



# ORBiT Avionics II System Requirement

Sys-Req

Rev: A01

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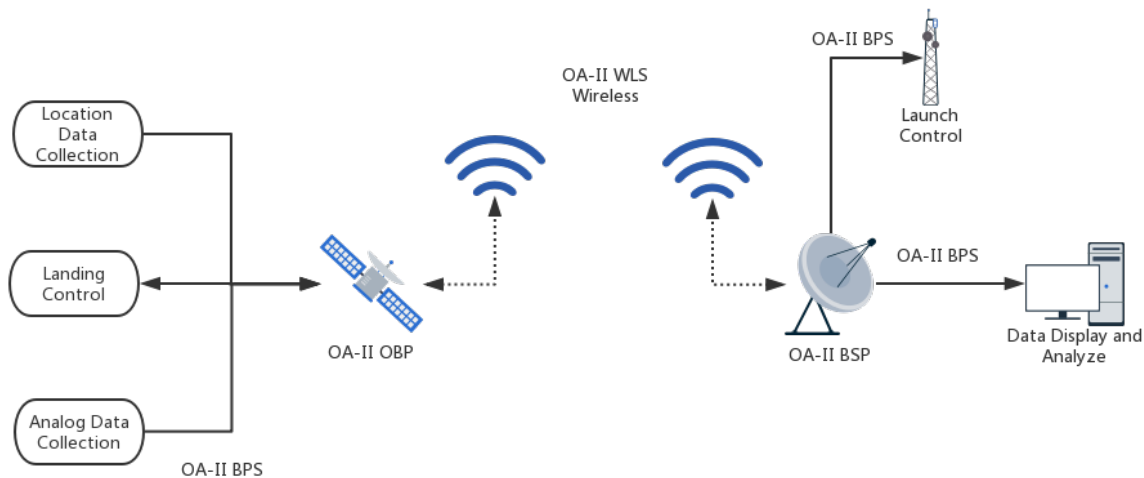
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# 1 Introduction to ORBiT Avionics II System (OA-II)

## 1.1 Introduction

ORBiT Avionics II System is a new generation avionics system for Orange Rocket Ballistics Team rocket. It include twq major part, the On Board part, and the Base Station part. All the compone in the OA-II system are inter connect with a unique backplane system and wireless system.



### On Board Part (OBP)

The OA-II OBP is use to collecting information about the rocket and deliver it to the OA-II BSP for further analysis. In the same time, it also will back up all the information to a on board storage in case wireless connection failure.

### Base Station Part (BSP)

The OA-II BSP is use to receive the information delivered by OA-II OBP via wireless connection and perform basic analyze on roket status. The OA-II BSP provide live for rocket status and location and data storage for further analysis. The OA-II BSP also help to indetify the rocket location after it is landed for reclaim personnel to locate the rocket.

## Backplane System (BPS)

The OA-II BPS is a unique, multi-level information exchange system that links different parts in the OA-II BSP and the OA-II OBP. It provides different speed modes for different components.

## Wireless System (WLS)

The OA-II WLS is a wireless communication system which provides communication between OA-II BPS and OA-II OBP. In the same time, it also provides landing locating signals.

## 1.2 Requirement

### On Board Part (OBP)

Require feature

- Three dimension linear kinematics data. P(position), V(velocity), A(acceleration) data.
- Three dimension Rotational kinematics data.  $\theta$ (angle),  $\omega$ (angular velocity),  $\alpha$ (angular acceleration) data.
- Air pressure data.
- Sound frequency level ADC(Sample frequency  $\geq 40\text{kHz}$ )
- Power manage (convert from 24V)
- High power driver (Peak Power  $\geq 50\text{W}$ )
- 720p 24Hz RGB Camera
- Landing location broadcast (up to 2 hours, 3km range, low power consumption)

Additional feature

- Radio frequency level ADC(Sample frequency  $\geq 4\text{GHz}$ )
- 1080p 60Hz RGB Camera

### Base Station Part (BSP)

Require feature

- Receiving Data from rocket.
- Display Rocket Status information.
- Basic Data analysis(Normal/Warning/Error Status).
- Locate rocket after landing.

- Ignition control system  
Rocket engine fuel injection and ignition  
Critical cutoff  
Fire control

#### Additional feature

- Rocket Tracking(via camera or radio)
- Launch Pad Control
- Automatic system check

### Backplane System (BPS)

- Provide different speed mode with ms level delay  
Info level(  $\leq 3\text{MB/s}$ )  
Data level( $\approx 50\text{MB/s}$ )  
Stream level( $\geq 100\text{MB/s}$ )
- Tolerance high vibration and EMP
- Tolerance high temperature ( $\leq 75^{\circ}\text{C}$ )

### Wireless System (WLS)

- Provide high speed data connection within 10km
- Provide low speed, low power consumption data connection within 3km

## 2 Revision History

Reversion Number	Person	Change Log	Time
A01	Jinzhi Cai	Initialize	2019-6-21

Table 1: Summary of Revision History