SAS Algorithm Pseudocode:

1. Find: sequence of slew maneuvers to avoid sun vector
   (a) Check the sun vector intrusion
      i. Find eigenaxis $\hat{e} = \frac{\hat{P}_i \times \hat{P}_f}{|\hat{P}_i \times \hat{P}_f|}$
      ii. Compute $\alpha = \frac{\pi}{2} - \cos^{-1}(\hat{S} \cdot_{\mathcal{N}} \hat{e})$
      iii. IF $|\alpha| < \epsilon_p$, THEN find $\vec{S}_{||} = \hat{S}\cos\alpha$
   (b) Compute ϕ_1: $\phi_1 = \cos^{-1}(\hat{P}_i \cdot_{\mathcal{G}} \hat{S}_{||}) - \epsilon_p$
   (c) Compute ϕ_2:
      i. IF $\alpha \neq 0$, THEN $\phi_2 = 2\sin^{-1}\left(\frac{\sin\epsilon_p}{\sin\theta}\right),\ \theta = \cos^{-1}(\hat{P}_1 \cdot \hat{S})$
      ii. IF $\alpha = 0$, THEN $\phi_2 = \pi$
   (d) Compute ϕ_3: $\phi_3 = \cos^{-1}({}_{\mathcal{G}}\hat{P}_f.\hat{P}_2)$
2. Find: commanded angular velocity, angular acceleration, and quaternion profiles
   (a) Compute $\phi_{tt} = \frac{\dot{\phi}^2_{max}}{\ddot{\phi}_{max}}$
   (b) Compute t_1, t_2, and t_f.
   IF $\phi > \phi_{tt}$, THEN :
   $t_1 = t_0 + \frac{\dot{\phi}_{max} - \dot{\phi}_0}{\ddot{\phi}_{max}}$
   $t_2 = t_1 + \frac{1}{\dot{\phi}_max}\left[\phi_f - \dot{\phi}_0(t_1 - t_0) - \frac{1}{2}\ddot{\phi}_{max}(t_f 1 - t_0)^2 - \frac{\dot{\phi}_{max}(\dot{\phi}_{max} - \dot{\phi}_f)}{\ddot{\phi}_{max}} + \frac{(\dot{\phi}_{max} - \dot{\phi}_f)^2}{2\ddot{\phi}_{max}}\right]$
   $t_f = t_1 + \frac{1}{\dot{\phi}_{max}}\left[\phi_f - \dot{\phi}_0(t_1 - t_0) - \frac{1}{2}\ddot{\phi}_{max}(t_1 - t_0)^2 + \frac{(\dot{\phi}_{max} - \dot{\phi}_f)^2}{2\ddot{\phi}_{max}}\right]$.
   ELSE:
   $t_f = \sqrt{\frac{\dot{\phi}^2_{max}}{\ddot{\phi}_{max}}}$
   $t_2 = t_f/2$
   $t_1 = t_2$
   (c) Find ${}^D R^N$: ${}^D R^N = \left[(cos\phi)I_{3x3} + (1 - cos\phi)\hat{e}\hat{e}^T - (sin\alpha)E^x\right]$
   (d) Find ${}_{\mathcal{B}}\dot{\omega}^D$: ${}_{\mathcal{B}}\dot{\omega}^D = {}^D R^N \ddot{\phi}_{max} \cdot_{\mathcal{N}} \hat{e}$
   (e) Solve for control torque, u: $J \cdot_{\mathcal{B}} \dot{\omega}^D = u -_{\mathcal{B}} \omega^C \times J \cdot_{\mathcal{B}} \omega^C$
   (f) FOR each ϕ between switching times, propagate ω and q between switching times by solving above eqn and $\dot{q} = \frac{1}{2}\Omega q$
   where
$$\Omega = \begin{bmatrix} 0 & \omega_3 & -\omega_2 & \omega_1 \\ -\omega_3 & 0 & -\omega_1 & \omega_2 \\ \omega_2 & -\omega_1 & 0 & \omega_3 \\ -\omega_1 & \omega_2 & -\omega_3 & 0 \end{bmatrix}$$
   with correct u for each switching time interval.