via a cell switching site (a variant of the local or transit exchange) and a satellite ground station. The satellite could, however, be replaced by a traffic switching payload satellite like IRIDIUM, Teledesic, Spaceway or KaStarcom; in this case, the satellite would also realize the traffic switching and routing functions of the cell switching site *and* of the satellite system management center shown in the Figure. The resultant system design

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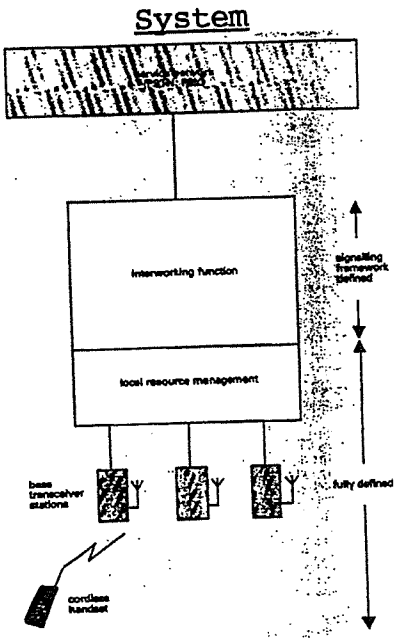
[1] *Developing Technologies for Personal Communication Networks;* P. S. Gaskell; Electronics and Communication Engineering Journal, April 1992.

[2] *Satellites in UTMS and B-ISDN: Status of Activities and Perspectives;"* P. Polese, R. Mort, L. Combarel; Electronics and Communication Engineering Journal, December 1994.

is shown in Figure II.A.3.a.3-3.[3] As can be remarked, the transit exchange function is now limited to the gateway to the PSTN.

Figure II.A.3.a.3-1: Generic Architecture For A Cordless Phone System



[3] Ibid., P. Polese et al.

Figure II.A.3.a.3-2: Network Communications Via A Bent-Pipe Satellite

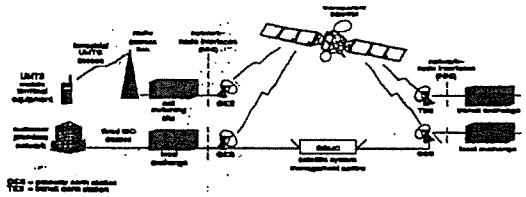
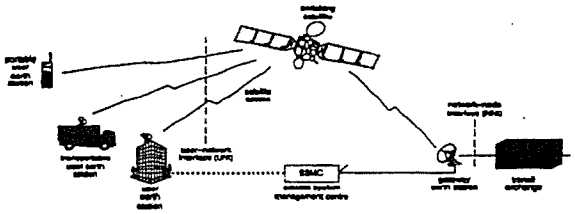


Figure II.A.3.a.3-3: Network Communications Via A Traffic Switching/Routing Satellite



While it is theoretically possible to also have direct access to a GEO-satellite from a phone handset, the technical and cost problems have so far prevailed against it. The CELSAT Application to the FCC to implement a Hybrid Personal Communication System (HPCS) at L-band, and the Hughes "Tritium" study for a cellular system at L-band, both used GEO-satellites with communication antennas of around 20 meters diameter to achieve the communication links with the handheld user terminals; but neither system has been implemented. Therefore, mobile phone links via a GEO-satellite have been confined to ship-, car- or truck-borne transponders (AMSC, INMARSAT) where it was possible to provide more transmitter power and a larger, more directional or steered terminal antenna.

However, a KaStarcom system operating at a higher frequency and with a higher satellite EIRP, would allow smaller, less directional antennas on the user terminals, thus facilitating the existing communications with vehicles. Similarly, the higher frequency would reduce the size of the satellite receive antennas from the 20 meters of the above L-band designs to around 1 - 1.5 meter for the same antenna gain at Ka-band. This is only slightly larger than the present

KaStarcom communications payload antennas. Hence, as the Ka-band receiver technology progresses in the near future, getting smaller and more sensitive, it is to be expected we will see the future development of handheld communications via the KaStarcom and similar Ka-band GEO-satellite network systems.

Although the Big LEO systems are intended to provide ubiquitous and global cellular phone coverage later this century, the four principal cellular license holders in Asia (Binariang, TRI, Hutchison, Shinawatra) are already installing C- and Ku-band VSAT backbone links between their cellular switches, i.e., they are implementing the approach of Figure IV.B.1.2. For example, CELCOM (Malaysia) has installed 10 meter C-band VSAT terminals in East Malaysia to link their switches there via RIMSAT's GORIZONT and EXPRESS satellites with their switches on the mainland of West Malaysia, and they are moving to expand the system into Cambodia and the other countries of Asia. The advantages of such an approach over the Big LEO systems are price (terrestrial cellular rates versus Big LEO rates) and immediacy for the developing market demand (today instead of some years hence). KaStarcom will be able to take great advantage of this trend and also extend it to the evolving PCN networks by implementing the approach of Figure III.B.1.3, with its consequent system efficiency and flexibility increases over the bent-pipe VSAT backbone approach of Figure III.B.1.2. And the KaStarcom system will offer the great advantages of price, capacity, performance and coverage when compared to the existing C and Ku-band satellites serving this market.

The migration of the present GEO and developing Little LEO pager services to the KaStarcom system presents no real technical challenges but offers the prospect of even smaller pager terminals as a consequence of the higher frequencies employed and the higher EIRP's available. Unlike the voice communications service, provision of this service is not dependent on the development of new technologies for communications between the GEO satellite and the pager unit.

The airlines have tried for some years to provide reliable in-flight phone systems allowing passengers to phone the office or home from their seat, and GTE Airphone has already added the capability for the passenger to receive in-coming calls as well as send calls. These phones have also included for some time the ability for the user to attach a laptop computer and establish a modem connection with the home or office. But the communications performance of these phones has not been optimum as a consequence of the lower transmission frequencies and lower bandwidth employed, and the problems with outages and fading due to the placement of the ground hub stations and incomplete coverage from the relevant GEO satellites. KaStarcom will overcome both problems over the CONUS, providing high capacity, high rate, high power communications links and continuous, uninterrupted coverage from above (rather than from below) the aircraft. And this service could be extended in the future to be a truly global system if additional satellites are added in international orbital locations. Alternatively, the KaStarcom satellites over the CONUS could cooperate with other international Ka-band satellites from other international operators.

Thus, the phone systems market can be summarized as:

- PSTN linking
- Inflight phones and data links
- Mobile communications from vehicles (cars, trucks, ships, etc.)
- Cellular phone hub/switch linking
- PCN hub/switch linking
- Pager links

II.A.3.a.4 Social Services

This market covers:

- Remote Medical Diagnostics and Treatment

KaStarcom will provide a functional equivalent of the "Flying Doctor" services used even today in the remote regions of Australia, Canada and, to a lesser extent, in the thinly populated rural areas of the USA. But the difference will be that the doctors will not need to be pilots and will not, in fact, need to leave their offices. Instead they will be connected to their patients by video-conferencing facilities operated via KaStarcom, enabling them to view the patient's demeanor and other physical symptoms while conducting an interview of the patient. This service will be further enhanced as low loss video compression technology improves in the future. Local nursing staff or paramedics at the remote facilities will be able to interact with doctors and specialists and perform tests requested by the doctors while the latter watch the results. Finally, doctors will be able to prescribe medications and describe other treatment programs to both the patients and the local nursing staff. The overall benefits to the patients will be to both provide guaranteed access to medical diagnosis and treatment and to provide access to a whole range of medical consultation from anywhere to anywhere in the U.S. without requiring travel by either party.

- Distance Learning

The development of distance learning techniques are proceeding very actively with the Community College system in the USA and with the colleges and universities in the Asia-Pacific region. This is driven both by the recognition that education is the key to social and economic development for a nation and by the need to more effectively provide access to complete

educational resources for everybody regardless of their geographic location. Thus, in the USA, the push is to take college and university courses to the population which lives remote from the centers of learning or are prevented attending full time classes by their need to be full time employed. This will also impact industrial training where corporate training instructors can also disseminate lectures and course materials without requiring travel to a central location.

The Community colleges have already successfully experimented with such techniques as interactive video-conferencing, computer conferencing, and televised distribution of lectures and many Colleges are now offering a growing range of courses in the distance learning format. Indeed, it is even possible to do some college degrees entirely by distance learning. The growth in the number of courses offered directly reflects the growth in demand. In the USA, the continuous increase in the number of students registering at Community Colleges is often likened to the addition of a new medium-sized college every month. Therefore, distance learning is clearly a market KaStarcom will greatly assist as a consequence of the system's inherent suitability for data communications, interactive video-conferencing, and so forth. The major difference will be that the KaStarcom system will facilitate the transition of these services from the present local centers, thus greatly increasing the efficacy of the distance learning process.

- Library Searches and Materials Distribution.

The Internet already offers an ability for businesses and private citizens to access a limited number of libraries and perform basic reference searches and information retrieval. But development of this service is limited by the performances of the modems and phone equipment employed for the link. KaStarcom will remove these barriers in one step, providing the capability for up to OC-3 class data communications if so desired for a particular User. This will be achieved by installing small and inexpensive VSAT-like terminals for each user as has been already discussed above.

Additionally, libraries are increasingly converting to digital recording on magnetic and CD disks in the place of microfiche. As computer-based desktop publishing is now almost the norm for the book publishing industry, there is no reason that books will not be available in the digital form on CD's for libraries in the future. Therefore, following a successful reference search by computer over the KaStarcom links, the transfer of complete books and other reference materials from the libraries to the readers over the same links will be entirely feasible. As has already been mentioned, these developments will be fostered by the mass production and mass marketing through stores and other retail outlets of the inexpensive KaStarcom user terminals.

- Earth Resource Products Distribution.

This market is similar in scope and approach to the library search and materials distribution just discussed, the only real difference being in the type of user who will be accessing the data: farmers, geologists, surveyors, and others needing this earth resource data for particular areas in various formats, sensitivities and resolutions. The processing centers work on the original digital data from the earth observation satellites, whether the data is originally a measurement result or an image. The bandwidth of the KaStarcom communication channels means the end-users can get the required data and images in digital form from the processing centers rather than having to wait for its transfer to magnetic disk or tape or conversion to photographs, and subsequent transmittal by courier or mail. The communication system also opens the possibility of the end-user and the processing center engaging in some real-time cooperative data manipulation before the user makes the transfer, thus greatly increasing the effectiveness of the earth resource operation.

Additionally, personnel exploring at remote sights can transmit near-realtime compressed imagery to assist in planning and deploying equipment to areas with difficult terrain.

II.A.3.a.5 Entertainment and Leisure Activities

We have already stated KaStarcom will not compete with the existing Ku-band DBS video systems until the service migrates to the Ka-band and ATM technology, so this service is classified as a "future market." However, digital audio radio service (DARS) and CD radio does not fall into this category because these two services do not yet exist even though a number of filings have been made with the FCC. And, because these services will ultimately use digital technology, they are easily implemented in ATM from the beginning. In fact, a Ka-band DARS system has the very real advantage over the presently proposed S-band systems of inherently smaller and higher gain User terminal antennas which can be easily integrated into the roof of a car as a conformal antenna; the latter would use the fabrication technologies already developed and implemented for military and commercial aircraft. A typical antenna would look like a thin "disk" some 10 cms in diameter, and would consist of a ceramic substrate carrying a printed circuit antenna pattern on the upper face and the necessary low noise amplifiers (LNA's) and downconverters as MMIC chips on the lower face. The whole would be encapsulated in a weatherproof conformal coating. These DARS antennas would be smaller than the standard 66 cm User terminal used for the full network access service because of the lower data rate of the audio transmission.

Because of KaStarcom 's background in broadcasting to niche markets, it will be a natural endeavor for the KaStarcom system to be used as a channel for DARS/CD radio broadcasts to the same community.

II.A.3.a.6 Utilities and Services

A number of low data rate but very important data collection services are already provided for via the GOES Satellite Data Collection System:

- Utility meter monitoring and interrogation
- Environmental monitor data collection and interrogation
- Remote telemetry (SCADA) systems

The data is distributed in the CONUS via the NOAA/NESDIS DOMSAT services on SATCOM K1; Users outside CONUS receive the data direct from GOES. Hence, a proven market exists which KaStarcom could service with the attendant advantages to the Users of being able to use a much smaller and cheaper ground terminal than the current GOES or DOMSAT ones. KaStarcom would also facilitate the expansion of the utility meter monitoring and interrogating service to the domestic meters — one can envision the domestic meters being connected into the domestic VSAT system. In addition SCADA-type services to collect data from remote utility facilities could be done inexpensively; for example, water flow pumping rates, etc.

A related service is the provision of disaster and emergency services communications. Clearly, the on-demand features of the KaStarcom system make the provision of this capacity on an extremely short notice very easy: the emergency service agencies (Fire, Medical, etc.) would be handled like any other User, able to access the system via the Orderwire channel and get the required capacity and coverage immediately assigned by the NCC. The data packet/ATM operating mode of the system replaces a "hard" allocation of channel resources with a "soft" one, making it easier for the NCC to schedule bandwidth among the competing users.

II.A.3.a.7 Air Traffic Control

The FAA is now moving to incorporate GPS-based navigation aids in all civil aircraft, meaning that in the future all aircraft will have an accurate knowledge of their own position derived from an on-board GPS receiver. Therefore, the air traffic control of all aircraft will become vastly easier and more precise if that same GPS-derived navigation data can be downlinked to the air traffic control centers for processing, correlation and display. Clearly, with its continuous, uninterrupted coverage from above of all aircraft over CONUS, KaStarcom will provide an economic and reliable real-time communications link for getting this GPS-derived navigation data from the aircraft to the air traffic control stations, and for routing instructions back to the pilots. The result will be a significant increase in the safety of air travel owing to the virtual elimination of the risk of mid-air collisions. The future extension of this service, from an international growth-version of KaStarcom, to aircraft over the oceans would bring the same benefits to trans-ocean air travel. Thus KaStarcom will complement the GPS system by facilitating

the distribution of GPS navigation data between the Users and one can foresee the same service being used for other GPS users: ships, recreational boats, cars, freight companies, pagers, etc.

II.A.3.a.8 Government

Naturally, the availability of a high rate, high capacity communications system covering the whole of the USA will be very attractive to the federal and state governments and to the military, especially when those communication services will be available at very low financial rates. For budgetary reasons, the military is already actively studying the replacement of their dedicated communications satellites with capacity on commercial systems. The KaStarcom system will fall in with that thrust. The relatively small terminals required will allow the military more flexibility.

II.A.3.b FUTURE MARKETS

II.A.3.b.1 Business Communications

The automobile is still one of the most important acquisitions for the American citizen and the automobile is one item where electronics and software have been making increasing inroads. This has been driven by the increasing federal and state regulations on emissions and safety, and by the public's demands for improved fuel economy, performance, reliability and sophistication. However, a side effect has been the increasing difficulty for the automobile repair technician to accurately and economically diagnose faults in the automobile's systems. Most automobiles are now already intended to be diagnosed by a technician using a diagnostic test set, and this trend will increase in the future as the automobile systems become even more electronic and software intensive. For this reason, the automobile companies are predicting that diagnostic tools will be the area of greatest growth in their industry in the future. But such test sets are not inexpensive and, unless some means can be found for the smaller repair business to gain economic access to the required test sets, it will inevitably mean the demise of the smaller operation in favor of the big chains.

The KaStarcom system offers a potential solution to this dilemma: the communications capabilities of the satellite system means a small and inexpensive standard front-end test set could be connected via a high speed modem and a small VSAT to a central diagnostic set elsewhere in the US, perhaps at the automobile manufacturer's facility. The front end would only have to provide the interface to the automobile's test connector and include a display for the results, so it would be very small and cheap to produce and buy. The expensive diagnostic unit, which also would need frequent and expensive upgrades to match the latest innovations in the automobile systems, would effectively be shared by very many repair shops or even provided for free by the automobile manufacturer.

II.A.3.b.2 Entertainment and Leisure Activities

As has already been mentioned, the KaStarcom system will be used for the DBS video market when the transmissions and the home terminals migrate to broadband ATM technology.

In November 1994, Pacific Bell, Alcatel and Ameritech combined efforts to demonstrate Pacific Bell's Cinema of the Future Network, transmitting in HDTV the Opening NBA basketball game. The game was relayed from the Detroit area to a United Artists theater in Los Angeles using ATM, digital compression, and SONET technology, and transmitted over fiber optic lines to HD video projectors in the theater. This was an example of what many believe will be the replacement of film stock as the medium for distribution of films to cinemas in the future: distribution of film in HDTV video compressed digital format to the cinema via satellite from a central distributor. The video would be sent at higher speed ahead of the viewing and stored on disc or tape at the cinema. Use of this technique would allow the cinemas to better adjust their offerings to the market demands, would be less expensive than film stock, and would provide a more consistent, less degraded image and audio quality over repeated screenings. Clearly, the KaStarcom system would play a key role in such a distribution scheme since the speeded-up, compressed HDTV signals would require a very high rate and reliable link in an on-demand mode. Thus, the film distribution companies would digitize and compress the film, and convert the signal to ATM cell format with the appropriate ATM cell address headers for the intended cinemas. They would then uplink it to KaStarcom from their own traffic hub stations, and the satellite payload would downlink the film to the designated cinemas depending on the decoded ATM cell addresses. Each cinema would have a standard KaStarcom high rate user terminal connected to disc or tape storage equipment.

A natural extension of the phone and video systems on-board aircraft discussed above would be the provision of on demand video distribution for aircraft inflight entertainment. This would allow the airlines to stop carrying video recordings and instead provide access to the Pay-TV channels and free TV channels for each passenger from an individual seat video unit. Obviously, to do this means the aircraft has to be in constant communication with the TV stations and this is only achievable by using a GEO-satellite as the link.

Similarly, the frequently touted development of interactive home video will require a high rate and reliable two-way communications link between the home and the broadcast station. It also means the home video equipment has to migrate to ATM and data packet technology in order to implement an effective interactive system. Thus, KaStarcom automatically becomes the communication system of choice as that technology is introduced as an adjunct to home video.

II.A.3.b.3 Social

There are already exiting developments in progress in the fields of medical surgery and transportation highways which will crucially depend on communication systems like KaStarcom if they are to ever be implemented in reality:

- Remote Controlled "Virtual" Surgery By Telepresence

This is an extension of the remote diagnosis and medication already possible today, to the realm of surgery. MIT, SRI International and JPL are very active in this field, working with many hospitals and surgeons to develop working techniques. One of the thrusts for these "telepresence" developments comes from the military who see advantages for performing surgery on wounded soldiers in the thick of battle by surgeons in their base hospitals behind the front lines. But the same advantages will also apply for the non-military public for much the same reasons as were already discussed for remote diagnostics and medication. Apart from the technical problems to be resolved at the surgeon's and the patient's ends of the link, the whole concept will fail if there is not a wide bandwidth and extremely reliable two-way data link between the two locations capable of supporting real-time applications. In the development labs fiber optic links are frequently used for this reason. But for the real systems the KaStarcom communications links will provide the answer.

- Intelligent Highway Data Communications

The idea of instrumented highways on which the automobiles are controlled for speed, spacing and actual route taken by central "highway computers" has been a dream for many years. Now the development of powerful computers, software and instrumentation promises to make the dream a reality in the not too distant future. But, again, very capable and reliable communication links are crucial to this development. Clearly, fiber optics will be used to link the hardware elements in the local nets but the wide band RF links from the KaStarcom system will be essential for linking the local nets into the wide area system as well as for providing restoration capabilities for cable failures.

II.A.3.b.4 Phone Systems

As was mentioned above, mobile communications between a handset and a GEO satellite are not really practical today despite the fact a number of papers and proposals have been written to the contrary. However, as was also discussed, it is expected the situation will change in the future, and that the Ka-band operating frequencies of the KaStarcom system will be instrumental in fostering that change.