ROUTING AND TRANSMITTAL SLIP Date 25 April 1986

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. [redacted]		
2. Executive Secretariat		
3. Room 7E12, HQS		
4.		
5.		

Action	File	Note and Return
Approval	For Clearance	For Conversation
As Requested	For Correction	Prepare Reply
Circulate	For Your Information	See Me
Comment	Investigate	Signature
Coordination	Justify	

REMARKS

STAT

Per your 17 April request (see Tab A), enclosed is a copy of materials used in the 18 April SIG(Space) meeting on space launch policy. An MFR summarizing the decisions reached in the meeting is also enclosed.

DO NOT use this form as a RECORD of approvals, concurrences, dispposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)

[redacted] DD/PPS (Policy)

STAT

5041-102

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FPMR (41 CFR) 101-11.206

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Next 1 Page(s) In Document Denied

DCI/ICS 86-4302
24 April 1986

MEMORANDUM FOR THE RECORD

SUBJECT: SIG(Space) Meeting, 18 April 1986

1. The subject meeting, chaired by VADM Poindexter, was held to discuss issues related to the loss of the Challenger. The meeting started at 1600 hours and lasted until 1820 hours with attendees as shown in Attachment A.

2. Before starting the meeting, VADM Poindexter asked Mr. Aldridge to give information on the Titan launch failure. Mr. Aldridge stated that a Titan 34D had blown up earlier in the day after five seconds of flight. The cause was as yet unknown.

3. VADM Poindexter started the meeting by stating that it was to be a precursor to a NSC meeting. Two SIG(Space) members, who were unable to attend, had sent memos to the Chairman. Mr. Burnley, DoT, had emphasized the need for a firm transition date for discontinuing Shuttle launch of commercial and foreign payloads. Dr. McTague, OSTP, had stated that a replacement orbiter was needed.

4. VADM Poindexter commended the IG(Space) for the report and stated that the meeting would focus on the three issues highlighted in the meeting agenda. A number of lesser issues related to bracketed items in the report would also be covered.

5. The next 45 minutes were spent discussing the commercial ELV issue. VADM Poindexter concluded this discussion by stating that all had the same objectives (i.e., they desired a transition from the Shuttle to US commercial ELV industry), but that a transition plan needed to be developed. VADM Poindexter said that he would discuss the matter with members of the Economic Policy Council (EPC). He would then request that they convene a subgroup (as they had in the past under the Cabinet Council on Commerce and Trade) to develop this plan with appropriate industry consultation. Discussion points on this subject are given in Attachment B.

6. VADM Poindexter than opened the discussion of the funding issue by noting that the President wanted to restore our space launch capability and support the Shuttle program, but that the provision of funding of the magnitude required was a serious problem. VADM Poindexter further noted that all agencies appeared to support Option 3A (the option that replaced the Orbiter by 1990 and provided an expanded DoD ELV program). VADM Poindexter

SUBJECT: SIG(Space) Meeting, 18 April 1986

then started the discussion of the funding issue by stating he understood that DoD would provide offsets for their required funding, but that NASA could not. DoD corrected him on this point and a 45-minute discussion followed (see Attachment C). VADM Poindexter concluded the discussion by asking OMB to reconvene the Budget Working Group to address the funding issue. The Working Group was to come up with innovative funding approaches for cases based on the following:

- FY 1986 and FY 1987 starts (presumably for orbiter only).
- With and without offsets.

The ground rules appeared to be:

- NASA budget authority could be requested year by year vice NASA's desire to get all of it in the first year.
- DoD would offset its outlays in FY 1986, but would not offset the FY 1986 budget authority (The policy on DoD FY 1987 offsets was unclear).

7. VADM Poindexter then turned the Group's attention to the timing of this report with respect to that of the Rogers Commission. The discussion brought out that the Rogers Commission report would be going to the printer in the middle of May. Since the NSC meeting to discuss the launch recovery plan would not be held until after the economic summit meeting (not earlier than 8 May), all agreed that consistency with the Rogers Commission report would not be a problem.

8. VADM Poindexter then turned the meeting to a discussion of the minor issues. Of these, the only significant item was the discussion of the alternate wording for the first sentence of Section II in the draft NSDD. NASA wanted continuation of the wording that stated that "the STS remains the primary launch system and a vital element of the US space launch program." The majority view was that this sentence should be changed to reflect the new goal of a more balanced national launch capability with wording of this sentence as follows: "The STS remains a key element of the US space launch program." In arguing his case, Mr. Graham pointed out that the language that he preferred was already in national policy and he was concerned that a change could be interpreted in the Congress as a lack of support for the Shuttle program. Others, however, pointed out that it was important to modify this sentence to reflect more accurately the Shuttle's new role in the US space launch program. Several compromise approaches were offered during the discussion:

(1) Replace the wording "the primary" with "a primary."

(2) Leave out the sentence entirely.

SUBJECT: SIG(Space) Meeting, 18 April 1986

The issue was not resolved, but it appeared that VADM Poindexter might want to avoid the issue completely by leaving out all general policy statements and focusing the NSDD on the implementation actions necessary for the recovery of US space launch capability.

9. VADM Poindexter concluded the meeting by reviewing the follow-up actions:

- Colonel May will redraft the NSDD to reflect the agreements reached in the meeting. (Colonel May will presumably convene a working group for this purpose.)
- Briefings will be prepared for the NSC meeting. (No specific assignments were made.)
- A draft package of materials for the Congress will be prepared. (This will presumably be based on the work of the OMB Budget Working Group.)

STAT

Deputy Director for Policy
Planning and Policy Staff

Attachments:
A. Attendees at SIG(Space) Meeting, 18 April 1986
B. Discussion of ELV Commercialization Issue
C. Decision of Funding Issue

SUBJECT: SIG(Space) Meeting, 18 April 1986

Distribution:
1 - D/ICS
1 - D/PBS
1 - AD/PPS
1 - PPS Subject (Rosen)
1 - PPS Chrono
1 - ICS Registry

DCI/ICS/PPS/ [redacted] (s) 14 April 1986 STAT

Attachment A

Attendees at SIG(Space) Meeting, 18 April 1986

Chairman: VADM John M. Poindexter

Members:

DoT: Jennifer Dorn, Madeline Johnson.
DoS: William Schneider, John Negroponte.
NASA: William Graham, Conrad Forsythe, Thomas Newman.
DoD: William H. Taft, IV, Edward Aldridge, Don Latham.
DoC: Clarence J. Brown, Courtney Stadd.
DCI: VADM E. A. Burkhalter [redacted] STAT
JCS: LtGen John H. Moellering, Maj. Tom Bishop.
ACDA: Michael Mobbs, Vigdor Teplitz.

Observers:

OMB: Randall Davis, Dan Taft, Jeff Struthers.
OSTP: Richard Johnson, Col. Maurie Roesch.
Assistant to the President, Cabinet Affairs: Al Kingon.
Assistant to the President, Policy Development: John Svahn
CEA: Thomas Moore

Executive Secretary: Col. Gerald May, Director of Space Programs, NSC Staff

Attachment B

Discussion of ELV Commercialization Issue

DoT/Dorn

- Secretary Dole has met with the CEOs of Martin Marietta and General Dynamics Astronautics. Both are very interested in entering the commercial ELV market, but they feel they need a clear signal that the Government will not compete with them for this business.

- DoT feels that transition problems should be minimal.

  -- DoT has been working on the regulatory framework for two years.

  -- A "date certain" (e.g., October 1988) is imperative. This will provide two and a half years notice to all parties.

  -- It is unlikely that the backlog will permit NASA to fly the commercial payloads on the Shuttle until the early 1990s.

NASA/Graham:

- Agrees with the overall goal and policy.

- The US commercial ELV capability does not exist now, and the transition is, therefore, a problem.

- The launch services industry is more than just the provision of hardware. There are legal problems, insurance problems, etc. An example is that NASA negotiated for two years with Hughes for a recent launch services agreement.

- NASA will help with the transition, but they believe they also have an obligation to support the US COMSAT industry. Setting a date certain would not show US support for this industry.

- NASA proposes that the Government work on a transition plan that will provide the appropriate assurances to both the ELV industry and the US COMSAT industry.

- NASA will not act as either a competitor or an impediment to the US commercial launch industry.

DoC/Brown:

- The ELV industry needs assurance that the Government will not compete.
- NASA needs to contribute its expertise in the provision of launch services for commercial payloads.
- Would like to see a six-year manifest on the table. DoC does not understand what we can and can't launch.
- US Government needs to negotiate with the ELV companies. (DoT restated their view that these firms have already been involved and are ready to transition now.)

ACDA/Mobbs:

- Whatever approach is followed, ACDA would like a provision that the SIG(Space) would review, on an annual basis, progress on commercialization and leadership goals.

State/Schneider:

- State agrees with NASA on the need for a transition plan. Hughes has stated that it will be four years before a US commercial ELV launch capability is available.
- State is concerned about the timeliness of the market's development. They don't want to force the US COMSAT industry to foreign launch vehicles.

Assistant to the President for Cabinet Affairs/Al Kingon:

- Without a clear signal to the contrary, industry would be reluctant to enter the market if they know that we are expanding NASA's and DoD's launch capacity.
- Two and a half years is ample time for a transition. As chairman of the President's Privatization Task Force, supports the DoT position.

DoT/Taft:

- A very clear signal is needed. This could be a specific date or could also be the availability of commercial capacity.

DoC/Brown:

- The problem is that nobody trusts anyone else. The potential commercial launch suppliers have strong economic ties to NASA.
- Wants clarification of the market and the potential industry capacity.

OMB/Davis:

- ELVs are not new. In the past, the Government has undercut its commitment to the creation of this industry.
- We need a strong commitment now. If the date we pick is wrong, we can revisit it at a later time.

NASA/Graham:

- Agreed again that a strong signal is needed, but that we should not send a hostile signal to the users. We need to work together to accomplish the transition as quickly as possible.

VADM Poindexter:

- All seem to have the same objectives.
- Agreed with Bud Brown's proposal that we set up an EPC group to develop a transition plan.

Taft and Graham:

- Need a firm commitment that once the industry is established, the Government will not compete.

Attachment C

Decision of Funding Issue

VADM Poindexter:

- Understands that DoD will supply offsets.

DoD/Taft:

- This is not correct. DoD can handle the problem of offsets in FY 1988 and beyond. FY 1986 and 1987 are problems.

DoS/Schneider:

- Stated that there was $1.1 billion of EX/IM bank direct loan authority in FY 1986 and some amount in FY 1987 which is equated with budget authority by Congressional Committees. EX/IM bank does not need the funds. OMB may be able to devise an approach to use this authority to offset the space launch funding.

  NOTE: OMB privately advises that they do not believe this is feasible.

VADM Poindexter:

- Can we find offsetting funds in the savings from lower fuel costs?

OMB/Davis:

- The fuel savings are small in FY 1986, but they might be larger in FY 1987.

DoD/Taft

- The fuel savings that are being discussed have already been spent many times.

JCS/Bishop

- JCS believes that the Challenger disaster was a national problem that requires a national solution. JCS does not believe that it is appropriate that Defense and NASA alone must fund the recovery plan.

NASA/Graham

- NASA believes that it can get by with about $1 billion less than shown in the IG(Space) report.

- NASA wants a full commitment for replacement orbiter funding so that the budget profile can be as efficient as possible. NASA needs about $3 billion.

DoD/Taft:

- DoD has already provided $46 billion in offsets; we can not provide any more.

OMB/Davis:

- OMB wants to fund the program starting in FY 1987. OMB sees no way to solve the FY 1986 funding problem.

VADM Poindexter:

- (After extended further discussion of Administration policy on offsets.) Changing the Administration policy offsets would be very difficult.

- Why can't we provide the NASA budget authority on a year-by-year basis?

NASA/Graham:

- Pointed out that the US Government does not buy insurance; it self-insures. The tragedy has happened, and now it is appropriate for the entire Government to provide the insurance payment, i.e., the recovery funds.

DoD/Taft:

- DoD can handle offsets for the DoD outlays required in FY 1986 (approximately $100 million). DoD can not provide offsets for the budget authority.

- 1987 is not a problem with respect to offsets. (Note: [1] Not clear whether this refers to outlays, budget authority, or both. [2] OMB has been in contact with DoD comptroller after the meeting. DoD comptroller says there will be no DoD offsets in FY 1987).

OMB/Davis:

- If the principle that we require offsets has indeed been established, OMB recommends that they reconvene the Budget Working Group to work out the details.

VADM Poindexter:

- Agrees that we should reconvene this Working Group to address the problem based on the agreements reached.

- Working Group should consider orbiter starts in either FY 1986 or 1987; it should also consider cases with and without full offsets.

- VADM Poindexter urged OMB to seek innovative approaches for identifying the budget offsets. It was implied that these need not be within the budgets of the affected agencies.

BRIEFING BOOK

BRIEFING BOOK

FOR

18 APRIL SIG(SPACE) MEETING

SIG(Space) Meeting (4/18/86)

- Subject meeting will address three issues (see Tab A).

    1. Identify funding offsets.

    2. Deciding policy changes to relieve NASA of the responsibility for launching all commercial and foreign payloads.

    3. Release of the report with the Rogers Commission report.

- Report (Tab B) is essentially complete and coordinated at the Working Group level.

    -- Agency differences are accommodated by numerous inclusions of alternate text. Alternate text inserts and their proponents are shown in brackets. Desired deletions are shown by underlines. The text has been highlighted in key sections to make it easy to locate the points of disagreement.

    -- Both the Executive Summary and the main report are complete. If time is short, suggest that you concentrate on the Executive Summary, but you may also wish to spend some time reviewing the Issues and Conclusions sections of the full report (pages 33-38).

- The report highlights four issues, three that have been the subject of Working Group debate and one being a last-minute insertion by a nonmember of the Working Group (SDIO).

    -- How can required funding be provided?

    -- When and how should NASA discontinue flying commercial and foreign payloads that do not require a manned presence?

    -- Should NASA consider the use of ELVs for civil missions?

    -- Should the decisions regarding the recovery of US space launch posture in the pre-1995 period await the conclusions of the Joint National Space Transportation and Support System Study?

The first two of these issues will be a focus of discussion at the SIG(Space).

- There is also another fundamental issue that drives the choice among the options:

    -- Should the CHALLENGER orbiter be replaced?

These issues (plus a few others that might come up) are discussed in the following pages and recommended positions are given.

List of Issues

1. How can Required Funding be Provided? (S/TK)

2. When and How Should NASA Discontinue Flying Commercial and Foreign Payloads that do not Require a Manned Presence? (FOUO)

3. Should NASA Consider the Use of ELVs for Civil Missions? (FOUO)

4. Should the Decision Regarding the Recovery of US Space Launch Posture in the Pre-1995 Period Await the Conclusions of the Joint National Space Transportation and Support System (STAS) study? (FOUO)

5. Should the CHALLENGER Orbiter be Replaced? (FOUO)

6. Should the SIG(Space) Report be Released with the Rogers Commission Report? (FOUO)

Funding

Issue: How can required funding be provided? (U)

Key Points in Report: (U)

- Funding unanticipated.
- Difficulty with GRH.
- No attempt to resolve.
- How to provide funding, including offsets, to be addressed through the budget process.
- Funds should be assessed against overall Presidential budget (NASA and DoD position).

Discussion: (S/TK)

- In last IG(Space) meeting, OMB-chaired "Mafia" Working Group was formed to address this problem separately.
- Group had one meeting with [redacted] representing DCI. No consensus was reached on the issue of offsets (see Tab C). 25X1
  - -- Issue paper for Budget Review Board (BRB) (chaired by Don Regan) was recommended and prepared (see Tab C).
  - -- ICS received draft issue paper and sent comments (see Tab C).
  - -- Do not know if issue paper was finalized.
- OMB Director Miller discussed the offset issue with Poindexter prior to the previously scheduled 7 April SIG(Space) meeting.
  - -- Poindexter did not agree to send issue paper to BRB.
  - -- Agreed instead to direct agencies to come forward with offsets (not necessarily 100 percent). This is expected in memorandum inviting members to SIG(Space) meeting and is apparently causing delays in getting the memorandum out.

[redacted] 25X1

- DoD continuing to resist identifying offsets.

  -- Informally agreed that they will provide offsets in FY 1988 and beyond. Resisting offsets in FY 1986 and FY 1987.

  - NASA has apparently put forward some candidates for offsets. OMB is not pushing them for 100 percent offsets, as they are DoD.

- We are unaware of any DoD requests for NRP identification of offsets.

  -- NRO Staff believes that DoD offsets, if any, will be outside the NRP.

- Poindexter's SIG(Space) Agenda memorandum (Tab A) states "I believe the DoD should identify full offsets." DoD does not interpret this as firm direction. DoD is prepared to discuss the policy on offsets and may have some preliminary thoughts in their hip pocket.

Recommendation: (U)

- Points in [redacted] 3 April memorandum to OMB (Tab C) are worth repeating: 25X1

  -- Cost of an acute emergency (such as the CHALLENGER accident) should not be accommodated by drawing down other planned Federal activities.

  -- Impact on budgetary process of recovery package without offsets can be minimized by citing this as an extraordinary case--an acute and unexpected emergency.

- Press for Presidential decision on the substantive recommendations first.

  -- Funding mechanisms and necessary offsets can then be worked as part of budget process. Note: DoD draft supplemental has been prepared (see Tab D).

[redacted] 25X1

Issue: When and how should NASA discontinue flying commercial and foreign payloads that do not require a manned presence?

Key Points in Report:

- Except for NASA, Working Group consensus is that STS should not be used for routine commercial deployment and that NASA will actively support and facilitate the acceptance of US commercially-offered launch services.

- Clear signal must be sent that Government will no longer compete with US private sector.

  -- Limited size of market.

  -- Uncertainty of Government's intentions.

  -- Long-term nature of capital investments.

DoT Proposal and Arguments:

After satisfying contractual commitments originally manifested for flight through FY 1988, the Government will discontinue providing launch services for commercial and foreign missions that do not require a manned presence.

- Will give industry a firm point in time when Government competition will cease.

- Matches the time when US commercial ELVs can begin to be available in volume (1988).

- Does not impact presently manifested customers.

NASA Proposal and Arguments:

An approach should be established whereby the Government would, to the best of its ability, accommodate all existing contractual commitments, but would not in the future compete with a viable and competitive US ELV industry providing launch services for commercial and foreign satellites that do not require a manned presence.

- Maintains US leadership in space launch capability.

- Provides clear signals to the private sector.

- Maintains best efforts of Government to fulfill contractual obligations for provision of launch services.

Discussion:

- Working Group has heard from potential ELV suppliers and communications satellite manufacturers. Justice has also examined NASA's services contracts to determine the extent of Government liability, should the Government attempt to terminate them.

- ELV suppliers state that they stand ready to enter the market and could have vehicles available by 1988.

  -- TCI is a potential supplier of Delta launch vehicles. Its financial staying power has limited its success to date.

  -- General Dynamics could supply Atlas vehicles. They need commitments for four vehicles before they will make the needed capital investments.

  -- Martin Marietta is in the best competitive position because they have production base for CELVs and Titan IIs.

  -- All of these suppliers will have difficulty competing with Ariane's current price, but Ariane has been raising its price recently.

- DoD's proposed procurement of ELVs for GPS could provide an additional production base for one of these ELV suppliers.

  -- DoD procurement could provide for a commercial buy.

- ELV suppliers desire a strong signal that Government will not compete.

- COMSAT manufacturers have multiple interests and concerns.

  -- Pleased with current low (subsidized) Shuttle price. Recognize that prices will go up.

  -- Concerned about Shuttle's ability to supply a launch slot in near term.

  -- Do not want to incur satellite modification costs for a new launcher.

-- Do not want to become dependent on single supplier or a foreign supplier (e.g., Ariane).

-- Believe that US ELV industry is not commercially competitive at this time.

- How to accomplish the transition from Shuttle to US commercial ELVs is indeed a serious problem.

-- DoT approach is clear and unequivocal. NASA's legal liability on unmaintained launches is open to question.

-- NASA approach gives NASA considerable room to continue in the market if they so desire.

- A viable US commercial ELV industry will benefit national security by broadening the US ELV manufacturing base.

-- DoD issue paper on this subject has been made available (Tab E). Recommend you take the time to read it.

Recommendation:

- I'm not completely pleased with either NASA's or DoT's policy formulation:

-- DoT's formulation could result in Government legal liability; this should be examined more carefully. It also does not permit NASA to provide launch services for commercial customers under any circumstances (e.g., an ELV grounding).

-- NASA's formulation, on the other hand, does not define what is meant by "in the future," does not define what is a "contractual commitment," and provides that someone (presumably NASA) will determine whether the US ELV industry is "viable and competitive" before NASA can decide to compete.

-- DoT's formulation will provide the clearest signal to the industry; NASA's formulation will ease the transition for all parties but would probably not encourage an ELV industry to develop.

- Recommend that both policy formulations be combined using guidelines as follows:

-- Eliminate reference to "viable and competitive."

-- Use NASA's formulation on not competing.

Policy language might be something like this:

"After satisfying contractual commitments originally manifested for flight through 1988 to the best of its abilities, the Government would not compete with a US ELV industry providing launch services for commercial and foreign missions that do not require a manned presence."

Issue: Should NASA consider the use of ELVs for civil missions? (OMB issue).

Key Points in Report:

- Civil offload could be substantial (perhaps equivalent to capacity of an orbiter).

- Use of ELVs for routine deployment of civil missions is consistent with strategy to offload DoD and commercial payloads.

Discussion:

- This is an issue that OMB repeatedly tried to raise for Working Group consideration. NASA resisted and it was never thoroughly addressed.

- We agree that there are a number of civil payloads that could be offloaded. Transition costs could be incurred for those that are already in development.

- NASA's main argument against this was based on launch cost. They asserted that marginal cost of Shuttle launch would always be less than that for an ELV.

- If major civil offloads were implemented, the case for a replacement orbiter would be weakened.

Recommendation:

- This is not an issue agreed to by the majority of the Working Group, and is for the most part an internal NASA issue that can be resolved later.

- If pressed to comment, we should recommend that this issue should be deleted as a separate highlighted issue in the executive summary. It can be mentioned in the main report as a possible argument against a replacement orbiter.

Issue: Should the decisions regarding the recovery of US space launch posture in the pre-1995 period await the conclusions of the Joint National Space Transportation and Support System (STAS) study?

Key Points in Report:

- STAS report due in May.
  - -- Will contain recommendations for post-1995 time frame.
  - -- Will require sizable investments in rocket and air-breather propulsion.
- These investments should be recognized as elements of near-term fiscal planning.

Discussion:

- Systems resulting from STAS report recommendations will probably not be available until close to the year 2000. These systems can not address our near- and mid-term problems and the funds for solving our immediate problems can not be traded off against the funds for these STAS proposals.

Recommendation:

- This last minute SDIO issue does not contribute to the resolution of the major SIG(Space) issues.
- Recommend that it be deleted from the report.

Issue: Should the CHALLENGER Orbiter be replaced?

Key Points in Report:

- All agree that a more diversified launch posture composed of STS and expanded use of ELVs should be established.

- Replacement orbiter contributes to nation's total launch capacity. Options with expanded ELV usage and a replacement orbiter are the only ones that eliminate the backlog before 1995 for conservative Shuttle flight rates.

- There is considerable risk inherent in operating a three-orbiter fleet. If one of the remaining orbiters is out of service for an extended period of time, a two-orbiter fleet would be inadequate to satisfy manned space flight, Shuttle-unique, and national security requirements.

Discussion:

- To make the three-orbiter fleet acceptable from a risk perspective, the nation would probably seek to offload the STS to a greater extent. This implies an increased national security use of ELVs and some attempts at a civil offload (see previous OMB issue).

- Use of ELVs significantly beyond that proposed by DoD would likely require additional investment in production and launch capacity.

- The outyear demand projections are undoubtedly overstated. NASA program adjustments (yet to be determined) will exacerbate this problem.

- National security use of ELVs may have to be increased for other reasons:

  -- Performance limitations and/or VAFB Shuttle facility closure might require one payload to transition to ELVs.

  -- Centaur safety concerns could affect some high altitude payloads currently planned for the Shuttle.

  -- DoD may modify its planning to allow for a Shuttle, down-time greater than the 12-months that is the basis for all current planning. Note: According to the press, NASA has now increased their estimate of the down-time to 18 months. We have reviewed the down-time estimates with Air Force staff. One knowledgeable individual states that a down-time of two-three years is

possible. This is based on the need to redesign and requalify the SRB joint. This would include the time to complete the design, order forgings, do machining, load propellants, manufacture the SRB, and conduct test firings. On 17 April, RADM Truly met with D/ICS and restated the NASA position that the down-time will be between 12 and 18 months. The discussion showed that this was based on a redesign approach that would not require new forgings and propellent loading.

- The accident and its ramifications are likely to have a profound near-term impact on the Shuttle and its operations:

  -- Performance could be reduced significantly by increased weight of the SRBs and from other yet to be determined fixes. Filament wound cases needed for highest Shuttle performance, appear to have design deficiencies that may preclude their effective use.

  -- Cost per launch will be increased. SRB cost may go up because Rogers Commission may recommend one-time use only. This may add $20 million/launch. Any turn-around time increase will also increase cost per launch. Factors here include additional weather conservatism, more extensive safety checks, etc.

  -- Launch capacity, related to turn-around time, is likely to decrease from preaccident estimates. NASA's preaccident planning goal of 24/year was previously thought to be optimistic by most observers outside NASA.

- The accident investigation has shown that NASA's flight qualification testing for the SRBs was deficient. NASA's review of safety-related Shuttle subsystems may turn up additional candidates for requalification and, perhaps, redesign.

  -- We understand that Rogers Commission has not turned up any major orbiter design problems.

  -- We understand that NASA's cost estimates may include a large contingency for redesign efforts.

  -- Building a replacement orbiter of the same design on an accelerated schedule may therefore be reasonable.

Recommendation:

- National security interests are best served by a robust orbiter fleet. However, our primary need is for expanded ELVs since our parochial needs can be satisfied by a three-orbiter fleet.

- We believe that a replacement orbiter will ultimately be required and that the nation should plan for it. Rogers Commission report and NASA's internal safety investigations should be completed first so that replacement orbiter can incorporate all necessary redesigns. This will also ease the near-term budget impact.

Timing/Rogers Commission

Issue: Should the SIG(Space) report be released with the Rogers Commission report?

Key Points in Report:

- Proposed recovery options treated as coherent strategies.
- Consolidated package to Congress advantageous.
- If orbiter replacement decision delayed, need to reconsider approach.
- DoD ELV-related procurements must proceed ASAP to meet critical schedules.

Discussion:

- As far as we know, proposed strategies are indeed consistent with probable Rogers Commission recommendations.
- President can decide issue on basis of current report.

Recommendation:

- Move report to President ASAP.
- Depending on President's decision, move DoD and NASA budget requests to Congress through the normal budget process.
- Report itself should not be sent to Congress, but can be used by agencies as a resource document.

Table of Contents
SIG(Space) Meeting (4/18/86)

A

EXECUTIVE SECRETARIAT
ROUTING SLIP

TO:		ACTION	INFO	DATE	INITIAL
1	DCI				
2	DDCI				
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4	D/ICS	X			
5	DDI				
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	SUSPENSE _____ Date				

Remarks To 4: for action as DCI rep to this meeting. (Please provide a copy of materials used in this meeting plus an MFR, to ES so DDCI-D can look over to get up to speed.)

STAT

Executive Secretary

17 Apr 86
Date

3637 (10-81)

WASHINGTON

THE WHITE HOUSE

C

85 APR 17 A11:

WHITE HOUSE SITUATION ROOM

EXECUTIVE 1615X 85

A

MESSAGE NO. 634 CLASSIFICATION CONFIDENTIAL PAGES two

FROM RODNEY B. MCDANIEL RBM 456-2224

(NAME) (EXTENSION) (ROOM NUMBER)

MESSAGE DESCRIPTION SIG SPACE AGENDA

NSC LOG# 90265

TO (AGENCY)	DELIVER TO:	DEPT/ROOM NO.	EXTENSION
STATE	WILLIAM SCHNEIDER	UNDER SECRETARY SECURITY ASSISTANCE & TECHN	
DEFENSE	WILLIAM H. TAFT IV	DEPUTY SECRETARY	
COMMERCE	CLARENCE J. BROWN	DEPUTY SECRETARY	
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JCS	LTG JOHN H. MOELLERING	ASSISTANT TO CHAIRMAN	
ACDA	DAVID F. EMERY	DEPUTY DIRECTOR	

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URGENT

EA 1618X-86

THE WHITE HOUSE

WASHINGTON

CONFIDENTIAL

April 17, 1986

MEMORANDUM FOR MEMBERS, SENIOR INTERAGENCY GROUP FOR SPACE

SUBJECT: SIG(Space) Agenda (U)

A meeting of the SIG(Space) will be held on April 18, 1986, 4:00-5:00 p.m., Room 208 OEOB, to discuss three major issues related to loss of the Challenger. The first is one of identifying funding offsets. We must reconcile the need to expedite recovery of U.S. space launch capabilities with the fact that we cannot submit an unfunded request to the Congress. I believe the DOD should identify full offsets, and NASA should identify appropriate additional offsets, to the extent possible, by year, for those programmatic actions that must be started. OMB has committed to assisting in the search for offsets within current budgetary limits. (C)

The second issue is deciding policy changes to relieve NASA of the responsibility for launching all commercial and foreign payloads. At the same time we must ensure a permanent role in national and international space launch operations for the commercial U.S. space launch industry. While all SIG participants agree to privatization of a commercial ELV capability, how and when such systems will be made available is an issue. I am looking to DOC, DOT and NASA to identify policy changes, options and transition plans to address this issue. (C)

I will ask the opinion of the SIG on the third issue of the release of this report with the Rogers Commission report. I urge all participants to give the interagency process renewed interest and commitment and be prepared to present your points of view at the SIG meeting. I enjoin you to continue to treat our decisions and deliberations confidential. (U)

Attendance at this meeting will be limited to principals plus one. Please call Col Jerry May (395-5022) with the names of your representatives by COB April 17, 1986. (U)

John M. Poindexter

Attachment
SIG(Space) Membership List

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CHAIRMAN: JOHN M. POINDEXTER

Members

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Secretary of Transportation

WILLIAM SCHNEIDER
Under Secretary of State for Security Assistance, and Technology

DR. WILLIAM R. GRAHAM
Acting Administrator
National Aeronautics and Space Administration

WILLIAM H. TAFT, IV
Deputy Secretary of Defense

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Deputy Secretary of Commerce

ROBERT M. GATES
Deputy Director-Designate
Central Intelligence Agency

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Deputy Director
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Office of Management and Budget

JOHN MONTAGUE
Deputy Director
Office of Science and Technology Policy

ALFRED KINGON
Assistant to the President for Cabinet Affairs

JOHN SVAHN
Assistant to the President for Policy Development

LT COLONEL TERRY MATTKE
Military Assistant/Aide to the Vice President

Executive Secretary: COLONEL GERALD M. MAY
Director of Space Programs, NSC Staff

B

for VP's Notebook

INTERAGENCY GROUP ON SPACE

RECOMMENDATIONS FOR

THE U.S. SPACE LAUNCH PROGRAM

April 14, 1986

NOT FOR RELEASE WITHOUT APPROVAL OF THE NSC

FOR OFFICIAL USE ONLY

FOREWORD

This draft report has been prepared in response to the directives received from the National Security Council Interagency Group (Space) per memorandum dated February 7th 1986, Rodney B. McDaniel to Donald P. Gregg and al., subject: IG (Space) Actions. The following members of the IG(Space) Working Group participated in the preparation:

Otho Eskin / V. Malahy	Department of State
Robert H. Brumley / C. Stadd	Department of Commerce
M. Johnson / Karlyn Daube	Department of Transportation
D. Taft / J. Struthers / A. Wu	Office of Management and Budget
	Intelligence Community Staff STAT
T. J. Bishop	Department of Defense (OJCS)
L. Nosenzo/ V. Teplitz	Arms Control and Disarmament Agency
M. Roesch / R. Johnson	Office of Science and Technology
C. O. Forsythe / D. Branscome	National Aeronautics and Space Administration (Co-Chairman)
T.P. Rona / T.E. Maultsby	Department of Defense (Co-Chairman)

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INDEX

EXECUTIVE SUMMARY

I. General

This report specifically addresses strategies for reconstituting the national space launch capability in the aftermath of the CHALLENGER accident. While this is a complex subject on its own right, there are far-reaching national implications associated with each strategy, since launch capability is a basic element of all space activities.

If the nation is constrained by a limited space launch capability, our national space goals are impacted: the perception of the U.S. as a world leader in peaceful space activities would be eroded; our ability to provide flexible and responsive launch services to critical national security missions would be impaired; it would further force reconsideration of the role of the STS in flying commercial and foreign payloads that do not require a manned presence; our ability to pursue advanced space R & D and to continue the pace of our manned spaceflight program would be reduced; and our ability to continue international cooperative programs in furtherance of our foreign policy objectives would be limited.

These implications are important for the final decision, but were for the most part considered beyond the scope of the Working Group's effort. The Working Group considered these factors in a general sense as well as reviewing the full spectrum of launch vehicle options from existing ELVs and STS through the future capabilities, such as the NASP.

[General Perspective

The loss of the CHALLENGER has serious bearing on the Nation's ability to implement the President's space policy as promulgated in NSDD-42. It disrupts the planned timetable for national security and for civil Government space missions. The disruption threatens to delay during the 1989-1995 period the transportation support for the Space Station and for the Strategic Defense Initiative-related experiments. It forces reconsideration of the role of the space shuttle in flying commercial and foreign customers' satellites. The accident also raises broader questions in regard to the Nation's means for gaining access to space with the requisite degree of assurance, flexibility and surge capability. Actions need to be defined and implemented in order to improve these attributes at an affordable cost and to enhance the public perception of these improvements. *(Alternative text by DoD, NASA, DoS)*

In addition of its well recognized contributions to national security, the U.S. space pro-gram, particularly our highly visible manned spaceflight program, has been a powerful tool for asserting leadership in international affairs. It has encouraged many nations to link their space-related efforts with ours, rather than with those of our adversaries. Failure to restore quickly a

strong and reliable national space launch capability and a vigorous manned space program will erode our position as a world leader in science and technology **at a time when the Soviet Union continues to pour large resources in their highly publicized manned space program.** Such a trend, if allowed to continue, would limit our ability to achieve foreign policy objectives through space cooperation. Already the loss of the CHALLENGER has forced the delay of many foreign and cooperative missions, and may encourage the efforts of our political adversaries and of our commercial competitors. A clear and unambiguous national commitment to maintaining the momentum of our space program would eliminate growing doubts among our foreign partners about our ability to support the Manned Space Station activities. Again, failure to act deliberately but decisively, could open opportunities for the Soviet Union. *(Alternative text by DoD, NASA, DoS)*

This report is primarily focused on policy and programmatic actions that could be taken to mitigate the near-term impact of the accident and to restore, preferably in an improved form, the space launch posture of the U.S. The attractive options require significant additional resources in the 1986 - 1993 period. Decisions on these options must be made in the broader context of our long-term space policies and objectives. Specifically, the recommendations of the Joint National Space Transportation and Support Study, conducted under NSSD-6-85, will be available in May 1986 and will call for sizeable technology investments. The National Aerospace Plane program is in the planning stage, aiming at a demonstration starting in 1994-95; it will grow into a multi-billion dollar investment by the mid-1990s, if the techno-logy proves consistently promising. The recommendations of the National Commission on Space also call for substantial increases in the Nation's space-related budgets. While the recommendations of this report should be assessed on their own merits, the associated funding commitments must be part of the broader decision of giving steadfast support to the ambitious long-term space goals of the United States. *(Alternative text by DoD, NASA, DoS); OMB strongly objects to the inclusion of the General Perspective section on the grounds that it is well beyond the scope of the Working Group's effort and contains programmatic assertions for which there is no analytical support.*]

I. Tasking. Following the Challenger accident on January 28th, 1986, the Interagency Group (Space) was tasked to evaluate the effects of the loss in space launch capability and to identify possible recovery options.

This tasking was divided into the following three areas:

a) an assessment of the near term impact of the Space Transportation System (STS) accident on the U.S. space program;

b) an assessment of the loss of an orbiter on the national space launch capability and the identification of options for reconstituting this lost capability;

c) the identification of policies and strategies to recover from the interruption of STS launch capability and minimize such effects in the future.

II. Near Term Impacts on U.S. Space Program. The STS was in the process of building up its flight rate toward the target of 24 flights a year when the accident occurred. A total of 14 STS flights had been planned for FY86 and the Challenger accident was the fifth STS flight of the fiscal year.

The remainder of the STS fleet will be grounded for at least 12 months and a backlog of unlaunched satellites will grow in direct proportion to the length of the grounding period. Once flight operations resume, a gradual buildup of the flight rate will be required before full effectiveness can be achieved with the three remaining orbiters.

Once normal flight operations have been resumed, there will be a period when missions will have to be flown on the basis of priority, rather than what had been previously scheduled. This reprioritization will continue until additional launch assets can be made available. The earliest that additional expendable launch vehicles (ELVs) could be available is 1988; the earliest that an additional orbiter could be made available is 1990.

If the STS is not grounded longer than 12 months, as assumed in this report, the near term impacts to the U.S. space program are significant, but can be held to manageable levels. Should this grounding period be significantly longer than 12 months, the impacts will become progressively more severe, and the actions to implement recovery may have to be reassessed.

III. Assessment of Reduced Launch Capacity and Recovery Options. The loss of CHALLENGER reduced the STS fleet from four to three orbiters. The U.S. use of ELVs was essentially programmed to end by 1988-89, except that the DoD was planning to continue using ELVs at a rate of about 2 STS equivalents a year through 1992.

The basic goal of the recovery / reconstitution strategy is twofold -- (1) to recover from the interruption in launch operations as efficiently and quickly as practical, consistent with safety, and (2) to rebuild a more balanced and flexible national space launch capability largely independent of failures in a single system.

Four criteria were selected for evaluating possible recovery options.

1. **Capability / Risk**. This criterion considers the number of STS equivalent launches a year that can be supported, the diversity of the assets that provide this capability, and the risk to the nation's launch capability if an interruption in launch operations should occur.

2. **Backlog / Lost Flight Opportunities**. In the near term (FY86-89) the backlog represents existing payloads whose launches have been delayed by the reduced launch capacity. In the mid term (FY90-95) the backlog represents lost flight opportunities that would have been available before the accident but have now been lost due to the reduced launch capacity. This criterion assesses the ability to reduce the backlog.

3. **Affordability**. All recovery options require funds that had not been envisioned before the CHALLENGER accident and therefore exceed the Balanced Budget Act (Gramm-Rudman-Hollings) deficit reduction targets. This criterion addresses the funding requirements without regard to how such funding would be provided. Initial cost estimates available to the Working Group for additional funding requirements, beyond those originally included in the President's budget, have been used for relative evaluation of the options. It is important to note that the funding requirements used to assess affordability are not the costs to fully implement the described options. These funding estimates will be revised during the Administration's budget review.

4. **Private Sector Launch Capability**. The commercialization of U.S. ELVs is a specific Presidential initiative, whose potential has not yet been achieved. This criterion assesses the extent to which the option specifically encourages or discourages the private investment critical to developing a domestic, commercial ELV industry.

Flight Rate. Throughout the report, two flight rates were consistently used for all assessments. The NASA planned flight rate (building to 24 flights a year with 4 orbiters) was used as a baseline. A more conservative flight rate (building to 16 flights a year with 4 orbiters) was assumed by the majority of the IG (Space) Working Group to be more appropriate for planning purposes.

Analysis of Options

All options include actions necessary to restore the remaining three orbiters to a safe operational status in as short a time as possible.

Option 1 -- Return to pre-accident baseline (four-orbiters---no additional ELVs) - This option does not improve the diversity and flexibility of the overall national launch posture since no additional ELVs (beyond those previously planned) would be procured. In addition , Option 1 does little to reduce or eliminate the STS backlog and does not encourage the development of a U.S. commercial ELV industry. Replacement of the fourth orbiter protects the Nation's capability to support critical programs requiring the presence of man in space. It also provides increased flexibility for responding to schedule changes, maintenance and refurbishment requirements. Estimated costs related to this option are about $ 3.5 Billion.

Option 2 Three-orbiters---expanded ELVs - The procurement of additional ELVs provides additional launch diversity which reduces the risk of dependence on a single launch system. However, in the event an orbiter is out of service for an extended period of time, a two-orbiter fleet would be inadequate to satisfy manned space flight, Shuttle-unique, and national security requirements. Depending on assumptions about the amount of off-loading to ELVs and the flight rates achieved by the STS, the backlog would either be reduced very slowly or continue to grow. The private U.S. ELV industry would be encouraged. Estimated costs related to this option are about $ 5.1 Billion.

Option 3A -- Four-orbiters by FY 1990---expanded ELVs - This option combines the advantages of both Option 1 and Option 2 by replacing the fourth orbiter and expanding Government ELV usage to achieve a more diversified launch capability. This option would eliminate the STS backlog by 1993 (under NASA planned flight rates) or (under more conservative flight rates) would stabilize the backlog by 1992. This option would encourage the development of a private ELV industry by offloading commercial and foreign satellites from the STS. Estimated costs related to this option are about $ 8.1 Billion and it has the highest total outlay impact in FY 1987 ($1.8 billion), [and would be the most difficult to fund with offsets because of its requirements to identify larger offsets in FY86 and 87]. *(Insert by OMB, DoT, and DoC)*

Option 3B -- Four-orbiters by FY 1991---expanded ELVs - This option is the same as Option 3A except the fourth orbiter delivery is delayed about one year to ease the impacts in meeting the deficit reduction targets imposed by the Gramm-Rudman legislation and Presidential policy. Affordability would be improved by reducing the budget authority and outlays by about $ .6 Billion in FY 87 with respect to Option 3A . Estimated costs related to this option are about $ 8.0 Billion. The backlog would be eliminated at a slightly later date, because this option provides fewer flights in 1990 and 1991. [Slightly higher risk exposure results from the one-year additional period in which only three orbiters are operational.] *(Insert by NASA, DoS and DoD)*

The summary results of the analysis are shown in the Table on Page ES - 6:

	Current Posture	OPTION 1	OPTION 2	OPTION 3A	OPTION 3B
APABILITY / RISK					
Balanced Launch Capability	NO	NO	YES	YES	YES
Number of Orbiters	3	4	3	4 (by 1990)	4 (by 1991)
Launch Capability/Diversity (Shuttle Equivalent/year)					
STS	12 - 18	16 - 24	12 - 18	16 - 24	16 - 24
Add'l DoD ELVs (1)	0	0	3 -5	3 - 5	3 - 5
Commercial ELVs	0	0	3	3	3
TOTAL	12 - 18	16 - 24	18 - 26	22 - 32	22 - 32
2. BACKLOG or LOST FLIGHT OPPORTUNITIES (NASA Planned / Conservative Flight Rates)					
Near Term FY 89 (Cum)	-33/-46	-33/-46	-28/-41	-28/-41	-28/-41
Mid-Term FY 95 (Cum) (See accompaning Graphs)	-69/-118	-35/-97	-22/-71	+ 12/-49	+ 4/-53

	$ MILLIONS		$ MILLIONS		$ MILLIONS		$ MILLIONS		$ MILLIONS	
AFFORDABILITY (2)	Budget Auth.	Budget Outlays	Budget Auth.	Budget Outlays	Budget Auth.	Budget Outlays	Budget Auth.	Budget Outlays	Budget Auth.	Budget Outlays
FY 86			494	177	798	199	1055	289	988	229
FY87			934	878	951	660	1683	1308	1051	745
REMAINDER			2053	2398	3286	4176	5364	6505	5965	7030
TOTAL NASA (3)				3844		2470		5537		5439
TOTAL DOD (4)				-364		2565		2565		2565
TOTAL				3481		5035		8102		8004

	Current Posture	OPTION 1	OPTION 2	OPTION 3A	OPTION 3B
4. Private ELV Industry Encouraged	NO	NO	YES	YES	YES

(1) The ELV increments provided by each option are in addition to the 10 CELVs currently being procured by DoD

(2) Initial cost estimates available to the Working Group for additional funding requirements, beyond those originally included in the President's budget, have been used for relative evaluation of the options. These estimates include NASA / DoD reimbursables not yet negotiated. Funding requirements used to assess affordability are not the costs to fully implement the described options. These funding estimates will be revised during the Administration's budget review.

(3) Based on NASA cost estimates (FY86 - 91) that include anomaly resolution, hardware items, flight savings, reimbursables and program adjustments.

(4) Based on DoD cost estimates (FY86 - 92) that include hardware items, reimbursables and program adjustments.

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Recommendations

The following recommendations represent the consensus of the Working Group, except as noted:

1. A more diversified national launch posture composed of the STS and expendable launch vehicles should be established and maintained to meet the full range of space launch needs and to avoid dependencies on single launch systems to the extent practical.

2. The CHALLENGER orbiter should be replaced to help ensure that a minimum of three orbiters are routinely maintained in operational service throughout the rest of this century. *(OMB, DoC and DoT reserve their positions).*

3. [Options 3A and 3B satisfy the recommendations (1) and (2) above; 3A should be considered for implementation.] *(Insert by NASA, DoD, and DoS)*

4. The STS program should emphasize those missions that best exploit the unique capabilities of the shuttle and manned spaceflight, should support research and development activities and should not be used for routine commercial and foreign satellite deployments. *(NASA reserves its position.)*

5. During the period of limited launch capacity, critical national security and civil missions, including international cooperative missions, should be given the highest STS launch priority. For other U.S. Government missions, the launch priorities should be established to reflect, as far as practical, a reasonable balance among users.

6. In the future, selected payloads, primarily national security, commercial and foreign satellites, should be offloaded from the STS to ELVs in order to improve assured access to space, to eliminate the backlog of delayed missions and to encourage the development on a domestic ELV industry. *(NASA questions timing).*

7. In order to encourage the establishment of a U.S. ELV industry based on private capital, after satisfying existing contractual commitments originally manifested for flight through FY 1988, the Government will discontinue providing launch services for commercial and foreign customers that do not require a manned presence.

[7A. In order to encourage the establishment of a U.S. ELV industry based on private capital, an approach should be established whereby the Government would to the best of its ability, accommodate all existing contractual commitments, but would not in the future compete with a viable and competitive U.S. ELV industry providing launch services for commercial and foreign satellites that do not require a manned presence.] *(NASA Alternate for (7))*

8. The STS should continue to be used to encourage commercial exploitation of space, including development of new materials, products, and services.

9. References to STS flight rates and quantities of DoD ELVs should be deleted from current national policy directives. A projection of annual flight rate goals consistent with safe and sustainable Shuttle operations should be established by NASA to provide for planning and budgeting of Government space programs.

Unresolved Issues: The following issues have been identified, but not addressed or resolved within the purview of the report:

- How can required funding be provided?

  Each option represents unanticipated funding [in excess of the spending targets established by the President and the Emergency Deficit Control Act of 1985 (GRH) and other legislation] *(NASA and DoD delete)*. No attempt was made to resolve the funding issue; rather, the question how to provide the necessary funding, including offsets as required, will be addressed separately through the Administration's budget process. [The funds required for recovery, following the disaster of the CHALLENGER accident, which impacts the whole Nation, should be assessed against the overall Presidential budget.] *(NASA and DoD position)*

- When and how should NASA discontinue flying commercial and foreign payloads that do not require a manned presence?

  It is the consensus of the Working Group that the STS should not be used for routine commercial and foreign satellite deployment *(NASA reserves its position)* and that NASA should assist potential customers in the transition to U.S. privately supplied ELVs. The Group further agrees that a clear signal must be sent to the U.S. private sector that the Government will no longer compete with the U.S. private sector for this market. The issue is one of timing.

One approach for a clear signal is that, after satisfying contractual commitments originally manifested for flight through FY 1988, the Government will discontinue providing launch services for commercial and foreign missions that do not require a manned presence. This timing was selected on the basis that it: (1) Will give the industry a firm point in time when Government competition will cease; (2) Matches the time when U.S. commercial ELVs can begin to be available in volume; and (3) Does not impact presently manifested STS customers. ***(NASA delete)***

[The alternative advocates an approach which will satisfactorily accommodate current commitments and future commercial and foreign requirements using U.S. launch systems. The Government will not, in the future, compete with a viable and competitive U.S. launch vehicle industry. This approach recognizes that transition is not a discrete event; a period of transition is required to best achieve these objectives. The timing of implementation of spectific elements of this transition may vary, and unequivocal signals will be sent for each. This approach has the merits of : (1) Maintaining U.S. leadership in space launch capability; (2) Providing clear signals to the private sector; and (3) Maintaining the best efforts of the Government to fulfill contractual obligations for provision of launch services.] ***(NASA alternative)***

o [Should NASA consider the use of ELVs for civil missions?

If a substantial volume of civil traffic could be offloaded (space science and some aspects of space station deployment / resupply), additional STS capacity could be made available for high priority missions, perhaps equivalent to the capacity of another orbiter.

One approach is to use the STS for all civil missions. Another is to use the STS for high-priority civil missions and those requiring manned presence, and not for routine deployment of civil satellites, consistent with the strategy to off-load DoD, commerical and foreign payloads.] ***(OMB and DoT issue)***

- o [Should the decisions regarding the recovery of U.S. space launch posture in the pre-1995 period await the conclusions of the Joint National Space Transporta-tion and Support System Study ?

  The Joint National Space Transportation and Support System (STAS) Study is being conducted under the mandate of NSSD-6-85 and is expected to report by May 1986 on the technologies and potentially attractive concepts for space launch and support systems in the 1995 period and beyond. While the details of the STAS report are not known at this time, it is clear that it will contain recommendations for sizeable near-term investments in both rocket and air breather propulsion technologies. These investments will be necessary to ensure the availability of cost-effective space transportation options in the post-1995 timeframe. Continued U.S. leadership in space, a major tenet of the President's various directives on national space policy, requires that provisions for these needed investments be recognized as elements of near-term fiscal planning.]

  (Issue identified by the SDIO)

Implementation

The attached draft NSDD reflects the policy recommendations listed on page ES - 7.

NATIONAL SECURITY DECISION
DIRECTIVE NUMBER

U.S. Space Launch Strategy

I. Introduction and Principles

The loss of Challenger highlighted the vulnerability of all space launch systems regardless of their redundancy, sophistication, and reliability; and demonstrated the risk of relying on any single space launch system for all U.S. access to space. This directive affirms the nation's commitment to recovering and reconstituting a sound national space launch capability and to maintaining U.S. leadership in space.

The objective of this space launch strategy is twofold -- (1) to recover from the interruption in space launch operations as efficiently and quickly as practical, consistent with safety, and (2) to rebuild a more balanced and flexible national space launch capability, largely independent of failures in a single system.

This directive [reaffirms and] *(NASA add)* updates the policies that apply to the space launch capabilities of the national security, civil, and commercial sectors; it is consistent with the basic objectives embodied in NSDD's 42, 80, 94, 144, 164, 181, and related Executive Orders, but modifies implementation as appropriate.

II. National Space Launch Capability

The Space Transportation System (STS) remains a key [the primary launch system and a vital] *(NASA alternate)* element of the U.S. space launch program. However, a balanced mix of STS and expendable launch vehicles (ELVs) is necessary to provide assurance that critical space mission capabilities can be supported regardless of specific launch vehicle availabilities.

A. CIVIL SPACE TRANSPORTATION

The Shuttle represents a capability unequaled in the world to provide routine manned access to space; this capability must be exploited in those areas that offer the greatest national return. The STS fleet should be reconstituted to maintain the Nation's capability to support critical programs requiring man, as well as to provide flexibility for responding to STS schedule changes, maintenance and refurbishment requirements. NASA will emphasize exploiting the unique capabilities of the Shuttle as well as supporting civil research and development programs.

Implementation: NASA will procure a replacement orbiter, structural spares and other lost equipment in an expeditious and cost-effective manner. Specific STS target flight rates established in previous NSDDs are no longer in effect. NASA will establish safe and sustainable flight rates to provide for planning and budgeting of Government space programs. [NASA will not maintain an ELV adjunct to the STS. When need dictates the launch of a civil mission on an ELV, NASA shall obtain these either from the DoD or the private sector.] *(OMB and DoT insert)*

NATIONAL SECURITY SPACE TRANSPORTATION

The Department of Defense will develop and maintain an adequate ELV capability to ensure that critical national security missions are not jeopardized by dependence on a single launch system. This effort will include the actions required to make selected satellites compatible with more than one launch system or other strategies to assure adequate mission availability.

Implementation: The DoD will procure additional ELVs as necessary to maintain a balanced launch capability and to provide a more assured access to space. Specific ELV quantities and flight rates established in previous NSDDs are no longer in effect. The DoD will implement assured mission capability in satellite/launch vehicle compatibility, and scheduling, and establish a launch capability for ELVs at both the East and West Coast launch sites. [The DoD will establish, jointly with NASA, a revised pricing agreement for national security missions on the STS.] *(OMB add)*

COMMERCIAL SPACE TRANSPORTATION

Consistent with previous Administration policy to encourage and facilitate a domestic ELV industry, and with the recovery strategy to be implemented, the STS will be phased out from providing commercial and foreign satellite deployments that do not require manned presence.

Implementation: (1) After satisfying existing contractual commitments originally manifested for flight through FY 1988, NASA will launch only those commercial and foreign payloads that either require a manned presence or for which there are no U.S. commercial ELV alternatives. [An approach should be established whereby the Government would, to the best of its ability, accommodate all existing contractual commitments, but would not in the future compete with a viable and competitive U.S. ELV industry providing launch services for commercial and foreign satellites that do not require a manned presence.] *(NASA alternate)* NASA will use the experience developed in working with the private sector to actively support and facilitate the acceptance of U.S. commercially-offered

launch services by existing shuttle customers. *(NASA delete)* The STS p[ricing policy for foreign and commercial customers will be reviewed and modified accordingly. (2) NASA, DoT, DoC and OMB will jointly plan and implement the transition of satellites to a commercial space launch industry; and (3) The Department of Commerce will work with NASA and OMB to create an environment that will attract commercial experimentation, development, and exploitation of unique Shuttle capabilities.

INTRODUCTION

This Interagency Group (Space) draft report responds to the National Security Council directive dated February 7, 1986 on the subject of recovery from the accidental loss of the STS orbiter CHALLENGER on January 28, 1986.

Three specific objectives have been set forth for the study reported here. First, consider, and report on, the expected impacts on the nation's capabilities to implement the national space policies. Second, summarize the recommendations made by the cognizant agencies on the ways to mitigate the immediate impact of the CHALLENGER accident on the on-going programs in the three sectors of the U.S. space activities: national security, civil, and commercial. Third, develop and assess the measures to be taken for reconstituting the U.S. means for providing assured access to space in order to accommodate the President's broad space policy objectives. The Group was encouraged to identify any longer-term policy issues that may require future consideration in the light of the CHALLENGER accident.

In broad terms, the several tasks have been completed. Two essential questions have not been answered: how will the recommendations of the Presidential Commission on the causes of the CHALLENGER accident ("Rogers Commission") impinge upon the schedule and the cost of regaining operational status of the Space Transportation System; and what are sound approaches for providing the resources recommended for the reconstitution. The Interagency Working Group has made assumptions on the effects of the Rogers Commission's recommendations and has limited its work to the identification of the funding requirements associated with the recommendations.

The main body of the report contains the essential facts, suppported by background, approach and argument. Detailed quantitative background and supporting information is provided in Appendices.

Chapter I recapitulates the background of the situation addressed by the Working Group in the period immediately following the CHALLENGER accident.

Chapter II discusses the impacts on policy implementation and the means for mitigating the impact on our immediate space launch capability prior to resumption of operations and in the following period when the 3-orbiter STS fleet is operational. Chapter III defines and assesses the options available to recover and reconstitute the U.S. space launch posture to a level adequate to support the U.S. space policy goals for the mid-to late 1990's.

Chapter IV briefly identifies the issues pertinent to the recovery / reconstitution, but which have not been explicitly addressed or resolved by the Working Group.

Chapter V summarizes the conclusions and recommendations.

I. BACKGROUND

A. The CHALLENGER Accident. In January of this year, the twenty-fifth STS mission suffered an accident that destroyed the CHALLENGER and its crew. The accident highlights the vulnerability of all space launch systems regardless of their degree of redundancy, sophistication, and reliability and demonstrates the risk of relying on any single space launch system for all U.S. access to space.

While the Presidential Commission is investigating the cause of the CHALLENGER accident, the Interagency Group (Space) has been separately charged with assessing the impact on scheduled satellite deployments and identifying appropriate launch capability recovery options. [This report was requested on an accelerated schedule to support the President's option of submitting an FY86 supplemental budget / FY87 budget amendment request for implementing recovery actions.] *(OMB delete)*

B. U.S. Space Program. The U.S. space program is composed of three independent, but highly interactive sectors -- national security, civil, and commercial. The national security and civil space programs are the direct responsibility of the U.S. Government. The commercial space activities are the responsibilities of the private sector; the government encourages and assists the commercial space sector by developing technology and providing a legal and policy environment which encourages sound investments for commercial space activities. Administration policy specifically encourages the development of a U.S. commercial space launch industry.

The national security space program is principally oriented toward deploying and operating satellite systems that provide information and support to the National Command Authority (NCA) and operational military forces. These space systems provide critical functions such as attack warning, strategic communication, environmental monitoring, global navigation, and treaty monitoring.

Civil space systems provide opportunities for basic scientific research, planetary exploration, research and development, technology applications, including operational monitoring of the earth and its atmosphere, and manned spaceflight. These systems provide technology spinoffs that enable new commercial products and services, and advance our understanding of physics, astronomy, meteorology, environmental and life sciences. The U.S. manned spaceflight program is a part of the civil space program. These programs are a visible demonstration of U.S. technological leadership and offer opportunities to share space exploration with our international partners and allies.

Commercial space systems provide services to both the public and government. These ventures exploit private capital and augment government investments in space activities. Services are sold both domestically and internationally and contribute to the image of American leadership in space and technology.

Each sector of our space program relies on basic space services -- command and control, tracking, and launch services. To date, the government has been the sole provider of space launch services; until recently launch services were based on expendable launch vehicles (ELVs) developed by the government for primarily government use. Early this decade, the space shuttle entered operations and NASA began to phase out the use of ELVs; commercial satellite operators that had previously relied on NASA's ELVs for launch began to transition their payloads to the space shuttle.

The European Space Agency (ESA) developed an ELV and spun off its production and operation to the world's first quasi-commercial space launch system. This French company, Arianespace, began offering commercial launch services in competition with other launch systems, principally the shuttle.

The Department of Defense, while transitioning the majority of its payloads to the STS, established a policy of assured access to space and is procuring a limited number of ELVs as a complement to the shuttle. This effort was specifically designed to avoid total dependence on a single space launch system for all national security satellites.

C. National Space Goals and Objectives. The U.S. has established space policy goals or objectives which provide a focus for the activities in the individual space sectors. These goals are as follows:

1. Maintain U.S. space leadership.
2. Assure critical space system support to the NCA and operational commanders.
3. Provide a more assured access to space.
4. Provide routine, cost effective space transportation.
5. Establish a permanent manned presence in space.
6. Maintain a vigorous and balanced space research and development program.
7. Encourage U.S. private sector involvement and investment in space activities.
8. Encourage commercialization of U.S. ELVs.
9. Continue international cooperation in space.

D. The Space Transportation System. The STS was developed to be the workhorse of the U.S. space launch capability. The original concept called for a fleet of five reusable orbiters, providing 60 launches a year, and reducing space transportation costs well below the costs of ELVs. During the decade that the STS was being built, its costs increased, the number of orbiters was reduced, and the projected number of launches dropped to around 24 per year.

While the concept was based on high usage, rapid turnaround, and frequent satellite recovery and refurbishment, none of these have yet fully developed. Plans for intensive usage have not been achieved; turnaround is more complex and time consuming than originally planned; and satellite recovery and refurbishment have gained slow acceptance by system designers. A reluctance to commit all U.S. space assets to sole dependence on a single launch system has led DoD to maintain an ELV capability in addition to the STS. These factors combine to undermine the economic premise that encourages flying every spacecraft on the shuttle and using the shuttle as intensively as possible to reduce the cost per flight.

The spacecraft deployment capability of the STS is only one of its features; the other major capability of the shuttle is its ability to carry man into space and support experimentation there for several days. This is the truly unique capability of the STS that cannot be matched by ELVs or any current foreign competition other than the Soviet Union. This capability has never been accounted for in the economic arguments of the STS concept. All costs were attributed to the cargo mission, and the importance of manned presence was not assigned a cost. Despite the emphasis on cargo carrying, the STS has been the centerpiece of the U.S. manned space program following Apollo/Skylab and is an essential element in satisfying the national space objectives.

E. Expendable Launch Vehicles. As the STS became operational in the early 1980s, national security and civil space systems were planned to transition from ELVs to the shuttle. Civil missions, and foreign and commercial missions launched by NASA have essentially completed this transition; the DoD and NOAA usage of ELVs was planned to continue into the 1988 timeframe.

The current DoD inventory of ELVs consists of seven (7) T34D, one (1) T34B, sixteen (16) ATLAS vehicles, and nine (9) THOR vehicles in inactive storage. NASA has four (4) completed DELTA vehicles, three (3) partially built vehicles, as well as long-lead materials for eight (8) more.

The DoD has implemented an assured access to space strategy which calls for a limited number of ELVs to augment an otherwise complete dependence on the STS. This effort included ten (10) Complementary ELVs (CELVs), which are capable of launching Shuttle-size and weight payloads. The first of these will be available in the fall of 1988. In addition, thirteen (13) TITAN II ICBMs are being refurbished to launch selected small payloads; these will first be available in the spring of 1988.

II. IMPACTS

A. Introduction. The recent STS failure has two principal effects on the U.S. space launch capability. The first is the loss of the reusable flight hardware. The second is the disruption of all STS flight operations until the cause of the CHALLENGER accident is determined and corrected. This will create a backlog of missions that will have to be worked off in addition to the normally scheduled flights. The size of this backlog will be directly proportional to the length of time the STS is grounded. Once flight operations resume, both the normal schedule and the backlog will have to be accommodated with only 75% of the planned orbiters until additional space transportation can be made available.

The types of actions that can be taken as well as the options available to decision-makers vary with time; five timeframes have been identified and considered by the study group.

The first timeframe is the grounding period defined by the length of the accident investigation and the time required to correct the cause of the STS failure. At this time, the most optimistic estimate of the grounding period is one year.

The second timeframe is the accommodation period. This period begins with the resumption of STS flight operations and continues until that time when additional launch assets (either additional ELVs or a replacement orbiter) can be brought into service. This period is characterized by reprioritizing missions and most effectively using the limited launch assets that are available. The earliest that a replacement orbiter could be available would be 1990 and the soonest that additional ELVs could be available would be 1988.

The third timeframe is the recovery period. This period could begin around 1988 when the first additional ELVs become available to assist in reducing the growing backlog of STS missions. The length of the recovery period will be determined by the operational capability of the orbiter fleet, the quantity of ELVs available, and any reduction in demand that may have resulted from payloads that have been canceled or lost to foreign competition during the disruption of STS launch operations.

The fourth timeframe is the nominal operations period. The period begins when the combination of U.S. space launch assets, both the STS and ELVs, are capable of handling each year's operational demand for launches.

The fifth timeframe is the next generation period. This period begins when new technology enables new launch systems and they enter operational service. This period is judged to be post 1995-2000, even if sizable near-term technology investments are made.

B. Impact on Launch Capability. The CHALLENGER represented one fourth of the total STS fleet. It was one of two orbiters configured to carry the CENTAUR upper stage. This reduction in the number of available orbiters will significantly impact the nation's space launch capability. The remaining orbiters will be grounded pending the determination of the cause of the accident and the subsequent repairs. The current baseline assumption is that the STS fleet will be grounded for 12 months.

Based on a 12-month grounding, the same pre-accident demand for STS flights, a three-orbiter fleet, and the previously planned NASA STS flight rate, and no procurement of additional ELVs, the following backlog of missions would develop:

TABLE II - 1 STS BACKLOG PROJECTION (NASA Planned Flight Rates)

Shuttle-Equivalent Payloads	FISCAL YEARS									
	86	87	88	89	90	91	92	93	94	95
Pre-Accident Demand	9*	17	18	24	24	24	24	24	24	24
NASA Planned Flight Rates	0	6	14	15	18	18	18	18	18	18
Backlog	-9	-20	-24	-33	-39	-45	-51	-57	-63	-69

* Does not include the five missions previously flown in FY 1986, including 51-L (CHALLENGER accident)

If more conservative flight rates are assumed, the resulting backlog is correspondingly increased:

TABLE II - 2 STS BACKLOG PROJECTION (Conservative Flight Rates)

Shuttle-Equivalent Payloads	FISCAL YEARS									
	86	87	88	89	90	91	92	93	94	95
Pre-Accident Demand	9	17	18	24	24	24	24	24	24	24
Conservative Flight Rates (three orbiters)	0	4	8	10	12	12	12	12	12	12
Backlog	-9	-22	-32	-46	-58	-70	-82	-94	-106	-118

The Complementary Expendable Launch Vehicle (CELV) being developed by the DoD could accommodate a shuttle-sized payload. Increases in production and launch rates could be achieved with additional capital investment. The first CELV will be delivered in the fall of 1988. By that time the STS is already 24 to 32 shuttle equivalent missions (depending on the flight rate assumptions) behind pre-accident demand.

The FY 1986-89 backlog consists of existing payloads, whose launches will be delayed by reduced STS launch capacity. The FY 1990-95 backlog is better characterized as "lost flight opportunities" for missions not yet funded or completely defined that could not be launched as planned as a result of the CHALLENGER loss.

Until additional ELVs can be made available in 1988, the nation will have to operate with essentially the launch capability that now exists. Therefore, the remaining orbiters, once they are released from grounding, will provide the only resources that can be reallocated to accommodate the highest priority launches over the next two years.

C. Impacts During the Accommodation Period (FY 1986-88). If the current assumption that the STS fleet will be grounded for 12 months is valid, high priority national security missions will not be significantly impacted. DoD is in the midst of transitioning its payloads to the STS; the number of DoD payloads still on ELVs lessens the impacts of the STS grounding on defense, but some of the DoD payloads will have to be flown on the shuttle, as soon as practical. Civil and commercial missions will be impacted to a greater extent. Individual missions will be slipped on the order of 3 to 15 months. Initial manifest impact charts are provided in Appendix I and a preliminary manifest, based on a 12-month grounding is provided in Appendix II.

If the STS is grounded for longer than 12 months, the impact on national security missions will become more serious and commercial and foreign customers might try to reschedule on Ariane or another ELV. Foreign partners cooperating in scientific missions, when faced with lengthy or unknown delays, may elect to develop cooperative agreements with the U.S.S.R. or China, causing complex technology transfer and foreign policy problems. No efforts were made in this study to quantify the schedule impacts for downtimes longer than 12 months.

III. RECOVERY OPTIONS

A. Objectives. Before attempting to identify possible recovery options, a basic statement of the objectives of the recovery plan should be made. Simply stated the basic goal of the recovery / reconstitution strategy is twofold -- (1) to recover from the interruption in launch operations as efficiently and quickly as practical, consistent with safety, and (2) to rebuild a more balanced and flexible national capability largely independent of failures in a single system.

B. Criteria. The following general criteria were selected for evaluating and comparing possible recovery options.

1. Capability / Risk.

In addition to adequate capacity, the U.S. space launch capability must offer a high degree of operational availability and be able to reliably satisfy the diverse requirements of all three sectors of the space program.

Time critical national security missions require assured access to space and need launch diversity to avoid total reliance on a single launch system. The majority of civil missions have become highly dependent on manned interaction and recovery of experimental equipment; they, therefore, require the unique STS capabilities. Commercial satellite operations are concerned with launch schedule availability and costs. Commercial R & D activities rely extensively upon STS capabilities.

The unique manned capability of the shuttle must be explicitly considered in addition to its ability to support launching routine cargo. Routine cargo delivery not requiring manned capability may be allocated to expendable launch vehicles. STS-unique capabilities will be required to support programs such as space station, materials processing, and other space commercialization activities; revisit/resupply missions like the Hubble Space Telescope; as well as national security missions, such as the SDI-related experiments.

Civil missions, including some with time-critical constraints (i.e., NOAA weather and remote sensing satellites) and many requiring the unique STS capabilities, are required to maintain U.S. leadership in space, in scientific research and exploration, in advanced space technology and applications and in manned space systems; to foster international cooperation in space and to facilitate and encourage private sector developments in space.

Each option is assessed on its ability to provide a balanced space launch posture throughout the rest of this century.

The risk associated with each option's launch capability is a measure of the consequences if this capability is again perturbed or interrupted. The risks posed by this possibility of interruption are different for each sector of the space program.

Elements of this risk assessment include diversity of launch capability versus reliance on a single launch system; adequate reserve capability beyond anticipated demand to accommodate interruptions in launch operations without creating an unacceptable backlog of missions; the ability of a private sector expendable launch vehicle industry to augment government launch capacity on either a routine basis or in emergency situations; adequate capacity to accommodate growth in specific requirements. Risk is especially critical for those missions that must have manned interaction and must rely solely on the shuttle since only one launch system can satisfy these requirements.

2. Backlog/Lost Flight Opportunities.

Backlog is a measure of reduced flight capacity -- the difference between the flight projections before the accident and current post-accident flight projections.

Backlog can be divided in two general categories:

-- Near-term (FY 1986-89) consisting of existing payloads whose launches will be delayed by reduced launch capability.

-- Mid-term (FY 1990-95) consisting of lost flight opportunities for planned missions not yet built.

The size of this cumulative backlog and the time required to eliminate it are indicators of the recovery capacity of each option.

A launch capability that is unable to eliminate the mid-term backlog would reduce the scope and extent of the U.S. space program in the 1990s.

3. Affordability.

The Balanced Budget Act (Gramm-Rudman-Hollings) and Presidential policy mandate that specific deficit reduction targets be met. The President's FY 1987 budget meets the targets from FY 1986-91. OMB advises that Administration policy requires any funding requests to Congress be accompanied by offsets. Initial cost estimates available to the Working Group for additional funding requirements, beyond those originally included in the President's budget, have been used for relative evaluation of the options. It is important to note that the funding requirements used to assess affordability are not the costs to fully implement the described options. These funding estimates will be revised during the Administration's budget review.

This criterion addresses the ability to fund the required costs within each budget year.

The magnitude of the required budget authority and outlays projected for FY 1986-92, and the total costs will be shown for each option, and the ability to fund each option in the currently constrained fiscal environment will be discussed.

4. Private Sector Launch Capability.

The availability of a privately funded U.S. ELV industry could represent an important element in developing a balanced U.S. space launch strategy. Even a limited commercial ELV launch capability could effectively augment government launch capacity for selected missions.

This criterion assesses the extent to which the individual option specifically encourages or discourages the private investment critical to developing a domestic, commercial ELV industry, consistent with existing Presidential policies.

C. Common Assumptions and Considerations

(1) Flight Rate Assumptions.

Throughout this report, two flight rates are consistently used for all assessments. The NASA planned flight rates were used as a baseline; this planning builds to a rate of 6 flights per orbiter per year or a total of 24 flights a year with 4 orbiters.

A more conservative flight rate was assumed by the majority of the IG(Space) Working Group to be more appropriate for planning purposes. This planning builds to a rate of 4 flights per orbiter per year, or a total of 16 flights a year with 4 orbiters.

These two flight rate assumptions represent a reasonable range of boundary conditions for the purpose of this study. In the current circumstance, conservative planning assumptions are warranted. Once new flight rate schedules are established, any significant shortfall in achieving these rates will increase the already large backlog created by the accident. Costs to the government will also increase due to program delays -- costs that can be avoided now by conservative planning.

These planning assumptions are not a ceiling; higher rates may be achieved and could permit backlogs to be reduced more quickly. Rather, they represent prudent nominal capacity to be used for more conservative program and budget planning.

For the space shuttle program, the flight rate target of 24 per year by 1989 was based on detailed NASA pre-accident plans consistent with expected technical achievements in production, launch processing, and in-flight operations. While the Working Group recognizes that such flight rate schedules may be technically feasible, they would not provide the conservative margins that are essential to reduce the risk of further serious disruption of the U.S. space program.

(2) NASA Salvage Operations and Corrective Action.

All options include actions necessary to restore the remaining three orbiters to a safe operational status in as short a time as possible, consistent with safety. This includes salvage operations, redesign, procurement, requalification of flight hardware, and additional flight instrumentation. While it is assumed that orbiter performance will not be significantly reduced as a result of these post-accident modifications, a decrease in payload lift capability may occur. Initial estimated costs for these necessary actions are included in every option considered.

(3) Initial Cost Estimates

Because of the limited time available to assess the programatic implications resulting from the STS backlog created by the loss of CHALLENGER, the costs presented for each option focus on launch system assets, such as vehicles, facilities, and payload impacts.

Effects of the near-term backlog were addressed, where possible, in terms of changes in reimbursements, STS flight savings due to lower post-accident flight rates, and program adjustments through FY 1991. These net effects tend to increase the total costs and are included with each option.

Additional effects due to potential delays in future programs or offsets from future reductions or cancellations, were beyond the scope of this effort. These unidentified effects could lower the cost impacts identified in each option but were not addressed in this study due to the limited time available.

OMB advises that Administration policy requires any funding requests to Congress be accompanied by offsets. No offsets were used in developing the cost estimates. Estimated costs used to compare the options are not meant to preempt the responsible agencies' efforts to finalize their preliminary estimates.

(4) Next Generation Technology

Consistent with the NSC tasking to the Working Group, advanced technology, such as the National Aerospace Plane, was reviewed. The operational availability of these next generation launch systems was judged to be no earlier than 1995 through 2000. Since the recovery / reconstitution period covered by this report extended only through 1995, these new systems were not considered viable candidates.

A specific study of second generation space transportation systems, the National Space Transportation and Support (STAS) Study, is being conducted in response to NSSD-6-85. This study and the other ongoing NASA and DoD technology programs must reflect the strategy adopted to solve the near and mid-term launch problems. This can be done within the normal coordination/ budget process to ensure a coherent long-term plan. [Technology investment and demonstration programs in this context may require up to $ 500 M / year for 10 years or more] *(SDIO Insert)*

(5) U.S Commercial Expendable Launch Vehicles.

In May 1983, a Presidential policy was established to encourage and facilitate development of a U.S. commercial ELV industry. This policy was based on the premise that the existence of a viable commercial ELV industry would add to the general economic vitality of the U.S. and provide it with a robust space launch capability. The policy was not fully implemented; low STS prices for commercial and foreign payloads, set in order to compete with Arianespace, precluded domestic ELV companies from gaining a share of this market.

Several of the options considered in this paper assume the availability of a U.S commercial ELV industry given proper government encouragement. The following is the status of this industry and vendor estimates of production and launch rates that could be achieved in the 1989-1990 timeframe without major capital investment in new facilities:

TITAN - 14 TITAN vehicles per year of various configurations.

ATLAS - 16 CENTAUR upper stages and 17 ATLAS vehicles per year of various configurations.

DELTA - 10 DELTA vehicles per year.

These quantities clearly exceed the available commercial and foreign market but provide strong assurance that a U.S. ELV industry could develop from existing resources. Both General Dynamics and Transpace Carriers, Inc. (TCI) have been negotiating with NASA for nearly two years, for commercial production, marketing, and launch responsibilities for the ATLAS and DELTA vehicles, respectively. Commercialization of the TITAN launch vehicles is also possible.

D. Options

The options described in this paper represent the spectrum of alternatives considered by the Working Group. Each option is described and assessed in relation to the preceding criteria.

The options addressed are:

1. Return to pre-accident baseline - replace the fourth orbiter with no change in STS goals or objectives and with no additional ELVs.

2. Three orbiters with expanded ELVs - do not replace the fourth orbiter; use the remaining three orbiters as efficiently as possible and augment launch capability with USG and commercial ELVs.

3A. Four orbiters with expanded ELVs - replace the fourth orbiter, and augment launch capability with USG and commercial ELVs.

3B. Four orbiters (delayed delivery) with expanded ELVs - the same as Option 3A except the delivery of the replacement orbiter is delayed to ease the near-term funding impact.

These options correspond to space launch strategy alternatives; they do not represent specific programs. It is important to note that the funding estimates used to assess affordability are not the costs associated with the full implementation of the described strategies. They represent current estimates of the costs associated with the major elements of these strategies.

Option 1 -- Return to Pre-Accident Baseline (Four Orbiters - No Additional ELVs)

This strategy represents the baseline option in that it would attempt to return to pre-accident conditions. The lost orbiter would be replaced using existing structural spares and the spares would be replaced. The replacement orbiter would be operational in 1990. Under this option, the shuttle would be the nation's primary space launch system.

National security and critical civil missions would be given highest priority; commercial and foreign customers would be given the next highest priority; other civil missions would be the lowest priority.

The Vandenberg STS facility would be activated on schedule and, until the delivery of the fourth orbiter, used only for those missions that require orbit inclinations unattainable from Kennedy. The existing three orbiters are thus essentially dedicated to Kennedy usage to reduce the STS backlog.

No additional ELVs beyond those currently approved (i.e., ten CELVs and 13 TITAN IIs) would be procured. NASA's commitment to three STS equivalent commercial and foreign flights per year would be retained.

The following tables show the STS backlogs under two assumptions of flight rates (i.e., **NASA planned rates** of six flights per orbiter per year and **conservative rates**, i.e., four flights per orbiter per year):

TABLE III - 1 **OPTION 1** STS BACKLOG PROJECTION (NASA Planned Flight Rates)

Shuttle-Equivalent Payloads	FISCAL YEARS									
	86	87	88	89	90	91	92	93	94	95
Pre-Accident Demand	9	17	18	24	24	24	24	24	24	24
NASA Planned Flight Rates	0	6	14	15	22	24	24	24	24	24
Backlog	-9	-20	-24	-33	-35	-35	-35	-35	-35	-35

: Not to be released without NSC approval :

TABLE III - 2 **OPTION 1** STS BACKLOG PROJECTION (Conservative Flight Rates)

Shuttle-Equivalent Payloads	FISCAL YEARS									
	86	87	88	89	90	91	92	93	94	95
Pre-Accident Demand	9	17	18	24	24	24	24	24	24	24
Conservative Flight Rates	0	4	8	10	13	16	16	16	16	16
Backlog	-9	-22	-32	-46	-57	-65	-73	-81	-89	-97

For the NASA planned flight rates, the backlog/lost opportunities remains constant at 35 for the early 1990s.

For a conservative flight rate, the backlog continues to grow and almost doubles in the first half of the 1990s.

Assessment of Option 1

Capability/Risk. This option includes only the additional launch capacity from a restored four-orbiter fleet (16 to 24 STS flights a year). The option restores the assets lost in the accident, but does not improve the diversity and flexibility of our national launch posture from the posture planned prior to the accident. It further does not meet the national security requirement for a launch capability essentially independent of failures in a single launch system. However, a four-orbiter fleet provides increased flexibility in responding to changes to payload schedules and events. The replacement orbiter helps to ensure that the STS fleet would not be reduced to two orbiters in the event that one of the three remaining orbiters was out of service for an extended period of time.

Backlog. As shown in Tables III - 1 and III - 2 this option does little to reduce or eliminate the STS backlog under either the NASA planned or conservative flight rate assumptions.

Because this option returns to the launch posture planned prior to the accident, it leaves the nation just as susceptible to future outages and does not provide the ability to recover quickly.

The decision to replace CHALLENGER must consider that elements of the shuttle fleet will inevitably experience downtime for repairs. Furthermore, it would be prudent to recognize the possibility of another major shuttle accident and to protect the nation's capability to support critical programs requiring man, like SDI and space station, in the wake of such an accident. In addition, a four-orbiter fleet provides increased flexibility in response to launch schedule changes from payload and weather delays as well as maintenance and refurbishment.

Affordability. Table B.1 shows the fiscal impact of Option 1. Cost for selected replacement items (anomaly resolution/corrective actions, replacement orbiter, Inertial Upper Stage Airborne Support Equipment (IUS ASE), and replacement structural spares) is estimated at $2.8 billion. NASA costs (including replacement items) considering flight savings, lost reimbursables, and program adjustments, are estimated at $3.8 billion. DoD impacts consist of program adjustments of about $0.3 billion and STS reimbursable credits of about $0.6 billion resulting in a net savings of about $0.3 billion. Total USG cost for Option 1 is about $3.5 billion.

NASA would require budget authority of $493 million in FY 1986 and $882 million in FY 1987. NASA outlays are projected at $177 million in FY 1986 and $867 million in FY 1987.

DoD would require budget authority of $1 million in FY 1986 and $53 million in FY 1987. DoD outlays are projected at less than $1 million in FY 1986 and $11 million in FY 1987.

Option 1 is the least costly of all options in terms of total costs with a total outlay impact of $0.9 billion on the FY 1987 deficit reduction target required by Gramm-Rudman legislation.

U.S. Commercial Space Industry. Since the STS continues to fly commercial and foreign payloads, a U.S. commercial ELV industry would fail to develop.

Option 2 - Three-Orbiter / Expanded ELVs

This option does not replace the fourth orbiter, but relies on expanded use of expendable launch vehicles. The STS would provide for all manned missions and other civil and national security missions which most effectively use the capabilities of the shuttle. The option also assumes the availability of a U.S. commercial ELV industry.

The DoD would increase its procurement of CELVs and expand existing ELV production to maintain the full spectrum of launch capability required in addition to that offered by the U.S. commercial ELV industry.

An ELV launch capability would be maintained on both eastern and western test ranges. The Vandenberg STS facility would be activated on schedule and, until the delivery of the fourth orbiter, used only for those missions that require inclinations unattainable from Kennedy. The existing three orbiters are thus essentially dedicated to Kennedy usage to reduce the STS backlog.

No commercial or foreign communications satellites beyond existing contractual commitments originally manifested for flight through FY 1988 [existing contractual/legal commitments] *(NASA alternate)* would be flown on the shuttle, although the shuttle would be used to fly commercial and foreign experiments requiring manned intervention to help explore new space applications. Approximately three STS equivalents would be offloaded from the STS and would be available for launch on commercial expendable launch vehicles. A U.S. commercial ELV industry, created through private investment, would compete with foreign ELVs. The government could buy U.S. commercial launch services for selected government missions.

This offload, when combined with the DoD offload, would result in the following backlog projections:

(See Tables III - 3 and III - 4 Page 22)

TABLE III - 3 **OPTION 2** STS BACKLOG PROJECTION (NASA Planned Flight Rates)

Shuttle-Equivalent Payloads	FISCAL YEARS									
	86	87	88	89	90	91	92	93	94	95
Pre-Accident Demand	9	17	18	24	24	24	24	24	24	24
DoD Offloads	0	0	0	-2	-3	-2	-4	-5	-5	-5
C & F Offloads	0	0	0	-3	-3	-3	-3	-3	-3	-3
Adjusted Demand	9	17	18	19	18	19	17	16	16	16
NASA Planned Flight Rates	0	6	14	15	18	18	18	18	18	18
Backlog	-9	-20	-24	-28	-28	-29	-28	-26	-24	-22

TABLE III - 4 **OPTION 2** STS BACKLOG PROJECTION (Conservative Flight Rates)

Shuttle-Equivalent Payloads	FISCAL YEARS									
	86	87	88	89	90	91	92	93	94	95
Pre-Accident Demand	9	17	18	24	24	24	24	24	24	24
DoD Offloads	0	0	0	-2	-3	-2	-4	-5	-5	-5
C & F Offloads	0	0	0	-3	-3	-3	-3	-3	-3	-3
Adjusted Demand	9	17	18	19	18	19	17	16	16	16
Conservative Flight Rates	0	4	8	10	12	12	12	12	12	12
Backlog	-9	-22	-32	-41	-47	-54	-59	-63	-67	-71

: Not to be released without NSC approval :

Assessment of Option 2.

Capability/Risk. This option includes launch capacity from a three-orbiter fleet (12 to 18 flights per year), additional DoD ELVs (three to five STS-equivalents per year), and commercial ELVs (three STS-equivalents per year) resulting in a total national capability of 18 to 26 STS-equivalents a year, starting in FY 1989. This provides additional launch diversity beyond that planned prior to the CHALLENGER accident and satisfies the national security requirements for assured access to space for critical national security payloads. The launch vehicle diversity in this option reduces the risk of dependency on a single launch system. A three-orbiter fleet provides less flexibility in responding to changes in payload schedules and delays. In the event an orbiter was out of service for an extended period of time, a two-orbiter fleet would be inadequate to satisfy manned spaceflight, shuttle-unique, and national security requirements.

Backlog. Offloading some DoD missions from the STS and not flying commercial and foreign communication satellites beyond existing contractual commitments originally manifested for flight through FY 1988 [existing contractual/legal commitments] *(NASA alternate)* results in an adjusted demand which is depicted in Tables III - 3 and III - 4. Under these assumptions and NASA planned flight rates, the backlog would stabilize by 1989 at about 28 flights and would be reduced by approximately 2 shuttle equivalents per year beginning in 1992. If conservative flight rates are used, then the backlog continues to grow by approximately four STS-equivalents a year through 1995.

Affordability. Table B.2 shows the fiscal impact of Option 2. Cost for selected replacement items (anomaly resolution/corrective actions and IUS ASE is estimated at $0.4 billion. NASA costs (including replacement items) considering flight savings, lost reimbursables, and program adjustments, are estimated at $2.5 billion. DoD costs include program adjustments, launch recovery plans estimated at $4.3 billion, and reimbursable credits of about $1.7 billion for a total DoD cost of about $2.6 billion. Total USG cost for Option 2 is estimated at about $5.0 billion.

NASA would require budget authority of $236 million in FY 1986 and $150 million in FY 1987. NASA outlays are projected at $87 million in FY 1986 and $219 million in FY 1987.

DoD would require budget authority of $562 million in FY 1986 and $801 million in FY 1987. DoD outlays are projected at $112 million in FY 1986 and $441 million in FY 1987.

Option 2 requires more funding than Option 1, with a total outlay impact in FY 1987 of $ .7 Billion. Option 2 is the least difficult to fund with accompanying offsets and has the least to the Gramm-Rudman deficit reduction target for FY 1987.

U.S. Commercial ELV Industry. This option supports the development of a U.S. commercial ELV industry. Without direct competition from the government for routine commercial and foreign communications satellite launches and with proper government encouragement, this industry should be competitive in the world market. DoD could buy commercial launch services for those classes of defense missions that do not have high security requirements. Potentially, some civil satellites could also use commercial ELV launch services. This government business would enhance a sound economic base and contribute to competitive commercial prices. This option would implement the President's ELV commercialization policy by enabling the establishment of a U.S. commercial launch industry to augment government's launch systems. This industry could provide emergency relief in those cases when government launch systems were grounded for protracted periods of time. No direct government funds are required to maintain this capability. A U.S. commercial launch industry could also maintain and enhance the U.S. competitive position in the international market, particularly if the dollar/French franc exchange rate remains favorable.

Option 3A -- Four-Orbiters by FY 1990 / Expanded ELVs

This option replaces the fourth orbiter and delivers it by 1990, increases the DoD procurement of ELVs, and reserves the STS essentially for government use and those missions requiring unique STS capability. The option also assumes the availability of a U.S. commercial ELV industry.

After satisfying existing contractual commitments, originally manifested for flight through FY 1988, [After current commitments are met] *(NASA alternate)* routine commercial and foreign satellite deployments not requiring manned presence would not be deployed by the shuttle. New commercial exploitation requiring manned interaction (i.e., materials processing and experimentation) would be encouraged on the STS. DoD would continue to use the STS for those high priority missions where the payloads cannot be effectively reconfigured for ELVs or where man's presence is required as well as in contingencies when ELVs are grounded. National security missions would rely equally on both the STS and ELVs.

Civil missions tend toward designs that take advantage of the unique manned capabilities of the orbiters and therefore rely heavily on the use of the STS. However, both DoD and commercial ELVs would be available for civil use.

An ELV launch capability is maintained on both the eastern and western test ranges. The Vandenberg STS facility would be activated on schedule and, until the delivery of the fourth orbiter, used only for those missions that require inclinations unattainable from Kennedy. The existing three orbiters are thus essentially dedicated to Kennedy usage to minimize the STS backlog.

Commencing in FY 1989, Defense would launch additional ELVs ranging from two to five STS-equivalents per year (see Tables III - 5 and III - 6). This offload, when combined with the elimination of three equivalent STS flights a year for commercial and foreign customers, beginning in FY 1989, would reduce the demand for shuttle flights to about 16 a year by FY 1993.

TABLE III -5 **OPTION 3A** STS BACKLOG PROJECTION (NASA Planned Flight Rates)

Shuttle-Equivalent Payloads	FISCAL YEARS									
	86	87	88	89	90	91	92	93	94	95
Pre-Accident Demand	9	17	18	24	24	24	24	24	24	24
DoD Offloads	0	0	0	-2	-3	-2	-4	-5	-5	-5
C & F Offloads	0	0	0	-3	-3	-3	-3	-3	-3	-3
Adjusted Demand	9	17	18	19	18	19	17	16	16	16
NASA Planned Flight Rates	0	6	14	15	22	24	24	24	24	24
Backlog	-9	-20	-24	-28	-24	-19	-12	-4	+ 4	+ 12

TABLE III - 6 **OPTION 3A** STS BACKLOG PROJECTION (Conservative Flight Rates)

Shuttle-Equivalent Payloads	FISCAL YEARS									
	86	87	88	89	90	91	92	93	94	95
Pre-Accident Demand	9	17	18	24	24	24	24	24	24	24
DoD Offloads	0	0	0	-2	-3	-2	-4	-5	-5	-5
C & F Offloads	0	0	0	-3	-3	-3	-3	-3	-3	-3
Adjusted Demand	9	17	18	19	18	19	17	16	16	16
Conservative Flight Rates	0	4	8	10	14	16	16	16	16	16
Backlog	-9	-22	-32	-41	-45	-48	-49	-49	-49	-49

Assessment of Option 3A.

Capability/Risk. This option includes the launch capacity for a restored four-orbiter fleet (16 to 24 flights per year), additional DoD ELVs (three to five STS-equivalents per year), and commercial ELVs (three STS-equivalents per year) resulting in a total national capacity of 22 to 32 STS-equivalents per year starting in FY 1991. The combination of replacing the fourth orbiter and expanding government ELV usage achieves a more diversified launch capability. This option satisfies the requirement for assured access to space and the need to avoid dependencies on single launch systems. The emphasis on assuring mission capability for critical national security missions can best be satisfied by the diversified launch capability. This option allows the ability to select from various strategies (e.g., dual compatibility, mixed scheduling) to assure minimum interruption of critical national security functions, despite possible future launch vehicle outage. A four-orbiter fleet provides increased flexibility in responding to changes in payload schedules and events. The replacement orbiter ensures that the STS fleet would not be reduced to two orbiters in the event that one of the three remaining orbiters was out of service for an extended period of time.

Backlog. This option, assuming NASA planned flight rates, could support all manned missions, including space station and other civil and national security missions. Assuming that NASA-planned flight rate projections could be achieved, this reduction in combination with the availability of a replacement orbiter would allow the elimination of the backlog by 1994 (see Table III - 5). Under more conservative flight rate assumptions, the backlog would be stabilized by 1992, rather than eliminated. (see Table III - 6).

Affordability. Table B.3 shows the fiscal impact of Option 3A. Cost for selected replacement items (anomaly resolution/corrective actions, replacement orbiter, IUS ASE, and replacement structural spares) is estimated at $2.8 billion. NASA costs (including replacement items) considering flights savings, lost reimbursables, and program adjustments, are estimated at $5.5 billion. DoD costs for program adjustments, launch recovery plans, and STS reimbursable credits are about $2.6 billion. Total USG cost for Option 3A is estimated at about $8.1 billion.

NASA would require budget authority of $493 million in FY 1986 and $882 million in FY 1987. NASA outlays are projected at $177 million in FY 1986 and $867 million in FY 1987.

DoD would require budget authority of $562 million in FY 1986 and $801 million in FY 1987. DoD outlays are projected at $112 million in FY 1986 and $441 million in FY 1987.

Option 3A requires the most funding of all options and has the highest total outlay impact in FY 1987 at $1.3 billion. Option 3A has the greatest impact to the FY 1987 deficit reduction target required by Gramm-Rudman legislation and would be the most difficult to fund with accompanying offsets.

U.S. Commercial ELV Industry. This option supports the development of a U.S. commercial ELV industry. Without direct competition from the government for routine commercial and foreign communications satellite launches, with proper government encouragement, this industry should be competitive in the world market. DoD could buy commercial launch services for those classes of defense missions that do not have high security requirements. Potentially, some civil satellites could also use commercial ELV launch services. This government business would enhance a sound economic base and contribute to competitive commercial prices. This option would implement the President's ELV commercialization policy by enabling the establishment of a U.S. commercial launch industry to augment government's launch systems. This industry could provide emergency relief in those cases when government launch systems were grounded for protracted periods of time. No direct government fund are required to maintain this capability. A U.S. commercial launch industry could also maintain and enhance the U.S. competitive position in the international market, particularly if the dollar/French franc exchange rate remains favorable.

Option 3B -- Four- Orbiters By FY 1991 / Expanded ELVs

This option is the same as 3A except that the fourth orbiter delivery is delayed approximately 1 year. The additional orbiter procurement would proceed on a slower schedule to ease the impacts in meeting the deficit reduction targets imposed by the Gramm-Rudman legislation and Presidential policy.

With this option, the backlog under NASA planned flight rate assumptions, would be eliminated by 1995. More conservative flight rate assumptions would allow stabilization of the backlog by FY 1992.

TABLE III - 7 **OPTION 3B** STS BACKLOG PROJECTION (NASA Planned Flight Rates)

Shuttle-Equivalent Payloads	FISCAL YEARS									
	86	87	88	89	90	91	92	93	94	95
Pre-Accident Demand	9	17	18	24	24	24	24	24	24	24
DoD Offloads	0	0	0	-2	-3	-2	-4	-5	-5	-5
C & F Offloads	0	0	0	-3	-3	-3	-3	-3	-3	-3
Adjusted Demand	9	17	18	19	18	19	17	16	16	16
NASA Planned Flight Rates	0	6	14	15	18	20	24	24	24	24
Backlog	-9	-20	-24	-28	-28	-27	-20	-12	-4	+4

TABLE III - 8 **OPTION 3B** STS BACKLOG PROJECTION (Conservative Flight Rates)

Shuttle-Equivalent Payloads	FISCAL YEARS									
	86	87	88	89	90	91	92	93	94	95
Pre-Accident Demand	9	17	18	24	24	24	24	24	24	24
DoD Offloads	0	0	0	-2	-3	-2	-4	-5	-5	-5
C & F Offloads	0	0	0	-3	-3	-3	-3	-3	-3	-3
Adjusted Demand	9	17	18	19	18	19	17	16	16	16
Conservative Flight Rates	0	4	8	10	12	14	16	16	16	16
Backlog	-9	-22	-32	-41	-47	-52	-53	-53	-53	-53

Assessment of Option 3B.

Capability/Risk. Because of the capacity provided by an additional shuttle, manned flights, and unmanned payloads requiring the unique capabilities of the shuttle would have greater flight opportunities. The overall U.S. launch posture would be strengthened by the purchase of additional ELVs for DoD missions and the availability of a U.S. commercial ELV industry. Greater diversity and flexibility would be provided for the U.S. spacé launch program due to the replacement of the orbiter, increased DoD use of ELVs, and a strong market incentive for private investment in commercial ELVs. Slightly higher risk exposure results from the one year additional period in which only three orbiters are operational.

Backlog. This option, assuming NASA planned flight rates, could provide for all manned missions, including space station, and other civil and national security missions while eliminating the backlog of planned missions before FY 1995.

As with Option 3A, at conservative flight rates, this option would stabilize the backlog of lost flight opportunities by the early 1990s. Under this option some civil government payloads may be further delayed as a result of delivering the fourth orbiter about one year later.

Affordability. Table B.3 shows the fiscal impact of Option 3B. Cost for selected replacement items (anomaly resolution/corrective actions, replacement orbiter, IUS ASE, and replacement structural spares) is estimated at $3.1 billion. NASA costs (including replacement items) considering flight savings, lost reimbursables, and program adjustments, are estimated at $5.4 billion. DoD costs for program adjustments, launch recovery plans, and STS reimbursables are about $2.6 billion. Total USG cost for Option 3B is estimated at about $8.0 billion.

NASA would require budget authority of $426 million in FY 1986 and $250 million in FY 1987. NASA outlays are projected at $117 million in FY 1986 and $304 million in FY 1987.

DoD would require budget authority of $562 million in FY 1986 and $801 million in FY 1987. DoD outlays are projected at $112 million in FY 1986 and $441 million in FY 1987.

Option 3B has a total outlay impact in FY 1987 of $ 0.7 Billion, reduces the NASA outlay impact in FY 1987 of Option 3A by $0.6 Billion with about a one year delay, reducing the fiscal impact to the FY 1987 deficit target required by Gramm-Rudman legislation. Option 3B would be less difficult to fund with accompanying offsets than Option 3A; it would be slightly more difficult to fund than Option 2.

U.S. Commercial ELV Industry. This option supports the development of a U.S. commercial ELV industry. Without direct competition from the government for routine commercial and foreign communications satellite launches, with proper government encouragement, this industry should be competitive in the world market. DoD could buy commercial launch services for those classes of defense missions that do not have high security requirements. Potentially, some civil satellites could also use commercial ELV launch services. This government business would enhance a sound economic base and contribute to competitive commercial prices. This option would implement the President's ELV commercialization policy by enabling the establishment of a U.S. commercial launch industry to augment government's launch systems. This industry could provide emergency relief in those cases when government launch systems were grounded for protracted periods of time. No direct government funds are required to maintain this capability. A U.S. commercial launch industry could also maintain and enhance the U.S. competitive position in the international market, particularly if the dollar/French franc exchange rate remains favorable.

	Current Posture	OPTION 1	OPTION 2	OPTION 3A	OPTION 3B
CAPABILITY / RISK					
Balanced Launch Capability	NO	NO	YES	YES	YES
Number of Orbiters	3	4	3	4 (by 1990)	4 (by 1991)
Launch Capability/Diversity (Shuttle Equivalent/year)					
STS	12 - 18	16 - 24	12 - 18	16 - 24	16 - 24
Add'l DoD ELVs (1)	0	0	3 -5	3 - 5	3 - 5
Commercial ELVs	0	0	3	3	3
TOTAL	12 - 18	16 - 24	18 - 26	22 - 32	22 - 32
2. BACKLOG or LOST FLIGHT OPPORTUNITIES (NASA Planned / Conservative Flight Rates)					
Near Term FY 89 (Cum)	-33/-46	-33/-46	-28/-41	-28/-41	-28/-41
Mid-Term FY 95 (Cum) (See accompaning Graphs)	-69/-118	-35/-97	-22/-71	+ 12/-49	+ 4/-53

AFFORDABILITY (2)	$ MILLIONS		$ MILLIONS		$ MILLIONS		$ MILLIONS		$ MILLIONS	
	Budget Auth.	Budget Outlays	Budget Auth.	Budget Outlays	Budget Auth.	Budget Outlays	Budget Auth.	Budget Outlays	Budget Auth.	Budget Outlays
FY 86			494	177	798	199	1055	289	988	229
FY87			934	878	951	660	1683	1308	1051	745
REMAINDER			2053	2398	3286	4176	5364	6505	5965	7030
TOTAL NASA (3)				3844		2470		5537		5439
TOTAL DOD (4)				-364		2565		2565		2565
TOTAL				3481		5035		8102		8004

	Current Posture	OPTION 1	OPTION 2	OPTION 3A	OPTION 3B
4. Private ELV Industry Encouraged	NO	NO	YES	YES	YES

(1) The ELV increments provided by each option are in addition to the 10 CELVs currently being procured by DoD

(2) Initial cost estimates available to the Working Group for additional funding requirements, beyond those originally included in the President's budget, have been used for relative evaluation of the options. These estimates include NASA / DoD reimbursables not yet negotiated. Funding requirements used to assess affordability are not the costs to fully implement the described options. These funding estimates will be revised during the Administration's budget review.

(3) Based on NASA cost estimates (FY86 - 91) that include anomaly resolution, hardware items, flight savings, reimbursables and program adjustments.

(4) Based on DoD cost estimates (FY86 - 92) that include hardware items, reimbursables and program adjustments.

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IV. ISSUES

The following issues were identified as requiring resolutions:

1. Funding. Although funding estimates were used to compare the relative fiscal impacts of the various options, each option represents unanticipated funding [in excess of the spending targets established by the President and the Emergency Deficit Control Act of 1985 (GRH) and the Congressional Budget Control and Impoundment Act.] *(NASA and DoD delete).* No attempt was made to resolve the funding issue; rather, the question how to provide the necessary funding, including offsets as required, will be addressed separately through the Administration's budget process. [The funds required for recovery, following the disaster of the CHALLENGER accident, which impacts the whole Nation, should be assessed against the overall Presidential budget.] *(NASA and DoD position)*

2. Restrictions of STS Competition for Commercial and Foreign Launch Services. The Working Group has agreed that the current practice of selling excess STS launch capacity within the commercial and foreign satellite market as a revenue generating practice should be discontinued. This proposed new policy would make an additional 3 STS flights a year available to reduce the backlog and provide extra capacity for future government needs. While there is no disagreement over this proposed new policy, there is an issue over the timing and definition of the commitment. Without a clear, unambiguous transition point defined by the government, as well as the precise definition of the payload categories that would no longer be flown on the shuttle, it is unlikely that private investors will take the risk of potentially competing with the government. This is due to the limited size of the market, the uncertainty of the government's intentions, and the long term nature of the capital investments required to establish the industry. Because of the backlog of STS missions resulting from the CHALLENGER accident, a commercial ELV industry would be useful as soon as practical; under the most favorable conditions, this could be 1988. This early date would only be achieved if a realistic market were available in this timeframe. The government can best influence the size of the available commercial market in this timeframe is by establishing a firm date to discontinue government competition for this market. NASA believes that it must continue to honor all its commitments to commercial and foreign customers, including those projected into the early 1990s. DoT believes that the earliest practical transition date must be established to convince the industry that they should invest now.

3. Flight Rate Planning. Presidential policy establishes an STS flight rate of 24 flights per year as a target. Throughout this report, two flight rates were used for all assessments. The NASA planned flight rates reflect their estimates of the technical capacity of the STS as a whole. The rest of the working group, while not challenging the technical capacity of the system, used a more conservative flight rate. These lower rates were believed to be more realistic for planning purposes during the recovery period in light of the many routine operational problems that are likely to continue to reduce the technically achievable capacity of 24 flights per year. The working group (with the exception of NASA) believes that a more conservative flight rate should use used for planning purposes. A lower flight rate should be planned than what is physically achievable ; this reserve capacity could be required to recovery from brief interruptions of flight operations without developing a further backlog. [No longer an issue for the SIG]

4.NASA use of ELVs for civil missions If a substantial volume of civil traffic could be offloaded (space science and some aspects of space station deployment / resupply), additional STS capacity could be made available for high priority missions, perhaps equivalent to the capacity of another orbiter.

One approach is to use the STS for all civil missions. Another is to use the STS for high-priority civil missions and those requiring manned presence, and not for routine deployment of civil satellites, consistent with the strategy to off-load DoD, commerical and foreign payloads. ***(OMB and DoT issue)***

5. [Conclusions of the Joint National Space Transportation and Support System Study The Joint National Space Transportation and Support System (STAS)Study is being conducted under the mandate of NSSD-6-85 and is expected to report by May 1986 on the technologies and potentially attractive concepts for space launch and support systems in the 1995 period and beyond. While the details of the STAS report are not known at this time, it is clear that it will contain recom-mendations for sizeable near-term investments in both rocket and air breather propulsion technologies. These investments will be necessary to ensure

the availability of cost-effective space transportation options in the post-1995 time- frame. Continued U.S. leadership in space, a major tenet of the President's various directives on national space policy, requires that provisions for these needed investments be recognized as elements of near-term fiscal planning.]

(Issue identified by the SDIO)

V. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions.

The following major conclusions were unanimously agreed to by the Working Group, except as noted.

1. CHALLENGER salvage operations and STS anomaly resolution costs must be funded regardless of the recovery/reconstitution strategy adopted.

2. The loss of CHALLENGER created a significant reduction in U.S. space launch capacity that must be restored. This launch capacity could be restored by a replacement orbiter or expendable launch vehicles or a combination of both.

3. Second generation launch systems are currently under study but could not be operationally available until after the 1995 timeframe. In addition, technology risks could well delay IOCs beyond 2000. These systems were not considered realistic alternatives for a near- to mid-term recovery/reconstitution strategy.

4. Because the production and use of ELVs were being phased out, no significant additional ELV capability could be operationally available before 1988. Until that time, all STS payloads will have to compete for the limited launch capacity of the remaining three orbiters.

5. A growing backlog of unlaunched missions is being created by the loss of one orbiter and the interruption of STS flights while the failure analysis and corrective actions are being completed. Selected missions should be offloaded from the STS to ELVs to free up additional capacity and assist in recovering from this backlog. Selected DoD missions and commercial communications satellites represent the most practical offload candidates. Civil missions tend to rely more on the unique manned capabilities of the orbiter and could not be easily offloaded. [Further study is required to examine civil offloads.] *(OMB and Dot add]* Offloading could not begin until additional ELVs become available in the 1988 timeframe.

6. A replacement orbiter could be operationally available as early as 1990 if sufficient resources are provided.

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7. The large backlog of STS flights represents delayed launches in the near term and lost flight opportunities in the longer term; these lost flight opportunities will reduce the scope of what could have been included in the U.S. space program in the early 1990s. Funding to restore the lost launch capacity will compete in part for the same funds that would be required to develop future space systems and the related payloads that would have flown. Further study will be required to understand this competition and ensure that a proper balance between restoration of launch capacity and new and existing programs is maintained.

8. A more diversified national space launch capability must be developed and maintained to reduce the impacts of any future accidents and system groundings. The nation cannot afford to rely totally on a single launch system; a launch posture must be developed that avoids dependence on single systems, to the extent practical. A variety of ELV capabilities must be established and maintained to complement the STS to ensure that all weight classes of [critical] *(NASA add)* payloads could be launched by more than one launch system if necessary.

9. Since the effects of the CHALLENGER loss impact several agencies, every effort was made to treat the proposed recovery options as coherent strategies. The advantage of presenting a consolidated package containing all the necessary actions to Congress is obvious. However, if the decision to recommend replacing the orbiter is significantly delayed, this consolidated approach needs to be reconsidered. If the additional ELV capability is to be available in the 1988-89 timeframe to meet critical DoD schedules, this activity must proceed as soon as possible.

10. The manned spaceflight program is totally dependent on the STS. While three orbiters could service all projected manned spaceflight needs, the ability to keep three orbiters routinely in service is uncertain. A future accident, significantly less severe than the loss of CHALLENGER, could reduce the fleet to only two orbiters for a protracted period of time. Such an interruption of flight operations results in significant delays and backlogs. Four orbiters would help to assure that at least three orbiters can be maintained in operational service on a routine basis.

11. The emphasis of the STS program must be on the exploitation of the truly unique capabilities of the shuttle. Previous goals of increasing the flight rates to reduce the cost per flight should be reconsidered. Cost per flight is only a measure of the cost and ignores the effectiveness of the mission. STS flights should be focused on applications that require the unique capabilities of the orbiter. If these concepts are

accepted by the Administration, a consistent rationale must be adopted by all agencies that reflects this altered set of goals and priorities or the recommended strategy will be interpreted as inconsistent with what has been defined as the "most cost effective" use of the STS. *(NASA reserves judgement)*

12. References to STS flight rates and quantities of DoD ELVs should be deleted from current national policy directives. A projection of annual flight rate goals consistent with safe and sustainable Shuttle operations should be established by NASA to provide for planning and budgeting of Government space programs.

The planning flight rates should not represent a ceiling or the maximum achievable flight rate. In any given year, a flight rate higher than planned may be flown when such rates would clearly meet program safety standards and sufficient program resources are available.

13. To help ensure that the U.S. can maintain a solid share of the international launch services market, and consistent with the President's ELV commercialization policy, the government should work to have the U.S. private sector provide these launch services and maintain U.S. private competitiveness with private capital, rather than with Government funds.

14. The critical factor in encouraging the development of a domestic ELV industry is a clear and unequivocal statement of the government's intent to not compete with the private sector for this category of foreign and commercial payloads. Without this commitment from the government, the private sector will not risk investing the capital required to establish a competitive domestic launch services industry. Existing ELV production and launch capacity, developed with government funds for previous government needs, could be converted into a commercial venture. Additional ELV capacity being developed for DoD as well as future government purchases of commercial launch services to meet selected needs would further contribute to the economic base for a U.S. commercial ELV industry.

B. Recommendations

The following recommendations represent the consensus of the Working Group, except as noted:

1. A more diversified national launch posture composed of the STS and expendable launch vehicles should be established and maintained to meet the full range of space launch needs and to avoid dependencies on single launch systems to the extent practical.

2. The CHALLENGER orbiter should be replaced to help ensure that a minimum of three orbiters are routinely maintained in operational service throughout the rest of this century. *(OMB, DoC and DoT reserve their positions).*

3. [Options 3A and 3B satisfy the recommendations (1) and (2) above; 3A should be considered for implementation.] *(Insert by NASA, DoD, and DoS)*

4. The STS program should emphasize those missions that best exploit the unique capabilities of the shuttle and manned spaceflight, should support research and development activities and should not be used for routine commercial and foreign satellite deployments. *(NASA reserves its position.)*

5. During the period of limited launch capacity, critical national security and civil missions, including international cooperative missions, should be given the highest STS launch priority. For other U.S. Government missions, the launch priorities should be established to reflect, as far as practical, a reasonable balance among users.

6. In the future, selected payloads, primarily national security, commercial and foreign satellites, should be offloaded from the STS to ELVs in order to improve assured access to space, to eliminate the backlog of delayed missions and to encourage the development on a domestic ELV industry. *(NASA questions timing).*

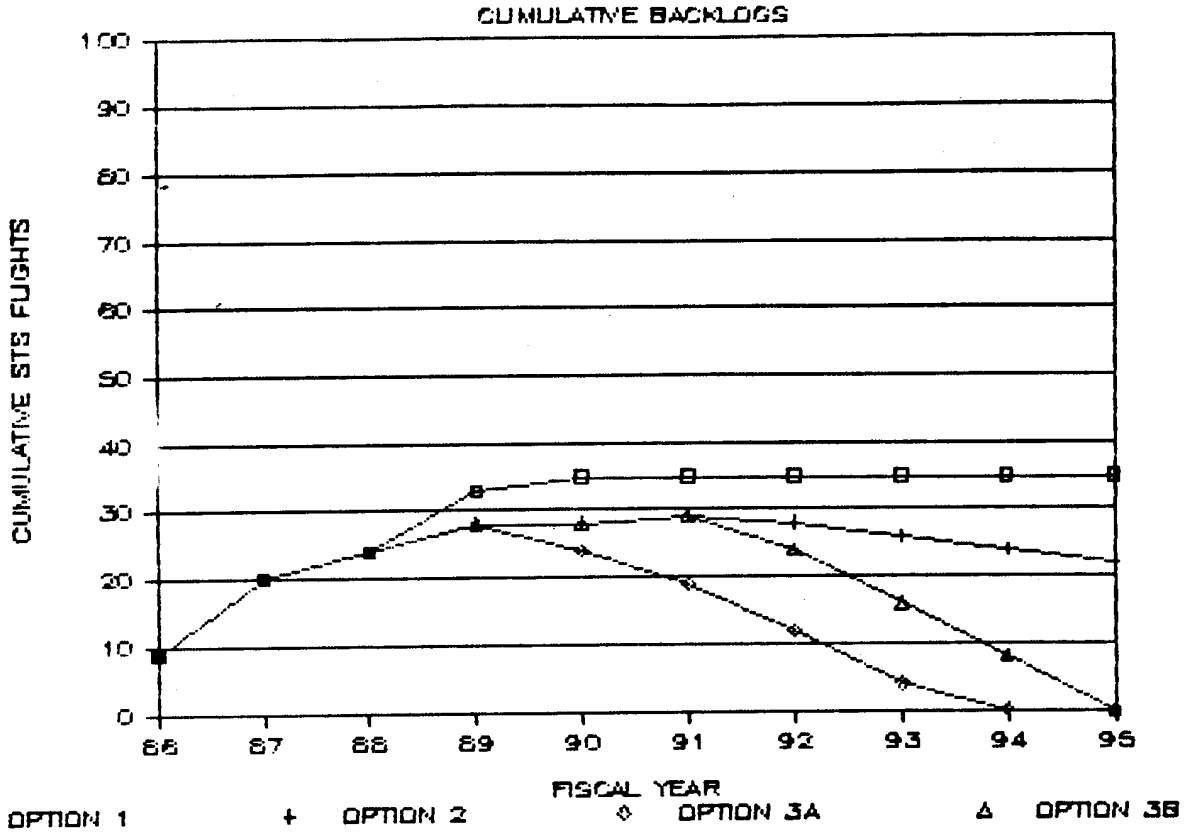
7. In order to encourage the establishment of a U.S. ELV industry based on private capital, after satisfying existing contractual commitments originally manifested for flight through FY 1988, the Government will discontinue providing launch services for commercial and foreign customers that do not require a manned presence.

[7A. In order to encourage the establishment of a U.S. ELV industry based on private capital, an approach should be established whereby the Government would to the best of its ability, accommodate all existing contractual commitments, but would not in the future compete with a viable and competitive U.S. ELV industry providing launch services for commercial and foreign satellites that do not require a manned presence.] *(NASA, Alternate for (7))*

8. The STS should continue to be used to encourage commercial exploitation of space, including development of new materials, products, and services.

9. References to STS flight rates and quantities of DoD ELVs should be deleted from current national policy directives. A projection of annual flight rate goals consistent with safe and sustainable Shuttle operations should be established by NASA to provide for planning and budgeting of Government space programs.

NASA PLANNED FLIGHT RATES



CONSERVATIVE FLIGHT RATES

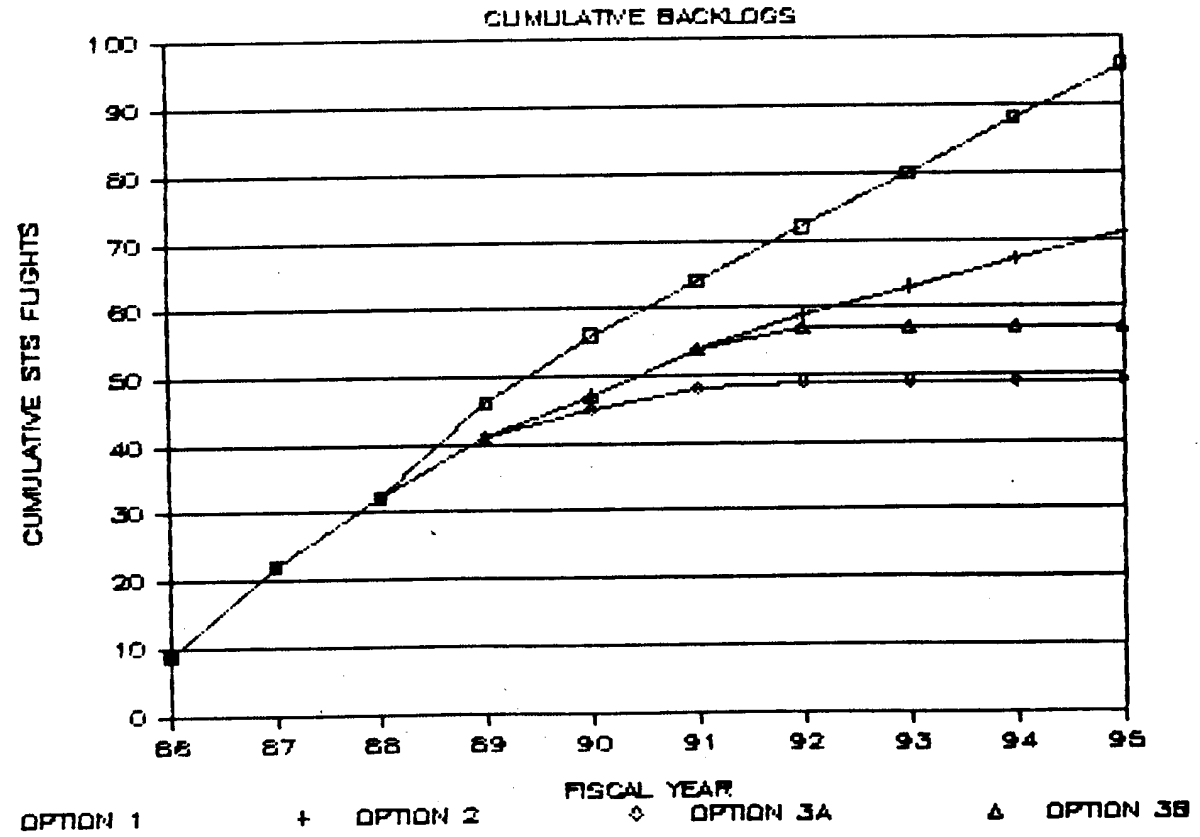


FIGURE II.C.1.

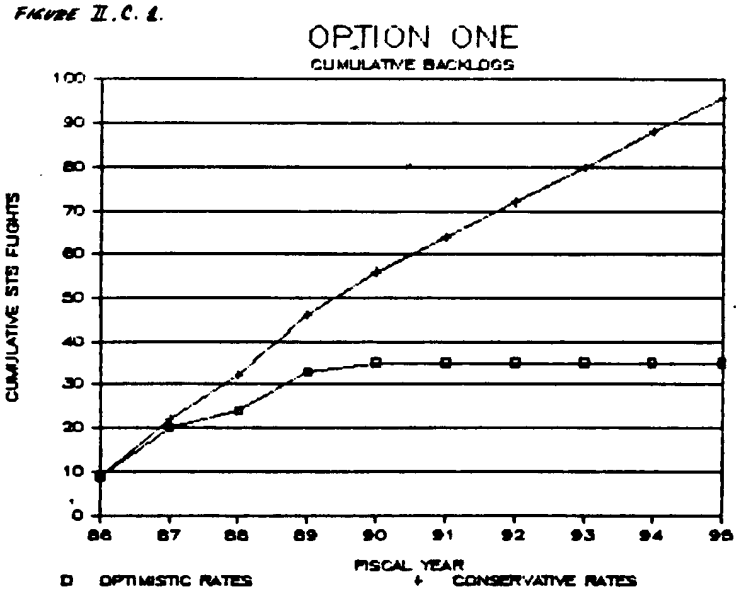


FIGURE II.C.2.

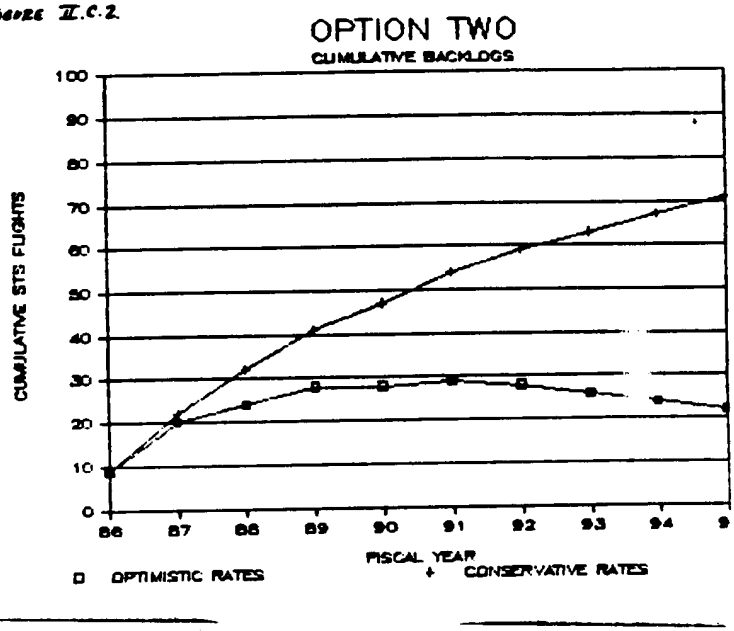


FIGURE II.C.3.

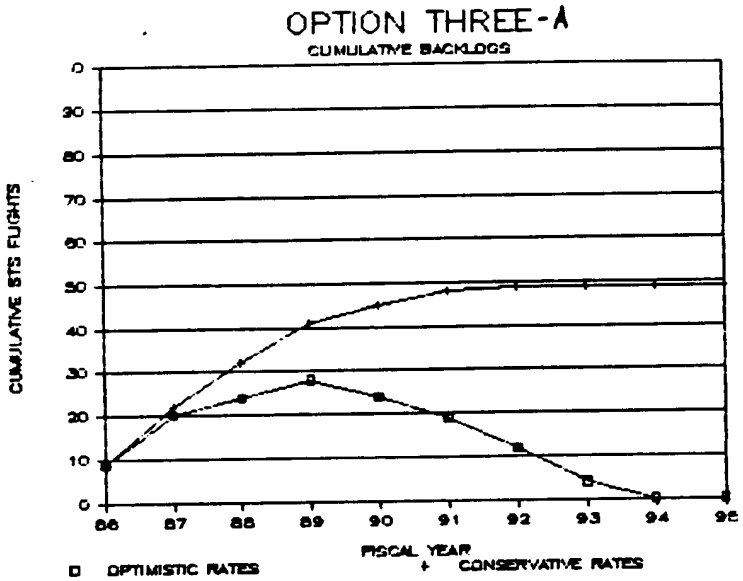
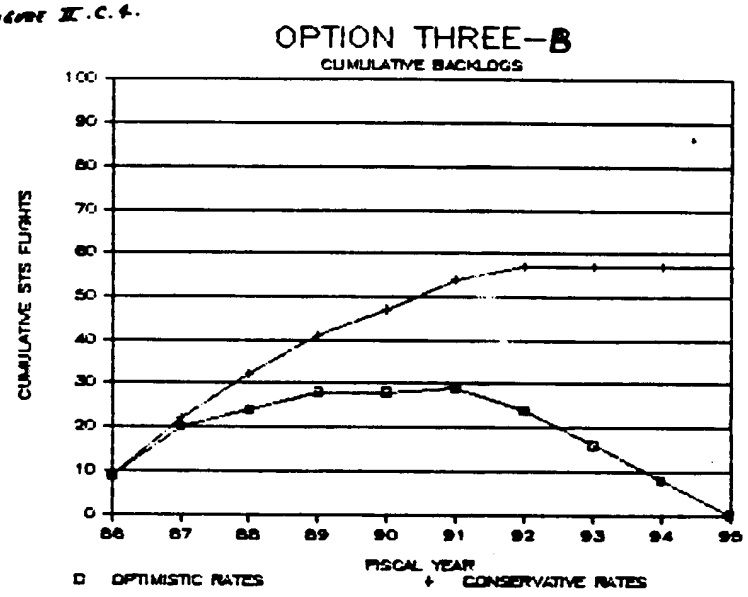


FIGURE II.C.4.



BUDGET SUMMARY FOR OPTIONS

	1986 Current Year GRH	1987 Budget Year	1988	1989	1990	1991	BTC	Total All Years
Option 1. Late 1986 Orbiter Buy (42 Month Delivery from Authority to Proceed)								
DOD Budget Authority	1	52	106	-363	-240	81	0	-364
Outlays	0	11	48	-4	-198	-213	-8	-364
NASA Budget Authority	493	882	1008	953	312	196	0	3844
Outlays	177	867	1002	1147	364	185	102	3844
Total Budget Authority	494	934	1114	590	72	277	0	3481
Outlays	177	878	1050	1143	166	-28	94	
Option 2. No New Orbiter with Offloads								
DOD Budget Authority	562	801	926	32	30	254	-40	2565
Outlays	112	441	754	709	300	75	173	2565
NASA Budget Authority	236	150	137	808	343	427	369	2470
Outlays	87	219	187	856	370	395	369	
Total Budget Authority	798	951	1063	840	373	681	329	5035
Outlays	199	660	941	1566	670	470	542	
Option 3A. Late 1986 Orbiter Buy with Offloads (42 Month Delivery from Authority to Proceed)								
DOD Budget Authority	562	801	926	32	30	254	-40	2565
Outlays	112	441	754	709	300	75	173	2565
NASA Budget Authority	493	882	1046	1268	696	783	369	5537
Outlays	177	867	1040	1381	689	686	697	5537
Total Budget Authority	1055	1683	1972	1300	726	1037	329	8102
Outlays	289	1308	1794	2090	989	761	870	8102
Option 3B. Early 1987 Orbiter Buy with Offloads (4/87 Start, 1/91 Delivery)								
DOD Budget Authority	562	801	926	32	30	254	-40	2565
Outlays	112	441	754	709	300	75	173	2565
NASA Budget Authority	426	250	902	1646	977	794	444	5439
Outlays	117	304	899	1668	1047	832	572	5439
Total Budget Authority	988	1051	1828	1678	1007	1048	404	8004
Outlays	229	745	1653	2378	1347	907	745	8004

Note: See fiscal data for each option

TABLE B.1

01-Apr-86

Option 1. Late 1986 Orbiter Buy (42 Month Delivery from Authority to Proceed)

	1986 Current Year GRH	1987 Budget Year	1988	1989	1990	1991	BTC	Total All Years
DOD								
Program Adjustments/1	1	52	106	45	24	30	0	258
STS Reimbursable Credits/4	0	0	0	-408	-264	51	0	-621
DOD Budget Authority	1	52	106	-363	-240	81	0	-364
Outlays	0	11	48	-4	-198	-213	-8	-364
NASA								
Program Adjustments/1	67	179	259	314	218	239	0	1276
Replacement Items/3	493	882	895	365	115	55	0	2805
Flight Savings/Reimb Loss/2,4	-67	-179	-146	274	-21	-98	0	-237
NASA Budget Authority	493	882	1008	953	312	196	0	3844
Outlays	177	867	1002	1147	364	185	102	3844
Total Budget Authority	494	934	1114	590	72	277	0	3481
Outlays	177	878	1050	1143	166	-28	95	3481

Notes:

1) Adjustments to programs based upon 12 month STS Standdown, NASA adjustments include TDRSS Follow-on, Spartan, STS changes including reliability & quality assurance, Tracking and Data, Science and Application, and R&PM
2) NASA/DOD reimbursables changes in negotiation
3) Anomaly Resolution/Corrective Actions, Replacement Orbiter, IUS ASE, and Replacement Structural Spares
4) Flight Savings due to reduced NASA Planned Flight Rates

TABLE B.2

01-Apr-86

Option 2. No New Orbiter with Offloads

	1986 Current Year GRH	1987 Budget Year	1988	1989	1990	1991	BTC	Total All Years
DOD								
Prog Adjust/Launch Recovery/1,2	562	801	926	744	450	493	329	4305
STS Reimbursable Credits/3	0	0	0	-712	-420	-239	-369	-1740
DOD Budget Authority	562	801	926	32	30	254	-40	2565
Outlays	112	441	754	709	300	75	173	2565
NASA								
Program Adjustments/1	67	179	259	314	218	239	0	1276
Replacement Items/4	236	150	0	0	0	0	0	386
Flight Savings/Reimb Loss/3,5	-67	-179	-122	494	125	188	369	808
NASA Budget Authority	236	150	137	808	343	427	369	2470
Outlays	87	219	187	856	370	395	369	2483
Total Budget Authority	798	951	1063	840	373	681	329	5035
Outlays	199	660	941	1566	670	470	542	[illegible]

Notes:

1) Adjustments to programs based upon 12 month STS Standdown, NASA adjustments include TDRSS Follow-on, Spartan, STS changes including reliability & quality assurance, Tracking and Data, Science and Application, and R&PM
2) DOD Recovery Plan - Dual compatibility/payload integration, ELV's, launch facility modifications and support
3) NASA/DOD reimbursables changes in negotiation
4) Anomaly Resolution/Corrective Actions and IUS ASE
5) Flight Savings due to reduced NASA Planned Flight Rates

TABLE B.3A

Option 3A. Late 1986 Orbiter Buy with Offloads (42 Month Delivery from Authority to Proceed)

	1986 Current Year GRH	1987 Budget Year	1988	1989	1990	1991	BTC	Total All Years
DOD								
Prog Adjust/Launch Recovery/1,2	562	801	926	744	450	493	329	4305
STS Reimbursable Credits/3	0	0	0	-712	-420	-239	-369	-1740
DOD Budget Authority	562	801	926	32	30	254	-40	2565
Outlays	112	441	754	709	300	75	173	2565
NASA								
Program Adjustments/1	67	179	259	314	218	239	0	1276
Replacement Items/4	493	882	895	365	115	55	0	2805
Flight Savings/Reimb Loss/3,5	-67	-179	-108	589	363	489	369	1456
NASA Budget Authority	493	882	1046	1268	696	783	369	5537
Outlays	177	867	1040	1381	689	686	697	5537
Total Budget Authority	1055	1683	1972	1300	726	1037	329	8102
Outlays	289	1308	1794	2090	989	761	870	8102

Notes:

1) Adjustments to programs based upon 12 month STS Standdown,
   NASA adjustments include TDRSS Follow-on, Spartan, STS changes including reliability & quality assurance, Tracking and Data, Science and Application, and R&PM
2) DOD Recovery Plan - Dual compatibility/payload integration, ELV's, launch facility modifications and support
3) NASA/DOD reimbursables changes in negotiation
4) Anomaly Resolution/Corrective Actions, Replacement Orbiter, IUS ASE, and Replacement Structural Spares
5) Flight Savings due to reduced NASA Planned Flight Rates

TABLE B.3B

Option 3B. Early 1987 Orbiter Buy with Offloads (4/87 Start, 1/91 Delivery)

	1986 Current Year GRH	1987 Budget Year	1988	1989	1990	1991	BTC	Total All Years
DOD								
Prog Adjust/Launch Recovery/1,2	562	801	926	744	450	493	329	4305
STS Reimbursable Credits/3	0	0	0	-712	-420	-239	-369	-1740
DOD Budget Authority	562	801	926	32	30	254	-40	2565
Outlays	112	441	754	709	300	75	173	2565
NASA								
Program Adjustments/1	67	179	259	314	218	239	0	1276
Replacement Items/4	426	250	765	830	575	180	75	3101
Flight Savings/Reimb Loss/3,5	-67	-179	-122	502	184	375	369	1062
NASA Budget Authority	426	250	902	1646	977	794	444	5439
Outlays	117	304	899	1668	1047	832	572	5439
Total Budget Authority	988	1051	1828	1678	1007	1048	404	8004
Outlays	229	745	1653	2378	1347	907	745	8004

Notes:

1) Adjustments to programs based upon 12 month STS Standdown, NASA adjustments include TDRSS Follow-on, Spartan, STS changes including reliability & quality assurance, Tracking and Data, Science and Application, and R&PM
2) DOD Recovery Plan - Dual compatibility/payload integration, ELV's, launch facility modifications and support
3) NASA/DOD reimbursables changes in negotiation
4) Anomaly Resolution/Corrective Actions, Replacement Orbiter, IUS ASE, and Replacement Structural Spares
5) Flight Savings due to reduced NASA Planned Flight Rates

C

The Director of Central Intelligence

Washington, D.C. 20505

Intelligence Community Staff

3 April 1986

MEMORANDUM FOR: Randall E. Davis
Associate Director for Natural Resources,
Energy and Science
Office of Management and Budget

FROM: Deputy Director, Program & Budget Staff

SUBJECT: Draft Issue Paper entitled "Funding for National Space Launch Program Recovery"

1. The following comments are offered in response to your request of 1 April 1986:

2. I believe that most of us would agree that there is some threshold above which it would make no sense to attempt to absorb the cost of an acute emergency by drawing down other planned Federal activities. The central question then becomes one of whether or not the cost of recovery from the Challenger tragedy exceeds that threshold. One problem I have with the issue paper is that, after correctly citing the gross cost at about $8B, it masks the budget impact for given fiscal years by citing ranges of costs, the low ends of which apply to options that, having been judged unacceptable by the IG(Space) Working Group, are not presently being seriously considered.

3. A second problem is what I believe to be an exaggeration of the impact on the budgetary process of putting forth a recovery package without offsets. If a package without offsets were the Administration's selected option, it would presumably be defended as an special case, e.g. by emphasizing the extraordinary circumstances being remedied and by drawing a strong distinction between adding to the deficit to solve acute and unexpected emergencies and adding to it by failing to correct chronic imbalances between receipts and

SUBJECT: Draft Issue Paper entitled "Funding for National Space Launch Program Recovery"

expenditures. Futhermore, the FY 86 deficit will be changing as a result of variations from economic projections, the refusal of the Congress to endorse rescissions, etc. Hence, a Supplemental for Recovery from the Challenger Tragedy would be swallowed along with a host of other adjustments and would not have high visibility. Looking to FY 87, it would not seem unreasonable to beat Congress to the punch by suggesting that a part of the $10B margin allowed by G-R-H before sequestration is automatically triggered be allocated to the Challenger Recovery Amendment.

4. If a replacement orbiter is to be procured, Option 3B as urged by OMB is preferable to Option 3A. With all the uncertainties surrounding the STS there is no reason to rush toward acquiring capacity we seem to be in the process of deciding we will use only when an unmanned vehicle cannot do the job. If offsets are mandated, the case for Option 3B in preference to 3A will be stonger still. Moreover, it is not unlikely that considerable support will build outside of NASA for Option 2 which is the least cost/least risk solution to restoring absolutely essential capabilities.

5. The package about to be sent to the Congress should avoid getting ahead of our understanding of what makes sense for the long run. It should stress the need for emergency measures dictated mostly by national security to maintain access to space while we sort things out. By the time the FY 88 budget is ready for submittal it should be possible to have a good understanding of the prospects for sharing with the commercial sector the costs of restored production capacity and launch facilities for ELVs. We also need to "re-baseline" the cost of ELVs so that we can better assess the economic aspects of second- and possibly third-generation reusable launchers.

STAT

SUBJECT: Draft Issue Paper entitled "Funding for National Space Launch Program Recovery"

Distribution:
Orig. - Randall E. Davis, OMB
1 - PBS Subject
1 - PBS Chrono
1 - PPS
1 - ICS Registry

STAT

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

April 1, 1986

MEMORANDUM FOR: [redacted] STAT
DEPUTY DIRECTOR FOR PROGRAMS AND BUDGET STAFF
INTELLIGENCE COMMUNITY STAFF

FROM: Randall E. Davis
Associate Director for Natural Resources,
Energy and Science

SUBJECT: Funding Options for U.S. Launch Program Recovery

Per agreement at our Monday, March 31, meeting on the subject topic, we have prepared a draft issue paper (see attached) as a vehicle for resolving the offsets issue through the Budget Review Board. Also enclosed are minutes from the meeting. Please provide me your comments on the draft issue paper by Thursday, April 3.

Attachments

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

DRAFT

MEMORANDUM FOR:

FROM:

SUBJECT: Funding for National Space Launch Program Recovery

Introduction.

The IG(Space) is nearing completion of its recommendations to the SIG(Space) in the wake of the Space Shuttle Challenger accident. The options being considered by the IG(Space) would require new funding for NASA and DOD totalling up to about $8 billion for 1986-1992, with outlay impacts of $0.2-1.3 billion per year in the 1986-1987 period. A summary of the funding requirements for NASA and DOD identified by the IG(Space) is attached. These funds would be applied primarily to fixing Shuttle problems, procuring a replacement orbiter, and procuring additional expendable launch vehicles (ELVs) for national security missions. However, the IG(Space) has not attempted to resolve the issue of how to provide this extra funding within the fiscal constraints imposed by the President's deficit reduction policy, the Gramm-Rudman-Hollings Act (G-R-H), and the budget resolution targets required by the Congressional Budget Act.

At issue now is whether or not reductions will be proposed by the President to offset any anticipated 1986 supplemental funding and 1987 budget amendments for the space launch recovery program.

Background and Discussion.

Each of the options being considered by the IG(Space) represents unanticipated funding in excess of the spending targets established by the President and the Emergency Deficit Control Act of 1985 (G-R-H), and the resolution limits mandated by the Congressional Budget Control and Impoundment Act. If the new funding needs for space launch recovery are not offset, the President's commitment to fiscal responsibility through spending restraint could be undermined seriously, signalling to the Congress that fiscal responsibility no longer matters. Moreover, if any supplemental requests were not offset fully, the current Congressional spending situation would make such a proposal subject to a point-of-order challenge under the Congressional Budget Act, requiring a majority vote for waiver in the House and a 3/5 vote in the Senate.

If full offsets are required, space programs needs must be traded against other priority Administration programs. If first recourse is made to other NASA and DOD programs, space launch recovery needs would be traded primarily against other priority civil space and defense programs (e.g., Space Station). Funding for other Defense programs, which has been repeatedly reduced by Congressional action, would be further reduced.

Beyond NASA and DOD, there are no other large Federal programs which offer further savings opportunities sufficient to address fully the new space launch recovery funding needs. Also, any across-the-board re-opening of the budget would be impractical, as it would affect every agency during a sensitive period of budget defense before the Congress. Furthermore, there is no practical opportunity to consider now re-estimates of economic assumptions, as no economic update is planned or required by law until August, 1986. Moreover, preliminary indications are that such re-estimates might not be favorable.

Finally, the degree of difficulty of identifying offsets depends upon the approach chosen for space launch recovery. The problem would be most acute if the Administration seeks to replace the lost orbiter on the fastest possible schedule, and seeks a $3.4 billion 1986 supplemental to provide for most civil space recovery needs (including full forward funding of a replacement orbiter) and initial defense needs. Finding offsets of this magnitude late in the current year would be extremely difficult, if not impossible.

The identification of offsets would be relatively more manageable if the Administration seeks a slower, annual funding approach to minimize funding needs in the 1986-1987 period. For example, reprogramming of funds from some civil space programs that are likely to be delayed anyway due to the accident or Congressional action. It might also be possible to realize some relief from lower DOD fuel prices. However, there may still be some painful trade-offs required in civil space and defense programs.

Options.

1) Require no offsets (let Congress decide priorities).

2) Require NASA and DOD to offset fully their respective needs by reprogramming funds from lower priority programs.

3) Require DOD to offset fully its needs by reprogramming, and require NASA to offset a substantial portion of its needs, to the extent practical. Remaining offsets would be found in the budgets of other agencies.

Option 1. Require no offsets (let Congress decide priorities).

Pros.

- o Would allow the Administration to propose the fastest possible recovery for the U.S. space launch program, reaffirming the high priority of the U.S. space program (e.g., the Space Station).
- o Would avoid further trade-offs by the Administration with other priority programs, especially for national security.

Cons.

- o Would undermine seriously the President's commitment to fiscal restraint, which will only encourage Congress to ignore Budget Act and G-R-H limitations.
- o Would not necessarily achieve the proposed launch recovery schedule, as Congress may find it difficult to ignore the fiscal constraints.
- o Would likely face Congressional offsets from Administration priority programs because of Budget Act requirements which would otherwise have to be waived.

Option 2. Require NASA and DOD to offset fully their respective needs by reprogramming funds from lower priority programs.

Pros.

- o Would not require the President or the Congress to abrogate their joint commitment to fiscal responsibility.
- o Would require offsets from the agencies receiving most of the benefits of the new space launch capabilities.
- o Would not require reopening the budget process for other agencies during a sensitive budget defense period.

Cons.

- o Would not permit the Administration to propose the fastest possible recovery for the U.S. space launch program.
- o May require trade-offs with other Administration priority programs, especially for national security.
- o May cause undue hardship on NASA, because of the need to find large offsets in 1986, when additional funds are also needed to resolve Shuttle anomalies. If the fastest procurement schedule is sought, it would require drastic reductions in many other NASA programs.

Option 3. Require DOD to offset its needs by reprogramming, and require NASA to offset a substantial portion of its needs, to the extent practical. Remaining offsets would be found in the budgets of other agencies.

Pros.

- o Would not require the President or the Congress to abrogate their joint commitment to fiscal responsibility.
- o Would require offsets primarily from the agencies receiving most of the benefits of the new space launch capabilities.
- o Would not require reopening the budget process for other agencies during a sensitive budget defense period.
- o Would permit NASA to identify substantial offsets from programs that would have likely been delayed anyway due to the accident or Congressional action (e.g., 1-2 year space station delay already included in the Senate Budget Resolution).
- o Would allow NASA partial relief in 1986 and after 1987, where it would be impractical to seek full offsets now.

Cons.

- o Would not permit the Administration to propose the fastest possible recovery for the U.S. space launch program.
- o May require trade-offs with other Administration priority programs, especially for national security.
- o May also require some additional offsets from other Federal programs (e.g., DOE energy conservation grants).

Decision.

Option 1 -- Require no offsets (let Congress decide priorities). / /

Option 2 -- Require NASA and DOD to offset fully their respective needs by reprogramming funds from lower priority programs. / /

Option 3 -- Require DOD to offset fully its needs by reprogramming, and require NASA to offset a substantial portion of its needs, to the extent practical. Remaining offsets would be found in the budgets of other agencies. / /

RANGE OF COSTS FOR U.S. SPACE LAUNCH RECOVERY OPTIONS

(IG(Space) estimates, dollars in billions)

	1986	1987	TOTAL (1986-1992)
DOD			
Budget Authority	0 to 0.6	0.1 to 0.8	0 to 2.6
Outlays	0 to 0.1	0 to 0.4	0 to 2.6
NASA			
Budget Authority	0.2 to 0.5	0.2 to 0.9	2.5 to 5.5
Outlays	0.1 to 0.2	0.2 to 0.9	2.5 to 5.5
Total			
Budget Authority	0.4 to 1.0	0.9 to 1.1	3.5 to 8.1
Outlays	0.2 to 0.3	0.7 to 1.3	3.5 to 8.1

MARCH 31, 1986 MEETING MINUTES

SPACE LAUNCH RECOVERY FUNDING OPTIONS

Senior budget officials (see attached list) from agencies affected by the IG(Space) process for developing U.S. space launch recovery options met at room 248 EOB to discuss funding requirements and the process for resolving funding issues. The following are highlights of the topics discussed:

- o IG(Space) Process. It was noted that the program recovery options being developed by the IG(Space) raised major budget issues which were not being addressed by the IG(Space). It was agreed that these issues need to be addressed by cognizant budget officials through the budget process.

- o Funding Constraints and Options. OMB representatives outlined the current Presidential and Congressional policies for fiscal restraint and the requirements of the Congressional Budget Act and the Gramm-Rudman-Hollings Act.

  -- OMB representatives indicated that full offsets are required if the President and the Congress are not to abrogate their policies and responsibilities under current law, and that all supplementals proposed to-date have been covered fully by offsets.

  -- The Defense representative requested that there be a "no offset" option because of the importance of the programs and the difficulty of identifying sufficient offsets. It was agreed that there should be a "no offset" option.

  -- The Defense representative also raised the possibility of re-estimating economic assumptions as a possible revenue source, as was done in April of many previous years. The OMB representatives noted that an April update is not planned or required under G-R-H, and that preliminary indications suggest that such re-estimates would not likely yield favorable results.

  -- The Defense representative noted that DOD has "lost" some $61 billion in "hits" from Congressional reductions and the budget process, and would have grave difficulty if asked to offset the full costs of the recovery program.

  -- There was discussion between DOD and OMB staff on possible offsets in DOD, including lower oil prices, the T-46 trainer, and funds appropriated but not authorized. The Defense representative, however, stated that he was not prepared to propose specific offsets at this meeting.

-- There was also discussion between the NASA representative and OMB representatives regarding possible NASA offset areas. The NASA representative indicated general agreement with the target areas identified by OMB staff, but indicated the need to discuss specific estimates further.

-- The Defense representative and others suggested that offsets might be sought from agencies other than NASA and DOD. The OMB representatives indicated that such offsets would generally be difficult and that it would be impractical to reopen the budget process across-the-board. However, OMB representatives noted that some limited offsets from agencies other than NASA and DOD might be possible if the overall recovery needs could be minimized in the 1986-1987 period.

o Process for resolving the offset issue.

-- The Defense representative suggested that the offset policy and launch recovery options need not be decided by the President. The Defense representative suggested that the Budget Review Board be reconstituted to address the funding offset issue.

-- Several agency representatives also suggested that OMB take the lead in preparing a decision paper for the BRB as a vehicle for resolving this issue.

-- OMB agreed to draft a decision paper for consideration at the BRB level and to circulate it to the senior agency budget officials for comment.

D

SECRET

DEPARTMENT OF THE AIR FORCE
WASHINGTON, D.C. 20330

OFFICE OF THE SECRETARY

MEMORANDUM FOR THE DEPUTY SECRETARY OF DEFENSE

SUBJECT: FY 1986 Budget Supplemental/FY 1987 Budget Amendment for Space Launch Recovery - ACTION MEMORANDUM

(U) The attached FY 1986 budget supplemental ($562.0 million) and FY 1987 budget amendment ($832.1 million) identify funding requirements to implement the recovery of space launch capability. Our requirements assume a twelve month Space Shuttle standdown and are consistent with the Space Transportation Architecture Study.

(U) The supplemental and amendment are in consonance with SecDef guidance to selectively offload missions to expendable launch vehicles (ELV) while maintaining the DoD commitment to the Shuttle program, to develop dual coast Shuttle and complementary expendable launch vehicle (CELV) launch facilities, and to achieve satellite dual compatability where practical.

(U) It is imperative that we take immediate action to restore our launch capability, and I urge expedited action on these requests.

2 Atchs
1. FY86 Budget Supplemental (S)
2. FY87 Budget Amendment (S)

cc: The Secretary of Defense
ASD(C3I)
ASD(C)

SECRET

[redacted] (or not Attached) the classification of this correspondence will be canceled in accordance with AFR [redacted]

SECRET

DEPARTMENT OF DEFENSE

JUSTIFICATION OF ESTIMATES FOR FISCAL YEAR 1986

BUDGET SUPPLEMENTAL

MARCH 1986

SECRET

Department of Defense
FY 1986 Supplemental Appropriation Request

Table of Contents

Department of Defense
FY1986 Supplemental Appropriation Request
Summary of Requirements

The following is a recap by appropriation of funds needed in support of space launch capability recovery. Funds will provide for an expanded CELV program and an expendable launch vehicle competition for GPS.

Appropriation	Dollars in Thousands
Missile Procurement, Air Force	$329,400
Research, Development, Test and Evaluation, Air Force	232,500
Research, Development, Test and Evaluation, Defense Agencies	$ 100
Total	$562,000

Missile Procurement, Air Force

For an additional amount for "Missile Procurement, Air Force", $329,400,000, to remain available until September 30, 1988.

Missile Procurement, Air Force
(Supplemental Now Requested, Existing Legislation)

Program and Financing (in thousands of dollars)

Identification Code 57-3020-0-1-051	1985 actual	1986 est.	1987 est.
Program by activities:			
Direct Program:			
00.05 Other Support	———	171,288	108,702
10.00 Total obligations		171,288	108,702
Financing:			
Unobligated balance available, start of year:			
21.40 For completion of prior year budget plans		-	-152,112
Unobligated balance available, end of year:			
24.40 For completion of prior year budget plans		152,112	43,410
39.00 Budget Authority		329,400	
Budget Authority:			
40.00 Appropriation		329,400	

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Missile Procurement, Air Force
(Supplemental Now Requested, Existing Legislation)

Program and Financing (in thousands of dollars)

Relation of obligation to outlays:	1985 actual	1986 est	1987 est.
71.00 obligations incurred, net		171,288	108,702
72.40 obligated balance, start of year			136,602
74.40 obligated balance, end of year		-136,602	-159,001
90.00 Outlays		34,686	86,303

Budget Plan (in thousands of dollars)
(amount for procurement actions programmed)

Direct:		
07.05 Other Support	329,400	

Object classification (in thousands of dollars)

31.0 Direct obligations, equipment	171,288	108,702

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Department of the Air Force
Missile Procurement, Air Force

(Dollars in Thousands)

FY1986 Presently Available	$ 7,909,732
FY1986 Revised Estimate	$ 8,239,132
FY1986 Proposed Supplemental	$ 329,400

Budget Activity: Other Support ($329,400)

Justification of Supplemental Requirements.

Summary:

Line Total Cost	Item	Quantity
33	Global Positioning (MPY)	6,000
40	Defense Satellite Comm System (MYP)	1,000
43	Space Boosters	46,000
44	Space Boosters Advance Procurement (CY)	188,700
52	Special Programs	87,700
	Total	329,400

Global Positioning (MYP) 6,000
This line provides for integration, minor hardware changes, and other program impacts of launching GPS satellites aboard expendable launch vehicles beginning in FY 89. Also provides for GPS program support for an expected ELV competition. No provision is made for major satellite design changes.

Defense Satellite Comm System (MYP) 1,000
This line provides for necessary spacecraft storage, engineering/launch support contract extensions, and software modifications resulting from an STS stand-down until Feb 87.

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Space Boosters-Advanced Procurement 188,700

CELV Production. This line provides necessary funding to procure long lead materiels necessary to increase Complementary Expendable Launch Vehicle (CELV) Production from the proposed multi-year buy of 10 vehicles to a multi-year buy of 23 boosters. The first of the additional 13 Titan 34D7 boosters will be available in FY 89. Includes funding to enable a 3 per year Centaur G Prime upper stage flight rate. Assumes a Jun 86 ATP.

Space Boosters 46,000

CELV Production. This line provides necessary funding to increase CELV Production from the proposed multi-year buy of 10 vehicles to a multi-year buy of 23 boosters. It also provides for additive requirements at Titan launch facilities at the Eastern Space and Missile Center to provide increased Centaur launch rates. Buys competitively procured ELV's for GPS satellites at a launch rate of 4 per year beginning in FY 89. (Procurement funding begins in FY 87).

Special Programs 87,700

Justification materials will be provided through special access channels.

Research, Development, Test and Evaluation, Air Force

For and additional amount for "Research, Development, Test and Evaluation, Air Force", $232,500,000, to remain available until September 30, 1987.

Research, Development, Test and Evaluation, Air Force

(Supplemental Now Requested, Existing Legislation)

Program and Financing (in thousands of dollars)

Identification Code 57-3600-0-1-051	1985 actual	1986 est.	1987 est.
Program by Activies			
Direct program:			
00.02 Advanced technology development		172	28
00.03 Strategic programs		13,760	2,240
00.05 Intelligence and communication		104,318	16,982
00.06 Defensewide mission support		81,700	13,300
10.00 Total obligations		199,950	32,550
Financing:			
Unobligated balance available, start of year:			
21.40 For completion of prior year budget plans		-	-32,550
Unobligated balance available, end of year:			
24.40 For completion of prior year budget plans		32,550	-
39.00 Budget authority		232,500	
Budget Authority:			
40.00 Appropriation		232,500	
Relation of obligation to outlays:			
71.00 Obligations incurred, net		199,950	32,550
72.40 Obligated balance, start of year		-	97,650
74.40 Obligated balance, end of year		-97,650	-34,875
90.00 Outlays		102,300	95,325

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Budget Plan (in thousands of dollars)
(Amount for procurement actions programmed)

Direct:	1985 actual	1986 est.	1987 est.
07.02 Advanced technology development		200	
07.03 Strategic programs		16,000	
07.05 Intelligence and Comm		121,300	
07.06 Defensewide mission support	------	95,000	----
08.93 Total budget plan		232,500	

Object Classification (in thousands of dollars)

Direct obligations:			
31.0 Equipment		199,950	32,550

Department of the Air Force
RDT&E, Air Force

(Dollars in Thousands)

FY1986 Presently Available	$ 13,115,216
FY1986 Revised Estimate	$ 13,477,716
FY1986 Proposed Supplemental	$ 232,500

Budget Activity: Advanced Technology Development ($200)

Justification of Supplemental Requirements.

R-1 Line	P.E.	Item	Total Cost
40	63410F	Space Sys Environ Interactions Tech	$200

This line provides for necessary payload storage, and software modifications resulting from STS stand-down until Feb 87.

Budget Activity: Strategic Programs ($16,000)

R-1 Line	P.E.	Item	Total Cost
102	33603F	Milstar Comm Sat System	$16,000

Milstar Dual Compatibility. Provides for required integration analysis and documentation, interface redesign, and other program impacts of integrating Milstar to the CELV at Satellite 1. This effort is in addition to the ongoing STS Centaur integration activities for Milstar. Assumes an Apr 90 ILC based upon a Jun 86 ATP.

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Department of Defense
Research, Development, Test and Evaluation
Defense Agencies

(Dollars in Thousands)

FY1986 Presently Available	$ 6,317,154
FY1986 Revised Estimate	6,317,254
FY1986 Proposed Supplemental	$ 100

Budget Activity: Defensewide Mission Support

Justification of Supplemental Requirements.

Provides for necessary payload storage and software modification resulting from an STS stand-down until Feb 87.

General Provision

Funds available in the appropriation "Missile Procurement, Air Force, 1986/1988" may be used to initiate multiyear procurement of Complementary Expendable Launch Vehicles (CELV)

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DEPARTMENT OF DEFENSE

JUSTIFICATION OF ESTIMATES FOR FISCAL YEAR 1987

BUDGET AMENDMENT

MARCH 1986

SECRET

Department of Defense
FY 1987 Budget Amendment

Table of Contents

Department of Defense
FY1987 Budget Amendment
Summary of Requirements

The following is a recap by appropriation of funds needed in support of space launch capability recovery. Funds will provide for an expanded CELV program and an expendable launch vehicle competition for GPS.

Appropriation	Dollars in Thousands
Missile Procurement, Air Force	$567,000
Research, Development, Test and Evaluation, Air Force	251,500
Research, Development, Test and Evaluation, Defense Agencies	13,600
Total	832,100

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Missile Procurement, Air Force

For an additional amount for "Missile Procurement, Air Force", $567,000,000, to remain available until September 30, 1989.

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Missile Procurement, Air Force
(FY 1987 Budget Amendment)
Program and Financing (in thousands of dollars)

Identification Code 57-3020-0-1-051	1985 actual	1986 est.	1987 est.
Program by activities:			
Direct Program:			
00.05 Other Support			294,840
10.00 Total obligations			294,840
Financing:			
Unobligated balance available, start of year:			
21.40 For completion of prior year budget plans			
Unobligated balance available, end of year:			
24.40 For completion of prior year budget plans			
39.00 Budget Authority			272,160
Budget Authority:			
40.00 Appropriation			567,000

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Missile Procurement, Air Force
(FY 1987 Budget Amendment)

Program and Financing (in thousands of dollars)

Relation of obligation to outlays:	1985 actual	1986 est.	1987 est.
71.00 obligations incurred, net			294,840
72.40 obligated balance, start of year			-
74.40 obligated balance, end of year			-235,135
90.00 Outlays			59,705

Budget Plan (in thousands of dollars)
(amount for procurement actions programmed)

Direct:	
07.05 Other Support	567,000

Object classification (in thousands of dollars)

31.0 Direct obligations, equipment	294,840

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Department of the Air Force
Missile Procurement, Air Force

(Dollars in Thousands)

FY1987 Budget Request Pending	$ 8,982,400
FY1987 Revised Request	$ 9,549,400
FY1987 Proposed Amendment	$ 567,000

Justification of Budget Amendment

Budget Activity: Other Support ($567,000)

Summary:

P-1 Line	Item	Quantity	Total Cost
33	Global Positioning (MYP)		15,500
35	Space Shuttle Operations		9,500
40	Defense Satellite Comm System (MYP)		1,000
43	Space Boosters		279,000
44	Space Boosters Advance Procurement (CY)		145,000
52	Special Programs		117,000
	Total		567,000

Global Positioning (MYP) 15,500

This line provides for integration, minor hardware changes, and other program impacts of launching GPS satellites aboard expendable launch vehicles beginning in FY 89. Also provides for GPS program support for an expected ELV competition. No provision is made for major satellite design changes.

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Space Shuttle Operations

9,500

Defense Satellite Comm System (MYP)

1,000

This line provides for necessary spacecraft storage, engineering/launch support contract extensions, and software modifications resulting from an STS stand-down until Feb 87.

Space Boosters-Advanced Procurement

145,000

CELV Production. This line provides necessary funding to procure long lead materiels necessary to increase Complementary Expendable Launch Vehicle (CELV) production from the proposed multi-year buy of 10 vehicles to a multi-year buy of 23 boosters. The first of the additional 13 Titan 34D7 boosters will be available in FY 89. Includes funding to enable a 3 per year Centaur G Prime upper stage flight rate. Assumes a Jun 86 ATP.

Space Boosters

279,000

CELV Production. This line provides necessary funding to increase CELV production from the proposed multi-year buy of 10 vehicles to a multi-year buy of 23 boosters. It also provides for additive requirements at Titan launch facilities at the Eastern Space and Missile Center to provide increased Centaur launch rates. Buys competitively procured ELV's for GPS replenishment satellites at a launch rate of 4 per year beginning in FY 89.

Special Programs

117,000

Justification materials will be provided through special access channels.

Research, Development, Test and Evaluation, Air Force

For an additional amount for "Research, Development, Test and Evaluation, Air Force", $251,500,000, to remain available until September 30, 1988.

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Research, Development, Test and Evaluation, Air Force

(FY 1987 Budget Amendment)

Program and Financing (in thousands of dollars)

Identification Code 57-3600-0-1-051	1985 actual	1986 est.	1987 est.
Program by Activies			
Direct program:			
00.02 Advanced technology development			860
00.03 Strategic programs			15,136
00.05 Intelligence and communication			52,460
00.06 Defensewide mission support			147,834
10.00 Total obligations			216,290
Financing:			
Unobligated balance available, start of year:			
21.40 For completion of prior year budget plans			
Unobligated balance available, end of year:			
24.40 For completion of prior year budget plans			35,210
39.00 Budget authority			251,500
Budget Authority:			
40.00 Appropriation			
Relation of obligation to outlays:			
71.00 Obligations incurred, net			216,290
72.40 Obligated balance, start of year			-
74.40 Obligated balance, end of year			-105,630
90.00 Outlays			110,660

Budget Plan (in thousands of dollars)
(Amount for procurement actions programmed)

Direct:	1985 actual	1986 est.	1987 est.
07.02 Advanced technology development			1,000
07.03 Strategic programs			17,600
07.05 Intelligence and Comm			61,000
07.06 Defensewide mission support			171,900
08.93 Total budget plan			251,500

Object Classification (in thousands of dollars)

Direct obligations:			
31.0 Equipment			216,290

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Department of the Air Force
RDT&E, Air Force

(Dollars in Thousands)

FY1987 Request Pending	$ 17,275,400
FY1987 Revised Request	$ 17,784,700
FY1987 Proposed Amendment	$ 251,500

Justification of Budget Amendment

Budget Activity: Advanced Technology Development ($1,000)

R-1 Line	P.E.	Item	Total Cost
40	63410F	Space Sys Environ Interactions Tech	$ 100

This line provides for necessary payload storage, and software modifications resulting from STS stand-down until Feb 87.

41	63424F	Cruise Missile Surveillance Tech	$ 900

Budget Activity: Strategic Programs ($17,600)

R-1 Line	P.E.	Item	Total Cost
102	33603F	Milstar Comm Sat System	$17,600

Milstar Dual Compatibility. Provides for required integration analysis and documentation, interface redesign, and other program impacts of integrating Milstar to the CELV at Satellite 1. This effort is in addition to the ongoing STS Centaur integration activities for Milstar. Assumes an Apr 90 ILC based upon a Jun 86 ATP.

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Department of Defense
Research, Development, Test and Evaluation
Defense Agencies

(Dollars in Thousands

FY1987 Budget Requests Pending	$ 8,364,300
FY1987 Revised Request	$ 8,377,900
FY1987 Proposed Amendment	$ 13,600

Budget Activity: Defensewide Mission Support ($13,600)

Justification of Supplemental Requirements.

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SECRET

DEPARTMENT OF THE AIR FORCE
WASHINGTON, D.C. 20330-1000

OFFICE OF THE UNDER SECRETARY

21 March 1986

MEMORANDUM FOR AF/CV

SUBJECT: Recovery of Space Launch Capability - ACTION MEMORANDUM

In the short time since the Challenger loss, your staff has done an outstanding job of assessing the impact, developing recovery alternatives, and recommending a general course of action to recover space launch capability. Given the environment of turmoil in the wake of the accident, this effort represents a significant accomplishment.

The next step in this process is to submit a FY 86 supplemental and FY 87 budget amendment to Congress and determine FY 88-92 POM requirements. The FY 86 and FY 87 information must be firm, should assume a twelve month Shuttle standdown and should use the attached mission model as a baseline. The POM data can be an approximation of requirements that will be updated for new projections of Shuttle downtime, flight rates and mission priorities.

To assist in this effort, the following guidance is provided: 1) Maintain DOD's commitment to the STS, 2) selectively offload missions to ELVs, 3) develop dual coast STS and CELV launch facilities, and 4) achieve satellite dual compatibility for Milstar, GPS, DSP and DSCS.

DOD and NASA must present a joint position to the President and Congress as soon as possible. Please provide the FY 86 emergency supplemental package for my approval by March 28.

E. C. Aldridge, Jr.

1 Atch
Mission Model (s)

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When Standing Alone This Page is Unclassified.

STS 51-L IMPACT OPTION / 860318:1630

GPS

PAYLOAD	JAN 23 (MISSION DESIG.)			12 MO. DOWN		
GPS 1	1	87	(71-A)	8	87	-7
GPS 2	3	87	(71-F)	11	87	-8
GPS 3	7	87	(71-K)	2	88	-7
GPS 4	8	87	(71-L)	3	88	-7
GPS 5	8	87	(71-L)	6	88	-7
GPS 6	11	87	(81-C)	11	88	-6
GPS 7	12	87	(81-D)	12	88	-11
GPS 8	12	87	(81-D)	11	88	-11
GPS 9	3	88	(81-H)	7	89	-17
GPS 10	6	88	(81-K)	7	89	-14
GPS 11	6	88	(81-L)	11	89	-18
GPS 12	7	88	(81-M)	12	89	-17
GPS 13				4	90	
GPS 14				1	91	
GPS 15				1	91	
GPS 16				2	91	

GPS 17 AND SUBS
MOVED TO ELV's

E

Private Sector Expendable Launch Vehicle Industry

ISSUE When and how should NASA discontinue flying commercial and foreign payloads that do not require a manned presence?

BACKGROUND Prior to the accident NASA planned to sell excess STS capacity (on the order of 3 shuttle flights a year) to commercial and foreign customers (principally communications satellites.)

This came into direct conflict with the President's 1984 decision to encourage and facilitate the development of a U.S. private sector commercial launch services industry to capitalize on the previous U.S. government investments in ELVs that were no longer required by the government. The Department of Transportation was given the lead in this initiative.

Since the commercial satellite market consists of a limited number of commercial and foreign communications satellites, the potential commercial ELV industry found itself in direct competition with the U.S. government (i.e., the NASA STS) for these customers. This led to a Cabinet Counsel study to establish "full cost recovery" for the STS to ensure that the commercial ELV industry could fairly compete with the STS.

The range of full cost recovery prices identified varied widely depending on the definition of what items were to be included or excluded. A political concern was raised that the European launch firm, ArianeSpace, would continue to subsidize their launches and capture the entire world market. For this reason, a low price for STS full cost recovery was established.

The companies that comprise the potential commercial ELV industry interpreted this as an indication that the government did not seriously want them competing with the STS. As a consequence, there has been no serious investment of private capital to establish a domestic, commercial ELV industry.

CURRENT FACTORS With the loss of Challenger and the subsequent grounding of the STS fleet, several factors influencing this issue have changed.

Given the backlog of STS missions produced by the grounding of the fleet and the availability of only 3 orbiters to service this backlog through about 1991, there will be no excess STS capacity until well into the 1990s.

NASA had 16 commercial or foreign communications satellites scheduled for launch on the STS between Feb 86 and the end of FY 88. If the STS is down 18 months, none of these will be flown until at least FY 88 if the STS is down 18 months.

These customers are paying STS prices established before "full cost recovery" i.e., 1/3 to 1/4 of what current Ariane prices would be). Even if Ariane can accept additional payloads, these customers may well elect to stay on the shuttle despite the long launch delays.

U.S. Commercial ELVs could be available by early FY 88 to compete with Ariane. Although the originally commited 16 payloads may stay on the STS for economic reasons, an additional 16 payloads were potentially planning to use the STS during the FY 89-91 timeframe. It is unlikely that the STS will be able to accommodate these users. (NASA disagrees with this assessment since they assume 24 flights/year in this period with a fourth orbiter.)

The Working Group agreed that NASA should discontinue providing commercial launch services; the issue is one of timing. All agree that NASA should attempt to honor those firm commitments (i.e., payloads manifested before the accident through FY 88). Most agree that trying to compete for those projected for FY 89-91 with the STS is unrealistic.

Additional the political issues raised are:

- We must not allow Ariane to capture the world market in commercial launch services or they will undercut both the U.S. commercial ELV industry and the U.S. satellite communication industry.

- How can we be sure that a commercial U.S. ELV industry will be viable and competitive.

- If we do not maintain our current market share, the Russians, Chinese, and Japanese will capture whatever Ariane cannot fly.

Major ELV manufacturers (Martin and General Dynamics) have told the IG working group that they are willing to invest, and that they believe they can be competitive. They await the government's decision on this issue.

The communications industry expressed concern to the IG Working Group over a policy that would preclude their use of the STS. Despite their obvious interests in maintaining low launch costs through the use of the government supported STS, they have legitimate concerns for those payloads they currently have under contract (i.e., through FY 88). They agree they need alternatives and do not want to be totally dependent on Ariane. Hughes representatives expressed confidence that, if current contracts were honored, they could accommodate increased STS prices or commercial ELVs in the FY 89 and beyond period.

NASA has raised the issue that they are legally liable for all

projected missions (i.e., through about FY 91). The Department of Commerce requested the Department of Justice review this assertion. The NASA legal opinion is attached at TAB 1; the Justice comments are attached at TAB 2.

CONCLUSIONS The establishment of a domestic, commercial ELV industry is in the best national interests for the following reasons:

1) There is little-to-no excess STS capacity available in the FY 89-91 period; therefore, the STS is not a viable competitor for the available commercial communications satellites in the FY 89-91 period.

2) The U.S. should strive to retain a solid share of this market for both political and economic reasons; a commercial ELV industry offers the best promise of meeting this objective in this timeframe. Should they fail for any reason, the U.S. government could reenter the market as the STS regains its full operational capacity.

3) Without positive, immediate action by the government to encourage the industry to invest and compete for this market it is unlikely that such an industry will develop at all and certain that it will not develop in time to assist in recovering from the backlog created by the loss of Challenger.

4) The DoD must procure ELVs for its own needs from these same limited number of manufacturers. If Defense becomes their only customer, all our best efforts will not be adequate to prevent increases in costs. They will become the sole provider of a service critical to national security space programs and will have little incentive to reduce costs. If on the other hand, they are attempting to provide a commercially competitive launch service to the private sector, Defense can reap the benefits of this competition.

5) By the same token, if the size of the commercial satellite market is judged to be too small to permit the establishment of a commercially viable ELV industry, the sale of ELVs to DoD increases this economic base and essentially enables commercialization.

6) Finally, offloading commercial and foreign satellites from the STS frees up additional capacity to reduce the backlog of U.S. government missions and allows the STS to be used for those missions that take advantage of the truely unique manned capabilities of the orbiter.

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