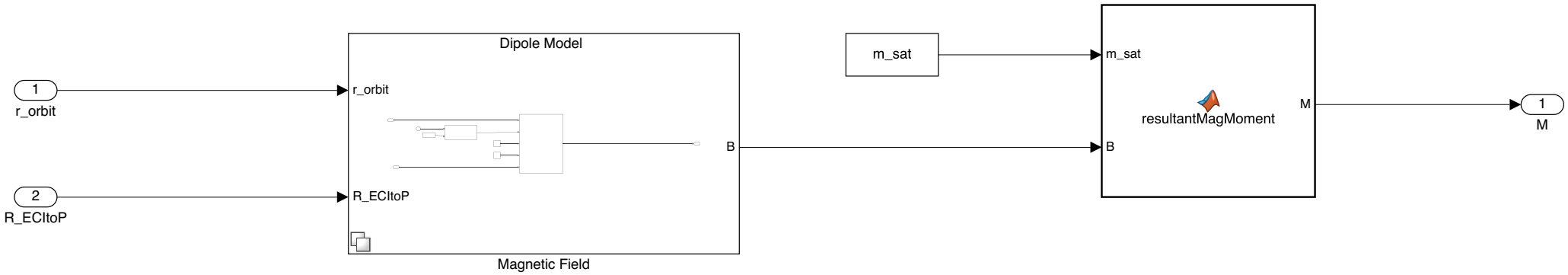
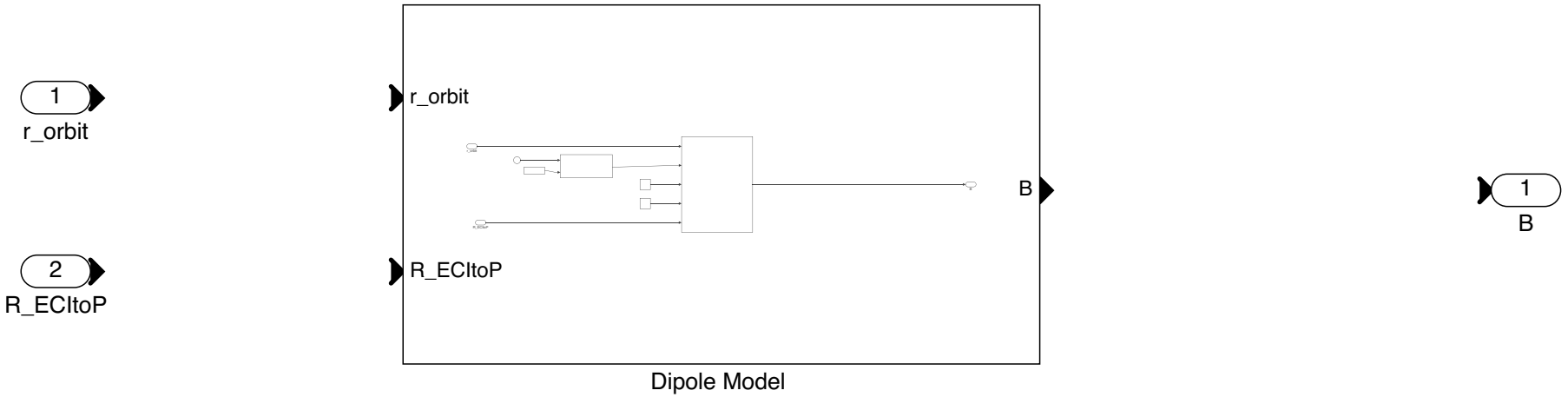

1
r_orbit
2
R_ECItoP
Dipole Model
r_orbit
R_ECItoP
B
Magnetic Field
m_sat
m_sat
B
resultantMagMoment
M
1
M

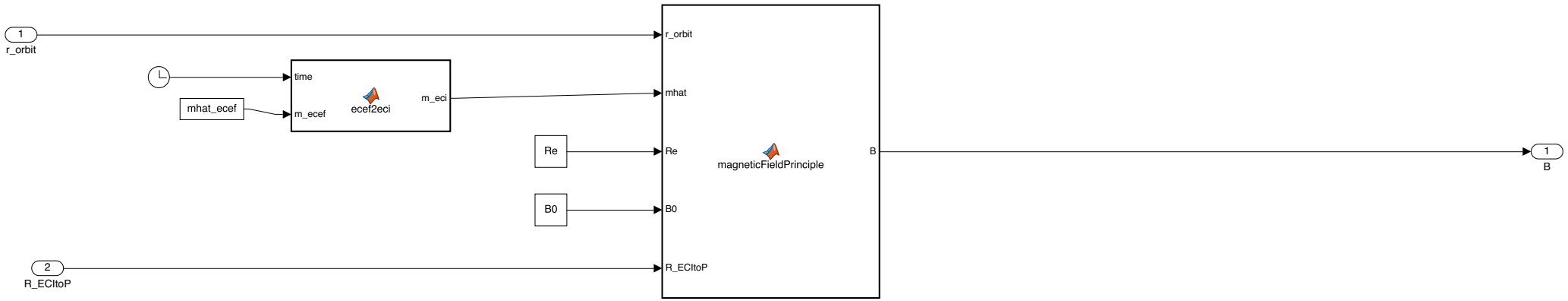
```
function M = resultantMagMoment(m_sat,B)

n = size(m_sat, 2);

M = zeros([3 1]);

for i=1:n
    M = M + cross(m_sat(:,i), B);
end
```


1
r_orbit
2
R_ECItoP
r_orbit
R_ECItoP
B
1
B
Dipole Model


1
r_orbit
time
mhat_ecef
m_ecef
ecef2eci
m_eci
Re
B0
2
R_ECItoP
r_orbit
mhat
Re
B0
R_ECItoP
magneticFieldPrinciple
B
1
B

```
function B = magneticFieldPrinciple(r_orbit, mhat, Re, B0, R_ECItoP)

R = norm(r_orbit);
Rhat = r_orbit./R;

B = -(Re/R)^3 .* B0 .* (3*(dot(mhat, Rhat).*Rhat) - mhat);

B = R_ECItoP * B;
```

```
function m_eci   = ecef2eci(time, m_ecef)

    D = time/(24*60*60);

    mjd = 59987.6458 + D;

    d = mjd - 51544.5;
    gmst_deg = 280.4606 + (360.9856473*d);
    gmst_rad = deg2rad(gmst_deg);

    % Step 1: Create rotation matrix for Earth's rotation about its axis
    R_z = [cos(gmst_rad), -sin(gmst_rad), 0;
           sin(gmst_rad), cos(gmst_rad),  0;
           0,               0,              1];


    m_eci = R_z*m_ecef;

end
```