

ICEYE

# BUY ICEYE SAR SATELLITES RAPIDLY DELIVERED

TAKE FULL CONTROL OF YOUR MISSIONS WITH THE WORLD'S ONLY  
HIGH-PERFORMANCE SAR SATELLITE SYSTEM

Q2 2023

ICEYE-BD-000000388



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## AIRCRAFT GRAVEYARD, KANSAS, US

IMAGE MODE: SPOT FINE @ 50 CM GROUND RESOLUTION, TAKEN ON 15-12-2022 AT 09:08 UTC.



# EXECUTIVE SUMMARY - WELCOME TO A NEW ERA IN SAR

Spaceborne Earth observation has been well established for decades. Recently, the use of Synthetic Aperture Radar (SAR) has entered a new era, bringing significant advantages over historical SAR use. A revolution in SAR is being pioneered by ICEYE.

For the first time ever, ICEYE now makes it possible for governments and organizations to purchase one or more of their own ICEYE satellites - rapidly delivered. This enables them to image any location on Earth, day or night, with very high resolution, high frequency revisits, and at an affordable price. We are the only organization in the world to offer high-precision SAR satellites for direct purchase.

## DESIGNED FOR FLEXIBILITY

Our unique satellite and antenna design lets you take a wide range of operational approaches. By mechanically maneuvering the satellite and electronically steering the radar beam, you can quickly and easily scan large areas in low resolution and zoom in at high resolution when needed.

## POWERFUL AND AFFORDABLE

To date, SAR satellite missions have used large and expensive platforms carrying massive payloads. Our novel SAR system is a miniaturized, active phased array sensor mounted on a small satellite platform, enabling the frequent imaging of any AOI and making our SAR satellites powerful and affordable by design.

## OPERATIONAL, PROVEN, TRUSTED

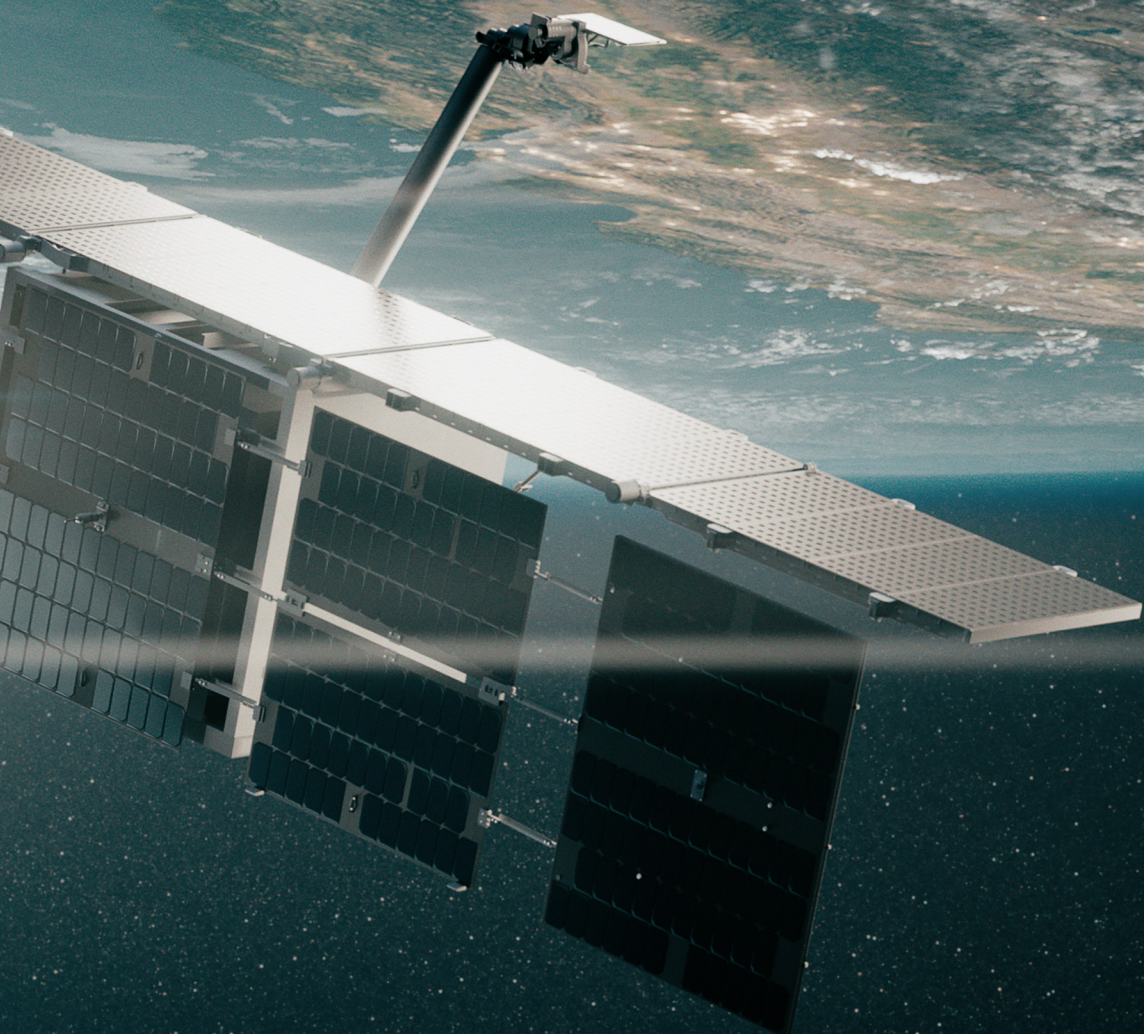
We've launched over 20 satellites since 2018 with 20+ more planned for 2023 and beyond. As the only New Space company with the proven ability to design, build and supply new-era SAR Earth observation satellites, we are already trusted by governments and organizations across the globe.

**“Your turnaround is fantastic.”**

**NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY**  
REGARDING ICEYE'S RESPONSE TO HISTORIC FLOODING IN THE U.S.

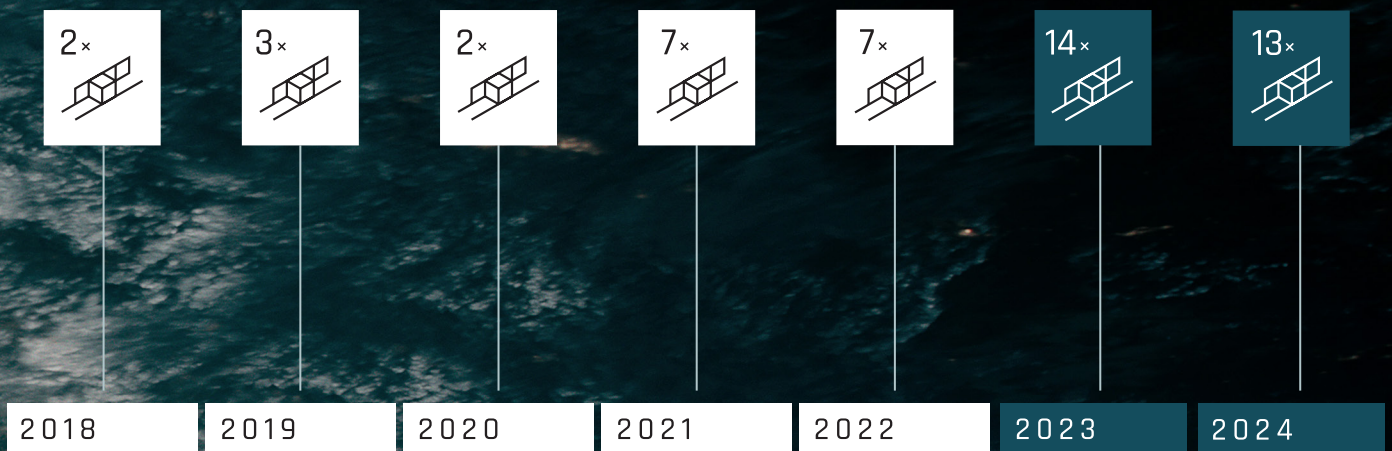
**“Your images are works of art!”**

**UNITED STATES NAVY**  
REFERENCING ICEYE SAR COLLECTIONS IN SUPPORT OF A MILITARY  
DEMONSTRATION IN 2021.



# PROVEN SATELLITE LAUNCHES AND MORE TO COME

- 20+ satellites successfully launched since 2018
- 20+ more to be launched in 2022 and beyond
- Future developments planned for 2023 and beyond

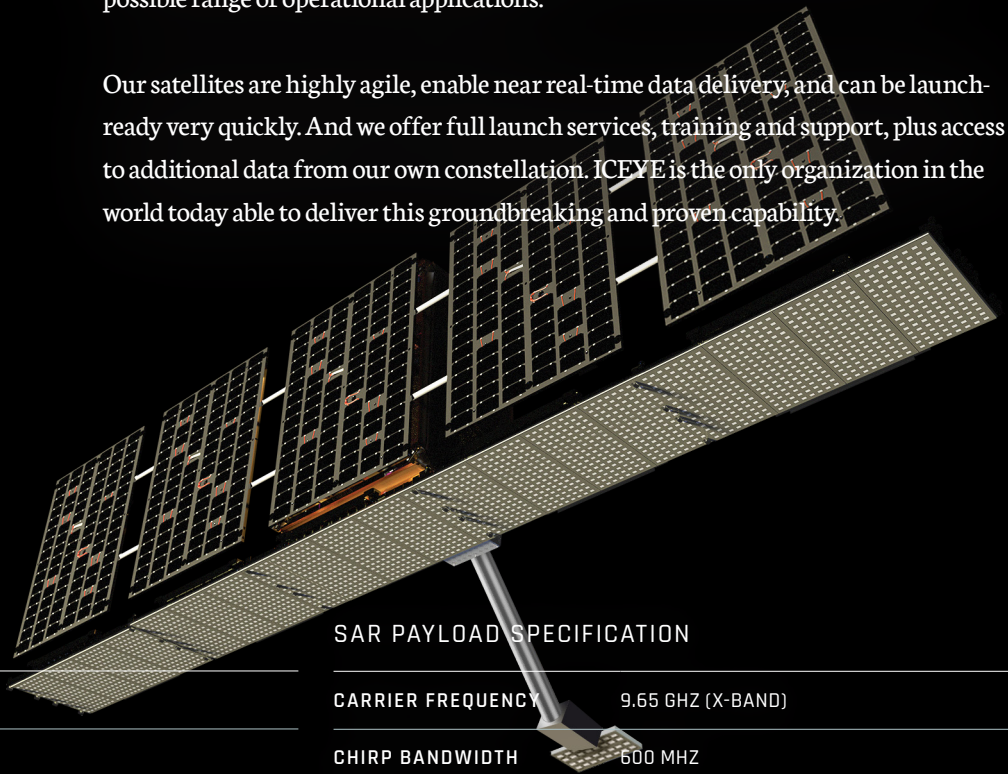


# A REVOLUTIONARY SAR SATELLITE DESIGN

ICEYE SAR satellites are purpose-built to be smaller, more affordable and more flexible than legacy systems, giving governments and organizations the opportunity to own their own fleets. With the unique combination of a miniaturized SAR sensor payload integrated onto a high-performance lightweight platform, ICEYE satellites deliver a level of performance that has never been possible before.

The design enables long imaging dwell times at extremely high resolution and the ability to flexibly maneuver the antenna and scan the radar beam across wide areas. This enables ICEYE to deliver multiple imaging modes that enable the broadest possible range of operational applications.

Our satellites are highly agile, enable near real-time data delivery, and can be launch-ready very quickly. And we offer full launch services, training and support, plus access to additional data from our own constellation. ICEYE is the only organization in the world today able to deliver this groundbreaking and proven capability.



## SATELLITE SPECIFICATION

MASS	120 KG
BATTERY	1.4 KWH
POWER	5 SOLAR PANELS (PEAK POWER GENERATION 345 W)
COMMUNICATION	S-/X-BAND
DOWNLINK	X-BAND 500 MEGABITS WITH ENCRYPTION
DIRECT DOWNLINK	YES, WITH GIMBALED ANTENNA FOR SIMULTANEOUS IMAGING
ATTITUDE DETERMINATION	STAR TRACKER CAMERAS AND OTHER SENSORS - 3 AXIS / 0.1 DEG
ATTITUDE CONTROL	REACTION WHEELS AND TORQUE RODS - 3 AXIS / 0.1 DEG
PROPULSION	ION PROPULSION SYSTEM
MISSION DESIGN LIFE	THE SYSTEM IS SIZED FOR MINIMUM OF 3 YEARS OF LIFE

## SAR PAYLOAD SPECIFICATION

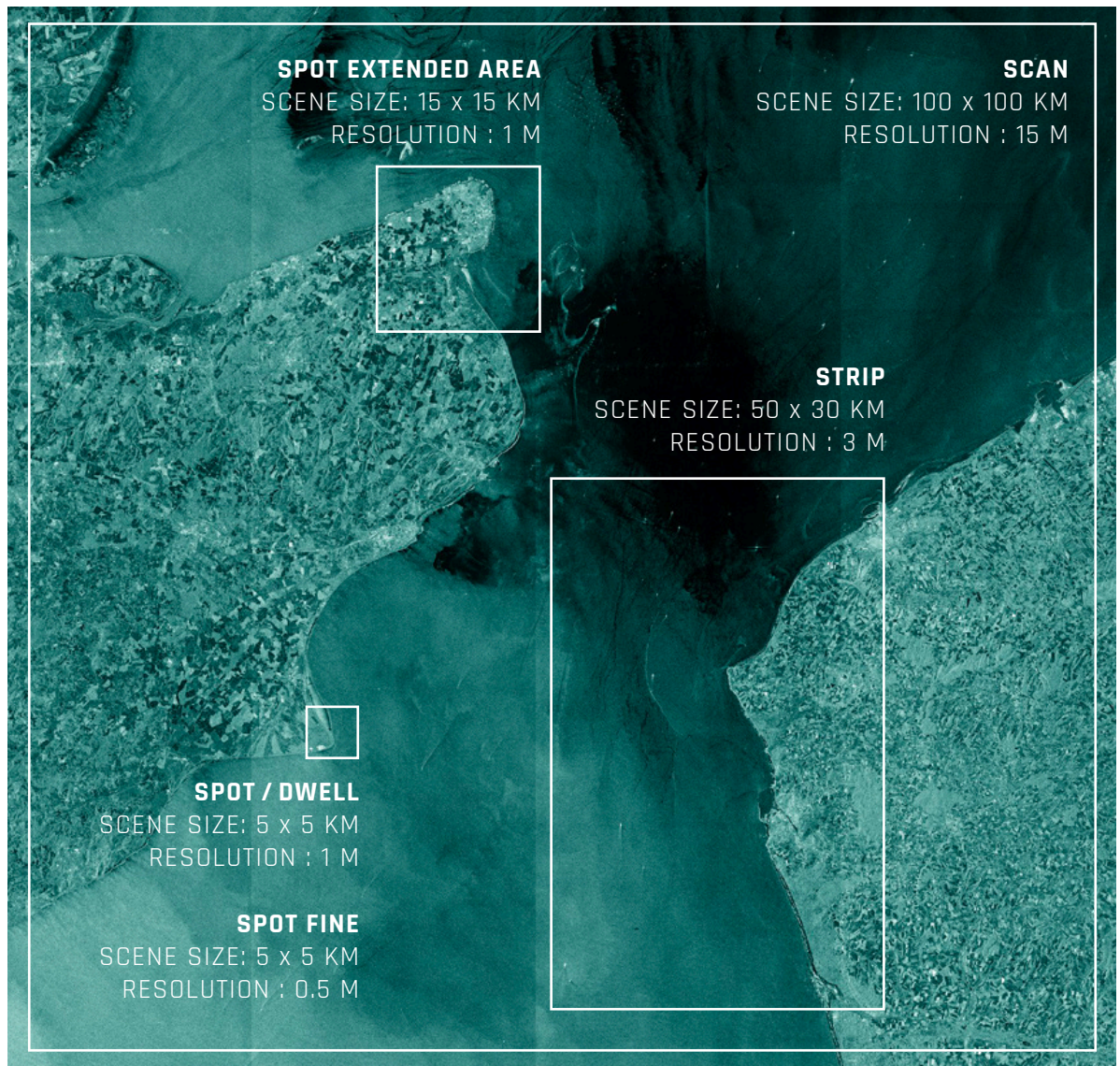
CARRIER FREQUENCY	9.65 GHZ (X-BAND)
CHIRP BANDWIDTH MAX.	600 MHZ
LOOK DIRECTION	LEFT AND RIGHT
POLARIZATION	VV
PHASED ARRAY	1.4 M <sup>2</sup> (ALONG TRACK 3.4 M X 0.4 M WIDTH)
STEERING	BOTH ELECTRONIC AND MECHANICAL STEERING IN THE ELEVATION AND AZIMUTH DIRECTIONS
PEAK RADIATED RF POWER	3.4 KW

**ICEYE'S UNIQUE ANTENNA** IS AN ELECTRONICALLY-STEERED PHASED ARRAY THAT CAN BE CONTROLLED TO ENABLE A RANGE OF IMAGING MODES FOR DEMANDING OPERATIONAL NEEDS.

**ICEYE SAR IMAGING MODES:**

**UP TO 50 CM** RESOLUTION.

**UP TO 50,000 KM<sup>2</sup>** SCENE SIZE.



IMAGING MODE	STRIP	SPOT	SPOT FINE	DWELL	SLEA	SCAN
NOMINAL SWATH WIDTH X LENGTH [KM]	30 X 50	5 X 5	5 X 5	5 X 5	15 X 15	100 X 100
SINGLE LOOK SLANT RANGE RESOLUTION [M]	0.5 TO 2.5	0.5	0.25	0.5	0.5	N/A
SINGLE LOOK AZIMUTH RESOLUTION [M]	3	0.25	0.1	0.05	1	N/A
GROUND RANGE RESOLUTION [M]	3	1	0.5	1	1	15
GROUND AZIMUTH RESOLUTION [M]	3	1	0.5	1	1	15
NOMINAL COLLECTION DURATION [SEC]	10	10	15	25	10	15
RANGE LOOKS	1	1	1	1	1	1
AZIMUTH LOOKS	1 TO 2	4	5	20	1	1
INCIDENCE FOR NOMINAL PERFORMANCE [DEG]	15 - 30	20 - 35	20 - 35	20-45	20 - 35	21 - 29
NESZ [DB]	<-21.5 TO -20	-18	-15	-17	-18	-22.2 TO -21.5
MAXIMUM IMAGE LENGTH [KM]	500	N/A	N/A	N/A	N/A	500

**“ICEYE is a forerunner in the New Space movement, enabling completely new high performance capabilities, revolutionary affordability and speed of delivery.”**





**“The ability to persistently monitor locations with SAR means you can now make critical decisions without guessing or hoping to predict an event. Now you know.”**

**SHAY STRONG**  
VICE PRESIDENT OF ANALYTICS, ICEYE

# FLEXIBLE OPTIONS FOR ANY MISSION

You can choose to buy satellites, capacity or both. We will build a package that suits your needs.

## BUY SATELLITES

**Satellites:** Own one or more of the same latest generation of satellites flown by ICEYE.

**Rapid delivery:** Delivered launch ready 18 months from contract agreement.

**Launch:** We can also arrange the launch of your spacecraft into low Earth sun-synchronous orbit, saving you time and money.

**Launch insurance:** We can assist you in getting the required launch insurance for added peace of mind.

**Commissioning (LEOP):** After satellite separation from the launch vehicle, ICEYE will commission the satellite for you, saving you time and money.

**Mission Ground Segment (MGS):** We can provide hardware and software to enable satellite order management, satellite tasking and operations, and SAR processing and archival.

**Ground Station (Antenna):** If you don't have your own ground station antenna, we can provide you with one or more, for direct downlink of data into your premises.

**Training:** We can support your operational team with basic, intermediate, and comprehensive training for satellite operations.

**Technical support:** We can provide mission lifetime technical support to ensure the smooth running of your missions.

## BUY 100% SATELLITE CAPACITY

**Buy 100% capacity:** Get full capacity from one or more SAR satellites operated on your behalf by ICEYE.

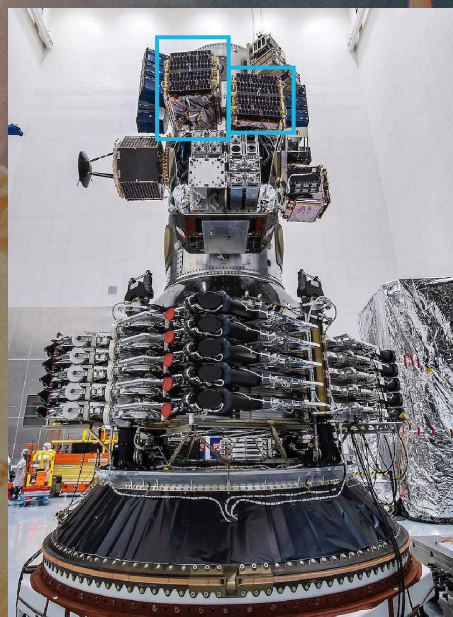
**All the benefits of satellite use without the admin:** Get the full-capability benefits of satellite use and let ICEYE handle operations, registration, maintenance, upgrades and replenishment.

**Exclusive Tasking:** Gain exclusive priority for your tasking compared to use of a shared constellation.

**Data delivery:** Data delivered exclusively to you.

**Polar or inclined orbit:** Sun-synchronous orbit (SSO) is the standard option and inclined orbit is available at an extra cost.

**Contract:** Choose a 3-year or rolling contract / price.



**TWO ICEYE SATELLITES LOADED READY FOR LAUNCH ON TRANSPORTER-1 MISSION ON JANUARY 24TH 2020. CREDIT: SPACEX.**

# LAUNCH SERVICES AND GROUND SEGMENT

We offer full launch services, ground segment and access to our network of stations, as well as training and support.

## BE READY FOR TAKEOFF

From helping you submit the proper approvals to managing the launch of your spacecraft into low Earth orbit to support once you've taken control of your satellites, ICEYE's comprehensive launch services will guide you every step of the way.

## BE FULLY OPERATIONAL

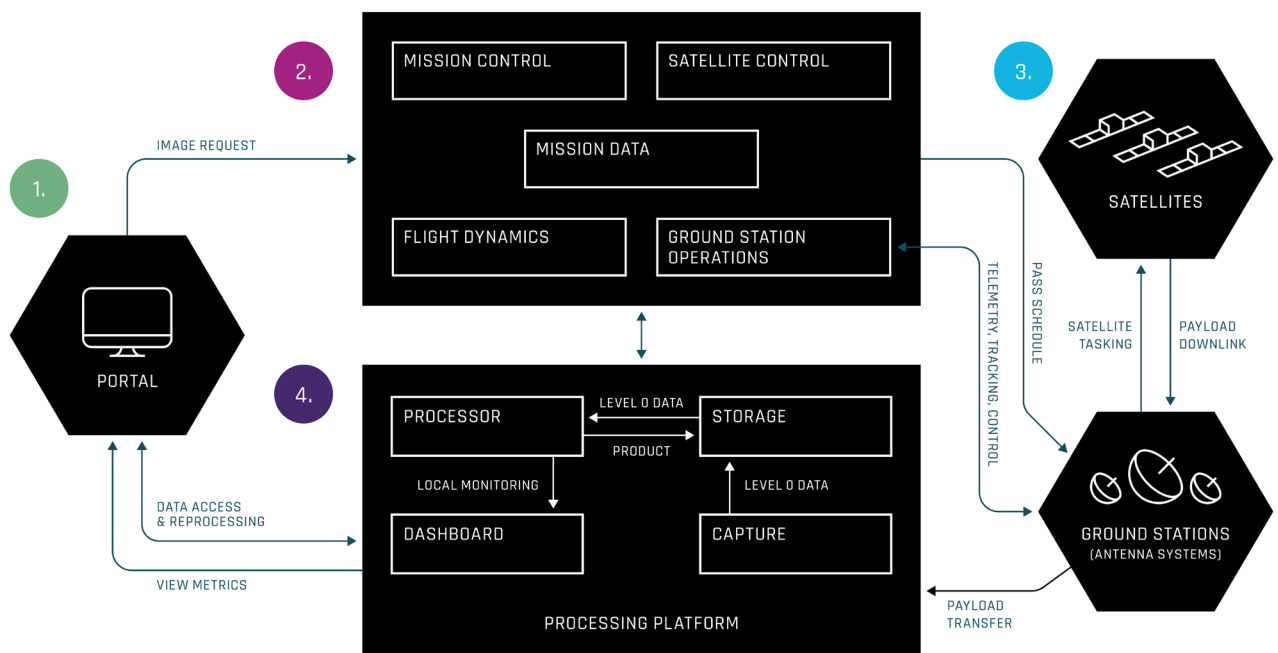
ICEYE's Ground Segment comes with everything you need to operate your satellites, from mission planning and satellite tasking to data processing, data storage and retrieval.



# GROUND SEGMENT

THE FOLLOWING DIAGRAM IS A SCHEMATIC OF WHAT'S INCLUDED IN AN ICEYE GROUND SEGMENT, WITH EACH FUNCTIONALITY DESCRIBED FURTHER BELOW.

1. ORDER MANAGEMENT
2. SATELLITE TASKING AND OPERATIONS
3. SATELLITE COMMUNICATIONS
4. SAR PROCESSING AND ARCHIVAL



## FUNCTIONALITIES

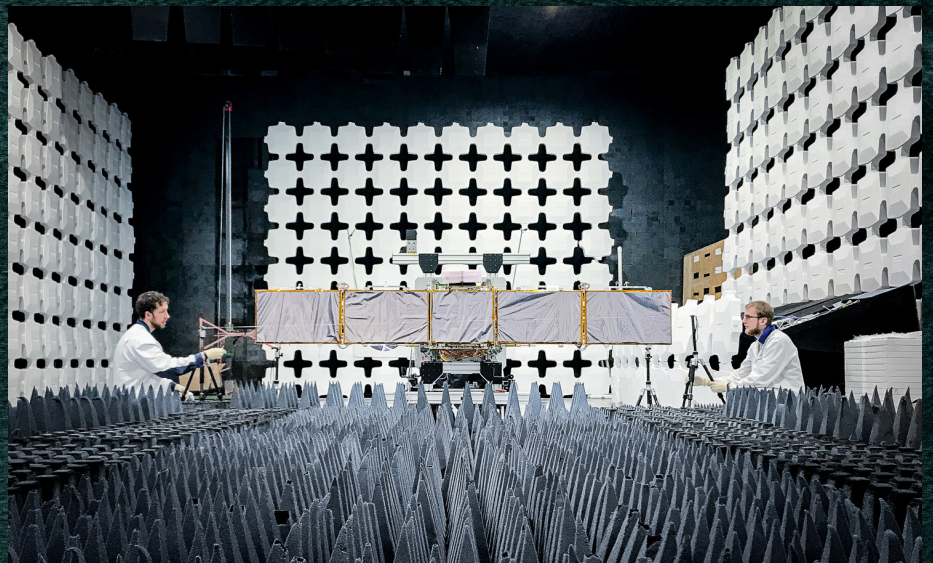
SEGMENT COMPONENTS	DESCRIPTION
PORTAL ●	PLACE AN ORDER FOR A NEW IMAGE, VIEW IMAGE PRODUCTS THAT ARE IN THE CATALOG, OR REPROCESS AN IMAGE
MISSION CONTROL ●	MANAGE IMAGE ORDERS, SATELLITE TASKING, AND GROUND STATION OPERATIONS
SATELLITE CONTROL ●	A SERVICE FOR MANAGING THE AUTOMATION OF NOMINAL IN-CONTACT OPERATIONS WITH THE SATELLITE
ANTENNA SYSTEM ●	UPLINK COMMANDS TO THE SATELLITE, RECEIVE TELEMETRY AND RAW SAR PAYLOAD FROM IT, AND SEND IT TO THE PROCESSING PLATFORM
MISSION DATA ●	TIME-SERIES MEASUREMENT DATA COMING FROM THE SATELLITES FOR SPACECRAFT ANALYSIS GROUND
FLIGHT DYNAMICS ●	TOOLS FOR ORBIT DETERMINATION, ORBIT PREDICTION AND MANOEUVRES PLANNING
PROCESSING PLATFORM ●	DECODE, DECRYPT AND CONVERT SAR PAYLOAD DATA INTO IMAGE PRODUCTS. STORE, CATALOGUE AND EXPOSE DATA FOR ITS EXTERNAL ACCESS

## TYPICAL MISSION SOLUTION

ICEYE has the capability to rapidly deliver any number of satellites. We welcome further discussion so that we can understand your use case and design a solution tailored to your needs.

### A TYPICAL SATELLITE SOLUTION WOULD INCLUDE:

- 3 OR 5 (FOR EXAMPLE) OF ICEYE'S **LATEST SAR SATELLITES**
- **DELIVERED LAUNCH-READY** IN APPROXIMATELY 18-24 MONTHS
- **ARRANGEMENT OF LAUNCH SERVICES** ON YOUR BEHALF INTO LOW EARTH SUN-SYNCHRONOUS ORBIT (LEO SSO)
- **PROVISION OF A MISSION GROUND SEGMENT** IN YOUR COUNTRY FOR SOVEREIGN SATELLITE CONTROL AND DATA RECEIPT
- **CONTINUOUS SUPPORT** FOR OPERATIONS AND MAINTENANCE THROUGHOUT THE SATELLITE SERVICE LIFE
- **TRAINING** FOR CONSTELLATION OPERATIONS, DATA ACQUISITION AND PROCESSING PROVIDED BY WORLD EXPERTS



**CHUGINADAK ISLAND, ALASKA, US.**

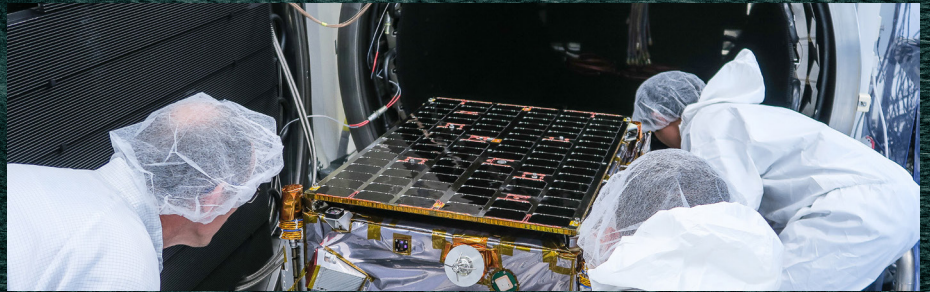
**A ICEYE SATELLITE IN THE ANAEOCHIC CHAMBER FOR ENVIRONMENTAL TESTING**

IMAGE MODE: STRIP @ 3 M X 3 M  
RESOLUTION, TAKEN ON 18-10-2019 AT  
15:18 UTC.

## WHY ICEYE?

For governments and commercial clients, ICEYE really has changed what is possible from Synthetic Aperture Radar (SAR) Earth observation. Our New Space approach has made it possible for clients to purchase one or more of the latest-generation of ICEYE SAR satellites. We are the only organization in the world to offer high-precision SAR satellites for direct purchase. We also offer full launch services, training and support, plus access to additional data from our own constellation.

AN ICEYE SATELLITE IN THE ANACHOIC CHAMBER FOR ENVIRONMENTAL TESTING



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If you are interested in procuring ICEYE satellites, please get in contact and we would be happy to provide a tailored solution to meet your requirements.



**ICEYE**

SALES@ICEYE.COM  
MAARINTIE 6, 02150 ESPOO, FINLAND

WWW.ICEYE.COM