

with the left-most bit transmitted first.

**Note:** Because of the close relationship between the synchronization sequences used for the ADS-B and Ground Uplink Messages, the same correlator can search for both simultaneously.

### 2.2.3.2.2 Payload (Before Interleaving and After De-interleaving)

The Payload consists of two components: the first eight bytes that comprise UAT-Specific Header and bytes 9 through 432 that comprise the Application Data as shown in [Table 2-4](#). Bytes and bits are fed to the interleaving process with the most significant byte, byte #1, transmitted first, and within each byte, the most significant bit, bit #1, transmitted first.

**Table 2-4: Format of the Ground Uplink Message Payload**

Byte #	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7	Bit 8								
1	(MSB)															
2	GROUND STATION LATITUDE (WGS-84)							(LSB)	(MSB)							
3																
4	GROUND STATION LONGITUDE (WGS-84)															
5								(LSB)	P Valid							
6																
7	UTC COUNTER	Reserved	APPLICATION DATA VALID	(MSB)	SLOT ID			(LSB)								
8	(MSB)	TIS-B SITE ID		(LSB)	Reserved											
9	Application Data															
432																

#### 2.2.3.2.2.1 UAT-Specific Header

##### 2.2.3.2.2.1.1 “GROUND STATION LATITUDE” Field Encoding

The “GROUND STATION LATITUDE” field is a 23-bit (bit 1 of byte 1 through bit 7 of byte 3) field used to identify the latitude of the ground station. The encoding of this field by the ground station will be the same as defined for latitude information in the ADS-B Message (§2.2.4.5.2.1).

**Note:** The resolution of this field has been selected to support a potential passive ranging function.

##### 2.2.3.2.2.1.2 “GROUND STATION LONGITUDE” Field Encoding

The “GROUND STATION LONGITUDE” field is a 24-bit (bit 8 of byte 3 through bit 7 of byte 6) field used to identify the longitude of the ground station. The encoding of this field by the ground station will be the same as defined for longitude information in the ADS-B Message (§2.2.4.5.2.1).

**Note:** The resolution of this field has been selected to support a potential passive ranging function.

**Note:** It is beyond the scope of this MOPS to specify the method by which a TIS-B service provider would assign track file identifiers for those TIS-B targets for which the ICAO 24-bit address is unknown.

#### 2.2.4.5.1.3.5 Surface Vehicle Address

An “ADDRESS QUALIFIER” value of FOUR (binary 100) is used to indicate that the “ADDRESS” field holds the address of a surface vehicle authorized to operate in the airport’s surface movement area.

**Note:** It is beyond the scope of this MOPS to specify the method by which ADS-B surface vehicle addresses are assigned.

#### 2.2.4.5.1.3.6 Fixed ADS-B Beacon Address

An “ADDRESS QUALIFIER” value of FIVE (binary 101) is used to indicate that the “ADDRESS” field holds the address assigned to a fixed ADS-B beacon or “parrot.”

**Note:** It is beyond the scope of this MOPS to specify the method by which ADS-B beacon addresses are assigned.

#### 2.2.4.5.2 STATE VECTOR Element

Format for the STATE VECTOR element is defined in [Table 2-11](#). This encoding **shall** apply to ADS-B Messages with PAYLOAD TYPE CODES of “0” through “10,” when the ADDRESS QUALIFIER value is “0,” “1,” “4” or “5.” Each of the fields shown is defined in §2.2.4.5.2.1 through §2.2.4.5.2.10.

**Table 2-11: Format of STATE VECTOR Element**

Payload Byte #	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7	Bit 8
5	(MSB)							
6	LATITUDE (WGS-84)							
7							(LSB)	(MSB)
8	LONGITUDE (WGS-84)							
9							(LSB)	Alt Type
10	ALTITUDE							
11	(MSB)				(LSB)	(MSB)	NIC	(LSB)
12	(MSB)		A/G STATE	(LSB)	Reserved			
13	HORIZONTAL VELOCITY							
14	VERTICAL VELOCITY OR A/V LENGTH/WIDTH CODE							
15					UTC		Reserved	
16								
17								

##### 2.2.4.5.2.1 “LATITUDE” and “LONGITUDE” Field Encoding

- The “LATITUDE” field is a 23-bit (bit 1 of byte 5 through bit 7 of byte 7) field used to encode the latitude provided to the ADS-B Transmitting Subsystem in WGS-84. The encoding of this field **shall** be as indicated in [Table 2-12](#). Also see [Figure 2-5](#).

### 2.2.4.5.1 “SECONDARY ALTITUDE” Field Encoding

The “SECONDARY ALTITUDE” field is a 12-bit (bit 1 of byte 30 through bit 4 of byte 31) field used to encode either the geometric altitude or barometric pressure altitude depending on the setting of the “ALTITUDE TYPE” field (§2.2.4.5.2.2). The altitude encoded in the “SECONDARY ALTITUDE” field is the opposite type to that specified by the “ALTITUDE TYPE” field. The encoding **shall** be consistent with that used for “ALTITUDE” described in [Table 2-14](#).

### 2.2.4.5.5.2 Reserved Bits

Bit 5 of byte 31 through bit 8 of byte 34 are reserved for future use, and **shall** be set to ALL ZEROS.

***Note:** This field is reserved for future definition to contain either Air-Referenced Velocity or perhaps wind vector and temperature.*

### 2.2.4.5.6 TARGET STATE Element (Payload Type Codes “3” and “4”)

Format for the TARGET STATE element is defined in [Table 2-51](#). This encoding **shall** apply to ADS-B Messages with “PAYLOAD TYPE CODES” of “3” and “4.”

**Table 2-51: Format of TARGET STATE Element (Payload Type Codes “3” and “4”)**

Payload Byte #	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7	Bit 8
30	TARGET HEADING OR TRACK ANGLE INFORMATION							
31	TARGET HEADING OR TRACK ANGLE INFORMATION							
32	TARGET ALTITUDE INFORMATION							
33	TARGET ALTITUDE INFORMATION							

### 2.2.4.5.6.1 “TARGET HEADING or TRACK ANGLE INFORMATION” Field Encoding

The “TARGET HEADING or TRACK ANGLE INFORMATION” field is composed of subfields as indicated in [Table 2-52](#).

**Table 2-52: “TARGET HEADING or TRACK ANGLE INFORMATION” Format**

Byte 30							
Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7	Bit 8
Hdg/Trk	Target Source Indicator (H).		Mode Indicator (H)		Reserved	(MSB)	
Byte 31							
Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7	Bit 8
-- Track Heading or Track Angle --							(LSB)