

























$$\sigma_K = \frac{T_{\text{sys}}}{\sqrt{2} dv \Delta t}.$$







$\pi_{ij}$   
sys

=

$\sqrt{\pi_{ij} \pi_{jv}}$

$\pi_{ij}$   
sys;







1992

2

100

$$\sigma_K = \frac{T_{\rm sys}}{\eta_{\rm spec} \sqrt{2} dv \Delta t}.$$





$$j_{\text{ant}}^{\text{sd}} = \frac{2k F_{\text{eff}}}{A_{\text{eff}}} ;$$









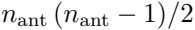
$$\sigma_{Jy} = \frac{J_{\text{ant}}^{\text{sd}} T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{2} dv \Delta t}.$$

2017

$$\sqrt[n]{a_{ij}} = \sqrt[n]{a_{ji}}$$



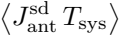
and  
all



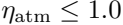




$$\sigma_{\mathrm{Jy}} = \frac{\left( J_{\mathrm{ant}}^{\mathrm{sd}} T_{\mathrm{sys}} \right)}{\eta_{\mathrm{spec}} \sqrt{n_{\mathrm{ant}} \left( n_{\mathrm{ant}} - 1 \right)} dv \Delta t},$$









$$j_{\text{ant}}^{\text{int}} = \frac{j_{\text{ant}}^{\text{sd}}}{\eta_{\text{atm}}}$$

WILLIAM

1871

1871



QWERTY

$$\text{rotation} = e^{-\frac{\phi^2}{2\pi m}} e^{i\pi}$$

$$\sigma_{Jy} = \frac{\langle J_{\text{ant}}^{\text{int}} T_{\text{sys}} \rangle}{\eta_{\text{spec}} \sqrt{n_{\text{ant}} (n_{\text{ant}} - 1)} dv \Delta t}.$$

$$\sigma_{Jy} = \frac{\langle J_{\text{ant}}^{\text{int}} T_{\text{sys}} \rangle}{\eta_{\text{spec}} \sqrt{n_{\text{ant}} (n_{\text{ant}} - 1)} d\nu \Delta t}, \quad \text{with} \quad J_{\text{ant}}^{\text{int}} = \frac{J_{\text{ant}}^{\text{sd}}}{\eta_{\text{atm}}} \quad \text{and} \quad \eta_{\text{atm}} = e^{-\frac{\phi_{\text{rms}}^2}{2}} \leq 1.0,$$



1000

1

1000



NEWBORN











$$j_{\text{ant}} = \frac{2k \Omega_{\text{ant}} F_{\text{eff}}}{\lambda^2} \cdot$$

QPR100

$$j_{\text{ant}}^{\text{int}} = \frac{j_{\text{ant}}^{\text{sd}}}{\eta_{\text{atm}}} = \frac{1}{\eta_{\text{atm}}} \frac{F_{\text{eff}}}{B_{\text{eff}}} \frac{2k\Omega_{\text{prim}}}{\lambda^2}.$$

QWERTY





2014

—  
—

1

1000

1000

1000

$$\sqrt{\frac{\rho_{\text{syn}}}{\rho_{\text{ant}}}} = \frac{2k\Omega_{\text{syn}}}{\lambda^2} \cdot$$

$$\sigma_K = \frac{\sigma_{Jy}}{J_{\text{ant}}^{\text{syn}}} \quad \text{with} \quad J_{\text{ant}}^{\text{syn}} = \frac{2\pi k \theta_{\text{maj}} \theta_{\text{min}}}{4 \ln 2 \lambda^2},$$

$$\sigma_K = \frac{\Omega_{\text{prim}}}{\Omega_{\text{syn}}} \left\langle \frac{F_{\text{eff}} T_{\text{sys}}}{B_{\text{eff}} \eta_{\text{atm}}} \right\rangle \frac{1}{\eta_{\text{spec}} \sqrt{n_{\text{ant}} (n_{\text{ant}} - 1)} d\nu \Delta t} = \frac{\theta_{\text{prim}}^2}{\theta_{\text{maj}} \theta_{\text{min}}} \left\langle \frac{F_{\text{eff}} T_{\text{sys}}}{B_{\text{eff}} \eta_{\text{atm}}} \right\rangle \frac{1}{\eta_{\text{spec}} \sqrt{n_{\text{ant}} (n_{\text{ant}} - 1)} d\nu \Delta t},$$

Q. 100

QWERTY

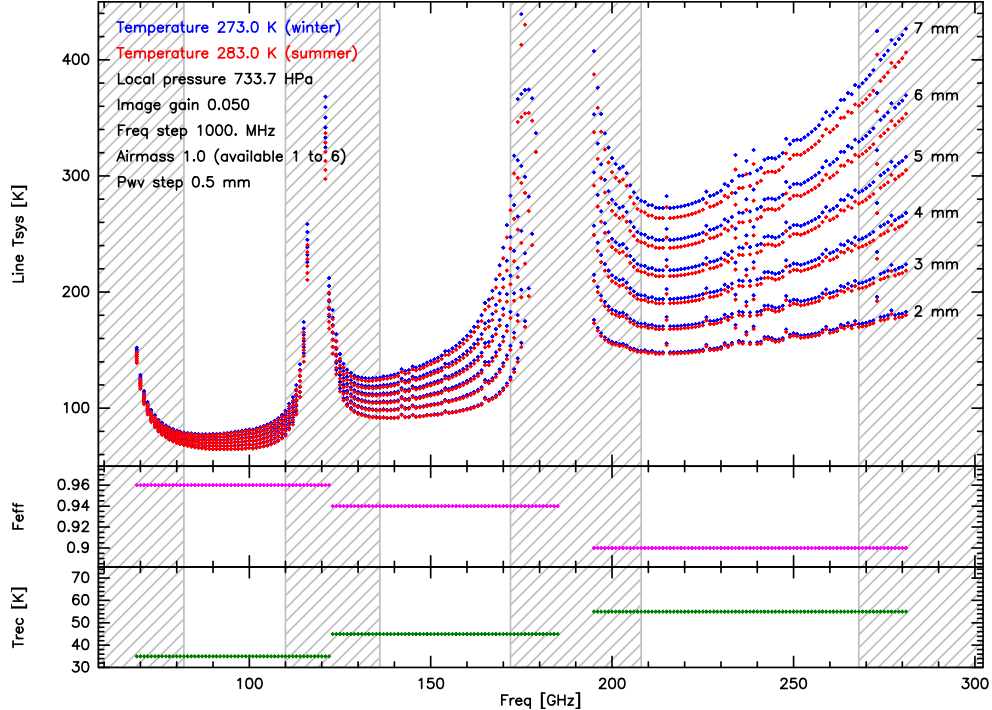


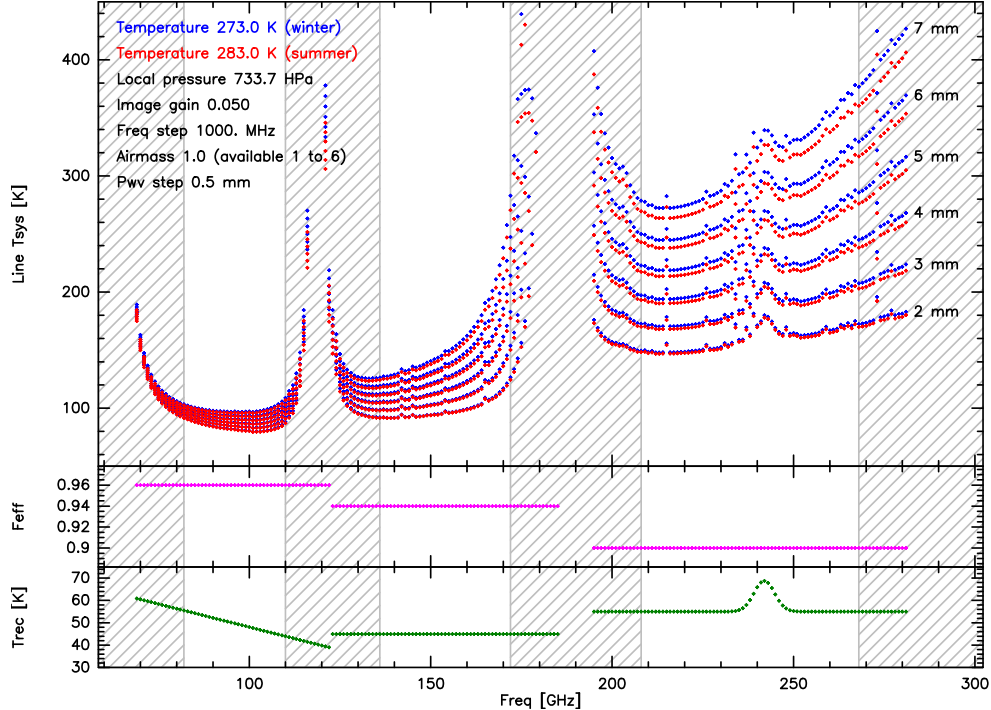


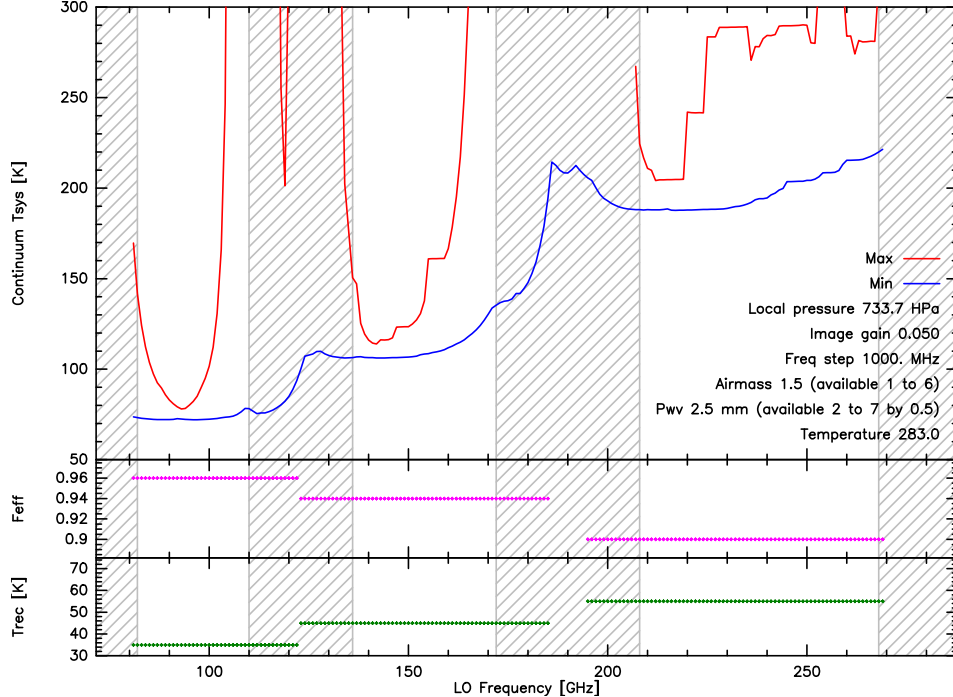


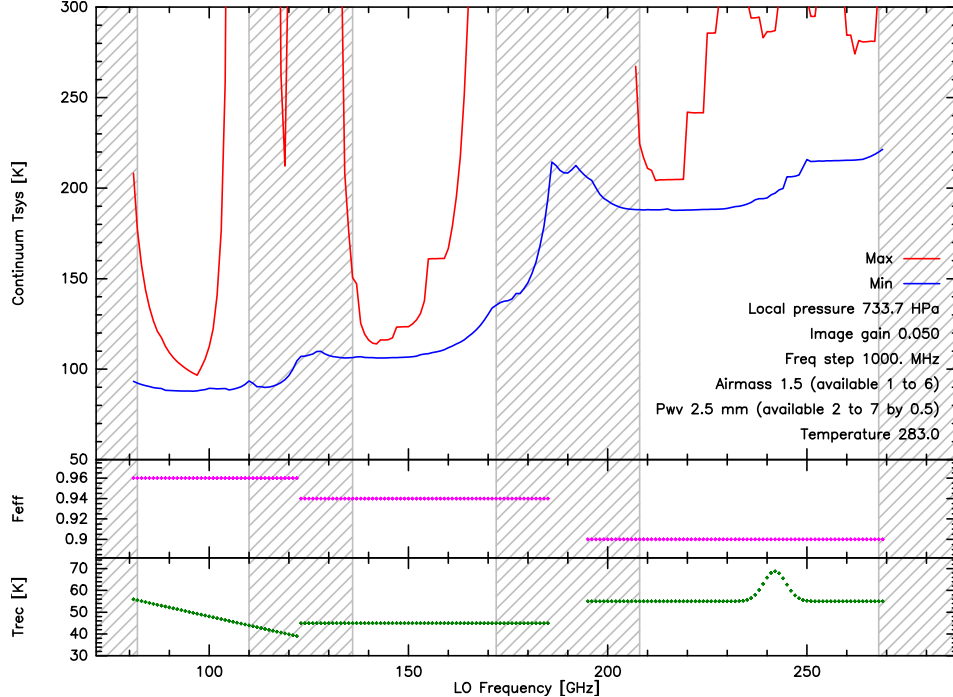
100%



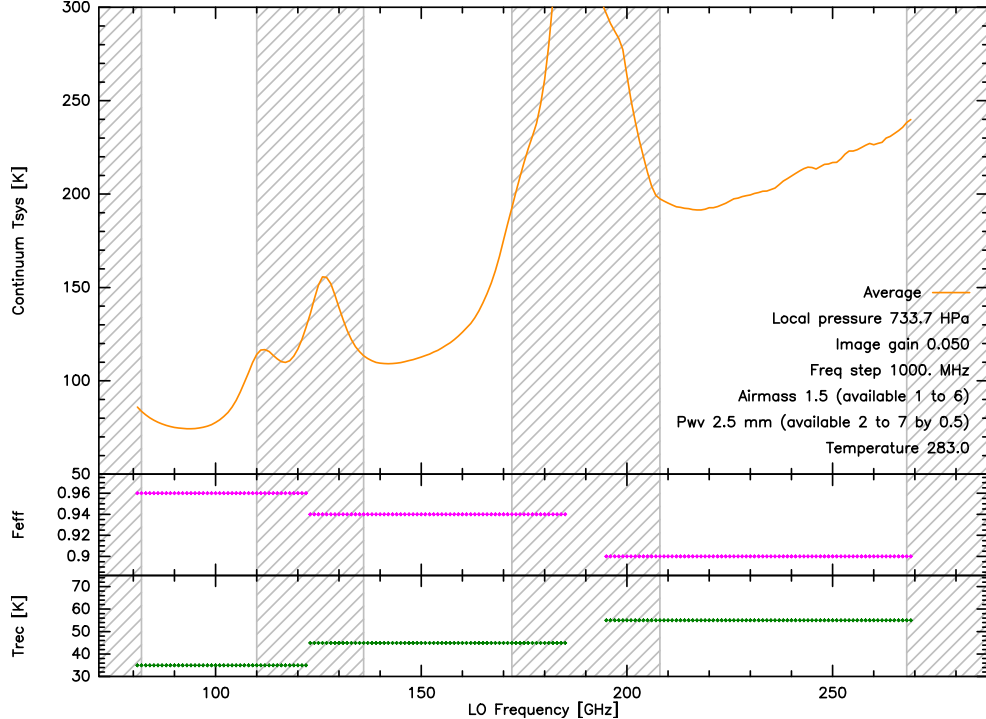


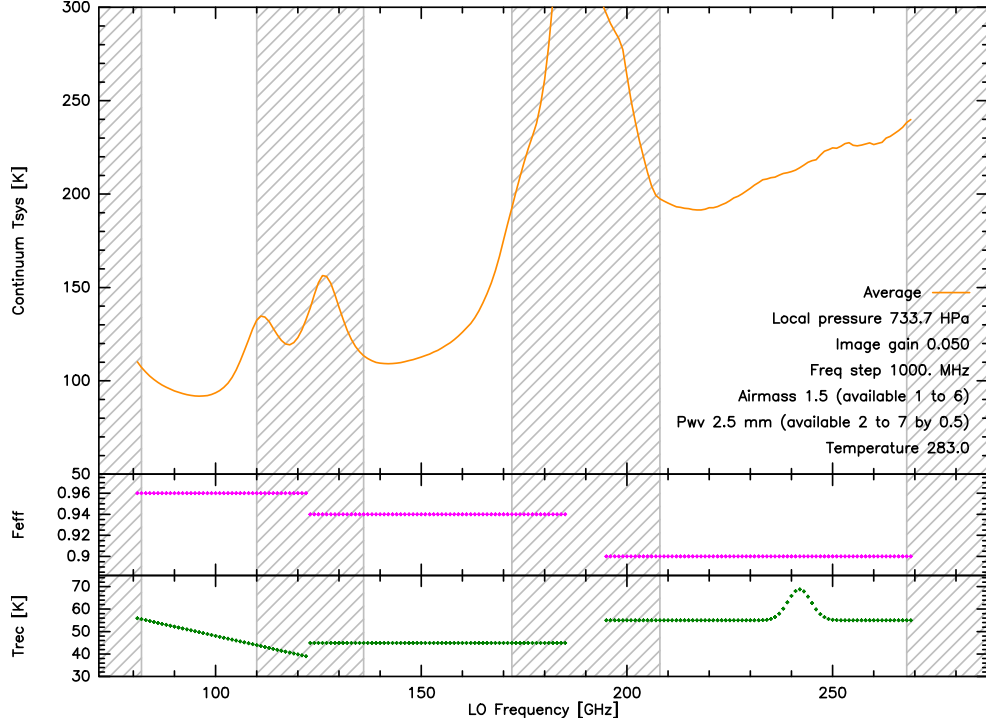












$$T_{sys} = \frac{(1 + G_{im}) \exp \{ \tau_s A \}}{F_{eff}} [F_{eff} T_{atm} (1 - \exp \{ -\tau_s A \}) + (1 - F_{eff}) T_{cab} + T_{rec}],$$





Adrianus







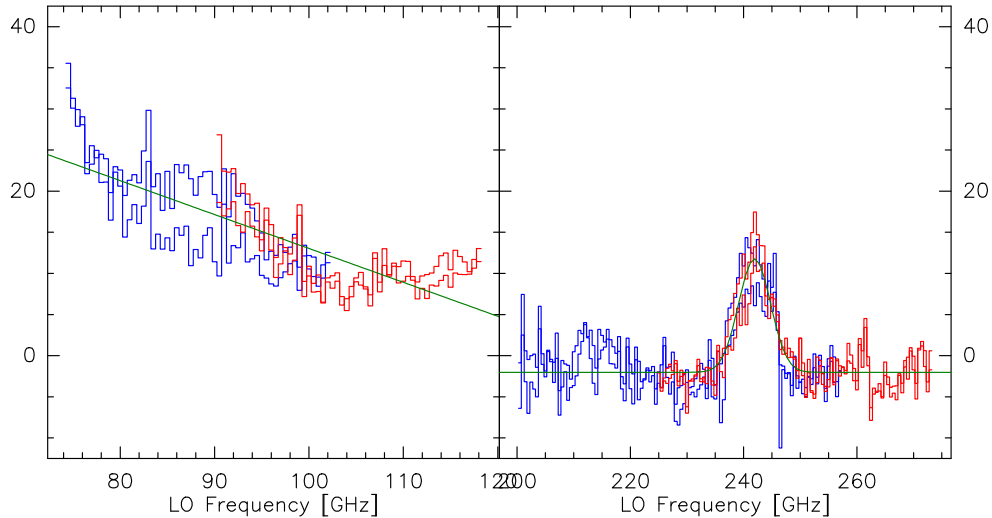




$$\frac{1}{\langle T_{\text{sys}} \rangle^2} = \frac{1}{N} \sum \frac{1}{T_{\text{sys}}^2} \cdot$$

Band 1

Band 3









$$\sigma_{Jy} = \frac{j_{\rm ant}^{\rm int} T_{\rm sys}}{\eta_{\rm spec} \sqrt{n_{\rm ant} (n_{\rm ant} - 1)} dv n_{\rm pol} \Delta t_{\rm on}}.$$



$$\sigma_{Jy} = \frac{j_{\rm ant}^{\rm int} T_{\rm sys}}{\eta_{\rm spec} \sqrt{n_{\rm ant} (n_{\rm ant} - 1)} d\nu n_{\rm pol} \Delta t_{\rm on}} \quad \text{with} \quad j_{\rm ant}^{\rm int} = \frac{j_{\rm ant}^{\rm sd}}{\eta_{\rm atm}} \quad \text{and} \quad \eta_{\rm atm} = e^{-\frac{\phi_{\rm rms}^2}{2}} \leq 1.0,$$

$$\sigma_K = \frac{\sigma_{Jy}}{J_{\text{ant}}^{\text{syn}}} \quad \text{with} \quad J_{\text{ant}}^{\text{syn}} = \frac{2\pi k \theta_{\text{maj}} \theta_{\text{min}}}{4 \ln 2 \lambda^2}.$$









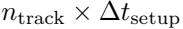
$$\Delta t_{\text{setup}} = \Delta t_{\text{setupmin}} + (n_{\text{freq}} - 1) \Delta t_{\text{setup}} / \text{freq};$$

U.S. Environmental Protection Agency



△✱  
estp  
isq





100%

$$\Delta t_{obs} = \Delta t_{tel} - n_{track} \times \Delta t_{setup}.$$

$$n_{\text{track}} = \frac{\Delta t_{\text{tel}}}{\Delta t_{\text{visible}} + \Delta t_{\text{setup}}},$$

Welding

0.99



[illegible]

— 2019

10000000

*△ + △ = △*

$\Delta t_{on}$

$=$

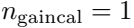
$\Delta t_{obs}$

$\times$

$\eta_{obs}$

A pixelated, grayscale image of the text "100%". The characters are rendered in a blocky, digital font style. The "1" is a simple vertical bar. The "0" is a circle with a thick border. The "0" is a circle with a thick border. The "%" is a standard percentage symbol. The entire image is composed of a grid of black, white, and gray pixels.







$$\eta_{\text{obs}} = \frac{1}{\Omega_{\text{obs}}} \quad \text{with} \quad \Omega_{\text{obs}} = \Omega_{\text{min}} + n_{\text{gaincal}} n_{\text{freq}} \Omega_{/\text{freq}/\text{gaincal}}, \quad \Omega_{\text{min}} = 1.3, \quad \text{and} \quad \Omega_{/\text{freq}/\text{gaincal}} = 0.3.$$



Uppå  
Enligt

100%

100%

100%

A horizontal sequence of six grayscale images showing the progression of a handwritten digit '1'. The first image on the left is highly noisy and pixelated, with the digit '1' barely discernible. As the sequence progresses from left to right, the noise is gradually removed, and the digit becomes increasingly clear and smooth. The final image on the right is a clean, high-quality representation of the handwritten digit '1'.

2020-2021

opinion





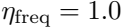
$$\eta_{\text{tot}} = \frac{\Sigma \Delta t_{\text{on}}}{\Delta t_{\text{tel}}}$$

WORLD OF

$$\sigma_{Jy} = \frac{j_{\text{ant}}^{\text{int}} T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{n_{\text{ant}} (n_{\text{ant}} - 1)} dv n_{\text{pol}} \Delta t_{\text{on}}},$$

$$\Delta t_{on} = \eta_{obs} \eta_{freq} (\Delta t_{tel} - n_{track} \times \Delta t_{setup}) ,$$













$$\sigma_{Jy} = \frac{j_{\text{ant}}^{\text{int}} T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{n_{\text{ant}} (n_{\text{ant}} - 1)} dv n_{\text{pol}} \Delta t_{\text{on}}}$$

$$\Delta t_{\text{on}} = \eta_{\text{obs}} \eta_{\text{freq}} \left( \frac{\Delta t_{\text{tel}} - n_{\text{track}} \times \Delta t_{\text{setup}}}{n_{\text{sou}}} \right) .$$





$$n_{\text{beam}} = \frac{A_{\text{map}}}{A_{\text{beam}}}$$

1990





$$A_{\text{beam}} = \frac{0.8 \pi \theta_{\text{prim}}^2}{4 \ln(2)} ;$$

$$\sigma_{Jy} = \frac{j_{\text{ant}}^{\text{int}} T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{n_{\text{ant}} (n_{\text{ant}} - 1)} dv n_{\text{pol}} \Delta t_{\text{on}}}$$

$$\Delta t_{\text{on}} = \eta_{\text{obs}} \eta_{\text{mos}} \left( \frac{\Delta t_{\text{tel}} - n_{\text{track}} \times \Delta t_{\text{setup}}}{n_{\text{beam}}} \right), \quad \text{and} \quad \eta_{\text{mos}} = \frac{\Delta t_{\text{point/cycle}}}{\Delta t_{\text{point/cycle}} + \Delta t_{\text{slew}}},$$

penitence

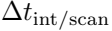
1991

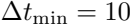


$$n_{\text{point}} = n_{\text{beam}} \left( \frac{7}{4} \right)^2,$$











$$\frac{\Delta t_{\text{int}}/\text{scan}}{1\text{s}} < < \frac{6900}{\theta_{\text{alias}}/\theta_{\text{syn}}},$$

Q112

QWID

$$\Delta t_{\text{int}/\text{scan}} \leq \eta \frac{6900}{1\text{sec}} \sqrt{\frac{\theta_{\text{maj}}\theta_{\text{min}}}{A_{\text{map}}}},$$

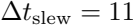




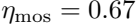




$$\leq \Delta t_{\text{int}/\text{scan}} = \min \left( 45 \text{ sec}, \eta \frac{6\,900}{1 \text{ sec}} \sqrt{\frac{\theta_{\text{maj}} \theta_{\text{min}}}{A_{\text{map}}}} \right) \quad \text{with} \quad \eta = 0.5.$$



The image is a pixelated, black and white graphic of the text "The End of the World". The text is rendered in a highly stylized, jagged, and irregular font that resembles a low-resolution digital or hand-drawn aesthetic. The letters are composed of various shades of gray and black pixels, giving it a textured, almost mosaic-like appearance. The words are arranged in a single line, with "The" and "of" being smaller and positioned between the larger words "End" and "World". The overall effect is one of digital decay or a corrupted digital message.





1990-1991



$$\eta_{\text{mos}} = \frac{\Delta t_{\text{point/cycle}}}{\Delta t_{\text{point/cycle}} + \Delta t_{\text{slew}}}$$

$$\Delta t_{\text{cycle}} = \Delta t_{\text{point/track}} (\Delta t_{\text{point/cycle}} + \Delta t_{\text{slw}}),$$

$\Delta t_{\text{point/cycle}} = \sqrt{\text{repeat}} \cdot t_{\text{point/cycle}} \cdot \Delta t_{\text{acc}}$

A pixelated, black and white graphic of the text "The Legend of Zelda". The font is a stylized, blocky, and slightly irregular typeface, reminiscent of early computer or video game typography. The letters are composed of various shades of gray and black pixels, giving it a textured, digital appearance. The text is centered horizontally and occupies the middle portion of the image.

$$n_{\text{repeat/point/cycle}}^{\text{max}} = \frac{\Delta t_{\text{calmax}}/n_{\text{point/track}} - \Delta t_{\text{slew}}}{\Delta t_{\text{int/scan}}},$$

$$\eta_{\text{mos}} = 1 - \frac{n_{\text{point}} / \text{track} \Delta t_{\text{slew}}}{\Delta t_{\text{calmax}}} .$$

$$n_{\text{point/track}}^{\text{large}} = \text{floor} \left( \frac{\Delta t_{\text{calmax}}}{\Delta t_{\text{int/scan}} + \Delta t_{\text{slew}}} \right).$$

1991-2022



$$n_{\text{point}/\text{track}}^{\text{max}} = \frac{\Delta t_{\text{cyclmax}}}{\Delta t_{\text{min}} + \Delta t_{\text{slew}}} \sim 150.$$

$$\Delta t_{\text{int}/\text{scan}} = \min \left\{ \Delta t_{\text{int}/\text{scan}}, \left( \frac{\Delta t_{\text{cyclmax}}}{n_{\text{point}/\text{track}}} - \Delta t_{\text{slew}} \right) \right\}.$$

$$\eta_{\min} = \frac{\Delta t_{\min}}{\Delta t_{\min} + \Delta t_{\text{slew}}} = 0.47.$$

$$n_{\text{beam}} = \frac{A_{\text{map}}}{A_{\text{beam}}}, \quad \text{where} \quad A_{\text{beam}} = \frac{0.8 \pi \theta_{\text{prim}}^2}{4 \ln(2)}.$$

$$n_{\text{point}} = n_{\text{beam}} \left(\frac{7}{4}\right)^2, \quad \text{and} \quad n_{\text{point/track}} = \min\left(n_{\text{point}}, \frac{n_{\text{point}}}{n_{\text{track}}}\right).$$

$$10 \text{ sec} \leq \Delta t_{\text{int/scan}} = \min \left( 45 \text{ sec}, \eta \frac{6900}{1 \text{ sec}} \sqrt{\frac{\theta_{\text{maj}} \theta_{\text{min}}}{A_{\text{map}}}} \right) \quad \text{with} \quad \eta = 0.5.$$

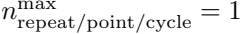
$$n_{\text{point/track}}^{\text{large}} = \text{floor} \left( \frac{\Delta t_{\text{calmax}}}{\Delta t_{\text{int/scan}} + \Delta t_{\text{slew}}} \right), \quad \text{where} \quad \Delta t_{\text{slew}} = 11 \text{ sec}, \quad \text{and} \quad \Delta t_{\text{calmax}} = 25 \text{ min}.$$

$\left( \text{point/track} \right) \leq \left( \text{large point/track} \right)$



$$n_{\text{repeat/point/cycle}}^{\text{max}} = \frac{\frac{\Delta t_{\text{calmax}}}{n_{\text{point/track}}} - \Delta t_{\text{slew}}}{\Delta t_{\text{int/scan}}}.$$

$\left( \text{point/track} \right) \rightarrow \left( \text{large point/track} \right)$



$$n_{\text{point/track}} \leq n_{\text{point/track}}^{\text{max}}, \quad \text{where} \quad n_{\text{point/track}}^{\text{max}} = \frac{\Delta t_{\text{cyclemax}}}{\Delta t_{\text{min}} + \Delta t_{\text{slew}}} \sim 150, \quad \text{and} \quad \Delta t_{\text{cyclemax}} = 60 \text{ min.}$$

$$\text{if } n_{\text{point/track}} > n_{\text{point/track}}^{\text{large}}, \quad \text{then } \Delta t_{\text{int/scan}} = \min \left\{ \Delta t_{\text{int/scan}}, \left( \frac{\Delta t_{\text{cyclemax}}}{n_{\text{point/track}}} - \Delta t_{\text{slew}} \right) \right\}.$$

$$\eta_{\text{mos}} = \frac{\Delta t_{\text{point/cycle}}}{\Delta t_{\text{point/cycle}} + \Delta t_{\text{slew}}}, \quad \text{and} \quad \Delta t_{\text{point/cycle}} = n_{\text{repeat/point/cycle}}^{\text{max}} \Delta t_{\text{int/scan}},$$

$$\Delta t_{\text{cycle}} = n_{\text{point}/\text{track}} (\Delta t_{\text{point}/\text{cycle}} + \Delta t_{\text{slew}}).$$

$$\sigma_{\text{Jy}} = \frac{J_{\text{ant}}^{\text{int}} T_{\text{sys}}}{\eta_{\text{spec}} \sqrt{n_{\text{ant}} (n_{\text{ant}} - 1)} d\nu n_{\text{pol}} \Delta t_{\text{on}}}, \quad \text{and} \quad \Delta t_{\text{on}} = \eta_{\text{obs}} \eta_{\text{mos}} \left( \frac{\Delta t_{\text{tel}} - n_{\text{track}} \times \Delta t_{\text{setup}}}{n_{\text{beam}}} \right).$$













$$\Omega_{\text{ant}}(\nu) = \int_{4\pi} P_{\text{ant}}(\theta, \phi, \nu) d\Omega,$$









airbnb

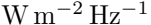


$$\Omega_{\text{fb}}(\nu) = \int_{2\pi} P_{\text{ant}}(\theta, \phi, \nu) d\Omega, \quad \text{and} \quad \Omega_{\text{mb}}(\nu) = \int_{\text{main lobe}} P_{\text{ant}}(\theta, \phi, \nu) d\Omega.$$

$$F_{\text{eff}} = \frac{\Omega_{\text{fb}}}{\Omega_{\text{ant}}}, \quad \text{and} \quad B_{\text{eff}} = \frac{\Omega_{\text{mb}}}{\Omega_{\text{ant}}}.$$

$$F_{\text{sou}}(\nu) = \int_{\text{source}} B(\theta, \phi, \nu) d\Omega,$$











90 100

$$F_{\text{obs}}(\theta_0, \phi_0, \nu) = \int_{\text{source}} B(\theta, \phi, \nu) P_{\text{ant}}(\theta - \theta_0, \phi - \phi_0, \nu) d\Omega,$$



$$F_{\text{obs}}(\theta_0, \phi_0, \nu) = \int_{\text{source}} B(\theta, \phi, \nu) \tilde{P}_{\text{ant}}(\theta_0 - \theta, \phi_0 - \phi, \nu) d\Omega,$$

$$P_{\text{int}}(\theta_0 - \theta, \phi_0 - \phi, v) = P_{\text{int}}(\theta - \theta_0, \phi - \phi_0, v).$$

$$B_{\text{obs}}(\theta_0, \phi_0, \nu) = \frac{1}{\Omega} \int_{\text{source}} B(\theta, \phi, \nu) \tilde{P}_{\text{ant}}(\theta_0 - \theta, \phi_0 - \phi, \nu) d\Omega,$$











Is it possible to

$$= \frac{1}{\Omega_{\text{ant}}} \int_{\text{source}} B(\theta, \phi, \nu) \tilde{P}_{\text{ant}}(\theta_0 - \theta, \phi_0 - \phi, \nu) d\Omega,$$

1990-2000

$$= \frac{1}{\Omega_{\text{fb}}} \int_{\text{source}} B(\theta, \phi, \nu) \tilde{P}_{\text{ant}}(\theta_0 - \theta, \phi_0 - \phi, \nu) d\Omega,$$



Beethoven's Op. 10, No. 1

$$= \frac{1}{\Omega_{\text{mb}}} \int_{\text{source}} B(\theta, \phi, \nu) \tilde{P}_{\text{ant}}(\theta_0 - \theta, \phi_0 - \phi, \nu) d\Omega.$$

$$B_{fb} = \frac{1}{F_{eff}} B_{ant} \quad \text{and} \quad B_{mb} = \frac{F_{eff}}{B_{eff}} B_{fb}.$$

overlapping  
= overlapping

















$$T_{\text{mb}}(\theta_0, \phi_0, \nu) = \frac{1}{\Omega_{\text{mb}}} \int_{\text{source}} B(\theta, \phi, \nu) \tilde{P}_{\text{ant}}(\theta_0 - \theta, \phi_0 - \phi, \nu) d\Omega.$$





139059x1021

$$d\nu(\theta_0, \phi_0, \nu) = \frac{1}{2} A_{\text{eff}} \int_{\text{source}} B(\theta, \phi, \nu) \tilde{P}_{\text{ant}}(\theta_0 - \theta, \phi_0 - \phi, \nu) d\Omega.$$







$$\eta_{\text{ant}} = \frac{A_{\text{eff}}}{A_{\text{geo}}} < 1;$$

$$A_{geo} = \pi \left( \frac{D_{ant}}{2} \right)^2 \cdot$$

$$\text{Aeff}(v) \text{ quant}(v) = \lambda^2,$$

$$B(\theta, \phi, \nu) = \frac{2kT}{\lambda^2},$$

$$d\nu(\theta_0, \phi_0, \nu) = \frac{1}{2} A_{\text{eff}} \int_{\text{source}} B(\theta, \phi, \nu) \tilde{P}_{\text{ant}}(\theta_0 - \theta, \phi_0 - \phi, \nu) d\Omega = \frac{1}{2} A_{\text{eff}} \Omega_{\text{ant}}(\nu) \frac{2kT}{\lambda^2}.$$

www.loveis.org





$$A_{\text{eff}}(\nu)\Omega_{\text{fb}}(\nu)=\lambda^2 F_{\text{eff}}(\nu) \text{ and } A_{\text{eff}}(\nu)\Omega_{\text{mb}}(\nu)=\lambda^2 B_{\text{eff}}(\nu).$$

$$B_{\text{eff}}(v) = \eta_{\text{ant}} A_{\text{geo}} \frac{\Omega_{\text{mb}}(v)}{\lambda^2} \cdot$$

$$A_{\mathrm{geo}} = \frac{\pi}{4} D^2, \quad \frac{\Omega_{\mathrm{mb}}(\nu)}{\lambda^2} = \frac{\pi}{4 \ln 2} \left( \frac{\theta_{\mathrm{mb}}}{\lambda} \right)^2,$$

$$\theta_{mb} = \alpha \frac{\lambda}{D},$$

$$B_{\text{eff}}(\nu) = \frac{\pi^2}{16 \ln 2} a^2 \eta_{\text{ant}}(\nu) \simeq 0.88899 a^2 \eta_{\text{ant}}(\nu).$$









$$\eta_{\text{ant}}(\nu) = \eta_{\text{ant}}^0 \exp \left\{ - \left( \frac{4\pi\sigma}{\lambda} \right)^2 \right\}.$$