Appendix 3: Zero-Casualty War Scenario

- Provision of hierarchical views of the network struoture, depending on the "user": forward operating base, CONUS, Task Force commanders, and FFCS Cell team

Appendix 4: Deeply Networked World/SWARMS Scenario (Smart World Airforce Repair and Maintenance System)

Appendix 5: Crisis Management Scenario

In 2010, NOAA began a five-year deployment of its Ultra Doppler/SAR radars across "Tornado Alley" in the central U.S. In the following year, DoD received "dual use" approval to supply early fire warning bulletins from its "staring" missile launch detection satellite systems. And in 2012, NASA orbited Firesat, capable of providing twice-a-day high resolution multi-spectral, multi-instrument views of forest fire activity around the world.

The year is now 2015, and a "perfect" fire and tornado season has descended on the U.S. Hot, dry Santa Ana winds have come to the West Coast of the U.S. with a vengeance, from San Diego all the way up to the Pacific Northwest. In the Central States, destructive twisters are beginning to form along nearly every low-pressure system that sets up across Oklahoma and Texas.

be facing from the need to continuously monitor, at high resolution, the physical world I am interested in exploring. My task would be much easier if it were possible to execute local correlation and possible aggregation of data inside the network before I collect and process the data at the desired level of granularity."

Then in reference to her collaboration with her direct national and international peers, Dr. Clotho added, "Facilitating the interaction and collaboration among the large number of limited devices addresses only one aspect of my problem. We also need collaborative

Scalability and High Assurance Networking

To support the cardiologist at home, the wireless channel must provide real-time video and real-time data signal display. Although this application may tolerate a fair amount of latency, it will not tolerate jitter and the video, audio, and data channels must be synchronized.

End-to-End Performance, Intelligent Networking

The angiogram procedure identifies the need Per end-to-end knowledge of the network data path including the display devices at the ends. An intelligent, scalable network should

Appendix 8: High Energy Physics Scenario

Never before has the scientific mission of particle physics research been so dependent on state-of-the-art information technology. Collaborations of hundreds to thousands of physicists and engineers are formed to create accelerators, detectors, and analysis systems with a productive life of tens of years. These analysis systems form a complex and widely distributed "fabric" of computing and storage resources.

The non-deterministic nature of quantum physics, uneasily understood during the last century, inevitably requires the measurement and analysis of billions of particle interactions to observe and understand fundamental processes. Particle physics experiments have pushed against the limits1ee technol, acctronhysicof computors, anetworkdurims rs cadurces wimf billions channelsice

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capacity switching fabric, but individual data acquisition nodes and filtering nodes will communicate at gigabit speeds. In addition to the substantial bandwidth requirement, challenges include:

- The multicast service required when more than one remote filtering center is available
- Achieving adequate error rate and robustness without *ever* allowing the implementation of the "wild idea" to impact the detector-site data acquisition system