

# アンテナ歴史保存資料 詳細

登録番号 : 264

登録日 : 2002-09-18 21:32:00+09 認定日 : 2002-10-01 13:25:25+09 登録者

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## 1. 資料の名称、形式

(Japanese) : マルチビーム地球局用オフセット球面鏡アンテナ

(English) : Offset Spherical Reflector Antenna for Multi-Beam Earth Stations

## 2. 製作(発明、発表)時期

(Japanese) : 平成2年

(English) : 1990

## 3. 所有者

(Japanese) : N/A

(English) : N/A

## 4. 開発者

(Japanese) : KDD/NEC

(English) : KDD/NEC

## 5. 保存場所

(Japanese) : N/A

(English) : N/A

## 6. 資料の歴史的な重要性

(Japanese) :

オフセット球面鏡により高利得を実現した世界初のアンテナで国内衛星通信用 (JCSAT/SCC共用) として実用化。放物トーラス面よりも高い回転対称性を有する球面鏡の利用により、給電系を斜交配置することが可能なため、ビーム分離角の小さい複数のビームを放射できる。また、鏡面修整された2面の副反射鏡とコルゲート円錐ホーンからなる一次放射器系により高利得を実現しつつ、原理的にビーム偏向による性能の劣化がない。交差偏波最小条件も成立させており、交差偏波特性にも優れた地球局アンテナ。

(English) :

This is the world first offset spherical reflector antenna achieving a high efficiency for multi-beam earth stations which is commercially used for JCSAT and SCC. Since the spherical reflector has another rotational

symmetry over a parabolic torus, the tilted feed system make it possible to radiate multiple beams with a small separation angle. The primary feed system consists of a couple of shaped sub-reflectors and a corrugated conical horn. The antenna also achieves a high cross polarization discrimination because the reflector system meets with the minimum cross-polarization condition for an offset shaped multi-reflector antenna.

## 7. 主要性能

(Japanese) :

周波数 : Rx 12.25-12.75GHz/Tx 14.0-14.5GHz, 主反射鏡直径 : 6.5m, 直線偏波 (直交偏波共用) , 利得 : Rx 54.9dBi以上/Tx 56.0dBi以上, 交差偏波識別度 : 35dB以上, ビーム数 : 4 (設計) /2 (実装) , 最小ビーム分離角 : 4.5度, 追尾範囲 : ±1度, 近軸サイドローブレベル : 29-25logθdBi以下

(English) :

Freq: Rx 12.25-12.75GHz/Tx 14.0-14.5GHz, Main reflector diameter: 6.5m, Linear Polarization (orthogonal dual polarization), Gain: Rx>54.9dBi/Tx>56.0dBi, XPD: >35dB, Number of beams: 4(design)/2(itinial installment), Minimum beam separation angle: 4.5degrees: Beam steerable range: plus/minus 1degree, Near axis sidelobes: better than 29-25log(theta)dBi

## 8. 関係論文・文献

(Japanese) :

F. Watanabe and Y. Mizugutch, "An Offset Spherical Tri-Reflector Antenna," Transactions of the IECE, vol. E66, no. 2, pp. 108-115, Feb. 1983.

F. Watanabe, Y. Mizugutch, and M. Yamada, "A Beam-Steerable Antenna with an Offset Spherical Reflector for Earth Station," Proceedings of 10th International Communication Satellite Systems Conference and Exhibit (ICSSC84, The American Institute of Aeronautics and Astronautics), no. AIAA-84-0672, pp. 117-124, March 1984.

渡辺, 水口, 山田, “ビーム偏移形地球局アンテナ –理論検討とモデル実験–”, 国際通信の研究, no. 124, pp. 12-19, April 1985.

渡辺, 水口, 山田, “マルチビームオフセット球面鏡アンテナ –給電系の斜交配置構成による–”, 信学論 (B) , vol. J69-B, no. 11, pp. 1393-1399, November 1986.

野本, 渡辺, 水口, “鏡面修整オフセット複反射鏡アンテナの交さ偏波最小条件”, 1991年電子情報通信学会春季大会, B-85, p. 2-85, March 1991.

S. Nomoto, F. Watanabe, Y. Mizuguchi, A. Abe, T. Ino, S. Ohno, "A Ku-Band 4-Beam Earth Station Antenna with a 6.5-m Fixed Spherical Reflector," Proceedings of 14th International Communication Satellite Systems Conference and Exhibit (ICSSC92, The American Institute of Aeronautics and Astronautics), no. AIAA-92-1903-CP, pp. 702-710, Washington, DC,

USA, March 22-26, 1992.

(English) :

F. Watanabe and Y. Mizugutch, "An Offset Spherical Tri-Reflector Antenna," The Transactions of the IECE, vol. E66, no. 2, pp. 108-115, Feb. 1983.

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F. Watanabe, Y. Mizuguchi, and M. Yamada, "Theoretical and Experimental Study on Beam-Steerable Earth Station Antennas," KDD R&D Report, no. 124, pp. 12-19, April 1985.

F. Watanabe, Y. Mizuguchi, and M. Yamada, "Multiple Beam Offset Spherical Reflector Antenna with Tilted Feed Systems," Trans. IEICE, vol. J69-B, no. 11, pp. 1393-1399, November 1985.

S. Nomoto, F. Watanabe, and Y. Mizuguchi, "The Minimum Cross-Polarization Condition for an Offset Shaped Multi-Reflector Antenna," IEICE 1991 Spring National Convention Record, B-85, March 1991.

S. Nomoto, F. Watanabe, Y. Mizuguchi, A. Abe, T. Ino, S. Ohno, "A Ku-Band 4-Beam Earth Station Antenna with a 6.5-m Fixed Spherical Reflector," Proceedings of 14th International Communication Satellite Systems Conference and Exhibit (ICSSC92, The American Institute of Aeronautics and Astronautics), no. AIAA-92-1903-CP, pp. 702-710, Washington, DC, USA, March 22-26, 1992.

## 9. 関係特許

(Japanese) :

(English) :

## 写真 (構成図)



## キーワード

(Japanese)

(English)

球面鏡	Spherical reflector
マルチビーム	Multi-beam
鏡面修整	Shaped reflector
交差偏波最小条件	Minimum cross-polarization condition
斜交配置給電系	Tilted feed configuration
反射鏡アンテナ	
衛星通信 (地球局)	

