SWARM LEVEL 1B PRODUCTS

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ABSTRACT

An overview of the current definition of the Level 1b Products for the Swarm Mission is provided. The definition of the products is still in an early phase and the content of the products is subject to change.

1. INTRODUCTION

The Swarm Level 1b Products are defined using experience from the Ørsted Mission. There will be one set of Level 1b Products (files) for each of the three Swarm satellites. Each product will contain data from either one orbit (mag-h) or one day (all others).
All Level 1b data are fully calibrated and corrected. However, as the mission progresses, various calibration parameters may be refined leading to updates of some of the products. Specifically, the alignment between the Common Reference Frame (CRF) – the combination of the attitudes of the 3 Star Camera heads - and the vector magnetometer (VFM) is subject to refinement in the Level 2 data processing, hence products containing $\mathbf{B}_{NEC}$ are subject to updates every 3-12 months.

2. MAGNETIC HIGH RATE DATA (MAG-H)

The Magnetic High Rate Data, mag-h, contains magnetic field vector data at 50 Hz, which is the basic sampling rate of the vector magnetometer. Field vectors are provided both in the instrument and in the NEC frame.

MAG-H	
t	Time, UTC
r	Position, ITRF
$\mathbf{B}_{VFM}$	Magnetic field vector, VFM frame
$\mathbf{B}_{NEC}$	Magnetic field vector, NEC frame

3. MAGNETIC DATA, VFM FRAME (MAG-R)

The Magnetic Data in the VFM frame, mag-r, contains magnetic field vector and intensity data together with attitude information at 1 Hz data rate.

MAG-R	
t	Time, UTC
r	Position, ITRF
F	Magnetic field intensity
$\mathbf{B}_{VFM}$	Magnetic field vector, VFM frame
$\mathbf{q}_{CRF}$	Rotation from NEC to CRF frame

4. MAGNETIC DATA, NEC FRAME (MAG-L)

The Magnetic Data in the NEC frame, mag-l, contains magnetic field vector and intensity data at 1 Hz data rate.

MAG-L	
t	Time, UTC
r	Position, ITRF
F	Magnetic field intensity
$\mathbf{B}_{NEC}$	Magnetic field vector, NEC frame

5. PLASMA DATA (PLASMA)

The Plasma Data, plasma, contains plasma information from the EFI instrument at 2 Hz data rate.

PLASMA	
t	Time, UTC
r	Position, ITRF
$\mathbf{v}_{ion}$	Ion velocity, NEC frame
E	Electric field vector, NEC frame
□	Plasma density
T	Plasma temperature

6. GPS DATA (RINEX)

The raw GPS data is to be provided in the RINEX format Details are yet to be defined.

7. ORBIT DATA (ORBIT)

The Orbit Data Product, orbit, contains information from the Precise Orbit Determination (POD) and from the accelerometer (ACC). Data rate is 1 Hz.

ORBIT	
t	Time, UTC
r	Position, ITRF
v	Velocity, ITRF
a	Acceleration, ITRF (from POD)
q	Rotation from NEC to Spacecraft frame
$\mathbf{a}_{S/C}$	Non-gravitational acceleration, Spacecraft frame