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SPEAKING AT THE:

Space-Weather Awareness Dialogue

Hosted by DG ENTERPRISE & INDUSTRY and the Joint Research Centre
The Schuman Room, Berlaymont Building, European Commission
25th October 2011

ESOA is the association of ALL European satellite operators - they fly **over 150 satellites**, employ more than **6000 people**, have a **combined turnover of over 6 billion euros**. Communications satellites sustain Europe's space industry (account for **9 out of 10 European launches/ 60% of space industry turnover & space industry employs 30,000 people**). Satops also make private investment & believe that all this should be recognized & advantaged by policymakers in all relevant fields of activity.

1. SPACE WEATHER (SW) & THE SATELLITE OPERATORS (SATOPS):

SW is nothing new, something we have been aware of for a long time and something that is taken very seriously by the space industry including satops. For satops the biggest safeguard against SW is the design & quality of integration of the satellite - making sure it is as 'immune' as possible and provides redundancy to ensure ongoing operations even if there is a SW event. Satellite design is constantly improving: when issues arise on one satellite, the manufacturer typically shares the experience with satops & improves design accordingly. ***Beyond optimising DESIGN with today's knowledge, nothing can be done to prevent incidents but by having a maximum of DATA available (both on the space environment & on previous incidents) one can better understand malfunctions & feed that knowledge back into satellite design.***

2. PUBLIC PERCEPTION OF THE ISSUE -V- REALITY:

Generally this subject is hugely exaggerated in the media. 2 examples: August 2010 - the popular press grossly exaggerated the solar activity & predicted dire consequences for satops. There were NO malfunctions reported. This Sept (2011) we saw a few articles following a US study. One had the title "*Solar megastorm could cripple satellites for a decade*"! There was however no context for the article such as a prediction of a solar mega-storm happening in the near future. The impact of such media coverage however is huge as it starts to impact policy-making: e.g. it featured in Prime Minister's Question Time in the UK and even in Brussels, MEPs started asking about how reliable Galileo satellites would be in the event of a solar storm! No one tempers these articles by adding that in reality despite at least 4 solar maxima in the last 50 years, there has never been a solar megastorm & one like the Carrington event is only predicted to happen every 500 years! My satops have sats that are 20 yrs old that have never been affected, on the

contrary I'm told that if anything the impact of the radiation environment is less than originally predicted. ***Hysterical media attention should not be allowed to influence policy decisions, which need to be based on reasoned technical discussion.***

3. THE EFFECT ON SATELLITE SERVICES:

There are of course incidents with satellites from time to time, e.g. with solar arrays - which is one of the areas more often investigated - but whether they are due to space weather is not certain. If there is an incident, satops are able to react in a very robust way because they have flexibility: services can be moved to other adjacent satellites or services re-shuffled. Satops even have the ability to choose which services should be lost so that 'essential services' can be maintained or restored. They also always specify for redundancy - e.g. a sat will never be deployed with only one on board processor on board, it will always have two, so that if one fails, it can switch to using the other. ***So the impact of an incident on satellite services is generally manageable unless we're talking about a complete satellite failure.***

4. ROLE OF POLICY-MAKERS:

I've already said that **design & data** are the two most important components to being shielded from incidents. Today some satops spend their own money into putting SSA sensors on their own satellites to monitor solar activity & other space environment activities, like RF interference issues. INT/ SES/ INM share SSA data because they've got common SSA sensor types that look at the same types of data from different locations. They have also put into place the Space Data Association (SDA) to share data to manage physical space (conjunction assessments) & mitigate RF interference. The SDA and its space data centre is the ideal vehicle through which SSA data could be shared efficiently/ reliably on a global basis all while protecting legal sensitivity of the data. Note that one valuable former source of space weather data was LANL (a US military science institution) but since last year it no longer makes data available to non-US agencies! ***A useful policy initiative would therefore be to supplement these activities in Europe. E.g. Europe could look at putting its own SSA sensors into space, e.g. as hosted payloads on board ESOA members satellites. SSA sensors are small/ light/ & low power consuming so this is an easy & pragmatic solution, to be preferred over a more scientific long program.***

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