Velikost sprejemnika – HeNe laser

$A = r_0^2 \cdot \pi =$ $\quad A_s = r^2 \cdot \Omega$

$D_0 = \frac{4\pi}{\lambda^2} \cdot A =$

$D_0 = \frac{4\pi}{\Omega} \Rightarrow \Omega = \frac{4\pi}{D_0} = [\text{srd}]$

TV satelit – smernost, sprejeta moč, slabljenje, najnižja Fr.

$A_g = \Omega r_z^2$ satelit

$D_0 = \frac{4\pi}{\Omega} = \frac{4\pi r^2}{A_g} = \frac{4\pi r^2}{\pi r_g^2}$ [dBi]

$P_s = \frac{P_0 A_s \eta_s \eta_0}{A_g} = \frac{P_0 \pi r_s^2 \eta_s \eta_0}{\pi r_g^2}$ [dBm]

$a = 10 \log \frac{P_s}{P_0}$ [dBm]

$A_0 = \pi r_0^2 = \frac{\lambda^2}{4\pi} D_0 \Rightarrow \lambda^2 = \frac{4\pi^2 r_0^2}{D_0}$

$\lambda = \frac{2\pi r_0}{\sqrt{D_0}}$ $\quad f \geq \frac{c_0}{\lambda} =$

TV sateliti – razmak?

$D_s = \frac{4\pi}{\lambda^2} \cdot A_s = \frac{4\pi}{\lambda^2} \cdot \pi r_s^2$

$\Omega = \frac{4\pi}{D_s}$ $\quad h = r - r\cos\alpha$

$A = r^2 \cdot \Omega = 2\pi r h = 2\pi r^2 (1 - \cos\alpha)$

$\Omega = 2\pi(1 - \cos\alpha) \Rightarrow \cos\alpha = 1 - \frac{\Omega}{2\pi}$

Razvoj v vrsto: $\cos\alpha = 1 - \frac{\alpha^2}{2} + \dots$

$\frac{\alpha^2}{2} \approx \frac{\Omega}{2\pi}$ $\quad \alpha \simeq \sqrt{\frac{\Omega}{\pi}} \Rightarrow$ razmak $\times 2$!

Satelit do mobilnega upor. oddajna moč?

$P_s = \frac{U_s^2}{Z} \leftarrow V_{eff} =$

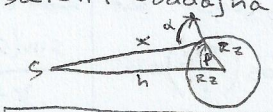
$A_s = \frac{\lambda^2}{4\pi} G_s = \frac{G_s}{4\pi} \left(\frac{c_0}{f}\right)^2$

$A_g = \pi r^2$

$P_0 = P_s \cdot \frac{A_g}{A_s}$

↳ razmerje površin (slabi)

TV satelit – oddajna moč?



$x = \sqrt{(h+R_z)^2 + R_z^2 - 2(h+R_z)R_z \cdot \cos\beta}$

$\frac{x}{\sin\beta} = \frac{h+R_z}{\sin(180° - \alpha)} = \frac{h+R_z}{\sin\alpha}$

$\Downarrow$

$\alpha = \arcsin\left(\frac{h+R_z}{x} \sin\beta\right)$

Geog. področje manjše zaradi ukrivlj. zemlje: $A_g' = A_g \cdot \cos\alpha$

$P_0 = S A_g \cdot \cos\alpha$

Najmanjša razdalja med antenama

$\lambda = \frac{c_0}{f}$

$r_0 \geq \frac{2d^2}{\lambda}$ ← Fraunhofer pogoj

$r \geq r_{0,min} + r_{s,min}$

$r \geq r_0 \cdot 2$

Max fazna napaka

α	r_{min}
2π	$\frac{\pi d^2}{8\lambda}$
π	$\frac{\pi d^2}{4\lambda}$
$\pi/2$	$\frac{\pi d^2}{2\lambda}$
$\pi/4$	$\frac{\pi d^2}{\lambda}$
$\pi/8$	$\frac{2\pi d^2}{\lambda}$

Dolžina lijaka za sprejem SAT signala

$A = \frac{\lambda^2}{4\pi} \cdot D \rightarrow$ dBi ?

$l = \frac{a^2 + b^2}{2\lambda}$

Globoko zrcalo uporabno od f_{min}

$z_r = 5\lambda \Rightarrow$

$\Rightarrow \lambda = \frac{z_r}{5}$

$f = \frac{c_0}{\lambda}$

Parabolno zrcalo dovoljena odstopanja smernosti 1dB in 0.25dB

$\lambda = \frac{c_0}{f}$

$\Delta_{-1dB} \leq \frac{\lambda}{16}$

$\Delta_{-0.25dB} \leq \frac{\lambda}{32}$

Razmerje $\frac{f}{d}$, gorišče v odprtini $f = h$

$f = \frac{d^2}{16h} \mid \cdot f$ $\quad \frac{f^2}{d^2} = \frac{f}{16h}$

$f^2 = \frac{d^2 \cdot f}{16h}$ $\quad \frac{f}{d} = \sqrt{\frac{f}{16h}} = \frac{1}{4} \cdot \sqrt{\frac{f}{h}}$

Da sat. ubeži iz tirnice (motor vključimo v perigeju)

$a_1 = \frac{1}{2}(h_a + h_p + 2R_z) =$

$a_2 = \infty$

$r_p = h_p + R_z$

$\left.\begin{matrix} v_1 \\ v_2 \end{matrix}\right\} = \sqrt{\mu\left(\frac{2}{r_p} - \frac{1}{a_n}\right)}$ $\quad \Delta V = V_2 - V_1$

Življenjska doba satelita s popravki

$\Delta V_c = V_i \ln \frac{m}{m - m_g}$

$t = \frac{\Delta V_c}{\frac{\Delta V}{\Delta t}}$

Višina vseh orb za prevoz geost. sat.

$v_z =$ $\quad r_p = R_z$ $\quad a_g =$

$v_g = \sqrt{\frac{\mu}{a_g}}$ $\quad a_p = \frac{r_a + r_p}{2}$

$\Delta V_1 = \sqrt{\mu\left(\frac{2}{r_p} - \frac{1}{a}\right)} - v_z$

$\Delta V_2 = v_g - \sqrt{\frac{2}{r_a} - \frac{1}{a}}$

$\Delta V = \Delta V_1 + \Delta V_2$

Satelit – odstopanje položaja na nebu

$d = (R_z + h) \cdot 2 \sin\left(\frac{\Omega \cos\alpha}{2}\right)$

TV satelit – dobitek spr. ant.

~~Dobro~~ $P_0 G_0 =$ dBW

$\lambda = \frac{c}{f}$ $\quad P_s = P_0 G_0 G_s \left(\frac{\lambda}{4\pi d}\right)^2$

$G_s = \frac{P_s}{P_0 G_0} \left(\frac{4\pi d}{\lambda}\right)^2$

Satelit – premer zrcala sprejemne antene

P_s $\quad G_0$

$P_s = P_0 G_0 \frac{A_{eff}}{4\pi d^2} \rightarrow A_{eff} = \frac{P_s}{P_0 G_0} 4\pi d^2$

$A_{eff} = \eta \pi r^2 \rightarrow z_r = z \sqrt{\frac{A_{eff}}{\eta\pi}}$

Moč sat. odd. P_0?

$P_s = \frac{U_s^2}{Z}$ $\quad A_s = \frac{\lambda^2}{4\pi} \cdot G_s =$

$A_g = \pi r^2$ $\quad = \frac{G_s}{4\pi} \cdot \left(\frac{c_0}{f}\right)^2$

$P_0 = P_s \cdot \frac{A_g}{A_s}$