SYMPOSIUM ON INTEGRATED APPLICATIONS (B5)
Integrated Applications End-to-End Solutions (1)

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# ESA ACTIVITIES IN THE FIELD OF TRANSPORTATION

**Abstract**

Transport of goods is a major issue for all the economies of the world. An efficient transfer of goods from producers to resellers, no matter the social or political situation, is mandatory for their business to work smoothly and efficiently according to plan. In the particular case of terrestrial transport, space technology plays such an important role today that it is difficult to conceive of efficient transport without the link with space infrastructure. Nevertheless, this link is not always transparent to the users, and moreover, not yet exploited to its full potential. Much of road transport today already incorporates satellite navigation into their operational systems. The EU has acknowledged the added value of GNSS to track and monitor trains fleets for traffic and incident management purposes. Meteorological Earth Observation satellites provide important information on the weather and thus road conditions. Satellite and ground communication systems provide the two-way link obtaining a multitude of pertinent information and requesting help. Additionally, Satellite communications can be extremely useful in areas with low coverage of terrestrial infrastructure or where such infrastructure has collapsed. In cases of natural disasters or other emergencies (e.g. terrorism, war) terrestrial communications systems often break down or are overloaded, and, among other alternative solutions, satellite provides a useful and very dependable backup. All these space assets are currently utilised in one way or another to assist transport. In the domain of transport, as with other domains, integrating the functionalities of separate systems into a system of systems results in advantages far greater than the sum of the individual systems working alone. ESA's integrated applications programme is currently working in several areas related to transport, where combining space and terrestrial assets are adding value to existing services or facilitating new innovative services in Europe. As an example, transport of hazardous goods is one domain of work where space assets can play a significant role. The very nature of such transport requires uninterrupted communications independent of terrain (e.g. mountainous) or conditions (bad weather, emergencies, natural disasters), as well as positioning of vehicles, and contents of the payloads. Such information is both necessary for the planning of the routes beforehand and monitoring and changing the routes (preventive measures) in real time dependent on conditions, as well as immediately after an accident or emergency situation, where accurate and timely information plays a major role in taking corrective action. Such control and monitoring is not only paramount for vehicle transport on the roads, but also train and passenger transport on water ways and rail.