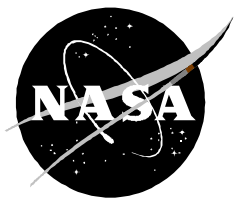


IG-98-028

**AUDIT
REPORT**

**AUDIT OF TRANSPORTATION COSTS
FOR NON-NASA PAYLOADS FLOWN IN THE
SPACEHAB MODULE**

September 8, 1998



National Aeronautics and
Space Administration

OFFICE OF INSPECTOR GENERAL

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Acronyms

CMAM	Commercial Middeck Augmentation Module
COTR	Contracting Officer's Technical Representative
JSC	Johnson Space Center
OIG	Office of Inspector General
PNM	Price Negotiation Memorandum
ReALMS	Research and Logistics Mission Support
SPOC	SPACEHAB Phase One Contract
SSDA	Space Systems Development Agreement
STS	Space Transportation System

W

September 8, 1998

TO: M/Associate Administrator for Space Flight

FROM: W/Assistant Inspector General for Auditing

SUBJECT: Final Report on the Audit of Transportation Costs
for Non-NASA Payloads Flown in the SPACEHAB Module
Assignment Number A-HA-98-041, Report Number IG-98-028

The subject final report is provided for your use. Please refer to the executive summary for the overall audit results. The report provides our evaluation of your response with respect to planned corrective actions. We request additional comments on the recommendation; therefore, it will remain open until the requested information is provided.

If you have questions concerning the report, please contact Ms. Clara L. Seger, Auditor-in-Charge, at (407) 867-4715. We appreciate the courtesies extended to the audit staff. The report distribution is in Appendix F.

[Original signed by]

Russell A. Rau

Enclosure

cc:
B/Chief Financial Officer
G/General Counsel
JM/Management Assessment Division

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TRANSPORTATION COSTS FOR NON-NASA PAYLOADS FLOWN IN THE SPACEHAB MODULE

EXECUTIVE SUMMARY

INTRODUCTION

On December 18, 1997, NASA awarded the Research and Logistics Mission Support (ReALMS) Contract, NAS9-97199 to SPACEHAB, Inc., for \$42.86 million. The contract covers lease of SPACEHAB's pressurized modules to be flown in Space Shuttle missions and provides associated integration and operation services for NASA payloads. NASA agreed to allow non-NASA customers secured by SPACEHAB to share payload capacity on Space Shuttle missions covered by the contract. The NASA Office of Inspector General received an allegation that the Agency might not receive consideration¹ from SPACEHAB for Shuttle transportation costs associated with the non-NASA payloads.

OBJECTIVE

The objective of the audit was to determine whether the Agency sought and received appropriate consideration from the contractor for Shuttle transportation costs allocable to non-NASA payloads.

Appendix A provides details on the scope and methodology used for the audit.

AUDIT RESULTS

NASA management initiated and subsequently withdrew a waiver of consideration and sought consideration through a reduced price for the ReALMS contract. However, because there is no clear guidance on how to determine the appropriate amount of consideration, NASA has no assurance that it received sufficient consideration. Using the methodology applied to previous contracts, we calculated that the transportation costs should have been \$27.32 million, \$19.12 million more than NASA received. Moreover, without appropriate guidance, NASA has no assurance that, in the future, it will receive adequate consideration.

¹ Consideration can mean a reduced contract price, reimbursement, or other compensation.

RECOMMENDATION

The Associate Administrator for Space Flight should develop guidance for calculating transportation fees (consideration) for commercial payloads flown on the SPACEHAB module.

***MANAGEMENT'S
RESPONSE***

Management concurred with the recommendation and is developing a Plan for Commercialization of the International Space Station; SPACEHAB has indicated a desire to participate. The planned actions are a positive step toward satisfying the intent of the recommendation. However, we request additional comments to clarify how the planned actions will specifically address the recommendation.

INTRODUCTION

CONTRACT AWARD FOR LEASING MODULES

The ReALMS fixed-price contract is to provide flight opportunities for research missions and to support the logistics needs of the International Space Station. Under the contract, SPACEHAB will lease to NASA its pressurized modules and provide associated integration and operation services for payloads. The SPACEHAB modules fit in the Space Shuttle Orbiter, act as the payload carrier, and interface between the Orbiter and the payloads on each mission.

To allow for international partner participation and commercial development of space, NASA will share module resources with the contractor under the basic contract and options. The basic contract covers three Space Shuttle missions, Space Transportation System (STS) 95, STS 96, and STS 107. These missions are scheduled to fly on October 8, 1998; December 3, 1998; and May 11, 2000, respectively. On STS 95, 45 percent of the module capacity is allocated for non-NASA (commercial) use. Similarly, 18 percent is allocated for commercial use on STS 107. NASA will use 100 percent of the module capacity on STS 96.

NASA anticipated commercial customers for Shuttle missions covered by two previous contracts with SPACEHAB (see Appendix B). For those contracts, NASA required consideration² for transportation costs associated with non-NASA payloads. For example, NASA negotiated a \$2 million reduction in the SPACEHAB phase one contract price to cover non-NASA payloads flown on STS 84 (see Appendix C). To determine the amount of consideration, NASA used the methodology presented in the Space Systems Development Agreement (SSDA), the original agreement, as amended, with SPACEHAB (see Appendix B).

² Consideration can mean a reduced contract price, reimbursement, or other compensation.

FINDING AND RECOMMENDATION

***NASA HAS NO
ASSURANCE THAT
THE GOVERNMENT
RECEIVED
ADEQUATE
CONSIDERATION***

The ReALMS contract and Price Negotiation Memorandum (PNM) evidence that the Agency sought consideration from SPACEHAB for transportation costs. However, NASA has no assurance that it received adequate consideration for commercial payload transportation costs under the ReALMS contract. Assurance is lacking because the Office of Space Flight has not established clear guidance for calculating the amount of transportation costs allocable to non-NASA customers. Different methodologies used in several contracts can result in significant variances in the calculated amount of consideration due to NASA. We estimated that under the ReALMS Contract, the Agency received about \$19.12 million less than the \$27.32 million we calculated as the appropriate amount of consideration under the basic contract.

***CONTRACT PRICE
INCLUDED
TRANSPORTATION COSTS***

NASA procurement officials decided to terminate a draft request to waive transportation costs as a result of a legal opinion, issued November 5, 1997, by officials at NASA Headquarters and Johnson Space Center (JSC). The opinion states:

. . . the Government has received proper consideration for commercial payload transportation costs under the new contract. The consideration flowing to the Government is the discounted prices SPACEHAB is able to charge the Government given that they [SPACEHAB] will be able to sign up some paying customers.

The contract states that the fixed price of \$42.86 million includes consideration received for transportation costs associated with non-NASA payloads. The PNM explains that consideration for transportation costs allocated to commercial payloads on STS 95 and STS 107 was \$4.2 million and \$4.0 million, respectively, for a total of \$8.2 million. The PNM states that \$8.2 million subtracted from the Government's objective and maximum negotiation positions³ (\$47.3 million and \$55.2 million, respectively)

³ The contracting officer establishes prenegotiation objectives to judge the overall reasonableness of proposed prices. The resulting objective and maximum positions create a price range within which the contract price should be negotiated.

yields more than adequate consideration for transportation costs in the negotiated basic contract.

CLEAR GUIDANCE FOR DETERMINING TRANSPORTATION COSTS

No clear guidance exists for calculating the appropriate fees for commercial payloads flown on the Space Shuttle. The Office of Space Flight used the formula in the SSDA to determine transportation costs for missions flown under NASA's first contract with SPACEHAB, NAS9-18371, the SPACEHAB Commercial Middeck Augmentation Module (CMAM). The SSDA was effective from 1988 until 1996 when the CMAM contract was completed.

NASA USED SSDA METHODOLOGY TO CALCULATE TRANSPORTATION COSTS FOR SECOND CONTRACT

The SSDA not only specified the methodology for calculating transportation costs for commercial payloads but also included the calculation of transportation costs NASA would charge SPACEHAB (see Appendix C). Although the SSDA was terminated, the contracting officer, in conjunction with Headquarters Office of Space Flight, used the SSDA formula to calculate costs for commercial payloads under a subsequent contract, the SPACEHAB Phase One Contract (SPOC), NAS9-19250. Modification 34 to the SPOC allowed SPACEHAB to fly non-NASA experiments and adjusted NASA's contract price downward \$2 million to reflect the change. The prenegotiation position memorandum⁴ for Modification 34 contains the rationale and calculations used to determine the consideration for transportation costs for non-NASA payloads.

We concluded that the SSDA methodology provided a reasonable basis for determining the amount of consideration due to NASA for non-NASA payloads. The methodology consists of calculating the percentage of non-NASA payloads compared to the full Shuttle payload capability and multiplies the Shuttle flight costs by that percentage. This results in the assignment of a pro rata share of the transportation costs to non-NASA payloads.

VARIATION OF SSDA FORMULA USED FOR REALMS CONTRACT

Using a variation of the basic formula shown in the SSDA can result in significantly different amounts. The contract specialist assigned to the Shuttle Program at JSC stated that she and the contracting officer's technical representative

⁴ The prenegotiation position memorandum sets forth the technical, business, contractual, price, and other aspects to be negotiated for the procurement.

(COTR) at JSC used a variation of the SSDA formula to determine the consideration for transportation costs for non-NASA payloads for STS 95 (\$4.2 million) and STS 107 (\$4.0 million) under the ReALMS contract. The variation resulted in lower costs to SPACEHAB than the costs that would have resulted by using the basic formula. A comparison of the basic formula and the variation used for the ReALMS contract is in Appendix C.

The basic formula allocates the proportionate share of transportation costs to non-NASA payloads. Although the amounts for various factors in the formula change (as a result of differences in Shuttle capability, weight of the module, or capacity allocated to the payload) the basic formula should not be changed. Factors included in the formula are discussed in Appendix C.

The COTR explained that absent clear guidance, he used the variation to arrive at what he believes is a fair and reasonable amount for the non-NASA payloads. While he recognizes that this amount is lower, he believes that SPACEHAB is in a startup phase for securing commercial customers and that the lower amount is necessary at this time.

***TRANSPORTATION COSTS
COULD BE UNDERSTATED
BY \$19.12 MILLION***

The transportation costs for the current contract could be significantly higher than the amount presented in the PNM. To determine the appropriate transportation costs, we applied the methodology (basic formula) used for Modification 34 to the SPOC. For our calculations (see Appendix C), we used the cost per flight for the experiments flown on STS 84 and applied the respective weights for STS 95 and STS 107. According to the calculations, the total transportation costs would be \$27.32 million, \$19.12 million more than the amount shown in the PNM.

Because NASA may allow commercial payloads under future contracts, clear guidance is needed for calculating transportation costs.

RECOMMENDATION

The Associate Administrator for Space Flight should develop guidance for calculating transportation fees for commercial payloads flown on the SPACEHAB module.

***MANAGEMENT'S
RESPONSE***

Concur. There are no current plans to contract with SPACEHAB beyond the existing contract that would allow commercial use of a portion of the module's capability. However, the Office of Space Flight is working toward the development of a Plan for Commercialization of the International Space Station, and SPACEHAB has indicated a desire to participate. The overall goal of commercialization is to not only allow the private sector to grow new profitable industries in space, but to do it in a manner that reduces NASA's overall costs under fair and reasonable terms. The plan is expected to be available by early September 1998. The complete text of management's comments is in Appendix E.

***EVALUATION OF
MANAGEMENT'S
RESPONSE***

The development of a Plan for Commercialization of the International Space Station is a positive step toward satisfying the intent of the recommendation. However, management did not specify whether guidance for calculating transportation fees for commercial payloads will be included in the plan. Therefore, we request additional comments to clarify how the plan will address the recommendation.

OBJECTIVE, SCOPE, AND METHODOLOGY

OBJECTIVE

Our objective was to determine whether the Agency sought and received appropriate consideration for Shuttle transportation costs allocable to non-NASA payloads under ReALMS Contract NAS9-97199.

***SCOPE AND
METHODOLOGY***

We limited our review to the negotiations and final ReALMS contract awarded on December 18, 1997. We interviewed officials from the Office of Space Flight at NASA Headquarters and contracting officials at JSC. In addition, we reviewed documentation provided by the interviewees. Finally, we reviewed previous contracts and agreements (dated from 1988 through 1997) with SPACEHAB (Appendix B) and previous Office of Inspector General (OIG) reports that discuss contracts with SPACEHAB (Appendix D).

FIELD WORK

We performed field work from October 22, 1997, to February 6, 1998, during various visits to JSC. The audit was conducted in accordance with generally accepted government auditing standards.

NASA CONTRACTS AND AGREEMENTS WITH SPACEHAB

<p><i>SPACE SYSTEMS DEVELOPMENT AGREEMENT AUGUST 1988, AMENDED FEBRUARY 1991</i></p>	<p>The original agreement provided that NASA would fly the SPACEHAB module on six STS missions. Fees would be assessed at \$28.2 million per flight for a total of \$169.2 million. The agreement was amended in 1991 to reflect NASA's use of two-thirds of the capacity available. Fees assessed to SPACEHAB for each flight of the module would be reduced to reflect capacity used by NASA. The agreement terminated on September 30, 1996, at the completion of NASA's first contract with SPACEHAB (NAS9-18371).</p>
<p><i>NAS9-18371 SPACEHAB COMMERCIAL MIDDECK AUGMENTATION MODULE</i></p>	<p>Firm-Fixed-Price Contract for \$184 million Period of Performance: November 1990-September 1996</p> <p>The contract covered NASA's lease of two-thirds of available capacity on the module. The original schedule of NASA's usage over six flights was accelerated during the contract period so that NASA used essentially all the capacity on the first four flights. The result was little or no fees assessed to SPACEHAB as calculated under the SSDA.</p>
<p><i>NAS9-19250 SPACEHAB PHASE ONE CONTRACT</i></p>	<p>Firm-Fixed-Price Contract for \$53.98 million Period of Performance: November 17, 1994-July 15, 1997</p> <p>The basic contract covered lease of the SPACEHAB modules (one single and three doubles) on four Mir missions. A contract modification was issued for three option missions (two double modules and one single module) on July 16, 1997, for \$38 million. Period of performance for the optional missions was July 2, 1996, through July 31, 1998.</p> <p>Modification 34 was made to the contract as an equitable price reduction of \$2 million for two non-NASA experiments flown on STS 84.</p>

Appendix B (cont.)

*NAS9-97199 RESEARCH
AND LOGISTICS MISSION
SUPPORT CONTRACT*

Firm-Fixed-Price Contract for \$42.86 million for the basic contract
Period of Performance: December 18, 1997-July 12, 2000

The basic contract covers lease of a single module for STS 95 (55 percent of the capacity to be used by NASA for scientific experiments), lease of a double module for STS 96 (100 percent of the capacity to be used by NASA as a logistics carrier), and a double science module for STS 107 (82 percent of the capacity to be used by NASA). Four options were priced; each added a fourth mission with varying module configuration and NASA usage.

TRANSPORTATION COSTS FOR NON-NASA PAYLOADS

Transportation Costs for Modification 34 to the SPACEHAB Phase One Contract

Paragraph 6.3.1 of the prenegotiation position memorandum prepared in connection with Modification 34 to NAS9-19250 is shown below. This paragraph describes the methodology and calculations used to arrive at fair and reasonable transportation costs for two non-NASA experiments flown on STS 84.

The Contracting Officer, in conjunction with HQ [Headquarters] Code M used the SSDA cost model in developing the Objective position for transportation costs. The SSDA model takes the total experiment weight (225 lb.) divided by the SPACEHAB load capability weight (6500 lb.). Then the model takes the total SPACEHAB module weight (18,914 lb.) and divides it by the total payload capability weight (65,000 lb.) The model then multiplies the percentage of available SPACEHAB weight used by the experiments (3.5%) with the percentage of payload bay capacity used by the SPACEHAB module (29.1%). The total cargo bay capacity used by the experiments is then multiplied by the SSDA developed cost per flight attributable to payloads (\$165,000,000). The equations are as follows:

$$\begin{aligned}
 225 \text{ lb.}/6,500 \text{ lb.} &= 3.5\% \text{ [use factor]} \\
 18,914 \text{ lb.}/65,000 \text{ lb.} &= 29.1\% \text{ [payload load factor]} \\
 3.5\% \times 29.1\% &= 1.0185\% \\
 \$165,000,000 \times 1.0185\% &= \$1,680,000
 \end{aligned}$$

Basic SSDA Methodology Used to Calculate Transportation Costs for ReALMS Contract

To perform our calculations, we maintained the \$165 million cost per flight and inserted into the formula above the weights applicable to STS 95 and STS 107. The calculations show that total transportation costs for STS 95 and STS 107 should have been about \$27.32 million, not \$8.2 million as provided for under the ReALMS contract. The table shows the weights applicable to STS 84, STS 95, and STS 107.

STS 95:

$$\begin{aligned}
 2,160/4,800 &= 45\% \\
 11,000/55,000 &= 20\% \\
 45\% \times 20\% &= 9\% \\
 9\% \times \$165 \text{ million} &= \mathbf{\$14.85 \text{ million}}
 \end{aligned}$$

STS 107:

$$\begin{aligned}
 1,620/9,000 &= 18\% \\
 18,914/45,000 &= 42\% \\
 18\% \times 42\% &= 7.6\% \\
 7.6\% \times \$165 \text{ million} &= \mathbf{\$12.47 \text{ million}}
 \end{aligned}$$

Cost Model Weights And Transportation Costs For Non-NASA Payloads

Cost Model Factors	Mission ¹ STS 84 (Double Module)	Mission ² STS 95 (Single Module)	Mission ² STS 107 (Double Module)
Total Experiment Gross Weight	225 lb.	2,160 lb.	1,620 lb.
SPACEHAB Load Capability (Gross)	6,500 lb.	4,800 lb.	9,000 lb.
SPACEHAB Module Gross Weight with Payload	18,914 lb.	11,000 lb.	18,914 lb.
Total Shuttle Payload Lift Capability	65,000 lb.	55,000 lb.	45,000 lb.
Transportation Costs for Non-NASA Payloads	\$1.68 million	\$14.85 million	\$12.47 million

¹Weights and cost presented in the prenegotiation position memorandum for Modification 34 to NAS9-19250.

²Weights applicable to transportation costs for STS 95 and STS 107 and transportation costs calculated by OIG auditor.

Cost Model Weights and Mission Price Can Vary

- The “use factor” can vary according to the capacity allocated to NASA and non-NASA payloads. For example, NASA is allocated 55 percent on STS 95 and 82 percent on STS 107. The remainder, 45 percent and 18 percent, respectively, is allocated to non-NASA use.
- The “payload load factor” compares the total SPACEHAB module weight to the Shuttle capability.

The weight of the SPACEHAB module varies with the type of module used. A single module weighs 11,000 pounds, and a double module weighs 18,914 pounds. NASA contracts for the single or double module, depending on how much pressurized capacity is required for a mission.

Shuttle capability can vary from 35,000 to 65,000 pounds between flights.

- The Shuttle flight price can be based on marginal costs (only those costs associated with the current mission, excluding hardware development costs, etc.) that can range from \$100 million to more than \$400 million. Modification 34 to the SPOC used \$165 million. The ReALMS contract calculations used \$100 million per flight in 1996 dollars, escalated at 2.9 percent per year, or \$106 million.

Comparison of Basic Formula (A) and Variation Used (B) for ReALMS Contract

(A) - STS 95 using basic formula (retaining \$165 million Shuttle flight price used for SPOC Mod. 34)

$2160/4,800 = 45\%$	Experiment weight divided by SPACEHAB load capability.
$11,000/55,000 = 20\%$	SPACEHAB module weight divided by Shuttle payload capability.
$45\% \times 20\% = 9\%$	Percentage of payload bay capacity multiplied by experiment weight.
$\% \times \$165 \text{ million} = \mathbf{\$14.85 \text{ million}}$	Capacity used by experiment multiplied by cost attributable to payloads.

(B) - STS 95 as described in Price Negotiation Memorandum (using \$106 million Shuttle Flight Price)

$2,160/55,000 = 3.93\%$	Experiment weight divided by Shuttle payload capability.
$3.93\% \times \$106 \text{ million} = \mathbf{\$4.2 \text{ million}}$	Capacity used by experiment multiplied by cost attributable to payloads.

Conclusion: Two factors account for the difference in the calculated transportation costs. First, formula B varies from the basic formula A by omitting the step recognizing the SPACEHAB module weight. Consequently, the weight of SPACEHAB hardware necessary to fly the experiment is not taken into consideration. Secondly, \$106 million was used as the Shuttle flight price in formula B instead of \$165 million as used for formula A and Modification 34 of the SPOC. Similar differences occur for STS 107 calculations.

PREVIOUS OIG REPORTS REGARDING SPACEHAB

<p><i>RE-EVALUATION OF THE SPACEHAB CMAM CONTRACT KE-93-008 September 30, 1993</i></p>	<p>In view of SPACEHAB's inability to secure commercial customers and its unwillingness to provide proof of ability to pay future STS fees, we recommended that the Associate Administrator for Advanced Concepts and Technology justify continued support of the CMAM contract and if continued support was not justified, limit FY 1994 funding to completion of Flight 2. The Agency concurred with the recommendation and provided justification for continued support based solely on fulfilling the needs of the Centers for Commercial Development of the Space program. The OIG expressed concerns about SPACEHAB's ability to secure commercial customers which the Agency did not address in its response.</p>
<p><i>IMPACTS OF THE SPACEHAB CMAM FISCAL YEAR 1994 APPROPRIATION SHORTFALL KE-94-002 February 17, 1994</i></p>	<p>The OIG concluded that because of SPACEHAB's financial dependency on NASA, the appropriation shortfall would have a significant impact on SPACEHAB's program. Various options were being considered to address the shortfall, including termination of the contract for convenience of the Government. We recommended that steps be taken to prevent this action since it was not in NASA's best interest. The Agency concurred with the recommendation and initiated steps to address OIG concerns.</p>
<p><i>CMAM CONTRACT NEGOTIATED PRICE KE-95-009 March 20, 1995</i></p>	<p>Special circumstances, such as the requirement to foster commercialization of space, were cited by Headquarters and JSC procurement officials as justification for approval of deviations and liberal treatment of contract elements in favor of the contractor. We recommended that the Associate Administrator, Office of Procurement, should (1) ensure that deviations aimed at fostering the commercialization of space are approved only when they are in compliance with applicable cost and procurement regulations and are in NASA's best financial interest; and (2) ensure that construction costs recovered by SPACEHAB under the CMAM contract be considered when negotiating subsequent contracts. The Agency concurred with both recommendations.</p>

Appendix D (cont.)

*SELECTED SECURITY RISKS
TO THE SPACE SHUTTLE AND
CREW
KE-95-008
March 20, 1995*

This report addressed concerns that some commercial payloads flown under the CMAM project pose security vulnerabilities to the Space Shuttle and crew. Specifically, sealed or self-contained payloads delivered directly to the Shuttle prior to launch were not subject to NASA's usual integration procedures. Consequently, NASA did not have reasonable assurance that the lowest feasible level of risk had been provided for these payloads. The Office of Space Flight responded that although there may be security risks associated with commercial payloads, these risks are unavoidable. Further, with the decision to use SPACEHAB in support of the Shuttle/Mir program, there's little chance that truly commercial payloads will be flown in the SPACEHAB module.

*SPACEHAB COMMERCIAL
MIDDECK AUGMENTATION
MODULE PROJECT
KE-96-002
October 27, 1995*

This report summarizes audit work performed under assignments A-KE-93-009 and A-KE-94-012 that resulted in the reports listed above. No additional issues were presented in this report.

MANAGEMENT'S RESPONSE

National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001



Copy to Attn of

M-7

JUL 24 1998

TO: W/Assistant Inspector General for Auditing
FROM: M/Associate Administrator for Space Flight
SUBJECT: Comments to Draft Report on the Audit of Transportation Costs for Non-NASA Payloads Flown in the Spacehab Module (Assignment Number A-HA-98-041)

The Office of Space Flight appreciates the opportunity of reviewing a draft of the subject audit. We have requested the Johnson Space Center procurement organization responsible for this procurement to review the draft report and respond to the methodology used in determining transportation charges. Their comments are contained in the enclosure and are offered as clarification/correction to the draft report.

The Space Systems Development Agreement between NASA and Spacehab, Inc. was developed to serve as the contract between NASA and Spacehab, Inc. (customer) wherein launch costs and associated services to be furnished to the customer were identified for recovery by the U.S. Government. As such, the transportation pricing considerations (use factor, load factor, charge factor, shared flight price) were developed on the premise that Spacehab, Inc. would be the primary customer and NASA would/could be a user but not the primary user. To date, the commercial market has not been fully realized and NASA has become the primary user and customer for the Modules.

We fully concur in the recommendation, on developing and providing future guidance for calculating transportation fees for commercial payloads flown in the Spacehab module. At this time we have no definitive plans to contract with Spacehab, Inc. beyond the existing contract (NAS 9-97199) that would allow commercial use of a portion of the module's capability.

We are in the process of developing a Plan for Commercialization of the International Space Station and Spacehab, Inc. has indicated a desire to participate. The overall goal of commercialization is not only to allow the private sector to grow new profitable industries in space, but to do it in a manner which reduces NASA's overall costs under fair and reasonable terms. We are working toward the development of this plan and expect to have it available by early September 1998.

If there are any questions, please contact John Castellano, at 358-4423 who is the point of contact for this activity.


Joseph H. Rothenberg

Enclosure

cc:
B/Mr. Holz
G/Mr. Frankle
J/Mr. Sutton
JSC/BA/Mr. Shannon

**COMMENTS TO DRAFT REPORT ON THE AUDIT OF TRANSPORTATION
COSTS FOR NON-NASA PAYLOADS FLOWN IN THE SPACEHAB MODULE
ASSIGNMENT NUMBER A-HA-98-041**

The comments listed below are submitted for clarification and/or correction to statements of facts contained within the draft report.

- A. Appendix C, Page 8 - Heading "Basic Formula Used....." should read "Basic SSDA Methodology Used...." to clarify whose basic method was used to calculate costs.
- B. Appendix C, Page 8, first line in second section - Should read, "To perform our calculations, we maintained the \$165 million cost per flight and inserted into the formula above...."
- C. Appendix C, Page 9 - the table is incorrect. Gross weights were used to calculate Transportation Costs in Mod. 34 for STS-84, not net weight. So the data for STS-95 and -107 is in error, as well as note 3 under the table. The "Cost Model Factors" column in the table should read (top to bottom): "Total Experiment Gross Weight", "SPACEHAB Payload Capability (Gross)", "SPACEHAB Module Gross Weight w/ Payload", and "Total Shuttle Payload Lift Capability".
- D. Appendix C, Page 9, Cost Model Weights and Mission Price Can Vary section - the "NASA Use Factor" and "Payload Load Factor" terms introduced in this section are common to the SSDA formula, but the formula itself is missing. Somewhere in Appendix C the SSDA Formula should be presented and explained, since so much reliance is placed on it in the report. Oblique references like this are just confusing.
- E. Appendix C, Page 9, last bullet, last sentence - should read, "The ReALMS contract calculations used \$100M per flight in 1996 dollars, escalated at 2.94% per year." Comment - The report mentions a range from \$100M to \$400M per flight.
- F. Appendix C, Page 10 - Example B uses \$105M in title and \$100M in calculation. Should be \$100M throughout.
- G. Appendix C, Page 10, Conclusion - Second sentence should read, "First, formula B was varied by omitting the step recognizing the SPACEHAB module weight in formula A." Last sentence should read, "Secondly, \$105 million was used as the Shuttle flight price in formula B instead of the \$165 million used for formula A and Mod 34 of the SPOC."

Note: All page numbers cited above have changed in the final report; they advanced by one page number.

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Budget Examiner, Energy Science Division, Office of Management and Budget
Associate Director, National Security and International Affairs Division,
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Chairman and Ranking Minority Member - Congressional Committees and Subcommittees

Senate Committee on Appropriations
Senate Subcommittee on VA, HUD, and Independent Agencies
Senate Committee on Commerce, Science and Transportation
Senate Subcommittee on Science, Technology and Space
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on VA, HUD, and Independent Agencies
House Committee on Government Reform and Oversight
House Committee on Science
House Subcommittee on Space and Aeronautics

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