

# Clarus

**Comment Matrix for the Draft *Clarus* Concept of Operations dated  
February 18, 2005 based on comments received at the**

***Clarus* Initiative Coordinating Committee (ICC) Meeting # 2  
March 2 – 3, 2005  
Las Vegas, Nevada**

Submitted to:

**Federal Highway Administration**

April 13, 2005



This comment matrix contains those comments received by March 28th affecting possible changes to the Draft *Clarus* Concept of Operations dated February 18, 2005. Other editorial or Non-*Clarus*-related comments can be found in the *Clarus* ICC #2 meeting proceedings. The disposition of the comments is either “Incorporate” or “No Change”. The comments are categorized by subject area of the meeting or reviewer’s name.

No.	Comment Description	Disposition
<b>Clarus ICC #2 - Executive Summary Review of ConOps</b>		
1	How does the airport industry involve itself in the <i>Clarus</i> process? How does the marine industry do the same?	<b>No Change</b> – The scope of <i>Clarus</i> is transportation agency assets that collect environmental observations related to roads or routes. This includes vehicles traversing roads as well as trains and ferries traversing routes. The airport industry has been identified as an industry that will have to be linked to <i>Clarus</i> ; though not a specific component of the initial system design in the way the boundaries were identified for the base <i>Clarus System</i> . Some DOTs are investing in airport or other industry sensors, (e.g., Michigan DOT’s AWOS investments); however, AWOS data falls under the FAA and/or NOAA. Marine data is not homogenous, as the railroad industry also operates marine ports. It is conceivable that <i>Clarus</i> could collect certain aviation or marine reports but these and other environmental information fit better under existing

		NOAA collection mechanisms or through NOAA arrangements with other agencies.
2	It seems like everything involves service providers accessing data and making it available to users, but if <i>Clarus</i> is being funded by taxpayer dollars, we should consider making this data available to everyone.	<b>No Change</b> – the current scope of <i>Clarus</i> allows for data to be made available to service providers who provide the mechanism for data dissemination to others. Reference Comment #100.
3	The ConOps focuses on data quality as a differentiator for <i>Clarus</i> from any other system, but there is not a quality assurance / quality control (QA / QC) process clearly identified as a key component of the design. Flagging data, but not removing it from the data stream during the QA / QC process is highly important.	<b>No Change</b> – the specifics of the QA/QC process will be defined in the design. <i>Clarus</i> will flag the data and the ConOps does discuss this process at a couple of levels.
<b>Clarus ICC #2 - NOAA Surface Weather Program Update</b>		
4	Could you clarify the relationship between ISOS and <i>Clarus</i> ?	<b>Incorporate</b> – ConOps will be updated to better show the relationship between <i>Clarus</i> and ISOS. NOAA would like to see <i>Clarus</i> as a part of ISOS, but as federal agencies, we are looking to not have the two systems compete, but rather complement each other. We are determining how the systems will work cooperatively in the end. <i>Clarus</i> is on a more aggressive schedule than ISOS is and one vision is to develop <i>Clarus</i> and have it handed over to function under NOAA. Further discussion needs to occur to draw out the full relationship between <i>Clarus</i> and ISOS.

<b>Clarus ICC #2 - Canadian RWIN Program</b>		
5	Any sort of shared data between Canada and the U.S. at the moment?	<b>No Change</b> - Currently, not much data is even shared within Canada at the moment, but that is the goal. The Canadian Federal government does not own all stations and provincial governments that do are beginning to make them available.
6	Do insurance companies provide funding for weather information?	<b>No Change</b> - A quasi-public insurance corporation, owned by the government, in British Columbia has provided funding for weather info. To enhance safety. In other provinces, private insurance companies have supported our efforts, but show very little interest.
<b>Clarus ICC #2 - Update on Standards</b>		
7	Is DATEX being supported any longer?	<b>No Change</b> – The comment at the ICC #2 meeting was that CORBA may not be supported, but DATEX is supported. It is more likely that the <i>Clarus</i> interfaces will involve XML.
<b>Clarus ICC #2 - Update on VII Program</b>		
8	Are we looking at interim projects that are currently ongoing to help solve some of the hurdles that VII faces? Have we looked at private / public fleets to deploy these vehicle sensors?	<b>No Change</b> - This is a great topic for discussion as there are many projects that would contribute to VII advancement. We have had discussions with the Post Office and will consider these and other fleets in deployment. <i>Clarus</i> is working with the VII Initiative to make sure they are in concert with

		each other.
<b>Clarus ICC #2 - Review on Interpreting Use Cases and Operational Scenarios</b>		
9	Have we considered a three level hierarchy instead of a two level hierarchy system, as part of a distributive system for information?	<b>No Change</b> – It is unclear where the referenced hierarchy is in the <i>Clarus</i> ConOps. The diagrams define the logic of the system. While the ConOps will discuss possible alternatives for a regional vs. distributed <i>Clarus</i> system, this is a design issue.
<b>Clarus ICC #2 - Roadway Maintenance Treatment &amp; Construction Operations Function</b>		
10	Addition of actors and better identification of actors is needed.	<b>No Change</b> – Need clarification on what actors are needed and which actors need better identification. (See Appendix)
11	From a DOT perspective, the big issue is what requirements are going to be levied on DOTs as to what type of information will be required as input to <i>Clarus</i> and the cost associated with that. Ultimately, who is going to run <i>Clarus</i> and where is the money to run it coming from? Outside viewers will possibly ask what the U.S. DOT is doing with <i>Clarus</i> and why was not NOAA involved in this from the beginning. The Federal Aviation Administration and the National Weather Service (National Weather Service) set a precedent for this type of working relationship.	<b>No Change</b> – These are issues that go beyond the current scope of the concept of operations. At this time, US DOT is not expecting to levy requirements on transportation agencies; however, it is expected that guidelines will be developed. Other issues such as cost will be addressed in the <i>Clarus</i> Design phase. This ConOps development is the beginning of the systems engineering process and US DOT has been working with NOAA on this project.
12	DOTs would rather see <i>Clarus</i> feed the DOT instead of DOTs feeding <i>Clarus</i> .	<b>No Change</b> – We acknowledge that the

		DOT's own many of the ESS and maintenance and construction vehicles from which <i>Clarus</i> will receive data. The DOT can also be a recipient of the <i>Clarus</i> data affecting roadway maintenance and construction operations activities. It is the intent of this project to facilitate information exchange in both directions.
13	<p>Overall ConOps elements for Roadway Maintenance Treatment &amp; Construction Operations Function:</p> <ul style="list-style-type: none"> <li>• Provide support for winter and non-winter maintenance decision making</li> <li>• Real-time verification of upstream conditions</li> <li>• Enhance construction operations scheduling</li> <li>• Quality-controlled data to <i>Clarus</i> users</li> <li>• Improved forecast of weather and pavement conditions</li> </ul>	<b>Incorporate</b> – ConOps will be updated with these bullets except the QC bullet where it should read “Data with quality control flags or metadata to <i>Clarus</i> users”.
14	Additional discussion ensued on what would gauge the extent of detail that goes into the UCD actors as these elements of data collection relate to each state's specific processes for data collection. Having an actor that is “too generic” loses the detail as to what entities are the actual components of data collectors for the <i>Clarus System</i> .	<b>Incorporate</b> – The revised ConOps will have a diagram framework with generic actors (e.g., vehicles) and each scenario will discuss the specific detailed vehicle (e.g., transit vehicle) as it pertains to the scenario.
15	Do you stop bad data and force maintenance actions, or do you flag it and let it go, so that it can be out there for an undefined period of time? Flagging the data and pulling it after a period of time is a better option. If it is a huge disparity, something obviously is wrong. It is better to stop data. Otherwise, if you transmit the data but flag it and depending on the type of flag then let it go or pull it after a period of time. A lot of these	<b>No Change</b> – the current <i>Clarus</i> ConOps does not remove “bad” data from the <i>Clarus</i> output. <i>Clarus</i> does not change the collected data. It runs quality controls and compares the data at various levels and flags the data based on its related information. It is

	sites are redundant, <i>Clarus</i> may be able to compare the bad data against other sensor data and provide accurate data until the sensor providing the bad data is repaired.	acknowledged that communicating “bad” data does take bandwidth and processing time. It is possible to have the option to manually mark a sensor as “bad” within <i>Clarus</i> and not propagate its data.
16	What the actors should identify is entities / actors that provide data that will be used for different purposes. If they are used for the same purpose, then we can combine these into one actor. We should also identify actors where we will need to contract with them differently for data use agreements.	<b>Incorporate</b> – Agree with comment and the ConOps will be improved to show a framework diagram with generic actors. Corresponding specific scenario will show the unique actors related to the generic ones at the higher level. Some actors are shown on different diagrams and if they have the same name they are the same actor.
17	It is important to make a distinction between proprietary and non-proprietary data, as it will be handled differently. We are actually talking, then, about restricted data and non-restricted data. If actors and the actors being handed the data by the first set of actors can be combined in functionality, then we can combine them on the diagram. If they are not, or we are not sure, we should keep them separate and combine them later as the process gets clearer. We understand, also, that there is data that is being collected and processed that is happening outside of <i>Clarus</i> , that does not need to get processed within <i>Clarus</i> .	<b>Incorporate</b> – The <i>Clarus</i> ConOps will be updated to make the distinction between proprietary and non-proprietary data.
18	For the Sequence Diagram, edits made to the UCD will be reflected on the Sequence Diagram as well. Listed actors on the left and right hand side of the Sequence Diagram should reflect the generic nature of actors as detailed as they are on the UCD. Arrows indicate to / from, start / stop of the data feed, correct? Correct, the diagram	<b>Incorporate</b> – It is within the scope of <i>Clarus</i> to provide Quality Control feedback to the originating observation sources if they so desire regardless of any other NOAA QC feedback. The Sequence Diagrams

	<p>shows the flow of data between the actors and ultimately to the <i>Clarus System</i> and out to the end users. The diagram should show an arrow going back from <i>Clarus</i> to the data provider to indicate response where QC has found a flaw with the data. Correct, but we need to identify where a response is a requirement of the <i>Clarus System</i> and where it is not, to avoid redundancy from QC and notifications that NOAA is already providing.</p> <p>This notification will happen by <i>Clarus</i> anyway as a professional courtesy, data validation and partnership requirements between NOAA and FHWA on <i>Clarus</i>. Identifying this is “requirement creep” on <i>Clarus</i>, which will ultimately drive the cost and make the <i>Clarus System</i> a two-way communication system in reference to a data feed and that is more expensive than a one-way system. In terms of professional courtesy, possibly posting a static display of faulty data found may be the solution.</p>	<p>should be consistent with the Use Case Diagrams however, not all of the sequences are shown on the Draft ConOps diagrams due to the complexity of the diagrams. The revised ConOps will have these sequences depicted. With regard to “requirements creep” and communications cost, the <i>Clarus</i> ConOps is only defining potential operations based on stakeholder input. Requirements and Communications and Costs will be analyzed in the Design phase.</p>
19	<p>What does Roadway Winter Maintenance Provider refer to? DOTs. We need, then, some consistency between what we call actors from one diagram to another to clearly define these actors or identify that there are more than one actor and reflect these on both diagrams.</p>	<p><b>Incorporate</b> – The intent of the appendix delineating the descriptions of each actor is to clearly define each actor. It is also important to understand that one agency can have multiple roles and in effect be multiple actors. The actors are designed to be logical in nature.</p>
<b>Clarus ICC #2 - Public Safety Function</b>		
20	<p>In the UCD, all needs are not captured. There should be some flow of information on weather impacts to the general public, not just emergency managers. You may want to have people advised about evacuations.</p> <p>But will general public users be able to interpret raw <i>Clarus</i> data? Are they sophisticated enough? If we are providing decision support to emergency management personnel, we need to provide it to the public</p>	<p><b>Incorporate</b> - Raw data sets will be provided for service providers to add value. Evacuation information and other weather impacts are provided to travelers in that scenario. It is expected that there will be some information service providers who will be</p>



	<p>also. They will be making travel decisions in evacuation situations. We do not have a complete set of users on right side if we are not providing information to the public.</p>	<p>taking the <i>Clarus</i> data and sending it to travelers.</p> <p>An information service provider actor will be added to the <i>Clarus</i> ConOps.</p> <p><i>Clarus</i> users are those that directly interface with the system. To better understand how <i>Clarus</i> will perform, the primary users are the Service Providers. We are not dismissing the general public, but we are not designing the system for John Q. Public who will have to get that information from the system's primary users.</p>
21	<p>You have to understand the trade offs to design the system; <i>Clarus</i> does not generate raw data but collects it from others. The provider will be able to restrict dissemination of data collected from their systems. Should dissemination control be included in the diagram? Who will manage this distribution? There needs to be access control. If everyone has access, DOTs might not provide data to <i>Clarus</i>. The data will be provided in ASN.1 or XML. We need a bubble for dissemination control within the box.</p>	<p><b>Incorporate</b> – <i>Clarus</i> will accept data access restrictions from data collectors and control who receives their information.</p>
22	<p>We may have some processed data available, such as CCTV images and radar-derived data. <i>Clarus</i> will not generate raw data itself. Do we need a data fusion bubble or a bubble for internal processing?</p>	<p><b>Incorporate</b> – We will show the Roadway Condition Equipment actor covering CCTV images and radar-derived data as part of the overall <i>Clarus</i> framework and it also applies to the Public Safety function.</p>
23	<p>Question about Non-<i>Clarus</i> Data. It was agreed that this is poor wording as it should</p>	<p><b>Incorporate</b> – The “Non-<i>Clarus</i> Data” designation is</p>

	<p>be Non-ESS Data. These data are not quality controlled by <i>Clarus</i>, but will be in NOAA systems possibly. Automated Surface Observing System (ASOS) data is quality controlled. It will be used as a benchmark for quality control. Automated Weather Observing System (AWOS) may not be given the same weight as a Federal ASOS.</p>	<p>not just Non-ESS but any data coming from NOAA, or Private or Public Weather Data Providers. We will change this to the more generic External Environmental Data.</p>
24	<p>Please explain the Compare ESS Data with External Data bubble. This comparison to NOAA data is for quality control. Suspect data would be flagged. There is a need for a general use case scenario with highlighting of items of special significance for other scenarios. This is because the ConOps slices the system into different scenarios. Data are flagged in all operational scenarios based upon NOAA data and the assumption that their QA procedures are acceptable.</p>	<p><b>Incorporate</b> – The next version of the ConOps will have a general use case scenario with each scenario describing its unique items. We disagree with the statement “Data are flagged in all operational scenarios based upon NOAA data and the assumption that their QA procedures are acceptable.” Weather data is always suspect. The assumption one must make is that the majority of the data accurately represents the variable measured and through a process of statistical comparisons, it is possible to flag potential outliers. The statistical process may begin to break down if the data points used as input for the QC process have already been modified by previous QC processes.</p>
25	<p>We may have a redundancy in the bubbles in the box (error checking and comparison). Why are we including bubbles outside of the box (Integrate and Transform Service Provider Data)? Why do we need it if it is not part of the system? We may need to show these in different colors or as dashed.</p>	<p><b>No Change</b> – There are two levels of error checking and comparison – the first level is the device or vehicle error checking as the data is collected by <i>Clarus</i>. The second level</p>

	<p>If ASOS data are passed through <i>Clarus</i>, people should not have to go to multiple sources for weather data.</p>	<p>is the comparison of similar data from multiple sources. The use case bubbles outside of the <i>Clarus</i> box are for informational purposes only to show end-to-end functionality. The ASOS data is only used in the QC process and not passed through <i>Clarus</i>.</p>
26	<p>Do the NOAA and <i>Clarus</i> boxes overlap? This question may come up in the NOAA Group. Will <i>Clarus</i> collect all of the data that the service providers need? It will collect NOAA data to validate. Service Provider may need to go to other sources for other data. It can be confusing to distinguish what NOAA data comes through <i>Clarus</i> and what does not. <i>Clarus</i> could be absorbed by NOAA and some DOTs might not want to deal with NOAA. The FHWA had to start <i>Clarus</i> to garner DOT participation. It will ultimately be part of ISOS in some as-yet-undetermined form. That would be a success story for the Road Weather Management Program. The problem of going to different sources for weather information will likely be taken care of if NOAA operates the system. There are opportunities to use ISOS as an umbrella. FHWA will be a liaison between <i>Clarus</i> and what ever agency operates it.</p>	<p><b>No Change</b> – NOAA data does not come through <i>Clarus</i>, it is only used to help with the QC process. Likewise, the FAA runs the AWOS program and makes weather data available to NOAA. This is analogous to FHWA supporting a data transfer process for STW data.</p>
27	<p>What will <i>Clarus</i> do that MesoWest or MADIS does not do?</p>	<p><b>No Change</b> - <i>Clarus</i> will be the liaison to bring all those assets together. FHWA has funded the ingest of road/route environmental data to prove that data sets can be quality controlled. <i>Clarus</i> aims to build the foundation for a nationwide system with surface transportation-specific data that may not be available</p>

		anywhere else. <i>Clarus</i> is also setting the stage for capabilities not yet realized (e.g., pavement condition data acquisition system).
28	There is still a lack of a path for human readings being input into the system. Bridge winds are an example. There were a number of things that could only be measured by humans. Human observations could also be used to indicate that hazardous conditions are clear and it is okay to start reentry.	<b>Incorporate</b> – The next version of the ConOps will include an actor representing manual entry of road/route environmental information into <i>Clarus</i> .
29	Would there be a situation where different data providers have different permission schemes that affect whether or not it is really a one-stop shop? There will be agreements for distribution categories and about sensitivity of data. Vendors, for example, will have to agree not to resell data. They can process the data and do forecasts, but not share the raw data or we would have the same situation that we have today.	See Response to Comment #21.  Vendors have always had the right to organize data from NOAA and charge for this service.
30	This is a global comment for all use cases. The UCD does not reference a stakeholder for ESS Equipment actor. There is a focus on state DOT owned equipment, but there are some privately owned sensors that are operated for public agencies. It was suggested that both public and private actors be included. The top path has defined NTCIP 1204 linkages. The bottom path gives latitude for non-DOT equipment. Another person interpreted ESS Equipment to be all ESS. We may need an additional link for private ESS equipment operated for DOTs. The narrative on page 67 describes only publicly-owned equipment.	<b>Incorporate</b> – It is the intent that the ESS Equipment actor applies to both public and private agencies. We will correct the narrative on page 67.
31	There needs to be fault detection and correction that goes back to agencies. Data will be checked, flagged and sent back to provider agency (quality controlled). Then it is up to them to make necessary corrections.	See Response to Comment #18.

	The FHWA cannot mandate sensor maintenance.	
32	In Florida, the University of North Florida is collecting and storing ESS data for the DOT. It is also being sent to other places. There are a variety of protocols being used for center to field transmission and center to center transmission. The narrative text in the ConOps may need to be revised.	<b>Incorporate</b> – It is the intent that the ESS Equipment actor applies to both public and private agencies. We will correct the narrative text.
33	What we are here for is what is inside the box. Other things are data providers and users. If QC information is in the box, there should also be a translator use case oval shown in the box. In the system design, we may want to create a translator at the ESS Data Collector (decentralized translation). This is a design issue. Someone will operate <i>Clarus</i> and they will need to control and maintain the translators. Decentralization could create problems.	<b>No Change</b> – The <i>Clarus</i> design will address translation issues as necessary.
34	The UCD does not convey functions in a way that stakeholders can understand. We should add arrows to show data flows and add the translation function. The diagram is confusing. It would help to add arrows to the UCD. In the UCD bi-directionality is assumed. Everything inside the box has an implied connection. In UML notation, Use Cases do not have associations between them. It seems odd that some actors send data to <i>Clarus</i> and do not get anything back. Is this the most effective way to pursue concepts development? We may need to better define what type of acknowledgement is sent back to data providers. But this is getting into requirements development.	<b>No Change</b> – The UCDs (Use Case Diagrams) follow the Unified Modeling Language notation where actors and use cases have associations between them. The UML sequence diagrams need to be used in conjunction with the UCDs to show flow directionality.
35	The ConOps sets the vision, but there may be a problem with the vision – we could add reducing weather-related crash deaths. We need boundaries and the ConOps should be the living vision, but it is not highlighted in the document.	<b>No Change.</b> This statement represents the confusion between the vision of the <i>Clarus Initiative</i> and the <i>Clarus System</i> . The vision the

		ConOps addresses has to relate to the vision of the <i>Clarus System</i> . The objective of <i>Clarus</i> is to move STW data. To some extent the broader vision needs to be considered in the Concept of Operation but the fundamental requirement is the data transfer.
36	Check and flag collected ESS data, operational thresholds should be in there also as those fall “outside of the box.”	<b>No Change</b> – operational thresholds are part of the flagging process.
37	Why are we limited to Emergency Vehicle?	<b>No Change</b> – This focuses on the Public Safety function. The ConOps is structured so that each user group can see themselves. For the system design, all the functions will be considered.
38	There will be input process, quality control and feedback mechanisms. Is the purpose to provide data back to providers?	See Response to Comment #18.
39	Is there a familiarity with relational databases? In relational databases, data are tabulated for delivery upon request. Transaction requests will likely be erratic and random and frequent during weather events.	<b>No Change</b> – The ConOps should not discuss design issues like relational databases.
40	Three processes: loaded, extraction and transformation are not in the ConOps.	<b>No Change</b> – The <i>Clarus</i> ConOps through the use of use cases and sequences does show information transfer and transformation.
41	The advantage of use cases is to explore how we interact with <i>Clarus System</i> . Here, we should be identifying all possible actors in a public safety scenario, why they need the data and in what form. Then, how will they get it in order to do their jobs? A scenario should have an actor with a goal. We need	<b>No Change</b> – Showing all possible public safety actors is not feasible, the actors were grouped as one actor “Emergency Management Personnel” as they all will be receiving

	to look at a few of these with the potential to show <i>Clarus</i> value. How does an actor make decisions and interact with <i>Clarus</i> ? The scenario was confusing with implied system functions and we clearly need to show how users get value out of <i>Clarus</i> .	weather data from <i>Clarus</i> in a similar manner.
42	Can we get back to operations like speed limit control? There is a need to have other boxes for non-emergency vehicles. There may be a need to explicitly show input from other vehicle types. The lower right bubble in the box includes all vehicle data types. Responders need to know about maintenance actions to get to the scene. Other vehicles may provide data to emergency vehicles. The other missing piece is the cargo that commercial vehicle operators are carrying. If it is spilled, we need to know. This may be outside the scope of <i>Clarus</i> .	See Response to Comment #37. Other areas of ITS can access <i>Clarus</i> pavement condition information and re-route vehicles. Yes, cargo contents are outside of the scope of <i>Clarus</i> .
43	Do we need human input from an on-scene commander? How does information about a plume get into the system? We need a plume flag and then we can collect data to model. We are missing a spotter network, like Skywarn ( <a href="http://www.skywarn.org">http://www.skywarn.org</a> ). There are other inputs from humans in the field which could be other weather observation equipment (lower left of UCD). The service providers could use that data with weather data to provide decision support.	See Response to Comment #28.
<b>Clarus ICC #2 - Commercial Vehicle Operation (CVO) Function</b>		
44	<p><i>Do the Use Case scenarios documented in the ConOps report capture all the Clarus operational needs?</i></p> <ul style="list-style-type: none"> <li>- Aviation, Marine</li> <li>- Environment (e.g., fuel emissions)</li> <li>- Some DOTs (e.g., WA, AK) already have marine sensors</li> <li>- Health / Centers for Disease Control?</li> </ul>	See Response to Comment #1.

	<ul style="list-style-type: none"> <li>- River traffic (e.g. Barges) and CVO on waterways</li> <li>- Recreational vehicles are end users?</li> </ul>	
45	<p><i>Do the Actors / Use Cases interfacing in the Clarus System adequately capture Clarus operational needs?</i></p> <ul style="list-style-type: none"> <li>- Coast Guard as potential Actor? Mission, Interactions</li> <li>- Common data format in <i>Clarus</i>? Function of <i>Clarus</i></li> <li>- Performance measurements (Impact, Benefits)</li> <li>- Funded?</li> <li>- Incentive to state DOTs?</li> <li>- Similar to development of Interstate</li> <li>- Cost: collecting “free” data and charging users?</li> <li>- New weather technology included?</li> </ul>	See Response to Comment #1.
46	<p>What about aviation pilot reports and truck citizens band reports? The larger trucking firms notify their trucks of weather conditions via their dispatch centers. Pilot reports can widely vary for the same conditions.</p>	<p><b>No Change</b> – commercial vehicle and fleet management are part of this scenario.</p> <p>Aviation Pilot Reports - See Response to Comment #1.</p>
47	<p>What about traveler information for transit riders?</p>	<p><b>No Change</b> – <i>Clarus</i> does not provide transit information, however an ISP could with augmented data from <i>Clarus</i>.</p>
48	<p>Fleet Management Systems gather truck performance information now. How would dispatch centers send weather data to <i>Clarus</i> if they do collect that type of information and would they?</p>	<p><b>No Change</b> – <i>Clarus</i> can accept commercial vehicle fleet weather-related data from the Fleet Management System (Vehicle Data Collector in the use case diagram)</p>
49	<p>Does all information have to go through</p>	<p><b>No Change</b> – Not all the</p>



	<i>Clarus?</i>	weather information has to go through <i>Clarus</i>
50	What happens to non-ESS data? Is it <i>Clarus'</i> role to have the data go through QC?	<b>No Change</b> – <i>Clarus</i> would be the umbrella for ESS, non-ESS and vehicle data providing QC for all related weather data. Of course, autonomous users (e.g., State DOTs) and service providers decide whether they want their data to go through the QC process.
<b>Clarus ICC #2 - Recap of Day 1</b>		
51	Is it possible to have layered diagrams to overlap scenarios and an electronic version as an example of these?	<b>No Change</b> – At this time we are investigating if we can put diagrams on a website.
52	Access Control To Data – should there be a separate actor for access control?	<b>No Change</b> – As part of the <i>Clarus</i> design an access control mechanism can be provided that allows each actor to control information receipt and dissemination.
53	There are inconsistencies in actors and actions on diagrams. In an electronic version we should be able to provide exact, consistent references between all diagrams and scenarios actors. On paper, the size limits this consistency somewhat.	See Response to Comment #51.
54	Air Quality / Environmental Scenario?	<b>No Change</b> – There can be a myriad of scenarios for <i>Clarus</i> . An Air Quality / Environmental scenario would need to have something unique or that could not be extrapolated for the other scenarios in order to justify a new scenario.
55	Data Archive – <i>the archive may be an actor</i>	<b>No Change</b> – <i>Clarus</i> has a

	<ul style="list-style-type: none"> <li>• Important for planning / performance measures, being able to look back at data and make it useful for future analysis</li> <li>• Data Mining opportunity with this data – <i>could find dangerous road segments with this data and it could be an “early warning system.”</i></li> </ul>	short-term archiving capability “Store and Index Quality Controlled Data”; other actors are responsible for archiving their own data and data mining.
56	Is <i>Clarus</i> going to be a 24 / 7 type of system? If so, are there going to be redundancy requirements, safety issues, etc.	<b>Incorporate</b> – ConOps will be updated to reflect that <i>Clarus</i> would be a 24 / 7 operation. The other issues are Design considerations.
57	Metadata should be considered within the concept of the use case scenarios, not necessarily at the high level ConOps	<b>No Change</b> – Supporting Metadata is explained in each scenario description.
<b>Clarus ICC #2 - NOAA Function</b>		
58	UCD – where is the conduit from NOAA into <i>Clarus</i> QC system?	<b>No Change</b> – The NOAA Disseminator actor provides NOAA data to <i>Clarus</i> .
59	Apply QA / QC to all data coming into <i>Clarus</i> because current quality control procedures on various data inputs are questionable.  There needs to be feedback paths on incoming data, especially for flagged questionable input data.	See Response to Comments #13, #15, #18 and #24.
60	Need human reported input (i.e. cell phone call-ins) to be analyzed for quality with other observational data coming in.	See Response to Comment #28.
61	Currently, public weather data collectors (non-NOAA) and private weather data collectors do not have QC feedback or controls prior to incorporating their data into the <i>Clarus</i> database. QA needs to be done ASAP – otherwise latency is a major issue.	<b>Incorporate</b> – This was an omission from the sequence diagram in order to keep it readable. Feedback will be added as flows in the next version of the ConOps.
62	Need a line between the integrated NOAA data bubble and the <i>Clarus</i> operator.	<b>No Change</b> – Currently, <i>Clarus</i> is not part of NOAA and the <i>Clarus</i> operator is not controlling NOAA data

		collection.
63	Remote sensors and non-ISOS information needs direct input into the <i>Clarus System</i> .	<b>No Change</b> – this information currently comes to <i>Clarus</i> from the NOAA Disseminator.
64	We need to ensure that there a real-time process for dissemination is possible – tiered dissemination of data with some bound checks.	<b>No Change</b> – the concept is captured in the Time Critical Weather Operations scenario. This will be more fully explored in the Design phase.
65	Is there a NOAA to Transport Canada MOU? If so, this needs to be incorporated into UCD.	<b>No Change</b> – this is not applicable to the <i>Clarus System</i> .
66	<i>Clarus</i> needs to be fully VII compatible.	<b>No Change</b> – The <i>Clarus Initiative</i> is working with the VII Initiative.
67	Non-surface observations need to go into NOAA and <i>Clarus</i> .	<b>No Change</b> – This is only true if the non-surface observations have a specific purpose within the <i>Clarus</i> QC scheme. Currently <i>Clarus</i> gets non-surface observations from NOAA; the manual entry mechanism for <i>Clarus</i> could allow entry of other non-surface observations.
68	Data should have metadata flags indicating whether data was received in the first transmittal or subsequent quality-controlled data update. No raw, untouched observations will be sent out. A bounds check will occur.	<b>No Change</b> – <i>Clarus</i> will send metadata along with all raw observations data transmitted from <i>Clarus</i> .
<b>Clarus ICC #2 - Time Critical Weather Operations Function</b>		
69	If short latency data is used to control an operation, then we would directly go into that system for data. For example, would manually entered data come out of the <i>Clarus System</i> ? How do we minimize latency? We need to evaluate if this fits in <i>Clarus</i> or will time restrictions preclude its inclusion.  Will a new approach for design of data collection systems (to facilitate time critical)	<b>No Change</b> – The <i>Clarus</i> ConOps currently supports time critical weather data, whether entered manually or electronically. It is up to the application to choose to use this <i>Clarus</i> feature.

	<p>be needed and how does this affect legacy systems? The aviation community has had special reports for time critical conditions that are detected. This should be identified differently in an ESS report.</p>	
70	<p>Relative to the architecture of VII, there are cycles on which this data is collected by vehicles and sent to roadside units. The VII network will require communication for backhaul; this may be an opportunity for <i>Clarus</i> to piggyback on. There are questions about costs for on-board units and sensors. How is the VII coalition exploring feasibility and existing sensor capabilities?</p>	<p><b>No Change</b> – There are roughly 25 data elements currently identified from vehicles. Data from vehicles will go from the vehicle to a roadside unit to some processing system “Vehicle Data Collector” which may or may not be <i>Clarus</i>. We do not know whether this is economically feasible or even doable. It may all depend upon who collects and controls the data at collection points.</p>
71	<p>All this data is being collected but data needs to be processed within the <i>Clarus System</i>. There is a need for modeling and analysis within the system.</p>	<p><b>No Change</b> – the use cases inside the <i>Clarus</i> box depict the modeling of how <i>Clarus</i> will process the data. Note that the Time Critical processes in the <i>Clarus</i> box are simplified to allow for time critical information to pass through <i>Clarus</i> quickly.</p>
72	<p>The difference in this UCD is ESS equipment interfacing directly with <i>Clarus</i>. Conceptually, this is different from the other scenarios. Would <i>Clarus</i> request data from ESS? What would trigger direct communications? Establish a schedule possibly, but those issues are unknown.</p>	<p><b>Incorporate</b> - A direct interface is needed to support Time Critical Weather Operations. We need to add an ESS data collector to show that States still collect data. There are significant institutional issues involving this capability.</p>
73	<p>The left side is public sector driven. Are other private data sources included? No information on QC in the box. What QC is</p>	<p><b>No Change</b> – one of the casualties of having time critical operations for</p>

	applied for time critical data? It needs to happen and be shown in the diagram.	<i>Clarus</i> is that QC cannot wait for corroborating data from other sources; select sensors can be marked as good based on historical performance.
74	The public and private sector are treated differently in other diagrams. Is that needed here?	<b>No Change</b> – this diagram assumes that both public and private data is immediately available.
75	What is the value that <i>Clarus</i> is adding?	<b>No Change</b> – The value is in better data from disparate sources. The time to do QC is not as significant. Most time takes place in the communications transfer from the observation equipment.
76	Are there time critical functions for forecast updates (like the last half-hour of a 6 hour cycle)?	<b>No Change</b> – Time criticality is dependent upon the needs of the end user. Criteria that define critical thresholds within a forecast can trigger forecast updates at any time in the forecast cycle.
77	We need to focus on critical data types, communication and processing capabilities. How long is the data resident on a remote processing unit for collection? Most are accessed via dial-up and this may take a few minutes. It is not practical to have <i>Clarus</i> talk to the ESS which may interfere with an agency's ability to collect data.	<b>No Change</b> – this function is optional, the agency will decide whether or not they support this capability.
78	Is there an adaptive scheme to modify polling cycle frequency based on conditions?	<b>No Change</b> – This is a new process; <i>Clarus</i> may need to do additional things such as thresholding. There is a need for software to identify critical weather

		events. This design of this logic is very complex and is impacted by the fact that each user has a different concept of what conditions are critical. The best solution is to work to reduce collection times to meet the expectation of the most time critical elements.
79	Also, we need to be able to go to the system to get data in the event of emergency. The reversal of the data flow is implied in the UCD. Can data get through <i>Clarus</i> fast enough? There is need for a more direct link.	<b>No Change</b> – Agencies owning the data sources already have immediate access to the data. They would likely be the primary user of this information and determine access rights to immediate use of the data. <i>Clarus</i> is a consolidation system designed to efficiently aggregate data from numerous sources. The ultimate design must weigh the benefits of routine data collection requirements against occasional demands of immediate availability of data.
80	Is there enough density to provide time critical information?	<b>No Change</b> – Sparse coverage in many locations. VII has the potential to change this. Otherwise, there may not be enough density. Again, this is an optional function depending in part on the sensor density.
81	Priority is tied to the geospatial issue. In arid areas, a little rain could cause flooding which would need to be known immediately. What happens at state borders where there are someone else's sensors?	<b>No Change</b> – <i>Clarus</i> provides the ability to cross boundaries, possibly in a time critical nature.
82	<i>What about International weather data?</i>	<b>Incorporate</b> - add international to the

		<p>description of the Non-Surface Observations and Surface Observation Networks actors within the NOAA box. It is acknowledged that International weather data could be useful to <i>Clarus</i>. The Canadians are participating in the <i>Clarus</i> ICC meetings. Also, with their RWIN system, Canada is hoping to leverage advances made by <i>Clarus</i>. At this time, it is expected that International weather data will come to <i>Clarus</i> through NOAA.</p>
83	<p>In <i>Clarus</i> is there critical condition identification as events unfold? The diagram needs input into <i>Clarus</i> from right side.</p>	<p><b>Incorporate</b> – Although it currently is not within the scope of <i>Clarus</i> to do critical condition identification, we will add a use case for receiving input from a service provider in order for <i>Clarus</i> to possibly concentrate on and/or prioritize critical road/route environmental information. However, the potential exists for multiple WSP customers to set their data requirements to the highest priority continually. Algorithms to manage priorities could get very complicated and subsequently decreasing the total throughput due to message queuing. These issues will be explored in the Design phase.</p>
84	<p>What are the value-added products for time critical? Will agencies be able to read / use raw data? Will service providers delay data transfer?</p>	<p><b>No Change</b> – Raw data should flow through <i>Clarus</i> on a first in – first out (FIFO) basis. The design</p>

		of <i>how</i> data is delivered to the Service Provider community (the <i>Clarus</i> data end users) will be considered in the next phase of <i>Clarus</i> . Whether the data is broadcast or stored for user polling is a topic for the design phase. How the data is processed and transferred by service providers is a decision they have to make. Customers will gravitate to data sources that best meet their expectations.
85	It would be nice to QC data from a bridge sprayer without going through <i>Clarus</i> to reduce communication time. Could <i>Clarus</i> send QC algorithms to agencies for specific sites? An additional adaptive scheme could be done by the vendor / service provider rather than <i>Clarus</i> , which would only provide information.	<b>No Change</b> – It currently is not within the scope of <i>Clarus</i> to send QC algorithms to agencies.
86	There are other Federal agencies as potential data sources for adaptive information, such as U.S. Geological Survey stream gauges. These could be transportation related and they are not incorporated in the UCD.	<b>Incorporate</b> – Although stream gauge information from hydrologic agencies are already available through NOAA and Law Enforcement backbones via the WFO, there are stream gauges owned by transportation agencies which will be processed by <i>Clarus</i> .
87	<i>Clarus</i> could accept threshold-driven prompts defined by users based on location and time. Also, it could receive spontaneous requests from users to perform these same functions.	<b>No Change</b> – <i>Clarus</i> needs to support a variety of mechanisms for inputs and requests. The <i>Clarus</i> design will explore these mechanisms.
88	Severe weather alerts, as defined by NWS, should be included.	<b>No Change</b> – they are included as part of the information from the NOAA Disseminator.



89	Is notification a function of <i>Clarus</i> or providing time critical weather data to notification systems? If the latter, then what are the user requirements for notification systems?	<b>No Change</b> – <i>Clarus</i> could notify users based on data thresholds defined in limited subscription requests, the mechanisms for this will be defined in the design. However, it is the responsibility of the service providers to monitor the incoming data stream, check for notification thresholds, and send notifications.
90	Is <i>Clarus</i> an adaptive observing system that changes the frequency of data collection based on perceived need or based on other data?	<b>No Change</b> – Possibly, more likely <i>Clarus</i> will receive data at the highest possible rate.
91	Is <i>Clarus</i> smart enough to know where incidents / locations are that need time critical weather information?	<b>No Change</b> – Currently the scope of <i>Clarus</i> does not include this capability.
<b>Clarus ICC #2 - Railroad Carrier Operations Function</b>		
92	<p>We are not aware of any actor that is a vehicle – no rail vehicles produce data. The rail industry does not understand this issue and does not consider vehicle “platforms.” Where is the research that vehicle platforms are advantageous instead of the wayside? Where is the research that says it would be good to be on the vehicles? A demonstration project is needed to prove that rail vehicle-based data gathering is effective. Moving vehicles are useful for being able to overcome the data voids.</p> <p>Rail assets are beginning to use GPS as a method of asset control – roughly 1,000 of 17,000 vehicles. There is a demonstration project ongoing for positive train control using GPS.</p>	<b>No Change</b> – Keep Rail Vehicle actor for future capability.
93	Union Pacific appears to have about 500 wayside measurement stations, but not all wayside units are fully equipped and many lack anemometers.	<b>Incorporate</b> – Need to add Wayside Measurement Station (Rail ESS?) actor similar to ESS Equipment.

94	Railroad Vehicle and Private and Public Sector Weather Observation Equipment needs further refinement.	<b>No Change</b> – Need to elaborate on this comment.
95	A conduit is needed from Rail ESS to NOAA and MesoWest.	<b>No Change</b> – <i>Clarus</i> shouldn't specify the association between Rail ESS and NOAA and MesoWest.
96	Manual information / confirmation is needed as an additional actor and it could be transmitted from the rail operation centers.	See Response to Comment #28.
97	Hydraulic and snow sensors are placed on mountains to detect snow loading for potential for avalanches. The scenario should describe the impact of an avalanche.	<b>No Change</b> – The scenarios can not describe every possible combination of events.
<b>Clarus ICC #2 - Traffic Operations Function</b>		
98	<p><i>Do the Use Case scenarios documented in the ConOps report capture all the Clarus operational needs?</i></p> <p>Does pipeline safety have to be added to this? Research and Innovative Technology Administration? The Commercial Vehicle Safety Alliance is another organization that may be a stakeholder in <i>Clarus</i>.</p>	<p><b>No Change.</b> There are numerous scenarios that were not addressed. The intent was to provide a flavor and allow readers to understand how their specific needs would be met. The referenced agencies appear to be customers of the Service Provider group whether that is NOAA, a major research organization, or a private service provider. Many such agencies currently get their data from one of the service providers primarily because their interest is getting organized data to support further processing rather than having to do the dynamic sorting and aggregation themselves. There does not appear to be a new <i>Clarus</i> operational need.</p>

99	Will there be a direct link from the TMC to the end user? If so, it addresses the concern about TMCs adding value to data before distribution to end-user.	<b>No Change</b> – It is up to the TMC on how it disseminates its data but usually a TMC would add value (e.g., roadway congestion) before disseminating the information to the end-user.
100	In terms of a business model, how is the information collected going to be made available to the public? Will this public information be sold? Is there a limit to access? Are there concerns about security? What actors become identified for data mining?	<b>No Change</b> – <i>Clarus</i> provides its data to service providers, there is no direct public access. The service providers combine the <i>Clarus</i> data with their own data and sell it. The service providers limit access and need security mechanisms to do this. Data Mining into <i>Clarus</i> is through the service provider's access to the indexed <i>Clarus</i> database. We envision there will be other service providers such as NOAA, government agencies, universities, and associations that will develop ways to provide the information at no cost and with no restrictions. We don't see how the environment will permit limitation of the data by service providers.
101	We need to keep in mind that there is a benefit from pulling data from private sources, and as such, it should be made available back to these private sources without a cost attached. We need to avoid the monopolies of data that exist in the industry today. There are also issues with data collected by these sources as well and a need to keep the data anonymous.	<b>No Change</b> – <i>Clarus</i> is currently envisioned to keep the data it receives intact along with any corresponding metadata. There is envisioned to be a data tagging mechanism that could allow for private source data to be utilized in

		the overall <i>Clarus</i> processing and returned back to the private source. It will also be possible for the data to become anonymous.
102	In the UCD, is this real-time information?	<b>No Change</b> – That depends on what is considered real-time. There is some inherent latency in the data collection, depending on the design of the data collection system. There are various types of data collection methods that DOTs use to collect data with different latencies. Latency and collection point intervals are sometimes driven by the cost of polling data every 20 seconds, for example. So, latencies are inherent to the data collection process that will be used to report to the <i>Clarus System</i> .
103	QC on <i>Clarus</i> data is a major component of the <i>Clarus System</i> given the volume of data that will be feeding into the system and the goal of providing valuable data. How do DOTs QC their data, if at all and how would that QC compare to <i>Clarus'</i> process?	<b>No Change</b> – Various types of QC methods exist: comparing data sets; anomalies among similar data collected; and understood and expected data given the region's weather or climate expectancies.
104	Will data coming from the <i>Clarus System</i> be real-time?	<b>No Change</b> – This too depends on the inherent latency within <i>Clarus</i> given the QC process, and depends on the extent of QC that you want to submit the data to. For EOC data or any other application

		that would need immediate data processed that would likely be disseminated directly, and not go through the extensive QC and feedback process. Data that bypasses <i>Clarus</i> , as when sensor data goes directly to TMCs, should concurrently go to <i>Clarus</i> for QC.
105	Other data components should be a part of the <i>Clarus System</i> , such as gas explosions, seismic activity, dense smoke, etc.	<b>No Change</b> – Focus was brought back on <i>Clarus</i> as a weather reporting system, but there should be brainstorming as to how this data, which is collected by weather sensors as well, can be reported and archived as well.
106	<p>Sequence Diagram: Traffic Management should have a line going straight from <i>Clarus</i>, so that it receives weather data directly. Who would then provide data directly, as the TMC is in effect the information service provider (ISP), as was discussed for the UCD? There was a concern with the definitions of actors in case use diagram when DOTs take on the role of ISPs, if the definition implies that DOTs are adding value to data received and forwarding on to the NWS for forecasts or forecasting weather from the beginning. The definitions are vague, and it is important that we define our requirements as well. For example: what is the definition of weather? Does that include seismic events? Does it include forest fires? Before the document is finalized, we need to provide descriptions for each of the actors and events.</p> <p>According to the use case, if you're not taking the data and adding value to it, you</p>	<b>Incorporate</b> – DOTs have every right to add value to their data and make it available to their constituents or any other party who wants to view it in a value added format. If a DOT chooses to make the data available to the TMC for presentation, then they are merely expanding their delivery mode to their constituents. The decision regarding who becomes an ISP is partially the decision of the autonomous entity. ISP's to provide free access to data is desirable as long as there is an agreed mechanism to cover the cost of data acquisition, maintenance of sensing equipment, archival costs, etc.

	are outside of the <i>Clarus System</i> .	<p>DOTs acting as ISPs are a predecessor condition to <i>Clarus</i> and one of the very reasons <i>Clarus</i> was proposed. The cost to acquire data from all of the separate sites argues the need for the consolidation process. Value is also gained from composite views of combining weather data with transportation data without regard for political boundaries.</p> <p>Service Providers are outside of the <i>Clarus System</i> as well. They merely interface to it.</p>
107	<p><i>UCD Discussion:</i></p> <p>Flagged data should go back to the provider:</p> <ul style="list-style-type: none"> <li>- Why added to the cost of the system?</li> <li>- What level of QC does the DOT want?</li> <li>- WSDOT does not compare for out of range data or viable, it is flagged and transmitted.</li> <li>- WSDOT data is sent to the University of Washington for QC.</li> <li>- Data should be date and time stamped for visual check by the TMC to make real-time decisions or posting of data.</li> <li>- Standard level of QC for all data.</li> </ul>	See Response to Comment #18.
108	<p><i>UCD Discussion:</i></p> <ul style="list-style-type: none"> <li>• Provide manual data input to the system.</li> </ul>	See Response to Comment #28.
109	<p><i>UCD Discussion:</i></p> <ul style="list-style-type: none"> <li>• Real-time information will depend on its definition? The hope is that data will be real-time:</li> </ul>	See Response to Comment #104.

	<ul style="list-style-type: none"> <li>○ Timing of data collection and dissemination</li> <li>○ EOCs base decisions on current data – time critical</li> <li>○ Data is sorted in <i>Clarus</i> and sent to providers</li> <li>○ Data from flood gates and sensors – TMC grabs data before being sent to <i>Clarus</i></li> <li>○ Catastrophic events are an emergency management function</li> </ul>	
110	<p><i>UCD Discussion:</i></p> <ul style="list-style-type: none"> <li>● Will <i>Clarus</i> be the engine to connect TMCs in other states weather information?</li> </ul>	<b>No Change</b> – Not a function of <i>Clarus</i> , it is a user function. Real-time information will indicate that the weather is active in other states.
111	<p><i>UCD</i></p> <ul style="list-style-type: none"> <li>● Seismic information?</li> </ul>	<b>No Change</b> – This will be looked at as another sensor. TMCs will get data external of <i>Clarus</i> and <i>Clarus</i> would provide as additional data.
112	<p><i>UCD</i></p> <ul style="list-style-type: none"> <li>● Problem with actor definition for DOTs providing weather information as DOTs are not forecasting provider and there could be liability issues.</li> </ul>	See Response to Comment #106.
<b>Clarus ICC #2 - Traveler Information Function</b>		
113	The addition of an ISP actor to support some of the concerns was considered.	<b>No Change</b> – The Weather Service Providers are more weather-specific ISPs and there is currently not a need to add an ISP too.
114	QC of VII data from vehicles is one issue.	<b>No Change</b> – Currently the <i>Clarus</i> ConOps has input from the VII Initiative and has a representative dataset identified from VII that will need to be analyzed in the Design Phase in order to

		determine QC and how the vehicle data will augment the other weather observations.
115	Will <i>Clarus</i> be able to accept free form text?	<p><b>No Change</b> – It is unclear what information this comment is referring to. <i>Clarus</i> will have manual entry data collection. It is possible that some data entry fields will be free form text as part of this manual entry capability. Usually free form text is discouraged because the system would have to parse the free form text in order to understand what it is. There are cases like a comment field where the free form text does not get parsed or quality-controlled and this capability will be supported. The details of data entry fields will be explored in the Design phase.</p> <p>Examples include NOAA's ASOS and FAA's AWOS collection systems. They permit remarks but those remarks are encoded to permit easy parsing and conversion into a structured digital database.</p>
116	The reliability, maintainability and availability of the data collection process itself, in addition to the QA / QC of the data collected are issues.	<b>No Change</b> – Agree, in the Design phase, requirements will need to be defined for these areas in alignment with the operational scenarios of the <i>Clarus</i> ConOps.
117	There will be databases existing outside of <i>Clarus</i> , but how do we tie them together?	<b>No Change</b> – The various service providers are



		responsible for combining their data with the <i>Clarus</i> data.
118	A lot of this gets into usability and ease of use on the user interface. This could also become a barrier. <i>Clarus</i> hopes to be a model for other databases to progress.	<b>No Change</b> – The user interface will be a part of the Design phase.
<b>Clarus ICC #2 - Transit Management Function</b>		
119	<p><i>Do the Use Case scenarios documented in the ConOps report capture all the Clarus operational needs?</i></p> <p>School Administrator scenario may be somewhat different than transit because they do not have personnel to interpret data or understand roadway operations. They would likely get data from a Service Provider rather than be a primary user.</p> <p>No information on maintenance, such as chains for buses. This is decision support and should be described in the narrative. There was a suggestion to add a Fleet Management actor.</p>	See Response to Comment #98.
120	<p><i>Do the Actors / Use Cases interfacing in the Clarus system adequately capture Clarus operations in support of your needs?</i></p> <p>Fixed route systems operate differently when deviating the routes (passenger trains vs. buses). Do we need another scenario for light rail (other than freight rail)?</p>	<b>Incorporate</b> – We will include light rail in the Transit scenario.
121	<p><i>What potential changes do you anticipate in services rendered by Weather Service Providers, as Clarus becomes an active quality-controlled data clearinghouse resource?</i></p> <p>Service Provider service changes – decisions to add more cars or change speeds, better scheduling and routing. Add Transit Parking to the decision support</p>	<b>Incorporate</b> – We will add transit parking to the decision support narrative. We will investigate adding a School Administrator actor – right now that role falls under the Transit Management Personnel actor.

	<p>narrative. Possibly add a new actor for School Administrator or cover information application in the decision support narrative</p> <p>The level of route planning / management data needed for each region is encouraged by <i>Clarus</i>. We have a weather plan (certain operations for designated routes under specific conditions) that goes back to <i>Clarus</i> for performance measurement.</p>	
122	Need to include information called in from cities and counties or from their ESS.	See Response to Comment #28.
123	In narrative, change “graphical” to “geographical” or “spatial”	<b>Incorporate</b> – Agree.
124	Global change “road condition” to “road / route condition” because some transit vehicles do not travel on roads, such as trains and ferries.	<b>Incorporate</b> – Agree, within Transit section.
<b>Clarus ICC #2 - Next Steps</b>		
125	Dr. Bruce Hicks, Director of the NOAA Air Resources Laboratory, has an urban weather network concept that is driving dispersion models for homeland security. Is that a possible link to <i>Clarus</i> ?	<b>No Change</b> - The Emergency Transportation Operations Initiative is also involved and we are discussing applications and the potential for work with Lawrence Livermore Labs is in the early stages. We need data, not a model and there might be sensors to gather data.
<b>Renee McPherson Clarus ConOps Feedback</b>		
126	Page 11- "data provided without post-processing" in the bullet list - Does this mean you'll provide data without ANY real-time quality assurance? I don't think that's a good idea, especially for input to a model and other value-added products.	See Response to Comment #73.
127	Page 11- "data transferred... with full metadata" in the bullet list - Hopefully, all sites will have extensive metadata,	<b>Incorporate</b> – Agree, we will elaborate that full metadata does not need to

	including pics. I don't think you want to send "full metadata" with every data file. I think you want a subset that's appropriate, including station id, lat/lon, elevation, network/owner, etc. I don't think you want to be sending the serial numbers of the instruments, pics, and other metadata with every file.	be with every data file.
128	Page 28- near bottom, it says "Error! Reference source not found"	<b>Incorporate</b> – Agree, this will be fixed.
129	Pages 36 & 37- discussion of "shelf life" of data - I agree that for real-time operations, the perceived (and likely real) value of the dataset decreases with time. However, for research purposes, the value can increase with time as more complete QA is run on the dataset or missing data are filled into the dataset. If <i>Clarus</i> agrees to archive their dataset for research purposes, then you may want to add the words "operational usage" or "real-time decision making" into this section. In addition, the "value" of the observation is discussed primarily in terms of time from measurement to dissemination. Yet, I will argue that a bad observation given to a customer in 1 second has substantially LESS value than a good observation given to him/her in 1 minute. I would be cautious on oversimplification of the time issue here. From some of the comments made at the recent <i>Clarus</i> meeting, this issue may require some education for the customers.	<b>No Change</b> – <i>Clarus is not</i> responsible for archiving data for long periods of time, it may however keep selected historical data to support algorithms for QC.
130	Page 41& similar places elsewhere - I think the quality control check details are a bit sketchy compared to the details of other parts of this document. I'd advise that you either focus on what you want as a result (rather than the 'how') or include a detailed 'how' rather than the cursory overview. For example, real-time QA of rainfall in regions of the country with convective events is not well represented by the statements in this	<b>Incorporate</b> – Agree, the QA/QC section will be updated.

	QC check area. Hence, you may want to tell the meteorologists what kind of result you desire and let them figure out the best way to accomplish that task.	
131	Page 41& similar places elsewhere - I'm wondering why you are interested in the radar and satellite imagery and not on the observations. With the observations, you have the opportunity to have value-added products result (albeit likely through the service providers). With the imagery only, it's hard to make products.	<b>No Change.</b> On page 41 it references data that is accessed from NOAA which includes surface and upper air observations along with radar and satellite imagery.
132	Page 86 - You need to be a bit careful on making assumptions about NOAA's QA system. There currently are frustrations in the user community with ASOS QA, for example. At the very least, <i>Clarus</i> should study the reliability of QA within NOAA before they assume the QA is extensive.	<b>Incorporate</b> – This section has been reviewed by NOAA. We will verify with NOAA whether we should put a caveat about consistency within NOAA's QA system
133	Page 94- top- average collection time of 2.5 minutes and 10 minutes for processing - I can't tell what "processing" you're referring to. The previous page has a bullet for processing and another bullet for QC. Is this the same as the 10 minute figure? Data processing should be less than the collection time, so it seems like I'm missing something here. For example, OCS "processes" about 40,000 variable in about 1 minute at this time. That's primarily our QC tests. It takes another minute or two to create our products and have them on the web page. In comparison, it takes about 3 minutes to collect our data from about 120 stations. So I'm confused on what "processing" means between pages 93 and 94 and how that relates to the time estimates.	<b>Incorporate</b> – We will make clear what "processing" is going on and how that relates to the time estimates.
134	Page 94- Just a comment about comms costs. We do not incur any recurring comms costs by using our Law	<b>No Change</b> – Communications options will be explored in the

	Enforcement Telecommunications System. Partnerships between DOTs and LETs agencies could reduce these costs if the ESS systems are somewhat open architectures.	Design phase.
<b>Dan Farrell Clarus ConOps Feedback</b>		
135	1. The concept of operations document talks of use cases, diagrams interactions between use cases but doesn't really describe any use cases. A use case has a name, summary (goal), basic course of events, alternate paths, triggers, assumptions etc. All I can find is the name! Without the summary, basic course of events etc. there was nothing concrete to talk about. I don't see any way that you can develop a system design etc. until you get some actual use cases.	<b>Incorporate</b> – The text in each scenario leading to the diagrams contains much of the description of the use cases. Agree that each use case should be defined.
136	2. Scenarios are supposed to be a specific instance of using the system/use cases. They are to be the realization of a use case. And since there were no use cases in the document, the scenarios had no detail. The scenarios in the concept of operation document are too general describing a class of interactions rather than specific ones. The whole purpose of the scenarios is to focus on detailed interactions and there was no way to do that given the general scenarios. The document did contain something close to a scenario in highlighted text; however, the document couldn't build upon those scenarios because there were no use cases.	<b>No Change</b> – Scenarios provide the framework for partitioning the <i>Clarus</i> discussion of concepts of operation. The scenario descriptions in the highlighted text will be expanded. Each element in the highlighted text maps to an actor in the general use case scenario along with a sequence diagram to give an example of interaction between actors.
137	The sequence diagrams were useless. They all simply repeated the same general information on data ingest or output. Since they weren't tied to a real scenario or use case they were simply describing general data flow through the system.	<b>No Change</b> – the sequence diagrams show a dynamic side to information exchange not readily apparent in the use case diagrams. They are supposed to show general flow of data through <i>Clarus</i> and different actors in each

		sequence diagram behave differently.
138	The two parts of <i>Clarus</i> ( <i>System</i> and <i>Initiative</i> ) are not tied together. The first part is the system and the second part is the tools, models, decision support that make use of the system. It is this second part that delivers value to the stakeholders. The second part can save lives, property, time etc. In addition, it is this second part that will make demands on the system and ultimately set the requirements for the system. There is no way to really design the system if we don't have the requirements from these stakeholders.	<b>Incorporate</b> – the two parts of <i>Clarus</i> need to be better explained and tied together.
139	This second part of <i>Clarus</i> is the true users of the system. There needs to be a "user needs assessment" for the models, tools, decision support, State DOT, State Police etc. and feed these back into the use cases for the system. The assessment should reveal what these diverse groups expect of the system which will impact the use cases and design. Leaving the models and tools for private industry is risky because there is no guarantee that the tool or model will ever be built.	<b>No Change</b> – We have a User Needs document that preceded this ConOps. We acknowledge the true users of <i>Clarus</i> and that is why we didn't just model the actors surrounding the <i>Clarus System</i> box but showed use cases and actors outside of the <i>Clarus</i> domain.
140	Without this, the system runs the risk of being a bloated system of data -- like the internet is today. There needs to be an emphasis on the analysis needed to provide value from the data. Do the analysis and you'll see what <i>Clarus</i> needs to do to support it. You'll also have a basis for deciding what data stays in <i>Clarus</i> and what data does not.	<b>No Change</b> – We could argue that the Internet is very useful if you can easily extract the information you need through it. <i>Clarus</i> will accept weather-related data and provide value-added services to service providers. The design will need to be flexible in how users access the data and only receive what they need.
141	There is still a need for the good old fashioned requirements stating what the system shall do. The sooner this is started,	<b>No Change</b> – Agree, systems like <i>Clarus</i> are envisioned to require a

	the better. Ultimately, use cases and scenarios are a just a way of defining some of the requirements for the system. They must be referenced by the requirements document but don't have the strength of themselves to stand without a requirements document.	give and take or brainstorming period documented in the ConOps on how it will operate. <i>Clarus</i> operations will become more clearly defined and agreed upon as the system goes through the Systems Engineering Process. It is critical that the requirements be derived from the ConOps and defined in detail for the operational functions of the system.
142	At the meeting, we wished for a way to view electronically the diagrams etc. I think there are several free UML programs available. These programs should allow interested stakeholders to view the use cases, timing diagrams and additional details. I see one free one at <a href="http://www.gentleware.com">www.gentleware.com</a> . I'm sure that there are others too. Using one of these would make it simple to share electronically the use case information now and the class information later on.	See Response to Comment #51.
<b>Paul Pisano Clarus ConOps Feedback</b>		
143	Italicize <i>Clarus</i> .	<b>Incorporate</b> - we will italicize the <i>Clarus System</i> and <i>Clarus Initiative</i>
144	Prefer to use "needs" when referring to users and requirements when referring to the system (see 1 <sup>st</sup> paragraph in 2.5)	<b>Incorporate.</b>
145	Need to make sure we include IPWV (from NDGPS).	<b>No Change</b> – The NDGPS-integrated perceptible water vapor (IPWV) observation system is the responsibility of the National Weather Service. Data from IPWV would traverse from NOAA to <i>Clarus</i> .

146	Need to better recognize the private sector processes (perhaps as a box akin to the NOAA box)	<b>Incorporate.</b>
147	Need to make sure it is clear that a State DOT will not lose control/access to their data (on a CPU), i.e., they will not have to go through <i>Clarus</i> to get to use their data	<b>Incorporate</b> - this is a fundamental aspect of <i>Clarus</i> that the autonomous layer, including State DOTs, controls their own equipment.
148	Need a companion document that speaks specifically to the “Service Provider Customer” (see Figure 5)	<b>Incorporate</b> - a scenario document or appendix is being developed.
149	Need to articulate transit user in the ConOps – either in the Trav. Info. Or Transit Mgr.	See Response to Comment #106.
150	Narrative on pages 40-43 does not match use case diagram. It is unclear in the text what is an actor and what is a function.	<b>Incorporate</b> - ConOps will be revised to make narrative clear.
151	Various hardcopy editorial comments will be considered.	<b>Incorporate.</b>
152	Need consistency between the use case diagram, sequence diagram and the text.	<b>Incorporate.</b>
153	Question about what is done with these flags. We don't have the requirement to report back (nor should we), but should we notify if we find some bad data?	<b>Incorporate</b> - will add a bad data feedback path to External Weather Data Sources
154	Need to add road condition measurement use case tied to a manual entry actor tied to CARS and on to the Public Surface Transportation Weather Service Provider (see diagram)	<b>Incorporate</b> – but generalize the actor as RCRS (Roadway Condition Reporting System).
155	Add an International Observations actor associated with NOAA's input actors.	See Response to Comment #82.
156	Add association from Integrate NOAA data use case to <i>Clarus</i>	<b>No Change</b> - the NOAA Disseminator already is associated with the Transfer External Weather Data use case.
157	Change non-ESS to non-NOAA for the Public Sector Weather Observation Equipment	<b>Incorporate</b>
158	Add ISP actor for data accessibility	See Response to Comment #106.
159	Various hardcopy editorial comments will be considered.	<b>Incorporate.</b>



<b>Lee-Ann Seeling Clarus ConOps Feedback</b>		
160	Diagram details too small to read	<b>Incorporate</b> - Although it appears that the document was printed in markup mode, the ConOps diagrams will be revised and improve readability.
161	Need simple and useable standards	<b>Incorporate</b> - various standards are being considered for the <i>Clarus</i> interfaces, the ConOps will present likely standards that could apply to <i>Clarus</i> .
162	Who owns the data, or is it free to all?	<b>Incorporate</b> - it is the intent of <i>Clarus</i> to accept and provide both private sector and public sector data. <i>Clarus</i> will be able to restrict access to data based on agreements with data providers. The issue of how much the data will cost has not been resolved.
163	Section 3.4.2 - Communication latencies and robustness will be the driving constraint, particularly for the volumes of data potentially available. Regional distribution may be very likely the only viable option.	<b>No Change</b> – agree that regional distribution is a good approach from a communications point of view. There are many issues besides communications. This will be explored in the Design phase.
164	Various hardcopy editorial comments will be considered.	<b>Incorporate.</b>