After a little of spherical trigonometry, I got the final formula:

$$\sin\left(\frac{\angle HA}{2}\right) = \sqrt{\cos(s)\sin(s-h)\csc(ZD)\sec(\phi)}$$

where, $s = \frac{ZD+h+\phi}{2} = \frac{73°05'+16°44'+24°03'}{2} = 56°56'$

$s-h = \frac{ZD+\phi-h}{2} = \frac{73°05'+24°03'-16°44'}{2} = 40°12'$

$ZD = 73°05'$

$\phi = 24°03'$

Let us use the $\log_{10}$ of both RHS and LHS of the equation:

$$\log_{10}\left(\sin\left(\frac{\angle HA}{2}\right)\right) = \frac{1}{2}\left[\log(\cos(s)) + \log(\sin(s-h)) + \log(\csc(ZD)) + \log(\sec(\phi))\right]$$

$\log(\cos(56°56')) = -0.2631141 = 9.736886 +$

$\log(\sin(40°12')) = -0.1901322 = 9.809868 +$

$\log(\csc(73°05')) = 0.0192107 = 0.019211 +$

$\log(\sec(24°03')) = 0.0394388 = 0.0394388 =$

Sum $= -0.394459 = 19.605409$

$\log_{10}\left(\sin\frac{\angle HA}{2}\right) = (1/2)\,\text{Sum} = -0.197298 = 9.802702$

$\sin\left(\frac{\angle HA}{2}\right) = 10^{-0.197298} = 0.634895$

$A/2 = \sin^{-1}(0.634895) = 39°412197$

and $A = 78°.824394 / (15°/h) = 5^h\,15^m\,18^s$

The rest of the log is easy. Ship time adjustment. Difference between ship and GMT Times and thence longitude.