International Space Weather Service Coordination during Extreme Events

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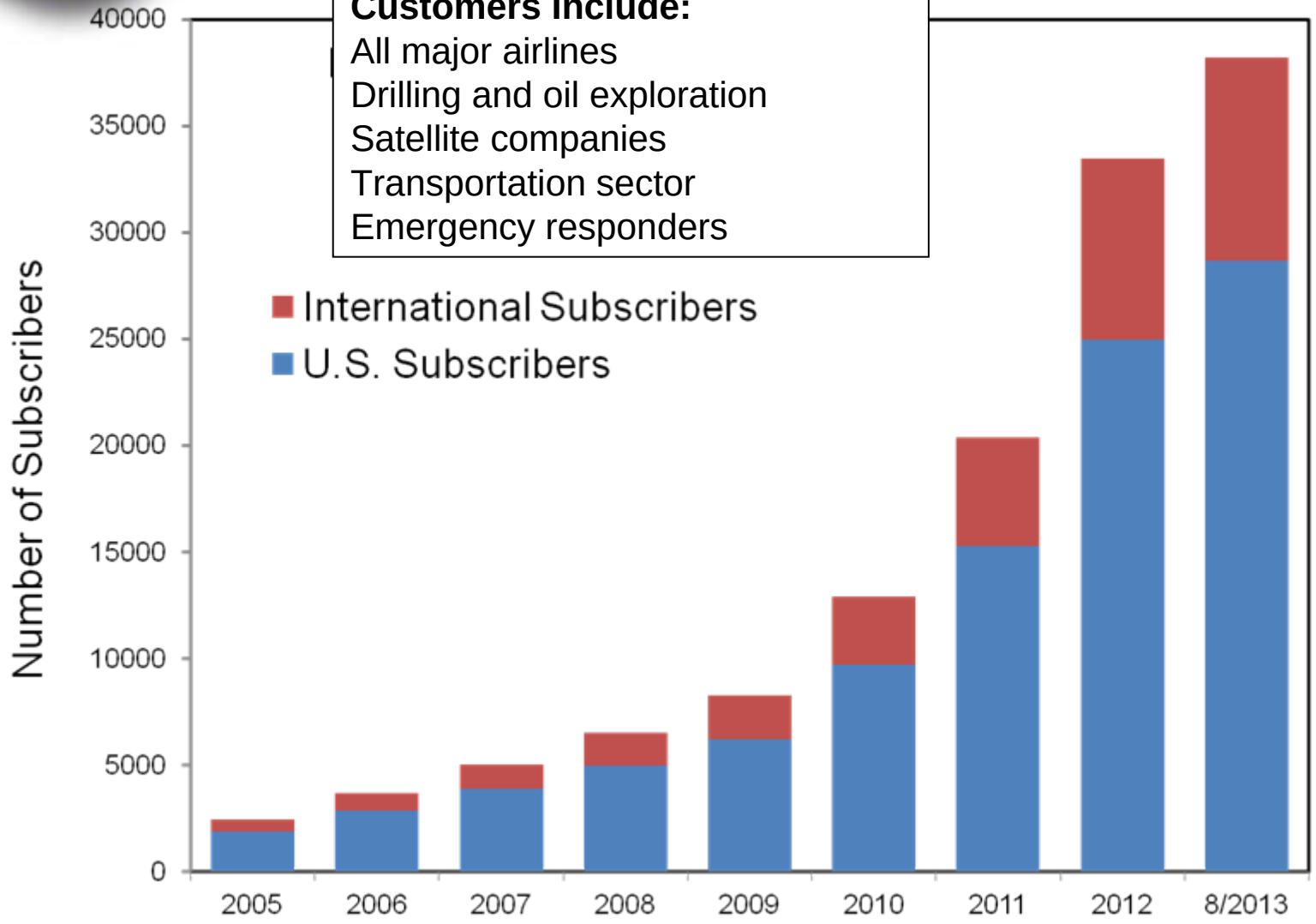
International and U.S. Subscribers to NOAA's Space Weather Products

Customers Include:
All major airlines
Drilling and oil exploration
Satellite companies
Transportation sector
Emergency responders



Space Weather Risks are Recognized - Mitigation Plans are being Developed

United Kingdom National Register Recognizes Space Weather Risks

CabinetOffice

National Risk Register of Civil Emergencies

2012 edition

United States Recognizes Space Weather as a Grand Challenge for Disaster Reduction

SPACE WEATHER

A report of the Subcommittee on Disaster Reduction
www.sdr.gov

An element of the National Science and Technology Council

International Coordination of Space Weather Service Providers

ISES
International Space Environment Service

15 Regional Warning Centers
4 Associate Warning Centers
1 Collaborative Expert Center

World Meteorological Organisation

WMO Inter-Programme Coordination Team on Space Weather

21 (out of 185) Member Countries
7 International Organizations

WMO Inter-Programme Coordination Team Action: Extreme Event Warnings

ICTSW-3 meeting (November, 2012): Need for a global system to detect, warn, and facilitate response to extreme events.

- Required consensus on definition of extreme events
  - Characterize probability of occurrence & potential impact
- Identify service requirements, including space weather scales
- Define observational requirements
- Define organizational requirements for service providers
- Develop guidelines for national procedures for preparedness and response

Discussion on Extreme Space Weather Events at NOAA Space Weather Workshop – April, 2013

ISES/WMO Panel session on International Communication and Coordination for Extreme Space Weather Events

- Panelists: Australia, Brazil, China, Japan, NATO, Poland, South Korea, United States, United Kingdom, WMO
- Purpose: to address detection and response to extreme events and to identify capability gaps
- Topics discussed: event characterization, alert chain, forecast models, available services, communication methods

Focus on « severe » event warning

- Extreme events:
  - Infrequent or exceptional (decadal or centennial)
  - Involve unusually large energy levels
  - Large impact, often with cascading effects
- Such « worst case » events are fully relevant for design purpose and vulnerability assessment
- Warning procedures should extend to any « severe » event requiring emergency reaction, potentially hazardous
  - more likely to be experienced in a man’s life

International framework for building resilience (1)

- 2003: International Conference on Early Warning identified 4 components
  - Monitoring and warning service
  - Risk knowledge (incl. exposure)
  - Communication & dissemination
  - Response capacity

International framework for building resilience (2)

- 2005: Hyogo Framework for Action (HFA)
  « Building the Resilience of Nations and Communities to Disasters » outlined 5 priority areas:
  - Institutional basis
  - Risk monitoring and warnings
  - Education to safety
  - Risk factor reduction
  - Preparedness

International Harmonization of Severe Event Warning Procedures

- Cross-border information consistency
  - Required for large scale events (international impact)
  - Required for international users (consistent procedures/terminology)
- Warning centres interoperability
  - Share experience, provide confirmation and back-up
- Should all Warning Centres use the same alert thresholds?
  - Physical thresholds adjusted regionally to ensure consistent degree of rarity of « extreme » events
  - Hazard frequency, exposure, vulnerability may differ

Early Warning information has to be…

- Communicated
  - Specific, active delivery (beyond routine channels)
  - From designated authoritative source
  - To determined recipients: authorities, major operators, public at risk
- Understood: minimize information losses or mis-interpretation
  - Simplified
  - Focused on decision support : risk resulting from the hazard
  - Standardized (e.g. scale) with pre-defined explanations
- Trusted: demonstrated reliability
  - Standardized information enables verification
  - Post-event statistics help justify the « extreme » nature
- Responded: efficient user reaction
  - Preparedness for mitigation, throughout alert chain

ISES/WMO Panel Discussion on Extreme Space Weather Events

Recommended areas for further action:

- Identify activity levels to initiate communication
- Share information and develop manual of best practices
- Develop a standard set of products in concise formats
- Exercise coordination mechanisms under test conditions
- Conduct post-event analyses to refine capabilities
- Include space weather in multi-hazard warning schemes

ISES/WMO will be developing and strengthening capacities and working to define response procedures to extreme events

Summary

- There is an increasing need to improve resilience to space weather through the global coordination of services
- Several international organizations are becoming engaged in space weather in complementary ways
- WMO/ISES are addressing the systems and procedures needed to support a global response to severe events
- Panel discussion was held to consider current capabilities and to identify coordination needs
- Discussion is encouraged to establish the research, service, and emergency-response actions required

International Space Weather Service Coordination during Extreme Events

Thank You !

World Meteorological Organization

Specialized Agency of the United Nations with 191 Members

Terms of Reference:

- Integration of space weather in global observing system
- Standardized service delivery
- Harmonized products for major application sectors
- Encourage research and operations dialogue

WMO Inter-Programme Coordination Team on Space Weather (ICTSW)

21 Member Countries

7 International Organizations

World Meteorological Organisation

International Space Environment Service

Coordinating space weather services since 1962

- Endorsed by national governments as space weather service providers
- Serves local regions in local languages
- Fosters forecaster interaction and coordination
- ICSU-World Data System Network Member
- Agreement with WMO in development

ISES
International Space Environment Service

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Additional International Organizations Interested by Space Weather Services

International Civil Aviation Organization – Defining civil aviation needs and information flow

Coordination Group for Meteorological Satellites – Satellite observations and anomaly reporting – drafting Terms of Reference

UN Committee on Peaceful Uses of Outer Space – New space weather agenda item – Research, observations, applications

UPU – Resilience of postal services

International Telecommunications Union – Ionospheric disturbances on radiocommunications

Strengthen Resilience Through Improved Services

Four elements needed to improve space weather capabilities:

1. User Needs:	Understand the risks and the actions that need to be taken
2. Targeted Services:	Develop useable capabilities from basic science knowledge
3. Observing Infrastructure:	Shared approach for long-term continuity
4. Global Coordination:	Consistent, accurate message

Global coordination will be essential during extreme events