

# GGAK Format description

|          |         |        |
|----------|---------|--------|
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Document describing the format used by Russian satellites that carry GGAK.

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# 1   Elektro-L 2

| <div> <div>←</div> <div>1792 bits</div> <div>→</div> </div> |                                                          |                                        |                                 |                   |                        |         |
|-------------------------------------------------------------|----------------------------------------------------------|----------------------------------------|---------------------------------|-------------------|------------------------|---------|
| Sync Word                                                   | Marker                                                   | Sub Marker                             | Times-tamp                      | Data Block        | Filler                 | CRC 16  |
| CCSDS Standard ASM                                          | Used to differentiate each frame (sequentially from 0-7) | Only used by the last frame (Marker 7) | Times-tamp of the current frame | Blocks of 50 bits | Filler 0xAA (Optional) | CRC 16  |
| 32 bits                                                     | 4 bits                                                   | 4 bits                                 | 64 bits                         | Varies            | Varies                 | 16 bits |

Table 1: Elektro-L2 GGAK Frame Structure

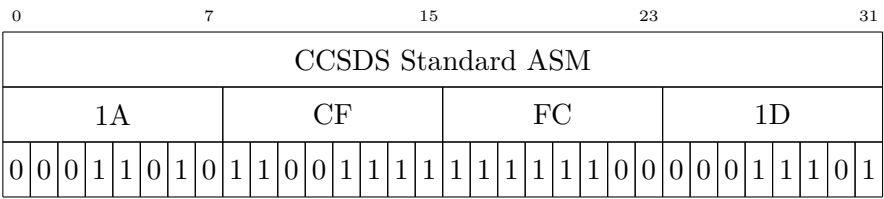


Figure 1: Elektro-L 2 GGAK - Sync Word

|        |   |   |   |            |   |   |   |
|--------|---|---|---|------------|---|---|---|
| 0      |   |   |   | 3 4 7      |   |   |   |
| Marker |   |   |   | Sub Marker |   |   |   |
| 0      | 0 | 0 | 0 | 0          | 0 | 0 | 0 |

Marker 0

|        |   |   |   |            |   |   |   |
|--------|---|---|---|------------|---|---|---|
| 0      |   |   |   | 3 4 7      |   |   |   |
| Marker |   |   |   | Sub Marker |   |   |   |
| 0      | 0 | 1 | 0 | 0          | 0 | 0 | 0 |

Marker 2

|        |   |   |   |            |   |   |   |
|--------|---|---|---|------------|---|---|---|
| 0      |   |   |   | 3 4 7      |   |   |   |
| Marker |   |   |   | Sub Marker |   |   |   |
| 0      | 1 | 0 | 0 | 0          | 0 | 0 | 0 |

Marker 4

|        |   |   |   |            |   |   |   |
|--------|---|---|---|------------|---|---|---|
| 0      |   |   |   | 3 4 7      |   |   |   |
| Marker |   |   |   | Sub Marker |   |   |   |
| 0      | 0 | 0 | 1 | 0          | 0 | 0 | 0 |

Marker 1

|        |   |   |   |            |   |   |   |
|--------|---|---|---|------------|---|---|---|
| 0      |   |   |   | 3 4 7      |   |   |   |
| Marker |   |   |   | Sub Marker |   |   |   |
| 0      | 0 | 1 | 1 | 0          | 0 | 0 | 0 |

Marker 3

|        |   |   |   |            |   |   |   |
|--------|---|---|---|------------|---|---|---|
| 0      |   |   |   | 3 4 7      |   |   |   |
| Marker |   |   |   | Sub Marker |   |   |   |
| 0      | 1 | 0 | 1 | 0          | 0 | 0 | 0 |

Marker 5

|        |   |   |   |            |   |   |   |
|--------|---|---|---|------------|---|---|---|
| 0      |   |   |   | 3 4 7      |   |   |   |
| Marker |   |   |   | Sub Marker |   |   |   |
| 0      | 1 | 1 | 0 | 0          | 0 | 0 | 0 |

Marker 6

|        |   |   |   |            |   |   |   |
|--------|---|---|---|------------|---|---|---|
| 0      |   |   |   | 3 4 7      |   |   |   |
| Marker |   |   |   | Sub Marker |   |   |   |
| 0      | 1 | 1 | 1 | 0          | 0 | 0 | 0 |

Marker 7 - Sub Marker 0

|        |   |   |   |            |   |   |   |
|--------|---|---|---|------------|---|---|---|
| 0      |   |   |   | 3 4 7      |   |   |   |
| Marker |   |   |   | Sub Marker |   |   |   |
| 0      | 1 | 1 | 1 | 0          | 1 | 1 | 1 |

Marker 7 - Sub Marker 7

Figure 2: Elektro-L 2 GGAK - Marker and Sub Marker