

Beginning of closing talk

Now, let's step back and take up the question of where to go from here. You'll recall from my opening comments that one of the things that makes NextGen complex is that there are multiple organizations with their people, cultures, needs, objectives and ways of looking at problems wrapped up in NextGen. And we often look at this as a problem, but the reality is that they – we – are all parts of the system. And each organization has a legitimate perspective that must be considered.

So, let's start with the FAA. First, let's recognize that FAA comes at this from a safety and operational perspective. They see the system as it is today and the next incremental improvements. These incremental improvements are managed separately within the overall FAA organization to keep the development close to the operation. Within this context, they have had very good success with their OEP process to coordinate these changes across the total FAA organization. So, for example, the opening of new runways is coordinated with airspace and procedure design and CNS infrastructure installation. Because of this worldview and success, FAA is naturally looking to apply the OEP approach to NextGen implementation. Unfortunately, OEP has not been tested on something with the long time horizon, scale and complexity of NextGen and therefore there may be substantial risk.

Next, let's look at the manufacturing community. Their inclination is to look at NextGen as a system with fixed requirements to be engineered, using systems engineering and integration best practices. They advocate for a special program office that has the resources and span of control to manage all of the major development and implementation activities, including developing and controlling requirements, synchronizing resources and schedules, specifying and managing interfaces, and integrating systems. Using this approach, the DoD has fielded systems of incredible capability such that the US military is unsurpassed globally.

Unfortunately, this approach has also come up short nearly every time it has been applied to very complex military systems. A March 2008 GAO report shows that substantial cost growth, schedule slips and reduced functional performance are the norm.

Finally, let's examine the user community. Perhaps their view is the most straightforward. They view NextGen through the lens of benefits and costs. They want to operate in the most efficient and safe manner possible for the minimum cost, whether that is a commercial aircraft flying passengers from point a to point b, a military aircraft flying to and from special use airspace for training or a general aviation pilot doing some recreational flying. Unfortunately, user investment horizons are by and large short-term, but the implications of their investments are very long-term as vehicles and avionics have multi-decade lifecycles.

While these are clearly different world views, I believe there is a path forward that can satisfy all of these legitimate perspectives. There are four elements: first, a set of prioritization criteria designed to be responsive to complexity of NextGen; second, let's develop and execute an integrated CNS plan; third, let's establish a development and demonstration environment and process; and fourth, let's incentivize public-private partnerships around creating real change and delivering benefits.

I'll briefly address each of these elements. First, in order to deal with the inherent complexity of NextGen, let's adopt a set of architecture criteria to drive prioritization of our solution sets. They would be: scalability to varying levels of demand; flexibility to implementation at different locations and times; robustness to a wide variety of interfaces; resilient to considerable pressure before failing; and, highly leverageable and adaptable to many different uses and applications. I know, a pretty challenging set of criteria.

The second is apropos for an ICNS conference. And that is, let's develop and execute an integrated CNS plan. Integrated CNS provides the enabling infrastructure for NextGen and hence an important foundation for supporting an evolutionary development process. There is consensus on the components – GNSS for position, navigation and timing with ground based augmentation for specific high performance applications, ADS-B out and in for surveillance and aircraftbased separation applications and a combination of voice and DataComm for communications. System-wide information management provides the backbone for a net-enabled operations construct. Obviously there are a lot of other details – many of which will be discussed at this conference. The primary challenge is that this infrastructure crosses Agency lines and will therefore require inter-Agency cooperation. But I believe this part of the NextGen challenge can be sufficiently well bounded so that it is suitable to a large-scale, integrated systems engineering effort.

This will also provide a substantial basis for an integrated, long-term perspective for avionics that the user community needs to put near-term investments on a long-term timescale. As a note, the JPDO has a Senior Policy Committee meeting tomorrow that will be chaired by Deputy Secretary Barrett. The three major interagency issues we are taking for decision are around CNS and information sharing.

The second element is to establish a NextGen development and demonstration environment and process. This gets to the heart of an evolutionary approach that integrates developers, operators and users. The idea is to create an experimental environment that is based on real systems, real software and real operators and users and couple it with a rule-based process that allows developers to competitively, but fairly, integrate, evaluate and ultimately be rewarded for real solutions. Evaluations would occur in virtual and real operations. NextGen capabilities define the target vision. The architecture criteria fully defined from each stakeholders' perspective would support a set of objective metrics. Other criteria would include the ability to spiral out near-term improvements that deliver operational benefits. This changes the model from specifying the solution to guiding the evolution. Experiments and demonstrations that integrate various policy and technical changes to evaluate predicted and emergent system behavior and performance can guide higher confidence decision-making for policy makers. Again, real feedback is driven by real performance, not the plausibility of predicted performance.

The third element is public-private partnership. Because of the complex relationship of stakeholders within the system, we should incentivize organizations to work together toward system solutions. Think of the UPS CDA and ADS-B trials as one example. This approach would be especially useful when cooperation is required to achieve a capability or policy, such as methods for allocating trajectories across many users in constrained conditions such as weather events. In conjunction with a NextGen development and demonstration environment, this could provide a workable approach to making difficult decisions in this complex system. Public-private partnerships can also provide balance between competition and cooperation within the system.

These are some specific proposals I believe will capture common ground and address key needs and perspectives of the various stakeholders. The important point is that to be successful, we must integrate the legitimate

perspectives of the stakeholders in NextGen. The bottom line is that it is impossible to separate the development of NextGen from the definition of NextGen. In such a complex system, they are inextricably linked through the evolutionary process. Perhaps the biggest culture change we are going to go through is not to the role of the controller or pilot, but to create a culture that blends the planning, development and implementation communities. If there is one message that you take from this talk, it is as we collectively embark on this journey, let's start a real dialogue around finding a shared implementation strategy for NextGen.

Thank you.