

EBOOK FREE HACKING RISKS FOR SATELLITES

WORLD SPACE RISK FORUM COPY

HERE S A LOOK AT THREE OF THE BIGGEST THREATS TO SATELLITES AND WHAT S BEING DONE TO COUNTER THEM THE NEW RESEARCH WHICH LOOKED AT RARE EXTREME HISTORIC STORMS WILL HELP SATELLITE OPERATORS BETTER UNDERSTAND SATELLITE LIFETIMES AND DYNAMICS MAKING THE NEAR EARTH SPACE ENVIRONMENT SAFER WHEN THE NEXT BIG SUPERSTORM HITS IF YOU HAVE 50 000 SATELLITES WHICH IS A NUMBER A LOT OF PEOPLE USE AND THEY RE UP FIVE YEARS THAT S 10 000 PER YEAR RE ENTERING THAT S MORE THAN ONE AN HOUR DANIEL MURPHY NOAA MICROMETEORIODS AND ORBITAL DEBRIS MMOD IS THE NUMBER ONE RISK FOR NASA S HUMAN SPACEFLIGHT PROGRAMS MANY ORBITAL DEBRIS OBJECTS APPROXIMATELY 20 000 ARE LARGE ENOUGH TO BE TRACKED AND CATALOGUED BY THE U S SPACE SURVEILLANCE NETWORK AND CAN BE AVOIDED BY SPACECRAFT MANEUVERING DEBRIS PARTICULARLY NEAR THE INTERNATIONAL SPACE STATION ORBITS THE EARTH 15 TO 16 TIMES A DAY INCREASING THE RISK OF COLLISION THE EUROPEAN SPACE AGENCY ESA ESTIMATES THE TOTAL MASS OF ALL THE RAPID DEVELOPMENT OF MEGA CONSTELLATIONS RISKS MULTIPLE TRAGEDIES OF THE COMMONS INCLUDING TRAGEDIES TO GROUND BASED ASTRONOMY EARTH ORBIT AND EARTH S UPPER ATMOSPHERE GROWING INTEREST IN NETWORKS OF THOUSANDS OF SATELLITES IN LOW EARTH ORBIT LEO OFTEN CALLED MEGACONSTELLATIONS HAS ELEVATED CONCERNS ABOUT THE SUSTAINABILITY OF HUMAN ACTIVITIES IN OUTER SPACE SPACE IS DANGEROUS HUMANS CANNOT VENTURE THERE WITHOUT EXTENSIVE GEAR AND PROTECTION EVEN WITH THIS EQUIPMENT SPACE TRAVELERS ENCOUNTER A VARIETY OF HEALTH RISKS INCLUDING ATROPHIED MUSCLES WEAKENED BONES AND LOWERED IMMUNITY THE MACHINERY WE LAUNCH INTO SPACE IS ALSO SUBJECT TO HAZARDS SPACEX S STARLINK BROADBAND SATELLITES WERE FORCED TO SWERVE MORE THAN 25 000 TIMES BETWEEN DEC 1 2022 AND MAY 31 2023 TO AVOID POTENTIALLY DANGEROUS APPROACHES TO OTHER SPACECRAFT AND EXPERTS SAY THIS POSITIONING UNCERTAINTY INCREASES THE RISK OF DANGEROUS ORBITAL COLLISIONS WHICH THREATEN TO WORSEN THE SPACE DEBRIS PROBLEM AND MAKE THE SPACE AROUND EARTH UNSAFE POTENTIAL EFFECTS FROM THE LAUNCH OPERATION AND DISPOSAL OF SATELLITES GAO ASSESSED TECHNOLOGIES AND APPROACHES TO EVALUATE AND MITIGATE THE FOLLOWING POTENTIAL EFFECTS INCREASE IN ORBITAL DEBRIS DEBRIS IN SPACE CAN DAMAGE OR DESTROY SATELLITES AFFECTING COMMERCIAL SERVICES SCIENTIFIC OBSERVATION AND NATIONAL SECURITY TYPE OF RISKS FOR SATELLITES SPACE WEATHER FROM METEORITES TO SOLAR WIND VARIOUS SPACE WEATHER CONDITIONS CAN KNOCK A SATELLITE OFF COURSE OR EVEN DAMAGE IT CONJUNCTIONS SPACE JUNK CAN INTERFERE WITH SATELLITE ACTIVITY BY GETTING TOO CLOSE AND DISRUPTING SERVICE OR HITTING ONE AND DAMAGING IT ANTI SATELLITE SYSTEMS THE RISING POPULATION OF ARTIFICIAL SATELLITES AND ASSOCIATED DEBRIS IN LOW ALTITUDE ORBITS IS INCREASING THE OVERALL BRIGHTNESS OF THE NIGHT SKY THREATENING GROUND BASED ASTRONOMY AS WELL AS A FROM 2003 TO 2019 ONLY ONE OR TWO FAILURES IF ANY CARRIED MULTIPLE PAYLOADS FOR THE PAST FOUR YEARS THERE HAVE CONSISTENTLY BEEN FIVE LAUNCH FAILURES ANNUALLY THAT RESULTED IN THE LOSS

2023-05-18

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VERY HUNGRY CATERPILLAR

FACE MASK

OF MORE THAN ONE SATELLITE MAJORITY LAUNCH FAILURES DRIVE RISK BY TAKING DECISIVE ACTION TO FORTIFY OUR SATELLITE CYBERSECURITY WE ENSURE THAT SPACE REMAINS NOT JUST A FRONTIER OF EXPLORATION BUT ALSO A DOMAIN OF SECURITY AND RELIABILITY OUT OF 34 260 OBJECTS TRACKED IN ORBIT ONLY AROUND 25 PER CENT ARE WORKING SATELLITES WHILE THE REST ARE JUNK SUCH AS BROKEN SATELLITES OR DISCARDED ROCKET STAGES ADDITIONALLY THERE ARE LIKELY AROUND 130 MILLION PIECES OF DEBRIS TOO SMALL TO BE TRACKED MEASURING BETWEEN 1 MM AND 1 CM THINK AIR AND MARITIME TRAVEL TELECOMMUNICATIONS FINANCE SYSTEMS AND POWER GRIDS SELF DRIVING VEHICLES AND MORE THE TECHNOLOGY CAN BE VULNERABLE TO ADVERSARY ATTACKS LIKE JAMMING AND SPOOFING JAMMING INVOLVES ATTEMPTS TO DEGRADE OR DENY THE ABILITY TO RECEIVE GPS SIGNALS DESTROY A SATELLITE ON IMPACT OVER 500 000 THE SIZE OF A MARBLE BIG ENOUGH TO CAUSE DAMAGE TO SPACECRAFT OR SATELLITES AND OVER 100 MILLION THE SIZE OF A GRAIN OF SALT THAT COULD PUNCTURE A SPACESUIT THE SPACE ENVIRONMENT IS HARSH AND FULL OF EXTREME RADIATION SCIENTISTS DESIGNING SPACECRAFT AND SATELLITES NEED MATERIALS THAT CAN WITHSTAND THESE CONDITIONS IN A PAPER PUBLISHED IN JANUARY 2024 COMMERCIAL SATELLITES HAVE CROSSED THE RUBICON AND COMPANIES NEED TO FIGURE OUT HOW THEY WILL COPE WITH THE PROSPECT OF INTENTIONAL OR ACCIDENTAL ATTACKS DURING INTERNATIONAL CONFLICTS SAYS A

THREE BIG THREATS TO SATELLITES AND WHAT TO DO ABOUT THEM *MAY 23 2024*

HERE S A LOOK AT THREE OF THE BIGGEST THREATS TO SATELLITES AND WHAT S BEING DONE TO COUNTER THEM

SOLAR SUPERSTORMS OF THE PAST HELP NASA SCIENTISTS UNDERSTAND APR 22 2024

THE NEW RESEARCH WHICH LOOKED AT RARE EXTREME HISTORIC STORMS WILL HELP SATELLITE OPERATORS BETTER UNDERSTAND SATELLITE LIFETIMES AND DYNAMICS MAKING THE NEAR EARTH SPACE ENVIRONMENT SAFER WHEN THE NEXT BIG SUPERSTORM HITS

MEGACONSTELLATIONS OF SATELLITES ARE BURNING UP IN OUR *MAR 21 2024*

IF YOU HAVE 50 000 SATELLITES WHICH IS A NUMBER A LOT OF PEOPLE USE AND THEY RE UP FIVE YEARS THAT S 10 000 PER YEAR RE ENTERING THAT S MORE THAN ONE AN HOUR DANIEL MURPHY NOAA

SPACE DEBRIS UNDERSTANDING THE RISKS TO NASA SPACECRAFT *FEB 20 2024*

MICROMETEORIDS AND ORBITAL DEBRIS MMOD IS THE NUMBER ONE RISK FOR NASA S HUMAN SPACEFLIGHT PROGRAMS MANY ORBITAL DEBRIS OBJECTS APPROXIMATELY 20 000 ARE LARGE ENOUGH TO BE TRACKED AND CATALOGUED BY THE U S SPACE SURVEILLANCE NETWORK AND CAN BE AVOIDED BY SPACECRAFT MANEUVERING

Q A WHAT IS SPACE DEBRIS AND HOW DANGEROUS IS IT REUTERS JAN 19 2024

DEBRIS PARTICULARLY NEAR THE INTERNATIONAL SPACE STATION ORBITS THE EARTH 15 TO 16 TIMES A DAY INCREASING THE RISK OF COLLISION THE EUROPEAN SPACE AGENCY ESA ESTIMATES THE TOTAL MASS OF ALL

SATELLITE MEGA CONSTELLATIONS CREATE RISKS IN LOW

EARTH ORBIT *DEC 18 2023*

THE RAPID DEVELOPMENT OF MEGA CONSTELLATIONS RISKS MULTIPLE TRAGEDIES OF THE COMMONS INCLUDING TRAGEDIES TO GROUND BASED ASTRONOMY EARTH ORBIT AND EARTH S UPPER ATMOSPHERE

HOW GOVERNMENTS SHOULD ADDRESS THE INCREASING RISKS *OF Nov 17 2023*

GROWING INTEREST IN NETWORKS OF THOUSANDS OF SATELLITES IN LOW EARTH ORBIT LEO OFTEN CALLED MEGACONSTELLATIONS HAS ELEVATED CONCERNS ABOUT THE SUSTAINABILITY OF HUMAN ACTIVITIES IN OUTER SPACE

HAZARDS OF SPACE HOW SATELLITE MISSIONS CAN GO *WRONG OCT 16 2023*

SPACE IS DANGEROUS HUMANS CANNOT VENTURE THERE WITHOUT EXTENSIVE GEAR AND PROTECTION EVEN WITH THIS EQUIPMENT SPACE TRAVELERS ENCOUNTER A VARIETY OF HEALTH RISKS INCLUDING ATROPHIED MUSCLES WEAKENED BONES AND LOWERED IMMUNITY THE MACHINERY WE LAUNCH INTO SPACE IS ALSO SUBJECT TO HAZARDS

SPACEX STARLINK SATELLITES CAUSED 25 000 NEAR MISSES *IN JUST SEP 15 2023*

SPACEX S STARLINK BROADBAND SATELLITES WERE FORCED TO SWERVE MORE THAN 25 000 TIMES BETWEEN DEC 1 2022 AND MAY 31 2023 TO AVOID POTENTIALLY DANGEROUS APPROACHES TO OTHER SPACECRAFT AND

SPACE WEATHER CAN MAKE IT HARD TO PREDICT SATELLITE *AUG 14 2023*

EXPERTS SAY THIS POSITIONING UNCERTAINTY INCREASES THE RISK OF DANGEROUS ORBITAL COLLISIONS WHICH THREATEN TO WORSEN THE SPACE DEBRIS PROBLEM AND MAKE THE SPACE AROUND EARTH UNSAFE

LARGE CONSTELLATIONS OF SATELLITES MITIGATING

ENVIRONMENTAL *JUL 13 2023*

POTENTIAL EFFECTS FROM THE LAUNCH OPERATION AND DISPOSAL OF SATELLITES GAO ASSESSED TECHNOLOGIES AND APPROACHES TO EVALUATE AND MITIGATE THE FOLLOWING POTENTIAL EFFECTS INCREASE IN ORBITAL DEBRIS DEBRIS IN SPACE CAN DAMAGE OR DESTROY SATELLITES AFFECTING COMMERCIAL SERVICES SCIENTIFIC OBSERVATION AND NATIONAL SECURITY

THE SPACE RACE AND A RISING NEED TO CONSIDER SATELLITE RISK *JUN 12 2023*

TYPE OF RISKS FOR SATELLITES SPACE WEATHER FROM METEORITES TO SOLAR WIND VARIOUS SPACE WEATHER CONDITIONS CAN KNOCK A SATELLITE OFF COURSE OR EVEN DAMAGE IT CONJUNCTIONS SPACE JUNK CAN INTERFERE WITH SATELLITE ACTIVITY BY GETTING TOO CLOSE AND DISRUPTING SERVICE OR HITTING ONE AND DAMAGING IT ANTI SATELLITE SYSTEMS

AGGREGATE EFFECTS OF PROLIFERATING LOW EARTH ORBIT OBJECTS *MAY 11 2023*

THE RISING POPULATION OF ARTIFICIAL SATELLITES AND ASSOCIATED DEBRIS IN LOW ALTITUDE ORBITS IS INCREASING THE OVERALL BRIGHTNESS OF THE NIGHT SKY THREATENING GROUND BASED ASTRONOMY AS WELL AS A

AS LAUNCH FAILURES GROW SATELLITE OPERATORS ARE MORE *APR 10 2023*

FROM 2003 TO 2019 ONLY ONE OR TWO FAILURES IF ANY CARRIED MULTIPLE PAYLOADS FOR THE PAST FOUR YEARS THERE HAVE CONSISTENTLY BEEN FIVE LAUNCH FAILURES ANNUALLY THAT RESULTED IN THE LOSS OF MORE THAN ONE SATELLITE MAIDEN LAUNCH FAILURES DRIVE RISK

WE NEED CYBERSECURITY IN SPACE TO PROTECT SATELLITES *MAR 09 2023*

BY TAKING DECISIVE ACTION TO FORTIFY OUR SATELLITE CYBERSECURITY WE ENSURE THAT SPACE REMAINS NOT JUST A FRONTIER OF EXPLORATION BUT ALSO A DOMAIN OF SECURITY AND RELIABILITY

SPACE DEBRIS INTERCONNECTED DISASTER RISKS *FEB 08* ***2023***

OUT OF 34 260 OBJECTS TRACKED IN ORBIT ONLY AROUND 25 PER CENT ARE WORKING SATELLITES WHILE THE REST ARE JUNK SUCH AS BROKEN SATELLITES OR DISCARDED ROCKET STAGES ADDITIONALLY THERE ARE LIKELY AROUND 130 MILLION PIECES OF DEBRIS TOO SMALL TO BE TRACKED MEASURING BETWEEN 1 MM AND 1 CM

SATELLITE SYSTEMS PRACTICALLY RUN THE WORLD HOW DO WE ***JAN 07 2023***

THINK AIR AND MARITIME TRAVEL TELECOMMUNICATIONS FINANCE SYSTEMS AND POWER GRIDS SELF DRIVING VEHICLES AND MORE THE TECHNOLOGY CAN BE VULNERABLE TO ADVERSARY ATTACKS LIKE JAMMING AND SPOOFING JAMMING INVOLVES ATTEMPTS TO DEGRADE OR DENY THE ABILITY TO RECEIVE GPS SIGNALS

FINAL REPORT IG 21 011 NASA S EFFORTS TO MITIGATE THE ***DEC 06 2022***

DESTROY A SATELLITE ON IMPACT OVER 500 000 THE SIZE OF A MARBLE BIG ENOUGH TO CAUSE DAMAGE TO SPACECRAFT OR SATELLITES AND OVER 100 MILLION THE SIZE OF A GRAIN OF SALT THAT COULD PUNCTURE A SPACESUIT

SPACE RADIATION CAN DAMAGE SATELLITES MY TEAM ***DISCOVERED Nov 05 2022***

THE SPACE ENVIRONMENT IS HARSH AND FULL OF EXTREME RADIATION SCIENTISTS DESIGNING SPACECRAFT AND SATELLITES NEED MATERIALS THAT CAN WITHSTAND THESE CONDITIONS IN A PAPER PUBLISHED IN JANUARY 2024

REPORT INDUSTRY HAS TO FACE REALITY THAT COMMERCIAL ***OCT 04 2022***

COMMERCIAL SATELLITES HAVE CROSSED THE RUBICON AND COMPANIES NEED TO FIGURE OUT HOW THEY WILL COPE WITH THE PROSPECT OF INTENTIONAL OR ACCIDENTAL ATTACKS DURING INTERNATIONAL CONFLICTS SAYS A

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