Science AMA Series: Hello! We are Greg Mandt and Steve Goodman from NOAA's GOES-R team. We are excited to talk about this state-of-the-art satellite, set to launch in less than 30 days! Ask us anything!

NOAAgov [1] and r/Science AMAs[1]

[1]Affiliation not available

April 17, 2023

Abstract

Hi redditors! We are Greg Mandt, System Program Director for NOAA's GOES-R satellite series, and Dr. Steve Goodman, GOES-R Senior Scientist. Together, we have worked with our team to plan, develop, and launch NOAA's GOES-R, a revolutionary new geostationary weather satellite! We cannot wait to see it launch atop its Atlas V 541 rocket and make its way to geostationary orbit. GOES-R is scheduled to head to space in less than 30 days—leaving Earth at 5:40pm EDT on November 4, 2016. GOES-R, or GOES-16 as it will be known once it reaches orbit, will provide five times faster weather coverage, more accurate data for hurricane tracking and intensity forecasts, real-time mapping of total lightning for improved severe weather prediction, advanced warning of space weather hazards, and improved transportation safety– all from ONE satellite! Want to know more about the mission, the satellite, the launch, or the science behind it all? We are here today to discuss all things GOES-R! Thank you everyone! We appreciate all of the questions. If you would like more information on the launch, please visit www.nesdis.noaa.gov/GOES-R You can learn more about the GOES-R satellite series and see the countdown to launch here!

the WINNOWER

REDDIT

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NOAAGOV R/SCIENCE

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So rockets occasionally encounter "unscheduled spontaneous disassembly".

If that happens, how do you recover? When you build spacecraft like this, is every component a one-off, or do you have spares enough to build another?

NorthStarZero

Although we don't anticipate "unscheduled spontaneous disassembly," we maintain a robust GOES constellation that can withstand a satellite failure. Currently there are three satellites on orbit. Two are operational and one is a spare. If one of them fails, we can immediately put the spare into operations. GOES-R will add to that constellation. We are also currently building the next spacecraft in the series, GOES-S, which will be ready to launch in 2018 which will add additional robustness to the constellation. We are also building the GOES-T and U satellites. This should ensure the constellation of two operational satellites can continue until 2036. -Greg

Do you think that Hurricane Mathew will affect your launch schedule?

mherr77m

In advance of Hurricane Matthew's potential path to Florida's east coast, the team preparing NOAA's

GOES-R spacecraft for launch has taken appropriate safety measures to secure the satellite at its present location -- Astrotech Space Operations in Titusville, Fla. GOES-R is contained in a building that can withstand strong (category 4) hurricane conditions. After the effects of Hurricane Matthew subside, NOAA and NASA will carefully assess the spacecraft and provide an update on its status. -Greg

I've managed to use GOES data in some of my work (oddly enough), so I look forward to the updates! Technologically speaking, what has improved to allow for all of the advancements you mention? I can see how faster mapping speeds would help but has the sensitivity of various detectors also improved? Processing algorithms on the raw data? Thanks!

themeaningofhaste

Advancements in electronics manufacturing, similar to those that have improved everyone's computers and phones, have also improved the detectors and electronics in our GOES-R instruments. This makes them more sensitive and more accurate and allows us to transfer their data to our users faster. -Greg

Does it run on FOSS software?

IronManDoesMC

Nope! -Greg

"Space weather hazards" what are those, and how does this satellite keep prevent them?

Thanks for taking the time out for this!

VerticesII

The changing environmental conditions from the sun's atmosphere are known as space weather. Space weather is caused by electromagnetic radiation and charged particles being released from solar storms. Changes in the magnetic field and a continuous flow of solar particles during a powerful storm headed to Earth can disrupt power utilities and communication and navigation systems, damage satellite electrical systems, and may cause radiation damage to orbiting satellites, high-latitude aircraft, and the International Space Station. The Solar Ultraviolet Imager (SUVI) will observe and characterize complex active regions of the sun, solar flares, and the eruptions of solar filaments which may give rise to coronal mass ejections. The Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS) will detect solar flares and monitor solar irradiance that impacts the upper atmosphere. The Space Environment In-Situ Suite (SEISS) will monitor proton, electron and heavy ion fluxes in the magnetosphere. The Magnetometer (MAG) will measure the magnetic field in the outer portion of the magnetosphere. SUVI and EXIS instruments will provide improved imaging of the sun and detection of solar eruptions, while SEISS and MAG will more accurately monitor, respectively, energetic particles and the magnetic field variations that are associated with space weather. Together, observations from these instruments will enable NOAA's Space Weather Prediction Center to significantly improve space weather forecasts and provide early warning of possible impacts to Earth's space environment and potentially disruptive events on the ground. -Steve

Space Weather Prediction Center - Space weather scales http://www.swpc.noaa.gov/noaa-scales-explanation

See a video discussing the role of the GOES-R and DSCVR satellites play in forecasting space

weather and warning of hazardous effects on Earth at https://youtu.be/5JJjFzN15Jo

With the 8' storm surges and predicted direct hit by Hurricane Matthew on Cape Canaveral, how far above sea level is Astrotech's Titusville facility, just across the causeway? A tweet earlier had the techs covering GOES-R in non permeable material, what else was done to protect it?

ticklestuff

In advance of Hurricane Matthew's potential path to Florida's east coast, the team preparing NOAA's GOES-R spacecraft for launch has taken appropriate safety measures to secure the satellite at its present location -- Astrotech Space Operations in Titusville, Fla. GOES-R is contained in a building that can withstand strong (category 4) hurricane conditions. After the effects of Hurricane Matthew subside, NOAA and NASA will carefully assess the spacecraft and provide an update on its status. -Greg

Meteorologist here... when will we be able to access the data publicly? I can't wait for a satellite with more frequent scans, plus the new lightning data.

Also, we do a WeatherWise question every day about weather science... what would be a REALLY cool fact about the GOES-R that the public would find interesting?

WXGirl83

The data from GOES-R will be archived in the NOAA Comprehensive Large Area Storage System (CLASS) and available in near real time once the satellite becomes operational 6 months after launch.

Fun fact!! There are 18 miles of harnesses inside the satellite connecting the electronics boxes. -Steve and Greg

From a solar physicist: thanks for providing us with X-ray flux data for years, it remains the standard measurement of flare energy, and the new EUV imager looks good, hope to see it in action soon.

As a question: How useful has the solar data actually been in weather (including space weather) forecasting?

Robo-Connery

Continuity is the key requirement for GOES-R space weather the current sensors nonetheless offer improved capabilities over earlier measurements. The new EXIS X-Ray Sensor (XRS) will use a segmented solid-state detector design to monitor the sun within the same wavelength bands as the heritage sensors but, additionally, will provide a capability to locate flares on and off the surface of the sun. EXIS Extreme Ultraviolet Sensor (EUVS) offers improved calibrations that are traceable to standards established by the National Institute of Standards and Technology (NIST). SUVI for GOES-R represents perhaps the most substantial change in the GOES-R space weather complement by imaging the sun at the 6 distinct ultraviolet wavelengths rather than in the adjacent X-ray band. The improved spectral content in SUVI environmental products will allow for the automatic classification of solar features that will enable the creation of solar thematic maps. Please refer to the NWS Space Weather Prediction Center "Products and Data" web page for descriptions of how the current satellite data are used in space weather forecasts and warnings (http://www.swpc.noaa.gov/). -Steve

Who initially funded Harris to develop the ABI instrument? How did AHI get launched so far ahead of ABI? Why wasn't more of a technological leap taken if AHI was already proven technology?

captmrwill

We issued the development contract for the ABI in 2004. Since that time, our partners at JAXA required on-orbit capabilities and elected to launch a satellite with fewer instruments than GOES-R. Our satellite has a broader mission including seven different instruments, a search and rescue system, data collection system, and emergency manager weather communication system. The AHI instrument was purchased from Harris Corporation, the same vendor who built the ABI for GOES-R, and we have learned a lot from sharing in the data available from the Himawari satellite since it was launched last year. -Greg

- How long will it be until the current GOES satellites are decommissioned? Assuming no issues with deployment, how long will we receive data from both the older (N/O/P) GOES satellites, and the newer ones?
- At what point will some form of the new GOES data be made public?
- Assuming that both the older GOES satellites will remain in operation alongside the newer for a few years, will models that use older GOES data be run side-by-side with models with newer GOES data?
- I lack the terminology for this question, so I hope my point is clear. How will correctness and utility of the new GOES data be verified? In other words, how will you know if the data is correct and the satellite just isn't out of whack? Furthermore, how will you know that the new data is 'helping'? (What does 'helping' mean there? Does it just mean that longer-term forecasts are more accurate, and which forecasts, anyway?)

ultracrepidarianist

We normally decommission satellites when something critical breaks or it gets low on fuel. Since there are three current GOES satellites on orbit, there will be data from both older and newer satellites for quite a while.

The imagery is expected to be available within 6 months after launch after the instruments have been tested and calibrated on-orbit for optimized performance.

When the first GOES-R satellite is operational in 2017, data from both current GOES and the new GOES-16 (GOES-R is assigned a number once on orbit) are used in the operational models. The new GOES-16 data will be tested in the various NOAA models before being made operational by the National Weather Service, There will be one model that includes GOES-16 and the current GOES.

We have predictions of expected instrument on-orbit performance. The performance will be intensively verified during the first year on orbit using many types of well characterized reference data from other operational and research satellites on-orbit as well as in-situ ground-based measurements. During the post launch testing the forecasters, having already completed training on the use of the GOES-R capabilities, will also be assessing the products in their operational environment and providing feedback on the imagery and products. The user feedback will inform the post launch testing evaluations and reviews. Regarding forecast and warning improvement, we have been preparing forecasters through our NOAA Testbeds and Proving grounds, where we have demonstrated the GOES-R capabilities using similar proxy or synthetic data with forecasters in their own operational environment. To validate longer term forecast accuracy, the NWS routinely conducts on-going evaluations of the model forecasts. -Greg and Steve

Which data products from the new satellite do you expect to be used most widely right away?

How soon after launch should we expect to see data from the new satellite?

Has there been a decision on whether GOES-R is going to be slotted as East or West yet after the test phase?

reddit_bacon_42

I think the visible satellite imagery loops will be used most widely right away. Seeing thunderstorms and hurricanes in real time at half a kilometer resolution every 30 seconds reveals amazing features that most people have never seen before! When GOES-R is launched, it will be placed in the 89.5° checkout orbit. It has not yet been determined where GOES-R will be placed in its operational orbit, but the final decision will be based on the health/safety/performance of the GOES constellation. -Greg

How much data per second will all the sensors combined stream back to Earth/receiving stations?

Inform2015

The raw data downlink will be at 31Megabits per second. But even this is compressed!-Greg

What is the mission of the new satellite?

What are you going to achieve?

GroundsKeeper2

The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the nation's next generation of geostationary weather satellites. The GOES-R series satellites will significantly improve the detection and observation of environmental phenomena that directly affect public safety, protection of property and our nation's economic health and prosperity. The satellites will provide advanced imaging with increased spatial resolution and faster coverage for more accurate forecasts, real-time mapping of lightning activity, and improved monitoring of solar activity.

GOES-R will offer: -3x more spectral information, 4x better resolution and 5x faster coverage than current imager. -total lightning detection (cloud-to-cloud as well as cloud-to-ground) -improved hurricane track and intensity forecasts -increased thunderstorm and tornado warning lead time -earlier warning of ground lightning strike hazards -improved aviation flight route planning; -improved air quality warnings and alerts -better fire detection and intensity estimation -better detection of heavy rainfall and flash flooding risks -improved solar flare warnings for communications and navigation disruptions -more accurate monitoring of energetic particles responsible for radiation hazards to humans and spacecraft -better monitoring of coronal mass ejections for improved geomagnetic storm forecasting -improved numerical weather prediction models -better data for long-term climate variability studies -Greg

How do you feel about the Climate Change or global warming subject?

Is there anything from your profession that would make you more or less informed about it?

ThePu55yDestr0yr

According to NOAA, 2015 was the warmest year on record, breaking the record set the year before by 0.29°F—the largest margin by which one year has ever beaten another since official records began in 1880. More information about climate study is available on the website. https://www.climate.gov/. While my own research has focused on severe storms and the global distribution and interannual variability

of thunderstorms, including a paper on the major 1997-1998 El Nino event, I try to stay informed on climate variability and change through the peer reviewed literature. -Steve

Can you share what the downlink frequency is & if so are we going to be able to decode the data just as we can from the other GOES satellites, or is it going to be encrypted? If not encrypted, what position in degrees in the Geostationary belt will it be in? Also if it happens to be in the L, C, or other satellite band & not encrypted, will Chicago be in its footprint or is there a map of its footprint? I look forward to seeing the images once it's online! Best of luck with the launch! Thanks for doing the AMA!

EnerGeTiX618

The data will not be encrypted. If you are familiar with today's downlink you should be able to handle the new downlink. It is still in L band with center frequency of 1686.6Mhz. The major differences are that we shifted it 5 MHz downward, added dual polarization and compressed the data. You can find the specs on our website: www.goes-r.gov. Search for the GRB downlink specification. - Greg

Once the satellite is operational, how much day to day monitoring is required?

Conler

Operators in our NOAA Satellite Operations Facility (NSOF) in Suitland, Maryland monitor all NOAA satellites 24 hours a day. These operators monitor telemetry and data from the satellite and send commands to the satellite as needed. - Greg

Facetious Ghostbusters-related question. Is the GOES-R satellite linked to the Sumerian god Gozer?

Is there some sort of Keymaster or Gatekeeper protocol? Can we expect demon dogs in NASA refrigerators saying, 'Zool'?

Can you at least assure me that the satellite was built using 'cold riveted girders with cores of pure selenium.'? Egon Spengler and Ray Stantz *assure* me that is 'exactly like the kind of telemetry tracker that NASA uses to identify dead pulsars in deep space.'

Seriously. Ghostbusting satellites. You're sitting on a gold mine here.

ps. Thank you for doing wonderful science and for sharing it with the public. I'm not used to that. I'm Canadian.

busterfixxitt

Thanks for tuning in from Canada!

While is sounds like the satellite was named after a god from another dimension, I can assure you GOES-R will not be possessing the Stay Puft Marshmallow Man anytime soon!

The name has to do more with its position in the GOES series of satellites. Before launch, NOAA assigns a letter to GOES satellites (-A, -B, -C…) and a number once it has achieved orbit. For example, GOES-O, once in orbit, was designated GOES-14, GOES-G, which was lost at launch, was never assigned a number. GOES-R follows the GOES-NOP (Q was cancelled) series and will be known as GOES-16 once operational. -Steve

We're in need of data streams for our data science program at a university near Boston, MA. Will we be able to pick anything up over the air, and how easy will it be to decode that information?

jwelgan

The data are being broadcast openly to any user; however, to receive the data would require a fairly sophisticated receive antenna. I know that a couple of companies will be putting the data in the cloud for customers and a few universities have build antennas to collect the data. So data should be available on numerous websites in near real time. In addition, NOAA is archiving all data and products in its long term data archive, the NOAA Comprehensive Large Area Storage System (CLASS). -Steve

As someone who used to live in south Florida, I know how difficult it can be to accurately predict weather more than a day or two in advance (most of the year). What exactly, if anything, makes this satellite different that can help in this regard?

I know that other regions of the globe are easier to predict, but it sounds like GOES might help in the more difficult locales as well.

Thanks for your time, and keep up the awesome work!

mpcfuller

So what will the faster refresh rate of imagery from GOES-R mean for the public? Well, it means that when a hurricane is bearing down on the Gulf, NOAA's GOES-R satellite will generate imagery that is like watching a movie of a storm in near real-time, which helps forecasters better understand storm intensification and decay. And when severe weather is imminent, GOES-R could mean extra time to seek shelter during a tornado, or more time to get cars off the road when flash floods occur, and extra seconds to get kids inside when lightning strikes. -Steve

How might THIS hurricane impact your launch? I asked on r/nasa last night about mitigation efforts but as far asi know the buildings there were designed for cat 3 only. Cat 4/5 could be something else along with the other variables like storm track, speed, angle of approach, etc.

Keep in mind I'm not wanting to be a doomsayer merely I'm curious since Merritt island was already evacuated.

Thanks for what you do, and success to you as well. Goes certainly helped tremendously with hurricane monitoring and it's only getting better with each new generation.

SoyMurcielago

In advance of Hurricane Matthew's potential path to Florida's east coast, the team preparing NOAA's GOES-R spacecraft for launch has taken appropriate safety measures to secure the satellite at its present location -- Astrotech Space Operations in Titusville, Fla. GOES-R is contained in a building that can withstand strong (category 4) hurricane conditions. After the effects of Hurricane Matthew subside, NOAA and NASA will carefully assess the spacecraft and provide an update on its status. -Greg and Steve

What are the requirements to work on this satellite? Does it run autonomously at all or do humans need to be heavily involved?

name_goes_here_11

We generally have engineers and scientists involved in building and operating the satellites, although many other professions are also involved in the program, including business majors, artists, and administrative professionals. The satellites can operate by themselves for an extended time, but they are continuously monitored by operators at the NOAA Satellite Operations Facility in Suitland Maryland.-Greg

Good luck on your mission! I was wondering what role GIS plays if any in your work. I've ways wondered if GIS analysts are interpreting your photos and what kind of degree, past the bachelor's in Geotechniques I'm pursuing, would be needed to become a GIS analyst for NASA?

haggusmapimus

You might be surprised to learn our GOES-R Fog and Low Stratus product uses digital elevation models to provide terrain height information to help identify the locations of valley fog. You could consider taking courses in Remote Sensing, usually in the Geography or Civil Engineering Dept. GIS is a very useful degree with many job opportunities. You could also consider a private sector employer that develops software and applications, or government agencies such as the National Geospatial-Intelligence Agency (www.nga.mil). - Steve

Wow that's awesome - my father worked on GOES as an electeical engineer for 10 or so years at Goddard in the 90s, though I truthfully don't know what he was doing.

My question then: what are the big points that have changed from that version to what's currently in development?

rollie82

The GOES-R series marks the the first major technological advances in geostationary observations since 1994. The imager will provide 3x more spectral information with 4x the resolution, 5x faster than current GOES. It will also fly the first operational lightning mapper in geostationary orbit and a suite of enhanced solar imaging and space weather monitoring instruments. Hi to your Dad from GSFC!! -Greg

Thank you for doing this AMA. Where will the geostationary orbit be located? Also, did Boeing help design the satellite itself or just the rockets? Looking forward to launch! And cheers from the NWFSC!

lm_xoxide

Geostationary satellites orbit 35,800 km (22,300 miles) above Earth's equator at speeds equal to Earth's rotation. This allows them to stay in a fixed position in the sky, remaining stationary with respect to a point on the ground.

Lockheed Martin designed and built the satellite as well as the Geostationary Lightning Mapper, Solar Ultraviolet Imager, and Magnetometer instruments. The Advanced Baseline Imager was built by Harris Corporation, the Extreme Ultraviolet and X-ray Irradiance Sensors by the Laboratory for Atmospheric and Space Physics, and the Space Environment In-Situ Suite by Assurance Technology Corporation. United Launch Alliance designed and built the launch vehicle.

Go Raiders!

-Greg

Greg and Steve: Thank you so much for being on here! I have a quick question about satellite positioning and orbit. With the rocket launch lending itself to massive amounts of speed to get out of our atmosphere how do you guys slow down the payload enough to lock the satellite into orbit at the estimated elevation/height you are shooting for? (Also what is the lifetime expectancy of the GOES-R satellite?) Thank you in advance!

Haydens_Army

Actually, the satellite is still moving fast when it is in orbit. In its final geostationary orbit, it is traveling at 3 kilometers per second. At that speed, it circles the planet at the same speed that the Earth is rotating, making it appear stationary relative to a position on Earth.

GOES-R is designed for 15 years, 5 years of storage plus 10 years of operating life. -Greg

Hi! Thanks for doing this.

Last year Ted Cruz talked about reshuffling funding and priorities around when it came to atmospheric science. He wanted to cancel some planned NASA projects (seen as a huge blow to climate change science), and shift priority of such programs over to the NOAA, including handing priority of existing projects over to your organization.

My question is: has this effected the projects you have planned, the projects you handle (or will handle), and how has this effected the NOAAs atmospheric science initiatives?

Also, has this shift came with any planned funding increases to manage the increased role the NOAA will play in atmospheric science going forward?

Once again, thank you! And by the way, it a great to see such a wonderful addition to our science satellite lineup getting launched!!

Red_Stormbringer

Work began to develop the GOES-R Series of satellites in the early 2000s. The life of the satellites will extend through 2036. This means that the scope of our satellite mission and constellation is comprehensive and intended to ensure the continuity of NOAA's geostationary weather satellite operations. NOAA has continuously operated a geostationary satellite since 1975 and will continue to do so well into the future. -Greg

How does NOAA plan to store the 3.5 terabytes of data that will come through the GOES-R sensors and monitors each day? That's a lot of data.

JFulford

NOAA's GOES-R satellite system will produce 1.75 terabytes of data per day. That adds up to nearly 40,000 16GB smartphones of data per year! Once two GOES-R Series satellites are on-orbit, the system will generate 3.5 terabytes per day. The data from GOES-R will be archived in the NOAA Comprehensive Large Area Storage System (CLASS) (https://www.class.noaa.gov/) and available in near real time once the satellite becomes operational, approximately 6 months after launch. -Steve and Greg

Is GOES-R in a clean facility now? What is the protocol if the cleanliness somehow becomes compromised due to Matthew?

captmrwill

Yes, GOES-R is in clean facility now. In advance of Hurricane Matthew's potential path to Florida's east coast, the team preparing NOAA's GOES-R spacecraft for launch has taken appropriate safety measures to secure the satellite at its present location -- Astrotech Space Operations in Titusville, Fla. GOES-R is contained in a building that can withstand strong (category 4) hurricane conditions. After the effects of Hurricane Matthew subside, NOAA and NASA will carefully assess the spacecraft and provide an update on its status. -Greg and Steve

How long will it take after launch for the satellite to start sending back useful data? Will the average person watching the weather forecasts notice a change?

RhetorRedditor

GOES-R will undergo an extensive 6 month checkout period, after which the satellite is anticipated to become operational. The National Weather Service will begin using GOES-R data for their operational forecasts at this time. The imagery will be visibly improved as compared to current GOES. GOES-R has worked with the National Weather Service over the last several years on a Hazardous Weather Testbed initiative, which has prepared the meteorology community to work with and display this higher refresh imagery, potentially making dramatic improvements to the forecast. In addition, we have worked with the broadcast meteorology community to prepare them for the new imagery that will become available from GOES-R. Steve and Greg

What are some of the methods used to test the instruments once they are mounted on the satellite?

sunburned_goose

Our testing is aimed at proving that the satellite will survive the launch and perform in space. We subject the satellite to the vibration loads and sound levels that it will experience during the launch, and then we put the satellite in a vacuum chamber and change the temperature to simulate the thermal environment it will see in space. For short, we call this testing "shake and bake". -Steve

What kind of enhancements in predictive space weather capabilities will GOES-R instruments provide? Where will the (near) real-time data related to space weather be available first?

LASPatCU

The Solar Ultraviolet Imager (SUVI) will observe and characterize complex active regions of the sun, solar flares, and the eruptions of solar filaments which may give rise to coronal mass ejections. The Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS) will detect solar flares and monitor solar irradiance that impacts the upper atmosphere. The Space Environment In-Situ Suite (SEISS) will monitor proton, electron and heavy ion fluxes in the magnetosphere. The Magnetometer (MAG) will measure the magnetic field in the outer portion of the magnetosphere. SUVI and EXIS instruments will provide improved imaging of the sun and detection of solar eruptions, while SEISS and MAG will more accurately monitor, respectively, energetic particles and the magnetic field variations that are associated with space weather. Together, observations from these instruments will enable NOAA's Space Weather Prediction Center to significantly improve space weather forecasts and provide early warning of possible impacts to Earth's space environment and potentially disruptive events on the ground.

The data from GOES-R will be archived in the NOAA Comprehensive Large Area Storage System

(CLASS) (https://www.class.noaa.gov/) and available in near real time once the satellite becomes operational, approximately 6 months after launch. Space weather forecasts and imagery can be found via the Space Weather Prediction Center, http://www.swpc.noaa.gov/. -Steve

What is the plan for GOES-R after checkout? Will it move to the operational East or West spot? Will it be put into storage as a spare?

captmrwill

When GOES-R is launched it will initially be placed in a central 89.5 degrees west checkout orbit where it will undergo an extended checkout and validation phase of approximately one year. It has not yet been determined where GOES-R will be placed in operational orbit. The final decision will be based on the health and performance of the GOES constellation. And once we get there, NOAA's office of Satellite and Product Operations will be responsible for determining the operational orbit for GOES-R. -Greg

The satellite will collect data for monitoring both terrestrial and space weather. Which of the two is its primary function? I'd enjoy hearing about its space weather capabilities.

JFulford

While terrestrial weather is the satellite's primary mission, its suite of space weather instruments are critical to NOAA's Space Weather Prediction Center. The Solar Ultraviolet Imager (SUVI) will observe and characterize complex active regions of the sun, solar flares, and the eruptions of solar filaments which may give rise to coronal mass ejections. The Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS) will detect solar flares and monitor solar irradiance that impacts the upper atmosphere. The Space Environment In-Situ Suite (SEISS) will monitor proton, electron and heavy ion fluxes in the magnetosphere. The Magnetometer (MAG) will measure the magnetic field in the outer portion of the magnetosphere. SUVI and EXIS instruments will provide improved imaging of the sun and detection of solar eruptions, while SEISS and MAG will more accurately monitor, respectively, energetic particles and the magnetic field variations that are associated with space weather. Together, observations from these instruments will enable NOAA's Space Weather Prediction Center to significantly improve space weather forecasts and provide early warning of possible impacts to Earth's space environment and potentially disruptive events on the ground.

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Looking into the GOES-R, the ABI instrument will be generating a lot of data. How quickly is it transmitted to ground stations? Does the spacecraft use data storage to queue the data, or is it transmitted continuously?

sunburned_goose

The data is transmitted immediately to the ground, processed into products and transmitted to users. We have to do this very fast because the data comes down continuously and we can't fall behind in processing! - Greg

- Any Easter Eggs on your satellite? Like, did you spray paint your name?
- What's happened to the older gen GOES? Are they still above us? Are they in use?
- What has been the most enjoyable part of this project so far?

wujugod

I can't tell you or they may take it off!!! Just kidding, there are actually no Easter Eggs here.

Older GOES satellites were used until they were low on maneuvering fuel and then boosted to their retirement in a "graveyard orbit" so they are out of the way of other operational spacecraft. The current on-orbit GOES will retire in the same way at the end of their operational life.

As an engineer I have loved all the fun of watching the design turn into real hardware. But the most enjoyable part is watching the reaction of the weather service forecasters when we have shown them the simulated data in preparation for the new satellite. Their excitement over what is coming with the new satellite makes me very happy!-Greg

Hey Dr. Goodman & Mr. Mandt,

Ever since I was a (younger) kid I was fascinated with meteorology. As I've grown up that fascination has manifested into a broader interest of GIS and sustainability as a whole. Indeed that (GIS) is what I'm currently studying for my undergraduate degree. Among others I've even considered NOAA, NOAA Corps, or possibly even NASA for employment after graduation.

My question for you guys is what can I do "today" and the next couple years to help prepare, and maybe get an advantage for entering the career field? And also where you guys think the future of the field is heading?

Thanks for taking the time to answer questions from us plebs.

P.S. I'll trade you sweet karma for an internship at the Norfolk NOAA office.

30_Rack

GIS is a very useful degree with many job opportunities. You could also consider a private sector employer that develops software and applications, or government agencies such as the National Geospatial-Intelligence Agency (www.nga.mil). You might be surprised to learn our GOES-R Fog and Low Stratus product uses digital elevation models to provide terrain height information to help identify the locations of valley fog. -Steve

Will GOES-R improve day to day weather prediction?

f0urtyfive

The greatest impact GOES-R will have will be in the severe storm warning activity. The combination of the new lightning mapper and the high spatial and temporal resolution of the imager will give forecasters better situational awareness and understanding of developing thunderstorms and hurricanes. This will enable more precise and accurate warnings of these dangerous storms.- Steve

My fluid mechanics teacher told me that to accurately forecast weather for 24 hours, it will nearly take as many hours to compute the data. In this regard, how this will help us in better forecast results?

Crazyeyedcoconut

The accuracy of forecasts is an initial value problem and subject to the accuracy and resolution of the observations that go into the initial conditions. Finer scale observations and routine updates of the data assimilated into the models leads to more accurate forecasts. A number of models, from global to regional, are run throughout each day taking an hour or less to run on the NWS supercomputers on a regular schedule. Refer to the following link for the model run schedule (http://www.nco.ncep.noaa.gov/pmb/nwprod/prodstat/) -Steve