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Examining UAS Employment Expectations and Requirements

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Unmanned Aircraft Systems

Examining Employment Expectations and Requirements

National Training Aircraft Symposium 2020 – Daytona Beach, FL



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Overview

- Domestic UAS Background
- Positional/Career Opportunities - Data Capture
- Results and Observations
- Recommendations



Domestic UAS Background

- Radically changing **HOW** organizations apply aviation resources
 - Government agencies
 - Non-profit corporations/ academia
 - Companies
- Supporting realization of
 - Improved efficiency
 - Expanded capability
 - Heightened reliability
- Increasing application (uses):
 - a) Research and development and training-education
 - b) Event filming
 - c) Industrial, utility, and environmental projects
 - d) Real estate
 - e) Construction
 - f) Agricultural
 - g) Press and media
 - h) State/local emergency services



Domestic UAS Background

- Increasing utility and subsequent operational growth is occurring in response to
 - Maturing technology
 - Refined operational management and permissibility
 - Innovative concept development
 - Demonstrated capability
 - Enhanced supportability
 - Availability of specialized education and training
- Employment growth
 - Application diversification
 - Technological advancement
 - Regulatory changes
 - Economic development
 - Widespread adoption of this technology
- FAA indicates there are 116,027 remote pilots certified to operate small UAS
 - Expected growth up to almost 350,000 by 2023
 - More than 230,000 remote pilots will require certification -> could benefit from formal education and training

Data Capture and Analysis

Exploratory Design

- Improve insight
- Define terms
- Establish priorities

Problem: *Need for improved perspective and understanding of factors contributing towards UAS-related employment and career development*

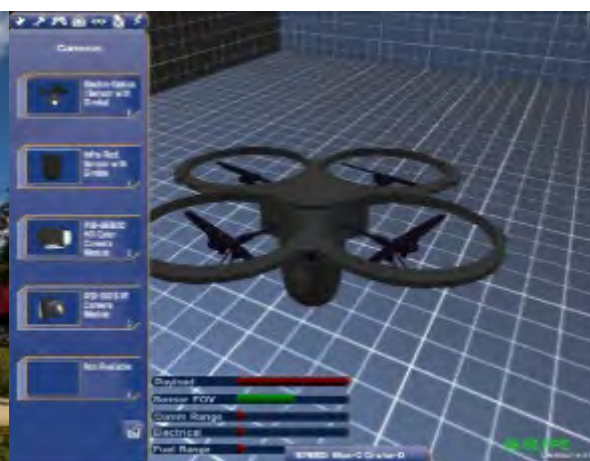
- Examination of large diverse population
- Categorization: salary bands, types of advertised positions, and location
- Guided by a series of tailored research questions

Data Capture and Analysis

Number of positions and data querying

- Examination of entire population (on Indeed.com)
- Recursive text string
 - Controls to limit introduction/query of unrelated terms (-medical -nurse -health)
 - Inclusive of commonly used terms
 - Nesting to connect related/dependent concepts

((UAS -medical -nurse -health) || "ground control station" || "sense and avoid" || "Remotely Piloted" || RPAS || (unmanned + (aerospace || Airborne || pilot || aircraft || aerial || space || traffic)) || "eVTOL" || "multirotor" || "visual line of sight" || "certificate of authorization" || drone || "Part 107" || sUAS || UAV || "aerial robotics" || "LAANC" || (autonomous + (aircraft || flight)) || "urban air mobility")



Data Capture and Analysis

Categorizing associated salaries

- Establish salary baselines
 - Total number of advertised positions (N)
 - \$50,000 ($n_1^{captured}$)
 - \$59,999:\$99,999 ($n_2^{captured}:n_6^{captured}$; \$10,000 increments)
- Calculate values associated with bands
 - <\$50,000 ($N - n_1^{captured} = n_1$)
 - Each band between \$50,000:\$99,999 (prior capture – current capture value; i.e., $n_1^{captured} - n_2^{captured} = n_2$)
 - \$100,000+ ($N - [n_1 + n_2 + n_3 + n_4 + n_5 + n_6] = n_7$)
- Calculate (conservative) estimated market value
 - Multiply the total number of positions associated with each band with the entry-point of the band (e.g., 50000 x n_2)
 - Exception – those positions with a salary less than \$50,000 (mid-point, 25000 used)
 - Sum calculated value of each band

Data Capture and Analysis

Categorizing associated salaries (continued)

- *Associated Research Questions*
 - *What affects the salary/market-value distribution; how do various UAS-related educational and training offerings help support students in this market?*
 - *Is the market healthy; how is it current performing and what is affecting this performance?*
 - *What critical relationships should be examined and why?*
 - *Is there commonality within the requirements or details of the advertised positions (especially within specified salary-bands); what are unique to the bands?*
 - *What differentiators can help applicants become better prepared for a position in a higher salary-band?*
 - *What other details are evident from examination of this data and the advertised positions?*



Data Capture and Analysis

Categorizing position/career types

- Queried by individually appending common keywords relating to position types

Specialist, Scientist, Developer, Expert, Analyst, Manager, Director, Advisor, Technician, Operator, Pilot, Field Service, Research Associate, Coordinator, Surveyor, Instructor, Designer, Supervisor, Assistant, Clerk, Lead, Programmer, Engineer, Inspector, Assembler, Trainer, Mechanic, Maintainer, Agent, Fabricator, and Planner

- Recorded values associated with each to create ordinal ranking and population percentage
- *Associated Research Questions*
 - *What affects the distribution of advertised position types; how do the various UAS-related educational and training offerings help support students in this market?*
 - *What critical relationships should be examined and why?*
 - *Is there commonality within the requirements or details of the advertised positions; what are unique to each position type (is this dependent upon specific credentials, experience, or knowledge)?*
 - *Are these military, DoD, civil, commercial; what is the specific market segment addressed?*
 - *What differentiators can help applicants become better prepared or more competitive for the top advertised positions?*
 - *What other details are evident from examination of this data and the advertised positions?*

Categorizing hiring locations

- Examined high-level data tracking (provided by Indeed.com)
- Identified specific advertisement locations, including calculation of ordinal rank and population percentages
- *Associated Research Questions*
 - *What affects the distribution of advertised positions; what factors come into play (e.g., proximity to central funding/development/testing center)?*
 - *What critical relationships should be examined and why?*
 - *Is there commonality within the locations (e.g., are they already established tech development centers)?*
 - *What other details are evident from examination of this data and the advertised positions?*

Results and Observations

Number of positions and associated salaries

- Total (N): **6,575** total jobs identified; market value of **\$449.90M**
- **<\$50,000**
 - 1,574 positions (23.94% of total)
 - Market value of \$39.35M (8.75%)
- **\$50,000-\$59,999**
 - 647 positions (9.84%)
 - Market value of \$32.35M (7.19%)
- **\$60,000-\$69,999**
 - 768 positions (11.68%)
 - Market value of \$46.08M (10.24%)
- **\$70,000-\$79,999**
 - 595 positions (9.05%)
 - Market value of \$53.76M (11.95%)
- **\$80,000-\$89,999**
 - 666 positions (10.13%)
 - Market value of \$53.28M (11.84%)
- **\$90,000-\$99,000**
 - 742 positions (11.29%)
 - Market value of \$66.78M (14.84%)
- **\$100,000+**
 - 1,583 positions (24.08%)
 - Market value of \$158.30M (35.19%)

Results and Observations

Position/career types

- Top 10-most advertised positional keywords
 - *Engineer* (35.39%, 2,327 positions)
 - *Lead* (25.22%, 1,658 positions)
 - *Manager* (22.1%, 1,453 positions)
 - *Expert* (16.02%, 1,053 positions)
 - *Pilot* (12.15%, 799 positions)
 - *Operator* (11.89%, 782 positions)
 - *Technician* (10.77%, 708 positions)
 - *Developer* (10.1%, 664 positions)
 - *Analyst* (8.53%, 561 positions)
 - *Specialist* (8.35%, 549 positions)



Results and Observations

KPIs/Keywords

- Most common KPIs/keywords contained in positional descriptions:
 - *Experience* (3,223)
 - *Engineering/Engineer* (2,244; 1,348)
 - *Development* (1,707)
 - *Test* (1,600)
 - *Flight* (1,468)
 - *Design* (1,467)
 - *Software* (1,419)
 - *System* (1,389)
 - *Technical* (1,330)
 - *Requirements* (1,319)
 - *Team* (1,221)
 - *Control* (1,086)
 - *Support* (1,065)
 - *Aircraft* (1,037)
 - *Management* (898)
- Majority of positions highlight importance of UAS engineering, development, & testing



Results and Observations

Hiring locations

Top five-hiring locations (U.S.)

- 1. California** (33.90%)
 - San Diego (522)
 - Los Angeles (53)
 - San Francisco (92)
- 2. Washington DC** (13.12%, 202)
- 3. Alabama** (11.88%)
 - Huntsville (183)
- 4. Washington State** (4.61%)
 - Seattle (71)
- 5. Florida** (4.42%)
 - Orlando (68)

Other notable locations

- Colorado (Colorado Springs, 63)
- Illinois (Chicago, 58)
- New York (NYC, 58)
- Texas (Houston, 58)
- Massachusetts (Boston, 57)
- Maryland (Hunt Valley, 55)



Recommendations

- **Early examination into factors influencing hiring and career development**
 - Subsequent follow-on recommended
 - Further alignment and focus on Research Questions
 - Longer-term analysis, including comparison over time
 - Investigation featuring SME and employer interview
 - In-depth examination of market factors, including known geographic centers, technical advancement areas, and regulatory dependencies
- **Education and Training**
 - Providing direct linkages to the KPIs in curricula
 - Facilitated experience building, proficiency development, and feedback
 - Level-setting expectations (employment opportunity, credentials, and potential earnings)
- **Employment Preparation**
 - Mentoring and networking
 - KSA exhibition and presentation (resume, credentials, and portfolio)
 - Professional rehearsal (soft skills)

QUESTIONS?



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