

## *State of Play*

# SYNTHETIC APERTURE RADAR (SAR)

*February 23, 2021*

### **Overview**

New emerging synthetic aperture radar (SAR) technologies in the start-up domain and commercial marketplace were investigated, and a comparison of two key players representative of SAR trends, Capella Space (United States) and ICEYE (Finland), are discussed below. Each company is developing SAR technology on small satellites launched by commercial launch providers, such as SpaceX. ICEYE is currently developing a U.S. presence in the Los Angeles metropolitan area, with the intent to manufacture in the United States. Both Capella Space and ICEYE are viable and growing into the \$420 billion Earth imagery sector.

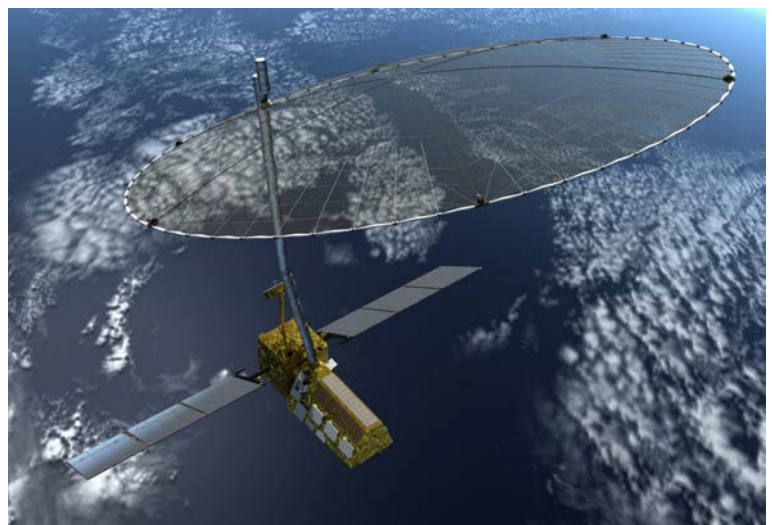
### **Key Technologies and Developments**

#### **Capella Space**

Capella Space was founded in 2016 to provide SAR imagery to government and commercial customers. Capella Space has an exclusive agreement with Inmarsat to rideshare on their 36-constellation satellite system using SpaceX launch vehicles. They currently have 100+ employees and are based in San Francisco. They have acquired \$80 million in venture funding to date and have contracts with multiple government customers. They are a 2019 Space Pitch Day awardee, and, in June 2020, they signed a Cooperative Research and Development Agreement (CRADA) with the National Geospatial-Intelligence Agency. Their SAR system will have hourly global imagery when fully deployed, with strip mode resolution of 2m. The X-band system currently provides imagery every six hours. Capella Space is developing an innovative on-demand tasking system through a web interface. Their leadership team has strong credentials and connections to U.S. government customers, and their advisory team includes former leaders from strategic organizations.

#### **ICEYE**

ICEYE was founded in 2014 in Finland, with CEOs in both Finland and the United States. They also provide SAR imagery to government and commercial customers. ICEYE builds their own SAR technology and has a large engineering force in-house, with a 200+ employee base. Their model is to launch their own satellites using SpaceX and ExoSat vehicles. ICEYE has raised \$152 million to date in venture funding and has a variety of customers, a few of which are Business Finland (government), EU's Horizon 2020 Program/SME Instrument (government), True Ventures (Silicon Valley), Promus Ventures (Chicago/SF), the Luxembourg Future Fund, and the European Investment Fund. They also have imagery every six hours, with 1 meter global radar imaging commercially available. Their X-band system has on demand spot imagery at 25 centimeter and a worldwide 0.5 slant range resolution. Their image acquisition to processed SAR image delivery is less than 15 minutes. In December, ICEYE won the 2020 SpaceNews Small Company of the Year award.



Artist's concept of the NASA-ISRO synthetic aperture radar (NISAR) satellite in orbit.  
Credit: NASA/Public Domain.

Several other companies developing SAR technologies remain on the current watchlist for this trade space. These include Airbus, L3Harris, PredaSAR, R2Space, Umbra, Ursa Space Systems, and XpressSAR.

## **Future Outlook**

In the coming years, we expect to see a boom in commercial SAR satellite activities. Commercial vendors will most likely move from a single imaging channel to multiple channels and multiple beams that will enable them to perform clutter cancellation and detection of moving targets. Commercial SAR systems will become more capable for various applications, such as imaging, detection, and tracking.

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