

4.1.8 Accounting and Billing Activities

ECS operations are supported by integrated and automated billing and accounting functions. The ECS Billing and Accounting Application Service (BAAS) provides the mechanisms for ECS to account for resource utilization, price user purchases of ECS data, invoice users for these data orders, and meet ECS' needs to track financial data. The implementation of billing and accounting procedures will be based on ESDIS policies

Figure 4.1.8-1 provides a context diagram for the ECS BAAS.

Billing and Invoicing

The Billing and Invoicing function is responsible for recovering costs from the user community and other parties purchasing ECS data.

Billing and Invoicing collects and prices user resource utilization information which it accesses from the ECS Management Database. Resource cost information for user data orders will be logged to the ECS Management Database. This data is reported by DSS, Data Processing Subsystem (DPS) and other subsystems reporting resource utilization. The Billing and Accounting Application Service (BAAS) will access these logs every twenty-four (24) hours. Priced transactions (data purchases) will be posted automatically to the appropriate accounts receivable.

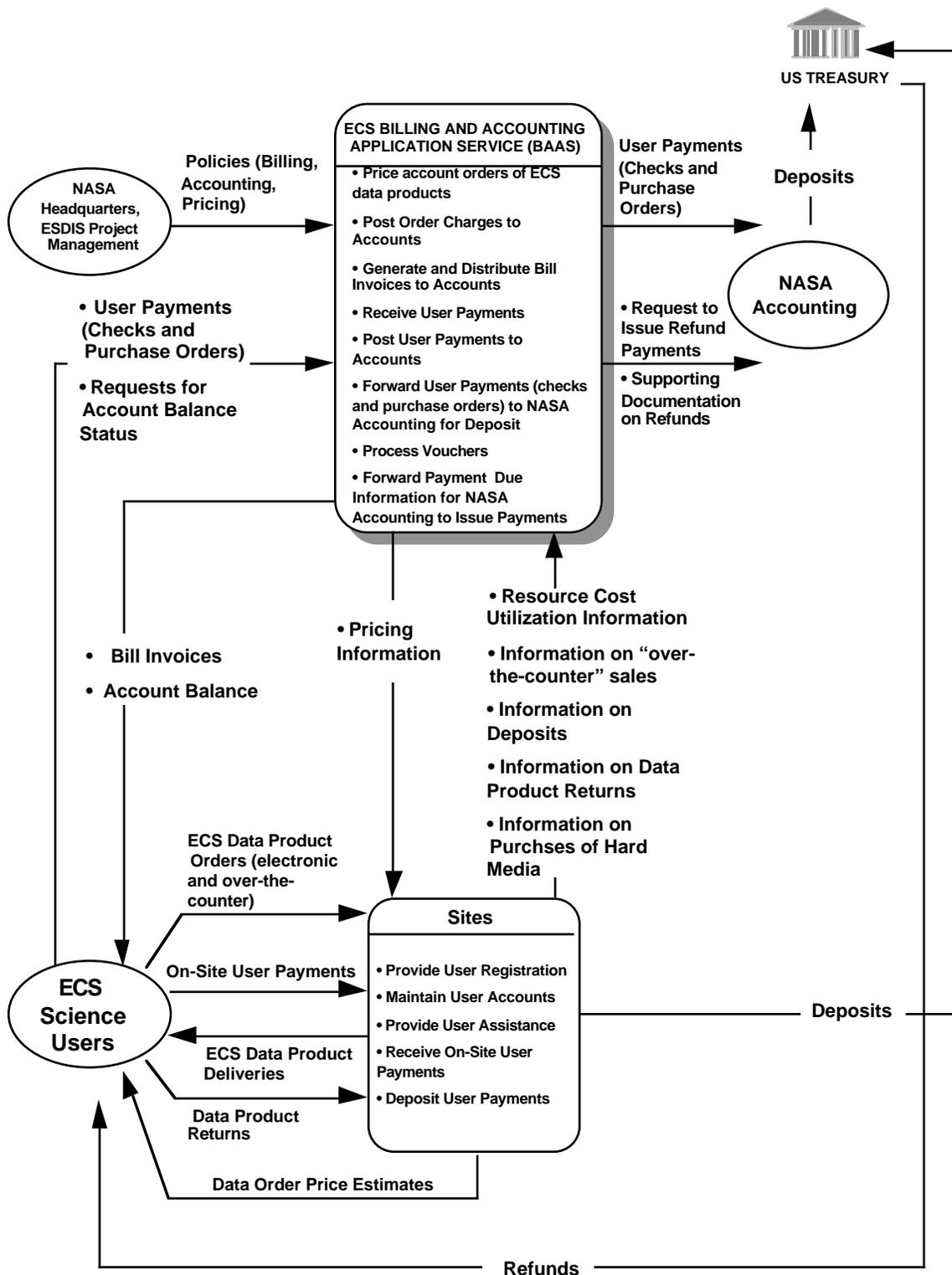


Figure 4.1.8-1. ECS/EMC BAAS Context Diagram

On a monthly cycle, the Billing and Invoicing function generates bill invoices. By charging fees, ECS regulates the user by periodically expecting reimbursement for resources consumed (e.g., disk utilization, CPU utilization), hard media, mailing costs, and other chargeable costs involved in fulfilling a user's order for ECS data. NASA Headquarters and ESDIS project management policy directives will establish what charges will be assessed to the user community.

Although the invoicing service is centralized at the SMC, DAAC operators have access to the SMC records to review invoices and to provide "customer service" to local users when required.

The Billing and Invoicing function shall:

- collect user data order resource cost information and chargeable information from the ECS Management Database
- capture user profile and account information
- price user data order resource cost information
- update appropriate accounts receivable
- calculate total user invoice amounts
- generate bill invoices

Please refer to section 4.1.8.1 for a scenario describing the invoicing of an account.

Service requests which are charged will be assessed standard prices established by ESDIS management and NASA Headquarters policy using pricing tables maintained by the BAAS. As shown in the context diagram, the pricing information will be available to the Data Server Subsystem (DSS) for the purpose of estimating the charges of a service request, including the hard media and shipping components of a request if non-electronic distribution is requested, before the user decides to place an order. The price estimation capability provides science users with pricing information regarding ECS services. Current representative pricing is made available in order to provide the user community with a "feel" for the price associated with a given type of service or product.

Under some circumstances dictated by ECS billing policy, it is possible that the concept of bill invoicing an account on a monthly basis will not apply. Among these policy-driven circumstances:

- ECS policy dictates that no charges apply to any product order;
- a particular account is exempt of charges for data purchases by a policy decision;
- the account is not charged in U.S. dollars for data orders; instead, the account has a pre-set number of resource units allocated to the account, and is measured on those units (e.g., number of tapes);
- an account is "pre-paid;" that is, an account has funds credited to it in advance of data purchases. As purchases take place, charges are deducted from these existing funds.
- ECS policy dictates that all orders must be paid for in advance of the order being processed.

When real funds are involved, accounting functions play an important role.

Accounts Receivable, Collections, and Accounts Payable comprise accounting functions. Accounting functions are concerned with the receipt, management, control, and disposition of ECS funds. They collect, organize, and report financial data on (1) moneys owed to ECS and (2) moneys obligated by ECS.

For reconciliation, accountability, and tracking purposes, all financial transactions must be supported with appropriate documents and referenced to their sources. Types of references might include journal references or transaction/document identifiers (e.g., voucher number, deposit ticket number), amount of a transaction, and identification of the staff preparing and approving a transaction.

Accounts Receivable

The Accounts Receivable function manages the amounts due to ECS for the purchase by users of ECS data products. It maintains current account balances for user accounts, credits payments to the appropriate accounts, and forwards payments for deposit. The Accounts Receivable function shall:

- manage user account balances
- apply payments to user accounts
- manage "pre-paid" user accounts
- manage aging of accounts receivable
- provide management reports

Distributed accounts receivable data at DAACS are accessible to the SMC to provide a centralized repository of information for system-wide view and analysis at the SMC under the management of the SMC accountant.

Science user payments received by the billing clerks at the SMC consist of checks and purchase orders. These payments either will fund an account in advance of data purchases ("pre-paid" accounts) or will be sent in response to a bill invoice. As shown on the context diagram presented on figure 4.1.8-1, after the payments have been received and have been posted to the appropriate account, SMC billing clerks will forward the payments (checks and purchase orders) to a designated NASA accounting system for processing and for deposit in the appropriate U.S. Treasury account(s). Please refer to section 4.1.8.2 for a scenario describing receiving and applying payments to an account.

Sites may conduct on-site sales of ECS data products. Revenues derived from these site sales ("over-the-counter" transactions) will be reported to the ECS Billing and Accounting Application Service (BAAS). "Over-the-counter" transactions will be controlled by the policies adopted at each site (e.g., cash-drawer controls). Payments for these transactions may be made in any form which the sites are prepared to accept. As shown on the context diagram presented by figure 4.1.8-1, each site is responsible for ensuring the processing of credit cards, and for depositing the moneys received (checks, cash, or other form) to the appropriate U.S. Treasury account(s).

Reports generated by the Accounts Receivable function will include:

- "trial balances" for a period showing each account's opening period balance, all period activity, and the account's closing balance
- a key indicator report indicating a summary of accounts receivable activity for a specific period
- an accounts receivable aging report

Science users will be provided on-line access to inquire about their accounts receivable balance status.

Accounts Payable

Accounts Payable provides for the tracking of amounts obligated by ECS. These could be amounts obligated to other agencies (e.g., Radarsat, for which there may not be charges but for which ECS might want to keep track) for data, or amounts due to a user account as refunds. During the course of normal operations, users might find it necessary to return a data product which they have purchased; or they may have overpaid for a product; or, in the case of an open ("pre-paid") account, the account may ask for the account to be closed and the funds balance in the account to be refunded. In all instances, a refund payment would have to be processed, and supporting documentation would have to be presented to the US Treasury with the request for refund.

The Accounts Payable function shall:

- manage payable account balances
- establish temporary accounts to accommodate refunds
- process vouchers
- track obligations
- provide management reports

In the case of refunds, the user also may opt to have the amount due for the return credited to her account instead of having it refunded. The amount credited will be applied against future purchases of ECS data.

Collections

The Collections process shall support ECS policies and procedures to handle subscriber accounts which are delinquent in payment of their accrued charges. The function receives information on past due user accounts from the Accounts Receivable function, and reports information on amounts written-off as non-collectible. Past due accounts are those accounts which are delinquent in their payment for service; parameters for past due accounts will be defined as a matter of ECS policy -- traditionally, these are accounts which are 30 days, 60 days, 90 days, or 90+ days due.

The Collections function shall:

- process delinquent account activities
- calculate and record write-offs
- provide management reports

Cost Accounting

As an analytical tool, the Cost Accounting functionality is an important component of the BAAS. The Cost Accounting application describes how resources are spent; it provides the capability to track resources utilized to serve individual users, groups, and processes.

Cost Accounting is responsible for calculating this resource utilization and making the results available for analysis. It collects order data from the same logs which were used to price individual user service requests, and it receives data on the cost of hard media items purchased to fulfill ECS service requests from inventory and logistics application services at the individual sites. The reports generated by Cost Accounting will help, hence, to determine and to update the appropriate "cost" of data services and products. The charge to users for these services will be set by adopted policies and procedures.

The Cost Accounting application shall:

- Provide a trail that reports the sources of all costs
- Provide capability to assign resource utilization costs to processes and products
- Determine resources utilized to serve different clients
- Provide reports to assist in the management of activities undertaken to provide services and products

Reports generated from data gathered by Cost Accounting will include:

- reports identifying the costs incurred by ECS in support of its activities
- reports identifying costs traceable to particular individual and group accounts

Reporting

The production of timely and useful data is a primary goal of the ECS BAAS. Reporting refers to the ability of the BAAS to perform comprehensive reporting and comparative analysis on financial performance. The function communicates to management not only what happened during an accounting period, but provides valuable decision-making tools by comparing data to prior period information, or to forecasted activities.

The ECS BAAS Reporting function shall:

- provide standard automated statements and summary reports
- provide customized reporting capabilities to tailor a report on a user's specific needs
- maintain prior period reporting data for future reference and analysis

4.1.8.1 Bill Invoicing a User Scenario

During the course of normal ECS operations, science users will place orders for ECS data products. These products will be processed and prepared at the sites, which also will ship the data product to the science user if the user requested that the product be delivered on any form of hard media (CD-ROM, disk, tape).

As this process unfolds, the Data Server (DSS) and Data Processing Subsystems (DPS) will accumulate certain metrics on the user's data request which may be used to bill invoice the science user's account at a later date. Bill invoices will reflect purchase and delivery data of user product orders. These metrics might include, for example, type of product ordered, delivery media type, and data order resource utilization (e.g., disk, CPU, and IO utilization). These metrics will be logged by the DSS/DPS to the ECS Management Database, from whence the ECS Billing and Accounting Application Service (BAAS) will access these logs to price an account's purchases of ECS data products.

This scenario assumes that a science user successfully presented a request for ECS data products and received them as ordered; and that ECS will charge the science user for this order. It also assumes that key resource cost information needed to price the science user's order is included in the information logs produced by the ECS subsystems. The logs have been posted to the ECS Management Database to be accessed by the ECS BAAS. The basis for the charges could be media type, delivery charges, resource cost utilization, or any combination decided by Headquarters policy. Figure 4.1.8.1-1 presents a pictorial description of the scenario. Table 4.1.8.1-1 presents the steps associated with the scenario.

Once that the ECS data product has been delivered and key resource cost information has been posted to the ECS Management Database, the ECS BAAS will access the logs every twenty-four hours. Using the information provided on these logs, the billing and invoicing functionality of the ECS BAAS identifies the science user and applies user account-specific billing information to this request.

Such information is helpful when the science user's order is priced. The billing function prices the order information provided by the activity logs using standardized pricing tables. A science user's service level, special agreements with ECS, product ordered, media requested, all play a role in determining which charges will apply as the order is priced.

Having priced the user's data order using the appropriate algorithms, the BAAS will store the information until the current billing cycle is over. The billing cycle will be performed monthly. The information captured during the each pricing instance also serves to update (debit) the science user's account receivable balance.

When the bill invoices are generated at the end of the cycle, the billing clerk will distribute them to the appropriate accounts.

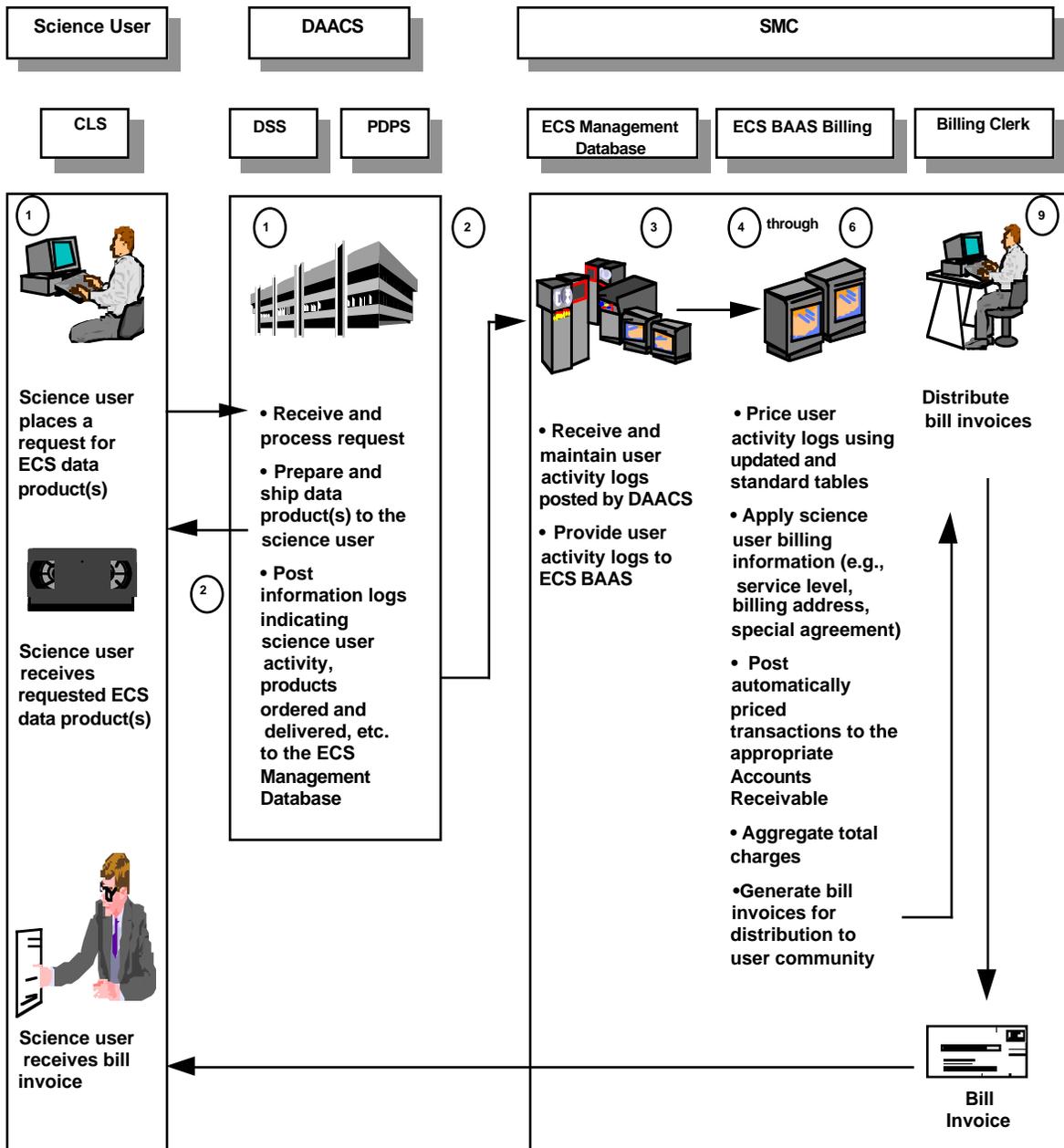


Figure 4.1.8.1-1. Billing a Science User

Table 4.1.8.1-1. Billing a Science User

Step	Operator/User	System	Purpose
1	Science user places an order to purchase data	Process science user data request	Provide information requested by user
2	Site makes data available to science user	Log information collected on science user's data order (e.g., product ordered, delivery media, resource utilization) to the ECS Management Database	Make records of orders and user activity available to ECS
3		Receive information logs provided by ECS subsystems at DAACS and used for billing purposes from the ECS Management Database	Gather all data order records captured for each particular account
4		Apply science user-specific billing information captured at registration time (e.g., account limits, account credits)	Capture account-specific data that drives pricing of orders
5		Price activity information logs using standardized pricing tables	Price orders
6		Update science user's account receivable balance	Update current account balance
7		Maintain all priced data order information	Aggregate data orders and update total balance due
8		Generate statement	Distribute statements
9	Distribute statements		Inform the account contact of activity, orders, and charges incurred during a billing cycle

4.1.8.2 Receiving and Posting Science User Payments to Accounts Scenario

Once a science user account has been established, the account may be billed regularly for purchases of ECS data products; or the account may make funds available in advance of such purchases (establishing a "pre-paid" account). In the latter case, as the member(s) of the account purchases products, the amounts credited to the account will be deducted by the amount represented by each data purchase. This will continue until the account funds have been exhausted. Payments to an account directed to the SMC may be made via a purchase order or check.

Sites may conduct on-site sales of ECS data products. Revenues derived from these site sales ("over-the-counter" transactions) will be reported to the ECS Billing and Accounting Application Service (BAAS). "Over-the-counter" transactions will be controlled by the policies adopted at each site (e.g., cash-drawer controls). Payments for these transactions may be made in any form which the sites are prepared to accept. As shown on the context diagram presented by figure 4.1.8-1, each site is responsible for ensuring the processing of credit cards, and for depositing the moneys received (checks, cash, or other form) to the appropriate U.S. Treasury account(s).

This scenario involves descriptions of the receipt and posting of three forms of payment information: checks received at the SMC to settle a billing invoice; purchase orders received to establish a "pre-paid" account; and sales transactions reported by the DAACS. It assumes that the Headquarters policy will be to charge science users for purchases, and that non-NASA DAACS which transact sales on-site will owe money collected on sales of ECS data products to NASA. The accompanying figure presents a pictorial description of these three activities.

Assume that an account does not have any amounts already credited to it. In such case, the science user will be billed at regular intervals (each monthly billing cycle) for the purchase of ECS products. When a science user receives a bill invoice, payments to settle the invoice will be forwarded to the SMC. The check will be received by M&O staff (billing clerk) at the SMC. Remittance payments are opened by the billing clerk, who posts the payment to the proper account. The ECS BAAS Accounts Receivable function, which maintains and ages science user accounts, and matches the amounts received to the account's outstanding balance. If the amounts match, the account's outstanding balance is closed. Should an overpayment or an underpayment situation exist, the billing clerk will inform the account contact. Overpayments may be credited to an account to cover future charges, or a refund may be extended to the account. For a refund, a temporary account would be established in Accounts Payable. All supporting documentation demonstrating the need for a refund would be forwarded to the US Treasury so that it can issue the refund to the user.

After the payment has been recorded to the appropriate account, the billing clerk forwards the moneys received to NASA accounting for deposit with the U.S. Treasury. NASA accounting will inform the SMC Accountant of any checks which are returned due to insufficient funds. The billing clerk, with approval from the SMC Accountant, will re-establish that account's receivable balance. The account whose check has been returned will be contacted and invoiced again for the amounts due.

In the case of a "pre-paid," or open, account, funds are available to that account as credits in advance of any purchases. These credits may have been established through a purchase order (P.O.) or with a check. The billing clerk receives these P.O.s and checks and credits the amounts to the proper accounts. As the member(s) of the account purchases ECS data products, the charges incurred are automatically deducted from the account's existing funds. When these funds are low, the account will be contacted to "replenish" these funds.

Purchase orders and checks received as "pre-payments" will be forwarded to NASA accounting for processing, and for deposit with U.S. Treasury. Figure 4.1.8.2-1 presents a pictorial description of the scenario. Table 4.1.8.2-1 presents the steps associated with the scenario.

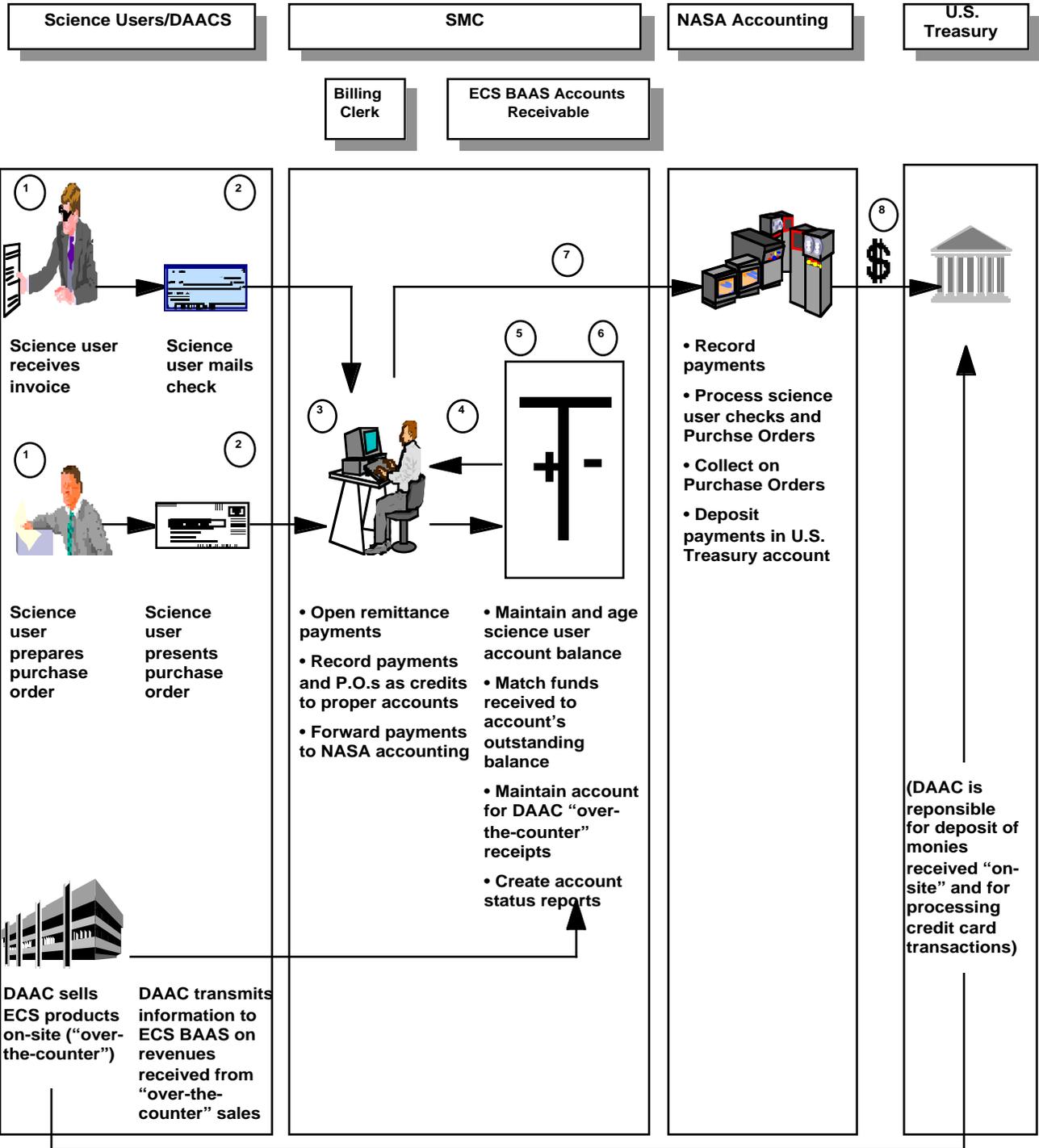


Figure 4.1.8.2-1. Receiving and Posting Science User Payments to Accounts Scenario

Table 4.1.8.2-1. Receiving and Posting Science User Payments to Accounts Scenario

Step	Operator/User	System	Purpose
1	Science user receives and approves invoice/ prepares purchase order (P.O.)	Maintain account	Initiate payment/fund account
2	Science user mails check to SMC / forwards P.O. to SMC	nn	Initiate payment/fund account
3	M&O Billing Clerk receives and opens remittance payments	nn	Record payments
4	M&O Billing Clerk prepares batch receipt report and inputs into ECS BAAS	Payments are posted to the appropriate accounts receivable as credits	Record payments
5		If the science user is paying for charges already incurred, the payments received are matched to the accounts outstanding balance	Balance accounts
6		If the science user is anticipating purchases, the user's account is credited ("pre-paid") for future activity	Record available funds
7	M&O Billing Clerk forwards payments and Purchase Orders for deposit in Treasury account	Maintain accounts	Deposit of ECS receipts with Federal Government
8	NASA accounting forwards checks and Purchase Orders to Treasury	nnnn	Deposit of ECS receipts with Federal Government
9	NASA accounting informs ECS of check remittances returned due to insufficient funds	nnnn	Re-establish account receivable
10	Billing clerk, with approval from SMC Accountant, re-establishes the receivable balance for the account whose check could not be processed	Debit appropriate amount. Update account balance due	Re-establish account receivable
11	Billing clerk informs account contact and makes arrangement for a new payment	nnn	Settle account