

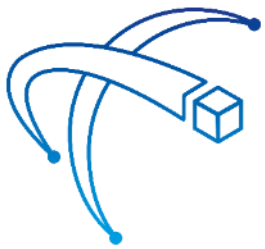


FireSat – A UK-Africa collaboration for enhanced detection of fires using nanosatellite technology

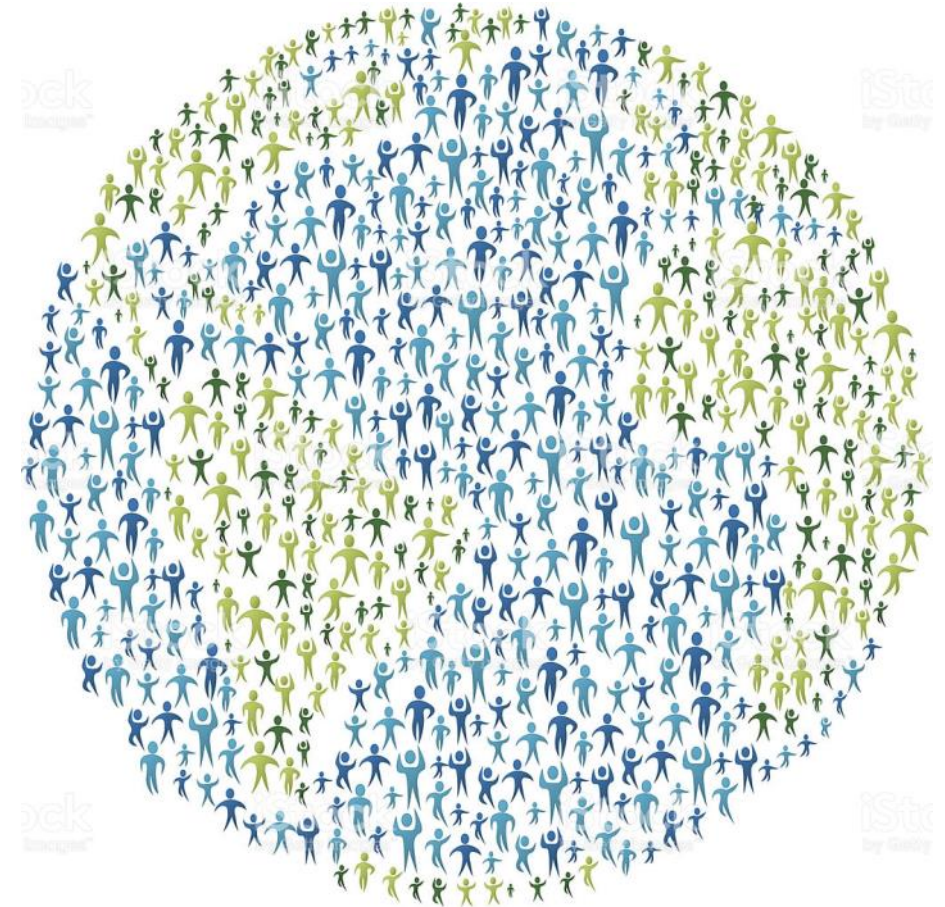
12th December 2017



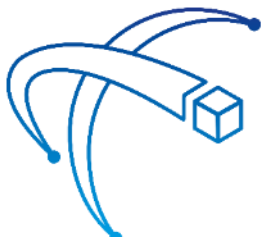
Presentation outline

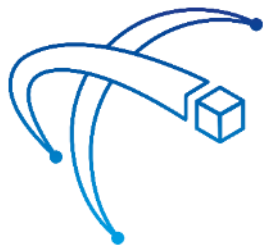


- Project partners
- International Partnership Programme
- Project breakdown
- Knowledge Transfer
- FireSat
 - background
 - Platform
 - Payload
 - Constellation
 - Development timelines
- The Advanced Fire Information System
- Programme impact



UK-Africa collaboration



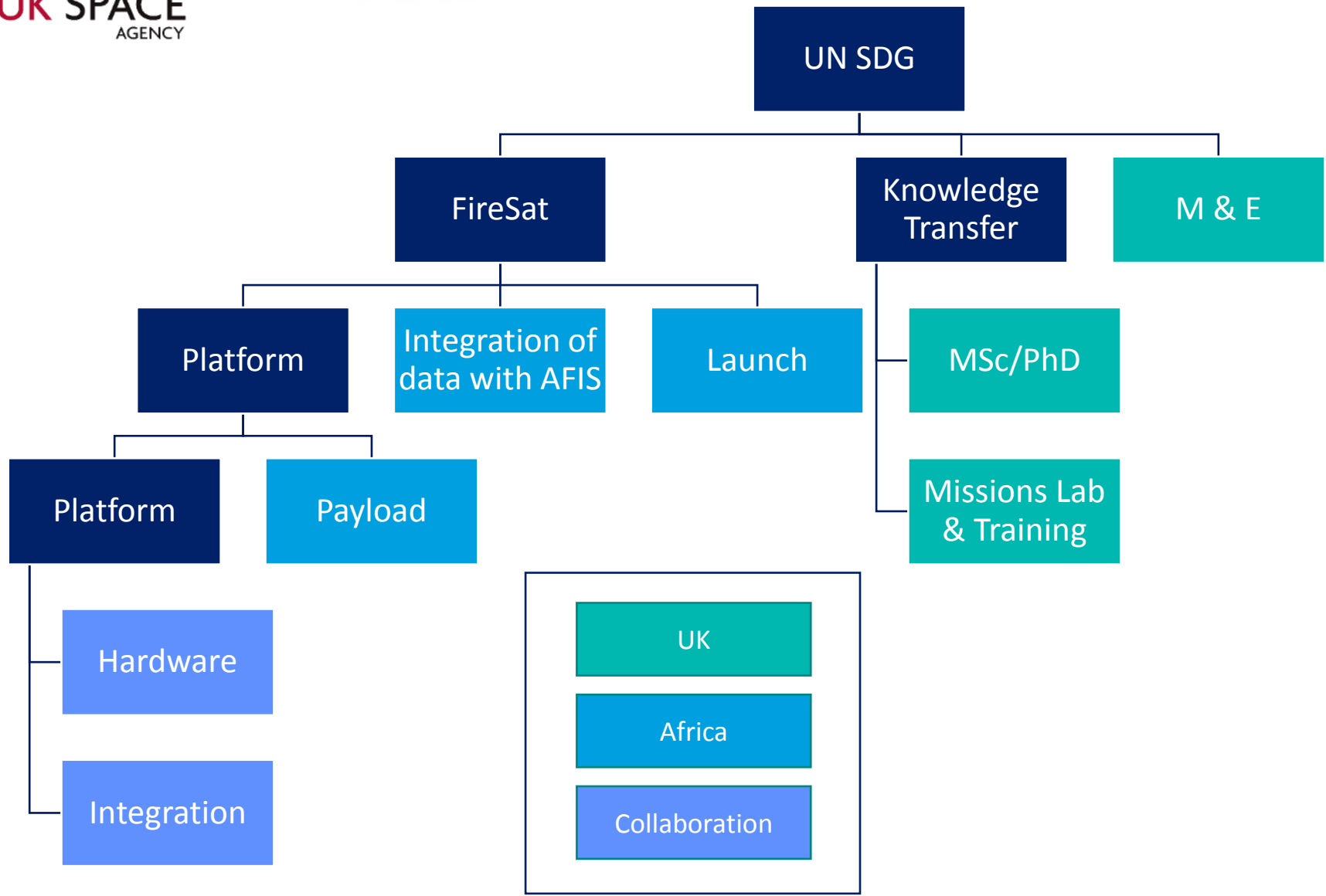
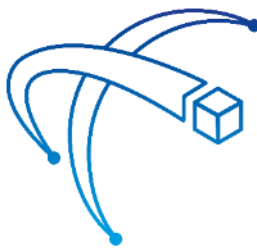


- 5-year, £152 million programme
- UK space sector's research and innovation strengths to deliver sustainable economic or societal benefit to emerging and developing economies around the world
- Projects run by industry, academia, and non-profit entities
- Uses space solutions to make positive impact on those living in international partner countries
- Increasing capacity of developing nations to respond to specific challenges



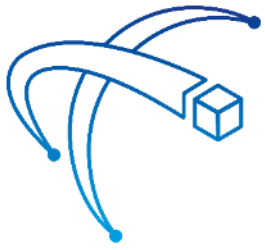


Project outline





Project outline

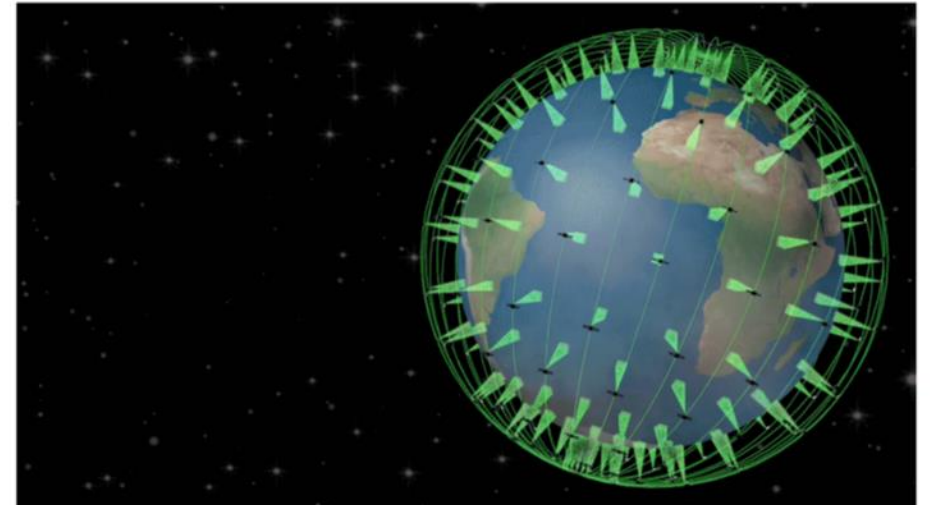


Phase 1 – Technology Demonstration

- Use of ZACube-2

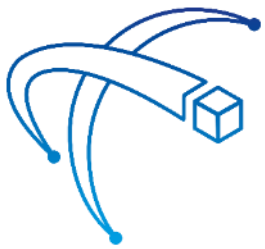
Phase 2 – Scale up

- IPP funding



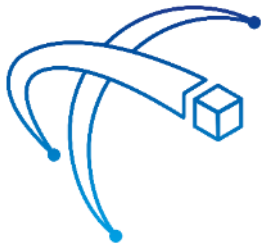


Knowledge transfer – Missions Lab



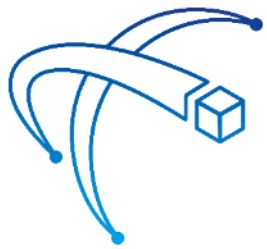


Knowledge transfer – MSc

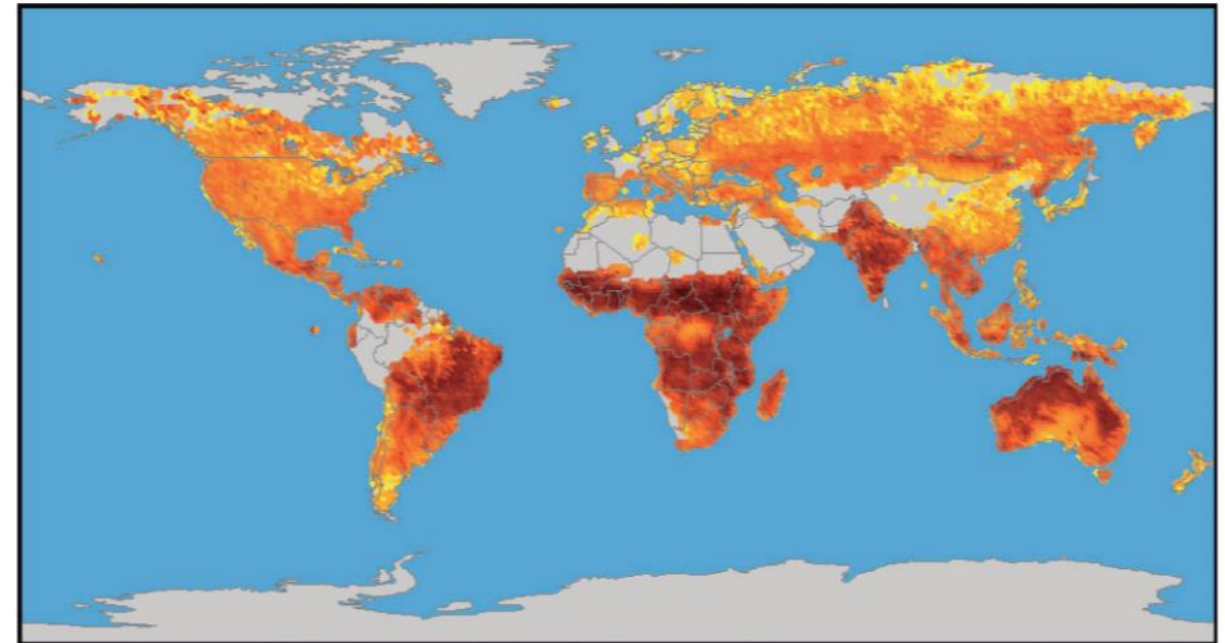


- UN Sustainable Development Goals to illustrate the application of satellite applications
- EO, Navigation and Communications, Data Science, Entrepreneurship & Space Systems (optional)
- Aims to encourage students towards creating new services and companies
- Course is well suited to markets without a mature space sector
- Remote learning and CPD
- Available from September 2019 – applications from early 2019
- Joint PhD Programmes also available



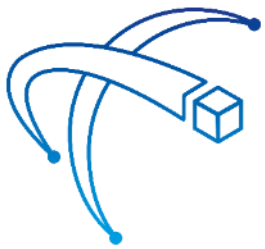


- Frequency, severity and damages from global wildfires are increasing annually
 - From 1979 to 2013 fire weather seasons have lengthened across 29.6 million km² of Earth's vegetated surface, which results in an 18.7% increase in global average fire season length
 - Doubling of global burnable area and increased global frequency of long fire weather seasons (53.4% from 1996 to 2013)

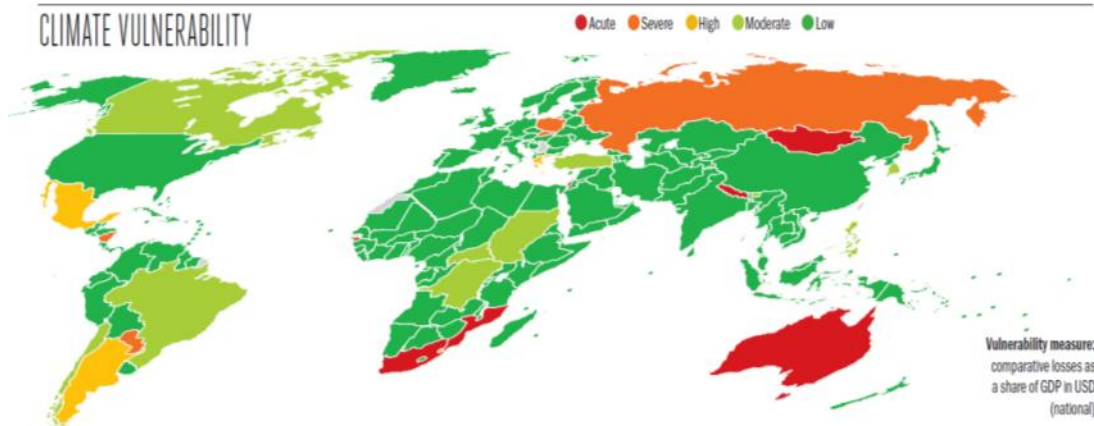


0% burnt  >60% burnt

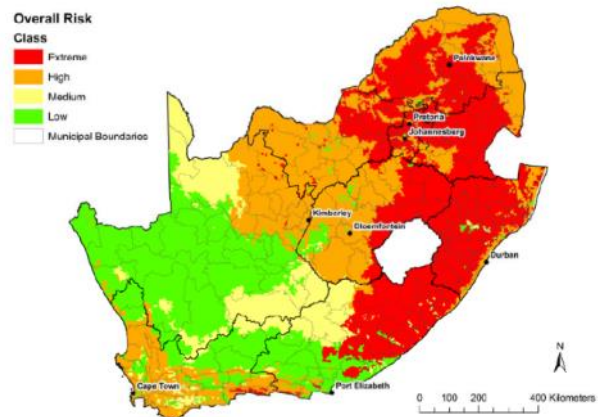
Average annual burned area between 1960 and 2000



The 'fire continent' - 70% of total global wildfires



Global climate vulnerability to wildfires



CSIR national veld fire risk assessment report

30.6% South Africa at Extreme risk

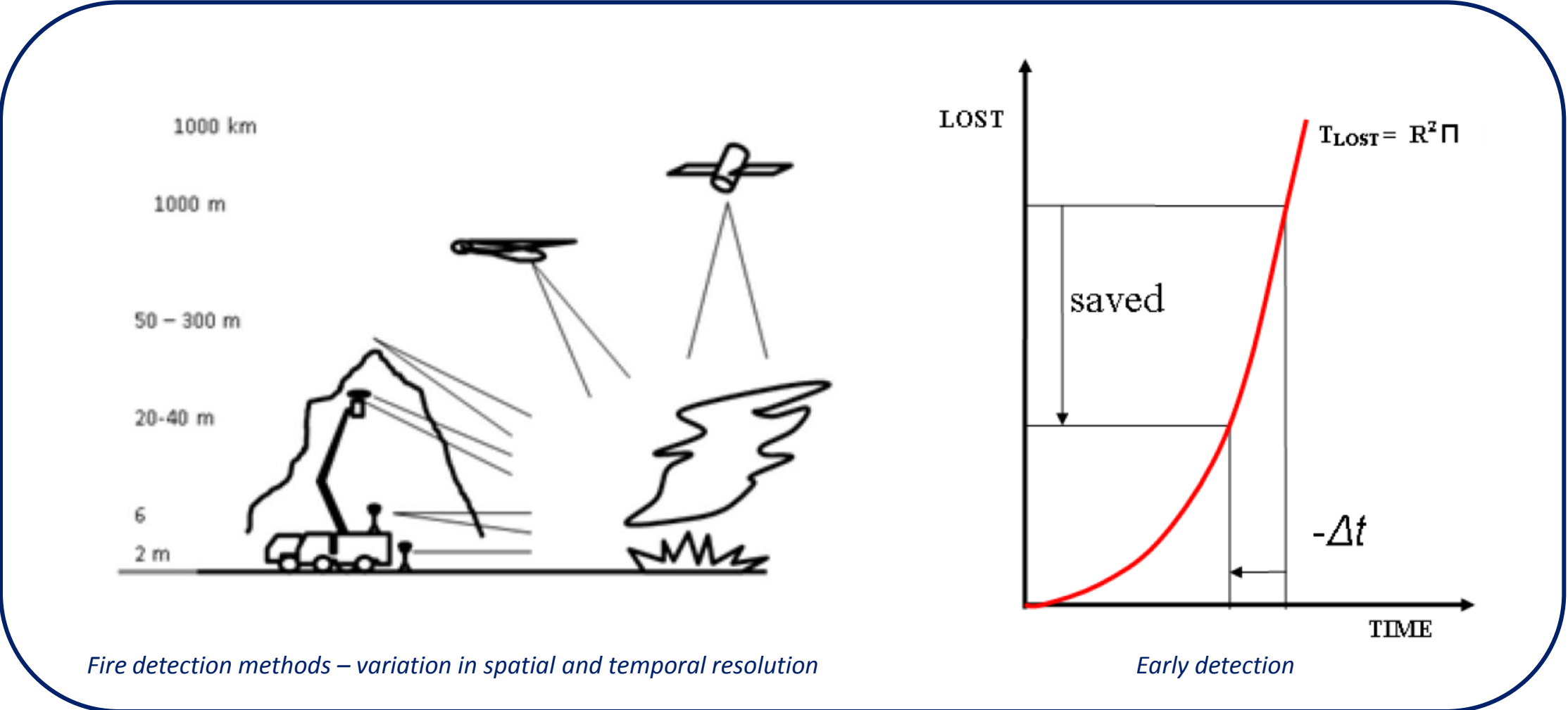
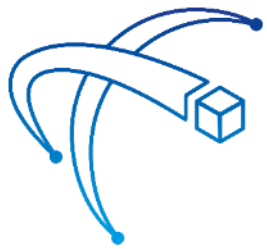
31.3% South Africa at High risk

CAPE FIRE BY NUMBERS

ON 1 MARCH 2015, FIRES BEGAN TO ROAR ACROSS CAPE TOWN'S SOUTH PENINSULA. STARTING IN MUIZENBERG, THE FIRE SPREAD RAPIDLY TO SURROUNDING AREAS.

- 5 DAYS** THE FIRE BROKE OUT ON 1 MARCH 2015, AND CONTINUED FOR 5 DAYS
- 5 500 HECTARES** AFFECTED BY THE FIRES
- R5 MILLION** COST OF DAMAGE TO TABLE MOUNTAIN INFRASTRUCTURE
- 13** PROPERTIES AFFECTED
- TWO THOUSAND** PEOPLE HELPING TO STOP THE FIRE
- 500** PEOPLE EVACUATED
- 2 MILLION LITRES** OF WATER DUMPED ON THE FIRE IN ABOUT 2 000 WATER DROPS
- R2.4M** ESTIMATED COST OF FLIGHT TIME
- 1 PILOT DEAD**
- 198 HOURS FLOWN**
- 26 AIRCRAFT**
- ONE CIGARETTE** POTENTIALLY CAUSED THE FIRE, ACCORDING TO REPORTS
- 11 HELICOPTERS, 6 FIXED-WING BOMBERS AND 9 SPOTTERS** DEPLOYED TO FIGHT THE 11 FIRES

Images: Shutterstock // text: SAPA

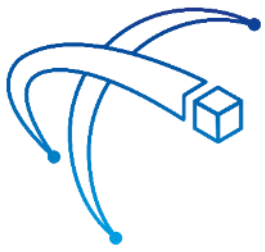


FireSat platform





FireSat platform



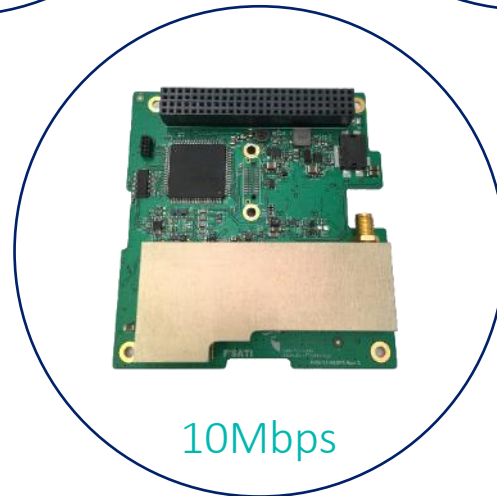
OBC w/ GPS



3U Body



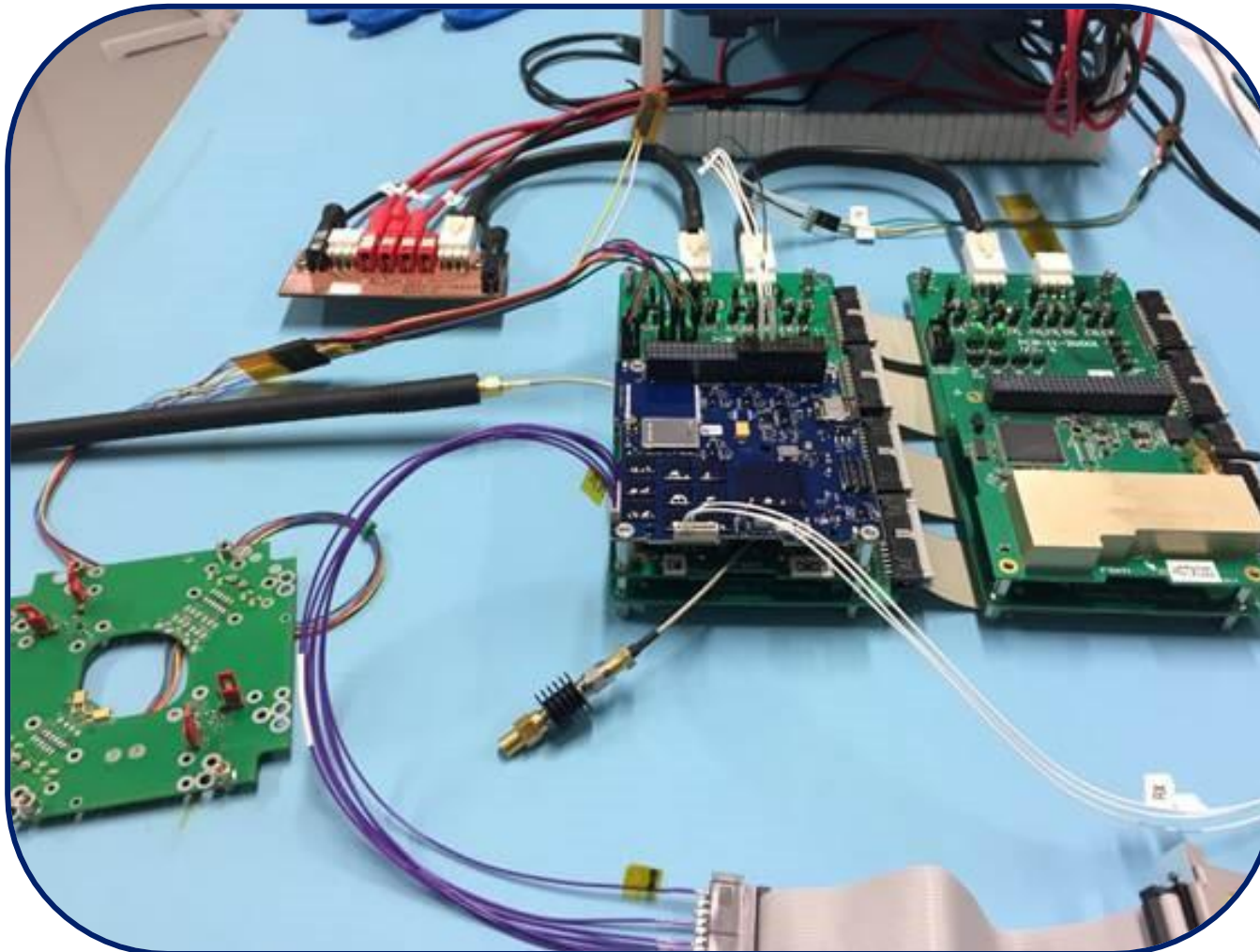
3U EPS



10Mbps

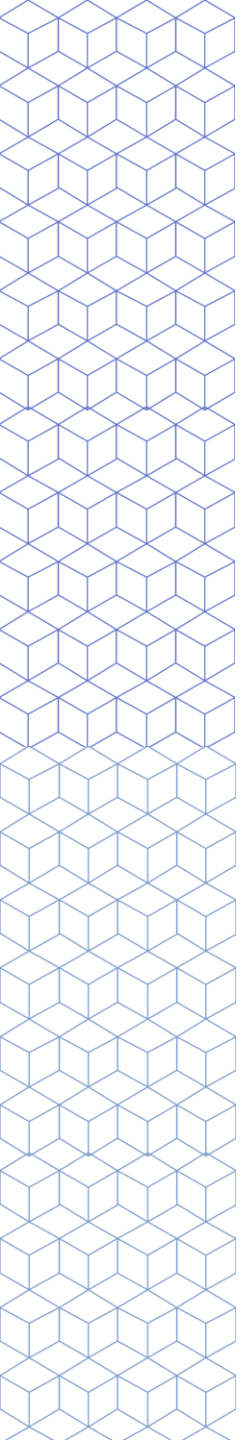


30Whr

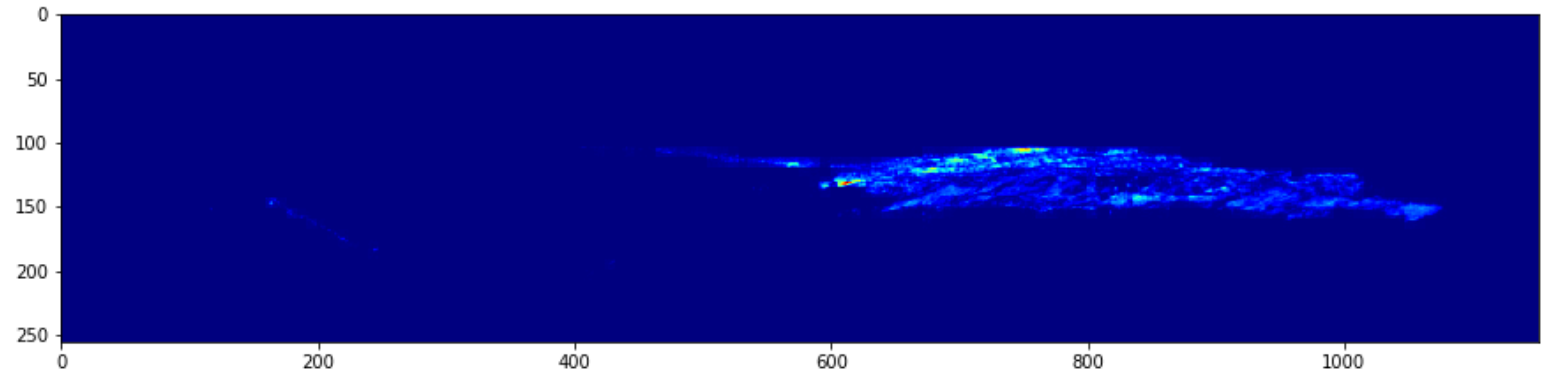
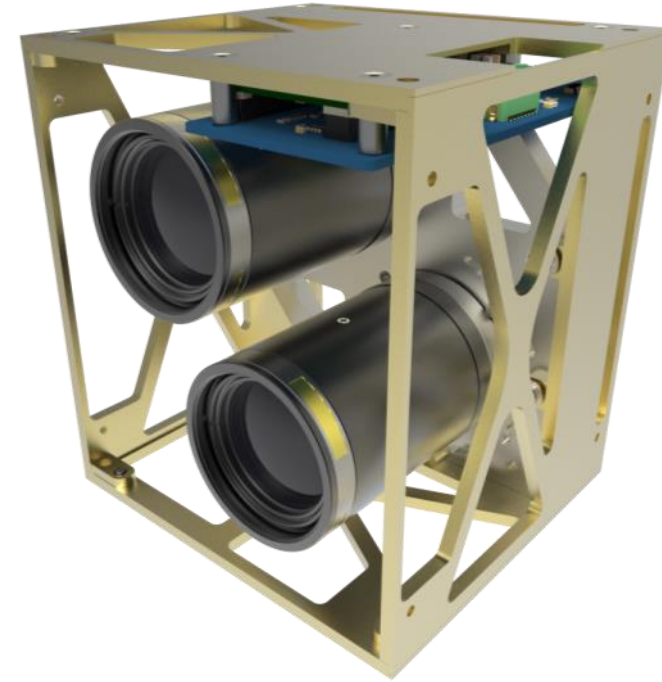
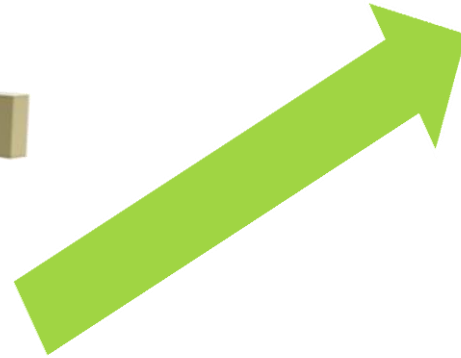
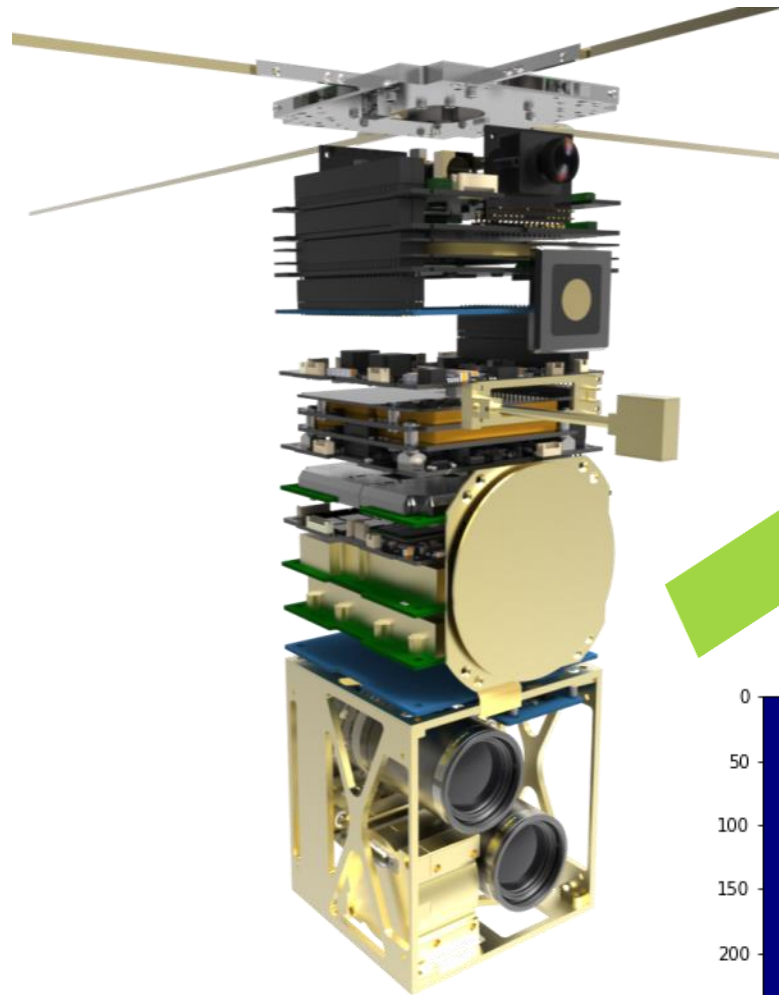
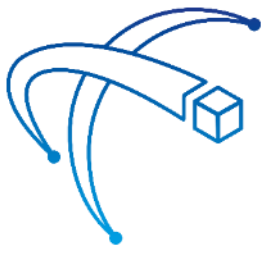


- On-Board Computer (OBC)
- UHF Transceiver (UTRX)
- High-Speed S-Band Transmitter (HSTX)
- Antenna

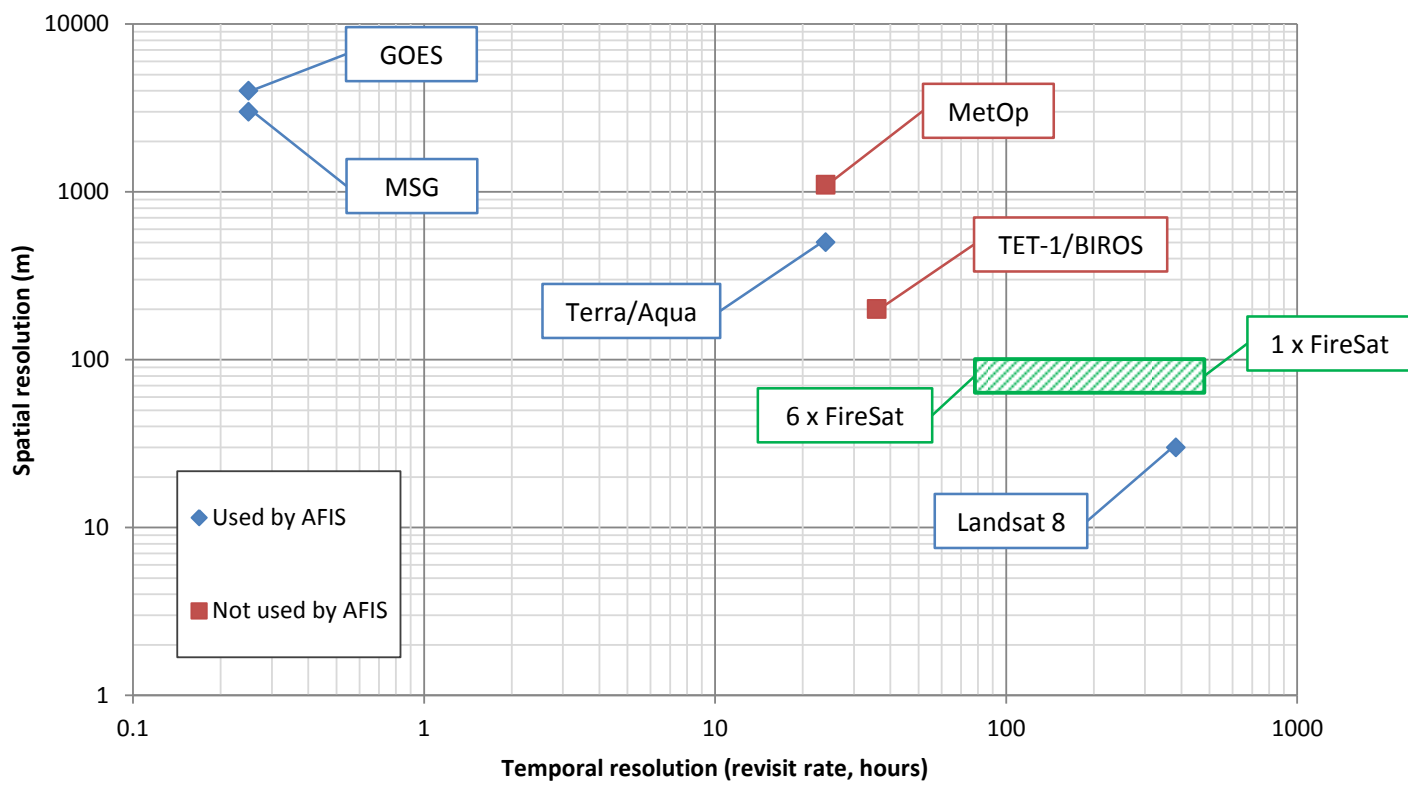
FlatSat testing – November 2017



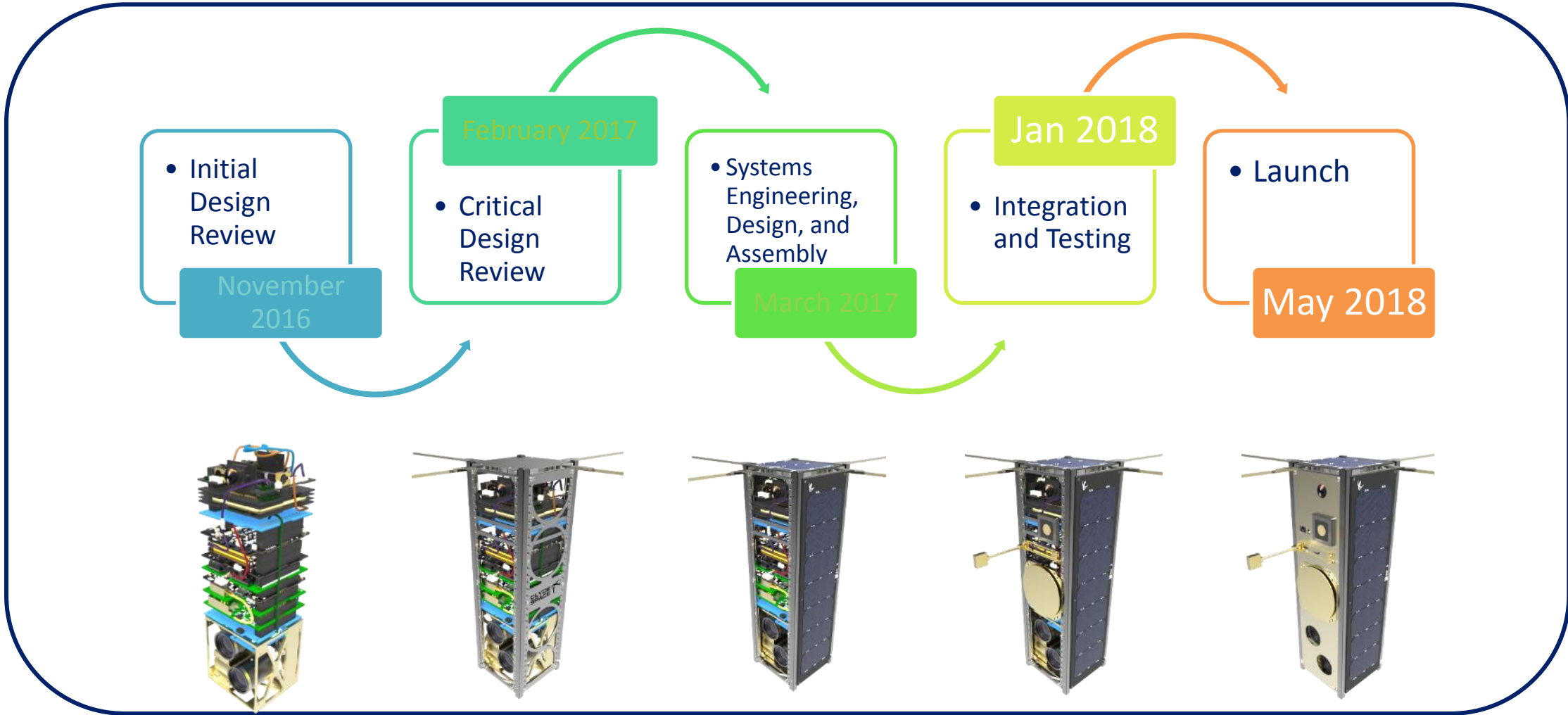
FireSat payload



Grass fire at 8 km

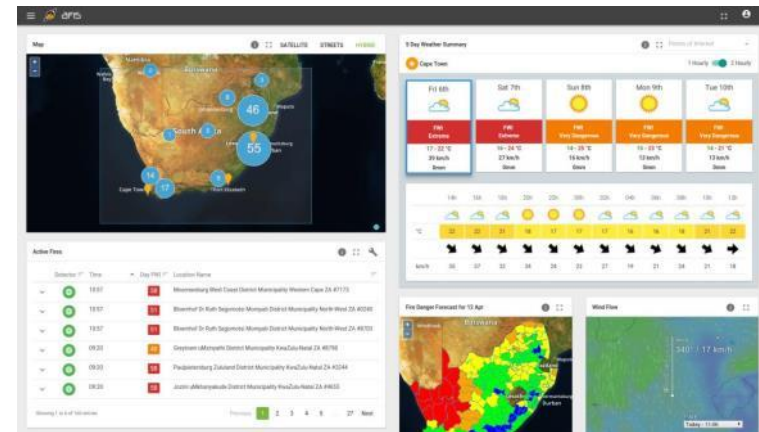
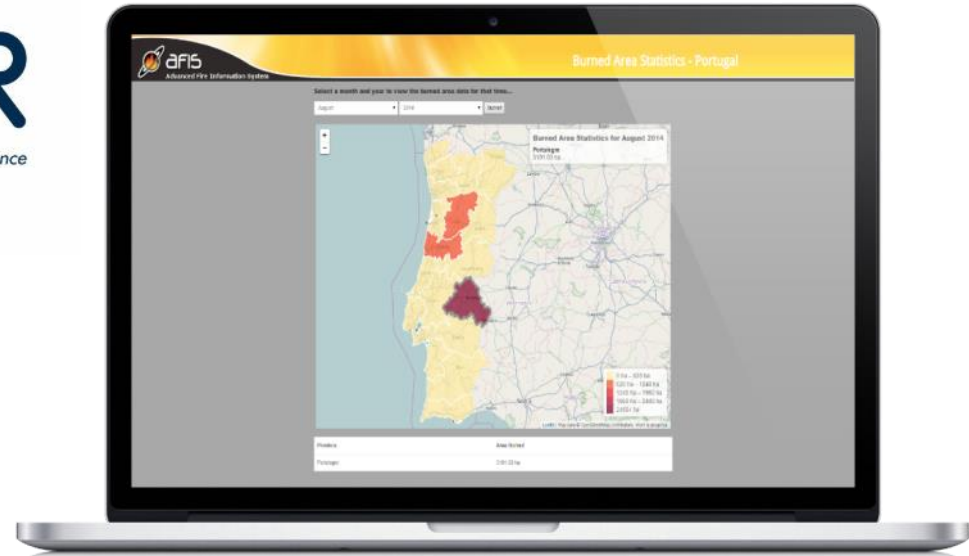
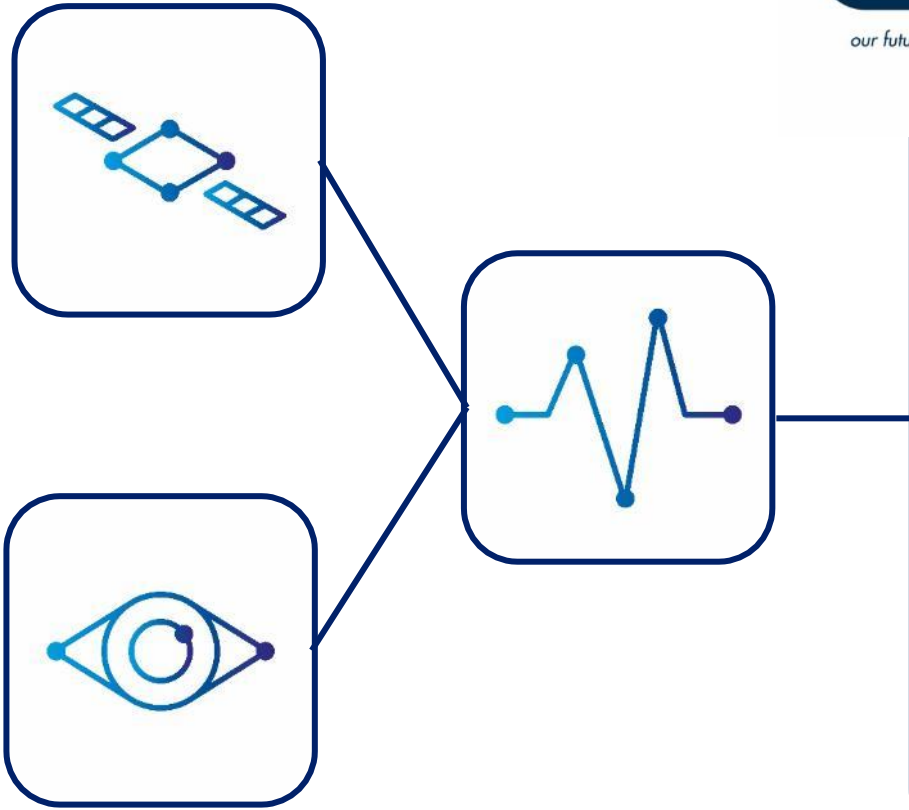
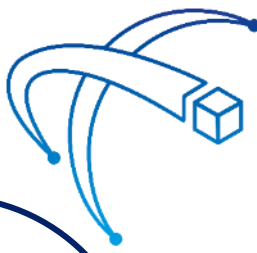


Temporal vs Spatial resolution for fire detection from space



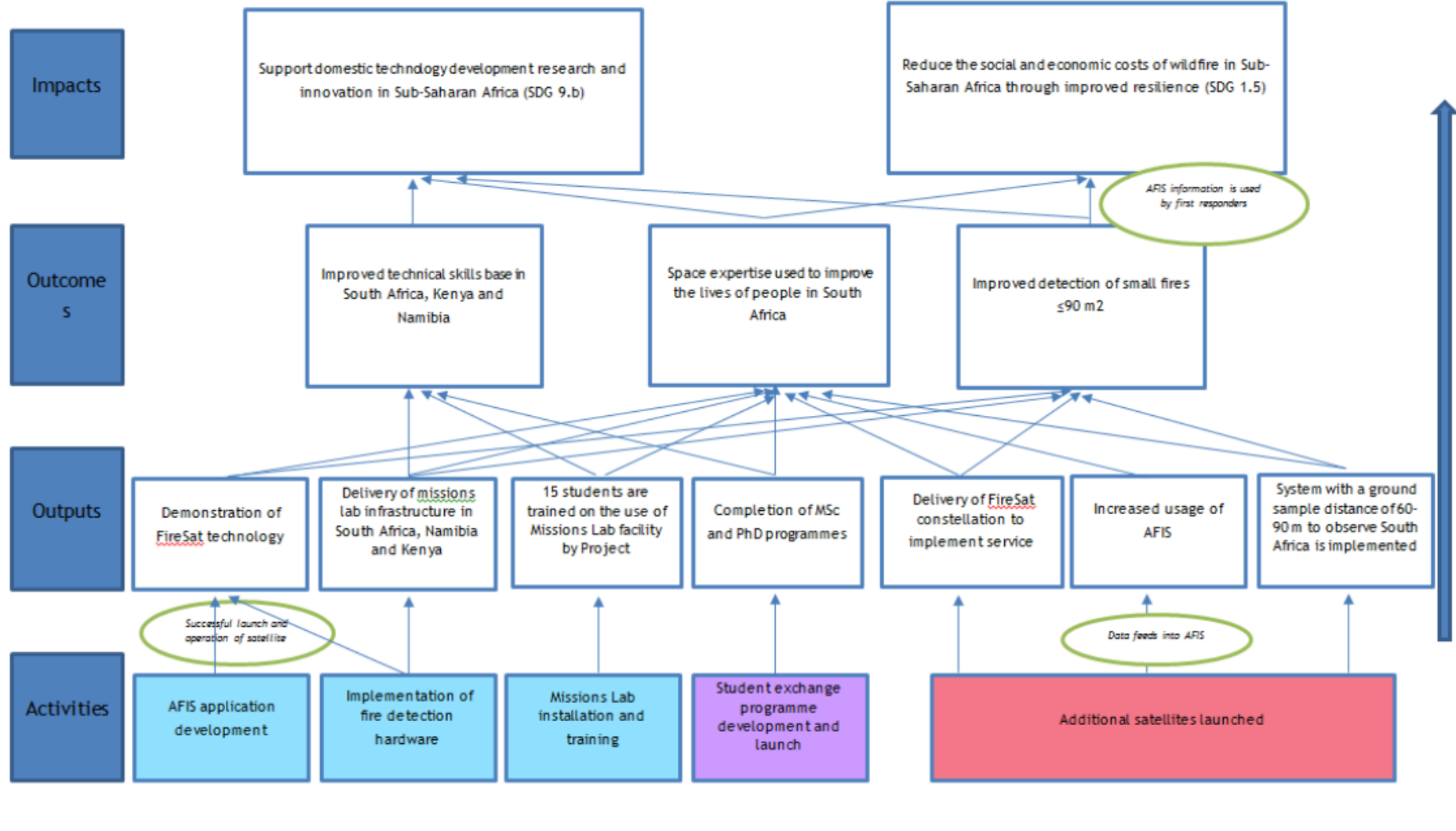


The Advanced Fire Information System





Programme impact





Thank you for
listening

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Systems Engineer

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