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The J-UCAS Common Systems and Technologies organization will develop what we refer to as the Common Operating System. The Common Operating System will facilitate the integration of subsystems such as sensors, weapons, and communications while minimizing the impact from platform constraints. In addition, we will develop a system architecture to ensure intra-operability between the internal components of J-UCAS and inter-operability with external elements such as manned aircraft, command and control centers, and space assets. Furthermore, we will develop a single suite of sensors accompanied by common mission avionics, and software applications. Bottom line, one architecture, one sensor suite, and a Common Operating System will lead to the reduction of costs, the lowering of barriers to the entry of new technology into J-UCAS, and finally, the acceleration of a network centric war fighting capability.

Now, what is the Common Operating System?. First, let me tell you what it is not. The Common Operating System is NOT a single monolithic software application hosted on a central processing element within J-UCAS. It's not like UNIX, LINUX, or any of the available embedded operating systems. It does not manage and control resources such as hard drives, network cards, and keyboards as one would expect of these typical operating systems. In the case of the common operating system, the resources that it controls and manages are the specific components within J-UCAS. For example, the weapons, sensors, communication links and even the air vehicles that carry these subsystems.

It also helps to understand the Common Operating System by looking at the structure of typical unmanned systems. We often speak of the air vehicle segment and the ground control segment with an overlaying level of integration that is required to make it all work together. The software that enables these elements to operate together is usually developed in discrete pieces. In J-UCAS, we treat the connect-the-dots portion of the system as a single, integrating entity and refer to it as the Common Operating System. Anything that reaches beyond the individual platforms is part of this Common Operating System. Just so there is no confusion, the common operating system is the software and the algorithms that provide for command and control, communications management, mission planning, much of the interactive autonomy, the human systems interface and the many other qualities associated with each of these.

Besides the control and management of J-UCAS resources, the Common Operating System facilitates information exchange. It provides the technical interfaces to both the components within J-UCAS and the external information consumers and producers. In addition, the Common Operating System manages the overall network services. It also allows for battlespace awareness for J-UCAS operators, command authorities, and pilots. In summary, the Common Operating System enables the autonomous capabilities of J-UCAS in its accomplishment of mission objectives.

A major factor motivating the development of the Common Operating System is the level of integration and interoperability implied by the J-UCAS concept. J-UCAS is not a single ground station and a single platform, but a collection – in fact an arbitrary collection of platforms – as well as multiple control elements all linked together with the infrastructure and support systems to provide a single, seamless integrated capability. The system should be versatile in performing its various mission functions. The J-UCAS elements therefore, have to be intra-operable as well as inter-operable with outside elements of the system. Another motivating factor for the Common Operating System is the level of autonomy versus human-in-the-loop operation needed during the operation of the J-UCAS. This balance between the two at any given point in the mission is dictated by the actual mission itself. A Common Operating System is needed to manage this balance. Finally, while we're focused today on particular platforms the services have prescribed for use in J-UCAS, this Common Operating System is being designed so that it can, in effect, host a number of other configurations that might be required to pursue missions of a similar type as we move into the future and the requirements for the existing platforms change. To summarize, the network centric nature of the J-UCAS, with the need for collaboration and synchronization coupled with the demanding mission timelines drives us to a Common Operating System solution.

Now, with the understanding of the scope and motivation for the Common Operating System, I will now focus on its specific functions. As you would expect with any operating system there is functionality related to resource management. For J-UCAS, this includes sensor management, communications management, and attack management. In addition, contingency management at the system level is performed by the Common Operating System. It manages information with a publish and subscribe mechanism and performs the necessary data fusion.

The Common Operating System provides the battle management functionality. It creates a common relevant operational picture of J-UCAS in the battle space. The Common Operating System provides J-UCAS operators with decision aids and the mechanisms necessary for integrated fire control in a joint environment.

The network centric nature of the J-UCAS along with its various networks and communication links requires the Common Operating System to provide both communications and network quality of service functionality. Critical interfaces are provided to the Global Information Grid (GIG). For instance the interfaces to the beyond line of site links such as MILSTAR and TCDL, line of site links such as Link 16, and network links such as SIPRNet and JWICS are all controlled by the Common Operating System.

We believe that the Common Operating System will lower the life-cycle costs for the whole software system. This should be accomplished by using a single, integrated development instead of multiple, segregated developments and for having an evolving, internet-like model for pursuing that development. Our hope is that the concept pioneers broad industry collaboration, the kind of collaboration necessary to move to higher levels of interoperability. It also affords us a means for decoupling the platform and the operating system in a way that segregates the technology-driven element which is driven by the advances in information technology from the user-driven element, which is the air vehicle platform.

Let me tell you a little about how we intend to develop the Common Operating System.

We are in the process of defining a new business arrangement for its development that will involve a consortium-like environment. A master agreement will connect not only our two program primes, Boeing and Northrop-Grumman, but other organizations necessary to help develop and evolve this most important piece of the system. This agreement will form the consortium among the program primes, an integrator-broker, and technology contributors.

Program primes are key stakeholders not only that they will have fractional ownership of the Common Operating System, but they are the platform integrators from both a physical and functional point of view. While they can support this directly as a software developer for specific functionality, their role as a system integrator is unique in this consortium arrangement.

An important entity within this consortium-like arrangement is the integrator (slash) broker. This is a unique role in this business arrangement. The integrator/broker is not a large scale integrator or LSI, but rather an organization that can have no other role in the consortium.

The main group of participants in this consortium are the technology contributors. This can include a variety of other organizations and contractors. Their involvement is based on the specific potential contributions that they might make. These entities can include small developers, other large defense contractors, as well as traditional sub-contractors. The door is also open for commercial providers.

The key to the successful development of the Common Operating System is collaboration between the two prime contractors and the technology contributors in this consortium. The role of the integrator/broker is to be proactive in the integration process, mitigating the effects of the competitive forces between the two primes. A key part of our strategy and the development of the Common Operating System is to make sure that the prime contractors are both stakeholders and share holders in the Common Operating System, not merely receptors of it.

We are in the process of crafting the solicitation that will result in the selection of the integrator/broker entity. Proposals will be due some time after this conference and selection completed by early summer of this year. Once the consortium is formed, mechanisms will be announced leading to teaming with organizations that will ultimately make up the entire consortium.

We are motivated by the reality that the J-UCAS enterprise requires a level of integration far exceeding what would be needed for individual platforms. Our intention is that over time as the common operating system comes together, it will be looked upon with respect and awe. Eventually, both prime contractors and technology developers will embrace it as an irreplaceable component for J-UCAS.

Now, I would like to now turn the podium over to Col select Paul Waugh to talk to us more about the challenges faced by the Joint UCAS program and some of the other opportunities that exist for you to participate. Paul....