

**Meeting:** 998, Houston, Texas, SS 19A, Special Session on Algebraic Geometry

998-14-311            **E. Javier Elizondo\*** (javier@math.unam.mx), Instituto de Matematicas, Ciudad Universitaria, UNAM, 04510 Mexico, DF, Mexico, and **Kazuhiko Kurano** and **Kei-ichi Watanabe**. *The Cox ring for normal projective varieties*.

The total coordinate ring  $TC(X)$  of a normal variety is a generalization of the ring introduced and studied by Cox in connection with a toric variety. Consider a normal projective variety  $X$  with divisor class group  $Cl(X)$ , and let us assume that it is a finitely generated free abelian group. We define the total coordinate ring of  $X$  to be  $TC(X) = \bigoplus_D H^0(X, O_X(D))$ , where the sum as above is taken over all Weil divisors of  $X$  contained in a fixed complete system of representatives of  $Cl(X)$ . We prove that for any normal projective variety  $X$ ,  $TC(X)$  is a UFD, this is a corollary of a more general theorem that is proved in the paper. (Berchtold and Haussen proved the unique factorization for a smooth variety independently.) We also prove that for  $X$ , the blow up of  $P^2$  along a finite number of collinear points,  $TC(X)$  is Noetherian. We also give an example that  $TC(X)$  is not Noetherian but  $\bigoplus_n H^0(X, O(nD))$  is Noetherian for any Weil divisor  $D$ . (Received March 01, 2004)