Drones have become increasingly capable and have become a crucial component in accomplishing many modern day tasks. To increase the effective range of drones and reduced the downtime, infrastructure should be in place to artificially extend drone range. The basis of this concept is wireless charging.

**Overview**

The wireless drone charging platform operates from the concept of wireless power transfer. This solution provides for more frequent use of the drone and eliminates the need for human intervention in the charging process.

**Specifications**

- **Key Features:**
  - Solar-Powered
  - Wireless
  - 12+ Charge Platform Capacity
  - Potential for Automation
- 5W Delivered Wirelessly
- 4-7cm Charging Distance
- 120kHz Switching Frequency
- 22min Charging Time
- 7Ah Platform Battery
- 500mAh Drone Battery

**System Block Diagram**

**System Descriptions**

- **Power Delivery**
  - Ensures that the WPT and microcontrollers are supplied enough power from the solar panels to function.
- **Power Management**
  - Includes the rectifier and the inverter. Responsible for changing from AC to DC, and vice versa.
- **Wireless Power Transfer**
  - This subsystem contains the coils themselves and the physics of the transfer.
- **Communications**
  - Systems programmed to allow the drone to communicate with the platform via XBee and GPS.
- **Control Systems**
  - Subsystem dedicated to detecting when the battery is fully charged and ensuring that the whole system functions properly.

**Hardware / Key Components**

- **Single Coil Design**
  - SS compensation topology
  - Coupling coeff. = 0.324
  - 12.08µH Mutual Induct.

- **Full Bridge Inverter**
  - Operates at 120kHz
  - 12VDC - 24Vpp AC
  - IRF 540N FETS
  - PWM driven, forced dead time

- **Full-Bridge Rectifier**
  - Schottky diodes with low 2 * 0.45V drop

- **XBees Communication Module**
  - Radio communication link between drone and platform
  - Lightweight, low power, low cost
  - Interchangeable with other XBees Modules

- **XPlained Mini Dev Board**
  - Processor: ATMega 328PB
  - Two USART Interfaces
  - Analog-Digital Converters
  - 5V Power Supply

- **Adafruit Ultimate GPS**
  - 5V, 20mA
  - Internal Antenna
  - <3 meter accuracy