

FREQUENCY COORDINATION AND INTERFERENCE  
ANALYSIS REPORT

PREPARED FOR  
ORBITAL COMMUNICATIONS

HERNDON, VA  
EXPERIMENTAL AUTHORIZATION 2004/2005 REQUEST  
4/6 GHZ BANDS

PREPARED BY  
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MARCH 10, 2004

# ORBITAL COORDINATION REPORT

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## 1. CONCLUSIONS

AN INTERFERENCE STUDY CONSIDERING ALL EXISTING, PROPOSED AND PRIOR COORDINATED MICROWAVE AND SATELLITE FACILITIES WITHIN THE COORDINATION CONTOURS OF THE PROPOSED GSO SATELLITE TEST BED IN HERNDON, VA DEMONSTRATES THAT THIS SITE WILL OPERATE SATISFACTORILY WITH THE COMMON CARRIER MICROWAVE AND SATELLITE ENVIRONMENT BASED UPON THE OPERATIONS NOTED IN THE SUMMARY OF RESULTS (SECTION 2).

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## 2. SUMMARY OF RESULTS

ORBITAL'S INTEGRATION AND TESTING OF COMMERCIAL COMMUNICATIONS SATELLITES EXPERIMENTAL AUTHORIZATION INVOLVES OPERATING, AT LOW POWER LEVELS, WITHIN THE COMMON CARRIER C-BAND FREQUENCY RANGES. SPECIFICALLY, THE FACILITY IN HERNDON WILL OPERATE BETWEEN 3.7-4.2 GHZ (4 GHZ) AND 5.925-6.425 GHZ (6 GHZ). THE FACILITY WILL BE IN OPERATION STARTING AROUND APRIL 2004 AND WOULD LIKE TO OPERATE FOR A PERIOD OF TWO (2) YEARS. THE LICENSED SERVICES OPERATING WITHIN THESE FREQUENCY BANDS INCLUDE POINT-TO-POINT COMMON CARRIER FIXED SERVICE MICROWAVE LINKS AND COMMERCIAL GSO FSS SATELLITE SYSTEMS. THE FIXED SERVICE LINKS RECEIVE IN BOTH THE 4 AND 6 GHZ BANDS AND THE SATELLITE SYSTEMS RECEIVE ONLY IN THE 4 GHZ BAND. IT SHOULD BE NOTED THAT ALL TRANSMISSIONS WILL BE PERFORM INSIDE THE TEST FACILITY IN HERNDON, WHICH CONSIST OF A FULLY ENCLOSED METALLIC BUILDING AND THAT THE AREA OF TRANSMISSION INSIDE THE BUILDING HAS BEEN SPECIFICALLY DESIGN WITH RF ABSORBING MATERIALS TO REDUCE RF LEVELS.

COMSEARCH HAS PERFORMED AN INTERFERENCE ANALYSIS FOR THE 4 AND 6 GHZ BANDS. USING THE PROPOSED GSO FSS TEST CONFIGURATION THREE SEPARATE INTERFERENCE ANALYSES WERE PERFORMED: INTO 4 GHZ FS, INTO 4 GHZ FSS, AND INTO 6 GHZ FS. DETAILS OF THE TECHNICAL PARAMETERS USED IN THE ANALYSIS ARE INCLUDED IN SECTION 2. COMPLETE ANALYSIS DETAILS ARE INCLUDED AS ATTACHMENTS TO THIS REPORT.

BASED UPON THE RESULTS OF THE STUDIES NO POTENTIAL FOR INTERFERENCE IS EXPECTED FROM THIS FACILITY. THE ANALYSIS INDICATES THAT DUE TO THE RELATIVELY LOW POWER LEVELS AND THE ATTENUATING EFFECTS OF THE TEST

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ENCLOSURE AND BUILDING THAT NO 4 OR 6 GHZ RECEIVER WILL BE ADVERSELY  
AFFECTED BY THE OPERATION OF THIS FACILITY.

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## 3. SUPPLEMENTAL SHOWING RE: PART 25.203(C)

PURSUANT TO PART 25.203(C) AND 101.103(D) OF THE FCC RULES AND REGULATIONS, THE SATELLITE INTEGRATION AND TEST FACILITY PROPOSED IN THIS EXPERIMENTAL APPLICATION WAS COORDINATED BY COMSEARCH USING COMPUTER TECHNIQUES AND IN ACCORDANCE WITH PART 25 OF THE FCC RULES AND REGULATIONS.

COORDINATION DATA FOR THIS EARTH STATION WAS PERFORM VERBALLY AND USING EMAIL DURING THE PERIOD BETWEEN FEBRUARY 15 AND MARCH 10, 2004. THE FOLLOWING LICENSEES OR THEIR PROTECTION AGENTS WERE CONTACTED.

### 4 GHZ GSO FSS LICENSEES OR THEIR AGENTS:

COMSEARCH

### 4 GHZ FS LICENSEES OR THEIR AGENTS:

COMSEARCH

MCI WORLDCOM

AT&T

### 6 GHZ FS LICENSEES OR THEIR AGENTS:

COMSEARCH

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## 4. EARTH STATION COORDINATION DATA

THIS SECTION PRESENTS THE DATA PERTINENT TO FREQUENCY COORDINATION OF THE PROPOSED TEST FACILITY, WHICH WAS CIRCULATED TO ALL COMMON CARRIERS WITHIN ITS COORDINATION CONTOURS. THE TEST WAS ANALYZED AND COORDINATED AS TWO SIMPLEX POINT-TO-POINT MICROWAVE LINKS, OPERATING IN THE 4 AND 6 GHZ BANDS. THE EXPERIMENTAL REQUEST HAS A COMPLETE DESCRIPTION OF THE INTEGRATION AND TEST FACILITY. THE WORST CASE POWER LEVELS EMINATING FROM THE TEST SETUP WERE CONSIDERED IN THIS ANALYSIS.

### 4 GHZ TEST LINK

TRANSMIT SITE - TEST BAY, HERNDON, VA

TX LATITUDE: 39 00 56 N

TX LONGITUDE: 77 25 42 W

TX GND ELEVATION: 72.3 M

TX ANTENNA CENTERLINE: 6.1 M

RECEIVE SITE: TEST BAY, HERNDON, VA

TX LATITUDE: 39 00 56 N

TX LONGITUDE: 77 25 42 W

TX GND ELEVATION: 72.3 M

TX ANTENNA CENTERLINE: 25 M

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THE TRANSMISSION AND POWER PARAMETERS ARE SHOWN BELOW

<b>FREQUENCY SPAN, NULL-NULL BANDWIDTH (GHZ)</b>	<b>MODULATION TYPE</b>	<b>MAXIMUM EFFECTIVE RADIATED POWER (ERP)</b>
3.700 - 4.200	CONTINUOUS WAVE (CW)	+10 DBW
3.70175	FREQUENCY SHIFT KEYING WITH RANGING TONES	+10 DBW
4.198 - 4.199875	FREQUENCY SHIFT KEYING WITH RANGING TONES	+10 DBW
5.945- 6.425	CONTINUOUS WAVE (CW)	+1 DBW

## ADDITIONAL DETAILS:

THREE TYPES OF ANTENNAS ARE USED IN THE PRODUCTION OF OUR SATELLITES. THEY ARE AS FOLLOWS:

1. HIGH GAIN SHAPED REFLECTOR - THIS IS THE MAIN COMMUNICATIONS ANTENNA FOR 3.7 - 4.2 GHZ CW TRANSMISSION. THE ANTENNA IS POINTED HORIZONTALLY DIRECTLY INTO A FIELD OF ANECHOIC MATERIAL LOCATED ON THE ROOF OF THE TEST FACILITY. ADDITIONAL ANECHOIC MATERIAL IS PLACED AROUND THE ANTENNA AND ON THE FLOOR TO ABSORB ANY STRAY RADIATION FROM THE SPILLOVER OF THE FEED HORN, WHICH IS POINTED DOWN AT THE REFLECTOR.
2. OMNI ANTENNA - THIS IS AN OMNI ANTENNA WHICH IS SURROUNDED BY ANECHOIC MATERIAL AND LOCATED IN A METAL BUILDING
3. WIDE COVERAGE ANTENNA - THIS IS A DIRECTIONAL ANTENNA WHICH POINTED HORIZONTALLY INTO A FIELD OF ANECHOIC MATERIAL LOCATED ON THE ROOF OF THE TEST FACILITY.

THE SHIELDED TEST AREA AND ANECHOIC MATERIAL ARE USED TO ABSORB NEARLY ALL RADIATED ENERGY. A CONSERVATIVE ESTIMATE OF UP TO 50 DB OF ATTENUATION HAS BEEN ATTRIBUTED TO THE ANECHOIC MATERIAL AND METAL WALLS OF THE BUILDING.



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## 5. CERTIFICATION

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE FREQUENCY COORDINATION DATA CONTAINED IN THIS APPLICATION, THAT I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS, THAT I HAVE EITHER PREPARED OR REVIEWED THE FREQUENCY COORDINATION DATA SUBMITTED WITH THIS APPLICATION, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.



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DATED: MARCH 11, 2004