

13 COST OVERVIEW

Costs for executing this architecture are based on full life-cycle costs for fielding, operating, and/or maintaining current systems and projected costs, including acquisition for future systems. NAS modernization costs include training, procedures development, regulation changes, and certification requirements. The funding levels described in the NAS Architecture Version 4.0 ensure continued safety for the flying public and growth of system capacity. Total costs by funding category are provided, except for Airport Improvement Program (AIP) funds, which are not currently integrated into the NAS architecture.

The primary cost is for air traffic management services (i.e., the process of efficiently clearing aircraft from origin to destination while maintaining safety). Other costs include:

- Safety:
 - Safety inspection of aircraft
 - Certifying new aircraft and avionics
 - Testing and certifying pilots
- Capacity:
 - Disseminating information to airspace users
 - Maintaining the NAS infrastructure

- Introducing new technologies
- Strategic planning for future operations
- Security:
 - Maintaining security at airports and FAA facilities and in flight
- Environment:
 - Responding to environmental issues.

All costs represented in this document indicate fiscal year (FY) costs from 1998 through 2015.

13.1 FAA Funding Appropriations

The FAA receives four different types of appropriations from Congress each year: Research, Engineering, and Development (R,E&D); Facilities and Equipment (F&E); Operations (OPS), and AIP. Figure 13-1 shows total FY R,E&D, F&E, and OPS costs (escalated for inflation) associated with the architecture, which are based on the FAA’s January 1998 funding projections through 2015.

13.1.1 Research, Engineering, and Development Funding

R,E&D activities minimize the risks associated with capital expenditures; focus research in areas with a high potential for success, such as joint re-

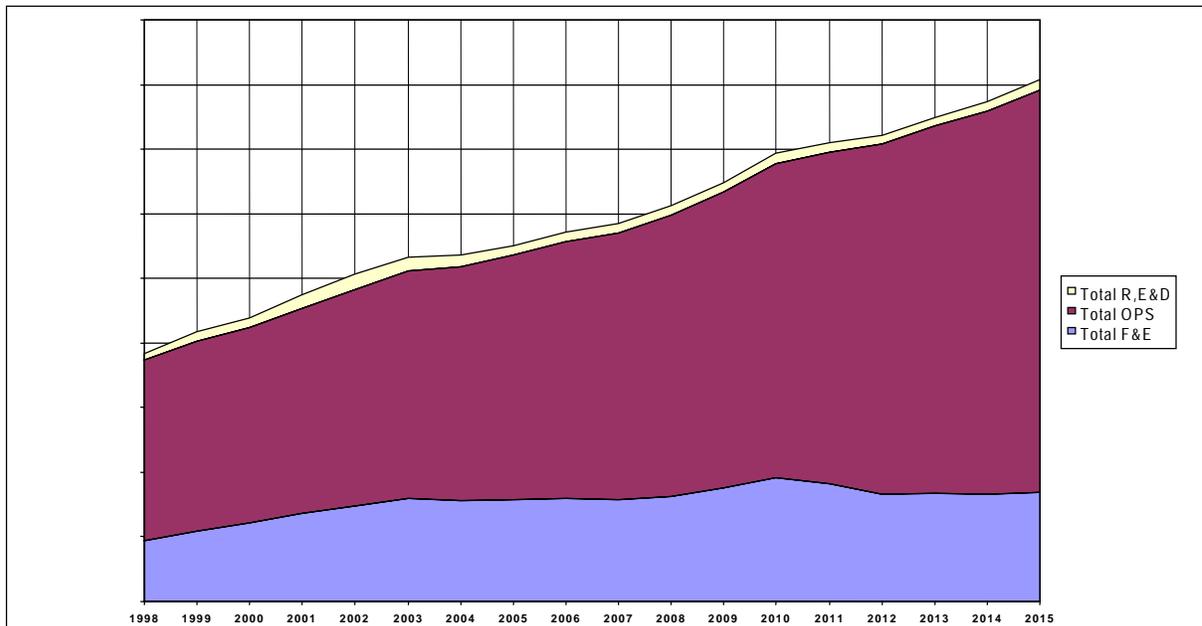


Figure 13-1. Estimated NAS Architecture Costs

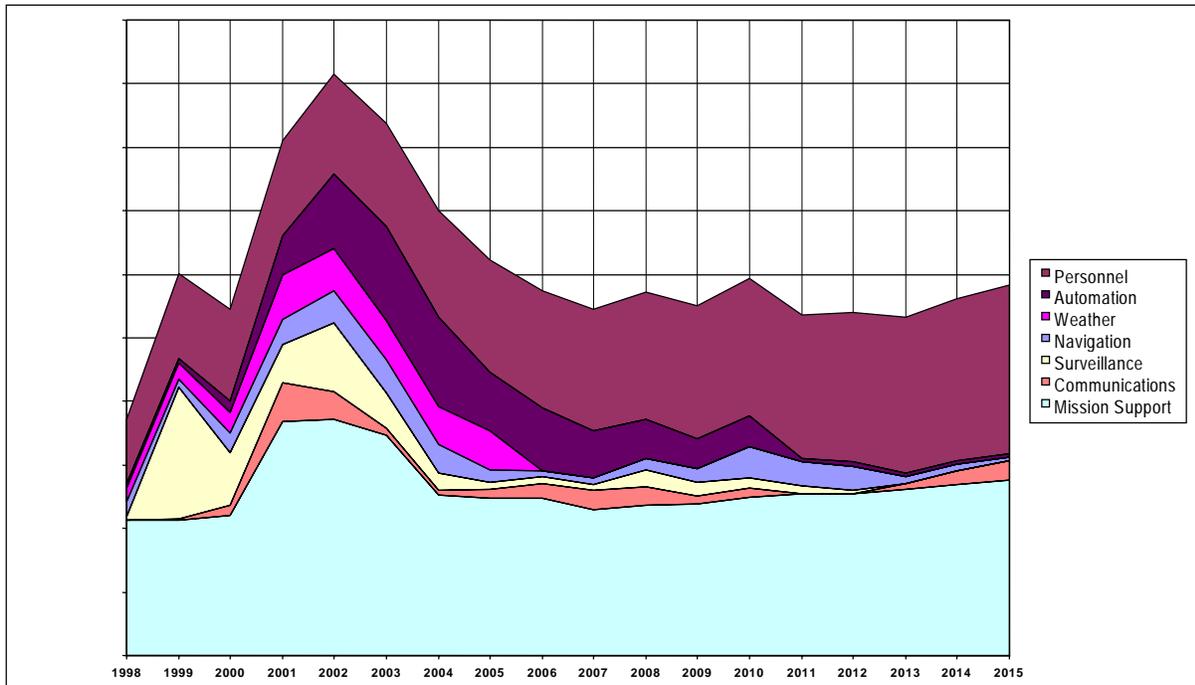


Figure 13-2. Estimated R,E&D Costs

search with the National Aeronautics and Space Administration (NASA) for future avionics; and research aviation-unique disciplines (e.g., aircraft fire safety). Figure 13-2 shows the estimated R,E&D funding requirements associated with the architecture. The FAA and NASA sponsor joint research projects; however, NASA research funding is not included in Figure 13-2.

The R,E&D funds required in the early years of NAS modernization (from 1999 through 2004) are significant because implementing a smooth, low-risk NAS transition depends on research. This R,E&D provides the foundation for projects that will implement the Government/Industry concept of operations (CONOPS). For more detailed information about R,E&D activities, see Section 10, Research, Engineering, and Development.

13.1.2 Facilities and Equipment Funding

Figure 13-3 shows the minimum estimated F&E funding required to implement the NAS architecture. F&E required in the financial baseline (from 1999 through 2004) is vital because a significant amount of equipment replacement and infrastructure refurbishment has been delayed due to the previous lack of funds. The FAA must modernize, repair, and replace a significant portion of its in-

frastructure in the near future to sustain current services and also to provide new capabilities and services to meet user needs. Delaying infrastructure replacement will cause increases in the OPS funding for maintaining equipment. Historically, systems reaching the end of their economic service lives fail more often and require increased maintenance. In addition, it is difficult, costly, and sometimes impossible to add functional enhancements to these older systems.

The gradual increase in F&E funding is shown in Figure 13-1. Additional future user needs will also emerge over time, which could increase funding requirements.

13.1.3 Operations Funding

OPS funding and estimated requirements are shown in Figure 13-4. Investing capital can save operating expenses. The architecture considers this, but as new systems are deployed, the total OPS cost for a service increases until its transition period is complete, the older equipment is removed from service, and the site is environmentally restored. This is most dramatically demonstrated in the navigation functional area with the deployment of the augmentation systems for satellite-based navigation and landing and the gradual phase-down of the ground-based navigation

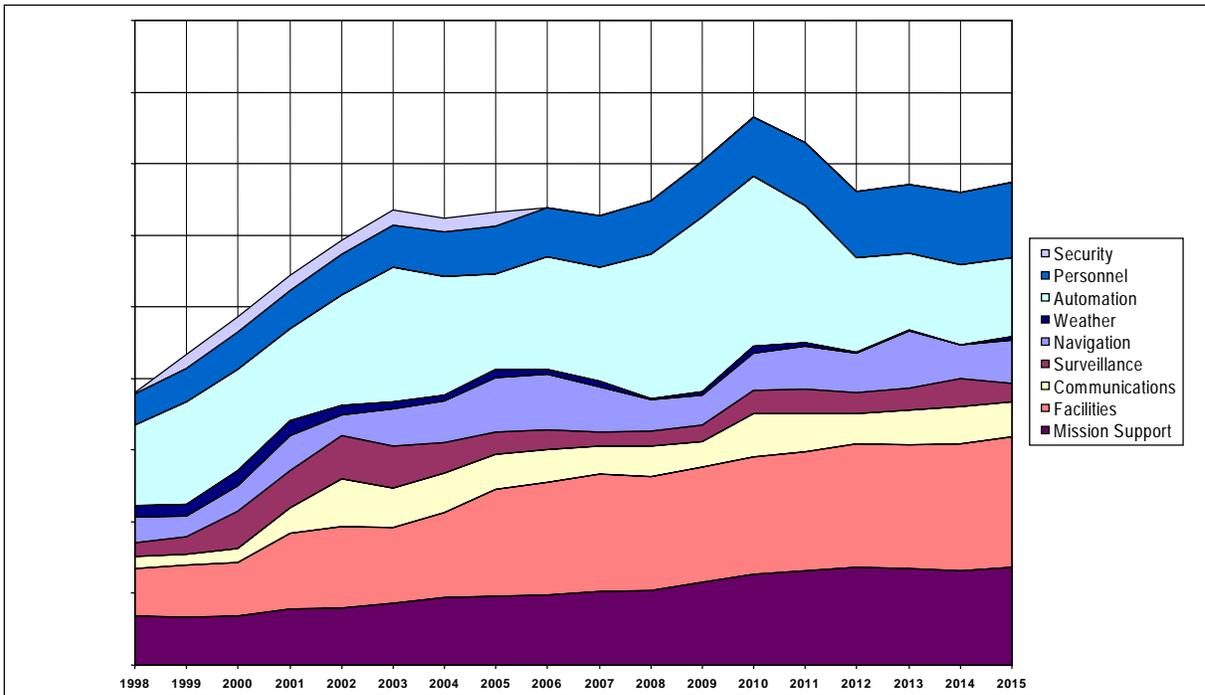


Figure 13-3. Estimated Architecture F&E Costs

and landing systems (see Section 15, Navigation, Landing, and Lighting Systems).

To implement the concepts of Free Flight, the FAA must increase the services it provides to NAS users. This is best demonstrated in the ex-

pansion of communications and information-sharing activities. Even though unit prices for communications and commercially available computer processors (like desktop personal computers) are decreasing, the FAA’s use of and reliance

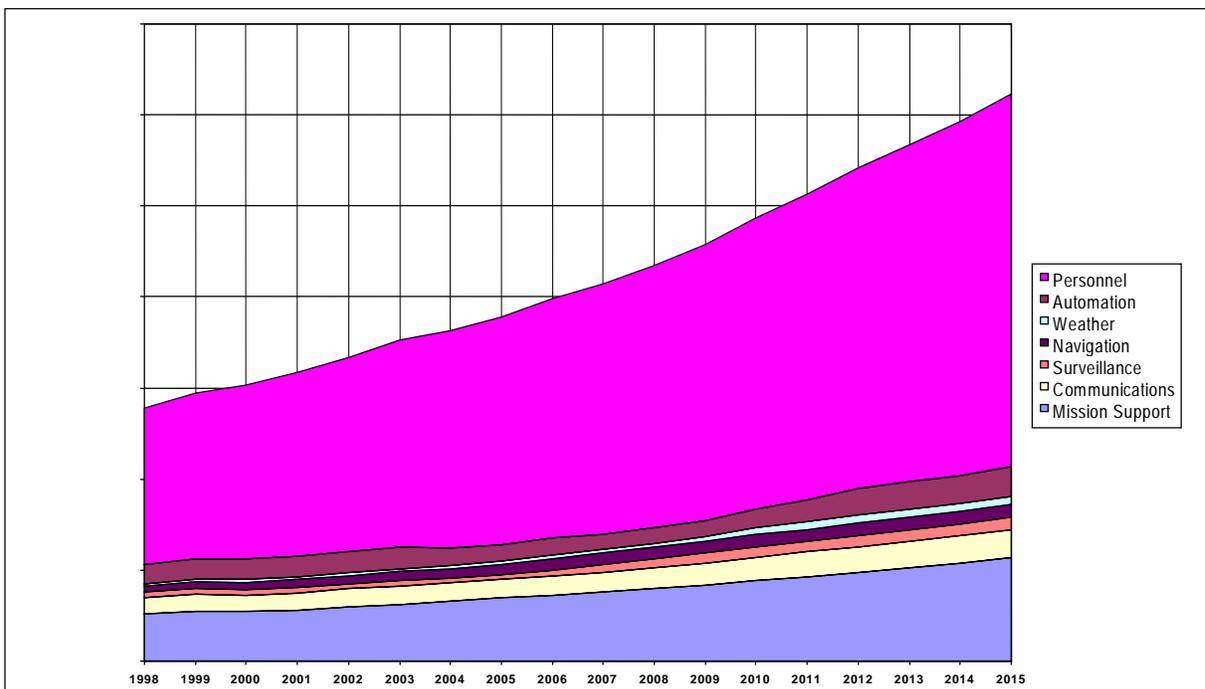


Figure 13-4. Estimated Architecture OPS Costs

on these items is increasing, and therefore, the total OPS cost to provide services will rise.

Operating the NAS is personnel-intensive; therefore, the dominating cost element is personnel cost (see Figure 13-5). Personnel account for approximately 70 percent of operations costs (see Section 12, Personnel). As traffic and services increase more FAA personnel (controllers, traffic managers, technicians, inspectors, etc.) may be needed.

13.1.4 Airport Improvement Program Funding

AIP funds are primarily airport improvement grants given to various qualifying airports. Airports use the money to help modify or add runways, relocate utilities, or even buy land around the airport to ensure environmental compliance for noise restrictions. Currently, AIP funding is not included in the architecture cost profiles. In FY99, work will focus on integrating airport development needs into the architecture. See Section 28, Airports, for additional information. The FAA will continue to fund approach lighting and landing aids based on current criteria.

13.2 User Avionics Costs

For NAS modernization to be realized, aircraft need to equip with new avionics. The costs for avionics required by NAS modernization, as well as the transition/implementation periods, have been estimated. The estimates were developed by the FAA working in conjunction with avionics manufacturers, aircraft manufacturers, airlines,

and general aviation organizations. These costs are discussed in Section 18, Avionics.

13.3 Cost Estimate Methodology

Consistent with funding, a key goal of the NAS architecture is to modernize the NAS as quickly as possible to achieve Free Flight. In the architecture, investments are planned for new technology to implement Free Flight capabilities. Aging facilities and equipment are replaced in a time-phased manner. Capital investment is promoted to avoid escalating maintenance costs.

Most systems in the architecture are life-cycle funded. Life-cycle cost estimates include research and development; procurement; installation; operations; associated personnel costs; and technology updates and other system upgrades. The timing of funding for new systems and upgrades to existing systems is based on the estimated life cycles of existing systems and on the estimated refresh cycle of the associated replacement systems.

Some individual projects or investment areas (e.g., traffic flow management and communications) may show spikes of funding in some years. These numbers can be smoothed by using multi-year funding. As the budgeting process is completed, the estimates are revised to stabilize the yearly funding requirements.

Cost estimates are based on a variety of sources, including:

- Engineering judgment
- Industry estimates
- Investment analyses
- Cost-benefit analyses (CBAs)
- Life-cycle cost estimates prepared to support mission analyses
- April 1997 Future Telecommunications Book for communications OPS costs
- Cost Performance System (COPS) and the Workload Information System (WIS) for OPS costs
- F&E funding baselines as of June 1998
- Software Life Cycle Model (SLIM) estimates.

These sources were used as departure points for cost analyses to estimate life-cycle R,E&D, F&E, and OPS funding from 1998 through 2015. If a

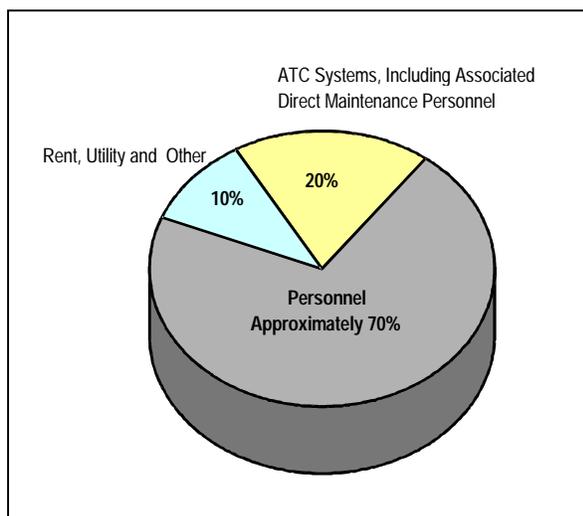


Figure 13-5. Estimated OPS Costs

project changes significantly or if a new project is created, estimates will be derived using the best data and estimating tools available.

Estimates for programs that have been included in the current FAA financial baseline are expected to be at least 80 percent accurate. Estimates for new programs without approved baselines are less accurate. In other words, for programs without approved baselines, the actual costs will be lower than the estimate about half the time and higher than the estimate about half the time.

13.4 Watch Items

The ability to meet FAA funding projections.

13.5 Summary

The NAS Architecture Version 4.0 was developed to stay within the FAA's January 1998 funding

projections. This modernization plan has identified all necessary funding needs for R,E&D, F&E, and OPS from 1998 through 2015. NAS modernization costs include training, procedures development, regulation changes, and certification requirements. The primary cost is for air traffic management services, which includes improvements in safety, capacity, security, and environment. AIP funding is not included in the architecture cost profiles; however, user avionics costs are included. Cost estimates are based on recognized industry practices.

