

ARTIC Workshop
Berlin, March 09

Satcoms in Support of ITS



Alejandro Fransoy
Satcoms Engineer
Avanti Communications Plc.



- **SISTER -Satcoms In Support of Transport on European Roads.**
- It is a co-funded €10.5M project run under the European 6th Framework Program.
- It will finish in Nov. 2009 after 3 years of development (possible extension).
- It studies the feasibility of use of satellite communications in support of ITS applications such as Map Updates, Weather & Traffic alerts, eCall, Road User Charging, Real Time Kinematics and some more.





The consortium





Applications

Market	Application	Communication type	Data load
Regulatory	Digital Tachograph	Broadcast	Low. Firmware updates
	Road User Charging	Broadcast and bidirectional	It depends on OBU type (thin or fat)
Safety	eCall	Bidirectional	Low (140Bytes messages)
	Speed Alert	Broadcast speed updates	Variable
	ADAS	Broadcast alerts, road status reports	Variable
Non safety	GPS authentication	Broadcast	~1kbps constant stream
	Real Time Kinematiks	Broadcast	60kbps stream for Europe
	Map Updates	Broadcast	High
	Traffic Updates	Broadcast	Variable
	Floating Vehicle	Bidirectional	Low
	Pay-per-use Insurance	Broadcast and Bidirectional	Low
	Theft Detection	Bidirectional	Low
	Remote vehicle diagnosis	Bidirectional	Low
Commercial	Fleet management	Broadcast and Bidirectional	Variable
	Hazardous Goods Monitoring	Broadcast and Bidirectional	Variable



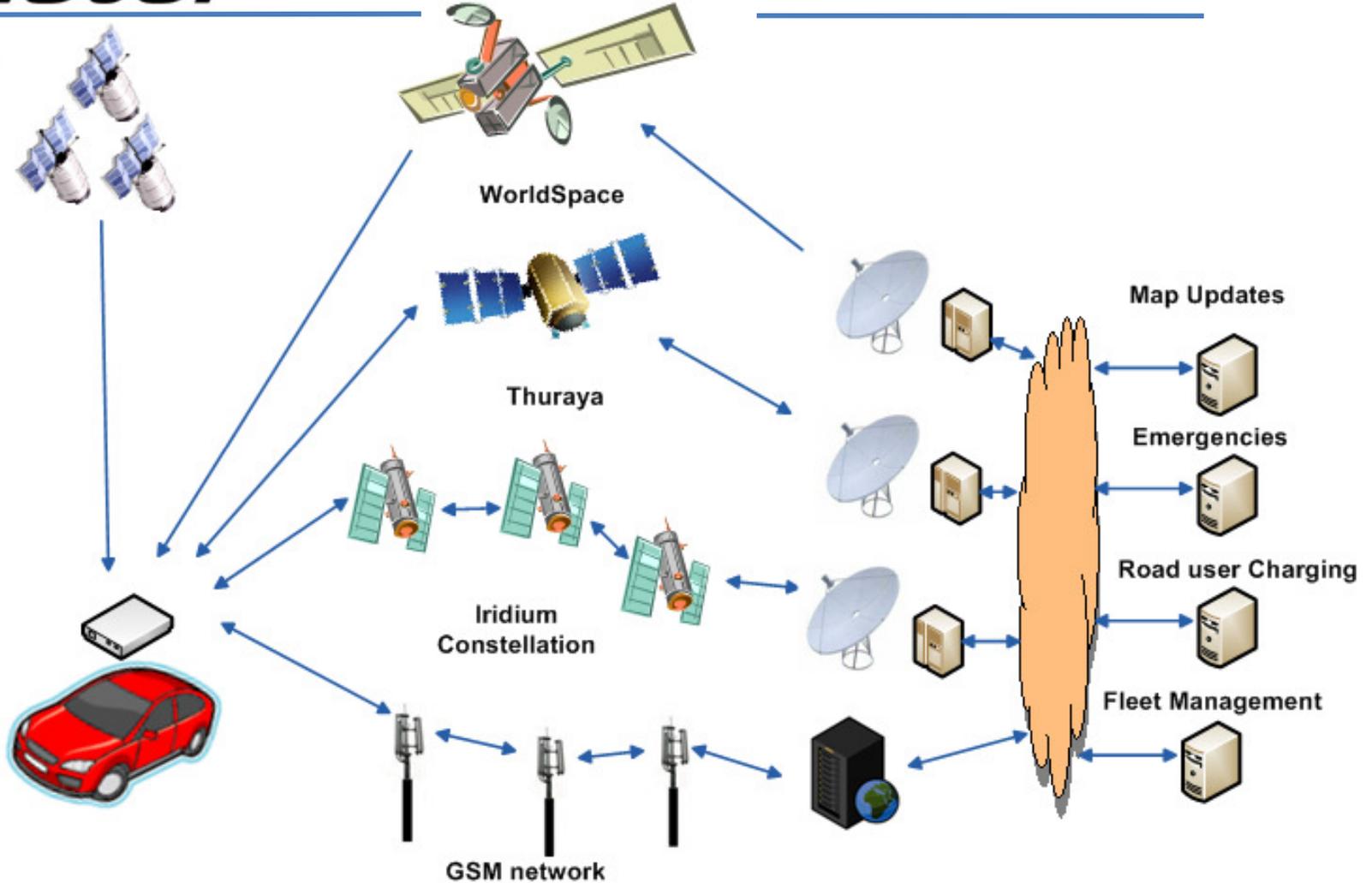
Architecture

GPS constellation



Applications

- Maps
- eCall
- RUC
- Fleet M.





Satellite Operators

Platform	Orbit	Band	Type of comms	Return channel	Data rate down/up	Data size	supported traffic	Trx delay	User terminal
WorldSpace	GEO	L	real-time broadcast/ multi-cast	No	128kbps per channel	Unlimited	3Mbps per satellite	10s	14x8x3cm
Iridium	LEO	L	Bidirectional (Voice, SMS and Internet)	Yes	4.8kbps full duplex	1.9KBytes SBD 180Bytes SMS	72600 full duplex channels	0.071 to 0.232s	11x6.5x2cm
Thuraya	GEO	L	Bidirectional (Voice, SMS and Internet)	Yes	60/15 kbps	180Bytes SMS	13,500 full duplex channels per satellite	~ 0.5s two-way	7.2x5.2x0.9cm
Solaris	GEO	S	Broadcast, Multicast and Bidirectional (Voice and Internet)	Yes	N.A.	Unlimited	2.3Mbps per spot beam (satellite) 7Mbps terrestrial	~ 0.5s two-way	11.5x4.7x 2.1cm
Hylas	GEO	Ka/Ku	Broadband, Broadcast and multicast	Yes	1Mbps uplink, 5Mbps downlink	Unlimited	Ku: 80Mbps total Ka:420Mbps per beam	~ 0.5s two-way	Fixed user MODEM





Antenna Requirements

Platform	Orbit	Antenna Pattern	Freq. (MHZ) FWD	Freq. (MHZ) RTN	Polarization	BW FWD	BW RTN	GAIN
GSM	-	Omni.	935 -960 1,805 -1,880	890 - 915 1,710 - 1,785	LP	25MHz 75MHz	25MHz 75MHz	~3dB
GPS	LEO	Omni.	1,575	-	RHCP	1.023MHz	-	~3dB
WorldSpace	GEO	Omni./ Conical	1,467 - 1,492	-	R/LHCP	25MHz	-	~3dB
Iridium	LEO	Omni.	1,616-1,626	1,616-1,626	RHCP	10MHz	10MHz	~3dB
Thuraya	GEO	Omni./ Conical	1,525 - 1,559	1,626 -1,660	LHCP	34MHz	34MHz	~3dB
Solaris	GEO	Omni./ Conical	2,170-2,200	1,980-2,010	R/LHCP	30MHz*	30MHz*	~3dB
Hylas	GEO	Directional	12,100	17,700	LP	36MHz**	36MHz**	~20dB

* Solaris is expected to be given a 15MHz slot in the S-band

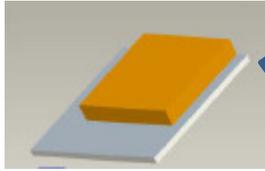
** Approximately 1Mbps effective data rate (Spread Spectrum Techniques)



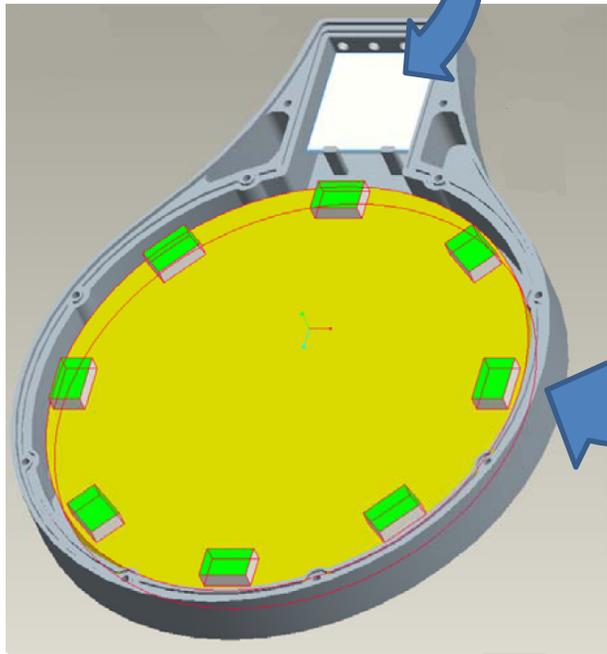
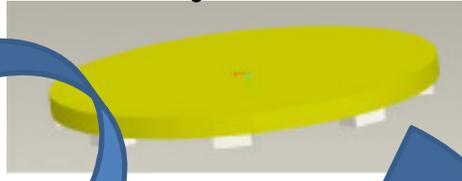


SISTER Antenna

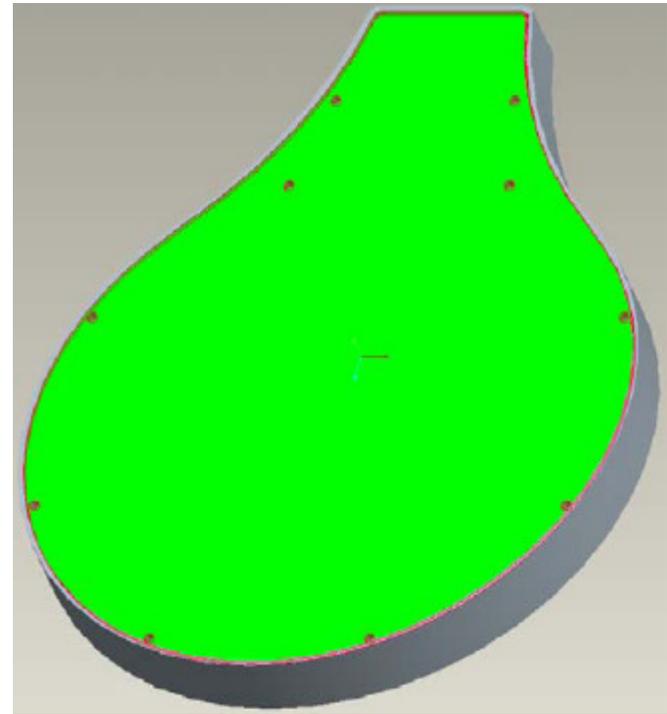
GPS patch



WorldSpace-
Thuraya-Iridium

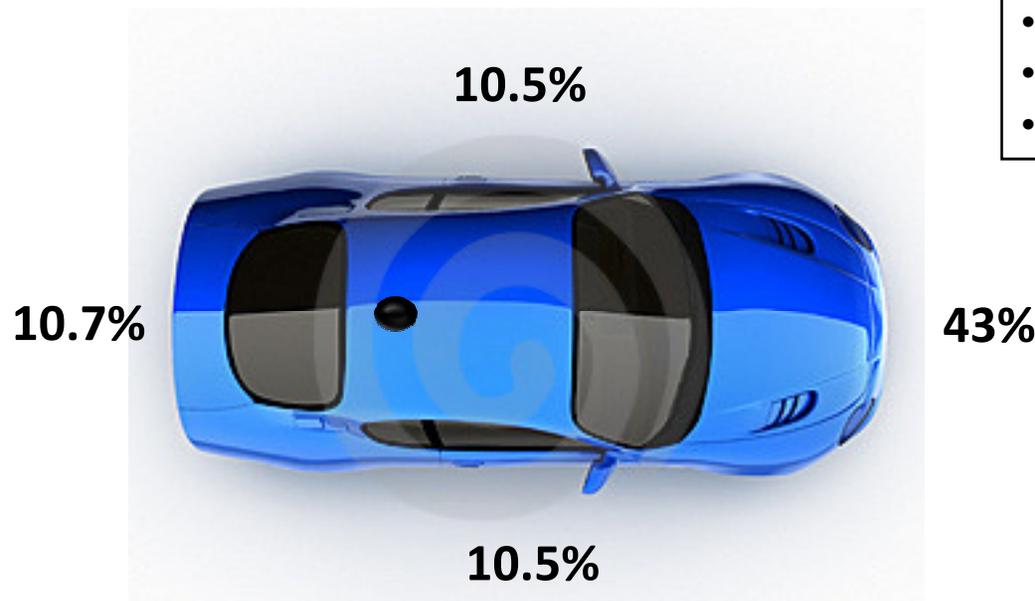


Shielded



Antenna Location

Accidents Statistics



•Single impact rollover:	0.4%
•Multiple impact crash:	20.5%
•Multiple impact rollover:	4.0%





Thank you!

For more information, please visit:
www.sister-project.org

