# Attachment B

**Exhibit 1**

ICO

September 22, 2006

Mr. James Burtle
Chief, Experimental Licensing Branch
Office of Engineering and Technology
Federal Communications Commission
445 Twelfth Street, Southwest
Washington, D.C. 20554

Dear Mr. Burtle:

ICO Global Communications ("ICO") and Globalstar, Inc. ("Globalstar") submit this letter in support of an application for experimental special temporary authority for testing at earth stations in Brewster, Washington using frequencies in the 5/7 GHz band.

Since 2000, ICO and Globalstar, Inc. have coordinated use of the 5/7 GHz band to support feeder link operations of their respective non-geostationary satellite systems under an interim coordination agreement.[1] By this letter, ICO and Globalstar confirm that the interim coordination agreement for sharing the 5150-5250 MHz (uplink) band and the 6975-7075 MHz (downlink) band, in which the gateway earth stations of these systems operate, remains in effect.

Please direct any questions regarding the above-referenced application to the undersigned.

Sincerely,

Suzanne Hutchings Malloy
Senior Regulatory Counsel
ICO Globalstar Communications

William F. Adler
V.P., Legal and Regulatory Affairs
Globalstar

[1] The U.S. Table of Allocations provides for the use of the 5150-5250 MHz (uplink) band and the 6975-7075 MHz (downlink) band by two gateway earth stations operating with the Globalstar syster gateway earth station operating with the ICO system.

815 Connecticut Avenue, NW
Suite 610
Washington, DC 20006

202 330 4005 phone
202 330 4008 fax
web: www.ico.com

# Exhibit 2

**FOR INFORMATION** **Doc. 35293/1**

U.S. Department
of Transportation
**Federal Aviation Administration**

800 Independence Ave., SW.
Washington, DC 20591

AUG 23 2006

***MEMORANDUM***

Mr. Karl B. Nebbia
Chairman, Interdepartment Radio Advisory Committee
National Telecommunication and
Information Administration
1401 Constitution Ave. NW
Washington, DC 20230

Subject: Coordination of ICO feeder link earth stations at Brewster, WA

Dear Mr. Nebbia:

In February 2002, the FAA received a request from ICO to coordinate their planned installation of a feeder link earth station in Brewster, WA. The coordination involved two meetings and discussion of analyses performed by ICO to determine the compatibility with existing and planned microwave landing system sites. The Brewster earth stations were successful coordinated. Recently, ICO coordinated with the FAA their request to renew their Federal Communications Commission (FCC) license. As a result of the successful coordination, the FAA had no objection to the FCC license renewal.

I would like to provide the documentation of the first coordination as information to the IRAC for the record. No action is being requested of the IRAC or National Telecommunications and Information Administration.

Please contact me at 202-493-4157 if you have any questions.

Sincerely,

Michael Richmond
FAA Representative

Enclosures (2)

## MINUTES OF SECOND AND THIRD MEETINGS

INTERFERENCE PROTECTION OF MLS SITES
IN REGARD TO 5 GHz OPERATION OF
USEI'S EARTH STATIONS AT BREWSTER, WASHINGTON
WITH ICO SATELLITES

On February 1, 2000 and February 7, 2000, the below-listed representatives from U.S. Electrodynamics, Inc. ("USEI") and ICO Global Communications ("ICO") discussed with Federal Aviation Administration ("FAA") personnel the potential for harmful interference to existing operational and planned installations of the aeronautical radionavigation service microwave landing system (MLS) from the five transmit/receive earth station antennas at Brewster, Washington ("Brewster Satellite Access Node (SAN)"), which are to provide tracking, telemetry and command ("TT&C") and feeder link communication carriers for the ICO medium Earth orbit satellite system.

In accordance with the Federal Communications Commission ("FCC") Order and Authorization of June 24, 1999, USEI is required to demonstrate, prior to commencing operation of its antennas, that its operation will not cause interference to existing and planned MLS installations. A list of these sites is attached as Exhibit 1.

At these meetings, ICO presented a detailed analysis of interference from Brewster Satellite Access Node operations (single or aggregate carrier total EIRP of 81 dBW) into MLS receiver at aircraft landing at Moses Lake, Wenatchee and Pemberton (Canada), in order to assess if the ARINC 727 MLS "out of band" interference protection criterion of –55 dBm (in the range 5150-5250 MHz) would be respected. A copy of the ICO study describing the analysis and reviewed at each meeting is attached as Exhibit 2.

At the meetings, the FAA posed technical questions. The ICO staff responded to all of the queries by the second meeting. At the conclusion of the second meeting, the FAA felt that ICO had satisfactorily demonstrated that harmful interference would not be caused to the MLS stations of concern.

Under the worst case scenario, ICO demonstrated the following: (1) the maximum worst case interference level to MLS receivers on aircraft landing at Moses Lake is –74.5 dBm; (2) the maximum worst case interference level to MLS receivers on aircraft landing at Wenatchee is –62.4 dBm; and (3) the Brewster Satellite Access Node would not have the visibility of aircraft operating MLS and landing at Pemberton (Canada).

It was agreed among the parties to the meeting that:

(1) The FAA considered that Brewster Satellite Access Node operations, within the parameters as described by ICO and USEI, would not cause interference concerns with respect to the existing and planned MLS operations in Washington State and Pemberton (Canada).

(2) The FAA agreed to notify NTIA and the FCC that the Brewster Satellite Access Node 5 GHz emissions in the band 5150-5250 MHz, operating up to an aggregate total EIRP of 81 dBW, SAN minimum elevation angle of 5 degrees, SAN circular polarization and SAN antenna radiation pattern

complying with ITU-R Rec. S.580, would not cause harmful interference to MLS operations to the set of existing and planned MLS installations in Washington State and Pemberton Canada.

(3) USEI and ICO would prepare these Draft Meeting Minutes for circulation to all the participants for their comments.

Exhibits

Attendees:
(1) Michael Richmond, FAA
(2) Robert Frazier, FAA*
(3) Tom Christein, FAA*
(4) Fred Neudecker, FAA*
(5) Tony Azzarelli, ICO
(6) Jeffrey Binckes, ICO
(7) Kumar Singarajah, ICO**
(8) William Coulter, USEI*
(9) Elizabeth Holowinski, USEI

* Attended February 1, 2000 Meeting only.

** Attended February 7, 2000 Meeting only.

## EXHIBIT 1

| MLS Station | Geographic Coordinates | Particulars of Operation |
|---|---|---|
| Wenatchee, WA | 47° 24' 00" N, 120° 12' 00" W | MLS @ Runway 30; Runway length 5500 ft; Airport elevation 1249' above mean sea level ("amsl"); Antenna oriented 315° True North |
| Moses Lake, WA | 47° 13' 43" N, 119° 19' 41" W<br>47° 11' 36" N, 119° 18' 34" W | Active MLS @ Runway 32R; Runway length 13,503 ft; Airport elevation 1185' amsl; Antenna oriented 162° True North |
| Seattle, WA | 47° 27' 42" N, 122° 17' 34" W | Not available |
| Bellingham, WA | 48° 47' 09" N, 122° 32' 11" W<br>48° 48' 18" N, 122° 32' 15" W | Active MLS @ Runway 34; Runway length 6751 ft; Airport elevation 166' amsl; Antenna oriented 180° True North |
| McChord, WA | 47° 08' 18" N, 122° 28' 36" W<br>47° 07' 36" N, 122° 28' 28" W | Transportable military system; A cylindrical coverage volume is assumed |
| Pullman, WA | 46° 44' 26" N, 117° 07' 08" W<br>46° 44' 34" N, 117° 06' 38" W | Planned MLS @ Runway 23; Runway length 6731 ft; Airport elevation 2551' amsl; Antenna oriented 70° True North |
| Portland, OR | 45° 34' 52" N, 122° 35' 09" W<br>45° 35' 55" N, 122° 37' 50" W | Not available |
| Pemberton, Canada | 50° 18' 28" N, 122° 46' 30" W | Not available |

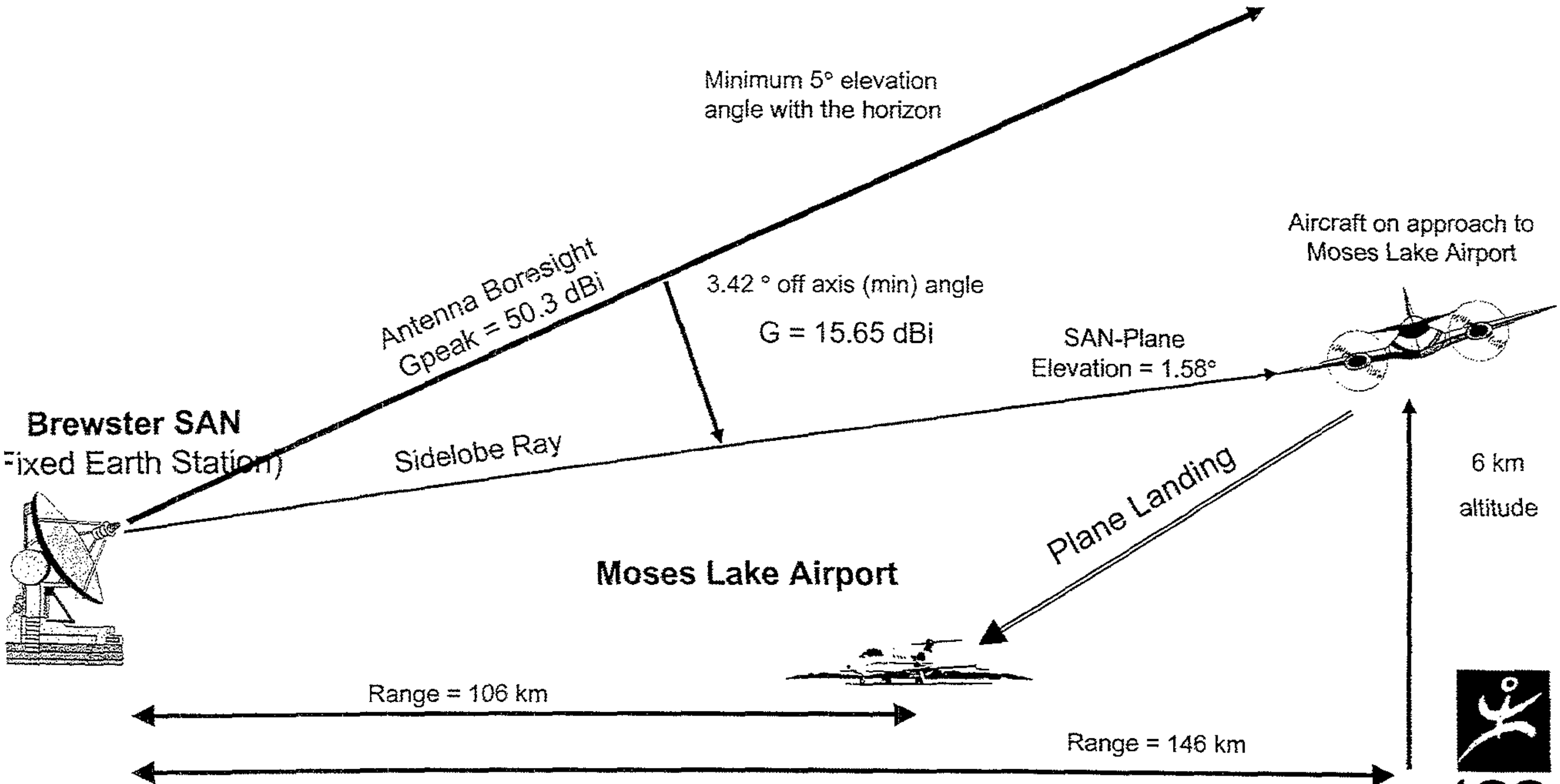
# ANNEX 1 : BREWSTER - MOSES LAKE





ICO

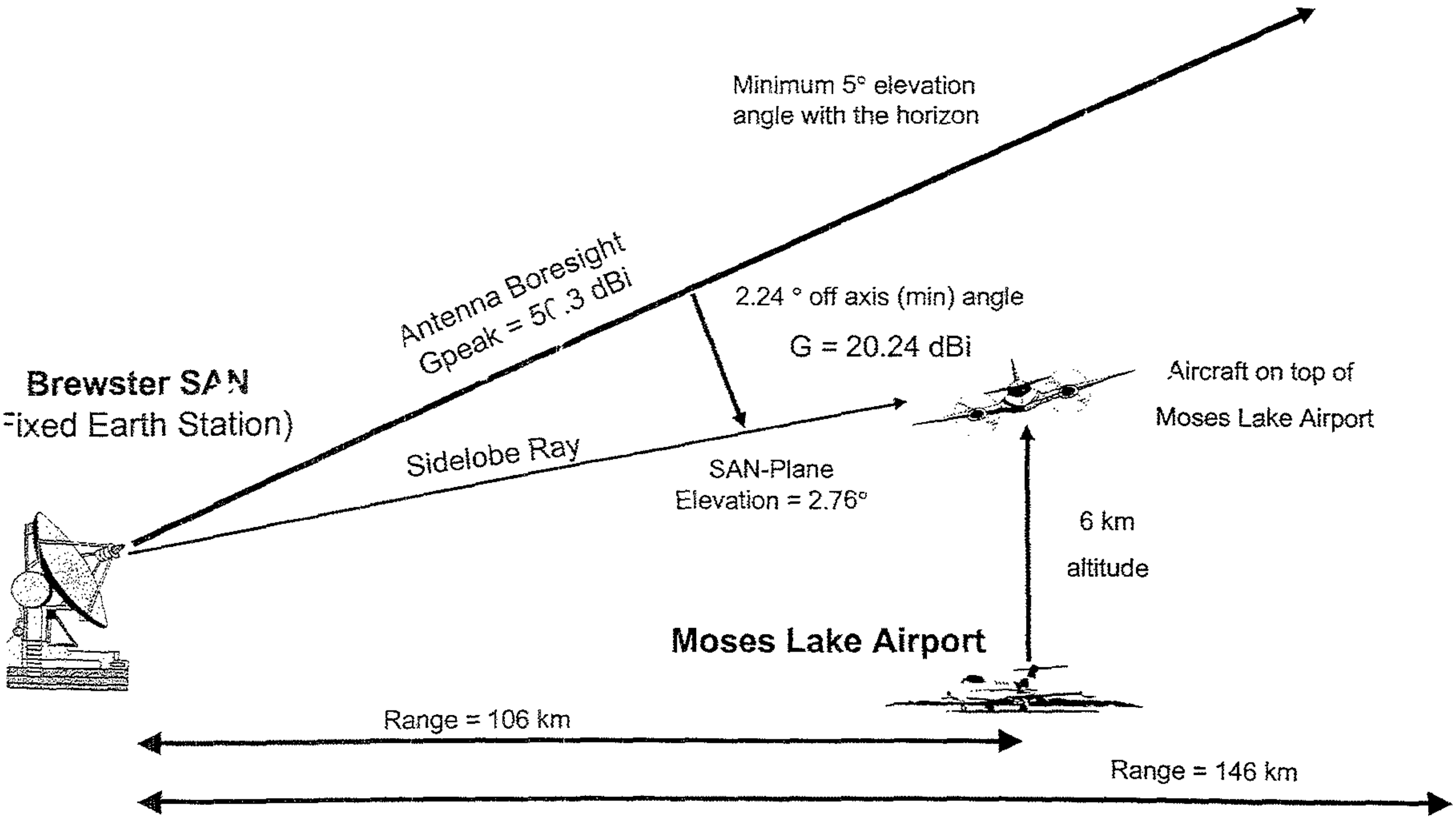
# Interference Geometry - Real Case






ICO

# Interference Geometry - Worst Calculation Case

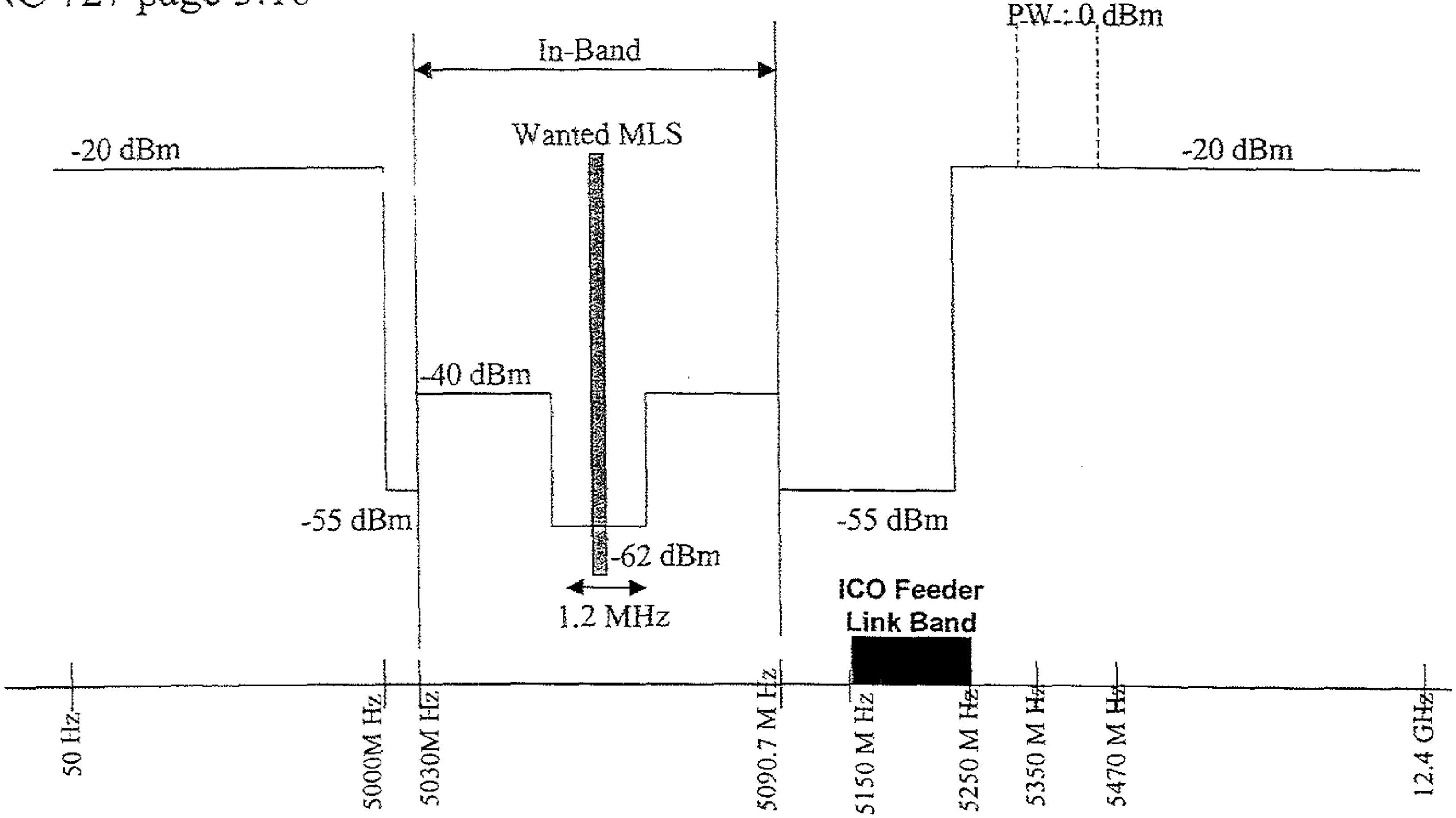





ICO

# ARINC 727 Interference Specifications

ARINC 727 page 3.16






ICO

# Worst Calculation Case - As per Communication

| | | |
|---|---|---|
| * TT&C Emergency Mode SAN Peak EIRP | = 81 dBW | |
| * Plane Elevation Angle from Brewster | = 2.76 degrees | |
| * Worst Case SAN Off-Axis Angle to Plane ($\theta$) | = 5.0 - 2.76 = 2.24 degrees | |
| * SAN Antenna Gain toward plane | = 29 - 25 Log($\theta$) = 20.25 dB | |
| * SAN Peak Gain | = 50.3 | |
| * Gain Differential | = 50.3 - 20.25 = 30.05 dB | |
| * EIRP toward plane | = 81 - 30.05 dBW | = 50.95 dBW |
| * Free Space Path Loss (106 km) | | = -147.11 dB |
| * MLS antenna Gain | | = 0 dBi |
| * Polarization Advantage | = -1 dB | |
| *Worst Case Total Interference Power at Antenna Output | = -97.15 dBW | |
| | or | = -67.15 dBm |
| * Interference Threshold level | | = 55 dBm |
| * Margin | = 12.15 dB | |



ICO

# Worst Calculation Case - Modified

* TT&C Emergency Mode SAN Peak EIRP = 81 dBW
* Plane Elevation Angle from Brewster = 2.55 degrees
* Worst Case SAN Off-Axis Angle to Plane ($\theta$) = 5.0 - 2.76 = 2.45 degrees
* SAN Antenna Gain toward plane = 29 - 25 Log($\theta$) = 19.3 dB
* SAN Peak Gain = 50.3
* Gain Differential = 50.3 - 19.3 = 31.0 dB
* EIRP toward plane = 81 - 31.0 dBW = 50.0 dBW

* Free Space Path Loss (106 km) = 20 Log(4$\pi$ 5.2/0.3 *106000) = = -147.27 dB

* MLS antenna Gain = 0 dBi
* Polarization Advantage = -1 dB

*Worst Case Total Interference Power at Antenna Output = -98.27 dBW
or = -68.27 dBm

* Interference Threshold level = -55 dBm

* Margin = 13.27 dB



ICO

# Worst Calculation Case - Real Case

| | | |
|---|---|---|
| * TT&C Emergency Mode SAN Peak EIRP | = 81 dBW | |
| * Plane Elevation Angle from Brewster | = 3.42 degrees | |
| * Worst Case SAN Off-Axis Angle to Plane ($\theta$) | = 5.0 - 3.42 = 1.58 degrees | |
| * SAN Antenna Gain toward plane | = 29 - 25 Log($\theta$) = 15.65 dB | |
| * SAN Peak Gain | = 50.3 | |
| * Gain Differential | = 50.3 - 15.65 = 34.65 dB | |
| * EIRP toward plane | = 81 - 34.65 dBW | = 46.35 dBW |
| * Free Space Path Loss (143 km) = 20 Log(4$\pi$ 5.2/0.3 *143000) = | | = -149.87 dB |
| * MLS antenna Gain | | = 0 dBi |
| * Polarization Advantage | = -1 dB | |
| *Worst Case Total Interference Power at Antenna Output | = -104.52 dBW | |
| | or | = -74.52 dBm |
| * Interference Threshold level | | = -55 dBm |
| * Margin | = 19.52 dB | |



ICO

# Ameliorating Factors

Why Worst Case ?

* TT&C Emergency is normally used during launch phase and in emergency only cases, I.e. when there is a state of satellite being lost. Normal Cases TT&C = 66 dBW.

* The SAN antennas will be moving with the moving satellites, hence the % time that the antenna will be pointing toward the Moses Lake direction and near the 5 degrees minimum elevation will be much much less than 1% of the time

* The Terrain will block SAN emissions when plane is approaching Moses Lake run-way. From simulations this will happen at plane-runway distance of about 12 km. In such cases the interfering signal level will be many dBs below the line of sight interference level.

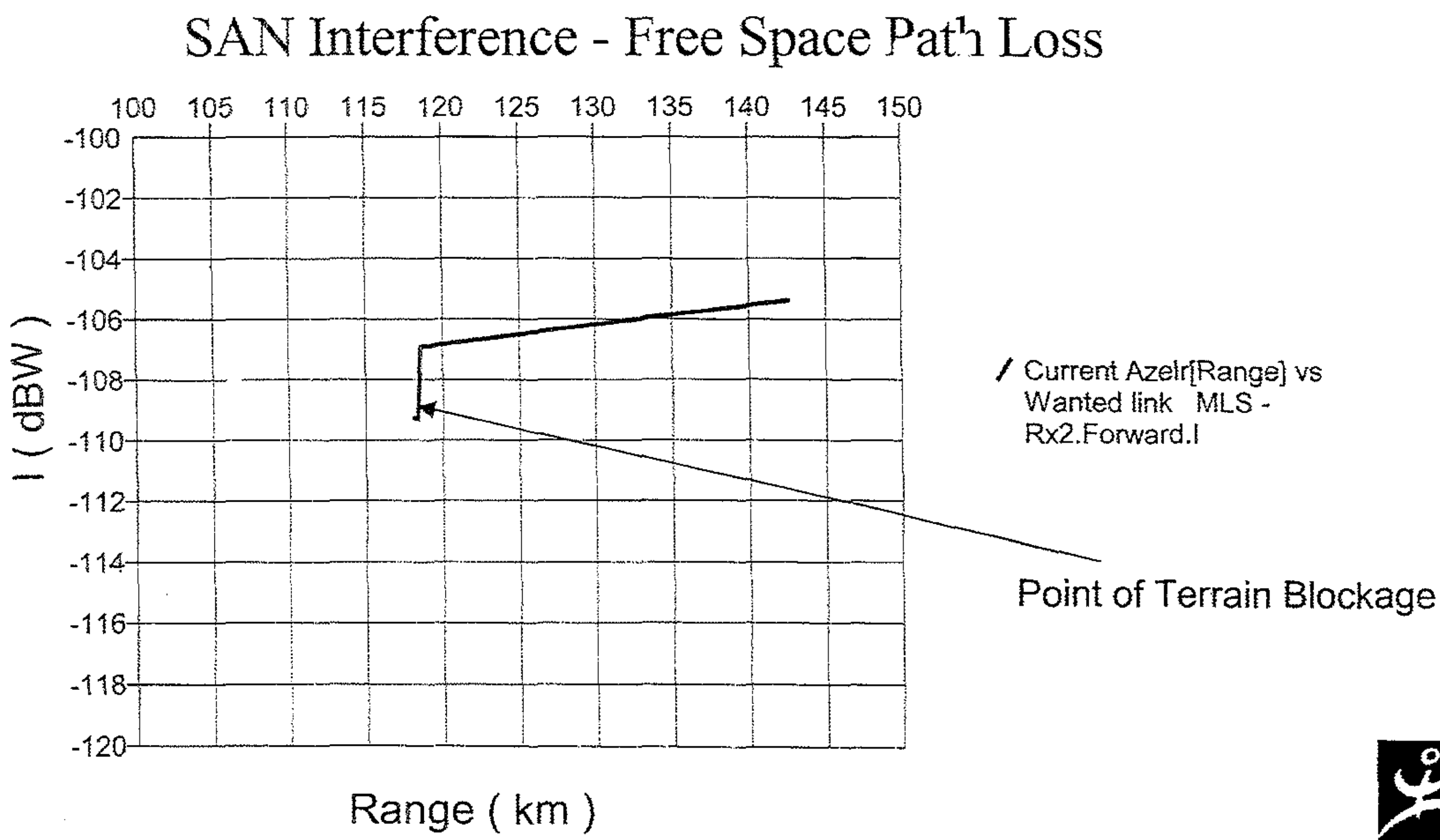
* As the plane approaches the run-way and descends, the minimum SAN off-axis angle will increase, hence the Interference level toward the plane will decrease (see simulations).

* MLS Receive Wanted Signal Level increases by 6 dB for every halving of plane-runway distance as plane is approaching to run-way.



ICO

# Interference At Approach Path



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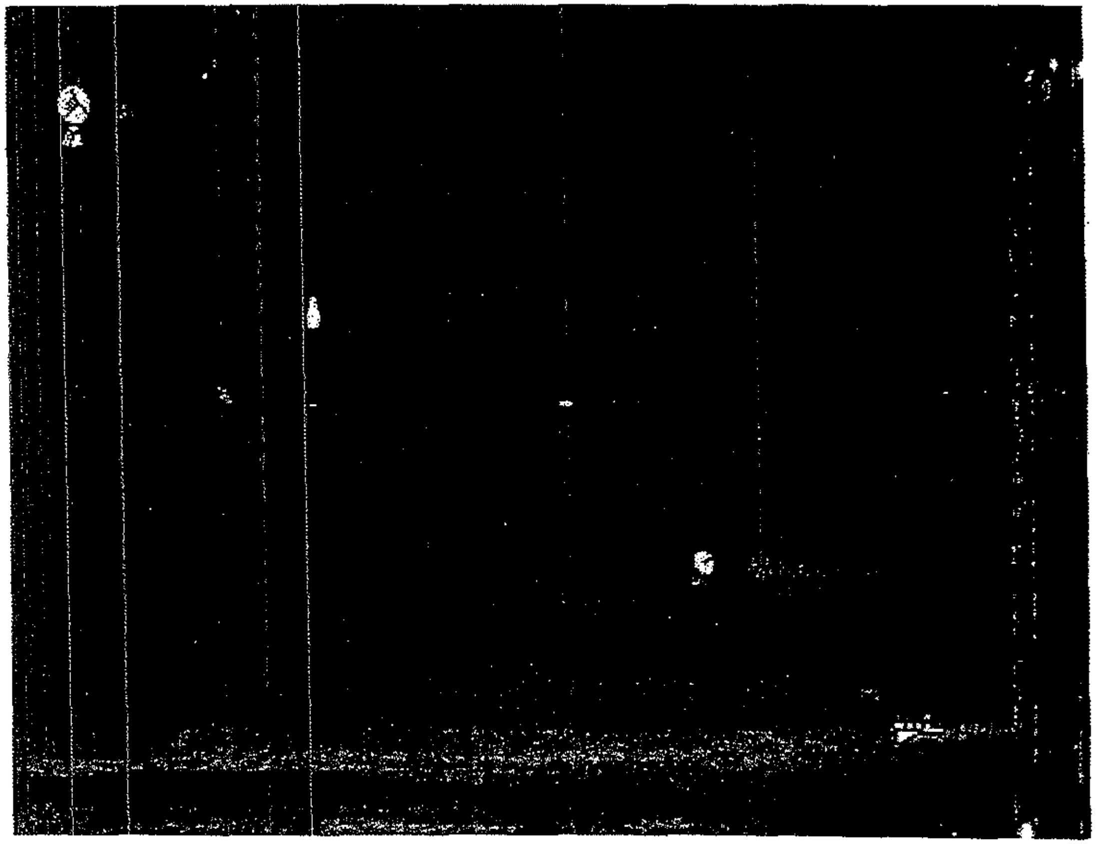
# Brewster - Moses Lake Map



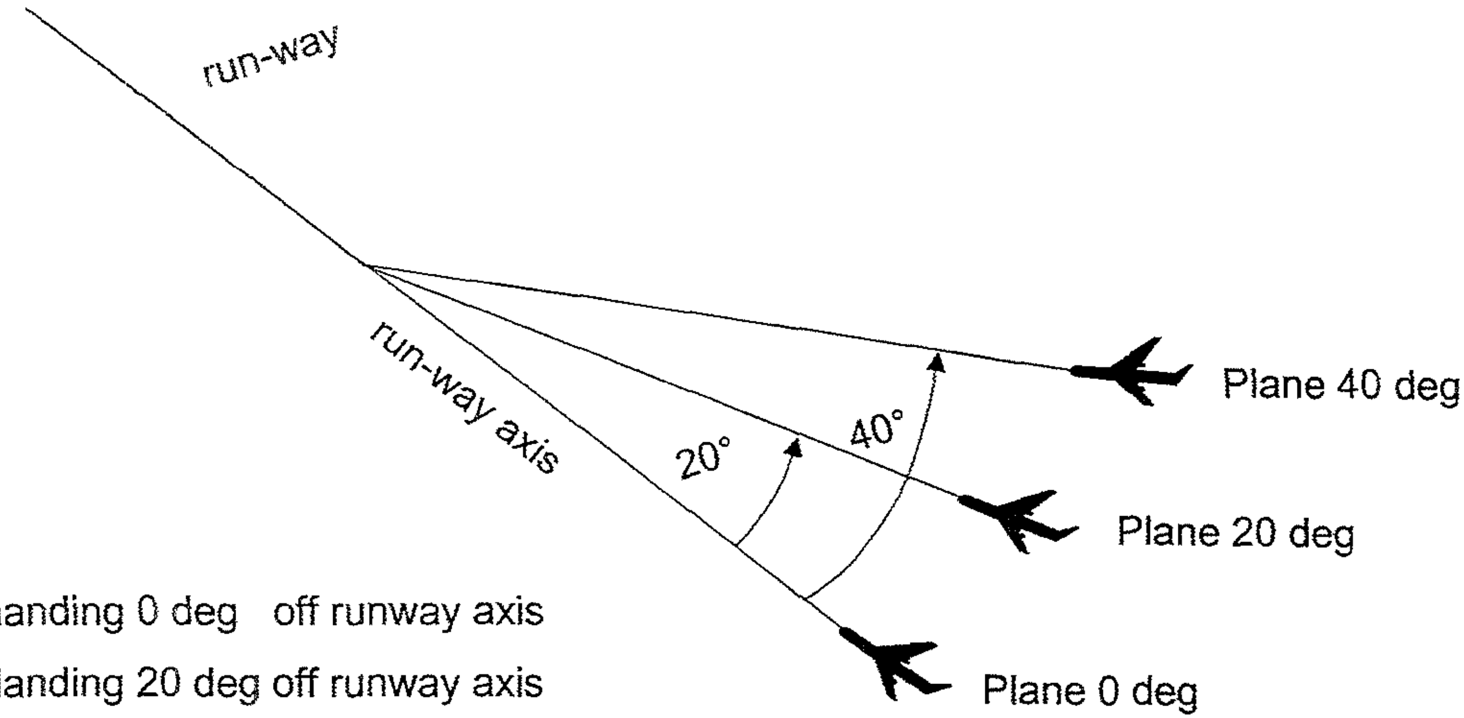
# ANNEX 2: BREWSTER - WENATCHEE

- Landing Scenarios
- Brewster - Wanatchee Map
- SAN - Plane Link Geometry at Worst Case
- SAN-Plane Worst Case Interference
- Interference Calculation from Brewster to MLS Receiver Landing at Wenatchee
- Terrain Blockage
- Worst Case Vertical Profile for Link 2
- Worst Case Vertical Profile for Link 3
- Worst Case Vertical Profile for Link 4
- Link 2B at Terrain Blockage
- Link 3B at Terrain Blockage
- Link 4B at Terrain Blockage



ICO

# Landing Scenarios




**Definition**

Plane 0 deg = plane landing 0 deg off runway axis

Plane 20 deg = plane landing 20 deg off runway axis

Plane 40 deg = plane landing 40 deg off runway axis



ICO

# Calculation of Interference

Here it is shown:

1. The geometry of the landing paths at Wenatchee with respect to Brewster.

2. The worst case interference scenario on page 15 and 16.

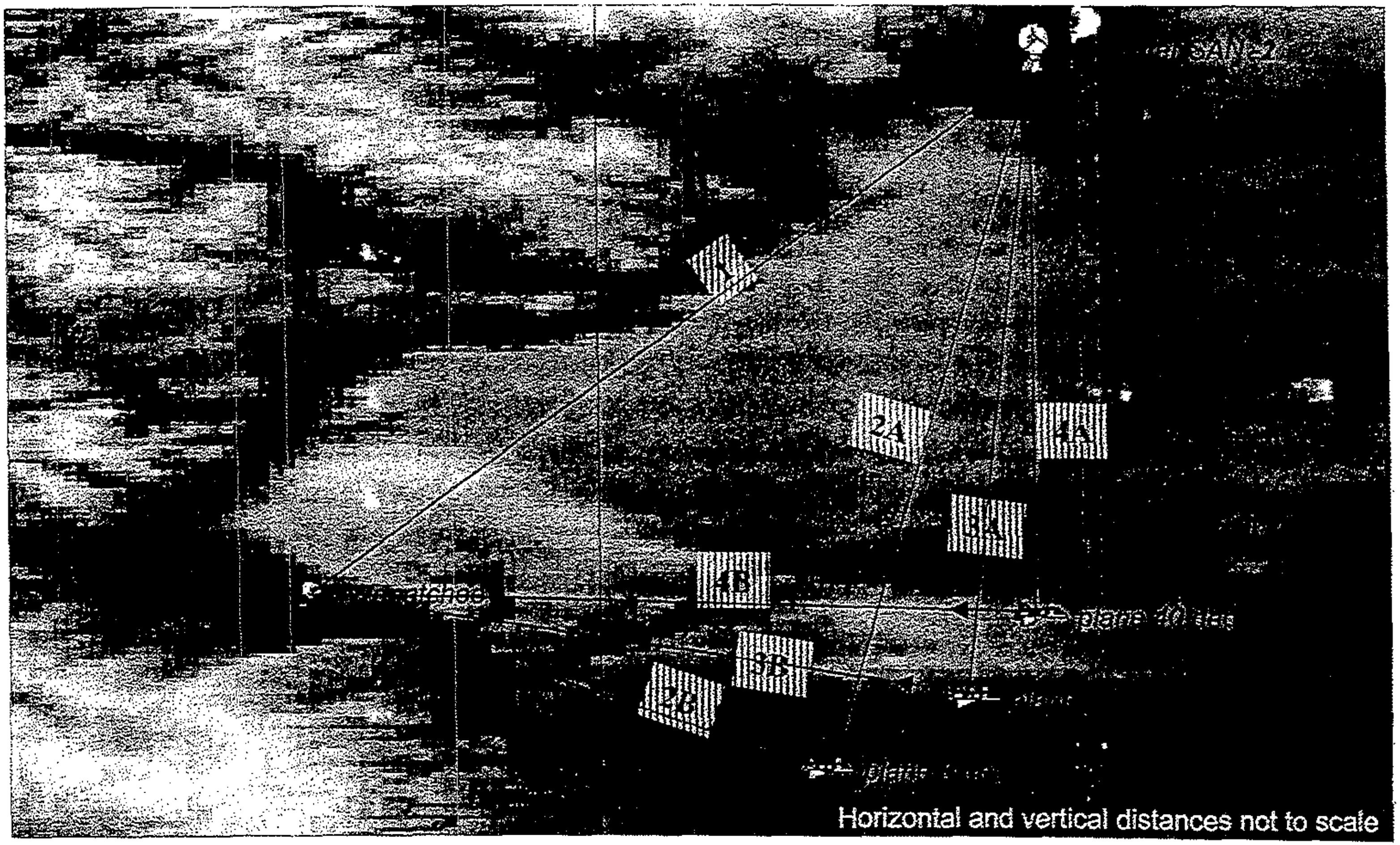
3. The interference level from the SAN antenna at the point of the hypothetical landing paths on page 17. In reality the SAN will never be pointing at the plane, but instead will follow an ICO satellite. When this happens the SAN will start at 5° minimum elevation angle and then will be moving with the satellite with a angular velocity between 1°/minute to 1.25°/minute. The angle between the SAN antenna boresight and the plane landing will hence have an angular velocity which is greater than the one given above since now there also exist the movement of the plane landing at the airport.

4. The rest of the plots are supporting material for this Annex.



ICO

# Brewster - Wanatchee Top View Map




ICO

# SAN - Plane Link Geometry at Worst Case

The following geometrical link characteristics are at the worst case point, which correspond to the position when the plane is at its highest altitude (6km AMSL) and at the edge of the MLS coverage volume (see page 12 and 14).

| Link | Link Number | Azimuth (°) from SAN | Elevation ε (°) from SAN | Range (km) from SAN |
|---|---|---|---|---|
| SAN to Wanatchee | 1 | 204.4 | -0.4 (below Horizon) | 91.1 |
| SAN to Plane 0deg | 2 | 185.8 | 2.41 | 110.4 |
| SAN to Plane 20deg | 3 | 182.0 | 2.79 | 99.2 |
| SAN to Plane 40deg | 4 | 180.0 | 3.33 | 86.4 |

**Worst Case** defined when plane is at Edge of the MLS Coverage Volume, Height of 6000m and Distance of 37 km.

# SAN-Plane Worst Case Interference

Below are the interference values from the SAN at Brewster in the Worst Case position for planes at the edge of the MLS coverage volume (see page 12 and 14). As the plane lands these values will be reduced (see page 17).

| Link Number | EIRP (dBW) | ΔG (dB) | Lp (dB) | Grx (dBi) | Pol Adv. (dB) | I (dBW) |
|---|---|---|---|---|---|---|
| 2 | 81 | -31.6 | -147.6 | 0 | -1 | **-99.2** |
| 3 | 81 | -29.9 | -146.7 | 0 | -1 | **-96.6** |
| 4 | 81 | -26.9 | -145.5 | 0 | -1 | **-92.4** |

$\Delta G = 29 - 25\mathrm{Log}(\theta) - \mathrm{Gpeak}$

$\theta = 5° - \varepsilon$

The Polarization Advantage between Circular Pol. (MSS) and Linear Pol. (MLS) is assumed at 1 dB

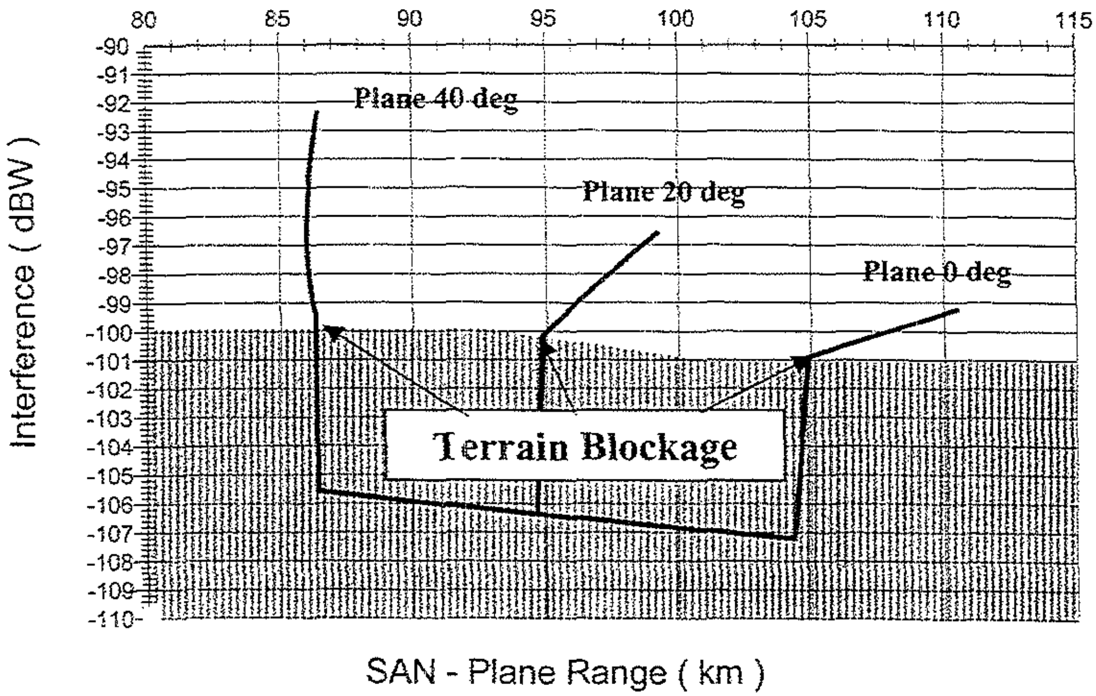


ICO

# Interference Calculation from Brewster to MLS Receiver Landing at Wenatchee

Below are calculations results for the cases depicted on page 12 and 14. These show that at the landing path (assumed as a straight line), due to the lower plane elevation from the SAN, the interference reduces as shown up until when the Terrain Blockage kicks in where then the interference will be much much less than the line of sight free space interference.

Worst Case Interference from Brewster SAN to MLS




- Plane 0 deg
- Plane 20 deg
- Plane 40 deg

ICO

# Terrain Blockage

At the landing paths (see page 19, 20 and 21) as the height AMSL reduces and also the elevation angle from the SAN reduces, the interference level reduces with respect to the worst case (see page 16), since the angle between the SAN antenna boresight and the plane increases and hence the SAN antenna gain discrimination increases.

At a certain point in the landing path the Terrain will block the SAN-Plane line of sight link as shown on page 21, 22 and 23. Below are the interference values just before this happens (also see graph on page 17).

| Link Number | Plane Height at Blockage | Plane Distance to Wanatchee | Interference Level at MLS Before Blockage (see previous page) |
|---|---|---|---|
| 2 | 3600 m | 28 km | **-101.1 dBW** |
| 3 | 4100 m | 24 km | **-100.4 dBW** |
| 4 | 4400 m | 23 km | **-100.0 dBW** |

# Link Plots At Edge of MLS Coverage Volume

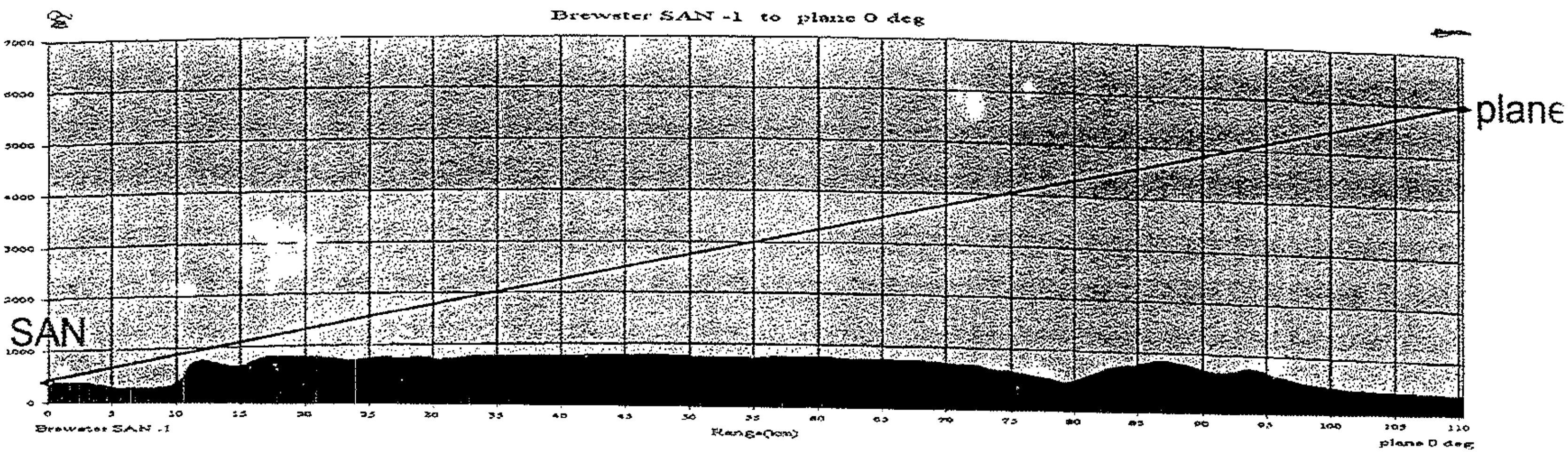
Following are Vertical Plots of the links at the Edge of the MLS coverage volume. These corresponds when the planes are at 6000m AMSL and at about 37 km from the run-way. These plots also show the terrain cut from the SAN to plane and from the airport to the plane.



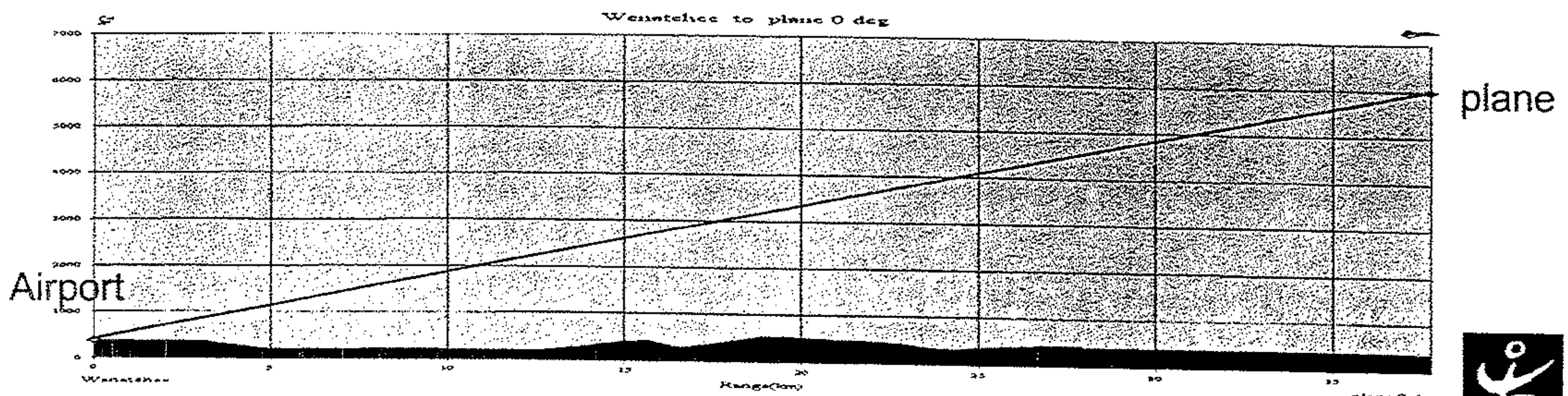
ICO

# Worst Case Vertical Profile for Link 2

**Link 2B**




**Link 2A**

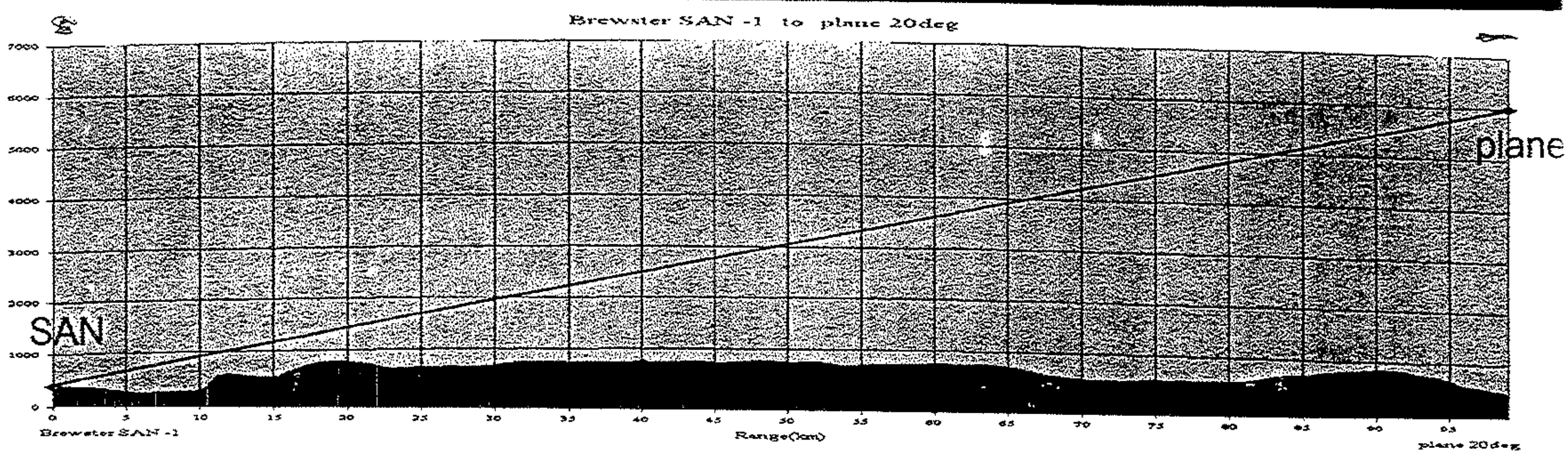




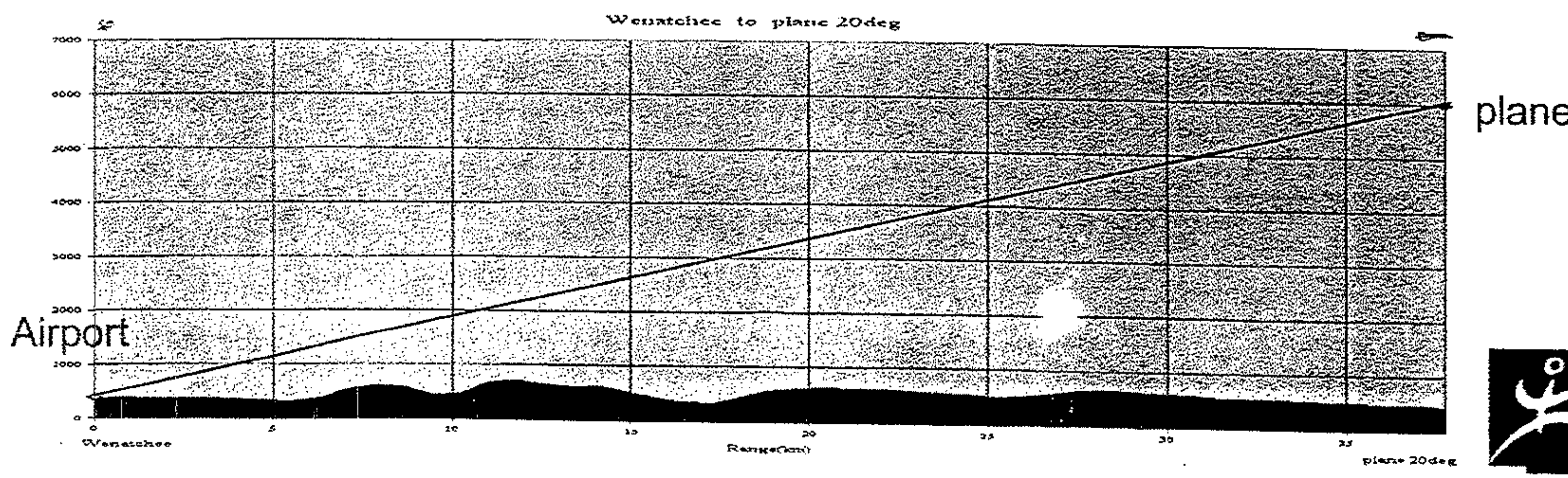

ICO

# Worst Case Vertical Profile for Link 3

**Link 3B**

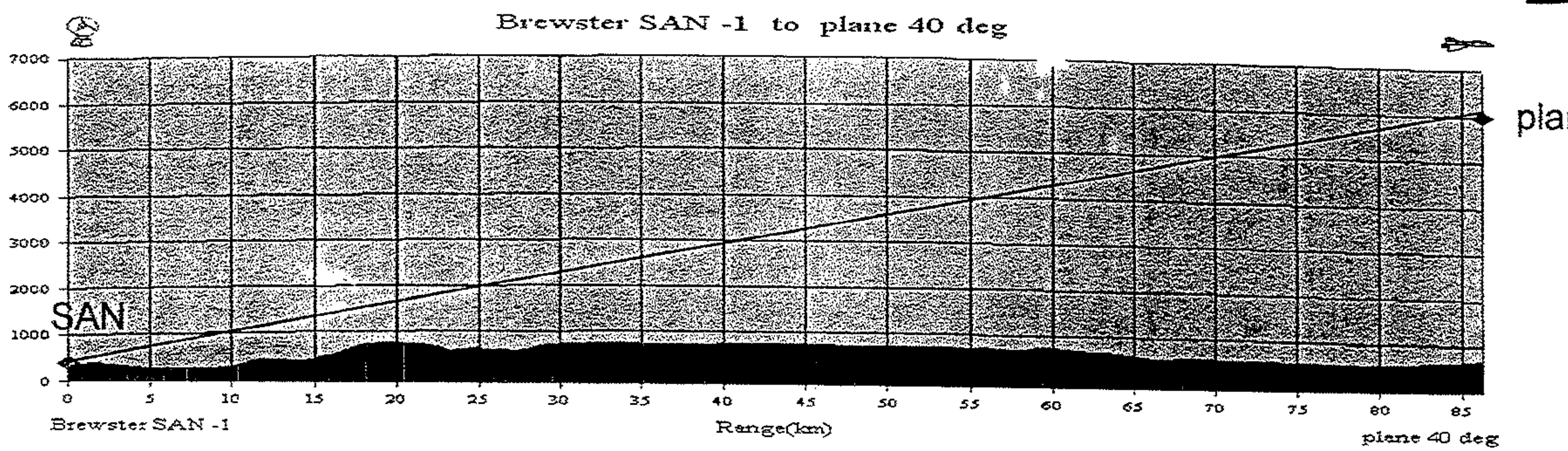



**Link 3A**

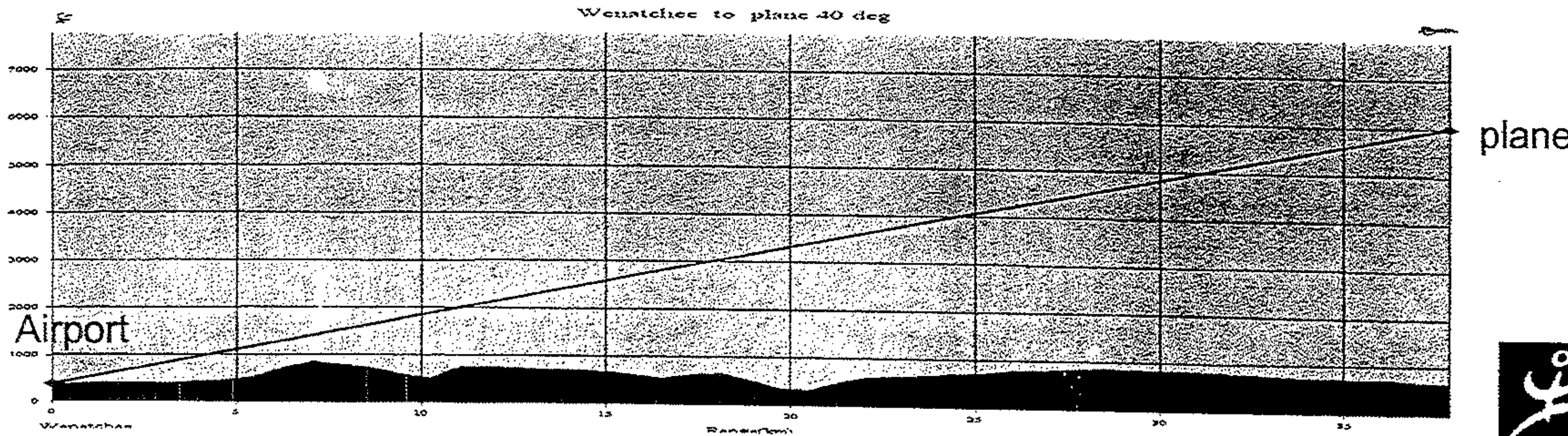


# Worst Case Vertical Profile for Link 4

**Link 4B**




**Link 4A**

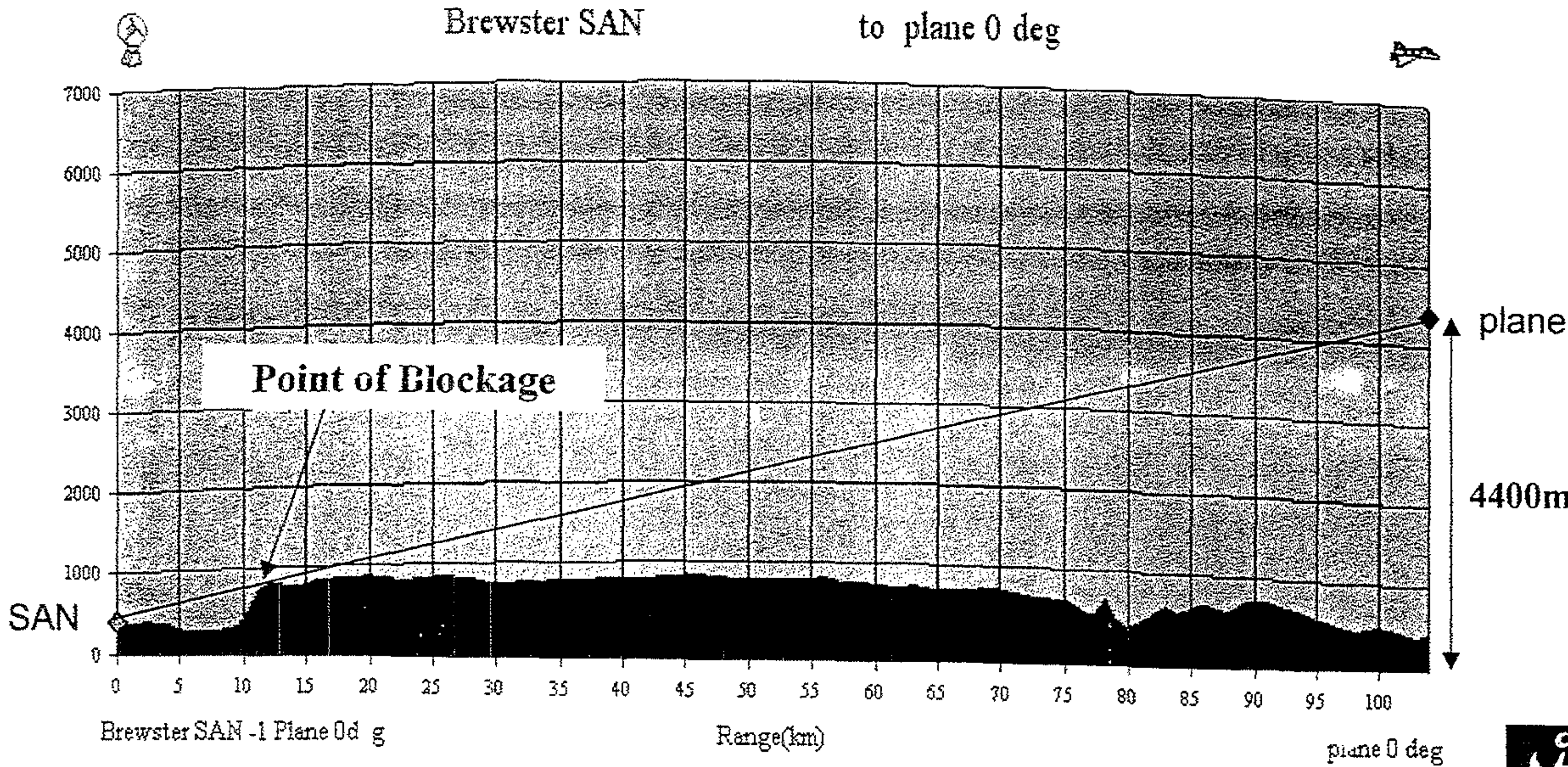


# Link Plots When the SAN-Plane Link Gets Blocked by Terrain

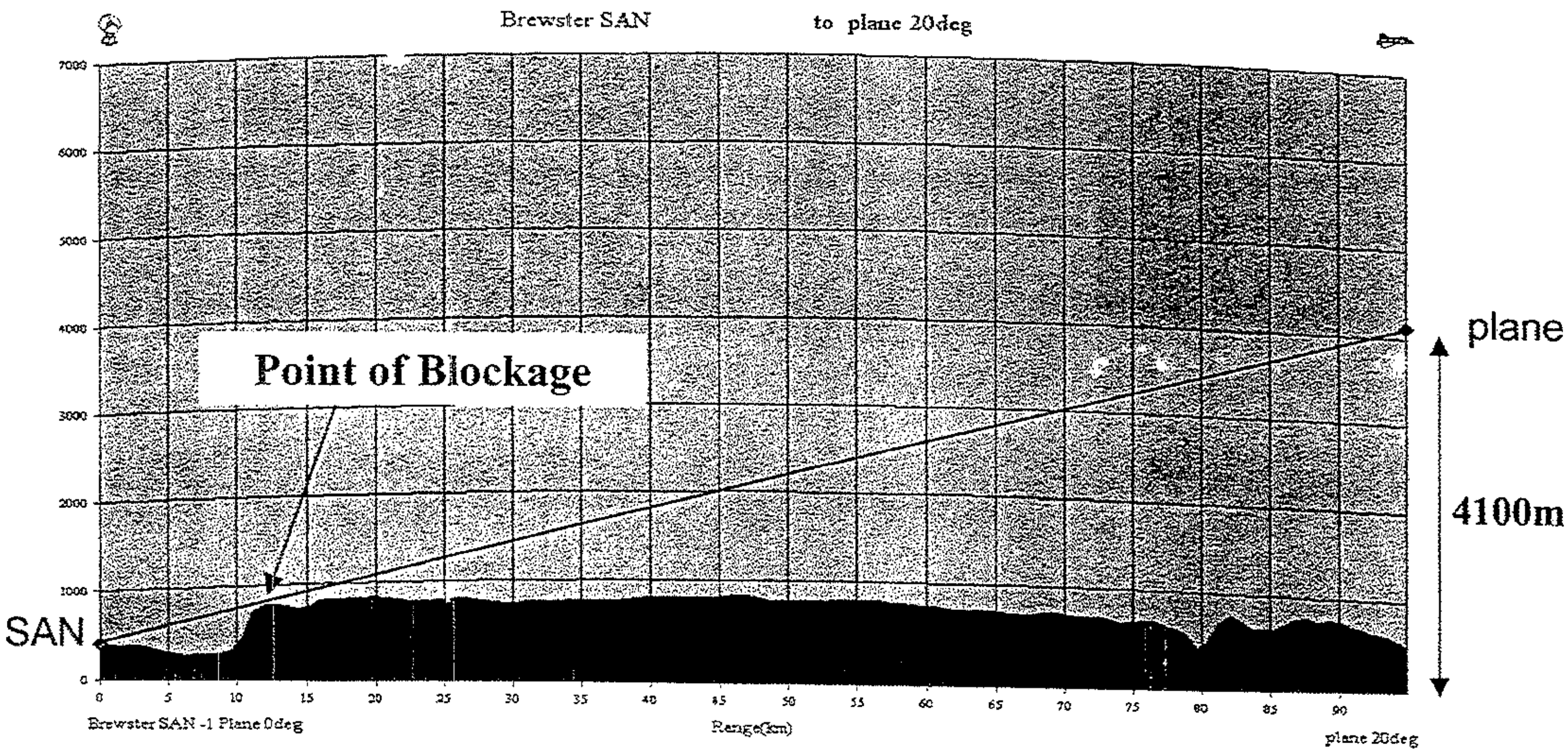
Following are Vertical Plots of the SAN-Plane links when it gets blocked by the terrain between the SAN and the airplane. The point of terrain blockage is near the SAN (about 12-15 km) as can be seen from the following three figures.

The plane is already inside the MLS coverage volume, since it is already descending and its respective height AMSL and distance from the airport are reported on page 18.

# Link 2B at Terrain Blockage



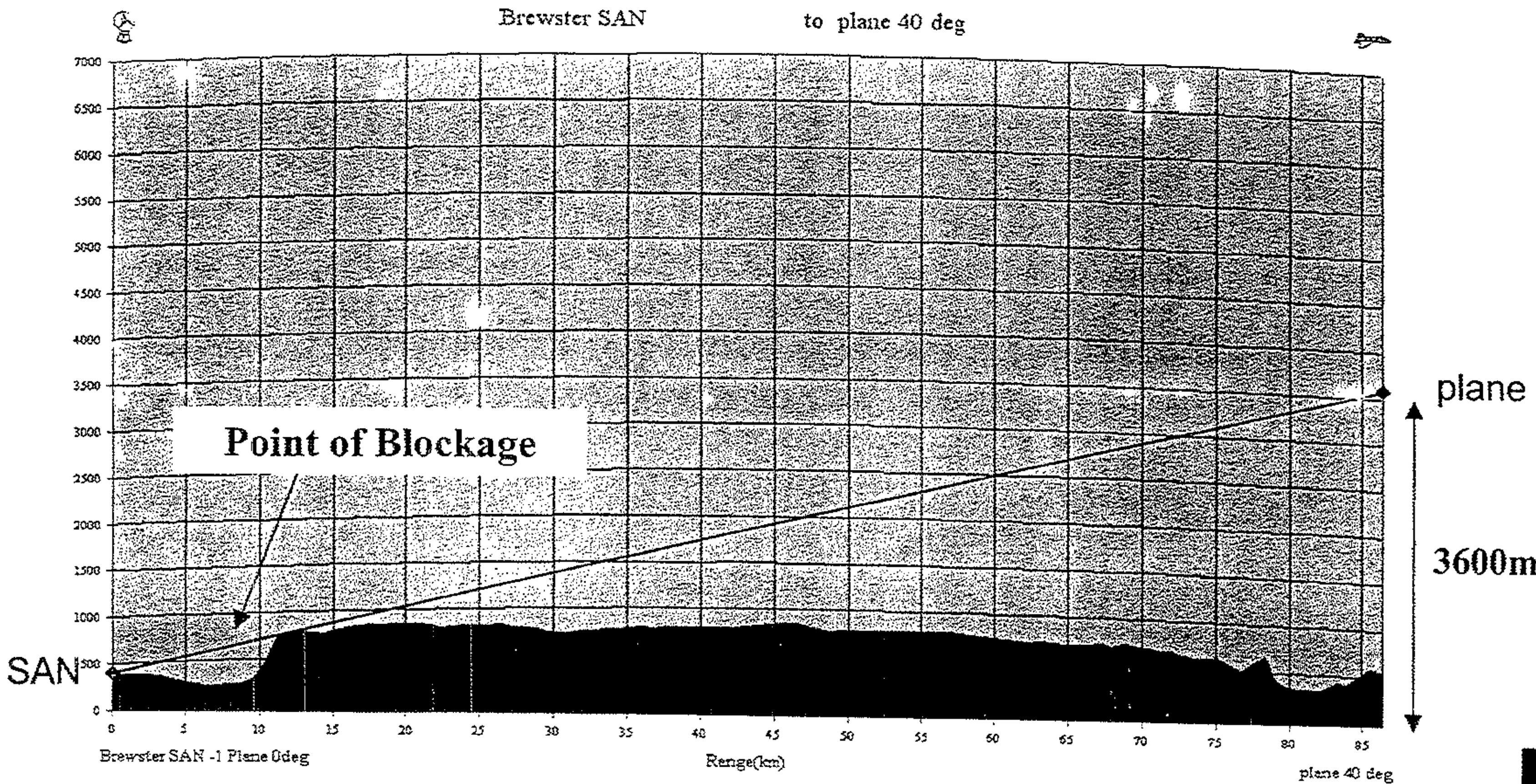
# Link 3B at Terrain Blockage






ICO

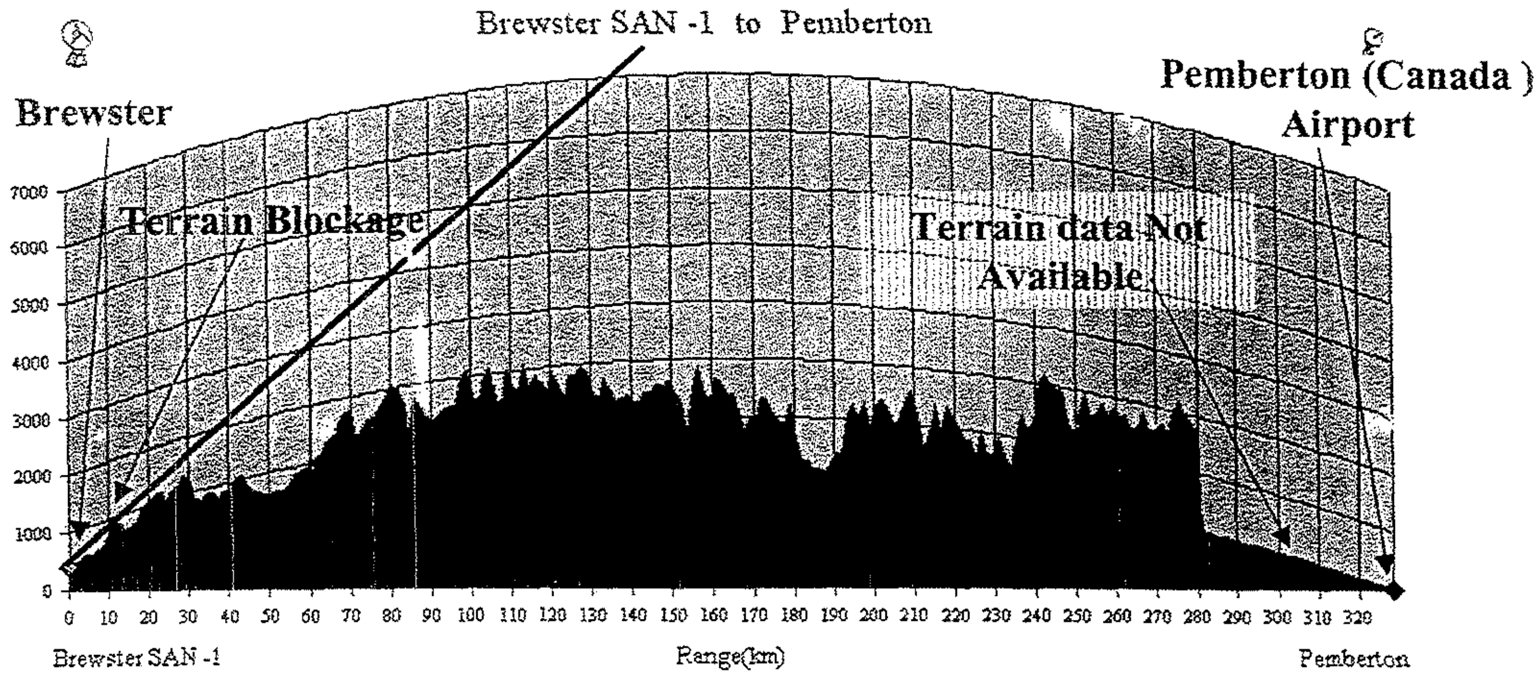
# Link 4B at Terrain Blockage






ICO

# ANNEX 3 : BREWSTER - PEMBERTON (CANADA)

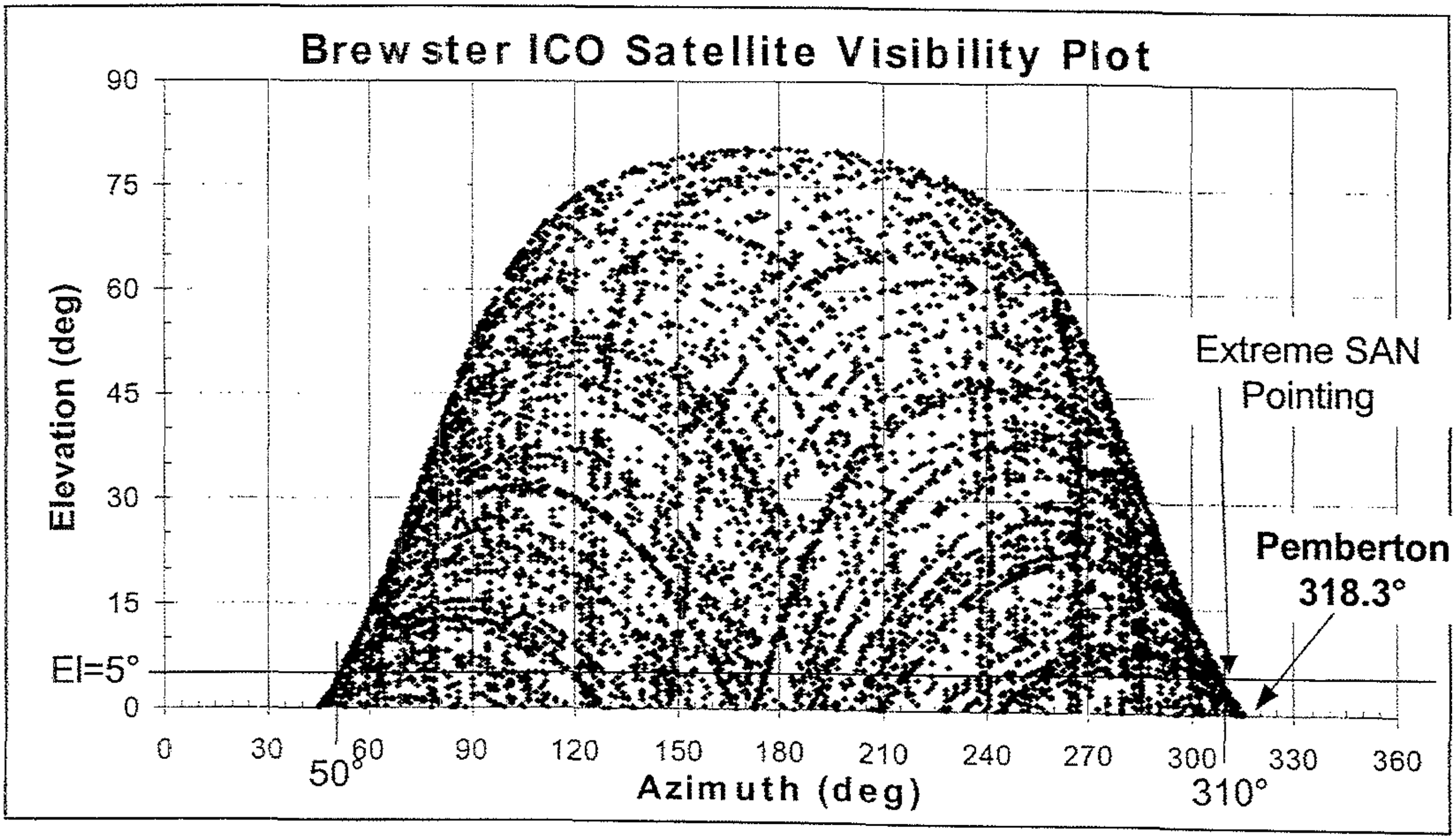



* Distance Brewster - Pemberton = 330 km
* There exist No line-of-sight between these two locations or any MLS receivers near Pemberton at 6km height as shown in the figure above.



ICO

# ANNEX 4



Brewster ICO Satellite Visibility Plot
Elevation (deg)
90
75
60
45
30
15
El=5°
0
0
30
50°
60
90
120
150
180
210
240
270
300
330
360
310°
Azimuth (deg)
Extreme SAN Pointing
Pemberton 318.3°

# Exhibit 3

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
**ICO Global Communications**
**BREWSTER, WA**
**Satellite Earth Station**

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
September 28, 2006

# TABLE OF CONTENTS

# 1. CONCLUSIONS

An interference study considering all existing, proposed and prior coordinated microwave facilities within the coordination contours of the proposed earth station demonstrates that this site will operate satisfactorily with the common carrier microwave environment. Further, there will be no restrictions of its operation due to interference considerations.

## 2. SUMMARY OF RESULTS

A number of great circle interference cases were identified during the interference study of the proposed earth station. Each of the cases, which exceeded the interference objective on a line-of-sight basis, was profiled and the propagation losses estimated using NBS TN101 (Revised) techniques. The losses were found to be sufficient to reduce the signal levels to acceptable magnitudes in every case.

The following companies reported potential great circle interference conflicts that did not meet the objectives on a line-of-sight basis. When over-the-horizon losses are considered on the interfering paths, sufficient blockage exists to negate harmful interference from occurring with the proposed transmit-only earth station.

Company

Spokane Television Inc./KXLY-TV

No other carriers reported potential interference cases.

# 3. SUPPLEMENTAL SHOWING

Pursuant to Part 25.203(c) of the FCC Rules and Regulations, the satellite earth station proposed in this 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 sent to the below listed carriers with a letter dated 09/13/2006.

Company
APPLE VALLEY BROADCASTING INC.
Fisher Broadcasting - Seattle TV, LLC
KING BROADCASTING COMPANY - KREM
KIRO TV, INC
MOUNTAIN LICENSES, L.P.
SPOKANE SCHOOL DISTRICT #81
SPOKANE TELEVISION INC./KXLY-TV
Tribune Television Northwest, Inc.

# 4. EARTH STATION COORDINATION DATA

This section presents the data pertinent to frequency coordination of the proposed earth station that was circulated to all carriers within its coordination contours.

# COMSEARCH

## Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 http://www.comsearch.com

| | |
|---|---|
| Date: | 09/26/2006 |
| Job Number: | 060913COMSGE01 |

| **Administrative Information** | |
|---|---|
| Status | ENGINEER PROPOSAL |
| *Call Sign* | |
| Licensee Code | ICOGLB |
| Licensee Name | ICO Global Communications |

| **Site Information** | **BREWSTER, WA** |
|---|---|
| Venue Name | |
| *Latitude (NAD 83)* | *48° 8' 47.2" N* |
| Longitude (NAD 83) | 119° 42' 3.7" W |
| Climate Zone | A |
| Rain Zone | 5 |
| Ground Elevation (AMSL) | 382.8 m / 1255.9 ft |

| ***Link Information*** | |
|---|---|
| Satellite Type | Low Earth Orbit |
| Mode | TO - Transmit-Only |
| Modulation | Digital |
| Minimum Elevation Angle | 5.0° |
| Azimuth Range | 0.0° to 360° |
| Antenna Centerline (AGL) | 4.88 m / 16.0 ft |

| **Antenna Information** | | **Transmit - FCC32** |
|---|---|---|
| Manufacturer | | NEC |
| Model | | 7.6 Meter |
| Gain / Diameter | | 34.2 dBi / 7.6 m |
| 3-dB / 15-dB Beamwidth | | 1.30° / 2.60° |
| Max Available RF Power | (dBW/4 kHz) | -34.9 |
| | (dBW/MHz) | -10.9 |
| Maximum EIRP | (dBW/4 kHz) | -0.7 |
| | (dBW/MHz) | 23.3 |
| Interference Objectives: | Long Term | -154.0 dBW/4 kHz 20% |
| | Short Term | -131.0 dBW/4 kHz 0.0025% |

| **Frequency Information** | **Transmit 2.0 GHz** |
|---|---|
| Emission / Frequency Range (MHz) | 150KG7D / 2000.0 - 2015.0 |
| Max Great Circle Coordination Distance | 235.0 km / 146.0 mi |
| *Precipitation Scatter Contour Radius* | 100.0 km / 62.1 mi |

| **Coordination Values** | **BREWSTER, WA** | |
|---|---|---|
| Licensee Name | ICO Global Communications | |
| Latitude (NAD 83) | 48° 8' 47.2" N | |
| Longitude (NAD 83) | 119° 42' 3.7" W | |
| Ground Elevation (AMSL) | 382.8 m / 1255.9 ft | |
| Antenna Centerline (AGL) | 4.88 m / 16.0 ft | |
| Antenna Model | NEC 7.6 Meter | |
| Antenna Mode | Transmit 2.0 GHz | |
| Interference Objectives: Long Term | -154.0 dBW/4 kHz | 20% |
| Short Term | -131.0 dBW/4 kHz | 0.0025% |
| Max Available RF Power | -34.9 (dBW/4 kHz) | |

| | | | Transmit 2.0 GHz | |
|---|---|---|---|---|
| Azimuth (°) | Horizon Elevation (°) | Antenna Discrimination (°) | Horizon Gain (dBi) | Coordination Distance (km) |
| 0 | 0.00 | 69.62 | 8.00 | 235.00 |
| 5 | 0.00 | 65.27 | 8.00 | 235.00 |
| 10 | 0.00 | 60.97 | 8.00 | 235.00 |
| 15 | 0.00 | 56.73 | 8.00 | 235.00 |
| 20 | 0.00 | 52.58 | 8.00 | 235.00 |
| 25 | 0.00 | 48.54 | 8.00 | 235.00 |
| 30 | 0.00 | 44.65 | 8.00 | 235.00 |
| 35 | 0.00 | 40.94 | 8.00 | 235.00 |
| 40 | 0.00 | 37.47 | 8.00 | 235.00 |
| 45 | 0.00 | 34.32 | 9.50 | 235.00 |
| 50 | 0.00 | 31.59 | 9.50 | 235.00 |
| 55 | 0.00 | 29.40 | 9.50 | 235.00 |
| 60 | 0.00 | 27.87 | 9.50 | 235.00 |
| 65 | 0.00 | 27.11 | 9.50 | 235.00 |
| 70 | 0.00 | 27.20 | 9.50 | 235.00 |
| 75 | 0.00 | 28.12 | 9.50 | 235.00 |
| 80 | 0.00 | 29.80 | 9.50 | 235.00 |
| 85 | 0.00 | 32.12 | 9.50 | 235.00 |
| 90 | 0.00 | 34.94 | 9.50 | 235.00 |
| 95 | 0.00 | 38.16 | 9.50 | 235.00 |
| 100 | 0.00 | 41.69 | 9.50 | 235.00 |
| 105 | 0.00 | 45.44 | 9.50 | 235.00 |
| 110 | 0.00 | 49.37 | 9.50 | 235.00 |
| 115 | 0.00 | 53.43 | 9.50 | 235.00 |
| 120 | 0.00 | 57.60 | 9.50 | 235.00 |
| 125 | 0.00 | 61.85 | 9.50 | 235.00 |
| 130 | 0.00 | 66.16 | 9.50 | 235.00 |
| 135 | 0.00 | 70.52 | 9.50 | 235.00 |
| 140 | 0.00 | 74.92 | 9.50 | 235.00 |
| 145 | 0.00 | 79.34 | 9.50 | 235.00 |
| 150 | 0.00 | 83.78 | 9.50 | 235.00 |
| 155 | 0.00 | 88.23 | 9.50 | 235.00 |
| 160 | 0.00 | 92.69 | 9.50 | 235.00 |
| 165 | 0.00 | 97.13 | 9.50 | 235.00 |
| 170 | 0.00 | 101.57 | 9.50 | 235.00 |
| 175 | 0.00 | 105.99 | 9.50 | 235.00 |
| 180 | 0.00 | 110.38 | 9.50 | 235.00 |
| 185 | 0.00 | 114.73 | 9.50 | 235.00 |

# COMSEARCH

**Earth Station Data Sheet**

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 http://www.comsearch.com

| **Coordination Values** | **BREWSTER, WA** | |
|---|---|---|
| Licensee Name | ICO Global Communications | |
| Latitude (NAD 83) | 48° 8' 47.2" N | |
| Longitude (NAD 83) | 119° 42' 3.7" W | |
| Ground Elevation (AMSL) | 382.8 m / 1255.9 ft | |
| Antenna Centerline (AGL) | 4.88 m / 16.0 ft | |
| Antenna Model | NEC 7.6 Meter | |
| Antenna Mode | Transmit 2.0 GHz | |
| Interference Objectives: Long Term | -154.0 dBW/4 kHz | 20% |
| Short Term | -131.0 dBW/4 kHz | 0.0025% |
| Max Available RF Power | -34.9 (dBW/4 kHz) | |

| | | | Transmit 2.0 GHz | |
|---|---|---|---|---|
| Azimuth (°) | Horizon Elevation (°) | Antenna Discrimination (°) | Horizon Gain (dBi) | Coordination Distance (km) |
| 190 | 0.00 | 119.03 | 9.50 | 235.00 |
| 195 | 0.00 | 123.27 | 9.50 | 235.00 |
| 200 | 0.00 | 127.42 | 9.50 | 235.00 |
| 205 | 0.00 | 131.46 | 9.50 | 235.00 |
| 210 | 0.00 | 135.35 | 9.50 | 235.00 |
| 215 | 0.00 | 139.06 | 9.50 | 235.00 |
| 220 | 0.00 | 142.53 | 9.50 | 235.00 |
| 225 | 0.00 | 145.68 | 9.50 | 235.00 |
| 230 | 0.00 | 148.41 | 9.50 | 235.00 |
| 235 | 0.00 | 150.60 | 9.50 | 235.00 |
| 240 | 0.00 | 152.13 | 9.50 | 235.00 |
| 245 | 0.00 | 152.89 | 9.50 | 235.00 |
| 250 | 0.00 | 152.80 | 9.50 | 235.00 |
| 255 | 0.00 | 151.88 | 9.50 | 235.00 |
| 260 | 0.00 | 150.20 | 9.50 | 235.00 |
| 265 | 0.00 | 147.88 | 9.50 | 235.00 |
| 270 | 0.00 | 145.06 | 9.50 | 235.00 |
| 275 | 0.00 | 141.84 | 9.50 | 235.00 |
| 280 | 0.00 | 138.31 | 9.50 | 235.00 |
| 285 | 0.00 | 134.56 | 9.50 | 235.00 |
| 290 | 0.00 | 130.63 | 9.50 | 235.00 |
| 295 | 0.00 | 126.57 | 9.50 | 235.00 |
| 300 | 0.00 | 122.40 | 9.50 | 235.00 |
| 305 | 0.00 | 118.15 | 9.50 | 235.00 |
| 310 | 0.00 | 113.84 | 9.50 | 235.00 |
| 315 | 0.00 | 109.48 | 9.50 | 235.00 |
| 320 | 0.00 | 105.08 | 8.00 | 235.00 |
| 325 | 0.00 | 100.66 | 8.00 | 235.00 |
| 330 | 0.00 | 96.22 | 8.00 | 235.00 |
| 335 | 0.00 | 91.77 | 8.00 | 235.00 |
| 340 | 0.00 | 87.31 | 8.00 | 235.00 |
| 345 | 0.00 | 82.87 | 8.00 | 235.00 |
| 350 | 0.00 | 78.43 | 8.00 | 235.00 |
| 355 | 0.00 | 74.01 | 8.00 | 235.00 |

# 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.

BY: ______________________

Gary K. Edwards
Senior Manager
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: September 28, 2006