Proposed Approach to Analyzing the Results of the Interoperability Workshops

ICG Working Group A Meeting

11-13 November 2014

Purpose of Industry Q&A

- Provide useful inputs to GNSS Providers

- Even agreement/disagreement in answers could be useful information for Providers

- Therefore, we should consider parsing the Q&A by Provider

- Only if a Provider considers making changes would further investigation be beneficial

- Discussion among Providers on mutual issues would be a good next step

#	Combined Questions	BeiDou	Galileo	GLONASS	GPS	IRNSS	QZSS	Comments
	What Interoperability Questions Affect Your Signal and System Design?							
1	What types of applications do receivers from your company (or receiver designs) support?							
2	Do you see a threat to GNSS receivers due to many more GNSS signals centered at 1575.42 MHz?	x	x	x	x	x	x	Policy Question
3	Do you prefer all new CDMA signals at "L1" to be centered at 1575.42 MHz or have some of them elsewhere, e.g., at 1602 MHz?	x	x			x		Signal Plans
4	Given that most GNSS providers plan to transmit a "modernized" signal at 1575.42 MHz, what is your long term perspective on whether you will continue to use C/A? Why? How?				x		x	Signal Plans
5	Once there are a large number of good CDMA signals, will there be continuing commercial interest in FDMA signals? Why or Why Not?			x				Signal Plans
6	Do you prefer signals in different "L1" frequency bands for interference mitigation rather than at one center frequency for interoperability? Why?	x	x			x		Signal Plans
7	If a satellite's signals do not meet quality standards, what should happen: a. Be set unhealthy? b. Transmit with a nonstandard code? c. Transmit with reduced signal power (reduce interference)? d. Be switched off? e. Other method f. Other	x	x	x	x	x	x	Policy Question
8	To assure only "good" signals, should GNSS providers agree on minimum international signal quality standards and agree to provide only signals meeting the standard?	x	x	x	x	x	x	Policy Question
9	Given that L5/E5a will be transmitted by most GNSS providers, do you intend to use the E5b signal? If so, for what purpose?	x	x	x		x		Signal Plans
10	For your applications, are small satellite "frequency steps" a problem?	x	x	x	x	x	x	Quality Issue
11	If so, what interval between "frequency steps" and what delta-f magnitude would be excessive?	x	x	x	x	x	x	Quality Issue
12	Assuming signal quality is acceptable from every provider, would you limit the number of signals used by the provider or by other criteria? What criteria?							
13	Is having more satellites inherently better or do you think there should be a limit (e.g. are more than 3 global constellations desired)?	x	x	x	x	x	x	
14	Will the marketplace "force" you to make use of signals from every available constellation (i.e. GPS, GLONASS, Galileo, BeiDou, QZSS, IRNSS)?							
15	For best interoperability, how important is a common center frequency? How important is a common signal spectrum (PSD)?	x	x			x		Signal Plans
16	Will you provide "tri-lane" capability in the future? Why?							
17	If so, do you prefer a common middle frequency or the combined use of L2 (1227.6), B3 (1268.52), and E6 (1278.75) if B3 and E6 open access is available	x	x	x	x	x	x	Signal Plans
18	Would you prefer a common open signal in S Band? In C Band? Why?	x	x	x	x	x	x	Signal Plans
19	Does a wider satellite transmitter bandwidth help with multipath mitigation?							
20	What minimum transmitter bandwidth would you recommend for future GNSS signals in order to achieve optimum code precision measurements?	x		x		x		Satellite Design
21	Would you recommend GNSS or SBAS services provide interoperability parameters: system clock offsets, geodesy offsets, ARAIM parameters, or others?	x	x	x	x	x	x	Policy Question
22	Should they be provided by other means so as not to compromise TTFF or other navigation capabilities?	x	x	x	x	x	x	Policy Question
23	For your applications and for each signal, what amount of drift between code and carrier over what time frame would be excessive?	x	x	x	x	x	x	Quality Issue
24	For your applications and for two or more signals in different frequency bands, e.g., L1 and L5 (when scaled properly), what amount of relative drift in code and carrier between the signals would be excessive?	x	x	x	x	x	x	Quality Issue
25	Should the international community strive to protect all GNSS signal bands from terrestrial signal interference?	x	x	x	x	x	x	Policy Question
26	Do the current differences (~10 cm) in Geodesy pose a problem for your users? Why or why not?							
27	If geodesy differences are a problem, what is the preferred method of compensation: Published values (e.g., on websites)? Satellite messages?	x	x	x	x	x	x	Policy Question
28	Do you want each system to cross reference the other's time (e.g., with a GGTO type of message) or compare itself to a common international GNSS ensemble time? To what precision?	x	x	x	x	x	x	Data Message and Policy Issue
29	Will your future receivers calculate a time offset between systems based on signal measurements or use only external time offset data?							
30	What is the preferred method of receiving time offsets: Satellite messages, Internet messages, or internally calculated?	x	x	x	x	x	x	Data Message and Policy Issue
31	*Do you prefer transmit the time/space interferences into a same standard and calculate the offsets? What is the accuracy level?*	?	?	?	?	?	?	What does this mean?
32	Will you consider using interoperability parameters provided by a third party? If so, which technique would you prefer: a. Provided by Telstar? b. Provided by mobile communication (e.g. GSM)? c. Provided over the Internet? d. Other method?	x	x	x	x	x	x	Data Message and Policy Issue

Recommendations

- Relevance of Questions to the specific plans of Providers is more important now than the detailed answers
  - Answers can be consulted by Providers if useful
- Each Provider consider their pertinent questions
  - Report conclusions or positions back to WG-A
- Task force focus on common policy issues
  - Report results to WG-A
- Provider signal plans defined
  - Provides stability for users