



What is SPoRT?

- The Short-term Prediction Research and Transition (SPoRT) Center focuses on solving short-term weather forecast problems by providing unique observations and research capabilities.
- SPoRT has four main focus areas:
 - Remote Sensing
 - Modeling and Data Assimilation
 - Lightning
 - Disasters
- SPoRT also provides Decision Support Service (DSS) support as well as end user training and support for all transitions.

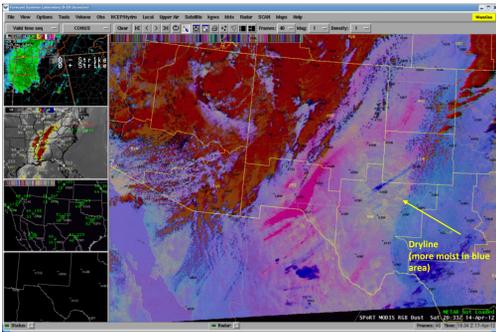


Figure 1. Example of Dust RGB.

SPoRT's Disasters Work

- The disaster's work is the newest to SPoRT's portfolio and came about after the 27th April 2011 tornado outbreak.
 - Satellite imagery was used to help end users identify tornado tracks and make adjustments to tracks that were difficult to access
- SPoRT responded and provided imagery for additional disasters because of this work
 - Hurricane Sandy (2012)
 - 2014 Chilean Earthquake
- Through a ROESES proposal SPoRT has partnered with the National Weather Service (NWS) to automatically provide EOS datasets to the Damage Assessment Toolkit (DAT).
 - SPoRT is working on integrating commercial data into the DAT as well.



Figure 2. High-resolution optical imagery displayed iPad DAT interface.

SPoRT's Plan for SAR Data

- SAR imagery provides an additional dataset to help respond to disasters and monitor recovery efforts
 - Text
 - Lingering cloud cover from storm systems, can prevent optical imagery from obtaining data immediately after and event. SAR data can provide crucial data when clouds are present.
- SPoRT intends to further its education and knowledge on SAR instruments, processing and products to fully understand the full spectrum of SAR data
- Develop products that can interpret SAR imagery to support end users and decision makers
 - Techniques and products that are easily interpretable are key, especially in time sensitive responses
- In addition to the examples below, SPoRT is interested in the use of SAR data for:
 - Wildfire monitoring & recovery
 - Landslides
 - Oil Spills

Hailstorm Damage

- Severe thunderstorms can bring damaging winds and large hail
- These severe weather hazards can bring millions, even billion dollars worth of damage to agricultural regions.
- SAR data will help to survey and evaluate potential damage areas, which can help a range of end users from USDA to insurance companies to NWS.



Figure 3. MODIS True Color RGB valid for 8 August 2009 with Landsat-7 ETM+ True Color RGB valid for 30 August 2009 overlaid.

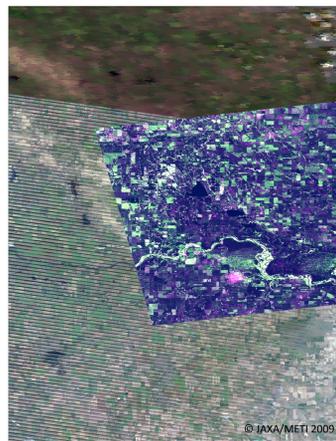


Figure 4. Same as Figure 1, but with 10 August 2009 ALOS-1 PALSAR RGB (HV, HV HH-HV) overlaid.

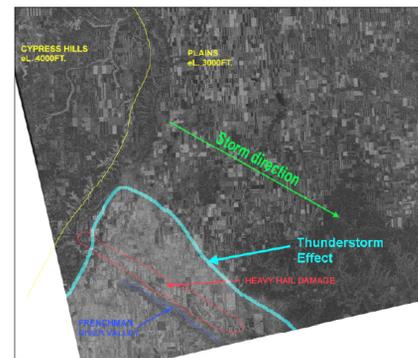


Figure 5. 11 July 2004 Envisat ASAR C-VV image. Source of image comes from Digital Environmental, Saskatoon, SK, Canada. www.digitalevironmental.ca Courtesy of Mohammed Daboor, Environment Canada.

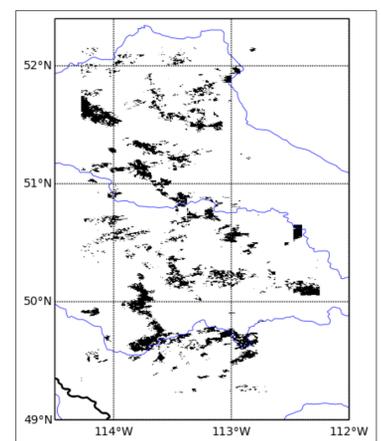


Figure 6. Hypothetical product from automatic algorithm that can detect damage

Tornado Damage

- Tornadoes are currently the only severe weather that has a formal survey post storm
- Surveys can be exhaustive and expensive. In large outbreaks the process can take weeks.
- Satellite imagery has already proven to be useful in supplementing damage surveys
- SAR data would add additional data and products of the damaged areas
 - Especially areas that are difficult to access.



Figure 7. RADARSAT-1 image from 8 May 1999 showing portion of the F5 tornado track that tracked through Moore, Oklahoma on 3 May 1999.



Figure 8. Pleiades imagery taken on 22 May 2015 following the 20 May 2013 EF-5 tornado in Moore Oklahoma. SPoRT delivers high-resolution imagery to end users to help with damage assessments and ground surveys

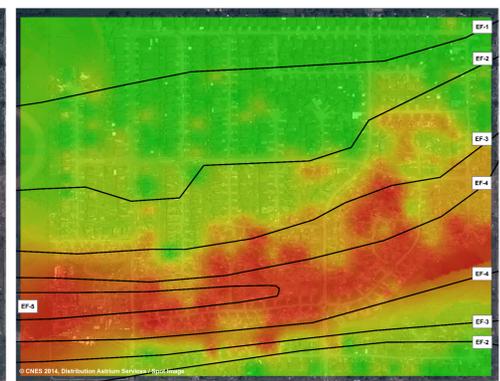


Figure 9. Damage product created by interpolating damage points with official damage survey outlines created. SAR data would help to create damage proxy maps after severe storms, especially in large outbreaks (i.e. 27 April 2011) where optical imagery may be restricted by cloud cover.

Hurricane Damage

- Hurricanes are a constant threat worldwide, that bring many threats to life and property
- Once a hurricane hits, it may be a couple of days before the storm system and its clouds clear
 - Restricts optical imagery, SAR data will not be restricted
- Storm surge and coastal flooding are two the biggest impacts from hurricanes



Figure 10. RADARSAT-1 image of eastern New Orleans, La. taken on 2 September 2005



Figure 11. RADARSAT-1 image of eastern New Orleans, La. taken on 18 September 2005

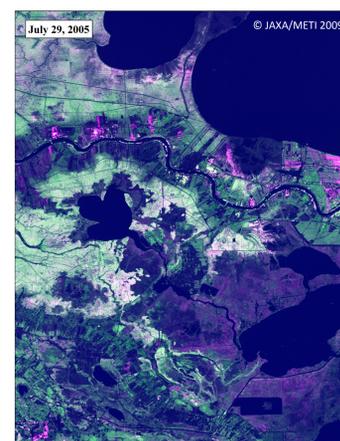


Figure 12. ALOS RGB (HH, HV, HH-HV) over west New Orleans, La. valid for 29 July 2008.



Figure 13. ALOS RGB valid for 13 September 2008, same day as landfall of Hurricane Ike.