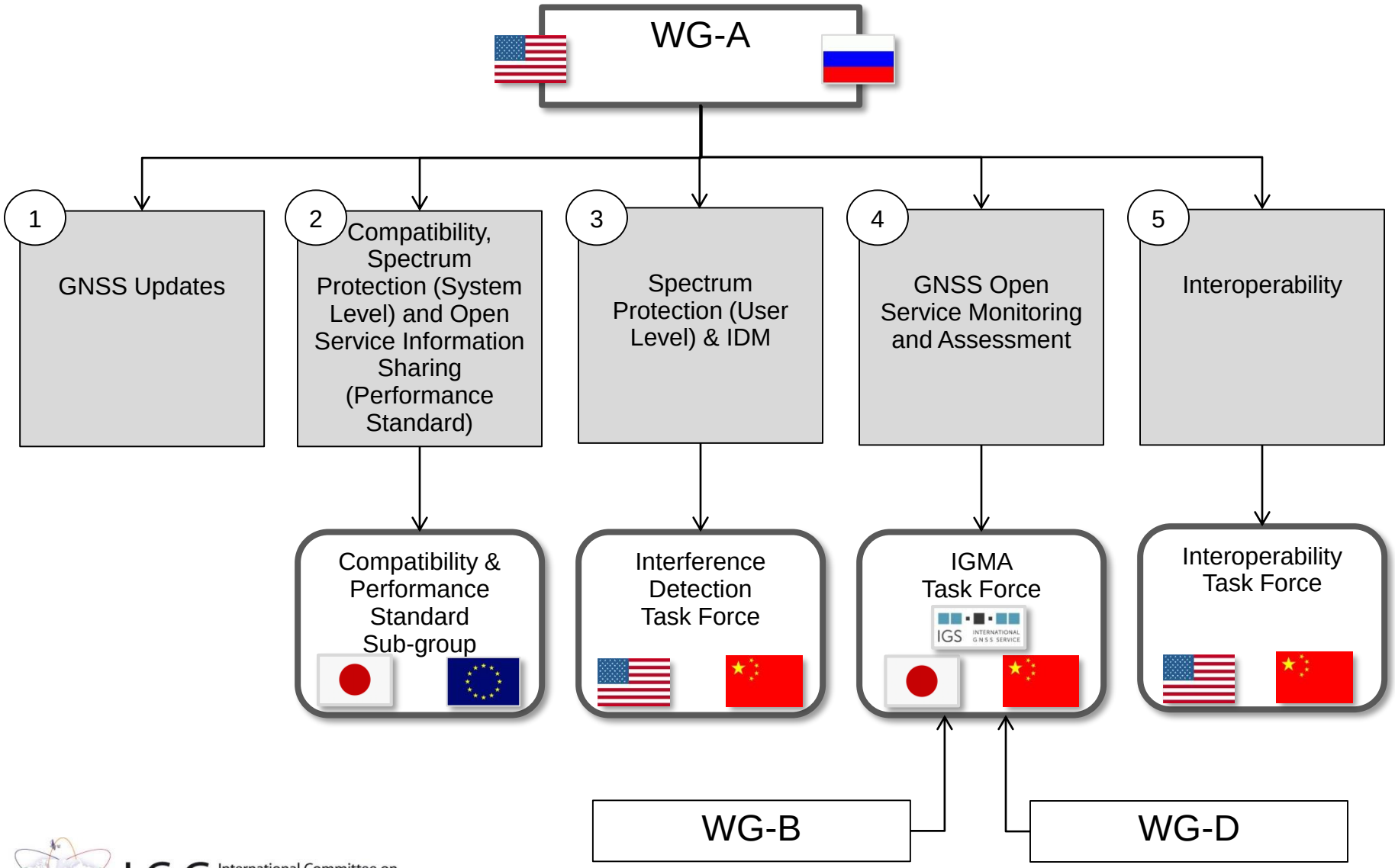
WG-A Architecture



ICG International Committee on Global Navigation Satellite Systems

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SPECTRUM PROTECTION & IDM

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(Current) Work Plan
Spectrum Protection (user level) & IDM

- The Providers Forum has agreed to pursue the protection of radionavigation satellite service (RNSS) spectrum through appropriate domestic and international regulation.
  - When necessary and appropriate, the Working Group will facilitate Provider discussions on their individual views and actions related to RNSS spectrum issues and agenda items under consideration by the ITU and its Working Parties.
- The Working Group will develop a strategy for ICG support of mechanisms to detect and mitigate sources of electromagnetic interference, taking existing regulatory mechanisms into consideration. This could lead to concrete proposals for detecting interference.

Interference Detection Task Force

(as of 12 June 2015)

- **Co-Chairs**:
  - **Rick Hamilton, USCG, Co-lead stephen.r.hamilton@uscg.mil**
  - **Weimin Zhen, China, Co-lead crirp_zwm@163.com**
- Members:
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Interference Detection Task Force Preliminary Work Plan

Initially the task force will focus on developing a common set of information to be reported to GNSS civil service centers.

- The U.S., China and the ITU have presented existing interference reporting forms that are used to report interference
- The task force leaders will distribute the forms to the members of the task force and coordinate by e-mail. Findings and decisions will be reported to the next IDM workshop

Next the task force will focus on establishing routine communications among the (provider service) centers.

- Some center activities are more mature than other emerging providers organizations. Best practices will be shared by e-mail and the task force members agreed to share “after action reports” of interference activity on a regular basis.

Finally, the task force will develop guidelines for common capabilities to be considered in the development of future national IDM networks.

- The task force agreed that presentations could be made at future IDM workshops and that providers will come prepared to brief capabilities being considered.

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ICG-8 Recommendation 8A.3.1

Education & Outreach Regarding Sources of GNSS Interference

- The ICG should develop educational material such as a downloadable pamphlet or other web content on sources of interference to GNSS. The material should include an explanation why radio navigation satellite services (RNSS) are different than radio communications services and more vulnerable to interference, and will emphasize the importance of GNSS services to critical public and private sector functions, infrastructure, and economic activity

The WG-A Task Force on Interference Detection will lead the development of sample educational material on GNSS Interference for ICG consideration

Implementation of this recommendation has been moved from the IDM Task Force to the Compatibility Sub-Group

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GNSS as Critical Infrastructure (as reported at ICG-9)

US	RU	China	EU
There is official Critical Infrastructure definition	There is no official Critical Infrastructure definition	There is no official Critical Infrastructure definition	There is official Critical Infrastructure definition
GPS is not a critical infrastructure	Navigation is a critical technology	BeiDou is Essential Space Infrastructure	Galileo will be designated as critical infrastructure
GPS integrated in most of all critical infrastructures	GLONASS is integrated in most of all priority development directions of science and technique	Beidou is integrated in most of all economy branches	Galileo service is critical to Energy and Transport critical infrastructure sectors

3 GNSS Jammers – National Legal Status (As Reported at ICG-9)

Jammers	US	RU	China	EU
manufacture	illegal	illegal	illegal	Nation-by-nation
sell	illegal	illegal	illegal	illegal
export	illegal	illegal	illegal	Nation-by-nation
purchase	Undefined (consumer import illegal)	illegal	illegal	illegal
own	legal	Undefined	Undefined	legal
use	illegal	illegal	illegal	illegal

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4th IDM Workshop & Inter-sessional Task Force Meeting

Vienna, Austria

10-11 June 2015

3 Agenda of 4th Workshop – 10 June 2015, Vienna

- Introduction
- Discussion of recommendation/outcomes from previous Workshop:
  - Unintentional interference levels
  - Crowd Sourcing interference detection techniques
  - GNSS as International Critical Infrastructure
  - Adjacent Band Compatibility
  - Status update on the recommendations from ICG-9
- Interference Detection and Geo-Location Capabilities
- New Discussions
  - Back-up systems: Is a backup practical?
  - Spoofing
  - Workshop views and recommendations
- Adjourn

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Recommendation 9A.3.1

The ICG recommends that GNSS providers and GNSS user community member states evaluate existing and emerging interference detection, localization, and characterization capabilities and consider developing, testing and implementing these or similar capabilities in their nations or regions of the world

STATUS: keep continued ?

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Rec. 9A.3.1. implementation

IDM Geolocation Systems

Discussed at June 2015 IDM Workshop

- Harris Corporation presented information about their Signal Sentry 1000 system, demonstrating a real-time geolocation system
- Consensus that all existing sensors should be tied into detection network, then add in other capabilities as they are developed
- IDM geolocation capabilities at ports in the U.S. are tied to Government intervention through regulation or legislation
  - Workshop attendees discussed a potential recommendation from the ICG to UN COPUOS that would suggest the same approach in other nations

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Rec. 9A.3.1. implementation

EMI Spatial Distribution Analysis

- Design Bureau «Vektor», Russia presented General guidelines and a practical example of the analysis of the spatial distribution of emissions in the frequency bands of GNSS from a ground monitor station
- The spatial distribution of emissions in the frequency bands of GNSS:
  - provides meaningful characterization of the detailed electromagnetic environment;
  - helps to detect the interference impact on GNSS
- The proposed approach to obtain data from practical measurement and assessment techniques is aimed at a comprehensive analysis of the electromagnetic interference situation in the GNSS radio frequency bands
- The results could be used as a basis for guidance on needed measurements and data processing and operational recommendations to develop special GNSS interference monitoring equipment

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Recommendation 9A.3.2

System providers and user community member states are encouraged to work with industry groups to determine if standards for crowd sourcing interference detection and localization techniques should be developed and cost-effectively implemented by mobile telecom service providers.

STATUS: keep continued

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Rec 9A.3.2 Implementation

Crowd Sourcing for Interference Detection

- Discussed at June 2015 IDM Workshop
  - Suggestion that it might be better for detection networks to begin with cell-towers instead of mobile phones
  - Volume of data from nation-wide system may not be practical; regional monitoring centers might be more realistic.
  - Consensus that efforts aimed at initiating crowd-sourcing should begin with discussions between Task Force and individual companies before approaching user industry organizations such as 3GPP
  - Industry may be reluctant to act without market demand or government intervention through laws or regulations

Way Forward

- **WG-A requested Task Force** to invite industry representatives to WG-A Meeting at ICG-10 to show how crowd-sourcing would work and discuss the feasibility
- Crowd Sourcing may also be discussed further at the next IDM Workshop

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Recommendation 9A.3.3

The ICG Executive Secretariat, in coordination with the IDM taskforce, should organize United Nations workshops on RNSS spectrum protection and IDM for governments of user community member nations in order to protect the worldwide utility and benefits of GNSS.

- A proposal focused on educating UN member state administrations regarding RNSS spectrum management approaches and IDM capabilities will be developed for consideration by the ICG
- Participating member state administration representatives will be encouraged to Provide information as to whether it is legal within their country to: manufacture, sell domestically, export, import, purchase, own, or use GNSS jammers

STATUS: keep continued

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Rec 9A.3.2 Implementation

Planned UN Experts Workshop: 14-18 December 2015

- Will include session (1-2 days) devoted to Spectrum Protection and IDM
- Task Force agreed to help organize this session
- Task Force will assist in developing agenda and encourage appropriate experts to participate
- Will include presentations from WG-A participants focused on the IDM work taking place in the ICG

Based on the success of the Spectrum/IDM session in December, WG-A and the ICG Secretariat will pursue additional sessions at upcoming UN Space Applications Program GNSS Workshops and/or events held by UN GNSS Regional Centers

Draft Recommendation for ICG-10

- UN COPUOS, based on a presentation to the Science & Technology Subcommittee (STSC), should establish a multi-year agenda item focused on National Efforts to protect RNSS Spectrum, and pursue GNSS Interference Detection and Mitigation in member states
- Under this agenda item, Member States will be asked to report on:
  - [National RNSS Spectrum Allocations and consistency with ITU Allocations]
  - Planned or existing Laws and Regulations related to the manufacture, sale, export, import, purchase, ownership, and use of GNSS jammers
  - Domestic efforts to detect and mitigate GNSS interference

Recommendation modified based on Compatibility session discussions

WG-A should prepare a presentation on its spectrum protection and IDM activities for the February 2016 session of the UN COPUOS STSC

3 Additional Workshop/Task Force Agenda Items

Unintentional Interference

- China presented their regulatory limits and pointed out that they are more strict than FCC Part 15 regulations.
- Co-Chairs of WG-A informed the workshop that this work had been moved to the Compatibility sugroup.

Critical Infrastructure

- The representative from China explained that the GNSS signals in China are treated as National Essential Space Infrastructure.
- It was consensus that the Task Force/WG-A has exhausted the work on this item for now

Back-Up Systems

- It was suggested that back-up systems would not be used without a government mandate
- There is some indication of discussion at IMO of mandating carriage requirements for terrestrial signals
- It was the consensus of the workshop that this topic is currently outside the scope of the ICG

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Next Proposed Workshop – May 2016

- China expressed interest in hosting the next IDM Workshop
- To be held in conjunction with the 2016 China Satellite Navigation Conference (CSNC)