# EIS Telecommanding

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## 1 - Introduction :

This document outlines the TC packet structure to be used on the EUV Imaging Spectrometer (EIS) to be launched on-board ISAS Solar-B satellite.

At the present time a single byte command (DC) is not envisaged to be of any use as far as EIS software operations is concerned. Only real-time Block Commands are needed by the software. These commands consist of :
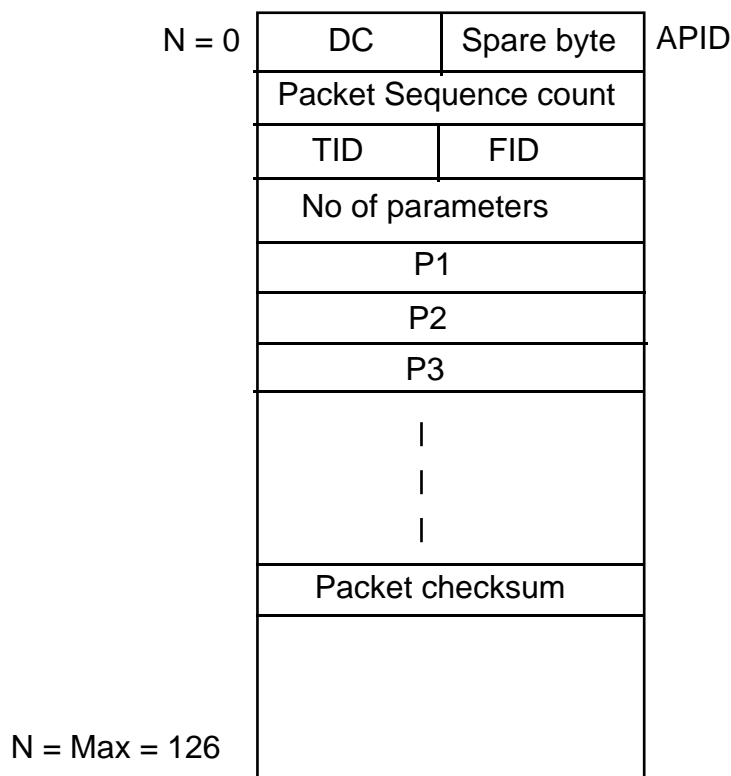
Discrete command (1 byte), followed by up to 252 byte commands, i.e.

DC (1 byte) + up to 252 BCs.

Note that only one DC is needed in this case (only needed to comply with solar-B TC structure) and up to 126 16 bit EIS command parameters.

## 2 - TC packet template:

The tentative packets structure template is shown below :

```
N = 0          +--------------+------------+  APID
               |      DC      | Spare byte |
               +--------------+------------+
               |  Packet Sequence count    |
               +--------------+------------+
               |     TID      |    FID     |
               +--------------+------------+
               |    No of parameters       |
               +---------------------------+
               |           P1              |
               +---------------------------+
               |           P2              |
               +---------------------------+
               |           P3              |
               +---------------------------+
               |            |              |
               |            |              |
               |            |              |
               +---------------------------+
               |     Packet checksum       |
               +---------------------------+
               |                           |
N = Max = 126  |                           |
               +---------------------------+
```

Real-Time Block Commands

Where :

APID : APplication IDentifier. The APID is a unique number to identify the intended destination of this TC packet (EIS packet). APID can be treated as a DC + spare byte.

Packet Sequence count : This is a 16 bit counter. This packet counter is incremented by 1 for each TC packet sent. This counter ranges from 0 to FFFFh. This counter is used as a TC command identifier if the command is rejected (incorrect command which will aid identifying the failed command. Further error codes to identify the command rejection cause, e.g. checksum failure may be available in the HK (TBC)).

TID : Task IDentifier. This is an 8-bit parameter which defines the task for which the command applies. For example TID = 1 is the time tagged task (EIS process) and TID = 2 is the HK task, etc.

FID : Function IDentifier. This an 8 bit parameter which defines the function of the command, in conjunction with TID. For example :

TID = 1 (time tagged task)

FID = 1 (load time tagged table)
FID = 2 (enable time tagged operations)
FID = 3 (disable time tagged operations)
FID = 4 (dump time tagged table)

Number of parameters : This is a 16 bit parameter that indicated the number of command parameters. Note while the number of parameters does not require a 16-bit number, however, a 16 bit is used so that the commanding structure is 16 bit word aligned. The Number of parameters to follow does not include the checksum (TBC).

P1, P2, etc : These are 16 bit parameters representing the command parameter values.

Packet checksum : This parameter is used to detect commanding errors. This parameter is calculated as follows :

Initial checksum = FFFFh

Loop for the TC packet length (no of parameters + 3)
    Checksum = Checksum XOR packet_value
End loop

## 3 - Unresolved issues :

All EIS real time software commanding, using the above structure, can be achieved using **a single DC value** (the command function (processing) can be deduced from TID and FID). However, the following commands need further considerations :

1 - Is it possible to have Solar-B OP and OG commands sent to EIS using the same APID (DC), though there is uncertainty about the use or need of these commands by EIS?

2 - Flare flag and flare coordinates distribution method to instruments is not defined yet. If these will arrive via normal commanding route (as in SOHO) then they need to be accommodated via the commanding structure (Eg. using different APID - another DC).