

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
24 February 2005 (24.02.2005)

PCT

(10) International Publication Number
WO 2005/018048 A1

(51) International Patent Classification⁷: **H01Q 13/28**,
21/00, 3/46, 13/08

Segundo Boulevard, P.O. Box 902 (E4/N119), El Segundo,
CA 90245-0902 (US).

(21) International Application Number:
PCT/US2004/003318

(74) Agents: **ALKOV, Leonard, A.** et al.; c/o Raytheon
Company, 2000 E. El Segundo Boulevard, P.O. Box 902
(E4/N119), El Segundo, CA 90245-0902 (US).

(22) International Filing Date: 5 February 2004 (05.02.2004)

(81) Designated States (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/373,941 25 February 2003 (25.02.2003) US

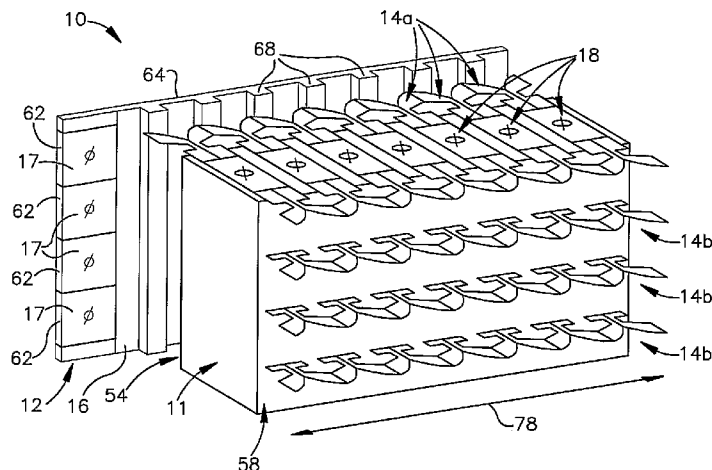
(71) Applicant: **RAYTHEON COMPANY** [US/US]; 870
Winter Street, Waltham, MA 02451-1449 (US).

(84) Designated States (*unless otherwise indicated, for every
kind of regional protection available*): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Euro-
pean (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,
GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

(72) Inventors: **LEE, Jar, J.**; c/o Raytheon Company, 2000
E. El Segundo Boulevard, P.O. Box 902 (E4/N119), El
Segundo, CA 90245-0902 (US). **QUAN, Clifton**; c/o
Raytheon Company, 2000 E. El Segundo Boulevard, P.O.
Box 902 (E4/N119), El Segundo, CA 90245-0902 (US).
PIERCE, Brian, M.; c/o Raytheon Company, 2000 E. El

[Continued on next page]

(54) Title: 2-D ELECTRONICALLY SCANNED ARRAY WITH COMPACT CTS FEED AND MEMS PHASE SHIFTERS



(57) Abstract: A microelectromechanical system (MEMS) steerable electronically scanned lens array (ESA) antenna (10) and method of frequency scanning are disclosed. The MEMS ESA antenna (10) includes a MEMS E-plane steerable lens array (11) and a MEMS H-plane steerable linear array (12). The MEMS E-plane steerable lens array (11) includes first and second arrays of wide band radiating elements (14a, 14b), and an array of MEMS E-plane phase shifter modules (18) disposed between the first and second arrays of radiating elements (14a, 14b). The MEMS H-plane steerable linear array (12) includes a continuous transverse stub (CTS) feed array (16) and an array of MEMS H-plane phase shifter modules (17) at an input of the CTS feed array (16). The MEMS H-plane steerable linear array (12) is disposed adjacent the first array of radiating elements (14a) of the MEMS E-plane steerable lens array (11) for providing a planar wave front in the near field. The H-plane phase shifter modules (17) shift RF signals input into the CTS feed array (16) based on the phase settings of the H-plane phase shifter modules (17), and the E-plane phase shifter modules (18) steer a beam radiated from the CTS feed array (16) in an E-plane based on the phase settings of the E-plane shifter modules (18).

WO 2005/018048 A1



Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.