Brice Loveland

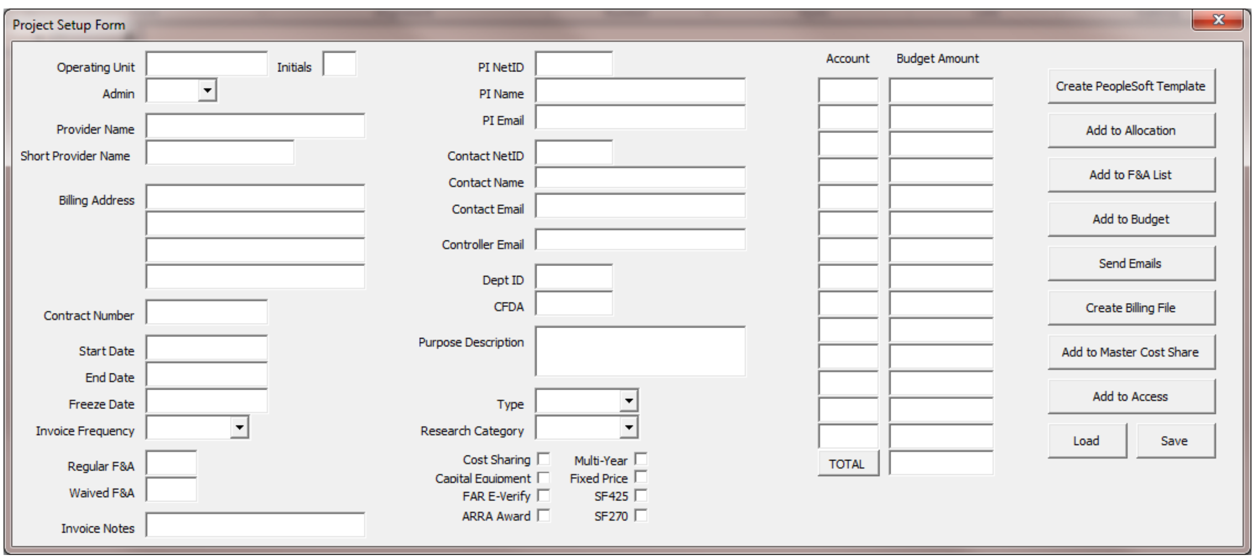
Final VBA Project

Automated Project Setup (APS)

Executive Summary

APS is a user form designed to add a level of automation to the new research project setup process at BYU's Grants & Contracts Accounting (GCA). GCA is responsible for handling the accounting for private and federal research grants. Prior to APS, once a new grant or contract was formed, GCA manually added each project to its various tracking mechanisms. Similar data was input into multiple spreadsheets and templates. To improve accuracy and eliminate the need for manual duplicate entries of identical data, this form accepts all data required and inputs the data into the appropriate excel files. Additionally, the form is capable of sending emails to notify individuals responsible for new research grants that their projects have been setup.

This is a screenshot of the APS user form:



Implementation Documentation

The form on the following page is the "New Project Set-up Checklist" used prior to APS's implementation. Line items marked with "APS" are automated through the use of the APS user form. Data is input once onto the user form and used for each of the APS features outlined below. All data input onto the form is found by manually searching through research project contracts. The "New Project Set-up Checklist" will likely be modified to adjust for the new APS system.

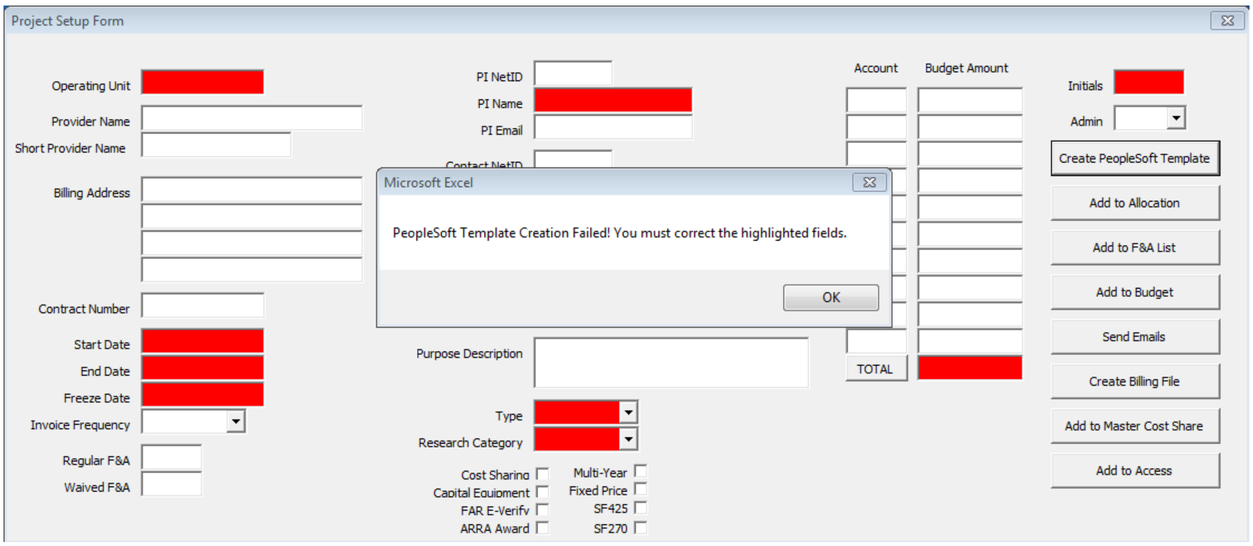
Project Number: ______________

NEW PROJECT SET-UP CHECKLIST

DATE	INITIALS	PROCEDURE
___/___/____	**APS**	1. **Setup Project**
	APS	A. Do Set-up in Excel (RES/Setup/New Project Setup Template.xls)
	APS	B. Setup Project in Peoplesoft
	APS	C. Setup Attributes in Peoplesoft
___/___/____	**APS**	2. **Indirect Cost Allocations**
		A. Add Project to Appropriate Tree
	APS	1. FA_Regular Rate ______% FA_Waived Rate______%
		B. Update Allocation Lists
	APS	1. Add to "Res/Setup/Allocation.xls" to track date added to Peoplesoft
	APS	2. Add to "Res/Setup/F&A_list.xls" - allocation database
___/___/____	**APS**	3. **Add Budget Entries** - ______________
	APS	A. RES/Budget/FY (current year)/BYU Budget Upload
	________	B. Add budget file name to "NOTES" in PS
___/___/____	________	4. Initial & Date setup sheet-submit to Kathleen for approval
___/___/____	**APS**	5. **Send E-mails**
	APS	A. Send new set-up memo for PI and Dept Contact - Word (S:/RES/SetupMemos/BlankSetUpNotice)
	APS	B. E-mail oper unit and description to the following: maryanne_draney@byu.edu
	APS	C. E-mail college controller
___/___/____	**APS**	6. Set-up in Excel/INVOICES
___/___/____	________	7. Cost Sharing set up Amount $_______________
	________	A. Photo copy cost share summary sheet & file in a new manila folder
	APS	B. Add CS wages & CS SummSheet to excel file (res/costshare/!Sumsheet)
	APS	C. Add project to Master Cost Share List (res/costshare)
___/___/____	________	8. Prepare File Folder.
	________	A. Include Invoice folder.
	________	B. Include this sheet.

Invoice Type: ___________

APS is broken down into several individual features based upon the excel file that is updated or created. To execute any feature APS users simply click the button that corresponds with the feature they desire to use. When a feature is executed, if any data is missing or invalid, the program highlights the appropriate fields that need attention. Not all data fields are needed for each feature. For example, the Add to F&A List feature only requires an operating unit, regular F&A rate, waived F&A rate, and project type. If one of these fields is blank or invalid it will be highlighted red and a message will appear.

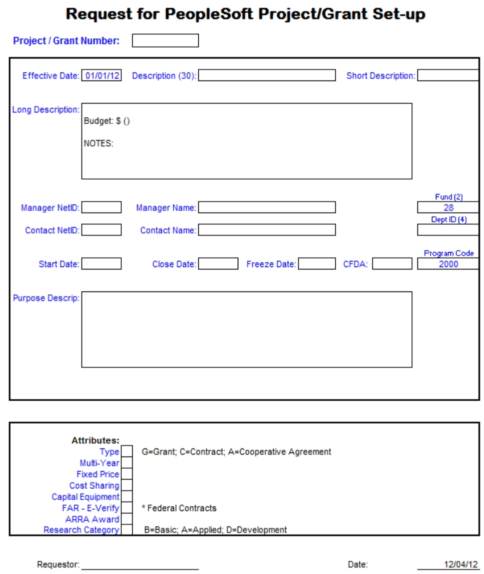


The following is a list of specific data validation rules implemented. To reduce repetitiveness, the fact that fields cannot be blank if used by the feature executed is implied. Each of these rules only applies if the field is used.

- Operating Unit – Must be exactly 8 characters and start with “R0.”
- Start Date / Close Date / Freeze Date – Must be valid dates.
- PI Email / Contact Email / Controller Email - Must be valid email address.
- CFDA Number – If the Operating unit begins with R01, R02 or R03 this field cannot be blank.
- Account - Accounts must be numeric and exactly four digits. If a corresponding budget field has a value, the account cannot be blank.
- Budget Item - Budget items must be numeric. If a corresponding account has a value, the budget item cannot be blank.
- Project Type - Limited to combo box list.
- Regular F&A and Waived F&A – Regular F&A must be greater than 1 and less than 100. Waived F&A cannot be less than 0 or greater than regular F&A.

As mentioned previously each feature of APS is executed through a series of buttons. The following are descriptions of each of those features.

- <u>Create PeopleSoft Template</u> – The PeopleSoft template is used to identify information to be entered into PeopleSoft. The form is filled using information obtained from grant contracts. APS automatically prints the template form for documentation and approval purposes. Completed forms are not saved.



Request for PeopleSoft Project/Grant Set-up

Project / Grant Number:

Effective Date: 01/01/12 Description (30): Short Description:

Long Description: Budget: $ ()

NOTES:

Fund (2) 28

Manager NetID: Manager Name:

Dept ID (4)

Contact NetID: Contact Name:

Program Code 2000

Start Date: Close Date: Freeze Date: CFDA:

Purpose Descrip:

Attributes:

Type G=Grant; C=Contract; A=Cooperative Agreement

Multi-Year

Fixed Price

Cost Sharing

Capital Equipment

FAR - E-Verify * Federal Contracts

ARRA Award

Research Category B=Basic; A=Applied; D=Development

Requestor: ____________________ Date: 12/04/12

- <u>Add to Allocation</u> - The allocation spreadsheet is used to track changes to allocation rates. Whenever a project is setup, modified, or closed this sheet is used to track any changes to F&A rates. New projects are entered using black text on two lines. The first line is the regular F&A rate typically applied to a project marked as FA_Regular. The next line, FA_WAIVED is any portion of the F&A rate that is waived for a particular project. Not all projects have waived F&A. In that case, the user simply inputs 0, for the waived F&A rate, on the form and a line is not added for FA_WAIVED. Each tab on the allocation spreadsheet is for a single year. APS looks for the next empty line to add F&A rates to the table for new projects. If a project is the first to be entered in any given month, the program skips to the start of the next month leaving a gap between the months. After the allocation spreadsheet has been updated it is saved and closed automatically.

	Effective Date		Project	Tree	Percent	Date Added	Added note on F&A list	Delete	Added to list Initials
2			For these columns: Black = Add Allocation Red = Delete Allocation			Columns For Preston's Use Only			
538									
539									
540	Add/Delete for Oct.	1	R0666666	FA_REGULAR	50.0%				sdf
541		3	R0999555	FA_REGULAR	50.0%				bl
542		4	R0999555	FA_WAIVED	40.0%				bl
543		5	R0555777	FA_REGULAR	50.0%				bl
544		6	R0555777	FA_WAIVED	10.0%				bl
545		7	R0899999	FA_REGULAR	50.0%				bl
546		8							

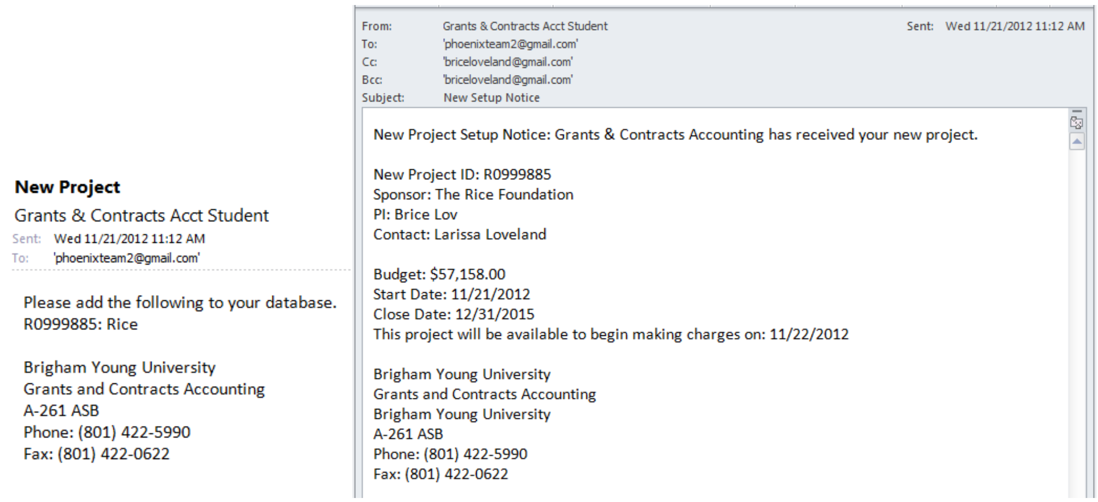
- Add to F&A List – The F&A List serves as a reference table of all research projects and their regular F&A rates, waived F&A rates, and project types. Additions to the table are added numerically. APS searches for the appropriate location and inserts a new line for the new project being setup. APS then saves and closes the F&A List.

4	Allocations		Consultants and Subcontracts						
5	Project	Regular	Waived	Consultants	Subcontracts	Exempt	Grant, Contract or CA	F&A	Inactivated	Commen
2386	R0601013	46.000%								
2387	R0601014	46.000%						**Removed from tree for Dec closeout		
2388	R0601016	46.000%	46.000%							
2389	R0601017	46.000%	46.000%							
2390	R0601018	46.000%								

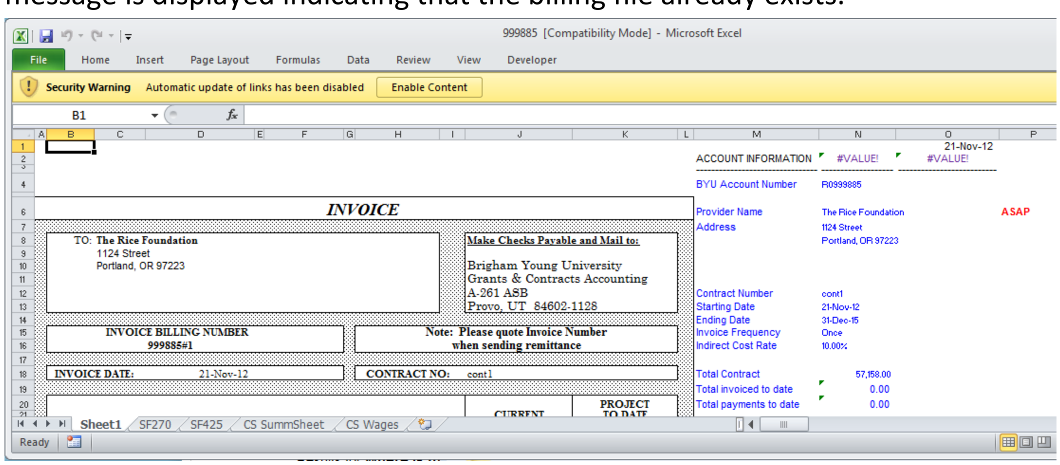
- Add to Budget – New budget upload workbooks are manually created after the current budget workbook has been uploaded, or a new month has begun. Each new workbook is manually given a new file name that includes the current month and the number of budget workbooks that have been uploaded in that month. Because of this, unlike other spreadsheets that are updated by APS, the user selects the location of the budget spreadsheet to be updated. There is no way to predict or automate the budget workbook file name selection. For new budget items, a line is inserted on the next blank line of the budget upload spreadsheet. The number of lines added varies depending on the number of valid budget items input onto the user form. The user form has a max of 14 budget items per project. Rarely do projects have more than 14 new budget items. If a project exceeds the number of budget items allowable, the user will need to manually open the budget workbook and input the extra budget items.

3	Journal ID			Journal Date	Header Description	Journal Source					Total
4	NEXT			11012012	GCA Budgets Nov 2012	430					180,263.00
6	BU	Ledger	Ledger Group	Account	Operating Unit	Class	Scenario	Currency	FY	Line Description	Monetary Amount
7	BYU	BUDGETS	BUDGETS			00000	REVISED	USD	2012	Budget New Nov 2012 #1	
8	BYU	BUDGETS	BUDGETS			00000	REVISED	USD	2012	Budget Closeout Nov 2012 #1	
9	BYU	BUDGETS	BUDGETS			00000	REVISED	USD	2012	Budget Adjustment Nov 2012 #1	
21	BYU	BUDGETS	BUDGETS	2000	R0199888	00000	REVISED	USD	2012	Budget New Nov 2012 #1	60.00
22	BYU	BUDGETS	BUDGETS	2500	R0199888	00000	REVISED	USD	2012	Budget New Nov 2012 #1	70.00
23	BYU	BUDGETS	BUDGETS	3000	R0199888	00000	REVISED	USD	2012	Budget New Nov 2012 #1	80.00
24	BYU	BUDGETS	BUDGETS	9000	R0199888	00000	REVISED	USD	2012	Budget New Nov 2012 #1	90.00
25	BYU	BUDGETS	BUDGETS	8100	R0199888	00000	REVISED	USD	2012	Budget New Nov 2012 #1	100.00
26	BYU	BUDGETS	BUDGETS	7000	R0999888	00000	REVISED	USD	2012	Budget New Nov 2012 #1	100,000.00
27	BYU	BUDGETS	BUDGETS	7000	R0999885	00000	REVISED	USD	2012	Budget New Nov 2012 #1	500.00
28	BYU	BUDGETS	BUDGETS	6000	R0999885	00000	REVISED	USD	2012	Budget New Nov 2012 #1	10,000.00
29	BYU	BUDGETS	BUDGETS	6100	R0999885	00000	REVISED	USD	2012	Budget New Nov 2012 #1	41,545.00
30	BYU	BUDGETS	BUDGETS	8000	R0999885	00000	REVISED	USD	2012	Budget New Nov 2012 #1	551.00
31	BYU	BUDGETS	BUDGETS	8960	R0999885	00000	REVISED	USD	2012	Budget New Nov 2012 #1	4,562.00

- Send Emails – For each new project setup, APS has the option to send out emails to individuals responsible for research projects. An email with project setup information is sent to the principle investigator, contact, and department controller. A second email is sent to financial services, to notify them that the project needs to be added to the P-Card database.



- Create Billing File – Billing files are used to maintain a record of invoicing and cost share for each research project. Individual billing files are created for each project. APS uses a billing file template to create a new billing file for each project setup. Data input into the user form is added to the billing file. Based upon specifications indicated on the user form SF270, SF425, and cost share sheets may be added to the new billing file. References are added to the additional sheets that refer to data input onto the main invoice sheet (Sheet1). Once all data has been added to the new billing file and the appropriate sheets have been added, the billing file is saved as a new file. The file name is the right six digits of the operating unit. If a billing file with that name already exists a message is displayed indicating that the billing file already exists.



- <u>Add to Master Cost Share List</u> – The master cost share list is used to track cost share for all projects. APS finds the appropriate numeric position for the current project being setup and inserts a new line. A formula is added to the remaining columns that references cells in the billing file. If a billing file has not been created, the user is prompted to create a billing file before adding the project to the master cost share list. The user must then run the Create Billing File feature. If this control were not in place, the master cost share list would be filled with invalid references.

R0112200	Tim McLain	2/28/2013	544,000.00	0.00	544,000.00	0.00	0.00	544,000.00	Dean Johnson	bl 1/1/2012	D
R0202267	Larry St Clair	5/31/2015	41,191.00	28,982.44	12,208.56	10,078.16	2,285.80	2,130.40	David Morris	bl 1/1/2012	N W a
R0202288	Joshua Udall	6/1/2014	86,473.00	36,533.31	49,939.69	15,666.12	5,606.34	34,273.57	David Morris	bl 10/4/2012	F: Ju fc
R0202306	Sam St. Clair	5/31/2013	71,870.00	42,810.25	29,059.76	29,545.09	9,026.91	(485.34)	David Morris	bl 1/1/2012	D

- <u>Add to Access</u> – An Access database is used to track all invoices that have been sent out. This feature adds the project account to the database to track future invoicing.

tblAccounts

Account_No	Sponsor_Name	Contract_No	Invoice_Typ	Click to Add
Sharon Nishizal	Academy for Educational Devel	reimbursement for h		
R0999885	The Rice Foundation	cont1	Once	
R0999555	Your Tax Dollars	cntrct63423	Once	

- <u>Save / Load</u> – This feature is used to save data input into the form. Data saved can be loaded back into the form using the load button. This feature was useful for testing to save time inputting data for each test run. Additionally, this feature can be used to save data input if the APS user is unable to complete a project's setup in one sitting.

- <u>Total</u> – This adds all budget items together to ensure they have been input correctly. The user can check the total against the amount listed on the physical contract.

Learning and Conceptual Difficulty

The Pareto principle is greatly applicable to the effort I expended in creating APS. A few snippets of code required the vast majority of my time. However, I learned a great deal about programming with VBA. I have outlined below a few of the areas which were a struggle for me to complete.

- False Sense of Completion – Throughout the development process I would frequently think that I had completed features. However, through testing I often quickly realized that APS was not able to handle certain circumstances. Handling those special cases or errors typically took more time to resolve than the feature itself.
- Input Validation – Invalid input could cause any number of problems with APS. To prevent APS from crashing or creating error filled spreadsheets, I had to find ways to control the input on APS. For example, operating units must begin with "R0" and be exactly eight characters long. If conditions for any field are not met it is highlighted red and an error message appears. Each feature of APS has a unique set of data validation rules. This is mostly due to the fact that not all data is needed for every feature.
- Connecting to Access – I have taken a SQL class before and used VBA within access to reference a database. However, I had a difficult time getting APS to connect with the access database that I needed it to from excel. After trying several different methods of connecting to the access database, I found a solution that worked. It would have been much easier if I had waited to do this section until we covered this topic in class.
- Inserting a Formula – I spent more time than I would like to admit inserting a reference formula into an excel workbook. In the end, I was missing a quote, but the syntax was still correct.
- Opening Other Workbooks – It took me awhile to get the billing file feature working the way I needed it to. I spent quite a bit of time figuring out how to get the data I needed in each billing file. Including inserting data from the user form and copying worksheet templates into new billing files.
- Form Design – Figuring out how to best organize the APS form took quite a bit of time. Also, I could not find an easy way to change the tab order. I had to manually input the index number for each item on the form.
- Unfamiliar Methods and Errors – It took quite a bit of trial and error to get some methods working that I was previously unfamiliar with. For example, I had trouble with the .close method. I set the save conditions to true and would get an error stating that the connection to the file I had been referencing was lost. I had the error written down on a sticky note, but have since tossed it, otherwise I would be more specific here. The error would cause APS to crash despite the fact that it had actually accomplished everything it was programmed to do. For some reason if I used the .save method and then the .close method without any save conditions, the problem went away. There were other notifications that I had to cover up by turning off alerts. Since this program will be used in my office, I will likely spend more time cleaning up the program to insure these errors do not become issues once I leave. However, everything currently works as it should.

- Looping Through a series of objects - The data validation for the account and budget items initially consisted of two sets of fourteen identical if statements. I knew that a loop would be the most efficient use of code, but I was unsure of how to loop through text boxes on a user form. I eventually found that by using the controls collection and a loop I could greatly reduce the length of my code.

```
For i = 2 To 14
    If Controls("txtAcct" & i).Text <> "" And (Len(Controls("txtAcct" & i).Text) <> 4 _
    Or IsNumeric(Controls("txtAcct" & i).Value) = False) Or (Controls("txtAcct" & i).Text = "" _
    And Controls("txtBudget" & i).Text <> "") Then
        Controls("txtAcct" & i).BackColor = RGB(255, 0, 0)
        errorCheckBudget = True
    End If

Next i
```

Assistance

This project would have been impossible without the internet. I used several blogs and reference sites to gain insight in how to accomplish certain tasks. I used code found online to validate email addresses and find the last row of a spreadsheet. I did not solicit help from anyone in person or via the internet. Whenever I came to a trouble spot I scoured the internet for a solution or modified my code until my current challenge was resolved.