

NASA Career Information System

Requirements Analysis

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I. Introduction

As the number of scientists and engineers continue to decrease, NASA is looking for ways to recruit new employees. These new employees include those who are currently in the workforce as well as those that have not yet left school. It is NASA's belief that if students were to become interested in fields related to NASA in school, they will be more likely to take a job with the agency.

In order to attract the students, the students must be exposed to information about NASA and its programs. The students must also be actively engaged, to maintain their interest. The exposure can come from a number of formal and informal settings. Primary examples would be a structured classroom where a teacher brings in NASA related information into lesson plans and a student browsing the Internet on their own. Each has the potential to make students interested in pursuing a career with NASA. Therefore, a medium must be determined to provide the content for teacher, information for students, and job postings for those who want to apply for a job at NASA.

This project is the analysis of requirements for a web-based system to become that medium. The NASA Career Information System (NCIS) will be created to meet the needs of its stakeholders and uphold the goals of the NASA Career Information System. These goals are:

- Help users understand the nature of established and emerging careers that support the mission and work of the five NASA's enterprises: Aerospace technology, biological and physical research, earth science, human exploration and development of space, and space science.
- Produce a multimedia program with an engaging instructional interface to help outreach staff, teachers, and counselors integrate career information and science, technology, engineering, and mathematics education in informal and formal settings.
- Help users identify potential educational and career paths for pursuing careers that support the mission and work of the five NASA's enterprises.

- Provide users with an interactive, one-stop, web-based platform for locating opportunities to explore careers (e.g., internships, summer camps), conduct job searches through a searchable database, and access a clearinghouse of links to related career/job information.

With the implementation of the NCIS, it is the intention of NASA and the design team to bring more students into the fields of science and to become NASA employees.

II. Field Study Preparation

1. Root Concept

A web-based system can attract new and existing scientists and engineers to NASA. In addition, the system could also help attract larger amounts of minorities and women into the field. The system will allow students to learn about careers, potential workers to find job postings and requirements, and NASA human resources personnel to post openings and information to recruit new people.

1.1 Stakeholders

Stakeholder	Stake
Students	Learn about NASA programs, jobs, and requirements
Current Workforce Employee	Learn about open positions, pay, requirements
NASA	Educate and attract new employees
Scholastic Advisors	Assist students in making career decisions and scheduling required courses

1.2 Starting Assumptions

- There is a need to attract new employees to NASA
- Students are a primary focus
- System will be developed based on requirements set forth by NASA and the design team
- System will be used by students of varying levels, NASA employees, and current workforce employees.

2. Interview Preparation

2.1 Questions for student searching for career

1. How have you searched for a career?
2. How heavily have you relied on the web?
3. Which websites do you use?
4. Do you have any particular place of employment in mind?
5. How have you approached that organization?
6. How have others you know in your field obtained a career after graduation?
7. What has been most effective in alerting you to organizations seeking recent graduates?
8. Do you feel that seeking employment online limits your ability to sell yourself?
9. If NASA were to be recruiting recent grads and you were interested in applying, where would you first look?
10. What do the ads or alerts you receive do to impress or turn you away?

2.2 Questions for Hiring Manager

1. What is your role in the hiring process of new employees?
2. What are the largest obstacles in recruiting new employees?
3. Do you feel that students from an early age should be exposed to the opportunities your field has to offer?
4. Are the applicants for positions in your field disproportionately biased (Gender, Race, Urban vs. Rural)?
5. Would a video exposition on your field help appeal to students who are undecided on a major/field of study?
6. Would a website on your field help appeal to students who are undecided on a major/field of study?

III. Field Data Collection

1. Interview with Career Searching Student

This interview was conducted with a student attending the Penn State, University Park campus. The student is currently a senior biology major in search of a career to begin after his graduation this May. The following questions were presented to him in order to evaluate the needs of the current career search project.

1. How have you searched for a career?

Yes, I have searched for a career and hope to find one in time for graduation.

2. How heavily have you relied on the web?

So far I have used the web for the majority of my job searches because of how easy it is to sort the possibilities and also the jobs that don't apply to me.

3. Which websites do you use?

Mainly monster.com, but I stumble on a lot of sites that have job search engines and I usually at least give them a try.

4. Do you have any particular place of employment in mind?

American Home Products, a pharmaceutical corporation.

5. How have you approached that organization?

I have gone to their web page and searched their open positions. There was not a lot to offer at that time but I submitted my resume to the site anyway.

6. How have others you know in your field obtained a career after graduation?

A few have gone through career services and others have been able to find jobs on their own...either through the newspaper or online.

7. What has been most effective in alerting you to organizations seeking recent graduates?

I received emails from a few sites and sometimes from my advisers about recent openings that may be good matches for me.

8. Do you feel that seeking employment online limits your ability to sell yourself?

Yes and No. It does deny you the opportunity to show yourself as professional and it lacks the personal interaction that helps a possible employer remember you, but it I find so many more opportunities online that I could never reach as many employers without it.

9. If NASA were to be recruiting recent grads and you were interested in applying, where would you first look?

I would probably go to Nasa.gov to check it out and find some contact info.

10. What do the ads or alerts you receive do to impress or turn you away?

The messages I receive that show an obviously legitimate organization and send a personal message to me really impress me and make me feel that I am truly being considered for a position. The messages I get that are very flashy and sent in bulk tend to make me wonder if I received this from someone who got my information off of the internet for work or for spam.

2. Interview with George Otto

Senior staff at the Penn State University Visualization Group

1. What is your role in the hiring process of new employees?

Screen applicants

Interview applicants that we are interested in

Identify candidates from resumes

Recommend candidates for employment if they meet standards

2. What are the largest obstacles in recruiting new employees?

Finding skilled employees that match the needs of the group

Finding employees that aren't already employed

3. Do you feel that students from an early age should be exposed to the opportunities your field has to offer?

Yes, it raises awareness of the possibilities that exist

I don't believe young students should decide on a career path

immediately, but I think that showing them what is out there will plant the seed of discovery in their minds

4. Are the applicants for positions in your field disproportionately biased (Gender, Race, Urban vs. Rural)?

*Yes, we receive many times more male applications than female
Predominantly, our non-white applicants are from foreign countries such
as India, and we receive very few if no African American applicants*

5. Would a video exposition on your field help appeal to students who are undecided on a major/field of study?

Yes, perhaps. It could inform them of the possibilities

6. Would a website on your field help appeal to students who are undecided on a major/field of study?

*Yes, in more ways than just a video could.
Website is more accessible, universal*

7. Do you have any other input to offer?

*The problem in hiring disparities exists in the surroundings of the people
who aren't represented
If more information about these opportunities permeated remote areas,
problems would be less stark*

IV. Field Data Summaries

1. Stakeholder Profiles

Students (Secondary through Post-Secondary)	Background	Still in school or educational environment Experienced with computers and Internet Short attention span on Internet
	Expectations	Learn about career paths at NASA Determine course requirements
	Preferences	Prefers multimedia
Current Workforce Employee	Background	Has experience finding jobs Higher expectations for new job
	Expectations	Get information about jobs in one place Apply for job online
	Preferences	Receive feedback throughout application process Be notified if a position of interest opens
NASA Personnel	Background	Maintains information about open positions Responsible for educational content
	Expectations	Easily update information on web Accept applications for positions Filter applications Provide educational entertainment for students
	Preferences	Easy to use interface for managing site

Scholastic Advisors	Background	Assists students with course and career selection
	Expectations	Information from website about NASA career paths to help students make decisions Incorporate NASA related topics in classroom to increase interest
	Preferences	Single location for all information Ability to send students information Be informed when updates are made

2. Artifact summary:

2.1 Website

<http://gears.aset.psu.edu/viz/>

Information: Group mission statement, responsible tasks, mailing list, staff directory, facilities, services, and web resources.

2.2 Resume

Student looking to enter workforce created a resume to send to potential employers detailing his skills and accomplishments.

V. Problem Scenarios and Claims

1. High School Student Scenario

Character: Jacqueline Stokes

Stakeholder group: Students

Jacqueline is a high school sophomore who is interested in working for an aerospace firm later in her life. She has a few weeks before she has to pick her junior courses, and doesn't know exactly what courses to take.

One morning in school, she hears over the announcements about a website for NASA that her guidance counselor has participated in, specifically designed for students at her school. She is told that many opportunities in the aerospace field exist, and to visit the website.

During study hall, she logs onto the computer lab and goes to the NASA website. There, she sees an area for high school students, and decides to explore. An interactive page loads where Jacqueline explores different careers at NASA, with video tours of a day at work.

Excited by what she has seen, Jacqueline decides to head to the 'advising' section of the website. When she picks her high school from the list shown, she reads a greeting written by her own guidance counselor, and is shown what junior and senior year courses she should take so that she will be in a good position to get into a college program that NASA recommends. She views the different course tracks and takes a note of the advanced mathematics track that offers two calculus courses.

Later that week, she submits her junior year schedule with courses that were recommended from the NASA website.

1.2 Claims

Claim	Positives, Negatives
School official creates a customized version of site for a high school	+) Students have a feeling of connection with website +) Course list is accurate and can be used to schedule -) Requires maintenance from school officials, without which the site is less usable
Video tours of a day in the life of NASA	+) Provides a looking glass into the exciting aspects of NASA +) Entertains prospective students -) Long load times could deter dial-up users
Advising section with course list	+) Students can plan out their high school course load leading to better educated prospects

2 Graduate Student Scenario

Character: Abu Muhammed al-Hajj al-Bakr

Stakeholder group: Students

Abu is a graduate student at a prestigious university. He has just enrolled in a graduate degree in electrical engineering and is exploring different career paths. A professor in one of his classes has provided links to many different career information websites, one of which is NASA's. Upon viewing NASA's website, Abu is convinced that he would like to work for them. He, however, is not sure that his credentials are good enough for employment with NASA.

Abu notices a list of recommended graduate topics in the graduate student section of the NASA website. Here it lists topics such as advanced logic control structures and

computer vision. Realizing that he is offered those courses as electives, he jots a note down to schedule these for the next semester.

Next, Abu decides to look through the available job openings to see how he would fit in. After reviewing several job postings, he decides he will be right on target for some jobs once he graduates.

Finally, Abu reads details about the work environment, starting salary, and benefits of being a NASA employee. Impressed, he resolves that NASA will be his future employer.

2.2 Claims

Claim	Positives, Negatives
Graduate topics listed	+) Graduate students can better prepare themselves for a job with NASA +) List of topics is general, so it applies to all schools -) List of topics is general, so it may not easily translate into exact courses
Job postings viewable by anyone	+) Allows prospective employees to see what qualifications are needed -) If no jobs are available, or limited, sends a negative message to a prospective employee
Benefits listed	+) Gives students a goal to work towards +) Showcases monetary reasons to work for NASA -) May not be competitive

3. Career Change Scenario

Character: Bob

Stakeholder group: Current Workforce Employee

Bob is married and a father of two. He graduated college with excellent grades. After college, he was instantly hired full time by a very respectable company. For him alone, the benefits were perfect as was the income. Eventually he got married to Mary. His income was still acceptable because Mary worked as well. Two incomes were working out wonderfully. Before they knew it, they were having twins. That meant that Mary needed to quit her job. She needed to take care of the twins. Bob understood completely and agreed that she should stay home with them. Bob's only worry was money. He would not be able to comfortably support his family. He needed to find a new, better paying job preferably with excellent family health benefits. He decided that he would only apply to a new job if it appealed to him in every way.

Bob decided to do a search online. There were a couple of companies that were the result of his search. The one job that instantly caught his eye was NASA. At some point, every guys dream is to be an astronaut. He wanted to be practical though and think of his family's needs. He figured he'd look over NASA's website in search of information. He also decided that he would submit an application as well. Bob had a hard time finding information on job openings and job descriptions. After searching the website for possible positions to apply for, he submitted a general application and hoped for the best.

3.2 Claims

Claim	Positives, Negatives
Application	+) Allows for submission of information to company -) takes time to complete -) feedback is not fast

Search	+) Allows users to find specific content -) requires additional resources -) not always accurate
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4. College Graduate Scenario

Character: Sarah

Stakeholder group: Current Workforce Employee

Sarah is a mechanical engineer that just graduated college and is looking for a job. She spends much of her time looking at online repositories of job listings. Her most recent search took her through MonsterTrak.com where the jobs are categorized by field. After finding comparing a few possibilities, she looks over at her TV and sees that NASA is planning on going to the moon again. “NASA!” she thought, remembering her childhood dream of building a space shuttle.

As she heads over to NASA.gov, she looks for their job postings in mechanical engineering. After much searching, she finds a few different areas of the site that offer different jobs. Some have descriptions on the same page as the posting. For others, she must go to the department web site and look for the information herself. After getting frustrated, she decides to turn back to MonsterTrak because it has almost everything she needs in one place.

4.2 Claims

Claim	Positives, Negatives
Collection of job postings in single location	+) allows for one-stop searching -) may not be complete -) may be specialized for a certain area
Categorized job postings	+) faster search ability +) postings are grouped logically +) allows comparison

5. NASA Hiring Manager Scenario

Character: Robert

Stakeholder group: NASA Employee

Robert, a hiring manager at NASA believes his department is understaffed, underpaid, and overworked. He is beginning his work day and is very worried about analyzing and preparing all of the job listings that need to be posted to the NASA career site.

He logs onto his new system and is able to type up the new openings given to him by all of the separate five departments. In the hopes of getting home in time to see his son's baseball game he gets to work and begins to examine the new list of openings. He worries at first when he sees that the emails have come in completely out of order. They are not arranged by department or by need basis. Robert then remembers that the new system allows him to input all of the jobs in any given order and then, using the fields as a reference, sorts them to fit his needs. He posts the new openings, sorts them, and even has the time to send out a weekly email to the departments alerting them to the next due date for new position notifications.

As the day is drawing to an end Robert realizes how the new technology implemented in the NASA career service system alleviates the need for more staff and allows him to keep his budget for expanding his service capabilities.

5.2 Claims

Claim	Positives, Negatives
Online Posting	+) Easier to Use +) More manageable +) Easier to track -) More likelihood of error

Sorting	+) Quicker analysis +) Quicker addition and removal of positions and applicants +) More likelihood of error +) More manageable -) Less Personal -) More likelihood of error
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6. NASA Human Resources

Character: Guadalupe

Stakeholder group: NASA Employee

Guadalupe, a manager in the hiring department, works closely with Robert, the hiring manager. She also worries about the fact that the hiring department appears to be understaffed and as a new member to the NASA team is worried about the number of incoming applications that will be received. Knowing that every kid once dreamed of being an astronaut she braces herself for a tough day at the office. Upon arrival, Guadalupe is not surprised to see that several hundred job applications had been submitted over the weekend. She sits down to her computer and logs into the new NASA career system.

Guadalupe first decides to sort the applicants by situation - recent graduate (student history) or by career history. After separating the two groups, she then breaks down each group even more by position applied for. She now can see each position applied for and a listing of students and professionals that are applying for the positions. Guadalupe now filters the applications by eliminating all student applicants with a GPA less than 3.5 on a 4.0 scale and by eliminating all of the professional applicants that have not received a master's degree.

After eliminating this large chunk of the applicant pool, Guadalupe sends the remaining applications out to each department which made the request and the system auto-responds

to the denied applicants stating the problem with their application and a link to a site containing the requirements and ways to gain eligibility for NASA employment.

6.2 Claims

Claim	Positives, Negatives
Online Posting	+) Easier to Use +) More manageable +) Easier to track -) More likelihood of error
Sorting	+) Quicker analysis +) Quicker addition and removal of positions and applicants +) More likelihood of error +) More manageable -) Less Personal -) More likelihood of error

VI. Appendices