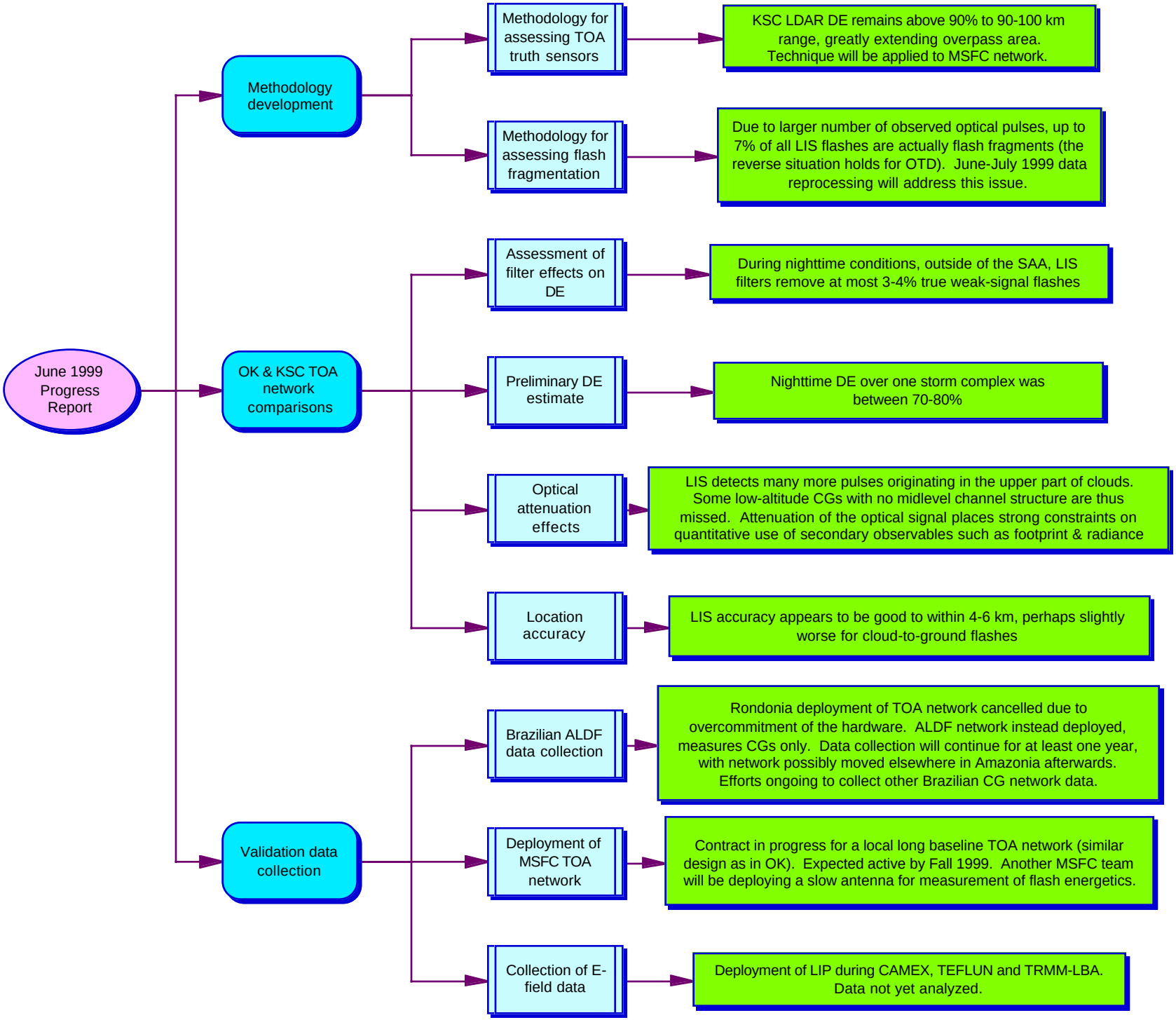
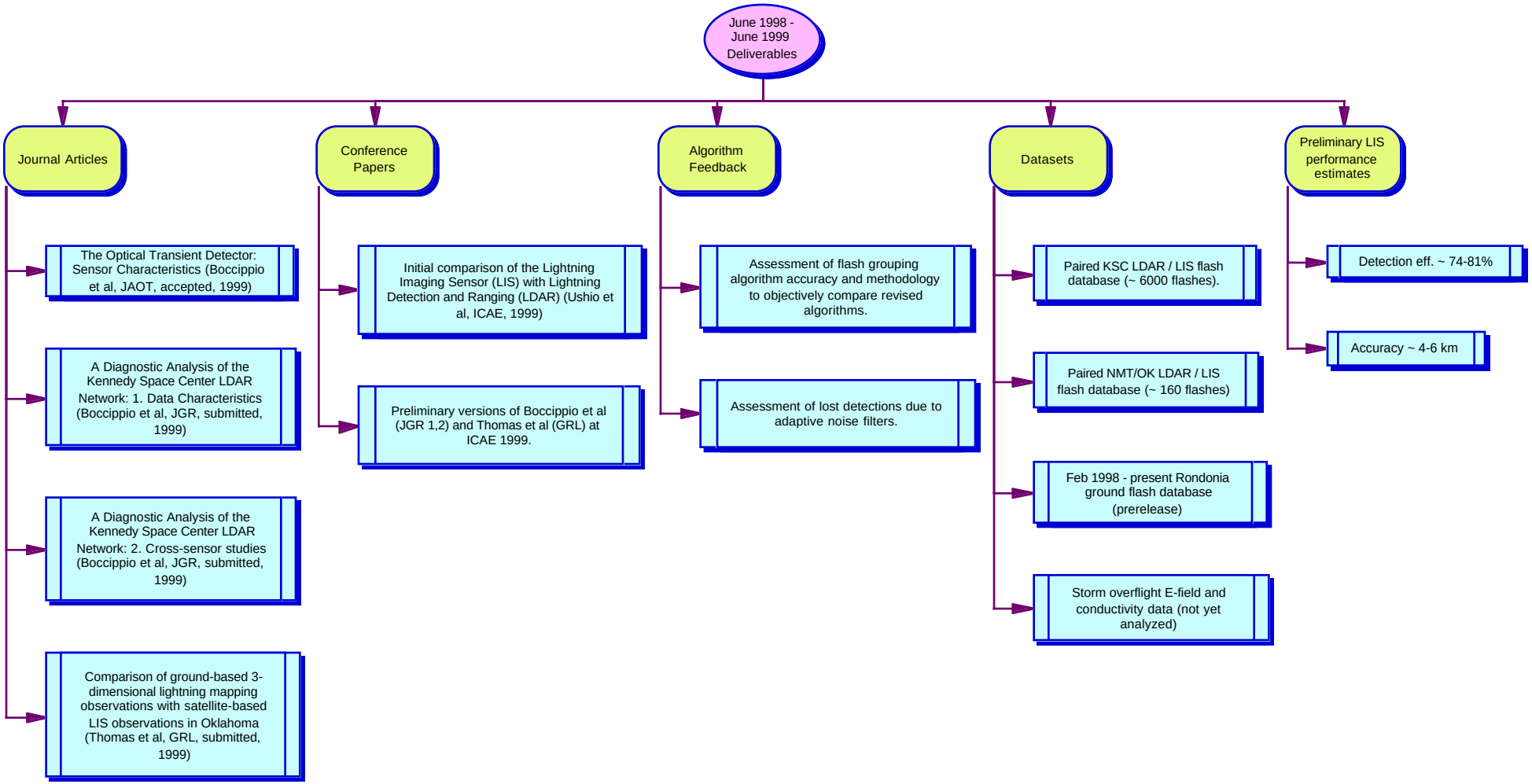

June 1999 Progress Report
Methodology development
Methodology for assessing TOA truth sensors
KSC LDAR DE remains above 90% to 90-100 km range, greatly extending overpass area. Technique will be applied to MSFC network.
Methodology for assessing flash fragmentation
Due to larger number of observed optical pulses, up to 7% of all LIS flashes are actually flash fragments (the reverse situation holds for OTD). June-July 1999 data reprocessing will address this issue.
OK & KSC TOA network comparisons
Assessment of filter effects on DE
During nighttime conditions, outside of the SAA, LIS filters remove at most 3-4% true weak-signal flashes
Preliminary DE estimate
Nighttime DE over one storm complex was between 70-80%
Optical attenuation effects
LIS detects many more pulses originating in the upper part of clouds. Some low-altitude CGs with no midlevel channel structure are thus missed. Attenuation of the optical signal places strong constraints on quantitative use of secondary observables such as footprint & radiance
Location accuracy
LIS accuracy appears to be good to within 4-6 km, perhaps slightly worse for cloud-to-ground flashes
Validation data collection
Brazilian ALDF data collection
Rondonia deployment of TOA network cancelled due to overcommitment of the hardware. ALDF network instead deployed, measures CGs only. Data collection will continue for at least one year, with network possibly moved elsewhere in Amazonia afterwards. Efforts ongoing to collect other Brazilian CG network data.
Deployment of MSFC TOA network
Contract in progress for a local long baseline TOA network (similar design as in OK). Expected active by Fall 1999. Another MSFC team will be deploying a slow antenna for measurement of flash energetics.
Collection of E-field data
Deployment of LIP during CAMEX, TEFLUN and TRMM-LBA. Data not yet analyzed.


June 1998 - June 1999 Deliverables
Journal Articles
The Optical Transient Detector: Sensor Characteristics (Boccippio et al, JAOT, accepted, 1999)
A Diagnostic Analysis of the Kennedy Space Center LDAR Network: 1. Data Characteristics (Boccippio et al, JGR, submitted, 1999)
A Diagnostic Analysis of the Kennedy Space Center LDAR Network: 2. Cross-sensor studies (Boccippio et al, JGR, submitted, 1999)
Comparison of ground-based 3-dimensional lightning mapping observations with satellite-based LIS observations in Oklahoma (Thomas et al, GRL, submitted, 1999)
Conference Papers
Initial comparison of the Lightning Imaging Sensor (LIS) with Lightning Detection and Ranging (LDAR) (Ushio et al, ICAE, 1999)
Preliminary versions of Boccippio et al (JGR 1,2) and Thomas et al (GRL) at ICAE 1999.
Algorithm Feedback
Assessment of flash grouping algorithm accuracy and methodology to objectively compare revised algorithms.
Assessment of lost detections due to adaptive noise filters.
Datasets
Paired KSC LDAR / LIS flash database (~ 6000 flashes).
Paired NMT/OK LDAR / LIS flash database (~ 160 flashes)
Feb 1998 - present Rondonia ground flash database (prerelease)
Storm overflight E-field and conductivity data (not yet analyzed)
Preliminary LIS performance estimates
Detection eff. ~ 74-81%
Accuracy ~ 4-6 km