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Idriss Khemar* (khemar@math.jussieu.fr), T.U. Munich, Zentrum Mathematik, Lehrstuhl Scheurle M 8, Boltzmannstr.3, D- 85747 Garching, Germany. *Geometric Interpretation of elliptic integrable systems associated to k -symmetric spaces.*

We give a geometrical interpretation of all the m -th elliptic integrable systems associated to a k -symmetric space G/G_0 (in the sense of C.L. Terng) in terms of vertically harmonic twistor lifts taking values in certain subbundle of the bundle $\text{End}(TM)$, $M = G/H$ being a p -symmetric space associated to G/G_0 . The general problem splits into three cases : the primitive case ($m < [(k + 1)/2]$), the determined case ($m = [(k + 1)/2]$) and the over determined case ($m > [(k + 1)/2]$). The most interesting is the determined case which splits itself into two subcases: the even case (k is even) (for $k = 4$ our twistor space coincides with the bundle of almost complex structure in M), and the odd case (k is odd) in which we obtained in particular an interesting result: the second elliptic integrable system associated to a 3-symmetric space is the equation for (all) "holomorphically harmonic" maps into this 3-symmetric space. We will particularly insist on the case $m = 2$ in which will be all our examples: Hamiltonian Stationary Lagrangian surfaces into Hermitian symmetric space, surfaces with Holomorphic mean curvature vector into 4-dimensional symmetric spaces, constrained Willmore surfaces. (Received September 15, 2008)