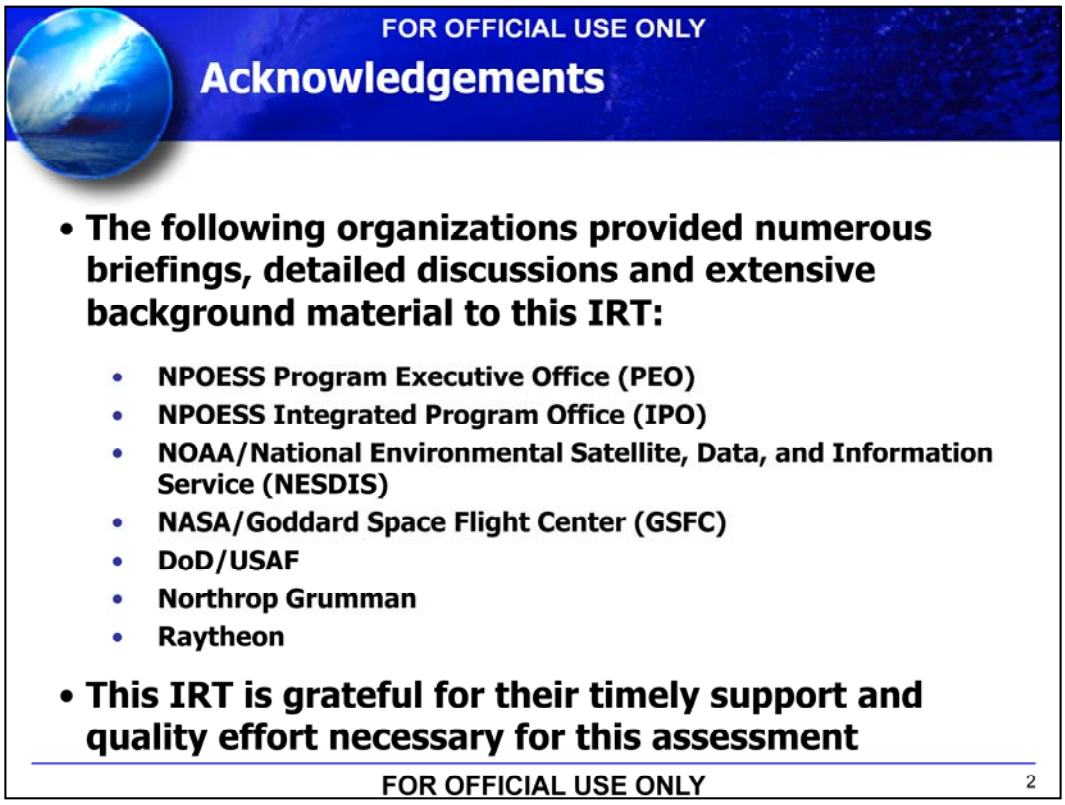
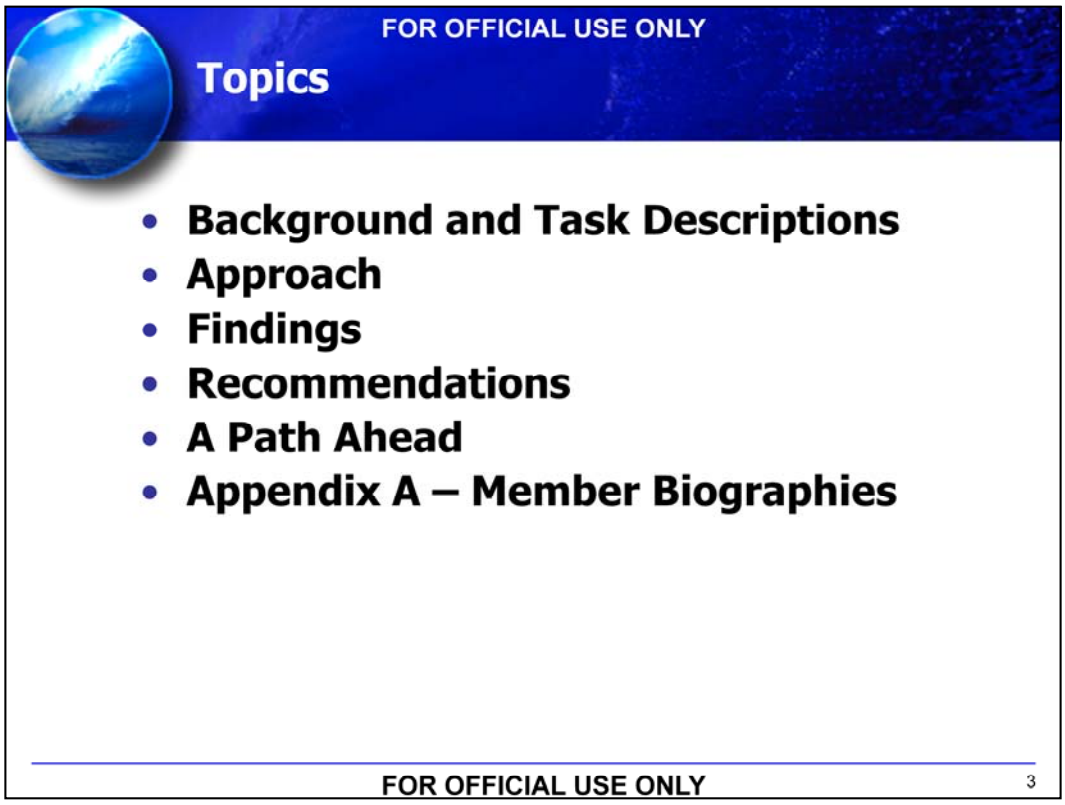
This briefing contains the assessment of the National Polar-Orbiting Environmental Satellite System (NPOESS) program by the Independent Review Team (IRT). It captures the *significant* findings and recommendations resulting from the review of the baseline NPOESS Program. It is important to note that the findings and recommendations in this briefing are in response to the NPOESS Program definition and content presented to the IRT, and primarily cover the NPOESS Management Approach and Baseline Assessment (Tasks 1 and 2). It reflects the integrated perspectives of the IRT developed over time across all review tasks.



The IRT would like to thank the many individuals and organizations that supported this effort with numerous briefings, detailed discussions, and extensive background material. Some of these include:

- NPOESS Program Executive Office (PEO)
- NPOESS Integrated Program Office (IPO)
- NOAA/National Environmental Satellite, Data, and Information Service (NESDIS)
- NASA/Goddard Space Flight Center (GSFC)
- DoD/USAF
- Northrop Grumman
- Raytheon

This IRT is grateful for their timely and forthright support necessary for this assessment.

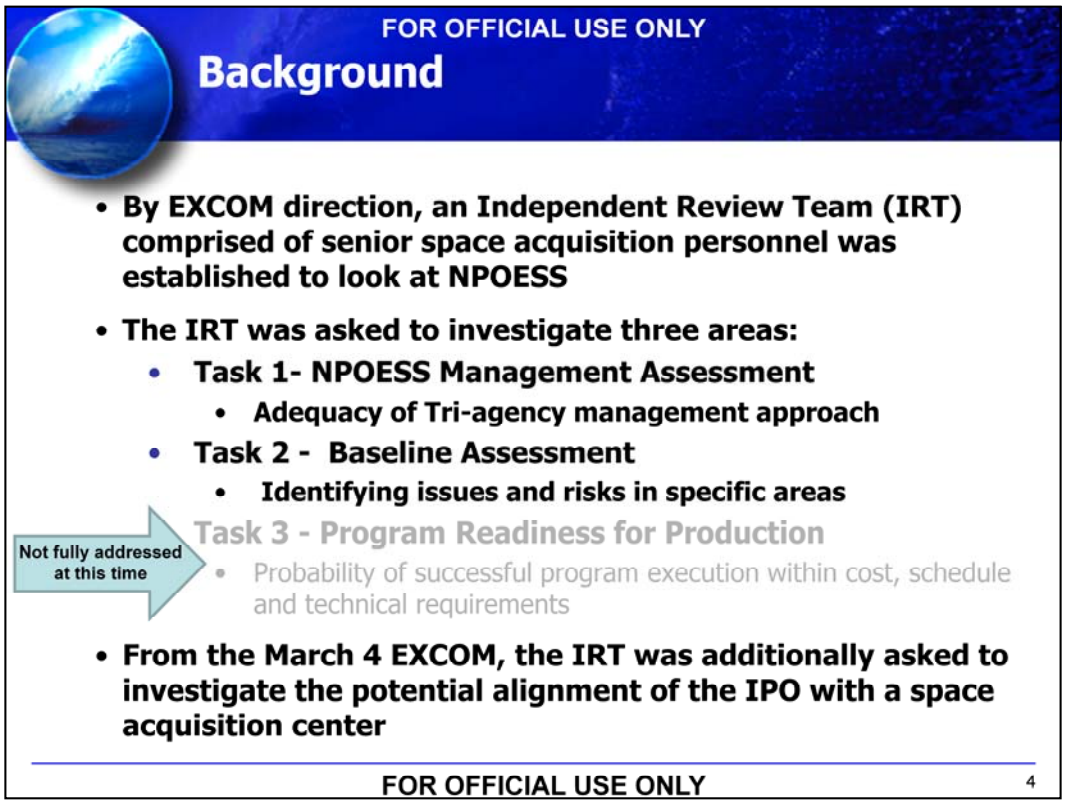


This slide depicts the overall content and structure of the report.

After the Acknowledgements and this overview slide, the briefing will cover some background information on the IRT – the tasks assigned, the approach and the timeline.

The Findings and Recommendations sections capture the key observations and overall recommendations from the IRT. It is organized in a similar flow as discussed and presented at the EXCOM on March 4, 2009. It is followed with some additional conclusions developed since the EXCOM meeting in the section titled “A Path Ahead”.

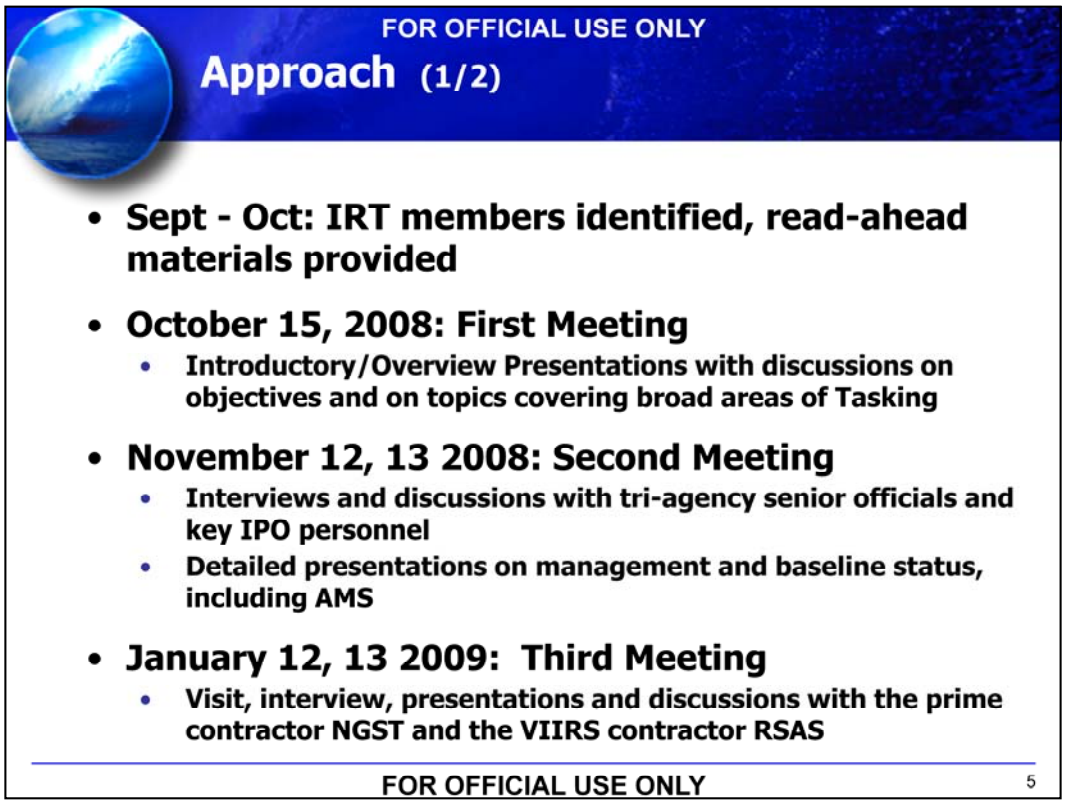
Appendix A describes the make up of the IRT and contains the IRT member biographies.



Comprised of senior executive space acquisition experts, this Independent Review Team (IRT) was tasked by the EXCOM to assess the National Polar-orbiting Operational Environmental Satellite System (NPOESS), the next generation of polar-orbiting weather and environmental monitoring satellite system.

Tasks for this major review included an evaluation of high-level NPOESS program elements, including (1) the organization, effectiveness, and efficiency of the Tri-Agency management approach and (2) the technical feasibility, adequacy, and risk of the program baseline. A third task, the program readiness for production, was not fully addressed at this time.

From the March 4 EXCOM, the IRT was additionally asked to investigate the potential alignment of the IPO with a space acquisition center. The results of these deliberations are captured in the section “A Path Ahead”.



The IRT held a series of meetings beginning in October 2008 and ran through March 2009.

The initial session, on October 15, 2009 discussed the tasks, objectives, and organization of the IRT and provided the IRT an introductory overview of NPOESS and the Integrated Program Office (IPO).

The second meeting, held in November 2008, consisted of interviews and discussions with tri-agency senior officials and key IPO personnel including:

- Dan Stockton (NPOESS PEO), Ed Phillips (NPOESS SPD), Mike Haas (Aerospace), Pam Sullivan (RSAS Factory GPOC)

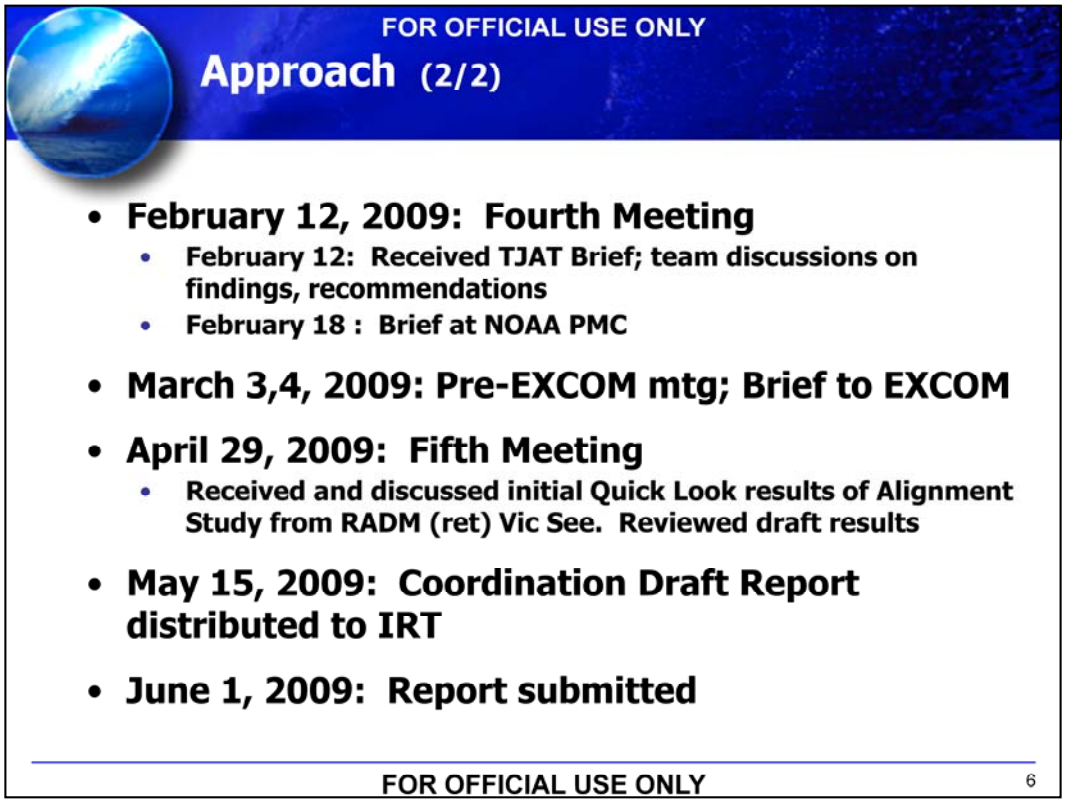
- MGen Neil MacCasland, BGen Mashiko from the USAF

- Chris Scolese from NASA

- Mary Glackin, Abby Harper, and Gary Davis from NOAA; and

- MGen (ret) Mitch Mitchell (AMS lead). The Alternative Management Study was conducted by an independent team spanning 3 years and over 2 phases. The second phase, led by MGen Mitchell, looked at the internal NPOESS management and contractor structures.

The third set of meetings were held in January 2009 at the contractor facilities in El Segundo, CA. Interviews were held with contractor senior executives, including Ron Sugar (CEO, Northrop Grumman) and Bill Swanson (CEO, Raytheon).



At the fourth meeting held in February 2009, the IRT received the Tri-agency Joint Assessment Team (TJAT) brief, and held detailed discussions with Mary Kicza (NOAA), Josh Hartman (DoD), Mike Freilich (NASA), as well as with Dan Stockton and Gary Davis. Additional contractor discussions were held, and the IRT spent a working session developing findings and recommendations.

Numerous action items were generated from these meetings, and answers were quickly supplied to the IRT, reviewed and dispositioned.

On March 3, 2009, the IRT held a pre-brief meeting to discuss findings and recommendations prior to the EXCOM held on March 4, 2009. At the EXCOM, Mr. Tom Young presented the IRT findings and recommendations, summarizing them into ten key observations and two potential program responses. One of the recommendations from the IRT was to investigate aligning the IPO with a space acquisition center. During the closed Executive Session following the open EXCOM meeting, the principals assigned an action, documented in revised EXCOM minutes published on April 1, 2009, for the IRT to develop pro's and con's for two alignment alternatives: The Air Force Space and Missile Systems Center or the NASA Goddard Space Flight Center.

Following receipt of the minutes, the IRT tasked Vic See to look at the advantages and disadvantages of aligning the IPO with either NASA's Goddard Space Flight Center or the USAF's Space and Missile Systems Center. He presented a status and an assessment of his research at the April 29th meeting.

On May 15, 2009 the Coordination Draft Report was distributed to IRT.

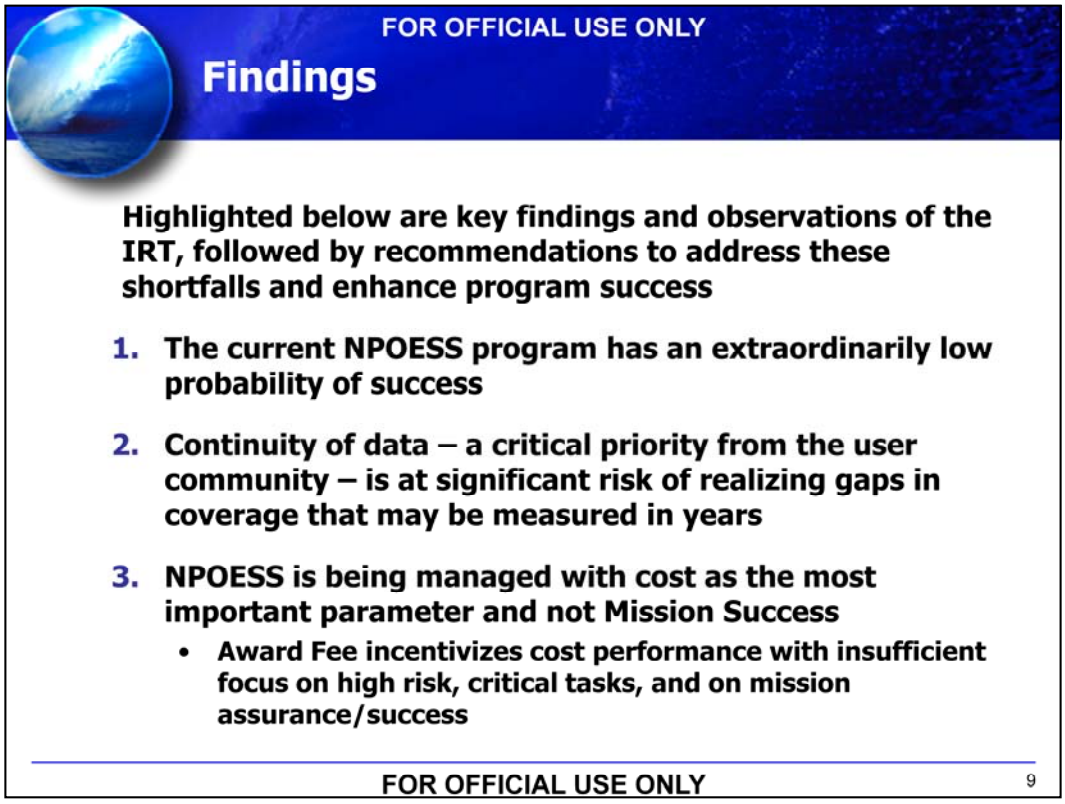
On June 1, 2009, this report was submitted.

Summary

NPOESS is a national priority - it is a critical enabler for national security, weather forecasting, emergency response, and climate research. NPOESS is vitally important, and in the IRT's opinion, it cannot be successfully executed with the current management construct and within the current funding and scheduling constraints.

The tri-agency team must work more closely and effectively together, garner White House support, and aggressively address these findings. If the status quo continues, there is an extremely low probability of success.

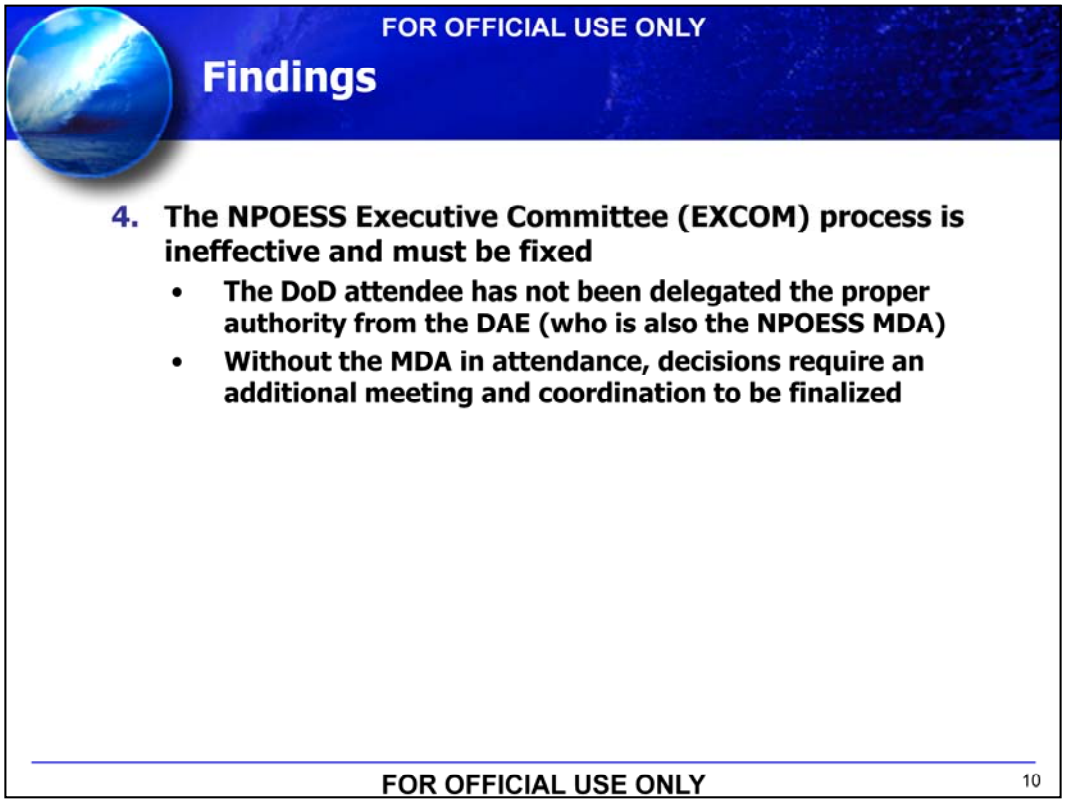
This section presents the Findings of the IRT. These Findings are organized similar to the discussion and presentation flow held at the EXCOM on March 4, 2009.



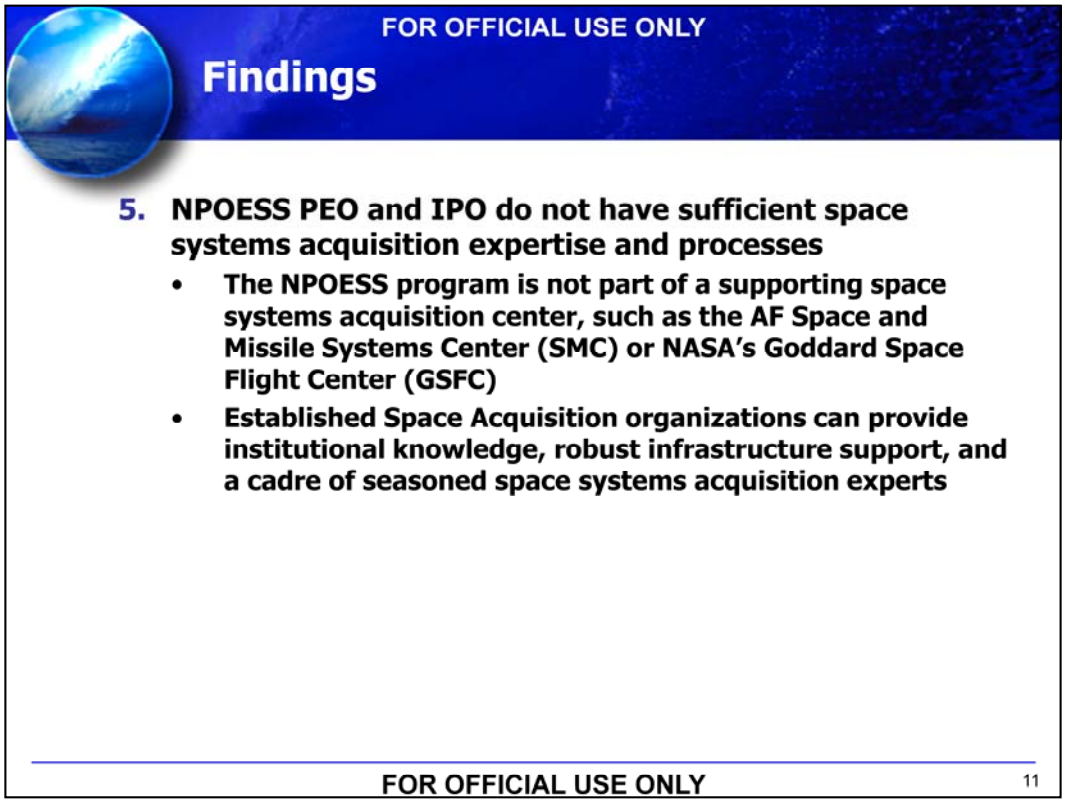
1. The current NPOESS program has extraordinarily low probability of success: It is the IRT's assessment that the current program cannot be successfully executed within the constraints of cost, schedule, performance, and with the current management construct. Many of the following findings and observations will support this principle finding, and identify more specific areas to address to enhance program success.

2. While continuity of data is a critical priority for all users, it is at extreme risk: If all satellites are delivered on schedule, launched without incident, and meet their full design life, there will be no significant gap in capabilities. In keeping with historical trends, there is a high likelihood of early problems with the first few satellites. If NPOESS exhibits similar characteristics, there will be a minimum gap of several months. If there is a launch failure – a 41% chance of occurring over the remaining DMSP launches, NPP and NPOESS – there is a high likelihood of a gap measured in years (note: 41% based on the Success Probability used in the Aerospace GAP analysis). The NPOESS Preparatory Project (NPP) – once a key risk reduction activity for NPOESS – is now a critical asset to help mitigate these potential gaps in operational coverage. (see also #8)

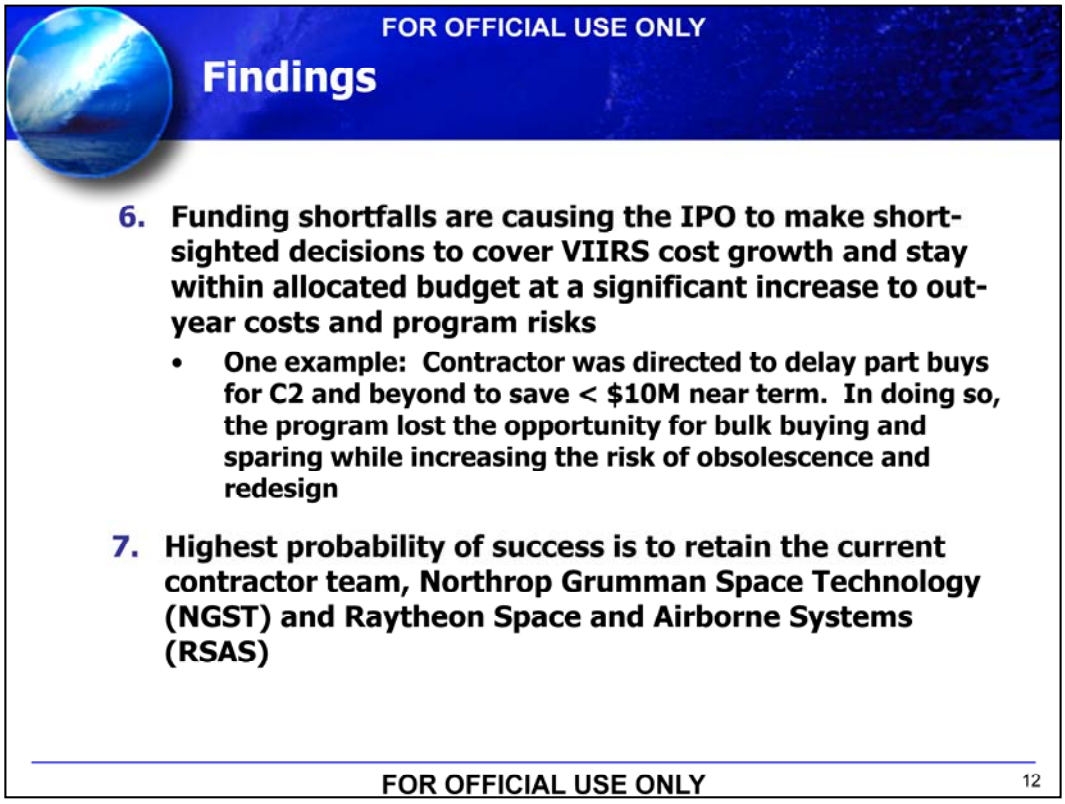
3. NPOESS is being managed with cost as the most important parameter: One observation of this cost priority is reflected in the award fee structure and its emphasis on cost control. Successful space acquisition requires mission success to be the top priority not cost as the overarching factor. It is the IRT's belief that best way to control cost is to manage quality and focus on mission success. In turn, this quality focus will have the lowest cost in the long run.



4. The EXCOM process is ineffective: The EXCOM is intended to be a decision body to provide streamlined direction to the PEO. The current DoD EXCOM representative has not been delegated the proper authority from the Defense Acquisition Executive (DAE), who is also the NPOESS Milestone Decision Authority (MDA), and decisions require an additional meeting and coordination to be finalized. Additionally, the IRT has observed that many of the topics that are discussed at the EXCOM delve too deeply into program details and many critical top level issues are left unresolved.

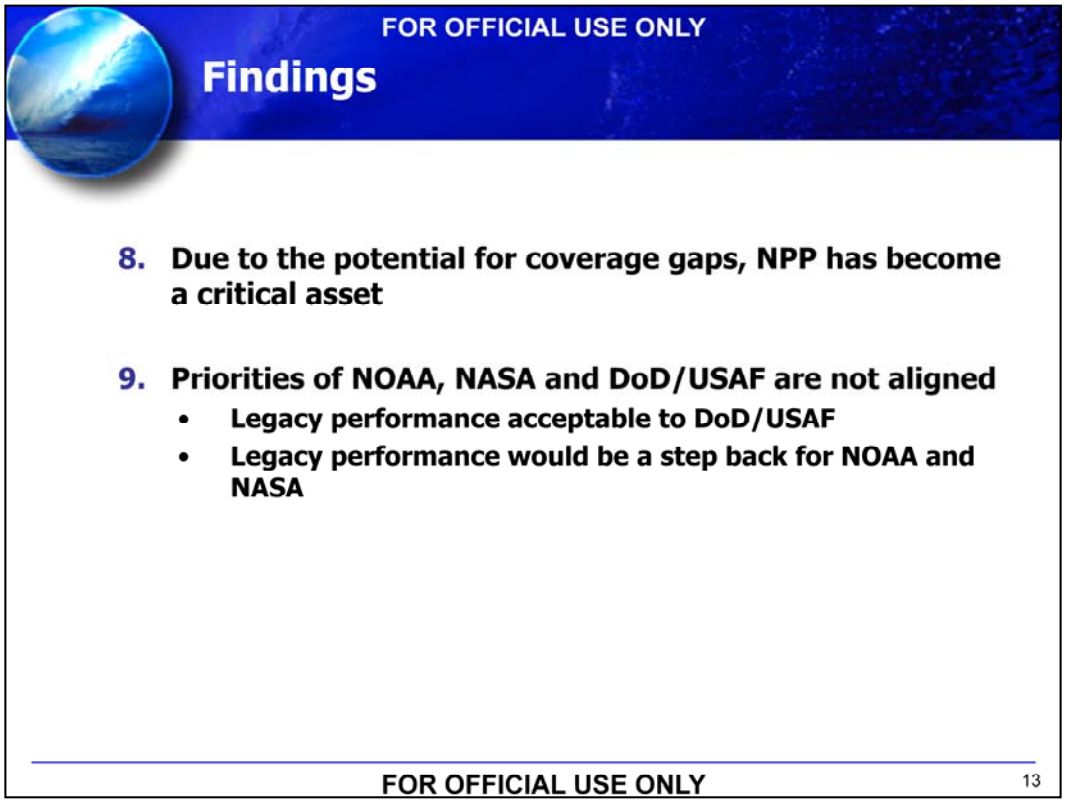


5. The PEO and IPO do not have sufficient space systems acquisition expertise and processes: The NPOESS program is not part of a supporting space systems acquisition center, such as the AF Space and Missile Systems Center (SMC) or the NASA Goddard Space Flight Center (GSFC). These types of established space acquisition organizations can provide institutional knowledge, robust infrastructure support, and a cadre of seasoned space systems acquisition experts. A program such as NPOESS has a questionable probability of success without the support capabilities of an acquisition center.



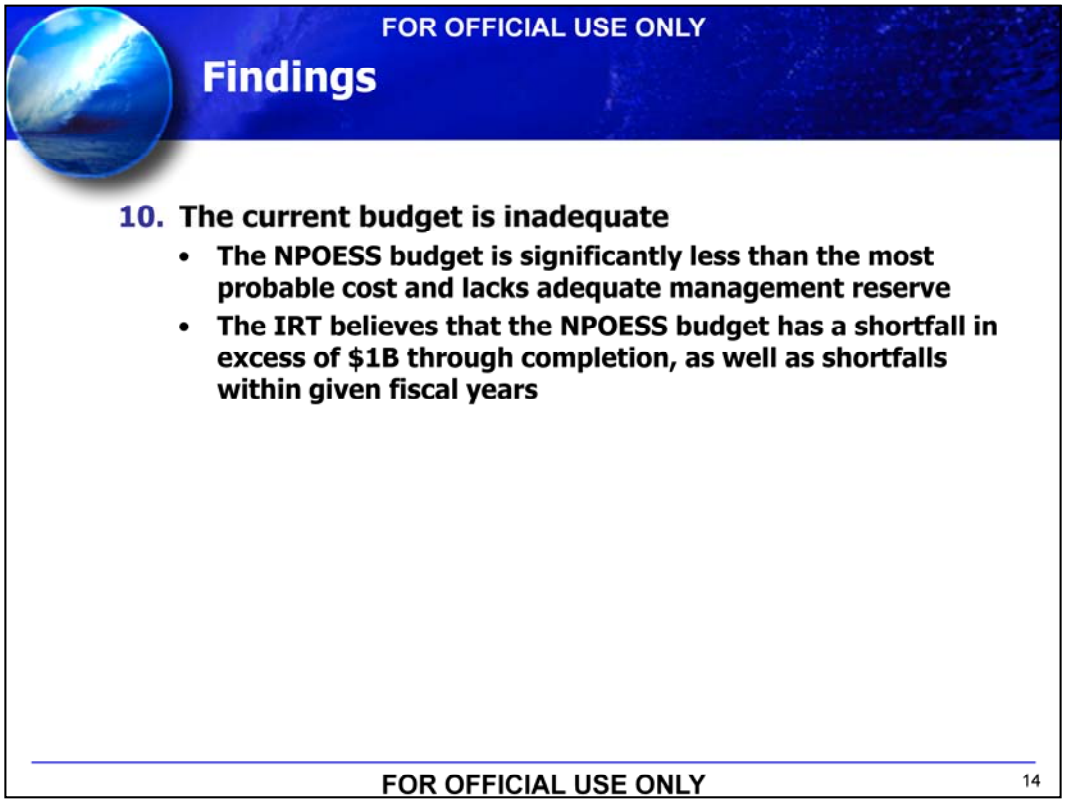
6. Funding shortfalls are causing the IPO to make short-sighted decisions to cover VIIRS cost growth and stay within allocated budget at a significant increase to out-year costs and program risks: While the IPO has no choice but to make these decisions, risk is being deliberately built into the program to stay within allocated budget. Two examples: 1) After the System CDR in April 2009, contractors will immediately begin lay-offs to the spacecraft team to save near-term dollars. Not only will reconstituting the team be difficult, but the spacecraft development will now be on the critical path for the NPOESS C1 launch; 2) VIIRS parts purchases are now spread out, losing block buy purchase savings, losing the flexibility of spares, and increasing the risk of parts non-availability and obsolescence with potential requalification costs.

7. The highest probability of success is with the current contractor team: Northrop Grumman Space Technology as the prime and Raytheon Space and Airborne Systems as the subcontractor for the Visible/Infrared Imager Radiometer Suite (VIIRS). A new team will cost at least as much, take at least as long, will further dilute limited near term funds, and will not provide any benefits to the probability of success. Although the best chance to achieve a VIIRS-like capability is with RSAS, it is unclear though, on what schedule and at what cost.

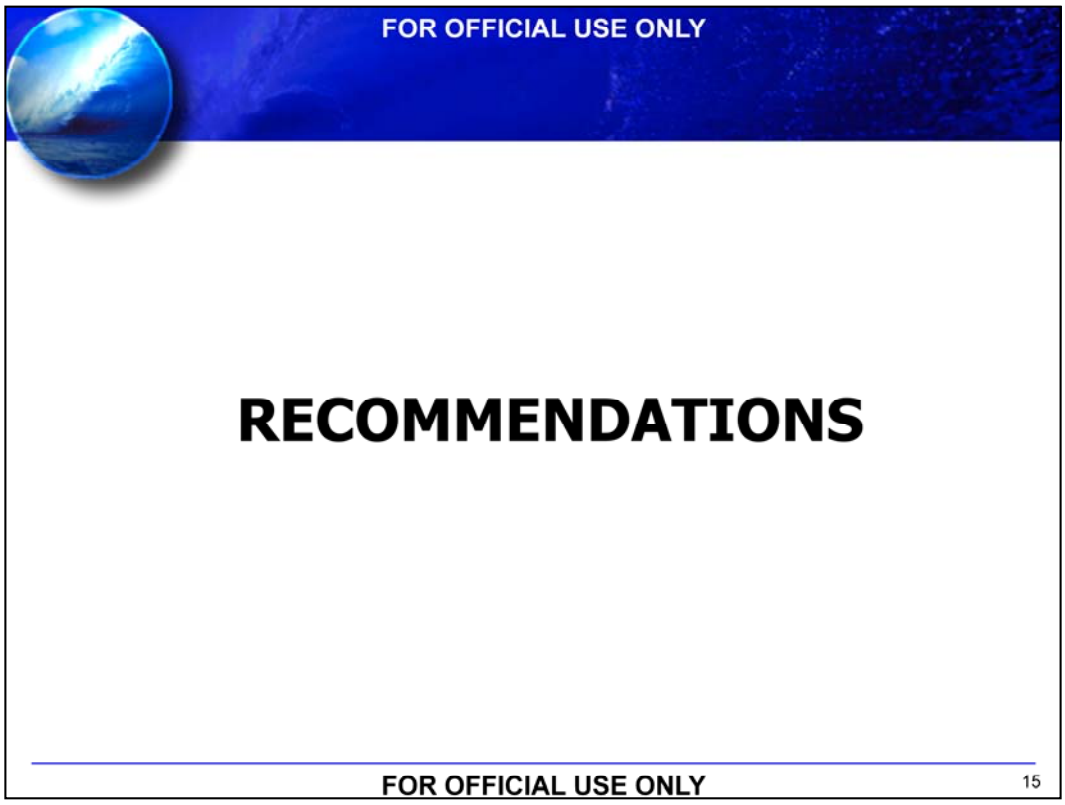


8. NPP has become a critical asset: As noted in Finding #2, with data continuity at significant risk, the NPOESS Preparatory Project has become a critical asset. While its value has diminished as a pathfinder and risk reducer for the NPOESS program, NPP can provide needed gap mitigation for this fragile and hardware poor constellation.

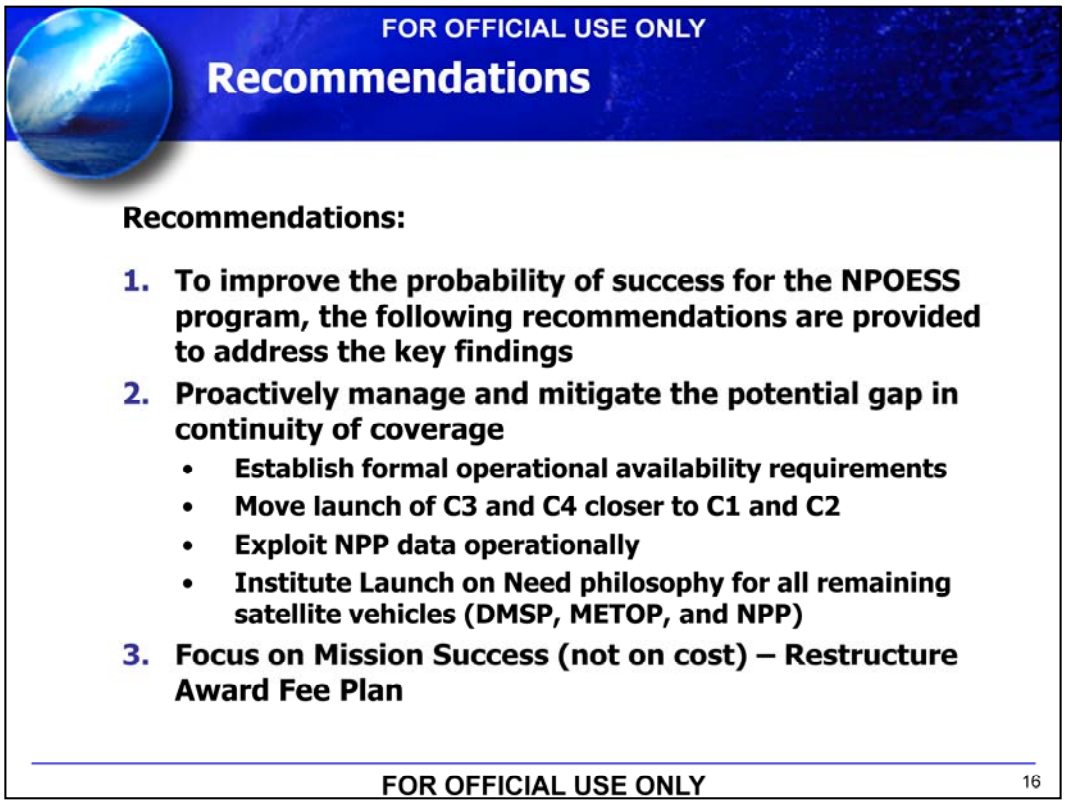
9. The priorities of NOAA, NASA and DoD/USAF are not aligned: The DoD has stated that while the program should continue to pursue the current NPOESS requirements, the DoD is willing to accept legacy performance (DMSP and POES) to maintain continuity, cost and schedule goals and is not willing to provide additional funding to pursue requirements beyond legacy. NOAA states that legacy performance would be a step back in today's performance because of their current operational use of NASA research satellites that are well beyond their design life. The NOAA requirements are reflected in the current Level 1 requirements, but because they are more than legacy, the requirements are characterized as objective vice threshold values. NASA has requirements similar to NOAA for climate data records. These differences are straining interagency relationships and are impacting how people do their jobs, even down to the lowest levels of the IPO. The IRT believes that this program will not survive if this particular problem is not addressed immediately.



10. The current budget is inadequate: Budgeting to a 50-50 cost estimate leads to insufficient funding. It lacks sufficient management reserve, and as noted in Finding #6, this leads to programs using risk as its management reserve. The current budget is not at the 50/50 level. The most probable cost is at the 80/20 level including reserves. To fund at the most probable cost, the IRT estimates that the NPOESS budget has a shortfall in excess of $1B through program completion.



This section presents the Recommendations of the IRT. The Recommendations are organized to track against the Findings, and the flow is similar to the discussion and presentation held at the EXCOM on March 4, 2009.



1. The current NPOESS program has extraordinarily low probability of success:

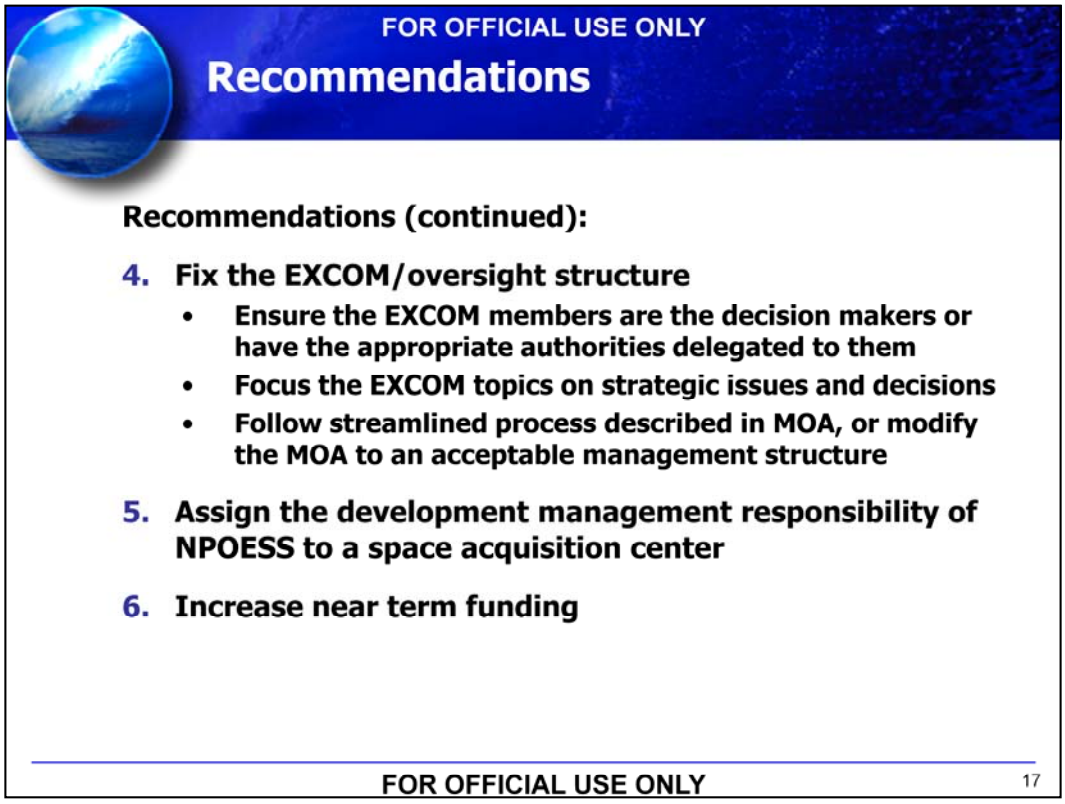
Recommendation: To improve the probability of success for the NPOESS program, the following recommendations are provided to address the key findings. These recommendations attempt to protect operational data continuity, fix the management structure, strengthen infrastructure support, and increase budget or decrease program scope. These recommendations are provided in more detail below.

2. Continuity of data is at extreme risk:

Recommendation: Proactively manage and mitigate the potential gap in continuity of coverage. Treat all remaining and future polar-orbiting environmental assets as part of an integrated architecture. Establish formal operational availability requirements. Move production and launch dates of C3 and C4 closer to C1 and C2. Modify launch philosophy of all polar-orbiting environmental satellites to launch on need (or launch on failure). Use the NPOESS Preparatory Project (NPP) data, originally intended for risk reduction, as an option to mitigate potential data gaps. This will help but will not compensate for lack of spares in case of launch or early spacecraft failures.

3. NPOESS is being managed with cost as the most important parameter:

Recommendation: Change the culture throughout the program and focus on mission success. Change the award fee structure.



4. The EXCOM process is ineffective:

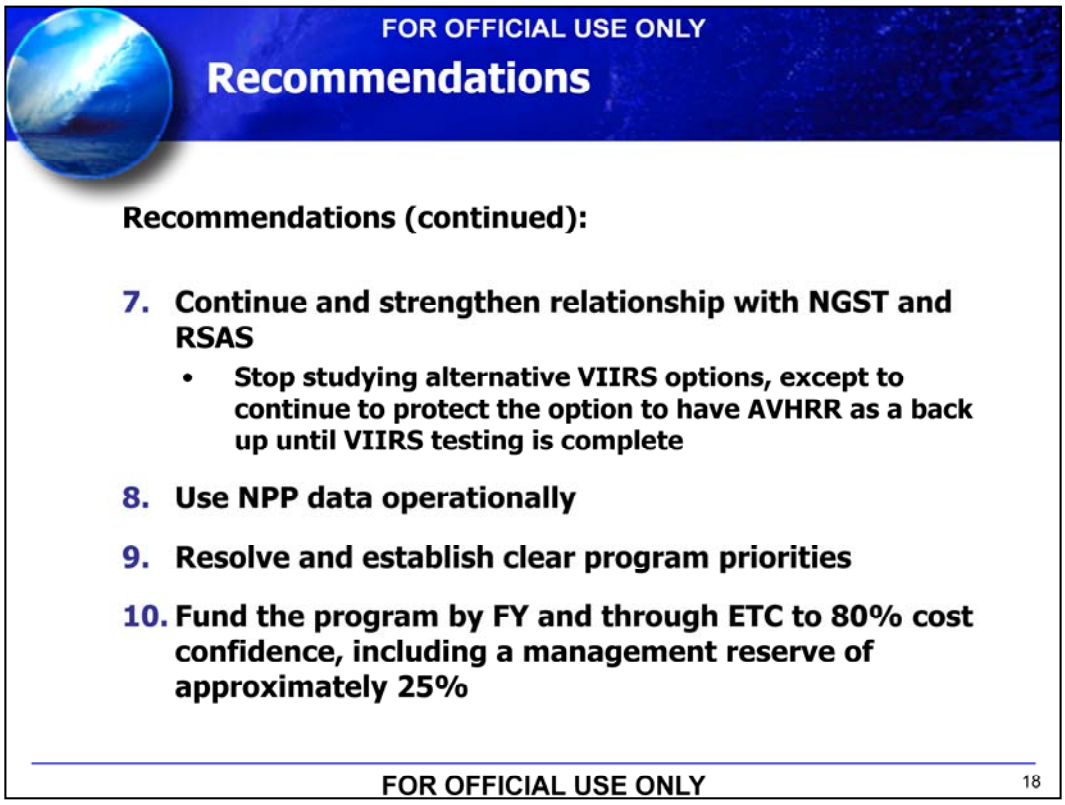
Recommendation: Fix the management/oversight structure. For an EXCOM process to be effective, the EXCOM members must be the decision makers or have the appropriate authorities delegated to them. The EXCOM topics must also be focused on strategic issues and decisions, and not on tactical program issues. Follow the streamlined process described in the Memorandum of Agreement (Dec 2008), or modify the MOA to reflect an acceptable management structure.

5. The Program Office lacks space acquisition institutional support:

Recommendation: Assign NPOESS within a space acquisition center. Additional thoughts and considerations in aligning the IPO with a space systems acquisition center are provided in following sections of this report.

6. Due to inadequate funds, the IPO is forced to make short-sighted decisions to stay within budget at a significant increase to out-year costs and risks:

Recommendation: Increase near term funding. Fund to 80% confidence levels.



7. The highest probability of success is with the current contractor team:

Recommendation: Given the risk to continuity of operational polar environmental data, the least risk to a gap is to continue the development of the original NPOESS scope with Northrop Grumman and Raytheon. Stop studying VIIRS options. In addition to increased costs, the IPO efforts are fragmented by studying options instead of executing the program. Instead, only protect the option to have AVHRR as a back up until VIIRS thermal vacuum testing is complete.

8. NPP has become a critical asset:

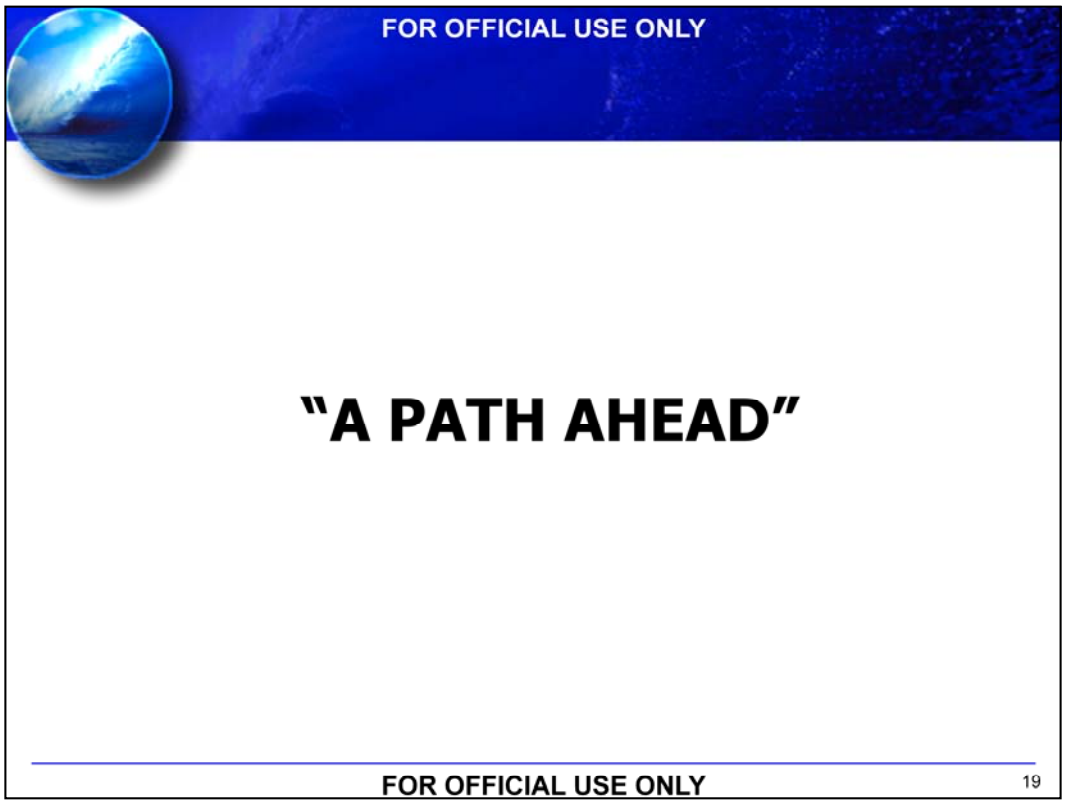
Recommendation: Use NPP operationally. The employment of NPP should be managed as a part of an integrated approach to the polar-orbiting environmental satellite architecture. (see Recommendation #2)

9. The priorities of NOAA, NASA and USAF are not aligned:

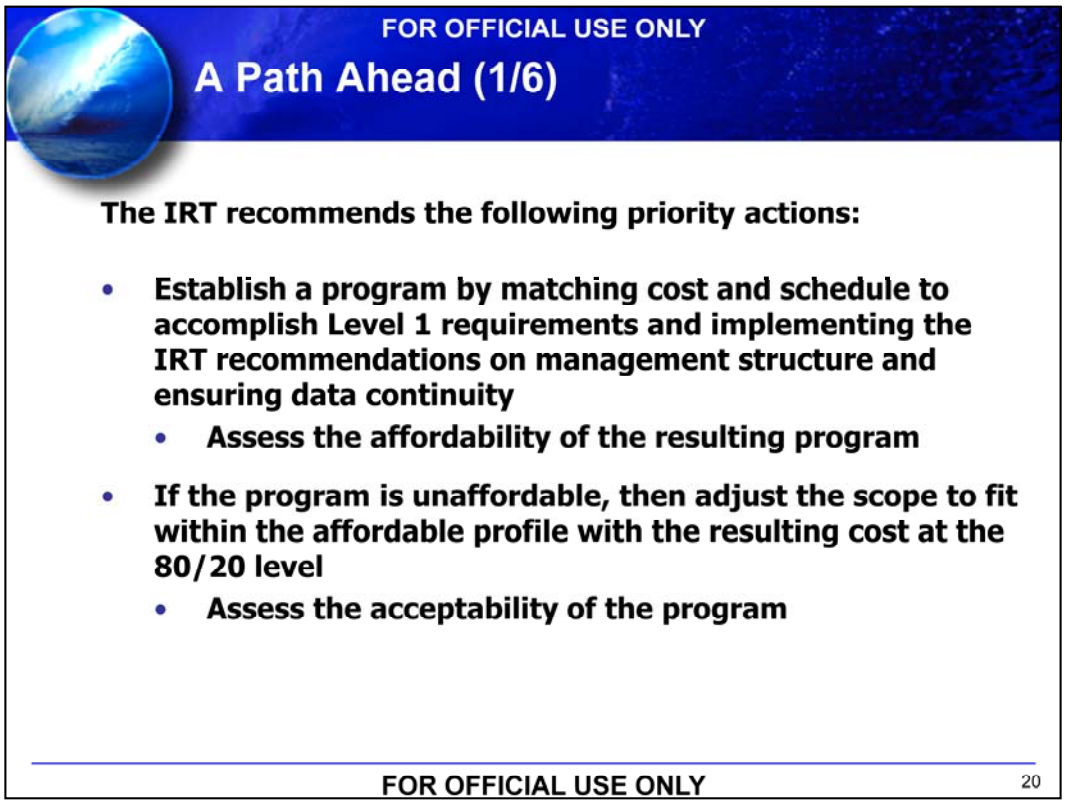
Recommendation: This issue can only be resolved at the White House level. The White House should appoint a senior official or officials to establish the future course for NPOESS.

10. The current budget is inadequate:

Recommendation: Fund the program (by Fiscal Year and through Estimate to Complete) to an 80-20 cost confidence including a management reserve of approximately 25%.

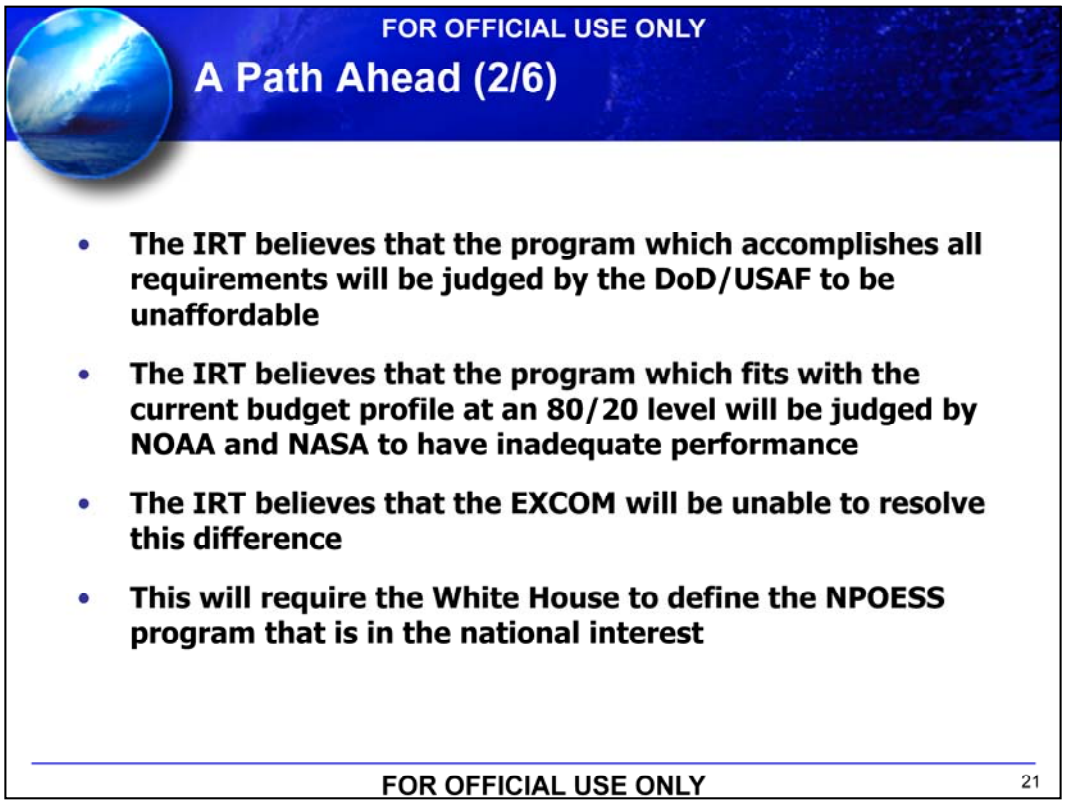


This section focuses upon "A Path Ahead" to establish the NPOESS program that is in the best interest of the country and a management approach that maximizes the probability of program success.



A program that responds to all requirements and corrective actions needs to be established for NPOESS. This program should provide the capabilities necessary to meet Level 1 requirements and include all of the IRT recommendations regarding management structure and data continuity. The resultant funding and schedule for this program should be adjusted to support an 80-20 cost confidence in each fiscal year and for the total program. The affordability of the resultant program and the associated funding should be assessed.

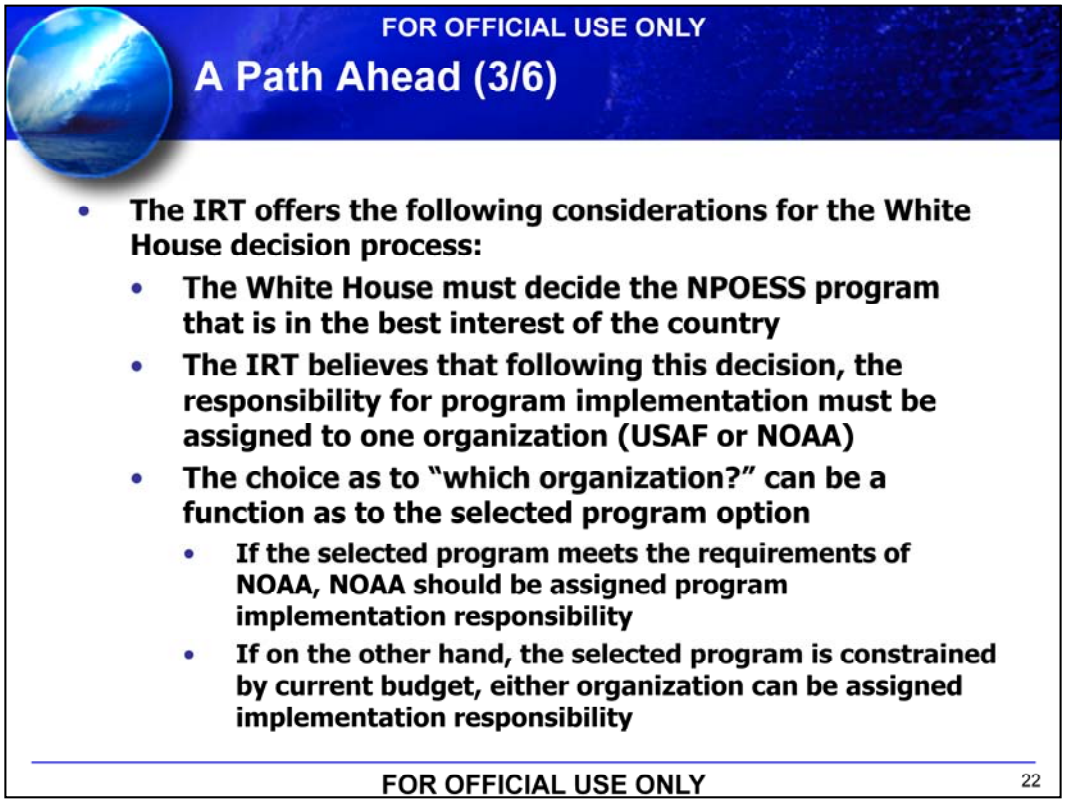
If the resultant program and level of funding are judged to be unaffordable then the scope of the program should be adjusted such that the reduced program scope can be accommodated within the level of the available funding at an 80-20 cost confidence level in each fiscal year and for the total program. The acceptability of this reduced scope program should be assessed.



Based upon the DoD/USAF stated priorities for NPOESS, its willingness to accept legacy capabilities and the associated cost, the IRT believes the DoD/USAF will be unwilling to budget an NPOESS program compliant with the level 1 requirements and the IRT recommendations to an 80-20 cost confidence level.

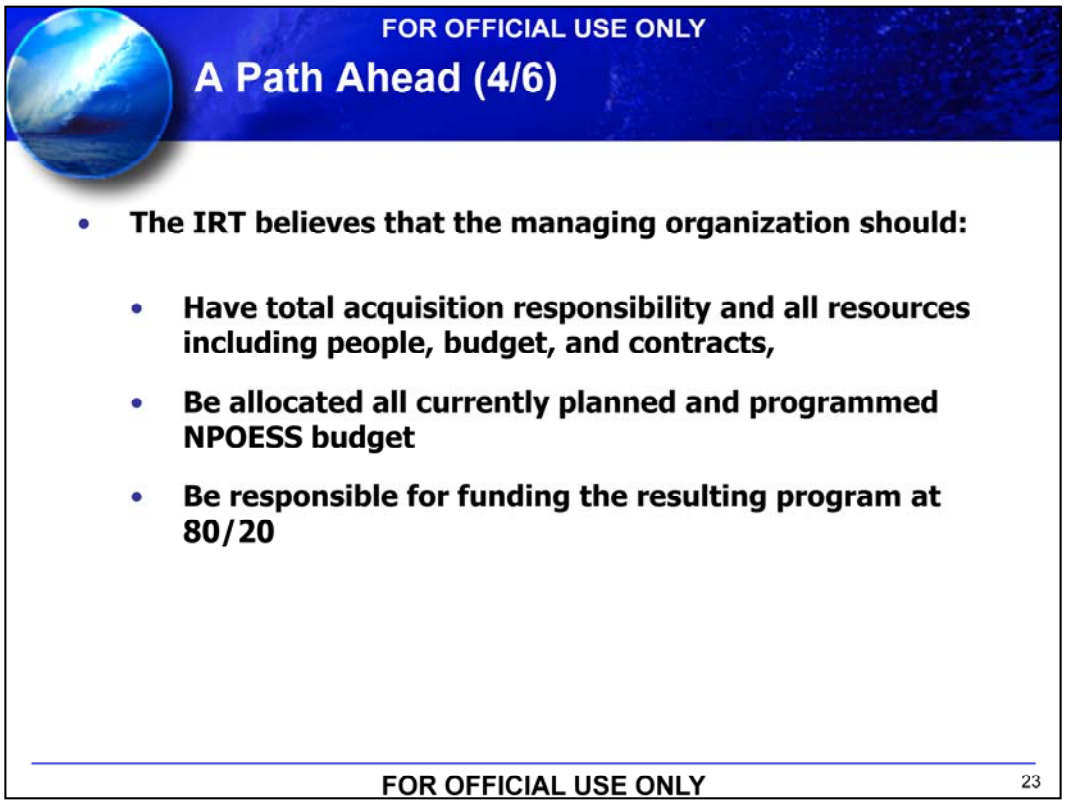
On the other hand, NOAA and NASA are unlikely to support a reduced program that will fit available funding based on an 80-20 cost confidence since the likely reductions in capabilities would represent a step back from the level of capabilities they are using today to meet forecasting and climate requirements.

The IRT believes that the EXCOM will be unable to resolve this difference. This leaves the White House as the only viable forum for the resolution and definition of the NPOESS program that best fits the national interests.



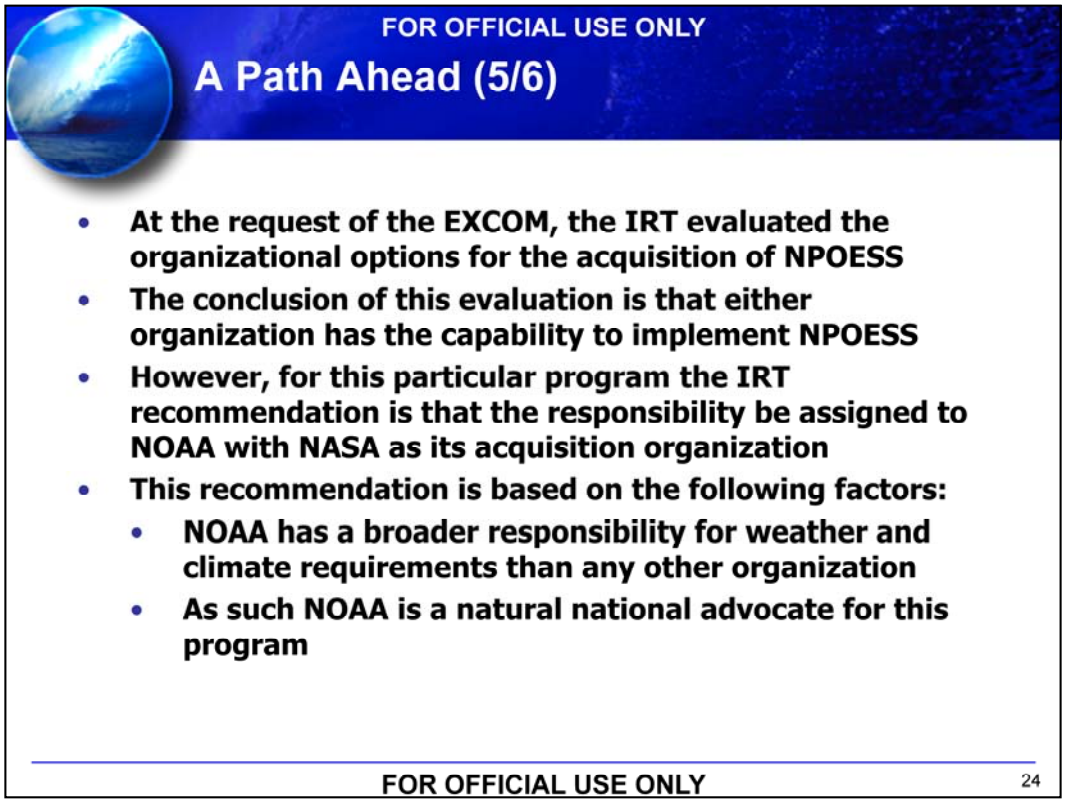
The IRT believes that, in addition to defining the NPOESS program that meets national interests, responsibility for the program's execution must be assigned to one organization (USAF or NOAA).

Should the selected NPOESS program option have requirements consistent with current Level 1 requirements, the logical choice would be the organization needing the improved capabilities above legacy, i.e., NOAA. If the decision is to constrain the program to be consistent with legacy performance and the associated budget, either NOAA or the USAF could be assigned the responsibility.



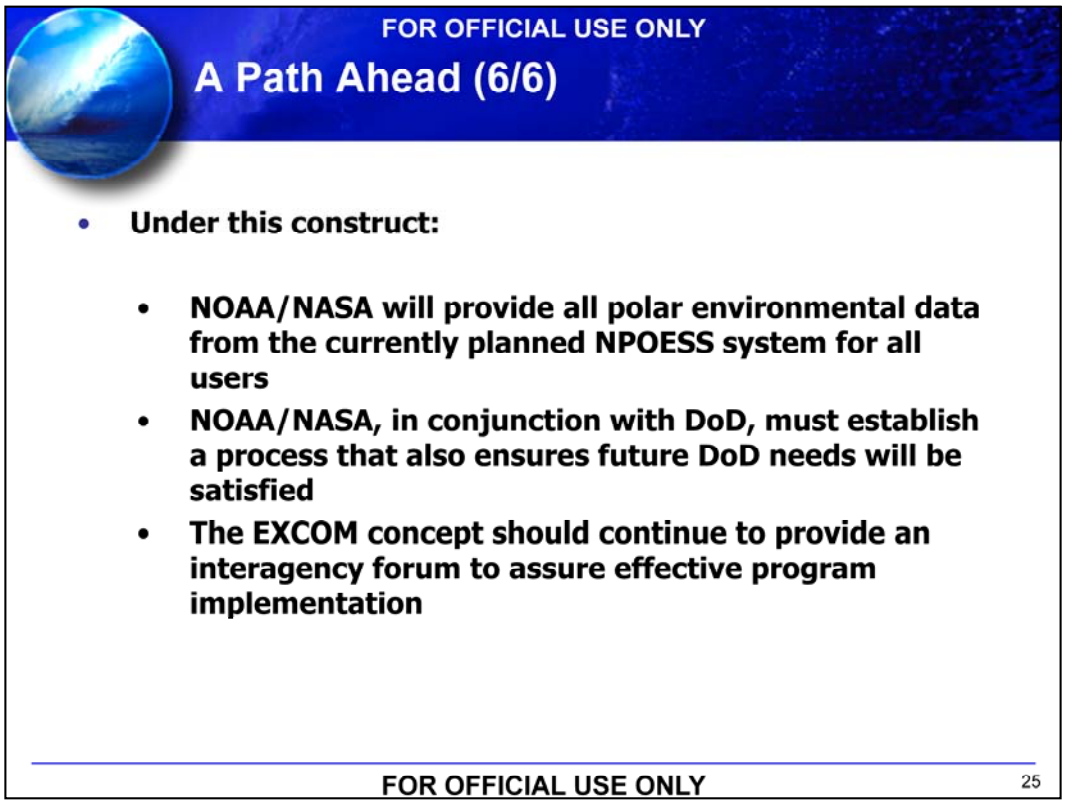
The organization assigned management responsibility must have total acquisition responsibility including control and responsibility for all supporting resources and functions such as people, budget, and contracting.

Additionally, that organization should be allocated all currently planned and programmed NPOESS budget and then be responsible for funding the NPOESS program at an 80-20 cost confidence level.



At the March 4, 2009 EXCOM briefing of the IRT findings and recommendations regarding NPOESS, the EXCOM requested that the IRT evaluate the organizational alternatives for the acquisition of NPOESS. The conclusion of this evaluation is that either organization has the capability to execute the NPOESS program.

The IRT recommends that responsibility for NPOESS execution be assigned to NOAA with NASA acting as NOAA's acquisition organization. This recommendation is based on the following two factors: 1) NOAA has the broader responsibility for weather and climate than any other organization; and 2) This national responsibility of NOAA aligns well with the national character of the NPOESS program and makes NOAA the natural national advocate for the NPOESS program.



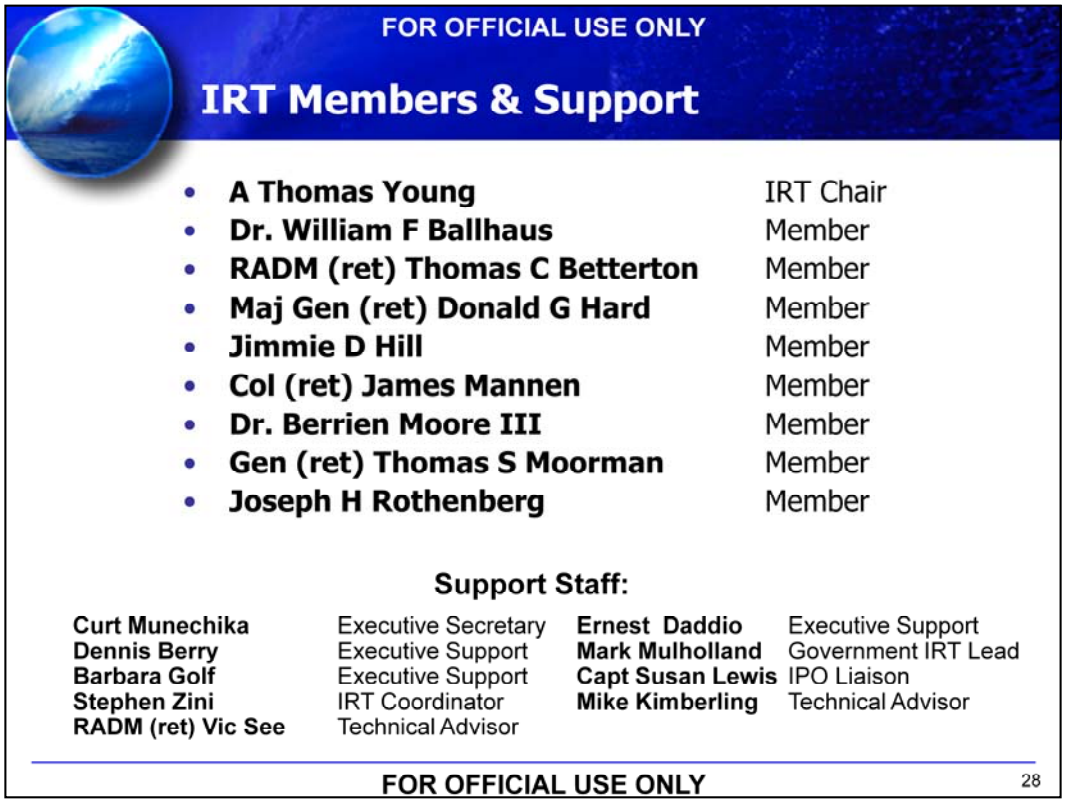
Under this construct, NPOESS execution is assigned to NOAA with NASA as NOAA's acquisition organization, NOAA/NASA will provide all polar data from the NPOESS program to all users. Additionally, NOAA/NASA, working with DoD, must establish a process that will ensure that future DoD needs will be satisfied.

The current EXCOM concept should continue as an interagency forum to assure effective program implementation and address high level strategic and policy issues associated with NPOESS implementation.

Conclusion

The decision and implementation of the new approach is urgently needed. Risk and unnecessary costs are being realized at an unacceptable rate

Appendix A
IRT Member Biographies



This Independent Review Team (IRT) is composed of DoD General Officers, Director-level NASA personnel, NRO, Industry, and space, weather, and climate professionals. A brief biography on each member is provided in Appendix A.

Additionally, the Program Executive Officer for Environmental Satellites invited each of the NPOESS participating agencies to send an official observer to each of the IRT meetings. The designated official observers were:

- NOAA: Abigail Harper, NOAA NESDIS Deputy Assistant Administrator for Systems;

- Air Force: Major Riley Pyles, SAF/USAE, Program Element Monitor

- NASA: Andrew Carson, HASA HQ Earth Science Division, Science Mission Directorate

IRT Members

1. **A. Thomas Young** -- **IRT Chairperson**: Former President and Chief Operating Officer, Martin-Marietta Corporation; former director, Goddard Space Flight Center; chair of numerous national-level space acquisition independent review panels; chair of NOAA GOES-R IRT; member, National Academy of Engineering

2. **Dr. William Ballhaus**: Retired President and CEO, Aerospace Corporation; Retired Corporate VP, Engineering & Technology, Lockheed Martin Corporation; and former Director, NASA Ames Research Center; Member, National Academy of Engineering

3. **Thomas Betterton, Rear Admiral, USN (Retired)**: former Director, NRO Program C; visiting professor and Space Technology Chair, Naval Postgraduate School; GOES-R IRT member

4. **Donald Hard, Major General, USAF (Retired)**: former deputy director, Secretary of the Air Force Office of Special Projects; former director of space acquisition, Secretary of the Air Force (SAF/AQS); GOES-R IRT member

IRT Members

5. **Jimmie D. Hill**: Former Principal Deputy Assistant Secretary of the Air Force (Space) and Deputy Director, National Reconnaissance Office (NRO); Goddard Memorial Trophy recipient; GOES-R IRT member

6. **James Mannen, Colonel, USAF (Retired)**: Former (first) System Program Director, NPOESS; former program director, NRO classified programs; GOES-R IRT member

7. **Dr. Berrien Moore III**: Executive Director, Climate Central, Inc, Princeton, NJ; Chair, Committee on Earth Studies, Space Studies Board, National Research Council, The National Academies; former Director, Institute for the Study of Earth, Oceans, and Space, University of New Hampshire

8. **Thomas Moorman, General, USAF (Retired)**: former Vice Chief of Staff, USAF; former Commander, Air Force Space Command; former Director, NRO Staff; former partner Booz Allen Hamilton; participant in numerous national-level space acquisition independent review panels

IRT Members

9. **Joseph Rothenberg**: former Director, Goddard Space Flight Center and Associate Administrator for Space Flight, NASA HQ positions; Chief Customer Service Officer, President and Board member, Universal Space Network; GOES-R IRT member