

GSAW: Working Group 11B

AUTOMATION IN CONTESTED AND CONGESTED SPACE

KSAT



KONGSBERG

KONGSBERG SATELLITE SERVICES

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QUICK KSAT INTRODUCTION

- Ground Station as a Service
- 50k+ passes per month across worldwide groundstation network
- Polar/Antarctic/Mid-Latitude Sites
- Tailored and Standardized Network Solutions
- Antennas ranging from 2.4m to 15m
- Frequencies: S, X, C, L, Ka, Ku & UHF*



KSAT Lite launched in 2015

- Hundreds of spacecraft are now on the network
- Designed to support constellations
- 22 sites available – more being built
- Over 3000 passes/week on KSAT-Lite
- 99.6% Documented Proficiency

Automation is a big goal for LITE

KSAT GLOBAL GROUND STATION NETWORK



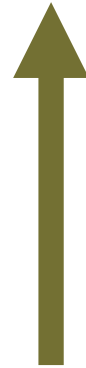
 KSAT GROUND STATION

 KSAT PARTNER STATION

DEFINING THE SCOPE OF THE AUTOMATION PROBLEM

- What is the goal of Automation for a ground station?

- Reduce Labor
- Higher Reliability / Shorter Downtimes
- Failure Prediction
 - Ground system components
 - Space vehicle
- Spectral Management



Decreasing level of complexity

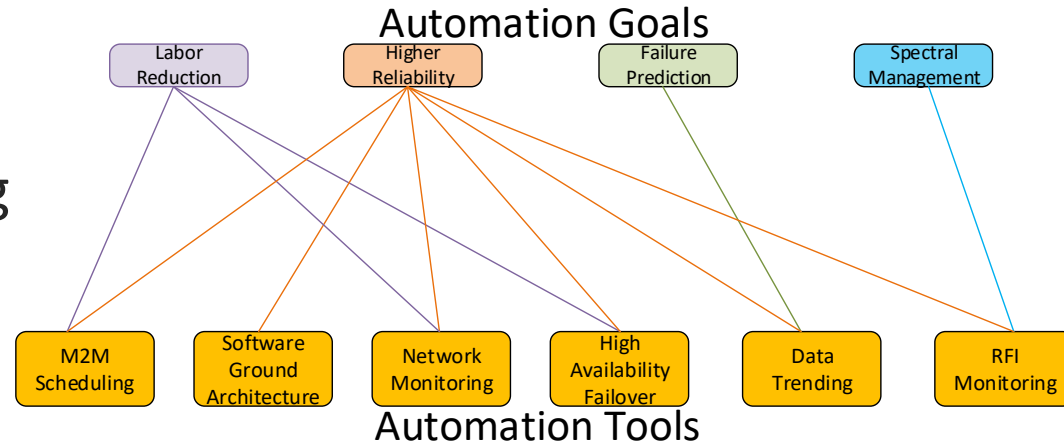
Traditionally, Automation focused on bottom levels of complexity
Goals: Focus on higher levels of complexity

TECHNIQUES & TOOLS AVAILABLE

- Software Ground Station Architecture (SDRs, etc...)
- M2M Scheduling and De-confliction
 - Need smarter APIs for scheduling
- Network Monitoring
- High-Availability Failover
- Data Trending
- RFI Monitoring and Alerting

Reliability & Labor Reduction
have lots of automation tools

Failure Prediction and Spectral
Management have less



OBSTACLES TO AUTOMATION

- Infrastructure Costs
- Space Radio/Flight Computer Designs
- Algorithms
 - M2M Scheduling limitations (CCSDS 902.1-B, etc...)
 - Data Mining and Trending: Data-Set Training
 - Schedule confliction algorithms
- Cultural
 - Site Licensing Issues
 - Confidence in algorithms “Out-smarting the link”
 - “Human Touch” for customer interactions

Thank You!



Troll



Svalbard

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