Questions on 1090 ES .

1. Is it understood that 1090 ES will require a new and separate infrastructure should it be integrated into the ground ATM systems? That will be a time consuming and costly activity that should be born by those who requested it. Standards on 1090 ES for ADS-B and ground systems are also missing. There are no relations between e.g. planned Mode S radars in some Core European countries and use of 1090 ES for possible ADS-B applications?
   What ADS-B applications are envisaged for the 1090 ES and for what user groups? Assuming that it is those contained in what is commonly called "Package 1" the following questions have to be sorted out and answered before 1090 ES should be adopted for other than TCAS/ACAS enhancements:

2. What equipment should GA and ground vehicles have for ADS-B and Runway Incursion Prevention and how will GNSS Augmentation be provided to those user groups?

3. In most User Expectations surveys and in e.g. Boeing's ATM strategy the implementation of a Trajectory based ATM system is a high priority issue. How will 1090 ES support implementation of up to four (4) Trajectory Change Points?

4. How are the fruit, garbling and multipath problems going to be solved e.g. during high military activities, on the airport surface, etc?

5. How are the problems with 5-7 percent undetected erroneous messages that will provide false information from 1090 ES going to be solved?

6. How will the availability requirements (equal to radar availability figures) for ADS-B be satisfied on:
   - air transport aircraft?
   - general aviation aircraft?

7. Assuming that the availability requirements cannot be satisfied what ADS-B applications will 1090 ES be able to support?

8. How will the target level of safety be affected by adding ADS-B functions into the TCAS/ACAS system.

9. How will the different receiver sensitivity levels required for ADS-B and TCAS/ACAS be implemented into the 1090 ES system?

10. Can someone guarantee that the combined 1090 ES and TCAS/ACAS system can be certified for ADS-B?

11. When can properly validated 1090 ES ICAO SARPs) according to Eurocae ED-78A/RTCA DO-264) and ground systems specifications for ADS-B be expected?