UNIT IV - DRONE COMMERCIAL APPLICATIONS

Choosing a drone based on the application -Drones in the insurance sector- Drones in delivering mail, parcels and other cargo- Drones in agriculture- Drones in inspection of transmission lines and power distribution -Drones in filming and panoramic picturing.

4.1 CHOOSING A DRONE BASED ON THE APPLICATION

Choosing a drone based on your application requires considering key factors that will affect its performance, features, and suitability for your specific needs. Here's a guide to help you make the right choice depending on what you plan to use the drone for:

1. Photography and Videography

- **Primary Features to Look for**:
  - **Camera Quality**: Look for drones with high-resolution cameras (4K or higher) and gimbal stabilization for smooth video and still images.
  - **Flight Time**: A longer battery life (20–30 minutes or more) allows for extended shooting sessions.
  - **Range and Transmission**: Consider drones with long-range transmission and real-time HD video feeds for accurate shot composition.
  - **Intelligent Flight Modes**: Features like follow-me, orbit mode, and waypoint navigation are beneficial for creative shots.
- **Examples**: DJI Mavic series, Autel Evo series, Skydio 2.

2. Recreational Flying

- **Primary Features to Look for**:
  - **Ease of Use**: Opt for drones with beginner-friendly controls, such as GPS-assisted hover and return-to-home (RTH) functions.
  - **Durability**: If you're a beginner, you'll want a drone that can handle crashes or hard landings.
  - **Portability**: Foldable, lightweight drones are ideal for recreational flying, especially if you like to carry them around.
  - **Price**: Since recreational use doesn't require high-end specifications, you can go for budget-friendly drones.
- **Examples**: DJI Mini-series, Holy Stone HS720, Parrot Anafi.

3. Racing

- **Primary Features to Look for**:
  - **Speed and Agility**: Racing drones need to be fast and highly maneuverable, capable of handling tight turns and high speeds (up to 100 mph).
  - **Customizability**: Many drone racers prefer building or modifying their drones to suit their flying style.

- o **Low Latency Video Transmission**: An FPV (first-person view) setup with minimal latency is crucial for real-time control during races.
  - o **Durability**: Crashes are common, so a sturdy frame is essential.
- **Examples**: Emax Hawk Pro, iFlight Nazgul, BetaFPV FPV drones.

4. Surveying and Mapping

- **Primary Features to Look for**:
  - o **GPS Accuracy**: High-precision GPS or RTK (Real-Time Kinematic) technology ensures accurate geospatial data.
  - o **Multispectral or Thermal Cameras**: Depending on the survey needs (agriculture, construction, etc.), you might require different types of sensors.
  - o **Long Battery Life**: Mapping large areas requires drones with extended flight times.
  - o **Software Integration**: Look for drones that are compatible with mapping software like Pix4D, DroneDeploy, or similar.
- **Examples**: DJI Phantom 4 RTK, senseFly eBee X, Parrot Anafi USA.

5. Inspection and Monitoring

- **Primary Features to Look for**:
  - o **Specialized Cameras**: Thermal cameras are useful for inspections of power lines, solar panels, or search-and-rescue operations.
  - o **Zoom Capabilities**: Optical zoom allows you to inspect objects from a safe distance.
  - o **Obstacle Avoidance**: Drones with advanced sensors for obstacle avoidance are critical in industrial settings.
  - o **Long-Range Communication**: For inspecting tall structures or vast areas, long-range control and data transmission are important.
- **Examples**: DJI Matrice series, Autel Evo II Enterprise, Yuneec H520.

6. Agriculture

- **Primary Features to Look for**:
  - o **Multispectral Sensors**: These sensors help monitor crop health, soil conditions, and irrigation issues.
  - o **Large Payload Capacity**: For agricultural spraying, the drone must be able to carry and distribute fertilizers, pesticides, or water.
  - o **Long Flight Time**: Coverage of large fields demands drones with high endurance and range.
- **Examples**: DJI Agras series, senseFly eBee Ag, Parrot Bluegrass.

7. Security and Surveillance

- **Primary Features to Look for**:

- o **Thermal Imaging and Night Vision**: Essential for monitoring in low light or nighttime conditions.
  - o **Long Flight Time and Range**: Drones used for surveillance may need to cover large perimeters or stay airborne for extended periods.
  - o **Live Video Streaming**: Real-time transmission of high-quality video to a base station is key for effective surveillance.
- **Examples**: DJI Matrice 300 RTK, Parrot Anafi USA, FLIR UAS.

8. Delivery

- **Primary Features to Look for**:
  - o **Payload Capacity**: The drone should be able to carry a substantial load depending on the type of delivery (medical supplies, packages, etc.).
  - o **Autonomous Navigation**: Advanced waypoint navigation and obstacle avoidance are crucial for ensuring safe and efficient deliveries.
  - o **Regulatory Compliance**: Delivery drones need to comply with regulations such as FAA's Part 107 or BVLOS (Beyond Visual Line of Sight) operations.
- **Examples**: Wingcopter 198, DJI Matrice 600, Zipline delivery drones.

Other Considerations:

- **Budget**: Drones range in price from under $100 for hobbyist models to thousands of dollars for professional ones.
- **Regulations**: Ensure the drone complies with local laws (e.g., FAA in the U.S.) regarding weight limits, no-fly zones, and registration.
- **Software and App Ecosystem**: The availability of companion apps or software for mission planning, post-processing, and data analysis.

4.2 DRONES IN THE INSURANCE SECTOR

Drones are revolutionizing the insurance industry by streamlining operations, enhancing risk assessments, and improving customer service. Here's an in-depth look at their roles:

1. Claims Processing and Damage Assessment

- **Post-Disaster Inspections**: Following natural disasters, drones can survey large areas quickly, capturing high-resolution images and videos of damage. This allows insurers to assess claims without delay and without needing adjusters to enter hazardous areas.
- **Faster Payouts**: By collecting detailed visuals of damage, drones enable insurers to process claims faster, leading to quicker settlements for policyholders.

2. Risk Assessment and Underwriting

- **Property Evaluations**: Drones can inspect buildings, rooftops, and surrounding environments in real-time, providing accurate information to support underwriting.

Insurers can assess structural conditions, potential hazards, and environmental risks, tailoring policies accordingly.

- **Accurate Premiums**: Drones help gather data on property conditions that would otherwise be difficult or costly to collect, enabling insurers to set fairer and more customized premiums.

3. Fraud Detection

- **Documentation and Transparency**: Drones provide a clear, verifiable record of a property's condition before and after an incident. This helps reduce fraudulent claims by offering indisputable visual evidence.

4. Cost Savings

- **Reduced Need for Manual Inspections**: Drones minimize the need for ladders, scaffolding, and other costly inspection tools, cutting down on both time and labor costs.
- **Efficiency in Large-Scale Events**: After a widespread disaster, drones can inspect multiple properties in a fraction of the time it would take for manual assessments, allowing insurers to respond to a higher volume of claims.

5. Improved Customer Experience

- **Quick and Transparent Processes**: Drones help streamline inspections and claims processes, enabling insurers to communicate more effectively with policyholders and deliver faster settlements.
- **Enhanced Trust**: The ability to provide visual proof of inspections and assessments fosters transparency and builds trust with policyholders.

6. Advanced Data Analytics and Insights

- **Predictive Analytics**: Data collected from drones, combined with AI, allows insurers to predict maintenance needs and detect patterns in damage, which can lead to proactive risk management.
- **Integration with IoT**: Drones can be used in conjunction with IoT sensors, gathering data that provides a comprehensive view of risks and conditions for real-time monitoring and predictive analysis.

Challenges in Drone Use

- **Regulatory Compliance**: Navigating airspace regulations is a challenge, and insurers must adhere to laws from aviation authorities to operate drones legally.
- **Data Privacy and Security**: Protecting the sensitive data drones collect is critical, and insurers must ensure compliance with privacy standards.
- **Skilled Workforce**: Skilled pilots and analysts are needed to operate drones and interpret the data accurately, adding a new competency requirement for insurance teams.