

Research and Technology Support Request

Functional Requirements

NASA KSC IT-G

Technical Integration Office

Brandeis Bellamy NIFS Intern
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CHANGE HISTORY

NAME	WHAT WAS CHANGED/ADDED	DATE
Brandeis Bellamy	All Sections	July 2018

Approved by A.S.

ACRONYM LIST

BOA	= Business Objectives and Agreement
CCT	= Center Chief Technologist
CIF	= Center Innovation Fund
EGS	= Exploration Ground Systems
ER&T	= Exploration Research and Technology Programs
FTE	= Full-time Equivalent
ISS	= International Space Station
IT-G	= Technical Integration Office
KSC	= Kennedy Space Center
LX	= Exploration Ground Systems
NE-L	= Engineering Directorate: Laboratories, Development & Testing Division
NIB	= Non-Interference Basis
PI	= Principle Investigators
R&T	= Research and Technology
RED	= Regional Economic Development
SME	= Subject Matter Expert
STMD	= Science and Technology Mission Directorate
UB	= Exploration Research and Technology Programs
UB-A	= Utilization and Life Sciences Office
UB-B	= Program Planning and Control Office
UB-C	= Mission Support Office
UB-I	= Strategic Integration Office
UB-R	= Science and Technology Projects Division
UB-R1	= Spaceport Systems Branch
UB-R2	= Flight Technology Branch
UB-R3	= Applied Science Branch

GENERAL INFORMATION

According to the Exploration Research and Technology Programs Directorate (UB) Business Objectives and Agreement (BOA), UB is responsible for the management and implementation of technical, cost, and schedule requirements for the International Space Station (ISS) program and its derived Exploration systems and for the management of KSC research and technology programs and projects. KSC research and technology programs span across the NASA's Mission Directorates and Center innovation programs. It also includes implementation and technology infusion for requested Space Communications and Navigation, Launch Services, and Ground Systems Development and Operations Programs research and technology projects and for non-NASA customers via partnerships and reimbursable agreements.

Functional Requirements: R&T Support Request

The organization serves as the primary interface for technology development activities at KSC and provides strategic leadership, project and program management, technical expertise, guidance, and integration in support of these activities, including technical management, program processes, budget management, organizational efficiencies, and knowledge management. The office includes the Center Chief Technologist (CCT), who serves as the principal advisor to Center leadership on matters concerning Center-wide technology development and leverage. The office supports the CCT as the Center's change agent and member of the Chief Technologist Council, enabling effective communication of Center technology capabilities and fostering the workforce's capacity to innovate.

Introduction

The idea of the R&T Support Request online platform stemmed from the suggestions of a 2017 LION Business Challenge Cohort. This Cohort was established by the Office of the Center Chief Technologist. Two teams were tasked by the Center Director to find ways to increase innovation and communication on Center.

The main findings from the business challenge concerning UB were that:

- 1) There was no central location where people could read about current UB R&T projects.
- 2) There was no automated system where people could request help from UB concerning R&T projects.

Employees within other directorates who would like to request help from UB were only able to directly contact someone they knew within UB, or ask someone who knew someone.

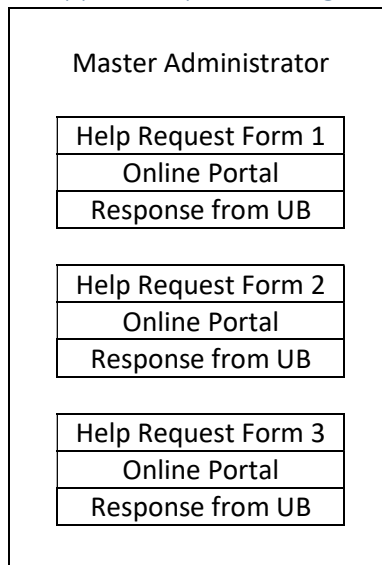
The objective of this Functional Requirements document is to present a new online platform, called R&T Support Request, which can be used to improve the overall quality and efficiency of communication between Users who request help from UB and Suppliers who answer those calls for help. The online portal is to be used for the first step of communication, as well as a tracking system to give progress updates.

This document will establish stakeholders of this online platform, focus on interactions between potential Users (within and outside of the UB Directorate) and Suppliers (within the UB Directorate). This communication will be facilitated through a secure online platform which allows Users to submit Help Request Forms which will be received by designated groups within UB.

Help Requests forms in the R&T Support Request online portal can be submitted by NASA Civil Servants and Contractors who have access to the internal network (local area network) at Kennedy Space Center. Each submitted Help Request will be only accessible to the User, the additional people who the User has added to the request (optional), and the group within UB who has received the request (Intermediary). A Master Administrator has complete access to all organization data.

Functional Requirements: R&T Support Request

R&T Support Request Configuration



Design Group

The IT-G Technical Integration Office at NASA Kennedy Space Center will develop the R&T Support Request online portal and serve as Master Administrator. The first prototype of the online portal will be created by NASA Intern Brandeis Bellamy, under the direction of IT-G Supervisor Clint Bartley and Information Manager Ali Shaykhian. Once development and testing is complete, Users and Suppliers will be able to communicate through the R&T Support Request online portal to communicate and fulfill requests, backed with full IT-G support and security.

Stakeholders

Below are the Users or groups of Users who will be interested in the R&T Support Request Online Portal.

Name	Role	Interest
Users: UB employees, non-UB employees, or contractors at KSC	A person or group who perform activities on center. Desires external R&T help to complete an activity.	Use the online portal to submit help requests from UB. Access to capabilities outside of their expertise.
Intermediary: UB-I Strategic Implementation Office	Receives help request. Follows up with User to get details about the request. Passes information to the Supervisor who manages division with expertise in that request. Verifies that help request reaches the Supplier who can fulfill the help requests.	Use the online portal to network and promote the capabilities of UB to other directorates and contractors center-wide.
Supervisor: NE-L UB-A UB-R	Chief who interfaces with Intermediary and Supplier. May also speak with Users for clarification.	Supervisors have knowledge of capabilities and workload of their division. Make sure that Users are using the online portal as an initial form of communication. Makes sure

Functional Requirements: R&T Support Request

		that Suppliers follow through with requests. Possible access to Data Analytics.
Supplier: UB-R1 UB-R2 UB-R3 Principle Investigator (PI) and team	Interfaces with the Supervisor. Organize Supplier response to help request. Establishes time to completion.	Have SME knowledge of capabilities and technical skills to solve problems. Can showcase knowledge to center. Suppliers can include labs in UB-R for example.
Funding Authority	Business Office, Project Office or external group who oversees funding and charge codes to fulfill the help request.	They have knowledge of the funding limitations and possibilities.
Office of the Center Chief Technologist	Is kept abreast of which Help Requests come into the system and how the Intermediary is following up with those requests	Helps to fulfill the CCT's role in BOA as "the principal advisor to Center leadership on matters concerning Center-wide technology development and leverage"
IT-G Technical Integration Office	Manages the R&T Support Request online portal, creates and updates software, provides security	Point of Contact for software issues faced by stakeholders
Other Stakeholders	TBD	Have interest in the success of the online portal

Justification for R&T Support Request

The current way that Users make Help Requests for R&T capabilities from UB is through phone calls and/or emails. This form of communication can be inefficient, time consuming, non-transparent if:

- The User does not know which division in UB has the specific R&T knowledge to fulfill the request.
- The User does not know the exact name or contact information of the Supplier.
- The capabilities, work load, or responsibilities of a Supplier changes, unbeknownst to the User.
- A Supplier from the incorrect division:
 - Receives the Help Request, yet does not answer in a timely manner.
 - Receives the Help Request and attempts to fulfill the request.
 - Receives the Help Request, yet does not forward it to a correct Supervisor and/or Supplier.
- A Supplier from the correct division:
 - Does not receive, overlooks, or does not respond to the Help Request.
 - Receives the Help Request, yet does not respond in a timely manner.
 - Is not available, yet does not forward it to the Supervisor who can find another Supplier.

There is great opportunity for improvement in this communication process through software automation.

SYSTEM OVERVIEW

Help Request Form

In the R&T Support Request online portal, a User will initiate correspondence by making a new request for R&T support in a Help Request form. This simple form would require only the User's email address and a short description of the issue. Once the User enters the email address, their contact information will auto-populate in the form (i.e. name, phone number and mail code). In addition, the User can enter the email addresses of up to two other individuals/groups who the User believes should be privy to this information. One of the possible email addresses could be a Funding Authority who would be involved in providing the external funding or charge codes. Also, a dropdown menu allowing the User to specify the desired UB division or branch, as well as expertise is also a possibility. However, for the sake of simplicity, those dropdown menus may be omitted.

Notional Concept Design

R&T Support Request

Help Request

Email Please Enter Work Email

First Name <autofill>

Last Name <autofill>

Phone Number <autofill>

Mail Code <autofill>

Request Title Please Enter Title

UB Division * UB Division Dropdown List

UB Branch * UB Branch Dropdown List

Expertise * Expertise Dropdown List

Request Details:

Please Enter Details Under 250 Words

Up to two people may be added to request **

Email 2 Optional

First Name <autofill>

Last Name <autofill>

Email 3 Optional

First Name <autofill>

Last Name <autofill>

Submit Help Request

* If not known, please leave blank. The correct selection will be determined.
** Anyone added to New Idea form will be included in all correspondence with UB.

User Contact with Intermediary

The User will receive an email confirmation upon completion of the Help Request form, and intermittently when the request status changes. The Intermediary, the Strategic Integration Office (UB-I), will receive a notification via email that a new Help Request has been submitted. Based on the information filled out by the User, UB-I would use the provided contact information to set up a face-to-face meeting or

teleconference with the User. The User would provide details about the Help Request. If the Intermediary does not respond to the Help Request during a predefined time period, a reminder email will be sent to the Intermediary. If there is no subsequent response, the Office of the Center Chief Technologist (CCT) will be sent an email. The CCT will follow up with UB-I.

Intermediary Contact with Supervisor

Next, the Intermediary will add the User's Help Request as a point of discussion in a weekly or biweekly meeting with UB Supervisors. For example, a recurring meeting could be established between UB-I and UB-R to discuss the incoming Help Requests. The Supervisors are privy to the capabilities, work load, people and personalities within their division. They would best know how the User's request could be fulfilled. While discussing the incoming Help Requests, Supervisors would talk amongst themselves and decide which division's capabilities best match the User's needs. That Supervisor can then either accept, decline or ask the User for clarification of the Help Request. Once accepted, the Intermediary will update the status of the Help Request by noting the assigned Supervisor and division/branch. Similarly, if the Intermediary does not update the work status of the Help Request within a predefined period of time, a reminder email will be sent. If there is no subsequent response, the Office of the Center Chief Technologist (CCT) will be sent an email. The CCT will follow up with UB-I.

Supervisor Contact with Supplier

The assigned Supervisor would then present the Help Request to the Principal Investigator and team to supply a solution to the Help Request. This Supplier would determine how many hours, based on the level of technical difficulty, their team requires to complete the Help Request. They would most likely also have to prioritize the request based on other projects currently in production. As the request is coming from outside of UB, Suppliers would have to work on these tasks on a Non-Interference Basis (NIB). The Supplier would notify the Supervisor, and then Supervisor would notify Intermediary of requested hours and time to completion. This chain of communication would continue during the lifecycle of the project.

Continuous Updates from Intermediary

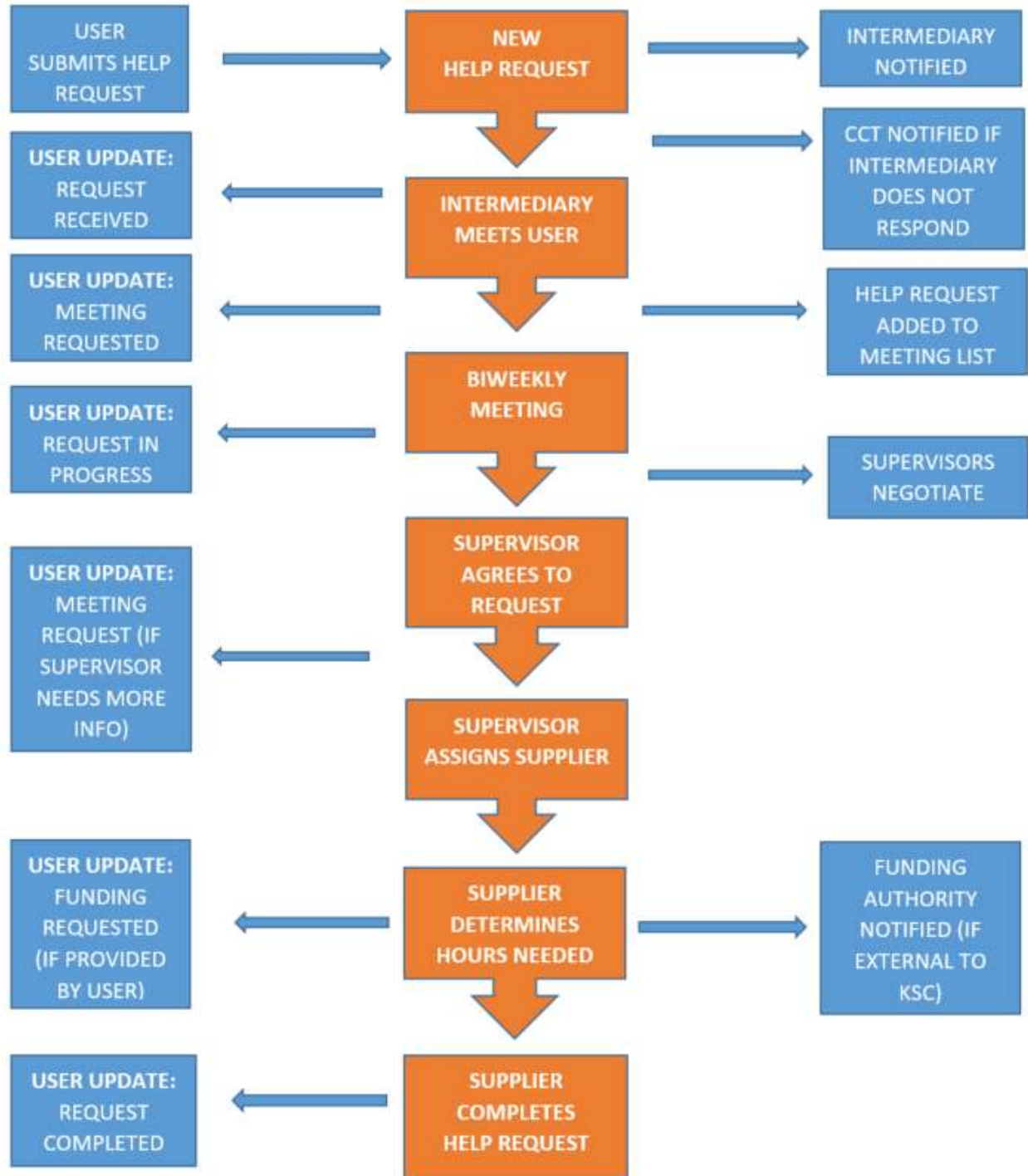
After the Intermediary has received the requested work hours and time to completion, the Intermediary will update and write notes in the R&T Support Request online portal. This will help to keep track of the progress of the Help Request, thus allowing Users to receive email updates and be kept abreast of work being done. If the deadline changes, the Intermediary would have to note that in the system as well. When the project is completed, the Intermediary will make a final update in the online portal.

Additional Intermediary Contact with a Funding Authority

It has not yet been stipulated the exact process in which funding will be established to complete these Help Requests. Funding will either be established internally in UB, within another directorate, or at the Headquarter level. The Intermediary is tasked with updating the Funding Authority through the online portal as well, if applicable.

Functional Requirements: R&T Support Request

Help Request Flowchart



Communication Enhancements

R&T Support Request online portal enhancements to the communication process will insure that:

- Users provide all required information
- There is a dedicated Intermediary to facilitate communication and completion
- Only designated Suppliers are contacted
- Intermediary responds during a predefined time period
- Users receive confirmations that their Help Requests have been received, as well as periodic updates on completion status
- Users can see the status of multiple Help Requests, and can update requests if needed
- The CCT and/or Intermediary will be notified of unfulfilled Help Requests, and have the ability intercede when needed

DATABASE OF CURRENT UB R&T

An additional service to Users would be to create a database with current research and technology being created by UB. This database could be linked to the Help Request form. Users can peruse this database for similar technologies, which can help them determine exactly the kind of help they need, if any help is needed at all. They might be requesting a technology that has already been developed by UB.

A number of sources exist that showcase R&T capabilities at the agency level, such as Techport, which can be narrowed down to KSC projects. This website is in part populated by the UB projects completed through the Center Innovation Fund (CIF). CIF is mandated at the Headquarter level by the Science and Technology Mission Directorate (STMD) to issue agency-wide proposal calls. STMD puts out these yearly calls which are funneled through the KSC Proposal Portal. UB divisions usually answer those calls. R&T is funneled up from the center level to the agency level, then often distributed publically. At that stage, it is not immediately apparent that the research came from UB, only from KSC.

However nothing exists which showcases only current UB R&T. Previously there was an annual R&T report published by the Office of the Chief Technologist, also funded by STMD. It was published from the early 2000's until 2013 and gave one-page summaries of current technology. It was assembled by contractors who served as technical writers. They would print, package, and distribute these booklets nationwide. It doubled as an informative document and KSC marketing tool. However, it eventually lost funding. It was considered a "nice to have" but not "need to have".

Stakeholders have indicated that even though the mass packaging and distribution of R&T projects might not be needed, it would still be beneficial to have a central location where this technology can be searched online. Perhaps documentation of the previous five or ten years would suffice. Most would argue that the latest research should be documented in one place. And unlike the Techport database, which only houses CIF research, this database could include all research done by UB.

POTENTIAL BARRIERS TO USAGE

Funding Authority

After speaking to multiple Stakeholders, it was mentioned multiple times that funding is a large obstacle in the success of this project. Not the funding for the creation of the online portal, but funding for the Help Requests to be completed by Suppliers. Agency programs, such as the Regional Economic Development (RED), have similar help request portals where groups (external to NASA) can request help for certain projects. They are able to receive help because the agency has reserved funding for their type of endeavors. The external group does not have to indicate a funding source. However, if Users were to make Help Requests, funding would have to be established along the way. This might be a barrier to submitting Help Requests and reduce the online portal's use. A solution to funding, so it does not become a unending debate on charge codes, needs to be addressed.

Marketing and Willingness to Ask for Help

One of the many benefits of having an online portal where Users can request help is that UB will have a new way of marketing their services to the center. It often occurs that when a technical issue arises in a directorate or division, external help is not usually one of the main ways the issue is solved. Groups usually like to keep issues "in house" and solve the solution themselves. This online portal will only be successful if Users are encouraged to break that loop and be willing to ask for external assistance. Extensive marketing on UB's part might go a long way to help bridge that gap.

APPENDIX – USEFUL LINKS

Requirements Gathering

- Requirements Gathering Course
 - <https://www.linkedin.com/learning/requirements-elicitation-and-analysis/welcome>
- Requirements Elicitation for Business Analysts: Interviews
 - <https://www.linkedin.com/learning/requirements-elicitation-for-business-analysts-interviews/welcome>

NASA Documentation

- **John F. Kennedy Space Center Business Objectives and Agreement for Exploration Research and Technology Programs**
 - https://tdksc.ksc.nasa.gov/servlet/dm.web.Fetch/KDP-B-1053-UB_Final2017.pdf?gid=1060880&FixForIE=KDP-B-1053-UB_Final2017.pdf